SHERMAN+REILLY™
A Textron Company

SHERMAN + REILLY Revolution Series

PT-3500 / PT-7500 Puller Tensioner

Operators Manual

Table of Contents

6 **Section 1: Introduction**
7 Terms of Use

8 **Section 2: Specifications**
8 PT-3500 General Overview
8 PT-3500 Key Features
9 PT-3500 Specification Details
10 PT-7500 General Overview
10 PT-7500 Key Features
11 PT-7500 Specification Details

12 **Section 3: Safety**
12 Hazard Overview
12 Safety Warning Terms
13 General Warnings
14 Operator Safety Precautions
15 Employer Safety Precautions
16 Chemical Safety

17 **Section 4: Operation**
17 Terms You Need to Know
18 Safe-Zone™ Cab
20 Operator Controls
24 Tier 4 Engine PT-3500
29 System Control Panel
33 USB Interface
35 Joystick Control
38 Jack Controls
39 Automatic Levelwind Controls
41 Outside Hydraulic Control Panel
42 Emergency Manual Override Controls
43 Quick Start Guide
49 Towing and Road Safety
51 Positioning the Machine
52 Start-Up Procedure
53 Payout Operations
57 Pulling Operations
61 Drum/Reel Removal and Installation
63 Tensioning Operations
66 Spider System Operations
69 Emergency Stop Procedure

70 **Section 5: Troubleshooting**
70 Quick Tips
71 Troubleshooting Guide for Fault Codes
76 Torque Ratings for Machine Fasteners
78 Fuse/Relay Block Diagram
79 Fuse/Relay Wiring Schematic
80 PT Trailer Wiring Schematic
81 PT Hydraulic Schematic

82 **Section 6: Maintenance**
82 Safety and Reliability Disclaimer
82 Safety
83 Safety Warning Terms
84 General Care and Inspections Instructions
85 Cleaning
86 Fault and Malfunction Detection
87 Hydraulic System
88 Hydraulic System/Hose Inspection
89 Checking Hydraulic Fluid
90 Adding Hydraulic Fluid
91 Replacing Hydraulic Fluid and Filters
92 Hydraulic Hose Replacement
94 Drum/Reel Drive Assembly
94 Drive Shaft
94 Drive Shaft Cones
95 Drive Barn and Pins
95 Drive Couplings
96 Drive Motors
97 Inspecting Pillow Block Bearings
98 Tightening Set Screws
98 Greasing Pillow Block Bearings
99 Spider System Assembly
100 Hydraulic Power Engine
101 Safe-Zone™ Cab
101 Inspection of Operators Chair
101 Climate Control System
102 Trailer Assembly
102 Brakes
102 Towing
103 Tires
103 Wheels
104 Axle Drum Oil
105 Trailer Lighting
106 Lighting Replacement
107 Pre-Operation Inspection Checklist
110 Post-Operation Inspection Checklist
112 Preventive Maintenance Schedule
118 Torque Ratings for Machine Fasteners

122 **Section 7: Service & Repair**
122 Equipment Information
122 Major Fault Issues
122 When to Send for Service or Repair?

124 **Section 8: Parts**
124 Sherman+Reilly Accessories
124 Miscellaneous Replacement Parts

127 **Appendix A: Manufacturer Manuals**
Kubota V3800TB Engine Manual
Kubota V1505T Engine Manual
Dexter 10,000 lbs. Axle Manual

Introduction

This manual is provided to assist operators and owners with the functions and proper methods for safely and efficiently getting the most from this Sherman-Reilly™ equipment. It is very important that every machine be operated in a safe manner. Precautions to guard against the possibility of an accident are a prerequisite to operating any type of equipment. To properly and safely operate this machine, it is necessary that operators and maintenance personnel read and understand the information in this manual, to including appendixes and other provided materials.

Anyone working around this machine should also, at a minimum, read the safety precautions listed in the manuals. Be aware each warning and precaution is to help protect against injury. Taking unnecessary risks and ignoring warnings is the primary cause of personal injury and fatal accidents in the work place. If you have any questions regarding operation or safety of a procedure or situation, contact the Sherman+ Reilly™ Customer Service Manager at 1-800-251-7780, via email at help@sherman-reilly.com, or via our website: www.sherman-reilly.com

This manual is of no value if the operator does not read and understand the instructions and precautions (before starting and trying to operate the machine). The operator must be aware of the machine's capacities and limitations.

It is the operator's responsibility to watch for situations and conditions which could affect the normal performance of the machine and safety in the work area.

The Sherman+Reilly Models PT-3500 and PT-7500 Puller/Tensioners are diesel engine powered, hydraulically actuated machines. Both machines have variable speed and line tension controls; however, if pulling multiple conductors using a running board, the total line tension applied from all conductors must not exceed the pulling capacity of the machine.

Terms of Use

Publication of this manual and the safety precautions in it does not in any way represent an all-inclusive list and should not be interpreted as an all-inclusive comprehensive list of precautions and procedures.

It is the operator's responsibility to make sure the machine is operated in accordance with all state and local safety requirements and codes, including all applicable OSHA- (Occupational Safety and Health Administration) and EPA- (Environmental Protection Agency) regulations, as well as ANSI- (American National Standards Institute) accredited standards. .

Sherman + Reilly also recommends following the guidance published by the Institute of Electrical and Electronics Engineers (IEEE), and specifically IEEE Standard 524 – Guide to the Installation of Overhead Transmission Line Conductors (IEEE 524-2003 or Subseq.).

Should a problem or unsafe condition arise, shut the machine down using the normal shut-down procedure. In the event of an emergency, use the Emergency Stop Procedure described in this manual, and then notify the proper authorities or follow your employer's prescribed procedure for an emergency situation.

Sherman+Reilly strongly recommends that only personnel who have a full understanding of the provided manual and who are competent in the use of overhead line pulling and tensioning machines, to include all applicable laws, regulations, and safety standards, be allowed to operate this machine.

There are significant hazards inherent to the use of this machine; therefore, all operators should be educated on all functions, procedures, and safety measures outlined in this manual prior to their use or maintenance of this machine.

If you have questions regarding any operational steps or the safety of a procedure listed in this manual, contact Sherman+Reilly at 1-800-251-7780 or 423-756-5300, via email at help@sherman-reilly.com, or via our website: www.sherman-reilly.com

2

Specifications

PT-3500 General Overview

Sherman+Reilly's Revolution Series PT-3500 Single Drum Puller/Tensioner is a multi-purpose puller and tensioner capable of pulling up to 3,500 lbs., with additional re-conductoring capabilities. This distribution class puller utilizes an automatic horizontal floating levelwind that permits overhead rope retrieval with precision control. The PT-3500 is equipped with an ACG (advanced control group), allowing for a single operator at a protected central console to control payout speed, pulling speed and tension, levelwind controls, and jack position. The operator controls employ electronic machine control with CAN-bus technology, providing for accurate to-the-second display readouts of the machine system status.

The hydraulically actuated, automatic floating levelwind helps ensure even distribution of rope during pulling operations, thereby minimizing the risk of tangles and overlap, and maximizing rope life. The horizontal floating style of the levelwind also allows for easy upright standby positioning during payout and tensioning operations. The PT-3500 is equipped with a turbo-charged industrial Tier 4 Final diesel engine that delivers 71 HP at 2700 RPM and 3,500 lbs. of line pull, at the top of the drum. The fully hydraulic direct drive system provides the operator with precise and intuitive automatic drive/drum braking. The PT-3500's single axle trailer is equipped with three hydraulic jacks, an adjustable pintle eye, safety chains/hooks, and U.S. DOT-approved LED lighting.

The PT-3500 features a Safe-Zone™ Cab providing ultimate safety and comfort for the operator. The Safe-Zone™ Cab employs a floor to ceiling polycarbonate front window for maximum visibility while providing superior protection against impact. The cab includes climate control, a fully adjustable ergonomic seat, and all required electronic controls and gauges. The Safe-Zone™ Cab is designed to reduce operator fatigue and provide an "off-ground" envelope for greatly reducing the risk of "touch potential" in energized environments.

Key Features

- Fully Hydraulic/Direct Drive System
- Safe-Zone™ Cab
- 44 inch Drum with Opt. 10,500 ft. (Max) Uniline™ Synthetic Rope
- Horizontal Floating Automatic Levelwind
- 71 HP Tier4f Kubota Diesel Engine
- 3 Hydraulic Jacks
- 10.4 cu. ft. Frame Mounted Tool Box
- Centralized Engine Controls- CAN-bus technology

Specifications Details: PT-3500

(Dimensions, weights, and capacities listed are approximate. All specifications are subject to change without notice.)

Pulling Capacity	TOD: 3,500 lbs., (*Rated at the top of drum)*	
	Max: 4,500 lbs., (*Rated maximum)*	
Average Line Speed	Pulling: 4 mph / Payout: 10 mph	
Maximum Conductor Reel Size	66 in. Diameter (≤39 in. wide) / 48 in. Width / 6,500 lbs. Weight	
Drum Dimensions	Core Diameter:	24 in.
	Total Width:	48 in.
	Flange Diameter:	44 in.
Drum Capacity	11 mm. dia. Unitrex™	21,000 ft.
	5/8 in. dia. Uniline™	10,500 ft.
Drive System	Direct Drive: single hydraulic motor, drum/reel shaft coupler and drive bar/dual pin	
Drive System Engine	Vertical 4-cycle, liquid cooled, turbo-charged, direct drive 71 HP	
Fuel Capacity	30 gallon	
Hydraulic Fluid	ISO Grade 32	
Hydraulic Reservoir	40 gallon *(32 useable gallons)*	
Hydraulic Fluid Filtration (2)	10 micron, *both supply and return filters*	
Levelwind	Hydraulically driven, automatically-controlled	
Operator's Safety Enclosure	Safe-Zone™ Cab, fully-enclosed/single door	
Frame Construction	Steel tubing, steel plate, continuous weld	
Length (Overall, Nom.)	18 ft., 11 in.	
Width (Overall, Nom.)	7 ft., 6.5 in.	
Height (Overall, Nom.)	8 ft., 8 in.	
Weight (With Rope)	9,400 lbs.	
GVWR	12,000 lbs.	
Suspension	Torsion	
Axle Configuration	Single	
Wheel Configuration and Tires	Single 245/70R 17.5	
Brakes (Trailer)	Electric, with break-away switch	
Towing Attachment	3 in. pintle eye, with two safety chains and hooks	
Tie Downs (4)	(2) 5/8 in. dia. steel D-Rings, (2) 1 in. dia. steel D-Rings	
Rear (R/L) Jacks (2)	Hydraulic, with shoe	
Front/Nose Jack (Rear)	Hydraulic, with shoe	
Electrical System	12 VDC	
Battery (2)	12 V, 585 CCA, BCI group 24	
Lights / Navigation	12 V, LED, U.S. DOT-approved	
Grounding (4)	¾ in. dia. copper-clad steel loops	
Wheel Chocks	Standard	
Fire Extinguisher	ABC	
Color	S+R White	

Specifications

PT-7500 General Overview

The Sherman+Reilly Revolution Series PT-7500 Single Drum Puller/Tensioner is a multi-purpose puller and tensioner capable of pulling up to 7,500 lbs., with additional re-conductoring capabilities. This distribution class puller utilizes an automatic horizontal floating levelwind that permits overhead rope retrieval with precision control. The PT-7500 is equipped with an ACG (advanced control group), allowing for a single operator at a protected central console to control payout speed, pulling speed and tension, levelwind controls, and jack position. The operator controls employ electronic machine control with CAN-bus technology, providing for accurate to-the-second display readouts of the machine system status.

The hydraulically actuated, automatic floating levelwind helps ensure even distribution of rope during pulling operations, thereby minimizing the risk of tangles and overlap and maximizing rope life. The horizontal floating style of the levelwind also allows for easy upright standby positioning during payout and tensioning operations. The PT-7500 is equipped with a turbo-charged industrial diesel engine delivering 99HP at 2600 RPM and a full 7,500 lbs. of line pull, from the top to the core of the drum. The fully hydraulic direct drive system provides the operator with precise and intuitive automatic drive/drum braking. The PT-7500's single axle trailer is equipped with three hydraulic jacks, an adjustable pintle eye, safety chains/hooks, and U.S. DOT-approved LED lighting.

The PT-7500 features a Safe-Zone™ Cab providing ultimate safety and comfort for the operator. The Safe-Zone™ Cab employs a floor to ceiling polycarbonate front window for maximum visibility while providing superior protection against impact. The cab includes climate control, a fully adjustable ergonomic seat, and all required electronic controls and gauges. The Safe-Zone™ Cab is designed to reduce operator fatigue and provide an "off-ground" envelope for greatly reducing the risk of "touch potential" in energized environments.

Key Features

- Fully Hydraulic/Direct Drive System
- Safe-Zone™ Cab
- 48 inch Drum with Optional 11,500 ft. (Max) of Unitrex™ Synthetic Rope
- Horizontal Floating Automatic Levelwind
- 99 HP Diesel Engine
- 3 Hydraulic Jacks
- 10.4 cu. ft. Frame Mounted Tool Box
- Centralized Engine Controls- CAN-bus technology

Specifications Details: PT-7500

(Dimensions, weights, and capacities listed are approximate. All specifications are subject to change without notice.)

Maximum Pulling Capacity	7,500 lbs.- *(Rated from top of drum to core)*	
Average Line Speed	Pulling: 4 mph / Payout: 10 mph	
Maximum Conductor Reel Size	66 in. Diameter (≤39 in. wide) / 48in. Width / 6,500 lbs. Weight	
Drum Dimensions	Core Diameter:	24 in.
	Total Width:	48 in.
	Flange Diameter:	48 in.
Drum Capacity	16 mm. dia. Unitrex™	11,500 ft.
	1 in. dia. Uniline™	5,500 ft.
Drive System	Direct Drive: dual hydraulic motors, drum/reel shaft coupler and drive bar/ dual pin	
Drive System Engine	Diesel, 99 HP, water-cooled	
Fuel Capacity	30 gallon	
Hydraulic Fluid	ISO Grade 32	
Hydraulic Reservoir	40 gallon *(32 usable gallons)*	
Hydraulic Fluid Filtration (2)	10 micron, *both supply and return filters*	
Levelwind	Hydraulically driven, automatically-controlled	
Operator's Safety Enclosure	Safe-Zone Cab™, fully-enclosed/single door	
Frame Construction	Steel tubing, steel plate, continuous weld	
Length (Overall, Nom.)	18 ft., 11 in.	
Width (Overall, Nom.)	8 ft., 6 in.	
Height (Overall, Nom.)	8 ft., 8 in.	
Weight (With Rope)	11,360 lbs.	
GVWR	14,500 lbs.	
Suspension	Torsion	
Axle Configuration	Single	
Wheel Configuration and Tires	Dual 235/85R 16	
Brakes (Trailer)	Electric, with break-away switch	
Towing Attachment	3 in. pintle eye, with two safety chains and hooks	
Tie Downs (4)	(2) 5/8 in. dia. steel D-Rings, (2) 1 in. dia. steel D-Rings	
Rear (R/L) Jacks (2)	Hydraulic, with shoe	
Front/Nose Jack (Rear)	Hydraulic, with shoe	
Electrical System	12 VDC	
Battery (2)	12 V, 585 CCA, BCI group 24	
Lights / Navigation	12 V, LED, U.S. DOT-approved	
Grounding (4)	¾ in. dia. copper-clad steel loops	
Wheel Chocks	Standard	
Fire Extinguisher	ABC	
Color	S+R White	

3

Safety

Hazard Overview

Please pay attention to all safety warning labels and information placards posted on the machine, components, and trailer assembly. These labels and placards are provided to assist in identifying areas containing potential hazards while also providing information regarding equipment specification and limitations. Please see below for examples:

Warning Terms: Are signal words in this manual that call the operator's attention to safety concerns.

The word **DANGER** indicates the information relates to a specific immediate hazard which, if disregarded, will result in severe personal injury or death.

The word **CAUTION** indicates the information pertains to a potential hazard or unsafe practice which, if disregarded, may result in minor personal injury or equipment damage.

The word **WARNING** indicates the information relates to a specific immediate hazard or unsafe practice which, if disregarded, could result in personal injury or death.

The word **NOTE** indicates the information is important to the correct operation or maintenance of the machine.

General Warnings

WARNING: Ear protection should be worn when operating machines with operator ear noise levels above 85dB.

WARNING: This machine must not be used as a winch for pulling another vehicle. For trailer models, this trailer must not be modified to allow towing of another trailer behind and in tandem with this trailer.

WARNING: California Proposition 65: Engine exhaust, some of its elements, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

WARNING: Batteries produce explosive gases, contain corrosive acid, and supply levels of electrical current high enough to cause burns.

WARNING: To prevent serious injury from hot and high pressure oil, never use your hands to check for oil leaks; use paper or cardboard. Hydraulic fluid escaping under pressure can have sufficient force to penetrate skin. If fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this form of injury, otherwise gangrene may develop.

Operator Safety Precautions

- Do not place any part of the body into a potential pinch point. The machine must be turned off and locked out in accordance with OSHA regulations before attempting to correct a problem, work on the machine, or perform preventive maintenance.
- Do not attempt to operate any Sherman+Reilly equipment without proper instruction, including reading and understanding the provided manual.
- Obey and enforce all warnings including OSHA requirements and ANSI standards.
- Never allow anyone to ride on the unit while it is being towed.
- Always wear proper safety equipment as required by employer.
- Never bypass safety switches or operate equipment with faulty safety devices.
- Be sure all guards and access covers are in place and secured when the machine is being operated.
- Be aware of people in the work area who may be at risk during operation.
- Know all emergency shutdown procedures.
- Do not obstruct controls or fire extinguisher and make sure fire extinguisher is fully charged.
- Never operate equipment while under the influence of any substance which could impair ability or judgment.
- Do not operate equipment if work ability is impaired by fatigue, illness, or other causes.
- Always use employer-approved grounding procedures when operating the machine.
- Never use hands to check for hydraulic system leaks. Hydraulic fluid escaping under pressure can cause personal injury.
- Avoid contact with pumps, cylinders, hoses, engine components, and exhaust system.
- Do not refuel unit while the engine is running or hot.
- Keep all body parts, to include head and limbs, away from all moving parts.
- Refer to engine manufacturer's manual for all additional safety precautions which relate to engine operation and service.
- Know location and function of all controls, gauges, instruments, and protective devices.
- Never use unit to tow or winch another vehicle.
- Never use controls or hoses for hand holds.
- Do not exceed unit specifications and limitations, to include weight.
- Know where to get help in the event of an emergency or injury.

- When towing this machine/unit trailer, the driver should use caution and adjust speed based on road, weather, and terrain conditions, as well as applicable laws and speed limits.
- Do not make physical contact with rope or cable as it enters or leaves the machine or drum.
- To prevent the possibility of electrocution, do not enter or leave the unit while it is operating or allow anyone to touch or lean on the machine when in use.

Employer Safety Precautions

This guideline is intended to assist owners/employers to ensure equipment is serviced and operated in a safe manner. Each job site may have additional situations and conditions which need consideration.

Monitor the operators to be sure they observe and practice safety procedures and operate the support equipment as outlined in this manual.

Establish a regular inspection program which includes malfunction reports, inspection, and service records. This inspection should cover the machine condition, adjustment, and ensure all safeguards are in place and functional. Additionally, all pre/post-operation inspections should be conducted at prescribed intervals.

Make sure that any malfunction or breakdown affecting the safe operation of the equipment is properly corrected or repaired before returning the machine to service.

The employer shall provide training and instruction in chemical safety and safe methods of work before assigning workers to operate, service, or repair the machine and equipment. A record of training dates, employee names, and level of training shall be maintained. Only persons who have a full understanding of the provided manual- *(provided in English only)*, and who are competent in the use of overhead pulling and tensioning machines; to include all applicable laws, regulations, and safety standards, should be allowed to operate this machine. There are significant hazards inherent to the use of this machine; therefore, all operators should be educated on all functions, procedures, and safety measures outlined in this manual- prior to their use or maintenance of this machine.

Employer shall utilize a lock-out/tag-out procedure which complies with OSHA Standard, Part 1910.147, Title 29 of the Code of Federal Regulations. This procedure must include control of all keys.

The employer will specifically inspect all safety equipment and protective devices on the equipment to ensure they are not bypassed or disabled. Operation of equipment will not be permitted unless all safety devices are in place and functional. The employer shall meet all appropriate information dissemination and protection requirements for the workers.

Chemical Safety

Exposure to chemicals during normal operation of the machine is limited; however, chemical exposure may be encountered through preventive maintenance and repair. Operators and maintenance/service personnel should take appropriate precautions, to include wearing all (PPE)-Personal Protection Equipment, prior to the operation, maintenance, or service of the machine. All Material Safety Data Sheets (MSDS's) or Safety Data Sheets (SDS's) for OEM chemicals present upon initial manufacture/shipment of machine can be made available upon request to Sherman+Reilly.

Any additional chemicals introduced to the machine or used in conjunction with maintenance or repair of the machine must have a MSDS/SDS available for work being done, and would thereby be the responsibility of the operator's employer or the organization providing the maintenance. All chemical handling and disposal should be done in accordance with environmental, federal, state, and local laws and regulations. Sherman+Reilly is not liable for the mishandling, misuse, or improper disposal of chemicals, with regard to the use or maintenance of Sherman+Reilly machines or equipment.

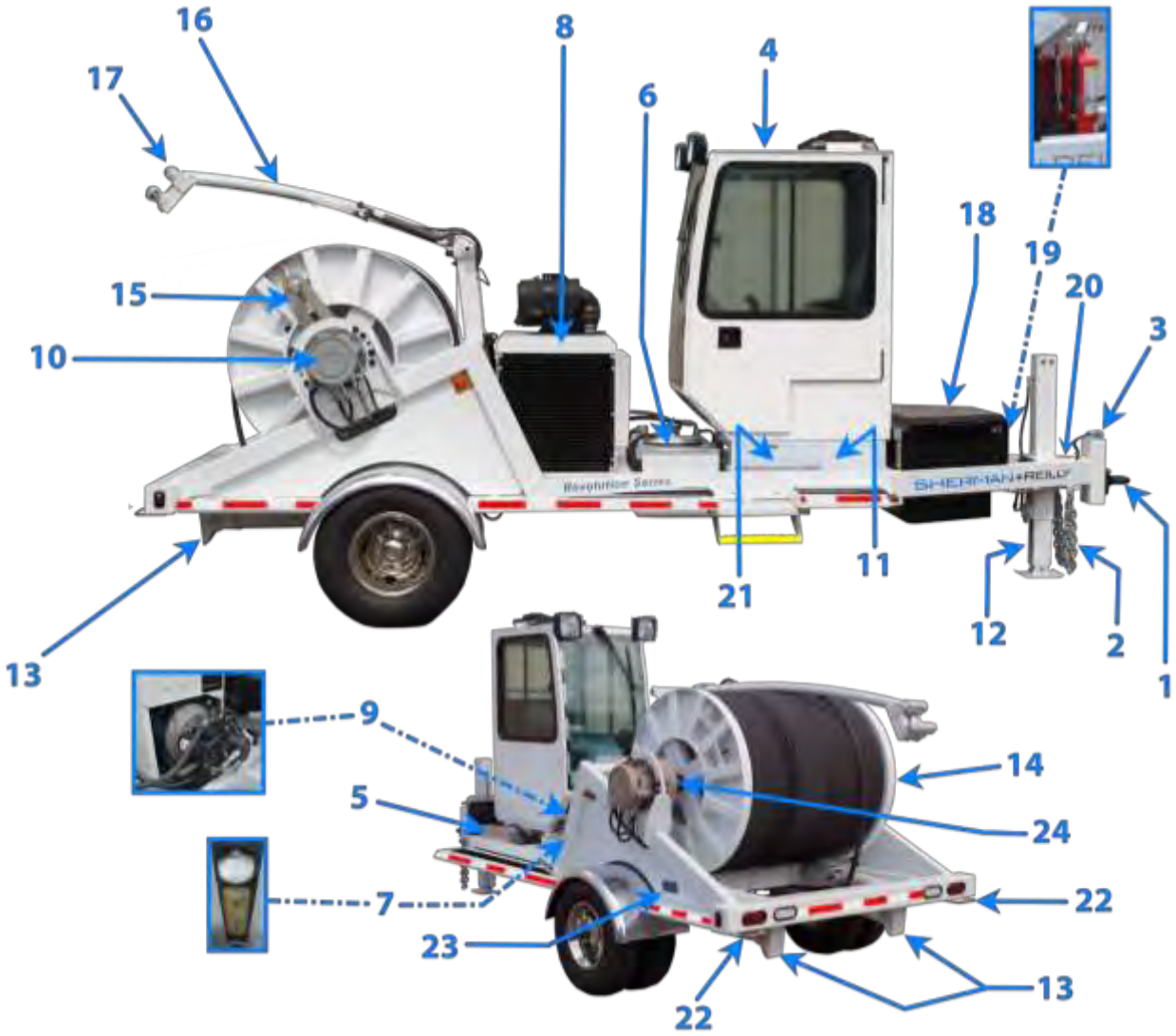
All responsibilities, including but not limited to: handling and disposal of chemicals, availability and maintenance of MSDS's/SDS's, labeling of chemical containers, and training of employees and operators, should be fulfilled in accordance with the Hazard Communication Act, Hazardous Materials Transportation Act, OSHA's Hazard Communication Standard- (29 CFR) Part 1910.1200, and all applicable EPA Standards and Regulations- *(additional standards may apply)*. For further information on safety standards regarding chemicals see OSHA and EPA websites.

4

Operation

Terms You Need to Know

1. Pintle Hitch
2. Safety Chains
3. Safety Breakaway Switch
4. Safe-Zone™ Cab
5. Diesel Fuel Tank
6. Hydraulic Tank w/Filter
7. Sight Gauge
8. Hydraulic Power Engine
9. Hydraulic Pump
10. Hydraulic Drive Motor(s)
11. Emergency Manual Override
12. Rear/Nose Jack
13. Side [L/R] Jacks (2)
14. Drum/Reel
15. Drum Drive Bar
16. Levelwind Arm
17. Levelwind Head
18. Tool Box
19. Fire Extinguisher
20. Level Gauge
21. Battery
22. Grounding Bracket (4)
23. Exterior Hydraulic Control Panel
24. Drum/Drive Coupling(s)



Safe-Zone™ Cab

The Safe-Zone™ Cab is designed to keep the operator off the ground while the equipment is in use, and is built with a polycarbonate front window, fully adjustable ergonomic seat, high-resolution color LCD screen, and a full set of electronic controls. The Safe-Zone™ Cab comes in several sizes and forms, dependent upon the machine. It is designed to reduce operator fatigue, reduce errors and injuries in the field, and also reduce the risk of "touch potential" in energized environments.

Operators Controls

A 12-Volt DC power port has been provided on the operator control console. This port can be used to charge field radios or cellular telephones, or provide power for other similar devices.

