TORC ROBOTICS

RemoteTask™
Remote Control System

Operation and Maintenance Manual

Version 2.0

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Operation and Maintenance Manual

V2.0

Assignment of Liability

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Foreword

This manual provides safety information, operator instructions, and maintenance instructions for the RemoteTask remote control system that can be installed in most CAT D-Series Skid Steer Loader (SSL), Multi Terrain Loader (MTL), and Compact Track Loader (CTL). This manual is to be used in addition to the documentation and the Operation and Maintenance Manual that is provided with the machine.

This manual should be stored in the operator's compartment in the literature holder or seat back literature storage area. Keep this manual with the machine that is installed with the RemoteTask system.

Some photographs or illustrations in this publication show details or attachments that can be different from your machine. Guards and covers might have been removed for illustrative purposes.

Table of Contents

Important Safety Information

Failure to observe the outlined safety measures regarding operation, maintenance, and repair is the most common cause of accidents that involve product operation. It is important to heed all safety precautions and warnings provided in this manual and on the product.

Do not operate the machine unless you have read and understand the instructions and warnings in the Operation and Maintenance manual. The list of procedures and hazards identified by WARNING and NOTICE labels is not all inclusive. TORC cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive.

This manual is not a stand-alone machine operations manual. Prior to the operation of the machine, read the applicable Caterpillar Operation and Maintenance Manual. The information that is contained in this manual is an addition to the owner's documentation and the Operation and Maintenance Manual that is provided with the machine. The information that is contained in this manual should not be used as a replacement for any of the original documentation.

The following symbols are used throughout the manual to indicate a particularly hazardous condition:

The warning label is used when a hazardous condition could result in serious injury or loss of life.

A caution label identifies a hazard or procedure that could result in damage to the product or loss related to equipment malfunction.

A notice label indicates information that may not be applicable regarding system safety, but needs to be known for best system performance.

1 - General Information

Product Overview

The TORC® RemoteTask wireless remote control system provides the ability to operate a CAT D-Series SSL, MTL, or CTL from a remote location up to 1000 feet away (line-of-sight). The RemoteTask can be installed in all CAT D-Series SSL, MTL, and CTL machines. Installation takes approximately one hour, and the RemoteTask system is completely transferrable between compatible machines. The remote enabled machines can quickly transition from manual to remote control mode via an external key switch.

The RemoteTask controller interface is designed to replicate in-cab machine controls and indicators to make remote operation intuitive for existing operators. The controller can operate for over 24 hours on a single battery charge. A versatile, padded shoulder strap supports the controller for operator comfort, even during extended operation of the machine. The RemoteTask controller can operate all CAT approved machine work tools, with the exception of backhoe attachments.

An emergency stop button is integrated onto the remote control unit as well as on the Remote Enable Interface that will bring the system to an immediate stop in case of an emergency. If communication is lost between the RemoteTask controller and the machine, the machine will automatically come to a stop to minimize the possibility of unintended operation.

Other safety features include audible tone and vibration alerts to ensure that the operator is alerted to important warnings, even in noisy environments. Machine warning lights, alarms, and fault codes are clearly labeled on the RemoteTask controller, allowing the operator to have access to machine status and information remotely.

Intended Use

The RemoteTask system is intended to be used to remotely control a CAT D-series Skid Steer Loader, Multi Terrain Loader, or Compact Track loader within 1000 feet, line-of-sight. The system is designed to operate with an unobstructed view of the machine from the operator's position.

⚠ WARNING

Do Not Modify or Disassemble RemoteTask components or wiring. Modifications could result in a shock hazard, product damage, or unexpected operation. Opening, modifying, or repairing the RemoteTask will void any applicable warranty and could prevent the device from operating properly. Contact a CAT dealer if repairs or modifications are required.

Remote Control Safety

In addition to the safety messages for the machine provided in the CAT Operation and Maintenance manual, the Remote Enabled Machine warning label is used to alert personnel that the machine has remote control capabilities. This warning label should be present and legible on the machine when the RemoteTask system is installed. The warning label is located on the Remote Enable Interface on the rear of the machine. A magnetic version is also provided with the system that should be placed on the front of the implement arm, so it is visible to the operator prior to entering the machine cab. If the warning is not readable, it should be cleaned or replaced. Additional warning magnets can be purchased if desired.

Figure 1. Remote Enabled Machine

⚠ WARNING

All personnel must keep a safe distance from remote machine operation area. The machine can be operated without a person in the cab. Personnel who are within the operation area of a remote control machine may not be visible to the remote operator, which may result in personal injury or death. Always check with the operator before approaching the machine.

Additional Safety Messages

Remote control operation requires additional safety precautions to prevent potential hazards such as injury, loss of life, or damage to the machine or other property. Be sure to also review the safety messages in the CAT Operation and Maintenance Manual.

TORC cannot anticipate every possible circumstance that might involve a potential hazard; therefore, the warnings in this publication and on the product are not all inclusive. The operator must be alert to potential hazards and ensure that any operating technique used is safe.

⚠ WARNING

All Caterpillar safety and service procedures and precautions should be followed during product installation or servicing. In the event of a conflict of direction, Caterpillar procedures override any procedures found in this manual.

⚠ WARNING

Do not operate the machine unless you have read and understand the instructions and warnings in the Operation and Maintenance manual. Most accidents that involve product operation are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. The operator should have the necessary training, skills, and tools in order to perform operation and safety functions properly.

⚠ WARNING

Do Not Modify or Disassemble RemoteTask components or wiring. Modifications could result in a shock hazard, product damage, or unexpected operation. Opening, modifying, or repairing the RemoteTask will void any applicable warranty and could prevent the device from operating properly. Contact a CAT dealer if repairs or modifications are required.

⚠ WARNING

The operator is responsible for safely operating the remote machine. Ensure the remote operation area is clearly marked and personnel do not enter the area during remote operation. Verify site personnel are aware the system will be operating remotely. Maintain line-of-sight with the machine at all times during remote operation.

⚠ WARNING

All personnel must keep a safe distance from remote machine operation area. The machine can be operated without a person in the cab. Personnel who are within the operation area of a remote control machine may not be visible to the remote operator, which may result in personal injury or death. Always check with the operator before approaching the machine.

⚠ WARNING

Do not approach the machine if the Active Indicator (amber beacon) is flashing. Verify with the operator that it is safe to approach the machine.

⚠ WARNING

Do not enter the cab if the machine is remotely enabled. Verify the Remote Enable Interface is in the OFF position and key is removed.

⚠ WARNING

Make sure the machine is configured for Caterpillar Joystick Control Pattern 1 before enabling remote operation.

⚠ CAUTION

Do Not Operate With Suspected Failures. If you suspect there is damage to the RemoteTask, contact a CAT dealer to have it inspected before further use.

⚠ CAUTION

Only use work tools approved for the machine. Refer to the machine Operation and Maintenance Manual for a list of approved work tools. Remote work tool controls need to be used in conjunction with an applicable Work Tool Operation and Maintenance Manual to fully understand the functions of each control.

⚠ CAUTION

Do not remotely operate the machine if the Remote Enable Interface 'Service' light is illuminated red. Resolve using the **Troubleshooting** section. If the 'Service' light continues to be illuminated, contact a CAT dealer.

⚠ CAUTION

Only use work tools approved for the machine. Refer to the machine Operation and Maintenance Manual for a list of approved work tools.

⚠ CAUTION

Stopping the engine before allowing it to cool can result in overheating and accelerated wear of the engine components. Always run the engine at low idle for five minutes to cool down the engine. Excessive temperatures in the turbocharger housing (if equipped) could cause oil cooking problems.

⚠ CAUTION

Do not clean the RemoteTask components under high pressure, with solvents (such as benzene, thinner, ammonia), or with abrasive cleaners. If water or other liquids get inside the RemoteTask™ Controller's battery compartment, immediately remove the batteries and allow the unit to air dry.

⚠ CAUTION

Only use the provided batteries and charger with the RemoteTask™ Controller. The use of third party batteries or chargers could damage the hardware and void the product warranty.

⚠ CAUTION

Ensure that the shoulder harness is securely fastened and the RemoteTask™ Controller is stable before remote operation.

⚠ NOTICE

The RemoteTask controller has a built-in inclinometer which will automatically stop the machine when the console is tilted past 45 degrees in any direction.

⚠ NOTICE

Access to the cab door may be obstructed if the implement and work tool are not completely lowered prior to powering down the RemoteTask controller.

⚠ NOTICE

Different obstructive materials may affect the maximum range (increase or decrease) at which the system will operate. Some materials will absorb radio signals while others will reflect radio signals.

⚠ NOTICE

Whether operating the machine from the rear, facing forward or the front, backing out, the functionality of the remote controls does not change. If operating from the front of the machine, the operator's perspective of the machine controls will be opposite.

⚠ NOTICE

Remote work tool controls need to be used in conjunction with an applicable Work Tool Operation and Maintenance Manual to fully understand the functions of each control.

⚠ NOTICE

Do not operate the machine remotely with the in-cab AUX 8 control enabled because remote control of this feature will not be possible. If the AUX 8 control is enabled in the cab, the red 'Service' light will illuminate when the Remote Enable Interface key switch is in the ON position.

⚠ NOTICE

Pairing mode will timeout after two minutes. In pairing mode, the green "Ready" light on the Remote Enable Interface will blink rapidly. Once a timeout has occurred the light will glow solid, and the RemoteTask system will need to be powered down to restart the pairing procedure.

