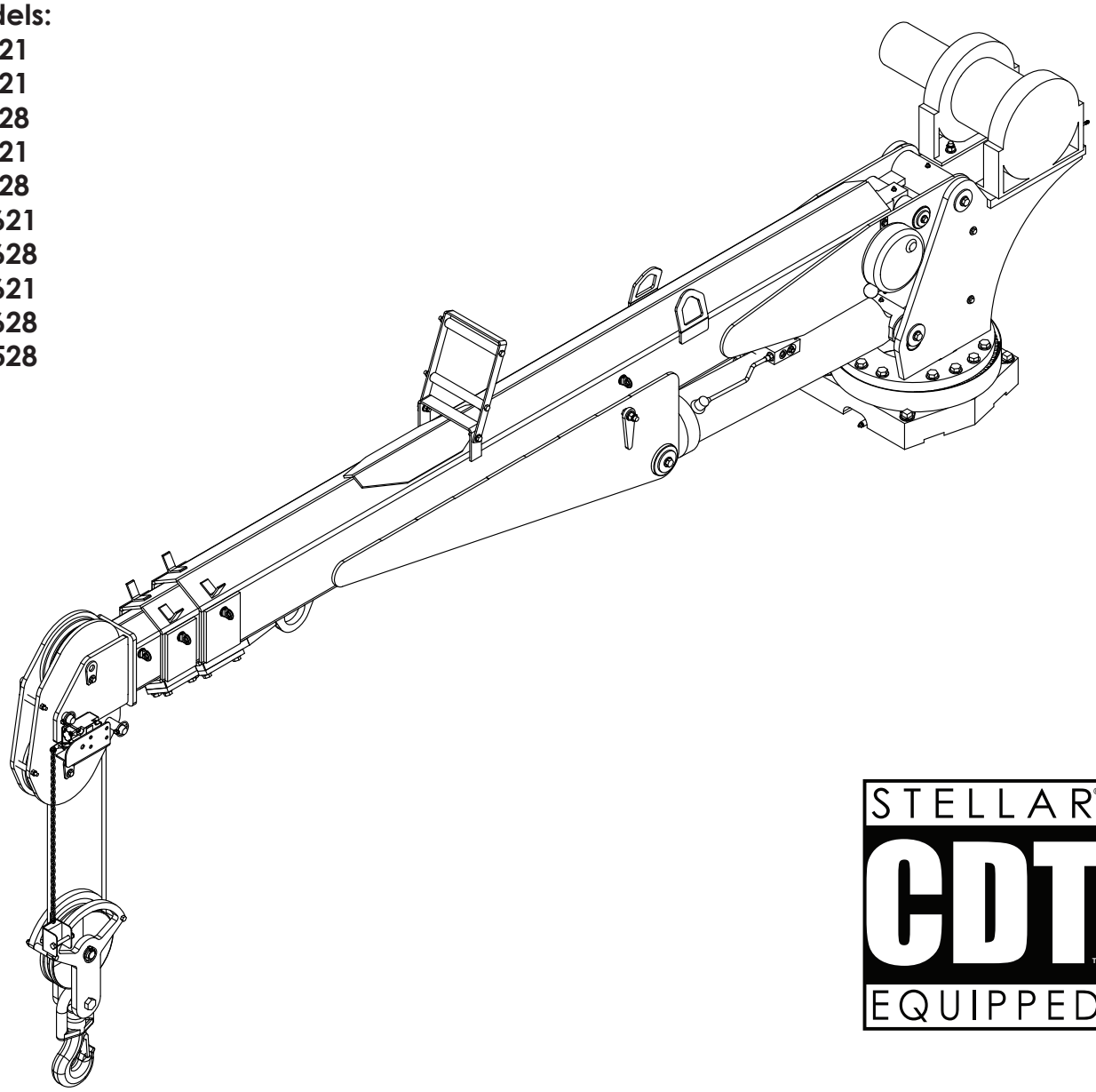
# Heavy-Duty Crane

## Owners' Manual

*Safety • Operation • Maintenance • Troubleshooting*

**Models:**

**5521**
**7621**
**7628**
**9621**
**9628**
**10621**
**10628**
**12621**
**12628**
**14528**



STELLAR®
CDT™
EQUIPPED

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Last Revision: 04/29/13

# Heavy-Duty Crane Manual Revisions

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# Introduction

Stellar® Cranes are designed to provide safe and dependable service for a variety of operations. With proper use and maintenance, these cranes will operate at peak performance for many years.

To promote this longevity, carefully study the information contained in this manual before putting the equipment into service. Though it is not intended to be a training manual for beginners, this manual should provide solid guidelines for the safe and proper usage of the crane.

Once you feel comfortable with the material contained in this manual, strive to exercise your knowledge as you safely operate and maintain the crane. This process is vital to the proper use of the unit.

**A few notes on this manual:**
A copy of this manual is provided with every crane and can be found in the hard plastic manual case that is installed on the chassis. This manual shall remain with the crane at all times.

Information contained within this manual does not cover all maintenance, operating, or repair instructions pertinent to all possible situations.

Please be aware that some sections of this manual contain information pertaining to Stellar manufactured cranes in general and may or may not apply to your specific model.

This manual is not binding. Stellar Industries, Inc. reserves the right to change, at any time, any or all of the items, components, and parts deemed necessary for product improvement or commercial/production purposes. This right is kept with no requirement or obligation for immediate mandatory updating of this manual.

**In closing:**
If more information is required or technical assistance is needed, or if you feel that any part of this manual is unclear or incorrect, please contact the Stellar Customer Service Department by phone at 800-321-3741 or email at service@stellarindustries.com.

## ATTENTION

**Failure to adhere to the instructions could result in property damage or even serious bodily injury to the operator or others close to the crane.**

**For Technical Questions, Information, Parts, or Warranty, Call Toll-Free at**

**800-321-3741**

Hours: Monday - Friday, 8:00 a.m. - 5:00 p.m. CST

Or email at the following addresses:

| | |
|---|---|
| **Technical Questions, and Information** | service@stellarindustries.com |
| **Order Parts** | parts@stellarindustries.com |
| **Warranty Information** | warranty@stellarindustries.com |

# Chapter 1 - Safety

**Please Read the Following Carefully!** This portion of the manual contains information regarding all Stellar manufactured cranes. Some items contained within this chapter may not apply to your specific equipment.

Safety should be the number one thought on every operator's mind. Three factors should exist for safe operation: a qualified operator, well-maintained equipment, and the proper use of this equipment. **The following information should be read and understood completely by everyone working with or near the crane before putting the unit into operation.**

Please take note that Stellar Industries, Inc. is not liable for accidents incurred by the crane because of non-fulfillment from the operator's side of current rules, laws, and regulations.

**GENERAL**
It is the responsibility of the owner to instruct the operator in the safe operation of your equipment and to provide the operator with properly maintained equipment.

Trainees or untrained persons shall be under the direct supervision of qualified persons.

Operators must conform to the qualifications specified in *ANSI B30.5 - Chapter 5-3 Operation*.

**PERSONAL SAFETY**
Keep clear of all moving parts. All protective guards must be in place and in good operating condition.

Always wear the prescribed personal safety devices.

Always wear approved accident-prevention clothing such as: protective helmets, anti-slip shoes with steel toes, protective gloves, anti-noise headphones, protective glasses, and reflective jackets with breathing apparatus. Consult your employer regarding current safety regulations and accident-prevention equipment.

Do not wear rings, wristwatch, jewelry, loose-fitting or hanging clothing such as ties, torn garments, scarves, unbuttoned jackets or unzipped overalls, which could get caught up in the moving parts of the crane.

Keep a first-aid box and a fire extinguisher readily available on the truck. Regularly check to make sure the fire extinguisher is fully charged and the first-aid kit is stocked.

Do not use controls and hoses as handholds. These parts move and cannot provide stable support.

Never allow anyone to ride the crane hook or load.

**MAINTENANCE SAFETY**
Before operating the equipment, make sure all regular maintenance has been performed.

Never modify or alter any of the equipment, whether mechanical, electrical, or hydraulic, without explicit approval from Stellar Industries.

Do not perform any maintenance or repair work on the crane unless authorized and trained to do so.

Release system pressure before attempting to make any adjustments or repairs.

Do not attempt service or repair when the PTO is engaged.

Failure to correctly plumb and wire the crane can cause a malfunction and damage to the crane and/or operator.

Decals are considered safety equipment. They must be maintained, as would other safety devices. Do not remove any decals. Replace any decals that are missing, damaged, or illegible.

The safety instruction plates, notices, load charts and any other sticker applied to the crane or service body must be kept legible and in good condition. Replace if necessary.

**STABILITY**
Know the crane components and their capabilities and limitations. Overloading the crane may result in serious injury to self and others, and damage to the equipment and immediate surroundings.

Never exceed manufacturer's load ratings. These ratings are based on the machine's hydraulic, mechanical, and structural design rather than stability.

The supporting surface under the service truck must be able to support the weight of the machine and its load. Use stabilizer pads if necessary.

