ARIS

WEB GUIDING SYSTEM

Sensor

Operator Interface

ARIS SCU MR

Web Guide Controller

Linear Hybrid Actuator

ARIS Retrofit Kit

Product and User Manual

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INTRODUCTION

This product manual provides information about installation, use and maintenance of ARIS SCU M retrofit kit. The kit is designed to replace existing web guides with the kit's actuator, controller, sensor and operator interface. The sensor and the controller are 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.

Working Principle

There are three main components to a web guiding system:
1. Web position sensor
2. Controller
3. Guide mechanism
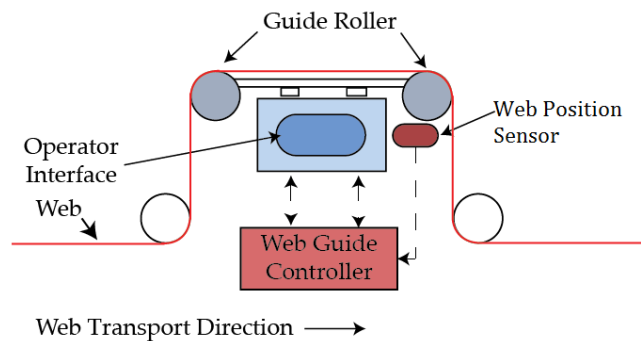
Fig. 1: Components of a web guiding system

Web Position Sensor

The web position sensor provides the vision for the control system. The sensor measures the position of the web (edge or a contrasting feature on the web) and sends that information to the controller for corrective action.

Controller

The controller is the brain for the control system. Based on the sensor measurement the controller determines the corrective action necessary to accurately align the web material.

Guide Mechanism

The web guide mechanism is the muscle for the control system. The guide mechanism actuated by a motor physically steers the web to the required position based on the command from the controller.

Key Features

- **No setup or re-calibration:** The intelligent control system adapts automatically to physical characteristics of the web material and web transport conditions to provide best performance without the need for re-tuning.
- **Plug-and-play system:** The sophisticated technologies within the system make the web guide simple to operate. There is no need to (1) select the type of sensor, (2) change controller gains, (3) change sensitivity or (4) perform any calibration. Everything is done automatically. Just connect the power and sensor to start guiding the web.

Product Description

The sensor, controller and the actuator can be integrated into existing web guides for retrofit purposes. An illustration of the components of the retrofit kit is shown in Fig. 2.

Fig. 2: Key Components of the ARIS SCU M retrofit kit

The retrofit kit can be integrated with an existing web guide mechanism to create a complete control system to guide the web. There are four basic components of the retrofit kit:

1. *Sensor:* The sensor head houses the LED light source, the optics and the camera sensor. The sensor head is connected to the web guide controller through a shielded cable secured by a cable gland. The sensor head assembly is mounted onto an off-shelf aluminum rail (igus drylin N low profile linear rails with using NW-22-17-40 carriage) on web guide and is secured by M3 thumb screws.
2. *Web Guide Controller:* The controller powers the sensor, processes the image captured by the sensor, computes the necessary corrective action and commands the actuator to position the web guide to the desired location to control the web position. A 24 VDC power source is needed to power the web guide controller and the maximum power consumption is about 4 Amps.
3. *Operator Interface:* The touch screen operator interface enables the interaction between the web guide and operators. The screen also provides visual indication of the various operations of the web guiding system.

4. *Actuator:* The linear hybrid stepper motor actuator is connected to the existing web guide mechanism.

General Specifications

Motor Type	Linear hybrid stepper
Correction Rate	Up to 40 mm/sec to 175 mm/sec
Nominal Actuating Travel	± 27mm
Sensor Type	Fiber optic
Sensor Range	16 mm, 48 mm and 221 mm
Sensor Resolution	0.0635 mm or 0.125 mm
Sensor Accuracy	>99.2%
Power	24 VDC
Error Frequency	1 – 8 Hz max
Control Frequency	50 Hz
Linear Force	250 – 1000 N

SAFETY INSTRUCTIONS

The web guiding system, retrofitted with the ARIS Retrofit Kit, is an electromechanical 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 operation of the system.

Instructions for Use

The web guiding system must be properly transported, stored before being installed professionally. The guide 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 web guide.
Notes:
- 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 ARIS Retrofit Kit is intended for indoor uses only. The sensor and controller are designed for use in industrial and lab equipment that process materials in web form as they move through a converting or raw material manufacturing process.

Improper Use

- The sensor uses high powered LED light source (visible or invisible) that may be harmful to human eye. Staring directly at the light source may harm vision and should be avoided.
- Outdoor use 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 necessaries for the ARIS Retrofit Kit should be made by Roll-2-Roll Technologies LLC.

Pinch Points

- The gap between the top roller platform and the enclosure assembly is a region with pinch points. The force of the actuator motor can cause damage to body parts due to crushing if these are caught in a pinch point.
- The gap between the rollers and the roller support plates must be considered a pinch point. The guide rollers are not powered and are only driven by the friction of the web on the rollers as the web travels over the rollers. However, while the material is threaded and transported over the guide rollers this creates pinch points between the web and the roller. Under no circumstance should the roller or the web be touched while the web is transported.
- Any installation, maintenance, or inspection work on or around the web guide must be performed when the power to the web guide is turned off or unplugged. It is recommended

that caution should be exercised when handling the web guide under power to avoid having body parts caught in the pinch points.

- Please follow standard Lockout/Tagout procedure while performing any function near the web guide.
- Care should be taken when handling the guide during shipping, transportation, or installation to avoid crushing of body parts or of other equipment from impact due to mishandling of the guide and to avoid personal injury. The web guide system should be securely and properly assembled before placing it in operation. Internal safety rules should be observed during the assembly process.
- The web guide with the ARIS Retrofit Kit is an automatic control device that may stop and start at any time without notice, especially when controlled remotely. Hence standard safeguards must be in place to prevent any kind of injury.

Static Discharges and Grounding

- Web, especially plastic webs, when transported over rollers can create significant static voltage potential. This potential needs to safely discharged by proper grounding.
- The electronic elements of the web guiding system are sensitive to static discharges. Make sure that the web guiding system, the power supply, and the machine on which the web guide operates is properly grounded to avoid shock and the effect of static discharge.
- A grounding connector on the web guide may be used to safely ground the electronics within the web guiding system.

INSTALLATION

There are four main components of the retrofit kit: (1) a sensor head, (2) web guide controller, (3) remote operator interface, and (4) actuator.

Sensor Head

The sensor head houses the LED light source, the optics and the camera sensor. The sensor head is connected to the controller unit through a 10 conductor shielded cable secured by a cable gland. The sensor head assembly is mounted onto an off-shelf aluminum rail (igus drylin N low profile linear rails with using NW-22-17-40 carriage) secured by M3 thumb screws as shown below. Other options for mounting are also available upon request. All these elements are factory shipped assembled as a ready to install unit.

Sensor Head Assembly with Mounting Rail

- Each sensor slide carriage will have a locking thumbscrew. Unscrew both thumbscrews to allow the carriage to slide in the rail.
- The sensor face has a acrylic filter lid. Make sure that the filter lid faces the web material when the sensor assembly is slid into the guide rail.
- Carefully slide the sensor carriages into the sensor slide.
- Once the sensor has been installed in the sensor slide, install the plastic end caps (NSKB-17) on the ends of the rail.

Attention:
- The sensor rail should be positioned such that the sensor is at the downstream span of the web guide as shown in Fig. 1.
- The sensor should be installed such that the web material is about 5 to 10 mm from the filter lid for the most accurate measurement.
- The length of the sensor should be parallel to the width of the web and the sensor should be positioned normal to the plane of the web.
- The standard convention for the sensor is such that the bottom of the sensor has the cable gland nut and the left/right side are oriented while facing the sensor (as shown above).