⚠ NOTICE

Return used batteries to an appropriate recycling facility. Check local laws and regulations regarding appropriate battery recycling.

⚠ NOTICE

Obtain the most current version of product documentation. Updated documentation will reflect any changes made to the system specifications or operation. Contact a CAT dealer for information on the most current documentation available.

Effects on System Operation

RF Interference

This device complies with CFR 47 Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Environmental

The RemoteTask system must be operated with a clear, unobstructed line-of-sight between the remote operator and the machine. Physical and landscape obstructions between the operator console and the machine receiver will cause signal interference. Upon a loss of signal with the RemoteTask controller, the machine will come to an automatic stop.

⚠ NOTICE

Different obstructive materials may affect the maximum range (increase or decrease) at which the system will operate. Some materials will absorb radio signals while others will reflect radio signals.

Installation

Any on-board hardware mounted in proximity to the 2.4 GHz antenna on the roof of the machine may obstruct line-of-sight transmission between the Machine Interface Module and the RemoteTask controller.

2 - Components Overview

This section provides a description of the components included in the RemoteTask system.

⚠ WARNING

Do Not Modify or Disassemble RemoteTask components or wiring. Modifications could result in a shock hazard, product damage, or unexpected operation. Opening, modifying, or repairing the RemoteTask will void any applicable warranty and could prevent the device from operating properly. Contact a CAT dealer if repairs or modifications are required.

RemoteTask Controller

Table 1. Main components of the RemoteTask Controller

	Part Number	Description
	RT01-RC	The RemoteTask controller is used by the operator to remotely control the CAT machine. It is paired with the Machine Interface Module located on the machine and can only control one machine at a time.
	RT01-RC-BAT	The controller is powered by four Li-Ion 18650 Cell 2600mA batteries.
	RT01-RC-BC	The battery charger comes with a Nitecore i4 Intellicharger and both AC and 12V DC power cords.

RemoteTask Machine Interface

Table 2. Main components of the RemoteTask Machine Interface Assembly

	Part Number	Description
	RT01-MI-MIM	The Machine Interface Module receives commands from the RemoteTask controller and translates them to the base machine. It is mounted under the machine cab.
	RT01-MI-REI	The Remote Enable Interface (REI) contains the key switch used to enter/exit remote control, the onboard Emergency Stop button, and status indicators. It is affixed to the rear exterior of the machine.
	RT01-MI-GRN	The external Communication Link Indicator (green beacon) indicates when the Machine Interface Module is communicating with the RemoteTask controller.
	RT01-MI-AMB	The external Active Indicator (amber beacon) indicates that the machine is in a state where motion is possible (parking brake is not applied or the hydraulic lockout is disengaged).
	RT01-MI-UCH	2.4 GHz, magnetically-mounted, flexible antenna.

3 - Operator Feedback

This section provides a detailed description of the status and warning feedback that is provided to the operator. The indicators of the RemoteTask controller are designed to mimic the feedback inside the cab as closely as possible. There are three forms of feedback on the RemoteTask controller: LED indicators, Audible Alarm, and Vibration.

LED indicators provide visual indication of control alerts, warning alerts, and system status information during operation. Icons are identical to in-cab icons whenever possible. The following lighting convention is used for indicator LEDs:

Green	Alerts operator about system status and operation mode.
Red	Indicates items that prevent movement, critical errors, and unsafe conditions.
Amber	Alerts operator to issues that may result in limited operation or become critical if not addressed. Has a lower criticality than red errors.

Alarm feedback will sound an audible alarm to notify the operator of a warning or alert during machine operation. Utilization of the audible alarm is detailed in Table 3 and Table 5 in the following Warning Feedback section. There are three distinct alarm patterns:

Alarm on First	A short tone emitted on the rising edge of a warning/alert being triggered.
Intermittent Alarm	Short, repeating alarm tones continually emitted when a warning is triggered. Operator should take action to determine the cause of the warning to avoid component damage. The intermittent alarm will continue to sound until the issue that prompted the warning has been resolved.
Continuous Alarm	A steady, continuous tone indicating a serious warning. Operator action must be taken immediately to avoid personal injury or severe component damage. The continuous alarm will sound until the issue that prompted the warning has been resolved.

Vibration feedback is designed to ensure that the operator is alerted of system warnings in noisy environments or in moments when the operator is not looking at the remote control. Consult Table 3 and Table 5 in the following Warning Feedback section for information on warnings or alerts that will trigger vibration feedback. There are two distinct vibration patterns:

Vibrate on First	A short pulse emitted on the rising edge of a warning/alert being triggered.
Intermittent Vibration	Short, repeating vibration pulses. The intermittent vibration feedback will continue until the issue that prompted the warning has been resolved.

Warning Feedback

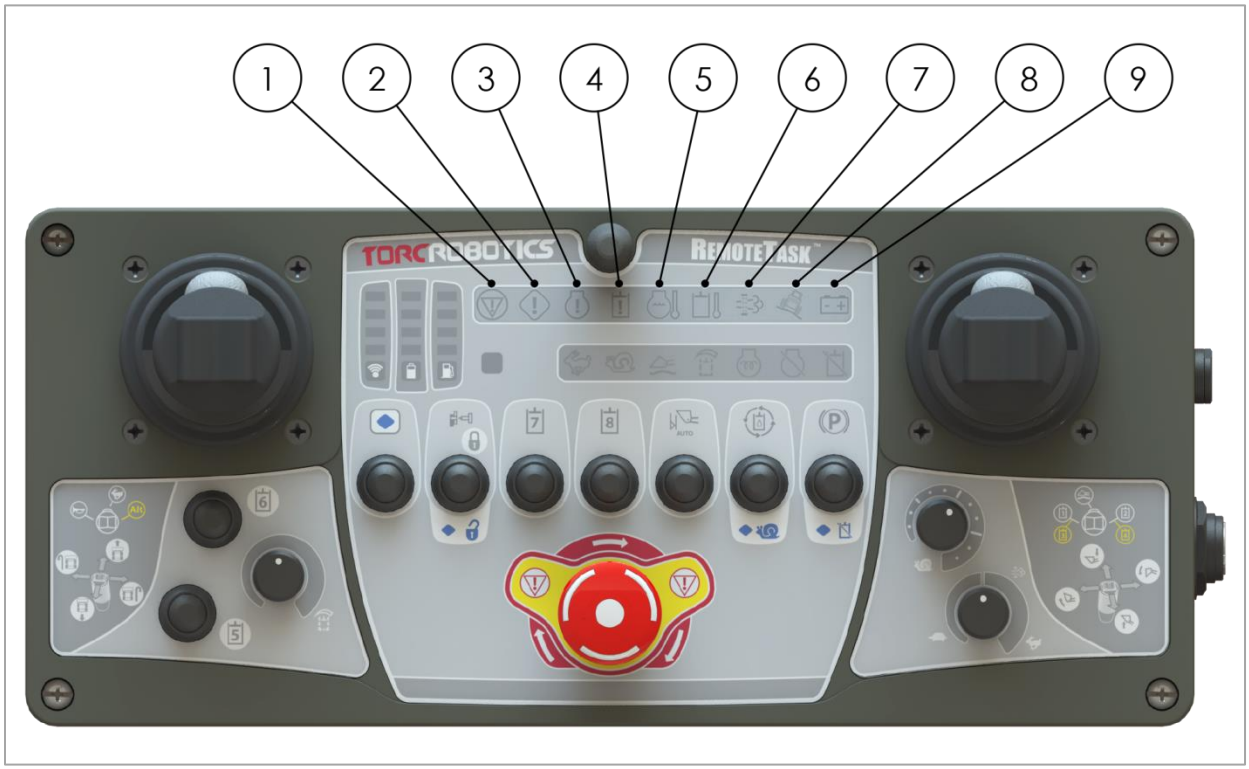


Figure 2. RemoteTask Controller Warning LED Indicators

1) **Emergency Stop Warning**
2) **Operator Alert Warning**
3) **Engine Warning**
4) **Hydraulic Warning**
5) **Coolant Temperature Warning**
6) **Hydraulic Temperature Warning**
7) **Diesel Particulate Filter Regeneration Warning**
8) **Machine Angle Warning**
9) **Electrical System Warning**

Table 3. Warning Feedback Detail

Emergency Stop Warning (1)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Red	Solid	On First	On First	Machine mounted or RemoteTask controller mounted E-Stop Button is triggered.

Operator Alert Warning (2)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Amber	Solid	On First	On First	There is a malfunction or a parameter is outside typical range. Determine the cause of the alert and address as required.
		Flash	Intermittent	Intermittent	Severe component damage could occur. Change current operation or perform indicated maintenance.
	Red	Flash	Intermittent	Intermittent	Injury to operator or severe component damage could occur. Stop operation and shut off machine engine immediately.

Engine Warning (3)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Amber	Solid	On First	On First	Air Cleaner Restriction.
	Red	Solid	Intermittent	Intermittent	Severe component damage could occur. Stop operation and shut off machine engine immediately.
		Flash	Intermittent	Intermittent	Injury to operator or severe component damage could occur. Stop operation and shut off machine engine immediately.

