



Safety, Installation, Maintenance, and Operation

14629 Telescopic Crane

MANUAL #700-20015

Revision Date 03/20/18

**Summit Truck Bodies
990 Vernon Road
Wathena, KS 66090
866-985-3100
Fax: 785-989-3563**

www.summitbodies.com

Subject to Change Without Notification

SUMMIT TRUCK BODIES WARRANTY REGISTRATION

Fax Transmission

| | | | |
|--|-------------------------|----------------------|----------------|
| To: | Warranty Department | Fax: | (785) 989-3563 |
| From: | | Date: | |
| Re: | Production Registration | Pages: | |
| End user information: (Required for Warranty Activation) | | | |
| Name: | | Phone: | |
| Address: | | | |
| City: | | State: | Zip: |
| Contact: | | E-mail Address: | |
| Distributor information: (Required for Warranty Activation) | | | |
| Name: | | Phone: | |
| Address: | | | |
| City: | | State: | Zip: |
| Contact: | | E-mail Address: | |
| Product information: (Required for Warranty Activation) | | | |
| Model Number: | | Serial Number: | |
| Date Product Delivered: | | Date Processed:* | |
| Original Vehicle Vin: | | *For Summit Use Only | |

ONE REGISTRATION FORM PER UNIT (CRANE OR BODY)

Registration form must be mailed or faxed within 15 days of customer installation.

Mail to:
Warranty Department
Summit Truck Bodies
990 Vernon Road
Wathena, KS 66090

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REVISION RECORD

| Date | Section(s) or Page(s) Revised | Description of Change | Initials |
|----------|--|--|----------|
| 03/01/10 | 1, 3, 13, 15, 17, 18, 21, 23, 26, 27, 28, 52 | Updated Logo and various graphics | |
| 7/15/10 | 1, 8, 9-12, 17, 20-22, 29-31, 34-39, 44 | Updated text for clarification | |
| 7/26/10 | 11-14, 22-24, 26-42 | Updated text for clarification | |
| 08/03/10 | Full Manual | Edited typographical errors | |
| 06/12/15 | Section 2.6, 2.7, and 2.8 | Updated sections adding Phase II | |
| 10/13/16 | Page 72 | Updated callouts on control valve view | |
| 07/03/17 | Section 2.9 | Added Phase III info and data | |
| 09/06/17 | Full Manual | Updated contents | NB |
| 03/20/18 | Full Manual | Updated contents | CG |

Note:

1. The information contained in this manual is in effect at the time of this printing. It does not cover all instructions, configurations, accessories, etc. If additional information is required, please contact Summit Truck Bodies (866) 985-3100.
2. Summit Truck Bodies reserves the right to update this material without notice or obligation.

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OWNER'S MANUAL

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LIMITED WARRANTY A



INTRODUCTION

READ CAREFULLY

Congratulations on your purchase. You are the owner of what we consider to be one of the leading cranes in the service body field. This crane will provide you with both quality and safety if you follow the guidelines of working with a well-maintained piece of equipment in a safe manner using the correct Personal Protective Equipment (PPE) for your work environment. Your crane carries a 5-year warranty on paint and weldments, a 3-year warranty on the remote system and 1-year warranty on parts.

For continued quality service, carefully read the information contained in this manual before operating the equipment. This manual provides basic guidelines for the safe and proper operation of the crane. After reading and understanding the material in this manual, work with the crane and safely learn basic operations.

To prevent injury or death, maintain the crane, operate it safely, and know your surroundings. Be cautious of such things as overhead wiring, overloading of the crane, and side loading of the crane, and wear prescribed PPE.

The operator must have a working knowledge of existing federal, state, and local codes and regulations governing the safe use and maintenance of this crane.

This crane was tested to conform to the following code:

ASME B30.5a
Test Documented On: March 14, 2013
MOBILE AND LOCOMOTIVE CRANES
The American Society of Mechanical Engineers

This crane carries a warranty, but the warranty will be null and void if the crane is misused or abused by overloading, side loading, pulling a load through open terrain, lack of maintenance as directed in this manual, or making modifications to the crane without the express permission of Summit Truck Bodies.

Treat the equipment with respect and service it regularly.

These two things can add up to a safer working environment, longer equipment life, and prevention of loss of life and limb

Summit Truck Bodies issues a limited warranty certificate with each unit sold. See warranty information located in this manual.

Distributor Assistance:

Should you require any assistance not given in this manual, we recommend you consult your nearest Summit Truck Bodies distributor. Our distributors sell authorized parts and have service departments that can solve almost any needed repair. This manual does not cover all maintenance, operating, or repair instructions pertinent to all possible situations. **If you require additional information, please contact Summit Truck Bodies at the following telephone number: (866) 985-3100.** The information contained in this manual is in effect at the time of this printing. Summit Truck Bodies reserves the right to update this material without notice or obligation.

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SAFETY

To prevent serious injury or death, thoroughly read this chapter. Make sure safety practices discussed in this chapter are put into practice when operating the crane. This chapter is **NOT** all-inclusive. Become familiar with all other safety precautions implemented by the company, owner of the equipment, or state and federal government.

Make sure the work environment is safe.

Know the surroundings. Be aware of the following:

- Power lines
- Loose soil not allowing for solid footing
- Lack of PPE at the job site

Safety should be the number one priority from the beginning to the end of each job. The following safety requirements listed provide basic requirements for safety on the job.

To qualify as a safe operator first know and understand the equipment.

- Know the limitations and strengths of the crane.
- Properly Maintain the equipment. If not kept clean and in working order, the crane will likely malfunction. Follow a preventive maintenance schedule and a routine visual inspection of the crane before the start any job.
- The operator must have a working knowledge of all safety and government regulations. Refer to any Occupational Safety and Health Administration (OSHA) manual for guidance. Summit Truck Bodies is not liable for accidents caused by the operation of the crane.

Safety Tips

- The truck should be equipped with a fire extinguisher and first-aid kit.
- Use best practices with PPE.
- Avoid any type of body jewelry that might get caught on moving objects.
- Avoid using moving parts of the truck as a foothold or handhold. Use the grab bars and steps designed for this purpose.
- Avoid walking under a load.
- Never use the crane as a mode of transportation from the ground level to an elevated surface.

General

The equipment owner is responsible to establish a training process for the operators. Qualified personnel should be established before starting any job. As with any equipment, be it a motor vehicle or machinery, this equipment cannot be operated by anyone under the influence of alcohol, drugs, or prescription medication, or any substance that impairs the operator physically, mentally, or physiologically.

Personal Safety

The use of PPE is critical to the safety of the operation and the well being of the operator. The following PPE (this list is not all-inclusive) should be used in the safe operation of the crane:

- Protective helmets
- Safety shoes, preferably steel toed
- Cut proof gloves, preferably snug fitting
- Ear plugs or any form of hearing protection
- Safety glasses or shields
- Reflective vests

Follow the established safety rules and regulations. If the established rules and regulations are not available, consult the appropriate OSHA manual.

Routine inspection of the safety decals must be performed for the safety of the operator. Make sure all decals are legible and in good condition. Replace any and all missing or damaged labels.

SAFETY

When performing maintenance follow these safety guidelines:

- Disengage the power source before working on the equipment.
- There is stored hydraulic pressure in the hydraulic lines. Stored hydraulic pressure must be released prior to working on the crane components or any part of the hydraulic system.
- Stay clear of all moving parts of the equipment. Failure to do so could cause equipment failure, personal injury, or death.
- Only trained and competent personnel should record and perform maintenance.
- Never bypass electrical circuits and/or hydraulic plumbing. Failure to do so could cause equipment damage, injury, or death.

Stability

- The truck should be parked on solid level ground. If unable to park on such a surface, outrigger pads may need to be used to level and support the truck and its load.
- Never exceed the crane capacity chart or the stability chart. These ratings are based on tested capacities of the truck, the structural design or the crane, and mechanical abilities of the crane's components.
- Be aware of the abilities and limitations of the crane. Improper use of the crane could cause damage to the crane, service truck, lifted load, surroundings, and cause injury or death.
- Park the truck on level ground if possible, use outrigger pads if needed, and always fully extend the outriggers out and then down.
- Be aware of the surroundings when lowering outriggers. Stay clear of outriggers when lowering.
- Never operate the crane before the truck is positioned on stable, level ground.
- Put the truck in park or neutral (for manual transmissions), and set the parking brake before attempting a lift.

Load Safety

Before lifting a load, know the weight of the load that will be lifted. Consult the capacity chart located on the rear of the truck, comparing the two to ensure the crane will safely handle the job.

The crane has a safety built into the remote and receiver to prevent an overload, but like any mechanical device, it can be overridden by an operator. Please be advised that if this happens, **the warranty is null and void**. Consult with our service department to return the crane safety features back to the required setting established at the plant.

The traveling block is equipped with a safety hook at the point of attachment to a load. Always make sure the load is secured to the hook with the safety latch in the closed position prior to lifting the load. Directions can be found in any OSHA manual.

- The gear rotation mechanism is equipped with a ring and pinion gear. These are not designed for side loading of the crane, which will result in failure of the gears.
- A load suspended overhead should be avoided; never walk under one.
- When leaving the truck, lower the load to the ground. Failure to do so can result in injury or death if the load were to become unstable while unattended.
- Keep all people away from the suspended load; never position the load over a person.
- Dragging the load with either the winch or the boom will result in damage to the equipment and could cause injury to the people around the load.
- The crane boom is designed to lift; it is not intended to be used to force downward pressure on any type of operation.

Environment

The crane operates at maximum performance if there is a good preventive maintenance program in place. The work site is generally full of contaminants, so weekly washing of the truck and/or crane is a good prevention tool. The use of lubricants on mechanical parts on the equipment should be followed on a weekly, monthly, and quarterly basis. Prevention of the general wear and tear due to corrosives is insurance that the machine will last.

- Avoid using the crane at the highest point during a storm.
- Keep crane at the prescribed clearance from all power lines.

If operating the truck in extreme cold, follow these guidelines to prevent equipment failure or damage to hydraulic system components:

- Start the truck and let it run for 15 minutes before engaging the Power Take Off (PTO).
- With the PTO engaged, wait an additional 15 minutes prior to starting the compressor or crane. This allows the systems to warm up before putting them under pressure.
- Do not rev the truck engine with the PTO engaged. This will damage the hydraulic pump and other hydraulic system components.
- Make sure guidelines attached to the truck owner's manual for extreme cold conditions are read and followed to allow for maximum performance of the truck.

Maintenance Safety


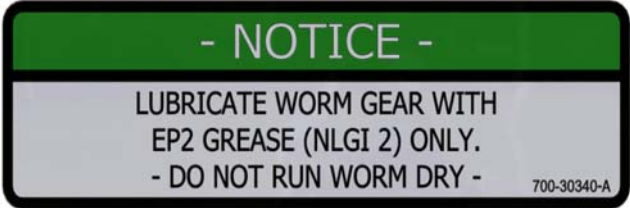
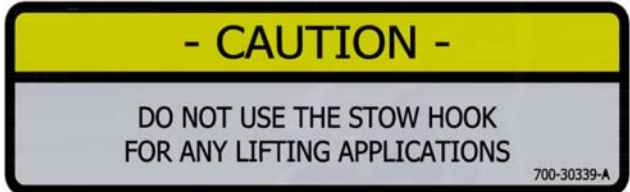
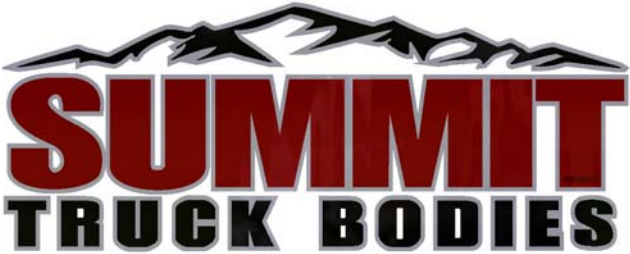
The Summit Truck Bodies truck or crane is designed for years of use. Do not modify the components or the systems of the truck or crane. This will cause damage to the equipment and impede the functions of the truck.

Electrocution





- Use extra personnel to signal when operating near electrical wires.
- Keep at least 10 ft between any portion of the crane and an electrical line. Add an additional 12 in. for every additional 30,000 volts or less.
- Allow extra space during windy conditions for swaying power lines.
- Death or serious injury can occur when working during electrical storms or near power lines.

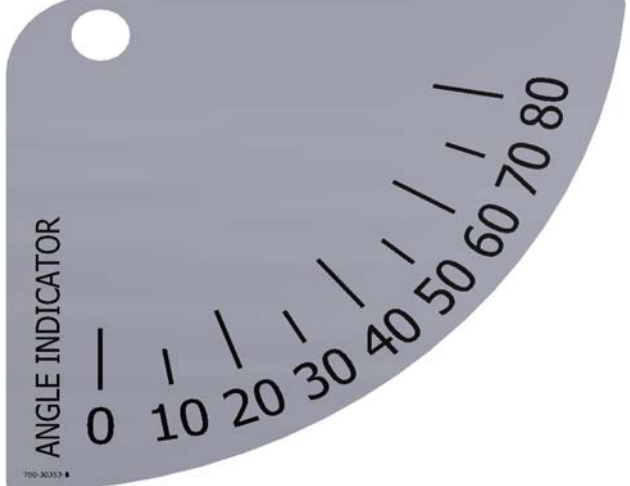
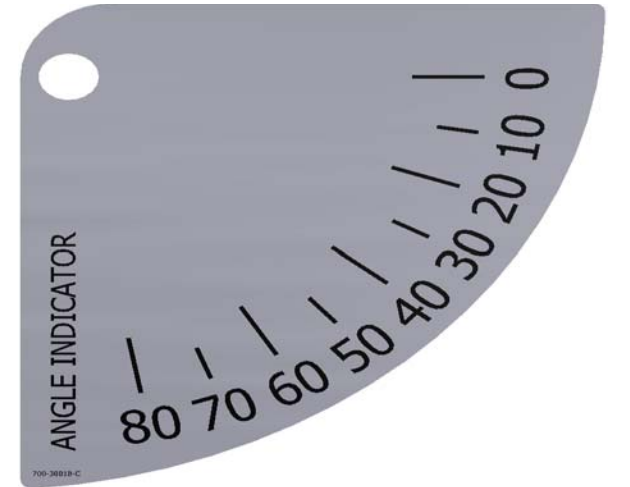
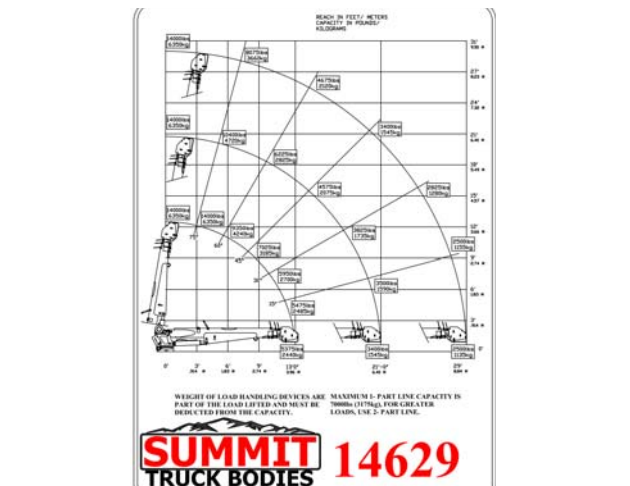
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LABELS AND DECALS





| | |
|--|--|
| <p>Decal Number: 700-30347</p> <p>Title: Danger, Two Blocking Crane</p> <p>Description: Informs the operator not to allow the hook block to come into contact with the boom tip by hoisting up, extending, or lowering the boom tip.</p> <p>Location: Boom Tip</p> |  <p>The decal features a red header with a white exclamation mark icon and the word "DANGER" in white. Below is a black and white illustration of a crane boom with a hook block. Red arrows indicate the hook block moving towards the boom tip in three directions: "BOOM DOWN", "BOOM EXTENDING", and "WINCH PULL". Below the illustration, the text reads: "TWO BLOCKING THE CRANE WILL CAUSE DEATH, SERIOUS INJURY OR PROPERTY DAMAGE. DO NOT ALLOW THE HOOK BLOCK TO CONTACT THE BOOM TIP BY HOISTING UP, EXTENDING OR LOWERING THE BOOM." The part number "700-30347-A" is in the bottom right corner.</p> |
| <p>Decal Number: 700-30340</p> <p>Title: Notice, Lubricate Worm Gear</p> <p>Description: Informs the operator to inspect the worm gear. Do not run the worm gear dry.</p> <p>Location: Pedestal</p> |  <p>The decal has a green header with the word "NOTICE" in white. The main body is white with black text: "LUBRICATE WORM GEAR WITH EP2 GREASE (NLGI 2) ONLY. - DO NOT RUN WORM DRY -". The part number "700-30340-A" is in the bottom right corner.</p> |
| <p>Decal Number: 700-30339</p> <p>Title: Caution, Do Not Use Stow Hook for Lifting</p> <p>Description: Informs the operator not to use the stow hook for lifting purposes.</p> <p>Location: Lower boom section by stow hook</p> |  <p>The decal has a yellow header with the word "CAUTION" in black. The main body is white with black text: "DO NOT USE THE STOW HOOK FOR ANY LIFTING APPLICATIONS". The part number "700-30339-A" is in the bottom right corner.</p> |
| <p>Decal Number: 700-30373</p> <p>Title: White Outline Logo</p> <p>Description: Identifies Summit Truck Bodies as the crane manufacturer.</p> <p>Location: Both sides of the base boom</p> |  <p>The logo features a stylized mountain range silhouette above the word "SUMMIT" in large, bold, red letters with a black outline. Below "SUMMIT" is the phrase "TRUCK BODIES" in smaller, bold, black letters.</p> |

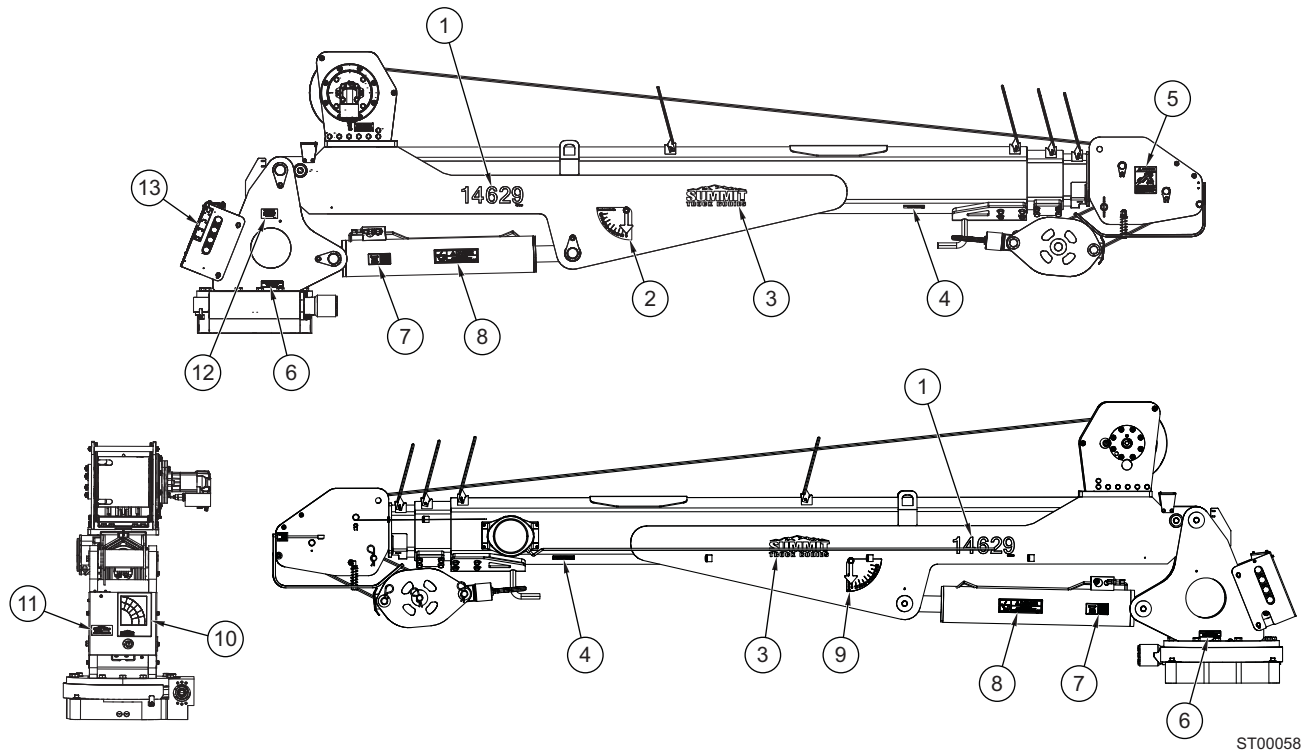
LABELS AND DECALS

| | |
|---|--|
| Decal Number: 700-30452 Title: 14629 Crane ID Description: Identifies size and reach of the crane. Location: Lower boom sections on both sides of the base |  |
| Decal Number: 700-30131 Title: Danger Scissor Point Description: Notifies the operator of a potential scissor point. Location: Both sides of the lift cylinder |  |
| Decal Number: 700-30025 Title: Warning, Overload Hazard Description: Notifies operator not to tamper with the overload device. Location: Both sides of the lift cylinder |  |
| Decal Number: 700-30342 Title: Notice, Crane Designed Description: Informs the operator this crane has been designed and manufactured to ASME/ANSI. Location: Pedestal |  |

| | | |
|---|--|--|
| <p>Decal Number: 700-30353</p> <p>Title: Angle Indicator</p> <p>Description: Informs the operator of the angle.</p> <p>Location: Left side lower boom</p> | |  |
| <p>Decal Number: 700-30018</p> <p>Title: Angle Indicator</p> <p>Description: Informs the operator of the angle.</p> <p>Location: Right side lower boom</p> | |  |
| <p>Decal Number: 700-30453</p> <p>Title: Capacity Chart, 14629</p> <p>Description: Informs operator of the lifting capacity of the crane.</p> <p>Location: Cover pane of valve assembly</p> | |  |

LABELS AND DECALS

| | |
|--|--|
| Decal Number: 700-30411 Title: Crane Control Pedestal Lever Description: Informs operator of how to override crane valve for manual operation. Location: Cover pane of valve assembly |  |
| Decal Number: 700-30451 Title: Serial Number, Model 14629 Description: Informs operator of the model and serial number of the crane. Location: Cover pane of valve assembly |  |
| Decal Number: 700-30364 Title: Crane Color Zone Description: Helps to identify possible dangers in load capacity zones. Location: Rotation gear |  |
| Decal Number: 700-30589 Title: Certification Statement Description: Informs operator that the crane capacity is certified. Location: Pedestal side plate |  |



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| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|---|
| 1 | 2 | 700-30153 | 14629 Crane ID |
| 2 | 2 | 700-30373 | White Outline Logo |
| 3 | 2 | 700-30339 | Caution, Do Not Use Stow Hook For Lifting |
| 4 | 1 | 700-30347 | Danger, Two Blocking Crane |
| 5 | 1 | 700-30353 | Angle Indicator |
| 6 | 2 | 700-30340 | Notice, Lubricate Worm Gear |
| 7 | 2 | 700-30025 | Warning, overload hazard |
| 8 | 2 | 700-30131 | Danger Scissor Point |
| 9 | 1 | 700-30403 | Serial Number, Model 14629 |
| 10 | 1 | 700-30416 | Capacity Chart, 14629 |
| 11 | 1 | 700-30411 | Crane Control Pedestal Lever |
| 12 | 1 | 700-30589 | Certification Statement |
| 13 | 1 | 700-30018 | Angle Indicator |