WARNING: Even though the sensor working distance is less than 25 mm, the sensor operation may be affected by any object in the field of view of the sensor which is at a distance of 150 mm. Make

sure that no object is present within this safe field of view range to ensure proper operation of the sensor.

WARNING: The infrared light source is invisible to the naked eye. Please do not stare directly into the sensor at any time. This can potential damage eyesight and may cause blindness.

WARNING: The white light source is visible to the naked eye. Please do not stare directly into the sensor at any time. This can potential damage eyesight.

WARNING: The ultraviolet light source may be visible or invisible to the naked eye. Please do not stare directly into the sensor at any time. This can potential damage eyesight and may cause blindness. Avoid any skin exposure with the ultraviolet light source. The exposure may be potentially harmful.

Three different sensor size options are available; the size corresponds to the sensing range.

Top Left: ARIS WPS 16; Top Right: ARIS WPS 48; Bottom: ARIS WPS 221. Pictures are not to scale.

The physical dimensions of the sensor head, the assembly and the rail are shown next.

Physical Dimensions of ARIS WPS 16
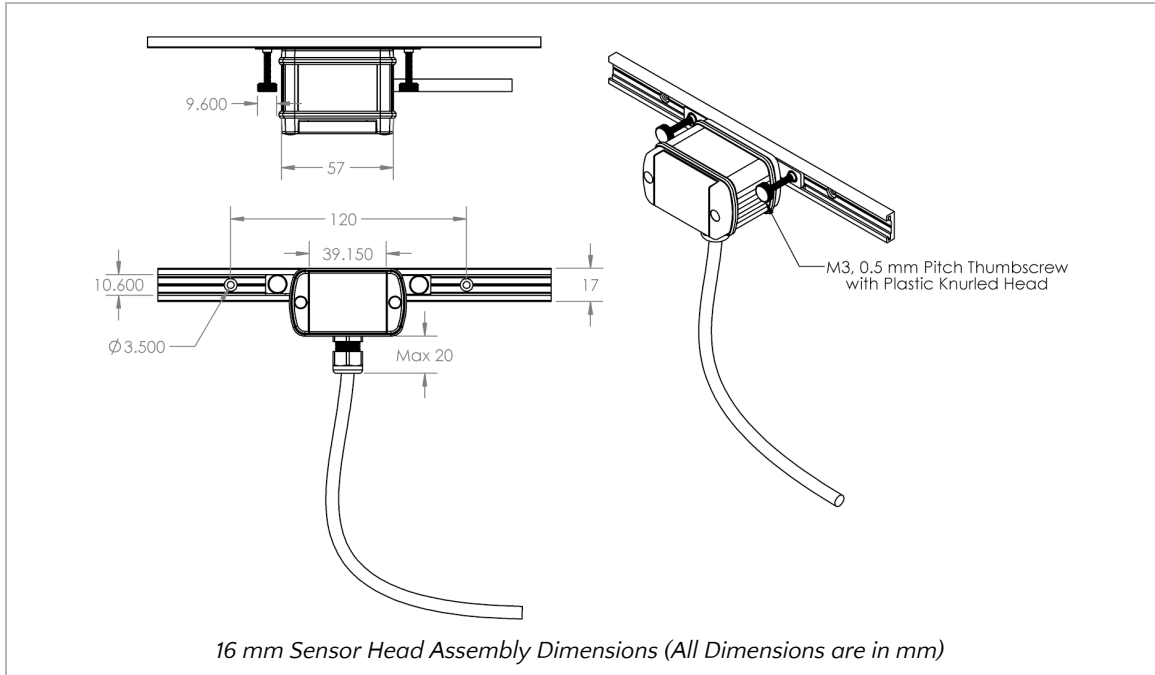
16 mm Sensor Head Assembly Dimensions (All Dimensions are in mm)

Physical Dimensions of ARIS WPS 48

48mm Sensor Head Assembly Dimensions (All Dimensions are in mm)

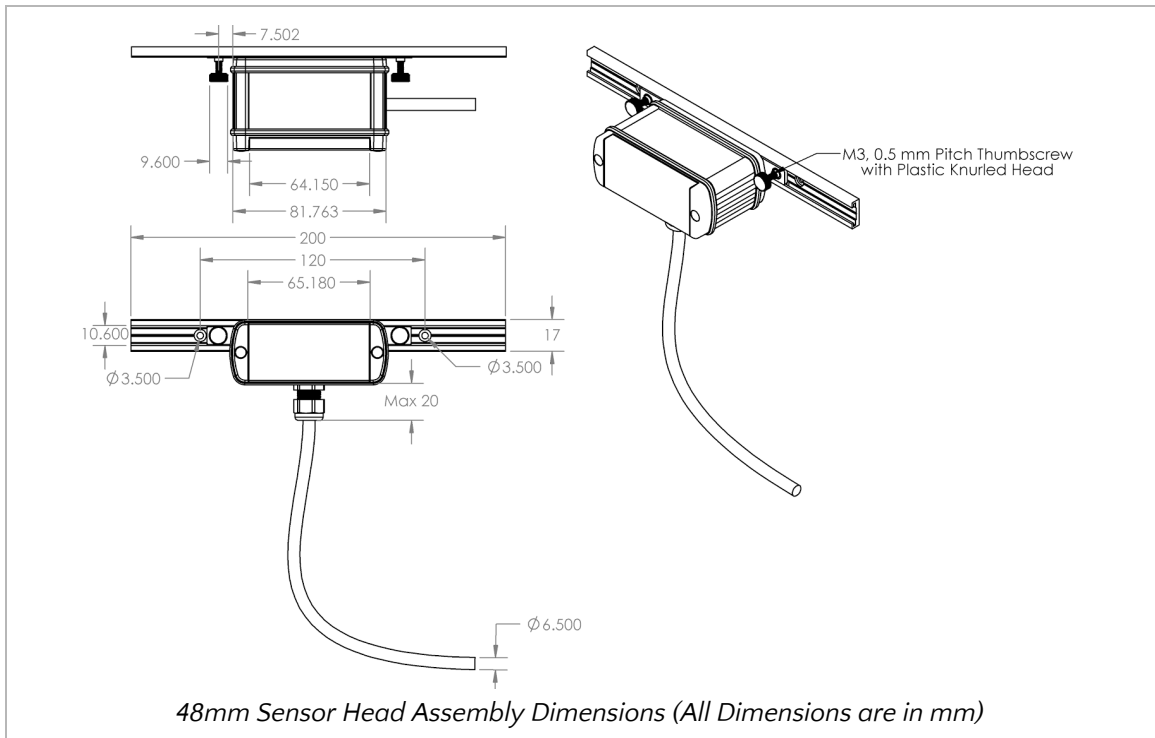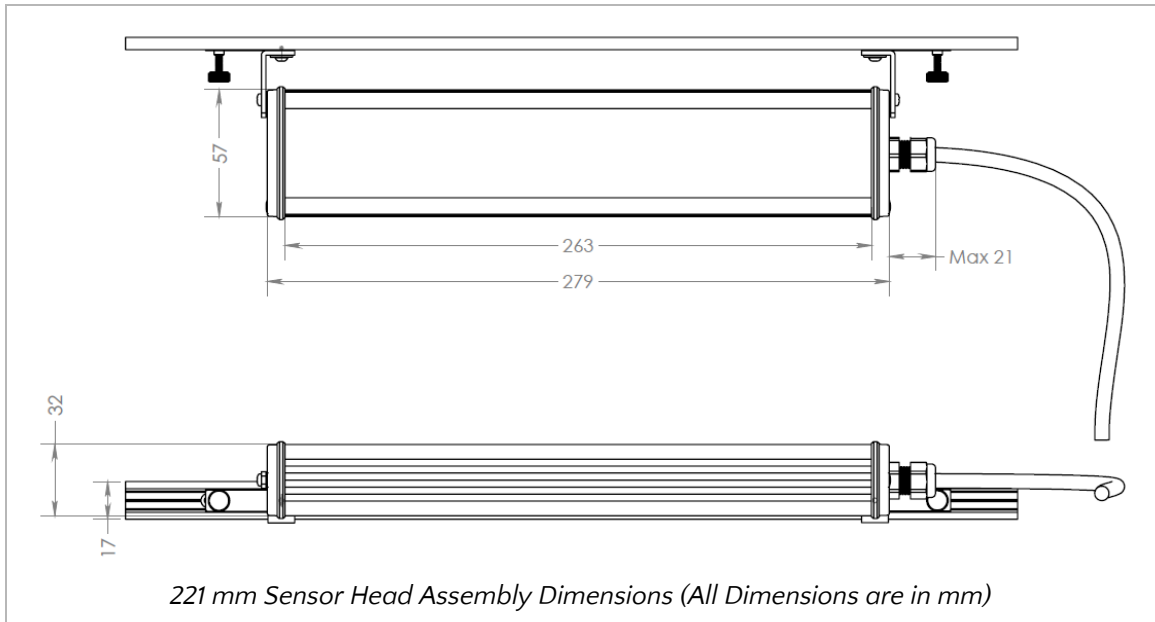## Physical Dimensions of ARIS WPS 221

