ORTHMAN GRAIN
797 and 897
GRAIN CART
1992 MODEL

OPERATOR'S MANUAL

OM07-91-01

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Farm Safety

Contrary to the popular image of fresh air and peaceful surroundings, a farm is not a hazard-free work setting. Every year, thousands of farm workers are injured and hundreds more die in farming accidents. According to the National Safety Council, agriculture is the most hazardous industry in the nation.

How You Can Improve Farm Safety

You can start by increasing your awareness of farming hazards and making a conscious effort to prepare for emergency situations including fires, vehicle accidents, electrical shocks from equipment and wires, and chemical exposures. Be especially alert to hazards that may affect children and the elderly. Minimize hazards by carefully selecting the products you buy to ensure that you provide good tools and equipment. Always use seat belts when operating tractors, and establish and maintain good housekeeping practices. Here are some other steps you can take to reduce illnesses and injuries on the farm:

- Read and follow instructions in equipment operator's manuals and on product labels.
- Inspect equipment routinely for problems that may cause accidents.
- Discuss safety hazards and emergency procedures with your workers.
- Install approved rollover protective structures, protective enclosures, or protective frames on tractors.
- Make sure that guards on farm equipment are replaced after maintenance.
- Review and follow instructions in material safety data sheets (MSDSs) and on labels that come with chemical products and communicate information on these hazards to your workers.

Health and Safety Hazards on Farms

Farm workers including farm families and migrant workers are exposed to hazards such as the following:

Danger	Potential Effect or Injury	Prevention
Chemicals/Pesticides	Skin and respiratory injury or death	MSDS and proper Personal Protective Equipment. Review Manufacturers data sheets
Cold	Illness, Frostbite or death	Dress properly for the day.
Dust	Respiratory injury or explosive combinations	Be aware of your surroundings and activity
Electricity	Shock, burns, fire, death	Use a qualified professional for wiring dangerous electrical devices. Never overload a circuit. Replace damaged electrical devices or cords. Electrical tape will not insulate you from injury.
Grain bins, Silos	Entrapment, Suffocation, Explosion from formation of dangerous gases and poisoning.	Make sure the bin is properly ventilated and maintained. Never walk the grain.
Hand tools	Injury including cuts abrasions, electrocution, strains, sprains and death	Make sure you hand tools are in good condition. Never leave a damaged tooling accessible for someone else to use.
Highway traffic	Collisions resulting in injury or death	Follow regulations, stay alert. Avoid alcohol and use of communication devices while driving
Lifting and lifting devices	Back injury, sprains, strains. Falling material resulting in being struck or crushed by heavy material	Use proper lifting technique. Get help when the load is too heavy. Inspect chains, straps or cables routinely to make sure they are in good condition.
Livestock handling	Serious injury or death resulting from being pinned struck or trampled.	Always make sure you have adequate room and an escape route
Machinery/Equipment	Cuts, abrasions, amputations, death.	Thoroughly read and understand your Owners Equipment Manual. Never operate the equipment without guards in place. Make sure the equipment can not be energized or otherwise put into operation while you are working on it.
Manure pits	Explosion from formation of dangerous gases. Suffocation. Poisoning	Proper maintenance.
Mud	Sprains, strains, entrapment and suffocation. Eye injury and skin irritation.	Proper Personal Protective Equipment. In some conditions a "Spotter" may be needed.
Noise	Hearing damage	Personal Protective Equipment.
Ponds	Drowning	Wear a life preserver and make sure help is readily available.
Slips/Trips/Falls	Sprains, strains, back and neck injury, bone breaks or death	Keep work area free from clutter and organized. If working on anything elevated make sure you have appropriate guarding and/or fall protection such as a harness and lanyard.
Sun/Heat	Sun burn, Heat Stroke, shock, death	Use common sense on excessively hot days, use sun screen, wear a hat and stay hydrated.
Toxic gases	Skin and respiratory injury or death. Explosion.	MSDS and proper Personal Protective Equipment. Review Manufacturers data sheets
Tractors	Cuts, abrasions, amputations, death.	Thoroughly read and understand your Owners Equipment Manual. Never operate the equipment without guards in place. Anti-roll over devices.
Wells	Electrocution, amputation, death	Avoid contact with water while working on an electrical device. Always be sure the equipment can/will not be energized during repair or maintenance. Make sure all guarding is in place.
Severe Weather	Electrocution, "struck by" injuries, death	Move to a safe place. Lightening, hail and tornadoes are unpredictable.

Orthman Manufacturing, Inc. does not limit the potential effects or injuries nor prevention measures to those listed above. They are provided solely as a guideline to making your farm life safer. Always consult your Owner/Operators Manual for specific tool and equipment safety requirements.

High Risk Factors on Farms

The following factors may increase risk of injury or illness for farm workers:

• **Age** – Injury rates are highest among children age 15 and under and adults over 65.

• **Equipment and Machinery** – Most farm accidents and fatalities involve machinery. Proper machine guarding and doing equipment maintenance according to manufacturers' recommendations can help prevent accidents.

• **Protective Equipment** – Using protective equipment, such as seat belts on tractors, and personal protective equipment (such as safety gloves, coveralls, boots, hats, aprons, goggles, face shields) could significantly reduce farming injuries.

• Take precautions to prevent entrapment and suffocation caused by unstable surfaces of grain storage bins, silos, or hoppers. Never "walk the grain."

• Be aware that methane gas, carbon dioxide, ammonia, and hydrogen sulfide can form in unventilated grain silos and manure pits and can suffocate or poison workers or explode.

• Take advantage of safety equipment, such as bypass starter covers, power take-off master shields, and slow-moving vehicle emblems.

• **Medical Care** – Hospitals and emergency medical care are typically not readily accessible in rural areas near farms.

The Benefits of Improved Safety and Health Practices

Orthman Manufacturing Provides this document in the hope that everyone that has a job to do, does it SAFELY. Our goal and yours should be to end each day in the best possible health. Better safety and health practices reduce fatalities, injuries, and illnesses as well as associated costs such as workers' compensation insurance premiums, lost production, and medical expenses. A safer and more healthful workplace improves morale and productivity.

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APPENDIX A: J-STAR SCALE OPERATOR'S MANUAL

1.1 WARRANTY

Orthman Manufacturing, Inc. warranties the products it manufactures to be free from defects in materials and workmanship, for a period of one year from the date of sale to the original user. The warranty is valid provided written notice of the alleged defect is received by Orthman Manufacturing, Inc. during said period and within ten days after its discovery.

If proven to our satisfaction that the product is defective as to material and workmanship, the necessary parts will be replaced and/or repaired, this being Orthman Manufacturing, Inc. sole responsibility. Our obligation under this warranty is limited to repair or replacement of Orthman product or part only and does not obligate Orthman Manufacturing, Inc. to bear any other cost involved.

This warranty will apply only if the product has not been subject to misuse, misapplication, neglect, repair or alteration.

In respect to products and parts not manufactured by Orthman Manufacturing, Inc. the warranty obligations of Orthman Manufactuing, Inc. shall in all respects conform and be limited to our supplier's warranty.

Incoming freight should be prepaid. If products are found to be within warranty, credit wil be allowed on the incoming charges and return freight will be prepaid.

THE WARRANTY IN THE ABOVE STATEMENT BY ORTHMAN MANUFACTURING,INC. IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THE WARRANTY OF MERCHANTABILITY AND FITNESS FOR USE. WE NEITHER ASSUME, NOR AUTHORIZE ANY OTHER PERSON TO ASSUME FOR US, ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF OUR PRODUCTS.

1.2 INTRODUCTION

This manual details information concerning safety, operation and maintenance guide lines pertaining to your Orthman **797** or **897 GRAIN CART**.

Read and thoroughly understand the contents of this publication before operating the grain cart. Please keep the operator's manual in good condition for handy reference in the future.

This product was designed and manufactured with common sense and integrity; therefore, if the prescribed operating techniques and maintenance intervals are met, you will receive many years of excellent performance.

The directions left, right, front, and rear, as mentioned in this manual, are based on the driver sitting on the tractor seat and facing in the direction of travel.

The serial number plate is located on the left, front corner tub brace. Information contained on this plate should be recorded below for future reference when ordering replacement parts from an authorized Orthman dealer, or when corresponding with ORTHMAN MANUFACTURING, INC.

Serial No._____

1.3 SAFETY INSTRUCTIONS

This symbol is used to call your attention to instructions concerning your personal safety. Be sure to observe and follow these instructions. Failure to do so increases the possibilty of personal injury or death. Read manual carefully before operating or servicing Orthman Grain.

You are responsible for the safe operation of your Grain Cart. Anyone operating, maintaining or working around the Grain Cart must be familiar with the procedures and pertinent safety information contained in this manual.

Do not modify the equipment in any way. Modifications will void your warranty and may affect the safety and life of the equipment. Observe all safety decals found on theOrthman Grain Cart. Replace all damaged or faded safety decals immediately; they are available from your Orthman dealer. Keep equipment clean to insure retaining safety decals are at their highest visibility level.

INSTALL AND SECURE ALL SHIELDS AND GUARDS IN THE PROPER MANNER BEFORE OPERATING.

DANGER! DO NOT OPERATE GRAIN CART WITH AUGER CAGE OR PTO SHIELDS REMOVED. INJURY OR DEATH MAY RESULT.

DO NOT ENTER CART DURING OPERATION. Death or serious injury may result from grain suffocation or entanglement with unloading auger.

f it is necessary to enter cart for repair or clean out, follow hese steps:

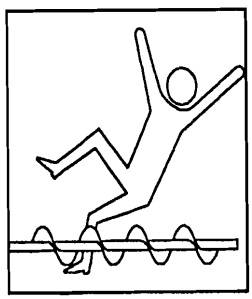
1. Shut off tractor engage park brake and remove ignition key.
2. Wait for all moving parts to stop.
3. Open internal flow control gate.
4. Open external pit dump gate.
5. Disconnect hydraulic supply hoses from tractor.
6. Disconnect PTO shaft from tractor.


REPLACE ALL SHIELDS PRIOR TO RESUMING OPERATION.

OPERATING SAFETY

1. Equipment is to operated by qualified personnel only. A full understanding of the operation, maintenance, an safety requirements is mandatory before use.

2. Before operating Grain Cart, be sure everyone is clear of tractor and cart. Absolutely no riders on tractor or cart during operation. Severe bodily injury may result.



3. LOOK UP for obstructions before activating hydraulic auger fold.

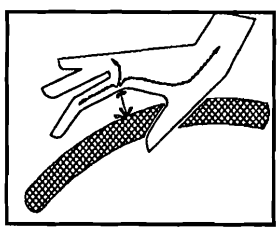
4. Stay away from overhead obstructions and power lines during setup and operation. Even without direct contact, electrocution can occur.

5. **MINIMUM** tractor horsepower requirement - 125 HP.

6. **MAXIMUM** towing speed: Loaded - 10 mph. Empty - 20 mph. Grain cart is designed for off-road use only.

7. Recommended PTO operating speed: 1000 RPM.

8. Be sure internal flow control gate is closed before unloading auger is engaged.



9. Escaping hydraulic oil under pressure can have sufficient force to penetrate the skin, causing serious personal injury. Before attaching or disconnecting hydraulic lines, relieve pressure by shutting off tractor and moving corresponding remote cylinder lever in both direction. Before applying pressure, make sure all connections are tight and that lines, pipes and hoses are not damaged.

Hydraulic oil escaping from a very small hole can be almost nvisible. Rather than hands, use a piece of cardboard or wood to search for suspected leaks. If injured by escaping ıydraulic oil, see a doctor at once. Serious infection or eaction can develop if proper medical treatment is not ıdministered immediately.

10. Wear suitable ear protection for prolonged exposure to excessive noise.

11. Never wear ill-fitting, baggy or torn clothing when working around or on any of the drive system components.

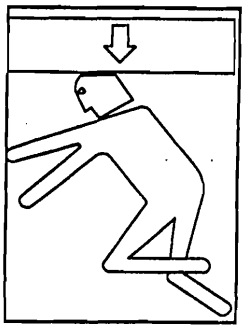
12. Keep hands, feet, hair and clothing away from all moving or rotating parts.

13. Never operate the machine inside a closed building.

SECTION 2

ASSEMBLY INSTRUCTIONS

AXLE ASSEMBLY



WARNING!: Properly block grain cart when assembling axle onto frame. **DO NOT** allow anyone to position themselves underneath frame work while cart is suspended in air. Use safe practices to prevent needless mishaps that could result in death or permanent injury.

1. Jack cart frame up until transport wheels are clear. Block framework securely to prevent cart movement while suspended.

2. Unbolt shipping axle and remove from underneath cart. Position permanent axle under frame and secure with eight ¾" x 2" grade 5 bolts, lock washers and nuts. One side is shown in Figure 1. Tighten mounting bolts and torque accordingly. Be sure of tire/axle match for the particular grain cart size.

3. Mount wheels onto axle hubs. Figure 2 shows the hub and wheel. See Figure 3 for proper placement of nuts. Torque to 450 lb-ft. Check torque after first hour of operation and weekly thereafter.

4. Carefully remove support blocks and lower cart to ground.

AXLE ASSEMBLY (continued)

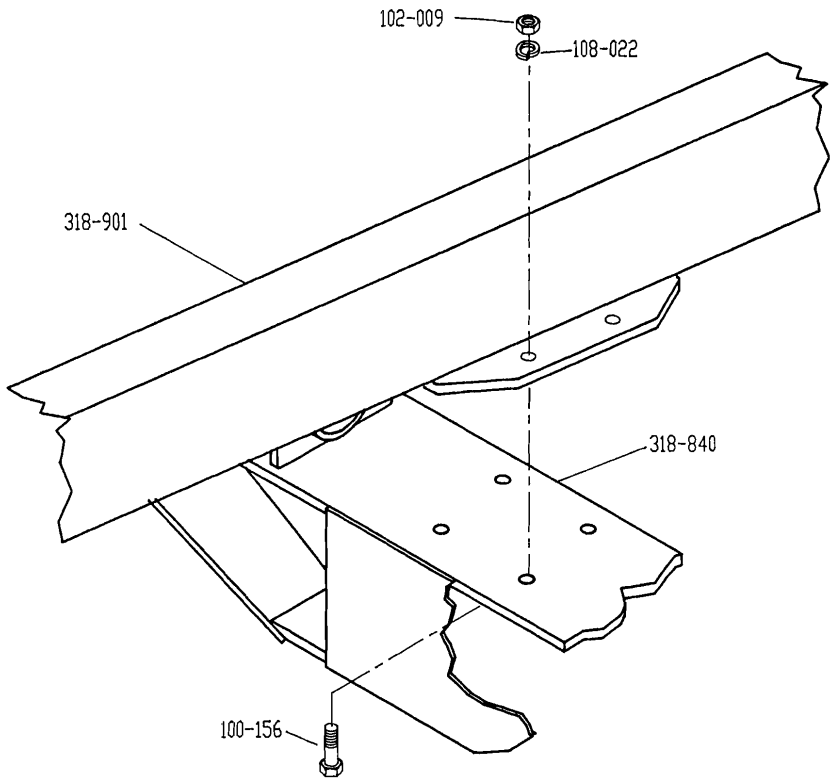


FIGURE 1: AXLE ASSEMBLY

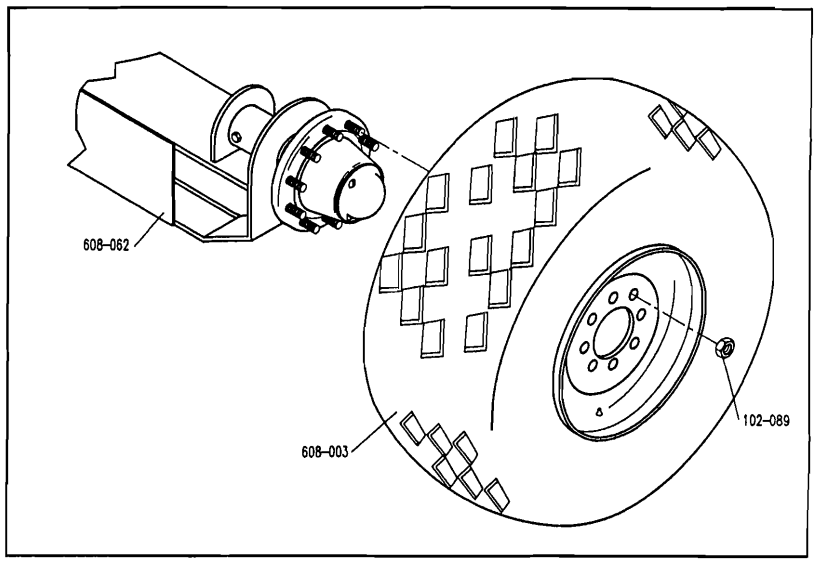


FIGURE 2: HUB ASSEMBLY

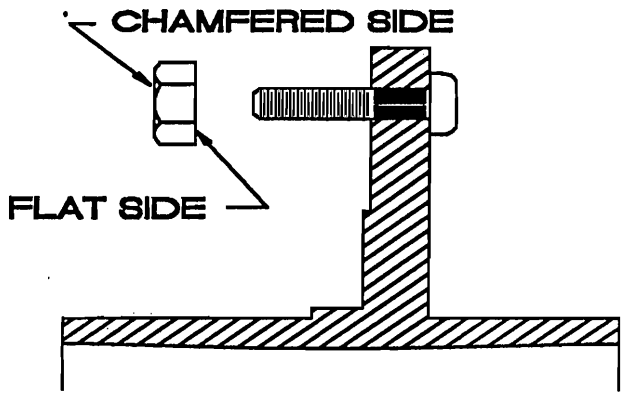


FIGURE 3: INSTALLING NUTS ON HUB STUDS

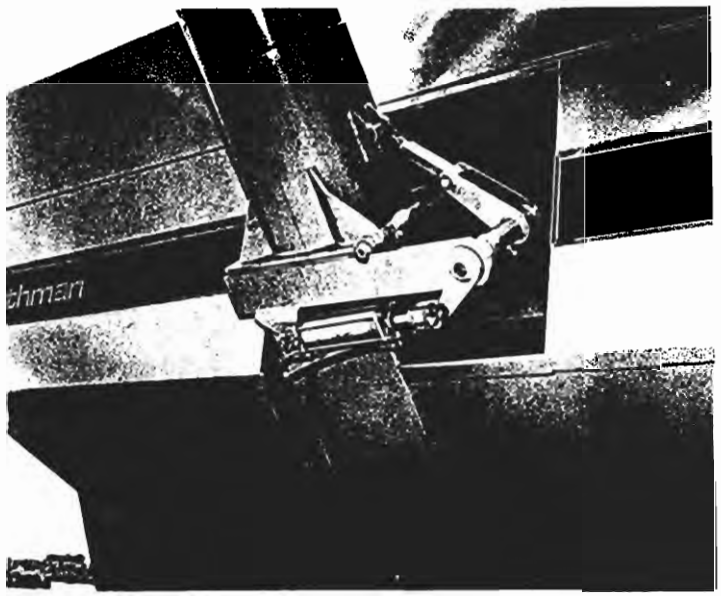


FIGURE 4: OVER-CENTER AUGER LOCK

AUGER ASSEMBLY

IMPORTANT! Remove rubber boot from top auger discharge to prevent auger lock, it is tucked inside for shipment.

Note: Over center adjusting linkage strap will require adjustment to properly mesh auger surfaces and corresponding. Your Orthman Grain Shuttle is equipped with four (4) dog pins in the auger dog to provide a more positive auger drive and to equalize stress to prevent fatigue failure of pins. These are shown in Figures 4 & 5. See Step 6 to adjust. Top auger setting (page 2.12) must also be checked. Make sure bearing lock collar is secure.

1. See Figure 5. Place top auger plate in line with bottom auger plate in the transport (folded) position. Grease auger hinge shaft (318-793) and insert into hinge from left to right. Be sure nut end of shaft is on the side away from the grain cart. If shaft does not slide in easily it may be hit with a rubber mallet. Damage may be caused to the nut if a metal hammer is used. The shaft will become difficult to remove if damage occurs. If a rubber mallet is not available,some protection may be obtained by inserting a bolt into the nut before striking with a hammer. Remove bolt from nut after shaft is installed.

2. See Figure 6. Turn the shaft until drilled hole in shaft is aligned with hole in top auger plate portion of hinge and drive in ½" x 2 ½" roll pin (104-005), securing shaft in hinge assembly.

3. Connect hinge lock adjusting screw assembly (318-527) to over center lock linkage on top auger and secure with pin (104-087) and one 3/16" x 1½" cotter pin.

