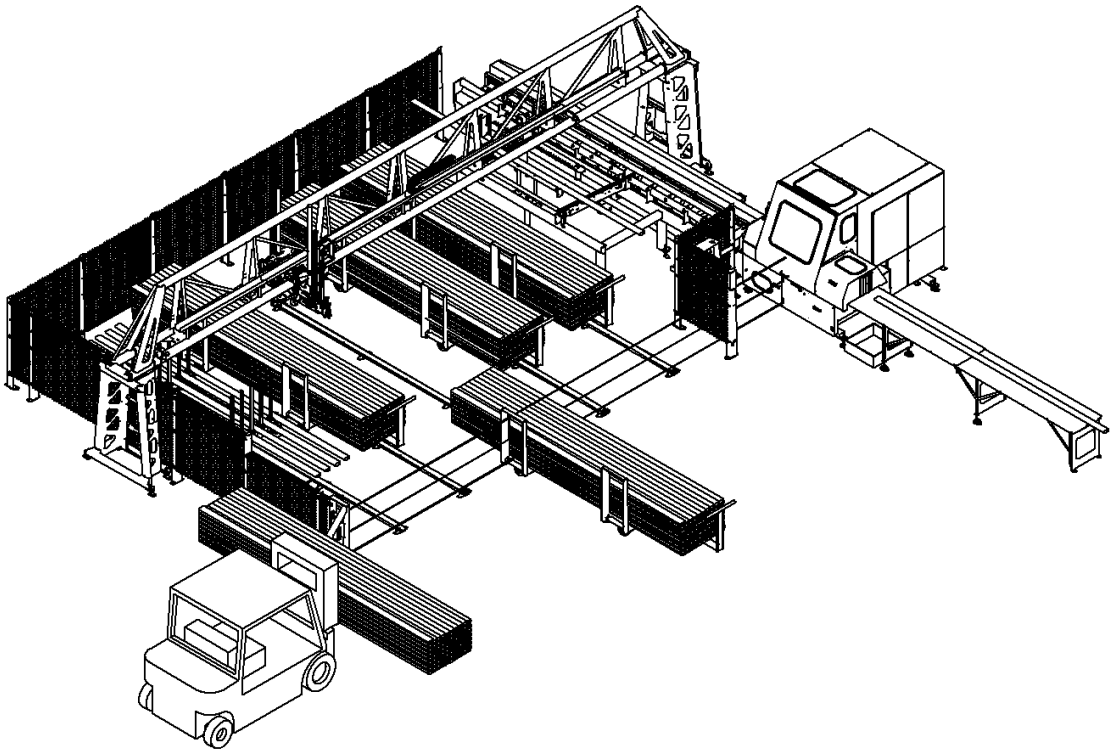
RANGER RS™



Lumber Retrieval System
Operation & Service Manual
Screw & Vacuum Pickup

ACER INC.

MACHINE SERIAL NUMBER_____

4/6/17 Revision 10

Contents

1 WARRANTY

ACER INC warrants the Ranger RS system to be free from defects in material and workmanship for one year on parts and 30 days on labor from the original installation date of the system. Expenses for travel or room and board or other incidental expenses to install replacement parts are not covered under this warranty. Parts will be repaired or replaced at ACER INC'S discretion. ACER INC. shall not be liable for parts damaged by abuse, alteration, lack of maintenance, normal wear and tear or use other than as specified in the Ranger RS owner's manual. Components not manufactured by ACER INC (computers, motors etc.) are subject only to the manufacturer's warranty terms and are not further warranted by ACER INC.

Warranty claims must be submitted to ACER INC. in writing and must include the machines serial number and installation date. Parts returned for warranty consideration must be shipped to ACER INC via prepaid freight. Warranty parts shipped from ACER INC will be shipped via ground freight. All extra charges for expedited shipping shall be at the customer's expense.

ACER INC shall not be liable for any loss of use, loss of profits or damages based upon a claim for breach of warranty. This warranty shall be in lieu of any other warranty, expressed or implied, including but not limited to, any implied warranty of fitness for a particular purpose, all such other warranties being hereby expressly excluded.

2 INTRODUCTION

2.1 MACHINE INTRODUCTION

The Ranger RS is a lumber delivery system designed to feed dimensional lumber to a saw or other production process. It has the capability to dispense boards from multiple units of lumber. Each unit can be of a different size, length or grade. Capacities of the machine are 2 x 3 through 2 x 12 lumber and 6'-20' in length. Lumber is side-loaded into the machine. An integrated safety system protects operating personnel from the moving parts of the system. It is imperative that all personnel are trained in the safe operation of the system. This manual is to be used as a training guide for all operators.

2.2 WHO SHOULD USE THIS MANUAL

All personnel that are involved in the installation, operation and maintenance of this equipment should read and follow the instructions in this manual. All personnel are to be completely familiar with the safe operation of this equipment. All persons operating this machine are to be 18 years of age or older and properly trained by the employer.

2.3 PURPOSE OF THIS MANUAL

This manual is a guide to the safe operation, installation, service and parts of this machine. With this manual, personnel should be able to understand the operation and servicing of the machine. Mechanical, pneumatic and electrical layout and implementation are provided to aid in troubleshooting most problems that arise.

2.4 SYMBOLS

Throughout this manual there are standardized symbols to denote hazard reminders. When viewing this guide take note of the symbols to gain an understanding of hazards involved with each section. All sections should be viewed with safety in mind, and note that the lack of a symbol in a section does not imply that safety hazards of any type do not exist. The following are symbols used throughout this guide:

 Exclamation point is an alert to important safety reminders.

 Key & Lock is an alert to lock out reminders.

 Lightning bolt is an electrical hazard reminder.

 Heavy object or objects could fall.

2.5 RELATED DOCUMENTATION

Related documentation includes but is not limited to the following:

1. Safety – The following safety standards should be followed in addition to any safety rules listed in this manual.
    - OSHA
    - Local safety standards
2. Mechanical –In addition to the guidance and specifications given in this manual, consult specific part vendor information as required.
3. Pneumatics - See specific part vendor information as required.
4. Electrical – In addition to the guidance and specifications given in this manual, consult specific part vendor information as required.

2.6 TERMS USED IN THIS MANUAL

- Air Supply Assembly - The valves, regulator and filter mounted on the end of the Runway. This is where the plant air supply is connected.
- Away Direction – The travel direction of the Trolley as it moves away from the Home Switch and the Infeed Deck.
- Cable Carrier - The traveling carrier mounted to the Runway and Trolley that supports and protects the cables and hoses connected to the moving Trolley.
- E-stop Button – Emergency Stop switch, located on the Operator Console and used for emergency shutdown only. Pressing the button while Trolley is in motion will apply Safety Brake and stop the Trolley rapidly.
- Ethercat Cable - Cables that carry the Ethercat communication signal between various components of the Ranger RS.
- Hazardous Zone - The hazardous zone in which the Trolley and suspended lumber travels. It is protected by the Perimeter Guarding and Light Curtain. Personnel must not be in this area during machine operation.
- Home direction – The travel direction of the Trolley as it moves towards the Home Switch and the Infeed Deck.
- Infeed Deck - Receives and stores lumber from the Trolley and feeds it to the saw as needed. This component is generally specific to the brand of saw that is being fed.
- I/O Cable - Cables that carry the control signals between various components of the Ranger RS.
- Laser - A specialized sensor that is mounted on the Trolley. Its purpose is to scan the lumber stacks and send information to the computer.

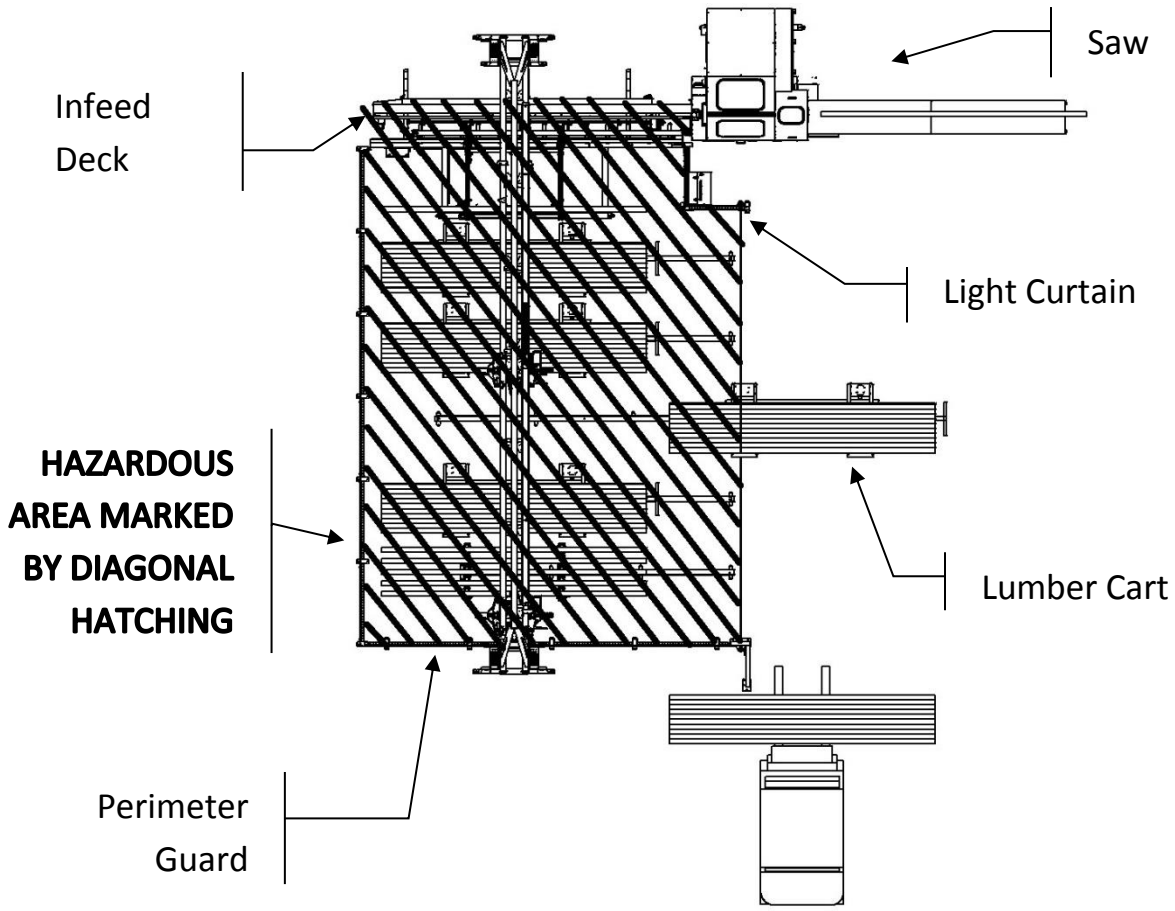
- Light Curtain - Safety device with light beams to detect personnel entering the Hazardous Zone. Breaking the beams will cause the Trolley to stop rapidly and all other functions to shut down.
- Lockout/Tag-out - Refers to the OSHA requirement of locking the electrical and pneumatic disconnects in the off position before servicing the machine. See the Section 3.4 of this manual for more information.
- Lumber Cart - Carts which hold complete units of lumber. They are movable for loading with a forklift and are guided into position by a floor rail.
- Magazine - A stationary rack which holds several individual stacks of lumber. They are hand loaded and each contains a single vertical stack up to 33" high.
- Magazine cart-A magazine mounted on wheels and movable like a lumber cart
- Manual Load Position - The rear position on the Magazine designed to hold 1-4 boards. It is used for low volume boards used in the cutting process.
- Obstruction sensors - Light beam sensors mounted to the Trolley. Breaking any of the four beams will cause the Trolley to stop rapidly and all other functions to shut down.
- Operator Console - Contains the main computer and operator interface touch screen. Also contains the E-stop and Reset Key Switch.
- Perimeter Guarding - Fencing around the Hazardous Zone to keep personnel out while the machine is operating.
- Picking Head Assembly - The horizontal bar which moves vertically to pick up lumber from the stack. The Picking Head is mounted to the Trolley.
- Pickup Screws - Replaceable screws driven by the Screw Motors for lumber pickup.
- Pressure Switch – Mounted near the Air Supply Assembly. Prevents the Ranger RS from operating if the air supply pressure is too low.
- Runway - The guide rails and supporting truss that the Trolley travels along.
- Runway Electrical Enclosure - Contains the high-voltage electrical components for the machine and is mounted on the end of the Runway. The electrical service for the machine is connected here. The Main Disconnect is located here and has provisions for locking out the electrical power for maintenance and repair. See Lockout/Tag-out section.
- Screw Motors - Pneumatically driven motors which rotate the pickup screws.
- Shoe/Pad Assembly – The yellow sheet metal plate with attached foam that forms the bottom of the Vacuum Pickup Assembly.
- Trolley - The traveling part of the machine that scans, picks up and moves lumber to the Infeed deck.
- Trolley Brake- A spring-applied safety brake to rapidly stop the trolley movement when an E-stop device is triggered.

- Trolley Brake Valve- A valve mounted on the trolley near the brake chamber which holds the brake in the released position until an E-stop is triggered.
- Vacuum Pickup Assembly – The complete vacuum pickup mechanism, from the quick-release pin down.

3 SAFE OPERATING PROCEDURES

3.1 HAZARDOUS ZONE

The shaded area in the diagram below is the HAZARDOUS ZONE. This includes the entire area in which the Trolley and suspended lumber travels, inside a perimeter bounded by the Light Curtain, Perimeter Guard, and Infeed Deck. This area must be totally surrounded by the Perimeter Guard fence and Light Curtain. There must never be personnel inside this area while the system is enabled. Serious injury or death may occur from moving machine parts inside this area**. Never reset the safety system or enable the Ranger RS system unless you are sure all personnel are clear of the Hazardous Zone.**



NEVER enter the Hazardous Zone while the machine is operating. Serious injury or death could result!

NEVER reset the safety system or place the machine in operation when personnel are in the Hazardous Zone. Serious injury or death could result!

NEVER attempt to defeat any part of the Safety System or remove any part of the Perimeter Guarding. All access to the Hazardous Area must be through the Light Curtain only.

3.2 SAFETY REQUIREMENTS

- The employer shall provide training in the safe operation, maintenance and service of this equipment.
- The employer shall monitor the employee's operation of the equipment and ensure that safe practices are being followed.
- The employer shall establish a program of regular safety and maintenance inspections on this equipment as outlined in the maintenance section of this manual.
- The employer shall establish a procedure for the locking out and tagging out of energy sources as required by OSHA.

Safety precautions do not imply or in any way represent an all-inclusive list. The owners and machine operators are responsible for ensuring that the machine is operated in accordance with all safety requirements including OSHA (Occupational Safety and Health Act) and ANSI (American National Standards Institutes) regulations. Other standards and regulation may apply depending on the geographical area. Because these regulations are subject to change it is impossible to give a reference that will remain current. It is strongly recommended that current safety regulations be made available and reviewed with operators on a continual basis. For specific safety information pertaining to this machine, see the detailed Safety Section later in this manual.

3.3 PRECAUTIONS

The Ranger RS was designed with safety in mind, but as with any machinery, safe operating procedures must be followed to prevent downtime, machine damage, personal injury or loss of life. It is the responsibility of all persons involved in the installation and operation of this equipment to completely understand the safe operating procedures for this machine and to adhere to all safety precautions in this manual. If unsafe conditions exist, shut down the equipment using the Emergency Stop Button and Lockout the power sources before servicing system.

- **READ THE OWNERS MANUAL** before installing, loading or operating the machine.
- **KEEP THE OWNERS MANUAL** for future reference and training new operators.

- **FOLLOW THE OWNERS MANUAL** to insure safe and trouble-free operation.
- **OBEY ALL WARNINGS** to prevent injury or loss of life.
- **WEAR SAFETY GLASSES** and steel toe shoes when operating this equipment.
- **DO NOT WEAR LOOSE FITTING CLOTHING** or jewelry which could catch on moving parts. Wear personal protective equipment as required by employer.
- **MACHINE OPERATING PERSONNEL** must be at least 18 years old and properly trained. It is the employer's responsibility to see that the operators are properly trained.
- **DO NOT OPERATE THIS MACHINE** if you are impaired by drugs, fatigue, illness or other causes.
- **LASER LIGHT** is hazardous to the eyes. Never look or stare directly into the beam of the laser.
- **EMERGENCY STOP BUTTON** is located on the front of the Operator Console. It is red in color and should be used if any unsafe conditions are observed.
- **ACCESS COVERS** must be in place at all times to prevent injury. If it is necessary to remove a cover the air and power must be locked out using proper OSHA methods.
- **LOCK OUT ELECTRICAL AND PNEUMATIC POWER** using proper OSHA procedures before performing any maintenance or adjustments.
- **PNEUMATIC POWER** can remain in hoses and cylinders after power is removed and escaping air can cause severe injury.
- **SAFETY DECALS** are provided to indicate safety hazards or show safe operating procedures. If they are damaged or missing, they must be replaced before operation.
- **PINCH POINTS** exist on all moving machinery. Guards have been provided where possible. Some moving parts, because of operating characteristics, cannot be guarded and operators must use caution to avoid injury. Never place hands into or near moving parts or dropping lumber.
- **VERY IMPORTANT**. Never attempt to load or unload a unit or partial unit of lumber that is not securely banded. Falling or tipping lumber could cause injury.
- **NEVER** enter the **HAZARDOUS ZONE** while the machine is in operation.
- **NEVER** reset or place the machine in operation while personnel are in the **HAZARDOUS ZONE.**

3.4 LOCKOUT/TAGOUT

The following is an outline of the OSHA standard for locking out and tagging out equipment from hazardous energy sources. A comprehensive copy of this standard is available from OSHA. It is recommended that the owners and operators obtain this copy and read and understand its contents. A current copy may be obtained at the regional offices of US Department of Labor, Occupational Safety and Health Administration.

The purpose of this procedure is to ensure that the equipment is isolated from its power source and rendered inoperative prior to service or maintenance. Lockout/tag-out devices shall meet the requirements set forth in the OSHA standards as to

durability, standardization, and identity. A lockout padlock has been provided with the system.

- **RESPONSIBILITY**

  This standard requires the employer to establish a program, which includes the following:

  - Documented energy control procedures.
  - Employee training program.
  - Periodic inspections of the use of this procedure.

  It is the responsibility of the employer to develop a compliant lockout/tag-out program and to make sure that the program is put into use.

- **PROCEDURE**

  The following procedure is suggested to comply with this standard:

  - Shut down the machine by depressing the Emergency Stop button.
  - Lockout the main power disconnect and pneumatic shutoff valve per OSHA requirements.
  - Tag-out all controls and energy sources which cannot be locked out. All personnel affected must know about and understand all lockout tags.
  - Verify that all energy sources have been accounted for before performing any maintenance or service work.
  - When restarting equipment, all lockout/tag-out devices must be removed by the person who installed them.

  - **PNEUMATIC LOCKOUT:** To lock out the pneumatic system, turn the valve to OFF as shown, and pull out on the lip at the top of the valve. The slide will engage and lock the valve handle, exposing padlock holes along the front.

- **ELECTRICAL LOCKOUT:** To lock out the electrical system, turn the main disconnect to the off position. Push out on the hasp from behind the handle as shown, exposing padlock holes.

3.5 EMERGENCY STOP

The E-Stop button located on the Operator Console is the first line of defense to stop a machine from operating. This button halts operation of the machine and may be used for emergency situations or general shut down. When using the button for non-emergency shutdowns it is important to wait until the machine is not in a cycling mode as the emergency brake system will rapidly stop the Trolley if it is in motion. **The emergency stop does not remove power to the machine**. Follow lockout/tag-out procedure prior to any service or maintenance.

3.6 SETUP

The following procedures are designed to maximize safety and machine life:

- Make sure a properly rated forklift is used to unload your machine and follow all unloading instructions in this guide.
- Do not operate machine until all components are located correctly and anchor bolted to the concrete floor.

- Before making electrical connections, verify the incoming voltage correctly matches the factory set voltage of the Ranger RS.

3.7 OPERATION

OPERATION OF MACHINE is to be performed by qualified and trained personnel only. Before operating the machine a safety check should be performed to verify the machine is ready for use and is operating correctly.

3.8 SAFETY WHILE SERVICING

ADJUSTMENTS AND SERVICING are to be performed by trained personnel only. A safety check should be performed upon completion of adjustments or servicing to determine that the equipment is operating correctly.

3.9 PNEUMATIC SAFETY

Make sure machine is properly locked out when servicing. When servicing the pneumatic system maintain a clean working area and environment to minimize contamination potential. Keep all spare pneumatic parts in sealed proper containers until needed to minimize contamination.

3.10 ELECTRICAL SAFETY

Make sure machine is properly locked out when servicing. Do not attempt to change or modify the electrical system without first consulting and obtaining approval from a qualified person. Any electrical changes should only be made by a qualified electrician.

- Do not override or bypass the safety switches, sensors, or Light Curtain on this machine.
- Do not override or bypass E-Stop.
- Always keep electrical panel doors closed unless being serviced.

3.11 LASER SAFETY

The Ranger RS is equipped with a laser sensing device. While it outputs very little power, injury to eyes may result from looking directly at the beam for prolonged periods.

4 INSTALLATION OF EQUIPMENT

4.1 UNLOADING AND INSPECTION

In order to prevent injury or damage to the machine, use only the methods shown in this manual. Some parts of the Ranger RS have a high center of gravity while being moved and could present a tipping hazard.

- Always use caution when unloading. Keep all personnel clear to prevent injury. Damage to air lines and conduits must be avoided while unloading.
- When handling the Runway truss with a forklift, lift under the lower runway tubes. The lift point will vary depending on where the trolley was positioned for shipping, but will be near the middle. Center of lift point will be marked with an arrow prior to shipping.

4.2 SITE REQUIREMENTS

- **PNEUMATIC REQUIREMENTS:** 100 PSI (max 120PSI) at 20 SCFM (average) clean dry air. Minimum airline feed size: 1/2”diameter

- **ELECTRICAL REQUIREMENTS**: 208-230 volts 3Phase 50/60Hz 20 amps or 460 volts 3 phase 50/60 Hz 20 amps. Voltage must be specified at time of order.

- **ENVIRONMENT:** The machine must be installed within a building to provide weather protection. Intense sunlight, precipitation or windblown dust will cause malfunction and dramatically shorten the life of the machine. A heated building is required in cold climates. Moisture and condensate in the air lines and valves may freeze and cause machine malfunction if the temperature drops below freezing. Temperatures above 100 degrees Fahrenheit may shorten the life of electronic components.

- **SPACE:** Minimum space requirements are shown on the installation drawings provided with your machine. It is important to allow enough room for access to machine parts for service and loading. The drawing shows the minimum space - more space will generally allow for more efficient and safer operation and loading.

- **REQUIRED FLOOR:** The floor must be concrete and a minimum of 4” in thickness to allow the machine to be securely anchored. The floor should be reasonably flat and level. Proper anchoring and leveling is critical for proper machine operation and safety.

4.3 POSITIONING, ANCHORING, AND LEVELING

- Careful consideration should be given to the site selected for the Ranger RS. Ample room must be provided to facilitate the loading of the machine and for service or maintenance. Once the site is chosen it will be necessary to level and securely anchor the machine to the floor. Installation drawings are included with the machine. Roughly lay out the entire system according to your installation drawings to check for clearances before anchoring. Check to make sure that you have adequate clearance for forklift access and lumber exiting the saw.

- Experience has shown that it is best to level and anchor your saw first according to the saw manufacturer's instructions.

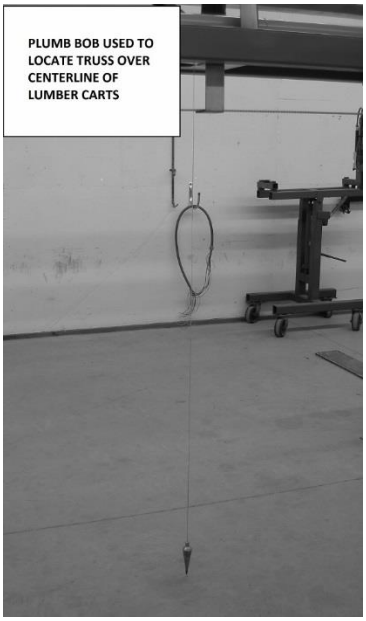
- Once the saw is anchored, position the Infeed Deck, level and anchor it. Set the height adjustment on the deck to correspond with the installed height of the saw according to the installation drawings.

- On the underside of the runway truss, the web plates each have a notch at the center to hang a plumb bob. These can be used to accurately position the truss position relative to the lumber centerline. See photos below.

- **The Runway should be positioned and anchored after the Infeed Deck. Anchoring and leveling the Runway is critical for safety and machine performance. The Runway truss should be securely bolted to the end support towers before anchoring and leveling. Height should be adjusted to approximately 73.75" from the floor to the bottom of the truss. Ensure that all four leveling bolts of each tower are bearing approximately equal weight. End-to-end leveling is not critical, but cross-level should be carefully checked at both ends of the truss by placing a level across the bottom of the runway tubes. See photo.**

- Locate and anchor the Operator's console guarding per the drawings.


NOTCH FOR HANGING PLUMB BOB FROM CENTERLINE OF TRUSS, FOUND ON EACH WEB PLATE ON UNDERSIDE OF TRUSS


PLUMB BOB USED TO LOCATE TRUSS OVER CENTERLINE OF LUMBER CARTS


LEVELING THE RUNWAY WITH LEVEL UNDER GUIDE TUBES. LEVEL AT BOTH ENDS NEAR THE SUPPORT TOWERS. RUNWAY SHOULD BE POSITIONED APPROXIMATELY 73.75" FROM FLOOR.

4.4 FINAL ASSEMBLY

- The Lumber Cart guides and Perimeter Guarding should now be positioned and anchored to the floor, using installation drawings provided. It is imperative that the Perimeter Guard is properly installed so that no personnel can enter the Hazardous Zone without passing through the Safety Light Curtain.

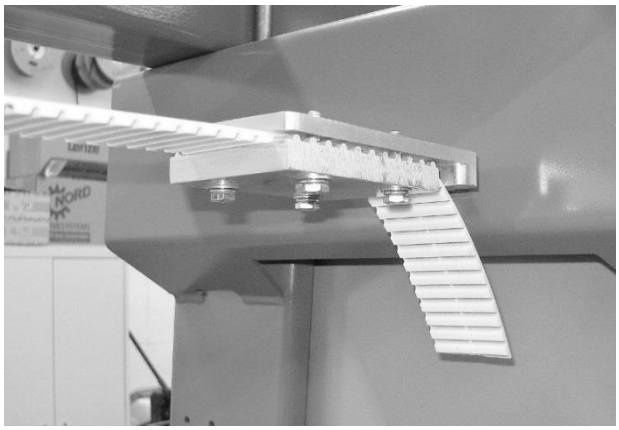
- See 11.1 for System Overview showing cable connections. The Ethercat and I/O cable are typically routed through the frame of the Infeed Deck. Connect one end of the I/O cable to the connector on the underside of the Runway Electrical Enclosure, and the other end to the connector on the underside of the Operator Console.

- Connect the Ethercat cable between X2 on the controller in the Operator Console and X4 on the inverter in the Runway Electrical Enclosure. Both ends of the Ethercat cable route through aluminum grips. Remove the protective tape or sleeve from the Ethercat cable end and route it through the grip. This grip must be taken apart to allow the cable to be placed in the slit in the rubber portion. Reassemble the grip and plug in the cables.

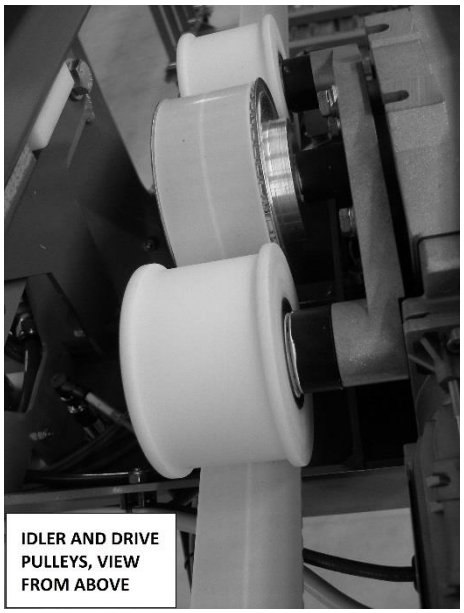
- Connect cables from runway cableway to Runway enclosure. These include I/O cable, Ethercat cable, motor power cable, and motor resolver cable. The I/O cable connects to the corresponding connector on the bottom of the Runway Enclosure. The Ethercat cable connects to jack X5 on the inverter. The motor cable connects to X108 on the inverter. The resolver cable connects to X7 on the inverter.

- Mount the Light Curtain receiver to its bracket near the saw and mount the transmitter to the Forklift Guard. The receiver has an 8 pin electrical connector; the transmitter has a 5 pin connector. The transmitter cable is located in conduit along the Runway truss and must be fastened along the Perimeter Guard to protect it from damage. The receiver cable originates from the Operator's console. The light curtain will need to be aligned after the machine is powered up. See the Section 8.5 for alignment procedure.

- Install drive belt to clamps on support towers as shown below**. IMPORTANT: The belt MUST be installed with the teeth DOWN. Ensure belt lies on TOP of all belt supports, or the belt will be damaged.** The clamp mounting rods can be adjusted to take up slack. After adjusting tension, tighten the jam nut with the bracket horizontal to prevent twisting the belt. Belt should be tensioned so that there is about 1/4" (6mm) sag between supports. A straight 12' board placed across two belt support brackets will facilitate this. Overtightening the belt will cause premature failure of bearings in the rollers and drive.



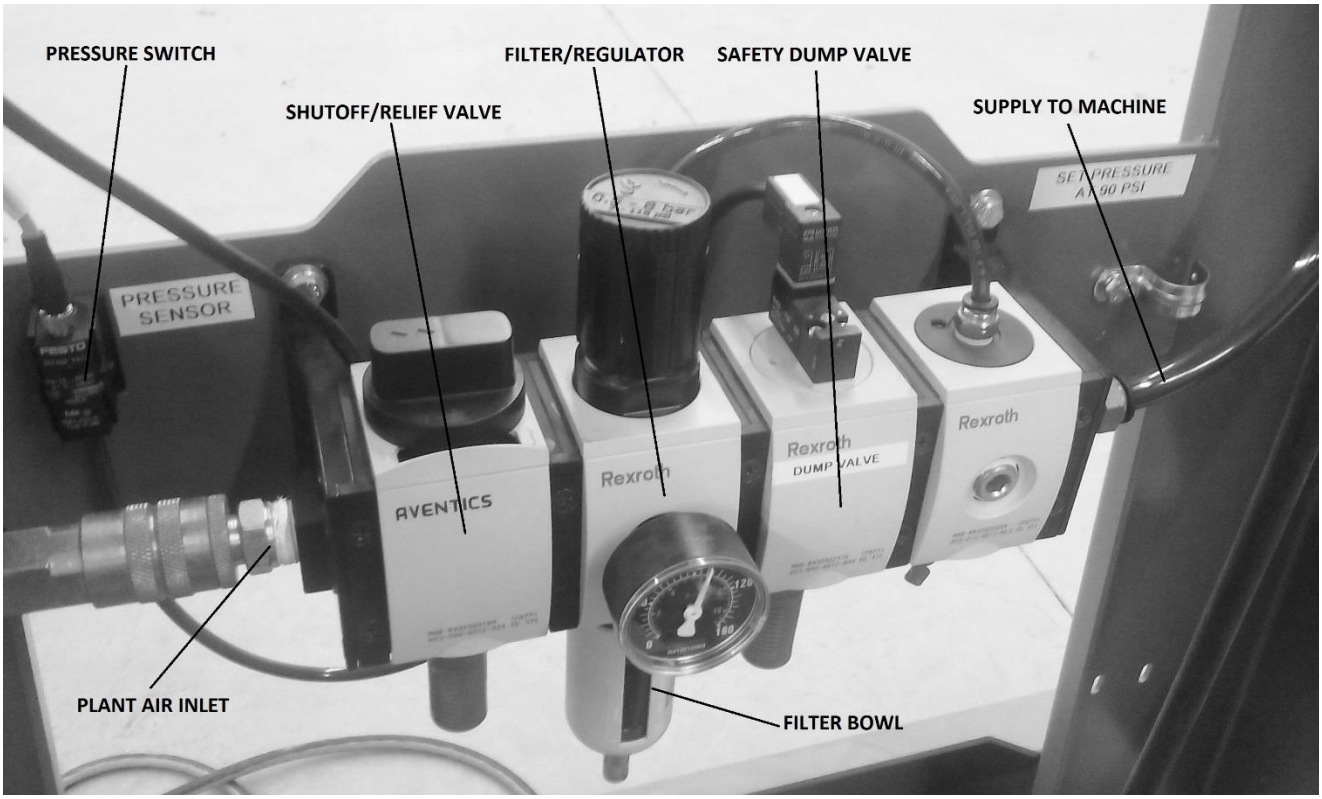
Belt clamp showing proper installation



IMPORTANT: Belt must go UNDER idler pulleys and OVER drive pulley, and must lie on top of belt supports as shown.

