



RTI: Remote Touch Screen Operator Interface

Product and User Manual

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INTRODUCTION

This product manual provides information about installation, use and maintenance of RTI (Remote Touch screen operator Interface). RTI is an off-shelf HMI+PLC with ethernet capability which has customized firmware from Roll-2-Roll Technologies that can be used with SCU5 controllers or standalone WPS sensors for specialized applications. The off-shelf product is made by Schneider Electric under the Proface brand name. The exact product series is LT4000M and the hardware manual can be downloaded from: https://www.hmisource.com/otasuke/files/manual/lt4000m_hard/LT4243TM-MM01-ENG-PDF.pdf

The RTI can be used for remote web guiding applications and remote width measurement applications when used in conjunction with an appropriate Roll-2-Roll® Sensor and Controller. The RTI can only be used with ethernet enabled SCU5 controllers or ethernet enabled standalone WPS sensors (WPS 440 E or WPS 440 P). Only a certain version of the firmware versions are compatible with the RTI. Additional custom applications can be implemented on the RTI based on customer need. Please consult the factory for your customization needs. For installation of the Roll-2-Roll® Sensor, Controller and Web guides please refer to the respective product manuals.

The RTI is designed for use in indoor industrial and laboratory equipment that process materials in web form as they move through a converting or raw material manufacturing process.

Web Guiding Application

RTI provides the operator interface for the SCU5 MC(E)D controller and allows the web guide controller to be commanded from a remote location. This is especially useful when multiple webguides in a single processing line needs to be controlled from a single location. For example, in a commercial printing press six web guides may need to be adjusted to get all the layers of the web to align properly in a booklet or book printing application. RTI allows the operator to stay in one location (close to the end of the folding process) to make fine guide point adjustments to all the web guides based on the layer alignment inspection. This saves a significant amount of time and reduces the inconvenience for the operator.

Currently RTI allows for control of up to 6 web guides. But software customization can enable control of up to 16 web guide controllers. Each of the web guide controllers should have the ethernet capability with an EtherNet/IP module.

Web Width Measurement Application

RTI provides a user interface for the now obsolete, WPS 440 E and WPS 440 P sensors. These sensors had both the image capture and processing capabilities built into their enclosure without an operator interface. RTI was the only means of communication for standalone applications. These sensors are now replaced with a sensor head (WPS 440 IR-QD) and controller (SCU5 C(E)D) combination. Only certain firmware versions of the SCU5 allow the RTI integration.

Custom software for width measurement applications allows data logging capabilities, digital outputs for stack lights or alarms as well as remote monitoring and operation.

RTI Options

Two main screen options are available for the RTI with 3.5" and 5.7" diagonal length. RTI 3.5 is the most common option. The RTI is a two part component with a touchscreen human machine interface (HMI) that is removable from the PLC part. Apart from the screen size, application specific digital IO (NPN or PNP) and analog IO are available. Please consult the factory for more details about those options.

Physical Dimensions

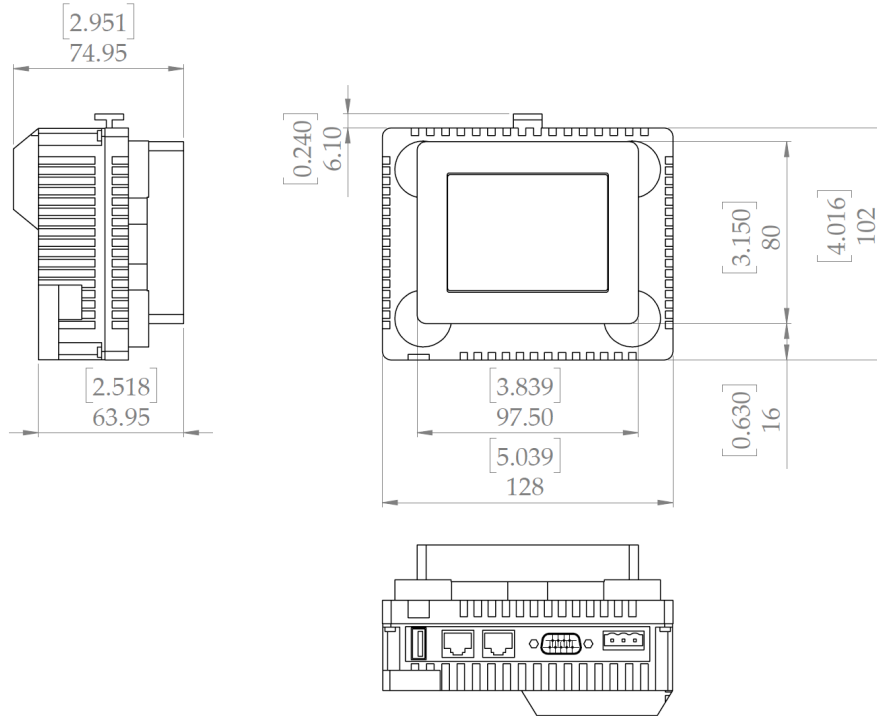


Fig. 1: RTI 3.5 with PLC Physical Dimensions (All dimensions are in mm [in]); Subject to change without notice.

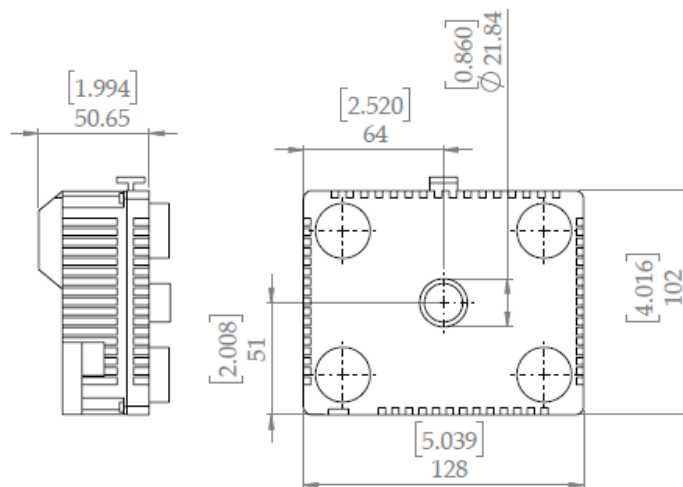


Fig. 2: Detachable PLC rear module

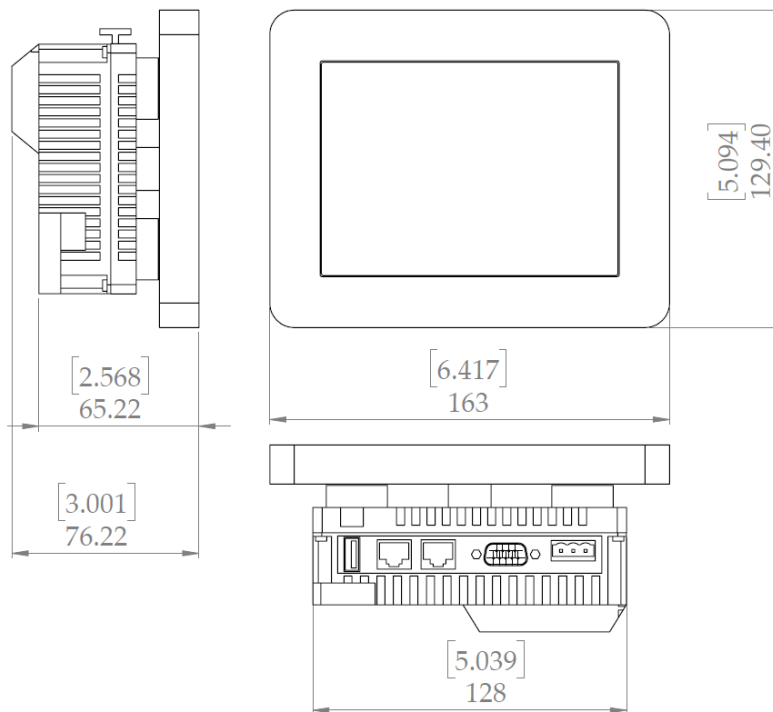


Fig. 3: RTI 5.7 with PLC Physical Dimensions (All dimensions are in mm [in])

Power Input

The RTI operates under 24 VDC ($\pm 15\%$) power with a maximum power draw of 13 W. The power is supplied through a three pin DC power connector on the bottom. The third pin can be used to safely ground the PLC to earth ground or protective earth.

WARNING: Supplying more than 24 VDC would damage the controller permanently.

WARNING: A reverse polarity connection may also damage the controller permanently.

NOTE: Please use all possible options to safely earth ground the controller. Improper grounding may result in static buildup that can potentially result in malfunction of the controller.

Ethernet

A RJ45 jack (with status LEDs) is available for connection to a network that can connect to the SCU5 controller or the standalone WPS sensor with ethernet connectivity. The RTI can be connected to a switch (managed or unmanaged) or a router for ethernet connectivity.

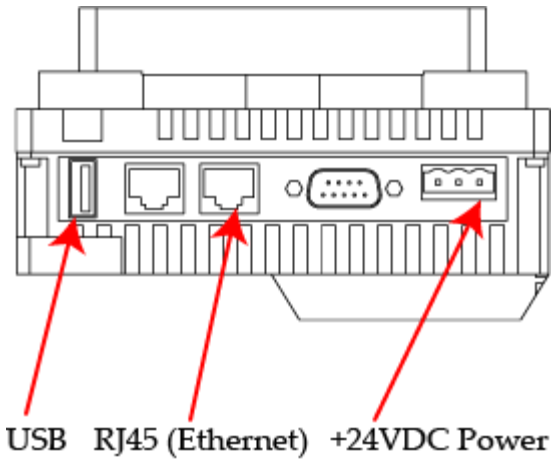


Fig. 4: RTI ports for connection

USB Port

A USB Type A port is available. This port can be used for remote firmware update as well as for data logging purposes with a USB mass storage device.

SAFETY INSTRUCTIONS

The RTI is an electronic device that operates on low voltage (24 V DC). However, it does present a few safety requirements that must be followed in order to assure safe and effective operation of the system.

Instructions for Use

The RTI must be properly transported, stored before being installed professionally. The controller should not be installed or commissioned for operation if any visible damage is observed. Only persons who have the necessary qualifications should work on the installation, commissioning, operation, and maintenance of the system.