AUGER ASSEMBLY (continued)

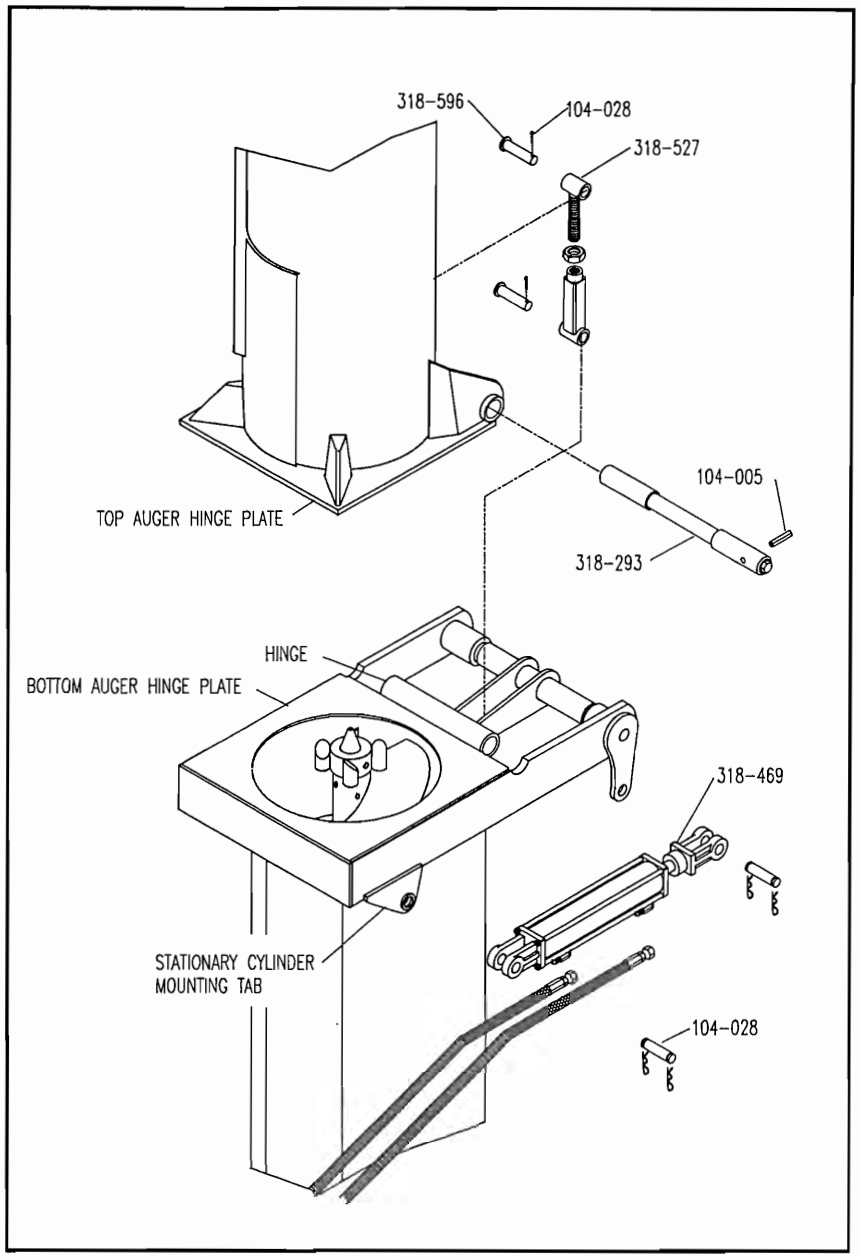


FIGURE 5: AUGER HINGE ASSEMBLY

AUGER ASSEMBLY (continued)

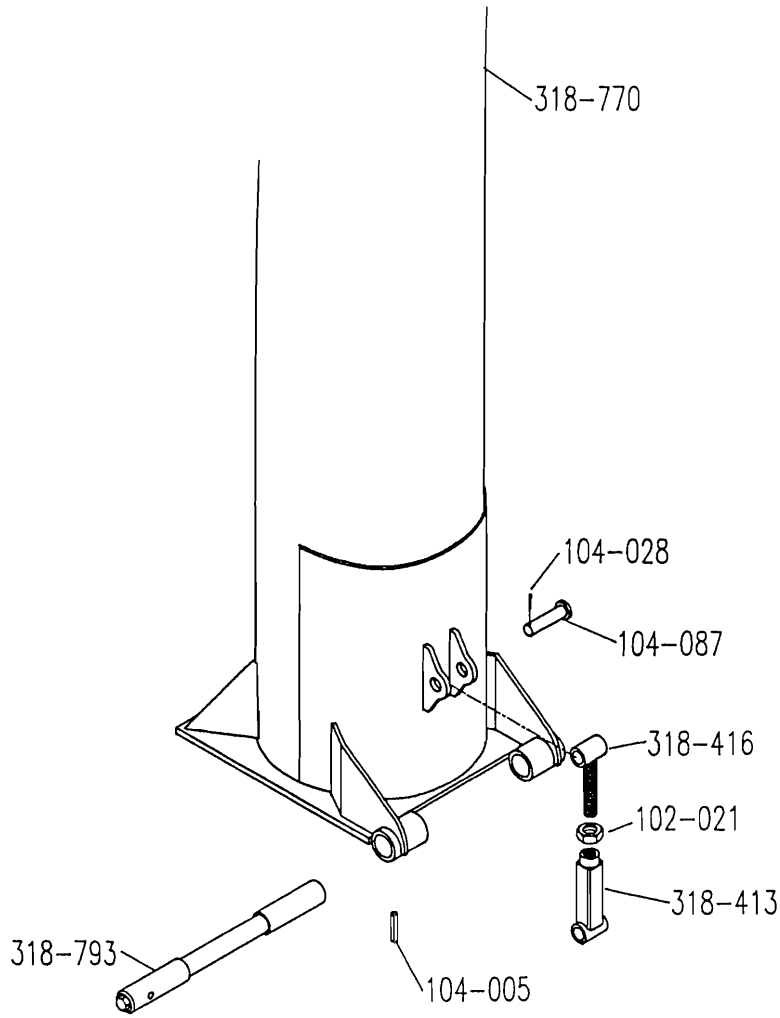


FIGURE 6: TOP AUGER HINGE ASSEMBLY

AUGER ASSEMBLY (continued)

4. See Figure 5 for assembly of 2½" x 8" cylinder, base end to stationary mounting tab, leaving rod end of clevis loose. Attach hoses to fittings on cylinder.

5. To avoid auger whipping into place, cycle cylinder to purge system of all possible air locks. Then extend cylinder rod and attach rod end of clevis to other bottom auger mounting tab.

6. Retract cylinder to unfold auger. When fully extended with over center linkage locked, auger will not seat tight against bottom plate. Extend over center adjusting screw assembly one half turn at a time until auger surfaces mesh satisfactorily.

IMPORTANT! DO NOT EXTEND adjusting screw in more than half turn increments. Extending more than a half turn may damage hinge and over center linkage assemblies.

7. 7. Check the position indicator to ensure it is in the correct position for unloading. If it is not, adjust by loosening set screws, repositioning arrow, and retightening set screws.

AUGER REST

7. See Figure 7. Position auger rest onto outside left rear corner of grain cart tub with four 3/8" x 1¼" carriage bolts (100-105). Place two strengthening straps (318-814) horizontally over carriage bolts on the inside of tub. Secure entire assembly with 3/8"lockwashers (108-018) and 3/8" nuts (102-005).

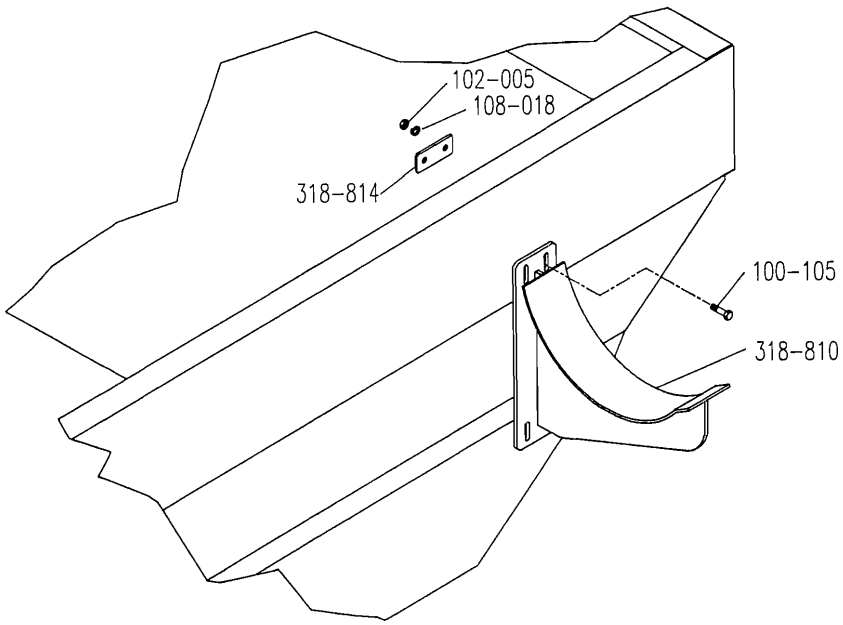
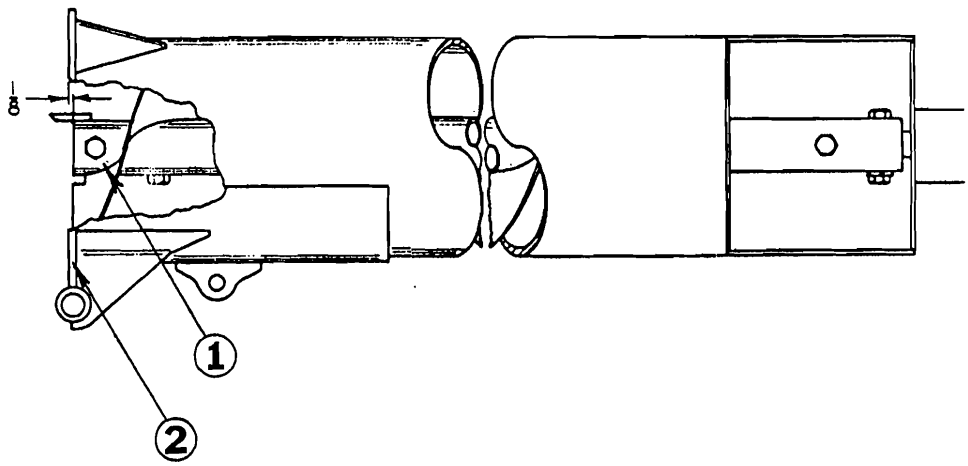


FIGURE 7: AUGER REST ASSEMBLY

TOP AUGER SETTING

MPORTANT! The top auger is shipped complete with auger /tube clearance factory set. It will be necessary to reset clearance if auger is disassembled for repair.

See Figure 8. The auger screw (flighting shaft, 1) must be 1/8" inside the hinge plate (2). Using a square, position auger screw to the recommended 1/8" clearance dimension, then secure bearing lock collar. Clearance should be checked each time top auger is assembled onto cart.



1 - Auger Screw or Flighting Shaft
2 - Hinge Plate

FIGURE 8: TOP AUGER FLIGHTING SHAFT

LADDER MOUNTING

1. See Figures 9 and 10. Locate mounting hardware in ladder mounting holes. Attach top of ladder to cart tub with two 3/8" x ¾" Carriage Bolts (100-008), 3/8" Flat Washers (108-007) and 3/8" Hex Nuts (102-005). Attach to tab on hitch with one 3/8" x 1¾" Carriage Bolt (100-024), 3/8" Flat Washer (108-007), and 3/8" Hex Nut (102-005).

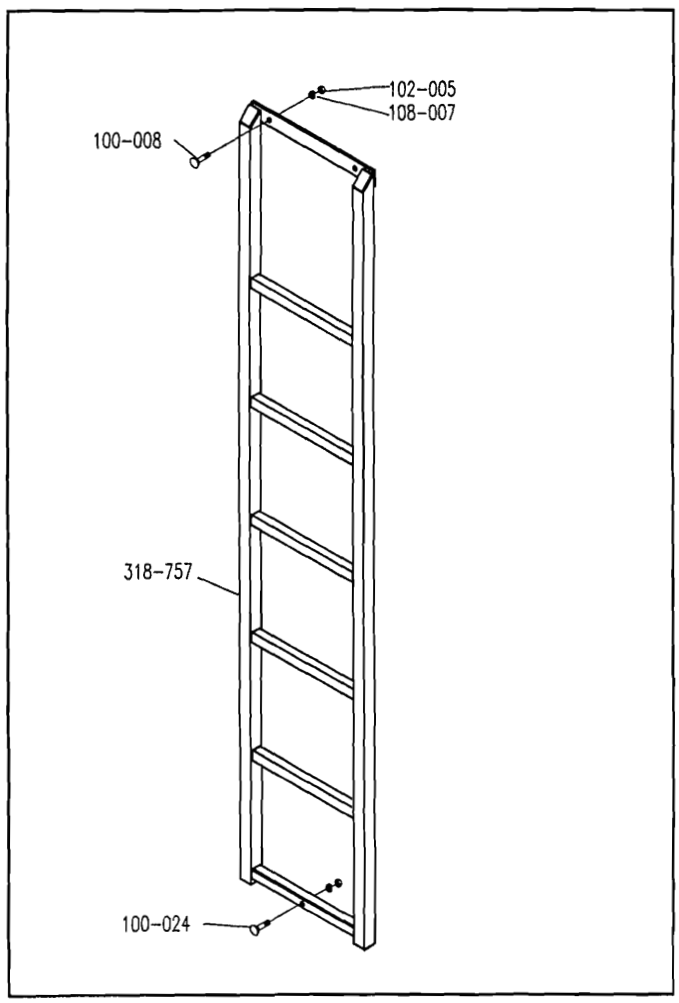
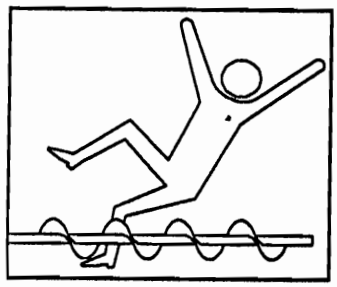


FIGURE 9: MOUNTING LADDER

LADDER MOUNTING (continued)

FIGURE 10: PICTURE OF LADDER, MOUNTED

AUGER GRATE AND CYLINDER HOSES INSTALLATION



DANGER! DO NOT OPERATE CART WITH AUGER GRATE OPEN OR REMOVED. Death or permanent injury may result from entanglement with unloading auger.

FIGURE 11: PHOTO OF SAFETY GRATE

EXTENSIONS

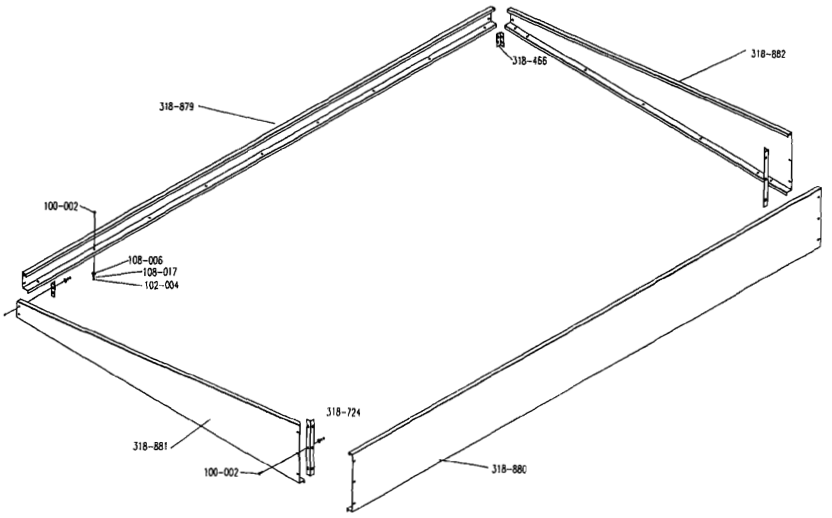


FIGURE 13: EXTENSIONS FOR THE 897 GRAIN CART

1. See Figure 13. Carefully position left hand extension (26" deep for 897, 16" deep on 797) in place on auger side of tub and loosely secure with 5/16" x ¾" carriage bolts washers and nuts from bottom up through tub and extension mounting surfaces.

2. Attach right hand extension member (6" deep) with carriage bolts, washers and nuts. Limit number of bolts secured initially to enable alignment with other extension members and corner braces.

3. Place front and back tapered members on tub and secure with hardware.

EXTENSIONS (continued)

4. Align four corner braces with extension members and insert 5/16" x 3/4" carriage bolts with appropriate hardware from outside. Slide these through extension and corner brace. Slide brace downward against tub.

5. Assemble remaining hardware and tighten accordingly. Torque recommendations can be found on page 6.4.

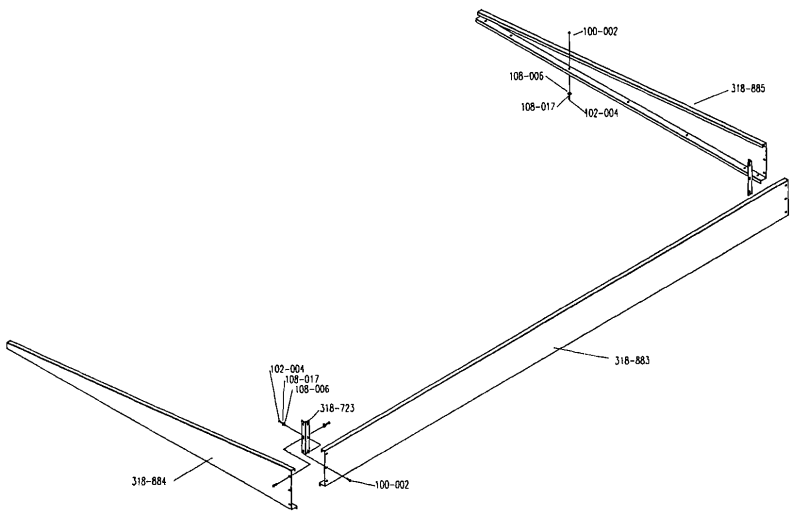


FIGURE 13a: EXTENSIONS FOR THE 797 GRAIN CART

LIGHTING & RUBBER SPOUT INSTALLATION

A. SAFETY LIGHTING

1. Drill mounting holes (4) on each side for light housing and a single hole (1) on each side for wiring access on each rear tub brace member. Not all grain carts will need to be drilled for light mountings.

2. If REPAIRS ARE NECESSARY:
Strip six wire cable jacket back 1" on "tractor" end. Remove insulation 1/8" to 1/4" from individual conductors. Place wires into plug screw terminals according to wiring diagram below. Re-assemble plug cover and strain relief.

6 Wire Cable	Plug Terminal	Description
Blue	Wht 1	Ground
Black	Blk 2	Work Lights
Yellow	Yel 3	L.H. Turn Signal
--------	Red 4	Auxiliary
Green	Grn 5	R.H. Turn Signal
Brown, Red	Brn 6	Tail Lights
-------	Blu 7	Auxilliary

B. HALOGEN FLOOD LAMP AND TOP AUGER RUBBER SPOUT ASSEMBLY

1. Auger should be in a transport position.
2. Route light cable (318-897) through cable clip (152-412) and channel on rear of auger. Plug cable into lamp.
3. Attach cable clip (152-412) and lamp (318-896) to auger and secure with 5/16" x 1" Carriage Bolt (100-003), 5/16" Flat Washer, 5/16"Lock Washer (108-017), 5/16" Hex Nut (102-004).

_IGHT & RUBBER BOOT INSTALLATION (continued)

. Place rubber boot around directional spout and one side ver lamp. With one strap, secure lamp and side of boot to irectional spout with 5/16" x 1" Carriage Bolt(100-003), 5/ 6" Lock Washer (108-017) and 5/16" Hex Nut (102-004). low assemble all other straps around rubber boot and irectional spout with 5/16" x 3/4" Carriage Bolts (100-003).

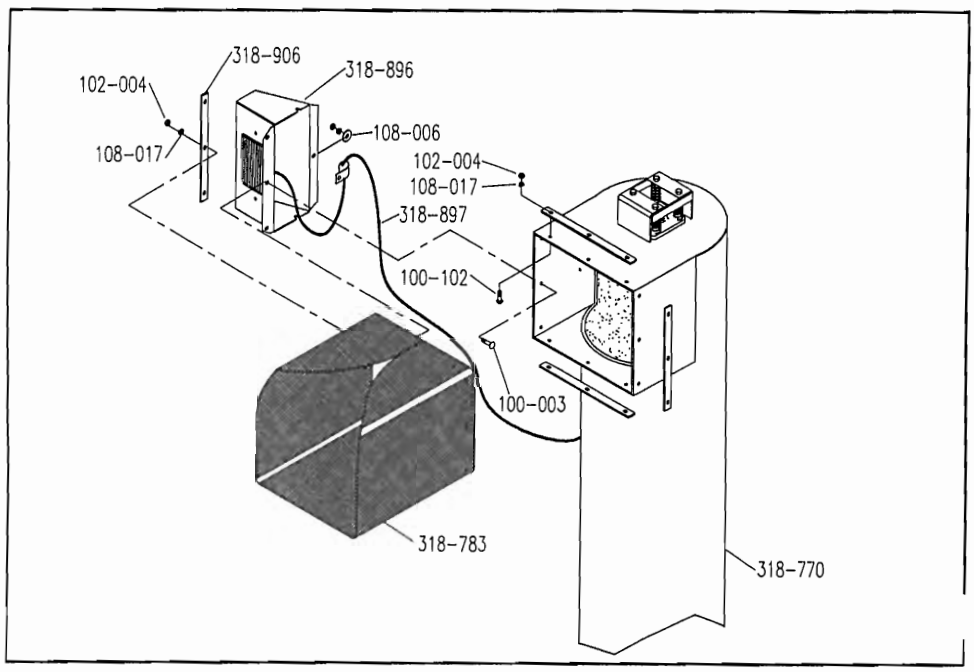


FIGURE 14: ASSEMBLY OF RUBBER BOOT AND HALOGEN LAMP TO DIRECTIONAL SPOUT ON TOP AUGER

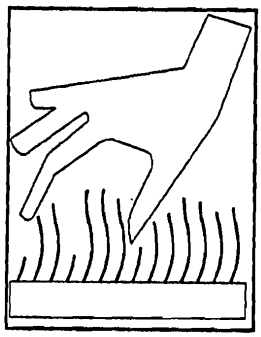
PTO SHAFT INSTRUCTIONS

The grain cart drive line is protected from overloading by a slip clutch as well as an overrunning clutch. These clutches are to relieve shock loading and stress on the gear box.

Spring lengths are preset at 1-11/16". This length has a torque of 4100 in-lbs before run-in and 4900 in-lbs after run-in.

