DOUGLAS

WASHING AND SANITIZING SYSTEMS

TUNNEL WASHER

OPERATION GUIDE

Parts & Service 800-331-6870

DougMac.com

DOUGLAS
WASHING AND SANITIZING SYSTEMS

Second Edition (April 2021)

This book is a publication of Douglas Machines Corp. Service Department.
Future editions will reflect changes in procedures or technical details.

Use and duplication of this document is encouraged.

For technical assistance, please call
1-800-331-6870.

SAFETY

Qualified installation personnel, individuals, firms, corporations, and companies are responsible for:

- Wear appropriate P.P.E. ie... hearing protection, thermal resistant gloves, and eyewear.
- Know where the **exits** are located.
- Always turn off and drain the machine before entering. Allow a cool down period. Follow facility's L.O.T.O. procedure.
- **Never** enter a machine where flooring has been removed. – Fall Hazard.
- Use non-permit required confined space guidelines for entering.
- When loading a rack into the washer keep hands away from the door edges. Keep hands on the horizontal bars inside of the rack. **Do not** hold racks on the vertical support bars or outside edges. Push the rack with both hands. Never strain yourself to move racks if racks are too heavy unload some product.
- Always use Caution. – Use mats to help reduce slip hazards.
- Ensure that float switches and level probes are well maintained and cleaned daily. Failure to do so can result in unintended heater startup and potential fire.
- **Never** leave your machine idle (not in use) for more than 4 hours. This can result in water evaporating out of the rinse tank causing damaging. Do not touch Rinse tank without a cool-down period.

CONTENTS

IMPORTANT
Pre-Installation

Qualified installation personnel, individuals, firms, corporations, and companies are responsible for:

- The installation or replacement of the gas piping and connection, installation, repair, or servicing of the equipment. Qualified installation personnel must be experienced in such work, familiar with all precautions required, and have complied with all requirements of state or local authorities having jurisdiction. Reference National Fuel Gas Code, NFPA 54 or latest edition or ANSI Z223.1 or latest edition, Section 1.4.

- The installation of electrical wiring from the electric meter, main control box, or service outlet to the appliance. Qualified installation personnel must be experienced in such work, familiar with all precautions required, and have complied with all requirements of state or local authorities having jurisdiction. Reference National Electrical Code, ANSI/NFPA 70 or latest edition. In Canada, Canadian Electrical Code Pan I (Std. 22.1 or latest).

- The installation of gas heated units in Canada. Qualified installation personnel should comply with the Installation Codes for Gas Burning Appliances and Equipment, (CAN-I-B 149.1 and B-149.2) and any local codes or approvals.

- The installation of washers equipped with casters. These washers shall be made with a connector that complies with the Standard for Connectors for Movable Gas Appliances, ANSI Z2 1.69 or latest, and a quick-connect device that complies with the Standard for Quick-Disconnect Devices for use with gas fuel, ANSI Z2 1.41 or latest.

- Water and waste piping and connections shall comply with the International Plumbing Code, International Code Council (ICC) or the Uniform Plumbing Code, International Association of Plumbing and Mechanical Officials (IAPMO). NSF/ANSI 3-2009

- **Douglas Machines Corp. highly discourages the use of tankless or demand water heating units as a hot water supply for our machines. They typically are not properly sized nor can they meet the demand required by our machines.**

Note: A fixed restraint must be provided if casters are used in conjunction with a flexible connector for movable appliances. This restraint must secure the washer to a non-movable surface to eliminate stress on the connector. If the washer is moved, the restraint must be reconnected after the washer is returned to its normal position.

DELIVERY

Upon delivery of your Douglas washer:

- Inspect the machine for any external damage. Any evidence of damage should be noted on the delivery receipt and signed by you and the driver.
- Remove packaging from the washer and check for any concealed damage. Carrier must be notified of damage immediately. Please retain packaging for inspection if claim is filed.
- Douglas Machines Corp. cannot accept responsibility for lost or damaged merchandise suffered in transit. The carrier assumes full responsibility for delivery in good order; however, we are prepared to assist you in any action needed regarding shipping damage.

Electrical Connections: Upon receiving your machine, all wire connections in the electric panel, pump motor and electric heaters should be checked, including the wire nuts and lugs. Check connections monthly for the first six months and every 90 days after the first six months of operation.

SAFETY PRECAUTIONS

Important: All safety precautions must be adhered to as to avoid personal injury.

Please Be Cautious!

BEFORE ATTEMPTING TO PERFORM ANY SERVICE TO THE UNIT ENSURE THAT THE ELEC- TRICAL DISCONNECT HAS BEEN TURNED TO THE OFF POSITION AND LOCKED OUT WITH A PHYISCAL LOCKING MECHANISM.

"THIS MACHINE MUST BE OPERATED WITH AN AUTOMATIC DETERGENT FEEDER AND, IF APPLI- CABLE AN AUTOMATIC CHEMICAL SANITIZER FEEDER, INCLUDING A VISUAL MEANS TO VERIFY THAT DETERGENTS AND SANITIZERS ARE DELIVERED OR A VISUAL OR AUDIBLE ALARM TO SIGNAL IF DETERGENTS AND SANITIZERS ARE NOT AVAILABLE FOR DELIVERY TO THE RESPECTIVE WASHING AND SANITIZING SYSTEM."

This manual will help with troubleshooting and the replacement of parts.

For parts or technical assistance please call Douglas Machines Corporation at **800-331-6870** and ask for the Service Department. Please have your **Serial Number** available to assist with the call. If the call is an emergency and after nor- mal working hours (Monday – Friday 8 AM - 4:30 PM) you can call your warranty provider direct and follow it up with a call during normal hours of operations. Douglas Machines Corporation will provide you with your local warranty provider contact information during the Factory Start up and Demonstration.

BEST PRACTICE

DO'S

- Before attempting any maintenance or repairs, ensure that electrical supply to the unit has been turned off and locked out. Wear safety glasses.
- Check inside the unit before starting the cycle to ensure nothing is inside.
- Keep hands and clothing clear of moving parts.
- Ensure safety rules are followed at all times.
- Ensure all electrical panel enclosures are closed before using the match

DO NOT'S

- Attempt to perform any maintenance, repairs or adjustments unless the supply power has been shut off and locked out first.
- Open door during machine cycle. There may be a delay between cycle steps so ensure cycle is complete by visually checking that the Run light in not illuminated.
- Hose down any electrical components.
- Remove any access panels or pit grids while unit is in use. Touch outside of cabinet without wearing gloves.
- Attempt to do any service or make any adjustments to this unit unless you are qualified service person.

