

Operation and Maintenance Manual



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Valued Customer:

Please review the following manual. If you have any questions or need assistance of any kind, please contact your account representative toll free:

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We welcome feedback on your manuals and our marketing communications. We need, and are driven to constantly improve. If you have any suggestions, comments or criticisms we'd love to hear from you.



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Custom Engineered for PECO Energy

S/N: 1F9UZ1318AV048029

Preface

Thank you for choosing Sauber Mfg. Co.. You have purchased a trailer designed and built with care. With minimal maintenance and by understanding its operation, your new trailer will provide you with years of excellent service. We welcome your suggestions for improvement and stand willing to assist you if any questions arise during its operation. If we can help in any way, please contact your account representative toll free:

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Voice Communications: (800) 323-9147
Fax Communications: (800) 833-3264

The following manual provides important safety information and instruction. Please read this manual before operating your new trailer. It is important to follow safety instructions and cautions.

We acknowledge that not every situation or combination of tow vehicle and trailer can be addressed, therefore we ask that you use sound judgment after reading the following outlines.

Some components may be produced by a third party. When available, separate service manuals and instructions may apply.

Serious Hazards

Loss of control of the tow vehicle/trailer combination could result in serious injury or death. The most common causes for loss of control include:

- **Failure to adjust driving behavior when towing a trailer**
- **Immoderate speed – Driving too fast for the conditions**

With ideal road conditions, the maximum recommended speed for safely towing a trailer is 60 mph. If you drive too fast, the trailer is more likely to sway, increasing the possibility for loss of control. In addition, it is possible that the tires may overheat, increasing the chance of a blow out.

Decrease your speed as road, weather, lighting, and other conditions decline.

- **Improper sizing of the tow vehicle for the trailer**

Trailers that weigh too much for the tow vehicle can cause unsafe stability issues which can lead to loss of control and a serious accident. Know your vehicle tow rating and Gross Combination Weight Rating (GCWR.) Vehicle manufacturers will provide you with maximum towing capacities, as well as the GCWR. The additional strain put on the engine and drive-train of the vehicle may also lead to serious maintenance problems. For these reasons, the maximum towing capacity of your towing vehicle should not be exceeded. The towing capacity of your vehicle can be found in the tow vehicle's Owner's Manual.

Use of a hitch with a load rating less than the load rating of the trailer can result in loss of control and may lead to a serious accident. Ensure that your hitch and tow vehicle are rated for the Gross Vehicle Weight Rating (GVWR) and tongue weight of your trailer.

- **Overloading and/or improper weight distribution**

The total weight of the load you put in or on the trailer, plus the empty weight of the trailer itself, must not exceed the trailer's Gross Vehicle Weight Rating (GVWR.) If you do not know the empty weight of the trailer plus the cargo weight, you must weigh

the loaded trailer at a commercial scale. In addition, you must distribute the load in the trailer such that the load on any axle does not exceed the Gross Axle Weight Rating (GAWR.) The GVWR and GAWR are located on the OEM certification and VIN label attached to the front frame of the trailer.

Never exceed the trailer Gross Vehicle Weight Rating or the Gross Axle Weight Rating. Do not load a trailer so that the weight on any tire exceeds its rating.

Improper front/rear load distribution can lead to trailer sway and poor handling conditions. Undesirable trailer sway results from tongue weights that are too low, while tow vehicle instability results from tongue weights that are too high.

Uneven left/right load distribution can cause tire, wheel, axle or structural failure. To the extent possible, be sure your trailer is evenly loaded left/right. Towing stability also depends on keeping the center of gravity as low as possible.

Make certain the tongue weight is within the allowable range. Keep the center of gravity as low as possible.

- **Unsecured loads**

Your trailer may be designed for specific cargo, such as reels, or poles. If your trailer is designed for specific cargo, do not carry any other cargo such as people, hazardous substances or containers of flammable materials.

It is important to avoid shifting cargo. The trailer ride can be bumpy and rough. Securing cargo so that it does not shift or bounce out of the trailer is imperative. Tie down all loads with proper sized fasteners. Always secure doors or lids if present on your trailer by securing it's latch.

- **Improper braking and steering under sway conditions**

When towing a trailer, you will have decreased acceleration, increased stopping distance, and increased turning radius. The trailer will change the handling characteristics of your towing vehicle, making it more sensitive to steering inputs and more likely to be have its stability affected in windy conditions or when passed by large vehicles. You will also need to adjust driving accordingly, i.e. taking a longer distance to pass and allowing for increased braking distances, etc.

Common sense measures may be necessary, such as; being alert for slippery conditions, anticipate trailer sway and be ready to reduce speed, use small, trim-like steering adjustments to re-gain control, check rear view mirrors frequently to evaluate trailer towing and traffic conditions, use a lower gear when driving downhill or on long grades, be aware of your trailer height at all times, especially when approaching bridges and roofed areas.

- **Improper or incorrect coupling of the trailer to the hitch**

It is critical that the trailer be securely coupled to the hitch, and that the safety chains and emergency break-away cable (electric brakes) and air hoses (air brakes) are correctly attached. Uncoupling of the trailer during transit can lead to a serious accident or a fatality.

Ensure that the pintle hook capacity rating, including installation, is sufficient for the GVWR and the tongue weight of the trailer being towed. Make sure that the pintle hook is physically compatible with the trailer drawbar. Compatibility information is available from the pintle hook manufacturer.

Observe the drawbar and pintle hook for wear, corrosion and cracks before coupling. Replace worn, cracked or corroded components per the manufacturer's recommendations.

Ensure the hitch drawbar and pintle hook are installed with grade-8 fasteners and are properly torqued before coupling to the tow vehicle.

Do not move the trailer if any of the following conditions appear:

- The drawbar is not secured and locked to the pintle hook.
- The safety chains are not secured to the tow vehicle. If your trailer detaches from the pintle hook for any reason, we have provided safety chains so that control of the trailer can still be maintained. Improper rigging of the safety chains could result in loss of control. Fasten chains to the frame of the towing vehicle. Do not fasten chains to any part of the hitch unless the hitch has special holes or loops specifically designed for that purpose. Cross chains underneath hitch and coupler with enough slack to permit turning and to suspend the trailer tongue should it become detached.

- The trailer jacks are not fully retracted.