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SPECIFICATION SHEET

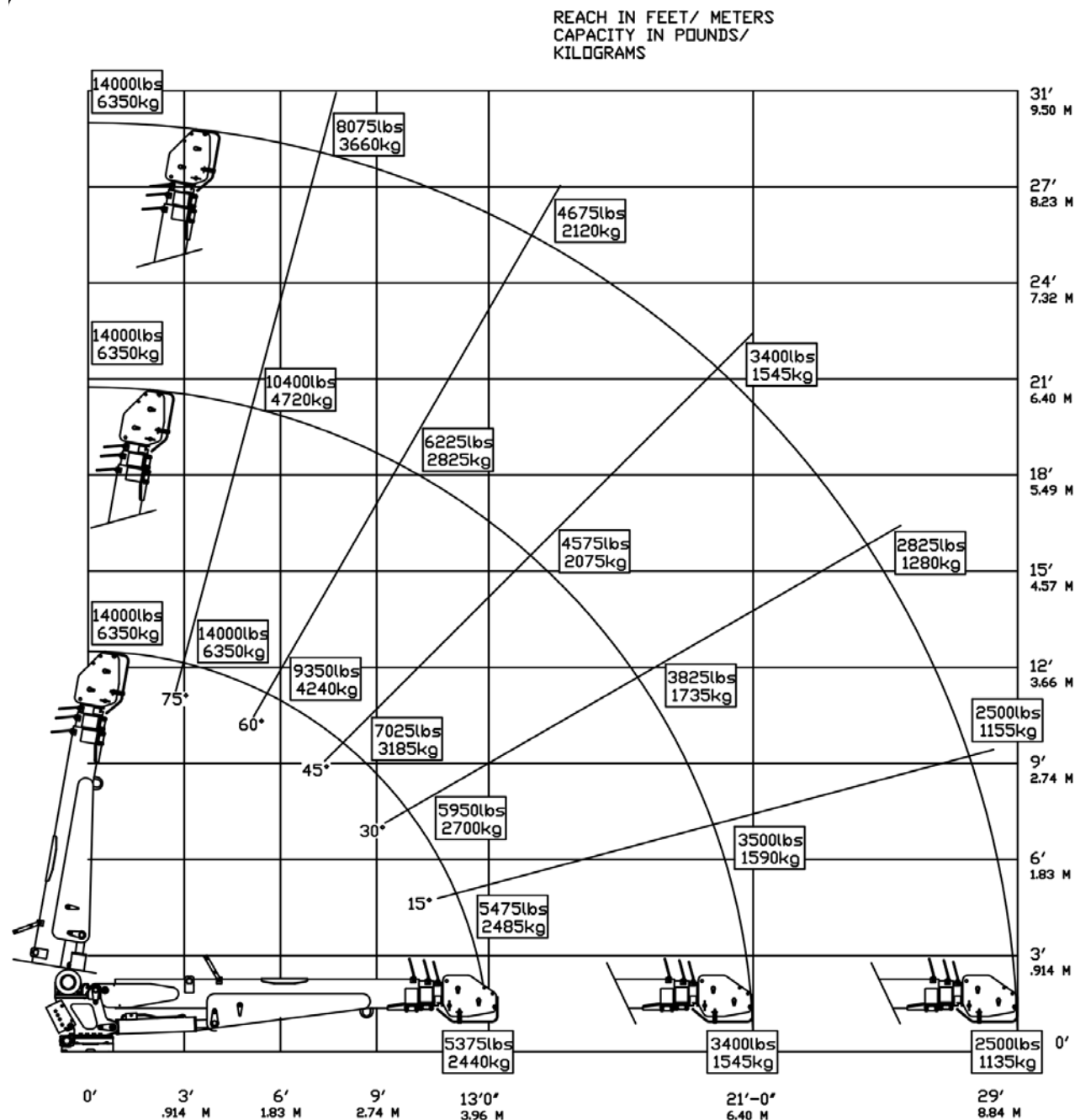
Specifications Model 14629 Crane*

| | |
|---|--|
| Crane Rating: | 70,000 ft-lb (9.68 ton-meters) |
| Standard Boom Length: | 13 ft (3.96 m) from CL of crane |
| Boom Extension: | 1st stage: Hydraulic 96 in. (243.8 cm) 2nd stage: Hydraulic 96 in. (243.8 cm) |
| Maximum Horizontal Reach: | 29 ft (8.84 m) from CL of crane |
| Maximum Vertical Lift: (from crane base) | 30 ft 6 in. (9.29 m) |
| Boom Elevation: | -5 to +80 degrees |
| Stowed Height (crane only) | 35 in. (88.9 cm) |
| Mounting Space Required | 25 x 34.5 in. (63.5 x 87.6 cm) |
| Approximate Shipping Weight | 3425 lb (1554 kg) |
| Controls | Radio control standard for all functions. |
| Winch Specification | |
| Rope Diameter: | 0.5 in. (1.27 cm) |
| Line pull speed: | 60 ft/min (18.29 m/min) |
| Max. Synthetic line: | 7000 lb (3175 kg) |
| Max. double part line: | 14000 lb (6350 kg) |
| Rotation: (worm gear) | 400-degree power |
| Lifting Capacities | 14,000 lb @ 5 ft (6350 kg @ 1.52 m) |
| | 5375 lb @ 13 ft (2440 kg @ 3.96 m) |
| | 4385 lb @ 17 ft (1990 kg @ 5.18 m) |
| | 3400 lb @ 21ft (1545 kg @ 6.40 m) |
| | 2950 lb @ 25 ft 6 in. (1340 kg @ 7.62 m) |
| | 2500 lb @ 29 ft (1135 kg @ 8.84 m) |
| Hydraulic Requirements | PTO and Pump |
| | (8 gpm @ 2800 psi) |

*Subject to change without notification

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CRANE CAPACITY



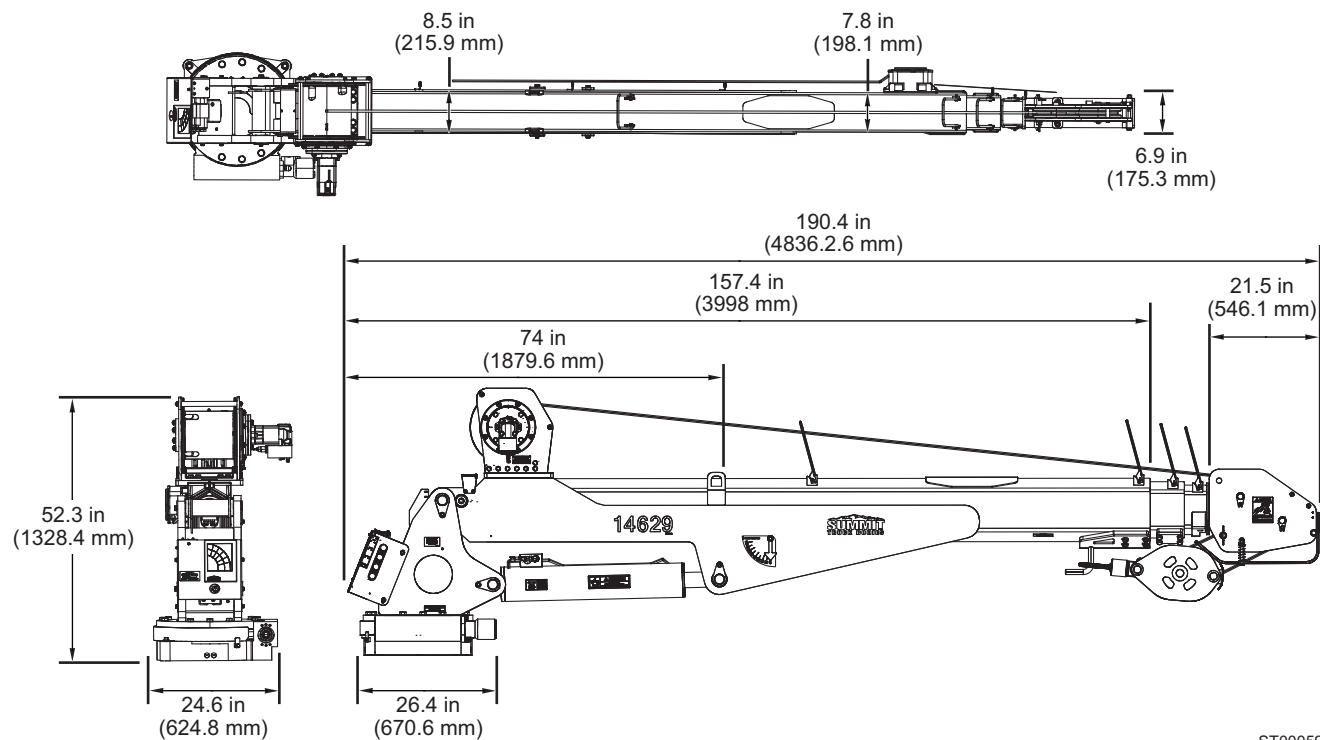
WEIGHT OF LOAD HANDLING DEVICES ARE PART OF THE LOAD LIFTED AND MUST BE DEDUCTED FROM THE CAPACITY.

MAXIMUM 1-PART LINE CAPACITY IS 3,000 LB (1,364 KG). FOR GREATER LOADS, USE 2-PART LINE.

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DIMENSIONS

General Dimensions for a 14629 Crane



ST00059

Note:
All dimensions are in inches.

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CHAPTER 1 - INSTALLATION**WARNING**

To avoid injury or death, the following procedure must be followed when crane installation is performed.

1.1 Overview

The crane and truck body may be purchased separately. To mount the crane to the truck body, please follow the instructions to avoid accidents and/or personal injury or injury to others. It is likely the truck body manual has an instruction guide to help aid in the mounting of the crane. If available use the manual for the particular truck body the crane will be mounted to. Knowing the truck's capacity will allow for the best installation possible for a particular application.

For ease of operation take note of the following:

1. Total Gross Vehicle Weight (GVW) after the crane is installed.
2. If truck body is able to support the weight of the crane.
3. The crane weight depends upon the size of the crane purchased.
4. Determine manufacturer recommended weight requirements before mounting the crane.

1.2 Installation**NOTICE**

Before installing the crane to truck body read and understand the guidelines established under federal law (Title 49 cfr part 568.6). Note Section 567.5 of the law. The end user and installer of the crane is required to certify the vehicle is in compliance with Federal Motor Vehicle Safety Standards and other regulations issued under the National Traffic and Motor Vehicle Safety Act. Visit <http://www.gpoaccess.gov/nara/index.html> for further information. The vehicle must comply with all applicable federal and state regulations.

NOTE

There multiple PTO and pump combinations available. All vary depending upon the chassis, transmission, flow requirements of the crane, and flow requirements of the compressor. Please contact Summit Truck Bodies Customer Service for the individual truck requirements.

1. Make sure the weight and chassis of the vehicle coincides with the chassis requirements of the crane to be installed. The following chassis requirements must be met for the 14629 crane:
 - Minimum cab to axle 84 in. (2134 mm).
 - Body length nominal 170 in. (4318 mm).
 - Body width 98 in. (2489 mm).
 - Compartment depth 22 in. (559 mm)
 - Floor width 54 in. (1372 mm)
 - GVW 33,000 lbs (14,969 kg)

**CAUTION**

To prevent damage to the vehicle, truck body, or crane, make sure all modifications made to the truck body have been approved by the truck body manufacturer. Any components used to modify the crane and/or Summit Truck Bodies will void the warranty and liability of the manufacturer.

INSTALLATION

2. Make sure all modifications made to the truck body have been approved by the body manufacturer and will properly and safely support the weight of the crane.

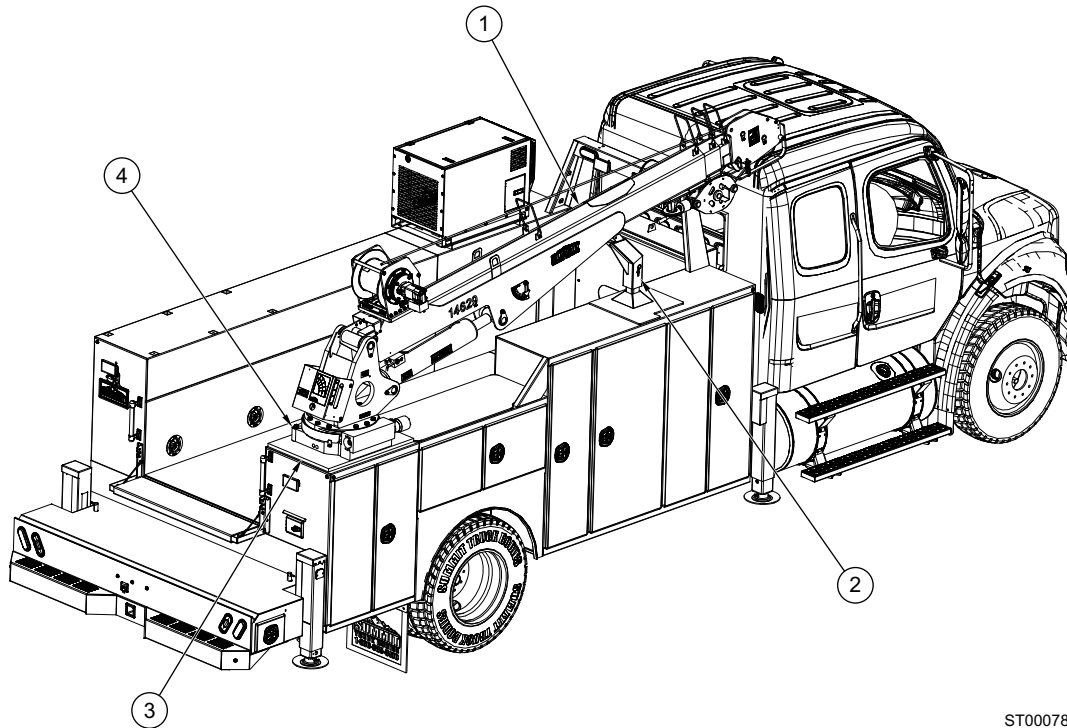


Figure 1-1.

3. Install boom cradle. A boom cradle (Figure 1-1, Item 2) is required on the body to support the crane boom during transportation.



WARNING

To avoid injury or death an appropriate lifting device must be used to support the crane during installation procedure.

4. Use an appropriate lifting device to support the crane.
5. Make sure all hoses and control wires are routed through the 7-in. (178 mm) diameter clearance hole.
6. Secure the crane to the truck body as follows:
 - a. Lower the crane into place with the boom (Figure 1-1, Item 1) facing the rear.
 - b. Make sure the crane is resting properly on the base (Figure 1-1, Item 3).
 - c. Apply Loctite® thread locker #277 to eight mounting bolts (Figure 1-1, Item 4) and install them from the underside of the base (Figure 1-1, Item 3). Torque the mounting bolts to 680 ft lbs (922 N•m).
7. Connect the six-strand power/auxiliary control cord located under the base plate to the hydraulic valve. This provides power to the crane and feedback to auxiliary functions.

8. Connect two hydraulic hoses located under the base plate to the crane. When connecting two hydraulic hoses take note of the following:

- The pressure connections are “06 JIC” and tank connections are “08 JIC” fittings.
- The factory-set pressure relief valve is included in the crane valve.
- Recommended operating pressure between crack pressure and full flow is 2800 psi (19,305 kPa).

NOTE

It is recommended that the return line be no less than 1/2 in (13 mm). Do not use the hose on a hydraulic system with less than 100R1 rating.

9. After the crane has been installed, check all hydraulic lines for:
- Free movement through 400 degrees of crane rotation
 - Sharp corners (which may cut into hose) and kinks
 - Abrasions and chafing
 - Tightness of fittings
 - Leaks
10. Check all bolts and pins.
11. Visually inspect all welds for cracks, holes, etc.
12. Engage PTO.
13. Slowly operate crane through all functions. Inspect all hoses, cylinders and structural members for proper operation.
14. Return crane boom to its support. The unit is ready for operation.
15. Install all safety decals supplied with the crane in a visible area as close to the crane as possible.

1.3 Testing:

1.3.1 Initial Use Checks



CAUTION

To prevent damage to equipment, testing should be performed by designated personnel only.

Prior to initial use all new, altered, modified, or extensively repaired cranes must be tested for compliance with the operational requirements of this crane as follows:

- Test all functions to verify speed and operation.
- Check that all safety devices are working properly.
- Confirm operating controls comply with appropriate function labels.
- Test the crane with a load. Loads must not exceed 110 percent of the manufacturer's load rating.
- Complete and maintain written reports showing test procedures and confirming the adequacy of repairs.

INSTALLATION

1.3.2 Stability Capacity Test:

NOTICE

Under federal law, all crane mountings must be tested for stability. All trucks loaded or unloaded will have a different weight, which affects the stability. Once the truck is loaded to the approximate hauling capacity, a stability test must be completed.

NOTICE

Summit Truck Bodies takes no liability for the placement of a crane by an outside source. If a crane not designed for the body or chassis is installed, the crane and the stability of it will fail. Summit Truck Bodies has completed extensive testing of the crane and has formulated a stability chart to for the truck body and chassis on which it is mounted.

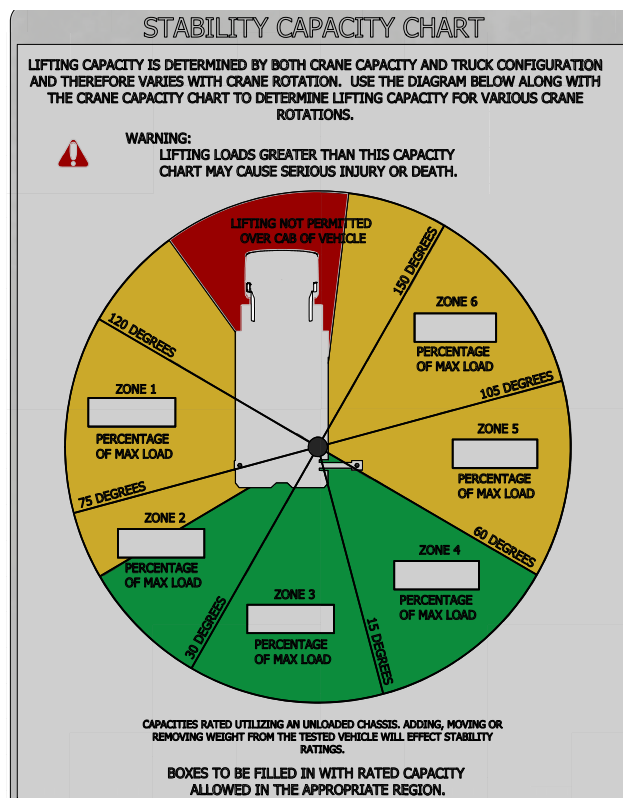


Figure 1-2.

NOTE

The above Stability Capacity Chart is to be used by the installer of the crane. The installer may be unaware of the stability of Summit Truck Bodies cranes being mounted on unknown bodies and chassis.

NOTE

A Stability Capacity Chart must be completed by the crane installation personnel.

1. Place crane in the Zone 1 position (see Figure 1-2).
2. Extend boom until it reaches full extension or begins to become unstable using the weight shown at max horizontal extension in the Crane Capacity Chart (xxi).

3. If the crane is stable with full extension, 100% can be written in the data box for Zone 1 (see Figure 1-2).
4. If the truck becomes unstable prior to the crane achieving full extension, retract the boom until the truck becomes stable.
5. Measure the horizontal reach in this position (center of rotation to end of boom). This is the stable horizontal location in this zone.
6. Divided stable horizontal location by the maximum horizontal location and multiply by 100. This is the percentage of rated capacity for this zone.
7. Record the percentage of rated capacity in the data box for Zone 1 (see Figure 1-2). This is the revised load capacity for this zone due to stability of the service truck.
8. Repeat Steps 1-7 for all other zones until the stability capacity chart is complete.
9. After the test has been completed, return the boom to the transport position.

For more information please contact Summit Truck Bodies at (866)-985-3100.

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CHAPTER 2 - OPERATION

2.1 General

For ease of operation, become familiar with the crane and truck combination. Practice lifting without a load, and then graduate to a small load, gradually becoming larger in load size. Do this prior to actually going to the job site to perform the job task. As with all jobs, there is an element of risk, so prepare the operator for emergency situations and, much like testing for a fire drill, they will master the situation with each practice.

2.2 Load Limits

Know the lifting limits before starting a lift. Study the charts supplied with the crane, to include the load chart and the angle indicator plate. Exceeding the limits within the radius of operation can result in tipping of the truck and/or structure failure, voiding the warranty.

2.3 Equipment Inspection

2.3.1 OSHA Regulations

OSHA regulation 1910.180 calls for frequent and periodic inspections. The inspection record must include the following:

- Date of inspection
- Signature of the person doing the inspection
- Serial number of the crane inspected
- The certification record must be available upon request

2.3.2 Safety Checks

Safety checks must be current and made prior to the operation of the crane. Follow the guidelines listed above as well as the following:

1. Ensure the crane is structurally sound by inspecting the unit for damaged members and loose fasteners.
2. With the crane in a stored position, and all cylinders retracted, check the oil level.
3. Examine hydraulic lines for damage or hydraulic leaks.
4. Test controls for proper operation.
5. Inspect wire rope for damage, kinks, and/or fraying.
6. Correct all defects and malfunctions before the crane is put into service.

2.4 Operating Restrictions and Guidelines



WARNING

When operating the crane rotate slowly. If the crane must be stopped quickly, the weight of the load will cause stress on both the crane and load. This could cause equipment damage, injury, or death.

- Make sure truck is level before using crane for loading or unloading.
- The emergency brake must be engaged prior to any crane operation.
- Engage the PTO while the truck is in the neutral position. If the truck is equipped with a manual transmission, depress the clutch pedal before engaging the PTO.
- The outriggers must be extended and sit on a solid surface to stabilize the truck before operating the crane.
- Extend the wire rope prior to extending the boom. Failure to do so will cause the hook and traveling block to contact the crane.
- Never lift the load any further than necessary. Keep load as close to the ground as possible.
- Never lift load directly over any person(s).
- Do not rotate load too quickly. Rotating the load too quickly will result in an unstable load that could cause injury or damage the crane rotate gears.
- Avoid power lines if at all possible. If it is necessary to make a lift near a power line, do so with extreme caution. Make sure the boom at full extension clears the power line by at least 10 ft.
- The crane should be used for lifting up to the rated load capacity. Lifting over the rated load capacity will result in personal injury or damage to equipment.
- Never leave a load unattended.
- Do not side load crane. Side loading of the crane using the winch will result in damage to the crane assembly.
- Never use crane to move people. The crane is designed to lift a material load only.
- Due to the height of the crane, avoid electrical storms and/or high winds.
- Do not attempt to make repairs to a crane while it is in operation.
- When operating the crane, rotate slowly. If the crane must be stopped quickly, the weight of the load will cause stress on both the crane and load. This could cause equipment damage, personal injury, or death.
- The crane can rotate up to 400 degrees. While rotating the crane do not attempt a full speed stop. If a full speed stop is attempted, the weight of the load will cause stress on both the crane and load.

2.5 Operator Requirements

NOTE

The crane should only be operated by qualified personnel.

- The crane operator must be trained and certified as an operator.
- All trainees must be accompanied by a certified trained operator.
- If a crane inspector is required to inspect and operate the crane, the inspector must have credentials qualifying them to perform the inspection.
- To perform the preventive maintenance on the crane, the maintenance crew must be certified and trained on proper operation of the crane.
- The operator must be competent and have a working knowledge of the crane, safe operation of the crane, and of the owner's manual.
- The operator should know safety and other policies dictated by state and/or federal regulations, ANSI B30.5, and job site guidelines for safety.
- The operator must be able to perform all controls of the crane in a safe manner and know how to implement an emergency procedure if needed.
- The operator must read and understand all guidelines.