4.5 PNEUMATIC CONNECTIONS

Clean dry air is required for machine operation. The Ranger RS is provided with a filter and automatic condensate trap in the Air Supply Assembly. A 1/2" minimum plant air line should be connected to the 1/2" NPT female port on the Air Supply Assembly. A minimum of 100 PSI and a maximum of 120 PSI are required. Maximum air consumption can be as high as 20 CFM, so plant air plumbing must be adequately sized. Malfunction or slow operation will result from using a feed line smaller than 1/2". The 1/2" hose from the runway truss should be plugged into the distribution block at the right-hand end of the air assembly. The 3/8" hose from the infeed deck should be plugged into the connector on the bottom of the distribution block. See section 3.4 for pneumatic lockout instructions. See section 7.4 for filter changing instructions.



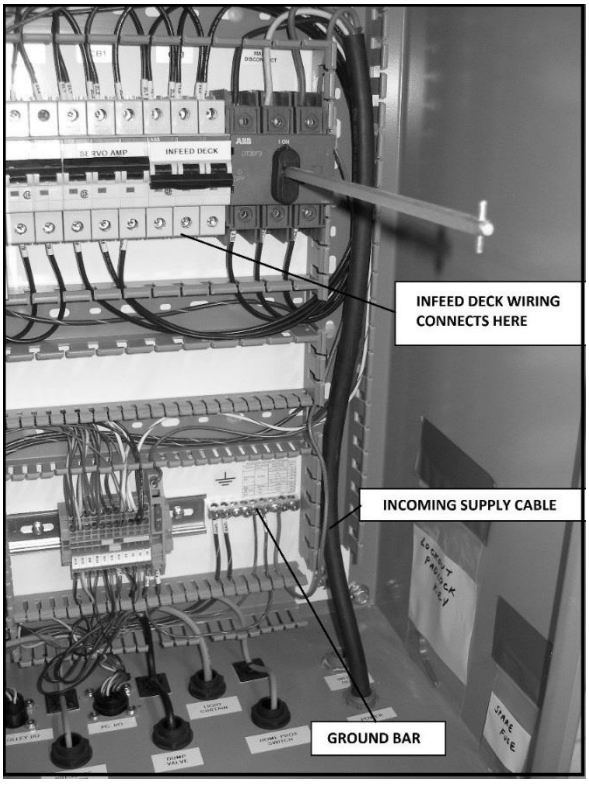
4.6 ELECTRICAL CONNECTIONS

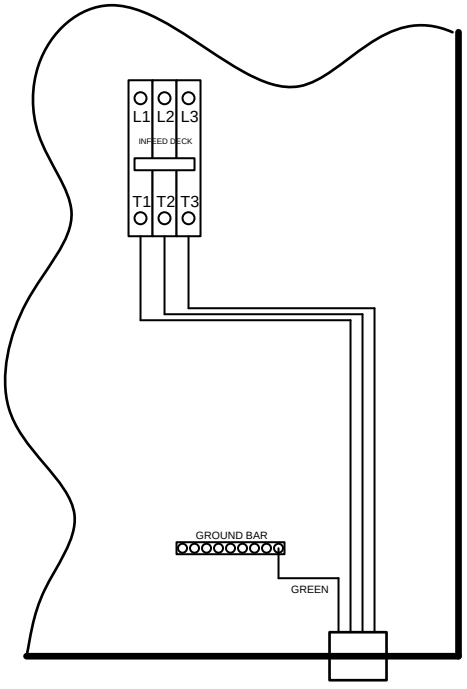
All wiring must be done by a qualified electrician in accordance with local and national electrical codes. The machine is designed to operate on 3 phase, 50/60 Hz, 208/230 or 460 volt power depending on the Ranger RS's factory wiring. Order of phase connections does not matter, as it does not determine motor rotation direction. Your machine should be factory wired to your voltage. Changing the voltage in the field will require factory assistance. Motor wiring, overloads and circuit breakers are different for

high and low voltage systems. Software settings for the motor drive will also need to be changed. The panel will also require new voltage stickers and labels.

A branch circuit protected by a 30 amp circuit breaker is required. An extra knockout hole is provided from the factory in the enclosure for incoming power. Drilling or punching of any other holes in the enclosure must be done carefully. Any drill shavings or other particles of metal which enter the electrical components can seriously damage or destroy them and will not be covered under warranty. Cover all components before drilling and vacuum out the shavings from the enclosure. Never use an air hose as you may blow particles into the electrical components.

- Connect the wires for the Infeed Deck motors as shown in the diagram. These are the 4 wires in the flexible conduit. Order of phase connections does not matter, as it does not determine motor rotation direction. The green ground wire is connected to the ground bar in the lower right corner of the Main Electrical Enclosure. **WIRING IS TO BE DONE BY QUALIFIED ELECTRICIAN**.
- A ground bar is provided in the panel for the incoming ground wire**. Grounding is very important for safety and proper operation of the electronic devices.**





Infeed Deck Power Connection

5 OPERATING INSTRUCTIONS

You will need to familiarize yourself with the different screens available on the Ranger RS computer. Navigation to the various screens is selected by buttons on the Main screen.

5.1 INITIAL STARTUP AFTER INSTALLATION

- Check to see that you have completed all of the connections properly as outlined above and make sure all personnel are clear of the Hazardous Zone. See Section 3 Safe Operating Procedures.
- Depress the E-stop button on the Operator Console to ensure that the machine does not start.
- Turn the Main Disconnect to the ON position.
- Turn the safety lockout air valve to the ON position. This is located on the Air Supply Assembly. Check the main pressure gauge for proper 90 psi pressure setting and adjust the regulator if necessary.
- Turn the key switch on the Operator Console to the ON position and wait for the computer to display the Main screen.
- Adjust the Light Curtain alignment as covered in section 8.5 of this manual. A Light Curtain that is not aligned properly will prevent the safety system from resetting and the machine from operating.
- Enter the Hazardous zone and press the Pre-Reset button. You will now have 12 seconds to break the Light Curtain beam as you exit the hazardous area and reset the system using the reset key switch on the operator console. See section 6.4 for a description of the Pre-Reset Button operation.
- Turn the key switch to the Reset position momentarily. If a Reset does not occur, recheck the Light Curtain and Obstruction sensor adjustment. Refer to section 6 on the Safety system.
- The Enable button will illuminate in red. Touching the Enable button will clear them to gray and enable the system and put the machine in operational mode. This will power up the Trolley motor drive. See the Troubleshooting Section if the enable fails. Check to see that the E-stop button is not depressed, and the Light Curtain and Obstruction Sensors are not blocked.
- Check the Main screen for a low air warning indicator. See the Troubleshooting section if you have a warning.

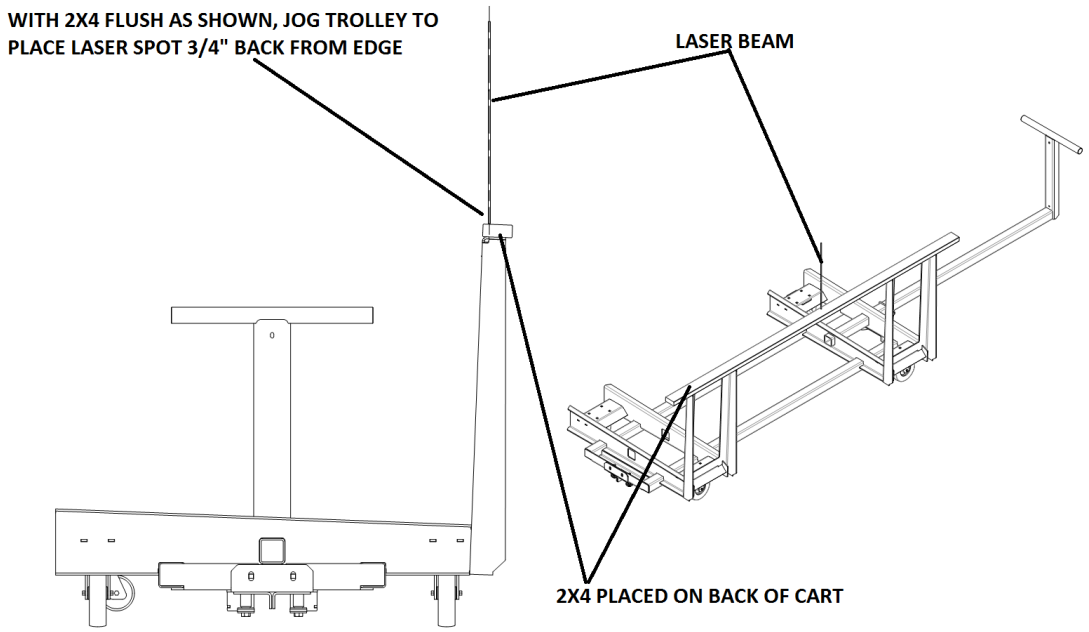
5.2 TROLLEY POSITION SET-UP

- Check to make sure that the Trolley is free from obstructions. Press the Home Machine button on the screen and wait for the machine to travel toward the Home end of the Runway, reverse, and then stop. See the Operating Instructions section under Homing for a detailed explanation.
- Enter 0 in the Goto Position box, then press Move Now. Verify that the Home side Obstruction Sensor laser beam is 1-2” from the Over-Travel Stop Target. See photo below. If adjustment is needed, change the Home Position value on the Settings screen. Decreasing the Home Position value will move the zero point further from the Over-Travel Stop Target. If the Home Position is set too high, the Over-Travel Stop Target will block the beam from the Obstruction sensor, and cause an E-stop as the trolley moves toward the zero point.
- Using the Manual controls, raise the Elevator. Jog the trolley until the **pickup screws** are centered over the Elevator. Note the Current Position, and enter that number in the Drop Position box in the Settings screen. This will ensure the boards are centered on the elevator when they are dropped from the picking head. Lower the elevator.
- Next, jog the trolley in the Away direction, watching the laser lumber sensor dot as you do so. When the laser dot moves off the infeed deck and hits the floor on the Away side of the deck, stop and note the Current Position reading. Enter that value in the Start Scan box in the Settings screen. This will prevent the machine from seeing the infeed deck during the lumber scanning process.
- Take the Start Scan value, add 24”, and enter the sum as Park Home value in the Settings screen. The Park Home position is the spot where the trolley will stop and wait when the lumber deck queue is full and a board is held on the Elevator. If it is set too close, the Obstruction Sensors could be tripped by a board waiting on the elevator.
- **IMPORTANT**: The Max Position must be set to prevent the trolley from impacting the Away end stop. Jog the machine toward the Away end until the obstruction sensor laser beam is 1” from the Over-Travel Stop Target. Note the Current Position, and enter that number in the Max Position box in the Settings screen.
- Setting up Lumber Stations is necessary to define the position of the lumber carts. Place a 2x4 on the back of each lumber cart as shown in drawing, with its edge flush with the upright. Using the Jog controls, position the trolley so that the laser spot is 3/4” back from the Home side edge of the board. Note the Current Position value on the screen, and enter that number after the appropriate Station number. Repeat for each cart. The number entered defines the end of that station, and the machine defines the start of the next station as 2” beyond that point. See drawing below. The Number Of Stations in

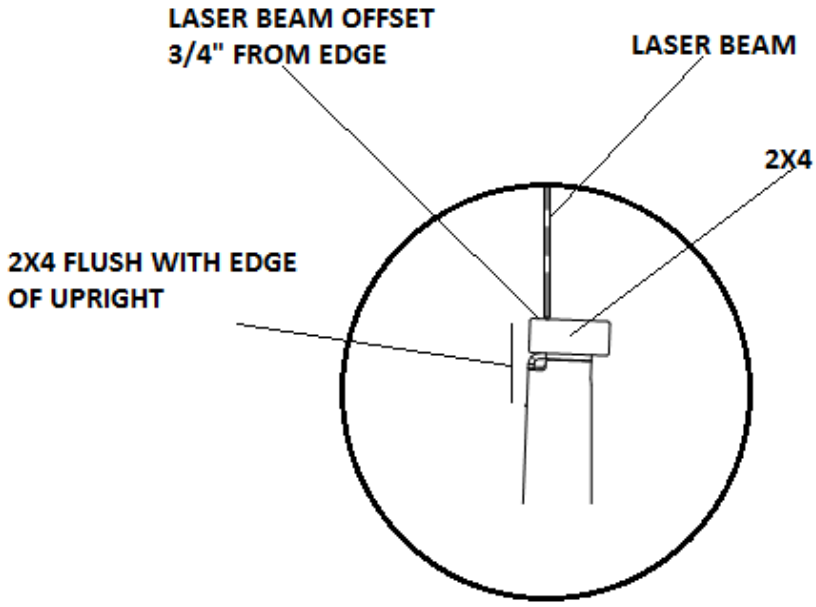
the Settings screen must be set equal to or higher than the total number of stations required.

- The Machine is now ready for lumber loading and operation. **See illustrations on next page.**

STATION SET-UP USING A 2X4



INSET SHOWING POSITIONING



5.3 STARTUP FOR NORMAL OPERATION

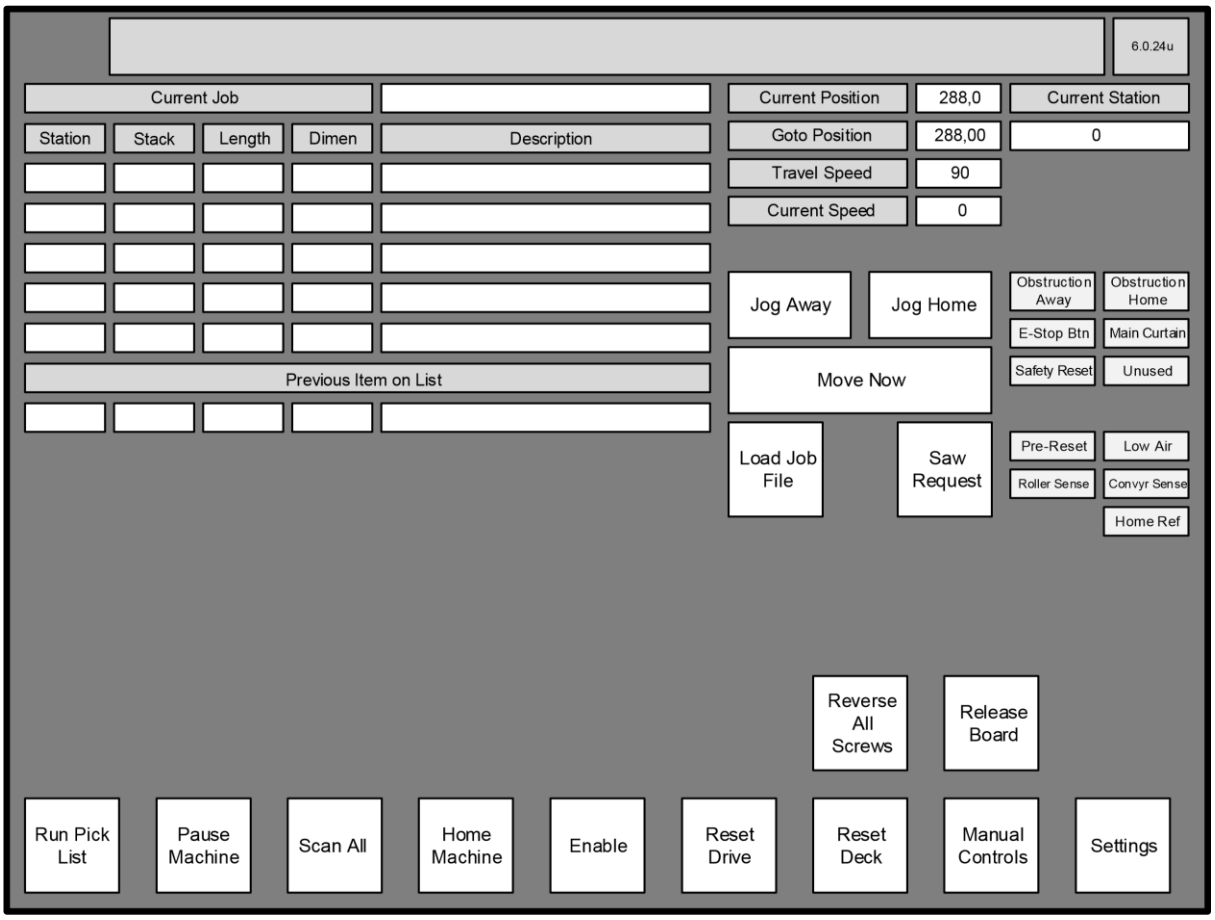
- Ensure main power is on at Runway Enclosure.
- Turn keyswitch on Operator Console to ON, and wait for boot-up.
- When Main screen appears, press E-stop button, and inspect the machine Hazardous Area to ensure there are no obstructions or safety hazards present. If area is clear,,press the Pre-Reset button, exit the Hazardous Area, release the E-stop button, and turn the keyswitch to Reset.
- Press Enable until it turns gray, also press Reset Drive if it is red. The machine is now ready to operate. If the machine fails to enable, check the indicators to determine the cause. Correct any unsafe conditions and repeat the startup process.
- Press the Home button to initiate homing sequence, it will turn gray when homing is complete.
- Load lumber into carts as desired, see below.
- Press Scan All to scan the lumber stacks, then press Run Pick List to prepare the Ranger RS to receive commands from the saw.

5.4 LOADING LUMBER

- Depress the E-stop button and leave it depressed when loading lumber into the system.
- Always center the lumber carefully on the carts. **Off center lumber may cause problems with the lifting mechanism and may impact the Perimeter Guarding, possibly causing equipment damage.** Put a mark on the lumber stack to help the forklift operator line the lumber up with the cart.
- Place the lumber on the cart so that the stack is tight to the vertical support with no gap. The lumber should be in an orderly stack and parallel to the cart's length. **The slight lean of the lumber stacks built into the carts is by design, and is necessary for proper operation.**
- The lumber stack must sit firmly against the bottom cart supports. Remove any dunnage or spacers that will interfere with the cart supports before loading.
- Cut and remove all banding and dunnage after the lumber is loaded.
- Lumber must also be centered when loaded into a magazine. Marks placed on the floor for the end of the lumber can help center the different lengths.
- Push the cart all the way in to the stop when replacing it. This centers the cart under the Trolley.

5.5 MAIN SCREEN

This is the primary operating screen, and displays when the machine is powered up. During operation the lumber sequence is shown as well as the status of the Infeed Deck. Homing can be done from this screen. Indicators show the status of the various components of the Safety System and other functions. Note that some functions are not used, depending on installed machine configuration.



Main Screen (Settings shown are for illustration only and may vary.)

- **Top Bar** Status and Error messages will display in this area
- **Current Job** (The functions of this area vary with different saw systems)
- **Station (Not used with Blade saw)**
- **Stack (Not used with Blade saw)**
- **Length (Not used with Blade saw)**
- **Dimension (Not used with Blade saw)**
- **Description (Not used with Blade saw)**

- **Previous item on list**
- **Current Position** Real-time position of the trolley along the runway, from Zero position.
- **Go To Position** Enter a desired position here, and trolley will move to that position when Move Now is pressed.
- **Travel Speed** Speed (in inches per second) at which trolley will travel while picking lumber.
- **Current Speed** Current actual trolley speed.
- **Current Station** Station number from which lumber is currently being picked.
- **Jog Away** Moves trolley at jog speed in the Away direction.
- **Jog Home** Moves trolley at jog speed in the Home direction.
- **Move Now** Initiates trolley movement to requested position.
- **Load Job File (Not used with Blade saw)**
- **Saw Request (Not used with Blade saw)**
- **Reverse All Screws** Activates screw motors in reverse direction.
- **Release Board** Drops head at current position and activates screw motors to release board.
- **Run Pick List** Enables lumber picking operations and sets up the Ranger RS to receive requests from the saw. Informs saw that Ranger RS is ready to receive pick list and pick lumber.
- **Pause Machine** Pauses and resumes machine motion.
- **Scan All** Starts lumber scanning process to find the location of all lumber.
- **Home Machine** Indicates need to home machine when red. Starts homing process. Turns gray when homing is complete.
- **Enable** Enables machine after startup or safety shutdown. The head must be up before the machine will enable. Red indicates machine is not enabled.
- **Reset Drive** Resets trolley motor drive after safety shutdown. Red indicates motor drive is disabled. Touching the indicator will clear it to gray if the condition that caused the shutdown has been corrected.
- **Reset Deck** Clears lumber picking commands and queue. All lumber currently in queue (on the conveyors or elevator) must be manually removed.
- **Manual Controls** Opens Manual Control screen.
- **Settings** Opens Settings screen to adjust system parameters.

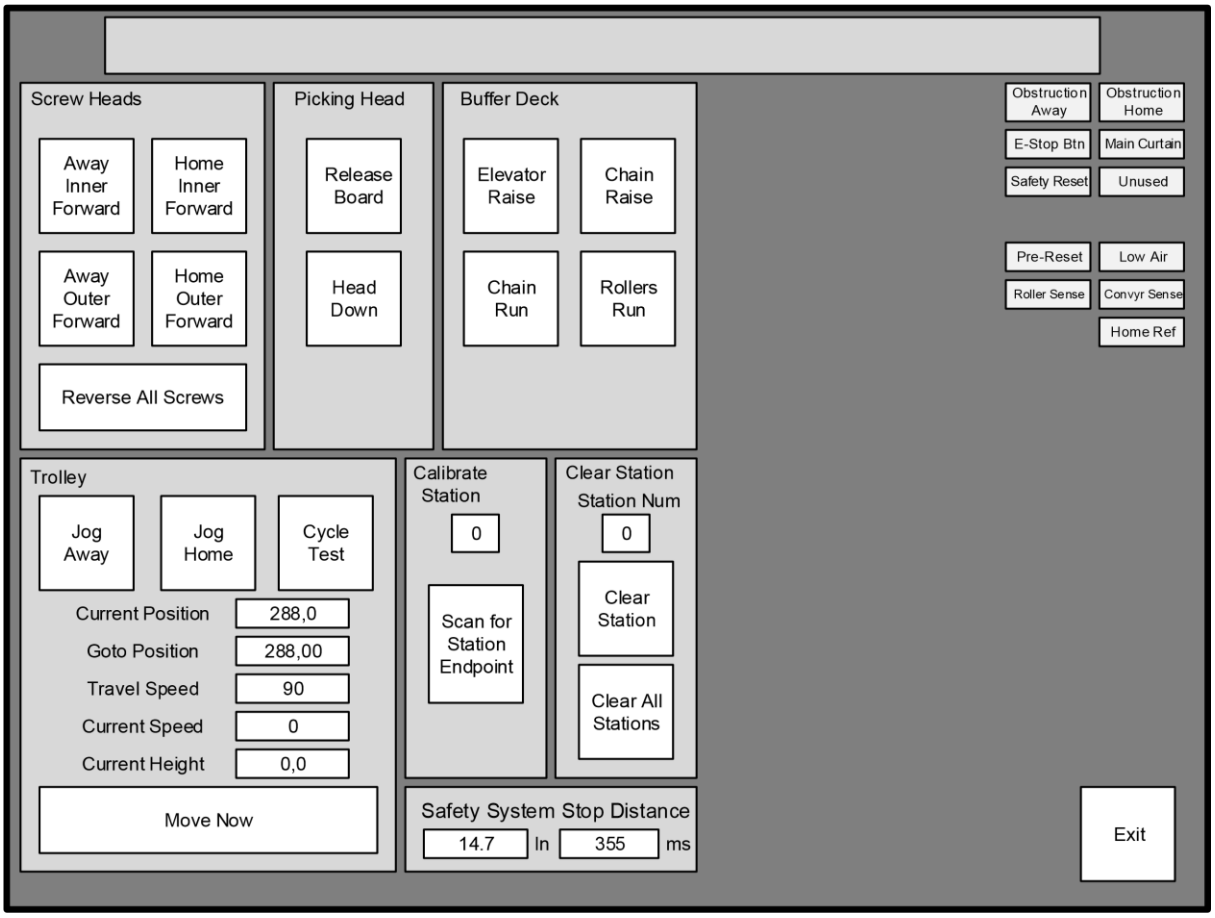
Indicators

- **Obstruction Away** Yellow indicates one or both of the Obstruction sensors on Away side is triggered.

- **Obstruction Home** Yellow indicates one or both of the Obstruction sensors on Home side is blocked.
- **E-Stop Button** Yellow indicates E-stop button has been depressed.
- **Main Curtain** Yellow indicates Main light curtain is blocked.
- **Safety Reset** Yellow indicates a reset of the safety system is required.
- **Pre-Reset** Diagnostic indicator for Pre-reset button, yellow while button is pushed.
- **Low Air** Yellow indicates system air pressure is low, or has been dumped by safety system. If system air pressure drops below 75PSI, system operation will be paused until air pressure recovers.
- **Roller Sensor** Yellow indicates a board is present at the end of the rollers.
- **Conveyor Sensor** Yellow indicates a board is present on the conveyor.
- **Home Reference** Diagnostic indicator, indicates status of home switch. Yellow indicates the switch is triggered.

5.6 MANUAL CONTROLS SCREEN

Troubleshooting and testing can be done from this screen. You will be able to see all of the inputs from the safety system, sensors and buttons. Outputs can be controlled from here. The outputs include the air valves, motors and Trolley movement. Use caution when controlling outputs to avoid machine damage due to interference of the controlled movements. Note that some functions are not used, depending on installed machine configuration.



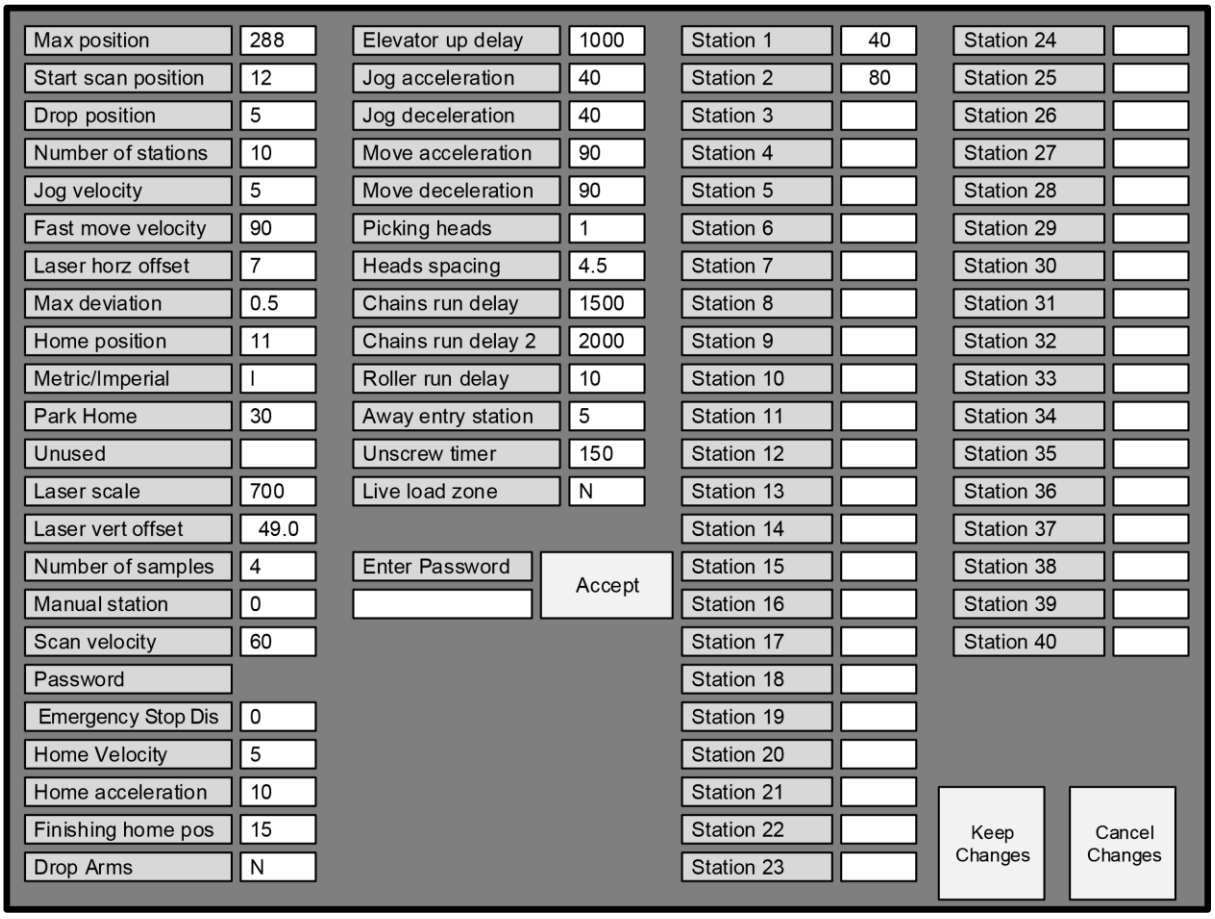
Manual Screen (Settings shown are for illustration only and may vary.)

- **Screw Heads** Activates individual screw motors**.** (Only the two on the Home side will be present on a standard single-head machine)
- **Reverse All Screws** Activates screw motors in reverse direction.
- **Release Board** Drops head at current position and activates screw motors to release board.

- **Head Down** Drops picking head to top of stack, or bottom of travel if no lumber is present.
- **Elevator Raise** Activates board elevator.
- **Chain Raise** Raises chain conveyor to active position.
- **Chain Run** Activates chain drive motor.
- **Rollers Run** Activates roller conveyor drive motor.
- **Jog Away** Moves trolley at jog speed in the Away direction.
- **Jog Home** Moves trolley at jog speed in the Home direction.
- **Cycle Test** Initiates cycle test, running the trolley back and forth repeatedly until stopped. Limits of test are set by Start Scan Position and Max Position.
- **Current Position** Real-time position of the trolley along the runway, from Zero position.
- **Go To Position** Enter a desired position, trolley will move when Move Now is pressed.
- **Travel Speed** Sets speed at which trolley will travel when not carrying lumber. The travel speed when carrying a board is fixed by software for safety reasons.
- **Current Speed** Current actual trolley speed.
- **Current Height** Diagnostic indication of laser height measurement.
- **Move Now** Initiates trolley movement to requested position.
- **Calibrate Station** Not used.
- **Scan For Station Endpoint** Not used.
- **Clear Station** Not used.
- **Station Number** Not used.
- **Clear All Stations** Not used.
- **Safety System Stop Distance** Indicates measured stopping time and distance of trolley when emergency stop is initiated.
- **Exit** Returns to Main screen.

5.7 SETTINGS SCREEN

System parameters and Station positions can be set using this screen. A password is required for changing parameters, but not for setting up Stations. Note that some functions are not used, depending on installed machine configuration.



Settings screen (Settings shown are for illustration only and may vary.)

- **Max position** Sets maximum position for gantry travel in the Away direction. Default is 100. **Setting this value too high will create an unsafe condition and allow the trolley to impact the Away end stop. See Section 5.1.**
- **Start scan position** This is set so that scanning does not start until the Laser is past the infeed deck. Jog until the Laser is just past the deck and enter the current position value. This value also sets the Home reverse point for the cycle test. Default 3”. This setting must not be the same as the **Drop Position**.
- **Drop position** Sets board drop point. This is the centerline of elevator measured from the 0 point. Using the jog controls, center the Picking Head over the elevator and enter the current position value.

- **Number of stations** Default 1, must be set equal or higher than number of lumber picking stations.
- **Jog velocity** Speed while jogging (inches per second). Default 5.
- **Fast move velocity** Default 90. This only affects travel speed without a board. Travel speed with a board is fixed in software for safety reasons.
- **Laser horizontal offset** Offset of measuring point from center of picking head. Adjust this value to center picking screws on board. Decreasing value moves picking screw location in the Home direction. Default 7.5.
- **Max deviation** Internal parameter-- do not change. Default 0.5
- **Home position** Defined by the position of the homing switch. Lowering the value moves the "0" position further from the Home end stop bumper. Default is 11.
- **Metric/Imperial** Determines measurement units used, centimeters or inches. Default is Imperial.
- **Park home** Sets home park position, which is the trolley waiting position when the elevator is holding a board and the deck queue is full. Default 35. If set too low, the Obstruction Sensors may be activated by a board waiting on the elevator.
- **Unused** For future use.
- **Laser scale** Scaling constant for laser—do not change. Default 700.
- **Laser vertical offset** Offset constant value for laser—do not change. Default 49.
- **Number of samples** Internal scanning parameter—do not change. Default 4.
- **Manual station** Address of manual load station, if used. Default 0
- **Scan velocity** Maximum velocity in the away direction when scanning. Default 60.
- **Password** User changeable. Default 1234.
- **Emergency stop distance** Indicates measured stopping distance of trolley when emergency stop is initiated.
- **Home velocity** Only affects velocity during homing process after reversal, while travel is in the Away direction. (Traveling towards home while homing is permanently set at 30.) Default 5.
- **Home acceleration** Sets deceleration value during homing process after reversal, while travel is in the Away direction.
- **Finishing home position** Not used**.**
- **Drop arms** Not used.
- **Elevator up delay** When queue is full, delays dropping the board until the elevator has raised.

- **Jog acceleration** Also sets homing acceleration in the Home direction. Default 40.
- **Jog deceleration** Also sets homing deceleration in the Home direction. Default 40. Caution: A setting less than 40 will cause the trolley to impact the bump stop during the homing process.
- **Move acceleration** Acceleration during automatic Trolley moves. Default 90.
- **Move deceleration** Deceleration during automatic Trolley moves. Default 90.
- **Picking heads** Used only for double head system. Default 1.
- **Heads spacing** Used only for double head system. Default 4.5.
- **Chains run delay** Delays stopping of chains after conveyor sensor is actuated by a board.
- **Chains run delay 2** Delays stopping of chains when placing board on the power rollers.
- **Roller run delay** Delays stopping of power rollers after board has actuated roller sensor.
- **Away entry station** Only used with Live Load option. Sets Live Load beginning station number.
- **Unscrew timer** Sets the run time of the unscrew motors after the pressure pad sensors turn off.
- **Live load zone** Set to Y when machine is equipped with Live Load option. Should otherwise be set to N.
- **Enter password/ Accept**
- **Station 1-40** Sets location of individual lumber stations. Normally done at installation startup.
- **Keep Changes** Saves changes and exits to Home screen.

