TADANO

Operation

Telescopic Boom Crawler Crane
GTC-1200 Operation Manual—US

GTC-1200

Serial Number: 120-___

Document Number: 99600142846_B

Do not operate the GTC-1200 without first reading and understanding this manual.
Keep this manual in the operator cab for future reference.

CALIFORNIA

Proposition 65 Warning

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

WARRANTY

Tadano Mantis Corporation (herein referred to as TMC) warrants that each new product manufactured by TMC shall be free from defects in material or workmanship under normal use and maintenance for a period of twelve (12) months or 2,000 hours, whichever occurs first, from the date of initial sale, lease or rental. The distributor designated by TMC, shall repair and replace free of charge, including related labor, any such defective parts.

This warranty does not apply in the following cases, even when they occur during the warranty period:

1. Damage or defects caused by accident, misuse, negligence or natural calamity.
2. Damage or defects caused by using other than TMC recommended parts.
3. Damage or defects ascribed to repair work or modification, etc., being carried out at workshops other than those designated by TMC.
4. Damage or defects arising from the use of a product beyond the operating limitations specified by TMC.
5. Damage or defects caused by failure to operate, service or maintain products in accordance with the operation and maintenance manual or other instruction of TMC.
6. Loss of use, loss of time, inconvenience and other consequential damages such as expenses for fuel, telephone, travel, lodging, transportation, loss or damages to personal property or loss of revenues.
7. Slight defects that generally do not affect the integrity or reliability of product.
8. Corrosion or discoloration of plated surfaces caused by aging.
9. Consumable articles such as oil, fan belts, packings, gaskets, fuses, brake linings, fuel filters and other similar parts.

The present warranty is in lieu of any other warranties, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.

This manual describes how to properly use the machine indicated.

This manual also describes inspection and maintenance, and measures to be taken in an emergency. Be sure to read this manual before use.

This manual is divided into chapters entitled “Safety,” “Specifications,” “Component Location and Overview,” “Crane Preparation and Transport,” “Operation,” “Maintenance,” “Actions for Abnormal Conditions” and “Troubleshooting.”

For operation, inspection and maintenance of the item below, read the separate manuals.

- Engine

Keep this manual in the cab so that it can be consulted at any time.

If this manual is lost or damaged, immediately place an order from your nearest Tadano Mantis distributor or dealer.

When transferring this machine, also transfer this manual together with the machine.

If you have any questions regarding this machine, contact your nearest Tadano Mantis distributor or dealer.

WARRANTY

Check details of the warranty policy.

The engine in this machine is warranted as specified in the warranty policy issued by the engine manufacturer.

Do not handle this machine in any way other than described in this manual. Note that the warranty of Tadano Mantis or the engine manufacturer shall not cover any failure or accident caused by improper handling.

Do not modify this machine.

Failure or accidents caused by modification by the customer shall not be covered by the warranty.

IN EVENT OF FAILURE

If issues occur with this machine that require replacement parts or service, contact your nearest Tadano Mantis distributor or dealer and inform them of the items below.

1. Model and serial no.
2. Details of the problem and parts needed

The crane model and serial number are printed on the label on the right wall inside the operator cab.

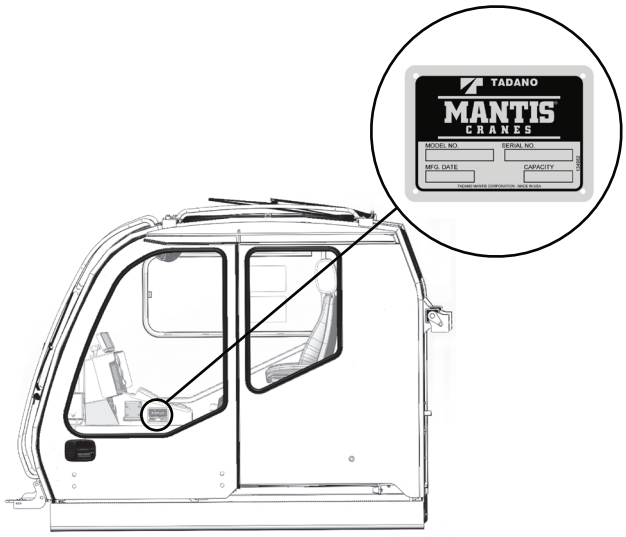

Figure 1

USING CRANE OUTSIDE OF THE U.S. (INCLUDING SATELLITE COMMUNICATION TERMINAL)

This is a U.S.-specification machine, conforming to the laws and standards of the U.S. If you use this machine outside of the U.S., you must observe the laws and standards of the country where the machine is used. Do not use this machine until it is confirmed that the machine conforms to the laws and standards of the country.

For the machines equipped with the satellite communication terminal, termination of communication contracts and removal of the satellite communication terminal are required before you ship the machine outside of the U.S.

Please contact Tadano Mantis beforehand.

FOR SAFETY

Read all the precautions for safety and understand them before operation, inspection and maintenance.

This crane as originally shipped from Tadano Mantis Corporation is equipped with the following safety devices/ operational aids:

1. AML-C Rated Capacity Indicator
2. Anti-Two Block Device
3. Emergency Machine Off Device
4. Audible Motion Alarm
5. External Visual Rated Capacity Indicator Light
6. Controls Disable “deadman” in Seat
7. Controls Disable Switch

Many accidents during operation, inspection and maintenance are caused by ignoring the basic safety rules and precautions.

Be aware that disregarding even one safety precaution can result in a serious accident involving persons and properties around the machine.

In order to prevent accidents, it is important to predict danger.

The responsible manager and operator shall recognize the potential dangers specific to the operation, and take proper measures according to the degree of danger.

Safety is described in “Safety Precautions,” “For Inspection and Maintenance” and also in each corresponding section.

It is also described on the warning labels (nameplates) on the machine.

This manual and warning labels (nameplates) use terms of “Danger,” “Warning,” “Caution” and “Notice” to call attention in order to emphasize that they are important for safety and procedures. Meanings of these terms are described in Signal Words, pg 1-2.

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CHAPTER 1: SAFETY

SAFETY INTRODUCTION

Always be alert to the safety precautions within this manual. Safety precautions are crucial to the operator and service personnel. Safety precautions describe the actions necessary to prevent accidents when using the crane. All operators and service personnel must comply with the safety precautions in the manual.

In actual operation, risks associated with the crane vary greatly depending on the conditions such as operation method, environment at the job site and weather. Therefore, observe the safety precautions described in the manual and on the safety labels on the crane. Also pay attention to anticipate potential risks regarding operation to prevent accidents and damage to the crane.

Your most important duty is to secure safety for yourself, co-workers and people around the crane.

BASIC SAFETY RULES

The operator should:

- Have sufficient experience in working with cranes and be trained and qualified as a crane operator.
- Be in good health, emotionally stable and not subject to physical disability.
- Not be using any medicine or drug that impairs physical, visual or mental response.
- Ensure that all personnel who are going to enter the working area wear a hard hat, safety shoes or gloves, in accordance with local regulations or in-house rules.
- Be in good physical condition to be prepared for the job.
- Master the techniques for safe control of the machine and be completely familiar with the operation and maintenance instructions given in this manual.
- Keep the cab, the walkways and any other access areas free of mud, oil, grease or water. (Also keep the control console clear of any objects that may obstruct free operation of the controls.)
- Do not climb on the boom or jib; it is very easy to fall and be injured. (When working at an elevated position, use a platform to prevent an accident.)
- When on the crane for inspection or other purposes, beware of the overhead clearance and watch footing; take care not to slip and walk on the anti-slip strips provided; worn anti-slip strips should be replaced.
- Never get on or off a moving machine.

SAFETY DEVICES

The rated capacity indicator (RCI) functions properly only when used exactly as instructed in the manual supplied with the machine. Failure to follow the instructions given there could cause the machine to overturn or be damaged, leading to a serious accident.

Make sure that the safety devices (RCI, A2B hoist limit switch, winch third wrap shutdown, etc.) and the alarm devices are always in good working order. Should any device malfunction, do not use the machine until it is repaired. Avoid any act that can impair normal operation of the vehicle.

A safety device is not a substitute for human skill and judgment. Safety devices are provided only as an aid to the operator; they themselves cannot control the machine. For example, the RCI does not provide a warning when the crane is on soft, loose ground or when the number of parts-of-line is insufficient. It cannot predict the effect of wind, improperly adjusted devices, side loads on the boom, or any other potentially hazardous condition on the crane. Many safety devices can assist the operator in achieving safe results, but the operator should not depend solely on them to prevent accidents. Operating safety requires all the qualities of a good operator, including skill, experience, judgment and safety awareness.

SIGNAL WORDS

The signal words DANGER, WARNING, CAUTION and NOTICE are used throughout this manual to highlight important information. Be certain that the meanings of these alerts are known to all who operate and service the crane.

This safety alert symbol appears with most safety statements. It means attention, become alert, your safety is involved! Please read and abide by the message that follows the safety alert symbol.

⚠ DANGER

Indicates a hazardous situation that, if not avoided, *will* result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation that, if not avoided, *could* result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation that, if not avoided, *could* result in minor or moderate injury.

NOTICE

Indicates a situation that can cause damage to the machine, personal property and/or the environment, or cause the machine to operate improperly.

NOTE: Indicates a procedure, practice or condition that should be followed in order for the machine to function in the manner intended.

GENERAL SAFETY PRECAUTIONS

PRECAUTIONS BEFORE STARTING THE ENGINE

⚠ WARNING

The safety precautions that follow have WARNING level hazards.

READ THIS MANUAL

Always make sure all operators read this manual carefully to fully understand how to operate, inspect and maintain the crane. Do not start work until you understand this manual. Incorrect crane operation, inspection and maintenance can damage the crane and cause injury or death. Keep this manual in the cab so that you can refer to it at any time.

FOLLOW SAFETY PRECAUTIONS AND SAFETY LABELS

Always read and understand the safety precautions within this manual and the safety labels on the crane. The safety precautions and safety labels alert you of potential hazards when operating the crane.

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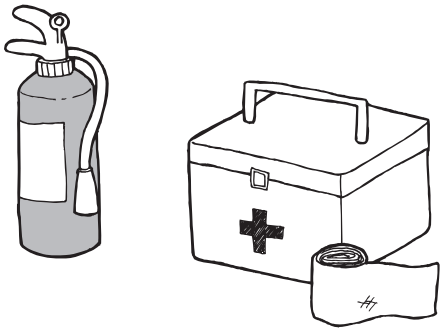
CARE OF SAFETY LABELS

Always keep safety labels clean and readable. The safety labels attached to the crane give important precautions necessary when you operate the crane. If any safety label is lost or illegible, order a replacement label from your Tadano Mantis distributor or dealer and attach it to the machine.

PREPARE FOR EMERGENCY

Always make sure you know where the first-aid kit and fire extinguishers are kept and how to use them against possible accidents or fires. Prepare a list of emergency contacts and communication methods beforehand.



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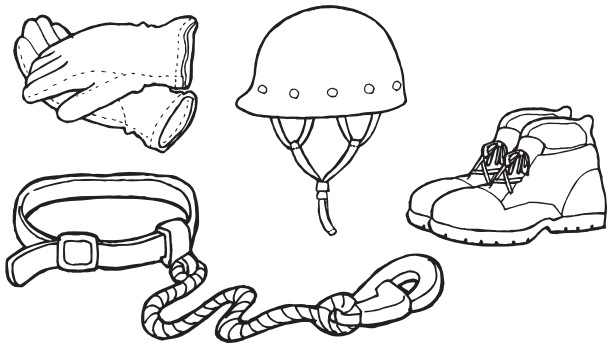
WEAR PROPER CLOTHING

Always wear appropriate and well-fitting clothing. Loose clothing or clothing with holes may catch on control levers or protrusions or not provide adequate protections. Wear shoes with non-slip soles.

WEAR PROTECTIVE EQUIPMENT

Always wear OSHA-approved protective equipment such as a hard hat, safety shoes, hearing protection and protective gloves to ensure safety while you work. Wear a safety belt while you work at a height of 6.5 ft (2 m) or higher.



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NEVER OPERATE CRANE WHEN YOU ARE TIRED OR UNDER THE INFLUENCE OF ALCOHOL OR DRUGS

Never operate the machine when you are tired or when you are under the influence of intoxicants and/or narcotics. If you are short of sleep or under the influence of drugs or alcohol, your judgment and attention are compromised, making you a hazard to both yourself and other people.

KEEP FLOORS AND SHOE SOLES CLEAN

Always completely wipe off oil and mud from shoe soles and floors before operation. Always keep shoe soles and floors clean. Always wear slip-proof shoes. Oil and mud on shoe soles, pedals, steps or walking surfaces make your feet slip. This can cause a falling accident or an operation error.

Never place parts or tools on the floor of the operator's cab or in the walkways. Loose items will obstruct safe operation.

GET ON AND OFF MACHINE SAFELY

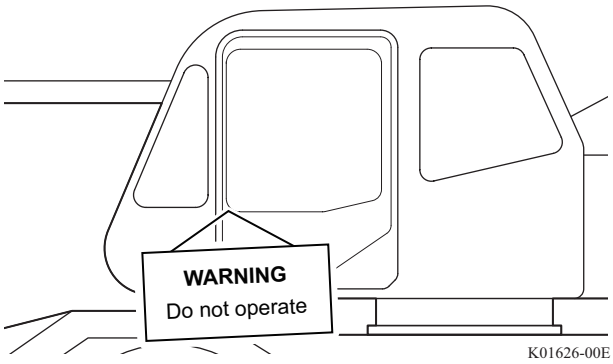
Always wait until the machine has stopped completely before you get on or off the machine. Always get on and off the machine with your front body facing the machine. Always hold your body at 3 or more points by using the handrails and steps. Never jump on or off the machine. Never get on or off the machine while carrying something in your hand. Never use the crane controls to support your body.

MAINTAIN GOOD VISIBILITY

Always keep the window glass and lights clean to ensure good visibility. Poor visibility hinders safe operation.

NEVER OPERATE MACHINE DURING INSPECTION OR MAINTENANCE

Never operate the machine during inspection or maintenance. When a warning tag is hung on a door or control lever, never operate the machine until the warning tag is removed by the maintenance technician. Operation during inspection or maintenance can cause accidents or damage to the machine.



HOLD PLANNING MEETING BEFORE WORK

Always make detailed arrangements before the start of the work with the supervisor, rigging workers and signal people about the following points listed. Make sure that all decisions are obeyed. An accident can occur if pre-work planning meetings are not held or are inadequate.

The following are some of the factors for consideration during the planning meeting:

- Plan the work based on the rated lifting capacity table, the mass of the load to be lifted, the lifting height, the place for loading and unloading, the place for crane setup, work procedures, rigging method, etc.
- Check of ground conditions where the crane is set up, and presence of buried objects such as water or gas pipes
- Methods of preventing overturning, such as extension of the tracks and use of steel plates on the ground
- Selection of rigging workers and signal people, and agreement about the signaling method
- Setting of off-limits zone, fencing and installing ropes
- Check of the work positions for workers
- Always have clear communication established between the crane operator and any ground personnel.
  - ◊ If using hand signals, both the crane operator and any ground personnel must decide on the hand signals that they will be using during the job before the work begins.
  - ◊ If hand signals are not used, proper radio communication must be set up and tested before the job begins.
- Check of emergency communication methods, contact addresses and safety and health organizations in charge

CHECK SAFETY AROUND MACHINE BEFORE STARTING ENGINE

Before starting the engine always sound the horn to alert anyone around the machine. Make sure there are no people or obstacles under or around the machine before you start the engine. If you start the engine without checking safety surrounding the machine, machine damage, injury or death may occur.

KEEP ENGINE SURROUNDINGS CLEAN

Always remove dead leaves, trash, oil and other flammable objects near the engine before operation. Flammable objects can cause a fire.

BE CAREFUL WHEN REFUELING

Always pay attention when handling fuel, oil and grease. These are highly flammable and can be dangerous.

Always observe the following precautions when you refuel the machine.

- Stop the engine.
- Refuel the machine in a well-ventilated, open place.
- Keep open fire such as a lit cigarette away.

WHEN YOU LEAVE MACHINE

Always make sure unauthorized people cannot operate the machine if you leave it with the engine running or the starter switch key inserted. Use the following precautions:

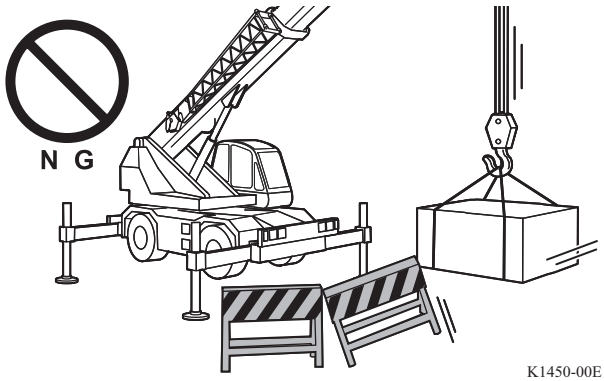
- Always press the controls enable switch to the OFF position before leaving the cab.
- Park the vehicle on a level surface.
- Apply all the brakes and locks, and set the levers to neutral position.
- Stop the engine, and remove the key from the starter switch.
- Lock all the doors, windows and covers.

PRECAUTIONS DURING OPERATION

CHECK WORK SITE CONDITIONS

Always pay close attention to the surrounding conditions when operating the crane. Watch for any changes in the surroundings during work. Unexpected accidents can occur.

Before you start work, check the location in which the crane operates, the passageways, presence of obstacles, how other machines are set up, etc.



PROHIBIT UNAUTHORIZED ACCESS TO WORK SITE

Always make sure there are no unauthorized people or obstacles in the work site area before you start work. Designate the work site as an off-limits zone. Take measures to prevent unauthorized people from gaining access, such as putting up fencing and assigning a guide person to prevent accidents while working in a site with heavy traffic. If unauthorized people or vehicles enter the work site, accidents such as collisions, injuries or deaths can occur.

ASSIGN SIGNAL PERSON

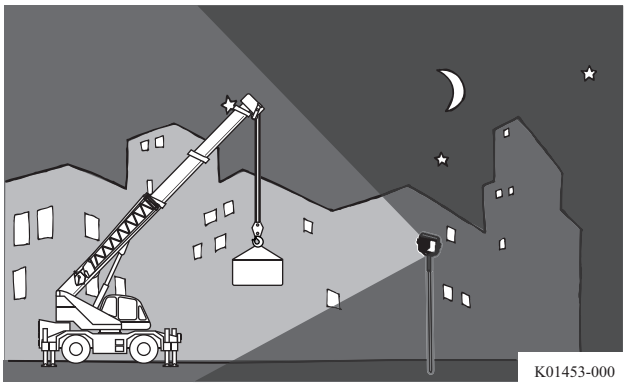
Always assign a signal person and make sure that the instructions from the signal person are obeyed. It is particularly important in the following cases:

- When working near electricity lines
- When the operator cannot see the lifted load
- When moving the machine into a narrow passage or in a direction where the view is unclear
- While working jointly with two or more machines

Always use portable radio equipment when possible for communications between the signal person and operator.

USE SUFFICIENT ILLUMINATION AT NIGHT

Always use work lights when working at night so that you can clearly see the movements of the machine and lifted load. Install additional lights to illuminate the areas surrounding the machine. In a dark, unlit area, people and obstacles around the crane cannot be easily seen, which increases the risk of accidents.



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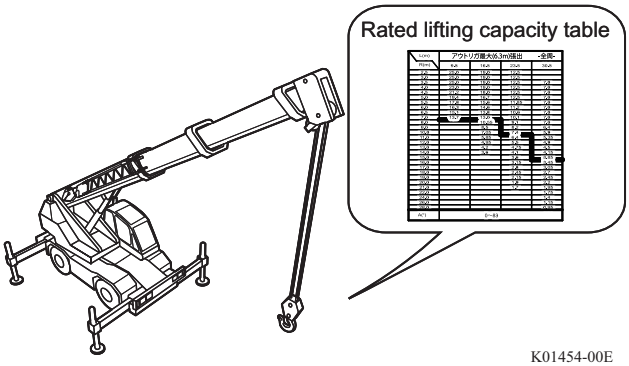
OBSERVE CONDITIONS FOR WORK

Always strictly observe the conditions for the work specified in the rated lifting capacity table. If the track position, boom length, load radius, etc. are outside of the specifications in the rated lifting capacity table, the machine can overturn even if a load is not lifted.



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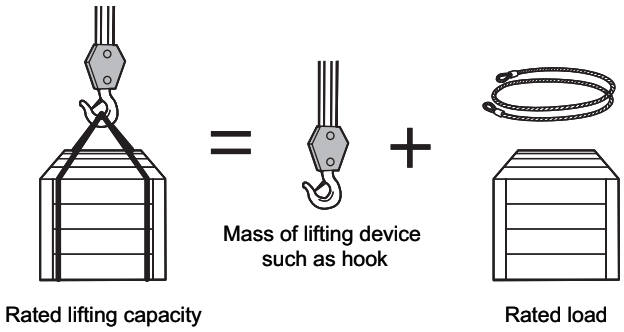
NEVER OPERATE CRANE WITH LOAD EXCEEDING RATED LIFTING CAPACITY

Always check the rated lifting capacity before lifting a load. The rated lifting capacity differs depending on boom length, load radius and other factors. Never lift a load exceeding the values specified in the rated lifting capacity chart. If a load with a mass that exceeds the rated lifting capacity is lifted, the machine is overloaded and damage to the machine or an overturning accident can occur.



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USE SAFETY DEVICES CORRECTLY

Always correctly use the safety devices such as the load moment indicator according to the instructions described in this manual. If safety devices are used incorrectly or their functions are obstructed, damage to the machine or an overturning accident can occur.

PROTECT AGAINST NOISE

Always protect yourself from noise-induced hearing loss by closing the doors and windows of the operator's cab during operation. If you work outside the cab, wear hearing protection such as earplugs as necessary.

CONDUCT INSPECTION AFTER STARTING ENGINE

Always check the devices and instrument readings after starting the engine. Make sure that no obstacles or people are around the machine. Then, under a no-load condition, check the operation of the control systems, lifting systems and safety systems. Carry out inspections in a sufficiently large space without people and obstacles around the machine. Neglecting the inspections after engine start-up will delay detection of machine abnormalities. This can cause damage to the machine and injury or death.

CHECK BEFORE LIFTING LOAD

Always check the following points before lifting a load:

- The mass of the lifting load does not exceed the rated lifting capacity.
- The number of parts of line for the wire rope is set according to the standard number of parts of line specified in the rated lifting capacity chart.
- Proper lifting devices are used and the load is rigged securely.
- The hook block is directly over the center of gravity of the load.
- The load lines are vertical so that the load is lifted vertically.
- The safety latch of the hook block functions properly.
- The wire ropes are free of intertwining or disorderly winding.

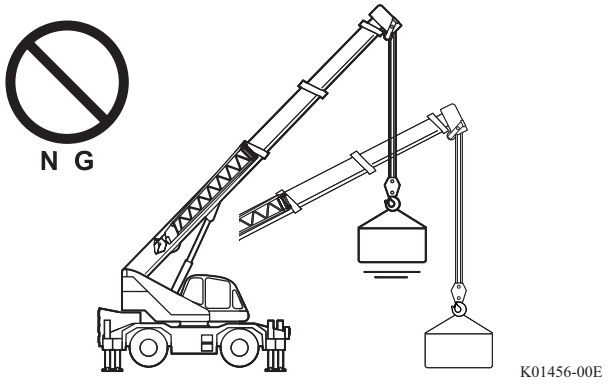
SECURELY RIG LOAD

Always use the correct rigging method. If the rigging method is incorrect, the lifted load can fall and cause an accident. Observe the following precautions to ensure secure rigging.

- Understand the mass and center of gravity of the load, and use the lifting devices best suited for the mass and shape of the load.
- The lifting devices such as wire ropes and chains must have sufficient strength and be in good condition with no damage or wear.
- Rig a load directly over its center of gravity so that the lifted load does not overturn or slip out of the lifting devices when lifted off the ground. Also, rig a load properly so that the lifting devices never cross over each other or intertwine.
- Never rig a load with a single rope. The lifted load can turn and create a hazard, and the turn of the load untwists the rope and reduces its strength.
- If a load has sharp corners, apply pads to the corners to protect the rigging wire ropes and loads from damage.

CAREFULLY LIFT LOAD OFF GROUND

Always be sure to raise the load just clear of the ground carefully first by winch operation. Never lift a load just clear of the ground by raising or extending the boom. Such operations can damage the machine and cause an overturning accident. When you lift a load just clear of the ground, stop winch for a moment with the rigging ropes tensioned. Check to make sure that the load is hung above its center of gravity and that the load does not stick to the ground or touch other loads or structures. Lift load vertically and stop when the load is raised by several inches above the ground to stop the sway of the load. Check to make sure that the state of rigging is satisfactory, the load is securely held at the position, and the machine is not overloaded. Then, continue lifting.



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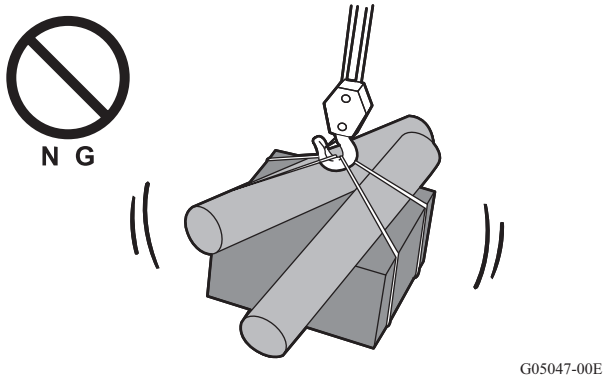
LIFT SINGLE LOAD ONLY

Always lift only a single load. Never lift two or more loads at once. Even if the total load mass is within the rated lifting capacity, the loads can lose balance and create a hazard. Also, the operator cannot fully concentrate on multiple loads.



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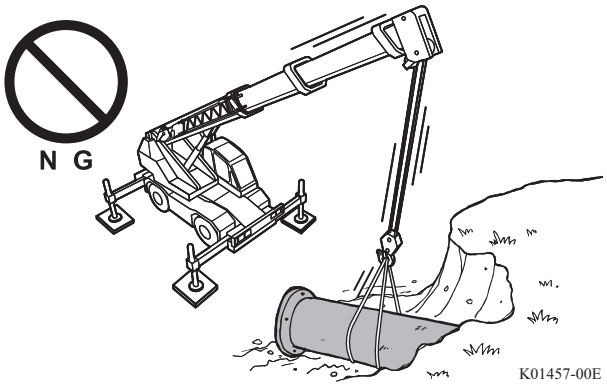
NEVER LIFT BURIED LOAD

Never lift objects driven into the ground such as poles or piles, trees, and objects buried in mud or sand. If you pull up buried objects, an unexpected load can be applied to the machine. This can damage the machine and/or cause an overturning accident.

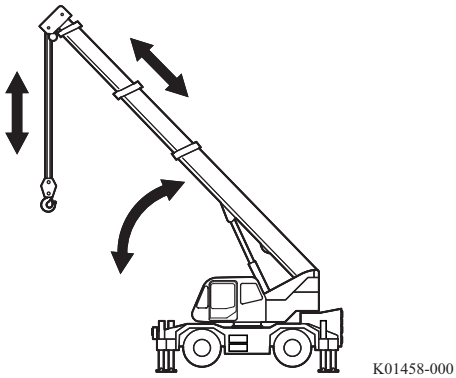


AVOID OVERLOADING (EXCEEDED CAPACITY)

Always operate the machine with extreme care if a load is close to the rated lifting capacity. An overloading can occur when the load sways. If an overload occurs, lower the load to the ground by winch down operation. When extending or lowering the boom, be careful of overloading due to the increase in the load radius.

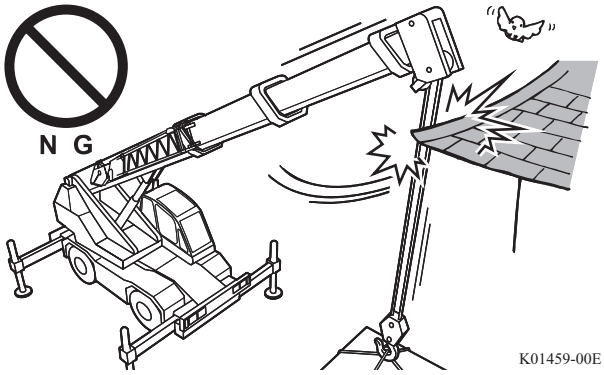
BE CAREFUL OF SIMULTANEOUS OPERATION OF CRANE FUNCTIONS

Never carry out a simultaneous operation of crane functions until you are familiar enough with its operation (see the following image). Before you are sufficiently accustomed to the machine, an operation warning can occur during simultaneous operation. During simultaneous operation, machine movement tends to be slower than those of independent operations. Conversely, when the simultaneous operation is switched to independent operation, movement can become faster. When you carry out simultaneous operation, always avoid a sudden change in speed.



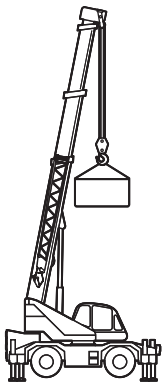
BE CAREFUL TO AVOID COLLISIONS WITH STRUCTURES NEARBY

When moving a lifted load, always be careful not to allow the machine or the load to collide with a building or other structure. In a site with many such obstacles, post a signal person and follow the instructions from the signal person to prevent a collision.



CAREFULLY OPERATE WHILE BOOM IS RAISED HIGH

Always operate carefully when the boom is raised close to its upper limit angle to prevent the load from colliding with the boom or jib (see the following image). When the boom is raised close to its upper limit angle, the horizontal clearance between a lifted load and the boom is small. If the lifted load sways in this condition, the load can collide with the boom or jib. This can damage the boom or jib or the load itself.



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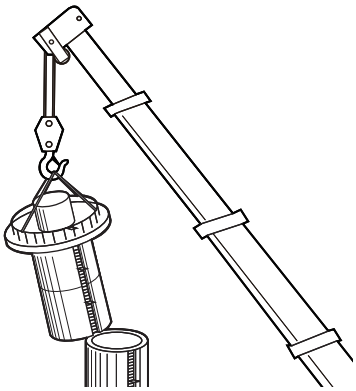
CARRY OUT DEMOLITION WORK CAREFULLY

Always check the mass and center of gravity of the load before operation, and decide the lifting method accordingly. Never lift a structure during demolition work if its mass and center of gravity are not known.



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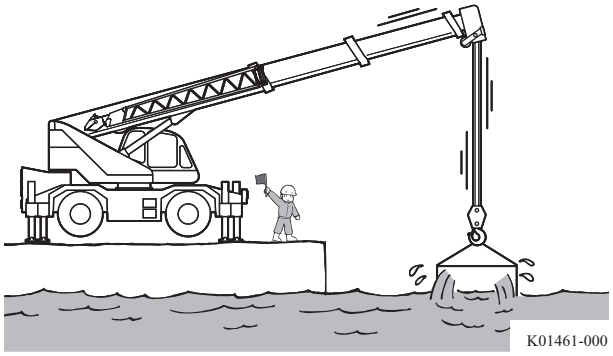
LIFT SUBMERGED LOAD CAREFULLY

Always be extremely careful not to allow overloading to occur when you lift a load submerged under water (see the following image). The load contains water and can be several times heavier than the expected mass. Never lift a load from water in one quick operation. Drain water while slowly lifting the load. Even if water is completely drained, a load raised out of water is much heavier than when it is buoyant.



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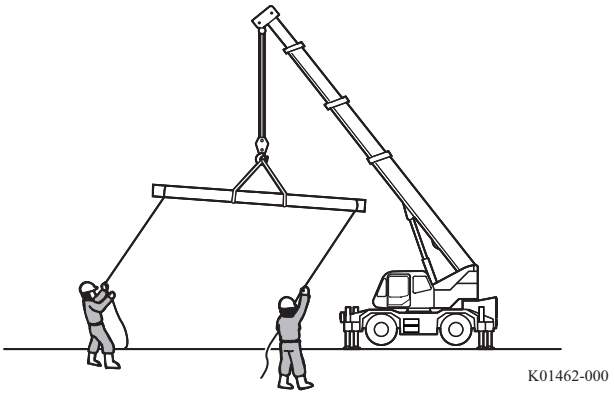
PAY ATTENTION TO A LONG LOAD

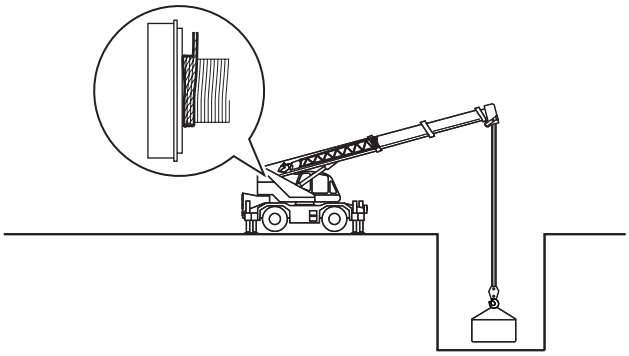
Always be careful when lifting a long load. The load can turn and collide with rigging workers, the crane itself and structures around the machine. Attach guide ropes to one end or both ends of the load and keep the position of the load, and prevent the load from turning or swaying.



K01462-000

PAY ATTENTION TO THE TURNS OF WIRE ROPES ON WINCH DRUM

Never allow a wire rope to be completely reeled out from the winch drum. If a wire rope is completely reeled out from the winch drum, the load is directly applied to the rope end due to loss of friction. This can damage or break the wire rope. Make sure that three or more extra turns always remain on the winch drum. Be especially careful when the load is lowered below ground level.



K01463-000

NEVER SUSPEND LOADS FOR LONG TIME

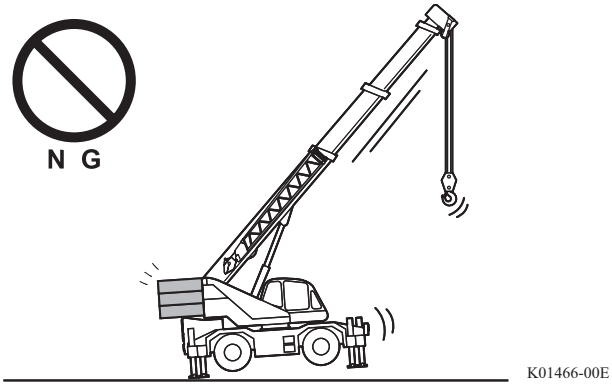
Always arrange the work procedure to minimize the load-lifting time. Avoid keeping a load lifted for a long period of time.

USE CRANE ONLY FOR ITS SPECIFIED PURPOSES

Always use the crane for its specified application of lifting objects. Never use the crane for other applications, such as pushing an object with the boom.

NEVER ADD COUNTERWEIGHT

Never install counterweights other than the ones specified, or objects substituting as counterweights, onto the machine (see the following image). Addition of counterweights other than the specified ones can damage the machine. This also can affect the backward stability and cause the machine to overturn to the rear.



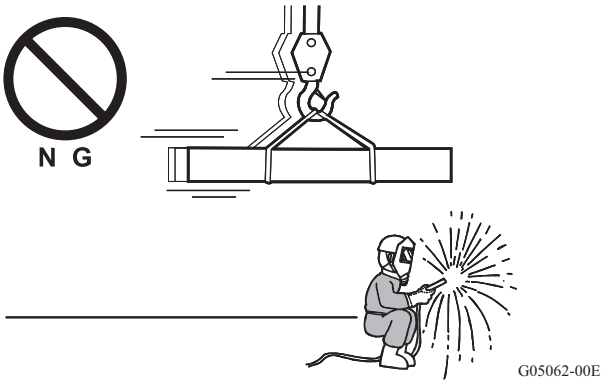
K01466-00E

NEVER BECOME DISTRACTED

Never look away from the signal person and lifted load. Always be sure to concentrate on the crane operation. Inattentive operation is very dangerous.

NEVER PASS A LOAD OVER A PERSON

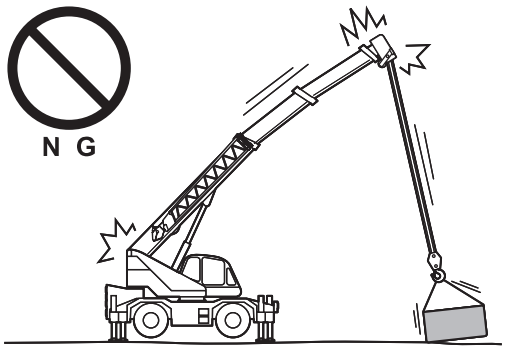
Always avoid dangerous operations such as passing a hook block or a lifted load over a person. Never allow anyone to enter the area under the boom or lifted load.



G05062-00E

AVOID SIDEWAYS PULLING, DIAGONAL LIFTING, AND PULLING IN OF LOAD

Never forcibly pull in a load that lies out of the load radius. Move the machine close to the load, and lift it vertically (see the following image). It is very dangerous to pull a load sideways, to lift it diagonally or to pull in a load. Such operations damage the boom, jib, and swing mechanism, and they may also overturn the machine.



K01468-00E

BEFORE LEAVING CAB

Always take the following measures before leaving the operator's cab:

- Lower the load onto the ground.
- Fully retract the boom and stow it.
- Apply the house locks.
- Return the control levers to the neutral position.
- Press the controls enable switch to the OFF position.
- Stop the engine, and remove the key from the starter switch.
- Lock all the doors and covers.

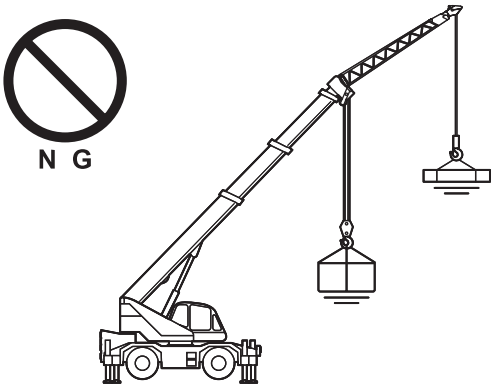
NEVER LET PERSONNEL OTHER THAN OPERATOR GET ON MACHINE

Never allow anyone other than the operator to get on the machine during operation. If anyone other than the operator rides on the machine, the person can be caught by or fall from the machine. Presence of other people also hinders crane operation.

PRECAUTIONS WHEN JIB IS MOUNTED

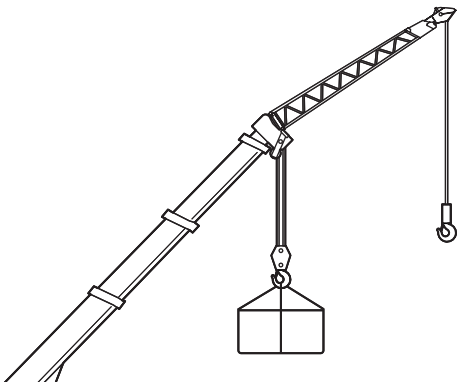
Always pay attention to the following points during a boom lift operation with the jib mounted.

- Never lift individual loads using the boom and jib at the same time. The boom and jib can be damaged, and the machine can overturn.



K01471-00E

- Observe the value of the rated lifting capacity chart according to the actual boom and jib conditions.
- During a boom lift operation with the jib mounted, the crane stops just before the moment load ratio reaches 100%.



K01472-01E

STOP OPERATION WHEN VISIBILITY BECOMES POOR

Always stop operation and stow the machine when visibility becomes poor due to bad weather such as rain, snow or fog. Wait to operate until good visibility returns.

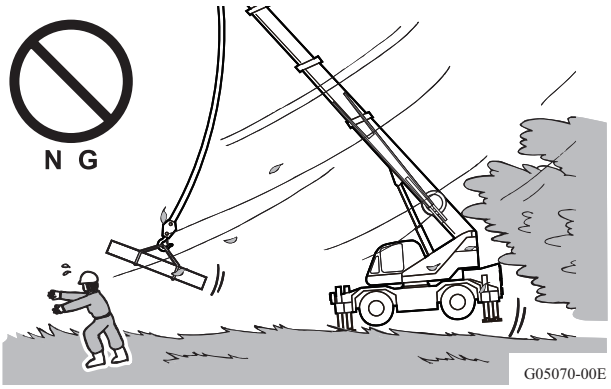
STOP OPERATION DURING STRONG WIND CONDITIONS

Always pay attention to wind speed. A strong wind sways the lifted load. This is dangerous to workers and surrounding structures, and it can damage the boom and overturn the machine.

- Note that the longer the boom and the bigger the size of the load, the more the wind affects the machine operation.
- Stop crane operation if you cannot control the load because of strong wind.
- Reduce the load considering the wind speed, if the wind speed exceeds 20 mph (9 m/s). When strong winds with maximum instantaneous wind speed of 31 mph (14 m/s) or more blow, stop operation and stow the boom.
- Pay special attention when the boom is long or the lifted load has a large area. Stop operation as the situation requires even if the wind speed is slower than 20 mph (9 m/s).

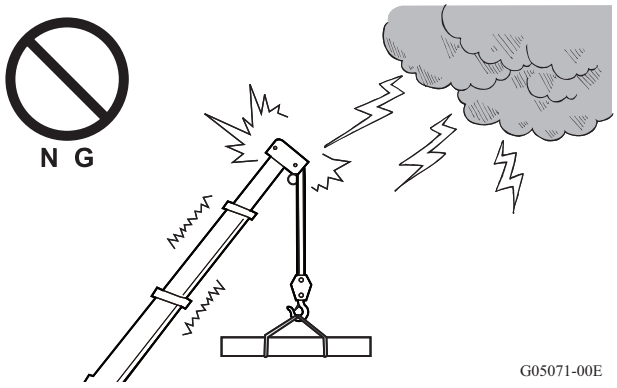
The following table shows an approximate indication of wind speeds. The wind speeds shown are at a height of 30 ft (10 m) from an open, flat ground.

WIND SPEED	INFLUENCE ON LAND
12 to 18 mph (5 to 8 m/s)	Dust and loose papers rise. Small tree branches begin to move.
18 to 24 mph (8 to 11 m/s)	Low trees with leaves start to sway. Water surfaces in ponds or marshes start to make waves.
24 to 31 mph (11 to 14 m/s)	Large branches move. Whistling is heard in overhead wires. Umbrella use becomes difficult.
31 to 38 mph (14 to 17 m/s)	Whole trees sway. Effort is needed to walk against the wind.

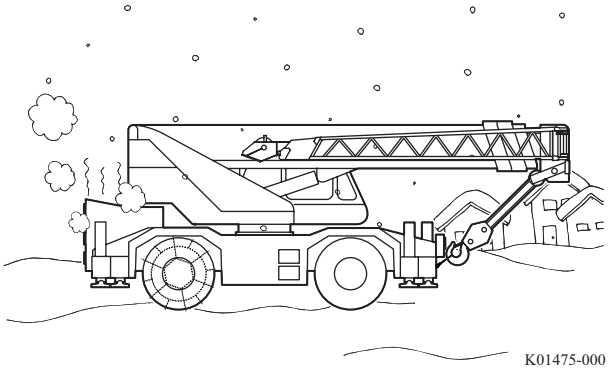


STOP OPERATION WHEN THERE IS RISK OF LIGHTNING STRIKE

Always stop operation, stow the boom and leave the machine when there is a risk of a lightning strike. If the machine is struck by lightning, the machine can be damaged and the operator and workers around it can be injured. If the machine is struck by lightning, stay in the cab to avoid another lightning strike.



COLD WEATHER PRECAUTIONS



Always pay attention to the following points when operating the crane during cold weather:

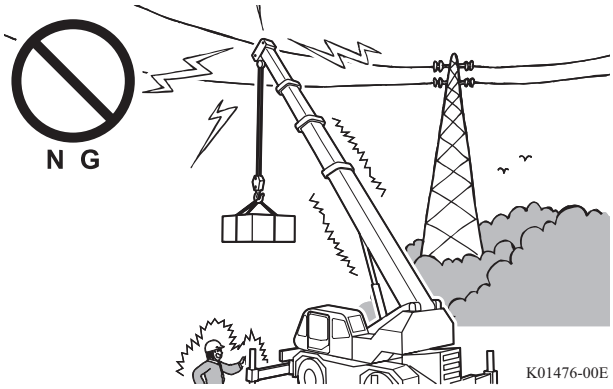
- Remove any snow and ice on the machine. Particularly, remove snow and ice on the boom completely. They can fall during operation.
- Never touch the metal surfaces of the machine in extreme cold. Skin can stick to the frozen metal surface.
- Warm up the machine sufficiently. After warm-up, make sure the machine operates normally. Properly unfreeze and dry the components as needed.
- When beginning operation, operate the machine slowly until the oil warms up and grease lubrication becomes effective.
- Make sure that the load is not frozen and stuck to the ground. It is dangerous to lift a load when it is stuck to the ground.
- At the end of an operation, clean the mud around the tracks to prevent accidents caused by freezing.
- Pay extra care to battery maintenance. Use oils, greases and fuels suitable for cold climates.

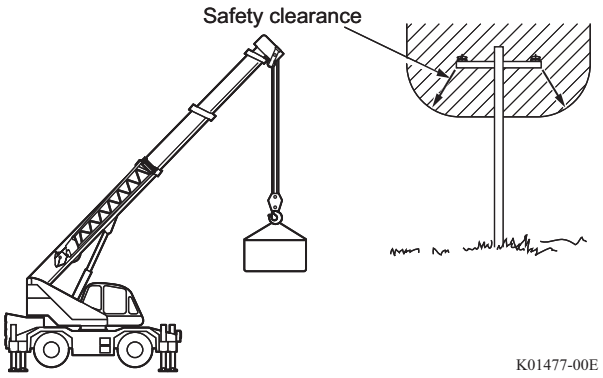
AVOID ELECTRIC SHOCK

Grounding the Crane

Grounding the crane has little or no effect in preventing electric shock accidents. Its effectiveness varies depending on the length and thickness of the lead, condition of the ground and intensity of the electric current and voltage. In addition, a grounded crane may produce an intense arc if it touches a power line.

Always avoid electric shock. You can be shocked simply by approaching electric lines, depending on the voltage. If operation near power cables or main lines is unavoidable, take the following preventive measures.





Should the crane or load touch a power line, act as follows:

- Keep calm and do not leave the cab. A mistake may directly result in loss of life. Warn all personnel not to touch the machine or load, and to keep clear of them.
- If the crane is still operative, remove the crane from the danger zone by driving away or by slewing or adjusting the boom.
- Request anyone outside of the danger zone to shut off the power supply.
- Break contact by moving in the direction opposite to that which caused the contact. Remember that an arc, once it has occurred, will extend over a distance much greater than expected before it breaks. Continue moving the crane, without stopping, until the arc breaks, and at least the minimum required distance is gained away from the power lines.
- If the crane is not on fire and no arc is passing through the cab but the machine cannot be detached from the power lines, wait in the operator's seat until the power is cut off.
- If you must get out of the crane, jump directly from the cab as far as possible after making sure that the place to land on is safe. Never touch the crane and the ground at the same time. Touching other parts of the crane when you descend will cause electric shock.
- After moving away from the power lines, carefully check the crane for possible damage. Before restarting operation, contact an authorized Tadano Mantis distributor or dealer to discuss the measures, and inspection and repairs required.

NORMAL VOLTAGE, KV (PHASE TO PHASE)	MINIMUM REQUIRED CLEARANCE, FT (M)
Operation near high-voltage power lines	
To 50	10 (3.05)
Over 50 – 200	15 (4.60)
Over 200 – 350	20 (6.10)
Over 350 – 500	25 (7.62)
Over 500 – 750	35 (10.67)
Over 750 – 1,000	45 (13.72)
Operation in transit with no load and boom or mast lowered	
To 0.75	4 (1.22)
Over 0.75 – 50	6 (1.83)
Over 50 – 345	10 (3.05)
Over 345 – 750	16 (4.87)
Over 750 – 1,000	20 (6.10)

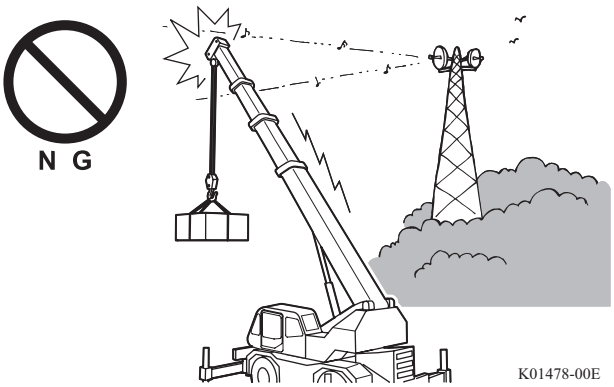
- Have a detailed consultation with the power company in advance, and take all necessary measures to ensure safety.
- Make sure that workers such as riggers wear rubber or leather shoes.
- Always keep the specified or larger clearance between a power line and a lifted load or a machine during operation.
- Assign a dedicated signal person to prevent a machine and a lifted load from approaching an electric line as well as unauthorized persons from entering the work area.
- Never allow workers on the ground to touch the machine or a lifted load. If it is necessary to control a lifted load, attach a dry fiber rope to a load as a guide rope to prevent a load from turning and swaying.
- Never place loads below electric lines or near power sources.
- Operate the crane slowly and cautiously, with extreme care.

If you get an electric shock, do not panic. Take the following measures:

- The operator should keep calm and slowly move the machine and a lifted load away from the power line as far as the specified clearance or more, and then escape from the cab.
- If the machine is damaged and cannot be operated, it is safest for the operator to stay in the operator's seat until the power line is de-energized. If this is not possible, jump off as far as possible from the crane body. It is dangerous to climb down the crane body. It may result in getting electric shock.
- Keep all workers away from the site to prevent secondary accidents. Keep people away from the electrified crane and lifted load.
- Contact the power company to have the power transmission stopped and to receive emergency instructions.
- Afterwards, inform a Tadano Mantis distributor or dealer of the accident, and seek advice on follow-up measures, inspection and repair.

PAY ATTENTION TO HIGH-POWER RADIO WAVES

Always contact the broadcasting company and seek safety advice before operating near high-power radio wave generating sources such as television and radio transmission towers. When operating the crane, take preventive measures such as wearing rubber gloves to avoid electric shocks and burns. Induction current is generated in the structural part of the machine near high-power radio wave generating sources. Induction current may cause electric shock by electrification or burns from heated-up machine parts, such as the hook block. Electronic equipment can also be destroyed.

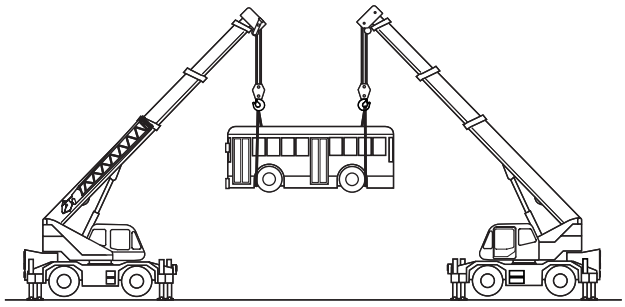


EXERCISE CAUTION FOR MULTI-CRANE OPERATION

Always avoid using two or more machines to lift a load (see the following image). Multi-crane operation is hazardous because of the deviations of the center of gravity. It can cause machine overturning, dropping of lifted loads and damage to the boom.

If a multi-crane operation is unavoidable, observe the following points with the closest attention:

- Make detailed arrangements with the involved workers about the operating methods in advance.
- Assign a supervisor and follow the supervisor's instructions. If necessary, make all involved workers carry communication equipment.
- Set up the machine level, on solid ground with the tracks fully extended.
- Use machines of the same type and the same performance with sufficient capacity for the loads. Set all the boom lengths, boom angles and number of parts of line to be equal.
- Lift the load so that the wire ropes of each machine are always vertical.
- Rig the load so that each machine evenly bears the load.
- Move the load by winch operation and boom elevating operation, and avoid swing operation wherever possible. Never do simultaneous operations of hoisting, boom elevating, swinging, etc.
- Operate each crane simultaneously so that the load is distributed evenly by both machines.



STOW CRANE AFTER OPERATION IS COMPLETE

Always stow the crane after the operation is complete. It is dangerous to leave the crane in the operating configuration.

SAFETY INSTRUCTIONS

RECOMMENDED HAND SIGNALS

During all intended crane movements (with or without load), the operator must always have the load or the load lifting device in his field of vision. Loads fixed by hand may only be moved by the crane operator after he has received a corresponding signal from the person fixing the load or from another responsible person who has been determined in advance.

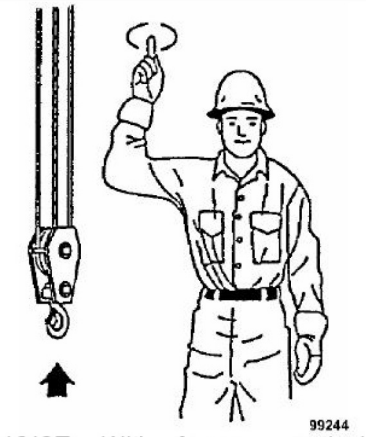
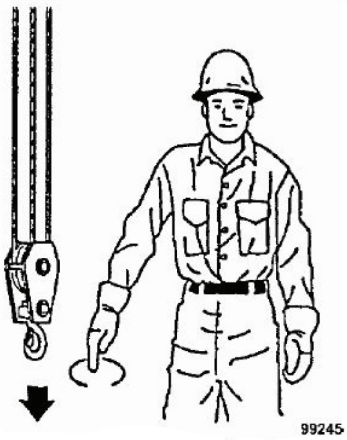
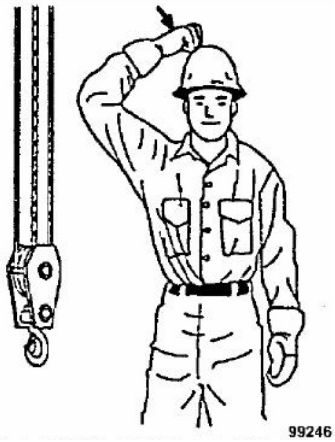
If the operator's field of vision is impaired by obstacles, he may only move the crane or the load with the help of an assistant determined in advance, who gives him appropriate instructions.

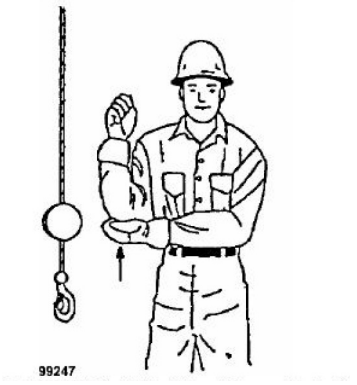
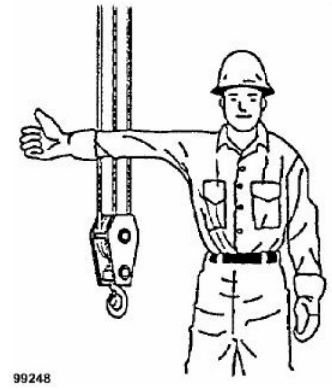
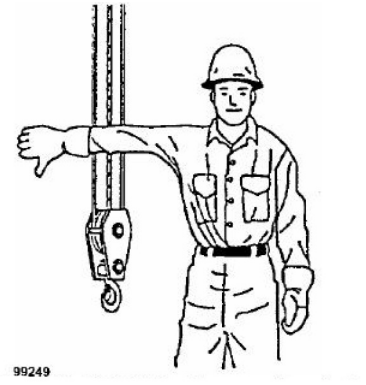
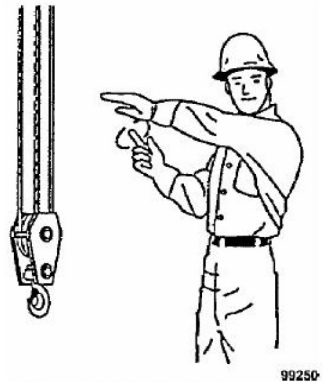
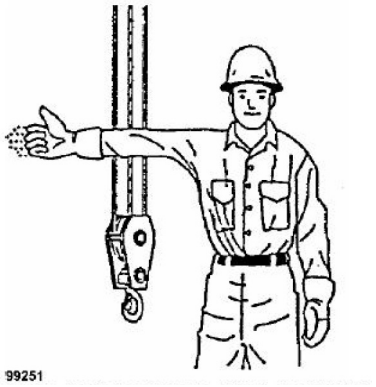
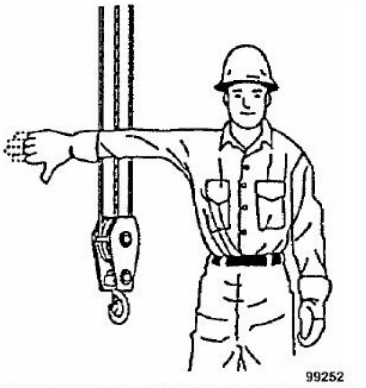
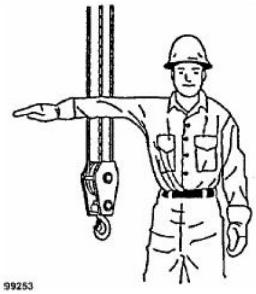
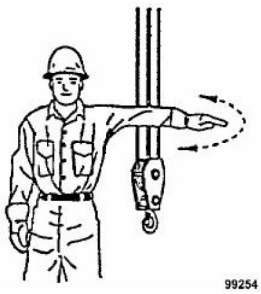
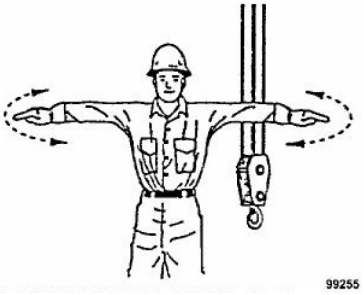
The instructions can be given by radio equipment or hand signals. However, clear communication free from misunderstandings must always be ensured between the assistant giving the instructions and the operator.

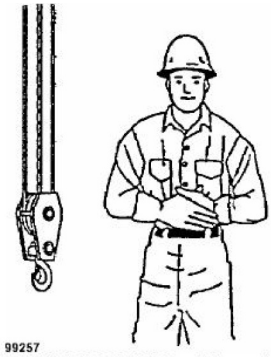
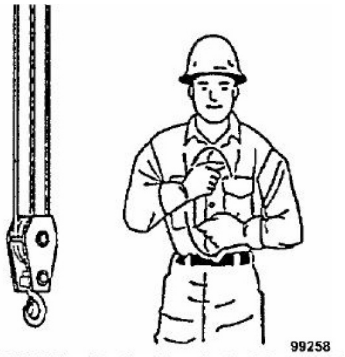
⚠ DANGER

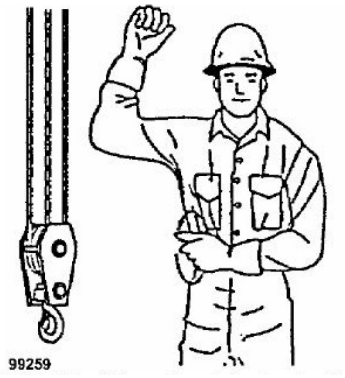
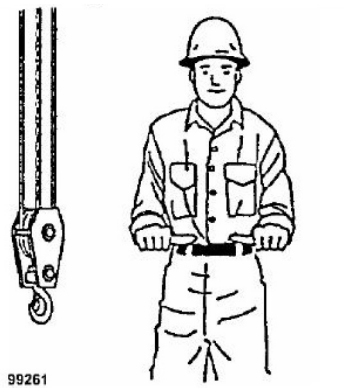
- **Hand signals and special verbal expressions must be agreed upon between the operator and his assistant and observed precisely.**
- **Any mistakes regarding the interpretation of the hand signals or verbal expressions may result in accidents.**
- **The person giving the hand signals must always be placed so that he can see the operator, and keep at a safe distance from the hook or the load.**

Hand signals shown are an excerpt from ASME B30.5-2014.

		
HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circle.	LOWER. With arm extended downwards, forefinger pointing down, move hand in small horizontal circle.	USE MAIN HOIST. TAP fist on head; then use regular signals.

		
USE WHIPLINE (Auxiliary Hoist). Tap elbow with one hand: then use regular signals.	RAISE BOOM. Arm extended, fingers closed, thumb pointing upward.	LOWER BOOM. Arm extended, fingers closed, thumb pointing downward.
		
MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example).	RAISE THE BOOM AND LOWER THE LOAD. With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.	LOWER THE BOOM AND RAISE THE LOAD. With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.
		
SWING. Arm extended, point with finger in direction of boom.	STOP. Arm extended, palm down, move arm back and forth horizontally.	EMERGENCY STOP. Both arms extended, palms down, move arms back and forth horizontally.

 99256	 99257	 99258
TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.	DOG EVERYTHING. Clasp hands in front of body.	TRAVEL (Both Tracks). Use both fists in front of body, making a circular motion about each other, indicating direction of travel, forward or backward. (For land cranes only).

 99259	 99260	 99261
TRAVEL. (One Track). Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body. (For land cranes only).	EXTEND BOOM (Telescoping booms). Both fists in front of body with thumbs pointing outward.	RETRACT BOOM (telescoping booms). Both fists in front of body with thumbs pointing toward each other.

	
EXTEND BOOM (Telescoping Boom). One Hand Signal. One fist in front of chest with thumb tapping chest.	RETRACT BOOM (Telescoping Boom). One Hand Signal. One fist in front of chest, thumb pointing outward and heel of fist tapping chest.

SAFETY LABELS AND LOCATIONS ON CRANE

The following safety labels are attached to the crane. They must be checked regularly. If the safety labels are unreadable or missing, they must be replaced before operating the crane.