1. Atmospheric condition and prolonged storage may alter the operating characteristics of friction clutches. Before first use of after storage of more than one month all spring adjusting nuts should be backed off until springs are just loose, then tightened one turn.

2. The clutch should then be slipped until it starts to smoke. The springs should then be set to the desired spring setting.



3. The temperature of the clutch should be checked often during the first 20 minutes of operation and about every 8 hours thereafter. If the clutch smokes or is too hot to touch (more than approximately 140 degrees F), the springs should be tightened or the clutch will burn up and fail. When checking clutch, care should be taken to avoid skin burning.

4. Some clutches may have a spring stop INSIDE the spring to prevent tightening the spring beyond a preset length. IMPORTANT: DO NOT TIGHTEN SPRINGS DOWN COMPLETELY (SO THEY ARE SOLID) AND OPERATE. DAMAGE WILL OCCUR.

et all springs to the same length.

OTE: After a clutch has been "run in" it will slip about 20 ercent higher than before.

AUTION! If an attempt is made to tighten the spring eyond the preset length the bolt may break and the spring ill make the fastener fly off.

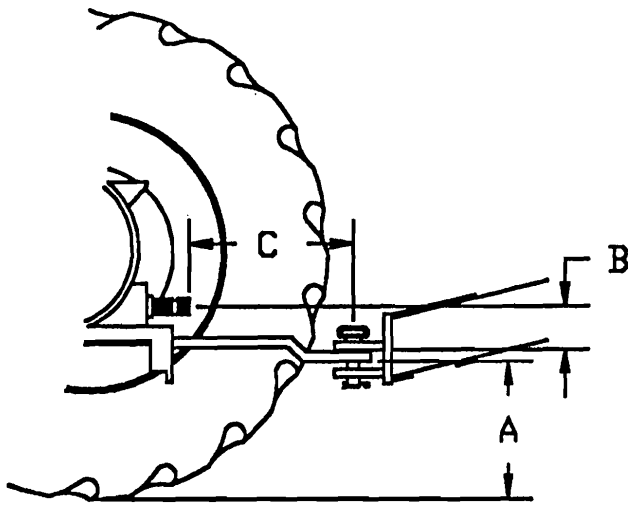
SECTION 3.0

OPERATING INSTRUCTIONS

MACHINE PREPARATION

The following procedure will help the operator properly prepare the tractor and grain cart for use.

1. Adjust tractor drawbar according to standard ASAE specifications for 1 3/8"-21 1000 rpm PTO spline. Dimension guidelines are given in Figure 15. Align drawbar with center line of PTO spline and secure from side sway.



		1 3/8"	1 3/4"
A	18"-21"		
B		8"	10"
C		16"	20"

FIGURE 15: TRACTOR DRAWBAR ADJUSTMENTS

MACHINE PREPARATION (continued)

2. Lubricate grain cart and check fluid levels per the lubrication and maintenance sections of this manual. Check tire inflation pressure and lug nut torque prior to each use period. Torque recommendations are on page 6.4, tire pressure recommendations on page 4.7.

WARNING! Clear the area of all bystanders, especially children, before attaching tractor to grain cart. Serious injury or death may result from tractor run over.

3. Hook grain cart up to tractor with 1 3/8" x 7 1/2" drawbar pin. Secure pin with supplied linch pin.

4. The standard tractor PTO spline requirement adaptable to grain shuttle PTO yoke is 1 3/8" - 21 spline 1000 rpm. Optional drive-line 1 3/4" - 20 spline (Part Number 152-166) is available for tractors of 150 hp and up. Attach grain cart telescoping yoke locks into spline groove.

IMPORTANT! Check drive shaft U-joint angles. If excessive, re-adjust drawbar height accordingly. Swivel hitch on cart can be turned 180 degrees to either raise or lower (depending on initial position) tongue approximately 2".

5. Match quick disconnect couplers to tractor requirements. Assemble with appropriate sealant material to 1/2" adaptors. Clean tips thoroughly and insert into appropriate control remote outlets in fashion that is both convenient and safe for the operator.

OPERATION

The operating procedures are crucial to you,as the operator, to follow and understand. These must be followed to obtain optimum performance and reliability from your grain cart. Please read and practice the following recommendations and procedures concerning operation of the cart and your personal safety, both in and out of the field. Keep this manual convenient for reference at anytime.

CAUTION! Equipment is to be operated by qualified personnel only. A full understanding of the operation, maintenance and safety requirements is mandatory before use.

CAUTION! Before operating grain car, be sure everyone is clear of tractor and cart. Absolutely no riders on tractor or cart during operation. Severe bodily injury may result.

Do not exceed 10 mph when loaded. Avoid ruts, wash-outs, pivot tracks, etc.. at high speeds when cart is under load. If rough conditions are inevitable, throttle back and gear down to acceptable speed while crossing such conditions.

Look up for obstructions before activating hydraulic auger fold. Make sure hinge linkage is locked before engaging unloading auger.

Lubricate cart according to intervals indicated on page 4.8.

UNLOADING

FIGURE 16: FLOW GATE INDICATOR

Via Auger

1. Unfold (extend) auger to unloading position. Auger indicator shaft should be extended.

2. Engage PTO with tractor at an idle.

IMPORTANT! DO NOT engage PTO lever at high engine RPM's. Severe drive-line damage may occur, resulting in extended down time and expensive repair costs. Take time to idle down engine.

4. Throttle engine up to desired unloading speed. Recommended PTO operating RPM is 1000.

3. Slowly open internal flow control gate until indicator is positioned into open range. See Figure 16.

5. When grain flow slows,gradually close internal flow control gate until rooster tailing of grain does not occur. A window is provided to enable you to see when the grain begins to rooster tail.

6. When grain tank is satisfactorily empty, shut internal flow control gate, throttle back engine, and disengage PTO lever.

7. If auger needs to be shut down before tank is empty, shut internal flow control gate and empty auger before disengaging PTO.

DO NOT START OR STOP UNLOADING AUGER FULL OF GRAIN UNLESS ABSOLUTELY NECESSARY FOR SAFETY REASONS

Via Pit Dump Gate:

1. Position grain cart over desired unloading zone. Activate internal flow control gate to "open" range. Shut off tractor and engage park brake. Remove keys from ignition.

2. See Figure 17 on next page. Rotate pit dump wheel to open gate, initiating grain flow out of cart. Sprocket latch enables gate to hold a desired opening distance. If flow reduction is required, the sprocket latch must be manually released and wheel rotation reversed.

3. When cart is empty, close internal flow control gate and external pit dump gate.

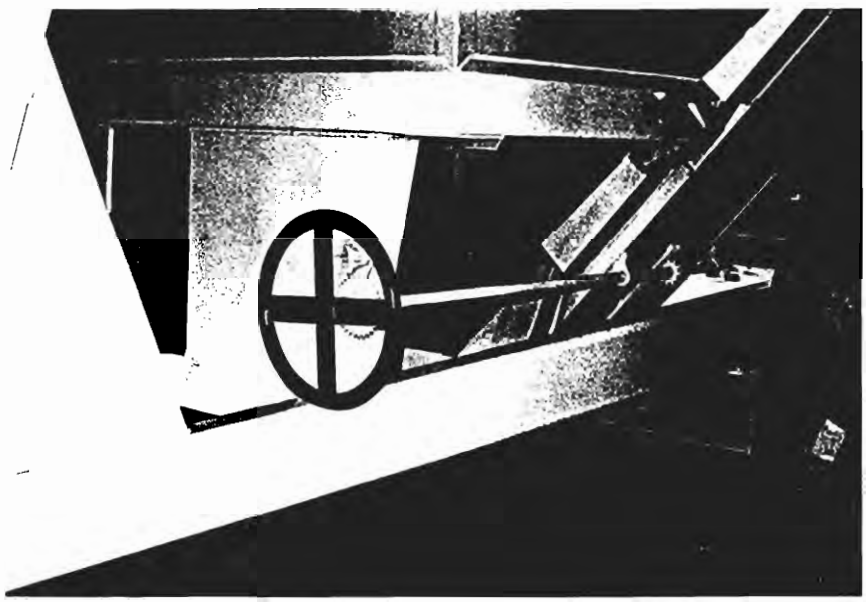


FIGURE 17: PIT DUMP WHEEL

SECTION 4: MAINTENANCE & LUBRICATION

MAINTENANCE SAFETY

To safely prepare cart for service, please follow the steps below:

1. Shut off tractor, engage parking brake, and remove key from ignition.

2. Disconnect PTO shaft from tractor.

3. Disconnect hydraulic supply hoses from tractor.

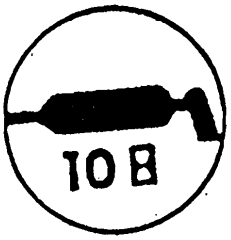
4. Visually inspect machine to ensure all shields are attached to their respective positions. This is to protect you and others from needless accidents!

LUBRICATION AND MAINTENANCE

The recommended lubrication intervals, if properly followed, should result in continued satisfactory grain cart performance. Intervals cited below are based on average machine working conditions. If working in extreme conditions, exposed components should be lubricated more frequently.

Symbols

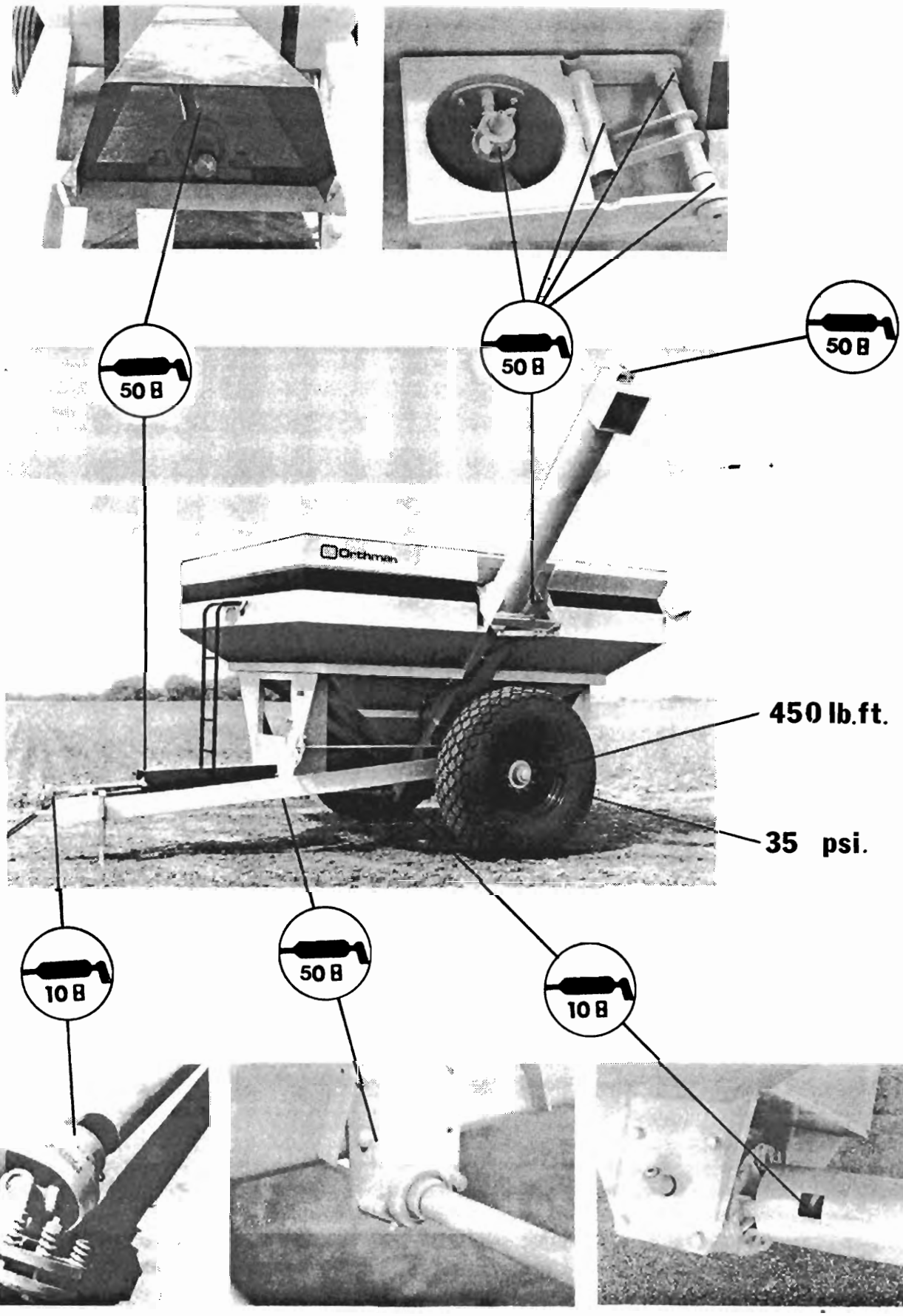
DO NOT service grain cart when PTO shaft or hydraulic hoses are connected to tractor. Accidental entanglement with drive line or auger could result in death or permanent injury.



Indicates component should be lubricated with a multipurpose lithium based NLGI NO. 2 grease at recommended hourly intervals indicated within a circle (i.e. every 10 hours of operation).

Indicates component should be lubricated (level checked) with an SAE 90 gear oil with an extreme pressure additive at recommended hourly interval within circle (i.e. gearbox level should be checked every 50 hours of operation).

LUBR ATION



GEARBOX

1.5 - 1 ratio
input output

The drive line gearbox should be visually inspected daily for possible seepage or loss or gear oil. If a leak develops, keep a close watch on gearbox fluid levels until problem can be corrected. Under normal conditions, the gearbox level should be checked in 50 hour intervals (about every two weeks) according to the following procedure.

1. Position cart on level, shut of tractor and engage park brake.

2. Remove breather plug (Item A) from filler elbow and sight plug from side of gearbox case (Item B).

3. Fluid level should be should be at bottom of sight plug opening, which corresponds with approximately half-way up on filler opening elbow. Note indicated fluid level line in Figure 18. If low, slowly add SAE 90 gear oil. Do not overfill.

holds 7.5 pts

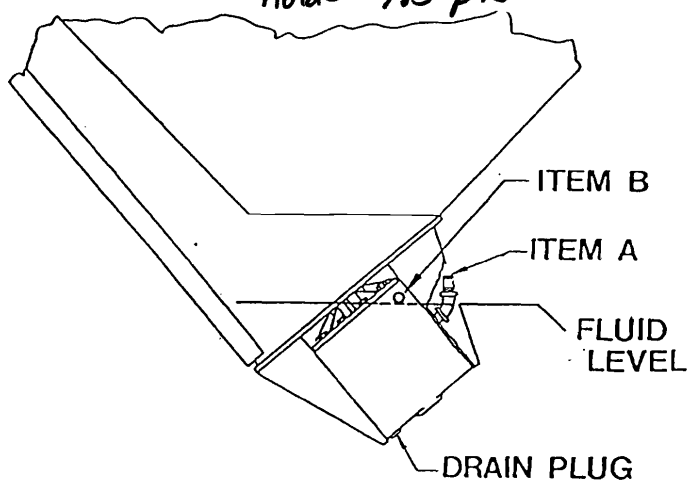


FIGURE 18: GEAR BOX MAINTENANCE

4. Replace plugs to their respective locations and wipe excess oil from gearbox surface.

LUBRICATION AND MAINTENANCE (continued)

OIL CHANGE

Change oil at beginning of use season.

1. Remove bottom plug and drain oil from gearbox. A suction pump may be required in some cases to completely drain gearbox.

2. Inspect oil for indications of foreign material.

3. If okay, refill with approximately eight pints of an extreme pressure SAE 90 weight gear oil until level is as indicated in Figure 18.

The following tips will provide invaluable for the purpose of extending useful machine life. A few minutes taken at the beginning and end of each season may add years of serviceable life to the machine.

Beginning of Use Season

1. Drain gearbox oil and refill. Winter condensation may cause formation of water in gearbox.

2. Visually inspect U-joints, bearings, hubs, cylinders, etc. for wear and replace as needed.

3. Check wheel bearings. If necessary, pack or replace wheel bearings.

4. Check lug nut torque and tire inflation pressure.

5. Lube grain cart.

6. Inspect hitch pin and replace if worn.

MAINTENANCE & LUBRICATION (continued)

During Use Season

1. Check lug nut torque weekly(450 lb-ft.).

2. Check tire inflation pressure frequently.
   24.5 x 32, 12 ply - 35 psi
   30.5 x 32, 12 ply - 35 psi

3.
   a. Lubricate auger bearings and drive shaft carrier bearings every 50 hours or as needed. An approximate interval would be twice during the use season.

   IMPORTANT! Do not grease grain cart bearings excessively, they are sealed bearings that are factory lubricated. If overgreased, seal damage may occur, leading to premature bearing failure.

   b. Lubricate U-joints in drive line every 10 hours.

   Note: On drive line U-joint yoke located near gearbox input shaft, the lock pin has intentionally been removed allowing yoke to slide on gearbox spline, relieving drive linestrain due to possible frame flex.

   c. Lubricate auger hinge every 50 hours.

   d. Lubricate internal flow control slide with graphite weekly.

4. Check gearbox oil level biweekly or every 50 hours.

5. Inspect hydraulic cylinders and lines frequently for suspected leaks.

SECTION 5:

OPTIONAL EQUIPMENT

OPTIONS: J-STAR ELECTRONIC SCALE

The 797 and 897 Grain Shuttles have the option of a J-Star electronic scale indicator.

To install scale on the grain cart:

1. Insert scale load cells into permanent axles on right and left side of grain cart. Secure with bolts.

2. Unscrew bolt holding tongue in place. Remove tongue.

3. Take off tongue end weldment by removing six 1/2" x 1" flat head socket cap screws.

4. Insert scale load cell into tonque. The load cell has a sticker on the clevis ends. The load sticker arrow must be pointing up:

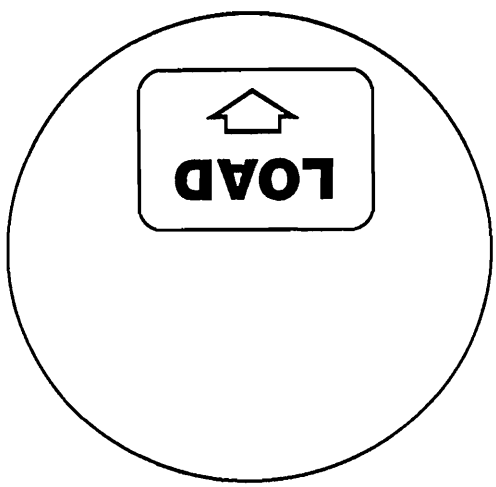


FIGURE 19:TONGUE LOAD CELL

OPTIONAL EQUIPMENT

5. Slide wire cable through holes on left side of hitch. Slide load cell in rest of the way until holes in load cell line up with holes in frame. Secure with one 1" x 5" bolt, 1" lockwasher, and nut. Tighten per torque recommendations on page .

6. Attach scale clevis with one 1" x 5" bolt, 1" lockwasher, and nut.

7. Uncoil cables from tire axle load cells. Use ties and tie mounts every 30" to secure the cable on top rear brace. Use more ties and mounts to secure cables to back side of rear brace. Run left hand cable from axle across rear brace to right side of rear brace. Join left and right cable at right frame. Use ties to secure cables to metal conduit on right frame. Run the two cables along right frame to front center support plate directly behind drive line cover shield.

JUNCTION BOX INSTALLATION

CAUTION! In order to obtain maximum protection from moisture this procedure must be followed.

1. Junction box must be mounted on a flat surface and equally supported on all corners so the box will not warp. This also allows the gasket to seal properly. We recommend this box be mounted on the center support plate behind the drive line cover shield. Use the template included in the back of this manual to ensure proper placement of holes. Drill 3/16" holes. Mount back of junction box. Use two shorter screws at top and two longer screws at bottom. Loop excess cable and secure to plate with ties and tie mounts.

INSTALLATION OF JUNCTION BOX (continued)

3. Remove the gland nut from the strain reliefs. Insert cables through gland nuts and verify that the rubber sleeve s in the strain relief whlie inserting the cable into the junction box.

4. Install colored wires in the proper colored terminals. Each series of wires in a cable should connect to one set of termninals, but it is not important which set of terminals as long as the colots on the wires match the color coded on the terminals. Tighten the screw securely against the wire and not the insulation. Give a short tug on wires to verify tightness.

5. Tighten the fland nut securely. When properly tightened, the cable should not slide easily when pulled. This is very important as the gland nut is there to provide strain relief and to seal against moisture.

6. Re-install top on box.

7. It is important the junciton box not be mounted where water, snow, etc., is a constant hazard to it. Box is water resistant but not water proof.

Turn to the Butler Electronic Scale Indicators Operation Manual.