Do not tow the trailer on the road until:

- The trailer breakaway system is operational

The breakaway switch must be connected and verified. If equipped with electric brakes, your trailer will be equipped with a breakaway system that can apply the brakes on your trailer if it becomes detached from the tow vehicle for any reason. The breakaway system, including the battery, must be in good condition and properly rigged to be effective. An inoperative breakaway can result in a runaway trailer. The breakaway cable must be attached to the towing vehicle and not to any part of the hitch. Before towing the trailer, test the system. If the system is not working, do not tow the trailer. Have it serviced or repaired.

- Tires and wheels are checked

Failure to maintain proper tire condition and pressure can lead to loss of control.

Just as with your tow vehicle tires, the trailer tires and wheels are important safety items. It is essential to inspect them before each tow.

If a tire is found to include defects such as a bald spot, bulge, cut, cracks or is showing any cords, replace before towing. Have the tires inspected by qualified persons. Check inflation pressure on all tires prior to towing.

Failure to keep lug nuts tightened properly may cause the wheels to be seated to the hub improperly. Before each tow, check to make sure they are properly torqued. The proper torque for lug nuts is listed in this manual and available from the manufacturer. Use a torque wrench to tighten the lug nuts, use a crisscross star pattern.

Lug nuts are also prone to loosen after first being assembled. When driving a new trailer (or after wheels have been remounted,) check to make sure they are tight after the first 10, 25, and 50 miles of use and before each tow thereafter.

- The trailer lights and brakes are connected and checked

Be sure the trailer brakes and all the lights on your trailer are functioning properly before towing your trailer. Brakes and lights on a trailer are controlled via a connection to the tow vehicle.

Electric Brakes

Check the trailer brake lights by having someone operate the brake and turn signals on the tow vehicle while you visually verify it is functioning. If your trailer has electric brakes, your tow vehicle will have an electric brake controller that is required to be installed at the driver's position that sends power to the brakes. To check the condition of the electrical brake system, pull the breakaway pin and check for the illumination of the green LED indicator light. When fully lit, the battery is charged and the system wiring is correct. To test this system, operate the brake controller while trying to pull the trailer at a speed of less than 5mph to verify they are operating and you can feel them engage.

If your trailer has hydraulic, or "surge" brakes, pull the emergency breakaway lanyard to check the operation of the emergency brake system.

Straight Air Brake Systems

Air systems include spring applied brakes as standard equipment. There is no breakaway cable; connecting the emergency and service glad hands is all that is required. The spring brakes are shipped in a mechanically retracted position for receiving and handling purposes. They must be activated prior to use. Loosen the nut on the threaded rod located on the back side of the spring brake canister. Rotate the threaded rod one quarter turn, remove the threaded rod and insert it in the storage pipe provided on the brake actuator casting. Insert the rubber plug provided into the center spring brake canister hole.

ABS Information

If your trailer is equipped with an anti-lock braking system. Anti-lock brakes greatly enhance trailer stability while braking. Because a sliding wheel always leads, a brake lockup situation under manual braking can cause loss of control as the trailer slides sideways. Anti-lock brakes provide the electronic and physical control to prevent wheel lockup and the ensuing control problems. Although Anti-lock brakes may not necessarily help you stop over shorter distances, it will help keep you in control while eliminating excessive tire wear and *flat spotting*.

Anti-lock brakes use microprocessor technology to sense when the wheels are about to lock up under braking and then controls the brake pressure and timing to prevent it. Each wheel must be controlled independently, although only one axle of a multi-axle configuration needs to be equipped with sensors. An exciter ring (sometimes referred to as a tone ring) is installed on the inside of the hub. A sensor reads the level of magnetism present as the teeth of the exciter ring pass it. Since they don't touch, there is no wear or friction between them. The sensors provide wheel speed information to the Electronic Control Unit (the ECU or system brain). Input from the sensors is used to determine if a wheel is about to lock during braking. If so, the system can release and apply the brake up to six times per second through the modulator valve.

The system is powered by the stoplight circuit. This allows any of your trucks currently equipped to pull trailers to be used with a Sauber ABS equipped trailer. The system is off while the brakes are off and powers on and checks itself when the brakes are applied. It is so fast that it can test itself sixty times before air from the tow vehicle gets to the trailer brake valves. A warning light is provided on the trailer side and will illuminate if any component is not functioning. The system will continue to have normal brakes until the problem is resolved. Although there are no batteries in the system, the electronic control unit (ECU) has a special microprocessor that can remember up to ninety-nine problems and keep them stored until they're fixed. A number displayed on the hand held display unit (DDU) identifies one of sixty-three fault codes - providing accurate and quick troubleshooting. This unit is available from Sauber Mfg. Co. and should be kept at each garage location expecting to service ABS brakes. All cables are sealed, weatherproof and polarized to provide high reliability and mistake-free serviceability.

Air Over Hydraulic Brake Systems

Air over hydraulic systems have a built-in valve to allow application of the hydraulic trailer brakes in the event of a break-away. The energy for this operation is stored in the air tank of the system. Therefore, once the air is expended, braking power is released unless equipped with a spring brake mechanism.

Hydraulic Brake Systems

Straight hydraulic systems are equipped with a surge-actuated braking system. Pressure exerted on the towing eye is transferred to the axle brake hydraulic cylinders. The greater the braking inertia, the more pressure is applied to the brakes. An over-center actuator provides breakaway protection.

- **Proper Tongue Weight is established**

It is critical to have a portion of the trailer load carried by the tow vehicle. The trailer tongue should always exert a downward force on the hitch. Proper tongue weight is essential to good trailer tracking and safe operation. If too little weight is distributed to the tongue, towing will be erratic. Too much tongue weight may overload the towing vehicle's rear axle or the pintle hitch rating. Ten to twenty percent weight transfer is considered a normal range. Smaller, single axle trailers can transfer weight on the high side of this range. Larger, multiple axle trailers are designed to transfer less because of the limited capacity of the towing vehicle's rear axle.

When necessary, tongue weight can be controlled by distributing the load or by adjusting the pintle eye. Even loading is ideal, but when this is not possible, place more weight toward the trailer front to provide a safe tongue weight. Be aware that too much tongue weight from an uneven load can overload tow vehicle components. It is incumbent upon the operator to provide a safe, towable tongue weight without excessive hitch weight transfer that could place the tow vehicle in a non-compliant condition. If your trailer is equipped with an adjustable eye, lowering it will generally increase tongue weight while raising it will decrease tongue weight - especially on multi-axle models. Additional loading instructions may be included with your trailer, and should be followed.

