

# ELSTON

## Traction Sanders



### Owners Manual for Truck Sanders

Please Contact Us for Parts and Service:

Another Quality Product of:

 **ELSTON** MANUFACTURING INC.  
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Sioux Falls, SD 57103  
[www.elstonmfg.com](http://www.elstonmfg.com)  
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# 1 Introduction to Elston Traction Sanders for Trucks

## Overview

An Elston Traction Sander is an on-demand, gravity-fed delivery system designed to provide you with improved traction at the push of a button. When the button on the dash is pressed, electricity energizes a solenoid in the base of each sander opening a valve to allow grit to fall out of the bottom of the tank. The grit travels down each of the rubber tubes and is deposited directly in front of the tires.

The Elston Traction Sander set sent to you is one of the following three styles listed in the tables below. The only differences between the styles is the size and shape of the hopper used to store the grit. Mounting kits are available for all 3 styles. Please inquire at [elstonmfg.com](http://elstonmfg.com) or toll free at 1-800-845-1385 at availability and pricing for these mounting kits.

## Specifications

### Specifications: S-N661: 6” Sander

Dimensions <sup>1</sup> .....	6 in wide x 20 in long x 36.5 in tall
Shipping Weight.....	50 lbs/side (100 lbs/set)
Grit Capacity <sup>2</sup> .....	70-90 lbs/side (140-180 lbs/set)
Voltage Requirement.....	12 VDC (nominal)
Current Draw .....	12 A (6A per side) when dropping grit

### Specifications: S-N861: 8” Sander

Dimensions <sup>1</sup> .....	8 in wide x 20 in long x 36.5 in tall
Shipping Weight.....	55 lbs/side (110 lbs/set)
Grit Capacity <sup>2</sup> .....	90-115 lbs/side (180-230 lbs/set)
Voltage Requirement.....	12 VDC (nominal)
Current Draw .....	12 A (6A per side) when dropping grit

### Specifications: S-N100: Quarterfender Sander

Dimensions <sup>1</sup> .....	13 in wide x 24 in long x 39.5 in tall
Shipping Weight.....	70 lbs/side (140 lbs/set)
Grit Capacity <sup>2</sup> .....	140-180 lbs/side (280-360 lbs/set)
Voltage Requirement.....	12 VDC (nominal)
Current Draw .....	12 A (6A per side) when dropping grit

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<sup>1</sup>Height can be varied 1 to 2” taller or shorter by modification of the discharge hose.

<sup>2</sup>The exact weight depends on the density of grit used and the filling procedures followed. Actual values may differ from that listed.

## Grit Recommendations

One of the most common questions on the traction sanders is the type of grit that should be used. We recommend that the grit used in the sanders meet the requirements below for the most reliable performance of the unit.

- **Material**

Grit used in the sander must be:

- Dry and free flowing
- Low in silt, dust, or other materials that cause the material to clump as it dries

- **Grain Shape**

Grit should be largely irregular shaped grains of an approximately rounded shape. The shape of most crushed materials is acceptable.

- **Grain Size**

Material with grains longer than 1/2" or more than 3/8" in diameter **should be avoided** to prevent clogging the sander. The material should not have more than a small percentage of fines or vibration will cause the material to compact and not flow out of the tank. **For this reason, most sand will not work.**

A material sized 7/20 or 16/20 is ideal and a material sized 4/20 is usually acceptable.

A number of materials can meet the requirements above. The materials listed below are those most commonly asked about by our current users.

### *Fullers Earth based Floor Dry*

This material is a specific type of clay that is mined and is one of the three most common materials sold as floor dry. It works well as long as the grain size meets the above recommendations. Figure 1 shows examples of Floor Dry products that work in Elston Sanders. These products are Oil Dri, NAPA Floor Dry, or Safe T Sorb. It is available at numerous retail automotive stores in 25 to 50 lb. bags. It is the easiest material to find and keep dry but does not provide as much traction as the other materials.



Figure 1: Examples of Fullers Earth-based Floor Dry

### *Coal, Iron and Copper Slag*

Copper, iron, and coal slag are materials that are used for blasting abrasives and have been found to work as sander material as long as they are not too fine or have too much fine material. Avoid mixes with material finer than #20.



*Figure 2: Example of Blast Furnace Slag*

### *Crushed Rock*

Crushed rock is an inexpensive product that works well as long as it is the correct size and dry. It can be difficult to find dry, so it will require an extra drying step. Quartz or other siliceous materials are ideal but other materials are acceptable as long as they are dense enough to make it to the pavement without blowing away and hard enough to provide traction between the wheels (and not turn into powder or completely flatten). Figure 3 shows an example of crushed quartzite that can be used as a sander material.



*Figure 3: Example of Crushed Rock (Quartzite)*

### *Salt*

Salt requires more maintenance of the sander to prevent corrosion and may decrease the operating life of the unit. Most blends of salt have a tendency to clump or harden with exposure to humid air and need to be closely monitored to ensure the material is flowing well through the sander. Therefore, salt is not a recommended traction aiding material for use with the Elston Traction Sanders.

### *Sand*

Most sand will not work if it is wet or has too much fine material. Sand with excessive fines will quickly become too firmly packed to flow out of the sander although it may appear to work fine when first added to the sander.

Sand will work in Elston Traction Sanders if:

- Dry
- Clumps are removed
- It is not prone to compaction (see grain size recommendations)

Something like a dry sifted “playground” sand will work. The tube sand sold for ballast will not work since it has pieces that are too large and get stuck or too fine and cause compaction.

## **2 Service Instructions**

Thank you for purchasing a set of Traction Sanders from Elston Manufacturing. We are confident this product will provide you with years of service.

### **At the Start of Each Trip**

- Check the exterior of the sander for damage
- Check the grit level in the sander and refill if low

### **Annually Before the Start of the Winter Season**

- Check that all bolts and fittings are tight
- Inspect the electrical conduit, mounting brackets, sight glasses, and rubber hoses for damage and replace if necessary
- Touch up any areas where the finish is damaged to limit corrosion
- Check that the sander functions correctly, both in dropping grit and the level sensor (if present)

### **Annually At the End of the Winter Season**

- Drain the grit from the sander (if desired to save weight)
- Check that all bolts and fittings are tight
- Touch up any areas where the finish is damaged to limit corrosion

We always welcome feedback on our products. If you have comments, suggestions, or problems with the units please contact us at 1-800-845-1385 or email at [sales@elstonmfg.com](mailto:sales@elstonmfg.com).