- Please read the product manual and properly follow its instructions
- Please read and follow the warning labels on the device
- Be aware of all national, state, and local requirements for accident prevention and environmental protection.

Proper Use

The RTI is intended for indoor use in industrial and lab equipment that process materials in web form.

Improper Use

- Outdoor use or exposure to direct sunlight is considered improper.
- Any use outside the general specifications shall be considered improper use and voids any warranty of the equipment.
- Any replacement parts or modification necessities should be made by Roll-2-Roll Technologies LLC.

Static Discharges and Grounding

- Web, especially plastic webs and paper web, when transported over rollers can create significant static voltage potential. This static may discharge to the controller through the cables. The static potential needs to be safely discharged by proper grounding of the RTI.
- Ensure that the sensor, the controller and all other devices connected to the SCU5 controller are properly grounded as well.
- Proper grounding can be ensured by checking for the continuity from any of the connectors on the controller and the earth ground.

OPERATION AND OPERATOR INTERFACE

The operator interface is a resistive touch screen. Never use sharp or pointed tools of any kind to operate the interface. Best practice is to have operators use their fingers to press the different icons. An appropriate stylus can also be used. Care must be taken to clean the touch screen surface periodically. The functional operation of the RTI is described in the following.

Web Guiding Application

Multiple SCU5 web guide controllers can be controlled from a single RTI. Currently the RTI has the ability to control six SCU5 web guide controllers. However, upto 16 SCU5 web guide controllers can be controlled from a single RTI module with some additional customization.

The RTI is not actually controlling the web guide directly, however, the RTI sends the information to the SCU5 controller so that the web guide can be controlled remotely.

The RTI is compatible with v2.6 and v3.4 firmware versions of the SCU5 controller.

Home Screen

The home screen provides a quick access to all the web guide controllers. Pressing any of the buttons labeled as a guide would take to the respective operator screen of the web guide controller.

Additional web guide controller setup functionality can also be accessed through the setup icon on the bottom right corner.

Web Guide Operator Screen

The main operator screen provides relevant information and operator access to control the respective web guide controller. The web guiding operations are accomplished using the buttons on the bottom of the screen.

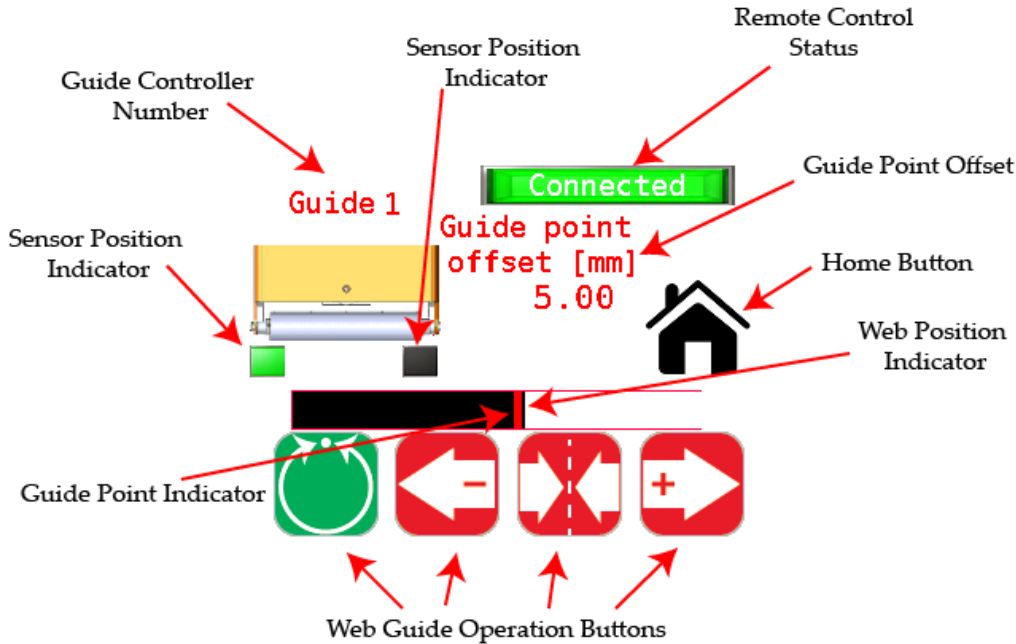
Most of the icons on the RTI are similar to the icons on the SCU5 controller. However, there are a few differences. There are three new icons/buttons on this RTI screen when compared to the SCU5 controller screen. And a few buttons, features and icons are not available on the RTI. Please refer to the appropriate SCU5 user and operator manual for more information.

NOTE: RTI can only be connected to the SCU5 controller. Sensors, actuators and motor drivers cannot be connected to the RTI directly without the SCU5 controller in the middle.

NOTE: RTI is intended for remote operation of the web guide. Not all features, parameters and functions of the SCU5 controller can be accessed from the RTI.

An annotated view of the RTI for web guiding operation is shown in the following figure.





Web Position Indicator

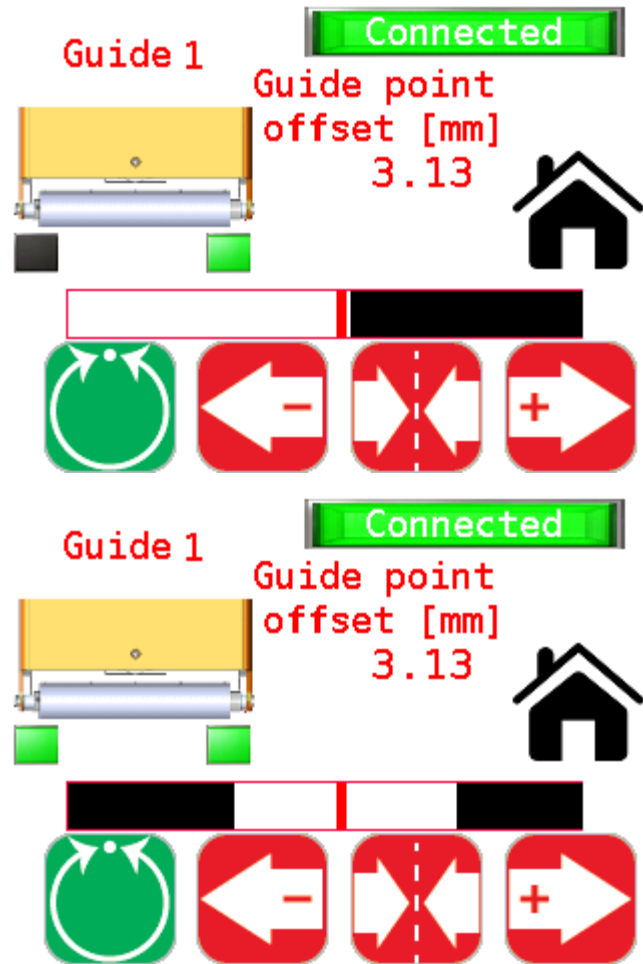
A horizontal bar graph, white bar in a black background, in the web guide operator screen is used to indicate the relative position of the web within the sensor range. The white portion indicates the web, specifically representing the light reflected/scattered back from a web, while the black background indicates the absence of web, specifically the darkness because of no reflection or scattering from the web.

Depending on the position and orientation of the sensor the white bar graph may move:

- from left to right for a sensor located on the right side of the web edge
- from right to left for a sensor that is located on the left side of the web edge.

When a wide sensor is connected and if the sensor is set to see both the edges, then both left and right edges of the web will be shown using the web position indicator.

When two sensors are connected, the bar graph will split in two, with the left half indicating the left edge of the web and the right half indicating the right edge of the web. If both sensors are the same orientation, then the web position from the sensor



connected to Sensor 1 port will be displayed on the left and the right half indicating the web position from the sensor connected to Sensor 2 port.

NOTE: The RTI is not intended to be used with contrast guiding application. The contrasting features on the web cannot be displayed on the RTI over the ethernet.

NOTE: When in center guiding mode, the vertical green line in the middle that indicates the centerline position of the web that appears on the SCU5 controller will not appear on the RTI.

WARNING: The RTI is not intended for contrast guiding applications and enabling the sensor to be in contrast mode on the SCU5 may have unintended consequences.

Sensor Position Indicator

The position of the sensor is indicated by two square indicators on the display that are located downstream of the web guide picture.

- The indicator turns green to represent the position and orientation of the sensor with respect to the web.
- If no sensor is connected to the SCU5 controller then both the indicators will turn gray.
- If two sensors (one right and one left) are connected or if a wide sensor in center mode, both indicators will turn green.
- It is important to ensure that the sensor position indicator accurately indicates the actual position of the sensor with respect to the web.

Automatic/Manual Icon



Manual



Automatic

The RTI for web guiding application, can put SCU5 web guide controller into manual or automatic operation mode by pressing this icon. The press of the icon will toggle the controller between manual and automatic operation.

WARNING: Changing from one mode to another can result in a change in the web guide position causing process upsets. Caution must be exercised when changing the operating mode and should be done by those who completely understand the consequence of this change.

WARNING: No personnel should be manually handling the web guide or the material around the web guide when the guide is in automatic operation. Failure to follow this warning could result in crushing of body parts at pinch points around and within the web guiding system.

WARNING: Care must be taken to ensure that only one person is working on the guide when it is in manual operation. Failure to follow this warning could result in crushing of body parts at pinch points around and within the web guiding system.

Servo Center Icon



Default/normal state



Servo-centering ON

Pressing the servo center icon will initiate the servo centering operation for web guiding applications. This operation can be performed only when the RTI is in manual mode. Pressing this momentary switch will initiate the servo centering operation which would toggle the icon to green. When the controller is in servo centering mode, the actuator connected to the SCU5 controller will move towards the home position or center position which is provided by the servo center sensor. As soon as the actuator reaches the home or the center position, the actuator will stop and the state of the momentary switch will change from Servo-centering (Green) to Default/normal state (Red).

The servo center feature allows the guide to be centered quickly to facilitate threading of the web during changeover.

WARNING: Servo centering operation results in a change in the web guide position causing process upset. Caution must be exercised when performing this function and should be done by those who completely understand the consequence of this change.

WARNING: Servo centering can be performed only when the web guiding system is in manual mode. Pressing the servo center icon during automatic operation will perform a different function.

WARNING: This is an automatic procedure of the web guiding system. No personnel should be performing manual work on or around the guide during the servo-centering procedure. Failure to follow this warning could result in crushing of body parts at pinch points around and within the web guiding system.

