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SAVAGE BROS. CO.

Lif*TIL*Truk

Models B, C & D

Installation, Operation, Maintenance and Parts Manual

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SINCE 1855 SAVAGE BROS CO.

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Lif*TILT*ruk

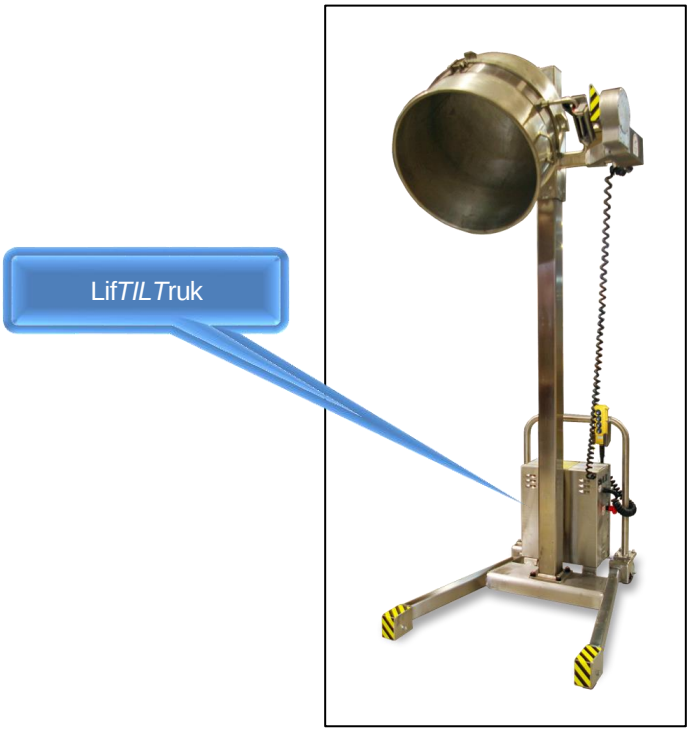
GENERAL CONCEPT OF OPERATION

The Savage Bros. Co. Lif*TILT*ruk is designed for the safe lifting, transporting and pouring of a mixing bowl or kettle. The unit is engineered to be operated by one person. A mixing bowl or kettle can be lifted off of a mixer or stove, transported to another location, raised and tilted so that product can be safely poured onto a table or into a hopper or other container.

The Auto-Lift Model "C" lifts and lowers the bowl or kettle by means of a hydraulic system that is powered by an on-board 12 Volt, Absorbent Glass Mat (AGM) battery. The AGM battery provides improved performance, it is non spillable, and it does not require ventilation to operate. The Lif*TILT*ruk has fixed front casters and rear casters that swivel for maneuverability. Once in position for pouring, the bowl or kettle can be tilted.

The Lif*TILT*ruk has designed-in safety features including a fail-safe, fused hydraulic system to prevent the container from dropping even if a catastrophic hydraulic pressure loss occurs.

Savage Bros. manufactured candy kettles adapt directly to the Lif*TILT*ruk. Mixing bowls manufactured by Hobart and others require a special adapter or lifting strap with the proper handles for safe tilting. Straps for various size and makes of mixing bowls are available from Savage Bros.



WARNINGS

The Lif*TILT*ruk is designed and manufactured to be a dependable, predictable, and safe tool when used by a SAFE OPERATOR. Savage Bros. Co. cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore, the safety measures in this manual and on the Lif*TILT*ruk may not include all possible safety cautions. Clearly, no matter how safe we make the Lif*TILT*ruk, there are ways to use it unsafely. This can lead to expensive accidents which could cause serious injury OR EVEN DEATH, possibly YOUR death! To lessen the chance of breakage, expense, injury or death, we urge you to read, understand, and work continually with the following cautions in mind:

- **Read and understand this entire manual thoroughly before operating or servicing the LifTILTruk.**
- **Improper operation and maintenance can be hazardous and could result in serious injury or even death.**
- **Never modify the LifTILTruk to lift any other type of load, or for any other reason**.
- **Be sure the handles of the load are securely locked in the lift arms**.
  About 80% of all problems or accidents happen because the operator failed to be certain the handles were securely locked by the lock mechanism. There is only one right way for the handles to be captured, as shown in Figure 1.

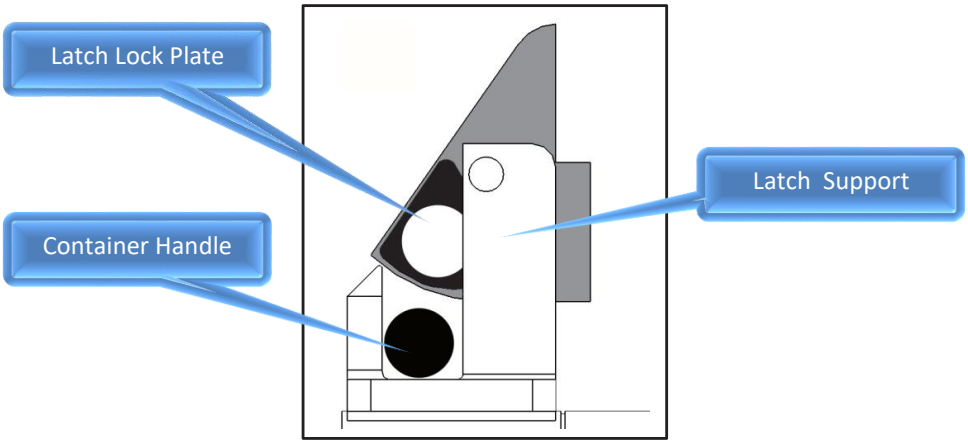


Figure 1

- **Go slowly.** The faster things happen, the less control you have over the outcome, especially when you are transporting a load, or adjusting the position of a load which has been lifted to its pouring height. GO SLOWLY.
- **Never transport a load unless it has been lowered to its lowest position.** You greatly decrease the possibility of accidents, injury, and DEATH if you lower the load completely before moving it.

- **Use extra caution when moving Lif*TILT*ruk over uneven floors.**

- **Never use the Lif*TILT*ruk for any job for which it was not designed.**
  The Lif*TILT*ruk should be used only to lift Savage Bros. Co. kettles or containers of other manufacture which USE A SAVAGE BROS. CO. ADAPTER STRAP. Only Savage kettles or Savage adapter straps are designed to provide support for the loads for which the Lif*TILT*ruk was designed.

- **Never use the Lif*TILT*ruk on the job unless the Operator has:**
  a. Read the manual sections that pertain to operating the Lif*TILT*ruk.
  b. Read and understand all of the cautions in this section.
  c. Practice WITHOUT A LOAD before using with an actual load.

- **Don't stand under raised Lif*TILT*ruk arms at any time!**

- Keep visitors out of the work area when raising, lowering or moving loads.

- **It is your responsibility to be sure you and others can do the procedures and actions outlined in this manual safely and without damaging the Lif*TILT*ruk. If you are unsure about the safety of some procedures, contact Savage Bros. Co. at 847–981–3000.**

SEE BATTERY WARNINGS (Page 8)

DO NOT WALK UNDER LIFTED ARMS

DO NOT STAND ON ARMS

DO NOT MOVE WITH ARMS UP OR ON ANGLED SURFACE

ONLY ONE PERSON OPERATION

About Batteries

Each time the battery is discharged then recharged, it goes through a "cycle." The chemistry in your Lif*TILT*ruk battery works when it goes through very deep discharging, then charging cycles.

Figure 2

You can lengthen the Lif*TILT*ruk battery's effective life by discharging it to the deepest working level, then recharging it completely before returning it to service.

The Digital Voltmeter on the side of the control box will indicate to you "how the battery is doing". Keeping the L.E.D. in the green makes a healthy battery in a good state of charge.

At some point in the working day the LEDs may dip down into the yellow zone on the when you do a lift or tilt. As long as the Digital Voltmeter does not go below 12V DC and the LEDs, on your Digital Voltmeter go no further down than the bottom of the yellow zone, the battery is still charged enough to continue working.

When the Digital Voltmeter starts to dip into the RED ZONE, THE BATTERY NEEDS TO BE RECHARGED.

It takes approximately **10** hours to recharge the AGM deep cycle battery used on the Lif*TILT*ruk. To most people this will mean "overnight recharging." Batteries don't usually get into the red conveniently on the last lift of the day. They usually require charging before or after this moment. Therefore, most businesses usually have a spare battery fully charged, ready for use when the on-board battery goes into the red.

Working with a spare battery

The spare battery should be of the same size and type as the one delivered with your Lif*TILT*ruk. Handling a spare battery requires the same level of caution and professionalism outlined in our warnings for working with the original battery delivered with your Lif*TILT*ruk. Attach the positive cable first when installing a replacement battery, followed by the negative cable. Avoid short-circuiting the battery terminals through accidental contact with tools or other metal objects across the terminals.

BE SURE YOU ARE DOING THINGS SAFELY.

When replacing the battery, specify an Absorbent Glass Mat (AGM) deep cycle or marine deep cycle battery, with a minimum reserve capacity of 160 minutes.

Specific Cautions when Servicing the Lif*TILT*ruk

- **Unplug** the Lif*TILT*ruk from the outside power source. When plugged in for charging, SERIOUS INJURY OR DEATH BY ELECTROCUTION CAN RESULT!!
- **Always wear eye protection** – a face mask or goggles equal to ANSI Z87.1 specifications when opening the electrical control box. The battery is an EXPLOSION HAZARD!
- **Remove rings** or other jewelry when servicing the inside of the electrical control box. Severe burns result from metal touching the battery posts or other exposed electric parts.
- **Disconnect the battery (–) cable** from the battery when performing service inside the control box or when servicing the battery.
- **Avoid sparks** or open flame when servicing inside the control box. Remember, the battery is an EXPLOSION HAZARD.
- Perform all service in a **well-ventilated area**. Ideally, a fan should be used to provide positive ventilation to avoid the EXPLOSION HAZARD of hydrogen gas accumulation when opening the control box to service the battery or any other component inside the electrical control box.
- **Do not tip or drop the battery.** The battery contains sulfuric acid which can burn holes in skin and clothing and cause SEVERE INJURY to anyone contacting the acid.
- **Battery Acid** will burn skin and clothing, and it will cause blindness if splashed into the eyes. If battery acid is contacted, flush liberally with lots of water and get medical attention immediately. If swallowed, drink a large quantity of water or milk mixed with beaten egg white or vegetable oil. Call a doctor or poison control center immediately.
- Take care when near the column slider and the chain to **keep fingers out of the chain slot.**
- **Keep enclosure vents free and clear** – in order to avoid the buildup of fumes.

Acid burn potential | **Deadly fumes** | **Wear eye protection**

IMPORTANT SAFETY MEASURES

General

Rotating and moving machinery of any type presents a risk of injury. The Lif*TILT*ruk lifts tilts and rolls which means the operator (one trained person at a time only) must be alert at all times. Ideally, everyone who will have any contact with the Lif*TILT*ruk should be trained in its function, operation, care and respect – as with all tools and machines.

Safety Rules

- Do not operate the Lif*TILT*ruk or other machinery if you are fatigued, if you have been drinking alcohol or have taken any medication which can make you sleepy.
- When carrying out operation, inspection or maintenance of the Lif*TILT*ruk, always follow all workshop rules, safety regulations and precautions.
- Do not overload. Do not exceed the weight limitation as seen on the top of the pendant hook on the control pendant. Weight limitation is also included on the serial plates, which are on the outside and inside the control box and on the side of the tilt motor cover.
- Always pay attention to safety and be careful of other people, equipment and surrounding conditions.
- Do not use the Lif*TILT*ruk for anything other than the intended purposes.
- Use tools that are suitable for inspection and maintenance. It is extremely dangerous to use broken tools or tools designed for another purpose.
- **SAFETY IS UP TO YOU.**

SEE BATTERY WARNINGS (Page 8)

Operation Manual and Safety Decals

- **Read** the instructions in this manual and the safety labels attached to various parts of the Lif*TILT*ruk. Make sure you understand and follow all the instructions for assembly, operation and maintenance. If you do not understand or do not follow the instructions, this will lead to improper operation which may result in your personal injury, damage or death.
- **Understand** the proper method of using the Lif*TILT*ruk and the procedure for carrying out maintenance inspections and ensure that they are carried out safely.
- **Read** this manual and safety labels again from time to time to refresh your memory of the operational procedures.
- **Replace** this manual or safety labels which have been lost or become dirty and cannot be read. Obtain replacements from Savage Bros. Co. and apply the safety labels in the specified positions.

Operating Qualifications

- **Operation** of the Lif*TILT*ruk should only be done by qualified personnel. Be sure you have proper qualifications before operating the Lif*TILT*ruk.
- **One** qualified individual only should operate the Lif*TILT*ruk. This includes raising, lowering, attaching the kettles and other movements which, if more than one person is involved, could cause injury or damage to people or property.
- **Previous** experience with other types of lift trucks does not qualify a person for operating this particular Lif*TILT*ruk. Obtain training instruction from an authorized person who has experience in operating the Lif*TILT*ruk.

Clothing and Personal Protective Items

- **Avoid** loose clothing, jewelry and loose long hair when operating the Lif*TILT*ruk. These and other items can catch on controls or in moving parts and cause serious injury or death.
- **Hard hat and safety boots** are highly suggested when operating or around the Lif*TILT*ruk to prevent personal injury.
- **Other** safety equipment, in addition to the hard hat and safety boots, should be worn as working conditions dictate.

SEE BATTERY WARNINGS (Page 8)

Unauthorized Modification

- Modifications of any type to the Lif*TILT*ruk without specific written authorization from Savage Bros. Co. can create unknown hazards and voids the warranty.
- Before making any modification, consult the manufacturer. Savage Bros. Co. will not be responsible for any injury or damage caused by any unauthorized modification.
- Obstruction or limitation of movement and/or operator view can result if unauthorized equipment or parts are added to the Lif*TILT*ruk.

Moving Parts

- **Column Slide** moves over the chain slot in the column. Make sure all fingers, tools and other objects are kept away from this area to prevent serious injury or damage to the Lif*TILT*ruk.
- **The entire Column** must be kept clear of all objects of all types. Not only will this prevent injury or damage from pinching under the slide, but it will help keep the Lif*TILT*ruk operating in good condition.
- **Kettle/ Bowl Handles** must be fully seated in the locks before lifting or lowering the arms, or before moving the Lif*TILT*ruk. If handles and locks do not appear as in Figure 1 (page 6), injury or damage may result from the bowl falling off the arms or spilling its contents. When seating the handles, keep fingers and other objects out from being pinched between the handles and the locks.

Moving the Lif*TILT*ruk

- **Arms Down** – With or without a load, lower the arms. The higher the arms are, especially with increased weight, the greater the risk of spillage or tipping the Lif*TILT*ruk over.
- **Kettle Handle Locked** – Whenever a load for which the Lif*TILT*ruk was designed is to be lifted, poured or moved, the handles must be locked in position as shown in Figure 1 and elsewhere in this manual.
- **Floor Surface** – Clean floors allow the Lif*TILT*ruk's wheels to roll smoothly. Objects on the floor can cause the Lif*TILT*ruk to stop suddenly which can make a load spill. If the load is carried high, or rolling speed too fast, the Lif*TILT*ruk and the load could tip over more easily.
- **Floor Level** – Flat, level surfaces are ideal for moving the Lif*TILT*ruk. If the floor is slanted in any way, greater care must be taken to prevent spilling and tipping over as above. Use wheel chocks to prevent unwanted rolling on uneven surfaces.
- **Moving Liquids** – Great care must be taken to prevent spilling anything. Move slowly and carefully. Hot liquids can burn skin, exposed or otherwise.

- **Steering** – Control the direction of movement by only using the operator handle. The wheels below the handle swivel for steering. Moving by pushing or pulling from any other direction can be difficult and dangerous.
- **Vision** – Always be aware of everything that is around you and the Lif*TILT*ruk to prevent damage and injury. If a load obstructs your vision, STOP! Look around to see where you will be going or ask another experienced Lif*TILT*ruk operator to help guide you.
- **Manual Only** – Do not use any motorized device to move the Lif*TILT*ruk. Move only by hand.

WORK SMART
WORK ALERT

INITIAL INSTALLATION

Step 1. Be certain you have everything you need for the job.

- Check the shipped contents carefully.

  Savage Bros. Co. typically ships B-size Lif*TILT*ruks in one pallet, with the base and column assembled.

  Size C-size and larger Lif*TILT*ruks are typically shipped in two cartons (Figure 2A). Carton 1 contains the tilt and idler arms. Carton 2 contains two mixing bowl adapter straps if ordered. Pallet 1 contains the base unit. Pallet 2 holds the lift column and slide assembly. The base unit and column are secured to their pallets with rope tie-downs.

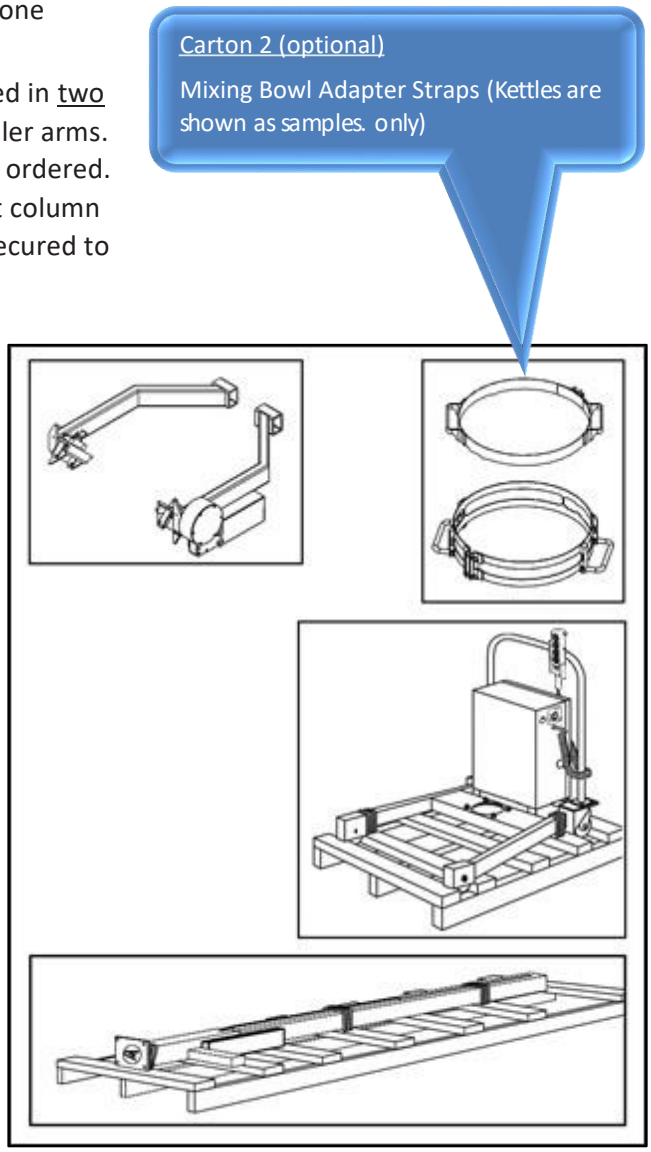


Figure 2A, Shipped Contents

- Tools required, not supplied by Savage:
  - Hammer
  - Pry bar
  - Saw
  - Knife
  - 1-1/16 inch socket wrench with torque wrench (suggested) or a ratchet wrench or handle for the 1-1/16 inch socket
  - 5/8 inch wrench
  - 9/16 inch wrench
  - Hex wrenches:
    - 5/32 inch
    - 1 /2 inch
    - 7/16 inch
  - 4-inch span C-clamp
  - #2 Phillips screwdriver
  - Various box, open end, or adjustable wrenches.
  - Teflon thread tape

- Tool supplied by Savage:
  - 5/16 inch Allen wrench to open electrical control box.

Read and understand the whole manual:

Step 2: Prepare the Base unit for Assembly.

1. Disassemble the crate until the base unit looks like the illustration below (Figure 3).
2. Move the base unit, on its pallet, to a site where the column can be safely hoisted vertically over it for assembly.

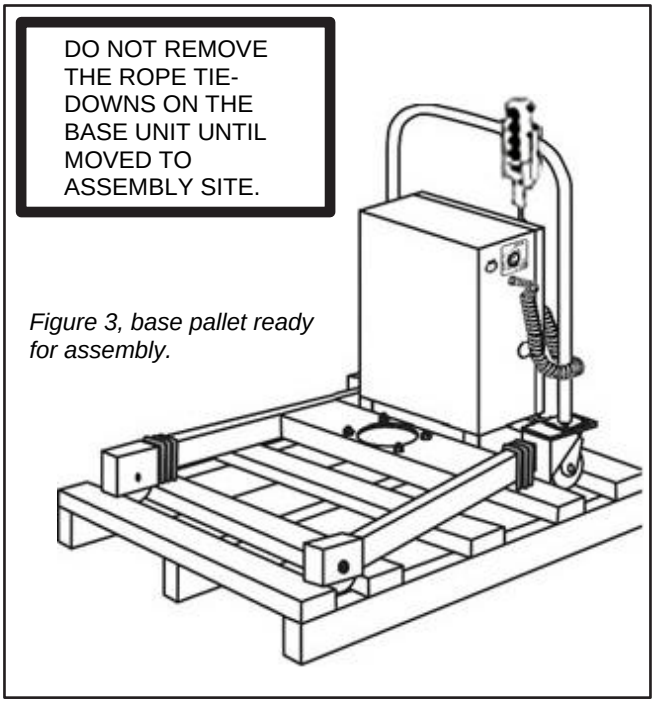


Figure 3, base pallet ready for assembly.

WORK SMART
WORK ALERT

Step 3: Remove the Lif*TILT*ruk base from the Pallet.

1. Cut the tie-down ropes holding the Lif*TILT*ruk to the pallet (Figure 4).
2. Remove the pallet cross-ties (Figure 5) and use a pry-bar as required to remove them.

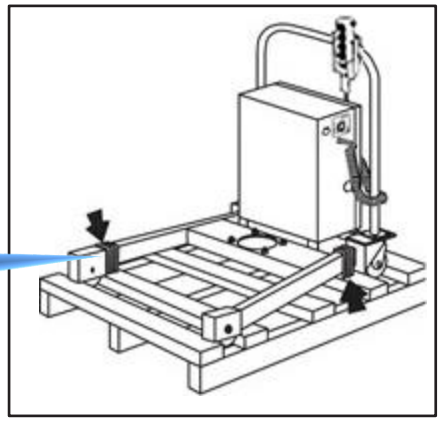


Figure 4

Method One: (Recommended)

1. Use the overhead crane or forklift to lift the base assembly off the pallet then remove the pallet. **USE CAUTION**. Keep hands or feet from under the raised Lif*TILT*ruk.

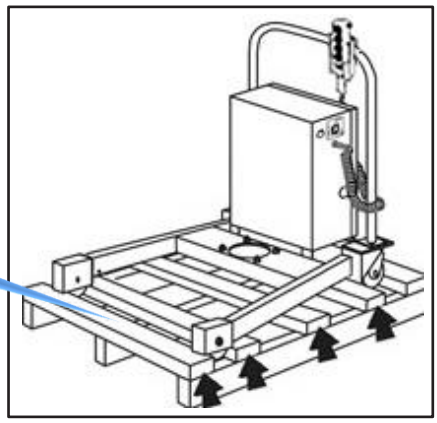


Figure 5

Method Two:

This method requires the use of THREE PERSONS. Any fewer than three persons can create a dangerous situation which could result in damage to the Lif*TILT*ruk components or worse, injury to the persons assembling the unit.

1. Lift the back of the unit. Lift to keep the rear supported and place the front wheels on the floor (Figure 6).
2. Carefully remove the rest of the pallet from underneath the Lif*TILT*ruk and lower the unit to the floor.

   USE CAUTION. Keep hands or feet from under the raised Lif*TILT*ruk. Carefully slide the pallet from under the unit.

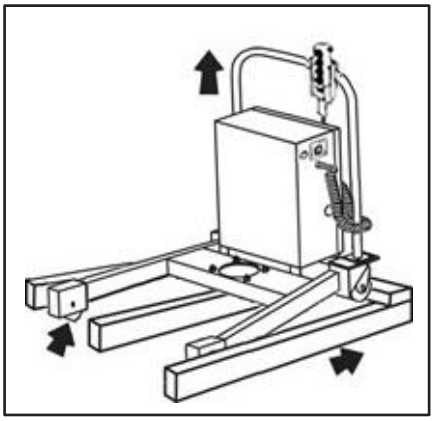


Figure 6

Step 4: Prepare the Column for Assembly.

1. Disassemble the crate until the column unit looks like the illustration below (Figure 7).

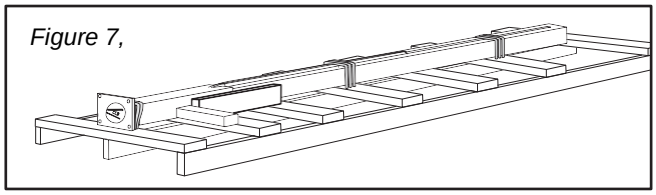


Figure 7,

2. Pry off the two 2x4 blocks (Figure 8) which keep the slide assembly from moving during shipment.

3. Install a C-clamp on the column as shown (Figure 9) to prevent the slide assembly from moving during assembly.

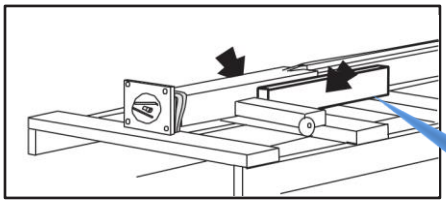


Figure 8
Remove both 2x4 shipping blocks.

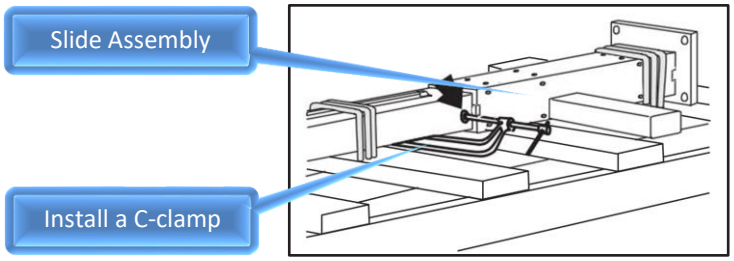


Figure 9, Attach C-clamp to column. KEEP SLIDE ASSEMBLY FROM MOVING DURING ASSEMBLY.

4. Locate the right-angle hydraulic fitting in the base of the column (Figure 10). Remove the protective cap from the fitting.

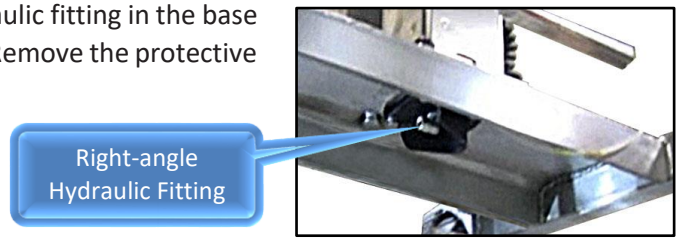


Figure 10
Remove plastic cap from hydraulic fitting on base of column.

5. Cut and remove the rope tie-downs used to hold the column on its shipping pallet.
6. On the base unit open the electrical control box door by turning the two Allen head screws with the 5/16" Allen wrench, provided (Figure 11).

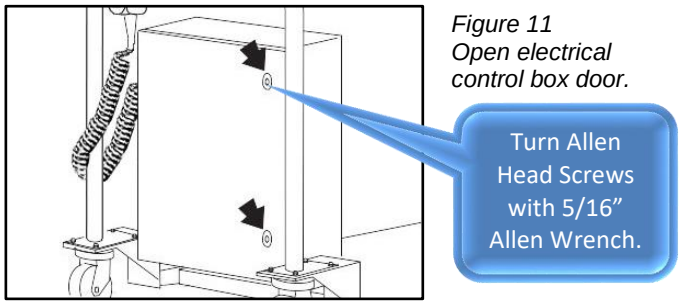


Figure 11
Open electrical control box door.

7. Locate the hydraulic fuse "stored" in the end of the hydraulic line inside the control box (Figure 12).

8. Remove hydraulic fuse from the end of the hydraulic hose.
9. Remove the protective cap from the fuse. **NOTE:** the fuse has an arrow on it. This arrow should point away from the column when the fuse is installed.

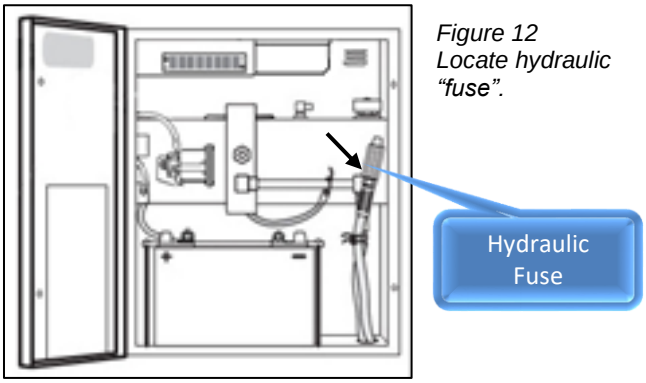


Figure 12
Locate hydraulic "fuse".

10. Put Teflon™ thread sealing tape on the hydraulic fuse threads. The tape should be wound at least one thread above the bottom thread of the threads (Figure 13a).

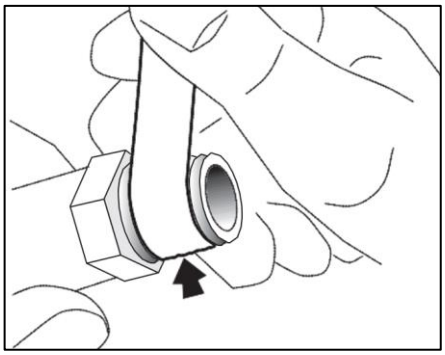


Figure 13a
Wrap fuse thread with Teflon tape.

11. Using a 5/8 inch wrench with extension and log socket, install the hydraulic fuse in the right angle fitting on the end of the column (Figure 13b); tighten the fuse. Check later for leaks, and if necessary, tighten enough to prevent leaks when the system is under pressure.

Figure 13b
Install the hydraulic fuse.

12. Using a 1-1/16 inch wrench, remove the four nuts from the base support plate (Figure 14).

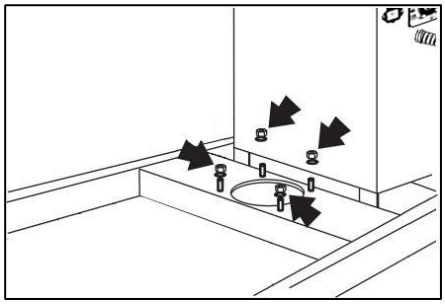


Figure 14
Remove 4 nuts.

Step 5: Lift the Column over the Base.

1. Install a sling system to allow lifting and positioning the column safely. For the sling, use web strapping in good condition, minimum strength of 1,000 lbs. (450Kg). Loop the webbing under the arms of the slide assembly, tie securely then loop the strap near the top of the column. Support the column along its entire length when it is lifted to vertical (Figure 15).
2. Lift the column to position it over the base according to one of the following methods.

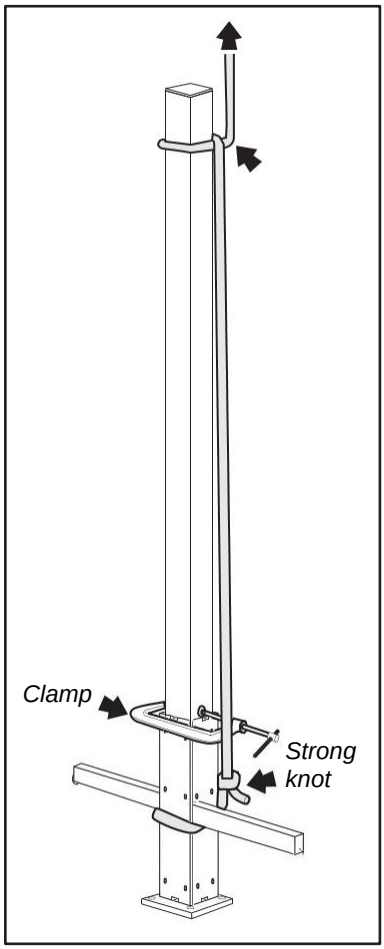


Figure 15
Create a strap hoist.

Method One: (Recommended)

Use an **overhead crane** or other mechanical lifting device to lift and support the column during assembly (Figure 16a).

Method Two: (Recommended)

Use a **forklift truck** to lift and support the column during assembly (Figure 16b).

Method Three: (Minimum safe assembly method)

⚠WARNING

This method (Figure 16c) requires the use of THREE PERSONS. Any fewer than three persons creates a dangerous situation which could result in damage to the Lif*TIL*Truk components or worse, injury to the persons assembling the unit.

Loop the free length of web strap used in the sling system over a girder or beam located above the base unit. With one person pulling on the strap to take up slack, two persons should lift the column to an upright position. With the C-clamp in position on the column, the arms of the slide assembly can be used to lift and maneuver the mounting plate on the column into position on the base studs.

Lifting of the column to the base can be done without the sling system if the three persons doing the job are very strong and very careful.

Figure 16a
Overhead Crane

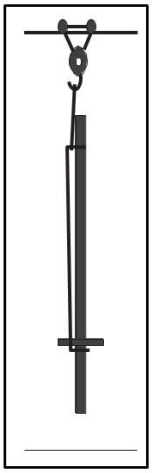


Figure 16b
Forklift Truck

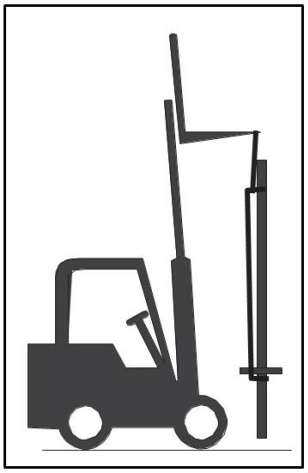
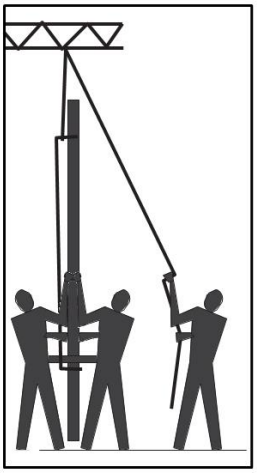


Figure 16c
Manually, 3-person minimum crew



First move the back part of the Lif*TILT*ruk next to a wall if possible, to stabilize it. Doing this task without a positive lifting and stabilizing method is not at all recommended.