CAUTION: **Do not use ammonia-based cleaners.** Use only non-ammonia-based cleaners to clean the front polycarbonate window. Using ammonia on polycarbonate will cause structural damage to the polycarbonate material, thereby degrading the impact resistance of the front window. This can create a hazard for the operator should a line brakeage situation occur.

Ergonomic Operators Chair

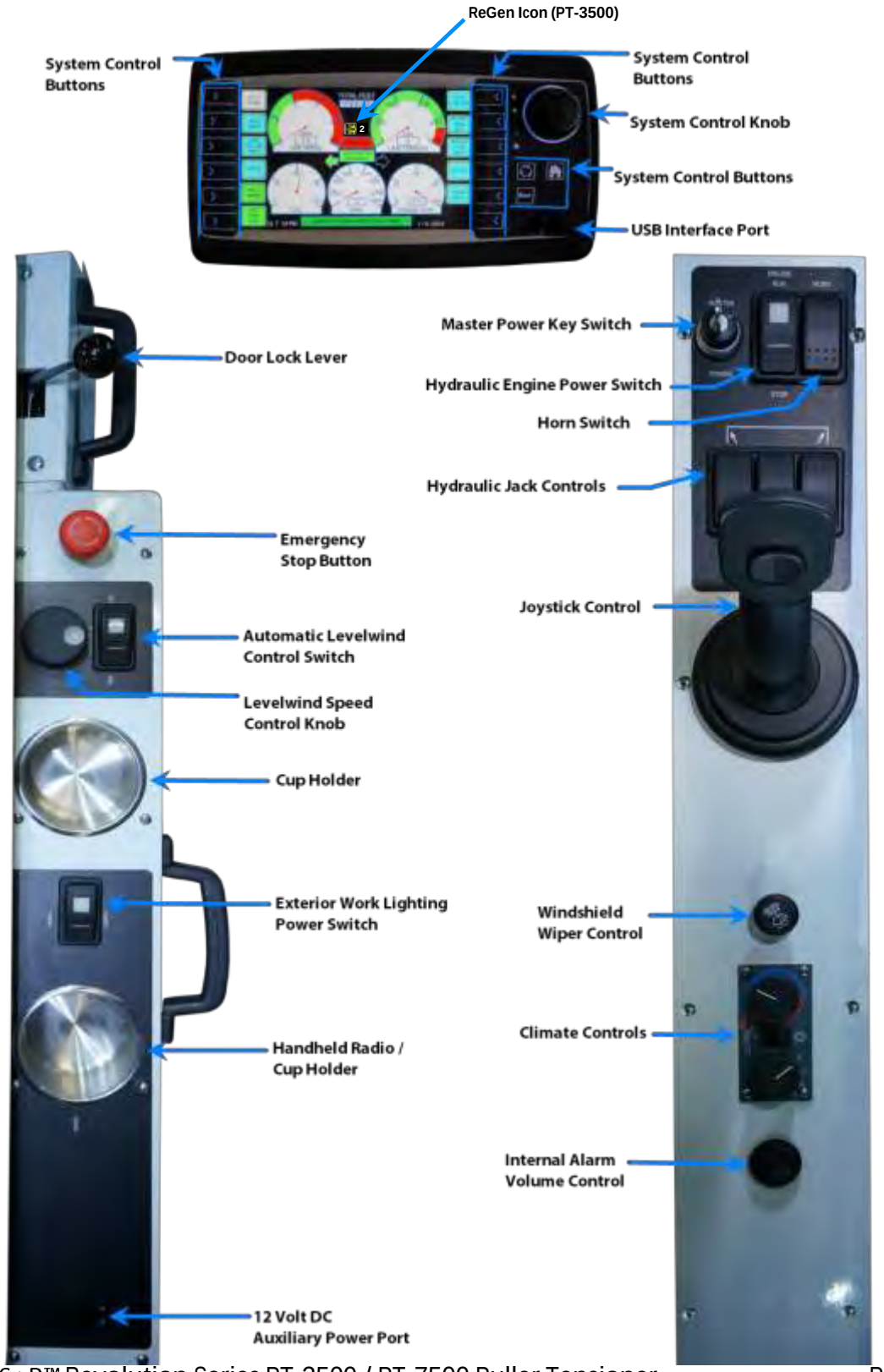
Safe-Zone™ Cab

Climate Control System

The PT-Series Safe-Zone™ Cab comes equipped with a climate control system providing customized air temperature controls for both heating and cooling.

The climate control system has multiple air fan speeds- [OFF, LO, MED, HI], with overhead and foot level multidirectional vents.

Operator Controls



Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

Master Power Key Switch

This switch is used to control power to the operator controls. This switch must be turned to the On position to start the machine.

Emergency Stop Button

When pushed, this red push button stops all operation functions, turning off system and engine power, while disengaging all controls. After being depressed, the button must be rotated and released to the disengaged position to restore power to the system and reengage operator controls.

Hydraulic Engine Power Switch

To start the engine, first ensure that the master power key switch is turned to the on position, then push the hydraulic engine power switch upward to the [START] position. If the glow plugs are required they will engage automatically when the switch is placed in the ON position.

Exterior Work Lighting Power Switch

This control switch, located on the door panel, operates in a rocking pattern, and is designed to turn on and off the exterior work lights, thereby allowing operations during low light conditions. To turn on the exterior work lights, depress the switch forward, from the position of the operator's chair. To turn off the exterior work lights, depress the switch backward toward the operator's chair. When the switch is engaged; the light in the center of the switch will illuminate.

Automatic Levelwind Controls

This switch and knob, located on the door panel, are used to control the automatic levelwind function. The switch is pushed up to turn on the automatic levelwind function and back to turn off. Then knob is used to increase and decrease the overall speed of the levelwind. ***For more information see the Automatic Levelwind Controls section.***

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

The system control panel has 15 soft key buttons and a rotational control knob/button for control of machine and computer functions. The panel is also equipped with a seven inch widescreen high-definition color liquid crystal display showing system and operation specific information.

HOME Button

This button, when pushed at any time and from any screen, returns the display to the HOME Screen- (*see HOME Screen section*).

Refresh Button

When pushed, this button will refresh the system to its default setting- for the screen that is current displayed.

Escape [Esc] Button

When not on the HOME screen, the escape button, when pressed, allows the user to go back to a previous screen from the currently displayed screen- if there is no [BACK] button. When there is a [BACK] button, the operator must use it to return to the previous screen. However, if desired, the operator can always press the HOME button to return to the HOME screen.

CAUTION: The PT-3500 has a Tier 4 final engine, check for Tier 4 REGEN messages. (*See troubling shooting)*

Rotational Control Knob/Button

This knob, when rotated, controls the value of a selected variable field on the display. Rotate the knob CW to increase the value and CCW to decrease the value. Once the value is set, the knob must be pushed in, as a button, to save the setting. If this knob is rotated while on the HOME screen, it changes the line tension limit- *(see LINE TENSION SETTING section)*.

HOME Screen

Once the master power switch is turned on and the system loads, the first screen the operator sees (after the S+R logo screen) is the HOME menu screen. This screen allows the operator to access the seven functions of the system controls: winch mode, jacks, levelwind, line tension limit, hydraulic brake, footage counter reset, and data logging. The HOME screen also allows access to settings and diagnostics.

In the center of this screen are system gauges that show line speed, a footage counter, line tension, fuel level, engine RPM's, and engine temperature, in addition to the selection buttons. To return to this screen from any other screen, simply press the HOME button.

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

SELECT MODE

Push and Hold the [SELECT MODE] button for three seconds to switch between MODES. The HOME screen will change to display the mode specific information, such as: tension limit (lbs.), line speed (ft./min.), and footage counter (ft.).

Additionally, there will be a corresponding identification message showing the mode selected.

Engine Control Display

The engine control display shows general system and operation specific information.

The PT-3500 is equipped with a Tier 4 Final diesel engine that requires periodic cleaning / REGENERATION (REGEN)..of the Diesel Particular Filter (DFP)

DPF REGEN Display – PT-3500

The DPF REGEN Icon will be displayed when the Tier 4 final diesel engine regeneration (REGEN) filter must be cleaned. Refer to the page 24 for REGEN messages. Refer to Engine Manual for more information about the Diesel Particulate Filter (DFP) and requisite filter cleaning using the Regeneration (REGEN) function. .

DFP REGEN Icon

PT-3500 TIER 4 ENGINE –

Diesel Particulate Filter (DPF) and REGEN

To promote a cleaner environment and adhere to EPA guidelines, the PT-3500 employs a T4 Diesel Engine which utilizes a Diesel Particulate Filter (DPF). The DPF is used to remove soot and undesired combustion gas from the exhaust system, and must be periodically cleaned. During normal operation, the DPF is cleaned automatically. However under certain conditions (particularly when the engine is lightly loaded for long periods of time) the operator may have to instruct the control system to perform a manual cleaning of the DPF system. The symbols below explain various aspects of the DPF system and when action is required by the operator.

A Solid Lamp is the initial warning that soot levels are rising in the DPF. A Flashing Lamp indicates a DPF REGEN is needed (on some systems, the lamp will become RED when flashing). The lamp will turn solid again when a REGEN is initiated.

Any time the lamp begins flashing, the operator should increase the loading on the engine so that regeneration is possible. **If increased load does not cause an automatic REGEN to occur, the operator should immediately perform a Parked, Manual REGEN.**

NOTE: DPF level must be at Level 2 or higher to perform Parked Regeneration.
Move machine to an appropriate location if necessary. .

CAUTION: Do not attempt to operate the unit, change the engine RPM or use the unit during a Parked Regen. This will abort the Regeneration process and require you to start the process over.

CAUTION: Exhaust Temperatures will be extremely high. Be sure exhaust will not come into contact with any combustible materials.

PT-3500 Tier 4 Engine DPF Icons - indicate the level of soot built up in the DPF from Levels 0 to 5.

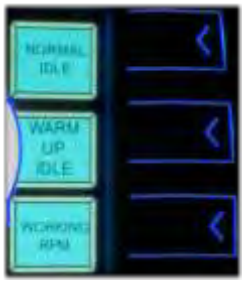
Indicators	*Description*
	**DPF Level Icon** – Indicates the level of soot build up in the DPF from 0-5. **Level 0**: Regeneration (REGEN) is unnecessary. **Level 1-2**: REGEN can occur automatically. **Level 3**: A PARKED, MANUAL REGEN is required. **Level 4-5**: Non-warranty factory assistance from Kubota is required. **IMPORTANT! Perform a Parked, Manual REGEN BEFORE the engine reaches Level 4**.
	**Check Engine** – When this lamp is illuminated, a fault exists within the control system. The engine may continue to operate, however, it is unable to perform DPF cleaning either automatically or manually. Take action immediately to correct the fault.
	**Diesel Particulate Filter (DPF)** – A Solid Lamp is the initial warning that soot levels are rising in the DPF. A Flashing Lamp indicates a DPF REGEN is needed (on some systems, the lamp will become RED when flashing). The lamp will turn solid again when a REGEN is initiated. Any time the lamp begins flashing, the operator should increase the loading on the engine so that regeneration is possible. If increased load does not cause an automatic REGEN to occur, the operator should immediately perform a Parked, Manual REGEN.
	**High Exhaust Temperature** – This lamp illuminates during the REGEN cycle to warn of high exhaust temperatures. Be sure engine exhaust is away from any potentially combustible materials when this is illuminated. This lamp will turn off when normal operating temperatures are reached after the REGEN cycle.

ENGINE INFO

When this selection button is pushed, it displays a screen with multiple engine monitoring gauges. This screen also allows manual control of the engine idle.

IDLE CONTROL BUTTONS

When the [WARM UP IDLE] button is pushed, it will toggle the hydraulic power engine to a high idle. When the [WORKING RPM] is pushed it will raise the hydraulic power engine to a mid-level working idle. The [NORMAL IDLE] is used to return to a normal system managed idle.



TOGGLE LEVELWIND DIRECTION

This function button, when pushed and held for three seconds changes the direction that the levelwind moves back and forth: (Left to Right / Right to Left). This function may need to be changed on initial start of operations, if the drum is changed, and when changing the rotational direction of the drum (payout/pull-in).

NOTE: The system is designed to automatically adjust the engine idle speed when the hydraulic system is actuated (i.e. jack movement, drum rotation, etc.). Once the system is no longer triggered for use, for instance, the joystick is placed in the neutral position for a period of time, the engine will automatically reduce to a low idle speed. Automatic idle speed reduction times vary dependent upon operating mode and are in an effort to reduce fuel consumption, engine emissions, and reduce noise levels.

NOTE: If using the [WARM UP IDLE] or [WORKING IDLE] functions, they system will remain at higher than normal idle until the system is actuated or otherwise lowered in idle by either actuating a drive component or pressing the [NORMAL IDLE] button.

NOTE: This button will only show when the levelwind system is turned to [ON].

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

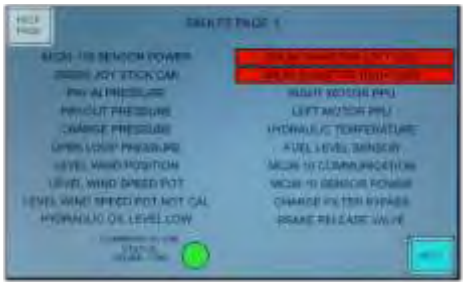
System Control Panel

HYDRAULIC GAUGES

When this button is pushed, it will display a screen with multiple hydraulic system monitoring gauges. In addition to hydraulic pressure, this screen also shows drum RPM's.

FAULT

This button, when pushed, will display a screen showing all of the measured fault points for the system. If a fault is detected, both the HOME Screen button and the page the selection for that fault will turn red.



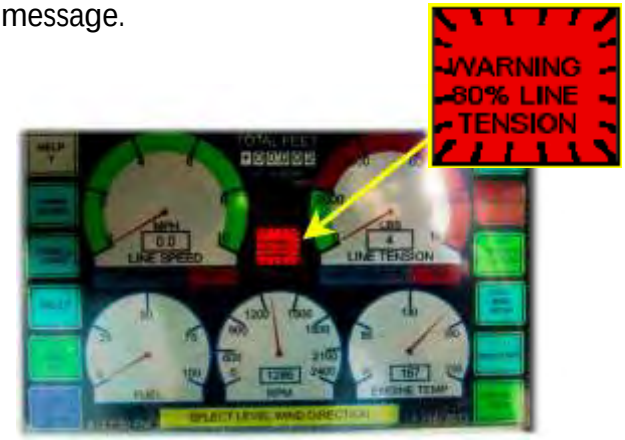
HELP

When this button is pushed, it will display a screen containing helpful information about the current screen. To return to the previous screen, press the [BACK] button.

LINE TENSION SETTING

To adjust the line tension limit rotate the control knob CW to increase the tension limit, and CCW to decrease the tension limit. Press the control knob/button in to set and lock the new tension limit- *(see Rotational Control Knob/Button section)*.

If the line tension reaches 80% of the total set limit, the screen will display a warning message.



Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

DATA LOGGING

Press and Hold the DATA LOG button to initiate system data logging. When the system first boots up, the default setting for data logging is OFF. The operator must manually initiate data logging.

FLOAT ARM ON/OFF

When this button is pushed and held it will toggle the Float Arm function of the levelwind. When the float arm is On, the levelwind will float freely with the line. When the Float Arm is Off the vertical hydraulic cylinders will hold the levelwind in position.

CAUTION: If using the levelwind during pulling operations, the Float Arm function should be set to [ON]. Failure to enable the float arm function could result in damage to the levelwind as upward line tension forces might exceed the downward holding strength of the levelwind and its retainers.

CAUTION: If the levelwind arm is in the upward standby position and the Float Arm function is enabled, the levelwind arm will drop rapidly, creating a hazard for personnel and possible damage to the rope or levelwind. Use extreme caution if personnel are in the vicinity as the weight of the falling levelwind could cause significant injury or death if it strikes a person.

NOTE: When either [RAISE ARM] or [LOWER ARM] buttons are pressed to actuate the vertical movement of the levelwind, the [FLOAT ARM] function will automatically change to the [OFF] position. The operator will have to re-enable the float arm if it is needed during pulling operations.

RESET TOTAL FEET

When this button is pushed and held for three seconds, it will reset the footage counter for the system. The footage counter is displayed at the top center on the HOME screen.

NOTE: The footage counter should only be reset when the line is all the way out from or onto the drum. Otherwise, the values will not accurately represent how much line is on/off the drum.

DEPLOY LEFT/RIGHT JACKS

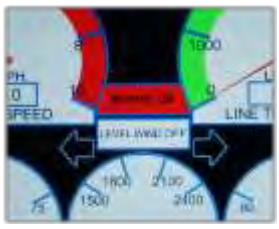
This button, when pressed, enables the right and left jack controls, while showing the rear facing camera. This button will disappear when the joystick is taken out of neutral, preventing the use of the R/L jacks from inside the operator cab and disabling interior the R/L jack controls.

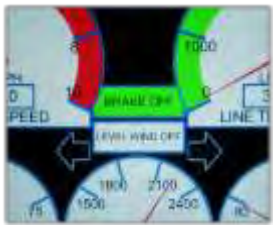
Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

BRAKE ON / BRAKE OFF
The drum brake status is shown on the center of the system control panel screen.





By default, the drum brake should be set to ON when the machine is first started up. To disengage the hydraulic drum brake, simply depress the joystick trigger then pull the joystick slightly backward and out of neutral then pause for several seconds. When the system has built up hydraulic pressure, the brake will release and the drum will begin to spin. The process for setting the hydraulic drum brake is the same for both [PULL] and [TENSION] Modes.

WARNING: Once the hydraulic brake is released, the operator should release the joystick trigger. This ensures that if the brake is needed for a rapid halt and the operator returns the joystick to the neutral position, that the trigger will not be inadvertently pressed preventing the brake from engaging.

CAUTION: Before handling any pilot, pulling, or conductor lines attached to this machine, the operator must ensure that the hydraulic drum brake is set and the joystick is in the neutral position with the trigger released.

The only way to activate the brake on the hydraulic drive motor is to place the joystick control into the center neutral position with the trigger released.

Low-Speed Feathering
If attempting to feather the drum speed at a low speed while at high tensions with the joystick positioned close to the neutral stopped position, the operator should be aware of any potential free spin of the drum that can occur in this situation. The result of the system interpreting the "close to neutral position" with the trigger released- (as per the safe operating procedures), is created to prepare the system to set the hydraulic brake. However, if operating at high tension settings, the system may not be able to build adequate hydraulic pressure to apply the brake in the amount of time it can take the high tension levels to create a very fast build up in reverse free-spin payout.

If this occurs, simply conduct a rapid double tap of the joystick trigger to manually override and apply the hydraulic brake. To reactivate the drum after manually applying the brake, simply return the joystick to the center neutral position with the trigger released, then reengage the drum.

WARNING: When the line is being **driven out with a truck or other off road vehicle**, ensure that the payout vehicle has completely stopped prior to returning the joystick to the center neutral position and setting the brake. Otherwise, serious personal injury and/or equipment damage will result. Also, limit off road vehicle speed to account for sudden accidental changes in line tension.

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

SETUP

This button allows the operator to change settings and set data input factors that are programmed in the system to regulate how the machine operates.

START BRAKE TEST

This button is used to test the braking capability of the system to ensure optimum hydraulic braking functionality. To test the hydraulic drum brake holding pressures, press and hold the START BRAKE Test button for 3 seconds, then use the joystick to apply pressure to the drum brakes in both payout and pulling direction. The operator can watch the drum to see if any slippage occurs. To exit the test, press the [Esc] button.

The hydraulic brake test is provided as a feature for those users whose pre-run procedures required it, but there is no manufacturer recommendation on frequency. If the brake test fails, please contact the S+R Service department.

DIAGNOSTICS

This button provides the operator with several pages of live views of machine component inputs and outputs. If the component is actuated or turned on, the field for that function will be highlighted green. This screen allows the operator to troubleshoot machine electronic I/O's in the event of a loss of control or unresponsiveness to determine if the input or output is being received by the system computer or controller.

ABOUT

This button displays the versions and revisions for the computer and control systems. This screen also shows the last four digits of the equipment VIN- (Vehicle Identification Number).

This screen also allows the operator to disable or enable the Spider System- (if equipped). This provides a management level limitation option for the Spider System. Additional password protected Rental and Manufacturer Mode settings pages can be accessed via the [ABOUT] page after using owner and OEM passwords. The Rental and Manufacturer functions allow master-level capacity limitations.

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

SETUP (Cont.)

LEVELWIND

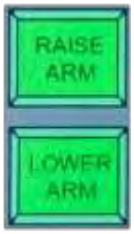
This screen allows the operator to calibrate the levelwind for advanced level sensor calibration. To do this simply position the levelwind to the far right or left using the top joystick lateral rocker switch then press the corresponding left or right [CALIB LEV WIND] button to lock in the sensor position.

On this screen is an additional levelwind float arm control button. This is in addition to the [Float Arm On/Off] button located on the HOME screen. See the FLOAT ARM ON/OFF Section for more information.

CAUTION: If using the levelwind during pulling operations, the Float Arm function should be set to [ON]. Failure to enable the float arm function could result in damage to the levelwind as upward line tension forces might exceed the downward holding strength of the levelwind and its retainers.

CAUTION: If the levelwind arm is in the upward standby position and the Float Arm function is enabled, the levelwind arm will drop rapidly, creating a hazard for personnel and possible damage to the rope or levelwind. Use extreme caution if personnel are in the vicinity as the weight of the falling levelwind could cause significant injury or death if it strikes a person.

Within this screen are also options to raise and lower the levelwind arm. Push and hold the desired button to initiate corresponding vertical movement. When the button is released, the levelwind movement will stop.



NOTE: When either [RAISE ARM] or [LOWER ARM] buttons are pressed to actuate the vertical movement of the levelwind, the [FLOAT ARM] function will automatically change to the [OFF] position. The operator will have to re-enable the float arm if it is needed during pulling operations.

DRUM

This button, when pushed, displays the Drum Setup Screen. This screen allows the operator to change between the Standard provided Rope/Cable Drum and the optional Reconductoring Drum. To do this simply push and hold the [SET DRUM] button. This will toggle the configuration settings for the machine between the two available drum sizes. As the drums are changed the current configuration will be displayed on the screen along with a status indicator bar.

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

SETUP (Cont.)

DRUM (Cont.)

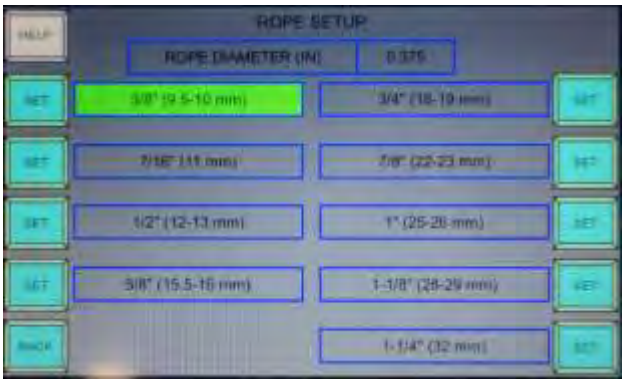
To alter the drum configuration to allow for alternative drum/reel sizes first push the [EDIT] button located adjacent to the corresponding field you wish to edit. Next use the [+] and [-] buttons to dial up or down the width/diameter for the drum or reel. Once set, push the option button for [SAVE] to lock in that value.

NOTE: When the configuration size is changed for either the STANDARD DRUM or RECONDUCTORING DRUM the setting will stay in the system for that drum setting until it is changed.

To return to the SETUP Screen press the [BACK] button.

ROPE

This screen provides the operator with a way of setting the rope size configuration for the machine. This is an important setting that the levelwind requires to ensure proper rewind laying of the rope or cable onto the drum or reel. By default the system will retain the last setting used, and the system contains all most common size rope diameter sizes.



LOGGED DATA

This screen allows the operator access to the recorded system and operations data to thereby be able to export and transfer the data to a portable storage device such as a USB. *(See USB Interface Section for steps on transferring data.)*

Once on the screen the operator can view the total Free and Used memory space for the onboard memory storage. This screen also shows the mount path for the USB device once connected, as well as the status of the data transfer once initiated. The [MOVE DATA TO USB] button is a soft touch screen button that requires the user to touch the screen to initiate the transfer.

Operator Controls

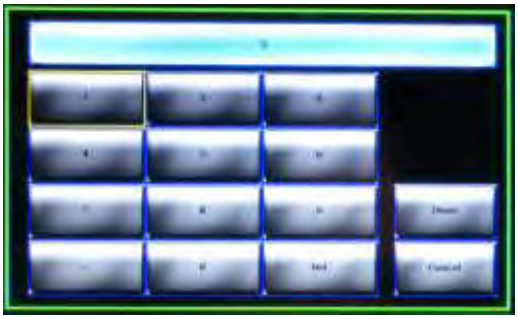
***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

SETUP (Cont.)

CLOCK

This screen gives the operator access to set the system date and time.



DISPLAY

This button, when pressed, takes the operator to the Display Settings Screen. Once on this screen the user can dial up or down the screen backlight. To do this simply rotate the control knob CW to increase and CCW to decrease the backlight intensity. Once set, press the [BACK] button to return to the SETUP screen.

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

USB Interface

The PT-Series Puller/Tensioners come equipped with a Universal Serial Bus (USB) 2.0 interface port for attaching USB storage devices. The PT-Series control system is designed to record pulling and tensioning operations information to its internal memory and allow transfers to a USB device.

✓ To initiate recording, first ensure that Data Logging is turned to ON.

NOTE: Once data logging is turned on, the system will being recording all operation data in one second increments to the internal memory.

✓ Once operations are concluded, the operator can move the data from the internal memory to a USB storage device or "USB drive/stick". To do this, first press the [SETUP] Button, second press the [LOGGED DATA] button, and last insert the USB drive into the USB port.

✓ Once on the Data Recording screen, and with the USB Drive inserted, ensure that the USB mount path shows the "/disk/usb…" message.

NOTE: If the USB device is not inserted, or is not recognized by the system due to a faulty USB drive, the system will not show this mount path, and the upper button message will say insert USB drive.

✓ Next, press the touch screen button marked [MOVE DATA TO USB]. This will begin the transfer of the data file.

NOTE: As the data is transferred to the USB drive, the progress bar will gradually fill in green. This process may take several minutes, and in some cases 30 minutes or more, dependent upon how much data is being transferred.

NOTE: If copy errors are reported, this may be due to a faulty USB Drive, or that the USB drive is smaller than the data being transferred.

✓ Once completed remove the USB drive.