Park the vehicle on level ground and extend the stabilizers fully out and then down.

Keep feet and legs clear when lowering stabilizer jacks.

Never operate the crane without making sure the stabilizers are positioned on stable, flat ground.

Set the parking brake and disengage the drive axle before attempting a lift.

**LOAD SAFETY**
Operate the crane in compliance with the load capacity chart at all times. Know the weight of the load being lifted. Do not rely on the overload device to determine maximum rated loads. If the crane is picking more than the maximum rated load, the overload protection device may be malfunctioning. Discontinue use immediately and contact Stellar Customer Service for support.

Never use a sling bar or anything larger than the hook throat that could prevent the hook latch from closing. This would negate the safety feature.

Do not apply side loads to the booms.

Do not leave a crane load suspended or unattended.

Do not walk under suspended loads.

Do not position any load over a person nor should any person be permitted to place him or herself under a load.

Do not use the boom or the winch to drag a load.

Do not use the crane boom to push downward onto anything.

**ELECTROCUTION**
Allow extra space for swaying power lines in windy conditions. Maintain a clearance in accordance with *ANSI B30.5: 5-3.4.5 Operating Near Electric Power Lines*.

Remember - Death or serious injury can occur when working near power lines or during electrical storms.

Use a signal person when operating near electrical sources.

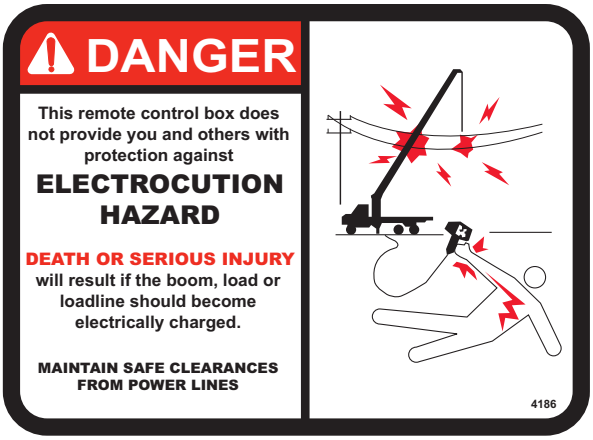
**ENVIRONMENT**
Do not operate the crane during electrical storms.

In extreme cold, allow adequate time to warm the truck before engaging the PTO. Do not rev the truck engine and over speed the hydraulic pumps as permanent damage to the pumps may occur. Follow the vehicle owner's manual regarding operating the vehicle in such adverse conditions.

In dusty work areas, every effort must be taken to keep dust and sand out of the moving parts of the machinery.

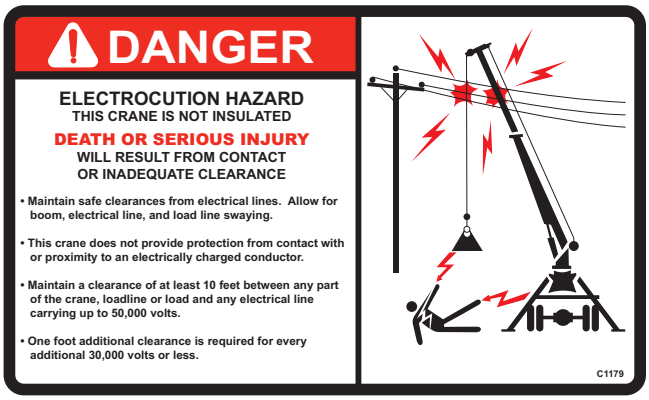
In high humidity work areas, keep parts as dry as possible and well lubricated.

# Safety Decals of Note



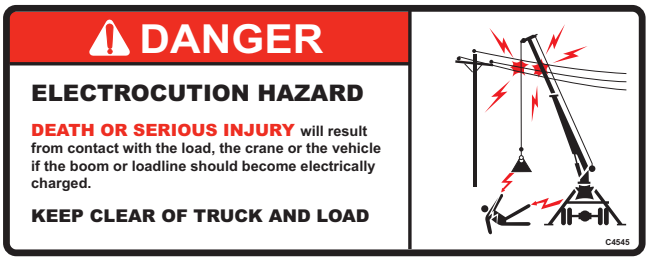

## Electrocution Hazard Decal

**Location:** Inside Crane Compartment, on Compartment Door
**Function:** To inform the operator of the hazard associated with contact or proximity to electrical lines, the possible consequences should the hazard occur and how to avoid the hazard.
PN: 4186




## Electrocution Hazard Decal

**Location:** Inside Crane Compartment, on Compartment Door
**Function:** To inform the operator that the crane is not insulated and the possible consequences if the crane would come into contact with power lines or electrically charged conductors., and how to avoid the hazard.
PN: C1179




## Electrocution Hazard Decal

**Location:** Each side of truck body, Front & Rear Bumper
**Function:** To inform the operator and other personnel in the work area of the hazard associated with contact or proximity to electrical lines, the possible consequences should the hazard occur and how to avoid the hazard.
PN: C4545


## Hoisting Decal:

**Location:** Inside Crane Compartment, on Compartment Door
**Function:** To inform the operator of the hazard associated with lifting personnel with the boom, boom hook, the load or winch loadline, the possible consequences of lifting personnel, and how to avoid the hazard.
PN: 12451


## Operation Hazard Decal

**Location:** Inside Crane Compartment, on Compartment Door

**Function:** To inform the operator and other personnel in the work area of the hazard associated with improper maintenance and unauthorized modifications, the possible consequences should the hazard occur, and how to avoid the hazard.

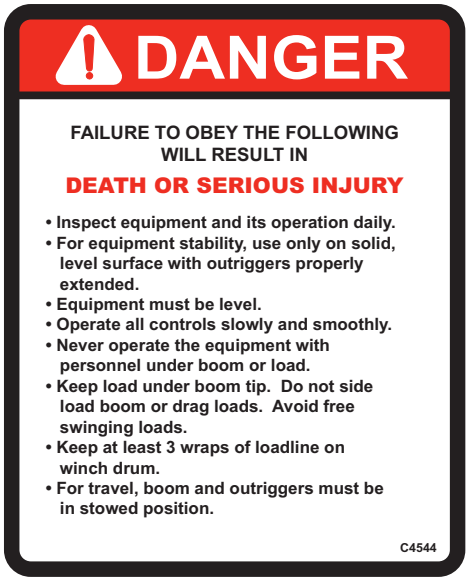
PN: 4190


## Operation Hazard Decal

**Location:** Inside Crane Compartment, on Compartment Door

**Function:** To inform the operator of the hazard associated with overloading the crane, the possible consequences should the hazard occur, and how to avoid the hazard.

PN: 4189




## Training Decal:

**Location:**Inside Crane Compartment, on Compartment Door

**Function:** To inform the operator of the need for proper inspection procedures, and the possible consequences of operation without inspection.

PN: C4544


## Operation Hazard Decal

**Location:**Inside Crane Compartment, on Compartment Door

**Function:** To inform the operator of the need for proper training, familiarity with safe operating procedures and, the possible consequences without training.

PN: C4540


## Moving Boom Hazard Decal

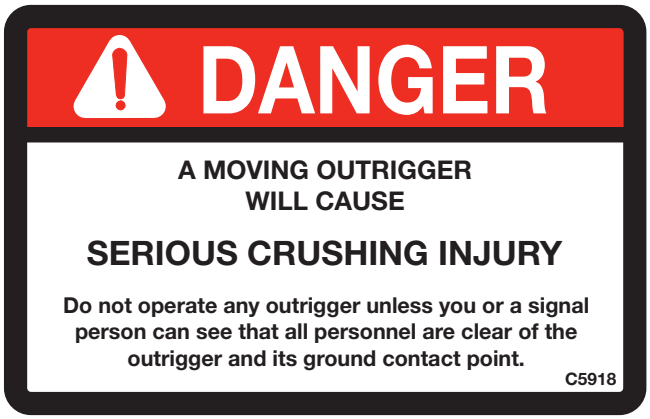
**Location:**Inside Crane Compartment, on Compartment Door
**Function:** To inform the operator and other personnel in the work area of the hazard associated with a moving boom, especially while stowing and unfolding the crane, the possible consequences should the hazard occur, and how to avoid the hazard.
PN: C4541


## Two Block Hazard Decal

Location: At Boom Tip
Function: To inform the operator of the hazard associated with bringing the sheave(s) into contact with the hook, snatch block or load, the possible consequences should the hazard occur and how to avoid the hazard. PN: 12300

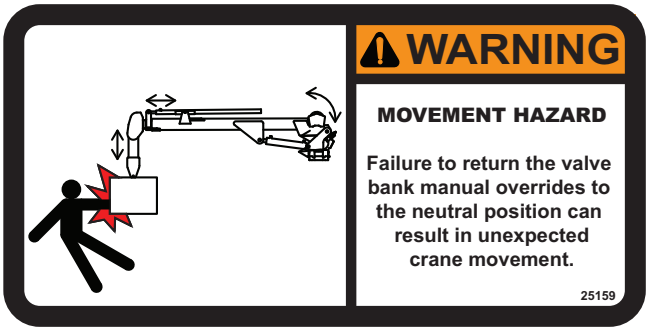

## Foot Crushing Hazard Decal

**Location:** On each stabilizer leg.
**Function:** To inform the operator and other personnel in the work area of the hazard associated with the operation of the stabilizers, the possible consequences should the hazard occur, and how to avoid the hazard. PN: C4795