Step 6: Bolt the Column to the Base.

1. With the column supported above the base unit, put the plastic hydraulic return tubing through the hole in the base as shown (Figure 17). Be sure to ease the tubing out of the way as you lower the column onto its studs, so it is not damaged during column assembly.

2. Using a 1-1/16 inch wrench, install and tighten the column-to-base nuts, about as tight as you might tighten wheel lug nuts on an automobile.

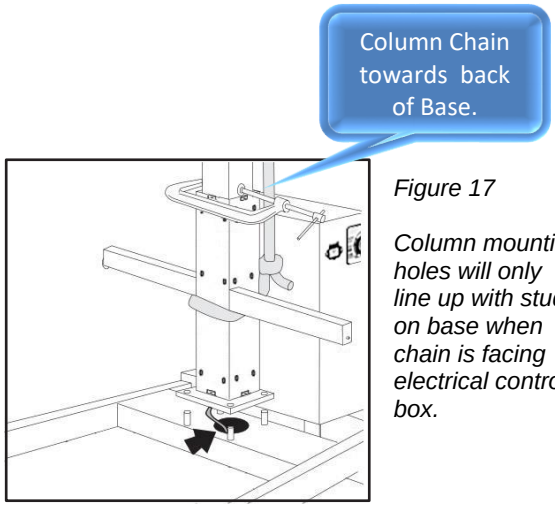


Figure 17

Column mounting holes will only line up with studs on base when chain is facing electrical control box.

3. Remove the C-clamp and sling system and lower slide assembly to the base.

NOTE: The column chain goes toward the back of the base against the electrical control box. This is the only way the holes on the column mounting plate will line up with the studs on the base.

Step 7: Hydraulic Hose Connection.

⚠WARNING

The method below requires the use of TWO PERSONS. Any fewer than two persons can create a dangerous situation which could result in damage to the Lif*TILT*ruk components or worse, injury to the **persons assembling the unit.**

1. Slightly and carefully lift Lif*TILT*ruk on one side near the back of the base unit. One method is, nail three 2" x 4" pieces of lumber together and use a longer piece of 2" x 4" lumber for the lift, then place the nailed 2" x 4" pieces underneath the base unit, near the back side. This clears room for you to use a wrench to attach the hydraulic hose to the fuse at the bottom of the column.

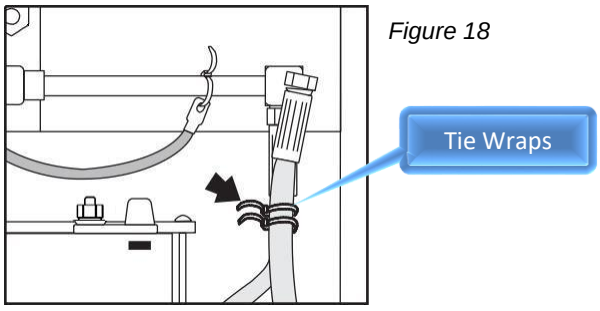


Figure 18

2. Clip the two tie-wraps that secure the hydraulic line inside the electrical control box (Figure 18).

3. Put some shop rags under the electrical control box and base to absorb any hydraulic fluid which might spill during the next step. By working quickly, any loss of hydraulic fluid can be minimized.

4. Pull down and route the open end of the hydraulic hose through the hole in the base of the electrical control box (Figure 19a) and attach it to the hydraulic fuse attached in step 11 of "Prepare the Column for Assembly" (page 17). The connection must be made tight enough to prevent hydraulic fluid loss during system operation(Figure 19b). This will be checked during a later step.

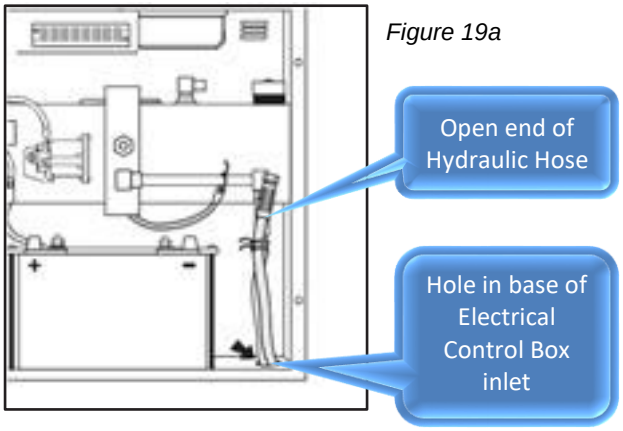


Figure 19a

Figure 19b

5. Route the hydraulic return tubing through the hole in the base of the electrical control box and attach it to the fitting on top of the hydraulic reservoir. Push the tubing into the fitting until it seats (Fig. 19c).

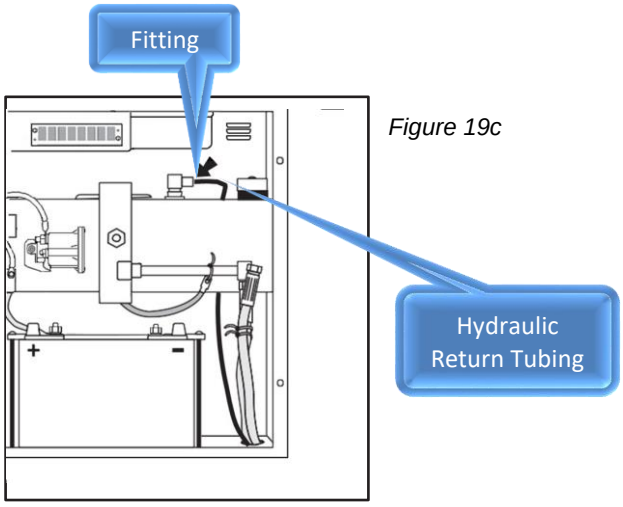


Figure 19c

Step 8: Major Electrical Connections.

1. Connect the RED cable to the positive battery terminal. The terminal wing-nut should be tightened "finger tight" and should not be easily loosened.
2. Clip the tie-wraps which hold the battery ground cable to the hydraulic pipe assembly (Figure 20). Attach the cable to the ground (negative) terminal of the battery (Figure 21).
3. Inspect all main connections.

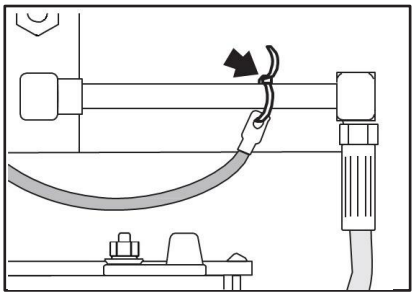


Figure 20

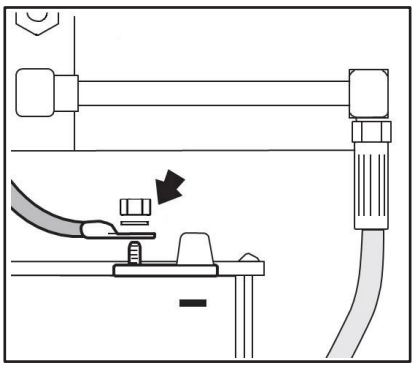


Figure 21

4. On the left side of the electrical control box you will find the red emergency stop (E-Stop) button. Pushing the knob in disconnects battery power. Above the knob is an on-off switch that operates the Control Circuit Breaker (Figure 22).

   Pull the Emergency Stop Button out and move circuit breaker switch to the up position.

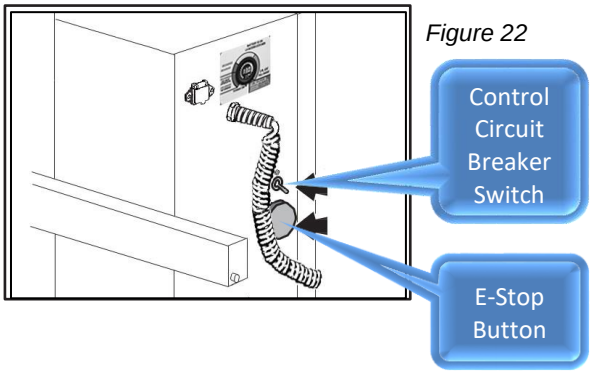


Figure 22

5. The Digital Voltmeter, on the side of the electrical control box should show between 13.5V DC to 14.6V DC with the corresponding LEDs indicating the status of the battery charge, (Figure 23). If not between 13.5V DC to 14.6V DC, the battery must be charged before further testing.

   See the "*About Batteries "* (page 8) and "*Servicing the Battery"* (pages 40-41) for help in battery system trouble-shooting.

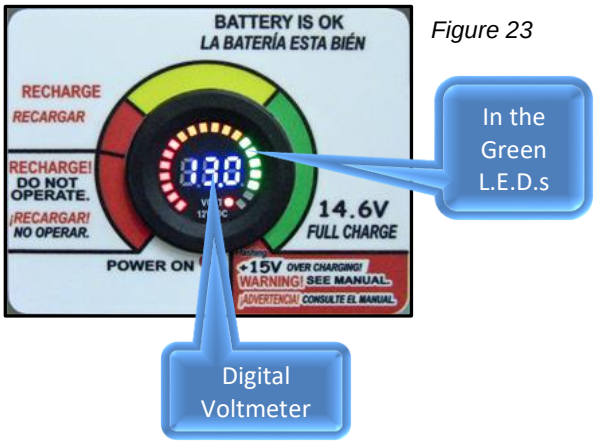


Figure 23

Step 9: Perform the Initial Hydraulic System Check.

1. Remove the C-clamp from the column.
2. Using the operator control, (Figure 24) press the UP button until the slide assembly is about half-way up the column.
3. If nothing happens when you press the UP button, including no motor or pump sound, then check the emergency stop (E-Stop) button and on-off circuit breaker switch (Figure 22). It may be in the off position.

   To RESET the circuit breaker, first press it down, then pull it up until the switch lever stays up.
4. Check all hydraulic connections, both under the column and inside the electrical control box, for leaks. Tighten hoses and fittings, if required, to stop leaking. If you do not see any leaks, repeat the UP/DOWN lifting sequence several more times and check for leaks, again. When you are satisfied that all hydraulic connections are tight enough for operations, go on to the next steps.
5. Close the electrical control box door. Lock with Allen wrench.
6. Lower the slide assembly to the bottom of the column and re-install the C-clamp above the slide assembly to keep it from moving on the column.

Figure 24

NOTE

If you press the UP button and you hear the motor and pump running but the slide assembly does not move up on the column, STOP!!! Either you have forgotten to remove the C-clamp or THERE IS NO HYDRAULIC FLUID IN THE PUMP RESERVOIR. Every Lif*TILT*ruk is run at the factory before shipment, so you can be certain it does work. However, at some point in shipment hydraulic fluid may have been lost. So, if the slide assembly does not go up, check for fluid according to instructions in the Service section of this operating manual.

CAUTION

Continued operation with the C-clamp on the column, or without enough hydraulic fluid, will damage or destroy the pump, electrical components, etc.

Step 10: Install the Lifting Arms.

1. Remove the screw, washer, and retainer plate from the end of the right slide assembly arm (Figure 25).
2. Locate the right and left arms. Slide them on the slide assembly arms (Figure 26).
3. Install the retainer plate, washer, and screw onto the end of the right slider arm (Figure 26).
4. Install the retainer plate attached to the coil cord on the end of the left slider arm. Secure with washer and screw.

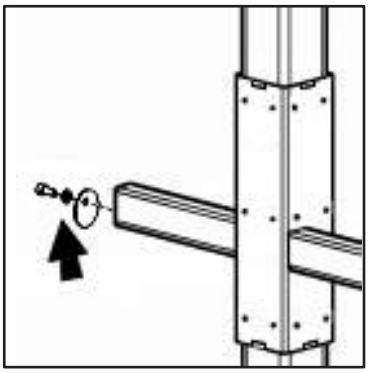


Figure 25

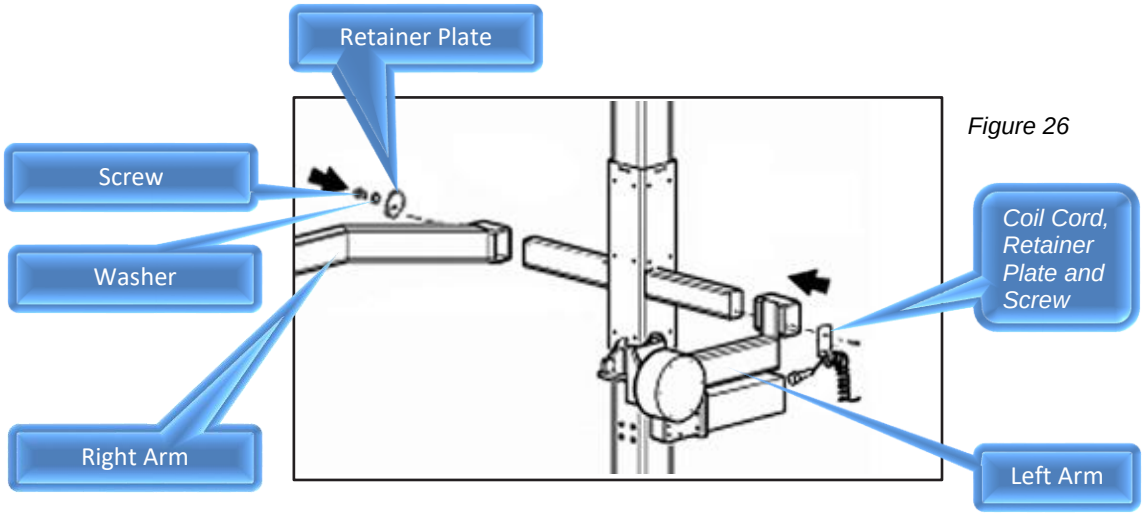


Figure 26

Step 11: Connect the Tilt Motor Cable (if equipped with Power Tilt).

1. Attach the connector plug on the coil cord to the tilt motor socket on the rear of the tilt motor housing. A keyway must be aligned before the connector will seat (Figure 27).
2. Tighten the threaded ring on the cable termination so the connector is securely joined.

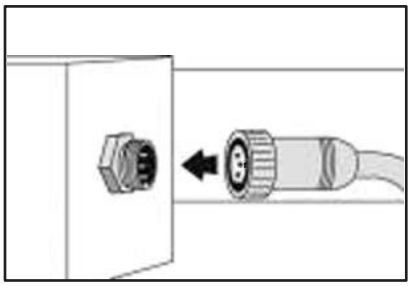


Figure 27

DO NOT WALK
UNDER LIFTED ARMS

Step 12: Test the Completed Lif*TILT*ruk.

Use the operator control to raise the slide assembly to the top and bottom of the column and to activate the tilt mechanism.

Do not continue pressing the UP button when the slide assembly is at the top of the column. Continued pump operation with the slide assembly at a stopped position can result in damage to the Lif*TILT*ruk hydraulic or electrical systems.

Installing Adapter Strap

Savage Bros. Co. kettles are correctly designed for use with the Lif*TILT*ruk. If you are lifting any other containers, bowls, kettles etc. you will need to install **adapter straps** for lifting. Straps are available for purchase via Savage Bros. Co.

Example adaptor strap(s) are shown on (Figure 28).

The instructions below are common to those bowl types and would be similar for other manufacturer bowls.

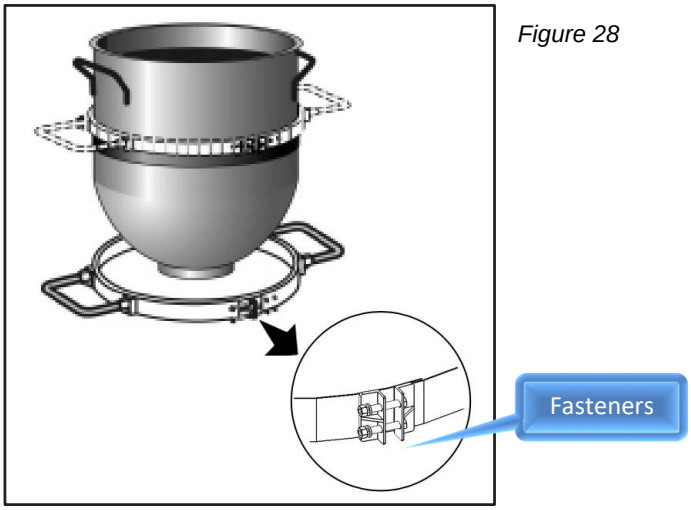


Figure 28

Step-by-step:

1. Place the adapter strap above the mounting ring of the Hobart bowl.

2. Use the fasteners supplied to pull the strap tight against the bowl. Initially hand tighten, then use wrench to apply a slight additional tightening torque to the fasteners, without overtightening.

NOTE: While Hobart bowl adapters are usually required, there are other types, sizes and shapes of containers which require other configurations of adapter straps. The use of adapter straps may seem like a trivial matter, and in many cases, you might be tempted to use the existing handles of your containers for lifting. IN MOST CASES, HANDLE PLACEMENT WILL NOT BE CORRECT FOR USE WITH THIS EQUIPMENT.

Handle placement:

Savage designs its adapters and specifies installation to establish the tilt axis close to the center-of-gravity of the container being used and the typical load lifted. Most container designs place the “normal” handles high on the container side, which means they are often far off the center-of-gravity axis. This puts enormous strain on the tilt system and can result in premature failure of the gears or the motor, making early replacement of these components necessary.

Ask for assistance

If you need adapter straps for special container sizes, types, and loads, please call Savage Bros. Co. for assistance. Our phone/fax numbers and web addresses are on the front cover of this manual.

Lif*TIL*Truk Safety and Operation Decals

The Lif*TIL*Truk decals are important for personnel safety and as reminders for operator usage. They are not a replacement for reading and understanding the Owner's Manual.

Clean surfaces with rubbing alcohol or similar cleaner before applying decals. Keep liquids away from the decals for several days for best adhesion. Clean decal surfaces with damp cloth.

Decals and Lif*TIL*Truk parts are not shown to scale. There may be some variations between these drawings and your equipment. Use your best judgment for placement.

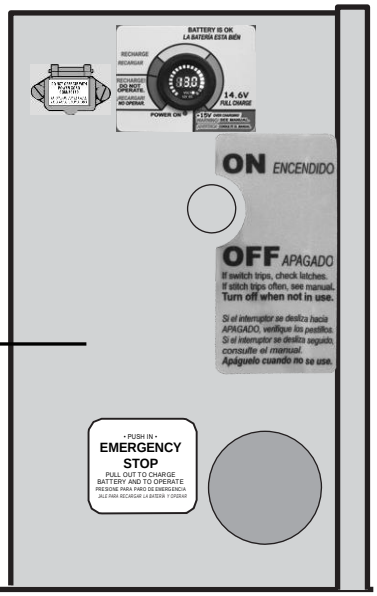
To order a new set of decals from Savage Bros. Co., order P/N: 9400-90-016, English – Spanish Label Set.
To order decals in other languages "*Stickers & Labels*" (page 75).

APPLY CAREFULLY
Permanent adhesive used on these decals is very strong for long life and resistance to abuse. Think before applying.

Place on slide assembly facing operator pendant (front).
Place decals on side panel as shown.

Place on outside panels of each arm.

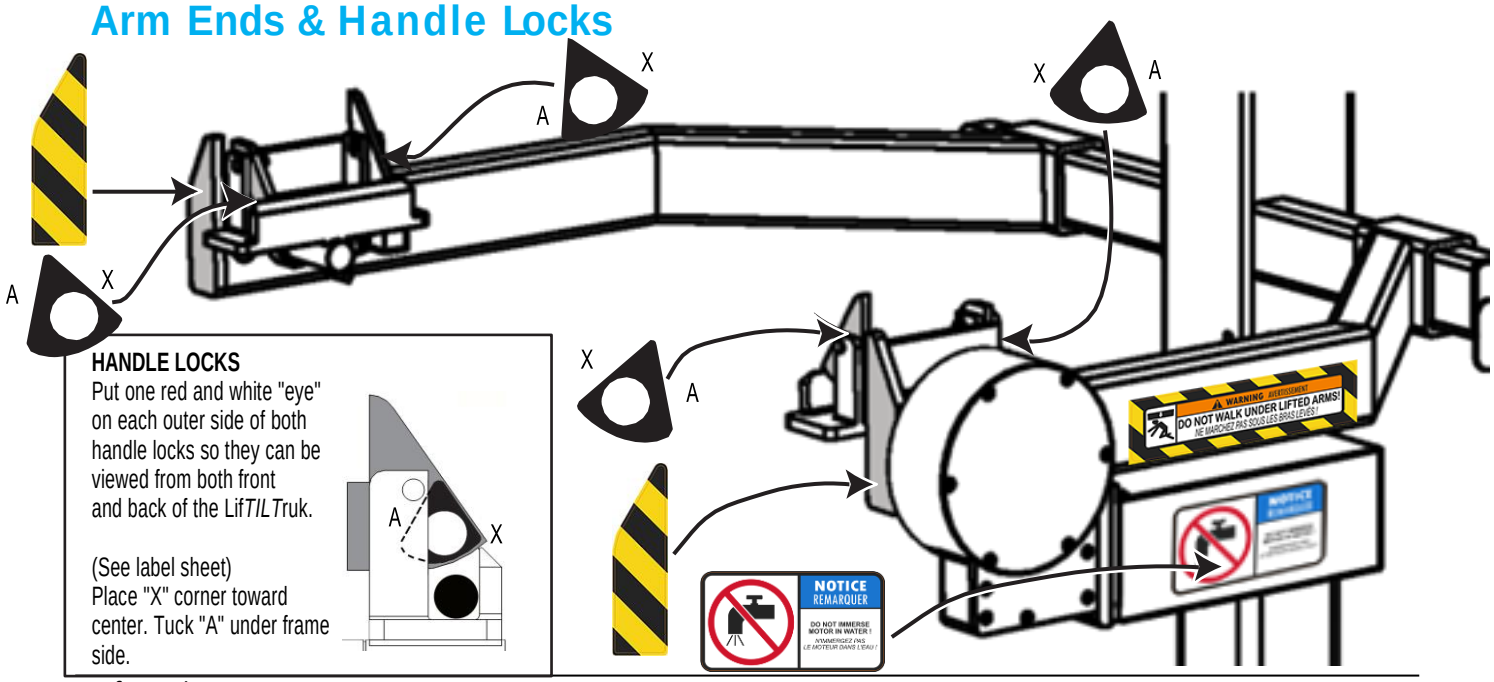
Wrap on front and top of feet.



Use only if large red emergency off button is installed.

Frame & Electrical Box Side

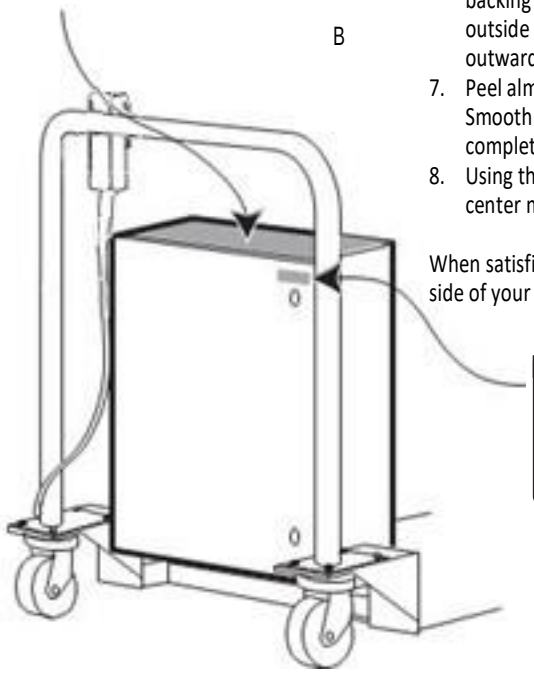
Arm Ends & Handle Locks



HANDLE LOCKS
Put one red and white "eye" on each outer side of both handle locks so they can be viewed from both front and back of the Lif*TIL*Truk.

(See label sheet)
Place "X" corner toward center. Tuck "A" under frame side.

A B



TOP OF CONTROL BOX

1. Cut entire label, with its backing, away from sheet.
2. Peel backing at (A) about 1 to 2 inches and, with adhesive up, crease backing paper.
3. Align right side of decal on top of battery box (B).
4. Smooth decal in place with light hand pressure moving from B to A.
5. Carefully apply adhesive at A starting in the center and working outward. Do not press down hard. This will hinder repositioning if it is necessary.
6. Lift lightly at B and peel backing to no more than half-way. Crease backing and carefully apply decal using light pressure with the outside of your hand moving across the center and gradually outward.
7. Peel almost all the backing off, leaving some for a hand grip. Smooth decal as in step 4 then peel remainder of backing and complete the application.
8. Using the outside of your hand, slowly spread outward from the center making sure to gradually work air bubbles toward the edges.

When satisfied the decal is flat and smooth, rub moderately with the side of your fist. Work from the center outward.

BEFORE OPENING DOOR *ANTES DE ABRIR LA PUERTA*
- **UNPLUG** AC power cord. • **DESCONECTE** *el cable de alimentación de CA.*
- **TURN OFF** circuit breaker. • **APAGUE** *el interruptor del circuito.*
- **Remove all jewelry.** • ***Quítese todas sus joy as.***

AFTER OPENING DOOR *DESPUÉS DE ABRIR LA PUERTA*
- **READ** caution label on door. • **LEA** *la etiqueta de precaución en la puerta.*
- FOLLOW repair procedures in manual. • *SIGA los procedimientos de reparación en el manual.*

Place in upper right corner of battery box door.

Electrical Box, Top & Front

Electrical Box, Inside

Place On top inside of door

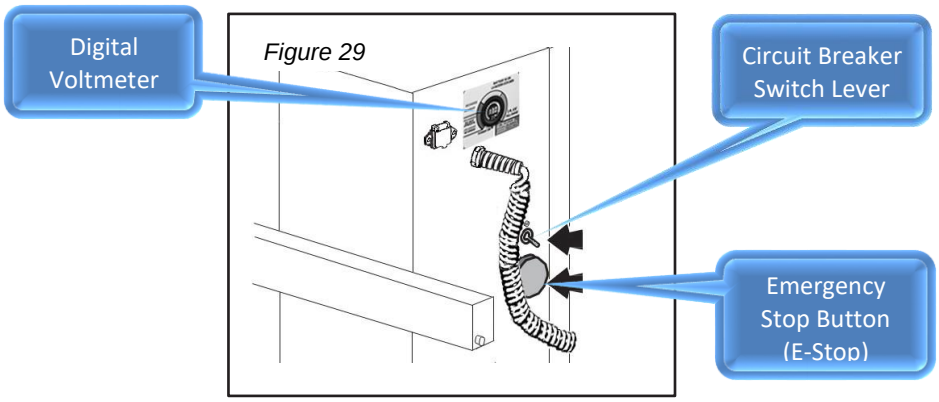
Inside battery box door

OPERATION

Resetting the Circuit Breaker

NOTE: If the tilt button is not released when the tilt mechanism is at either end of its travel, the circuit breaker will trip to prevent damage to the tilt motor. In this case it is necessary to reset the circuit breaker.

Pull the circuit breaker switch lever up. The circuit breaker is now reset (Figure 29).



Raising the Lif*TILT*ruk Arms

1. Remove the operator's control pendant from the handle on the rear of the Lif*TILT*ruk.
2. Press and hold the UP button to raise the slide assembly on the column. If the slide assembly does not raise, and the Digital Voltmeter (Figure 29) on the side of the electrical control box is displaying 12V DC to 14.6V DC, refer to "Testing the Circuit Breaker" (page 48) for help in circuit breaker trouble-shooting.
3. Release the UP button if the slide assembly is at the top of the column. Holding the UP button down at this lift point will overheat the hydraulic pump. This will cause excessive wear on the hydraulic pump/motor unit.

Lowering the Arms

1. Be certain there is nothing underneath the arms or the container which might keep the device from lowering safely. Keep hands away from chain and column slide assembly.
2. Press and hold the DOWN button on the control. This releases hydraulic pressure and allows the slide assembly to lower.
3. Release the DOWN button at any time to stop lowering further.

NOTE: Holding the DOWN button down after the slide assembly is completely lowered has no effect on the system.

Adjusting the Span of the Lift Arms

WARNING

The lift arms are free to move on the slide assembly arms but are prevented from sliding off by a plate at either end of the slide assembly arms. Be sure these plates are in place before adjusting the arms.

1. Determine the span of the arm spread you require.
2. Wiggle and pull on the arm(s) as necessary to achieve the required span. The arms will stay in place at the point to which they are moved (Figure 30).
3. Move the arms so that both are the same distance from the column. This will keep your load centered and balanced. Moving a load which is off-center, especially if the arms are raised, could increase the possibility of the Lif*TILT*ruk tipping over.

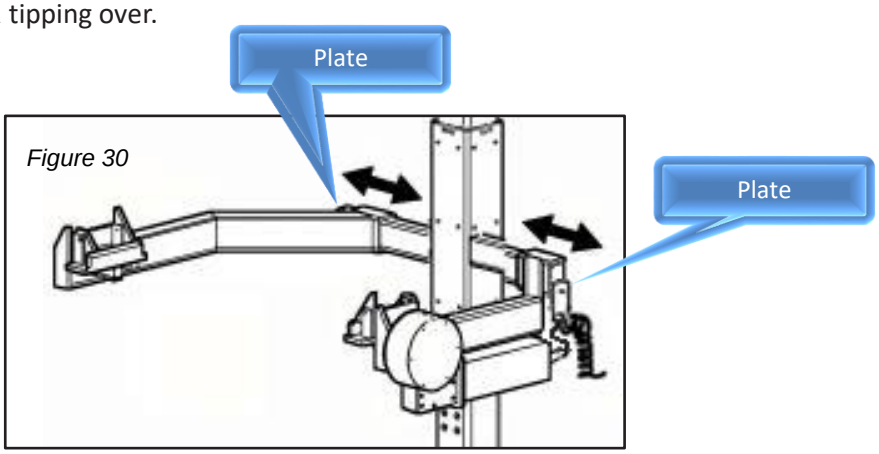


Figure 30

Adjusting the Latches

WARNING

The lifted container can be any container, of any configuration, AS LONG AS IT IS EITHER A SAVAGE CONTAINER, OR ONE USING A SAVAGE ADAPTER STRAP. No other container, of any manufacture, should be lifted by a Lif*TILT*ruk.

1. Adjust the span of the arms on the slide assembly cross so the latch mechanisms are directly under the container handles.

2. Position the latches DIRECTLY UNDER EACH CONTAINER HANDLE.

3. Use the UP button on the operator's control to lift the latch mechanisms upward, until the latch lock plates have swung into position above BOTH HANDLES.

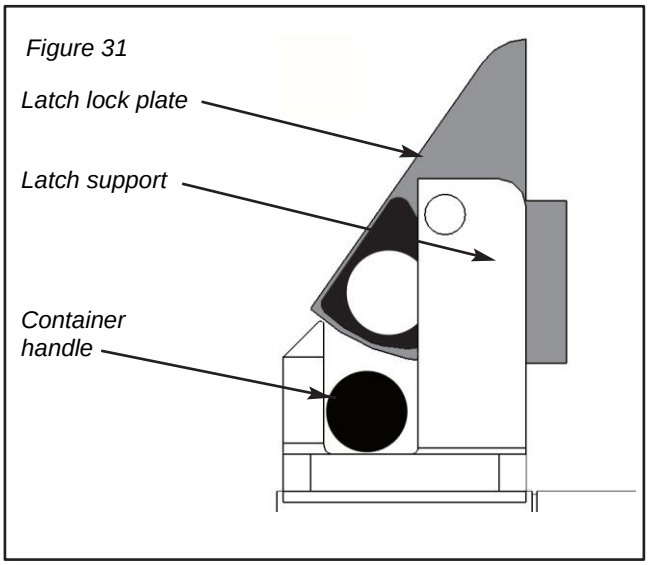
WARNING

Note the position of the latch locks in Figure 31. Each container handle must be ON its support and UNDER its latch lock plate.

Any other condition is UNSAFE and can result in accidents or SERIOUS INJURY during tilting operations.

Take the time to LOOK at both handles and be certain the handles are locked securely under the latch plates.

Figure 31



5. Use the operator's control UP button just enough to lift the container off of its mixer/stand or other device.

6. Use the rear handle to pull the Lif*TILT*ruk far enough from the stand or other device so the container is clear of the device.

7. Use the DOWN button on the operator's control to lower the slide assembly, arms, and container near the bottom of its travel (but before the container touches the floor) prior to transporting the container to any other shop location.

WARNING

NEVER TRANSPORT A CONTAINER UNLESS THE LIF*TIL*TRUK COLUMN SLIDE IS IN THE FULL DOWN POSITION.

Pouring from a Container

1. Make certain handles are locked in latches (Figure 31).

2. Position lifted bowl so that lip of bowl is approximately centered above the target to prevent pouring outside of receptacle.

3. Use the selector switch on the operator control pendant (or the hand crank if so equipped) to rotate the lifted bowl forward. Smoothly pour the contents of the bowl making sure to prevent spilling. When pouring is complete, return bowl to upright position using the selector switch or hand crank.

CAUTION

If the selector switch on the operator control pendant is switched back and forth too rapidly, it will trip the circuit breaker, in which case the circuit breaker switch needs to be turned to ON position to reset the Li*fTILT*ruk.

CAUTION

Do not jam on the operator control pendant into the holder or jerk on the pendant, doing so can loosen wires in the pendant and void the warranty (Figure 32).