SET-UP

- Close Drain Valve.
- Ensure all electrical enclosures are closed.
- Ensure that maintenance is NOT being performed on the unit.
- Ensure there is nothing inside of the unit.
- Turn on the Disconnect Switch. (Note: Disconnect switch is optional)
- Turn Off/On switch (to the ON position.
- Wait until the unit fills with water (low water lights will go out on the control panel) and comes up to operating temperatures. The operating temperatures should be 150° for the wash temperature and up to 160° for the rinse temperature.
- Ensure detergent is added to the wash water.

DAILY START UP PROCEDURES

- Close Drain Valve.
- Ensure all electrical enclosures are closed.
- Ensure that maintenance is NOT being performed on the unit.
- Ensure there is nothing inside of the unit.
- Turn on the Disconnect Switch.

- Turn Off/On switch to the ON position.

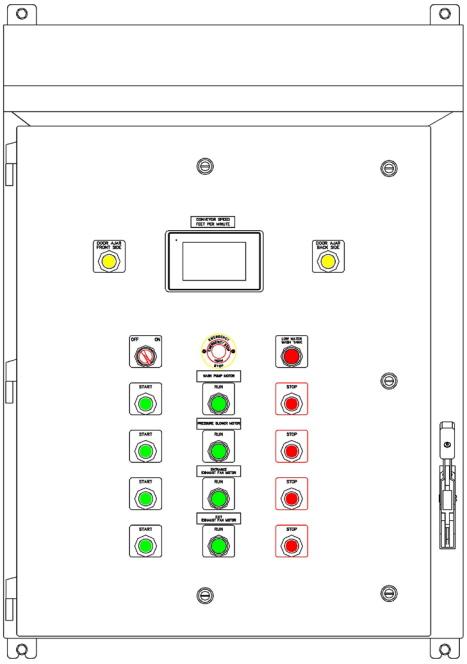
- Wait until the unit fills with water (low water lights will go out on the control panel) and comes up to operating temperatures. The operating temperatures should be 150° for the wash temperature and up to 160° for the rinse temperature.
- Ensure detergent is added to the wash water.

OPERATOR CONTROLS

General Information

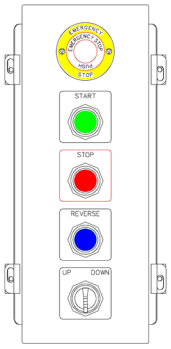
Operator controls have basic functions, which are Green for Start and Red for Stop. Green contact blocks are normally open (N.O.) and red are normally closed (N.C.)

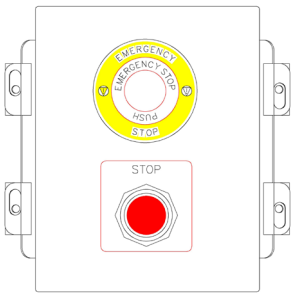
The Belt Speed is controlled by a variable speed controller that is increased by using the UP button on the top od the Touch Screen. (Use the DOWN arrow to decrease the speed) The approximate speed in F.P.M. will be displayed at the top of the Touch screen.



The red lights at the top of each row indicate when the tanks need water to meet the required fill level. See F Bellow is an illustration of main electrical box.
At the Load end of the unit there is an additional box with push buttons, which control the direction of belt travel, as well as start and stop the belt. This is also the location for the **Emergency Stop Button.**
Note: Reverse and UP/DOWN controls are model specific.

At the Un-Load end of the unit there is a box with an Emergency Stop Button as well as a Stop button for the belt.





Trouble Shooting the Belt Drive Motor

If the belt drive motor will not start when the green button is pushed, check the following:

- Are the E Stops at each end of the unit in the pulled-out position?
- Is the Off/On switch on the main electrical panel set to ON?
- Does the Belt Speed Display on the main electrical have any faults?

OPERATION PROCEDURES

1.After the unit is filled with water and all temperatures are at operating specification you are ready to start washing.

2.Go to the Main Electrical Panel on the side of the unit and push the Start Button for each component. You should pause for a few seconds after starting each one to allow the motors to come up to speed before starting the next component.

3.If your machine is equipped with a hold down, adjust to the correct setting for the product size you are washing.

4.
Set the belt speed for each product. This is done by adjusting the up or down arrows on the Belt Speed Touch Screen. (See Figure 6 below.)

HMI WALKTHROUGH

Home Screen

The Home Screen is the primary operator interface with the following features.

Conveyor Speed

- The up arrow increases the FPM reference to the VFD.
- The down arrow decreases the FPM reference to the VFD

Toolbar (Present on all screens)

- Running Indicator Light - lit when the drive is running.
- Faulted Indicator Light - lit when the drive is faulted.
- Fault Reset Button – Visible when the machine is faulted, replaces the Douglas logo on the left hand side of the toolbar. Resets current VFD fault.

Customer Name – Indicates Customer and Machine Style.

Current Screen – located top left, indicates current screen name.

Navigation Buttons

- Fault Log – Takes you to the Fault Log Screen
- Running Data – Takes you to the Running Data Screen
- Settings – Takes you to the settings screen.

Conveyor Inhibited Indicator (Present on all screens)– Visible in the top right when the conveyor is disabled.

Fault Log

The Fault Log screen displays the last ten faults the drive registered, trip 0 being the most recent. The faults are displayed across two sheets, navigated to using the arrows at the top of the screen.

Run Data Screen

The Running Data Screen is used to view the relevant VFD parameters. It displays the output amperage, voltage, frequency, percentage of rated torque, motor rpm, and the current runtime hours and minutes.

Screen Settings

The Settings screen is primarily used during commissioning to set the machine specific parameters in the VFD.

Minimum FPM

- The minimum belt speed reference that the belt can take.

Maximum FPM

- The maximum belt speed reference that the belt can take.

Torque Limit

- The percentage of rated torque that is necessary to trigger a trip in the VFD.

Measured Hertz

- When calibrating belt speed the output hertz of the VFD is recorded in this parameter.

Measured FPM

- At the frequency recorded in the Measured Hertz field the measured belt speed in FPM is entered in this field. These two parameters are all that are needed to calibrate the belt speed.