SECTION 6
SPECIFICATIONS, PARTS DRAWINGS AND PARTS LISTS

SPECIFICATIONS

DIMENSION:		
Capacity	720 Bushel	840 Bushel
A	132"	132"
B	126"	126"
C (Axle Clearance)	16"	16"
D	120" or 144"	120" or 144"
E	67" or 55"	64" or 52"
F	144"	144"
Length of Tank	216-3/8"	216-3/8"
Tongue Height	18"-21"	18"-21"
Drawbar length from axle	218"	218"
Tire	24.5 x 32, 12 ply	30.5x32,12 ply
Axle	54.4 lbs/ft	54.4 lbs/ft
	10" I-Beam	10" I-Beam
Tank Material	11 gauge	11 gauge
Hydraulic Hose	3/8" and 1/4"	3/8" and 1/4"
Unloading Time	Approx. 4 Min.	Approx. 4 Min.
Windows	Front & Rear	Front & Rear
Light Package	Standard	Standard
Gearbox Capacity	4 pints	4 pints
Slip Clutch	1-11/16"	1-11/16

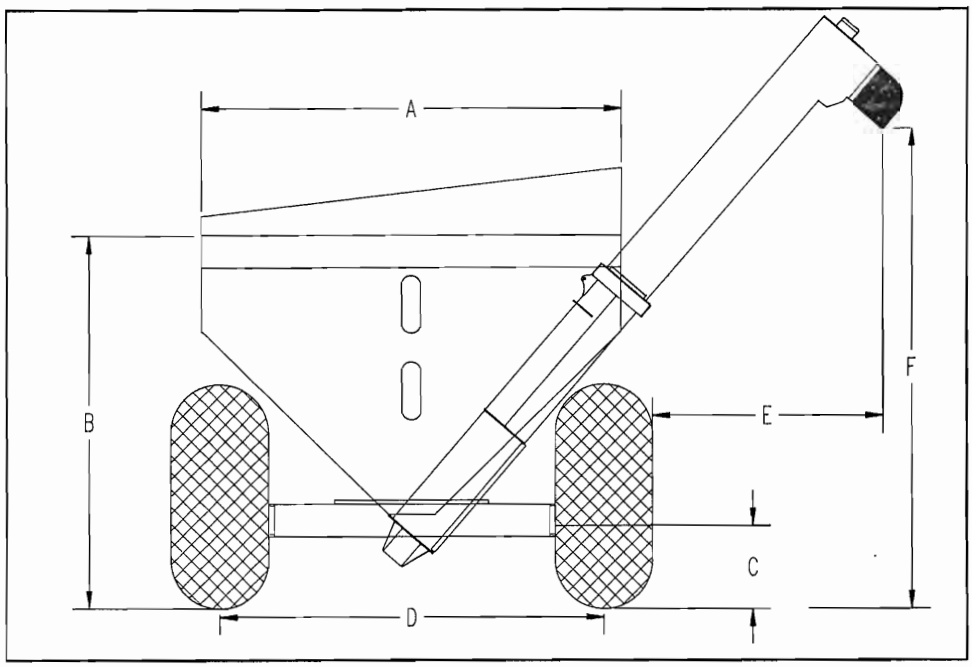
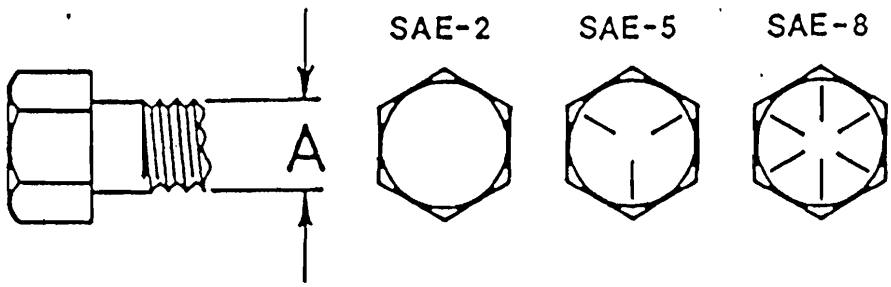


FIGURE 20: SPECIFICATIONS

TORQUE SPECIFICATIONS



Check bolt tightness on Orthman 797 and 897 Grain Cart. Retighten after initial 10 hours of use and check periodically thereafter. Torque recommendations for SAE grade 5 bolts are listed below.

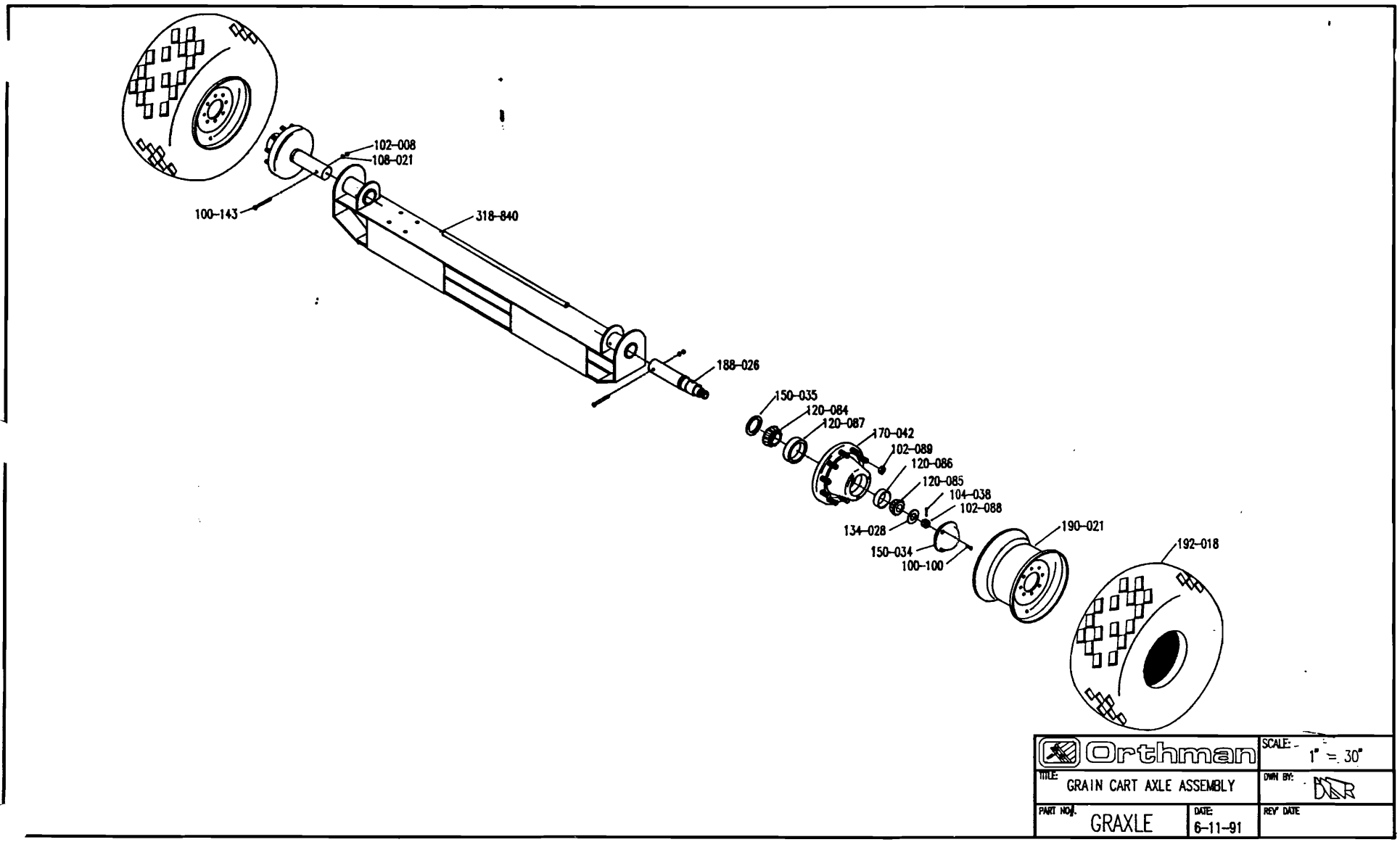
Bolt Diameter	Bolt Torque Lb-Ft	N-m	Kg-m
3/8"	35	(47)	(4/7)
7/16"	55	(75)	(7.5)
1/2"	85	(115)	(11.5)
9/16"	130	(176)	(17.6)
5/8"	170	(231)	(23.1)
3/4"	300	(407)	(40.7)
7/8"	445	(603)	(60.3)
1"	670	(910)	(91.0)
1-1/4"	910	(1235)	(123.5)

PARTS LIST FOR AXLE PACKAGES

PKG. NUMBER	AXLE PACKAGE
608-061	120" Axle with 20,000 lbs. Hub
608-062	120" Scale Axle with 20,000 lbs. Hub
608-063	144" Axle with 20,000 lbs. Hub
608-064	144" Scale Axle with 20,000 lbs. Hub

PART NUMBER	PART DESCRIPTION
100-100	5/16" x ¾" Hex Head Cap Screw
100-143	5/8" X 5½" Hex Head Cap Screw
102-008	5/8" Hex Nut
102-088	2" Slotted Castle Nut
102-089	¾" SAE Wheel Nut
104-038	Cotter Pin 5/16" x 2½"
108-021	5/8" Lock Washer
120-084	20,000 lbs. Hub Large Bearing
120-085	20,000 lbs. Hub Small Bearing
120-086	20,000 lbs. Hub Small Cup (part of 170-042)
120-087	20,000 lbs. Hub Large Cup (part of 170-042)
134-028	Bushing 4" O.D. x 2-1/16" x ¼"
150-034	20,000 lbs. Hub Dust Cap
150-035	20,000 lbx. Hub Seal
152-222	Spindle for Scale Axle
170-042	20,000 lbs. Hub with Studs and Cups
188-026	Spindel for Regular Axle
190-021	Wheel 10-Bolt 21 x 32
192-018	Tire 24.5 x 32 12 Ply
316-840	120" Axle
316-	144" Axle
316-	Scale Axle

AXLE PACKAGES PARTS DRAWINGS

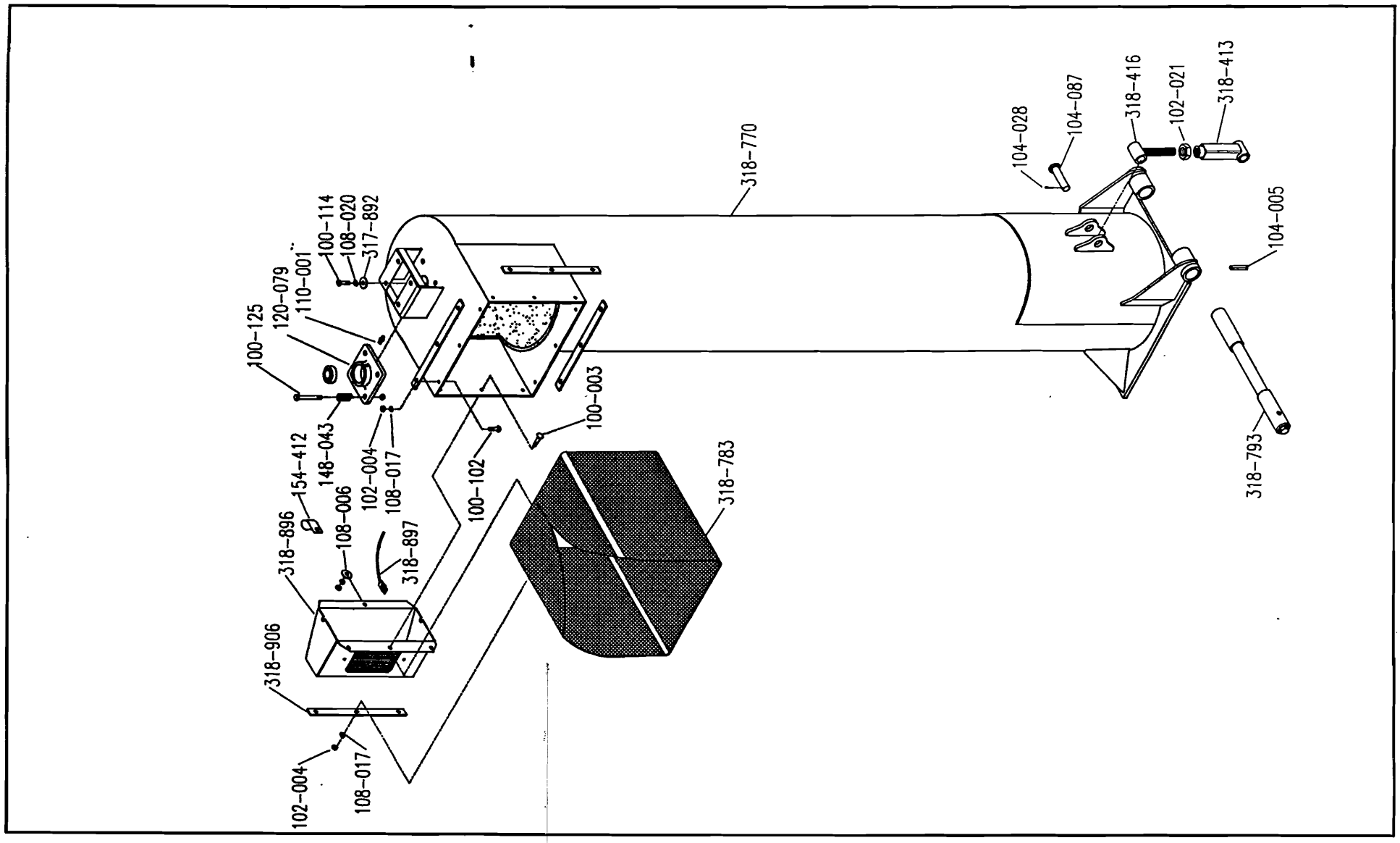


Orthman Grain Cart Operator's Manual

TOP AUGER PARTS LIST

NUMBER	DESCRIPTION
100-002	5/16" x ¾" Carriage Bolt
100-003	5/16" x 1" Carriage Bolt
100-114	½" x 1" Hex Head Cap Screw
100-125	½" x 4½" Hex Head Cap Screw
102-004	5/16" Hex Nut
102-021	1" Jam Nut
104-005	Roll Pin ½" x 2½" Spiral
104-028	3/16" x 1½" Cotter Pin
108-006	5/16" Flat Washer
108-020	½" Lock Washer
108-017	5/16" Lock Washer
110-001	
120-079	1-3/8" Four Bolt Flange
148-043	Spring for Grain Cart Top Auger
318-413	Auger Hinge Lock Adjusting Screw (part of 318-527)
318-416	Grain Cart Auger Adjusting Screw
318-770	97 Cart Top Auger Welded Assembly
318-783	97 Cart Top Auger Rubber Boot
318-793	97 Car Auger Hinge Shaft
318-892	John Deere TD. Marker Spacer 1-13/16" Dia.
318-896	97 Cart Field Light Assembly
318-897	97 Cart Field Light Cable Assembly
318-906	97 Cart Top Auger Spout Strap

TOP AUGER PARTS DRAWING

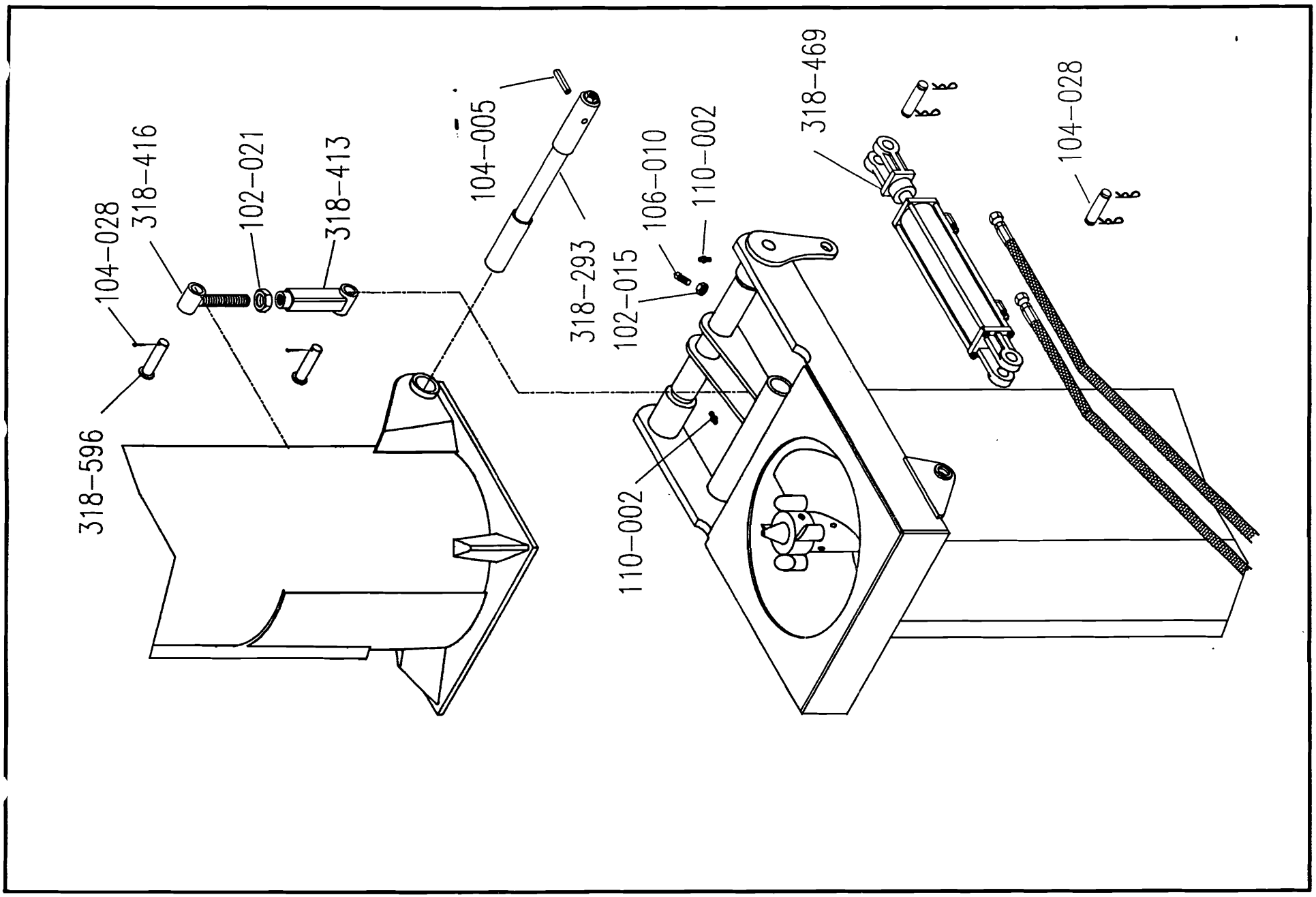


Orthman Grain Cart Operator's Manual

AUGER OVER CENTER HINGE
PARTS LIST

NUMBER	DESCRIPTION
104-005	½" x 2½" Spiral Roll Pin
104-028	3/16" x 1½" Cotter Pin
106-010	½" x 1½" Square Head Set Screw
110-001	Grease Fitting, ¼" -28, Straight
318-469	Cart Auger Hinger Cylinder Assembly
318-527	Hinge Lock Adjusting Screw Assembly
318-596	Cart Auger Lock Pin, Welded
318-793	97 Cart Auger Hinge Shaft, Welded Assembly

AUGER OVER CENTER HINGE PARTS DRAWING



Orthman Grain Cart Operator's Manual

LIGHT ASSEMBLY (318-896) PARTS LIST

NUMBER	DESCRIPTION
102-085	¼" Flange Lock Nut
106-077	¼" x ¾" Round Head Machine Screw, Slotted
154-409	John Deere Retainer Clip HI32687
154-410	Halogen Bulb John Deere AH127718
154-411	Lamp John Deere AH128328
154-412	Clip Mount John Deere AH89557
154-413	Grommet John Deere HI32686
154-414	Retainer, John Deere HI32900
318-779	97 Cart Top Auger Light Mount
318-896	97 Cart Field Light Assembly
318-897	97 Cart Field Light Cable Assembly
318-898	97 Cart Light Main Cable Assembly
318-899	97 Cart Tail Light Assembly, Right
318-900	97 Cart Tail Light Assembly, Left

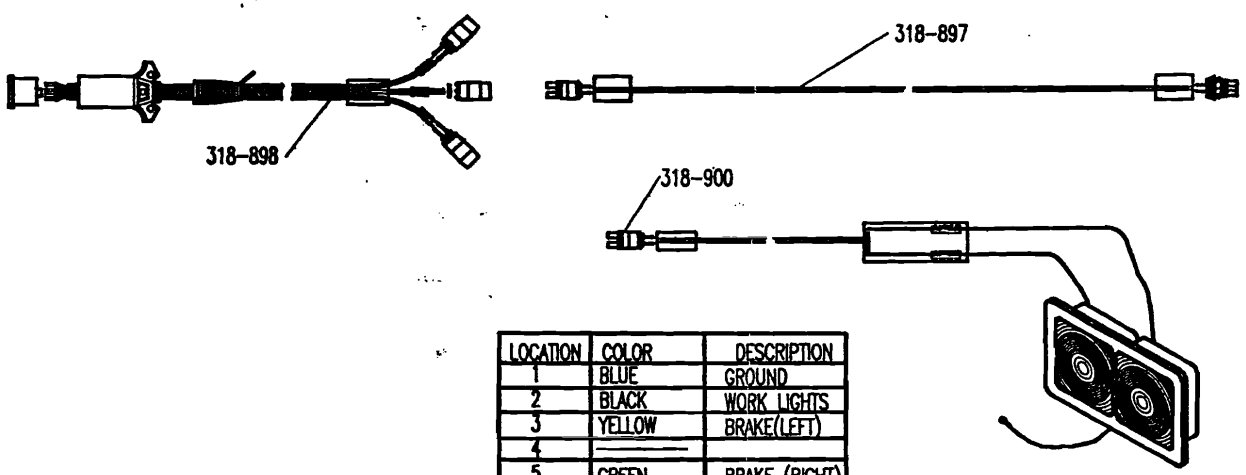
PARTS LIST FOR AUGER REST

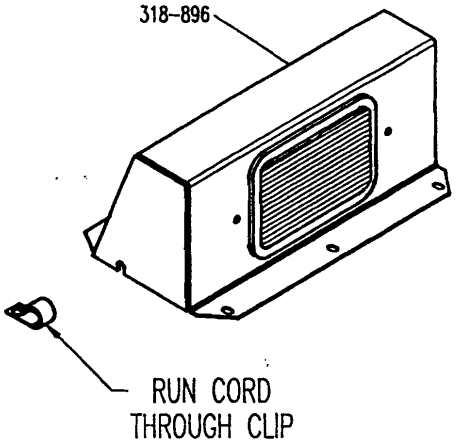
100-105	3/8" x ¾" Hex Head Cap Screw
102-005	3/8" Hex Nut
108-018	3/8" Lock Washer
318-810	97 Cart Auger Rest Welded Assembly
318-814	97 Cart AUger Rest Bolt Strap