Figure 32

Do not jam operator control pendant switch in cutout.

Removing a Container from the Lif*TILT*ruk

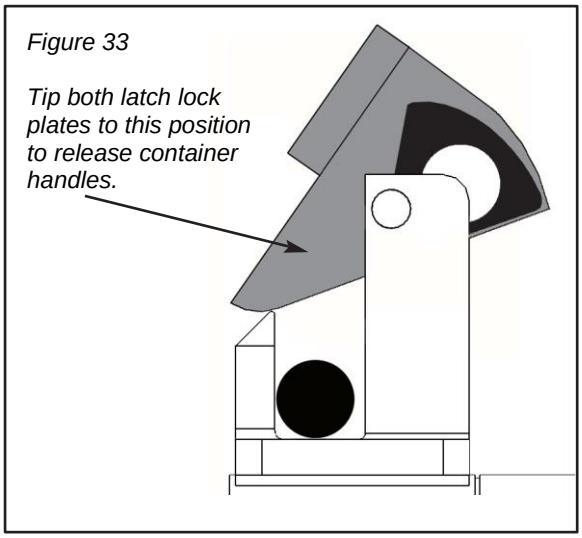
1. Raise the container until it is positioned directly over the receiving equipment, dolly or other support required.

2. Tip the latch lock plates upward to the position shown in Figure 33. The latch lock plates are balanced to stay in this position until the container is freed from the latch mechanisms.

3. Use the operator's control DOWN button to SLOWLY lower the container onto its support.

4. Keep pressing the DOWN button so the Lif*TILT*ruk slide assembly and arms “clear” the container handles.

5. Pull the rear handle of the Lif*TILT*ruk to move away from the container.



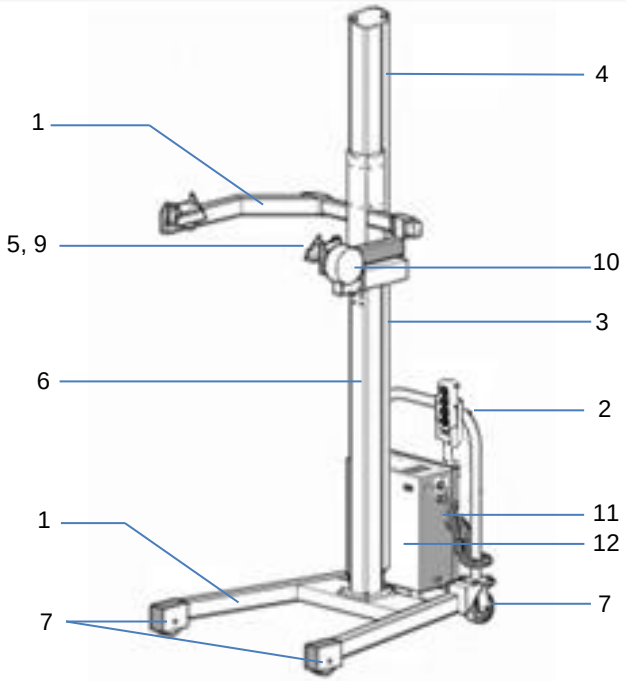
WARNING

Unsafe use of the Lif*TILT*ruk may cause serious injury or death. Operators and maintenance personnel must read this manual and be sure they understand its contents before operating, inspecting, or carrying out maintenance to the Lif*TILT*ruk. This manual should be kept near the Lif*TILT*ruk for reference and be periodically reviewed by all personnel who come into contact with the Lif*TILT*ruk.

PERIODIC MAINTENANCE

Periodic Maintenance Chart

DO NOT WALK
UNDER LIFTED ARMS



No.	Item	Service Action	Interval	Figure Reference
1	Painted and metal surfaces	Wipe with damp cloth to keep clean.	Daily or as needed	Figure 34
2	Operator's control and switch covers	Wipe with damp cloth to keep clean.	Daily or as needed	Figure 35
3	Chain	Check for looseness, rust or corrosion or food debris. Inspect for cracks, breaks in links. Inspect the chain master link.	Weekly	Figure 37
		Lubricate	Monthly	Figure 39
4	Chain idler wheel (inside column guiding chain)	Check for looseness or wobble (indicates worn or damaged bearing).	Weekly	Figure 38
5	Latch mechanisms	Check for free movement. Wipe with damp cloth to keep clean.	Daily or as needed	Figure 36
		Coat lightly with grease.***		
6	Column	Coat lightly with grease.***	Weekly	Figure 40
7	Wheels	Lube with grease gun.**	Monthly	Figure 41
8	Caster locks	Lube with grease gun.**	Monthly	N/A
9	Tilt latch pivots	Lube with grease gun.**	Monthly	Figures 42 & 43
10	Tilt gearbox	Check and refill as needed with Food Grade, Pure White™ - Anti-Seize Grease, with PTFE.	Annually or more frequently	Figure 44
11	Battery terminals and battery cable ends	Wire brush to clean bright surface.*	When changing battery	Figure 46
12	Hydraulic return tubing	Check for overflow of hydraulic fluid in hydraulic return tubing (a small amount is acceptable).		Figure47

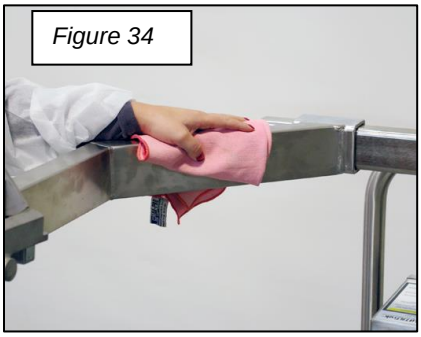
* Follow specific instructions in the "*Servicing the Battery*" section of this manual (pages 40-41).

** Any food grade lithium grease is acceptable. Do not use any type of grease other than lithium grease - other greases will be too sticky.

*** When Lif*TIL*Truk is used in the food industry, use food grade lubricant.

Periodic Maintenance

Figure 34

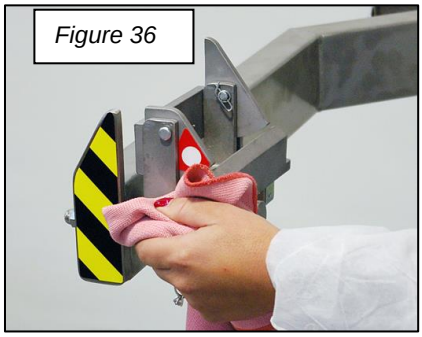


Painted and metal surfaces – wipe with a damp cloth and keep clean – **Daily or as needed**.

Figure 35

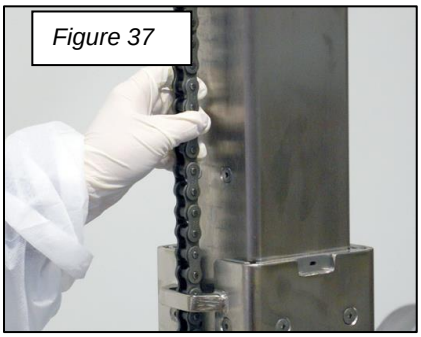
Operator's Control and switch covers – wipe with a slightly damp cloth to keep clean (do not let water drip into Operator's Control) – **Daily or as needed**.

Figure 36



Latch Mechanisms – Check for free movement of the latch mechanism. Wipe off any food debris with a damp cloth – **Daily or as needed**.

Figure 37

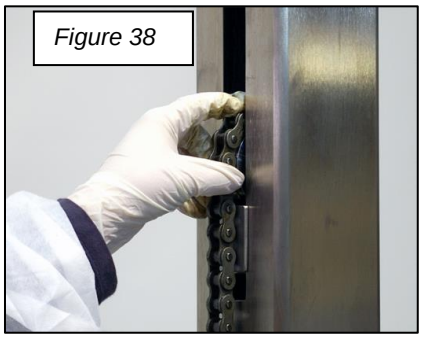


Chain – Check for looseness, rust, corrosion or food debris – **Weekly**.

Note: *In order to check chain and chain idler wheel, remove the chain guard following the steps below:*

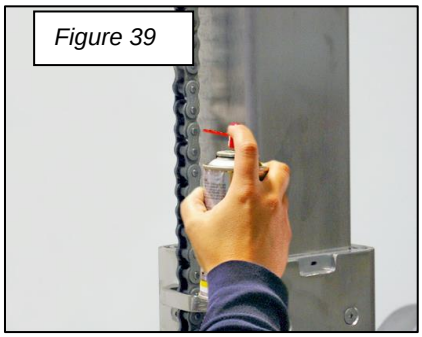
1. *Remove the two hex cap screws from the top of the column using a 1 /2 inch wrench. Be careful not to let the column drop while removing the screws.*
2. *Remove the two hex head screws, securing the chain guard at the base of the column, using a 7/16 inch wrench.*
3. *Reinstall reversing the above steps. Do not over tighten the bolts.*

Figure 38



Chain Idler Wheel – Check for looseness or wobble (indicates worn or damaged bearing) – **Weekly**.

Figure 39

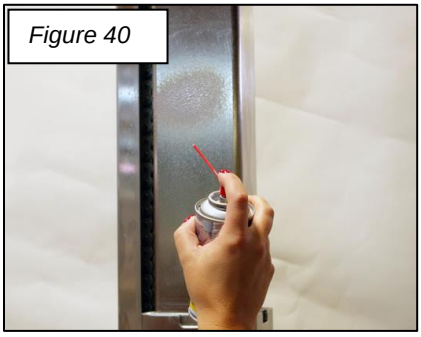


Chain – Lubricate (spray onto chain, using nozzle) with food grade, white grease, aerosol spray can – **Monthly**. ***

Note: *Use Food Grade, White Grease, 16 oz. aerosol spray can, which can be ordered from Grainger, P/N: 1XFC1 or equivalent.*

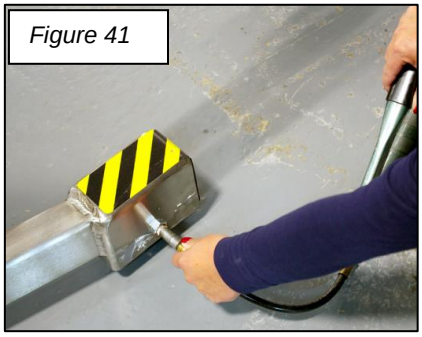
NOTE

Do not "wash down" the Lif*TIL*Truk at any time. Early failure of the chain, idler mechanism and electrical components can result. ONLY WIPE CLEAN with a damp rag.

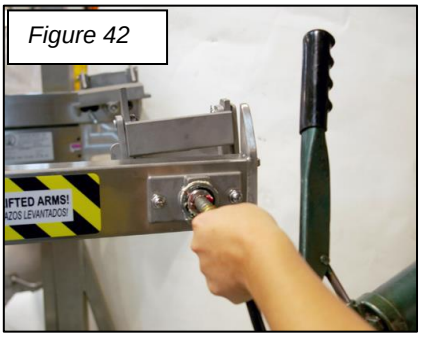


Column – Lubricate (spray onto column) with food grade, white grease, aerosol spray can – **Weekly**. ***

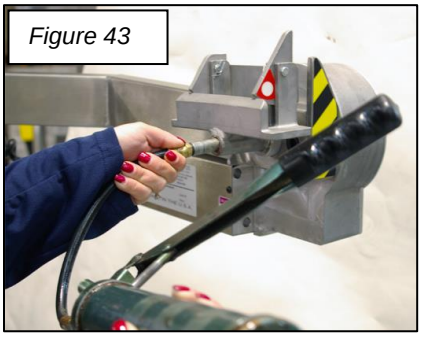
Note: *Spray lubrication onto column, then move column slider past the lubricated location. Wipe off excess lubrication.*



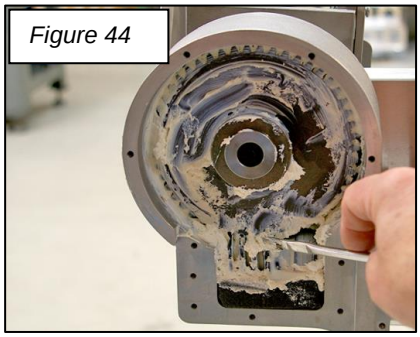
Wheels – Lubricate with grease gun –**Monthly**. **



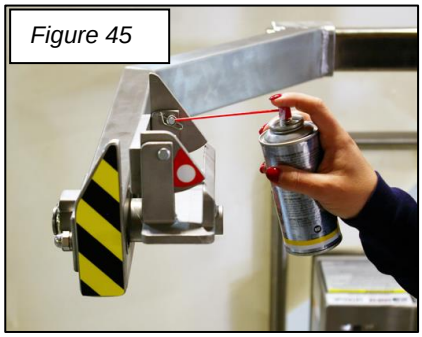
Idler Mechanism Assembly – Lubricate with grease gun – **Monthly**. **



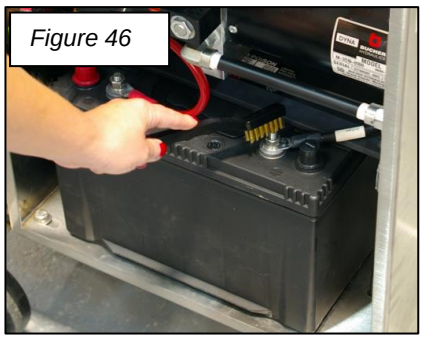
Tilt Latch Pivots – Lubricate with grease gun – **Monthly**. **



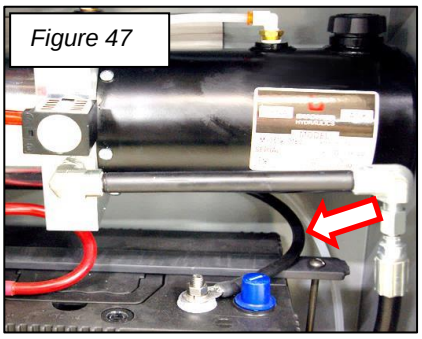
Tilt Gearbox – Check and refill as needed with Food Grade, Pure White™ - Anti-Seize Grease, with PTFE, (Refer to Figure 34 for additional steps) – **Annually or more Frequently**.



Latch Mechanism – Lubricate with food grade, white grease, aerosol spray can (spray onto clevis pins) – **Monthly**. ***



Battery terminals and battery cable ends – Wire brush to clean bright surface – **When changing the Battery**. *



Hydraulic return tubing – Check for overflow of hydraulic fluid in hydraulic return tubing (a small amount is acceptable). – **Weekly**

* Follow specific instructions in "*Servicing the Battery*" section of this manual, (pages 40-41).

** Any food grade lithium grease is acceptable. Do not use any type of grease other than lithium grease -- other greases will be too sticky.

*** When Lif*TIL*Truk is used in the food industry, use food grade lubricant.

Tilt Gearbox Lubrication

1. Remove the eleven 8/32 inch flat head cap screws holding the gearbox main cover and lower cover.
2. Check to be sure that worm gear makes contact with oiled sponge. Add Food Grade, Pure White™ - Anti-Seize Compound with PTFE and/or replace sponge P/N: 0712-04-002 as necessary (see page 89).
3. Use a brush or other applicator to put food grade lithium grease on the worm gear helical and worm gear where they mesh (Figure 47a).
4. Replace the gearbox cover, seal with silicone caulk or similar, replace and tighten the eleven screws holding it to the gearbox main cover and lower cover.

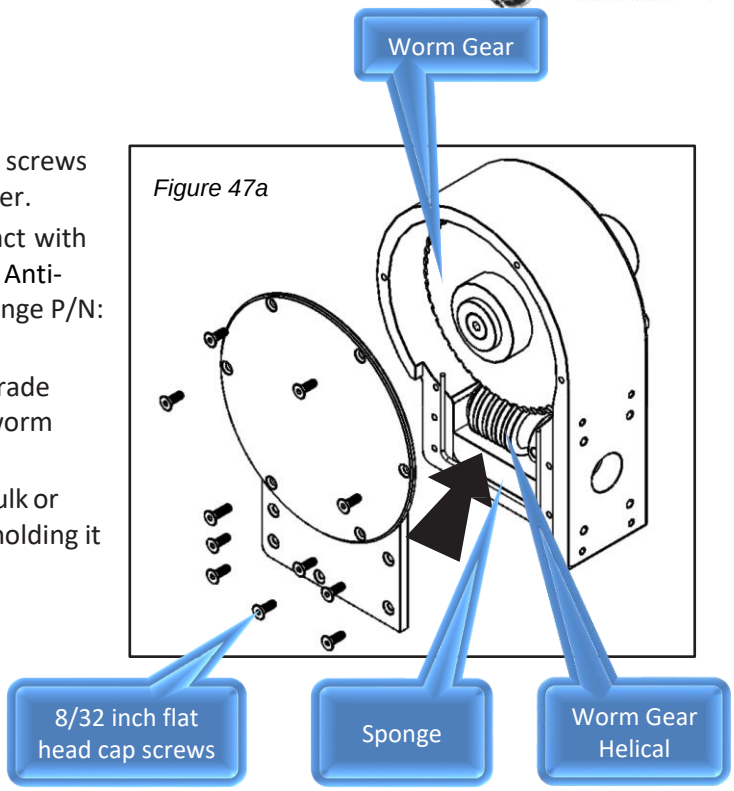


Figure 47a

SERVICING THE LIF*TILT*RUK

⚠WARNING

IN ORDER TO PERFORM SERVICE AND MAINTENANCE, ONLY CERTIFIED ELECTRICAL TECHNICIANS SHOULD OPEN THE ELECTRICAL CONTROL BOX.

Main Control Box

1. In the event that service such as replacing the battery is required inside the main control box, first disconnect the machine's electrical power cord from the charging socket (Figure 48). Use a 5/16" Allen wrench to open the electrical control box door. Be careful not to touch any electrical wires inside the main control box.

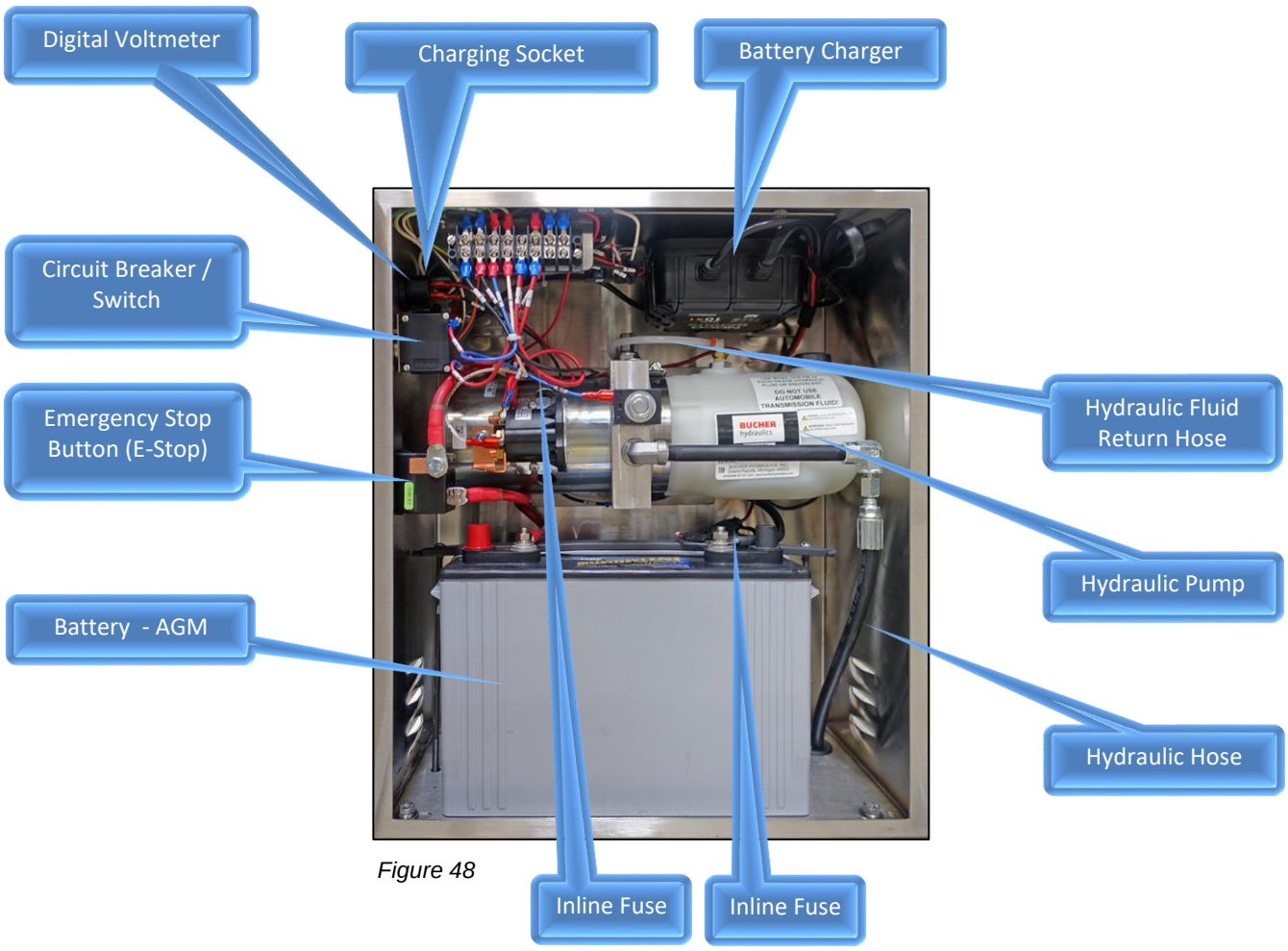


Figure 48

Battery Charging - Inside the Control Box

1. Plug in a common heavy-duty 3-wire extension cord from a 120-volt 60Hz service outlet (or to other voltage source if listed on decal on side of control box such as 240-Volt) to the charging socket on the Lif*TIL*Truk control box.

2. The red Emergency Stop (E-Stop) button must be pulled out to charge the battery. The on-off circuit breaker switch must be in the up position to observe the voltage reading on the Digital Voltmeter, located on the side of the electrical control box (Figure 49).

3. When performing a charge, the green LEDs should be lit (Green Zone) to indicate that the charge is 13.5V DC to 14.6V DC and charging voltage is being delivered from the battery charger to the battery (Fig. 49). Note that if the extension cord is unplugged, and 120V 60 Hz is no longer supplied to the charger, the volts indicated on the Digital Voltmeter and corresponding LEDs may drop. This is a normal condition, in which case make sure that the volts indicated on the Digital Voltmeter is 13.5 V DC or above.

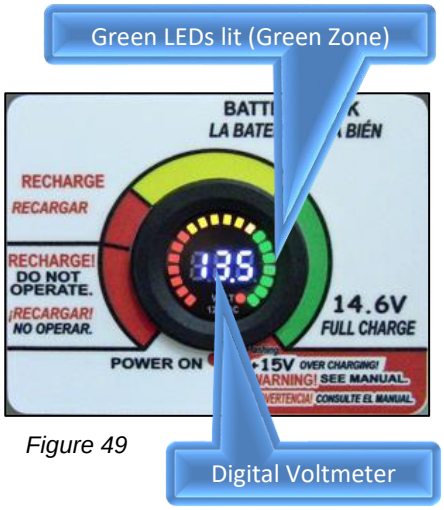


Figure 49

4. A voltage reading of 13.5 VDC to 14.6 VDC, in the center of the Digital Voltmeter with the green LEDs lit, indicates a safe charging range for the entire electrical circuit. Note that even if all the green LEDs are lit, the battery may still not be fully charged, therefore also observe the voltage reading for full charge.

5. Another way to confirm that the battery is fully charged is by opening the control box and observing that the LED on the right side of the Battery Charger is green.

> **⚠WARNING**
>
> **IN ORDER TO PERFORM SERVICE AND MAINTENANCE, ONLY CERTIFIED ELECTRICAL TECHNICIANS SHOULD OPEN THE ELECTRICAL CONTROL BOX.**

6. The Lifter normal operating range is 12V DC to 14.6V DC, on the Digital Voltmeter, with the green and yellow LEDs lit (Green Zone and Yellow Zone) (Figure 50).

7. If the voltage on the Digital Voltmeter and corresponding LED (Yellow Zone) dips below 12V DC and the red LEDs are lit (Red – Recharge Zone), the battery needs to be recharged, as indicated by the label (Figure 50).

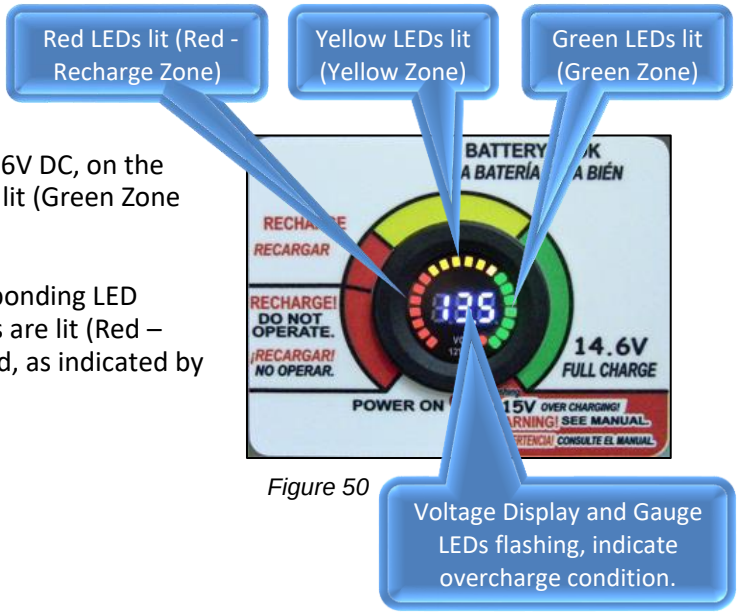


Figure 50

NOTE: — When the arms are lifted on the lifter, the Digital Voltmeter may temporarily drop to 12V DC or below, into the "Red - Recharge Zone", then go back to the normal operating zone when no longer lifting, this is a normal and is not necessarily a recharge condition.

8. The Voltage Display and all the Gauge LEDs on the Digital Voltmeter will flash if the voltage is more than 15V DC, indicating an overcharge condition (Figure 50).

9. If the LEDs dip down into the "Red - Recharge Zone", below 12V DC and the label indicates "DO NOT OPERATE", at that point the lifter should not be operated before recharging, because of lack of charge.

10. If the above conditions are not met, continue reading in this section to determine possible reasons for the lack of charge.

Battery Charging - Outside the Control Box

1. Remove the battery from the electrical control box using the instructions in "*Replacing the Battery*" (page 41).

2. Clean the battery terminals using a wire brush until clean, bright metal is exposed.

3. Use the instructions supplied with your charger to hook up the charging cables and set the correct charging rates for the battery.

4. Check the voltmeter on the charger to be sure it is reading above 14 volts and below 15 volts. If this condition is met, then the battery is being charged correctly. If outside of these values, either the charger is at fault or the battery requires replacement. Check the testing and service sections of this manual to determine the correct action to take.

   NOTE: Use the "*Battery Charging Time* chart" (Figure 51) to determine the approximate length of time required to charge a deeply discharged battery.

Servicing the Battery

⚠WARNING

IN ORDER TO PERFORM SERVICE AND MAINTENANCE, ONLY CERTIFIED ELECTRICAL TECHNICIANS SHOULD OPEN THE ELECTRICAL CONTROL BOX.

Testing the Battery

As long as the Lif*TILT*ruk seems to be "working OK" – it does the work you expect it to do and in a reasonable amount of time between charging, there is no reason to test the battery.

However, if it seems as though the battery doesn't have the power you expect, or if it seems to require frequent recharging, then you should test the battery for its ability to take and keep a charge.

Determining the State of Charge of the Battery

Measure the battery voltage across the terminals using a digital voltmeter capable of reading to 1/100th of a volt. The state-of-charge chart (Figure 51) tells you the actual state-of-charge of the battery.

Conclusions: If the battery is between 90 and 100% state-of-charge per the chart and you believe your lift times are getting longer, or the battery seems to require frequent recharging, then the battery is probably being "overworked." Perhaps the load you are lifting is excessive for the size Lif*TILT*ruk you are using or there is excessive friction between the column and slide assembly. Be especially certain the column is properly lubricated to extend battery life (refer to Lubricating the Column", page 65).

If the battery is below 90 % state-of-charge, the battery must be recharged before any conclusions can be reached.

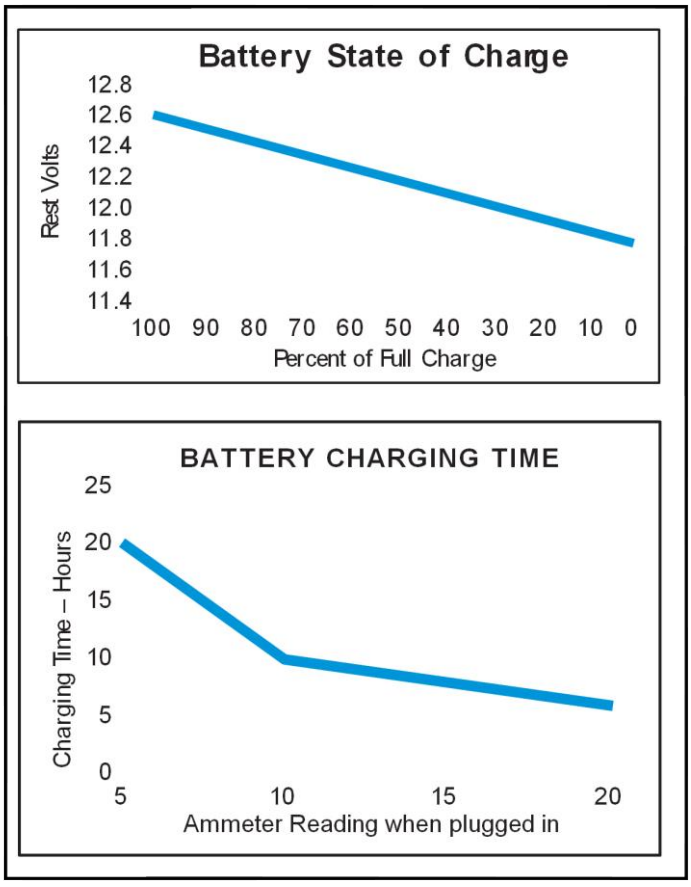


Figure 51

Replacing the Battery

1. Be sure the charging cable is NOT plugged into the charging socket on the electrical control box.
2. Push the circuit breaker switch so it is in the down position to turn off current flow in the Lif*TILT*ruk circuits.
3. Push in the red emergency stop (E-Stop) button.
4. Put on Z87.1 specification full coverage safety goggles or face shield.
5. Use the 5/16" Allen wrench to open the electrical control box door.
6. Using a 1/2 inch wrench, remove the nut and lock washer from the negative terminal of the battery. Tuck the cable out of the way so it cannot touch the negative battery terminal (Figure 52).
7. Using a 9/16 inch wrench, remove the nut and lock washer from the positive terminal of the battery. Tuck the cable out of the way so it cannot touch the positive battery terminal.
8. Remove the long bolts holding the battery hold-down to the top of the battery. Remove the battery hold-down.
9. Lift the battery upward slightly, then out of the electrical control box.
10. Replacement of the battery is a reversal of the above steps.

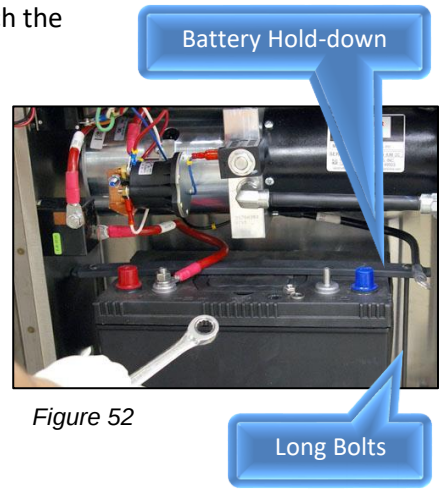


Figure 52

Determining the ability of the Battery to take a charge

1. Give the battery a "normal, overnight charge" of ten (10) hours or more using the charger on-board the Lif*TILT*ruk.
2. Measure the battery voltage using a digital voltmeter capable of reading to 1/100th of a volt.

   After comparing with the state-of-charge chart (Figure 52a) and the battery is not between 90 and 100% state-of-charge, then one of two conditions is possible:

   a. The battery is getting near to the point of replacement.

   b. The battery charger may be at fault.

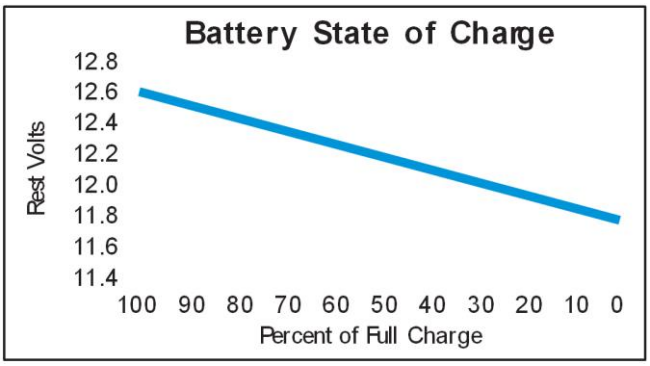


Figure 52a

3. Check the charger for efficiency using instructions in testing the battery charger.

Servicing the Battery Charger

⚠WARNING

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Testing the Battery Charger

1. Install a fully charged battery into the Lif*TILT*ruk. (See Replacing the Battery, page 41). It must be a new or nearly new battery which has been charged overnight using an external charger, not the one on the Lif*TILT*ruk.

2. Measure the battery voltage on this fully charged battery using your digital multimeter, set it, on the DC volts reading to 1/ 100ths of a volt. In other words, be certain it is indeed, fully charged.

3. Look at the Digital Voltmeter, on the electrical control box to be certain it is in the green. If it does not show in the green, reset the circuit breaker (see Resetting the Circuit Breaker, page 28) and/ or pull out the emergency stop button.

