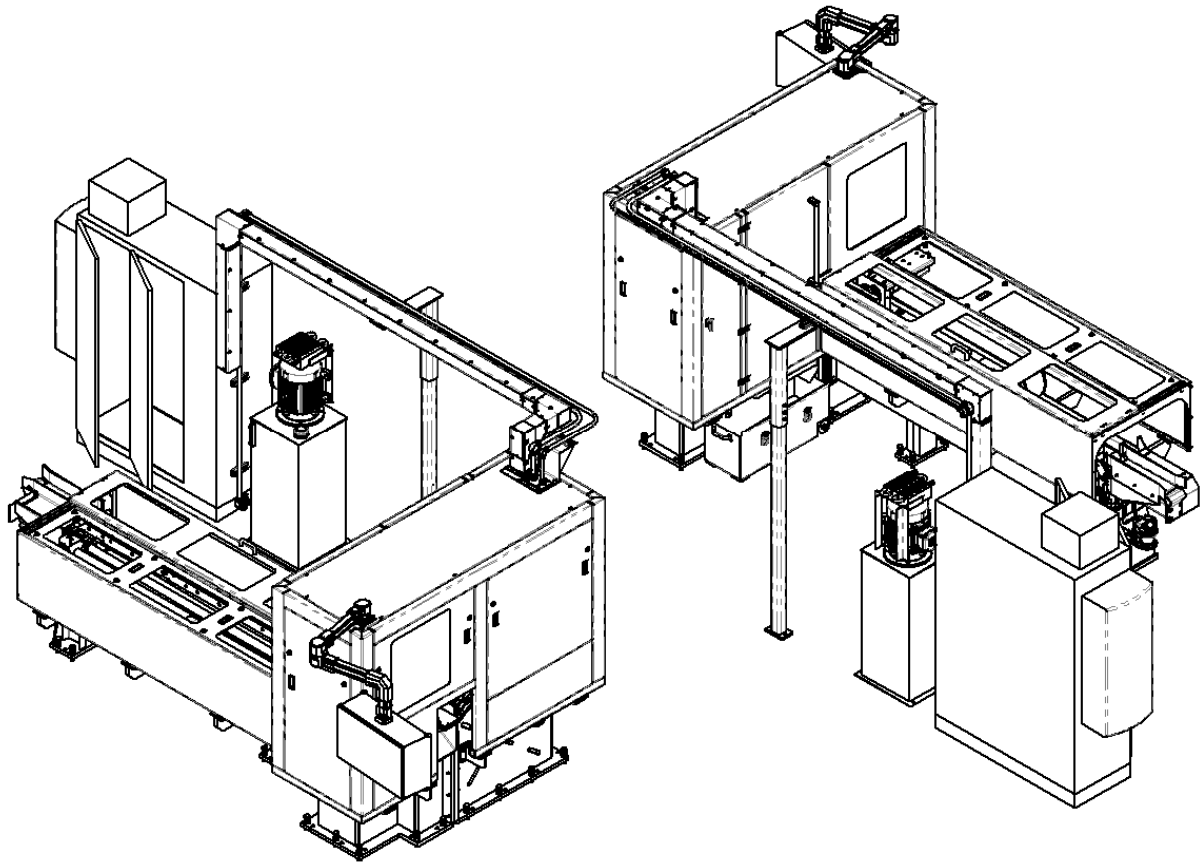
ADVANCED MACHINE & ENGINEERING

CIRCULAR CARBIDE SAWING SYSTEM

Model: AMS-125SL

Serial: A202272



SERVICE MANUAL

ADVANCED MACHINE & ENGINEERING

TECHNICAL SERVICE MANUAL

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1 Preface

These operating instructions were written for the purpose of being read, understood and exactly observed by all those responsible for the machine.

We recommend careful reading of the operating instructions before initial operation, as we are unable to accept any liability for damage or faults occurring as a result of non-compliance.

Should you have any queries, please contact our sales department or the responsible agent, who will be pleased to assist you.

Should you wish to register a complaint or order spare parts, please specify the machine type, and the serial number.

2 Safety Regulations

2.1 Explanation of symbols

The following warning signs are attached to the machine:

DANGER: HIGH VOLTAGE!

Disconnect unit from mains! Maintenance by qualified staff only!

DANGER: PINCH POINTS/OPEN MACHINERY!

Stay clear, keep limbs away, do not reach into machine!

DANGER: PINCH POINTS!

Stay clear, keep limbs away, do not reach into machine!

DANGER: FLYING CHIPS/SPARKS!

Safety Goggles must be worn!!

DANGER: PINCH POINTS!

Stay clear, keep limbs away, do not reach into machine!

The warning signs on the machine must be kept in a legible condition.

In these operating instructions, the following symbols are used to draw attention to information of a particularly important nature:

DANGER: This symbol points to personal danger to health

WARNING: This symbol points to a possible danger or a dangerous situation

HINT: This symbol hints to information regarding professional operation of this equipment

INFORMATION: Here you get hints and practical information regarding this equipment.

2.2 Transport

When loading only use hoists and load carrying equipment with sufficient load-bearing capacity.

Only lift the machine correctly with a hoist in accordance with the Transport instructions and the instructions in the operating manual.

2.3 Machine operation

The machine is constructed in accordance with the state of the art and recognized safety standards. Despite these precautions, however, dangers or impairments to the machine can occur under certain circumstances.

Only use the machine when in technically sound condition and in compliance with its intended purpose. Be aware of safety factors and possible dangers and always observe the operating instructions provided.

In addition to the operating instructions, observe the generally applicable statutory and other regulations pertaining to accident prevention, and instruct staff accordingly.

Make sure that safety-related faults are remedied without delay.

2.4 Setup Mode

In set-up mode, all machine movements can be performed via the control panel with the protective devices open.

Only operate the buttons once you are sure of their function.

Do not reach into the potential danger zones (e.g. pinch points) during manual operation.

Please ensure that no personnel are within the indicated (restricted) zones.

2.5 Safety devices

The machine may only be run when all safety devices and safety related equipment are **available and fully functional!**

WARNING: Because each purchasers installation and safety requirements are unique, This AMSAW (unless otherwise specified) is provided with a minimum of safety protection equipment. It is the responsibility of the purchaser to provide, install and maintain the highest level of safety equipment possible to prevent personnel from entering unsafe areas of the AMSAW installation site.

No changes, additions or conversions may be performed which might impair safety.

The supplied settings of safety devices may not be changed without prior consultation.

All warning signs on the machine must be clearly legible.

Staff qualifications

The machine may only be operated, maintained and repaired by authorized, qualified and instructed staff. This staff must have been specially instructed on the potential hazards.

The end user of the machine must make these operating instructions available to the staff and make sure they have read and understood them.

Personal protection equipment

The protective clothing must be designed so as to ensure that no items of clothing or hair can get caught in rotating/moving machine parts.

The machine operator must wear safety goggles when cutting.

Safety shoes with steel toe protection and a helmet are recommended.

Procedure in an emergency

If an acute fault occurs during operation, the red "EMERGENCY STOP" button on the control panel must be pressed. The protective devices may not be released until the machine has reached a complete standstill.

Eliminate the cause of the error and check the condition of the machine, electrical conductors, tool and work piece. Damaged parts must be replaced before starting up the machine.

2.6 Maintenance, repairs and trouble-shooting

Servicing and maintenance work entails a greater risk of accidents than normal operation. For this reason, turn off the main switch before starting work and secure with a padlock to prevent unauthorized activation of the machine.

Servicing and maintenance work may only be executed by suitable qualified and authorized personnel.

Pay attention to the information provided in the operating instructions during setting, maintenance and repair work.

Electrical energy

Work on the electrical system may only be carried out by suitably qualified electricians in accordance with the electrical standards. Only qualified electricians should have access to the electrical cabinet.

The electrical system must be checked at regular intervals, and any defects, e.g. loose cables or plug connections, must be remedied immediately.

Only use original type fuses with the specified rating.

Hydraulic System, Pneumatic System

Work at the hydraulic or pneumatic system may only be executed by suitably qualified operating staff.

All conductors, hoses and fittings must be checked regularly once a month for leaks and externally recognizable damage. Any discovered defects must be remedied without delay. Oil spraying out of the system can cause fire or injury and has to be cleaned up immediately.

When exchanging hydraulic or compressed air pipes, ensure that correct hose fittings are used, that the pipes used are of sufficient length, and that they are mounted and laid correctly by suitably qualified staff.

Tools/tool change

Tool cutting edges can cause minor cuts. For this reason, pay particular attention to the clamped tool when performing work on the machine.

Make sure the machine has reached a complete standstill before reaching into the working area.

Chemical substances and oils

When working with chemical substances and oils, always avoid contact with the eyes or inadvertent swallowing. Where skin contact is unavoidable, treat hands beforehand with protective skin ointment. Also observe the safety information provided on the packaging or data sheets.

2.7 Intended purpose

This AMSAW® PLC Controlled sawing system is built for use with circular carbide or cermet saw blades to cut steel. When operating this machine, the capacity and technical data listed in this manual must not be exceeded and the recommendations and requirements of this manual must be followed.

Any other use of the machine is deemed inconsistent with its intended purpose. The manufacturer is not liable for any resulting damage; any risk arising from incorrect use is the sole responsibility of the user.

Application in accordance with the intended purpose also implies adherence to the operating and maintenance conditions contained in the operating instructions.

All AMSAWS® are designed as self-contained units and are safety-inspected.

3 Requirements at the installation site

3.1 Foundation, floor properties

The load bearing capacity of the floor must be examined by a static expert commissioned by the customer. If necessary, a foundation adapted to the conditions on site must be provided.

The area surrounding the machine must have an anti-slip floor which is safe to walk on.

Make sure that the machine's performance cannot be impaired by other machine tools (e.g. floor vibrations due to presses, high traffic etc.)

Use 3/4 or equivalent anchor bolts and level the machine to avoid distortion of the base.

- Complete grouting of machine components is required.
- Use steel support plates; 0.75 x 4 x 4 inch (16 x 100 x 100 mm) (not included) under the leveling screws.
- Make sure that the machine is isolated from external vibrations such as presses and heavy traffic.

3.2 Space requirement

Sufficient Space must be available around the machine to ensure that there is no impairment to operation. Unhindered access to doors and covers during repairs and maintenance must also be guaranteed.

3.3 Utility Requirements

Electrical supply	460V, 60Hrz, 3Ph, 250 Amps
Air supply	100 scfm @ 60 psi minimum

3.4 Transportation and Installation

3.5 Transportation

The machine is shipped in several pieces. The packaged machine must be transported with a forklift truck which meets the relevant requirements in terms of loading capacity, fork length and entry width. The length and entry width must be sufficient to ensure secure transportation.

WARNING: A wooden crate is not suitable for crane transportation.

Remove packaging and check contents. Any damage in transit and/or missing parts must be reported immediately in writing.

Crane transportation

Attach a hoist with sufficient load carrying capacity to the machine as shown in the diagram.

The length of the individual cables should be such that the machine can be raised more or less horizontally.

If it is not possible to prevent the transport cables from resting against the machine, enclosure, or adjustable parts of the machine place wooden blocks or pads underneath them.

WARNING: Only use hoists and load-carrying equipment of sufficient capacity. All local safety regulations and general accidental prevention regulations must be observed.

HINT: Do not remove the locking elements used to secure the load during transport until the machine has reached its final destination.

3.6 Intermediate Storage

If the machine is not assembled immediately after delivery, it must be carefully stored in a protected location. It must be properly covered to keep out dust and moisture.

The machine must be coated with a commercially available rust protection agent which protects the components under normal air humidity conditions. If the air humidity is higher, or the storage period longer, the machine should be periodically re-coated with rust protection agent.

3.7 Removing the rust protection agent

WARNING: Do not operate the machine before removing any rust protection agent that may have been used to protect the machines critical surfaces.

The rust protection agent is not harmful to the environment or health.

Carefully remove the rust protection agent using a soft cloth soaked in petroleum or alkaline cleaning solvent. Never use scrapers or other sharp objects.

HINT: In the event of prolonged contact with rust protection agents and cleaners, we recommend the use of protective gloves. The cloth used for cleaning has to be disposed of as special waste.

Lightly grease/oil all unpainted parts after removing the rust protection agent.

3.8 Leveling of the machine

The installation site must conform to the condition specified in the chapter "Requirements at the installation site".

At the installation site, slide the steel support plates (not included) under each leveling point of the machine. Screw in the leveling screw until it rests on the leveling element. Do not tighten the jam nut yet. With a level, align the machine horizontally in the longitudinal and transverse directions by turning the leveling screws. After the machine has been properly leveled, the jam nuts can be tightened and the tie down screws installed.

3.9 Power Hook-up

WARNING: Work on the electrical system may only be performed by qualified electricians.

Before connecting to the electrical line, make sure that the voltage is the same as specified. The AMSAW® is completely wired and requires only the hookup to the disconnect switch and to a ground rod. Please check for proper rotation of the saw spindle and hydraulic motor and chip conveyor to avoid damage.

3.10 Compressed Air Hook-Up

Connect the air input to a shop airline of 80 psi minimum (5.5 bar)

3.11 Hydraulic & Lubrication

The machine contains no hydraulic or lubrication oils or greases when delivered.

WARNING: Never operate the machine without filling hydraulic and lubrication reservoirs.

Fill the head case to the center of the oil sight gage. See Lubrication section for type and quantity.

Fill the hydraulic tank with to the center of the oil sight gage. See Hydraulic section for type and quantity.

Fill automatic lubrication system. See Lubrication section for type and quantity.

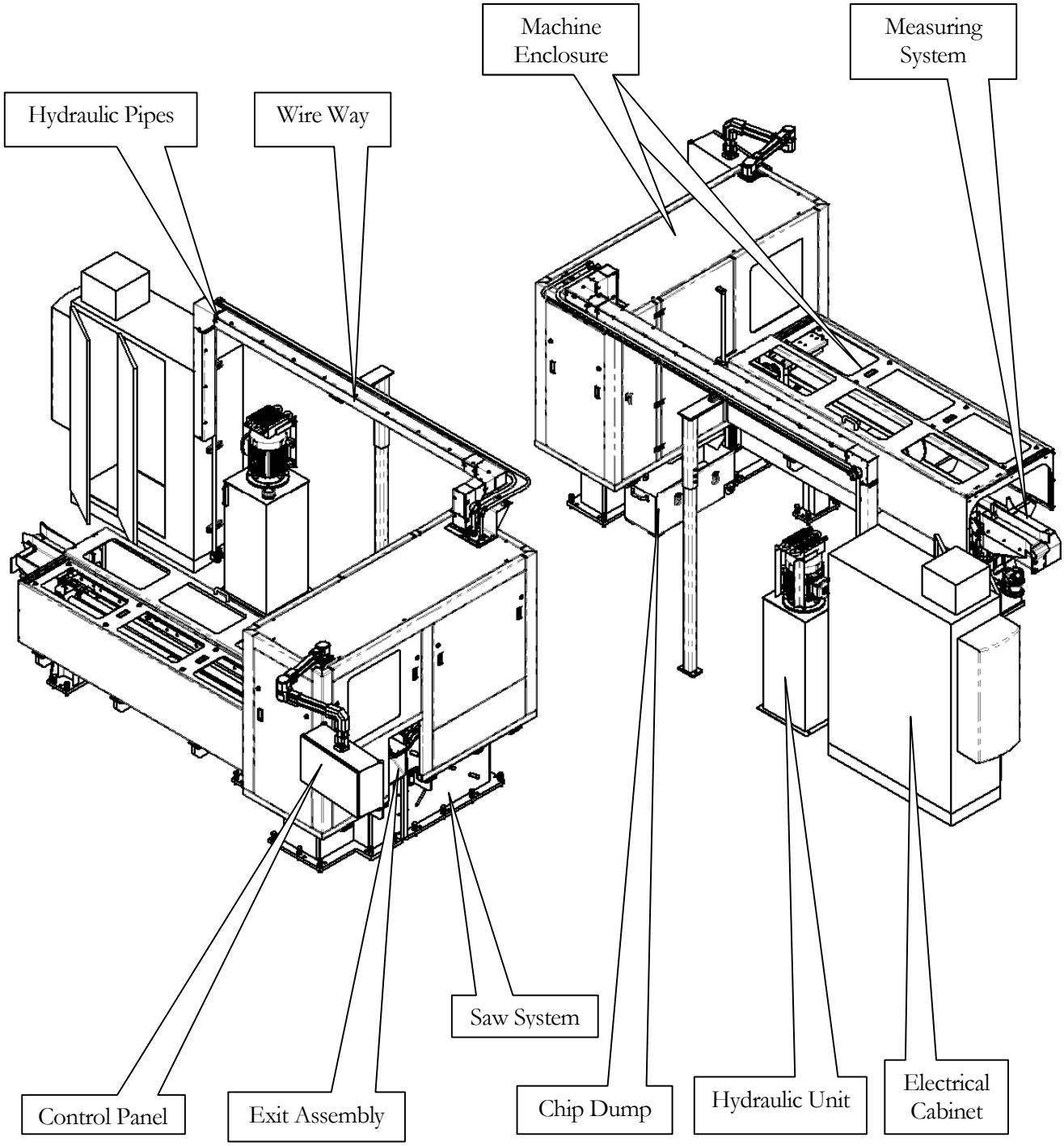
3.12 Transport locking devices

Certain machine components are equipped with wooden locking devices to protect them and the machine against shocks during shipment. When the machine has been set up properly those locking devices can be removed. Jammed locking devices cannot be removed until the machine has been powered up and the saw head has been lifted.

3.13 Chip removal and guarding

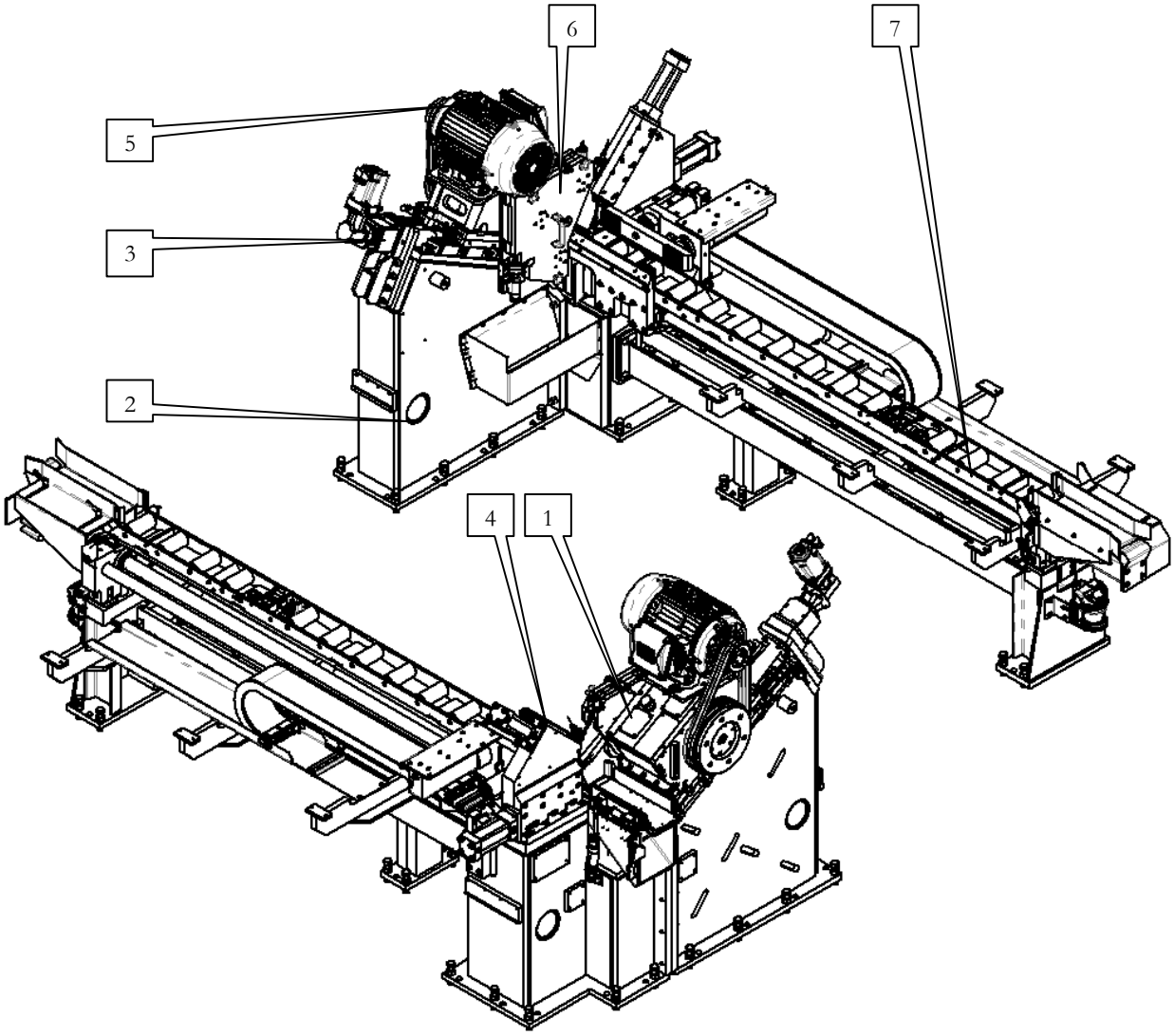
Make sure that all guards are properly attached, a Chip Conveyor is in place and that no obstruction is in the way of the moving axes of the machine.

4 Machine Outline



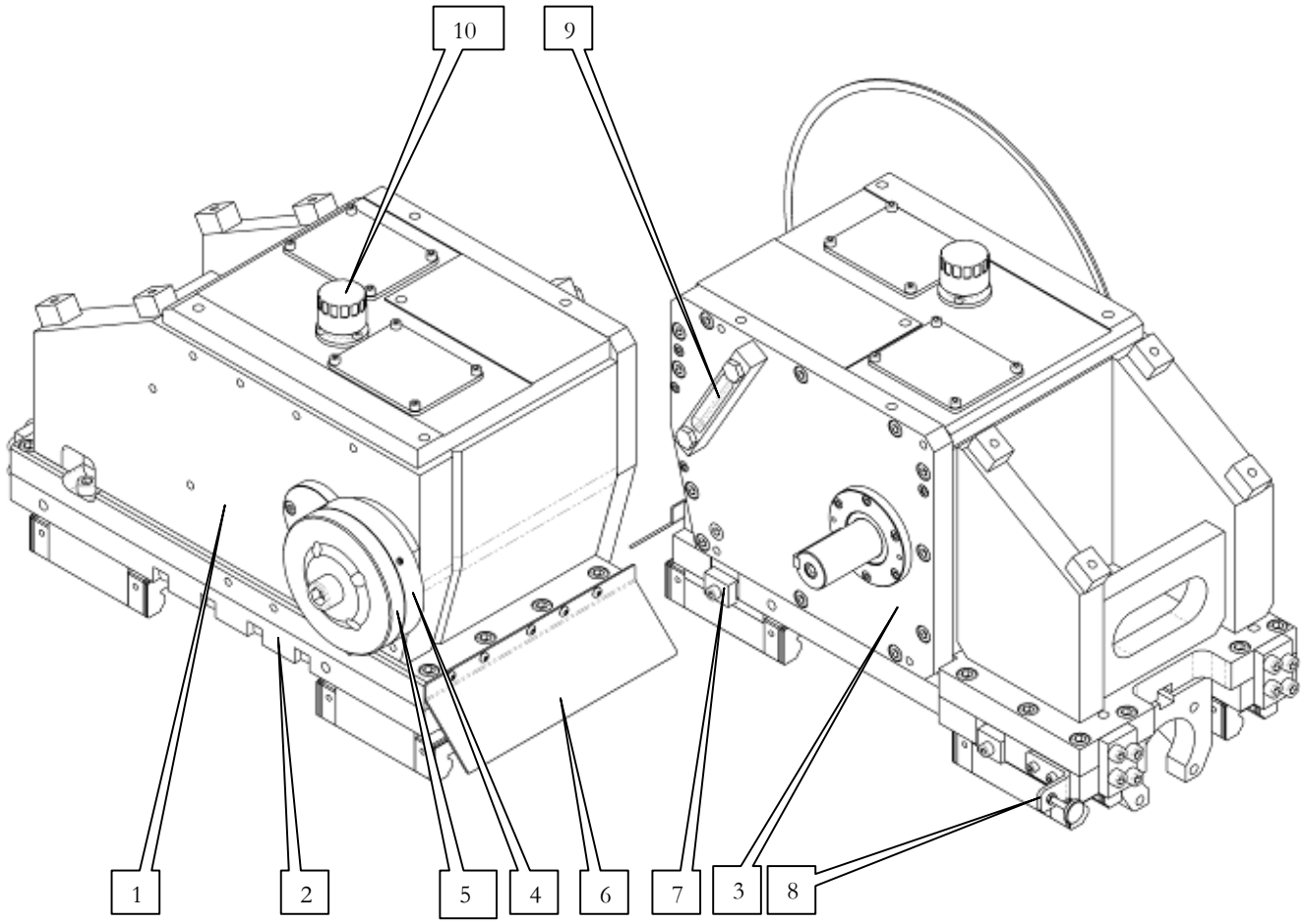
5 Description of the Saw

5.1 Designation of basic saw subassemblies and their main functional components

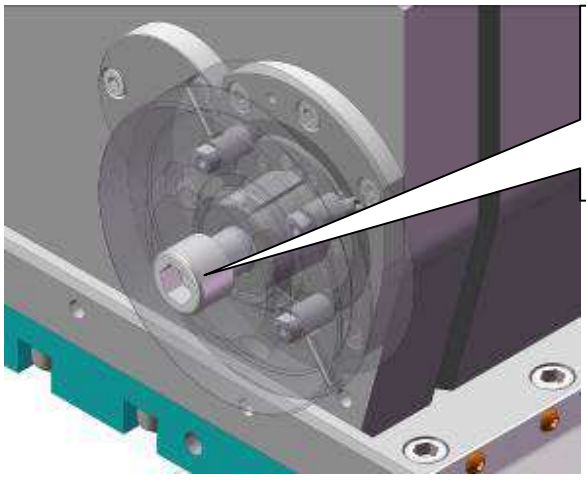


1. Saw Head
2. Machine Base
3. Head Feed
4. Fixture Assembly
5. Saw Spindle Drive
6. Blade Damper Assembly
7. Measuring System

Saw Head

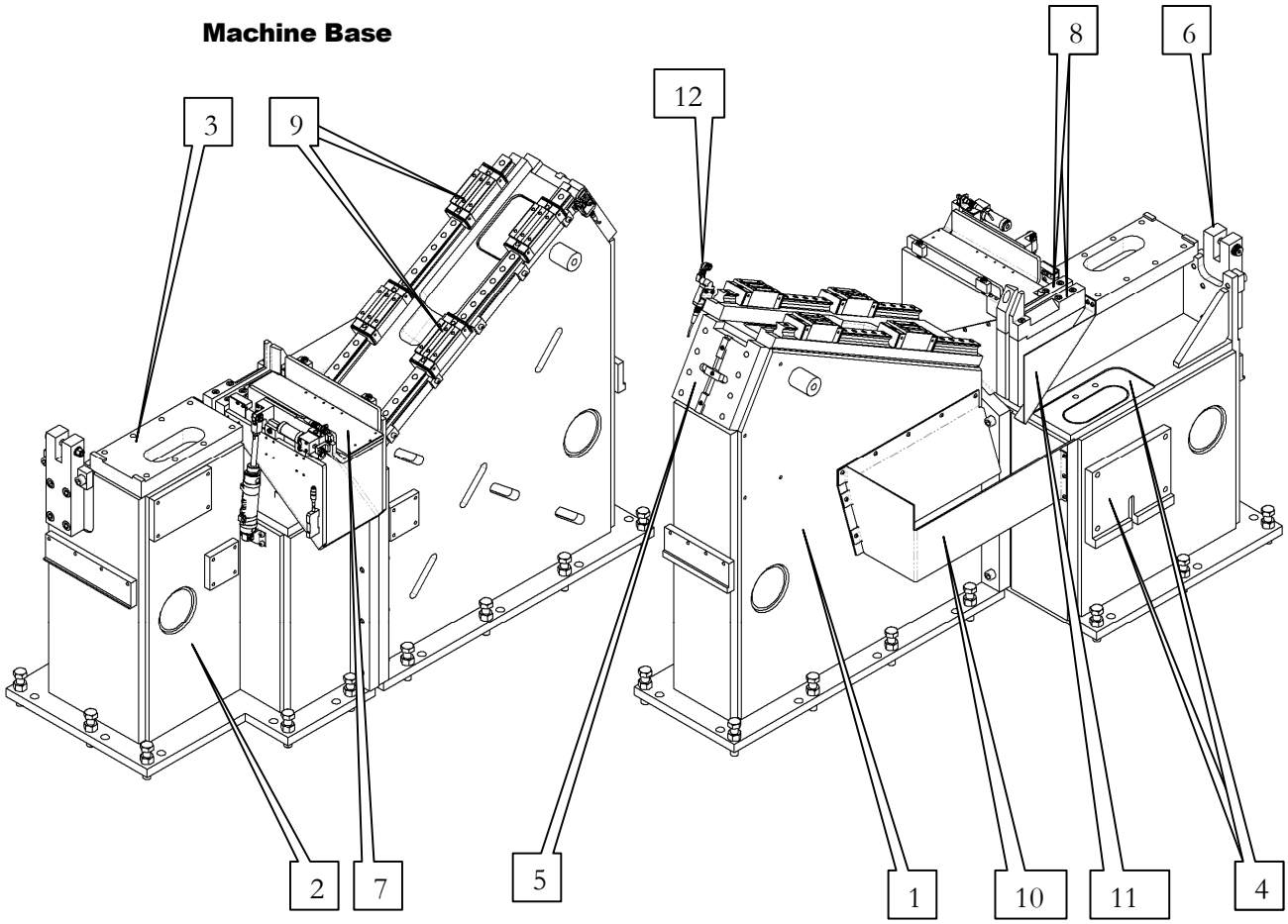


1	Gear Box
2	Gear Sliding Base
3	Main Cover
4	Drive Hub
5	Clamp Disc
6	Chip Reflector
7	Clamp, way
8	Bracket
9	Oil Gage
10	Filler / Breather



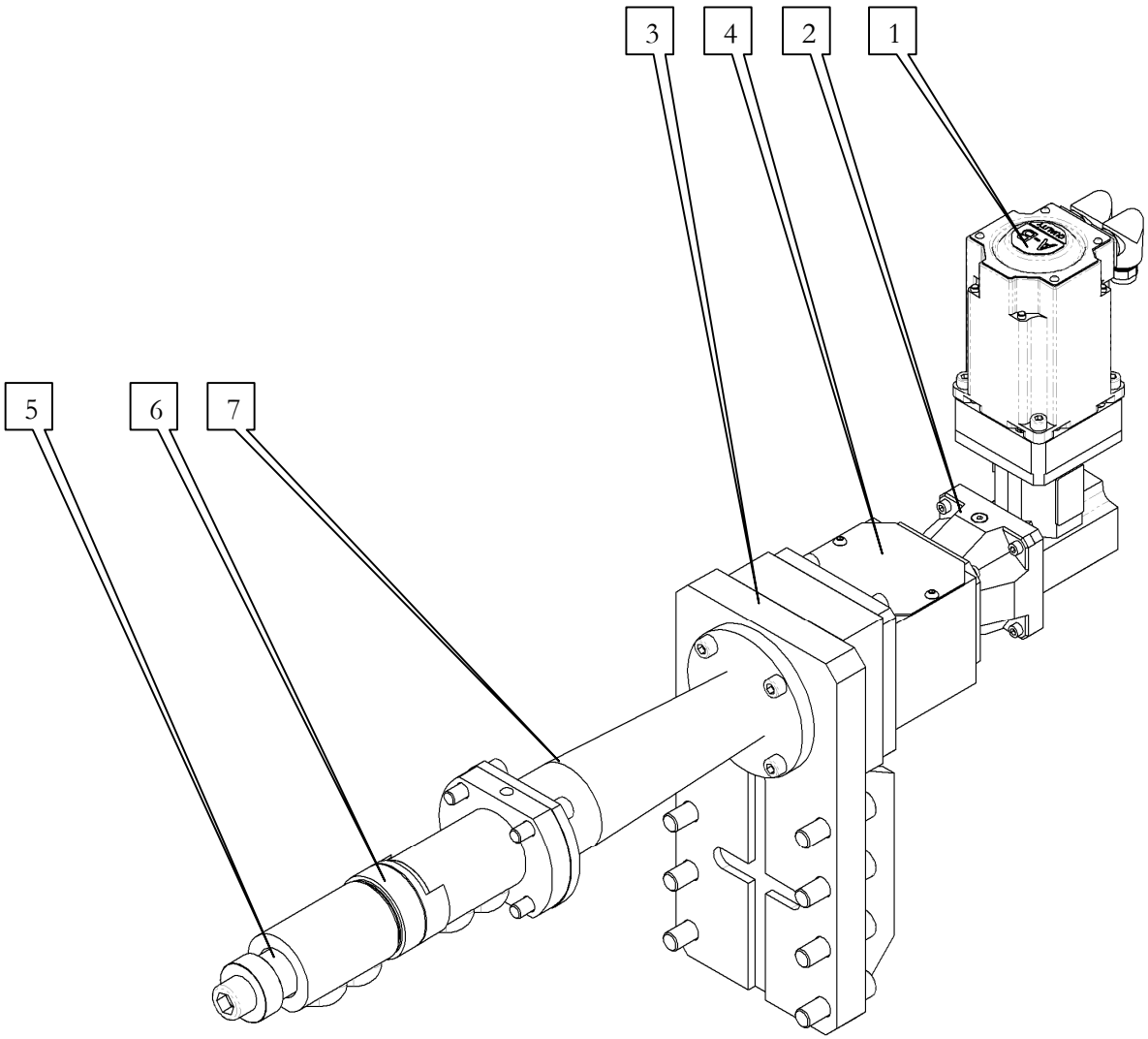
(1) Bolt M20 holding the Drive Hub to the spindle. In case of replacing or maintenance, the M20 bolt must be torque to 180 Ft-Lbs