Hydraulic Warning (4)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Amber	Solid	On First	On First	Hydraulic oil filter malfunctioning. Stop the machine and replace the oil filter. Do not operate the machine until the indicator turns off.
	Red	Solid	On First	On First	Hydraulic oil issue. Stop the engine immediately and investigate the problem.

Coolant Temperature Warning (5)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Amber	Solid	On First	On First	Coolant temp too high. Stop work and reduce engine speed to idle.
	Red	Solid	Intermittent	Intermittent	Coolant temp severely too high. Stop work and turn off engine immediately.

Hydraulic Temperature Warning (6)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Amber	Solid	On First	On First	Oil temp too high. Stop work and reduce engine speed to idle.
	Red	Solid	Intermittent	Intermittent	Oil temp severely too high. Stop work and turn off engine immediately.

Diesel Particulate Filter Regeneration Warning (7)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Green	Solid	-	-	Active DPF regeneration is required. Increase the engine RPM above the active regeneration threshold.
	Amber	Solid	-	-	Active DPF regeneration is urgently required. Increase the engine RPM above the active regeneration threshold.

Machine Angle Warning (8)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Amber	Solid	On First	On First	Machine operating above continuous limit. Move to a safe, flat location.
	Red	Flash	Intermittent	Continuous	Machine operating at unsafe angle. Immediately move machine to safe, flat location.

Electrical System Warning (9)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Red	Solid	On First	On First	Machine Battery is low.

Status Feedback

LED Indicators

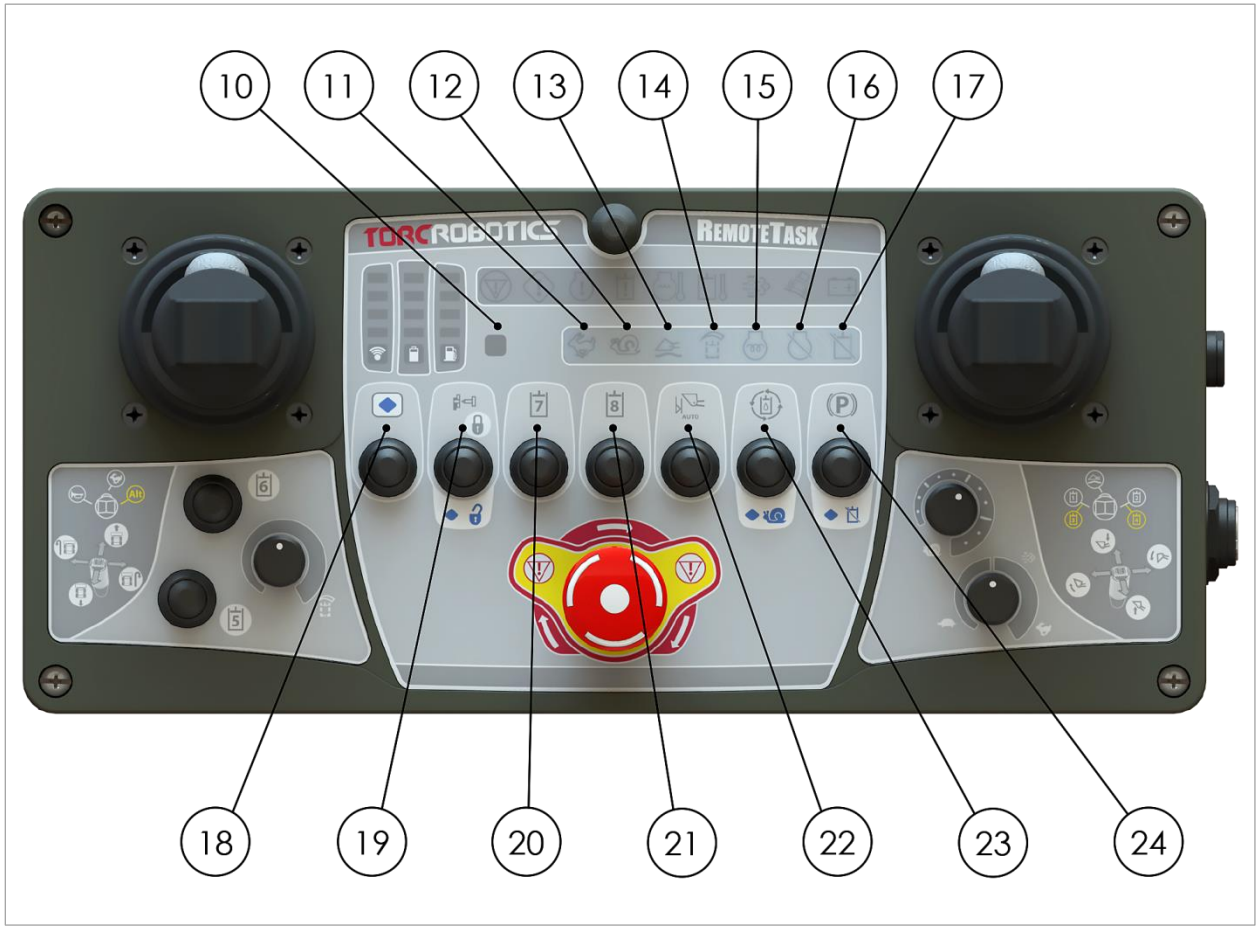


Figure 3. Status LED Indicators

10) **Ambient Light Sensor**
11) **Two-Speed Indicator**
12) **Creeper Indicator**
13) **Work Tool Float Indicator**
14) **Hydraulic High Flow Indicator**
15) **Glow Plug Indicator**
16) **Engine Off Indicator**
17) **Hydraulic Lockout Indicator**
18) **Function Indicator**
19) **Quick Coupler Indicator**
20) **Left Trigger Behavior Indicator**
21) **Auxiliary Electric Power Indicator**
22) **Work Tool Auto Level Indicator**
23) **Hydraulic Continuous Flow Indicator**
24) **Parking Brake Indicator**

Table 4. Status LED Indicators Detail

Callout	Icon	Indication	Color	Pattern	Description
10	-	Ambient Light Sensor	-	-	The light sensor detects the level of ambient light during operation and adjusts the LED brightness for optimal viewing. It does not illuminate.
11		Two-Speed Indicator	Green	Solid	High speed travel enabled.
12		Creeper Indicator	Green	Solid	Creeper enabled.
13		Work Tool Float Indicator	Green	Solid	Work Tool Float enabled.
14		Hydraulic High Flow Indicator	Green	Solid	Hydraulic High Flow is active.
15		Glow Plug Indicator	Amber	Solid	Glow Plug is active.
16		Engine Off Indicator	Red	Solid	Machine Power on, Engine not running.
17		Hydraulic Lockout Indicator	Red	Solid	Hydraulic operation is locked.
18		Function Indicator	Green	Solid	Function button (28) is pressed.
19		Quick Coupler Indicator	Green	Solid	Quick coupler is engaging or disengaging.
20		Left Trigger Behavior Indicator	Green	Solid	When lit, left joystick trigger will engage AUX 7. When not lit, left joystick trigger will engage Two-Speed function.
21		Auxiliary Electrical Power Indicator	Green	Solid	AUX 8 electrical output is enabled.
22		Work Tool Auto Level Indicator	Green	Solid	Work Tool Auto Level enabled.
23		Hydraulic Continuous Flow Indicator	Green	Flash	Continuous Flow control is available.
				Solid	Continuous Flow control active.
24		Parking Brake Indicator	Red	Solid	Vehicle parking brake applied.

Multilevel LED Indicators

Multilevel indicators are used to provide feedback to the operator on the strength of the communication link, the controller battery charge, and machine fuel level.