2.6 Operator Conduct

As outlined above, the operator is responsible for the safety and welfare of themselves and others at the job site. They should follow the rules of conduct listed below:

- A suspended load must never be left unattended.
- When lifting a load, the operator must give full attention to the lifting of the load.
- All operations of the crane are directly in the control of the operator at the time of the lift.
- A good preventive maintenance policy must be followed by the operator for the safety and maintenance of the crane.

2.7 Crane Precautions

To avoid an accident or injury, follow the guidelines listed below:

- Make sure the equipment is neat, clean, and clearly marked.
- If any equipment damage is visible, it must be repaired before operating the crane.
- Become familiar with capacity and stability charts before performing a lift.
- Use a minimum lifting height when lifting a load. Never lift a load higher than necessary.
- Be aware of moving loads, which can alter the stability and capacity of the crane.
- Be aware of the load and the crane tip locations at all times during the lift.
- Center the load directly under the crane tip. This will help to provide a safe, smooth lift.
- Do not allow the load to swing from side to side. This will cause a load to shift, creating an unsafe and uncontrolled load.
- Do not attempt to over lift the capacity.
- Never attempt to lift a stationary or fixed object.
- Do not side load the crane. Side loading of the crane will result in damage and/or failure of the cranes rotation system.
- A suspended load must remain clear of all personnel. Never pass a suspended load over a person/persons for any reason.
- Use Personal PPE when operating the crane.

2.8 Hook Precautions

- Be aware of all ratings of the hook being used. Each crane hook is rated with a specific load rating.
- Do not exceed the rated capacity of the hook with any lift and/or load attempted lift.
- Do not side load the crane or lift with only the crane tip. This will result in damage to the equipment. The tip is designed to do a straight direct upward lifts only.
- As part of the preventive maintenance plan, include visual inspections of the hook for stress, wear, and as worn safety latch.



WARNING

Do not attempt to repair a hook by welding. Heat from a weld will compromise the integrity of the hook material causing it to fail and resulting in injury or death.

2.9 Deploying Outriggers

2.9.1 Hydraulic Outriggers

1. Rotate locking pins into the unlocked position
2. Go to home screen on the control box.
3. Press the Outriggers button. This will then navigate to the outrigger control screen.
4. Press the buttons DS deploy and PS deploy to deploy the outriggers.
5. Press the DS retract and PS retract buttons to retract the outriggers

2.9.2 Manual Outriggers

1. Rotate locking pin to release drivers side outrigger leg.
2. Pull out outrigger leg and rotate locking pin to lock outrigger leg in position.
3. Lower outrigger leg until it has firm contact with the ground.
4. Repeat Steps 1-3 for the passenger side.

2.10 Performing a Lift

The normal computation for all load ratings is 85 percent of tipping. To ensure a safe lift, the crane must meet all manufacturers' required mounting procedures. All lifts are to be completed with outriggers fully extended, and the truck setting on a flat, level surface. Follow the stability chart for all lifting ratings.

2.10.1 Prelift Checks

1. Test all crane functions for proper operation.
2. Make sure all safety devices are operational.
3. Make sure all functional labels match the operations of the crane.
4. When testing the load capacity, the load shall not exceed 110% of the recommended load ratings for the manufacturer.
5. Written reports for maintenance and repairs must be kept for future reference.

2.10.2 Planning the Lift

1. Position the truck and crane as close to the lift site as possible.
2. Park on a solid level surface.
3. Engage the PTO.



CAUTION

Use extreme caution when setting up near overhanging banks or excavations. Failure to do so could result in personal injury or equipment damage.

4. Set outriggers. If setting outriggers on sandy or soft soil additional support, such as wooden cribbing or bearing pads, may be required under the outriggers to prevent sinking. Use extreme caution when setting up near overhanging banks or excavations.

**WARNING**

To prevent injury, death, or equipment damage, keep a minimum clearance of all obstructions with the crane fully extended. Power lines with the capacity of 50,000 V or more require 10 additional feet of clearance for any part of the crane body. With each additional 30,000 V or fewer an additional 1 ft of clearance is required.

NOTE

Keep a wide berth when working near power lines and the use of a secondary signal man is required.

5. Check surrounding area for overhead power lines, tree limbs, and/or any other obstructions that may come into contact with the crane while performing the lift.

2.10.3 Performing the Lift

1. Engage the PTO.

**CAUTION**

Use extreme caution when setting up near overhanging banks or excavations. Failure to do so could result in personal injury or equipment damage.

2. Set outriggers. If setting outriggers on sandy or soft soil additional support, such as wooden cribbing or bearing pads, may be required under the outriggers to prevent sinking. Use extreme caution when setting up near overhanging banks or excavations.

**CAUTION**

Before extending the boom, always pay out the winch cable. Failure to do so may result in cable damage or failure.

NOTE

Summit Truck Bodies cranes are equipped with counter-balance valves that are located in the manifold block that is welded to the lift cylinder. These valves function as a deceleration control and serve as a safety device locking the load in case of a hydraulic line breakage or in the event of accidental or unauthorized operation of the directional valve when the pump is not operating. The valves are equipped with a manual load release, which is to be used only in case of an emergency.

3. Raise crane and extend the boom in the center of the load. The crane is now ready to perform lift.

2.10.4 Handling the Load



WARNING

Make sure the load weight does not exceed the crane's capacity. Failure to do so will cause equipment damage, personal injury, or death.

1. Measure the weight and size of the load being lifted.
2. Make sure the lifting capacity of the crane is not being exceeded.



WARNING

The crane is equipped with wire rope intended to rotate on the sheave of the travel block while performing a lift. Never use this device to wrap around the load. Failure to do so will cause equipment damage, injury, or death.

3. Use only approved lifting straps or lifting devices that are properly secured to the crane hook to perform the lift.
4. Prior to lifting the load make sure the outriggers are firmly set and the truck base is stable.
5. Balance the load evenly with the wire rope directly in the center of the load.



CAUTION

Do not attempt to drag the load sideways. Side loading will result in damage to the rotation gear of the crane.

6. Lift load slightly, making sure the load is both stable and centered.



WARNING

Make sure the load remains stable throughout the lift. Avoid swinging the load. A swinging load could result in injury or death.



WARNING

A suspended load must remain clear of all personnel. Never pass a suspended load over a person/persons for any reason. Failure to do so may result in injury or death.

7. Perform lift using smooth, gentle operation of the controls. Sharp jerking motions while performing a lift should be avoided.

2.10.5 Shutting Down the Crane

1. Retract the boom and cable. Make sure cable is properly wrapped on winch spool.
2. Secure the snatch block and hook to the hook attachment loop on the boom.
3. Stow the boom into the boom cradle.
4. Retract the outriggers.
5. Disengage the PTO.

2.11 Phase I Controls

2.11.1 Overview



ST00029

Figure 2-1.

The crane comes standard with a Summit Truck Bodies brand PGT Radio Remote Equipment Control (Figure 2-1). There is a wireless or tethered option for this feature. The wireless functions allow the operator to control the crane operation at a range of 0-200 ft, allowing for obstruction within the line of the remote to the receiver.

- Study the remote and know the control panel and how each function corresponds within the operation of the crane.
- If the remote panel decal becomes damaged, call the Summit Truck Bodies service department for a replacement.
- Keeping the remote decal clean will ensure safe operation of the remote.
- Practice using the remote before lifting a load.
- Plan the lift, and ensure the outriggers are down and on solid stable ground and the crane is clear of outside obstructions.
- Follow a regular preventive maintenance schedule with the crane and truck to ensure maximum performance of the equipment.
- Prior to lift, give the crane one last visual inspection for leaks and clearance of outside obstructions, and ensure outriggers are properly set.

NOTE

The tether cable will not charge the battery of the transmitter. The optional Nickel-metal Hydride (NiMH) battery of the transmitter needs to be recharged in one of the Summit Truck Bodies-approved battery chargers. If the battery level reaches 10 percent, the status Light Emitting Diode (LED) will illuminate red to indicate a low battery level.

2.11.2 Crane Function Speed Control

The speed control trigger is located at the upper portion of the pistol grip controls. The trigger is proportional and allows the operator to control the speeds of the selected operations by pulling back on the trigger, allowing for a gentle touch or a faster pace depending on the needs of the operator.

NOTE

The below steps must be followed in order. A safety feature is built into the remote that will not allow the crane to operate if this procedure is not followed.

1. Select the desired function by depressing the appropriate toggle switch (Figure 2-1, Item 4).
2. Gently pull back on the speed control trigger (Figure 2-1, Item 5) until the desired speed is reached. This will allow for a smooth operation of the selected function.

2.11.3 Crane Wireless Remote Control Instructions

2.11.3.1 Remote Power Startup

1. Supply power to the crane receiver.
2. Make sure the E-STOP switch (Figure 2-1, Item 1) on remote is up.
3. Depress the TRANSMITTER ON button (Figure 2-1, Item 2) after the status LED illuminates.
4. Once the status LED illuminates green the unit will run an initialization process, checking for switches or motions that may be active. If any are detected, the status LED will illuminate red and the unit will turn off.
5. After initialization is successfully completed, the unit will enter Normal Operation Mode and be ready to use.

2.11.3.2 Remote Manual Shutoff

The remote can be turned off by pressing the Off-On-Start toggle switch down to the OFF position.

2.11.3.3 Emergency Shutoff

Press the E-Stop switch (Figure 2-1, Item 1) to immediately break all communications between the remote and receiver. This will stop electrical functions on the crane.

2.11.3.4 Remote Automatic Shutoff

The transmitter will automatically power down after a programmable time of non-use. The tether cord on the job sites that do not allow radio signals. Once installed properly, the tether mode turns off the wireless transmissions and diverts signals through the tether cable.

2.11.3.5 Remote Tether Cord

A tether cord is supplied with the crane that can directly tie the remote transmitter to the remote receiver.

NOTE

In order for the tether cord to work properly, the remote must be powered down and powered up following tether installation.

1. Connect one end of the tether cord to the tether plug point on the side of the remote.
2. Attach the other end of the tether cord to the plug point in the crane compartment.

2.11.3.6 Engine Start/Stop

1. Make sure the PTO switch is on (Manual transmissions only) and the park brake is set.
2. Press the start button (Figure 2-1, Item 3) on the remote. When the engine is not running then pressing up the start switch will close the K1 relay, activate the starter, and starting the engine.
3. Repeat Steps 1-2 to stop engine.

2.12 Phase II Controls



Figure 2-2.

2.12.1 Overview

The control system for Summit Truck Bodies consists of a J1939 based main controller (Figure 2-2), engine module, and a cab switch panel. The main controller is most commonly located in one of the rear cabinets of the truck. The main controller is sometimes referred to as the rear control or rear display panel. The main controller has a 10-button user interface with color display. The main controller has various Input-Output (I/O) that monitors and controls several of the main functions on the truck. A J1939-based engine module is mounted in the engine compartment and operates and monitors various functions associated with that area of the truck. Inside the cab of the truck there is a six-button J1939-based switch panel used to operate various functions.

The control system also includes several external J1939 nodes and devices. These devices include a dual multi-axis inclinometer, rotary encoder, high current I/O module, and a radio remote system.

A radio remote system is used to operate the crane from a remote location there. The radio remote system uses a transmitter that communicates through Radio Frequency (RF) to a receiver. The receiver is equipped with a J1939 interface, transmitting and receiving data through the data link. The transmitter's screen displays basic system info, boom load, current operation, as well as a screen that directs the operator to the main control panel if any fault is present. The main control panel is located in the rear passenger side cabinet.

OPERATION

2.12.2 Screen Navigation

2.12.2.1 Splash Screen

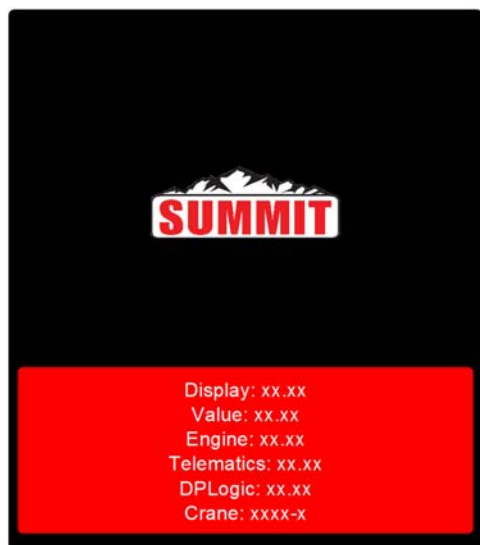


Figure 2-3.

The splash screen displays the Summit Truck Bodies logo and current software and hardware versions for 7 seconds during initial power up of the control system.

2.12.2.2 Home Screen (Home)



Figure 2-4.

Navigating from this to other screens is done with 10 buttons on the control panel. The buttons are numbered 1-10 with 1-4 on the left, 5-8 on the right, 9 on the bottom left, and 10 on the bottom right of the screen. The system will navigate to the Home screen any time the Home button is pressed. There is also a button on this screen to perform engine start/stop.

The LED on each switch will change state from white to red when the function is active. A 1-Hz flash on the 6-position switch panel indicates an error/warning. Errors and warnings are displayed on the warning panel of the main display. There is also an audible tone when any navigation function is pressed.

2.12.2.3 Lighting Screen (Home> Lighting)

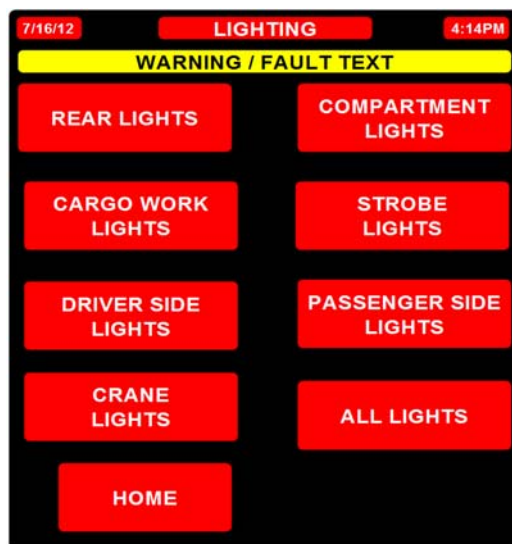


Figure 2-5.

The lighting screen will allow desired lighting to be turned on or off. All functions on this screen operate as a toggle on/off. When toggled on, ALL LIGHTS will turn on all lights, other than the strobe light, which are not already illuminated. When toggled off, ALL LIGHTS will turn off all lights that are illuminated, including the strobe light.

2.12.2.4 Aux Screen (Home> Aux)



Figure 2-6.

This screen is used for six auxiliary functions and the pressurized compartments. All functions on this screen operate as a toggle on/off. Two spare buttons on the cab switch panel will also toggle the aux outputs 1 and 2.

2.12.2.5 Hours Screen (Home> Hours)

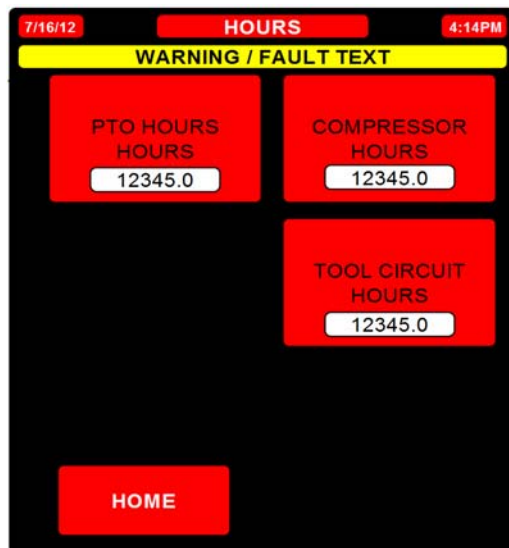


Figure 2-7.

This screen displays the hour meter values stored in Electrically Erasable Programmable Read-Only Memory (EEPROM).

2.12.2.6 Outriggers Screen (Home> Outriggers)

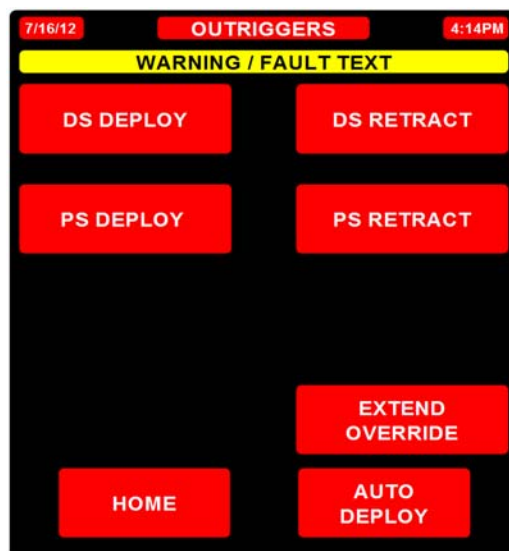


Figure 2-8.

The outriggers screen is the default outrigger control. The outriggers screen is used to operate the rear outriggers. All outrigger functions are controlled with momentary controls. AUTO DELPOY is used to navigate to the Auto Deploy Caution screen so the auto-deploy feature can be used.

2.12.2.7 Hydraulics Screen (Home> Hydraulics)

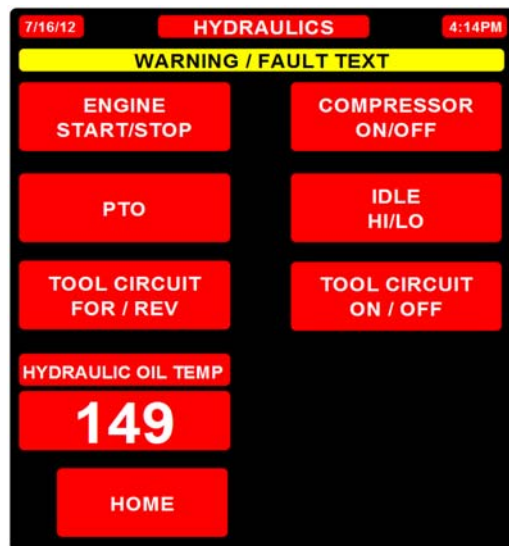


Figure 2-9.

Six functions can be operated and the hydraulic oil temperature can be monitored from this screen. All functions on this screen operate as a toggle on/off. This screen has active fields that will appear or disappear based on their selection from the Truck Option Screen.

2.12.2.8 Crane Screen (Home> Crane Control)



Figure 2-10.

The crane screen allows for operation of the crane from the control panel. All functions on this screen operate as momentary on. AUTO STOW is used to navigate to the Auto Stow Caution screen.

2.12.2.9 Settings Screen (Home> Settings)

The settings screen allows for navigation to several other screens. To progress through the settings screen, provide the OEM password (5150) or the new password created.

OPERATION

2.12.2.10 Diagnostics Screen (Home> Settings> Diagnostics)

The diagnostic screens display various diagnostic information.

2.12.2.11 Network Information Screen (Home> Settings> Network Information)

The network information screen will display the status of the following items if they are available:

- Engine RPM
- Oil temperature
- Water temperature
- Encoder position
- Boom angle
- Master X axis
- Master Y axis
- Other

2.12.2.12 Alarm History Screen (Home> Settings> Alarm History)

The alarm history screen logs warning ribbons and assigns a time and date to them.

2.12.2.13 Auto Deploy Caution Screen (Home> Outriggers> Auto Deploy)

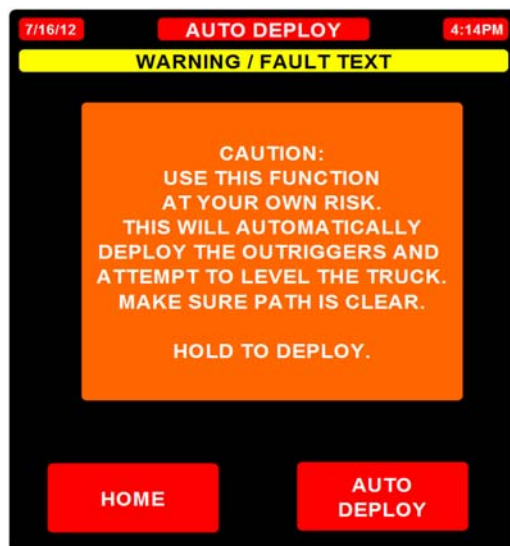


Figure 2-11.

If the auto deploy button is pressed on the outrigger screen, it will navigate to the auto deploy caution screen.

2.12.2.14 Auto Stow Caution (Home> Crane Control> Auto Stow)



Figure 2-12.

If the auto stow feature is accessed from Crane screen. The auto stow caution screen contains a caution statement about using auto stow.

2.12.2.15 Truck Options Screen (Home> Settings> Truck Options)

The truck options screen displays multiple different options depending on the setup.

2.12.2.16 Crane Settings Screen (Home> Settings> Crane Settings)

The crane settings screen allows the operator to set the home position on the crane and set a boom up limit angle. It also allows for perimeter protection and novice mode to be enabled. **Novice Mode allows the user to operate at 57% of regular speed.** The states of both of these functions will be saved in EEPROM, and will remain selected through a power cycle. If these functions are active the associated button LED will be red. If these functions are inactive the associated button LED will be false. **Pressing the set perimeter button will navigate to the Perimeter Program screen. Protection On/Off will activate or deactivate the perimeter set.**

2.12.2.17 Perimeter Program Screen (Home> Settings> Crane Settings> Set Perimeter)

The perimeter program screen includes a caution statement that defines and warns about the use of the perimeter protection (also referred to as virtual fence). This screen is also used to program the perimeter protection boundaries.

2.12.2.18 Date/Time Screen (Home> Settings> Date and Time)

The date/time screen allows navigation to the date and the time screen, to set the date and time.

2.12.3 Warning Ribbons

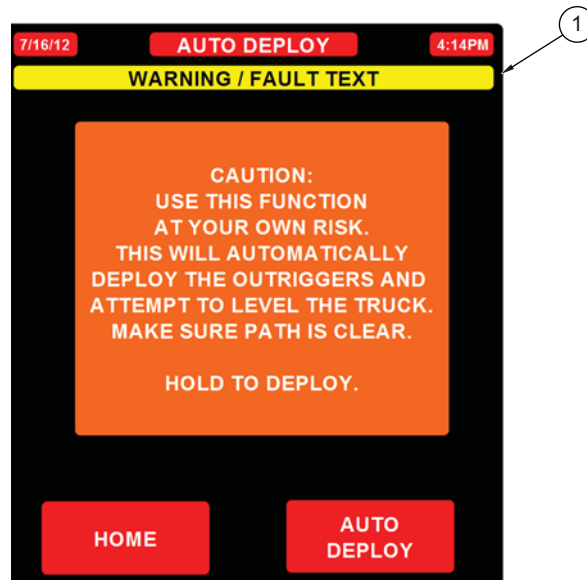


Figure 2-13.

The warning ribbons (Figure 2-13, Item 1) are presented on the display. If multiple warnings are in effect one warning will be displayed for 3 seconds. The buzzer will also sound 3 times upon initial warning and will sound every 30 seconds until all warnings are false. If warning/alarms are active the front switch panel lights and buzzer will go into alarm state. Warning ribbons have been prioritized so that critical warnings will override informational or less significant warnings.