Machine Base



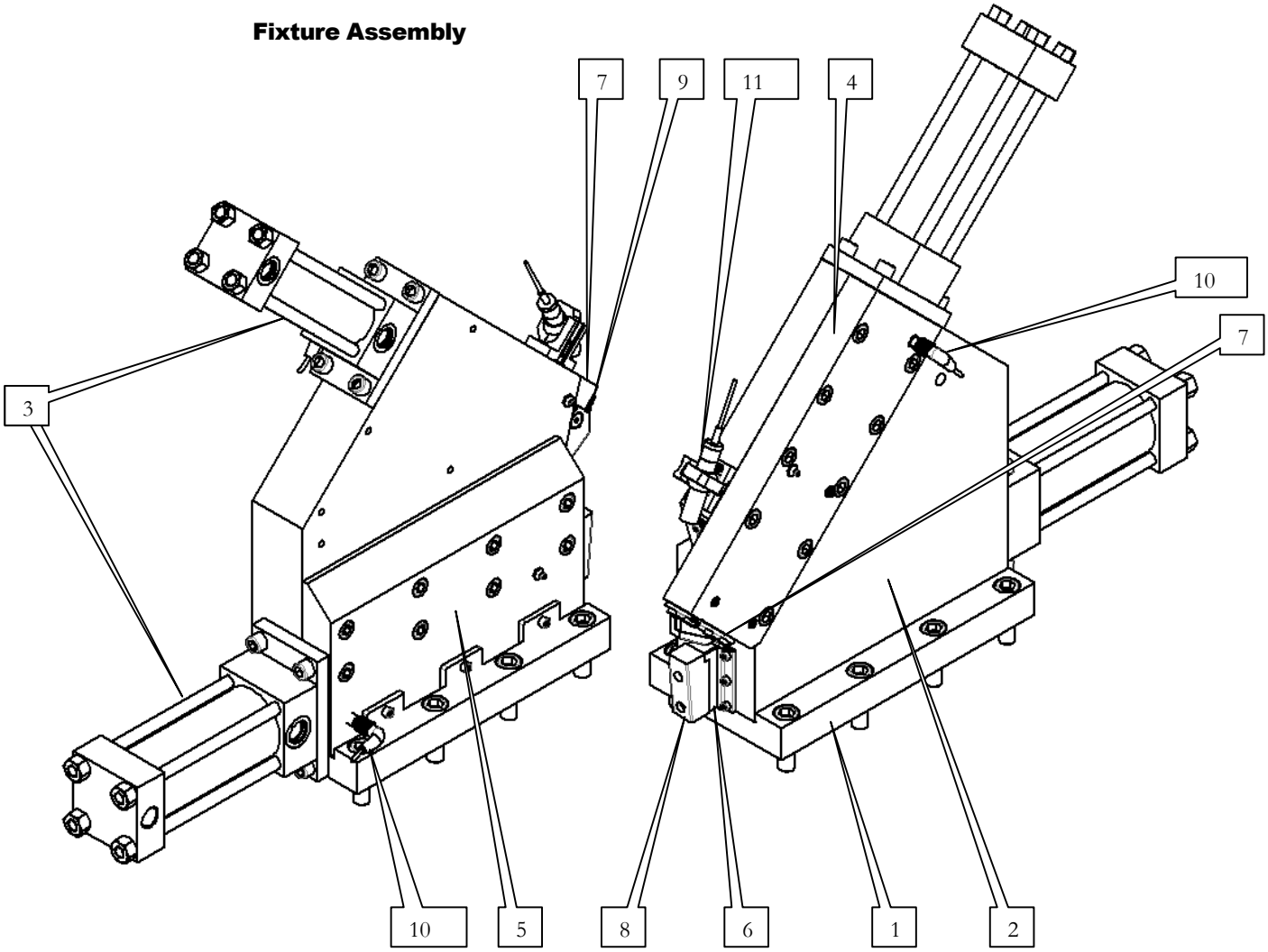
1 Saw Base
2 Fixture Base
3 Fixture Mount
4 Index Mount
5 Head Feed Mount
6 Three Positions Cylinder Mount
7 Exit Assembly
8 Side Jaw
9 Linear Guide
10 Chip Chute
11 Chip Guide
12 Head Home Switch

Head Feed



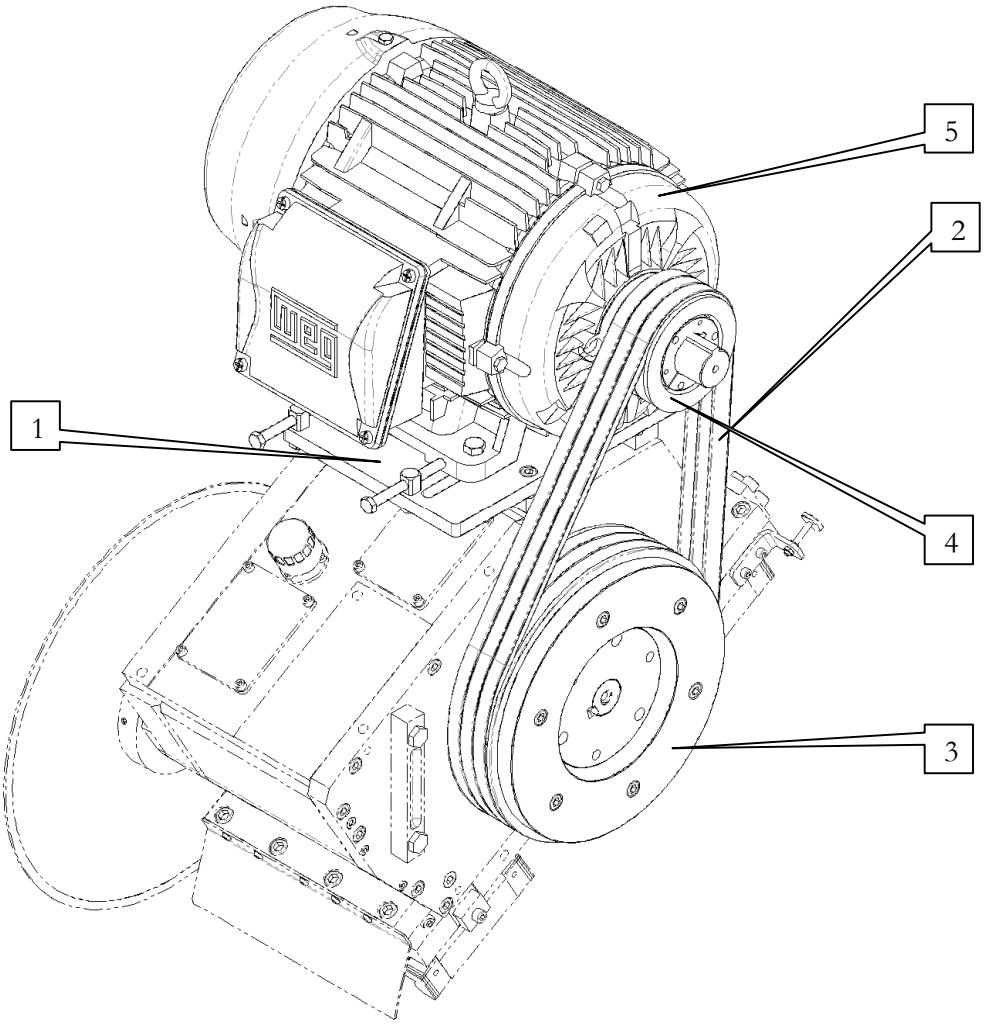
1 Servo Drive Motor
2 Gear Reducer
3 Head Feed Bracket
4 Motor Bracket
5 Ball Screw (Under Cover)
6 Ball Nut
7 Cover

Fixture Assembly



1. Fixture Base
2. Fixture Plate (With Lube. Point)
3. Clamp Cylinder
4. Inclined Guide Plate (With Lube. Point)
5. Side Guide Plate (With Lube. Point)
6. Horizontal Clamp Bar
7. Inclined Clamp Bar
8. Horizontal Jaw
9. Inclined Jaw
10. Fixture Open Switch
11. Laser Pointer

Saw Spindle Drive



Motor Mount Plate

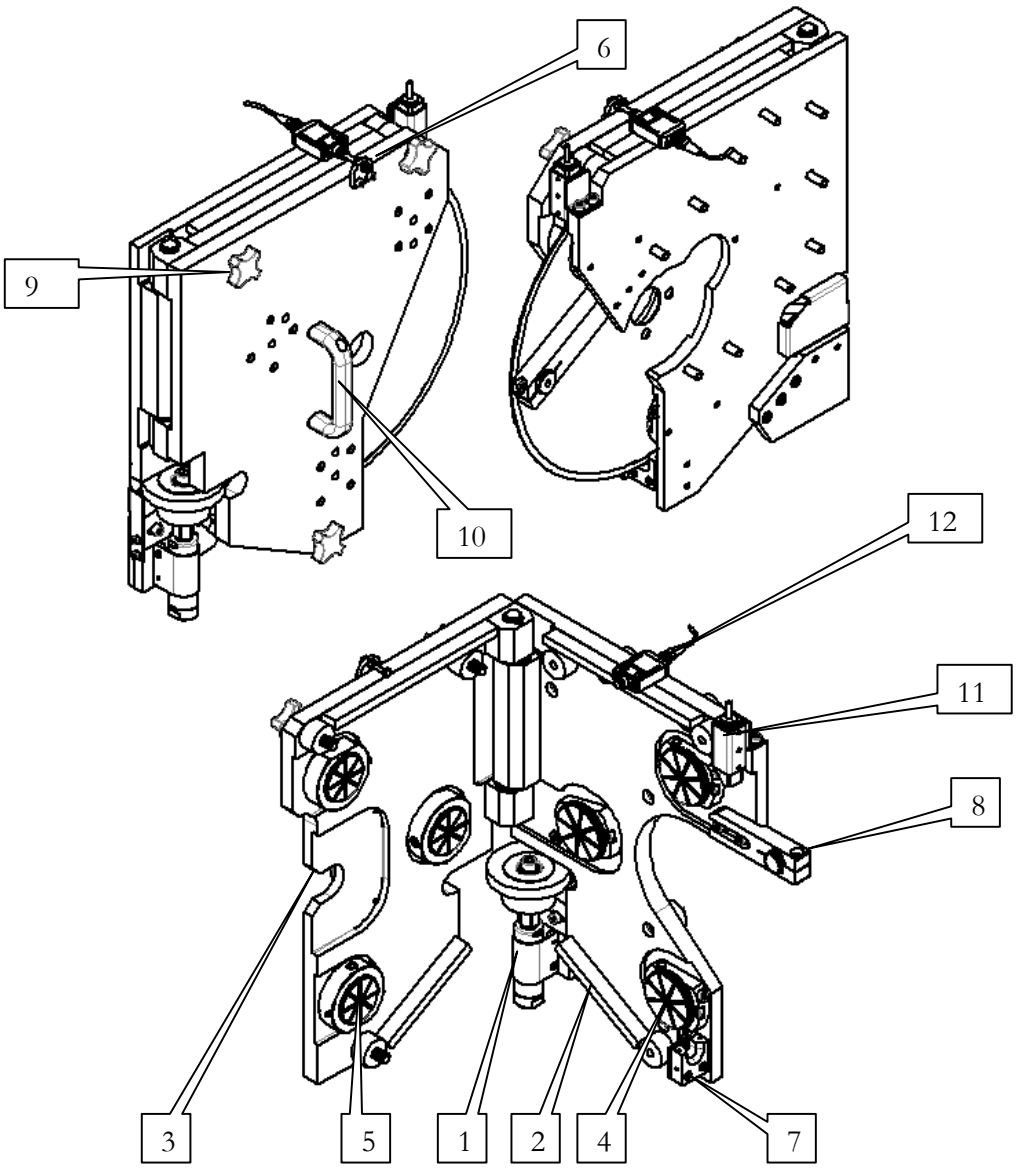
Belt

Driven Sprocket

Drive Sprocket

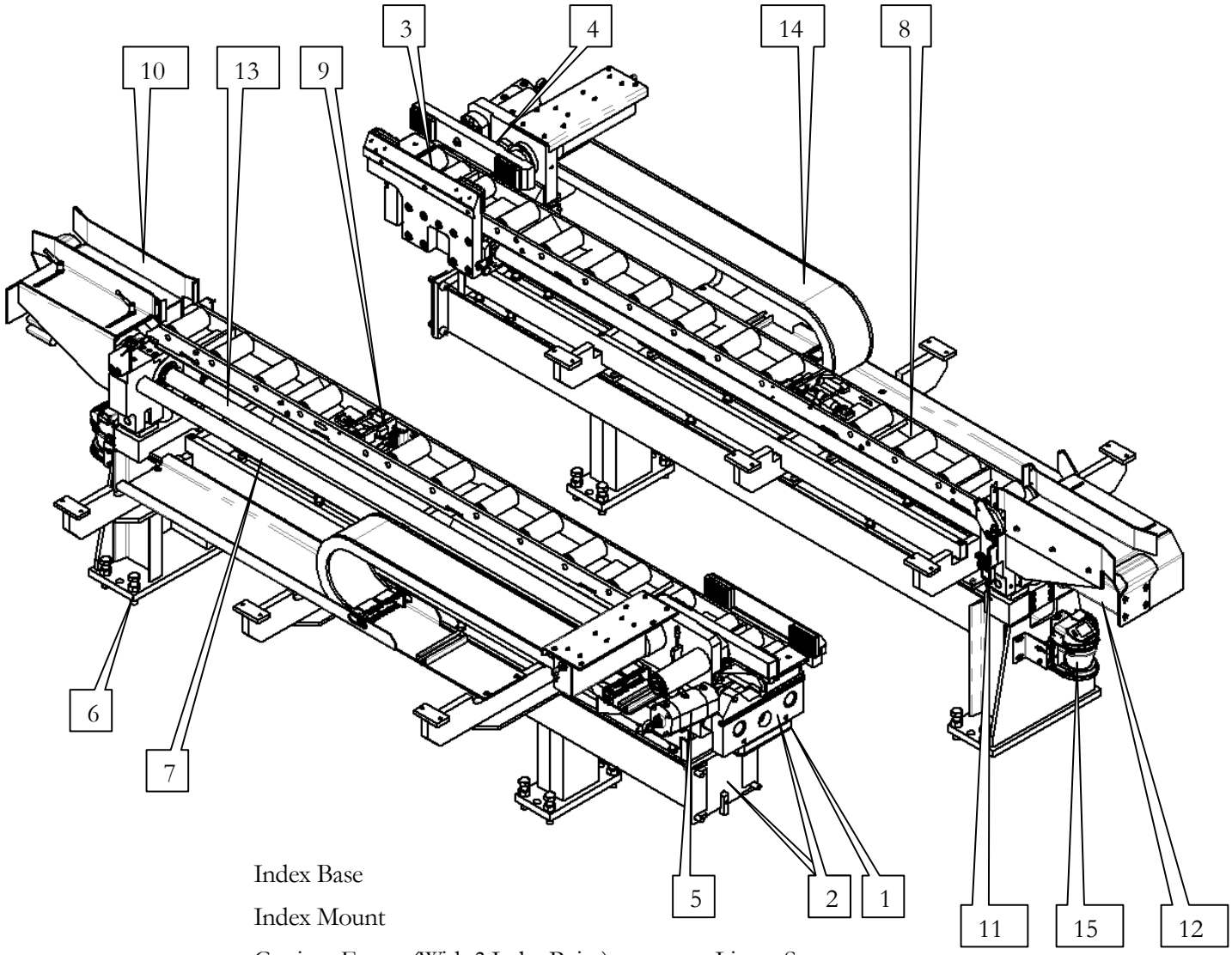
Motor

Blade Brake Assembly



Rotary Brush Assembly	Blow Off Block
Damper Frame, Head Side	Stabilizer Arm, Outer
Damper Frame, Door Side	Knob, Special Hand
Damper Assembly, Head Side	Handle, Pull
Damper Assembly, Door Side	Nozzle
Switch Dog Tab	Switch, Safety

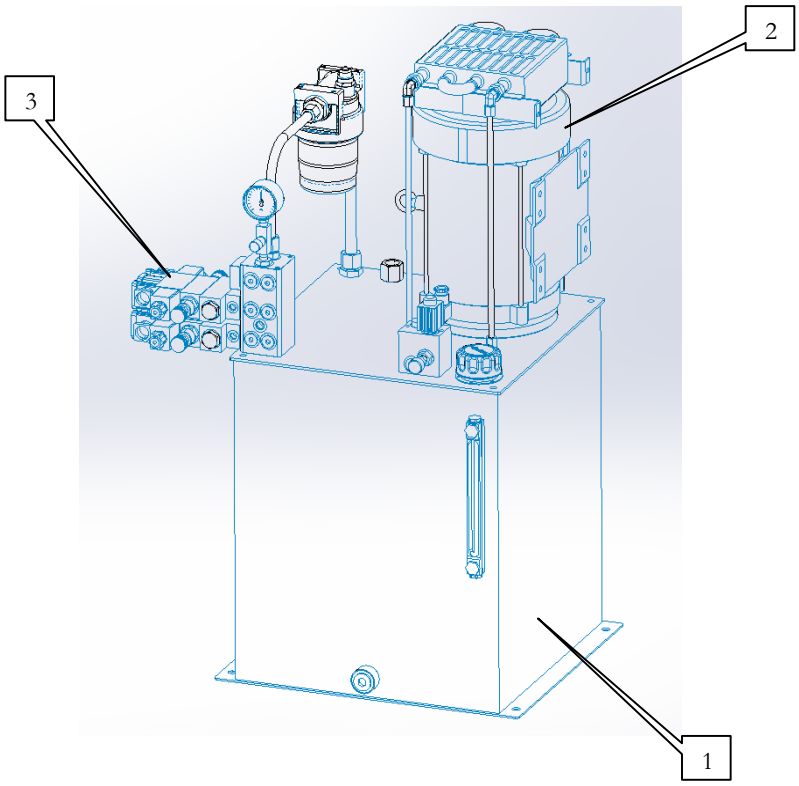
Measuring System



Index Base
Index Mount
Carriage Frame (With 3 Lube Point)
Moving Jaw
Three Position Cylinder
Measuring Frame
Guiding Rods
Conveyor Assembly
Stop Assembly
Incoming Guide

Linear Sensor
Servo Guide Motor
Ball Nut and Ball Screw
Cable Carrier
Safety Scanner

Hydraulic Power Unit

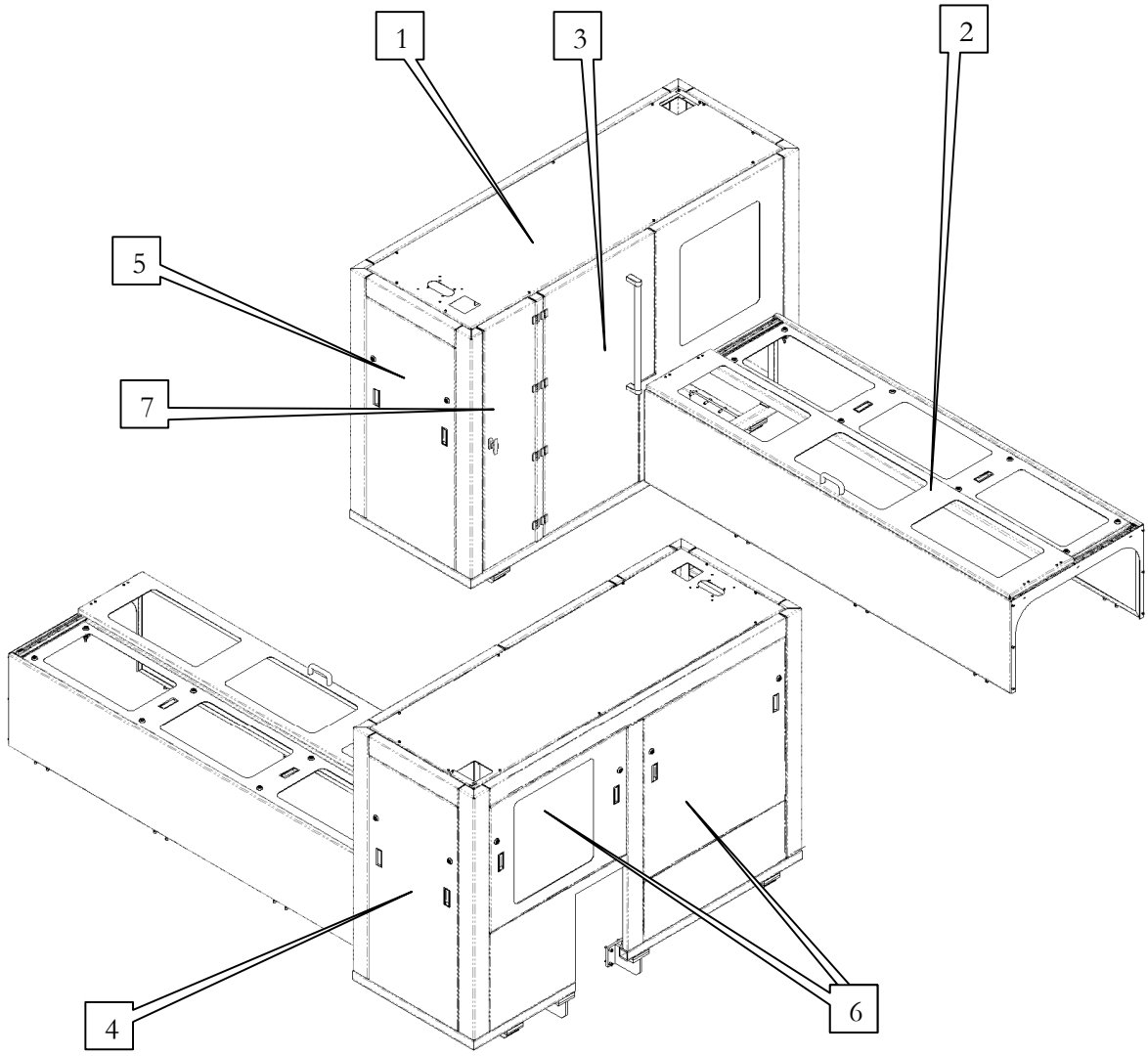


1 Tank assembly

2 Power Unit

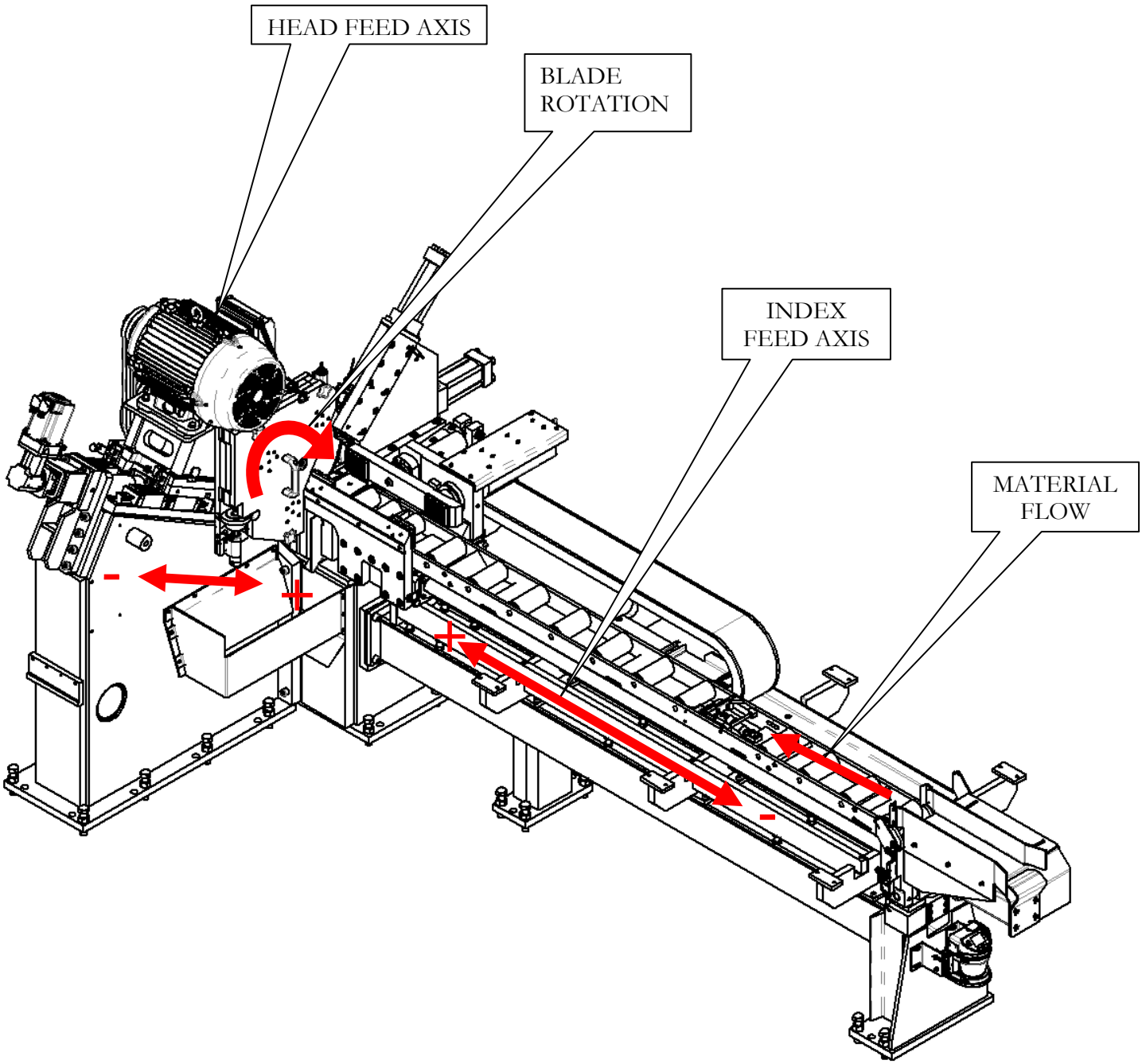
3 Valve Assembly

Machine Enclosure



1 Saw Enclosure
2 Measuring System slide door
3 Tool Change Door
4 Front access panel
5 Rear access panel
6 Side access panel
7 Fluids Panel access door

6 Designation of Saw Movements



7 Technical Data

Material Type:	Carbon and Alloy Steel Tubing	
Incoming Material:		
Max. material diameter	Ø 5.00"	125 mm
Min. material diameter	Ø 1.00"	25 mm
Max. wall thickness	0.5"	12.7 mm
Min. wall thickness	0.25"	6.35 mm
Material length	25'	7.6 m
Measuring system stroke:		
Max. measured length single stroke	80"	2032 mm
Voltage, Feed rate and Blade Diameter:		
Voltage	460 V , 3-phase	60 Hz
Saw head motor	15 HP @1750 RPM	11.2 kW
Saw Spindle speed	20-110 RPM	20-110 RPM
Hydraulic pump motor	7.5 HP	5.6 kW
Feed rate	4 - 40 IPM	100 – 1000 mm/min
Max. Saw blade diameter	Ø 18.11 "	Ø 440 mm
Blade pilot diameter	Ø 1.968"	Ø 50 mm
(4) Drive pins	Ø 0.544"	Ø 13.8 mm
Pin Circle	Ø 3.149"	Ø 80 mm

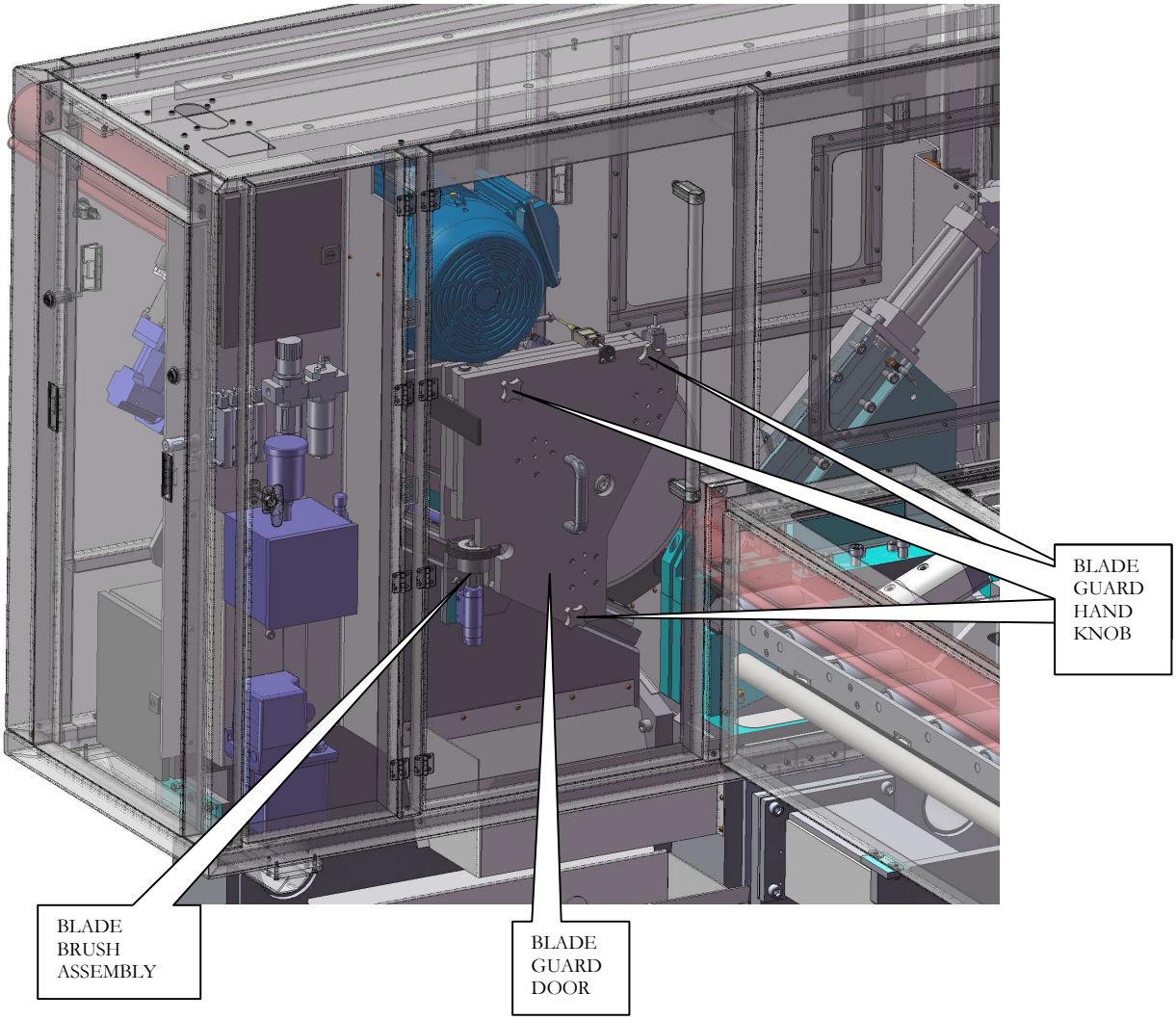
8 Preparation for Operation

8.1 Saw blades and blade mounting

HINT: For optimum performance and blade life, use only our recommended blades with the proper diameter and number of teeth.

8.2 Blade Change

Move Head to maximum Returned -Position. Disengage inter-lock tool change door and open the tool change door. Rotate the (3) knob hand counter clockwise till they get loose, then open the guard door.



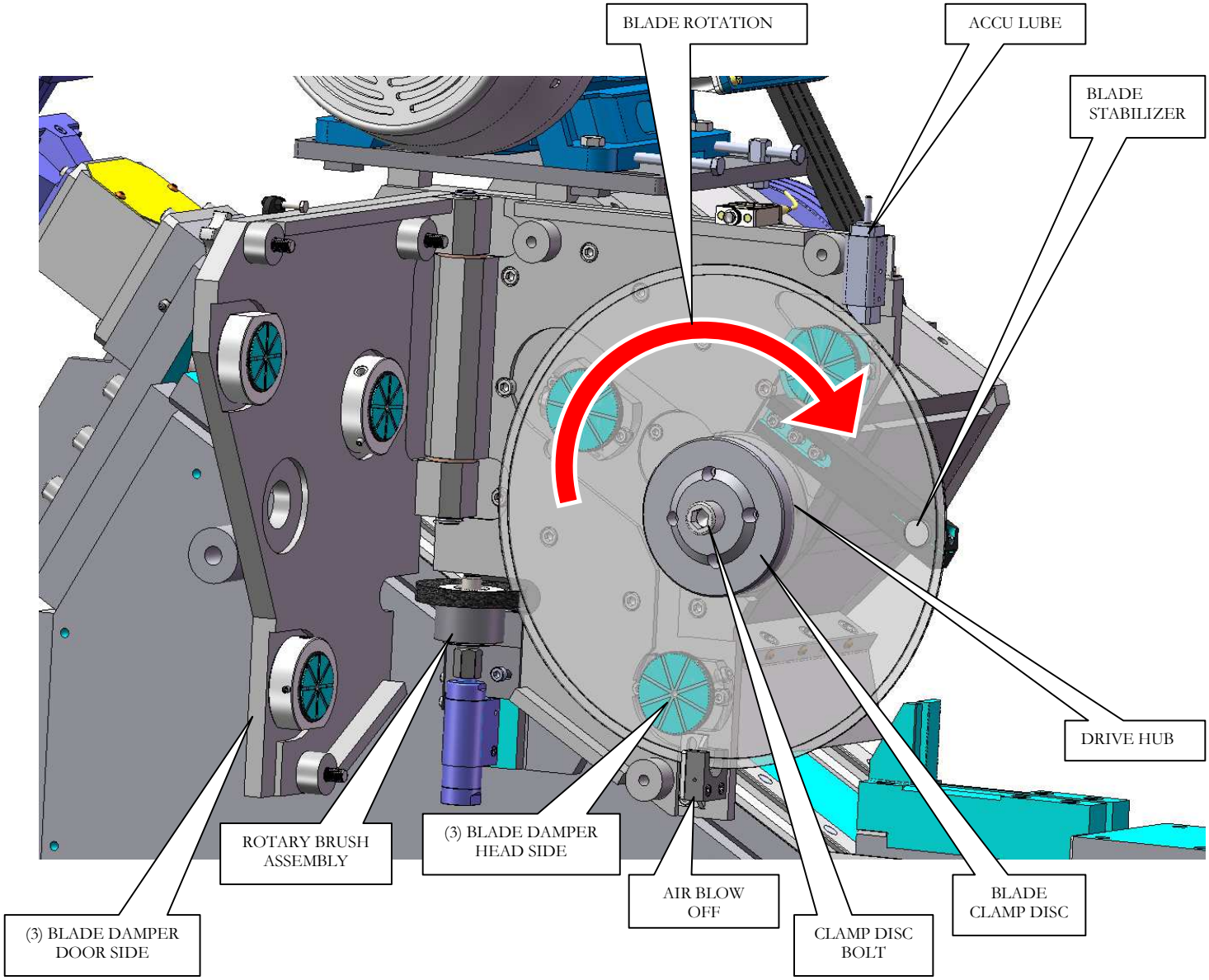
Remove Old Blade

Adjust rotary brush assembly and air blow off brackets to clear the way to the blade to come out.