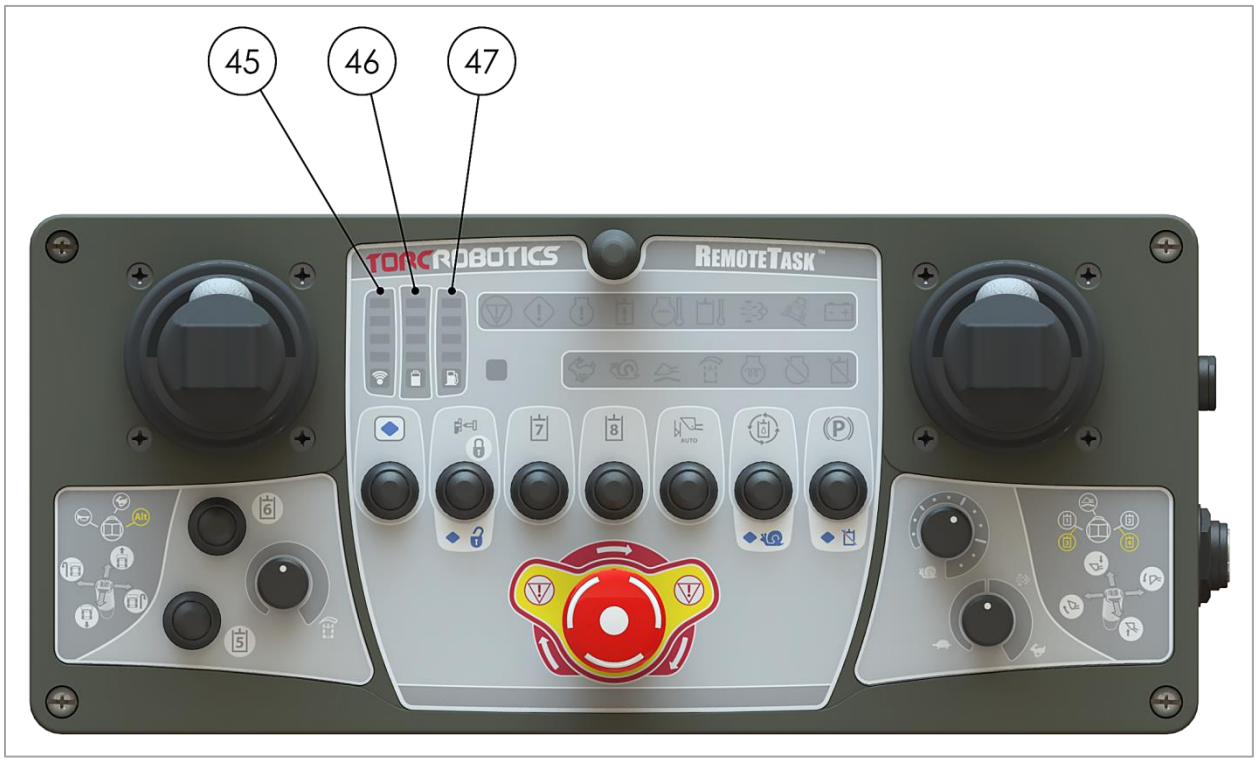


Figure 4. Multilevel Status Indicators

45) Wireless Link Status Indicator

46) RemoteTask Controller Battery Level Indicator

47) Machine Fuel Level Indicator

Table 5. Multilevel Status Indicator Detail

Wireless Link Status Indicator (45)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Green	Multilevel	-	-	Link ≥75% ≥ 50% ≥ 25% ≥ 0%
	Red	Solid	-	-	No link to machine detected.

RemoteTask™ Controller Battery Level Indicator (46)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Green	Multilevel	-	-	Battery ≥75% ≥ 50% ≥ 25% ≥ 10%
	Red	Solid	On First	On First	Battery < than 10%

Machine Fuel Level Indicator (47)					
Icon	**Color**	**Pattern**	**Vibration**	**Alarm**	**Description**
	Green	Multilevel	-	-	Fuel ≥75% ≥ 50% ≥ 25% ≥ 10%
	Red	Solid	On First	On First	Fuel level < than 10%

4 - Operator Controls

This section provides a detailed description of the controls available to the remote operator. The controls of the RemoteTask controller are designed to mimic the controls inside the cab as closely as possible. For detailed information regarding machine control, consult the applicable CAT Operation and Maintenance manual.

Key Switch Controls

Machine Remote Enable Interface

The Remote Enable Interface (REI) is located on the rear of the machine. The REI key switch enables or disables the remote functionality of the machine. The REI key switch has three positions: OFF, ON, and PAIRING.

Figure 5. Remote Enable Interface

OFF – In this position, remote control capabilities are not enabled and the machine can be operated manually.

ON – In this position, the REI is on and remote control capabilities are enabled.

PAIRING – Pairing mode is initiated by turning the key to this momentary position and holding it for three seconds. Once the key is released, it will revert to the ON position.

⚠ NOTICE

Do not operate the machine remotely with the in-cab AUX 8 control enabled because remote control of this feature will not be possible. If the AUX 8 control is enabled in the cab, the red ‘Service’ light will illuminate when the REI key switch is in the ON position.

Controller Key Switch

RemoteTask controller power, machine power, and engine startup are operated via a right side key switch on the RemoteTask controller. The key switch has three positions: OFF, POWER ON, and ENGINE START.

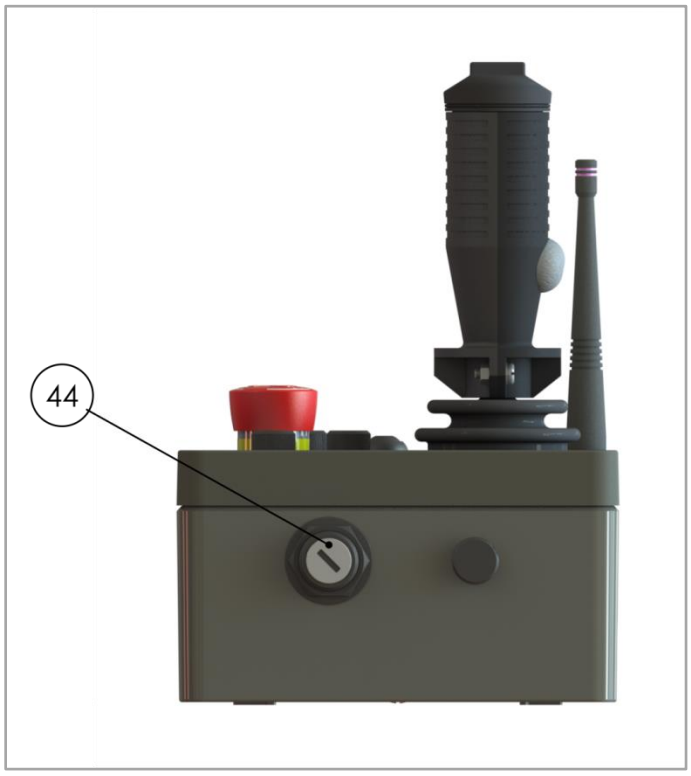


Figure 6. RemoteTask Controller Key Switch

OFF: In this position, the RemoteTask controller, machine power, and engine are all off.

POWER ON: In this position, the RemoteTask controller and machine is powered on. The machine engine may be on or off in this state depending on if the engine has been started.

ENGINE START: To turn engine on, turn the key switch to the farthest most clockwise position (momentary position) until the engine starts up, then release.

Remote Operation Controls

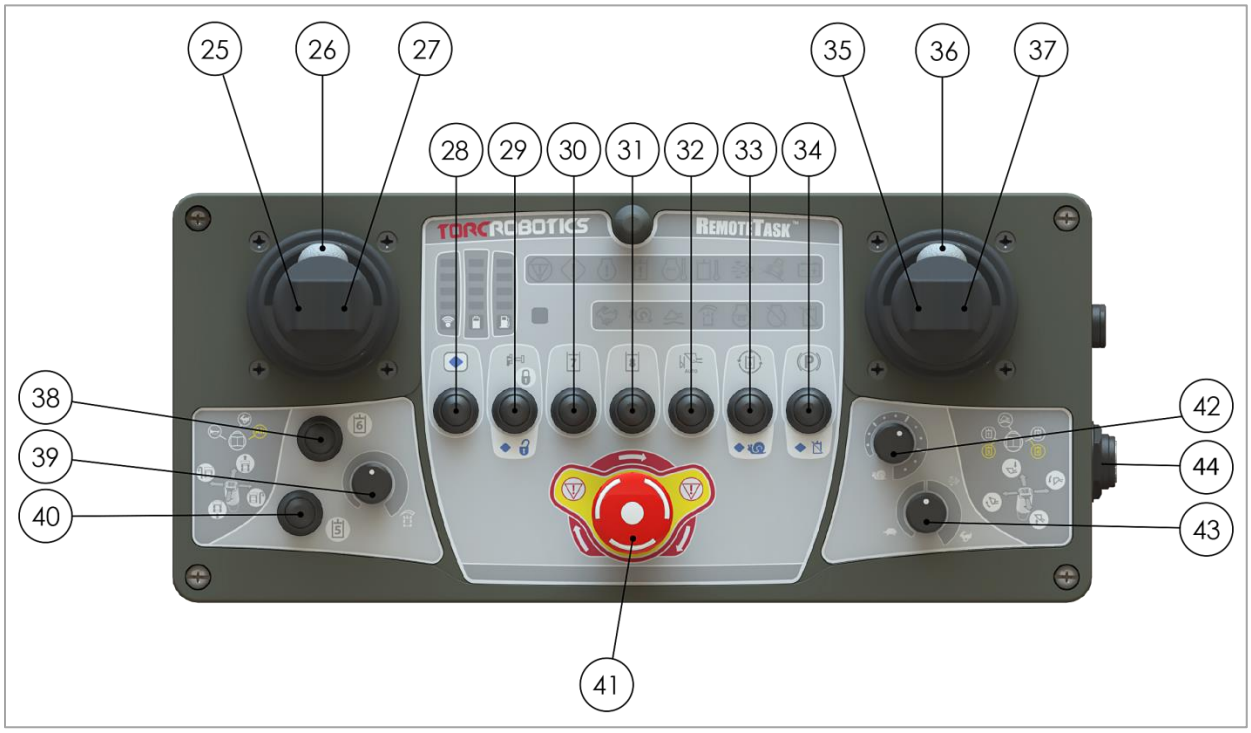


Figure 7. Operator Controls

25) Horn Button
26) Auxiliary Electrical 7 / Two-Speed Button
27) C0 A1/A2 Alternate Select Button
28) Function (FN) Button
29) Work Tool Coupler Engage/Disengage Button
30) Auxiliary Electrical 7 Button
31) Auxiliary Electrical 8 Button
32) Work Tool Auto Level Button
33) Hydraulic Continuous Flow / Creeper Button
34) Parking Brake / Hydraulic Lockout Button
35) A1/Auxiliary Electrical 3 Button
36) Work Tool Float Button
37) A2/Auxiliary Electrical 4 Button
38) Auxiliary Electrical 6 Button
39) Auxiliary Hydraulic Flow Rate Knob
40) Auxiliary Electrical 5 Button
41) Emergency Stop Button
42) Creeper Control Knob
43) Engine Speed Control Knob
44) Controller Key Switch