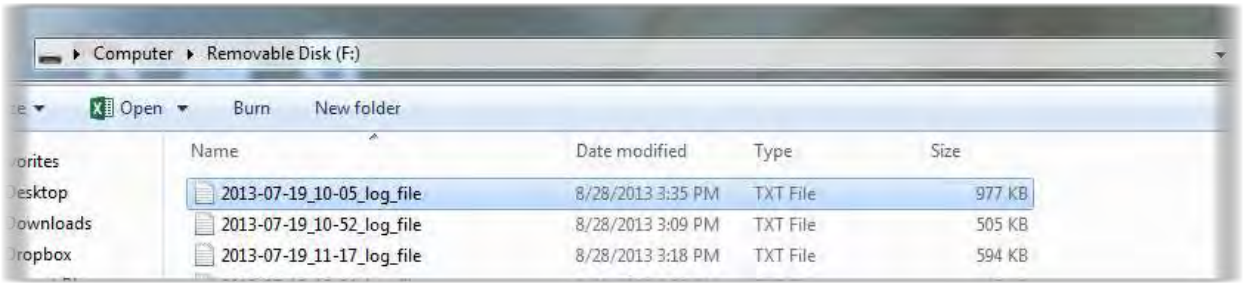
Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

System Control Panel

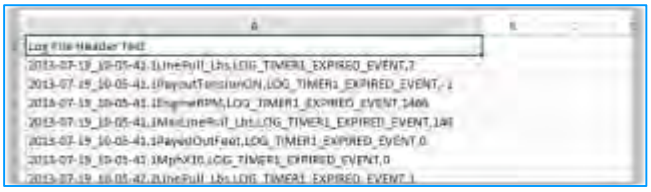
USB Interface (cont.)

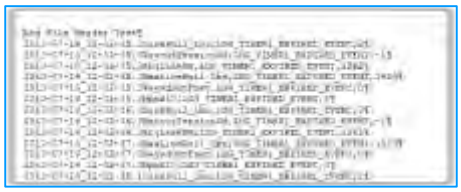
Each file saved to the USB drive will be a (.txt-text) file. These files can be opened with many computer programs to include: Microsoft Excel, Windows Note Pad, and Oracle's Open Office.

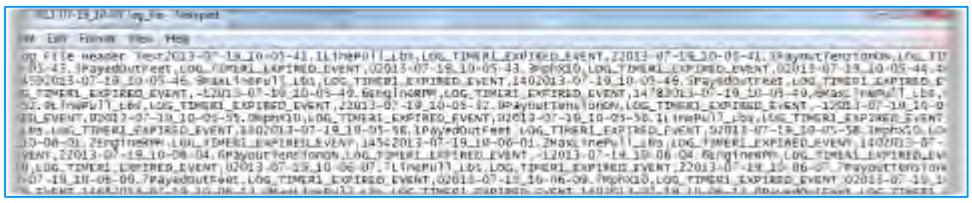


The information contained in the file will be displayed in consecutive sequence and time stamped to the second for which the status/event occurred.

NOTE: Information within the file may be displayed differently, dependent upon which program the file is opened with. Microsoft Excel and Word will list the events in a single column by data/time stamp, whereas Note Pad will display the information in block format- making it difficult to read.







Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

Joystick Control

Dependent upon the mode selected, the joystick can control the levelwind position, drum/line speed and tension, and accessory spider system.

Levelwind Control:

The operator can manually position the drum and spider levelwinds using the Lateral Rocker Switch located on top of the control Joystick . To move the levelwind left, push and hold the rocker switch to the left. To move the levelwind to the right, push and hold the rocker switch to the right. When the switch is released in either direction, the motion will stop. Continuous pressure or bumping motions can be used when adjusting the levelwinds lateral position.

NOTE: The levelwind is automatically controlled; however, the operator will need to set the initial starting position and direction of the levelwind to being pulling operations- *(See Automatic Levelwind Control section).*

Drum/Line Control:

Once the operational mode [PULL/TENSION] is selected, the operator can control the drum speed/tension and direction using the joystick.

Pulling Mode: With the trigger depressed the operator can rotate the drum forward to payout the line by pushing the joystick forward. The farther forward the joystick is pushed, the faster the drum will spin, thereby increasing line speed. To decrease speed, pull the joystick backward toward the operator and the neutral position. **The joystick trigger should always be released once the hydraulic brake is released or after crossing over neutral to being forward payout rotation- see BRAKE ON/BRAKE OFF Section.** The joystick itself can be released once the desired line speed is achieved, and it will stay in place. To stop the drum at any time, return the joystick to the center neutral position with the trigger released. This allows the operator to set the line speed for extended operations, without the need to constantly hold the joystick in position.

To rotate the drum backward and pull in the line, depress the trigger and pull the joystick backward toward the operator. The farther the joystick is pull backward the faster the drum will spin, thereby increasing line speed. Push the joystick forward toward neutral to decrease line speed. To stop the drum at any time, return the joystick to the center neutral position with the trigger depressed.

NOTE: There is a small delay from the time the joystick is moved out of neutral, to when the drum will engage. This delay allows the time for the hydraulic system to raise the pressure needed to hold any existing line tension to the drum prior to releasing the brake. **It is recommended that the operator position the joystick slightly out of the neutral position, wait until the hydraulic drum brake releases, then slowly increase drum speed.** Avoiding abrupt joystick movements will prevent any rapid jolts or increases in drum speed when the brake releases.

NOTE: To slowly decrease speed after releasing joystick, the operator can slowly move the joystick toward the neutral position. If feathering speed close to the neutral position, be ready to place the joystick in the neutral position with the trigger released or double tap the trigger to set the hydraulic drum brake and avoid a reverse equilibrium state and unintentional payout of the line- *(see Low Speed Feathering section on page 27).*

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

Joystick Control (cont.)

Drum/Line Control (cont.):

Tensioning Mode: In tensioning mode, there is no forward joystick motion control. To begin tensioning, first depress the trigger then slowly pull back on the joystick to apply line tension**.** If the joystick is placed in neutral with the trigger released, the hydraulic drum brake will set halting operations. It is important to know that the amount of tension applied to the line is not controlled by the joystick, rather the tension setting programmed into the system by way of the rotating control knob on the display. **In tension mode, the joystick trigger should always be released once the hydraulic brake is released-** ***(see BRAKE ON/BRAKE OFF section).***

CAUTION: Always ensure that the hydraulic drum brake is set before attempting to tie off any line or conductor that this tied to or being managed by this machine. The operator should never hold tension on the line using the drive system while the conductor is being tied off. Always set the brake first.

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

Joystick Control (cont.)

Spider System Control:

To begin using the accessory Spider system, it must first be enabled. Press [SETUP] ➔ [ABOUT] ➔ Press and hold the [SPIDER CONTROL] button. Once the spider system is enabled, it should look like the icon to the right. Return to the HOME screen and cycle the controls to the spider system by pressing and holding the [SELECT MODE] button until the message bar at the bottom of the screen reads [SPIDER WINCH CONTROL] .

With the Spider System turned on, the joystick will control the spider system and spider Levelwind.

The spider system can be setup with lateral winding limits to accommodate different reel sizes, but the operator must use the Joystick to control the Levelwind.-The operator will need to ensure that the LEVEL WIND control is turned to [ON] in order to use the lateral winding limits as calibrated.-

To rotate the spider reel forward for payout, depress the joystick trigger then push the joystick forward. The farther forward the joystick is pushed the faster the reel will spin, thereby increasing line speed. To decrease speed pull the joystick backward toward the operator and the neutral position. The joystick can be released once the desired line speed is achieved, and it will stay in place. This allows the operator to set the pilot line speed for extended operations, without the need to constantly hold the joystick in position.

To stop the spider reel at any time, return the joystick to the center neutral position. To rotate the reel backward and pull in the pilot line, depress the trigger and pull the joystick backward toward the operator. The farther the joystick is pulled backward, the faster the reel will spin, thereby increasing line speed. Push the joystick forward toward neutral to decrease line speed. To stop the spider reel at any time, return the joystick to the center neutral position.

The Spider Wind does not have an Automatic Level Wind. The operator must control the Level Wind by using the Lateral Rocker Switch on top of the Joystick.

CAUTION: Ensure that all personnel and objects are free and clear of the spider reel prior to attempting to operate.

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

Jack Controls

The PT-Series Puller/Tensioner has three hydraulically actuated jacks for ease of leveling; two front jacks- (Right and Left), and a rear/nose jack. The engine must be turned on and running to use the jack controls. Each jack can be operated manually from both inside the cab- through the console buttons, and from the outside hydraulic control panel and emergency manual override controls- *(See Exterior Hydraulic Control Panel and Emergency Manual Override Controls sections)*.

Interior Jack Controls:

To lower the jacks using the inside console rocker buttons, first ensure that the hydraulic power engine is on, and then select the

[DEPLOY LT/RT JACKS] option on the control panel screen to

enable jacks. Once enabled, views of the jack cameras will populate on the screen. Next, press and hold the assigned button forward. When the button is released, the motion will stop. To retract the jack, press and hold the rocker button backward.

The operator can use the provided bubble gauges mounted on the cab side of the engine compartment to determine how level the machine is. The bubble gauge is easily viewable from inside the cab, through the lower front window.

CAUTION: Ensure that all jacks are fully raised and clear of the ground before attempting to tow trailer.

NOTE: If the jack control buttons are not pushed for a period of time after enabling the jacks on the control panel screen, the system will time out, and the jacks will again be disabled.

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

Automatic Levelwind Controls

The levelwind can be manually operated, if needed, using the joystick, outside panel, and emergency manual override controls; however, the levelwind is designed to operate automatically during pulling and spider operations. For spider system levelwind, see end of this section.

✓ To initiate automatic levelwind functions, the operator must first manually position the levelwind down, centered on the rope run end leading off of the drum, with the rope threaded through the levelwind head. This can be done either using the inside control panel [LEVELWIND SETUP] Screen or by using the outside control panel.

Using the top joystick lateral rocker switch, adjust the R/L starting position of the levelwind so that the levelwind is centered over the exit rope.

✓ Getting outside the cab, place the pulling rope through the levelwind head and secure all rollers and retaining pins.

✓ Getting back into the cab, turn the levelwind automatic control switch to the ON position by pushing the rocker switch to the forward position.

✓ Set the correct Drum mode:

✓ The operator can verify that all pertinent rope specific information is entered into the [ROPE SETUP] screen on the control display- *(See Set-Up Screen section)*.

NOTE: The only time the operator will have to review or alter the rope diameter/levelwind setup criteria is if the rope was changed to a different diameter rope.

✓ Ensure that the levelwind float arm is set to ON.

Operator Controls

***For control locations see Operator Control Panel Section on page 20.*

Automatic Levelwind Controls (cont.)

✓ Set the levelwind starting direction by pressing and holding the [LEV WIND DIR] button for three seconds. The arrow indicators in the center of the screen will toggle showing which way the levelwind is programmed to move.

NOTE: The operator will need to set the initial direction (Right/Left) of the levelwind before beginning operations. The direction will depend on which side of the drum the rope end leading off is located.

✓ The system will now automatically manage the levelwind functions. However, the operators can adjust the speed of the levelwind, if needed, by rotating the levelwind speed control knob CW to increase and CCW to decrease speed.

Spider System Levelwind:

The spider system levelwind controls are the same as rope drum levelwind. However, the operator must first ensure that the spider system and automatic levelwind controls are enabled and activated on the system control display before the controls will transfer to the spider system levelwind. For more information on the spider system operations, see the Spider System section under Operations.

Operation

Outside Hydraulic Control Panel

This exterior hydraulic control panel, located on the rear left / (street) side panel, provides the operator with additional outside controls for the jacks and levelwind functions. The jack and levelwind functions found on this control panel can also be controlled from inside the cab. The levelwind vertical assist is used to raise and lower the levelwind arm, of which use would usually be in tandem with outside line rigging and drum changing operations.

NOTE: The hydraulic power engine must be running before the outside hydraulic control panel can be used to operate the levelwind and jacks.

To operate the control, simply push and hold the button to move the machine component. When the button is released the motion will stop. All buttons are labeled with their corresponding function and motion direction.

CAUTION: Line of sight view of the jacks and levelwind should always be established prior to operating these components using the outside hydraulic control panel. Operators should first ensure that all personnel are clear of the area.

Emergency Manual Override Controls

Located under a panel adjacent to the right side of the Safe-Zone™ Cab are the outside emergency manual override controls. Each has a three-position spring-loaded valve with attached lever that is used to operate the jack and levelwind functions. On inside of the access panel is a labeling placard.

Levelwind Adjustment: The levelwind lateral and vertical position can be adjusted using the emergency manual override controls, but the engine must be running. To move the levelwind to the right, lift and hold the corresponding lever up. To move the levelwind to the left, push and hold the corresponding lever down. To move the levelwind up, lift and hold the corresponding lever up. To move the levelwind down, push and hold the corresponding lever down. When the levers are released, the spring loaded valve/lever will return to the center neutral position, and the levelwind motion will stop.

Jack Adjustment: To operate the jacks using the emergency manual override lever, first ensure that engine is running. To lower the jacks, push and hold the corresponding jack lever down. To raise the jack, pull and hold the corresponding lever upward. When the lever is released, the spring loaded valve/lever will return to the center neutral position and the jack motion will stop.

CAUTION: Ensure that all jacks are fully raised and clear of the ground before attempting to tow trailer.

CAUTION: Line of sight view of the jacks and levelwind should always be established prior to operating these components using the emergency manual override controls. Operators should first ensure that all personnel are clear of the area.

Quick Start Guide

Sherman+Reilly PT-3500 / PT-7500

Single Drum Puller/Tensioner– 3,500 / 7,500 lb. Capacity

Acronym/Terms Key:

CW – *Clockwise*

CCW – *Counter Clockwise*

DANGER *– Indicates the information relates to a specific immediate hazard which, if disregarded, will result in severe personal injury or death.*

WARNING *– Indicates the information relates to a specific immediate hazard or unsafe practice which, if disregarded, could result in personal injury or death.*

CAUTION *– Indicates the information pertains to a potential hazard or unsafe practice which, if disregarded, may result in minor personal injury or equipment damage.*

NOTE *– Indicates the information is important to the correct operation or maintenance of the machine.*

Start-Up Procedure		
Step	Action	Note
1	**Perform all pre-operation inspections.**	
2	**Position machine and chock wheels.**	The machine should be positioned in line with the tower and centered as much as possible on the line being pulled. Wheels should be chocked to prevent rolling.
3	**Ensure that all controls** (levers, switches, etc.) **are in the neutral** and disengaged position.	
4	With the key inserted, **turn master power key switch CW to the [ON] position**.	Wait for the system display to light up and the system to load.
5	**Start the engine**: Once the display and panel lights are on, place the Engine Start button to the [START/RUN] position.	In colder climates (below 40°F), the preheat function- (glow plugs) may be needed. The glow plugs are automatically engaged once the Engine Start button is placed in the [START/RUN] position. After the preheat cycle has concluded- in about 10 seconds, the engine will start automatically.
6	**Ensure that there are no warnings** listed on the system control display screen.	The engine oil pressure and hydraulic pressure/flows are both monitored by the system.
7	**Level, stabilize, and anchor the machine**.	Use the jack control buttons and bubble gauges to level the machine.

Operation

Start Payout Operations		
Step	Action	Note
1	**Perform all Start-Up Procedures.**	*Must include pre-operation inspections- if not already completed.
2	**Raise the levelwind to the upward standby position,** then attach appropriate swivel to pulling line.	Utilize either the exterior hydraulic control panel or interior controls to raise the levelwind.
3	**Turn off the automatic levelwind control.**	To turn off the automatic levelwind control, push the Levelwind Power Switch backward to the Off position.
4	**For hydraulic assisted payout select [PULL MODE]. For non-assisted payout select [TENSION MODE].** Then set the tension limit on the system control display.	If the system is not already in the desired mode, press and hold the winch mode button for three seconds to change. Rotate and press the control knob to set and lock the tension limit.
5	**Begin payout**: Depress the joystick trigger, release brake, then slowly increase drum rotation by pushing forward on the joystick for assisted payout, **or** pull back for non-assisted payout.	First, pull slightly back on the joystick (out of neutral), and pause for about 3 seconds for the brake to release before pushing forward or pulling further back on joystick. Once rotation speed is achieved, the joystick and trigger can be released. Trigger should be released after brake release.
6	**Continue to monitor line speed and tension.**	To stop rotation at any time, return the joystick control to the center stop position with the joystick trigger released.

Operation

Start Pulling Operations		
Step	Action	Note
1	**Lower the levelwind back down, position levelwind centered over exit rope, and place rope through levelwind head.**	Utilize either the exterior hydraulic control panel or interior controls to lower the levelwind. Use the top joystick lateral rocker switch to adjust the R/L starting position of the levelwind. Ensure that all levelwind rollers and retaining pins are re-secured.
2	**Turn on the automatic levelwind control.**	Push the Automatic Levelwind Control Power Switch forward-(away) to the On position.
3	**Set drum/rope configuration, enable levelwind control and float arm, then set the levelwind direction.**	Set levelwind/drum configuration and turn the levelwind float to [ON] using the [HOME] screen. The levelwind direction is set by pushing and holding the [LEV WIND DIR] button for three seconds.
4	**Ensure that the system mode is set to PULL MODE** on the system control display.	If not, push and hold the [SELECT MODE] button for three sections to toggle.
5	**Set the line tension limit**, prior to beginning pull.	The tension limit can be changed without halting operations by using the rotating control knob at the top of the display. Press the control knob to lock in tension.
6	**Begin pull**: Depress the joystick trigger, release the brake let go of trigger then slowly increase drum rotation by pulling backward-(toward the operator) on the joystick.	Pull slightly back on the joystick (out of neutral), and pause for about 3 seconds for the brake to release before continuing to pull backward on joystick. Once rotation speed is at the desired level, the joystick and trigger can be released.
7	**Continue to monitor line speed/tension and levelwind adjustment.**	To stop rotation at any time, return the joystick control to the center stop position with the trigger released. An override adjustment can be made to the levelwind position using quick (R/L) taps to the top joystick lateral rocker switch.

CAUTION: Before handling any pilot, pulling, or conductor lines attached to this machine, the operator must ensure that the hydraulic drum brake is set and the joystick is in the neutral position.

CAUTION: If using vehicle to drive out line, ensure vehicle has stopped prior to setting brake.

Operation

Start Tensioning Operations		
Step	Action	Note
1	**Perform all Start-Up Procedures.**	*Must include pre-operation inspections- if not already completed.
2	**Turn off the automatic levelwind control.**	To turn off the automatic levelwind control, push the Levelwind Power Switch backward to the Off position.
3	**Raise the levelwind to the upward standby position.**	Utilize either the exterior hydraulic control panel or interior controls to raise the levelwind.
4	**Remove rope drum, install conductor reel, and ensure that the drive bar and pins, tapered cones, and lock rings are secured.**	See Drum/Reel Removal and Installation section. Ensure that drum and conductor size is programmed correctly in system.
5	With conductor reel installed, **attach appropriate size grips to conductor,** and attach any running grounds to grounding brackets- if needed.	**CAUTION:** Only attach running grounds to machine if the machine is properly grounded.
6	**Select [TENSION MODE]** on the system control display.	Press and hold the winch mode button for three seconds to toggle over to tensioning mode.
7	**Set line tension limit/level**, prior to beginning operations.	The line tension limit functions as the tension level setting when in [TENSION MODE].
8	**Begin tensioning**: Depress the joystick trigger, release the brake, release the trigger, then apply tension by pulling backward- (toward the operator) on the joystick.	Pull slightly back on the joystick (out of neutral), and pause for about 3 seconds for the brake to release before continuing to pull backward on joystick. After the brake and trigger are released and the joystick is pulled all the way back, the joystick itself can be released. The machine will pull all slack out of line/conductor and begin applying constant tension.
9	**Continue to monitor line tension and speed.**	Tension limits can be changed by rotating the control knob at the top of the display- (CW to increase; CCW to decrease). Press the control knob to lock in tension. To halt operations and set the brake at any time, return the joystick control to the center neutral position or double tap the joystick trigger.

NOTE: In tensioning mode, the operator can stop the drum and apply hydraulic drum brake by placing the joystick to the center neutral position or double tap the joystick trigger. The icon will change to [BRAKE SET] and the drum brake will set.

CAUTION: Always ensure that the hydraulic drum brake is set before attempting to tie off any line or conductor that this tied to or being managed by this machine. The operator should never hold tension on the line using the drive system while the conductor is being tied off- always set the brake first.

CAUTION: Ensure that all personnel and objects are free and clear of the drum prior to attempting to rotate.

Operation

Start Spider System Operations			
Step	Action	Note	
1	**Perform all Start-Up Procedures.**	*Must include pre-operation inspections- if not already completed.	
2	**Install the reel of spider rope, and secure the reel using the lock pin.**	First ensure that the joystick is in the center neutral position. Rope should come off the bottom of the reel, and not the top.	
3	**Route the rope through the guide arm loop and the fairlead head rollers.**	The guide arm can be bypassed if not using it during payout. However, it will need to be retracted prior to beginning- Step 7.	
4	If needed, **manually raise the fairlead head to the desired height.**	Ensure that the rope will clear the installed drum or conductor reel.	
5	**Set the [SPIDER CONTROL] to [ON].**	Press and hold the [SELECT MODE] button, located on the [HOME] screen, for several seconds to toggle between modes. Dependent on the current mode, a repeat of the button depression may be necessary to cycle through to the Spider Control mode. **NOTE**: The Spider system must first be enabled under the Set-Up section. The Enable/Disable button can be found on the [ABOUT] sub screen under [SETUP].	
6	**Calibrate/Input the LEVELWIND LIMIT STOPS**	On the Control Panel Main Menu screen, Press [SETUP] ➔ Press [LEVEL WIND] ➔ LEFT SIDE: Press [CALIB LEV WIND LT] ➔Using the ROCKER SWITCH on top of the Joystick, visually position the Levelwind Loop to the Left desired limit ➔ Press and Hold [CALIB LEV WIND LT] " until it turns GREEN and reads [LEFT CALIB OK] RIGHT SIDE: Press "CALIB LEV WIND RT": the ROCKER SWITCH on top of the Joystick , visually position the Levelwind Loop to the Left desired limit. ➔ Press and Hold until the icon turns GREEN reads [LEFT (RIGHT) CALIB OK]	
7	**After Calibration, set the Level Wind switch to "ON"**	This sets the software to recognize the Calibrated Left and Right Limit Stops created in Step 5. **ON for Rewinding, OFF for Payout.**	
8	**If rewinding,** center the guide arm loop over the location of the last run of incoming/outgoing rope. **If paying out**, retract the guide arm if it is not being used.	Use the top joystick lateral rocker switch to adjust the RIGHT / LEFT starting position of the guide arm loop to align it with the location of the rope on the reel. **NOTE**: If not using the guide arm for payout, fully retract the arm by pressing the holding the top joystick lateral rocker switch to the left.	

9	If using the guide arm, **set the guide arm starting direction.**	The guide arm direction is set by pushing and holding the [LEV WIND DIR] button for three seconds.	
10	**Begin paying out or rewinding rope**: Depress the joystick trigger, then slowly increase drum rotation by either pulling backward or pushing forward on the joystick.	Pushing forward on the joystick results in the rope paying out. Pulling backward on the joystick results in the rope being pulled in. Once rotation speed is at the desired level, the joystick and trigger can be released. Trigger should be released after rotation begins.	
11	**Continue to monitor line speed and guide arm loop position.**	To stop rotation at any time, return the joystick control to the center stop position with the trigger released. An override adjustment can be made to the guide arm position using quick (R/L) taps to the top joystick lateral rocker switch.	

CAUTION: Ensure that all personnel and objects are free and clear of the reel prior to attempting to rotate.

Towing and Road Safety

Connecting to the Tow Vehicle

- ✓ Make certain tow vehicle has the capacity and rating to tow machine safely.

> **NOTE:** The approximate trailer weights are:
> **PT-3500: 9,400 lbs.** with rope/drum.
> **PT-7500: 11,360 lbs.** with rope/drum.

- ✓ Inspect pintle eye and safety chains for excessive wear, corrosion, cracked welds or structural damage.
- ✓ Inspect tow vehicle hitch and ensure hitch is in good working order.
- ✓ Make sure trailer brakes are operable- *(See Trailer Brakes section)*.

> **WARNING:** Do not attempt to tow machine/trailer if there is any question about the condition of the safety chains, hitch or trailer brakes.

- ✓ Make sure the unit is safe for towing with tires in good condition and properly inflated- *(See Trailer Tires section)*.
- ✓ Make sure there are no tools, objects, or trash items which could fall off during transport.
- ✓ Chock wheels on both sides of the machine/unit trailer, then start machine/unit engine- *(See Start-Up Procedure section)*.

- ✓ Make sure the right and left jacks are fully retracted- *(See Jack Controls section)*.
- ✓ Open the tow vehicle hitch and back vehicle into position under the pintle eye. Set tow vehicle parking brake.

- ✓ Slowly retract trailer nose/hitch jack, so that the pintle eye goes over and rests correctly on hitch.
- ✓ Close and secure the hitch.

> **CAUTION:** The hitch coupler is a pinch point. Keep hands and fingers clear.

> **CAUTION:** Ensure that the nose/hitch jack and all other jacks are fully retracted prior to transport.

Towing and Road Safety

Connecting to the Tow Vehicle (cont.)

- ✓ After trailer is secured to the vehicle, stop the machine/unit engine, and remove the key from the ignition key switch.

- ✓ Attach the break-away switch cable to the tow vehicle.

- ✓ Properly connect the safety chains by latching in a crisscross pattern, as this provides added directional control. The safety chains should be crossed and short enough to prevent the tongue from digging into the ground, should the unit unintentionally become disconnected from the hitch. The chains should be no longer than necessary to allow slack for turning.

- ✓ Connect the electrical plug to the tow vehicle and check:
  - Clearance lights
  - Brake Lights
  - Turn Signals
  - Brakes

(For issues see Trailer Assembly section.)

- ✓ Remove and stow the wheel chocks

CAUTION: Do not tow the machine/unit unless all the trailer lights and brakes are working correctly.

NOTE: When towing the machine/trailer assembly, the driver should be knowledgeable and obey all applicable transportation laws and speed limits. Laws for towing speed of trailers differ widely between states, provinces, and localities.

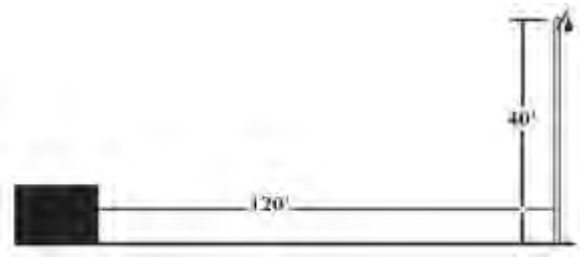
CAUTION: Drivers should use caution and drive slower at night and when hazardous conditions are present, such as heavy traffic, bad weather, or uneven or rough terrain.

Unless otherwise indicated by applicable laws, posted speed limits, or cautionary conditions (stated above), a recommended maximum safe operating speed for normal road conditions is 50/55mph for night/day conditions and 30mph in residential, urban, and business districts.

Positioning the Machine

The driver/operator should position the puller in a suitable location where it will be free from obstructions and clear of any obvious hazards. For overhead pulling, the puller should be approximately three times the distance of the lead block height.