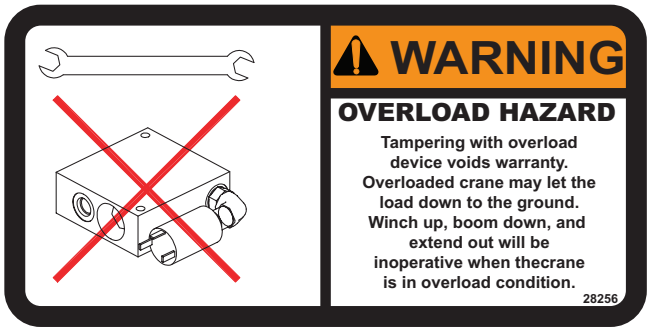

## Moving Stabilizer Hazard Decal

**Location:** On each stabilizer
**Function:** To inform the operator of the hazard associated with stabilizer operation, the possible consequences should the hazard occur, and how to avoid the hazard. PN: C5918




## Movement Hazard Decal

Location: Below Override Controls
Function: To inform the operator that failure to return the manual overrides to the neutral position may result in unexpected crane movement.
PN: 25159




## Overload Hazard Decal

Location: At Overload Switch
Function: To inform the operator that tampering with the overload device may cause a unit failure.
PN: 28256


## Free Falling Manual Boom Decal

**Location:** Inside Crane Compartment, on Compartment Door
**Function:** To inform the operator of the hazard associated with free falling manual boom extensions, the possible consequences should the hazard occur, and how to avoid the hazard.
PN: 12452


## Instructional Decal

**Location:** At Stow Hook area
**Function:** To caution the operator not to use the stow hook for any lifting applications.
PN: 24712

# Chapter 2 - Operation

This chapter contains information regarding the operation of Stellar® Telescopic Cranes. Please study the following pages to ensure your familiarity with the operation process. This understanding is vital to the safe and efficient operation of the crane.

## Job-Site Setup

*Thoroughly plan the lift by understanding your loads and distances before positioning the vehicle. For a complete and detailed description of job site set-up, please refer to the AEM Safety Manual (Form C-70-2). Consider the following:*

1. The vehicle should be positioned in an area free from overhead obstructions to eliminate the need for repositioning. The vehicle should be placed so that it is impossible for any portion of the equipment to come within the minimum required safe distance of any power line. Maintain a clearance in accordance with *ANSI B30.5: 5-3.4.5 Operating Near Electric Power Lines*.
2. Make certain that vehicle is parked on stable ground as close to the job as possible. The supporting surface under the service truck must be able to support the weight of the machine and its load.

## Pre-Operation Inspection

*Each day, inspect the crane for all of the following:*

1. Vehicle for standard checks such as proper tire inflation and fluid levels.
2. Parking brake operation.
3. Hydraulic reservoir for proper oil level.
4. Hoses and gearboxes for evidence of oil leaks.
5. Crane controls for excessive wear, cleanliness and proper operation.
6. Operational aids such as decals for placement and legibility.
7. All securing hardware such as cotter pins, snap rings, hairpins, and pin keepers for proper installation.
8. Crane hook and other loose parts for damage to structures or weld.
9. Wire rope for broken wires, extensive wear, distortion, and heat damage.
10. All safety guards for proper installation.

*Replace/repair as necessary prior to operation. For a more detailed checklist of scheduled inspection points, refer to the Stellar® Crane Inspection Log. This document is an essential guide for the daily, monthly, quarterly and annual inspection tasks that will help maintain the quality of your Stellar product.*

## ATTENTION

**Operators of Stellar® Telescopic Cranes must conform to the qualifications specified in ANSI B30.5 - Chapter 5-3 Operation. Stellar Industries, Inc. is not liable for accidents incurred by the crane because of the operator's non-fulfillment of current rules, laws and regulations.**

## Step 1: Set the parking brake.

The parking brake must be set before any operation.

## Step 2: Engage the PTO.

1. Make certain that the transmission is in neutral/park and that the PTO switch is in the 'off' position.
2. Start the vehicle engine.
3. Depress the clutch on manual transmission vehicles.
4. Engage the PTO. Consult the PTO manual for specific instructions if needed.
5. Slowly release the clutch on a manual transmission vehicle.
6. Allow the hydraulic system oil to warm before operating hydraulic equipment.

## Step 3: Turn on power to the crane.

To initiate electrical power to the crane, activate the button labeled 'Main Power' on the VEC control panel. The VEC control panel is commonly mounted on the floor in the middle of the vehicle cab. Feel free to activate any other button functions needed for the job.


Note: For non-VEC control panels, consult the manufacturers' documentation of operation.

## Step 4: Position the stabilizers.

*Extend the stabilizers using the control levers or switches marked 'stabilizer' or 'outrigger'. These may be located in the compartment under the crane or on the rear bumper.*

1. Locate the street side stabilizer control handle (labeled "SS"). Push the lever down to lower the stabilizer leg on the street side of the truck. While looking under the rear of the truck, you will see the street side stabilizer leg lowering to the ground. When the stabilizer makes solid contact with the ground, release the control lever.
2. Locate the extension stabilizer lever. Push the extension lever down to fully extend the curb side stabilizer.
3. Locate the curb side stabilizer control handle (labeled "CS"). Push the CS lever down to lower the stabilizer to the ground. Release the lever when the stabilizer has made solid contact with the ground.

*Note: Do not raise the rear tires of the truck off the ground with the stabilizers and pay particular attention that the truck is as level as possible both front to rear and side to side.*

### WARNING

**Moving stabilizers can cause serious crushing injury. Make certain that all personnel are clear of the stabilizer and the ground contact point before operating.**

# Step 5: Operate the crane.

Operators should have a firm understanding of *ANSI B30.5 - Section 5-3.2 Operating Practices* and *AEM Safety Manual (Form C-70-2)*prior to operation of the crane.

**Using the Radio Remote:**
To operate the crane using the radio remote control:
1. Activate and hold the desired toggle switch (See next page for details).
2. While holding the toggle, gently pull the variable speed trigger until the crane begins to move. The speed of the crane will vary in direct correlation to how much or how little the trigger is engaged.

*Note: The radio remote allows for simultaneous functions. With practice, it is possible to use more than one toggle at the same time (Extension Out/Winch Down for example).*

**Unstowing the Crane:**
To unstow the crane and prepare it for a lift:
1. Winch down slightly to disengage the anti-two block feature.
2. Raise the boom high enough to clear the boom rest and any other obstructions from the chassis.
3. Rotate the crane until it clears the side of the truck body.
4. Lower the crane boom down far enough so that the snatch block is within comfortable reach.
5. Winch down to create slack in the wire rope and unhook the snatch block. Be very cautious when releasing the snatch block. Maintain control to avoid personal injury or damage to any equipment.

**Attaching the load:**
1. Make sure the hook is centered directly over the load to minimize swinging.
2. Attach the load to the hook by means of slings or other approved devices.
3. Know the rated load of the hook used to pick the load.
4. Do not use a hook to lift personnel.
5. Do not wrap the hoist rope around the load.
6. Maintain a minimum of 3 full wraps of wire rope on the winch drum at all times.

*Note: Do not load the crane beyond the rated capacity. It is the responsibility of the operator to know the weight of both the rigging and the handled load to avoid overloading the crane.* ***Consult the capacity and stability charts as needed.***

**Lifting the load:**
1. Lift load slightly off the ground to check the safety of the cargo. Do not use stability to determine the safety.
2. Do not attempt to lift fixed loads.

**Moving the load:**
1. Ensure that the load is secure and balanced within the sling before moving.
2. Be sure that the crane is level and stable before moving the load. Use stabilizer pads to ensure the proper distribution of weight.
3. Be aware of the surroundings: low branches, power lines, unstable ground, etc.
4. Do not drag loads with the crane.
5. Do not extend or rotate a load over anyone.
6. Avoid sudden starts and stops when moving a load.

# Radio Remote Control Functions


**A. Optional Speed Control/Compressor Start/Stop Toggle:** Push up to start or stop the optional speed control. Push down to start or stop the compressor.

**B. E-Stop Button:** Push to immediately stop all crane functionality. *Note: The E-stop button is not intended to be an on/off switch. This is also the first item to check if the crane is not responding to toggle and trigger activation. Make sure the red E-Stop button is in the up or disengaged position.*

**C. Engine Start/Stop Toggle:** Push to start or stop the engine.

**D. Link/Boost Button:** Push and hold for 5 seconds to engage boost mode (See the following page for details on 'Boost Mode'). If the remote loses connection with the transmitter, use this button to reconnect.