5.8 HOMING

Homing the machine allows the Trolley to determine its exact position on the Runway. There is a homing switch located on the Runway close to the Runway Electrical Panel. When the machine is instructed to home, the Trolley will move slowly in the Home direction until the switch is energized and then reverse direction until the switch is de-energized. This homed position is set by default to 11". If the homing switch is already energized when the homing command is given, the Trolley will move in the Away direction until the switch is de-energized. Homing is required whenever the computer is powered down and after certain faults occur. The Home button will display as red when homing is required. If the machine will not Home itself check to see that the machine is enabled. An improperly adjusted Head Up switch will not allow the machine to Home. See photo below.

5.9 SCANNING

Scanning refers to the process of determining the position and height of all lumber stacks in the system. This is performed by the Lumber Scan Laser, which is mounted on the trolley and pointed at the floor. Scanning finds the position of the next board to be picked from each lumber station and can identify empty stations. A lumber scan must be performed after any changes in the lumber inventory or movement of any wood, and also after the system has been restarted after being powered down.

5.10 VACUUM SYSTEM OPERATION, TESTING, MAINTENANCE

NOTE: The vacuum system needs a large volume of air to operate properly. While holding a board it requires approximately 20 cfm continuously. This will require generously sized airlines feeding the system. All lines should be at least ½" inside diameter. The main regulator below the electrical panel will be set at 90 psi.

Maximum vacuum requires 75-80 psi at the gauge on the picking head. Actuate the vacuum system from the manual screen (the system need not be enabled) and check for 75-80 psi on this gauge. Pressures lower than this indicate that the air supply is not adequate to the system or that the filter is plugged.

IMPORTANT: In order to protect the vacuum shoe pads from damage during periods when the machine is not operating, it is important to park the trolley over the elevator or in an open area where the head will not encounter an obstruction that could damage the foam pad. The flat pans on the elevator will protect the pads if the system is shut down and the head settles.

Spare Shoe/Pad assemblies have been sent with the system. These are located in their own storage box. A worn or damaged foam pad is the most likely cause of a failure to achieve a vacuum while picking wood. They can be changed quickly with a #2 Phillips screwdriver.

If the Vacuum Pickup Assembly fails, do not disassemble the failed unit. Please send the assembly back to Acer. We will overnight a new assembly out.

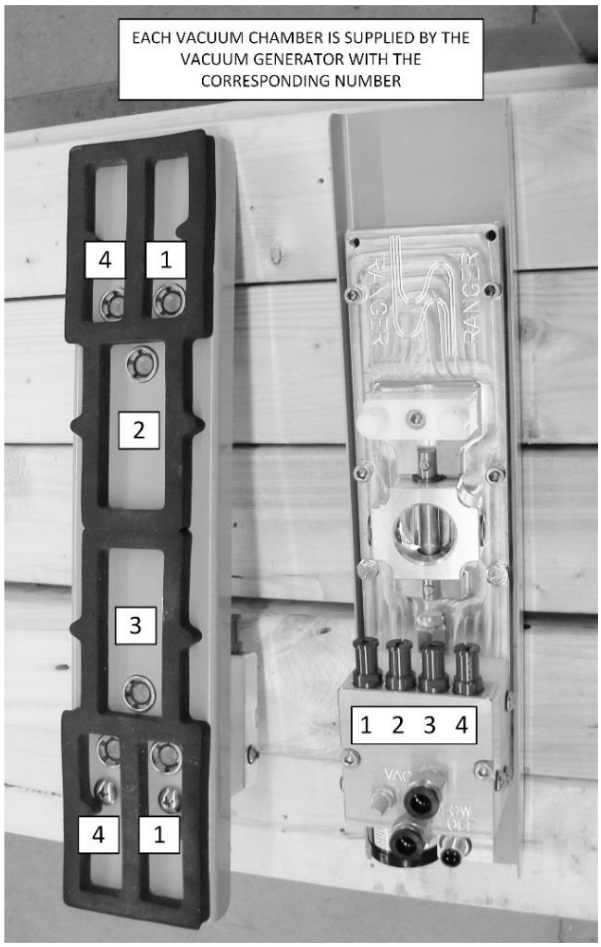
HOW IT WORKS: The vacuum pickup system uses compressed air passing through 4 vacuum generator cartridges to produce a vacuum, which is ported to the bottom of each vacuum shoe to pick up a board with suction. The vacuum generators are mounted on a manifold that is part of each vacuum pickup assembly. The shoe/pad assembly that forms the bottom layer of the vacuum pickup assembly has multiple vacuum chambers, enclosed by the foam pads that make a seal against the wood. For a successful pickup, it is not necessary for all of the chambers to seal. Any one of the 4 sections shown is capable of achieving vacuum independently. The chambers that have the same number work together, since their suction is produced by the same generator. There are two indicator lights mounted on the outside of the trolley electrical box. These indicate when each of the vacuum shoes has achieved adequate vacuum while picking up a board.

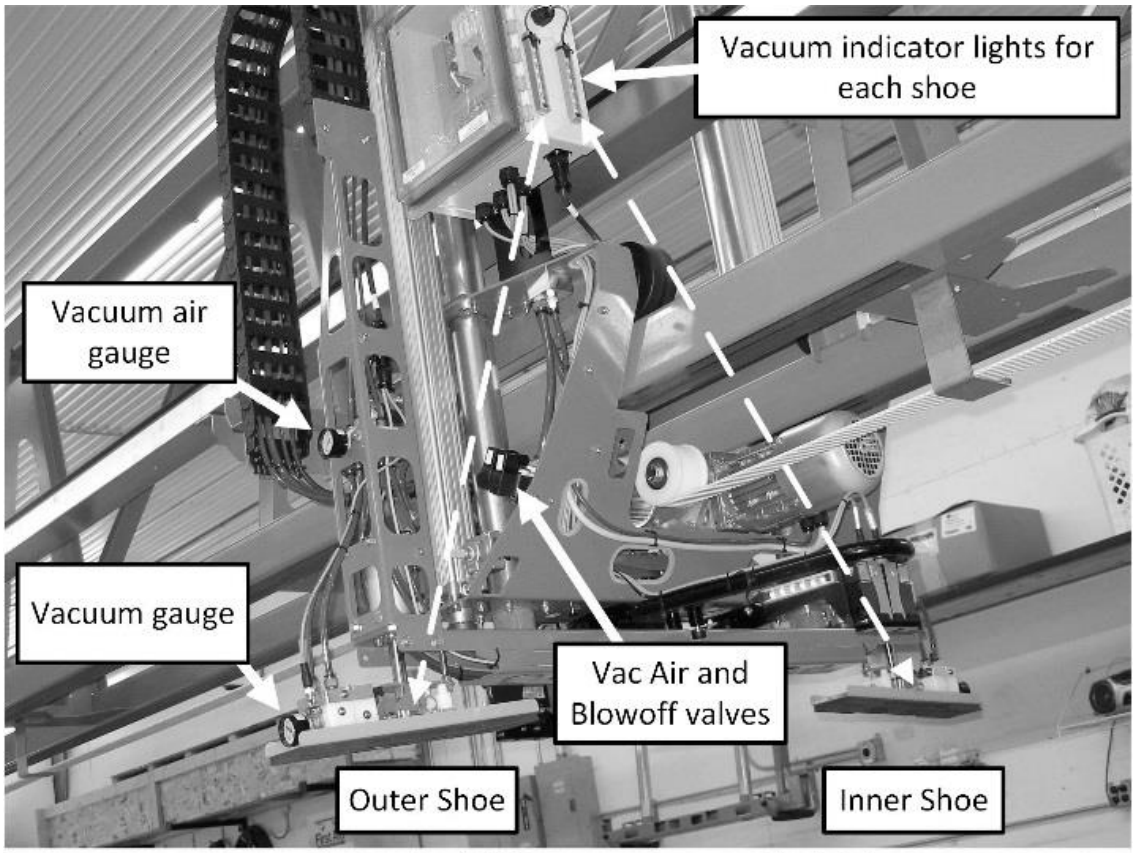
Vacuum is measured in units of inHg. As the vacuum shoes drop onto a board, the air that generates the vacuum is turned on. The gauge mounted on the trolley frame shows the air

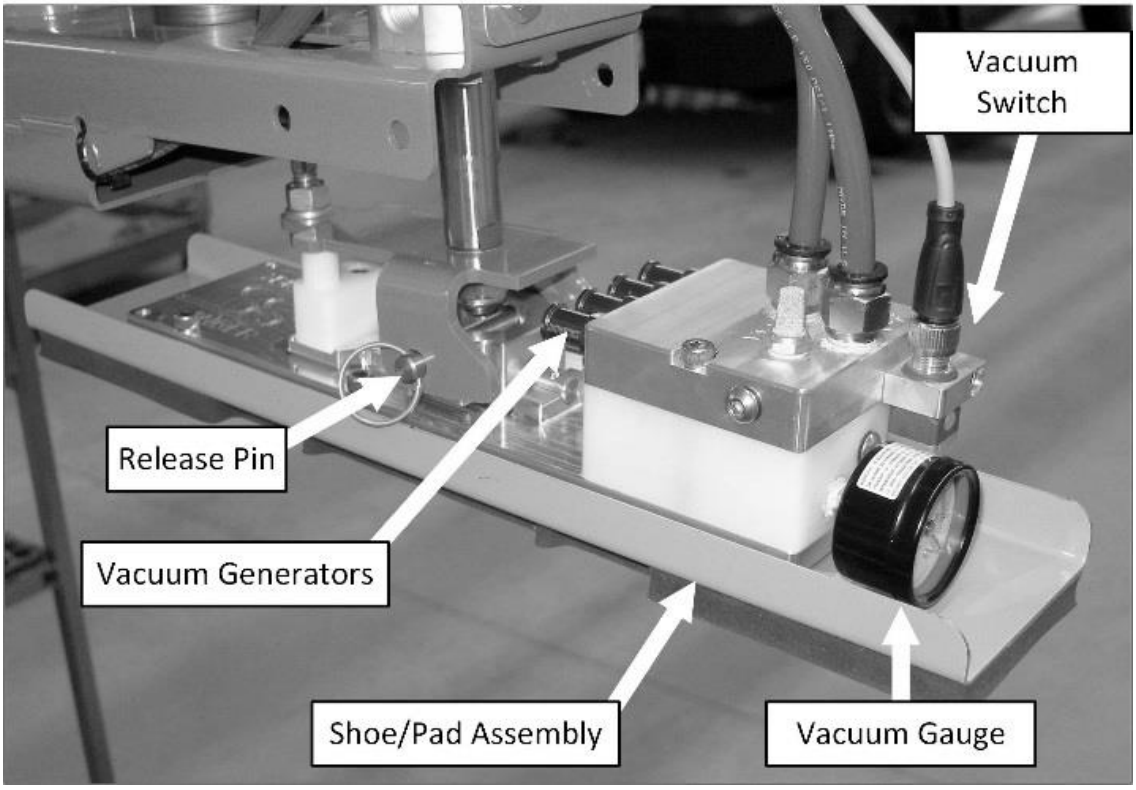
pressure provided to the vacuum generators. Once the foam on the bottom of the shoe is compressed against the wood, a seal is achieved and the vacuum level rises.

On each vacuum shoe, there is a vacuum switch that senses the vacuum level, and turns on the respective indicator light when a level of 9 inHg is achieved. If a pickup fails, these lights will indicate whether either shoe failed to achieve vacuum. Note that the vacuum switch will close and light the indicator even if only one generator achieves vacuum. When operating correctly, each vacuum generator will produce a vacuum of 15-20 inHg. A failure to achieve vacuum could be due to irregularities in the wood such as cracks or knots, excessive twist in a board, a worn or damaged foam seal, or particles (such as sawdust) clogging the vacuum generators.

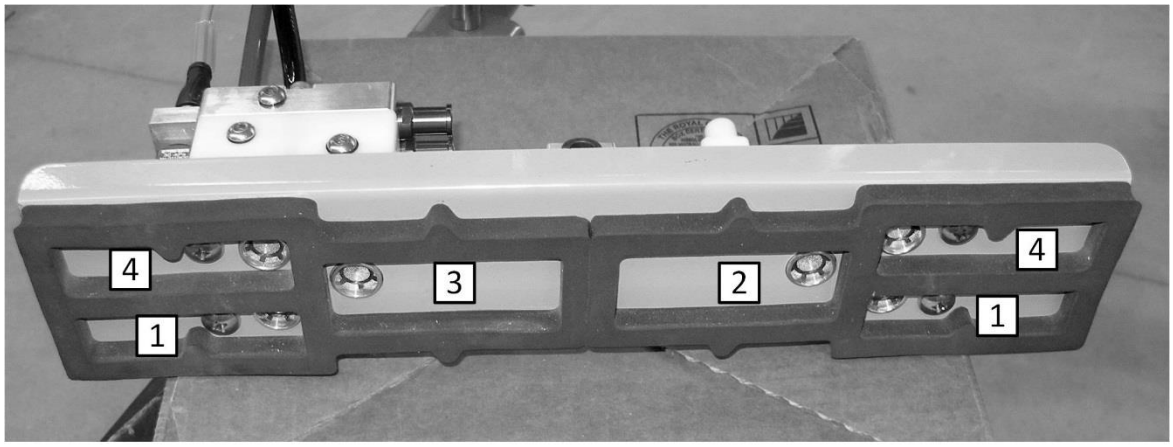
To release the board, air to the vacuum generators is cut off, thus turning off the suction that holds the board. The vacuum ports in the bottom of the shoes are protected by a fine mesh screen to prevent suction of particles into the vacuum generators, which can affect their operation. Upon release, the blowoff valve is activated, blowing a pulse of air back through the screens to clean them.

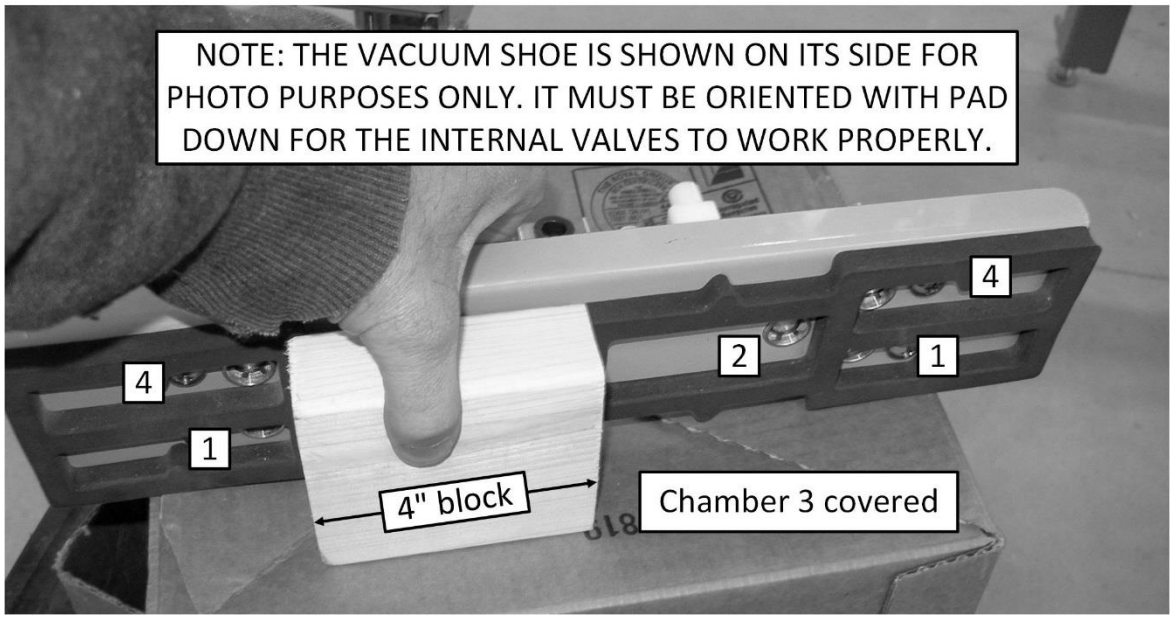



Vacuum indicator lights for each shoe
Vacuum air gauge
Vacuum gauge
Vac Air and Blowoff valves
Outer Shoe
Inner Shoe


Vacuum Switch
Release Pin
Vacuum Generators
Shoe/Pad Assembly
Vacuum Gauge

TESTING: The vacuum manifold contains numerous check valves that rely on gravity to operate. They will ONLY function properly with the pad oriented down toward the floor, just as they are mounted on the picking head. To test the vacuum generators, it is necessary to block off the respective vacuum chambers on the shoe by pressing a 4” block of wood firmly against the pad, covering the chamber. The vacuum indicator lights and vacuum gauge only show that ONE or MORE of the generators have achieved vacuum. By checking one generator at a time, it is possible to isolate a problem with one of the generators. Since vacuum generators 1 and 4 each feed two chambers on the shoe, it is necessary to block BOTH corresponding chambers. For example, to test generator 1, use two wood blocks to cover both #1 chambers, and ensure the vacuum indicator light comes on. In the lower photo, chamber 3 is covered, so if the generator and pad are functioning properly, the vacuum indicator light would come on, even if the other chambers are uncovered. A normal vacuum gauge reading is 15-20 inHg.

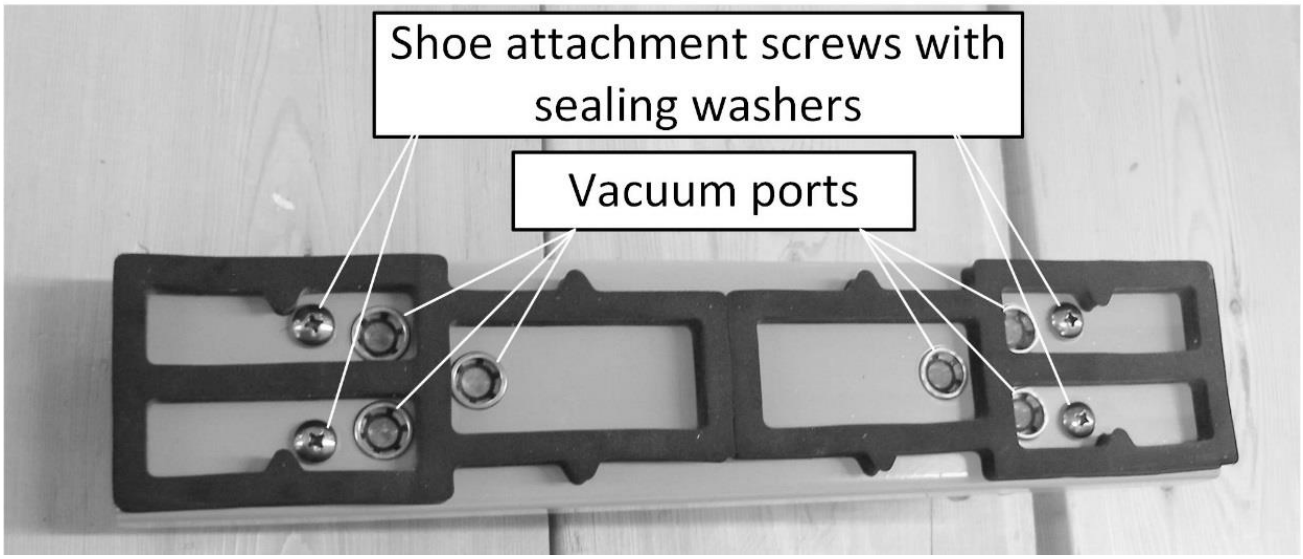


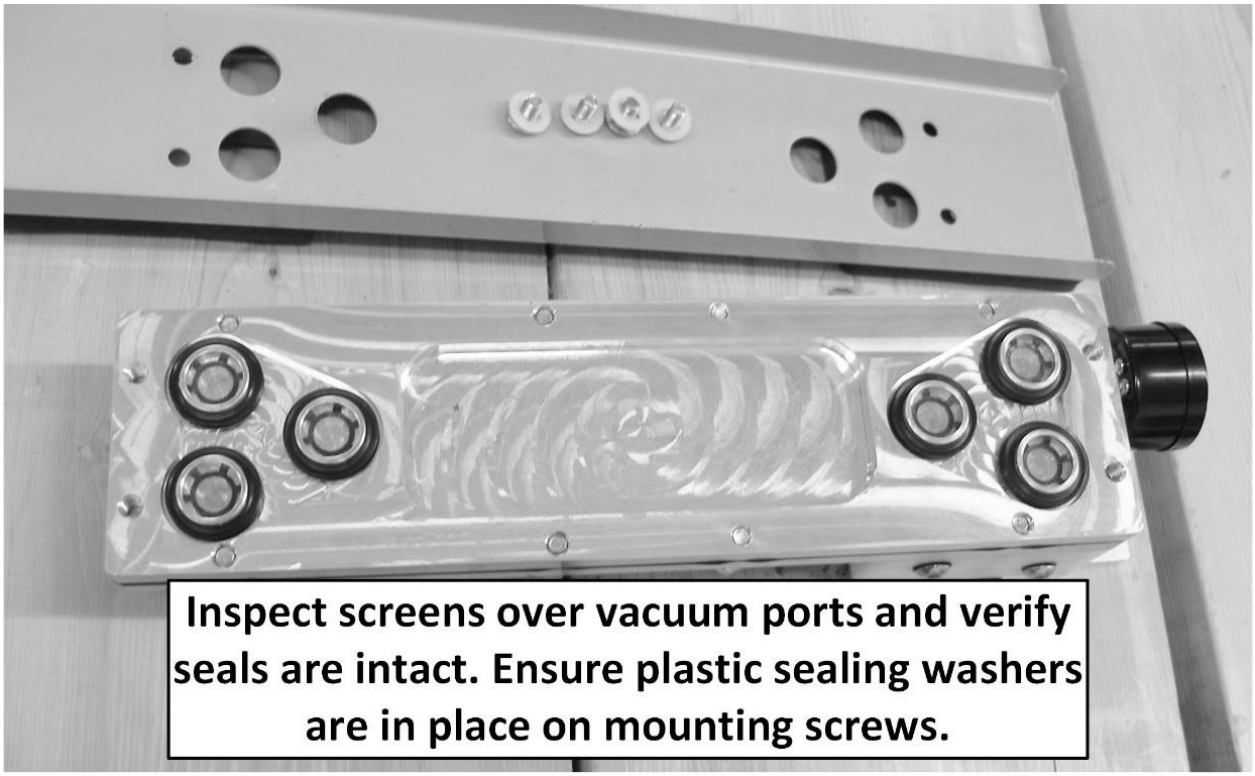


MAINTENANCE: To remove the vacuum pickup assemblies from the machine, disconnect both hoses and the vacuum switch cable. The two air hoses are color-coded, with the color marked next to the ports. Pull the quick-release pin and then remove the vacuum pickup assembly. The Inner and Outer vacuum pickup assemblies are identical.

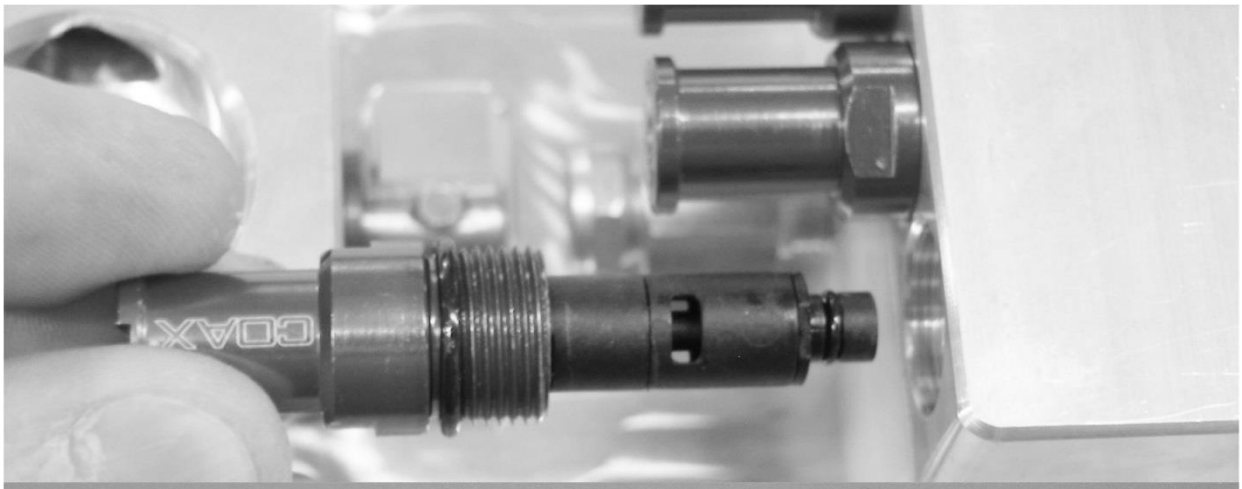
The shoe/pad assembly is attached by 4 screws. If the foam seal is worn or damaged, replace the entire shoe and pad assembly. Ensure the six seals around the vacuum ports remain in place when replacing the plate assembly, as well as the plastic sealing washers on the mounting screws. The shoe/pad assemblies are symmetrical and can be installed either way.

If a vacuum generator malfunctions, the most likely cause is particle contamination. The generators can be cleaned by removing the cartridges and blowing them out with compressed air. Use a large screwdriver to unscrew the red vacuum exhaust fittings and carefully pull the vacuum generator cartridge out for cleaning. The orientation during reassembly is critical—see photos**. INCORRECT ASSEMBLY WILL DESTROY THE CARTRIDGES**. See photos for proper assembly. Lubricate all O-rings with a small amount of air-tool oil during reassembly.





Inspect screens over vacuum ports and verify seals are intact. Ensure plastic sealing washers are in place on mounting screws.



IMPORTANT: Vacuum cartridge must be inserted as shown. Incorrect installation will DESTROY the cartridge.

6 SAFETY SYSTEM DESCRIPTION AND TROUBLESHOOTING

The Ranger RS system is equipped with several safety components to insure the safety of the operator and other personnel. These components make up the Safety system and work together to shut down the Ranger RS system when a dangerous condition exists.
NEVER modify, tamper with or remove any part of this safety system as severe injury or death may occur. Test the function daily before operating the machine. Do not operate the machine if any part of the safety system is not functioning correctly. Have the safety system repaired and tested before placing it back in service.

6.1 LIGHT CURTAIN

The Light Curtain emits multiple beams of invisible light which cause an E-stop to be triggered when the beams are broken by a person or object. The Light Curtain is made up of two parts, the Transmitter and the Receiver. The Transmitter emits the light beams and the Receiver detects them. Any interruption in one of the beams will trigger the Receiver. The Light Curtain detects a person entering the Hazardous Zone through the open side of the Perimeter Guarding and shuts the system down. **The set-back of the light curtain from the actual end of a traveling board is necessary to give the trolley time to stop after a person breaks the light curtain and moves into the hazardous zone.**

Light Curtain Receiver

Light Curtain Transmitter

6.2 EMERGENCY STOP BUTTON

Located on the Operator Console next to the screen. Depressing the button causes an E-stop to be triggered. Twist the button clockwise and pull slightly to reset it.

Emergency Stop Button & Reset Switch **Safety Pre-reset Button**

6.3 KEYED SAFETY RESET SWITCH

This switch has 3 positions. “OFF” removes power from the operator’s console but does not remove power from the RUNWAY ENCLOSURE. “ON” boots the computer and powers other machine functions. “Reset” causes the safety system to reset if the required conditions are met.

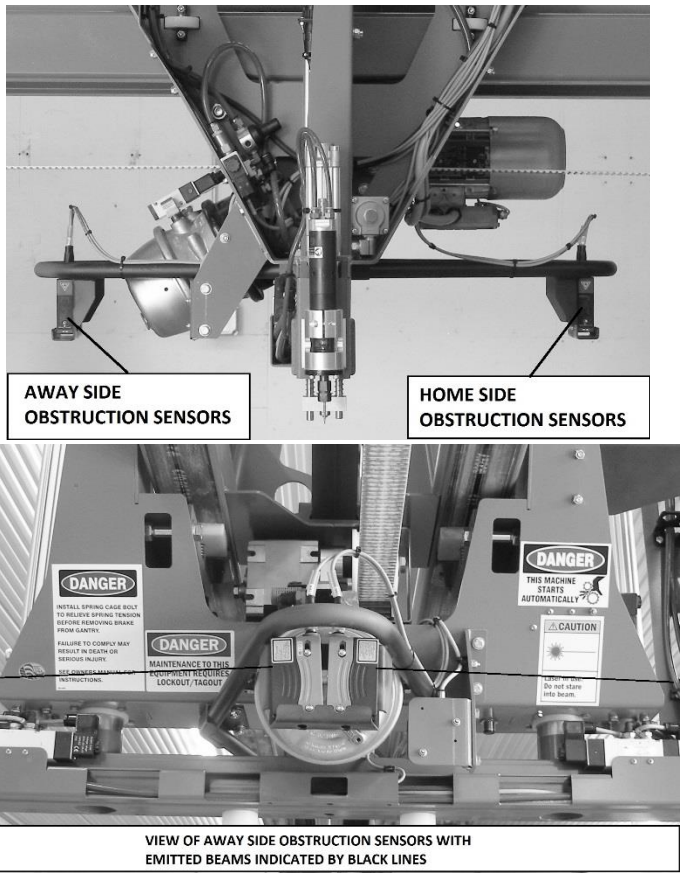
6.4 SAFETY PRE-RESET BUTTON

This button is located inside the HAZARDOUS ZONE. Its purpose is to protect personnel who are within the HAZARDOUS ZONE by preventing a system safety reset by someone outside the HAZARDOUS ZONE. The button must be pressed by the last person leaving the HAZARDOUS ZONE. After pressing the Pre-Reset button you will have 12 seconds to break the light curtain upon leaving and reset the safety system using the keyed reset switch on the operator’s console. If the reset switch is not operated within the required time it will be necessary to push the pre-reset button and break the Light Curtain again. Never attempt to reset the system if someone else is still within the HAZARDOUS ZONE as moving machinery could cause serious

injury or death. You will need to repeat the procedure if a reset does not occur within the 12 seconds. This timing is not adjustable.

6.5 OBSTRUCTION SENSORS

The Obstruction Sensors are four light beam sensors protecting both sides of the Trolley. The sensors are only active when the trolley is moving, furthermore, only the sensors protecting the direction of travel are active. Breaking either of the beams on the active side will cause an E-stop condition. The primary purpose is to rapidly stop the Trolley if something is in the path of travel. The sensors emit a diffuse beam, and will trigger if an obstruction is within a preprogrammed distance to the side. This distance is preset according to the length of lumber the system is designed to handle. The sensors located closest to the Infeed Deck are the Home Obstruction sensors and the sensors on the opposite side are the Away Obstruction sensors. There is a green LED on each sensor that indicates power is on, and an amber LED that lights when the sensor is not triggered. Each sensor has a corresponding Input on the Input/Output module in the Trolley enclosure. The Inputs are equipped with a green status LED. The input LED is illuminated if the beam sensor is not blocked. The Obstruction sensors also detect the Over-Travel Stop Target rods to prevent the trolley from impacting the end stops.



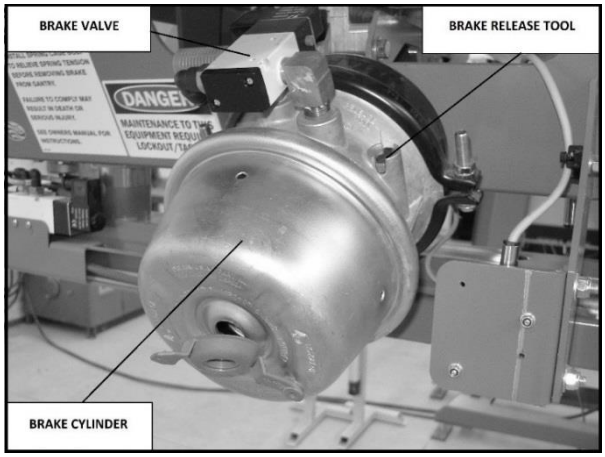
VIEW OF AWAY SIDE OBSTRUCTION SENSORS WITH EMITTED BEAMS INDICATED BY BLACK LINES

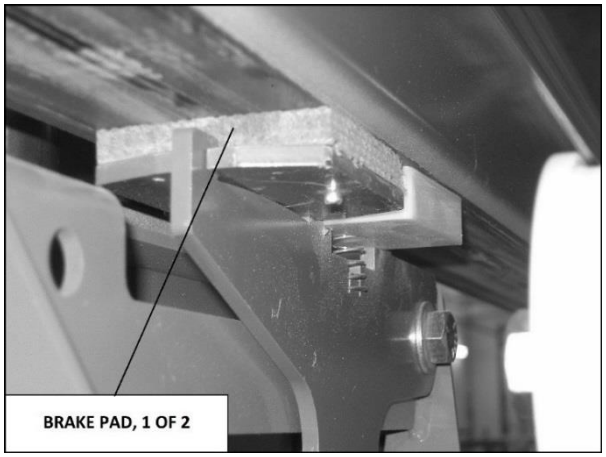
6.6 OVER-TRAVEL STOP TARGET

The Over-Travel Stop Targets are white plastic rods hanging from each of the end support towers. Their purpose is to interrupt the beam of one of the Obstruction Sensors and cause the trolley to stop before it hits the end bumper. They are an important part of the safety system and should not be removed.

