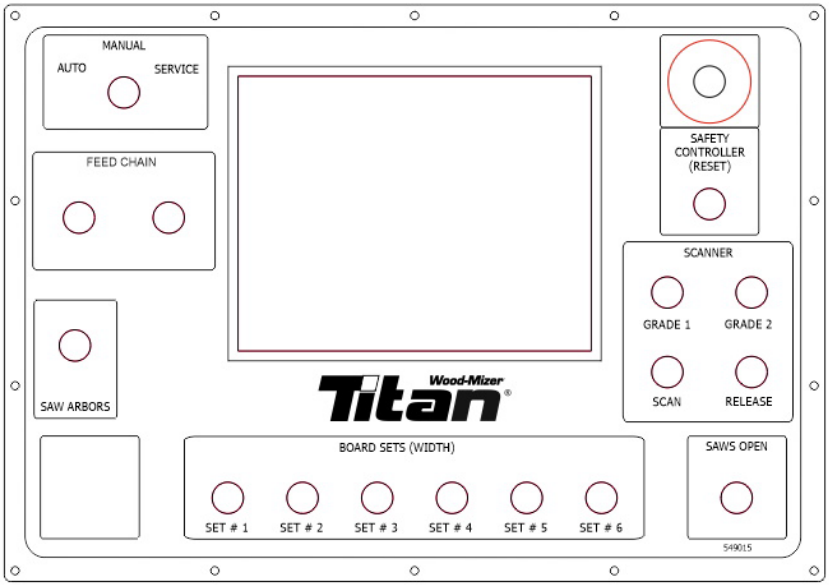
EA3000 – Cooper Marine – Phase 1

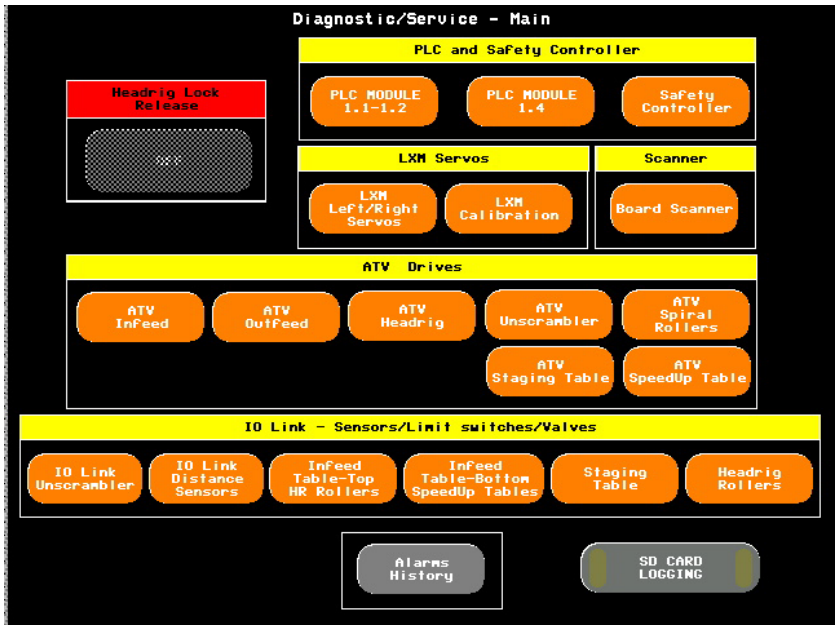
After turning on the power supply, the following screen appears on the HMI panel:

Then reset the safety controller. The safety controller monitors all emergency stop devices (buttons, wire switches) and the lock on the edger cover.

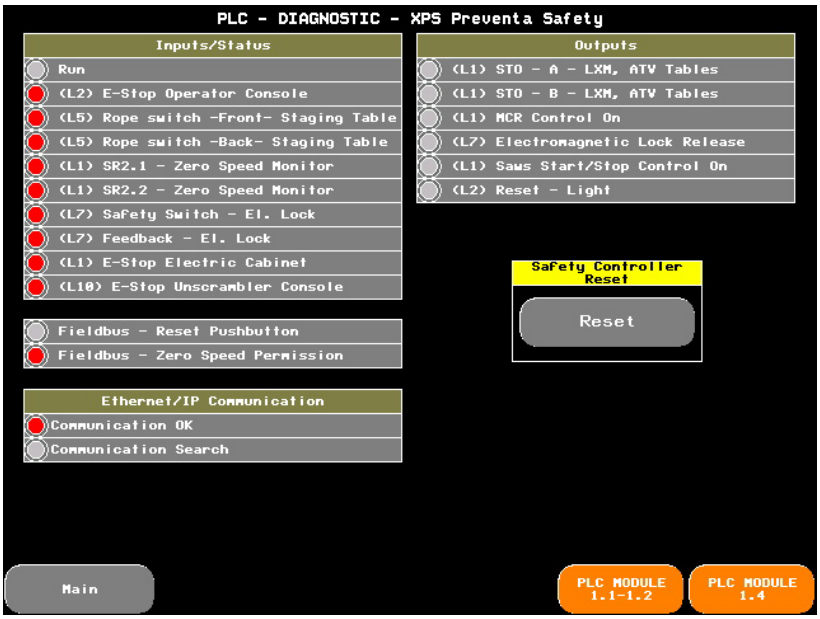


To reset the safety controller, press the SAFETY CONTROLLER RESET button. The button light should go out after pressing the button. If the button is still illuminated, check which safety function is active. To do this, switch to the SERVICE position using the button in the upper left corner of the control panel.

The following screen will appear on the HMI panel:



Press the Safety Controller button in the PLC and Safety Controller section:

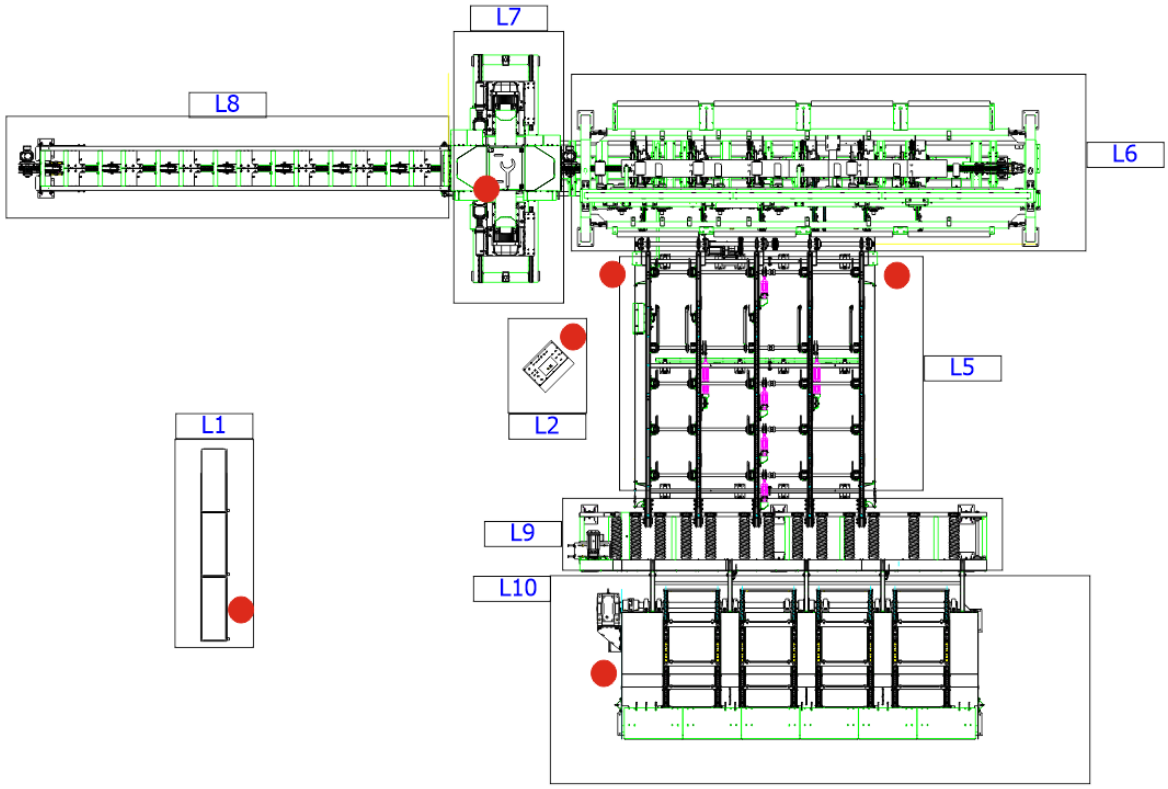


Locate the line with red indicator on the left side of the screen in the Inputs/Status section.

Emergency Stops Location

(L2) E-Stop Operator Console	Emergency stop button – control box
(L5) Rope switch - Front Staging Table	Pull-wire switch - table with hooks - front
(L5) Rope switch - Back Staging Table	Pull-wire switch - table with hooks - rear
(L1) SR2.1 – Zero Speed Monitor	Zero speed monitor - left blade
(L1) SR2.2 – Zero Speed Monitor	Zero speed monitor – right blade
(L7) Electromagnetic lock – Contacts	Top cover lock - edger saw head
(L7) Electromagnetic lock - Feedback	Top cover lock feedback contact - edger saw head
(L1) E-Stop Electric Cabinet	Emergency stop button – electrical box
(L10) E-Stop Unscrambler Console	Emergency stop button – operator service console

The emergency stops are marked with a red dot in the figure below.



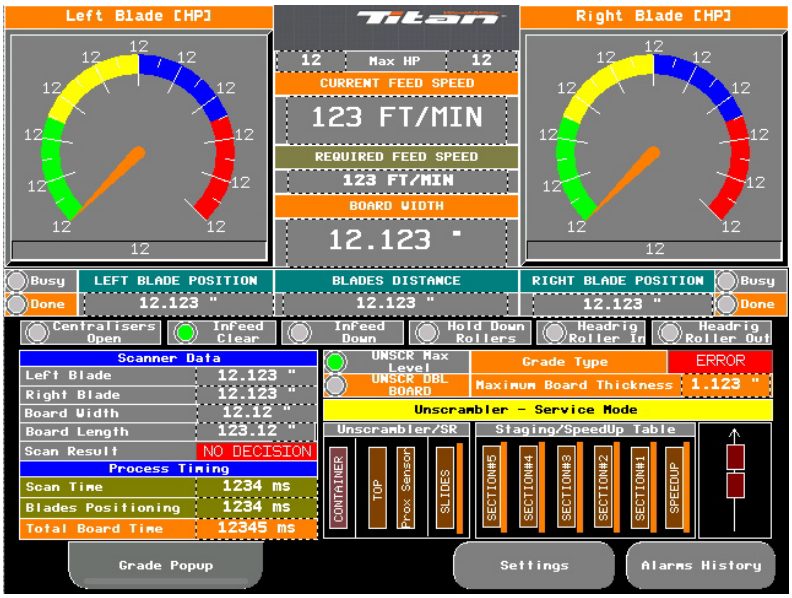
After locating an active safety device, make sure the entire zone is safe and then deactivate the device and press the SAFETY CONTROLLER RESET button again (on the control panel). The light under the button should go out, the control circuits are ready for operation.