Once the trailer pintle eye is secured in the towing vehicle hitch, cross the safety chains and connect them to the rings provided at the towing vehicle bumper. Insert the electrical connection cord and check trailer lighting. Connect the air glad hands if present and check brake operation. Ensure the trailer axle(s) do not exceed their GAWR and the entire trailer and load does not exceed the GVWR rating.

- **Grounding**

Your trailer is equipped with a bronze grounding lug. When the trailer is used near energized conductors the trailer must be grounded. A grounding lug is provided to help you follow your company's safety practices.

- **Outriggers**

Stability is an important part of safe trailer use. Because the towing vehicle can provide additional stability, leave it connected to the trailer when you can. Set the rear outriggers to their lowest level. If you need to decouple the towing vehicle, lower the front jack slightly, set the outriggers and then raise the jack to seat the outriggers firmly in the ground.

- **Wheel Chocks**

Set the chocks at each rear wheel in the direction of the expected load or grade.

- **Do not modify your trailer**

Your trailer is a custom engineered piece of equipment. Essential safety items can be damaged by altering your trailer. The simplest modifications, such as driving a screw or punching a hole to install a hanger can inadvertently damage an electrical wire or other hidden component. Before making any alteration to your trailer, contact Sauber Mfg. Co. at (800) 323-9147.

Underground Pull Preparation

Prior to beginning the job, estimate the amount of pull that will be required to ensure that up to 3000 lbs of tension will be adequate throughout the entire pull. Sauber Mfg. Co. can assist in modeling the pull and providing a range of pull required. Due to the difficulty in estimating coefficients of friction, past experience is sometimes the best method to determine what a particular job will require. We recommend you maintain a log detailing pull variables and required pulling power to refer to as a guide. If your anticipated line pull does exceed 3000 lbs, do not attempt to start the pull - contact the factory.

Remove the underground sheave assembly from its stored position and insert it into its rear receiver tube. The sheave insert tube should be fully seated in its lowest position. An available A-frame can also be attached in the mounting holes provided at the rear of the trailer. The bronze sheave is detachable via quick pin to allow the assembly to be removed without disturbing the rope path if necessary. Set the trailer outriggers and chocks as described above and engage the over center trailer brake actuator located at the right side of the trailer. Due to the nature of underground pulling, we recommend that the unit be operated in low speed mode throughout the duration of the pull.

Overhead Pull Preparation

Prior to beginning the pull, be sure that you have computed the amount of tension that will be required based on the distance between the poles, the weight of the wire, the wire sag, and the number of poles. Sauber Mfg. Co. can provide a spreadsheet file that will compute this information quickly in the event you do not have ready access to it. The formula to compute overhead line tension and necessary pulling power follows. Your puller will develop up to 3000 lbs of line pull, which is more than enough for distribution line construction. If your calculated line pull does exceed 3000 lbs, do not attempt to start the pull - contact the factory.

$$ATR = (SL * SL * WT) / (8 * SG)$$

$$APR = ATR / (.98 * SB)$$

$$AFR = TR * DD / 2$$

SB: Number Stringing Blocks

WT: Wire Weight per Foot

SL: Span Length in Feet

SG: Sag in Feet

ATR: Absolute Tension Required

DD: Drum Diameter of Wire Reel in Feet

APR: Absolute Pull Required

AFR: Absolute Ft-Lbs Required

Note: Add 30% or multiply above results by 1.3 to obtain operating range

Position the puller with the rope incident angle less than 35 degrees from the first sheave or stringing block. Always keep the trailer attached to the towing vehicle or tied down to an immovable object when pulls are expected to reach 1000 lbs or when surface conditions will not allow outriggers to seat firmly into the ground. When attached to the towing vehicle set the emergency brake and chock the wheels. Set the rear outriggers to their lowest level, then raise the front jack to "seat" the outriggers firmly in the ground. Set the chocks at each rear wheel in the direction of the pull. Engage the over center trailer brake actuator located at the right side of the trailer.

Hydraulic Power Source and Controls

The controls for all of pulling and power source controls are located at the console at the right side of the trailer. Refer to the power source section below prior to starting for operation instructions.

Pulling Unit

Your puller is equipped with a hydraulically activated platform which can be raised or lowered to pull rope at angles between -15 and 30 degrees. A full feathering directional control valve for this function is located at the operator controls.

The levelwind is completely automatic and features a self-regulating slip brake to control cassette winding tension. This tension is adjustable via an adjustment nut accessible when the platform is fully elevated.

The capstan control is adjacent to platform raise-lower valve. When the capstan control valve is in neutral, any line tension present will activate the internal capstan brake mechanism. This brake is automatically de-activated by solenoid when the directional control valve enters the "take-up" mode. If the brake has been activated, it will be necessary to move the directional control valve slightly into the take-up position before attempting to pay out additional rope as described below. If rope will be left unattended and under tension for a significant time, make it a practice to secure the rope with a catch-off.

To start the pull, feather the directional control valve to the take-up position. To stop the pull, return the valve handle to the detented center position. To payout rope, feather the directional control valve into the take-up position momentarily to release the automatic brake. Then, activate (pull) the reversing protection plunger and move the valve to the payout position. When payout operations are complete, allowing the plunger to return to its normal position activates the automatic brake.

Relief Setting

The relief setting on the control console is hand-adjustable and provides the ability to control the maximum amount of pull. Simply rotate the extended knob on the left side of the panel counter-clockwise to reduce the hydraulic relief setting. When the capstan begins to slow, rotate the knob clockwise again to regain full speed. This procedure will set the relief pressure just above the current operating pressure. Setting the relief slightly above the required amount of pull will protect your equipment and plant against excessive pulling pressures should an encumbrance be encountered.

Speed/Pull Power Controls

The electronically controlled two-speed motor can be activated by the weather-proof switch located at the console. The indicator lamp will light when the unit is in high speed. The low speed/high torque setting provides twice the pulling power and will result in a fifty percent hydraulic system pressure drop. To determine the amount of pull being exerted, read the pressure gauge and refer to the chart on the control console to determine the applied pull. The following *Pulling Power Chart* relates available pull in Low Speed and High Speed modes to input pressure.