   If you have a fully charged new battery installed and you cannot get a green reading on the Digital Voltmeter, then either the Digital Voltmeter is at fault or some other part of the circuitry is at fault. The system will have to be diagnosed by a qualified electrician.

4. If the Digital Voltmeter is in the green, attach the power cord to the charger socket on the Lif*TILT*ruk.

5. With the battery now on charge, touch the leads of your digital multimeter, set on DC volts to the terminals of the battery. The digital multimeter should register more than the battery voltage measured in step 2 above. If it does not register above measured battery voltage, the system needs to be checked by a qualified electrician.

6. If the Digital Voltmeter shows sufficient charging voltage as in step 5 above, unplug the charging cord from the charging socket.

7. Remove the battery using instructions in "*Replacing the Battery*" (page 41).

8. Install a battery which is deeply discharged or almost at that point. (You want a battery which really needs a charge.)

9. Plug the charging cord back into its socket.

10. Measure the voltage across the battery terminals. The voltage should be above 12 volts, indicating that the battery is on charge.

11. The Green LED's should be lit on the Digital Voltmeter, on the side of the electrical control box.

Conclusions: If the battery charger shows that it can provide 15 volts of charging power on a charged battery, and 10 to 15 amps of current flow on a discharged battery, then the charger is performing correctly. If the battery you are testing cannot be charged by this charger, then the battery is at fault and needs replacing. Dispose of old batteries properly.

Replacing the Battery Charger

Required tools

- 5/16” Allen wrench.
- Medium flat blade screwdriver.
- 7/16" socket with 3" extension or combination wrench.
- 1/2" and 9/16" wrench.
- Pencil and paper to make notes about disassembly.

Prepare to Remove the Old Charger

1. Unplug the power supply cord.
2. Put on safety goggles or face shield meeting ANSI Z87.1 specifications.
3. Open the electrical control box door using the 5/16 inch Allen wrench.
4. Remove the battery (see “Replacing the Battery”, page 41): Disconnect the battery negative (–) cable and tuck safely out of the way so it cannot accidentally touch the (+) terminal. Disconnect the positive cable from the battery. Remove the battery hold down bracket. Hold the screws from the top and remove the nuts and washers from the screws on the bottom of the control box.
5. The negative (black with red stripe) wire from the battery charger is connected to the (–) negative terminal of the battery. Disconnect it (Figure 53).

Figure 53

6. The positive (red) wire from the battery charger is connected to the solenoid. Disconnect it (Figure 54).

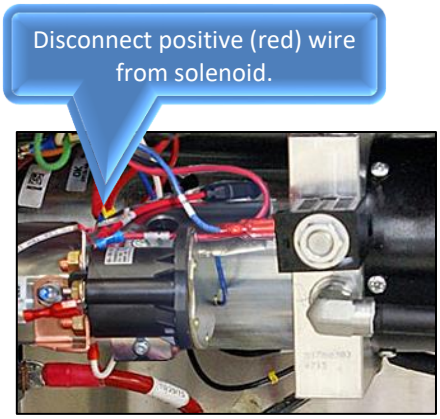


Figure 54

7. Remove the 2 screws holding the power inlet to the side of the control box. Pull the inlet far enough out to gain access to the screw terminals where the black and white wires are secured (Figure 55). Note placement of these wires for reconnection. Disconnect the wires.

Figure 55

Remove the Battery Charger Assembly

1. Remove the battery charger by unscrewing the 2 mounting screws (one on each side) that fasten the charger to the bracket to the top of the control box. It may be possible to remove the charger by unscrewing the screw on the right side, then loosening the one on the left side (Figure 56).

2. It should not be necessary to remove the hydraulic pump.

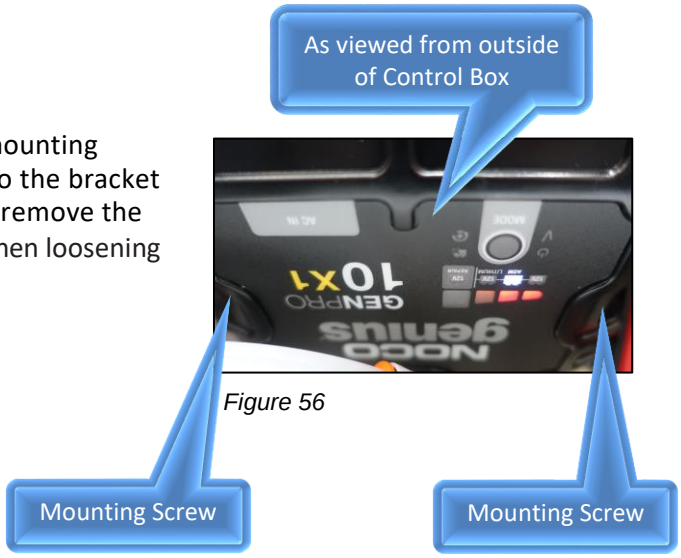


Figure 56

Install the Replacement Charger

1. Mount the replacement charger. Attach the green ground wires. Secure the 2 mounting screws (one on each side) that fasten it to the top of the control box.
2. Connect the charger wires (120 Volt = black/ white, 230 Volt = black/ red, and green) to the terminals of the power inlet. Tighten all connections. Replace the power inlet into the round hole and attach screws.
3. Connect both the negative (black) battery power cable and the charger negative (black with red stripe) wire together to negative terminal, of the on the right side of battery.
4. Connect the (red) positive) wire from the battery charger to the connection on the solenoid.
5. Connect the (red) power cable to the battery. Install the battery hold down bracket; do not over tighten. Be careful not to touch the negative cable to the positive terminal as it could create a spark and cause burns or an explosion.
6. Close and secure the door of the electrical control box before plugging the unit in.

Testing Voltages

Put on safety goggles or face shield meeting ANSI Z87.1 specifications.

1. Open the electrical control box door using the 5/16 inch Allen wrench.
2. Use a DC digital voltmeter to determine if there is voltage between the two voltmeter terminals:
3. If the measured voltage is **10 volts or more**, but the meter still continues to point to the far left, replace the voltmeter.
4. If **no measured voltage** between the terminals, put the negative test probe onto the negative (–) battery terminal and test with positive probe for voltage greater than 10 volts on:

   4a ...positive (+) battery terminal (Figure 57). If yes, proceed to 4b. If no, the battery is discharged or failed. Try recharging it.

Figure 57

4b ...back terminal of emergency stop switch. If yes, proceed to 4c. If no, disconnected (+) battery cable.

4c ...front terminal of emergency stop switch (Figure 58). If yes, proceed to 4d. If no, emergency stop switch is not pulled out.

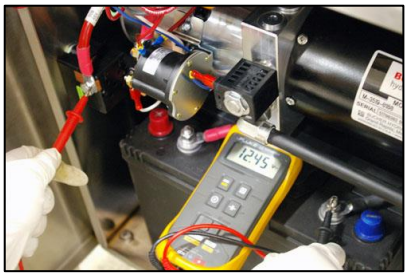


Figure 58

4d ...top power post on solenoid (Figure 59). If yes, proceed to 4e. If no, disconnected emergency stop switch cable.

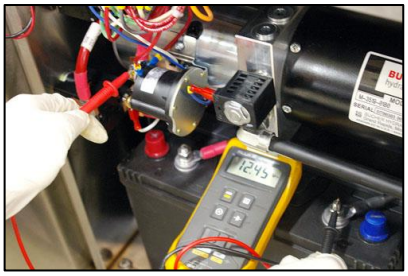


Figure 59

4e ...terminal #4 on the terminal strip (Figure 60). If yes, proceed to 4f. If no, disconnected or broken wire from the top solenoid post to terminal #4.

4f ...top terminal on the circuit breaker (further back inside control box) (Figure 61). If yes, proceed to 4g. If no, circuit breaker is off or faulty. Reset the circuit breaker and test again.

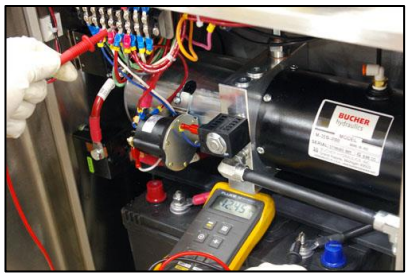


Figure 60

4g ...terminal #3 (Figure 62A) on the terminal strip. If yes, proceed to 4h. If no, disconnected or broken wire from the top terminal on the circuit breaker to terminal #3.

4h ... positive Digital Voltmeter terminal (inside control box, the top terminal of the Digital Voltmeter (Figure 62B). If yes, go to Step 5. If no, disconnected or broken wire between terminal #3 on strip and positive Digital Voltmeter terminal.

Figure 61

Figure 62A

Figure 62B

5. Put the positive test probe onto the positive battery terminal. Test with negative probe for voltage greater than 10 volts on:

   5a ...the bare metal mounting strap of the solenoid (Figure 63). If yes, proceed to 5b. If no, disconnected or bad connection at the battery negative cable. (Check both ends of cable for tightness, etc.)

   5b ...terminal #8 on the terminal strip. If yes, go to 5c. If no, disconnected or broken wire from the negative *ba*ttery cable terminal at the pump base to terminal #8 on the strip.

   5c ...disconnected or broken wire to terminal #8 on the strip to the negative voltmeter terminal.

Figure 63

Servicing the Circuit Breaker

Testing the Circuit Breaker

1. Put on safety goggles or face shield meeting ANSI Z87.1 specifications.
2. Open the electrical control box door using the 5/16 inch Allen wrench.
3. Using a ½ inch wrench, remove the nut and the lock washer from the negative battery terminal and remove the lock washer.
4. Remove the cable from the battery negative terminal and tuck safely out of the way so it cannot accidentally touch the battery terminal.
5. Attach a continuity tester or ohmmeter to the circuit breaker terminals.
6. Push the toggle switch of the circuit breaker down to reset. No continuity: raise the toggle to the full up position. Verify continuity. Resistance should be less than 0.2 ohms.

   If the circuit breaker does not need replacement (that is, it tests OK) then a qualified electrician will have to do a circuit trace using the electrical diagram to determine which circuit in the system is open or otherwise defective.

Preparing the Replacement of the Circuit Breaker

If the circuit breaker does needs replacement, follow the steps below:

1. Push the circuit breaker switch so it is in the down position to turn off current flow (Figure 64).

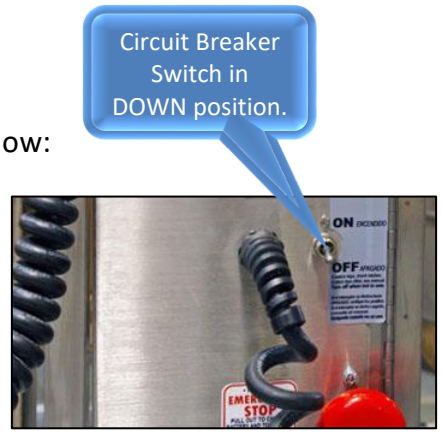


Figure 64

2. Push in the red emergency Stop (E-Stop) button (Figure 65).

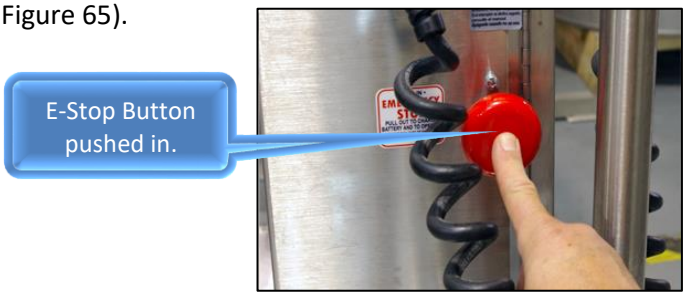


Figure 65

3. Remove the nut and lock washer from the negative terminal of the battery (see Figures 66 and 67). Tuck the cable out of the way so it cannot touch the negative battery terminal (Figure 68).

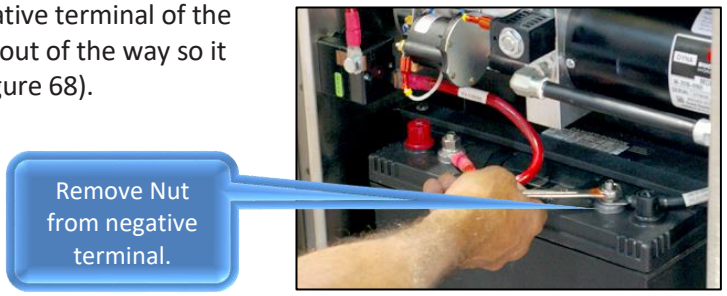


Figure 66

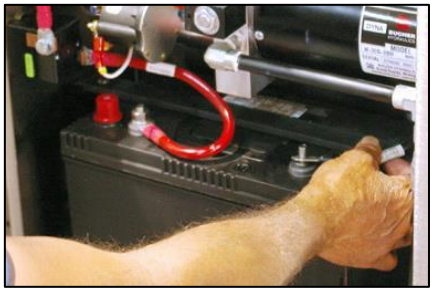


Figure 67

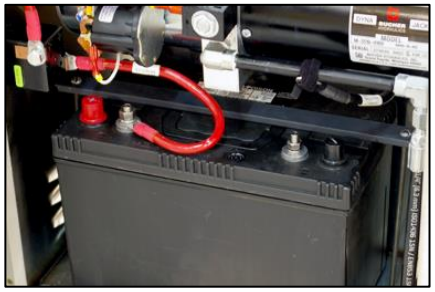


Figure 68

Replacing the Circuit Breaker

1. On the outside of the electrical control box, remove the screw and nut holding the circuit breaker unit in place (Figures 69 and 70).

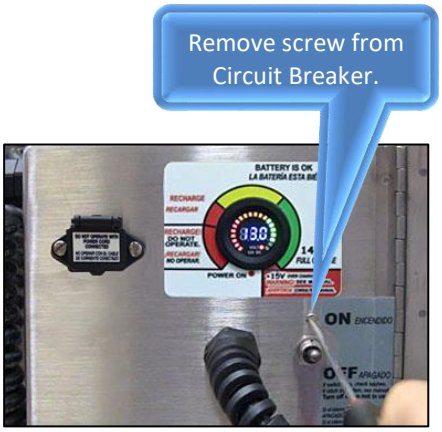


Figure 69

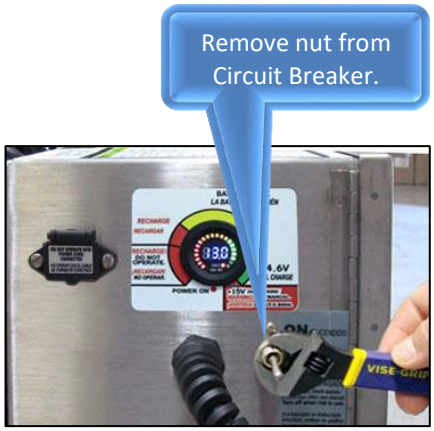


Figure 70

2. Remove the wires from the circuit breaker terminals (Figures 71 and 72).

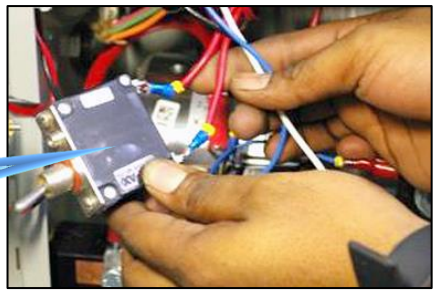


Figure 71

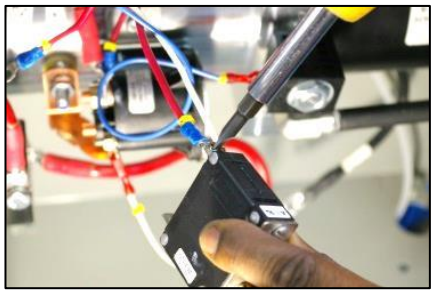


Figure 72

3. Remove the circuit breaker (Figure 73).

4. Replacement is a reversal of the above four steps.

When attaching the terminals, make sure the "LOAD" terminal connects to terminal ring "3" and "LINE" terminal connects to terminal ring "4."

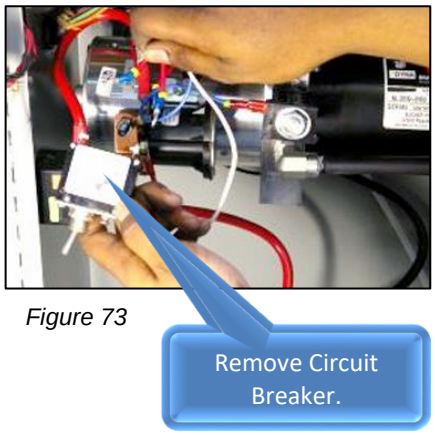


Figure 73

Servicing the Digital Voltmeter

Testing the Digital Voltmeter

1. If the Digital Voltmeter is suspected to be faulty, install a discharged battery in the Lif*TILT*ruk using the instructions in "Replacing the Battery" (page 41).
2. Connect the battery charging cable to the socket on the electrical control box so the battery is being charged.
3. Look at the Digital Voltmeter and its charge rate to determine if the meter is faulty and should be replaced.

Replacing the Digital Voltmeter

1. Remove the charging cable from the charging socket.
2. Turn the circuit breaker to OFF position (DOWN).
3. Put on safety goggles or face shield meeting ANSI Z87.1 specifications.
4. Open the electrical control box door using the 5/16 inch Allen wrench.
5. Using a ½ inch wrench, remove the nut and lock washer from the negative battery terminal.
6. Remove the cable and wire from the battery negative terminal and tuck them safely out of the way so they cannot accidentally touch the battery terminal.
7. First follow steps 1 through 6 then:
   A… Remove the connectors to the Digital Voltmeter from terminal locations #3 and #8, using a Phillips screwdriver.
   B… Inside the control box, unscrew and remove the nylon retaining nut that secures the Digital Voltmeter, then remove the Voltmeter.
8. Reverse steps 1 through 7, above, to complete the installation of the Digital Voltmeter and return the Lif*TILT*ruk to service.

Servicing the Inline Fuses

If your Lif*TILT*ruk has two inline fuses (Figure 74a). They should be checked whenever the battery charger does not move the Digital Voltmeter into the green charging zone (13.5 VDC to 14.6 VDC) when the battery is on charge.

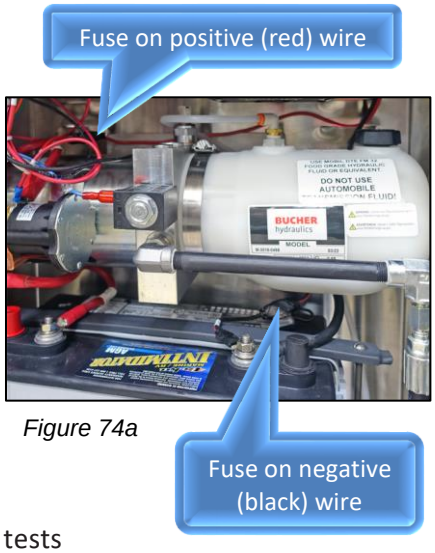


Figure 74a

1. Put on safety goggles or face shield meeting ANSI Z87.1 specifications.
2. Open the electrical control box door using the 5/16 inch Allen wrench.
3. Locate the fuses, one on the positive (red) wire, and one on the negative (black with red stripe) wire, near the ends of each wire, and remove the fuses (Figure 74a).
4. If the fuses are not blown, have a qualified electrician perform any tests required to troubleshoot the charging system.
5. If a fuse or both fuses are blown, replace them with new fuses (15A "mini" 32V automotive, 2 prong) P/N: 9400-80-052.
6. If the fuses blow frequently in service, a qualified electrician should check the system circuits to locate the source of any electrical trouble.

Checking the Battery Charger

Your Lif*TILT*ruk battery charger should be checked whenever the does not move the Digital Voltmeter into the green charging zone (13.5 VDC to 14.6 VDC) when the battery is on charge. To Turn the battery charger on, open the control box cover and locate the "Mode" button, underneath the battery charger (Figure 74b). Press the "Mode" button to cycle through and observe that the "Mode 2" (AGM) light illuminates (Figure 74b). To Charge the battery charger, plug the charging cable in then then pull out the Estop Knob, on the Control Box.

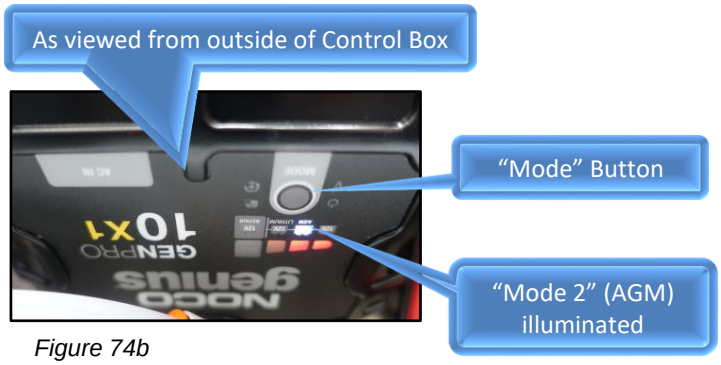


Figure 74b

For the battery charger features, refer to Figure 74c an Figure74d below:

(For GENPR01OX1/1OX2/1 OX3/1OX4, each bank is isolated and functions independently.)

1. Mode Button Push to cycle through charging Modes.

2. Overvoltage Error LED - Illuminates solid Red; Battery Voltage is above Protect voltage.

3. Bad Battery Error LED - Illuminates solid Red when connected battery will not hold a charge.

4. Reverse Polarity Error LED - Illuminates solid Red when reverse polarity is detected.

5. Standby LED - Illuminates when the charger is in Standby Mode, the charger is not charging or providing any power to the battery.

6. Charge LED - indicates the connected battery(s) state-of-charge.

7. Mode LED - Indicates the Charge Mode the charger is currently in. Push the MODE button to cycle through charge Modes.

8. Press and Hold» Mode LED Mode button - must be pressed and held for 3 seconds to enter the mode.

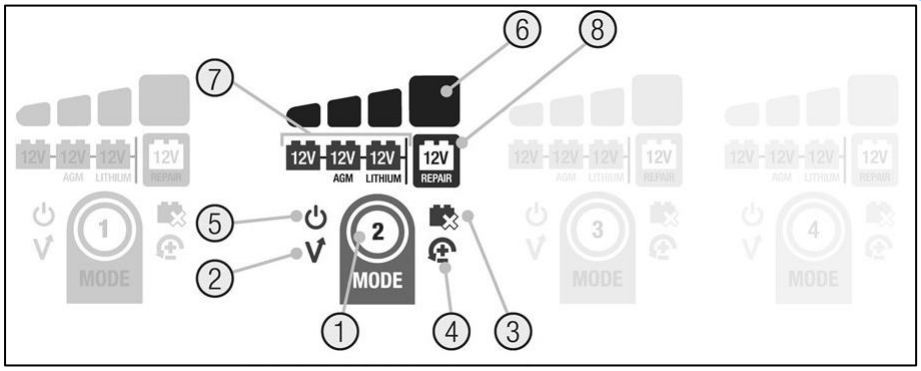


Figure 74c

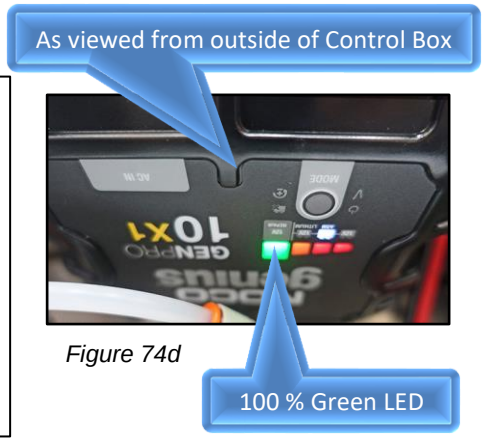


Figure 74d

Refer to the chart below and observe and make sure that the charge reaches the 100 % Charge, and the Green LED illuminates.

	Explanation
25%  Red LED	The 25% Charge LED will slowly pulse "on" and "off" when the battery is less than 25% charged. When the battery is 25% charged, the 25% LED will go solid and the next LED will begin to pulse.
50%  Red LED	The 50% Charge LED will slowly pulse "on" and "off" when the battery is 25% - 50% charged. When the battery is 50% charged, the 50% LED will go solid and the next LED will begin to pulse.
75%  Orange LED	The 75% Charge LED will slowly pulse "on" and "off" when the battery is 50% - 75% charged. When the battery is 75% charged, the 75% LED will go solid and the next LED will begin to pulse.
100%  Green LED	The 100% Charge LED will slowly pulse "on" and "off", when the battery is less than 100% fully charged. When the battery is fully charged, the Green LED will be solid, and the 25%, 50% and 75% Charge LEDs will turn "off".
Maintenance  Green LED	During Optimization, the 100% Charge LED will pulse "on" and "off" slowly. Once the battery is fully optimized the 100% Charge LED will turn solid green. The charger can be left connected to the battery indefinitely.

Understanding Error LEDs

LED	Reason/Solution
 Solid	Charger is in Standby mode or Battery voltage is too low for charger to detect.
 Solid	Battery voltage is too high for the selected charge mode. Check the battery and charge mode.
 Solid	Possible battery short/ Battery will not hold a charge. Have battery checked by a professional.
 Solid	Reverse polarity. Reverse the battery connections.
 Flashing	Charger internal temperature too high / Charger will resume function once the Charger internal temperature drops. Charger ambient temperature too cold / Charger will resume function once the Charger ambient temperature rises.

Raising and Lowering the Lif*TILT*ruk for Service

⚠WARNING

This method (Figure 16c) requires the use of THREE PERSONS. Any fewer than three persons creates a dangerous situation which could result in damage to the Lif*TILT*ruk components or worse, injury to the persons servicing the unit.

The Lif*TILT*ruk must be raised and blocked off the floor before any service can be performed on the wheels or casters, or the column and related hydraulic systems.

1. Use an overhead crane or forklift truck to first lift the rear of the Lif*TILT*ruk, the electrical control box side.
2. With the Lif*TILT*ruk lifted and tilting forward, put a 4" x 4" or 6" x 6" block of wood underneath the frame (Figure 75). The block must be long enough to support BOTH LEGS OF THE FRAME.

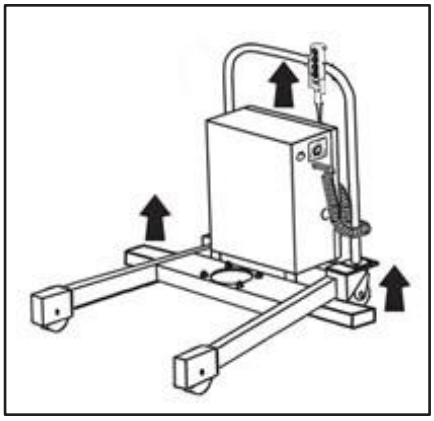


Figure 75

3. Tilt the Lif*TILT*ruk backwards and slide another block, identical to the rear block, under the front of the frame legs (Figure 76). Servicing to the wheels, casters, column or associated hydraulic parts can now be performed.
4. Reverse steps above to remove the Lif*TILT*ruk from its blocked- up position, front wheels first then rear casters, and return the unit to the floor.

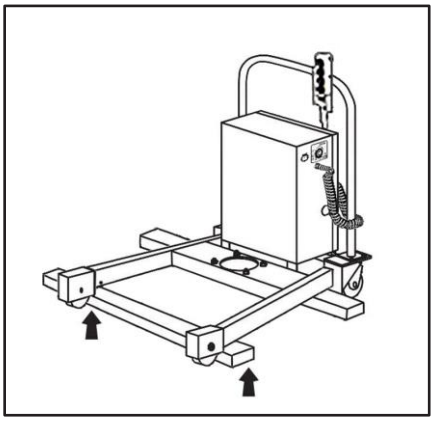


Figure 76

Lift*TILT*ruk Tilt Motor Troubleshooting

In the case of Tilt Motor issues, proper voltage going to it must be determined. In order to determine proper voltages, follow the steps below:

⚠WARNING

IN ORDER TO PERFORM SERVICE AND MAINTENANCE, ONLY CERTIFIED ELECTRICAL TECHNICIANS SHOULD OPEN THE ELECTRICAL LOCK.

Tools Required:

- 5/16 inch Allen wrench
- Digital multimeter

1. Pull Emergency Stop Button (Estop) out and move circuit breaker switch to the up position.
2. The Digital Voltmeter, on the side of the control box should show “in the green".
3. Raise the circuit breaker switch to the full up position.
4. Open the electrical cabinet door using the 5/16 inch Allen wrench.
5. Set the multimeter to the DC setting.
6. Place the red multimeter lead on **terminal #3** on the terminal strip. Place the black multimeter lead on **terminal #2** on the terminal strip (Figure 77). The voltage reading on the multimeter needs to be 0V. Select the **“FORWARD”** position on the control pendant, at which point the voltage should go to **12V** or slightly higher.

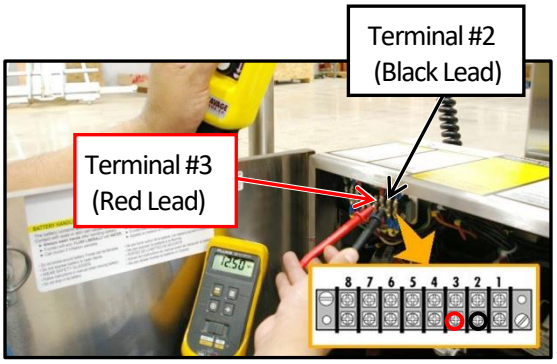


*Figure 77– **“FORWARD”** Position*

7. Place the red multimeter lead on **terminal #3** on the terminal strip. Place the black multimeter lead on **terminal #1** on the terminal strip (Figure 78). The voltage reading on the multimeter needs to be 0V. Select the **“REVERSE”** position on the control pendant, at which point the voltage should go to **12V** or slightly higher.

   If voltages are correct up to this point, it is an indication that the operator control pendant is functioning properly. If this is not the case, the wiring in the operator control pendant needs to be inspected. Check to make sure that the terminals are tight and there are no loose wires.

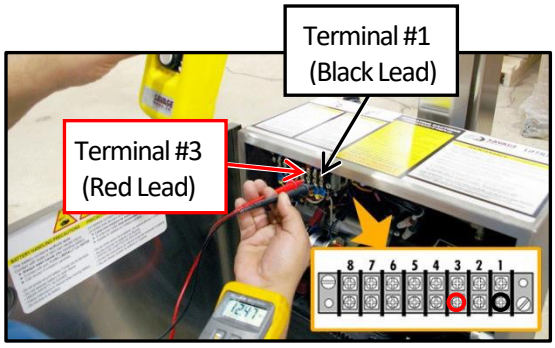


*Figure 78– **“REVERSE”** Position*

If the voltages were correct in the previous steps, then proceed with the steps below in order to determine if proper voltages are present at the motor coil cord connector.

1. Unscrew the tilt motor coil cord connector and disconnect it from the tilt motor assembly (Figure 79).

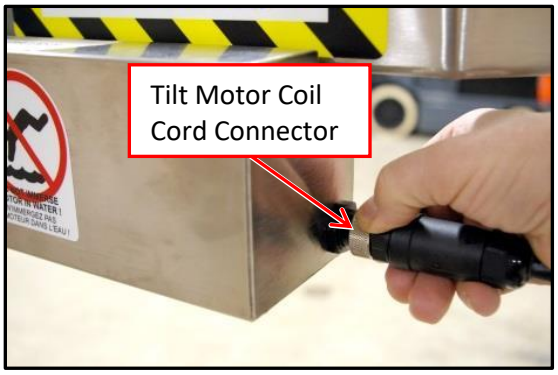


Figure 79 – Disconnect the Coil Cord

2. Place the red multimeter lead on **terminal #3** on the terminal strip. Place the black multimeter lead into **pin #3** on the coil cord connector (Figure 80). When inserting the multimeter leads make sure not to expand the pins in the connector. The voltage reading on the multimeter needs to be 0V. Select the **"FORWARD"** position on the operator control pendant at which point the voltage should go to **12V** or slightly higher.

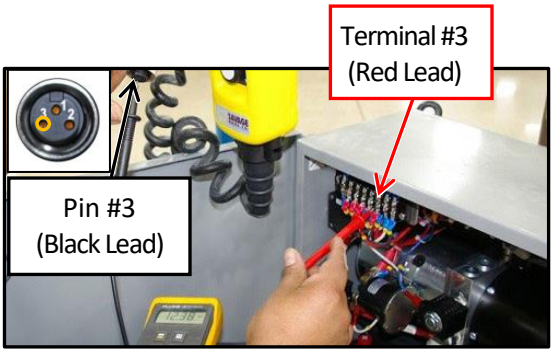


*Figure 80– **"FORWARD"** Position*

3. Place the red multimeter lead on **terminal #3** on the terminal strip. Place the black multimeter lead on **pin #2** on the coil cord connector (Figure 81). The voltage reading on the multimeter needs to be 0V. Select the **"REVERSE"** position on the operator control pendant at which point the voltage should go to **12V** or slightly higher.

   If all the voltages are correct going to the tilt motor coil cord connector, the tilt motor assembly may need to be replaced, contact Savage Bros. Co. for assistance. Please make the model number and serial number readily available when contacting savage Bros. Co.

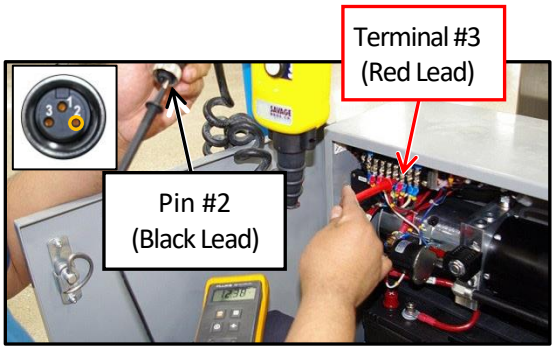


*Figure 81 – **"REVERSE"** Position*

Replacing Pendant Components

Replacing the Pendant

1. Put on safety goggles or face shield meeting ANSI Z87.1 specifications.
2. Open the electrical control box door using the 5/16 inch Allen wrench.
3. Remove ground cable from the battery by unscrewing the securing nut on top of it.
4. Unscrew the protective plastic cover from front of the button on the pendant.
5. Loosen the lock ring holding the button to the pendant case.
6. Remove screws from the cover of the pendant case and remove the cover.
7. Remove wire connections to pendant, noting their positions.
8. Reassembly with replacement pendant is a reversal of the above procedure.