Example: If the lead block is 40 feet high, it is recommended that the puller be positioned approximately 120 feet from the base of the pole whenever possible. By allowing the distance to the lead block as specified, this reduces the direct downward forces that would be created otherwise. In some situations; however, it may not be possible to achieve these distances- *(see note below).*



NOTE: In some situations, for example; due to rough terrain, it may not be possible to achieve these safe distances from the lead block. In these situations, operators should achieve as must distance as possible from the lead block, and be aware of the increased down forces during operations.

The unit should be leveled as much as possible, centered on the lead block, and parallel to the line being pulled prior to beginning operations.

CAUTION: All jacks must be extended for stabilization, and the machine must be leveled prior to conduction operations.

The operator must chock all trailer wheels prior to operations and any time the vehicle is parked. All appropriate grounding, anchoring, and protective equipment must be installed and secured to machine prior to operations.

Start-Up Procedure

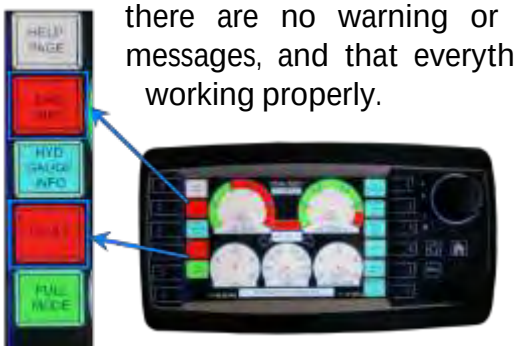
NOTE: Before beginning operations, the operator must perform all pre-operation inspections. *(See Pre-Operation Inspection Checklist on page 103.)* Pre-operation inspections are important for the safe operation of the machine, and are required under OHSA Regulations.

- ✓ Perform all pre-operation inspections.
- ✓ Position the machine and chock wheels. The machine should be positioned centered on the lead block, and parallel to the line being pulled prior to beginning operations. Wheels should be chocked to prevent the unit from rolling- *(see Positioning the Machine section).*
- ✓ Ensure that all controls (levers, switches, etc.) are in the neutral and disengaged position- *(see Operator Controls section).*
- ✓ With the key inserted, turn master power key switch to the On position- *(see Operator Controls section).*

- ✓ Once display and panel lights are on, place Engine Start button to the [START/RUN] position to start the engine.

NOTE: The preheat function/glow plugs are automatically engaged once the Engine Start Button is placed in the [START/RUN] position. After the preheat cycle has concluded, about 10 seconds, the engine will start automatically- *(see Operator Controls section).*

- ✓ View the control panel screen to ensure that there are no warning or faults messages, and that everything is working properly.



NOTE: Warnings and faults are displayed as a red icon or button. If warnings or faults are present, see the faults and diagnostics screens, and check system components prior to beginning operations- *(see GENERAL FAULTS section).*

- ✓
- ✓ Level and stabilize the machine using the available hydraulic jacks- *(see Jack Controls section).*

- ✓ Properly anchor the machine to prevent the machine from moving under tension or line load.

CAUTION: All jacks must be extended for stabilization, and the machine must be leveled and anchored prior to conduction operations.

Payout Operations

NOTE: Before beginning payout operations, the operator must perform all pre-operation inspections. *(See Pre-Operation Inspection Checklist on page 103.)* Pre-operation inspections are important for the safe operation of the machine and are required under OSHA Regulations.

The PT-3500 and PT-7500 are designed to offer two methods of payout operations. They can both be run utilizing a hydraulically assisted payout, where the drum drives the line out. This assisted payout method is usefully when manually pulling out with a vehicle or "walking out" the line. The other method of payout is a non-assisted payout where the operator utilizes the tensioning capabilities of the machine. In this method, the machine will hold a set tension on the line, and the line must be pulled off of the drum at that tension. This method is useful if employing a spider system to pull the pilot line in or if operating above energized lines.

Hydraulic Assisted Payout:

- ✓ Perform Start-Up Procedure starting on page 50.

- ✓ Raise the levelwind to the upward standby position using LEVELWIND SETUP screen.

- ✓ Alternatively, the operator can manually raise the levelwind to the upward standby position by pressing the raise button on the exterior hydraulic control panel.

If necessary, while outside of the cab, attach the pulling rope to the tow vehicle.

NOTE: With the system in **Pull Mode**, the operator will be able to payout the line at a speed that is consistent with **walking or driving out the line with a truck or other off road vehicle.** This is accomplished by using the drive system to drive out the line with minimal or no tension.

- ✓ Get back inside the cab, and turn off the automatic levelwind control using the door panel rocker switch.

- ✓ Select PULL MODE on the system control display by pressing and holding the [SELECT MODE] mode button for three seconds to toggle through the drive mode cycles. This setting is defaulted to whatever was last set for the system. If the system is already in PULL MODE, there is no need to change this setting.

CAUTION: When using pulling mode with minimal or no tension, excess slack and over spin of the drum can occur.

Payout Operations

Hydraulic Assisted Payout (cont.):

- ✓ **Set the tension limit for the machine to Zero** using the rotational control knob. Once the tension is set, press the knob to lock in the new limit.

- ✓ Begin paying out the rope by depressing the joystick trigger then pull back slightly on the joystick, bringing it out of neutral, and then pause for about three seconds for the brake to release. Once the brake releases, with the joystick trigger still depressed, slowly move the joystick forward to begin forward payout drum rotation. Once the joystick has crossed over neutral, the joystick trigger should be released. Once rotations speed is at the desired level, the joystick itself can be released.

NOTE: The reason the joystick must first be pulled back during payout is that this motion triggers the release of the hydraulic brake and begins the hydraulic pressure building sequence. As soon as the brake releases, the operator will notice the drum beginning to rotate very slowly backward toward the operator. This is also designed to pull any slack out of the line.

NOTE: The three second pause allows the hydraulic system time to build enough pressure to sustain any pre-existing line tension before releasing the brake. This is a safety feature of the system that prevents the drum from rapidly paying out or jolting as soon as the brake is released.

- ✓ Continue to monitor the line speed and the footage counter.

NOTE: To stop drum rotation at any time, return the joystick control to the center neutral position **with the joystick trigger released**, and the hydraulic drum brake will set.

- ✓ Once the rope is paid out and operations have concluded, place the joystick control into the center neutral position with the trigger released, and ensure that the hydraulic drum brake is set.

WARNING: When the line is being **driven out with a truck or other off road vehicle**, ensure that the payout vehicle has completely stopped prior to returning the joystick to the center neutral position with the joystick trigger released to set the brake. Otherwise, serious personal injury and/or equipment damage will result. Also, limit off road vehicle speed to account for sudden accidental changes in line tension.

CAUTION: Before handling any pilot, pulling, or conductor lines attached to this machine, the operator must ensure that the hydraulic drum brake is set and the joystick is in the neutral position with the joystick trigger released.

CAUTION: Never payout all of the rope off of the drum. Leave at least one layer of rope wrapped on the drum. Otherwise, the rope end could be pulled from its anchor point.

Payout Operations

Non-Assisted Payout:

- ✓ Perform Start-Up Procedure starting on page 52.
- ✓ Raise the levelwind to the upward standby position using LEVELWIND SETUP screen.

- ✓ Alternatively, the operator can manually raise the levelwind to the upward standby position by pressing the raise button on the exterior hydraulic control panel.

- ✓ While outside of the cab, attach any appropriate pulling swivels and/or grips to the pulling line.

- ✓ Get back inside the cab, and turn off the automatic levelwind control using the door panel rocker switch.

- ✓ Select TENSION MODE on the system control display by pressing and holding the [SELECT MODE] button for three seconds. This setting is defaulted to whatever was last set for the system. If the system is already in TENSION MODE, then there is no need to change this setting.

NOTE: With the system in **Tension Mode**, the operator will be able to payout the line at a desired speed and tension **when using a pilot line and stringing blocks to pull the line off of the drum**. This is accomplished by using the drive system to hold back tension on the line. In tension mode, there is no forward driving forces applied to the line/drum.

- ✓ Set the tension limit for the machine using the rotational control knob. Once the tensioned is set, pressed the knob in to lock in the new tension limit.

NOTE: When in tensioning mode, the line tension limit functions as the line tension setting. When more or less tension is needed, the control knob must be rotated then pressed to change the tension. The joystick does not control the amount of tensioned holdback on the line, as the machine automatically manages the tension applied based on the line tension setting.

Payout Operations

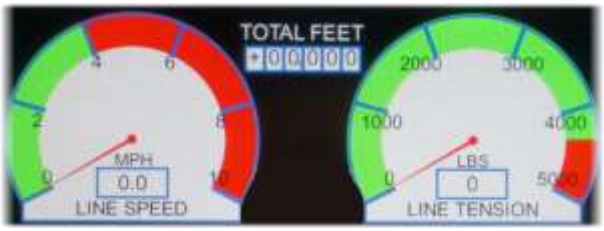
Non-Assisted Payout (cont.):

✓ Begin payout operations and apply tension by depressing the joystick trigger then pull back slightly on the joystick, bringing it out of neutral, and then pause for about three seconds for the brake to release. Once the brake is released, release the joystick trigger, then continue to pull backward on the joystick until it is all the way back. The joystick can be released.

NOTE: The reason the joystick must first be pulled back slightly out of neutral is that this motion triggers the release of the hydraulic brake and begins the hydraulic pressure building sequence. As soon as the brake releases, the operator will notice the drum beginning to rotate very slowly backward toward the operator. This is also designed to pull any slack out of the line.

NOTE: The three second pause allows the hydraulic system time to build enough pressure to sustain any pre-existing line tension before releasing the brake. This is a safety feature of the system that prevents the drum from rapidly paying out or jolting as soon as the brake is released.

✓ Continue to monitor the line speed and tension, and the footage counter.



NOTE: To stop drum rotation at any time, return the joystick control to the center neutral position with the joystick trigger released, and the hydraulic drum brake will set.

✓ During operations, the tension limits can be adjusted by rotating the control knob at the top of the display- (CW to increase; CCW to decrease). Once the tension is adjusted, press the knob in to lock in the new tension setting.

✓ Once the rope is paid out and the pulling machine stops pulling the line, place the joystick control into the center neutral position with the joystick trigger released and the hydraulic drum brake will set. This will conclude Payout operations.

CAUTION: Before handling any pilot, pulling, or conductor lines attached to this machine, the operator must ensure that the hydraulic drum brake is set and the joystick is in the neutral position with the joystick trigger released.

CAUTION: Never payout all of the rope off of the drum. Leave at least one layer of rope wrapped on the drum. Otherwise, the rope end could be pulled from its anchor point.

Pulling Operations

NOTE: Before beginning pulling operations, the operator must perform all pre-operation inspections. *(See Pre-Operation Inspection Checklist on page 103.)* Pre-operation inspections are important for the safe operation of the machine and are required under OSHA Regulations.

Sherman+Reilly PT-Series Puller-Tensioner utilizes a hydraulically driven motor(s) that apply up to 3,500lbs. or 7,500lbs. of pulling force to the pulling line. Both the PT-3500 and the PT-7500 come equipped with a variable speed drive system.

✓ Once the pulling line is safely tied off at the pole, and with the machine running, lower the levelwind back down using the LEVELWIND SETUP screen.

NOTE: The operator can manually lower the levelwind down by pressing the lower button on the exterior hydraulic control panel. However, if the pulling line is strung over energized lines, it is safer to limit the handling of the line or machine, while standing on the ground.

✓ Using the top joystick lateral rocker switch, adjust the R/L starting position of the levelwind so that the levelwind is centered over the exit rope.

Getting outside the cab, place the pulling rope through the levelwind head, and secure all rollers and retaining pins.

✓ If not completed already, have the cable end and the conductor pulling grips attached to opposite sides of swivel on the conductor side.

✓ Get back inside the cab, and turn on the automatic levelwind control using the door panel rockers switch.

✓ Ensure that the levelwind float arm is set to ON.

✓ Set the correct drum configuration:

NOTE: If the rope was changed to a different diameter rope, the operator can verify all pertinent rope specific information is entered into the [ROPE SETUP] screen on the control display. *(See Set-Up Screen section.)*

Pulling Operations

- ✓ Set the levelwind starting direction by pressing and holding the [LEV WIND DIR] button for three seconds. The arrow indicators will toggle on the center screen showing which way the levelwind is programmed to move.

- ✓ Ensure that the system is set to PULL MODE. If not, select PULL MODE on the system control display by pressing and holding the [SELECT MODE] button for three seconds to toggle modes. Repeat the depressions until the PULL MODE information bar displays.

PULL MODE

- ✓ Set the line tension limit for the pull using the rotating control knob at the top of the display. Turn the knob CW to increase the line tension limit and CCW to decrease the line tension limit. After the knob is rotated to the desired tension limit setting, the operator must push the knob in to lock in the new tension limit.

- ✓ Begin pulling in the rope/old conductor by depressing the joystick trigger then pull back slightly on the joystick, bringing it out of neutral, and then pause for about three seconds for the brake to release. Once the brake is released, release the joystick trigger and continue to pull backward on the joystick until the desired rotation speed is reached. Once the speed is at the desired level, the joystick can be released.

NOTE: The tension limits can be changed without halting operations by using the rotating control knob at the top of the display.

NOTE: The reason the joystick must first be pulled back slightly out of neutral is that this motion triggers the release of the hydraulic brake and begins the hydraulic pressure building sequence. As soon as the brake releases, the operator will notice the drum beginning to rotate very slowly backward toward the operator. This is also designed to pull any slack out of the line.

NOTE: The three second pause allows the hydraulic system time to build enough pressure to sustain any pre-existing line tension before releasing the brake. This is a safety feature of the system that prevents the drum from rapidly paying out or jolting as soon as the brake is released.

Pulling Operations

- ✓ Continue to monitor the line speed and tension, and the footage counter. Adjust line tension as needed using the rotation control knob.

NOTE: To stop drum rotation at any time, return the joystick control to the center neutral position with the joystick trigger released, and the hydraulic drum brake will set.

- ✓ Once the rope end reaches within sight of the drum, begin to slow the line speed by pushing forward slowly on the joystick.

- ✓ Once the rope end reaches within its last several feet of length, bring the drum to a complete stop by placing the joystick control in the neutral position with the joystick trigger released, and the hydraulic drum brake will set.

CAUTION: Before handling any pilot, pulling, or conductor lines attached to this machine, the operator must ensure that the hydraulic drum brake is set and that the joystick is in the neutral position with the joystick trigger released.

- ✓ Once the conductor is safely tied off, the operator may need to provide slack on the pulling line/old conductor to detach the rope/old conductor end from the new strung conductor. To do this, depress the joystick trigger then pull back slightly on the joystick, bringing it out of neutral, and then pause for about three seconds for the brake to release. Once the brake releases, with the joystick trigger still depressed, cross over neutral by pushing the joystick forward. Once the joystick has crossed over neutral, release the joystick trigger, and continue slowly moving the joystick forward to begin forward payout drum rotation. Once enough slack is generated, the operator can place the joystick back into the neutral position with the joystick trigger released to stop the drum and set the brake.

CAUTION: Before handling any pilot, pulling, or conductor lines attached to this machine, the operator must ensure that the hydraulic drum brake is set and the joystick is in the neutral position with the joystick trigger released.

Pulling Operations

- ✓ Remove the conductor pulling grip from the strung conductor and the swivel. Also, remove the swivel from the rope/old conductor end, remove any pulling grips from the old conductor-(if applicable), and store pulling grip(s) and swivel in the tool box-unless further operations are planned.

- ✓ Once completed with pulling operations remove the rope/old conductor from the levelwind head, and pull the remaining rope/old conductor onto the drum.

NOTE: Ensure that all pins and rollers are re-secured after removing the rope/old conductor from the levelwind head.

- ✓ When using a rope drum, ensure that the joystick is in neutral with the trigger released, the hydraulic drum brake is set *(shown on screen)*, then using a tie-off rope around the drum, secure the rope end to the drum.

- ✓ Raise all jacks prior to transport.

- ✓ If tools were used during operations, store them in the tool box, unless further operations are planned.

- ✓ Turn the hydraulic power engine off, by pushing the rocker switch backward.

- ✓ Once the engine is off,

turn the master power key switch CCW to the Off position, and remove the key.

- ✓ Complete all towing and road safety procedures prior to towing machine- *(See Towing and Road Safety section)*.

CAUTION: The rope end and levelwind must be secured prior to transport.

- ✓ Complete all Post-Operation Inspections on page 104.

Drum/Reel Removal and Installation

When changing from a conductor reel to a rope drum, reverse the steps listed in this section.

- ✓ The first step when changing from a rope drum to a conductor reel or reconductoring drum is to rotate the rope drum using the joystick control, so that the drum hoisting loop/bracket is at the top, the drive bar is vertical, and the drive coupling split is horizontal.

NOTE: When transitioning from a rope drum to a conductor reel, ensure that the rope end is secured to the drum using a tie-off rope around the drum. This will prevent the rope from paying out and the rope end from being damaged.

- ✓ Turn off the engine and remove the key.

CAUTION: The engine must be off and the key removed prior to proceeding to the next step.

- ✓ Attach the hoisting chain to the drum loops.

CAUTION: It is highly recommended that the drum be attached to the hoisting chains prior to proceeding to the next step. This will help ensure that the drum does not fall, damaging equipment or injuring personnel, in the event of an accident.

- ✓ Next, loosen and remove the four bolts from the top half of both the drive couplings on the sides of the drive shaft, and remove the top half of each drive couplings.

NOTE: If these bolts are accidentally lost during removal of the coupling, see the parts section to order replacements. These bolts are specific 10.9 metric grade, 2.5 thread path, 20mm x 65mm bolts.

CAUTION: Do not operate machine with missing drive coupling bolts. Do not attempt to use any other size or grade bolts. These must meet OEM specifications.

- ✓ Once the top coupling halves are removed, lift the rope drum up and off of the machine.

WARNING: Injury or Death: All personnel assisting during the lifting of heavy loads must be wearing appropriate personal protective equipment and must remain vigilant and be ready to get clear in the event of a load shift or restraint breakage.

CAUTION: Ensure that all non-essential personnel are clear of the area before lifting and moving the drum.

- ✓ Lower the rope drum to a level surface on the ground, and install chocks on both sides of the drum to prevent it from rolling.

- ✓ Loosen the set collars, set screws using a 5/16 inch hex driver or allen wrench, and remove the set collar from the drive bar.

NOTE: It is not necessary to remove this set screw all the way; however, if the set screw is accidentally lost, the type/size is [Socket Head Cap, 3/8 in. x 1 in, UNF]. Screws not sold separately, and if lost, full set collar replacement may be necessary.

- ✓ Once the set collars are removed, pull the drive bar assembly out of the rope drum from the drive bar side.

- ✓ Insert the drive bar assembly into the conductor reel or reconductoring drum, leaving enough room to align the drive pins.

- ✓ Adjust the drive pins so they align with the holes on the conductor reel or reconductoring drum. To do this, loosen the drive pin nuts using a 1 1/4 inch wrench, then slide them up or down on the drive bar slot. Once aligned, re-tighten the drive pin nuts jto hold them in place in line with the holes.

NOTE: If it is required to rotate the drum lifting eye to the top for proper lifting, do this prior to turning off engine, and attempt work with drive couplers.

Drum/Reel Removal and Installation

When changing from a conductor reel to a rope drum, reverse the steps listed in this section.

- ✓ With the drive pins aligned with the holes, push the drive bar assembly all the way through the conductor reel so that the drive pins fully seat into the holes.
- ✓ Re-attach the set collars to the opposite end of the drive bar assembly, and tighten the collar set screws anchoring the bar to the new conductor reel/reconductoring drum.
- ✓ Tighten the drive pin nuts to **100 ft. lbs. of torque**.

NOTE: It is not necessary to remove the drive pin nuts all the way; however, if the nuts are accidentally lost, the size is 1 ¼ in., Grade 5, UNC.

- ✓ Position the conductor reel/reconductoring drum so that the drive bar is vertical.
- ✓ Lift the conductor reel/reconductoring drum, and place into the machine drive assembly seating the drive shaft into both of the bottom drive coupling halves.
- ✓ With the lifting straps/chains still attached to the conductor reel/reconductoring drum, re-install the top coupling halves and tighten the bolts.

WARNING: Injury or Death: All personnel assisting during the lifting of heavy loads must be wearing appropriate personal protective equipment and must remain vigilant and be ready to get clear, in the event of a load shift or restraint breakage.

CAUTION: Ensure that all non-essential personnel are clear of the area before lifting and moving the reel.

- ✓ Torque the drive coupling retaining screws to **135 ft. lbs. of torque**.

Tensioning Operations

NOTE: Before beginning tensioning operations, the operator must perform all pre-operation inspections. *(See Pre-Operation Inspection Checklist on page 103.)* Pre-operation inspections are important for the safe operation of the machine and are required under OSHA Regulations.

✓ **CAUTION:** Only attach running grounds to the machine if the machine is properly grounded.

✓ Manually raise the levelwind to the upward standby position by pressing the raise button on the exterior hydraulic control panel.

✓ Once the levelwind is in the upright standby position, and if not already done so, remove the rope drum and install the conductor reel to the drive assembly. For steps involved in rope drum removal and conductor reel installation see Drum/Reel Removal and Installation section.

✓ Once the conductor reel is installed and while outside of the cab, attach any appropriate conductor grips and pulling swivels and attach the pulling line to the conductor.

✓ Attach any running grounds to the machine grounding brackets- if needed.

✓ Get back inside the cab, and turn off the automatic levelwind control using the door panel rocker switch.

✓ Select TENSION MODE on the system control display by pressing and holding the [SELECT MODE] button for three seconds. This setting is defaulted to whatever was last set for the system. If the system is already in TENSION MODE, then there is no need to change this setting.

✓ Set the tension limit for the machine using the rotational control knob. Once the tensioned is set, press the knob in to lock in the new tension limit.

NOTE: When in TENSION MODE, the line tension limit functions as the line tension setting. When more or less tension is needed, the control knob must be rotated, then pressed to change the tension. The joystick does not control the amount of tensioned holdback on the line, as the machine automatically manages the tension applied based on the line tension setting.

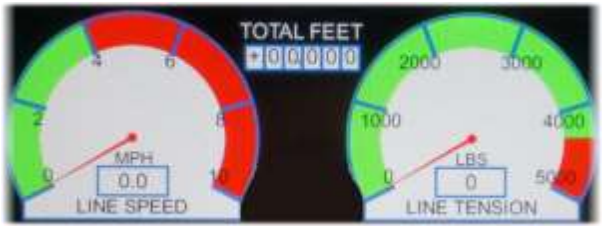
Tensioning Operations

✓ Begin tensioning by depressing the joystick trigger then pull back slightly on the joystick, bringing it out of neutral, and then pause for about three seconds for the brake to release. Once the brake is released, release the joystick trigger, and continue to pull backward on the joystick until it is all the way back. The joystick can then be released. **In tension mode, the joystick trigger should always be released once the hydraulic brake is released-** ***(see BRAKE ON/BRAKE OFF section).***

NOTE: The reason the joystick must first be pulled back slightly out of neutral is that this motion triggers the release of the hydraulic brake, and begins the hydraulic pressure building sequence. As soon as the brake releases, the operator will notice the drum beginning to rotate very slowly backward toward the operator. This is also designed to pull any slack out of the line.

NOTE: The three second pause allows the hydraulic system time to build enough pressure to sustain any pre-existing line tension before releasing the brake. This is a safety feature of the system that prevents the drum from rapidly paying out or jolting as soon as the brake is released.

✓ Continue to monitor the line speed and tension, and the footage counter.



NOTE: To stop the reel rotation at any time, return the joystick control to the center neutral position, and the hydraulic drum brake will set.

✓ During operations, the tension limits can be adjusted by rotating the control knob at the top of the display- (CW to increase; CCW to decrease). Once the tension is adjusted, press the knob in to lock in the new tension setting.

NOTE: If the knob is not pushed in, the new tension setting will not be applied. The operator must push the knob in to lock in the new setting.

CAUTION: Never payout all of the conductor off of the reel. Leave at least one layer of conductor wrapped on the reel; otherwise, the conductor end could be pulled from its anchor point.

Tensioning Operations

- ✓ Upon completion of the re-conductoring operations, and once the puller machines brake and/or lock dog are set, the tensioner operator can now set the hydraulic brake to hold the desired tension on the conductor to be tied off. The hydraulic drum brake can be set by returning the joystick control to the center neutral position with the joystick trigger released.

CAUTION: Always ensure that the hydraulic drum brake is set before attempting to tie off any line or conductor that this tied to or being managed by this machine. **The operator should never hold tension on the line using the drive system while the conductor is being tied off- <u>always set the brake first</u>.**

- ✓ Once the conductor is safely tied off, the conductor can be cut from the reel.

- ✓ After the reel is freed of its ties to the strung conductor, the operator can remove the reel to install another reel or pulling rope drum, if desired. See pages 58-59 for steps involved in changing/installing conductor reel.

- ✓ Upon completion of re-conductoring operations, and once the empty reel is removed and/or drum/reel is installed, the operator can lower the levelwind arm using the outside hydraulic control panel.

- ✓ If operations are completed, secure the levelwind to the frame, using a tie down or rope.

- ✓ Raise all jacks prior to transport.

- ✓ If tools where used during operations, store them in the tool box, unless further operations are planned.

- ✓ Turn the hydraulic power engine off, by pushing the rockers switch backward.

- ✓ Once the engine is off, turn the master power key switch CCW to the Off position and remove the key.

- ✓ Complete all towing and road safety procedures prior to towing machine- *(See Towing and Road Safety section)*.

CAUTION: The drum rope end and levelwind must be secured prior to transport.

Complete all Post-Operation Inspections on page 110.

Spider System Operations

NOTE: Before beginning spider system operations, the operator must perform all **Pre-Operation Inspections.** (*See Pre-Operation Inspection Checklist on page 104.)* Pre-operation inspections are important for the safe operation of the machine and are required under OSHA Regulations.

The PT-Series Puller/Tensioners come with an optional Spider line rewind system. This system, like the drive system, employs a direct drive hydraulic motor. The drive motor is reversible for forward payout and rewind capabilities.

SPIDER SYSTEM SETUP AND OPERATIONS

✓ To operate the spider system, first perform all Start-Up Procedures.

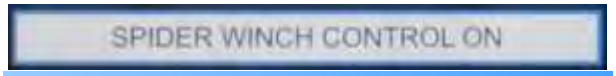
Setup

1. Place the Joystick in the center/neutral position.
2. Install the reel of spider rope and secure the reel with the lock pin. (Rope must come off of the top of the reel).
3. Route the rope through the Guide Arm Loop and the fairlead head rollers.
4. If needed, raise the fairlead to a height that will clear the installed drum or conductor reel.