The following warning ribbons are considered priority warnings and will be prioritized over other warnings:

- Auto deploy successful
- Crane overload
- No auto stow with load
- Outriggers not deployed
- Outriggers disabled
- Outriggers deployed
- Crane homing successful
- Auto stow failed, please stow manually
- Auto stow successful
- Auto deploy failed
- Auto stow in progress
- Auto deploy in progress

The following sections describe the warning ribbons and how they are enabled.

For assistance with warnings please call (866) 985-3100.

2.12.3.1 Filter Service Required

The filter service required warning ribbon will become active if the input that monitors the hydraulic filter pressure differential switch is true and the hydraulic oil temperature is greater than 80° F (27° C).

2.12.3.2 Hydraulic Fluid High Temperature

The hydraulic fluid high temperature warning ribbon will become active if hydraulic oil temperature transducer is reading greater than 180° F (82° C). This warning ribbon is reset when temperature falls below 172° F (78° C). This warning ribbon will not be shown if the hydraulic fluid over temperature ribbon is active.

2.12.3.3 Hydraulic Fluid Over Temperature

The hydraulic fluid over temperature warning ribbon becomes active if the hydraulic oil temperature transducer is greater than 190° F (88° C). Disengage the PTO or turn off Alternate Power Unit (APU). This warning ribbon is reset when temperature falls below 182° F (83° C).

2.12.3.4 Boom Not Stowed

If the boom is not stowed and the park brake input is false, the boom not stowed warning ribbon becomes active. The boom stow zone is determined by homing the crane to 90.0 degrees inclination and approximately 0 degrees rotation. There is a 5-second debounce timer to avoid nuisance warning ribbons while driving on rough surfaces. This warning ribbon will also be active if attempting to auto deploy outriggers when the crane is not stowed. The crane must be stowed for proper alignment when leveling.

2.12.3.5 Auto Deploy Successful

When auto deploy is successful, the auto deploy warning ribbon will become active, display for 3 seconds, and then become inactive. A successful auto deploy is indicated by the outriggers being deployed (indicated by the outrigger prox inputs) and the vehicle being level.

2.12.3.6 Battery voltage low

If the truck battery voltage is less than 10 VDC, the battery voltage low warning ribbon becomes active.

2.12.3.7 Crane Overload

If the transducer monitoring pressure in the boom up hydraulic circuit is greater than the maximum boom pressure set point for that zone, the crane overload warning ribbon will become active. Maximum crane load is based upon crane position. Different zones have been developed with unique limits.

Limit operation of the following:

- Boom extend
- Boom down
- Winch up
- Reduces rotate speed

2.12.3.8 Input / Output Fault

The input / output fault warning ribbon becomes active when there is one or more output faults. Output faults are reset by cycling main power.

2.12.3.9 Truck Not Level

If truck's roll angle is +/- 4 degrees out of level, the PTO or APU is on, and if the crane is in operation the truck not level warning ribbon will become active. The warning ribbon is set to display at 4.2 degrees out of level and is reset at 3.8 degrees out of level with a 1-second reset debounce to account for slight truck rocking. This warning ribbon does not include truck pitch with rear outrigger only. The inclinometer is mounted on the boom turret that rotates, so this warning ribbon can only be displayed when the boom is parallel with the roll axis of the truck.

2.12.3.10 No Auto Stow With Load

If boom load exceeds 60% of the zone set point the auto stow feature will not work causing the no auto stow with load warning ribbon to become active. This warning ribbon only becomes active if the operator is attempting to auto stow the crane.

2.12.3.11 Outriggers Not Deployed

The outriggers not deployed warning ribbon will become active if outriggers are not planted and crane operation is attempted.

2.12.3.12 Pendant Not In Stow

If the pendant stow input is false and the park brake input is false the pendant not in stow warning ribbon becomes active. This warning ribbon will cause the 6 position switch panel lights to flash and a buzzer to sound.

2.12.3.13 Outriggers Disabled

The outriggers disabled warning ribbon will become active if the outriggers have been disabled for any reason.

2.12.3.14 Boom Up Limit Angle Reached

The boom up limit angle reached warning ribbon is determined by the inclinometer data. The default boom up value is set to 1000. When button 4 on the crane settings screen is depressed, the crane will move to the maximum upward position and release the button. This will set that position as the maximum up angle.

2.12.3.15 A2B Switch

If the A2B switch (N/C) is false, the A2B switch warning ribbon will become active. If this warning ribbon is active the winch up and boom extend functions will be disabled.

2.12.3.16 Unit In Tether Operation

The unit in tether operation warning ribbon will only be displayed if the remote is connected through the tether cable and a function is active. Operating the transmitter with the tether cable will disable RF. Once the tether is disconnected RF will resume.

2.12.3.17 Outriggers Deployed

The outriggers deployed warning ribbon is displayed if the outriggers are not retracted with the park brake false.

2.12.3.18 Driver Side Outrigger Sensor Fail

The drivers side outrigger sensor fail warning ribbon is displayed when a divers side outrigger sensor failure is detected.

2.12.3.19 Crane Homing Successful

The crane homing successful warning ribbon is displayed when the crane has been successfully homed. This will display for 3 seconds then reset to false. Homing is the process of calibrating or zeroing the inclinometer and encoder when the boom is stowed.

2.12.3.20 Auto Stow Failed, Please Stow Manually

The auto stow failed, please stow manually warning ribbon displays if the auto stow function is not successful. This will display for 3 seconds then reset to false.

2.12.3.21 Auto Deploy Failed

The auto deploy failed warning ribbon is displayed if the auto deploy function fails. This will display for 3 seconds then reset to false.

2.12.3.22 Auto Stow In Progress

The auto stow in progress warning ribbon is displayed when the auto stow feature is under operation.

2.12.3.23 Auto Deploy In Progress

The auto deploy in progress warning ribbon is displayed when the auto deploy feature is in progress.

2.12.3.24 Low Pump Pressure

The low pump pressure warning ribbon becomes active if PTO pump pressure is not received within 5-seconds of the PTO solenoid output becoming true.

2.12.3.25 Passenger Side Outriggers Sensor Fail

The passenger side outrigger sensor fail warning ribbon is displayed when a passenger side outrigger sensor failure is detected.

2.12.3.26 Crane Sensor Fail

If a crane sensor is out of its operation range the crane sensor fail warning ribbon will become active.

2.12.3.27 Temperature Sensor Fail

If the temperature sensor is out of its operation range the temperature sensor fail warning ribbon will become active.

2.12.3.28 Comm Error – Engine

If communication is lost with the engine, the comm error – engine warning ribbon will become active.

2.12.3.29 Comm Error – FSP

If communication is lost with the FSP, the comm error – FSP warning ribbon will become active.

2.12.3.30 Comm Error Incline

If communication is lost with the inclinometer, the comm error incline warning ribbon will become active.

2.12.3.31 Comm Error – Encoder

If communication is lost with the encoder, the comm error – encoder warning ribbon will become active.

2.12.3.32 Comm Error – LCM

If communication is lost with the LCM, the comm error – LCM warning ribbon will become active.

2.12.3.33 Comm Error – Receiver

If communication is lost with the receiver, the comm error – receiver warning ribbon will become active.

2.12.3.34 Comm Error – PDM

If communication is lost with the PDM, the comm error – PDM warning ribbon will become active.

2.12.4 Lighting Operation

2.12.4.1 Rear Lights

The rear lights can be operated from either the cab switch panel or the rear control panel. The switch operation is a multiplexed toggle style switch. If the cab switch is in the lights on position, the rear control panel switch can be used to turn the rear lights off. The rear lights are not interlocked with anything.

2.12.4.2 Strobe Lights

The strobe lights can be operated from either the cab switch panel or the rear control panel. The switch operation is a multiplexed toggle style switch. If the cab switch is in the lights on position, the rear control panel switch can be used to turn the strobe lights off. The strobe lights are not interlocked with anything. There is no reset operation from the park brake input.

2.12.4.3 All Other Lights

The remaining lights are all toggle style operation. There are no interlocks preventing operation of these lights; however the lights reset if the falling edge of the park brake input is detected.

2.12.4.4 All Lights Button

The all lights button will turn on all lights, with the exception of the strobe lights, when all lights are off. It will turn off all lights, including strobe light, when any light is on.

2.12.5 Auxiliary Operation

Auxiliary buttons 1-6 on the Aux screen will toggle Aux outputs 1-6. The outputs are Multiplexed Vehicle Electrical Center (mVEC) relays and the auxiliary digital outputs on the 32007 VDM. Aux 1-3 can also be toggled on the six-switch cab module using switches 4-6. Cab switch 6 is used to control pressurized compartments (mVEC Relay 8) if that option is enabled. Aux 3 cannot be controlled from the cab if the cab switch 6 is used to control the pressurized compartments.

2.12.6 Hour Meter Operation

2.12.6.1 PTO Hours

Whenever the PTO pressure switch input is true, the PTO hour meter will begin to calculate. This value will be stored in EEPROM and will be displayed in the hours screen. The PTO hours field is an active field that will appear or disappear based on the APU selection on the truck options screen.

2.12.6.2 Compressor Hours

Whenever the compressor output is true, the compressor hour meter will begin to calculate. This value will be stored in EEPROM and will be displayed in the hours screen. This is an active field that will appear or disappear based on the APU selection on screen.

2.12.6.3 Tool Circuit Hours

Whenever the tool circuit output is true, the tool circuit hour meter will begin to calculate. This value will be stored in EEPROM and will be displayed in the hours screen. This is an active field that will appear or disappear based on the tool circuit selection on screen.

2.12.7 Hydraulic Oil Temperature

The hydraulic oil temperature field on the hydraulics screen will display the hydraulic oil temperature. The controller receives the hydraulic temperature from a temperature transducer. The controller will perform a scaling function to take the 4-20 mA value and scale it to a temperature between 0° to 300° F (-18° to 149° C). When the value exceeds high setpoint a warning ribbon is triggered. When value exceeds the over temperature setpoint, a warning ribbon is triggered and the PTO and APU disengages.

2.12.8 Engine Start/Stop Operation

NOTE

Both Engine Start/Stop keys on the home screen and hydraulics screen will be illuminated when the engine is running.

2.12.8.1 Engine Start/Stop From Switch Panel

1. Make sure the PTO switch is on (manual transmissions only) and the park brake is set.
2. Depress the engine start button. When the engine is not running, depressing the engine start button will close the K1 relay, activate the starter, and start the engine.
3. Repeat Steps 1-2 to stop engine.

2.12.8.2 Engine Start/Stop From Radio Remote

1. Make sure the PTO switch is on (manual transmissions only) and the park brake is set
2. Depress the start switch on the radio remote. When the engine is not running, depressing the start switch will close the K1 relay, activate the starter, and start the engine.
3. Repeat Steps 1-2 to stop engine.

2.12.8.3 Interlock operation

Interlock operation differs slightly depending on transmission type, automatic or manual, and hydraulic pump drive type, PTO or APU. The automatic transmission does not require the clutch to be depressed to engage the PTO, so the engine can be started without regard to PTO state. The PTO enable option is disabled on the rear panel with manual transmissions because of the required clutch operation. Engine start is disabled if the engine is already turning as indicated by engine speed monitored on the J1939 Controller Area Network (CAN bus).

Engine Idle Control Operation with J1939 Throttle Control Compatible Vehicles:

- When the PTO is engaged and the park brake set, the engine speed will automatically increase to 850 RPM.
- When the PTO is engaged and the park brake set and either the high idle switch is pressed on the radio remote or the idle hi/lo button is pressed on the rear control panel, the engine idle speed will increase to 1050 RPM.
- Using this feature will disable the in-cab throttle control.
- If the PTO is disengaged and the park brake released at any time, the engine will return to its base RPM. If reactivated, the engine will return to the default 850 RPM.

2.12.9 PTO Operation

The PTO switch is a multiplexed switch. There are two PTO switches, one located in the cab and the other on the rear panel. The LED on the PTO switches will be illuminated if the PTO switch is pressed, even if the feedback switch indicates no pump pressure. The PTO will be disabled with hydraulic over temperature.

1. Make sure the park brake is set.
2. Place the PTO switch in the on position. This will engage the PTO.

2.12.10 Compressor Operation

There are two compressor switches, one located on the radio remote and the other on the rear panel.

1. Make sure the PTO switch is on (manual transmissions only) and the park brake is set.
2. Press the compressor switch radio remote or the rear control panel. This will activate the compressor.

2.12.11 Tool Circuit Operation

The tool circuit is an active content option and it is enabled in the truck options screen.

NOTE

Deploying outriggers and tool operation functions may not be available for use at the same time.

1. Make sure the PTO switch is on (manual transmissions only) and the park brake is set.
2. Toggle the tool circuit on/off switch to the on position. This will activate the tool circuit.
3. With the tool circuit active the tool circuit will default to the Forward (FWD) function.

NOTE

Perform Step 4 only if the Reverse (REV) function is needed.

4. Depress the tool circuit FWD/REV button while the FWD function is active. The FWD function will become inactive and the REV function will become active.

2.12.12 Outrigger Operation

The outriggers can be operated by using outriggers buttons on the rear control panel or by using the auto leveling feature.



WARNING

To prevent injury or death, make sure the vehicle is parked on level, solid ground before deploying outriggers. If vehicle is carrying a load, make sure the load is evenly distributed and that one side of the vehicle isn't significantly heavier than the other. Failure to do so may result in equipment damage, injury, or death.

NOTE

If the outriggers are deployed and the park brake is released, the front switch panel LEDs will flash white and red, an audible alarm will sound, and a warning ribbon will display.

2.12.12.1 Outrigger Operation Using Outriggers Buttons

1. Make sure the PTO switch is on (manual transmissions only) and the park brake is set.
2. Use the following outriggers buttons to deploy the outriggers.
 - Driver side deploy
 - Driver side retract
 - Passenger side deploy
 - Passenger side retract.

2.12.12.2 Outrigger Auto Leveling:

1. Make sure the PTO switch is on (manual transmissions only) and the park brake is set.
2. Check pitch angle of vehicle to verify it is within 4 degrees of level. There are no interlocks to disable auto deploy if the angle is considered too steep. If the pitch angle is not in range, the truck not level warning ribbon will display when operating the crane.

NOTE

Each outrigger jack cylinder is equipped with a normally closed proximity switch to indicate the outrigger has contacted the ground.

3. Press the auto deploy button. The outriggers will deploy until the proximity switch opens for each jack cylinder, indicating the outriggers are contacting the ground.
4. Both outriggers will continue extended so the outriggers will be more firmly planted after both outriggers contact the ground. The outriggers are extended together as to not increase the roll angle. However, if hydraulic system is not performing properly, there is an uneven load on the outriggers, a mechanical malfunctions, uneven cargo loads, or a number of other circumstances could prevent this from happening. Once the extend timers are expired, the outriggers will be considered planted.
5. Once planted the truck will attempt to level side to side by monitoring the roll angle of the vehicle. Based on this angle, the correct outrigger will be extended until vehicle is level within 0.5 degrees. If level is not reached, it is possible a cylinder is bottomed out. The auto deploy failed warning will be displayed. Cylinders will never be retracted automatically as part of the auto leveling process.

2.12.12.3 Extend Override

Outrigger override is available if there are space limitations at job sites. It is not always possible to fully extend all outriggers with the horizontal cylinders. It is preferable to lower the jack cylinder and plant the outrigger even if not fully extended. An override is required that will allow each outrigger jack cylinder to be lowered when the outrigger is not fully extended. The extend override button is located on the outriggers screen. The extend override button is not available on units with front outriggers. This will derate the crane capacity.

1. Make sure the PTO switch is on (manual transmissions only) and the park brake is set.
2. Check pitch angle of vehicle to verify it is within 4 degrees of level. There are no interlocks to disable auto deploy if the angle is considered too steep. If the pitch angle is not in range, the truck not level warning ribbon will display when operating the crane.
3. Press the extend override button.

NOTE

Each outrigger jack cylinder is equipped with a normally closed proximity switch to indicate the outrigger has contacted the ground.

4. Press the auto deploy button. The outriggers will stop extending and immediately begin lowering until the proximity switch opens for each jack cylinder, indicating the outriggers are contacting the ground.
5. Both outriggers will continue extended so the outriggers will be more firmly planted after both outriggers are contacting the ground. The outriggers are extended together as to not increase the roll angle. However if hydraulic system is not performing properly, there is an uneven load on the outriggers, a mechanical malfunction, uneven cargo loads, or a number of other circumstances could prevent this from happening. Once the extend timers are expired, the outriggers will be considered planted.
6. Once planted, the truck will attempt to level side to side by monitoring the roll angle of the vehicle. Based on this angle, the correct outrigger will be extended until vehicle is level within 0.5 degrees. If level is not reached, it is possible a cylinder is bottomed out. The Auto Deploy Failed warning will be displayed. Cylinders will never be retracted automatically as part of the auto leveling process.

2.12.13 Crane Operation

The open center system will use a single proportional flow control that feeds directional valves for each of the eight boom functions.

2.12.13.1 Crane Interlocks

The crane interlocks must be met for operation. This would include that the PTO output is engaged, park brake is set, the outriggers are planted, and the truck's engine must be running.

- If the A2B switch is false (N/C switch), the winch up PWM output and boom out PWM output is inactive.
- If the boom up angle setpoint is active the boom up output will deactivate.
- If the 4-20 mA boom transducer input value is less than 3.61 mA, the crane will not operate. This could indicate the transducer is disconnected
- Boom extend and retract and winch up and down are disabled if either outrigger is planted.
- All crane functions, with the exception of winch down and boom retract, will be disabled if the outriggers are partially planted (e.g., one outrigger is planted and one is not).
- Boom up, Boom Extend, Boom down, and Winch up operation will be disabled if the zone overload pressure is exceeded.
- If novice mode is active, the all crane speeds will be reduced by 57%.

2.12.14 Zone Load De-Rating:

The zone load de-rating system works based on the values entered in zone load de-rating settings screen (screen 19). It associates those values with the six zones found in the 360-degree rotation of the screen. Based on the rotational position of the crane, the boom overload pressure is multiplied by the de-rate value. A seventh no-load zone exists directly over the truck cab. The lowest value from zones one and six are used for the no-load zone.

2.12.15 Crane Control From Rear Control Panel

The crane can be operated from the rear control panel using the crane screen. When a function is pressed, it will operate the crane at a predetermined speed, approximately 25-50% of the maximum speed.

2.12.16 Crane Control With Radio

The crane can be operated from the transmitter by either RF or tethered communication. The functions will operate the same way regardless. On the transmitter there are two two-axis joysticks that control crane direction and speed. The crane speed will be nearly proportional to the position of the joystick. A 10% deadband will be added to the joystick output to eliminate unintended activation of the other function on the joystick. If the stop button is pressed on the transmitter it will attempt to stop crane movement.

2.12.17 Auto Stow

This feature automatically returns the boom to the stowed position when the button is pressed and held.

2.12.17.1 Boom Position Sensors Homing

1. Move the crane to the stow position.
2. Once stowed, navigate to the crane settings screen and press the home crane button. This will home the encoder and inclination sensors. The Crane Homed ribbon will be shown for 3 seconds when successful.

2.12.17.2 Auto Stow Operation

Crane speed during auto stow is approximately 50% of maximum. When approaching changes in direction the crane will slow to 25% of maximum speed. When approaching the stow position, the crane will stow to 10% of maximum speed.

1. Press the auto stow button on the crane screen. This will navigate to the autostow screen.
2. The crane's angular position will set to the auto stow angle. If it is greater than the auto stow angle, the boom will lower itself to the auto stow angle +/- 2 degrees. If the crane angle is less than the auto stow angle, the boom will raise itself to the auto stow angle +/- 2 degrees.
3. The crane's rotational position will set to the auto stow position. The boom will rotate to the stow position +/- 1 degree.
4. The crane will lower until the inclinometer reaches the homed setpoint. Once a predetermined point has been reached, the crane operation will slow to allow gentle seating in the boom stow.
5. Confirm the crane has been properly stowed by monitoring the boom angle.

2.12.18 Pendant Not Stowed

If the pendant stow is not stowed and the park brake is disengaged, the front switch panel LEDs will flash white and red, an audible alarm will sound, and a warning ribbon will display.

2.12.19 APU Option

The APU uses the PTO output, high idle output, ignition circuit, starter output from the Engine module, and the compressor output.

Operation is the same as PTO driven units, with the following exceptions:

- The APU has a running signal to the engine module indicating the APU is running instead of the engine.
- There is no pressure feedback device on the APU.
- The APU has a built-in timeout feature that requires a power cycle before starting the engine.
 - The key switch must be turned to the off position and then back to the on position to complete the power cycle.
 - The oil pressure switch is used to determine if the APU engine is running.

2.12.20 Open Center Option

If open center option is selected the crane will operate using a single proportional valve to control speed and eight digital valves to control direction. When multiple functions are active the proportional valve will derive its value from the average proportional value.

This option will also require the outriggers to sequence electronically. Up to eight of the following outrigger solenoid valves are controlled:

- Passenger side extend
- Passenger side retract
- Passenger side up
- Passenger side down
- Driver side extend
- Driver side retract
- Driver side up
- Driver side down.

Extend and retract are optional for both the driver and passenger sides. All installed outrigger functions will have an associated proximity switch that will indicate full travel has been reached.

When operating any outrigger function, an unloading valve will be active.

2.12.21 Date/Time

The controller is equipped with an on-board real-time clock. The onboard clock is used to perform the following functions:

- Tracking warning ribbons.
- Displaying date and time on the screen.

The time will need to be set on each module. This is done to prevent the RTC battery from being enabled before the controller is on a truck. The time and date can be changed in their corresponding screens.

2.12.22 Perimeter Protection (Virtual Fence)

NOTICE

The proximity of the exhaust stack to the boom stow position makes it nearly impossible to protect the exhaust stack.

The perimeter protection system creates a boundary set in the software by the crane position sensors. When the crane position sensors are active, the crane cannot pass through. This is to limit collisions between the boom and other objects mounted to the truck, such as compressors or welders. The perimeter protection is not intended for personal injury protection. The equipment must be in good working order for this system to operate properly.

The boom cannot be stopped instantaneously due to the momentum of the crane, the hydraulic system response, electronic processing time, and many other factors. The required stopping distance will increase over time with wear of mechanical components. A horizontal and vertical buffer of 5 degrees is added to the perimeter to compensate for system response time. For example, if a perimeter is set at 30 degrees of vertical elevation, the electronic control system will attempt to stop the crane if lowered to 35 degrees of elevation. The distance will vary depending on inclination and length of the boom. For reference, at 10 feet from the center of the turret with a nearly horizontal boom, the buffer is approximately 10 in (254 mm).

A missing data point can be filled in by averaging with adjacent points; however two or more continuous missing points cannot be handled in this manner. Missing data points are otherwise populated with a maximum value equivalent to 90 degrees (straight up) resulting in a vertical perimeter. If a 360-degree perimeter is not set, no movement will be allowed into the untraced area. If an area is retraced, the most recent data will be used. Since some latitude is required to stow the crane, a window of 2 degrees will be created around the stow or home position where movement is unrestricted.

OPERATION

2.12.22.1 Setting and calibrating perimeter protection

NOTE

When setting the perimeter protection, the crane is forced to novice mode, or half speed, to insure proper fence data capture. Non-critical functions, including warning ribbons, are disabled during programming to minimize lost data.

1. Press the program button on perimeter program screen.

NOTE

The program button is maintained so that the operator is free to move about the truck for better visibility.

2. Operate the crane with the radio remote, moving rotating it 360-degrees at various angles. Keep clear of obstructions.
3. Once the perimeter is set, press the protection button on the crane settings screen to enable perimeter protection.
4. Once the perimeter is set, the perimeter protection will be active. Based on the rotational and angular position of the crane, this system will attempt to prevent operation of the crane if it passes through the fence buffer area. If the crane is stopped because it has passed through the buffer, the operator must raise the crane until it is above the buffer to resume operation.

