Radio Remote Boom Control System

Form No.
50960060
Revision B
October
2015

OPERATOR'S AND PARTS MANUAL

Table of Contents

INTRODUCTION

The information in this manual was written to give the owner/operator assistance in preparing, adjusting, maintaining and servicing the Radio Remote Boom Control. More important, this manual provides information on the safe and proper use of the Radio Remote Boom Control System. Major points of safe operation are detailed in the **SAFETY** chapter of this manual.

Be sure to read and understand the contents of this manual COMPLETELY and become familiar with the Radio Remote Boom Control System BEFORE operating it.

This Radio Remote Boom Control System allows the operator to remotely start the engine and operate the boom lift, lower, extend and retract functions. The operator can position a loaded attachment or raise personnel in an approved work platform from a safe position outside the operator's station or from within the work platform. Lift personnel only with an approved work platform, and in full compliance with the "Mandatory Work Platform Safety Rules" (see SAFETY chapter).

The use of this Radio Remote Boom Control is subject to certain hazards that cannot be eliminated by mechanical means, but only by the exercise of intelligence, care and common sense. It is therefore essential to have competent and careful operators, who are not physically or mentally impaired, and who are thoroughly trained in the safe operation of the Radio Remote Boom Control and the handling of the loads.

A storage pocket in the back of the seat of the telescopic handler is provided for storing this manual. After using the manual, please return it to the pocket and keep it with the unit at all times! If the machine is resold, give this manual to the new owner.

The manufacturer reserves the right to make changes or improvements in the design or construction of any part without incurring the obligation to install such changes on any unit previously delivered.

In cooperation with the Society of Automotive Engineers, this

Safety Alert Symbol

has been adopted to pinpoint characteristics that, if NOT properly followed, can create a safety hazard. When you see this symbol in this manual or on the machine itself, you are reminded to BE ALERT! Your personal safety is involved!

Chapter 1

SPECIFICATIONS

Transmitter Specification	
Item	**Description**
Power	V_{in} . . . . . .+1.6V to +3.2VDC Batteries . . . . . .Four (4) AA Battery Life . . . . . .175 to 200 hours Low V Shutdown . . . . . .1.6VDC Auto-shutdown . . . . . .60 minutes of button inactivity
Environment	Operating Temperature . . .-4°F to 131°F (-20°C to 55°C) Storage Temperature . . . . .-40°F to 131°F (-40°C to 55°C) Humidity . . . . . .0 to 100%
Radio	Frequency . . . . . .906-924MHz RF Power . . . . . .1mW License . . . . . .License free Modulation . . . . . .DSSS Antenna . . . . . .Internal
Enclosure	Dimensions . . . . . .9.1” x 5.3” x 5.8” (230.6mm x 133.9mm x 146.9mm Total Weight . . . . . .3 lbs. Durability . . . . . .High Impact Polymer Case Faceplate . . . . . .Aluminum or Polycarbonate
LED Indicators (4)	TX . . . . . .Blinking -transmitting, no switch active Solid -transmitting, switch active RX . . . . . .Blinking -receiving, no output of interest active Solid -receiving, output of interest active ERR . . . . . .Indicates error with transmitter BATT . . . . . .Low Battery Indication
Control Switches	Toggle . . . . . .Four 3-position spring return to center One 2-position spring return Trigger . . . . . .Proportional Red Mushroom . . . . . .Oversized Emergency Machine Stop

Receiver Specification

Item	Description
Power	V_{in} . . . . . .+7 to +32VDC
Environment	Operating Temperature . . .-4°F to 158°F (-20°C to 70°C) Storage Temperature . . . . .-40°F to 185°F (-40°C to 85°C) Humidity . . . . . .0 to 100% Vibration/Shock . . . . . .IEC60068-2-6 10Hz to 150Hz @ 1.0g peak acceleration 10.0g peak shock acceleration
Radio	Frequency . . . . . .906-924MHz RF Power . . . . . .1mW License . . . . . .License free Modulation . . . . . .DSSS Antenna . . . . . .Internal
Enclosure	Dimensions . . . . . .5.24” x 4.69” x 1.42” (119mm x 133mm x 36mm Durability . . . . . .High Impact Polymer Mounting Holes . . . .29” (7.4mm) dia., 4” (102mm) center-to-center
Indicators (12)	+V1, +V2, +V3 . . . . . .Unused HTH . . . . . .Blink -active RFTX . . . . . .Blink -transmitting RFRX . . . . . .Solid -receiving D4 . . . . . .Unused D5 . . . . . .Unused OUT . . . . . .Solid -active D7 . . . . . .Unused ERR . . . . . .Indicates error with transmitter
Discrete Outputs/Inputs	Sixteen . . . . . .FET -Open Drain (high side) Current . . . . . .2A per channel - 8A Max. Total
I/O	Assignment M1-Receiver Pin 3 M2-Receiver Pin 4 M3-Receiver Pin 5 M4-Receiver Pin 6 M5-Receiver Pin 9 M6-Receiver Pin 8 M7-Receiver Pin 9 M8-Receiver Pin 10

Chapter 2

SAFETY

Before using the Radio Remote Boom Control, read and study the following safety information. In addition, be sure that everyone who operates the Radio Remote Boom Control is familiar with these safety precautions.

Manitou Americas ALWAYS takes safety into consideration when designing its machinery. The Operator's Manual, Safety Manual and decals on the machine warn of hazards, and should be read and observed closely.

DANGER

"DANGER" indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

"WARNING" indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

"CAUTION" indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also alert to unsafe practices.

It is the responsibility of the operator to read and understand the Operator's Manual and other information provided, and use correct operating procedures. Machines should be operated only by qualified operators.

REMEMBER! It is the owner's responsibility for communicating information on the safe use and proper maintenance of the Radio Remote Boom Control System! This includes providing an understandable interpretation of these instructions for operators who are not fluent in reading English.

WARNING

ALWAYS maintain a safe distance from electric power lines and avoid contact with any electrically charged conductor. It is not necessary to make direct contact with a power line for power to ground through the structure of the machine. Keep the boom at least 10 ft. (3 m) from all power lines. Accidental contact can result in electrocution.

WARNING

U.S. OSHA regulations require employers in general industry and the construction, shipyard and cargo-handling industries (excepting agricultural operations) to ensure that forklift operators are competent, as demonstrated by successful completion of a training course.

The training course must consist of a combination of formal instruction and practical training, including both forklift-related and workplace-related topics, and evaluation of the operator's performance in the workplace.

All operator training and evaluation is to be conducted by persons who have the knowledge, training and experience to train and evaluate operators.

⚠ WARNING

U.S. OSHA regulations effective November 8, 2010 (29 CFR Part 1926, Subpart CC - Cranes and Derricks in Construction) include requirements for employers that use powered industrial trucks ("forklifts") configured to hoist (by means of a winch or hook) and move suspended loads horizontally. In particular, this regulation applies to any rough-terrain forklift (e.g., "telescopic handler") equipped with a jib or truss boom with a hook (with or without a winch), or a hook assembly attached to the forks. [Note: This regulation is in addition to the OSHA regulation that requires specific forklift operator training: §1910.178(l).]

When a forklift / telescopic handler is configured and used for hoisting, the employer must ensure that:

1. **Forklift, lift equipment and rigging have been inspected (each shift, month and year) and are in good, safe condition and properly installed.**
2. **An operator's manual and applicable load charts are on the forklift.**
3. **Work zone ground conditions can support the equipment and load. Any hazardous conditions in the work area have been identified, and the operator notified.**
4. **Equipment is being used within its rated capacity and in accordance with the manufacturer's instructions.**
5. **Operator and crew members have been trained in the safe use and operation of the equipment, including how to avoid electrocution.**
6. **During use, no part of the equipment, load line or load will be within the minimum clearance distance specified by OSHA [10 feet (3.0 m), and more for lines rated over 50 kV] of any energized power line, and any taglines used are non-conductive.**
7. **In addition, for lift equipment with a rated capacity greater than 2000 lbs. (907 kg), the employer must ensure that:**
   - **a.) An accessible fire extinguisher is on the forklift;**
   - **b.) Monthly and annual inspections are performed and documented, and records retained (three months for monthly, one year for annual);**
   - **c.) Before November 10, 2014, operators must have had the additional training and qualification / certification required by OSHA regulations §1926.1427 and §1926.1430.**

Note: Refer to the full text of the OSHA crane regulation (29 CFR Part 1926, Subpart CC) for a detailed description of the regulatory requirements.