Remove the Bolt M20 from the blade clamp disc.

Remove the blade clamp disk.

Remove the saw blade. Do not set the blade on a hard surface such as the concrete floor because this may cause damage to the teeth. It is best to rest the saw teeth on a block of wood, or place it directly into a crate for shipping to ***Advanced Machine & Engineering SPEED CUT division*** for reconditioning.



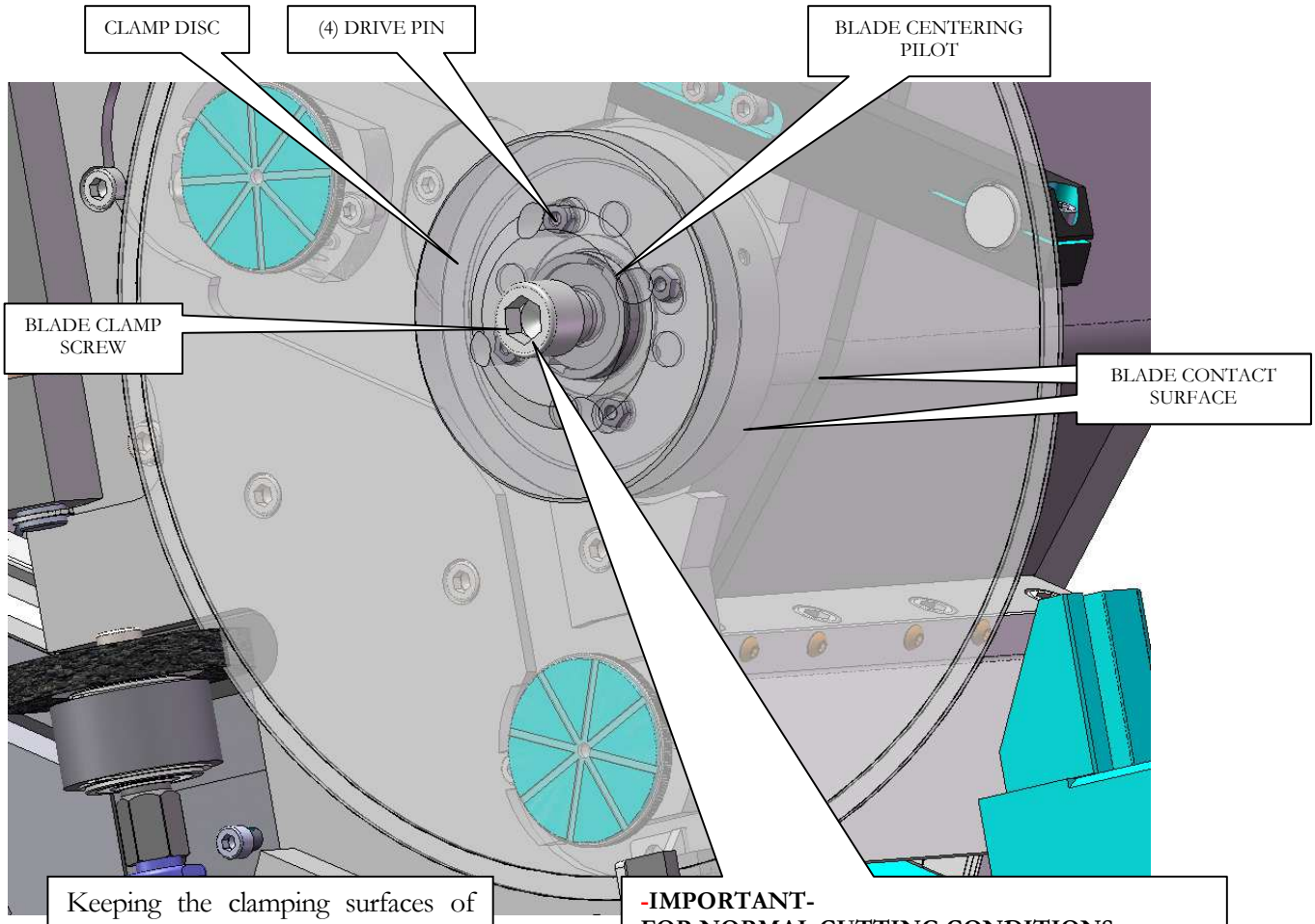
Install New Blade

Clean the blade contact surfaces

Inspect contact surface for build up or damage on the drive hub/clamp disc. If necessary, polish the pilot diameter and contact surfaces to insure adequate surface contact with the blade. If the drive hub is damaged beyond repair, replace it!

Locate the blade on the centering pilot on drive hub and rotate the blade to align the 4 mounting holes. Push the blade against the hub contact surface and engage the 4 drive pins.

Install clamp disc and bolt M20 and torque the screws as described below.



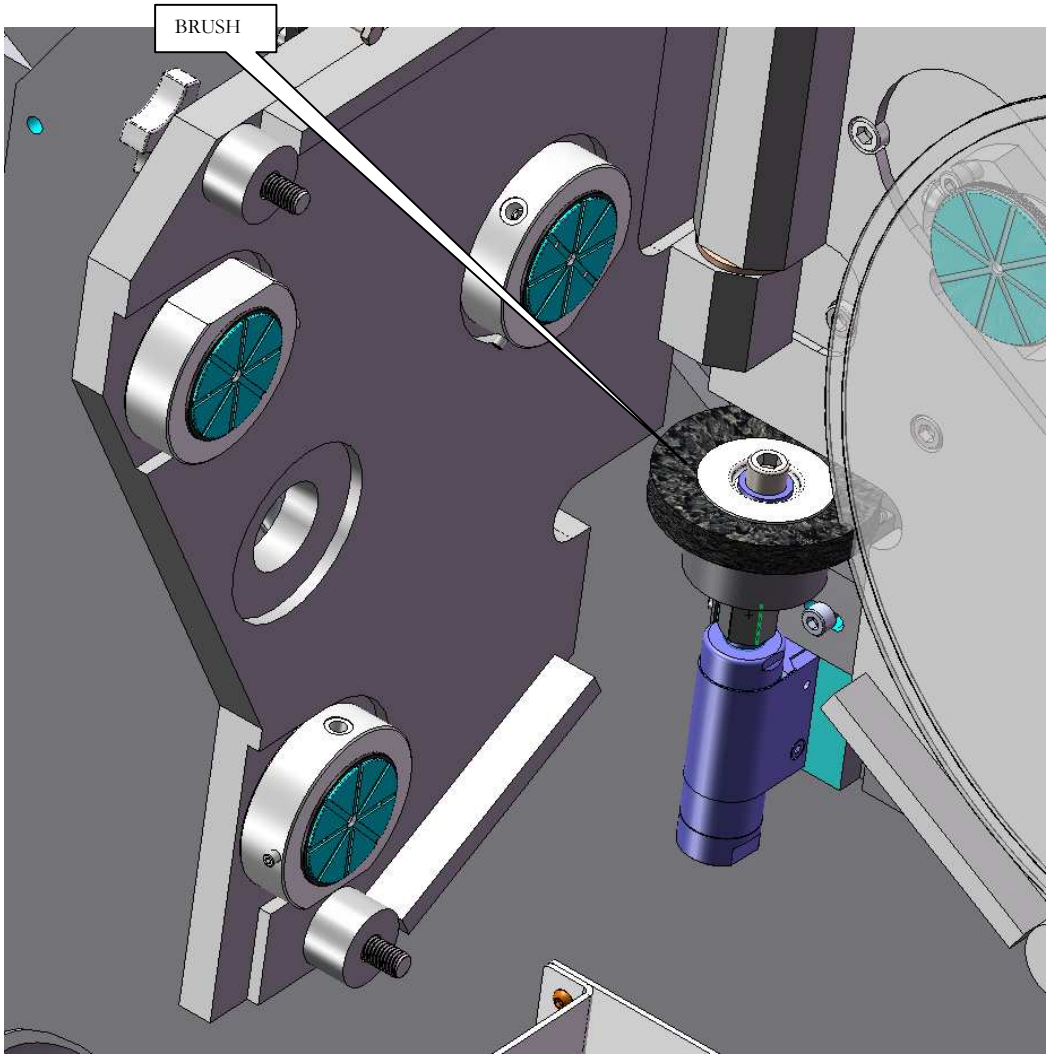
Keeping the clamping surfaces of the clamping disc and the drive hub free of chips, and other deposits is mandatory to ensure a proper blade seating.

-IMPORTANT-
FOR NORMAL CUTTING CONDITIONS TORQUE M20 SOCKET HEAD CAP SCREW TO 180 FT-LBS

Brush Position and Replacement

Your saw is equipped with a powered tooth cleaning brush. The blade brush removes any chips that might stick to a tooth or in the gullet. Proper maintenance of the brush is essential for long blade life. The brush should be checked for wear and replaced if necessary.

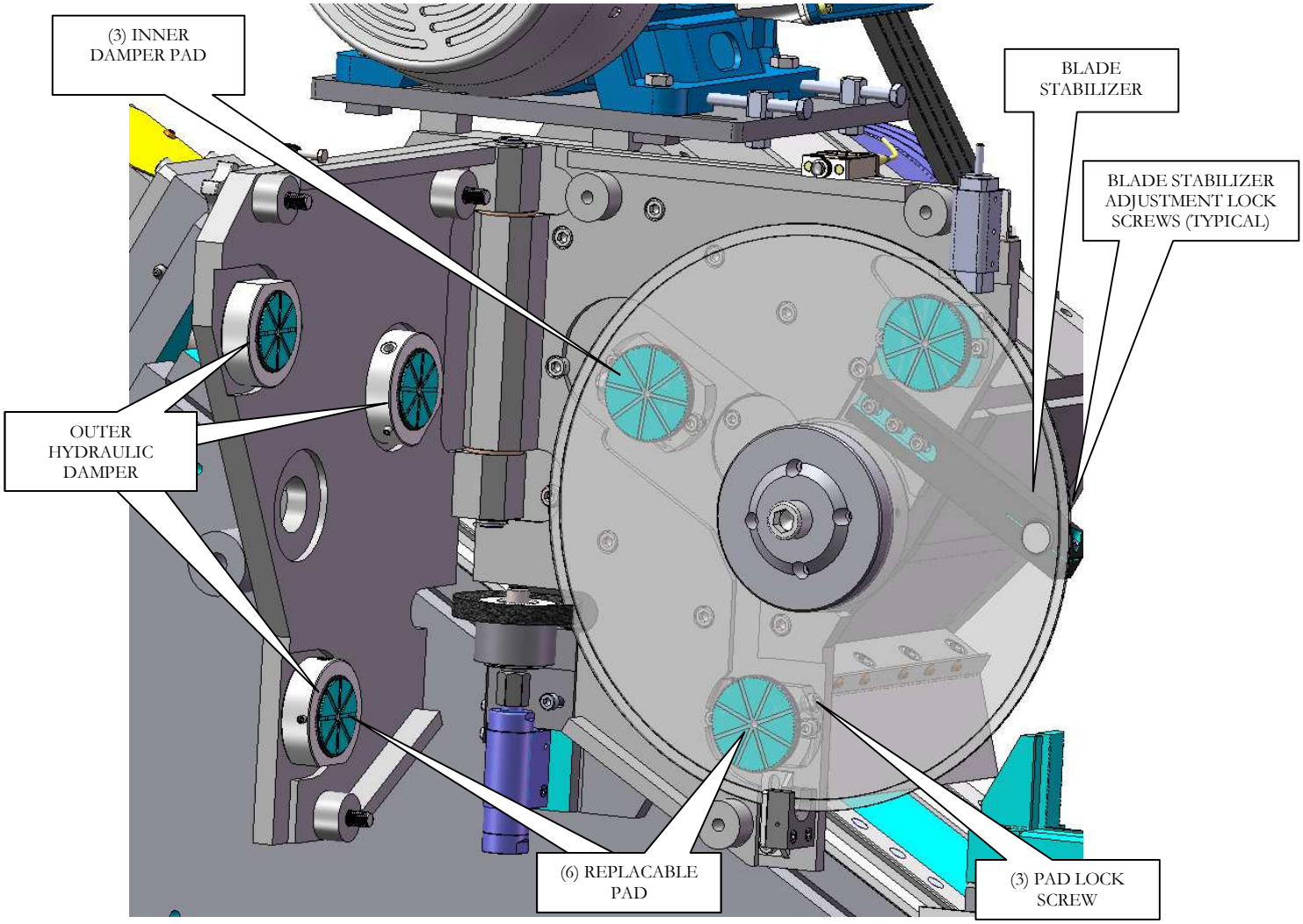
Also, whenever a blade is installed, the brush positions should be readjusted if necessary. The brush wires should protrude approximately 0.25" (6 mm) into the saw blade. The brush is adjustable for blade changing.



Blade Damper and Stabilizer

The saw blade is affected by harmonic vibrations, caused by its own critical speed, the cutting action, and vibrations created by outside sources. The saw blade will also lead to the side where the teeth are sharper.

A specially designed hydraulic blade damper with replaceable wear pad is used to minimize vibration facilitating a smooth clean cut and longer tool life.



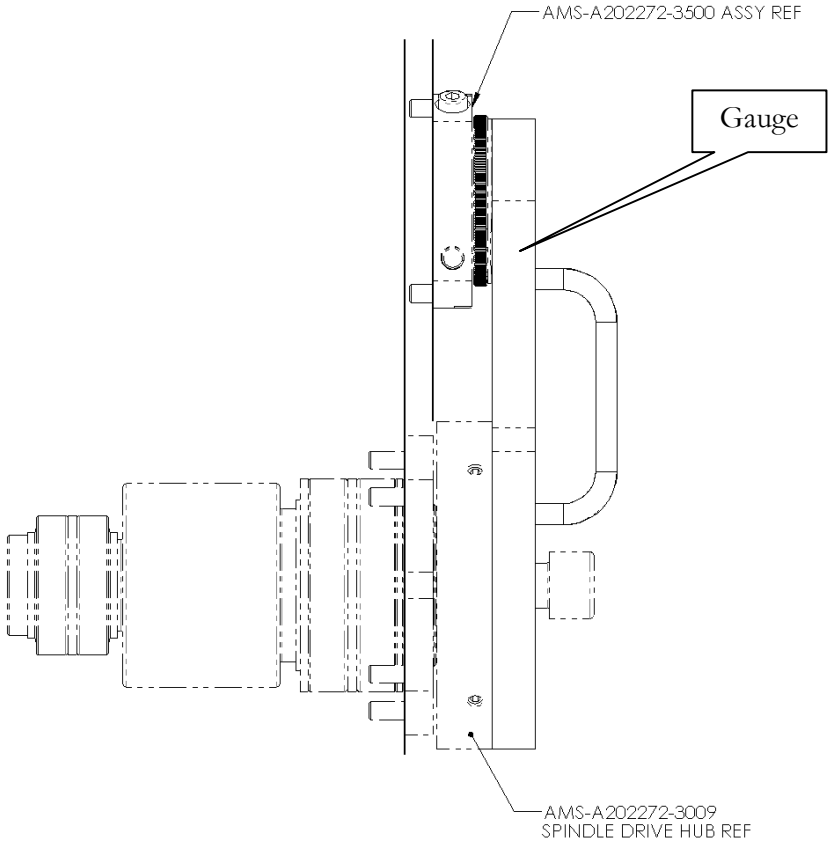
The three adjustable blade damper pads have been set-up to be in the same plane with the blade hub contact surface using a ground gauge bar. These pads are designed for long life and incorporate a locking mechanism in the mounting bracket. These features are incorporated so that the adjustment of the inner brake is not necessary.

DO NOT ADJUST OR REMOVE THE INNER DAMPER PADS WHEN CHANGING THE BLADE.

Damper set-up

The inner damper pad will only require adjustment to account for wear in the pad. Normally this pad should not require setting every blade change. A correctly set blade damper pad will be set flush with of the blade mounting surface of the hub. Use the setting gauge to set the height of the damper pads.

- Loosen adjustment pad lock screw.
- With no blade installed - Use this gauge to set the height of the inner blade damper pads. Adjust the inner pad until it touches the straight face of the gauge then tighten the locking screw.



- Repeat the setting procedure for all three inner damper pads.
- Remove the gauge, install the Blade using the proper torque .
- Close the blade guard door and tighten the (3) hand knobs.

Test Run

The machine has been carefully tested and adjusted at our plant. If our service was not contracted for startup, dry-cycle the machine in manual mode and in automatic mode to ensure that no damage or miss-adjustment occurred during transportation.

Make sure the saw blade rotates in the right direction, that the chip removal brush, and the brakes, stabilizer and the air blow off nozzle are set properly before putting the AMSAW® in production.

In detail the following important daily checks must be made before the machine is put in operation.

- The right saw blade is properly installed (watch rotation)
- The brush and air nozzles are engaged properly
- All doors and guards are locked and in place
- The speed and feed is set according to the specifications.
- Shop air is connected.
- All reservoirs are filled with the proper liquid
- All accessories such as chip conveyor, handling systems, material removal, etc. function properly.
- No unauthorized personnel is around the equipment
- The operator has been fully instructed and has complete responsibility of the AMSAW®, its peripheral equipment and the surrounding area.

9 General saw maintenance

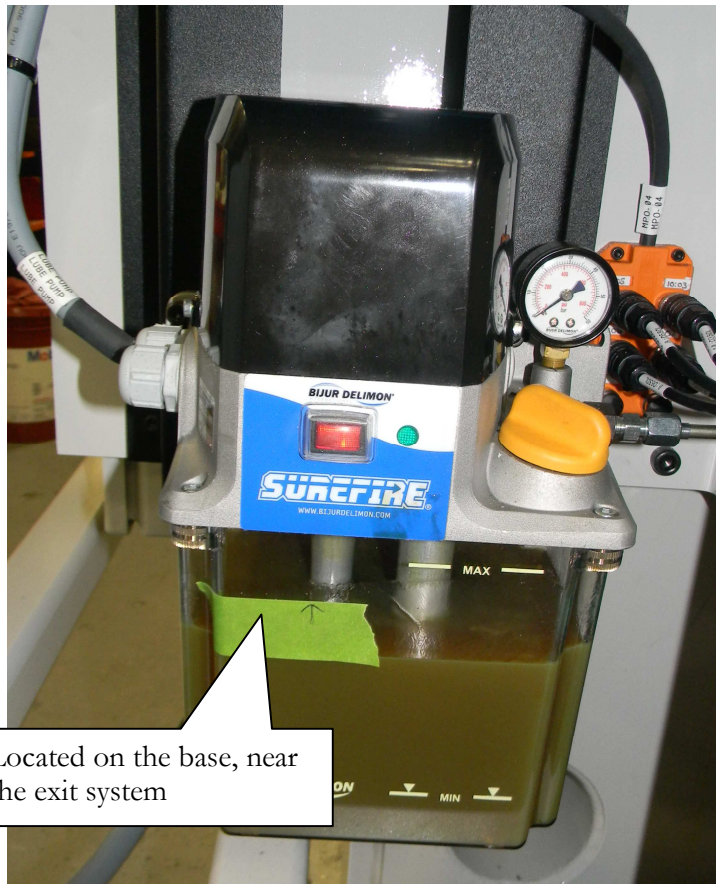
9.1 Lubrication

There are four types of lubrication used in this sawing system. (1) Components that require continuous replenishment of lubrication use an automatic lubrication system. (2) Other components that require lubrication less frequently are periodically manually re-lubricated, (3) gearboxes are filled with lubrication that must be maintained to a given level and (4) the blade uses a minimal mist cutter lubrication system.

Automatic Lubrication

This saw has its own automatic lubrication system that lubricates the head feed ball screw, index feed pinion, and index guide ways proportionally to number of cycles. The lubrication system is mounted on the main saw base, near the exit system. The lubrication should be checked weekly and filled to the proper level as needed.

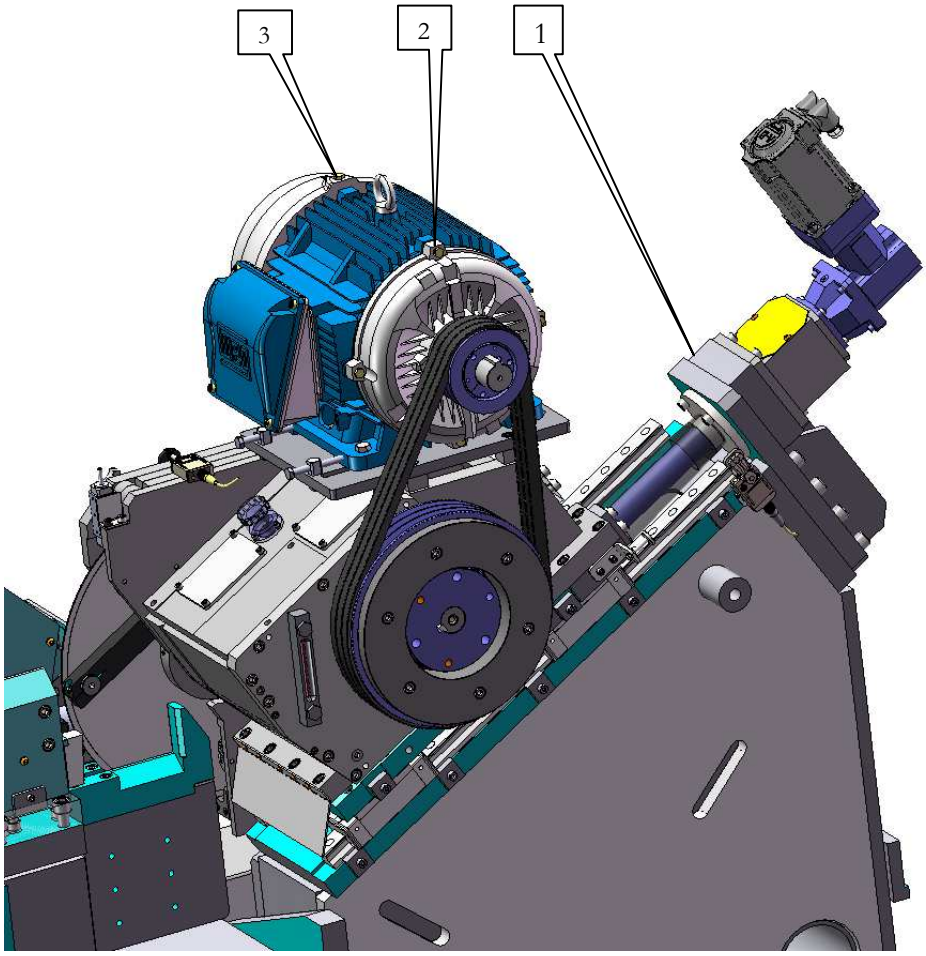
Fill automatic lubrication system with **Mobilux EP023** grease or equivalent.



Located on the base, near the exit system

Saw Periodic Manual Point Lubrication

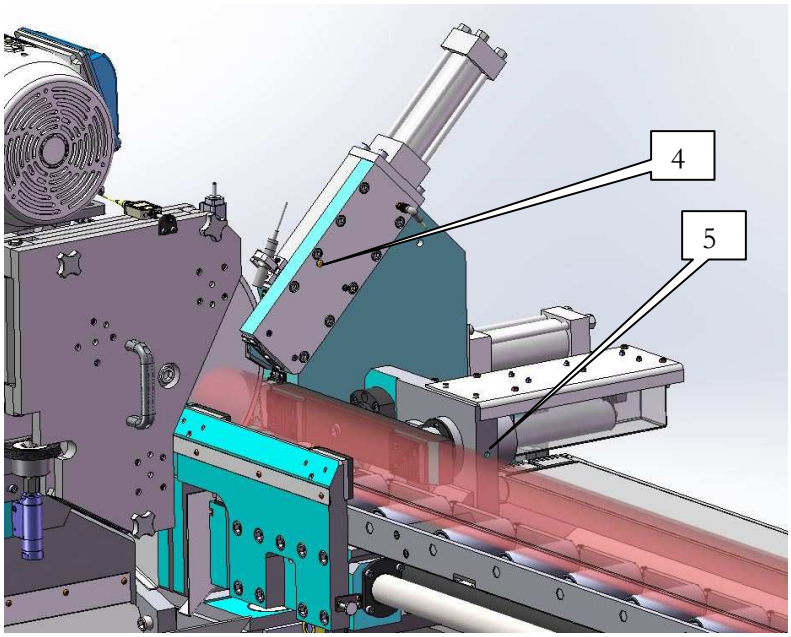
There are 8 manual grease points that will require a small amount of grease every three months.



Head Feed Bearing Block

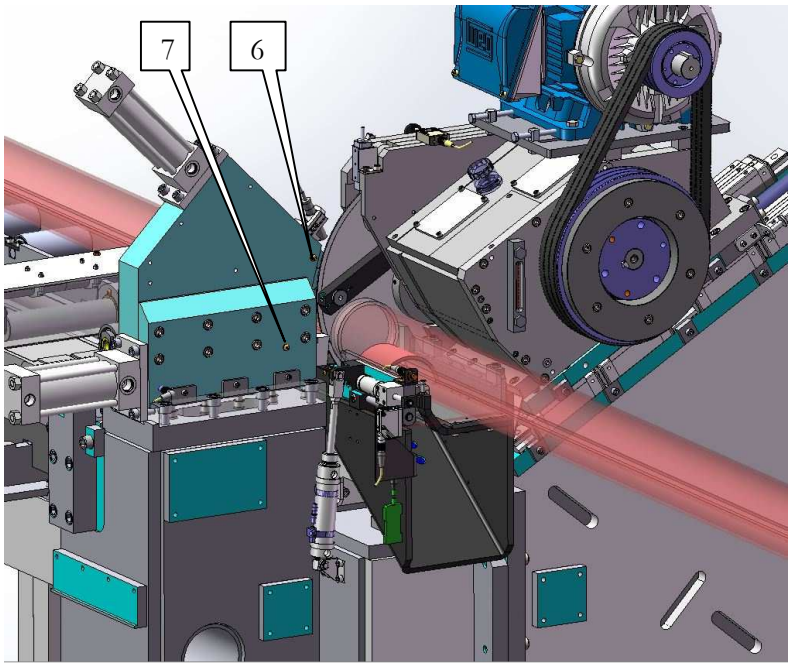
Front Spindle Motor Bearings

Rear Spindle Motor Bearing



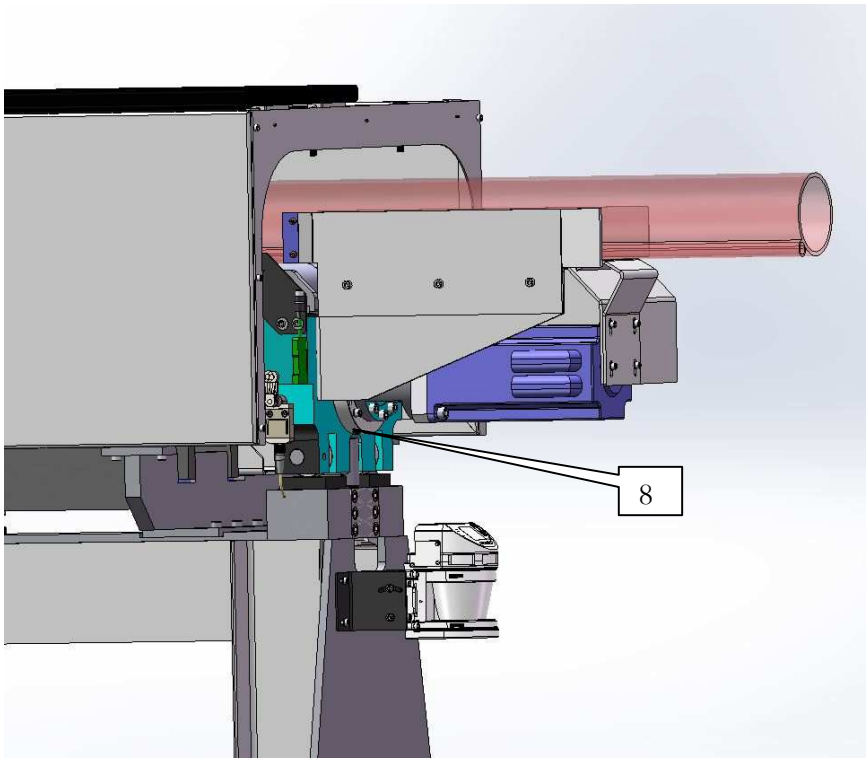
45° Clamp Arm (front side)

Measuring System Clamping Rod Bearing



45° Clamp Arm (rear side)

Horizontal Clamp Arm



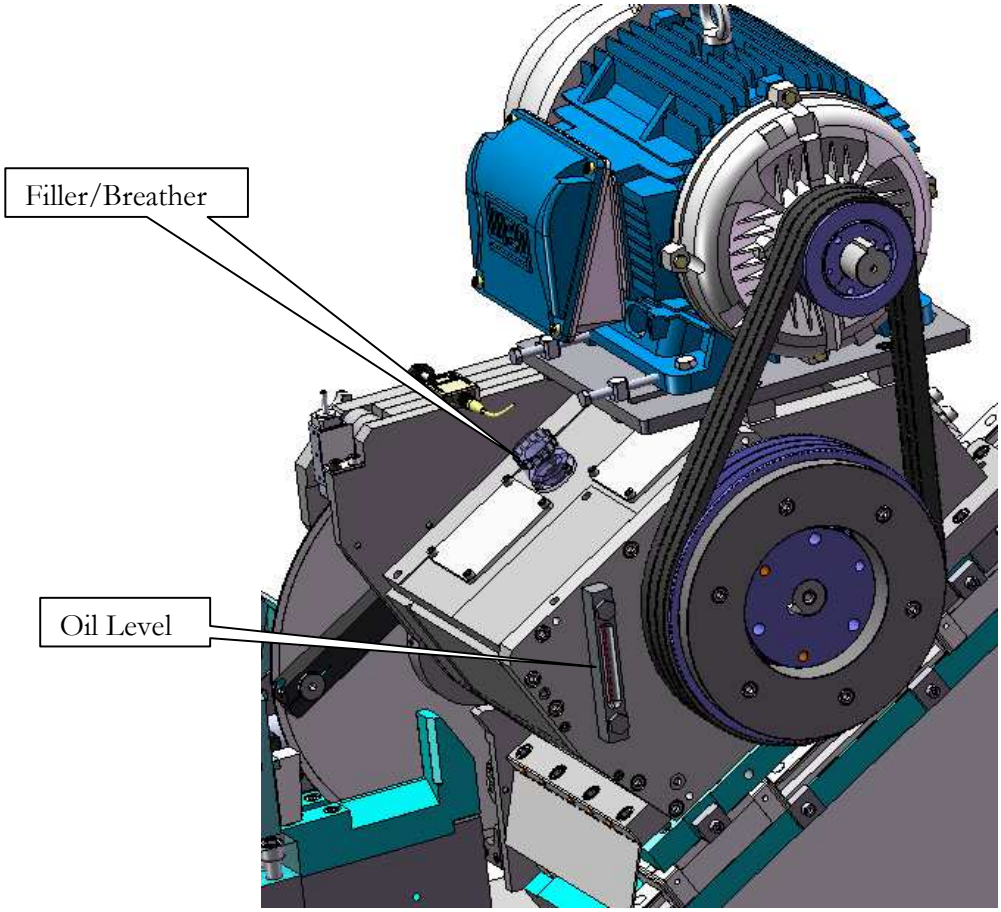
Measuring System Feed Bearing

Head Case Lubrication

The Saw head must be filled to a pre-determined level with gear oil. It is recommended that the oil level be checked weekly. The oil level in the head case should remain constant. If the level drops below the low limit indicated on the sight glass, oil should be added and the Head case should be inspected for leaks.

With saws used in high production environments (> 50,000 cuts/year) it is recommended that the head case be drained and refilled with clean gear oil at least once per year.

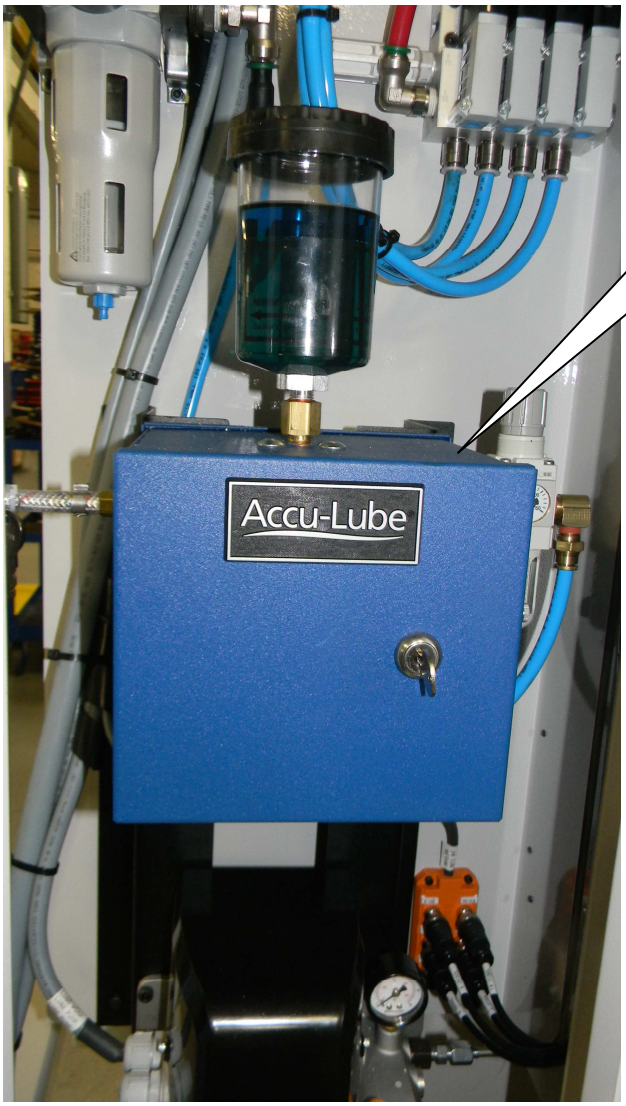
NOTE! The oil level must be in the center of the oil sight gage when the spindle is not turning. If required fill head case with **Mobilgear 600 XP 150** or equivalent.