6.7 SAFETY BRAKE

The Trolley safety brake stops the Trolley rapidly when an E-stop condition occurs. The brake is applied by a spring and is held in the released position by air pressure provided through the Brake Valve. An E-stop condition causes the air pressure in the Brake chamber to be exhausted through the Brake Valve. Exhausting the air pressure allows the spring in the chamber to rapidly apply the brake. This brake is meant for emergency use only and is not meant to be used for normal stopping. A properly maintained Safety Brake will stop the Trolley very quickly in an emergency. The Manual screen has a recorder which displays the Trolley stopping distance for each Emergency stop system actuation. A properly operating brake system will stop the Trolley in less than 20 inches from full speed. A stopping distance longer than 20 inches indicates a problem with the brake system and presents a safety hazard. Check to insure the release tool has been removed and placed in the storage hole on the side of the brake chamber. It is very important to identify and repair the cause of the problem immediately to prevent injury or death.





6.8 SAFETY CONTROLLER

A Safety controller located in the Operator Console monitors the status of the Light Curtain, E-stop button and the four Obstruction Sensors. The Obstruction Sensors are monitored via the PC Safety Enable signal on output 202. When any of these are triggered by the operator or an unsafe condition, the safety controller shuts the Ranger RS system down and reports this to the PC. The PC can then display information on the screen relating to the source of the E-stop condition. The Safety controller is equipped with LEDs to help troubleshoot any problems.

6.9 FUNCTION OF THE SAFETY SYSTEM

The safety system can be triggered (E-stopped) by any one of six separate devices. These devices are the Light Curtain, E-stop Button, and the Home Inner, Away Inner, Home Outer, and Away Outer Obstruction Sensors. The Obstruction Sensors are mounted on the Trolley, and project laser beams capable of detecting obstructions within the hazardous zone. The E-stop Button and Light Curtain are two-channel devices meaning that two separate electrical paths (A and B) are monitored in each. Breaking the flow of current in either path will cause an E-stop condition to occur. An E-stop condition causes power to be removed from the air system dump valve, the brake release valve, and motor drive safety inputs. The motor drive in turn shuts off power to the trolley motor. In addition to the safety circuit functions, the Infeed Deck motors are also shut off directly by the PLC.

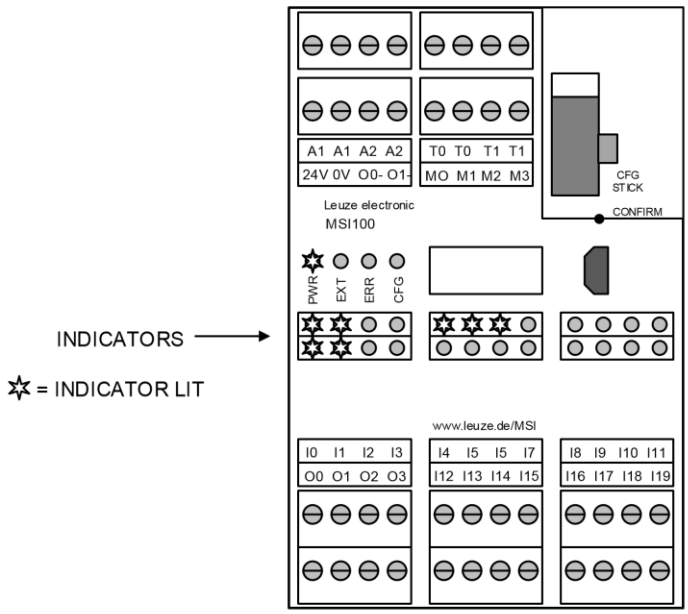
Breaking any of the Obstruction sensors, the Light Curtain beams, or pushing the E-stop Button will cause the Safety Controller to trip, dumping the system air supply and shutting down the Trolley and Infeed Deck motors. Anytime the safety system is tripped, it must be reset. The status of the overall Safety System can be viewed on the Main screen on the Operator Console. Here you can view the actual inputs from each of the safety devices and the reset status of the Safety controller. The cause of the last E-stop can be viewed here. This is explained in the next section.

Shown on the following pages are a flowchart and schematic of the Ranger RS safety system as well as an illustration of the safety controller indicators in the normal operating state. The main components and the interconnections between them and the system PC are detailed**. These illustrations are not intended to be used as wiring diagrams, but are presented as an aid to troubleshooting and understanding the safety system.** The flowchart shows the dual path that must be maintained through the various safety input devices and the inputs from the devices to the system PC. Also see the Safety Controller Schematic in Section 11.

6.10 SAFETY SYSTEM DIAGRAMS

INPUT/OUTPUT INDICATORS

I0 MAIN LIGHT CURTAIN A
I1 MAIN LIGHT CURTAIN B
I2 GATE SWITCH A#
I3 GATE SWITCH B#
I4 E-STOP SWITCH A
I5 E-STOP SWITCH B
I6 PLC OUTPUT 202 SAFETY ENABLE
I7 RESET SWITCH
O0 SAFETY OUTPUT A
O1 SAFETY OUTPUT B
M0 MAIN LIGHT CURTAIN STATUS
M1 GATE STATUS#
M2 E-STOP STATUS
M3 SAFETY RESET STATUS
#ONLY USED WITH GATE SWITCH OPTION



SAFETY CONTROLLER SHOWING
INDICATORS IN NORMAL OPERATING STATE

Title	Client	Project	Drawing No	Edited	Scale
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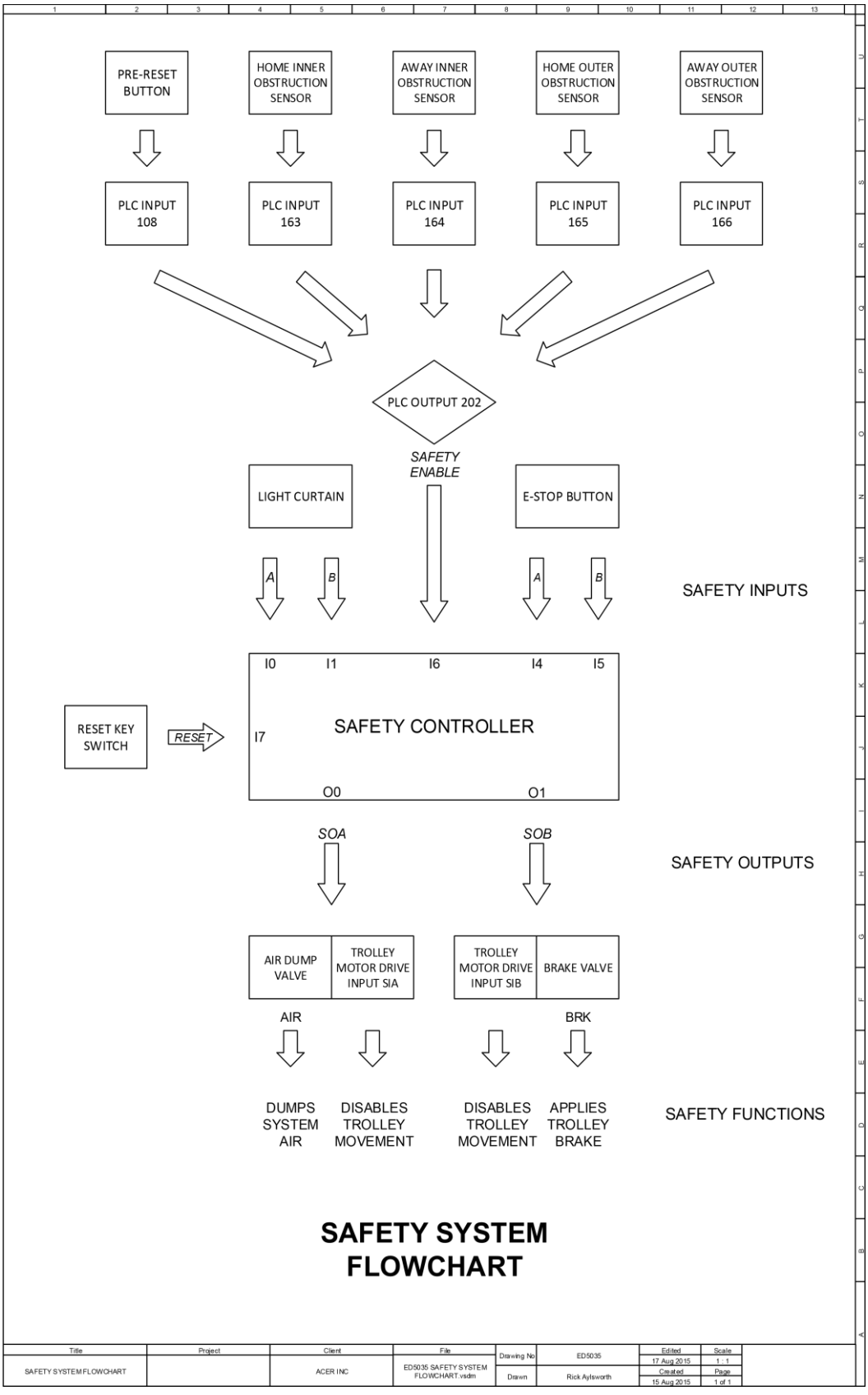
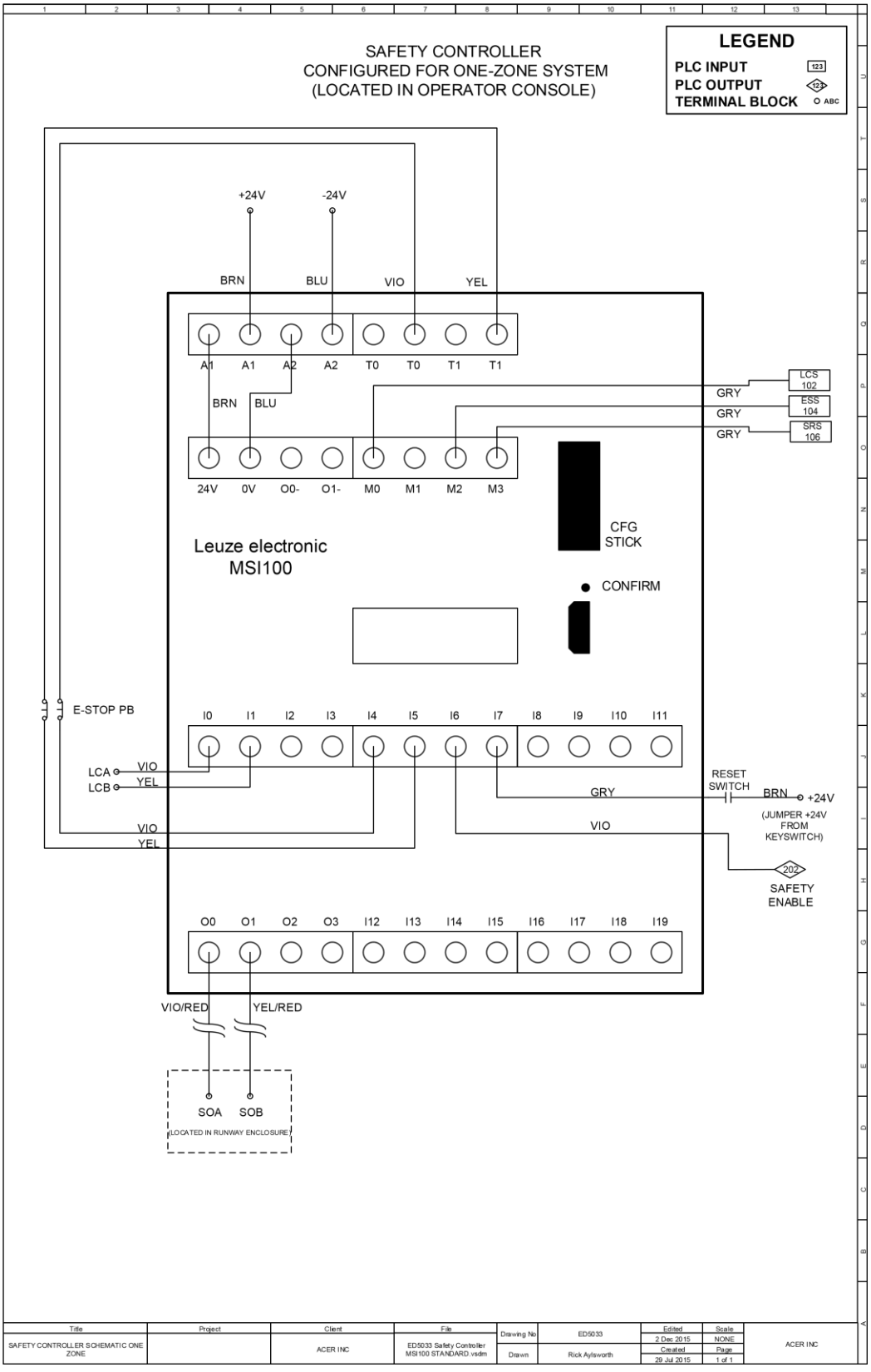
			Drawn	Created	Page
			Rick Aylsworth	20 Aug 2015	1 of 1



SAFETY SYSTEM FLOWCHART

Title	Project	Client	File	Drawing No	ED5035	Edited	Scale
SAFETY SYSTEM FLOWCHART		ACER INC	ED5035 SAFETY SYSTEM FLOWCHART.vsdm	Drawn	Rick Aylsworth	17 Aug 2015	1 : 1
						Created	Page
						15 Aug 2015	1 of 1


SAFETY CONTROLLER
CONFIGURED FOR ONE-ZONE SYSTEM
(LOCATED IN OPERATOR CONSOLE)
LEGEND
PLC INPUT 123
PLC OUTPUT 123
TERMINAL BLOCK ABC
+24V
-24V
BRN
BLU
VIO
YEL
A1 A1 A2 A2 T0 T0 T1 T1
BRN BLU
GRY
GRY
GRY
LCS 102
ESS 104
SRS 106
24V 0V O0- O1- M0 M1 M2 M3
CFG STICK
Leuze electronic
MSI100
CONFIRM
E-STOP PB
I0 I1 I2 I3 I4 I5 I6 I7 I8 I9 I10 I11
LCA
LCB
VIO
YEL
VIO
YEL
RESET SWITCH
GRY
BRN
+24V
(JUMPER +24V FROM KEYSWITCH)
VIO
202
SAFETY ENABLE
O0 O1 O2 O3 I12 I13 I14 I15 I16 I17 I18 I19
VIO/RED
YEL/RED
SOA SOB
(LOCATED IN RUNWAY ENCLOSURE)
Title
SAFETY CONTROLLER SCHEMATIC ONE ZONE
Project
Client
ACER INC
File
ED5033 Safety Controller MSI100 STANDARD.vsdm
Drawing No.
ED5033
Drawn
Rick Aylsworth
Edited
2 Dec 2015
Created
29 Jul 2015
Scale
NONE
Page
1 of 1
ACER INC

6.11 TROUBLESHOOTING THE SAFETY SYSTEM

Most problems that are likely to occur can be readily diagnosed using the messages on the Main screen, the input status on the Main screen, and the LED indicating lights on the Safety Controller in the Operator Console.

The most common problem you may encounter is that the Ranger RS system cannot be enabled or is disabled by a random E-stop not caused by the operator. The random E-stop could be of an intermittent nature and would be hard to diagnose without understanding the Safety system.

Main screen - The text at the top of the screen will show the cause of an E-stop condition as long as the condition still exists

Safety Controller - LEDs are located on the Safety Controller and are very useful for troubleshooting. The Safety Controller is located in the Operator Console. See the diagrams above. Any change of indicators from the diagram implies an abnormal status. Note that the Obstruction Sensors are not wired through the Safety Controller—they input directly to the PLC, which in turn provides Safety Enable to the Safety Controller.

6.12 DIAGNOSING AN E-STOP PROBLEM THAT IS NOT INTERMITTENT

The E-stop cause is continually displayed at the top of the Main screen. Check the message at the top of the screen to determine what device is causing the E-stop. Use the guide below to narrow down the source of the problem.

E-stop button - Check to see that it is not depressed. Check the wiring to the E-stop button for damage or disconnection. Replace the entire switch or both contact blocks on the switch if no wiring problem is found.

Light Curtain - First verify that both the Receiver and the Transmitter have green LED lights lit. Check the wiring for damage if one of the lights is not lit. If the red LED on the Receiver (unit closest to Operator console) is lit the Light Curtain is not aligned properly. An amber LED indicates that the Light Curtain alignment is poor or the lens is dirty. Re-align both the Transmitter and Receiver as covered in the Maintenance section under Adjustments. Replace the Light Curtain if the problem cannot be solved with alignment or wiring repair.

Obstruction Sensor - Verify that the green power LED is lit on each of the Obstruction sensors. The amber LED on the sensor should be lit if the beam is not broken. Check the green LED on the corresponding input in the Trolley Electrical Enclosure. The input LED should always be lit when the amber LED is lit on the sensor. A damaged or broken wire is the most likely cause if it is not lit. If wiring checks out, replace the sensor. The angle of the obstruction

sensors should be adjusted as follows: For 16’ lumber systems, the laser spot should be 53” above the floor at a distance of 100” from the back of the sensor. For 20’ lumber systems, the laser spot should be 53” above the floor at a distance of 124” from the back of the sensor.

6.13 DIAGNOSING AN INTERMITTENT E-STOP PROBLEM

No message will be retained at the top of the Main screen if the E-stop cause is intermittent. Most intermittent E-stop conditions will be caused by the Obstruction sensors or the Light Curtain being out of alignment usually due to being bumped. A damaged or worn cable in the Cable Carrier connected to the Trolley could also be responsible.

7 MAINTENANCE

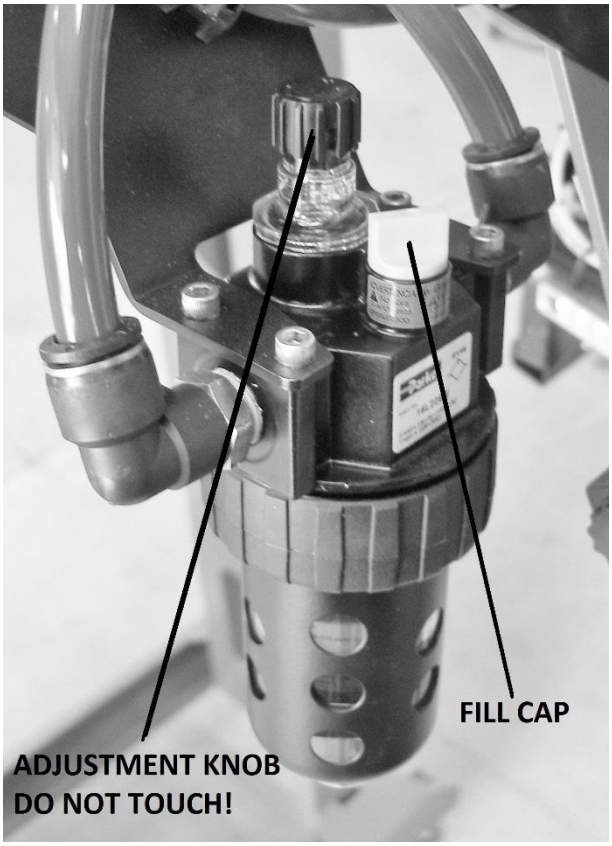
Proper maintenance will keep your Ranger RS working efficiently and minimize downtime.

7.1 DAILY

- Inspect all safety guarding to make sure it is in place and fasteners are tight. Repair if problems are found.
- Check the safety system for proper function - blocking the Light Curtain or pushing the E-stop button should cause the air system to exhaust. Repair any problem found before operating.
- Test the Trolley brake system for proper operation by breaking the Light Curtain beam when the Trolley is moving. The stopping distance recorded during the stop is displayed on the manual screen. This distance should be 20” or less. Repair the brake system immediately if the value is over 20”. Failure to do so may result in machine damage, injury or death.
- Replace pickup screws before starting a work shift.
- Check for loose fasteners, wires or airlines. Note that the picking head main cylinder rod nuts must be slightly loose to allow self-alignment. Tightening those nuts may cause the picking head to bind.
- Listen for air leaks while the system is energized.
- Any unusual noises while operating should be investigated immediately.
- Remove any debris that has accumulated in the cable carrier channel or on the Runway wheel path or other parts of the machine.
- Inspect Trolley Brake for pad material wear. For reference, a new pad is 1/2” thick. Replace brake pad when excessively worn.

7.2 WEEKLY

- The air motor lubricator should be checked weekly and refilled as needed. **ATTENTION**: Air pressure must be removed from the system to add oil. Remove the fill plug and add **10 weight air tool oil**. The black flow setting knob is factory set—do not alter the setting. Note that the drip rate observed in the dome is 33 times the actual drip output to the air motors. The air motors need only a minimal amount of oil; more will just make a mess. Oil flows only when air flows, as the motors run.



7.3 MONTHLY

- Check for proper drive belt tension and re-tension if necessary. Overtightening the belt will cause premature failure of bearings in the rollers and drive. A belt that is too loose will cause the drive pulley to jump teeth and cause the trolley to lose position.
- Tighten any loose fasteners. Note that the picking head main cylinder rod nuts must be slightly loose to allow self-alignment. Tightening those nuts may cause the picking head to bind.
- Reposition or replace any dangling or chafing wires or air lines.
- Inspect Trolley wheels for smooth operation and clean if needed.

- Inspect air line filter and replace if necessary. A clogged filter can cause low air pressure and system shutdown.

7.4 AIR FILTER CHANGEOUT

The compressed air filter should be changed every 6 months, or whenever low air flow becomes a problem. Shut off and lock out the system air supply, and verify the system pressure has dropped to zero. Depress the latch at the center front of the filter bowl, and rotate the bowl firmly 1/8 turn to the left. It should then come free, exposing the filter element. The black element holder unscrews to release the element. Be sure to replace the black spacer in the correct orientation on top of the new filter, and screw the filter assembly back into the housing. Replace the filter bowl until the latch clicks, and repressurize the system.

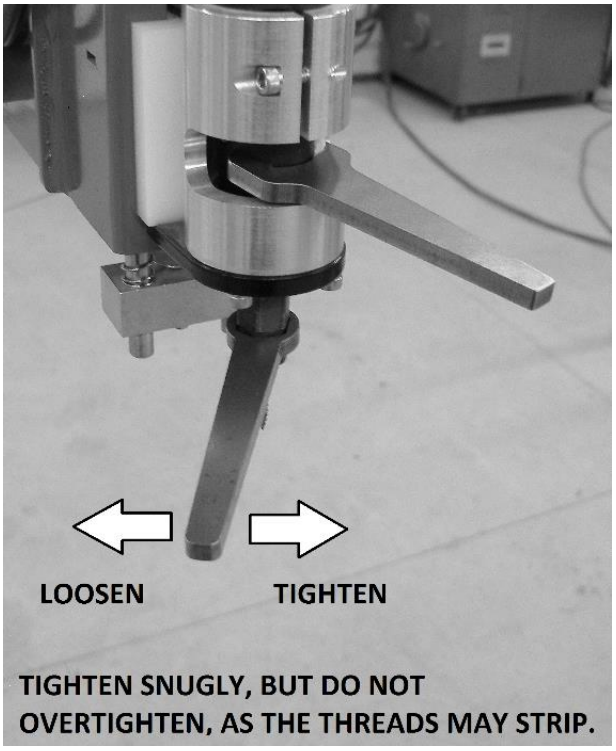
7.5 REMOTE DIAGNOSIS VIA THE INTERNET

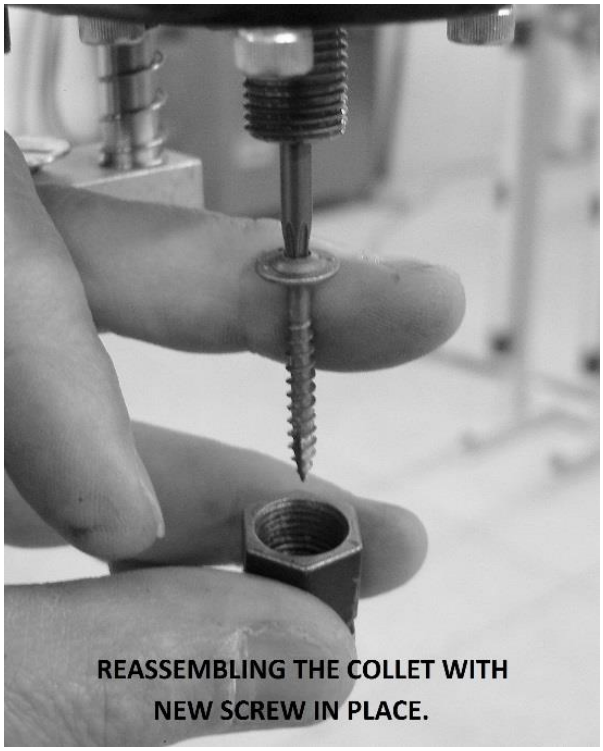
The eWON module in the Operator Console allows a remote computer to access information from the Ranger RS. It is not needed for normal operation. Contact your Ranger RS distributor for more information.

8 ADJUSTMENTS

8.1 PICKUP SCREW REPLACEMENT

Use a screw with an overall length of 1-1/4”. Use a 3/4” wrench to hold the Screw motor arbor and remove the collet nut with a 5/8” wrench. Wrenches are supplied with the machine. The screwdriver bit is free to fall out at this time. Insert the new screw into the collet nut and thread the nut onto the arbor while aligning the screw with the screwdriver bit. Gently tighten the nut - do not over tighten. Over tightening will damage the collet nut and shorten screw life.

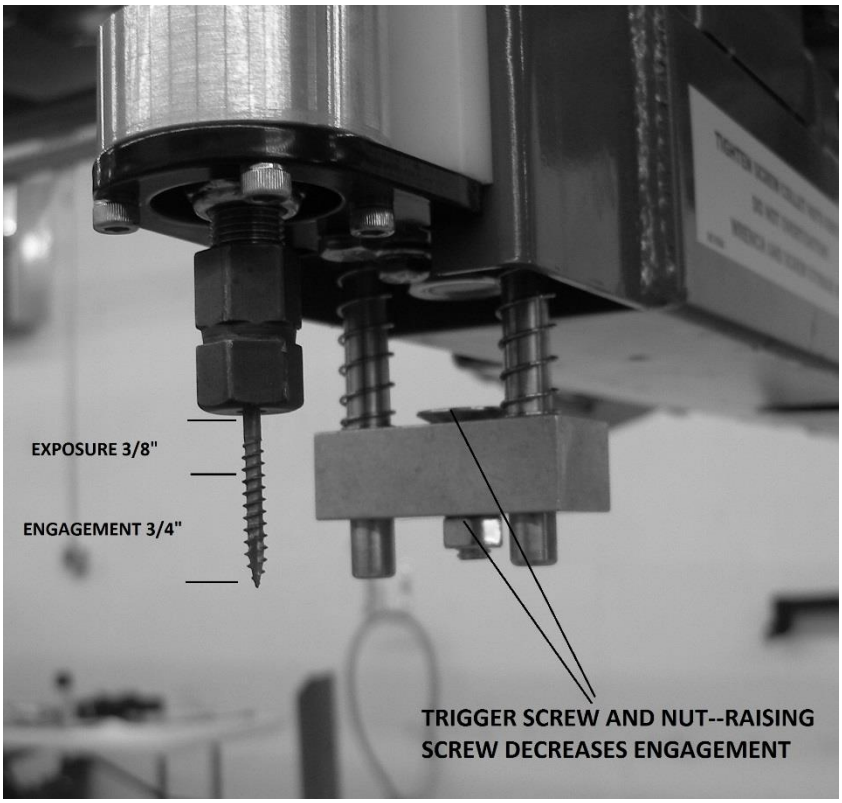




8.2 PICKUP SCREW DEPTH ADJUSTMENT

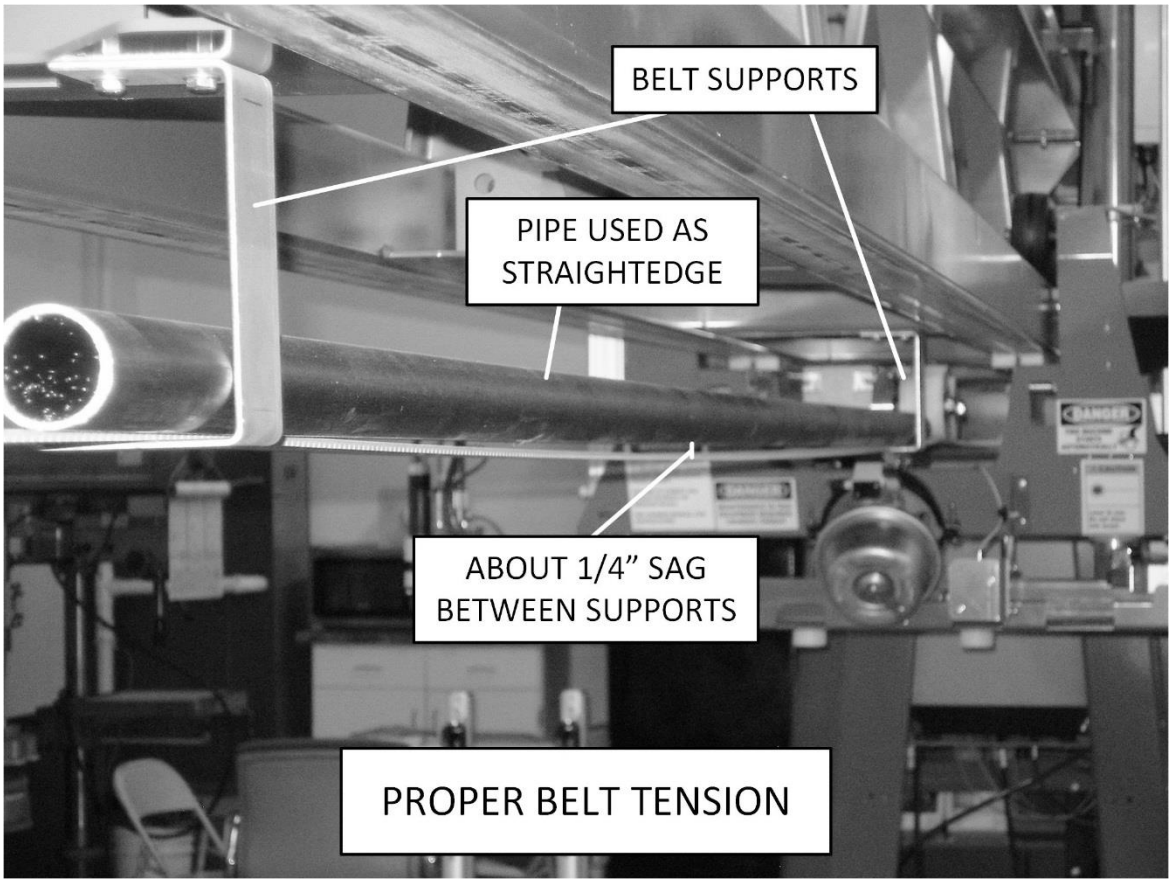
The depth that the Pickup screw threads into the board is adjustable. A 1-1/4” screw should always be used. Depth is set at 3/4” engagement into the board at the factory. A switch on the Pressure Pad is set to trip at the correct depth and shut the screw motor off. See the instructions and pictures below for the adjustment procedure.

1. Pick up a board with the machine using the Manual screen.
2. E-stop the system before entering the Hazardous Zone.
3. Measure the distance from the top of the board to the bottom of the collet nut. This should be about 3/8”, which will leave 3/4” of screw engagement in the board. Too much space between collet and board means that the screw engagement in the board is inadequate. Too little space means the screw is sinking too far into the board, which is unnecessary and slows machine cycle time. The trigger screw sets the engagement depth by triggering a sensor that stops the screw motors. Loosen the locknut and thread the trigger bolt clockwise/downward to increase the screw engagement depth or counter-clockwise/upward to decrease. Re-tighten the locknut and retest the engagement depth.



8.3 DRIVE BELT TENSIONING

Park the Trolley at either end of its travel. Press the E-stop button to disable the system. Locate a very straight 2x4x12' board and place it on top of the belt. In the photo below, a piece of pipe was used, but a straight board will work as well. The board should span between two of the belt support brackets. Measure the sag in the belt at mid span. This is the measurement between the bottom of the 2x4 and the top of the belt. Sag should be about 1/4" (6mm). Running the belt too loose will cause it to jump teeth and the Trolley will lose its correct position. Overtightening the belt will greatly shorten belt and bearing life. An overtightened belt will emit a whining sound during operation because the belt no longer fits the pulley tooth spacing.



8.4 PRESSURE SWITCH ADJUSTMENT

The purpose of the pressure switch is to provide a warning and prevent operation when the air pressure to the system is below the required pressure. While the low pressure warning is set at 75 psi, optimum regulator pressure is 90 psi. Supply air into the regulator should be 100-120 psi. Low pressure will not allow the safety brake to release and will impair other functions. The pressure switch is provided with an LED light that illuminates if the pressure is high enough for system operation and an output signal is sent to the Ranger RS's computer. Setting the pressure switch is a simple push button operation which is detailed below.