Select the operating mode:
- AUTO,
- MANUAL,
- SERVICE.

Then start the main motors using the Start button in the SAW ARBORS section.
Press the FORWARD button in the FEED CHAIN section to start the feed on all tables.

To start the feed in the Auto and Manual mode it is necessary to start the main blade motors first.

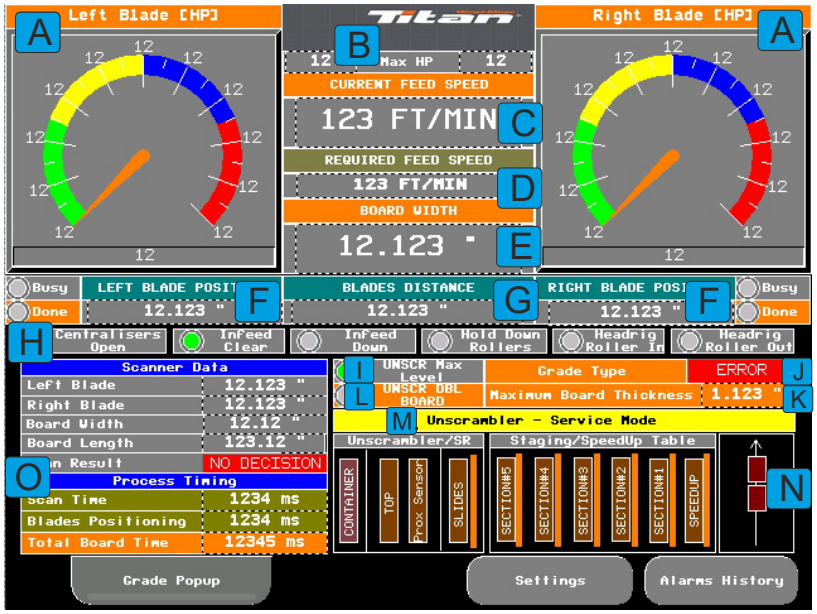
AUTO Mode



The AUTO mode is intended for fully automatic operation:

- The infeed table is automatically loaded.
- Then the board is centralized. Depending on its length, the appropriate number of centralizers are involved in the process. The length of the board is measured segmentally with the sensors placed above the hooks of the speed-up table.
- The hold-down rollers are lowered. The number of rollers being lowered depends on the length of the board.
- The scanning operation is made, light bars are used on one side and then on the other side.
- The positions of the blades are sent to the controller that sets the blades in the selected positions.
- The blades move to the preset positions.
- The board is lowered onto the chain.
- The infeed table chain moves the board towards the edger saw head.
- The infeed table rollers rise up while the board is leaving the infeed table.
- The hold-down rollers of the edger lower when the board reaches a position under the rollers.
- The board's side edges are trimmed.
- The board leaves the edger saw head and then it is moved along the outfeed table.
- Paddles on the infeed table
- The cycle starts from the beginning.

Auto Mode Screen Description



A – Power consumption of the left and right blade motor

B – Maximum power consumption during a single cutting cycle

C – Current linear speed of the infeed table/saw head rollers, outfeed table

D – Required linear speed, this value changes for different board thicknesses or constant speed mode. The current speed is the instantaneous speed that follows the required speed.

E – Preset board width

F – Real position of the left and right blade

Busy lights - the blade is being repositioned, Done - the blade has been set

G – Real distance between the blades

H – lights indicating a status of the following machine components

Centralisers Open – the centralizers are in the open position, a signal from the sensors on the actuators.

Infeed Clear - the infeed table is empty and ready for the next board.

Infeed Down – the paddles are in the down position.

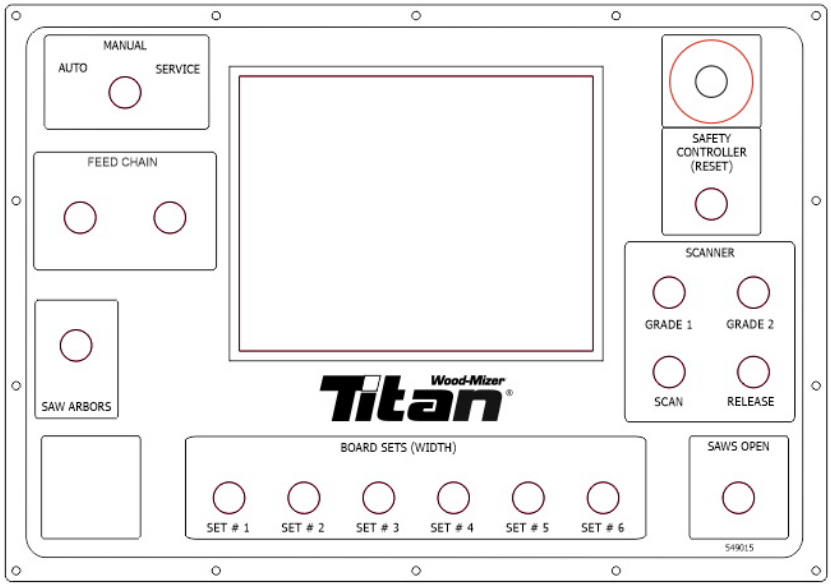
Hold Down Rollers – status of the hold-down rollers on the infeed table

Headrig Roller 1 – status of the infeed roller on the edger saw head

Headrig Roller 2 – status of the outfeed roller on the edger saw head

I – a light indicating that the board container on the unscrambler is full, a signal for the external conveyors working with the line

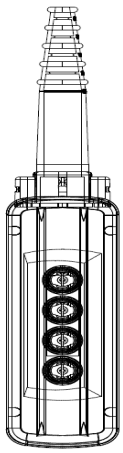
J - Grade Type – scanning algorithm type indicator. It is possible to set GRADE 1 or GRADE 2. To change the setting, use the buttons located on the control panel in the SCANNER section: GRADE1, GRADE2.



K – Maximum Board Thickness – the value of the maximum board thickness read from the distance sensors located above the infeed table chain. There are 2 sensors installed. The value is the average of the maximum reading of the sensors.

L – Indicator of the signal from the top sensor on the unscrambler. It indicates that there is a probability of stacking two boards together, one on top of the other.

M – Service mode activation indicator. This mode may be activated from the console connected to the unscrambler.



The unscrambler may be controlled only from the above-mentioned console in the Service mode: forward and backward movement.

N – In this area you can check if a board/boards are placed on the side tables, infeed table and the unscrambler with the board container. The brown rectangle symbolizes a board and indicates that the board is present on a given section with hooks. The board is detected (appears on the screen) when two of the three safety switches located in each section (left table - 3 sections, right table - 5

sections) are active. The narrow orange rectangle, placed next to the board symbol, symbolizes the position of the stop hooks: visible rectangle - hooks up; invisible rectangle - hooks down.

Additionally, there are the following indicators in the Unscrambler/SR section: an indicator showing that a board is present on the top of the unscrambler, an indicator of the proximity sensor detecting the chain dogs, an indicator of the limit switches on the slides, and an indicator showing that the board container is full.

H – data concerning the board scanner

Scanner data:

- Left Blade – left blade position calculated based on the scanner data
- Right Blade - right blade position calculated based on the scanner data
- Board Width – board width read from the scanner
- Board Length –board length read from the scanner
- Scan Result – scanning result: 0 - No decision, 1 - Normal decision

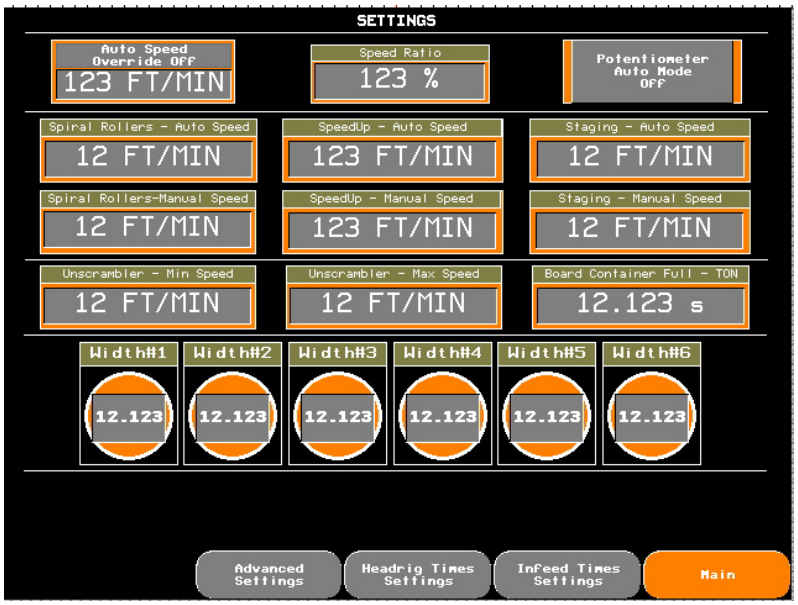
O – data regarding the times of the board width optimization stages

Process Timing:

- Scan Time – total time of scanning (scanning command sending, scanning, decision, sending a decision from the scanner to the PLC controller),
- Blades Positioning – blade positioning time (left and right blades),
- Total Board Time – total process time for one board (loading the board onto the infeed table, centralization, scanning, blade positioning, cutting).

The Alarm History button is used to display the alarm history. All error messages since the last time the power was turned on are displayed. After turning off the power supply, the machine history is cleared.

The Settings button is used to switch to the settings screen:



Auto Speed Override Off/On – this button is used to set a fixed feed rate for the Auto mode. With this option on, the board thickness sensor readings are ignored and the feed rate is the same for each board thickness. The feed rate value is entered in this window.

Speed Ratio – a factor used to slow down or accelerate the feed in the Auto mode. The value is given as a percentage value. The speed is selected based on the board thickness (if the Auto Speed Override Off/On mode is disabled), but it is finally multiplied by the ratio, e.g. selected speed 500ft/min * 50% = 250ft/min.

Potentiometer Auto Mode On/Off – this button is used to activate adjustment of the speed with the potentiometer in the Auto mode. The speed should be adjusted before loading a board onto the infeed table. Adjusting the potentiometer with the board being placed on the infeed table or in the edger saw head may result in incorrect release of the hold-down rollers and uncontrolled removal of the board and flitches from the edger head.