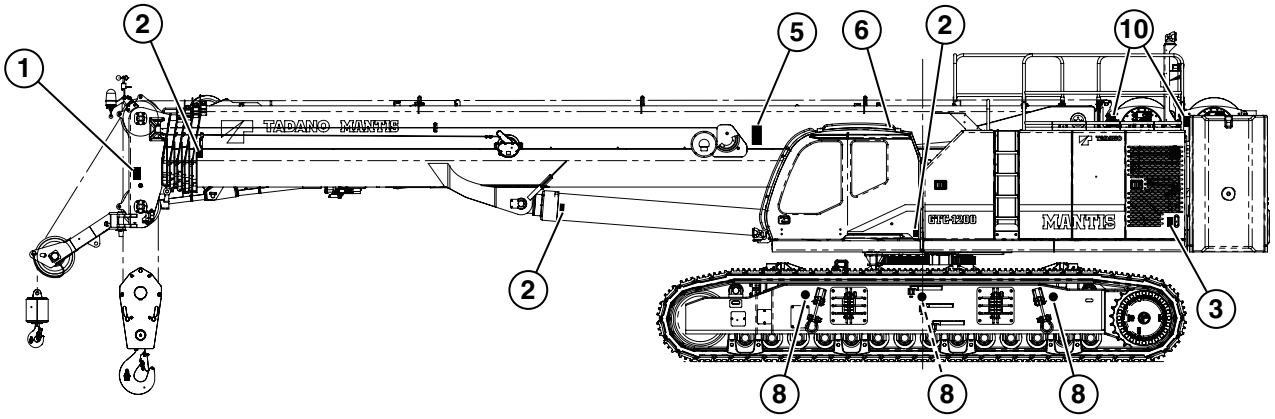


Figure 1

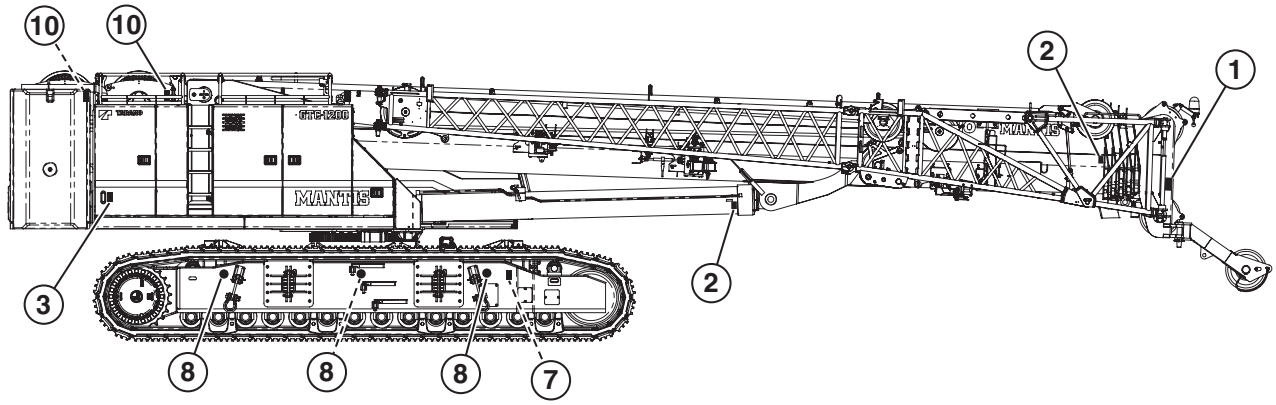


Figure 2

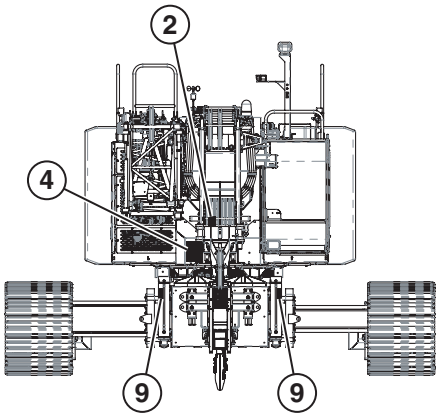
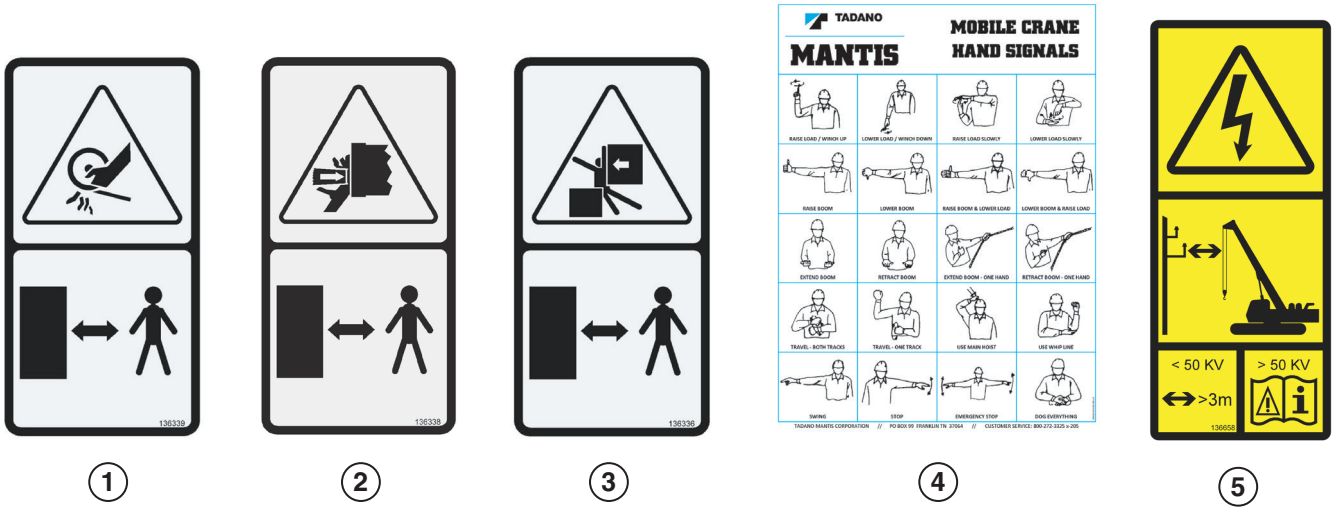


Figure 3



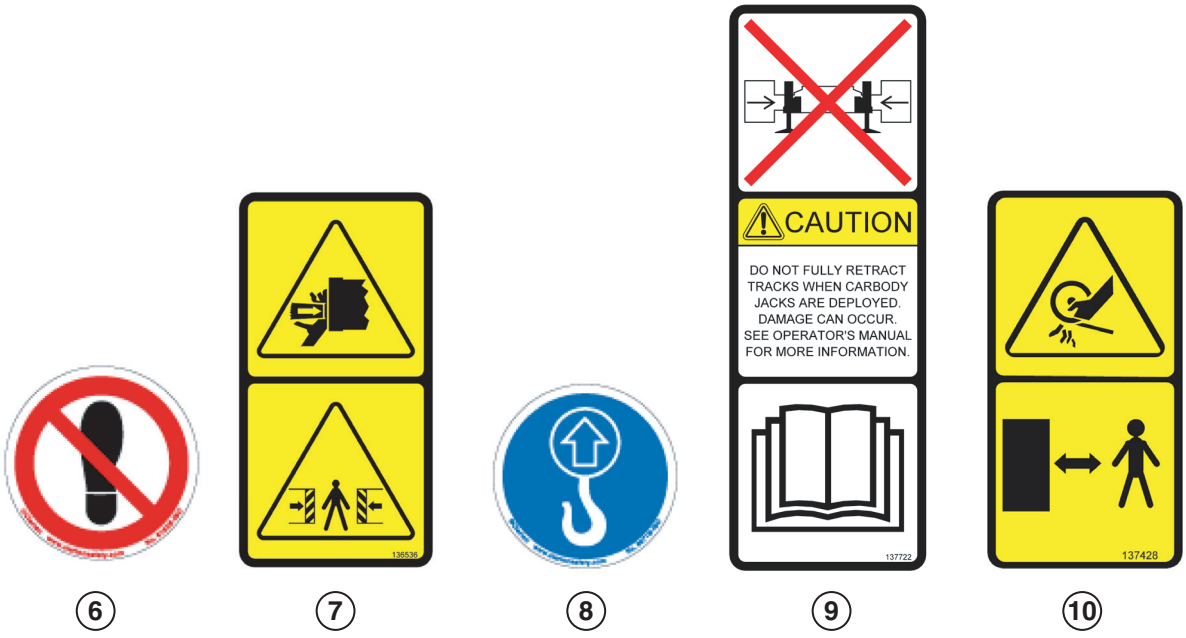


Figure 4

CHAPTER 2: SPECIFICATIONS

GENERAL DATA

CRANE CAPACITY	130 ton at 10 ft (120t at 3.0 m)
BOOM	5-section, 42' 1" – 155' 0" (12.8 m – 47.2 m)
DIMENSION	
Overall Length	51' 9" (15.8 m)
Overall Width (tracks extended)	19' 0" (5.8 m)
Overall Width (tracks retracted)	12' 0" (3.66 m)
Overall Width (tracks removed)	9' 9" (2.97 m)
Overall Height (working)	14' 10" (4.5 m)
MASS	
Gross Vehicle Mass (Standard Equipment Package)	262,600 lb (118,824 kg)
Maximum Counterweight	Upper = 70,000 lb (31,750 kg) Carbody = 20,000 lb (9,070 kg)
PERFORMANCE	
Travel Speed	0.5 mph (0.8 km/hr)/ 1.6 mph (2.6 km/hr)
Gradeability	52%

CRANE SPECIFICATION

MODEL	CAPACITY
GTC-1200	130 ton at 10 ft (120t at 3.0 m)

BOOM

5-section full power telescoping boom with 2 extension modes. System consists of three double-acting hydraulic cylinders with load-holding valves and extension and retraction cables.

- Retracted Length: 42' 1" (12.8 m)
- Extended Length: 155' 0" (47.2 m)
- Extension Time: 200 sec
- Elevating Angles: -2° to 82°
- Elevating Time: 90 sec
- Boom Head: Eight, 21.4 in. (543 mm) diameter cast nylon sheaves on heavy-duty roller bearings (6 load bearing and 2 lead-in sheaves). Designed for quick reeving of head and load block.

AUXILIARY BOOM HEAD

Quick reeve, single 21.4 in. (543 mm) diameter high-strength, cast nylon sheave mounted on a heavy-duty roller bearing. Allows single or 2-part reeving.

COUNTERWEIGHT

5-piece counterweight design. Three upper counterweight configurations:

- “A” Configuration = 23,350 lb (10,590 kg)
- “B” Configuration = 46,700 lb (21,180 kg)
- “C” Configuration = 70,000 lb (31,750 kg)
- Two carbody counterweights, 10,000 lb (4,535 kg) each

WINCHES

Planetary geared two-speed winch includes a hydraulic motor, multi-disc internal brake and counterbalance valve. Drum rotation indicator is included (complete winch performance specs on page 2-4).

- Main Winch
  - ◊ Wire Rope Diameter and Length: 7/8" x 760 ft (22 mm x 232 m), Rotation Resistant, Starlift Extra
  - ◊ Single Line Pull: 22,880 lb (101.8 kN) (first layer)
  - ◊ Single Line Speed: 317.3 ft/min (96.7 m/min) (5th layer)
- Auxiliary Winch
  - ◊ Wire Rope Diameter and Length: 7/8" x 615 ft (22 mm x 188 m), Rotation Resistant, Starlift Extra
  - ◊ Single Line Pull: 22,880 lb (101.8 kN) (first layer)
  - ◊ Single Line Speed: 317.3 ft/min (96.7 m/min) (5th layer)

TRAVEL

Each side frame contains a pilot controlled, two-speed track drive with hydraulic axial piston motor and parking brake. Travel system provides skid steering and counter rotation.

- Travel Speed - Low: 0.6 mph (0.9 km/h)
  High: 1.6 mph (2.6 km/h)
- Gradeability (unladen): 50%

SWING

Closed loop hydrostatic transmission with electronic displacement controlled piston pump. Operator selectable modes allow for either free swing with counter-swing or closed loop swing. Swing motor drives planetary gear reducer with a shaft mounted pinion, external gear shear ball slew bearing bolted to the superstructure and the carbody allows the superstructure to rotate 360°.

- Swing Speed: 0 - 1.8 rpm
- Swing Parking Brake: Spring applied fail-safe brake with hydraulic release that is controlled from the operator's cab.
- Swing Service Brake: Hydraulically applied, controlled through foot-actuated pedal.
- House Lock Systems:
  - ◊ 4-position house lock (boom over front, rear or either side). Actuated from the operator's cab.
  - ◊ 360 degree house lock. Actuated from the operator's cab.

LOAD MOMENT INDICATOR

TADANO AML-C Rated Capacity Limiter and Anti-Two-Block System

- Control function shutdown. Audible and visual warnings.
- LCD screen provides a continuous display of working boom length, boom angle, working load radius, tip height, swing position, parts-of-line (operator set), machine track configuration, relative load moment, maximum permissible load and actual load.
- Anti-two-block weight allows quick reeving of hook block.

FRAME

The frame is an all-steel, welded structure, precision machined to accept attachment of the boom and swing components.

OPERATOR CAB

Fully-enclosed, air conditioned all-steel modular cab with lockable sliding door, acoustical lining, anti-slip floor and tinted safety glass.

- Cab tilts 20°.
- Rear view, winch view, and engine side cameras are appropriately located as are three remote control work lights.
- Vent window in the rear of the cab.
- Grab bars and steps are located for easy access to the cab.
- Defroster, heater, circulating fan
- 2-speed windshield wiper, top glass wiper

- Six-way adjustable fabric seat with headrest, seat belt
- Dome light
- Dry-chemical fire extinguisher
- Four-way electronic armrest mounted joysticks control swing, main winch, auxiliary winch, boom hoist and boom telescope. Electronic foot pedals control travel and a hydraulic foot pedal controls the swing service brake.
- Selectable modes for Fine Control and Travel (using hand control for crane travel)
- Seat termination switch immediately disables all hydraulic functions as the operator rises from the seat. Functions can also be disabled by switch on console.
- Dash instrumentation: tachometer, hour meter, fuel gauge, and Diesel Exhaust Fluid (DEF) level gauge. Indicators are provided for crane level, swing position, load moment, drum rotation, air filter restriction, engine oil temperature and pressure, hydraulic oil temperature and level, and hydraulic and air filter restriction, and low voltage.

ENGINE

- Make/Model: Cummins QSL9
- Type: 6 cylinder, water cooled, 4 cycle
- Aspiration: turbocharged and aftercooled
- Max. Output: 350 hp (261 kW) at 2,100 rpm
- Max. Torque: 1,201 lb-ft (1,628 Nm) at 1,500 rpm
- Piston Displacement: 8.9 L
- Emission Cert: U.S. EPA Tier 4f, Euromot Stage IV
- Alternator: 70 amp

ELECTRICAL SYSTEM

- 24 VDC

FUEL SYSTEM

- Capacity: 125 gal (473 L)
- Filtration: Inline fuel/water separator and engine mounted fuel filter

SIDE FRAMES

Two welded steel side frames are paired with a track group. The side frames extend and retract hydraulically and are controlled from the cab.

- Track Rollers: Two top and 14 bottom sealed rollers on each track frame. Idler is oil-filled, self-lubricating with nitrogen-type tensioner.
- Track Shoes: 36 in. (900 mm), 3-bar semi grouser (standard; other shoe widths and types available as options)

TELEMATICS

Machine data logging and monitoring system with HELLO-NET via Internet.

HYDRAULIC SYSTEM

- Hydraulic Pumps: Two high-pressure, variable displacement axial piston pumps with load sense and power limiting control for crane functions. One hydrostatic pump for swing function.
- Directional Valves: Multiple pressure and flow compensated valves with integrated relief valves controlled by electrical signals.
- Pump Output: 220 gpm (833 L/min) at 2,100 rpm engine speed. 5,000 psi (345 bar) maximum pressure
- Reservoir: 366 gal (1,385 L) capacity, spin-on filler/breather, sight gauge, cleanout and sump drain.
- Filtration: Three 5-micron, full-flow tank-mounted return filters with electrical clogging indicator. 2-micron pilot oil in-line pressure filter
- Diagnostic Ports provided for system, load sense, pilot pressure and swing pressure.

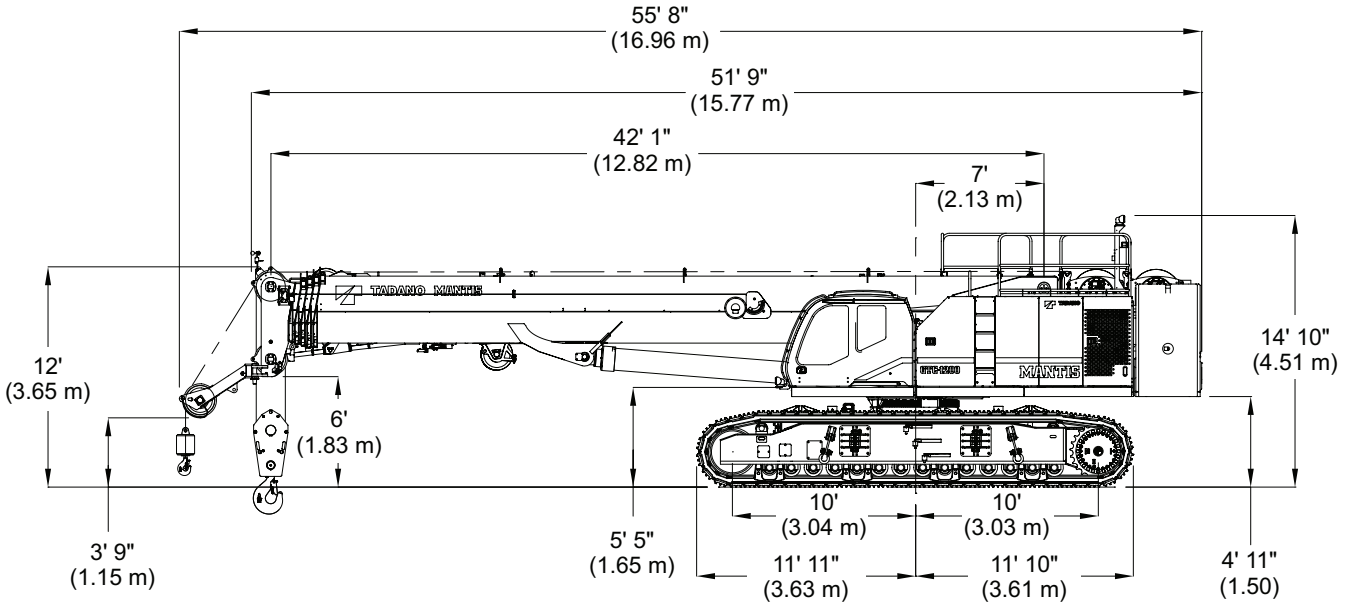
OPTIONAL EQUIPMENT

- Jibs
  - ◊ Heavy lift jib:
    - Total Length: 12.5 ft (3.8 m)
    - Offset Angles: 20° & 40°
    - Max. Lifting Height: 176 ft (53.6 m)
  - ◊ Main jib:
    - Total Length: 33.5 ft (10.2 m)
    - Offset Angles: 20° & 40°
    - Max. Lifting Height: 197 ft (60.0 m)
  - ◊ Fly jib:
    - Total Length: 58.1 ft (18.0 m)
    - Offset Angles: 20° & 40°
    - Max. Lifting Height: 224 ft (68.3 m)
  - ◊ Long jib:
    - Total Length:
      82 ft (25.0 m)
      105 ft (32.0 m)
    - Offset Angles: 20° & 40°
    - Max. Lifting Height: 269 ft (82.0 m)
- Hook blocks
  - ◊ 130 ton (120t) hook block – Six 18 in. (457 mm) steel sheaves, lockable swivel hook and safety latch
  - ◊ 70 ton (64t) hook block – Three 18 in. (457 mm) steel sheaves, lockable swivel hook and safety latch
  - ◊ 27 ton (25t) hook block – One 18 in. (457 mm) steel sheave, lockable swivel hook and safety latch
- Overhaul ball – 13.8 ton (12.5t) with swivel hook and safety latch
- Track Shoes: 36 in. (900 mm) flat shoe
- Tool Circuit: Provides 5 gpm (23 L/min) and 10 gpm (45 L/min) at 2,500 psi (176 bar) through a 50 foot (15.2m) twin hose reel with quick disconnect fittings to operate open center tools.
- High Flow Tool Circuit: Provides 45 gpm (170 L/min) at 4,800 psi (330 bar)
- Free Fall Hoists: Winches are available in controlled free fall configurations (Consult factory for application support).
- Cold Weather Packages: Cold weather options are available for operation to -40°C (Consult factory for application support).
- Work Platform: Model WP750 – 36 in. x 72 in. (0.9 m x 1.8 m), all steel, welded, two person platform with maximum capacity of 750 lbs (340 kg).
- Radio control package.

MAIN WINCH						
Planetary geared two-speed winch includes a bent axis, variable displacement hydraulic motor and a multi-disc internal brake. Wire Rope 7/8" (22 mm) diameter. Line pulls are not based on wire rope strength.						
Rope Layer	**Maximum Line Pull (lb)**	**No Load Line Speed (ft/min)**	**Full Load Line Speed (ft/min)**	**Pitch Diameter (in)**	**Layer (ft)**	**Total (ft)**
1	23,560	238.1	141.6	18.9	123.5	123.5
2	21,488	257.9	153.4	20.7	133.7	257.2
3	19,751	277.6	165.2	22.5	144.0	401.1
4	18,274	297.4	176.9	24.3	154.2	555.3
5	17,002	317.2	188.7	26.1	164.5	719.8
6	15,896	336.9	200.4	28.0	174.7	894.5

MACHINE WEIGHTS	LB	KG
Standard Crane with 5 section - 155 ft boom, full counterweight, auxiliary winch with wire rope and 36 in. 3-bar semi grouser track shoes	262,600	118,824
Standard Crane with 5 section - 155 ft boom, auxiliary winch with wire rope (Counterweight and track frames removed)	112,000	50,679
Standard Crane with auxiliary winch with wire rope (155 ft boom, boom hoist cylinder, counterweight and track frames removed)	70,666	31,976
OPTIONAL EQUIPMENT	**LB**	**KG**
Heavy Lift Jib - 12.5 ft (3.8 m)	1873	850
Main Jib - 33.5 ft (10.2 m)	2888	1310
Full Jib - 59.1 ft (18.0m)	3803	1725
Lattice Jib Insert - 2 Pieces, 23.4 ft (7.14 m) each	1053	478
Auxiliary Nose Sheave	298	135
130 ton (120t) Hook Block - six sheave	1,800	814
70 ton (64t) Hook Block - three sheave	1,300	588
27 ton (25t) Hook Block - one sheave	880	398
13.8 ton (12.5t) Overhaul Ball	440	199

DIMENSIONS



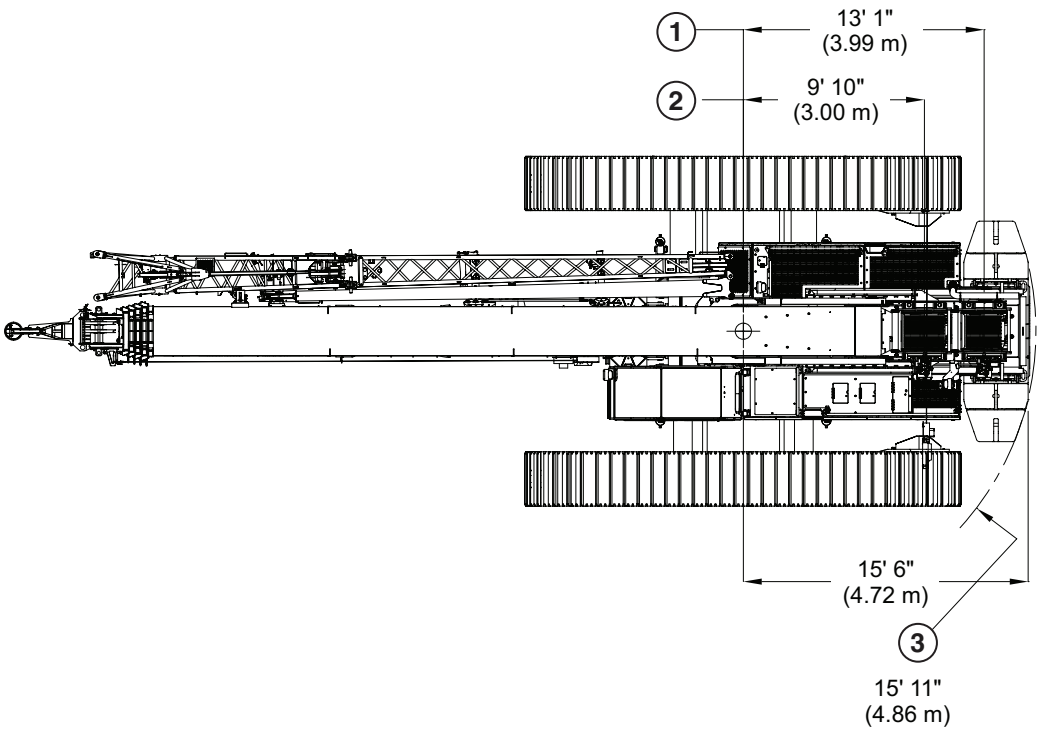


Figure 1

1 – Auxiliary Winch
2 – Main Winch
3 – Swing Radius

TRANSPORT DIMENSIONS

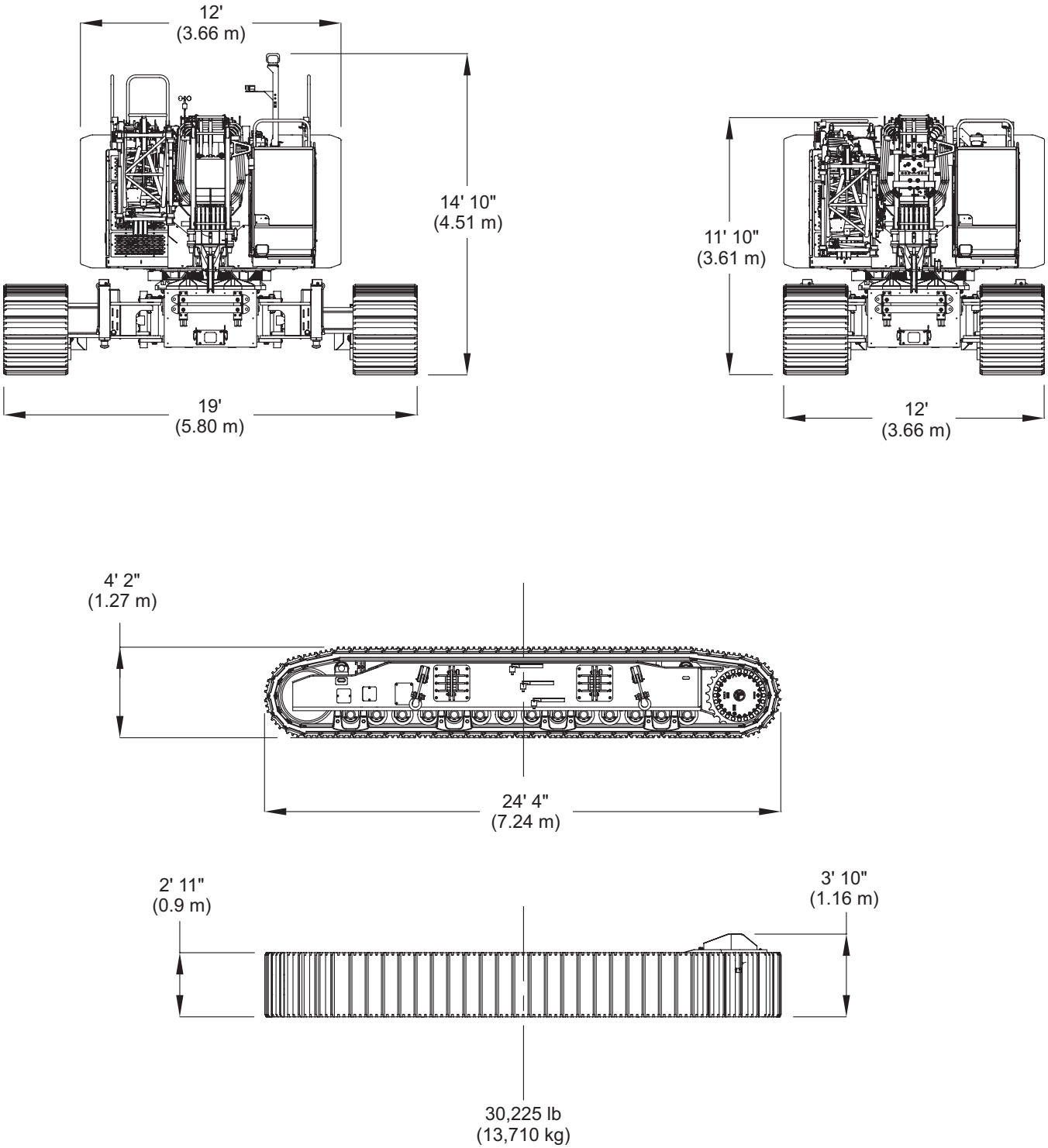


Figure 2

TRANSPORT DIMENSIONS

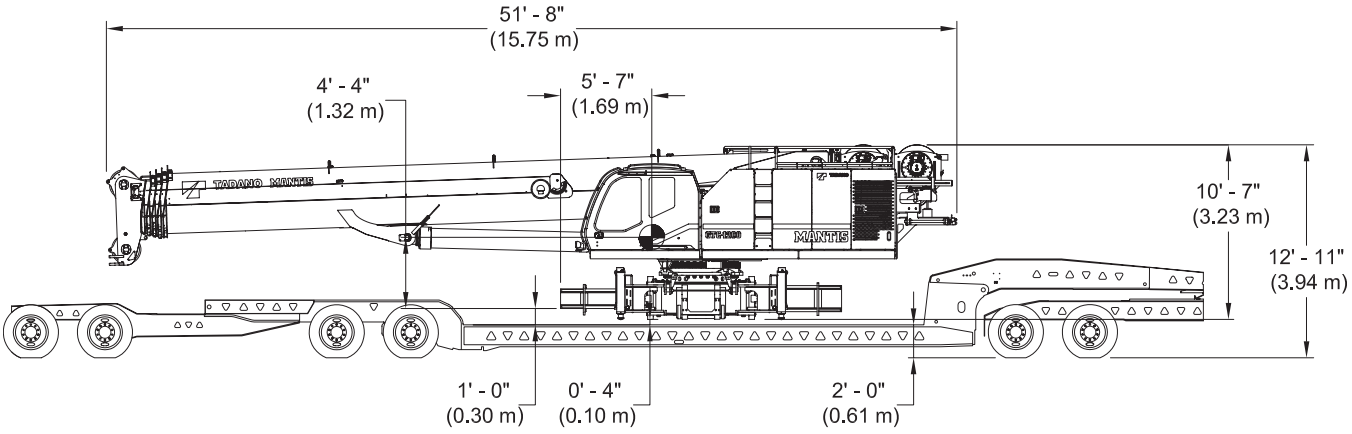


Figure 3

TRANSPORT DIMENSIONS – COUNTERWEIGHT

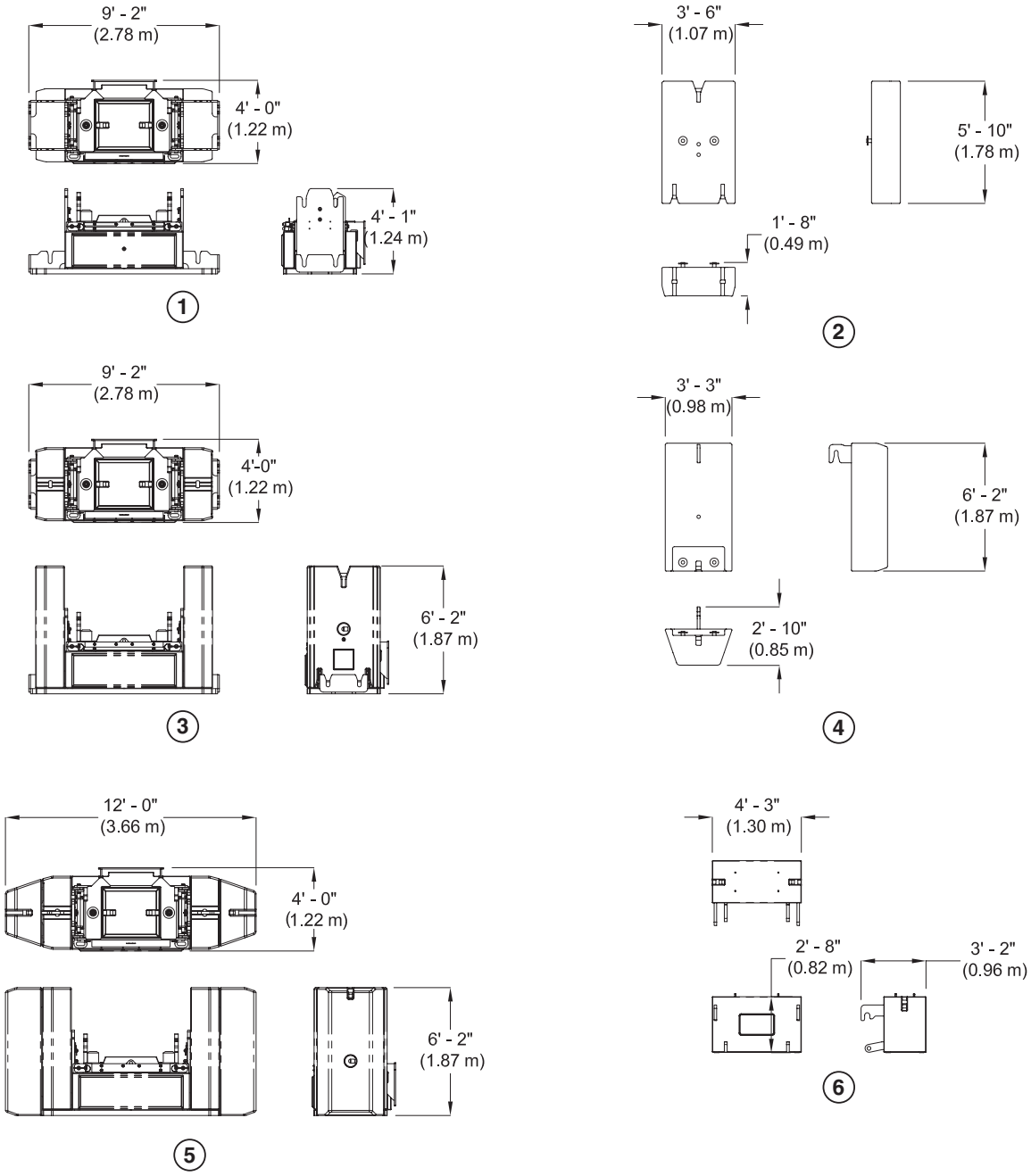


Figure 4

1 – Configuration “A” 23,350 lb (10, 590 kg)

2 – Counterweight Segment “B” 2 pieces 11,670 lb (5,300 kg) each

3 – Configuration “B” 46,700 lb (21,180 kg)

4 – Counterweight Segment “C” 2 pieces 11,670 lb (5,300 kg) each

5 – Configuration “C” 70,000 lb (31,750 kg)

6 – Carbody Counterweights Front and Rear 10,000 lb (4,535 kg) each

TRANSPORT DIMENSIONS – OPTIONAL LIFTING ATTACHMENTS

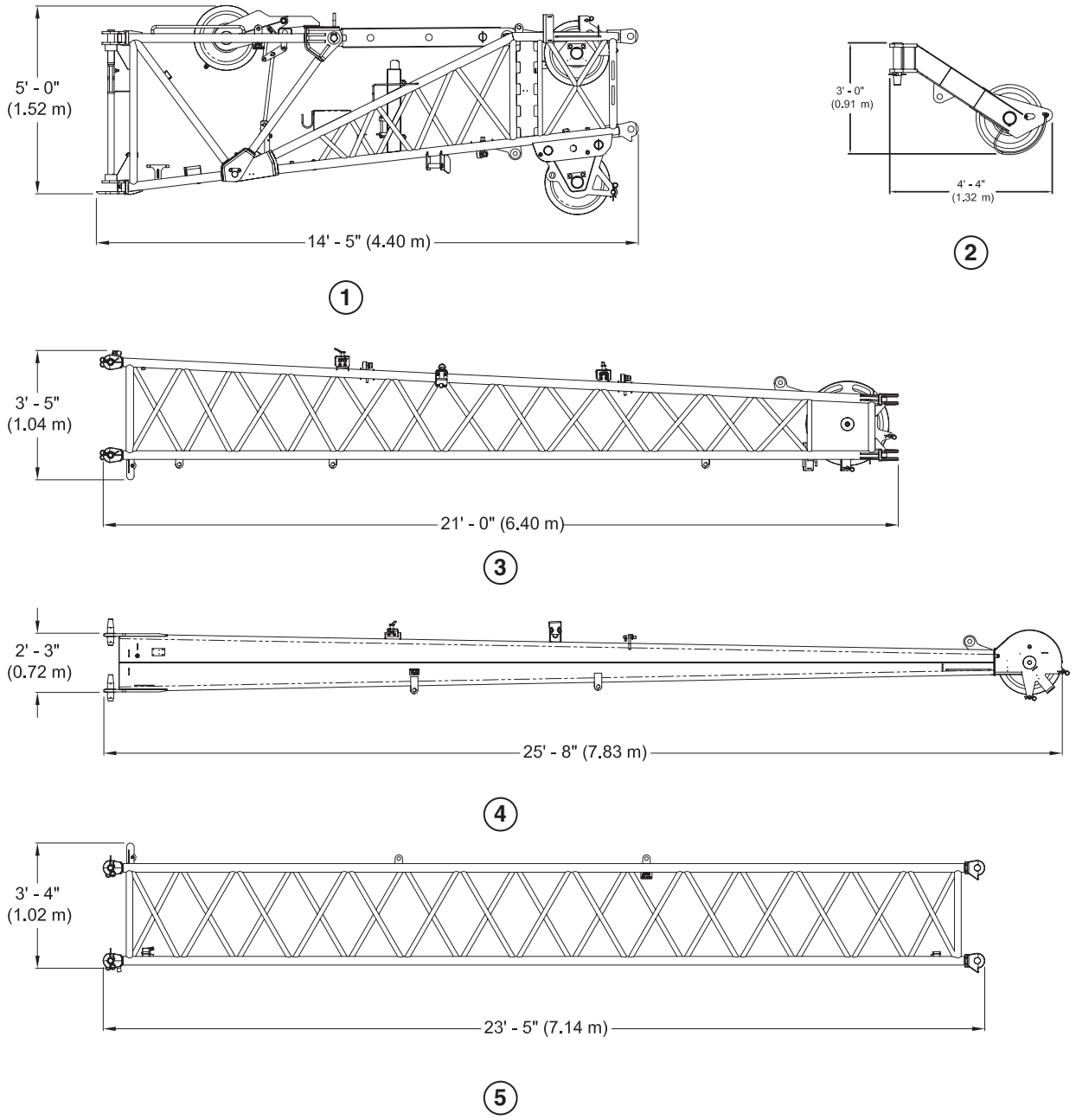


Figure 5

1 – Heavy Lift Jib 1874 lb (850 kg)
2 – Auxiliary Nose Sheave 298 lb (136 kg)
3 – Main Jib 1014 lb (460 kg)
4 – Fly Jib 915 lb (415 kg)
5 – Lattice Jib Insert 1058 lb (480 kg)

WORKING RANGE DIAGRAM

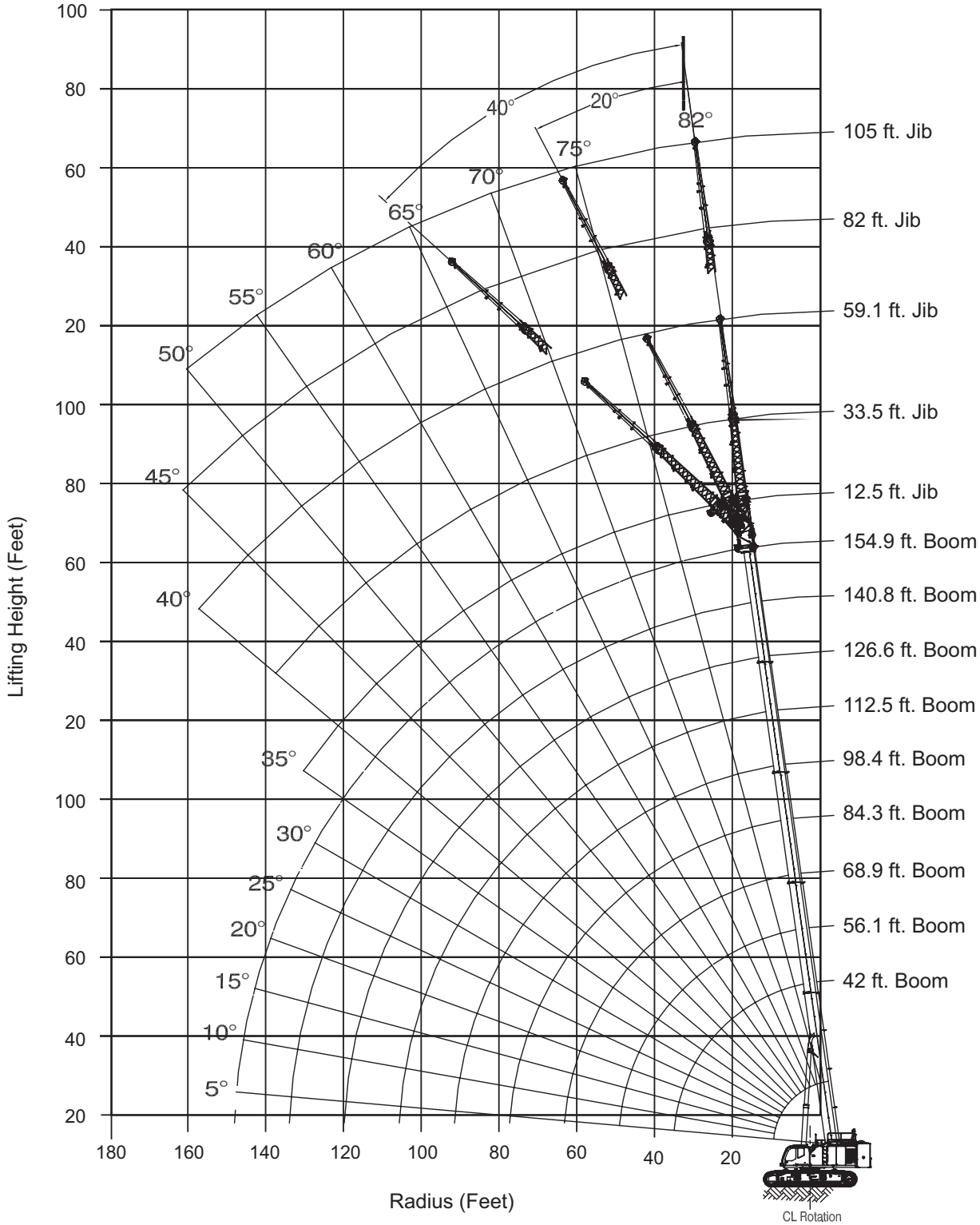


Figure 6

OIL CROSS REFERENCE CHART

FLUID	TEMPERATURE RANGE FOR 15-40 CST (OPTIMAL OPERATING RANGE)		TEMPERATURE RANGE FOR 10-200 CST (MINIMUM AND MAXIMUM OPERATING RANGE - LIMITED TIME)		TEMPERATURE FOR 1000 CST (MINIMUM COLD START)	
Shell S2V22	68°F to 122°F	20°C to 50°C	14°F to 149°F	-10°C to 65°C	-12°F	-24°C
Chevron Clarity AW22	75°F to 127°F	24°C to 53°C	21°F to 154°F	-6°C to 68°C	-16°F	-27°C
Hydrex MV22	77°F to 126°F	25°C to 52°C	23°F to 149°F	-5°C to 65°C	-42°F	-41°C
Hydrex AV22	78°F to 122°F	26°C to 50°C	28°F to 145°F	-2°C to 63°C	-4°F	-20°C
Shell S2V32	93°F to 145°F	34°C to 63°C	39°F to 171°F	4°C to 77°C	1°F	-17°C
Chevron Clarity AW32	99°F to 145°F	37°C to 63°C	50°F to 170°F	10°C to 76°C	16°F	-9°C
Hydrex AW32	99°F to 144°F	37°C to 62°C	46°F to 169°F	8°C to 76°C	10°F	-12°C
Hydrex MV36	95°F to 145°F	35°C to 63°C	37°F to 174°F	3°C to79°C	0°F	-18°C
Shell S4VX32	90°F to 158°F	32°C to 70°C	5°F to 212°F	-15°C to 100°C	-58°F	-50°C
Hydrex Extreme	89°F to 192°F	32°C to 89°C	-13°F to 230°F	-25°C to 110°C	-54°F	-48°C
Shell S2V46	109°F to 133°F	43°C to 56°C	53°F to 190°F	12°C to 88°C	23°F	-5°C
Chevron Clarity AW46	109°F to 158°F	43°C to 70°C	57°F to 183°F	14°C to 84°C	21°F	-6°C
Hydrex AW46	109°F to 158°F	43°C to 70°C	57°F to 185°F	14°C to 85°C	21°F	-6°C
Hydrex XV	109°F to 170°F	43°C to 81°C	34°F to 216°F	1°C to 102°C	-15°F	-26°C
Shell S2V68	127°F to 194°F	53°C to 90°C	64°F to 216°F	18°C to 102°C	12°F	-11°C
Chevron Clarity AW68	120°F to 172°F	49°C to 78°C	66°F to 199°F	19°C to 93°C	28°F	-2°C
Hydrex AW68	124°F to 178°F	51°C to 81°C	66°F to 207°F	19°C to 97°C	27°F	-3°C
Hydrex AW80	131°F to 183°F	55°C to 84°C	75°F to 210°F	24°C to 99°C	37°F	3°C
Hydrex AW100	140°F to 192°F	60°C to 89°C	82°F to 221°F	28°C to 105°C	43°F	6°C

NOTE: Shaded cells indicate that the maximum operating temperature should not exceed 176°F (80°C) to protect seals.

FLUID	MAXIMUM TEMPERATURE FOR WARM-UP VALVE OPERATION		TEMPERATURE FOR COOLING FAN MINIMUM SPEED		TEMPERATURE FOR COOLING FAN MAXIMUM SPEED		TEMPERATURE FOR ACTIVATION OF AUTOMATIC COOLING CIRCULATION		TEMPERATURE FOR WARNING	
Shell S2VX22	75 °F	24 °C	75 °F	24 °C	90 °F	32 °C	130 °F	52 °C	145 °F	63 °C
Chevron Clarity AW22										
Hydrex MV22										
Hydrex AV22										
Shell S2VX32	90 °F	32 °C	90 °F	32 °C	105 °F	41 °C	155 °F	68 °C	170 °F	77 °C
Chevron Clarity AW32										
Hydrex AW32										
Hydrex MV36										
Shell S4VX32										
Hydrex Extreme										
Shell S2VX46	100 °F	37 °C	100 °F	37 °C	125 °F	52 °C	160 °F	71 °C	176 °F	80 °C
Chevron Clarity AW46										
Hydrex AW46										
Hydrex XV										
Shell S2VX68	115 °F	46 °C	115 °F	46 °C	130 °F	54 °C	160 °F	71 °C	176 °F	80 °C
Chevron Clarity AW68										
Hydrex AW68										

CAPACITIES AND SPECIFICATIONS CHART

Equipment	Material	Capacity (gal)	S/N applicability
Boom Bearing Pads	Lube-A-Boom	As required	
Lube Pump	NLGI 2 Grease	4 lb (2 liter)	
Boom Cylinder Pins	NLGI 2 Grease	Until new grease is visible	
Boom Foot Pins	NLGI 2 Grease	Until new grease is visible	
Hoist Cylinder Pins	NLGI 2 Grease	Until new grease is visible	
Sheaves	NLGI 2 Grease	Until new grease is visible	
Slew Ring Race	NLGI 2 Grease	Until new grease is visible	
Slew Ring Teeth	Texaco Crater 2X or 5X	Coat teeth at each greasing	
Fuel Tank	"No. 1 or No. 2 Diesel (T3) Ultra Low Sulfur Diesel (T4)"	125 gallons (473 liters)	
Engine Cooling System (T3 engine)	50/50 Water/Anti-Freeze Mix	10.6 gallons (40.1 liters)	
Engine Cooling System (T4 engine)		11.1 gallons (42.0 liters)	
Engine Oil (T3 engine)	5W-40	20.0 quarts (18.9 liters)	
Engine Oil (T4 engine)		23.0 quarts (21.8 liters)	
Hydraulic Tank	Shell Tellus S2VX-32	366 gallons (1385 liters)	
Track Tension	NLGI 2 Grease	Per track tension measurements	
Track Drive	SAE 80W90-API GL5	26.4 quarts (25 liters)	120-201 through 215, 217 through 228
		32.8 quarts (31 liters)	120-216, 229 and up
Winch (Auxiliary or Main)	Mobilgear 600XP150 (ISO VG150)	8.9 quarts (8.4 liters)	
Winch (DRH45 Freefall)	ISO VG220	68.7 quarts (65 liters)	
Swing Drive Gearbox	SAE 80W90-API GL5	Fill gearbox until oil can be visibly seen from fill hole ~1.6 qt (1.48 liters) Maximum pressure to service brake port: 1000 psi (69.0 bar) Maximum pressure to parking brake port: 3000 psi (206.8 bar)	120-201 through 228
		4.1 quarts (3.85 liters) Maximum pressure to service brake port: 870 psi (60.0 bar) Maximum pressure to parking brake port: 725 psi (50.0 bar)	120-229 and up
Swing Drive Output Bearing	NLGI 2 Grease (ISO VG220)	0.6 quarts (0.56 liters) Remove breather opposite grease nipple and fill until grease exits the breather or lower pinion seal area.	120-229 and up

CHAPTER 3:
COMPONENT LOCATION AND OVERVIEW

EXTERIOR VIEWS

Right, Left, Front and Rear are determined from the operator's seat in the cab, with the operator sitting in the seat facing forward in the normal operating position. Right, Left, Front and Rear does not change regardless of the swing direction or position of the superstructure.

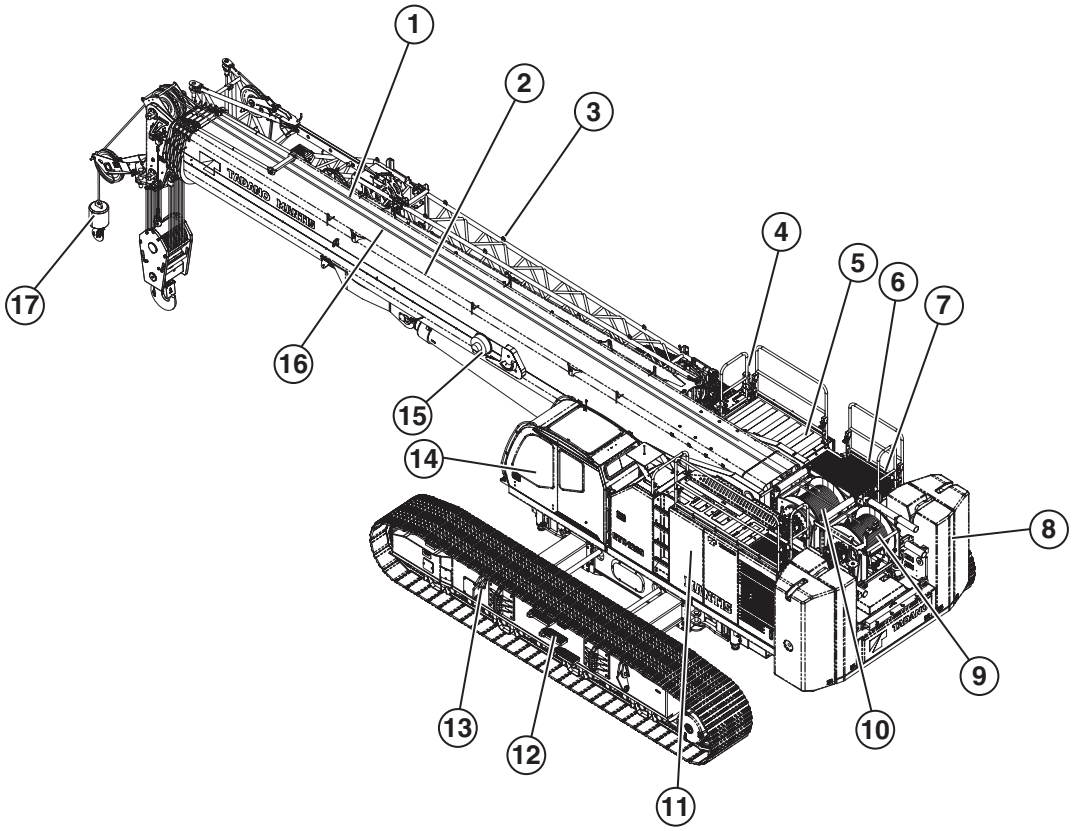


Figure 1

1 – Main Winch Wire Rope
2 – Boom
3 – Jib
4 – Load Moment Indicator External Warning Lamps
5 – Engine Compartment
6 – Diesel Fuel Fill
7 – Diesel Emission Fluid (DEF) Tank
8 – Rear Counterweight
9 – Auxiliary Winch
10 – Main Winch
11 – Hydraulic Oil Reservoir
12 – Steps
13 – Left Side Track
14 – Cab
15 – Boom Angle Indicator
16 – Auxiliary Winch Wire Rope
17 – Anti-Two-Block Weight

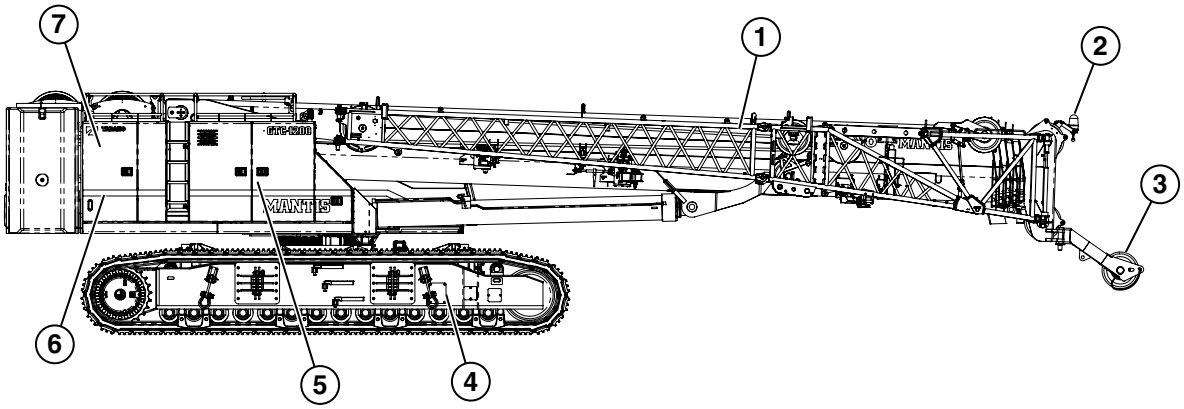


Figure 2

1 – Jib
2 – Beacon Light
3 – Nose Sheave Assembly
4 – Right Side Track
5 – Engine Compartment
6 – Diesel Emission Fluid (DEF) Tank
7 – Diesel Fuel Fill

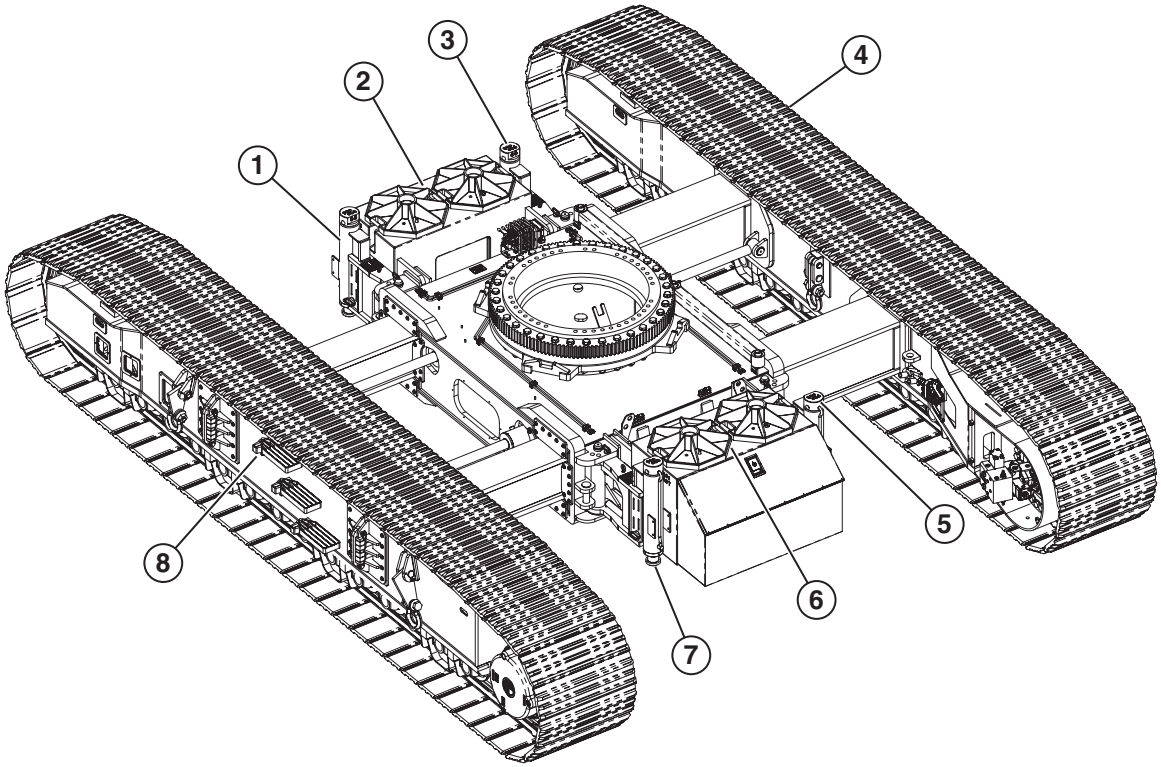


Figure 3

1 – Left Front Carbody Jack
2 – Front Carbody Counterweight
3 – Right Front Carbody Jack
4 – Right Side Track
5 – Right Rear Carbody Jack
6 – Rear Carbody Jack with Toolbox
7 – Left Rear Carbody Jack
8 – Left Side Track

CAB CONTROLS AND SWITCHES

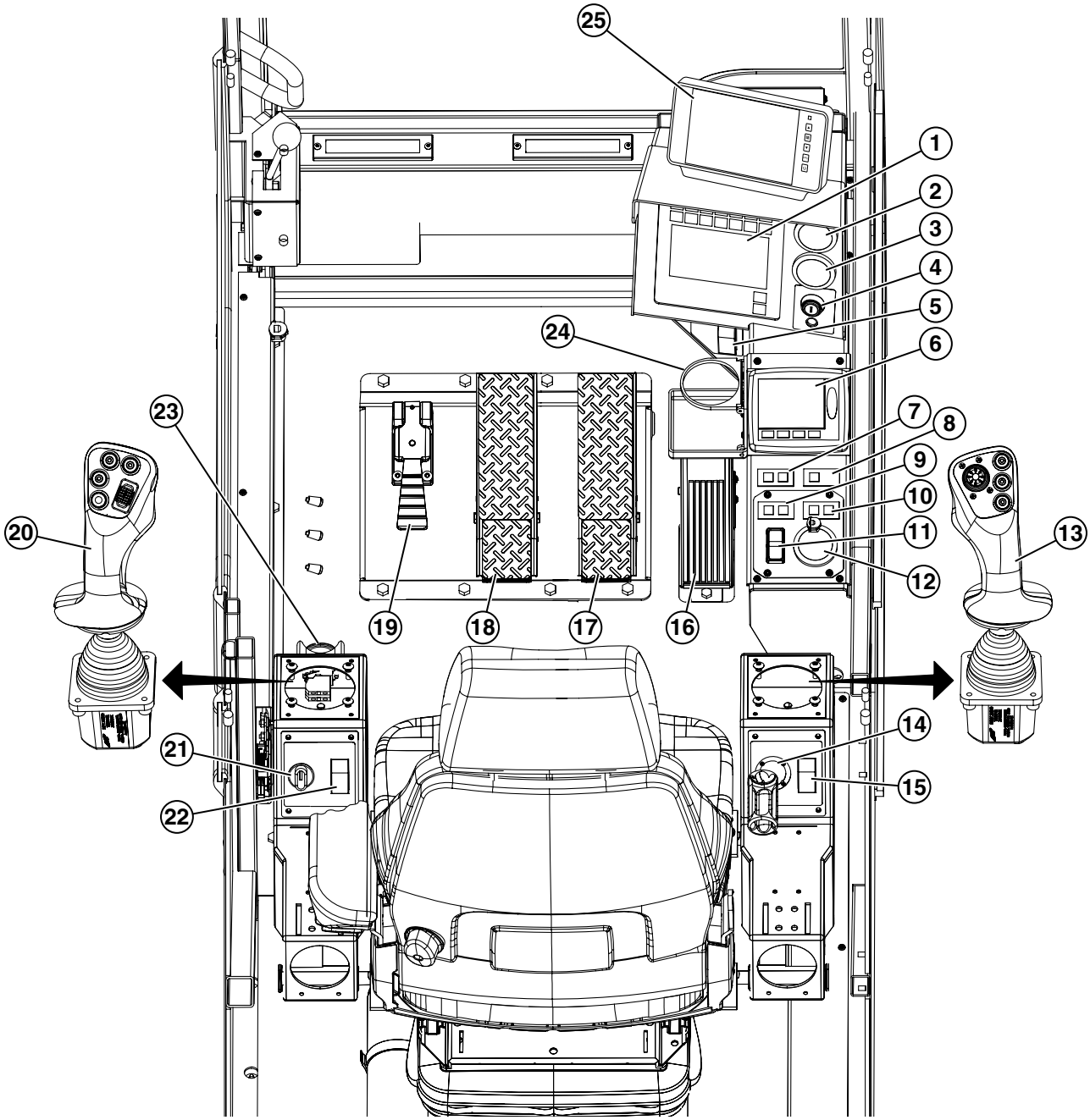


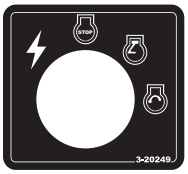
Figure 4

1 – **AML Screen** – Displays the Load Moment Indicator Information for the operator. Reference the Operation Section for details on the AML.

2 – **Tachometer** – Displays the current engine rpm.

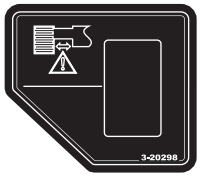
3 – **Fuel Gauge** – Displays the diesel fuel level as a percentage.

4 – **Ignition Switch** – A four-position switch with OFF, ACCESSORY, RUN and START positions.



NOTE: When Keyswitch is in "ACC" position a warning will appear on the MD3 screen noting that communication with the Engine ECM is not available.

5 – **Track Position Override Switch** – Turning this switch ON will allow you to override track extend position switching in AML. Load charts are automatically switched to "Tracks Retracted" if position sensors in the track extend cylinders do not indicate a fully extended position. Use of this switch will allow selection of "Tracks Extended" load charts even if sensors do not indicate full track extension.



⚠ WARNING

The "Track Position Override" switch should be used only in case of sensor failure. Use of "Tracks Extended" charts when crane is not properly configured can result in loss of stability and overturning.

6 – **MD3 Display** – The control system display shows extensive information and warnings regarding the boom, engine, hydraulic system, electrical system, and maintenance information. Reference the Operation section for details.

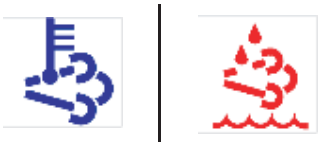
7 – **Engine Indicators** – The indicator on the left is the "Wait to Start" light and the indicator on the right will illuminate if there is an engine problem.

8 – **"Stop Engine" Indicator** – Light will illuminate if there is a severe problem with the engine. Return load to a safe position and turn the engine OFF.

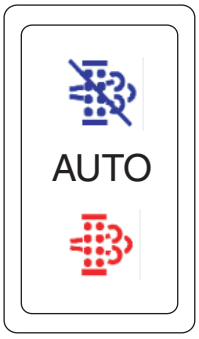
9 – **Exhaust System Cleaning Indicator (T4f Engines)** –

The "Exhaust System Cleaning Stop" indicator on the left will illuminate if the exhaust system cleaning is turned off. The "Exhaust System Cleaning" indicator on the right will illuminate if the exhaust system is unable to complete an automatic exhaust system cleaning. The indicator will flash if an exhaust system cleaning is being performed and will continue to flash until the cleaning is complete.

10 – **HEST and DEF Warning Indicator (T4f Engines)** – The "High Exhaust System Temperature (HEST)" indicator on the left will illuminate if the system temperature is higher than normal during exhaust system cleaning. The "Low Diesel Emissions Fluid (DEF) Level" on the right will illuminate if the DEF level in the tank is low.