221 mm Sensor Head Assembly Dimensions (All Dimensions are in mm)
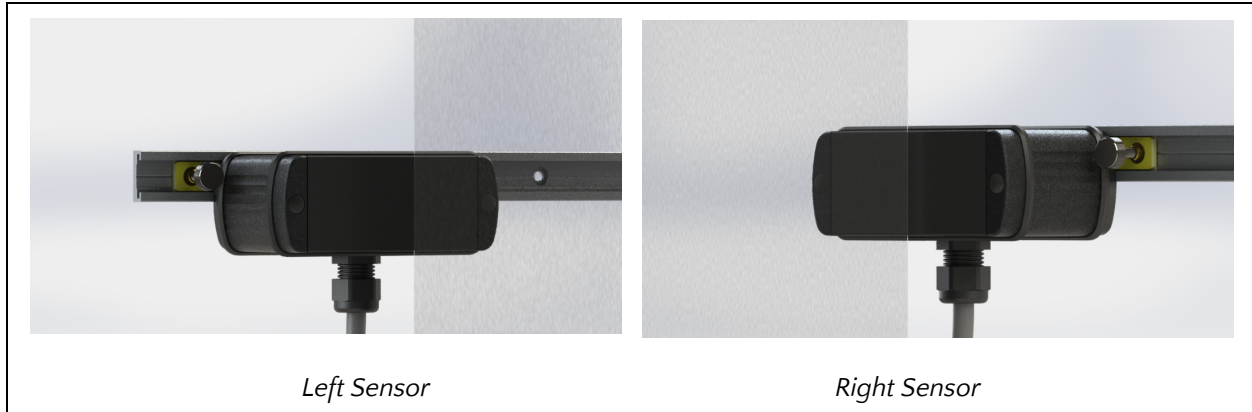
Sensor Configuration and Terminologies

The sensor configuration and terminologies for proper installation and use of the sensor is provided in this section.

Left Sensor   *Right Sensor*

The front view of the sensor is the orientation in which the cable gland is at the bottom while viewing the filter on the sensor. The front view of the sensor is shown above.

- Left Sensor: Looking at the front view of the sensor with the web between the observer and the sensor, if the sensor is positioned to the left edge of the web the orientation corresponds to a left sensor. This orientation is shown above.
- Right Sensor: When the sensor is positioned to the right edge of the web the orientation corresponds to a right sensor.
  The sensor orientation can be automatically detected by the intelligent web guide controller whenever a sensor is plugged into the controller.

Web Guide Controller

The web guide controller (ARIS SCU MR) encloses the electronic hardware for the sensor processing, motor control and operator interface. The five main ports in the controller include: power, sensor, display, motor, and guide lock. Depending on the model and configuration the ports may be pre-wired or may have a connector. The general wiring diagram for the retrofit kit is provided below.
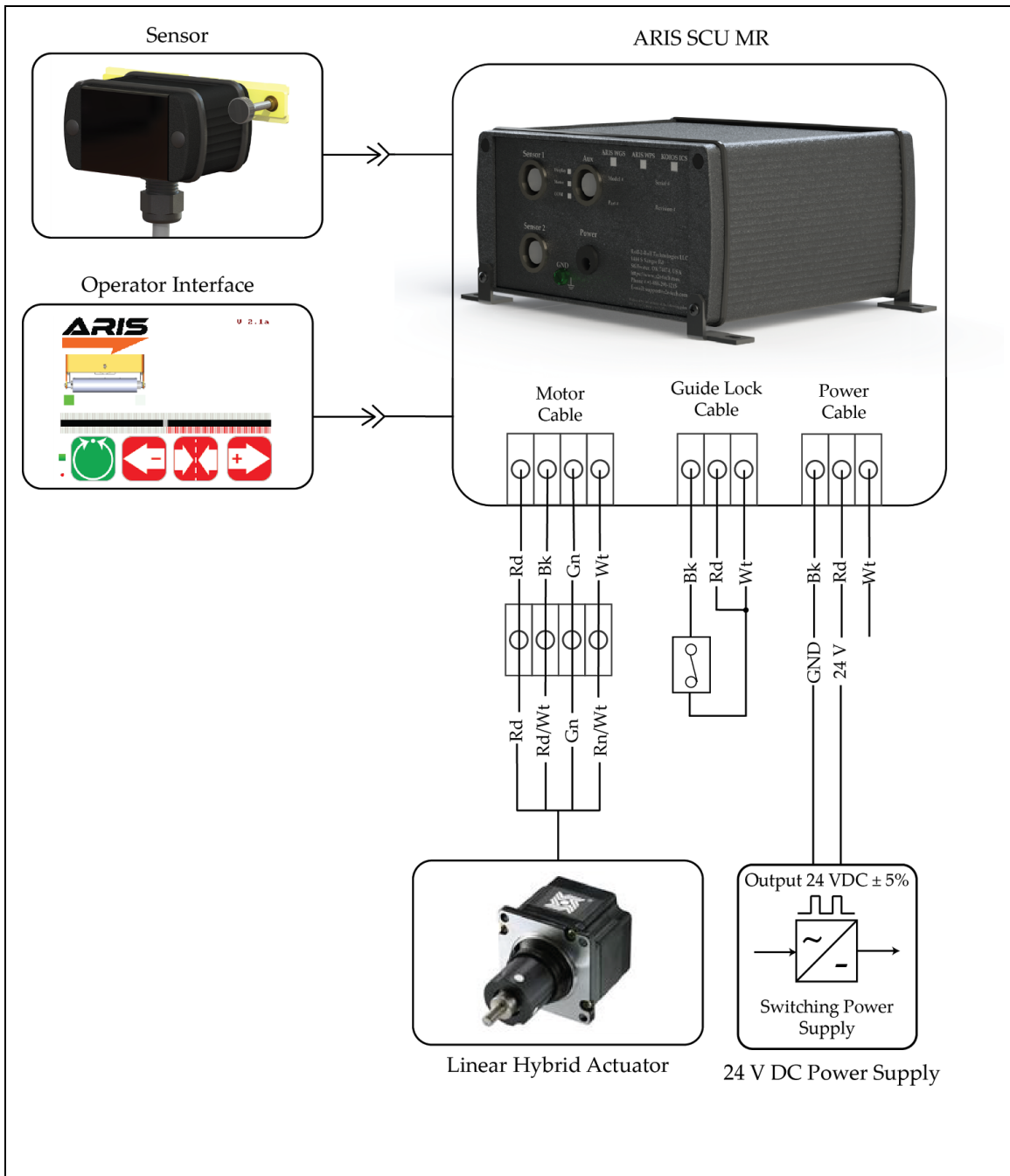
The unit comes with four wall mounting brackets located on the bottom four corners on the controller unit. Do not drill additional holes to the bottom of the control unit! You may be required to prepare an installation plate to install the unit to your production machine.