### 3 Installation

**⚠ WARNING** Improper installation of this sander creates a substantial safety hazard including the risk of accident or property damage.

#### Overview

The Elston Traction Sanders you are about to install are designed to provide many years of service. As you install these sanders, pay special attention to preventing corrosion and keeping moisture out of electrical connections and components as these are the two primary issues that limit the life of the sander.

The purpose of these instructions is to aid you in installing a fully functional set of sanders that operates reliably and is safe and secure under both normal condition and, as much as possible, during an accident. However these instructions are not a substitute for personal knowledge and experience with working on trucks and/or electrical systems. Please do not install those areas of the sander where you lack personal knowledge and experience.

Throughout this guide, the word “must” is used for any instruction that if not followed would create a safety hazard and/or yield an installation that would not comply with current standards. An instruction with the word “should” is necessary either for the proper functioning of the product or improves the long-term safe operation of the product. If you are unable to follow any instructions with the words “must” or “should”, please contact us to discuss how your installation can still be completed in a way that is functional, safe, and compliant. Finally, an instruction that recommends indicates an instruction designed to maximize the working life of the product, simplify installation, or improve the appearance of the installed product.

#### Unpacking the Sander and Gathering Supplies

##### Parts Needed for Installation shipped with Sanders:

- Set of traction sanders – one each of right hand and left hand sanders
- Dash mounted switch
- [4] S124-6 boots (bend rubber hose)
- [4] S83-97 clamps for boots
- 30 feet 12 gauge stranded automotive-type wire
- (optional) S10-02 Quarterfender Mounting Kit
- (optional) S5-100 x61 Mounting Kit

##### Additional parts required:

- [0 to 12] 3/8” diameter grade 5 bolts 1 inch long with flat washers and nylon lock nuts to match for securing sanders to mounting bracket (depending on mounting)
- [0 to 12] 3/8” diameter grade 5 bolts 2 3/4 inches long with flat washers and nylon lock nuts to match for securing sanders to mounting bracket (depending on mounting)

- [8 to 16] 1/2" diameter grade 5 bolts 1 1/2 inches long with flat washers and nylon lock nuts to match for securing mounting brackets to frame (depending on mounting)
- Corrosion preventive spray for coating threads and mating surfaces (recommended)
- Premium connectors, clips, heat shrink tube, and grommets for wire

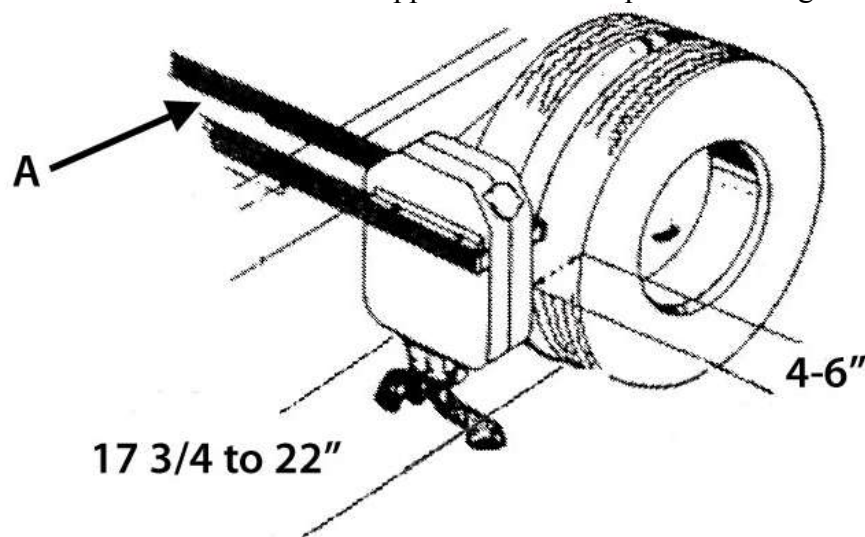
## Installation of the Sanders Tanks

**⚠ WARNING** Only drill and modify the frame of the vehicle as allowed by the manufacturer. Unauthorized modifications may cause cracking or failure of frame. Generally they prohibit drilling the flange of the frame rails or within 2" of the flange and limit or prohibit the application of heat by tools such as welders and cutting torches.

The first step is to determine the approximate mounting locations of the sander on the frame in front of the drive wheels. Figure 4 shows the critical dimensions needed for installation.

The sanders should be installed according to the following guidelines:

- Grit tank sides should be 4 to 6 inches in front of the tires for adequate clearance between the sander and the tire.
- The bottom of the grit tank should be installed 17 3/4" to 22" above the ground when the vehicle is fully loaded to allow the discharge boots to be trimmed to the correct height.
- The distance of the sanders from the frame is set by the grit outlets on the bottom of the unit. The center between those outlets should be between the tires with the outside edge of the sander no further from the frame than the outside edge of the tire tread of the outside tire.
- The tank should be installed with the sight glass or level sensor on the side of the sander opposite the tire if these optional accessories are present. However, tanks with a sight glass may be installed with the sight glass facing the tire if it provides better visual access to check the grit level on an S-N661 or S-N861. (Tanks with a level sensor should always be installed so that the level sensor is on the side of the sander opposite the tire to prevent damage to the wiring.)



*Figure 4: Sander Mounted on Long Square Tubing or Angled Metal*

Once you've determined the approximate mounting location, you will need to decide what type of brackets will be used to mount the sander.

We provide mounting brackets for the traction sanders. These are:

- The S10-02 mounting kit for S-N100 Quarterfender sanders
- The S5-100 mounting kit for S-N661 and S-N861 sanders

Otherwise, the traction sanders can be installed using square tubing, angle brackets, or any other robust configuration to securely fasten the sanders to the truck frame. Steel mounting setup must be strong enough to support at least 5 times the weight of a fully loaded sander without permanently bending. Aluminum configurations must be 8 times stronger for adequate stiffness and operating life. This level of strength is recommended as the brackets bear a substantial amount of load other than the weight of the sander due to bumps, constant stress, and corrosive winter chemicals which, in turn, increase the risks of the brackets cracking and failing.