Radio Remote System Safety Reminders

- Read and follow all instructions.
- Failure to follow these Safety Precautions may result in equipment failure, loss of authority to operate the equipment, and personal injury.
- Use and maintain proper wiring. Follow equipment manufacturer instructions. Improper, loose, and frayed wiring can cause system failure, equipment damage, and intermittent operation.
- Changes or modifications made to equipment not expressly approved by the manufacturer will void the warranty.
- Owner/operators of the equipment must follow all applicable Federal, State, and Local laws concerning installation and operation of the equipment. Failure to comply could result in penalties and could void user authority to operate the equipment.
- Use a damp cloth to keep units clean. Remove mud, concrete, dirt, etc. after use to prevent obstructing or clogging the buttons, levers, wiring, and switches.
- Do not intentionally allow liquid to enter the transmitter or receiver enclosures. Do not use high pressure equipment to clean the transmitter or receiver.
- Disconnect the radio receiver before welding on the machine. Failure to disconnect the receiver may result in destruction of or damage to the receiver.
- Operate and store units only within the specified operation and storage temperatures defined in this document.

- It is essential that operators be trained in the safe operation of the machine and the Radio Remote Boom Control System. Such training should be presented completely to all new operators and not condensed for those claiming previous experience.
- Make sure machinery and the surrounding area are clear before operating. Do not activate the Radio Remote Boom Control unless it is safe to do so.
- Turn off the receiver power before working on the machine. Always disconnect the Radio Remote Boom Control before doing any maintenance to prevent accidental operation of the machine.
- User/operator safety practices, as established by industry standards, are included in this Operator's Manual and intended to promote safe operation of the machine. These guidelines do not, of course, preclude the use of good judgment, care and common sense as may be indicated by the particular jobsite work conditions.

Before Operation Safety Reminders

- ALWAYS wear appropriate personal protective equipment for the job and working conditions. Hard hats, goggles, protective shoes, gloves, reflector-type vests, respirators and ear protection are examples of types of equipment that may be required. DO NOT wear loose fitting clothing, long hair, jewelry or loose personal items while operating or servicing the machine.
- ALWAYS check the job site for terrain hazards, obstructions and people. Remove all objects that do not belong in or on the machine and its equipment.
- Walk around the machine and warn all personnel who may be servicing the machine or who are in the machine path prior to starting. DO NOT start until all personnel are clearly away from the machine.

Operation Safety Reminders

- **IF YOU ARE NOT CAREFUL WHILE OPERATING THIS MACHINE, ANY OF THE FOLLOWING FACTORS COULD CAUSE THE MACHINE TO TIP:** terrain, engine speed, type of load being carried and placed, improper tire inflation, weight of the attachment tool, and abrupt movement of any control lever may affect the stability of the machine, **WHICH COULD RESULT IN SERIOUS BODILY INJURY OR DEATH!**
- DO NOT raise or drop a loaded fork or bucket suddenly. Abrupt movements under load can cause serious instability.
- Study the load charts carefully. They show maximum capacity to be lifted and placed at specific outward and upward distances. ALWAYS be aware of load weights prior to attempting lift and placement with this machine.
- DO NOT exceed the machine's rated operating capacity for the type of attachment tool being used.
- DO NOT allow minors or any unqualified personnel to operate or be near the machine unless properly supervised.
- DO NOT run the engine in an enclosed area without providing proper ventilation for the exhaust. Exhaust gases contain carbon monoxide, an odorless and deadly gas. Internal combustion engines deplete the oxygen supply within enclosed spaces and may create a serious hazard unless the oxygen is replaced. This includes the atmosphere within the cab when equipped.
- To ensure continued safe operation, replace damaged or worn-out parts BEFORE using this equipment.

Modifications, Nameplates, Markings and Capacities

- Modifications and additions that affect capacity or safe operation shall not be performed without the manufacturer's prior written approval. Where such authorization is granted, tags or decals shall be changed accordingly.
- All attachment tools MUST be marked to identify the attachment tool and the total capacity with attachment tool at maximum elevation with load laterally centered.
- ALWAYS be sure all nameplates, warnings and instruction markings are in place and legible. Local government regulations may require specific decals, which then become the responsibility of the local owner to provide.

Radio Remote Boom Control System

WARNING

Always activate the Radio Remote Boom Control System when lifting or carrying personnel, or fitting the machine with a personnel work platform.

The Mandatory Work Platform Safety Rules must be followed to at all times while lifting personnel. These rules are based on ANSI/ITSDF Standard B56.6-2005, "Safety Standard for Rough Terrain Forklift Trucks."

(A copy of this and related standards can be obtained from the Industrial Truck Standards Development Foundation, 1750 K Street NW, Suite 460, Washington DC 20009; or downloaded from: www.itsdf.org.) The rules apply to the owner, operator and personnel in the work platform.

MANDATORY WORK PLATFORM SAFETY RULES

1. The work platform must comply with ANSI/ITSDF Standard B56.6-2011, Sec. 8.24, "Platforms for Elevating Personnel." (See "Work Platform Design Requirements.")
2. The platform must be securely attached to the carriage or forks, and the carriage securely attached to the boom.
3. The carriage and forks must be secured to prevent them from pivoting upward.
4. If the machine is equipped with a rotating or swinging carriage, the rotation or swing must be deactivated. (This occurs automatically when the "Radio Remote Boom Control System" is switched on.)
5. Personnel on the platform must be provided protection from any moving parts on the forklift that may present a hazard.
6. If overhead hazards exist for platform personnel, overhead protection must be provided.
7. Be sure that the lifting mechanism is operating smoothly throughout its entire range, both empty and loaded, and that any lift-limiting devices and latches are functional.
8. Be sure that the frame is level, to ensure a vertical lift.
9. Be sure the platform is horizontal before lifting.
10. Be sure that the forklift has a firm footing.
11. Be sure that any required restraining means (railings, chains, harnesses, etc.) are in place and properly used.
12. Before lifting personnel, shift the transmission into Neutral, apply the parking brake, and activate the "Radio Remote Boom Control System" switch.
13. Before lifting personnel, the area should be marked to warn others of work by elevated personnel.
14. Be sure the path of platform travel is clear of hazards, such as scaffolds, electrical wires and overhead obstructions.
15. The operator must keep hands and feet clear of controls that are not in use.
16. Lift and lower the platform smoothly and cautiously and only after all personnel have been notified.
17. The platform must be lowered fully before moving the forklift. Do not drive the forklift with personnel on the platform.
18. The radio remote boom control operator must always alert elevated personnel before raising or lowering the platform.
19. A trained operator must be in position to operate the forklift and boom controls at all times.
20. The combined weight of the platform, personnel and load must not exceed one-third of the material handling capacity of the forklift.
21. Platform personnel must maintain firm footing on the platform floor. A harness is to be worn and a lanyard attached to the platform or boom when working from an elevated work platform, in accordance with OSHA regulations. Use of railings, planks, ladders, etc. on platform for the purpose of achieving additional reach or height is prohibited.
22. Workers on the platform must keep all parts of their bodies inside the work platform during raising and lowering.
23. Be sure that the personnel and equipment on the platform do not exceed the available space.
24. The platform must be fully lowered for personnel to enter and exit. Personnel must not climb on any part of the forklift in attempting to enter and exit.
25. Any harness, body belt, lanyard, or deceleration device that has sustained permanent deformation or is otherwise damaged must be replaced.
26. Modifications to the platform that are detrimental to its safe use are prohibited.