Cutter Lubrication

The Saw is equipped with an Accu-Lube automatic minimal mist cutter lubrication system used primarily when cutting high alloy steels.

Fill cutter lubrication system with **Accu-Lube LB-2000** oil or equivalent.



Accu-Lube Located on the Rear of the Base

9.2 Hydraulics

The Saw is equipped with its own hydraulic system primarily used to operating the saw fixture, index clamping, part separation and any optional material handling equipment.

Hydraulic Power Unit

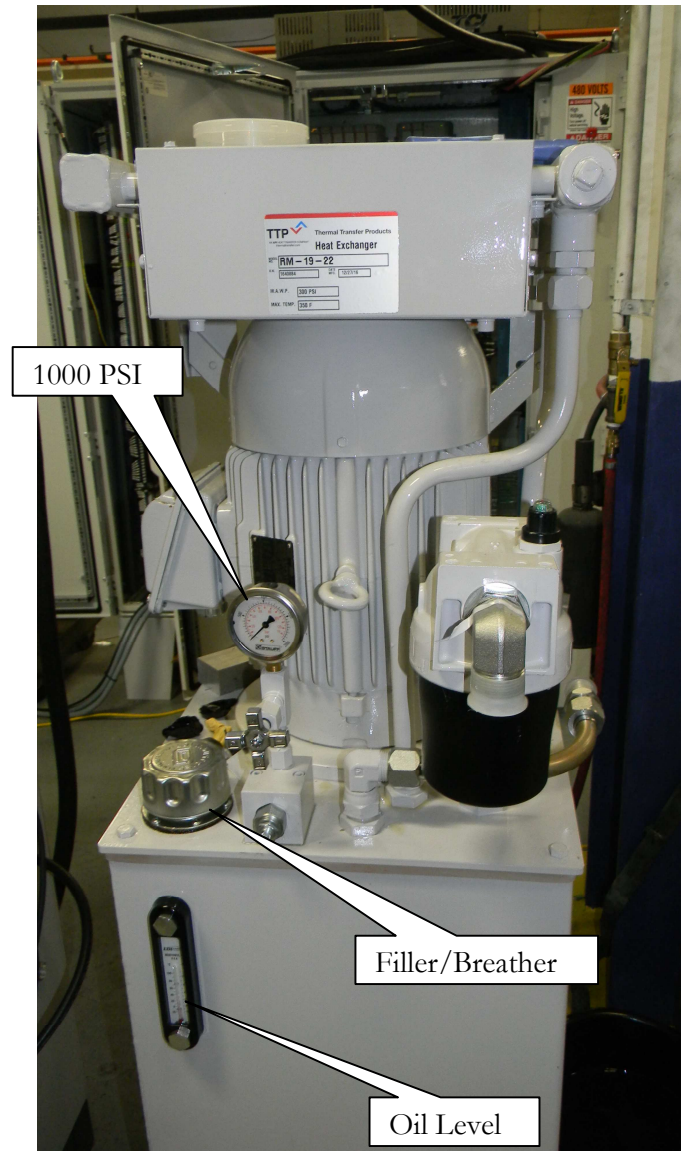
It is recommended that the oil level be checked weekly. The oil level in the hydraulic tank should remain constant. If the level drops below the low limit indicated on the sight glass, **hydraulic oil should be added and the entire hydraulic system including pipes, hoses, valves** and cylinders should be inspected for leaks.

With saws used in high production environments (> 50,000 cuts/year) it is recommended that the hydraulic tank be drained, cleaned and refilled at least once per year.

Fill the hydraulic tank to the center of the oil sight gage with Mobil DTE 24 or equivalent.

The hydraulic filter (Element #926169 10C) should be replaced when the indicator gage reaches the RED zone or every 6 months whichever comes first.

The hydraulic pressure has been pre-set at the factory to 1000 PSI. Altering the pressure may result in issues with inadequate clamping force.

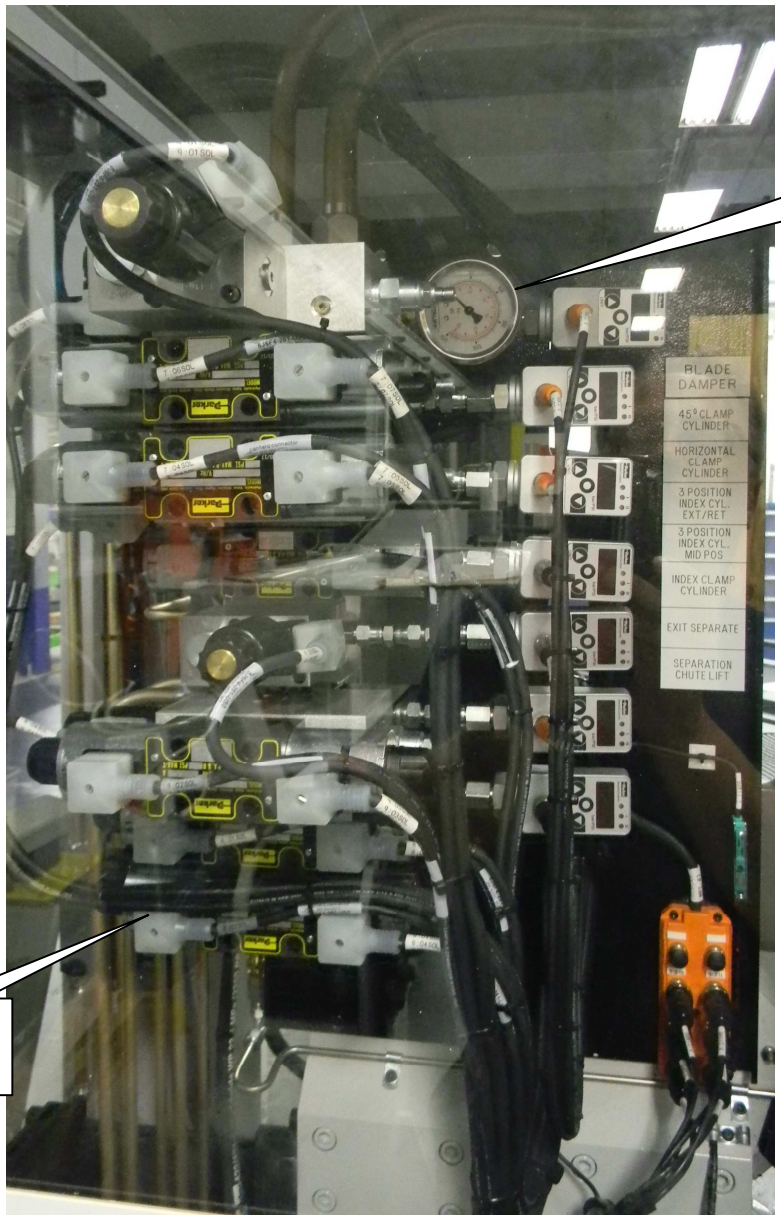


Hydraulic Valves

Solenoid operated Hydraulic valves with manually adjustable flow controls are used to operate all movements that are performed using hydraulic power.

All of the hydraulic valves are located on the back side of the machine.

The flow controls have been pre-set at our factory to achieve optimal performance. Altering the existing setting may result in degraded production cycle times



Pressure Gauges

See Appendix A for pressure sensor information

Hydraulic Valves

Pressure Settings

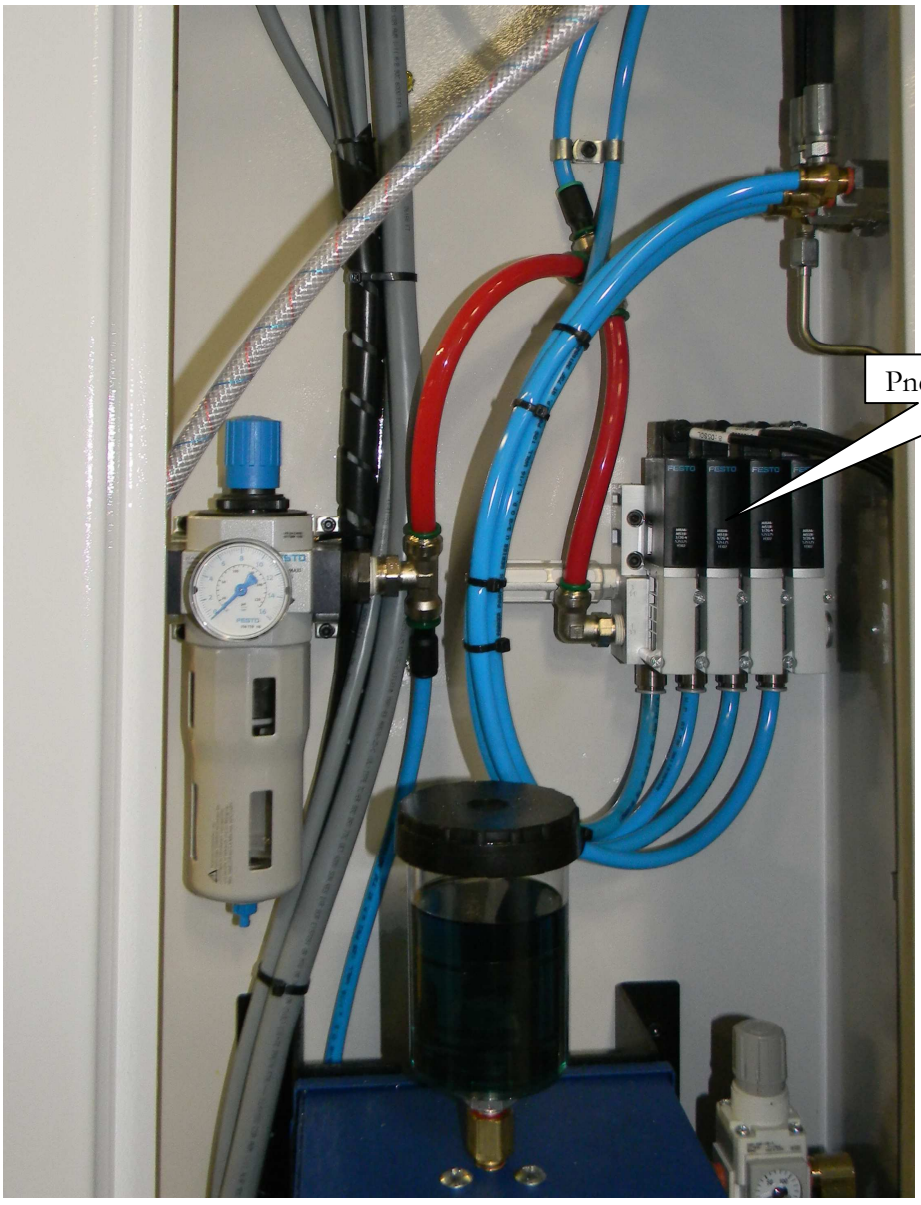
The hydraulic pressure for each actuator has been set at AME to optimize machine function.

HYDRAULIC ACTUATOR PRESSURE SETTINGS	
DESCRIPTION	**PSI**
TANK	900
BLADE DAMPENER	65
FIXTURE 45 DEGREE CLAMP (HIGH)	900
FIXTURE 45 DEGREE CLAMP (LOW)	300
FIXTURE HORIZONTAL CLAMP (HIGH)	900
FIXTURE HORIZONTAL CLAMP (LOW)	300
3 POSITION CYLINDER EXT/RET	900
3 POSITION CYLINDER MID	900
INDEX CLAMP	900
EXIT SEPERATE	450
EXIT PLATE LIFT	450

Solenoid operated Hydraulic valves with manually adjustable flow controls are used to control the actuation speed of the individual actuators.

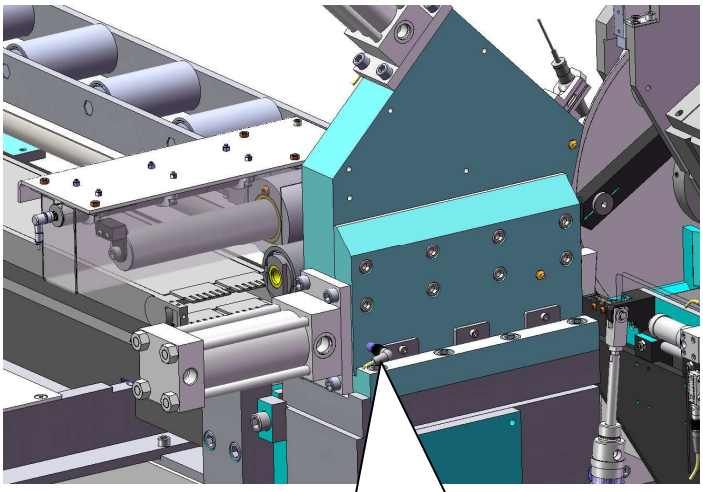
9.3 Pneumatics

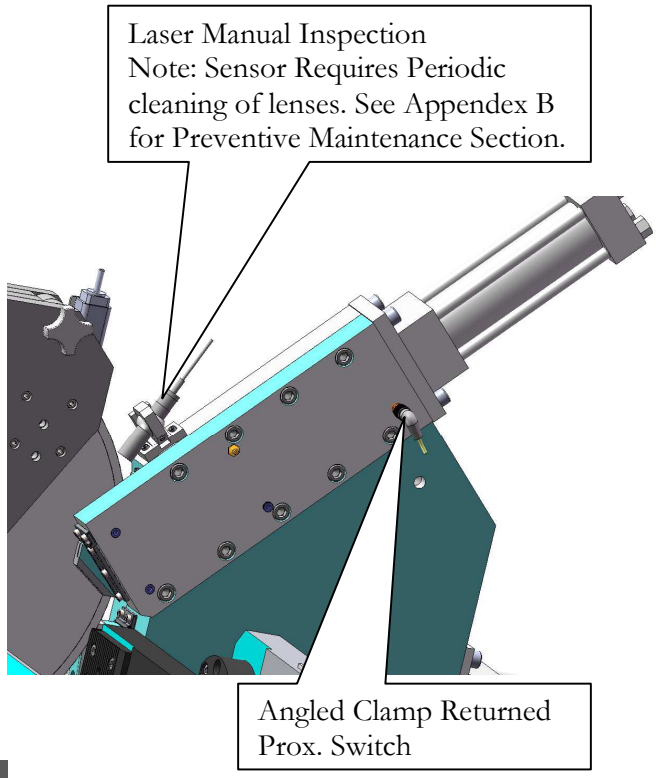
This AmSAW is equipped with an integral pneumatic regulator/water filter, and pneumatic valves for operating devices requiring pressurized air (Blade blow-off, cutter lubrication and chip blow-off). The water separator should be bleed before the sight window shows half full. The time will vary depending on the amount of moister in the air supply.



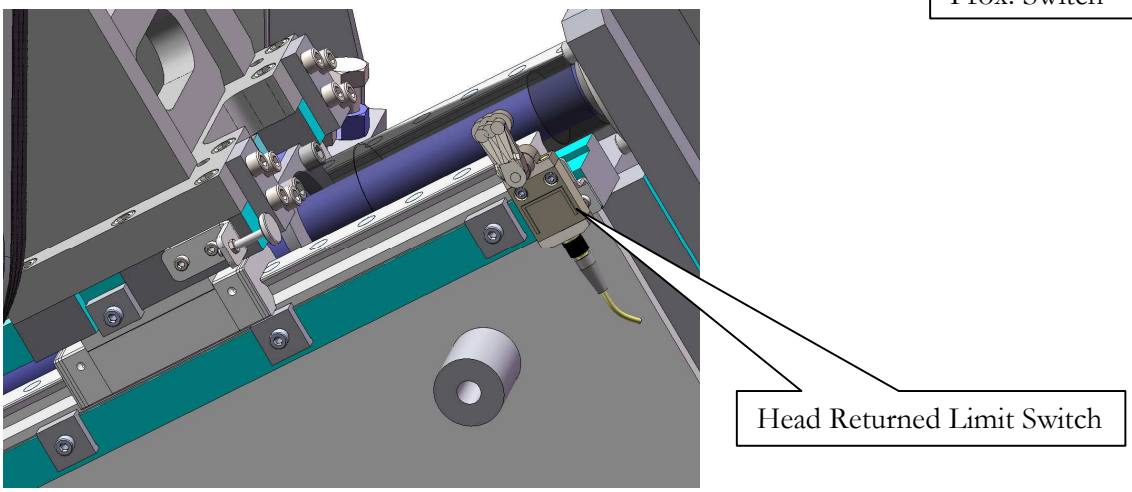
9.4 Switch & Sensor Locations

Fixture Assembly

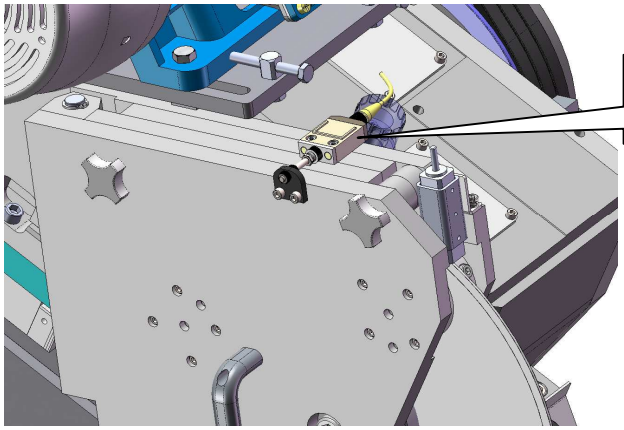




Head Assembly



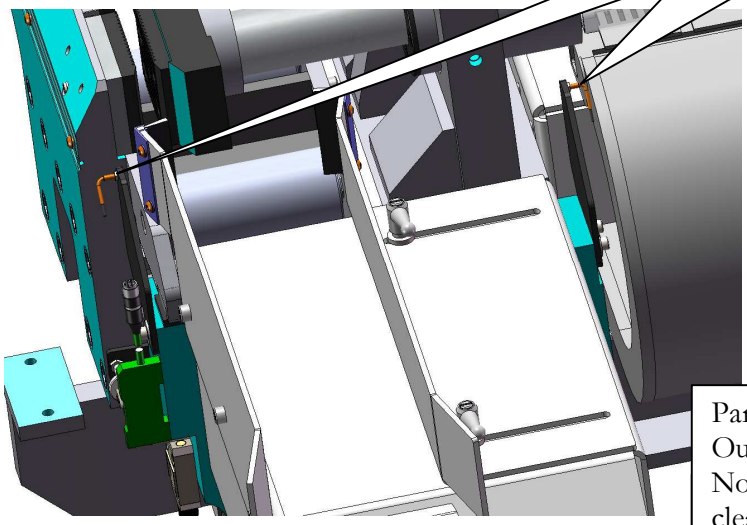
Blade Damper Assembly



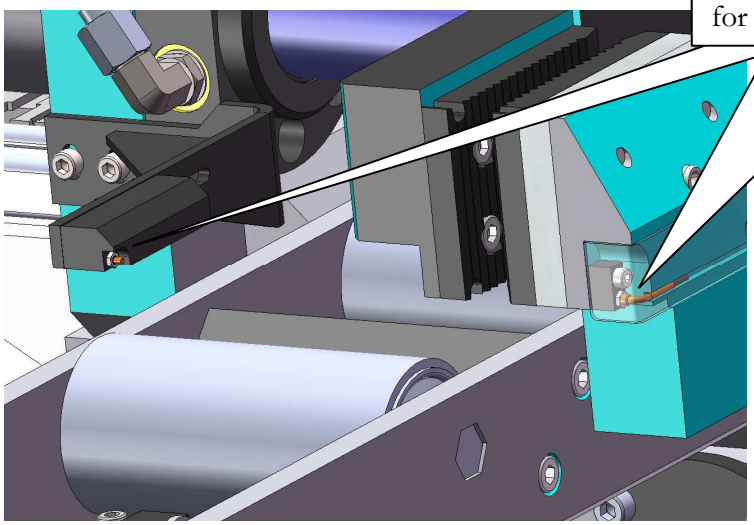
Blade Damper Door Closed Limit Switch

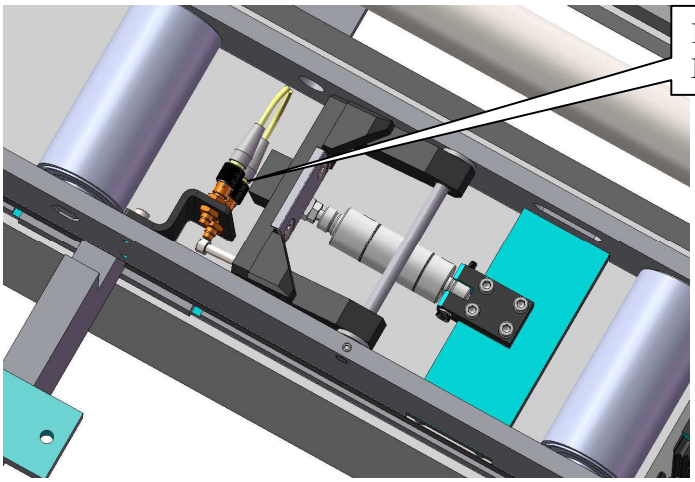
Part Present Thru Beam Incoming
Note: Sensor Requires Periodic cleaning of lenses. See Appendex B for Preventive Maintenance Section.

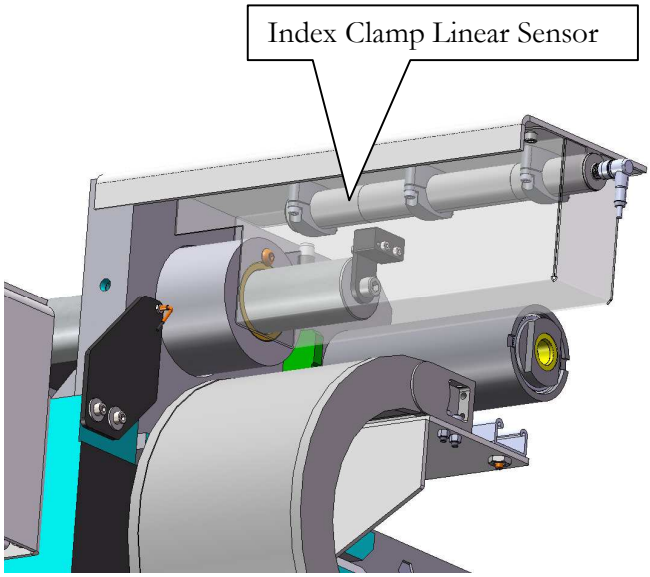
Measuring System Assembly

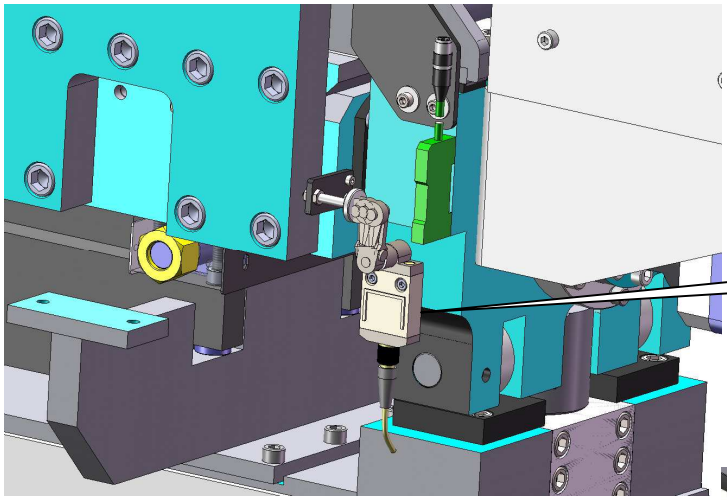


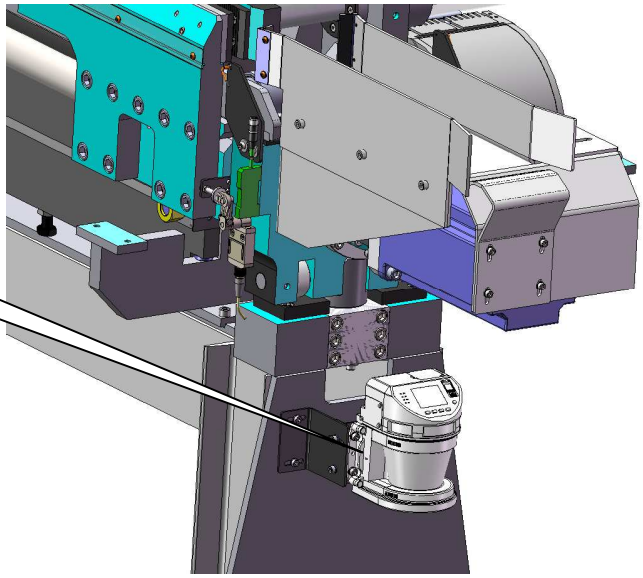
Part Present Thru Beam Outgoing
Note: Sensor Requires Periodic cleaning of lenses. See Appendex B for Preventive Maintenance



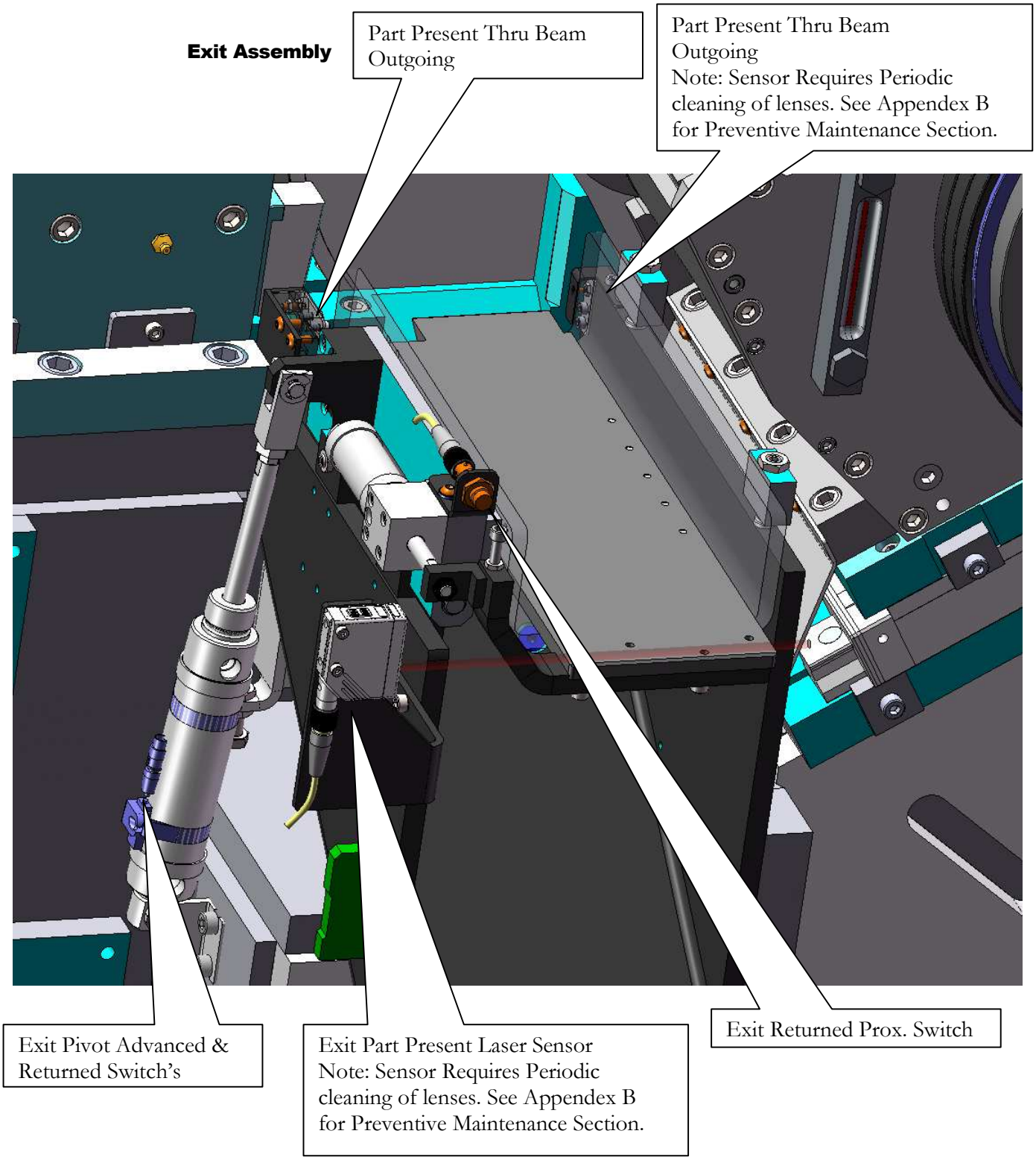

Index Stop Raised &
Lowered Prox. Switch's


Index Clamp Linear Sensor

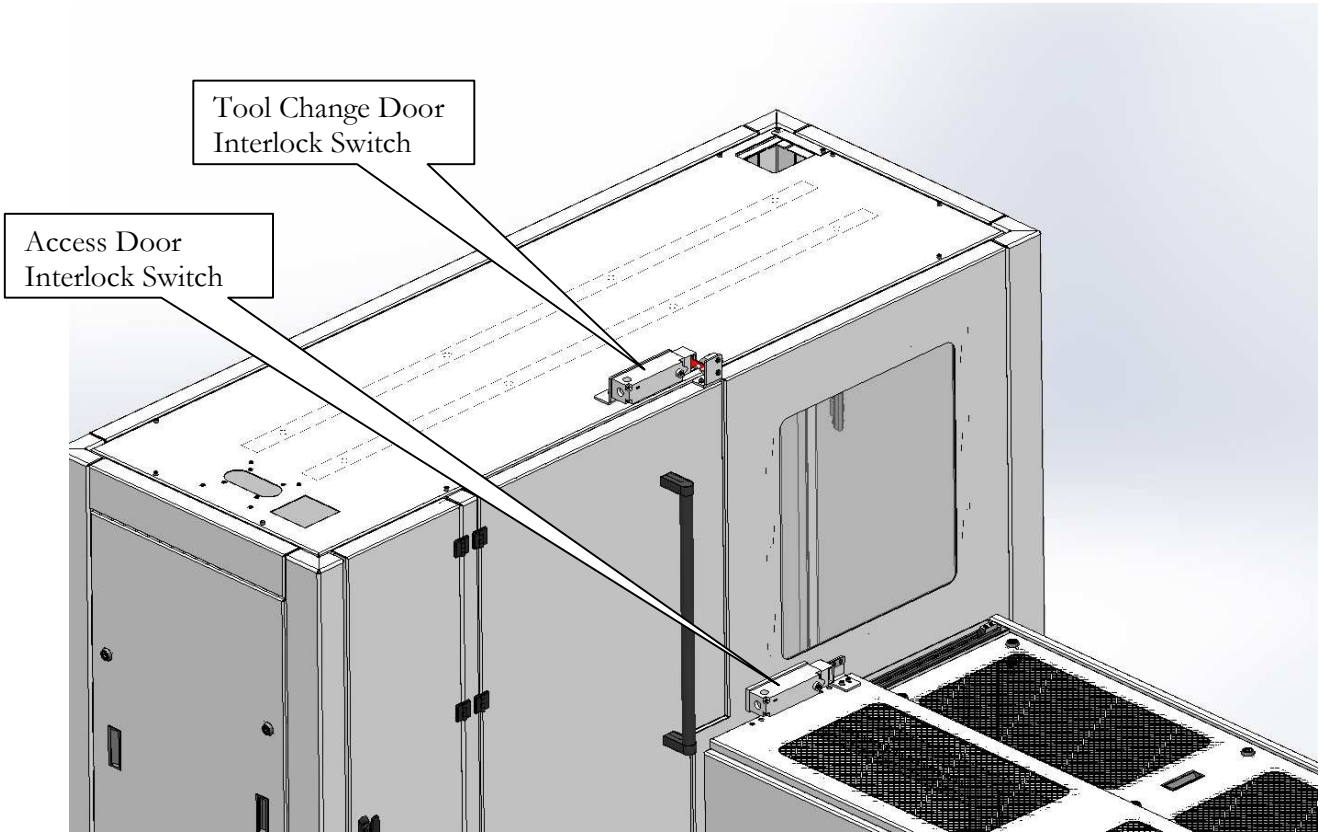

Index Returned Limit Switch


Index Safety Scanner

Exit Assembly

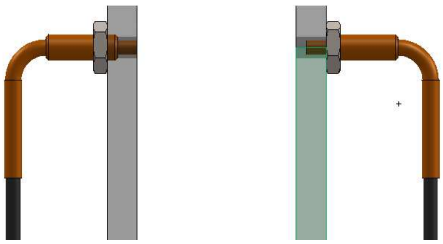


Enclosure Assembly

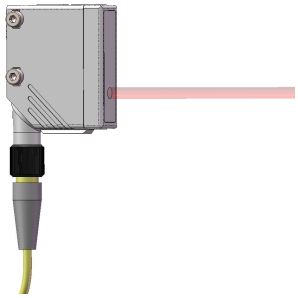


9.5 Sensor Discription

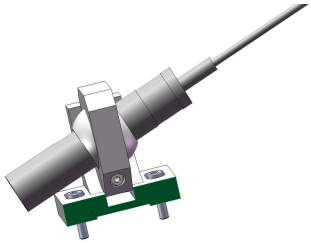
Plastic Fiber Optic –Thru Beam



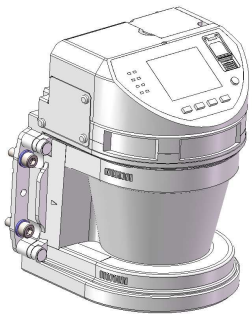
Photoelectric Sensor



Laser Line Projector



Safety Laser Scanner

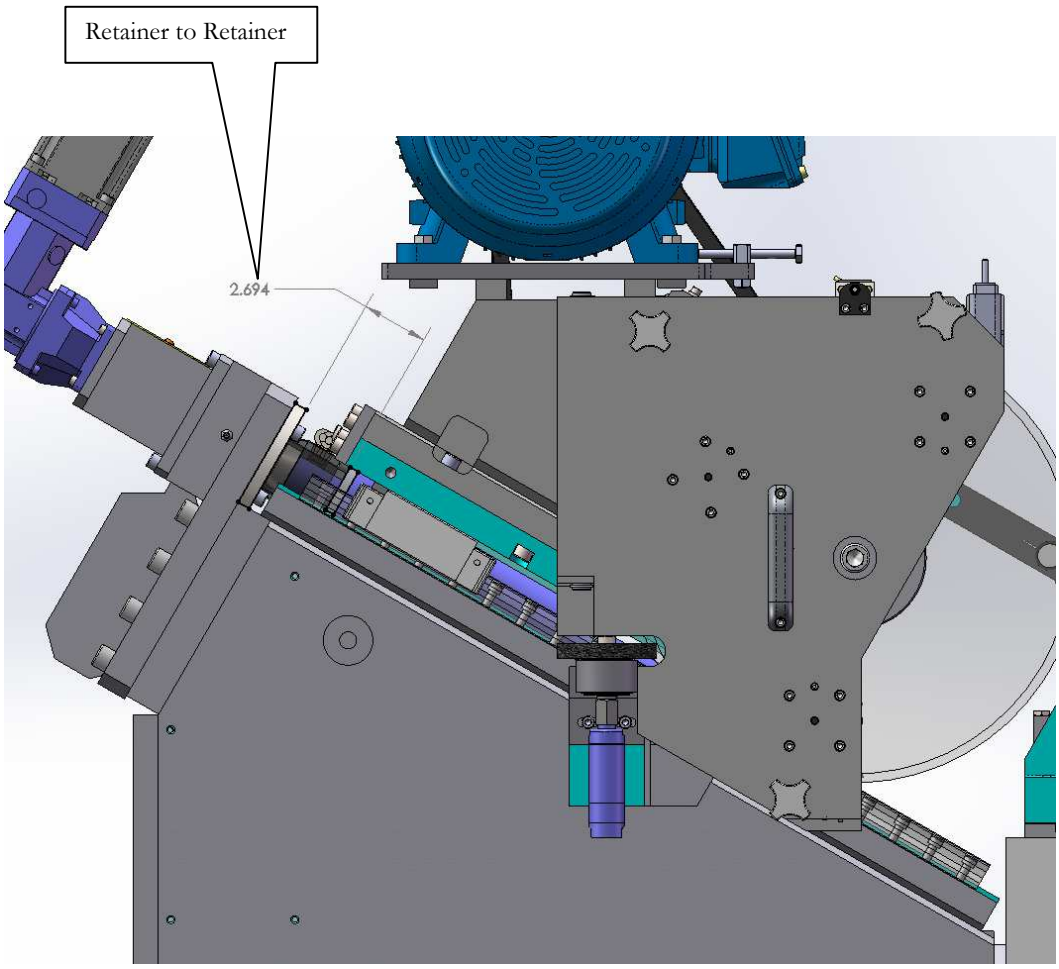


See Appendix B for additional switch/sensor information.