2.13 Phase III Controls

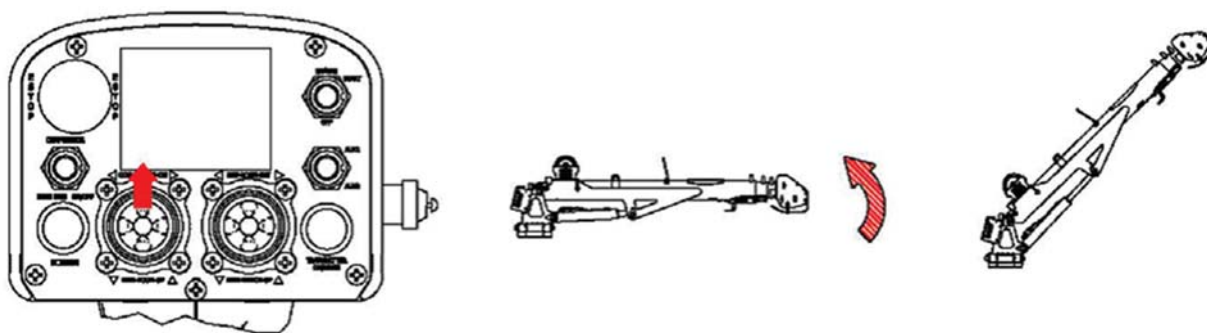


ST00030

Figure 2-14.

2.13.1 Remote Functions and Screen Displays

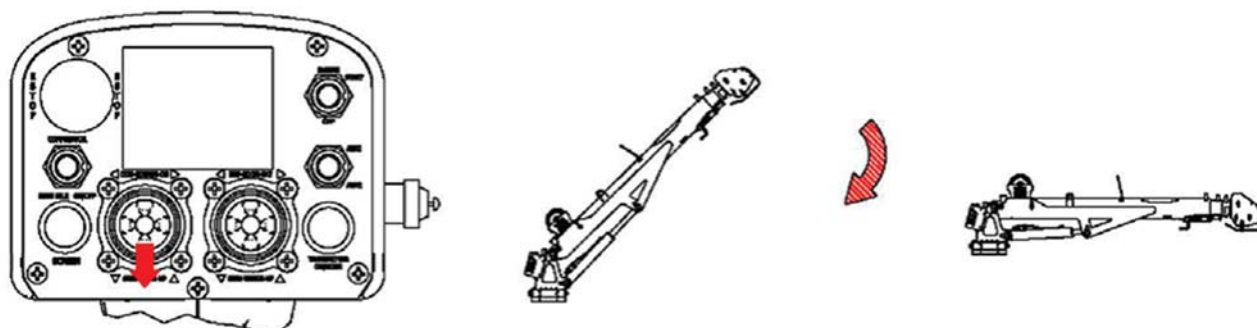
2.13.1.1 Boom Controls



ST00020

Figure 2-15.

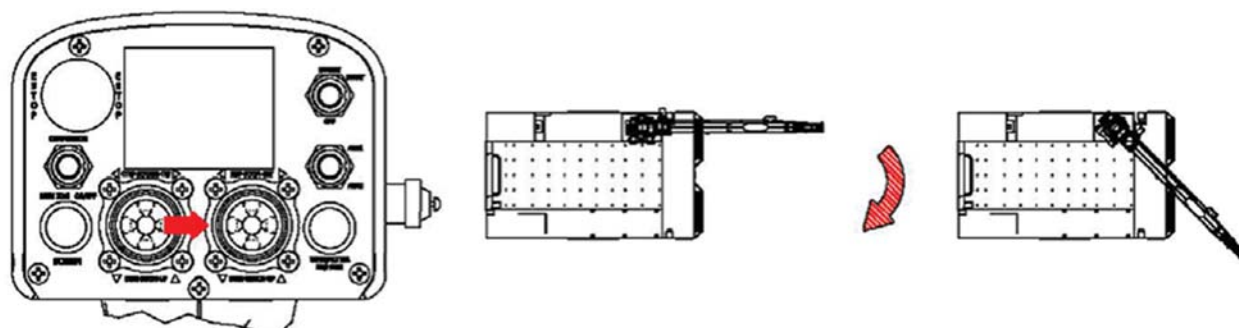
1. Press up on the left joystick to raise the boom (see Figure 2-15).



ST00021

Figure 2-16.

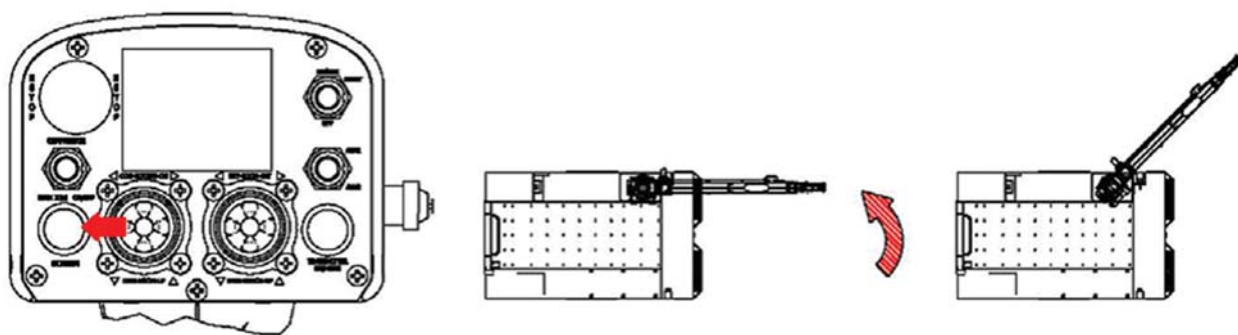
2. Press down on the left joystick to lower the boom (see Figure 2-16).



ST00022

Figure 2-17.

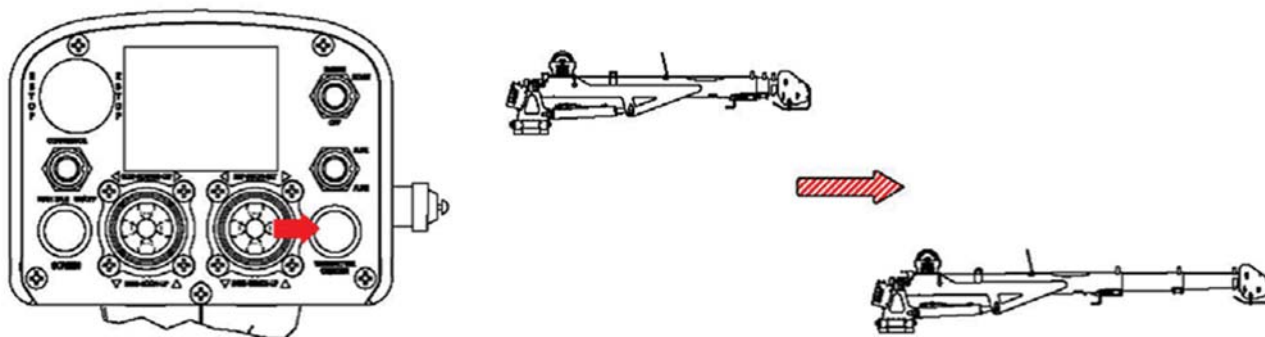
3. Press the left joystick to the right to rotate the boom clockwise (see Figure 2-17).



ST00023

Figure 2-18.

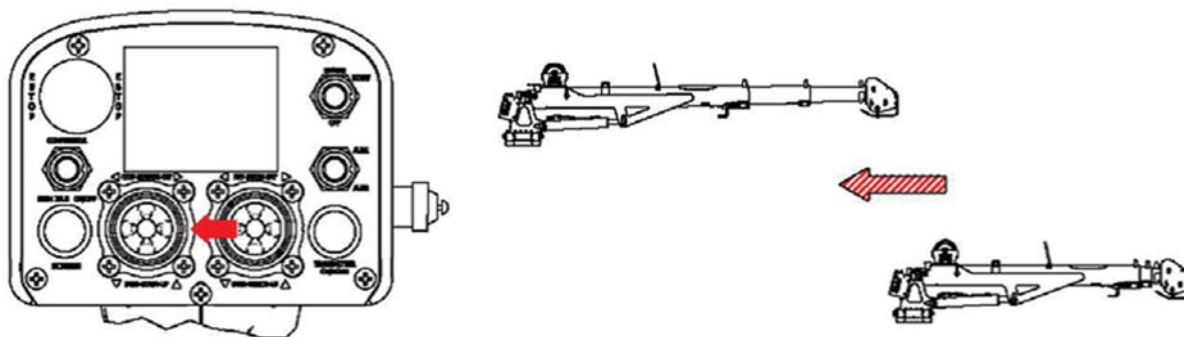
4. Press the left joystick to the left to rotate the boom counterclockwise (see Figure 2-18).



ST00027

Figure 2-19.

5. Press the right joystick to the right to extend the boom (see Figure 2-19).

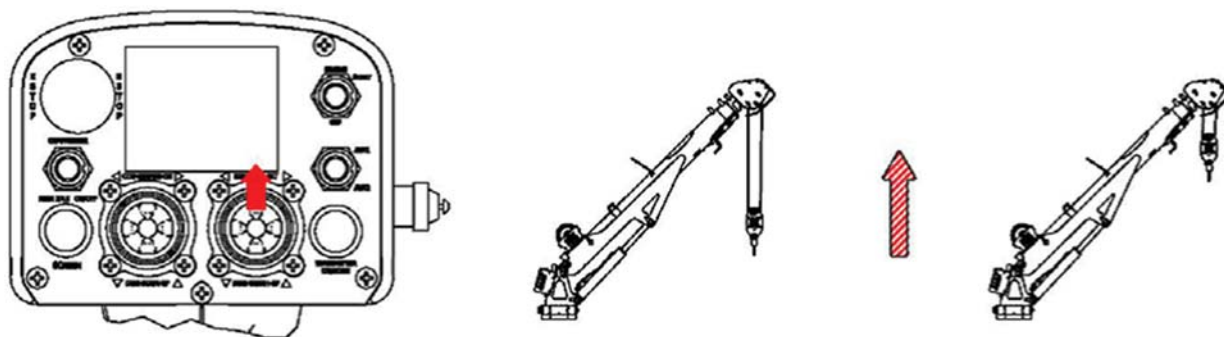


ST00028

Figure 2-20.

6. Press the right joystick to the left to retract the boom (see Figure 2-20).

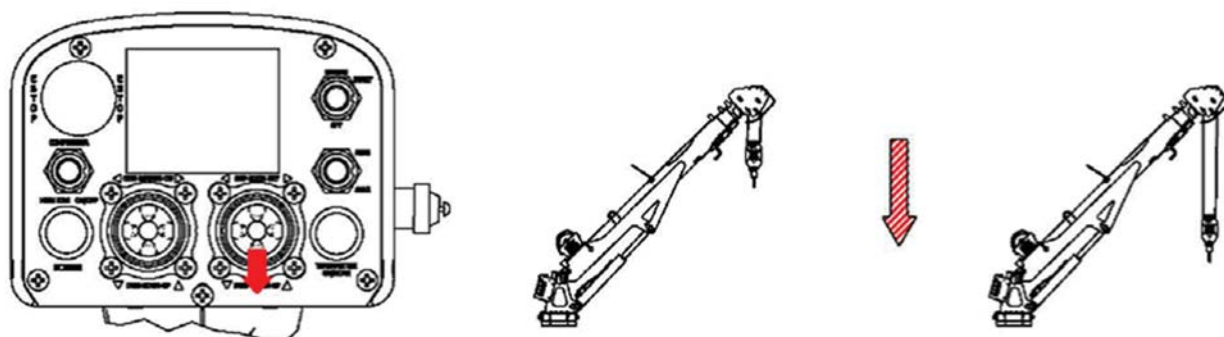
2.13.1.2 Winch Controls



ST00025

Figure 2-21.

1. Press the right joystick forward to raise the winch (see Figure 2-21).



ST00026

Figure 2-22.

2. Press the right joystick downward to lower the winch (see FFigure 2-22).



ST00019

Figure 2-23.

2.13.1.3 Engine Start/Stop

1. Make sure the PTO switch is on (manual transmissions only) and the park brake is set.
2. Press the start button (Figure 2-23, Item 1) on the remote. When the engine is not running, pressing the start/stop switch to close the K1 relay, activate the starter, and start the engine.
3. Repeat Steps 1-2 to stop engine.

2.13.1.4 Compressor and High Idle On/Off

1. Make sure the PTO switch is on (manual transmissions only) and the park brake is set.
2. Press the compressor button (Figure 2-23, Item 5). This will turn the compressor's high idle on or off.

2.13.1.5 Aux 1/Aux 2 On/Off (Optional)

If equipped with an optional accessory, this button will toggle that option on or off. For example, a common option is boom tip lights.

1. Press button (Figure 2-23, Item 2) to toggle option on or off.

2.13.1.6 Transmitter On/Horn

1. Press transmitter on/horn button (Figure 2-23, Item 3) to connect the remote to the receiver.
2. After the remote has been connected to the receiver, press the transmitter on/horn button to sound the horn.

2.13.1.7 E-Stop/Remote On

1. Pull out on the E-stop/remote on button (Figure 2-23, Item 6) to turn on remote.
2. Push E-stop/remote on button in to turn off the remote or perform an emergency stop.

2.13.1.8 Initial Screen

The initial screen is what is displayed under normal operation. The initial screen and LMI screen can be toggled. The percentage of the maximum boom load and percentages of functions being used are displayed on this screen.

2.13.1.9 Toggled LMI Screen

The initial screen and LMI screen can be toggled by pressing the button (Figure 2-23, Item 4). The LMI screen displays the following LMI data:

- Approximate load
- Radios of extension
- Percent of maximum capacity being used
- Boom angle

2.13.1.10 Warning LMI Screen

The warning LMI screen displays warning history.

2.13.2 Data Panel with LMI Data

1. Press the crane control button on the data panel main screen. This will navigate to the crane control screen.
2. The LMI data can be viewed in the center of the crane control screen.

2.14 Manual Operation



WARNING

This procedure is only to be used in the case of an emergency. Contact Summit Truck Bodies customer support prior to performing this procedure. The assistance of a qualified Summit Truck Bodies customer support representative is required to provide guidance through this procedure, to avoid equipment damage, injury, or death.

Follow the procedure below to override the remote, so the crane can be operated manually.



WARNING

If manual control must be activated, take truck in for service as soon as possible to prevent equipment damage, injury, or death.

1. Locate the override screw on the block.
2. Rotate the override screw clockwise three to five full turns. This will activate the flow control.
3. Using a small screwdriver, insert tip into the hole of the manual override and press in.
4. To deactivate the flow control, reverse the procedure.

CHAPTER 3 - MAINTENANCE**WARNING**

Read the following before maintaining any part of the crane. Only authorized and trained service personnel are to perform maintenance on the crane. Failure to do so could result in personal injury or death.

**CAUTION**

Routine maintenance ensures proper operation of equipment. All warranties are void if maintenance is neglected. Failure to follow any routine maintenance listed in this section could result in equipment damage or failure.

NOTE

- Use only authorized parts. Any damage or malfunction caused by the use of unauthorized parts is not covered under Warranty or Product Liability.
- Once a bolt has been torqued to its rated capacity and then removed, the bolt should be replaced.

3.1 General

A daily, weekly, monthly, and quarterly Preventive Maintenance (PM) plan should be established to prevent damage to the equipment and keep it operating at maximum levels. Follow all safety practices before undergoing maintenance on the equipment.

1. Set the emergency brake.
2. Lower the crane to a resting position, supported by the crane cradle on the truck or a stationary support on the ground level. The crane goes to -5 degrees.
3. Disable the PTO. Depending on the truck, this is done by shutting it off or pulling the handle out of gear.
4. Attempt to manually override the remote. This allows all reserve hydraulic pressure to be released.
5. Perform required PM on the equipment.
6. Any worn or broken parts should be replaced at this time. Replacement parts are available through Summit Truck Bodies.

3.1.1 Service

To better service the crane, it may be helpful to follow these guidelines:

1. Identify the problem. Knowing what the problem generally helps determine the solution.
2. Troubleshoot the problem. Identify all possible causes. Use Form 1-10 to assist in determining the actual cause of the problem.
3. Repair or replace all worn or damaged items.
4. Make any necessary repairs and or adjustments.
5. Check the function and proper operation of the equipment to ensure all components are working properly.
6. Put the crane back into service.

3.2 Lubrication

Follow the guidelines established in the manual for all lubrication requirements. Extreme heat or cold can adversely affect the life of the lubricant. Pay special attention to periods of heavy use of the equipment, as this will also shorten lubricant life.

3.3 Hydraulic Fluid Specification

NOTE

These recommendations are based on normal working parameters. If operating in less than favorable conditions (e.g., excessive dust, moisture, etc.), check the filter gauge often for filter change notice.

- Conoco Super Hydraulic Oil 46 or equivalent is recommended for use under normal conditions. This is the minimum viscosity specification to eliminate the need for seasonal oil changes under normal temperature conditions.
- For operation in extreme cold temperatures, hydraulic fluid with a viscosity of 3000 SSUs at the lowest temperature is required.
- Operating temperature of the hydraulic fluid should be 120°-160° F (49°-71° C).
- The hydraulic fluid must contain the following additives:
 - Antifoam
 - Antioxidant inhibitors
 - Rust resistant
 - Antiwear additives.
- Summit Truck Bodies recommends the first hydraulic oil filter be changed after 25 hours of service.
- After first hydraulic oil filter change, the hydraulic oil filter should be replaced every 500 hours of service.
- The hydraulic oil should be replaced at 3,000 hours or every year, whichever occurs first. If guidelines have not been followed, hydraulic oil may need to be replaced sooner.
- Check the filter gauge often for filter change notice.

3.4 Hydraulic Oil Deterioration

Hydraulic oil will break down over time and/or excessive use. To avoid damage to hydraulic components, take a sample of the hydraulic oil if deterioration or contamination is suspected and perform inspection as follows:

1. Put a sample of the hydraulic oil in a clean glass jar.
2. Inspect the hydraulic oil for a burnt or foul odor.
3. Make sure the hydraulic oil is clear and clean. Contaminated hydraulic oil generally is cloudy or is very dark in appearance.
4. Let the hydraulic oil settle in glass for 5 minutes. Inspect for water at the bottom of the glass jar.
5. If any issues are found in Steps 1-4 the hydraulic oil should be replaced.

3.5 Hydraulic Oil Replacement

The hydraulic oil should be changed at 3,000 hours of operation or every year, whichever occurs first. Follow these guidelines to purge the hydraulic system:

1. Park truck in area that allows for the full rotation of the crane.
2. Make sure PTO is disengaged.
3. Turn off truck engine.
4. Remove drain plug from hydraulic reservoir and drain hydraulic oil reservoir.
5. Remove two hoses located on the bottom of the hydraulic reservoir.
6. Remove two wire mesh strainers located on the bottom of the hydraulic reservoir.

7. Clean wire mesh strainers.
8. Install two wire mesh strainers in bottom of the hydraulic reservoir.
9. Install two hoses in bottom of the hydraulic reservoir.
10. Install drain plug
11. Fill hydraulic reservoir with new hydraulic oil.
12. Start the truck engine.
13. Engage the PTO.
14. Allow the system to cycle for 5 to 10 minutes, then fill the hydraulic oil reservoir to the full mark.

3.6 Purging Air From the Hydraulic System

Air in the hydraulic system will cause choppy, erratic crane functions.

NOTE

Do not purge the system for the winch circuit function.

3.6.1 Purging Air From One Hydraulic Function

If the choppy, erratic condition is only noticed when performing one function, perform the following procedure:

1. Operate the choppy or erratic function open until the cycle is complete.
2. Operate the function in the opposite direction, holding the control in the open position. This should eliminate the air.
3. Operate the crane to check the performance. If the system operates smoothly, it is purged. If the system does not operate smoothly, repeat the Steps 1-3.

3.6.2 Purging Air From Hydraulic Cylinders

If the choppy, erratic condition is noticed in a hydraulic cylinder, perform the following procedure:

1. Hold the control open in one direction after the cylinder has bottomed out.
2. Operate the affected cylinder in the opposite direction. Hold the control open after cylinder has bottomed out.
3. Operate the crane to check the performance. If the cylinder operates smoothly, it is purged. If the cylinder does not operate smoothly, repeat the Steps 1-3.

3.7 Hydraulic System Relief Pressure Check

To check the hydraulic system relief pressure follow the procedure bellow:

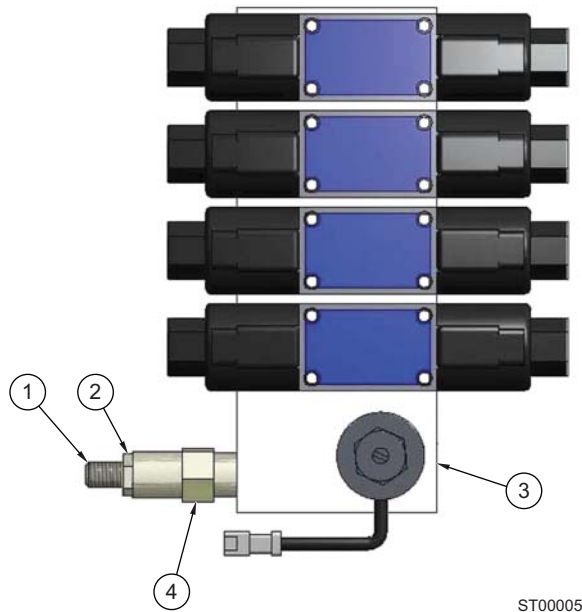


Figure 3-1.

1. Locate pressure gauge in the -4 O-ring near the front bottom side of valve manifold (Figure 3-1, Item 3).
2. Start the truck engine, engage the PTO, and allow the system to idle until it reaches operating temperature.
3. Extend the boom until the cylinder is fully extended.

NOTICE

Hold valve to the extend position while reading the pressure gauge. Note reading. If the reading is 2800 PSI, the hydraulic system relief pressure is correct. If the hydraulic system relief pressure is above or below 2800 PSI, the hydraulic system relief pressure must be adjusted.

NOTE

Perform Steps 5-8 to only if hydraulic system relief pressure needs to be adjusted.

4. Loosen jam nut (Figure 3-1, Item 2) on the relief valve (Figure 3-1, Item 4).
5. Turn relief valve screw clockwise (Figure 3-1, Item 1) if hydraulic system relief pressure needs to be increased, or counterclockwise if hydraulic system relief pressure needs to be decreased.
6. Tighten jam nut (Figure 3-1, Item 2) on relief valve (Figure 3-1, Item 4).
7. Repeat procedure until the relief valve pressure is set to 2800 PSI.

3.8 Counter Balance Valve Check

The crane is equipped with hydraulic cylinders with counter balance valves. The counter balance valves prevent the failure of the cylinder rods in a downward motion in the event there is a component failure within the hydraulic system. To check for proper function of the counter balance valves, follow the procedure below:

1. Locate cylinder where problem is suspected.
2. Determine which counter balance valve is for retraction and which is for extension.
3. Safely lift a lighter load than the crane has capacity for.
4. Disengage the hydraulic system.
5. Safely monitor cylinder. If cylinder allows the load to lower, the counter balance valve is faulty and needs to be replaced. If the cylinder does not lower, the counter balance valve is operational.

3.9 Rotation Gear

No adjustments are to be made to the planetary winch without prior consultation with Summit Truck Bodies. The planetary winch is only to be serviced by a trained technician, through the service department.