Spiral Rollers - Auto Speed – spiral rollers speed in the Auto mode

SpeedUp - Auto Speed – speed-up table speed in the Auto mode

Staging - Auto Speed - the speed of the table with hooks in the Auto mode

Spiral Rollers - Manual Speed - spiral rollers speed in the Manual mode

SpeedUp - Manual Speed - speed-up table speed in the Manual mode

Staging - Manual Speed - the speed of the table with hooks in the Manual mode

Unscrambler Min Speed – the minimum speed of the unscrambler, the speed to which the unscrambler slows down when a board is detected.

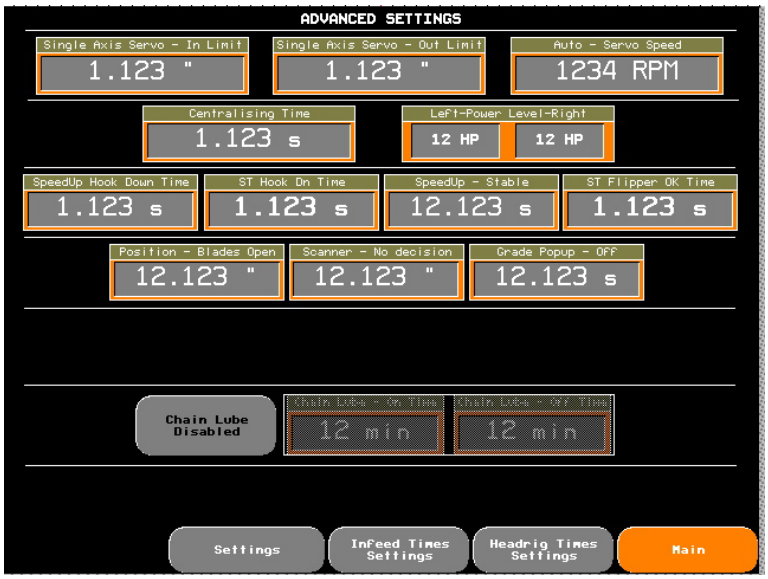
Unscrambler Max Speed –the maximum speed of the unscrambler. This speed is important for slowing down the board located on the top of the unscrambler to the minimum speed. If the value is too high, it will cause the next board to slide onto the previous one.

Board Container Full TON – setting the timer for detecting overfilling of the unscrambler container. After the signal from the optical sensor in the container has been maintained for the preset time, a signal will be sent to the device cooperating with the container that the boards should no longer be conveyed because the container is full.

Width#1- Width#6 – in this area you can program board widths/blade distances. To select the programmed value, use the buttons in the BOARD SETS (WIDTH) area on the control panel.

To change any dimension, press on the window containing this dimension; a numeric window will appear where you can enter the desired value.

The Advanced Settings button is used to access the advanced settings screen:



Single Axis Servo - In Limit – limit position – inner. This is a software limit switch. The limit position is also protected by a limit switch. This is the position for one blade, measured from the center of the machine.

Single Axis Servo - Out Limit - limit position – outer. This is a software limit switch. The limit position is also protected by a limit switch. This is the position for one blade, measured from the center of the machine.

Auto - Servo Speed – rotational speed of the servo motors in the Auto and Manual mode

Centralising Time – the amount of time when the centraliser valve is engaged during a cycle in the Auto or Manual mode

Left-Power Level-Right – the power threshold determined for the left and right blade motors. It is used to detect whether the material is still being processed by the blades. This is additional protection against changes of the blade positions during sawing.

SpeedUp Hook Down Time – the time in which the hooks on the speed up tables remain active (hooks in their down position)

ST Hook Dn Time - the time in which the hooks on the tables with hooks remain active (hooks in their down position)

SpeedUp – Stable – the time needed to stabilize the board on the speed up table. It allows to improve the board alignment before lowering the hooks and moving the board to the infeed table.

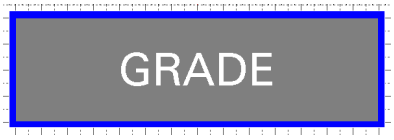
ST Flipper OK Time – the time needed to stabilize and align the board on the chains while it is being rotated on the flipper

Position - Blades Open – the positions in which the blades are set after pressing the Blades Open button on the control panel

Position - No decision – the positions in which the blades are set if the scanner does not make any decision regarding the blade positions

Grade Popup – Off – setting the time in which the window with the preset Grade algorithm is invisible

The visibility time is set to 1 second.



Chain Lube System Enabled/Disabled – activation or deactivation of the infeed table chain lubrication system

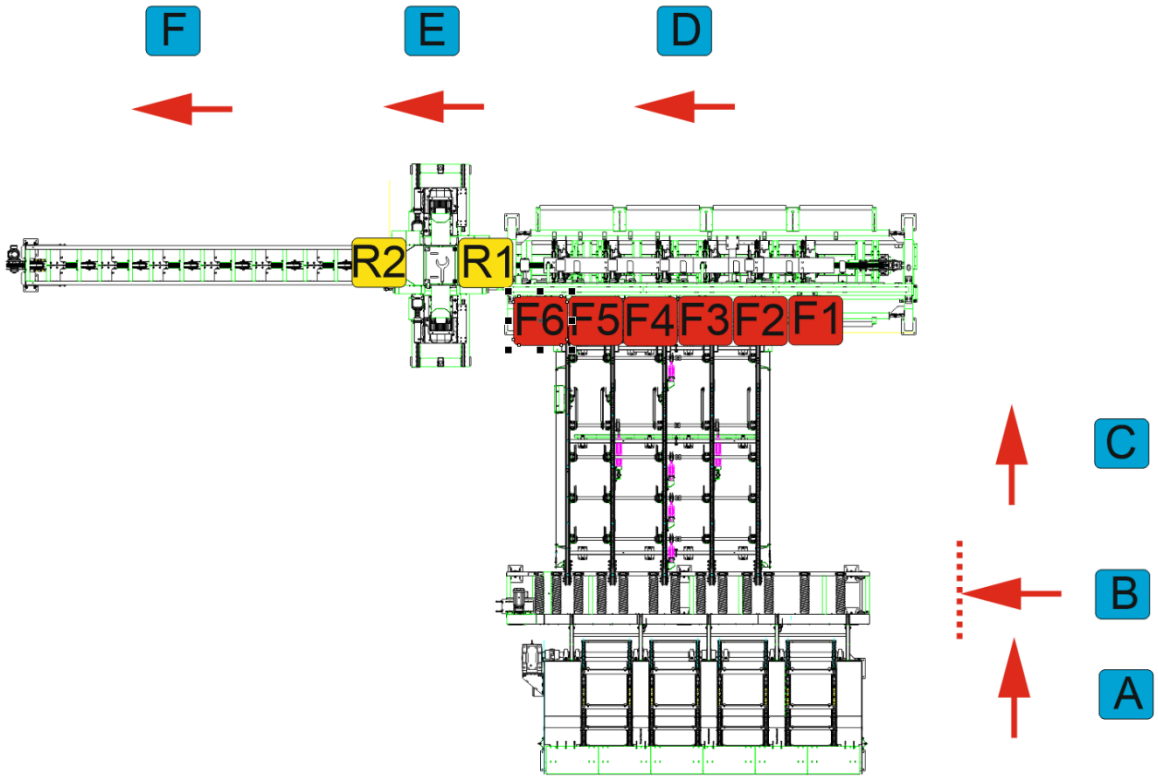
Chain Lube – ON Time – the time in which the lubrication valve of the infeed table chain is on

Chain Lube – Off Time – the time in which the lubrication valve of the infeed table chain is off

Headrig Times Settings – use this button to go to the screen with settings regarding the times/distances of controlling the hold-down rollers located on the edger saw head.

The left column refers to the infeed roller of the edger, it is marked R1. The infeed side in the figure - D.

The right column refers to the outfeed roller of the edger, it is marked R2. The outfeed side in the figure - F.



F1-F6 - optical sensors located above the hooks of the speed up table

The rollers are controlled based on the distance of the F1-F6 sensors to the R1-R2 rollers. The time required to lower and raise a given roller is calculated based on the distance and the current speed of the infeed table. The entered distance differs from the actual distance on the machine because the time required to lower the paddles on the infeed table, take the board by the chain and engage the roller valve must be taken into account. This distance is usually greater than the actual distance.

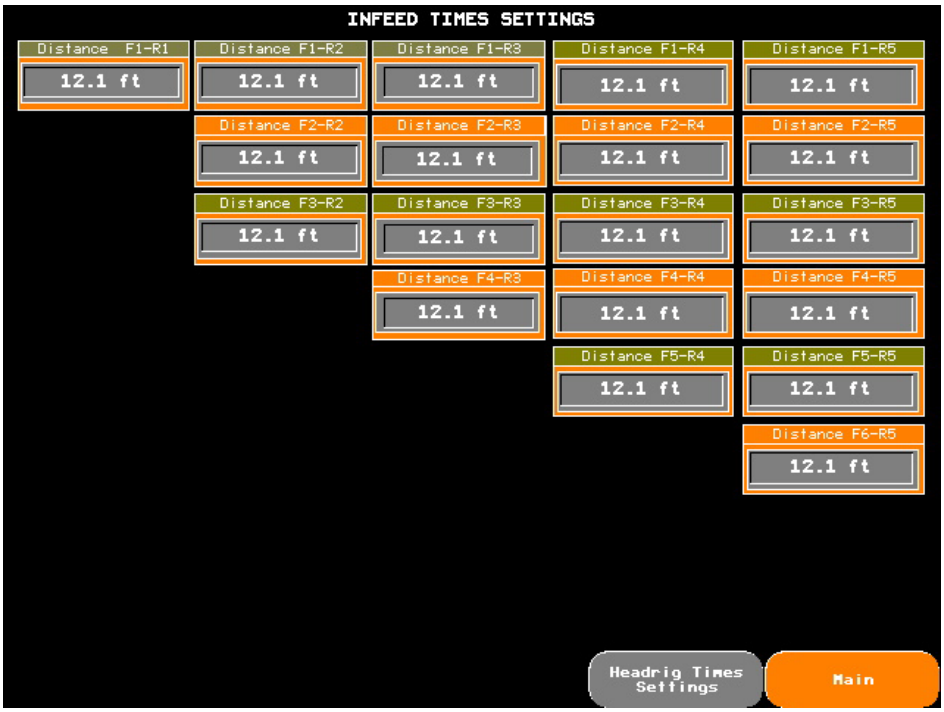
The numbering of sensors and rollers on the machine starts from the beginning of the infeed table D.

The distance between F5 and R1, F5 and R2, F6 and R1, F6 and R2 affects the speed of lowering the R1 and R2 rollers.

The distance between F1-F4-R1 F1-F4-R2 affects the speed of raising the R1 and R2 rollers.

The F1-F4 sensors determine location of the front end of the board on the infeed table.