<i>Pulling Power Chart</i>		
Pressure (PSI)	Pull In Low Speed (LBS)	Pull In High Speed (LBS)
600	800	400
900	1200	600
1200	1600	800
1500	2000	1000
1800	2400	1200
2100	2800	1400
2250	3000	1500

Pressure (PSI)	20" Capstan		11" Capstan	
	Pull In Low Speed (LBS)	Pull In High Speed (LBS)	Pull In Low Speed (LBS)	Pull In High Speed (LBS)
600	800	400	1300	650
900	1200	600	1900	950
1200	1600	800	2500	1250
1500	2000	1000	3200	1600
1800	2400	1200	3800	1900
2100	2800	1400	4400	2200
2250	3000	1500	5000	2500



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Rope Handling

Load an empty or partially filled cassette on the levelwind platform. Start the levelwind pulley at the top of an empty cassette. If the cassette is partially full, remove rope until the last wrap is at bottom or top of the cassette. Start the levelwind pulley at that location. If you are using an empty cassette, thread the rope through the hole in the cassette flange. Loop the rope through the levelwind pulley, around the platform rope guide and onto the capstan. The cassette will rotate clockwise to take up rope. Provide seven wraps on the capstan in a counter-clockwise direction starting at the bottom left of the capstan and working to the top. For optimal performance, the platform elevation level should allow the incoming rope to enter the capstan just below the curved portion of the flange. Engage the capstan by activating the directional control valve at the console to take-up remaining rope slack. You are now ready to pull.

If the length of your pull requires multiple rope cassettes, you will need to re-load an empty cassette onto the platform. When the spliced portion of the rope moves between the capstan and the full cassette, hold the rope between the capstan and the splice to prevent slippage during change out. Disconnect the splice and remove the full cassette and tie its rope against itself and return it to the payout bracket. Install an empty cassette in its place. Continue to take-up rope until enough is present to thread it onto the empty cassette in the manner described previously. Take-up any remaining slack by manually turning the cassette clockwise and continue pulling.

Our Model 1570-30 Simplex Rope Connector is a convenient method to connect ropes with spliced eyes together. An advantage to this system is the unlimited pull lengths that can be achieved by connecting multiple ropes together. After attaching each rope to the connector, wrap tape around the center to retain the rope when slack.

Available Rope Configurations

Rope Type.....	Length.....	Avg Break Strength.....	Cassette Type.....	P/N
11/32" Dia Amsteel.....	1350'.....	14,100 lbs	Steel	1570-80
11/32" Dia Amsteel Blue.....	1800'.....	20,445 lbs.....	Aluminum	1570-83
5/16" Dia Amsteel Blue.....	1600'.....	13,700 lbs.....	Steel	1570-81
5/16" Dia Amsteel Blue.....	2200'.....	13,700 lbs.....	Aluminum.....	1570-82
9/32" Dia Amsteel Blue.....	2700'.....	10,600 lbs.....	Aluminum.....	1502



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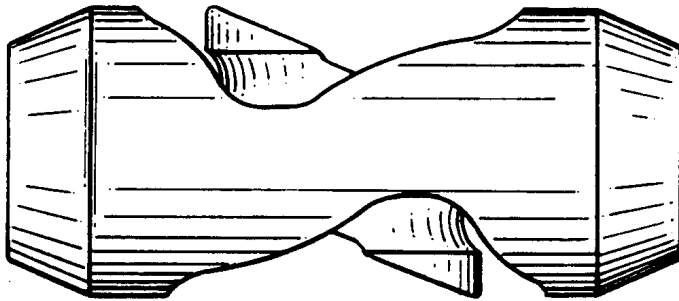
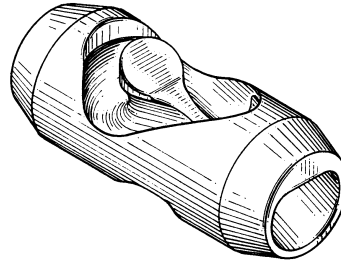
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1570-85 Simplex Rope Connector Benefits:

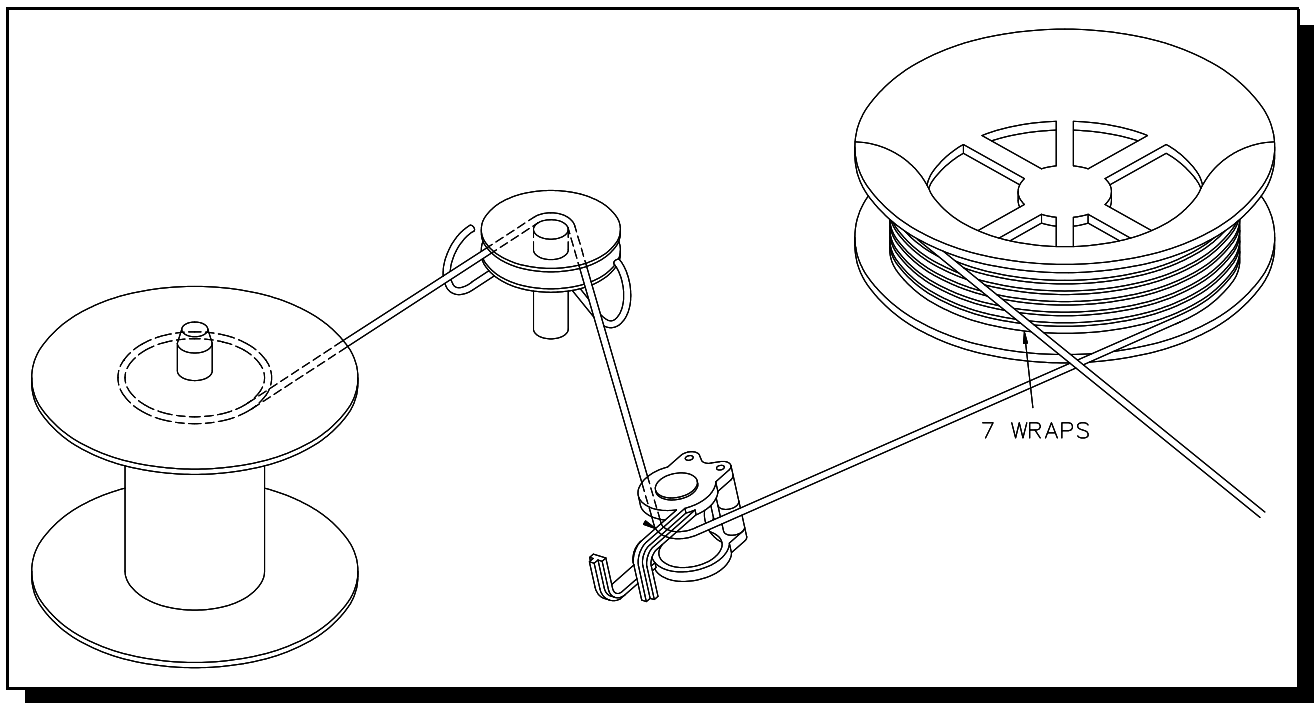
- No Tools Required
- Aircraft Aluminum Construction
- 5000 # Working Strength
- Substantially Decreases Connection Times



Rope Inspection Guidelines

Preface

The following information is taken from The American Group - Samson Division's General Inspection Procedures issued 2/3/97. The information was confirmed current by The American Group on 4/16/98. Since the publication of the inspection procedures, Samson Division has re-named this series rope as Am-Steel (Spectron 12) and AmSteel Blue (Spectron 12+).