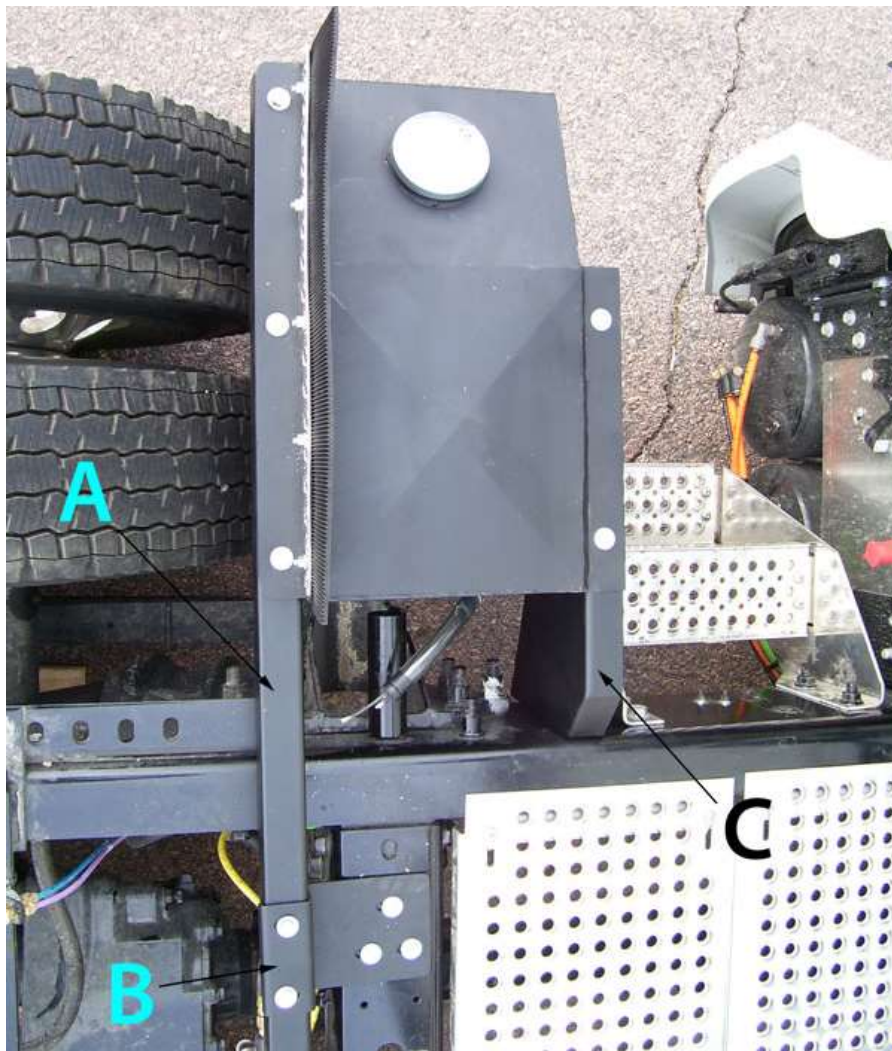


Figure 5: S-N100 Quarterfender sander installed using S10-02 mounting kit

Figure 5 shows an S-N100 sander installed with the S10-02 mounting kit. The tires side of the sander is hung from 2" x 2" square tube (part # S10-02-01) as indicated by A. The other side of the sander is hung from an angle bracket (part # S10-02-03) as indicated by C. The S10-02-01 square tubing is then mounted to the frame via 2 mounting brackets (part # S-10-02-02) as indicated by B.



*Figure 6: S-N861 Sander installed with custom angle brackets*

Figure 6 shows an S-N861 sander tank mounted with customer fabricated angle brackets (A).

If existing suspension parts attached to the frame interfere with mounting, the side of the sander closest to the tire needs to be hung from square tubing and the other side may need to be hung from square tubing as well.

Once you have installed the sander tanks, you should trim the top of the grit discharge boots to provide 4" ground clearance when the vehicle is loaded. Mount the boots (S124-6) on the outlets on the aluminum operating unit (S40059) with the included clamps (S83-97). If necessary, we recommend rotating the boots on the outlets to center each one in front of its corresponding tire.

## **Wiring**

Please refer to the appendix for the wiring diagram for the sander. Unless otherwise indicated on the sander, all sanders contain 12 volt coils. It is not necessary to wire the unit to receive power when the vehicle is off. Do not wire any other components, such as the level indicator, so that they turn on and off when the sander switch is operated as the voltage spike produced when turning off the solenoids will damage most electronic components.

All wiring from components on the sander terminate in the junction box on the back of each the sander and allow space for easy protected connections to the vehicle wiring. Wire is included in the installation kit and is suitable for most installations. Before routing any wire, check that the 12 gauge wire that comes with the unit will result in 10% or less voltage drop in your setup. If not, use 10 gauge wire to power the sander operating units. The level sensor is very low current and 18ga will work for all installations.

## **Mounting Switch and Indicators**

The sanders are controlled by a single momentary-on switch. This switch can have a pilot lamp and is mounted on the instrument panel. It is strongly recommended that the switch is a momentary-on switch since normal grit applications are a few seconds long and non-momentary switches are prone to being accidentally left on and emptying the tank.

The switch provided in the standard installation kit meets these requirements. If you are installing the sander where the Elston switch does not fit an existing hole, the switch requires a 0.92" x 1.5" opening. If another switch is used, it should have high quality contacts and a high enough rating (20A or better at 12 VDC) to ensure adequate life with the 12A inductive load of the sander.

If the sander has a level indicator, an indicator is required in the instrument panel. This indicator should be amber, labeled "Grit Tank Low", and have a current draw of 100 ma or less at 13.8VDC.

## **Final Details**

Test the sander to ensure both solenoids click open when the dash switch is pressed. If the sander has the level sensor, check that the indicator lights when the grit level is low.