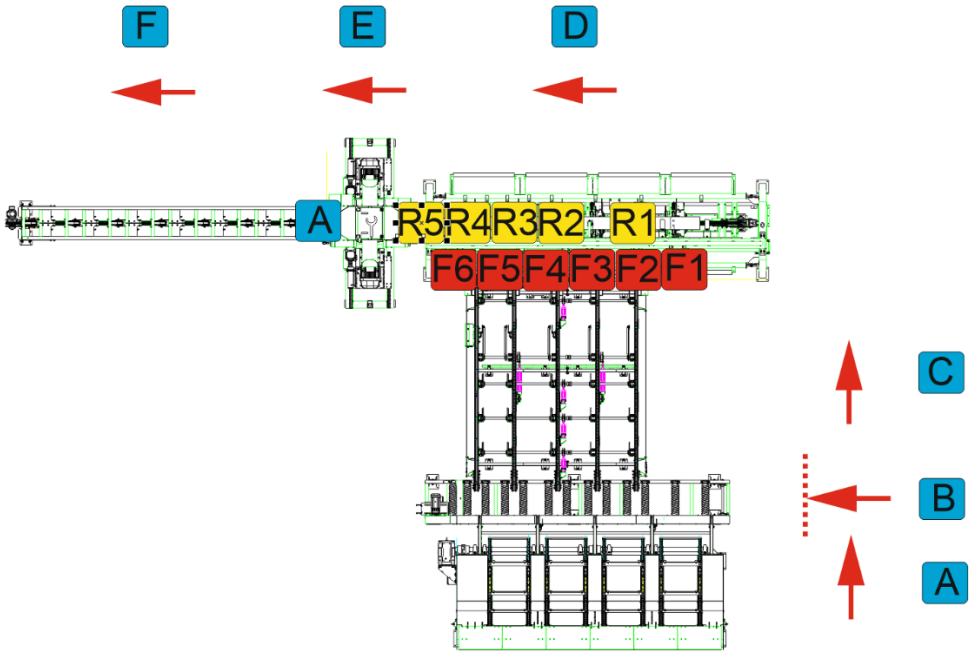
Infeed Time Settings – this button is used to go to the screen with settings regarding the times/distances of controlling the hold-down rollers located on the infeed table in front of the edger.



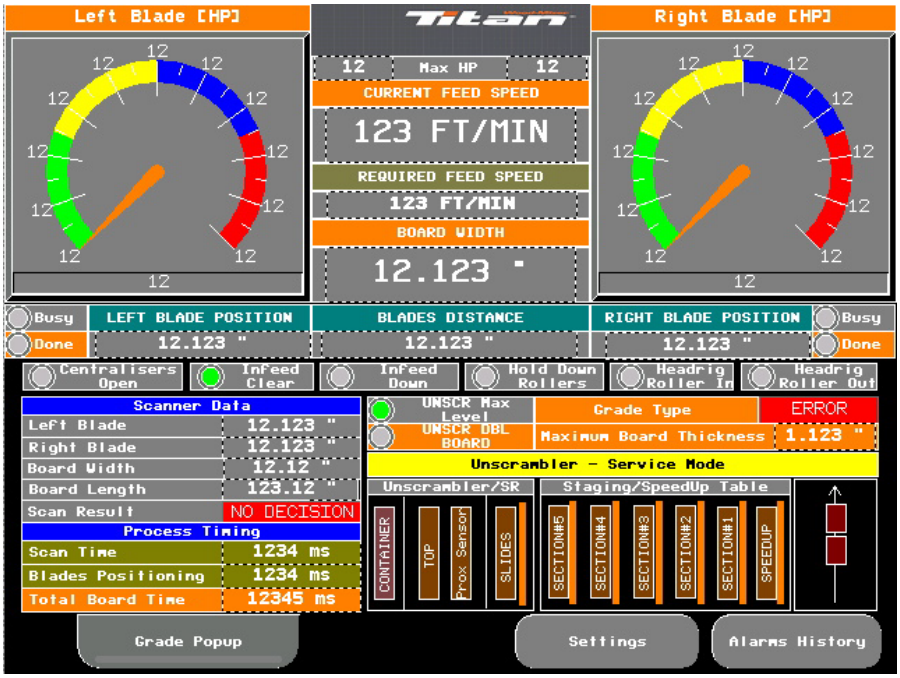
The hold-down rollers on the infeed table lower depending on the length of the board detected by the optical sensors located above the hooks of the speed up tables. The appropriate number of rollers is lowered onto the board depending on active signals from the sensors. This does not apply to the last roller that is placed in front of the edger. It is activated later, when the infeed table paddles are lowered and the board is taken by the chain.

As in the case of the hold-down rollers on the edger, the rollers on the infeed table are lifted based on time calculated from the distance of each sensor from the roller and the current infeed table speed.

Numbering of the sensors and hold-down rollers on the infeed table:



Manual Mode



The MANUAL mode is intended for manual operation:

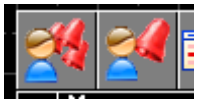
- The infeed table is automatically loaded as soon as the table feeds are started (FORWARD button in the FEED CHAIN section, the main motors must already be running).
- The feed rate is adjusted manually with the potentiometer located in the FEED CHAIN SPEED section.
- Pressing the SCAN button located in the SCANNER section on the control panel
- Then the board is centralized. Depending on its length, the appropriate number of centralizers are involved in the process. The length of the board is measured segmentally with the sensors placed above the hooks of the speed-up table.
- The hold-down rollers are lowered. The number of rollers being lowered depends on the length of the board.
- The scanning operation is made. Light bars are used for this operation on one side and then on the other side.
- The positions of the blades are sent to the controller that sets the blades in the selected positions.
- The blades move to the preset positions.
- 3 seconds after triggering the scanning operation, regardless of whether the data from the scanner has been returned or not, it is possible to set the positions of the blades by selecting one of the six dimensions in the BOARD SETS (WIDTH) section.
- After setting the blades, press the RELEASE button in the SCANNER section.
- The paddles on the infeed table are lowered.
- The infeed table chain moves the board towards the edger saw head.
- The infeed table rollers rise up while the board is leaving the infeed table.
- The hold-down rollers of the edger lower when the board reaches a position under the rollers.
- The board's side edges are trimmed.
- The board leaves the edger saw head and then it is moved along the outfeed table.
- The paddles on the infeed table move up.

- The cycle starts from the beginning.

Cycle Restarting

Below is the procedure for restarting the cycle in the event of any centralizer error or other errors causing the board to be already placed on the infeed table. It concerns both modes of operation: AUTO and MANUAL.

To start this procedure, confirm the errors that appeared on the HMI panel by pressing on the following icon:



The icon on the left confirms all active alarms on the screen, the icon on the right confirms only the alarm selected by the operator on the HMI screen.

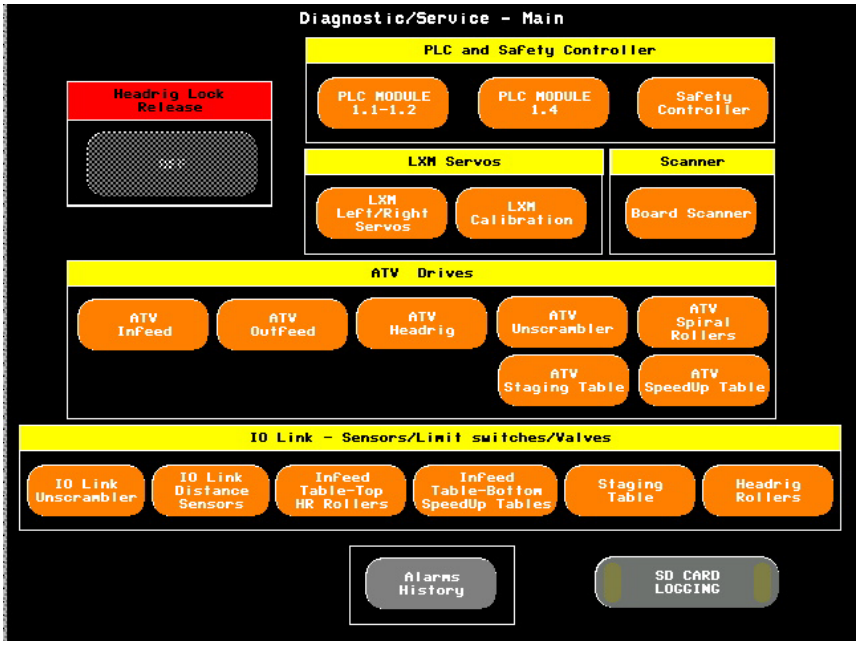
In addition, to start the procedure, it is necessary to turn off the feed by pressing the STOP button in the FEED CHAIN section.

Then hold down the SAFETY CONTROLLER (RESET) button for 3 seconds until EMERGENCY RESET CYCLE appears in the red bar at the bottom of the screen.

Then press the FORWARD button in the FEED CHAIN section. In the AUTO mode, the centralizers will be activated and the rest of the process proceeds as described in the AUTO section.
In the MANUAL mode, once the feed is activated, the process proceeds normally, that is, the operator must press the SCAN button in the SCANNER section to activate the centralizers. Then the rest of the process proceeds as described in the MANUAL section.

SERVICE Mode

This mode is used for diagnostics, calibration and service.



Headrig Lock Release - this button is used to release the electromagnetic interlock. It becomes active when the control circuits are turned off (the CONTROL POWER button on the control panel) and the blades are stopped. Stopping of the blades is monitored by safety relays.

Meaning of LED indicators:

- Green - key inserted and locked
- Orange - key not inserted

In case of problems with unlocking (damage, lack of voltage), a service key is available for manual unlocking. It is located in the main electrical box.

PLC Section and Safety Controller

The PLC MODULE 1.1-1.2, PLC MODULE 1.4 buttons are used to display statuses on each PLC module, both digital inputs and analog inputs.