Users must be logged in to modify any of these parameters. The Login button launches a dialog box to allow the operator to select the user name and enter the password.

User Name = C Password= DOUGMA2101

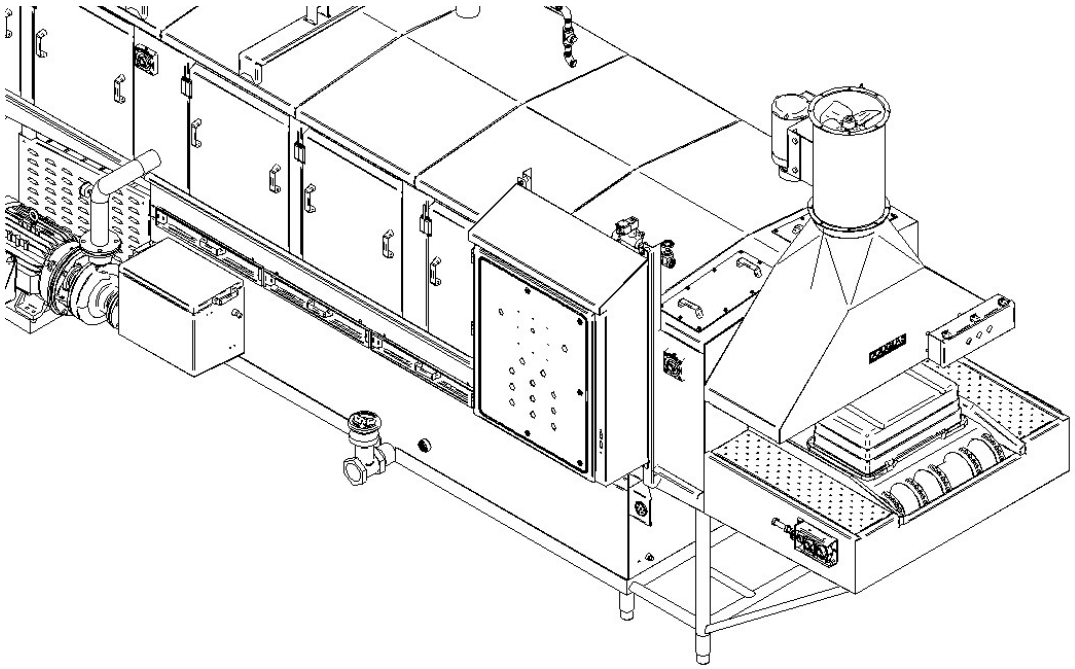
Once logged in the user has the ability to modify these parameters as well as reset the belt runtime meter.

LOADING PRODUCT

Push Tabs

When loading product onto the belt, you MUST place it in front of the Push Tab with the handle in the leading position to ensure you do not cause a jam. The next push tab on the belt will push the product into the washer. (Figure 7) below shows the push tabs pushing a product away from the viewer.

The PUSH TAB Is used to PUSH the product being washed through the unit.



The PULL TAB Is used to PULL the product being washed through the unit. DO NOT attempt to reach in the machine and load the product as you would a push tab.

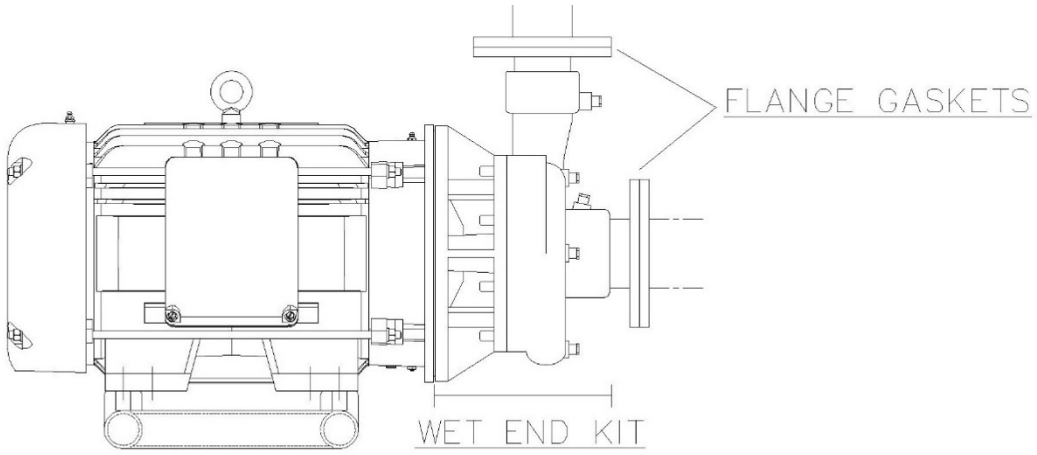
PULL Tabs

Some machines are designed to pull the product through the machine. Machines equipped with pull tabs are typically designed for Lugs, Totes and Bins but may differ from application to application. If the take up shaft is recessed into the machine at about the length of the product you are loading it is meant to be pulled through the machine. (Figure 7a) below shows the pull tabs pulling a product away from the viewer.

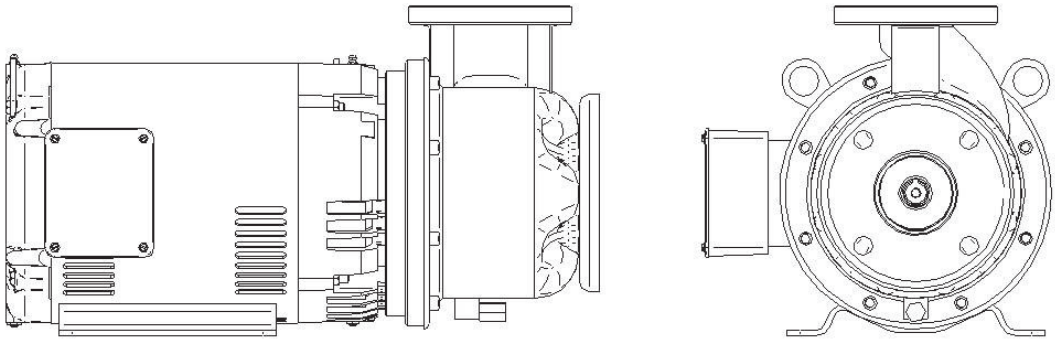
To start the belt moving, you will need to push the start button on the operator control panel, show above. (Figure 8). To stop the belt, use the stop button. If you encounter a jam, you should push the Stop button first, then use the reverse button and back up the belt so that the jam can be removed.