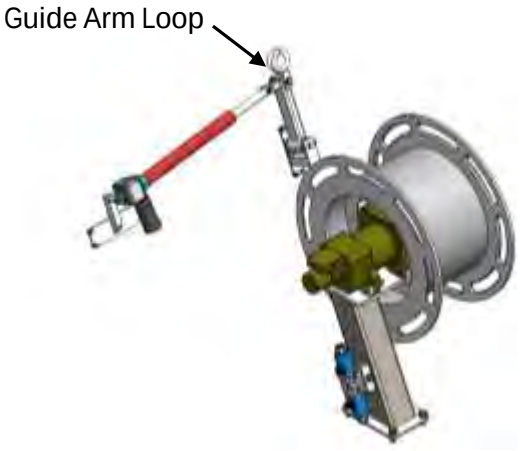
NOTE: If not using the guide arm during payout, the operator can bypass the guide arm loop and route the rope through the fairlead head. However, the operator will need to fully retract the guide arm prior to operations.

Operations

1. From the [HOME] screen, Press [SETUP] ➔[ABOUT] then the ENABLE/DISABLE button to enable SPIDER WIND]
2. Set the [SPIDER CONTROL] to ON
   a. Press and Hold the [SELECT MODE] button, located on the [HOME] screen for several seconds to toggle between modes. Cycle to the [SPIDER CONTROL] mode.



NOTE: When the spider system control is turned on, the operator should see the above information bar at the bottom of the Control Panel home screen.



Spider System

Spider System Operations (cont.)

REWINDING

Calibrating/Inputting Levelwind Limit Stops for Rewinding the Spider System

1. On the Control Panel Main Menu screen, Press [SETUP] ➔
2. Press [LEVEL WIND] ➔

3. <u>LEFT SIDE:</u> Press [CALIB LEV WIND LT] ➔Using the ROCKER SWITCH on top of the Joystick, visually position the Levelwind Loop to the Left desired limit ➔ Press and Hold [CALIB LEV WIND LT] until it turns GREEN and reads [LEFT CALIB OK].

4. <u>RIGHT SIDE:</u> Press "CALIB LEV WIND RT": the ROCKER SWITCH on top of the Joystick, visually position the Levelwind Loop to the Left desired limit. ➔

5. Press and Hold until the icon turns GREEN reads [LEFT (RIGHT) CALIB OK]➔

6. After Calibrating/Inputting the desired Level Wind Stops, set the [LEVEL WIND] switch, located on the left door, to [ON]. ➔

   This sets the software to recognize the Calibrated LEFT and RIGHT LIMITS.

NOTE: For PAYOUT, the [LEVELWIND] switch must be turned [OFF].

NOTE: The Spider System IS NOT AUTOMATIC. The Operator uses the Joystick to manually switch directions back and forth from side to side when the end of the spool is reached during rewinding.

Spider System Operations (cont.)

Paying out and Rewinding rope with the Spider System

- ✓ If paying out the line, the rope guide is not needed; therefore, get back inside the cab, and turn off the automatic levelwind control using the door panel rocker switch.

- ✓ If rewinding the spider rope, turn the automatic levelwind control on using the door panel rocker switch.

- ✓ Using the top joystick lateral rocker switch, adjust the R/L starting position of the guide arm loop so that the loop is centered over the exit rope.

NOTE: If not using the guide arm, fully retract the arm by pressing and holding the top joystick lateral rocker switch to the left.

- ✓ If using the guide arm, set the guide arm starting direction by pressing and holding the [LEV WIND DIR] button for three sections. The arrow indicators will toggle on the center screen showing which way the levelwind/guide arm is programmed to move.

- ✓ Begin paying out or rewinding rope. To do this, depress the joystick trigger, then slowly increase drum rotation by either pulling backward or pushing forward on the joystick. Once the joystick is out of neutral, release the joystick trigger. Pushing forward on the joystick results in the rope paying out. Pulling backward on the joystick results in the rope being pulled in. Once rotation speed is at the desired level, the joystick itself can be released.

NOTE: When bringing the joystick out of neutral to initiate the spider reel rotation, the operator will notice a delay. This delay allows the system to begin a hydraulic pressure building sequence. As soon as the hydraulic pressure to the spider system has reached a sustainable pressure, the reel will begin to rotate. Once the joystick is out of neutral the operator should release the trigger.

NOTE: The delay and pressure building sequence is necessary to allow the hydraulic system time to build an equilibrium pressure between the internal opposing- (forward and reverse) valves, thereby providing enough pressure to sustain any pre-existing line tension before actuating rotation. This is a safety feature of the system that prevents the reel from rapidly paying out or jolting as soon as the joystick is put into position.

- ✓ To stop rotation, place the joystick in the center neutral position with the joystick trigger released.

Emergency Stop Procedure

In the event of an emergency, the operator must be aware of how to shut down the machine so as to avoid any additional injuries or equipment damage. In these emergency situations, the lives of lineman, work crews, surrounding bystanders, as well as the operator may become at risk- dependent upon the severity of the situation. As an operator in these situations, the level of operating knowledge and proficiency can be tested. These factors alone make this procedure one of the most important to know.

1. **Pushing the Emergency Stop Button is** the first step of an emergency shut down during operations. This will de-energize the drive system/engine and stop all equipment rotation and power as quickly as possible. This button is located on the control panel.

2. Quickly assess the situation and assist any injured personnel to get free from hazards- only if safe to do so.

3. Notify proper authorities and get help.

4. Follow all employer emergency procedures.

Fire Extinguisher Usage:

Most Sherman+Reilly equipment comes standard with a fire extinguisher mounted somewhere on the equipment for quick access by the operator. However, should a fire occur with S+R equipment; the **operator should only utilize the provided fire extinguisher, if trained in its use, if safe to do so, if in accordance with employer policy, and in these described situations**:

a. To save your own life, if in jeopardy from fire.
b. To save someone else's life, if in jeopardy as a result of a fire- but only if safe to do so.
c. To put out small equipment fires to avoid further damage to equipment or prevent a dangerous explosion- but only if safe to do so.

CAUTION: Operators should exercise caution when attempting to put out fires, as **the provided extinguisher is only intended to suppress small localized fires**, and is not intended to put out or "fight" large scale fires, should one occur.

With the presence of flammable fluids and other operational environment factors, even small fires can grow out of control quickly. Operators must maintain awareness of these factors.

Proper training must also be provided by employer before engaging in any firefighting efforts. Should a fire occur with Sherman+Reilly equipment, the operator should **not** use the equipment until it has been inspected for safety and approved to be returned to service- regardless of the size of the fire.

5

Troubleshooting

Quick Tips

ENGINE WILL NOT START OR RUN

- ✓ Manual ignition switch, located in the engine compartment, is turned to [OFF] position- switch to [REMOTE & AUTO] and retry.
- ✓ Dead battery- could be caused by pulled breakaway switch.
- ✓ No fuel- check fuel gauge.
- ✓ Other- Refer to engine manufacturer's manual. *(Also, see General Faults section.)*

DRUM WILL NOT ROTATE

- ✓ Low system pressure drum clutch not releasing.
- ✓ Drum clutch out of adjustment.
- ✓ Obstruction between drum and inside fender/frame.
- ✓ Existing line tension in excess of line tension limit setting- brake set.

HYDRAULIC JACK CREEPS DOWN

- ✓ If motor running, control valve seals bad.
- ✓ Motor off, or holding valve on jack is malfunctioning.

UNIT WILL NOT BUILD MAXIMUM HYDRAULIC SYSTEM PRESSURE

- ✓ Operator's tension setting set to low restricting hydraulic pressure.
- ✓ Control valve blocked or malfunctioning.
- ✓ Pump relief valve malfunctioning.
- ✓ Pump Failure.
- ✓ System pressure relief valve at the pump out of adjustment or malfunctioning.
- ✓ Contamination in hydraulic system.
- ✓ Wiring damage to pump actuators.

HYDRAULIC FLUID TEMPERATURE IS ABOVE NORMAL

- ✓ Drum clutch not fully releasing.
- ✓ Contamination in hydraulic system.
- ✓ Wiring damage to the hydraulic cooling system- fan, wiring, coil, or sensor.

TRAILER LIGHTS DO NOT WORK AFTER CONNECTED TO VEHICLE

- ✓ Check vehicle/trailer wire connectors for damage or corrosion.
- ✓ The vehicle/trailer wire connectors can vary dependent upon owner/customer requirements. *(Also, see Trailer Lighting section).*

Troubleshooting Guide for Fault Codes

Fault Code	Potential Cause	Recommended Action
MC50-110 Sensor Power	5 volt sensor power (Pin C1-P8) is shorted to ground	Check harness for damage
JS6000 Joystick CAN	No CAN communication with joystick	Check power/ground to joystick and CAN connections
Pay-In Pressure	Pressure transducer for the winch pulling or tensioning side of the closed loop is in fault	Check 5 volt sensor power/ground to and sensor input; Check harness connection
Pay-Out Pressure	Pressure transducer for the low side of the closed loop is in fault	Check 5 volt sensor power/ground to and sensor input; Check harness connection
Charge Pressure	Pressure transducer or the charge pressure at H1 pump is in fault	Check 5 volt sensor power/ground to and sensor input; Check harness connection
Open Loop Pressure	Pressure transducer at the gage port on the PVG valve is in fault	Check 5 volt sensor power/ground to and sensor input; Check harness connection
Level Wind Position	The angle sensor for level wind arm position is outside the fault checking settings	Check power and ground and sensor input; Check harness connection
Level Wind Speed Pot	P-Q level wind speed pot is in fault	Check 5 volt sensor power/ground to and sensor input; check harness connection
Hydraulic Oil Level Low	Hydraulic level is below the low level switch input	Ensure proper amount of hydraulic oil in system
Keypad CAN Communication	CAN communication from keypad is off line	Check connections and power to device
Drum Diameter Left USS	Ultra sonic sensor on left side is in fault	Check power and ground and sensor input; Check harness connection
Drum Diameter Right USS	Ultra sonic sensor on right side is in fault	Check power and ground and sensor input; Check harness connection
Right Motor PPU	If command to the H1 pump is greater than 30% and pulse pick up is not generating a pulse signal fault will go true after a 5 second delay	Check pulse pickup sensor installation and harness connection

Left Motor PPU	This fault only applies to PT7500 with two motors. If command to the H1 pump is greater than 30% and pulse pick up is not generating a pulse signal fault will go true after a 5 second delay	Check pulse pickup sensor installation and harness connection
Hydraulic Temperature	Hydraulic temp sensor in tank is not sending the usable range of Ohms	Check connection at sensor and check resistance across sensor. (~2500 Ohms at 70 degF, ~1200 Ohms at 100 degF)
Fuel Level Sensor	Fuel level sensor in tank is not sending the usable range of Ohms	Check connection at sensor and check resistance across sensor
MC38-10 Communication	CAN communication between the MC50-110 and the MC38-010 is disconnected	Check CAN connections
MC38-10 Sensor Power	5 volt sensor power (Pin C3-P8) is shorted to ground	Check harness for damage
Charge Filter Bypass	The charge filter normally closed switch is open, indicating bypass. Hydraulic oil temperature must also be greater than 80 degF for this fault to occur.	Contact Sherman + Reilly service representative.
Brake Release Valve	Output is open or shorted	Contact Sherman + Reilly service representative.
Communication Status Blink	The green dot icon blinks if CAN communication between display and the Plus1 modules are OK. If the dot is not blinking CAN communication has been lost.	Contact Sherman + Reilly service representative.
Drum Wind EDC Valve	H1 Pump EDC valve output for wind when in operation is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Drum Unwind EDC Valve	H1 Pump EDC valve output for unwind when in operation is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.

Diverter Enable Valve	Normally closed diverter valve (FV-10705, Item 8) enable when in operation is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Tension Diverter Valve	Proportional diverter valve (FV-10705, Item 10) when in operation is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Tension RVPL Valve	Proportional RVPL (remote variable pressure limiter) valve (FV-10705, Item 4) when in operation is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Level Wind Valve	Voltage output for PVG valve (CVA-7418 Section 1) is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Motor Two Speed Valve	Two speed valve (FV-10705, Item 11B) when in operation is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Displacement 75 PCT Valve	Shift motors to 75% displacement valve (FV-10705, Item 11C) when in operation is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Front Jack Lift Valve	Front jack valve in the extended direction (CVA-7418 Section 3) is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.

Front Jack Lower Valve	Front jack valve in the retract direction (CVA-7418 Section 3) is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Left Jack Lift Valve	Left jack valve in the extend direction (CVA-7418 Section 5) is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Left Jack Lower Valve	Left jack valve in the retract direction (CVA-7418 Section 5) is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Right Jack Lift Valve	Right jack valve in the extend direction (CVA-7418 Section 4) is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Right Jack Lower Valve	Right jack valve in the retract direction (CVA-7418 Section 4) is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Cold Start Bypass Valve	Cold start bypass valve (FV-10705, Item 14) when in operation is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Level Arm Lift Valve	Voltage output for PVG valve (CVA-7418 Section 2) is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Accessory Flow Valve	Spider accessory flow valve is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Spider Level Wind Position	The actuator linear sensor for spider level wind arm position	Check power and ground and sensor input; Check Harness connection.

	is outside the fault checking settings.	
Spider Level Wind Left	Spider level wind electrical actuator in the left direction is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Spider Level Wind Right	Spider level wind electrical actuator in the right direction is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Spider Pay In Valve	Directional valve for spider pulling rope is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.
Spider Pay Out Valve	Directional valve for spider paying out rope is open or shorted. Fault maintains when true; repower control to clear.	Check harness connection at valve, continuity or shorts between pins and ground connection in harness. Fault maintains when true; repower control to clear.

Torque Ratings for Machine Fasteners

Torque ratings for fasteners on this piece of equipment follow ANSI accredited guidelines for ASTM/ASME specifications on tightening torque. As a general rule, tightening torque should be set according to the below table, with a tolerance of approximately + / - 5%, unless other specific torque rating is noted in this manual. The below table is for advisory purposes only.

General Recommended Torque for Fasteners by Size:

Nominal Dia. (in.)	SAE J429 Grade 5 Tightening Torque K = 0.15	K = 0.17	K = 0.20	SAE J429 Grade 8 Tightening Torque K = 0.15	K = 0.17	K = 0.20
Unified Coarse Thread Series						
1/4	76 in-lbs	86 in-lbs	101 in-lbs	107 in-lbs	122 in-lbs	143 in-lbs
5/16	157	178	209	221	251	295
3/8	23 ft-lbs	26 ft-lbs	31 ft-lbs	33 ft-lbs	37 ft-lbs	44 ft-lbs
7/16	37	42	49	52	59	70
1/2	57	64	75	80	90	106
9/16	82	92	109	115	130	154
5/8	113	128	150	159	180	212
3/4	200	227	267	282	320	376
7/8	322	365	429	455	515	606
1	483	547	644	681	772	909
1 1/4	840	952	1121	1363	1545	1817
1 1/2	1462	1657	1950	2371	2688	3162
Fine Thread Series						
1/4	87 in-lbs	99 in-lbs	116 in-lbs	123 in-lbs	139 in-lbs	164 in-lbs
5/16	174	197	231	245	278	327
3/8	26 ft-lbs	30 ft-lbs	35 ft-lbs	37 ft-lbs	42 ft-lbs	49 ft-lbs
7/16	41	47	55	58	66	78
1/2	64	72	85	90	102	120
9/16	91	103	121	128	146	171
5/8	127	144	170	180	204	240
3/4	223	253	297	315	357	420
7/8	355	403	474	502	568	669
1	542	614	722	765	867	1020
1 1/4	930	1055	1241	1509	1710	2012
1 1/2	1645	1865	2194	2668	3024	3557

Source: Fastenal

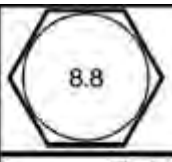
Torque ratings for ¼" and 5⁄16" are listed in inch-pounds. All other torque ratings are listed in foot-pounds. Torque value formula T=KDF where; (K = .15 for "lubricated" conditions) (K= .17 for Zinc plated and dry conditions) (K= .20 for plain and dry conditions).

CAUTION: Under/Over tightening fasteners can result in costly equipment failure or personal injury.

Torque Ratings for Machine Fasteners

Torque ratings for fasteners on this piece of equipment follow ANSI accredited guidelines for ASTM/ASME specifications on tightening torque. As a general rule, tightening torque should be set according to the below table, with a tolerance of approximately + / - 5%, unless other specific torque rating is noted in this manual. The below table is for advisory purposes only.

General Recommended Torque for Fasteners by Size:

Nominal Dia. (mm)	 Class 8.8			 Class 10.9		
	Tightening Torque			Tightening Torque		
	Lubricated (ft-lbs)	Zinc Plated (ft-lbs)	Plain&Dry (ft-lbs)	Lubricated (ft-lbs)	Zinc Plated (ft-lbs)	Plain&Dry (ft-lbs)
4	1.7	1.9	2.3	2.4	2.7	3.2
5	3.4	3.9	4.5	4.9	5.5	6.5
6	5.8	6.6	7.7	8.3	9.4	11.1
7	9.7	11.0	13.0	13.9	15.8	18.5
8	14.1	16.0	18.8	20.2	22.9	26.9
10	27.9	31.6	37.2	39.9	45.2	53.2
12	48.7	55.1	64.9	69.6	78.9	92.8
14	77.8	88.1	103.7	111.3	126.1	148.4
16	121	137	161	173	196	230
18	167	189	222	239	270	318
20	236	267	314	337	382	449
22	321	364	428	460	521	613
24	407	461	543	582	660	777
27	597	676	796	854	968	1139
30	809	917	1079	1158	1312	1544
33	1101	1248	1468	1576	1786	2101
36	1415	1603	1886	2024	2294	2699

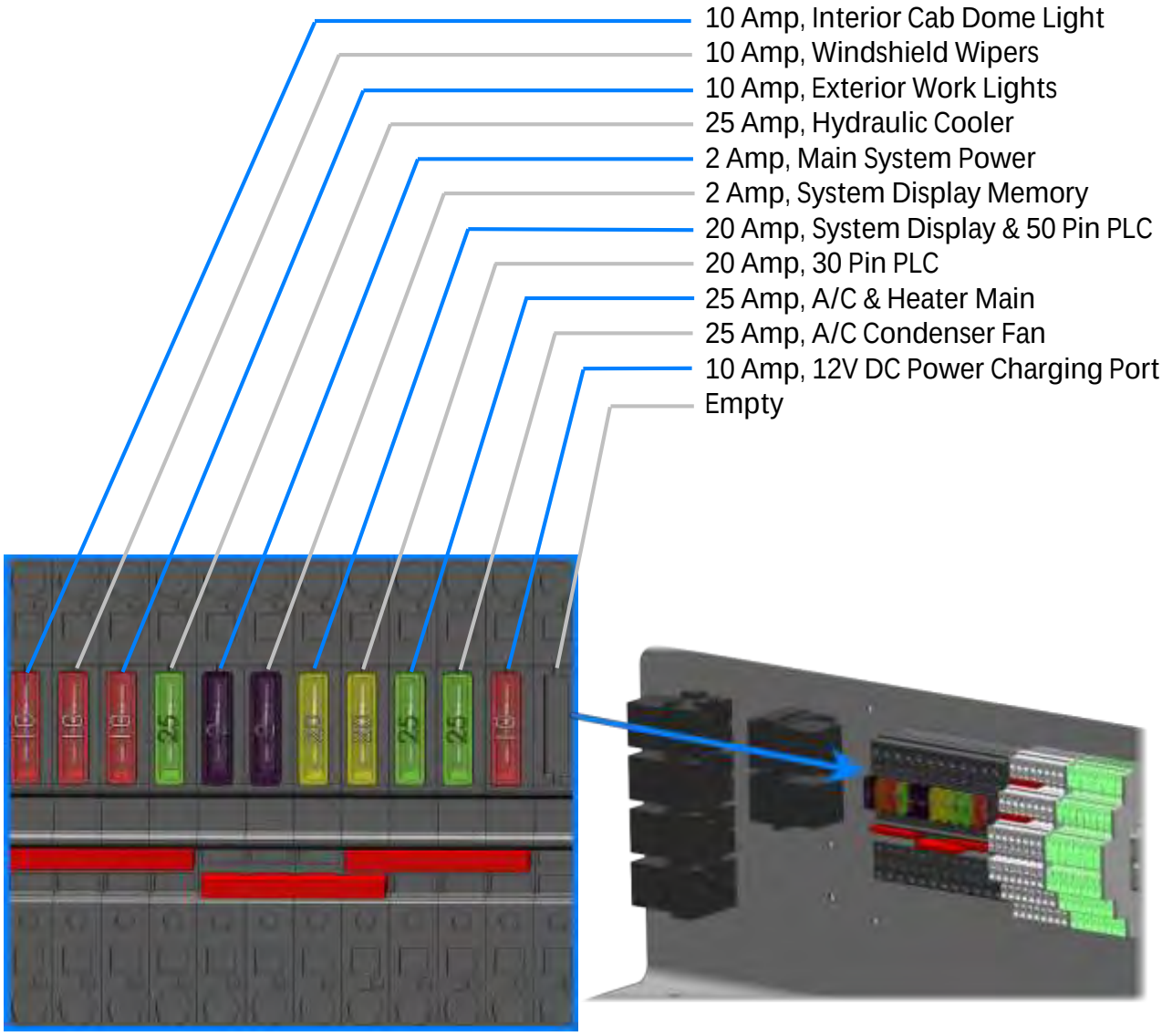
Source: Fastenal

All torque ratings are listed in foot-pounds. Torque value formula T=KDF where; (K = .15 for "lubricated" conditions) (K= .17 for Zinc plated and dry conditions) (K= .20 for plain and dry conditions).

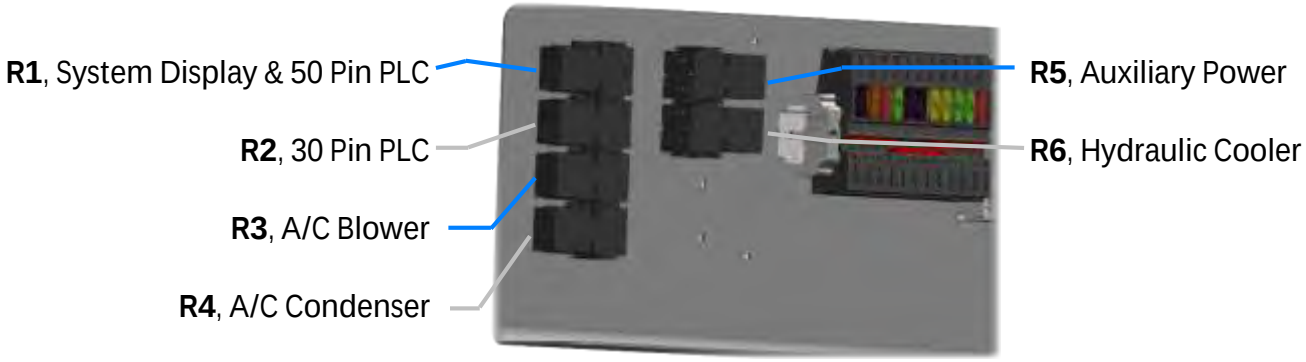
CAUTION: Under/Over tightening fasteners can result in costly equipment failure or personal injury.