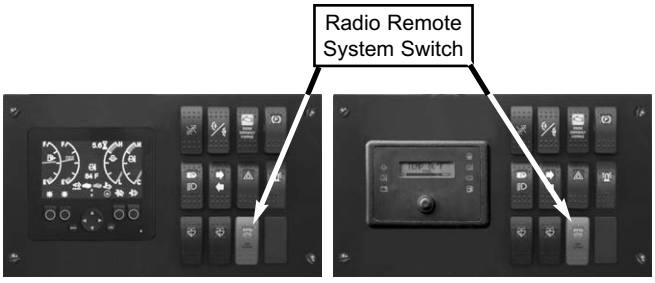
⚠ WARNING

Use ONLY an approved work platform for elevating personnel.

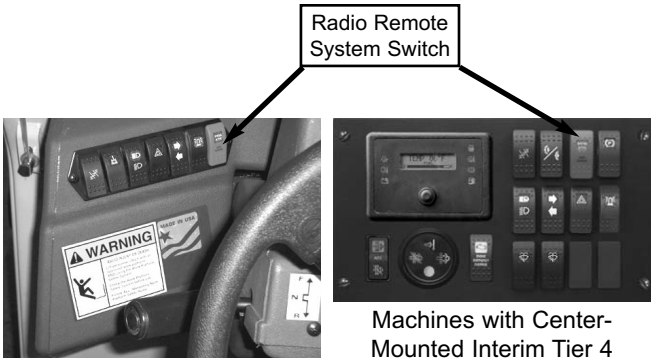
NEVER move the machine with the work platform in a raised position or with personnel on board.

NEVER tilt the platform forward, rearward, or to the side with personnel aboard.

ALWAYS engage the Radio Remote Boom Control System and follow the Mandatory Work Platform Safety Rules when lifting personnel.

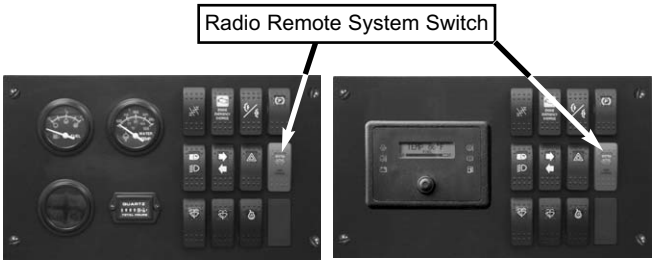


Machines with Center-Mounted Tier 4 Engine



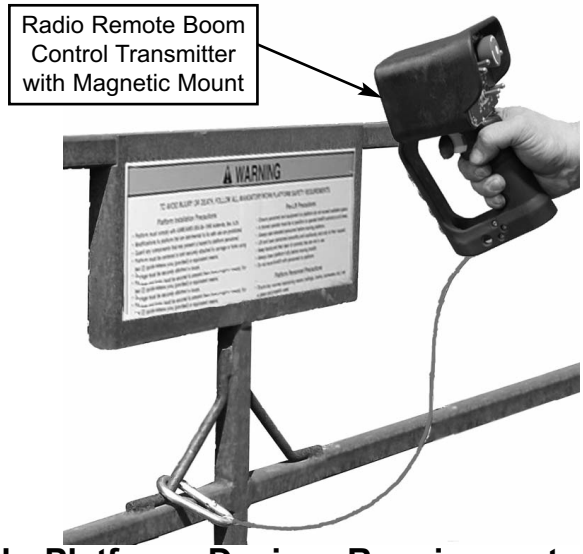
Machines with Side-Mounted Engine

Machines with Center-Mounted Interim Tier 4 Engine and Digital Display Screen



Machines with Center-Mounted Engine and Analog Gauges

Machines with Center-Mounted Tier 3 Engine and Digital Display Screen



Work Platform Design Requirements

(Per ANSI/ITSDF B56.6-2005, Sec. 8.24)

1. A platform floor having a slip-resistant surface located not more than 8 inches (200 mm) above the normal load supporting surface of the forks.
2. Floor dimensions that shall not exceed two times the load center distance of 24 inches (610 mm) listed on the forklift nameplate, measured parallel to the longitudinal center plane of the forklift, nor have a width greater than the overall width of the forklift [measured across the load-bearing tires] plus 10 inches (250 mm) on either side. Minimum space for each person on the platform shall not be less than 18 inches (450 mm) in either direction.
3. A 4 inch (100 mm) minimum height toe plate, which may be omitted at the access opening.
4. An overhead protective device, when requested by the user.
5. Protection for personnel in their normal working position on the platform from moving parts of the forklift that may present a hazard.
6. Information prominently indicated on the platform:
   - **a.** maximum work load including personnel and equipment, and
   - **b.** weight of empty platform.
7. Means so that the platform can only be centered laterally on the forklift, and retained against the vertical face of the forks, carriage, or lifting mechanism.
8. A means to securely attach the platform to the lifting mechanism, and to prevent the platform from inadvertently pivoting.

9. Restraining means such as a guard rail or a means for securing personnel such as a body harness and lanyard. A guard rail or similar structure shall have a nominal height to the platform floor of 42 inches (1066 mm) around its upper periphery and include a midrail. It may be hinged, removable, or of chains, and used to provide an access opening if proper positioning is easily accomplished and a secure condition is discernable. Such restraining means shall be capable of withstanding a concentrated horizontal force of 200 lbs. (890 N) applied at the point of least resistance without permanent deformation. A body harness and lanyard is to have an attachment point provided overhead for freedom of movement, and its length is to limit freefall to 5 feet (1500 mm) measured from the point of attachment to the operator. The complete system shall be capable of withstanding three consecutive drop tests to simulate a 250 lbs. (113 kg) person falling 6 feet (1800 mm) without allowing the test weight to fall free to the ground. A deceleration device may be included.

NOTE: *Fall protection should comply with applicable U.S. OSHA regulations: 1910.67 (c)(2)(v) (for General Industry) or 1926.453 (b)(2)(v) (for Construction).*

10. Lanyards, when provided, shall be arranged so as not to cause a tripping hazard.

11. Body harnesses, when provided, should have a width of at least 1.75 inches (44 mm).

12. Structural safety factor - all load-supporting structural elements of the work platform shall have a structural safety factor of not less than 2 - to - 1 based on the minimum yield strength of the materials used.

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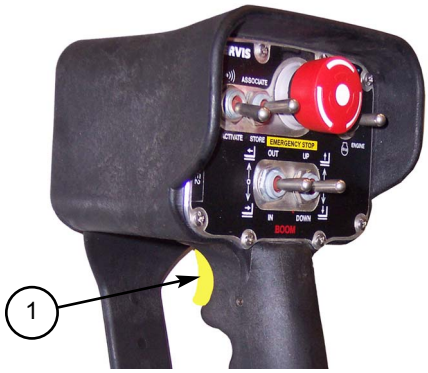
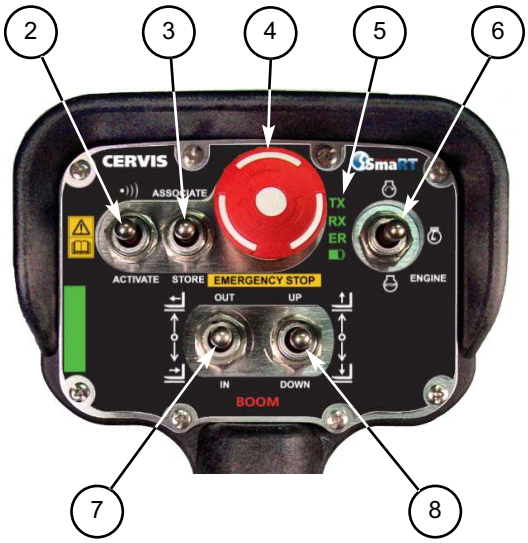
Chapter 3