Castrol Molub-Alloy 936 SF Heavy Lubricant or equivalent gear lube is recommended to grease the worm and ring gear.

3.10 Planetary Winch

No adjustments are to be made to the planetary winch without prior consultation with Summit Truck Bodies. The planetary winch is only to be serviced by a trained technician through the Summit Truck Body service department.

3.11 Wire Rope

3.11.1 Wire Rope Daily Inspection



WARNING

An inspection of the wire rope is required. Failure to do so could result in equipment damage, property damage, injury, or even death.

The safety of the personnel, crane, and load is dependent on the wire rope. A thorough visual inspection is required daily.

1. Inspect the entire wire rope as it is unwound from the winch. Inspect wire rope for the following:
 - Rust or corrosion
 - Worn or frayed strands
 - Heavy bends or kinks
 - Excessive wear due to rubbing
 - Ends at attachment points for damage and/or rust
 - Winch drum for wear (with wire rope unwound)
 - Sheaves for any unusual wear (with wire rope unwound)
2. If any defects are observed in Step 1, replace wire rope.

3.11.2 Wire Rope Quarterly Inspection



WARNING

A quarterly inspection of the wire rope is required. Failure to do so could result in equipment damage, property damage, injury, or even death.

The safety of the personnel, crane, and load is dependent on the wire rope. A thorough quarterly inspection is required. The quarterly inspection is a detailed inspection that should only be performed by qualified personnel with knowledge of the equipment and its features and functions.

1. Inspect the entire wire rope for the following:
 - Rust or corrosion
 - Worn or frayed strands
 - Heavy bends or kinks
 - Excessive wear due to rubbing
 - Ends at attachment points for damage and/or rust
 - Signs of stretching
 - winch drum for wear (with wire rope unwound)
 - Sheaves for any unusual wear (with wire rope unwound)
2. Measure the diameter of the wire rope with a micrometer. It is necessary when judging the diameter of the wire rope to determine the life expectancy of the rope. Make sure there is no more than 0.03 in (0.76 mm) of wear.
3. Inspect wire rope for signs of exposure to extreme heat such as discoloration, melting, or charring.

NOTE

The rope has weight associated with it so be cautious when near the ends of the rope.

4. If any defects are found in Steps 1-3 replace wire rope.

3.11.3 Wire Rope Care

In order to properly maintain the wire rope:

- Store in winch off the crane body
- Lubricate with WD-40 monthly
- Avoid using wire rope over sharp objects
- Avoid situations where wire rope can become snagged or caught
- Avoid situations where wire rope can become crushed

3.12 Gear-Bearing Bolts



WARNING

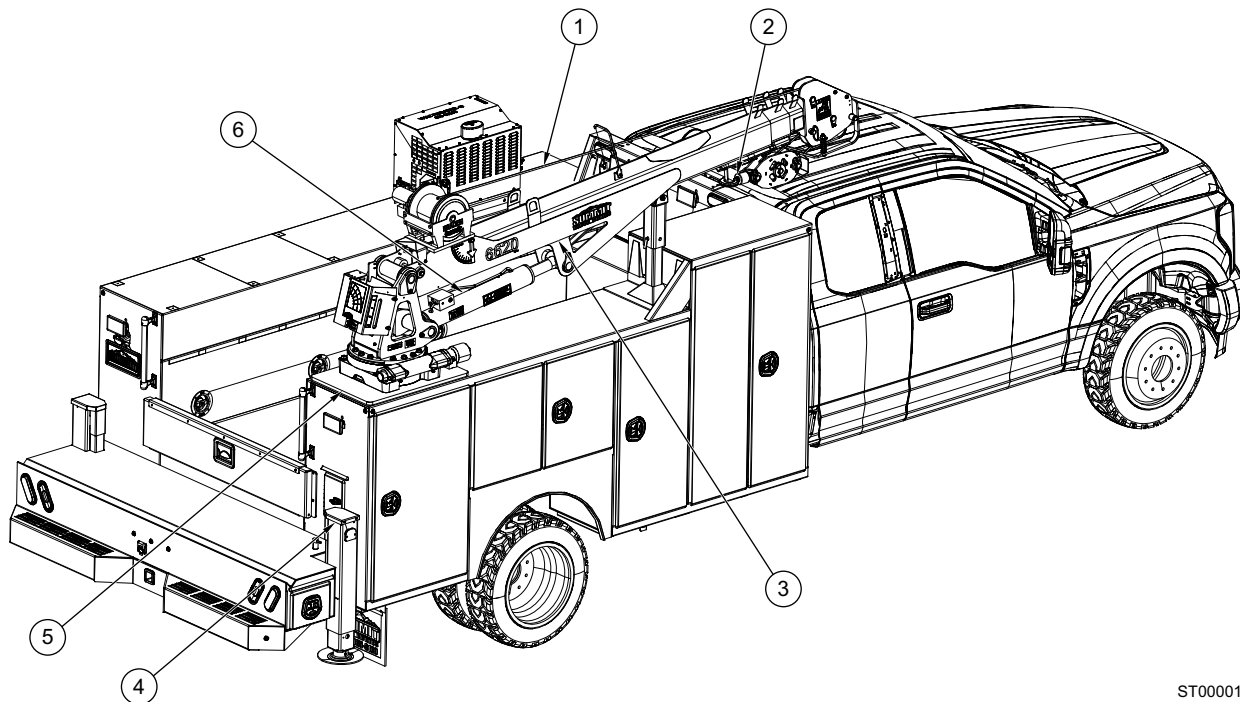
Do not reuse any of the gear-bearing bolts. Reuse of gear-bearing bolts will result in compromised bolt integrity. This could result in injury or death.

Do not reuse any gear-bearing bolts. If removed or damaged, gear-bearing bolts must be replaced using a bolt of identical size and grade.

| U.S. BOLT TORQUE SPECIFICATIONS | | | | | | | |
|--|----------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|
| | | SAE GRADE NO. 5 | SAE GRADE NO. 5 | SAE GRADE NO. 8 | SAE GRADE NO. 8 | Socket Head Cap Screw | Socket Head Cap Screw |
| Dia. inch | Thread per inch | lb-ft (N•m) Dry | lb-ft (N•m) Oiled | lb-ft (N•m) Dry | lb-ft (N•m) Oiled | lb-ft (N•m) Dry | lb-ft (N•m) Oiled |
| 1/4 | 20 | 8 (11) | 6 (8) | 12 (16) | 9 (12) | 14 (19) | 11 (15) |
| 5/16 | 18 | 17 (23) | 13 (18) | 25 (34) | 18 (24) | 29 (39) | 23 (31) |
| 3/8 | 16 | 30 (41) | 23 (31) | 45 (61) | 35 (47) | 49 (66) | 39 (53) |
| 7/16 | 14 | 50 (68) | 35 (47) | 70 (95) | 55 (75) | 76 (103) | 61 (83) |
| 1/2 | 13 | 75 (102) | 55 (75) | 110 (149) | 80 (108) | 113 (153) | 90 (122) |
| 9/16 | 12 | 110 (149) | 80 (108) | 150 (203) | 110 (149) | 163 (221) | 130 (176) |
| 5/8 | 11 | 150 (203) | 110 (149) | 220 (298) | 170 (230) | 230 (312) | 184 (249) |
| 3/4 | 10 | 260 (353) | 200 (271) | 380 (515) | 280 (380) | 400 (542) | 320 (434) |
| 7/8 | 9 | 430 (583) | 320 (434) | 600 (813) | 460 (624) | 640 (868) | 510 (691) |
| 1 | 8 | 645 (875) | 515 (698) | 910 (1234) | 725 (983) | 960 (1302) | 770 (1044) |
| 1 1/8 | 7 | 795 (1078) | 635 (861) | 1290 (1749) | 1030 (1396) | 1375 (1864) | 1100 (1491) |
| 1 1/4 | 7 | 1120 (1519) | 900 (1220) | 1875 (2542) | 1500 (2034) | 1980 (2685) | 1585 (2149) |
| 1 3/8 | 6 | 1470 (1993) | 1175 (1593) | 2380 (3227) | 1900 (2576) | 2535 (3437) | 2030 (2752) |
| 1 1/2 | 6 | 1950 (2644) | 1560 (2115) | 3160 (4284) | 2525 (3423) | 3340 (4528) | 2670 (3620) |

| BOLT TORQUE FACTORS | |
|---------------------------------|--------------------------|
| Lubricant or Plating | Torque Changes |
| Oil | Reduce torque 15% to 25% |
| Dry Film (Teflon or moly based) | Reduce torque 50% |
| Chrome Plating | No change |
| Cadmium Plating | Reduce torque 25% |
| Zinc Plating | Reduce torque 15% |
| Loctite® | No change |

3.13 Inspections



ST00001

Figure 3-2.

3.13.1 Daily Inspection

Before operating crane, a visual inspection of the following will help prevent unnecessary maintenance:

1. Make sure fluid levels in the crane, compressor, and engine are within the manufacturers' specifications.
2. Check for loose, broken, or damaged structural components such as welds and fasteners.
3. Check for leaking cylinder (Figure 3-2, Item 6) seals.
4. Check the following components for oil leaks:
 - Engine
 - Transmission
 - PTO
 - Pump
 - Power steering reservoir
 - Hydraulic reservoir
5. Inspect wire rope (Figure 3-2, Item 1). See Wire Rope Daily Inspection.
6. Check for excessive wear to the counter balance valves to ensure the crane load will not be compromised.
7. Make sure outriggers (Figure 3-2, Item 4) operate as specified.
8. Make sure all safety devices are in place and in good working order, and labels are legible.

3.13.2 Weekly Inspection

The inspection should be a routine inspection and should only be performed by qualified personnel with knowledge of the equipment and its features and functions.

1. Make sure fluid levels in the crane, compressor, and engine are within the manufacturers' specifications.
2. Check for loose, broken, or damaged components.

3.13.3 Monthly Inspection

A monthly inspection schedule should be developed. Monthly inspections should be performed at the same time every month by qualified personnel with knowledge of the equipment and its features and functions.

1. Check the following for leaks
 - Engine
 - Transmission
 - Crane
 - Outriggers (Figure 3-2, Item 4)
 - Hydraulic reservoir
 - All cylinders
 - All other fluids or lubricants on truck
2. Make sure all fluid levels in the crane, compressor, and engine are within the manufacturers' specifications.
3. Inspect crane hook and safety latch for wear or damage.
4. Check for loose, broken, or damaged structural components such as welds and fasteners.
5. Make sure all safety devices are in place and in good working order, and labels are legible.
6. Make sure all electrical components and lighting function properly.

3.13.4 Quarterly Inspection

A quarterly inspection schedule should be developed. Quarterly inspections should be done by qualified personnel with knowledge of the equipment and its features and functions.

This inspection should include, but not be limited to, the following:

1. Check for loose, broken, or damaged bolts on the crane body.
2. Check for loose, broken, or damaged mounting bolts that secure the crane to the truck pedestal (Figure 3-2, Item 5).
3. Make sure hydraulic pressure is within specification to the cylinders, main block assembly, and cartridges.
4. Lubricate pivot points on crane, such as the bearings, cylinders, and shafts.
5. Check for damage or wear to hydraulic hoses.
6. Check PTO for damage or wear. Refer to the manufacturer's maintenance manual for inspection procedure.
7. Check lift and extend cylinders for the following:
 - Leaks
 - Drifting cylinders
 - External damage

MAINTENANCE

3.13.5 Lubrication and Maintenance Schedule

| LUBRICATION & MAINTENANCE SCHEDULE | | | | | | |
|------------------------------------|-----|--------|---------|---------|------|---|
| Service Performed | Day | Weekly | 3 Month | 6 Month | Year | Notes |
| Hydraulic Fluid | X | | | | | Check fluid level |
| Hydraulic Hoses | X | | | | | Visually inspect for leaks, cracks, and wear |
| Load Hook | X | | | | | Inspect hook and latch for deformation |
| Winch Cable | X | | | | | Check for broken strands, flattening, and deformation |
| Cable Drum | X | | | | | Make sure cable is wound evenly on drum |
| Pin Retaining Bolts | X | | | | | Check bolts for proper torque |
| Rotation Ring Gear | | X | | | | Lube with Castrol Molub – Alloy, 936 SF Heavy Lubricant or equivalent |
| Sheaves | | X | | | | Inspect for wear and bearing fatigue |
| Mounting Bolts | | X | | | | Check torque to 680 ft lbs |
| All other Bolts | | X | | | | Check and tighten as required |
| Rotation Gear Box | | | X | | | Grease zerks with multipurpose grease |
| Hydraulic Fluid | | | | | X | Drain, flush, and refill with ISO 46 Hydraulic Oil |

CHAPTER 4 - TROUBLESHOOTING

NOTE

The following is meant as a reference for diagnosing on-the-job-malfunctions.

*If probable causes are checked and no solution is present on phase 2 or 3, please call
(866-985-3100)

| SYMPTOM | PROBABLE CAUSE* |
|--|--|
| Crane will not operate manually or electrically | 1. Parking brake is not engaged |
| | 2. PTO is not engaged |
| | 3. Radio receiver does not have 12-VDC power supply |
| | 4. Transmitter not on |
| | 5. Transmitter batteries have low voltage |
| | 6. Hydraulic pump is not operating at rated pressure |
| Crane will not rotate | 1. Hydraulic fluid level is low |
| | 2. Obstruction in control valve solenoid |
| | 3. Adjustable speed is improperly set |
| | 4. Bad ground on control valves |
| | 5. Rotation direction slope is too extreme (not on level ground) |
| Crane will operate manually but will not operate electrically. | 1. Radio receiver does not have 12-VDC power supply |
| | 2. Transmitter not on |
| | 3. Radio receiver is not functioning properly |
| | 4. Parking brake is not engaged |
| | 5. Parking brake switch is not working properly |
| Function does not respond to controls | 1. The toggle switch is not working properly |
| | 2. Hydraulic fluid is low |
| | 3. PTO is not engaged |
| | 4. Ruptured/obstructed pressure line |
| | 5. Faulty hydraulic pump |
| | 6. Short circuit in remote control |
| | 7. Broken wire in remote control |
| | 8. Crane is not grounded to truck |
| | 9. Solenoid in control valve is malfunctioning |
| | 10. Bad ground on the control valve |

TROUBLESHOOTING

| SYMPTOM | PROBABLE CAUSE* |
|--|---|
| Two functions operate at the same time while only toggling one function. | 1. Obstruction in solenoid control valve |
| | 2. Toggle switch has failed and is stuck in the on function |
| Functions operating slowly | 1. Hydraulic pump is operating at reduced speed |
| | 2. Relief valve is set too low |
| | 3. Flow control valve is not functioning properly |
| | 4. Proportional trigger on remote is not functioning properly |
| | 5. Low hydraulic fluid |
| | 6. Dirty filter/strainer |
| | 7. Obstruction in solenoid control valve |
| Unusual noise in operation | 1. Cavitation due to low hydraulic oil supply |
| | 2. Excessive loading |
| | 3. Restriction/collapse of suction line |
| | 4. Flow control valve is not functioning properly |
| | 5. Suction line filter is dirty |
| | 6. Relief valve is set too low |
| | 7. Relief valve is defective |
| | 8. Air in the lines |
| Outriggers will not react | 1. Adjustment speed is set improperly |
| | 2. Control valve is defective |
| | 3. Loss of power and/or ground to coil |
| | 4. Sensor needs adjustment |
| Boom drifts under load | 1. Cylinder piston seals are leaking |
| | 2. Counterbalance valve is defective |
| Boom or winch won't lift | 1. Restriction in the line |
| | 2. Relief valve is not set properly |
| | 3. Overload condition |
| | 4. Counterbalance valve is malfunctioning or defective |
| Rotation speed too fast or too slow | 1. Hydraulic lines are restricted or ruptured |
| | 2. Hydraulic motor is defective |

| SYMPTOM | PROBABLE CAUSE* |
|---------------------------|---|
| Winch brake will not hold | 1. Back pressure on the return line of the winch is greater than 50 psi |
| | 2. Excessive loading |
| | 3. Winch relief valve is not set properly |
| | 4. Counter balance valve is not set properly |
| Crane operates slowly | 1. Air in the system |
| | 2. Pump is not delivering rated oil volume |
| | 3. Holding valves are not operating |
| | 4. Hydraulic fluid is low |
| | 5. Flow control valve is restricted |
| | 6. Pressure relieve valve is sticking open |
| | 7. Speed control option is not engaged |

| Crane Interlock Summary | | | | | |
|--------------------------|---------------------------|-------------------------|--|---|---------------------|
| If: | Both Outriggers Unplanted | One Outrigger Planted | Both Outriggers Planted and Fully Extended | Both Outriggers Planted, Not Fully Extended | Zone Overload |
| Warning Ribbon Displayed | | | | | |
| Phase 2 | Outriggers Not Deployed | Maneuver Mode | | Maneuver Mode | Crane Zone Overload |
| Phase 3 | Outriggers Not Deployed | Outriggers Not Deployed | | Maneuver Mode | Crane Zone Overload |

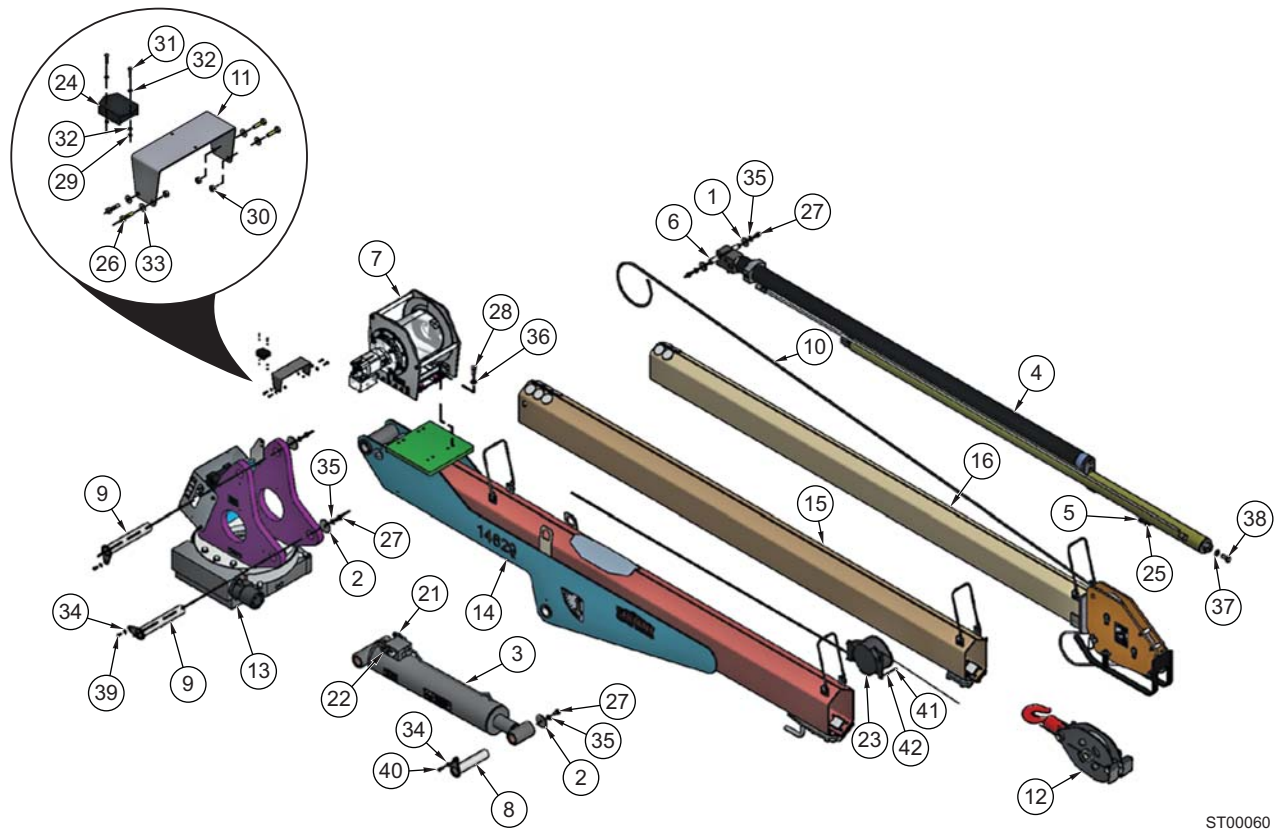
| Functions | | | | | |
|--------------|----------|----------|---------|---------|----------|
| Boom Up | Enabled | Disabled | Enabled | Enabled | Enabled |
| Boom Down | Enabled | Disabled | Enabled | Enabled | Disabled |
| Rotate | Enabled | Disabled | Enabled | Enabled | Enabled |
| Boom Extend | Disabled | Disabled | Enabled | Enabled | Disabled |
| Boom Retract | Disabled | Enabled | Enabled | Enabled | Enabled |
| Winch Up | Disabled | Disabled | Enabled | Enabled | Disabled |
| Winch Down | Disabled | Enabled | Enabled | Enabled | Enabled |

| Zone Rating | | | | | |
|--------------|--|-------------------------------|-------------------------------|---|-------------------|
| Zone 1 | 45% of nominal (Stability Derate Factor Setting) | No lift capability, see above | Stored Value for Zone 1 | 45% of nominal (Stability Derate Factory Setting) | Allow rotate to 2 |
| Zone 2 | 45% of nominal (Stability Derate Factor Setting) | No lift capability, see above | Stored Value for Zone 2 | 45% of nominal (Stability Derate Factory Setting) | Allow rotate to 3 |
| Zone 3 | Stored Value for Zone 3 | No lift capability, see above | Stored Value for Zone 3 | Stored Value for Zone 3 | Allow rotate |
| Zone 4 | 45% of nominal (Stability Derate Factor Setting) | No lift capability, see above | Stored Value for Zone 4 | 45% of nominal (Stability Derate Factory Setting) | Allow rotate to 3 |
| Zone 5 | 45% of nominal (Stability Derate Factor Setting) | No lift capability, see above | Stored Value for Zone 5 | 45% of nominal (Stability Derate Factory Setting) | Allow rotate to 4 |
| Zone 6 | 45% of nominal (Stability Derate Factor Setting) | No lift capability, see above | Stored Value for Zone 6 | 45% of nominal (Stability Derate Factory Setting) | Allow rotate to 5 |
| No Load Zone | 45% of nominal (Stability Derate Factor Setting) | No lift capability, see above | Stored Value for Zone 1 and 6 | 45% of nominal (Stability Derate Factory Setting) | Allow rotate to 6 |

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CHAPTER 5 - PARTS

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Figure 5-1.