1. Enable the system to allow air to reach the pressure switch. A disabled or E-stopped system will not allow the adjustment
2. Turn the main regulator control knob counter-clockwise to lower the system pressure to 75 PSI. Using a pen or pencil, push and hold the set button on the pressure sensor until it flashes continuously. Release the button and reset the main regulator to 90 PSI by turning the knob clock-wise to increase the pressure to 90 PSI.

PUSHING SET BUTTON ON PRESSURE SWITCH

8.5 ALIGNING THE LIGHT CURTAIN SENSOR

A misaligned Light Curtain may cause random E-stops or prevent the system from operating altogether. Use the following procedure to correctly set the alignment. The green LED on the receiver (sensor closest to the Operator's console) is steadily lit when the alignment is satisfactory. Amber or red LED's on the Receiver indicate an improperly aligned Light Curtain. A green LED on the Transmitter end of the Light Curtain shows only that power is present. The Transmitter is equipped with a laser alignment system to help align it to the Receiver.

1. Depress the E-stop button with the system powered up. Do not enable the system.

2. First plumb the Receiver using a small level on the front face.

3. Locate the small magnet that was shipped with the system, which is normally stored inside the Operator Console. This is used to turn on the laser alignment beams on the Light Curtain Transmitter. Hold the magnet over the bottom portion of the front face of the Transmitter as shown in the picture, and slide it up and down. This can take a few seconds and a bit of

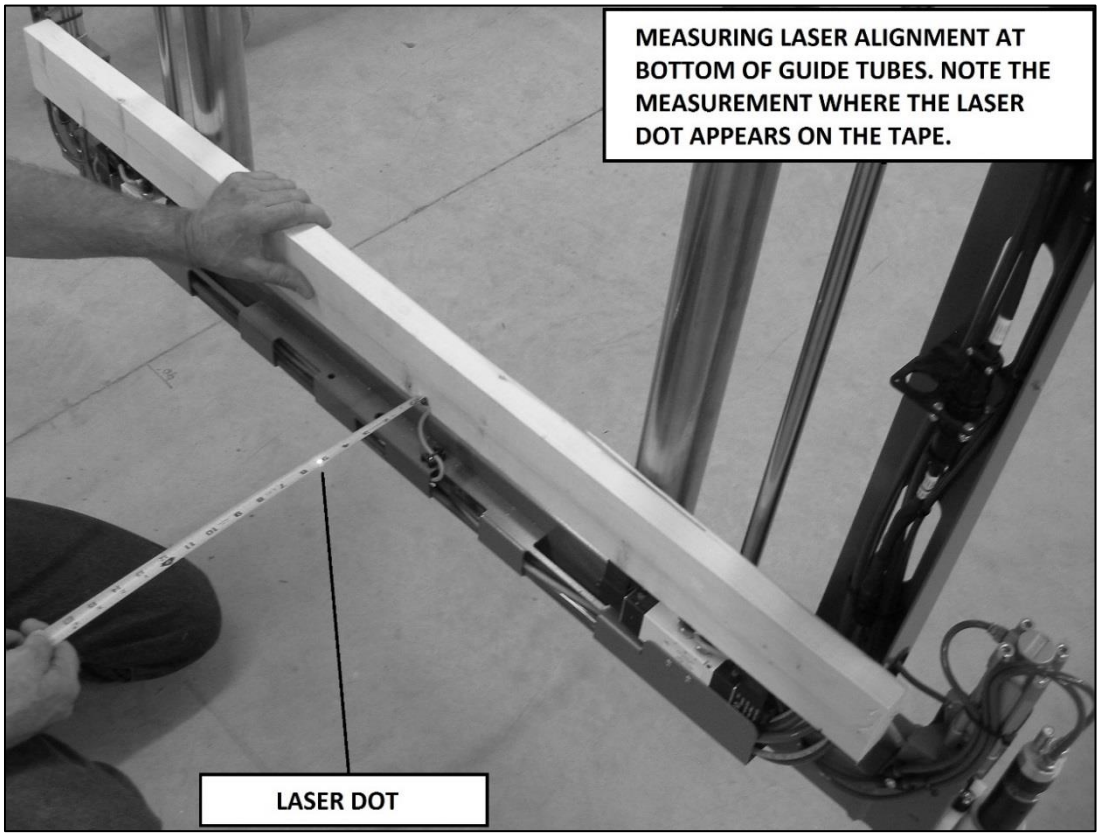
patience, and the 3 red laser beams will illuminate. Use the top and bottom bracket adjustments to aim the laser beams at the Receiver windows. They do not have to be perfect- just close is fine. Tighten the adjustment screws when alignment is complete. The red alignment beams will go off automatically after some time.

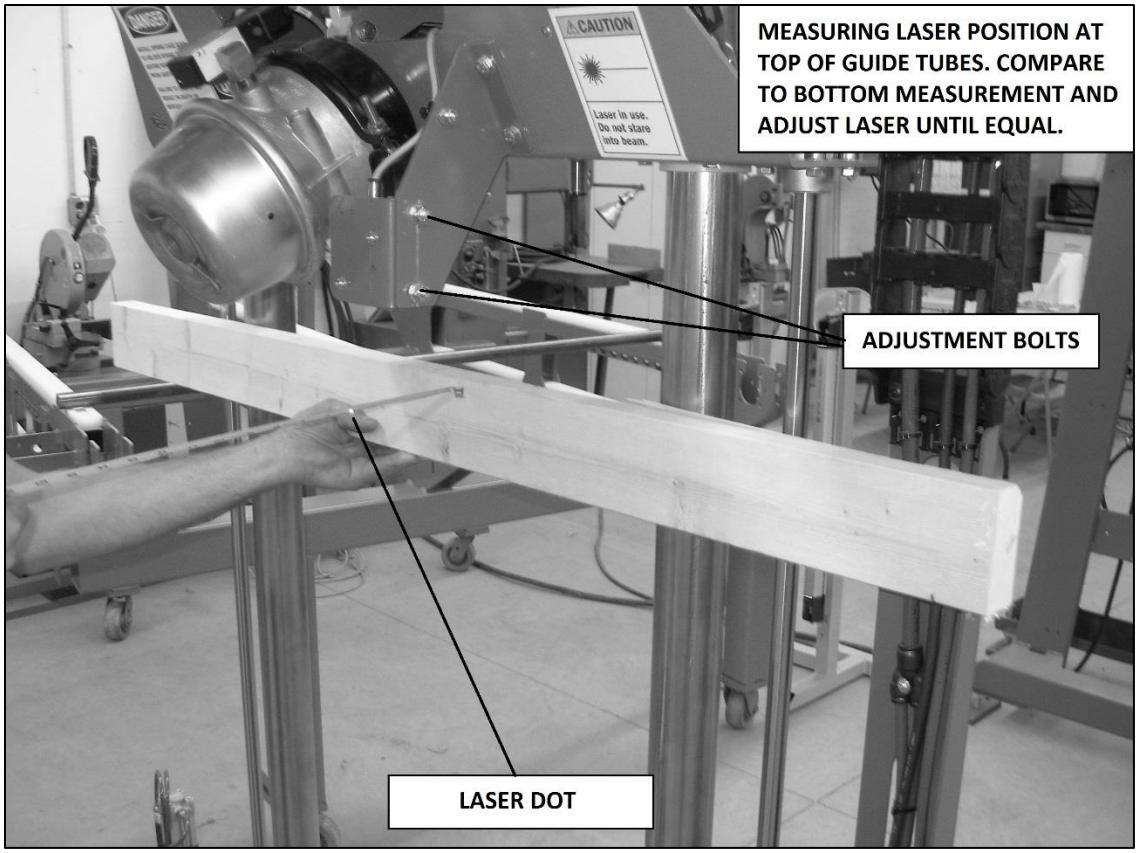
4. Loosen the adjustment screws on the Receiver and rotate it until the green LED is lit. Sweep it left to right to locate the midpoint of the “on” (green LED) before tightening the adjustment screws. Amber or red LED’s indicate misalignment.

8.6 ALIGNING THE LASER LUMBER SENSOR

It is important that the Laser sensor beam is aligned parallel to the Picking head vertical travel. A misaligned Laser will cause the Pickup Screws to land off center on the board when the lumber stack is low. Follow this procedure to correct the alignment.

1. Energize the system and use the manual controls to lower the Picking Head to its lowest level. Press the E-stop button before entering the Hazardous Zone.
2. Place a straight board against the guide tubes as LOW as possible. Hold a tape measure against the board in a position where the laser dot shows on the tape, and note the measurement.
3. Repeat the measurement with the board against the tubes as HIGH as possible.
4. If the measurements from step 2 and step 3 differ by more than 1/8" (3mm) you will need to re-align the Laser. Slightly loosen the adjustment bolts and move the laser slightly until top and bottom readings are within 1/8" (3mm). Tighten bolts when adjustment is complete.
5. Verify proper laser operation with the following procedure: Hold an object under the laser, and move it vertically up and down. Have a second person monitor the Current Height reading on the Manual Control screen. The reading should follow the movement, indicating approximate height above the floor. There are dead zones above and below the operating range, in which the height will read zero. It should read zero when the laser spot hits the floor, or an object less than 10" below the laser housing. See photos below.





8.7 TROLLEY BRAKE

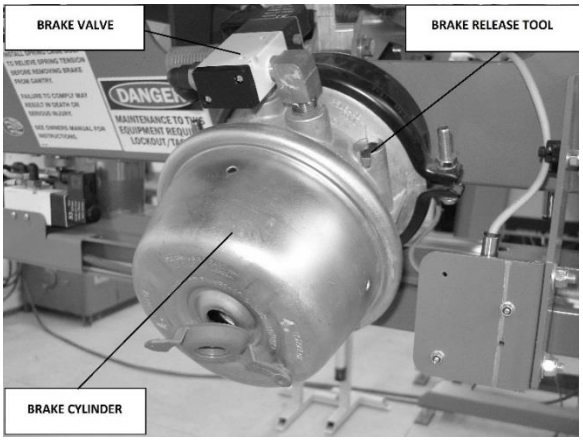
DANGER - <u>DO NOT</u> attempt to take the brake chamber apart. Never loosen either of the band clamps on the brake chamber. The brake chamber contains a large spring which is compressed and could cause severe injury or death to anyone servicing the brake system. Replace the entire brake chamber as a unit if service is required.

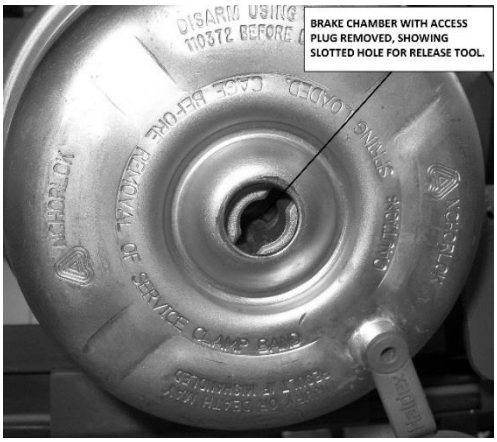
To Remove the Brake Chamber:

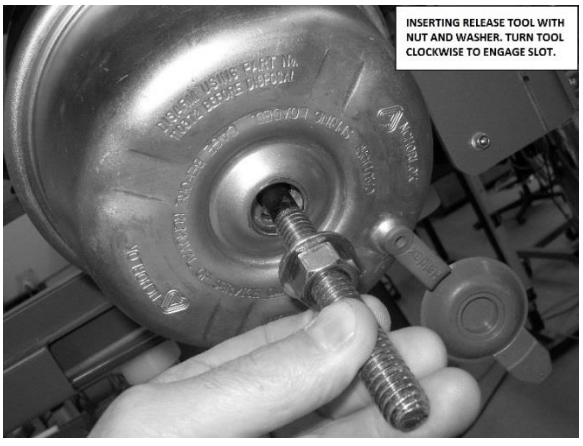
DANGER- <u>Do Not</u> attempt to remove the brake chamber from the Trolley without caging the spring as outlined below. Failure to comply may result in severe injury or death.

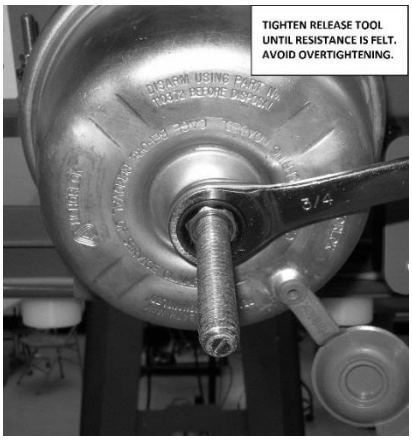
- Follow all safety precautions found in this manual and on the brake chamber.
- Disconnect the air line at the valve located on top of brake chamber.

- Insert release tool into the hole in the back of the brake chamber by aligning the tabs on the tool with the slots on the brake chamber. Applying slight inward pressure, turn the release tool clockwise ¼ turn until it locks in. Tighten the nut to fully compress the internal spring. You will feel a moderate resistance while the spring is being compressed. The nut should be tightened several turns until it bottoms out and increased resistance is felt. <u>DO NOT OVER TIGHTEN</u>! The spring is now caged.
- With the spring caged, the brake chamber may now be safely removed. The chamber is mounted with two studs. Remove the nuts and the clevis pin, and the chamber will come free.
- Reverse the above steps to uncage the brake.









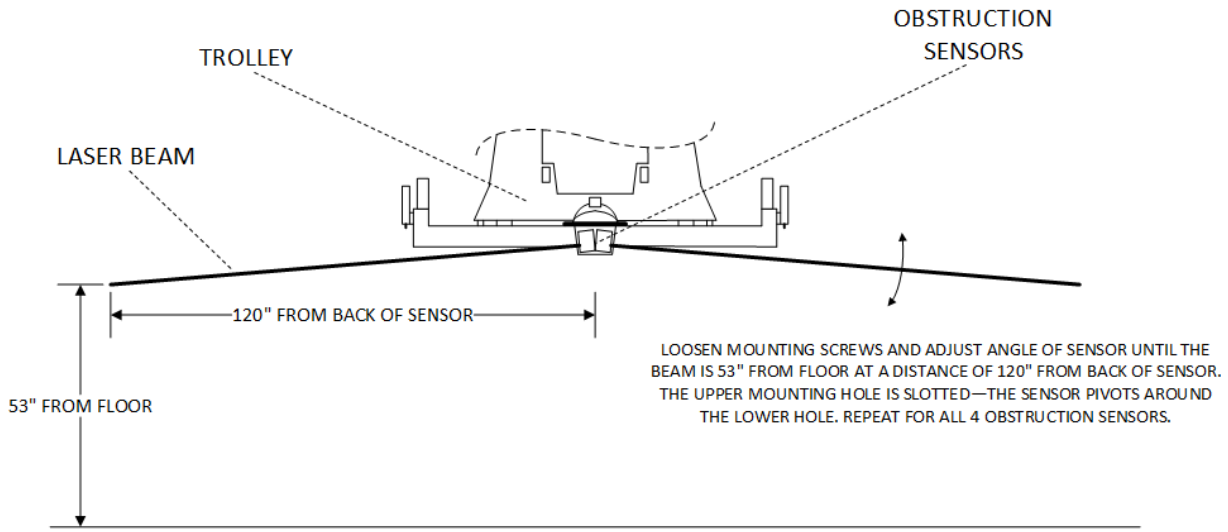
8.8 BRAKE PAD ADJUSTMENT

Cage the brake to fully retract the brake pads. Measuring at the center of the pad, each brake pad should have about 1/8” (3mm) clearance when the brake is released. Because the brake pads are connected by an equalizer beam, the clearance of each pad is variable. If more than 1/8” average clearance exists, the brake should be adjusted. The adjustment is accomplished by unpinning the clevis from the brake linkage, loosening the jam nut, rotating the clevis on the threaded shaft, and retightening the jam nut. It is necessary to remove the brake chamber, adjust the clevis, and remount the chamber to check the adjustment. See the above section for caging and removing the brake chamber**. If the clearance needs to be decreased, the clevis should be threaded out farther from the brake chamber.**

8.9 OBSTRUCTION SENSOR ADJUSTMENT

The Obstruction Sensor detection distance is factory set to suit the longest lumber handled by each machine. If a sensor is replaced, the angle should be set as illustrated below.

OBSTRUCTION SENSOR ANGLE ALIGNMENT



(NOT TO SCALE)

8.10 HEAD UP & HEAD DOWN SWITCH ADJUSTMENT

The Head Up and Head Down photo eyes on the trolley are factory set and should need no adjustment. If replacement is necessary, the switches must be adjusted to trigger properly, as follows.

1. The Head Up switch should be installed so that the face of the sensor protrudes 3/4” from the bottom face of the trolley frame.

2. The Head Down switch should be installed so that the face of the sensor is 1.5” above the bottom face of the picking head tube. The tape measure can be inserted up into the hole from below.

9 TROUBLESHOOTING

See Section 6 SAFETY SYSTEM for troubleshooting information for the safety devices and safety system.

SYMPTOM	PROBLEM	CAUSE/SOLUTION
System will not power up, no lights in Runway Enclosure.	No incoming power or main disconnect shut off. Circuit breaker for power supply tripped. Faulty power supply.	Have electrician check incoming power. Reset circuit breaker. Replace power supply.
Operator Console PC will not start, but Runway Enclosure has lights.	Problem with I/O cable to console. Faulty Keyswitch or PC. Faulty wiring inside console.	Check cable, reconnect, repair, or replace. Repair or replace. Repair.
System enables and trolley moves, but Inputs & Outputs in Trolley Enclosure not working.	Unplugged or faulty Ethercat cable from Runway Enclosure to Trolley.	Plug cable in or replace it. System reboot is necessary after connecting any Ethercat cable.
System enables but trolley will not home.	Unplugged or faulty Ethercat cable. Brake not released.	Plug in or replace cable. System reboot is necessary after connecting any Ethercat cable. Check air supply, inspect brake for mechanical problems. See 8.7-8.8. Reset breaker.

	Motor drive circuit breaker tripped. Motor drive power supply or inverter tripped.	Reset drive by pressing button on Main screen.
System will not enable.	Safety system has tripped. Head Up sensor not detecting head-up condition.	See section below. Verify that head is up, adjust or replace sensor.
Safety system will not reset.	Light curtain not aligned. E-stop switch pushed in or faulty. Obstruction sensor or light curtain blocked or faulty. I/O cable unplugged or faulty to Trolley or Console. Faulty safety controller.	Align light curtain, see Section 8.5 Check or replace. Check connections, check for damage to wiring. Check connections or replace cable. Check connections, replace.
Low Air notification on screen, but incoming air pressure is correct.	Safety Lockout valve is closed. Dump valve not opening. Filter plugged. Faulty pressure switch.	Open valve Verify dump valve cable is connected, replace switch. Replace filter element. Check connections, check for oil from plant air line, replace switch.

One of the solenoid air valves will not operate even from Manual screen.	Cable disconnected or faulty. Faulty valve.	Check connections, replace cable. Verify air supply is clean and not oily. Replace valve.
Infeed Deck motors will not operate, even from Manual screen.	Circuit breaker tripped. Motor drive shutdown. Wiring problem to motor. Faulty motor.	Check for mechanical problems, or faulty gearbox. Check fault codes—use extreme caution while opening a live panel. Reset drive by turning power off, then on. Check wiring and repair. Replace.
Trolley hits end stop when homing. Trolley hits end stop when homing	Misaligned Home switch or faulty connections. Jog deceleration set too low.	Adjust Home switch gap to 1/16”. Check wiring and connections, replace switch. On Settings screen, ensure Jog Decel is set to 40.
Trolley hits Away end stop	Max Position setting incorrect	Set Max Position to 1” from Over-Travel Stop Target
Pickup Screws consistently off-center in board	Laser alignment or Laser Horz Offset value set incorrectly.	Re-align laser using instructions in Section 8.6. Check Laser Horz Offset in Settings screen—value should be set to 7.0”.
Lumber piles not detected in scan.	Laser or Input module problem.	Check cable connections and wiring, replace cable, replace laser. Verify laser function, see Section 8.6, step 5.

Noisy drive belt	Belt too tight.	Re-tension belt, see Section 8.3.
Trolley does not stop rapidly when light curtain is broken, but brake valve activates.	Brake pads worn or contaminated, mechanical problem in linkage. Release tool left installed in brake chamber.	Adjust brakes, replace lining, repair linkage or valve. Remove tool after servicing brake chamber, place in storage hole.
Air dump valve does not drain air when E-stop or light curtain are activated.	Dump valve sticking.	Replace valve, ensure air supply is clean and oil-free.
Pickup screw engagement in board is inadequate.	Pressure pad misadjusted, or incorrect screw length.	See Section 8.1-8.2.
Pickup screw motor does not shut off after screw threads into board	Faulty or misadjusted pressure pad switch.	See 8.2 for adjustment, check connections, replace switch.
Screw motor will not run, even from manual screen.	Pressure pad sticking or misadjusted, keeping switch activated. Air valve or cable problem. Faulty screw motor	Adjust or repair. Check connections, replace valve. Replace
Picking head binds and does not move freely up and down.	Guide tube bearings misaligned, or nuts on main cylinder rods too tight.	The rod nuts and washers on the main cylinders should be slightly loose to allow self-alignment. It should be possible to grab the lower end of the rod and wiggle it within the hole in the picking head.

10 DETAILED PARTS IDENTIFICATION

NOTE: The parts listings only include parts which might be needed for repairs and are not easily available from other sources. Thus common fasteners and fittings are not listed and can be procured locally. Please feel free to contact the manufacturer if you need assistance with parts.

10.1 CABLE LIST

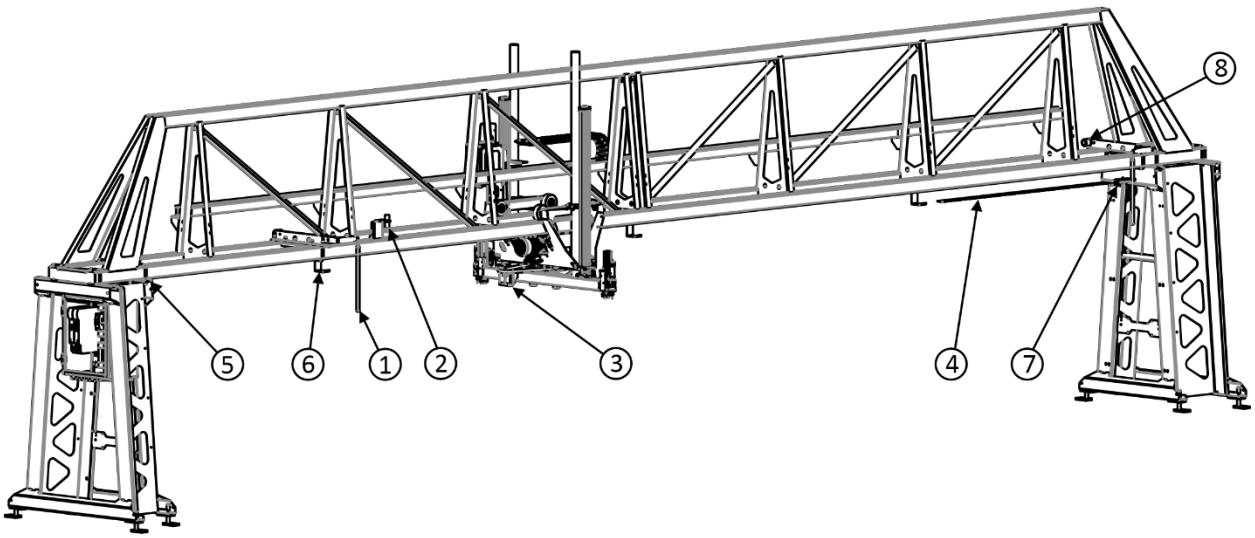
Keyed to System Overview drawing, Section 11.1

Key #	Description	Acer Part#
1	Motor Cable (Runway-Trolley)	ED5041-XX
2	Resolver Cable (Runway-Trolley)	ED5040-XX
3	M8 3-pin 2 meter cable (Pressure Sensor)	EP5021
4	Light Curtain cable M12 8-pin 10 meter*	EP5169
5	Picking Head Harness	ED5032
6	Picking Head I/O Cable	ED5022
7	I/O Cable, Console-Runway	ED5021-XX
8	I/O Cable, Console-Infeed	ED5002-XX
9	Light Curtain cable M12 8-pin 3 meter*	EP5166
10	M12 4-pin 5 meter cable	EP5020
11	Resolver Cable Trolley Head	EP5160
12	M12 4-pin 5 meter 90 degree	EP5006
13	Ethercat cable Runway/Trolley	ED5011-XX
14	Ethercat cable Console/Runway	EP5082-XX
15	I/O Cable Trolley Head	ED5031
16	Lumber Roller Sensor Cable	EP5141
17	Motor Cable Trolley Head	EP5215

***Cable may be custom-made to a different length to suit a particular system.**

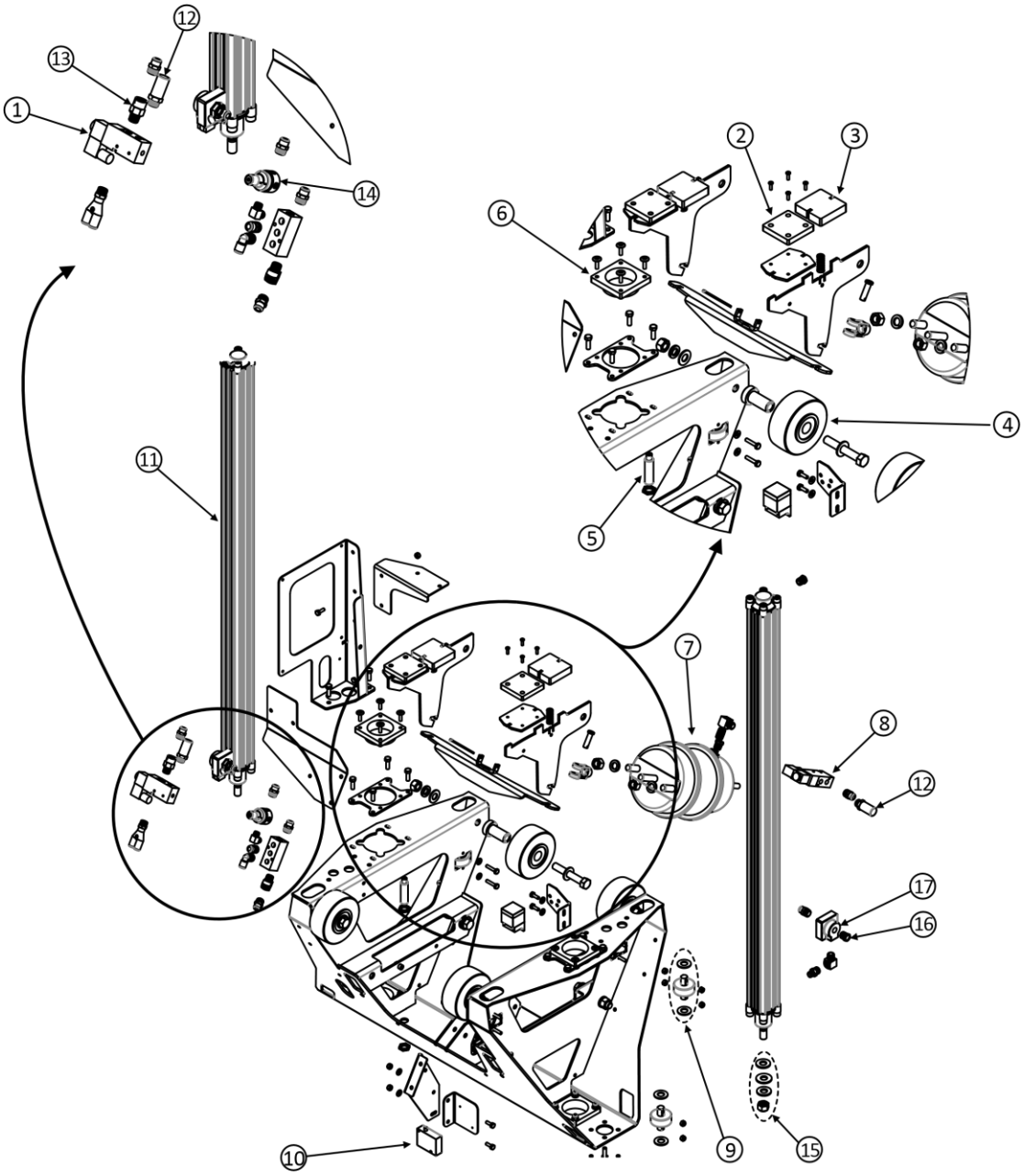
Cables with a –XX suffix, which indicates length, will vary with system size and configuration.