The physical dimensions and a picture of SCU with one port configuration are shown below.

Web Guide Controller

ARIS Web Guide Controller (All Dimensions are in mm)
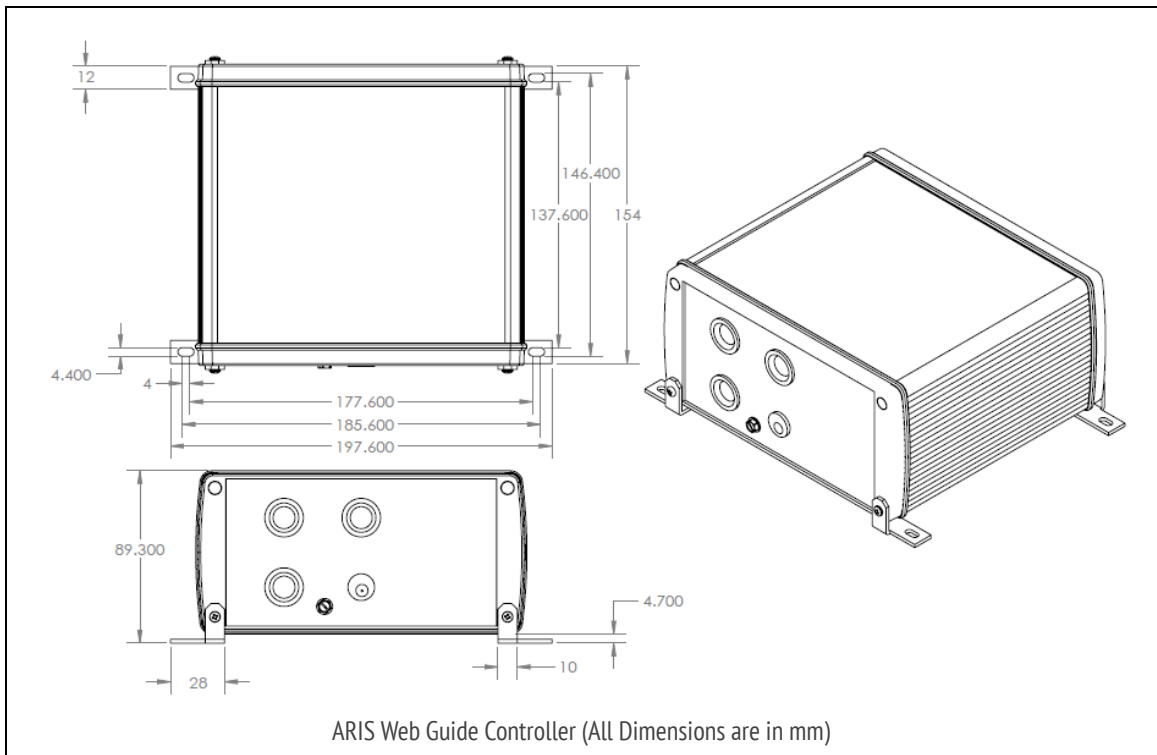
Power Input

The ARIS Web Position Sensor operates under 24 VDC (± 5%) power with a maximum current of 3 Amps. There are two power port options available: (1) pre-wired or (2) power jack connector.

Prewiring

In the pre-wired option, the unit may come with a 2.5 meter long power cable (through a gland nut) for the customer to connect to an appropriately grounded 24 VDC power source. There are three conductors in the power cable. The red colored conductor is the 24V power, the black colored conductor is the DC return or electronic circuit ground, and the white colored conductor is the earth ground or PE. For safety and for normal operation, the ARIS web sensing system, the equipment to which the sensor is installed must be properly grounded.

Switchcraft DC Connector

Sealed Switchcraft L712AS power jack port option is available on the SCU. A mating Switchcraft 761KS12 plug connector or a pre-assembled Switchcraft CARA761KS07984 or a pre-assembled Switchcraft CA761KS07984 can be used to supply power. For the plug connector the 24 VDC power should be supplied to the tip/center pin and electronic ground on the sleeve pin. For the cable assembly the 24 VDC should be connected to the red cable and the electronic ground connected to the black cable.

Industrial DIN Rail Power Supply

Industrial DIN rail mountable power supply such as Mean Well SDR-75-24 can be used to supply the 24VDC power. This is an available purchase option.

Desktop Adaptor

AC-DC desktop adaptor such as Mean Well GS90A24-P1M can be used to supply the 24VDC power. This is an available purchase option.

Sensor Interface

The signal from the sensor head is processed using digital processing algorithms implemented in the hardware within the web guide controller. The 10 conductor shielded cable from the sensor head is connected to the controller unit using a right angled 12 pin circular DIN connector (Amphenol C 091 A/D series). Each sensor control unit can process signals from two sensors through the two sensor ports[1].

Display Interface

A remote pluggable touch screen display unit is available in certain models. A 5 pin circular DIN connector (Amphenol C 091 A/D series) is provided to allow the connection of pre-wired remote touchscreen interface to the web guide controller. The remote touchscreen interface is pre-wired with the required male 5 pin DIN connector.

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[1] The number of sensor ports depends on the actual controller purchased.

Motor Interface

A pre-wired or a connector based motor interface to control the motor/actuator is available on this port. A bipolar stepper motor with a nominal coil voltage of up to 4 Volts and a RMS current of up to 2 Amps can be controlled by the web guide controller.

Prewiring

With a pre-wired option two pairs of 22 AWG shielded insulated cables (such as Alpha Wire 2466C) are provided. The cable color and corresponding function information is provided below:

Color	Signal
Red	Coil B Pin 2
Black	Coil B Pin 1
Green	Coil A Pin 2
White	Coil A Pin 1

M8 4-pin Connector

Optional M8 4-pin connector (such as Phoenix Contact SACC-DSI-M 8MS-4CON-M 8/0,5) is available with certain models. The pin output for such a connector is shown below.
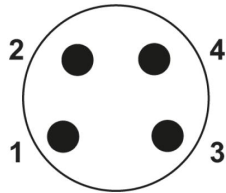
Pin #	Signal
1	Coil B Pin 2
2	Coil B Pin 1
3	Coil A Pin 2
4	Coil A Pin 1

Guide Lock Cable

A three conductor cable (such as Alpha Wire 1213C) which connects to a dry contact switch which can stop the functionality of the web guide is also available. This functionality can be used to lock the web guide in place when the external switch is open. For safety of the operators, please follow standard Lockout/Tagout procedure while performing any function near the web guide.

The functional wiring diagram to implement this functionality is shown on the right. In a typical installation the Red and White conductors should to connected to one terminal of the dry contact switch and the Black conductor to the other

Guide Lock
Cable
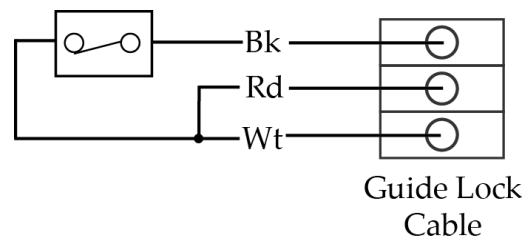
terminal of the dry contact switch. Whenever the switch is closed the guide will function normally. And whenever the switch is open then the web control controller will stop sending commands to the actuator thereby preventing the motion of the web guide.