PLC MODULE - 1.1 – DI:
I0 - Pb - Auto Mode – control box – the switch in AUTO position
I1 - Pb - Manual Mode – control box – the switch in MANUAL position
I2 - Not used – not used/reserve
I3 - Not used – not used/reserve
I4 – Pb – Feed Forward – Start – control box – FEED CHAIN Start button
I5 – Pb – Feed Forward – Stop – control box – FEED CHAIN Stop button
I6 - Pb - Blades Open – control box – BLADES OPEN button
I7 - Pb - Scanner – Grade 1 – control box - button – Grade 1
I8 - Pb – Scanner - Grade 2 - control box - button – Grade 2
I9 - Pb - Scanner - Scan – control box – Scan button
I10 - Pb - Scanner - Release – control box – Release button
I11 - ATS U1 - Left – Fault – a signal from the relay of left blade softstart error
I12 - ATS U2 - Right – Fault – a signal from the relay of right blade softstart error
I13 – ATS U1 – Left – Powered – an activity signal from the left blade softstart
I14 – ATS U2 – Right – Powered – an activity signal from the right blade softstart

I15 - Fs - Flipper – control box - a signal from the footswitch

PLC MODULE - 1.2 – DI:
I0 - Pb - Board Set #1 – Prim – control box Prim – BOARD SET (WIDTH) SET#1 button
I1 - Pb - Board Set #2 – Prim - control box Prim – BOARD SET (WIDTH) SET#2 button
I2 - Pb - Board Set #3 – Prim - control box Prim – BOARD SET (WIDTH) SET#3 button
I3 - Pb - Board Set #4 – Prim - control box Prim – BOARD SET (WIDTH) SET#4 button
I4 - Pb - Board Set #5 – Prim – control box Prim – BOARD SET (WIDTH) SET#5 button
I5 - Pb - Board Set #6 – Prim – control box Prim – BOARD SET (WIDTH) SET#6 button
I6 - Not used – not used/reserve
I7 - Not used – not used/reserve
I8 – RPM Monitor – Left Blade – PS OK
I9 – RPM Monitor – Left – Zero Speed
I10 – RPM Monitor – Right Blade – PS OK
I11 – RPM Monitor – Right – Zero Speed
I12 - Not used – not used/reserve
I13 - Not used – not used/reserve
I14 - Not used – not used/reserve
I15 - Not used – not used/reserve

PLC MODULE - 1.4 – AI:

AI0 - ATS Left – HP – RAW from the analog output of the left blade motor softstart, values in the range of 0-10000,

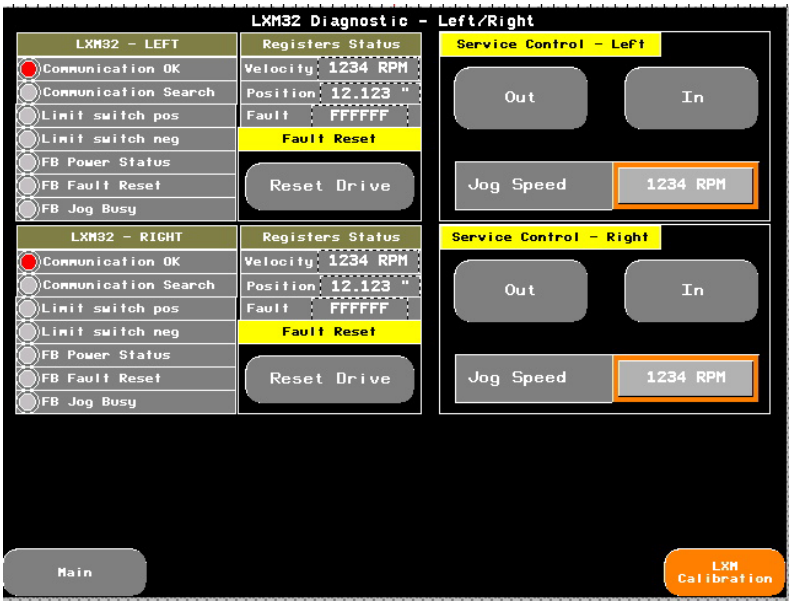
AI1 - ATS - Right – HP - RAW from the analog output of the right blade motor softstart, values in the range of 0-10000,

AI2- Feed Potentiometer – Prim – RAW value from the FEED CHAIN SPEED potentiometer of the left control box - PRIM, values in the range of 0-10000,

AI3 - Feed Potentiometer – Sec - RAW value from the FEED CHAIN SPEED potentiometer of the right control box - SEC, value in the range of 0-10000.

LXM Servos Section

LXM Left/Right Servos



Below you can find explanations of the items displayed on the screen shown above (the same decsriptions for the left and right servo).

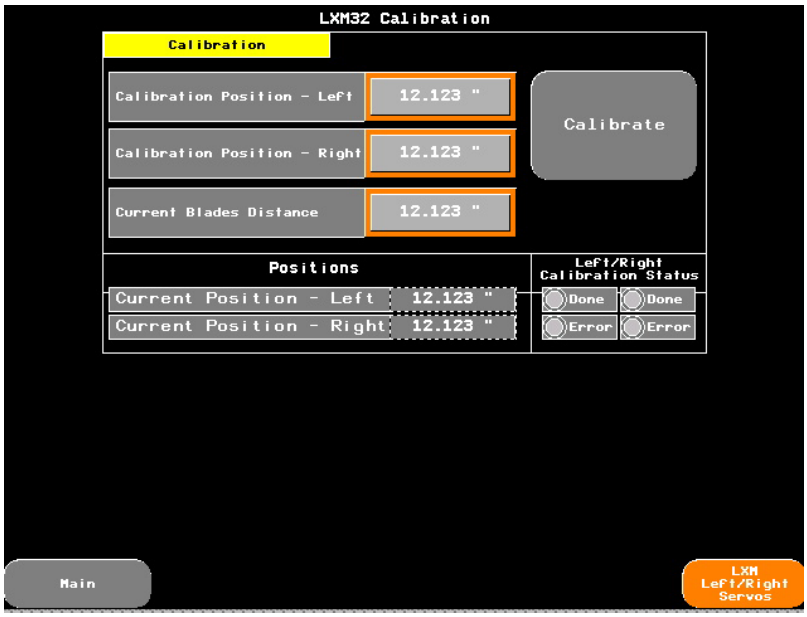
Communication OK – indicates that the Ethernet/IP communication is correct
Communication Search – lack of communication/searching a device in the Ethernet/IP network
Limit switch pos – a signal from the positive/outer position limit switch
Limit switch neg – a signal from the negative/inner position limit switch
FB Power Status – MC Power block status indicator
FB Fault Reset – MC Reset block status indicator
FB Jog Busy – Busy status indicator of the MC Jog block
Velocity – current servo speed in r.p.m.
Position – current servo position in inches, single blade position
Fault – current value representing the error code (hexadecimal number system)
Reset Drive – used to clear the error

Service Control – Left In/Out – controlling the left servo in the Manual mode, In – inward direction, Out - outward direction

Service Control – Right In/Out - controlling the right servo in the Manual mode, In – inward direction, Out - outward direction

Jog Speed – preset speed for manual controlling, concerns the Service Control window

LXM Calibration



Calibration Position - Left – left blade calibration position - distance measured from the center of the machine to the blade (inner plane)
Calibration Position - Right – right blade calibration position - distance measured from the center of the machine to the blade (inner plane)
Current Position – current distance between the blades
Calibrate – a button used to save the calibration position

Calibration procedure:

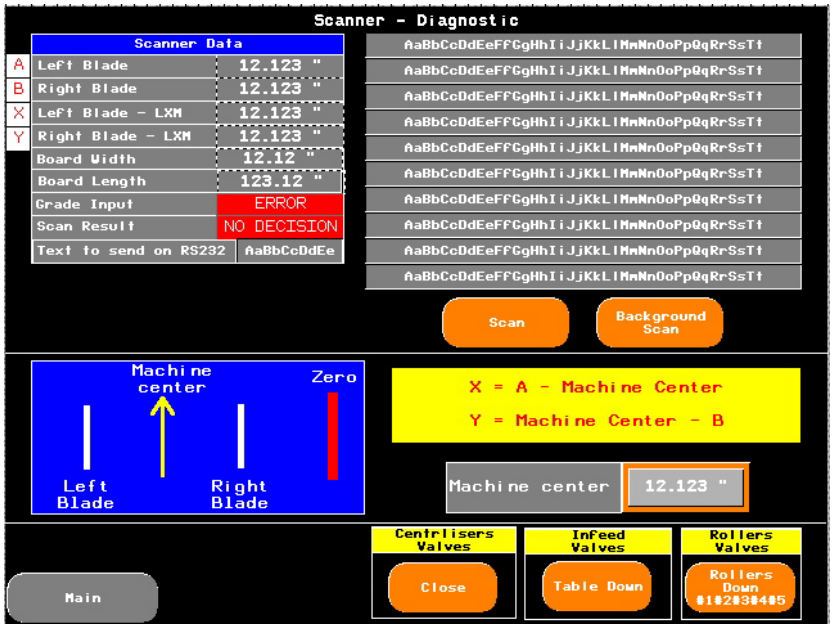
- Route a cable from the infeed table to the outfeed table through the edger,
- The cable should be in the middle of the infeed and outfeed table chain,
- Set the blades in a convenient position for making the measurement,
- To check the position of the blades, it is necessary to loosen the bolts mounting the top cover of the edger and release the lock,
- The lock may be released on the SERVICE mode main screen,
- Changing the blade position in the SERVICE mode is possible if the top cover is closed; each time the cover must be closed and the safety controller must be reset with the SAFETY CONTROLLER (RE-SET) button,
- After determining the position, enter its value in the Calibration Position window and press the Calibrate button,
- The values in the windows: Current Position, Current Position – Left and Current Position - Right will change to the value set by the operator.

Other items on the screen:

Current Position – Left – current left blade position
Current Position – Right –current right blade position
Left/Right Calibration Status – a status of servos calibration:
Done – completed successfully
Error – An error occurred during calibration; check if there is an error on the screen or display of the LXM servo. Clear this error and perform the calibration procedure again.

Scanner Section

Board Scanner



Scanner Data

Left Blade – left blade position – scanner coordinate system
Right Blade – right blade position – scanner coordinate system
Left Blade – LXM – left blade position – edger coordinate system
Right Blade – LXM – right blade position – edger coordinate system
Board Width – width of the scanned board
Board Length – length of the scanned board
Scan Time – inactive variable
Grade Input – cutting width selection algorithm: 1 - Grade 1, 2 - Grade 2. Selection of the algorithm is made with the buttons on the control panel (SCANNER section, GRADE 1, GRADE 2 buttons) and by marking a line on the board (marking specification agreed with the scanner manufacturer), such a mark overwrites the current algorithm setting for the current board, the next boards are set in accordance with the algorithm selected with the buttons on the control panel.
Scan Result – result of scanning, 1 - normal , 0 - no decision
Text to send on RS232 – a text sent to the scanning system by the PLC controller

Ten text boxes on the right side are the last communication frames received from the scanning system.
Description of character strings in each text box:

Solution String

Code	Digits	Description
A	3	board ID
B	4	board width * 100, 2 decimal places
C	5	board length * 100, 2 decimal places
D	1	Grade input used, echoed from PLC console push buttons. 1=Grade 1, 2=Grade 2
E	1	Scan Result 0-No decision, 1-Normal cutting
F	5	Right blade position * 1000, 3 decimal places.
G	5	Left blade position * 1000, 3 decimal places.