Table 6. Remote Operation Controls Detail

Callout	Icon	Control	Description
25		Horn Button	Use to activate machine horn in remote operation.
26		Auxiliary Electrical 7 Button	Use to activate AUX 7 control when the Left Trigger Behavior Indicator (20) is illuminated.
		Two-Speed Button	Use to toggle Two-Speed control when the Left Trigger Behavior Indicator (20) is not illuminated.
27		C0 A1/A2 Alternate Select Button	Use to activate the right joystick rocker secondary functions of AUX 3/C+ (35) and AUX 4/C- (37).
28		Function (FN) Button	Use to activate the secondary function controls.
29		Work Tool Coupler Engage Button	Use to lock Quick Coupler.
		Work Tool Coupler Disengage Button	Use with Function button (28) to Unlock Quick Coupler.
30		Auxiliary Electrical 7 Button (AUX 7)	Use to toggle AUX 7 functionality of left joystick trigger (26).
31		Auxiliary Electrical 8 Button (AUX 8)	Use to toggle Auxiliary Electrical Control.
32		Work Tool Auto Level Button	Use to toggle Auto Level Control.
33		Hydraulic Continuous Flow Button	Use to toggle Hydraulic Continuous Flow control.
		Creeper Button	Use with Function button (28) to toggle Creeper Control.
34		Parking Brake Button	Use to toggle Parking Brake.
		Hydraulic Lockout Button	Use with Function button (28) to toggle Hydraulic Lockout.
35		A1 Button	Use to activate Auxiliary Hydraulic Control (A1).
		Auxiliary Electrical 3 Button	Use with ALT control (27) to activate Auxiliary Electrical Control 3.
36		Work Tool Float Button	Use to toggle the Float function.

37		A2 Button	Use to activate Auxiliary Hydraulic Control (A2).
		Auxiliary Electrical 4 Button	Use with ALT control (27) to activate Auxiliary Electrical Control 4.
38		Auxiliary Electrical 6 Button	Use to activate Auxiliary Electrical Control (C1)
39		Auxiliary Hydraulic Flow Rate Knob	Use to control the flow rate of Auxiliary Hydraulic Control (A1) and Auxiliary Hydraulic Control (A2).
40		Auxiliary Electrical 5 Button	Use to activate Auxiliary Electrical Control 5 (C2)
41		Emergency Stop Button	Use to initiate an emergency machine shutdown.
42		Creeper Control Knob	Use to control Creeper level.
43		Engine Speed Control Knob	Use to control Engine Speed.
44	-	Controller Key Switch	See above “Controller Key Switch” section.

Secondary Function Controls

The AUX 7 button (30) enables the operator to toggle the function of the Left Joystick Trigger (26) from Two-Speed to the Auxiliary 7 electrical function.

The Function button (28) allows the operator to apply the secondary function of a control button on the RemoteTask controller. To engage the secondary function of a control button, press and hold the Function (FN) button, then press and release the desired control button. Finally, release the FN button after the control button has been fully released.

The left hand joystick’s right button functions as an ALT control. When ALT (27) is depressed, the secondary functions of the right hand joystick buttons are activated. The left button (35) functions as the Auxiliary Electrical Control 3, and the right button (37) functions as Auxiliary Electrical Control 4.

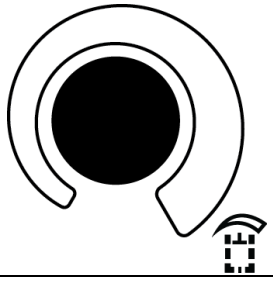
The RemoteTask controller does not include the following machine controls, but they can be configured in the machine cab prior to enabling remote operation:

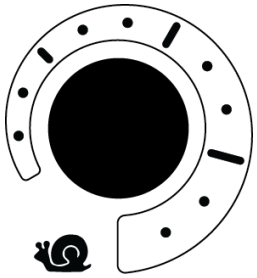
- Implement Sensitivity Control
- Hystat Sensitivity Control
- Front and Rear Work Light Control
- Ride Control

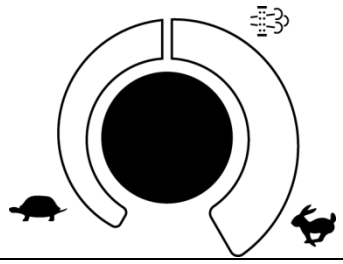
Remote Knob Controls Detail

The remote knob controls provide variable control settings for the hydraulic flow rate, travel speed, and engine speed.

Table 7. Remote Knob Control Detail

Auxiliary Hydraulic Flow Rate Knob (39)	
Icon	**Description**
	The Auxiliary Hydraulic Flow Rate Knob varies the flow rate of the Auxiliary Hydraulic A1 control (35) and the Auxiliary Hydraulic A2 control (37). Move the knob clockwise to increase the flow rate. Move the knob counter clockwise to decrease the flow rate.

Creeper Control Knob (42)	
Icon	**Description**
	The Creeper Control Knob allows the operator to select a maximum machine travel speed at full joystick movement. Move the knob clockwise to increase travel speed. Move the knob counter clockwise to decrease travel speed.

Engine Speed Control Knob (43)	
Icon	**Description**
	The Engine Speed Knob sets a constant engine speed, ranging from low engine idle to high engine idle. Move the knob clockwise to increase engine speed. Move the knob counter clockwise to decrease engine speed.

Remote Joystick Detail - Left Hand

The RemoteTask controller joysticks operate using the Caterpillar Joystick Control Pattern 1. More detailed information on joystick control patterns can be found in the applicable CAT machine Operation and Maintenance manual. For remote joystick button controls, refer to Table 6.

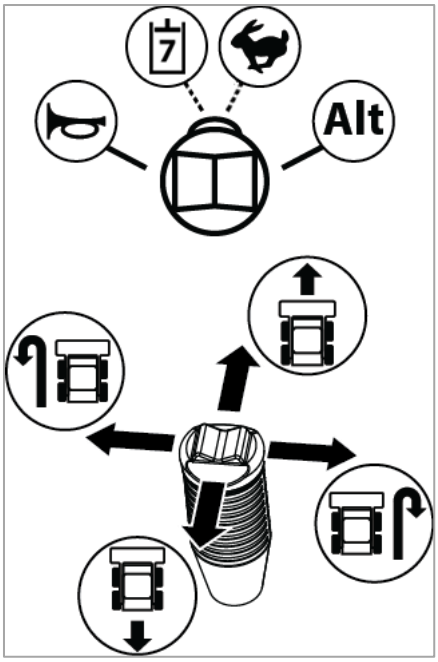


Figure 8. Left Hand Joystick

Forward Travel: Push the joystick forward in order to travel forward.

Backward Travel: Pull back on the joystick in order to travel in reverse

Right Turn: Move the joystick to the right in order to turn the machine to the right

Left Turn: Move the joystick to the left in order to turn the machine to the left.

⚠ NOTICE

Whether operating the machine from the rear, facing forward or the front, backing out, the functionality of the remote controls does not change. If operating from the front of the machine, the operator's perspective of the machine controls will be opposite.

Remote Joystick Detail - Right Hand

The RemoteTask controller joysticks operate using the Caterpillar Joystick Control Pattern 1. More detailed information on joystick control patterns can be found in the applicable CAT machine Operation and Maintenance manual. For remote joystick button controls, refer to Table 6.

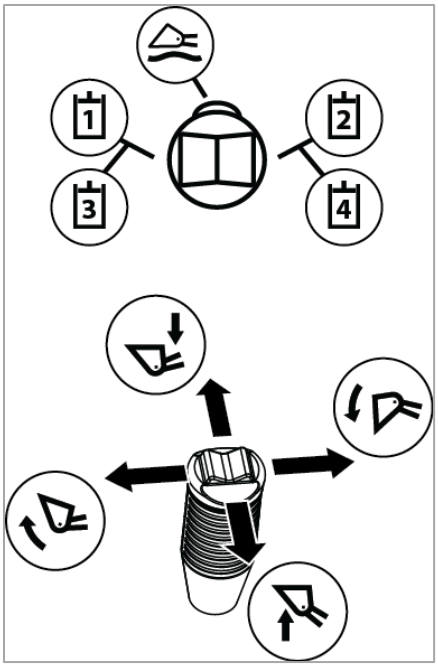


Figure 9. Right Hand Joystick

Lower: Push the Joystick forward in order to lower the work tool.

Raise: Pull the joystick back in order to raise the work tool.

Dump: Move the Joystick to the right in order to tilt the work tool downward

Tilt Back: Move the joystick to the left in order to tilt the work tool upward.

⚠ NOTICE

Remote work tool controls need to be used in conjunction with an applicable Work Tool Operation and Maintenance Manual to fully understand the functions of each control.

Remote Work Tools Detail

⚠ CAUTION

Only use work tools approved for the machine. Refer to the machine Operation and Maintenance Manual for a list of approved work tools. Use remote work tool controls in conjunction with an applicable Work Tool Operation and Maintenance Manual to fully understand the functions of each control.

The RemoteTask system is designed to operate all approved CAT machine work tools. The work tool control interfaces of the RemoteTask controller are designed to mimic the controls inside the cab as closely as possible. This section shows the mapping between the RemoteTask controller and in cab controls. Consult the CAT Operation and Maintenance Manual for the machine for a list of approved work tools. For operation of specific work tools, reference the applicable Operation and Maintenance Manual for that work tool.