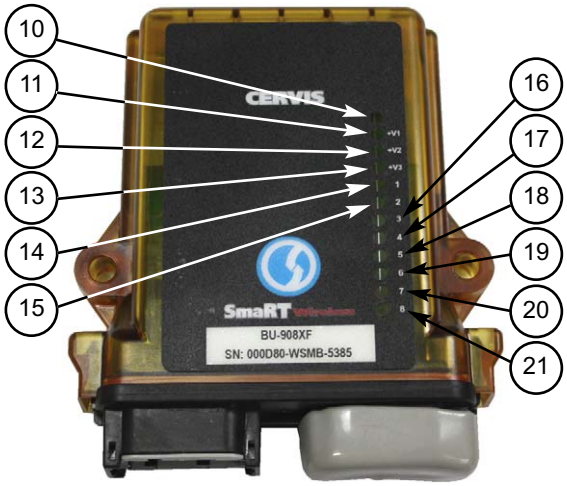
CONTROLS AND INDICATORS

Transmitter

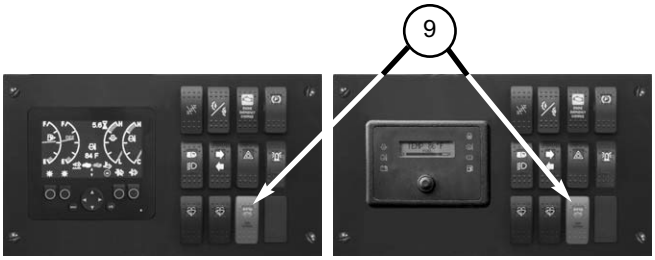




Receiver



REF.	CONTROLS / INDICATORS
01	VARIABLE TRIGGER
02	ACTIVATE SWITCH
03	ASSOCIATE/STORE SWITCH
04	EMERGENCY STOP BUTTON
05	TRANSMITTER LEDs (4)
06	ENGINE START/STOP SWITCH
07	BOOM EXTEND/RETRACT SWITCH
08	BOOM RAISE/LOWER SWITCH
09	RADIO REMOTE SYSTEM SWITCH
10	UNUSED LED
11	+V1 - UNUSED
12	+V2 - UNUSED
13	+V3 - UNUSED
14	HTH - ACTIVE
15	RTX - TRANSMITTING
16	RRX - RECEIVING
17	CTX - UNUSED
18	CRX - UNUSED
19	OUT - ACTIVE
20	IN - UNUSED
21	ERR - TRANSMITTER ERROR



Machines with Center-Mounted Tier 4 Engine

Machines with Side-Mounted Engine

Machines with Center-Mounted Interim Tier 4 Engine and Digital Display Screen

Machines with Center-Mounted Engine and Analog Gauges

Machines with Center-Mounted Tier 3 Engine and Digital Display Screen

Transmitter Controls and Indicators

The Transmitter controls and indicator lights (shown on the previous page) are described as follows:

1 - Proportional Trigger: This trigger is used to control the speed of the selected boom function. The further the trigger is pulled, the faster the function will operate.

2 - Activate Switch: Pressing this switch up in conjunction with the Emergency Stop button will activate the Radio Remote System.

3 - Associate Switch: This switch is used to program the transmitter to the receiver.

4 - Emergency Stop (E-STOP) Button: Pressing in this button turns off the Transmitter.

5 - Transmitter LEDs: These LEDs provide transmitter information as follows:

TX: Green
a. flashing when transmitting
b. solid when transmitter is active

RX: Amber
a. flashing when receiving
b. solid when receiver is active

ER: Red
a. solid indicates conflict at power-up
b. flashing indicates stop button is depressed

BATTERY: Amber
a. flashing indicates low battery

NOTE: *The Transmitter will continue to operate a minimum of 30 minutes after the LED comes on. See transmitter battery replacement procedure on page 19.*

6 - Engine Switch: When the Radio Remote System is activated, press and momentarily hold this switch up to start the engine, and press it down to stop the engine.

7 - Boom Extend/Retract Switch: Press this switch up and simultaneously pull the proportional trigger to extend the boom; press the switch down to retract the boom.

8 - Boom Raise/Lower Switch: Press this switch up and simultaneously pull the proportional trigger to raise the boom; press the switch down to lower the boom.

Radio Remote System Switch

9 - Radio Remote System Switch: This switch is used to activate the Radio Remote System. It is a red switch located in the dash area of the cab. When activated, an amber lamp lights on the switch.

NOTE: *This LED will flash on and off, indicating that the system is not yet fully functional (or not fully de-activated), until the brakes are held on for three or more seconds.*

Receiver Indicators

10 - LED: This LED is unused.

11 - +V1 LED: This LED is unused.

12 - +V2 LED: This LED is unused.

13 - +V3 LED: This LED is unused.

14 - #1 - HTH LED: This LED, when blinking, indicates an internal problem.

15 - #2 - RTX LED: This LED, when blinking, indicates the receiver is transmitting.

16 - #3 - RRX LED: This LED, when solid, indicates the receiver is receiving.

17 - #4 - CTX LED: This LED is unused.

18 - #5 - CRX LED: This LED is unused.

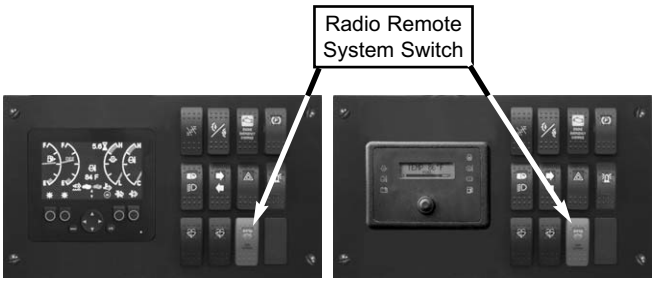
19 - #6 - OUT LED: This LED, when solid, indicates the receiver is active.

20 - #7 - IN LED: This LED is unused.

21 - #8 - ERR LED: This LED, when solid, indicates an error condition with the transmitter.

Chapter 4

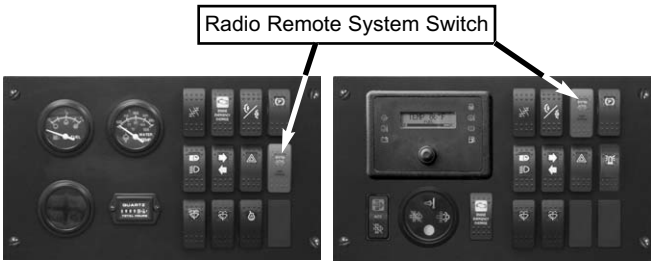
OPERATION



Machines with Center-Mounted Tier 4 Engine

Machines with Side-Mounted Engine

Machines with Center-Mounted Interim Tier 4 Engine and Digital Display Screen



Machines with Center-Mounted Engine and Analog Gauges

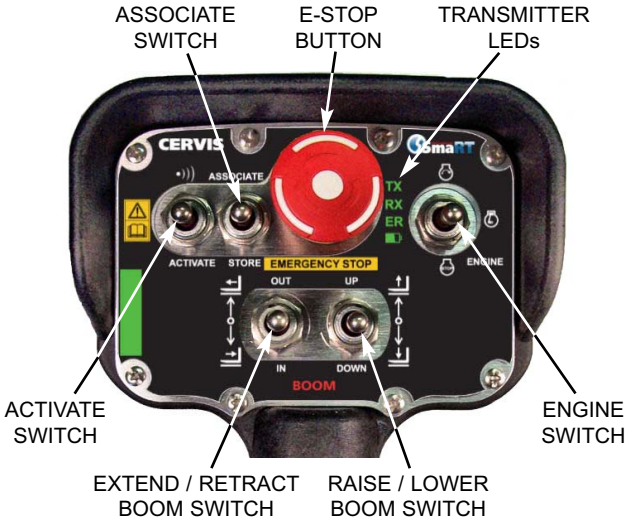
Machines with Center-Mounted Tier 3 Engine and Digital Display Screen

ACTIVATING THE RADIO REMOTE SYSTEM

To activate the Radio Remote System, press the top of the Radio Remote System rocker switch, apply and hold the service brakes on for three or more seconds. The system is activated when the lamp in the Radio Remote System rocker switch is on continuously.