A---B---C----D-----E-F----G-H-----I-----J-----

Example:
A123B1234C12345D1E1F12345G12345

A - Board ID = 123
B - Board Width = 12.34"
C - Board Length = 123.45"
D - Grade used = 1 = Grade 1, Echoed from PLC input
E - Scan Result = 1, normal cutting
F - Right Blade Poition = 12.345"
G - Left Blade Poition = 12.345"

Buttons:

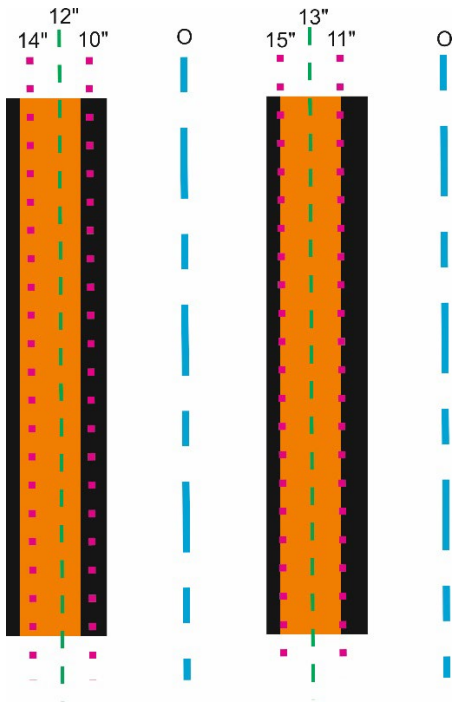
Scan – initiates manual scanning, it can also be activated from the scanner's PC software.

Background Scan – initiates background scanning that is performed when lighting conditions or mechanical configuration change. The background scanning can also be activated from the scanner's PC software.

Machine Center Section

The Machine Center parameter is a parameter that affects the position of the blades in relation to the position determined by the scanning system.

Two coordinate systems are used: the scanner and the machine coordinate systems.



The scanner's coordinate system has ”0” point on the right side of the machine - the blue dashed line.

The scanner sends the positions of the right and left blades by measuring these distances from the ”0” point.

The center of the machine is marked with a green dashed line, the value of this parameter is used to determine the positions of the left and right blades in the machine coordinate system. Zero of the coordinate system corresponds to the center of the infeed table chain. The position of the blades increases in a positive outward direction.

It is necessary to change the Machine Center parameter if the position received from the scanner requires a certain offset. The figure shows the situation of changing the machine center. The picture on the left shows the situation when the machine center is 12". The left blade received from the scanner a position of 14", the right blade 10". Assuming that the positions from the scanner are correct, the center of the machine must be changed in order to get a board without bark. The situation after the change is shown in the figure on the right. The center of the machine has been moved to the left to a position of 13".

The position of the blades is converted to the machine coordinate system according to the equation shown on the screen.

Left blade position = value received from the scanner for the left blade – Machine Center, in the example it would be 2".

Right blade position = Machine Center - value received from the scanner for the right blade, in the example it would be 2".

Buttons at the bottom of the screen:

Valves - Centrlisers – Open/Close – used to open and close all centralizers (1-6)
Valves - Infeed – Table Down – used to lower the infeed table paddles
Valves – Rollers - Rollers Down 1#2#3#4#5 –used to raise and lower all hold-down rollers on the infeed table (1-5).

These buttons are useful when testing the scanning system. The photo is taken when:

- The centralizers are closed,

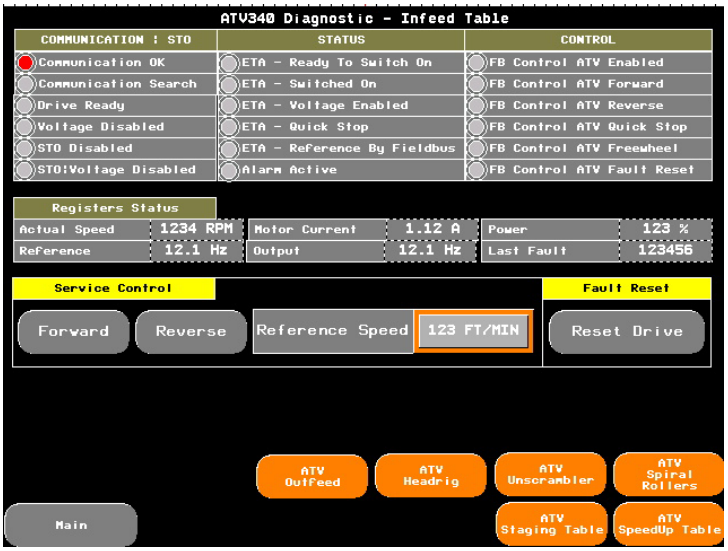
- The hold-down rollers are lowered.

ATV Drives Section

This section contains diagnostic screens for checking the AC drives.

ATV Infeed
ATV Outfeed
ATV Headrig
ATV Staging Table
ATV SpeedUp Table
ATV Spiral Rollers
ATV Unscrambler

The items that are displayed on the screen will only be explained using the ATV Infeed screen as an example because all screens look the same.



Communication | STO:
Communication OK – indicates that the Ethernet/IP communication is correct
Communication Search – lack of communication/searching a device in the Ethernet/IP network
Drive Ready – indicates that the drive is ready, the main 460V power supply and the STO signal are present
Voltage Disabled – lack of the main power supply, the STO signal is present
STO Disabled – the main 460V power supply is present, lack of the STO signal
STO|Voltage Disabled – lack of the main 460 V power supply, lack of the STO signal

STATUS:
ETA - Ready To Switch On
ETA - Switched On
ETA - Voltage Enabled – power block enabled
ETA - Quick Stop – quick stop, 0 – active, 1 - inactive
ETA - Reference By Fieldbus – reference velocity setting via the communication network
Alarm Active

CONTROL:
FB Control ATV Enabled – Control function block - enabled

FB Control ATV Forward – Control function block – forward movement
FB Control ATV Reverse - Control function block – backward movement
FB Control ATV Quick Stop - Control function block – quick stop
FB Control ATV Freewheel - Control function block – free wheel
FB Control ATV Fault Reset - Control function block – error reset

Registers Status
Registers status and values read via the Ethernet/IP network from the AC drive
Actual Speed – current motor speed in r.p.m.
Reference – preset frequency in Hz
Motor Current – motor current in amperes
Output – output frequency of the AC drive
Power – active power – in percent, 100% rated power of the AC drive
Last Fault – last error of the AC drive

Fault Reset – Reset Drive – a button used to clear current faults

Service Control
Forward – forward movement activation
Reverse – backward movement activation
The forward movement is the working movement/direction that occurs during normal machine operation. For the infeed table, this would be the movement toward the head of the edger.
Reference Speed – preset speed in feet per minute

IO Link - Sesnors/Limit switches/Valves

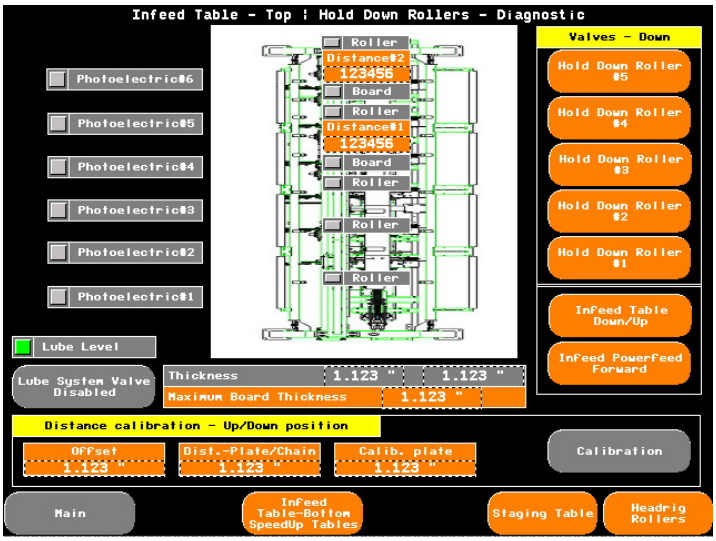
IO Link Distance Sensors

You can read and save the contents of the BOD distance sensor registers on this screen. The BOD distance sensor is used for measuring the board thickness.

For the purpose of thickness measurement, the contents of two registers are changed: with an index of 202 – only distance data, without the signal quality indicator, and 189 - measurement averaging filter value.

Each new sensor must be programmed using this screen. To program, just press the Write button, the corresponding parameters are stored in the PLC controller memory and sent to the sensors.

Infeed Table-Top Hold Down Rollers



Photoelectric #1 - #6 – indicators of signals from the sensors located above the hooks of the speed up tables

Roller – hold-down roller indicator - active (down position)

Distance#1 - #2 – "raw" RAW value from the distance sensor used to read the board thickness.

Board – indicates that there is a board under the sensor. Calibration of the sensors is necessary for correct reading. The calibration procedure is presented in the further part of these instructions.

Board thickness reading section. The upper Thickness window contains values read by each board distance sensor.

The Maximum Board Thickness window contains the maximum value read by one of the two sensors.

Section of values concerning calibration of readings from the distance sensors determining the board thickness

Offset – distance from the chain - deadband to eliminate false signals from the moving chain and debris on it

Dist.-Plate/Chain – distance between the paddle slides and the chain for the raised paddles of the infeed table, the board in the up position rests on the slides only.

Calib. plate – thickness of material used for distance/thickness calibration

Distance Sensor Readings Calibration

To calibrate the distance sensor readings, perform the following steps:

- Put a board of a certain thickness, e.g. 1", on the infeed table chain in the places where the distance sensors are located. The laser beam is red, position it so that the laser point is located approximately in the middle of the board.
- The infeed table paddles should be in the up position,
- Press the Calibration button,
- Using the Infeed Table Up/Down button, lower the infeed table paddles,
- Press the Calibration button,
- Using the Infeed Table Up/Down button, raise the infeed table paddles,,

- The procedure has been completed, the values have been saved.

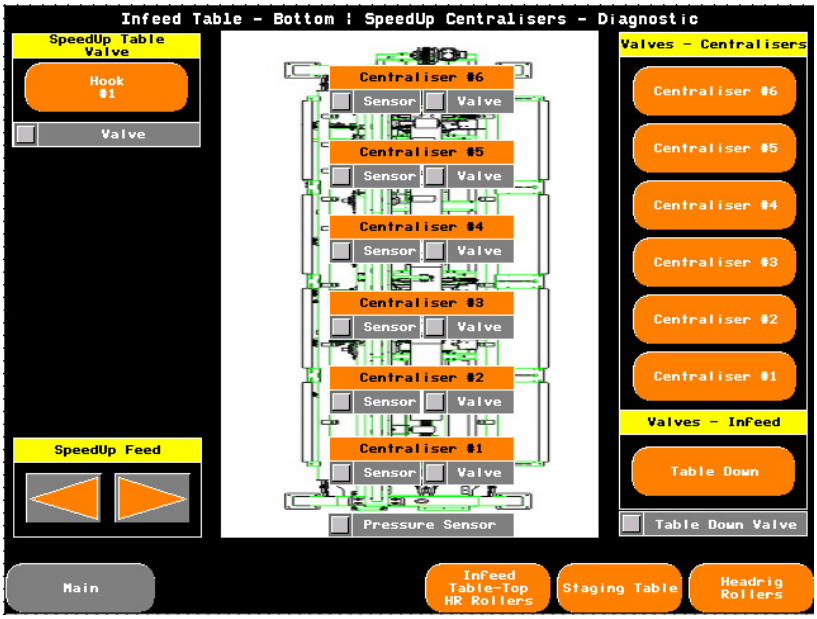
Section of buttons

Hold Down Roller #1 - #5 – activation of hold-down roller movement

Infeed Table Up/Down – raising or lowering the infeed table paddles

Infeed Powerfeed Forward – activation of the infeed table forward movement

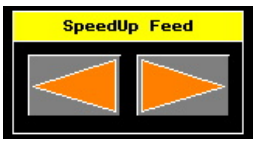
Infeed Table-Bottom SpeedUp Tables



Sensor – indicator of the sensor on the actuator of a given centralizer, should be active when the centralizer is open.