Rope Inspection Guidelines

One of the most frequent, as well as the most important, questions asked about ropes is how to visually inspect the rope in order to estimate the useful residual strength. There can be no positive method by which residual strength of a used rope can be determined visually as long as there is no actual fiber damage or distortion as described here. A laboratory analysis is the best way. The following guidelines are suggested for use in estimating damage and strength degradation brought on by normal wear.



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Synthetic Fiber Ropes

In synthetic fiber ropes the amount of strength loss due to abrasion and or flexing relates to the percentage of yarns broken or damaged in the rope's cross-section. In virtually all rope constructions the strands have intermittent surface exposure, usually referred to as "Crowns". Under normal conditions, abrasion is concentrated on these crowns and a rope with a smoother surface (smaller crowns) will wear more evenly because the wear is spread over a larger area of rope surface. This has the effect of minimizing strength loss due to abrasion. When the rope is first put into service, the many and various abrasive surfaces will cause the outer filaments of the rope to form a fuzzy surface appearance and texture. This is the result of these filaments breaking, and this roughened surface actually forms a protective cushion and shield for the fibers underneath. This, in turn, tends to help retard further abrasion and damage to the sub-surface fibers. This condition should stabilize, not progress. If the surface roughness increases, excessive abrasion is taking place and strength is being lost. Abrasion may occur between the yarns and strands due to cyclic tensioning at high loads causing internal fuzzing or powdering. Some internal fuzzing is normal and should be added to the surface abrasion when estimating total fiber wear.

Friction Burns (Melting)

Friction of fiber ropes under high tension or rendering over bitts, capstans or winches can generate enough heat to melt or fuse together the outer fibers. This type of melting can lead to serious strength loss.

Visual inspection can readily detect this melting or fusion and unless the damage is obviously gross, it must be emphasized that no type of visual inspection can be guaranteed to accurately and precisely determine actual residual strength. Heat damage is evident when the rope surface becomes glazed and shiny due to a film of melted fiber on its surface. Ropes that exhibit fusing below the outermost layer of fiber must be considered highly suspect and must be examined closely to determine the extent of damage. Fibers or strands adjacent to the fused area will appear to have the same appearance of any other undamaged fiber. They may in reality have been located very close to a melted or fused area and, being this close, may have been subjected to heat above their critical temperature but still have not reached their melting temperature. For all practical purposes, this type of damage represents an extremely difficult decision for the inspector. If there exists any doubt at all, the rope should be discarded, especially if fusing or melting has affected more than 20% of the total fiber in the rope cross section.

Critical Temperatures (50% strength loss, short-term exposure*)

Spectra (Amsteel/Amsteel Blue).....	150	Degree F
Nylon	350	Degree F
Polypropylene.....	150	Degree F
Polyester.....	390	Degree F
Manila	180	Degree F

* Lengthy exposure or storage at elevated temperatures will reduce strength permanently.

Cut Strands

Estimating the strength loss from one or more cut strands, in principal, is the same as estimating strength loss as a result of abrasion. Estimating the percentage of intact and undamaged fiber will give you a reliable estimate of the rope's remaining strength provided there is no other cause of strength loss. In Spectron 12 Plus, a single cut strand represents approximately 8.5% of the rope strength; two adjacent cut strands represents approximately 17% of the total rope strength. If more than two adjacent strands are cut the rope should be considered for immediate replacement.

Pulled Strands

Braided rope, will occasionally experience a pulled strand. Most often this occurs while the rope has little or no load (relaxed). Every effort should be made to reincorporate a pulled strand back into the rope proper by hand working the loop back into the body of the rope. If this is done, strength loss is minimal; if left unattended a pulled strand presents additional snagging hazard.

In the event this is not possible, the loop should be cut off and the strand ends re-incorporated into the body of the rope. A tight whipping at this point would provide added protection. A percentage of strength loss will occur which is proportional to the percentage of fiber in the cut strand.



Shock Loading and Over-Loading

A rope, just like most machinery, can be seriously damaged if shock loaded beyond its normal working range. Simply described, shock loads are a "jerking" or a "snatching" of a rope. Or, a very sudden change in tension, from a state of no load or low load to one of high load.

Visually, there is no reliable method of determining the extent of damage, or strength loss from a shock load. It should be emphatically stated that all ropes suspected of being seriously shock loaded should be retired from service, and if appropriate, tested to determine their suitability for service.

Cleaning of Synthetic Ropes

Most synthetic ropes may be washed with a mild detergent and warm water without any harmful effects. However, strong grease detergents, cleaning agents, bleaches and chlorinated hydrocarbons should be avoided. Some strong grease detergents may actually remove the natural lubricant of the rope fibers, causing undue internal wear from fiber friction. This would, naturally, shorten rope life.



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Components Sourcing Information

Item.....	Source.....	Description/Specification
Tires.....	Major Brand.....	235/80R16, LRE
Wheels.....	Dexter.....	8.00 x 6.5
Axle.....	Dexter.....	7K Torflex, 22.5 Degree Down - 90 ft-lbs
Brakes.....	Dexter.....	12" x 2" H.P.
Pintle Eye.....	Holland.....	11144, 3" I.D.
Safety Chain.....	Sauber.....	8256ST 3/8" Grade 70 Chain Group w/ 8250ST Crucifix Chain Traps – 26400# Breaking Strength
Clevis Slip Hook.....	Sauber.....	17186, 3/8" -GR70 w/Latch
Transport Chain.....	Sauber.....	15265 3/8" -GR70 Gold Chain – Galv -43"L w/Hitch Extension
Hitch Extension.....	Sauber.....	Model 8818-B1
Solar Battery Pack.....	Sauber.....	Model 8852 - 2 Watt
Striping.....	3-M.....	# 29804-SP DOT-C2, 2"W Red/White
Tongue Jack.....	Sauber.....	Model 8810 EZ-Up w/ Swivel Caster
Electrical Connector.....	SAE.....	11119 7-way