**E. Boom Up/Down Toggle:** Push up to raise the boom. Push down to lower the boom.

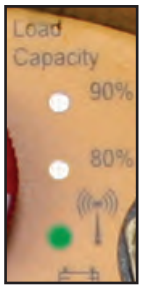
**F. Extension In/Out Toggle:** Push up to extend the extension. Push down to retract the extension.

**G. Winch Up/Down Toggle:** Push up to raise the winch. Push down to lower the winch.

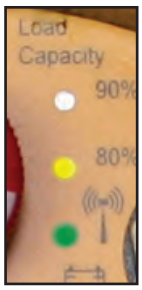
**H. Rotate Clockwise/Counterclockwise:** Push up to rotate the boom clockwise. Push down to rotat the boom counterclockwise.

# Radio Remote Feedback and Boost Mode

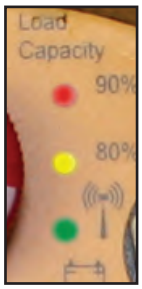
**CDT Remote Feedback**
If the crane starts to approach full capacity or an overload situation, the Stellar CDT sensory feedback system will respond:




**0-79% Capacity**
LEDs: Green Steady
Vibration: None
System Function: Normal




**80-89% Capacity**
LEDs: Green Steady, Yellow Flashing
Vibration: Short Pulsing
System Function: Normal




**90-99% Capacity**
LEDs: Green Steady, Yellow and Red Flashing
Vibration: Long Pulsing
System Function: Normal


**100% Capacity**
LEDs: Green Steady, Yellow and Red Alternate Flashing
Vibration: Long Pulsing
System Function: Overload Shutdown.

When the crane reaches 100% capacity, an overload shutdown will be initiated. The operator will need to set the load down and reposition the truck or activate the Stellar CDT Boost Mode (If equipped).

**Activating Boost Mode (If applicable)**
Boost Mode allows the crane to operate at 118% of its rated capacity for 30 seconds. This will give the operator adequate time to move the crane out of the shutdown condition without having to set the load down and reposition the truck.

Follow the steps below to activate boost mode:

1. Press and hold the Link/Boost Button for 5 seconds. This button is located on the right side of the handheld controller. You will know that boost mode is activated by an indicator light located near the boost/link button.

2. The crane will go from the 'standard mode' to 'boost mode' for 30 seconds.

3. During this minute, the capacity of the crane is increased to 118% of standard capacity.

*Note: Boost Mode can be reset multiple times after a 15 second delay.*

**See the troubleshooting section of this manual for information regarding troubleshooting the Stellar® CDT Remote System.**

## ATTENTION

**If the 118% capacity boost is not enough to temporarily suspend the overload shutdown, the operator will need to set the load down and reposition the truck.**

# Radio Remote Control Features

**Radio Remote Sleep Mode**
The radio remote control enters sleep mode after about 15 seconds of inactivity. Activate a toggle switch to re-link the transmitter to the receiver. Then activate the desired toggle to continue operation.

**E-Stop Button**
The Radio remote control is equipped with an emergency stop button. If a situation arises that requires the immediate stoppage of crane functionality, press down on the red Emergency Stop button located in the center of the remote control.

*Note: The E-stop button is not intended to be an on/off switch. This is also the first item to check if the crane is not responding to toggle and trigger activation. Make sure the red E-Stop button is in the up or disengaged position.*

**Radio Remote Battery Replacement**
Occasionally the batteries in the handheld transmitter will need to be changed. The AA Alkaline batteries are located in the handle portion of the radio transmitter. Release the button and slide the battery holder out. Replace the batteries and return the holder back into the handheld transmitter until the button latches.

**Radio Remote Backup Cord**
If the handheld transmitter has a system problem that makes the radio function un-usable, use of the back-up cord may be necessary.

1. Locate the backup control cord. Most likely it is in the crane compartment, or in the cab behind the seat.
2. Remove the battery holder from the remote handle and place the similar looking end of the back-up cord in the bottom of the transmitter handle.

3. Attach the other end of the back-up cord to the connector currently used by the antenna on the control receiver. The control receiver is located on the back of the crane mast.

**Power On Demand Mode (P.O.D.)**
When the optional engine speed control is toggled on, the crane controller will automatically ramp the engine speed up to high idle while the crane is actively being operated. During periods of inactivity the engine speed will be returned to low idle. See the *Installation, Assembly Drawings, and Parts Manual* for mode selection wiring.

## Step 6: Stow the crane.

Once you have performed your lift and are ready to shut down the work site:

1. Retract all extensions.
2. Winch up to bring the snatch block within 3 feet of the boom tip.
3. Lower the crane boom down far enough so that the snatch block is within comfortable reach.
4. Hook the snatch block to the stow ring on the main boom. Maintain control to avoid personal injury or damage to any equipment.
5. Tighten the winch line so that the snatch block comes within a few inches of the main boom. *Note: When tightening slack, avoid activating the anti-two block switch.*
6. Raise the boom slightly above the boom rest.
7. Rotate the boom counter-clockwise until it aligns with the boom rest. *Note: Use alignment arrows located on the crane base to properly align the boom with the boom rest.*
8. Lower the boom gently into the boom rest.
9. Store the radio remote control, preferably in the cab of the truck.


## Step 7: Stow the stabilizers.

After stowing the crane:

1. Return to the stabilizer controls and pull up on the CS and SS levers and fully retract the stabilizers. Note: Both levers can be used at the same time.
2. Pull up on the extension lever to fully retract and store the curb-side stabilizer.

## Step 8: Disengage the PTO and deactivate power.

1. Depress the clutch on manual transmission vehicles.
2. Disengage the PTO. Consult the PTO manual for specific instructions if needed.
3. Slowly release the clutch on a manual transmission vehicle. *Note: Make sure the PTO indicator light turns off.*
4. Turn off all switches on the VEC control panel. Note: For non-VEC control panels, consult the manufacturers' documentation of operation.

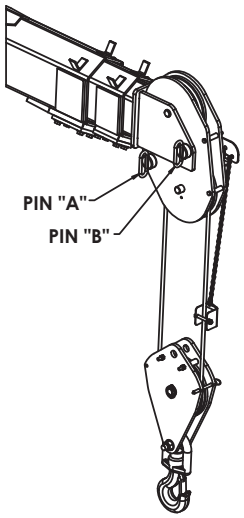
## Step 9: Release the parking brake.

The parking brake must be released before moving the truck.

**WARNING**

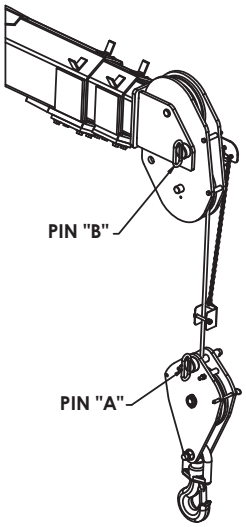
**Before moving the truck, make certain that the air tank is completely drained, even if the compressor was not in use.**

# Wire Rope/Sheave Configurations



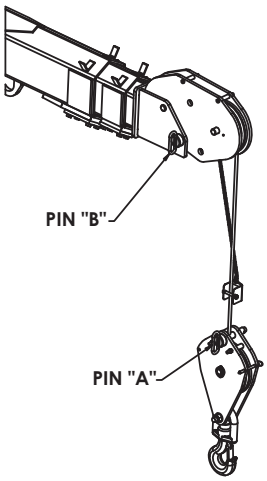

## Standard 2-Part Line
## Sheave Flipped Down

Capacities as shown on load chart.




## Single Part Line
## Sheave Flipped Down

1) Remove PIN "A" from boom tip.
2) Route wire rope through snatch block.
3) Pin wire rope to snatch block as shown with PIN "A"




## Single Part Line
## Sheave Flipped Up

1) Remove PIN "B".
2) Flip sheave.
3) Insert PIN "B" with sheave in upright position.

# Chapter 3 - Maintenance

Maintenance is an important part of extending the life of any Stellar® Telescopic Crane. Greasing pivot points and rotation gear bearing on a scheduled maintenance program will prevent unnecessary downtime.

*Note: Only qualified service personnel are to perform maintenance on the crane.*

**General Maintenance Procedures**

Read the following before performing any maintenance on the crane:

1. Position the crane where it will be out of the way of other operations or vehicles in the area.
2. Lower the boom fully or stow in the cradle to prevent uncontrolled movement.
3. Before any service or repair is performed:
   A. Disengage the PTO
   B. Shut off the engine.
4. Place all controls in the off position and secure operating features from inadvertent motion.
5. Before performing any maintenance on electrical components, disconnect the power source.
6. Before performing any maintenance on hydraulic components, relieve hydraulic oil pressure from all hydraulic circuits. Move pedals and control levers repeatedly through their operating positions to relieve all pressures. **Do not disconnect hydraulic hoses while there is still pressure in those components.**
7. Replace parts with Stellar® approved parts only.
8. Keep the crane and service body clean and free from grease build-up, oil and dirt to prevent slippery conditions.
9. Perform all safety and maintenance checks before each period of use.
10. Label or tag parts when disassembling.
11. Immediately repair or have repaired any components found to be inadequate.