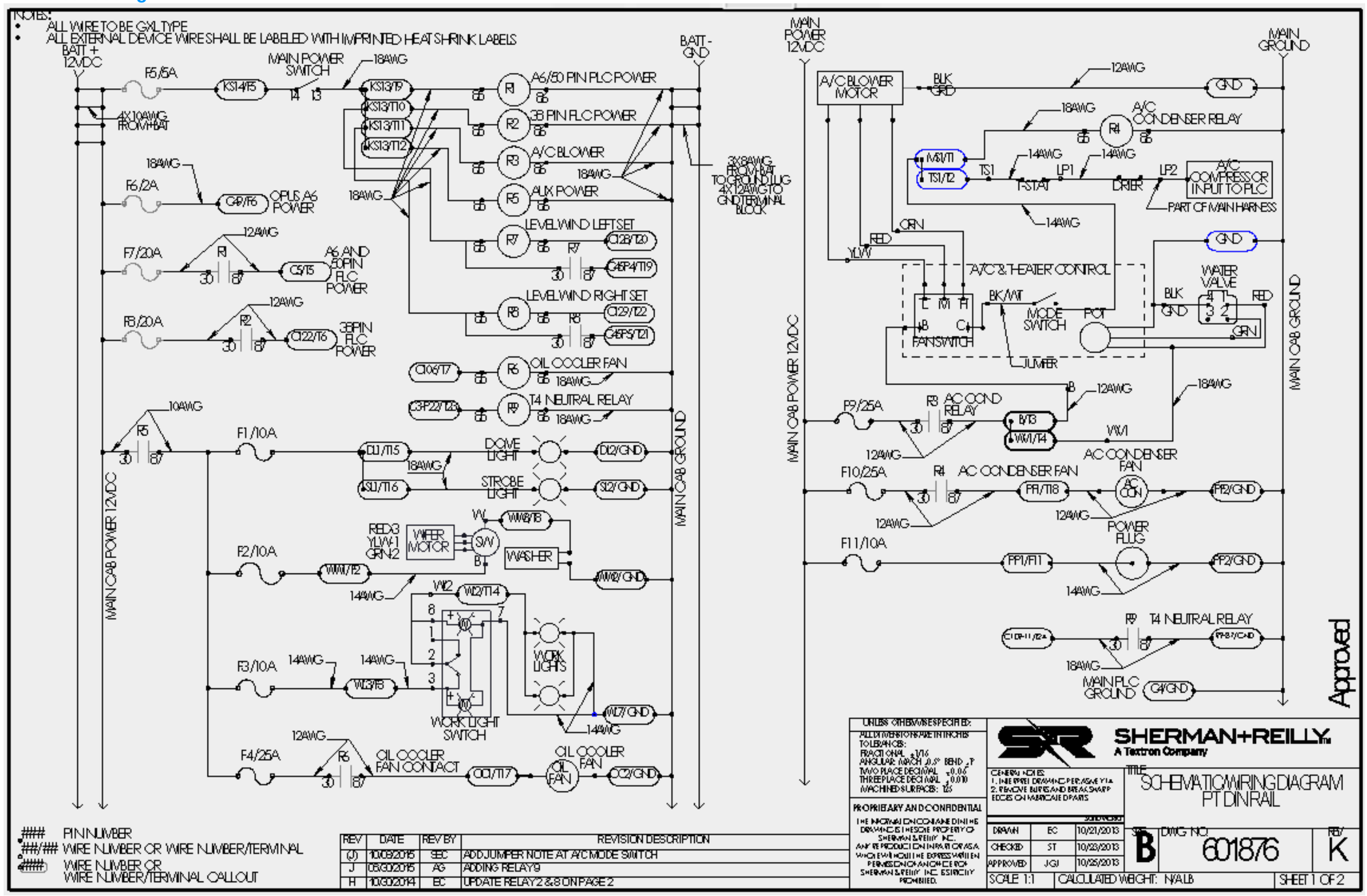
Troubleshooting [Fuse/Relay Block Diagram]

Fuse Description:



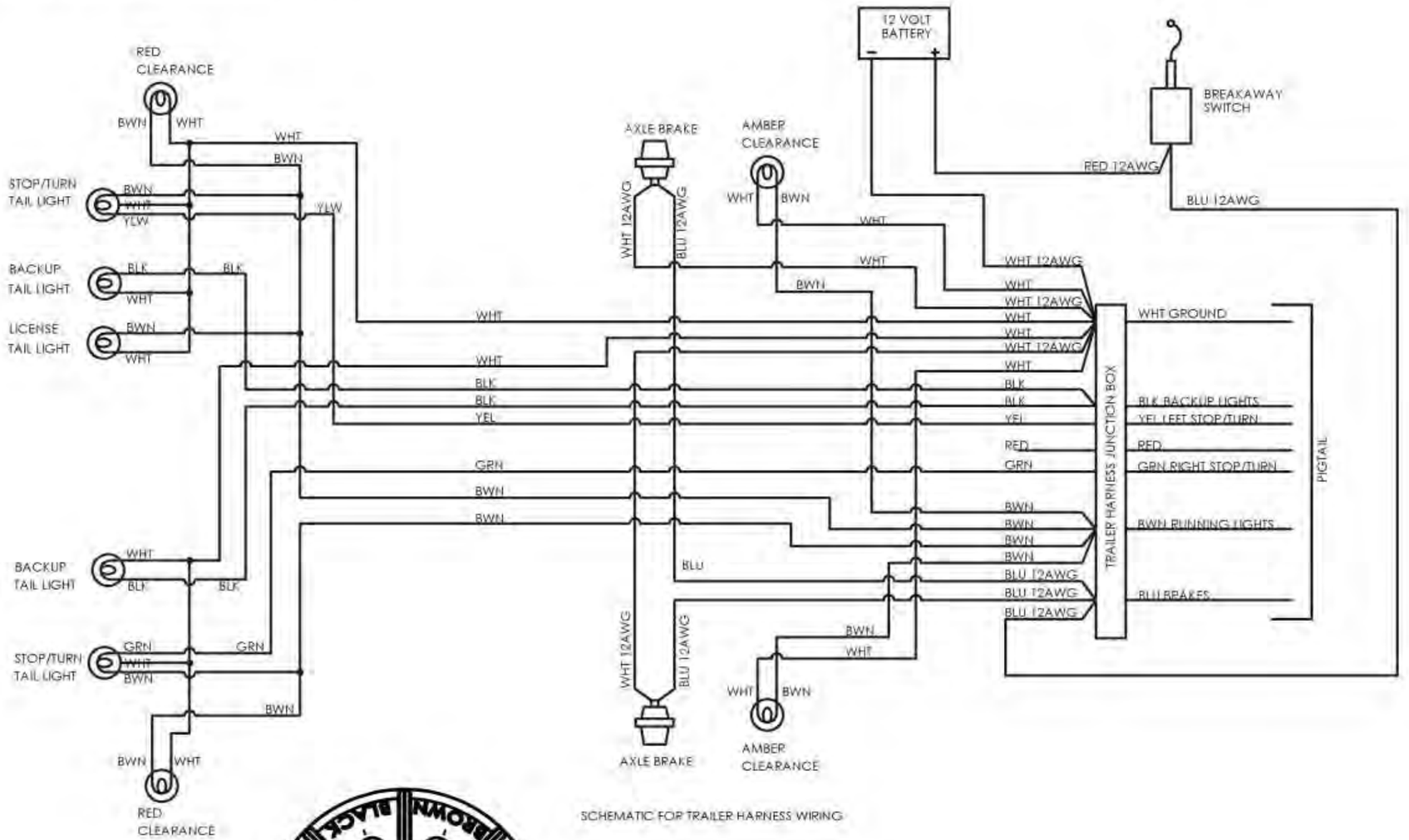
Relays: [50/30Amp 12V with Resistor]



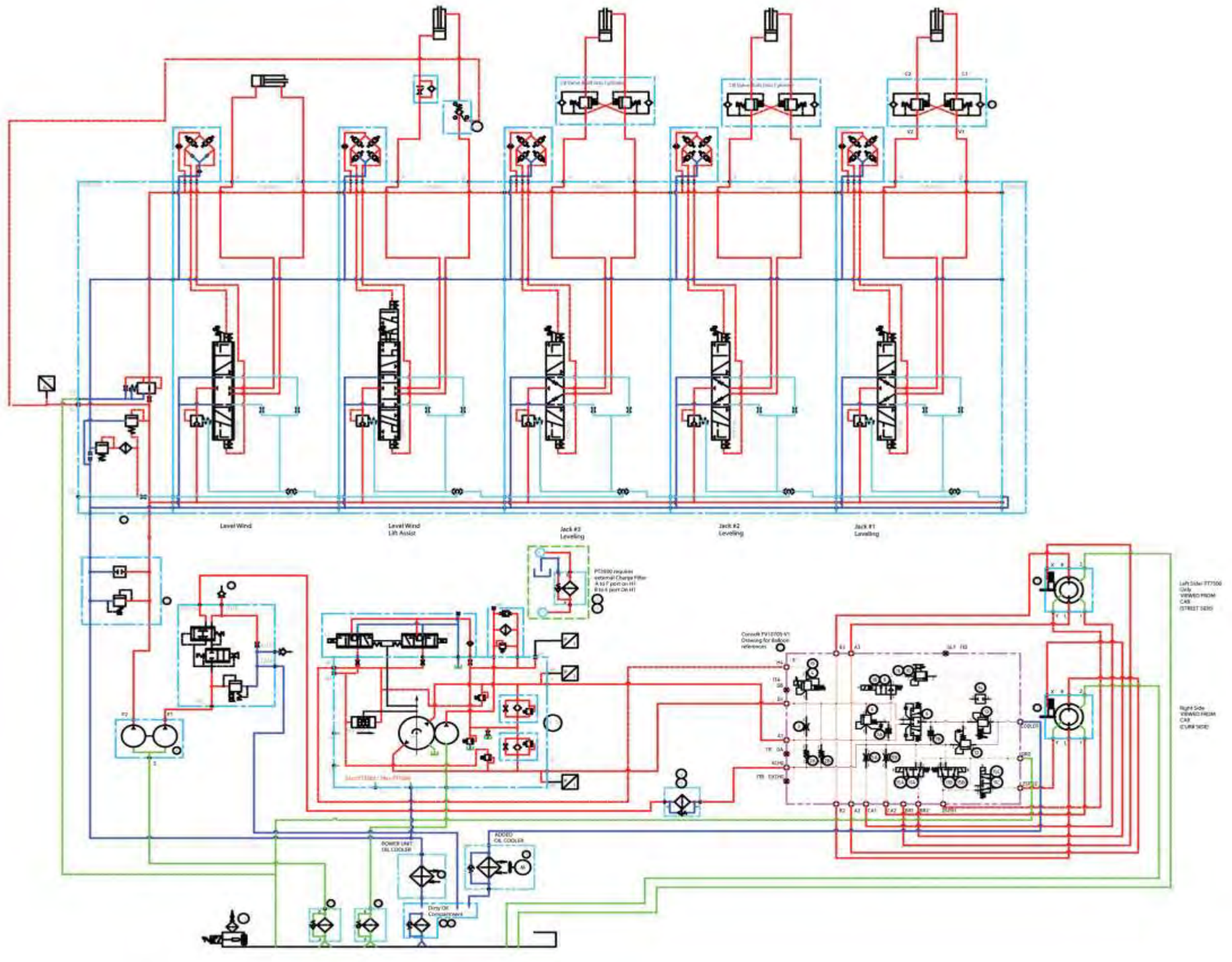

NOTES:
• ALL WIRE TO BE GXL TYPE
• ALL EXTERNAL DEVICE WIRE SHALL BE LABELED WITH IMPRINTED HEAT SHRINK LABELS
BATT + 12VDC
MAIN POWER SWITCH
18AWG
BATT - GND
MAIN POWER 12VDC
MAIN GROUND
A/C BLOWER MOTOR
A/C CONDENSER RELAY
A/C COMPRESSOR INPUT TO PLC
PART OF MAIN HARNESS
A/C & HEATER CONTROL
MODE SWITCH
FAN SWITCH
WATER VALVE
JUMPER
A/C CONDENSER FAN
POWER PLUG
T4 NEUTRAL RELAY
MAIN PLC GROUND
MAIN C48 POWER 12VDC
MAIN C48 GROUND
WIPER MOTOR
WASHER
WORK LIGHTS
WORK LIGHT SWITCH
OIL COOLER FAN CONTACT
OIL COOLER FAN
DOME LIGHT
STROBE LIGHT
A6/50 PIN PLC POWER
36 PIN PLC POWER
A/C BLOWER
AUX POWER
LEVELWIND LEFT SET
LEVELWIND RIGHT SET
OIL COOLER FAN
T4 NEUTRAL RELAY
A6 AND 50PIN PLC POWER
36PIN PLC POWER
OPLUS A6 POWER
4X10AWG FROM BAT
3X8AWG FROM BAT TO GROUND LUG
4X12AWG TO GND TERMINAL BLOCK
F1/10A
F2/10A
F3/10A
F4/25A
F5/5A
F6/2A
F7/20A
F8/20A
F9/25A
F10/25A
F11/10A
SHERMAN+REILLY
A Textron Company
SCHEMATIC WIRING DIAGRAM PT DINRAIL
DWG NO 601876
REV K
SIZE B
SCALE 1:1
SHEET 1 OF 2
Approved
PIN NUMBER
##/## WIRE NUMBER OR WIRE NUMBER/TERMINAL
WIRE NUMBER OR WIRE NUMBER/TERMINAL CALLOUT
REV | DATE | REV BY | REVISION DESCRIPTION
(J) | 10/09/2015 | SEC | ADD JUMPER NOTE AT A/C MODE SWITCH
J | 05/30/2015 | AG | ADDING RELAY 9
H | 10/30/2014 | EC | UPDATE RELAY 2 & 8 ON PAGE 2
PROPRIETARY AND CONFIDENTIAL
DRAWN EC 10/21/2013
CHECKED ST 10/23/2013
APPROVED JGI 10/25/2013

[Fuse/Relay Wiring Schematic]

NOTE:
1. ALL WIRE TO BE GXL TYPE
2. COLOR AS STATED ON DRAWING
3. WIRE SIZE IS 14AWG EXCEPT FOR WIRE MARKED AS 12AWG



[PT Trailer Wiring Schematic]


Level Wind
Level Wind Lift Assist
Jack #3 Leveling
Jack #2 Leveling
Jack #1 Leveling
POWER UNIT OIL COOLER
ADDED OIL COOLER
Drip Oil Containment

[PT Hydraulic Schematic]

6

Maintenance

Safety and Reliability Disclaimer: The reliability and working life of the machine depends on the regular inspection and preventive maintenance of the machine. All inspections and preventive maintenance described in this section are deemed as critical to the safe operation of the machine, and should be regarded as such.

The indicated intervals for maintenance work apply to normal operating conditions and stress. The manufacturer is not responsible for damages caused through faulty maintenance or inappropriate handling/operation of the machine.

Safety

Prior to work being performed, ensure the machine is locked/tagged out in accordance with OSHA safety requirements and all applicable safety regulations.

Take all fire prevention safety measures before using a welder or cutting device, including grinders. This should include having a fully charged fire extinguisher near the location of the work.

To avoid injury, make sure that all precautions are taken to support components before loosening or removing bolts.

Be sure everyone involved in the maintenance, service, or repair process understands what is being done and all of the safety precautions which need to be taken during the procedure.

Make sure all lifting devices, chains, slings, and hooks are in good condition and have the rated capacity to safely handle the work to be performed. Use guide lines when necessary for control during the lifting process.

Always wear proper protective clothing and equipment when performing service: gloves, safety glasses, etc.

Warning Terms: Are signal words in this manual that call the operator's attention to safety concerns.

The word **DANGER** indicates the information relates to a specific immediate hazard which, if disregarded, will result in severe personal injury or death.

The word **CAUTION** indicates the information pertains to a potential hazard or unsafe practice which, if disregarded, may result in minor personal injury or equipment damage.

The word **WARNING** indicates the information relates to a specific immediate hazard or unsafe practice which, if disregarded, could result in personal injury or death.

The word **NOTE** indicates the information is important to the correct operation or maintenance of the machine.

General Care and Inspections Instructions

Cleaning

Metal parts and canvas must be cleaned with a soft cloth and a neutral cleaning solution without solvents. Aggressive solvents like acetone or nitro thinners should not be used.

Clean petroleum ether is suitable to degrease the machine parts. No water should get on or around the bearings. If a steam blower is used to clean the machine, water may penetrate the machine causing damage to the bearings!

Make sure that no dirt gets into the bearings when vacuum cleaning the machine. If necessary, cover those parts beforehand. Bare metal parts can be cleaned and at the same time protected by using a slightly oiled cloth.

Fault and Malfunction Detection

Faults detected in supporting parts or parts which have an impact on safety must be corrected immediately. So long as the faults are not corrected, the machine must not be operated.

Machines, including their support construction and rope blocks, should be inspected by an expert before being put into operation for the first time as well as after having undergone substantial modification.

Machines, including their support construction and rope blocks, should be inspected a minimum of once a year by an expert. S+R recommends the frequency of inspections be directly related to the demands of the operating and working conditions.

Essentially, the checking process consists of making sure that the *safety devices* are available, fitting properly and effective, as well as checking the state of the machine, the hitching gear, the rollers, the equipment, and the support construction.

Safety devices described are, e.g. brakes, rope reeling devices, devices against overcharging, etc.

Experts are persons who, through their education and experience, have sufficient knowledge in the field of pullers, lifters, and traction machines. Further, they are familiar with the valid regulations for protection at work, for the prevention of accidents, and with the regulations and rules generally accepted in technology. "Experts" referred to are also able to decide if the pullers, lifters and traction machines are in a safe working condition.

Source: BGV D8.

Hydraulic System

Absolute cleanliness of the hydraulic system is a must. The smallest amount of foreign material in the system can cause extensive damage to the pump, motor(s), or valves.

Sherman+Reilly has taken every precaution to assure that each component and fitting was thoroughly cleaned and the system purged before this machine was delivered. Therefore, maintenance of the system should be carried out with extreme care.

Maintenance Notes: *(See Preventive Maintenance Schedule section for full details.)*

- Break-In Period: The hydraulic filters should be replaced after the first 25 hours of operation, and as outlined in the Preventive Maintenance Schedule section.
- Only use ISO Grade 32 hydraulic fluid.
- When adding hydraulic fluid, be sure to wipe all dirt and grime from around reservoir filler cap before removing.
- Clean hoses, fittings, and other components thoroughly prior to replacing, and then assemble carefully.
- Always ensure that hydraulic fluid and system have cooled prior to attempting maintenance.
- ***Always follow all federal, state, local, and environmental laws and regulations, to include but not limited to OSHA, EPA, and Hazard Communication Act, with regard to the storage, maintenance, and disposal of hydraulic fluid and other chemicals used in the maintenance of described mechanical equipment.***

Hydraulic System

When working on any hydraulic connections or parts:

- Be sure there is no pressure on fluid at the location of the work.
- Make sure nothing will move or drop when loosening a connection.
- Collect all the hydraulic fluid which will drain from the loosened connection.
- Use oil-dry or some absorbent material to soak up any fluid spills to keep working surfaces from becoming slippery.
- Cover all open connections to prevent loss and contamination to the hydraulic system.

When the hydraulic system has a problem or is opened at any point, filters and fluid should be replaced to prevent contamination or damage to the system.

Hydraulic System/Hose Inspection

✓ Check the outer surface of the hoses for damages, e.g. tears, bends, cuts, loosened parts, abrasions, brittle spots, etc.

WARNING Never check for hydraulic leaks with hands or body. When under pressure, leaks can puncture skin. Small or pinhole size leaks may be invisible during visual inspection. (Using a piece of cardboard or wood is recommended).

✓ Check the hoses for deformations (when pressure free as well as when under pressure).

✓ Special attention should be given to the connection between hose and fitting. If hose, fitting, or component damages are identified, they must be replaced immediately.

✓ All hydraulic hoses must be replaced after 2,500 working hours or at the latest every 10 years (starting from the year of the construction of the machine. *(See Preventive Maintenance Schedule section.)*

Hydraulic System

Checking Hydraulic Fluid

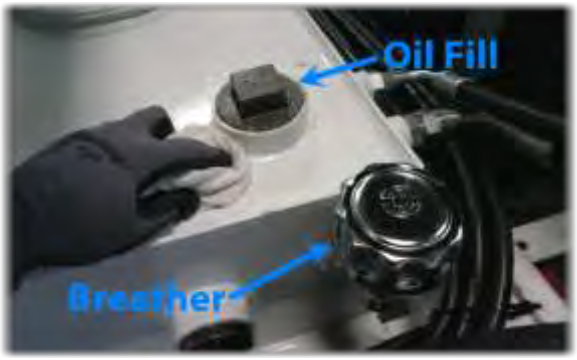
- ✓ To check hydraulic fluid level, first ensure that all cylinders: (**levelwind and jacks)** are retracted, and that the pump is off.
- ✓ View the hydraulic fluid level in reservoir through the sight gauge.
- ✓ Fluid should show within (High/Low) limits of the sight gauge.

Adding Hydraulic Fluid

- ✓ Clean around hydraulic fluid reservoir, and then remove reservoir cap or panel.

NOTE: If adding a small amount of fluid to the system, use the small oil fill cap for access. Cap must be reinstalled and hydraulic system cycled (use jacks) before sight gauge will read added fluid.

If adding a large amount of fluid, remove the center panel, gasket, and filter, then pour fluid into center hole. Reinstall filter, gasket, and panel once complete.



- ✓ Carefully pour fluid into tank so that it reaches within the (HIGH/LOW) limits of the sight gauge- about ¾ of the way full just below the HIGH mark is recommended.

NOTE: If the tank is overfilled, or there is air in the system, hydraulic oil may pour out of the bottom of the breather cap when the hydraulic system is charged. Use a drip pan where appropriate.

- ✓ Replace and tighten the fluid reservoir access (cap/panel).

Hydraulic System

CAUTION: Make sure hydraulic fluid system has had at least 30 minutes to cool prior to maintenance.

Replacing Hydraulic Fluid and Filters

Filter replacements are necessary if the indicator icon shows on the system control display. If the system indicates that a filter replacement is necessary, all filters must be replaced. The PT-Series has two in-line high pressure supply filters, and one low pressure return filter located inside the hydraulic fluid tank/reservoir.

NOTE: The system monitors the filter pressure/bypass at the system's first point of highest pressure. Therefore, to ensure optimal hydraulic system life, all filters must be replaced when required and at the same time.

✓ First ensure that all cylinders: (**levelwind and jacks)** are retracted as must as possible, and that the pump is off.

NOTE: Once removed, filter will still have fluid in it; use care when removing filter so as not to spill remaining hydraulic fluid. A small collection reservoir may be needed.

*****For Filter Only Replacement skip next step:***

✓ **With proper reservoir in place to catch the hydraulic fluid, open the tank drain cock by rotating it CCW. This will open the valve allowing the hydraulic fluid to flow from the center of the drain plug without having to remove the entire plug. The drain cock is located on the drain plug at the bottom of the hydraulic tank.

****Filter Only Replacement continue here:***

✓ Using filter wrench, loosen external supply filters, located behind the rope drum on the inside of the frame, by turning counter clockwise. Once loose, turn by hand and remove filter.

PT-3500 Filter Placement

PT-7500 Filter Placement

Hydraulic System

CAUTION: Make sure hydraulic fluid system has had at least 30 minutes to cool prior to maintenance.

Replacing Hydraulic Fluid and Filters (cont.)

✓ Install the new external supply filters and tighten rotating CW with filter wrench.

NOTE: A **10 micron filter** must be used when replacing the hydraulic return line filter.

✓ If changing fluid, and once fluid has finished draining from the tank, close the tank drain cock by rotating it CW. This will close the valve stopping the hydraulic fluid from flowing.

✓ With all of the fluid removed from the tank, loosen and remove the mounting screws on the top of the tank access panel using a ½ in. wrench, and then remove the panel to access the return filter assembly.

✓ Remove the filter assembly and spring from the tank casement.

NOTE: Take care to avoid dropping the spring, located on the top of the filter assembly, back into the tank. This spring is not secured to the filter holder, as it is designed to sit on the top of the filter assembly and provide downward pressure from the top of the tank to hold the filter in place.

✓ Holding the top or middle of the filter assembly, and using a crescent wrench, rotate the bottom retaining nut CCW to loosen the top and bottom filter assembly portions.

Hydraulic System

CAUTION: Make sure hydraulic fluid system has had at least 30 minutes to cool prior to maintenance.

Replacing Hydraulic Fluid and Filters (cont.)

✓ Once the nut is loosened, continue to rotate the bottom retaining nut CCW until all the way loose, then pull the bottom portion (spring and nut) off of the retaining rod to separate the filter assembly portions from the filter element.

✓ Separate the used filter element from the top portion of the holder, by pulling them apart.

NOTE: The filter element is partially comprised of steel, and the top of the filter assembly contains a powerful magnet for catching any possible metallic debris within the system. This combination may require a little finesse when removing and installing the metal filter.

✓ With the used filter element removed, wipe clean any metal fragments from the magnet using a cloth.

CAUTION: It is recommended to wear puncture proof gloves when cleaning the magnet, as metal fragments may be sharp and can cut or puncture skin.

✓ Clean the rubber O-ring on the top half of the assembly by wiping it with a clean dry cloth. Inspect the O-ring for damage. If damaged, remove it and replace with a new O-ring prior to installing the new filter element- *(see Parts section for replacement)*.

Hydraulic System

CAUTION: Make sure hydraulic fluid system has had at least 30 minutes to cool prior to maintenance.

Replacing Hydraulic Fluid and Filters (cont.)

✓ With all of the components cleaned and accounted for, insert the new filter element over the center retaining rod and seat it to the top portion of the holder.

✓

NOTE: The filter element is partially comprised of steel, and the top of the filter assembly contains a powerful magnet for catching any possible metallic debris within the system. This combination may require a little finesse when removing and install the metal filter.

Reattach the bottom portion of the filter holder by first hand threading the nut to avoid any cross threading.

✓ Continue to tighten the nut using a crescent wrench until all the way tight.

✓ Refill reservoir by carefully pouring fluid into the center hole until it reaches within the (HIGH/LOW) limits of the sight gauge- about ¾ of the way full just below the HIGH mark is recommended- *(see Adding Hydraulic Fluid section).*

NOTE: If the tank is overfilled, or there is air in the system, hydraulic oil may pour out of the bottom of the breather cap when the hydraulic system is charged. Use a drip pan where appropriate.

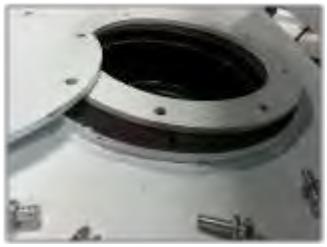
Hydraulic System

CAUTION: Make sure hydraulic fluid system has had at least 30 minutes to cool prior to maintenance.

Replacing Hydraulic Fluid and Filters (cont.)

- ✓ Reinsert the filter assembly, with the new filter element, into the tank casement and place the spring back on top of the assembly.

- ✓ Inspect the tank access panel gasket for any signs of damage or excessive deterioration. If damaged or worn, replace prior to installing the cover- *(See Parts Section for replacements).*



- ✓ Reinstall the tank access panel by first aligning the access panel holes. Then insert all screws to ensure holes line up properly. Begin hand tightening each screw to ensure that there are no cross threads.

- ✓ Continue tightening the mounting screws in a crisscross pattern using a ½ in. wrench until snug.

CAUTION: Take care to avoid over tightening the tank access panel mounting screws. If over-tightened, the gasket can become deformed or damaged and the tank may not seal properly.

NOTE: Filters should be changed after the first 25 hours of use as per the **break-in** period, and thereafter in accordance with the **Preventive Maintenance Schedule**. However, filters can be changed sooner as needed. Operators should watch for hydraulic filter indicator warnings on the control display, and if indicated, filter changes may be required prior to regular scheduled intervals.

Filter kits are available from S+R. See the Parts Section for replacement part numbers.

Hydraulic System

Hydraulic Hose Replacement

CAUTION: Make sure hydraulic fluid system has had at least 30 minutes to cool prior to maintenance.

- ✓ Ensure that all cylinders: (**levelwind and jacks)** are retracted, and that the pump is off.

NOTE: This unit does not require draining the hydraulic fluid completely prior to replacing most hydraulic hoses, as all but two of the tank hose fittings are at the top of the tank.

- ✓ With proper reservoir in place to catch hydraulic fluid, loosen hose connection for hose being replaced, and remove hose.
- ✓ Clean fitting using a non-scoring clean cloth, and ensure there is no damage to threads.
- ✓ Carefully thread new hose to fitting and tighten.

NOTE: The use of **thread sealant** may be required, dependent upon the type of fitting.

- ✓ Refill tank, as needed, to replenish any lost hydraulic fluid, using sight gauge for proper level- *(see Adding Hydraulic Fluid section).*

Drum/Reel Drive Assembly

WARNING: Loss of Limb/Death: System must be off and tagged out prior to attempting any maintenance on the drive assembly.

The PT-7500/3500 puller/tensioners both employ a fully hydraulic direct drive system. This drive system consists of hydraulic motor(s) and drive shaft, bar, and pins. The drive shaft, bar, and pins are connected directly to the drum or reel, making the drum/reel the final link in the direct drive system.

Drive Shaft

The drive/drum shaft should be inspected as part of the Pre-Operation Checklist.

- ✓ The drive shaft must be inspected for bending or damage each time the drum/reel is changed, as well as prior to operations.
- ✓ Ensure that the drive shaft cones and set collars are installed and secured- *(see Drive Shaft Cones and Set Collars section)*.
- ✓ The drive shaft must also be inspected to ensure that it is secured properly to the drive couplings before each operating period- *(see Pre-Operation Checklist section)*.

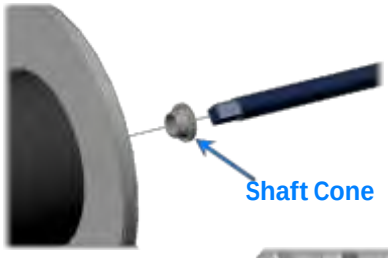
If excessive wear is found the part should be replaced prior to operation- contact Sherman+Reilly Service Department for service- *(see Service & Repair section)*.

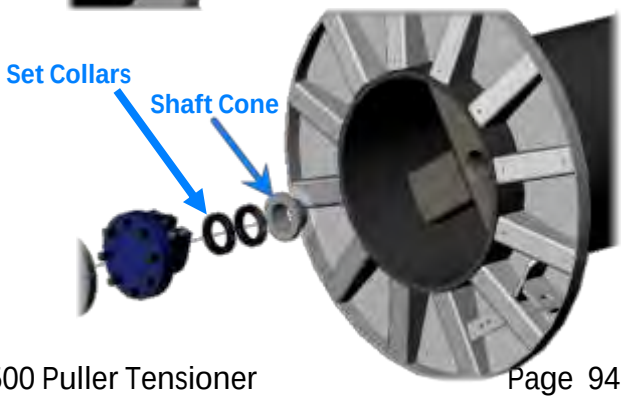
CAUTION: If any component of the drive system is damaged during pulling or tensioning operations due to excessive force or through some other non-operational related incident, then the entire drive system- (motor, couplings, pins, bar, etc.) and machine frame should be inspected to ensure no other damages exist prior to operations.