9.6 Setting Feed Positions

The head feed and index feed servo motors are equipped with absolute encoder feedback. After home position is set there is no need to re-home the saw unless a motor or drive have been removed and replaced. If a motor has been replaced the positions of the saw should be reset to the following positions.

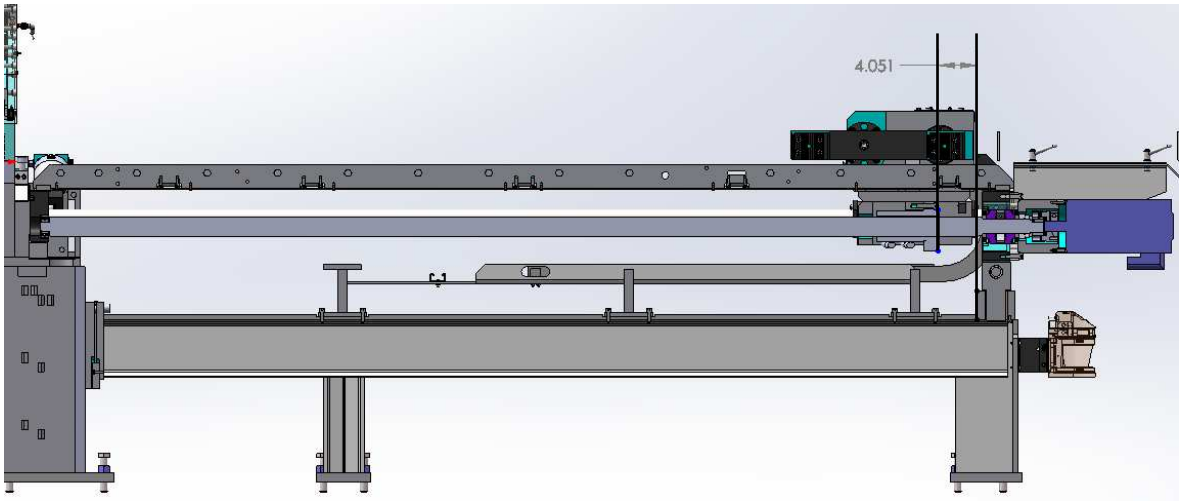
Head Feed Positions



Measure the distance from "retainer to retainer" of the head feed ball screw. Manually jog the Head feed to the dimensions listed below to set the "home position".

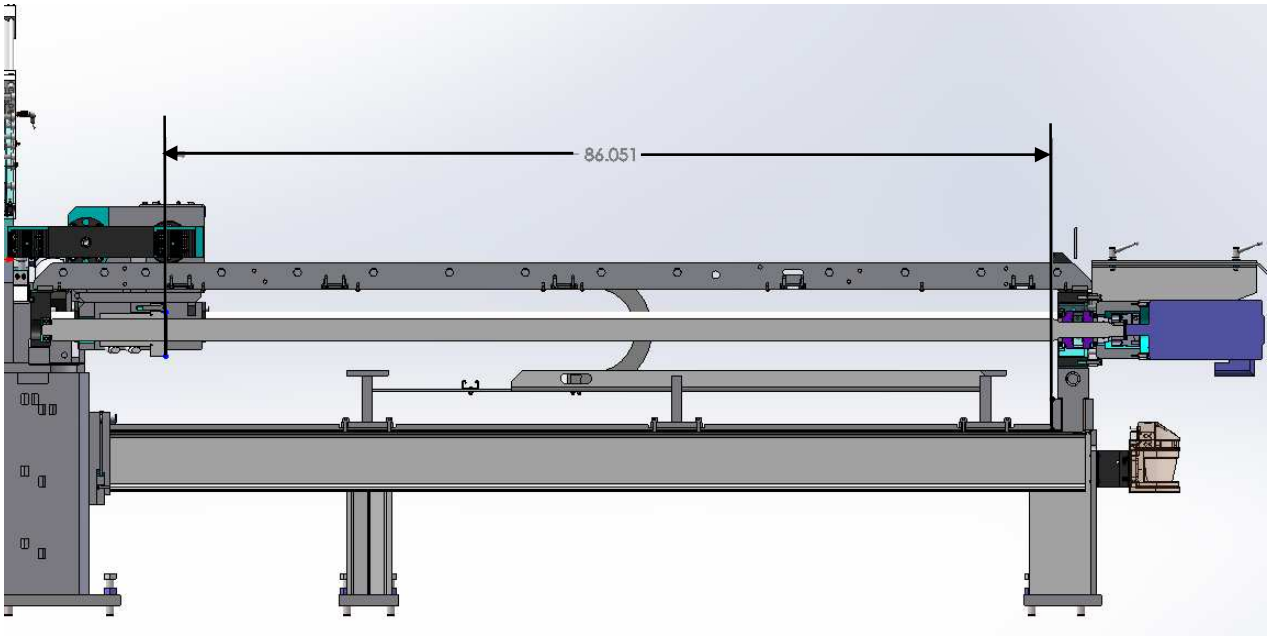
- HOME Position (0 -position) **X** = 2.694"

Measuring system Positions



Carriage Retracted (Home)

Face of the ball screw nut mounting surface and the face of the measuring system base = 4.051" Manually jog the measuring system feed to dimension listed to set the "home position".



Carriage Extended

Face of the ball screw nut mounting surface and the face of the measuring system base = 86.051". Manually jog the measuring system feed to dimension listed to set either the software limits or travel indication switches.

10 Machine Control Features

10.1 Selector-Switches & Manual Pushbuttons

Emergency Stop - Red Pushbutton – Used to immediately stop all machine motion and drop power to the motor drives in the main control panel.

Power On - Pushbutton – Turns machine control power on and starts the hydraulic system

Master Off - Pushbutton – Turns machine control power off, stops hydraulic system

Cycle Start - Lighted Pushbutton – Puts the machine in Auto Cycle. This pushbutton will flash steady when conditions are ready for auto cycle. During a release cycle the light will flash fast.

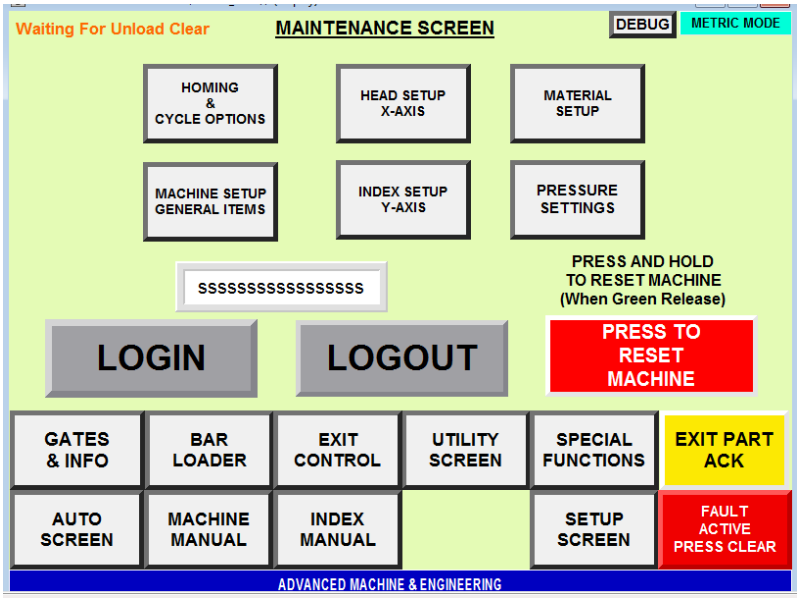
Cycle Stop - Pushbutton – Release the current machine auto cycle. When pressed the green cycle start light will flash a quick pulse, indicating the machine is releasing cycle. Normal end of a cycle is with the Head Side in the returned positions. If the index was set for the next part length, the Index will finish indexing the next part to be cut.

Return Head - Yellow Pushbutton – When pressed, the Head slide will immediately return to the home position. The Index slide will stop where it is currently located.

Auto / Manual - Selector Switch – Used to select between machine Auto Mode and machine Manual Mode. **Note**: Switching from Auto Mode to Manual Mode will stop an active Auto Machine Cycle (Release the Active Auto Cycle before going to Manual Mode)

10.2 Machine Recovery / Clearing the Machine - Priority Item

Anytime manual intervention was performed, the machine should be cleared of material and a "Machine Master Reset" should be performed. The Master Reset is located on the "Maint. Screen" Press and hold the button for about 3 seconds to reset the machine.



10.3 Machine Startup

- Power on Main Cabinet Disconnect
- Allow time for HMI to Boot-Up (The HMI takes about 3-4 minutes)
- Press the Green Power-On Hard Lighted Pushbutton

Auto Cycle Requirements

The machine setup must have Active and Reset Cuts set.
Head must be returned

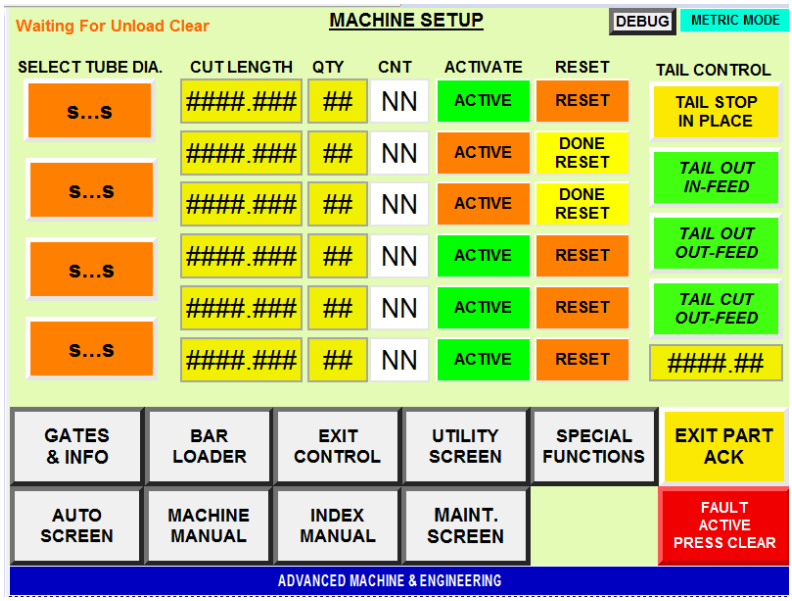
Setup Operations (Setup Screen)

Cut Length – Enter the desired length of the part(s) to be cut

Cut Quantity – Enter the quantity of parts to cut, of the length entered

Active/Not Active – Toggle on Active if you desire to make these cuts (Note: Is the cuts have already been made, a Count Reset will need to be made before the Active mode will come on). The "Active" button cut size will flash

Count Reset / Done – Status will indicate Done if all the cuts have been made, press to reset the count back to zero.

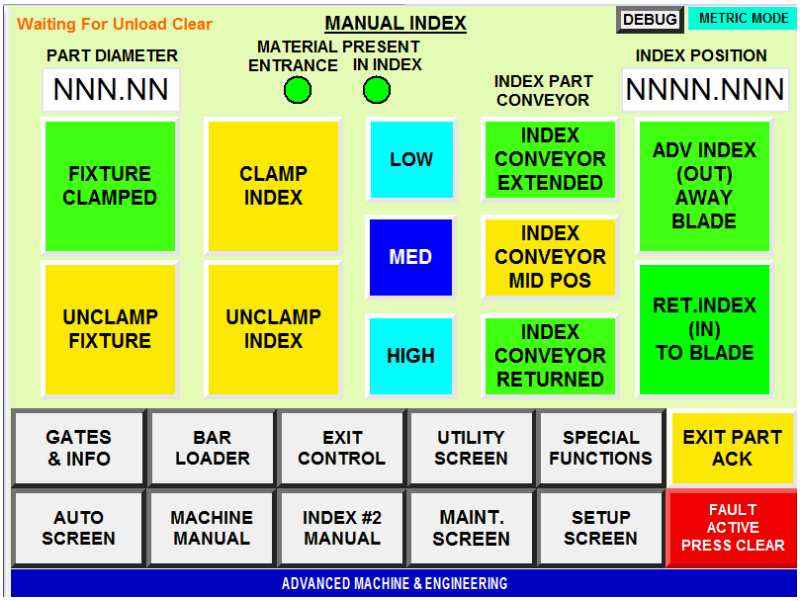


10.4 Manual Indexing Material out of the Machine

If there is material in the machine and you want to remove it. use the following steps.

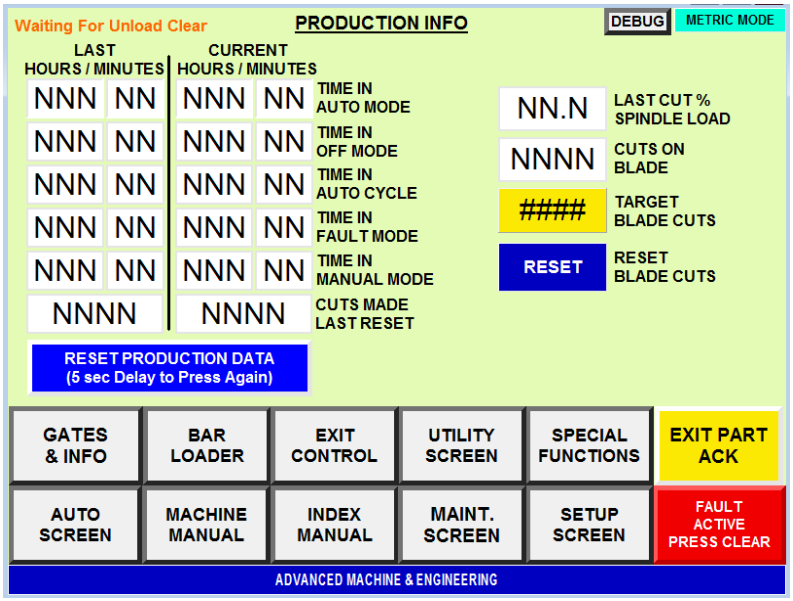
1. Unclamp Index
2. Move Index either to the Blade or away from the blade, depending on the which direction you want the material removed to.
3. Clamp the Index
4. Unclamp the Fixture
5. Move the Index in the direction you want the material to exit the machine.
6. Repeat steps 1-5

Note: When manual intervention is performed it is best to perform a Machine Master Reset before continuing Auto Cycle



10.5 Reset Production Count

Press the Reset Production Data to move the Current data to the Last Data area. Pressing the button again after 5 seconds will cause the Last Data to be over-ridden by the -0- in the Current fields.
Set the Target blade cuts to the desired amount, when the Cuts On Blade reach the Target Cuts, a message will be posted on the HMI. Use the Reset Blade Cuts button to clear the Cuts on the Blade.



10.6 Tail Control Modes

Tail Stop in Place
Once all the cuts have been made or the bar Tail was detected and there is not enough material to cut selected size. The machine will stop the cycle and leave the tail material in the machine. The operator will need to remove the material manually.

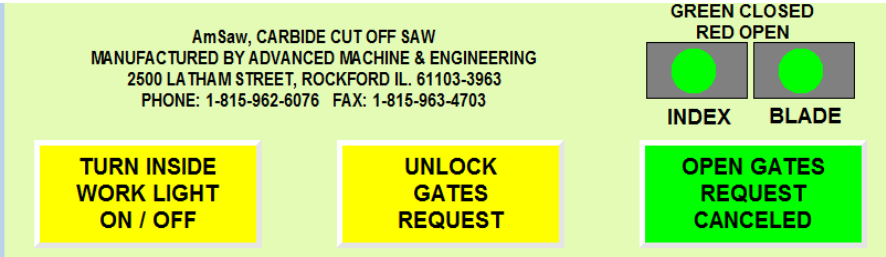
Tail Out the In-Feed
Once all the cuts have been made or the bar Tail was detected and there is not enough material to cut a selected size. The tail / remaining material will be pushed out the Load end of the machine.

Tail out the Out-feed
Once all the cuts have been made or the bar Tail was detected and there is not enough material to cut a selected size. The tail / remaining material will be cycled out the Unload end of the machine.

Tail Out the Out Feed – Cut
Once all the cuts have been made or the bar Tail was detected and there is not enough material to cut a selected size. The tail / remaining material will be cut and dropped in the unload chute. The "Tail Cut Size entered will determine the cut size for the scrap tail.

Tail Cut size
Enter the desired size to cut the tails when using the "Tail Out the Out-feed – Cut" Mode, Note: the size is limited to the size of the drop chute or shorter.

10.7 Gate Operations



The gate locks are controlled by an internal solenoid in the gate switch that requires it to be energized to open.

To Open Gates

Unlock Gate Request
If in cycle the machine will issue a controlled cycle stop
The spindle will stop
After a rundown timer (to ensure spindle has stopped)
The machine will power down and the Gates will be allowed to Open

To Closed Gates

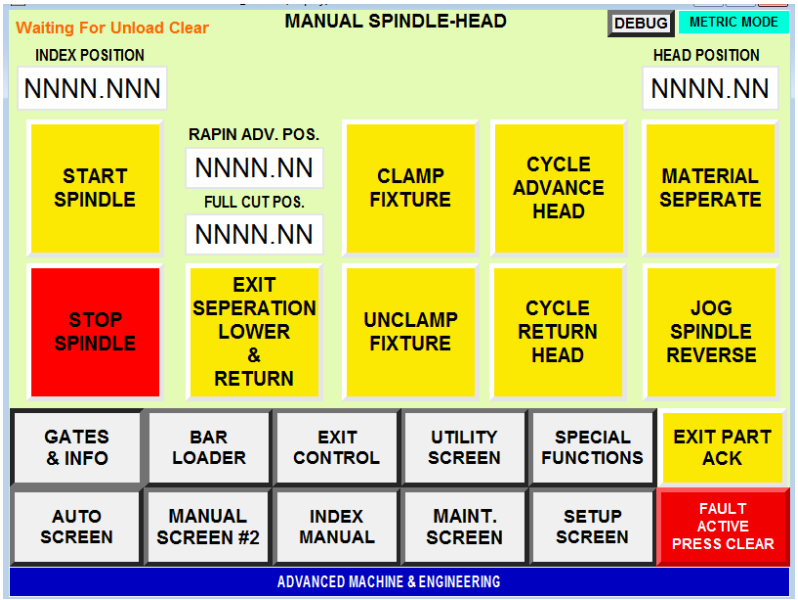
Press the HMI button to cancel the open request
Ensure the Gates are physically shut
On the screen are indicators to show the Gate Status (Open or closed, when the Unlock Request is active the Gates will indicate they are open)
Note: There are, Gate bypass keys located in the operator console.

10.8 Manual Cutting

Follow these steps to manually cut material.

1. Start Spindle
2. Press the "Exit Separation Lower and return (if this is not already green)
3. Clamp the Fixture (if you plan on going back into an auto cycle, go to the Index screen and clamp the Index)
4. Press the Cycle Head Advance Pushbutton
5. After the head has advanced through the material Press the Unclamp Fixture
6. Press the Material Separation pushbutton (This will Move the Index back away from the Blade and move the Exit Separation away from the Blade
7. Press the Cycle Return Head pushbutton (You can also press the Yellow Mushroom Return Head button on the panel)

Note: If the Indexer is fully clamped when manually cutting, the machine will know how much material is in the machine and an auto can be started when finished with the manual cut.



10.9 Material Size Setup

The Material Setup Screen is a password protected screen that can be accessed from the MAINT. Screen

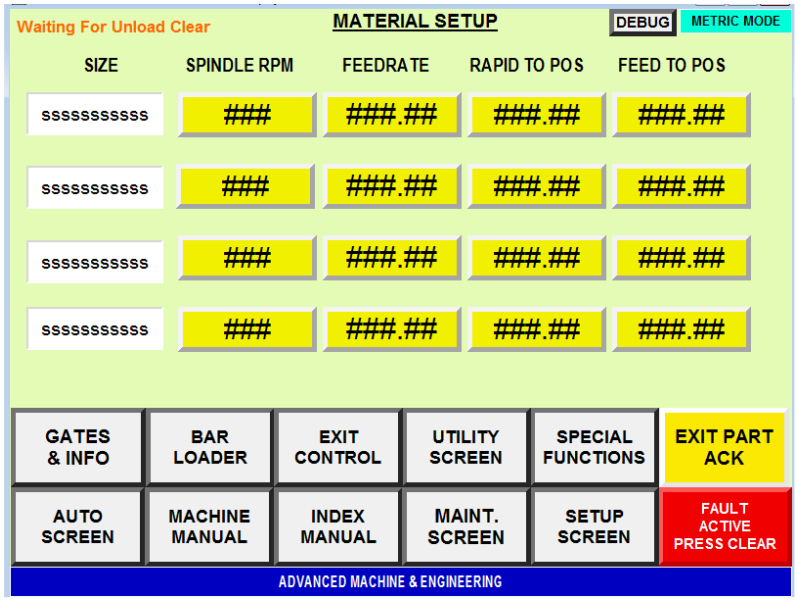
Spindle RPM
Enter the desire Spindle RPM for the selected size of material

Head Feed-rate
Enter the desire Head Cutting Feed-Rate for the selected size of material

Rapid to Position
Enter the Rapid to Position (this is the start of the Feed position)

Feed to Position
Enter the Feed to Position (this is the End of the Feed position, full cut position)

Note: the Rapid To and the Feed To positions have to accommodate the full range of the selected size (e.g. 1" to 2" etc.)



10.10 Change Blade

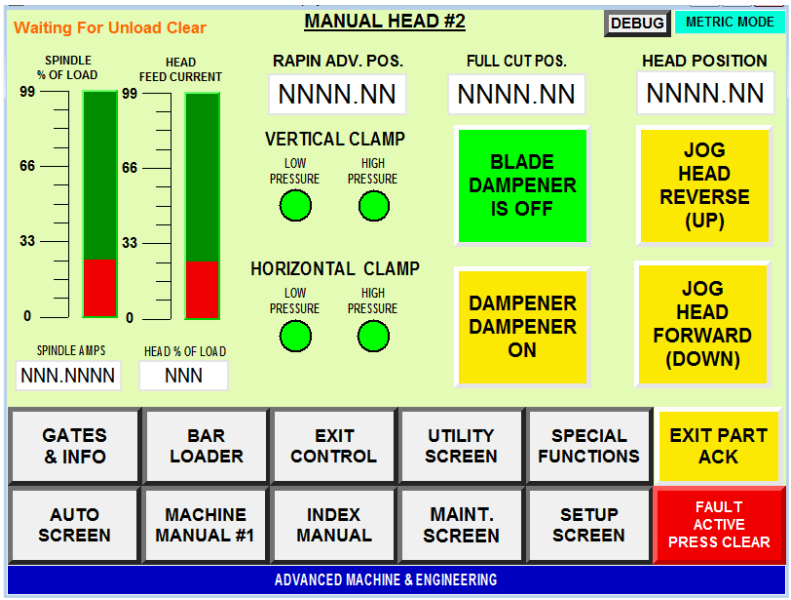
1. Release the machine cycle (Cycle Stop, or Open Gate Request)
2. Open the Gates
3. Open the Blade Enclosure Door
4. Open the Internal Blade door (Cover)
5. Use the Impact wrench to remove the blade nut
6. Remove the Blade
7. Inspect the Blade Hub and Blade Pins
8. Install the new Blade
9. Install and torque the retaining nut
10. Close all doors, lock the gates (Cancel the Open gate request)
11. Continue Machine Cycle

10.11 Blade Dampener

The spindle blade dampening is built into the Spindle Door cover. The dampening works by activating a hydraulic solenoid, which puts on minimal pressure on the pads riding against the saw blade. The Dampener is energized when the Saw Head enters the cutting zone and de-energized when the Head gets fully advanced.

The pressure used, is monitored by a pressure switch, this switch is setup as a Window function. If the pressure falls outside the switch window, the control will release the cycle, finish the cut, return the head and stop.

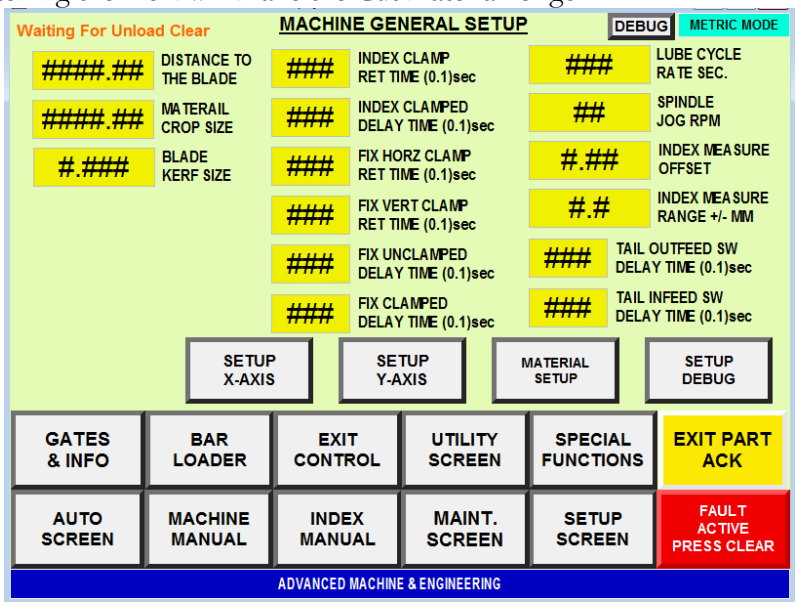
Note: the Dampener can also be energized on the Manual Screen #2, for set up purposes.



10.12 Blade Kerf Setting

The Blade Kerf Thickness is set in the Machine General Setup Screen, this screen is password protected and can be accessed from the MAINT. Screen. Once set, it is usually not necessary to adjust the Kerf, unless different style saw blades are used

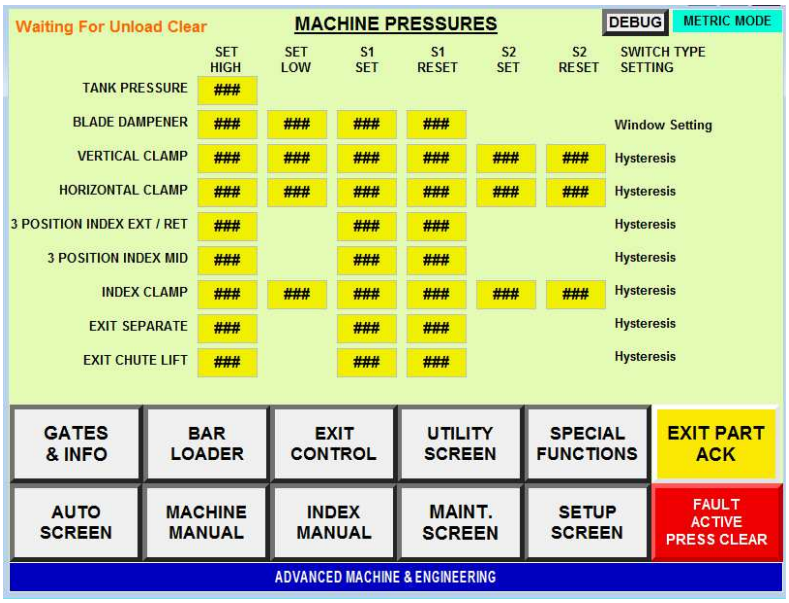
The setting is used in setting the material length, fine tuning the length can be made by adjusting the Kerf size. If the material size is coming out short, increasing the Kerf size will make the cut material longer. Same situation with cat material that is coming out long, shortening the Kerf will make the Cut material longer.



10.13 Pressure settings

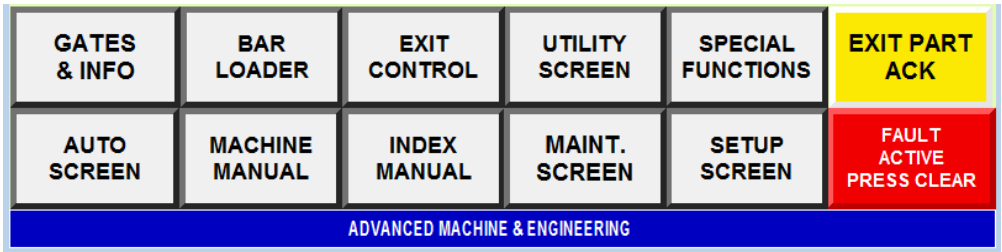
There is a Machine Pressure password protected screen, which can be accessed from the MAINT. SCREEN. This screen shows all the hydraulic pressure setting (High / Low) and the pressure switch set points and the type of settings. This screen is only used to record the values.

There is another screen that can be accessed from the Special Functions Screen. This pressure screen is for displaying the settings only.



10.14 Acknowledgement Fixture

On the screen selection bar is a button called “Exit Part ACK”, this is used to cause a pause in the machine cycle when active. When pressed (and held) the button will turn green, indicating the Acknowledgement cycle is active. When active, the head will paused in the advance position until the operator presses the “Acknowledgement Pushbutton” located on the remote E-stop electrical box. The operator can also press the Green Cycle pushbutton on the operator control console.



10.15 Spindle Load Features – Setting Warning and Max Levels

The machine has a number of features for monitoring spindle load and adjusting speed.

Located on the Special Function screen is "Spindle Load Status pushbutton. The Spindle Load Status screen gives a running status of the current spindle load % in a digital and graphical form. Based on spindle RPM the control calculates the amount of time per rev of the spindle, this value can be used as a reference when analyzing the chart reading.
Along with displaying the Spindle Load Percentage, the Chart will display the current Head Slide Load Percentage. Spindle load is displayed Read and the Head Slide load is displayed in Green.
Located on the Spindle Load Status screen are options for setting warning limits for monitoring the spindle load %. There are two settings that are operator definable. The "Warn" input field is used as a tool to help the operator monitor the saw blade for wear. If during a cut the highest recorded load % exceeds the preset value a message will be displayed on the operator panel, indicating the operator may want to check the blade for wear. When the cutting load % reaches the value entered in the "max" field, the machine will issue a program release cycle and post a message to the operator panel indicating that the Max setting has be detected. The "Max" input field should be set higher then the "Warn" amount.
Note: The warning and max level warning fields do not have a limit on their setting and can be set to 999 to disable these monitoring tools. The control has built in condition limits to help protect the system for excessive load.

10.16 Maintenance Screen Items

The maintenance screen contains password protected additional screens. The additional screens should only be accessed and the contents adjusted by qualified maintenance personnel. See the HMI Maintenance Screen breakdown page for more information on the additional screens.

10.17 Speeds and Feeds Calculator

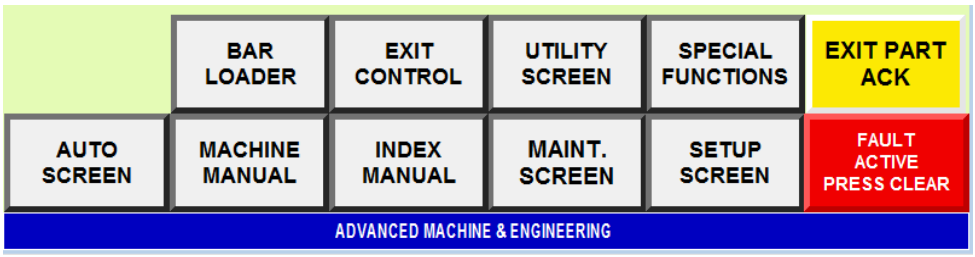
Located on the Special Functions Screen is a pushbutton for selecting the Speeds and Feeds Calculator. This calculator can be used to calculate the Heed feed and Spindle RPM, based on the type of material and desired tooth chip load. The calculator is configured for both inch and metric measurements. To convert from inch to metric (or metric to inch) enter the desired data and press the conversion button directly below the entry fields.

Note: Care must be taken to use the correct measurements (Inch / Metric). This calculator should only be used as a reference for suggested feed rates and spindle speeds.