**Inspection Checklist**

For a more detailed outline of scheduled inspection points, refer to the Stellar® Crane Inspection Log. This document is an essential guide for the daily, monthly, quarterly and annual inspection tasks that will help maintain the quality of your Stellar product.

## Crane Maintenance Schedule

| Maintenance Operation | Daily | Weekly | Monthly | Hourly |
|---|---|---|---|---|
| Check hydraulic reservoir oil level. | X | | | |
| Grease rotation gear inner race bearings. | | X | | |
| Grease rotation gear worm drive bearings. | | | 3 months | |
| Grease rotation gear open gear teeth. | | | X | |
| Grease all cylinder pivot points. | | | X | |
| Lubricate extension booms. | | | X | |
| Check winch gear grease level. | | | X | |
| Replace hydraulic return filter. | | | | 1000 |
| Hydraulic reservoir suction strainer. | | | | 6500 |
| Drain and replace hydraulic oil. | | | | 6500 |
| Lubricate PTO and hydraulic pump shaft splines. | | | 6 months | |
| Tighten all hydraulic lines. | | | 6 months | |

## Hydraulic Oil/Filter Maintenance

Stellar Industries recommends the first filter change to occur after the first 250 hours of service. The second, and every subsequent change, should occur after every 1,000 hours of service. By following these guidelines, the hydraulic oil should last up to 6,500 hours.

Note: These recommendations are based on normal working parameters. If operating in less than favorable conditions excessive dust, moisture, etc.), be sure to check the filter gauge often for filter change notice.

## Washing the Crane

Important: Prior to washing the Stellar crane, the radio remote receiver located on the crane mast must be covered to prevent any water from entering the plastic housing. Avoid any direct water pressure to the radio remote receiver.

## PTO and Pump Maintenance

Every six (6) months, remove the hydraulic pump from the PTO and lubricate the splines using Stellar PN 20885. Failure to lubricate shaft splines will cause damage to the PTO and Hydraulic pump.

## Wire Rope Maintenance

Proper maintenance is key in ensuring a long lasting rope. Refer to ANSI B30.5 for details on maintaining your wire rope.

## Winch Maintenance

Refer to winch manual supplied with crane.

## Extension Boom Maintenance

While operating the crane, extend and retract the extension booms. If the extension weldments are noisy during operation, it is necessary to lubricate the booms. Stellar® Model Cranes feature a metal coating which will require an aerosol lubricant. Stellar Industries recommends aerosol style lubricant Stellar PN 44512.

# Rotation Gear Bearing Maintenance


**Rotation Worm Gear and Open Gear Teeth**
Use a heavy Moly Lube grease (Stellar PN 4460) to lubricate the worm gear and open gear teeth of the rotation bearing. Slowly rotate the crane while pumping the grease between the worm and rotation gear. This should be greased every month or sooner depending on the usage of the crane. Another way of applying the grease would be to remove the gear guard and brush the Molube grease between the gear teeth of the rotation bearing. **Do not lubricate the worm and rotation gear teeth with EP2 grease.** EP2 grease will wipe the Molube grease clean causing excessive wear.

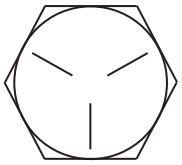
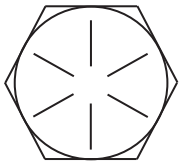
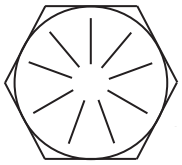
**Worm Gear Bearings and Races**
Apply three (3) pumps of EP2 grease to the two grease zerks located on the side of the Rotation Gear bearing; every three months. After adding the EP2 grease, rotate the crane fully.


**Inner Gear Bearing Race**
To lubricate the inner race of the large rotation gear bearing, open the compartment door just below the crane. The grease zerk for the inner race bearing is located on the compartment drip tray. The inner race will need to be lubricated with EP2 Grease weekly. The first week grease the inner race bearing at the one (1), three (3), five (5), seven (7), nine (9), and eleven (11) o'clock positions. The following week, grease the inner race bearing in the two (2), four (4), six (6), eight (8), ten (10) and twelve (12) o'clock positions. Rotate lubrication points every week.

# Gear Bearing Bolt Maintenance

**Anytime a gear-bearing bolt is removed, it must be replaced with a new bolt of the identical grade and size.** Once a bolt has been torqued to 75% of its proof load and then removed, the torque coefficient may no longer be the same as when the bolt was new thus giving indeterminate damp loads after torquing. **Note: Always use Red Loctite Threadlocker sealant to secure the new bolt.**

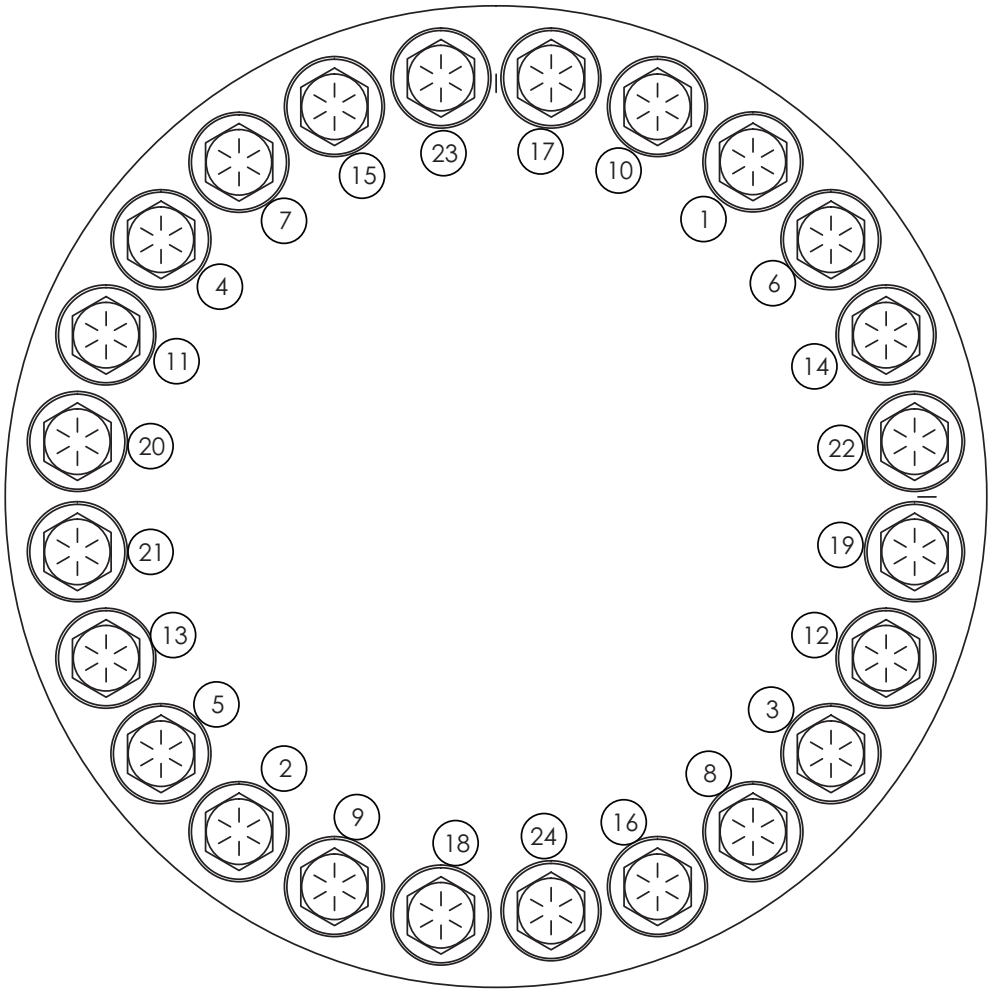
# Torque Data Chart

| | | GRADE 5 | | GRADE 8 | | GRADE 9 |
|---|---|---|---|---|---|---|
| | |  | |  | |  |
| **Size (DIA-TPI)** | **Bolt DIA (Inches)** | **Plain (Ft-Lb)** | **Plated (Ft-Lb)** | **Plain (Ft-Lb)** | **Plated (Ft-Lb)** | **Plated (Ft-Lb)** |
| 5/16-18 | 0.3125 | 17 | 13 | 25 | 18 | 22 |
| 3/8-16 | 0.3750 | 31 | 23 | 44 | 33 | 39 |
| 7/16-14 | 0.4375 | 49 | 37 | 70 | 52 | 63 |
| 1/2-13 | 0.5000 | 75 | 57 | 105 | 80 | 96 |
| 9/16-12 | 0.5625 | 110 | 82 | 155 | 115 | 139 |
| 5/8-11 | 0.6250 | 150 | 115 | 220 | 160 | 192 |
| 3/4-10 | 0.7500 | 265 | 200 | 375 | 280 | 340 |
| 7/8-9 | 0.8750 | 395 | 295 | 605 | 455 | 549 |
| 1-8 | 1.000 | 590 | 445 | 910 | 680 | 823 |
| 1 1/8-7 | 1.1250 | 795 | 595 | 1290 | 965 | 1167 |
| 1 1/4-7 | 1.2500 | 1120 | 840 | 1815 | 1360 | 1646 |
| 1 3/8-6 | 1.3750 | 1470 | 1100 | 2380 | 1780 | 2158 |
| 1 1/2-6 | 1.500 | 1950 | 1460 | 3160 | 2370 | 2865 |

*When using the torque data in the chart, the following rules should be observed:*

1. Bolt manufacturer's particular specifications should be consulted when provided.
2. Flat washers of equal strength must be used.
3. All torque measurements are given in foot-pounds. To convert to inch-pounds, multiply by 12.
4. Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress ability, such as Never-Seez compound graphite and oil, molybdenum disulphite, colloidal copper or white lead are applied, multiply the torque values in the charts by the factor .90. The use of Loctite does not affect the torque values listed above.
5. Torque values for socket-head capscrews are the same as for Grade 8 capscrews.