Drive Shaft Cones and Set Collars

Drive shaft tapered cones are installed on both sides of the drive shaft to prevent uneven gaping between the drum/reel and the drive shaft, thereby eliminating drum hop during shaft evolutions. Drive shaft cones should always be secured to the drive shaft/drum when conducting operations. There are also set collars installed to the side of the drum opposite to the drive bar. These collars hold the drum snug to the drive bar.

- ✓ Drive shaft cones and set collars should be inspected as part of the pre-operation inspections to ensure that they are in place and secured, with no signs of damage.





Drum/Reel Drive Assembly

WARNING: Loss of Limb/Death: System must be off and tagged out prior to attempting any maintenance on

Drive Bar and Pins

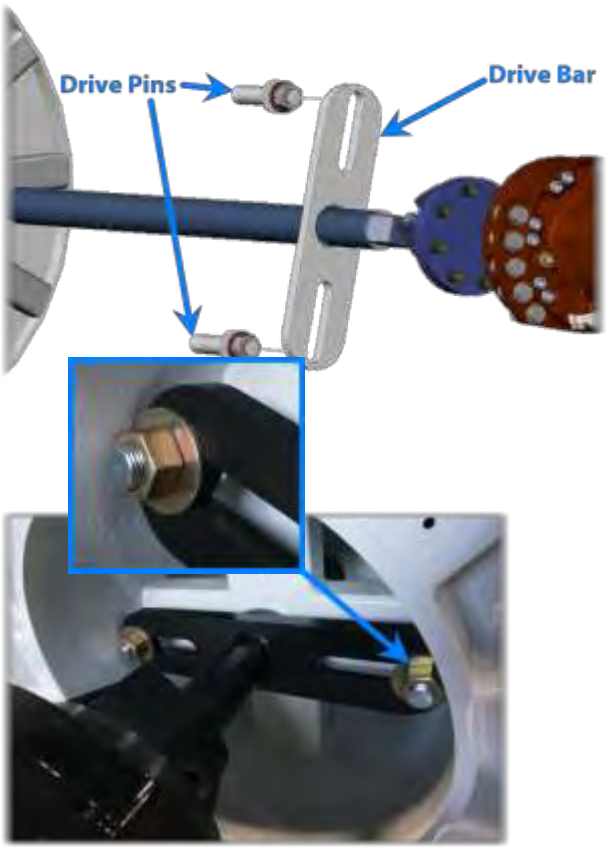
The drive bar and adjustable pins are what deliver the drive forces to the drum/reel. These components should be inspected each time the drum/reel is changed, and prior to operations.

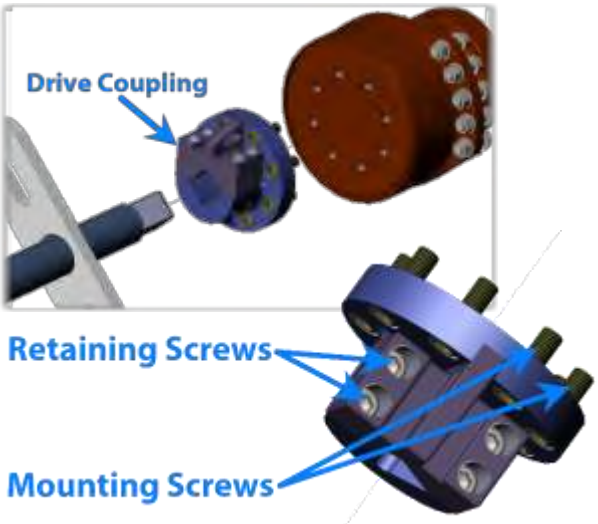
- ✓ The drive bar is attached to the drive shaft, and it should be inspected, along with the drive shaft, for any signs of bending or damage. If any of these conditions exist, it must be replaced prior to operations.
- ✓ The drive pins should be inspected to ensure that they move freely through the drive bar slots.
- ✓ The drive pins should also be inspected for stripped threads, cracks, and bending.

Drive Couplings

The drive shaft seats into the drive couplings on both sides of the machine. Each drive coupling is split horizontally into two halves. The top half of the coupling is removable with four screws and an integrated handle. The bottom half is designed to remain in place and support the drive shaft as the rope drum or conductor reel is loaded.

- ✓ The Retaining Screws should be **torqued to 135 ft. lbs.** after changing/installing rope drums or conductor reels and prior to operations to ensure they are tight and that the coupling halves are secured.





- ✓ The mounting screws that hold the couplings to the drive motor(s), or motor and roller pad-*(PT-3500)*, should be inspected and **torqued to 400 ft.** lbs. in accordance with the preventive maintenance schedule.

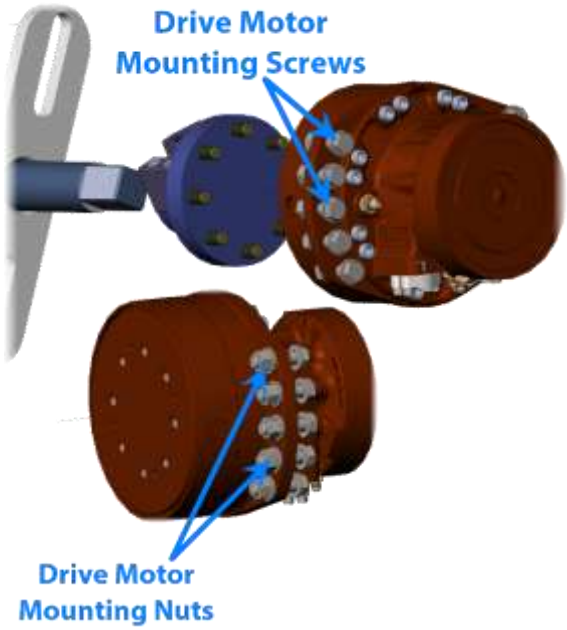
Drum/Reel Drive Assembly

WARNING: Loss of Limb/Death: System must be off and tagged out prior to attempting any maintenance on the drive assembly.

Drive Motor(s)

The PT-7500 comes equipped with two hydraulic motors- one on each side of the drive shaft. The PT-3500 comes equipped with one hydraulic motor on one end of the drive shaft and a pillow block bearing on the other end of the drive shaft. *(For pillow block bearing maintenance see Pillow Block Bearing section.)*

- ✓ The drive motor(s), should be inspected for obvious signs of damage prior to each operation- *(see Pre-Operation Checklist section).*
- ✓ The drive motor(s) mounting bolts/nuts should be inspected for damage and **torqued to 400 ft. lbs.** in accordance with the preventive maintenance schedule.



- ✓ Inspect the sensor connection to ensure that there is no damaged. Inspect the sensor wires for frayed or cut wires. Ensure that all sensor connections to the motor are secure.

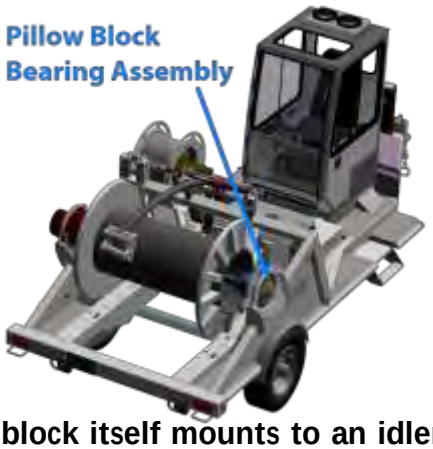
- ✓ The hydraulic hose connections should also be inspected for damage and leaks prior to operation. If leaks are found, replace the damaged hose/fitting. (See Hydraulic Hose Replacement Section.)

WARNING Never check for hydraulic leaks with hands or body. When under pressure, leaks can puncture skin. Small or pinhole size leaks may be invisible during visual inspection. (Using a piece of cardboard or wood is recommended).

Drum/Reel Drive Assembly

WARNING: Loss of Limb/Death: System must be off and tagged out prior to attempting any maintenance on the drive assembly.

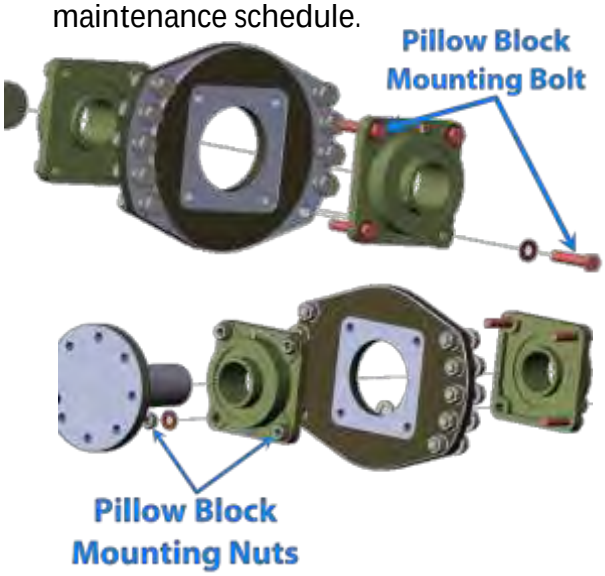
***PT-3500 Only**: The PT-3500 only has one drive motor, and therefore has a pillow block bearing to support the other side of the drive shaft. The pillow block bearing is located on the curb side of the machine. See below for specific maintenance steps.



Inspecting Pillow Block Bearings

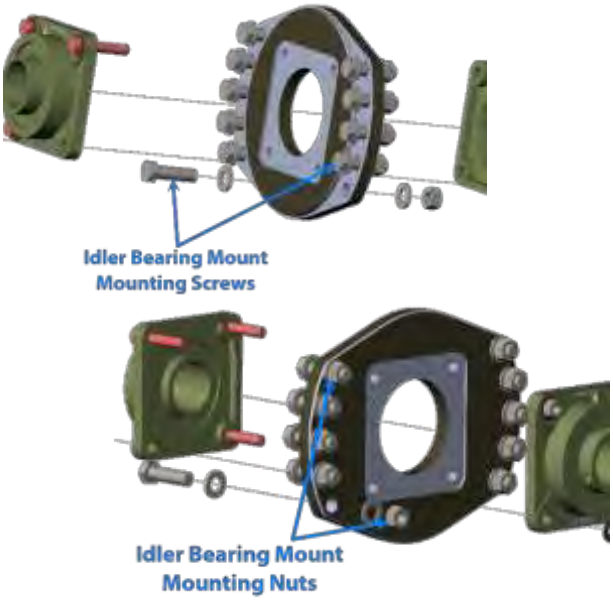
The pillow block bearing on the drum/reel shaft must be inspected prior to each operation to ensure that it is secured to the frame and that there are no visible signs of damage.

- ✓ The pillow block mounting bolts/nuts should be inspected for damage prior to operations and **torqued to 180 ft. lbs.** in accordance with the preventive maintenance schedule.



The pillow block itself mounts to an idler bearing mount which is mounted to the frame of the machine.

- ✓ These mounting screws and nuts should be inspected for damage prior to operations and **torqued to 400 ft. lbs.** in accordance with the preventive maintenance schedule.



Drum/Reel Drive Assembly

WARNING: Loss of Limb/Death: System must be off and tagged out prior to attempting any maintenance on the drive assembly.

***PT-3500 Only**: The PT-3500 only has one drive motor, and therefore has a pillow block bearing to support the other side of the drive shaft. See below for maintenance steps specific to this bearing.

Tightening Set Screws

Each side of the pillow block bearing- (inside/outside) has two set screws for a total of four.

- ✓ The four set screws should be tightened using a 3/16 in. hex key or allen wrench any time the drive shaft is removed/replaced.
- ✓ The set screws should also be inspected to ensure they are in place and tight prior to operation.

NOTE: The set screws hold the drive shaft snug to the inside of the pillow block bearing eliminating gapping between the drive shaft and the bearing. This also helps to prevent drum hop.

Greasing Pillow Block Bearings

The pillow block bearing must be properly lubricated with lithium base Grade 2 all-purpose grease according to the preventive maintenance schedule- *(see Preventive Maintenance Schedule section).*

- ✓ Apply grease to both the inside and outside grease fittings.

NOTE: In extreme hot or cold climates, a heavier or lighter grade grease may be required.

Spider System Assembly

CAUTION: Ensure that the system is powered off and the key removed prior to attempting any maintenance on the spider system.

The PT-Series Puller/Tensioners may come with an optional spider line rewind system. This system, like the drive system, employs a direct drive hydraulic motor. The drive motor is reversible for forward and rewind capabilities, and contains a grease fitting and mounting hardware.

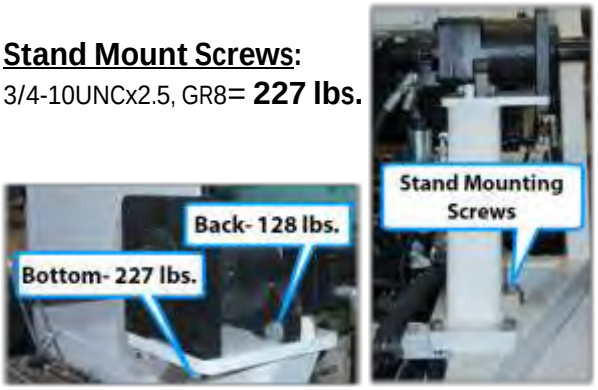
NOTE: The lower stand mounting bolts are Grade 8 bolts allowing for added strength to accommodate for side shearing forces. However, the recommended torque values should be lower than the standard recommended for Grade 8 bolts. If higher torque values are used, the mild steel- (which the bolts are threaded in) will begin to give stripping the threads.

Torqueing Mounting Bolts

The spider system is a bolt on accessory by design. Therefore, the bolts should be torqued in accordance with the preventive maintenance schedule. **See below for specified torque values**- *follow standard recommended torque values for all other values not specified here.*

Motor Mount Screws:
Bottom: 3/4-10UNCx2.25, GR5= **227 lbs.**
Back: 5/8-11UNCx3.5, GR5= **128 lbs.**

Stand Mount Screws:
3/4-10UNCx2.5, GR8= **227 lbs.**



Hydraulic Power Engine

All maintenance to the engine should be done in according to the instructions located in the engine manufacturer's manual.

Engine Models:

PT-3500: **V2607CR Tier 4**
PT-7500: **V3800T**

Keep all fluids at their proper level. *(See engine manufacturer's manual for minimum fluid levels.)*

CAUTION: Never add ETHER to fuel to start cold engine. Ether WILL damage small diesel engines. Use available block heater as needed.

CAUTION: Do not exceed 50% of anti-freeze in the coolant. More anti-freeze will damage small diesel engines.

Maintenance Notes: (See Preventive Maintenance Schedule section for full details.)

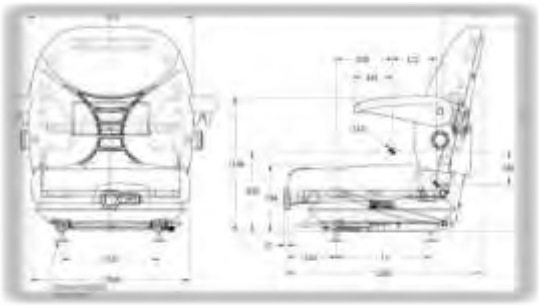
- Break-In Period: The engine oil and oil filter should be replaced after the first 50 hours of operation, and as outlined in the Preventive Maintenance Schedule section and engine manufacturer's manual.
- Always premix the correct coolant (50/50) before adding to cooling system- see SAE-J1034. Too much antifreeze can damage engine components.
- Engine oil should be MIL-L-2104C or have properties of API classification CF or higher. *(For further details see engine manufacturer's manual- Appendix A.)*
- When replacing hoses, fittings or other components, clean thoroughly and then assemble carefully.
- ***Always follow all federal, state, local, and environmental laws and regulations, to include but not limited to OSHA, EPA, and Hazard Communication Act, with regard to the storage, maintenance, and disposal of engine oils, coolants, and other chemicals used in the maintenance of described mechanical equipment.***

Safe-Zone™ Cab

CAUTION: **Do not use ammonia-based cleaners.** Use only non-ammonia-based cleaners to clean the front polycarbonate window.

Inspection of Operators Chair

The operators chair should be inspected for damage and loose or missing parts. *(For replacement parts, see Parts section.)*



Climate Control System

(Not installed on open cab platforms, and may not be available on all models. System types vary by model.)

The climate control systems are designed for both cooling and heating comfort functions.

- ✓ Routine visual inspections of the machine/unit should include the climate control system, (compressor, condenser, fans, hoses, etc.).
- ✓ Climate control system should be regularly inspected for damages and leaks.

NOTES:

- Any maintenance or modifications to the climate control system must be in accordance with US Federal EPA and State regulations.
- Only qualified HVACR technicians should perform work on Safe-Zone™ climate control systems. For all maintenance concerns contact the Sherman+Reilly Parts & Service Department at 1-800-251-7780.

CAUTION: For Turret Models: The operator must be seated while rotating the turret to avoid being accidentally thrown from the machine.

Trailer Assembly

Disclaimer: Any modifications to the Sherman+Reilly PT-Series trailer assembly or attached structures could result in damages to equipment, injury to operators, personnel, or others, and voiding of the manufacturer's warranty.

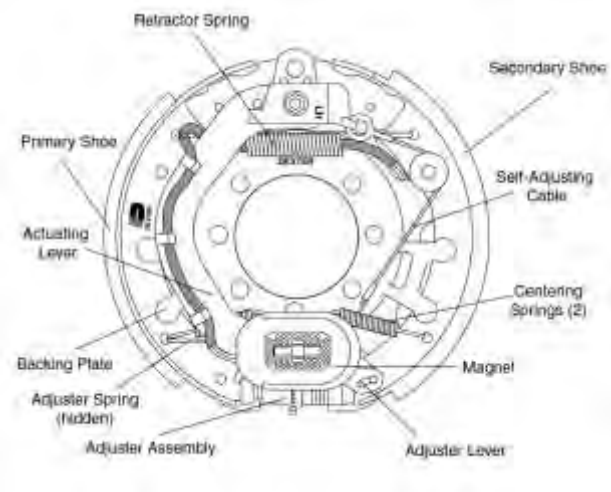
(United States Only) *Any and all maintenance or modifications to the Sherman+Reilly PT-Series trailer assemblies must be done in accordance with United States Federal and State Department of Transportation Standards, to include all applicable Federal Motor Vehicle Standards covered under Section 571.*

Brakes

The PT-Series puller/tensioners are equipped with a self-adjusting electric drum/shoe brake system.

- ✓ Brakes should be adjusted after the **first 200 miles,** and then every **3,000 miles thereafter**- *(see self-adjusting instructions in manufacturer's manual).*

NOTE: Replacement of linings is necessary when thickness is worn to **1/16inch or less**.



For all additional inspection, cleaning, adjustment, and replacement instructions see the manufacturer's manual.

CAUTION: Some older brake linings may contain asbestos dust which can cause serious health problems. Certain precautions should be taken when servicing brakes- (*see manufacturer's manual for instructions).*

Towing

Prior to towing, the trailer must be hooked up to a vehicle and hitch capable of supporting and towing a trailer/machine of this size and weight, while ensuring that the hitch is secure, safety chains and break-away switch are in place, and trailer lighting is connected.

Inspection of brake-away brake switch should be done on a regular basis to ensure that there is no damage and that it will function in the event of an emergency situation.

NOTE: The approximate trailer weights are:
PT-3500: 9,400 lbs. with rope/drum.
PT-7500: 11,360 lbs. with rope/drum.

Trailer Assembly

Tires

- The PT-3500 come standard with two **245/70R 17.5** tires.
- The PT-7500 come standard with four **235/85R 16** tires.

- The required air pressure for these tires is:
  [PT-3500: **125 psi cold**]
  [PT-7500: **110 psi cold**]
- Tire pressure should be checked each time before towing/operation, and weekly thereafter to ensure proper inflation.
- Tires should be inspected for wear and damage at least every **3,000 miles or 3 months**.
- The specifications for the tires can be found on the tire sidewall.

CAUTION: Replacement tires must meet the same specifications as the originals. Tires for Sherman+Reilly machines meet specific duty requirements, as well as weight and roadway/speed ratings. Mismatched tires and rims may come apart with explosive force causing personal injury. Mismatched and underrated tires can also blow out causing vehicle and roadway accidents that can create serious injury or death for those involved.

Wheels

- Wheel lug nuts should be torqued to **275-325 Ft. Lbs**.
- Wheel lug nut torque should be checked in accordance with the maintenance schedule to ensure safe towing operations- *(see Preventive Maintenance Schedule section).*

CAUTION: Wheel nuts or bolts must be tightened and maintained at the proper torque levels to prevent loose wheels, broken studs, and potential dangerous separation of the wheel from the axle, which can cause accidents, personal injuries, and death.

For all additional inspection, cleaning, adjustment, and replacement instructions see the manufacturer's manual.

Trailer Assembly

Axle Drum Oil

- Axle drum oil should be checked each time prior to towing or moving the trailer.

- Axle drum oil should be just below oil cap plug hole:

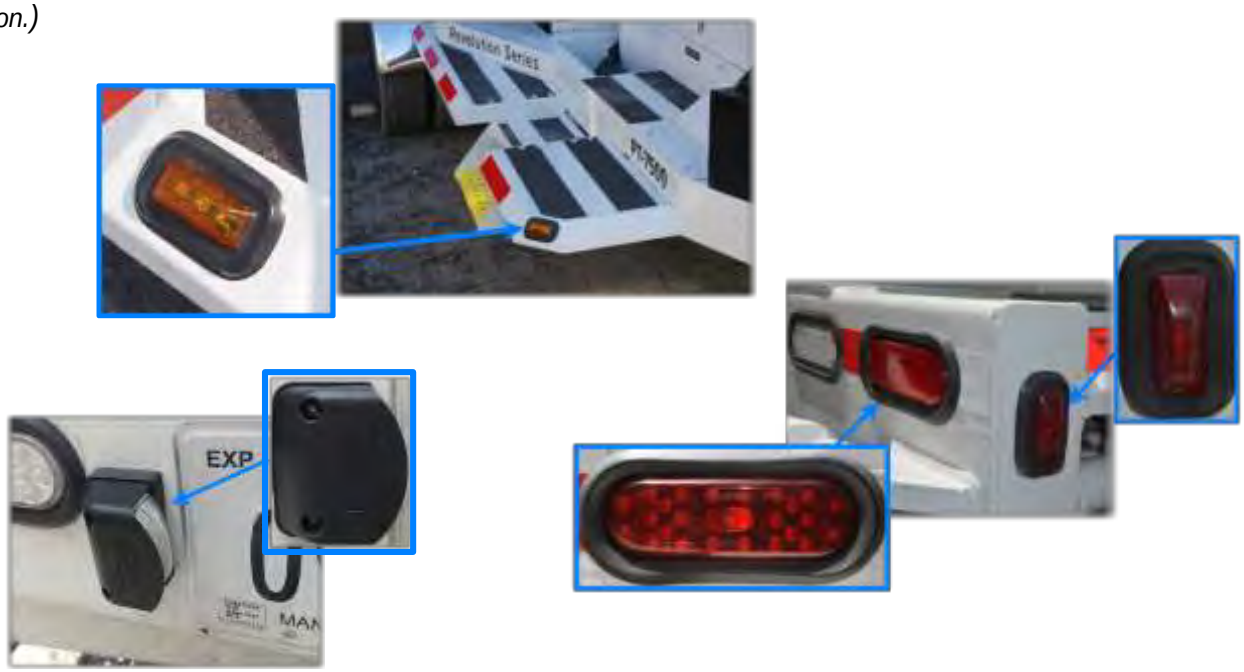
If axle drum oil level is low, remove axle drum oil cap plug, pour in fluid until fluid level is just below oil cap plug hole, and replace the plug. *(A funnel may be required to avoid spilling fluid.)*

For all additional inspection, cleaning, adjustment, and replacement instructions see the manufacturer's manual.

Trailer Assembly

Trailer Lighting

All trailer lights should be inspected to ensure they work prior to transport. (*For replacement see Parts section.)*



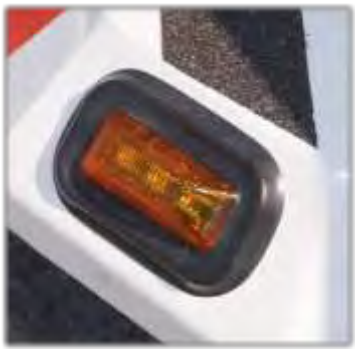
If none of the lights work:

- ✓ Check vehicle/trailer wire connectors for damage or corrosion.

(The vehicle/trailer wire connectors can vary dependent upon owner/customer requirements.)

- ✓ Also, check lighting junction box for damage, open and inspect wires for loose or corroded connections.

Trailer Assembly



Lighting Replacement

To replace trailer lighting, remove existing lighting by one of several methods, dependent upon the light:

- ✓ Pop out the lighting pod from its rubber grommet holder, by pushing from the inside toward the outside, or pushing in from the outside and reaching into the hole to pull the pod back through to the outside of the trailer. Once out of the rubber, unplug connection, and replace with new pod:

- ✓ Unscrew: Some lighting may require you to unscrew the unit from its retainer.

Pre-Operation Inspection Checklist (Page 1)

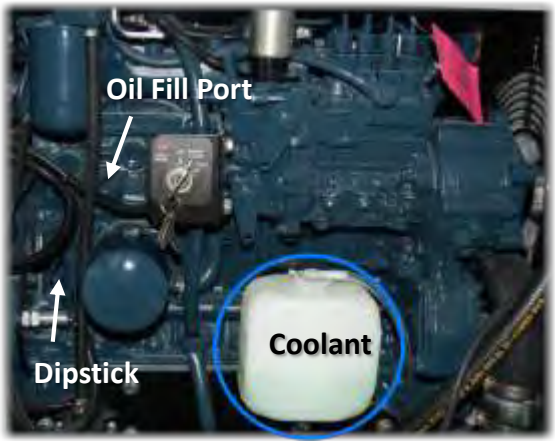
NOTE: Pre-operation checklist should be conducted in accordance with OSHA requirements, to include OSHA Standard- 29 CFR, Parts 1926.601, 1926.952, 1926.955, and 1926.150, as well as NFPA Standard No. 10-2013. It is recommended that pre-operation inspections be done before leaving the yard or garage.

1. **Check fuel level-** With key inserted in master power key switch, turn key to the On position to activate the display. Once activated, the fuel level will show on the color display.

2. **Ensure that the manual ignition switch is set to [REMOTE & AUTO]**- located inside the engine compartment, accessible through a round port cut in the engine cowling.