When the Radio Remote System is active:

- transmission is de-clutched into Neutral,
- parking brake is applied,
- (when equipped) rear axle stabilizer cylinder is locked,
- frame leveling speed is reduced, (only on models with rocker switch for frame leveling)
- auxiliary hydraulic and carriage tilt and swing functions are disabled,
- machine inclination sensor is activated, with the result that the Telescopic Handler must be level laterally (side-to-side) to the factory pre-set limits before the boom controls will function, and
- the Transmitter can be activated, to operate the boom functions remotely.



To de-activate the system, apply the service brakes and press the bottom of the Radio Remote System rocker switch. The system is de-activated when the LED in the rocker switch is OFF.

NOTE: *If the LED in the Radio Remote System rocker switch is flashing, apply the service brakes until the LED is off.*

TURNING ON THE TRANSMITTER

The Transmitter must be turned on before the Radio Remote System will function. To turn on the system:

1. Press the E-Stop button down.
2. Twist the E-Stop button clock-wise to release.
3. Toggle the ACTIVATE switch up.

NOTE: *Transmitter will not ACTIVATE unless all other toggle switches are in the neutral position.*

The Transmitter TX LED should now be flashing to indicate the Radio Remote System is active.

Press down the E-STOP button to turn off the Transmitter.

OPERATING THE RADIO REMOTE SYSTEM

Starting and Stopping the Engine

Press and momentarily hold the engine switch up to start the engine. Press the engine switch down to stop the engine.

Boom Operation

To raise the boom, first press the right boom switch "UP." With the switch held in the "UP" position, pull the trigger to increase the speed at which the boom is raised.

To lower the boom, first press the right boom switch "DOWN." With the switch held in the "DOWN" position, pull the trigger to increase the speed at which the boom is lowered.

To extend the boom, first press the left boom switch to "OUT." With the switch held in the "OUT" position, pull the trigger to increase the speed at which the boom is extended.

To retract the boom, first press the left boom switch to "IN." With the switch held in the "IN" position, pull the trigger to increase the speed at which the boom is retracted.

NOTE: *Only one boom function should be operated at a time.*

CHECK RADIO REMOTE SYSTEM (if to be used)

The following must be performed before beginning the Radio Remote System checking procedures:

1. Machine on level surface,
2. Boom fully lowered,
3. Frame level,
4. Transmission in "NEUTRAL,"
5. Parking brake switch "OFF,"
6. Radio Remote System switch "OFF," and
7. Press the E-STOP button.

Procedure to test the Radio Remote System mode enable logic:

1. Start the engine and turn the Radio Remote System switch "ON."
   - Radio Remote System mode lamp in the switch should be flashing.
2. Apply the service brakes.
   - After three seconds, the Radio Remote System mode lamp should be on continuously, indicating that the system has been activated.
   - Parking brake should engage, as indicated by the lamp on the parking brake switch lighting.
   - The carriage tilt and auxiliary functions should now be disabled. The hydraulic joystick for boom raise/lower and extend/retract should be disabled.

Procedure to test the transmission and joystick control lockout:

3. Shift transmission into "FORWARD" and increase the engine speed slightly.
   - The transmission should remain de-clutched and allow the engine to gain speed easily.
   - Return the transmission selector to "NEUTRAL" to complete the check.
4. Activate the Transmitter.
   - The hydraulic joystick should now be disabled such that boom raise/lower and extend/retract no longer function.
   - Press the E-STOP button on the Transmitter after completion of the check.
5. Tilt the frame to the right slightly more than two degrees.
   - The hydraulic joystick should now be disabled such that boom raise/lower and extend/retract no longer function.
   - Repeat the procedure with the frame tilted to the left.
   - Return the frame to a level position after completion of the check.

Procedure to test the Radio Remote System mode disable logic:

6. Turn the ignition key switch to "OFF" and wait for the engine to stop completely. Then turn the key switch to "ON."
   - The Radio Remote System mode lamp and the parking brake lamp should be illuminated.
7. Turn the key switch "OFF" and then turn the Radio Remote System rocker switch "OFF." Turn the key switch back "ON."
   - The Radio Remote System mode lamp should be flashing and the park brake lamp should be on continuously.
8. Start the engine and apply the service brakes.
   - The Radio Remote System mode lamp and the parking brake lamp should go off after approximately two seconds of service brake application.

⚠ WARNING

If the Radio Remote System fails to operate properly during any of the Radio Remote System checks, DO NOT USE the machine until the cause has been corrected. Contact your dealer for service information and parts.

Chapter 5

SERVICE

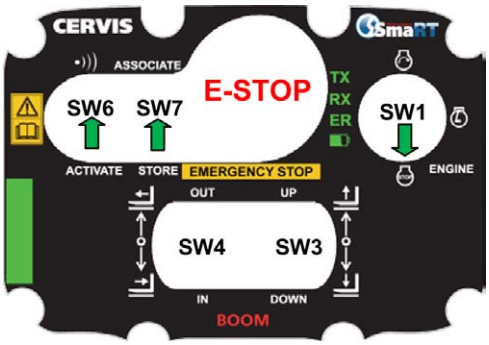
TRANSMITTER CONSIDERATIONS

Following are considerations for the transmitter:

1. Transmitter will timeout after 60 minutes of inactivity.
2. Configuration with receiver is 1:1.
3. Transmitter trigger is used for proportional output control.
4. Toggle the Activate switch to turn on the transmitter.
   - The transmitter outputs are only active when the Activate switch has been toggled ON.
   - Transmitter will not ACTIVATE unless all other toggle switches are in the neutral position.
   - The activate condition is OFF when the E-STOP button is pressed in.

ASSOCIATE TRANSMITTER TO THE RECEIVER

Follow these steps to associate the Transmitter to the Receiver. This will allow the Receiver to establish a radio link with the Transmitter.



Transmitter Switch Positions

NOTE: *It is necessary to associate the Transmitter and Receiver anytime one of them has been replaced.*

NOTE: *Do not operate the transmitter trigger while associating.*

1. Turn the ignition switch ON then press the top of the Radio Remote rocker switch. Apply the service brake until the light in the rocker switch is ON continously. Then turn the ignition switch to the OFF position.
2. Transmitter should be near the Receiver (in line of sight).
3. Twist the E-STOP button clock-wise to release it to the out position.
4. Hold SW1 in the Engine Stop (Down) position.
5. Hold SW7 in the Associate (Up) position.
6. Hold SW6 in the Activate (Up) position.

All four LEDs will flash for one second. After one second, the TX LED will be ON (because the switch is operated); the Battery LED will pulse indicating clear channel scans are in process; and the ERR LED will be lit solid. Once the clear channel scans are complete, the Battery LED will light solid. At this point, the TX, Battery, and ERR LEDs are lit solid.

6. Continue to hold SW1, SW6 and SW7; Power Up the Receiver by turning the ignition switch to the ON position, the light in the Radio Remote should be ON continously.

Transmitter and Receiver association is complete when the ERR and the Battery LEDs go out while still holding the SW1, SW6 and SW7 toggle switches. The RX LED begins to blink when the switches are released.

PROPORTIONAL OUTPUT DEFAULT SETTINGS

The Radio System can be programmed to two different proportional output minimum and maximum signal default settings. Setting ONE is specific to machines using the Parker/Gresen main valve, and setting TWO is specific to machines using the Hydrocontrol main valve. Refer to the tables on the next page for the type of main valve used in different machine models.

Selecting a Default Setting

A default setting is selected by reversing wires in the receiver harness as shown in the following default setting instructions.

Select Default Setting One

For machines equipped with the Parker/Gresen main control valve.