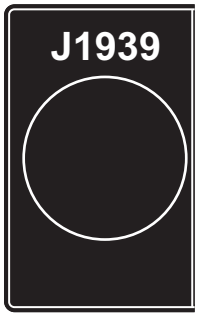
11 – **Exhaust System Cleaning Switch (T4f Engines)** – The "Exhaust System Cleaning" can be turned ON manually by pressing the top position of the switch. Pressing the bottom position of the switch will turn the system OFF. The switch will be in the middle position to set the system to AUTO and will start a cleaning cycle automatically when required.



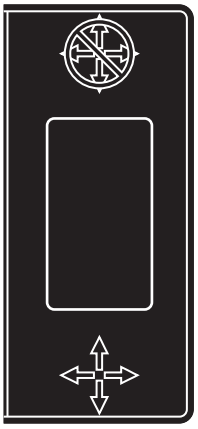
12 – **DEF Gauge (T4f Engines)** – Displays DEF (Diesel Exhaust Fluid) level as a percentage.

13 – **Right Joystick** – Controls the main winch and boom hoist cylinder. Also controls travel speed and steering in travel mode.

14 – **CAN BUS Connection** – Terminal can be used to connect to the J1939 CAN BUS for service.



15 – **Controls Enable Switch** – The operator must be sitting in the seat and turn this switch ON to begin any crane operations. The switch will not automatically reset itself. The switch will remain in the ON position until it is manually turned to the OFF position.



16 – **Throttle Pedal** – Press the pedal down to increase the engine rpm and release the pedal to decrease the engine rpm.

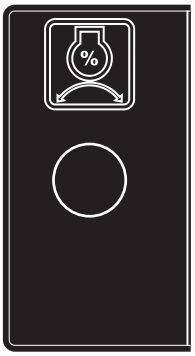
17 – **Right Travel Pedal** – Pressing down on the pedal will drive the right track. The farther the pedal is pushed, the faster the travel speed will be. Releasing the pedal will stop the right track from driving. The pedal is bi-directional. Toe down drives the track forward; heel down drives the track backward.

18 – **Left Travel Pedal** – Pressing down on the pedal will drive the left track. The farther the pedal is pushed, the faster the travel speed will be. Releasing the pedal will stop the left track from driving. The pedal is bi-directional. Toe down drives the track forward; heel down drives the track backward.

19 – **Swing Service Brake** – Press down on the swing brake pedal to slow rotation of the superstructure or hold it in position (when the swing parking brake is not engaged). Release the pedal to release the brake.

20 – **Left Joystick** – Controls the auxiliary winch, swing of the superstructure, and boom telescoping. Has buttons for horn and selection of fine control mode.

21 – **Engine Throttle Knob** – Engine rpm can be set at a fixed speed using this dial. Turning clockwise will increase engine rpm and turning counterclockwise will decrease the engine rpm.



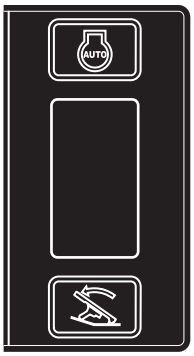
22 – **Auto Idle Switch** – Pressing the top of the switch will turn on the auto idle function. The operator can select from several modes to control the engine speed:

Standard

- ◊ Foot throttle (Gray icon on control display)
- ◊ Throttle potentiometer (Gray icon on control display)

Auto idle

- ◊ Adaptive (Green icon on control display)
- ◊ Set point (Blue icon on control display)



NOTE: The dedicated tachometer indicates the actual engine speed. "Adaptive Throttle" mode is active when "Auto Idle" switch is ON and throttle potentiometer dial is at 0%. In this mode, the engine RPM will increase to match the engine load and then return to idle.

23 – **Emergency Off Switch (EMO)** – In the case of an emergency, pressing this switch will immediately shut down the engine.

24 – **Cup Holder** – Can be folded up out of the way when not being used.

25 – **Video Camera Monitor** – Allows you to view the images from the three externally mounted cameras.

JOYSTICKS

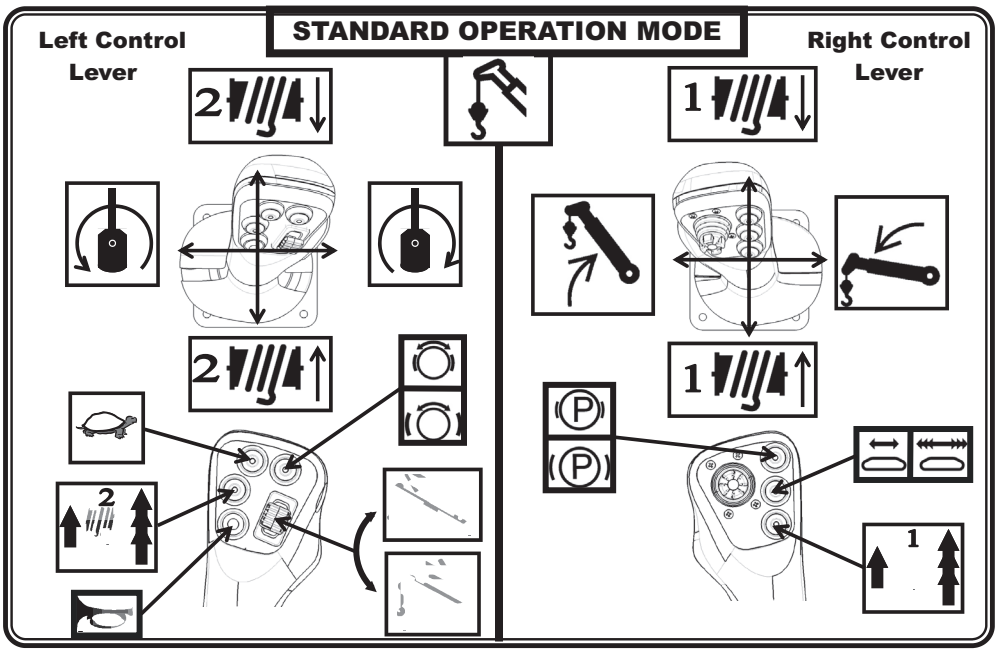


Figure 5

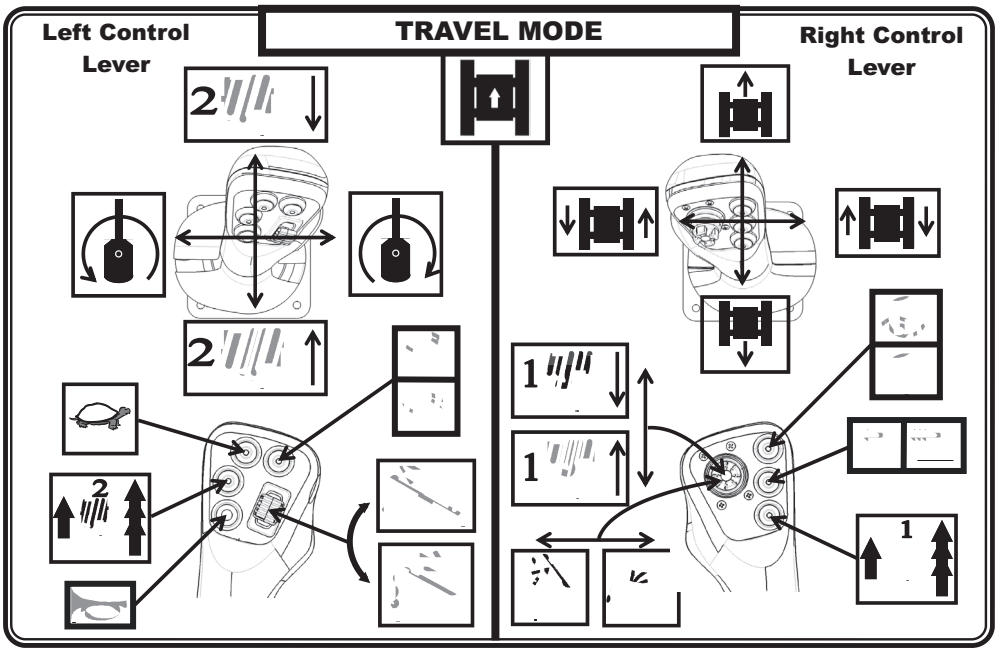


Figure 6

RIGHT JOYSTICK

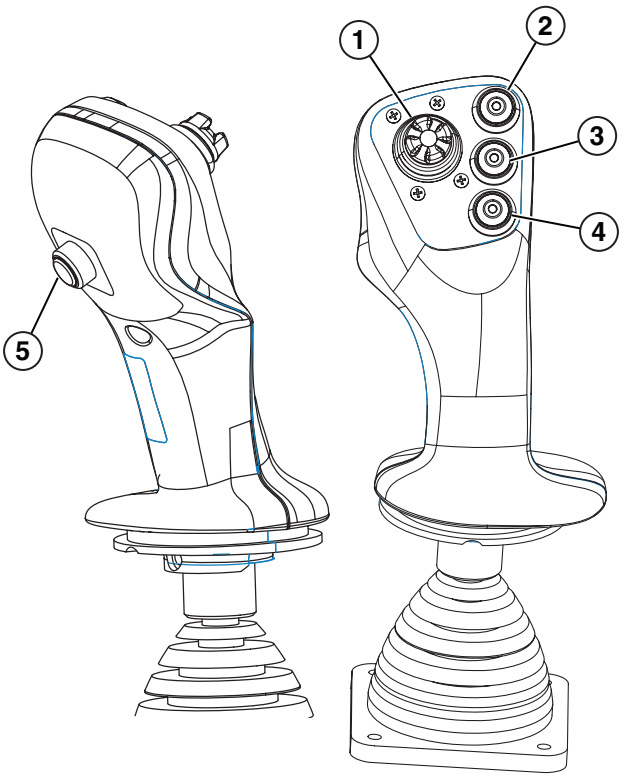


Figure 7 – Standard and Travel Mode

STANDARD MODE

1 – **Mini Joystick** – No function

2 – **Travel Parking Brake ON/OFF Switch** – Press the button to turn the parking brake off. The LED light in the center of the switch will be lit when the parking brake is OFF. Press the button again to apply the brake.

3 – **Travel Speed High/Low Switch** – Press the button to activate high speed travel. The LED light in the center of the switch will be lit when high speed is ON. Press the button again to activate low speed.

4 – **Main Winch Speed High/Low Switch** – Press the button to activate main winch high speed. The LED light in the center of the switch will be lit when high speed is ON. Press the button again to activate low speed.

5 – **Main Winch Free Fall Switch (OPTIONAL)** – Press and hold the button to engage main winch controlled free fall.

STANDARD MODE – MAJOR AXIS FUNCTIONS

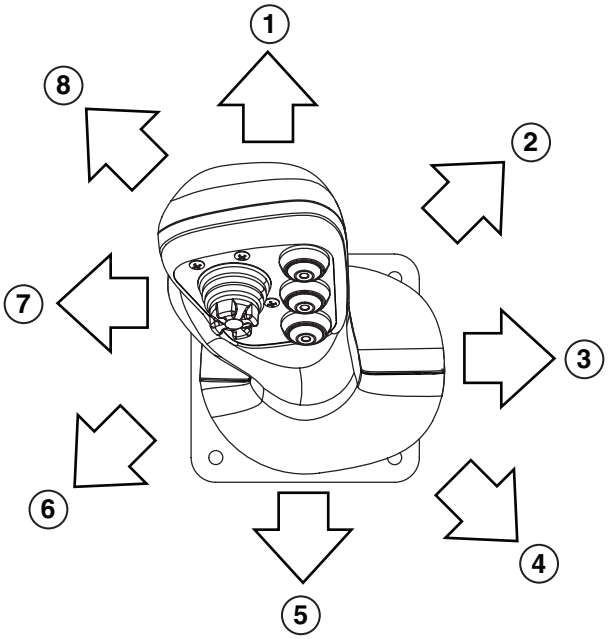


Figure 8

1 – Pushing the joystick forward will lower the main winch.

2 – Pushing the joystick forward and to the right will lower the main winch and the boom hoist.

3 – Pushing the joystick to the right will lower the boom hoist.

4 – Pulling the joystick back and to the right will raise the main winch and lower the boom hoist.

5 – Pulling the joystick back will raise the main winch.

6 – Pulling the joystick back and to the left will raise the main winch and the boom hoist.

7 – Pushing the joystick to the left will raise the boom hoist.

8 – Pushing the joystick forward and to the left will lower the main winch and raise the boom hoist.

TRAVEL MODE

1 – **Mini Joystick Main Boom Hoist Control** – Press UP for main winch to lower. Press DOWN for main winch to raise. Press to the right for boom hoist down. Press to the left for boom hoist up. Directions between UP-DOWN and RIGHT-LEFT activate both functions.

2 – **Travel Parking Brake ON/OFF Switch** – Press the button to turn the parking brake off. The LED light in the center of the switch will be lit when the parking brake is OFF. Press the button again to apply the brake.

3 – **Travel Speed High/Low Switch** – Press the button to activate high speed travel. The LED light in the center of the switch will be lit when high speed is ON. Press the button again to activate low speed.

4 – **Main Winch Speed High/Low Switch** – Press the button to activate main winch high speed. The LED light in the center of the switch will be lit when high speed is ON. Press the button again to activate low speed.

5 – **Main Winch Free Fall Switch (OPTIONAL)** – Press and hold the button to engage main winch controlled free fall.

The right joystick can also be used to drive and steer the crane in travel mode. The joystick is proportional so the farther you move the joystick from the center (neutral position), the faster the movement will occur.

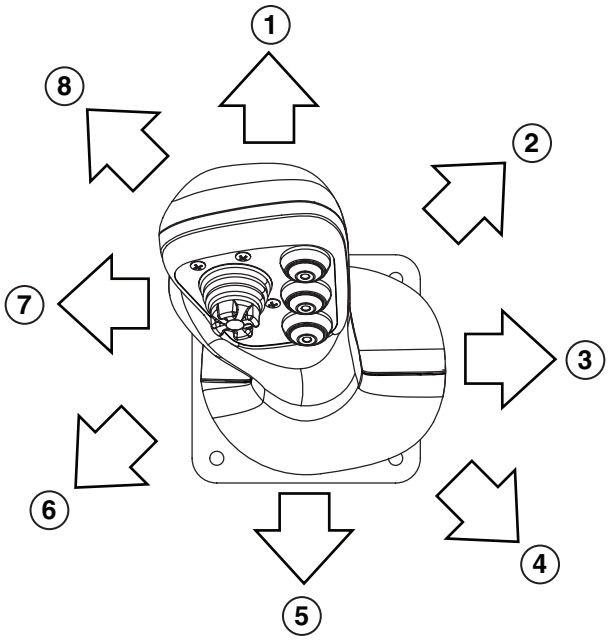


Figure 9

1 – Pushing the joystick forward will move both tracks forward.

2 – Pushing the joystick forward and to the right will move the left track forward, causing the crane to turn to the right.

3 – Pushing the joystick to the right will move the right track in reverse and the left track forward, causing the crane to counter rotate to the right.

4 – Pulling the joystick back and to the right will move the right track in reverse, causing the crane to turn right.

5 – Pulling the joystick straight back will move both tracks in reverse.

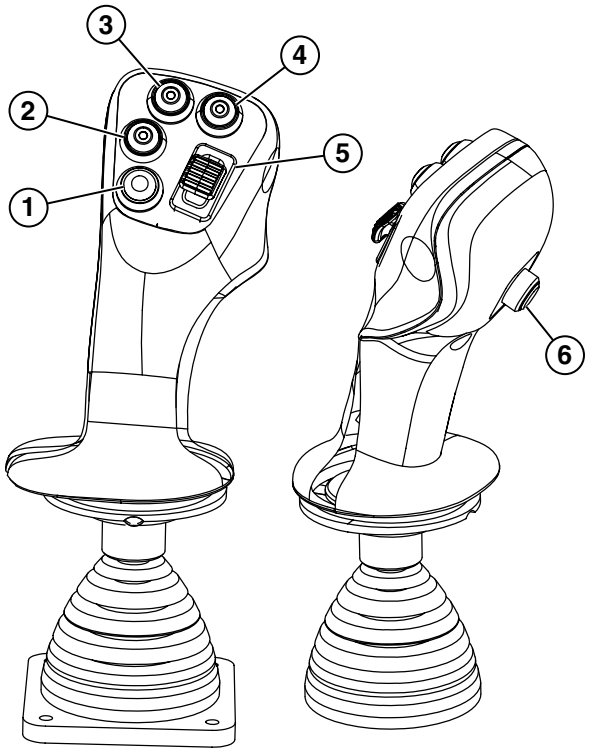
6 – Pulling the joystick back and to the left will move the left track in reverse, causing the crane to turn left.

7 – Pushing the joystick to the left will move the left track in reverse and the right track forward, causing the crane to counter rotate to the left.

8 – Pushing the joystick forward and to the left will move the right track forward, causing the crane to turn to the left.

LEFT JOYSTICK

The left joystick functions the same in both standard mode and travel mode.



1 – **Horn** – Pressing the button will sound the horn. The horn is always functional whether the key switch is on or off. Always sound the horn before starting the engine.

2 – **Auxiliary Winch Speed High/Low Switch** – Press the button to activate auxiliary winch high speed. The LED light in the center of the switch will be lit when high speed is ON. Press the button again to change to low speed.

3 – **Fine Control ON/OFF Switch** – Press the button to activate “Fine Control” mode. When the “Fine Control” indicator is OFF, functions operate at full speed. When the “Fine Control” indicator is ON, the resolution of controls is increased and the maximum function speeds are limited.

4 – **Swing Brake ON/OFF Switch** –The LED light in the center of the switch will be lit when the swing brake is OFF. When the swing brake is ON, the swing function is disabled. Press the button to turn the swing brake off. Press the button again to apply the swing brake.

5 – **Boom Telescope Switch** – Sliding the switch forward will extend the telescoping boom stages. Sliding the switch back will retract the telescoping boom stages.

6 – **Auxiliary Winch Free Fall Switch (OPTIONAL)** – Press and hold the button to engage auxiliary winch controlled free fall.

MAJOR AXIS FUNCTIONS

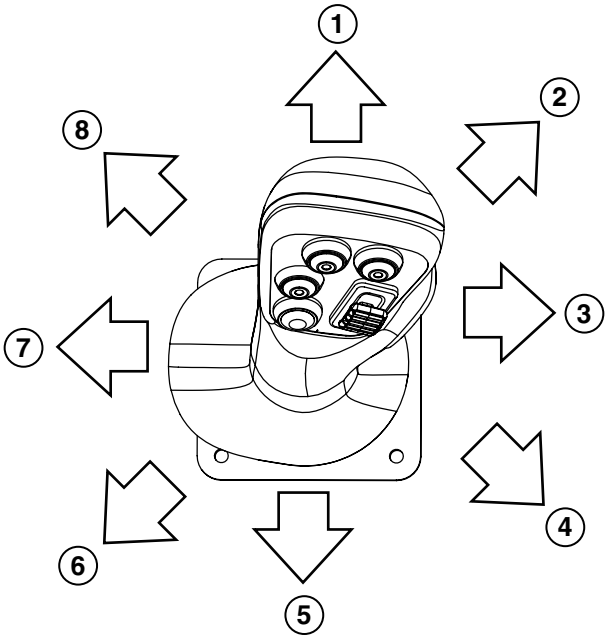


Figure 10

1 – Pushing the joystick forward will lower the auxiliary winch.

2 – Pushing the joystick forward and to the right will lower the auxiliary winch and swing the boom right.

3 – Pushing the joystick to the right will swing the boom right.

4 – Pulling the joystick back and to the right will raise the auxiliary winch and swing the boom right.

5 – Pulling the joystick back will raise the auxiliary winch.

6 – Pulling the joystick back and to the left will raise the auxiliary winch and swing the boom left.

7 – Pushing the joystick to the left will swing the boom left.

8 – Pushing the joystick forward and to the left will lower the auxiliary winch and swing the boom left.

UPPER RIGHT CONTROL CONSOLE

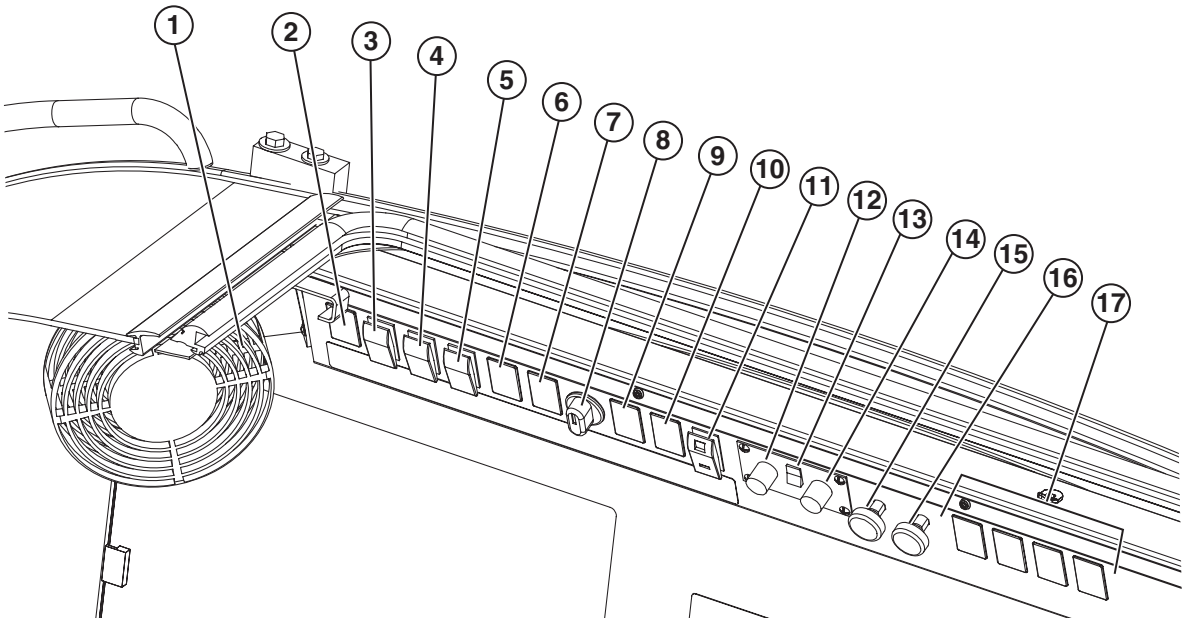


Figure 11

1 – **Fan** – Turn on the toggle switch to start the fan and circulate air inside the cab.

2 – **360° House Lock Switch** – Press the switch to engage the 360° house lock. The upper rotating frame can be held at any position with the 360° house lock. To disengage the 360° house lock, press the top of the switch and hold until the green indicator illuminates. It may be necessary to release the swing parking brake and gently activate the swing function to allow the mechanism to release. To engage the 360° house lock, position the upper rotating frame in the desired position and press the bottom of the switch. A pop-up warning will display on the MD3 screen until fully-engaged.

⚠ CAUTION

- **A pop-up warning will display on the MD3 screen indicating the house lock is neither fully engaged nor fully released. Do not operate in this condition.**
- **Do not engage while the swing is in motion.**

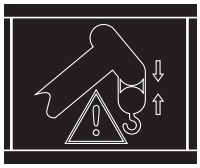
Release the swing parking brake and gently activate the swing function to allow the mechanism to engage, and then operate the swing again to verify it is engaged.

⚠ WARNING

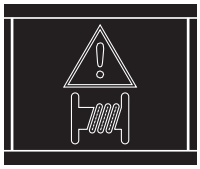
Never use the override switches during normal crane operations. Override switches are not intended for use during normal operation. Pushing an override switch cancels the stop function of the AML-C and/or crane control system. Using these switches during normal operation can be extremely dangerous. Use these switches only when operation has been disabled due to failure of the AML and/or crane control system, or by a trained technician for service or rigging.

3 – **Rated Capacity Indicator (RCI) Override Switch** – Press the switch to override the RCI stop functions: Boom telescope out, Main winch raise, Aux winch raise and lower. This can also override backward stability and work area function. Boom retract, boom hoist raise and lower, swing left and right. There is also another RCI override switch on the upper left control console. Only one needs to be pushed to override the RCI.

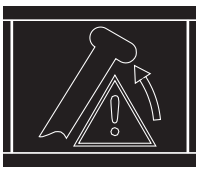
4 – **Anti-Two-Block (A2B) Override Switch** – Press the switch to override the anti-two-block system to enable the stop functions: Boom telescope out, Main winch raise, Aux winch raise, and Boom hoist lower. There is also another anti-two-block switch on the upper left control console. Only one needs to be pushed to override the anti-two-block system.



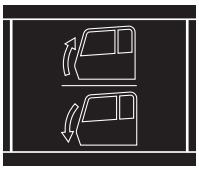
5 – **Last Wrap Override Switch** – Press the switch to override the last wrap shutdown. The winch requires a minimum number of wraps on the drum for operation. When the minimum number of wraps is reached on the main or auxiliary winch, the lower function for that winch will be blocked. The raise functions are not blocked. The “Last Wrap Override” switch may be used when it is necessary to remove all rope from the drum, such as for replacement.



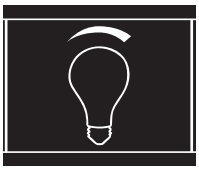
6 – **Boom Hoist Up Override Switch** CE option only.



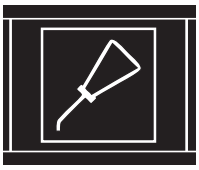
7 – **Cab Tilt Switch** – Press on the top of the switch to tilt the cab up. Press on the bottom of the switch to lower the cab.



8 – **Gauge Dimmer Switch** – Turning the knob clockwise will brighten the back light for the gauges. Turning the knob counterclockwise will dim the backlight for the gauges.

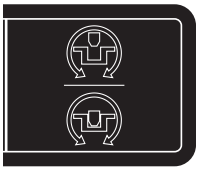


9 – **Lube Pump Switch** – Press the switch to activate the lube pump. The green LED will illuminate when pump is operating (approximately ten minutes). Slowly swing upper assembly to the right and left, and raise and lower boom through full range of motion to lube the slew bearing and the boom heel pin. The red LED will illuminate when the grease reservoir needs to be refilled.



10 – **Remote Enable Switch** – The center position of the switch is normal operation position. Press on the top of the switch to enable the counterweight and jib stowage remote. Press on the bottom of the switch to enable the carbody jack remote.

11 – **Transport House Lock Switch** – The upper rotating frame may be held with the transport house lock at each of the four quadrants: forward, reverse, left side, and right side. To disengage the transport house lock, press the top of the switch. An indicator will display on the MD3 screen until the house lock is fully re-engaged. It may be necessary to release the swing parking brake and gently activate the swing function to allow the mechanism to release. To engage the transport house lock, position the upper rotating frame near the desired quadrant and press the bottom of the switch. An indicator will display on the MD3 screen. Release the swing parking brake, and swing very slowly until the lock engages. Gently operate the swing to verify the house lock is engaged.



12 – **Temperature Control Switch** – Turn the knob clockwise to increase the temperature and counterclockwise to decrease the temperature.

13 – **Air Conditioner Switch** – Turn the temperature control knob counterclockwise and then press on the top of the “Air Conditioner” switch to turn on the air conditioner. Press on the bottom of the switch to turn the air conditioner off.

14 – **Fan Speed Switch** – Turn the knob clockwise to turn on the fan and increase speed. Turn the knob counterclockwise to decrease fan speed or turn fan off.

15 – **Front Window Wiper/ Washer Knob** – Turn the knob clockwise to turn on the front window wiper. The wiper has 2 speeds; continuing to turn the knob will put the wiper in high speed. Press the button to activate the washer fluid.

16 – **Top Window Wiper/ Washer Knob** – Turn the knob clockwise to turn on the top window wiper. The wiper has 2 speeds; continuing to turn the knob will put the wiper in high speed. Press the button to activate the washer fluid.

17 – **Options** – Not used on this model

UPPER LEFT CONTROL CONSOLE

⚠ WARNING

Never use the override switches during normal crane operation. Override switches are not intended for use during normal operation. Pushing an override switch cancels the stop function of the AML-C and/or crane control system. Using these switches during normal operation can be extremely dangerous. Use these switches only when operation has been disabled due to failure of the AML and/or crane control system, or by a trained technician for service or rigging.

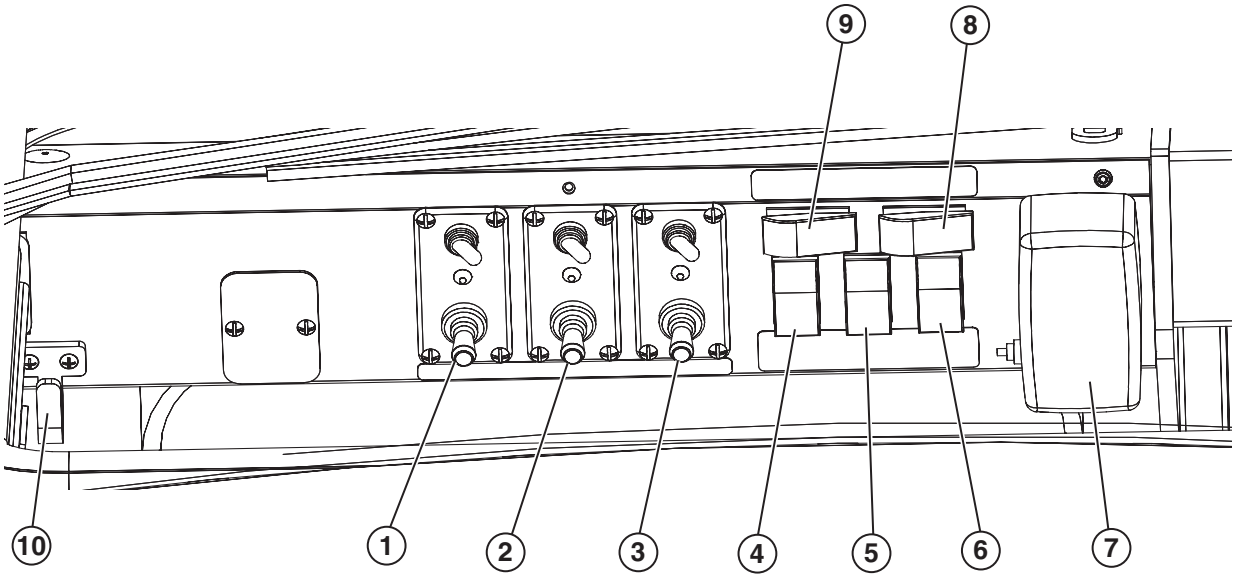


Figure 12

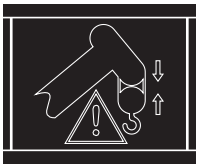
1 – **Rear Floodlight** – Move the toggle switch to turn the light on. When the light is on, the red light will illuminate. Move the directional control knob to control the direction of the light beam.

2 – **Front Engine Spotlight** – Move the toggle switch to turn the light on. When the light is on, the red light will illuminate. Move the directional control knob to control the direction of the light beam.

3 – **Front Cab Spotlight** – Move the toggle switch to turn the light on. When the light is on, the red light will illuminate. Move the directional control knob to control the direction of the light beam.

4 – **Rated Capacity Indicator (RCI) Override Switch** – Press the switch to override the RCI stop functions: Boom telescope out, Main winch raise, Aux winch raise, Boom retract, Boom hoist and lower, Swing left and right. This will also override backward stability and work area function. There is also another RCI override switch on the upper right control console. Only one needs to be pushed to override the RCI.

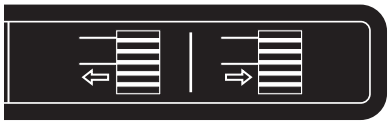
5 – **Anti-Two-Block (A2B) Override Switch** – Press the switch to override the anti-two-block system to enable the stop functions: Boom telescope out, Main winch raise, Aux winch raise, and Boom hoist lower. There is also another anti-two-block switch on the upper right control console. Only one needs to be pushed to override the anti-two-block system.



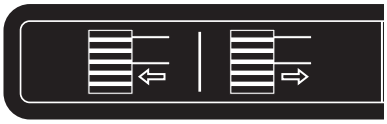
6 – **Option** – Not used on this model

7 – **Interior Cab Light** – Press the switch in to turn on the light. Press the switch again to turn off the light.

8 – **Right Track Switch** – Press and hold the right side of the switch to extend the track. Press and hold the left side of the switch to retract the tracks.



9 – **Left Track Switch** – Press and hold the left side of the switch to extend the track. Press and hold the right side of the switch to retract the tracks.



10 – **Coat Hook**

REMOTE CONTROLS

Two remote controls are included with the crane. One is used for removing and installing the counterweights, and for stowing and deploying the jib. The second is used for raising and lowering the crane on carbody jacks and controlling the “Track Extend” functions for removing and installing the track assemblies. To use the remote controls, the remote enable switch inside the cab must be in the correct position.

COUNTERWEIGHT AND JIB REMOTE

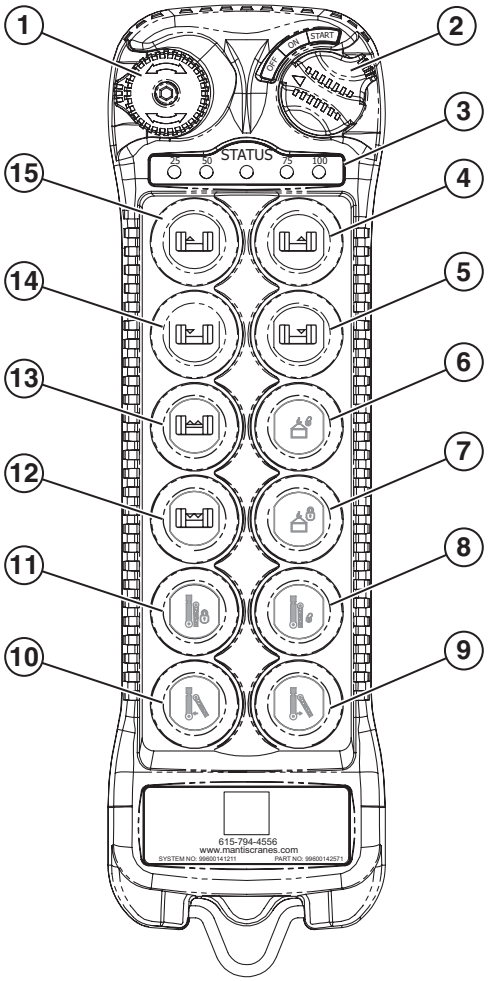


Figure 13

1 – **Emergency Stop Switch** – Press down on the red "Emergency Stop" button to immediately stop all remote functions. To reset, rotate the button clockwise or counterclockwise and cycle power. The button will pop up when reset.

2 – **Off/On/Speed Switch** – This is a three-position switch with Off, On and Speed selection positions.

3 – **Status LED Indicators** – Displays the current speed range that is selected. 25% is the slowest and 100% is the fastest.

4 – **Right Counterweight Raise** – Press and hold the button to raise the right counterweight cylinder.

5 – **Right Counterweight Lower** – Press and hold the button to lower the right counterweight cylinder.

6 – **Counterweight Pin Unlock** – Press and hold the button to unlock the counterweight pins.

7 – **Counterweight Pin Lock** – Press and hold the button to lock the counterweight pins.

8 – **Jib Pin Unlock** – Press and hold the button to unlock the jib stowage pins.

9 – **Jib Release** – Press and hold the button to extend the jib stowage cylinder.

10 – **Jib Stow** – Press and hold the button to retract the jib stowage cylinder.

11 – **Jib Pin Lock** – Press and hold the button to lock the jib stowage pins.

12 – **Both Counterweight Lower** – Press and hold the button to lower the right and left counterweight cylinders together.

13 – **Both Counterweight Raise** – Press and hold the button to raise the right and left counterweight cylinders together.

14 – **Left Counterweight Lower** – Press and hold the button to lower the left counterweight cylinder.

15 – **Left Counterweight Raise** – Press and hold the button to raise the left counterweight cylinder.

To decrease the speed range of the remote, hold the "Off/On/Speed" switch in the "Speed" position and press and release the left "Counterweight Raise" button. The speed will display on the status LED indicator. Press again until desired speed is reached.

To increase the speed range of the remote, hold the "Off/On/Speed" switch in the "Speed" position and press and release the right "Counterweight Raise" button. The speed will display on the status LED indicator. Press again until desired speed is reached.

CARBODY JACK REMOTE

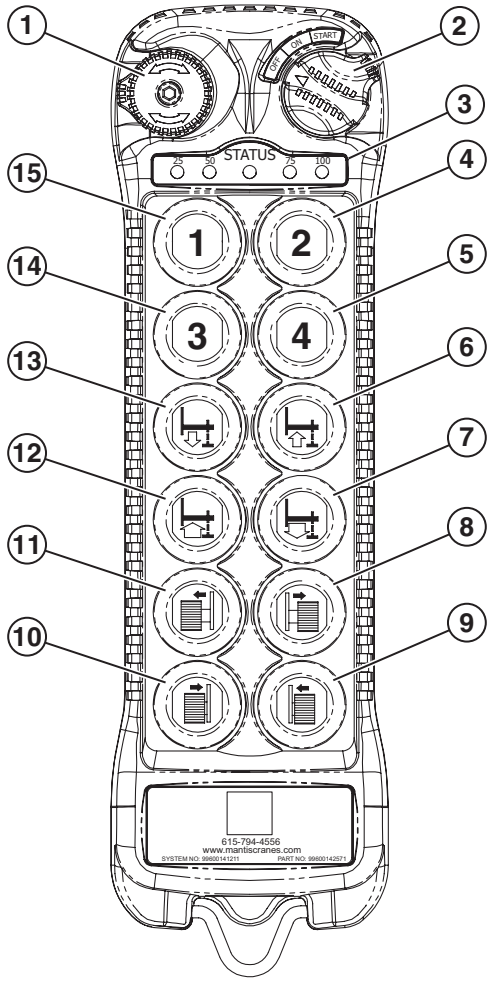


Figure 14

1 – **Emergency Stop Switch** – Press down on the red "Emergency Stop" button to immediately stop all remote functions. To reset, rotate the button clockwise or counterclockwise and cycle power. The button will pop up when reset.

2 – **Off/On/Speed Switch** – This is a three-position switch with Off, On and Speed selection positions.

3 – **Status LED Indicators** – Displays the current speed range that is selected. 25% is the slowest and 100% is the fastest.

4 – **"2" Button Right Front Jack** – To operate just the right front carbody jack cylinder, press and hold the "2" button and press and hold the "Jack Extend" button to extend the lift cylinder or the "Jack Retract" button to retract the lift cylinder.

5 – **"4" Button Right Rear Jack** – To operate just the right rear carbody jack cylinder, press and hold the "4" button and press and hold the "Jack Extend" button to extend the lift cylinder or the "Jack Retract" button to retract the lift cylinder.

6 – **Jack Retract** – Push the "Jack Number" button and the "Jack Retract" button to retract the jack cylinders individually.

7 – **All Jacks Extend** – Press and hold the "All Jacks Extend" button to extend all the jack cylinders at the same time.

8 – **Right Track Extend** – Press and hold the "Right Track Extend" button to extend the right side track.

9 – **Right Track Retract** – Press and hold the "Right Track Retract" button to retract the right side track.

10 – **Left Track Retract** – Press and hold the "Left Track Retract" button to retract the left side track.

11 – **Left Track Extend** – Press and hold the "Left Track Extend" button to extend the left side track.

12 – **All Jacks Retract** – Press and hold the "All Jacks Retract" button to retract all the jack cylinders at the same time.

13 – **Jack Extend** – Push the "Jack Number" button and the "Jack Extend" button to extend the jack cylinders individually.

14 – **"3" Button Left Rear Jack** – To operate just the left rear carbody jack cylinder, press and hold the "3" button and press and hold the "Jack Extend" button to extend the lift cylinder or the "Jack Retract" button to retract the lift cylinder.

15 – **"1" Button Left Front Jack** – To operate just the left front carbody jack cylinder, press and hold the "1" button and press and hold the "Jack Extend" button to extend the lift cylinder or the "Jack Retract" button to retract the lift cylinder.

MD3 DISPLAY

The crane control display provides extensive information and warnings regarding the engine, hydraulic and electrical system and maintenance. It may also be used to select operation modes. In addition, it is possible to adjust certain parameters, measure input and output values, set operator preferences, and view machine information on other pages. *See Figure 15*.

Figure 15

NAVIGATION BUTTONS

Table 3-1

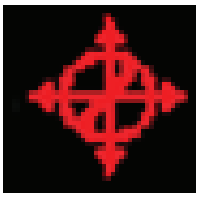
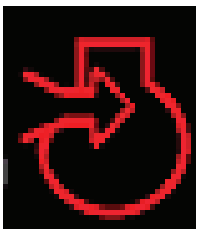
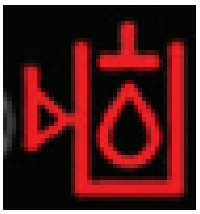
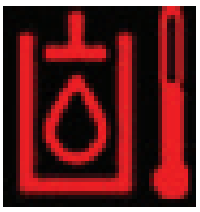
INDICATOR	DESCRIPTION	PURPOSE
	Up	Scroll through pages, navigate up a list of options or increase a parameter value.
	Down	Scroll through pages, navigate down a list of options or decrease a parameter value.
	OK	Select highlighted item/value and continue.

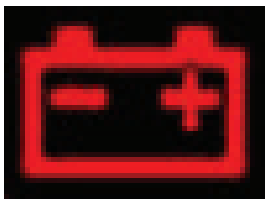
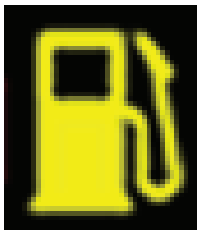
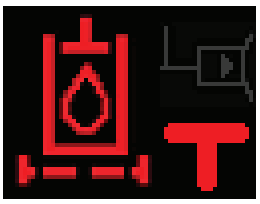
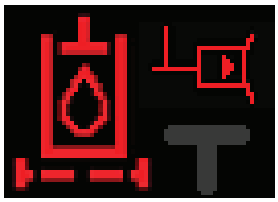
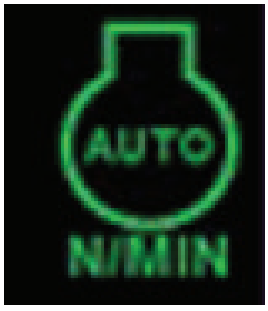
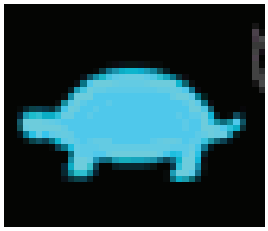
INDICATOR	DESCRIPTION	PURPOSE
	Escape	Navigate to previous level, exit without saving.
	Menu	Navigate between operating pages and main page.

WARNING AND STATUS INDICATORS

These icons are displayed at the top of all main pages and are indicators of status or provide warnings.

Table 3-2

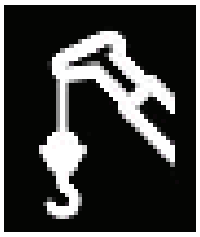
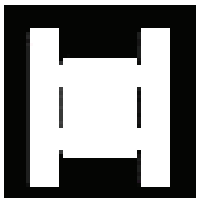
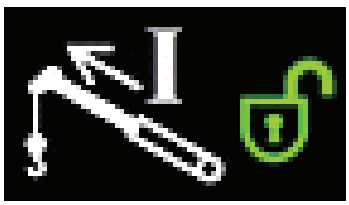
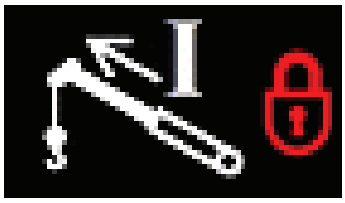
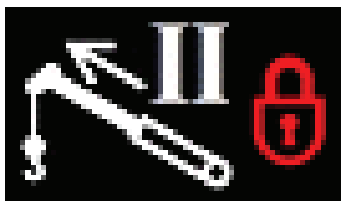
INDICATOR	DESCRIPTION	PURPOSE	RECOMMENDED ACTION
	Controls Disabled	Illuminated when functions are disabled; either operator is not in seat or controls switch is in “disabled” position.	To enable controls, operator must be in seat and controls switch must be in “enabled” position.
	Engine Air Intake Restriction	Illuminated when engine air intake is restricted, indicating the air filter is clogged.	Replace engine air intake filter.
	Low Hydraulic Fluid Level	Illuminated when hydraulic fluid level in the tank is below the minimum allowable level.	Retract all hydraulic cylinders and add hydraulic fluid to tank.
	High Hydraulic Fluid Temperature	Illuminated when hydraulic fluid temperature exceeds 176°F (80°C).	Return all functions to neutral and allow hydraulic fluid to cool before resuming operation.

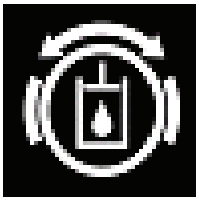
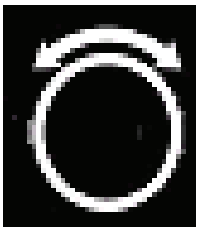
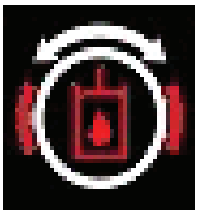
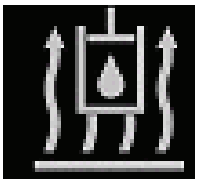
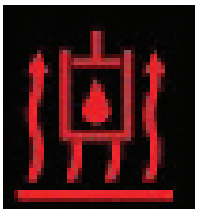
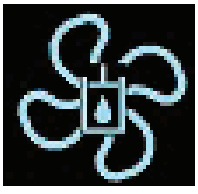
INDICATOR	DESCRIPTION	PURPOSE	RECOMMENDED ACTION
	Low Voltage	Illuminated when system voltage is less than 22 VDC.	Check alternator, battery and cable connections.
	Low Diesel Fuel Level	Illuminated when diesel fuel level is low.	Refill diesel fuel tank.
	Return Hydraulic Filter Restriction Indicator	When filter icon and T are illuminated, return filter is clogged.	Replace hydraulic return filter elements located in the tank. See page 6-5 for more details.
	Hydraulic Pilot Filter Restriction Indicator	When filter icon and pilot symbol are illuminated, pilot/ charge filter is clogged.	Replace hydraulic pilot/charge filters near the pumps. See page 6-15 for more details.
	Engine Control Indicator	Illuminated gray when in standard throttle mode Illuminated green when in adaptive throttle mode Illuminated blue when in set point throttle mode	N/A
	Fine Control	Reduces maximum command to 50% for boom hoist, winch, boom telescope and swing to allow for finer control of these functions.	N/A

SOFT KEYS

These icons are located at the bottom of all the main pages and both indicate current status and are located above the soft key used to change the status.

Table 3-3

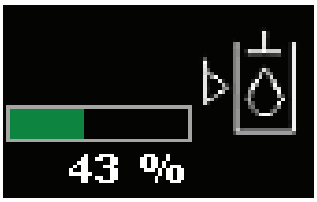
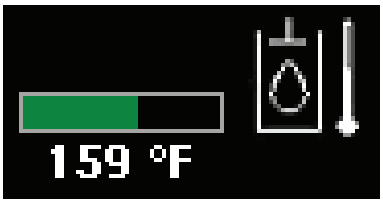
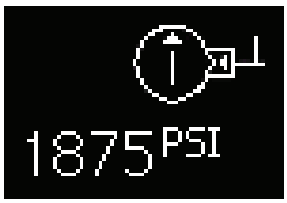
SOFT KEY	FUNCTION	ICON	CURRENT STATUS	PRESS SOFT KEY TO:
F1	Operation Mode		Crane Mode	Change to travel mode.
			Travel Mode	Change to crane mode.
F2	Boom Telescope Mode		Boom Telescope Mode 1	Change to Boom Telescope mode 2.
			Boom Telescope Mode 2	Change to Boom Telescope mode 1.
			Boom Telescope Mode 1 – Locked	Not available: Locked in mode 1 because boom is not fully retracted or boom mode is not available.
			Boom Telescope Mode 2 – Locked	Not available: Locked in mode 2 because boom is not fully retracted.

SOFT KEY	FUNCTION	ICON	CURRENT STATUS	PRESS SOFT KEY TO:
F3	Swing Mode		Controlled Swing Mode	Change to Free Swing mode.
			Free Swing Mode	Change to Controlled Swing mode.
			Controlled Swing Mode – Locked	Not available: Locked in Not Controlled Swing mode (Free Swing not available) due to swing zone limitation.
F4	Warm Up/ Cooling Circulation		Hydraulic Fluid Warm Up System available, but not active	Activate Hydraulic Fluid Warm Up circuit. This should be used in cold weather to increase hydraulic fluid temperature to 70-100°F (20-38°C) before starting normal operation.
			Hydraulic Fluid Warm Up System active	Turn off Hydraulic Fluid Warm Up circuit.
			Hydraulic Fluid Cooling automatically activated due to high hydraulic fluid temperature	Not available.

GAUGES

These gauges are located on the main page and provide information about the hydraulic system.

Table 3-4

GAUGE	DESCRIPTION	PURPOSE	ADDITIONAL INDICATION
	Hydraulic Fluid Level Gauge	Displays the amount of hydraulic fluid in the tank. During normal operation, the fluid level will decrease as cylinders are extended and increase as cylinders are retracted.	A green bar indicates normal range. A red bar indicates below normal range. See “Low Hydraulic Fluid Level” warning on page 3-19.
	Hydraulic Fluid Temperature Gauge	Displays the temperature of the hydraulic fluid returning to the tank.	A green bar indicates normal range. A red bar indicates above normal range. See “High Hydraulic Fluid Temperature” warning on page 3-19.
	Pump 1 Output Pressure	Displays output pressure of pump 1, which supplies Auxiliary Winch, Boom Hoist, Right Travel, Swing Brake Pedal, Track Extend, Jib Stowage, and Counterweight Removal.	Monitor during operation or use during troubleshooting.
	Pump 1 Load Sense Pressure	Displays load sense pressure to pump 1.	Monitor during operation or use during troubleshooting.
	Pump 2 Output Pressure	Displays output pressure of pump 2, which supplies Main Winch, Boom Telescope, Left Travel and Carbody Jacks.	Monitor during operation or use during troubleshooting.
	Pump 2 Load Sense Pressure	Displays load sense pressure to pump 2.	Monitor during operation or use during troubleshooting.

GAUGE	DESCRIPTION	PURPOSE	ADDITIONAL INDICATION
	Swing Pump Output Pressure	Displays output pressure of swing pump.	Monitor during operation or use during troubleshooting.
	Charge and Pilot Pressure	Displays charge and pilot pressure.	Monitor during operation or use during troubleshooting.

MENU PAGE

From any operator page, pressing the menu button will select the menu page. *See Figure 16*.

Figure 16

1 – Press F1 to view and adjust parameter settings.

2 – Press F2 to measure input and output values.

3 – Press F3 to view and adjust display settings.

4 – Press F4 to view machine information.

Pressing the menu button again will return to the operating pages.

Info Page: Displays crane control system software file name and revision. *See Figure 17.*

Figure 17

1 – Crane Control System Software Application File and Revision

Press F3 to view wind speed history information or access logs for service.

Wind Speed Log Page: On cranes equipped with optional anemometer, this page displays history of wind speed events. From the Info page, press F3 to select Logs, and then use down button to highlight “Wind Speed Logging” and press OK button. *See Figure 18.*

Figure 18

1. Each line is an instance the wind speed was greater than the threshold setting.
2. Press F2 to reverse the order of information from newest to oldest and oldest to newest.
3. The date and time of the instance and the actual wind speed is shown according to the selected units.
4. Press F3 to toggle between date stamp (DD/MM/YY) and time (24-hour clock).

Preferences Page: Provides current status of basic settings and allows operators to change settings. *See Figure 19.*

Figure 19

1. Press F1 to adjust backlight and screen saver settings.
2. Press F2 to view date and time and set. Date is DD/MM/YY and time is a 24-hour clock.
3. Press F3 to select language.

Measure Page: Displays actual values of inputs, outputs and CAN BUS messages. This is typically used by trained service personnel. *See Figure 20.*

Figure 20

- Engine Control
- Joystick and Pedal
- DI= Digital Inputs
- DO= Digital Outputs
- AML-C messages
- HP control measure group
- Hydraulic usage
- AI= Analog Input
- AO= Analog Output

Adjust Page: Displays current parameter settings and allows adjustment of certain parameters. Some parameters may be accessed by operators. The items listed with the lock symbol are reserved for trained service personnel. *See Figure 21.*

Figure 21

- The valve adjust group allows adjustment of minimum and maximum current for each control valve to calibrate the function.
- Operator options:
  - ◊ Allows selection of U.S. or metric units
  - ◊ Allows operator to disable main or auxiliary winch

CHAPTER 4:
ASSEMBLY/DISASSEMBLY FOR TRANSPORT

Due to the weight and overall width of the Tadano Mantis GTC-1200 cranes, it may be necessary to remove some components from the machine to meet the local weight and width requirements in the area for transportation. The crane will then need to be assembled at the jobsite before crane operation can begin.

To assemble the crane:

1. Unload Crane from Trailer (see page 4-2).
2. Install Carbody Counterweight (see page 4-4).
3. Install Track Frames (see page 4-6).
4. Assemble Rear Counterweight (see page 4-10).
5. Install Rear Counterweight (see page 4-12).

To disassemble the crane:

1. Remove Rear Counterweight (see page 4-14).
2. Disassemble Rear Counterweight (see page 4-16).
3. Remove Track Frames (see page 4-17).
4. Remove Carbody Counterweight (see page 4-20).
5. Load Crane on Trailer (see page 4-21).)

⚠ WARNING

Never begin to prepare the crane for the jobsite on an uneven, loose area. Always perform preparation on a flat, level, hard surface. The crane can tip, causing serious injury or death.

The following items can be installed/removed without the assistance of an additional crane:

- Counterweight(s)
- Track frame assemblies

If an additional crane or lifting device is used to remove any of the following items, it must be able to handle the lifting capacities of these components:

GTC-1200 REMOVABLE COMPONENT WEIGHTS

COMPONENT	WEIGHT	
	LB	KG
Left Track Frame	30,300	13,710
Right Track Frame	30,300	13,710
Counterweight A	24,427	11,053
Counterweight B - 1 Piece	11,670	5,281
Counterweight C - 1 Piece	11,670	5,281
Counterweight - Carbody - 1 Piece	10,000	4,525
Jib - Heavy Lift	2072	940
Jib Base Section	1,003	454
Jib Point	915	415
Jib Insert	1,053	476

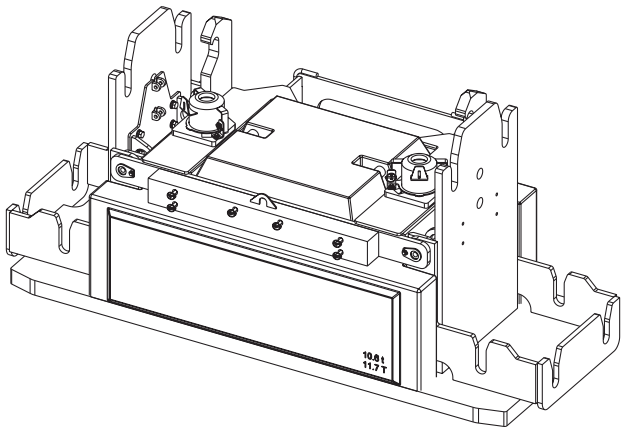


Figure 1 – Rear Counterweight Configuration A

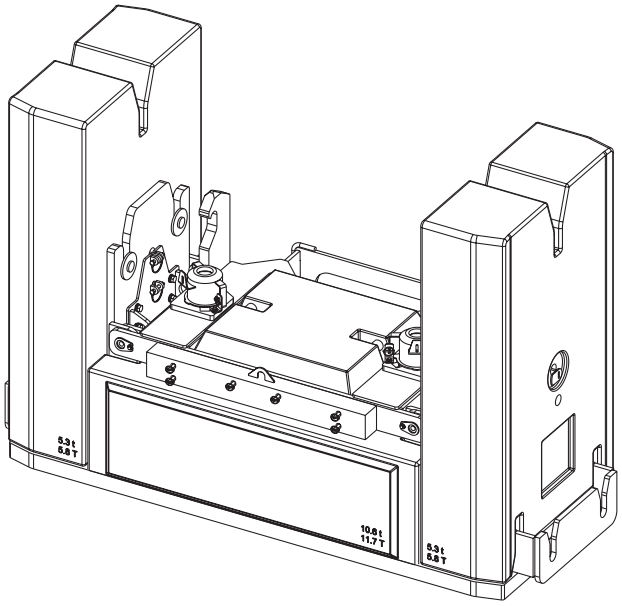


Figure 2 – Rear Counterweight Configuration B

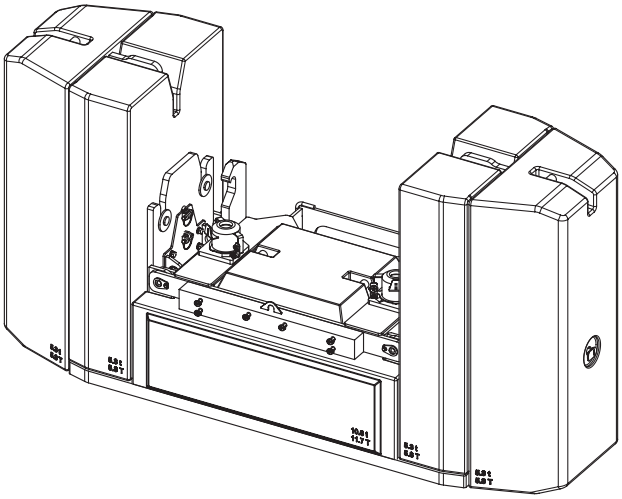


Figure 3 – Rear Counterweight Configuration C

UNLOAD CRANE FROM TRAILER

⚠ WARNING

Always park the trailer on a hard, flat, level surface before unloading the crane. The trailer must be parked on a hard, flat, level surface to prevent the crane from tipping.

Never use the carbody jacks to raise the crane unless the crane is in the proper configuration. The rear counterweights, jib, extension, auxiliary nose sheave, and overhaul ball must be removed before using the carbody jacks.

The crane is equipped with a carbody jack system to provide a means for raising the crane for unloading from a trailer. The jacks are controlled by a wireless radio remote. For information on the remotes, see *Remote Controls on page 3-15.*

1. Confirm the lift plan and make sure all personnel understands their responsibilities and a clear form of communication between personnel is established.
2. Start the engine. Make sure the swing brake is locked and the boom is pointing in line with the trailer.

3. Before operating, the remote must be enabled by moving the “Carbody Jack Remote Enable/Normal Operation/Counterweight & Jib Stowage Remote Enable” switch in the cab to the “Carbody Jack Remote Enable” position.
4. Make sure “On Carbody Jacks” mode is selected in the load moment indicator (AML).

⚠ WARNING

When lowering the carbody jacks, the boom angle should be maintained between 55° and 60° for optimal stability.

5. Raise the boom from the transport position. The boom angle should be set between 55° and 60°.
6. Verify the “Emergency Stop” switch on the remote is released and rotate the on/start switch to “START” and then release to the “ON” position.

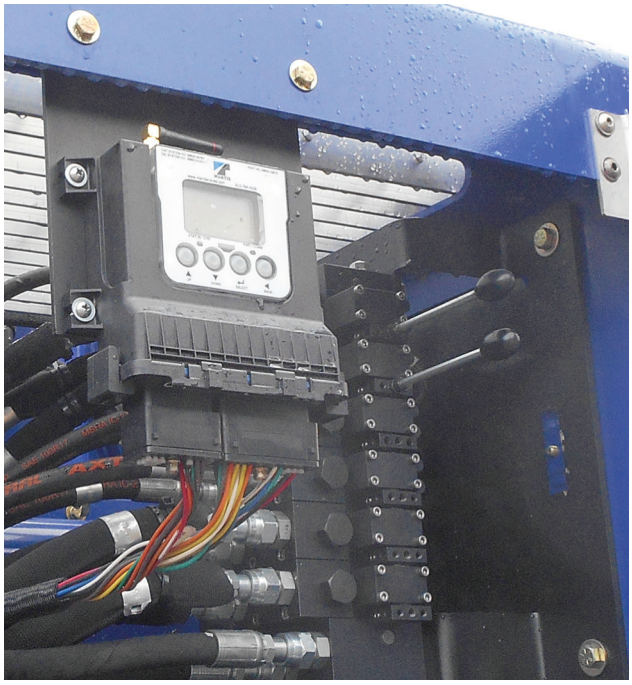


Figure 4

Figure 5

7. Verify the status lights on the receiver module located on the upper right behind the rear door and the light on the carbody are green, indicating the remote and receiver are communicating. When the remote is no longer needed, ensure functions are not activated accidentally or in case of a system fault, push the “Emergency Off” button to stop the communication between the remote and receiver.
8. Swing each carbody jack from the transport position away from the extend beams to the middle pin position and pin them into position.
9. Install the outrigger pads on each cylinder and verify surface is flat and smooth.
10. Position proper dunnage, if required, under each outrigger jack pad. Do not “bridge” the pads. Use cribbing material as required.

⚠ WARNING

Verify the AML system is registered in the “On Carbody Jacks” mode before extending the carbody jacks to lift the crane.

11. After positioning each carbody jack, extend each one individually until making firm contact with the ground or dunnage.
12. To operate jacks individually, fully press the button for the jack (1=front left, 2=front right, 3=rear left, 4=rear right) and press the jack extend button.

⚠ DANGER

Never raise the crane from the trailer if the crane is not level. The crane must be level to remain stable when rising from the trailer. Even when using the automatic leveling feature, the operator is responsible for keeping the crane level.

NOTE: The jacks may be operated individually or simultaneously with automatic leveling.

13. To raise the crane with automatic leveling, press the "All Jacks Extend" button. The system should automatically maintain level within 1° relative to gravity. If the crane is not level, operate the individual jacks to level the crane before using the automatic leveling feature.

NOTE: If jacks are operated in with All Jacks Extend/All Jacks Retract button before the jacks are in firm contact with he ground, they will not extend/retract equally.

Figure 6

14. Continue to raise the crane using the carbody jacks until there is enough clearance to remove the trailer.
15. Remove the trailer from under the crane.
16. Slowly lower the boom to 0° and install the hook block.
17. Raise the boom to 55 – 60°.

INSTALL CARBODY COUNTERWEIGHT

Depending on how your crane was transported, the front and rear carbody weights may need to be installed.

⚠ WARNING

Never allow any part of your body to be underneath the counterweight while it is being lifted. Always stay clear of the counterweight when it is being lifted. The counterweight can spin and swing while being lifted.

NOTICE

Tilt the cab back to its highest position to provide the most clearance between the lifting slings and the cab.

1. Position the boom so that the hook block is positioned directly above the carbody counterweight.

Figure 7

2. Using the factory-supplied track frame removal slings and nylon straps, attach the carbody counterweight to the hook block.

NOTICE

Make sure all travel hoses and obstacles are clear of the carbody counterweight while it is being lifted.