## 4 Troubleshooting

If this guide doesn't fix your problem please contact the company where you purchased the sander. If you are unable to contact them or you need additional help, please contact Elston Manufacturing at: 1-800-845-1385.

### What is wrong with the sander?

- A. Unit fails to drop grit when switch is pushed
- B. Fuse supplying power to the unit is repeatedly blown

### Problem A: Unit fails to drop grit when switch is pushed

#### Cause: Grit is Low

If the hole in the bottom of the grit tank is visible than the grit level is too low and the sander needs to be refilled. If the grit level is not low, check that the sander is receiving power.

#### Cause: No Power to Unit

Make sure that the ignition is in the correct position(s) for the sander to receive power.

When the switch in the dash is pressed, the solenoid in the sander will open with a distinct click that should be audible when the vehicle is not running. If neither side clicks, check that the fuse or circuit breaker supplying power to the sander is not blown. If the fuse blows again the next time you press the switch see problem B below. If the fuse is not blown check the wiring supplying power to the sander for bad connections and the solenoid for continuity.

#### Cause: Operating Unit Not Working Correctly

If a click is not heard and the unit is receiving power (typically only one side will not click), remove the boots on the sanders and check if the bellows and valve are moving when the dash switch is pressed. If they do not move freely, remove the cap on the operating unit and inspect the parts inside to ensure they move freely.

#### Cause: Grit Not Flowing Correctly

If the sander is opening with a click, check that the grit in the tanks moves freely when disturbed with a rod. If it does not, the grit will need to be removed from the sander. Grit can be removed most easily by removing the six bolts attaching the operating unit to the bottom of the sander and prodding the remaining grit. Note that frozen grit will need to be thawed before removal. As you remove the grit, inspection of the grit will show why it failed to flow correctly. If the grit flows out fine once the operating unit is removed this usually indicates that the grit contains some material that is too large to flow easily through the sanders. Moisture limited to around the outlet to the grit tank typically indicates a poor seal of the gasket between the tank and the guard on the bottom on the tank. More widespread moisture in the grit indicates the grit was too moist when placed in the sander or an extended loss of the sander cap let moisture in. Grit that is compacted will be dry and flow fine when removed from the sander but be resistant to disturbance while inside the tank.

Once the grit has been removed from the sander, take care when reinstalling the operating unit to make sure the gasket between the guard and the tank seals well. Replace any damaged gaskets. It appears there

was a poor seal of the gasket, install a bead of silicon between the guard and the tank once the operating unit is installed to provide an additional barrier to moisture. Refill the sander with a grit recommended in chapter 1.

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## **Problem B: Fuse supplying power to the unit is repeatedly blown**

### **Cause: Incorrect size of fuse**

The fuse should be a 20A AGC or comparable automotive style standard delay fuse. If a circuit breaker is used, it should be a 15A model.

### **Cause: Short in solenoid**

If the correct size of fusing is being used and the fuse continues to blow, check the solenoid for a short. Both solenoids almost never develop shorts at the same time so first you'll want to isolate the fault. We recommend open up the junction block on the back on one the sander and disconnect the wiring to the solenoid (the black 12 gauge leads). You can replace the fuse and recheck but it usually just as easy to check the resistances on the solenoid. Check the resistance between each lead and vehicle ground. This value should be at least 1000 ohms. If the resistance for both sides is low replace the solenoid. If the value is only low for one side, the shorted side can be hooked to ground and solenoid will work fine (usually for years). If both values are ok, check the resistance between the two leads. A bad solenoid will have a resistance below 1 ohms. (Some cheap multimeters have trouble with large inductive loads like our solenoids and will give incorrect readings.). If no short is found in the solenoid, inspect the rest of the wiring for faults.

If a short is found, inspect the solenoid for moisture or corrosion that indicate water contacted the solenoid. Check the gaskets and bellows for damage and replace if needed to reduce future water problems. In addition, retighten any loose conduit fittings and check the conduit for damage.

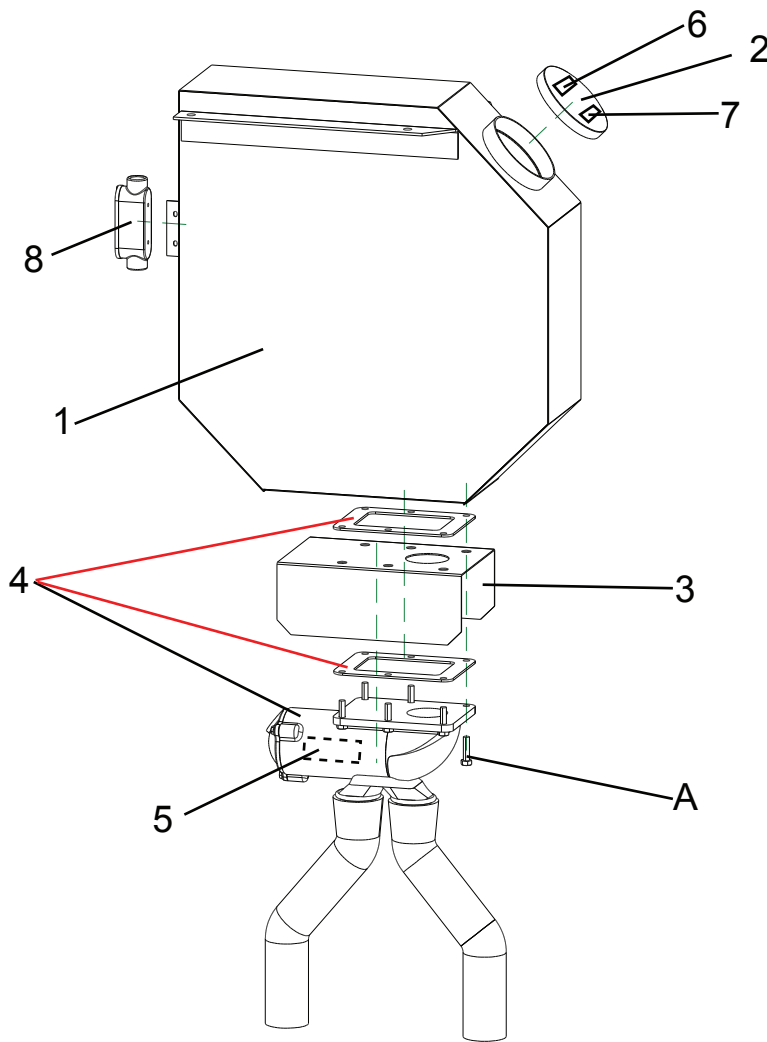
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Parts List for Traction Sanders