In case the case where there is no need for a guide lock switch, all the three conductors can be shorted to enable the web guide to operator normally all the time.

Remote Operator Interface

A touch screen operator interface pre-wired with a connector cable is available in certain models. A 5 pin male circular DIN cable connector allows the connection of the remote operator interface to the web guide controller.

Actuator

A standard off-the-shelf actuator is provided with the retrofit kit. The supplied actuator is a Nema 23 linear hybrid actuator from Haydon Kerk. Two options are for linear thrust of 333 N (57H42-3.25-815) and 900 N (57H4A-3.25-815) are provided based on the application need. Typical stroke length for the actuators are 1.5" while other stroke length options are also available upon request.

The installation of the actuator into the web guide depends on the type of web guide. Please contact Roll-2-Roll Technologies for any assistance on the actuator installation on the web guide.

OPERATION AND OPERATOR INTERFACE

Main Operator Interface Screen

The ARIS web guiding system operation is accomplished through the main operator interface located on the web guide; some models may have remote operator interface. The interface uses a language independent icon based screen that allows ease of operation. Fig. 11 shows an image of the Operator Interface screen:
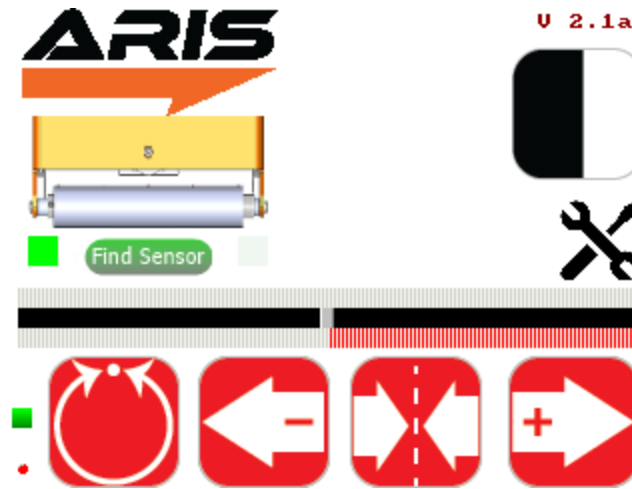

Fig.11: ARIS Operator Interface (Manual Mode)

The interface is a resistive touch screen panel. 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. Care must be taken to clean the touch screen surface periodically.

Its icon based design allows for a language independent operation without the need of translation of the screen for setup and operation in different countries.

Automatic/Manual Operation

 Manual   Automatic

The web guide can be put into manual or automatic operation mode by pressing this icon. The guide is in manual operation when the icon is red and is in automatic mode when the icon is green. When the guide is in manual mode and the icon is pressed, the guide will switch to automatic mode. When the guide is in automatic mode and the icon is pressed the guide will be put into manual mode.

- The guide should be placed in manual operation during initial setup of the guide, or during routine maintenance of the production line.
- The guide must be placed in automatic operation when the production line is in production mode.

WARNING: Changing from one mode to another can result in 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 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.

A few icons on the operator interface are enabled or disabled as the web guide is switched between manual and automatic mode based on the available options in each mode. Fig. 12 shows the operator interface while the web guiding system is in automatic mode. The advanced setup and sensing mode icons are disabled.

Fig. 12: ARIS Operator Interface (Automatic Mode)

Servo-Centering Operation

 Servo-centering off

 Servo-centering on

The servo-centering operation automatically centers the guide roller assembly of the guide.

- During normal operation the icon will be in red.
- Upon pressing the icon, the icon turns green and the guide automatically moves the rollers to a factory preset center position. Once centered the icon returns to red indicating that it has finished the procedure and that servo-centering is off.

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

WARNING: Servo centering operation result in 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 Operation

 Jog-left off

 Jog-right off

 Jog-left on

 Jog-right on

The Jog-left/Jog-right icons allow the operator to manually move the guide roller assembly to the left or to the right as needed. These operations can be performed only when the web guide is in manual operating mode.
- The Jog-left/Jog-right operation icon indicates the operation is off when the icon is red.
- When the operator turns the Jog-left or Jog-right ON by pressing the icon, the guide will start moving to the left or right position. The respective icon will turn green during the Jog operation and will turn back to red when the operation is stopped.

The Jog operation can be stopped at any time by pressing the respective icon any time during the jog. If the guide reaches the extreme position, the jog operation will stop automatically. This operation can only be performed when the guide is in manual setting.

The left position of the guide is defined as the left side of the guide if the operator is viewing the guide from the downstream position (facing the sensor). Similarly, the right position of the guide is

defined as the right side of the guide if the operator is viewing the guide from the downstream position.

WARNING: *Jog-Left and Jog-Right operations result in change in the web guide position causing process upset. Caution must be exercised when performing these function 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.*

Guide Point Adjustment

The guide point of the web guiding system (reference or the desired location of the web with respect to the sensor) is set to 50% of the sensing window of the sensor when shipped from the factory. In this setting the web will be guided to a position exactly in the middle of the sensing window. The guide point can be adjusted to a different location ranging from 25% to 75% of the sensing window. This setting is absolute irrespective of the sensor position. The current guide point setting is indicated by the guide point indicator as shown in Fig. 13.
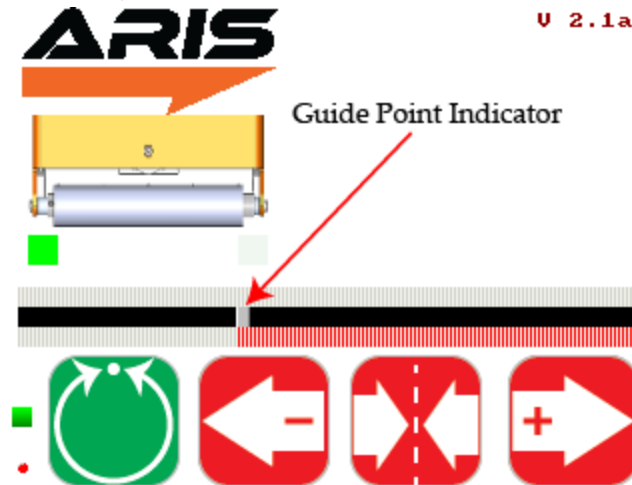

Fig. 13: Guide Point Indicator

The guide point can be adjusted by pressing the left (-) and 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 5%. This change is immediately displayed by the guide point indicator. Pressing the middle icon (servo-centering icon) will reset the guide point to 50%.

WARNING: *The Guide Point Adjustment operation result in 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: Guide Point Adjustment can be performed only when the web guiding system is in automatic mode. Pressing the icons during manual operation will perform a different function.

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.*

Web Position Indicator

A horizontal bar graph indicator (see Fig. 14) is available on the operator interface to indicate the position of the web as seen by the sensor.
Depending on the position and orientation of the sensor the bar graph may increase:
- from left to right for an edge sensor located on the right side of the guide
- from right to left for an edge sensor that is located on the left side of the guide.