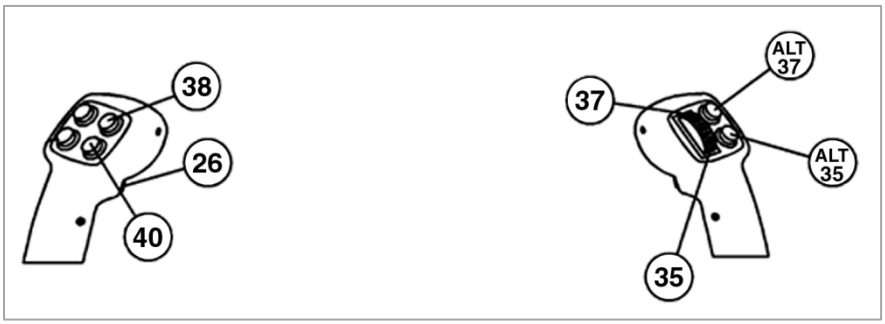


Figure 10. In-Cab Work Tool Controls

Figure 11. RemoteTask controller work tool controls.

26) Auxiliary Electrical 7 / Two-Speed button

27) C0 A1/A2 Alternate Select Button

38) Auxiliary Electrical 6 Button

40) Auxiliary Electrical 5 Button

35) A1 Button

ALT 35) Auxiliary Electrical 3 Button

37) A2 Button

ALT 37) Auxiliary Electrical 4 Button

The AUX 7 button (30) toggles the function of the left joystick trigger (26) between: AUX 7 and Two-Speed control.

The Alternate Select button (27) toggles the function of the right joystick buttons (35 and 37).

5 - Safety Features

The RemoteTask has a number of built-in features to improve safety during remote operation.

Emergency Stop

The RemoteTask system includes an emergency stop button on both the controller (41) and the machine. These buttons are used to bring the machine to a stop in the event of an emergency. Press the Emergency Stop button to initiate an emergency stop. Once pressed, the machine will immediately stop remote commands, apply the parking brake, activate hydraulic lockout, and turn off the engine. To release, turn the Emergency Stop button clockwise, restart engine, and press the Parking Brake button (34) to release the parking brake and disengage the hydraulic lockout.

In Cab Override

The RemoteTask system includes an override that disables remote operation if the cab door is open or a person is in the operator seat. When the cab door is opened or a person sits in the operator seat, all remote commands will stop and the parking brake and hydraulic lockout will be engaged. Once the door is closed and a person is no longer detected in the operator seat, control will be returned to the RemoteTask system.

Degraded Communication Link

In the event of degraded or lost communication between the RemoteTask controller and the Machine Interface Module, the machine will come to an automatic stop, implement commands will halt, and the engine speed will revert to low idle. If the communication link is not restored within one second, the machine parking brake and hydraulic lockout will be applied.

The following situations will cause degraded or lost communication:

- The maximum operating range has been exceeded.
- No line-of-sight between the controller and machine.
- RemoteTask controller batteries need to be charged.
- RF Interference from other systems communicating in the same frequency range.
- The RemoteTask system has been damaged.

To resume operation, determine and resolve the cause of the communication loss and reestablish the communication link. If the parking brake and hydraulic lockout have been engaged, press the Parking Brake button (34) to release the parking brake and disengage the hydraulic lockout.

Man-Down Feature

If the RemoteTask controller is tilted over 45° in any direction, the system will lockout machine motion. The machine will come to an automatic stop, implement commands will halt, and the engine speed will revert to low idle. After one second of the RemoteTask controller tilting, the machine parking brake and hydraulic lockout will be applied.

To resume operation after the Man Down feature has been triggered, level the RemoteTask controller. If the parking brake and hydraulic lockout have been engaged, press the Parking Brake button (34) to release the parking brake and disengage the hydraulic lockout.

Implement Lowering with Engine Stopped

⚠ WARNING

Do not approach the machine if the Active Indicator (amber beacon) is flashing. Verify with the operator that it is safe to approach the machine.

If the machine engine fails while remotely operating and the implement arm is raised, the following steps can be used to lower the implement without the engine running if the accumulator is charged:

1. Power cycle the RemoteTask controller.
2. Once the controller is powered on again, the Communication Link Indicator (green beacon) on the machine will begin to blink.
3. Press the Parking Brake button (34) to disengage the hydraulic lockout. The Active Indicator (amber beacon) will begin to blink.
4. Press the right joystick forward to lower the implement fully to the ground.
    a. If implement does not lower, try to recharge the accumulator by cranking the engine for fifteen seconds.
    b. If the implement still does not lower, complete the next step and refer to the CAT Operation and Maintenance Manual for alternate lowering procedure.
5. Complete the **Remote Shutdown Procedure** and **Return Machine to Manual Operation**.

6 - Remote Operation

This section guides the operator through switching the machine between manual and remote mode and procedures for system startup and shutdown.

⚠ WARNING

The operator is responsible for safely operating the remote machine. Ensure the remote operation area is clearly marked and personnel do not enter the area during remote operation. Verify site personnel are aware the system will be operating remotely. Maintain line-of-sight with the machine at all times during remote operation.

⚠ WARNING

All personnel must keep a safe distance from remote machine operation area. The machine can be operated without a person in the cab. Personnel who are within the operation area of a remote control machine may not be visible to the remote operator, which may result in personal injury or death. Always check with the operator before approaching the machine.

⚠ WARNING

Do not approach the machine if the Active Indicator (amber beacon) is flashing. Verify with the operator that it is safe to approach the machine.

⚠ WARNING

Do not enter the cab if the machine is remotely enabled. Verify the Remote Enable Interface is in the OFF position and key is removed.

⚠ WARNING

Make sure the machine is configured for Caterpillar Joystick Control Pattern 1 before enabling remote operation.

⚠ CAUTION

Do not remotely operate the machine if the Remote Enable Interface 'Service' light is illuminated red. Resolve using the **Troubleshooting** section. If the 'Service' light continues to be illuminated, contact a CAT dealer.

⚠ NOTICE

The RemoteTask controller has a built-in inclinometer which will automatically stop the machine when the console is tilted past 45 degrees in any direction.

Transition Machine to Remote Operation

⚠ WARNING

The machine should be configured for Caterpillar Joystick Control Pattern 1 before enabling remote operation.

⚠ CAUTION

Do not remotely operate the machine if the Remote Enable Interface 'Service' light is illuminated red. Resolve using the **Troubleshooting** section. If the 'Service' light continues to be illuminated, contact a CAT dealer.

⚠ NOTICE

Do not operate the machine remotely with the in-cab AUX 8 control enabled because remote control of this feature will not be possible. If the AUX 8 control is enabled in the cab, the red 'Service' light will illuminate when the Remote Enable Interface key switch is in the ON position.

1. Park the machine in a safe area to begin remote operation.
2. Engage the parking brake.
3. Set the engine speed to low idle.
4. Lower implement completely.
5. Engage the hydraulic lockout switch.
6. Ensure the machine is configured for joystick pattern 1.
7. Set desired machine controls that are not supported remotely:
    a. Implement Sensitivity Control
    b. Hystat Sensitivity Control
    c. Front and Rear Work Light Control
    d. Ride Control
8. Shut down the machine engine and remove the machine key.
9. Ensure cab seat is empty and the cab door is closed.
10. Insert the machine key into the Remote Enable Interface and turn to the ON position. The green 'Ready' light on the Remote Enable Interface will illuminate.
11. Verify that Remote Enable Interface 'Service' light is not illuminated.

Remote Startup Procedure

⚠ WARNING

The operator is responsible for safely operating the remote machine. Ensure the remote operation area is clearly marked and personnel do not enter the area during remote operation. Verify site personnel are aware the system will be operating remotely. Maintain line-of-sight with the machine at all times during remote operation.

1. **Inspect the system**
    a. Inspect the RemoteTask, machine, and work tool for damage or leaks.
    b. Verify the machine has sufficient battery, fuel, oil, water, etc.
2. **Transition Machine to Remote Operation** (defined above)
3. **Put on RemoteTask Controller**
    a. Place head through the center of the shoulder straps so that one strap rests on each shoulder.
    b. Bring the back clips underneath each arm and fasten to the designated holes on the back of the RemoteTask protection cage.
    c. Ensure the controller is secure, comfortable, and level.
4. **Power on RemoteTask Controller**
    a. Turn the RemoteTask controller key switch (44) to the ON position.
    b. Verify all LED indicators illuminate and cycle through their applicable colors.
    c. Verify the Communication Link Indicator (green beacon) begins to blink **on the desired machine**.
5. **Start Machine Engine**
    a. On the RemoteTask controller, verify the Engine Speed Control Knob (43) is set to low idle.
    b. Turn the RemoteTask controller key switch (44) to the ENGINE START position and hold until the engine starts. The Engine Off Indicator (16) will turn off once the engine has started.
6. **Confirm Remote Controls**
    a. Release the parking brake and hydraulic lockout by pressing the Parking Brake button (34).
    b. On the machine, verify the Active Indicator (amber beacon) begins to blink.
    c. Verify remote driving controls and implement controls are functioning properly.