1. Turn the ignition switch ON, then switch the Radio Remote rocker switch OFF. Verify the light in the

rocker switch is OFF. Then return the Ignition switch to the OFF position.

2. Connect the white wire with black stripe to the black wire. Connect the black wire with white stripe to the white wire as shown.

3. Start the machine and activate the Radio Remote system, turn ON the transmitter and verify communication link between the receiver and the transmitter by moving the boom with the transmitter.

MACHINES WITH PARKER/GRESEN VALVE
GEHL MODELS
RS6-34 - All serial numbers
DL-6H - Thru serial number 20924
DL-6L - Thru serial number 25647
DL-8H - Thru serial number 31006
DL-8L - Thru serial number 35545
DL-10H - Thru serial number 40905
DL-10L - Thru serial number 45393
DL12H - Thru serial number 50489
MUSTANG MODELS
634 - All serial numbers
742H - Thru serial number 20129
742L - Thru serial number 25066
944H - Thru serial number 30075
944L - Thru serial number 35020
1155H - Thru serial number 40065
1155L - Thru serial number 45020
MANITOU MODELS
MT6034 - All serial numbers

Select Default Setting Two

For machines equipped with the Hydrocontrol main control valve.

1. Turn the ignition switch ON, then switch the Radio Remote rocker switch OFF. Verify the light in the rocker switch is OFF. Then return the Ignition switch to the OFF position.

2. Connect the white wire with black stripe to the white wire. Connect the black wire with white stripe to the black wire as shown below.

3. Start the machine and activate the Radio Remote system, turn ON the transmitter and verify communication link between the receiver and the transmitter by moving the boom with the transmitter.

MACHINES WITH HYDROCONTROL VALVE
GEHL MODELS
DL-6H - Serial number 20925 thru 20926
DL-6L - None
DL-8H - Serial number 31007 thru 31009
DL-8L - Serial number 35546
DL-10H - Serial number 40906 thru 40968
DL-10L - Serial number 45394 thru 45418
DL-11H - All serial numbers
DL-11L - All serial numbers
DL12H - Serial number 50490 and up
DL7-44, DL9-44 - All serial numbers
RS6-42, RS8-42, RS8-44, RS10-44, RS10-55 and RS12-42 - ALL serial numbers
MUSTANG MODELS
742H - Serial number 20130 thru 20131
742L - None
744 - All serial numbers
944H - Serial number 30076 and up
944L - Serial number 35021
1155H - Serial number 40066 and up
1155L - None
MANITOU MODELS
MT6642, MTA6642 - All serial numbers
MT8044, MTA8044 - All serial numbers
MT10044, MTA10044 - All serial numbers
MT10055, MTA10055 - All serial numbers
MT12042, MTA12042 - All serial numbers

Receiver I/O Configuration

Channel No.	Output Type	Output Style	Custom Code Notes
M1 Engine Start	Level	Momentary	Engine Start
M2 Engine Stop	Level	Momentary	Engine Stop
M3 Proportional Valve Engage	Level	Momentary	Trigger
M4 Boom OUT	PWM	Momentary	Boom Out
M5 Boom IN	PWM	Momentary	Boom In
M6 Boom UP	PWM	Momentary	Boom Up
M7 Boom Down	PWM	Momentary	Boom Down
M8 Link Enable	Level	Latched ON	Link
		Latched OFF	Loss Of Link
AV1	Open Level Drain	Momentary	12VDC input to set to Default TWO
AV2	Open Level Drain	Momentary	12VDC input to set to Default ONE

Receiver Pin Connections

Pin No.	Function
1	+VDC
2	AV1 Default Setting TWO
3	M1: Engine Start
4	M2: Engine Stop
5	M3: Trigger Proportional Valve Engage
6	M4: Boom Out
7	M5: Boom In
8	M6: Boom Up
9	M7: Boom Down
10	M8: Link Enable
11	AV2 Default Setting One
12	-VDC

Receiver LED Diagnostic Troubleshooting

Indication	Solution
+V1, +V2, +V3 Power LED not active	√ Is +VDC input power present? √ Check input power polarity.
TX/RX not active	√ Check for obstructions preventing line-of-sight transmission. √ Check that the transmitter is active. • Re-associate the transmitter to the receiver.
Health LED blinking rapidly	• Indicates an internal problem.
Out LED not active	√ Check that the transmitter LEDs are active when the appropriate buttons are pushed.
ERR LED active	√ Check the outputs for loose wiring, etc. • Over-temperature channel indication. • Over-current channel indication. • Active channel current consumption less than 1A typical. (This is not a problem in cases where less ten 1A draw is a normal condition.)

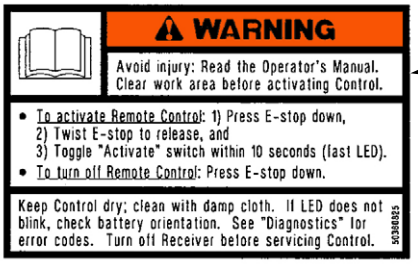
Transmitter Battery Replacement

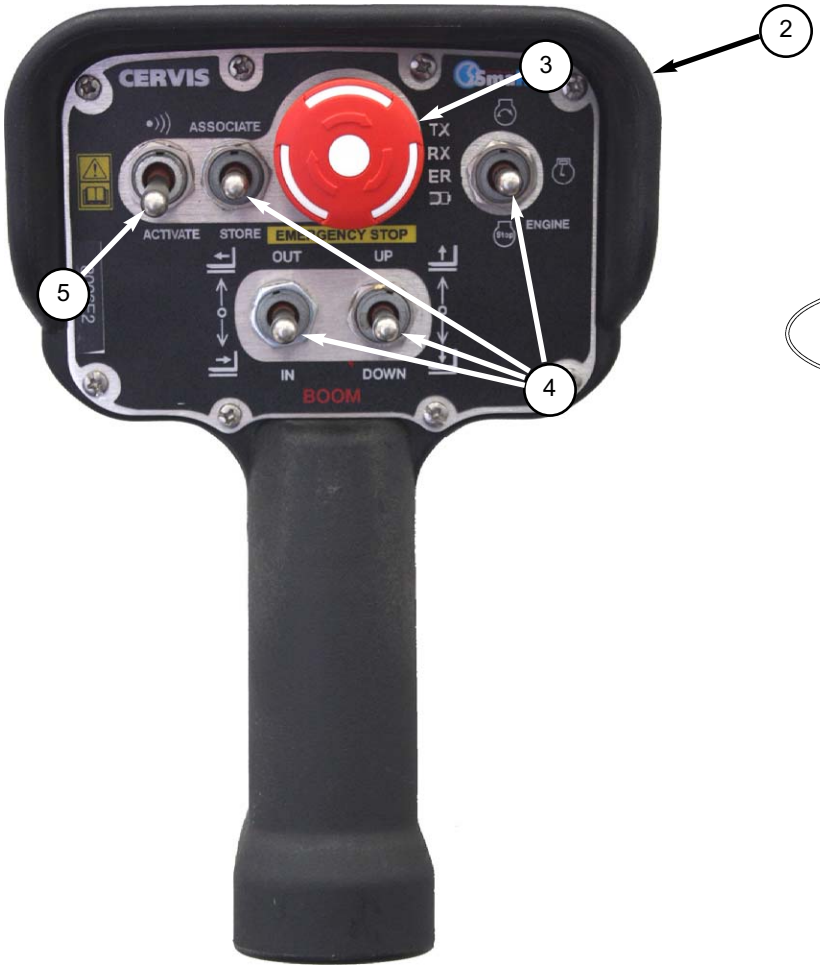
1. Remove the battery cover on the back of the transmitter by removing the four screws.
2. Insert four “AA” alkaline batteries. Battery orientation is shown inside the battery compartment.
3. Replace the cover and install the screws to secure the cover in place.