# Rotation Gear Bearing Thread Tightening Procedure



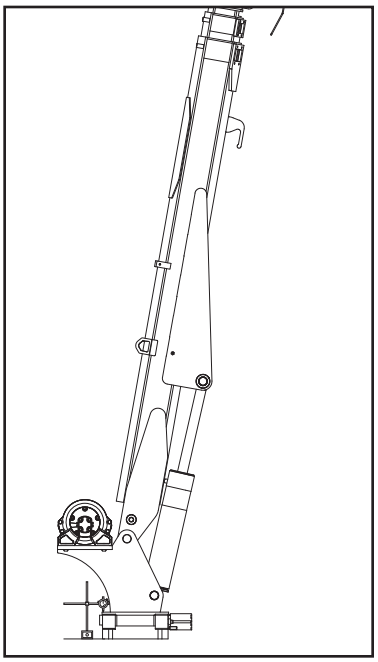

**Step 1:** Refer to the Torque Data Chart on the previous page to determine the proper torque value based on the size of bolt used.

**Step 2:** Torque all bolts to approximately 40% of the specificed torque value using the tightening sequence shown above. Note: The number of bolts may be different than shown in the diagram but the sequence will work using the same pattern in relation to Bolt #1.

**Step 3:** Torque all bolts to 75% of the specified torque value using the tightening sequence shown above.

**Step 4:** Torque all bolts to the listed torque value using the tightening sequence shown above.

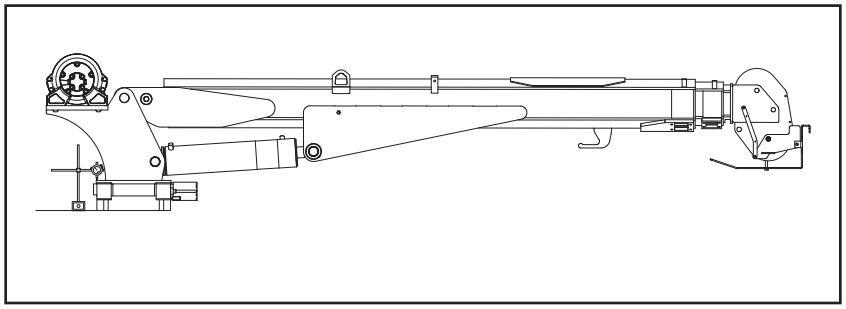
# Rotation Gear Bearing Tilt Test



**Step 1:** Place crane in vertical position.

**Step 2:** Place a dial indicator on the pinion cover plate at the back side of the mast.

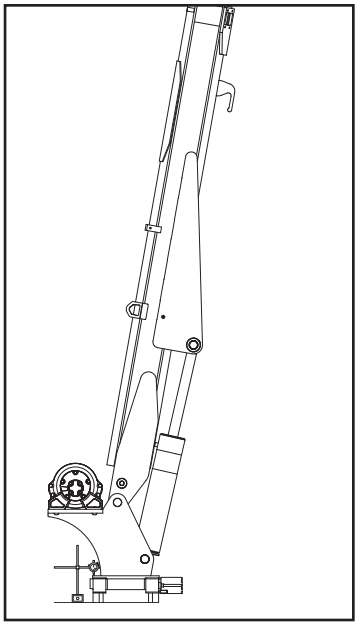
**Step 3:** Set the dial indicator to 0.



**Step 4:** Lower the crane to the horizontal position.

**Step 5:** Check and record the dial indicator change. It should not exceed the following tilt measurements:

- Stellar Models 5521 - 12628 = 0.060" (1.524 mm)
- Stellar Model 14528 = 0.070" (1.778 mm)



**Step 6:** Return the crane to vertical position. The dial indicator should return to calibration.

# Rotation Gear Bearing Worm End Play & Backlash

Stellar® Telescopic Cranes have an integral base and worm drive rotation system.

Backlash is the shortest distance between non-driving tooth surfaces in mating gears. Measure backlash using a feeler gauge at or near the pitch diameter and tangent to the gear.

**Locate High Tooth**

To set both Worm End Play and Backlash, first locate the high tooth on the gear. This spot is marked by the manufacturer with light blue paint. If the paint mark cannot be found, use a dial indicator with a magnetic base and a round steel pin large enough to contact the bearing near the pitch line of the bearing tooth to locate the high tooth:

**Step 1:** Set the indicator base on the face of the bearing race with no teeth.
**Step 2:** Place the pin between two of the teeth.
**Step 3:** Set the indicator probe on the pin and adjust the dial to zero.
**Step 4:** Rotate the bearing, checking every third tooth until you find the highest indicator reading.
**Step 5:** Check three teeth in both directions in this area to determine the highest tooth. The amount of run-out varies depending on the diameter of the bearing.
**Step 6:** Once you find the high tooth, mark it for future reference.

**Set Worm End Play**

**Step 1:** Locate the high tooth on the gear (See above)
**Step 2:** Screw a bolt into the threaded hole nearest the high tooth. Screw additional bolts into threaded holes at 90° from the high tooth.
**Step 3:** Mount a magnetic base with an indictor attached on top of the worm housing and at the opposite end from the motor mount.
**Step 4:** Adjust the indicator to read from the end of the worm shaft. Set the indicator to 0.
**Step 5:** Using two of the bolts as handles, rotate the outer race back and forth. Read the total indicator movement. This measurement is the end play of the worm. The specification for end play is +0.000/-0.004" (+0.000/-0.1016mm). If end play does not meet this specification, remove the bearing retainer and add or remove shims from the unit. Repeat this procedure until the end play meets specification.

**Set Gear Bearing Backlash**

**Step 1:** Locate the high tooth on the gear (See above)
**Step 2:** Rotate the bearing until the high tooth is engaged with the worm. Loosen the three bearing retaining allen head bolts just enough to be able to move the bearing toward or away from the worm. Screw a bolt into the threaded hole in the bearing nearest the worm.
**Step 3:** Set the magnetic indicator base on the worm housing with the indicator probe against the bolt. Set the indicator dial to zero.
**Step 4:** Move the bearing back and forth. Watch the indicator dial and adjust the bearing in or out of the worm until the total indicator movement is 0.005" (0.127 mm). Notice: Be sure to deduct any end play in the worm from the indicator reading.
**Step 5:** Rotate the bearing 180°. Recheck the backlash. The total backlash should be 0.005" to 0.012" (0.127 to 0.3048 mm).
**Step 6:** After setting the backlash, torque the bearing retaining allen head bolts while watching the indicator dial so the correct backlash setting is maintained. Use the Torque Data Chart and Rotation Gear Bearing Thread Tightening Procedure for specifications.

# Lubrication Recommendations

## Crane Lubrication

| Component | Location | Recommendation |
|---|---|---|
| Hydraulic System | Reservoir | |
| | Below –5˚F | High VI, low pour, ISO 22, AW hydraulic oil |
| | -5˚F to 90˚F | High VI, low pour, ISO 32, AW hydraulic oil |
| | Above 90˚F | ISO 46, AW hydraulic oil |
| Open Gear Teeth | Crane Rotation Gear | Lithium complex, NLGI 2 grease with moly |
| Worm Drive Bearings (including turntable bearing inner race) | Crane Rotation Gear, Inside Crane Compartment | Lithium complex, synthetic based NLGI 00 grease |
| Cylinders | Crane Pivot Areas | Lithium complex, NLGI 2 grease |
| Winch | Winch Drum | Synthetic 80W-90 gear oil with friction modifiers, API GL-5 |
| Wear Pad Lubrication | Extension Booms | Synthetic lubricant containing Teflon® |

## Compressor Lubrication

| Component | Location | Recommendation |
|---|---|---|
| Reciprocating Single Stage | Compressor Crankcase | ISO 100 compresser oil |
| Reciprocating Double Stage | Compressor Crankcase | ISO 100 compresser oil |
| Screw Compressor | Compressor Crankcase | |
| | -15˚F to 86˚F | Synthetic performing ISO 32 compresser oil |
| | -23˚F to 100˚F | Synthetic performing ISO 46 compresser oil |
| | 32˚F to 113˚F | Synthetic performing ISO 68 compresser oil |

**Greasing the Crane**
**Lubricate all grease gun points with**
**Extreme Pressure Grease - Stellar P/N: 22059.**

# Chapter 4 - Troubleshooting

**This chapter will list a number of potential problems that may occur while operating the crane. Most problems are easily solved using the solutions portion of this chapter. If problems persist, please contact Customer Service at Stellar Industries 1-800-321-3741.**

**Prior to troubleshooting:**
Always make sure the emergency brake is engaged, the PTO is engaged (if equipped), and the main power switch of the control panel inside the cab is turned on.