Jog-left/Jog-right Icon



Jog-left OFF



Jog-right OFF



Jog-left ON



Jog-right ON

The Jog-left/Jog-right icons allow the operator to manually move an actuator connected to the SCU5 controller in either direction. These operations can be performed only when the controller is in manual mode. Both these icons act as a momentary switch that will turn ON (Green) when pressed and turn OFF (Red) when released.

The Jog operation will continue as long as the button is pressed and will stop as soon as the button is released. This operation can only be performed when the guide is in manual setting.

WARNING: Jog-Left and Jog-Right operations result in a change in the web guide position causing process upset. Caution must be exercised when performing these functions and should be done by those who completely understand the consequence of this change.

WARNING: Jog-Left and Jog-Right operation can be performed only when the web guiding system is in manual mode. Pressing the icons during automatic operation will perform a different function.

WARNING: This is a manual procedure of the web guiding system. No personnel should be performing work on or around the guide during the jog procedure. Failure to follow this warning could result in crushing of body parts at pinch points around and within the web guiding system.

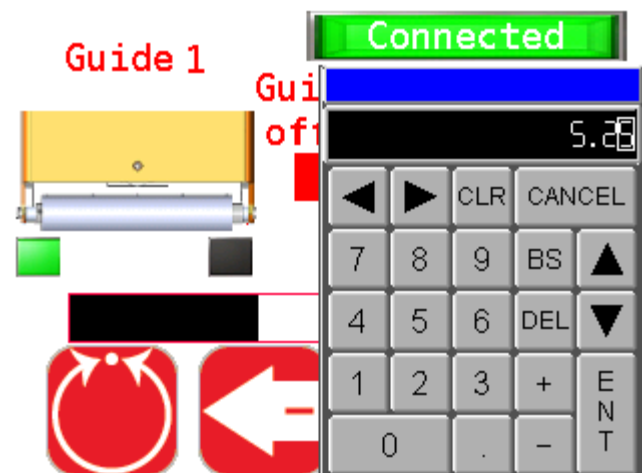
NOTE: RTI is not actually communicating with the sensor or the actuator or the servo center sensor. The RTI is a remote interface to the SCU5 controller that actually does all the operations.

Guide Point Indicator

The guide point indicator is a red line overlaid over the web position indicator bar. While in automatic mode, the web position will line up with the guide point indicator when the web guide is in normal operation.

Guide Point Offset

The guide point offset from the middle of the sensor window/range is displayed as a signed numerical value in millimeters. When the offset is 0 then the guide point is exactly at the middle of the sensor window/range. When the offset is positive then the guide point is on the right half of the sensor window/range. When the offset is negative then the guide point is on the left half of the sensor window/range.



Gross Guide Point Adjustment

The gross guide point adjustment can be made directly by entering the offset value in the keypad that appears when the numerical offset value is pressed on the screen. This value will be sent to the SCU5 controller and if that value is accepted, then the offset value will be updated accordingly. If the value is not accepted then the guide point offset value will revert back to the previous value.

NOTE: If the guide point offset value is outside the sensor range, then the entered value will not be accepted.

NOTE: If there is no communication with the corresponding web guide controller, the entered value will not be accepted.

WARNING: The guide point adjustment operation results in a change in the web guide position causing process upset. Caution must be exercised when performing this function and should be done by those who completely understand the consequence of this change.

Fine Guide Point Adjustment

Fine adjustment to the guide point can only be made when the web guide is in automatic mode. These adjustments enable small incremental changes to the guide through the operator interface to enable operators to move the desired guiding position of the web. The fine adjustment to the guide point can be made by pressing the left (-) or right (+) arrow icons on the operator interface while the web guiding system is in automatic mode. Every single touch of the left or right icon will respectively decrease or increase the guide point by 0.256 mm. This change is immediately displayed by the visual guide point indicator and the numerical guide point indicator. Pressing the middle icon (servo-centering icon) will reset the guide point to 50% or 0 mm guide point offset.

NOTE: The pressing of the Left (-) or Right (+) during fine guide point adjustment will momentarily change the icon to green. With the release of the button the icon changes the color back to red.

WARNING: The guide point adjustment operation results in a change in the web guide position causing process upset. Caution must be exercised when performing this function and should be done by those who completely understand the consequence of this change.

WARNING: Fine guide point adjustment can be performed only when the web guiding system is in automatic mode. Pressing the Left (-) or Right (+) icons during manual operation will perform the jog operations.

WARNING: Guide point adjustment should be made only if it is necessary and should be carried out by personnel with good knowledge about the consequences of the change. The performance of the guiding system may deteriorate if the guide point is too far away from the desired 50% setting. Some of the changes might have no effect if the web guide is in an extreme position.

Heartbeat Indicator

Heartbeat indicator is not available on the RTI.

Web Detected Indicator

Web detect indicator is not available on the RTI.

Reset guide point Button

No reset guide point button and functionality is not available on the RTI.

Advanced Setting Icon

No advanced setting icon

Find Sensor Button

No find sensor button.

Guide Controller Number

The number of the web guide that is being currently controlled by the operator screen is shown. The guide is identified by the number between 1 and 6 (or up to 16 if customized).

Remote Control Status

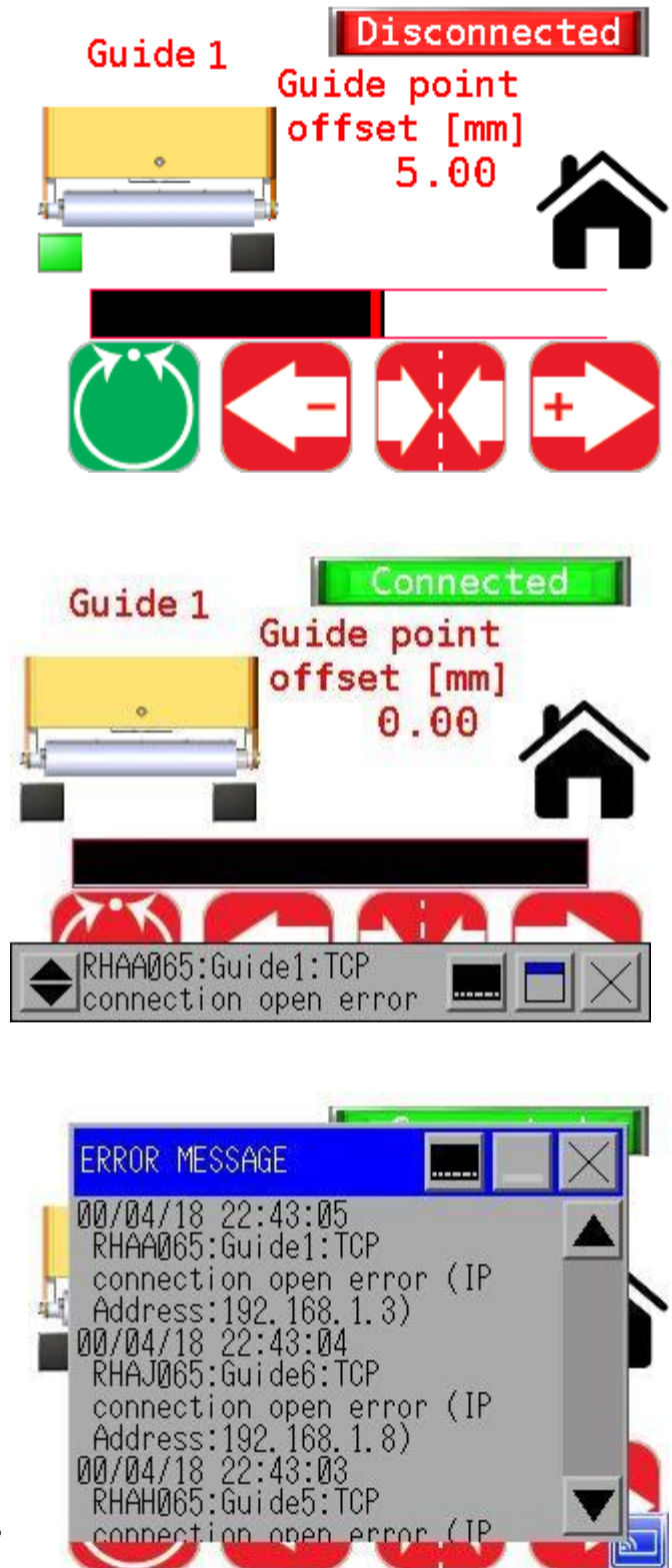
RTI can take over remote control of the web guide controller by connecting or disconnecting from the SCU5 web guide controller. When the RTI takes control, the operator icons on the SCU5 controller will be disabled, indicating remote control. For safety reasons, this is intended to prevent the web guide to be controlled from two locations at the same time. Pressing the button would toggle the remote control status. When the button is green and reads Connected, then a RTI has control over the SCU5 and the local operator interface would be disabled. If the button is red and read Disconnected, then RTI does not have a remote control connection with the SCU5 controller and the local operator interface on the SCU5 would be enabled for local operation.

NOTE: When the communication status is disconnected then the RTI will have no effect on the SCU5 controller and the web guiding system. Communication status is controlled in the advanced settings of the respective web guide controller.

NOTE: Even when the remote control connection is disconnected, the RTI screen will update with the status of the web guide controller. The status based on the local control of the web guide will be displayed on screen.

NOTE: If there is no physical ethernet cable connection or if the network is down or if the corresponding SCU5 controller is unreachable through the network, then a TCP connection open error message would appear.

NOTE: The error dialog box can be expanded to see the actual IP address of the SCU5 controller that is unreachable through the network.