Checking or Adding Hydraulic Fluid

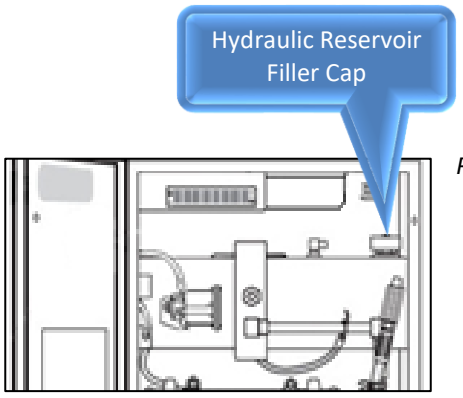


Figure 82

1. Lower the slide assembly to the bottom of the column.
2. Put on safety goggles or face shield meeting ANSI Z87.1 specifications.
3. Open the electrical control box door using the 5/16 inch Allen wrench.
4. Locate the hydraulic reservoir filler cap in the top of the motor/ pump assembly (Figure 82). Remove the cap.
5. Use a mirror to look down into the filler hole of the reservoir. The hydraulic fluid should be ½ inch below the top of the top of the Hydraulic Reservoir filler cap. If the fluid is not at this level, fill the reservoir to that level using Mobil DTE FM 32 Food Grade Hydraulic Fluid or its equivalent (refer to page 75 for equivalent hydraulic fluids). (An "old-fashioned oil can" with a thumb-style pumping device is probably the handiest way to put fluid into the reservoir.) **DO NOT USE AUTO MOBILE TRANSMISSION FLUID!**
6. Reverse steps 1-5 above to complete the filling operation.

Removing and Replacing the Column

Removal of column

1. Block the Lif*TIL*Truk up according to instructions in *"Raising and Lowering the* Lif*TIL*Truk *for Service"* (page 54). Make sure the column slide assembly is lowered all the way before continuing.
2. Press the DOWN control button while pulling outward on the lift chain. This will force the hydraulic piston to the very bottom of the cylinder. Press the button only as needed.
3. Put the circuit breaker switch into the OFF position.
4. Open the electrical control box door using the 5/16 inch Allen wrench.
5. Remove the nut and washer from the negative battery terminal.
6. Remove the cable from the terminal and tuck it safely out of the way so it cannot accidentally touch the battery terminal.
7. Remove the hydraulic return tubing from its fitting on top of the reservoir. To disconnect, push in the tubing and the ring, hold pressure on the ring and pull the tubing out. Pull the tubing through the hole in the electrical control box until it is free, underneath the frame. Keep rags handy in the event that hydraulic fluid spilling occurs.
8. Put something under the column to catch fluid which might spill out when you remove the hydraulic hose and fuse.
9. Remove the hose end from the hydraulic fuse.
10. Pull the hydraulic hose up into the electrical control box and put the end of the hose above the top of the pump. This will keep hydraulic fluid from continuing to leak from the hose.
11. Remove the hydraulic fuse from its fitting on the end of the cylinder in the column.
12. Take up slack in the sling system, see "Lift the Column Over the Base" (page 19) so the column is fully supported by the web strap.
13. Remove the four nuts which hold the column to the base of the frame.

14. Using an appropriate sling and lifting system, pull the column upward, free of the base, while carefully leading the hydraulic return tubing out of the hole in the base, see “Lift the Column Over the Base” (page 19) section for further instructions.

    The column is now free from the base. Service on the chain or hydraulic components can now be performed.

Replacement of the Column

15. Reverse steps 13 and 14 above to put the column back on the base and tighten the nuts on the column studs.
16. Put Teflon® hydraulic system sealing tape on the hydraulic fuse. Be sure the arrow on the fuse points toward the right angle fitting, at the bottom of the column.
17. Install the fuse into the right angle fitting on the end of the hydraulic cylinder. Tighten the fitting snugly. It must be tight enough to prevent leaks. You will check for leaks at a later step.)
18. Bring the hydraulic hose out of the control box, through the hole and under the base.
19. Attach the hose fitting to the hydraulic fuse. Tighten it snugly. You will check for leaks at a later step.
20. Attach the hydraulic return tubing to the fitting on the reservoir inside the electrical control box by holding pressure on the ring and pushing the tubing in.
21. Remove the filler cap from the hydraulic reservoir.
22. Add enough Mobil DTE FM 32 Food Grade Hydraulic Fluid its equivalent to the reservoir to bring the fluid level to within 1/2” (13mm) of the top of the reservoir. Refer to page 75 for equivalent hydraulic fluids.
23. Replace the filler cap, finger tight.
24. Reattach the negative battery cable and wire to the negative terminal of the battery.
25. Install the negative battery terminal washer and nut then tighten.
26. Pull the circuit breaker switch into the up (ON) position.
27. Use the UP and DOWN buttons on the pendant to move the slide assembly its full travel, up and down on the column, several times.
28. Look at the connections between the right angle fitting, the hydraulic fuse and the hydraulic hose to see if any joints are leaking. If any leak, tighten them. Repeat these steps until you are satisfied that the full travel of the slide assembly is OK and that no leaks are in the system.
29. Lower the slide assembly all of the way to the bottom of its travel.
30. Remove the filler cap to the hydraulic reservoir and check the level of the fluid. If required, add to the reservoir until the fluid is at the correct level.
31. Replace the filler cap, finger tight.

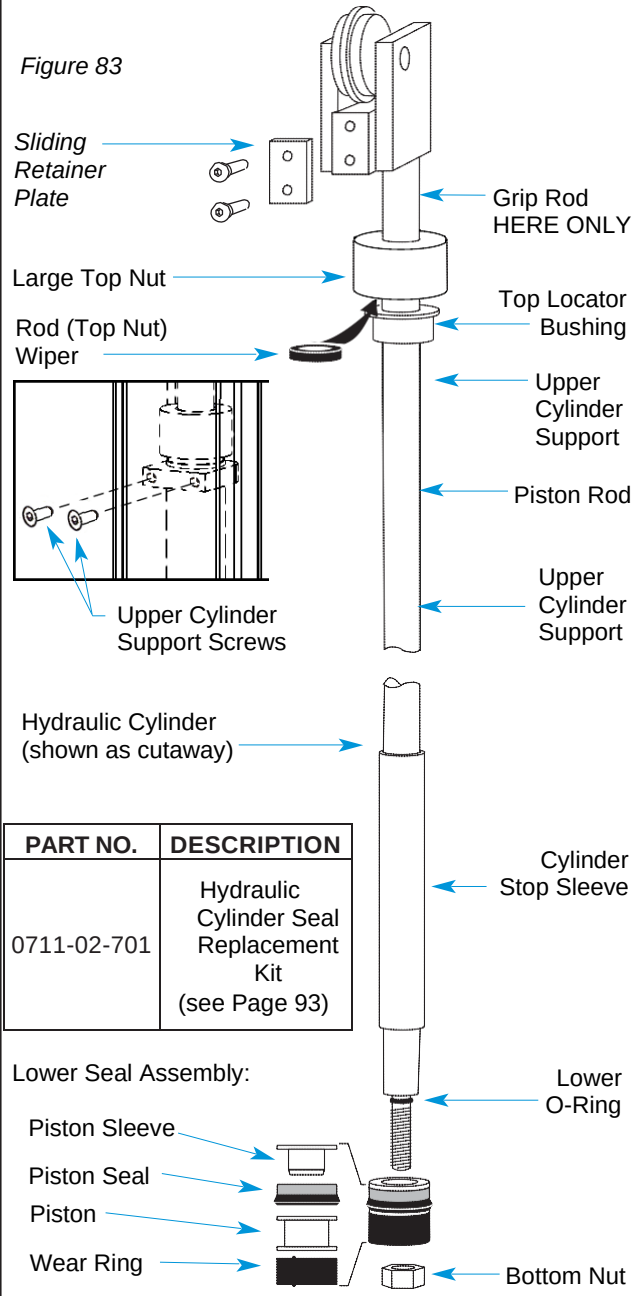
    Reverse steps as required to put the Lif*TIL*Truk back on the floor, now ready for use.

Replacing the Hydraulic Cylinder Seal

Refer to Figure 83.

1. Before the hydraulic cylinder can be serviced the column must be removed from the base. Use the instructions in "*Removing and Replacing the Column"* (page 58).
2. Lay the column with the CHAIN SIDE UP on a clean surface with enough clearance at the base of the column to allow removal of the hydraulic assembly.
3. Remove the two screws and the retaining plate.
4. Remove the two upper cylinder support screws which secure the top of the hydraulic cylinder to the column.
   (**NOTE**: Very early models of the Lif*TILT*ruk may not have this retainer and screws.)
5. Unscrew the four base screws holding the hydraulic cylinder inside the column.
   (**NOTE**: There may, or may not, be shims between the column and cylinder base. If there are any shims, NOTE THEIR LOCATION AND REPLACE THEM IN EXACTLY THE SAME POSITION AS THEY WERE ORIGINALLY INSTALLED.)
6. Remove the cylinder and take it to a clean bench or other clean work area. Be careful not to pinch the hydraulic return tubing when pulling the cylinder out of the column.
7. Using an adjustable pipe wrench with a rag on the teeth, remove the large top nut along with the rod wiper from the cylinder. Be careful not to scratch the large top nut with the wrench.
8. Slide the piston assembly from the cylinder. Slide the cylinder stop sleeve and top locator bushing from the piston.

Figure 83



PART NO.	DESCRIPTION
0711-02-701	Hydraulic Cylinder Seal Replacement Kit (see Page 93)

9. Remove the bottom nut from the piston shaft. A pipe wrench can be used to prevent the piston rod from turning BUT BE CERTAIN THE WRENCH IS USED ONLY ON THE TOP THREE INCHES OF THE PISTON ROD IN THE POSITION IN FIGURE 78. Marks left by the wrench only in this area will not damage any seals.
10. Remove the bottom seal system from the piston rod.

11. Remove the old O-ring from the rod and replace it with the new O-ring in the repair kit.
12. Remove the old piston seal from the piston sleeve and insert the piston sleeve in the new seal provided in the repair kit. Note that the blue portion of the seal is on the up-side of the assembly, and the black (lip) portion is on the down-side of the assembly.
13. Remove the wear ring (with the slit) from the piston and replace it with the new wear ring in the repair kit.
14. Remove the old rod wiper from the inside of the large nut and replace it with the new rod wiper in the "*Hydraulic Cylinder Seal Replacement Kit"* (see page 93).
15. Put the large nut, new rod wiper, top locator bushing and cylinder stop tube back onto the piston rod assembly.
16. Put the complete seal assembly back onto the bottom of the piston rod and reinstall the bottom nut. Use a wrench to make the nut tight. If using a pipe wrench on the piston rod, be sure to keep it in the upper 3 inches, as shown in Figure 83.
17. Slide the rod assembly into the hydraulic cylinder.
18. Slide the upper cylinder support (if your Lif*TILT*ruk has one) to the top of the hydraulic cylinder and slide the hydraulic cylinder assembly into the column. When the holes in the support match up with the holes in the column, insert the screws and tighten them securely.
19. The rest of the reassembly procedure involves reversing the disassembly steps, 1 through 11 above, while observing the cautions and instructions provided in the Assembly Guide at the beginning of this manual.
20. When the Lif*TILT*ruk is fully assembled and back on the floor, check the reservoir on the hydraulic pump for fluid level. Add Mobil DTE FM 32 Food Grade Hydraulic Fluid or its equivalent to the reservoir, if needed, to bring the level to within 1/2 inch (13mm) of the top of the reservoir. Refer to page 75 for equivalent hydraulic fluids. Replace the cap on the reservoir.

    NOTE: when the column is disassembled, there is no better time to check and, if necessary, replace the idler wheel and bearing assembly. Refer to the parts diagram on page 93, and you can see that removing the set-screw and dowel allows fast replacement of this component.

Replacing the Chain and Idler Wheel

1. Follow all instructions in "*Removing and Replacing the Column"* (page 58) until the column is free from the base.
2. Follow steps 2 through 6 in "*Replacing the Hydraulic Cylinder Seal"* (page 60).
3. Remove the four screws that hold the chain retainer inside the column and pull the chain out.
4. Use a chain breaking tool to remove the pins from the chain retainer slide assembly plate and column chain retainer.
5. Install a new chain, retaining it by using the chain breaker replacement mechanism to drive the retainer pins back into their bosses.
6. Reassembly is a reversal of steps 1- 3 above.

   NOTE: When the column is disassembled, there is no better time to check and, if necessary, replace the idler wheel and bearing assembly. Refer to the parts diagram on page 93, and you can see that removing the set-screw and dowel allows fast replacement of this component.

   NOTE: If you do not own a professional quality chain breaker tool, or if you do not have experience working with this tool, Savage Bros. Co. urgently recommends that you employ the services of a professional repair person who is experienced in this operation. A poor chain replacement job can result in failure of the chain retaining mechanism with serious injury or DEATH resulting from loss of the lifting chain.

Replacement of the Tilt Motor Coil Cord and Connector

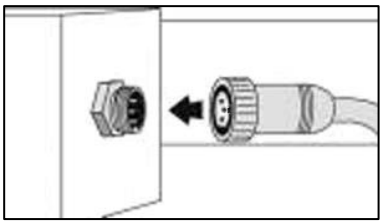


Figure 84

1. Put on safety goggles or face shield meeting ANSI Z87.1 specifications.
2. Open the electrical control box door using the 5/16 inch Allen wrench.
3. Disconnect the battery ground cable from the battery. Push the cable out of the way so that it will not accidentally make contact with the battery negative terminal.
4. Disconnect the coil cord plug connector from the tilt motor receptacle (Figure 84).
5. Remove and save the screw and washer that holds the coil cord support plate to the end of the arm slide assembly.
6. Disconnect the old coil cord wire connectors from the terminal strip – terminals #1 & #2 (Figure 85).

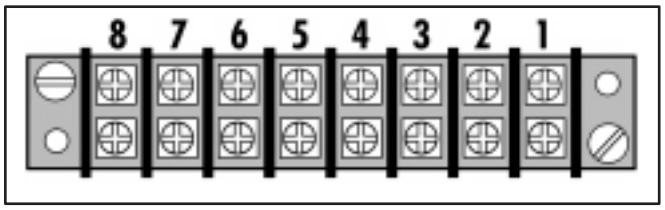


Figure 85

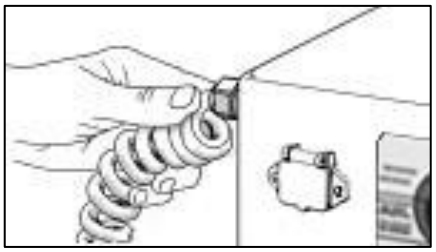


Figure 86

7. Unscrew the cord grip from the back of the box using an adjustable wrench. You will need to hold the locknut inside the box with a screwdriver or pliers. Access the locknut from inside the box (Figure 86).
8. Pull the old coil cord out and remove the locknut.
9. Install the new coil cord wires into the mounting hole. Feed the wires through the locknut. Screw the cord grip into the lock- nut. Hold the locknut with a screwdriver or a pair of pliers while tightening the cord grip on the outside. Do not over tighten.
10. Connect the coil cord wire connectors to the terminal strip. The black wire connects to terminal #1. Connect the white wire to terminal #2 (Fig. 85).
11. Attach the coil cord support plate to the end of the arm slide assembly. Tighten the screw and washer.
12. Connect the plug connector to the tilt motor receptacle.
13. Connect the battery negative power cable to the battery negative terminal. Use approved safety precautions.

Replacing the Tilt Motor Drive

NOTE: The Tilt Motor is under warranty terms. If it is replaced directly by the customer, the warranty will not be honored unless approved in advance by Savage Bros. Co.

1. Remove the three screws holding cover over tilt gear motor (Figure 87).

Figure 87

2. Remove the motor cover (Figure 88).

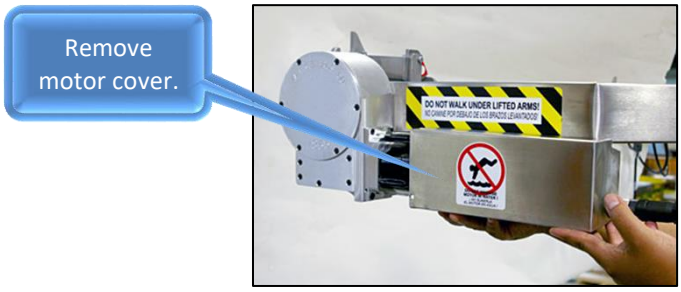


Figure 88

3. Disconnect the motor wires from the power source before working on the motor (Figure 89).

Figure 89

4. Remove the four cap screws (Figure 90) holding the motor mounting plate to the tilt gearbox and pull the motor and mount away from the gearbox.

5. Install the new motor and the motor cover in reverse order of the above procedure.

   There is no better time to re-grease and/ or replace the sponge for the worm gear assembly than right now, as you re-install the system (See page 36).

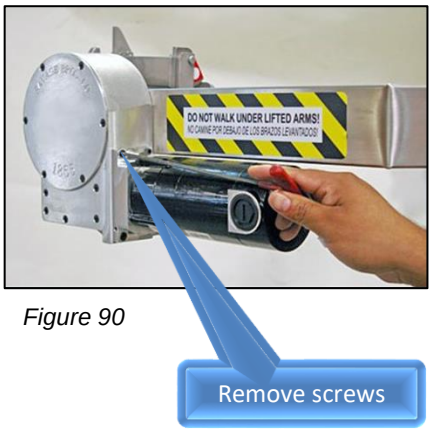


Figure 90

Lubricating the Column

Spray WD-40 on a rag and wipe the column from top to bottom. If WD-40 is not an acceptable lubricant, such as in food preparation areas, use Food Grade, White Grease, 16 oz. aerosol spray can, which can be ordered from Grainger, P/N: 1XFC1 or equivalent (refer to page 35). Do not use vegetable-based lubricant as it will gum up the column slide assembly.

How to check the Down Solenoid Valve

Temporarily disconnect the Down Solenoid lead wire from the terminal strip, 6th terminal from the right. Then, assuming that the voltmeter on the control box door is pointing to 12 volts or more, momentarily touch the down solenoid wire to the terminal strip where wire number 4 is connected, 4th terminal from the right (Figure 91).

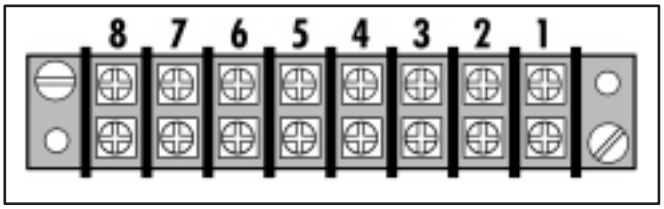


Figure 91

A faint click sound should be heard from the pump and the column slide assembly should come down. The resistance across the coil, as measured with an ohmmeter, should be approximately 8-9 ohms.

To remove the down solenoid valve for inspection, cleaning or replacement, the column slide assembly needs to be lowered all the way down. If the column slide assembly cannot be lowered due to a defective down solenoid, it will be necessary to remove any load, bowl and arms to reduce the pressure on the hydraulic hose and put a 6” c-clamp on the column under the column slide assembly to prevent the slide assembly from coming down when the hydraulic oil pressure is relieved.

When the column slide assembly is lowered or secured in a stationary position, follow the procedures for removing the battery on page 41. Put a pan under the control box and hydraulic hose to catch any hydraulic fluid that will come out when the hydraulic hose fitting is loosened. Use paper towels or rags to wipe up spills.

1. Wear eye protection.
2. Using a 9/16" wrench, loosen the hydraulic hose's swivel fitting nearer to the pump. Do not loosen more than 1/2 a turn to allow oil and oil pressure to be released.
3. Once the flow slows and only seeps out, re-tighten the hose fitting.
4. Remove the down solenoid coil.
5. Remove the down solenoid valve cartridge from the pump body. Some hydraulic fluid will come out of the port on the pump, keep your paper towels or rags handy to sop up the hydraulic fluid.

Up Solenoid Relay

Make sure the battery connections are clean and tight. Temporarily disconnect the Up Solenoid lead wire from the terminal strip, 5th terminal from the right.

⚠CAUTION

This test may startle you if the lift motor starts. Then, assuming that the Digital Voltmeter on the side of the control box is indicating to 12 volts or more, momentarily touch the Up Solenoid lead wire to the terminal strip where wire number 4 is connected, (4th terminal from the right). If the lift motor starts, there is no problem with the up solenoid relay. If there is no click, the solenoid relay needs to be replaced. If there is repeated clicking and the Digital Voltmeter on the door of the control box points to the left, the battery needs a charge or replacement. See "*Servicing the Battery*" on pages 40-41. If there is a single click and the motor does not start, continue to energize the solenoid, and check the voltage drop with a voltmeter, measuring between the large power terminals on the left and right sides of the solenoid relay. If it shows more than 0.5 volts, the solenoid needs to be replaced. When the solenoid is de-energized the voltage will read the same as battery voltage.

How to check the Hydraulic Pump Motor

Make sure the battery connections are clean and tight. While holding the UP button, and hearing the solenoid click in, check the voltage drop with a voltmeter, measuring between the large power terminal on the left side of the pump's motor and the unpainted body of the pump. If it shows 12 volts and the motor doesn't start, the pump and motor unit need to be repaired or replaced. Call the factory.

WORK SMART
WORK ALERT

Replacing the Slide Assembly Bearings

After continuous usage, the slide assembly bearings may need to be replaced. In order to replace the slide assembly bearings, follow the steps below.

1. Unscrew the six screws holding the slide tube insert, with a 5/32 inch hex wrench (Figure 92).

Figure 92

Figure 93

2. Insert a screwdriver in the notch of the slide tube insert and pull it up or down to remove it from the slide assembly (Figure 93). It may be necessary to tap the screwdriver with a hammer or mallet to remove the slide tube insert. Be careful not to scratch the column with the screwdriver.

3. Replace the slide bearings. To order the "*Slide Bearing Replacement Kit*" P/N: 0709-02-100 (see page 94).

   NOTE: The top bearing, on the chain side needs contain a cutout that conforms to the opening in the bearing plate.

4. Perform the same steps for each slide tube insert.

5. Reverse the previous steps to reattach the slide tube inserts.

6. When replacing the bearings on the chain side, the chain guard cover needs to be removed.

7. Remove the chain guard by removing the four 1/2 inch bolts at the top of the column. Be careful not to let the plate at the top drop while removing the bolts.

8. Remove the two 7/16 inch bolts, securing the chain guard at the base of the column.

9. Reinstall reversing the above steps. Do not over tighten the bolts.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION	PAGE
Bowl handles do not fit into supports on Lif*TILT*ruk arms:	Bowl adapter strap not installed.	Install bowl adapter strap. Native bowl handles are not designed for lifting and tilting.	25
	Bowl adapter strap not properly installed.	Check strap installation.	25
	Lifting arms are too close or too far apart to easily engage handles.	Adjust the span of the lifting arms to match the handles.	29
Latches on handle support won't swing open:	Handle support did not rotate all the way up to allow latch to open.	Tilt the handle support all the way upright.	30
	Handle support rotated into the back stop causing holder to bend and jam.	Tilt the handle support slightly forward to take the strain off of the handle support.	
	Latch and/or latch support is bent and jammed.	Straighten the bent metal on latch support to allow the latch to open easily.	
Bowl will not rise when UP button is pushed, and no sound is coming from Electrical control box:	Emergency stop button is not pulled out.	Pull out the emergency stop button.	23
	The control circuit breaker switch lever is not in the up position.	Put circuit breaker switch lever in the UP position.	23
	Battery is dead. Digital Voltmeter on the side of the control box is "In the Red".	Check the battery state of charge.	40
	DOWN button has not fully sprung back out. Rubber boot is acting like a suction cup.	Allow DOWN button to return to normal position. If persistent, put a small slit in the bead of the rubber boot.	
	Rubber boot missing or damaged. The DOWN button has not fully sprung back out. Button jammed by deposits or dirt.	See *Replacing the Pendant*	57
	Up solenoid relay not working.	See *How To Test Up Solenoid Relay*.	66
	The black control cord has a broken wire from excessive stretching or flexing.	Perform a continuity check on the six-conductor cable. Refer to the "Electrical Schematics and Electrical Parts".	96-97
	UP and/or DOWN contact blocks worn	See *Replacing the Pendant*	57

TROUBLESHOOTING (CONTINUED)

PROBLEM	CAUSE	SOLUTION	PAGE
Bowl will not rise when UP button is pushed, and chattering sound is coming from electrical control box:	Battery charge is low; not enough charge to start the motor.	Check the battery state of charge. Recharge the battery.	40
Bowl will not rise when UP button is pushed, and the lift motor sounds like it's running:	Not enough hydraulic fluid in the pump reservoir. Pumping air. Load is too heavy to lift. Internal pressure relief valve is preventing over pressure.	Add hydraulic fluid. Do not load beyond the rating indicated on the top of the operator control.	58
Bowl will not come down when Down button is pushed:	Emergency stop button is not pulled out.	Pull out the emergency stop button.	23
	The control circuit breaker switch lever is not in the UP position.	Put circuit breaker switch lever in the UP position.	23
	Battery is dead. Digital Voltmeter on the side of the control box is "In the Red".	Check the battery state of charge.	40
	The column is sticky or gummy. The slide assembly is sticking.	Clean and lubricate the column.	65
	The UP button has not fully sprung back out. Rubber boot is acting like a suction cup.	Allow the UP button to return to normal position. If persistent, put a small slit in the bead of the rubber boot.	
	Rubber boot missing or damaged. The UP button has not fully sprung back out. Button jammed by gunk stuck in it.	See *Replacing the Pendant*	57
	The down solenoid valve is not working.	Perform a continuity check on the six-conductor cable. Refer to the "Electrical Schematics and Electrical Parts".	96-97
	The black control cord has a broken wire from excessive stretching or flexing.		
	UP and/or DOWN contact blocks worn out and not making contact.	See *Replacing the Pendant*	56

TROUBLESHOOTING (CONTINUED)

PROBLEM	CAUSE	SOLUTION	PAGE
Bowl will not rise all the way to the top of the column:	Not enough hydraulic fluid in the pump reservoir. Pumping air.	Add hydraulic fluid.	58
	The column is sticky or gummy. The slide assembly is sticking.	Clean and lubricate the column.	65
	Load is too heavy to lift. Internal pressure relief valve is preventing over pressure.	Do not load beyond the rating indicated on the top of the operator control.	
Bowl rises OK, but does not hold position and slides on the column:	Hydraulic oil is leaking past the piston in the cylinder. Red fluid is observed returning to the reservoir in the white return tubing when the bowl is up.	Replace the piston seal in the hydraulic cylinder.	60-61
	The down solenoid coil is always energized.	Temporarily disconnect the down solenoid's lead wire and see if the problem continues. If problem stops, troubleshoot Down Control Circuit. Check circuit diagram and test operator control and cable for short circuits.	65-66
	The down solenoid valve is not working. Valve is stuck open.	Clean or replace the down solenoid valve.	65-66
Slight screeching sound is heard:	The column is sticky or gummy. The slide assembly is sticking.	Clean and lubricate the column.	
Bowl slides down the column with a jerky or slow movement.	The column is sticky or gummy. The slide assembly is sticking.	Clean and lubricate the column.	65
	Not enough hydraulic fluid in the pump reservoir. Air is in the cylinder.	Lower the arms all the way down. Check the hydraulic fluid level in the reservoir. Add hydraulic fluid if level is low.	58
Bowl will not tilt forward or reverse when the TILT selector switch is pushed. Lift UP and DOWN are working:	Coil cord or its plug connector have broken wire.	Check the continuity of the coil cord.	63
	Tilt motor has power, but motor is not turning.	Check the operation of the tilt motor.	31, 64
Bowl will not reverse after a forward tilt:	The control circuit breaker switch lever is not in the UP position.	Put circuit breaker switch lever in the UP position.	23
	Tilt selector switch broken or the black control cord has a broken wire from excessive stretching or flexing.	Check the function of the tilt selector or continuity of the control cord.	31

TROUBLESHOOTING (CONTINUED)

PROBLEM	CAUSE	SOLUTION	PAGE
Bowl tilts with a jerky movement, or the bowl tilts and trips the control circuit breaker frequently:	Lifting arms are too close or too far apart to easily engage handles.	Adjust the span of the lifting arms to match the handles. Check strap installation.	29
	Bowl adapter strap not properly installed.	Apply grease into grease fitting with grease gun.	25
	Worm gears in tilt gearbox are dry.	Open tilt gearbox cover and check for sufficient grease in lubricating sponge.	
		Open tilt gearbox cover and check and replace worn parts.	36
	Worm gears in tilt gearbox are worn.	Check the operation of the tilt motor.	36
	Tilt motor shaft is broken.		31, 63, 87
Battery does not hold a charge or drains prematurely:	The control circuit breaker switch lever is left in the UP position for extended of time. Small current drain of voltmeter slowly discharges battery.	Turn the circuit breaker switch lever off when not in use. The circuit breaker switch does not need to be on to charge battery.	
	Battery charger not functioning.	Check battery and charger.	38-41
	Battery drained beyond rechargeable condition. End of battery's useful life.	Check battery and charger.	38-41
Digital Voltmeter does not light up when battery charger is plugged into electrical outlet:	Emergency stop button is not pulled out.	Pull out the emergency stop button.	22
	The control circuit breaker switch lever is not in the UP position.	Put circuit breaker switch lever in the UP position.	22
	Battery charger not functioning.	Check battery and charger.	38-41
Hydraulic fluid puddles appear under the unit when lifting or when not in use:	Hydraulic return tubing has not been connected to the top of the pump.	Check hydraulic return tubing connection.	20
	Hydraulic hose fitting(s) are loose. Determine where leak is coming from.	Check and tighten hydraulic fittings.	
	Hydraulic return tubing has been pinched and the tubing has a leak.	Check tubing for leak.	23
Bowl does not rise:	The control circuit breaker has been tripped.	Move the control circuit breaker switch to the UP position.	28
None of the L.E.D.'s are lit on the Digital Voltmeter	The Digital Voltmeter may be defective.	Replace the Digital Voltmeter.	38

WARRANTY POLICY

Savage Bros. Co. machinery includes a warranty for a one year period from delivery of equipment for all parts and for all labor performed in our shop. Exceptions to this policy are:

- Damage to equipment from improper usage.
- Damage to equipment due to improper handling by the freight carrier.
- Local acquisition of parts or labor. However, this situation may be allowed under terms of the warranty but must be approved in writing by Savage Bros. Co. before acquisition of parts or labor.

Savage Bros. Co. warrants the Lif*TIL*Truk™ for a period of one year from delivery of equipment, for all parts and labor performed in our shop.

- This warranty does not include the electrical storage battery shipped with the unit.
- When replacing the battery, specify a deep cycle AGM or marine battery, which can withstand repeated, deep discharging.

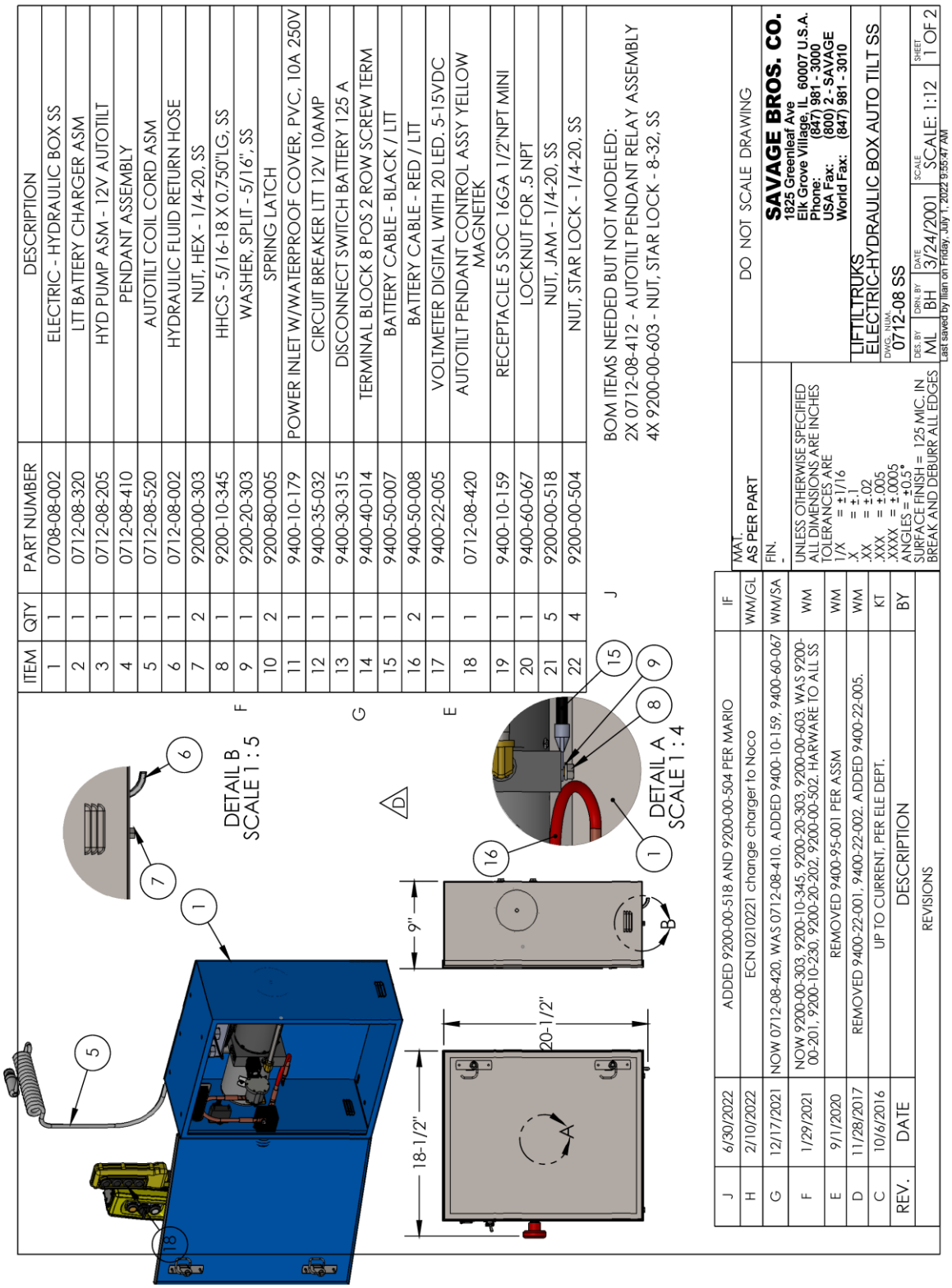
OBTAINING REPLACEMENT PARTS DURING THE WARRANTY

1. Notify Savage Bros. Co. of the defective part needing replacement.
2. Savage Bros. Co. will invoice and ship the part to the customer based on the customer's established credit terms with us (i.e. net 30). Savage Bros. will absorb the cost of ***standard transportation***. If priority transportation is requested, the customer shall be responsible for the cost in full.
3. If Savage Bros. Co. requires the defective part to be returned for warranty examination, Savage Bros. will notify the customer. Upon receipt and inspection of the defective part, either a full credit for the invoiced replacement part and shipping will be issued under the terms of the warranty, or the customer will be advised as to the reason the warranty cannot be honored.
4. If the defective part does not need to be returned, the invoice for the replacement part will include the full credit.
5. In most instances, parts are designed to be installed by the user. At the option of Savage Bros. Co., it may authorize the customer to obtain local installation service assistance. If necessary, labor for part installation is determined to be warranty, Savage Bros. Co. will reimburse the customer for fair and reasonable charges.
6. Any acquisition of parts or labor directly by the customer will not be honored under the terms of this warranty unless approved in advance by Savage Bros. Co.