NOTE: It is necessary to remove the engine cover to access the main ignition switch. Be sure the engine cover is replaced and latched in position properly before transport or operating the machine.

3. **Check for the engine radiator coolant level,** by viewing the level on the coolant reservoir to ensure that the fluid level is within the HI/LO limits, viewable through a round port cut in the engine cowling.



4. **Check for proper engine oil level.** The dipstick can be accessed through a round port cut in the engine cowling. After checking oil level, wipe dipstick clean of any debris prior to reinserting into spout.

NOTE: It may be necessary to remove the engine cover to check the oil level. Be sure it is replaced and secured in position properly before transport or operating the machine.

5. **Ensure proper hydraulic fluid level in reservoir for hydraulic system**, by viewing the sight gauge on the side of the tank.

Pre-Operation Inspection Checklist (Page 2)

6. **Inspect hydraulic pump and hoses for loose fittings, leaking fluid, and damaged hoses**.

7. **Inspect for structural damage**, **bent or broken parts, cracked or broken welds, missing pins and retainers.**

8. **Inspect drive motor(s), drive shaft/shaft cones/bar/pin, and screws on reel shaft coupling** to ensure they are secure and that there are no obvious signs of damage- if damaged do not operate, service may be required. For the PT-3500, also inspect the pillow block bearing and fasteners.

9. **Inspect levelwind** for any obvious signs of damage, leaking hydraulic cylinders or hoses, and ensure rollers move freely.

10. **Inspect all equipment grounds** for any signs of damage.

11. **Inspect all jacks** for damage or leaking hydraulic components.

12. **Conduct towing readiness inspection.**
    a. Inspect trailer hook up, and ensure that hitch is secure, safety chains are in place (crisscross pattern), and trailer lighting is connected.
        i. Inspect tail lights to ensure all lights work- replace bulbs as needed. If none of the lights work, inspect vehicle fuses, then trailer wiring for corrosion.
        ii. Ensure that trailer brakes work and that wheel chocks are available.
    b. Check tire pressure- tire pressure should be checked cold and read: [PT-7500: **110 psi cold**] / **[**PT-3500: **125 psi cold]**.
        i. If tire pressure is low, inspect tire for damage or punctures. If damaged or punctured, have repaired or replace.

Pre-Operation Inspection Checklist (Page 3)

13. Inspect Fire Extinguisher.

a. Inspect fire extinguisher charge, and ensure that gauge shows within charge limits.

NOTE: If undercharged or overcharged, see instructions on label- replacement may be required. **(Additional minimum monthly/annual inspections required- see instruction label on extinguisher for details.)**

b. Inspect the physical condition of the extinguisher- (cylinder, hose/cone assembly, etc.), for any signs of damage or corrosion.

c. Ensure that hinge pin is in place, to prevent accidental discharge.

d. Ensure that the plastic safety seal is secured to hinge pin, and that it has not been removed.

NOTE: If safety seal is missing or is broken, extinguisher may have been tampered with or have already been used- indicating the need for re-inspection/replacement.

e. Inspect mounting strap/bracket assembly to ensure extinguisher is secured to structure.

Post-Operation Inspection Checklist (Page 1)

NOTE: Post-operation checklist should be conducted in accordance with OSHA requirements, to include OSHA Standard- 29 CFR, Part 1926.600.

1. Check engine oil and radiator coolant levels- to ensure no leakage after operations.

NOTE: It is necessary to remove the engine covers to check the oil levels. Be sure all covers are replaced and latched in position properly before transport or operating the machine.
If machine is to be parked in a publically accessible area or area adjacent to a roadway or construction site, the engine compartments must be closed and locked.

2. Close all windows on the Safe-Zone™ Cab, remove the master keys from the control panel, and shut and lock the door.

NOTE: It is important that the windows are closed, the door is locked, and that all keys are removed to prevent unauthorized access or tampering with the equipment, especially when the machine is parked in a publically accessible area or area adjacent to a roadway or construction site.

3. If leaving machine parked/unattended at night adjacent to a roadway or occupied construction area, caution should be taken to ensure that there is no obstruction of the reflectors- all reflectors must be visible.

4. When parking the machine, the wheels should be chocked and the parking brake should be set- (Parking brakes may not be available on all trailer models). When parking brake is not available or when parking machine/trailer on an incline, having the wheels chocked is extremely important.

5. Store all grips, blocks, and other tools/equipment used during operations back into the tool box. Then close and lock tool box.

6. Secure the rope end to the drum using a tie-off rope around the drum. Also, secure the levelwind to the rear trailer frame using a tie down to prevent the levelwind from bouncing during transit.

Post-Operation Inspection Checklist (Page 2)

7. Remove any trash, rags, or other loose material from the machine, to keep the machine clean and so as not to create a fire hazard.

Storage:

- ✓ For periods of extended storage without use, the manual ignition switch (inside hydraulic engine compartment) can be switched to the [OFF] position to help maintain battery charge during storage.

Preventive Maintenance Schedule (Page 1)

NOTE: All preventive maintenance steps detailed in this sections are in addition to the required pre/post-operation inspection steps.

NOTE: All Preventive Maintenance should be conducted in accordance with OSHA requirements, to include OSHA Standard- 29 CFR, Part 1910.147.

WARNING: System must be tagged/locked out prior to removing any machine guarding, removing any system component, or performing any maintenance outside of basic visual inspections.

Reference Hydraulic Power Engine Manufacturer's Manual
For all hydraulic power engine models please refer to manufacturer's manual for complete maintenance schedule and instructions- (See Appendix A).

Reference Engine Manufacturer's Manual
For all engine models please refer to manufacturer's manual for complete maintenance schedule and instructions - (See Appendix).
Tier 4 Final Engine Compliance
For all Tier 4 final engines maintenance intervals and instructions, see appendix for maintenance steps and contact information for engine manufacturer. **(Failure to do so may result in engine damage, inoperability, and potential voiding of warranty)** - (See Appendix).

Reference Axle/Brake Assembly Manufacturer's Manual
For all axle and brake assembly models please refer to manufacturer's manual for complete maintenance schedule and instructions- (See Appendix A).

Break-In Period- All Models	
First 25 hours	Replace Hydraulic Fluid Filters- change all three filters.
First 50 hours	Replace the Engine Oil and Oil Filter- *See Hydraulic Power Engine section*.
	Check Battery for Proper Charge, Corrosion of Battery Terminals.
	Check for Leaks in the Fuel System.
First 25 miles	Check Trailer Wheel Lug Nut Torque- *See Trailer Wheels section*
First 50 miles	Check Trailer Wheel Lug Nut Torque- *See Trailer Wheels section*
First 100 miles	Check Trailer Wheel Lug Nut Torque- *See Trailer Wheels section*
First 200 miles	Adjust Brakes- *See Brake section.*

Preventive Maintenance Schedule (Page 2)

NOTE: All preventive maintenance steps detailed in this sections are in addition to the required pre/post-operation inspection steps.

NOTE: All Preventive Maintenance should be conducted in accordance with OSHA requirements, to include OSHA Standard- 29 CFR, Part 1910.147.

WARNING: System must be tagged/locked out prior to removing any machine guarding, removing any system component, or performing any maintenance outside of basic visual inspections.

Weekly/Routinely		
All	Inspect Drum and Drive Motor and Coupler Assemblies	Inspect drum, drive motor and coupler for obvious signs of damage, and loose or missing bolts/screws/parts. If damage or loose, do not operate machine, as service may be required.
All	Inspect Trailer Axle Assembly	Inspect for alignment, broken or damaged spring leaves.
All	Inspect Axle Drum Oil Level	Fill to just below drum plug- (*see Axle Drum Oil section).*
All	Check Battery	For proper charge.
All	Check Tire Inflation	Check tire air pressure- *(see Tires section)*.
All	Open Evacuator Valve on Engine Air Filter Housing	Open the evacuator valve on the engine air filter housing to purge any large particles of dust or debris.

Every 50 Hours of Use or 3 months/3,000 miles (whichever comes first)		
All	Inspect Tire Condition	Inspect tires for wear and damage every 3 months/3,000 miles- *(see Tires section).*
All	Check Torque on Wheel Nuts and Bolts	Tighten to specified torque values every 3 months/3,000 miles- *(see Trailer Wheels section).*
All	Adjust Trailer Brakes	Every 3 months/3,000 miles- *(see Brake section).*
All	Inspect Fuel Lines and Clamps	Inspect all fuel lines from for damage/leaks. Also, inspect fuel line hose clamps and ensure they are tight.
PT-7500	Drain the Fuel Water Separator	*(If Applicable)* Drain the fuel water separator to purge any accumulated water from the diesel fuel lines.

Preventive Maintenance Schedule (Page 3)

NOTE: All preventive maintenance steps detailed in this sections are in addition to the required pre/post-operation inspection steps.

NOTE: All Preventive Maintenance should be conducted in accordance with OSHA requirements, to include OSHA Standard- 29 CFR, Part 1910.147.

WARNING: System must be tagged/locked out prior to removing any machine guarding, removing any system component, or performing any maintenance outside of basic visual inspections.

Every 100 Hours of Use or 6 months/6,000miles (whichever comes first)		
All	Replace Hydraulic Fluid Filters	Replace all three hydraulic fluid filters every 100 hours, or sooner if indicated by the system- *(see Replacing Hydraulic Fluid and Filters section).* **NOTE:** Filters can be changed sooner dependent upon conditions and if indicated by the system. The system is designed to monitor fluid and filter life/flow.
All	Inspect Trailer Braking Components	Brake Magnets and Brake Controller- *(see Brake section).*
All	Inspect Trailer Suspension	Inspect for bending, loose fasteners, and wear.
All	Inspect Wheels	Inspect wheels for damage, (i.e. cracks, dents, or distortions).
All	Grease Spider System Fairlead Locking Pin	Use Lithium Grade 2 All-Purpose Grease- *(see Spider System Assembly section).*
All	Check Torque On Spider System Mount Screws	*(See Spider System Assembly section.)*
PT-3500	Grease Pillow Block Bearing	Use Lithium Grade 2 All-Purpose Grease- *(see Drum/Reel Drive Assembly section).*
PT-3500	Clean Engine Air Filter Element	Clean filter element every 100 hours, and only use less than 30 psi compressed air.
PT-3500	Drain the Fuel Water Separator	*(If Applicable)* Drain the fuel water separator to purge any accumulated water from the diesel fuel lines.
PT-3500	Clean Engine Fuel Filter	*(See Engine Manual.)*
PT-3500	Check Engine Fan Belt	Check engine fan belt for proper tightness- (*See Engine Manual).*

Preventive Maintenance Schedule (Page 4)

NOTE: All preventive maintenance steps detailed in this sections are in addition to the required pre/post-operation inspection steps.

NOTE: All Preventive Maintenance should be conducted in accordance with OSHA requirements, to include OSHA Standard- 29 CFR, Part 1910.147.

WARNING: System must be tagged/locked out prior to removing any machine guarding, removing any system component, or performing any maintenance outside of basic visual inspections.

Every 200 Hours of Use or *12 months/12,000 miles (whichever comes first- *unless otherwise specified)		
All	Inspect Trailer Brake Lines	Inspect air/hydraulic lines for damage or leaks- if equipped.
All	Inspect Trailer Brake Linings	Replace when at or below **1/16 inch** thickness- (*see Brake section).*
All	Inspect Trailer Brake Wiring	Inspect for damage or corrosion- (*see Trailer Wiring section).*
All	Inspect Wheel Hubs/Drums	Inspect for abnormal wear and scoring.
All	Inspect Wheel Bearings and Cups	Inspect for wear or corrosion. Clean and repack or lubricate bearings- *(see Trailer Wheels section).*
All	Inspect Axle/Trailer seals	Inspect for leaks. Replace as needed- *(see Manufacturer's Manual).*
PT-3500	Replace Engine Oil	Replace engine oil every 200 hours in accordance with manufacturer specifications- *(see Engine Manual)*.
PT-3500	Replace Engine Air Filter Element	*(Replace annually up to 600 hours/six cleanings.) Replace sooner if damaged or heavily discolored- *(see Engine Manual).*
PT-3500	Check Engine Coolant Hoses and Clamps	Inspect radiator hoses and clamps for signs of damage, wear, and leaks. Also ensure they are secured- *(see Engine Manual).*
PT-3500	Check of Engine Air Intake	Inspect air intake lines for the engine, and ensure no damage or obstructions.
PT-3500	Inspect Electrical Wiring	Inspect electrical wiring and connections for damage or loose connections.
PT-7500	Replace Engine Oil	*(Replace annually up to 500 hours.) Replace oil in accordance with manufacturer specifications- *(see Engine Manual)*.
PT-7500	Replace Engine Air Filter Element	*(Replace annually up to 1,500 hours/six cleanings.) Replace sooner if damaged or heavily discolored- *(see Engine Manual).*

Preventive Maintenance Schedule (Page 5)

NOTE: All preventive maintenance steps detailed in this sections are in addition to the required pre/post-operation inspection steps.

NOTE: All Preventive Maintenance should be conducted in accordance with OSHA requirements, to include OSHA Standard- 29 CFR, Part 1910.147.

WARNING: System must be tagged/locked out prior to removing any machine guarding, removing any system component, or performing any maintenance outside of basic visual inspections.

Every 250 Hours of Use		
All	Check Battery	For Proper Charge and Corrosion of Battery Terminals.
All	Grease Safe-Zone™ Cab, Tool Box, and Engine Compartment Hinges and Latches	Use any all-purpose grease, to prevent rust, corrosion, and sticking of hinges, and allow for easy smooth opening of compartment.
All	Clean Hydraulic Fluid Cooler	Clean the outside of the hydraulic oil cooler radiator fins. Use only low pressure water- (no higher than 30 psi). **NOTE:** Water pressure over 30 psi may penetrate electric cooling fan seals.
All	Clean and Inspect Outside of Fuel Tank	Clean dirt or contaminates from around filler hole and inspect tank for leaks.
PT-7500	Clean Engine Fuel Filter	*(See Engine Manual.)*
PT-7500	Check Engine Fan Belt	Check engine fan belt for proper tightness- *(see Engine Manual).*
PT-7500	Check Engine Coolant Hoses and Clamps	Inspect radiator hoses and clamps for signs of damage, wear, and leaks. Also ensure they are secured- *(see Engine Manual).*
PT-7500	Check of Engine Air Intake	Inspect air intake lines for the engine, and ensure no damage or obstructions.
PT-7500	Clean Engine Air Filter Element	Only clean primary filter element using less than 30 psi compressed air. Do not remove secondary element.

Every 400 Hours of Use		
PT-3500	Replace Engine Fuel Filter Cartridge	*(See Engine Manual.)*
PT-3500	Clean Engine Fuel Water Separator	*(If Applicable) See Engine Manual.*
PT-3500	Replace Engine Oil Filter	Replace oil filter cartridge every 400 hours (4.88in. deep oil pan).

Preventive Maintenance Schedule (Page 6)

NOTE: All preventive maintenance steps detailed in this sections are in addition to the required pre/post-operation inspection steps.

NOTE: All Preventive Maintenance should be conducted in accordance with OSHA requirements, to include OSHA Standard- 29 CFR, Part 1910.147.

WARNING: System must be tagged/locked out prior to removing any machine guarding, removing any system component, or performing any maintenance outside of basic visual inspections.

Every 500 Hours of Use or *24 months (whichever comes first- *unless otherwise specified)		
All	Clean Fuel Tank	Remove sediment from fuel tank using the drain at the bottom of the tank. Flush using diesel fuel or other suitable fuel tank cleaning solution. Ensure all fuel and sediment discharges are collected in accordance with environmental and safety regulations. *(See Engine Manual for additional fuel maintenance).* **CAUTION:** Use extreme caution when handling or working around diesel fuel as it is highly flammable and can become unstable if exposed to heat or electrical charge. Serious injury, burns, and even death may result if proper precautions are not taken.
All	Clean Engine Radiator Interior	Clean water jacket (radiator interior)- *(see Engine Manual).*
All	Replace Engine Coolants	Premix 50/50 before adding- *(see Hydraulic Engine section)*.
All	Replace Engine Fan Belt	*(See Engine Manual.)*
All	Replace Engine Radiator Hoses and Clamps	*Replace radiator hoses and clamp bands every two years- *(see Engine Manual).*
All	Replace Fuel Lines and Clamps	*Replace fuel lines and clamp bands ever two years- *(see Engine Manual).*
All	Replace Engine Air Intake Line	*Replace air intake lines for the engine every two years- *(see Engine Manual).*
All	Lubricate Key Tumblers and Switches	Use only graphite powder in key tumblers and switches to lubricate internal keyhole parts and prevent sticking of keys.
PT-7500	Replace Engine Fuel Filter Cartridge	*(See Engine Manual.)*
PT-7500	Replace Engine Oil Filter	Replace oil filter cartridge every 500 hours and in accordance with manufacturer specifications- *(see Engine Manual)*.
PT-7500	Replace Engine Oil	Replace oil (*annually up to 500 hours- whichever comes first) and in accordance with manufacturer specifications- *(see Engine Manual)*.
PT-7500	Clean Engine Fuel Water Separator	*(If Applicable) See Engine Manual.*

Preventive Maintenance Schedule (Page 7)

NOTE: All preventive maintenance steps detailed in this sections are in addition to the required pre/post-operation inspection steps.

NOTE: All Preventive Maintenance should be conducted in accordance with OSHA requirements, to include OSHA Standard- 29 CFR, Part 1910.147.

WARNING: System must be tagged/locked out prior to removing any machine guarding, removing any system component, or performing any maintenance outside of basic visual inspections.

Every 800 Hours of Use		
PT-3500	Check Engine Valve Clearance	*(See Engine Manual.)*

Every 1,000 Hours of Use or 4 Years (whichever comes first)		
PT-7500	Check Engine Valve Clearance	*(See Engine Manual.)*

Every 1,500 Hours of Use or 6 Years (whichever comes first)		
All	Check Engine Injectors	Check engine fuel injector nozzle pressure- *(see Engine Manual).*

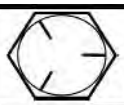
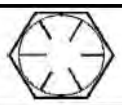
Every 2,500 Hours of Use or 10 Years (whichever comes first)		
All	Replace all hydraulic hoses	All hydraulic hoses must be replaced after 2,500 working hours or every 10 years, (starting from the year of construction of the machine) – *(see Equipment Information for manufacturer date)*.

Every 3,000 Hours of Use		
All	Check Engine Turbo Charger	*(See Engine Manual.)*
All	Check Engine Fuel Injection Pump	*(See Engine Manual.)*
PT-7500	Check Engine Fuel Injection Timer	*(See Engine Manual.)*

Torque Ratings for Machine Fasteners

Torque ratings for fasteners on this piece of equipment follow ANSI accredited guidelines for ASTM/ASME specifications on tightening torque. As a general rule, tightening torque should be set according to the below table, with a tolerance of approximately + / - 5%, unless other specific torque rating is noted in this manual. The below table is for advisory purposes only.

General Recommended Torque for Fasteners by Size:

Nominal Dia. (in.)	 SAE J429 Grade 5 Tightening Torque			 SAE J429 Grade 8 Tightening Torque		
	K = 0.15	K = 0.17	K = 0.20	K = 0.15	K = 0.17	K = 0.20
Unified Coarse Thread Series						
1/4	76 in-lbs	86 in-lbs	101 in-lbs	107 in-lbs	122 in-lbs	143 in-lbs
5/16	157	178	209	221	251	295
3/8	23 ft-lbs	26 ft-lbs	31 ft-lbs	33 ft-lbs	37 ft-lbs	44 ft-lbs
7/16	37	42	49	52	59	70
1/2	57	64	75	80	90	106
9/16	82	92	109	115	130	154
5/8	113	128	150	159	180	212
3/4	200	227	267	282	320	376
7/8	322	365	429	455	515	606
1	483	547	644	681	772	909
1 1/4	840	952	1121	1363	1545	1817
1 1/2	1462	1657	1950	2371	2688	3162
Fine Thread Series						
1/4	87 in-lbs	99 in-lbs	116 in-lbs	123 in-lbs	139 in-lbs	164 in-lbs
5/16	174	197	231	245	278	327
3/8	26 ft-lbs	30 ft-lbs	35 ft-lbs	37 ft-lbs	42 ft-lbs	49 ft-lbs
7/16	41	47	55	58	66	78
1/2	64	72	85	90	102	120
9/16	91	103	121	128	146	171
5/8	127	144	170	180	204	240
3/4	223	253	297	315	357	420
7/8	355	403	474	502	568	669
1	542	614	722	765	867	1020
1 1/4	930	1055	1241	1509	1710	2012
1 1/2	1645	1865	2194	2668	3024	3557

Source: Fastenal

Torque ratings for ¼" and 5/16" are listed in inch-pounds. All other torque ratings are listed in foot-pounds. Torque value formula T=KDF where; (K = .15 for "lubricated" conditions) (K= .17 for Zinc plated and dry conditions) (K= .20 for plain and dry conditions).

CAUTION: Under/Over tightening fasteners can result in costly equipment failure or personal injury.

Torque Ratings for Machine Fasteners

Torque ratings for fasteners on this piece of equipment follow ANSI accredited guidelines for ASTM/ASME specifications on tightening torque. As a general rule, tightening torque should be set according to the below table, with a tolerance of approximately + / - 5%, unless other specific torque rating is noted in this manual. The below table is for advisory purposes only.

General Recommended Torque for Fasteners by Size:

Nominal Dia. (mm)	8.8 Class 8.8			10.9 Class 10.9		
	Tightening Torque			Tightening Torque		
	Lubricated (ft-lbs)	Zinc Plated (ft-lbs)	Plain&Dry (ft-lbs)	Lubricated (ft-lbs)	Zinc Plated (ft-lbs)	Plain&Dry (ft-lbs)
4	1.7	1.9	2.3	2.4	2.7	3.2
5	3.4	3.9	4.5	4.9	5.5	6.5
6	5.8	6.6	7.7	8.3	9.4	11.1
7	9.7	11.0	13.0	13.9	15.8	18.5
8	14.1	16.0	18.8	20.2	22.9	26.9
10	27.9	31.6	37.2	39.9	45.2	53.2
12	48.7	55.1	64.9	69.6	78.9	92.8
14	77.8	88.1	103.7	111.3	126.1	148.4
16	121	137	161	173	196	230
18	167	189	222	239	270	318
20	236	267	314	337	382	449
22	321	364	428	460	521	613
24	407	461	543	582	660	777
27	597	676	796	854	968	1139
30	809	917	1079	1158	1312	1544
33	1101	1248	1468	1576	1786	2101
36	1415	1603	1886	2024	2294	2699

Source: Fastenal

All torque ratings are listed in foot-pounds. Torque value formula T=KDF where; (K = .15 for "lubricated" conditions) (K= .17 for Zinc plated and dry conditions) (K= .20 for plain and dry conditions).

CAUTION: Under/Over tightening fasteners can result in costly equipment failure or personal injury.

7

Service & Repair

NOTE: For service or repair please contact the Sherman+Reilly Parts & Service Department at **1-800-251-7780** or **(423)756-5300,** via email at help@sherman-reilly.com, or via our website: www.sherman-reilly.com

EQUIPMENT INFORMATION
Company Name: _____
Date of Purchase: _____
Date of Manufacture: _____
Equipment/Unit Model Number:_____
Equipment/Unit VIN Number: _____
Engine Serial Number: _____

Major Fault:
A "major fault" describes a system malfunction or other system degradation that, by equipment failure, operator error, or other environmental condition, renders that machine inoperable. A major fault can be identified when, through normal operations, the machine would create; an unsafe condition, further or permanent equipment damage, or other situations deemed outside of the operator's ability to effectively and safely operate the machine.

When to send for Service or Repair:
If after troubleshooting an issue or fault that cannot be resolved, or a major fault has been identified, the operator should stop all operation attempts and contact the Sherman+Reilly Parts & Service Department at **1-800-251-7780** or **(423)756-5300,** via email at **help@sherman-reilly.com,** or via our website: www.sherman-reilly.com**.** Further operation should not continue until the issue or fault is resolved- *(see Fault and Malfunction Detection section)*.

Scan with Smartphone to complete and email repair request form.

8

Parts

NOTE: Parts or features may only apply to certain models or build configurations, for questions, parts ordering, and pricing inquiries please contact the Sherman+Reilly Parts & Service Department at **1-800-251-7780** or **(423)756-5300**, or via email at **parts@sherman-reilly.com**

CAUTION: Sherman+Reilly machines often require specific parts that meet minimum specifications. Therefore, all replacement parts must meet OEM specifications, contact the Sherman+Reilly Parts & Service Department for details.

Sherman+Reilly Accessories:

Metal Reconductoring Reel	601830
B45 Overhead Pulling Swivel	700350
B75 Overhead Pulling Swivel	700420
B90 Overhead Pulling Swivel	700955
Kellems Grip 1037	700471
Kellems Grip 1038	701007
Kellems Grip 1039	700141
E-49D Underground Pulling Swivel 8,800 lbs. MWL	601025
E-49D Replacement Pin	555490
E-35D Underground Pulling Swivel 3,000 lbs. MWL	601027
E-35D Replacement Pin	553286
SRB-S23L-4 Pulling Bridle 4,000 lbs. MWL	700060
SRB-S23L-7 Pulling Bridle 7,000 lbs. MWL	700383
ATCC Air Adapter Kit (2″, 2.5″, 3″, 4″, 5″, 6″ Ducts for Sch 40)	316512
UG-71 Underground Block Kit (2″, 2.5″, 3″, 4″, 5″, 6″ Ducts for Sch 40)	600382

Miscellaneous Replacement Parts:

PT-3500:	⅝ in. x 10,500 ft. Uniline Rope with Grip & Swivel	602546
	.44. x 21,000 ft. Unitrex Rope with Eye Splice	602547
PT-7500:	.63 x 11,500 ft. Unitrex Rope with Eye Splice	601410
	1 in. x 5,500 ft. Uniline Rope with Grip & Swivel	602549
	⅝ in. x 10,500 ft. Uniline Rope with Grip & Swivel	602546
Fire Extinguisher		553858
Wheel Chocks, Rubber, Orange (7¾″x11″x8″H)		509722
Fuel Tank (31 Gallon) w/ Cap		552729
Fuel Tank Straps w/T-Bolt (2 total, sold separately)		600970
Operators Cab		600811

A

Appendix: Manufacturer Manuals

Separate Contents: (3)

Kubota V2607 Engine Manual
Kubota V3800T Engine Manual
Dexter Axle Manual

***Appendixes are located on a CD and may not be included with this manual. If not included, contact* Sherman+Reilly Parts & Service Department at **1-800-251-7780** or **(423)756-5300**, or via email at **parts@sherman-reilly.com** to order the additional appendix documentation. **www.sherman-reilly.com**

TM

We're **dedicated** to getting **every lineman home every night, no exceptions**

Follow Sherman + Reilly!

603815 Rev. A

0116

Scan with Smartphone to complete and email an information request form.