10.2 RUNWAY



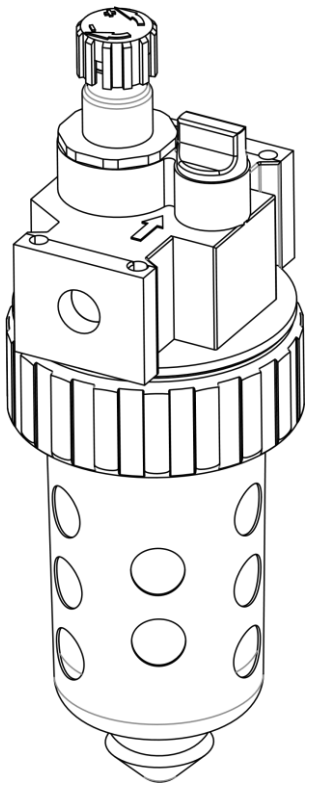
1	Over-travel stop target	PC5149
2	Home switch	EP5173
3	Obstruction sensor	EP5224
4	Drive Belt	PC5027
5	U-bolt	PC5134
6	Belt hanger	MC6144
7	Belt tensioner assembly	SA5396
8	Rubber bumper	PC5136

10.3 TROLLEY

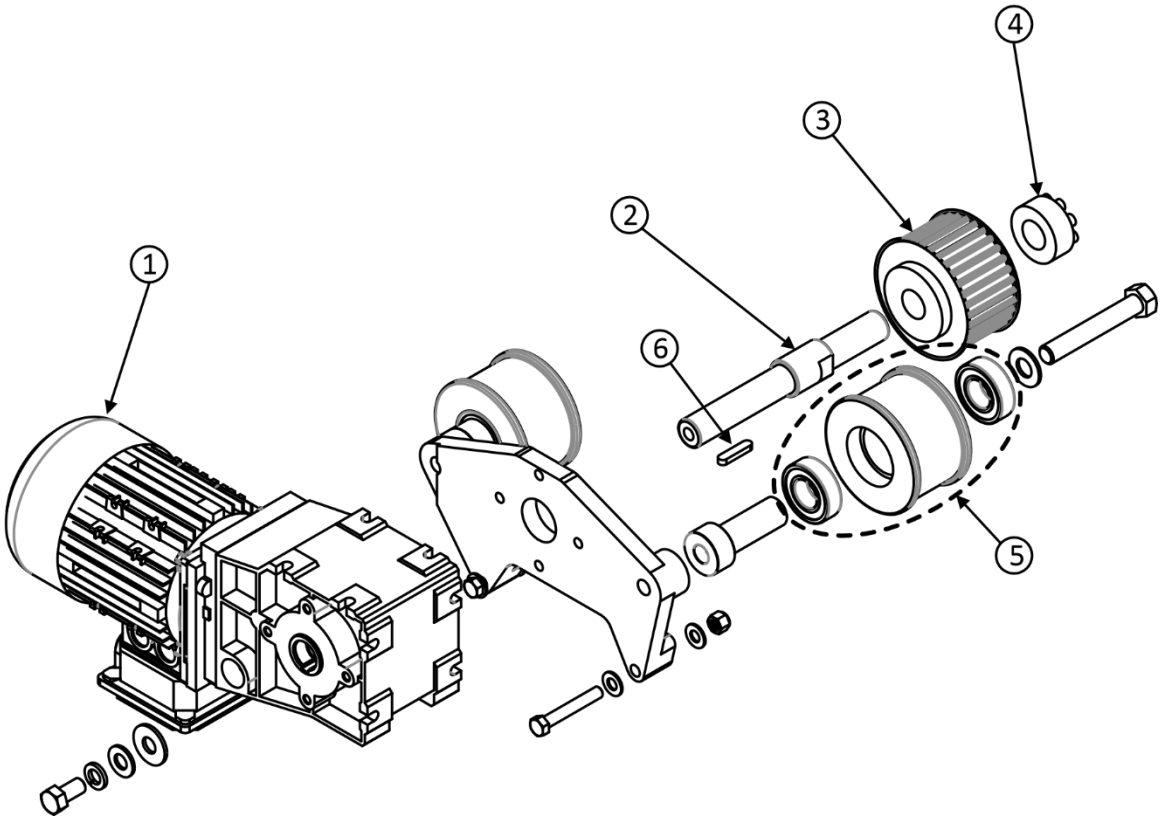


1	Head Down Valve	SA5382
2	Brake Pad Replacement Kit, includes wiper & spring	SA5393
3	Wiper Pad	MC6173
4	Wheel	PC5064
5	Head Up Switch	EP5213

6	Head Bearing	MC6172
7	Brake Chamber	PP5200
8	Brake Valve	PP5135
9	Side Guide Wheel & Axle Kit	SA5397
10	Laser Lumber Sensor	EP5000
11	Picking Head Cylinder	PP5174
12	Brass Cone Muffler 3/8”	PP5146
13	Check Valve	PP5205
14	Preset Regulator	PP5186
15	Cylinder Washer & Nut Kit	SA5395
16	Brass Muffler 3/8”	PP5149
17	Quick Exhaust	PP5094
18	Lubricator (drawing below)	PP5206
19	1/2” Tube x 3/8” NPT 90 degree fitting for lubricator	PP5207

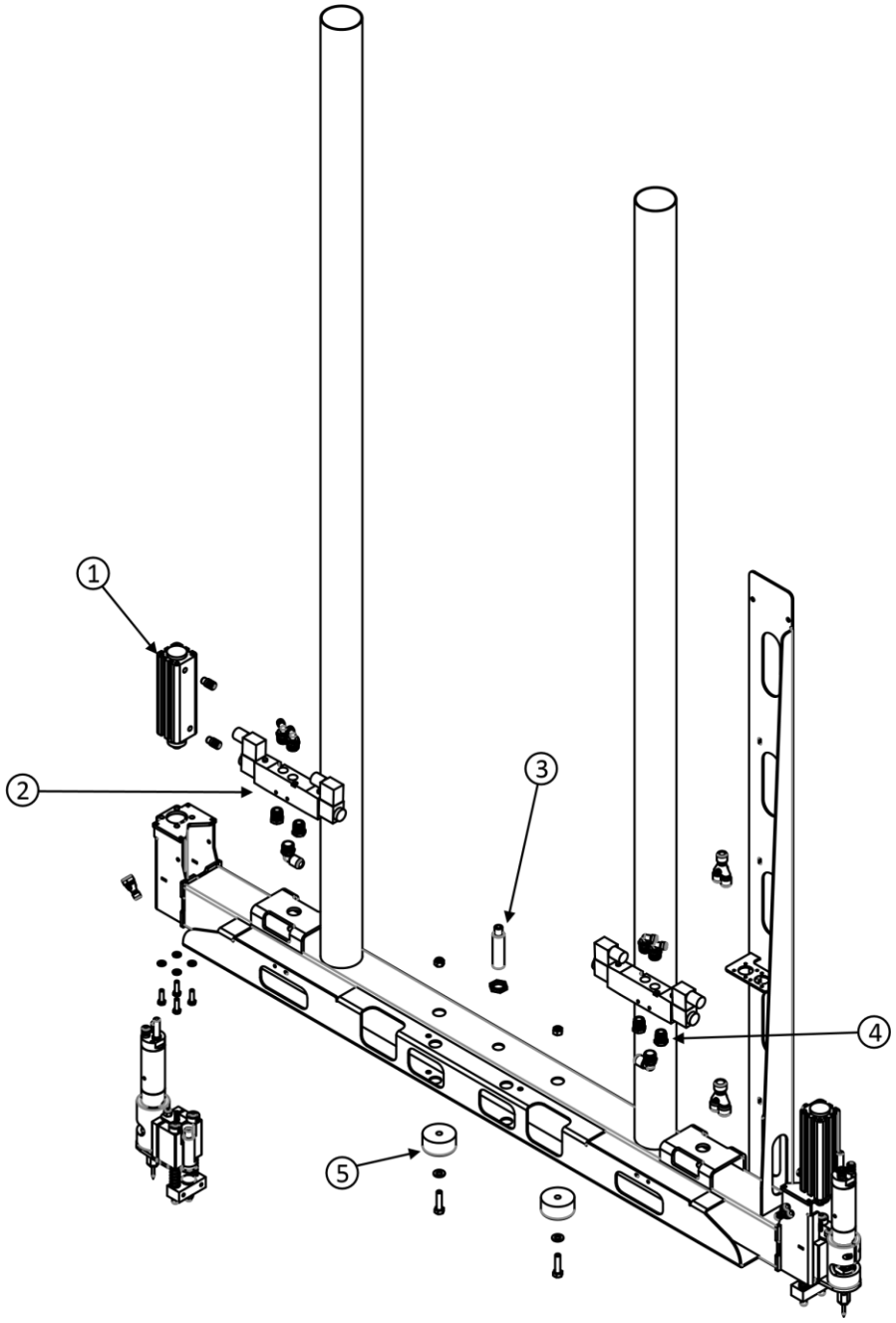


10.4 DRIVE MOTOR



1	Motor Assembly	EP5129
2	Shaft	MC6218
3	Drive Pulley	PC5140
4	Power Lock Bushing	PC5029
5	Idler Pulley with Bearings	SA5394
6	Shaft Key	PC5102

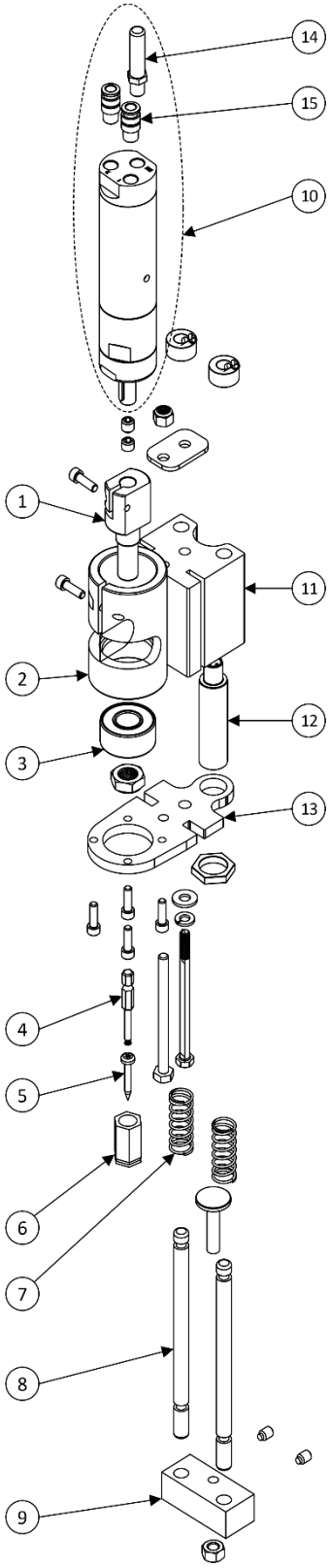
10.5 PICKING HEAD-SCREW



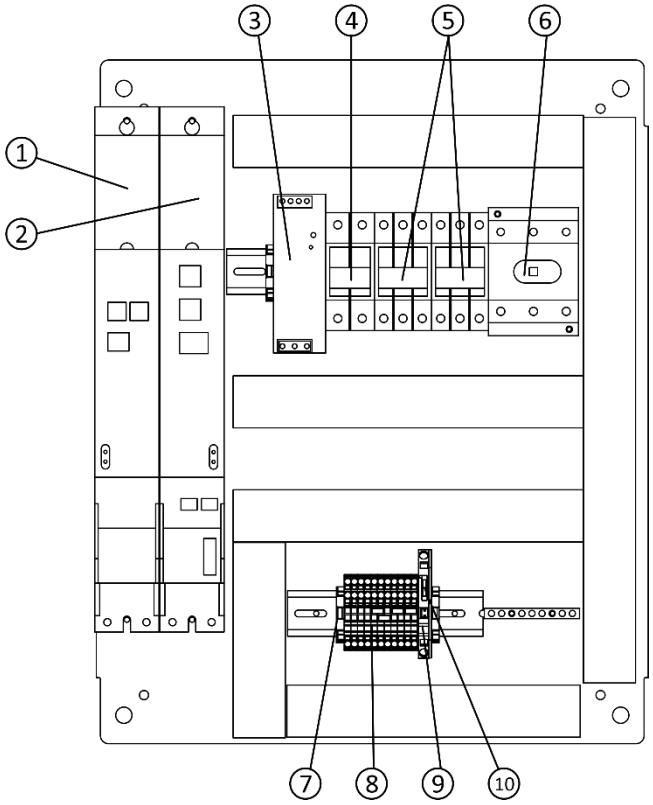
1	Screw Cylinder	PP5174
2	Screw Valve	PP5140
3	Head Down Sensor	EP5213
4	Muffler 1/4”	PP5122
5	Bumper	MC5281

10.6 SCREW MOTOR

1	Arbor	MC5224
2	Screw Housing	MC5220
3	Screw Bearing	PC5006
4	Square Driver Bit 2” long	PC5180
5	Screw #8 x 1.25” Square Drive	PC5181
6	Collet Nut for #8 x 1.25” Square Drive	MC5988
7	Compression Spring .60” OD x .055”	PC5031
8	Screw Pad Pin	MC5144
9	Screw Pad Block	MC5145
10	Air Motor w/fittings & muffler	SA5391
11	Slide Block	MC5135
12	Proximity Switch 18MM	EP5005
13	Motor Plate	MC5137
14	Muffler	PP5085
15	Tube fitting	PP5071
-	Collet Wrench	MC6125
-	Spindle Wrench	MC6124
-	Spindle Service Kit	SA5184
-	(Spindle Service Kit includes spindle, collet nut, driver bit, set screws, jam nut, and wrenches.)	

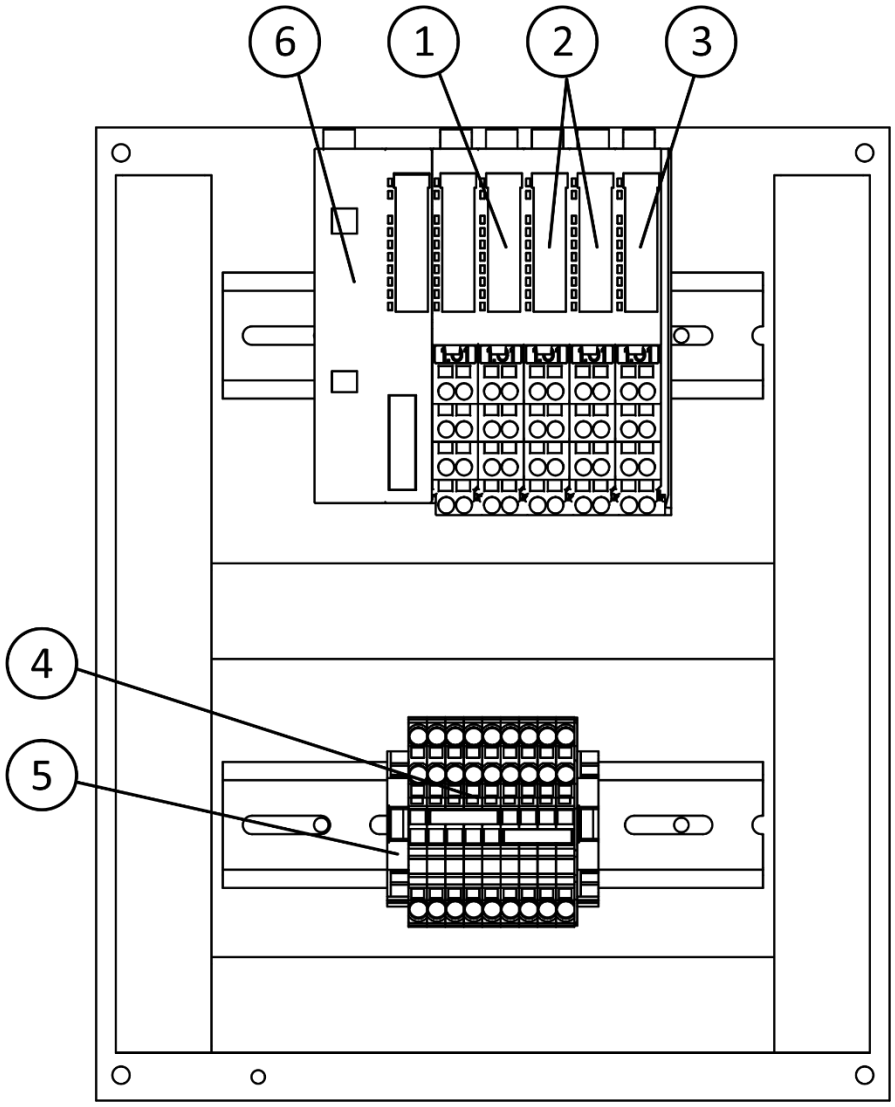


10.7 RUNWAY ELECTRICAL PANEL ASSEMBLY



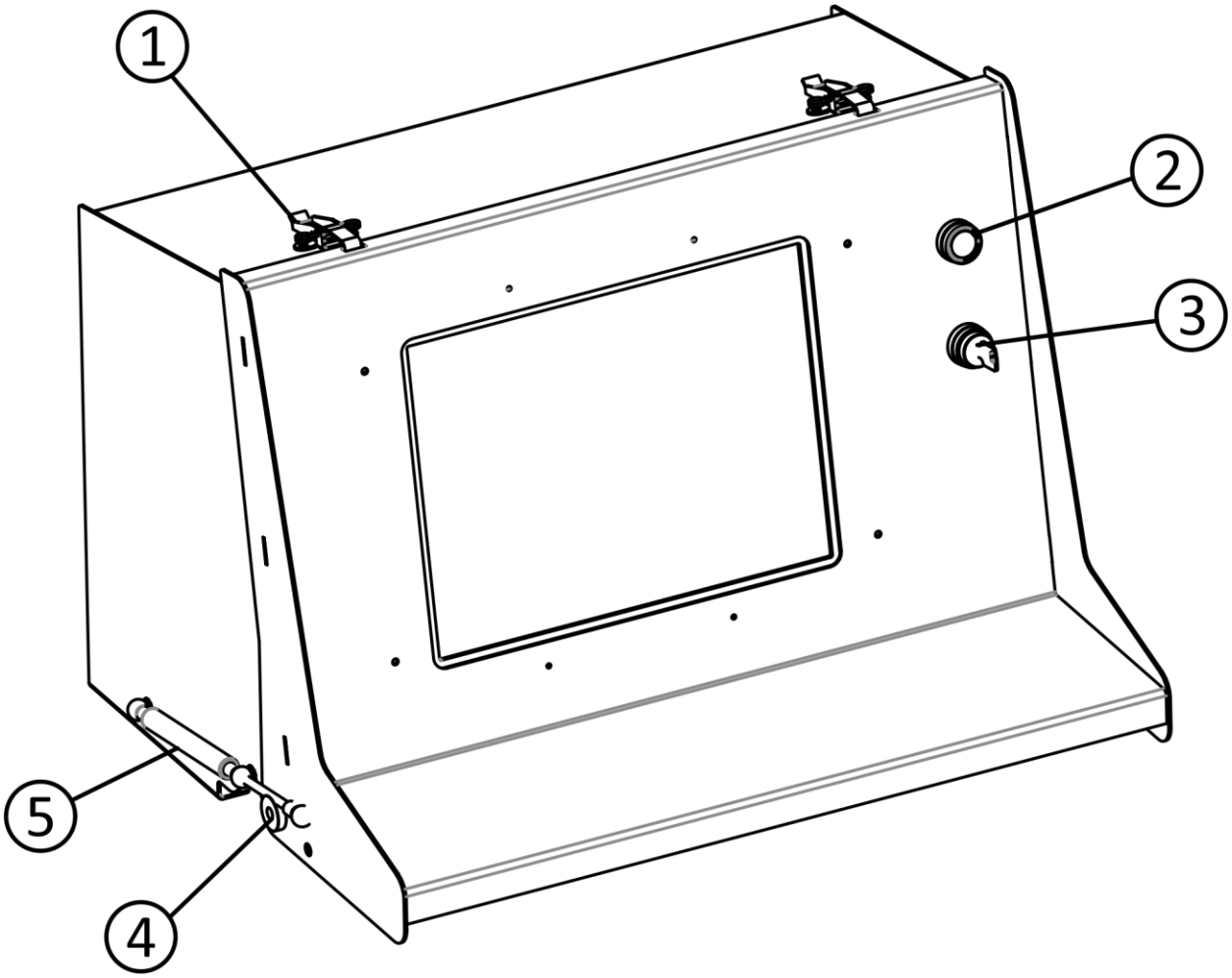
1	Motor Power Supply	EP5119
2	Inverter Drive I700	EP5120
3	24VDC Power Supply	EP5045
4	2 Pole 5 Amp Breaker –24 VDC Power Supply	EP5046
5	3 Pole 10 Amp Breaker – Servo Amp, Infeed Deck (2)	EP5047
6	3 Pole 30 Amp Disconnect Switch	EP5118
7	Wago End Stop	EP5189
8	3 Conductor Wago Block – Gray	EP5190
8	3 Conductor Wago Block – Blue	EP5191
8	3 Conductor Wago Block – Orange	EP5192
8	Wago Jumper 2-way	EP5186
9	Wago Fuse Terminal	EP5143
10	Fuse 5 Amp	EP5144

10.8 TROLLEY ENCLOSURE ASSEMBLY



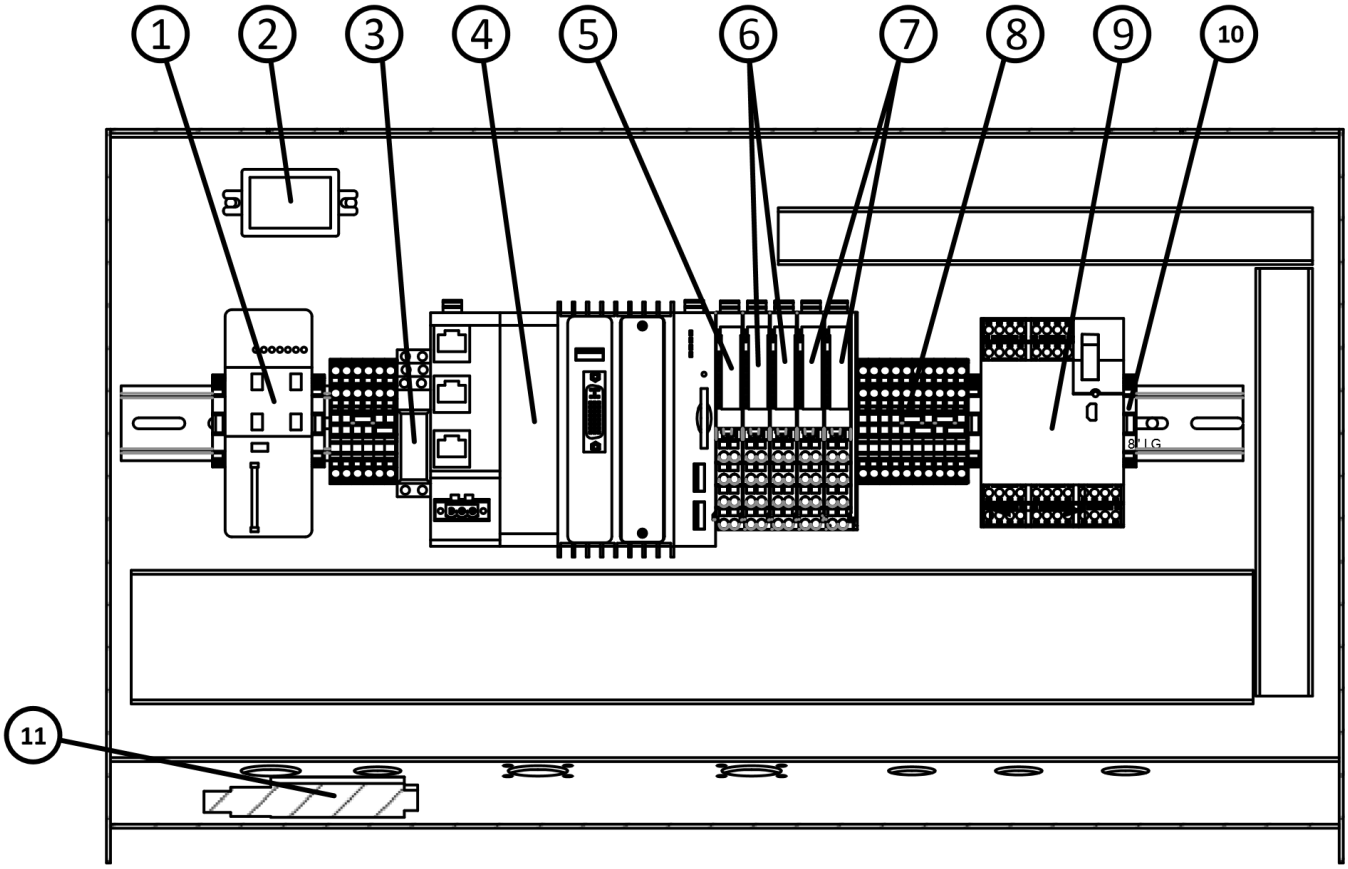
1	Analog Input Module EPB-S402	EP5128
2	Digital Input Module EPM-S202	EP5125
3	Digital Output Module EPM-S302	EP5126
4	Wago Block 3 Cond. Gray	EP5190
4	Wago Block 3 Cond. Orange	EP5192
4	Wago Block 3 Cond. Blue	EP5191
5	Wago End Stop	EP5189
6	Bus Coupler EPM-S130	EP5127

10.9 CONSOLE ASSEMBLY EXTERIOR



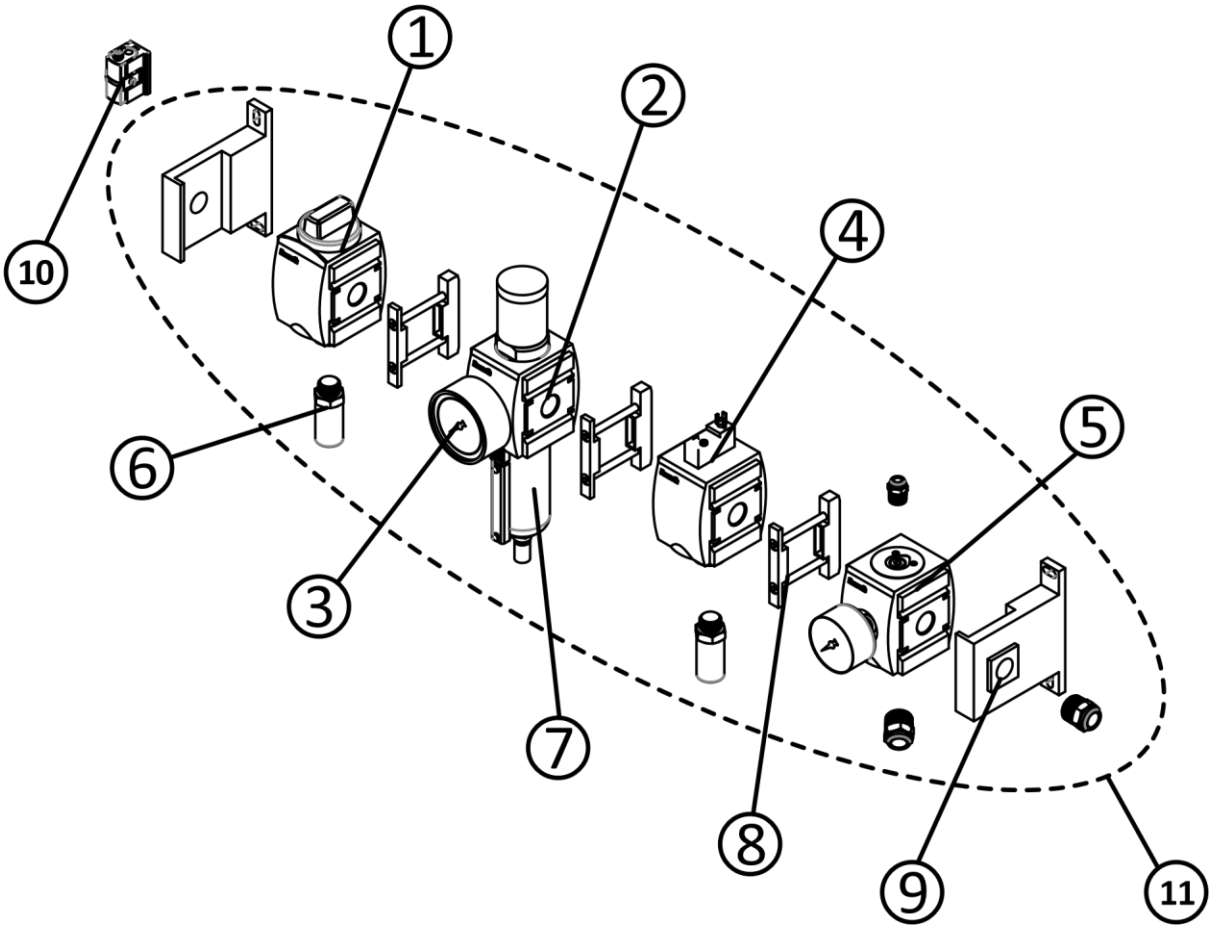
1	Draw Latch	PC5098
2	Red Twist E-Stop Switch	EP5055
3	3 Position Key Switch	EP5054
4	Hinge Bushing	MC5577
5	Gas Spring	PC5100

10.10 CONSOLE ASSEMBLY INTERIOR



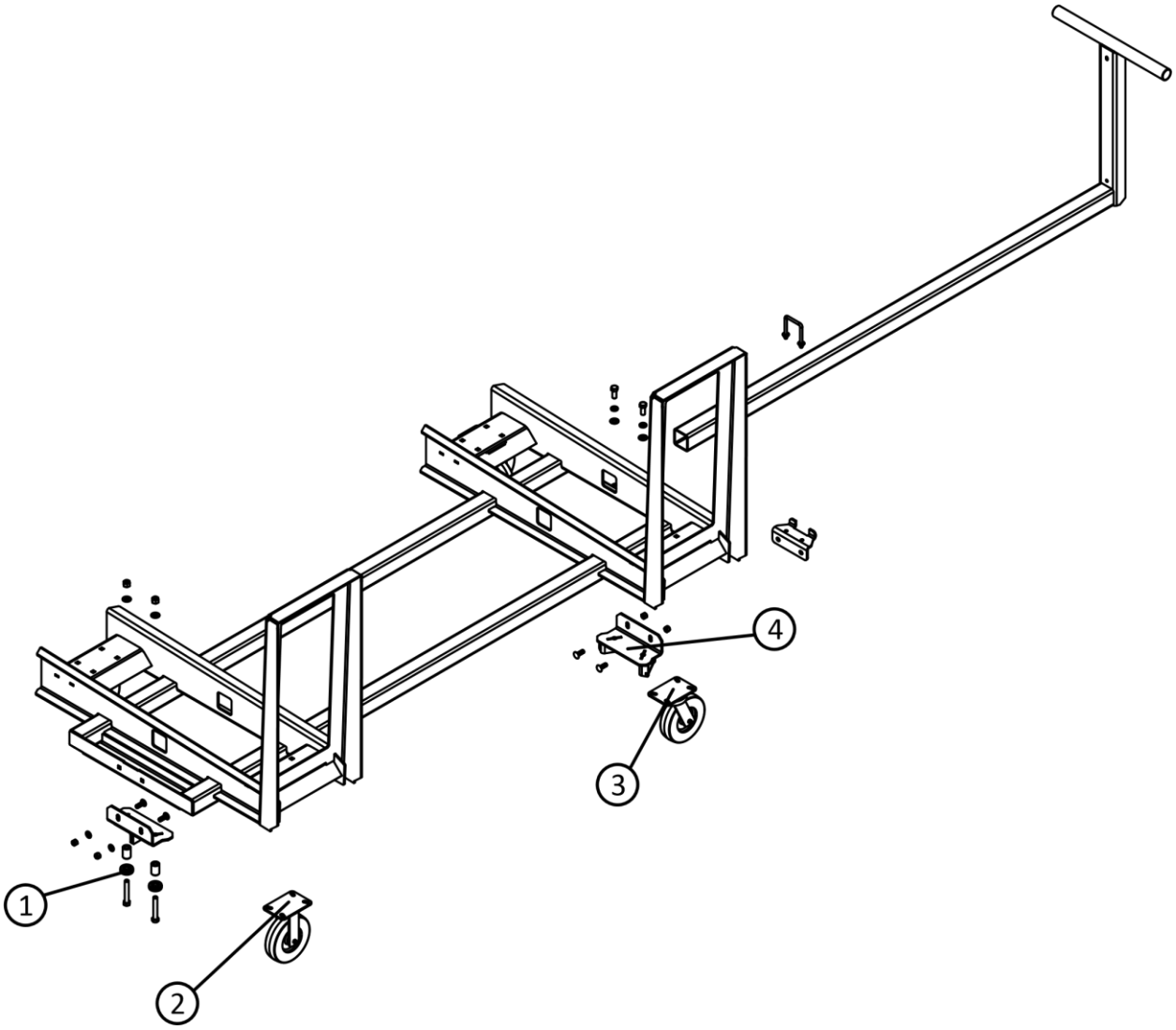
1	Ewon Cosy 131	EP5228
2	24VDC-12VDC Converter	EP5159
3	Relay	EP5010
4	Controller 3231C	EP5123
5	Power Supply EPM-S701	EP5124
6	Input Module EPM-S202	EP5125
7	Output Module EPM-S302	EP5126
8	Wago Block 3 Cond. Gray	EP5190
8	Wago Block 3 Cond. Orange	EP5192
8	Wago Block 3 Cond. Blue	EP5191
9	Safety Controller MSI-101	EP5222
10	Wago End Stop	EP5189
11	DVID-VGA Converter	EP5150

10.11 AIR SUPPLY ASSEMBLY



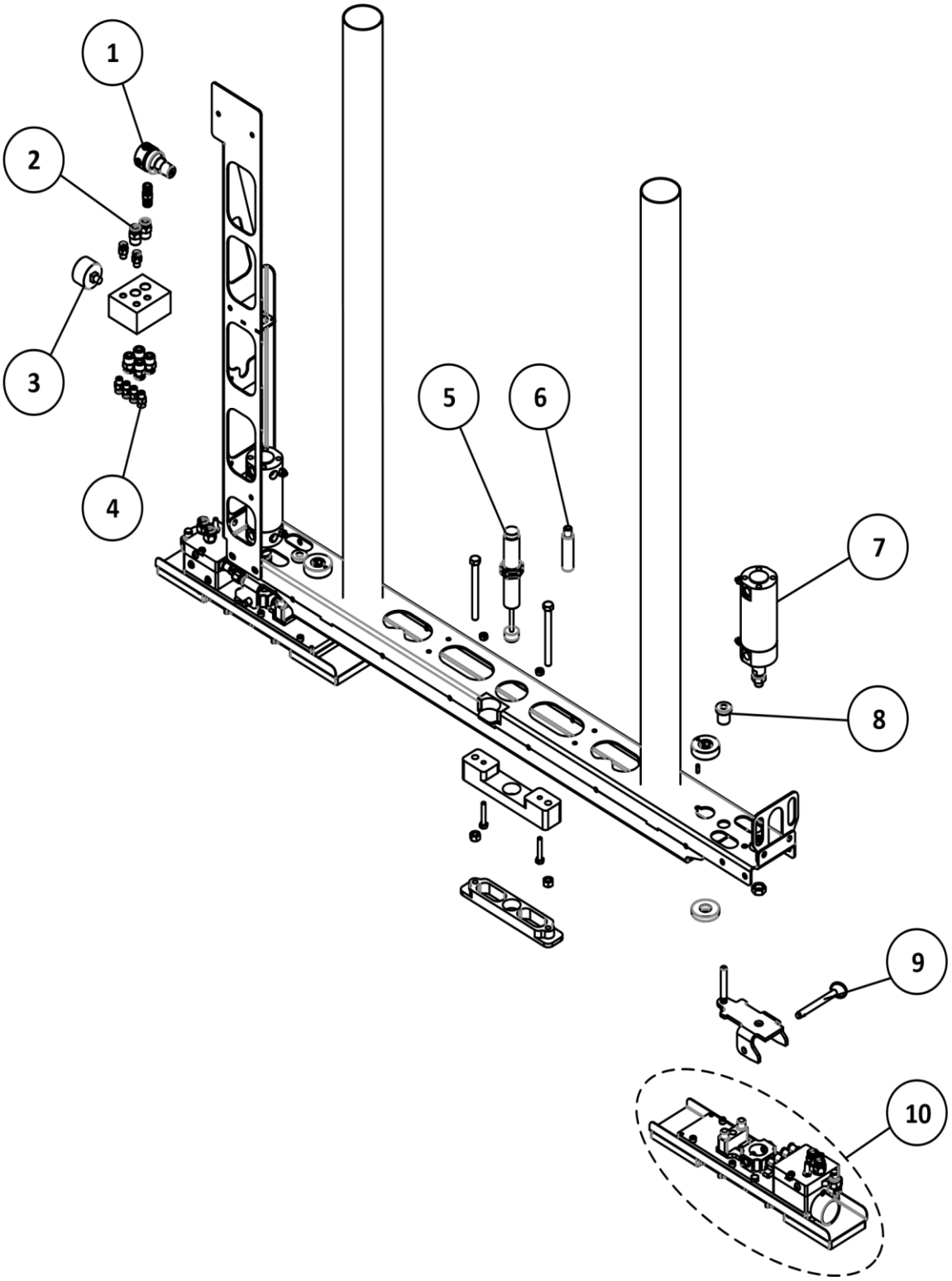
1	Shutoff/Relief Valve	PP5181
2	Filter Regulator – Auto Drain	PP5183
3	Liquid Filled Gauge	PP5155
4	Dump Valve	PP5184
5	Pneumatic Distribution Block	PP5185
6	Silencer (2)	PP5129
7	Filter Element (internal)	PP5193
8	Mid Connector	PP5182
9	End Plate (pair)	PP5180
10	Pressure Sensor	PP5023
11	Complete Air Supply Assembly w/o Sensor	SA5390