To determine if there is an electrical or hydraulic problem, first try to operate the crane manually. This is done by turning the manual override knob on the flow valve, then operating the individual solenoid valves located along the valve bank. If the crane operates, there will be an electrical problem to trace. If the crane does not operate using the manual overrides, there is a problem within the hydraulic circuit.

**Problem: Crane will not operate.**
**Solutions:**
- Make sure that the parking brake is engaged.
- Make sure that the PTO is engaged.
- Make sure that there is 12V power going to the radio receiver. If there is no power going to the receiver, trace back to the power source and check for a blown fuse or loose ground connection. Refer to radio remote troubleshooting guide at the end of this chapter.
- Make sure that the transmitter batteries are fully charged.
- Make sure that the hydraulic pump is operating at its rated flow or GPMs. Check the flow by using the flow meter to determine the GPMs. It is possible that the hydraulic pump is getting weak. If this is suspected, contact Stellar Customer Service.

**Problem: Crane will operate manually but will not operate by radio remote.**
**Solutions:**
- Make sure that there is 12V power going to the radio receiver. If there is no power going to the receiver, trace back to the power source and check for a blown fuse or loose ground connection. Refer to radio remote troubleshooting guide at the end of this chapter.
- Make sure that the parking brake is engaged.
- Make sure that the parking brake switch is working properly. Check the parking brake switch by performing a continuity test. If the switch is defective, simply replace it.

**Problem: Not all crane functions operate using the radio remote transmitter or crane operates intermittently.**
**Solutions:**
- Make sure that the toggle switch is working properly. If the switch is defective, simply replace it.
- Make sure that there is power going to the valve bank coil solenoid of the function that will not operate. If no power is going to the coil solenoid, check wiring connections on wire harness plug connector for broken wires, loose connection or poor crimp. If power is going to the solenoid valve, it may not be opening to allow hydraulic oil to the function that is not operating. Remove stem valve, thoroughly clean, lubricate, and reinstall valve. Do not over tighten. If the valve will not close, simply replace it.

**Problem: Two functions operate at the same time while only toggling one function.**
**Solutions:**
- Make sure that the solenoid valves are all latched in the center position to ensure that they do not move while operating the crane.
- Determine the function that is operating on its own. Check to see if there is power going to the solenoid valve from a function that should not be operating. If voltage is present at the solenoid valve without operating the function, the toggle switch has failed and is stuck in the "on" function. If no voltage is present, the solenoid valve may be partially open. Remove the stem valve, thoroughly clean, lubricate, and reinstall the valve. Do not over tighten. If valve will not close, simply replace it.

**Problem: Winch brake will not hold.**
**Solutions:**
- Check to see if the back pressure on the return line of the winch is greater than 50 psi. Try operating a function other than the winch. Operate the function both ways and then stop.

Now operate the winch. If the brake still does not hold, contact Customer Service at Stellar.

**Problem: Winch will not hold load.**
**Solutions:**
- Make sure that the object being lifted does not exceed the rated capacity of the winch. Refer to the capacity chart. If the object is within the rated capacity, reposition the truck and try to lift the object without using the crane boom extensions.
- Make sure that the relief valve on the winch is set correctly. Readjust the relief valve if necessary.

**Problem: Crane only operates at full speed.**
**Solutions:**
- Check to see if there is 12V power constantly going to the proportional valve. If 12 volts are showing up at the proportional valve without pulling on the transmitter trigger, the handle/trigger assembly may be defective. If 8 volts are showing at the proportional valve, it is possible that the valve is stuck open and will not close. Remove the valve, clean it thoroughly and reinstall. Do not over tighten. If the problem persists, replace the proportional valve.
- Check to see if the manual override on the proportional valve is turned out. Turn the manual override on the flow valve in.

**Problem: Crane operates slowly.**
**Solutions:**
- Make sure that the crane is receiving the recommended hydraulic flow to operate.
- Check the level of hydraulic fluid in the reservoir. Add fluid as needed.
- Check hydraulic fluid temperature.
- Check to see if the valve bank orifice is plugged. If so, replace the orifice. Call Stellar Customer Service for instructions.
- Make sure the proportional valve is receiving 12V power when fully engaging the transmitter trigger. If there is not 12V power while pulling the trigger, check for loose connections inside the transmitter or replace the handle trigger assembly. If the proportional valve is receiving 12 volts, loosen the solenoid holding nut and check to see if the solenoid coil is magnetizing. If no polarity is present, replace the coil. If coil is magnetizing, remove the stem valve, thoroughly clean, lubricate, and reinstall the valve.

**Problem: Winch "Up", Main Cylinder "Down", and Extension Cylinder "Out" are the only functions that don't operate.**
**Solutions:**
- Make sure that the anti-two block weight and chain on the end of the boom are straight so they slide easily along the wire rope cable.
- Make sure that the limit switch is working properly. Disconnect the two wires connected to the limit switch and tie them together. If all functions operate, replace the limit switch.
- Make sure that the cord for the cord reel is undamaged. Check the continuity of the cord. Disconnect the cord reel from the crane harness and bypass the harness connection. If the crane operates properly, replace cord reel.

**Problem: Cylinder drifts outward or downward.**
**Solutions:**
- Check to see if there is air in the hydraulic system. Operate all cylinders connected to the hydraulic system. Start with the extension cylinder, then operate the main boom, winch, rotation, and ending with the hydraulic stabilizers, if installed. When operating, extend each cylinder halfway out, retract all the way in, and then extend until the cylinder rod is at the end of its stroke. Operate cylinders slowly so air is pushed thru the system to the reservoir. Repeat this cycle 2-3 times.
- Make sure the holding valves are operating properly. Note: Before performing any maintenance on hydraulic components, relieve hydraulic oil pressure from all hydraulic circuits. Remove, clean, and then inspect each holding valve. When removing a holding valve, always relieve the pressure inside the cylinder by loosening jam nut of the holding valve and turning set screw inward/clockwise. Count the number of turns until the set screw is seated. When reinstalling the holding valve, make sure the valve is reset by turning the set screw the number of turns it took to relieve the pressure. Finish by tightening the jam nut.
- Check the cylinder rod for scratches. If a scratch is located on the cylinder rod, hydraulic fluid can pass thru and cause a loss of pressure. Replace cylinder rod or cylinder.
- Check to see if the piston seals are damaged. If they show signs of damage, install a new cylinder seal kit.

# Stellar® CDT™ Radio Remote Troubleshooting

| Symptom | Probable Cause | Remedy |
|---|---|---|
| System will not initialize after normal start-up procedure | Transmitter batteries fully discharged | Check batteries to ensure a full charge. Replace with fully charged batteries if necessary. |
| | No power to the receiver | Check the receiver to be sure power is applied. Ensure that the system is properly grounded. |
| Transmitter is transmitting (Power LED flashing), but machine will not respond<br><br>Always match the receiver address and frequency channel to the transmitter. | Transmitter out of range | Take the transmitter back into the range of the receiver. Restart. |
| | A motion function was not in OFF position when transmitter turned on | Ensure that all switches are in OFF (neutral) position when the Start switch is activated. |
| | Receiver power off | Turn on power to receiver. |
| | Transmitter/receiver frequency channels do not match | Check frequency settings to be sure transmitter and receiver are set to same frequency channel |
| All machine motions operate intermittently | Receiver antenna connection is loose or missing | Tighten or replace antenna. |
| | Surge suppressors not installed on contactors | Install RC type surge suppressors on all magnetic contactors that are controlled by the radio remote control system |
| | Control wiring too close to high power machine wiring | Control wiring must be run separately from high power machine wiring. |
| | Another frequency may be interfering with the system. | |
| Some machine motions operate intermittently | Machine motion wiring may be loose. | Check wiring from receiver to plug and from plug to machine motion actuator. |
| | Connector inside receiver is loose | Check all connectors, reseat if necessary. |
| | Surge suppressors not installed on contactors | Install RC type surge suppressors on all magnetic contactors that are controlled by the radio remote control system |
| | Control wiring too close to high power machine wiring | Control wiring must be run separately from high power machine wiring. |

# Synchronizing the Receiver and Transmitter

If the receiver and transmitter are not communicating, use the following procedure to re-synchronize the unit:

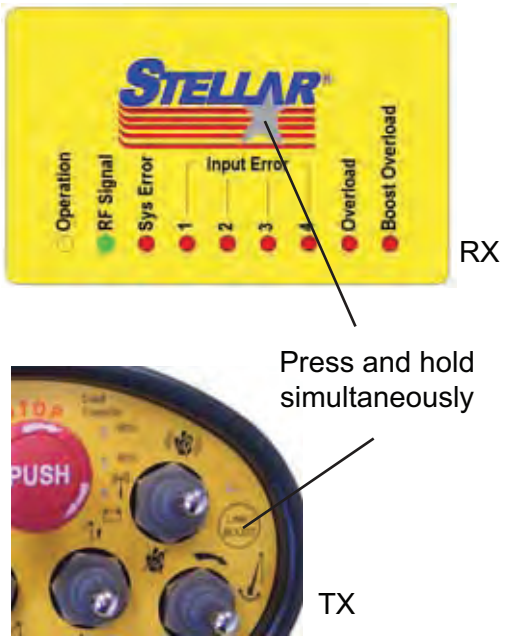
### Synchronizing the Receiver and Transmitter Address and Channels

1. Press and hold the **START** switch on the transmitter while pressing and holding the **Learning Function** button on the receiver.