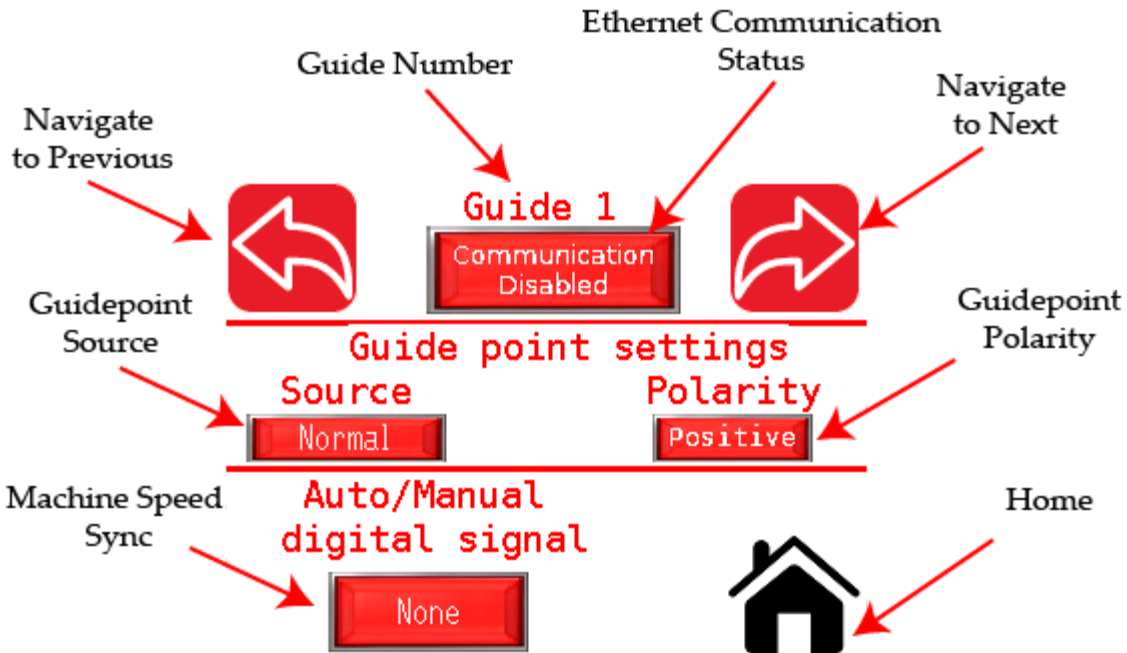
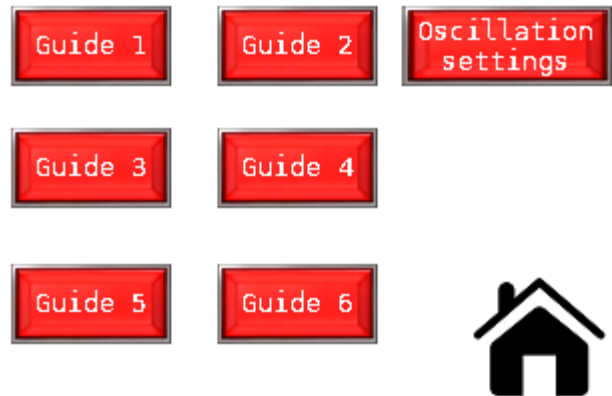
NOTE: If more than one SCU5 web guide controller is unreachable then the error message will be displayed for all the unconnected devices.

Home Button

Pressing the home icon would navigate back to the home screen.

Web Guide Controller Setup Screen

Pressing the setup tools icon on the home screen will switch to a setup menu screen that provides access to the individual setup screens for respective web guide controllers. Each of the individual web guide controllers can be set to work as independent web guides, or a coordinated web guide as part of a connected machine. The image below shows an annotated view of the individual setup screen for a web guide controller screen.



Guide Number

Indicates the web guide being set up currently.

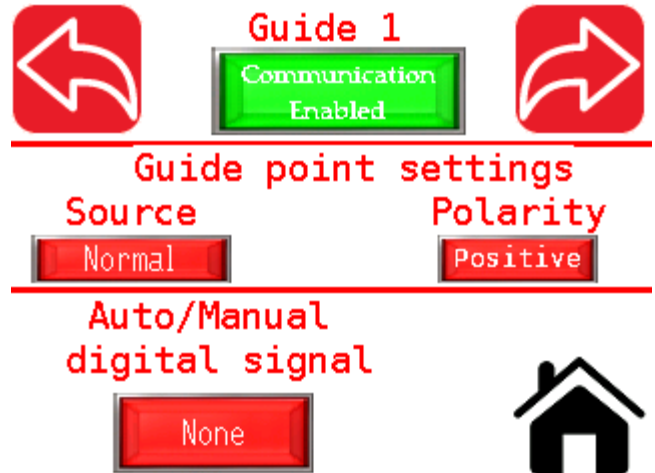
Ethernet Communication Status

In order for any web guide to be controlled remotely, the ethernet connection must be enabled and established. This button allows the communication to be enabled or disabled. When the button is green and reads Communication Enabled, then the ethernet communication is enabled between the corresponding web guide controller and the RTI. When the button is red and reads Communication Disabled, then the

ethernet connection between the web guide controller and the RTI is disabled.

NOTE: Communication enabled status only means that the RTI has enabled the status and is trying to communicate with the corresponding SCU5 web guide controller. If the network is down or if the SCU5 controller is unreachable then an actual connection will not be established. When the SCU5 controller is unreachable, then a TCP connection open error would be displayed.

NOTE: If the communication is disabled then the remote connection functionality on the operator screen would be meaningless.



Navigation Button

The left and the right arrows allow the user to navigate to the next web guide controller without going back to the main menu.

Guide Point Source

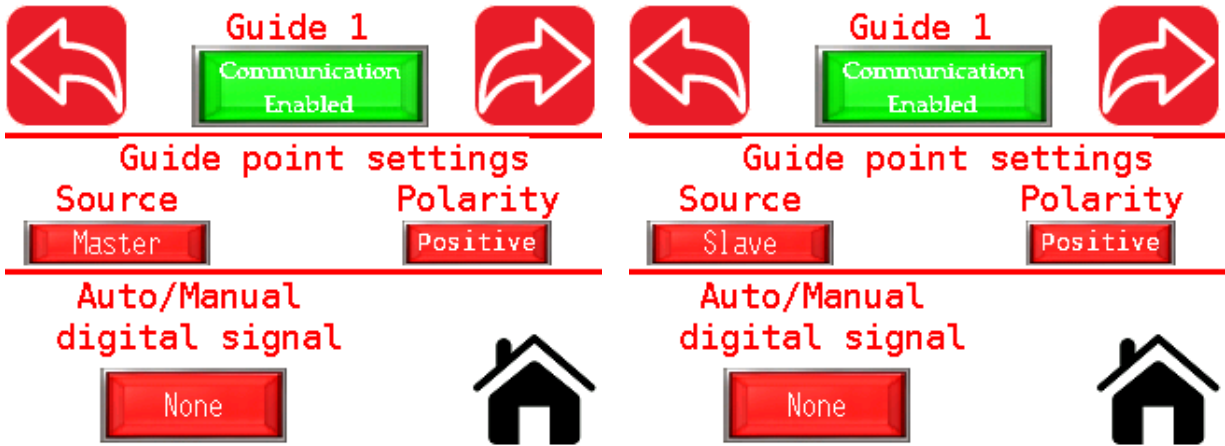
For interconnected operation, the guide point source can be set according to the interconnectivity requirements. Each web guide controller acts independently based on the remote guide point setting provided by the RTI. The coordination of the different web guide controllers are actually implemented on the RTI rather than the individual web guide controllers. Hence each controller should have remote control status enabled.

Normal

Normal operation disables all coordination and allows the web guide controller to function as a standalone device. Remote control is still available however no coordination with other controllers is enabled.

Master/Slave

Pressing the source button will toggle the guide point source to Master or Slave or Oscillation. In a master/slave operation, the guide point of a slave controller is adjusted based on the web position on the master controller. This enables the slave controller to follow a position based on the master controller. These master/slave operations are common while laminating multiple layers of the web. The master/slave functionality is implemented within the RTI and the individual SCU5 web guide controllers are oblivious to their master/slave status.



One controller should be set as master and the remaining as slave to enable this functionality. The guide point offset for the slave controllers will be adjusted based on the error seen at the master controller. The polarity of the guide point offset can be changed to either positive (same as the master controller error) or negative (opposite of the master controller error) based on the sensor orientation.

NOTE: Master controller can be a standalone sensor controller. It need not be a web guide controller.

NOTE: Slave controller must be a web guide controller.

NOTE: Remote control status for all the controllers that need coordination should be enabled.

NOTE: The physical offset between the webs in a coordinated control system would depend on the respective physical location of the sensors. If the sensors are not installed exactly at the same cross machine position within the machine, the guide point offset functionality can be used for relative web layer alignment.

WARNING: One controller, and only one controller, should be set as master controller. If no controller is set as master then the behavior of the master/slave system would be unpredictable.

Oscillation

When the guide point source is set to oscillation, parameters from the oscillation screen will be used to provide an oscillating guide point reference to the SCU5 controller. The respective SCU5 controller should be in automatic mode so that a controlled oscillation can be achieved with an oscillating guide point. The magnitude of oscillation and the period of oscillation can be set from the oscillation screen.

NOTE: The oscillation functionality will work only when the respective SCU5 controller is in automatic mode. When the controller is in manual mode, the oscillation will have no effect.

NOTE: The oscillation functionality will work only when the magnitude of oscillation is less than the corresponding sensor range.

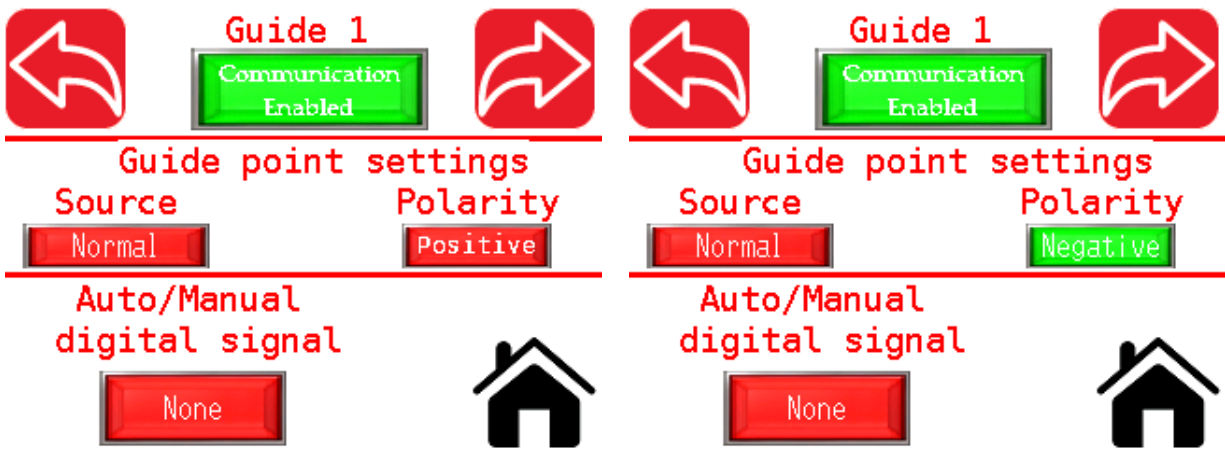
WARNING: Always set the web guide controller to automatic before turning on the oscillation. If it is done the other way, a sudden correction may happen and could cause damage of material.