It is the goal of Savage Bros. Co. to manufacture quality, reliable machinery. Should a part failure occur, we pledge to expedite a solution as quickly as possible to minimize any inconvenience to the customer.

MECHANICAL DRAWINGS AND MECHANICAL PARTS LISTS

Electric-Hydraulic Box Auto Tilt SS



ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	0708-08-002	ELECTRIC - HYDRAULIC BOX SS
2	1	0712-08-320	LIT BATTERY CHARGER ASM
3	1	0712-08-205	HYD PUMP ASM - 12V AUTOTILT
4	1	0712-08-410	PENDANT ASSEMBLY
5	1	0712-08-520	AUTOTILT COIL CORD ASM
6	1	0712-08-002	HYDRAULIC FLUID RETURN HOSE
7	2	9200-00-303	NUT, HEX - 1/4-20, SS
8	1	9200-10-345	HHCS - 5/16-18 X 0.750"LG, SS
9	1	9200-20-303	WASHER, SPLIT - 5/16", SS
10	2	9200-80-005	SPRING LATCH
11	1	9400-10-179	POWER INLET W/WATERPROOF COVER, PVC, 10A 250V
12	1	9400-35-032	CIRCUIT BREAKER LIT 12V 10AMP
13	1	9400-30-315	DISCONNECT SWITCH BATTERY 125 A
14	1	9400-40-014	TERMINAL BLOCK 8 POS 2 ROW SCREW TERM
15	1	9400-50-007	BATTERY CABLE - BLACK / LIT
16	2	9400-50-008	BATTERY CABLE - RED / LIT
17	1	9400-22-005	VOLTMETER DIGITAL WITH 20 LED, 5-15VDC
18	1	0712-08-420	AUTOTILT PENDANT CONTROL ASSY YELLOW MAGNETEK
19	1	9400-10-159	RECEPTACLE 5 SOC 16GA 1/2"NPT MINI
20	1	9400-60-067	LOCKNUT FOR .5 NPT
21	5	9200-00-518	NUT, JAM - 1/4-20, SS
22	4	9200-00-504	NUT, STAR LOCK - 1/4-20, SS

BOM ITEMS NEEDED BUT NOT MODELED:
2X 0712-08-412 - AUTOTILT PENDANT RELAY ASSEMBLY
4X 9200-00-603 - NUT, STAR LOCK - 8-32, SS

DETAIL A
SCALE 1 : 4

DETAIL B
SCALE 1 : 5

18-1/2"

20-1/2"

9"

REV.	DATE	DESCRIPTION	BY
J	6/30/2022	ADDED 9200-00-518 AND 9200-00-504 PER MARIO	WM/GL
H	2/10/2022	ECN 0210221 change charger to Noco	WM/SA
G	12/17/2021	NOW 0712-08-420, WAS 0712-08-410. ADDED 9400-10-159, 9400-60-067	WM
F	1/29/2021	NOW 9200-00-303, 9200-10-345, 9200-20-303, 9200-00-603. WAS 9200-00-201, 9200-10-230, 9200-20-202, 9200-00-502. HARWARE TO ALL SS	WM
E	9/1/2020	REMOVED 9400-95-001 PER ASSM	WM
D	11/28/2017	REMOVED 9400-22-001, 9400-22-002. ADDED 9400-22-005.	WM
C	10/6/2016	UP TO CURRENT, PER ELE DEPT.	KT

REVISIONS

MAT.
AS PER PART

FIN.
-

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
TOLERANCES ARE
1/X = ±1/16
.X = ±.1
.XX = ±.02
.XXX = ±.005
.XXXX = ±.0005
ANGLES = ±0.5°
SURFACE FINISH = 125 MIC. IN.
BREAK AND DEBURR ALL EDGES

DO NOT SCALE DRAWING

SAVAGE BROS. CO.
1825 Greenleaf Ave
Elk Grove Village, IL 60007 U.S.A.
Phone: (847) 981 - 3000
USA Fax: (800) 2 - SAVAGE
World Fax: (847) 981 - 3010

LIFTILTRUKS
ELECTRIC-HYDRAULIC BOX AUTO TILT SS

DWG. NUM.: 0712-08 SS

DES. BY	DRN. BY	DATE	SCALE	SHEET
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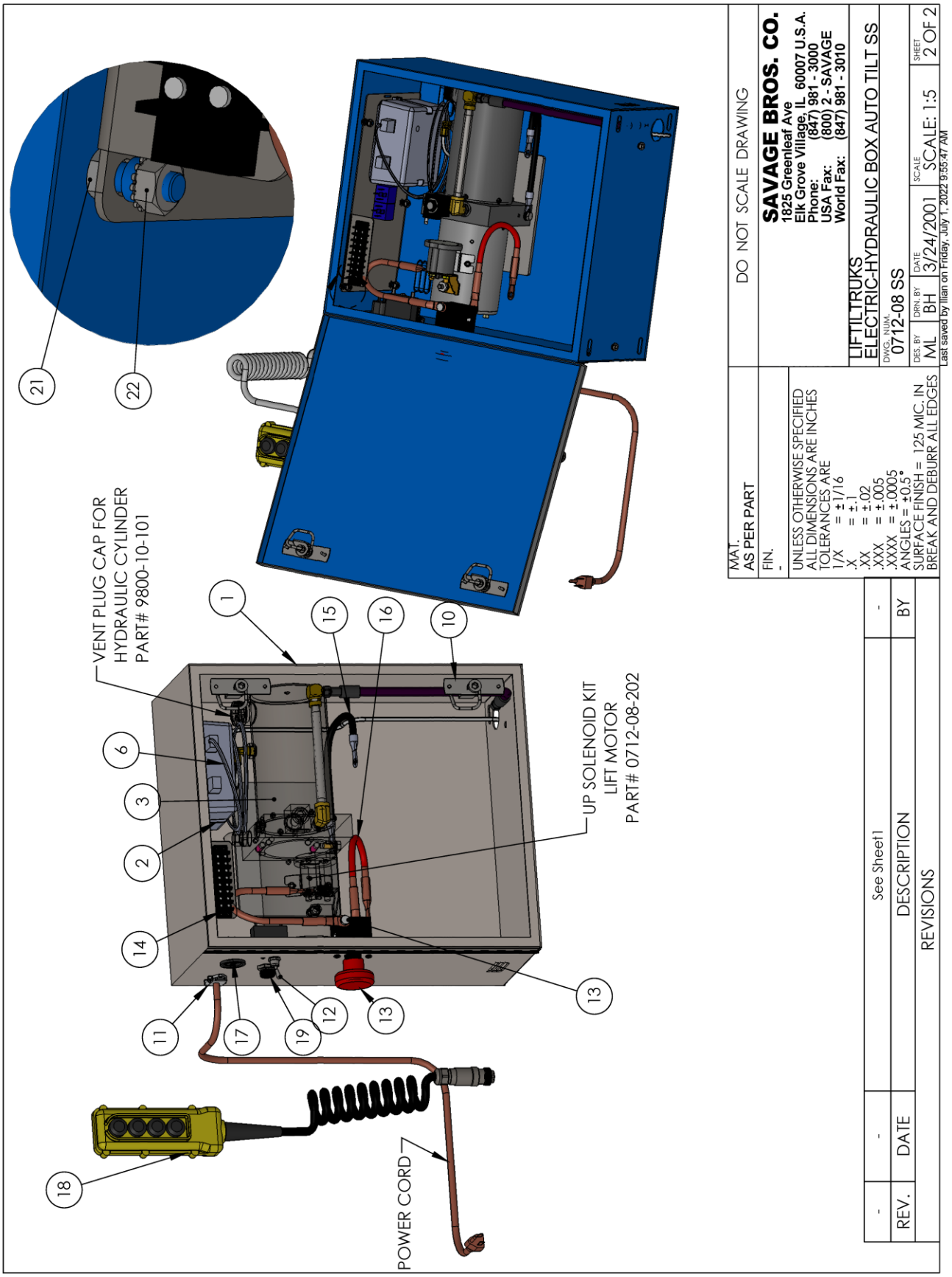
VENT PLUG CAP FOR
HYDRAULIC CYLINDER
PART# 9800-10-101
UP SOLENOID KIT
LIFT MOTOR
PART# 0712-08-202
POWER CORD
1
2
3
6
10
11
12
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22
DO NOT SCALE DRAWING
SAVAGE BROS. CO.
1825 Greenleaf Ave
Elk Grove Village, IL 60007 U.S.A.
Phone: (847) 981 - 3000
USA Fax: (800) 2 - SAVAGE
World Fax: (847) 981 - 3010
LIFTILTRUKS
ELECTRIC-HYDRAULIC BOX AUTO TILT SS
DWG. NUM. 0712-08 SS
DES. BY ML
DRN. BY BH
DATE 3/24/2001
SCALE SCALE: 1:5
SHEET 2 OF 2
MAT. AS PER PART
FIN. -
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
TOLERANCES ARE
1/X = ±1/16
.X = ±.1
.XX = ±.02
.XXX = ±.005
.XXXX = ±.0005
ANGLES = ±0.5°
SURFACE FINISH = 125 MIC. IN
BREAK AND DEBURR ALL EDGES
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See Sheet1
REVISIONS
REV. DATE DESCRIPTION BY
- - - -

Stickers and Labels / Hydraulic Fluid Equivalents /Battery Specifications

Stickers and Labels:

Lif*TIL*Truk Sticker Set, English / Spanish
P/N: 9400-90-027

Lif*TIL*Truk Sticker Set, English / French:
P/N: 9400-90-025

Pendent Sticker Set, Eng/Spa/French:
P/N: 9400-90-028

Tilt Arm Sticker Set Eng/Spa/French:
P/N: 9400-90-032

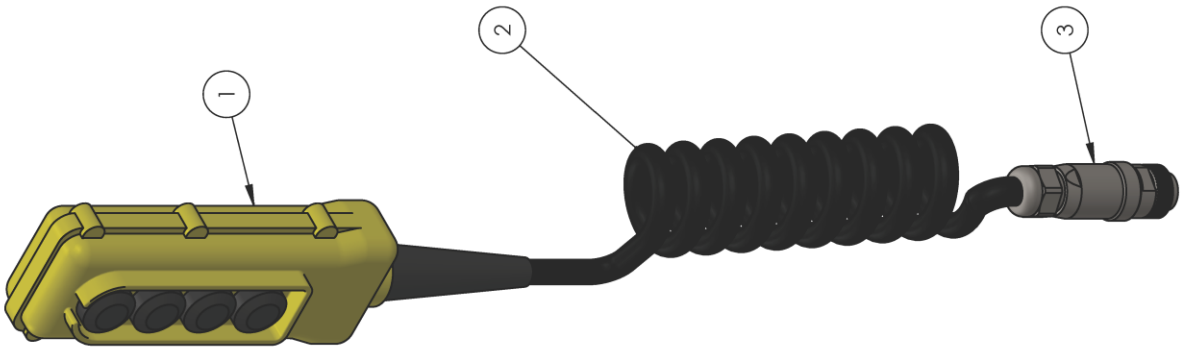
Battery Specifications:

Absorbent Glass Mat (AGM) Deep cycle or **marine deep cycle battery**, with **160-185** reserve minutes or **80-100** amp-hours

Mobil DTE FM 32 Food Grade Hydraulic Fluid Equivalents	
Name	**Product**
JAX	FGH-AW ISO 32
Lubriplate	FMO-150-AW
Belray	No-Tox HD 62682

Control Pendant Assembly

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	9400-30-420	PENDANT STATION 4 BUTTON YELLOW MAGNETEK
2	.33	9400-50-170	COIL CORD - 18/5 SJOW 300VAC
3	1	9400-10-223	PLUG 5 PIN FIELD ATTACHABLE FEMALE THREAD MINI



MAT.
AS PER PRINT

FIN.
-

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
TOLERANCES ARE
1/X = 1/16
.X = .1
.XX = .01
.XXX = .005
.XXXX = .0005
ANGLES = 0.5
SURFACE FINISH=125 MICIN
BREAK AND DEBURR ALL EDGES
REMOVE WELD SPATTER & DISCOLORATION

DO NOT SCALE DRAWING

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60007 U.S.A.
Phone: (847) 981 - 3000
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LIFTILTRUKS
AUTOTILT PENDANT CONTROL ASSY YELLOW MAGNETI

THIRD ANGLE

DWG. NUM. 0712-08-420

DES. BY	DATE	SCALE	SHEET
WM	12/17/2021	SCALE: 1:3	1 OF 1

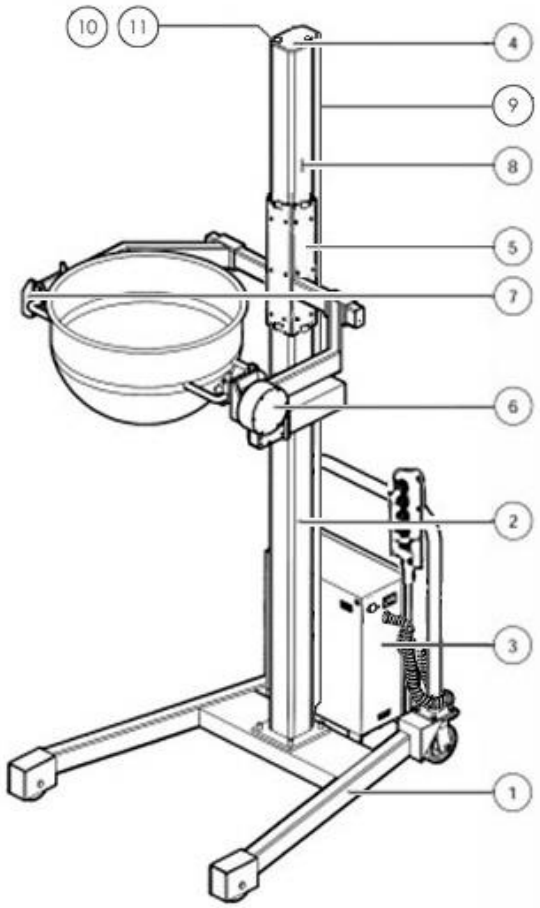
Model saved by william on Friday, December 17, 2021 12:47:52 PM

Drawing saved by lilian

Basic Mechanical Units

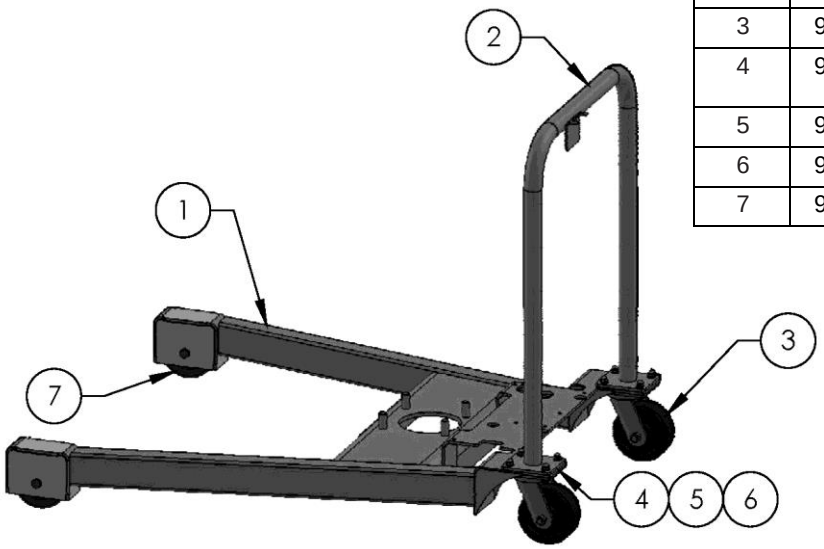
ITEM	PART NO.	DESCRIPTION	QTY
1	0711-01SS	SS Base Assembly. Model C	1
2	0712-02-610	Column Subassembly	1
3	0712-08 SS	Electric - Hydraulic 12VDC Box	1
4	0708-02-001	Column Cap	1
5	0735-02-007	Slide Column – Inverted with Slot	1
6	0712-03-600SS	Arm Left -Tilt Arm Assembly- SS	1
7	0711-03-610SS	Idler Mechanism Assembly-SS	1
8	0712-02-620	Hydraulic Cylinder, Model C	1
9	0730	LTT Chain Guard Option, Model C	1
10	9200-10-316	5/16-18x1 SS Cap Screw	2
11	9200-20-202	5/16 ZP Split Lock Washer	2
	0516	24x16 Copper Kettle (shown)	1

Specify Lifter model number when enquiring about or ordering parts.

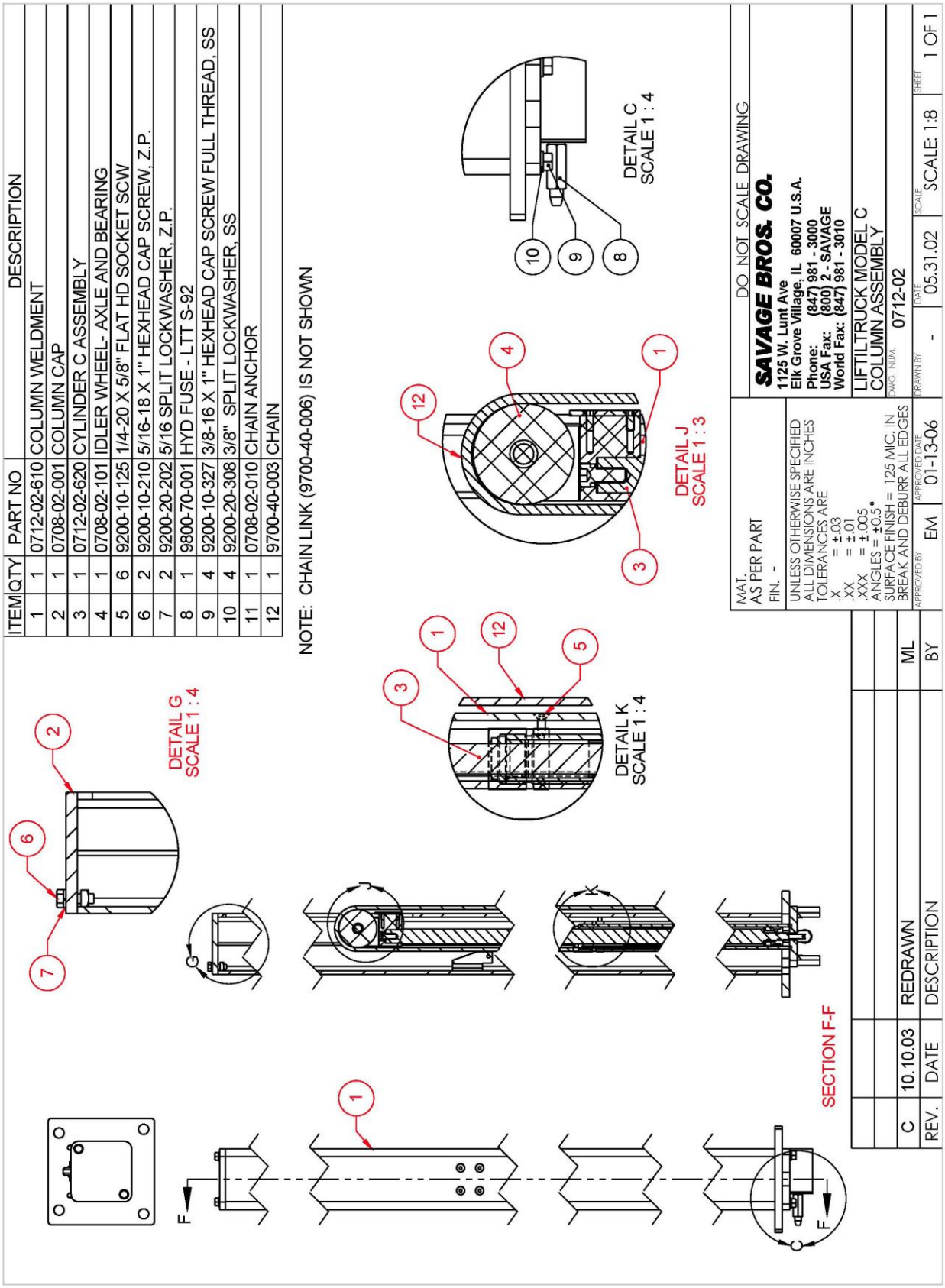


Base Assembly

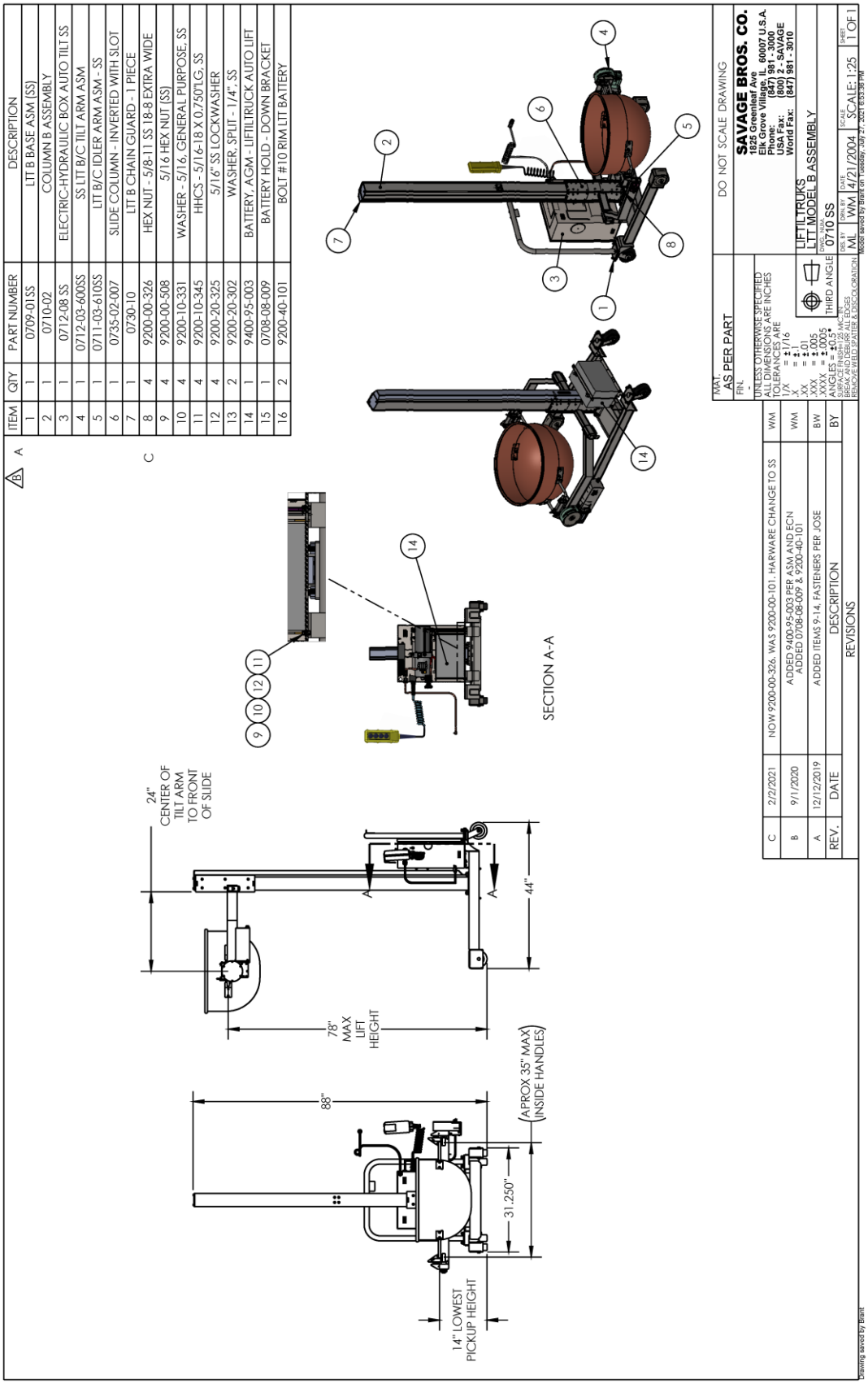
ITEM	*PART NO.*	*DESCRIPTION*	*QTY*
	0711-01 SS	SS Base Assembly - Model C	
1	0711-01-010SS	SS LTT C Base WELDMENT	1
2	0708-01-810SS	SS Push Handle & Pendant Station	1
3	9700-90-004	Caster, Rear Swivel	2
4	9200-10-101	HHCS, 3/8-16 X 1.250" LG, Flanged, Zinc	8
5	9200-20-203	Lock Washer, 3/8", Zinc	8
6	9200-00-403	Acorn Nut, 3/8-16, Nickel	8
7	9700-90-003	Caster, Front Fixed	2



Model "C" Column Assembly

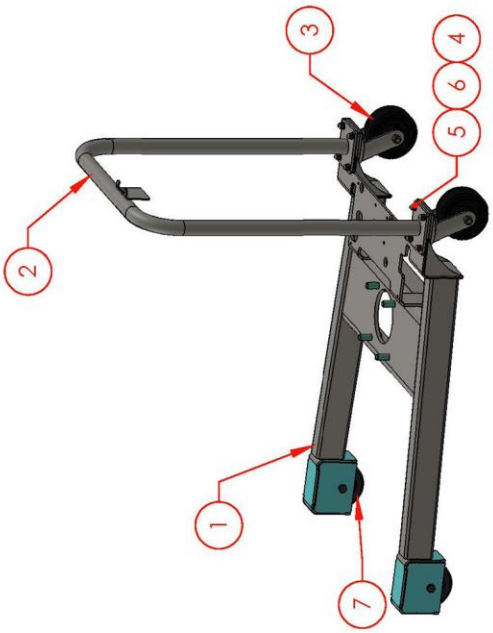


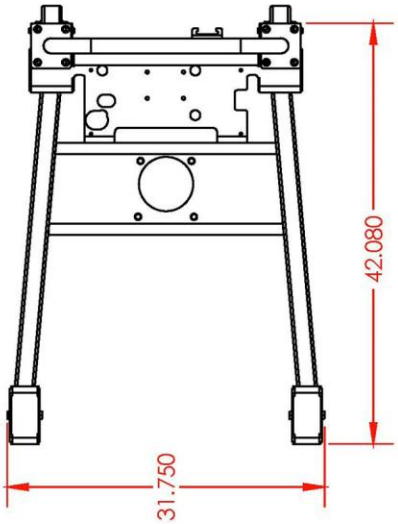
Model “B” Assembly

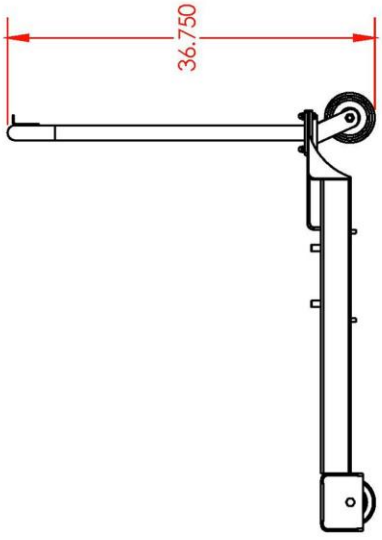


Model “B” Base Assembly (SS)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	0709-01-010SS	B BASE WELDMENT, SS
2	1	0708-01-810SS	PUSH HANDLE & PENDANT STATION
3	2	9700-90-004	CASTER, REAR SWIVEL
4	8	9200-10-101	HHCS, 3/8-16 X 1.250" LG, FLANGED, ZINC
5	8	9200-20-203	LOCKWASHER, 3/8", ZINC
6	8	9200-00-403	ACORN NUT, 3/8-16, NICKEL
7	2	9700-90-003	CASTER, FRONT FIXED







MAT.
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.XX = ±.02
.XXX = ±.005
.XXXX = ±.0005
ANGLES = ±0.5°
SURFACE FINISH=125 MICRIN
BREAK AND DEBURR ALL EDGES
REMOVE WELD SPATTER & DISCOLORATION

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LIFTILTRUKS
LTT B BASE ASM (SS)