WASH PUMP & MOTOR

Below is a picture of the Wash Pump Motor Assembly.
Wash Pump. (Parts not shown: impeller, mechanical seal, shaft sleeve, impeller washer, impeller washer O-ring, shaft sleeve O-ring and casing O-ring.)



Below is a picture of the Rinse Pump Motor Assembly (Figure 10) with a list of the parts.
Rinse Pump. (Parts not shown: impeller, mechanical seal, shaft sleeve, impeller washer, impeller washer O-ring, shaft sleeve O-ring and casing O-ring.)



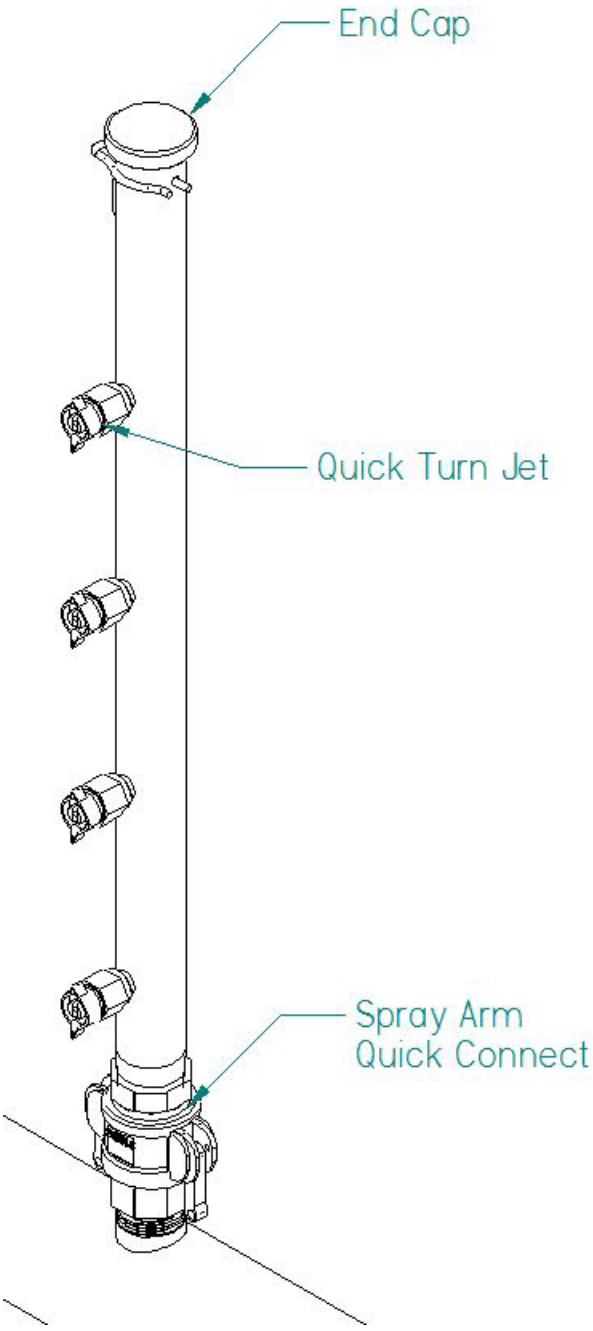
Trouble Shooting the Pump

If Pump will not start check the following:

- Is the tank filled with water (look at Low Water light)?
- Is the pump breaker tripped?
- Is the pump motor overload tripped?
- Are the float switches working?
- Is the start button working?
- Are the Emergency Stop buttons pulled out?