WARNING: Never set the oscillation magnitude to be more than the available sensor range.

WARNING: Never set the oscillation magnitude to be more than the available actuator stroke length.

Guide Point Polarity

When coordinating multiple web positions, the polarity of guide point offset would depend on how each of the sensors are installed with the individual web guides. It may be necessary to change the polarity. By pressing the polarity button either a positive or a negative polarity can be set for the guide point offset.



NOTE: The guide point polarity does not change the polarity of the actuator on the web guide controller. This only changes the polarity of the guide point offset. The web guide controller will still guide the web based on its original actuator polarity.

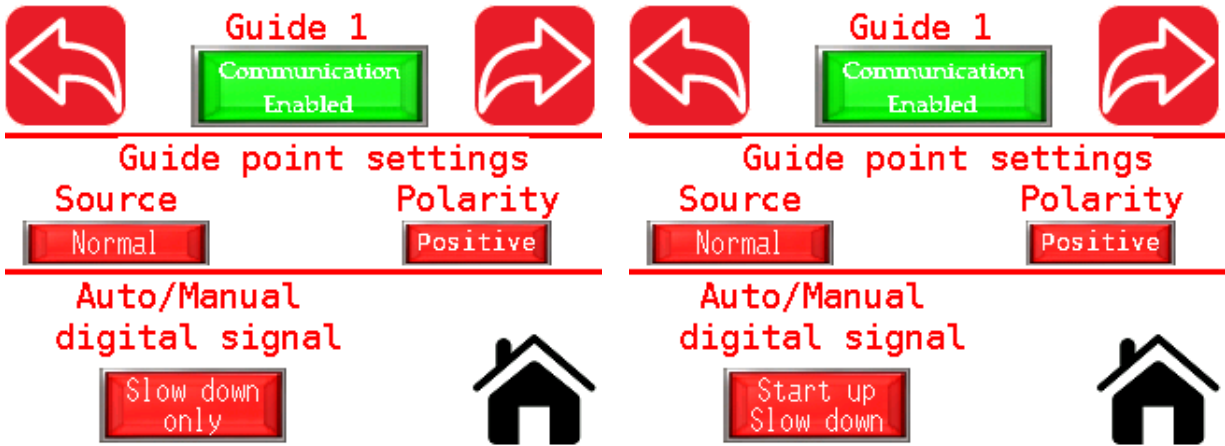
NOTE: Each individual web guide controller can have its own guide point polarity.

Digital Machine Speed Sync

When a machine slows down or when the machine starts it may be necessary to put all the web guide controllers in manual mode or automatic mode without an operator individually setting their states. This can be accomplished by setting the Auto/Manual digital signal.

A digital input is necessary to let the RTI know of the machine speed. Usually a 10% signal or a machine jog signal can be used to accomplish this. The digital signal would be high when the machine runs at intended speed and the signal would be low if the machine is stopped or runs below the ideal running speed such as when jogging.

When the Auto/Manual digital signal is set to None, this functionality is disabled. Two additional states are possible by pressing the button: slow down only and start up/slow down. These are shown below.



Slow down only state will change the web guide from automatic mode to manual mode when the digital input signal goes from a high state to a low state.

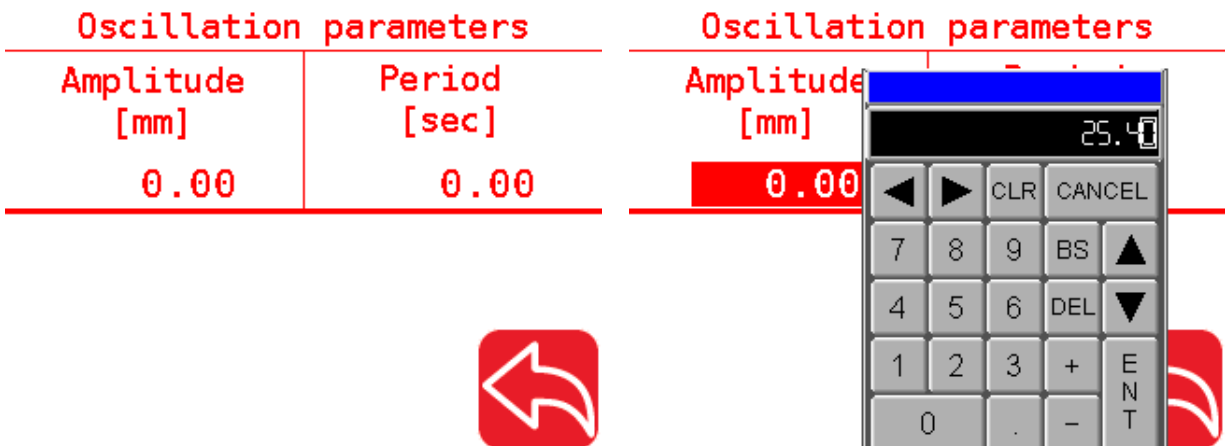
Start up/slow down state will change the web guide to automatic mode from manual mode when the digital input signal goes from low to high. And if the digital input signal goes from high to low then the web guide controller would be forced into the manual mode.


NOTE: The change of the web guide control state occurs only when the digital input signal transitions. The web guide controller will not be set to automatic mode all the time when the digital input signal is high or in manual mode if the digital input signal is low.



NOTE: If the digital input signal is held to a constant state, the auto/manual state of the web guide controller can still be changed from its corresponding screen on the RTI. And as soon as the digital input signal state changes the web controller state will also change appropriately.

Oscillation Setup Screen

The magnitude and the period of the oscillation can be set from this screen by pressing the corresponding parameter values.



Oscillation parameters		Oscillation parameters	
	Period [sec]	Amplitude [mm]	Period [sec]
	0.00	25.40	5.00

NOTE: The oscillation parameters are the same for all the web guide controllers controlled by a single RTI. Independent values cannot be set.

WARNING: Never set the magnitude of oscillation to be more than the available actuator stroke.

WARNING: Never set the magnitude of oscillation to be more than the available sensor range.

WARNING: Never set the velocity of oscillation (magnitude divided by period) beyond the actuator bandwidth capability.

Web Width Measurement

Application

RTI for width measurement application is used with certain SCU5 controllers and with WPS 440 E or WPS 440 P sensors (these sensors are now obsolete). The WPS 440 E/P sensors have the controller builtin, unlike the existing sensors that need a separate SCU5 controller to process the captured image.

RTI is mainly used for data logging purposes as well as for stand alone applications. RTI can be configured to trigger external alarms, stack lights, flagging systems and printers for quality monitoring applications based on the width measurement from the SCU5 controller or the WPS 440 E/P sensors.

The RTI controller communicates to the respective SCU5 controller or the WPS 440 E/P sensor over the ethernet and displays the web width based on the left edge and the right edge position measurement. RTI cannot directly process the image captured by the WPS sensor. It can only compute the width based on the pre-processed edge position from the SCU5 controller or the WPS 440 E/P sensor.

Home Screen

The home screen provides a quick indication of the actual web width measurement in millimeters. Three status lights, green, amber and red, are available to provide quick feedback on the web width status with respect to the width tolerances. When the web width is within the warning limits, then the green led will light up. If the web width is between the warning limit and the alarm limit then the amber led will light up. And if the web width is beyond the alarm limit then the red led will light up. The nominal width, the warning and alarm ranges can be set from the width setup screen that can be accessed from the main setup screen.



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100.58



Width Measurement

102.11



Width Measurement

96.90



NOTE: The nominal width, warning limits and alarm limits can be set from the width measurement setup screen.

Main Setup Screen

Pressing the tools icon on the home screen will lead to the main setup screen. From the main setup screen the user can access the width measurement setup screen, the communication/data log screen, product recipes screen and advanced setup screen. This version of the software also includes a Spanish option. When the icon for Spanish is pressed, the screen will translate to Spanish language.

Pressing the home button would take the user back to the home screen.



Width Measurement Setup Screen

When an alarm needs to be generated based on the width output, the width measurement setup screen provides the interface to set the tolerances for width measurements.

All units on this screen are in millimeters.

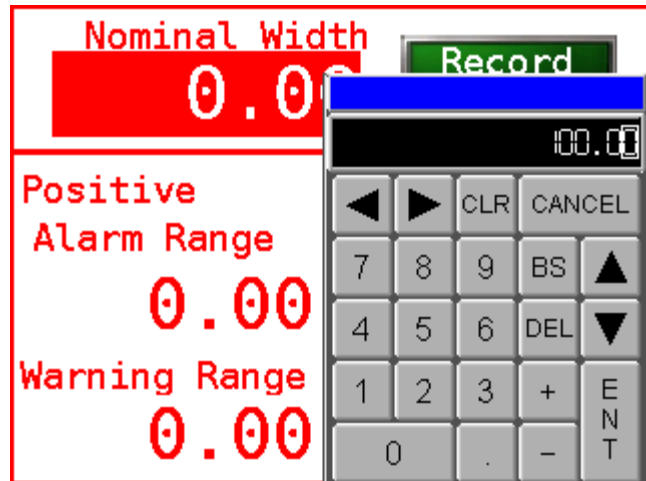
Nominal Width

The measured width of the web will be compared with the nominal width to provide the automated width monitoring capability. Pressing the digits under the nominal width, the user can enter the appropriate nominal width for the current product being measured. The keypad can be used to enter the value.

NOTE: Entering the nominal width does not change the width measurement. It only records a number that will be compared to the measured width.

NOTE: RTI is typically used with a single sensor that can measure width based on the left and right web edge seen by a single sensor. Hence the maximum nominal width is 440 mm.