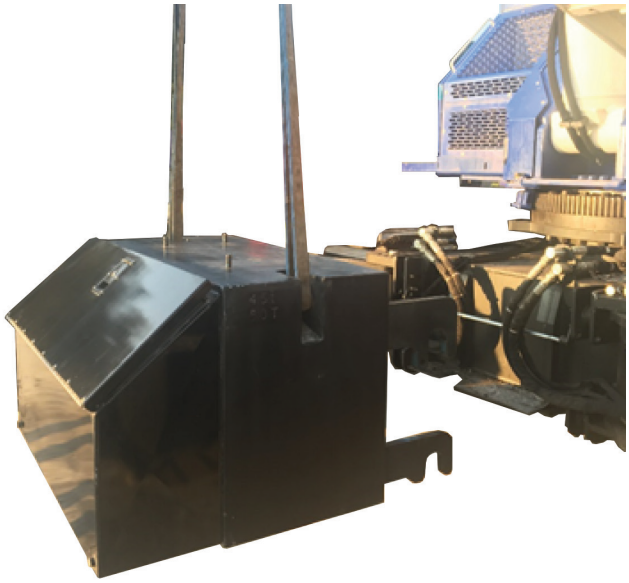


Figure 8

3. Slowly lift the carbody weight and move toward the crane.
4. Lower the counterweight and hook the carbody hooks onto the lug pins on the frame.

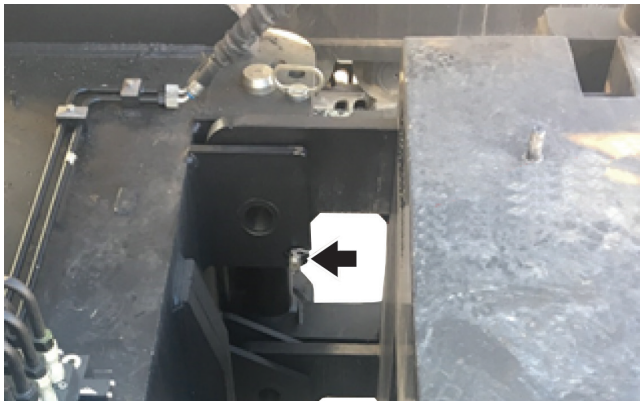


Figure 9

5. Install the carbody retaining pins through the lugs to secure the weights in place.
6. Repeat the procedure for the second carbody counterweight.

INSTALL TRACK FRAMES

⚠ WARNING

Always have clear communication established between the crane operator and any ground personnel.

- **If using hand signals, both the crane operator and any ground personnel must decide on the hand signals that they will be using during the job before the work begins.**
- **If hand signals are not used, set up and test proper radio communication before the job begins.**

1. Make sure “On Carbody Jacks” is selected in load moment indicator (AML).
2. The track frames should be positioned beside the crane within the rated radius of the rigging mode chart. Raise the carbody jacks for track frame clearance if required.
3. Extend the track frame beams for both left and right sides.
4. Raise the boom to a high angle and keep the boom fully retracted.

Figure 10

5. Swing the boom directly over the side, positioning the hook over the center of the first track to be installed.

Figure 11

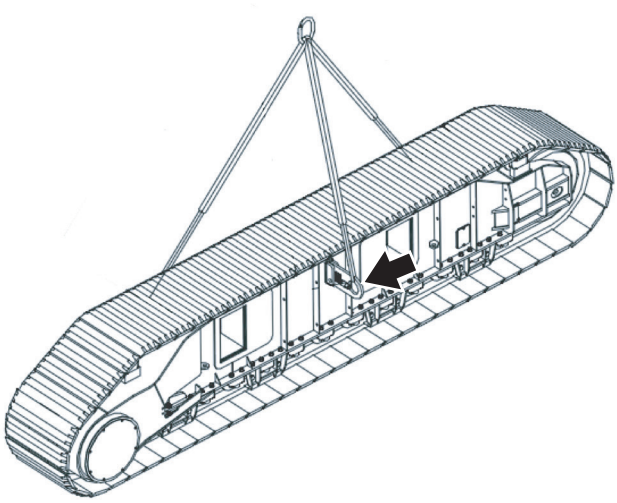


Figure 12

6. There are two shackles on the outside of the frame and one on the inside of the frame. Using appropriate rigging for the load, attach the factory-supplied 3-leg sling to each of the shackles.

Figure 13

7. On the track frame at each extend beam interface, remove retaining pins and release latch plate. Rotate catch plates alternately to right and left. *See Figure 13.*

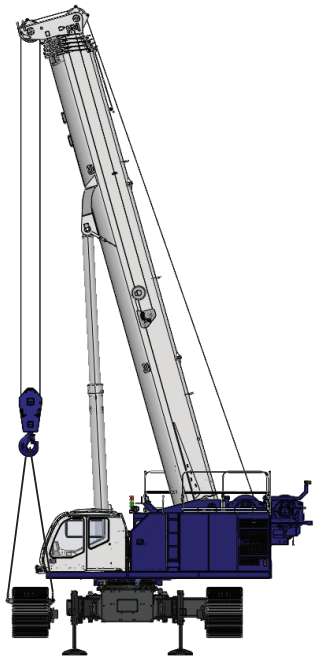


Figure 14

8. Using the crane, begin lifting the track frame into place. Tilt the track frame so the outside is slightly higher than the inside to aid the engagement with the extend beams. Adjust the 3-leg sling as needed.

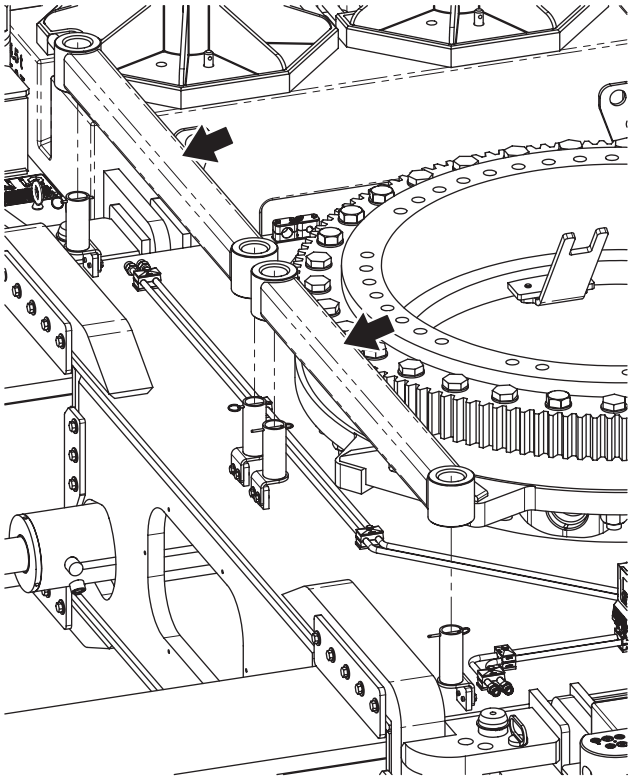


Figure 15

9. Remove the track frame assembly bars from the transport storage area.

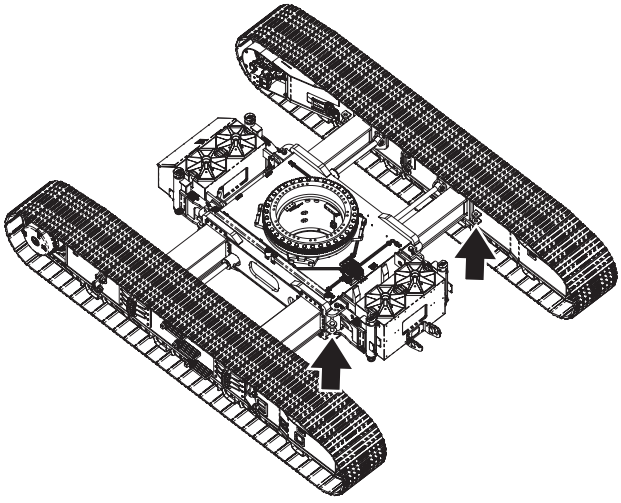


Figure 16

10. Connect the track frame assembly bars between the crane's carbody and the track frames to keep the frames from swinging outward. Use the "Track Extend/ Retract Control" button to help with engagement.

11. Ensure that the frame is fully engaged on the extend beam, and engage the latch bars with the end of the extend beam.

Figure 17

12. Rotate the locking bars to realign the vertical notch. Swing up latch plate and reinstall retainer pin.

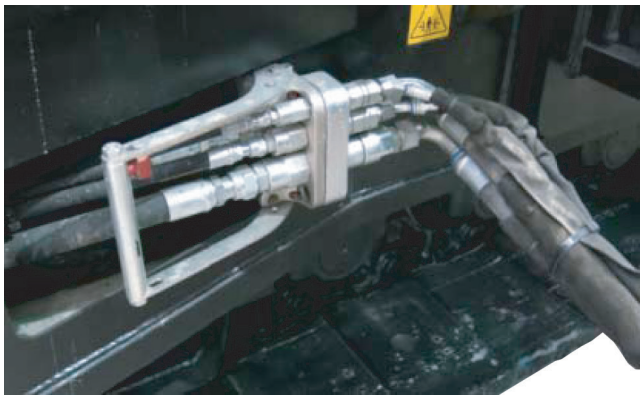


Figure 18

NOTICE

Before connecting quick couplers, make sure that both the male and female quick couplers are clean and free of any dirt and debris.

13. Connect the quick couplers for the drive motor hydraulic lines.
14. Repeat the above procedure for the track frame on opposite side.
15. Once the track frames are properly installed on the extended beams and the carbody counterweights are properly installed, carefully lower the crane off the carbody jacks and stow properly. Turn the Carbody Jack Mode off and register the proper crane configuration on the AML.

ASSEMBLE REAR COUNTERWEIGHT

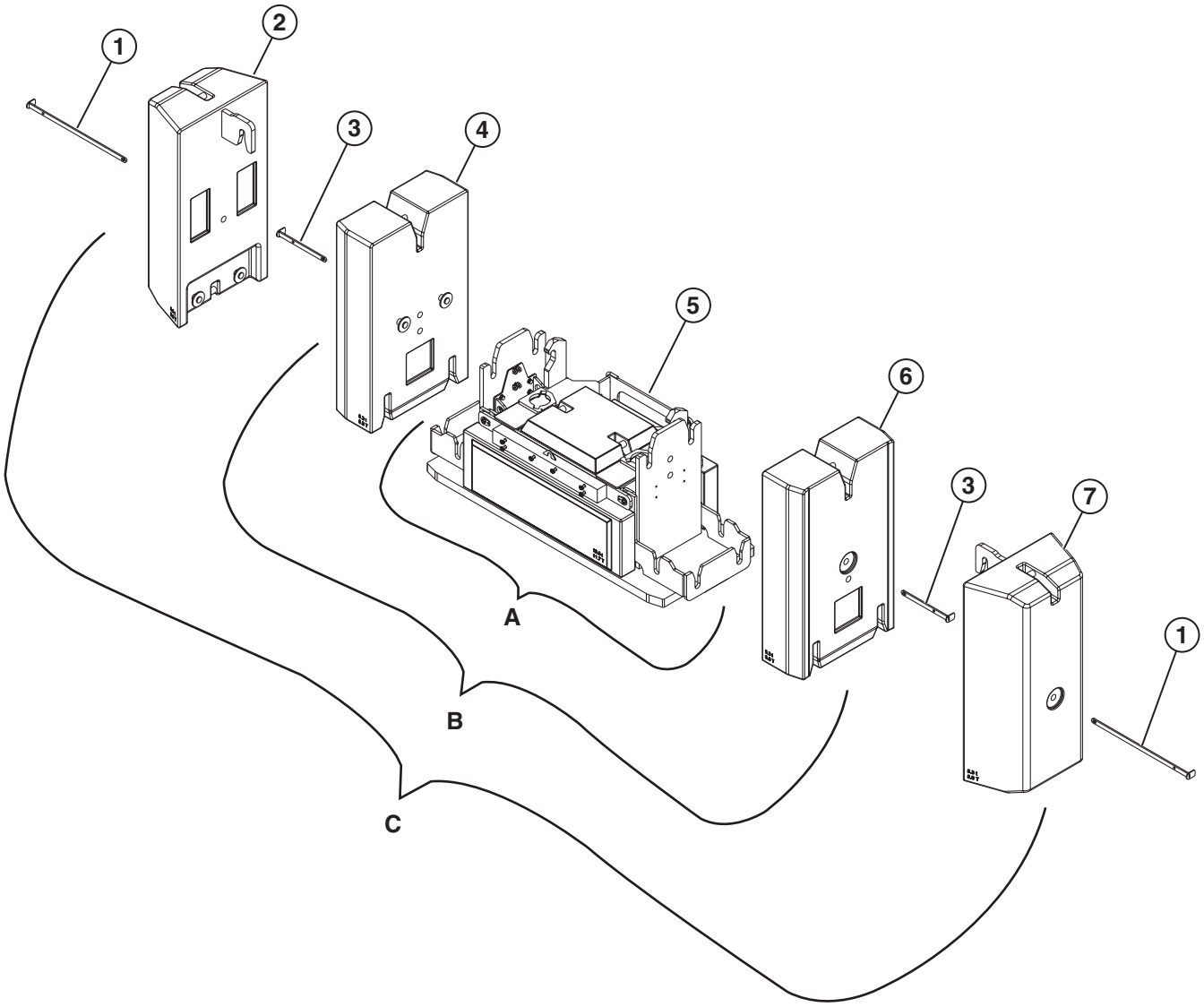


Figure 19

1 – Outside Counterweight Pin (2 used)
2 – Left Outside Counterweight
3 – Inside Counterweight Locking bars (2 used)
4 – Left Inside Counterweight
5 – Counterweight Cradle
6 – Right Inside Counterweight
7 – Right Outside Counterweight

Depending on how your crane was transported, the rear counterweight may need to be assembled before being installed onto the crane.

⚠ WARNING

Always use a suitable lifting device capable of lifting the weight of the counterweight components. A lifting device not suitable for safely lifting the components may fail and allow the component to drop.

Use a factory-supplied device to assemble the counterweights. The counterweight cradle weighs 23,350 lb (10,590 kg), the left and right inside counterweights weigh 11,675 lb (5296 kg) each, and the left and right outside counterweights weigh 11,650 lb (5284 kg).

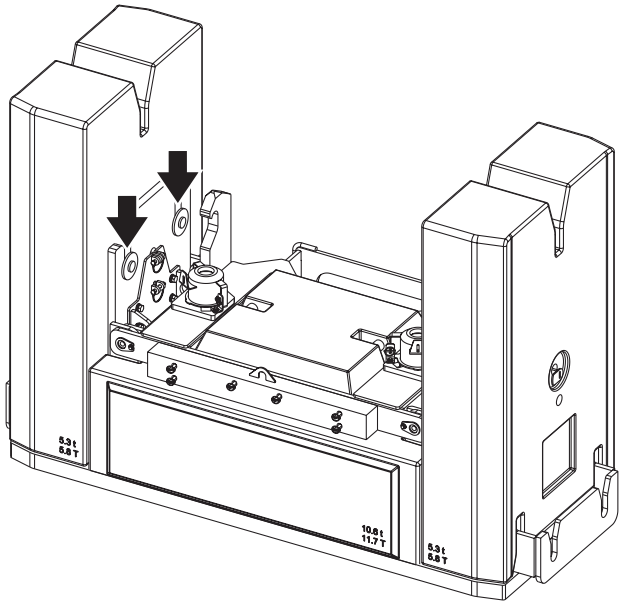


Figure 20

1. Install the left and right inside counterweights, making sure the pins are captured in the slots of the counterweight cradle.

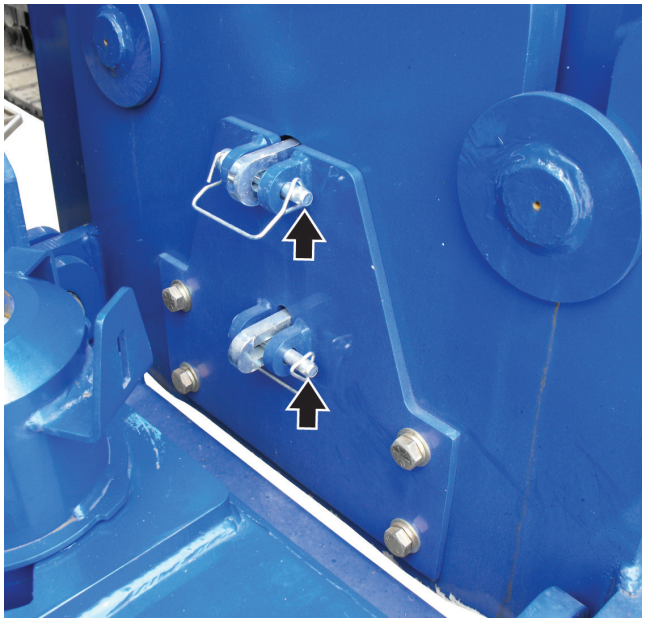


Figure 21

2. Lock the counterweights in place using the inside counterweight locking bars.

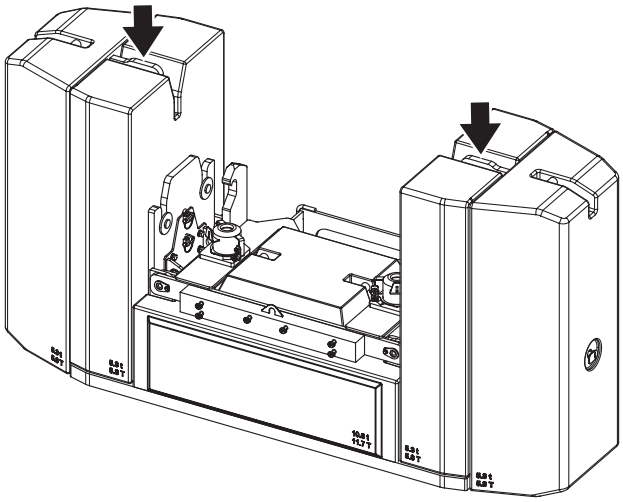


Figure 22

3. Slide the outside counterweights onto the cradle so the lower pins on the counterweight slide into the slots on the cradle and the hook on the top is hooked around the pin on the inside counterweight.
4. Lock the counterweights.

INSTALL REAR COUNTERWEIGHT

1. Before operating, the remote must be enabled by moving the “Carbody Jack Remote Enable/Normal Operation/Counterweight & Jib Stowage Remote Enable” switch in the cab to the “Counterweight and Jib Remote Enable” position.
2. Verify the “Emergency Stop” switch on the remote is released. Rotate the on/start switch to “START” and then release to the “ON” position. Verify the status lights on the receiver module located on the upper right behind the rear door and the light on the carbody are green, indicating the remote and receiver are communicating. To ensure functions are not activated accidentally or in case of a system fault, push the “Emergency Off” button to stop the communication between the remote and receiver.
3. Position the counterweight stack on level ground.

Figure 23

4. Move the crane into position with the counterweights sitting directly below their installed position.
5. To install the counterweight, fully press the “CWT Pin Lock” button on the remote until both the left and right pins are fully in the “Lock” position, down and forward. See *Figure 28 on page 4-13*

⚠ WARNING

Never allow any part of your body to be underneath the counterweight while it is being lifted. Always stay clear of the counterweight when it is being lifted. The counterweight can spin and swing while being lifted.

Figure 24

6. Remove the counterweight lift rope sockets from the transport position.
7. Using the remote, lower the lift rope sockets so they can be installed in the counterweight lifting lugs.

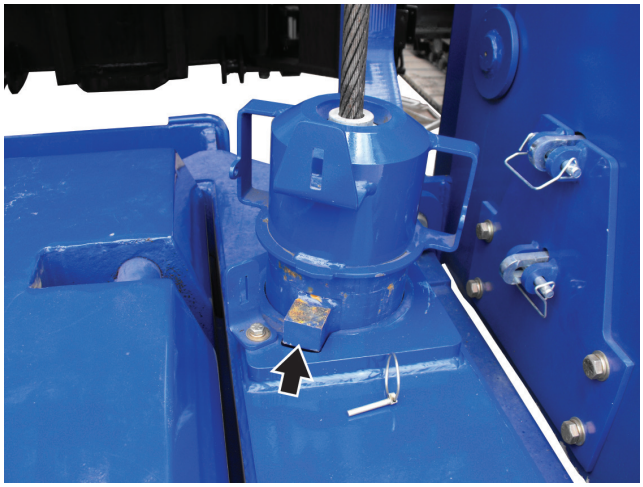


Figure 25

8. Line up the lift lugs on the lower part of the lift sockets with the cutouts in the top of the counterweights.

Figure 26

9. Lower the counterweight lift sockets into the cutout in the counterweight until the socket rests on the counterweight and there is slack in the wire rope in the socket.

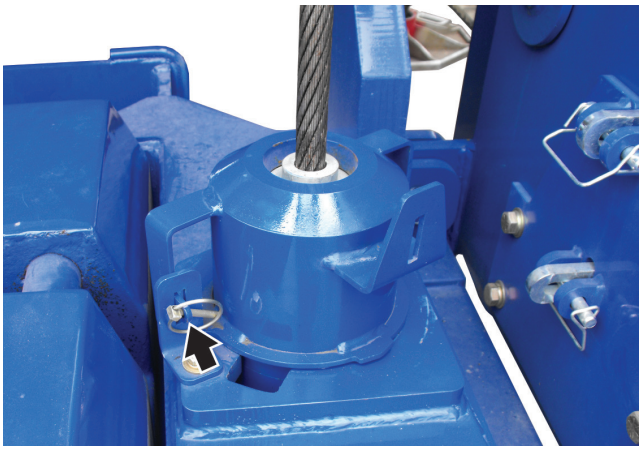


Figure 27

10. Rotate the sockets in the counterweight so that the locking tabs engage in the lock plates on the counterweight.
11. Install the lift pin in the bracket to secure the socket.
12. Press both the “Left CWT Raise” and “Right CWT Raise” buttons on the remote to begin lifting the counterweight. The lifting speed will be proportional to activation of the button. It may be necessary to adjust the speed or operate only one side to keep the counterweight level.
13. Continue to raise the counterweight until the left and right pins spring back into place under the ears.

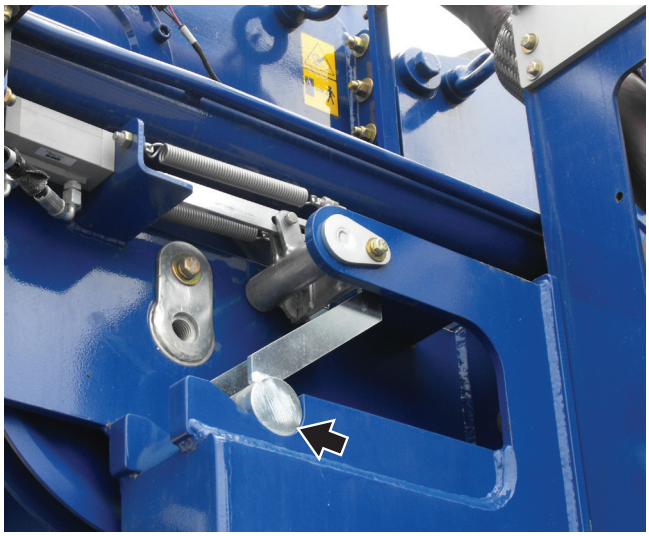


Figure 28

14. Using the remote control, lower the counterweight so the counterweight hanger pins are fully supporting the counterweights and locked in place in the cutout.
15. Return the counterweight remote to the operator cab and turn the remote off.

REMOVE REAR COUNTERWEIGHT

⚠ WARNING

Never allow any part of your body to be underneath the counterweight while it is being lifted. Always stay clear of the counterweight when it is being lifted. The counterweight can spin and swing while being lifted.

1. Before operating, the remote must be enabled by moving the "Carbody Jack Remote Enable/Normal Operation/Counterweight & Jib Stowage Remote Enable" switch in the cab to the "Counterweight and Jib Remote Enable" position.
2. Verify the "Emergency Stop" switch on the remote is released. Rotate the on/start switch to "START" and then release to the "ON" position. Verify the status lights on the receiver module located on the carbody are green, indicating the remote and receiver are communicating. To ensure functions are not activated accidentally or in case of a system fault, push the "Emergency Off" button to stop the communication between the remote and receiver.
3. Position sound cribbing underneath the counterweights to support the counterweights when removed.
4. Press both "Counterweight Raise" buttons to tension the lift cables. Raise the counterweight slightly.
5. Press both "Counterweight Raise" buttons again to raise the counterweight slightly to take tension off the upper counterweight hanger pins.

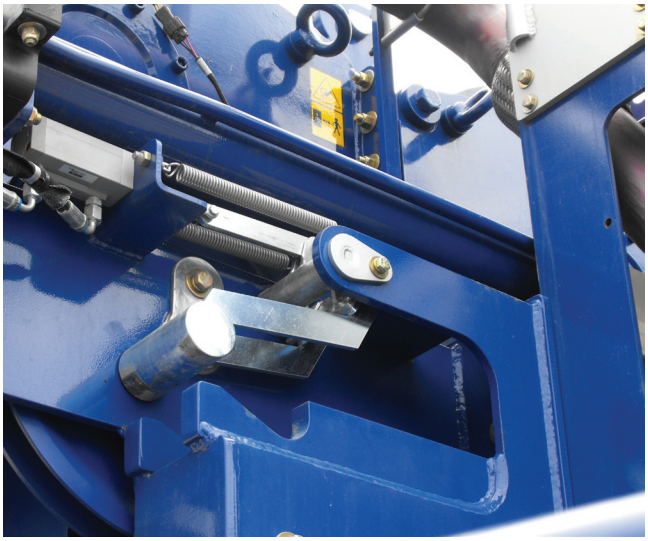


Figure 29

6. Once the weight of the counterweight is lifted off the hanger pins, use the remote to unlock/disengage the hanger pins from the notch in the bracket.

⚠ WARNING

Always stay clear of the counterweight when it is being lowered. The counterweight can spin and swing while being lowered.

7. Press both "Counterweight Lower" buttons to begin lowering the counterweight. If the counterweight begins to lower unevenly, you can level it out by pressing the left counterweight lower or right counterweight to lower individually. Pressing one of these buttons will lower only that side.

Figure 30

8. Continue lowering evenly until the counterweight is resting on the cribbing.
9. Disconnect the lifting sockets from the counterweight.
10. Press both “Counterweight Raise” buttons to retract the lift cables.
11. Install the counterweight lift sockets in the stowage brackets on the rear of the upper rotating frame.

DISASSEMBLE REAR COUNTERWEIGHT

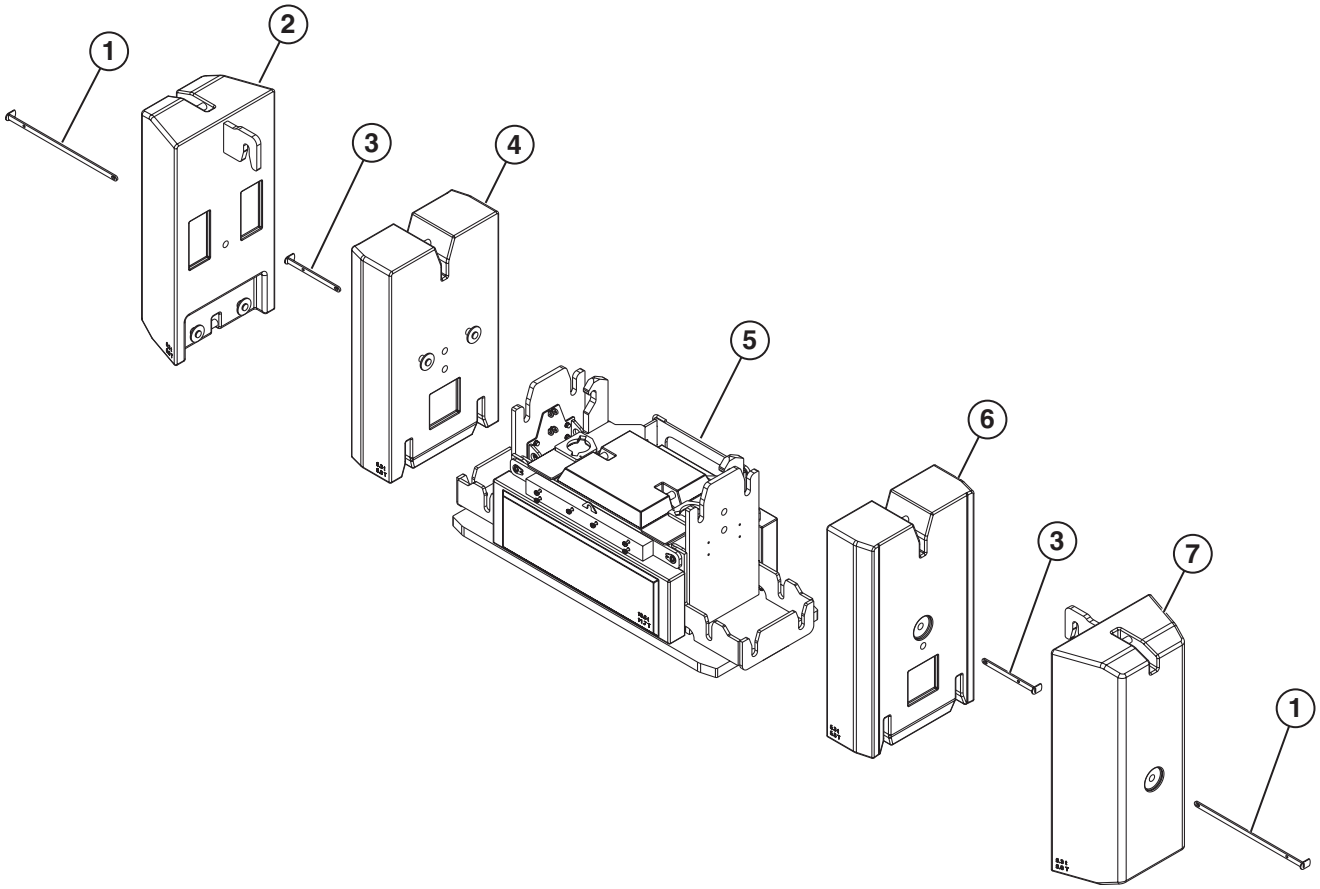


Figure 31

1 – Outside Counterweight Pin (2 used)
2 – Left Outside Counterweight
3 – Inside Counterweight Pin (2 used)
4 – Left Inside Counterweight
5 – Counterweight Cradle
6 – Right Inside Counterweight
7 – Right Outside Counterweight

Disassemble the counterweights as required for your transportation requirements.

REMOVE TRACK FRAMES

⚠ WARNING

Never use the carbody jacks to raise the crane unless the crane is in the proper configuration. The counterweights, jib, extension, auxiliary nose sheave, and overhaul ball must be removed before using the carbody jacks.

1. Position the crane on hard, flat, level ground to ease the removal of the track frames.

⚠ WARNING

Always keep the boom angle between 32° and 55° to maintain stability when removing the track frames.

2. Position the superstructure with the boom facing in the forward direction.

Figure 32

3. Before operating, the remote must be enabled by moving the “Carbody Jack Remote Enable/Normal Operation/Counterweight & Jib Stowage Remote Enable” switch in the cab to the “Carbody Jack Remote Enable” position.
4. Verify the “Emergency Stop” switch on the remote is released. Rotate the on/start switch to “START” and then release to the “ON” position. Verify the status lights on the receiver module located on the upper right behind the rear door and the light on the carbody are green, indicating the remote and receiver are communicating. To ensure functions are not activated accidentally or in case of a system fault, push the “Emergency Off” button to stop the communication between the remote and receiver.
5. Swing each carbody jack from the stowed position toward the track frames to the widest outward position and pin them into position.
6. Install the outrigger pads on each cylinder and verify the surface is flat and smooth. Do not “bridge” the pads. Use cribbing material if required.
7. Position proper dunnage, if required, under each outrigger jack pad.

⚠ WARNING

Verify the AML system is registered in the “On Carbody Jacks” mode before extending the carbody jacks to lift the crane.

8. After positioning each carbody jack, extend each one individually until making firm contact with the ground or dunnage.
9. To operate jacks individually, fully press the button for the jack (1=front left, 2=front right, 3=rear left, 4=rear right) and press the “Jack Extend or Retract” button.

⚠ DANGER

Never raise the crane if the crane is not level. The crane must be level to remain stable when rising. Even when using the automatic leveling feature, the operator is responsible for keeping the crane level.

10. The jacks may be operated individually or simultaneously with automatic leveling.

11. To raise the crane with automatic leveling, press the “All Jacks Extend” or “All Jacks Retract” button. The system should automatically maintain level within 1° relative to gravity. If the crane is not level, operate the individual jacks to level the crane before using the automatic leveling feature.
12. Continue to raise the crane using the carbody jacks until the track frames come just off the ground.

Figure 33

13. Swing the superstructure so the boom is over the track frame being removed.
14. Fully extend both the left and right track frames.
15. Install the track frame removal bars between the carbody and the track frame to hold the track frame in position as the extend beams are retracted.

Figure 34

16. Disconnect the hydraulic hose quick couplers for the track drive.
17. There are two shackles on the outside of the frame and one on the inside of the frame.
18. Install the assembly links between the carbody and the track frame.

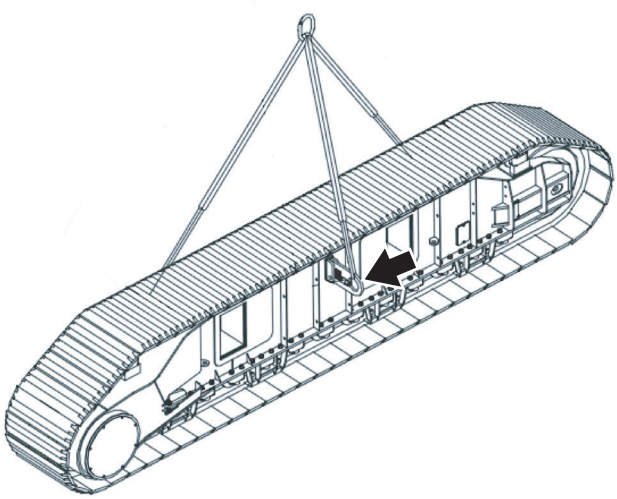


Figure 35

19. Using appropriate rigging for the load, attach the factory-supplied 3-leg sling to each of the shackles.

Figure 36

20. Remove the retaining pins and move the plate down from each beam. Rotate the locking bars alternately left and right. Recheck the rigging connections and crane configuration.

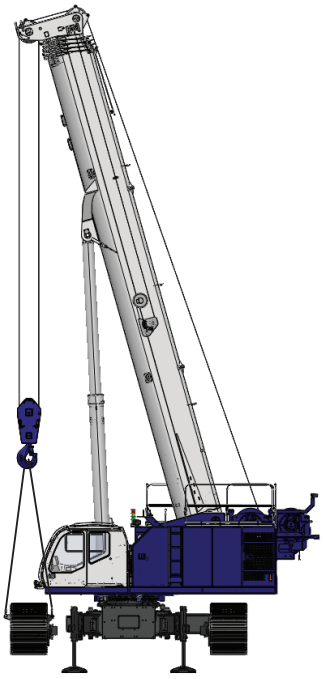


Figure 37

21. Lift the track frame slowly until the track is freely supported. Start retracting the track frame beams on the side being removed. Once the track frame is freely suspended and beams are disengaged from the track frame, take out the track frame removal bars and then lift the track frame to the minimum height required to place onto the transport trailer. The trailer should clear the carbody with the track beams retracted. Stay within the radius and load limits for “on carbody jacks” charts.
22. Place the track frame on the trailer. Swing to the opposite side to remove the remaining track frame. Repeat the procedure for removal of the remaining track frame.

REMOVE CARBODY COUNTERWEIGHT

⚠ WARNING

Never allow any part of your body to be underneath the counterweight while it is being lifted. Always stay clear of the counterweight when it is being lifted. The counterweight can spin and swing while being lifted.

NOTICE

Tilt the cab back to its highest position to provide the most clearance between the lifting slings and the cab.

1. Position the boom so that the hook block is positioned directly above the carbody counterweight.

NOTICE

Make sure all travel hoses and obstacles are clear of the carbody counterweight while it is being lifted.

Figure 38

2. Using the factory-supplied track frame removal slings and nylon straps, attach the carbody counterweight to the hook block.

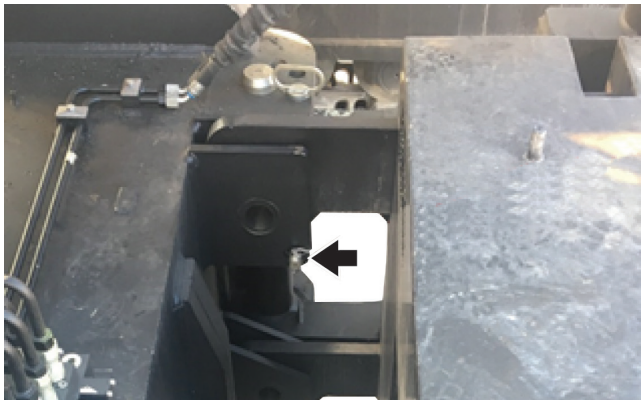


Figure 39

3. Remove the carbody counterweight retaining pins.

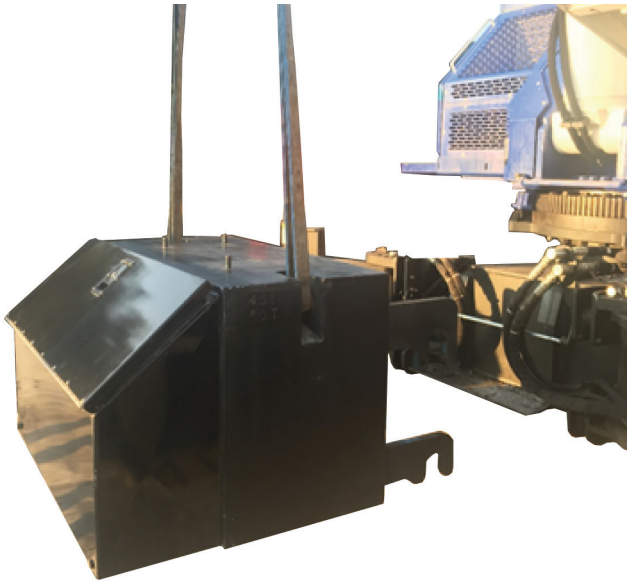


Figure 40

4. Slowly lift the carbody counterweight until the hooks clear the carbody lug pins. Slowly move the counterweight away from the carbody.
5. Place the counterweight on the ground or trailer. Repeat the procedure for the second counterweight.

LOAD CRANE ON TRAILER

NOTICE

Remove the hook block and spool wire onto the winch before lowering the boom.

1. Lower the boom and remove the hook block.
2. Wind the winch rope onto the winch.
3. Raise the boom to a 55 – 60° boom angle.
4. The crane is ready to load on the trailer. If the trailer will not clear under the carbody because of trailer beam height, have the truck turn around and drop the trailer and then use the truck to drag the trailer under the carbody of the crane. The trailer should be backed under the crane in line with the extend beams.

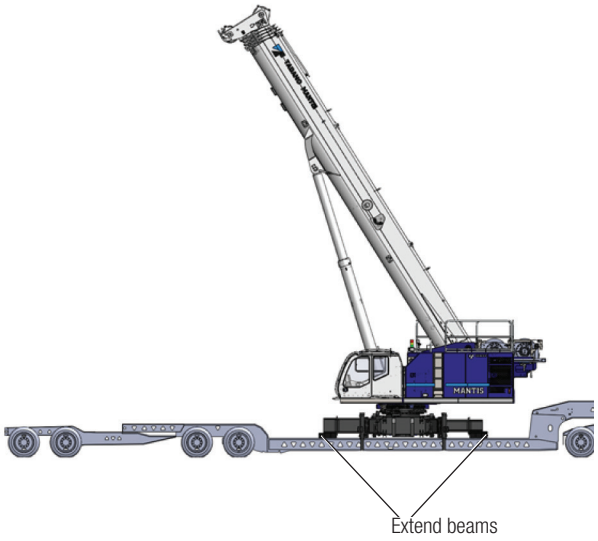


Figure 41

5. Make sure the track extend beams are extended before the truck lifts the trailer under the crane. Place dunnage under the ends of the extend beams so that the crane rests on the extend beams when the trailer is raised underneath the crane.

⚠ WARNING

Never retract the carbody jacks until secured to the trailer and the boom is lowered to the transport position. The carbody jacks must remain set and in firm contact with ground until the crane is secured to the trailer and the boom lowered into the transport position.

Figure 42

6. After the crane's track extend beams and carbody are chained securely to the trailer, the boom can be lowered for transport.
7. Retract the carbody jacks after the crane is fully secured and stowed for transport. Stow the jack pads in the locations provided on the crane undercarriage.

OPTIONAL JIB DEPLOYMENT INSTALLATION AND STOWAGE

INITIAL INSTALLATION

Before use, the jib must be installed onto the crane.

1. Using a secondary crane, align the attachment lugs on the end of the jib to the ends of the boom sheave pins.

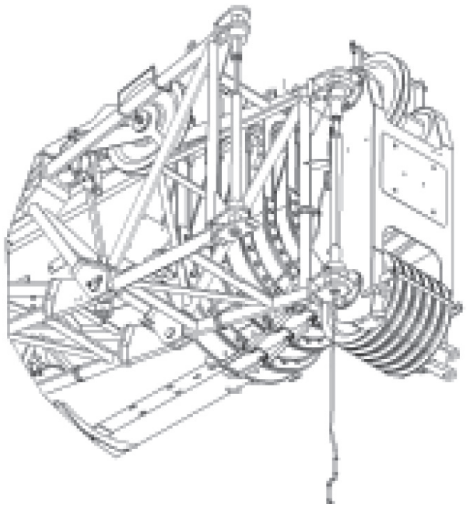


Figure 43

2. Insert the crank handle into the lower end of the installation pin and turn the crank until the third red marking is completely visible, and then remove the crank handle.

⚠ WARNING

Always have the upper and lower bolt elements retracted completely (up to the end stop) in the bearing brackets on the boom head. If both bolt ends are not retracted completely, the stinger may fall.

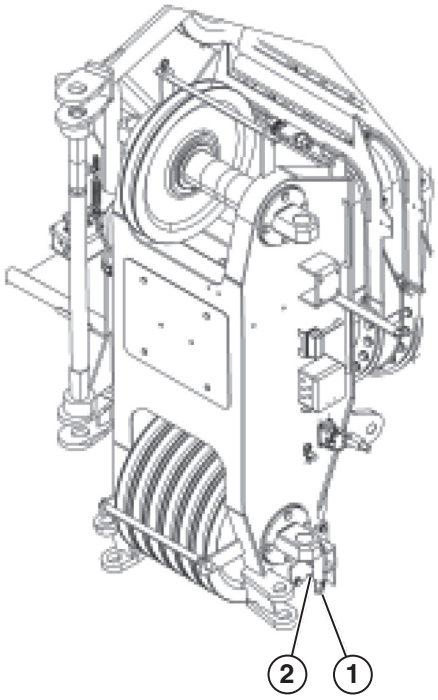


Figure 44

1 – Ring 2 – Pin

3. Release the lock on the left side of the boom head by pulling the ring (1) down and turning it 90°. The pin (2) points towards the telescopic boom.
4. Push the "Jib Pin Release" button on the transmitter until the hydraulic locking pins between the telescopic boom and the jib are fully disengaged.
5. Push the "Jib Release" button until the stowage cylinder is fully extended and the jib is off the support.

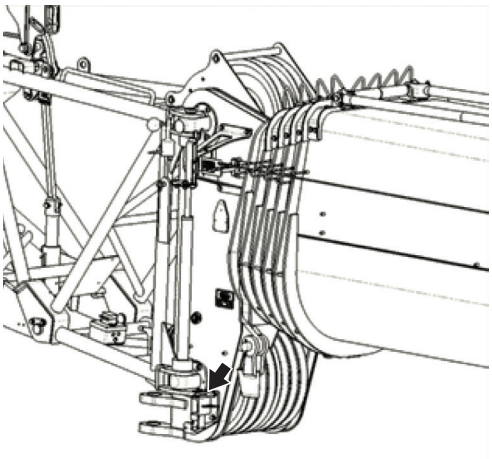


Figure 45

6. Use a tagline attached to the jib to swing the jib until it engages in the lock on the left side of the boom head.

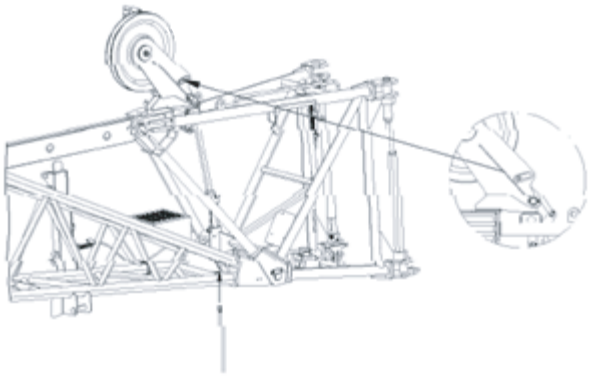


Figure 46

7. Use the crank handle as shown to raise the sheave until the handle cannot be turned any further and the sheave is completely supported on the adapter.
8. Once the jib is attached to the boom head, the jib can be used or stowed.

DEPLOYMENT

1. Before deploying the jib, the following conditions must be met:
   - The crane is on hard, flat, level, stable ground with both tracks fully extended.

- All counterweights are properly installed as required by load chart and lift plan.
- Swing park brake is engaged.
- Boom telescope is fully retracted.
- Boom is level (horizontal) within 1°.
- Set up mode is selected in load moment indicator (AML).

2. Before operating, the remote must be enabled by moving the "Carbody Jack Remote Enable/Normal Operation/Counterweight & Jib Stowage Remote Enable" switch in the cab to the "Counterweight and Jib Remote Enable" position.
3. Verify the "Emergency Stop" switch on the remote is released. Rotate the on/start switch to "START" and then release to the "ON" position. Verify the status lights on the receiver module located on the upper right behind the rear door and the light on the carbody are green, indicating the remote and receiver are communicating. To ensure functions are not activated accidentally or in case of a system fault, push the "Emergency Off" button to stop the communication between the remote and receiver.
4. Attach one end of the guide belt to the jib and the other end to the attachment point on the upper structure to prevent the jib from swinging out uncontrollably.

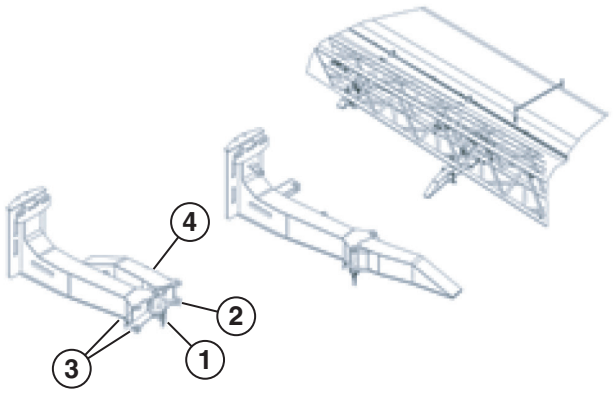


Figure 47

1 – Stowage Pin
2 – Pin
3 – Ramp Base
4 – Transporting Support Extension

5. Fold out the transporting support. Remove the folding plug (1) and pull the pin (2) downward. Fold out the transporting support extension (4), insert the pin (2) in the ramp base (3) from the bottom and secure using the folding plug (1).

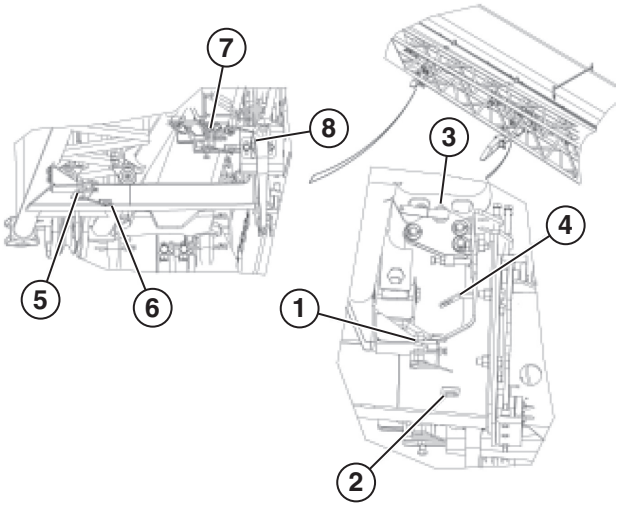


Figure 48

1 – Pin
2 – Pin Stowage
3 – Pin
4 – Pin Stowage
5 – Pin
6 – Pin Stowage
7 – Pin
8 – Pin Stowage

6. Loosen the pins (1) and (3) on the middle transporting support. Pull the spring clip and the lock pin, and stow properly in storage bracket (2) or (4) and secure again using the spring clip.
7. Loosen the pins (5) and (7) on the rear transporting support. Pull the spring clip and the lock pin, insert in the pin compartment (6) or (8) and secure again using the spring clip.
8. Extend the stowage cylinder by pushing the "Jib Release" button on the transmitter until the holes on the 12.5 ft (3.8 m) fly jib are flush with the holes on the right-hand side of the boom head.

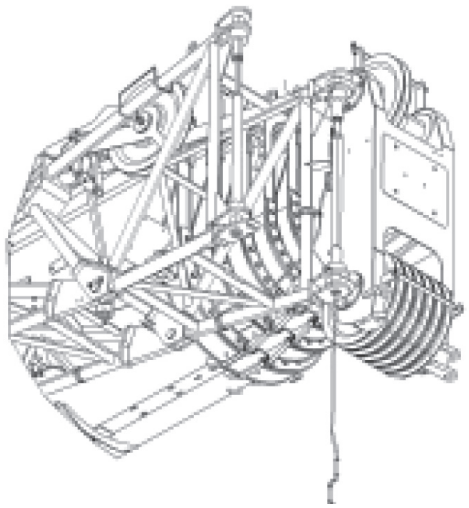


Figure 49

9. Insert the crank handle into the lower end of the installation pin and turn the crank until the third red marking is completely visible, and then remove the crank handle.

⚠ WARNING

Always have the upper and lower bolt elements retracted completely (up to the end stop) in the bearing brackets on the boom head. If both bolt ends are not retracted completely, the stinger may fall.

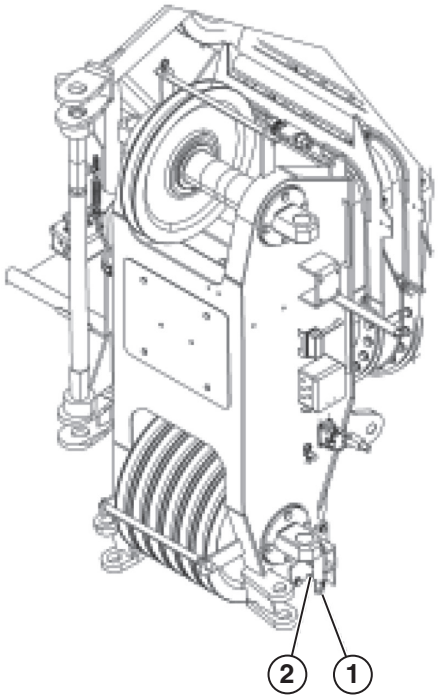


Figure 50

1 – Ring

2 – Pin

10. Release the lock on the left side of the boom head by pulling the ring (1) down and turning it 90°. The pin (2) points towards the telescopic boom.
11. Push the “Jib Pin Release” button on the transmitter until the hydraulic locking pins between the telescopic boom and the jib are fully disengaged.

12. Push the “Jib Release” button until the stowage cylinder is fully extended and the jib is off the support.

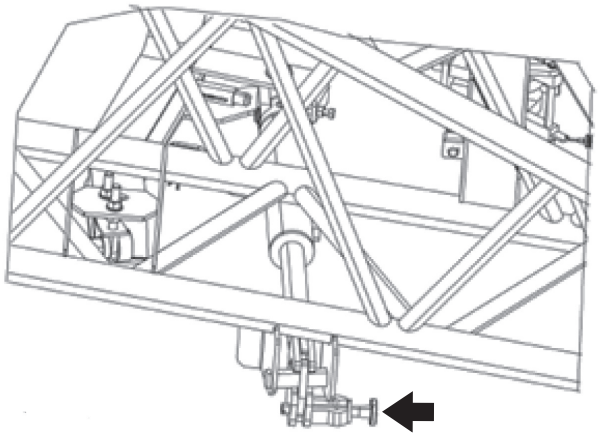


Figure 51

13. Pull the lock (arrow) on the stowage cylinder. The jib can now swing freely.
14. Use a tagline attached to the jib to swing the jib until it engages in the lock on the left side of the boom head.

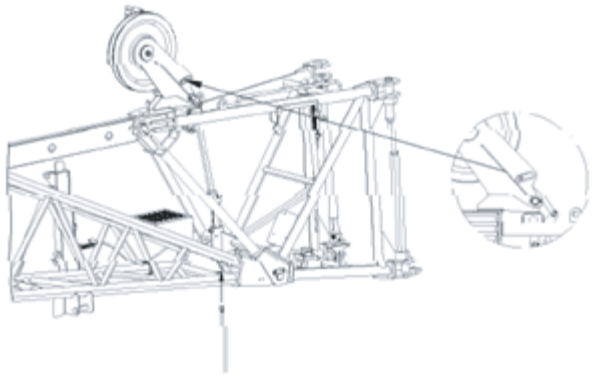


Figure 52

15. Use the crank handle as shown to raise the sheave until the handle cannot be turned any further and the sheave is completely supported on the adapter.

⚠ WARNING

Never let the sheave be unsupported on the adapter. If the sheave is not completely supported on the adapter, it may lead to uncontrolled lowering of the lifting load.

16. Remove the crank handle and store in toolbox.
17. Operate the winch to unwind the wire rope until it is past the end of the jib and place it to the side. Do not drag the wire rope on the ground.

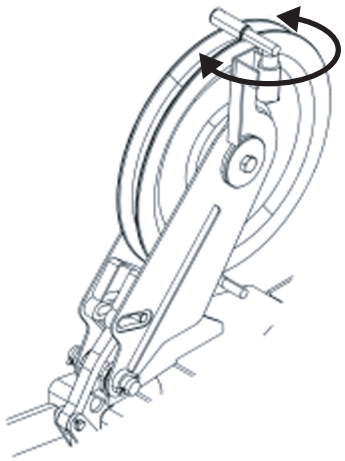


Figure 53

18. Place the wire rope on the sheave of the jib by pushing the securing clamp down and turning it to the locked position. Place the rope on the sheave and turn the securing clamp back to the operating position.

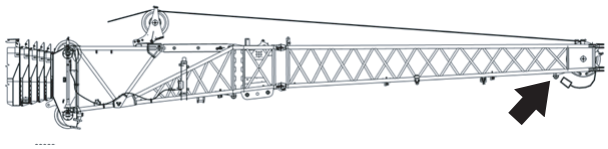


Figure 54

19. Connect the rope to the attachment point as shown and use the winch to lift the jib slightly to allow the upper pin to be threaded into the upper hole of the boom head.
20. Insert the crank handle into the pin and turn until the third red marking is completely visible.

⚠ WARNING

Always have the upper and lower bolt elements retracted completely (up to the end stop) in the bearing brackets on the boom head. If both bolt ends are not retracted completely, the stinger may fall.

21. Remove the crank handle.
22. Connect the electrical connection for the A2B switch and the warning beacon (if equipped).
23. To secure the support, fully retract the stowage cylinder by pushing the "Jib Stow" button.

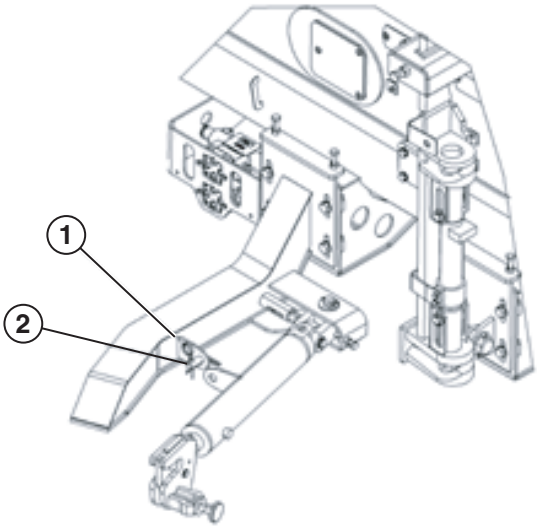


Figure 55

1 – Spring Clip 2 – Pin

24. Align the hole on the stowage cylinder to the hole on the support and attach it using the spring clip (1) and pin (2).
25. When operations are complete, move the 3-position key switch to the "OFF" position and return the mode select switch in the cab to the "Normal Operation" position.
26. Store the remote in a safe, dry location.
27. Fold back the middle support, pin it and secure it. Remove the tag line.

STOWAGE

To stow the jib, reverse the procedure for jib deployment.

CHAPTER 5: OPERATION

Before operating the crane, review all the safety information in the safety section of this manual. This crane should be operated only by a trained, skilled operator.

For more detailed information on control functions, see *Component Location and Overview on page 3-1*.

BATTERY DISCONNECT SWITCH

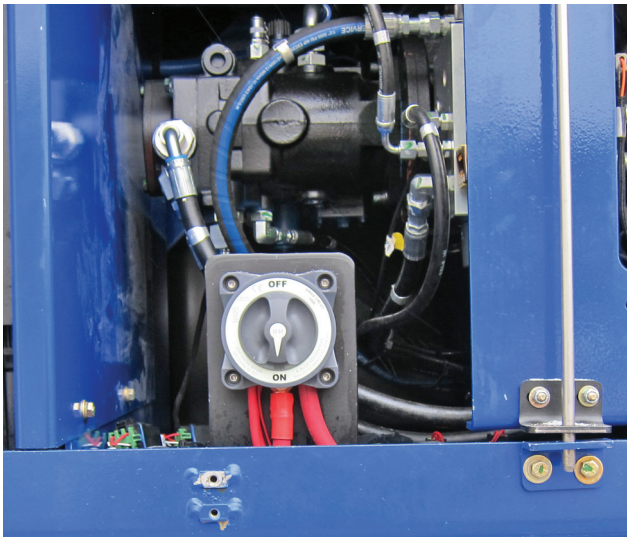


Figure 1

The battery disconnect switch is located on the right side of the crane inside the engine access door.

1. Open the access door and turn the switch down to the ON position.
2. When finished operating for the day or when storing the crane, turn the switch up to the OFF position.
3. Close and lock the engine access door.

NOTICE

Wait 2 minutes after stopping engine before turning the battery disconnect switches to the OFF position. This ensures the DEF fluid is cleared from all hoses and prevents the hoses from freezing in cold temperatures.

ENTERING THE CAB

Figure 2

1. Steps on the track frames can be folded out to allow easy access to the cab. To fold out, lift the steps up and swing out to lock in place.
2. Enter the cab from the left side of the crane.

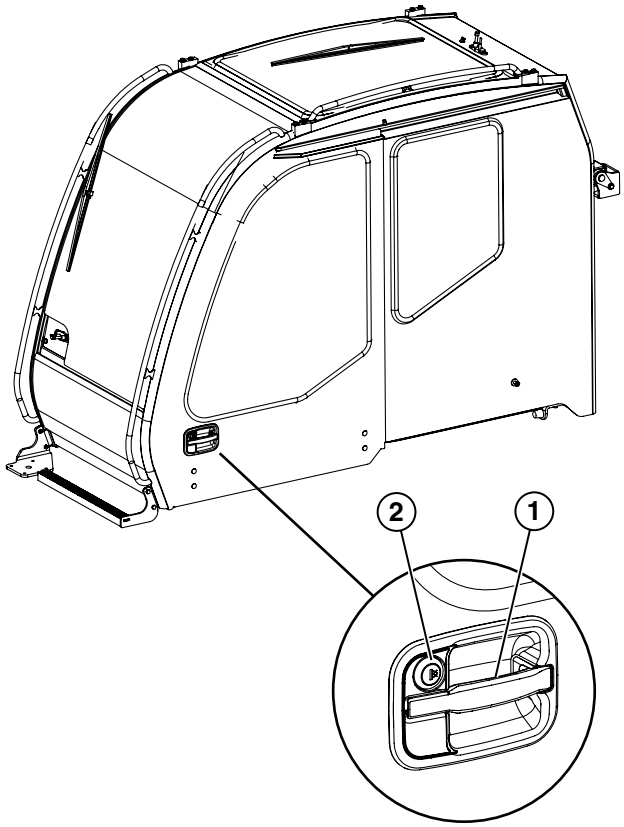


Figure 3

1 – Door Handle 2 – Door Lock

3. Pull on the door handle to open the door. The door can be locked when the crane is not in use by locking the door lock.

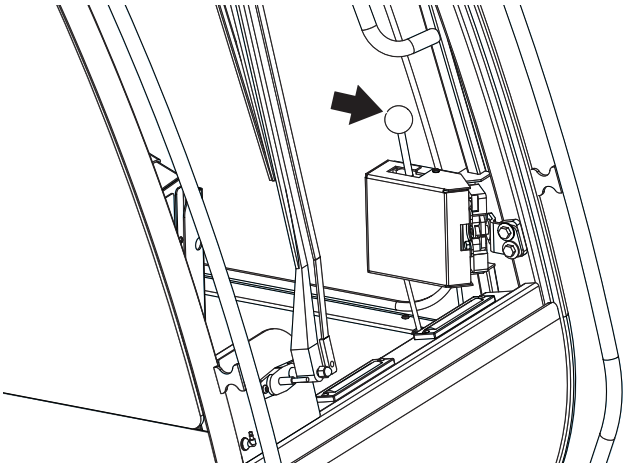


Figure 4

4. The door can be opened from the inside by pulling on the door lever.

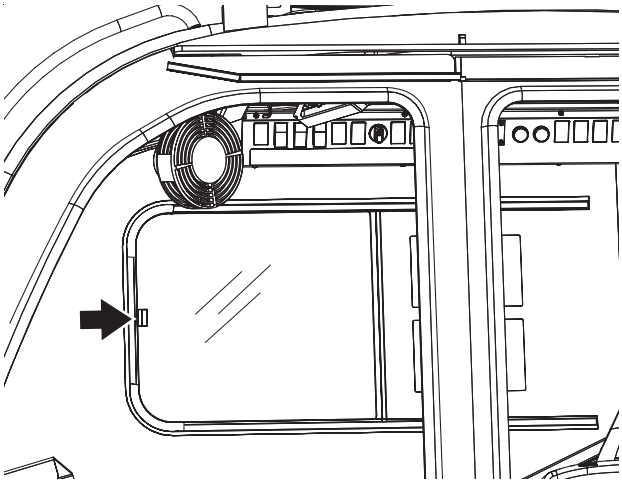


Figure 5

Figure 6

5. In case of an emergency, you can escape the cab by using the escape tool located behind the seat.
6. Use the hooked end of the tool to cut off the seat belt if needed.
7. Use the hammer end to break the glass to crawl out of the cab.

STARTING THE ENGINE

⚠ WARNING

The horn button is always powered whether the key switch is on or off. Always sound the horn before starting the engine to alert any bystanders in the area that the engine is going to be started.

NOTE: Starting the engine will be greatly improved at temperatures at 0°F (-18°C) or below by the use of a starting aid and/or block heater.

⚠ CAUTION

The GTC-1200 is equipped with hydraulic oil warming functionality. The temperature of oil in the hydraulic reservoir is not reflected in the temperature shown on the MD3 display Main page, but is available on the Measure page. Use caution when operating before sufficient warm-up—cold oil can cause crane hydraulic functions to operate sluggishly. See page 5-6 for more information.