10.12 LUMBER CART

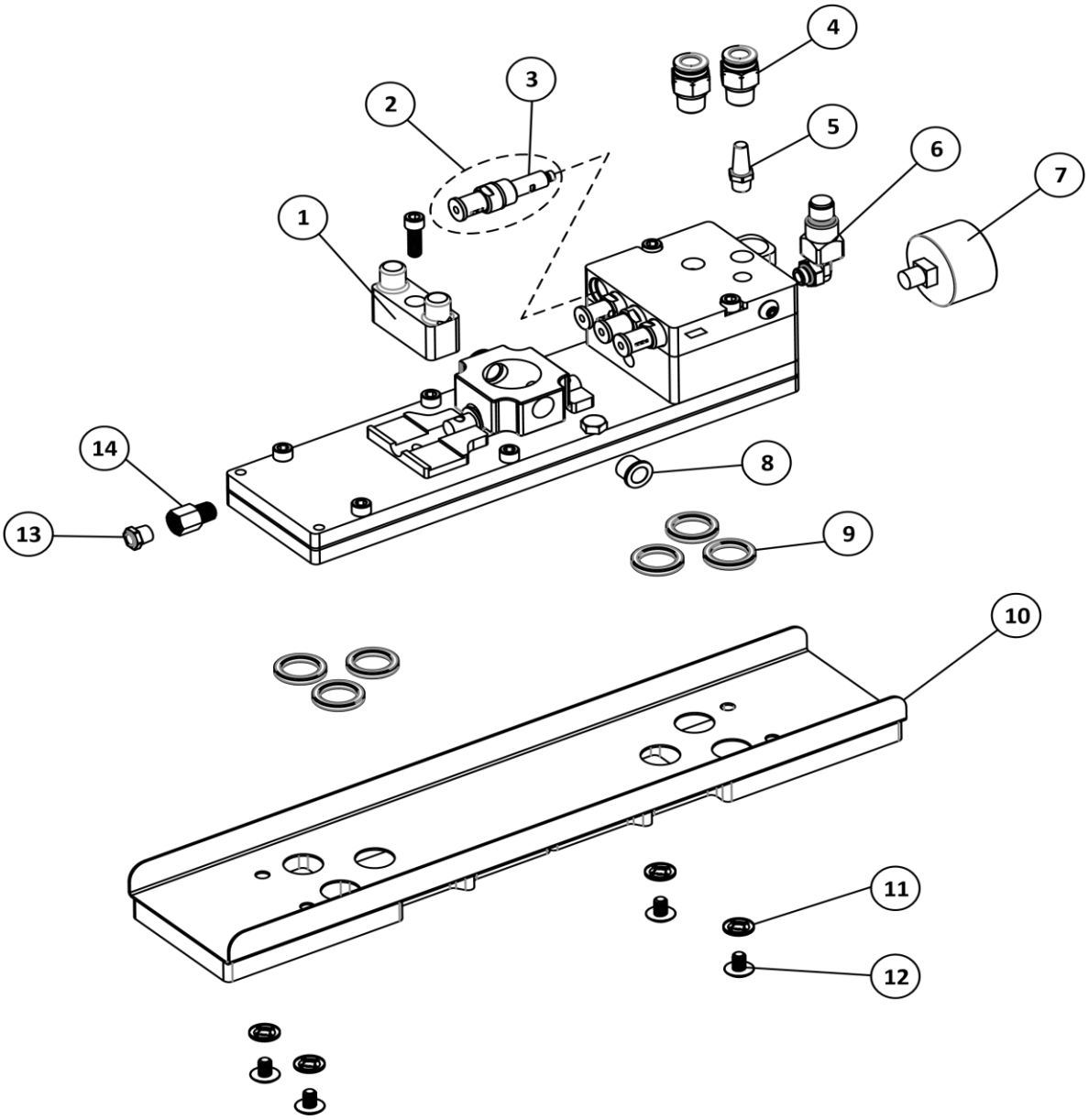


1	Guide Roller	PC5018
2	Rigid Wheel	PC5004
3	Swivel Wheel	PC5003
4	Rear V-guide	SA5398

10.13 PICKING HEAD-VACUUM



1	Regulator Preset 35psi	PP5216
2	Tube fitting 3/8” x 3/8” NPT	PP5079
3	Pressure gauge	PP5155
4	Tube fitting ¼” x 1/8” NPT	PP5071
5	Hydraulic damper	PP5225
6	Photoeye	EP5213
7	Air cylinder	PP5235
8	Plastic guide bushing	MC6388
9	Quick-release pin	PC5189
10	Vacuum head assembly	SA5507

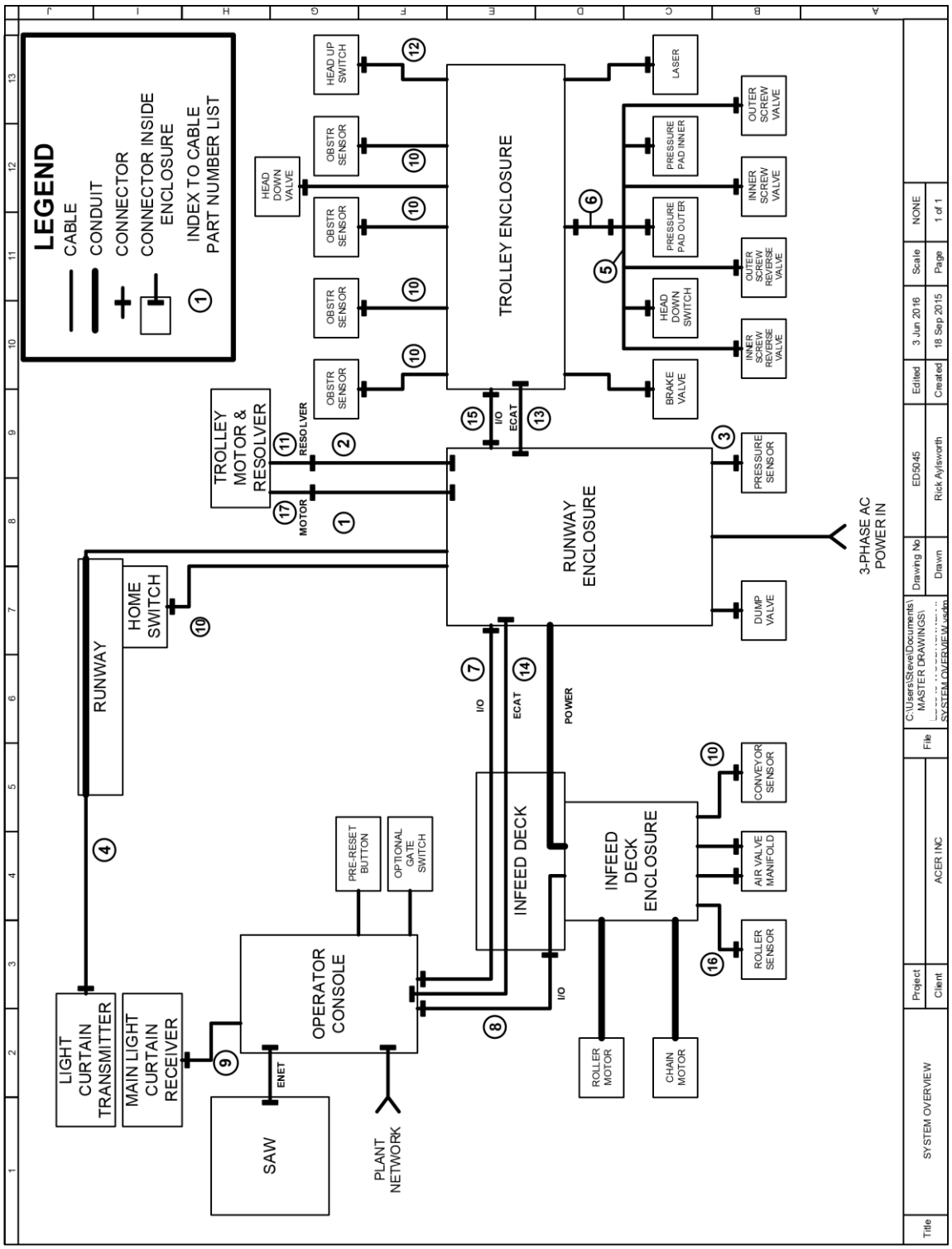


1	Bumper Block	MC6396
2	Vacuum generator cartridge with metal cap	PP5232
3	Vacuum generator cartridge only	PP5234
4	Fitting 3/8” tube x 1/4” NPT	PP5041
5	Conical muffler 1/8” NPT	PP5226
6	Vacuum switch 1/8” NPT	PP5233
7	Vacuum gauge 1/8” NPT	PP5221

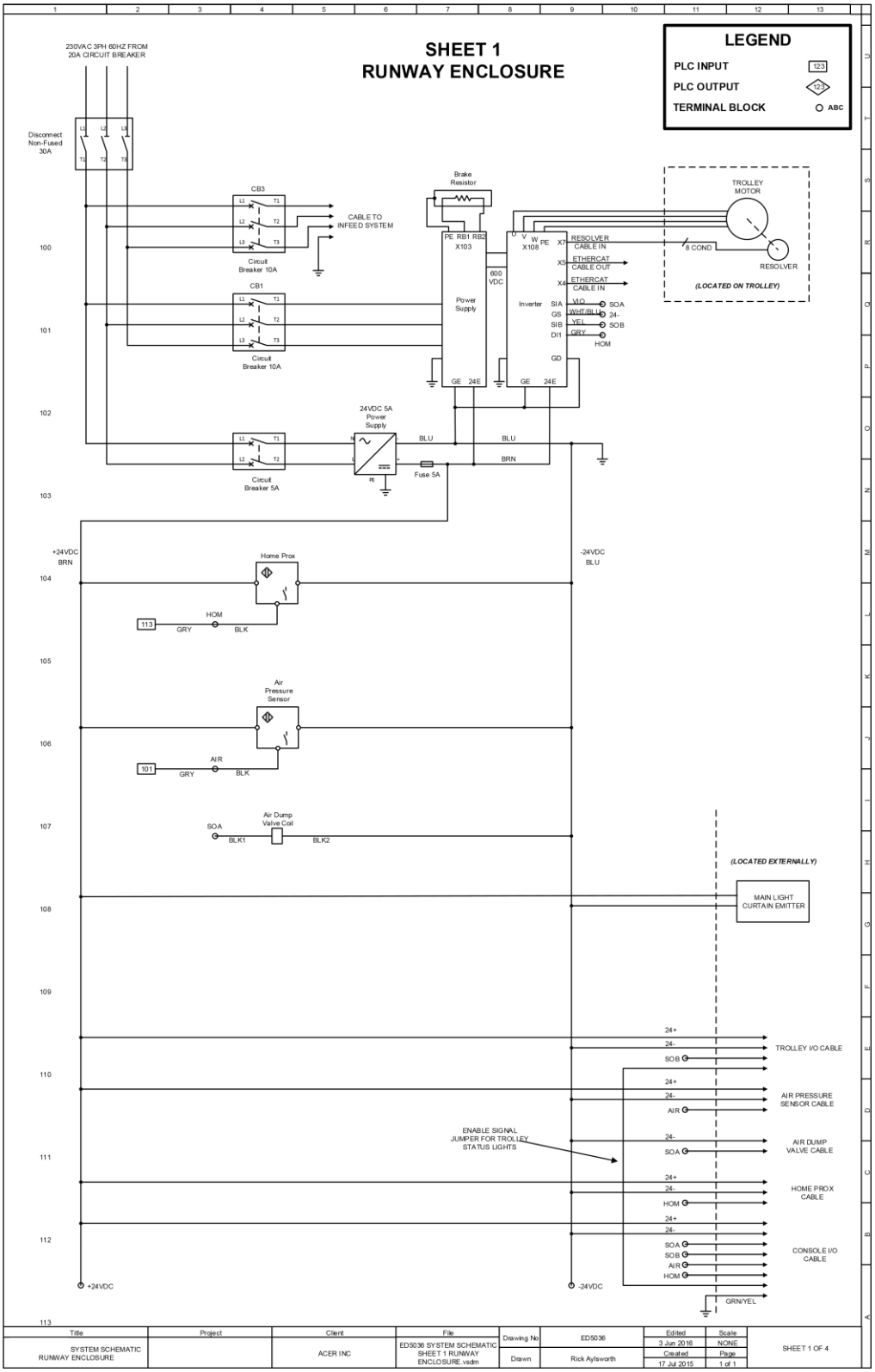
8	Nylon bearing 3/8” ID	PC5197
9	Size 210 X-ring seal 3/4” ID	PP5211
10	Shoe/pad assembly	SA5510
11	Nylon sealing washer 1/4” ID	PC5191
12	1/4”-20 round head screw	PC5190
13	Flat muffler 1/8” NPT	PP5227
14	Brass orifice fitting .010” x 1/8” NPT M-F	PP5215

11 ELECTRICAL DIAGRAMS (SEE 6.10 FOR SAFETY SYSTEM)

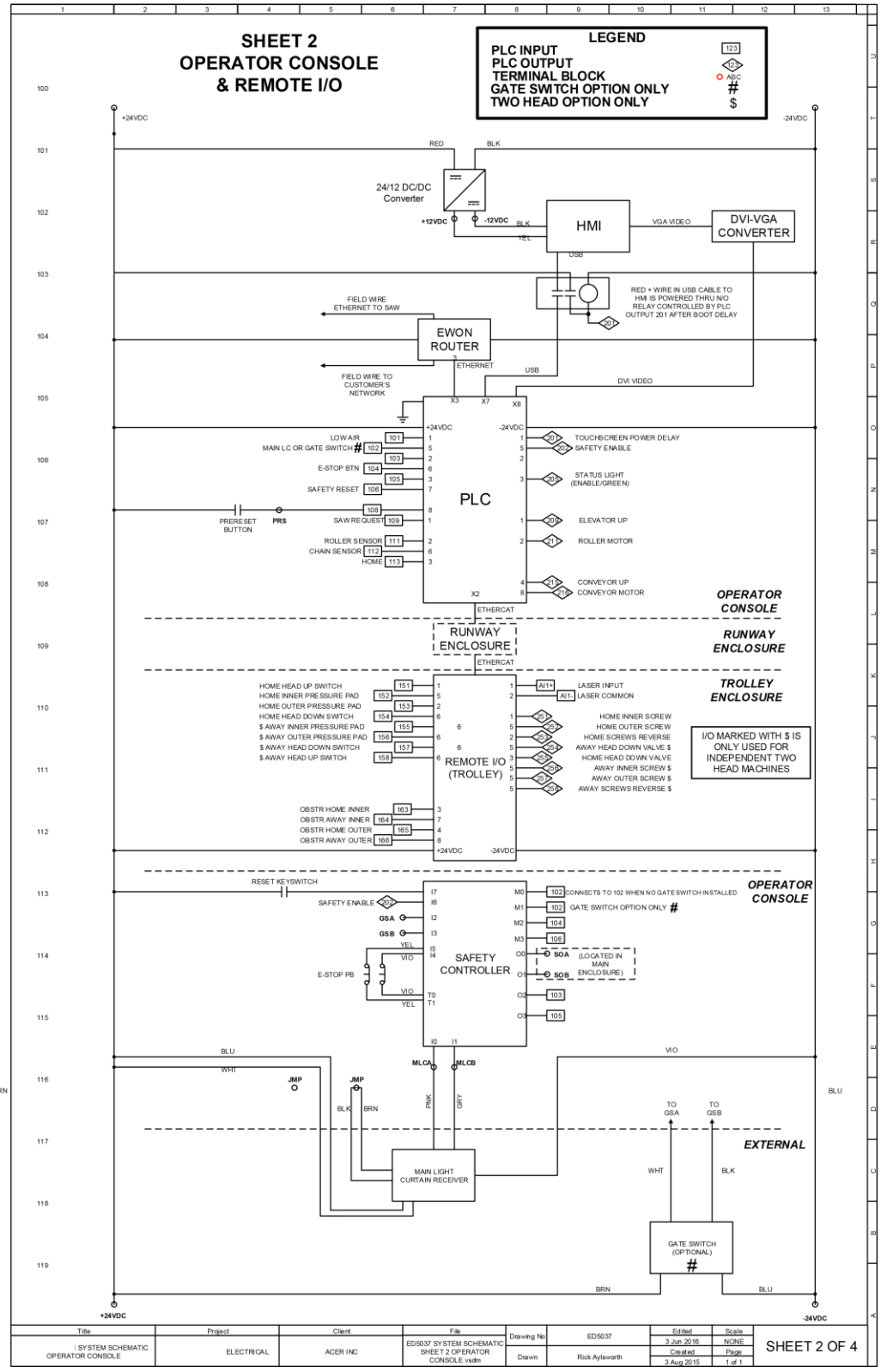
11.1 SYSTEM OVERVIEW



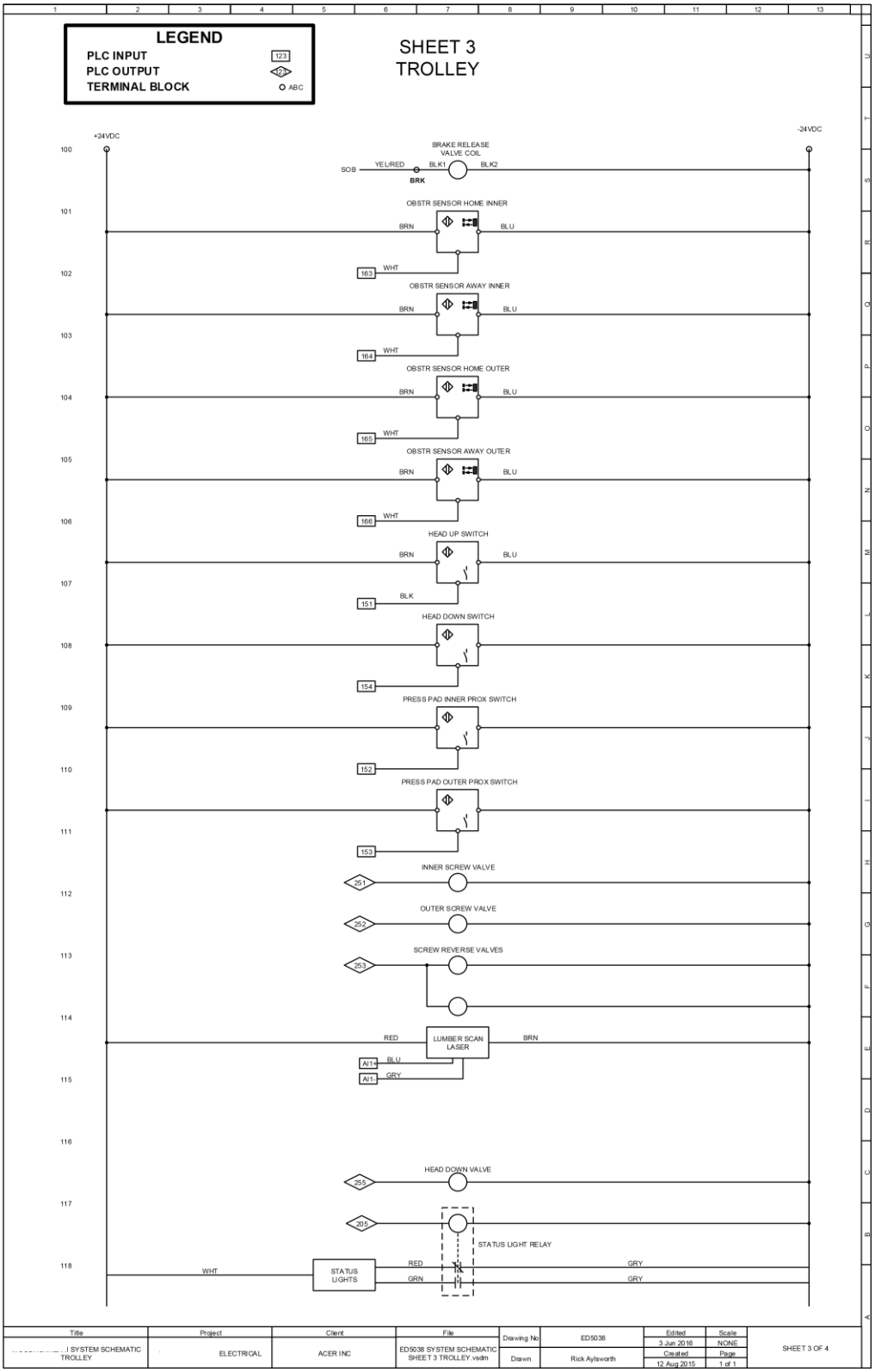
11.2 SYSTEM SCHEMATIC SHEET 1 MAIN ENCLOSURE



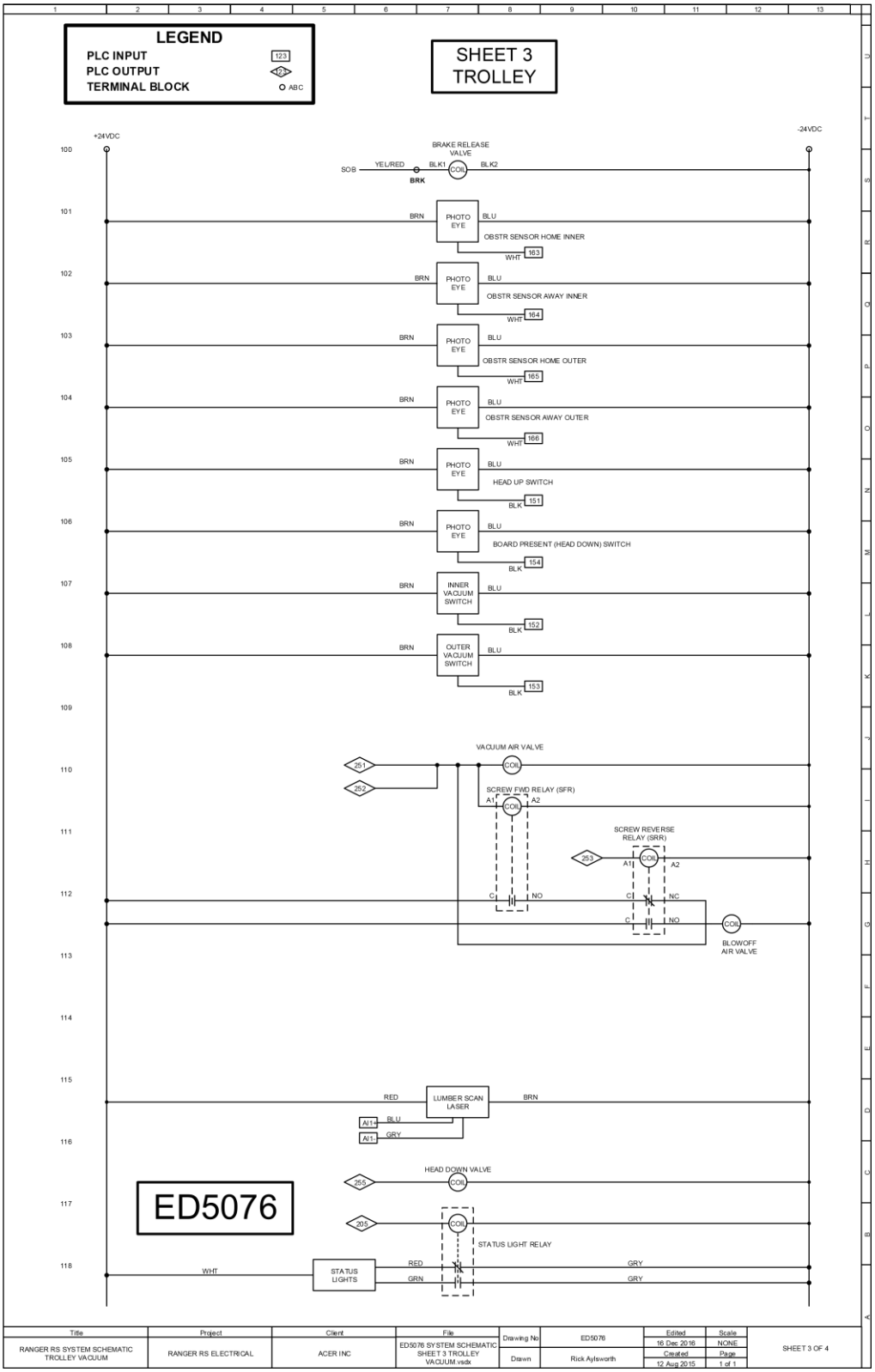
11.3 SYSTEM SCHEMATIC SHEET 2 OPERATOR CONSOLE



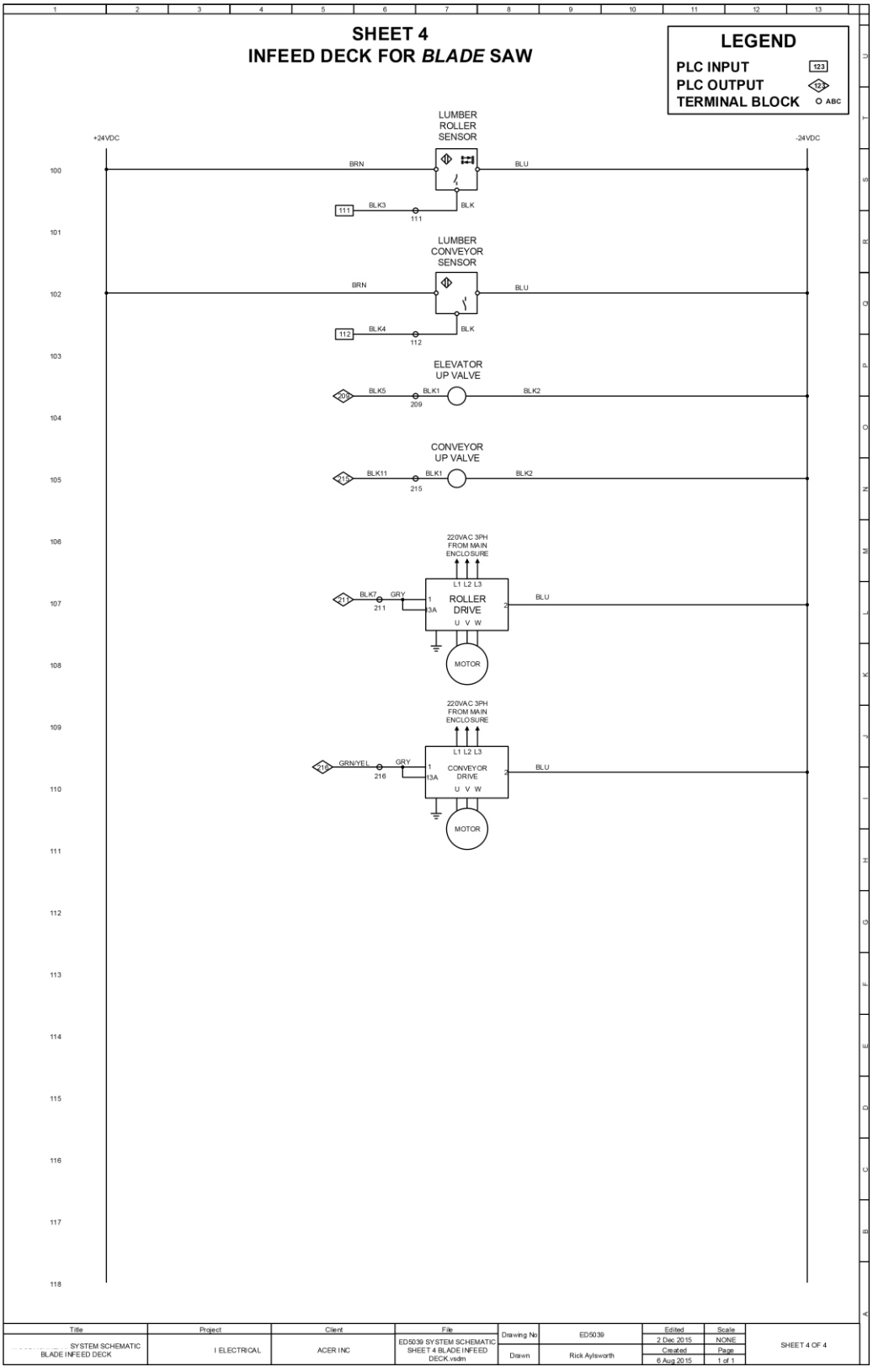
11.4 SYSTEM SCHEMATIC SHEET 3 TROLLEY (SCREW)



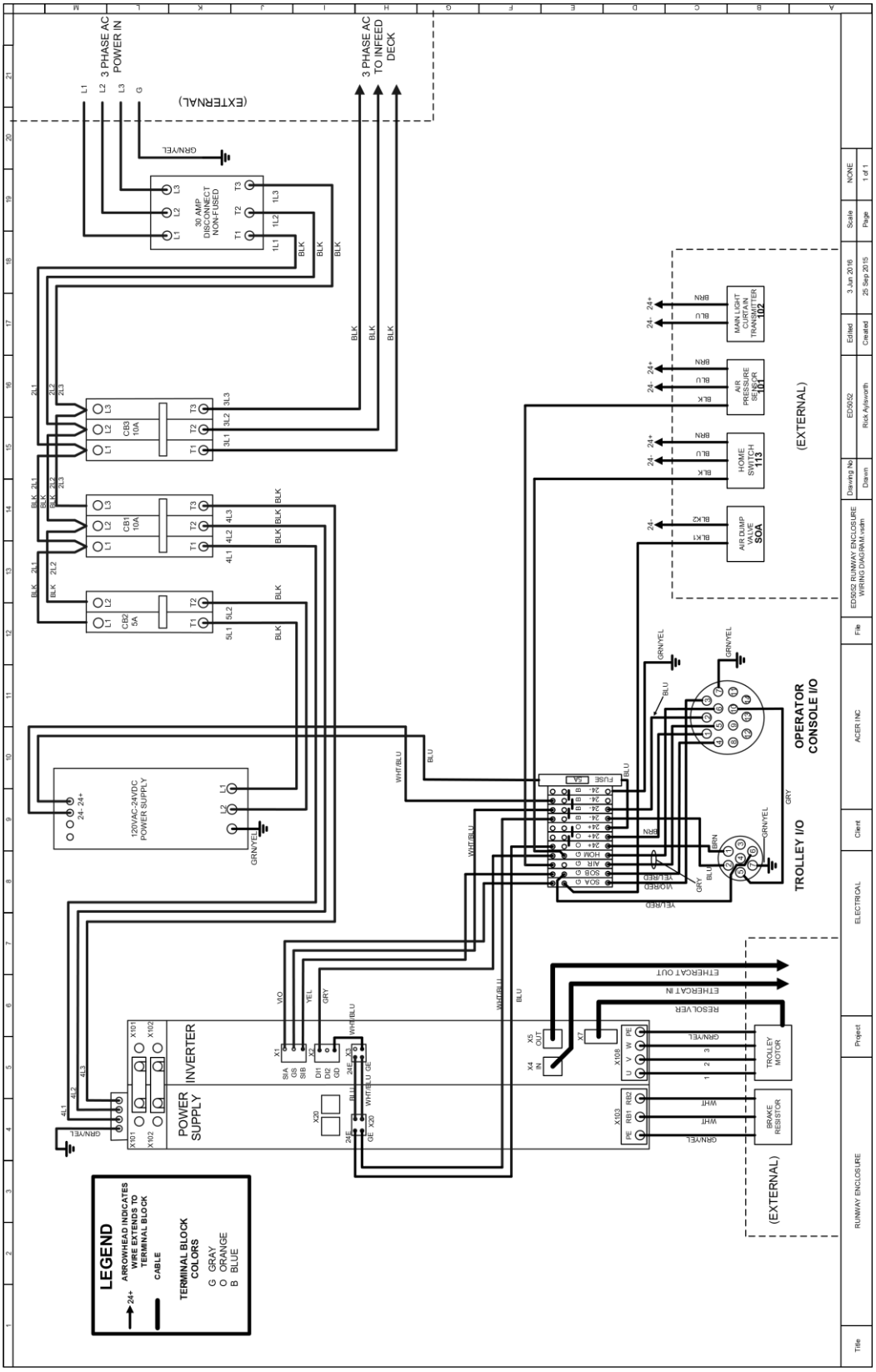
11.5 SYSTEM SCHEMATIC SHEET 3 TROLLEY (VACUUM)