NOTE: The star in the Stellar logo is the **Learning Function** button.

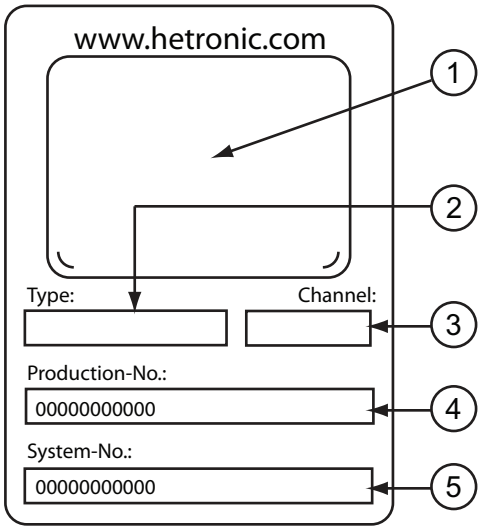
2. Release the Start switch and Learning Function button as soon as the green RF Signal LED is flashing on the receiver.

   Your receiver and transmitter are synchronized and ready to use.




**Synchronizing RX and TX**

# Receiver/Transmitter Identification Tag




## Unit Label Areas and Meanings

1. Specific approvals, such as BTZ, FCC, CE, etc.
2. Type of transmitter or receiver.
3. Frequency and RF unit.
4. Eleven-digit Production Number.
5. Eleven-digit System Number.

# Stellar ® CDT Radio Error Code Troubleshooting

**Error Input 1 (Pressure Transducer cylinder base end) Harness wire PD1**

**Problem: The Boom down, Extension out, and Winch up functions do not operate and the radio receiver is displaying Input error 1.**

**Solutions:** Check for broken or loose wires going to the transducer on the main lift cylinder. If the connector is unplugged from the transducer, plug the connector back into the transducer. If the problem still exists, check to make sure that the PD1 wire harness connector is plugged into the PD1 base end transducer. This transducer is locate on the cylinder manifold assembly and is closest to the base end of the cylinder. PD2 transducer is located closest to the rod end of the cylinder. If there is no change contact Stellar Customer Service.

**Problem: Winch up and Extension out do not operate while the main boom cylinder is fully retracted or the crane is stowed in the boom rest.**

**Solutions:** Raise main lift cylinder slightly, this condition is due the safety systems of the crane.

**Error Input 2 (Pressure Transducer cylinder rod end) Harness wire PD2**

**Problem: The Boom down, Extension out, and Winch up functions are only operating at 75% of their normal speed and the radio receiver is displaying Input error 2.**

**Solutions:** Check for broken or loose wires going to the transducer on the main lift cylinder. If the connector is unplugged from the transducer, plug the connector back into the transducer. If the problem still exists, reverse the two transducers and see if problem reverses. If there is no change contact Stellar Customer Service.

**Error Input 3 (Inclinometer)**

**Problem: The crane will not lift the rated load per the capacity chart and the Boom up, Extension out, and Winch up functions are only operating at 75% of their normal speed and the radio receiver is displaying Input error 3.**

**Solutions:** Check for broken or loose wires going to the Inclinometer located just inside the main boom assembly. If the connector going to the Inclinometer has come loose or is unplugged, plug the connector back into the Inclinometer. If the problem still exists, replace the Inclinometer.

**Error Input 4 (Anti-two-block)**

**Problem: The Boom Down, Extension out, and Winch up functions will not operate and the radio receiver is displaying Input error 4.**

**Solutions:**

1. Make sure that the Anti-2-block weight and chain on the end of the boom are straight so it easily slides up and down the wire rope cable.
2. Make sure that the cradle bar is not bent and is not allowing the limit switch to disengage.
3. Disconnect the two wires connected to the limit switch and twist them together. If all functions operate, replace the limit switch.
4. If the functions still do not operate after testing the limit switch, visually inspect the cord reel wires going to the limit switch. If the wiring appears to be ok, check the continuity of the cord or disconnect the cord reel from the crane harness and bypass the harness connection. If the crane operates properly, replace the cord reel.

# Models 5521-12628 Manual Operation

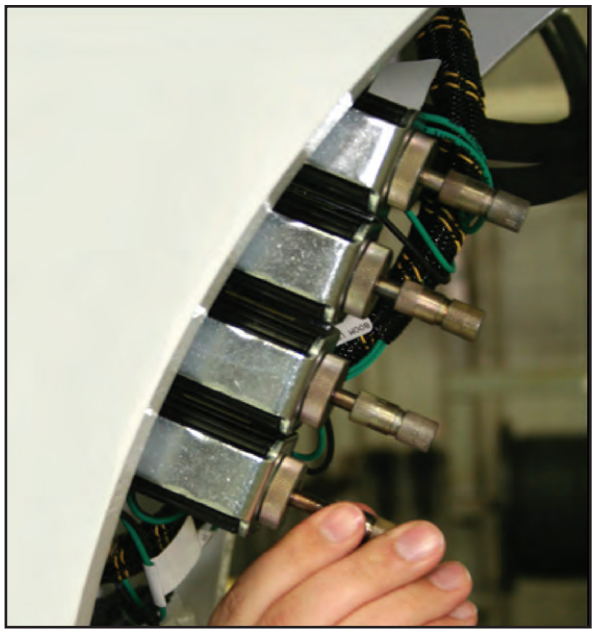
***If the remote control malfunctions, follow these steps to operate the crane manually:***

1. **Activate Flow Control.** Turn the override screw on proportional flow control counter-clockwise. Full adjustment is between three and five turns.

2. **Operate Solenoids.** Using the identification decal as a guide, slide the knurled sleeve out and then push or pull to operate the desired function. Be sure the sleeve is in the center, locked, position before returning to remote operation.

3. **Deactivate Flow Control.** Turn the override screw clockwise until stopped. Full adjustment is between 3 and 5 turns.

4. **Return the valve bank manual overrides to the neutral position.** Failure to do so can result in unexpected crane movement.



5. **Have the unit serviced immediately to restore remote control functionality.**

# Model 14528 Manual Operation

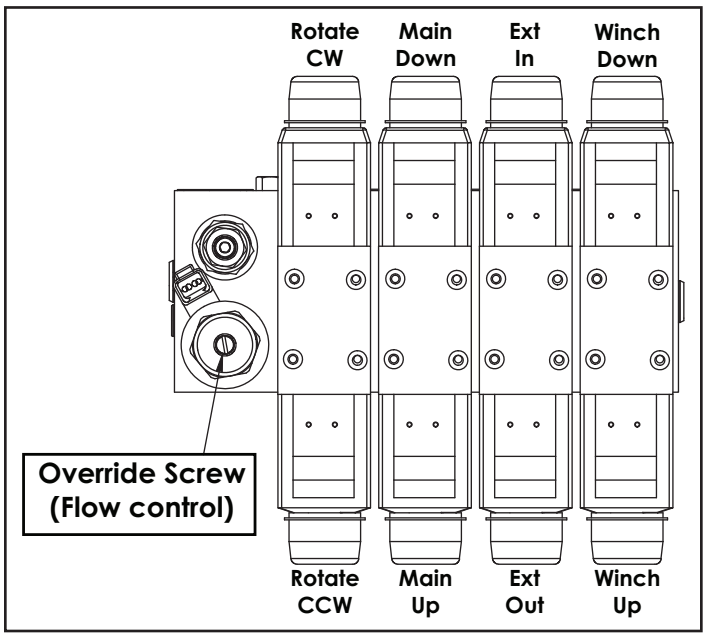
***If the remote control malfunctions, follow these steps to operate the crane manually:***

1. **Activate Flow Control.** Turn the override screw on proportional flow control clockwise. Full adjustment is between 1.5 and 2 turns.

2. **Operate Solenoids.** Using the identification decal as a guide, push the corresponding button to operate the desired function.

3. **Deactivate Flow Control.** Turn the override screw counter-clockwise back to its original position (between 1.5 and 2 turns).

4. **Have the unit serviced immediately to restore remote control functionality.**




**WARNING**

**Overload and anti-two block protection features are disabled during manual operation. Do not use manual operation to perform lifts.**