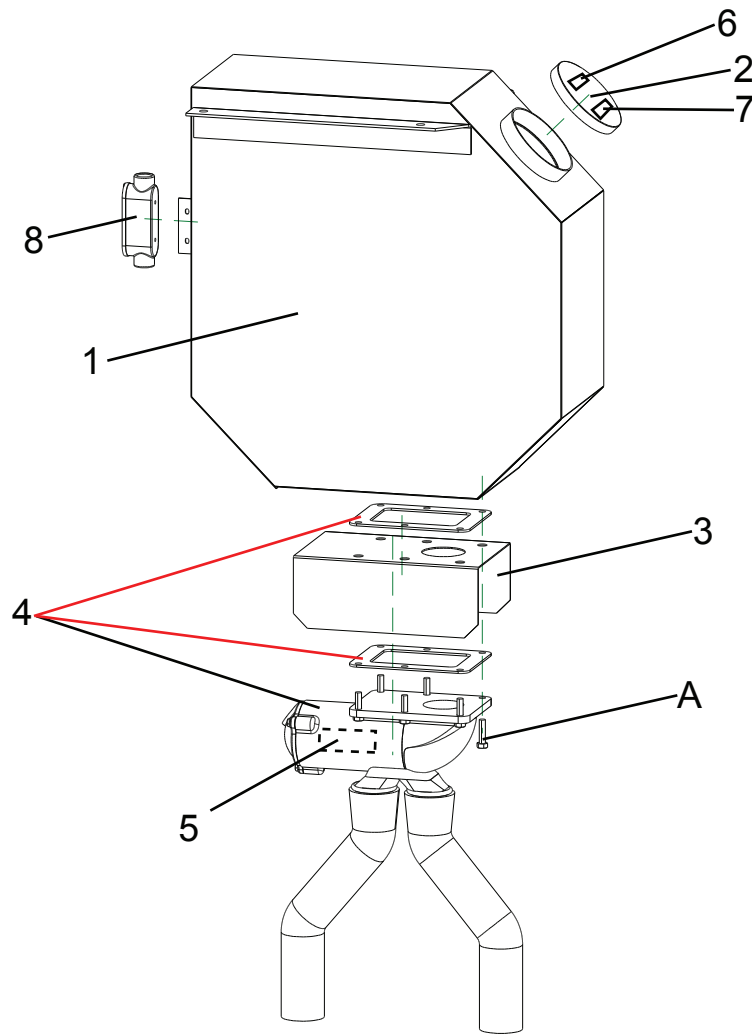
661 Series Sander Assembly



Ref #	Name	Part #	Ref #	Name	Part #
1	Powder Coated Steel Sander Tank	SN661T	5	Serial Number Decal (Inside Casting)	
2	Tank Cap w/ Retaining Lanyard	S4-53-04	6	Elston Logo Decal	SD-03
3	Powder Coated Steel Valve Guard	SP-02B	7	Grit Decal	SD-04
4	Operating Unit Area (includes gaskets)	see page A6	8	Straight Conduit Junction	S150-11
			1-14 (x2)	Set of Series 661 Sanders	S-N661
<b>Hardware</b>					
	A			5/16"-18 x 1 1/4" Serrated Hex Flange Bolt	

Add a C to the SN661T and S-N661 for custom colors.

see page A3 for additional parts



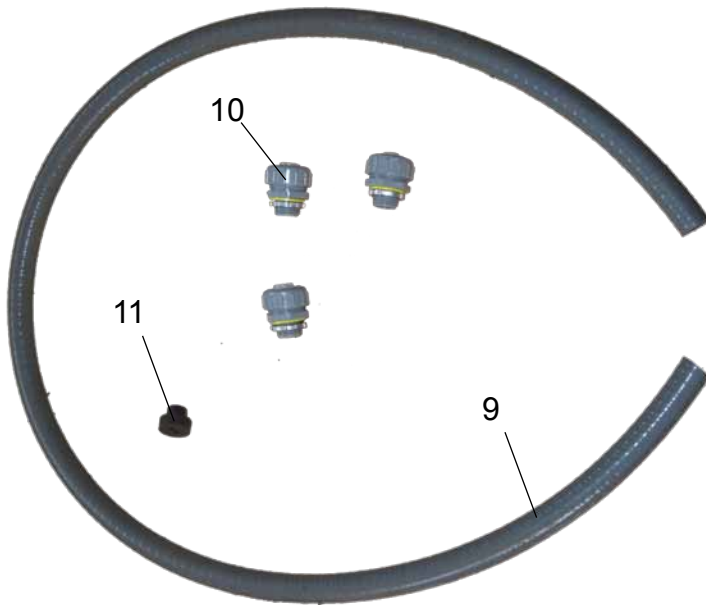
Ref #	Name	Part #	Ref #	Name	Part #
1	Powder Coated Steel Sander Tank	SN861T	5	Serial Number Decal (Inside Casting)	
2	Tank Cap w/ Retaining Lanyard	S4-53-04	6	Elston Logo Decal	SD-03
3	Powder Coated Steel Valve Guard	SP-02B	7	Grit Decal	SD-04
4	Operating Unit Area (includes gaskets)	see page A6	8	Straight Conduit Junction	S150-11
			1-14 (x2)	Set of Series 861 Sanders	S-N861
<b>Hardware</b>					
	A			5/16"-18 x 1 1/4" Serrated Hex Flange Bolt	

Add a C to the SN861T and S-N861 for custom colors.