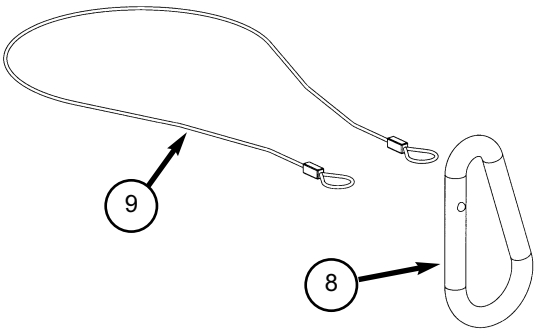
NOTE: *For operation at temperatures below 14° F (-10° C), lithium batteries are recommended. Low temperatures reduce battery performance for both alkaline and lithium types. Refer to the battery manufacturer’s specifications for detailed information on low temperature performance.*

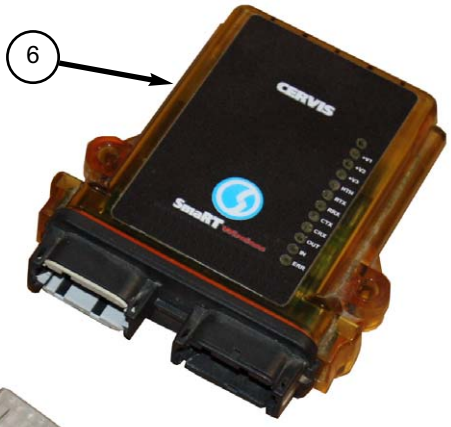
Chapter 6

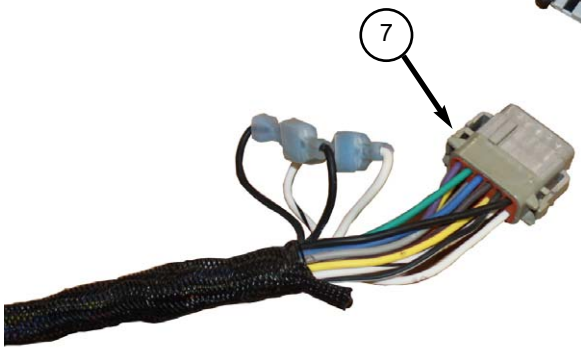
SERVICE PARTS











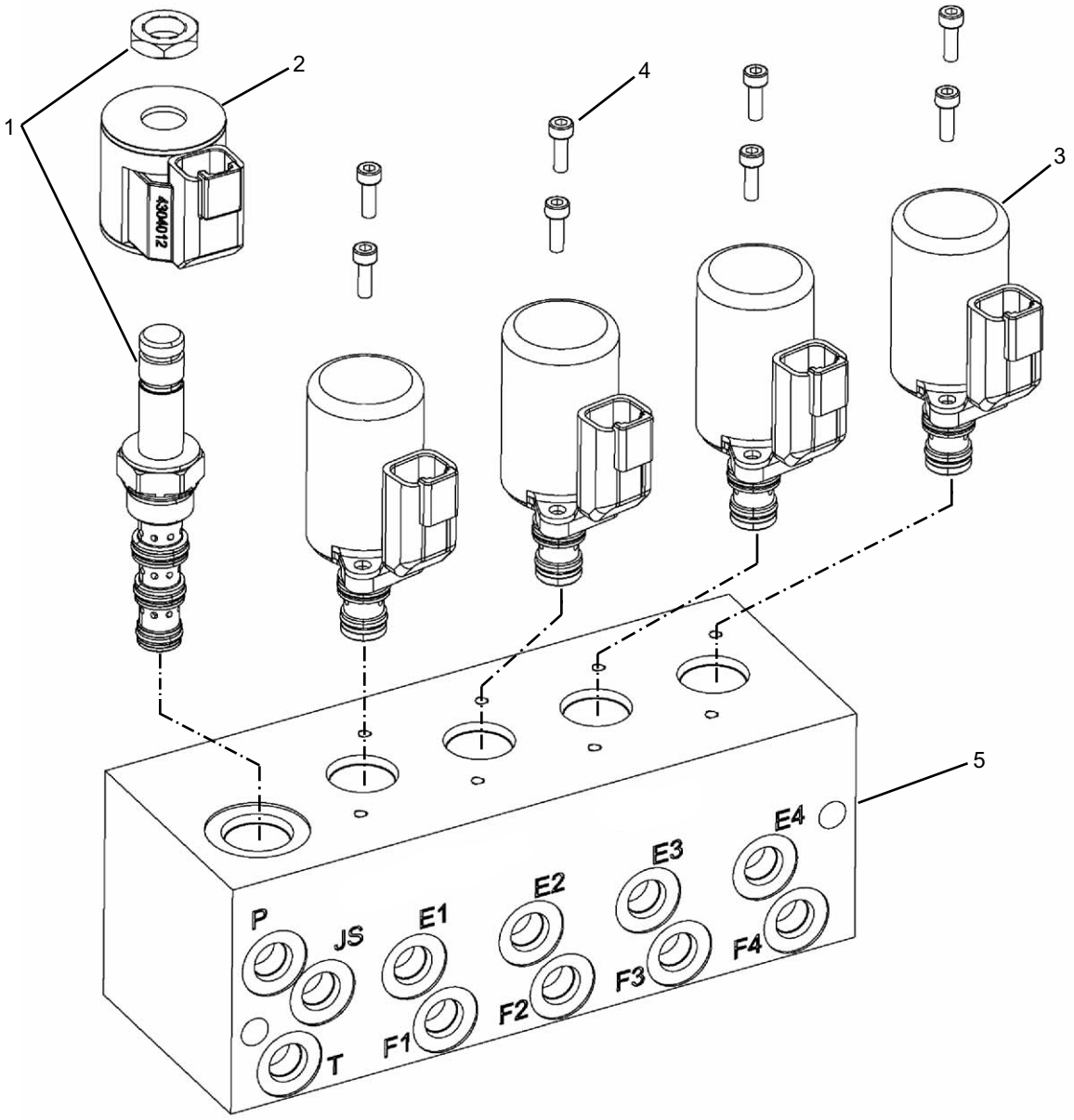
Transmitter and Receiver

Ref. No.	Part No.	Description	Qty.
00	50380274	COMPLETE, RADIO REMOTE *(Includes items 2 - 6)*	1
01	50380825	DECAL, REMOTE TRANSMITTER.	1
02	50220629	REMOTE TRANSMITTER.	1
03	50220626	BUTTON, RADIO E-STOP	1
04	50220627	SWITCH, TOGGLE 3-POSITION	4
05	50220628	SWITCH, TOGGLE 2-POSITION	1
06	50220630	RECEIVER	1
07	Note a	HARNESS	1
08	103476	SNAP RING, LANYARD	1
09	103475	LANYARD *(wire cable)*	1

a 50380175 used on the following models:
Gehl Models:
All RS Series
Mustang Models:
634, 642, 844 and 1055
Manitou Models:
MT6034, MTA6034, MT6642, MTA6642, MT8044, MTA8044, MT10044,MTA10044, MT10055, MTA10055, MT12042 and MTA12042

50380836 used on the following models:
Gehl Models:
All DL Series
Mustang Models:
742, 744, 944 and 1155

Manifold and Valves



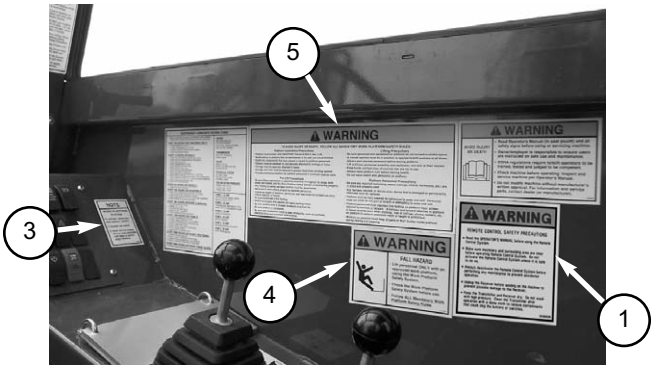
Manifold and Valves

Ref. No.	Part No.	Description	Qty.
00	50380273	COMPLETE VALVE	1
		(includes all items shown and listed)	
01	50220634	2/4 WAY SOLENOID VALVE	1
	50220635	SEAL KIT FOR VALVE	1
02[a]	104736	COIL, WEATHERPAK 12VDC	1
03	50220631	ELECTRO-PROPORTIONAL VLV.	4
	50220632	SEAL KIT FOR VALVE	AR
04	50220633	SHCS, M4 x 0.7 x 12mm	8
05	NSS	MANIFOLD	1