NOTICE

Before starting the engine, perform the daily checks listed in Preventative Maintenance Chart on page 6-8.

1. Sit in the seat and securely fasten the seat belt.
2. Make sure that all control levers, pedals, joysticks and switches are in their neutral or OFF positions.
3. Sound the horn before turning the key switch.
4. Turn the key to the RUN position and wait until the engine preheat light turns off.
5. Turn the key to the start position, and release the switch as soon as the engine starts.

NOTE: When the switch is in the ACCESSORY position, the MD3 screen will display a communications error. This is normal.

NOTICE

Do not crank the engine for more than 30 seconds. If the engine fails to start, allow the starter to cool for 2 minutes before cranking again.

6. Wait to be sure the oil pressure is sufficient. Oil pressure should rise within 15 seconds after the engine starts.

NOTICE

If oil pressure does not rise within 15 seconds after the engine starts, stop the engine and determine what the problem is.

7. Once the engine starts, allow it to run at low idle speed for 3 to 5 minutes. Increase engine speed to high idle only after the engine is running smoothly at low idle.

NOTE: At lower engine speeds, there may not be enough hydraulic oil flow to operate multiple functions simultaneously.

8. Operate the engine at low load and low rpm until the engine temperature is within its normal range. Monitor all gauges during this warm-up period.

STANDARD ENGINE CONTROL

When the auto-idle switch is in the “OFF” position, the engine speed is controlled with the foot throttle or the throttle potentiometer, whichever is higher.

FOOT THROTTLE

The engine speed can be continuously varied from minimum to maximum speed (RPM) with the far right foot pedal. When the pedal is released, the engine will operate at minimum speed or the speed selected with the potentiometer. Increasing pressure on the pedal will increase engine speed, up to the maximum.

THROTTLE POTENTIOMETER

The engine speed can be continuously varied from minimum to maximum speed (RPM) with the potentiometer located in the left armrest. Turning the potentiometer clockwise

will increase engine speed; turning it counterclockwise will decrease it.

AUTO IDLE ENGINE CONTROL

When the auto-idle switch is in the "ON" position, the engine will remain at low idle while all functions are in neutral. When a function is activated, the engine speed will increase. These modes can potentially reduce the amount of fuel consumed by the crane as it can reduce the amount of time the engine is operated at higher speeds.

ADAPTIVE THROTTLE

When the throttle potentiometer is in the far counterclockwise position, adaptive throttle is selected. When a function is activated, the engine speed will automatically adapt as required. For example, if one function is operated at a low to medium speed, the engine speed will stay at low idle. However, as the function speed is increased or multiple functions are operated, the engine speed will increase. The engine speed may also increase to provide more torque if the function load is high, even if the function speed is low. After all functions are returned to neutral, the engine speed will return to low idle.

NOTICE

If swing function is activated while in adaptive throttle mode, the engine speed will not vary while swinging because it could cause surges in swing speed.

SET POINT

When the throttle potentiometer is in any position except the far counterclockwise position, set point is selected. The engine speed will be at one of two points: low idle or set speed. When a function is activated, the engine speed will increase to the speed selected by the throttle potentiometer. Turning the potentiometer clockwise will increase the auto idle set point and turning it counterclockwise will decrease it. After all functions are returned to neutral, the engine will remain at the set speed for a short period of time before returning to low idle.

Figure 7

9. There is an emergency off switch located below the left joystick. Press the switch in to immediately shut down the engine and stop all crane functions.

STOPPING THE ENGINE

NOTICE

Stopping the engine immediately after it has been working under load can result in overheating and accelerated wear of the engine components. Follow the stopping procedure outlined below to allow the engine to cool. Excessive temperatures in the turbocharger center housing could cause an oil coking problem.

1. Remove all loads from the engine by returning all hydraulic functions to neutral.
2. Reduce engine speed to low idle.
3. Let the engine idle for 3 to 5 minutes.
4. Turn the ignition switch to the OFF position to stop the engine.

AFTER STOPPING THE ENGINE

NOTICE

Wait 2 minutes after stopping engine before turning the battery disconnect switches to the OFF position. This ensures the DEF fluid is cleared from all hoses and prevents the hoses from freezing in cold temperatures.

1. After the engine cools, fill the fuel tank to prevent accumulation of moisture in the fuel.
2. Maintain the engine coolant fluid levels.
3. If expecting freezing temperatures, allow the engine cooling system to cool, and then check the coolant for proper antifreeze protection. The system must be protected against freezing to the lowest expected outside temperature.

NOTE: Make sure the crane is on a flat, level surface when checking the engine oil level.

4. Always wait at least 5 minutes after shutting off the engine before checking the oil level to allow oil to drain back into the oil pan.
5. Check the engine crankcase oil level. The correct oil level is between the high (H) and low (L) marks on the dipstick.
6. Repair any leaks, perform minor adjustments, tighten loose bolts, etc.
7. If the crane will be left unattended for an extended period of time (overnight or over a weekend, for example), turn off the battery disconnect switch. This will help prevent unauthorized use of the crane and/or accidental battery discharge.

COLD WEATHER OPERATION

Diesel engines can operate effectively in cold weather. Engine operation in cold weather, however, is dependent on the type of fuel used and how well the fuel moves through the fuel-related components. The purpose of this section is to explain some of the problems associated with and steps that can be taken to minimize fuel problems during cold weather operation when the engine area is colder than 41°F (5°C).

FUEL SELECTION

Ultra-Low Sulfur Diesel (ULSD) fuel grade is required for operation.

NOTICE

Failure to use ULSD may result in severe engine damage.

There are two major differences between No. 1 and No. 2 diesel. No. 1 diesel has a lower cloud point and a lower pour point. The cloud point is the temperature at which a cloud or haze of wax crystals begins to form in the fuel and cause fuel filters to plug. The pour point is the temperature at which diesel fuel begins to thicken and becomes more resistant to flow through fuel pumps and lines. Be aware of these fuel values when purchasing your diesel fuel and anticipate the average outside (ambient) temperature for the area where your crane will be operating. Engines fueled in one climate may not operate satisfactorily if moved to another because of problems that result from cold weather.

HYDRAULIC FLUID OPERATING TEMPERATURE

⚠ CAUTION

The GTC-1200 is equipped with hydraulic oil warming functionality. The temperature of oil in the hydraulic reservoir is not reflected in the temperature shown on the MD3 display Main page, but is available on the Measure page. Use caution when operating before sufficient warm-up—cold oil can cause crane hydraulic functions to operate sluggishly.

For best performance and component longevity, use the hydraulic fluid warm-up circuit to increase the fluid temperature before operating the crane functions. As a standard, cranes use Shell Tellus S2VX-32. With this fluid, the temperature should be at least 40 °F (5 °C) before operation and ideally 95 °F (35 °C). See Oil Cross Reference Chart on page 2-12.

When idling the engine for warm-up in cold weather, observe the following recommendations:

- In temperatures below 32 °F (0 °C), warm-up requires approximately 30 minutes.
- In temperatures below 0 °F (-18 °C), warm-up requires up to 60 minutes.

After the warm-up period, carefully operate the boom hoist cylinder to circulate warm oil and confirm proper hydraulic function.

NOTE: The temperature value displayed on the Measure page will decrease when commencing crane operations.

TRAVEL CONTROLS

STANDARD TRAVEL

In standard mode, the travel function is controlled by two floor-mounted foot pedals.

In the forward direction with the boom facing forward over the track idler end, the left foot pedal controls the left track and the right foot pedal controls the right track.

1. Push the travel parking brake on/off switch on the right joystick to turn off the parking brake.
2. Push the pedal(s) toe-down to move the crane forward.
3. Push the pedal(s) heel down to move the crane backward.
4. The speed of travel is directly proportional to engine speed and how far down the pedal is pushed. The farther the pedal is pushed down, the faster the speed of travel will be.
5. Pushing down on the toe of the left pedal will turn the crane to the right. Pushing down on the toe of the right pedal will turn the crane to the left.
6. Pushing down on the heel of the left pedal will turn the crane to the left. Pushing down on the heel of the right pedal will turn the crane to the right.
7. Pushing the travel speed high/low switch on the right joystick will allow you to select between high and low travel speeds.

TRAVEL MODE

In travel mode, the travel function is controlled by the right joystick.

1. Moving the joystick forward moves the crane forward and moving it backward moves the crane backward.
2. To turn the crane, counter-rotation is achieved by moving the joystick left or right, depending on the desired direction.
3. To skid steer, the joystick is moved to an intermediate position such as one of the corners.

HIGH SPEED TRAVEL

If the boom is extended more than 115 ft (35.05 m) or the hook load exceeds 7500 lb (3401.9 kg), high speed is disabled. If high speed is active and then becomes disabled, the indicator will turn off and speed range will be low. As soon as high speed is enabled again, either by retracting the boom and reducing the hook load, high speed will be active again. If low speed is active and high speed is disabled, upon pressing the speed select switch, low speed will remain active and the indicator will turn off. As soon as high speed is enabled, high speed will be active.

TRACKS EXTEND/RETRACT

⚠ WARNING

Always be sure the correct track condition is selected on the AML-C before lifting a load.

NOTE: The tracks can be extended or retracted more easily when traveling at a slow speed in either forward or reverse.

1. While moving slowly, press and hold right track extend switch to extend the right track, and press and hold the left track extend switch to extend the left track.
2. Releasing the switch will stop the tracks from extending.
3. While moving slowly, press and hold the right track retract switch to retract the right track, and press and hold the left track retract switch to retract the left track.
4. Releasing the switch will stop the tracks from retracting.
5. AML-C will sense when tracks are fully extended.

WINCH OPERATION

WINCH WARM-UP PROCEDURE

Performing a winch warm-up procedure is recommended at each start-up and is necessary at ambient temperatures below 39°F (4°C).

⚠ WARNING

Failure to properly warm up the winch, particularly in low temperatures, may result in temporary brake slippage. If brake slippage occurs, it will create a hazardous situation that may result in serious injury, death and/or equipment damage.

To properly warm up the winch, run the engine at low rpm until it is properly warmed up. Once the engine has reached operating temperature, operate the winch with no load at low speed, forward and reverse, several times to prime all lines with warm hydraulic oil and to circulate gear lubricant through the planetary gear sets.

MAIN WINCH

The right joystick controls the main winch raise/lower function. The speed of the winch is directly proportional to engine speed and how far forward or backward the joystick is moved.

The button on the right joystick controls the main winch speed range. Pushing the button once switches from low to high speed. The LED light in the center of the switch will be lit when high speed is on. The winch cannot be shifted to high speed with load in the air. Pushing the button again switches back to low speed. The winch may be shifted from high to low speed or from low to high speed at any time during operation.

STANDARD MODE

1. To raise a load, pull the joystick back and the winch will reel in the wire rope.
2. To lower a load, push the joystick forward and the winch will reel out the wire rope.

TRAVEL MODE

In travel mode, the main winch is controlled by the mini joystick on the right joystick.

1. To raise a load, push the mini joystick down and the winch will reel in the wire rope.
2. To lower a load, push the mini joystick up and the winch will reel out the wire rope.

AUX WINCH

The left joystick controls the auxiliary winch raise/lower function. The speed of the auxiliary winch is directly proportional to engine speed and how far forward or backward the joystick is moved.

The button on the left joystick controls the auxiliary winch speed range. Pushing the button once switches from low to high speed. The LED light in the center of the switch will be lit when high speed is on. Pushing the button again switches back to low speed. The winch cannot be shifted to high speed with load in the air. The winch may be shifted from high to low speed or from low to high speed at any time during operation.

1. To raise a load, pull the joystick back and the winch will reel in the wire rope.
2. To lower a load, push the joystick forward and the winch will reel out the wire rope.

ANTI-TWO-BLOCK (A2B) CONTROL

The winch functions employ an A2B operator aid to prevent a “two-block” situation. When the hook block or overhaul ball trips the anti-two-block switch, the controller will disable the main and auxiliary winch functions in the raise direction. The anti-two-block override switch located in the cab can be used for rigging and setup.

⚠ WARNING

When the anti-two-block override switch is activated, the winch will not stop, even if there is a two-block condition.

OVERLOAD CONTROL

The winch functions employ an RCI/overload operator aid to prevent an overload condition. When the actual load is 100% or more of the rated load or an RCI system error occurs, the controller will disable the main and auxiliary winch function in the raise direction. The overload override switch located in the cab can be used to stow the boom in the event of an RCI system error.

⚠ WARNING

Activating the override switch cancels the stop function of the RCI and crane control system. Using this switch during normal operation is extremely dangerous. Never use this switch during normal operation. Use the switch only when an operation has been disabled due to failure of the RCI system.

LAST WRAP CONTROL

The winch functions employ a last wrap operator aid to maintain a minimum amount of rope on the drum. When the last wrap is reached on the main or auxiliary winch, the microcontroller will disable the respective winch function in the lower direction. The last wrap override switch on the right console may be used to allow removal of the rope from the winch.

⚠ WARNING

When the last wrap override switch is used, the winch will not stop, even if there is an under wind condition.

BOOM CONTROLS

BOOM HOIST

The right joystick controls the boom raise/lower function. The speed of the boom is directly proportional to engine speed and how far to the right or left the joystick is moved.

1. To raise the boom, move the right joystick to the left.
2. To lower the boom, move the right joystick to the right.

BOOM TELESCOPE

The boom telescope function is controlled by the telescope out/in proportional slider switch located on the left joystick. The five-stage boom is operated by a combination of hydraulic cylinders, cables and sheaves.

When retracting the boom, stages retract in the opposite order of extension. The boom telescope cylinders are equipped with an integral counterbalance valve that holds the boom in the extended position until pressure is applied to the retract port, unlocking the counterbalance valve and allowing the cylinder to retract. Extending and retracting the boom telescope speed is directly proportional to engine speed.

1. Slide the slider switch up to extend the boom.
2. Slide the slider switch down to retract the boom.

BOOM TELESCOPE MODES

The operator may select between sequencing mode 1 and sequencing mode 2 boom telescope operating modes to optimize load capacity or according to operator preference. For more information on load capacity, refer to the load charts. When the boom is fully retracted or fully extended, the F2 button on the crane control display may be used to change the mode.

NOTE: The boom sequencing mode 1 is not available in all boom configurations.

Sequencing Mode (1): In this mode, the second stage extends first to full extension, then the third stage extends to maximum extension, then the fourth and tip stages extend simultaneously to full extension. Conversely, when retracting, the fourth and tip stages retract first simultaneously until fully retracted, then the third stage retracts and then the second stage retracts.

Sequencing Mode (2): In this mode, the third stage extends first to maximum extension, then the fourth and tip stages extend simultaneously to full extension, then the second stage extends to full extension. Conversely, when retracting, the second stage retracts first, then the fourth and tip stages retract simultaneously until fully retracted and then the third stage retracts.

Boom Telescope Display Page: The system monitors the boom length and the retracted and extended state of the stages to check that the boom is properly sequencing. If an error is detected, the boom sequencing mode icon will display an error. The operator may retract the boom to reset the system. Alternatively, the operator may hold the soft key for the stage(s) indicated while retracting to manually adjust the position of stages.

⚠ WARNING

A boom telescoped incorrectly may fail when loaded. Be aware of an incorrect telescoping sequence when operating the machine. The total rated load table is based on correctly extending and retracting boom.

MAIN PAGE – BOOM MODE SELECTION & ACCESSING BOOM TELESCOPE SCREEN

1. When the boom is fully retracted or fully extended, the icon will be green and unlocked, and the operator may press F2 to change mode.

Figure 8

2. From main page, press “up” button once or “down” button twice to access the boom telescope page.

ICON	DESCRIPTION	PURPOSE
	Top Cylinder 2nd Boom Stage	Displays information directly related to the top cylinder which moves the 2nd boom stage.
	Middle Cylinder 3rd Boom Stage	Displays information directly related to the middle cylinder which moves the 3rd boom stage.
	Bottom Cylinder 4th & Tip Boom Stages	Displays information directly related to the bottom cylinder which moves the 4th & tip boom stages.
	Cylinder/stage(s) not blocked	The green circle indicates that this cylinder/ stage(s) is allowed to move or is moving.
	Cylinder/stage(s) blocked	The red circle indicates that this cylinder/stage(s) is not allowed to move.
	Boom stage movement display	Boom sections flash to indicate stage movement. This indication is not available when the operator is manually overriding stage movement.
	Selected mode	Lock indicates if mode may be changed. Boom icon indicates current mode selection. If unlocked, press F4 to change mode.

BACKWARD STABILITY CONTROL

The boom functions employ a backward stability operator aid. In the event of a backward stability condition, the controller will disable the boom function in the up direction and the boom telescope function in the retract direction. The overload override switch located in the cab can be used to stow the boom in the event of an RCI system error.

⚠ WARNING

Activating the override switch cancels the stop function of the RCI and crane control system. Using this switch during normal operation is extremely dangerous. Never use this switch during normal operation. Use the switch only when an operation has been disabled due to failure of the RCI system.

SWING CONTROLS

The swing function is controlled by the left joystick. The swing brake on/off switch is located on the left joystick. When the swing brake is on, the swing functions are disabled. When the swing brake is off, the LED in the center of the switch will be lit.

The speed of the swing is directly proportional to engine speed and how far to the left or right the joystick is moved.

NOTICE

Never use the park brake to stop the swing motion of the upper structure under any circumstances.

The swing service brake located on the floor of the cab can be used to slow the rotation or hold the superstructure in place when the swing brake is not activated.

NOTICE

Never rest your foot on the swing brake pedal during swing operation; even slight pressure will cause excessive wear on the swing brake mechanism.

1. To swing to the left, move the left joystick lever to the left.
2. To swing to the right, move the left joystick lever to the right.

FREE AND CONTROLLED SWING MODES

Before operating the swing, select the desired swing mode on the crane control display. There are two modes that may be selected based on crane application or operator preference: Free Swing and Controlled Swing.

NOTE: Free Swing is not available in all crane configurations.

Free Swing mode: When Free Swing mode is active, the upper rotating frame is free to move based on gravity or inertia when the joystick is in neutral. The swing service brake pedal may be used to slow and stop the swing motion. In addition, the swing joystick may be gently moved in the opposite direction of the swing motion to slow, stop and reverse the direction of the swing.

Controlled Swing mode: When Controlled Swing mode is active, the upper rotating frame is generally held in place when the joystick is in neutral. When the joystick is activated then returned to neutral, the swing will slow and stop.

⚠ CAUTION

This feature is not intended as a brake and some movement is possible. The houselocks or brakes should be used to hold the upper rotating frame in a set position.

Swing Park Brake: The upper rotating frame may be held at any position with the swing park brake. To release the swing park brake, press the push button on the top of the left joystick. When the indicator is on, the swing brake is released and the motion alarm is on. To engage the swing park brake, press the pushbutton again. When the indicator is off, the swing brake is engaged and the motion alarm is off. The swing brake will not release unless the operator is in the seat and controls enable/disable switch is set to enable. If the swing brake is released and the operator rises from the seat or the controls enable/disable switch is set to disable, the swing park brake will engage. It is recommended to apply the swing service brake with the foot pedal before releasing the swing park brake.

⚠ CAUTION

Do not engage swing park brake while the swing is in motion.

WORKING STATUS LIGHTS

The crane is equipped with an external working status light with three lights that indicate the current working status.

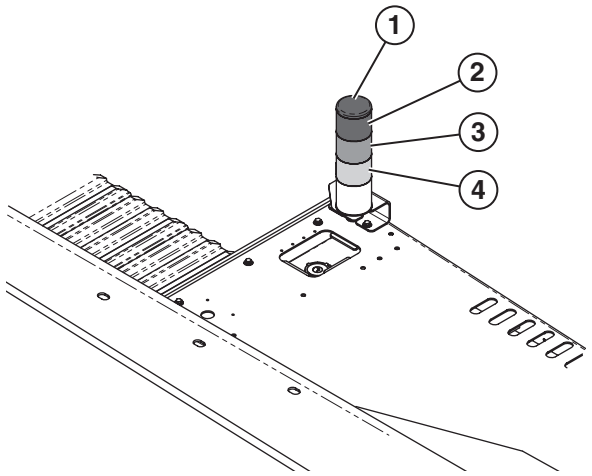


Figure 9

1 – Working Status Light
2 – Red Light
3 – Yellow Light
4 – Green Light

1. With a load factor of less than 90%, the green light will be on, indicating normal operation status.
2. With the load factor 90% to less than 100%, the working status light changes from green to yellow, notifying the operator and those around that the actual load is close to the rated total load.
3. With the load factor of 100% or higher, the working status light changes from yellow to red and an alarm in the cab will sound a series of 3 beeps once or twice. The following crane functions will stop immediately:
   - ◊ Boom out
   - ◊ Boom hoist down
   - ◊ Winch
   - ◊ Raise

The load moment must immediately be reduced in this situation by retracting the boom, reducing the load radius, and/or lowering the load.

EXTERIOR CAMERAS

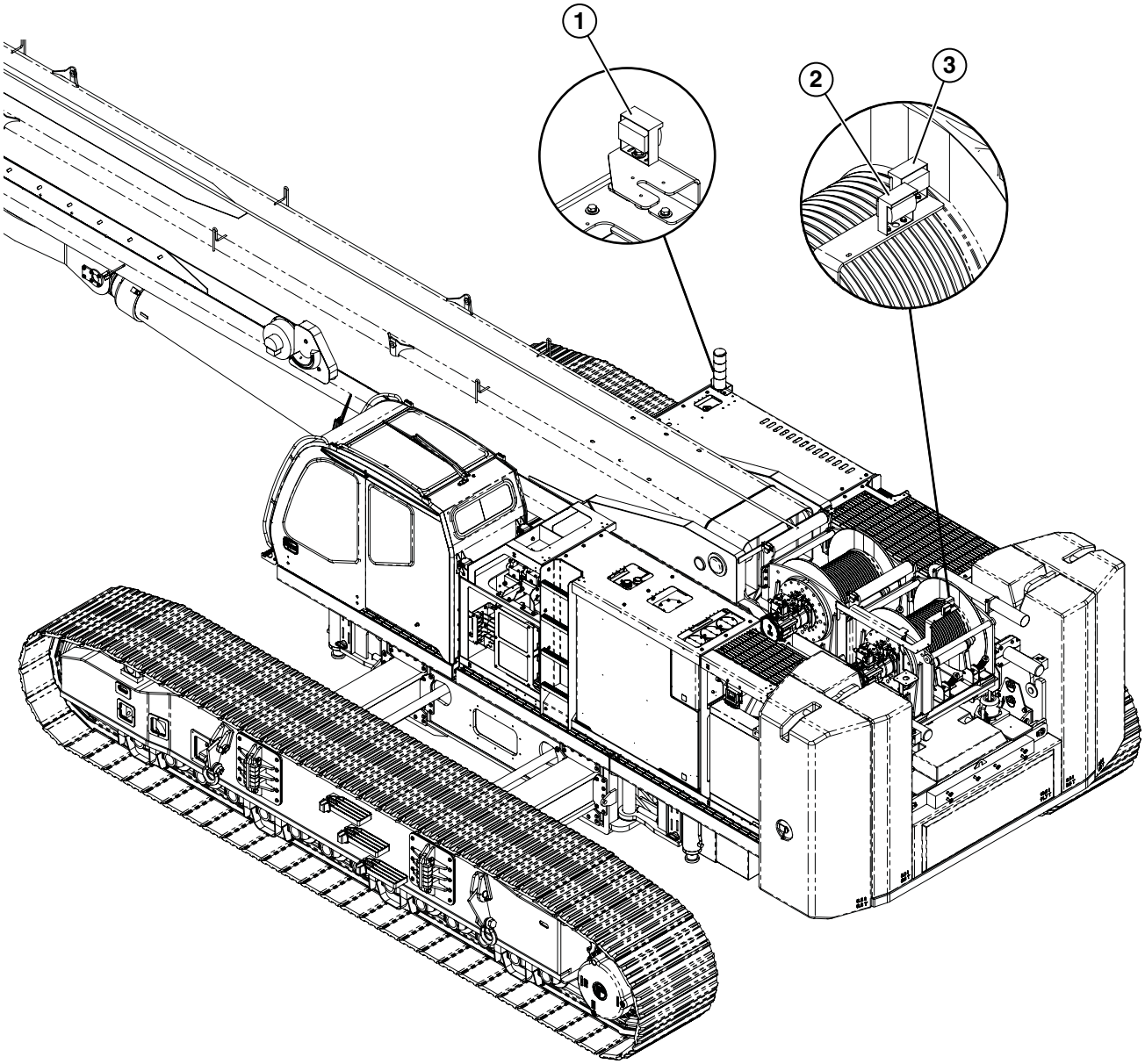


Figure 10

1 – Right-Side View Camera)
2 – Rear View Camera
3 – Rear View Camera

The crane is equipped with three exterior cameras that can be viewed on a monitor inside the cab.

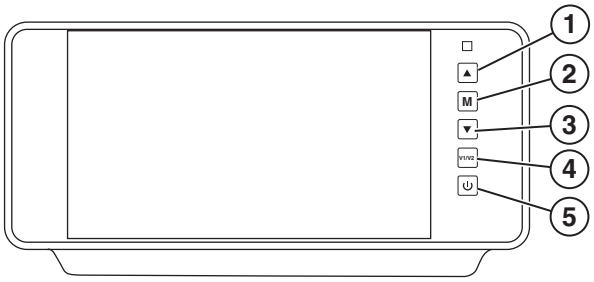


Figure 11

1 – UP Arrow
2 – M (Menu): Access adjustment of brightness, contrast, color, and other options
3 – DOWN Arrow
4 – V1/V2: Selects winch, right side or rearview camera
5 – Power Button

The default setting for the camera view is the winch view.

REEVING

The reeving diagram below illustrates the correct reeving procedure.

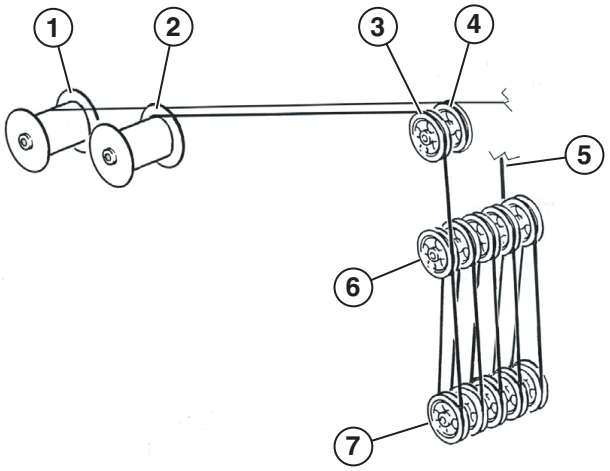
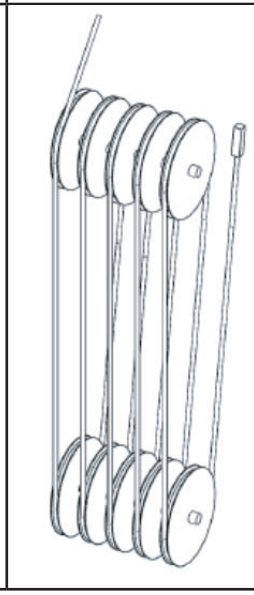
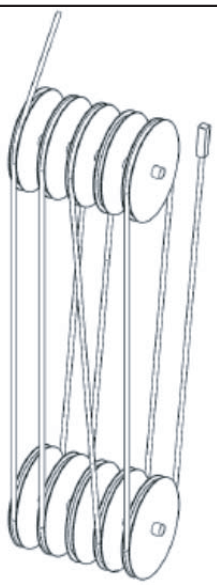
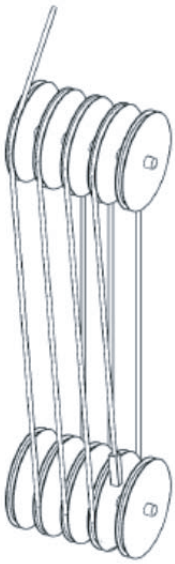
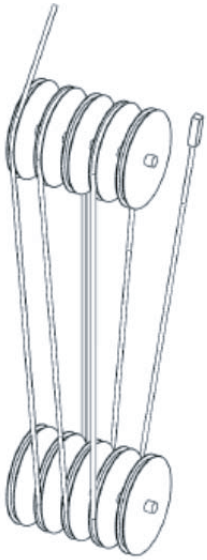


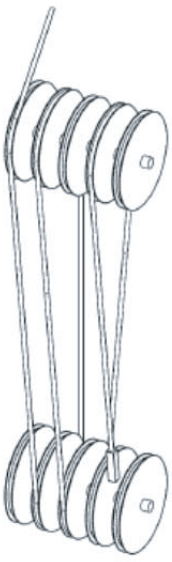
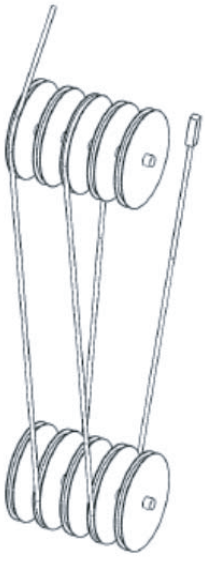
Figure 12

1 – Auxiliary Winch
2 – Main Winch
3 – Top of Boom Head
4 – Center Sheave for Jib
5 – To Dead End Anchor
6 – Boom Head Bottom Sheaves
7 – Hook Block

PARTS-OF-LINE

The following table shows the standard parts-of-line. Select the number of parts-of-line that ensures the most efficient operation, taking into consideration boom length, radius, load mass, hoisting speed and other considerations such as winch drum wire rope capacity.

NUMBER OF PARTS-OF-LINE	10	8	7	6
Reeving Pattern				

NUMBER OF PARTS-OF-LINE	5	4	3
Reeving Pattern			

⚠ DANGER

Do not exceed the manufacturer's specified maximum reeving of 10 parts-of-line. 10-part reeving is required for full capacity lifting.

ANEMOMETER (OPTION)

⚠ WARNING

A strong wind sways the lifted load. This is dangerous to workers and surrounding structures, and can damage the boom and overturn the machine. Note that the longer the boom is, and the larger the area of the load is, the more the wind affects the machine.

The rated lifting capacity does not include the effect of the wind on the load, boom or jib.

If you find it difficult to control the load because of the wind, stop crane operation.

For boom lift, with wind speed is in excess of 20 mph (9 m/s), contact Tadano Mantis for capacities.

During jib lift, stop operation when the wind speed exceeds 20 mph (9 m/s).

The anemometer measures the wind speed at the boom head in order to prevent damages to the crane or an overturning accident caused by a strong wind.

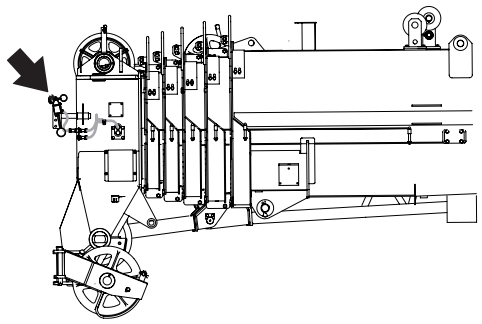


Figure 13

INSTALLING THE ANEMOMETER

1. Put the boom in the stowed position.
2. Turn the crane off.
3. Install the anemometer to the mounting support on the head of the boom and fix it with the fixing pin.

⚠ WARNING

To prevent the anemometer from falling, make sure that the fixing pin is mounted securely.

LOAD MOMENT INDICATOR (AML)

⚠ WARNING

Never operate the crane with the automatic stop function of the load moment indicator canceled. Using the load moment indicator incorrectly can cause the crane to overturn or suffer damage, and cause a fatal injury.

The load moment indicator calculates the load ratio from the hook load and rated lifting capacity, based on the operation status registered by the operator and input signals from the detectors.

When the load ratio reaches 100% or more, the load moment indicator stops the crane operations toward the critical side and warns with the warning codes and buzzer.

The load moment indicator is a safety device that is provided to prevent accidents such as overturning of the machine, and also to prevent machine damage caused by overloading. Note that the load moment indicator is not a load meter. The lifting load shown on it must be regarded as a reference value and its precision is not guaranteed. *See Figure 14.*

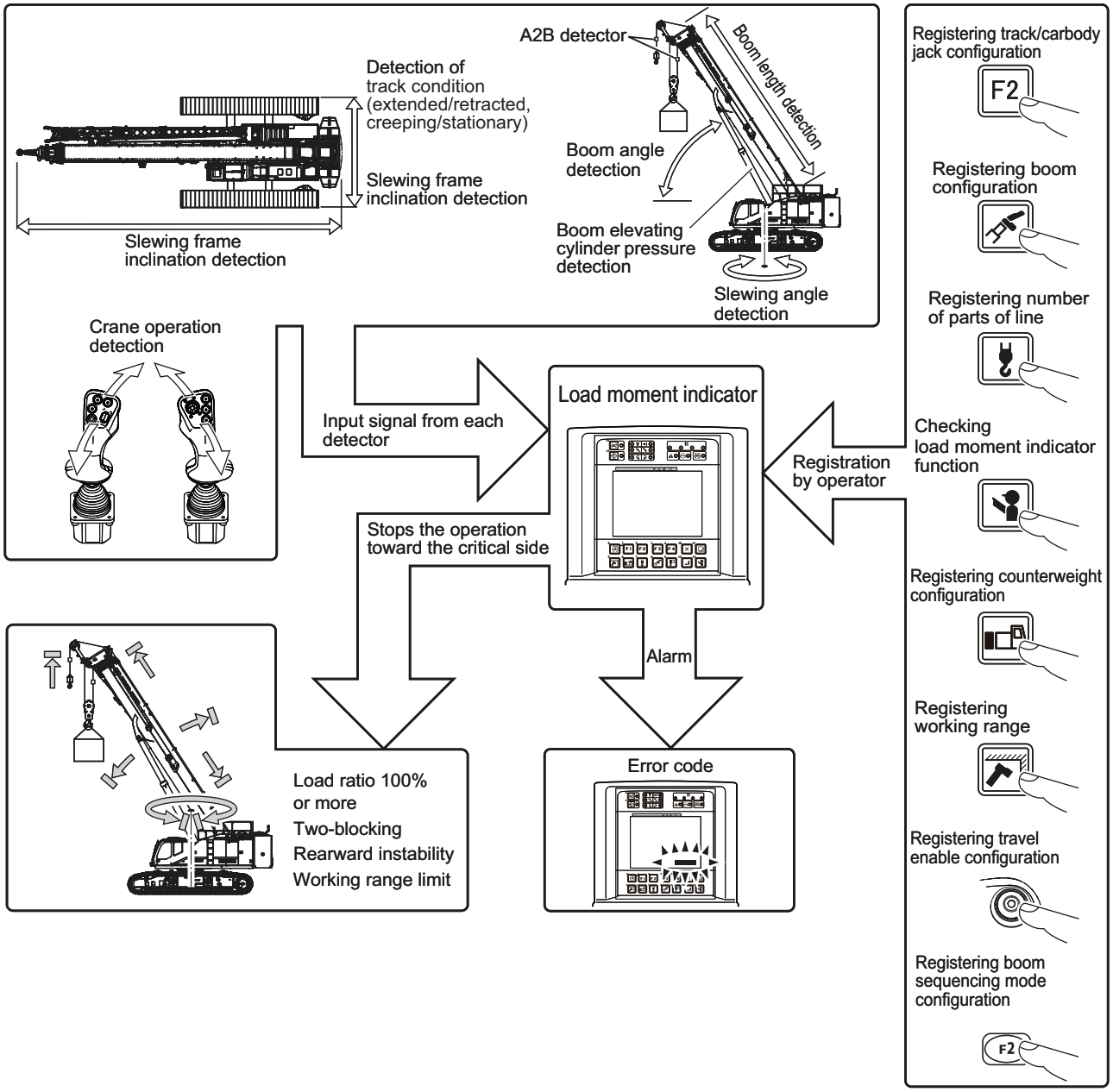


Figure 14

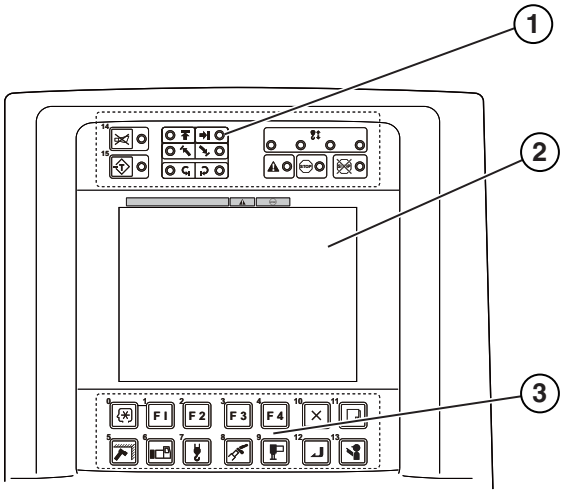


Figure 15

1 – LED Display
2 – Display Panel
3 – Controls

The load moment indicator consists of the LED display, display panel and controls. *See Figure 15.*

The LED display shows the working range limits, turning condition of the winch drums and the controlling status of the load moment indicator.

The display panel shows the moment load ratio, crane status, position of the tracks and carbody jacks, slewing position, inclination angle of the slewing table and warning codes.

BOOM SEQUENCING MODE SELECTION

Registers the boom sequencing mode (sequence 1 or sequence 2) on the MD3 screen.

HOW TO READ THE INDICATORS

DISPLAY PANEL

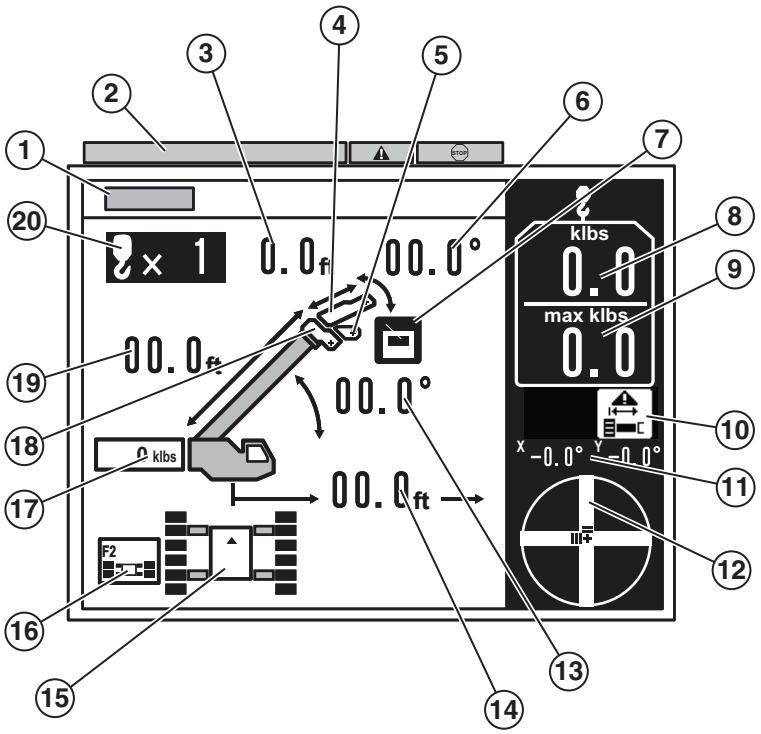


Figure 16

1 – Moment Load Ratio Display
2 – Moment Load Ratio Index
3 – Jib Length Display
4 – Jib Configuration Indicator Symbol
5 – Auxiliary Boom Nose Sheave Configuration Indicator Symbol
6 – Jib Offset Angle Display
7 – Work Platform Configuration Symbol
8 – Hook Load Display
9 – Rated Lifting Capacity Display
10 – Crane Status Indicator (B-2)
11 – Slewing Frame Inclination Display
12 – Slewing Frame Inclination Bargraph
13 – Boom Angle Display
14 – Load Radius Display
15 – Track/Carbody Jack Configuration Symbol
16 – F2 Key Information Symbol
17 – Counterweight Indicator
18 – Main Boom Configuration Indicator Symbol
19 – Boom Length Display
20 – Number of Parts of Line Display

NOTICE

- **Moment load ratio is not a ratio of the hook load to the rated lifting capacity. To find the correct lifting capacity, check the rated lifting capacity.**
- **The load moment indicator (AML) is not a hook load indicator. The hook load indication is a reference value, and not necessarily a correct mass of the lifted load.**

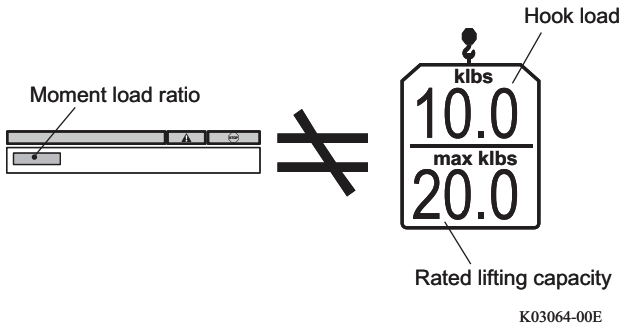


Figure 17

1. **Moment Load Ratio Display**

   Shows the moment load ratio with a bargraph.

2. **Moment of Ratio Index**

   Shows the moment load ratio index by bargraph: safe (green), warning (yellow) or critical (red).

3. **Jib Length Display**

4. **Jib Configuration Indicator Symbol**

   Appears when the jib is registered. Flashes when the jib set is registered to the load moment indicator.

5. **Auxiliary Boom Nose Sheave Configuration Indicator Symbol**

   Appears when the auxiliary boom nose sheave is registered.

6. **Jib Offset Angle Display**

7. **Work Platform Configuration Symbol**

   Appears when the use of a work platform is registered.

8. **Hook Load Display**

9. **Rated Lifting Capacity Display**

10. **Crane Status Indicator (B-2)**

    The indicator (icon) shows a crane state. Refer to Crane Status Indicator on page 5-26 for the meaning of the icons.

11. **Slewing Frame Inclination Display**

    Shows the inclination of the swing frame. The value in the “X” box shows the inclination in the right/left direction, and the value in the “Y” box shows the inclination in the front/rear direction.

    When the left side is higher, it shows a positive value and when lower, it shows a negative value in the “X” box.

    When the back side is higher, it shows a positive value and when lower, it shows a negative value in the “Y” box.

12. **Swing Frame Inclination Bargraph**

    Indicates crane level. The bargraph shows the direction where the swing frame is lower.

13. **Boom Angle Display**

14. **Load Radius Display**

15. **Track/Carbody Jack Configuration Symbol**

    Shows the track condition (extended/retracted, creeping/stationary) and the carbody jack condition. When the track condition (creeping) is registered, the crawler moves; when the track condition (stationary) is registered, the crawler illuminates.

16. **F2 Key Information Symbol**

    Indicates F2 key is used to register track/carbody jack condition.

17. **Counterweight Indicator**

    Shows the condition of mounted counterweight.

18. **Main Boom Configuration Indicator Symbol**

    Appears when the main boom is registered.

19. **Boom Length Display**

20. **Number of Parts of Line Display**

LED DISPLAY

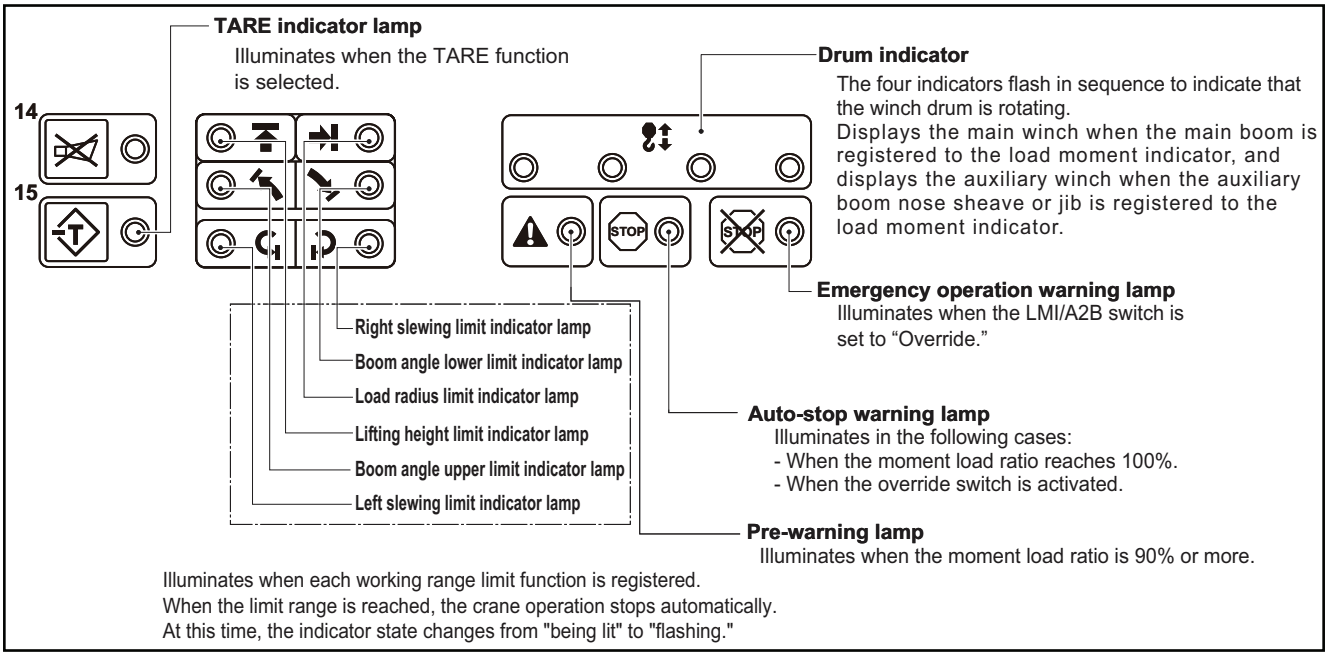


Figure 18

CONTROLS

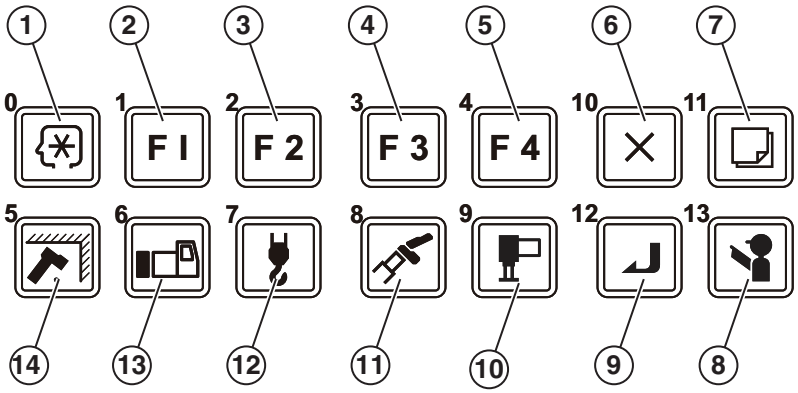


Figure 19

1 – Preset Menu Key
2 – F1 Key
3 – F2 Key (Use when selecting track/carbody jack configuration
4 – F3 Key
5 – F4 Key
6 – Exit Key
7 – Display Change Key
8 – Check Key
9 – Set Key
10 – Not Used
11 – Boom Configuration Select Key
12 – Parts of Line Key
13 – Counterweight Configuration Select Key
14 – Working Range Limit Key

SELECTING DISPLAY

When the display change key is pressed (item 5 in *Figure 20*, the content in the display panel changes as shown in *Figure 20*.

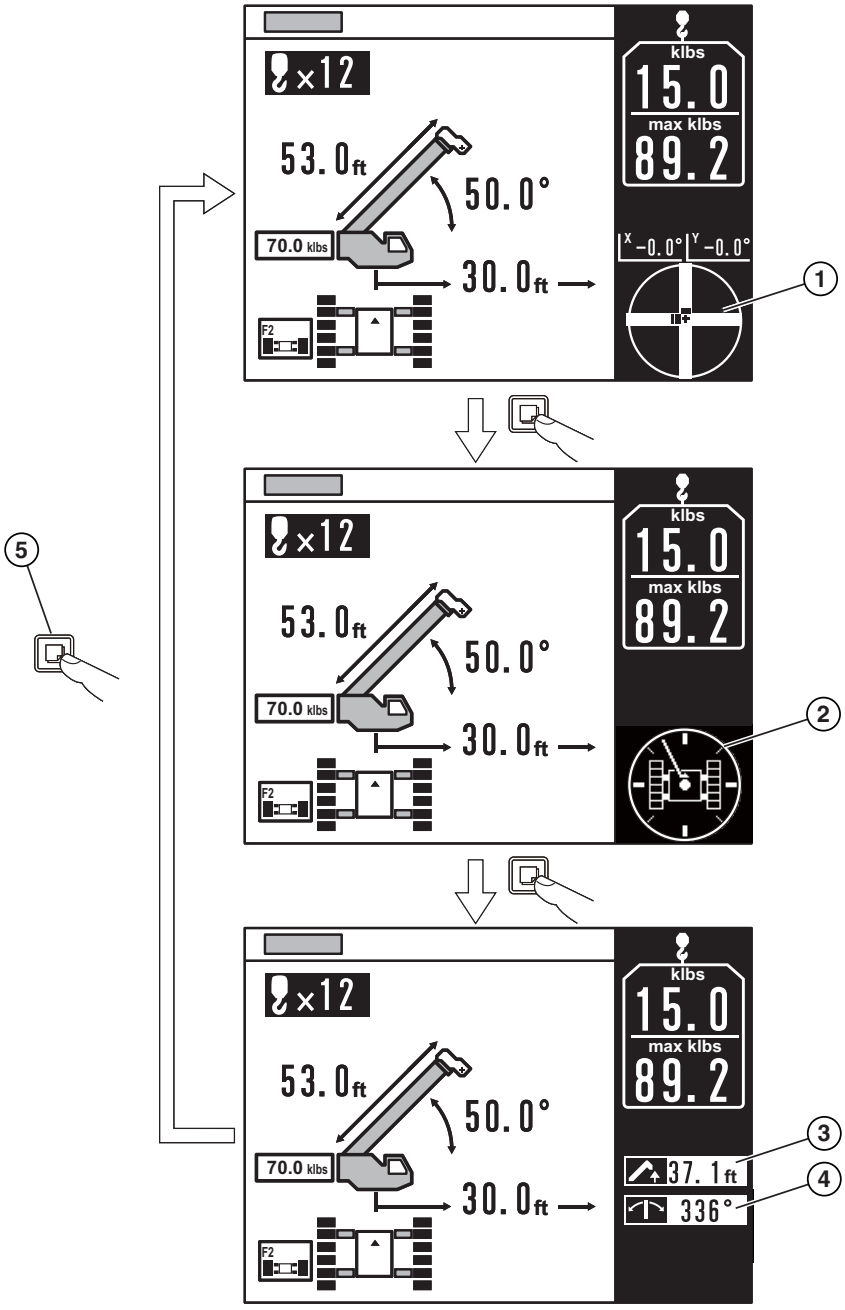
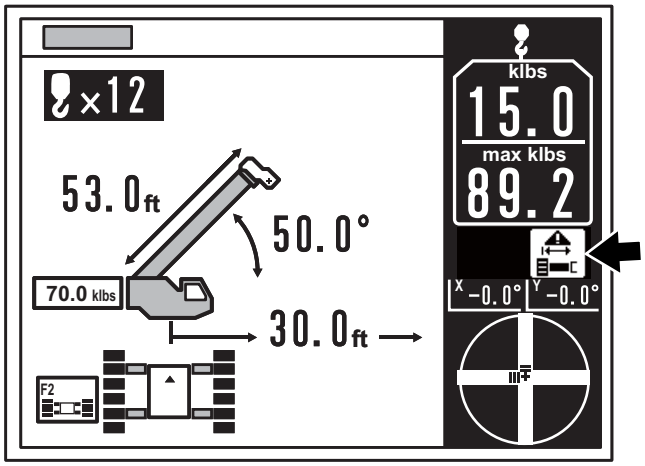


Figure 20

1 – Slewing Frame Inclination Bargraph
2 – Slewing Position Display
3 – Lifting Height Display
4 – Slewing Angle Display
5 – Display Change

CRANE STATUS INDICATOR

The crane state is displayed by the indicators (icons). *See Figure 21* for the positions and contents of the indicators.



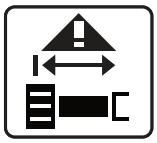
ICON	DESIGNATION	POSITION	DISPLAY CONDITION
	Track configuration emergency registration	B-2	Flashes when the emergency track control switch is set to “ON.”

Figure 21

REGISTRATION OF OPERATING STATUS AND CHECK OF LOAD MOMENT INDICATOR FUNCTION

⚠ WARNING

Before you start the crane operation, make sure that correct operation configuration is registered and the load moment indicator system functions normally. If you register the operation configuration incorrectly or the load moment indicator system does not function normally, the machine can overturn or suffer damage, and this can cause a fatal injury.

Before crane operation, observe the following steps to register the operation condition and check the load moment indicator functions.

1. Start the engine.
   - ◊ The load moment indicator is turned on.
2. Push the counterweight configuration select key (see *Figure 22*).

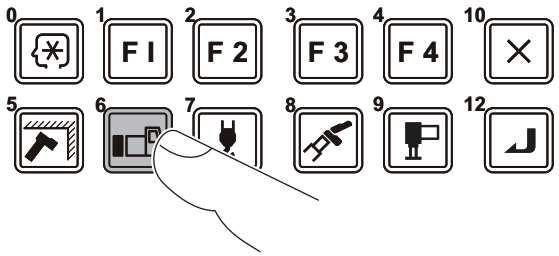


Figure 22

- ◊ The pop-up window for counterweight configuration registration appears on the display panel.
  Each time the counterweight configuration select key is pushed, the display changes as shown in *Figure 23*.

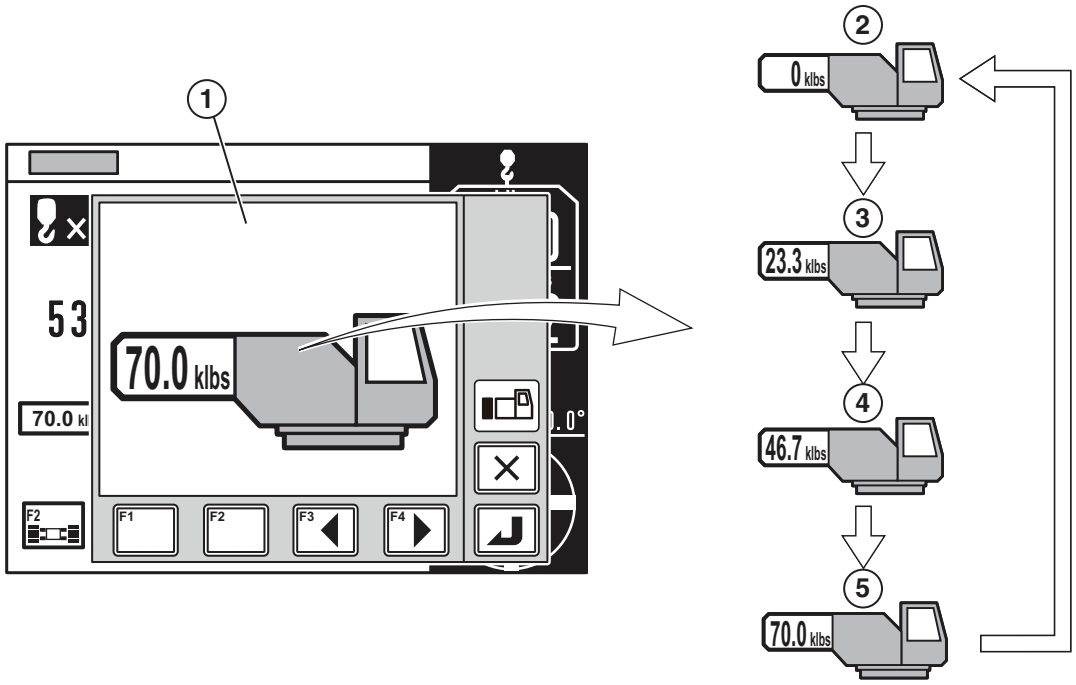


Figure 23

1 – Pop-up window for counterweight configuration registration is displayed.

2 – 0 klbs

3 – 23.3 klbs

4 – 46.7 klbs

5 – 70.0 klbs

◊ When the power of the load moment indicator is turned on, the pop-up window for counterweight configuration registration shows “0 klbs.”

◊ Instead of the counterweight configuration select key, you can use the F3 (backward) key or F4 (forward) key to change the display of the counterweight configuration registration.

3. Make sure that the display agrees with the actual counterweight configuration. *See Figure 24.*

◊ The meanings of the counterweight configuration symbols are as shown in *Figure 20*.

⚠ WARNING

If the indication on the load moment indicator and actual counterweight configuration do not match, an overturning accident or crane damage can occur.

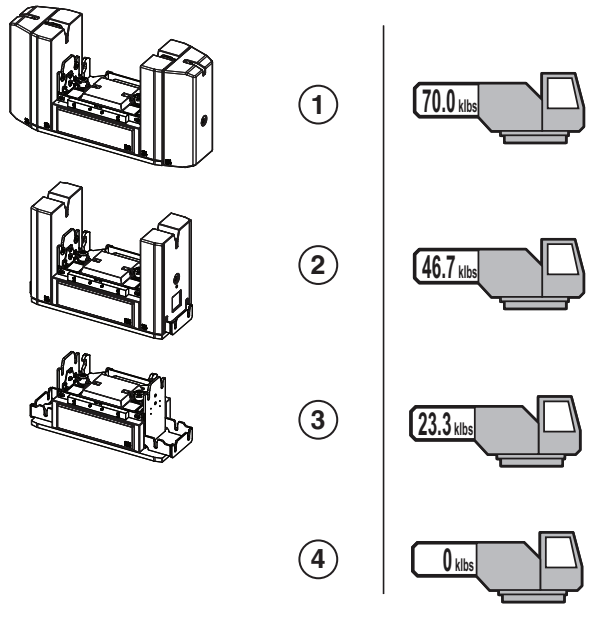


Figure 24

1 – Counterweight, 70.0 klbs (31.8 ton)
2 – Counterweight, 46.7 klbs (21.2 ton)
3 – Counterweight, 23.3 klbs (10.6 ton)
4 – No Counterweight, 0 klbs (0 ton)

◊ To stop registration, push the exit key. The pop-up window closes and the load moment indicator returns to the state before the start of the registration.

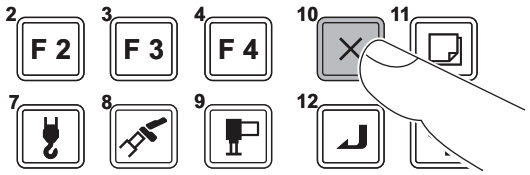


Figure 25

4. If the display agrees with the actual condition, push the set key to register the configuration. *See Figure 26.*

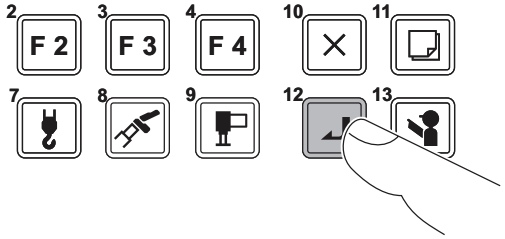


Figure 26

◊ After registration is completed, the pop-up window closes and the load moment indicator returns to the original screen. *See Figure 27.*

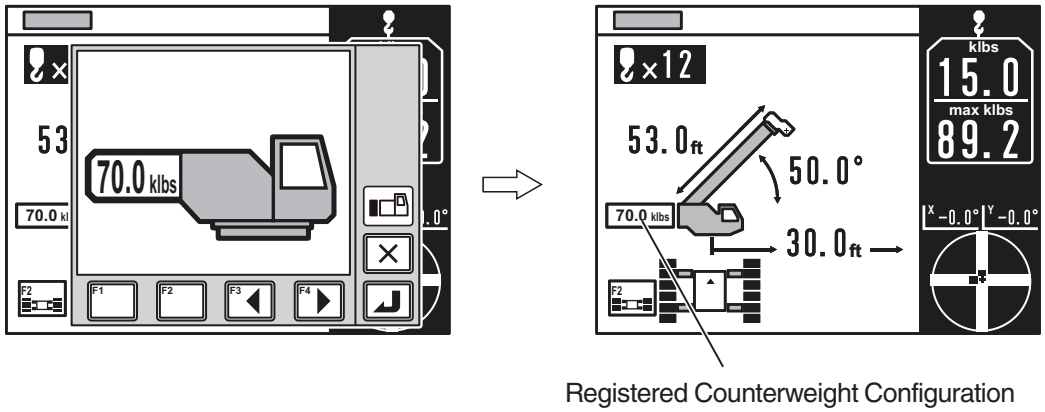


Figure 27

5. Push the F2 key.
   ◊ The track position setting on the AML-C is switched automatically based on the inputs from the crane.
      1. Fully extended - Proximity switch on track extend cylinder senses end of stroke.
      2. Retracted - Proximity switch on track extend cylinder senses tracks are less than fully extended.
      3. Carbody jacks - Carbody Jack Radio Remote system is enabled.

A configuration change prompted by a change in one of these inputs requires confirmation of the condition by the operator.

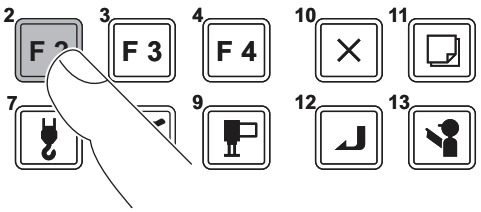


Figure 28

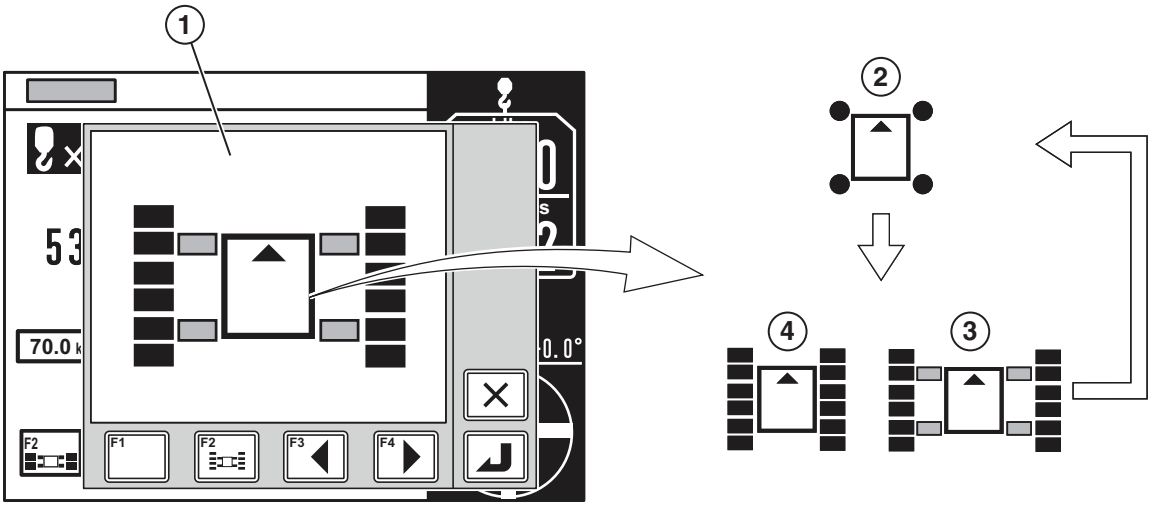


Figure 29

1 – Pop-up window for track/carbody jack configuration registration is displayed.