Table 5-1. Assy., Crane, Summit, 14629 Hydraulic PH 3

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|---|------|-----|-------------|--|
| X | 1 | 2 | 400-60200 | WASHER, RETAINER |
| P | 2 | 3 | 400-60201 | WASHER, RETAINER |
| P | 3 | 1 | 400-60355 | CYLINDER, LIFT, 6.00 BORE 26.50 STROKE 3.00 ROD |
| P | 4 | 1 | 400-60409 | CYLINDER, EXTEND, 3 BORE, 178.50, 2 BORE |
| P | 5 | 2 | 400-60414 | EXTENSION CYLINDER SKID PADS 10K/12K 20' |
| S | 6 | 1 | 400-60420 | EXTENSION CYLINDER PIN |
| | 7 | 1 | 400-60536 | WINCH, CRANE, 14K PURCHASED |
| X | 8 | 1 | 400-60681 | PIN WELDMENT, BOOM TO CYLINDER, 14K |
| W | 9 | 2 | 400-60682 | PIN WELDMENT, PDSTL TO BM, PDSTL TO CYL, 14K |
| P | 10 | 1 | 400-60829 | CABLE, 1/2 IN DIA. WIRE ROPE WITH THIMBLE, 115-HT 6X25FW-IWRC XX1P IWRC, 120 FT, MBF 14.6 TONS |
| X | 11 | 1 | 400-61195 | BRCKT, HARTFIEL CRANE INCLINATION SENSOR 14629 |
| A | 12 | 1 | 400-61456 | TRAVELING BLOCK ASSY, 14K |
| A | 13 | 1 | 400-62278 | CRANE, SUMMIT, PEDESTAL 14629 ASSEMBLY PH 3 |
| A | 14 | 1 | 400-62281 | CRANE, SUMMIT, BASE BOOM 14629 ASSEMBLY PH 3 |

Table 5-1. Assy., Crane, Summit, 14629 Hydraulic PH 3 (Continued)

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|---|------|-----|-------------|--|
| A | 15 | 1 | 400-62284 | CRANE, SUMMIT, INTERMEDIATE BOOM 14629 ASSEMBLY PH 3 |
| A | 16 | 1 | 400-62286 | CRANE, SUMMIT, STINGER BOOM 14629 ASSEMBLY PH 3 |
| P | 17 | 1 | 500-40616 | MOR X FOR 90 (.25-.25) |
| P | 18 | 1 | 500-41071 | ELBOW 90°, MOR -6 TO FMOR -6 |
| P | 19 | 1 | 600-10244 | GROMMET, .63 ID, SNG, RUBBER |
| P | 20 | 4 | 600-10249 | GROMMET, .38 ID, SNG, RUBBER |
| P | 21 | 1 | 600-80051 | PRESSURE TRANSDUCER, -4 STW PHASE 3 |
| P | 22 | 1 | 600-80052 | PRESSURE TRANSDUCER, -6 STW PHASE 3 |
| P | 23 | 1 | 600-80057 | COBO CABLE REEL |
| P | 24 | 1 | 600-80102 | HARTFIEL CRANE INCLINATION SENSOR |
| P | 25 | 4 | 700-10016 | 18-8SSX.25-20X.75 SOCKFLT CAP |
| P | 26 | 4 | 700-10019 | .25-20 1 NC GR8 BOLT |
| P | 27 | 5 | 700-10046 | .50-13X1 NC GR8 BOLT |
| R | 28 | 8 | 700-10058 | HHCS- 5/8"-11 x 1 1/2" |
| P | 29 | 2 | 700-10100 | 8-32 KEP NUT |
| P | 30 | 4 | 700-10108 | .25 NYLON LOCK NUT |
| P | 31 | 2 | 700-10126 | 8-32X.75 MAC SCREW HEX SLOT |
| P | 32 | 4 | 700-10156 | #8 WASHER GR2 |
| P | 33 | 4 | 700-10158 | .25 HR SAE FLAT WASHER |
| P | 34 | 3 | 700-10160 | .38 HR SAE FLAT WASHER |
| P | 35 | 5 | 700-10162 | .50 HR FLAT WASHER |
| P | 36 | 8 | 700-10163 | .63 HR SAE FLAT WASHER |
| P | 37 | 1 | 700-10164 | .75 HR SAE FLAT WASHER |
| P | 38 | 1 | 700-10285 | BOLT, FINE THREAD, .75-16 X 1.5 IN LG, HCS YZ8 |
| P | 39 | 2 | 700-10287 | .38-16X75 NC GR8 BOLT |
| P | 40 | 1 | 700-10315 | .38-16X1.25 NC GR8 BOLT |
| P | 41 | 4 | 700-10536 | SHCS 12-24 X 1" ZF |
| P | 42 | 4 | 700-10537 | #12 FLAT WASHER ZF |

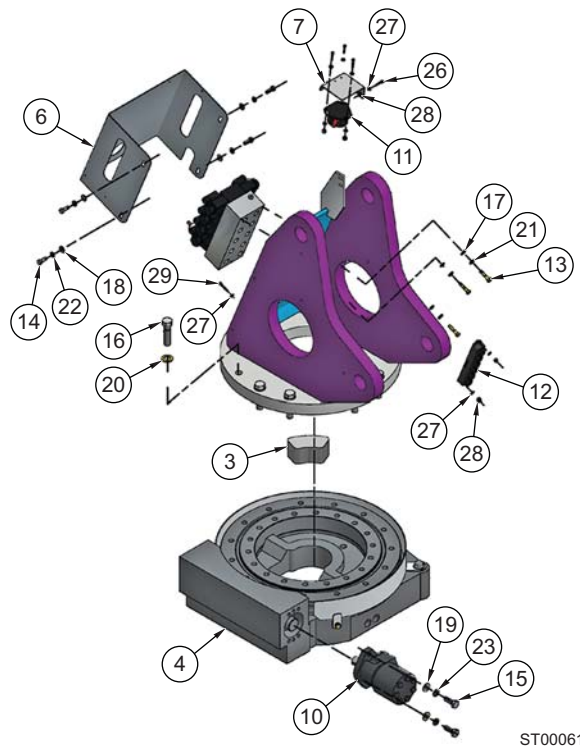


Figure 5-2.

Table 5-2. Crane, Summit, Pedestal 14629 Assembly PH 3

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|---|------|-----|-------------|---|
| P | 1 | 1 | 400-00567 | WEATHER STRIP,.0625 CRIMP,.375 BULB ON SIDE, BLACK PEBBLE |
| S | 2 | 1 | 400-60337 | WELDMENT, GEAR SHIELD 14K |
| P | 3 | 1 | 400-60677 | CRANE ROTATION STOP,SOLID,2.25 IN THK,5.25 IN L |
| P | 4 | 1 | 400-60678 | ROTATION GEAR, 14K CRANE, PURCHASED |
| X | 5 | 2 | 400-61447 | SPACER, GEAR SHIELD |
| S | 6 | 1 | 400-61459 | SHIELD, CRANE 14629 VER. 12 ONLY |
| S | 7 | 1 | 400-61530 | BRCKT, HARTFIEL CRANE INCLINATION BASE SENSOR |
| W | 8 | 1 | 400-62279 | PEDESTAL WELDMENT, 14629 CRANE PH 3 |
| P | 9 | 1 | 500-60055 | VALVE ASSEMBLY, CRANE, 4 STATION |
| P | 10 | 1 | 600-60064 | MOTOR, ROTATOR HYD |
| P | 11 | 1 | 600-80053 | C.O.B.O SpA INCLINOMETER |
| P | 12 | 1 | 600-80056 | PHASE 3 6 WAY CAN SPLITTER |
| P | 13 | 3 | 700-10027 | .31-18X.5 NC GR8 BOLT |

Table 5-2. Crane, Summit, Pedestal 14629 Assembly PH 3

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|---|------|-----|-------------|--------------------------------------|
| P | 14 | 4 | 700-10033 | .38-16X1 NC GR8 BOLT |
| | 15 | 2 | 700-10047 | .50-13X1.50 NC GR8 BOLT |
| P | 16 | 11 | 700-10070 | .75-10X3 NC GR8 BOLT |
| P | 17 | 5 | 700-10159 | .31 HR SAE FLAT WASHER |
| P | 18 | 4 | 700-10160 | .38 HR SAE FLAT WASHER |
| P | 19 | 2 | 700-10162 | .50 HR FLAT WASHER |
| P | 20 | 11 | 700-10164 | .75 HR SAE FLAT WASHER |
| P | 21 | 5 | 700-10170 | .31 LOCK WASHER |
| P | 22 | 4 | 700-10171 | WASHER LOCK .375 |
| P | 23 | 2 | 700-10173 | .50 LOCK WASHER |
| P | 24 | 2 | 700-10245 | .31-18X.75 NC GR8 BOLT |
| P | 25 | 2 | 700-10286 | PLUG,PLASTIC,THREAD,1-8 UNC,SQ. HEAD |
| P | 26 | 5 | 700-10536 | SHCS 12-24 X 1" ZF |
| P | 27 | 13 | 700-10537 | #12 FLAT WASHER ZF |
| P | 28 | 7 | 700-10538 | #12-24 SS NYLOCK NUT |
| P | 29 | 2 | 700-10539 | SHCS 12-24 X 1 1/4" SS |

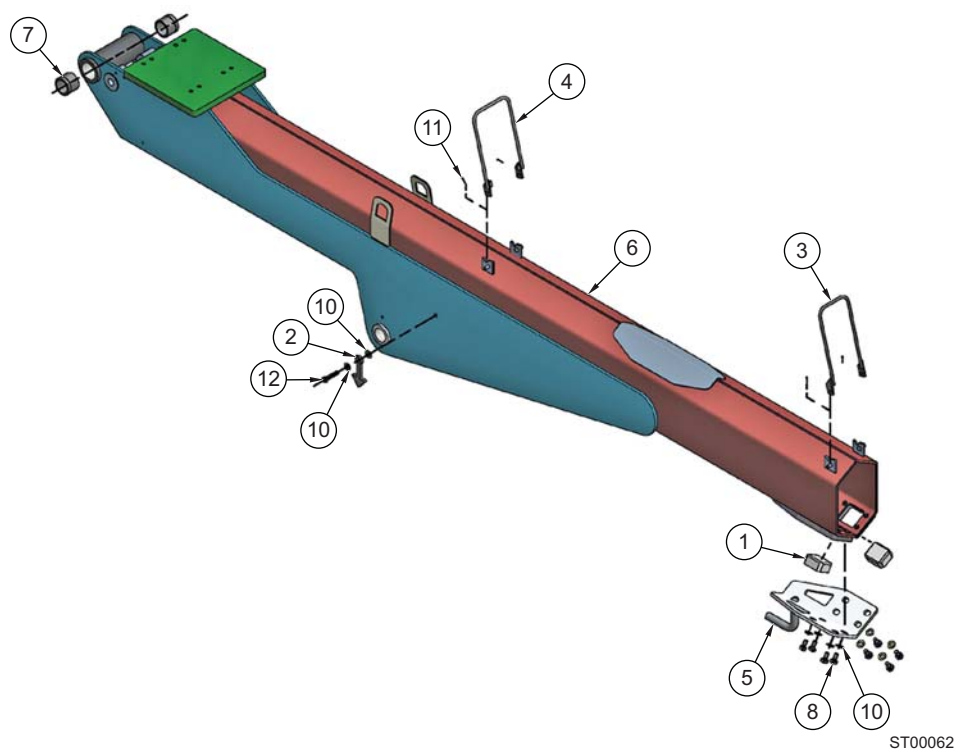


Figure 5-3.

Table 5-3. Crane, Summit, Base Boom 14629 Assembly PH 3

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|-----|------|-----|-------------|--|
| P | 1 | 2 | 400-60198 | SKID BLOCK |
| S | 2 | 2 | 400-60217 | ANGLE INDICATOR, CRANE |
| P | 3 | 1 | 400-60226 | CABLE GUIDE |
| W | 4 | 1 | 400-61488 | WELD., CABLE GUIDE, 14K BASE (EXTRA HEIGHT WIDTH) |
| W | 5 | 1 | 400-62018 | STOW HOOK WLDMNT 14K |
| P | 6 | 1 | 400-62282 | BOOM WELDMENT, BASE, 14629 PH 3 |
| P | 7 | 2 | 500-30021 | BEARING, CRANE LIFT CYLINDERS |
| K09 | 8 | 8 | 700-10046 | .50-13X1 NC GR8 BOLT |
| K10 | 9 | 4 | 700-10162 | .50 HR FLAT WASHER |
| K09 | 10 | 8 | 700-10162 | .50 HR FLAT WASHER |
| K12 | 11 | 4 | 700-10288 | COTTER PIN, .125 X.75, SS |
| K10 | 12 | 2 | 700-10296 | .50-13X2.25 NC GR8 BOLT, YELLOW ZINC HEX CAP SCREW |

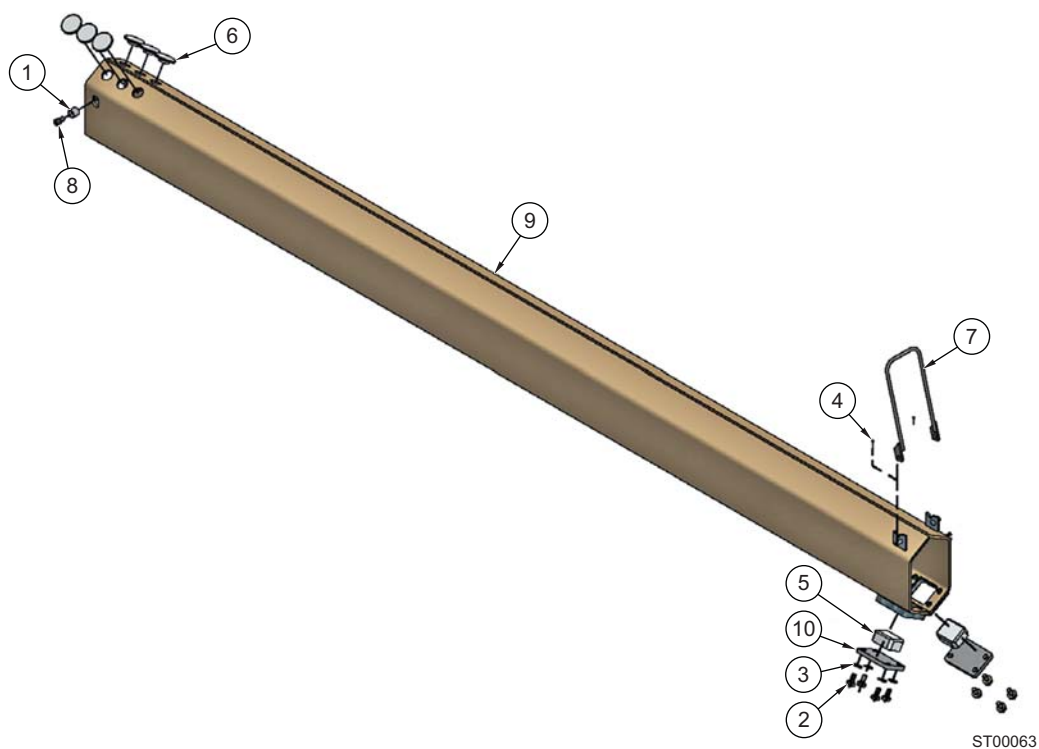


Figure 5-4.

Table 5-4. Crane, Summit, Intermediate Boom 14629 Assembly PH 3

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|-----|------|-----|-------------|---|
| K07 | 1 | 2 | 700-10291 | SHCS 1/2-13 X 3/4" |
| K09 | 2 | 8 | 700-10046 | .50-13X1 NC GR8 BOLT |
| K09 | 3 | 8 | 700-10162 | .50 HR FLAT WASHER |
| K12 | 4 | 2 | 700-10288 | COTTER PIN, .125 X .75, SS |
| P | 5 | 2 | 400-60198 | SKID BLOCK |
| P | 6 | 6 | 400-60199 | UPPER SKID PAD |
| P | 7 | 1 | 400-60226 | CABLE GUIDE |
| P | 8 | 2 | 400-60413 | THRUST BUSHING |
| P | 9 | 1 | 400-62285 | BOOM WELDMENT INTERMEDIATE - 14629 PH 3 |
| S | 10 | 2 | 400-60195 | BLOCK, INTERMEDIATE RETAINER |

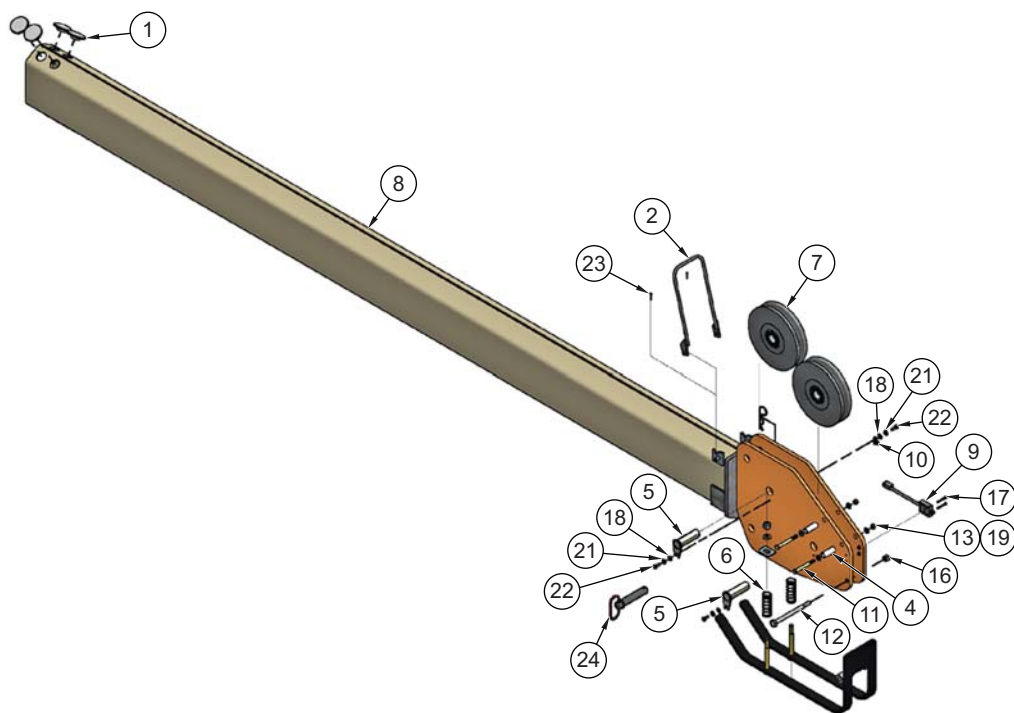


Figure 5-5.

Table 5-5. Crane, Summit, Intermediate Boom 14629 Assembly PH 3

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|-----|------|-----|-------------|---|
| P | 1 | 4 | 400-60199 | UPPER SKID PAD |
| P | 2 | 1 | 400-60226 | CABLE GUIDE |
| W | 3 | 1 | 400-60242 | WINCH STOP WELDMENT |
| P | 4 | 2 | 400-60388 | SPACER, 2 IN LG, .59 IN ID, 1.00 IN OD, NATURAL NYLON |
| S | 5 | 2 | 400-60390 | SHEAVE PIN W/A |
| P | 6 | 2 | 400-60397 | SPRING, 3 IN LG, 1.0 IN DIA, ANTI TWO BLOCK |
| P | 7 | 2 | 400-60482 | SHEAVE, 9 IN OD, 1.125 IN ID, ASSEMBLY, |
| P | 8 | 1 | 400-62287 | STINGER WELDMENT, DOUBLE SHEAVE 14629 PH 3 |
| P | 9 | 1 | 600-80127 | LIMIT SWITCH WITH 6 INCH LEAD AND 4 PIN DEUTSCH CONNECTOR |
| P | 10 | 1 | 700-00095 | CLAMP, VINYL COATED, 3/8 INCH |
| K12 | 11 | 2 | 700-10038 | .38-16X3-.50 NC GR8 BOLT |
| K11 | 12 | 1 | 700-10056 | .50-13X6.50 NC GR8 BOLT |
| K12 | 13 | 2 | 700-10105 | .38-16 STOVER/TOP LOCK NUT |

Table 5-5. Crane, Summit, Intermediate Boom 14629 Assembly PH 3

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|-----|------|-----|-------------|---|
| P | 14 | 2 | 700-10107 | 10-24 NYLON LOCK NUT |
| K11 | 15 | 2 | 700-10111 | .5"-13 NYLON LOCK NUT |
| K11 | 16 | 1 | 700-10113 | .50-13 STOVER LOCK NUT |
| K12 | 17 | 2 | 700-10133 | SCREW 10-24 X 1.5 MAC RD SLOT |
| K12 | 18 | 3 | 700-10159 | .31 HR SAE FLAT WASHER |
| K12 | 19 | 4 | 700-10160 | .38 HR SAE FLAT WASHER |
| K11 | 20 | 2 | 700-10162 | .50 HR FLAT WASHER |
| K12 | 21 | 3 | 700-10170 | .31 LOCK WASHER |
| K12 | 22 | 3 | 700-10245 | .31-18 X .75 NC GR8 BOLT |
| K12 | 23 | 2 | 700-10288 | COTTER PIN, .125 X .75, SS |
| P | 24 | 1 | 700-90024 | PIN, 1 IN DIA, 4 IN USABLE LENGTH, RED HAND |

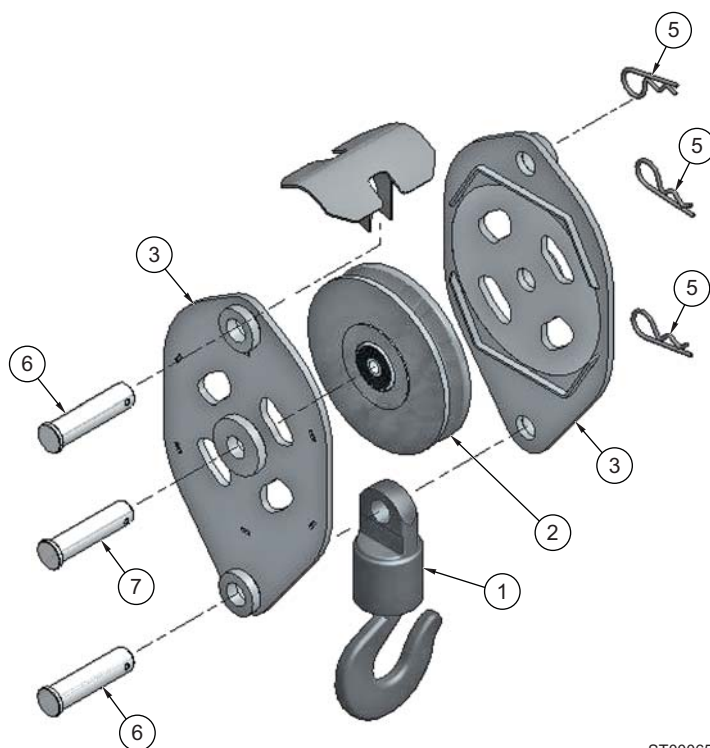


Figure 5-6.

Table 5-6. Travel Block Crane 6K 6000 # CAP

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|---|------|-----|-------------|---|
| | 1 | 1 | 400-60002 | 7 TON EYE & HOOK SWIVEL |
| | 2 | 1 | 400-60482 | SHEAVE, 9 IN OD, 1.125 IN ID, ASSEMBLY, |
| W | 3 | 2 | 400-60558 | TRAVELING BLOCK WELDMENT, 10000 LB, 5 TON OR LESS 3.8 TO 1 SAFETY FACTOR |
| | 4 | 1 | 400-60758 | WELD., TRAVELING BLOCK RETROFIT A2B STOP |
| P | 5 | 3 | 700-90011 | HAIR PIN |
| | 6 | 2 | 700-90017 | TRAVELING BLOCK PIN, LOWER |
| | 7 | 1 | 700-90023 | TRAVELING BLOCK PIN, MIDDLE, 1.15 IN DIA, 5.125 IN LG |

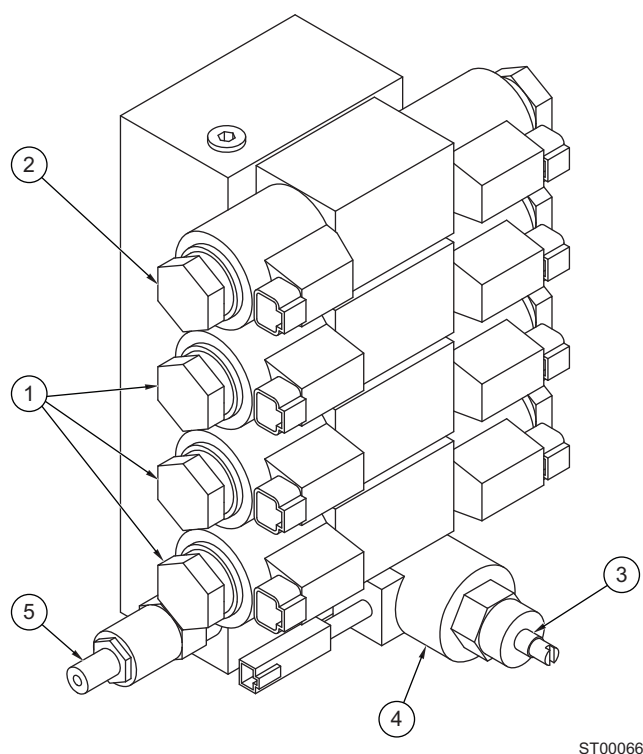


Figure 5-7.