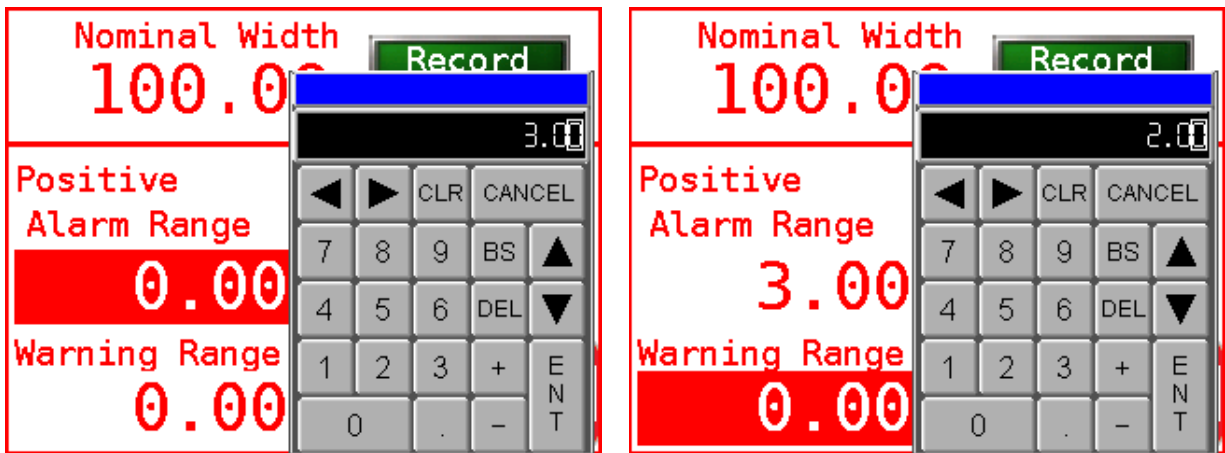
NOTE: When connected to the SCU5 controller, the appropriate sensor should be connected to Sensor 1 port.



WARNING: Currently, the RTI will not work when two sensors are connected. So applications that use two sensors for width measurement will not work properly. Please consult the factory for more information if such a situation arises.

Alarm and Warning Limits

The user can set limits to trigger outputs if the width falls outside the nominal range. A warning and an alarm signal can be output. The alarm signal will be generated when the difference between the measured width and the nominal width is more than the alarm range. Both a positive alarm range and a negative alarm range can be set for the alarm output. Similarly an warning signal can be generated if the difference between the measured width and nominal width is more than the warning range. Only a positive warning range can be set. Pressing the respective number and using the keypad these ranges can be set as shown below.



NOTE: The width measurement error is positive if the actual width is more than the nominal width. And the error is negative if the actual width is less than the nominal width.

NOTE: Do not set the warning range equal to or more than the alarm range.

NOTE: Always set the alarm range before the warning range. If the alarm range is set after the warning range, the RTI will not check to see if the alarm range is more than the warning range.

NOTE: The negative alarm range need not be the same as the positive alarm range. But for most applications it would be the same.

NOTE: The warning output is provided only when the error is positive.

NOTE: Irrespective of the polarity of the error, only one alarm signal is output.



Record Width

For certain applications, the RTI can correct for web width measurement errors due to installation conditions. In those cases, the RTI can be taught to correct or calibrate for the measurement error by pressing the record width button. This can be accomplished as follows:

- Present a web with a known width (calibration target) in front of the sensor under standard operating conditions (proper tension)
- Enter the known width (calibration target width) in the nominal width section
- Press record width so that the RTI can be taught to correct for the measurement error
- If the nominal width is different from the web width used for teaching, re-enter the appropriate nominal width.

NOTE: The width for teaching need not be the same as the nominal width. Typically the teaching is done once after the initial installation of the sensor.

NOTE: The teaching can be repeated for high accuracy width measurement application whenever a new product is introduced or after every material changeover.

NOTE: For best results teach the RTI only when the measurement is stable.

NOTE: Instead of entering the known width for teaching an offset can be provided directly for certain applications. This requires a different firmware. Please consult the factory to accomplish this functionality.

WARNING: Press record width only when a web of known width is presented in front of the sensor. If the nominal width value does not match the actual width of the web while the record width button is pressed, an incorrect offset would be introduced in the measurement.

NOTE: The offset (or teaching) can be cleared and set to zero if the record width button is pressed while no web is in front of the sensor.

Communication/Data Log Screen

The communication screen allows the user to enable ethernet communication as well as enable data logging when a USB storage device is connected to the PLC.

No data log



Logging data...



Ethernet I/P on



Ethernet I/P on

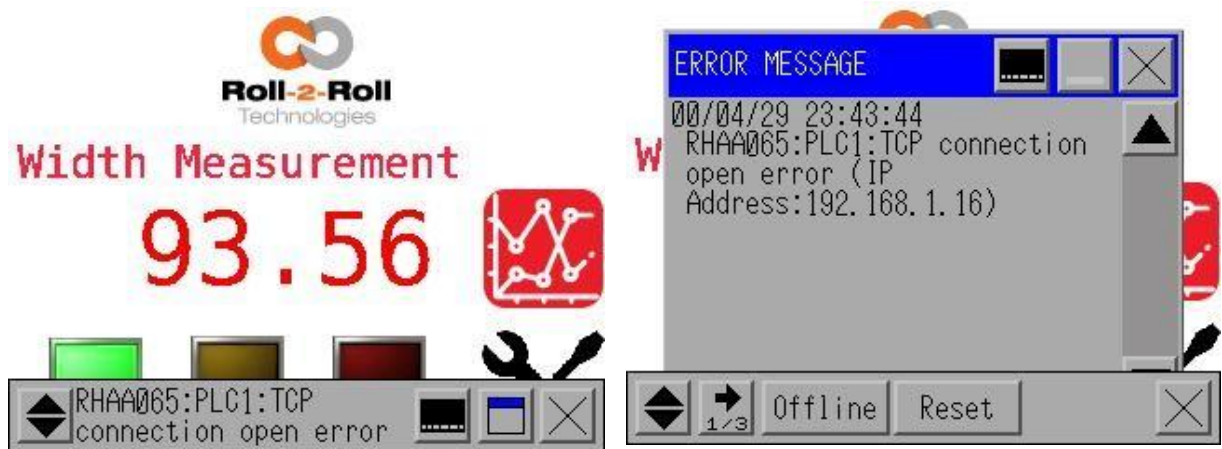


WARNING: Do not turn off the EtherNet/IP communication during normal operation.

WARNING: Before starting the data logging please ensure that a USB storage device is connected.

WARNING: Always safely remove the USB device before disconnecting the USB drive.

A TCP connection error may occur if the EtherNet/IP connection is turned OFF.



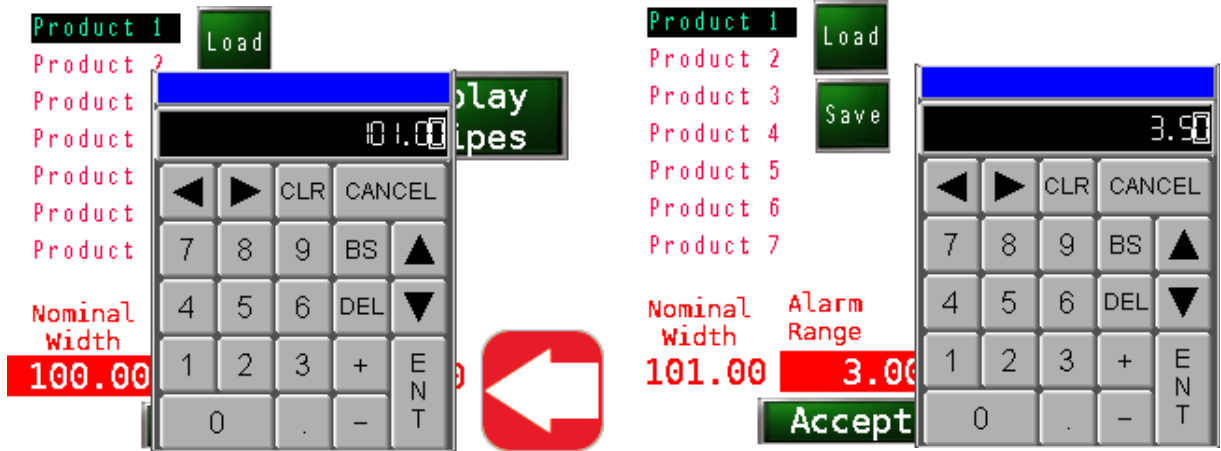
Product Recipes Screen

It is possible to store and restore product recipes for up to seven products. Pressing the display recipes button will make all the recipes visible. The user can then navigate, select and load an appropriate product number by pressing the load button. All units on this screen are in millimeters.

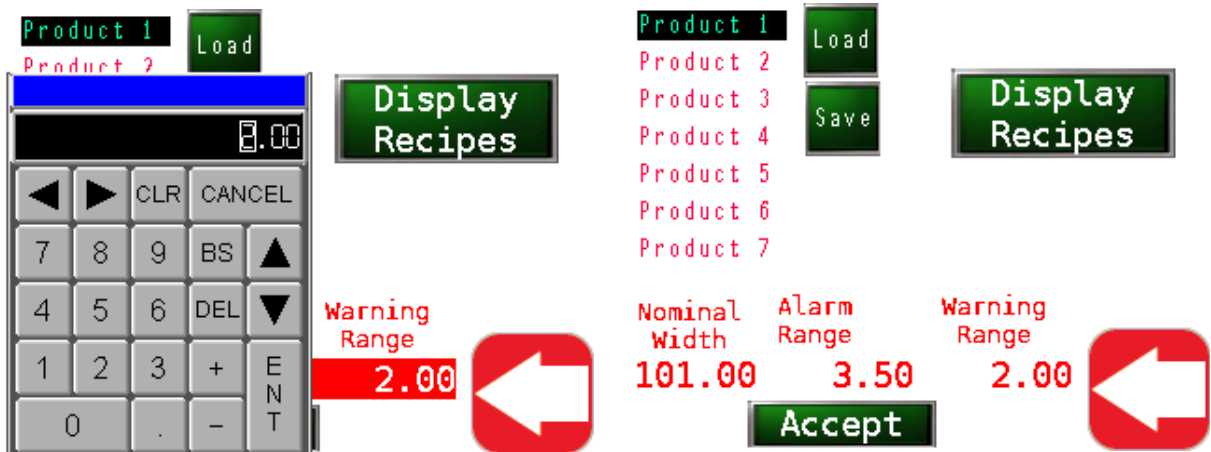


Loading the product recipe only displays the recipe to the user. It does not load the values to the operation parameters. In order to load the values to the operation parameters, the user needs to press the accept button.