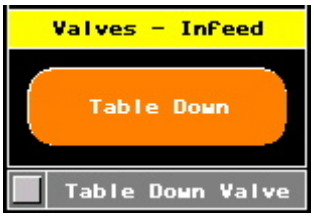
Valve – indicates activity of a centralizer valve

Table Down Valve – indicates activity of the valve of the actuator for raising and lowering the table/infeed table paddles



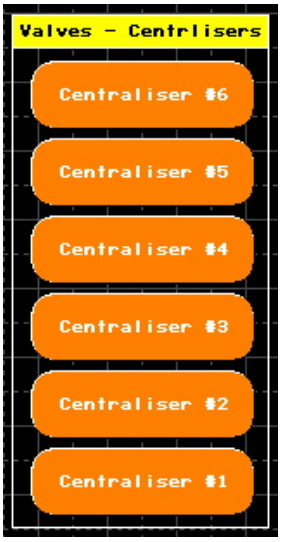
These buttons are used to activate movement of the speed up table chains.

The button above is used to activate the hook placed on the speed up table.



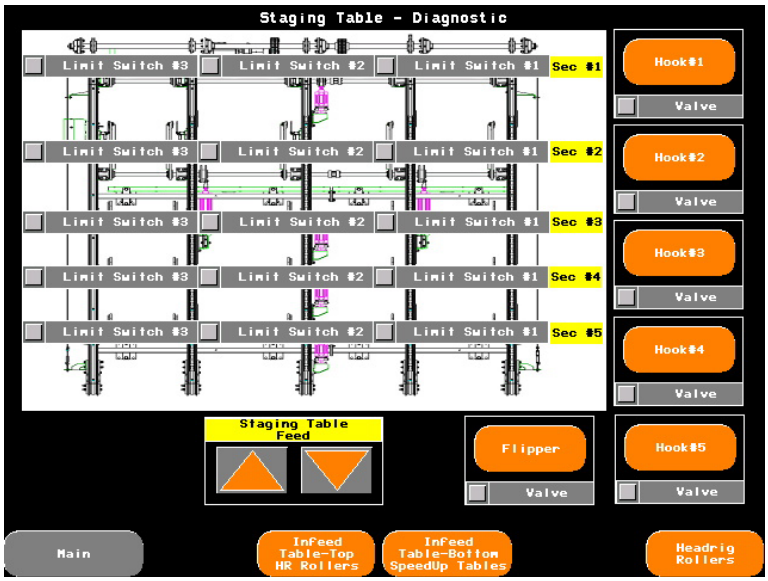
The button is used to lower the table/infeed table paddles.

Indicator of the air pressure sensor placed at the air supply assembly on the infeed table



The buttons are used to activate each centralizer, for example, to check if the position read by the sensor on the actuator is correct.

Left Staging Table



Indicators showing statuses of the limit switches in the section 1 of the hook table. The limit switches are connected in NC configuration, that is, they give a signal when they are not activated.

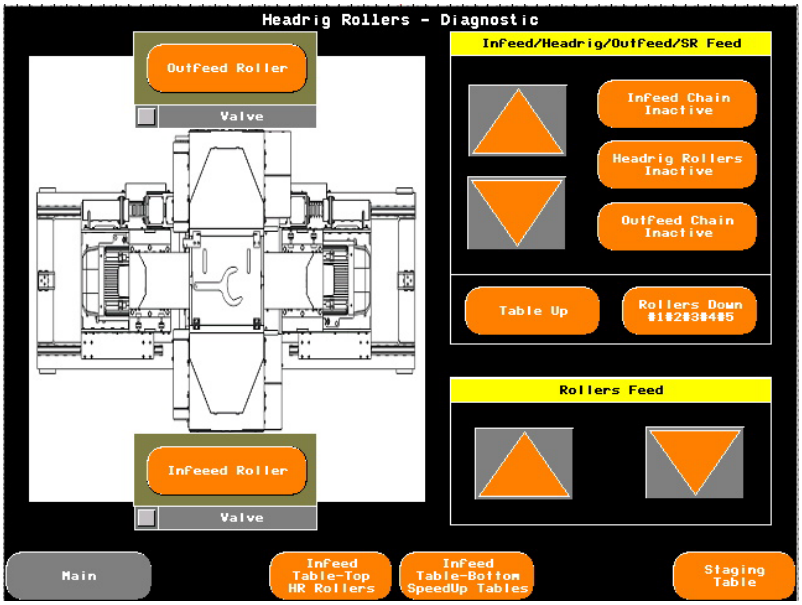
Buttons #1 - #5 allowing the user to activate the hook in the sections 1 – 5

The button above is used to activate the flipper for rotating the boards.

The flippers can also be activated with a foot switch located next to the control box.

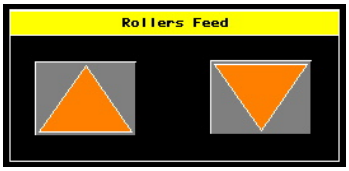
The buttons are used to activate movement of the table chains.

Headrig Rollers

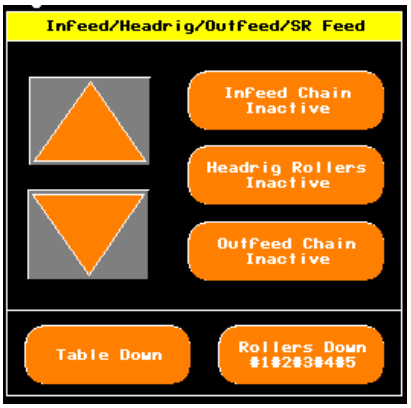


The button above is used to activate the outfeed roller - downward movement.

The button above is used to activate the infeed roller - downward movement.



This button is used to activate the feed of the edger rollers - forward and backward movement.



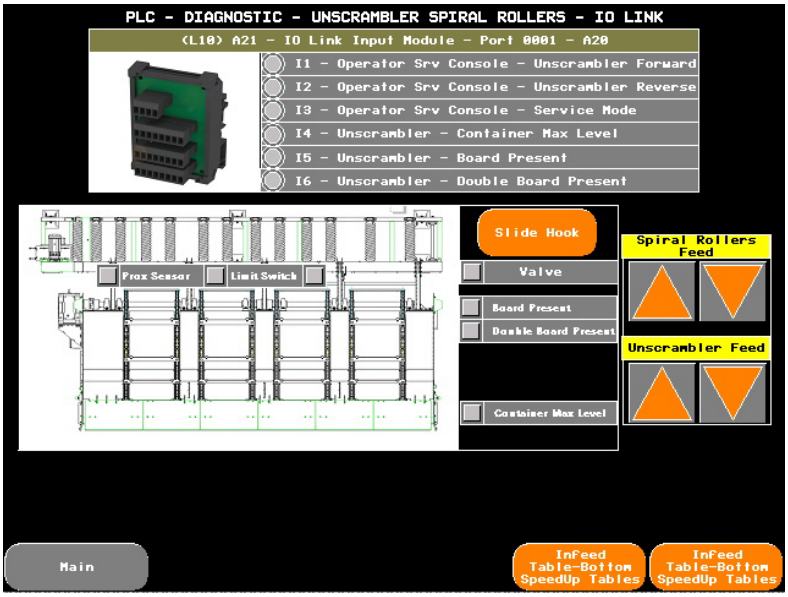
The section above is used for servicing. Using the buttons located on the right side, the operator can engage any part of the feed: the chain on the infeed table, the rollers located in the saw head or the chain on the outfeed table.

Table Down – used to lower the table/infeed table paddles

Rollers Down #1#2#3#4#5 – used to lower the hold-down rollers on the infeed table.

The above screen can be used for emergency removal of the board from the cutting space, for example, after blocking. To withdraw the board, lower the infeed table paddles, clamp the board with the hold-down rollers and the rollers in the edger saw head, activate all feeds and activate the backward movement.

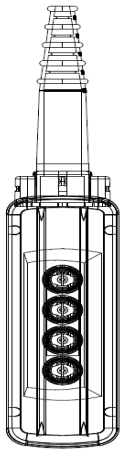
PLC – Diagnostic – Unscrambler Spiral Rollers – IO Link



The screen above is used for diagnostics of the part of the line that is related to the unscrambler, spiral rollers and the service console.

(L10) A21 - IO Link Input Module - Port 0001 - A20

This section allows diagnostics of signals from the service console:



It concerns the following signals:

I1 - Operator Srv Console - Unscrambler Forward – a signal from the Unscrambler Forward button

I2 - Operator Srv Console - Unscrambler Reverse – a signal from the Unscrambler Reverse button

I3 - Operator Srv Console - Service Mode – a signal from the Service Mode ON/Off switch

Other signals:

I4 - Unscrambler - Container Max Level – a signal from the optical sensor indicating that the container is full

I5 - Unscrambler - Board Present – a signal from the optical sensor indicating that a board is present on the top surface of the unscrambler

I6 - Unscrambler - Double Board Present - a signal from the optical sensor indicating that a double board is present on the top surface of the unscrambler

Prox Sensor - status indicator for the proximity sensor located on the top surface of unscrambler and determining if the metal dogs are present

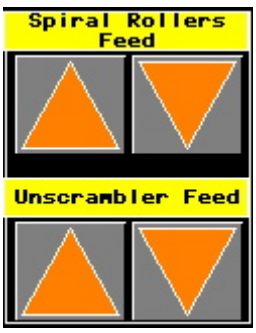
Limit Switch – indicates the status of the limit switches located on the unscrambler slides

The button above is used to activate the hooks on the unscrambler slides.

Valve - indicates activity of the hook valve.

The hooks are activated when a double board/specified height is detected at the top of the unscrambler. In such a case, the hooks are lifted up, the boards slide down on the slides and the lower board is stopped by the hooks. The upper board slides off the lower board onto the spiral rollers and is taken by the table with hooks. When the last section of the hook table is empty, the hook placed on the slides is retracted and the lower board slides onto the spiral rollers and then it is taken by the hook table, like the previous one.