Sauber Mfg. Co. Standard Wiring Code for Trailers

Function	From ABS/ECU (as applicable)	7-Way SAE ABS Socket Terminal ID / Color / Pos	7-Way SAE Socket Terminal ID / Color / Pos	6-Way SAE Socket Terminal ID / Color / Pos
LT	n/a	3 / Yellow / 4:00	3 / Yellow / 4:00	LT / Yellow / 4:00
RT	n/a	5 / Green / 8:00	5 / Green / 8:00	RT / Green / 7:00
Ground	White	1 / White / 12:00	1 / White / 12:00	GD / White / 2:00
Brakes	Blue	7 / Blue / Center	7 / Blue / Center	A / Blue / Center
Clearance/Tail	n/a	6 / Brown / 10:00	6 / Brown / 10:00	TM / Brown / 12:00
Stop	Red	4 / Red / 6:00	4 / Red / 6:00	S / Red / 10:00
Breakaway	n/a	n/a	Black / To Battery	Black / To Battery

Notes:

Clock positions are as viewed from male pin side

Center pin on chassis is expected to be wired hot on ABS

4-Lite systems will be wired in parallel unless otherwise noted

The Stop/Red circuit is generally run back to the rear junction box and is only used on a serperated 4-lite system

If clearance and tail need to be run on sepearate circuit, breakaway wire (orange) must be run outside 7/C Cable.

Breakaway may be wired directly to battery or through the 7/C cable depending on proximity to battery box.

7/C Cable - (6) 12 Gauge; (1) 10 Gauge - White

All Primary & Brake Feed Wire: 12 gauge

All Secondary Feed Wire: 14 gauge

Socket Housing.....	Sauber.....	# SCH-1
Breakaway.....	Warner.....	10475 w/ Charging Circuit
Chocks.....	Sauber.....	Model 8500 All Weather Wheel Chock
Chock Holders.....	Sauber.....	Model 8505 All Purpose Holder
Lighting.....	Truck Lite.....	LED Sealed Beam/Sealed Wiring Group
Registration Container.....	Truck Lite.....	10984 w/ Gasket
Grounding Lug.....	Sauber.....	10481 Bronze
Outriggers.....	Sauber.....	Model 8805 w/ Angular Mounting
Capstan.....	Sauber.....	19" Diameter

Operation & Maintenance Manual

Model 1570-B Puller

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Capstan Motor.....	Parker.....	#700-129-AS-O-P
Elevation Cylinder.....	Martner.....	BMC-2006 - 6"x2"x1"
Pole Payout Bracket.....	Sauber.....	Model 8090
Valve Bank.....	Brand.....	# TS2-755T4SJT4SJB
Counterbalance.....	Sun.....	# CBCA-LBN-YEK
Anti-Reverse Solenoid.....	Synchro-Start.....	# 1502-12C6U1B2S1
Levelwind Belt.....	Gates.....	# 7760
Connectors.....	Sauber.....	10791

Note: Most items listed here are in stock at Sauber Mfg. Co.

Maintenance

Operation.....	Interval
Torque Wheel Nuts - See Components Sourcing - Axle.....	After 1st 50 Miles
Torque Wheel Nuts	Monthly
Check Trailer Lighting.....	Every Use
Check Tire Wear & Inflation Pressure.....	Monthly
Adjust and Inspect Trailer Brakes.....	Monthly
Check Trailer Suspension.....	Monthly
Check Pintle Eye Wear.....	Yearly
Check Battery Condition.....	Every Use
Check Trailer Breakaway.....	Every Use
Grease Hub Bearings.....	Monthly
Check Overspin Brake Pad Condition.....	Each Use
Oil Drive Chain.....	Monthly
Inspect Sprocket Tooth Wear.....	Yearly
Check Drive Chain Tension.....	Monthly
Check Cylinder Rods and Packings.....	Yearly
Check for Hydraulic Leaks.....	Daily



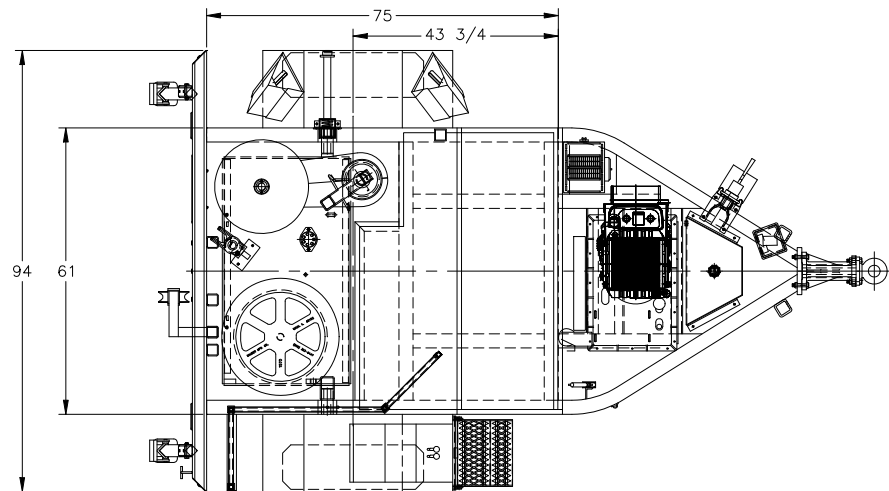
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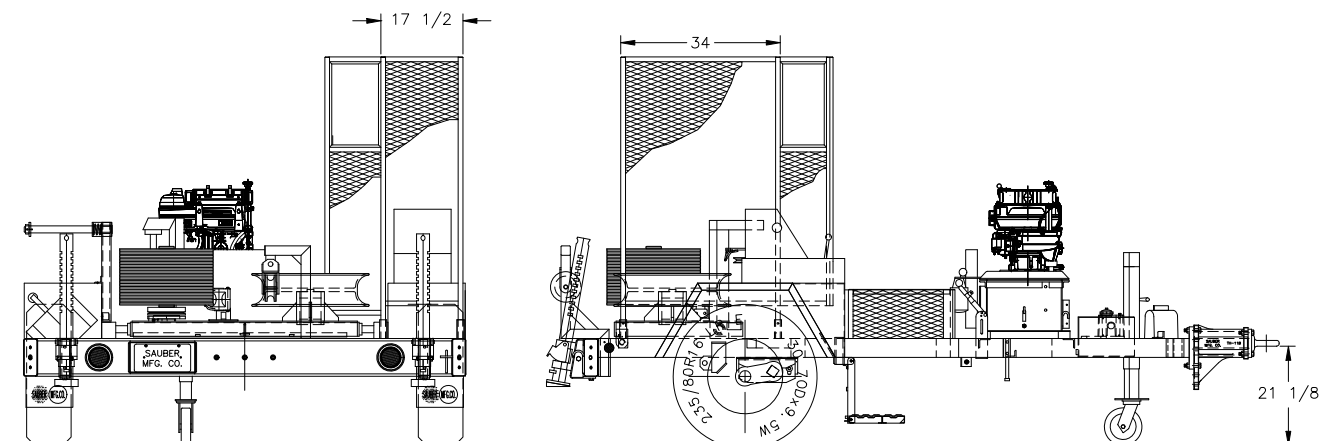
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Reference Drawing