The recipes can be changed once they are loaded to the recipes screen. By pressing the appropriate parameter the recipe values can be changed.



Once the appropriate values have been entered they can be saved by pressing the save button. If that recipe needs to be loaded to the current operating parameters, the accept button needs to be pressed.



NOTE: Alarm range is symmetric and will set both the positive and negative alarm range equal. If asymmetric alarm range needs to be set, it has to be done on the width measurement setup screen.

NOTE: Warning range is symmetric and will set both the positive and negative warning range equal. However, only the positive warning range is used to provide the warning output.

NOTE: Loading a recipe only displays the values of the recipe on this screen. In order for the recipe to be loaded to the operating parameters, the recipe needs to be loaded and accepted.

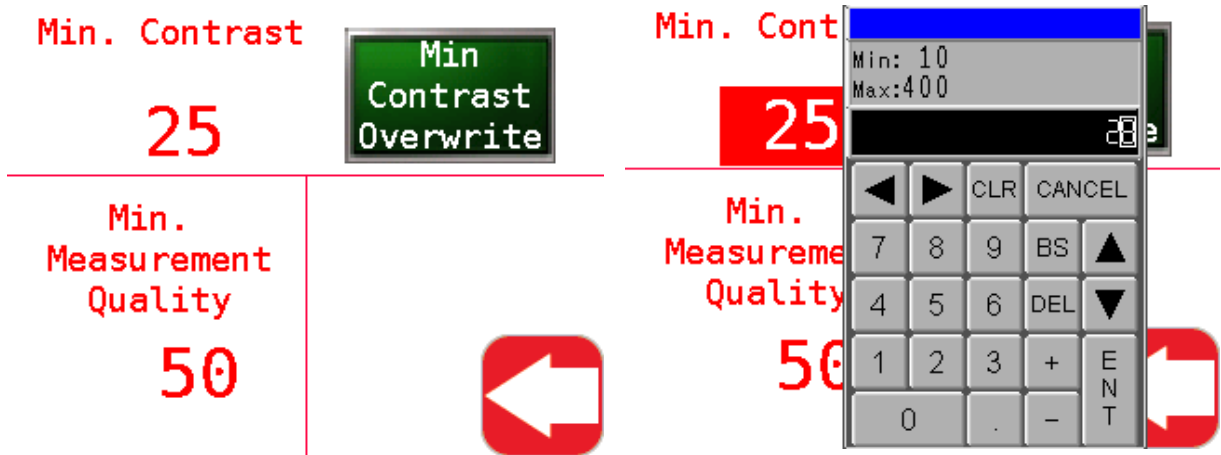
NOTE: When the save button is pressed the values for nominal width, alarm range and warning range will be saved to the highlighted product number.

NOTE: If the screen is blank, press display recipes to show the text.

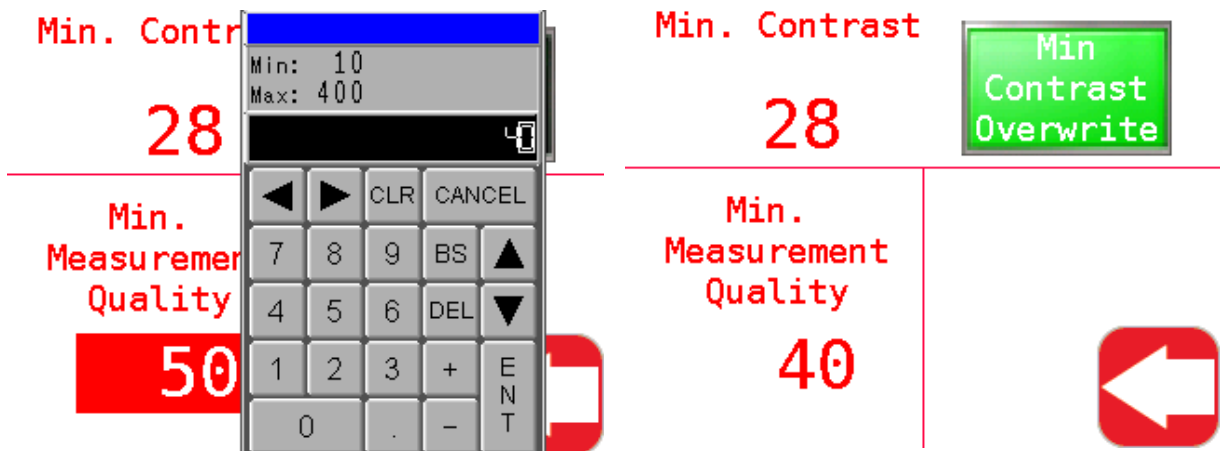
Advanced Setup Screen

For certain advanced use cases, the user has access to some additional parameters for the web width measurement application with the RTI. Please consult the factory before changing any of the parameters on this screen. These parameters are typically changed to increase the robustness of the measurement.

The robustness can be increased by changing the minimum measurement quality and the minimum contrast parameters. The minimum contrast value will fundamentally change the edge detection algorithm on the SCU5 controller. Lower value will make the controller sensitive to small changes in edge contrasts while a higher value reduces the sensitivity. When the Min Contrast Overwrite button is pressed or enabled, the RTI will change the minimum contrast parameter in the edge detection algorithm on the SCU5 controller. The minimum quality parameter forces RTI to accept the measurement only when the edge has a certain minimum quality.



The value of the appropriate parameter can be changed by pressing on the number and typing the values on the keypad.



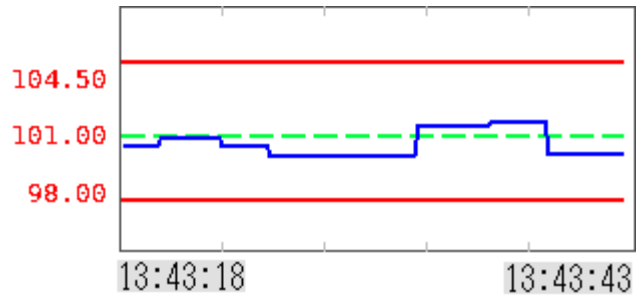
NOTE: The nominal value for the minimum contrast is 25. The minimum value is 10 and the maximum value is 100.

NOTE: The nominal value for minimum quality factor is 10 and the maximum value is 255.

Width Trend Screen

Pressing the trend icon on the home screen will allow the user to view a real-time trend of the width measurement. The x-axis is the current time while the y-axis is the width in millimeters. The width plot will automatically scale around the nominal width value, the upper alarm limit and the lower alarm limit. The horizontal scale corresponds to the last 30 seconds. The width measurement is updated every second.

The realtime width measurement is displayed in blue, the nominal width value is displayed in the green dashed line and the upper and lower limits in solid red line.



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NOTE: The plot will scale automatically based on the nominal width. If the width measurement does not seem to update, please ensure that the nominal width is set properly.

COMMISSIONING

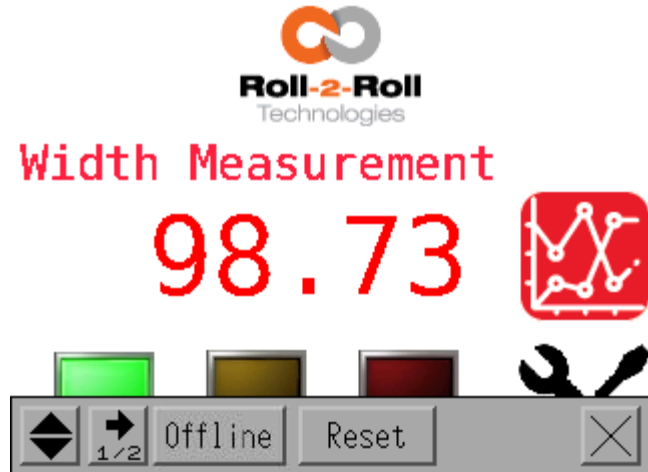
RTI is mainly used for remote monitoring, remote control and for data logging purposes. Hence the SCU5 controller needs to be commissioned before commissioning the RTI. Since the RTI and the SCU5 controller (or the WPS 440 E/P sensor) communicate through the ethernet network, the main commissioning involves proper network setting.

Network Commissioning

Offline Menu

In order to set the network information, the RTI has to be forced into the offline mode by pressing the top right and top left corner of the screen. This will bring a menu bar at the bottom (or top) with several options. Clicking the offline option will restart the RTI in the offline mode.

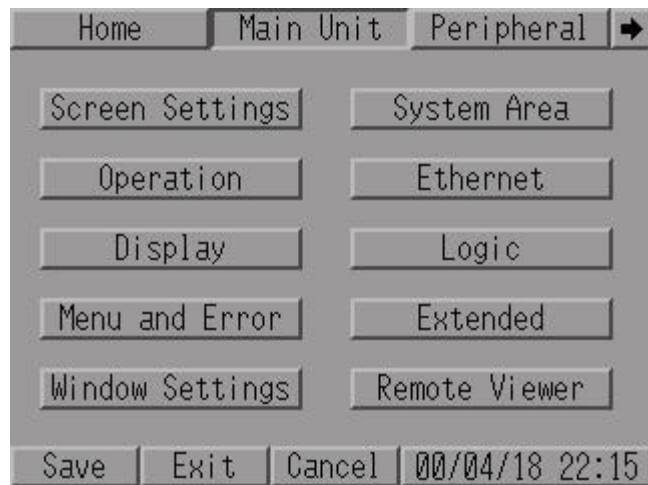
While in offline mode the parameters for the RTI as well as the SCU5 controller can be set. The RTI parameters would be under the Main Unit tab while the SCU5 controller(s) parameters would be under the Peripheral tab. In both cases the ethernet or network parameters need to be configured properly.