**see page A3 for additional parts**

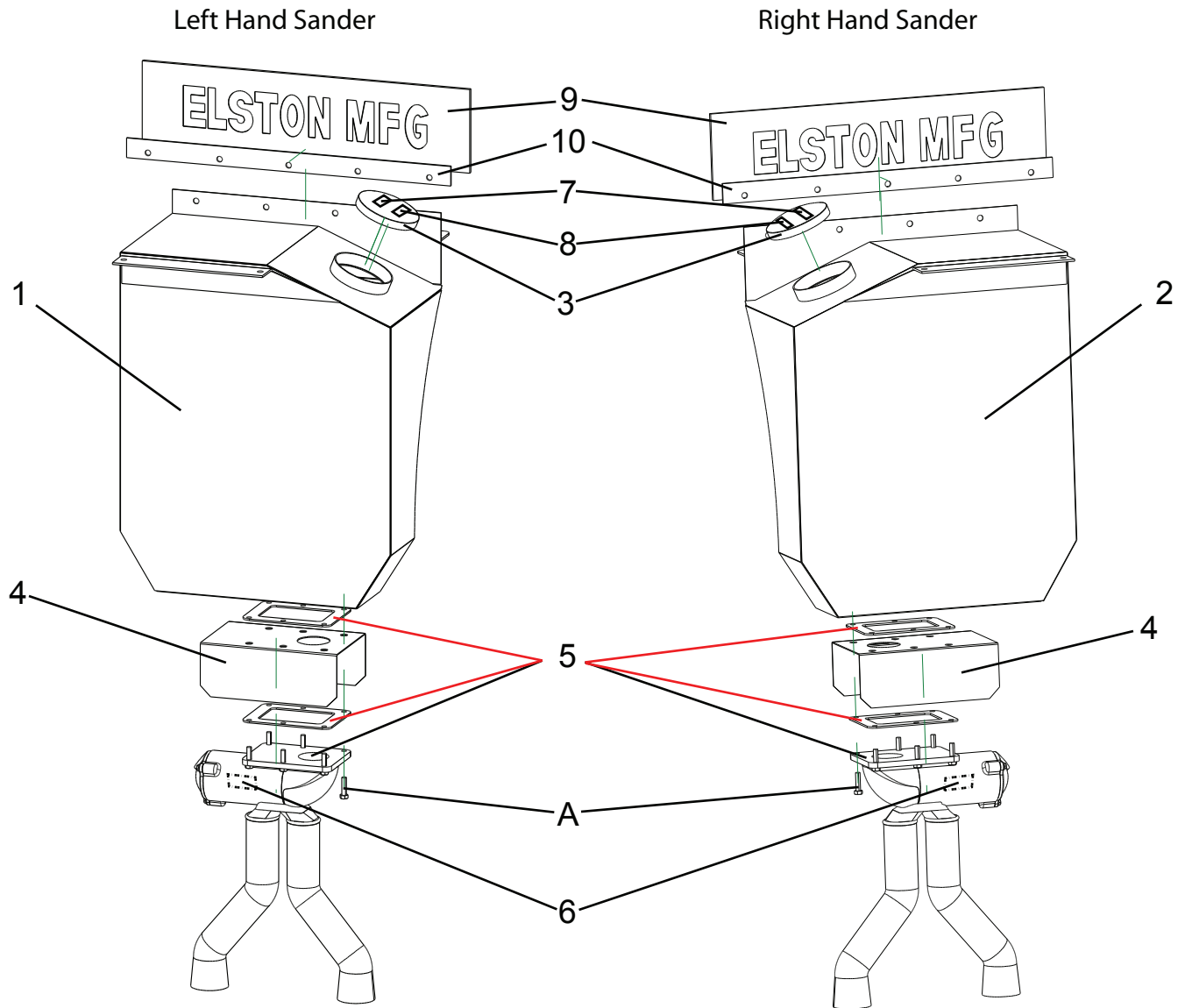
Parts List for Traction Sanders

Additional Parts for Sander Assembly



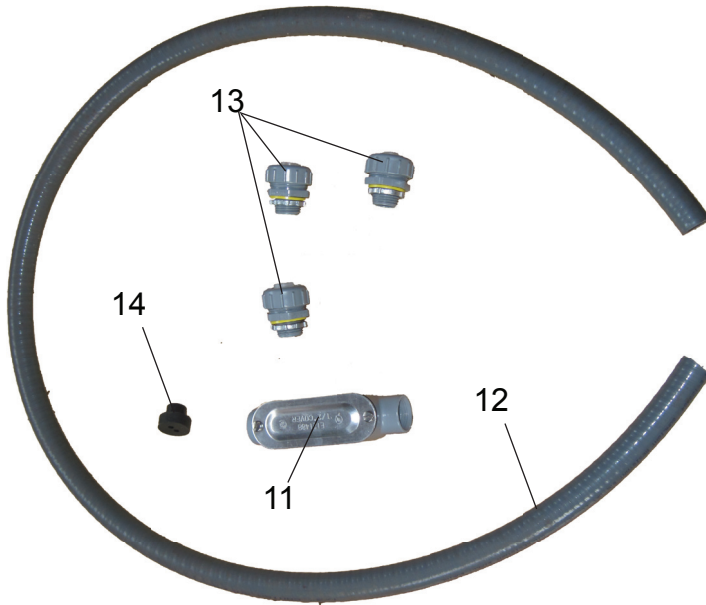
Ref #	Name	Part #
9	6 ft flexible nonmetallic conduit	S150-10
10	Straight thru watertight conduit fittings	S150-14 (x3)
11	Conduit Grommet	S150-8

Ref #	Name	Part #
12	Fuse Holder w/20A Fuse	SE-11
13	30ft 12 ga. Wire - Black	SE-12
14	Switch - Truck Style	S40135