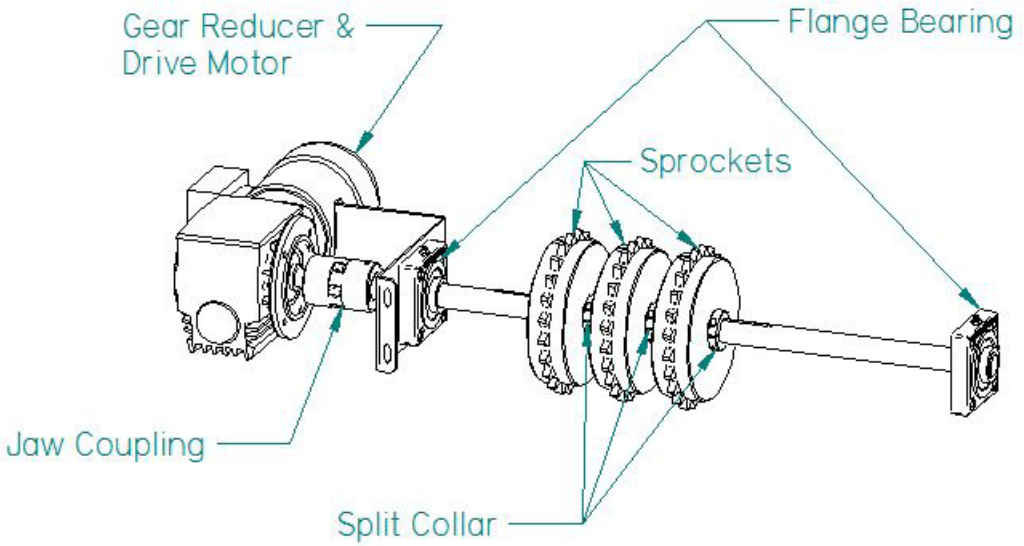
WASH & RINSE JETTING SYSTEM

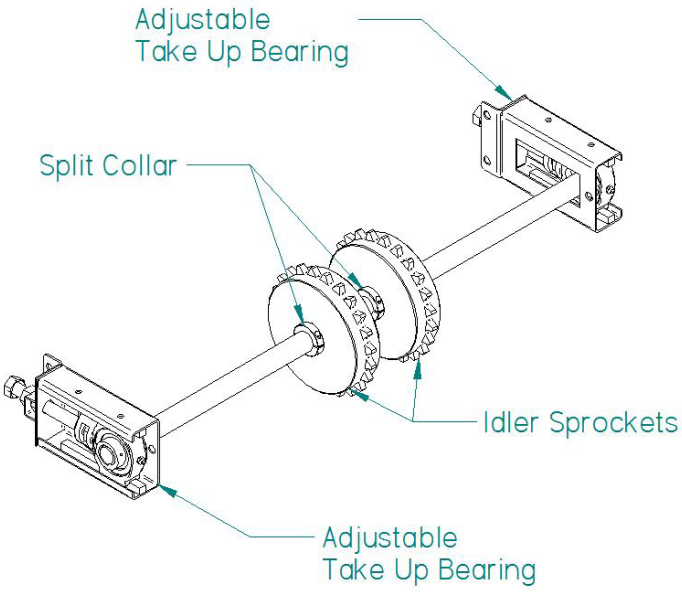
You should check the pipes daily to ensure they are not clogged with debris. If you find a pipe with an obstruction, first try to remove the jet that is clogged by twisting it and removing the obstruction from the orifice. If the spray arm has a clog somewhere other than the jet orifice remove the end caps to flush the debris out of the pipe (Figure 11) or remove the spray arm at the quick connect. The end caps are to remain on for normal operation and are only to be removed when flushing out the system. If you experience Low Pump Pressure, check to ensure all end caps are tightly fastened. If there is debris blocking one of the jets and cannot be removed easily, contact maintenance.

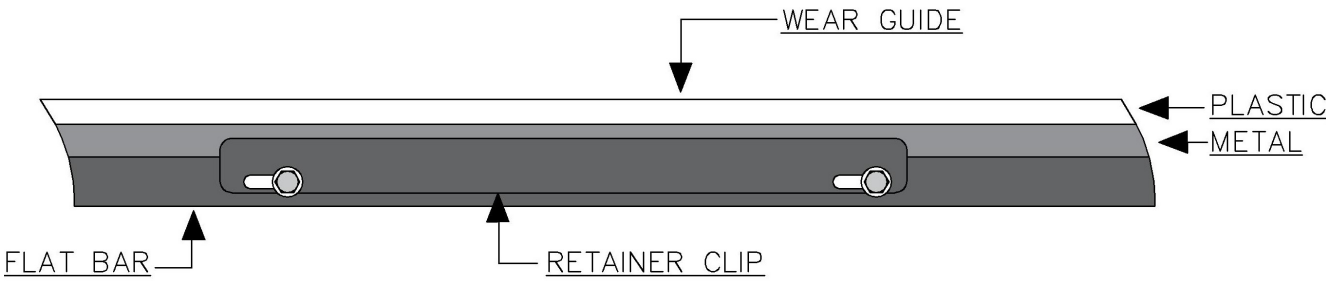


BELT OR CHAIN DRIVE SYSTEM

You should check the pipes daily to ensure they are not clogged with debris. If you find a pipe with an obstruction, first try to remove the jet that is clogged by twisting it and removing the obstruction from the orifice. If the spray arm has a clog somewhere other than the jet orifice remove the end caps to flush the debris out of the pipe (Figure 11) or remove the spray arm at the quick connect. The end caps are to remain on for normal operation and are only to be removed when flushing out the system. If you experience Low Pump Pressure, check to ensure all end caps are tightly fastened. If there is debris blocking one of the jets and cannot be removed easily, contact maintenance.







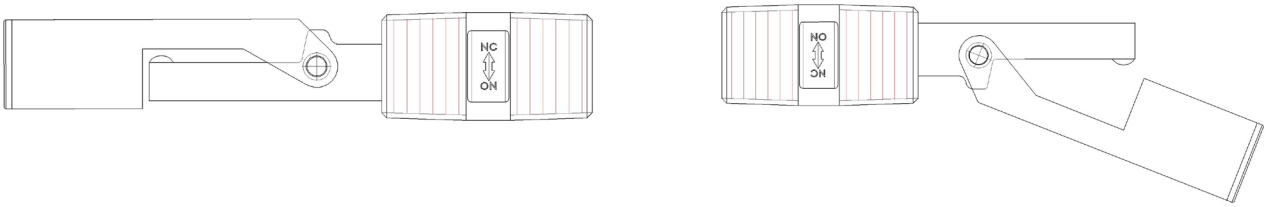
Above shows the belt, wear guide, and wear guide retaining clip. The wear guide is designed for easy replacement. To replace a section of wear guide, loosen the two bolts on each Wear Guide Retaining-Clip. You should not remove them, but only loosen them enough to allow the Wear Guide to be lifted off the Stainless Flat Bar.

When replacing a section of the Wear Guide that has a bend in it, use the one being replaced as a template to bend the replacement piece.

WASH & RINSE TANK

Float Switches

The Floats are magnetic switches that rise and fall to make or break the connection. They are used to provide an automatic fill, to the level of the top float. They are also used to protect the pump motor as well as the heating system from being used without the correct level of water in the tank. You can trouble shoot them by performing a continuity test on them. Below shows a view of the Floats from the inside of a Wash & Rinse Tank.



Configuration

Two Floats Per Tank	Three Floats Per Tank
Top Float Switch (Normally Closed)	*Top Float Switch (Normally Closed)*
Closed - Water On	Closed - Water On (Middle Float is Closed)
Open - Water Off	Open - Water Off (Middle Float is Open)
Bottom Float Switch (Normally Open)	Middle Float Switch (Normally Closed)
Closed - Heat & Pump Permissive On	Closed - Water On (Top Float is Closed)
Open - Heat & Water Pump Permissive Off	Open - Water Off (Top Float is Open)
	Bottom Float Switch (Normally Open)
	Closed - Heat & Pump Permissive On
	Open - Heat & Pump Permissive Off

Water Supply

The Wash and Rinse hot water supply parts and layout are the same.
Figure 16 shows the wash and rinse fill piping.