2 – Carbody Jack

3 – Track Extended

4 – Track Retracted

◊ When the power of the load moment indicator is turned on, the “carbody jack” operation status is selected automatically.

◊ Instead of the F2 key, you can use the F3 (backward) key or F4 (forward) key to change the display of track/carbody jack configuration.

6. Make sure the display agrees with the actual track/carbody jack configuration.
   ◊ The meanings of the track/carbody jack configuration symbols are as shown in *Figure 30*.

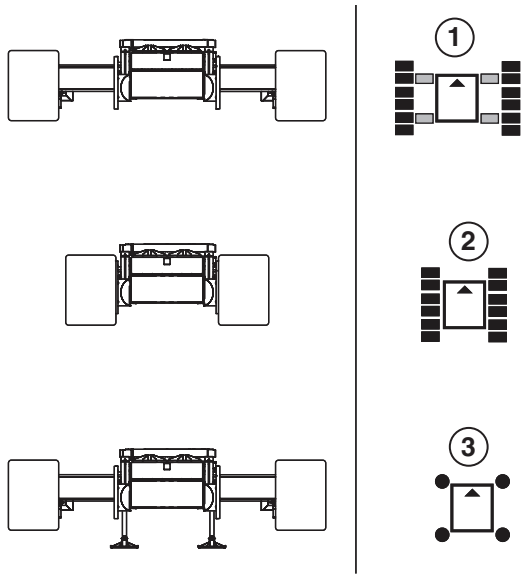


Figure 30

1 – Track Extended
2 – Track Retracted
3 – Carbody Jack

◊ To abort registration, push the exit key (see *Figure 31)*. The pop-up window closes and the load moment indicator returns to the state before the start of the registration.

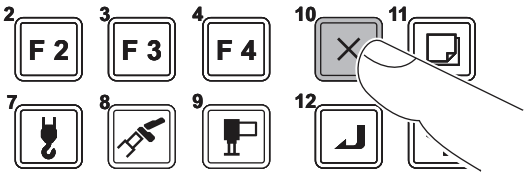


Figure 31

7. If the display agrees with the actual condition, push the set key to register the configuration (see *Figure 32)*.

◊ After registration is completed, the pop-up window closes and the load moment indicator returns to the original screen.

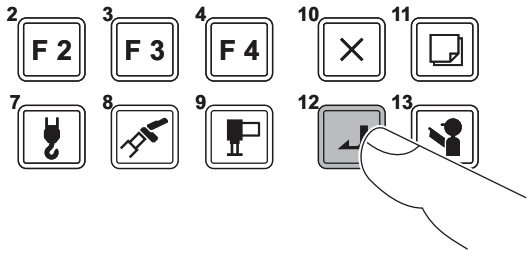


Figure 32

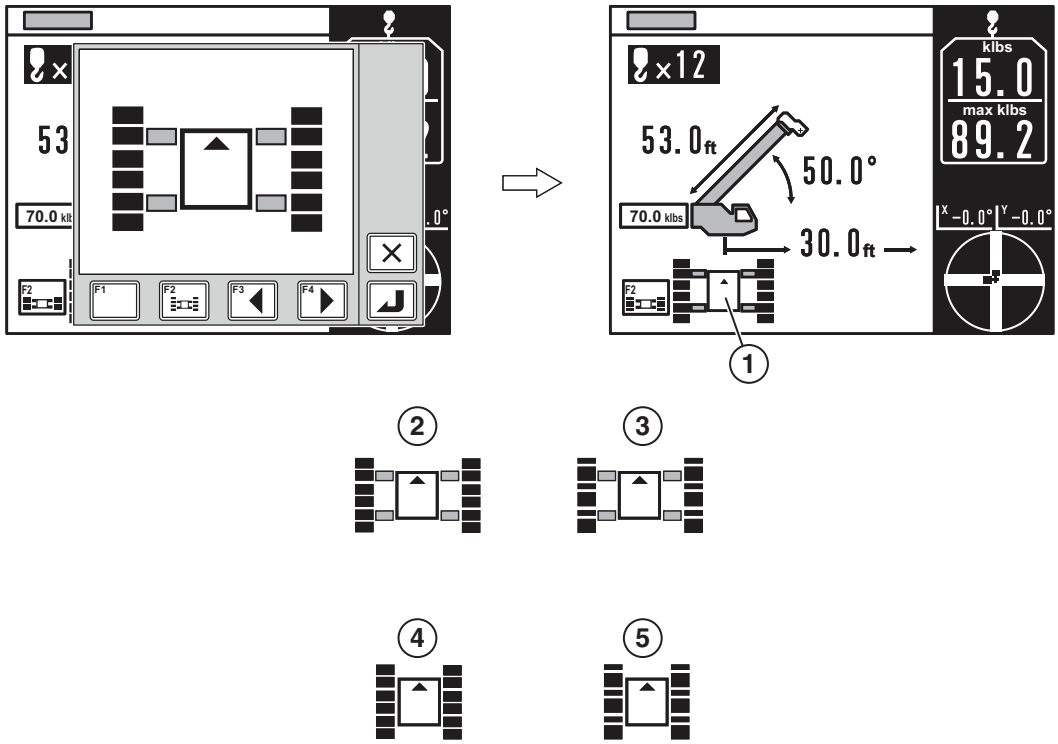


Figure 33

1 – Registered Track/Carbody Jack Configuration Symbol
2 – Track Extended (Stationary)
3 – Track Extended (Creeping)
4 – Track Retracted (Stationary)
5 – Track Retracted (Creeping)

NOTE: If the crane is in Free Swing mode when a zoned chart is selected, the crane will automatically change the swing mode to Controlled Swing. A pop-up notification and audible beep will warn of this condition.

8. Install main or auxiliary hook blocks as needed for the intended application (see *Figure 34*).

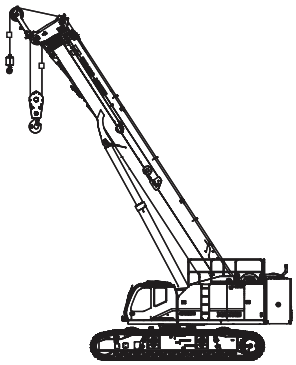


Figure 34

9. Push the boom configuration select key to register the boom configuration (boom/auxiliary boom nose sheave/jib/platform).

   ◊ The pop-up window for the boom configuration registration appears on the display panel. Each time you push the boom configuration select key, the display changes as shown in *Figure 36*.

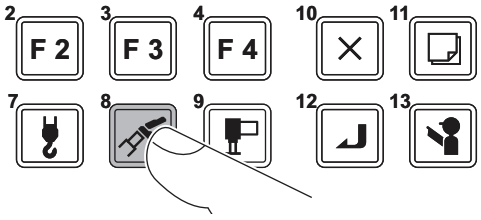
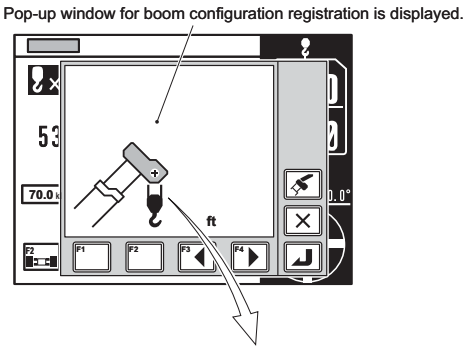


Figure 35



NOTE: The 82 ft and 105 ft jib are optional and ship separately with the software.

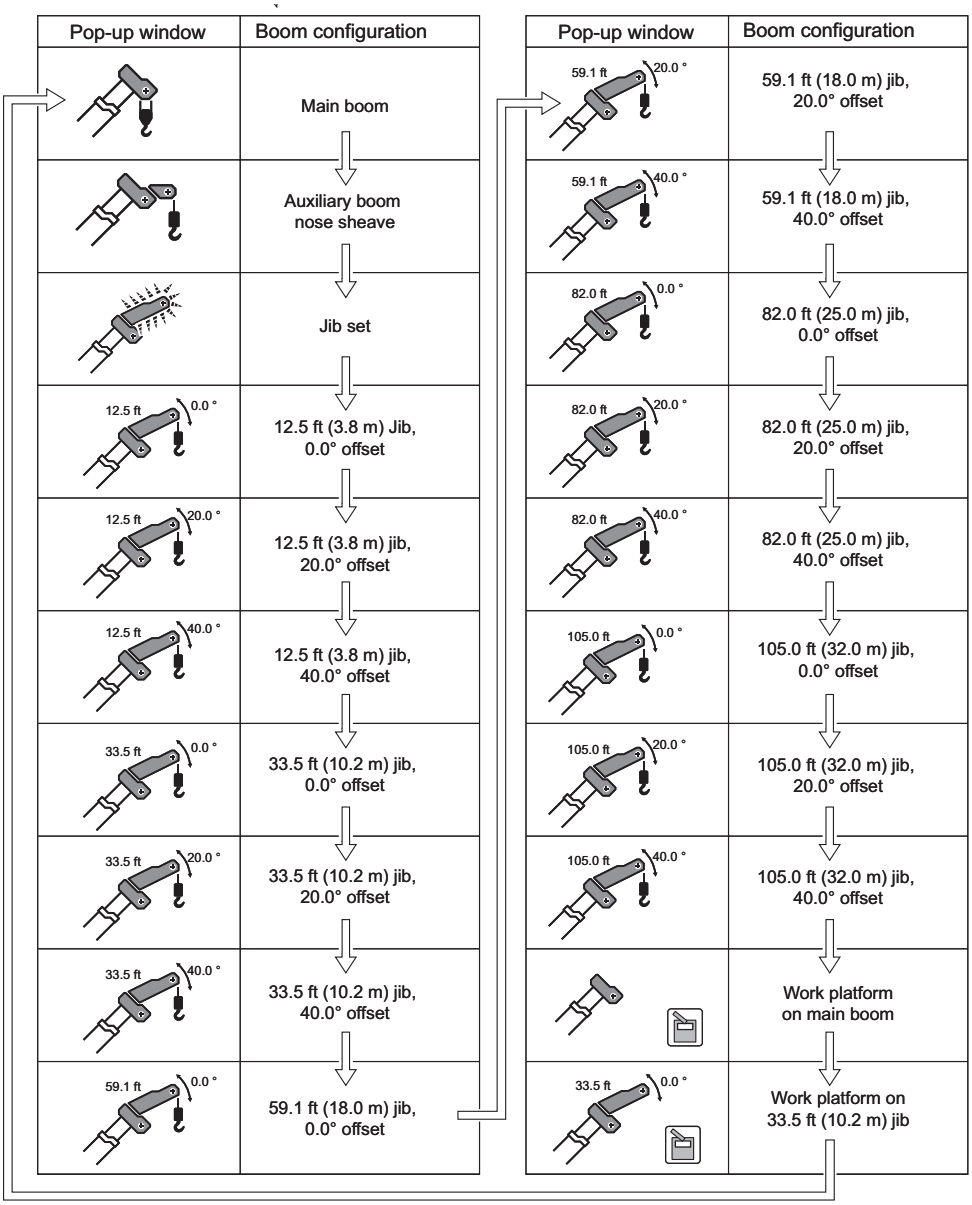


Figure 36

◊ When the power of the load moment indicator is turned on, the main boom is initially selected.

◊ Instead of the boom configuration select key, you can use the F3 (backward) key or F4 (forward) key to change the display of the boom configuration.

◊ To stop registration, push the exit key (see *Figure 37)*. The pop-up window closes and the load moment indicator returns to the state before the start of the registration.

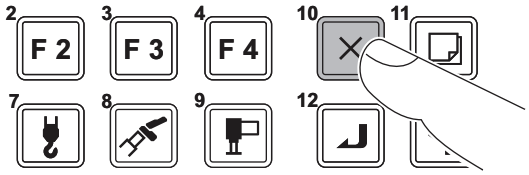


Figure 37

10. Push the set key to register the setting (see *Figure 38)*.

◊ After registration is completed, the pop-up window closes and the load moment indicator returns to the original screen (see *Figure 39)*.

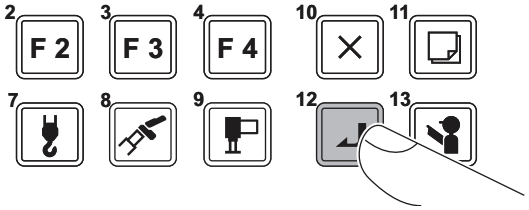


Figure 38

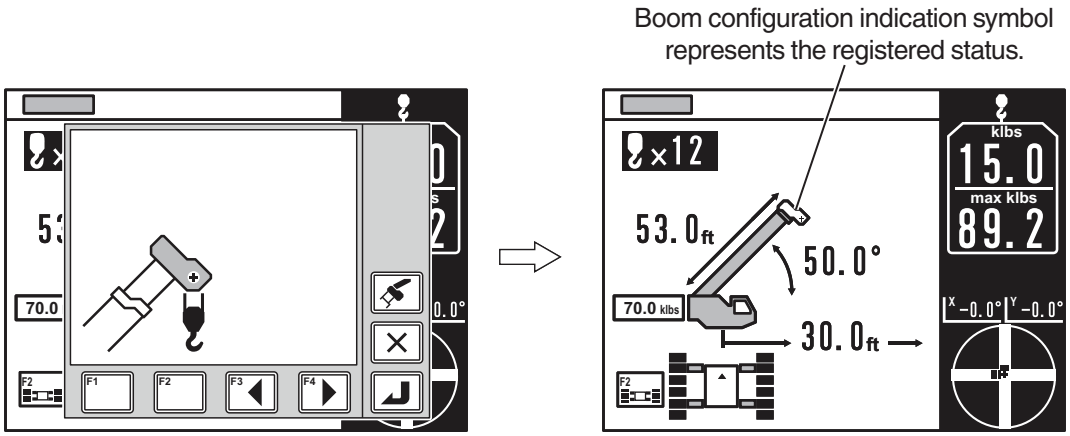


Figure 39

11. Push the parts of line key to register the number of parts of line to be used (see *Figure 40)*.

    ◊ The pop-up window for parts of line registration appears on the display panel. Each time you push the parts of line key, the number of parts of line changes.

The hook block is automatically selected and shown according to the registered boom configuration (see *Figure 41)*. If you must change the registration to a different hook block symbol, push the F1 (main hook block) key or F2 (auxiliary hook block) key to change the indication.

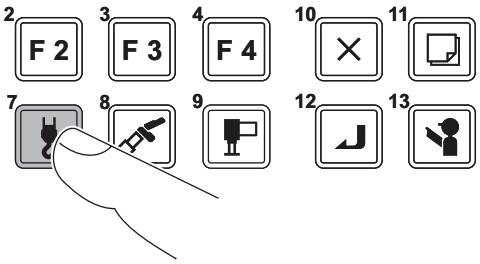


Figure 40

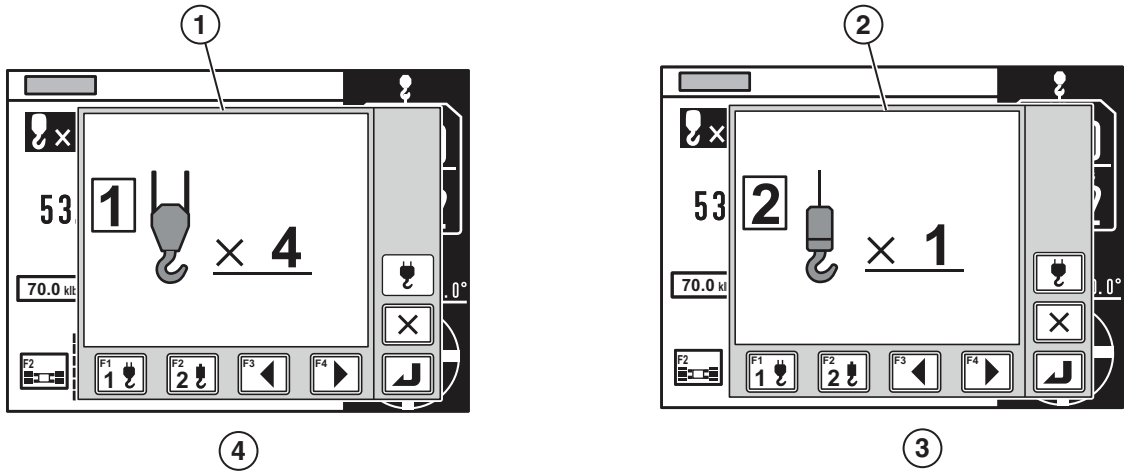


Figure 41

1 – Pop-up window for main hook block registration is displayed.

2 – Pop-up window for auxiliary hook block registration is displayed.

3 – When auxiliary boom nose sheave/jib is registered.

4 – When main boom is registered.

◊ You can register only the numbers of parts of line specified for each model.

◊ Instead of the parts of line key, you can use the F3 (backward) key or F4 (forward) key to change the display of the number of parts of line.

◊ To abort registration, push the exit key (see *Figure 42)*. The pop-up window closes and the load moment indicator returns to the state before the start of the registration.

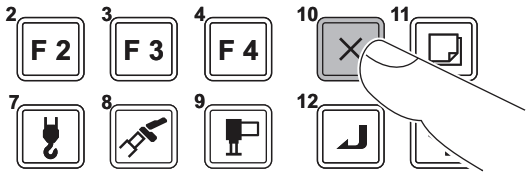


Figure 42

12. Push the set key to register the setting (see *Figure 43)*. After registration is completed, the pop-up window closes and the load moment indicator returns to the original screen (see *Figure 44)*.

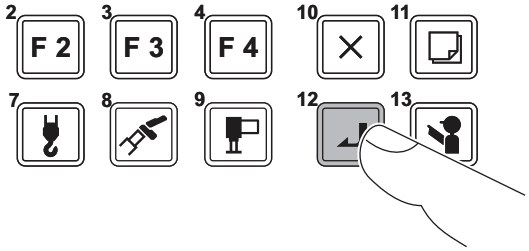


Figure 43

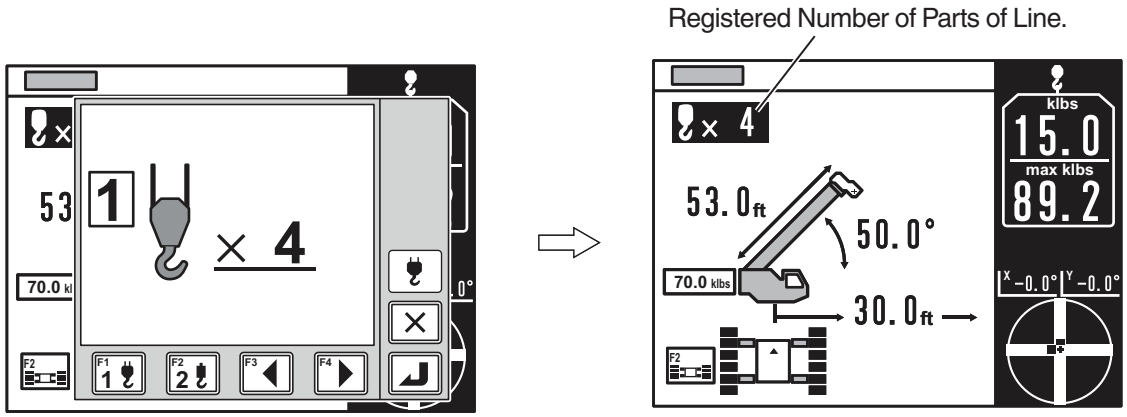


Figure 44

13. Push the F13 (check) key and make sure that the load moment indicator is in the condition shown in *Figure 45*.
    - ◊ LED Display: All lit
    - ◊ Display Panel: All inverted

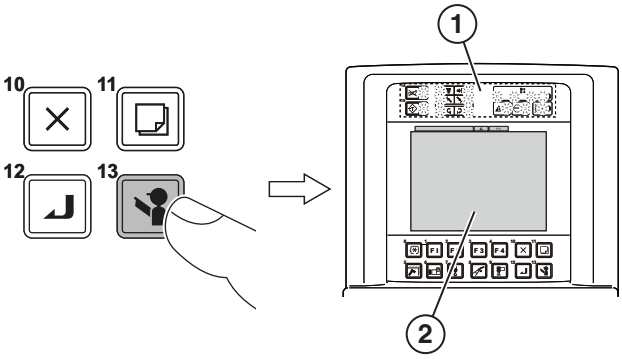


Figure 45

1 – LED Display 2 – Display Panel

14. Attempt hoist-up, boom extension, boom lowering, boom up, tele retract, and swing left and right operations to make sure the crane does not move (see *Figure 46*).

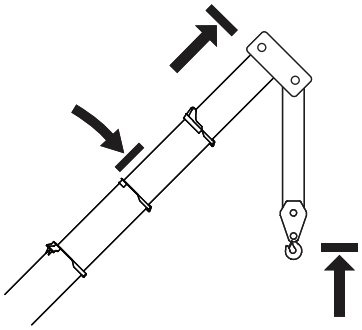


Figure 46

15. Push the F13 (check) key again to return to the original screen (see *Figure 47*).

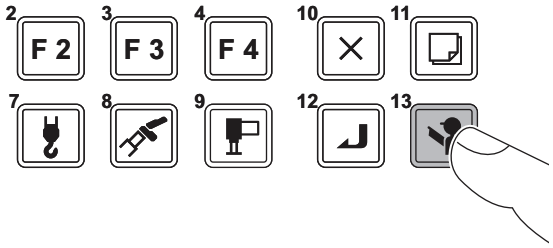


Figure 47

16. Make sure the items on the display panel listed in *Figure 48* agree with the actual condition.

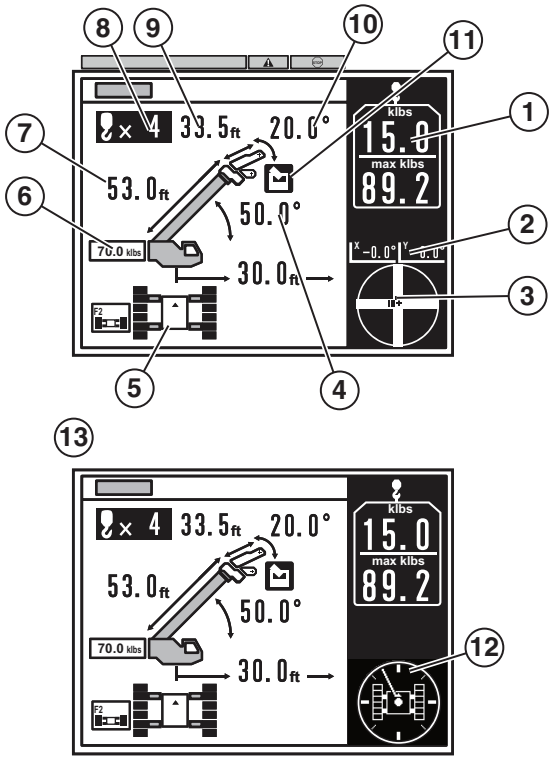


Figure 48

1 – Hook Load
Make sure that approximate hook mass is shown under a no-load condition.

2 – Swing Frame Inclination

3 – Swing Frame Inclination Bargraph

4 – Boom Angle

5 – Track/Carbody Jack Configuration Symbol

6 – Counterweight Configuration

7 – Boom Length

8 – Number of Parts of Line

9 – Jib Length (When jib is selected)

10 – Jib Offset Angle (When jib is selected)

11 – Work Platform Configuration
(When work platform is selected)

12 – Slewing Position Display

13 – Display Change

The hook block mass shown varies depending on the crane configuration, etc.

At this point, you have successfully completed registration of the crane operating configuration and AML indicator.

You can start crane operation.

After the power of the load moment indicator is turned off, the registered information is retained for approximately 2 hours. When the power of the load moment indicator is turned on, the operation starts with the retained information. After the 2-hour period, the registered information will be erased and it is necessary to register the operation configuration from the beginning.

ALARM AND RECOVERY OPERATION

NOTICE

Repair is necessary if any of the following events occurs:

- *A warning code not listed here is shown.*
- *The warning code does not disappear even after you register the condition corresponding to the warning code or perform the recovery operation.*
- *The crane functions remain halted and you cannot operate the crane.*

Contact your nearest Tadano distributor or dealer.

When any failure occurs or improper operation is performed during crane operation, the buzzer sounds and a warning code is shown to ensure safety and to prevent damage to the machine. Examine the meaning of the warning code, and perform recovery operation.

WARNING CODES AND BUZZER

The warning codes appear on the display panel.

The load moment indicator has a built-in buzzer. *See Figure 49.*

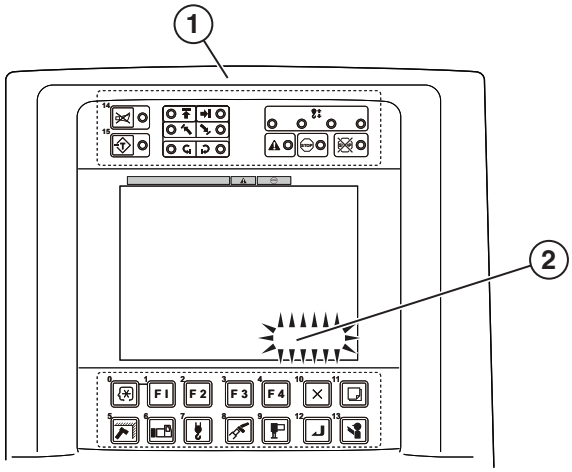


Figure 49

1 – Load Moment Indicator Built-In Buzzer

2 – Display Panel (Warning codes are displayed)

If the F1 key is pressed while a warning code is shown, a pop-up window appears and shows a message (see *Figure 50).*

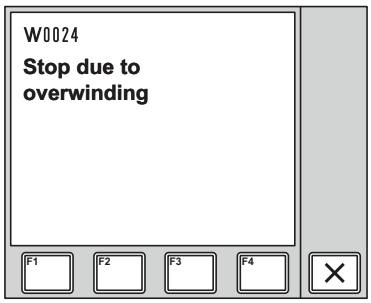


Figure 50

STOP ALARM

Table 5-1 contains warning codes that are not applicable to this model.

Table 5-1

WARNING CODE	BUZZER	CAUSE	REMEDY
Ordinary bar graph display (no warning code) 	– – –	Moment load ratio is 100% or more.	Unwind the winch, retract or raise the boom, or slew to the non-critical side.
[W0023] “Stopped at 100% of crane performance”	Load moment indicator built-in buzzer: beep-beep-beep (Repeats every 1 second for 5 seconds.)	Crane is operated toward a critical side while the moment load ratio is 100% or more.	
[W0024] “Stop due to overwinding”		Crane is operated toward a critical side while the hook block is overwound.	Unwind the winch or retract the boom to lower the hook block.
[W0007] “Stop at swing angle limit”		Overload occurs during the slewing operation.	Slew in the opposite direction, or retract or raise the boom.
[W0025] “Stopped due to backward stability”		Backward stability decreases and the crane can overturn.	Lower or extend the boom.
[W0034] “Stopped by main winch over-unwinding prevention device”		Remaining wire rope on the main winch drum is short.	Wind up the winch.
[W0035] “Stopped by aux. winch over-unwinding prevention device”		Remaining wire rope on the auxiliary winch drum is short.	
[W0044] “Jib stowed condition”		The jib is operated with the jib lock pin inserted.	Extend the jib.
[W0054] “Stopped by elevating cylinder stroke end”		Boom is lowered at elevation lower limit stroke end.	Raise the boom.
[W0055] “Stopped by elevating cylinder stroke end”		Boom is raised at elevation upper limit stroke end.	Lower the boom.
[W0121] “Stopped at elevating cylinder stroke end”		Boom is raised at elevation upper limit stroke end when the elevation slow stop is activated.	
[W0124] “Stopped at limit range of boom with jib”		Overloading occurs during boom lift with the jib extended.	• Unwind the winch, or retract or raise the boom. • Stow the jib.

WARNING CODE	BUZZER	CAUSE	REMEDY
[W0190] “Auto. stopped at critical range”	Load moment indicator built-in buzzer: beep-beep-beep (Repeats every 1 second for 5 seconds.)	The motion stops once, and then stops again.	Operate the crane toward non-critical direction from the point of the first stop.
[W0261] “Stopped due to pivot pin and connecting pin are inserted”		Jib set status is registered to the load moment indicator, and the boom is extended with the jib stowed.	Completely retract the boom.
[W0272] “Boom extend prohibited”		Jib set status is registered to the load moment indicator and the boom is extended.	Retract the boom fully.

WARNING ALARM

Table 5-2 contains warning codes that are not applicable to this model.

Table 5-2

WARNING CODE	BUZZER	CAUSE	REMEDY
Ordinary bar graph display (no warning code)	– – –	Moment load ratio is 90% or more and less than 100%.	Carefully monitor the moment load ratio.
[W0015] “Overwinding condition”	– – –	The stop function is canceled with the anti-two-block disable switch while the hook block is overwound.	Unwind the winch or retract the boom to lower the hook block.
[W0012] “Backward stability auto. stop range”	Load moment indicator built-in buzzer: beep-beep-beep (Repeats every 1 second for 5 seconds.)	The crane has taken a posture with no backward stability capacity during crane operation.	Extend or lower the boom.
[W0013] “Over-front detection switch is defective”		The state of front position detector switch and actual slewing angle do not agree.	Contact a Tadano distributor or dealer for inspection and maintenance.
[W0016] “State 1 is not applied”		• Crane operation state deviates from the states that are registered to the load moment indicator. • An operation state with no capacity rated is registered to the load moment indicator.	• Register the operation state again. • For operations using the carbody jacks, retract the boom within the capacity range.
[W0017] range. “State 2 is not applied”			

WARNING CODE	BUZZER	CAUSE	REMEDY
[W0018] “Boom full retraction switch 1 faulty”	Load moment indicator built-in buzzer: beep-beep-beep (Repeats every 2 seconds.)	The state of the boom full retraction detector switch and actual boom length do not agree.	Contact a Tadano distributor or dealer for inspection and maintenance.
[W0019] “Boom full retraction switch 1 faulty”			
[W0040] “AML override SW “ON” condition”		The load moment indicator is in the override status when it is turned on.	Turn OFF the override key switch.
[W0041] “Counterweight mismatch”		The state of the counterweight mounted on the crane does not agree with the state of registration on the load moment indicator.	• Register the state of counterweight on the load moment indicator. • Never operate a crane while counterweight is dismounted.
[W0056] “Swing operation is dangerous”		The tracks are retracted and further slewing operation causes overloading.	Slew in the opposite direction, or retract or raise the boom.
[W0097] “Wind speed upper limit”		Wind speed at the boom top or jib top exceeds the wind speed limit for crane operation.	Stow the boom and jib, and stop operation until wind speed becomes below the limit.
[W0191] “AML override SW is in override position”		The load moment indicator is in the override status when it is turned on.	Turn OFF the override key switch.
[W0197] “Boom interference condition”		The boom (or jib) may touch the engine cover or the mirror.	Be careful when lowering or slewing the boom.
[W0286] “Operation detector is not in neutral position”		A control lever is not in neutral position when power is turned on.	Set all the control levers in neutral position. If the load moment indicator buzzer does not stop, contact a Tadano distributor or dealer for inspection and maintenance.

WARNING CODE	BUZZER	CAUSE	REMEDY
[W0290] “Track condition changed”	Load moment indicator built-in buzzer: beep-beep-beep (Repeats every 1 second for 5 seconds.)	• During crane operation, the tracks are retracted and the capacity has changed into the retracted track capacity (lifting capacity). • The tracks are extended while the track retraction is registered, and the registered information does not match the actual condition.	• Extend the tracks again, and then register the track condition again. • Register the track condition again.
[W0999] “Back-up battery running down”		When the power is turned on, the battery for the load moment indicator built-in clock is low.	Contact a Tadano distributor or dealer for battery replacement.
[W0106] “Elevating speed is reducing”		The elevation slow stop function is activated and boom elevating operation is decelerating.	The crane is approaching the stop position. Operate with care.
[W0107] “Telescoping speed is reducing”		The telescoping slow stop function is activated and boom telescoping operation is decelerating.	
[W0108] “Swing speed is reducing”		The slewing stop function is activated and slewing operation is decelerating.	
[W0271] “Boom not fully retracted”		All conditions below have occurred at the same time. • Jib set status or jib lift status is registered to the load moment indicator. • Boom is not fully retracted. • The boom angle is close to horizontal.	Before mounting/stowing the jib, fully retract the boom.

OTHER FUNCTIONS

There are three other functions.

1. Work Range Limit Function
2. TARE Function
3. Preset Menu (winch drum rotation buzzer function, adjustment of display panel contrast, transmission of telematics data)

WORK RANGE LIMIT FUNCTION

NOTICE

If the work range limit is registered too close to an obstacle, the machine can hit the obstacle depending on the crane configuration and operation methods. Consider a sufficient allowance when you register the limit.

The work range limit function restricts the operation of the crane to the pre-registered boom angle (upper limit, lower limit), lifting height, load radius and slewing angle (left or right). Use this function when operating the crane in a place where there are obstacles around the crane or when requiring the working range limit of the boom.

When the crane reaches the registered working range, the limit function works as shown in the following table. *See Figure 51.*

WORK RANGE LIMIT FUNCTION	CRANE STATE
Boom angle upper limit Boom angle lower limit Lifting height limit Load radius limit Left slewing limit Right slewing limit	• Crane stops automatically. • Load moment indicator built-in buzzer: beep-beep-beep (Every 1 second for 5 seconds.)

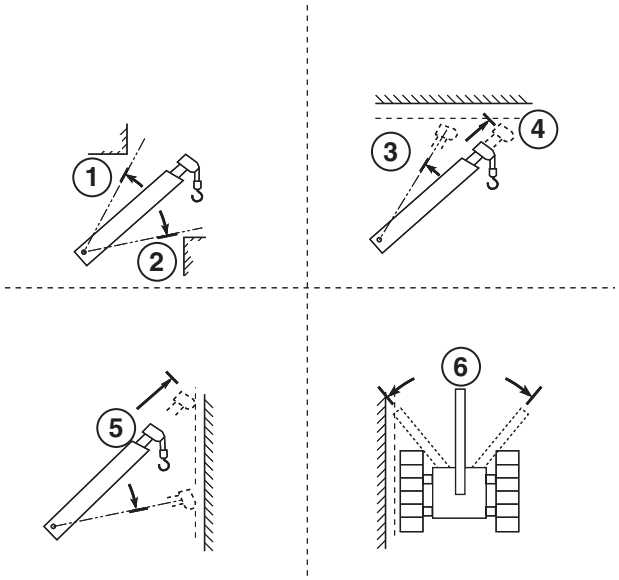


Figure 51

1 – Boom Angle Upper Limit
2 – Boom Angle Lower Limit
3 – Lifting Height Limit
4 – Boom Head Height Limit
5 – Load Radius Limit
6 – Slewing Limit

DISPLAY OF LIMIT FUNCTION STATE

You can monitor the registered state of the work range limit by the limit indicator lamps on the LED display (see *Figure 52*).

The limit indicator lamp(s) representing the work range limit currently activated illuminates.

When the crane reaches the limit and stops automatically, the condition of the limit indicator lamp changes from “staying lit” to “flashing.”

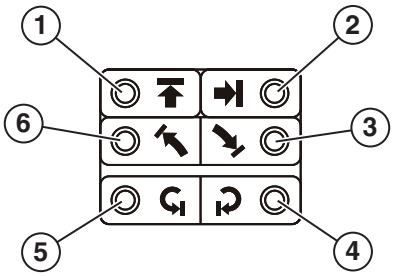


Figure 52

1 – Lifting Height Limit Indicator Lamp
2 – Load Radius Limit Indicator Lamp
3 – Boom Angle Lower Limit Indicator Lamp
4 – Right Slewing Limit Indicator Lamp
5 – Left Slewing Limit Indicator Lamp
6 – Boom Angle Upper Limit Indicator Lamp

REGISTERING BOOM ANGLE, LIFTING HEIGHT AND LOAD RADIUS LIMIT

1. Press the work range limit key to select the item to be registered (see *Figure 53*).

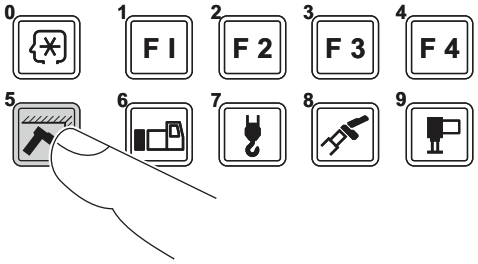


Figure 53

◊ The pop-up window for work range limit registration appears on the display panel.

◊ Every time you press the work range limit key, the item to be selected changes in sequence.

1. Lifting Height Limit
2. Load Radius Limit
3. Boom Angle Upper Limit
4. Boom Angle Lower Limit
5. Left Slewing Limit
6. Right Slewing Limit

- *Figure 54* shows an example of display where “load radius limit” is registered and “boom angle upper limit” is selected.

◊ Instead of the work range limit key, you can use the F3 (backward) key or F4 (forward) key to change the display of the item to be selected.

◊ To stop registration, press the cancel key. The pop-up window closes and the load moment indicator returns to the state before start of the registration.

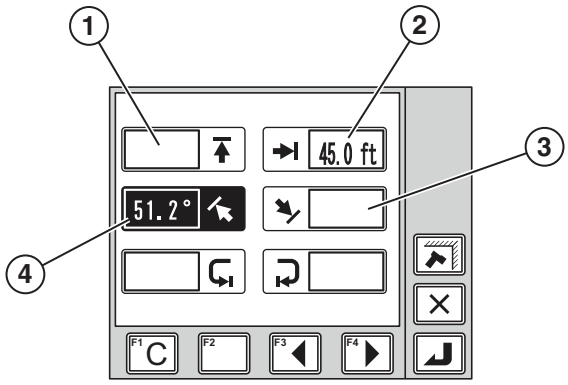


Figure 54

1 – Lifting Height Restriction
2 – Registered Load Radius Limit Value
3 – Boom Angle Lower Limit
4 – Boom angle upper limit is highlighted. Current boom angle is displayed.

2. After you operate the boom (jib) to the desired boom angle, height or load radius, press the set key.
   ◊ The corresponding limit indicator lamp flashes in the LED display, and the work range limit is registered.
   ◊ After registration is completed, the pop-up window closes and the load moment indicator returns to the crane operation state.

   If you select the item with the limit value already registered, remember that pressing the set key cancels the registration of the work range limit (see *Figure 55)*.

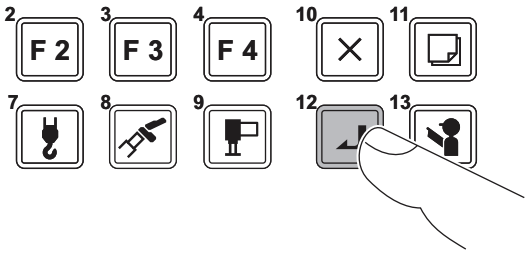


Figure 55

3. Move the boom (jib) within the limit range.
   ◊ The indicator lamp turns to “staying lit.”
   ◊ When the state of the crane reaches the registered limit, the indicator lamp flashes. The corresponding operation of the boom (jib) automatically stops, and the warning code is shown on the display panel. The load moment indicator built-in buzzer repeats every 1 second for 5 seconds.
4. To cancel the limit function, press the work range limit key to select the item to be canceled.
   ◊ The pop-up window for work range limit registration appears on the display panel.
5. Press the set key.
   ◊ The corresponding limit indicator lamp darkens.
   ◊ The pop-up window closes and the load moment indicator returns to the basic display.

   When you press the F1 (clear) key, all the work range limits are canceled.

REGISTRATION OF SLEWING RANGE LIMIT FUNCTION

1. Press the work range limit key (see *Figure 56)* repeatedly and select the item (left slewing limit or right slewing limit) to be registered.

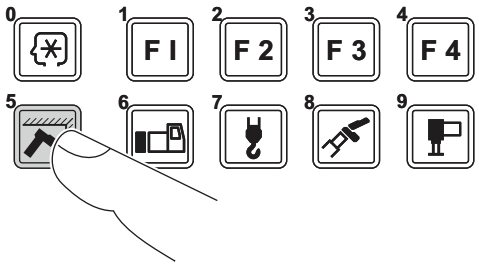


Figure 56

   ◊ The symbol for the selected item flashes.
   ◊ Every time you press the work range limit key, the item to be selected changes in sequence.
      1. Lifting Height Limit
      2. Load Radius Limit
      3. Boom Angle Upper Limit
      4. Boom Angle Lower Limit
      5. Left Slewing Limit
      6. Right Slewing Limit

   Figure 57 shows an example of the display where “left slewing limit” is selected.
2. Instead of the work range limit key, you can use the F3 (backward) key or F4 (forward) key to change the display of the item to be selected.
3. To stop registration, press the cancel key. The pop-up window closes and the load moment indicator returns to the state before start of the registration.

NOTE: If the crane is in Free Swing mode when a slewing range limit is selected, the crane will automatically change the swing mode to Controlled Swing. A pop-up notification and audible beep will warn of this condition.

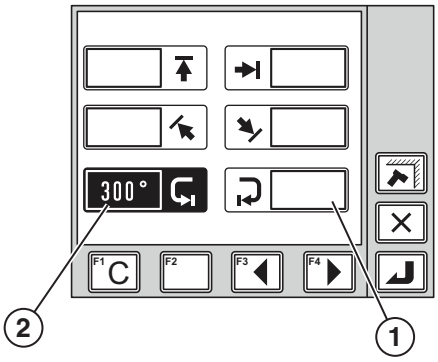


Figure 57

1 – Right Slewing Limit

2 – Left slewing limit is highlighted. Current slewing angle is displayed.

4. After slewing the boom to the desired position where the limit is to be set, press the set key (*Figure 58*).

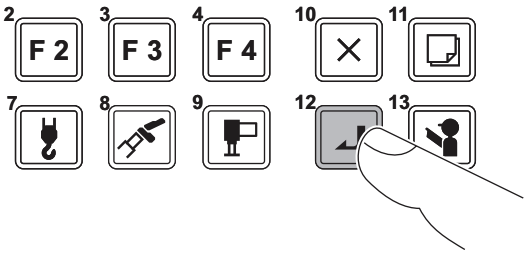


Figure 58

◊ The corresponding limit indicator lamp flashes, and the slewing limit is registered.

◊ After registration is completed, the pop-up window closes and the load moment indicator returns to the crane operation state.

If you select the item with the limit value already registered, remember that pressing the set key cancels the registration of the work range limit.

◊ *Figure 59* shows an example of display in which “slewing limit” is registered.

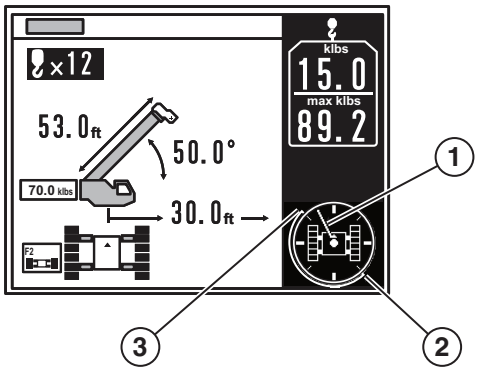


Figure 59

1 – Current Slewing Position

2 – Registration Position of Right Slewing Limit

3 – Registration Position of Left Slewing Limit

NOTICE

Registration of slewing range limit is the function to set the allowable slewing range. Register it for both the left slewing and right slewing.
If you register the slewing range limit only for one side (right or left), the crane does not operate properly.

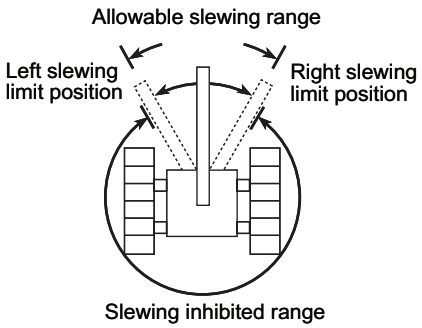


Figure 60

5. Move the boom (jib) within the limit range.
   ◊ The indicator lamp turns to "staying lit."
   ◊ *See Figure 60.* When the boom reaches a registered slewing limit, the indicator lamp flashes. The slewing operation automatically stops, and a warning code appears on the display panel. The load moment indicator built-in buzzer repeats every 1 second for 5 seconds.
6. To cancel the limit function, press the work range limit key to select the item to be canceled.
   ◊ The pop-up window for the work range limit registration appears on the display panel.
7. Press the set key.
   ◊ The corresponding limit indicator lamp darkens.
   ◊ The pop-up window closes and the load moment indicator returns to the crane operation state.

   When you press the F1 (clear) key, all the work range limits are canceled.

Even after you turn off the load moment indicator, the registered information is retained for approximately 2 hours.

When the load moment indicator is turned on, the operation starts with the retained information. The registered information is erased approximately 2 hours after the load moment indicator is turned off. In this case, it is necessary to register the operation state from the beginning.

ALARM FOR WORK RANGE LIMIT AND RECOVERY OPERATION

When the crane operation reaches the registered limit value, the load moment indicator buzzer sounds, and the warning code appears on the display panel. Examine the meaning of the warning code and perform recovery operation.
See Table 5-3 for details.

Table 5-3

WARNING CODE	BUZZER	CAUSE	REMEDY
[W0026] "Stopped at upper boom angle limit restriction"	Load moment indicator built-in buzzer: beep-beep-beep (Repeats every 1 second for 5 seconds)	The boom angle reaches the upper limit.	Lower the boom.
[W0027] "Stopped at lower boom angle limit restriction"		The boom angle reaches the lower limit.	Raise the boom.
[W0028] "Stopped at lifting height limit restriction"		The boom head or jib head reaches the lifting height limit.	Retract or lower the boom.
[W0029] "Stopped at load radius limit restriction"		The load radius reaches the limit.	Retract or raise the boom.
[W0042] "Right swing restriction limit"		The boom is slewed to the slewing limit.	Slew the boom in the opposite direction.
[W0043] "Left swing restriction limit"			

TARE FUNCTION

NOTE: The rated load is not changed and the crane will go into overload before the indicated load reaches the rated load.

The mass of the load only is shown on the hook load display.

1. Before you lift a load, push the TARE key (*See Figure 61*).
   ◊ The indication of the hook load display turns to "0," and the TARE indicator lamp illuminates.

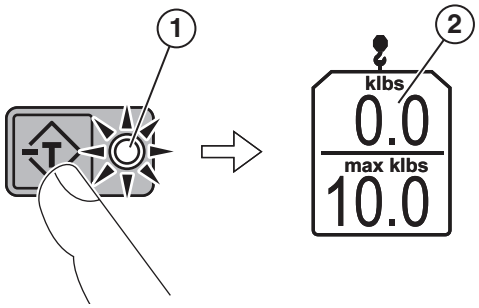


Figure 61

1 – TARE Indicator Lamp 2 – Hook Load Display

2. Perform hoist-up operation to lift up the load.
   ◊ The mass of the load is shown on the hook load display.
3. To cancel the TARE function, push the TARE key again.
   ◊ The hook load display returns to the original hook load display, and the TARE indicator lamp darkens.

PRESET MENU

⚠ CAUTION

Distraction Hazard:

Never operate the preset menu during a crane operation. Distraction can cause a serious accident.

The following functions are available with the preset menu.

- Winch drum rotation buzzer function
- Adjustment of display panel contrast
- Transmission of telematics data

1. Push the preset menu key (see *Figure 62*).
   ◊ The pop-up window for the preset menu selection appears on the display panel.

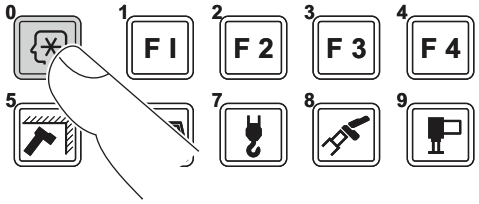


Figure 62

2. Push the F3 (backward) key or F4 (forward) key to select the preset icon (see *Figure 63*).
   ◊ The selected preset icon is highlighted.

3. Push the cancel key to exit the preset menu. The pop-up window closes, and the crane operation configuration before the adjustment is restored.

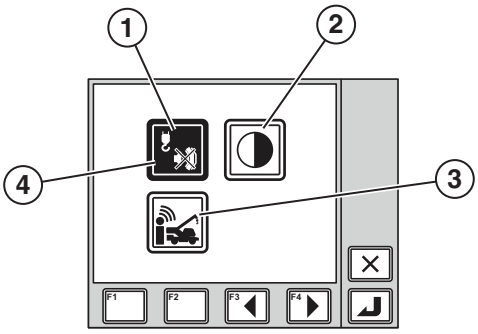


Figure 63

1 – Winch Drum Rotation Buzzer Icon
2 – Contrast Adjustment Icon
3 – Telematics Data Transmission Icon
4 – Selected

4. Push the set key.
   ◊ The selected preset screen appears.

ACTIVATING/DEACTIVATING THE WINCH DRUM ROTATION BUZZER FUNCTION

This is the function to sound the buzzer according to the rotation speed of the winch drum. Select whether or not to sound the buzzer (see *Figure 64)*.

The buzzer sounds only while the winch drum turns at a low speed. When the winch drum rotation speed increases, the buzzer stops sounding.

1. Select the winch drum rotation buzzer selection menu icon, and press the set key.
   ◊ The pop-up window for winch drum rotation buzzer selection appears on the display panel.
2. Press the F3 (backward) or F4 (forward) key to select one of the rotation buzzer icons.
   ◊ The selected icon is highlighted.

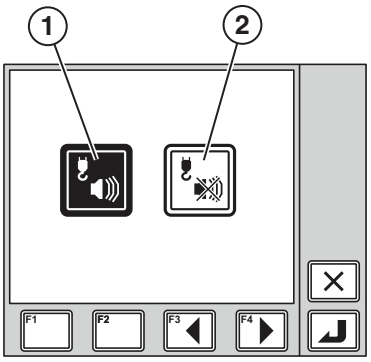


Figure 64

1 – Activation (Buzzer sounds.)
2 – Deactivation (Buzzer does not sound.)

3. Press the set key (see *Figure 65)*.
   ◊ After the registration is completed, the pop-up window closes and the load moment indicator returns to the crane operation state.
4. To cancel the registration, press the cancel key. The pop-up window closes and the load moment indicator returns to the crane operation state without changing registration.

   Even after the load moment indicator is turned off, the registered information is retained. When the load moment indicator is turned on, the operation starts with the retained information.

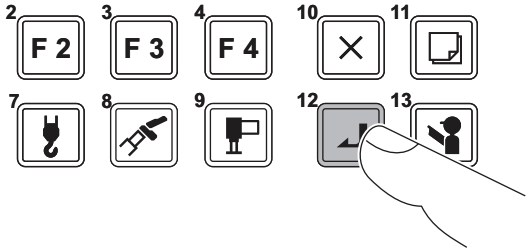


Figure 65

ADJUSTMENT OF DISPLAY PANEL CONTRAST

1. Select the contrast adjustment menu icon, and push the set key.
   ◊ The pop-up window for contrast adjustment appears on the display panel (see *Figure 66*).

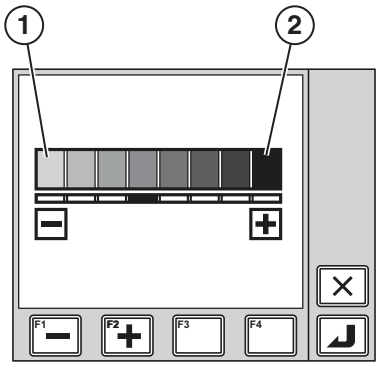


Figure 66

1 – Lower Contrast 2 – Higher Contrast

2. Push the F1 (-) key or F2 (+) key to adjust the contrast.
   ◊ Push the F2 (+) key to increase contrast and the F1 (-) key to decrease contrast.
3. Push the set key (see *Figure 67*).
   ◊ When registration is completed, the pop-up window closes and the load moment indicator returns to the crane operation state.
4. To stop registration, push the exit key. The pop-up window closes and the load moment indicator returns to the crane operation state without changing registration. If you push the exit key for 3 seconds or more, the contrast returns to the initial setting.
5. Even after the load moment indicator is turned off, the registered information is retained. When the load moment indicator is turned on, the operation starts with the retained information.

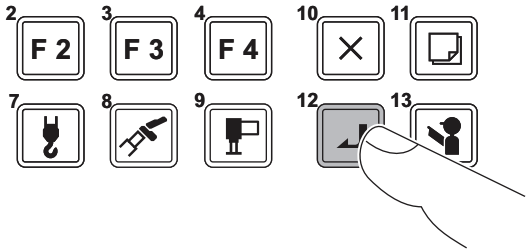


Figure 67

TRANSMISSION OF TELEMATICS DATA

The crane condition can be transmitted to the HELLO-NET server using the communication system mounted on the machine.

If there is any crane trouble, operate the crane following the instructions of a Tadano distributor or dealer.

1. Select the telematics data transmission menu and press the set key.
   ◊ The pop-up window for the telematics data transmission menu appears on the display panel (see *Figure 68*).

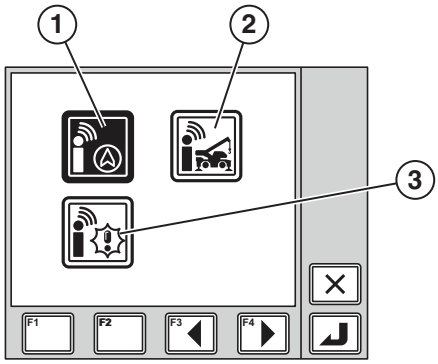


Figure 68

1 – Current Location Transmitting Icon
2 – Crane Status Transmitting Icon
3 – Alarm Details Transmitting Icon

2. Select an icon for data transmission by pressing the F3 (backward) or F4 (forward) key (see *Figure 68)*.
   - ◊ Transmitting current location:
     The current location that is detected by the GPS is transmitted.
   - ◊ Transmitting crane status:
     The current crane status is transmitted.
   - ◊ Transmitting alarm details:
     When there is a warning in the machine, the details of the alarm (warning) are transmitted.
3. Press the set key (see *Figure 69)*.
   - ◊ After the registration for data transmission is completed, the pop-up window closes, and the load moment indicator returns to the crane operation status.

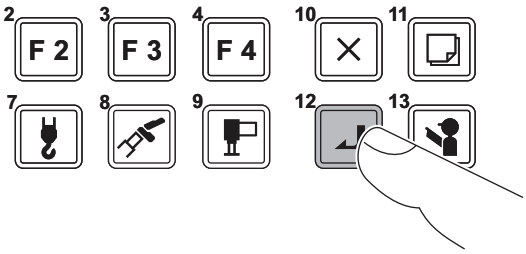


Figure 69

- There will be a time lag before the data is actually transmitted after the transmission data is registered.
- The required time for transmitting varies depending on the communication environment.
- The data cannot be transmitted from inside tunnels or indoors where radio waves are hard to reach. Move to an open-air location, where communication environment is good.
- During transmitting data, the Telematics data icon in the preset menu fades, and new data transaction cannot be accepted.
- For transmitting additional data, wait until the icon returns to normal status.

CHAPTER 6:
MAINTENANCE AND INSPECTION

If you have any questions, contact your authorized Tadano Mantis Dealer or Tadano Mantis Customer Support at (615) 794-4556.

MAINTENANCE SAFETY

The following are Warnings:

⚠ WARNING

Exhaust Hazard

- NEVER operate the crane in an enclosed area without proper ventilation.
- NEVER block windows, vents or other means of ventilation if the crane is operating in an enclosed area. All internal combustion engines create carbon monoxide gas during operation. Accumulation of this gas within an enclosure could cause illness or even death.
- ALWAYS make sure that all connections are tightened to specifications after repair is made to the exhaust system.

⚠ WARNING

Fire and Explosion Hazard

- Diesel fuel is flammable and explosive under certain conditions.
- ALWAYS keep sparks, open flame and any other form of ignition away from diesel fuel.
- Only use the key switch to start the engine. NEVER jump-start the engine. Sparks caused by shorting the battery to the starter terminals may cause a fire or explosion.
- NEVER remove the fuel cap while the engine is running.
- NEVER use diesel fuel as a cleaning agent.

⚠ WARNING

Explosion Hazard

- ALWAYS keep the area around the battery well-ventilated. While the engine is running or the battery is charging, hydrogen gas is produced and can be easily ignited.
- ALWAYS keep sparks, open flame and any other form of ignition away while the engine is running or battery is charging.

⚠ WARNING

Entanglement / Sever Hazard

- Keep hands and other body parts away from moving / rotating parts such as the cooling fan or the winches.
- ALWAYS wear tight-fitting clothing and keep your hair short or tie it back while the crane is running.
- ALWAYS remove all jewelry before you operate or service the crane.
- NEVER operate the crane without the guards and shields in place.
- Before you start the crane, make sure that all bystanders are clear of the area.
- NEVER leave the key in the key switch when you are servicing the crane. Someone may accidentally start the crane and not realize you are servicing it.

⚠ WARNING

Sudden Movement Hazard

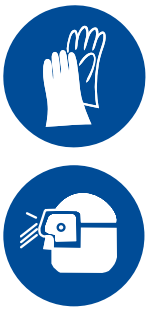
- Before you start the engine, make sure that all bystanders are clear of the area.
- ALWAYS allow the engine to warm up for at least 5 minutes and allow the idle speed of the engine to return to normal before operating.

⚠ WARNING

Burn Hazard

ALWAYS keep your hands and other body parts away from hot engine surfaces such as the muffler, exhaust pipe, turbocharger (if equipped) and engine block during operation and shortly after you shut the engine down. These surfaces are extremely hot while the engine is operating and could seriously burn you.

⚠ WARNING



Exposure Hazard

- ALWAYS wear personal protective equipment such as gloves, work shoes, eye and hearing protection as required by the task at hand.
- NEVER operate the crane while wearing a headset to listen to music or radio because it will be difficult to hear the warning signals.
- ALWAYS wear safety glasses while servicing the crane to prevent possible eye injury.

⚠ WARNING

Flying Object Hazard

ALWAYS wear eye protection when servicing the crane and when using compressed air or high-pressure water. Dust, flying debris, compressed air, pressurized water or steam may injure your eyes.

⚠ WARNING

Coolant Hazard

- Never remove the radiator cap for the cooling system when the engine is hot. The system is under pressure and steam and hot engine coolant can spray out and burn you.
- Wear eye protection and rubber gloves when handling Long Life Coolant (LLC). If contact with the eyes or skin should occur, flush eyes and wash immediately with clean water.

⚠ WARNING

High Pressure Hazard

Never check for a high pressure diesel fuel or hydraulic leak with your hand. Always use a piece of cardboard or wood.

⚠ WARNING

Crush Hazard

- NEVER stand under a hoisted component. If the hoist mechanism fails, the component could fall on you.
- ALWAYS use the proper lifting device when hoisting components.

INSPECTION

INSPECTION OF CRANE STRUCTURE

If the crane is heavily used (severe condition), inspect the items below for damage, wear, breakage, deformation, and abnormal noise when performing monthly periodic self-inspection at intervals within 1 month. If any abnormality is found as a result of the inspection, contact your nearest TADANO distributor or dealer for repair.

BOOM STRUCTURE

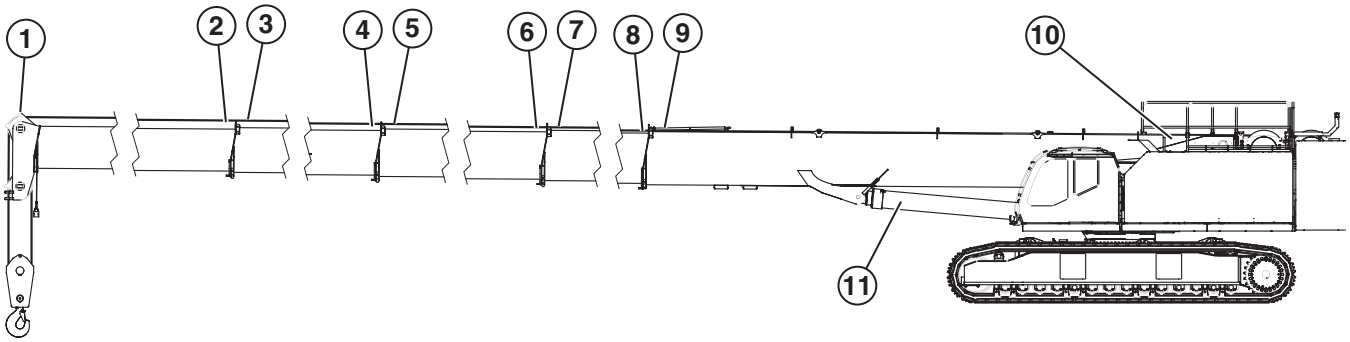


Figure 1

1 – Head of Top Boom Section
2 – Rear End of Top Boom Section
3 – Head of 4th Boom Section
4 – Rear of 4th Boom Section
5 – Head of 3rd Boom Section
6 – Rear of 3rd Boom Section
7 – Head of 2nd Boom Section
8 – Rear of 2nd Boom Section
9 – Head of Base Boom Section
10 – Rear of Base Boom Section
11 – Boom Elevating Cylinder Upper Pivot

JIB STRUCTURE

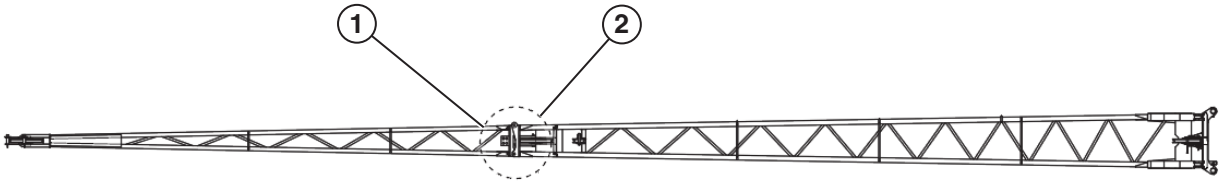


Figure 2

1 – Rear End of Top Jib
2 – Head of Base Jib

SWING FRAME

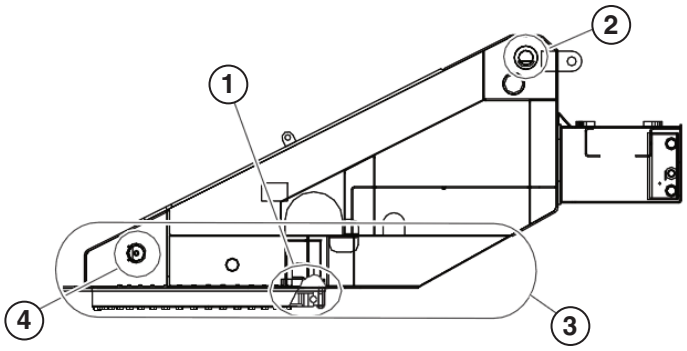


Figure 3

1 – Swing Bearing
2 – Boom Foot
3 – Lower Part of Swing Frame
4 – Boom Elevating Cylinder Lower Pivot

UNDERCARRIAGE AND FRAME

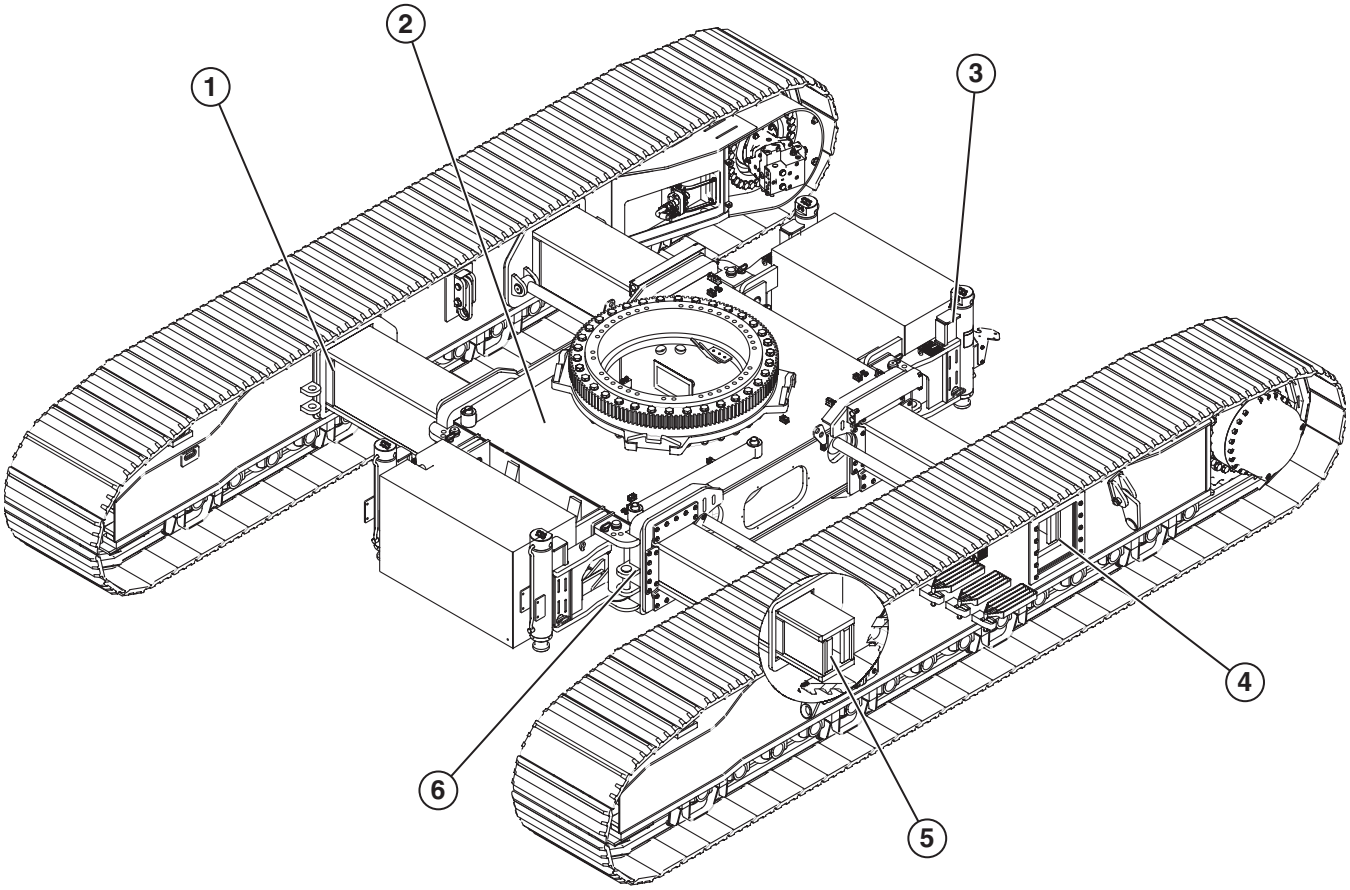


Figure 4

1 – Extend Boom Flange
2 – Carbody Front and Rear of Slew Ring Structure
3 – Carbody Jacks and Mount Weldments
4 – Track Frame at Extend Beam
5 – Outer End of Extend Beam
6 – Carbody at Extend Beam Exit

PREVENTATIVE MAINTENANCE SCHEDULE

Performing preventative maintenance on the crane will prolong the life of the equipment, help prevent expensive down time and minimize the potential for problems arising during operation.