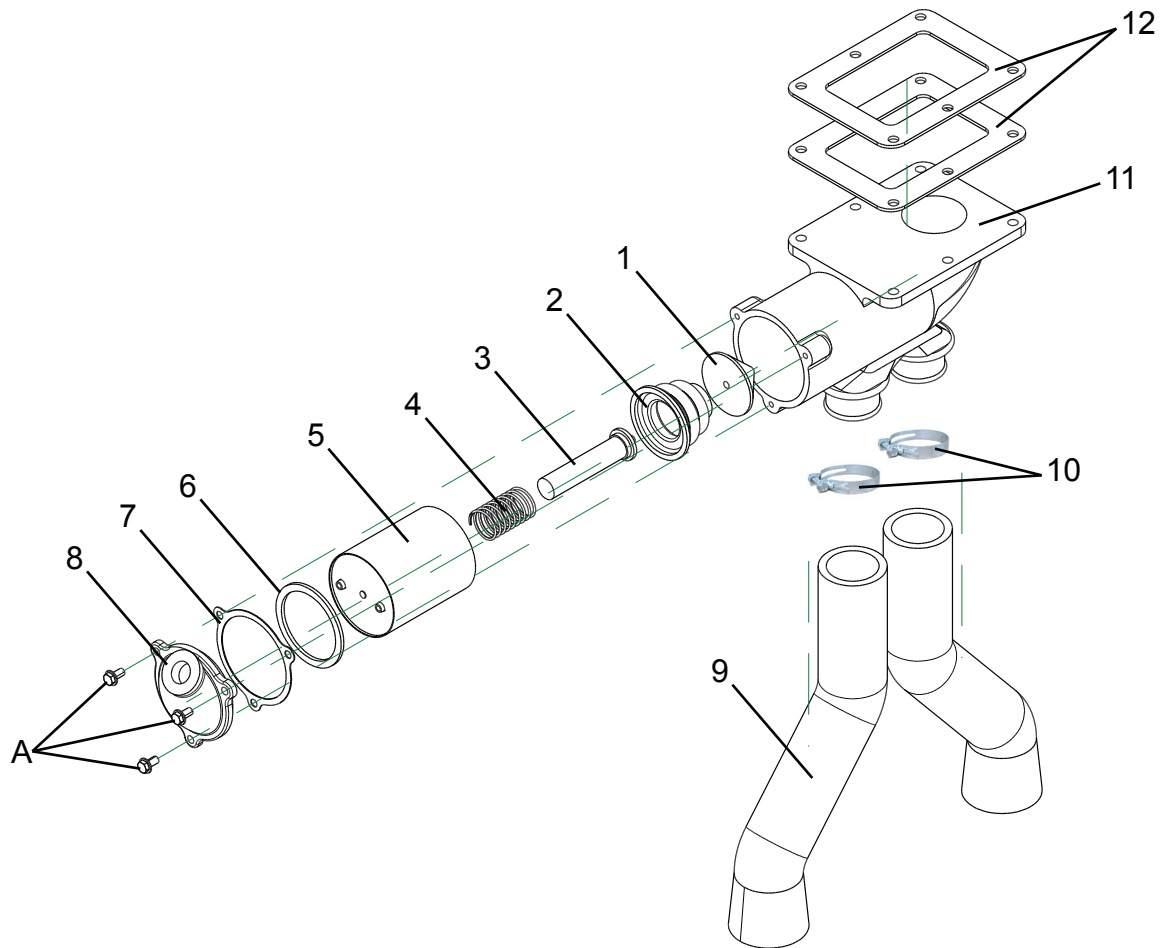
Ref #	Name	Part #	Ref #	Name	Part #
1	Left Hand Sander Tank Powder Coated Steel	S-N100TL	6	Serial Number (inside casting)	
2	Right Hand Sander Tank Powder Coated Steel	S-N100TR	7	Elston Logo Decal	SD-03
3	Tank Cap w/ Retaining Lanyard	S4-53-04	8	Grit Decal	SD-04
4	Valve Guard Powder Coated Steel	SP-02B	9	Quarterfender Mud Flap	S10-01
5	Operating Unit Area <i>(includes gaskets)</i>	see page A6	10	Mud Flap Mntg Bracket	S10-03
			1,2, 3-17 (x2)	Sander w/ Black Steel Tanks	S-N100
				<b>Hardware</b>	
			A	5/16"-18 x 1 1/4" Serrated Hex Flange Bolt	see page A5 for additional parts

Add a C to the tank and sander part numbers for custom colors.



Ref #	Name	Part #
11	Straight Conduit Junction	S150-11
12	6 ft flexible nonmetallic conduit	S150-10
13	Straight thru watertight conduit fittings	S150-14 (x3)
14	Conduit Grommet	S150-8

Ref #	Name	Part #
15	Fuse Holder w/20A Fuse	SE-11
16	30ft 12 ga. Wire - Black	SE-12
17	Switch - Truck Style	S40135



Ref #	Name	Part #
1	Cone Assembly	S15-85
2	Bellows	S161-2
3	Armature	S197-6
4	Compression Spring	S24-62
5	Solenoid - 12 V	S40085-501
6	Solenoid Gasket	S4-41G
7	Gasket for Cap	S16-87
8	Cap - Solenoid Opening*	S4-41B
9	Boot	S124-6
10	Clamp for Boot	S83-97