10.18 HMI Control

The screen selection buttons have a similar layout on each screen to make navigation between functions, clear from screen to screen.

The gradient light gray buttons with black text, call other control screens



10.19 HMI Current Mode Status Indicator

In the upper left-hand corner of all the operator screens there is a field that will display the active machine mode.

AUTO MODE……..	The Machine is in Auto Mode
AUTO CYCLING……	The Machine is Actively Cycling in Auto Mode
MANUAL MODE……	The Machine is in Manual Mode
RELEASING CYCLE……	The Machine Auto Cycle has be Released
E-STOP.....	The Machine is in a E-Stop condition
POWER OFF…….	The Machine Power is Off
NO MODE SELECTED…	No Machine Mode is Active
E-RETURN ACTIVE…….	The Machine Emergency Return is Active
SEPARATION ACTIVE…	The Machine Separation sequence is Active

10.20 Fault Indicator

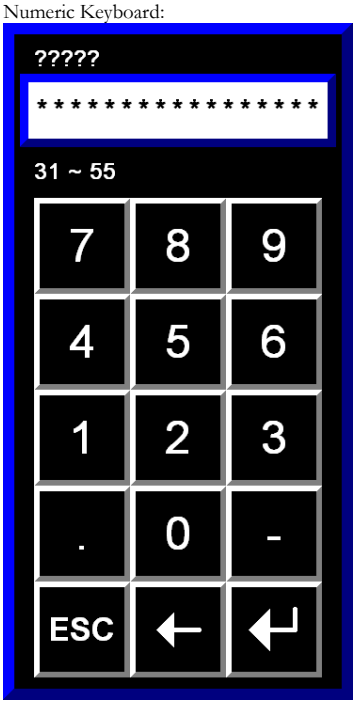
All screens contain a Fault / Message indicator. The Fault/Message Active indicator will change colors when a machine message becomes active. Pressing the button will issue a fault reset condition in the PLC. Many of the faults and status messages will clear automaticity.

(No Fault / Message Active)

(Fault / Message Active – Will flash Red)

10.21 Data Entry Pop-Up Window

Numeric Keyboard:



A Pop-up window is displayed when a data entry field (input field) is selected from any of the screens. Data entry fields contain a beige background color (e.g. Part Length, Blade Size, Material Size.).

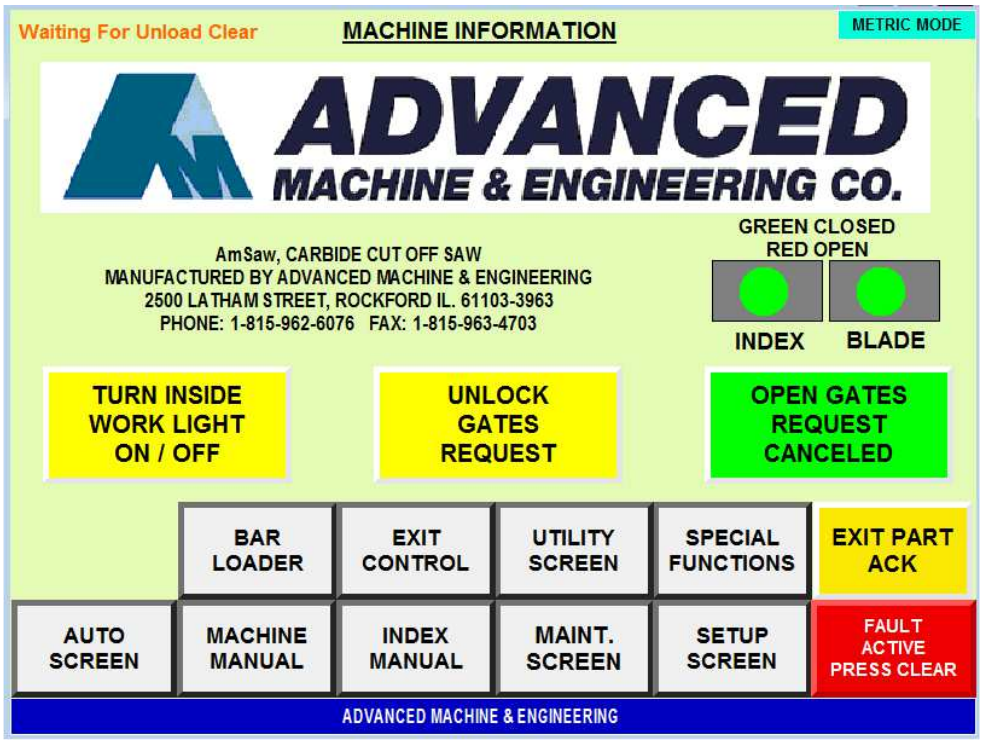
Note: Some input fields are password protected and some input fields have validation limits.

10.22 Ethernet IP Addresses

Tube Saw	IP Address	Mask
PLC	172.20.9.20	255.255.255.0
HMI	172.20.9.21	255.255.255.0
Head Servo	172.20.9.22	255.255.255.0
Index Servo	172.20.9.23	255.255.255.0
Spindle VFD	172.20.9.24	255.255.255.0

10.23 HMI Machine Operator Screens

Main Machine Informational and Gate Screen



The Information and Gate / Light control screen is the default screen loaded when electric power is first applied to the machine...

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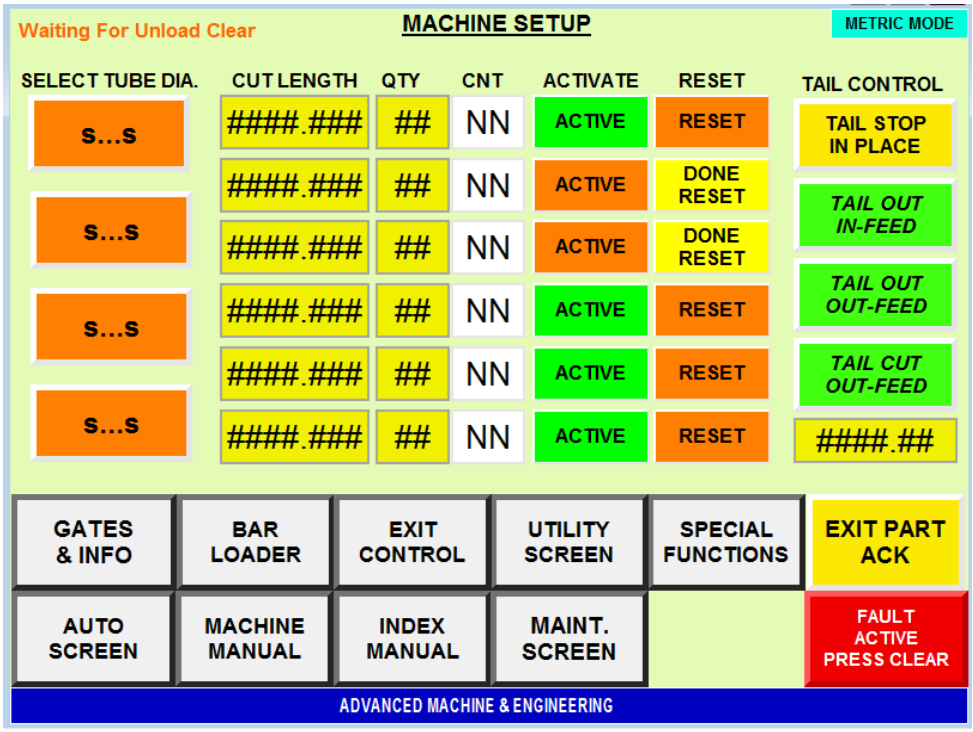
Screen Fields	Description
AUTO SCREEN	Master Auto Control Screen
BAR LOADER	Manual control of the Material Load Stop in the Index
MACHINE MANUAL	Manual control of the Fixture, Spindle, Head Slide
EXIT CONTROLL	Exit Plate Separation and the Part Dump Control
INDEX MANUAL	Manual control of the Index functions
UTILITY SCREEN	Lube, Hydraulic, Chip Conveyor and Blade Guide Control
MAINTENANCE SCREEN	Password protected machine settings
SPECIAL FUNCTIONS	Screen selection for machine Special Functions
SETUP SCREEN	Data entry for machine setup information
EXIT PART ACKNOWLEDGE PB	When active the Part acknowledge must be used
NO FAULT ACTIVE	Indicates a Fault is present – Resets Faults when pressed
INSIDE WORK LITE	Indicates work lite –on / off
UNLOCK GATES REQUEST	Request Master Cell to Unlock Gates
CANCEL GATE REQUEST	Tell Master Cell Cancel Open Gate Request
GATES CLOSED LIGHT	Indicates Gates Open

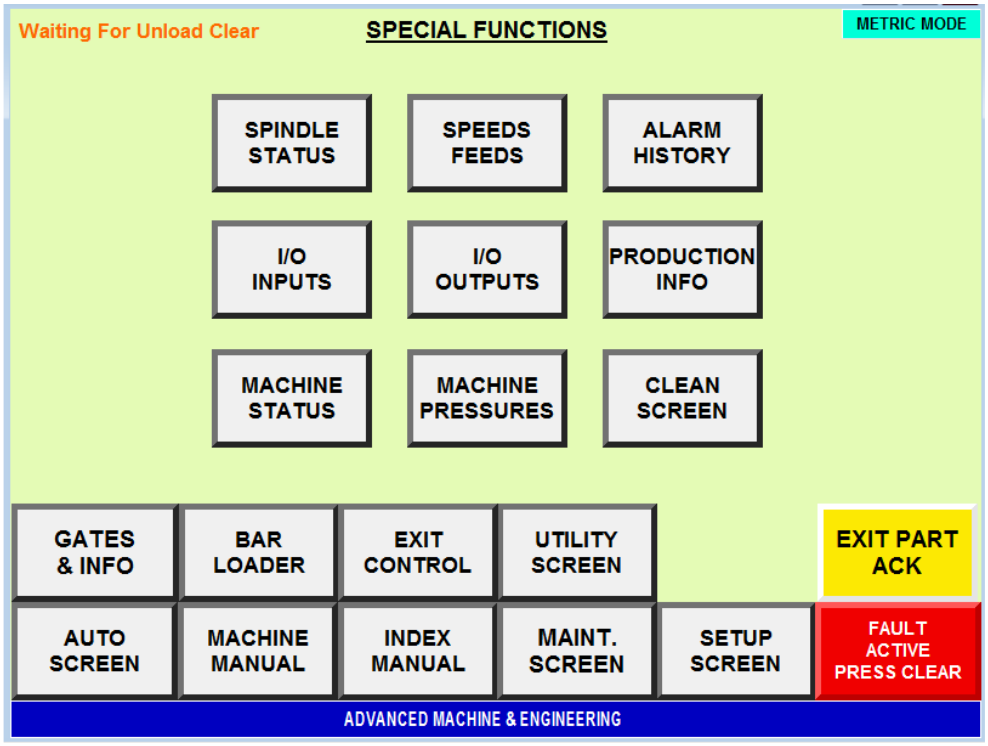
Machine Setup Screen



This screen is used to setup the following: Enter the desired cut lengths and cut amounts for each recipe, activate / reset each cut length recipe.

Screen Fields	Description
SELECT TUBE DIA.	Select the desired tube (Part) dia.
CUT LENGTH	Enter the cut length for each different cut
QYT (Quantity)	Enter the quantity of each cut length to make
CNT (Count)	Displays the cut amounts made for cut length
ACTIVATE	Activates the cut length and amount for each recipe
RESET \ DONE	Reset the Count to -0- for each cut length – Displays Done when the cut length has reached the cut amount.
TAILS STOP IN PLACE	When the all cuts have been made the machine will stop in place
TAILS OUT THE INFEED	When all cuts have been made the remaining material will be backed out the infeed of the Index / Machine
TAIL OUT THE OUTFEED	When all cuts have been made the remaining material will be pushed out the outfeed of the Index / Machine
TAIL CUT OUTFEED	When all cuts have been made the remaining material will be cut to selected cut length and processed out the outfeed of the Index / Machine
MAX TAIL SIZE	Enter the maximum tail size for scrap

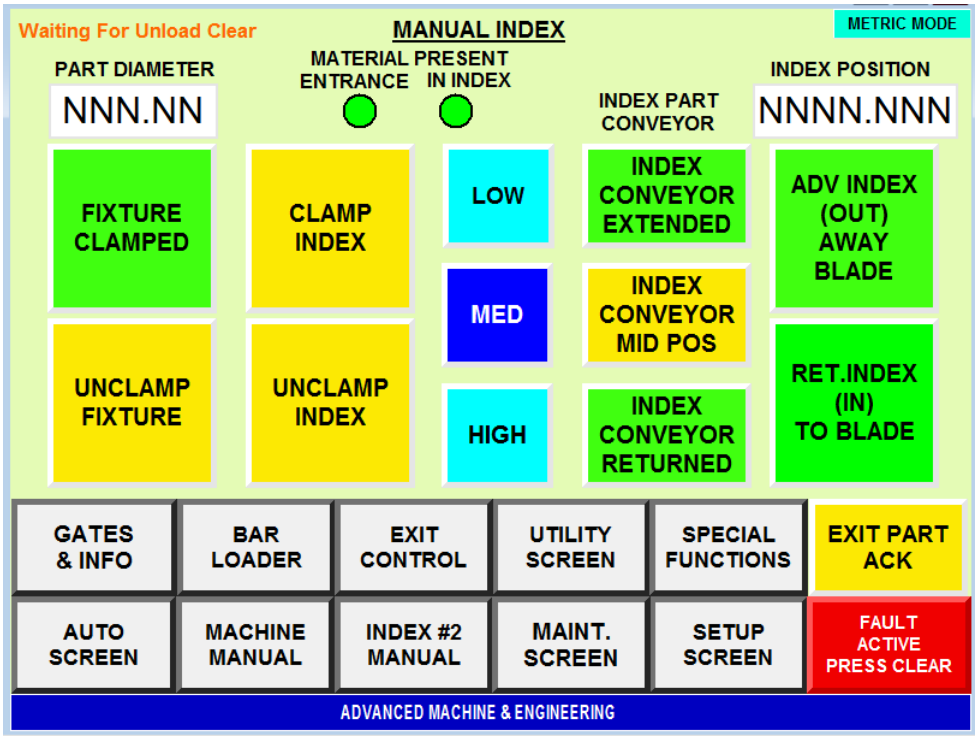
Machine Special Functions Selection Screen



This screen is used to access additional machine special function screens.

Screen Fields	Description
SPINDLE STATUS	Select Spindle Status Screen – Load % Chart Screen
SPEEDS - FEEDS	Select Speeds and feeds Calculation Screen
ALARM HISTORY	Select the Alarm History Screen
I/O SCREEN INPUTS	Select I/O Screen #1 – Machine Input Status Screen
I/O SCREEN OTPUTS	Select I/O Screen #1 – Machine Output Status Screen
PRODUCTION INFO	Select Production Info. Screen
MACHINE STATUS	Select Machine Status Screen
MACHINE PRESSURES	Select Machine Pressures Screen
CLEAN SCREEN	Select for a blank screen – Used to clean the HMI screen

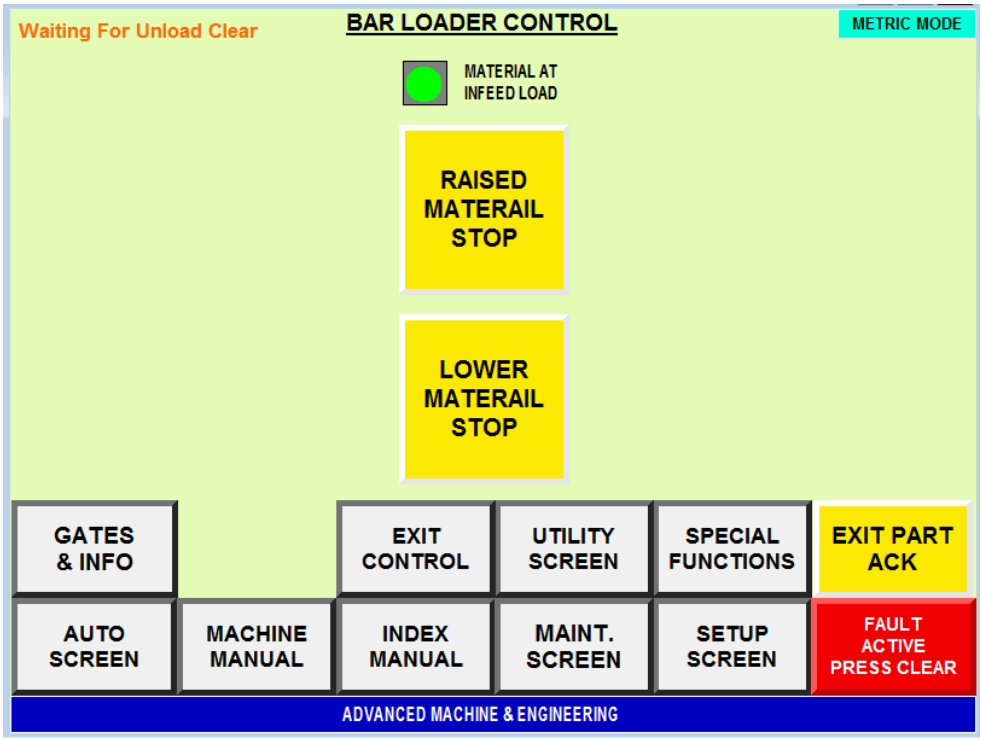
Machine Manual Index Control Screen (one of two)



This screen is used for manual control of the index, Index Clamp and Fixture Clamps.

Screen Fields	Description
PART DIA	Displays the dia. of the material in the Index (Measured)
MATERIAL PRESENT	Displays parts at entrance and in the Index
INDEX POSITION	Current Index Y-Axis Slide Position
CLAMP FIXTURE PB	Manually extend the Vertical and Horizontal Fixture Clamps
UNCLAMP FIXTURE PB	Manually retract the Vertical and Horizontal Fixture Clamps
CLAMP INDEX PB	Manually extend the Index clamp
UNCLAMP INDEX PB	Manually retract the Index clamp
Y-AXIS LOW PB	Select Y-Axis Slide Low speed
Y-AXIS MED PB	Select Y-Axis Slide Medium speed
Y-AXIS HI PB	Select Y-Axis Slide High speed
INDEX CONVEYOR EXTENDED	Select to move the Lift in the Index to extended position (away from the positive clamp edge)
INDEX CONVEYOR MID POS	Select to position the Index at the mid position (to the material clamping position)
INDEX CONVEYOR RETURNED	Select to move the Index to the return position (index unclamped, the jaws move away from the material)
ADV. INDEX PB	Manually move the Y-axis Index Slide out-away from the blade
RET. INDEX PB	Manually move the Y-Axis Index Slide in-towards the blade

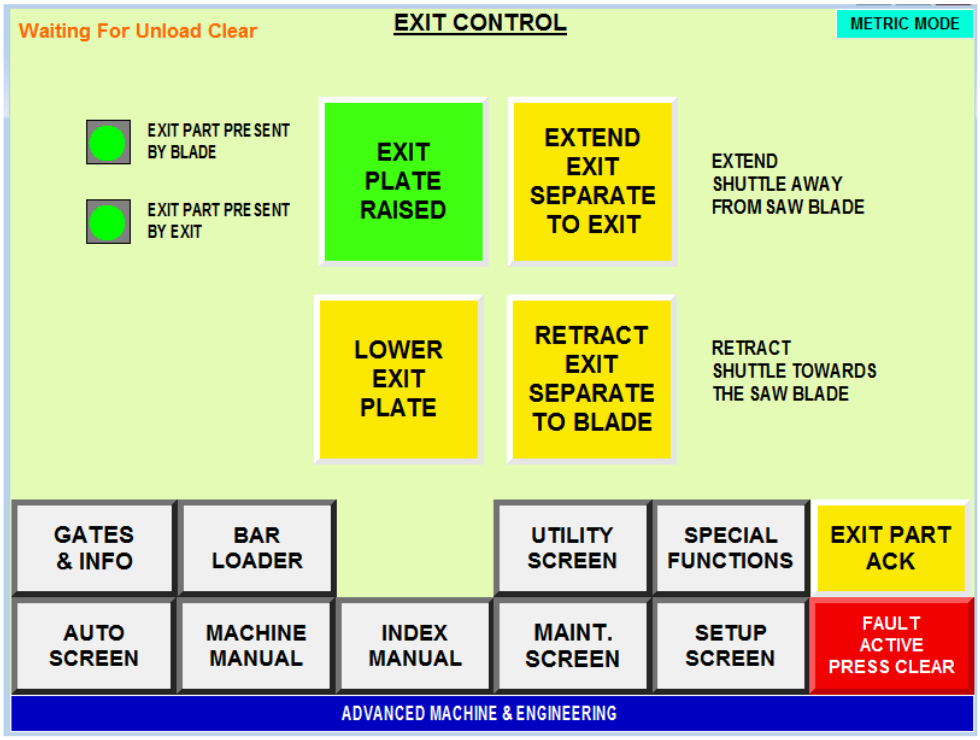
Machine Manual Bar Loader Control Screen



This screen is used for manually controlling the machine load function.

Screen Fields	Description
MATERIAL ON CONVEYOR	Indicates when material is present at the entrance of the index
RAISED MATERIAL STOP	Select to Raised Material Stop (to allow placement of the new material in the index)
LOWER MATERIAL STOP	Select to Lower Material Stop

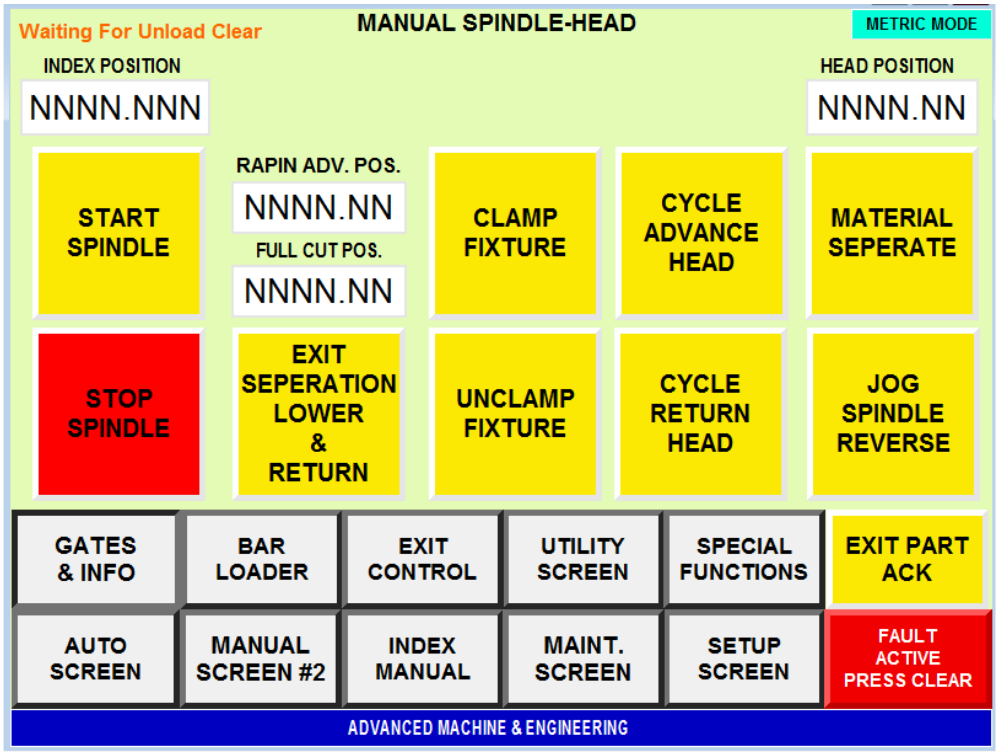
Machine Exit System Screen



This screen Controls the Manual Movements of the Machine Exit System. .

Screen Fields	Description
EXIT PLATE RAISED	Select to raise Exit Shuttle (to dump material)
LOWER EXIT PLATE	Select to lower Exit Shuttle
EXTEND EXIT SEPARATE TO EXIT	Select to move the Exit Shuttle to the Unload Conveyor
RETRACT EXIT SEPARATE BLADE	Select to move the Exit Shuttle to the Blade

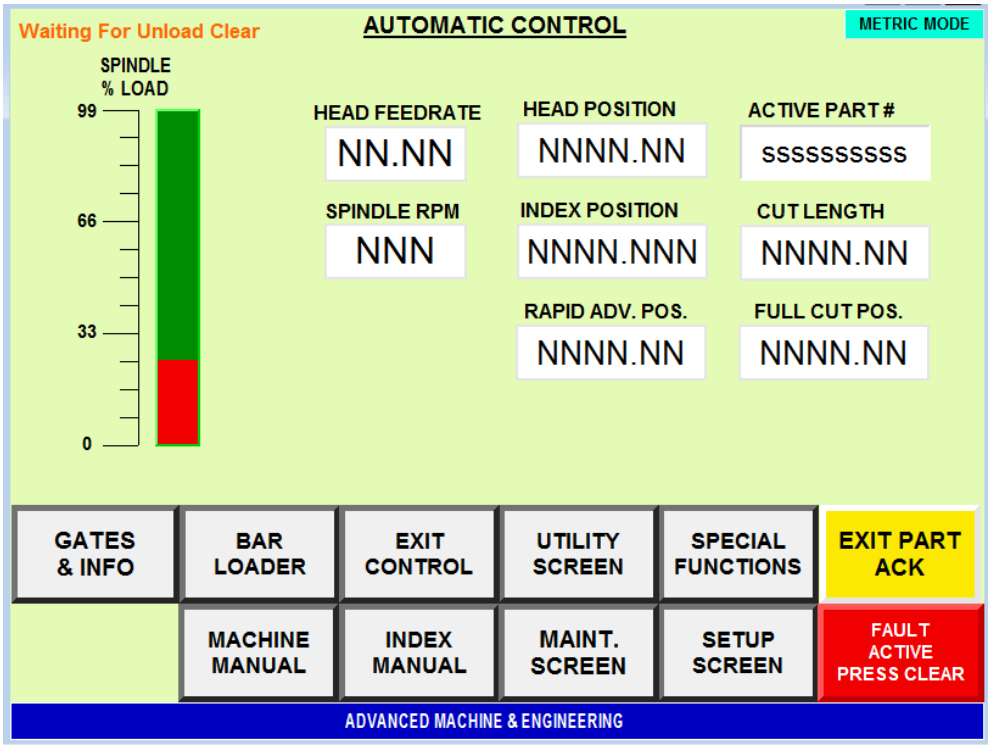
Machine Manual Spindle and Head Control Screen (one of two)



This screen is used to control the manual functions of the head slide, the spindle and the fixture clamping.

Screen Fields	Description
Index position	Display of the actual Index Position
HEAD POSITION	Display of the actual Head Slide Position
START SPINDLE PB	Command the spindle to start
STOP SPINDLE PB	Command the spindle to stop
RAPID ADV. POS.	Display the Head Rapid Advance to Position
FULL CUT POS.	Display the Head Full Cut to Position
RETURN-LOWER EXIT	Press to Return and Lower the Exit Shuttle
CLAMP FIXTURE PB	Extend the fixture vertical and horizontal clamps
UNCLAMP FIXTURE	Retract the fixture vertical and horizontal clamps
ADVANCE HEAD PB	Cycle Advance the Head Slide
RETURN HEAD PB	Cycle Return the Head Slide
MATERIAL SEPARATE	Activate the separation of the material from the Saw Blade.
JOG SPINDLE PB	Jog the spindle in the reverse direction

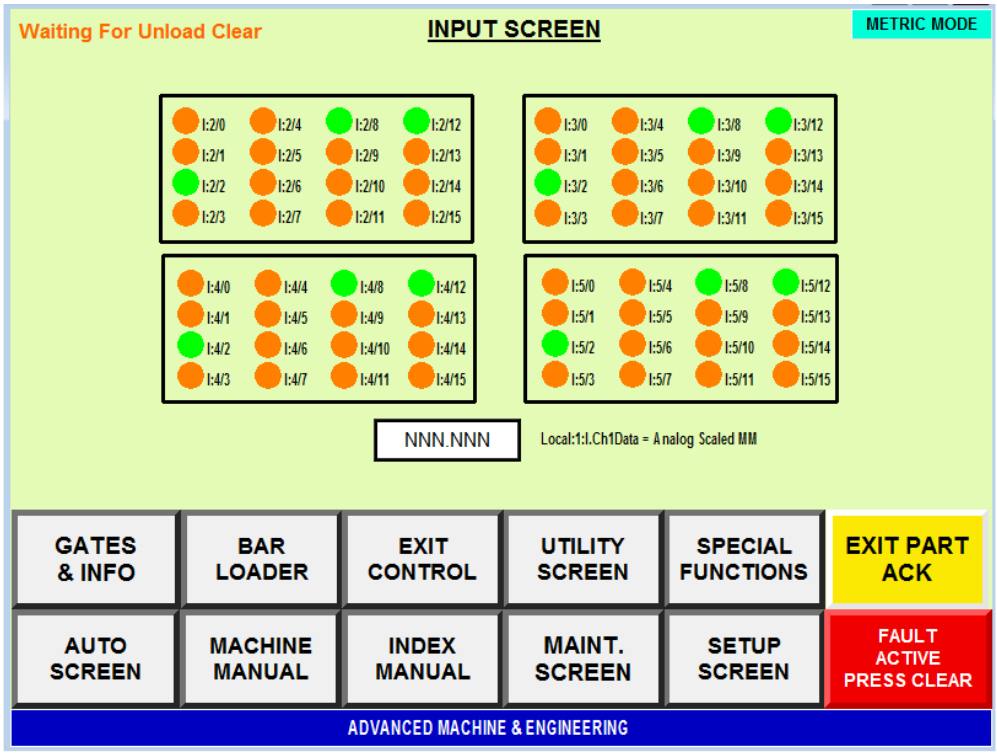
Machine Auto Control Screen (one of two)



This screen is used to display the machine status.

Screen Fields	Description
SPINDLE % LOAD	Graphical display of Spindle % of load
HEAD FEED-RATE	Head feed-rate (entered on the machine setup screen)
HEAD POSITION	Actual Head Slide position
ACTIVE PART #	Active Part Number to cut material
SPINDLE RPM	Commanded spindle speed (RPM)
INDEX POSITION	Actual Index Slide position
LENGTH OF CUT	Enter/Display part length to cut
RAPID ADVANCE. POSITION	Actual Head Slide Rapid Advance position
FULL CUT POSITION	Actual Head Slide Full Cut position

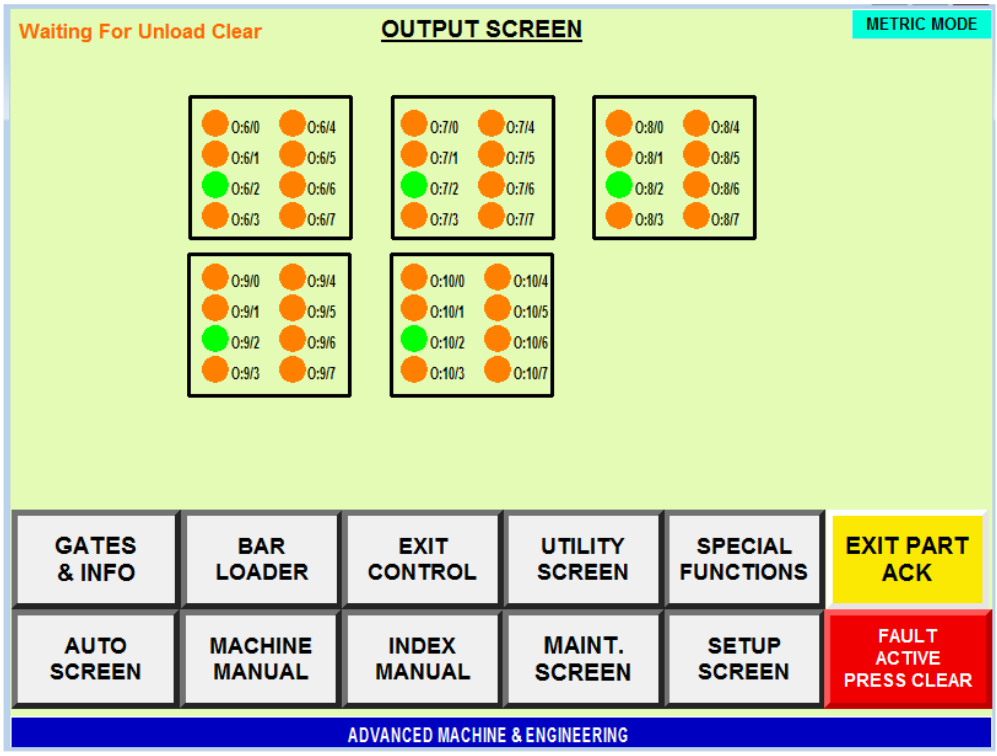
Machine I/O Debug Screen (one of two)



This screen is used primarily for machine input debug.

Screen Fields	Description
I**** ADDRESSES	Machine Input Addresses, indicating status
I**** ADDRESS	Machine Analog Input status reading

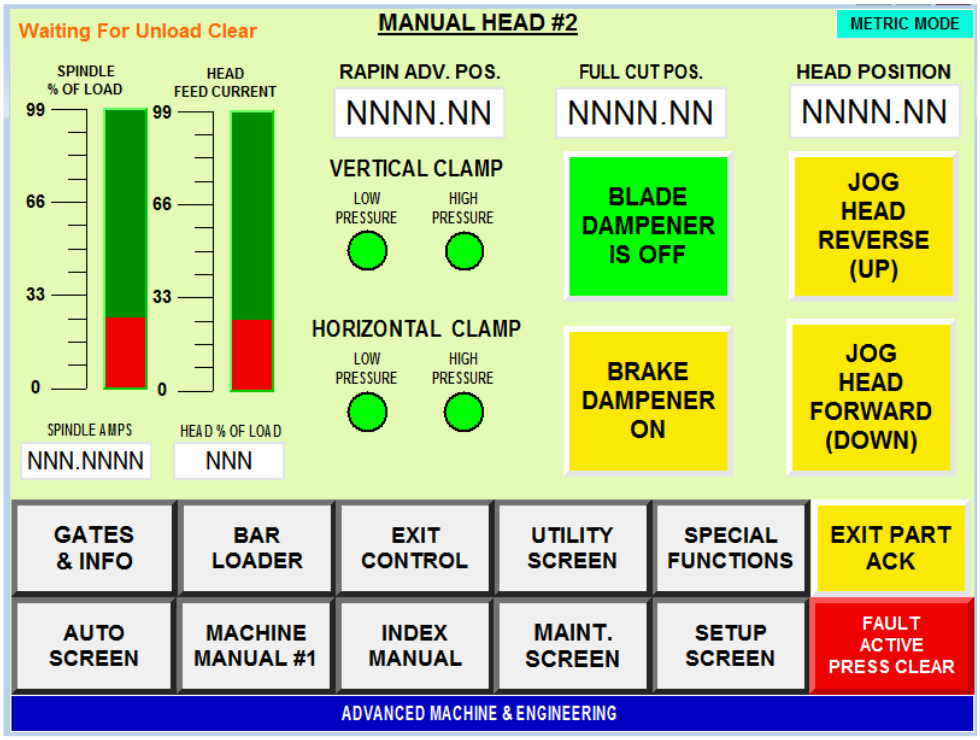
Machine I/O Debug Screen (two of two)



This screen is used primarily for machine input debug.