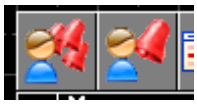
The above indicators are a duplicate of the signals from the section (L10) A21 - IO Link Input Module - Port 0001 - A20 and show the signals from the sensor indicating that a board/double board is on the top of the unscrambler and the signal from the board container sensor.



These buttons are used to activate movement of the spiral rollers and the unscrambler chains.

Alarms requiring confirmation by the operator

To confirm the alarm, use the buttons located in the upper left corner:



Left Blade Softstart Fault – left blade motor fault – check the fault code on the softstart display in the main box

Right Blade Softstart Fault - – right blade motor fault – check the fault code on the softstart display in the main box

Location of the softstarts in the main box:

Softstarty.jpg file

Centraliser Out Position Fault – centralizers base position fault, jammed material or sensor failure. If the centralizers are not jammed, check if the diode located on each centralizer actuator is on, if not, check the M12 connector and the positions of the sensor on the actuator. A magnet can also be used to check.

Location of the centralizers – dxf side view from Michał, it should be marked there.

Distance Sensors needs to be calibrated - Up and Down – distance sensors fault, calibration is required (see the calibration procedure in this manual).

Power Feed is disabled. Run Blade Motors – feed fault, the feed is turned off. To turn on the main motors, you must first turn on the feed.

Port#0 IOL Bottom Switch Disconnected – the device connected to the port#0 of the IO Link device located at the bottom of the infeed table is disconnected.

Port#1 IOL Bottom Switch Disconnected - the device connected to the port#1 of the IO Link device located at the bottom of the infeed table is disconnected.

Port#2 IOL Bottom Switch Disconnected - the device connected to the port#2 of the IO Link device located at the bottom of the infeed table is disconnected.

Port#3 IOL Bottom Switch Disconnected - the device connected to the port#3 of the IO Link device located at the bottom of the infeed table is disconnected.

Port#4 IOL Bottom Switch Disconnected - the device connected to the port#4 of the IO Link device located at the bottom of the infeed table is disconnected.

Port#5 IOL Bottom Switch Disconnected - the device connected to the port#5 of the IO Link device located at the bottom of the infeed table is disconnected.

Port#6 IOL Bottom Switch Disconnected - the device connected to the port#6 of the IO Link device located at the bottom of the infeed table is disconnected.

Port#7 IOL Bottom Switch Disconnected - the device connected to the port#7 of the IO Link device located at the bottom of the infeed table is disconnected.

Port#0 IOL Top Switch Disconnected - the device connected to the port#0 of the IO Link device located above the infeed table is disconnected.

Port#1 IOL Top Switch Disconnected - the device connected to the port#1 of the IO Link device located above the infeed table is disconnected.

Port#2 IOL Top Switch Disconnected - the device connected to the port#2 of the IO Link device located above the infeed table is disconnected.

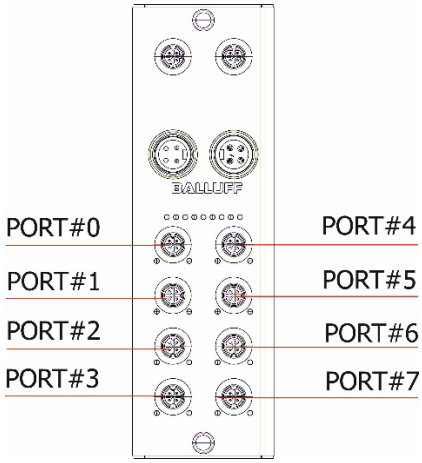
Port#3 IOL Top Switch Disconnected - the device connected to the port#3 of the IO Link device located above the infeed table is disconnected.

Port#5 IOL Top Switch Disconnected - the device connected to the port#5 of the IO Link device located above the infeed table is disconnected.

Port#6 IOL Top Switch Disconnected - the device connected to the port#6 of the IO Link device located above the infeed table is disconnected.

Port#7 IOL Top Switch Disconnected - the device connected to the port#7 of the IO Link device located above the infeed table is disconnected.

Location of ports on the IO Link device



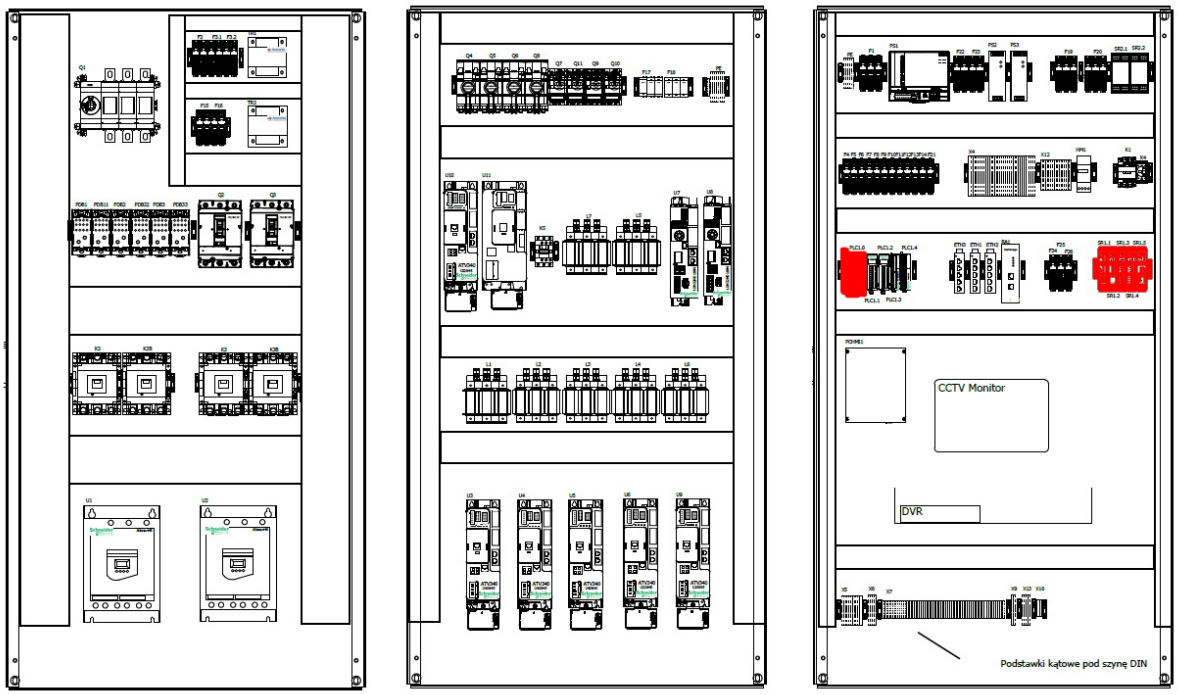
Location of the device above the infeed table and under the infeed table

Pressure Sensor Fault – pressure sensor fault, lack of pressure in the system or the pressure is too low. If the pressure gauge indicates the correct pressure, check the M12 connector and the wiring.

Infeed Chain Lube System - Low Oil Level – fault/low oil level in the container of the infeed table chain lubrication system

Safety Controller Communication Fault – communication error with the safety controller. Check the Ethernet cable connecting the controller to the safety controller.

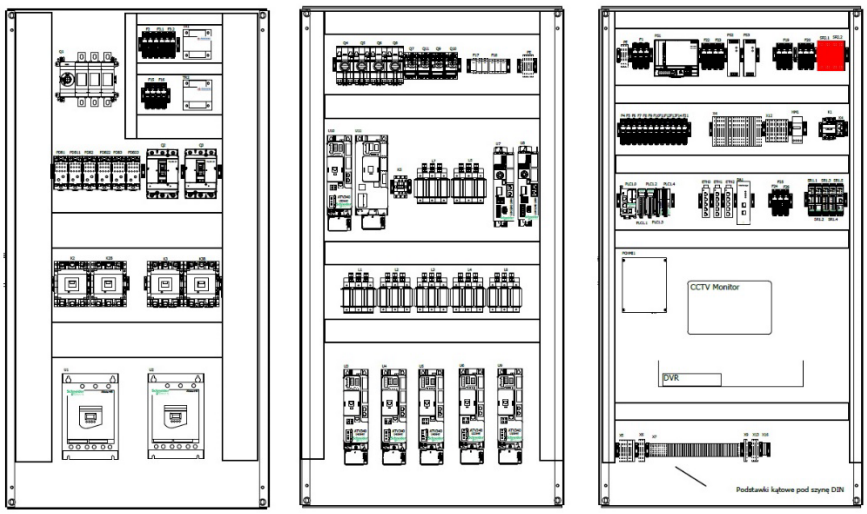
Location of the controller and the safety controller in the main box (marked in red)



Standstill Monitor Power Supply Fault – power supply fault of the zero-speed safety controllers. Check the power supply circuit.

Standstill Monitor Zero Speed Detection Fault – speed detection fault, the main motors are running.

Location of the zero-speed controllers in the main box (marked in red)



Messages displayed in the bottom bar with the red background

Emergency Reset Cycle – the cycle emergency restart procedure is active, the machine is waiting for turning the feed on.
Headrig Drive Fault – a fault of the feed AC drive in the edger saw head. Check the fault code in the window on the screen or in the main box on the AC drive display.
Infeed Drive Fault - a fault of the infeed table feed AC drive. Check the fault code in the window on the screen or in the main box on the AC drive display.
Outfeed Drive Fault - a fault of the outfeed table feed AC drive. Check the fault code in the window on the screen or in the main box on the AC drive display.
Speedup Drive Fault - a fault of the speed up table feed AC drive. Check the fault code in the window on the screen or in the main box on the AC drive display.
Staging Drive Fault - a fault of the hook table feed AC drive. Check the fault code in the window on the screen or in the main box on the AC drive display.
Left Servo Drive Fault – left servo fault. Check the fault code on the screen or in the main box on the LXM32 servo drive screen.
Right Servo Drive Fault - right servo fault. Check the fault code on the screen or in the main box on the LXM32 servo drive screen.
Unscrambler Drive Fault – unscrambler AC drive fault. Check the fault code in the window on the screen or in the main box on the AC drive display.
Spiral Rollers Drive Fault – spiral rollers AC drive fault. Check the fault code in the window on the screen or in the main box on the AC drive display.
Ultimizer Receive Fault – communication with the scanner error, data not received within the set response time
E-Stop Active, Control circuits disabled – the emergency stop circuit is active or the controller has not been reset.

Enclosures – Fault Codes – Soft Starts, AC Drives and Servos

Soft starts – ATS48_Err.pdf – concerns U1, U2
AC drives – ATV340_Err.pdf – concerns U3-U6, U9-U12
Servos – LXM32_Err.pdf – concerns U7 i U8