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Power Source

Preface

Thank you for choosing Sauber Mfg. Co. Your new generation Power Source represents the state of the art in mobile hydraulic power. We welcome your suggestions on its improvement and stand willing to assist you if any questions arise during its operation. With a very small amount of maintenance, and by understanding its operation, your Hydraulic Power Source will provide you with years of good service. If we can help you in any way please contact your national account representative toll free:

Voice Communications: (800) 323-9147
Fax Communications: (800) 833-3264

Principle of Operation

Your power source is designed as a compact, reliable source of hydraulic power. It features the best power plant technology available. The vertical shaft engine is mounted directly to the power source cover. Beneath the cover a mounting bracket houses the hydraulic pump. The pump is driven through a flexible shaft coupling set. It draws oil from the tank bottom through a suction strainer. Pressurized oil is delivered through a manifold providing flow and pressure regulation prior to being delivered to the tool. Oil is filtered prior to returning to the tank.

Pre-Operation Checks

Prior to using your new power source, make a complete review of the engine information provided with this manual. After doing so, invest a few minutes prior to starting the power source to perform these simple checks:

- Fuel Level
- Engine Oil Level
- Recoil Rope Condition
- Air Cleaner Condition
- Hydraulic Oil Level and Condition
- Signs of Excessive Hydraulic Leaks

Engine Starting & Operation

To assure easy starting be sure the pressure and return hoses are connected to our Retriever or any tool that will allow oil to circulate to the system tank in neutral. The valve spools in these tools are commonly referred to as "open" or "tandem" center spools. An attempt to start the power source without this connection will result in an engine stall condition and will strain the engine and pump components. If the engine is cold, the choke will be required. On single cable systems, pull the throttle out as far as possible to engage the choke. Depressing the control will disengage the choke. If the choke is controlled separately, its function will be labeled. Pull the cable out to engage the choke, push in to disengage. On electric start models, engage the starter with the keyed switch provided.

When work is being done, the power source should normally be operated at full throttle. This will provide maximum power capability. The unit should be returned to idle or shut off when power is not required. This will help reduce system heat build-up and conserve fuel. Although the unit may be run at "mid-throttle" to conserve fuel or reduce noise, recognize that the engine will stall prior to reaching system relief pressure. Flow is also reduced anytime the engine is operated at less than full throttle or when the flow control knob is rotated counterclockwise.

Hydraulic Leaks

With any hydraulic system, some small amount of leakage and spillage are common; but, persistent leaks pose a problem from a clean-up and operation standpoint. When hydraulic oil is found, check the following areas:

* Quick Couplers

_____ Tighten or replace as necessary; try dripless fittings if problem persists

* Tank Lid

_____ Remove tank lid and re-seal w/ new gasket and gasket compound

* Engine Mounting

_____ Remove tank lid and engine and re-seal w/ gasket compound

* Sight Gauge

_____ Remove sight gauge and replace O-rings or entire gauge

* Tank Drain

_____ Tighten drain plug

* Return Line Filter

_____ Tighten or replace filter

* Pressure Manifold

_____ Remove cover and tighten fittings or replace O-rings

Oil Filtration

Keeping the oil clean in your power source is one of the best precautions you can take to ensure maximum system life. There are three components to the filtration system. The sump strainer, located inside the tank, filters large particles introduced into the tank. The return line filter is located outside the tank. This filter has a back pressure gauge that shows relative filter effectiveness. As the filter becomes dirty and clogged, the dial will move into the red area of the gauge. This signals that a filter change is required. The third element of the filtration system is the fill/breather element. This filter is designed to keep large scale impurities from entering the tank during fill operations. Hydraulic oil works at peak performance when it is pure. Therefore change the oil and flush the tank if water or impurities inadvertently enter the system. A drain plug is provided at the base of the tank. Always change the return line filter with the hydraulic oil.

Oil Level/Temperature Gauge

At the power source side a sight gauge has been installed. This gauge shows the level of hydraulic fluid in the tank, its temperature and visual condition. Look for signs of impurities or water (cloudiness) in the glass. If found, refer to the oil filtration section above. On level ground, the optimal oil level is 1" from the top of the sight gauge. Over-filling the tank will result in leakage through the tank/lid seal. Low oil levels will cause increased system heat and may "starve" the pump resulting in loss of flow and pressure. Check the temperature gauge periodically during use. Hydraulic oil temperatures should not exceed 250 degrees Fahrenheit. If this temperature level is encountered, we recommend an optional oil cooler for your system.

Pressure Gauge & Control

Your unit is equipped with a gauge that indicates operating pressure in pounds per square inch (PSI). While in operation, the system pressure gauge will indicate pressures between 50 PSI and the maximum pump pressure shown in the Components Sourcing Information section. The system pressure should correlate to the amount of work being done by the tool in use. If it appears that this relationship is not true, check for restrictions in the line or excessive heat build-up.

The maximum system pressure can be controlled by changing the relief setting at the side of the power source. Turn the relief screw counterclockwise to lower the relief setting. Rotating it clockwise will raise the relief setting. Always make certain the relief setting is set at least 100 PSI below the engine stall level. Many tools, including our Retrievers have their own internal relief. The lowest relief setting in the system will prevail. Set the power source relief at the maximum level unless you wish to limit maximum tool power or your tool does not have internal relief.

If the power source will not produce its rated pressure, check other reliefs in the system. Also check for blockage between the pump and the pressure manifold/gauge. In order to produce maximum pressure, the engine must be running at top performance. Any reduction in engine horsepower will reduce system pressure and/or flow. If engine performance is satisfactory, check the pump output.