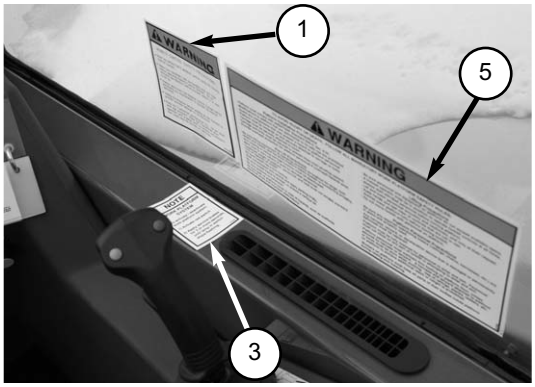
Radio Remote Boom Control System Decals

Ref. No.	Part No.	Description	Qty.
01	50380838	REMOTE SYSTEM WARNING	1
02	50380825	REMOTE TRANSMITTER	1
03	102969	PWP SWITCH INSTRUCTIONS	1
04	L71554	WORK PLATFORM	2
05	L71555	CAB WORK PLATFORM RULES	1
06	L71700	BOOM WORK PLATFORM RULES	1
07	103453	RADIO CONTROLLED	1

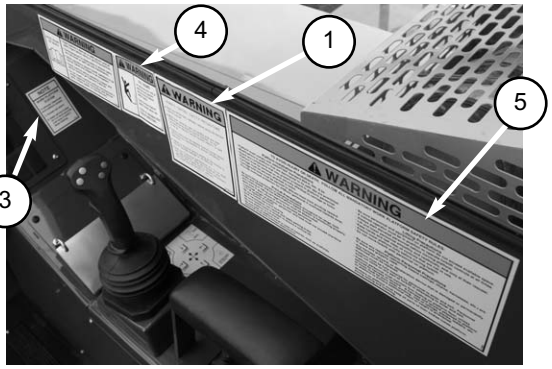
a See illustrations on this page for the decal locations.



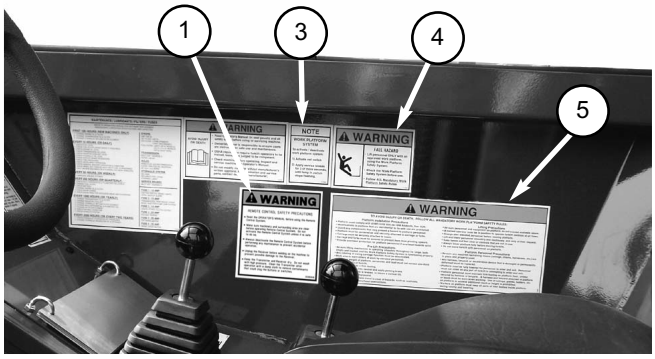
Machines with Center-Mounted Tier 4 Engine and 42', 44' or 55' Lift Height



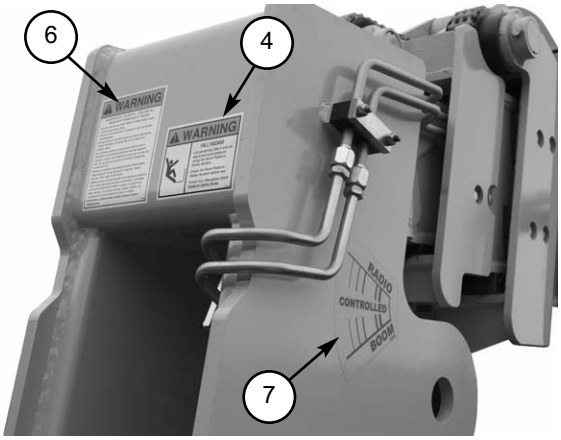
Machines with Side-Mounted Engine



Machines with Center-Mounted Engine and 42', 44' or 55' Lift Height



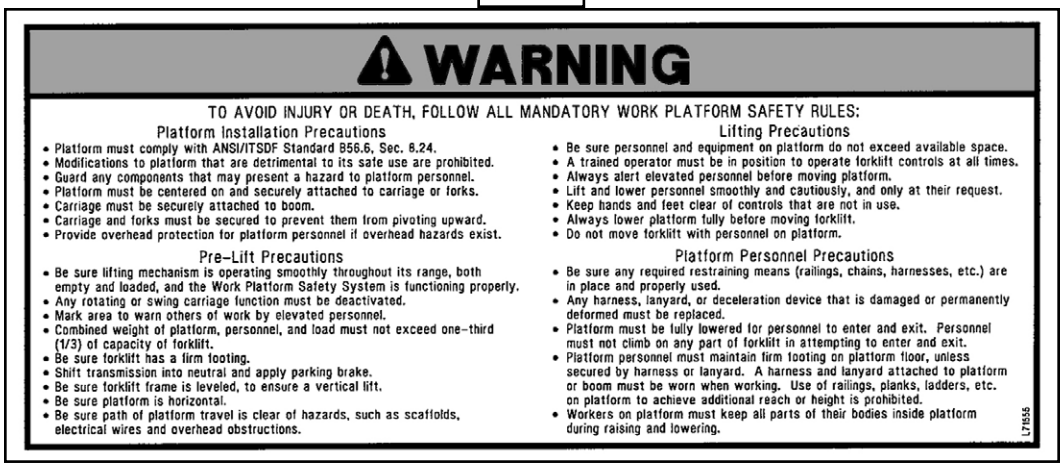
Machines with Center-Mounted Engine and 34' Lift Height



55' Boom Shown

Radio Remote Boom Control System Decals

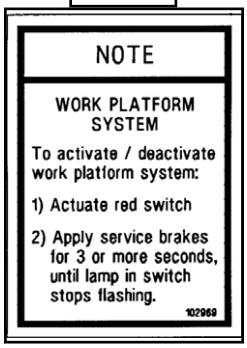
L71555



L71700

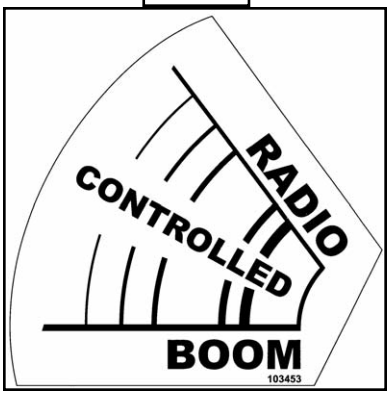
50380838

102969

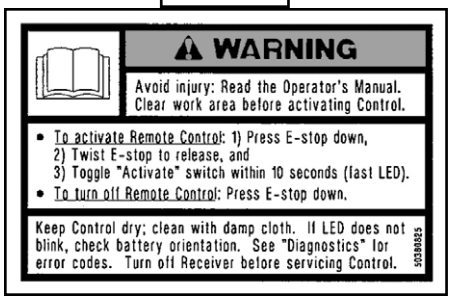


L71554

103453



50380825



⚠ WARNING ⚠

THIS MANUAL IS PROVIDED FOR OPERATOR USE

DO NOT REMOVE FROM THE MACHINE

Do not start, operate or work on this machine until you have carefully read and thoroughly understand the contents of this manual.

Failure to follow safety, operating and maintenance instructions could result in serious injury to the operator or bystanders, poor operation, and costly breakdowns.

If you have any questions on proper operation, adjustment or maintenance of this machine, contact your dealer before starting or continuing operation.

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