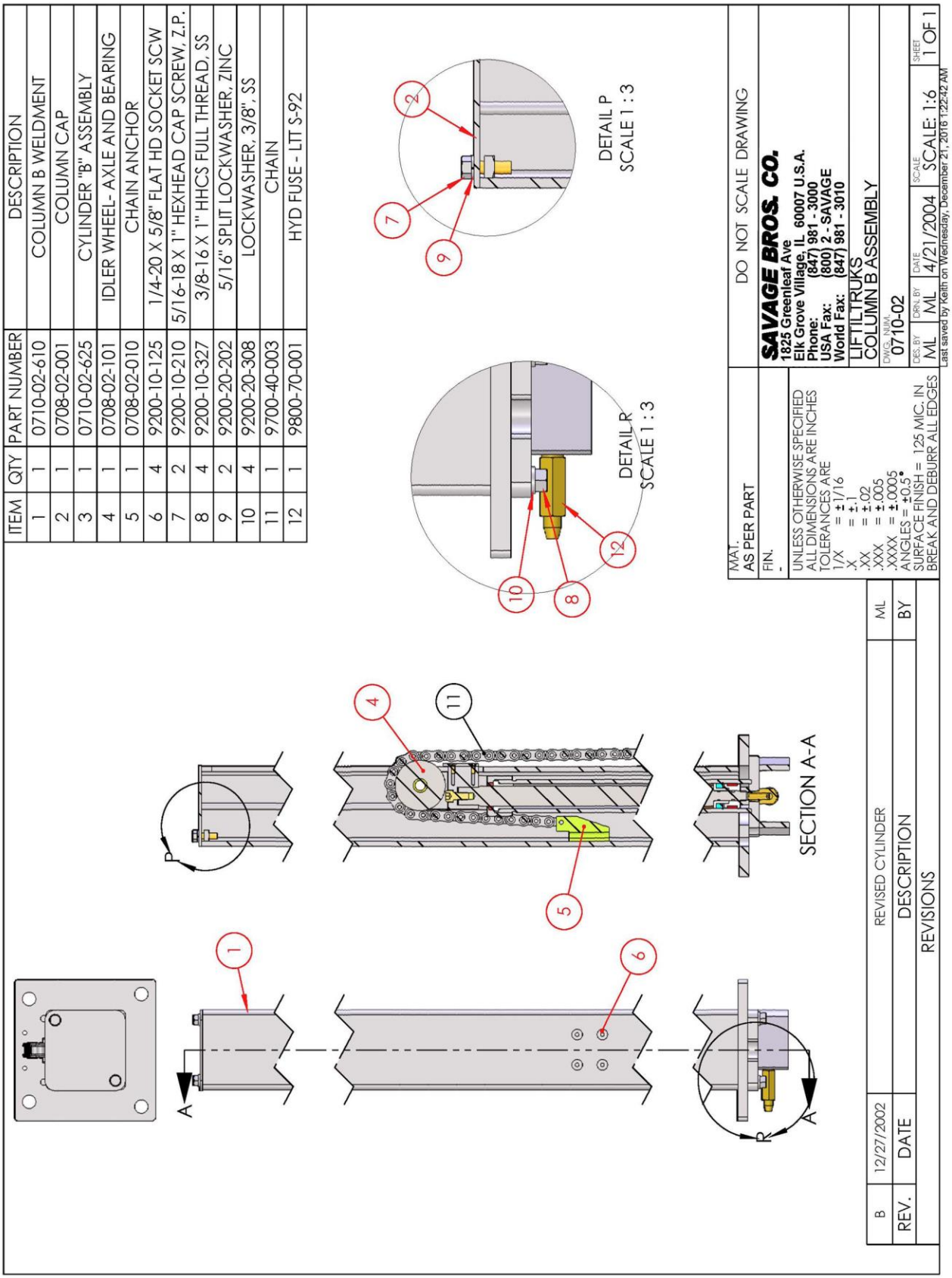
DWG. NUM.
0709-01SS

DES. BY	DRN. BY	DATE	SCALE	SHEET
KT	KT	02/10/2017	SCALE: 1:16	1 OF 1

Model saved by keith on Friday, February 10, 2017 3:54:22 PM

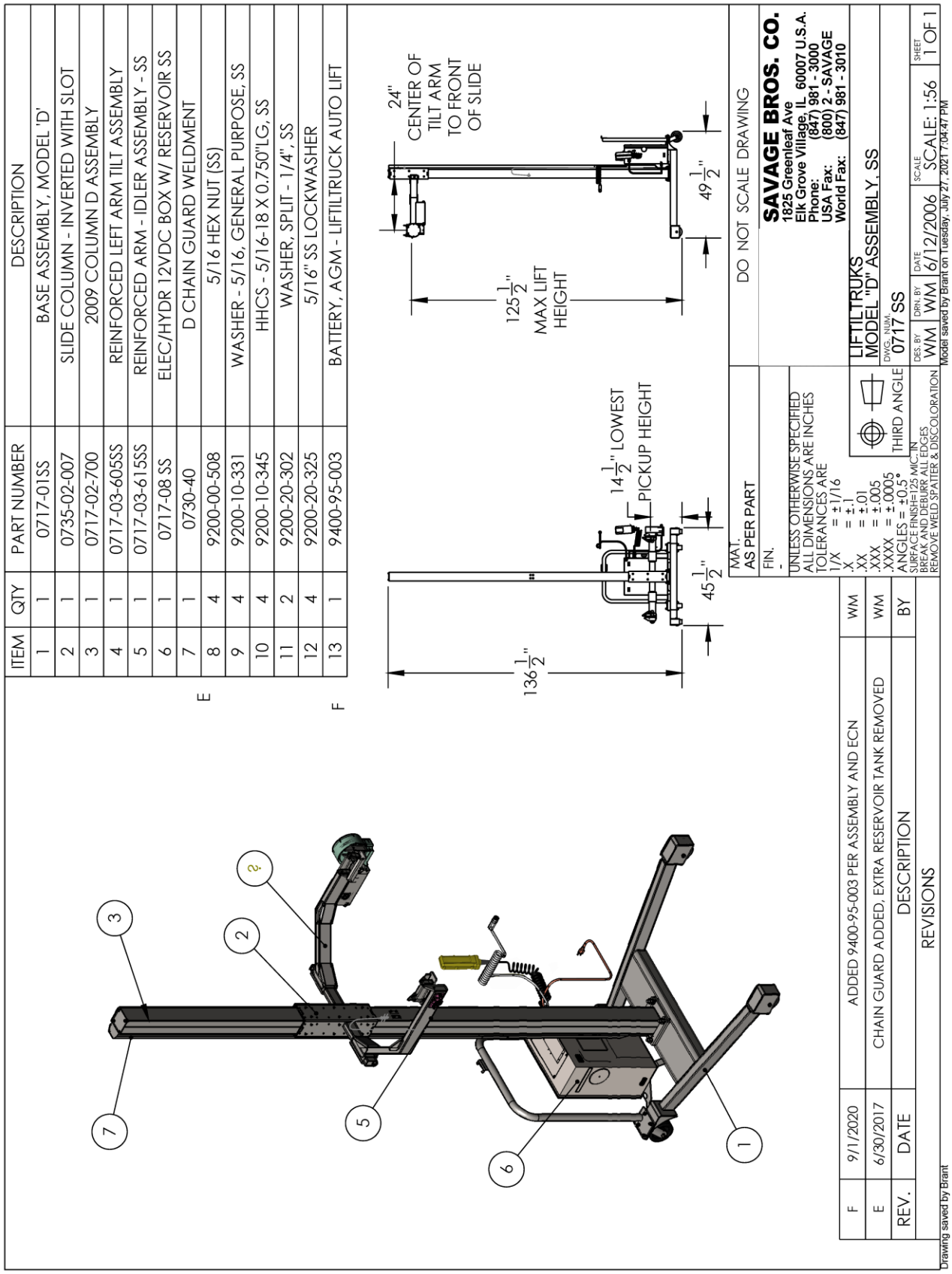
Drawing saved by keith

Column “B” Assembly



Model "D" Assembly (SS)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	0717-01SS	BASE ASSEMBLY, MODEL 'D'
2	1	0735-02-007	SLIDE COLUMN - INVERTED WITH SLOT
3	1	0717-02-700	2009 COLUMN D ASSEMBLY
4	1	0717-03-605SS	REINFORCED LEFT ARM TILT ASSEMBLY
5	1	0717-03-615SS	REINFORCED ARM - IDLER ASSEMBLY - SS
6	1	0717-08 SS	ELEC/HYDR 12VDC BOX W/ RESERVOIR SS
7	1	0730-40	D CHAIN GUARD WELDMENT
8	4	9200-00-508	5/16 HEX NUT (SS)
9	4	9200-10-331	WASHER - 5/16, GENERAL PURPOSE, SS
10	4	9200-10-345	HHCS - 5/16-18 X 0.750"LG, SS
11	2	9200-20-302	WASHER, SPLIT - 1/4", SS
12	4	9200-20-325	5/16" SS LOCKWASHER
13	1	9400-95-003	BATTERY, AGM - LIFTILTRUCK AUTO LIFT



REV.	DATE	DESCRIPTION	BY
F	9/1/2020	ADDED 9400-95-003 PER ASSEMBLY AND ECN	WM
E	6/30/2017	CHAIN GUARD ADDED, EXTRA RESERVOIR TANK REMOVED	WM

REVISIONS

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.X = ±.1
.XX = ±.01
.XXX = ±.005
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ANGLES = ±0.5°
SURFACE FINISH=125 MICIN
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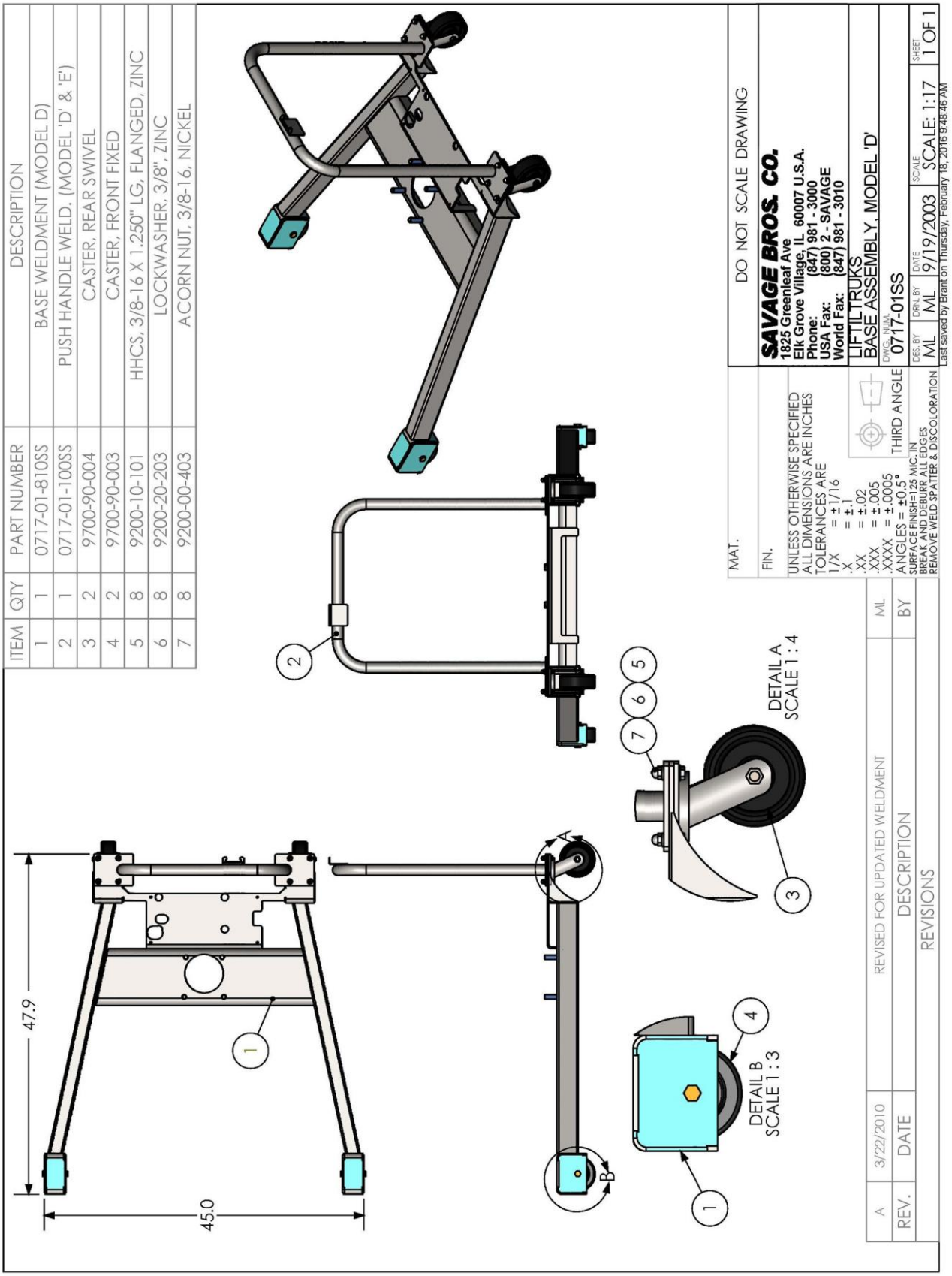
LIFTILTRUKS
MODEL "D" ASSEMBLY, SS

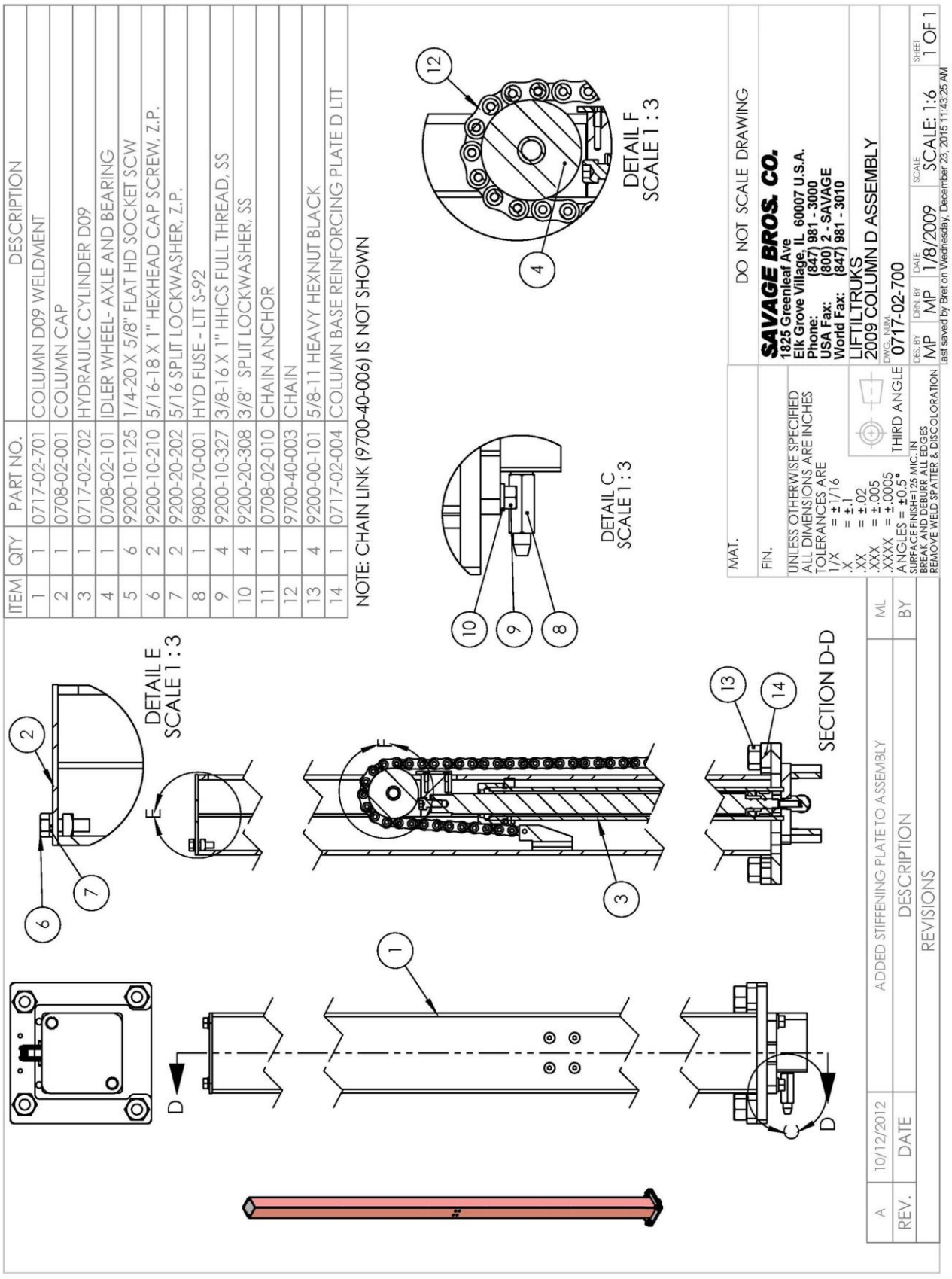
DWG. NUM. 0717 SS
DES. BY WM | DRN. BY WM | DATE 6/12/2006 | SCALE SCALE: 1:56 | SHEET 1 OF 1

Drawing saved by Brant
Model saved by Brant on Tuesday, July 27, 2021 7:04:47 PM

Model "D" Base Assembly (SS)

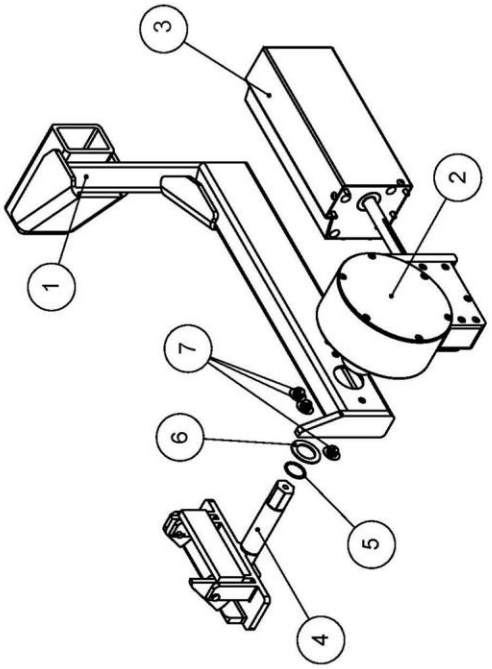


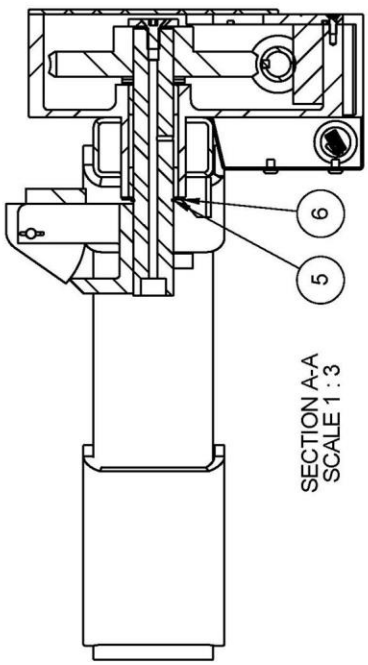
Model "D" Column Assembly



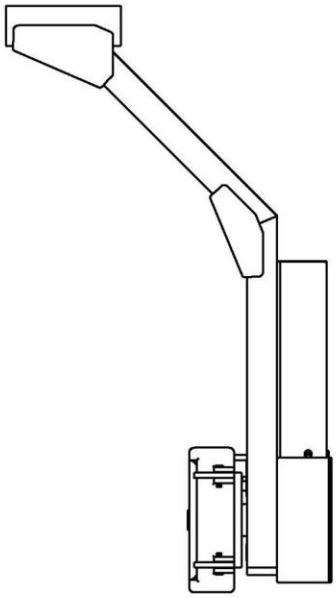
Model “D” Reinforced Tilt Arm Assembly

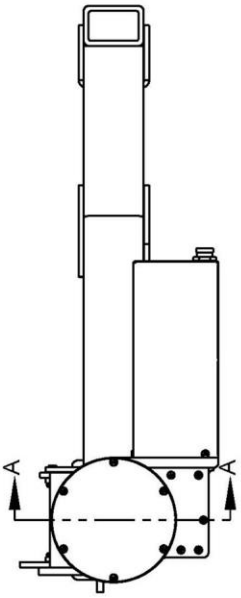
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	0717-03-607SS	REINFORCED ARM FRAME - LEFT
2	1	0712-04-630	GEAR BOX
3	1	0712-03-665	TILT MOTOR ASM - STD TORQUE
4	1	0717-03-820	REINFORCED TILT MECH SUBASSEMBLY
5	1	9700-20-125	RING 1" ID
6	1	9700-10-074	THRUST WASHER 1 X .06
7	3	9400-33-039	1/2" BUTTON PLUG - RECESSED HEAD





SECTION A-A
SCALE 1 : 3





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.XX = ±.01
.XXX = ±.005
ANGLES = ±0.5°
SURFACE FINISH = 125 MIC. IN
BREAK AND DEBURR ALL EDGES

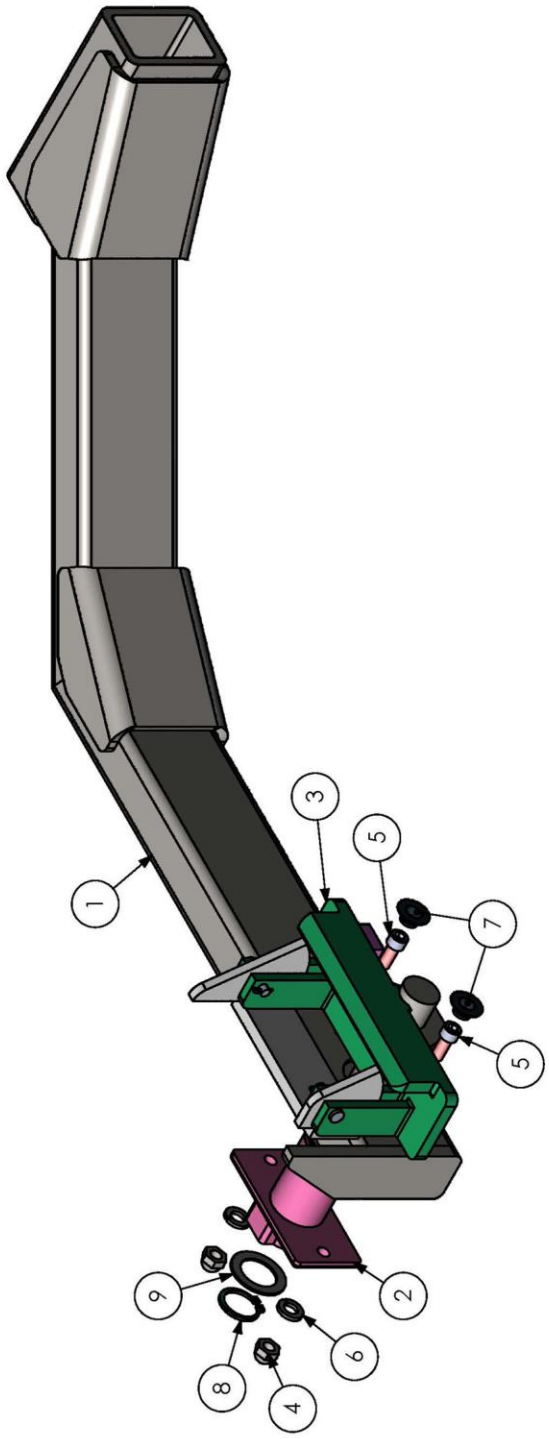
LIFTILTRUK 'D'
REINFORCED TILT ARM ASSEMBLY

DWG. NUM.	0717-03-605SS	SCALE	SHEET
DRAWN BY	DATE	SCALE: 1:8	1 OF 1
MP	06-12-06		

REV.	DATE	DESCRIPTION	BY
A	02-23-09	REVISED WELDMENT	MP

Reinforced Right Arm - Idler Assembly

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	0717-03-608SS	REINFORCED ARM FRAME - RIGHT
2	1	0711-03-810	BEARING HOUSING ASSEMBLY
3	1	0717-03-829	REINFORCED IDLER MECH SUBASSY
4	2	9200-00-403	ACORN NUT, 3/8-16, NICKEL
5	2	9200-10-217	5/16-18 X 3/4 SHCS, BLK
6	2	9200-20-203	LOCKWASHER, 3/8", ZINC
7	2	9400-33-039	1/2" BUTTON PLUG - RECESSED HEAD
8	1	9700-20-110	RETAINING RING LTT IDLER SHAFT 1 DIA
9	1	9700-20-219	SHIM 1" ID X 1 1/2" OD X 0.062" THK



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MAT.
AS PER PART

FIN.
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TOLERANCES ARE
1/X = ±1/16
.X = ±.1
.XX = ±.02
.XXX = ±.005
.XXXX = ±.0005
ANGLES = ±0.5°
SURFACE FINISH = 125 MIC. IN
BREAK AND DEBURR ALL EDGES

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LIFTILTRUKS
REINFORCED ARM - IDLER ASSEMBLY

DWG. NUM.
0717-03-615SS

DES. BY	DRN. BY	DATE	SCALE	SHEET
MP	MP	6/12/2006	SCALE: 1:4	1 OF 2

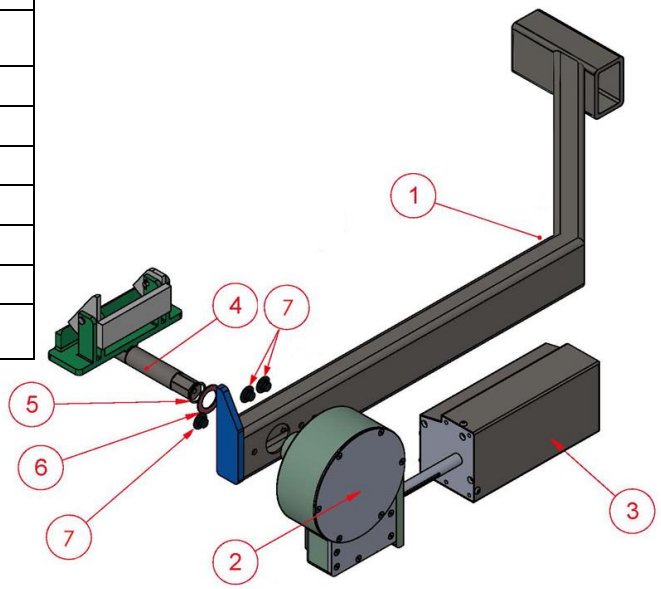
Last saved by Brant on Thursday, February 18, 2016 9:48:40 AM

REV.	DATE	DESCRIPTION	BY
A	2/23/2009	REVISED WELDMENT	MP

REVISIONS

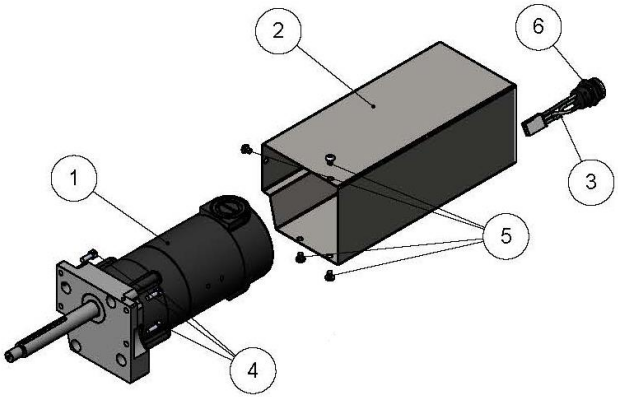
Left Arm Assembly

ITEM	PART NO.	DESCRIPTION	QTY
	0712-03-600SS	Arm Left -Tilt Assembly-SS, Standard Gearbox	
1	0711-03-606	Arm, Lif*TILT*ruk B-C, Left	1
2	0712-04-630	Gearbox	1
3	0712-03-665	Tilt Motor Assy. Std Torque	1
4	0711-03-821	Tilt Mech Subassembly	1
5	9700-20-125	Ring 1" ID	1
6	9700-10-074	Thrust Washer 1 X .06	1
7	9400-33-039	½" Button Plug – Recessed Head	3



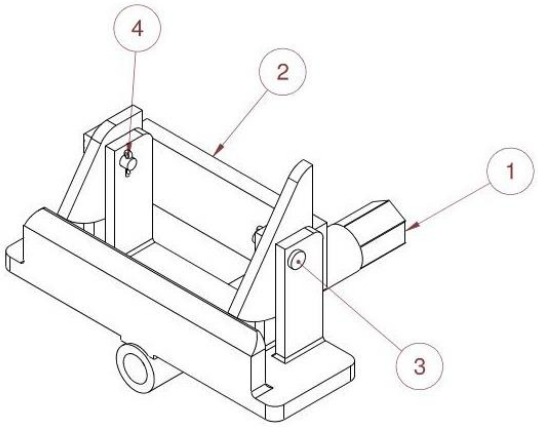
Tilt Motor Assembly

ITEM	PART NO.	DESCRIPTION	QTY
	0712-03-665	Tilt Motor Assembly Std Torque	
1	9400-00-210	Gearmotor 12VDC LTT 1/9 HP, 60:1 Gear Ratio, 100LB-in Torque 53 RPM Continuous Duty Tilt Motor	1
2	0712-03-011	Motor Cover Weldment	1
3	0712-06-010	LTT Tilt Motor wire harness	1
4	9200-10-395	SHCS - 10-24 X .500" LG SS 18-8	4
5	9200-10-445	BHCS - 10-24 X .250" LG SS 18-8	4
6	9400-10-095	3 Pin Male Receptacle - Tilt	1



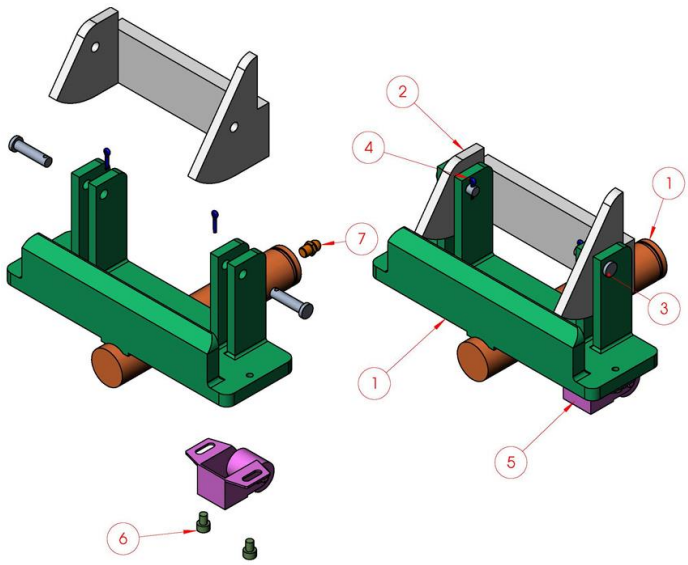
Tilt Mechanical Subassembly

ITEM	PART NO.	DESCRIPTION	QTY
	0711-03-821	Tilt Mechanical Subassembly	
1	0711-03-641	Tilt Arm Holder Weldment	1
2	0708-03-024	Double Tab Lock - Tilt Arm Machined	1
3	9200-60-103	Clevis Pin 1/4" Dia. X 1" LG Pltd Zinc	2
4	9200-60-104	Rue Ring 1/4" X .054" for Clevis Pin	2



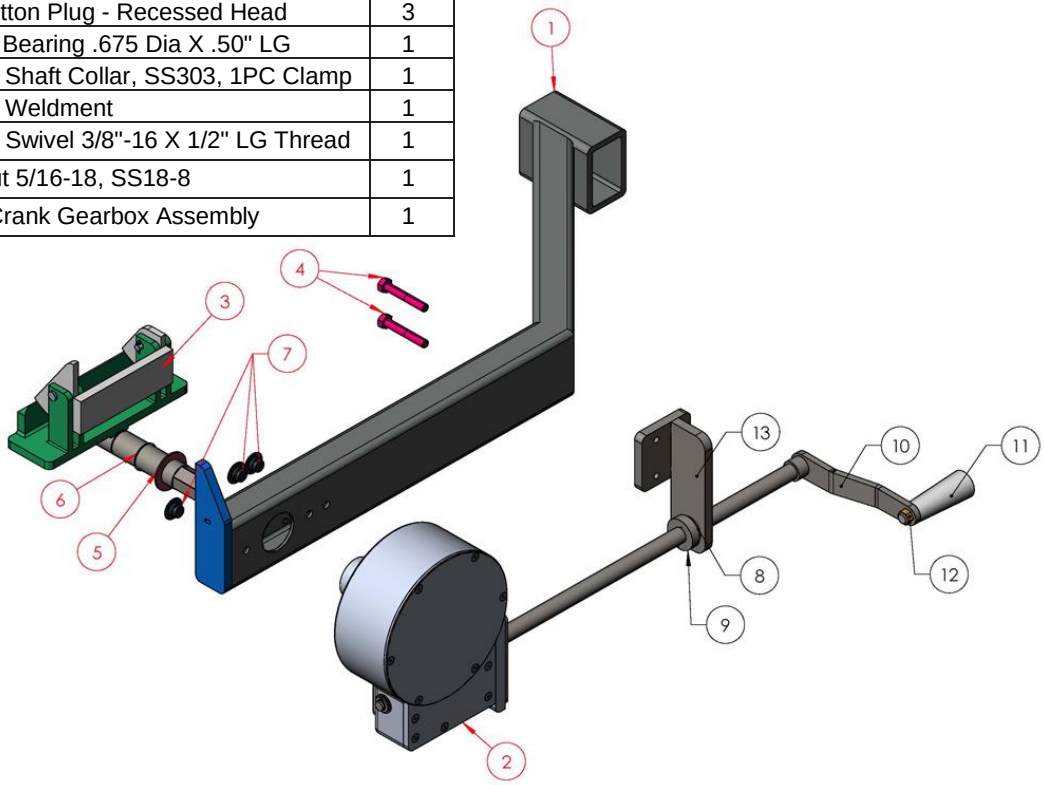
Idler Mechanism Assembly

ITEM	PART NO.	DESCRIPTION	QTY
1	711-03-660	Idler Drive Cast – Shaft Mechanism	1
2	0708-03-024	Double Tab Lock - Tilt Arm Machined	1
3	9200-60-103	Clevis Pin 1/4" Dia. X 1" LG Pltd Zinc	2
4	9200-60-104	Rue Ring 1/4" X .054" for Clevis Pin	2
5	9200-60-004	Roller Catch - LTT Idler Latch	1
6	9200-10-226	10-32 X 1/4, Socket Head Cap Screw, Black	2
7	9700-60-101	Grease ZERK Fitting .25-28	1



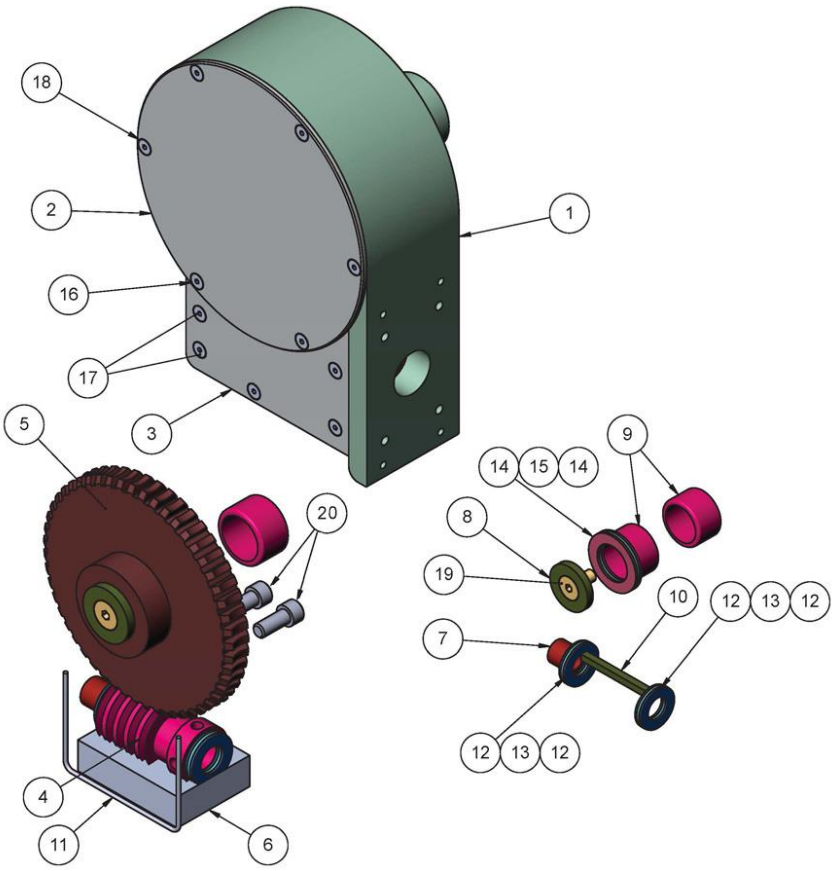
Hand Crank Assembly

ITEM	PART NO.	DESCRIPTION	QTY
1	0711-03-606	B-C Tilt Arm Weldment	1
2	0708-03-071	Gear Box	1
3	0711-03-821	Tilt Mechanism Subassembly	1
4	9200-10-211	5/16-18 X 2" Hex HD CAP Screw, Black	2
5	9700-10-074	Thrust Washer 1 X .06	1
6	9700-20-125	Ring, 1"ID	1
7	9400-33-039	1/2" Button Plug - Recessed Head	3
8	0716-03-137	Flange Bearing .675 Dia X .50" LG	1
9	9700-20-114	5/8 Dia Shaft Collar, SS303, 1PC Clamp	1
10	0716-03-004	Handle Weldment	1
11	9700-80-105	Handle Swivel 3/8"-16 X 1/2" LG Thread	1
12	9200-00-311	Hex Nut 5/16-18, SS18-8	1
13	0708-03-070	Hand Crank Gearbox Assembly	1



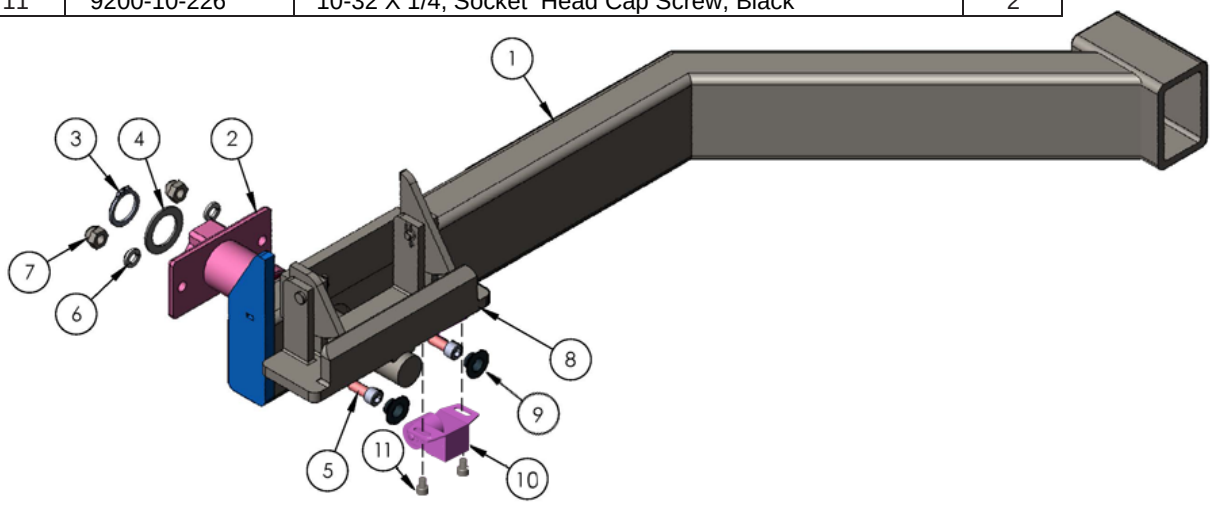
Standard Gearbox Assembly

ITEM	PART NO.	DESCRIPTION	QTY
	0712-04-630	Gearbox	
1	0712-90-050	Gearbox Housing	1
2	0712-04-052	LTT Gearbox Main Cover	1
3	0712-04-054	LTT Gearbox Lower Cover	1
4	9700-00-002	Worm Gear Helical	1
5	9700-00-001	Worm Gear	1
6	0712-04-002	¾" X 2 ¾" X 2" Sponge	1
7	9700-10-075	Needle B .437" X .62" LG	1
8	0712-04-057	LTT Gearbox Button	1
9	9700-10-009	Needle Bearing	2
10	9200-30-105	Key	1
11	0712-04-055	O-Ring-227 Viton	1
12	9700-10-052	Thrust Washer TRB 1018	4
13	9700-10-051	Thrust Bearing .625"	2
14	9700-10-074	Thrust Washer 1 X .06"	2
15	9700-10-073	Thrust Bearing 1.00"	1
16	9200-10-387	8-32 X 5/8" FHSC Screw, Black	1
17	9200-10-384	8-32 X ½" FHSC Screw, Black	5
18	9200-10-383	8-32 X 3/8" FHSC Screw, Black	5
19	9200-10-121	5/16 – 18 X ¾" FHMS, Black-	1
20	9200-10-217	5/16 – 18 X ¾" SHCS, Blk	3



Right Arm Assembly

ITEM	PART NO.	DESCRIPTION	QTY
	0711-03-610SS	LTT B/C Right Arm (Idler) Assembly - SS	
1	0711-03-605SS	LTT B/C Idler Arm SS Weldment	1
2	0711-03-810	Tilt Bearing Housing Assembly	1
3	9700-20-115	Retaining Ring - 1" Shaft .08" THK SS	1
4	9700-20-219	Shim 1" ID X 1 1/2" OD X 0.062" THK	1
5	9200-10-217	Socket Head	2
6	9200-20-303	5/16 Split Lock Washer, SS	2
7	9200-00-403	Acorn Nut, 3/8-16, Nickel	2
8	0711-03-830	Idler Mechanism Subassembly	1
9	9400-33-039	1/2" Button Plug - Recessed Head	2
10	9200-60-004	Roller Catch / LTT Idler Latch Perma-Bright Zinc	1
11	9200-10-226	10-32 X 1/4, Socket Head Cap Screw, Black	2



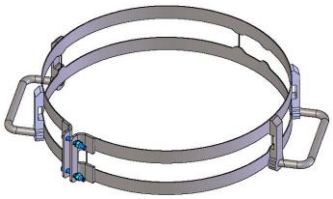
Bowl Strap

Bowl Adapters shown as samples.