LIGHT ASSEMBLY (318-896) PARTS DRAWING

LOCATION	COLOR	DESCRIPTION
1	BLUE	GROUND
2	BLACK	WORK LIGHTS
3	YELLOW	BRAKE(LEFT)
4	———	
5	GREEN	BRAKE (RIGHT)
6	RED–BROWN	TAIL LIGHTS
7	———	

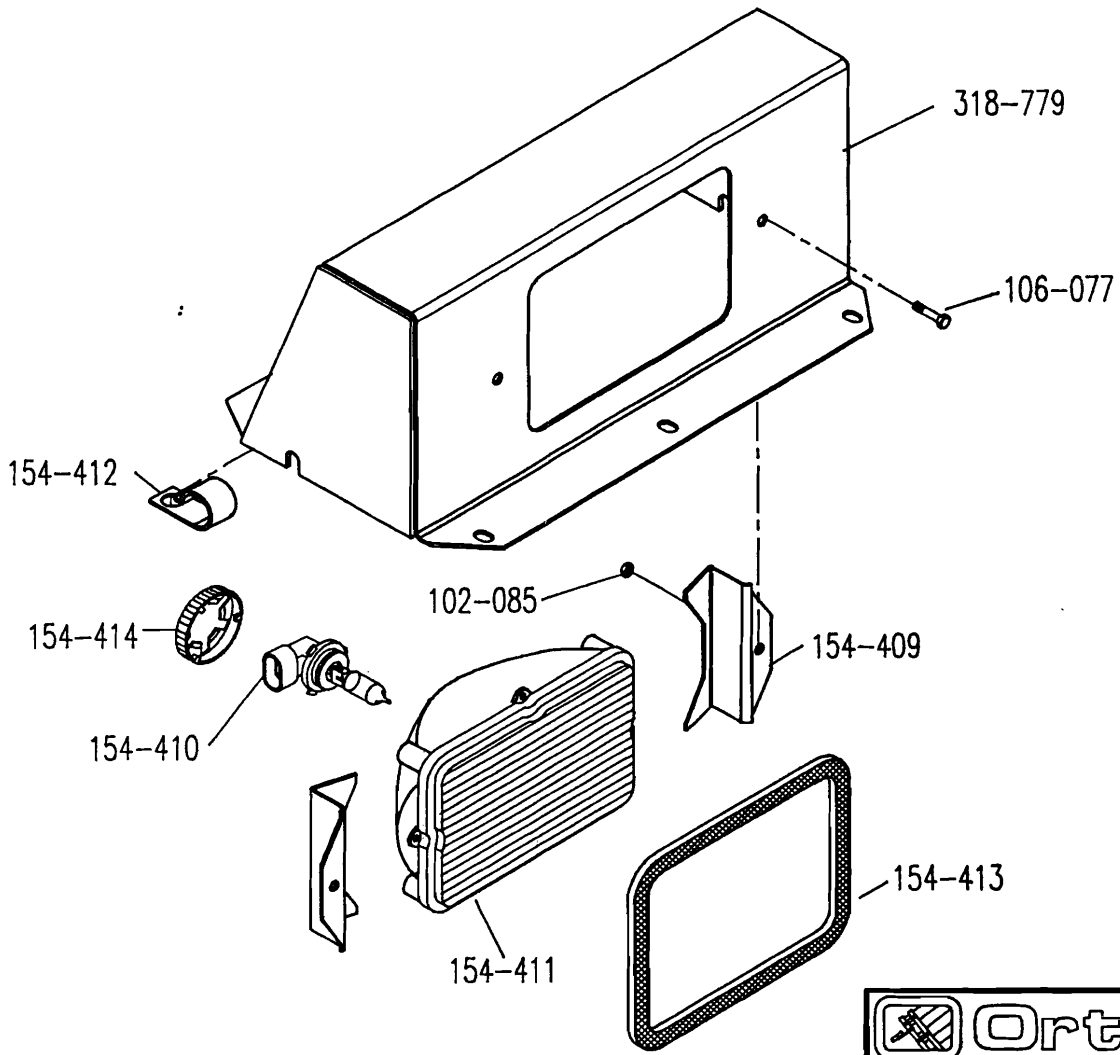
RED	RED	RIGHT TAIL LIGHT
GREEN	GREEN	RIGHT TAIL LIGHT
BROWN	RED	LEFT TAIL LIGHT
YELLOW	GREEN	LEFT TAIL LIGHT
BLACK	BLACK	AUGER LIGHT
BLUE	WHITE	GROUND





LOCATION	COLOR	DESCRIPTION
1	BLUE	GROUND
2	BLACK	WORK LIGHTS
3	YELLOW	BRAKE(LEFT)
4	———	
5	GREEN	BRAKE (RIGHT)
6	RED–BROWN	TAIL LIGHTS
7	———	

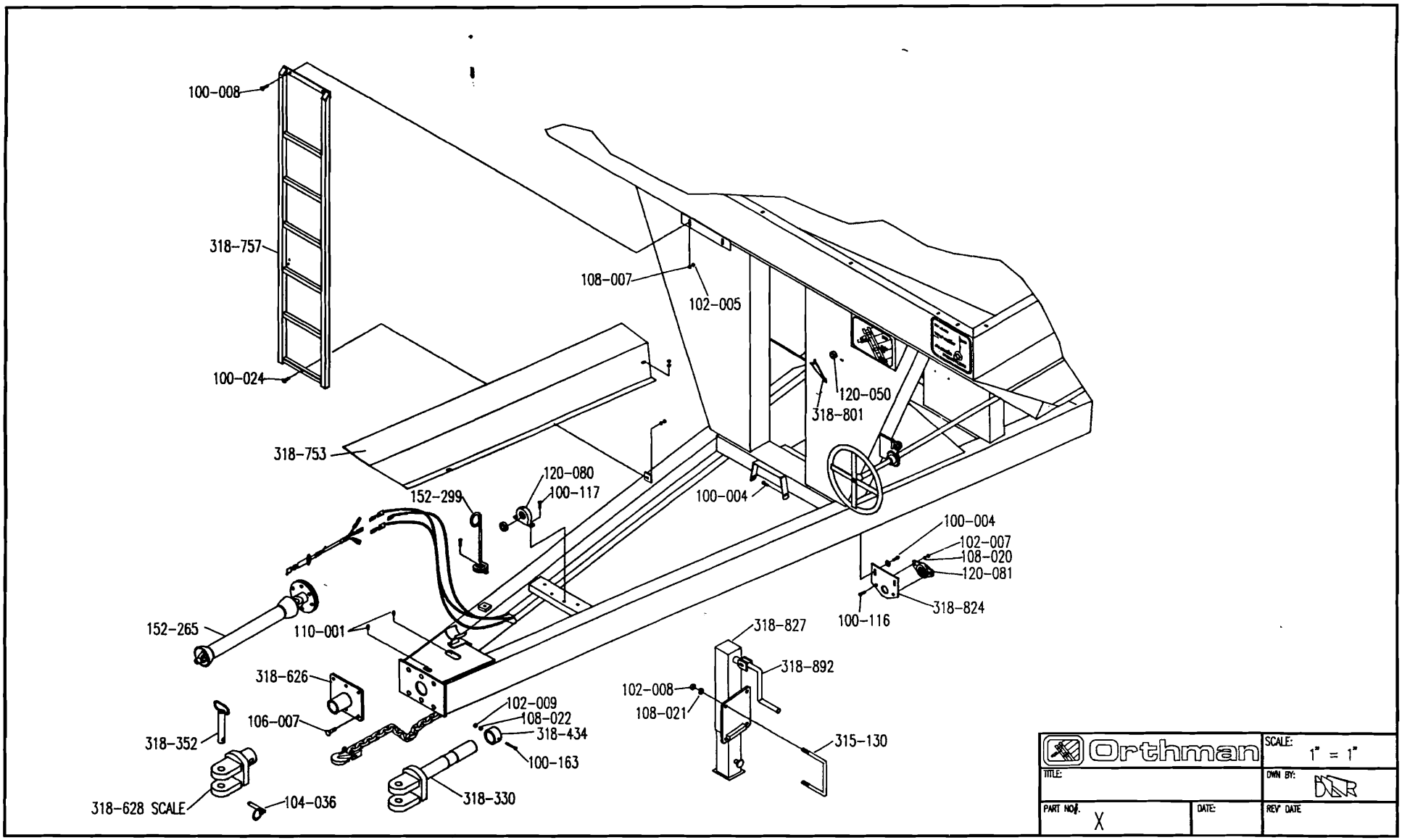
Orthman		SCALE: 1" = 6"
TITLE: 797/897 GRAIN CART LIGHT ASSEMBLY		DRN BY: DLR
PART NO#: LIAS	DATE: 7-16-91	CHK'D BY:



Orthman		SCALE: 3/16=1"
TITLE: 797/897 GRAIN CART LIGHT ASSEMBLY		DWN BY: DLR
PART NO#. LIGHT	DATE: 7-10-91	CHK'D BY:

GRAIN CART FRONT

100-008	3/8" x ¾" Carriage Bolt
100-116	½" x 1½" Hex Head Cap Screw
100-024	3/8" x 1 ¾" Carriage Bolt
102-005	3/8" Hex Nut
102-007	½" Hex Nut
102-008	5/8" Hex Nut
102-009	¾" Hex Nut
102-081	1-3/8" Two Bolt Flange
104-036	7/16" x 1¾" Linch Pin
106-007	½" x 1" Flat Head Socket Cap Screw
108-007	3/8" Flat Washer
108-020	½" Lock Washer
108-021	5/8" Lock Washer
108-022	¾" Lock Washer
100-163	¾" x 4" Hex Head Cap Screw
120-050	¾" Lock Collar
120-080	1-3/8" Pillow Block
152-265	Drive Line Slip Clutch
152-299	Hydraulic Hose Holder
315-130	5/8" U-Bolt for 4" x 8" Bar
318-330	Grain Cart Hitch Tongue
318-352	Grain Cart Hitch Pin
318-434	Grain Cart Hitch Collar x 2"
318-626	Cart Frame End Weldment
318-753	97 Cart Drive Line Cover Shield
318-757	97 Cart Ladder W/A
318-801	97 Cart Indicator Arrow
318-824	97 Cart Drive Line Hanger
318-892	Jack Handle, Painted



Orthman Grain Cart Operator's Manual

APPENDIX A

ERECTION 3105

J-STAR ELECTRONICS

OMP 5 AND OMP 15 ELECTRONIC SCALE INDICATORS

INSTALLATION INSTRUCTIONS
OPERATION MANUAL & SERVICE PARTS

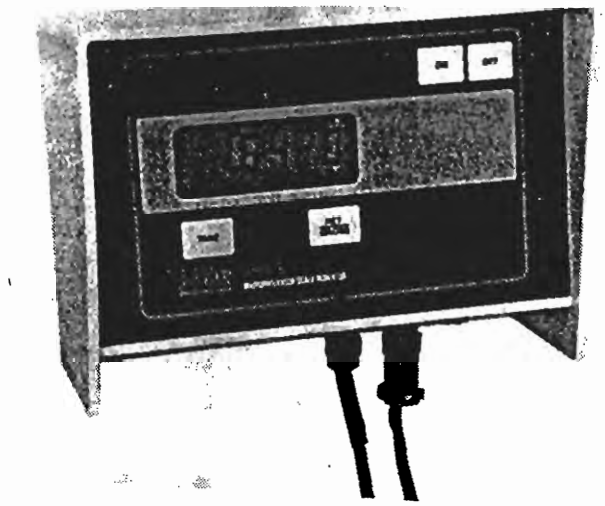
J-STAR INDUSTRIES, INC.
801 JANESVILLE AVENUE
FORT ATKINSON, WI, USA, 53538

F2827A 04/89 PRINTED IN U.S.A.

INTRODUCTION

The successful operation of your system depends upon the care it is given and the way it is operated. This manual has been carefully prepared and illustrated to make operation as easy as possible.

Read the entire manual carefully and familiarize yourself with the operation before using the scales. For further information check with your Dealer or contact J-Star Industries, Inc., 801 Janesville Ave., Fort Atkinson, Wi 53538. Phone (414) 563-5521.



MODEL 5

TABLE OF CONTENTS

SCALE INSTRUCTIONS

OMP 5 AND 15
INDICATOR SYSTEM

DESCRIPTION AND PRINCIPLES OF OPERATION

The Electronic Scale System consists of one or more loadcells and the Indicator.

The Scale System has been designed for use in outdoor enviroments and is weatherproof.

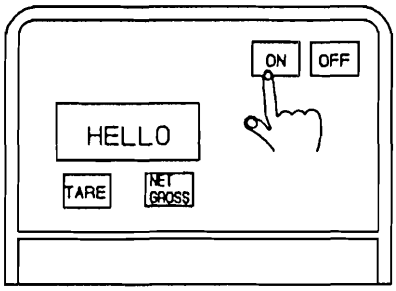
Operation is performed by pressing the keyboard on the front of the Indicator Panel. Feedback to the operation is by the Backlite Liquid Crystal Display on the Panel.

The Indicator operates from a 12 VDC power source. This can be a standard 12 VDC battery or a regulated 12 VDC power supply. If is LOW BATTERY condition exists (less than 10.5 volts), this will be indicated on the display by the message LO BAT. During this condition the unit cannot be balanced or calibrated.

Your scale will measure total or gross weights of material. The System can also be used with a Tare Weight, in which case it will record weight added or removed since the last recorded Tare Weight. This last method is used to determine net weights or lads and is also used for batch weighting applications.

GETTING STARTED

THE PANEL



POWER ON

The operator can keep track of the operation of the Indicator by observing the small messages in the top and bottom edges of the large display window on the Panel.

When using the keyboard, the indicator responds to the operator as follows:

1) As each key is preseed an audible "beep" will be heard. If the beep is not heard, the key hasn't been adequately pressed to activate it or the weight on the scale is not stable.

2) Messages (annunciators), which are generally 3 or 4 letter abbreviations for an operation will appear at either the top or or bottom edge of the display to confirm to the operator that what he has requested is being executed.

3) When the weight is not stable the indicator displays a flashing "bell" shaped annunciator to tell the operator it is processing or stabilizing information. While this annunciator is flashing the indicator is not ready for, nor will it accept further input.

NOTE: The bell shaped annunciator refers to stability. There may be apllications, such as weighing animals, when it is not possible for the reading to perfectly settle down. In these cases it is necessary to turn the bell annunciator **off** as described in the Setup And Calibration Procedure section of this manual.

In the upper RH corner of the panel you will find the ON and OFF keys. Pressing the ON key starts the unit. After about 4 seconds the unit will start and is indicated by a "HELLO" message on the display. However, the unit will not be ready for stable operation until it has been allowed to warmup for at least 10 minutes. In cold weather, allow 20-30 minutes for warmup. Pressing the OFF key will shut off power to the unit.

Test Function

If the ON key is depressed a second time after the "HELLO" message displays, the unit conducts a test of itself. During the test it will display program parameters and the display program parameters and the display annunciates the word TEST. This function is not used during normal operation. Should you enter the test mode, which requires nearly a minute to complete, it can be cancelled by pressing any key except **ON**.

OPERATION

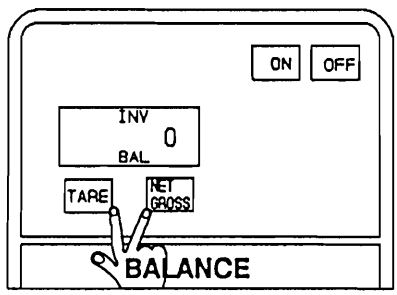
POWER ON

The indicator starts up inthe GROSS weight mode.

This can be verified by observing the annunciator INV (inventory) at the top of the display.

BALANCING

After the display is warmed up and stable, the indicator should be balanced with no weight on the scale. Do this by pressing the NET/ GROSS key and then while still holding it pressing the TARE key and hold both for one second. BAL will be displayed at the lower display to verify the operation. If 'INV' and '0' are not displayed, rebalance.



IMPORTANT: When balancing the scale, it must be empty and the display must be stable. Beware that if the scale is not empty during balancing, it will be in error. In a mobile application the vehicle must be stopped and on level ground.

Balancing can be done at any time, but if the bell shaped annunciator is flashing, the unit will not balance. The indicator "remembers" balance weights even when power is turned off but it should be checked regularly. Balance is affected by large temperature changes and by physical environment such as mud or snow buildup.

GROSS (INV) WEIGHING MODE

The INV annuciator displayed in this mode, the Indicator displays the weight of items on the scale. If the scale is empty and the display is not zero, rebalance the indicator.

NET WEIGHTING MODE (Using Tare Weights)

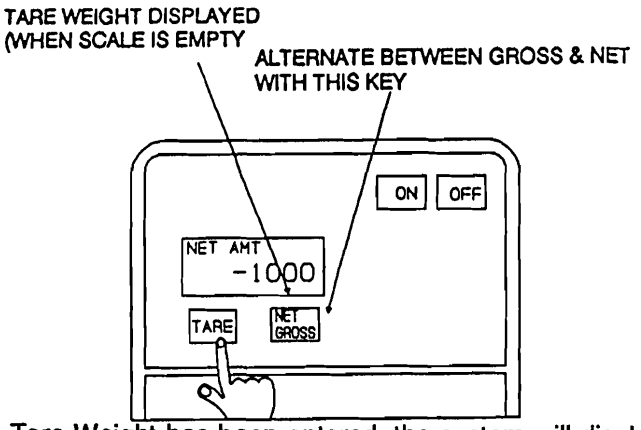
This method involves recording a TARE wieight with the system (tare this weight off from future loads).

The NET mode does not function until a Tare Weight is entered. Therefore, if you change to the NET mode with "no Tare weight entered, " the indicator displays a series of dashes.

Tare Weights can be entered in either GROSS or NET modes as follows:

With the Tare load on the scale and when the display is stable, press the TARE key. THe display wil then be in the NET mode and read zero. When the load is removed, the display indicates the Tare Weight as a negative value. Examples of a tare weight mmight be an empty truck to which you want to learn how much load has been added later; or a loaded truck to which you want to learn how much load has been removed later.

NOTE: The indicator does not "remember" Tare Weights if power is turned OFF. They must be entered again to use.



After the Tare Weight has been entered, the system will display the weight that is either added to or subtracted from the Tare Weight. When weight is added the display will be positive. When weight is removed the display will be negative and is the actual weight removed; not the difference between the Tar Weight and weight removed.

During the NET mode if you want to know the GROSS weight (NET plus TARE weights) on the scale, press the NET/GROSS key. THis toggles the mode display between NET and GROSS.

OPERATION SUMMARY

KEY(S)	DESCRIPTION
ON	Turns the indicator on. If power is already on, holding ON for one second starts the display test.
OFF	Turns the indicator off.
NET/GROSS	Toggles the display mode between the gross (INV) and the net (NET AMT) modes.
TARE	Puts the indicator in the net mode and zeros the display.
<GROSS+TARE>	Balances the Indicator.

WEIGHING EXAMPLE

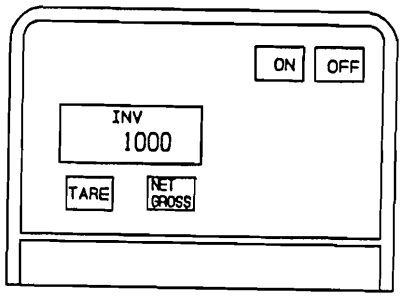
EXAMPLE 1. Typical Weighing Sequesnce In A Batch Mixing Application.

1. Press ON. YOur display will read HELLO for a short time.

2. Allow a 10 minute warm up period (20-30 minut3es in cold weather).

3. Hold NET/GROSS and press TARE, "BAL" will be displayed for a short time and then the display will read 0.

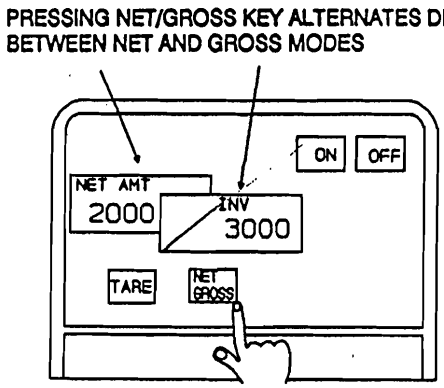
4. Add the first ingredient until the desired weight is reached. Let's use 1000 lbs.



5. Press the TARE key. THe mode changes to NET AMT and the display changes to 0.

6. Add the next ingredient. In this example assume 2000 more lbs. are added. The display will read 2000.

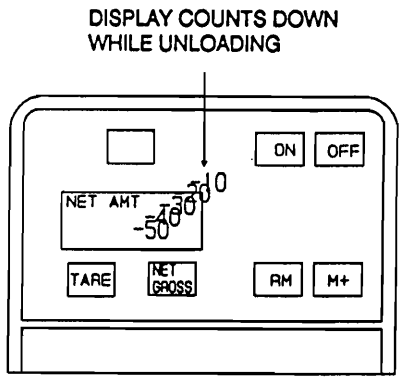
7. At any time the total (gross) weight can be viewed by pressing NET/GROSS. To return to the net weight display press NET/GROSS again. In this example the GROSS weight display will be 3000 lgs. (1000 + 2000)



8. If more ingredients are required, then repeat steps 5 and 6 until loading is completed.

9. To begin unloading, press TARE to zero the display.

10. Dump material until the desired weight is reached. The display number will be negative to show that weight has been removed.