Hour Meter

Your system is equipped with an hour meter. Use this meter to track service intervals shown in maintenance section.

Flow Gauge & Control

Tool speed can be controlled by the flow control knob located above the "Slower/Faster" placard. The flow can be read directly from the flow meter located on the instrument panel. Flow is indicated in liters per minute (LPM) and gallons per minute (GPM). For most applications full flow is recommended. Some tools, however, require specific flow rates for optimal performance. This information should be available from the tool manufacturer's documentation. Sauber Retrievers can be operated at flows up to 20 GPM and therefore can be run at full flow. If oil flow is at or near 0 GPM rotate the flow control clockwise until desired flow is restored. If flow does not respond, check the hydraulic oil level in the tank and ensure that the unit is not being operated on a slope exceeding 10 degrees. Finally, check the condition of the pump.

Components Sourcing Information

Item.....	Source.....	Description / Specification
Pump.....	Rexroth.....	S16S-7 - 2250 PSI . 81 cu-in displ
Engine.....	Kawasaki.....	16872, 22.5HP
Spark Plug.....	Kawasaki.....	BMR6A
Engine Oil Filter.....	Kawasaki.....	49065-2071
Fuel Filter.....	Kawasaki.....	49019-1055
Foam Breather Element.....	Kawasaki.....	11013-2114
Paper Breather Element.....	Kawasaki.....	11013-2115
Parts Manual.....	Kawasaki.....	99910-A826-00
Service Manual.....	Kawasaki.....	99924-2041-01
Tank Base.....	Sauber.....	1010-01 18 Gallon
Tank Cover.....	Sauber.....	1010-02 Almag - Machined for Kawasaki
Gasket Compound.....	Form-A-Gasket.....	Silicone Blue
Key Switch.....	Pollak.....	33-104
Pressure Relief Block.....	Catching.....	112989-DV
Flow Meter.....	Headland.....	601-010
Panel Light.....	Truck Lite.....	15009
Hour Meter.....	Veeder Root.....	87F-1091Oil Cooler Swirl Cool 10618S-1
Control Panel.....	Sauber.....	1010-03 Engraved Poly
Quick Couplers.....	Pioneer.....	8010-4/4050-4 1/2" NPT
Pump Coupler.....	Browning.....	L-095 x 5/8"
Engine Coupler.....	Browning.....	L-095 x 1"
Coupler Insert.....	Browning.....	L-090/095
Throttle / Choke.....	Morse Control.....	438220-003-60
Sump Strainer.....	Flow-Easy.....	P-20-1.25 NUT-100-RV3
Filter Housing.....	Gresen.....	FSP-107IEDNX
Filter Element.....	Gresen.....	CL-22001
Sight Gauge.....	Lube Devices.....	HSG-55
Pressure Gauge.....	Headland.....	MPG-1-P-5000E
Back Pressure Gauge.....	Gresen.....	C112
Filler/Breather.....	Filtration Prod.....	BF12
Hydraulic Oil.....	Citgo.....	# 32 Anti-Wear Premium
Motor Oil.....	Citgo.....	10W-30W All Season

Maintenance

Operation.....	Interval
Check Fuel Level.....	Each Use
Check Hydraulic Oil Level.....	Each Use
Check Recoil Rope Condition.....	Each Use
Check Air Cleaner.....	Each Use
Check For Hydraulic Leaks.....	Each Use
Check Engine Oil.....	Each Use
Check Hydraulic Filter Back Pressure Gauge.....	Each Use
Clean Fuel Tank & Strainer.....	12 Months or 300 Hrs
Check Fuel Line.....	12 Months or 300 Hrs
Clean Air Cleaner.....	3 Months or 50 Hrs
Clean/Gap Spark Plug.....	6 Months or 100 Hrs
Clean Spark Arrester.....	6 Months or 100 Hrs
Adjust/Check Valve Clearance.....	12 Months or 300 Hrs
Replace Return Line Filter.....	50 Hrs or at "Red" Gauge Reading
Replace Suction Strainer.....	300 Hrs
Replace Fill Screen/Breather.....	100 Hrs
Change Hydraulic Oil & Filter.....	100 Hrs
Check Hydraulic Relief Setting.....	6 Months or 100 Hrs.
Change Engine Oil & Filter.....	1st Month or 20 Hrs
Change Engine Oil & Filter.....	6 Months or 50 Hrs
Check Engine Oil Filter.....	1st Month or 20 Hrs
Clean/Check Oil Cooler.....	12 Months or 100 Hrs
Check Battery Condition.....	3 Months or 50 Hr

Adjusting the level wind tension

- Hand tighten the adjustment nut onto the lower threaded shaft, seating it against the compression spring.
- Rotate the nut with a wrench (12) revolutions.
- Tighten the jam nut against the adjustment nut.

This should provide the correct rope tension on the cassette. The goal is to use as little tension as possible to wrap the rope snugly onto the cassette. Too much tension can lead to premature brake pad wear and rope payout problems, while too little tension could allow the outer layer of rope to fall down when pulling is paused or stopped.



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We Guarantee

Sauber Manufacturing Company guarantees satisfactory operation of its products and will refund the full purchase price to utility customers who are not fully satisfied.

We Warranty

We specifically warranty that our products will be free from any defective materials or workmanship when purchased. We will repair or replace, at our option, any part(s) that prove to be defective within the warranty period specified below. This warranty is voided only by evidence of misuse, and does not include shipping charges.

Sauber Manufacturing offers the industry's only 10-year, comprehensive, trailer warranty. This warranty comes at no charge to our customers, yet covers parts and labor on all Sauber manufactured components.

As a leader in the utility industry, we have the financial strength and have demonstrated the integrity necessary to honor our commitments. This expanded warranty is a clear extension of who we are, what type of equipment we build, and how we are investing in our future and yours.

- 10 Year Structural, Parts & Labor on all Sauber Manufactured components
- 10 Year Galvanized Finish Warranty
- 3 Year total Parts & Labor Coverage
- Retroactive total parts & labor coverage includes all trailers built after 04/01/2006
- All warranty support will be provided directly from Sauber Mfg. Co.
- Customer Labor Reimbursement @ \$65/hour
- A credit memo will be issued for claims under \$400 and can be applied to a credit card

For additional details about our warranties, contact your sales professional, and thank you for investing in Sauber Manufacturing equipment.