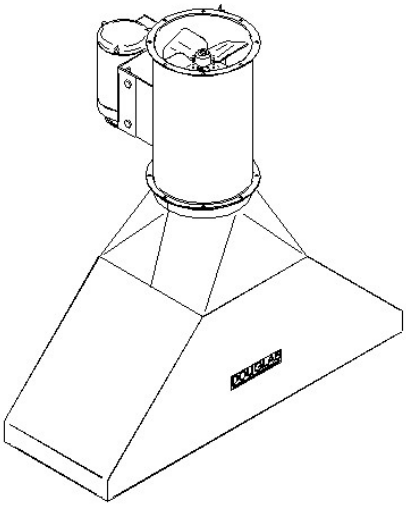
Trouble Shooting the Tanks

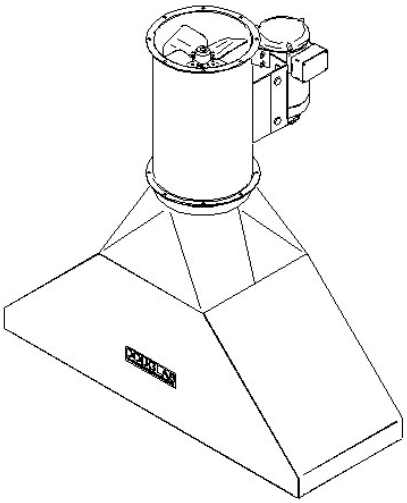
If wash or rinse tank is not filling check the following:

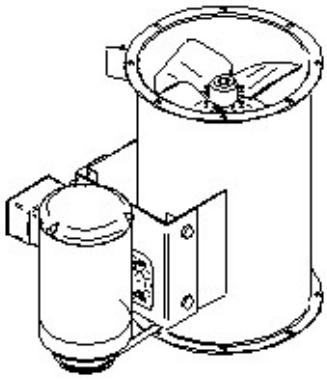
- Is the water supply turned on?
- Are the manual valves open?
- Are the float switches working?
- Is the Wye Strainer clogged?
- Is power being supplied to the solenoid valves?

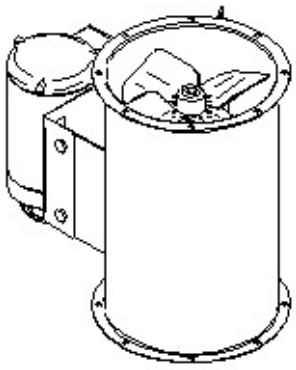
STEAM EXTRACTION FAN

Steam Extraction Fans are mounted at the Entrance as well as the Exit end of the Re-circulated Wash and Rinse areas. They are installed to help remove the excess steam from the cabinet that is generated from the atomized hot water. The Steam extraction fan is shown below.





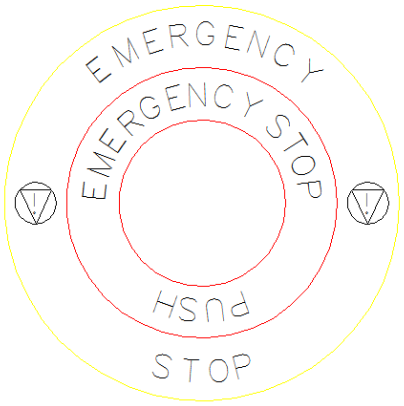




SHUT DOWN

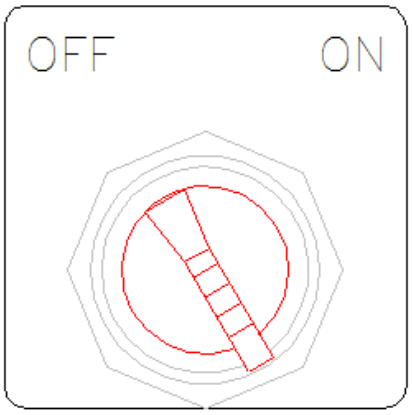
Emergency Shut Down

In an emergency situation, power-down the machine by pushing in on the E-Stop button at either end of the unit.



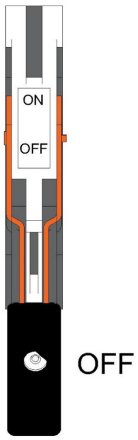
Normal Shut Down

To shut the unit down under normal conditions, turn the Off/On switch (Figure 19 below) on the main control panel to the off position. This will shut off the control power to the unit and stop all motors and heating systems. This should not be used as a SAFE off to do maintenance or cleaning of the unit. Follow your lock out procedures for maintenance shut down.



MAINTENANCE SHUT DOWN

Before performing any service or adjustments on this equipment you need to put the unit into Electrical Lock Out. To do this, turn the Off/On switch to the off position. Move the disconnect lever on the mail electric supply panel to the OFF position and install a lock through the locking mechanism.



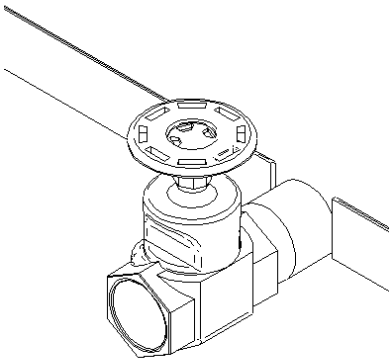
DAILY MAINTENANCE

Daily Maintenance Procedures

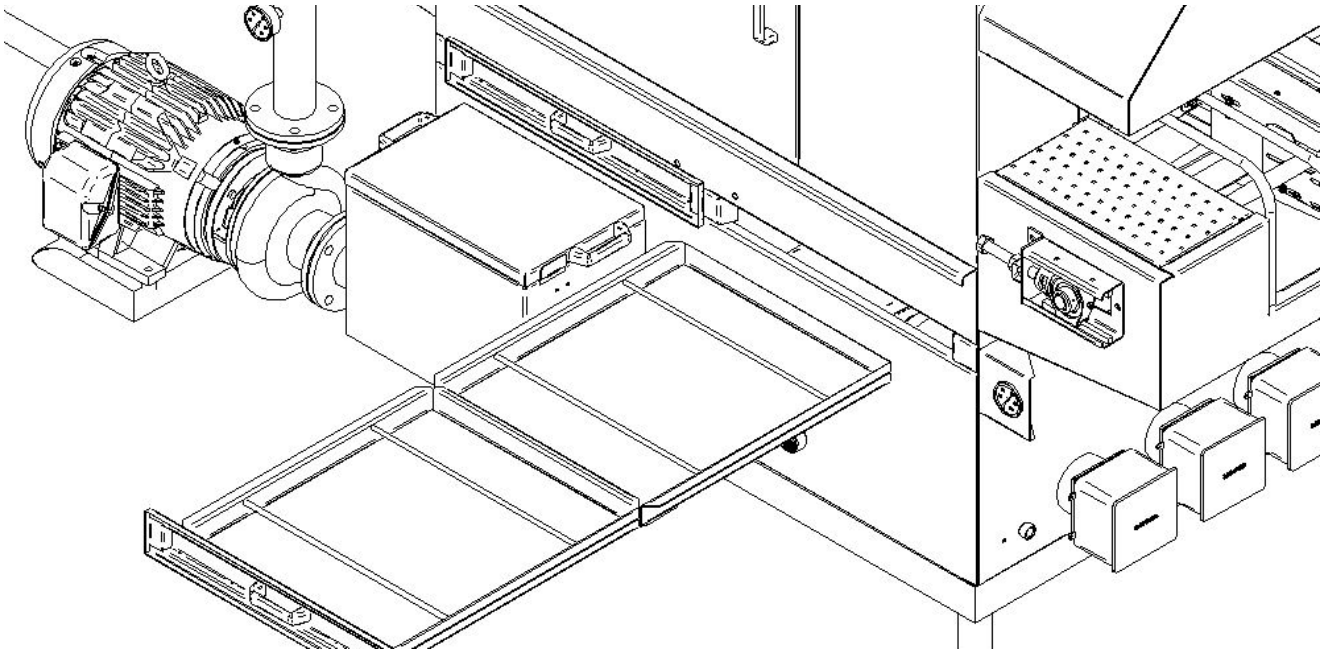
The daily maintenance of your new Douglas Washing and Sanitizing System is very easy but very important to long term, trouble free washing and sanitizing.