11. Repeat steps 9 and 10.

MAINTENANCE AND TROUBLESHOOTING

MAINTENANCE:

The Model 5 and Model 15 scale indicators do not require regular maintenance to operate properly, however calibration of the scale system should be checked once a year to m aintain the accuracy of the system. The manual supplied with the weighing portion of the system contains maintenance information for that specific product, i.e. Platform Scale, Mixer, Etc., but these general rules apply to all systems:

1. Verify that there is not physical interference between the weighting surface and the frame.

2. Check that the load cell is not bound up in the mount.
Verify that there is a slight amount of play between the load cell and mount.

3. If there are any moving parts in the weighting system (for example the power take off shaft of a mixer) make sure they are well lubricated and move easily.

4. Verify that the weighting surface is level with the frame so that all load cells are equally loaded and the weighting surface doesn't rock from corner to corner.

5. Apply a load to each corner of the weighing surface and verify that the corners read the same +/-1 display increment. The easiest way to do this is stand on or hang from each corner.

TROUBLESHOOTING:

The following table lists common problems and their possible cause, if a problem not listed in the table occurs contact your Distributor. All test assume the scale system is on and warmed up for 10 to 30 minutes.

SYSTEM	CIRCUIT	CORRECTIVE ACTION
I. System Dead	Power Switch On	Check fuses. Replace blown fuse. Check power cable for loose connection to the battery, or power supply. Voltage must be 10-½ V. minimum.
II. Display is unstable (varies more than 4 increments up and in 5 seconds)	Power On	Remove junction box cable from bottom of indicator. If display is still not stable, then indicator needs repair. IMPORTANT: On Model 5 after S/N 2681and Model 15 after S/N 2224 this test will not work. Display will flash 9999's. Use a simulator to test indicator stability or sue a shorting wire between pins of J902 to eliminate flashing 9999's.
or		
Display is unstable, gradual shift of weight in one direction (more than 10-20 increments in one hour).		If the indicator passes II. above above, then disconnect load cells from junction box until the defective load cell is located. If all load cells check out okay, then the junction box is defective. Check for loose or dirty connections, if none, contact your Distributor for repair or replacement.

SYSTEM	CIRCUIT	CORRECTIVE ACTION
II. System naccurate small error.	Power Switch On and Circuit Balanced	Contactor your Distributor for calibration instructions.
I. System naccurate, 10% or nore error.	Power Switch On and Circuit Balanced.	Apply weight to each corner to determine which load cell defective. Before replacing, check for binding or interference with the mount.

INSTALLATION REQUIREMENTS

INDICATOR MOUNTING

Various mounting plates are available. The indicator is easily attached by hooking the top of the indicator over the plate and securing with two #10-24 x 5/8" bolts and nuts.

POWER CONNECTION:

The power cable should be connected directly to a vehicle battery or regulated power supply. The scale end of the power cable is connected to the indicator as shown in Figure 2. Connect +12 VDC to red wire and GROUND to white wire. The indicator is fused at 4 amps.

TABLE 1: Power Cable Connections:

Wire Color	Wire Function
Red	Battery (+12 VDC)
White	Ground
Green	Not Used This Model
Black	Not Used This Model

LOAD CELL AND JUNCTION BOX CONNECTIONS:

The indicator is designed to operate with strain gage load cells. The indicator will be supplied with an interconection cable going to the load cell junction box. If a new cable is required or if a longer installation dictates that a cable be made, consult your Distributor for required parts.

To connect the load cells, plug the J-Star supplied interconect cable from the load cell junction box into the connector labeled J902 and located on the bottom of the scale. (See Figure 2.)

NOTE: If load cells are not manufactured by J-Star, color codes of wires may not match J-Box.

Connect the cables from the load cells to the junction box terminals as follows (See instructions on junction box cover):

TABLE 2: Load Cell Connections in Junction Box:

Terminal Color	Description
A)Red	+Excitation
B)Black	-Excitation
C) White	+Signal
D) Green	-Signal
E)Blue	Shield

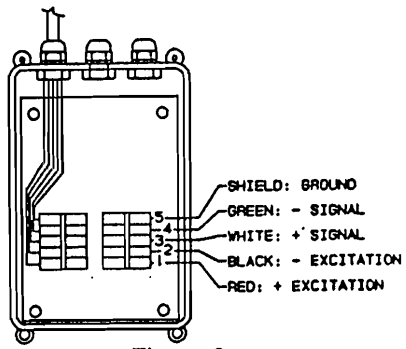


Figure 3

SPECIFICATIONS

SYSTEM

Operating Characteristics

Load Range	Up to 99,999 lbs. depending upon application
Accuracy	System 99.75% or 99.5% depending on load cell used.
Power Requirements	12 VDC (10½ VDC min. 13 VDC max.)
Temperature Range	
(Operating)	-20 to 140 degrees F
(Storage)	-40 to 180 degrees F
Remote Zero Option (TR4)	Operates up to 100 feet.
LCD Back Light	Standard

JUNCTION BOX

Cable	5/16" Dia. x 15' or 30' long standards. Also available in 50', 70' & 90' lengths
Capacity	4 Load Cells
Weight	2 pounds

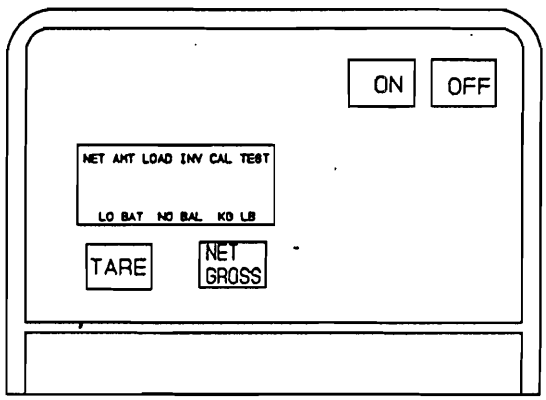
(Optional Duplex Kit Provides for up to 8 Load Cells)

LOAD CELLS

Operating Characteristics

Capacity	Depends on load cell
Overload Safety Factor	200% typical

PARTS LIST



MODEL 5
P/N 141620

ACCESSORIES

Part Number	Description
824461	Power Cord
141880	Junction Box, 30' Cable
141879	Junction Box, 15' Cable
143968	Junction Box, 30' Cable w/ Lightning Protection
823872	AC/DC Converter (12 VDC Power Supply)
824352	10' Trailer Extension for Power Cord w/Tractor Plug
141941	Junction Box Cable Extension Kit For Tractor Cab Mounting
141826	Receptacle For Tractor Plug

MODEL 5 AND 15

SETUP AND CALIBRATION PROCEDURE

IMPORTANT!
Do not attempt to recalibrate the scale indicator unless it is absolutely necessary. Indicators are factory precalbirated to the load cells they are shiped with. If the indicator is to be used with load cells different from the cells originally used with the indicator it may be necessary to make and internal change. If you are moving the indicator to a system with a differnt king of load cell, contact your Districturo for assistance. If the indicator is suspected to be inaccurate, then proceed with the calibration. To change calibration values you must have a known weight available or a load cell simulator. The known weight must be a minimum of 25 percent of the scale capacity.

GETTING STARTED, AN OVERVIEW OF SETUP

Setup and Calibration of the Model 5 and Modle 15 is done from the front panel. It is not necessary to opern the indicator to change switch settings or turn a potentiometer. You will press the NET/GROSS and ON keys at the same time to start calibration. The scale will show you which parameter it is ready to work on, and after a two second delay, the parameter itself. You will press the NET/GrOSS and TARE keys if you wish to change this value. We will explain this in detail on the next page. To enter the new value you will press ON. You can continue in this manner until the scale is set as you wish. When you are done, you press TARE then ON at the same time to go back to regular weighting. If you have set all possible parameters, the scale will go back to weighting by itself.

TEXT CONVENTIONS

We will be working with the keys and display. We will descrive each key or part of the display the same way each time we reger to it. We will use the following plan:

DISPLAY INDICATIONS: Numbers or messages on the main display will be enclosed in single quotes, i.e. '1'.

A*NNUNCIATORS INDICATIONS*: An annunicator is one of the small signs around the main display. Annunicators will be described with the annunicator capitalized and in single quotes, i.e., 'INV'.

SWITCH OR KEY NAMES: Switches will be shown by capital letters and no quotes, i.e. TARE. SOme operations require pressing nad holding one key then pressing a second key. At the end of this you should be holding two keys down at the same time. THis will be designated with an arrow, i.e. NET/GROSS->TARE.

To start the set up and calibration procedure press and hold NET/GROSS then press ON (NETGROSS->ON) and hold both keys for approximatedly one second. The indicator will beep when the keys have been held long enough and the 'CAL' annunicator in the main display will begin flashing. This annunicator will continue to flash as long as the indicator is in the setup and calibration procedure. You may release the NET/GROSS and ON keys at this poin.

All of the parameters are set in one of the following three ways:

For most of the parameters, the indicator displays a message for one second to describe the parameter to be set, then changes to display the present value. To change the value, press NET/GROSS and the value will change to the next choice. When the suitable choice is displayed proess ON to store the new value and advance to next parameter.

When entering numbers for overrange, calibrate weight, time and date, NET/GROSS advances the flashing digit by one. To change another digit press TARE and the next digit to the left will begin flashing and can now be changed by pressing NET/GROSS as shown above. If you "over-shoot", the numbers continually loop or repeat from 9 to 0. When the digit is what you want, press TARE to move to the next digit. Note that the star annunciator (in the uppoer left corner of the main display) represents 100,000 pounds and should be off when a number is ready to be entered. If it is not, continue pressing NET/GROSS until the left most digit is correct and the star is off. Continue this way, using the GROSS/NET and TARE keys until the value is set the way you want it. After the value has been entered press ON to store the new value.

Some of the parameters (input and output units - LB/KG) show the label and parameter at the same time. To change the value, press NET/GROSS and the value will change to the next choice. After the correct choice has been made press ON to store the new value.

The calibration routine can be exited at any time by pressing and holding TARE then pressing ON (TARE-ON).

Note: ON must be pressed before TARE->ON or any change to the display parameter will not be saved.

CALIBRATING THE INDICATOR

The following text describes the parameters, their possible values, and descriptions of what they do. The parameters may not appear in the order listed here. Depending upon options installed - see tables at end of this section.

NOTE: Depending on the revision level of indicator and installed option, your indicator may not have all of the following parameters. Please refer to the tables at the end to determine what parameters you should have. The indicator revision level may be determined by entering the test mode. Press ON after indicator warmup.

We recommend that the scale operator contact your Distributor before attempting to change any of the setup and calibration parameters. Items marked with an * affect the scale indicator's performance and should only be modified by trained service personnel. Continue through these parameters by pressing ON or exit the setup and calibration routin by pressing TARE-ON at any time.;

1. To begin, press and hold NET/GROSS then press ON until the indicator beeps and the 'CAL' annunicator begins flashing.

2. **sEt t** Enter time with hours, am/pm, minutes

The time is set using standard 12 hour format, with the am/pm letter set to 'A' for AM and 'P' for PM. Use the NET/GROSS key and the TARE key to change the time value.

Press ON.

3. **sEt d** Enter date

Enter month and day. The system makes no provision for leap years. Use the NET/GROSS key and the TARE key to change the date.

Press ON.

4. **sEt Yr** Enter year

Use the NET/GROSS key and the TARE key to change the year.

Press ON.

DISPLAY OPTIONS

5. **tc** 1,2,4,8 Time Constant

The time constant changes the responsiveness of the display to weight variations. 1 is the fastest and 8 is the slowest. Recommended values are 4 for batching applications and bin scales and 8 for platforms. Change by pressing NET/GROSS until the desired time constant is displayed.

Press ON>

6. **out** LB or KG Select pounds or kilograms

Output units (displat units). Allow the displayed weights to be put in either pounds or kilograms. Press NET/GROSS for desired selection. Recal;ibration is not required after changing the output units.

Press ON

NOTE: 2 thru 4 support a time and date option which is not yet a standard product.

17. **cntS** .1, .2, .5, 1, 2, 5, 10, 20, 50, 100 Display count size

The count size determines the increment the scale will count by. The count size should normally be the scale capacity divided by 4,000. Setting the count size too low (less than capacity/4000) does not increase the accuracy of the scale system and can cause an unstable display. Use NET/GROSS key to select desired count size.

Press ON.

8. **stAbl** on or off Stability feature

Stability, commonly known as motion detection, must be on to calibrate the scale.

When motion dectio is 'on', the bell annunciator on the display will flash when the displayed weight is not stable. When the weight is not stable, the following gunctions are disabled until the weight is stable: print, balance, calibration and memory accumulation. When 'off', zero tracking (0trAc) is also automatically set to 'off'. Stability must be on to allow calibration later in this procedure.

Use the NET/GROSS key to select 'on' or 'off'

Press ON.

9. **OtrAC** On or off Zero track feature

When 'on' is selected, the scale will automatically zero the display, compensating for minor variations in zero balance. For example: if mud or snow accumulates on the weighing surface of a platform scale, the display will continue to display zero. This feature functions only when the displayed weight is within two counts of zero and is stable. The calibration procedure will automatically exit after over range is set if zero tracking is on.

Zero tracking must be set to 'off' to calibrate the scale.
After calibration OtrAc may; be reset to 'on'. Use the NET/GROSS key to select 'on' or 'off'.

Press ON

10. **tr4** cir or nEt TR4 option, Model 15 only

Applies to use of tr4 option only. ONe of four buttons on TR4 transmitter may be reprogrammed to perform either, 'clr' (clear memory" or 'nEt' (net/fross) functions. Refer to TR4 Users Manual for more information. Use the NET/GROSS key to select 'clr' or 'nEt'.

Press ON.

11. **AutoP** on or off Auto print feature, Model 15 only

When 'on' and a printer is connnected, the scale will sutomatically print after each of the following keys are pressed: CM, PRINT, NET/GROSS, RM and M+. When NET/GROSS or TARE is pressed the weight displayed is printed and then the normal key function is performed. Use the NET/GROSS key to select 'on' or 'off'. Refer to XT Users Manual.

Press ON.

*12. **in** LB or KG Select pounds or kilograms
Input units. Allows the calibration weights to be entered as pounds or kilograms. For example if weights are to be displayed as kilograms but the weights used to load the scale are certified in pounds, the input units are LB's and the output units are KG's. Press NET/GROSS for selection.

Press ON.

13. **o rng** any valid weight Scale over range capacity

The overrance value is set by J-STAR for the application the indicator is to be used in. Do not change this value unless the indicator is moved to a different capacity scale. Inc this case the overrange value should be set at 5% above the rated capacity (i.e. 42000 for a 40000 lb capacity scale.) Use the NET/GROSS key and the TARE key to change the over range.

Press ON.

To exit the setup and calibration procedure at this point without changing the scale calibration press TARE->ON.

14. **bAl** ----------

Allows the scale to be balanced before calibration weights are added. Press the NET/GROSS key and hold, the press the TARE key. The instrument will beep and display 'BAL' when balancing is achieved.

Press ON.

15. **Add** ----------

At this point weight should be added to the scale or simulator switch moved to .2 mv/v or .4 mv/v. If the weight added is less than 5% of the scale capacity the indicator will continue to prompt to add weight. Recommended weight is 25 % or more of scale capacity. See the J-STAR simulator manual for specific instructions on its use.

Press ON.

16. **cal** any valid weight

Enter the amount of calibration weight added to scale using NET/GROSS and TARE keys. Pressing ON after entering the calibration weight returns to the gross mode, and calibration is complete. When weight is removed from scale, indicator should display 0 (zero). If not, repeat the calibration process.

DISPLAYING SETUP INFORMATION

After calibration the test procedure should be run to check for correct valueds. To do theis press ON. The indicator will beep and begin a test. After the display test is completed the indicator set up information. The following table lists the parameters displayed and a short description of each parameter:

MESSAGE	*DESCRIPTION*
1. test pattern	display test
2. tc	the display time constant
3.cntS	display count size
4. stAbl	on or off (model 15 rev f or later)
5. OtrAc	on or off (model 15 rev f or later)
6. tr4	clr or net (model 15 rev f or later)
9. rng	used by service personnel only
10. progno	program revision

Calibration Parameters for Model 5 or 15, revision 'D'

Action	Display	Options
Select Time Constant	tc	1,2,4,8,16
Select Output Units	out	LB, KG
Select Count BY	cnt	.1,. 2, .5, 1, 2, 5, 10, 20, 50, 100
Select Input Units	in	LB, KG
Enter Over Range Value	o rAng	System overrange limit value. Should be 105% of system capacity.
Balance Scale Now	baL	Any weight, balance to zero.
Add Calibration Weight Now (may be simulator	Add	Any weight greater than 100 and at least 5% of capacity.
Enter Calibration Value	CaL	Calibraion value for system. Adjust to match known weight.

Calibration Parameters for Model 5, revision 'G'.

Action	Display	Options
Select Time Constant	tc	1,2,4,8
Select Output Units	out	LB, KG
Select Count By	cnt	.1,. 2, .5, 1, 2, 5, 10, 20, 50, 100
Enable Motion Detector	stAbL	on, off
Enable Zero Track	0trAc	on,off
Select Input Units	in	LB, KG
Enter Over Range Value	o rAng	System overrange limit value. Should be 105% of system capacity.
Error, Zero Track Enabled. (Zero track must be off to set the next parameters.)	Error 0trAc	none Displayed only if 0trAc on.
Balance Scale Now	baL	Any weight, balance to zero.
Add Calibration Weight Now (may be simulator	Add	Any weight greater than 100 and at least 5% of capacity.
Enter Calibration Value	CaL	Calibraion value for system. Adjust to match known weight.

NOTE: Each Line of the tables represents one parameter that may be adjusted with the calibration.

APPENDIX A

ERECTION 3105

J-STAR ELECTRONICS

OMP 5 AND OMP 15 ELECTRONIC SCALE INDICATORS

INSTALLATION INSTRUCTIONS
OPERATION MANUAL & SERVICE PARTS

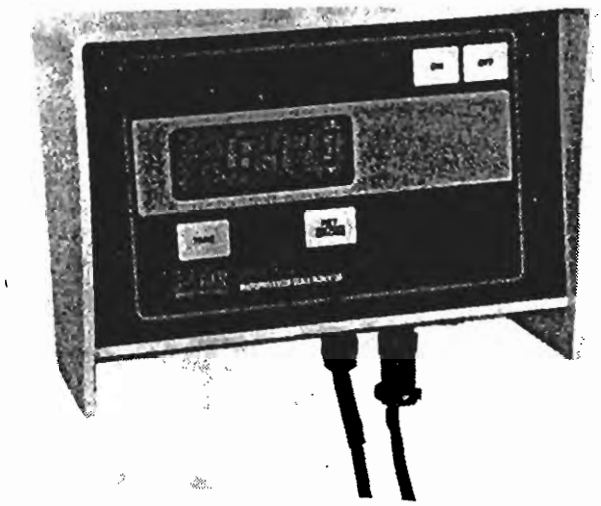
J-STAR INDUSTRIES, INC.
801 JANESVILLE AVENUE
FORT ATKINSON, WI, USA, 53538

F2827A 04/89 PRINTED IN U.S.A.

INTRODUCTION

The successful operation of your system depends upon the care it is given and the way it is operated. This manual has been carefully prepared and illustrated to make operation as easy as possible.

Read the entire manual carefully and familiarize yourself with the operation before using the scales. For further information check with your Dealer or contact J-Star Industries, Inc., 801 Janesville Ave., Fort Atkinson, Wi 53538. Phone (414) 563-5521.



MODEL 5

TABLE OF CONTENTS

SCALE INSTRUCTIONS

OMP 5 AND 15
INDICATOR SYSTEM

DESCRIPTION AND PRINCIPLES OF OPERATION

The Electronic Scale System consists of one or more loadcells and the Indicator.

The Scale System has been designed for use in outdoor enviroments and is weatherproof.

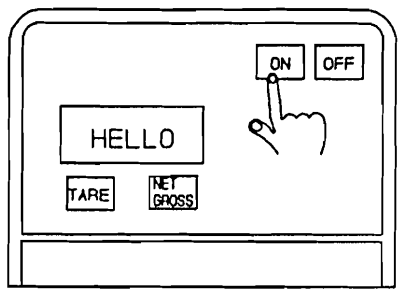
Operation is performed by pressing the keyboard on the front of the Indicator Panel. Feedback to the operation is by the Backlite Liquid Crystal Display on the Panel.

The Indicator operates from a 12 VDC power source. This can be a standard 12 VDC battery or a regulated 12 VDC power supply. If is LOW BATTERY condition exists (less than 10.5 volts), this will be indicated on the display by the message LO BAT. During this condition the unit cannot be balanced or calibrated.

Your scale will measure total or gross weights of material. The System can also be used with a Tare Weight, in which case it will record weight added or removed since the last recorded Tare Weight. This last method is used to determine net weights or lads and is also used for batch weighting applications.

GETTING STARTED

THE PANEL



POWER ON

The operator can keep track of the operation of the Indicator by observing the small messages in the top and bottom edges of the large display window on the Panel.

When using the keyboard, the indicator responds to the operator as follows:

1) As each key is preseed an audible "beep" will be heard. If the beep is not heard, the key hasn't been adequately pressed to activate it or the weight on the scale is not stable.

2) Messages (annunciators), which are generally 3 or 4 letter abbreviations for an operation will appear at either the top or or bottom edge of the display to confirm to the operator that what he has requested is being executed.

3) When the weight is not stable the indicator displays a flashing "bell" shaped annunciator to tell the operator it is processing or stabilizing information. While this annunciator is flashing the indicator is not ready for, nor will it accept further input.

NOTE: The bell shaped annunciator refers to stability. There may be apllications, such as weighing animals, when it is not possible for the reading to perfectly settle down. In these cases it is necessary to turn the bell annunciator **off** as described in the Setup And Calibration Procedure section of this manual.