Remote Shutdown Procedure

⚠ CAUTION

Stopping the engine before allowing it to cool can result in overheating and accelerated wear of the engine components. Always run the engine at low idle for five minutes to cool down the engine. Excessive temperatures in the turbocharger housing (if equipped) could cause oil cooking problems.

⚠ NOTICE

Access to the cab door may be obstructed if the implement and work tool are not completely lowered prior to powering down the RemoteTask controller.

1. Park the machine.
2. Set the engine speed to low idle.
3. Engage the Parking Brake (34).
4. Lower the implement completely.
5. Engage the Hydraulic Lockout (FN + 34).
6. Verify the Active Indicator (amber beacon) turns off.
7. CAT recommends cooling the engine down before shutting it off by running the engine at low idle for 5 minutes.
8. After the cool down period is complete, turn the RemoteTask controller key switch (44) to the OFF position. This will turn off the machine engine and power down the RemoteTask controller.

Return Machine to Manual Operation

⚠ WARNING

All personnel must keep a safe distance from remote machine operation area. The machine can be operated without a person in the cab. Personnel who are within the operation area of a remote control machine may not be visible to the remote operator, which may result in personal injury or death. Always check with the operator before approaching the machine.

⚠ WARNING

Do not approach the machine if the Active Indicator (amber beacon) is flashing. Verify with the operator that it is safe to approach the machine.

⚠ WARNING

Do not enter the cab if the machine is remotely enabled. Verify the Remote Enable Interface is in the OFF position and key is removed.

1. Complete the **Remote Shutdown Procedure** (defined above)
2. On the Remote Enable Interface, turn the key to the OFF position and remove the key.

Battery Replacement and Charging

The RemoteTask controller is powered by four Li-Ion 18650 Cell 2600mAH internally protected batteries. The RemoteTask system comes with a Nitecore i4 Intellicharger that can recharge batteries via AC or 12V DC power cord. Review the instructions and safety information accompanying the charger before charging the batteries.

⚠ CAUTION

Use only the provided batteries and charger with the RemoteTask controller. The use of third party batteries or chargers could damage the hardware and void the product warranty.

The batteries are accessible through a removable door on the bottom center of the RemoteTask controller. The battery door is fastened with a tool-less, quarter-turn fastener. Turn fastener clockwise to remove battery compartment cover. To take out the batteries, pull the internal ribbon until the batteries are released.

Make sure the ribbon is accessible when replacing the batteries. To close, align battery cover with the edges of the battery compartment and turn fastener counter clockwise until cover is secured.

Figure 12. RemoteTask Battery Compartment

⚠ NOTICE

Return used batteries to an appropriate recycling facility. Check local laws and regulations regarding appropriate battery recycling.

7 - System Configuration

Pairing Controller with Machine

The RemoteTask controller and Machine Interface Module must be paired to communicate. The system should come paired; however, the following pairing instructions can be used if the system needs to be re-paired to a different channel. The controller can only be paired to one machine at a time.

1. **Initiate Pairing Mode for the RemoteTask Controller**
    a. With the RemoteTask controller powered off, press and hold both the AUX 7 (30) and Auto Level (32) buttons and turn the RemoteTask controller key switch (44) to POWER ON.
    b. The icons for multilevel LED indicators will blink red to indicate pairing mode.
2. **Initiate Pairing Mode on the Remote Enable Interface**
    a. Turn the Remote Enable Interface key switch from the OFF position to the PAIRING position and hold for three (3) seconds.
    b. The green “Ready” light on the Remote Enable Interface will begin blinking rapidly, indicating that the machine is in pairing mode.
    c. On the controller, the multilevel LED indicators will illuminate green to indicate the current channel and the icons will stop blinking red.
3. **Select desired frequency channel**
    a. Use AUX 6 (38) or AUX 5 (40) to change the channel, which is displayed as a pattern on the multilevel LED indicator.
    b. Ensure that each RemoteTask system has a different channel pattern if using multiple machines remotely in the same operation area.
4. **Finalize the pairing process.**
    a. Press AUX 8 (31) to confirm the frequency channel and exit pairing mode.
    b. On the Remote Enable Interface, the green ‘Ready’ light will glow solid.
    c. On the machine, the Communication Link Indicator (green beacon) should begin to blink.
    d. The multilevel LED indicators will change to reflect signal, battery, and fuel values.

⚠ NOTICE

Pairing mode will timeout after two minutes. In pairing mode, the green “Ready” light on the Remote Enable Interface will blink rapidly. Once a timeout has occurred the light will glow solid, and the RemoteTask system will need to be powered down to restart the pairing procedure.

Shoulder Harness Attachment

The shoulder harness is designed to allow the remote controller to rest comfortably at the operator's midsection, supporting the weight of the RemoteTask controller and keeping the operator's hands free to control the machine. The shoulder harness straps may also be configured so that the remote controller rests on the operator's side.

⚠ CAUTION

Ensure that the shoulder harness is securely fastened and the RemoteTask controller is stable before remote operation.

Front Configuration

1. Remove both back strap clips from the holes in the protection cage.
2. Place head through the center of the shoulder straps so that one strap rests on each shoulder.
3. Bring the back clips underneath each arm and fasten to the designated holes on the back of the RemoteTask protection cage.
4. Ensure the controller is secure, comfortable, and sitting level. If necessary, adjust the straps to ensure a comfortable, supportive fit on the operator:
    a. Back adjustment: affects the tightness of the harness around the body.
    b. Front adjustment: adjusts the vertical height of the remote control console.

Figure 13: Front Shoulder Harness Configuration

Right Side Configuration

1. Unfasten both back strap clips from the cage.
2. Cross the left back strap behind the harness and clip it to the right side attachment point (see Figure 14).
3. The right strap end may be stowed away by inserting it under one of the fabric sections behind the mesh back.
4. Place head through left shoulder strap. The left strap should rest on the operator's left shoulder, with the remote controller resting on the right hip.
5. Adjust straps for tightness as necessary.

Figure 14: Attach left clip to right attachment point.

Left Side Configuration

1. Unfasten both back strap clips from the cage.
2. Cross the right back strap behind the harness and clip it to the left side attachment point (see Figure 15).
3. The left strap end may be stowed away by inserting it under one of the fabric sections on the mesh back.
4. Place head through right shoulder strap. The right strap should rest on the operator's right shoulder, with the remote controller resting on the left hip.
5. Adjust straps for tightness as necessary.

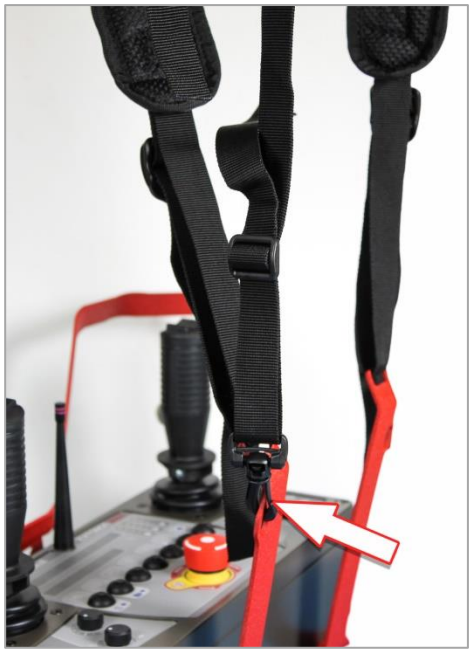


Figure 15: Attach right clip to left attachment point.

8 - Maintenance

This section provides basic care and maintenance of RemoteTask system. Refer to the applicable CAT Operation and Maintenance manuals for additional maintenance information related to the machine and work tools.

⚠ WARNING

Do not approach the machine if the Active Indicator (amber beacon) is flashing. Verify with the operator that it is safe to approach the machine.

⚠ WARNING

Do not enter the cab if the machine is remotely enabled. Verify the Remote Enable Interface is in the OFF position and key is removed.

⚠ WARNING

Do Not Modify or Disassemble RemoteTask components or wiring. Modifications could result in a shock hazard, product damage, or unexpected operation. Opening, modifying, or repairing the RemoteTask will void any applicable warranty and could prevent the device from operating properly. Contact a CAT dealer if repairs or modifications are required.

⚠ CAUTION

Do Not Operate With Suspected Failures. If you suspect there is damage to the RemoteTask, contact a CAT dealer to have it inspected before further use.

General Care

Use a damp cloth, and mild dish detergent if needed, to remove any mud, dirt, concrete, and other materials to prevent clogging of the controls.

⚠ CAUTION

Do not clean the RemoteTask components under high pressure, with solvents (such as benzene, thinner, ammonia), or with abrasive cleaners. If water or other liquids get inside the RemoteTask controller's battery compartment, immediately remove the batteries and allow the unit to air dry.

Maintenance Schedule

Table 8. RemoteTask Maintenance Schedule

Service Interval	Item	Description
Weekly, or every 60 Operating Hours	Machine harnesses	Verify wiring harnesses are secure. Verify wiring harnesses are not being pinched or damaged.