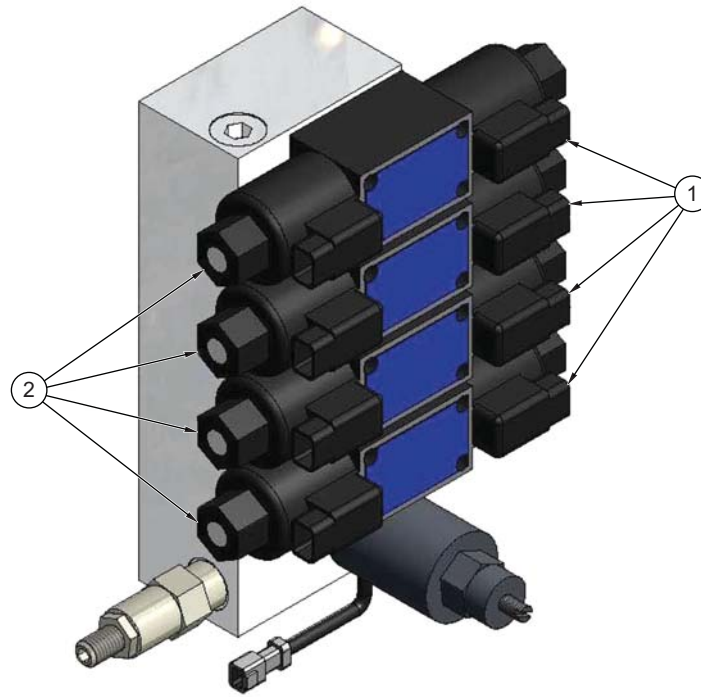
Table 5-7. Hydraulic Controls Valve Assembly

| * | ITEM | QTY | PART NUMBER | DESCRIPTION |
|---|------|-----|-------------|------------------------------|
| | 1 | 3 | 500-60144 | VALVE,DO3, TANDEM CENTER |
| | 2 | 1 | 500-60145 | VALVE,DO3, OPEN CENTER |
| | 3 | 1 | 500-60146 | VALVE,CARTRIDGE,PROPORTIONAL |
| | 4 | 1 | 500-60069 | VALVE,COIL,12V,DEUTSCH |
| | 5 | 1 | 500-60070 | VALVE,RELIEF |

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CHAPTER 6 - HYDRAULICS / CONTROLS

6.1 Valve Assembly



ST00013

Figure 6-1.

Table 6-1. Valve Assembly

| ITEM | DESCRIPTION |
|------|--|
| 1 | Deutsch Connector (Typical Both Sides) |
| 2 | Manual Overrides (Typical Both Sides)(2.14 Manual Operation) |

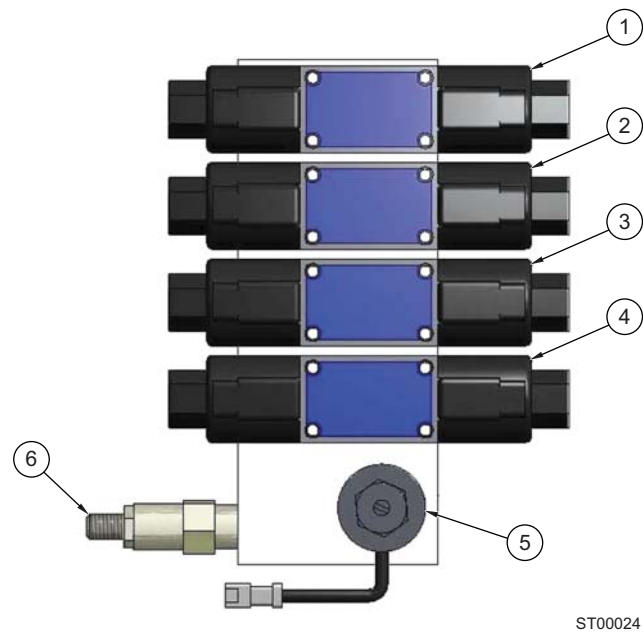


Figure 6-2.

Table 6-2. Valve Assembly Front and Rear View

| ITEM | DESCRIPTION |
|------|-----------------|
| 1 | Winch |
| 2 | Lift Cylinder |
| 3 | Rotate |
| 4 | Extend Cylinder |
| 5 | Flow Control |
| 6 | Pressure Relief |

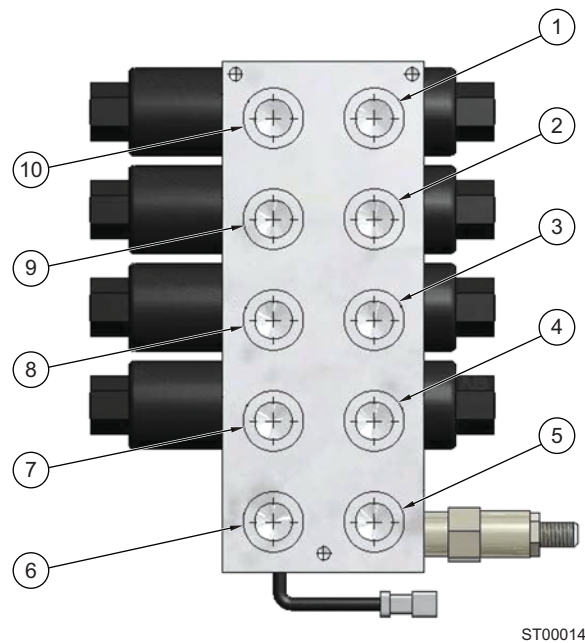


Figure 6-3.

Table 6-3. Valve Assembly Front and Rear View

| ITEM | DESCRIPTION |
|------|---------------|
| 1 | Winch Up |
| 2 | Cylinder Down |
| 3 | Rotate LH |
| 4 | Cylinder Out |
| 5 | Tank Return |
| 6 | Pressure Feed |
| 12 | Cylinder In |
| 13 | Rotate RH |
| 14 | Cylinder Up |
| 15 | Winch Down |

CHAPTER 7 - WIRING HARNESS

7.1 Phase I

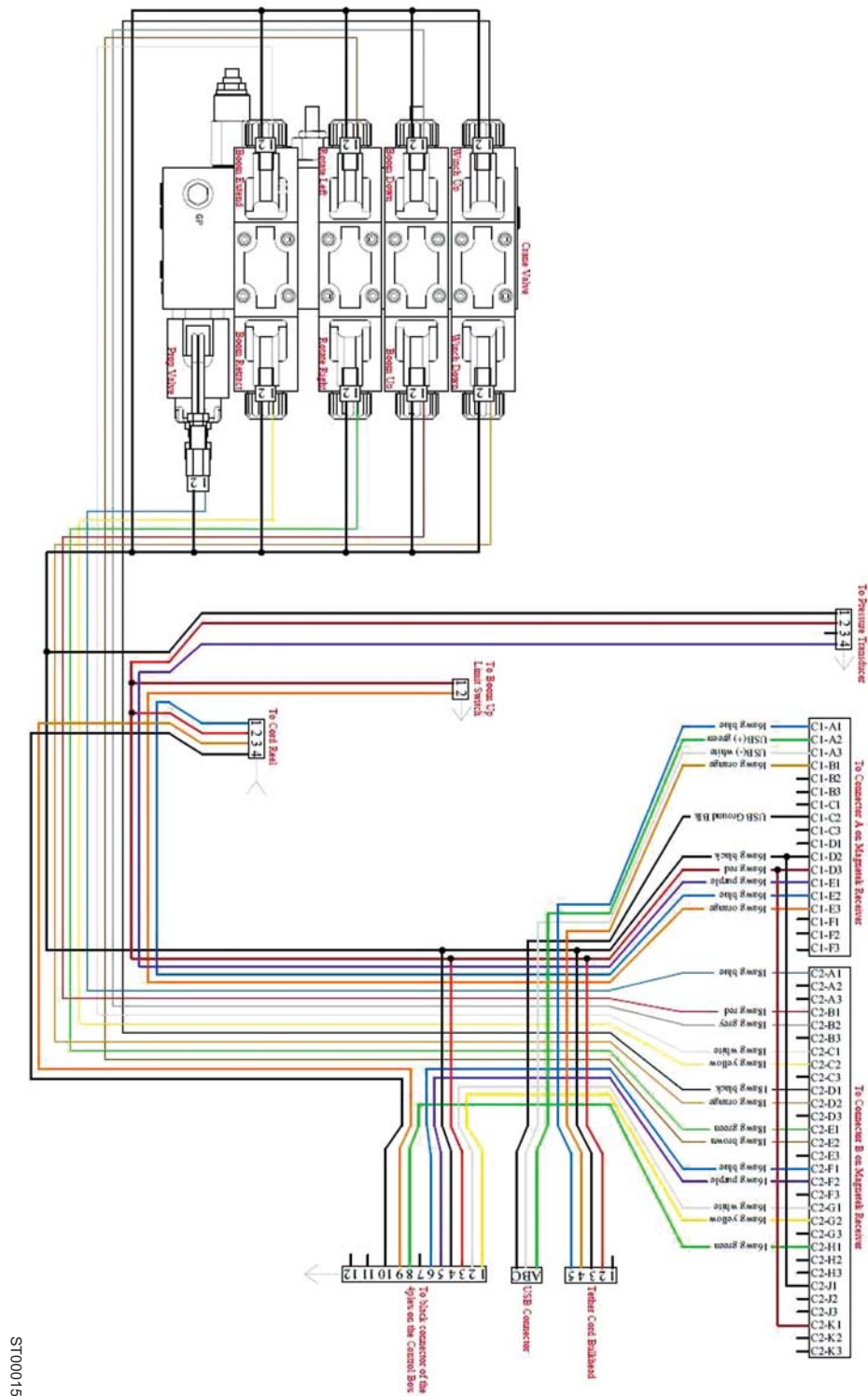


Figure 7-1.

7.2 Phase II

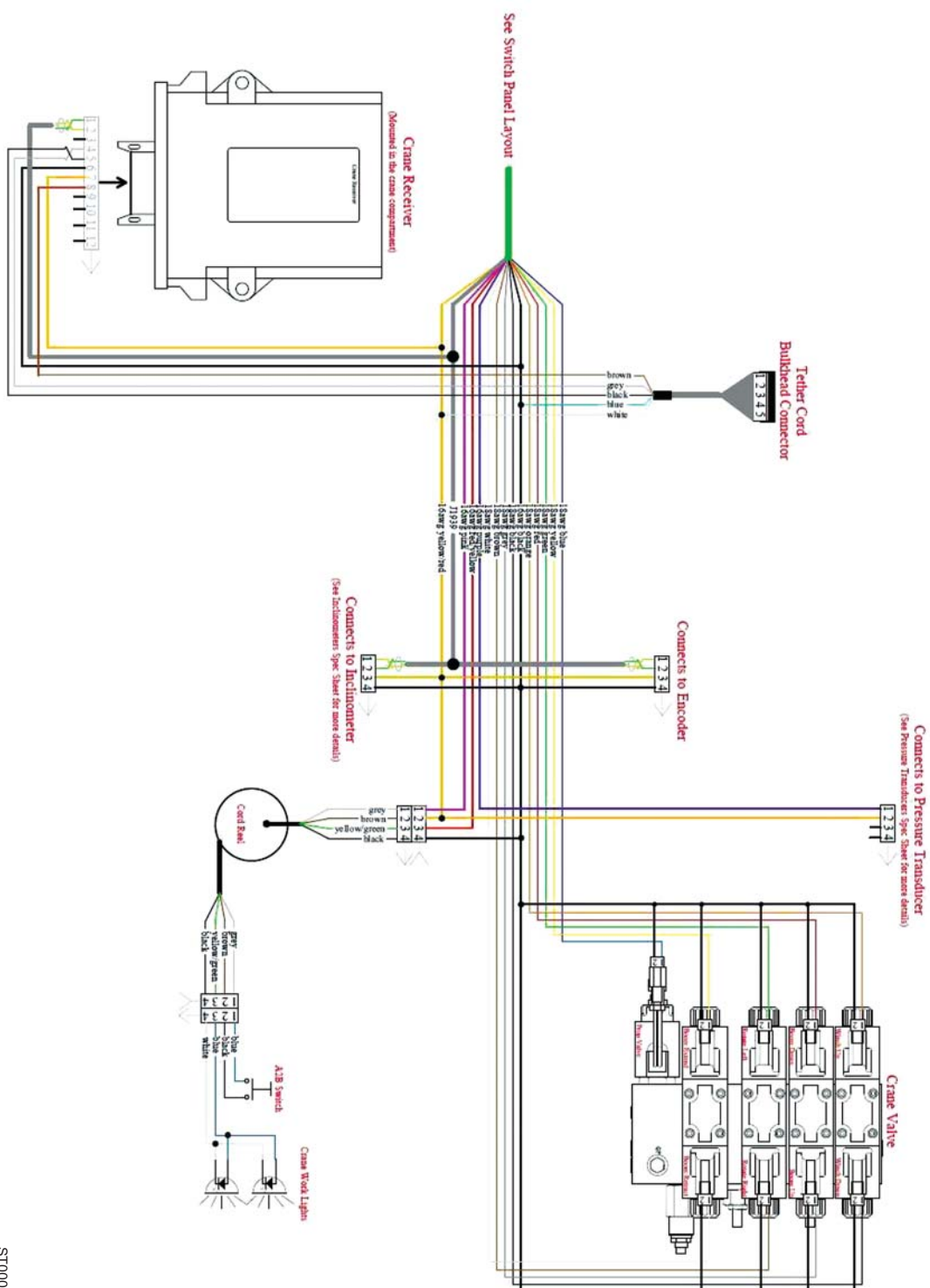


Figure 7-2.

7.3 Phase III

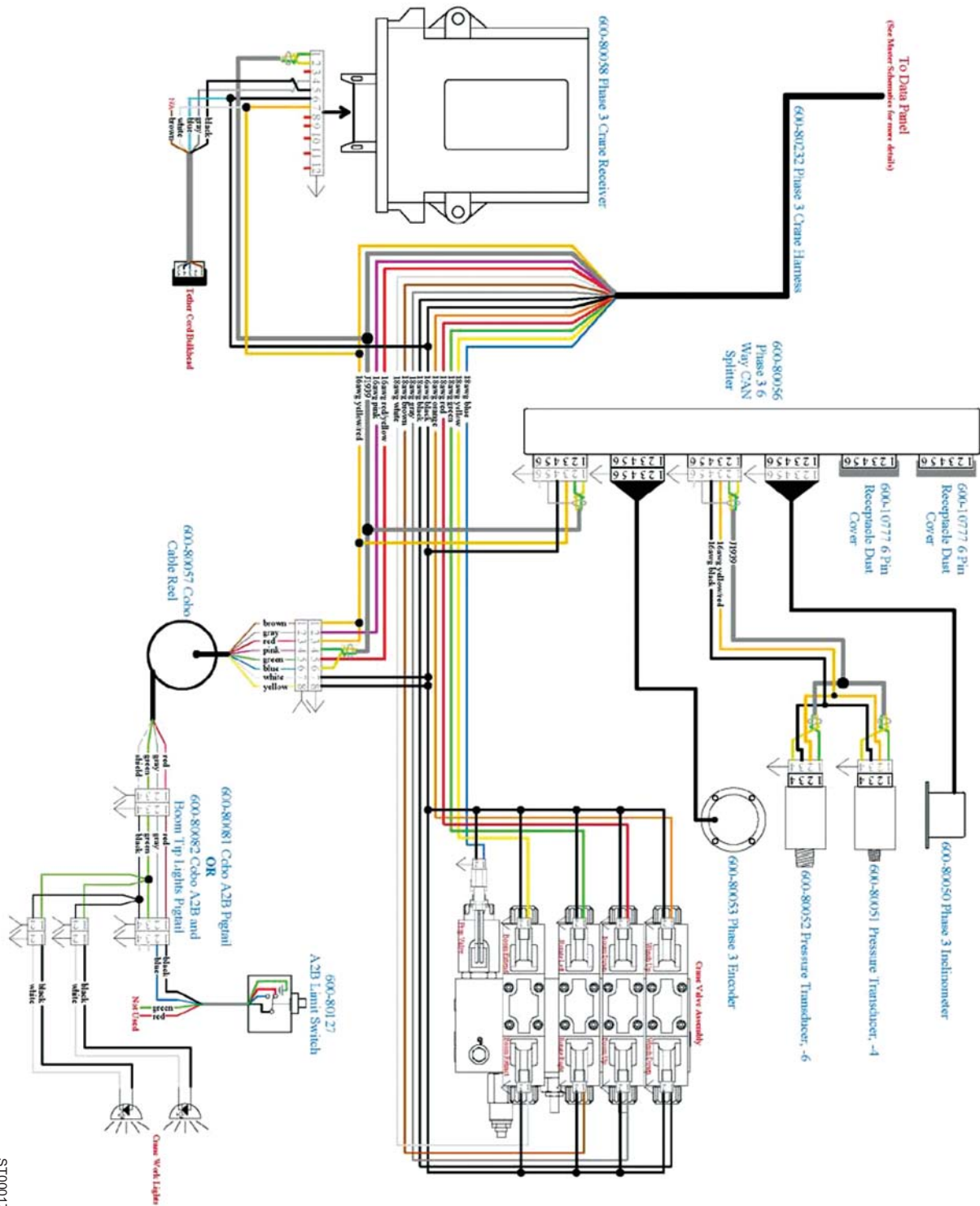


Figure 7-3.

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LIMITED WARRANTY

Summit Truck Bodies, LLC

Warranty Period: 60 Months

990 Vernon Rd.
Wathena, KS 66090
Phone (866) 985-3100
Fax (785) 989-3563

Summit Truck Bodies, LLC (hereinafter "Summit") warrants each new crane of Summit's manufacture to be free from defects in material and workmanship, under normal use and service for a period of five (5) years after initial purchase as derived from a completed warranty registration card. This Limited Warranty shall apply only to cranes of Summit's manufacture. Parts are covered by a separate limited warranty. **EQUIPMENT AND ACCESSORIES NOT OF SUMMIT'S MANUFACTURE ARE WARRANTED ONLY TO THE EXTENT OF THE ORIGINAL MANUFACTURER'S WARRANTY AND ARE SUBJECT TO THEIR ALLOWANCE TO SUMMIT ONLY IF FOUND TO BE DEFECTIVE BY SUCH MANUFACTURER.**

Warranty Terms

During the Limited Warranty period specified above, any defect in material and workmanship in any warranted item of Summit bodies not excluded below shall be repaired or replaced at Summit's option by a Summit representative or approved repair facility. Summit will pay for replacement parts and such approved repair shop's labor in accordance with Summit's labor reimbursement policy. Summit reserves the right to supply remanufactured replacement parts as it deems appropriate.

Retail Purchaser Responsibility

This Limited Warranty requires proper maintenance and periodic inspections of the crane as indicated in the Operator's Manual furnished with each new Summit crane. The cost of routine maintenance and services is the responsibility of the retail purchaser. The retail purchaser is required to keep documented evidence that these services were performed.

The Summit Truck Bodies, LLC Limited Warranty may be subject to cancellation if the above requirements are not performed.

Summit cranes with known failed or defective parts must be immediately removed from service.

Exclusions and Limitations

The warranties contained herein shall **NOT APPLY TO:**

Any defect which was caused (in Summit's sole judgment) by other than normal use and service of the crane or by any of the following: (i) accidents including but not limited to collision (ii) misuse or negligence (iii) overloading (iv) lack of reasonable and proper maintenance (v) improper repair or installation (vi) unsuitable storage (vii) non-Summit alteration or modification (viii) natural calamities (ix) vandalism

Any crane whose identification numbers or marks have been altered or removed.

Any crane which any of the required or recommended periodic inspection or services have been performed using parts not manufactured or supplied by Summit or meeting Summit specification.

New cranes delivered to the retail purchaser in which the warranty registration is not returned within fourteen (15) days from the date of delivery.

LIMITED WARRANTY

Any defect which was caused (in Summit's sole judgment) by operation of the crane not abiding by standard operating procedures outlined in the Operator's Manual.

Costs incurred by Summit for replacement parts for items not of Summit manufacture will be invoiced to the customer. To be considered for warranty, the failed part must be returned, at the discretion of Summit, to Summit or the manufacturer of the part within thirty (30) calendar days. The part will be evaluated and if warranty is approved by the manufacturer credit will be issued to the customer in the form of

- Credit to a Summit account if one exists or
- Credit back to a charge card or
- Check to the customer.

Transportation costs, if any, of transporting unit to an approved repair facility. Prior authorization is needed.

Depreciation caused by normal wear, lack of reasonable maintenance, failure to follow operating instructions, misuse, or lack of proper protection during storage.

Any installation of a crane on chassis other than original factory installation.

In no event shall Summit's liability exceed the original purchase price of the product.

Summit shall not be liable to any person under any circumstances for any incidental or consequential damages (including but not limited to loss of profits and out of service time) occurring for any reason at any time.

Diagnostic and overtime premiums are not covered under this Limited Warranty Policy.

Accessory systems and electronics not of Summit's manufacture are warranted only to the extent of such manufacturer's respective Limited Warranty, if any.

Parts Warranty

Replacement parts after the original warranty period are warranted to be free from defects in material for ninety (90) days or the part will be repaired or replaced without labor coverage for removal or installation.

Summit Labor Reimbursement Policy

Summit will consider labor reimbursement during the defined warranty period provided that the repair is pre-approved. Contact the Service Department at Summit for details.

Shipping Costs

Summit will pay for shipping of warranty parts by ground carrier. Expedited freight delivery is available at the expense of the owner. Shipping for the return of parts for warranty consideration will be at the owners' expense but will be reimbursed if the parts in question are deemed defective by Summit or by the manufacturer of the part and a legible copy of the invoice is provided.

Exclusion of Warranties

Except for the warranties expressly and specifically made herein, Summit makes no other warranties, and any possible liability of Summit hereunder is in lieu of all other warranties, expressed, implied, or statutory including but not limited to any warranties of merchantability or fitness for particular purpose. Summit reserves the right to modify, alter, and improve any product previously sold without incurring any obligation to replace any product previously sold without such modification. No person is authorized to give any other warranty or assume any additional obligation on Summit's behalf.

SUMMIT TRUCK BODIES IS UNDER NO OBLIGATION TO EXTEND THIS WARRANTY TO ANY CUSTOMER FOR WHICH AN SUMMIT CRANE WARRANTY FORM HAS NOT BEEN COMPLETED AND ON FILE WITH SUMMIT TRUCK BODIES.

OWNER'S MANUAL

Summit Truck Bodies
990 Vernon Road
Wathena, KS 66090
866-985-3100
Fax: 785-989-3563

www.summitbodies.com

Subject to Change without Notification