In the upper RH corner of the panel you will find the ON and OFF keys. Pressing the ON key starts the unit. After about 4 seconds the unit will start and is indicated by a "HELLO" message on the display. However, the unit will not be ready for stable operation until it has been allowed to warmup for at least 10 minutes. In cold weather, allow 20-30 minutes for warmup. Pressing the OFF key will shut off power to the unit.

Test Function

If the ON key is depressed a second time after the "HELLO" message displays, the unit conducts a test of itself. During the test it will display program parameters and the display program parameters and the display annunciates the word TEST. This function is not used during normal operation. Should you enter the test mode, which requires nearly a minute to complete, it can be cancelled by pressing any key except **ON**.

OPERATION

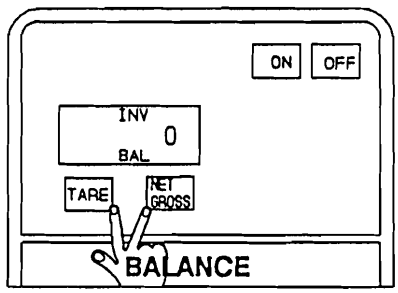
POWER ON

The indicator starts up inthe GROSS weight mode.

This can be verified by observing the annunciator INV (inventory) at the top of the display.

BALANCING

After the display is warmed up and stable, the indicator should be balanced with no weight on the scale. Do this by pressing the NET/GROSS key and then while still holding it pressing the TARE key and hold both for one second. BAL will be displayed at the lower display to verify the operation. If 'INV' and '0' are not displayed, rebalance.



IMPORTANT: When balancing the scale, it must be empty and the display must be stable. Beware that if the scale is not empty during balancing, it will be in error. In a mobile application the vehicle must be stopped and on level ground.

Balancing can be done at any time, but if the bell shaped annunciator is flashing, the unit will not balance. The indicator "remembers" balance weights even when power is turned off but it should be checked regularly. Balance is affected by large temperature changes and by physical environment such as mud or snow buildup.

GROSS (INV) WEIGHING MODE

The INV annuciator displayed in this mode, the Indicator displays the weight of items on the scale. If the scale is empty and the display is not zero, rebalance the indicator.

NET WEIGHTING MODE (Using Tare Weights)

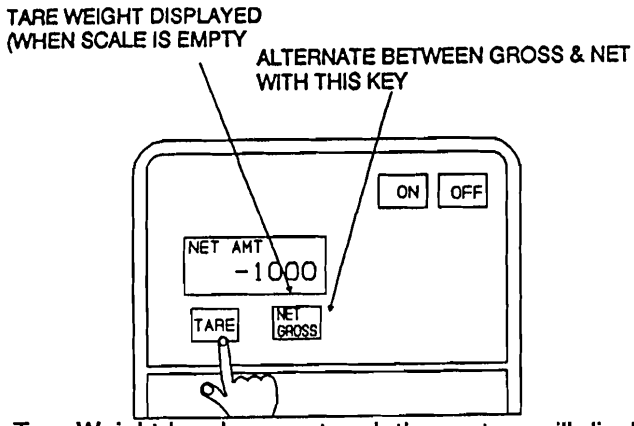
This method involves recording a TARE wieight with the system (tare this weight off from future loads).

The NET mode does not function until a Tare Weight is entered. Therefore, if you change to the NET mode with "no Tare weight entered, " the indicator displays a series of dashes.

Tare Weights can be entered in either GROSS or NET modes as follows:

With the Tare load on the scale and when the display is stable, press the TARE key. THe display wil then be in the NET mode and read zero. When the load is removed, the display indicates the Tare Weight as a negative value. Examples of a tare weight mmight be an empty truck to which you want to learn how much load has been added later; or a loaded truck to which you want to learn how much load has been removed later.

NOTE: The indicator does not "remember" Tare Weights if power is turned OFF. They must be entered again to use.



After the Tare Weight has been entered, the system will display the weight that is either added to or subtracted from the Tare Weight. When weight is added the display will be positive. When weight is removed the display will be negative and is the actual weight removed; not the difference between the Tar Weight and weight removed.

During the NET mode if you want to know the GROSS weight (NET plus TARE weights) on the scale, press the NET/GROSS key. THis toggles the mode display between NET and GROSS.

OPERATION SUMMARY

KEY(S)	DESCRIPTION
ON	Turns the indicator on. If power is already on, holding ON for one second starts the display test.
OFF	Turns the indicator off.
NET/GROSS	Toggles the display mode between the gross (INV) and the net (NET AMT) modes.
TARE	Puts the indicator in the net mode and zeros the display.
<GROSS+TARE>	Balances the Indicator.

WEIGHING EXAMPLE

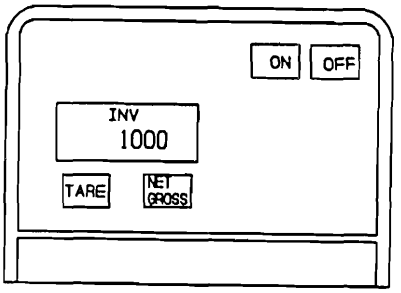
EXAMPLE 1. Typical Weighing Sequesnce In A Batch Mixing Application.

1. Press ON. YOur display will read HELLO for a short time.

2. Allow a 10 minute warm up period (20-30 minut3es in cold weather).

3. Hold NET/GROSS and press TARE, "BAL" will be displayed for a short time and then the display will read 0.

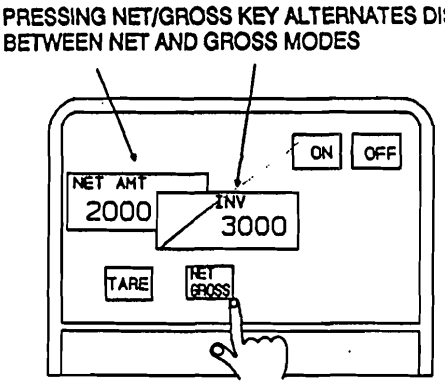
4. Add the first ingredient until the desired weight is reached. Let's use 1000 lbs.



5. Press the TARE key. THe mode changes to NET AMT and the display changes to 0.

6. Add the next ingredient. In this example assume 2000 more lbs. are added. The display will read 2000.

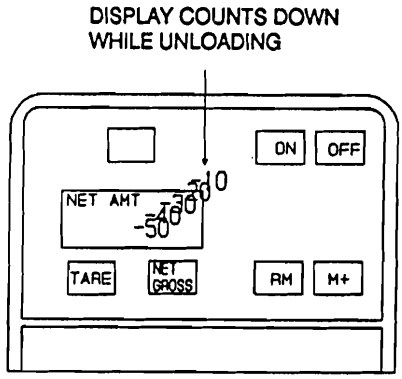
7. At any time the total (gross) weight can be viewed by pressing NET/GROSS. To return to the net weight display press NET/GROSS again. In this example the GROSS weight display will be 3000 lgs. (1000 + 2000)



8. If more ingredients are required, then repeat steps 5 and 6 until loading is completed.

9. To begin unloading, press TARE to zero the display.

10. Dump material until the desired weight is reached. The display number will be negative to show that weight has been removed.



11. Repeat steps 9 and 10.

MAINTENANCE AND TROUBLESHOOTING

MAINTENANCE:

The Model 5 and Model 15 scale indicators do not require regular maintenance to operate properly, however calibration of the scale system should be checked once a year to m aintain the accuracy of the system. The manual supplied with the weighing portion of the system contains maintenance information for that specific product, i.e. Platform Scale, Mixer, Etc., but these general rules apply to all systems:

1. Verify that there is not physical interference between the weighting surface and the frame.

2. Check that the load cell is not bound up in the mount.
Verify that there is a slight amount of play between the load cell and mount.

3. If there are any moving parts in the weighting system (for example the power take off shaft of a mixer) make sure they are well lubricated and move easily.

4. Verify that the weighting surface is level with the frame so that all load cells are equally loaded and the weighting surface doesn't rock from corner to corner.

5. Apply a load to each corner of the weighing surface and verify that the corners read the same +/-1 display increment. The easiest way to do this is stand on or hang from each corner.

TROUBLESHOOTING:

The following table lists common problems and their possible cause, if a problem not listed in the table occurs contact your Distributor. All test assume the scale system is on and warmed up for 10 to 30 minutes.

SYSTEM	CIRCUIT	CORRECTIVE ACTION
I. System Dead	Power Switch On	Check fuses. Replace blown fuse. Check power cable for loose connection to the battery, or power supply. Voltage must be 10-½ V. minimum.
II. Display is unstable (varies more than 4 increments up and in 5 seconds)	Power On	Remove junction box cable from bottom of indicator. If display is still not stable, then indicator needs repair. IMPORTANT: On Model 5 after S/N 2681and Model 15 after S/N 2224 this test will not work. Display will flash 9999's. Use a simulator to test indicator stability or sue a shorting wire between pins of J902 to eliminate flashing 9999's.
or		
Display is unstable, gradual shift of weight in one direction (more than 10-20 increments in one hour).		If the indicator passes II. above above, then disconnect load cells from junction box until the defective load cell is located. If all load cells check out okay, then the junction box is defective. Check for loose or dirty connections, if none, contact your Distributor for repair or replacement.

SYSTEM	CIRCUIT	CORRECTIVE ACTION
II. System naccurate small error.	Power Switch On and Circuit Balanced	Contactor your Distributor for calibration instructions.
I. System naccurate, 10% or nore error.	Power Switch On and Circuit Balanced.	Apply weight to each corner to determine which load cell defective. Before replacing, check for binding or interference with the mount.

INSTALLATION REQUIREMENTS

INDICATOR MOUNTING

Various mounting plates are available. The indicator is easily attached by hooking the top of the indicator over the plate and securing with two #10-24 x 5/8" bolts and nuts.

POWER CONNECTION:

The power cable should be connected directly to a vehicle battery or regulated power supply. The scale end of the power cable is connected to the indicator as shown in Figure 2. Connect +12 VDC to red wire and GROUND to white wire. The indicator is fused at 4 amps.

TABLE 1: Power Cable Connections:

Wire Color	Wire Function
Red	Battery (+12 VDC)
White	Ground
Green	Not Used This Model
Black	Not Used This Model

LOAD CELL AND JUNCTION BOX CONNECTIONS:

The indicator is designed to operate with strain gage load cells. The indicator will be supplied with an interconection cable going to the load cell junction box. If a new cable is required or if a longer installation dictates that a cable be made, consult your Distributor for required parts.

To connect the load cells, plug the J-Star supplied interconect cable from the load cell junction box into the connector labeled J902 and located on the bottom of the scale. (See Figure 2.)

NOTE: If load cells are not manufactured by J-Star, color codes of wires may not match J-Box.

Connect the cables from the load cells to the junction box terminals as follows (See instructions on junction box cover):

TABLE 2: Load Cell Connections in Junction Box:

Terminal Color	Description
A)Red	+Excitation
B)Black	-Excitation
C) White	+Signal
D) Green	-Signal
E)Blue	Shield

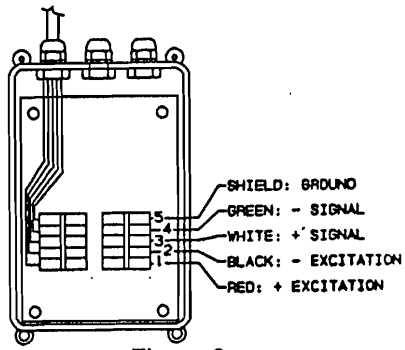


Figure 3

SPECIFICATIONS

SYSTEM

Operating Characteristics

Load Range	Up to 99,999 lbs. depending upon application
Accuracy	System 99.75% or 99.5% depending on load cell used.
Power Requirements	12 VDC (10½ VDC min. 13 VDC max.)
Temperature Range	
(Operating)	-20 to 140 degrees F
(Storage)	-40 to 180 degrees F
Remote Zero Option (TR4)	Operates up to 100 feet.
LCD Back Light	Standard

JUNCTION BOX

Cable	5/16" Dia. x 15' or 30' long standards. Also available in 50', 70' & 90' lengths
Capacity	4 Load Cells
Weight	2 pounds

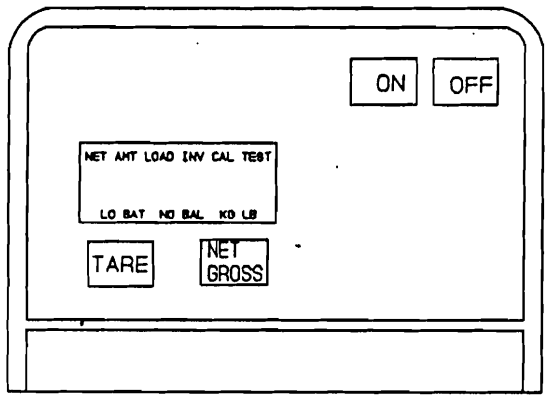
(Optional Duplex Kit Provides for up to 8 Load Cells)

LOAD CELLS

Operating Characteristics

Capacity	Depends on load cell
Overload Safety Factor	200% typical

PARTS LIST



MODEL 5
P/N 141620

ACCESSORIES

Part Number	Description
824461	Power Cord (#154-598)
141880	Junction Box, 30' Cable
141879	Junction Box, 15' Cable
143968	Junction Box, 30' Cable w/ Lightning Protection
823872	AC/DC Converter (12 VDC Power Supply)
824352	10' Trailer Extension for Power Cord w/Tractor Plug
141941	Junction Box Cable Extension Kit For Tractor Cab Mounting
141826	Receptacle For Tractor Plug

MODEL 5 AND 15

SETUP AND CALIBRATION PROCEDURE

IMPORTANT!
Do not attempt to recalibrate the scale indicator unless it is absolutely necessary. Indicators are factory precalbirated to the load cells they are shiped with. If the indicator is to be used with load cells different from the cells originally used with the indicator it may be necessary to make and internal change. If you are moving the indicator to a system with a differnt king of load cell, contact your Districturo for assistance. If the indicator is suspected to be inaccurate, then proceed with the calibration. To change calibration values you must have a known weight available or a load cell simulator. The known weight must be a minimum of 25 percent of the scale capacity.

GETTING STARTED, AN OVERVIEW OF SETUP

Setup and Calibration of the Model 5 and Modle 15 is done from the front panel. It is not necessary to opern the indicator to change switch settings or turn a potentiometer. You will press the NET/GROSS and ON keys at the same time to start calibration. The scale will show you which parameter it is ready to work on, and after a two second delay, the parameter itself. You will press the NET/GrOSS and TARE keys if you wish to change this value. We will explain this in detail on the next page. To enter the new value you will press ON. You can continue in this manner until the scale is set as you wish. When you are done, you press TARE then ON at the same time to go back to regular weighting. If you have set all possible parameters, the scale will go back to weighting by itself.

TEXT CONVENTIONS

We will be working with the keys and display. We will descrive each key or part of the display the same way each time we reger to it. We will use the following plan:

DISPLAY INDICATIONS: Numbers or messages on the main display will be enclosed in single quotes, i.e. '1'.

A*NNUNCIATORS INDICATIONS*: An annunicator is one of the small signs around the main display. Annunicators will be described with the annunicator capitalized and in single quotes, i.e., 'INV'.

SWITCH OR KEY NAMES: Switches will be shown by capital letters and no quotes, i.e. TARE. SOme operations require pressing nad holding one key then pressing a second key. At the end of this you should be holding two keys down at the same time. THis will be designated with an arrow, i.e. NET/GROSS->TARE.

To start the set up and calibration procedure press and hold NET/GROSS then press ON (NETGROSS->ON) and hold both keys for approximatedly one second. The indicator will beep when the keys have been held long enough and the 'CAL' annunicator in the main display will begin flashing. This annunicator will continue to flash as long as the indicator is in the setup and calibration procedure. You may release the NET/GROSS and ON keys at this poin.

All of the parameters are set in one of the following three ways:

For most of the parameters, the indicator displays a message for one second to describe the parameter to be set, then changes to display the present value. To change the value, press NET/GROSS and the value will change to the next choice. When the suitable choice is displayed proess ON to store the new value and advance to next parameter.

When entering numbers for overrange, calibrate weight, time and date, NET/GROSS advances the flashing digit by one. To change another digit press TARE and the next digit to the left will begin flashing and can now be changed by pressing NET/GROSS as shown above. If you "over-shoot", the numbers continually loop or repeat from 9 to 0. When the digit is what you want, press TARE to move to the next digit. Note that the star annunciator (in the uppoer left corner of the main display) represents 100,000 pounds and should be off when a number is ready to be entered. If it is not, continue pressing NET/GROSS until the left most digit is correct and the star is off. Continue this way, using the GROSS/NET and TARE keys until the value is set the way you want it. After the value has been entered press ON to store the new value.

Some of the parameters (input and output units - LB/KG) show the label and parameter at the same time. To change the value, press NET/GROSS and the value will change to the next choice. After the correct choice has been made press ON to store the new value.

The calibration routine can be exited at any time by pressing and holding TARE then pressing ON (TARE-ON).

Note: ON must be pressed before TARE->ON or any change to the display parameter will not be saved.

CALIBRATING THE INDICATOR

The following text describes the parameters, their possible values, and descriptions of what they do. The parameters may not appear in the order listed here. Depending upon options installed - see tables at end of this section.

NOTE: Depending on the revision level of indicator and installed option, your indicator may not have all of the following parameters. Please refer to the tables at the end to determine what parameters you should have. The indicator revision level may be determined by entering the test mode. Press ON after indicator warmup.

We recommend that the scale operator contact your Distributor before attempting to change any of the setup and calibration parameters. Items marked with an * affect the scale indicator's performance and should only be modified by trained service personnel. Continue through these parameters by pressing ON or exit the setup and calibration routin by pressing TARE-ON at any time.;

1. To begin, press and hold NET/GROSS then press ON until the indicator beeps and the 'CAL' annunicator begins flashing.

2. **sEt t** Enter time with hours, am/pm, minutes

The time is set using standard 12 hour format, with the am/pm letter set to 'A' for AM and 'P' for PM. Use the NET/GROSS key and the TARE key to change the time value.

Press ON.

3. **sEt d** Enter date

Enter month and day. The system makes no provision for leap years. Use the NET/GROSS key and the TARE key to change the date.

Press ON.

4. **sEt Yr** Enter year

Use the NET/GROSS key and the TARE key to change the year.

Press ON.

DISPLAY OPTIONS

5. **tc** 1,2,4,8 Time Constant

The time constant changes the responsiveness of the display to weight variations. 1 is the fastest and 8 is the slowest. Recommended values are 4 for batching applications and bin scales and 8 for platforms. Change by pressing NET/GROSS until the desired time constant is displayed.

Press ON>

6. **out** LB or KG Select pounds or kilograms

Output units (displat units). Allow the displayed weights to be put in either pounds or kilograms. Press NET/GROSS for desired selection. Recal;ibration is not required after changing the output units.

Press ON

NOTE: 2 thru 4 support a time and date option which is not yet a standard product.

*7. **cntS** .1, .2, .5, 1, 2, 5, 10, 20, 50, 100 Display count size

The count size determines the increment the scale will count by. The count size should normally be the scale capacity divided by 4,000. Setting the count size too low (less than capacity/4000) does not increase the accuracy of the scale system and can cause an unstable display. Use NET/GROSS key to select desired count size.

Press ON.

8. **stAbl** on or off Stability feature

Stability, commonly known as motion detection, must be on to calibrate the scale.

When motion dectio is 'on', the bell annunciator on the display will flash when the displayed weight is not stable. When the weight is not stable, the following gunctions are disabled until the weight is stable: print, balance, calibration and memory accumulation. When 'off', zero tracking (0trAc) is also automatically set to 'off'. Stability must be on to allow calibration later in this procedure.

Use the NET/GROSS key to select 'on' or 'off'

Press ON.

9. **OtrAC** On or off Zero track feature

When 'on' is selected, the scale will automatically zero the display, compensating for minor variations in zero balance. For example: if mud or snow accumulates on the weighing surface of a platform scale, the display will continue to display zero. This feature functions only when the displayed weight is within two counts of zero and is stable. The calibration procedure will automatically exit after over range is set if zero tracking is on.

Zero tracking must be set to 'off' to calibrate the scale.
After calibration OtrAc may; be reset to 'on'. Use the NET/GROSS key to select 'on' or 'off'.

Press ON

10. **tr4** cir or nEt TR4 option, Model 15 only

Applies to use of tr4 option only. ONe of four buttons on TR4 transmitter may be reprogrammed to perform either, 'clr' (clear memory" or 'nEt' (net/fross) functions. Refer to TR4 Users Manual for more information. Use the NET/GROSS key to select 'clr' or 'nEt'.

Press ON.

11. **AutoP** on or off Auto print feature, Model 15 only

When 'on' and a printer is connnected, the scale will sutomatically print after each of the following keys are pressed: CM, PRINT, NET/GROSS, RM and M+. When NET/GROSS or TARE is pressed the weight displayed is printed and then the normal key function is performed. Use the NET/GROSS key to select 'on' or 'off'. Refer to XT Users Manual.

Press ON.

*12. **in** LB or KG Select pounds or kilograms
Input units. Allows the calibration weights to be entered as pounds or kilograms. For example if weights are to be displayed as kilograms but the weights used to load the scale are certified in pounds, the input units are LB's and the output units are KG's. Press NET/GROSS for selection.

Press ON.

13. **o rng** any valid weight Scale over range capacity

The overrance value is set by J-STAR for the application the indicator s to be used in. Do not change this value unless the indicator is moved o a different capacity scale. Inc this case the overrange value should ɔe set at 5% above the rated capacity (i.e. 42000 for a 40000 lb capacity scale.) Use the NET/GROSS key and the TARE key to change the over ange.

Press ON.

To exit the setup and calibration procedure at this point without changing he scale calibration press TARE->ON.