The top web position indicator displays the right edge of the web and the bottom web position indicator indicates the left edge of the web. When two sensors (one left and one right) are connected or if a wide sensor is connected the edge position indicator may indicate both the left and the right edge of the web.
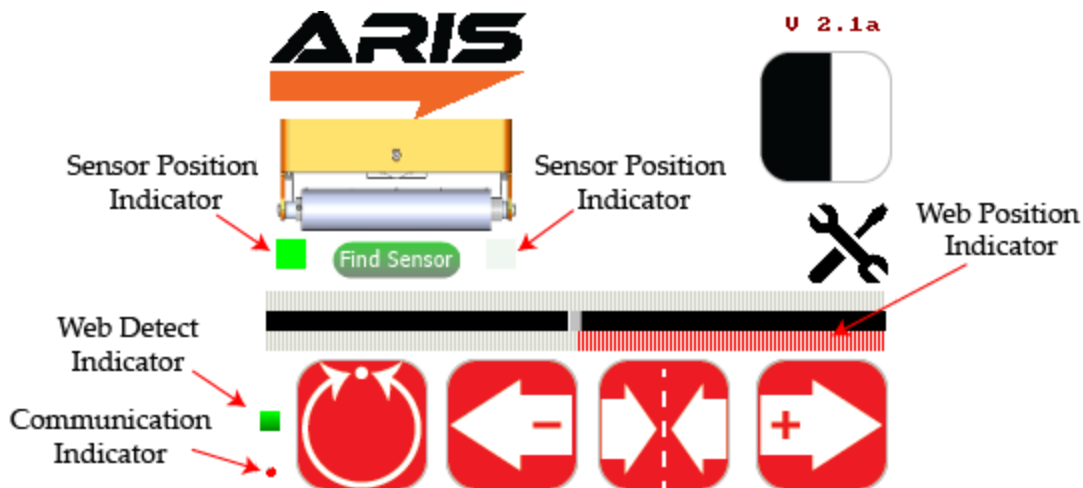

Fig. 14: ARIS WGS Operator Interface

Web Detected Indicator

A small square indicator on the bottom left part of the screen (see Fig. 14) indicates the presence and absence of the web as seen by the sensor.
- Whenever the sensor sees a web or a web edge, the indicator turns green.

- When the web is outside the sensing window the green indication goes off.

This web detect indicator can be used for troubleshooting purposes. If this indicator turns off intermittently while a web is in front of the sensor it may indicate that the sensor is finding it difficult to accurately sense the web. This indicates a low contrast condition for the sensor. Such a condition may occur for optical grade clear webs with low scattering in the infrared spectrum.

Sensor Position Indicator

The position of the sensor is indicated by two square indicators on the display (see Fig. 14) that are located downstream of the web guide picture.

- The indicator turns green to display the position and orientation of the sensor with respect to the guide and the web edge.
- If no sensor is attached to the web guiding system then both the indicators will turn gray.
- If two sensors (one right and one left) are attached to the web guiding system or if a wide sensor with center guiding option is used, 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 guide.
- The operator can find the correct position of the sensor by pressing the find sensor button that automatically detects the position of the sensor.

Find Sensor Button

The Find Sensor Button (see Fig. 14) can be used to automatically detect the position and orientation of the sensor with respect to the web guide and the web edge. Once the button is pressed the button will change state (as shown in Fig. 15) until the web edge is found.

- This button should be used whenever the sensor position is changed or when the edge orientation is changed.
- When the edge orientation changes, the bar graph will also change orientation.
- Find sensor button is activated only when the web guiding system is in manual mode.
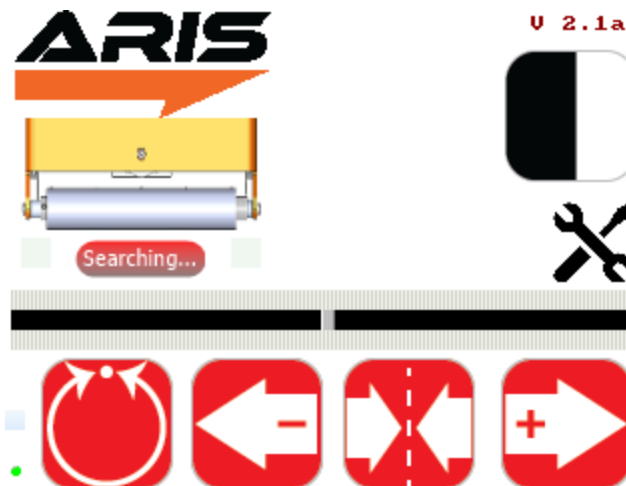

Fig. 15: Find sensor operation

Communication Indicator

A round indicator at the left bottom of the operator interface (see Fig. 14) indicates the communication between the electronic controller board and the operator interface.

- This indicator is used for troubleshooting purpose.
- During normal operation this indicator will switch between red and green at a frequency of about 2 to 4 Hz.

Edge/Contrast Web Position Sensing

 Edge sensing

 Contrast sensing

Depending on the type of sensor (infrared or white light or ultraviolet) the ARIS web guiding system can operator in either edge sensing mode or contrast sensing mode. The default configuration is edge sensing with infrared light source.

In edge sensing mode the sensor will look for the web edge scanning from the outside to the inside of the sensor. For a left sensor the scan goes from left to right, while for a right sensor the scan goes from right to left (see Fig. 16).
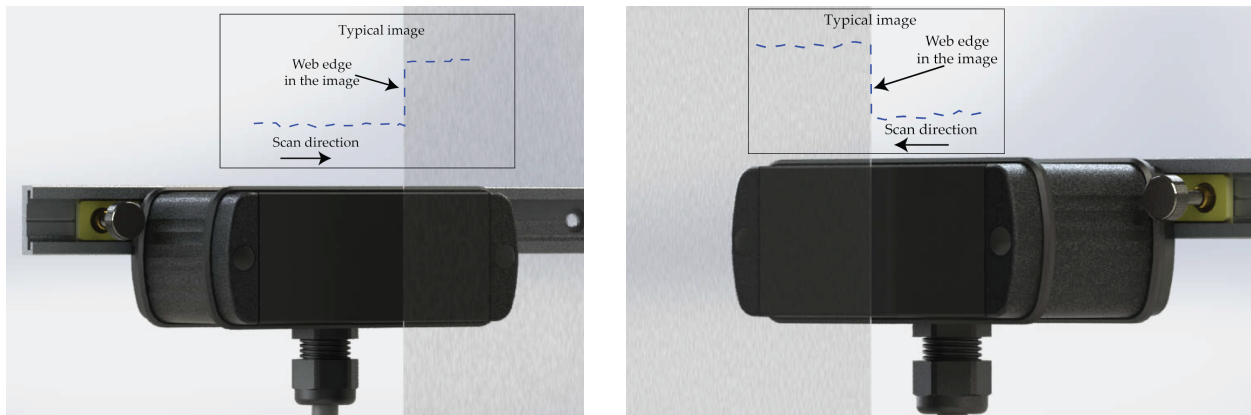

Fig. 16: Left sensor orientation (left) and right sensor orientation (right)

Contrast sensing mode is intended to be used only with white light sensor. This sensing mode can be used to detect a line or a contrast in the web. In contrast sensing mode the position, of the first contrast change in the web, as the sensor scans from inside to outside is detected. An additional setting to optimize the sensor performance (contrast adjustment) is available for advanced users through the advanced setting screen.

WARNING: Do not use contrast sensing method with an infrared sensor unless there is a specific need that has been already identified and tested.

WARNING: The Edge/Contrast sensing icon is visible, and can be used, only when the web guiding system is in manual mode.

WARNING: Both edge and contrast sensing method may work with white light. Additionally optical clear material may be difficult to sense with a white light option.