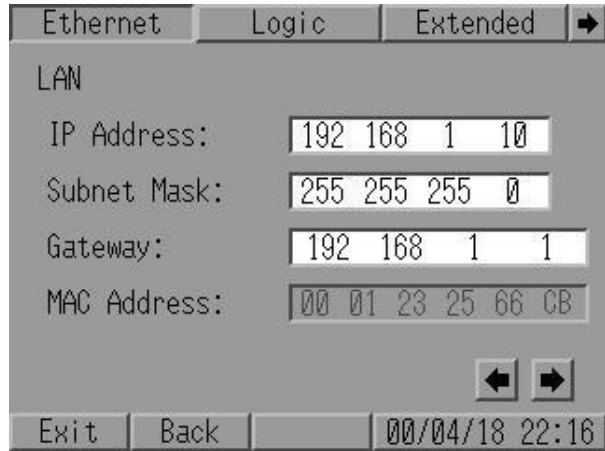
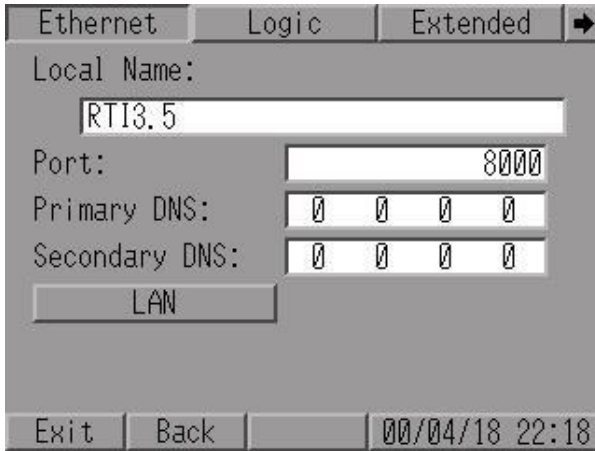
Main Unit Ethernet Setting

The main unit setting corresponds to the RTI settings. This product manual will only cover the Ethernet settings that are necessary for setting up the communication between the RTI and SCU5 controller(s). For other settings please refer to the user manual from Proface.

RTI can be connected directly to a single SCU5 controller (or WPS 440 E/P sensor) through a standard M12 to RJ45 ethernet cable. Alternatively, a switch or a router may be used to connect the RTI to one or more SCU5 controllers. In all the cases the IP address, the subnet mask, the gateway needs to be configured appropriately.



The ethernet settings for the RTI (main unit) is available under Main Unit -> Ethernet -> LAN. The network information can be changed by pressing the appropriate parameter and using the keypad to enter the network information. It is not necessary to set the local name but if the RTI is connected to a network, the local name might be useful to search for it. Other than these basic settings no other setting is necessary for the main unit tab.

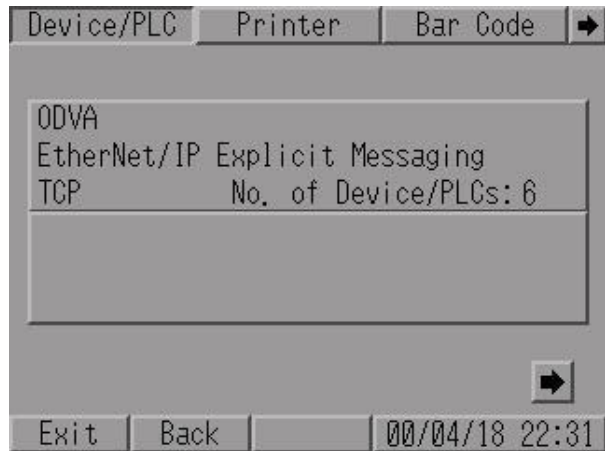
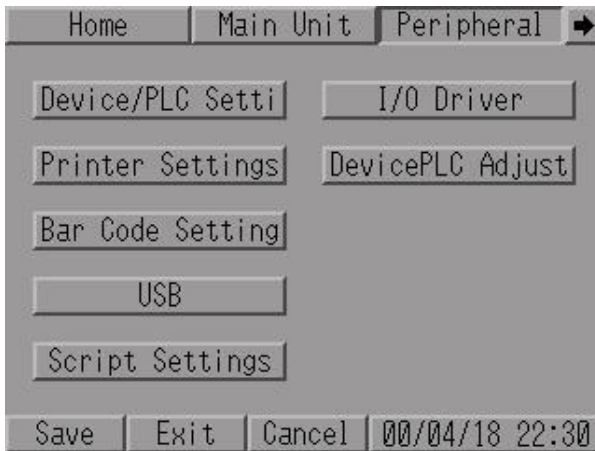


NOTE: Ensure that the network information matches the network information on the SCU5 controller (or WPS 440 E/P sensor).

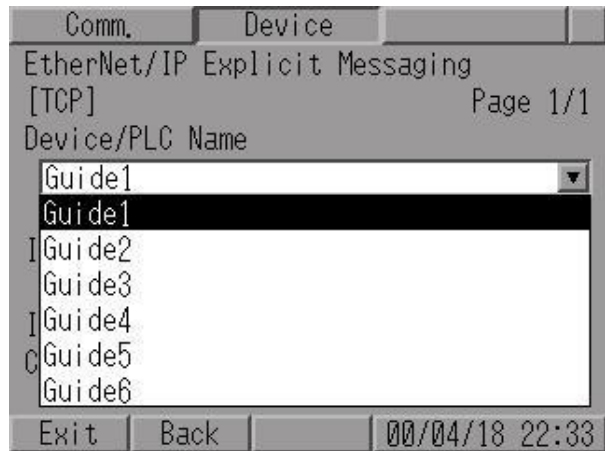
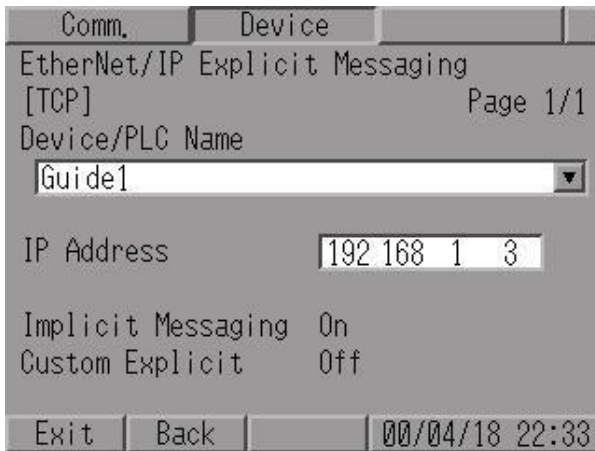
NOTE: Within a network each device should have a unique IP address so don't set the same IP address for the RTI and the SCU5 controller.

Device/PLC Ethernet Setting

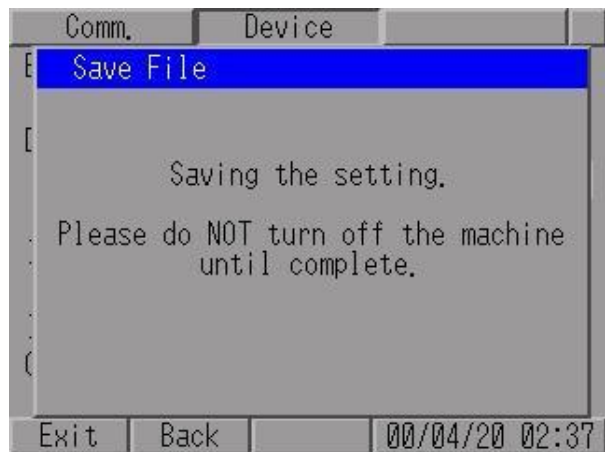
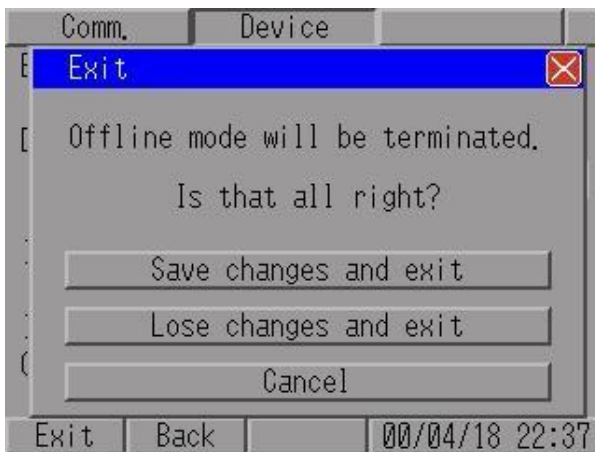
Similar to the main unit setting, the peripheral device(s) needs to be configured appropriately. These peripheral devices correspond to the SCU5 controller(s) or the ethernet enabled WPS 440 E/P sensor. This configuration is available under the Peripheral -> Device/PLC Setting -> ODVA EtherNet/IP tab.



Depending on the application one or more devices/PLCs need to be set. The total number of devices/PLCs for the application would be listed under No. of Device/PLCs. If multiple devices need to be connected then the appropriate device name needs to be selected to change their respective IP address information. Ensure that the correct IP addresses are configured based on the actual IP address of the corresponding SCU5 controller or the WPS 440 E/P sensor.



Once all the devices parameters are set, the settings can be saved while exiting the offline mode. Pressing save changes and exit will save and reboot the RTI with the new settings.



Communication Error

TCP connection open error may occur if (1) a physical or software connection is not enabled between the RTI and the corresponding device or (2) if the connection parameters are incorrect.

Ensure that the ethernet connection is enabled in the RTI, the ethernet cable is properly connected and the network connection settings are accurate. Power cycle all the network devices once proper connections settings are applied to the RTI.

Commissioning Web Guiding and Width Measurement Application

RTI for web guiding application is used for remote monitoring and control. Once the web guide controller is commissioned along with the RTI network, the RTI would be ready for operation. Ensure that the ethernet communication switch in the RTI is turned ON before using the RTI.

RTI for width measurement application is mainly used for remote monitoring and data logging. Once the RTI and the SCU5 controller are properly configured, the RTI would be ready for operation. Ensure that the ethernet communication switch in the RTI is turned ON before using the RTI.

TECHNICAL SUPPORT AND SERVICE

Contact information

Roll-2-Roll Technologies LLC is dedicated to providing exceptional service and support to its customers. Please feel free to contact us for any technical support, installation support and service requirements.

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Technical Support Email: engineering@r2r.tech
General Support Email: support@r2r.tech

Return shipping instructions

Please contact us or submit an online form to obtain a return merchandise authorization (RMA) number before returning the product to us. The online form can be accessed here: <https://r2r.tech/rma>

If returning the product, please follow the instructions on the RMA form for quick and efficient service.

REVISION HISTORY

Document Revision

Version	Date	Changes
1.0	May 2019	Initial Release Version



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