\* Use S4-41C for units on quarterfender sanders with metal conduit

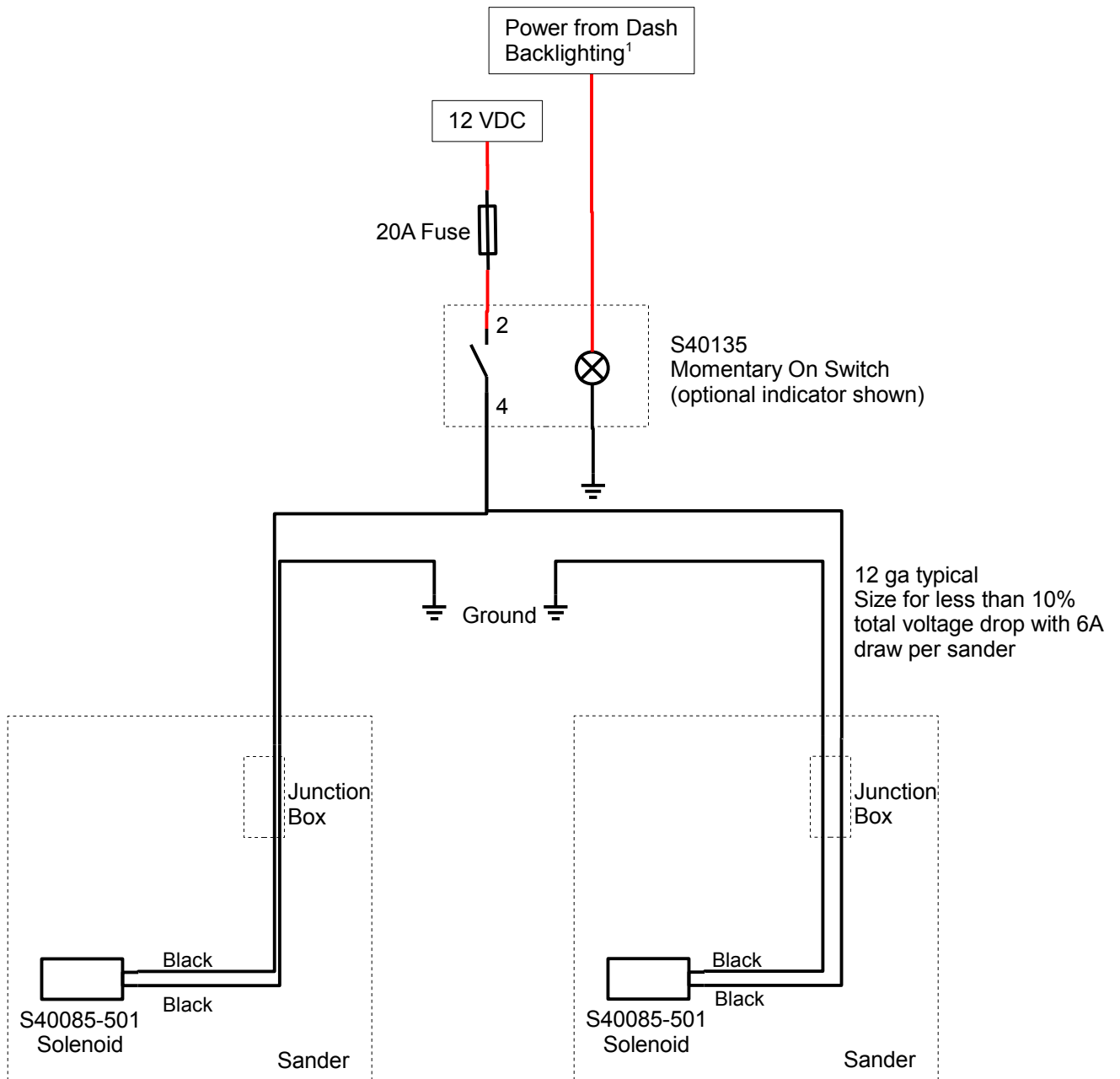
Ref #	Name	Part #
11	Valve Body	S40059
12	Gasket - Valve Body (one installed above SP-02 guard and one installed below)	S16-88
1-5	Solenoid & Valve Assy.	S40141
1-8,11	Operating Unit	S40084-501

**Hardware**

A 1/4"-20 x 3/4" Serrated Hex Flange Bolt

All hardware listed is coarse thread (UNC) and Grade 5 or better unless otherwise noted.

# Truck Sander Wiring Diagram



<sup>1</sup>If possible, indicators should be wired so that they are dimmable by the dash light brightness control (or rheostat).





## LIMITED WARRANTY TERMS

Elston Manufacturing, Inc. offers a one (1) year, non-transferable, Limited Warranty against specified defects as set forth below for Elston Manufacturing, Inc. product lines from the date of purchase through proof of purchase by providing original receipt.

This Limited Warranty specifically excludes normal wear and tear of products and is provided solely under the conditions that the product has been properly installed, operated and maintained in accordance with all applicable instructions. Proper installation instructions, or operating manuals, are provided with each product and operating condition. Travel, diagnostic cost, labor, transportation and any and all such costs related to repairing a defective product will be the responsibility of the owner. This warranty is extended only to the original owner of any equipment, the end user.


Elston Manufacturing, Inc.'s sole obligation under this Limited Warranty is to, in its sole and absolute discretion, either repair, modify, or replace (i.e. correct), Elston Manufacturing, Inc.'s products subject to this Limited Warranty. The allegedly defective products must be returned to Elston Manufacturing Inc. or an authorized service center freight paid by buyer. After confirmation by Elston Manufacturing, Inc. that a defect does exist in the product that is covered under this Limited Warranty then Elston Manufacturing, Inc. shall, in its sole and absolute discretion, either repair, modify or replace the product(s) and return the product(s) to the owner freight paid by Elston Manufacturing, Inc.

Elston Manufacturing, Inc. products received by Elston Manufacturing, Inc. within one (1) year from the original sale date to customer and found to be defective as referenced above will be corrected as referenced in the previous paragraph at no charge for parts (provided by original factory) or labor but will include freight paid by buyer. Failure to use original factory parts voids this warranty. Elston Manufacturing, Inc. products received by Elston Manufacturing, Inc. after one (1) year from original shipment date to customer will be corrected as foresaid for a charge of the then-current sale price of parts and labor with freight paid by buyer. Exception: Any parts to be found defective at any time that come under a recall status from providing manufacturer, will be covered under the terms and conditions of the recall status provided by manufacturer.

THIS LIMITED WARRANTY BY ELSTON MANUFACTURING, INC. IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION TOTHE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NO ONE IS AUTHORIZED BY ELSTON MANUFACTURING, INC. TO EXTEND OR ALTER THE TERMS OF THIS LIMITED WARRANTY. ELSTON MANUFACTURING, INC. ASSUMES NO LIABILITY FOR LOSS OF USE OR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR OTHER DAMAGES OF ANY KIND IN RESPECT TO THE USE OF THE ELSTON MANUFACTURING, INC EQUIPMENT.

Accessory items furnished by Elston Manufacturing, Inc. are covered by a Limited Warranty for a period of one (1) year from date of original sale, subject to the conditions, limitations, and disclaimers stated above, for replacement of defective materials, provided such items are returned freight paid by buyer to Elston Manufacturing, Inc. and are determined by Elston Manufacturing, Inc. to be defective in its sole and absolute discretion.

This Limited Warranty shall not apply to any piece of equipment, parts or accessories repaired by anyone other than Elston Manufacturing, Inc. personnel, or its authorized service organizations.



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