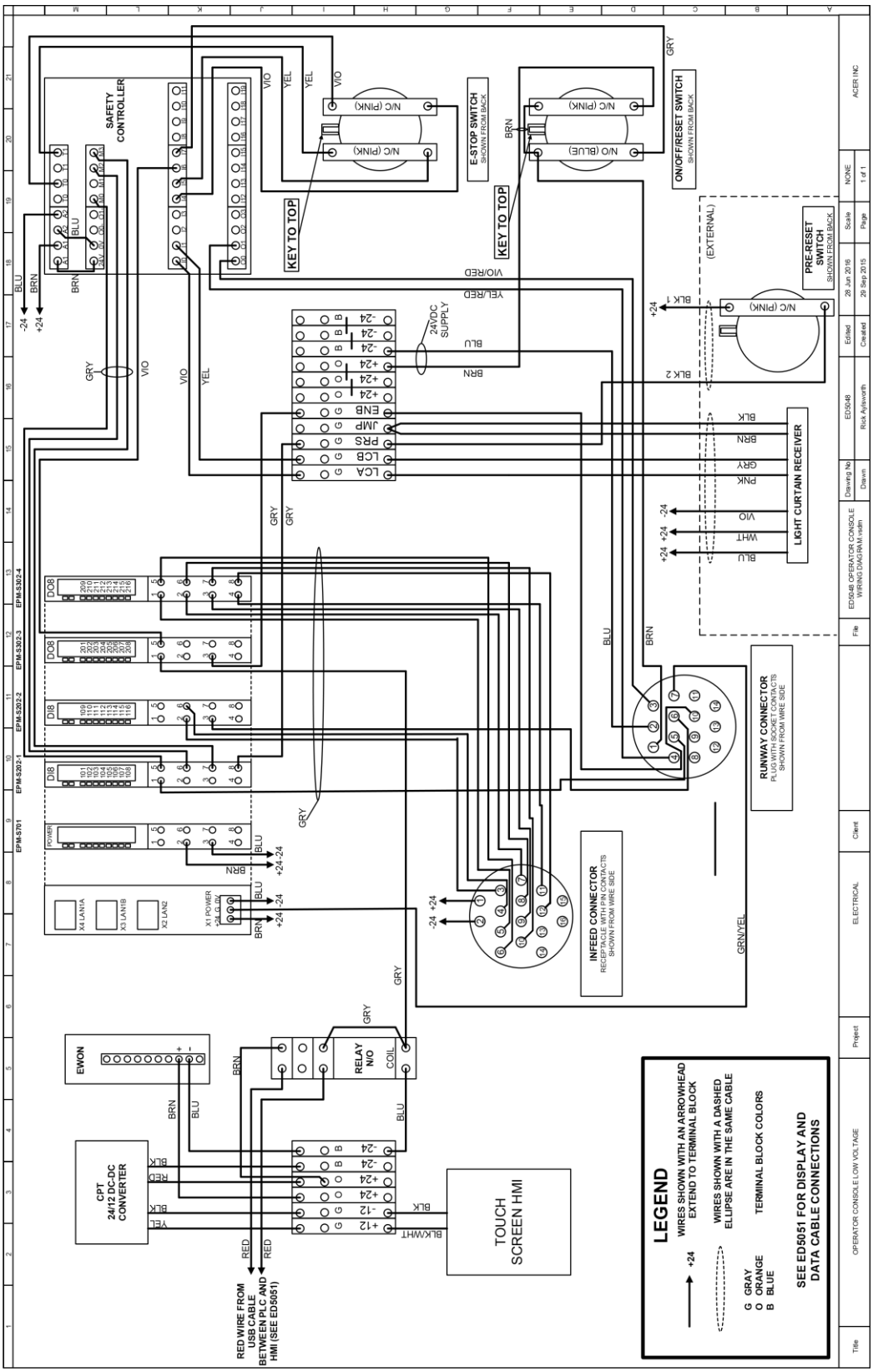
11.6 SYSTEM SCHEMATIC SHEET 4 INFEED DECK—FOR *BLADE* SAW



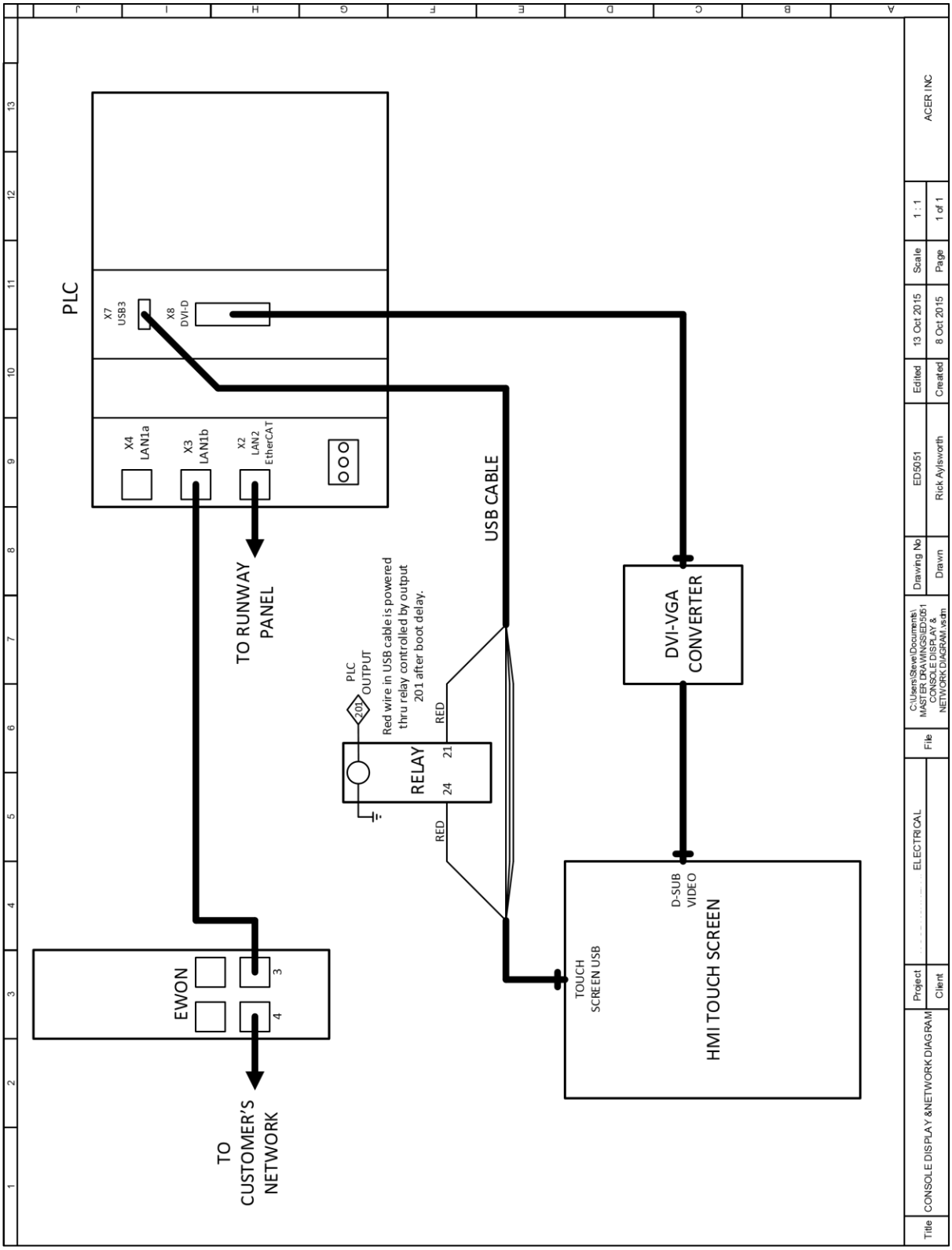
11.7 RUNWAY ENCLOSURE WIRING DIAGRAM



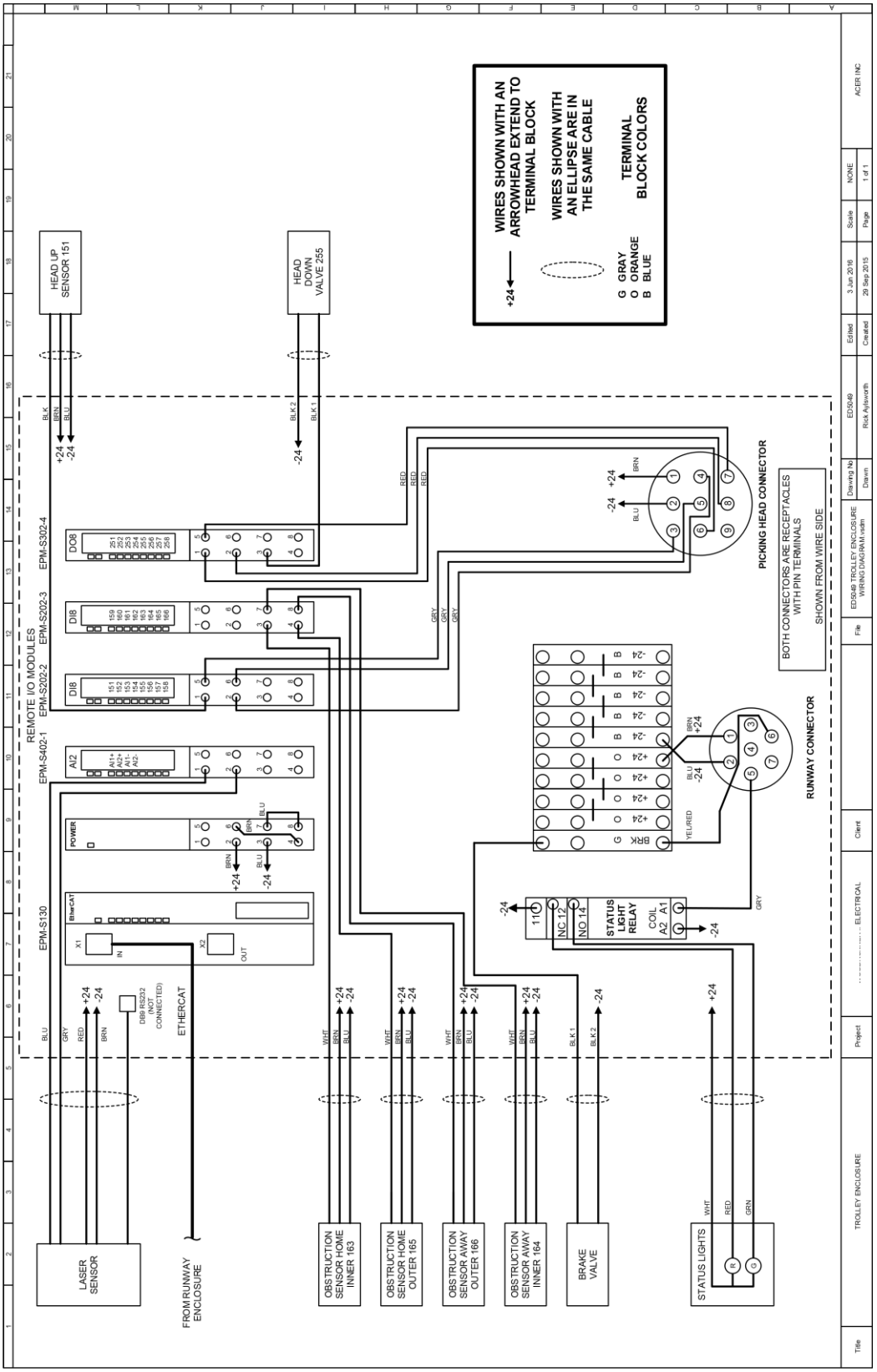
11.8 CONSOLE WIRING DIAGRAM STANDARD



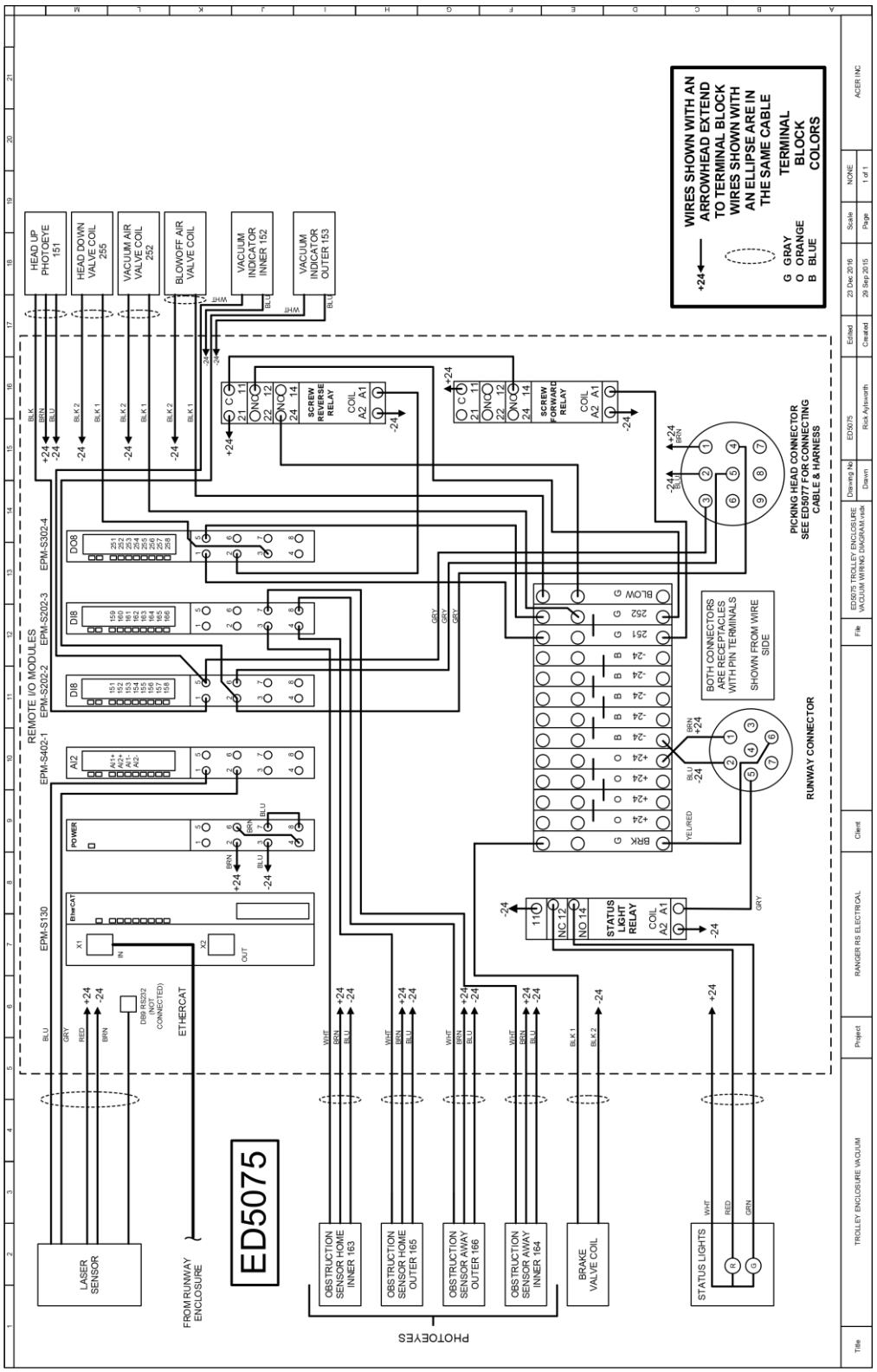
11.9 CONSOLE VIDEO & NETWORK DIAGRAM



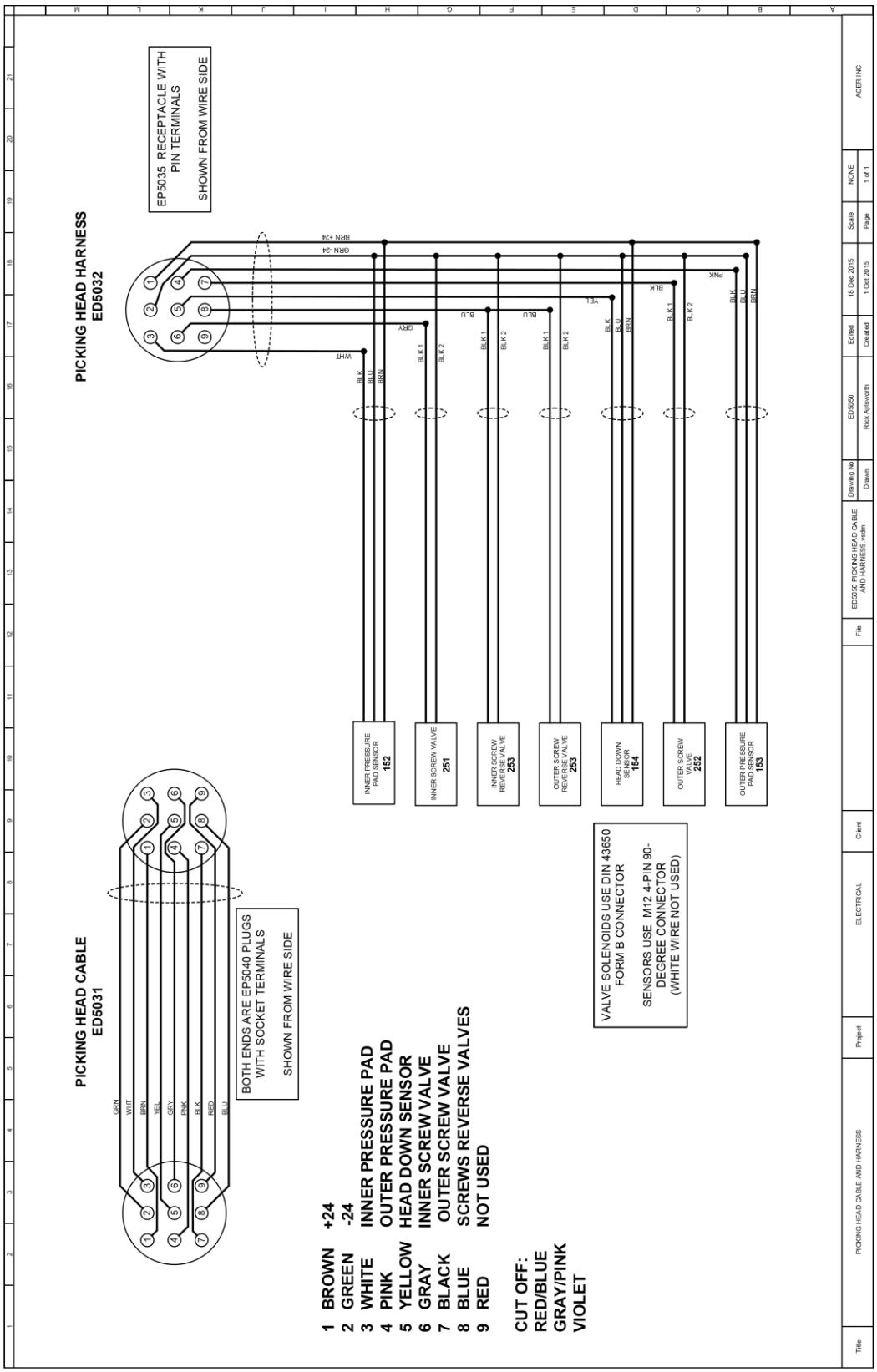
11.10 TROLLEY ENCLOSURE WIRING DIAGRAM (SCREW)



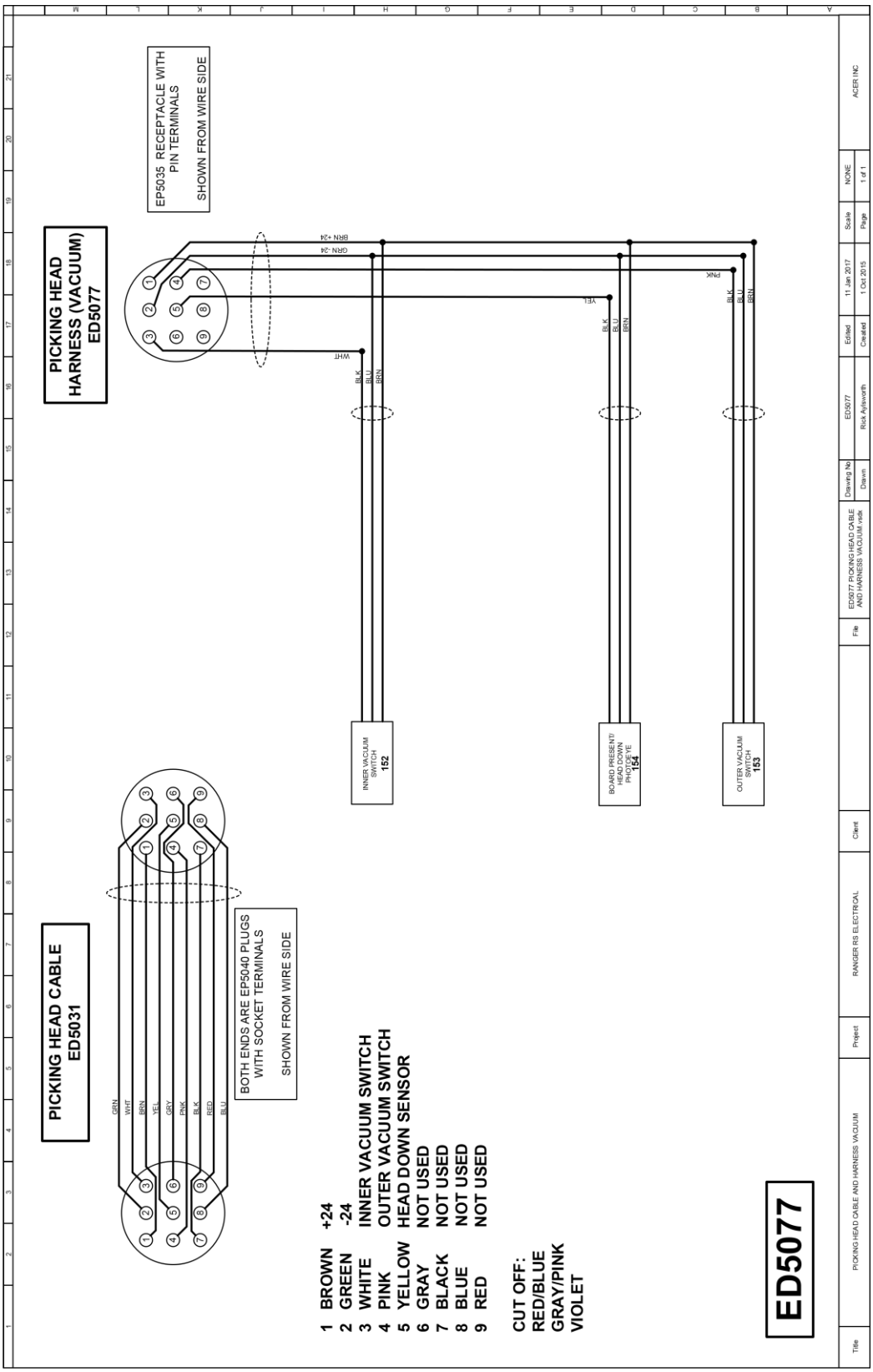
11.11 TROLLEY ENCLOSURE WIRING DIAGRAM (VACUUM)



11.12 PICKING HEAD CABLE & HARNESS (SCREW)



11.13 PICKING HEAD CABLE & HARNESS (VACUUM)



11.14 I/O CHART

LENZE 3200C OPERATOR CONSOLE I/O CHART STANDARD				*ED5042-1*
INPUTS ON EPM-S202-1				
TERM #	I/O #	DESCRIPTION	INPUT #	BIT #
1	101	LOW AIR	1	0
5	102	MAIN LIGHT CURTAIN	2	1
2	103		3	2
6	104	E-STOP	4	3
3	105		5	4
7	106	SAFETY RESET	6	5
4	107		7	6
8	108	PRE-RESET BUTTON	8	7
INPUTS ON EPM-S202-2				
TERM #	I/O #	DESCRIPTION	INPUT #	BIT #
1	109		1	0
5	110		2	1
2	111	LUMBER SENSOR ROLLERS	3	2
6	112	LUMBER SENSOR CONVEYOR	4	3
3	113	HOME SENSOR (DI1 AT I700 ALSO)	5	4
7	114		6	5
4	115		7	6
8	116		8	7
OUTPUTS ON EPM-S302-3				
TERM #	I/O #	DESCRIPTION	OUTPUT #	BIT #
1	201	USB POWER DELAY FOR TOUCHSCREEN	1	0
5	202	SAFETY ENABLE	2	1
2	203		3	2
6	204	SYSTEM NOT ENABLED	4	3
3	205	SYSTEM ENABLED—STATUS LIGHT GREEN	5	4
7	206		6	5
4	207		7	6
8	208		8	7
OUTPUTS ON EPM-S302-4				
TERM #	I/O #	DESCRIPTION	OUTPUT #	BIT #
1	209	ELEVATOR UP	1	0
5	210		2	1
2	211	ROLLER MOTOR	3	2
6	212		4	3
3	213		5	4
7	214		6	5
4	215	CHAIN CONV UP	7	6
8	216	CHAIN CONV MOTOR	8	7

LENZE 3200C TROLLEY REMOTE I/O CHART (SINGLE/DOUBLE HEAD) *ED5042-2*

ANALOG INPUTS ON EPM-S402-1 4-20 mA

TERM #	I/O #	DESCRIPTION	INPUT #	BIT #
1	AI1+	LASER ANALOG INPUT (RIFTEK BLUE WIRE)	1+	N/A
5	AI2+		2+	N/A
2	AI1-	LASER ANALOG COMMON (RIFTEK GREY WIRE)	1-	N/A
6	AI2-		2-	N/A
3	N/C			
7	N/C			
4	N/C			
8	N/C			

INPUTS ON EPM-S202-2

TERM #	I/O #	DESCRIPTION	INPUT #	BIT #
1	151	HEAD UP SWITCH	1	0
5	152	HOME INNER PRESSURE PAD	2	1
2	153	HOME OUTER PRESSURE PAD	3	2
6	154	HOME HEAD DOWN/BOARD PRESENT SWITCH	4	3
3	155		5	4
7	156		6	5
4	157		7	6
8	158		8	7

INPUTS ON EPM-S202-3

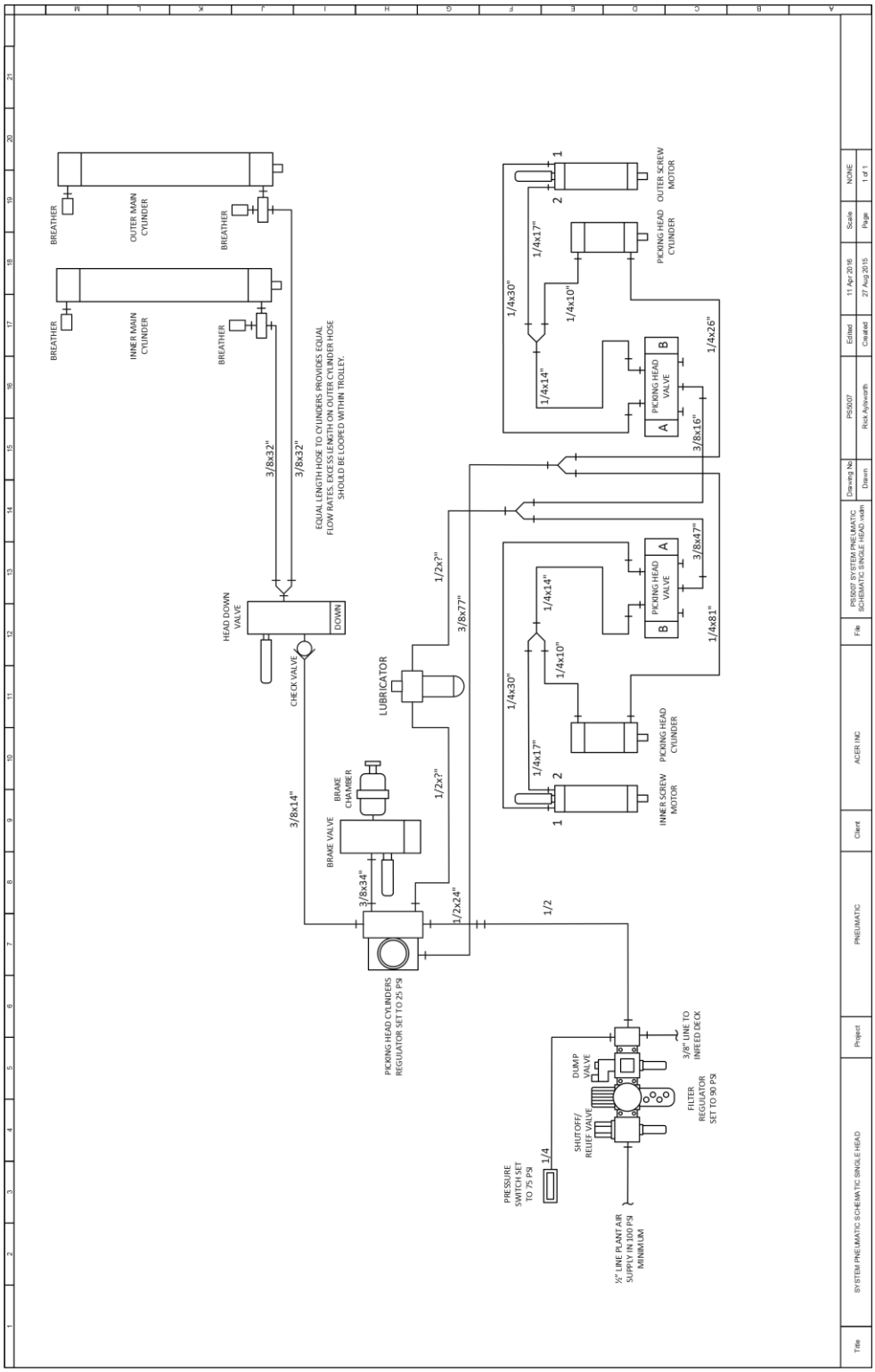
TERM #	I/O #	DESCRIPTION	INPUT #	BIT #
1	159		1	0
5	160		2	1
2	161		3	2
6	162		4	3
3	163	OBSTR HOME INNER	5	4
7	164	OBSTR AWAY INNER	6	5
4	165	OBSTR HOME OUTER	7	6
8	166	OBSTR AWAY OUTER	8	7

OUTPUTS ON EPM-S302-4

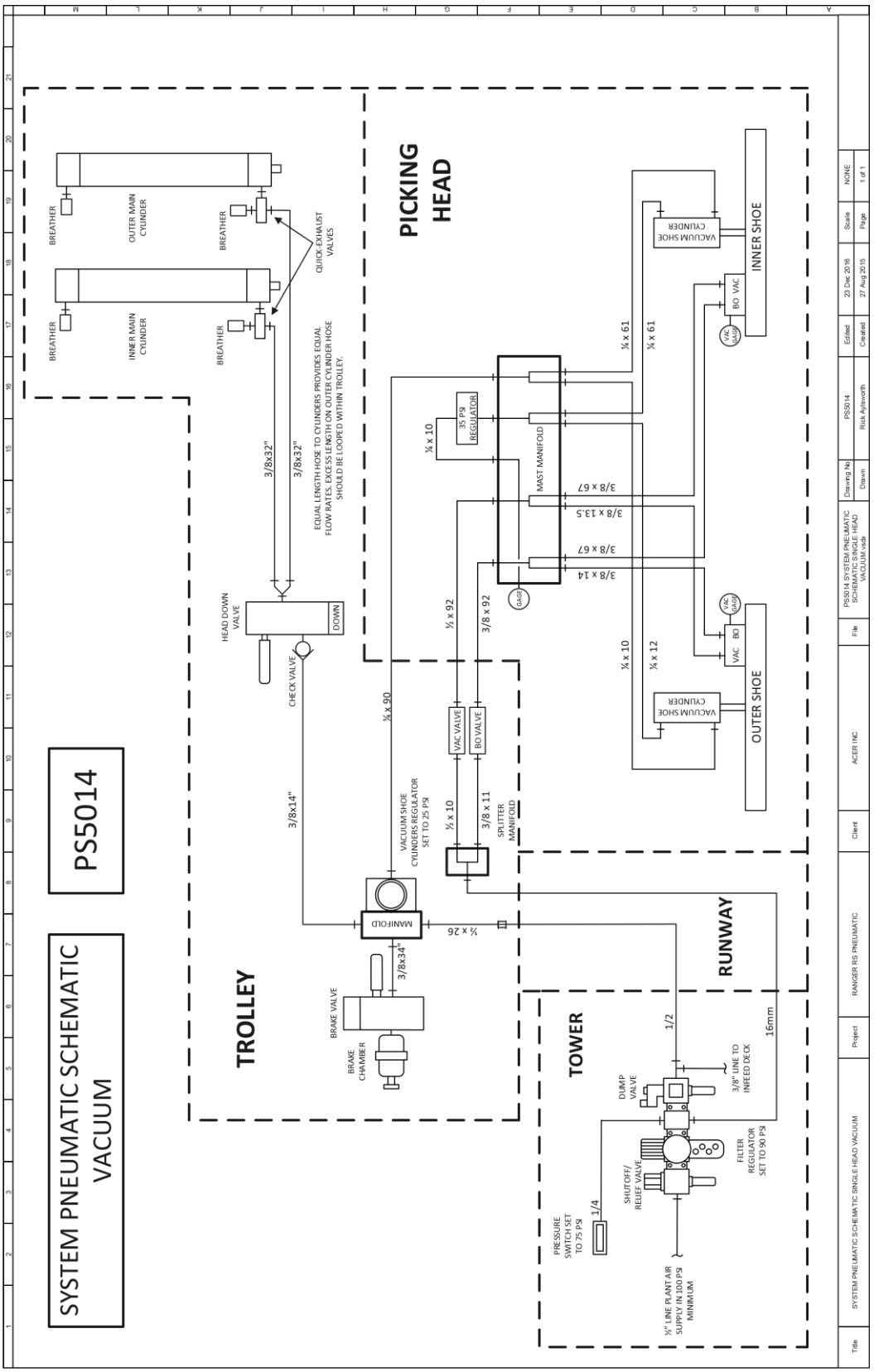
TERM #	I/O #	DESCRIPTION	OUTPUT #	BIT #
1	251	INNER SCREW/VACUUM ON	1	0
5	252	OUTER SCREW/VACUUM ON	2	1
2	253	SCREWS REVERSE/BLOWOFF	3	2
6	254		4	3
3	255	HEAD UP VALVE	5	4
7	256		6	5
4	257		7	6
8	258		8	7

12 PNEUMATIC DIAGRAMS

12.1 SYSTEM WITH SCREW PICKUP



12.2 SYSTEM WITH VACUUM PICKUP



13 INFEED DECK DIAGRAMS

Electrical and pneumatic diagrams and parts information for the specific deck installed with your Ranger RS will be found on the following pages.