The cleaning of the interior of the unit is the most important part of maintaining your equipment. Following the steps below will ensure your equipment will Wash and Sanitize to the level it did when leaving our factory.

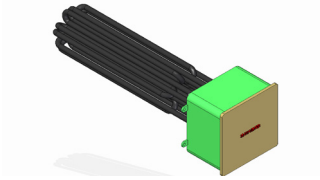
- Turn off the control power at the Main Electrical Panel on the side of the unit.
- Open the drain valve.
- Remove all access panels on the unit.
- Using a spray hose, begin rinsing the inside of the unit from the inside top, down into the filter baskets.
- Remove all the filter baskets and empty into a trash can.



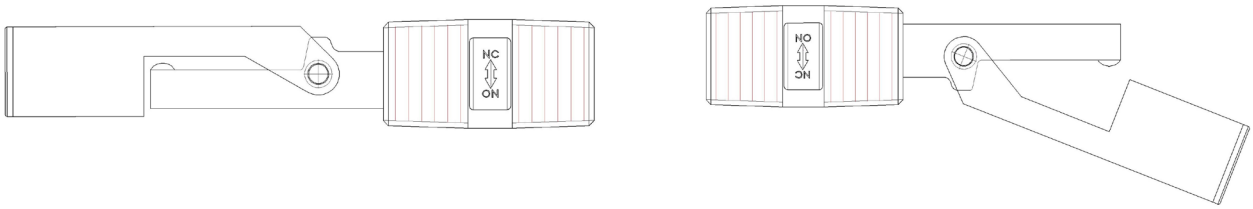
- Continue spraying the inside of the unit directing the flow of water down into the tank and towards the drain.



- After you have sprayed out the majority of the tanks, use a stiff scrub brush and clean the heating elements in each tank. For gas or steam heated, scrub the imersion tubes.



Daily Maintenance Procedures



- Wipe off the shafts on the Float Switches to ensure they work properly. The float arrangement may be different on your unit.
- Now do a final spray down of the lower tanks and direct the water to the drain.
- Re-install all the filters and access doors.

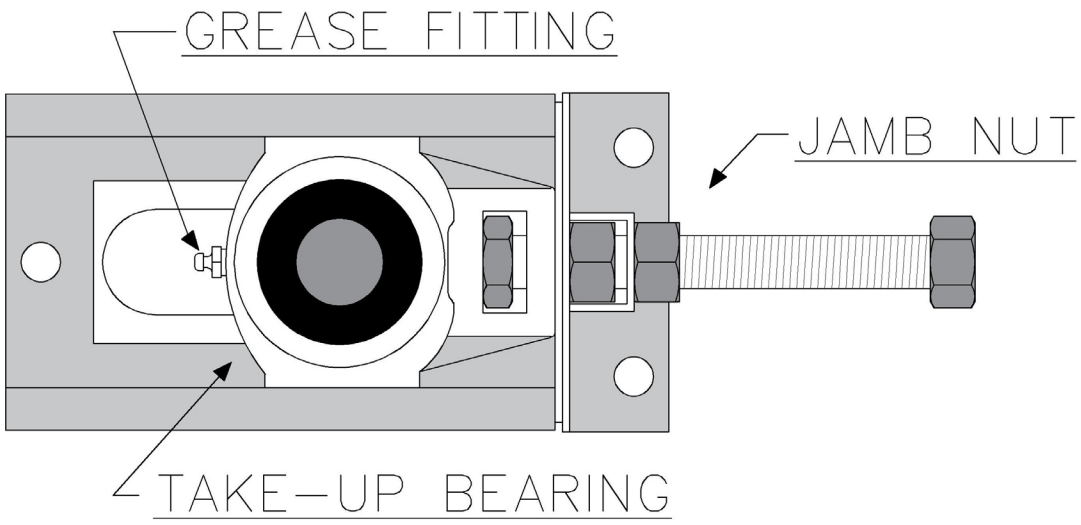
Periodic Maintenance

The periodic maintenance of your new Douglas Washing and Sanitizing System is minimal. Below we have outlined the items that need to be greased, adjusted, or monitored.
NOTE: Before attempting to perform any service of make any adjustments to the unit, ensure that the electrical disconnect has been turned to the OFF position and locked out with a physical locking mechanism.

Monthly Maintenance

THE FOLLOWING ITEMS SHOULD BE CHECKED MONTHLY

Belt or Chain Tension: The tension on the belt or chain should be checked and adjusted if needed. To check the tension, lift the belting or chain off the rails at the load end of the unit. You should be able to lift it but it should not disengage from the sprockets. It should also be tight enough that when you reverse the belt it will not wrap around the sprockets. If the belt needs to be tightened, you can do so with the Take-Up Bearings (Figure 25) on the load end of the unit.



Electrical Connections: The first 6 months that you have your unit, you should go over all wire connections in the electric panels as well as check the wire nuts on all motor leads. After the first 6 months, you should only need to do this every 90 days.

Ninety-Day Maintenance

THE FOLLOWING ITEMS SHOULD BE PERFORMED EVERY 90 DAYS

Grease Motors and Bearings: The motors and bearings on your unit require periodic greasing. For the motors, you should use Shell Dollum or an equivalent. For the non-motor bearings, use Sentinel SLNTHT #2 or an equivalent. Do not over grease any bearing.