The preventative maintenance chart summarizes the requirements to properly maintain the crane.

The chart specifies the recommended interval when each item should be performed. The maintenance intervals apply for cranes that are subject to normal operating and environmental conditions. If the crane is used in extreme or harsh conditions, the maintenance intervals must be adjusted to the prevailing operating conditions.

The crane must be checked and inspected each day or before each new shift of operation. Report any problems to the site supervisor. Never operate the crane until all problems are properly corrected.

PREVENTATIVE MAINTENANCE CHART

ASSEMBLIES/MAINTENANCE WORK AND INSPECTIONS	REFERENCE	INITIAL MAINTENANCE AFTER	REGULAR MAINTENANCE EVERY							MINIMUM INTERVALS	REMARKS
			DAILY; BEFORE START-UP	50/ WEEKLY	100	200	500	1000	2000		
Engine											Consult Engine Manual.
Check engine oil level			X								
Change engine oil							X				
Replace lubricating oil filter (if installed, option)											
Replace fuel filter cartridges											
Inspect v-belt for good condition				X							
Inspect valve clearance									X		
Check engine for leakage at regular intervals				X							
Inspect hose clamps of the charged air hoses				X							
Clean cooling fins on radiator						X					Or as needed if cooling performance is decreased.
Check radiator coolant level			X								
Fuel System											
Drain water/sediment	6-16 and 6-20					X					
Clean fuel inlet & screen	6-20					X					
Hydraulic System											
Check hydraulic oil level	6-14		X								Check for "desired level" at tank sight gage, all cylinders fully retracted and oil at operating temperature. Add as required. *See Capacities and Specifications Chart on page 2-14.*

ASSEMBLIES/MAINTENANCE WORK AND INSPECTIONS	REFERENCE	INITIAL MAINTENANCE AFTER	REGULAR MAINTENANCE EVERY							MINIMUM INTERVALS	REMARKS
			DAILY; BEFORE START-UP	50/ WEEKLY	100	200	500	1000	2000		
Check filter condition indicator			X								
Check for leaks	6-13 and 6-15		X								"Walk around" inspection of entire machine; repair as required.
Clean hydraulic tank											Clean with solvent.
Change hydraulic oil	6-24								X	Every 2 years	Drain, clean, and refill. *See Capacities and Specifications Chart on page 2-14.* Analyze an oil sample with each oil change.
Change hydraulic filters	6-22	100 hrs.						X		Once per year	Change as required, or at least every 1000 hours.
Replace hydraulic hoses										Every 6 years	
Clean oil cooler fins	6-20					X					
Check fan for proper operation	6-23							X			
Travel Drive/Tracks											
Check track drive reducers oil	6-17			X							Check level at "level" plug with "fill" and "drain" plugs in vertical alignment. Add as required. *See Capacities and Specifications Chart on page 2-14.*
Check/Adjust track tension	6-18			X							
Clean/Grease extend beams	6-19			X							
Inspect undercarriage	6-21						X				
Winches											
Mounting bolts	6-30	100 hrs.						X		Every 6 months	
Check oil level	6-29						X			Every 3 months	Add as required.
Check for leaks			X								Repair as required.

ASSEMBLIES/MAINTENANCE WORK AND INSPECTIONS	REFERENCE	INITIAL MAINTENANCE AFTER	REGULAR MAINTENANCE EVERY							MINIMUM INTERVALS	REMARKS
			DAILY; BEFORE START-UP	50/ WEEKLY	100	200	500	1000	2000		
Change oil	6-29	100 hrs.*						X*		Every 6 months	*See Capacities and Specifications Chart on page 2-14.*
Check wire rope	6-30		X								Add as required.
Inspect winch drum							X				Before installing new winch rope.
Boom											
Grease sheaves				X							Inspect for damage; replace as required. *See Capacities and Specifications Chart on page 2-14.*
Grease extend sheaves				X							Align holes in second, third, and fourth sections to grease extend sheaves. Inspect for damage; replace as required. *See Capacities and Specifications Chart on page 2-14.*
Grease boom bearing pads	6-19			X							Inspect for damage; replace as required. *See Capacities and Specifications Chart on page 2-14.*
Grease boom pins				X							Inspect for damage; replace as required. *See Capacities and Specifications Chart on page 2-14.*
Swing System											
Check for leaks			X								
Check for proper operation			X							Once per year	
Inspect swing drive reducer visually			X							Every 3 years	Both inside and outside.
Check swing drive reducer oil level	6-19				X					Once per month	
Check fasteners on slew ring and swing drive for tightness	6-21	100 hrs.					X				Comply with recommended torque values.

ASSEMBLIES/MAINTENANCE WORK AND INSPECTIONS	REFERENCE	INITIAL MAINTENANCE AFTER	REGULAR MAINTENANCE EVERY							MINIMUM INTERVALS	REMARKS
			DAILY; BEFORE START-UP	50/ WEEKLY	100	200	500	1000	2000		
Change swing drive reducer oil	6-23	200 hrs.†						X†		Once per year	Drain at operating temperature (initial oil change). *See Capacities and Specifications Chart on page 2-14.* Analyze an oil sample with each oil change.
Change swing brake oil	6-26								X*		
Inspect swing brake	6-26								X		
Grease slew ring race	6-19			X							Grease while rotating until grease is visible at seal. *See Capacities and Specifications Chart on page 2-14.*
Grease slew ring teeth	6-19			X							Check for damage; replace as required.
Electrical Equipment											
Check batteries	6-19				X		X				
Check battery cables and connections	6-19						X				
Check starter	6-24							X			
Check lamps and indicator lamps for operation/damage	6-16		X								
Check load moment indicator for proper operation	6-22		X								
Crane Cab											
Lubricate all joints, pins, hinges, and movable components	6-19				X					Every 2 weeks	And after every crane cleaning with pressure washer.
Treat door locks								X		Once per year	
Air conditioning system	6-24							X		Once per year	Perform inspection.
Clean wiper blade elements	6-20					X				Once per month	More frequently, if necessary.

ASSEMBLIES/MAINTENANCE WORK AND INSPECTIONS	REFERENCE	INITIAL MAINTENANCE AFTER	REGULAR MAINTENANCE EVERY							MINIMUM INTERVALS	REMARKS
			DAILY; BEFORE START-UP	50/ WEEKLY	100	200	500	1000	2000		
Replace wiper blade elements								X		Once per year	Or if damaged.
Check washer fluid level	6-20					X					More frequently, if necessary.
Check/Clean/Replace air filter	6-16					X					
Other Lubricaton Points	6-39										
Lubricate all joints, pins, hinges, and movable components	6-19				X					Every 2 weeks	And after every crane cleaning with pressure washer.
Cab Instrumentation											
Check for proper operation	6-16		X								Repair or replace as required.

* Based on Winch Operation hours
† Based on Swing Operation hours

CRANE INSPECTION AND MAINTENANCE – DAILY

Daily checks should be performed at the start of the day or shift before the crane is operated.

NOTE: See the engine manual that was supplied with the crane for any additional maintenance recommended by the engine manufacturer.

CHECK FOR ENGINE OIL LEAKS

Visually inspect around the equipment for oil leaks.

CHECK ENGINE OIL LEVEL

1. Ensure the crane is on a flat, level surface.
2. If the crane is running, shut the engine off and wait 15 minutes to allow the oil to drain back into the crankcase.

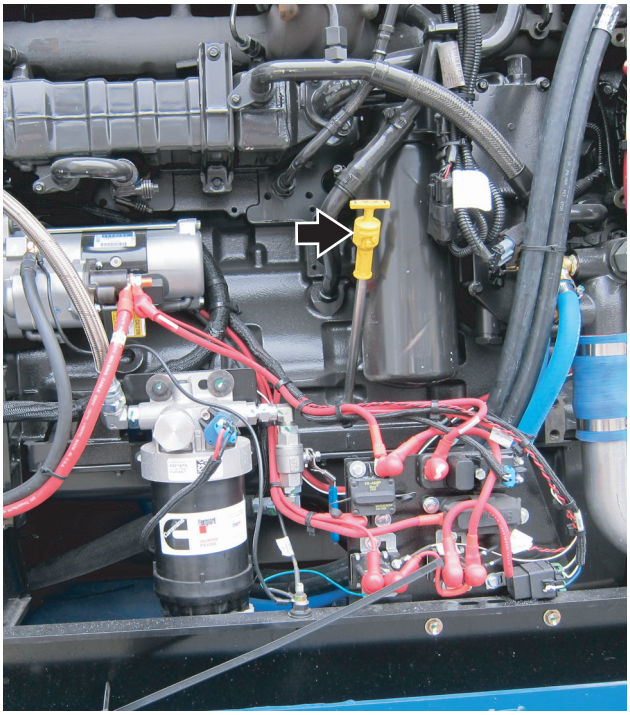


Figure 5

3. Open the engine access door and remove the dipstick.
4. The oil should be between the low and high level marks on the dipstick.

CHECK COOLANT SYSTEM FOR LEAKS

- Inspect the cooling system for leaks and trash build-up. Clean any accumulation with compressed air or high-pressure water.
- Inspect the water pump for leaks.

NOTE: The water pump seal is lubricated by the engine coolant. A small amount of leakage as the engine cools down and parts contract is acceptable.

- Inspect the system hoses and crankcase breather hose for cracks and loose clamps.
- Inspect the fan and accessory drive belts for cracks, breaks, or other damage. Check for proper belt tension.

NOTE: The cooling system filler cap is located on top of the radiator and can be accessed through the fluids access door on the engine-side covers.

CHECK ENGINE COOLANT LEVEL

⚠ DANGER

Do not remove the pressure cap from a hot engine. Wait until the coolant temperature is below 50°C before removing the pressure cap. Heated coolant spray or steam can cause personal injury.

- Check the coolant level with the engine stopped and cold. Remove the filler cap slowly to relieve pressure gradually.
- Maintain the coolant level to within 1/2 in. (13 mm) of the bottom of the fill pipe. Install the filler cap.

⚠ CAUTION

To prevent engine damage, never add coolant to an overheated engine. Allow the engine to cool first.

- The GTC1200 engine is equipped with a variable-speed cooling fan, allowing the engine to match the cooling capacity with the loads and conditions under which it is operating. All system checks are complete. At this point significant decrease in engine noise will be observed. After this, the engine ECM will control the fan speed based on load and conditions.
- After starting, operate the engine at slow speed until it reaches operating temperature. Check the coolant level and add coolant if necessary. Check for any obvious cooling system leaks or loose connections. Inspect the water pump for evidence of leaks.
- Inspect the fan and accessory drive belts for cracks, breaks, or other damage. Check for proper belt tension.

CHECK HYDRAULIC OIL LEVEL

Check the hydraulic oil level on the gauge on the display.

Only check the hydraulic oil level if:

- the engine is stopped and the telescope cylinders and the boom elevation cylinder are retracted
- hydraulic oil temperature is approximately 68°F (20°C)

1. Make sure all the hydraulic cylinders are in the fully retracted position.
2. Open the left rear access door.

Figure 6

3. The oil level should be at the top line of the sight glass.

Figure 7

NOTICE

A warning icon will display on the MD3 screen if the hydraulic oil is below the minimum allowable level. If the icon appears, shut down the crane and check/add hydraulic oil as required before resuming crane operation.

CHECK RETURN FILTER RESTRICTION INDICATOR AND PILOT FILTER RESTRICTION INDICATOR

Visually confirm the return filter restriction and pilot filter restriction indicators are not illuminated on the cab display.

If the filter icon and "T" are illuminated, the return filter is restricted. Replace restricted hydraulic return filter elements, located in the tank.

Figure 8

If the filter icon and pilot symbol are illuminated, the pilot/charge filter is restricted. Replace restricted hydraulic pilot/charge filter elements, located near the pumps.

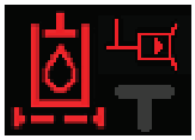


Figure 9

CHECK AIR FILTER RESTRICTION INDICATOR

Visually confirm the air filter restriction indicator is not illuminated on the cab display.

Figure 10

CHECK HYDRAULIC SYSTEM FOR LEAKS

⚠ DANGER

Only work on the hydraulic system while the engine is stopped.

- **Check and retighten the hydraulic assembly and pipe fasteners.**
- **Check the hydraulic system for leakage at regular intervals.**

⚠ CAUTION

The shut-off valves may only be closed in case of repair work (e.g., at the hydraulic pumps). Check the piping systems for leakage according to the maintenance schedule.

In case of leakage of the adjustable screw couplings and assemblies, proceed as follows:

1. Release cap nuts on the piping systems or hose pipes.
2. Tighten the adjustable screw couplings in the assemblies safely.
3. Fasten the cap nuts of the piping systems and hose pipes.

NOTE: A correct sealing condition is only ensured if the above steps are followed.

4. In case of leakage at the cap nuts of the piping systems, check cap nuts for tight fit; if necessary, replace the screw coupling.
5. Release the cap nut and check whether the gap between the packing ring and the retaining ring is closed.

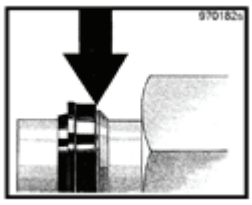


Figure 11

Inspect the hydraulic system and components for leaks and damage. Inspect around all fittings and connections. Look for any fresh puddles or drips under the crane. Inspect the hydraulic hoses and pipes for damage and proper clearance with other components.

CHECK FUEL LEVEL

Visually check the fuel level on the MD3 display in the cab.

DRAIN FUEL/WATER SEPARATOR

Open the drain valve of the fuel/water separator and allow the contents to drain into an appropriate vessel.

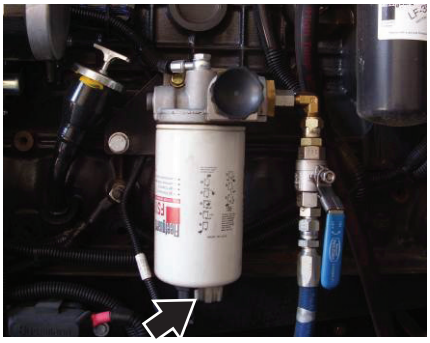


Figure 12

As necessary, replace the fuel/water separator.

1. Drain the entire filter contents of the fuel/water separator.
2. Disconnect the electrical connector from the bottom of the filter.
3. Disconnect the filter from the filter top together with the filter base.
4. Lubricate new sealing elements with diesel fuel and insert them into the gaskets.
5. Screw-fasten filter base by hand to the new filter cartridge to filter top.
6. Tighten all components securely and reattach the electrical connector.
7. Bleed the system.

NOTICE

Never dispose of drained fuel by dumping into a sewer, on the ground, or into groundwater or waterways. Always be environmentally responsible. Follow the guidelines of the Environmental Protection Agency (EPA) or other governmental agencies for proper disposal of hazardous materials. Contact local authorities or reclamation facility.

CLEAN DIRECT-FLOW RADIAL AIR CLEANER

1. Locate the dust ejection valve (DEV), directly below the air box.
2. Open the DEV to purge any dust inside.
3. If dust is present in the DEV, unfasten both tabs on the precleaner, remove and clean precleaner, and reinstall with tabs securely closed.
4. Check the air restriction indicator to confirm proper air flow through the filter.

CHECK SWING SYSTEM

Check the swing system for any visible external oil leaks. Check the mounting fasteners for the proper torque. Operate the swing system and listen for any unusual or abnormal sounds. Visually inspect the swing drive reducer.

CHECK ELECTRICAL EQUIPMENT

Check the lamps and indicator lights for proper operation and damage. Ensure the spotlights are working correctly.

Check the different camera views on the display screen. Ensure all views are appropriate and the picture is clear. Clean the camera lenses, if needed.

OPERATE LUBRICATION PUMP

1. Place crane in forward position.
2. Turn on grease pump in cab by activating switch on upper right-hand panel. The green LED will illuminate when the pump is operating.
3. Alternate crane motion between:
   a. Slowly swinging upper assembly to the right or left 90° and return to front position.
   b. Slowly hoist and lower boom through full range of motion.
   c. Repeat until pump shuts off as indicated by the green LED turning off.

NOTE: Grease system will operate for 10 minutes.

NOTE: An illuminated red LED indicates that the grease reservoir needs to be refilled.

NOTE: Shorter lubricating intervals may be required in tropical areas, at a high relative humidity, under ambient conditions entailing lots of dust or dirt, and in the case of significant temperature fluctuations.

NOTE: Before the crane is put out of operation for an extended time, and before it is restored to operating condition, re-greasing is essential.

When cleaning the crane, ensure that no water enters into the raceways. Once cleaning is finished, lubricate the crane thoroughly. The grease filling is to prevent friction, and to seal and to protect the assembly against corrosion. Use an ample amount of grease, so that a grease bead forms around the entire circumference of the bearing grooves.

⚠ DANGER

During slew operation, make sure no one is on the tracks or undercarriage.

CRANE INSPECTION AND MAINTENANCE – 50 HOURS/WEEKLY

CHECK TRACK DRIVE REDUCER OIL LEVEL

NOTE: Ensure the crane is parked on a flat, level surface.

1. Position the drive reducer so the oil drain plug is at the bottom (or 6 o'clock) position.
2. Remove the oil check plug. The oil should be at the check plug hole level or just beginning to trickle out.
3. Add oil if required. See *Capacities and Specifications Chart on page 2-14* for more information.

CHECK AND ADJUST TRACK TENSION

1. Ensure all components of the track are in the correct position.
2. Connect a grease gun to the grease nipple of the grease-tensioning valve.

NOTE: Use the grease gun until the track tension is correct. It may be necessary to fit a pressure gauge to the grease gun.

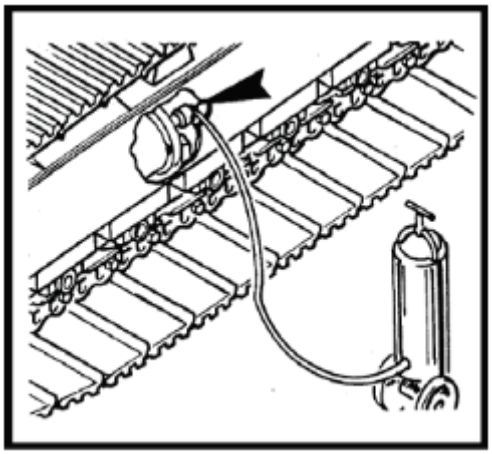
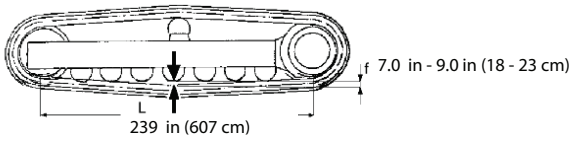


Figure 13

3. Set the track tension by:
   a. Measuring the pressure in the tensioning element or
   b. Lifting the undercarriage and measuring the sag of the lower strand.



Minimum sag, f(in) = .0293 * L(in)
Maximum sag, f(in) = .0377 * L(in)

Figure 14

NOTE: Measure sag at center roller position between contact surfaces of track chain and bottom roller.

4. Disconnect the grease gun.
5. Move the undercarriage back and forth about 1 sprocket turn.
6. Check the position of the tracks on the front idler and sprocket for proper positioning.

NOTICE

Tracks that are too loose can slip out of the flanges of the rollers, sprocket, and front idler and increase wear.

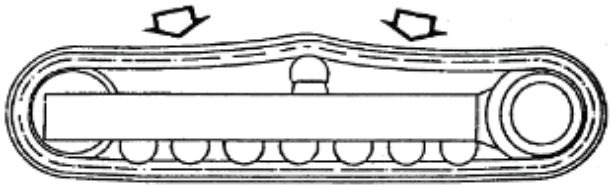


Figure 15

⚠ CAUTION

Tracks that are too tight increase the wear on the front idler, drive bearings, track pins, and bushings. They also necessitate greater motor output for driving and consequently a higher fuel consumption.

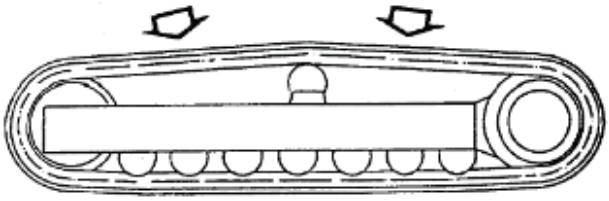


Figure 16

CLEAN / GREASE TRACK EXTEND BEAMS

1. Move the left and right track frames to the fully-extended position.

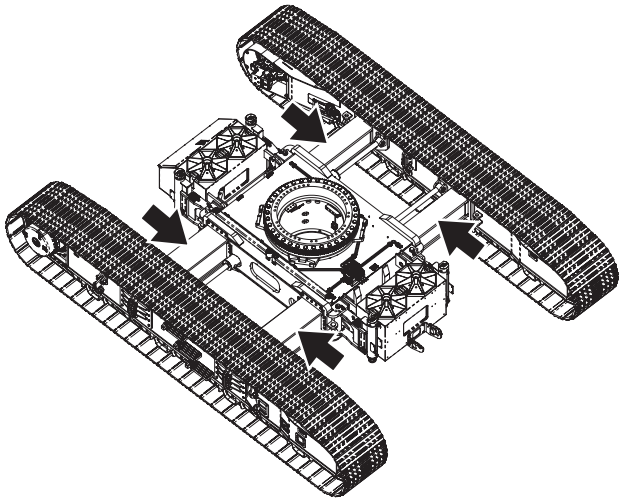


Figure 17

2. Clean dirt, debris and old grease from the extend beams.
3. Using a brush, apply fresh grease to all 4 sides of each extend beam.

LUBRICATE BOOM

Grease boom sheaves, boom bearing pads, and boom pins. See the diagram at the end of this section and the labels on the crane boom for more information.

GREASE THE SLEW RING GEAR AND PINION

The lubrication intervals depend on the slewing frequency. Apply the Texaco 'Crater' 2X or 5X grease to the gears using a paintbrush or a spray gun. Never leave blank areas on the tooth faces.

NOTE: After each cleaning operation of the machine – especially after using a steam-jet unit – check the lubrication of the ring gear and pinion of the swing mechanism. Always supply the ring gear and the pinion with lubricant.

CRANE INSPECTION AND MAINTENANCE – 100 HOURS

CHECK SWING DRIVE REDUCER OIL LEVEL

1. Remove swing drive reducer oil level check plug.
2. Oil should be at the check plug level or just beginning to trickle out of hole.
3. If low, add oil until oil trickles out of hole. See *Capacities and Specifications Chart on page 2-14* for more information.
4. Install oil level check plug.

CHECK BATTERIES AND CABLES

Inspect the battery terminals for corrosion. Ensure the cable connections on the battery terminals are tight. Ensure the battery retention clamps are tight and the batteries are properly secured.

LUBRICATE THE CABIN

Lubricate all joints, pins, hinges, and moveable components in the crane cabin.

CRANE INSPECTION AND MAINTENANCE – 200 HOURS

CLEAN THE ENGINE CRANKCASE BREATHER

See the crane engine manual for details.

DRAIN WATER AND SEDIMENT FROM FUEL

Under extreme weather conditions, condensation may form in the fuel tank.

1. Operate the vehicle until fuel level is low (< 1/8 tank).
2. Unscrew the drain plug from the tank bottom and drain the condensed water into a vessel for disposal.

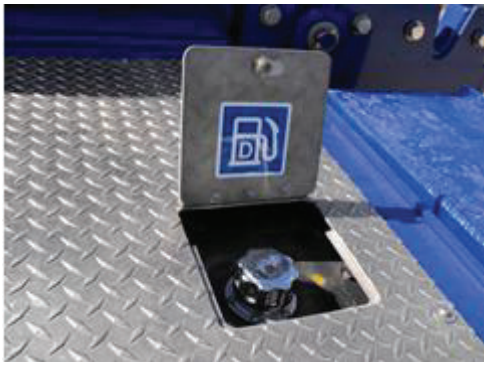


Figure 18

3. Leave the drain port open until clean fuel flows out.
4. Replace the drain plug and screw it into place.

NOTICE

Never dispose of drained fuel by dumping into a sewer, on the ground, or into groundwater or waterways. Always be environmentally responsible. Follow the guidelines of the Environmental Protection Agency (EPA) or other governmental agencies for proper disposal of hazardous materials. Contact local authorities or reclamation facility.

REPLACE FUEL FILTER

See the crane engine manual for details.

CLEAN FUEL INLET SCREEN

1. Open the fuel tank access and remove the fuel fill cap.
2. Remove the fuel strainer from the filler neck of the fuel tank.
3. Clean the strainer with a cleaning solvent.
4. Blow off the strainer using compressed air. Visually inspect the strainer. Replace the strainer if there are any tears or cuts in the mesh.

CLEAN HYDRAULIC OIL COOLER FINS

Remove accumulated dust from the cooler fins by flushing with compressed air or using a clean paintbrush.

NOTICE

Accumulated dust in the cooling fins will reduce cooling efficiency and can cause overheating of the system.

INSPECT / CLEAN WINDSHIELD WIPER BLADES

Clean the edge of the wiper blades with a mild detergent mixed with water. Clean off any dirt, debris or mud build-up. Inspect the blades for any cuts or tears. Replace if required.

CHECK WINDSHIELD WIPER WASHER FLUID

1. The windshield washer reservoir is located at the rear of the cab on the left side.

Figure 19

2. Remove the cap and add the appropriate type of washer fluid for the climate, as needed.

CRANE INSPECTION AND MAINTENANCE – 500 HOURS

CHANGE ENGINE OIL AND FILTER

NOTE: **Replace the engine oil and oil filter every 500 operating hours or once per year, whichever occurs first. Comply with all specifications regarding consumables set by the engine manufacturer.**

⚠ WARNING

Some sources have determined that used engine oil can be carcinogenic and cause reproductive toxicity. Avoid inhalation of vapors, ingestion, and prolonged contact with used engine oil. To reduce the possibility of personal injury, avoid direct skin contact with hot oil.

NOTE: **If not reused, dispose of oil in accordance with local environmental regulations.**

For detailed oil change procedures, see the crane engine manual.

For lubrication oil specifications and capacities refer to *Capacities and Specifications Chart on page 2-14*.

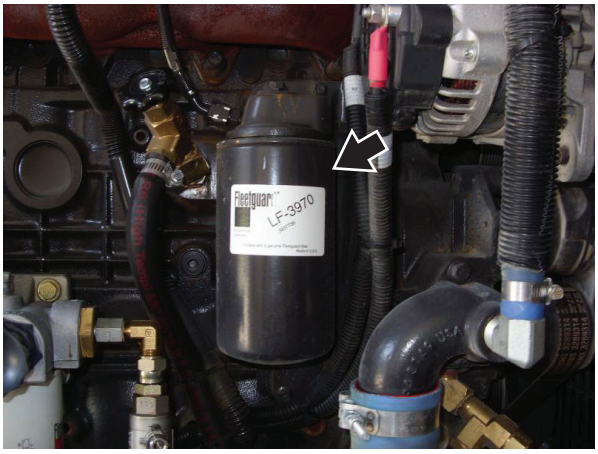


Figure 20

CLEAN THE RADIATOR

Remove collected dust from the cooler fins of the charge air and water cooler by flushing with compressed air or using a clean paint brush.

INSPECT THE UNDERCARRIAGE

Inspect the undercarriage for damage or premature wear. Inspect the drive sprocket and idler. Inspect the pins and cleats for wear. Ensure the tracks are properly tensioned.

Figure 21

CHECK SLEW RING

Never allow excessive swing gear backlash. After the running-in period, the tooth faces should show a smooth, bright surface in the case of normal wear. If there are other abnormalities, such as scrub marks, seizing, pits, flaking, blistering, cracks and plastic deformations, the gear wheels must be replaced.

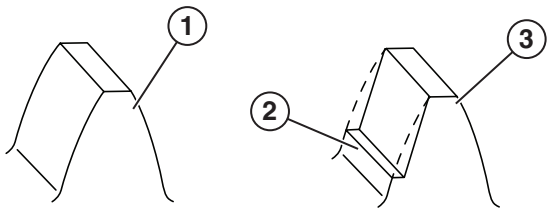


Figure 22

1 – Gear in Good Condition

2 – Step in Gear

3 – Damaged Gear

CHECK SLEW RING FASTENERS

Check the slew ring, hydraulic swivel, and swing drive assembly bolts for tight fit according to the maintenance schedule. If necessary, re-tighten them. Refer to the torque chart on page 6-37.

NOTE: Use a torque wrench for checking or re-tightening screws and bolts.

NOTE: All plated (yellow galvanized) bolts are to use the *1 (lubricated) columns for torque wrench setting and hydraulic torque wrench settings. You may clean the threads, but never apply the actual lubricant. The plating is the lubricant.

CHECK SLEW DEVICE FOR WEAR

During the many years of operation, the wear of the raceway system, and consequently the backlash of the slewing device, increases.

⚠ DANGER

If an increase of the backlash or advanced wear is suspected, contact Tadano Mantis Customer Support personnel.

CHECK LOAD MOMENT INDICATOR

The load moment indicator (LMI) must be serviced exclusively by a qualified service technician.

Before putting the machine into operation, the crane operator must ensure:

- LMI is functional and undamaged.
- Anti-two-block switch's weight and chain are correctly mounted.
- Electrical cable connections are inserted.
- Cables are correctly wound and tensioned in the electrical cable/length sensor reel.
- Cables are neither damaged nor are any strands broken.
- The systems are checked with calibrated weights according to applicable legal regulations.
- If a meaningful difference from the original setting is detected, re-adjustment must be performed by a qualified service technician.
- Tampering with the electronic system of the LMI by unauthorized persons is prohibited.

CRANE INSPECTION AND MAINTENANCE – 1000 HOURS

CHECK HYDRAULIC FAN FOR PROPER OPERATION

Visually inspect the hydraulic oil cooling fan to ensure proper operation.

CHANGE HYDRAULIC FILTER CARTRIDGES

⚠ DANGER

Only work on the hydraulic system while engine is stopped.

- Check and retighten the hydraulic assembly/pipe fasteners.
- Check hydraulic system for leakage at regular intervals.

⚠ CAUTION

The shut-off valves may only be closed in case of repair work (e.g., at the hydraulic pumps).

⚠ DANGER

Replace filter cartridges only while the engine is stopped.

⚠ CAUTION

- **The individual components installed in the valves, pumps and hydraulic motors have very tight tolerances. Even very small impurities entering the hydraulic system may cause malfunctions.**
- **Replace the filter cartridge during every oil change to the hydraulic system, when the "pilot filter restriction" or "return filter restriction" warnings illuminate and according to the maintenance schedule. Never attempt to clean the filter cartridge.**

NOTE: **Prior to filter cartridge replacement, retract the boom hoist, boom extend, and track extend cylinders.**

⚠ CAUTION

Hydraulic oil tank is pressurized. Drain air from tank before removing filler cap or any component.

1. Release the securing bolts for hydraulic oil filler cap access hatch and remove the cap assembly with bypass valve.
2. Open main hydraulic return filters access hatch and remove the filter cartridge. Allow the residual oil to drip.

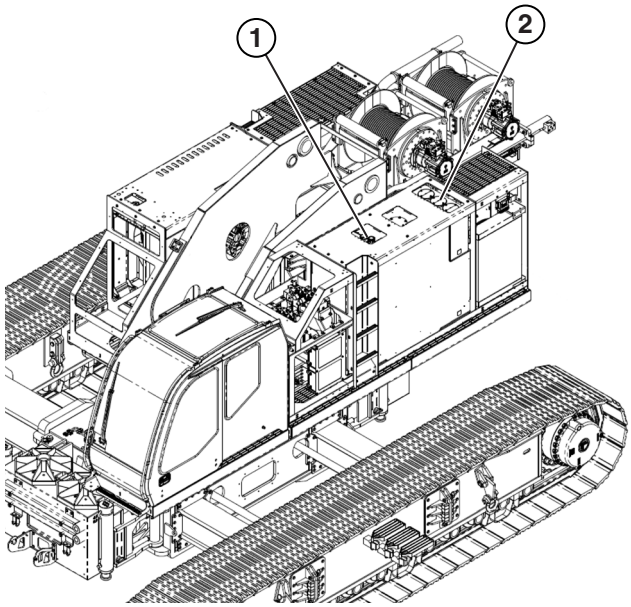


Figure 23

1 – Hydraulic Oil Filler Cap Access Hatch

2 – Main Hydraulic Return Filters Access Hatch

3. Check the cap O-ring seal and replace if necessary.
4. Clean the sealing surfaces using a lint-free cloth.
5. Make sure that the seal fits correctly.
6. Install the cap assembly and secure in place with the mounting bolts.
7. If the filling strainer is contaminated or restricted, open the ventilation filter and clean the filling strainer.

CHECK ENGINE COOLING FAN FOR PROPER OPERATION

Check that fan turns freely, does not make abnormal noise, and is not contacting guard, cooling fins or anything else. For additional information, see engine manual supplied with the crane.

CHANGE SWING DRIVE REDUCER OIL

⚠ DANGER

Allow the swing drive reducer oil to cool before changing; otherwise, scalding can result.

1. Set the swing drive shaft in the downward position.
2. Position a 5 qt drain pan below swing drive reducer.
3. Drain the swing drive reducer by removing the oil drain plug.
4. Reinstall the oil drain plug.
5. Remove the oil fill plug, and add enough oil to fill to the top of the gear set.

NOTE: **See** *Capacities and Specifications Chart on page 2-14* **for capacity (with the shaft down).**

6. Reinstall the oil fill plug.

⚠ CAUTION

- **Check oil for foreign matter whenever an oil change is performed. Drain oil when it has reached its service temperature. Allow the swing drive reducer oil to cool before changing; otherwise, scalding can result.**
- **If coarse impurities are detected, they may be due to excessive stress or improper operation. Determine the cause and eliminate it. Dismantle the gear reducer, and check it for damage. If necessary, have a general overhaul performed by the manufacturer.**
- **Check oil for possible blackening and foreign matter; if necessary, reduce oil change intervals.**

CHECK THE STARTER

Refer to the engine manual for any maintenance required on the starter.

TREAT DOOR LOCK AND SEAL

The mechanical components of the door lock require regular care. Lubricate lock and door latches with light oil. Treat the door seal and other rubber components with acid-free grease or French talc before the start of the cold season.

AIR CONDITIONING AND HEATING SYSTEM

Inspect the heating and air conditioning system for proper operation. Ensure the condenser fins are clean and no dirt or debris is built up on the fins.

NOTICE

The air conditioning system should only be serviced by a trained and certified air conditioning technician.

CRANE INSPECTION AND MAINTENANCE – 2000 HOURS

CHANGE HYDRAULIC OIL

⚠ DANGER

Change oil only while the engine is not running.

⚠ CAUTION

Only use new hydraulic oil, from clean vessels.

NOTE: Prior to an oil change, retract the boom hoist, boom extend, and track extend cylinders.

1. Close the butterfly valves in the suction ports of the hydraulic tank.
2. Remove the drain plug and drain the oil completely into an appropriate tank.
3. Once work is finished, clean the sealing surfaces; clean, check, and if necessary, replace the sealing element, then close the oil tank by means of the drain plug.
4. Replace the filter.
5. Add hydraulic oil via the quick disconnect (QD) fitting, as follows:
   a. Locate the rear QD fitting on the hydraulic tank. It is mounted high on the rear of the tank so that new hydraulic oil is filtered as it enters the tank.

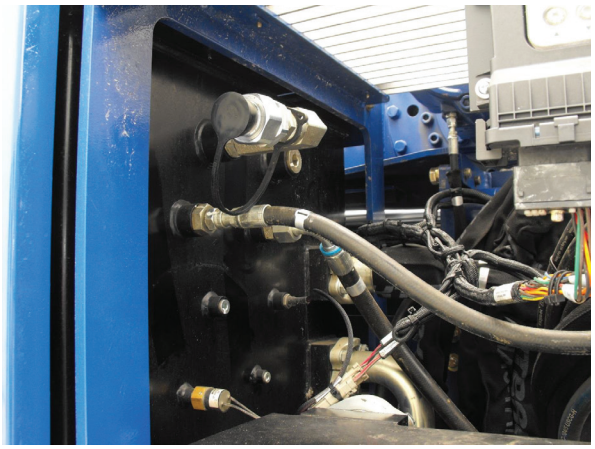


Figure 24

b. Disconnect the hydraulic oil line from the rear QD fitting on the hydraulic tank.

c. Connect a container of new hydraulic oil to the rear QD fitting.

d. Add new hydraulic oil to the tank until the level displayed in the sight glass is between the high and low level lines.

Figure 25

e. Disconnect the oil dispensing container.

f. Reconnect the hydraulic line to the rear QD fitting.

g. Bleed the system.

NOTE: Mating fittings for the quick disconnects are shipped with the crane, in the plastic tote.

6. Remove any impurities that might be present.
7. Re-open the butterfly valves in the suction ports of the hydraulic tank.
8. Confirm the low hydraulic oil icon is not displayed on the MD3 display in the cab.

Figure 26

NOTICE

A warning icon will display on the MD3 screen if the hydraulic oil is below the minimum allowable level. If the icon appears, shut down the crane and check/add hydraulic oil as required before resuming crane operation.

⚠ CAUTION

Before starting the engine, ensure the butterfly valves in the hydraulic tank suction ports are open.

The hydraulic system can be converted to biodegradable oils according to VDMA 23568.

⚠ CAUTION

When changing over the hydraulic system from oils based on mineral oil to biodegradable oils, comply with the directives of VDMA 24569.

For capacity and specifications of hydraulic oil, see *Capacities and Specifications Chart on page 2-14*.

CHANGE ENGINE COOLANT

NOTE: Before the coolant is replaced, the vehicle's warm water heating must be open.

Drain the cooling system by opening the drain valve on the radiator and removing the plug in the bottom of the water inlet. A drain pan with a capacity of 19 L will be adequate in most applications.

Check for damaged hoses and loose or damaged hose clamps. Replace as necessary. Check the radiator for leaks, damage, and buildup of dirt. Clean and replace as necessary.

1. Install the drain plug and pour in coolant mix via the overflow tank.
2. Start the engine and make it run at various speed levels for approximately one minute.
3. Stop the engine and check the coolant level in the overflow tank; top off, if necessary.

NOTE: Coolant must be disposed of in an environmentally responsible fashion.

NOTE: For instructions on how to drain the entire coolant from the engine, refer to the engine manufacturer's operating manual.

INSPECT SWING MECHANISM

⚠ DANGER

Before or after any extended continuous operation, and if the maximum load is reached frequently, the screws and bolts located within the load path must be checked for proper torque.

1. Check all fasteners for proper torque.

NOTE: For proper torque values, see torque chart on page 6-37.

2. Check the swing mechanism for abnormal sounds.

CHANGE HYDRAULIC OIL IN SWING DRIVE BRAKE

⚠ CAUTION

Always engage the swing house lock pin before performing any service or maintenance work on the swing brake.

The swing brake is a "wet" brake and has a sump that is filled with oil.

1. Remove the brake from the swing drive.
2. Remove one of the SAE-6 plugs on the side of the brake and drain the hydraulic oil from the brake until it is empty.
3. Fill the brake with clean hydraulic oil.
4. Reinstall the removed SAE-6 plugs on the side of the brake.
5. Reinstall the brake on the reducer.
6. Top off the brake with hydraulic oil through the top of the brake.

BLEED SWING DRIVE BRAKE

The service brake must be bled after repairs to the hydraulic components of the service brake circuit, before putting the gearbox into operation again. Bleed air from brake using the bleeder screws.

NOTE: See *Capacities and Specifications Chart on page 2-14* for maximum pressure to brake information.

INSPECT SWING BRAKE

⚠ CAUTION

Always engage the swing house lock before performing service or maintenance work on the swing brake.

Check for proper working order and leakage during operation. When the brake is removed to change the oil, it should also be disassembled to check the internal parts for wear. If the brake is worn or damaged, repair the brake or replace with a new brake.

Contact Tadano Mantis Customer Support in case of questions or problems.

CRANE MAINTENANCE – AS REQUIRED

AUTOMATIC LUBRICATION SYSTEM

The slew bearing and boom heel pin are greased with an electrically driven lube pump.

1. The lubrication reservoir is located on the upper structure. Visually confirm the lubrication reservoir is full.

Figure 27

2. When the lubrication level is low, the indicator light located on the lube pump switch will illuminate.
3. If the lubrication reservoir is low, there is a quick disconnect fitting located below the hand signal chart on the front right side of the crane that is used for filling the reservoir.

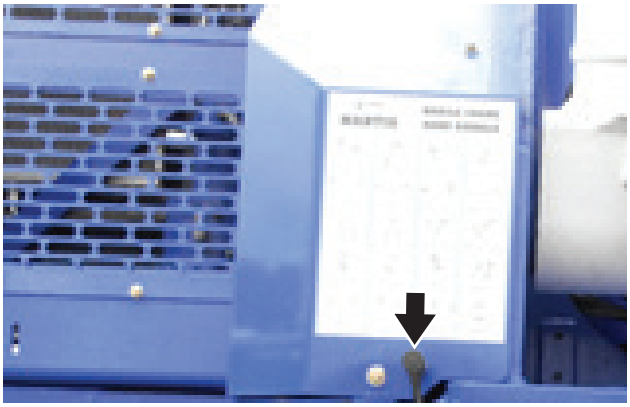


Figure 28

4. To activate the lubrication pump, press the switch located along the right roofline while swinging the boom slowly. Lubricate the slew bearing and the boom heel pin at least every two weeks during normal operation.

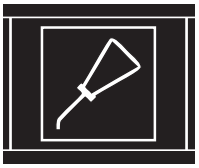


Figure 29

- Shorter lubricating intervals may be required in tropical areas, at a high relative humidity, in dusty or dirty conditions, and in the case of significant temperature fluctuations.
- Before the crane is put in storage for an extended period of time, and before it is put back into service, re-greasing of the slew bearing and boom heel pin is essential.
- Use caution when cleaning the crane. Ensure that no water or cleaning agents enter into the bearing raceways.
- Once cleaning is finished, lubricate the crane thoroughly.
- The grease filling is to prevent friction, to seal, and to protect the assembly against corrosion.
- Use sufficiently ample amounts of grease, so that a grease bead forms around the whole circumference of the bearing grooves.

WINCH INSPECTION AND MAINTENANCE – DAILY

CHECK WINCHES AND WIRE ROPE

Inspect the winches and the area around them for any visible oil leaks. Check that the drain and fill plugs have no visible oil. Check the winch speed reducers and the winch mounting brackets and hardware, and ensure they are not deformed or damaged.

⚠ CAUTION

Never handle the wire rope with your bare hands. The wire rope may have sharp edges. Always wear heavy leather protective gloves.

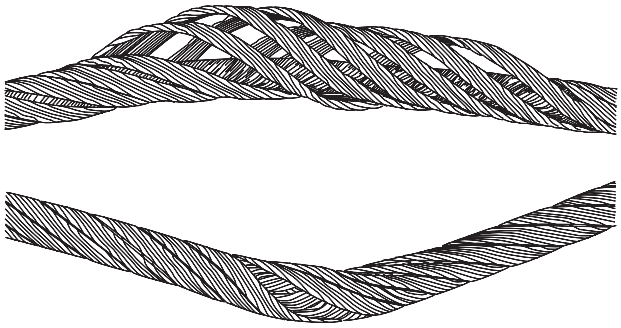


Figure 30

Visually inspect the wire rope for any fraying, broken strands, bruising, kinking, corrosion, reduction of rope diameter and wear. Check along the entire length, including at the fastening device.

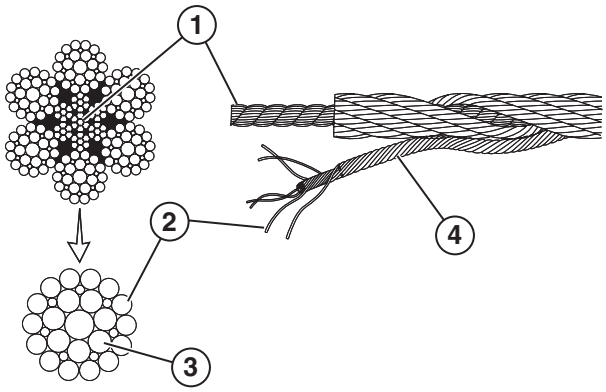


Figure 31

1 – Wire Rope Core
2 – Wire
3 – Filler Wire
4 – Strand

If the end of the wire rope is not in good condition, cut off the damaged end. Wire rope must be replaced if:

- For standard construction ropes, the running ropes have six or more randomly distributed broken wires in one lay or three or more broken wires in one strand of one lay. For rotation-resistant rope, running ropes have two randomly distributed broken wires in six rope diameters or four randomly distributed broken wires in 30 rope diameters.
- The standing ropes have more than two broken wires in one lay in the sections beyond the end connections or more than one broken wire at an end connection.

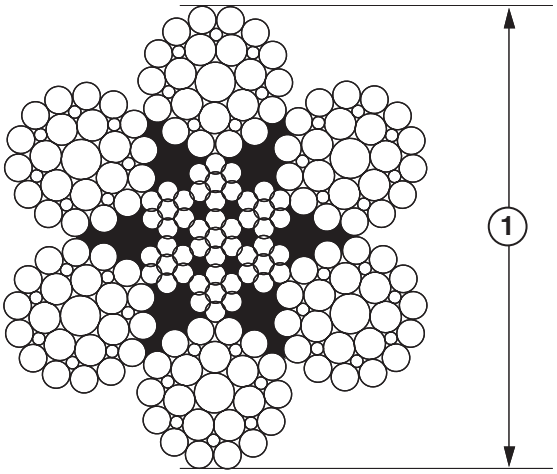


Figure 32

1 – Rotation Resistant Wire Rope Outside Diameter

The wire rope must be replaced if its diameter is reduced more than 5% from nominal. Use the table below to determine if the rope should be replaced.

NOMINAL DIAMETER OF WIRES	WEAR LIMITS
Up to 5/16 in. (Up to 8.0 mm)	1/64 in. (0.4 mm)
3/8 to 1/2 in. (9.5 to 12.7 mm)	1/32 in. (0.8 mm)
9/16 to 3/4 in. (14.3 to 19.0 mm)	3/64 in. (1.2 mm)
7/8 to 1-1/8 in. (22.2 to 28.6 mm)	1/16 in. (1.6 mm)
1-1/4 to 1-1/2 in. (32.0 to 38.0 mm)	3/32 in. (2.4 mm)

Check that the wire rope is wound correctly and evenly on the winch spools. If it is not wound correctly, unwind it and rewind correctly.

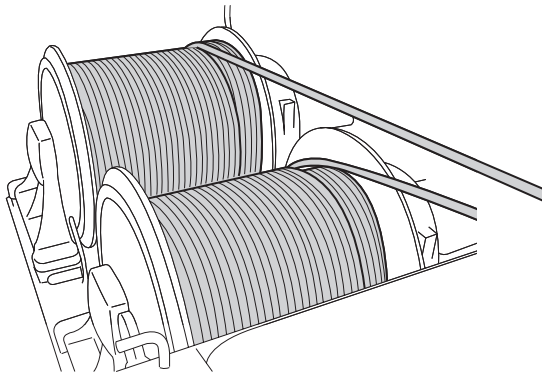


Figure 33

WINCH INSPECTION AND MAINTENANCE – 500 HOURS

CHECK WINCH OIL LEVEL

NOTE: Ensure the crane is parked on a flat, level surface.

1. Remove the oil level plug.
2. Oil should be at the bottom of the oil level hole or just beginning to trickle out.

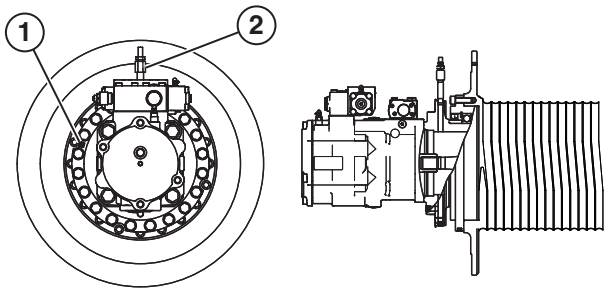


Figure 34

1 – Oil Level Plug 2 – Breather/Fill Plug

3. If level is low, add oil.
4. Apply pipe thread sealant to the threads of the oil level plug and install the plug.

INSPECT WINCH DRUM

Before replacing the wire rope, always do the following:

1. Clean the drum surface thoroughly of any old grease, oil, paint, dirt and debris.
2. Inspect the drum for grooves.

NOTE: The drum must have a smooth surface and be free of any deep scratches, gouges or rough surfaces.

WINCH INSPECTION AND MAINTENANCE – 1000 HOURS

CHANGE THE WINCH OIL

NOTE: Ensure the crane is parked on a flat, level surface.

1. Place a drain pan under drain plugs A and B.
2. Remove drain plugs A and B and allow the oil to drain.
3. Once the oil has drained, apply pipe thread sealant to the drain plugs and install drain plugs A and B.
4. Remove the breather/fill plug and the oil level plug.
5. Add oil so it is right at the oil check plug hole or just beginning to trickle out.
6. Install the oil level plug and the breather/fill plug.
7. Dispose of used oil properly.

NOTICE

Never dispose of drained oil by dumping into a sewer, on the ground, or into groundwater or waterways. Always be environmentally responsible. Follow the guidelines of the Environmental Protection Agency (EPA) or other governmental agencies for proper disposal of hazardous materials. Contact local authorities or reclamation facility.

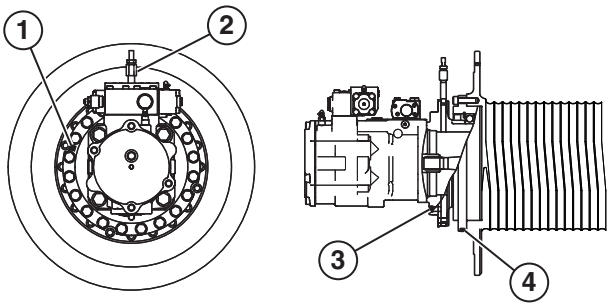


Figure 35

1 – Oil Level Plug
2 – Breather/Fill Plug
3 – Drain Plug A
4 – Drain Plug B

CHECK WINCH MOUNTING BOLTS FOR PROPER TORQUE

See torque chart on page 6-37 for proper torque values.

WIRE ROPE INSPECTION AND MAINTENANCE – AS REQUIRED

REMOVING WIRE ROPE

1. Extend the track frames.
2. Lower the boom fully, and place the hook block on the ground.

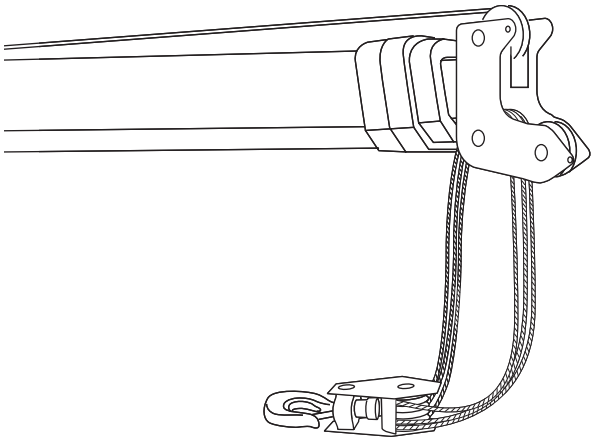


Figure 36

3. Remove the rope socket from the hook block or boom head.
4. Remove the wire clip. Hammer out the wedge from its position. Remove the wire rope from the rope socket.

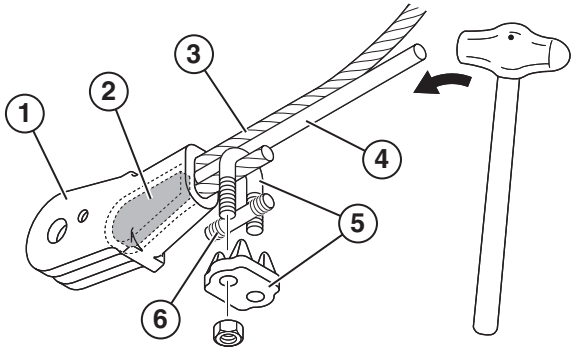


Figure 37

1 – Rope Socket
2 – Wedge
3 – Wire Rope
4 – Steel Rod
5 – Wire Clip
6 – Wire Clip

5. Pull the wire rope out of the hook block and weight for the anti-two-block device.

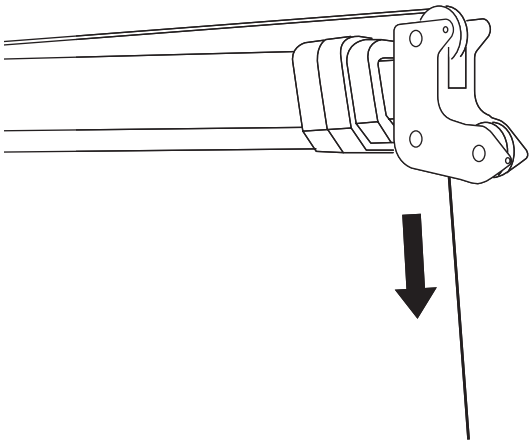


Figure 38

6. Unwind the winch while pulling the wire rope, and wind the wire rope around a wooden spool.

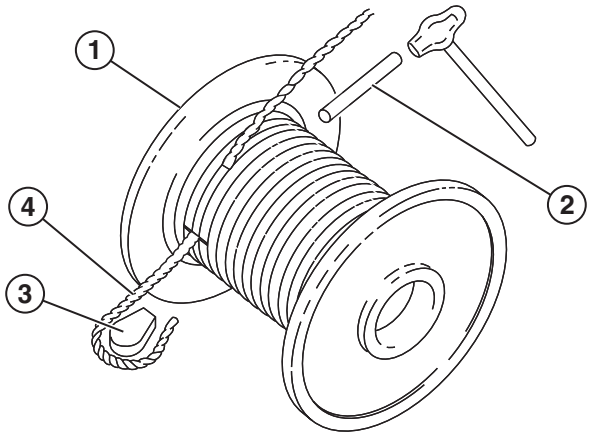


Figure 39

1 – Drum
2 – Steel Rod
3 – Wedge
4 – Wire Rope

7. Spool out the wire rope until there is no wire rope left on the winch drum. Hammer out the wedge from the winch drum, and then spool out all the remaining wire rope.

UNWINDING WIRE ROPE

Wire rope is wound as a coil or wound on a wooden spool when supplied. Unwind the wire rope by rolling the coil, or pull out the rope turning the spool. If the wire rope is unwound improperly, it can become twisted, or kinked, rendering it unusable. Even a small amount of twisting can cause the wire rope to become tangled.

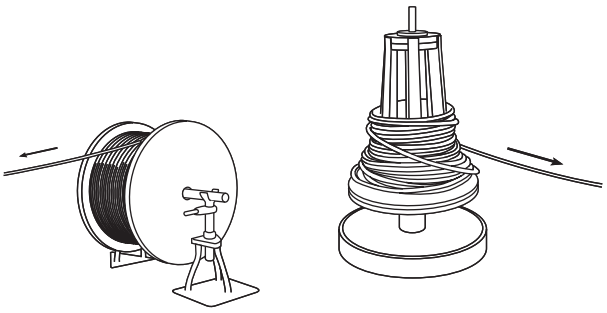


Figure 40

Figure 41

CUTTING WIRE ROPE

NOTE: Category 1 rotation-resistant ropes must be handled differently than other types of wire ropes. The operational properties of this type of rope are the result of the relationship of the lay of the outer strands to the inner strands. The outer strands are not preformed and must be tightly restrained when the rope is cut to maintain the rope's operational properties. It is for this reason that we recommend not removing the welded ends provided. If it becomes necessary to cut a Category 1 rotation-resistant rope, the following procedures for cutting and preparing the rope must be followed:

1. Before cutting the rope make three separate bands with seizing on each side of where the cut is to be made (total of six bands of seizing for each cut). Each band of seizing is to be tightly wrapped and have a minimum length of one-and-one-half times the rope diameter. The two bands of seizing closest to the cut should be located at a distance equal to one rope diameter away from the cut. The four remaining bands of seizing should be evenly spaced at a distance equal to three rope diameters.
2. Cut the rope as detailed below:
   a. If a welder is available, the cut should be made with an abrasive saw. Immediately after the cut, both ends of the rope are to be cap welded so that all inner and outer strands are welded together, preventing any movement between them.
   b. If a welder is not available, the cut is to be made with an acetylene torch. The cut is to be made in such a way that both ends of the rope are completely fused so that all inner and outer strands are bonded together, preventing any movement between strands.

NOTE: For both cutting methods, the outer strands must not be able to move with respect to the inner strands. The weld must not exceed the diameter of the rope.

3. Once the cuts and welding have been completed, the seizing bands are to be left in place if possible.

INSTALLING WIRE ROPE

1. Reeve the new wire rope through from the boom head or jib head to the winch drum.

NOTICE

Make sure the routing of the wire rope is correct.

2. Secure the end of the wire rope to the winch drum.

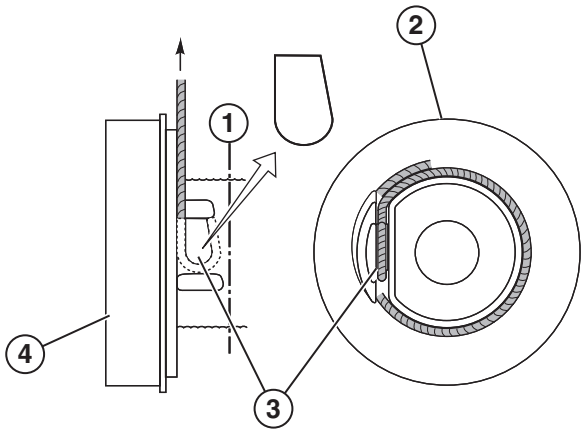


Figure 42

1 – Side View
2 – Cross Section of Side View 1
3 – Wedge
4 – Winch Drum

NOTICE

Orient the wedge correctly. Make sure that the end of the wire rope does not protrude from the winch drum spool.

3. Turn the winch to wind the wire rope around the drum. Wind until there is sufficient length for attaching it to the hook block.
   a. At the start of the winding, wind the rope along the guide at the verge of the drum.

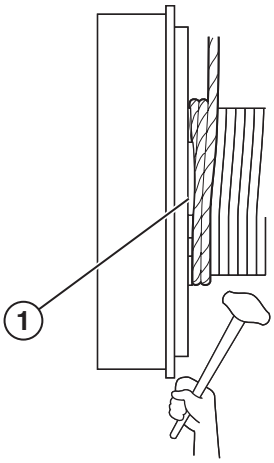


Figure 43

1 – Guide

b. For the first layer of winding, put the rope in the grooves on the drum.

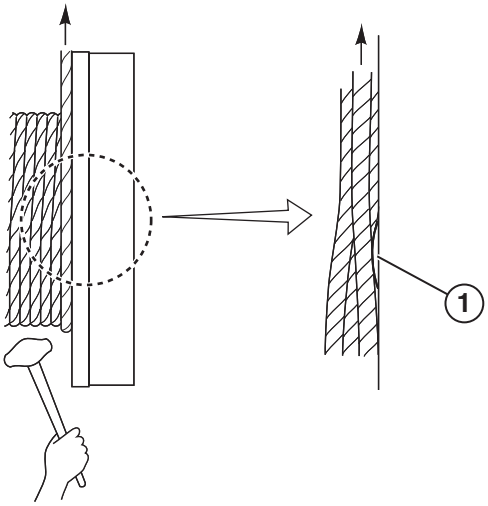


Figure 44

1 – Flange Projection

c. For additional winding layers, set the rope in the valleys between the ropes.