Advanced Settings Screen

The ARIS Web Guiding System is a truly plug and play system without any need for setup or calibration. However, it may be necessary to adjust a few parameters in rare occasions based on the processing conditions. The advanced setting screen (see Fig. 17) will allow the user to adjust three parameters: motor speed, minimum contrast and web width.
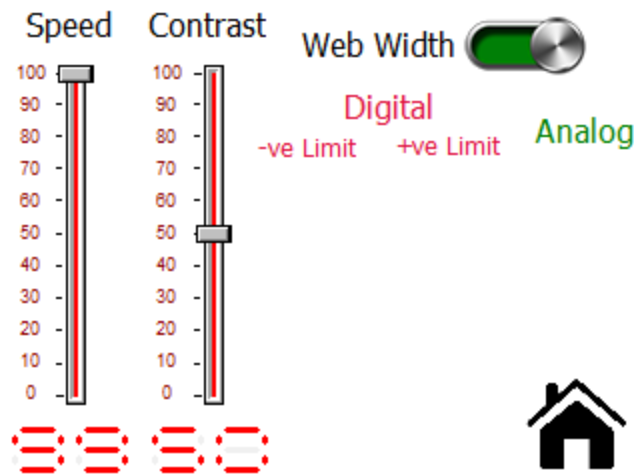

Fig. 17: Advanced Settings Screen

Motor Speed

In rare occasions when the web guide reaction speed needs to be reduced the speed slider can be used to vary the speed. The default setting corresponds to 99% of the maximum speed and the speed can be reduced all the way up to 0%. The speed reduction may be necessary while handling delicate material such a thin foils.

WARNING: When the speed is set to 0% the web guide will not respond in the automatic mode.

Minimum Contrast

When contrast web position sensing method is chosen the contrast slider can be used to set the minimum contrast that the web position sensor can detect. The default setting is 50 with a minimum of 0 and a maximum of 100. This relative scale adjusts the contrast sensitivity of the sensor output.

WARNING: The minimum contrast setting will have no effect when edge position sensing method is used.

WARNING: A very low contrast setting will make the sensor to be extremely sensitive to minute contrast difference.

Web Width

Web width changes can be monitored in real-time for quality control purposes using the ARIS Web Guiding System. The web width selection slider (only available in certain models) can be used to set the type of width output from the web guiding system. The output is an analog voltage based on the choice of width measurement or width monitoring. This setting is valid only when two sensors, one left and one right, or a wide sensor is used.

Analog Output

When the width output is set to be analog, the ARIS Web Guiding System sends an analog output ranging between 0 to 10 Volts based on the percentage of the sensor(s) covered by the web. For example, with a wide sensor if the web covers 60% of the sensor window 6 Volts is output. If two sensors are used, one left and one right, then the output will be the total percentage of the two sensors covered by the web on either side.

Digital Output

The digital output option can be used for event based web monitoring. When this option is selected additional settings are available to the user as shown in Fig. 18.
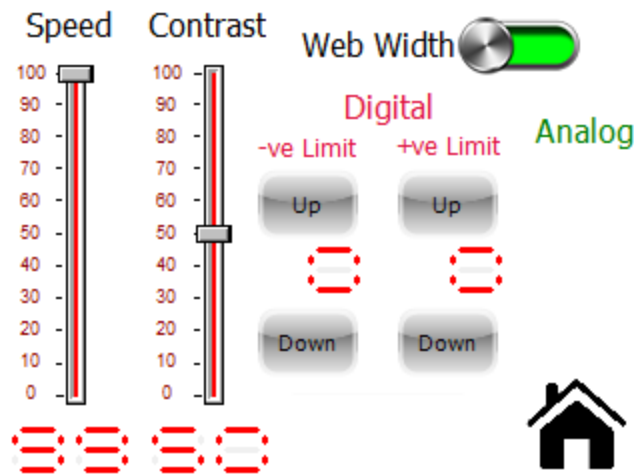

Fig. 18: Digital width output settings.

A lower (-ve limit) and an upper (+ve limit) web width tolerance can be set to trigger outputs based on web width. By default the lower and upper limits are set to zero. The resolution of the tolerances is in millimeters. By using the up and down buttons the lower limit and the upper limit can be changed. Any change in the limits must be accepted by pressing the "Accept Limits" button that becomes visible when the limits are changed (see Fig. 19). The nominal web width is recorded at the instant when the "Accept Limits" button is pressed. As soon as the "Accept Limits" button is pressed the button disappears indicating the limit acceptance as shown in Fig. 20.
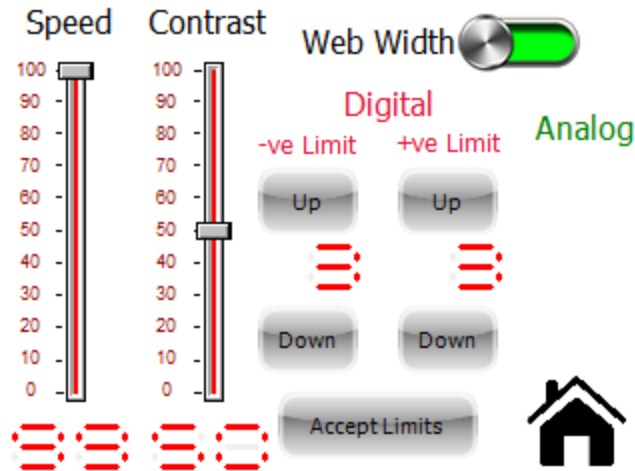
Fig. 19: Accept Limits button is visible after a limit change.

When the web width increases above the positive limit a positive high signal (+10V) is sent out by the ARIS Web Guiding System. Similarly when the web width decreases below the negative limit a negative low signal (–10V) is sent out. When the web width is within the positive and negative width limits 0V is output.
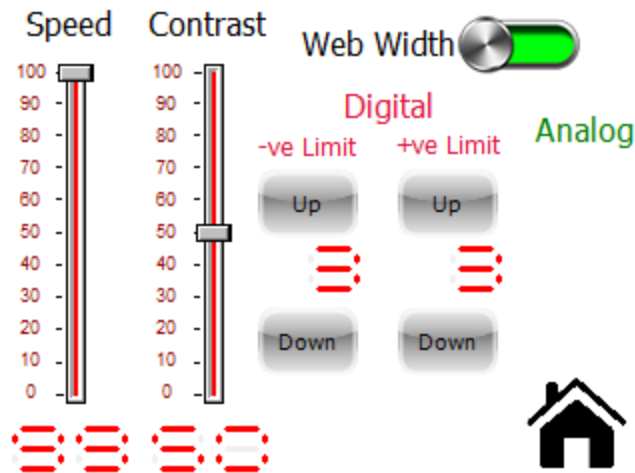
Fig. 20: User interface after the pressing Accept Limits button.

WARNING: This option may not be available on all the web guiding systems.

WARNING: If only one edge sensor is present then the output from the web guiding system, irrespective of the web width setting, will be an analog voltage between 0 to 10 Volts proportional to the web position (the percentage of the sensor covered by the web).

WARNING: Whenever a different web material with different nominal width is used the nominal width and the limits must be reset.

Software Servo Center

In certain models the hardware servo center sensor may not be available. In those controllers an option to set the servo center in software is available. The following describes the procedure.

Manually Center the Guide to the Desired Center Position

In order to set the servo center the user should manually move the web guide and position it in the middle of its stroke so that the web guide rollers are exactly parallel to the rollers in the machine. The left (–ve) and the right (+ve) icons can be used to make fine adjustments to the web guide position. If gross movement of the web guide is required, then the user can use the Jog Left and Jog Right button on the main screen to make gross adjustments, before using the small adjustment buttons in the setup screen.
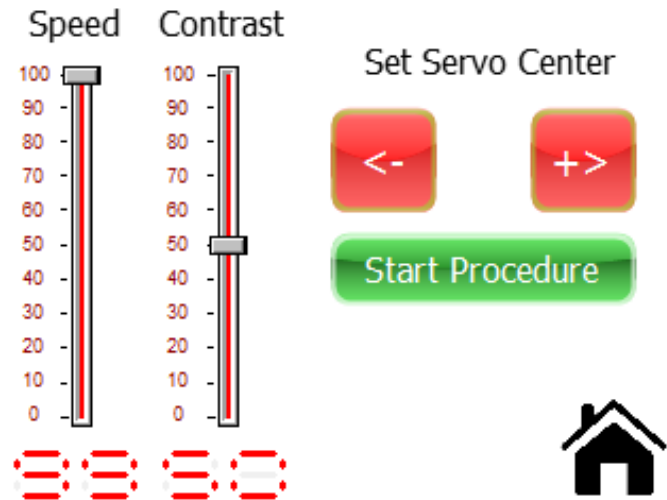
Start Servo Center Setup Procedure

Once the web guide is in the desired position, the user can press the "Start Procedure" button to initiate the automatic procedure. During this procedure, the web guide will move to one extreme and then to the other before moving back to the original position. This procedure automatically detects the two extreme position for the web travel. During this procedure the user may or may not hear the sound of the actuator when the guide is at the extreme position; this is normal.