If ordering, specify:

- Your bowl type
- Your bowl size or diameter
- Bowl manufacturer
- Particular shape

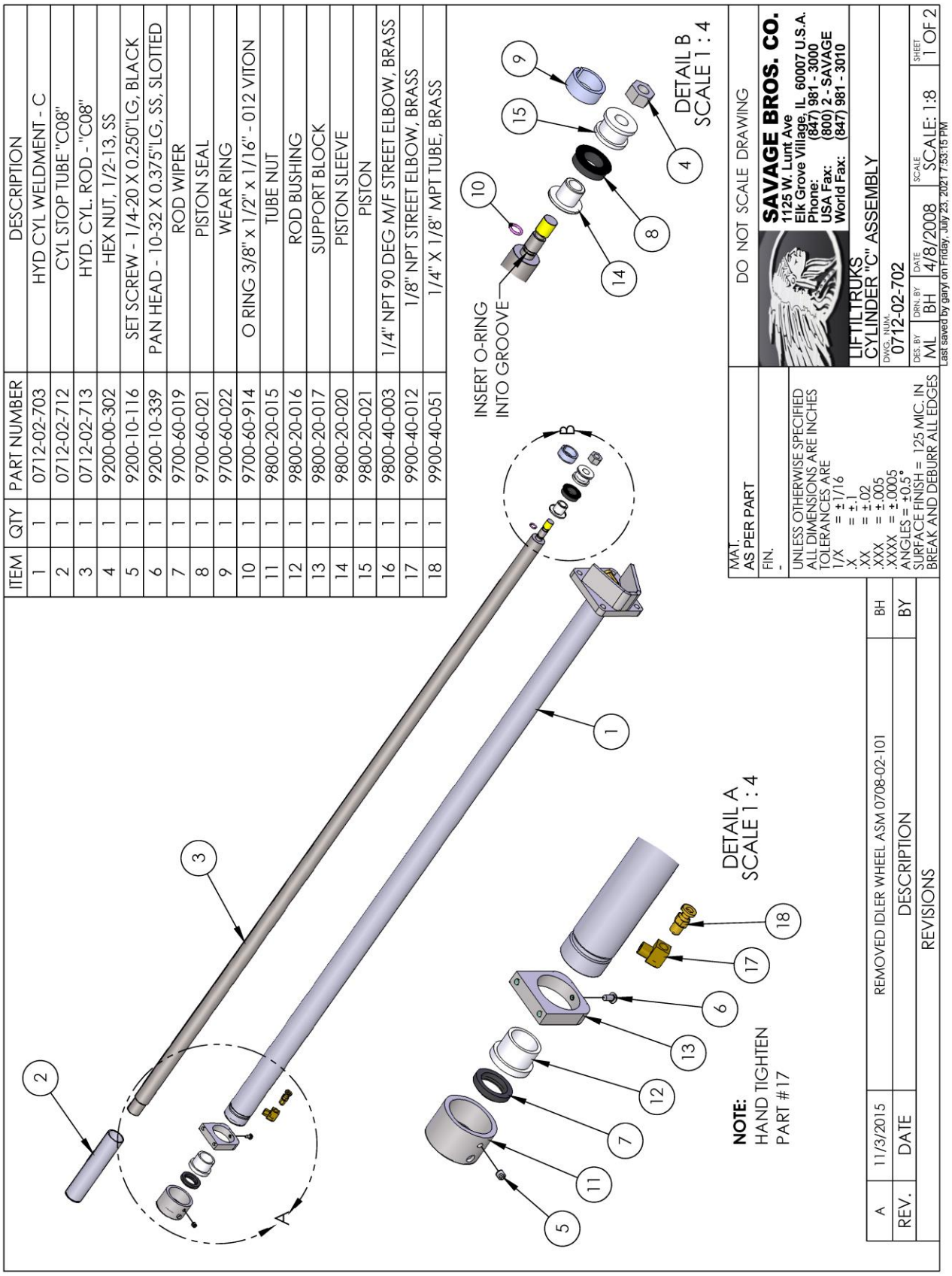
PART NO.	DESCRIPTION
0718-40	Hobart 40 QT Bowl Strap
0719-08	Hobart 60 QT Bowl Strap
0720	Hobart 80 QT Bowl Strap
0720-40	Hobart 80 QT Bowl Strap Legacy
0721	Hobart 140 QT Bowl Strap
0721-40	Hobart 140 QT Bowl Strap Legacy



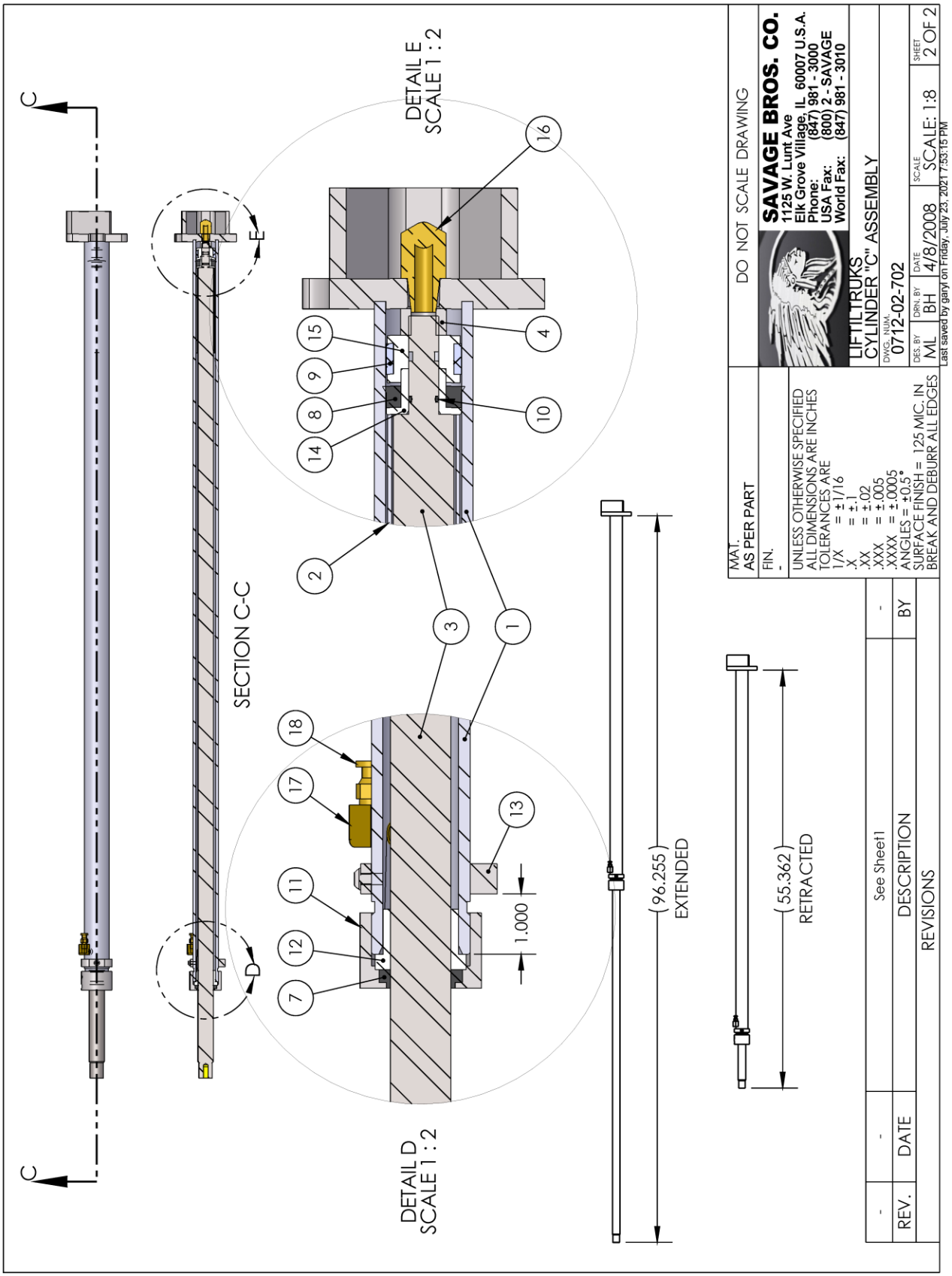
Savage Kettles

Kettles are shown as samples. If ordering, specify bowl size and material (copper or stainless steel)

Hydraulic Cylinder "C" Assembly – Page 1 of 2

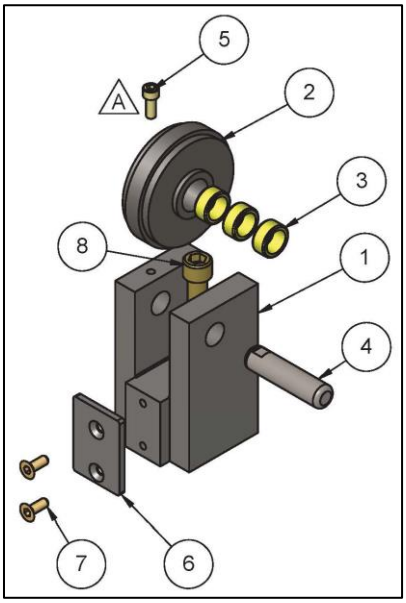


Hydraulic Cylinder "C" Assembly – Page 2 of 2



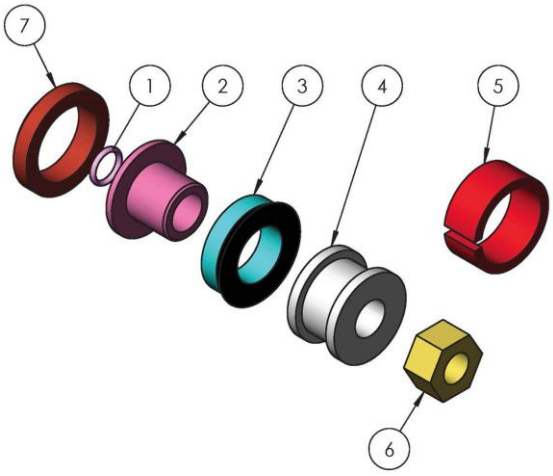
Idler Wheel - Axle and Bearing

ITEM	PART NO.	DESCRIPTION	QTY
	0708-02-101	Idler Wheel- Axle and Bearing	
1	0708-02-013	Idler Wheel Clevis	1
2	0708-02-011	B-C Chain Idler Wheel	1
3	9700-10-010	Needle Bearing	3
4	9200-60-105	Dowel Pin 1/2 X 2 LG	1
5	9200-10-270	SHCS 10-32 X 5/8" Blk	1
6	0708-02-014	Idler Clevis Guide Plate	1
7	9200-10-358	10-32 X 1/2" Flat HD Mach SCR, Black	2
8	9200-10-120	3/8-16 X 3/4 Socket Head Cap Screw	1



Hydraulic Cylinder Seal Replacement Kit

ITEM	PART NO.	DESCRIPTION	QTY
	0711-02-701	Hydraulic Cylinder Seal Replacement Kit	
1	9700-60-914	O Ring 3/8" x 1/2" x 1/16" - 012 VITON	1
2	9800-20-020	Piston Sleeve	1
3	9700-60-021	Piston Seal	1
4	9800-20-021	Piston	1
5	9700-60-022	Wear Ring	1
6	9200-00-302	1/2-13 Hex Nut, SS	1
7	9700-60-019	Rod Wiper	1



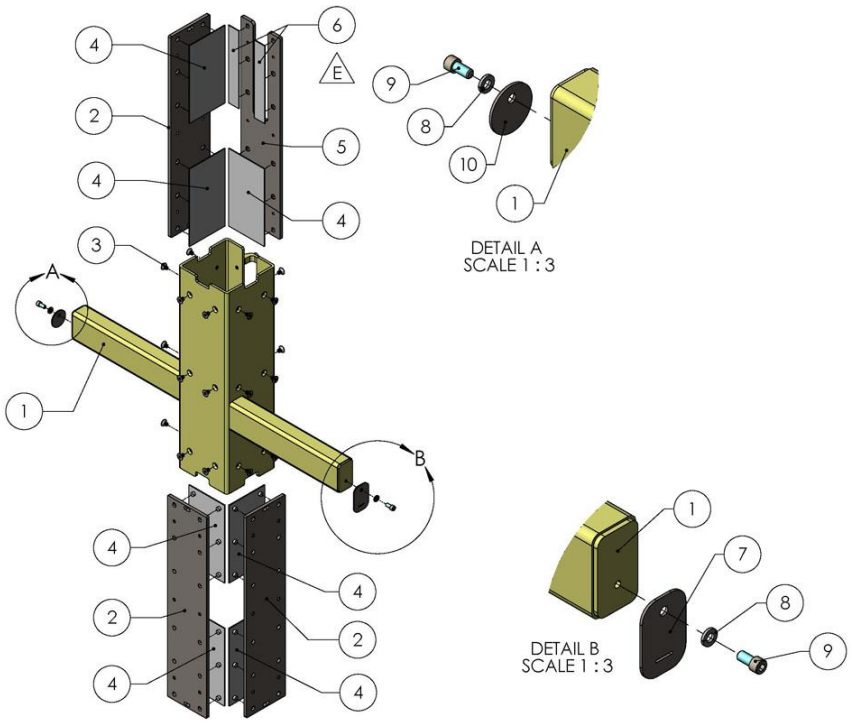
Column Slide Assembly

ITEM	PART NO.	DESCRIPTION	QTY
	0735-02-007	Column Slide Assembly– Inverted with Slot	
1	0735-02-100	Inverted Slide Tube With Slot, Weldment	1
2	0708-02-065	Slide Tube Insert	3
3	9200-10-542	1/4-20 X 3/8" FSCS 18/8 SS	24
4	9700-10-201	Column Slide Bearing - Long	7
5	0708-02-066	Slide Tube Insert, Chain Side	1
6	0709-02-105	Slide Bearing - Chain Side	2
7	0708-02-037	Slide Arm/Hold	1
8	9200-20-206	1/4" Split Lock Washer	2
9	9200-10-320	SHCS 1/4-20 X 1/2" S.S.	2
10	0708-02-007	Slide Arm Stop	1

Slide Bearing Replacement Kit

PART NO.	DESCRIPTION
0709-02-100	Slide Bearing Replacement Kit - Each kit contains 9 bearings (7 x callout #4 and 2X callout #6).

NOTE: The two Slide Bearings - Chain Side (callout #6, P/N: 0709-02-105) need to be installed on the chain side, at the top.



Hydraulic Pump Assembly

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	9800-10-013	HYDRAULIC PUMP - D.C. LIFTILTRUK
2	1	9800-50-004	HYDRAULIC HOSE - 26 IN WITH ADAPTOR
3	1	9800-40-012	1/4 NPT NIPPLE SCH 80 - 6.5" LONG
4	1	9800-40-011	1/4" NPTF X 1/4" JICM, HYDRLC 90 DEG ELBOW, BRASS
5	1	9900-40-031	ONE TOUCH 90 ELBOW 1/4 X 1/4 NPT
6	1	0708-08-012	HYD. PUMP MOUNT PLATE
7	2	9200-10-164	HHCS - 3/8-16 X 1.250"LG, FLANGED, SS,
8	1	9800-40-003	1/4" NPT 90 DEG M/F STREET ELBOW, BRASS

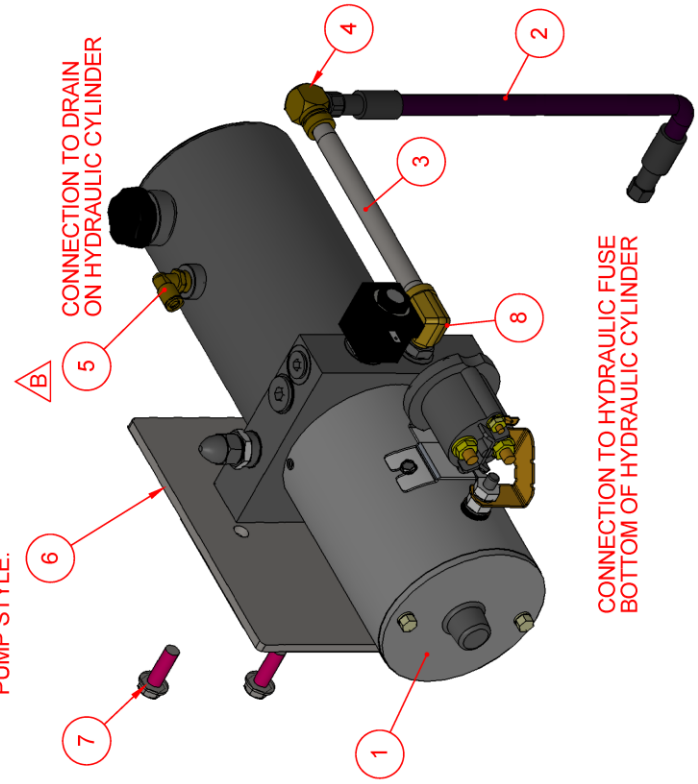
C USE 9800-90-002 - MOBIL DTE FM-32 FOOD GRADE HYDRAULIC FLUID

D NOTE: BRACKET 9800-10-012 NEEDS TO BE ADDED TO MATCH PRIOR 2002 PUMP STYLE.

B CONNECTION TO DRAIN ON HYDRAULIC CYLINDER

CONNECTION TO HYDRAULIC FUSE BOTTOM OF HYDRAULIC CYLINDER

FOR SPARE PART REFERENCE:
0712-08-201 - SOLENOID KIT - HYDRAULIC DOWN
0712-08-202 - SOLENOID KIT - LTT UP MOTOR



MAT.
AS PER PART

FIN.
-

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
TOLERANCES ARE
1/X = ±1/16
.X = ±.1
.XX = ±.02
.XXX = ±.005
.XXXX = ±.0005
ANGLES = ±0.5°
SURFACE FINISH = 125 MIC. IN
BREAK AND DEBURR ALL EDGES

SAVAGE BROS. CO.
1825 Greenleaf Ave
Elk Grove Village, IL 60007 U.S.A.
Phone: (847) 981 - 3000
USA Fax: (800) 2 - SAVAGE
World Fax: (847) 981 - 3010

LIFTERS
HYD PUMP ASM - 12V AUTOTILT

DWG. NUM.
0712-08-205

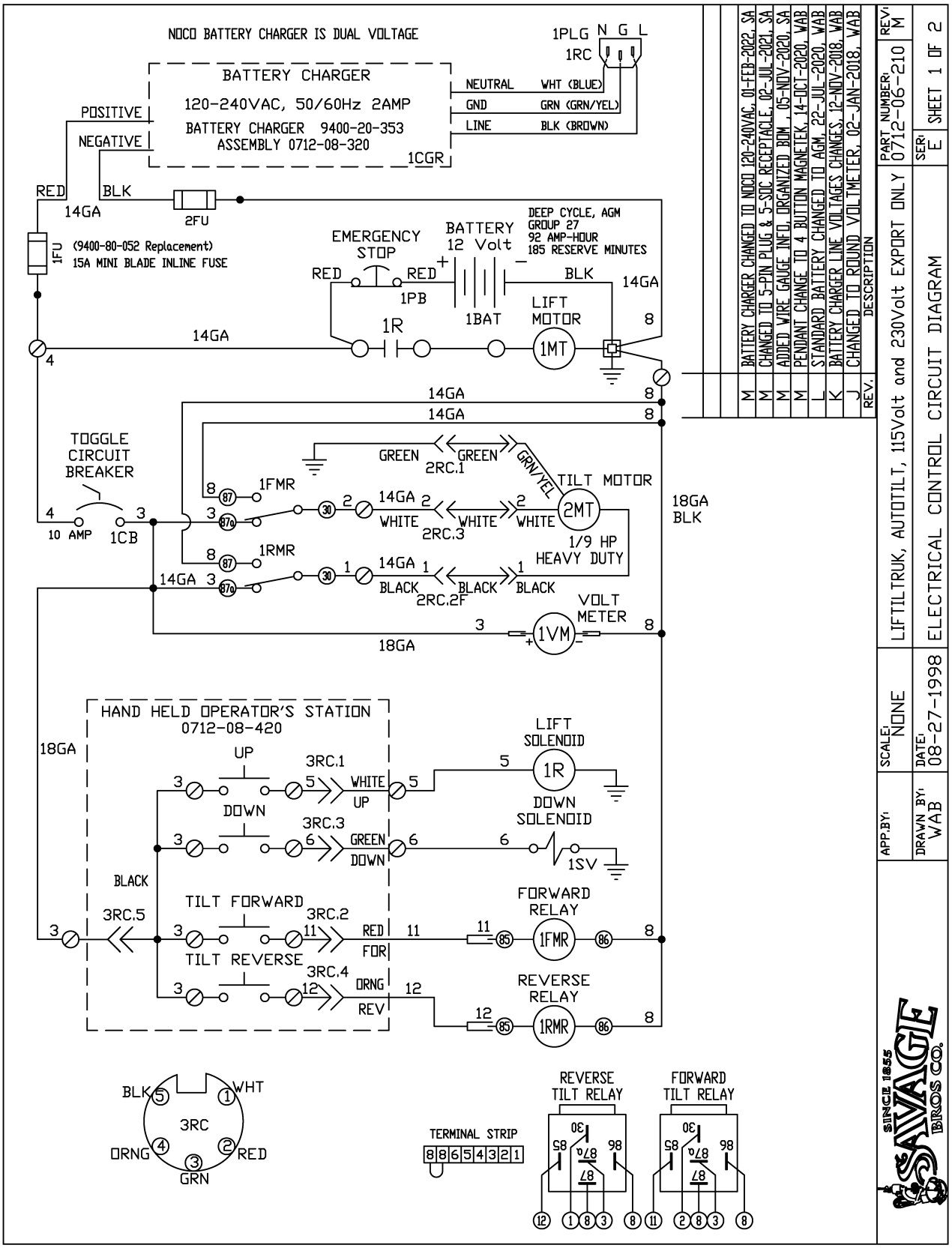
DES. BY	DRN. BY	DATE	SCALE	SHEET
	KT	3/18/2003	SCALE: 1:4	1 OF 1

Last saved by Bret on Friday, July 23, 2021 5:48:31 PM

REV.	DATE	DESCRIPTION	BY
D	2/1/2021	NOW 9200-10-164. WAS 9200-10-101. HARDWARE CHANGE TO SS	WM
C	2/28/2020	REMOVED 9800-10-107 PER KT, INCLUDED ON MOTOR	KT
B	3/13/2007	NOW 9900-40-031, WAS 9900-40-009	MD
A	10/10/2003	REVISED	ML

REVISIONS

ELECTRICAL SCHEMATICS AND ELECTRICAL PARTS



BILL OF MATERIAL			0712-08 SS G	ELEC/HYDR 12VDC BOX -AUTO TILT
-ITEM-	Qty	UM	Part Number	Description
1RC	1	EA	9400-10-179	POWER INLET W/ WATER PROOF PVC COVER,10A 250V, IEC 60320 C14
1CGR	1	EA	0712-08-320 B	BATTERY CHARGER ASSEMBLY w/NOCO
1BAT	1	EA	9400-95-003	BATTERY 12VDC AGM DEEP CYCLE, 185 RES. MIN., 92 AMP-HOUR
1BAT	1	EA	9400-50-007	BATTERY CABLE - BLACK / LTT
1BAT	2	EA	9400-50-008	BATTERY CABLE - RED / LTT
1PB	1	EA	9400-30-315	DISCONNECT SWITCH BATTERY 125A
1CB	1	EA	9400-35-032	CIRCUIT BREAKER LTT 12V/10AMP
1VM	1	EA	9400-22-005	VOLTMETER DIGITAL WITH 20 LED GAUGE 5-15VDC ROUND 1.150"HOLE
1VM	2	EA	9400-10-140	QUICK CONNECT FEMALE FULLY INSULATED 20-18 AWG
2OP.STA	1	EA	0712-08-420	AUTOTILT PENDANT CONTROL ASSY YELLOW MAGNETEK
1FR,1RR	1	EA	0712-08-412	AUTOTILT PENDANT RELAYS ASSY - YELLOW
2MT	1	EA	0712-08-520	AUTOTILT COIL CORD ASSEMBLY
1ENCL	1	EA	9400-40-014	TERMINAL BLOCK 8 POS 2 ROW SCREW TERM
1ENCL	2	EA	9400-60-025	RING TERMINAL- 5/16"/16-14/BLUE
1ENCL	1	EA	9400-60-032	RING TERMINAL-#10 STUD/16-14/BLUE
1ENCL	13	EA	9400-60-029	RING TERMINAL - #6 STUD/22-18/RED
1ENCL	4	EA	9400-60-140	TN14-WJ T&B NYLON WIRE JOINT QUICK CONNECT FEMALE-22-18/FULINS
1ENCL	1	EA	9400-90-028	LTT Yellow Pendant Label Set -English/French/Spanish
2OP.STA			**0712-08-420**	**AUTOTILT PENDANT CONTROL ASSY YELLOW MAGNETEK**
-ITEM-	Qty	UM	Part Number	Description
2ENCL	1	EA	9400-30-420	PENDANT STATION 4 BUTTON YELLOW MAGNETEK
2CORD	1	EA	0712-08-004	LTT YELLOW PENDANT COIL CORD CUT 10'EXT/2'RET 18 GA / 5 CONDUCTOR
3PLG	1	EA	9400-10-223	PLUG 5 PIN FIELD ATTACHABLE FEMALE THREAD MINI
-ITEM-	Qty	UM	Part Number	Description
3RC	1	EA	9400-10-159	RECEPTACLE 5 SOC 16GA 1/2"NPT MINI
	1	EA	9400-60-067	LOCKNUT FOR 1/2"NPT CORDGR SEALCON
	3	EA	9400-60-026	SPADE TERMINAL-#6 STUD/22-18/RED
	2	EA	9400-10-140	QUICK CONNECT FEMALE FULLY INSULATED 20-18 AWG
				REPLACEMENT PARTS:
1R	1	EA	0712-08-202	SOLENOID KIT LTT UP, w/ MOTOR CONNECTING STRAP
1CGR	1	EA	9400-20-353	BATTERY CHARGER 120-240VAC 50/60Hz 1.3AmpsAC, 10AmpsDC NOCO IP68
1,2FU	2	EA	9400-80-052	BLADE FUSE 15 AMP "MINI" 32 VOLT AUTOMOTIVE 2 PRONG
2MT	1	EA	9400-00-210	GEARMOTOR 12VDC LTT 1/9 HP, 60:1 GEAR RATIO, 100LB-in TORQUE 53 RPM
2MT	1	EA	9400-10-096	PLUG 3 SOC ATTACHABLE LTT TILT FEMALE THREAD MINI
				MECHANICAL ASSEMBLY
1MT	1	EA	9800-10-013	HYDRAULIC PUMP - 12VDC LIFTILTRUK, DYNA-JACK SYSTEM - SET@ 1000 PSI

BILL OF MATERIAL			0712-08-412	AUTOTILT YELLOW PENDANT RELAYS ASSY
-ITEM-	Qty	UM	Part Number	Description
1FR,1RR	2	EA	9400-30-152	RELAY 12V DC COIL 35A NO/ 20A NC SPDT QUICK CONNECT
1FR,1RR	1	EA	9400-60-141	TN10-WJ T&B NYLON WIRE JOINT 12-10GA CAP SPLICE
1FR,1RR	1	EA	9400-60-142	RP7 T&B NYLON WIRE JOINT 3#14 to 2#10 max CAP SPLICE
1FR,1RR	2	EA	9400-10-140	QUICK CONNECT FEMALE FULLY INSULATED 20-18 AWG
1FR,1RR	6	EA	9400-10-142	QUICK CONNECT FEMALE FULLY INSULATED 16-14 AWG
1FR,1RR	4	EA	9400-60-027	SPADE TERMINAL- #6 STUD/16-14/BLUE

BILL OF MATERIAL				
-ITEM-	Qty	UM	Part Number	Description
1PLG	1	EA	9400-50-162	POWER CORDSET 115V NEMA 5-15 10A, IEC 60320 C13, 18GA, 2.44M/8Ft
			9400-50-163	POWER CORDSET 230V NEMA 6-15 10A, IEC 60320 C13, 18GA, 2.44M/8Ft
			9400-50-164	POWER CORDSET AUSTRALIAN 10A, IEC 60320 C13, 18GA, 2.5M/8Ft
			9400-50-165	POWER CORDSET UK & IRELAND 10A, IEC 60320 C13, 18GA, 2.5M/8Ft
			9400-50-166	POWER CORDSET CONTINENTAL EU 10A, IEC 60320 C13, 18GA, 2.5M/8Ft
			9400-50-167	POWER CORDSET India/SAfrica 10A, IEC 60320 C13, 18GA, 2.5M/8Ft
			9400-50-340	POWER CORDSET CHINESE 10A, IEC 60320 C13, 18GA, 2.5M/8Ft Long

REV: M
PART NUMBER: 0712-06-210
SHEET 2 OF 2
SER: E
LIFTILTRUK, AUTOTILT, 115Volt and 230Volt EXPORT ONLY
ELECTRICAL CONTROL CIRCUIT DIAGRAM
SCALE: NONE
DATE: 08-27-1998
APP.BY:
DRAWN BY: WAB