Drive Reducer: The drive reducer should have the gear oil drained and flushed after the first 1500 hours of use and then every 5000 hours thereafter. Use Mobil 600W or an equivalent.

TROUBLE SHOOTING

Note: Some of the following remedies may need to be performed in the electrical panel. **Before you perform any task in the electrical panel, please make sure all incoming power is disconnected or turned off.**

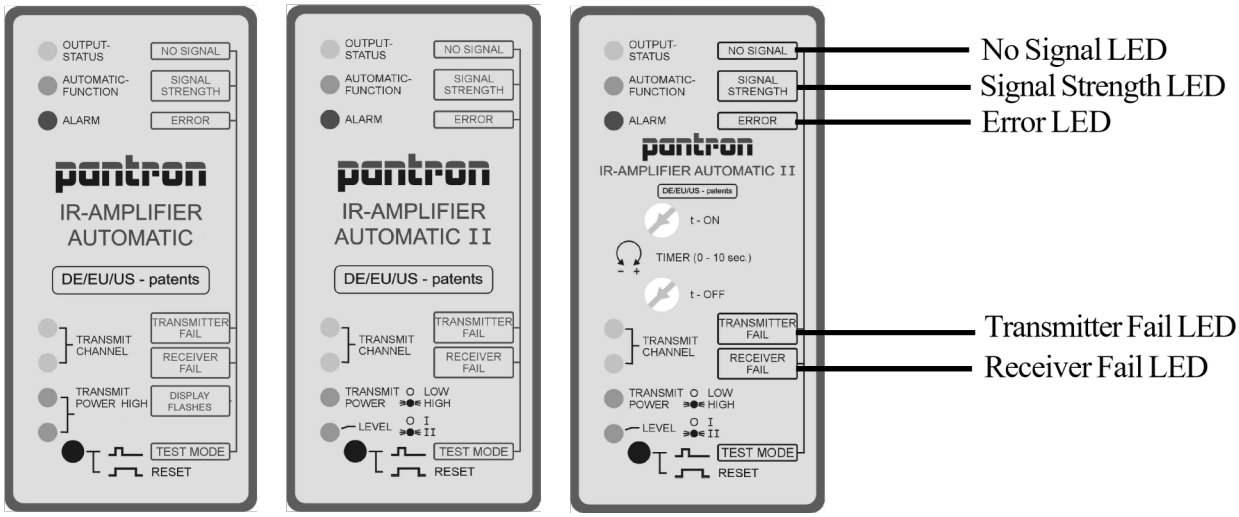
PROBLEM	THINGS TO CHECK
Machine will not turn on	• Incoming power turned ON • Machine circuit breakers and/or fuses are in place & turned on
Machine will not heat up (electric heated)	• Machine is filled to the correct level • Low water float is clean • Element circuit breakers/Fuses • Temperature controls are working • Temperature probes are working
Wash pump will not start	• Machine is filled to the correct water level • Lower water Floats are clean • Circuit breakers and/or fuses marked “Wash Pump” are on
Wash pump will not start Wash pressure is low	• Machine is filled to the correct water level • Filters are clear and in place • Check that there is no excessive foam • Pump is rotating in the correct direction • Pressure gauge is functioning correctly
Not rinsing	• Rinse solenoid valve
Rinse temperature is not hot enough (electric heated)	• Incoming water temperature (120°) • Thermostat set to correct temperature (180° - 210° max.) • Heat source is engaged • Circuit Breakers/ Fuses
Not cleaning	• Detergent level • Wash pressure (see sticker for minimum pressure) • Wash temperature • Wash jets (make sure jets are not clogged) • Water level • Make sure all filters are clear

Pantron Automatic Amplifier

Diagnostic Features

(For models C124, A102, A123, A124, A133, and A134)

Call for technical assistance: 1-800-211-9468



To put amplifier into test mode, briefly press the Reset / Test Mode button and let it go. Holding this button will result in a full reset. If the following LED's flash, please note the instructions included:

No Signal LED: If this LED flashes with the Alarm LED, the transmitter or receiver is either out of alignment or there is an obstruction preventing the two eyes from seeing each other. To check alignment, we recommend the "String Method". Pull a piece of string between the eyes to simulate the path of the infrared beam. A clear signal should be possible if the photo eyes and their cables are not damaged.

Signal Strength LED: If this LED blinks by itself, the eyes can see each other and the number of blinks shows the strength of the infrared beam. (1 blink signifies the weakest beam and 10 is the strongest). If the signal strength is low, try cleaning the face of the photo eye and realign them.

Transmitter Fail LED: If this LED blinks with the Alarm LED, watch how fast it blinks. If it blinks faster than the Alarm LED, there is a short on the transmitter side. Check your cable connections to make sure they are correct. If it blinks the same slow speed as the Alarm LED, there is an open on the transmitter side. Check the cable, first where it connects to the amplifier, and second in any areas where the cable is exposed or where there are splices. If you need to splice the wires, use a high quality .22 gauge cable, splice and solder the wires, and wrap with heat shrink tubing. If possible, do not use wire nuts! Also, if you are using quick disconnect photo eyes and cables, please use a silicon sealant to prevent corrosion buildup inside the connector.

Receiver Fail LED: If this LED blinks with the Alarm LED, watch how fast it blinks. If it blinks faster than the Alarm LED, there is a short on the receiver side. Check your cable connections to make sure they are correct. If it blinks the same slow speed as the Alarm LED, there is an open on the transmitter side. Check the cable, first where it connects to the amplifier, and second in any areas where the cable is exposed or where there are splices. If you need to splice the wires, use a high quality .22 gauge cable, splice and solder the wires, and wrap with heat shrink tubing. If possible, do not use wire nuts! Also, if you are using quick disconnect photo eyes and cables, please use a silicon sealant to prevent corrosion buildup inside the connector.

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IMPORTANT NUMBERS

FOR WARRANTY WORK YOU MUST CALL DOUGLAS MACHINES CORP.
AT 800-331-6870 AND WE WILL ISSUE A PURCHASE ORDER
TO THE LOCAL SERVICE AGENT.

FOR PART OR TECHINCAL SUPPORT, PLEASE CALL
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Thank You!

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