Servo Centering Operation

Once the servo center setup procedure is complete then servo center button on the main screen can be used to center the web guide in the future. The user should try and jog the web guide and also servo center the web guide to ensure that all these operations are functioning as desired.

WARNING: This option may not be available on all the web guiding systems.

WARNING: Do not turn the power off during the middle of this process. If the power is switched off in the middle of the process please carry out the procedure once again.

WARNING: This procedure only during the commissioning. After commissioning the operator can use the servo center button to put the web guide in the center location.

COMMISSIONING

A properly installed web guide requires correct threading of the web over the guide rollers and initial positioning of the sensor based on the desired position of the web to provide optimum performance. Once the material is threaded over the guide rollers and the sensor has been properly positioned, all the operator has to do is to press the automatic operation icon on the operator interface.

The following section describes the steps and conditions required for automatic operation of the ARIS Web Guiding System.

1. Power ON the system
2. Automatic/Manual operation set to "Manual" (Automatic/Manual icon pressed to red)
3. Press the Servo-Center button to center the guide rollers.
4. Thread the material over the rollers. The material wrapped over the rollers must be at a 90 degree angle both at the entry and exit of the guide rollers.
5. Verify that the material is aligned in the desired position with respect to the upstream and downstream position of the web. Place web under normal operation tension.
6. Adjust sensor position on the desired edge of the web. Then manually position the sensor so that the edge of the web is at the middle of the sensing window. This can be done by observing the web edge position indicator on the display. When the bar is in the middle position then the web edge is in the middle of the sensing window.
7. If the sensor position indicator and the actual position of the sensor are different then press the "Find Sensor" button on the operator interface so that the guiding system automatically find the correct orientation of the edge sensor. In order for this function to work the web edge needs to be in the middle of the sensing window.
8. Tighten the sensor thumbscrews to secure the sensor position on the sensor rail.
9. Press the Automatic/Manual operation icon to "Automatic" (Automatic/Manual icon pressed to green).
10. The guide will automatically adjust the position of the web material to guide it to the correct position.

General Maintenance

The ARIS Web Guiding System is virtually maintenance free. However, the sensor lid should be cleaned to remove any dust particles that might accumulate on the surface.
- You may use any lens cleaning solutions available in the market.
- Do not use use petroleum based products as these can damage the sensor cover and affect its performance.

This cleaning can be done as part of a weekly maintenance schedule or as required by usage or environmental conditions.

TROUBLESHOOTING

Problem	Probable Cause	Action
Sensor indicator does not light up and the sensor does not find the web.	Background or faulty sensor cable or connection.	* Ensure that the background in the field of view of the sensor is dark. Any bright surfaces may reduce the contrast levels and can prevent automatic find sensor operations. * Ensure that the sensor cable is properly connected. Disconnect the cable and reconnect it and use the find sensor button procedure. * If that does not fix the problem try a different sensor head. * If that does not fix the problem please call support.
The touch screen does not work and the communication indicator is not blinking.	Communication between the electronic hardware and the operator interface is lost.	* Power cycle the web guiding system to see if the communication is reestablished. * If that does not fix the problem, please call support.
The web guide is not moving in automatic mode.	Faulty cable or connection. or Software soft stop reached.	* Check the sensor cables and connection to ensure that the sensor sees the web. * If the sensor works properly, then try to manually jog the web guide away from the center position. The web guide will stop jogging when the software soft stop is reached. While jogging, the actuator may produce a noise because of the hard stop. It is normal. Once the software stops jogging, push the automatic button again. * If that does not fix the problem, please call support.

APPLICABLE MODELS

Sensor

Model Number	Description	Part Number
ARIS WPS 16-IR	Light source: Infrared; Width: 16 mm	3-000011
ARIS WPS 16-WL	Light source: White light; Width: 16 mm	3-000021
ARIS WPS 48-IR	Light source: Infrared; Width: 48 mm	3-000012
ARIS WPS 48-WL	Light source: White light; Width: 48 mm	3-000022
ARIS WPS 48-UV	Light source: Ultraviolet; Width: 48 mm	3-000032
ARIS WPS 221-IR	Light source: Infrared; Width: 16 mm	3-000014

Control Unit

Model Number	Description	Part Number
ARIS SCU M	Stand alone basic controller	4-000122
ARIS SCU MD	Basic controller + integrated touch screen display	4-000121
ARIS SCU MR	Basic controller + remotely mounted screen display	4-000123
ARIS SCU MC	Basic controller + industrial ethernet (Ethernet/IP)	4-000112
ARIS SCU MC	Basic controller + industrial ethernet (PROFINET)	4-001112
ARIS SCU MCD	Basic controller +Ethernet/IP + integrated touchscreen display	4-000111
ARIS SCU MCD	Basic controller +PROFINET + integrated touchscreen display	4-001111
ARIS SCU MCR	Basic controller +Ethernet/IP + remotely mounted touchscreen display	4-000113
ARIS SCU MCR	Basic controller +PROFINET + remotely mounted touchscreen display	4-001113

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.

Roll-2-Roll Technologies LLC
1414 S Sangre Rd
Stillwater, OK 74074
Website: https://www.r2r-tech.com

Technical Support Phone: +1 (888) 290-3215 - ext 3
General Support Phone: +1 (888) 290-3125 - ext 1

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

Return shipping instructions

Please contact us to obtain a return merchandise authorization (RMA) number before returning the product to us. 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	Jan 2017	Initial Release Version

Hardware Revision

Version	Date	Description
SCU V2	Dec 2014	Initial version with 12 VDC input
SCU V3	Jun 2015	Expanded version with 24 VDC input
SCU V4 Rev B	Oct 2015	Two sensor option, WDT, RTCC
SCU V4 Rev C	Mar 2016	Analog Output
SCU V4 Rev D	July 2016	Industrial ethernet option

Firmware Revision

Version	Date	Description
1.0	Jan 2015	Initial version, single sensor
1.1	Aug 2015	Firmware update for SCU V3, automatic sensor state detection
1.2	Nov 2015	Firmware update for SCU V4 Rev B. Modified sensor algorithm to increase precision and accuracy.
1.3	Dec 2015	Two sensor option with automatic pixel detection
1.4	Mar 2016	Background suppression algorithm
1.5	Apr 2016	Analog output
2.1a	Aug 2016	Firmware update for SUC V4 Rev D
2.2b	Dec 2016	Ethernet/IP implicit messaging, edge detection algorithm updates
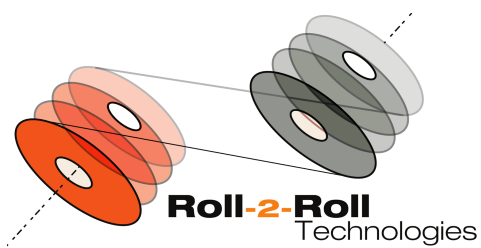
Roll-2-Roll Technologies LLC
1414 S Sangre Rd
Stillwater, OK 74074
www.r2r-tech.com
info@r2r-tech.com
+1-(888)-290-3215