Screen Fields	Description
O*** ADDRESSES	Machine Output Addresses, indicating status

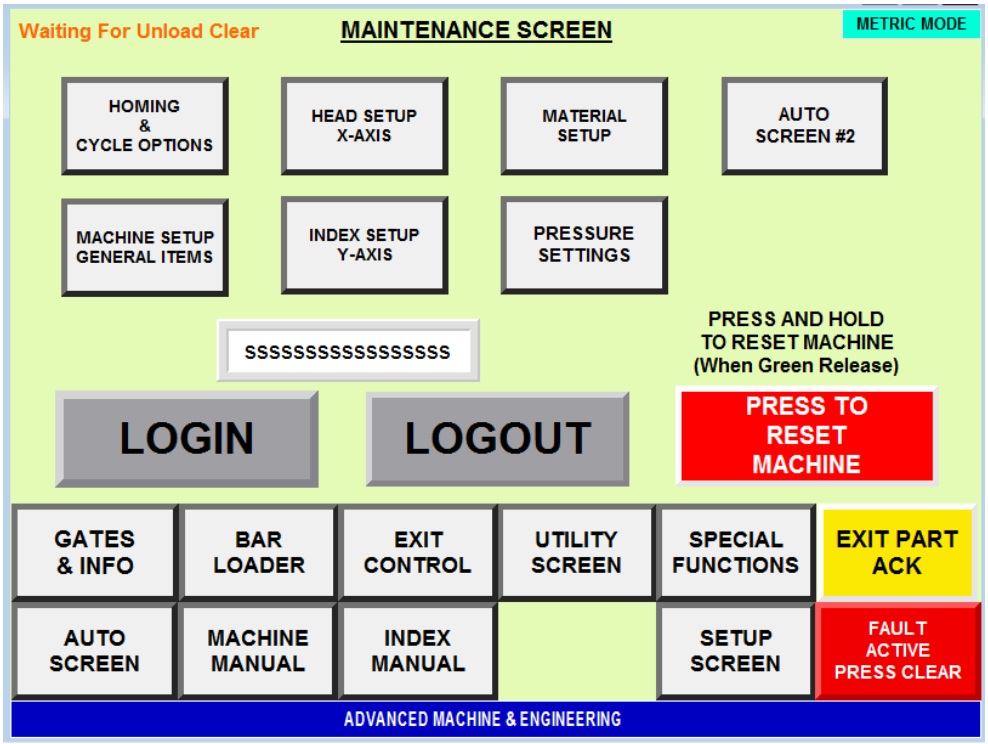
Machine Manual Head Control Screen (two of two)



This screen is used to display spindle status, X & Y- axes status and Head Slide (X-Axis) Jog Commands.

Screen Fields	Description
SPINDLE LOAD %	Graphical display of spindle load %
SPINDLE AMPS	
HEAD FEED CURRENT	Graphical display of head feed % current
HEAD % LOAD	
RAPID ADVANCE. POSITION	Actual Head Slide Rapid Advance position
FULL CUT POSITION	Actual Head Slide Full Cut position
HEAD POSITION	Actual Head slide position (Millimeters/Inches)
VERTICAL LOW PRES	Displays the Status of the Fixture vertical at low pressure
VERTICAL HI PRES	Displays the Status of the Fixture vertical at high pressure
HORIZONTAL LOW PRES	Displays the Status of the Fixture horizontal at low pressure
HORIZONTAL HI PRES	Displays the Status of the Fixture horizontal at high pressure
BLADE DAMPENER OFF	Press to retract the blade dampener
BLADE DAMPENER ON	Press to engage the blade dampener
JOG HEAD FORWARD	Jog the Head Slide in the Forward Direction
JOG HEAD REVERSE	Jog the Head Slide in the Reverse Direction

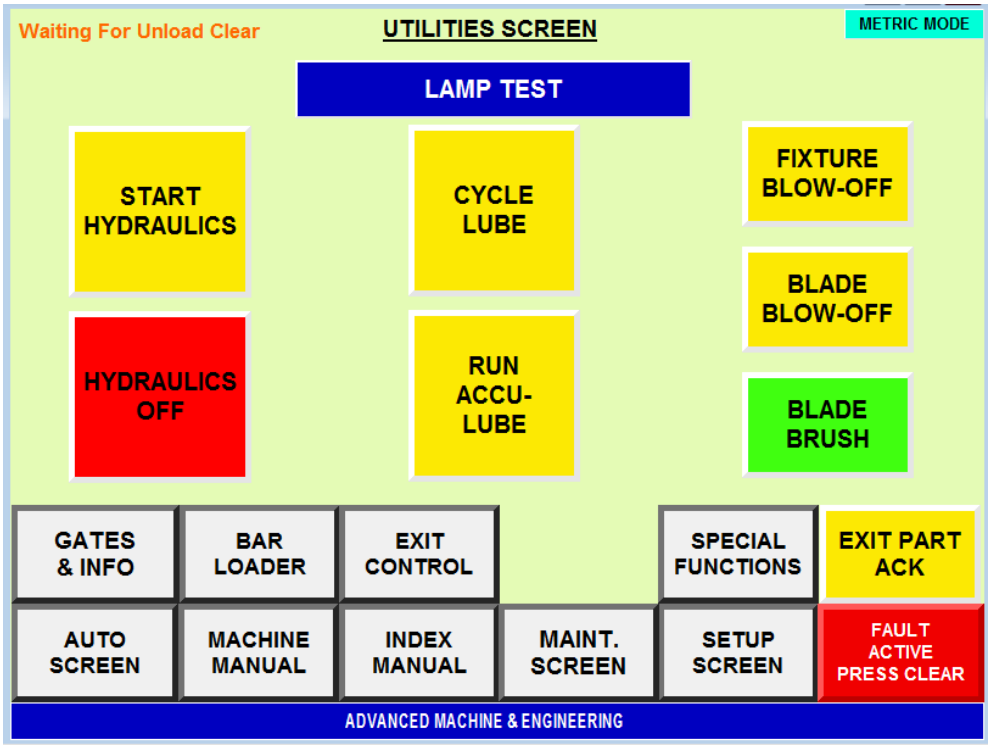
Machine Maintenance Control Screen



This screen is used to access the machine setup conditions. Items on the screen are password protected. This screen is also used to perform a machine Master Reset.

Screen Fields	Description
HOMING & CYCLE OPTIONS	Access to the slide homing commands and cycle options
MACHINE SETUP GENERAL ITEMS	Access General Setup Items
MACHINE SETUP X-AXIS	Access X-Axis Servo (Head Slide) Setup Items
MACHINE SETUP Y-AXIS	Access Y-Axis Servo (Index Slide) Setup Items
MATERIAL SETUP	Access the setup for the different material size, cutting speeds / federate / Head cut positions
PRESSURE SETTINGS	Access the screen to record the different pressure setting on the machine
AUTO SCREEN #2	Access to Auto Screen #2
LOGGED IN USER	Displays the current User that is logged in
LOGIN PB	Press to Open the Sign-on Window
LOGOUT PB	Press to Log out the current user
MACHINE MASTER RESET	Press and hold to perform a Machine Master Reset – See instructions in the "Machine Recovery – Reset" section

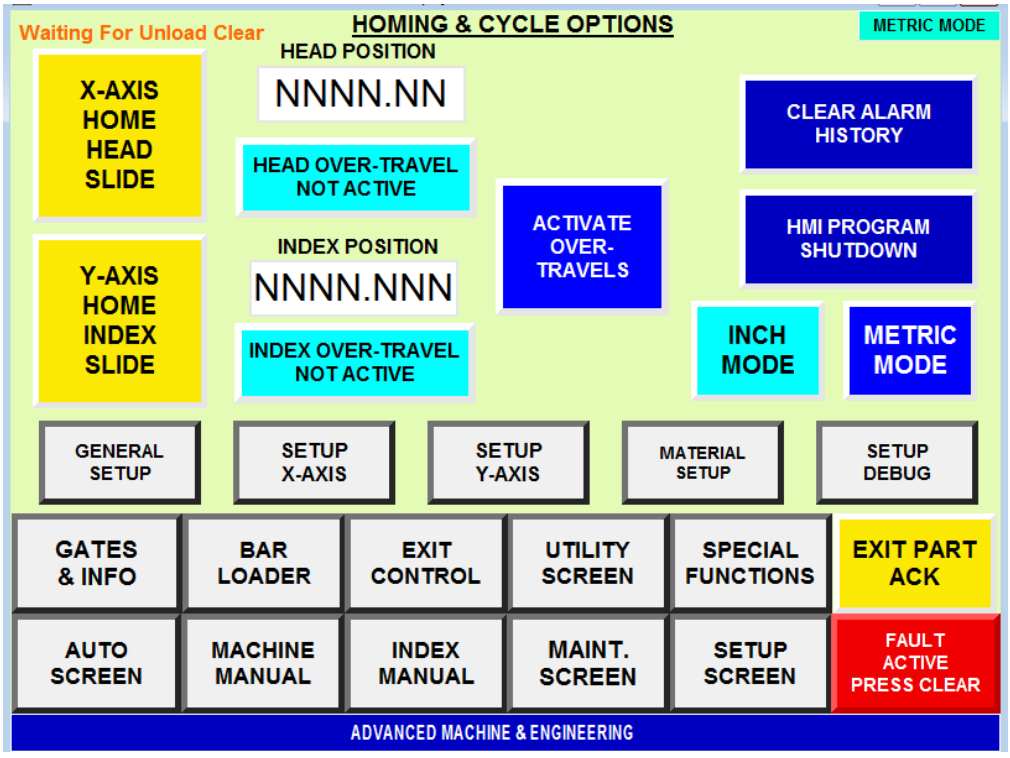
Machine Utilities Control Screen



This screen is used for manual control of machine functions, Hydraulics on/off, Cycle Lube, Run Accu-Lube, Fixture Blow-off, Blade Blow-off and Blade Brush..

Screen Fields	Description
LAMP TEST	Press to test the Stack Lights and Cycle Start Light
START HYDRAULICS	Command the machine hydraulics to start
STOP HYDRAULICS	Command the machine hydraulics to stop
CYCLE LUBE	Command the lube to cycle (each press equals one cycle)
RUN ACCU-LUBE	Command the ACCU-LUBE to cycle (runs 1 minute)
FIXTURE BLOW-OFF	Command the fixture chip blow-offs ON
BLADE BLOW-OFF	Command the Blade blow-offs ON
BLADE BRUSH	Command the Index lift blow-offs ON

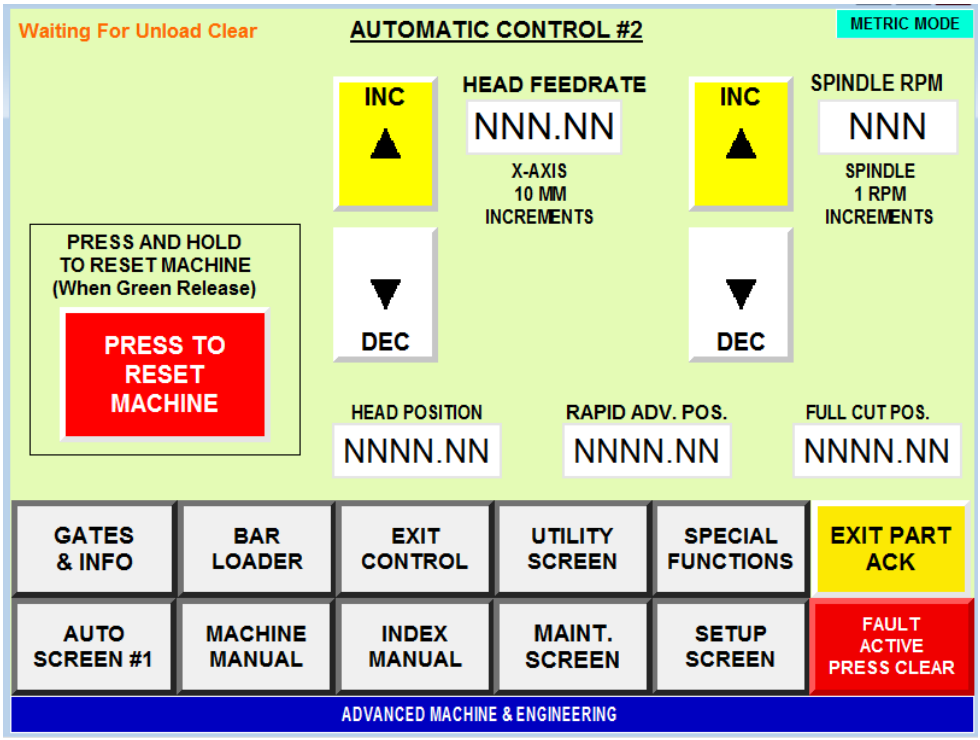
Homing and Dry Cycle Control Screen



This screen is used for homing the X & Y Axes, Head and Index Positions

Screen Fields	Description
X-AXIS HOME SLIDE	Commands X-Axis (Head) to perform a homing routine
HEAD POSITION	Actual Head Position
BYPASS HEAD OVER-TRAVEL	To turn off the over-travels when homing the head axis
Y-AXIS INDEX SLIDE	Commands X-Axis (Index) to perform a homing routine
INDEX POSITION	Actual Index Position
BYPASS INDEX OVER-TRAVEL	To turn off the over-travels when homing the Index axis
ACTIVATE OVER-TRAVELS	Press to activate the over-travels after homing
INCH MODE	Select to convert the machine for Inch Mode
METRIC MODE	Select to convert the machine for Metric Mode
CLEAR ALARM HISTORY	Clear Alarm History
HMI PROGRAM SHUTDOWN	Exits the Machine HMI program and enters the basic HMI setup screens

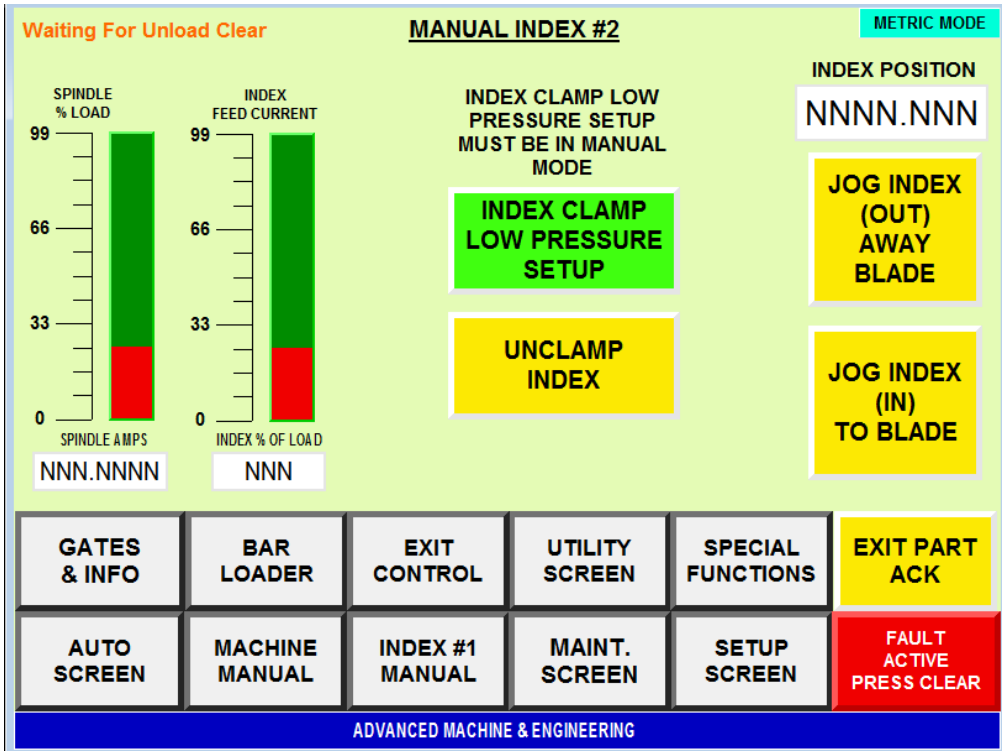
Machine Auto Control Screen (two of two)



This screen is used to monitor and adjust spindle speed and Head Feed in Auto Mode. It is also where you could perform a Master Machine Reset.

Screen Fields	Description
MACHINE MASTER RESET	Press and hold to perform a Machine Master Reset – See instructions in the "Machine Recovery – Reset" section
HEAD FEED RATE INCREASE PB	Incremental increase Head feed rate command
HEAD FEED RATE DECREASE PB	Incremental decrease Head feed rate command
HEAD FEED RATE	Displays the Head Cutting Feed Rate
SPINDLE RPM INCREASE PB	Incremental increase spindle RPM command
SPINDLE RPM DECREASE PB	Incremental decrease spindle RPM command
SPINDLE RPM	Displays the Spindle RPM Speed
HEAD POSITION	Actual Head Slide Position
RAPID ADVANCE POSITION	Actual Rapid Advance Head Slide Position
FULL CUT POSITION	Actual Full Cut Head Slide Position

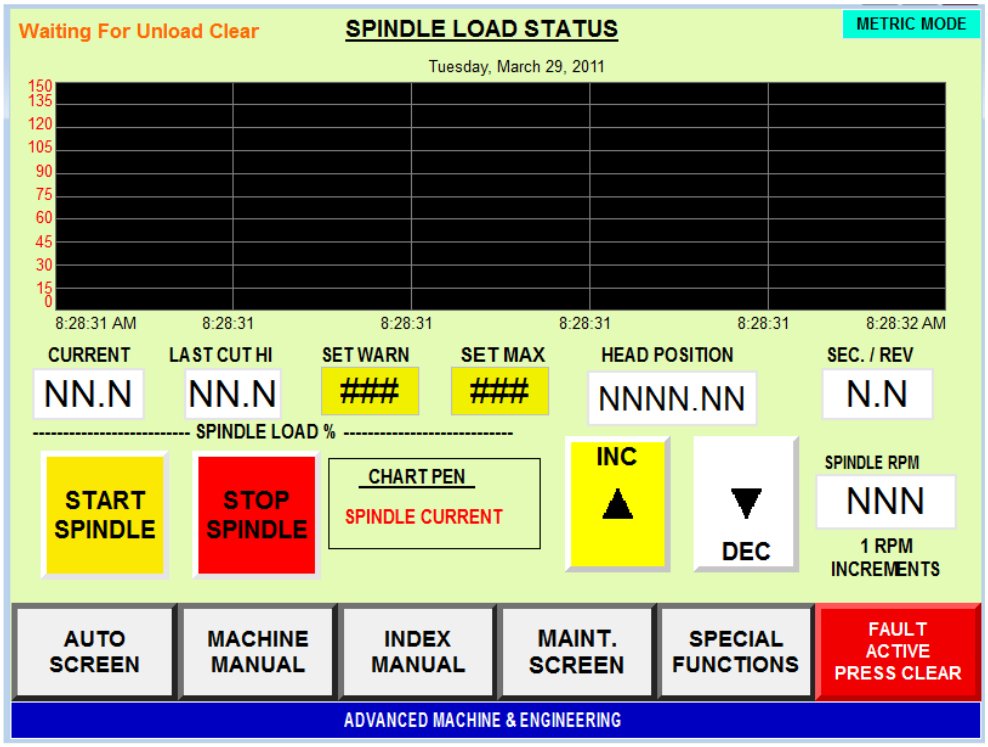
Machine Manual Index Control Screen (two of two)



This screen is used to control the manual functions of the Index Slide and Index Clamp.

Screen Fields	Description
SPINDLE LOAD %	Graphical display of spindle load %
SPINDLE AMPS	Displays the actual motor amps for the spindle motor
INDEX FEED LOAD	Graphical display of Index Servo Load
INDEX % OF LOAD	Displays the % of amps on the spindle motor
Index clamp Low pressure	Commands the Index to clamp using only low pressure
Index unclamp	Commands the Index clamps to Unclamp
INDEX POSITION	Displays the Actual Position of the Index slide
JOG INDEX (OUT) AWAY BLADE	Jog the Index Slide in the forward direction (away from the saw blade)
JOG INDEX (IN) TO BLADE	Jog the Index Slide in the reverse direction (towards the saw blade)

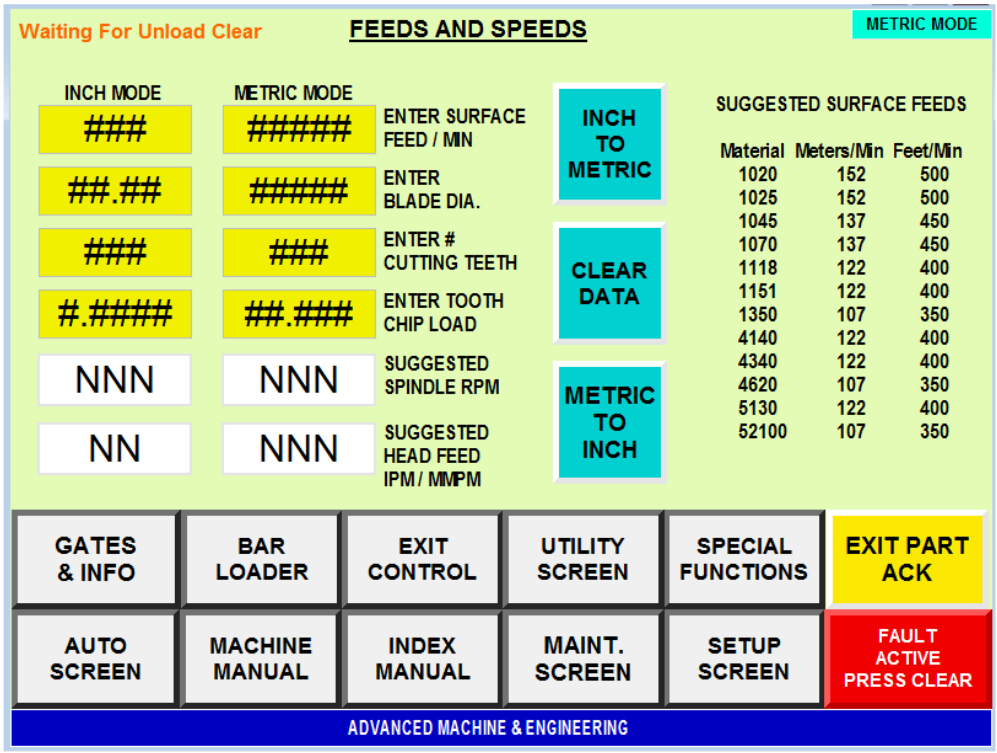
Machine Spindle Load Information Screen



This screen is used to display and configure spindle load % information.

Screen Fields	Description
SPINDLE / HEAD SLIDE LOAD % GRAPH	Graphical Displays active Spindle and Head Slide load %
SPINDLE CURRENT LOAD %	Current spindle load %
SPINDLE LAST CUT LOAD %	Last high spindle load % when in cut area
SPINDLE SET WARN	Set spindle load % to post a warning message
SPINDLE SET MAX	Set spindle load % to perform a cycle release and post a message
HEAD POSITION	Actual X-axis Head Slide Position (millimeters)
SEC. / REV	Calculates seconds per rev of the spindle
START SPINDLE PB	Command the spindle to start
STOP SPINDLE PB	Command the spindle to stop
SPINDLE INCREASE RPM PB	Incremental increase of spindle commanded RPM
SPINDLE DECREASE RPM PB	Incremental decrease of spindle commanded RPM
SPINDLE RPM	Commanded Spindle RPM

Machine Feeds and Speeds Calculation Screen

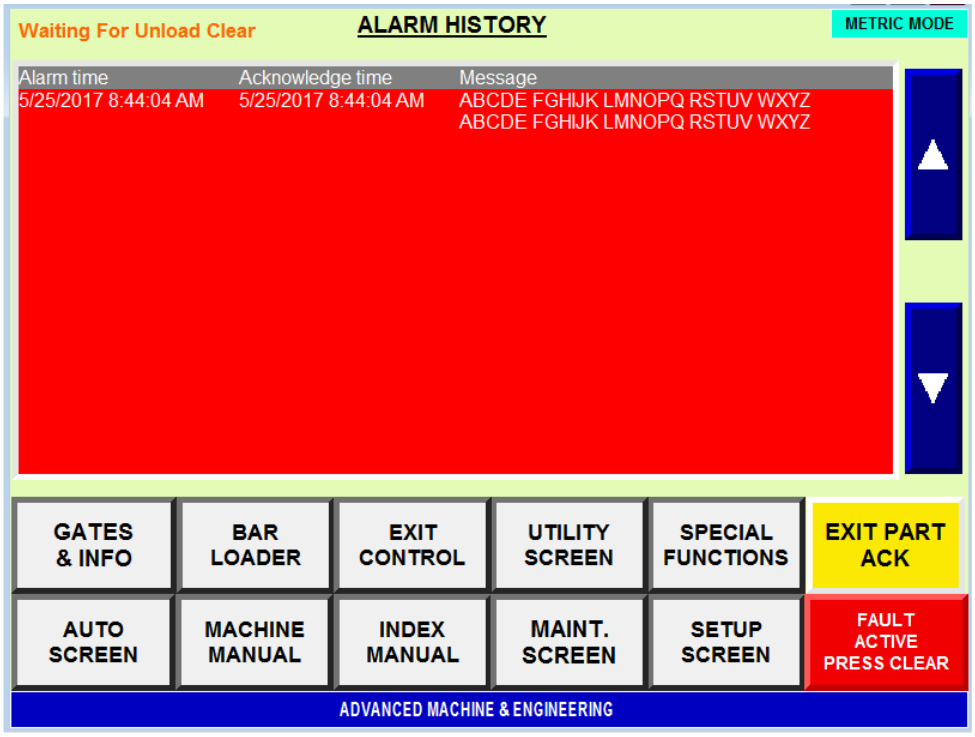


This screen is used to calculate the *suggested* Head Slide Feed Rate and the Spindle RPM.

NOTE: The screen has the capability of displaying data in both millimeters and inch measurements. Use caution when recording numbers.

Screen Fields	Description
ENTER SURFACE FEED/MIN	Enter the desired surface feed rate to use (reference chart)
ENTER BLADE DIAMETER	Enter the Saw Blade Diameter
ENTER # CUTTING TEETH	Enter the # of actual *cutting teeth* of the Blade
ENTER CHIP LOAD	Enter the desired chip load
SUGGESTED SPINDLE RPM	Displays the *suggested* spindle RPM to use
SUGGESTED HEAD FEED RATE	Displays the *suggested* Head feed rate to use
TO MM PB	Converts the Inch data to metric and displays it in the metric column
CLEAR PB	Clear both the metric and inch data
TO METRIC PB	Converts the metric data to inch and displays it in the inch column
SUGGESTED SURFACE FEEDS	Material selection and the suggested surface feeds

Machine Alarm History Screen



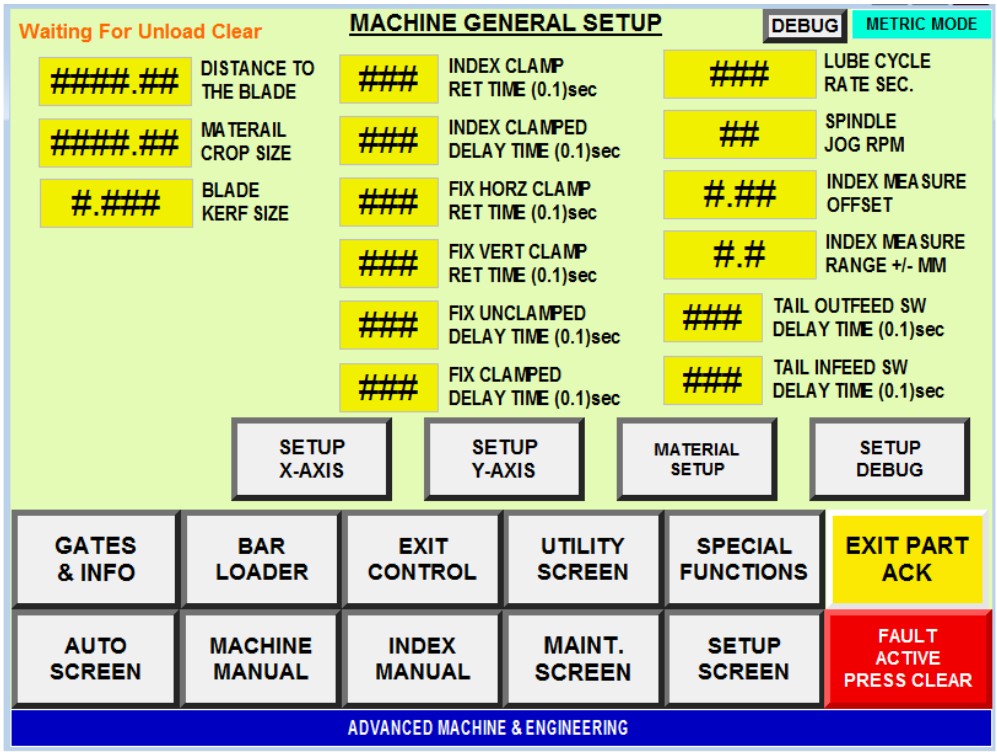
This screen displays the current fault status. Active messages will be displayed with white text; recent cleared messages will be displayed in yellow text.

To display additional message messages:

- Scroll using the Scroll Up and Scroll Down PB to view the message list for additional messages.

Screen Fields	Description
FAULT WINDOW	Display the current fault (Display help text when selected)
SCROLL UP	Scrolls the message list up
SCROLL DOWN	Scrolls the message list down

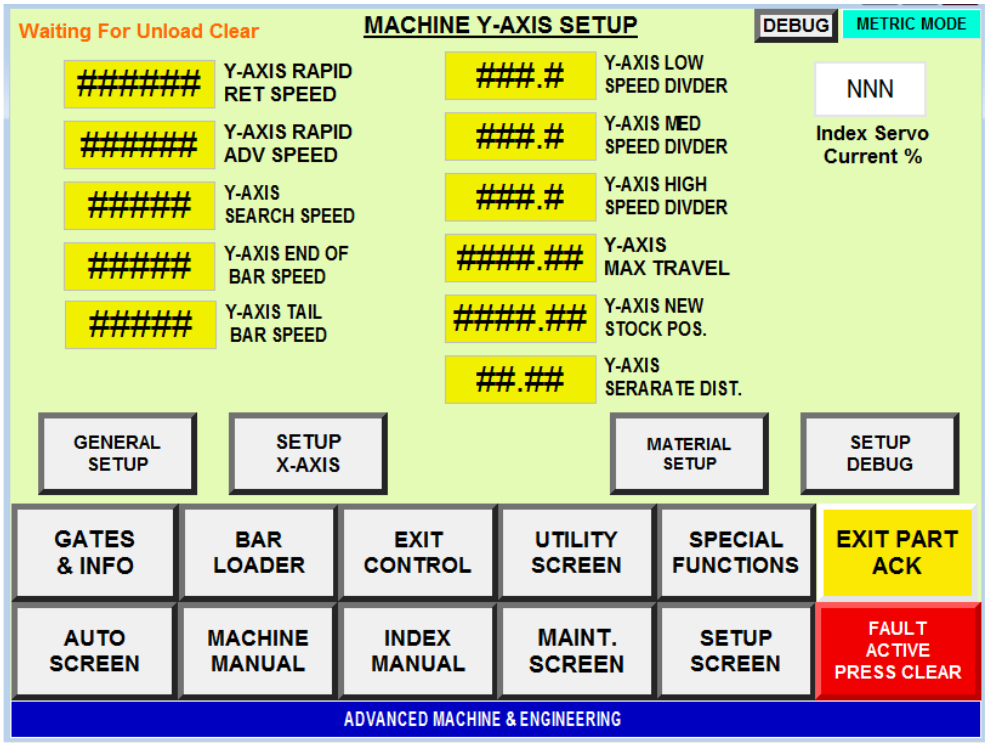
Machine General Setup Screen



This screen Displays/Configures the General Machine Setup Data.