4. Reeve the rope through the boom and hook block sheaves in a pattern appropriate to the number of parts of line.

5. Pass the rope through the weight for the anti-two-block device.

6. Pass the wire rope through the rope socket, and secure it with the wire clip.

- Always inspect socket, wedge and pin before using.
- Do not use parts showing cracks.
- Do not use modified or substitute parts.
- Repair minor nicks or gouges to socket or pin by lightly grinding until surface is smooth. Do not reduce original dimension more than 10%. Do not repair by welding.
- Inspect permanent assemblies annually, or more often in severe operating conditions.
- Do not mix and match wedges or pins between models or sizes.
- Always select the wedge and socket for the wire rope size.
- Use only with standard 6- to 8-strand wire rope of designated size. For intermediate-size rope, use next larger size socket.

  For example: When using 9/16 in. diameter wire rope, use a 5/8 in. size wedge socket assembly. Welding of the tail on standard wire rope is not recommended. Seizing of the tail is preferred following the recommended practices of the wire rope manufacturer. The tail length of the dead end should be a minimum of 6 rope diameters but not less than 6 in.

  a. Align live end of rope with center line of pin.

  b. Secure dead end section of rope.

NOTE: Do not attach dead end to live end.

c. Use a hammer to seat wedge and rope as deep into socket as possible before applying first load.

NOTE: To use with rotation-resistant wire rope (special wire rope constructions with 8 or more outer strands) ensure that the dead end is welded, brazed or seized before inserting the wire rope into wedge socket to prevent core slippage or loss of rope lay. The tail length of the dead end should be a minimum of 20 rope diameters but not less than 6 in.

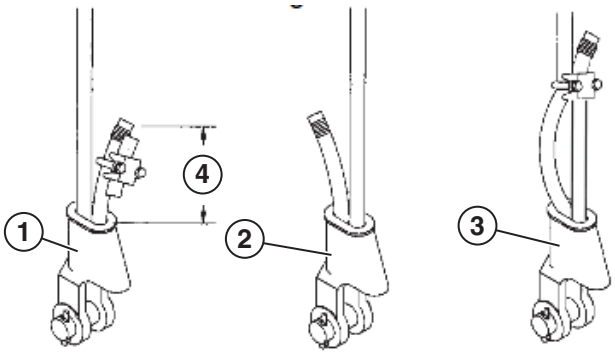


Figure 45

1 – Right
2 – Wrong
3 – Wrong
4 – Tail Length

Tail Length:
Standard 6 to 89 strand wire rope
A minimum of 6 rope diameters, but not less than 6 in.
(i.e. - For 1 in. rope: Tail Length = 1 in. x 6 = 6 in.

Rotation-Resistant Wire Rope:
A minimum of 20 rope diameters, but not less than 6 in.
(i.e. - For 1 in. rope: Tail Length = 1 in. x 20 = 20 in.)

⚠ WARNING

- **Loads may slip or fall if the wedge socket is not properly installed.**
- **Load misapplied in direct contact with the wedge can dislodge the wedge and cause loss of load.**
- **A falling load can seriously injure or kill.**
- **Read and understand these instructions before installing the wedge socket.**
- **Do not side load the wedge socket.**
- **Do not interchange Crosby wedge socket, wedge or pin with non-Crosby wedge socket, wedge or pin.**
- **Apply first load to fully seat the wedge and wire rope in the socket. This load should be of equal or greater weight than loads expected in use.**
- **Do not interchange wedge between S-421 and US-422 or between sizes.**
- Apply first load to fully seat the wedge and wire rope in the socket. This load should be of equal or greater weight than loads expected in use.
- Efficiency rating of the wedge socket termination is based upon the catalog breaking strength of wire rope. The efficiency of properly assembled wedge socket is 80%.
- During use, do not strike the dead end section with any other elements of the rigging (called two-blocking).
- Do not allow a direct load to contact the wedge.

NOTICE

Pay attention to the orientations and positions of the wedge and wire clip installation.

7. Insert the lock pin and secure the rope socket to the hook block or boom head.

⚠ WARNING

Always tighten the fixing pin mounting bolt for the rope socket using a wrench. Improper installation can cause the rope socket to come off and the lifted load to fall, resulting in an accident.

AFTER REPLACEMENT OF WIRE ROPE

A new wire rope is prone to uneven winding. If the wire rope is wound unevenly, unwind it and wind it again. When you put a new wire rope into use, lift a light load at a low speed to break in the rope. This practice helps prolong the life of the wire rope.

When the wire rope is replaced, the new wire rope wound around the winch drum does not have correct tension. If a load is hoisted up with the rope in this condition, the outer rope layer digs into the inner layer. This deforms the wire rope or causes uneven winding, cut wires, and damage to the rope. Before you lift a load, unwind the wire rope and apply proper tension to it while you wind it again in the procedures that follow.

1. Extend the boom, and unwind the wire rope leaving 3 or more dead turns of the rope on the winch drum.

2. Lift a load of approximately 10% of the allowable load per wire rope to provide tension to the wire rope, and then wind the rope tightly around the winch drum.

HANDLING WIRE ROPES

Always handle wire ropes carefully. The life of wire ropes is maximized if they are handled correctly. If handled improperly, wire ropes can become unusable, or must be replaced prematurely. Handle the wire ropes correctly.

⚠ CAUTION

Never handle the wire rope with bare hands. The wire rope may have sharp edges. Always wear heavy leather protective gloves.

DISENTANGLING THE WIRE ROPE

If a new wire rope is used with a long boom and when the number of parts of line is small, the rope can become tangled. This condition is dangerous because it causes the hook block or a load to rotate. Correct this condition with the procedure described below:

1. Extend the track frames and slew the boom toward the rear or the side.
2. Lower the boom fully, and put the hook block on the ground.

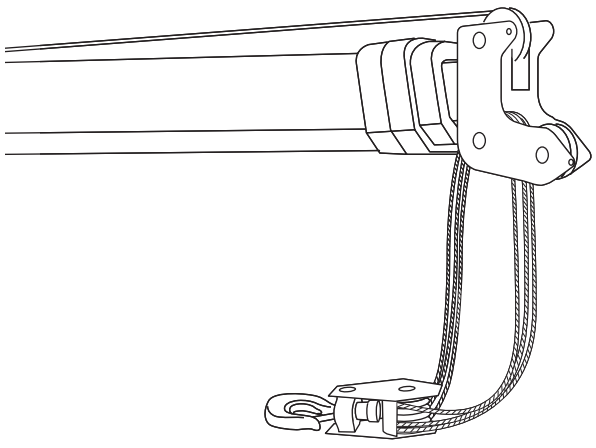


Figure 46

3. Remove the rope socket from the hook block or boom head.
4. Let the rope socket turn freely until it no longer turns on its own.

⚠ WARNING

- **Always watch the movement of the wire rope and the rope socket.**
- **The twist of the wire rope turns the rope socket.**

5. Attach the rope socket to the hook block.
6. Hoist the hook block up and down several times to make the twist even throughout the rope.

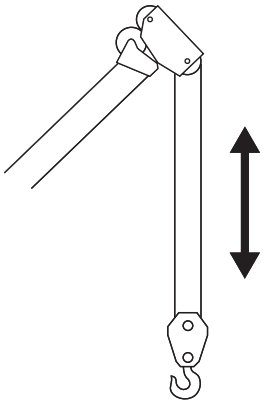


Figure 47

NOTICE

If there are numerous twists, correct the rope step by step several times.

7. If there are still some twists left, remove the rope socket from the boom or hook block. Once the rope is unrestricted, twist the rope an additional half turn.

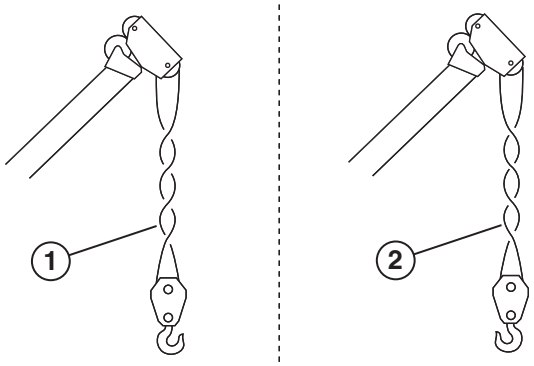


Figure 48

1 – Right Hand Twists

2 – Left Hand Twists

NOTICE

Never twist or untwist the rope more than 1 turn at a time.

8. Hoist the hook block up and down several times to make the twist even throughout the rope. If twists still remain after this, correct again.

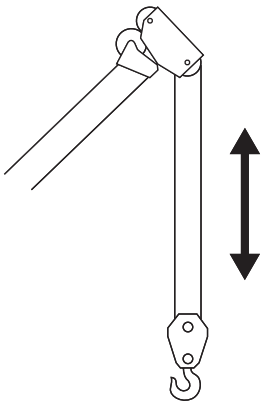


Figure 49

NOTICE

Never twist the rope socket more than twice.

9. Ensure that the wire rope is wound neatly on the winch drum. If the wire rope is disorderly, unwind and wind it again.

HYDRAULIC TEST PORTS

There are six quick coupler hydraulic test ports located behind the cab on the left side of the crane. These ports can be used to test hydraulic pressures.

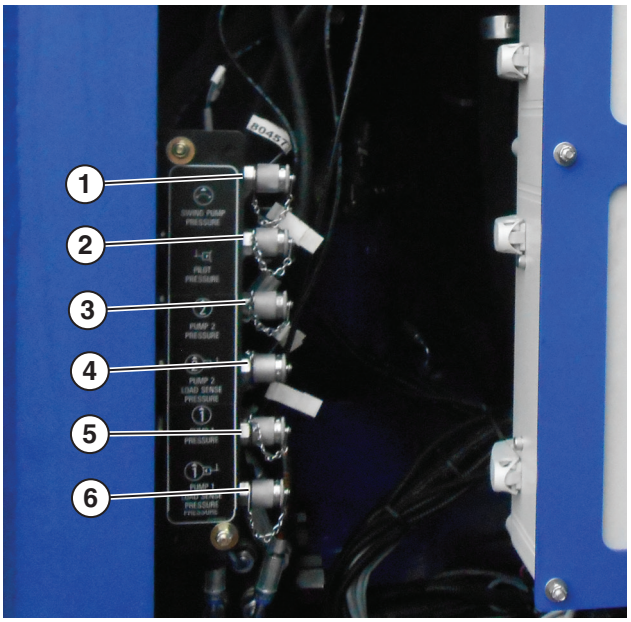


Figure 50

1 – Swing Pump Pressure

2 – Pilot Pressure

3 – Pump 2 Pressure

4 – Pump 2 Load Sense Pressure

5 – Pump 1 Pressure

6 – Pump 1 Load Sense Pressure

TORQUE VALUES

COARSE THREAD SIZE	SAE GRADE 8			
	FT-LB		NEWTON-METER	
	*1	**2	*1	**2
1/4-20	9	12	12	16
5/16-18	18	25	25	33
3/8-16	33	44	44	59
7/16-14	52	70	71	94
1/2-13	80	106	108	144
9/16-12	115	154	156	208
5/8-11	159	212	215	287
3/4-10	282	376	382	510
7/8-9	455	606	617	822
1-8	682	909	924	1233
1 1/8-7	966	1288	1309	1746
1 1/4-7	1363	1817	1848	2464
1 3/8-6	1787	2382	2423	3231
1 1/2-6	2371	3162	3215	4288
1 3/4-5	3117	4157	4227	5637
2-4 1/2	4688	6251	6356	8477
2 1/4-4 1/2	6855	9142	9296	12397
2 1/2-4	9375	12503	12713	16953
2 3/4-4	12710	16950	17235	22985
3-4	16791	22391	22768	30364

COARSE THREAD	PROPERTY CLASS 10.9		NOMINAL WRENCH SIZE	
	FT-LB	NEWTON-METER		
	*1-**2	*1-**2	H" HEX CAP SCREW	WRENCH SIZE
M3	1.0-1.4	1.4-1.9	M3	5
M4	2.4-3.2	3.2-4.3	M4	7
M5	4.9-6.5	6.6-8.8	M5	8
M6	8.3-11.0	11.2-15.0	M6	10
M8	20.2-27.0	27.4-36.6	M8	13
M10	40.2-53.6	54.5-72.6	M10	15
M12	70.2-93.6	95.2-127	M12	18
M14	112-150	152-203	M14	21
M16	176-234	238-318	M16	24
M18	277-370	376-502	M18	
M20	343-458	466-621	M20	30
M22	471-627	638-850	M22(HH)	36
M24	594-791	805-1073	M24	36
M27	875-1167	1187-1583	M27(HH)	46
M30	1184-1579	1606-2141	M30	46
M33	1806-2408	2449-3265	M33	
M36	2075-2767	2814-3752	M36	55
M39	3047-4062	4131-5508	M39	

*1: Torque for threaded parts that are clean, free of rust and contamination, and are well lubricated with 30 weight motor oil.

**2: Torque for threaded parts that are clean, free of rust and contamination, and dry.

INSPECTION POINTS (DAILY, BEFORE STARTUP)

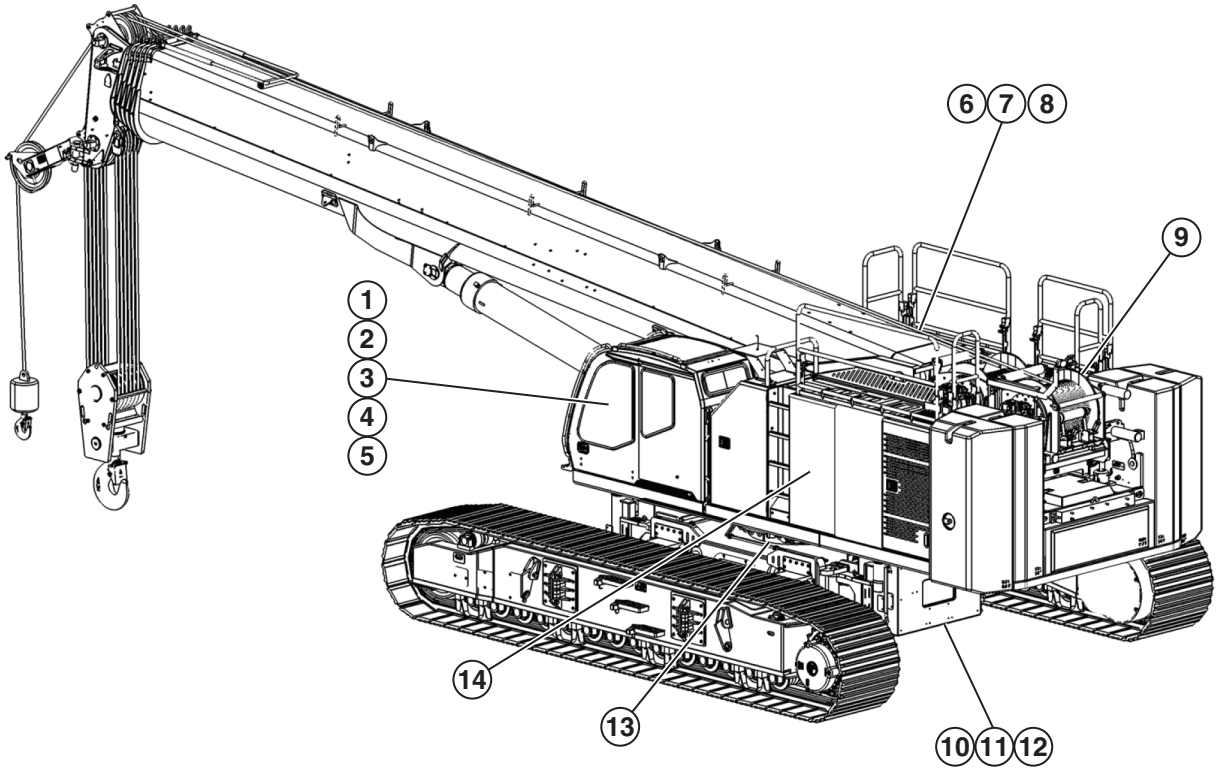


Figure 51

1 – Return Filter and Pilot Filter Restriction Indicators on MD3
2 – Air Filter Restriction Indicator on MD3
3 – Fuel Level Gauge
4 – Cab Electrical Equipment
5 – Swing Gear Lube Pump
6 – Engine Oil Level
7 – Engine Coolant Level
8 – Direct Flow Radial Air Cleaner
9 – Fuel/Water Separator
10 – Engine Oil Leaks
11 – Cooling System Leaks
12 – Hydraulic System Leaks
13 – Swing System
14 – Hydraulic Oil Level

LUBRICATION POINTS

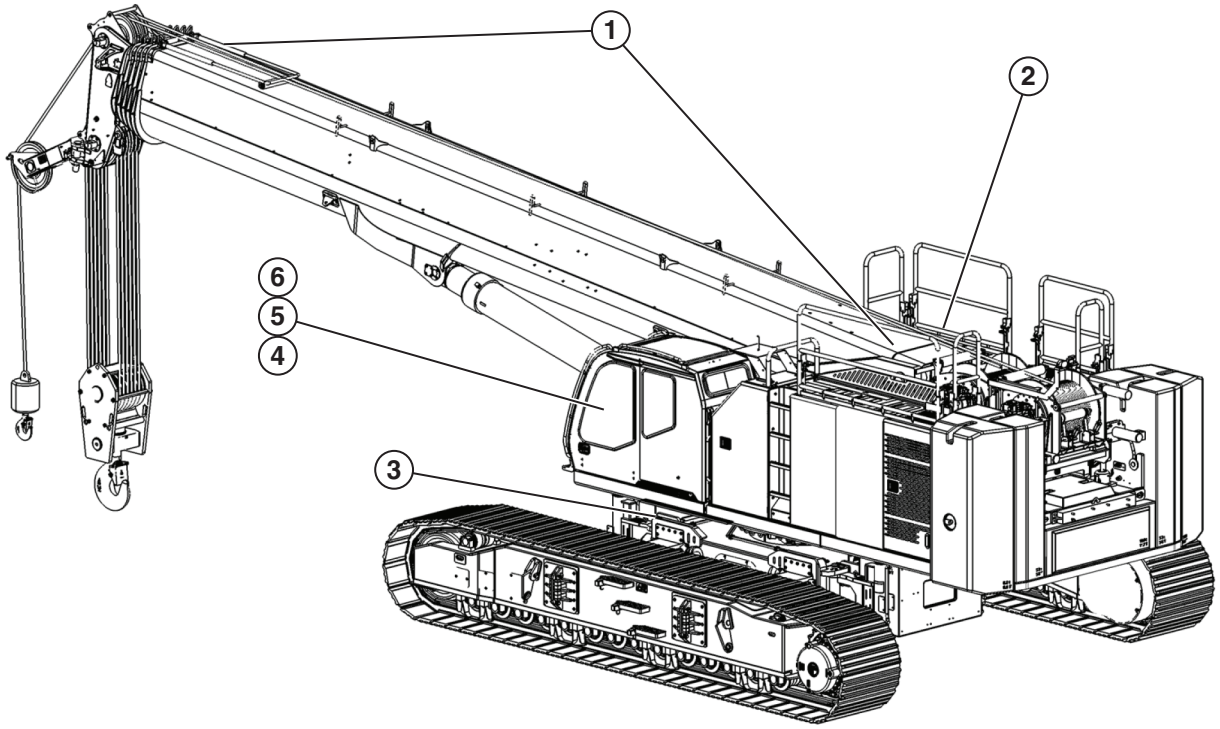


Figure 52

1 – Boom
2 – Automatic Lubricatoin System
3 – Slew Ring Gear and Pinion
4 – Door Lock and Seal
5 – Cab Pivot Points
6 – Swing Gear Pump

OIL / COOLANT LEVEL INSPECTION AND CHANGE

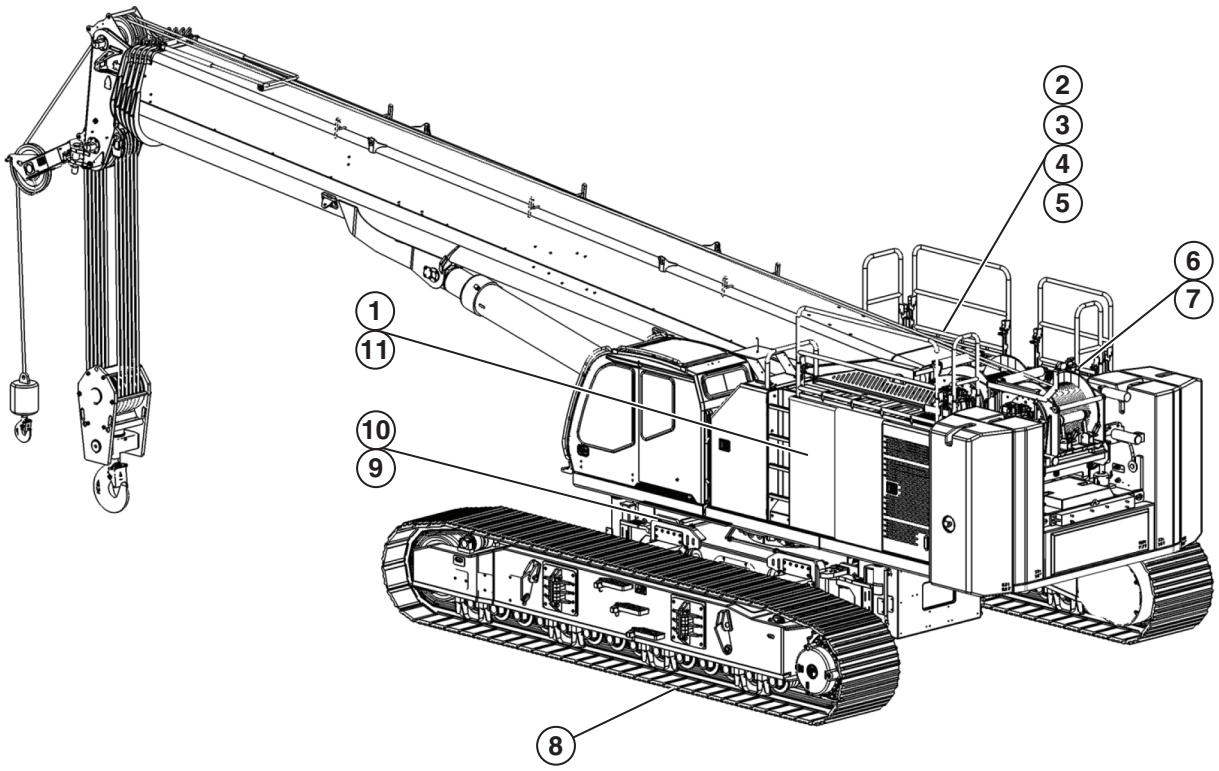


Figure 53

1 – Hydraulic Oil Level
2 – Engine Oil Level
3 – Change Engine Oil and Filter
4 – Engine Coolant Level
5 – Change Engine Coolant
6 – Check Winch Oil Level
7 – Change Winch Oil
8 – Check Track Drive Reducer Oil Level
9 – Check Swing Drive Reducer Oil Level
10 – Change Swing Drive Reducer Oil

CHAPTER 7:
BACKUP SYSTEM OPERATION

In the event of an electrical system or CAN BUS failure, some or all of the crane functions may be inoperable. If this occurs and it is necessary to operate the crane to move it to a different location for service or to reposition it for safety, it is possible to bypass the normal control system and operate one or two functions at a time.

All functions except the swing can be operated by manual control levers on the directional control valves.

NOTE: Swing is operated manually via push pins in the solenoids on the swing pump.

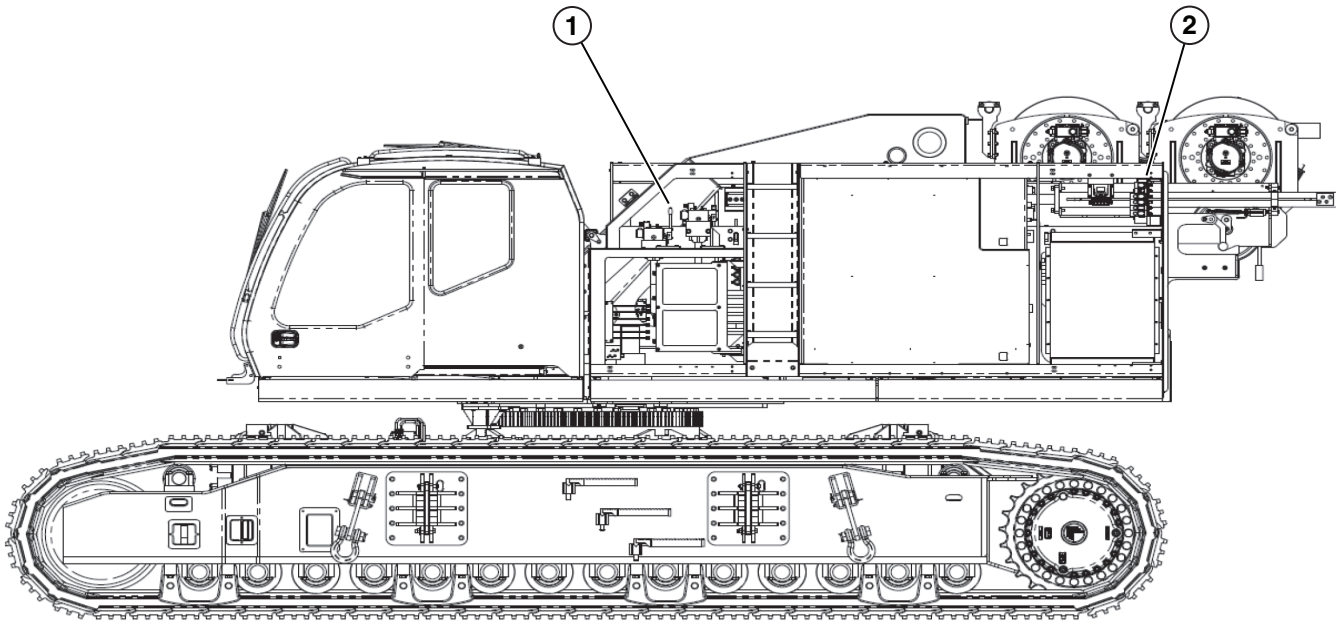


Figure 1

1 – Boom Telescope, Main Winch, Auxiliary Winch, Boom Hoist, Left Track Travel and Right Track Travel Manual Control Lever Location

2 – Counterweight Removal Cylinders, Track Extend/Retract and Jib Stowage Cylinders Manual Control Lever Location

⚠ DANGER

Back-up operation should only be used if normal cab controls are not operable and the crane must be repositioned for safety or service. Functions will operate at full speed when using the manual control lever override. Never use the back-up system for normal operation.

The operator is responsible for ensuring safe operation when using the back-up system. When using the back-up system all normal interlocks are bypassed, including but not limited to the following: seat and armrest switch, AML & A2B, and winch last wrap indication.

BACK-UP OPERATION PROCEDURE (EXCEPT SWING)

1. The crane comes with 2 manual control levers. If numerous functions are required, the manual control valve levers may need to be removed from one directional control valve to the next.

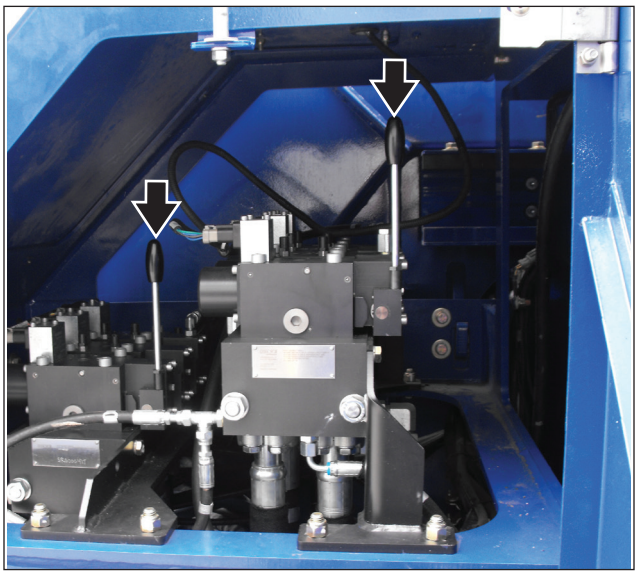


Figure 2

2. Identify the function(s) to be operated and move the manual control lever(s) to those sections of the control valve.
3. Move the control levers(s) in the desired direction for that function. Operation is proportional – the farther the handle is moved the faster the function operates.

NOTE: For boom telescope, the power to the boom sequence valves must be disconnected. Disconnect the round electrical connector in the bulkhead at the bottom left side of the boom. Control of boom sections individually is not possible when using the manual override.

4. To rotate the winches, the brake must be manually released before beginning winch operation.

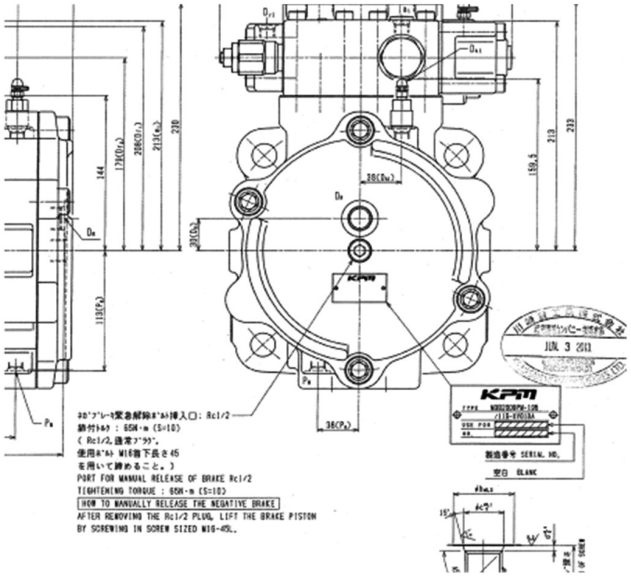


Figure 3

5. Remove the plug from the center of the winch motor brake.
6. Replace the plug with an M16-2.0 x 45 bolt. Turn the bolt 1.5 rotations clockwise to fully release the brake. The bolt will push on the brake piston and it will move 3 mm and then hit a mechanical stop.

NOTE: Any suspended load will be held hydraulically by the counterbalance valves.

7. When winch operation is finished, remove the M16x45 screw and replace with original plug.
8. After the crane is repositioned safely or is in the desired position, release the manual control levers to return the control valve back to the neutral position.

SWING BACK-UP PARK BRAKE RELEASE PROCEDURE

1. Before back-up swing operation, release the swing park brake.

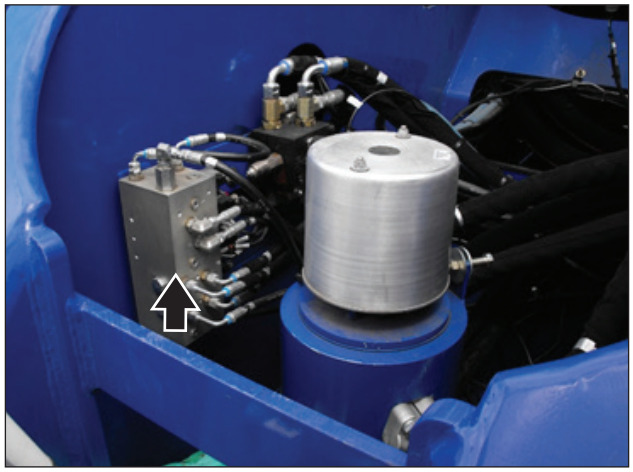


Figure 4

2. Locate the swing park brake release solenoid valve.
3. To operate the manual override, press down on the button on top of the valve and turn the button 180° clockwise.

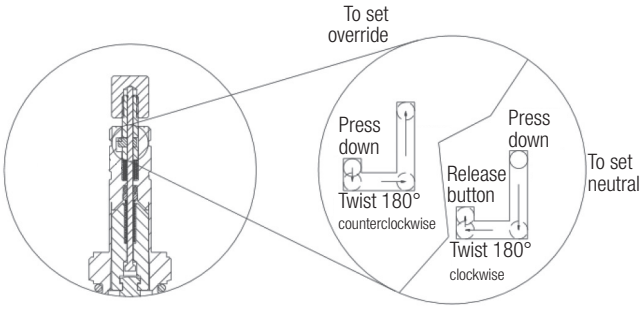


Figure 5

4. Release the button.

NOTE: The button will now extend farther than the original position. The swing brake will be released.

5. To swing manually, press the pin in the center of the hex nut in the solenoid at either end of the swing pump servo control.

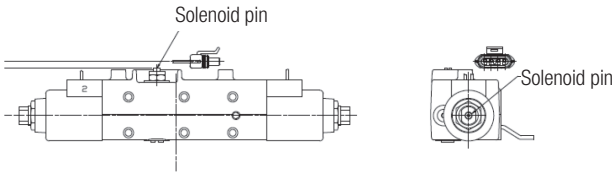


Figure 6

6. Press the pin on either end of the swing pump.
7. To release the manual override on the swing brake solenoid valve, press down on the button on top of the valve, and turn the button 180° counterclockwise.
8. Release the button.

NOTE: The button will now be back to original position. The swing brake manual override will be disabled.

CHAPTER 8: TROUBLESHOOTING

Table 8-1 Troubleshooting

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Engine Will Not Start or Starts Hard	Fuel tank empty	Check fuel quantity.
	Fuel tank vent restricted	Remove cap and listen to sound of air entering tank.
	Water in fuel or water frozen in fuel line	Drain water from fuel tank trap and water separator. Change filter. Inspect fuel filter(s) for water.
	Debris in fuel or improper type of fuel	Check inlet strainer for debris. Check for debris in tank with a flashlight through the filler neck. Check fuel.
	Air leak on suction side of fuel system	Check for bubbles in fuel filter(s) and tighten connections. Inspect fuel lines for damaged lines.
	Slow cranking speed	Check battery and connections.
	Restricted air filter	Check air filter restriction indicator and air filters.
Engine Misses or Stalls	Air in fuel	Inspect filter for evidence of air in fuel. Tighten connections and bleed fuel system.
	Fuel tank vent restricted	Remove cap and listen to sound of air entering tank. Replace cap.
	Debris in fuel or improper type of fuel	Check fuel tank inlet strainer and outlet strainer for debris. Check tank for debris with a flashlight through filler neck. Check fuel.
	Water in fuel	Drain water trap and inspect filter element for water.
	Fuel filter restricted	Replace filter.
	Fuel injection pump	See your authorized dealer.
	Injection nozzle(s)	See your authorized dealer.
	Improper valve clearance	See your authorized dealer.
	Valves sticking or burned	See your authorized dealer.
Engine Does Not Develop Full Power	Fuel tank cap vent plugged	Remove fuel cap and listen for air rushing into tank. Replace cap.
	Fuel filter(s) restricted	Replace fuel filter(s).
	Wrong grade of fuel	Drain and add correct fuel.
	Air system restricted	Check air filter restriction indicator and air filters.
	Incorrect high idle speed (too low)	See your authorized dealer.

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Engine Does Not Develop Full Power	Incorrect engine or injection pump timing	See your authorized dealer.
	Excess leakage in hydraulic system	See your authorized dealer.
	Fuel line restricted	See your authorized dealer.
	Incorrect valve clearance	See your authorized dealer.
	Injection pump delivery, or governor	See your authorized dealer.
	Turbocharger	See your authorized dealer.
	Injection nozzle(s)	See your authorized dealer.
	Muffler restricted	See your authorized dealer.
	Low compression	See your authorized dealer.
	Engine has an active fault code	Refer to the engine manual or see your authorized dealer.
Engine Emits Excessive Black or Gray Exhaust Smoke	Restricted air filter	Check air filter restriction indicator and air filters. Replace.
	Incorrect grade of fuel	Use correct grade of fuel.
	Incorrect injection pump timing	See your authorized dealer.
	Excessive fuel delivery	See your authorized dealer.
	Injection nozzle(s)	See your authorized dealer.
	Turbocharger	See your authorized dealer.
Engine Emits Excessive Blue or White Smoke	Cranking speed too slow	Check batteries and connections.
	Incorrect grade of fuel	Use correct grade of fuel.
	Injection pump out of time	See your authorized dealer.
	Engine running too cold	See your authorized dealer.
	Injection nozzle(s)	See your authorized dealer.
	Low compression	See your authorized dealer.
Abnormal Engine Noise	Low or incorrect engine oil	Add correct oil to proper level.
	Loose or worn hydraulic pump drive coupling	Inspect. Repair.
	Engine oil fuel diluted	Inspect engine oil. Determine cause. See your authorized dealer.
	Incorrect fuel injection pump timing	See your authorized dealer.
	Turbocharger	See your authorized dealer.
	Excessive valve clearance	See your authorized dealer.
	Bent push rods	See your authorized dealer.
	Worn rocker arm shafts	See your authorized dealer.
	Loose connecting rod caps	See your authorized dealer.
	Loose main bearing caps	See your authorized dealer.
	Worn main bearings	See your authorized dealer.
	Worn connecting rod bearings	See your authorized dealer.
	Incorrect cam timing	See your authorized dealer.

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Abnormal Engine Noise	Scored piston	See your authorized dealer.
	Worn piston pin bushings and pins	See your authorized dealer.
Low Engine Oil Pressure	Low oil level	Add oil to proper level. Inspect engine oil.
	Wrong viscosity oil, or oil diluted with diesel fuel	Change oil. See your authorized dealer.
	Oil pressure gauge or sensor	See your authorized dealer.
	Turbocharger shaft seal leaking	See your authorized dealer.
	Restricted oil pump intake screen	See your authorized dealer.
	Loose oil pump drive gear	See your authorized dealer.
	Worn oil pump gear or housing	See your authorized dealer.
	Excessive main bearing clearance	See your authorized dealer.
	Excessive connecting rod bearing clearance	See your authorized dealer.
	Cracked cylinder block	See your authorized dealer.
	Leakage at internal oil passage	See your authorized dealer.
High Oil Pressure	Wrong viscosity oil (too thick)	Change oil.
	Oil pressure gauge or sender	See your authorized dealer.
Engine Overheats	Low coolant level	Fill cooling system and check for leaks.
	Low engine oil level	Add oil.
	Loose or broken fan belt	Tighten or replace belt.
	Fan on backwards	Check for correct fan installation.
	Radiator dirty or restricted	Check air flow. Clean radiator.
	Radiator shroud missing or damaged, or baffles missing	Inspect. Repair or replace.
	Engine overloaded	Reduce load.
	Improper fuel	Use correct grade of fuel.
	Damaged radiator cap	Replace cap.
	Gauge or sender	See your authorized dealer.
	Thermostat (stuck closed)	See your authorized dealer.
	Water pump	See your authorized dealer.
Engine Runs Cold	Temperature gauge or sender	See your authorized dealer.
	Thermostat (stuck open)	See your authorized dealer.
Excessive Fuel Consumption	Air system restricted	Check filter restriction indicator and air filters. Replace.
	Leakage in fuel system	Inspect. Repair.
	Incorrect grade of fuel	Drain, refill with correct fuel.
	Incorrect injection pump timing	See your authorized dealer.
	Faulty turbocharger	See your authorized dealer.
	Injection nozzles	See your authorized dealer.

SYMPTOM	POSSIBLE CAUSE	SOLUTION
No Electrical Power	Dirty or corroded terminals	Clean.
	Battery disconnect switch turned off	Turn battery disconnect switch to ON position.
	Poor ground	Clean and tighten.
Batteries Will Not Take a Charge	Loose or corroded connections	Clean and tighten.
	Battery water level low	Add water.
	Battery defective	Install new batteries.
	Alternator/fan belts loose	Tighten or install new belts.
	Alternator not charging	See your authorized dealer.
	Broken wire between alternator and battery	Inspect and repair.
Starter Does Not Work or Turns Slowly	Excessive electrical load	Remove excessive load or install larger alternator.
	Loose or corroded connections	Clean and tighten.
	Low battery power	Check specific gravity or electrolyte.
	Wrong viscosity engine oil	Use correct oil.
	Faulty wiring	See your authorized dealer.
	Corroded, loose, or broken battery post	Wiggle battery post by hand. If post wiggles or turns, replace battery.
	Low battery voltage	See Low Battery Output.
	Starter defective	See your authorized dealer.
Starting Motor Spins But Will Not Crank Engine	Pinion gear not moving into engine flywheel ring gear	See your authorized dealer.
	Broken teeth on flywheel ring gear	See your authorized dealer.
Starter Solenoid Clicks	Poor or corroded connections at battery, battery ground strap, or starter	Inspect, clean, and tighten if necessary.
	Low battery voltage	See Low Battery Output.
Poor or No Swing Service Brakes	Worn brake lining	See your authorized dealer.
	Brake pressure low	See your authorized dealer.
	Leakage in brake valve	See your authorized dealer.
	Leakage in brake piston seal	See your authorized dealer.
Hydraulic System Overheating	Low oil level	Check, correct oil level.
	Wrong oil (wrong viscosity, oil too thin)	Verify type of oil, change oil.
	Oil flow through oil cooler restricted	Check for kinked or restricted hoses.
	Oil cooler air flow restricted	See your authorized dealer.
	Hydraulic function drifting down	See your authorized dealer.
	System relief valve setting too low	See your authorized dealer.
	Excessive leakage in hydraulic system	See your authorized dealer.

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Slow Hydraulic Functions	Low engine rpm	Increase engine speed.
	Low oil level (oil aerated)	See your authorized dealer.
	Oil too cold	Allow oil to warm up.
	Low standby pressure	See your authorized dealer.
	Worn hydraulic pump	See your authorized dealer.
	System relief valve setting too low	See your authorized dealer.
Excessive Hydraulic Pump Noise	Low oil level	See your authorized dealer.
	Pump control valve	See your authorized dealer.
	Pump drive defective	See your authorized dealer.
Function Drifts Down	Cylinders leaking	See your authorized dealer.
	Circuit relief valve leaking	Replace relief valve.
	Control valve leaking	See your authorized dealer.
Winch Brake Will Not Hold	Brake mechanicals defective	See your authorized dealer.
	Brake piston stuck in bore, or foreign material lodged behind piston	See your authorized dealer.
	Broken spring washers	See your authorized dealer.

ENGINE GAUGES AND INDICATORS

The console to the right of the AML-C display includes gauges and indicators that provide information about the engine.

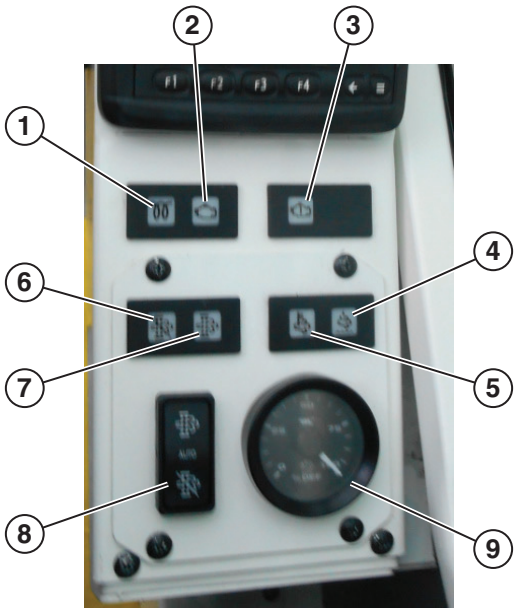


Figure 1

Table 8-2 Gauges/Indicators

ITEM	GAUGE/INDICATOR (shown backlit, if applicable)	DESCRIPTION	PURPOSE	RECOMMENDED ACTION
1		Wait to Start Lamp	Indicates grid heaters are heating intake air to required temperature	Wait until indicator light is off before starting the engine.
2		Check Engine Lamp	Indicates a problem with the engine	Service engine soon. Check crane control display for more details.
3		Stop Engine Lamp	Indicates a severe problem with the engine	Immediately return load to a safe place and turn engine off as soon as possible. Check crane control display for more details.
4		Low Diesel Emission Fluid (DEF) Level Lamp	Illuminates when DEF level is low	Refill tank.
5		High Exhaust System Temperature (HEST) Lamp	Illuminates to indicate higher than normal exhaust temperature during Exhaust System Cleaning	Ensure that the exhaust pipe outlet is not directed at any flammable or combustible surfaces.
4,2		**Flashing** DEF Level Lamp AND Check Engine Lamp	DEF level is critically low.	Refill tank.
4,3		**Flashing** DEF Level Lamp AND Stop Engine Lamp	DEF gauge reads zero. ENGINE POWER WILL BE REDUCED.	Refill tank.
6		Exhaust System Cleaning Stop Lamp	Exhaust System Cleaning Switch is in the “STOP” position, preventing a cleaning event.	When it is safe, return switch to AUTO position to allow Exhaust System Cleaning.
7		Exhaust System Cleaning Lamp	Illuminates when the exhaust system is unable to complete an automatic Exhaust System Cleaning event.	Ensure the Exhaust System Cleaning Switch is not in the “STOP” position and continue working until there is an opportunity, such as at the end of the work day or shift, to complete a stationary Exhaust System Cleaning.

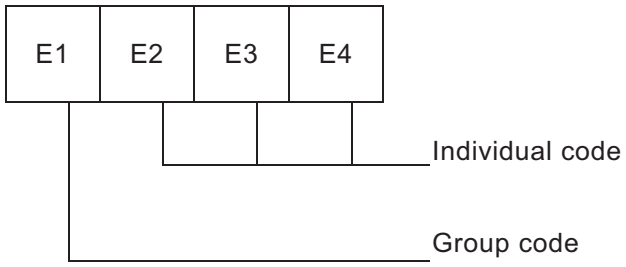
Table 8-2 Gauges/Indicators

ITEM	GAUGE/INDICATOR (shown backlit, if applicable)	DESCRIPTION	PURPOSE	RECOMMENDED ACTION
7,2		Exhaust System Cleaning Lamp AND Check Engine Lamp	Exhaust System Cleaning has not been performed within an allowable time after the Exhaust System Cleaning indicator is illuminated. ENGINE POWER WILL BE REDUCED.	Perform a stationary Exhaust System Cleaning.
7		**Flashing** Exhaust System Cleaning Lamp	Exhaust System Cleaning event has been initiated with the Exhaust System Cleaning Start Switch. The indicator will continue to flash until the stationary cleaning event is complete.	Leave all control in neutral. After the indicator turns off, resume normal work activity.
8		Exhaust System Cleaning Switch	*See Chapter 3: Component Location and Overview.*	*See Chapter 3: Component Location and Overview.*
9		Diesel Emission Fluid Level Gauge	Displays current level of Diesel Emission Fluid in tank (%)	Refill tank if necessary.

AML-C MESSAGE

CLASSIFICATION OF ERROR CODE

The error code is displayed with the numerical value having four digits. The first digit (E1) indicates the error group. The following three-digit number indicates the individual code within the error group.



Group 1: Communication device (transmitter, etc.) error

Group 2: Detector abnormality or abnormal combination of detectors

Group 3: AML internal abnormality (system abnormality). When this abnormality occurs, the execution of control software is aborted.

For information about the error code table, refer to *Error Notification*.

ERROR HISTORY

The error codes from group 1 to 3 are stored in the AML together with the error occurrence time (Note 1). The maximum of 50 error items are stored in chronological order of occurrence. When the number of error items exceeds 50, the oldest record is deleted each time a new error occurs.

Note 1: The error code in group 3 is rarely stored.

ERROR NOTIFICATION

When the AML detects an error, it displays the error code on the LCD display (as shown in *Figure 1*) and, at the same time, it outputs the beep sound to notify that an error has occurred. The error code continues to be displayed while the error exists.

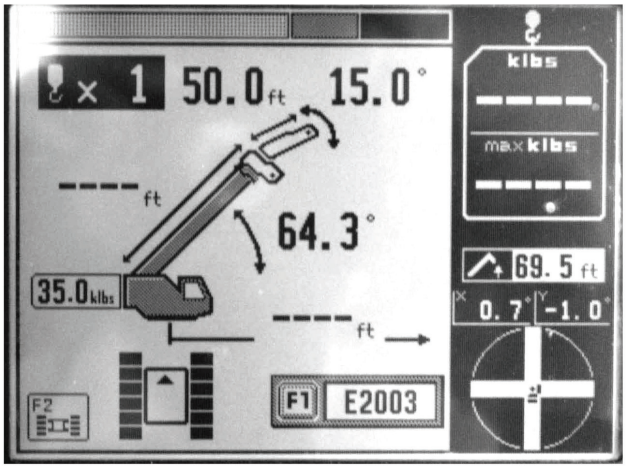


Figure 1 – Error Code Display Screen

When the <F1> key is pressed while the error code is being displayed, a sub window appears in the LCD display to show the error message as shown in *Figure 2*. Under this status, pushing the <×> key closes the sub window, and the error code display is restored. When two or more errors occur simultaneously, each of the error codes is displayed.

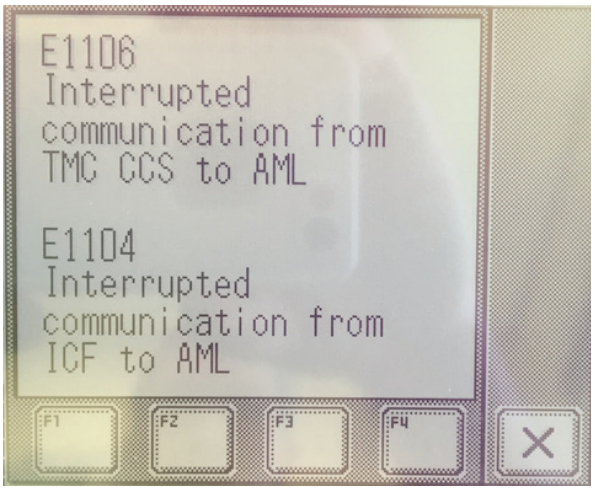


Figure 2 – Error Message Display Screen

COMMUNICATION DEVICE (TRANSMITTER, ETC.) ERROR
Crane Operation:

○: All the operations are possible.

×: All the operations are stopped.

Port 1: Serial port connected with signal transmitter (for jib)

Port 2: Serial port connected with MDT (Multiplex Data Transmitter)

CAN1: CAN port connected with TMC crane control system

CAN2: Not used

Table 8-3 Communication Device Error

ERROR CODE	NAME	DESCRIPTION	CRANE OPERATION	CAUSE	REMARKS
E1101	CAN1 reception abnormality	The data on the bus connected with the CAN port 1 cannot be acquired correctly. (Reception abnormality)		Bus connected with CAN1 is open or short. Device malfunction.	

Table 8-4 Detector Abnormality or Abnormal Combination of Detectors

ERROR CODE	NAME	DESCRIPTION	CRANE OPERATION	CAUSE	REMARKS
E2003	Boom length detector abnormality	The detection value of boom length detector is out of the normal range. Normal range: 5 to 95% (0.25 to 4.75 V)	×	Detector malfunction, signal line open/ short circuit, board malfunction	
E2004	Boom angle detector abnormality	The detection value of boom angle detector is out of the normal range. Normal range: 5 to 95% (0.25 to 4.75 V)	×	Detector malfunction, signal line open/ short circuit, board malfunction	
E2023	Moment abnormality	Load calculation value is negative. When the civil engineering input Di (No. 17206-34) is “During civil engineering work,” the abnormality will not be judged.	×	Detector malfunction, signal line open circuit, board malfunction	

Table 8-4 Detector Abnormality or Abnormal Combination of Detectors

ERROR CODE	NAME	DESCRIPTION	CRANE OPERATION	CAUSE	REMARKS
E2030	Elevating rod pressure abnormality	The detection value of elevating cylinder's rod side pressure detector is out of the normal range, and the status continues for 5 seconds in low pressure side or for 1 second in high pressure side. Normal range: 4 to 95% (0.20 to 4.75 V)	×	Detector malfunction, signal line open circuit, board malfunction	
E2031	Elevating cylinder pressure abnormality	The detection value of elevating cylinder's side pressure detector is out of the normal range Normal range: 5 to 95% (0.25 to 4.75 V)	×	Detector malfunction, signal line open circuit, board malfunction	
E2189	Lateral slope angle detector abnormality	The detection value of lateral slope angle detector is out of the normal range. Normal range: 1 to 99% (0.05 to 4.95 V)	0 (US Model) × (EN Model) (General region Model)	Detector malfunction, signal line open circuit, board malfunction	
E2190	Fore-aft slope angle detector abnormality	The detection value of fore-aft slope angle detector is out of the normal range. Normal range: 1 to 99% (0.05 to 4.95 V)	0 (US Model) × (EN Model) (General region Model)	Detector malfunction, signal line open/ short circuit, board malfunction	
E2200	Do0 output stoppage	Do output power monitor voltage is out of the normal range. Normal range: 18 V or more	×	Signal line short circuit, board malfunction	
E2201	Do1 output OFF abnormality	Although the Do1 output is OFF, the output monitor incorrectly becomes ON.	×	Signal line short circuit, board malfunction	
E2202	Do2 output OFF abnormality	Although the Do2 output is OFF, the output monitor incorrectly becomes ON.	×	Signal line short circuit, board malfunction	
E2203	Do3 output OFF abnormality	Although the Do3 output is OFF, the output monitor incorrectly becomes ON.	×	Signal line short circuit, board malfunction	

Table 8-4 Detector Abnormality or Abnormal Combination of Detectors

ERROR CODE	NAME	DESCRIPTION	CRANE OPERATION	CAUSE	REMARKS
E2204	Do4 output OFF abnormality	Although the Do4 output is OFF, the output monitor incorrectly becomes ON.	×	Signal line short circuit, board malfunction	
E2205	Do5 output OFF abnormality	Although the Do5 output is OFF, the output monitor incorrectly becomes ON.	×	Signal line short circuit, board malfunction	
E2206	Do6 output OFF abnormality	Although the Do6 output is OFF, the output monitor incorrectly becomes ON.	×	Signal line short circuit, board malfunction	
E2207	Do7 output OFF abnormality	Although the Do7 output is OFF, the output monitor incorrectly becomes ON.	×	Signal line short circuit, board malfunction	
E2208	Do8 output OFF abnormality	Although the Do8 output is OFF, the output monitor incorrectly becomes ON.	×	Signal line short circuit, board malfunction	
E2209	Do1 output ON abnormality	Although the Do1 output is ON, the output monitor incorrectly becomes OFF.	0	Signal line short to ground, board malfunction	
E2210	Do2 output ON abnormality	Although the Do2 output is ON, the output monitor incorrectly becomes OFF.	0	Signal line short to ground, board malfunction	
E2211	Do3 output ON abnormality	Although the Do3 output is ON, the output monitor incorrectly becomes OFF.	0	Signal line short to ground, board malfunction	
E2212	Do4 output ON abnormality	Although the Do4 output is ON, the output monitor incorrectly becomes OFF.	0	Signal line short to ground, board malfunction	
E2213	Do5 output ON abnormality	Although the Do5 output is ON, the output monitor incorrectly becomes OFF.	0	Signal line short to ground, board malfunction	
E2214	Do6 output ON abnormality	Although the Do6 output is ON, the output monitor incorrectly becomes OFF.	0	Signal line short to ground, board malfunction	
E2215	Do7 output ON abnormality	Although the Do7 output is ON, the output monitor incorrectly becomes OFF.	0	Signal line short to ground, board malfunction	
E2216	Do8 output ON abnormality	Although the Do8 output is ON, the output monitor incorrectly becomes OFF.	0	Signal line short to ground, board malfunction	

Table 8-5 AML Internal Abnormality (System Abnormality)
Crane operation ×: AML automatic stop output OFF

ERROR CODE	NAME	DESCRIPTION	CRANE OPERATION	CAUSE	REMARKS
-	ROM checksum abnormality	An abnormality has occurred to the ROM checksum.	×	Incorrect flash memory writing, memory malfunction	
E3002	RAM abnormality	RAM writing/readout cannot be performed normally.	×	Malfunction due to noise and others, board malfunction	
E3003	CPU exception	CPU or DMAC address error has occurred.	×	Runaway due to noise and others, board malfunction However, even in the normal status, this may be stored at turning ON/OFF of power.	
E3004		CPU has executed an abnormal command, including slot illegal instruction.			
E3005		An exception processing has been activated which is not executed in normal cases.			
E3006	Internal power supply abnormality	An abnormality has occurred to the analog power supply voltage.	×	Board malfunction, detector malfunction, short circuit in wiring to detector	
E3007	Flash memory abnormality	The area that stores the adjustment value is destructed. Re-adjustment is required.	0	Board malfunction, malfunction due to noise and others. Unless the error data is erased, the message remains.	
E3008	Task execution abnormality	Runaway has occurred to the I/O related program.	×	Malfunction due to noise and others, board malfunction	

Figure 3

1 – Type
2 – Modules and Pin Number
3 – Description
4 – Status

Table 8-6 Pop-Up Messages on IQAN MD3 Display

DESCRIPTION	STATUS	DEFINITION	TYPE	POSSIBLE CAUSES
XA2	VREFF Error		Error	
XA2	No Contact		Error	
XA2	High Temperature		Error	
XA2	Low Supply Voltage		Error	
XA2	High Supply Voltage		Error	
Front pump LS Pressure Sensor	High Error	Value over high error level on input channel.	Error	
Front pump LS Pressure Sensor	Low Error	Value below low error level on input channel.	Error	
Front pump LS Pressure Sensor	VREFF Error		Error	
Front pump Pressure Sensor	High Error	Value over high error level on input channel.	Error	
Front pump Pressure Sensor	Low Error	Value below low error level on input channel.	Error	
Front pump Pressure Sensor	VREFF Error		Error	
Pilot Pressure Sensor	High Error	Value over high error level on input channel.	Error	
Pilot Pressure Sensor	Low Error	Value below low error level on input channel.	Error	
Pilot Pressure Sensor	VREFF Error		Error	
Rear pump LS Pressure Sensor	High Error	Value over high error level on input channel.	Error	
Rear pump LS Pressure Sensor	Low Error	Value below low error level on input channel.	Error	
Rear pump LS Pressure Sensor	VREFF Error		Error	
Rear pump Pressure Sensor	High Error	Value over high error level on input channel.	Error	
Rear pump Pressure Sensor	Low Error	Value below low error level on input channel.	Error	
Rear pump Pressure Sensor	VREFF Error		Error	
Fuel Level Sensor	High Error	Value over high error level on input channel.	Error	

Table 8-6 Pop-Up Messages on IQAN MD3 Display

DESCRIPTION	STATUS	DEFINITION	TYPE	POSSIBLE CAUSES
Fuel Level Sensor	Low Error	Value below low error level on input channel.	Error	
Fuel Level Sensor	VREFF Error		Error	
Throttle Pedal	High Error	Value over high error level on input channel.	Error	
Throttle Pedal	Low Error	Value below low error level on input channel.	Error	
Throttle Pedal	VREFF Error		Error	
Hydraulic Level Sensor	High Error	Value over high error level on input channel.	Error	
Hydraulic Level Sensor	Low Error	Value below low error level on input channel.	Error	
Hydraulic Level Sensor	VREFF Error		Error	
Aux Winch Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Aux Winch Valve	Overload		Error	
Aux Winch Valve	Saturated	Not able to output commanded current. Current is 50-100% of commanded.	Error	
Boom Telescope Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Boom Telescope Valve	Overload		Error	
Boom Telescope Valve	Saturated	Not able to output current. Current is 50-100% of commanded.	Error	
Boom Hoist Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Boom Hoist Valve	Overload		Error	
Boom Hoist Valve	Saturated	Not able to output current. Current is 50-100% of commanded.	Error	
Swing Pump Control Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Swing Pump Control Valve	Overload		Error	
Swing Pump Control Valve	Saturated	Not able to output current. Current is 50-100% of commanded.	Error	
Fan Disable Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Fan Disable Valve	Overload		Error	

Table 8-6 Pop-Up Messages on IQAN MD3 Display

DESCRIPTION	STATUS	DEFINITION	TYPE	POSSIBLE CAUSES
Bottom Cylinder Shutoff Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Bottom Cylinder Shutoff Valve	Overload		Error	
Middle Cylinder Shutoff Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Middle Cylinder Shutoff Valve	Overload		Error	
Top Cylinder Shutoff Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Top Cylinder Shutoff Valve	Overload		Error	
Warm Up Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Warm Up Valve	Overload		Error	
Cooling Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Cooling Valve	Overload		Error	
MC2	VREFF Error		Error	
MC2	No Contact		Error	
MC2	High Temperature		Error	
MC2	Low Supply Voltage		Error	
MC2	High Supply Voltage		Error	
Pilot Filter Restriction Sensor	High Error	Value over high error level on input channel.	Error	
Pilot Filter Restriction Sensor	Low Error	Value below low error level on input channel.	Error	
Pilot Filter Restriction Sensor	VREFF Error		Error	
Hydraulic Temperature Sensor	High Error	Value over high error level on input channel.	Error	
Hydraulic Temperature Sensor	Low Error	Value below low error level on input channel.	Error	
Hydraulic Temperature Sensor	VREFF Error		Error	
Swing Pump Pressure Sensor	High Error	Value over high error level on input channel.	Error	

Table 8-6 Pop-Up Messages on IQAN MD3 Display

DESCRIPTION	STATUS	DEFINITION	TYPE	POSSIBLE CAUSES
Swing Pump Pressure Sensor	Low Error	Value below low error level on input channel.	Error	
Swing Pump Pressure Sensor	VREFF Error		Error	
Swing Relief A Pressure Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Swing Relief A Pressure Valve	Overload		Error	
Swing Relief A Pressure Valve	Saturated	Not able to output current. Current is 50-100%.	Error	
Horsepower Control Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Horsepower Control Valve	Overload		Error	
Horsepower Control Valve	Saturated	Not able to output current. Current is 50-100%.	Error	
Left Travel Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Left Travel Valve	Overload		Error	
Left Travel Valve	Saturated	Not able to output current. Current is 50-100% of commanded.	Error	
Right Travel Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Right Travel Valve	Overload		Error	
Right Travel Valve	Saturated	Not able to output current. Current is 50-100% of commanded.	Error	
Main Winch Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Main Winch Valve	Overload		Error	
Main Winch Valve	Saturated	Not able to output current. Current is 50-100% of commanded.	Error	
Swing Relief B Pressure Valve	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Swing Relief B Pressure Valve	Overload		Error	
Swing Relief B Pressure Valve	Saturated	Not able to output current. Current is 50-100%.	Error	
MD3	VREFF Error		Error	
MD3	No Contact		Error	

Table 8-6 Pop-Up Messages on IQAN MD3 Display

DESCRIPTION	STATUS	DEFINITION	TYPE	POSSIBLE CAUSES
MD3	High Temperature		Error	
MD3	Low Supply Voltage		Error	
MD3	High Supply Voltage		Error	
Throttle Potentiometer	High Error	Value over high error level on input channel.	Error	
Throttle Potentiometer	Low Error	Value below low error level on input channel.	Error	
Throttle Potentiometer	VREFF Error		Error	
Cab Buzzer	Open Load	Output is disconnected. Current is less than 50% of commanded.	Error	
Cab Buzzer	Overload		Error	
Cab Buzzer	Saturated	Not able to output commanded current. Current is 50-100% of commanded.	Error	
Left Joystick	No Contact		Error	
Right Joystick	No Contact		Error	
Right Travel Pedal	No Contact		Error	
Left Travel Pedal	No Contact		Error	
Swing Pump Filter Restriction Sensor	High Error	Value over high error level on input channel.	Error	
Swing Pump Filter Restriction Sensor	Low Error	Value below low error level on input channel.	Error	
Swing Pump Filter Restriction Sensor	VREFF Error		Error	
Right Track Position Sensor	High Error	Value over high error level on input channel.	Error	
Right Track Position Sensor	Low Error	Value below low error level on input channel.	Error	
Right Track Position Sensor	VREFF Error			
Left Track Position Sensor	High Error	Value over high error level on input channel.	Error	
Left Track Position Sensor	Low Error	Value below low error level on input channel.	Error	
Left Track Position Sensor	VREFF Error		Error	

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