RemoteTask Parts List

Item Number	Product Name
RT01	**RemoteTask™**
RT01-MI	**RemoteTask Machine Interface Assembly**
RT01-MI-MIM	Machine Interface Module
RT01-MI-MEI	Machine ECM Interface
RT01-MI-MIH	Machine Interface Harness
RT01-MI-UCM	Under Cab Mounting Assembly
RT01-MI-UCH	Under Cab Harness
RT01-MI-REI	Remote Enable Interface
RT01-MI-UIH	User Interface Harness
RT01-MI-AMB	Active Indicator (amber beacon)
RT01-MI-GRN	Communication Link Indicator (green beacon)
RT01-RC	**RemoteTask Controller**
RT01-RC-RCU	Remote Control Unit
RT01-RC-PC	Protection Cage
RT01-RC-SH	Shoulder Harness
RT01-RC-BAT	Controller Batteries
RT01-RC-BC	Controller Battery Charger
RT01-DOC	**RemoteTask Documentation Package**
RT01-DOC-OMM	Operation and Maintenance Manual
RT01-DOC-PIM	Parts and Installation Manual
RT01-OPT	**RemoteTask Options**
RT01-OPT-PRG	Firmware Update / Programming Toolkit
RT01-OPT-ISO	Remote control ISO warning label

9 - Troubleshooting

⚠ WARNING

Do not approach the machine if the Active Indicator (amber beacon) is flashing. Verify with the operator that it is safe to approach the machine.

⚠ WARNING

Do not enter the cab if the machine is remotely enabled. Verify the Remote Enable Interface is in the OFF position and key is removed.

⚠ WARNING

Do Not Modify or Disassemble RemoteTask components or wiring. Modifications could result in a shock hazard, product damage, or unexpected operation. Opening, modifying, or repairing the RemoteTask will void any applicable warranty and could prevent the device from operating properly. Contact a CAT dealer if repairs or modifications are required.

⚠ CAUTION

Do Not Operate With Suspected Failures. If you suspect there is damage to the RemoteTask, contact a CAT dealer to have it inspected before further use.

General Troubleshooting

This section provides general troubleshooting tips and information for solving operation issues with the RemoteTask system.

Warnings and Safety Messages

Warning Feedback – If a warning light is illuminated, reference the Warning Feedback section of the Operation and Maintenance Manual to determine the meaning of the warning and recommended action.

Safety Features – If the machine does not operate normally during remote operation, reference the Safety Features section of the Operation and Maintenance Manual and verify that features such as Emergency Stop, Man-Down, etc. are not engaged.

Startup

- Verify that both the Remote Enable Interface and the RemoteTask controller are powered on.
- If the RemoteTask controller does not power on, reference the Battery Replacement and Charging section of the Operation and Maintenance Manual. Verify that the controller batteries are charged and installed properly. Replace batteries if necessary.

Controls

If a control does not perform its expected function during remote operation, check for the following issues:

- Verify the machine is equipped with the control. The RemoteTask system will not add any additional functionality to the machine.
- Verify that the control performs as expected during manual operation. If the control still does not function normally during manual operation, reference the applicable CAT Operation and Maintenance Manual to troubleshoot the issue.

RemoteTask Wire Harness Connections

All components of the RemoteTask wire harness assembly must be connected correctly in order for remote OR manual operation to work. If any part of the RemoteTask Machine Interface Assembly is removed or not connected properly, the machine will not operate in either remote or manual mode.

- Consult the RemoteTask Parts and Installation Manual for information regarding the Machine Interface Assembly.
- Verify wiring harnesses are secure.
- Verify wiring harnesses are not pinched or damaged.

Troubleshooting Issues

This section provides basic troubleshooting information for specific operation issues with the RemoteTask system.

No link between RemoteTask controller and machine

AND	Possible Causes	Solutions
• Communication Link Indicator (green beacon) is blinking. • All other LED indicators behaving normally.	RemoteTask controller and machine attempting to communicate.	Wait for approximately 30 seconds for communication to be established.
Wireless Link Status Indicator Light (45) icon is blinking red.	RemoteTask controller is not paired with the machine.	Follow the steps in “Pairing Controller with Machine.”

Machine engine will not start remotely

AND	Possible Causes	Solution
Emergency Stop Warning Indicator (1) is illuminated.	RemoteTask Controller and/or Remote Enable Interface Emergency Stop Button Activated.	Turn Emergency Stop button clockwise to disengage.
Machine Fuel Level Indicator Light (47) is illuminated.	Machine does not have sufficient fuel to operate.	Add fuel to the machine.
• Communication Link Indicator (green beacon) is **not** illuminated. • Wireless Link Status Indicator Light (45) icon is illuminated red.	• Machine is not in remote mode. • Machine is out of signal range. • Signal between machine and controller is obstructed.	• Turn the REI key switch to the ON position. • Move controller within range of the machine. • Establish unobstructed line-of-sight with the machine.
Electrical System Warning (9) is illuminated.	Insufficient electrical power for machine operation.	• Charge machine battery. • Replace necessary fuses.
RemoteTask controller is tilted.	Man Down Feature activated.	Level the RemoteTask controller. See “Man Down Feature” section.

Linked machine will not operate

AND	Possible Causes	Solution
Emergency Stop Warning Indicator (1) is illuminated.	RemoteTask controller and/or Remote Enable Interface Emergency Stop Button Activated.	Turn Emergency Stop button clockwise to disengage.
Parking Brake Indicator (24) is illuminated.	Machine Parking Brake is engaged.	Press the Parking Brake button (34) to disengage.
RemoteTask controller is tilted.	Man Down Feature activated.	Level the RemoteTask controller. See “Man Down Feature.”

Work tool will not operate

AND	Possible Causes	Solution
Hydraulic Lockout Indicator Light (17) is illuminated.	Machine Hydraulic Lockout is engaged.	Press the Hydraulic Lockout button (FN + 28) to disengage.

Machine stops suddenly during operation

AND	Possible Causes	Solution
Wireless Link Status Indicator Light (45) icon is illuminated red.	• Machine is out of signal range. • Signal between machine and controller is obstructed.	• Move controller within range of the machine. • Establish unobstructed line-of-sight with the machine.
RemoteTask controller is tilted.	Man Down Feature activated.	Level the RemoteTask controller. See “Man Down Feature.”

Engine RPM increases spontaneously or will not decrease via Engine Speed Control Knob

AND	Possible Causes	Solution
Diesel Particulate Filter Regeneration Warning (7) is illuminated.	Diesel Particulate Filter Regeneration in progress.	Continue normal operation. Engine Speed control will return upon completion of the Diesel Particulate Filter Regeneration process

AUX 8 Control will not disengage remotely

AND	Possible Causes	Solution
Red “Service” light on Remote Enable Interface is illuminated.	The AUX 8 control is engaged in the cab.	Return machine to manual operation. Disengage the in-cab AUX 8 control. Transition machine back to remote operation.

Red “Service” light on Remote Enable Interface is illuminated.

AND	Possible Causes	Solution
The AUX 8 control will not disengage.	The AUX 8 control is engaged in the cab.	Return machine to manual operation. Disengage the in-cab AUX 8 control. Transition machine back to remote operation.
The in-cab AUX 8 control is **not** engaged.	One or more control outputs are faulted.	Contact a CAT dealer for support. Do not attempt to operate machine with suspected failures.

Remote controller does not power off immediately.

AND	Possible Causes	Solution
• Communication Link Indicator (green beacon) is **not** illuminated. • Wireless Link Status (45) icon is illuminated red.	• Machine is **not** in remote mode.	The controller will attempt to communicate with the machine before powering down. Wait ~5 seconds for the remote controller to power down.
	• No link between machine and controller.	• Reestablish the link (see "No link between RemoteTask controller and machine" above). • Ensure that the machine engine is off before powering down the RemoteTask controller.

10 - Specifications

Table 9. RemoteTask System Specifications

Wireless Performance	
Max. Operating range	1000 ft, (Line of Sight)
Frequency Band	2.4 – 2.48GHz
Technology	Spread Spectrum
Hopping Channels	79
Transmit Power	125 mW

RemoteTask™ Controller Electrical	
Battery Life	24+ Hours
Full Charge Time	7 hours, using provided charger
Battery Information	Four Li-Ion 18650 Cell 2600mAH batteries with integrated protection circuitry

Environmental	
Dust/ Water Resistance	Machine Interface Module: IP 67 RemoteTask controller: IP 65
Operational Temperature	-20ºC (-4ºF) to 55ºC (131ºF)

11 - FCC Compliance

This equipment has been approved for mobile applications where the equipment should be used at distances greater than 20 cm from the human body (with the exception of hands, wrists, feet, and ankles). Operation at distances less than 20 cm is strictly prohibited. This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. FCC ID: KQL– RM024

12 - Limited Warranty

TORC Robotics, Inc. (herein referred to as TORC) guarantees that the product(s) you have purchased from TORC are free from defects in materials or workmanship for a period of one year from the original date of purchase. Within this period TORC will, at its sole discretion, repair or replace any components which fail under normal use. This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alterations or repairs. There are no other warranties, expressed or implied, which extend beyond the description contained herein including the implied warranty of merchantability and fitness for a particular purpose. TORC expressly excludes all other warranties TORC's liability is limited to the cost of repair or replacement of the product. Such remedy shall be the sole and exclusive remedy for any breach of warranty. TORC shall not be liable for: 1. Damage to other property caused by any defects in the product, damages based upon inconvenience, loss of use of the product, loss of time, loss of profits, loss of business opportunity, loss of goodwill, interference with business relationships, or other commercial loss, even if advised of the possibility of such damages. 2. Any indirect or other damages, whether incidental, consequential, or otherwise. 3. Any claim against the customer by any other party.