Screen Fields	Description
DISTANCE TO THE BLADE	Enter the offset value to adjust the crop size to the correct length
MATERIAL CROP SIZE	Enter the desired length of the crop cut
BLADE KERF SIZE	Enter the size of the blade kerf (can be used to fine-tune cut lengths)
INDEX CLAMP RETURN TIME	Clamp Retract time (Partial Unclamp Condition)
INDEX CLAMPED DELAY TIME	Clamped Dwell Delay (De-bounce)
FIX HORZ CLAMP RET TIME	Clamp Retract time (Partial Unclamp Condition)
FIX VERT CLAMP RET TIME	Clamp Retract time (Partial Unclamp Condition)
FIX UNCLAMPED DELAY TIME	Unclamped Dwell Delay (De-bounce)
FIX CLAMPED DELAY TIME	Clamped Dwell Delay (De-bounce)
LUBE CYCLE RATE	Lube Cycle Rate
SPINDLE JOG RPM	Spindle Reverse Jog Speed
INDEX MEASURE OFFSET	Enter a offset value to match the material diameter when the index is clamped
INDEX MEASURE RANGE	Enter the +/- range that the material can be when measured
TAIL OUTFEED SW DELAY TIME	Enter the index part present switch delay time when processing the tail
TAIL INFEED SW DELAY TIME	Enter the index part present switch delay time when processing the tail

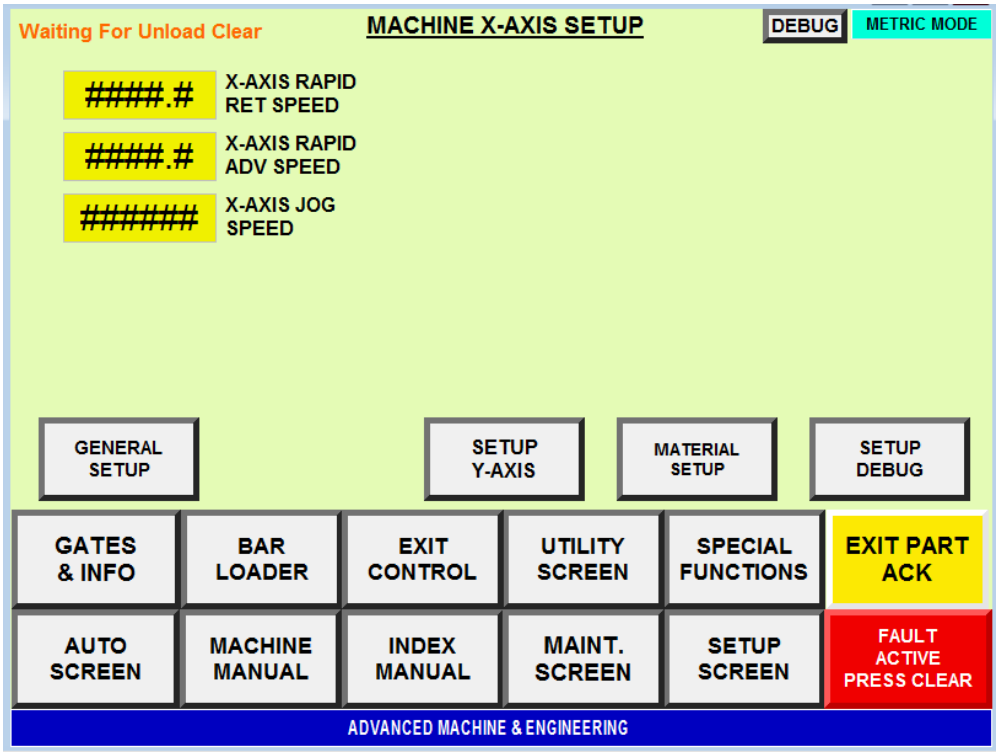
Machine Index Y-Axis Setup Screen



This screen Displays/Configures the Machine Index=Y-Axis Setup Data.

Screen Fields	Description
Y-AXIS RAPID RETURN SPEED	Index Rapid Speed when Clamped with material
Y-AXIS RAPID ADVANCE SPEED	Index Rapid Speed when Unclamped (Advance to get material)
Y-AXIS RAPID SEARCH SPEED	Index Rapid Speed when searching for new bar end
Y-AXIS RAPID END OF BAR SPEED	Index Rapid Speed coming back on end of bar
Y-AXIS TAIL BAR SPEED	Index speed when processing the tails (Out Infeed or Outfeed)
Y-AXIS LOW SPEED DIV	Index Manual Low Speed Override Devisor
Y-AXIS MED SPEED DIV	Index Manual Medium Speed Override Devisor
Y-AXIS HIGH SPEED DIV	Index Manual High Speed Override Devisor
Y-AXIS MAX TRAVEL	Index Maximum distance allowed
Y-AXIS NEW STOCK POSITION	Index Slide Position for waiting for new bar to be loaded.
Y-AXIS SEPARATE DISTANCE	Index distance index moves away from the blade at full cut

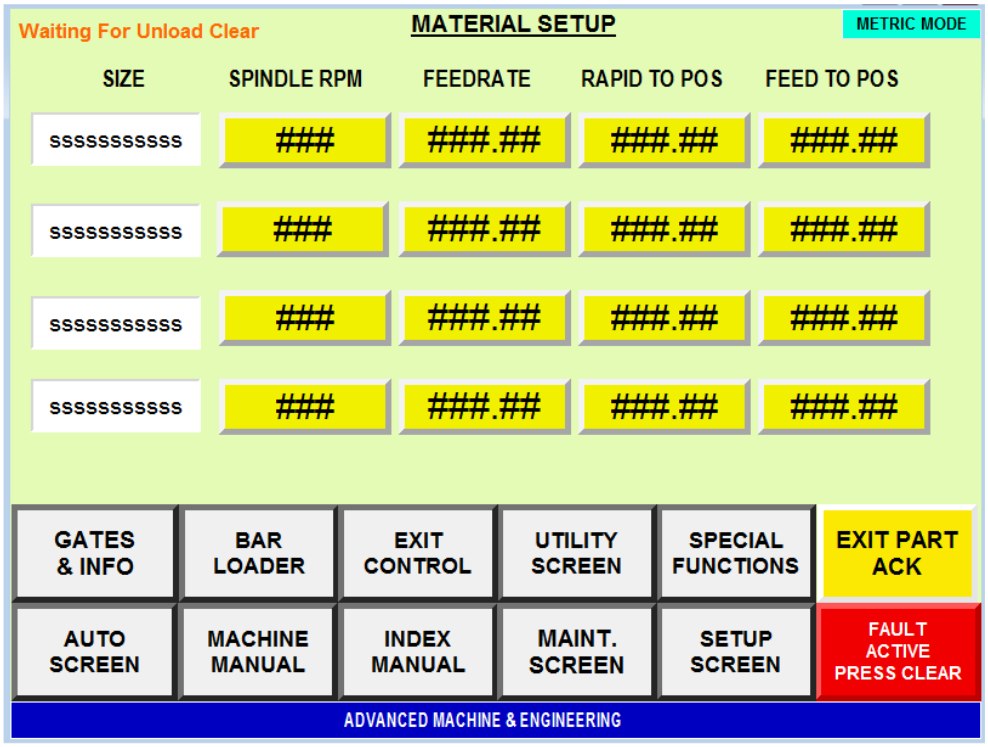
Machine Head X-Axis Setup Screen



This screen Displays/Configures the Machine Head=X -Axis Setup Data.

Screen Fields	Description
X-AXIS RAPID RETURN SPEED	Head Rapid Return Speed
X-AXIS RAPID ADVANCE SPEED	Head Rapid Advance Speed
X-AXIS JOG SPEED	Head manual jog speed

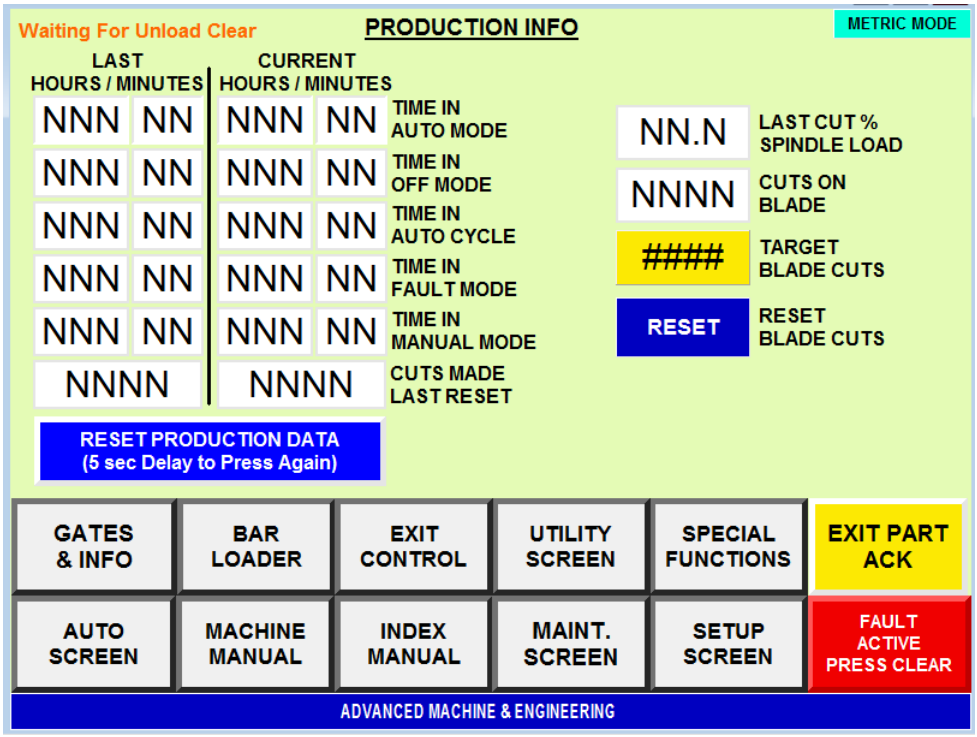
Material Setup Screen



This screen is used for Material Setup.

Screen Fields	Description
SIZE	Displays the different selection of materials sizes
SPINDLE RPM	Enter the Spindle cutting RPM for each part size range
FEED RATE	Enter the Head feed-rate for each part size range
RAPID TO POSITION	Enter the Head rapid to Position for each part size range
FEED TO POSITION	Enter the Head Feed to Position for each part size range

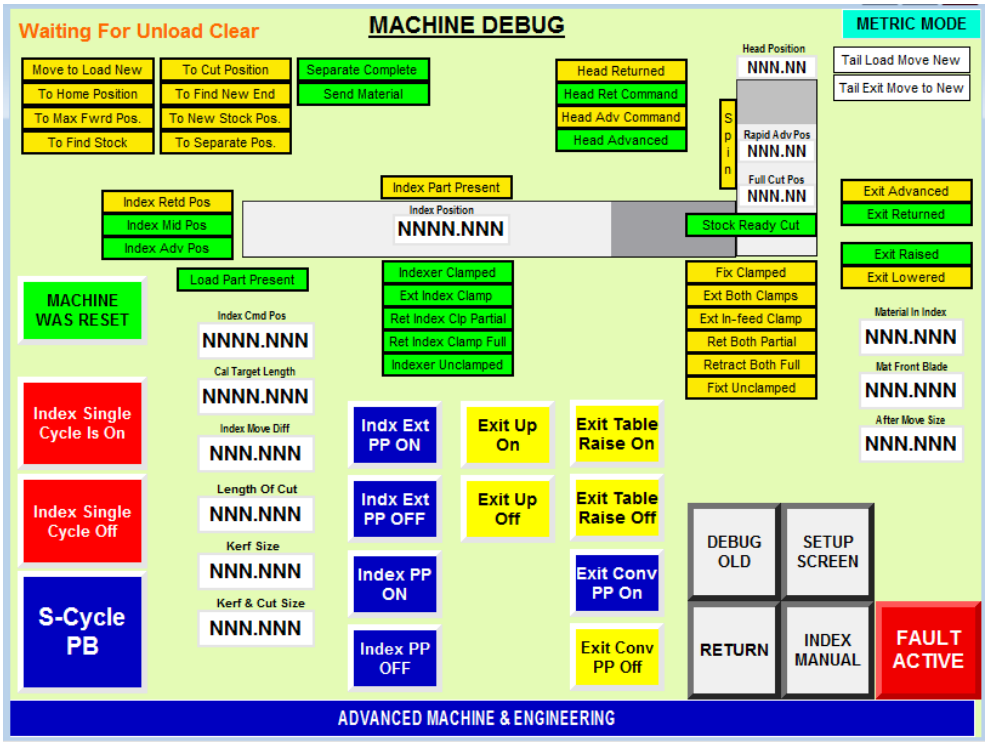
Production Info Screen



This screen is used for display machine / shift production data.

Screen Fields	Description
LAST / CURRENT FIELDS	Displays the last set or current set of production data
TIME IN AUTO MODE	Display the time the machine was in Auto mode since last reset
TIME IN OFF MODE	Display the time the machine was in Off mode since last reset
TIME IN AUTO CYCLE	Display the time the machine was in Auto Cycle mode since last reset
TIME IN FAULT MODE	Display the time the machine was in Fault mode since last reset
TIME IN MANUAL MODE	Display the time the machine was in Manual mode since last reset
CUTS MADE SINCE LAST RESET	Display the cuts the machine made since last reset
RESET PRODUCTION DATA	Moves the Current data to the Last data Production Fields
LAST CUT SPINDLE HIGH %	Records the last High spindle load made on the last cut
NUMBER OF CUTS ON THE BLADE	Displays the number of cuts on the current blade
TARGET BLADE CUTS	Enter the target number of cuts on the blade to display a warning message
RESET THE BLADE COUNT	Resets the number of counts on the blade

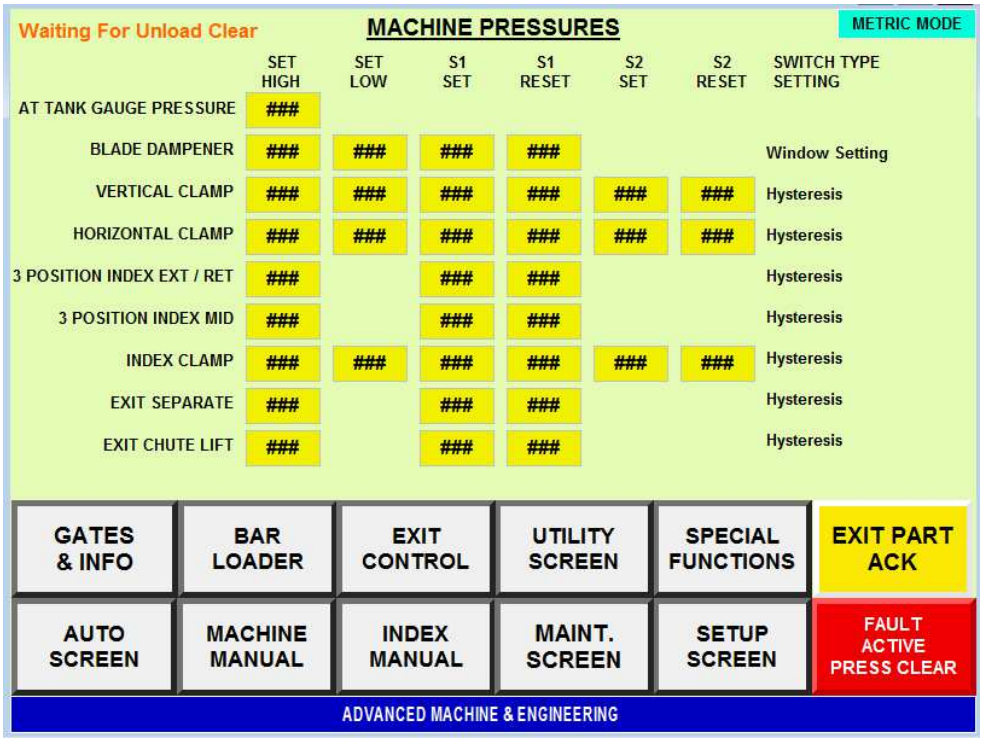
Machine Setup Debug Screen



This screen is used for Machine Setup and Debug Functions. By using these controls, it is possible to simulate cycling the machine without material present. It is also helpful to detect issues with length control by using the Single Cycle feature.

Screen Fields	Description
STATUS INDICATORS	Current Feedback and Command Status Indicators
MATERIAL IN INDEX	Display amount of calculated material in Index
MAT IN FRONT OF BLADE	Display amount of calculated material in Front of the Saw Blade
LENGTH OF CUT	Display the Length of material to cut
INDEX POSITION	Display Current Index Slide Position
HEAD POSITION	Displays Current Head Slide Position
INDEX COMMAND POS	Displays the Current Index command Position
RAPID ADV POS	Displays Head Slide Rapid Advance to Position
FULL CUT POS	Displays Head Slide Full Cut to Position
CYCLE LUBE CONTINUOUS PB	Toggle On/Off to setup a Continuous Lube cycle – Prime the system
INDEX SINGLE CYCLE ON PB	Set to Single Cycle Index – Requires a "Cycle Index" for each Index Move
INDEX SINGLE CYCLE OFF PB	Resets the Single Cycle Index Mode
PART PRES. LOAD CONVEYOR	Software On/Off to indicate a part is present on the load conveyor.
PART PRES. IN INDEX	Software On/Off to indicate a part is present in the Index
SHORT TAIL CYCLE	Used to debug the cycle when a short tail is present.
DETECT TAIL	Used to debug and auto cycle with no part present and set the tail length
MACHINE MASTER RESET	Press and hold to perform a Machine Master Reset – See instructions in the "Machine Recovery – Reset" section

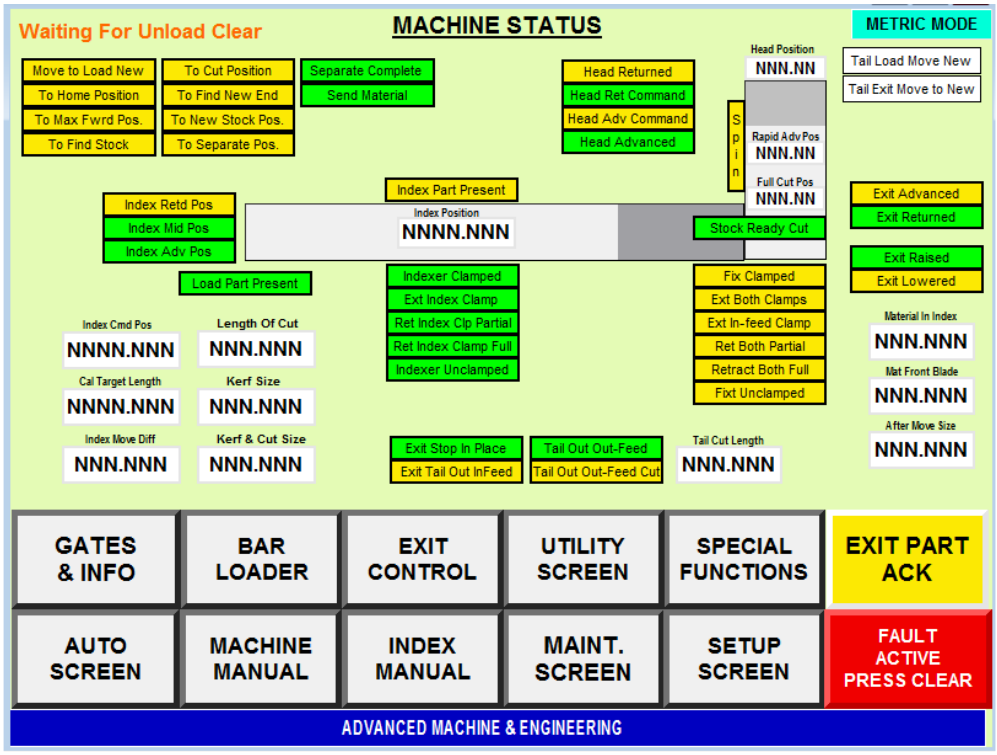
Machine Pressures Screen



This screen is used to record the machine setup pressure.

Screen Fields	Description
SET HIGH	Enter the setting of the hydraulic High pressure for each device
SET LOW	Enter the setting of the hydraulic Low pressure for each device
S1 SET	Enter the pressure switch trigger on pressure setting for High pressure
S1 RESET	Enter the pressure switch trigger reset pressure setting for High pressure
S2 SET	Enter the pressure switch trigger on pressure setting for Low pressure
S2 RESET	Enter the pressure switch trigger reset pressure setting for Low pressure
SWITCH TYPE SETTINGS	Displays the pressure switch type setting for each device

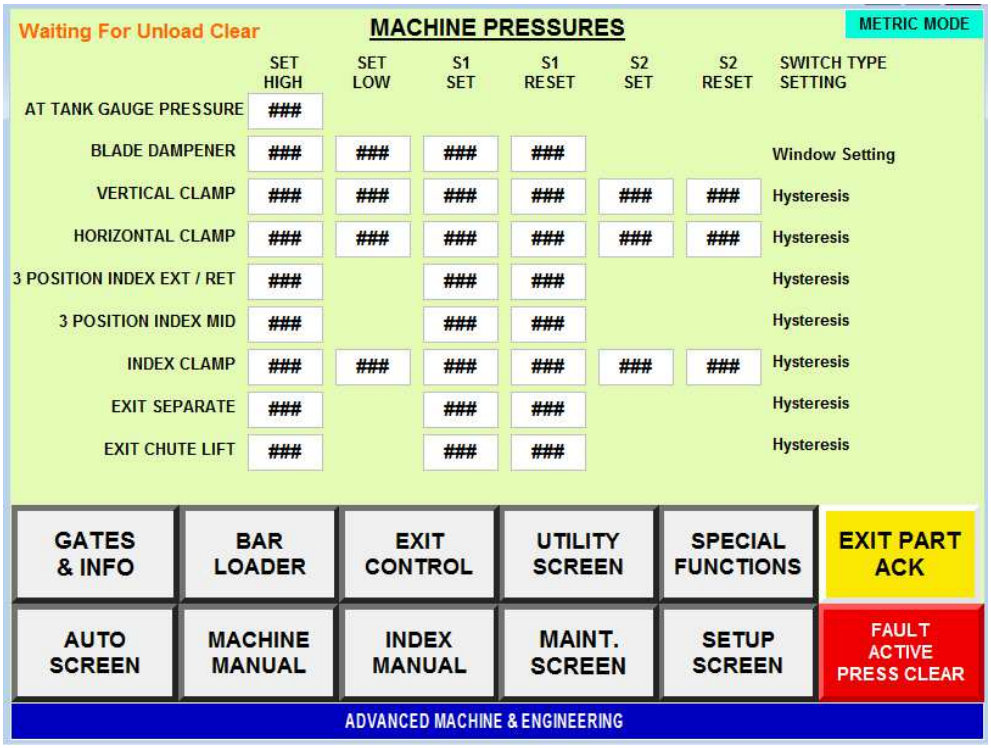
Machine Status Screen



This screen is used to display the machine running status.

Screen Fields	Description
STATUS INDICATORS	Current Feedback and Command Status Indicators
MATERIAL IN INDEX	Display amount of calculated material in Index
MAT IN FRONT OF BLADE	Display amount of calculated material in Front of the Saw Blade
LENGTH OF CUT	Display the Length of material to cut
INDEX POSITION	Display Current Index Slide Position
HEAD POSITION	Displays Current Head Slide Position
INDEX COMMAND POS	Displays the Current Index command Position
RAPID ADV POS	Displays Head Slide Rapid Advance to Position
FULL CUT POS	Displays Head Slide Full Cut to Position
PART PRES. IN INDEX	Software On/Off to indicate a part is present in the Index
TAIL CYCLES	Displays the status of the tail cycles

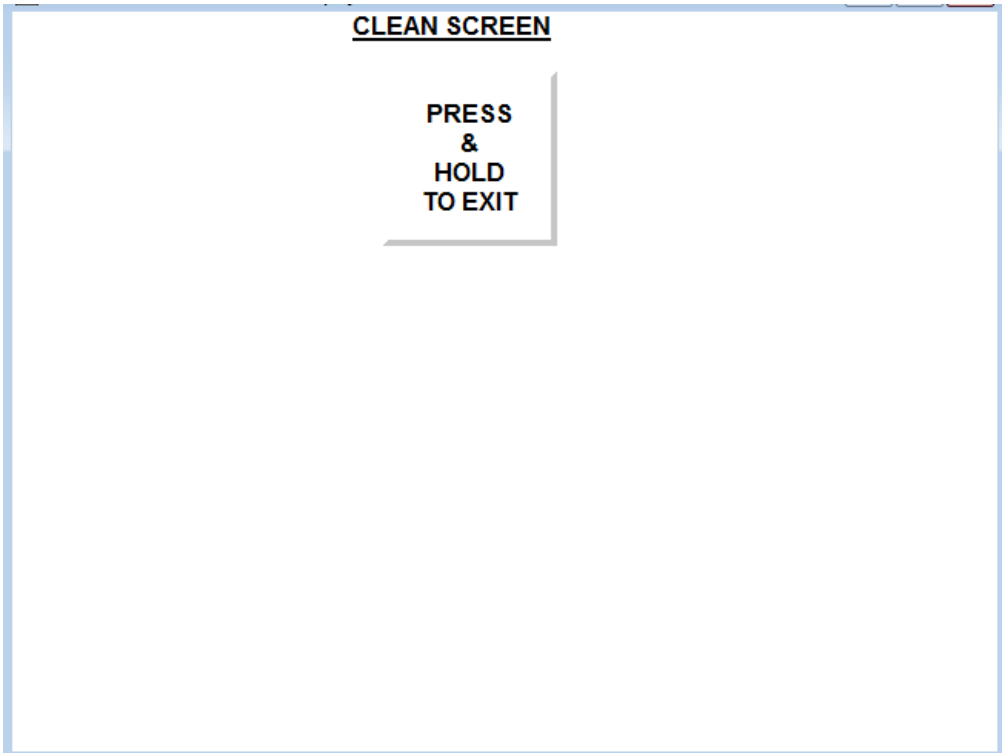
Machine pressures Screen



This screen is used for Machine Setup and Debug Functions. By using these controls, it is possible to simulate cycling the machine without material present. It is also helpful to detect issues with length control by using the Single Cycle feature.

Screen Fields	Description
SET HIGH	Displays the setting of the hydraulic High pressure for each device
SET LOW	Displays the setting of the hydraulic Low pressure for each device
S1 SET	Displays the pressure switch trigger on pressure setting for High pressure
S1 RESET	Displays the pressure switch trigger reset pressure setting for High pressure
S2 SET	Displays the pressure switch trigger on pressure setting for Low pressure
S2 RESET	Displays the pressure switch trigger reset pressure setting for Low pressure

Machine Clean Screen



This screen is used to clean the HMI screen, without activating any commands.

Screen Fields	Description
PRESS & HOLD TO EXIT	Press to exit the Clean Screen, this is a time based button that must be help active to exit

10.24 Machine Alarm and Status Messages

Auto Mode Was Lost When In Auto Cycle

Cause / Remedy:	Machine Not in Auto Mode The machine was in an auto cycle and the Auto mode was removed.

Blade Dampener Pressure Out Of Range

Cause / Remedy:	The blade dampener is out of the pressure range. Check and reset the pressure.

Check For Short Tail In Machine Fixture

Cause / Remedy:	Check for a short tail still in the machine.

Cuts On Blade Target Reached - Reset Count

Cause / Remedy:	The Saw Blade has reached the Target for desired cuts. Change the Saw Blade and reset the Blade Counts.

Exit Dump Plate Not Lowered

Cause / Remedy:	The Exit separation plate failed to lower in the given time limit. Verify the cylinder is lower and the switches are set correctly.

Exit Dump Plate Not Raised

Cause / Remedy:	The Exit separation plate failed to raise in the given time limit. Verify the cylinder is raised and the switches are set correctly.

Exit Not Clear- Part Present or Conveyor not Raise

Cause / Remedy:	The exit is not clear to pass material to. Check to see if the exit conveyor is raised. Ensure not parts are present

Fixture Must Be Fully Unclamped to Raise and Lower Exit

Cause / Remedy:	The fixture must be fully unclamped to raise the exit separation plate

Head Drive Motor Controller Not Ready

Cause / Remedy:	The controller has detected a fault with the Head Slide Servo Drive. Review the front of the Servo drive controller for the fault status, refer to the Drive User Manual for more information,

Head X-Axis Is Not Advanced

Cause / Remedy:	The Slide Head was commanded to advance and failed to advance in a timely manner. Review the front of the Servo drive controller for the fault status, refer to the Drive User Manual for more information,

Head X-Axis Is Not Returned

Cause / Remedy:	The Slide Head was commanded to advance and failed to advance in a timely manner. Review the front of the Servo drive controller for the fault status, refer to the Drive User Manual for more information,

Head X-Axis Servo Not Referenced/Homed

Cause / Remedy:	The X-Axis Slide needs to be referenced /homed. - Home Axis.

Horizontal Fixture Clamp Not Advanced

Cause / Remedy:	The fixture horizontal clamp was command to extend and failed to fully extend. Check and make sure the solenoid is active and check the extended pressure switch is on.

Horizontal Fixture Clamp Not Returned

Cause / Remedy:	The fixture horizontal clamp was command to retract and failed to fully retract Check and make sure the retract solenoid is active and check the extended pressure switch (Off) and the returned limit switch is On.

Hydraulic System Motor Overload Tripped

Cause / Remedy:	The control has indicated the Hydraulic motor started is overloaded. Verify the Hydraulic motor is running correctly, use a amp meter to verify the running amps. Check wiring for shorts.

Index Clamp Fault - Check Part Present Switch

Cause / Remedy:	The Index determined during clamping material, that there is an issue with the part present switch. Verify the functionality of the Index part present switch.

Index Part Present Not Found

Cause / Remedy:	The Index Slide was commanded to find the end of the material. The end was not found in the allotted motion range. Check for material and verify the Index part present switch is working correctly.

Index Y-Axis Is Not Advanced

Cause / Remedy:	The Index Slide was commanded to advance and failed to advance in a timely manner

Index Y-Axis Is Not Returned

Cause / Remedy:	The Index Slide was commanded to return and failed to return in a timely manner. Review the front of the Servo drive controller for the fault status, refer to the Drive User Manual for more information.

Index Y-Axis Servo Not Referenced/Homed

Cause / Remedy:	The Y-Axis Slide needs to be referenced /homed. - Home Axis

Index and Fixture Clamps Opposite States Required

Cause / Remedy:	The fixture and Index can not be clamped at the same time when trying to move the index Unclamp either the fixture of the Index

Indexer Clamp Did Not Retract -Check PS and Balluff Scale

Cause / Remedy:	he indexer was commanded to retract and failed to indicated it was retracted. Verify functionality of the Balluff scale. Review the Input screen to see if the scale is reading correctly.

Indexer Clamp Not Extended - Check P.S. Setting - Check for Correct Part Size

Cause / Remedy:	The Index Clamp was commanded to Extend, but failed to indicate Clamped. - Check the Pressure switch functionality.

Indexer Drive Motor Controller Not Ready

Cause / Remedy:	The controller has detected a fault with the Index Slide Servo Drive. Review the front of the drive for the fault status, refer to the Drive User Manual for more information.

Indexer Move Not Complete

Cause / Remedy:	The index was commanded a move, but failed to complete the move. Review the front of the drive for the fault status, refer to the Drive User Manual for more information.

Lube System fail to Cycle

Cause / Remedy:	The Central Lube System was commanded to cycle. The systems did not see the lube cycle switch, verify the lube system is turning on when commanded. Check Wiring, check for lube leaks.

Lube System Low Level

Cause / Remedy:	The Lube System is Low on Lube. - Fill Lube System Tank

Machine Back Side In E-Stop

Cause / Remedy:	The E-stop button at the back of the machine is pressed

Machine Exit Unload In E-Stop

Cause / Remedy:	The E-stop button at the unload side of the machine is pressed

Machine Blade Door Is Open

Cause / Remedy:	The Saw Blade door is not closed. Verify the door is closed and the safety switch is functioning correctly.

Machine Control Power Is Off

Cause / Remedy:	Machine Control Power Is Off - Press the Master On pushbutton to start the machine.

Machine Gate #1 Is Open

Cause / Remedy:	Machine Gate #1 Is Open - Close and latch the guard door. - Verify switch functionality.

Machine Gate #2 Is Open

Cause / Remedy:	Machine Gate #2 Is Open - Close and latch the guard door. - Verify switch functionality.

Machine Gates Are Unlocked

Cause / Remedy:	All The Machine Gates are indicating they are closed, verify the gates are closed.

Machine Hydraulics Not On

Cause / Remedy:	Auto mode was commanded or a manual clamp command was given with the machine hydraulics not running. - Start the Hydraulic System.

Machine Not in Auto Mode

Cause / Remedy:	Cycle Start pushbutton was pressed without the machine being in Auto Mode. - Put the Selector Switch in Auto.

Machine Not in Manual Mode

Cause / Remedy:	A manual function was commanded, without the machine being in Manual Mode. Turn the Selector switch to Manual.

Machine Not Powered On

Cause / Remedy:	A pushbutton command was made without the machine being powered on.- Turn the Machine Power On.

Machine Operator Console In E-Stop

Cause / Remedy:	The main operator panel is in E-Stop. Pull out the red E-Stop pushbutton.

No Cuts Are Active - Setup Screen

Cause / Remedy:	There are no active cuts on the setup screen. Activate a/some cuts.

Safety Scanner Is Tripped

Cause / Remedy:	The safety scanner is tripped. Reset the scanner

Separator Not Advanced

Cause / Remedy:	The Exit Shuttle was commanded to Advance (to the unload conveyor) and failed to fully advance. Check the advance solenoid (On). Check the returned pressure switch (Off), check the advanced limit switch (On).

Separator Not Returned

Cause / Remedy:	The Exit Shuttle was commanded to Return (to the saw blade) and failed to fully return. Check the return solenoid (On). Check the returned pressure switch (On), check the advanced limit switch (Off).

Spindle Drive Motor Controller Not Ready

Cause / Remedy:	The Spindle Motor VFD controller had detected a fault. Review the front of the VFD drive controller for the fault status, refer to the Drive User Manual for more information.

Spindle Load Reach Max Warning Level

Cause / Remedy:	The spindle load feedback has reached the maximum warning level that is set on the Spindle Load % Active Chart Screen - Verify Spindle and Head Speeds. Verify Blade Sharpness.

Spindle Load Reached Warning Level

Cause / Remedy:	The spindle drive has reached the warning level programmed. Verify Saw Blade condition or change warning setting on the Spindle Load Status Screen.

Spindle Motor Not Running

Cause / Remedy:	The Spindle Motor was commanded to run, but failed to start. Check the spindle drive for errors

Spindle Motor Not Running

Cause / Remedy:	A command that requires the spindle running was commanding. Start the spindle.

Tail Out In-Feed Selected - New Material Detected

Cause / Remedy:	New material was detected at the index infeed, when the tails out the infeed has been select. Remove the material manually

Unload Table Not Lowered

Cause / Remedy:	The unload table is not lowered. Lower the table

Unload Table Part Present

Cause / Remedy:	There is a part present on the unload side.

Vertical Fixture Clamp Not Advanced

Cause / Remedy:	The Vertical fixture clamp was commanded to advance, but failed to advance in the desired time limit, Verify the solenoid is functioning and the systems has Hydraulic pressure. Verify the clamp switch functionality and wiring.

Vertical Fixture Clamp Not Returned

Cause / Remedy:	The Vertical fixture clamp was commanded to return, but failed to advance in the desired time limit, Verify the solenoid is functioning and the systems has Hydraulic pressure. Verify the clamp switch functionality and wiring.

Waiting For Acknowledgment Part Was Removed

Cause / Remedy:	The part removed acknowledgement feature is active. Acknowledge the part has been removed