14. **bAl** ----------

Allows the scale to be balanced before calibration weights are added. Press the NET/GROSS key and hold, the press the TARE key. The nstrument will beep and display 'BAL' when balancing is achieved.

Press ON.

15. **Add** ----------

At this point weight should be added to the scale or simulator switch moved to .2 mv/v or .4 mv/v. If the weight added is less than 5% of the scale capacity the indicator will continue to prompt to add weight. Recommended weight is 25 % or more of scale capacity. See the J-STAR simulator manual for specific instructions on its use.

Press ON.

16. **cal** any valid weight

Enter the amount of calibration weight added to scale using NET/ GROSS and TARE keys. Pressing ON after entering the calibration weight returns to the gross mode, and calibration is complete. When weight is removed from scale, indicator should display 0 (zero). If not, repeat the calibration process.

DISPLAYING SETUP INFORMATION

After calibration the test procedure should be run to check for correct valueds. To do theis press ON. The indicator will beep and begin a test. After the display test is completed the indicator set up information. The following table lists the parameters displayed and a short description of each parameter:

MESSAGE	*DESCRIPTION*
1. test pattern	display test
2. tc	the display time constant
3.cntS	display count size
4. stAbl	on or off (model 15 rev f or later)
5. OtrAc	on or off (model 15 rev f or later)
6. tr4	clr or net (model 15 rev f or later)
9. rng	used by service personnel only
10. progno	program revision

Calibration Parameters for Model 5 or 15, revision 'D'

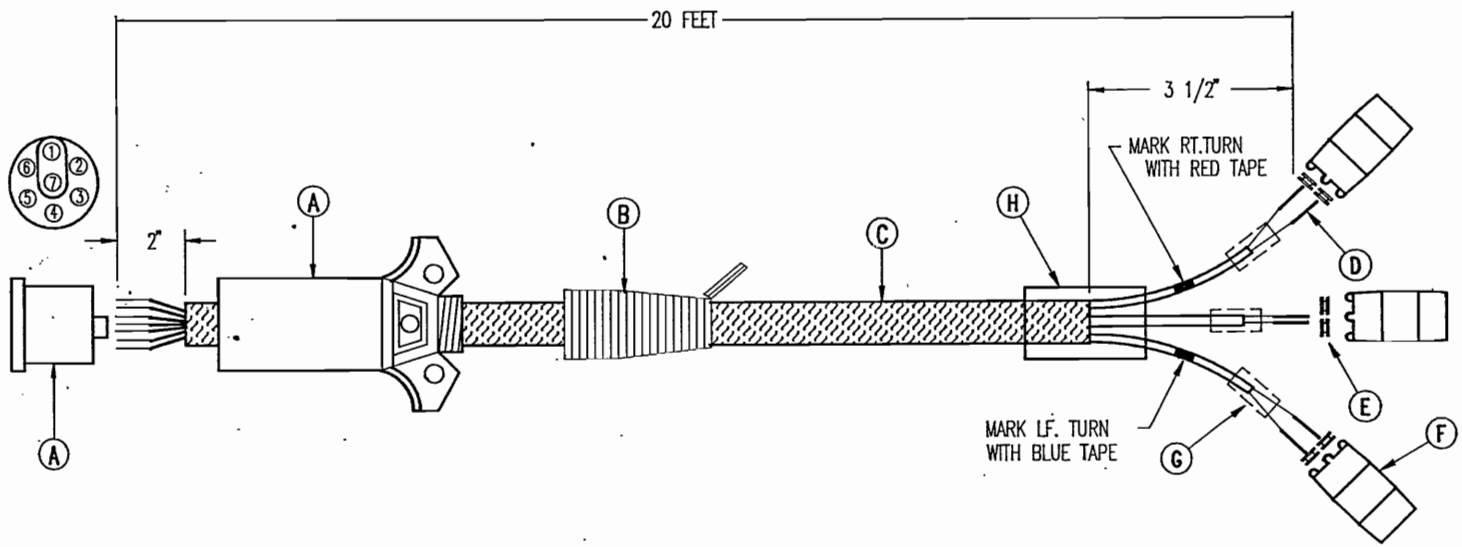
Action	Display	Options
Select Time Constant	tc	1,2,4,8,16
Select Output Units	out	LB, KG
Select Count BY	cnt	.1,. 2, .5, 1, 2, 5, 10, 20, 50, 100
Select Input Units	in	LB, KG
Enter Over Range Value	o rAng	System overrange limit value. Should be 105% of system capacity.
Balance Scale Now	baL	Any weight, balance to zero.
Add Calibration Weight Now (may be simulator	Add	Any weight greater than 100 and at least 5% of capacity.
Enter Calibration Value	CaL	Calibraion value for system. Adjust to match known weight.

Calibration Parameters for Model 5, revision 'G'.

Action	Display	Options
Select Time Constant	tc	1,2,4,8
Select Output Units	out	LB, KG
Select Count By	cnt	.1,. 2, .5, 1, 2, 5, 10, 20, 50, 100
Enable Motion Detector	stAbL	on, off
Enable Zero Track	0trAc	on,off
Select Input Units	in	LB, KG
Enter Over Range Value	o rAng	System overrange limit value. Should be 105% of system capacity.
Error, Zero Track Enabled. (Zero track must be off to set the next parameters.)	Error 0trAc	none Displayed only if 0trAc on.
Balance Scale Now	baL	Any weight, balance to zero.
Add Calibration Weight Now (may be simulator	Add	Any weight greater than 100 and at least 5% of capacity.
Enter Calibration Value	CaL	Calibraion value for system. Adjust to match known weight.

NOTE: Each Line of the tables represents one parameter that may be adjusted with the calibration.

LOCATION	AWG	COLOR	FUNCTION
1	14	BLACK	GROUND
2	24	GREEN	FIELD LIGHT
3	18	YELLOW	LEFT HAND TURN SIGNAL
4	24	NOT USED	NOT USED
5	24	BLUE	RIGHT HAND TURN SIGNAL
7	24	NOT USED	NOT USED
6	24	RED–BROWN	TAIL LIGHT



LOCATION	AWG	COLOR	FUNCTION	CONTACT NO#
A	16	BLUE	RT. HAND TURN	154–401
B	16	BROWN	TAIL LIGHT	154–401

LOCATION	AWG	COLOR	FUNCTION	CONTACT NO#
A	16	GREEN	FIELD LIGHT	154–401
B	16	BLACK	GROUND	154–401

LOCATION	AWG	COLOR	FUNCTION	CONTACT NO#
A	16	YELLOW	LF. HAND TURN	154–401
B	16	RED	TAIL LIGHT	154–401

ITEM	QTY.	ORTHMAN PART NO#	SUPPLIER NAME	SUPPLIER PART NO#	DESCRIPTION
A	1	154–237	WAYTEK	37675	7 POSITION PLUG
B	1	154–238	WAYTEK	37678	SPRING STRAIN REFIEF
C	1	154–248	WAYTEK	WT16–6	6–16 GA. CONDUCTOR CABLE X 20 FEET
D	6	154–401	PACKARD	12089040	18 GA. MALE CONTACT
E	6	154–402	PACKARD	12015323	18 GA. CABLE SEAL
F	3	154–404	PACKARD	12010973	2 POSITION FEMALE CONNECTOR
G	3	154–117	ALPHA	FIT 221–1/4	1/4" HEAT SHRINK X 2 1/2"
H	3	154–119	ALPHA	FIT 221–1/2	1/2" HEAT SHRINK X 2"

Orthman

SCALE: N. T. S.

TITLE: 797/897 LIGHTING CABLE MAIN CABLE ASSEMBLY

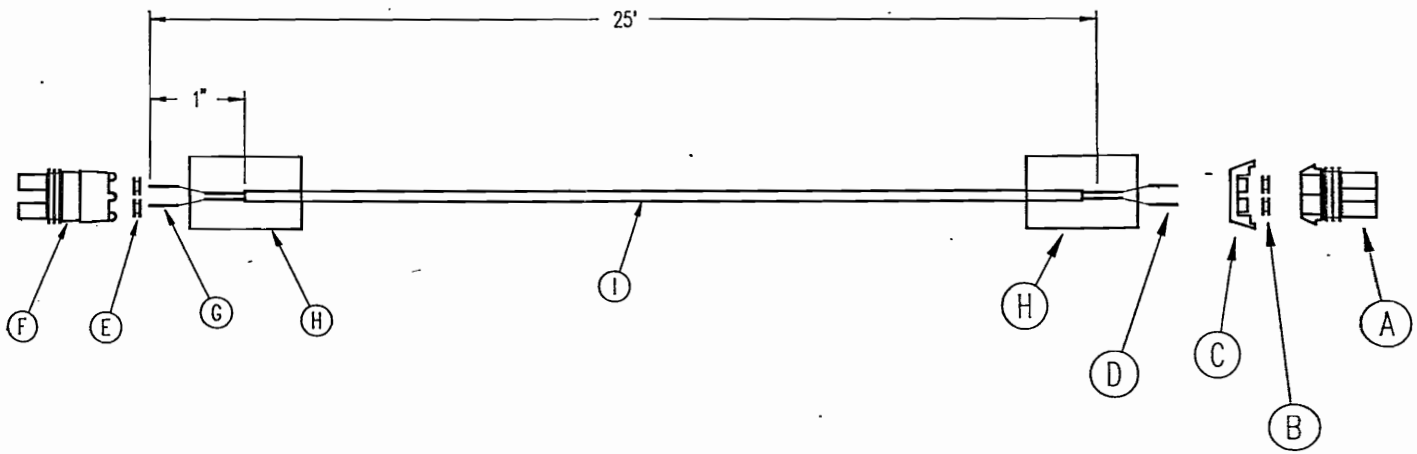
DRWN BY: J.P. MICHAELS

PART NO#: 318–898

DATE: 6/26/91

CHK'D BY:

LOCATION	AWG	COLOR	FUNCTION	CONTACT NO#
A	14	WHITE	+12 V FIELD LIGHT	154-400
B	14	BLACK	GROUND	154-400



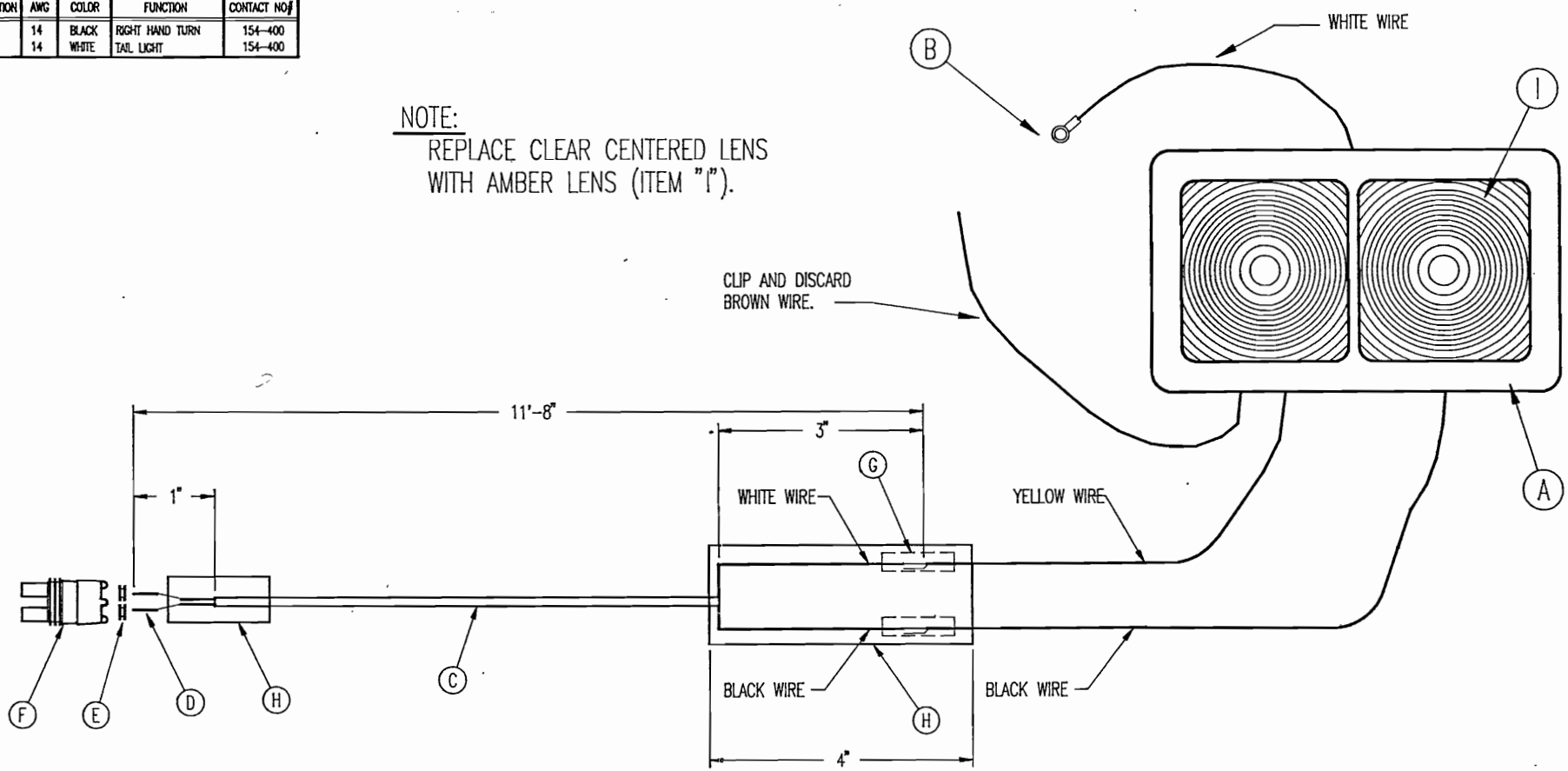
ITEM	QTY.	ORTHMAN PART NO#	SUPPLIER NAME	SUPPLIER PART NO#	DESCRIPTION
A	1	154-417	PACKARD	12059181	FIELD LIGHT CONNECTOR
B	2	154-423	PACKARD	12010293	LIGHT CONNECTOR CABLE SEAL
C	1	154-419	PACKARD	12059185	CONNECTOR RETAINING CLIP
D	2	154-418	PACKARD	12077412	16 GA. FEMALE LIGHT CONTACT
E	2	154-402	PACKARD	12015323	18 GA. CABLE SEAL
F	1	154-403	PACKARD	12015792	2 POSITION MALE CONNECTOR
G	2	154-400	PACKARD	12089188	18 GA. FEMALE CONTACT
H	1	154-318	ALPHA	FIT 221-3/8	3/8" HEAT SHRINK X 6"
I	36"	154-148	BELDEN	8473	2 CON. 14 GA. BLACK & WHITE X 25'

Orthman

TITLE: 797/897 FIELD LIGHT CABLE ASSEMBLY	SCALE: N. T. S.
PART NO#: 318-897	DATE: 6/28/91
	DWN BY: J P MICHAELS
	CHK'D BY:

LOCATION	AWG	COLOR	FUNCTION	CONTACT NO#
A	14	BLACK	RIGHT HAND TURN	154-400
B	14	WHITE	TAIL LIGHT	154-400

NOTE:
REPLACE CLEAR CENTERED LENS
WITH AMBER LENS (ITEM "I").



ITEM	QTY.	ORTHMAN PART NO#	SUPPLIER NAME	SUPPLIER PART NO#	DESCRIPTION
A	1	154-416	GROTE	51192-3	RIGHT HAND RECESSED DOUBLE TAIL LIGHT
B	1	154-[illegible]20	NEWARK	31507	1/2" ID 16 GA. EYELET
C	11'	154-148	BELDEN	8473	2 CON. 14 GA. BLACK & WHITE X 11'-8"
D	2	154-400	PACKARD	12089188	18 GA. FEMALE CONTACT
E	2	154-402	PACKARD	12015323	18 GA. CABLE SEAL
F	1	154-403	PACKARD	12015792	2 POSITION MALE CONNECTOR
G	1	154-117	ALPHA	FIT 221-1/4	1/4" HEAT SHRINK .X 4"
H	1	154-318	ALPHA	FIT 221-3/8	3/8" HEAT SHRINK X 6"
I	1	152-174	GROTE	9074-33	AMBER LENS

Orthman

SCALE: N. T. S.

TITLE: 797/897 RIGHT HAND TAIL LIGHT ASSEMBLY

DWN BY: J P MICHAEL

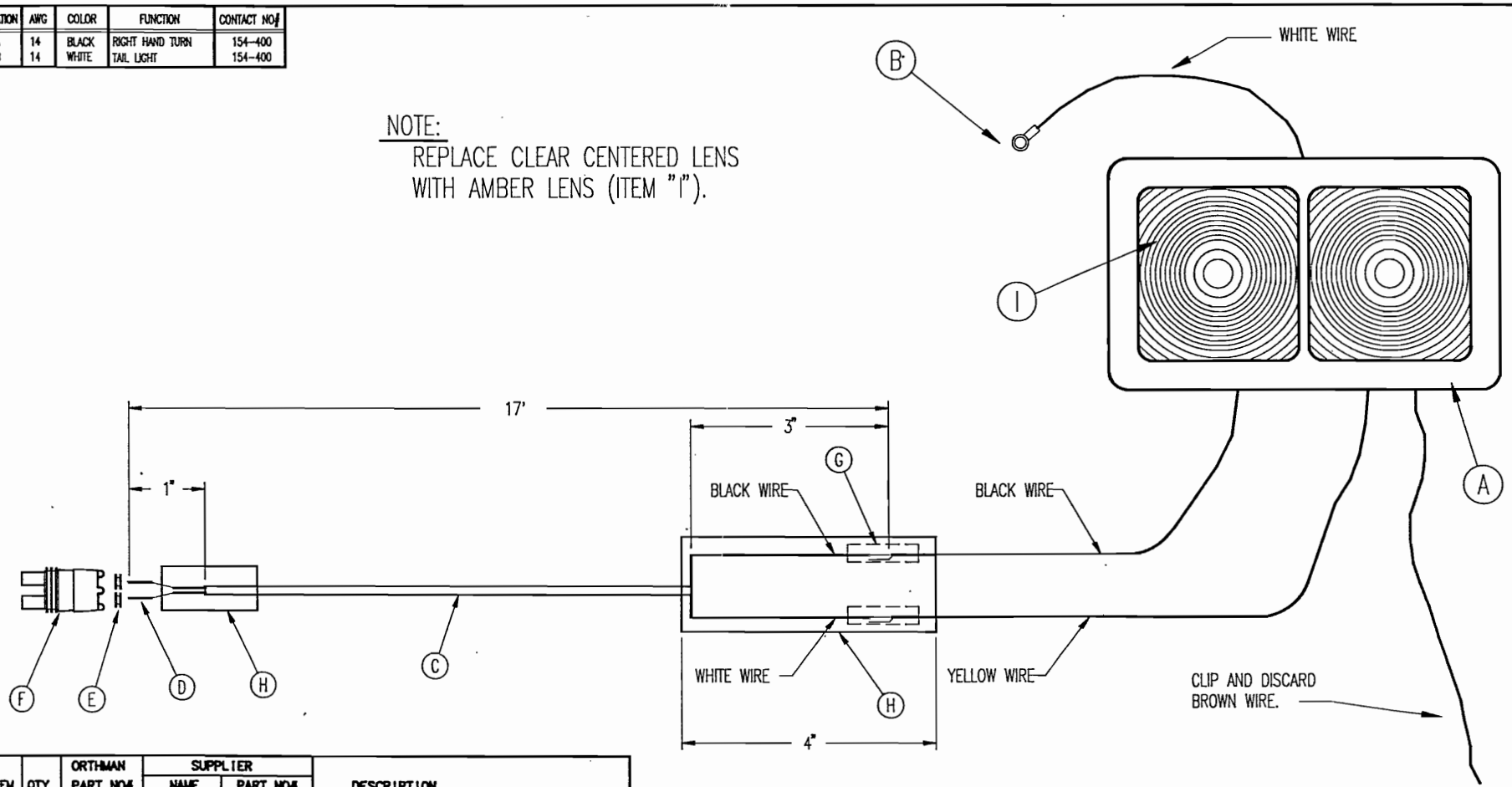
PART NO#: 318-899

DATE: 6/26/91

CHK'D BY:

LOCATION	AWG	COLOR	FUNCTION	CONTACT NO#
A	14	BLACK	RIGHT HAND TURN	154-400
B	14	WHITE	TAIL LIGHT	154-400

NOTE:
REPLACE CLEAR CENTERED LENS WITH AMBER LENS (ITEM "I").



ITEM	QTY.	ORTHMAN PART NO#	SUPPLIER NAME	SUPPLIER PART NO#	DESCRIPTION
A	1	154-415-20	GROTE	51042-3	LEFT HAND RECESSED DOUBLE TAIL LIGHT
B	1	154-~~348~~	NEWARK	31507	1/2" ID 16 GA. EYELET
C	17'	154-148	BELDEN	8473	2 CON. 14 GA. BLACK & WHITE X 17'
D	2	154-400	PACKARD	12089188	18 GA. FEMALE CONTACT
E	2	154-402	PACKARD	12015323	18 GA. CABLE SEAL
F	1	154-403	PACKARD	12015792	2 POSITION MALE CONNECTOR
G	1	154-117	ALPHA	FIT 221-1/4	1/4" HEAT SHRINK X 4"
H	1	154-318	ALPHA	FIT 221-3/8	3/8" HEAT SHRINK X 6"
I	1	152-174	GROTE	9074-33	AMBER LENS

Orthman

TITLE: 797/897 LEFT HAND TAIL LIGHT ASSEMBLY	SCALE: N. T. S.
PART NO#: 318-900	DWN BY: J P MICHAELS
DATE: 6/26/91	CHK'D BY: