

# INSTRUCTION MANUAL

MICRO 1000® Web Guide Control System



Guiding  
**PERFORMANCE**  
Leading  
**TECHNOLOGY**



P.O. Box 7816 • Madison, Wisconsin 53707

Ph: 608/223-0625 or 1-888-422-2893 • Fax: 608/223-0074 • E-mail: [frontdesk@bstna.com](mailto:frontdesk@bstna.com)



# MICRO 1000® Web Guide Control System

## Software Versions:

CTL 25.xx

DLG 21.xx

RMT03 GP21.xx

RMT03 AR21.xx

## Table of Contents

MICRO 1000® Web Guide Control System.....	3
<i>Introduction</i> .....	4
<i>Installation</i> .....	7
<i>Operation</i> .....	10
<i>Troubleshooting</i> .....	11
MICRO 1000® Controller.....	15
<i>Introduction</i> .....	16
<i>Parameters</i> .....	16
<i>Appendix 1 / Parameter Summary</i> .....	33
<i>Appendix 2 / Error Codes</i> .....	36
<i>Appendix 3 / Oscillation Function (Optional)</i> .....	37
<i>Appendix 4 / Inhibit Input</i> .....	39
<i>Appendix 5 / PLC I/O Board</i> .....	40
<i>Appendix 6 / Serial I/O Board</i> .....	44
<i>Appendix 7 / Chaser-Follower Configuration</i> .....	45
PointSource™ and WideArray™ Edge Detectors .....	47
<i>Introduction</i> .....	48
<i>Setup</i> .....	49
<i>Calibration</i> .....	50
<i>Maintenance</i> .....	51
AccuBeam® 3 Digital Line Guide Sensor .....	52
<i>Introduction</i> .....	53
<i>Installation</i> .....	54
<i>Operation</i> .....	55
<i>Calibration</i> .....	57
<i>Parameters</i> .....	63

<i>Keypad Lock</i> .....	70
<i>Troubleshooting</i> .....	71
<i>Maintenance</i> .....	72
<i>Appendix 1 / Parameter Summary</i> .....	73
<i>Appendix 2 / Line Guide Test Pattern</i> .....	74
AccuWeb® Linear Actuators.....	75
<i>Introduction</i> .....	76
<i>Setup</i> .....	76
<i>Maintenance</i> .....	76
Remote Station - Guide Point Adjust.....	80
<i>Introduction</i> .....	81
<i>Installation</i> .....	81
<i>Operation</i> .....	82
<i>Parameters</i> .....	83
<i>Keypad Lock</i> .....	87
<i>Troubleshooting</i> .....	88
Remote Station - Auxiliary.....	89
<i>Introduction</i> .....	90
<i>Installation</i> .....	90
<i>Operation</i> .....	91
<i>Keypad Lock</i> .....	92
<i>Troubleshooting</i> .....	93
Service / Return Authorization.....	94
Restocking Policy.....	95
Warranty Policy.....	96
Installation Drawings.....	97

<p><b>Important!</b> Make sure the first two digits of the software version numbers shown on page 1 of this manual match the first two digits of the version numbers displayed by your controller, digital line guide or remote station. If they do not match contact AccuWeb to obtain the correct manual.</p>
---

AccuBeam®, AccuWeb®, MICRO 1000®, and MICRO 4000® are registered trademarks of AccuWeb, Inc.

PointSource™ and WideArray™ are trademarks of AccuWeb, Inc.

## MICRO 1000<sup>®</sup> Web Guide Control System



## Introduction

The MICRO 1000 Web Guide Control System is a microprocessor-based control system for small to medium-sized web guides. It is compatible with AccuWeb's dynamically compensated ultrasonic and infrared edge detectors, digital line guide, remote stations, and small to medium-sized linear actuators.

A MICRO 1000 system can include up to seven main components:

### 1. Edge Detector or Line Guide Sensor

#### PointSource and WideArray Compensated Edge Detectors

- Ultra-compact housing
- Available with sensing areas ranging from 0.2" to 18.6" wide [5mm to 472mm]
- Available with gap widths ranging from 1.5" to 4" [38mm to 102mm]
- Fully compensated for temperature, humidity, dust, and most other process contaminants
- Immune to passline variation and web flutter
- Suitable for long cable length applications
- Ultrasonic models are ideal for transparent or opaque film, paper, and foil web materials
- Infrared (IR) models are ideal for non-wovens and other porous web materials

#### AccuBeam 3 Digital Line Guide Sensor

- Ultra-compact housing
- Three light source colors and three illumination angles provide optimal lighting
- Line and edge guiding modes
- Pattern matching algorithm locks onto hard-to-see lines
- Auto-calibration automatically selects optimum settings
- Environmentally-sealed function switches and display
- Suitable for long cable length applications

## **2. MICRO 1000 Controller Board**

- Single-board design
- Auto-recovery after power interruption
- Non-volatile memory for user-settable parameters and operating modes
- On-board parameter entry keypad and display
- Two edge detector inputs for centerline guiding
- PWM motor drive:
  - 22 kHz switching frequency
  - 120 watts continuous output power, 30 volts at 4 amps
  - 10 amp peak current limit
  - Thermistor-based over-temperature protection
- Actuator end-of-travel inputs:
  - Potentiometer input for electronically-adjustable limits
  - Limit switch inputs for fixed limits
- Inhibit input
- Switch-selectable input voltage: 90-132 VAC or 180-264 VAC, 50/60 Hz, single-phase

## **3. MICRO 1000 Enclosure**

- Low profile
- Environmentally-sealed function switches
- Cam-locked door with double-bit insert key
- External mounting feet

## **4. AccuWeb Linear Actuator**

- Available with brush DC motors up to 120 watts (1/8 HP).
- Available with standard stroke lengths up to  $\pm 6"$  [ $\pm 152\text{mm}$ ] (other lengths available upon request)
- Available with limit switches or potentiometer for sensing end-of-travel limits and servo-center position

## **5. Remote Station (optional)**

- Rugged, ultra-compact housing
- Remote guide point adjustment or remote access to digital line guide's front panel
- Environmentally-sealed function switches and display

## **6. PLC I/O Board (optional)**

- Links the MICRO 1000 system with a remote PLC
- Opto-isolated digital I/O provides control of operating mode and monitoring of end-of-travel status and other indicators

## **7. Serial I/O Board (optional)**

- Links the MICRO 1000 controller with a remote station and/or digital line guide

### **Product Specifications:**

- Enclosure size (H x W x D): 6.00" [152mm] x 12.00" [305mm] x 3.37" [86mm]
- Power requirements: 90-132 VAC or 180-264 VAC, 50/60 Hz, single-phase
- Operating environment:

Maximum ambient temperature	120 deg F [48.9 deg C]
Humidity	0-90% non-condensing



## Installation

The MICRO 1000 system has been tested, calibrated, and run at the factory in a closed-loop configuration. After installation, most systems may be started up and operated without further adjustment. Refer to the connection and wiring diagrams on page 97 for cable installation information.

**OEMs:** If shipping clamps and spreaders are removed, make sure that they are re-installed prior to forwarding to the final destination. Verify that all mechanical and electronic components are secured for shipment.

### 1. Linear Actuator and Guide

Install the web guide and linear actuator into the machine. Refer to the guide and actuator application drawings on page 97 for installation information. Once the web guide is installed, it must be trammed to the rest of the machine.

**Note:** Make sure the actuator is in the servo-center position before tramping the web guide. This may not be possible until after step 5, below.

**Important:** Special attention must be given to the actuator mounting. Any mechanical compliance or backlash in the actuator mounting will seriously affect guiding accuracy. Deflections of a few thousandths of an inch will reduce the performance of the system. Also, an anti-rotation bracket is required for most applications. The actuator must be allowed to gimbal slightly on the ball rod ends to accommodate minor actuator mounting misalignment.

**Note:** Motor contains no temperature-sensing device to protect motor from excessive temperature due to failure-to-start or overload. Motor should be protected by other means in accordance with the NEC and local code requirements.

### 2. Sensor (Edge Detector or Digital Line Guide)

Install the sensor (edge detector or digital line guide). Refer to the guide and sensor application drawings on page 97 for installation information. Use of the AccuWeb edge detector mounting bracket simplifies installation and adjustment.

The sensor cable should be long enough so that the sensor may be repositioned if the web width or web path changes. The standard cable length is 12 feet. Longer cables are available upon request.

**Note:** The cables supplied with the system have been chosen for specific shielding and capacitance properties. DO NOT splice or replace these cables with any other style or configuration of cable. This can cause serious degradation or complete loss of system performance. DO NOT SPLICE CABLES. Longer cables are available upon request.

### 3. Control Enclosure

Install the control enclosure on a rigid mount such as a wall or secure framework. Do not install the control enclosure on the side of a dryer or in other high temperature areas. Also, do not install the control enclosure on a moving winder structure.

### 4. Electrical Power

**Note:** Electrical power must be provided from a customer-supplied disconnect. Connections must comply with NEC 590 and other local codes.

- a) Verify that the power source is *off* and locked out.
- b) Install the electrical power cord through the right-most cord grip.
- c) Connect the cable to the terminal block located inside the enclosure.
- d) Make sure the circuit board is free of metallic debris such as screws, lockwashers, and wire strands.
- e) If any of the cables have been removed, shortened, or modified in any way, make sure the connections agree with the appropriate connection and wiring diagrams located on page 97.

## 5. Static Test

- a) Apply power to the system.
- b) Press the MANUAL button.
- c) Press the IN and OUT buttons several times. The actuator and web guide mechanism should move freely and without hesitation.
- d) Press and hold the IN button. When the guide mechanism gets near the In limit, release the button.
- e) Jog the IN button repeatedly until the actuator automatically stops at its end-of-travel limit.

**Caution:** If the actuator or web guide mechanism hits a mechanical obstruction before the actuator stops automatically at its end-of-travel limit, release the button immediately. Continued activation will cause serious damage to the actuator motor and/or guide mechanism.

- f) Repeat the previous two steps using the OUT button in order to check the Out limit.
- g) Press the SERVO-CENTER button and verify that the actuator drives to the center of its stroke.

## 6. Dynamic Test

- a) Press the SERVO-CENTER button and verify that the actuator drives to the center of its stroke. This also places the web guide in its center (or *tram*) position.
- b) Thread the web through the machine and put a slight tension on it so that the web is in its normal operating position.

**Repeat steps c) through h) for each sensor:**

- c) Press the SERVO-CENTER button.
- d) Position the sensor.

**Edge detector:** Place at the edge of the web. The edge detector's null indicator LED will turn off when the edge detector is positioned correctly. The scribed lines on the edge detector indicate the approximate location of the detector's guide point.

**Note:** The default calibration supplied with the system should work for most materials. However, if the null indicator LED does not turn off, then the detector may need to be calibrated. Refer to page 50 for calibration instructions.

**Digital line guide:** Position the sensor so that it is approximately centered over the registration line or edge. Calibrate the sensor (refer to page 57 for calibration instructions). When the sensor is calibrated and positioned correctly an indicator dot will appear in the display under the line or edge you want to track.

- e) Press the EDGE A, EDGE B, or LINE button to select the sensor under test.
- f) Press the AUTOMATIC button.
- g) Slowly move the sensor left or right and observe how the guide reacts. The guide should move the web so that it follows (or chases) the movement of the sensor.

**Edge detector:** The guide should move the web so that the edge of the web is always aligned with the edge detector's guide point.

**Digital line guide:** The guide should move the web so that the line or edge pattern is always aligned with the line guide's sight point.

**Note:** If the guide does not follow the movement of the sensor and moves in the opposite direction, then the sensor polarity (parameters 3, 4, or 50) is not correct and must be changed. Refer to page 16 for more information about setting controller parameters.

- h) If the guide mechanism oscillates around the guide point or overshoots excessively when steering in response to an abrupt change in web position, the servo gain (parameter 5) is too high and must be lowered. Refer to page 16 for more information about setting controller parameters.

## Operation

The MICRO 1000 may be configured for a wide variety of applications, but most configurations share the same basic operating procedure:

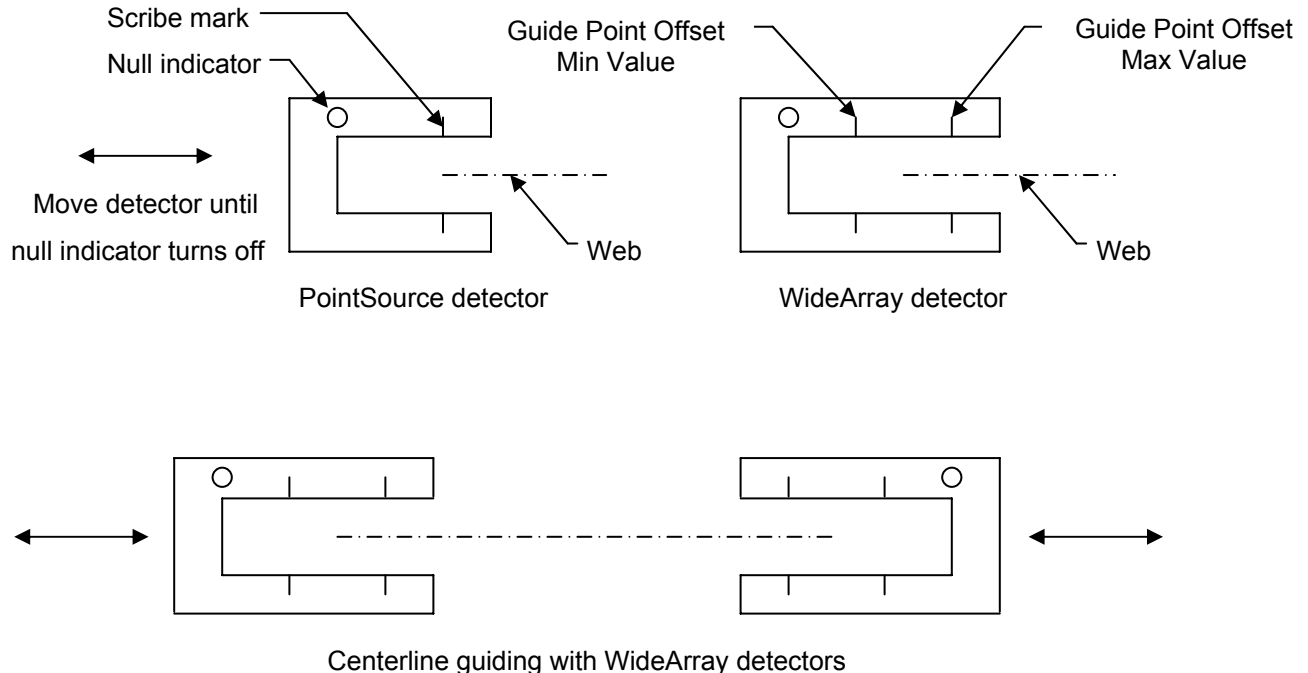
- 1) Press the SERVO-CENTER button and wait for the web guide to drive to the center of travel.
- 2) Thread the web through the machine.
- 3) Position the sensors.

**One edge detector:** Place the detector near the edge of the web. Move the detector towards the web until its null indicator LED turns off. **Note:** The scribed lines on the edge detector indicate the approximate location of the detector's guide point.

**Two edge detectors (centerline guiding):** Press the EDGE A button. Place detector A near the edge of the web. Move detector A towards the web until its null indicator LED turns off. Press the EDGE B button. Place detector B near the opposite edge of the web. Move detector B towards the web until its null indicator LED turns off. **Note:** The scribed lines on the edge detector indicate the approximate location of the detector's guide point.

**Digital line guide:** Position the sensor so that it is approximately centered over the registration line or edge. When it is positioned correctly an indicator dot will appear in the display under the line or edge you want to track. Refer to page 52 for more information about operating the line guide.

- 4) Press the EDGE A, EDGE B, or LINE button. For Centerline mode (centerline guiding), press the EDGE A and EDGE B buttons simultaneously.
- 5) Press the AUTOMATIC button. The system will now guide the web.



## Troubleshooting

The following checklist has been provided to assist in the analysis and repair of potential trouble situations with the MICRO 1000 system. If a situation occurs that is not described in this list, contact AccuWeb for assistance.

Problem	Solution
The system will not work in Automatic, Manual, or Servo-Center mode.	Check items 1, 2, 3, 4, and 5 in the table below.
When the system is in Automatic mode, the web guide steers the web in the wrong direction.	Check item 6 in the table below.
The system oscillates in Automatic mode even though web is not being pulled through the machine.	Check items 7 and 8 in the table below.
The system is unstable in Automatic mode while pulling web.	Check items 9, 10, 11, and 12 in the table below.
The actuator extends or retracts beyond the actuator's end-of-travel limits then jams.	Check items 13, 14, 15, 16, 17, 18, and 19 in the table below.
The web guide or actuator hits a mechanical stop before reaching the actuator's end-of-travel limit.	Check item 15 in the table below.
The system will not work in Automatic mode but works correctly in Manual and Servo-Center mode.	Check items 20, 21, and 22 in the table below.
While in Automatic mode the web guide or actuator moves too fast or slow in response to large changes in the position of the edge of the web (such as a splice).	Check item 23 in the table below.
While in Manual mode the web guide or actuator moves too fast or too slow.	Check item 24 in the table below.
The numeric display is showing a flashing '99' error code.	If error code is '10', then check item 5 in the table below, else refer to page 36 for more information about error codes.

Item	Description / Repair Procedure
1	<b>AC power.</b> If the LED data displays are not lit, check the AC power and repair if not connected.
2	<b>No output from the PWM motor drive.</b> Connect a digital voltmeter to the actuator motor leads at J4 terminals 1 and 2. Press the MANUAL button and then press and hold the IN or OUT button. If there is no voltage but the LED data displays are lit, the PWM motor output has failed and the system must be returned for repair.
3	<b>Actuator failure.</b> If there is motor voltage present in the previous step but the actuator does not move, the actuator motor or cable has failed. Troubleshoot and repair as required, or return the equipment for repair.

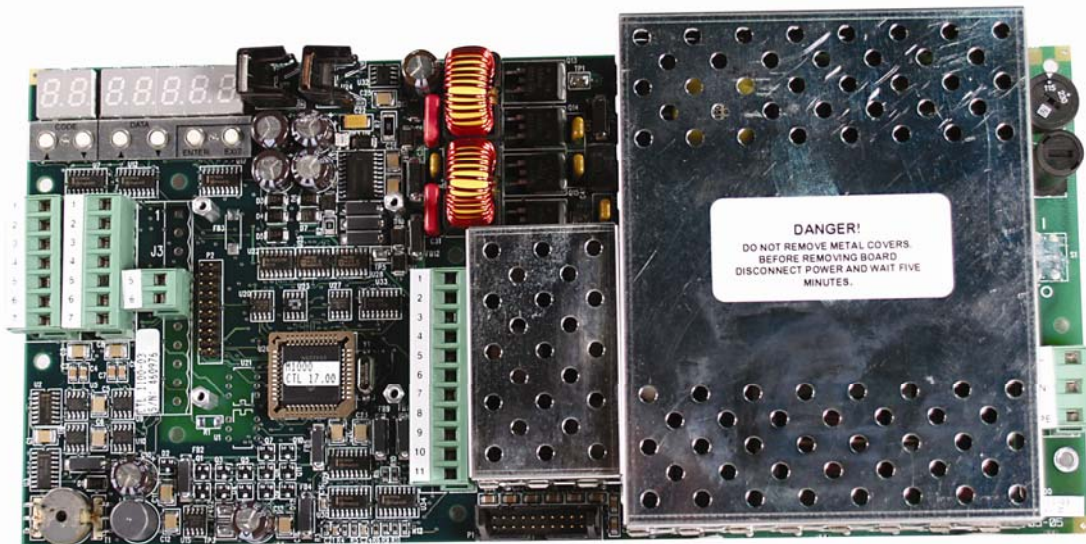
4	<b>INHIBIT input polarity is set wrong.</b> Set parameter 19 to the correct value. Refer to page 16 for more information about setting controller parameters.
5	<p><b>New software was installed during routine maintenance.</b></p> <p><b>or</b></p> <p><b>Non-volatile memory contains invalid data or has malfunctioned.</b></p> <p>Reset all parameters to their default values:</p> <p><b>Caution:</b> This procedure will erase all previously entered parameter settings! Be sure to record all current settings on page 16 before performing this step. If you are installing new software, then you must record the current settings <i>before</i> installing the new microcontroller chip.</p> <ol style="list-style-type: none"> <li>1. Turn the AC power <i>off</i>.</li> <li>2. Press and hold the EXIT button.</li> <li>3. Turn the AC power <i>on</i>.</li> <li>4. When the 'reset' message appears on the numeric display, release the EXIT button.</li> <li>5. Set parameter 2 (end-of-travel mode) and other parameters to their previous values. Refer to page 16 for more information about setting controller parameters.</li> </ol>
6	<b>Sensor polarity is wrong.</b> The value of parameter 3, 4, or 50 must be changed for the selected sensor. Refer to page 16 for more information about setting controller parameters.
7	<b>Servo gain is too high.</b> Decrease the value of parameter 5. Refer to page 16 for more information about setting controller parameters.
8	<b>End play in the actuator or mounting.</b> Press the MANUAL button and then press IN and OUT buttons several times. Actuator operation should be smooth and free, without binding. Firmly grasp the web guide mechanism moving part and push and pull to check for end play. Observe the actuator, mechanical components, and mounting hardware. There should be no observable motion in the mechanical system. If motion is noted, repair the web guide or actuator as required, or return the equipment for repair.
9	<p><b>Sensor in wrong position.</b></p> <p><b>Unwind stand:</b> The sensor should be located down-web, close to the last shifting idler roll. Refer to the guide application drawings on page 97.</p> <p><b>Winder stand:</b> The sensor should be located up-web before the last fixed idler roll, one to two web widths from the shifting base. Refer to the guide application drawings on page 97.</p> <p><b>Intermediate guides:</b> The sensor should be placed close to the exiting idler roll. Refer to the guide application drawings on page 97.</p>
10	<b>Excessive chuck wobble.</b> Decrease the web speed or re-chuck the roll of material.
11	<b>Web tension is low or tension control varies.</b> Increase the web tension or repair the tension control.

12	<b>Excessive web curl.</b> If web flutter or curl exists, change parameters 6 and 18 to higher values. Refer to page 16 for more information about setting controller parameters.
13	<b>All actuators. End-of-travel mode is incorrect.</b> Set parameter 2 to the correct value. Refer to page 16 for more information about setting controller parameters.
14	<b>All actuators. Actuator cable wires are broken, shorted or connected to wrong terminals of J4.</b> Refer to the connection diagrams on page 97. Check wiring at J4 and check the actuator cable for broken or shorted wires.
15	<b>Actuators with potentiometer feedback (MT, SF, and HF). End-of-travel limits not set correctly.</b> Parameters 9 and 10 must be adjusted to stop the actuator before the web guide or actuator hits any obstruction. Refer to page 16 for more information about setting controller parameters.
16	<b>Actuators with potentiometer feedback (MT, SF, and HF). Potentiometer failure.</b> Refer to the potentiometer replacement procedure on page 78.
17	<b>Actuators with limit switches (MM, MME, MN, and MNE). Limit switch failure.</b> Check the limit switch voltage at J4 terminals 5 and 6 (terminal 11 is GND). This voltage should normally be 0.0 VDC (switch is closed), then jump to +5.0 VDC when the limit is reached (switch opens). If the correct voltages are not present, replace the limit switch in the actuator or return the actuator for repair.
18	<b>Actuators with limit switches (MX). Limit switch failure.</b> The end-of-travel limit switches in the MX-series actuators directly control the motor circuit and cannot be monitored externally. If a limit switch has failed, replace the switch or return the actuator for repair.
19	<b>Reversed motor wires.</b> Restore the motor wire connections at J4 terminals 1 and 2 to the proper connection. Refer to the connection diagrams on page 97. Change the value of parameters 3, 4, or 50 as required. Refer to page 16 for more information about setting controller parameters.
20	<b>Edge detector not calibrated.</b> Refer to page 50 for calibration instructions.
21	<p><b>Edge detector: transducers covered with dust or other material.</b> Clean the edge detector transducer face with a cloth dampened with water or a mild detergent solution. If the contamination cannot be removed with this method, return the edge detector for repair.</p> <p><b>Digital line guide: optics covered with dust or other material.</b> Clean the underside of the sensor with a soft cloth dampened with water or a cleaning solution suitable for photographic lenses. If the contamination cannot be removed with this method, return the sensor for repair.</p>
22	<b>Edge detector failure.</b> Observe the value of parameter 14 or 15 as required. If this value is below 100, the edge detector is failing and must be returned for repair. Refer to page 16 for more information about displaying controller parameter settings.
23	<b>Auto-mode speed limit setting is incorrect.</b> Change the value of parameter 7. Refer to page 16 for more information about setting controller parameters.

24	<b>Manual-mode speed setting is incorrect.</b> Change the value of parameter 8. Refer to page 16 for more information about setting controller parameters.
----	--



## MICRO 1000<sup>®</sup> Controller



## Introduction

The MICRO 1000 controller's main functions include polling the web sensors, end-of-travel sensors, and control inputs, processing the input data, and sending the results to the servo-amplifier and status outputs.

The controller's main features include the following:

- Compatible with all ultrasonic and infrared PointSource and WideArray edge detectors, and AccuBeam 3 digital line guide. These sensors are described on pages 47 and 52.
- Has a built-in parameter-entry keypad and display.
- Compatible with the PLC I/O board described on page 40.
- Compatible with the Serial I/O board described on page 44.
- Compatible with the Remote Stations described on pages 80 and 89.

## Parameters

The MICRO 1000 system is configured by setting programmable parameters. These parameters are stored in non-volatile memory and may be examined or changed by using the parameter-entry keypad and display located on the MICRO 1000 board.

Note that the CODE and DATA display will show dashes immediately after power is turned on and after the EXIT button is pressed. The dashes indicate that no parameter is currently selected for examination or adjustment, but that the system is operating normally.

-	-	-	-	-	-
---	---	---	---	---	---

CODE      DATA

The general procedure for reading and/or changing the parameters is as follows:

- 1) Press the UP (▲) or DOWN (▼) CODE buttons to select the parameter you want to examine and/or adjust. Each parameter has a unique code number.
- 2) Press the UP (▲) or DOWN (▼) DATA buttons to adjust the parameter's setting.
- 3) Press ENTER to store the new data value in non-volatile memory. To leave the data value at its original value press EXIT, or press the UP (▲) or DOWN (▼) CODE buttons.

The parameters are described below:

### Software Version

1	x	x	x	x
---	---	---	---	---

This parameter displays the software version.

### End-of-Travel Mode

*No feedback.* This mode is used when the system has no motor drive output.

*Actuators with potentiometer feedback (MT, SF, and HF).* These actuators use a potentiometer to sense actuator position and have adjustable end-of-travel and servo-center limits.

**Caution:** To prevent jamming of the actuator make sure the end-of-travel limits are set correctly. Refer to page 76 for more information about setting end-of-travel limits.

*Actuators with limit switches (MM, MME, MN, and MNE).* These actuators use fixed limit switches to sense actuator position. Their end-of-travel limits are factory set.

*Actuators with limit switches (MX).* These actuators use fixed limit switches to sense actuator position. Their end-of-travel limits are factory set.

**Note:** The default setting for this parameter is 4. After resetting all parameters to their default values (refer to page 11, troubleshooting item 5) you must set this parameter to 0, 1, 2, or 3 before setting other parameters and/or operating the system.

### Input A Polarity

The actuator will move Out when edge detector A is *unblocked*, or the digital line guide's sight point is to the *left* of the line or edge it is following. **This is the default setting.**

The actuator will move Out when edge detector A is *blocked*, or the digital line guide's sight point is to the *right* of the line or edge it is following.

### Input B Polarity

The actuator will move Out when edge detector B is *unblocked*, or the digital line guide's sight point is to the *left* of the line or edge it is following.

The actuator will move Out when edge detector B is *blocked*, or the digital line guide's sight point is to the *right* of the line or edge it is following. **This is the default setting.**

### Servo Gain

Range: 0 to 255

This parameter determines the response time and accuracy of the system. In Automatic mode, the system produces a motor drive voltage proportional to web position error. Higher gain will increase the drive voltage at a given position error. For best response time and accuracy, set the *servo gain* to the highest value that does not produce excessive overshoot or oscillation. **The default value is 40.**

### Maximum Deadband

Range: 0 to 100

The *maximum deadband* is a zone around the sensor guide point where the motor drive is turned off. The higher the Maximum Deadband value is set, the farther the web edge or line must move away from the guide point before the motor drive is turned on. This parameter is typically used to compensate for edge curl and web flutter. The Maximum Deadband value must be higher than the Minimum Deadband value. **The default value is 10.**

### Auto-Mode Speed Limit

Range: 0 to 120

This parameter limits the top speed of the actuator in Automatic mode. The higher this value is set, the faster the actuator can move. **The default value is 80.**

### Manual-Mode Speed

Range: 0 to 120

This parameter determines how fast the actuator will move in Manual and Servo-Center mode. The higher this value is set, the faster the actuator will move. **The default value is 80.**

### In End-of-Travel Limit

Range: 0 to 255

This parameter works only with actuators that have potentiometer feedback (MT, SF, and HF). It sets the maximum distance that the actuator can move In. To increase this distance, set this parameter to a lower value. **The default value is 67.**

**Important:** Refer to page 76 for minimum and maximum values.

**Note:** Use parameter 26 to examine the current actuator position value.

### Out End-of-Travel Limit

Range: 0 to 255

This parameter works only with actuators that have potentiometer feedback (MT, SF, and HF). It sets the maximum distance that the actuator can move Out. To increase this distance, set this parameter to a higher value. **The default value is 189.**

**Important:** Refer to page 76 for minimum and maximum values.

**Note:** Use parameter 26 to examine the current actuator position value.

### Servo-Center Position

Range: 0 to 255

This parameter works only with actuators that have potentiometer feedback (MT, SF, and HF). It sets the home position for the actuator when Servo-Center mode is selected. To move the servo-center position closer to the In limit, set this parameter to a lower value. To move the servo-center position closer to the Out limit, set this parameter to a higher value. **The default value is 128.**

**Important:** Refer to page 76 for minimum and maximum values.

**Note:** Use parameter 26 to examine the current actuator position value.

### Input A Type

1 2     0

Sensor A is not installed.

1 2     1

Sensor A is an ultrasonic or IR edge detector connected to the Edge Detector A input. **This is the default setting.**

**Note:** Set parameter 55 to select sensor type.

1 2     2

Sensor A is a digital line guide connected to the Serial I/O board.

**Note:** In order to select Input A through the front-panel switchpad or PLC I/O inputs, parameter 12 must be set to 1 or higher.

### Input B Type

1 3     0

Sensor B is not installed. **This is the default setting.**

1 3     1

Sensor B is an ultrasonic or IR edge detector connected to the Edge Detector B input.

**Note:** Set parameter 56 to select sensor type.

1 3     2

Sensor B is a digital line guide connected to the Serial I/O board.

**Note 1:** In order to select Input B through the front-panel switchpad or PLC I/O inputs, parameter 13 must be set to 1 or higher.

**Note 2:** In order to select Centerline mode through the front-panel switchpad or PLC I/O inputs, parameters 12 and 13 must both be set to 1 or higher.

### Edge Detector A Signal Level

1 4

This parameter displays edge detector A's signal levels. Digits **aa** display the beam number and digits **bbb** display the signal level. Use the DATA buttons to select the desired beam.

### Edge Detector B Signal Level

1 5

This parameter displays edge detector A's signal levels. Digits **aa** display the beam number and digits **bbb** display the signal level. Use the DATA buttons to select the desired beam.

### Edge Detector A Transmit Level

1 6

This parameter displays edge detector A's transmit levels. Digits **aa** display the beam number and digits **bbb** display the transmit level. Use the DATA buttons to select the desired beam.

### Edge Detector B Transmit Level

1 7

This parameter displays edge detector B's transmit levels. Digits **aa** display the beam number and digits **bbb** display the transmit level. Use the DATA buttons to select the desired beam.

### Minimum Deadband

1 8

Range: 0 to 100

The *minimum deadband* is a zone around the sensor guide point that the web edge or line must enter before the motor drive is turned off. Once the web edge or line position enters this zone, it must then move outside of the *maximum deadband* zone before the motor drive is turned on. The Minimum Deadband value must be lower than the Maximum Deadband value. **The default value is 5.**

### INHIBIT Input Mode

Refer to page 39 for more information about the INHIBIT input.

1 9

The actuator will run only if the INHIBIT input is activated. The INHIBIT input controls the actuator in Automatic, Manual, or Servo-Center mode.

1 9

Same function as option 0, except the polarity of the INHIBIT input is inverted. **This is the default setting.**

1 9

The actuator will run only if the INHIBIT input is activated. The INHIBIT input controls the actuator only in Automatic mode.

1 9

Same function as option 2, except the polarity of the INHIBIT input is inverted.

**Note:** If your application requires an opto-isolated INHIBIT input, then set parameter 72 to 1.

### Calibrate Edge Detector A

2 0

Range: 0 to 2

This parameter initiates the calibration of edge detector A. Refer to page 50 for calibration instructions.

### Calibrate Edge Detector B

2 1

Range: 0 to 2

This parameter initiates the calibration of edge detector B. Refer to page 50 for calibration instructions.

### Edge Detector A Blocked Level

2 2

Range: 0 to 255

This parameter determines the blocked signal level for edge detector A and is automatically set by the edge detector calibration procedure. **The default value is 0.**

**This parameter value should not be changed manually.**

### Edge Detector B Blocked Level

23     0

Range: 0 to 255

This parameter determines the blocked signal level for edge detector B and is automatically set by the edge detector calibration procedure. **The default value is 0.**

**This parameter value should not be changed manually.**

### Sensor A Length

24     2

Range: 2 to 128

This parameter configures the system for the number of sensing beams in sensor A. **The default value is 2.**

Refer to the table of sensor models on page 49.

**Note:** To reduce the sensing area of a WideArray detector, change parameter 76.

### Sensor B Length

25     2

Range: 2 to 128

This parameter configures the system for the number of sensing beams in sensor B. **The default value is 2.**

Refer to the table of sensor models on page 49.

**Note:** To reduce the sensing area of a WideArray detector, change parameter 77.

### Actuator Position Display

This parameter displays the position of the actuator. The display format depends on the type of actuator installed:

26     0

Range: 0 to 255

*Actuators with potentiometer feedback (MT, SF, and HF).* The data display indicates the position of the actuator's end-of-travel potentiometer.

26   a b c

*Actuators with limit switches (MM, MME, MN, and MNE).* The data display indicates the state of the actuator's limit switches:

**a** = IN limit switch (0 = activated, 1 = deactivated)

**b** = POLARITY switch (0 = activated, 1 = deactivated)

**c** = OUT limit switch (0 = activated, 1 = deactivated)

26   a b c

*Actuators with limit switches (MX).* The data display indicates the state of the actuator's limit switches:

**a** = don't care

**b** = don't care

**c** = OUT POLARITY switch (0 = activated, 1 = deactivated)

### Power-Up Mode

27     0

The system will power-up in the same operating mode that was selected when last powered-down. All inputs are momentary. **This is the default setting.**

[continued on next page]

<b>2 7</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>1</b>	The system will power-up in Manual mode. All inputs are momentary.
<b>2 7</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>2</b>	The system will power-up in Servo-Center mode. All inputs are momentary.
<b>2 7</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>3</b>	The system will power-up in Automatic mode. All inputs are momentary.
<b>2 7</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>4</b>	The system will power-up in Manual mode. All inputs are <i>maintained</i> .
<b>2 7</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>5</b>	The system will power-up in Manual mode and Edge A (Input A) will be selected. All inputs are momentary.
<b>2 7</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>6</b>	The system will power-up in Manual mode and Edge B (Input B) will be selected. All inputs are momentary.
<b>2 7</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>7</b>	The system will power-up in Manual mode and Line (Input C) will be selected. All inputs are momentary.
<b>2 7</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>8</b>	The system will power-up in Manual mode and Edge A and Edge B will be selected (Centerline mode). All inputs are momentary.

**Note:** This parameter also affects the operation of the PLC I/O inputs (page 40).

**Parameter 28 is reserved for future use.**

#### System ID

<b>2 9</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	This parameter displays the system ID number.
------------	----------------------	----------------------	----------------------	----------------------	----------------------	---

#### Password

<b>3 0</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>0</b>	This parameter is used for enabling optional software features. To purchase and install optional features, contact AccuWeb for assistance.
------------	----------------------	----------------------	----------------------	----------------------	----------	--

Range: 0 to 255

**Note:** To see which features are enabled, set parameter 29 to 1. The displayed data value indicates which feature is enabled: 0 = none, 1 = oscillation, 2 = web width monitor, 4 = integrator.

**Refer to page 37 for a description of parameters 31, 32, 33, and 34.**



### LED Indicator Mode

3 5 ☐ ☐ ☐ ☐ 0

The front-panel switchpad LEDs and edge detector null indicator LEDs are enabled.

In this mode one or both null LEDs may be operational depending on which edge detector is selected by the switchpad or PLC I/O inputs.

If Edge A is selected, then edge detector A's null LED indicates the position of web edge A and detector B's null LED is off.

If Edge B is selected, then edge detector B's null LED indicates the position of web edge B and detector A's null LED is off.

If Edge A and Edge B are both selected (Centerline mode), then edge A's null LED and edge B's null LED operate in tandem and indicate the position of the web's centerline.

**This is the default setting.**

3 5 ☐ ☐ ☐ ☐ 1

The switchpad LEDs and edge detector null indicator LEDs are enabled.

In this mode each edge detector null LED indicates the position of the web sensed by that detector alone, and both null LEDs are always operational.

3 5 ☐ ☐ ☐ ☐ 2

The switchpad LEDs are enabled and the edge detector null indicator LEDs are always off. **Use this setting if the web is photosensitive.**

3 5 ☐ ☐ ☐ ☐ 3

The switchpad LEDs and edge detector null indicator LEDs are always off. **Use this setting if the web is photosensitive.**

### Sensor A Gap

3 6 ☐ ☐ ☐ ☐ 0

Sensor A has a 1.5 inch gap.

3 6 ☐ ☐ ☐ ☐ 1

Sensor A has a 4.0 inch gap. **This is the default setting.**

3 6 ☐ ☐ ☐ ☐ 2

Sensor A has an 8.0 inch gap.

### Sensor B Gap

3 7 ☐ ☐ ☐ ☐ 0

Sensor B has a 1.5 inch gap.

3 7 ☐ ☐ ☐ ☐ 1

Sensor B has a 4.0 inch gap. **This is the default setting.**

3 7 ☐ ☐ ☐ ☐ 2

Sensor B has an 8.0 inch gap.

**Parameters 38 through 46 are reserved for future use.**

## Edge-Loss and Line-Loss Detection

4 7     0

Edge-loss and line-loss detection are disabled. **This is the default setting.**

4 7     1

Edge-loss and line-loss detection are enabled.

The actuator will stop and the NO FAULT output will turn off when *any* active sensor enters the edge-loss or line-loss state. The edge-loss or line-loss state occurs when an edge detector becomes completely blocked or unblocked, or the digital line guide loses the line or edge it is following.

Guiding will resume and the NO FAULT output will turn on when *all* sensors have left the edge-loss or line-loss state.

4 7     2

Line-loss detection is enabled.

When the line guide loses the line, edge detector A will record the position of the web, the system will switch from Line mode to Edge A mode, and edge detector A will then maintain the web at the recorded position. When the line guide reacquires the line, the system will switch back to Line mode.

4 7     3

Line-loss detection is enabled.

When the line guide loses the line, edge detector B will record the position of the web, the system will switch from Line mode to Edge B mode, and edge detector B will then maintain the web at the recorded position. When the line guide reacquires the line, the system will switch back to Line mode.

4 7     4

Line-loss detection is enabled.

When the line guide loses the line, edge detectors A and B will record the position of the web, the system will switch from Line mode to Centerline mode, and edge detectors A and B will then maintain the web at the recorded position. When the line guide reacquires the line, the system will switch back to Line mode.

4 7     5

Line-loss detection is enabled.

When the line guide loses the line, the system will switch from Line mode to Edge A mode, and edge detector A will then maintain the web at the position specified by Offset 2. When the line guide reacquires the line, the system will switch back to Line mode.

4 7     6

Line-loss detection is enabled.

When the line guide loses the line, the system will switch from Line mode to Edge B mode, and edge detector B will then maintain the web at the position specified by Offset 2. When the line guide reacquires the line, the system will switch back to Line mode.

4 7     7

Line-loss detection is enabled.

When the line guide loses the line, the system will switch from Line mode to Centerline mode, and edge detectors A and B will then maintain the web at the position specified by Offset 2. When the line guide reacquires the line, the system will switch back to Line mode.

**Parameter 48 is reserved for future use.**

### Input C Type

4 9     0

Sensor C is not installed. **This is the default setting.**

4 9     1

Sensor C is an ultrasonic or IR edge detector connected to the Edge Detector A input.

**Note:** Set parameter 55 to select sensor type.

4 9     2

Sensor C is a digital line guide connected to the Serial I/O board.

**Note:** In order to select Input C through the front-panel switchpad or PLC I/O inputs, parameter 49 must be set to 1 or higher.

### Input C Polarity

5 0     0

The actuator will move Out when edge detector A is *unblocked*, or the digital line guide's sight point is to the *left* of the line or edge it is following. **This is the default setting.**

5 0     1

The actuator will move Out when edge detector A is *blocked*, or the digital line guide's sight point is to the *right* of the line or edge it is following.

### Switchpad Type

5 1     0

Select this option if the input selection buttons on the front-panel switchpad are labeled EDGE A, CENTERLINE, and EDGE B.

The EDGE A button selects Input A.

The EDGE B button selects Input B.

The CENTERLINE button selects Inputs A and B.

This switchpad does not allow the selection of Input C.

5 1     1

Select this option if the input selection buttons on the front-panel switchpad are labeled EDGE A, EDGE B, and LINE. **This is the default setting.**

The EDGE A button selects Input A.

The EDGE B button selects Input B.

The LINE button selects Input C.

To select Centerline mode, press the EDGE A and EDGE B buttons simultaneously.

**Note:** This parameter also affects the operation of the PLC I/O inputs (page 40).

## AUXILIARY Input Function

Refer to page 40 for more information about the AUXILIARY input.

5 2     0

The AUXILIARY input is off. **This is the default setting.**

5 2     1

The AUXILIARY input determines which offset is active. To select Offset 2, activate the AUXILIARY input. To select Offset 1, deactivate the AUXILIARY input.

5 2     2

Same function as option 1, except the polarity of the AUXILIARY input is inverted.

5 2     3

Activating the AUXILIARY input will enable Oscillation, and deactivating it will disable Oscillation. Oscillation parameter 31 must be set to 1 or higher.

Refer to page 37 for more information about the oscillation function.

5 2     4

Same function as option 3, except the polarity of the AUXILIARY input is inverted.

5 2     5

Activating the AUXILIARY input will switch the system to Automatic mode.

5 2     6

Same function as option 5, except the polarity of the AUXILIARY input is inverted.

5 2     7

Activating the AUXILIARY input will set Offset 1 to the current web position. This is typically done only during job set-up, when the system is in Manual or Servo-Center mode.

**Note:** To reset Offset 1 to its default value, select parameter 60, then press the EXIT key.

5 2     8

Same function as option 7, except the polarity of the AUXILIARY input is inverted.

5 2     9

Activating the AUXILIARY input will set Offset 2 to the integrator's input value and will reset the integrator output. This is typically done only during job set-up, when the system is in Manual or Servo-Center mode.

**Note:** To reset Offset 2 to its default value, select parameter 61, then press the EXIT key.

5 2    1 0

Same function as option 9, except the polarity of the AUXILIARY input is inverted.

5 2    1 1

Activating the AUXILIARY input will switch the system to Servo-Center mode. The system will return to the previous operating mode when the AUXILIARY input is deactivated.

5 2    1 2

Same function as option 11, except the polarity of the AUXILIARY input is inverted.

5 2    1 3

Activating the AUXILIARY input will switch the system to Servo-Center mode. The system will remain in Servo-Center mode when the AUXILIARY input is deactivated.

[continued on next page]

5 2				1 4	Same function as option 13, except the polarity of the AUXILIARY input is inverted.
5 2				1 5	Reserved (no action)
5 2				1 6	Reserved (no action)
5 2				1 7	Activating the Auxiliary Input, 100 milliseconds minimum, will reset the edge detector(s). The Auxiliary input must be deactivated to complete the function and return the edge detector(s) to normal operation.
5 2				1 8	Same function as Option 17, except the polarity of the Auxiliary Input is inverted.

**Note:** If your application requires a non-isolated AUXILIARY input, then set parameter 72 to 1.

**Parameters 53 and 54 are reserved for future use.**

#### Sensor A Type

5 5				0	Sensor A is an ultrasonic edge detector. <b>This is the default setting.</b>
5 5				1	Sensor A is an IR edge detector.

#### Sensor B Type

5 6				0	Sensor B is an ultrasonic edge detector. <b>This is the default setting.</b>
5 6				1	Sensor B is an IR edge detector.

**Parameters 57 through 59 are reserved for future use.**

#### Offset 1

6 0	1 6 3 8 4	This parameter allows Offset 1 to be examined and modified. Offset 1 is also accessible through the optional Remote Station. To reset Offset 1 to its default value, press the EXIT key. <b>The default value is 16384.</b>
-----	-----------	--

Range: 1 to 32767

## Offset 2

6 1 1 6 3 8 4

Range: 1 to 32767

This parameter allows Offset 2 to be examined and modified. Offset 2 is also accessible through the optional Remote Station. To reset Offset 2 to its default value, press the EXIT key.

**The default value is 16384.**

## Manual Polarity

6 2 0

The actuator extends when the In mode is selected, and retracts when the Out mode is selected.

6 2 1

The actuator extends when the Out mode is selected, and retracts when the In mode is selected. **This is the default setting.**

## Integrator Mode

6 3 0

The integrator function is off. **This is the default setting.**

6 3 1

This mode is used for applications that require complex control of the system guide point, but without integration or dampening.

6 3 2

This mode is used for stabilizing the response of guides that have sensors located downstream. The downstream sensors are connected to Integrator Input 1 and 2 and the local sensors are connected to Input A, B, and C. During operation the integrator output slowly changes the local guide point as long as the downstream sensors indicate that the web is not at the downstream guide point.

**Note:** This mode is available only if the integrator option is installed. Contact AccuWeb for availability.

6 3 3

This mode is used for dampening the response of the slave guide in chaser-slave systems. The chaser sensors are connected to Integrator Input 1 and 2 and the slave sensors are connected to Input A, B, and C. During operation the chaser sensors establish the slave guide point, but the integrator dampens noise and jitter in the chaser signal.

## Integrator Input 1 Type

This parameter selects the source for Integrator Input 1.

6 4 0

No input (zero).

6 4 1

Sensor 1.

6 4 2

Sensor 2. **This is the default setting.**

6 4 3

Digital line guide.

### Integrator Input 2 Type

This parameter selects the source for Integrator Input 2.

6 5     0

No input (zero). **This is the default setting.**

6 5     1

Sensor 1.

6 5     2

Sensor 2.

6 5     3

Digital line guide.

### Integrator Input 1 Polarity

6 6     0

Integrator Input 1 is not inverted. **This is the default setting.**

6 6     1

Integrator Input 1 is inverted.

### Integrator Input 2 Polarity

6 7     0

Integrator Input 2 is not inverted. **This is the default setting.**

6 7     1

Integrator Input 2 is inverted.

### Integrator Rate

6 8   0.0 1

Range: .001 to .255

This parameter sets the rate that the integrator output changes in response to an input signal. In a typical application the integrator controls the system guide point, so this parameter is scaled in units of inches-per-second per inch of input error. For example, if the input sensors measure an error of 2.0 inches and the integrator rate is set to 0.1, then the integrator output will change at a rate of 0.2 inches-per-second. **The default value is .01**

### Integrator Limit

6 9   1.0 0

Range: .01 to 1.00

This parameter sets the maximum rate that the integrator output can change. In a typical application the integrator controls the system guide point, so this parameter is scaled in units of inches-per-second. **The default value is 1.00**

### Integrator Input Gain

7 0     0

This option sets the integrator input gain to 1. Use this option if the integrator inputs are connected to only one sensor. **This is the default setting.**

7 0     1

This option sets the integrator input gain to 0.5. Use this option if Integrator Input 1 and 2 are connected to a pair of sensors configured for centerline operation.

### Integrator Input Offset

7 1     0

The integrator input is not offset. **This is the default setting.**

7 1     1

This option offsets the integrator input using Offset 1.

### Integrator Input Offset

7 1     0

The integrator input is not offset. **This is the default setting.**

7 1     1

This option offsets the integrator input using Offset 1.

7 1     2

This option offsets the integrator input using Offset 2.

### INHIBIT and AUXILIARY Input Configuration

This parameter swaps the function of the INHIBIT and AUXILIARY inputs. This is useful when your application requires either a non-isolated AUXILIARY input, or an opto-isolated INHIBIT input.

7 2     0

The INHIBIT function is routed through J3 terminal 5 (non-isolated).

The AUXILIARY function is routed through the PLC I/O board, J1 terminal 8 (opto-isolated).

**This is the default setting.**

7 2     1

The INHIBIT function is routed through the PLC I/O board, J1 terminal 8 (opto-isolated).

The AUXILIARY function is routed through J3 terminal 5 (non-isolated).

**Parameter 73 is reserved for future use.**



### Sensor A Transducer Orientation

This parameter reverses the order of the transducer beams in Sensor A.

7	4				0
---	---	--	--	--	---

**This is the default setting.** Beam 1 is located at the end of the transducer closest to the pigtail wiring.

7	4				1
---	---	--	--	--	---

Beam 1 is located at the end of the transducer farthest from the pigtail wiring.

### Sensor B Transducer Orientation

This parameter reverses the order of the transducer beams in Sensor B.

7	5				0
---	---	--	--	--	---

**This is the default setting.** Beam 1 is located at the end of the transducer closest to the pigtail wiring.

7	5				1
---	---	--	--	--	---

Beam 1 is located at the end of the transducer farthest from the pigtail wiring.

### Sensor A Reduced Length

7	6				2
---	---	--	--	--	---

Range: 2 to 128

This parameter is used to reduce the sensing area of WideArray sensor A by establishing the number of active beams. As the value of this parameter is lowered the low-numbered beams will be deactivated first, beginning with beam 1. The minimum value for WideArray sensors is 4. The minimum value for PointSource sensors is 2. The maximum value is determined by parameter 24. **The default value is 2.**

**Note:** Parameter 24 must always be set to the actual full length of sensor A.

### Sensor B Reduced Length

7	7				2
---	---	--	--	--	---

Range: 2 to 128

This parameter is used to reduce the sensing area of WideArray sensor B by establishing the number of active beams. As the value of this parameter is lowered the low-numbered beams will be deactivated first, beginning with beam 1. The minimum value for WideArray sensors is 4. The minimum value for PointSource sensors is 2. The maximum value is determined by parameter 25. **The default value is 2.**

**Note:** Parameter 25 must always be set to the actual full length of sensor B.

**Parameter 78 is reserved for future use.**

### View Register Item

This parameter is used for diagnostics purposes only.

7	9					0
---	---	--	--	--	--	---

**This is the default setting.**

### Register Item

8	0					0
---	---	--	--	--	--	---

This parameter displays the Value selected on parameter 79.

## Appendix 1 / Parameter Summary

Parameter	Description	Range	Default	Setting	Notes
1	Software version	-	-		see note 1
2	End-of-travel mode	0-3	4		
3	Input A polarity	0, 1	0		
4	Input B polarity	0, 1	1		
5	Servo gain	0-255	40		
6	Maximum deadband	0-100	10		
7	Auto-mode speed limit	0-120	80		
8	Manual-mode speed	0-120	80		
9	In end-of-travel limit	0-255	67		
10	Out end-of-travel limit	0-255	189		
11	Servo-Center position	0-255	128		
12	Input A type	0-2	1		
13	Input B type	0-2	0		
14	Edge detector A signal level	-	-	-	see note 1
15	Edge detector B signal level	-	-	-	see note 1
16	Edge detector A transmit level	-	-	-	see note 1
17	Edge detector B transmit level	-	-	-	see note 1
18	Minimum deadband	0-100	5		
19	INHIBIT input mode	0-3	1		
20	Calibrate edge detector A	0-2	0	-	see note 2
21	Calibrate edge detector B	0-2	0	-	see note 2
22	Edge detector A blocked level	0-255	0		see note 2
23	Edge detector B blocked level	0-255	0		see note 2
24	Sensor A length	2-128	2		
25	Sensor B length	2-128	2		
26	Actuator position display	-	-	-	see note 1
27	Power-up mode	0-8	0		
28	not used	0	0	-	not used
29	System ID	0-65535	-	-	see note 4
30	Password	0-255	-	-	see note 4
31	Oscillation mode	0-4	0		see note 5
32	Oscillation total travel	0-7.50	1.00		see note 5
33	Oscillation maximum speed	0-25.5	1.0		see note 5
34	Oscillation speed multiplier	0-100	50		see note 5
35	LED indicator mode	0-3	0		

[continued on next page]

36	Sensor A gap	0-2	1		
37	Sensor B gap	0-2	1		
38	not used	0	0	-	not used
39	not used	0	0	-	not used
40	not used	0	0	-	not used
41	not used	0	0	-	not used
42	not used	0	0	-	not used
43	not used	0	0	-	not used
44	not used	0	0	-	not used
45	not used	0	0	-	not used
46	not used	0	0	-	not used
47	Edge-loss and line-loss detection	0-7	0		
48	not used	0	0	-	not used
49	Input C type	0-2	0		
50	Input C polarity	0, 1	0		
51	Switchpad type	0, 1	1		
52	AUXILIARY input function	0-18	0		
53	not used	0	0	-	not used
54	not used	0	0	-	not used
55	Sensor A type	0, 1	0		
56	Sensor B type	0, 1	0		
57	not used	0	0	-	not used
58	not used	0	0	-	not used
59	not used	0	0	-	not used
60	Offset 1	1-32767	16384		see note 3
61	Offset 2	1-32767	16384		see note 3
62	Manual polarity	0, 1	1		
63	Integrator mode	0-3	0		see note 6
64	Integrator input 1 type	0-3	2		
65	Integrator input 2 type	0-3	0		
66	Integrator input 1 polarity	0, 1	0		
67	Integrator input 2 polarity	0, 1	0		
68	Integrator rate	.001-.255	.010		
69	Integrator rate limit	.01-1.00	1.00		
70	Integrator input gain	0, 1	0		

[continued on next page]

71	Integrator input offset	0-2	0		
72	AUXILIARY and INHIBIT input config	0, 1	0		
73	not used	0	0	-	not used
74	Sensor A transducer orientation	0, 1	0		
75	Sensor B transducer orientation	0, 1	0		
76	Sensor A reduced length	2-128	2		
77	Sensor B reduced length	2-128	2		
78	not used	0	0	-	not used
79	View register item	0-9	0		
80	Register item	0	-	-	see note 1

<sup>1</sup> These parameters are used for monitoring system functions and cannot be changed through the programming keypad.

<sup>2</sup> These parameters are used for calibrating the edge detectors.

<sup>3</sup> These parameters are primarily used for monitoring system functions, but can be changed through the programming keypad.

<sup>4</sup> These parameters are used for installing optional features such as oscillation, web width monitoring and integration. Contact AccuWeb for availability.

<sup>5</sup> These parameters function only if the oscillation option is installed. Contact AccuWeb for availability.

<sup>6</sup> Option 2 is available only if the integrator option is installed. Contact AccuWeb for availability.

## Appendix 2 / Error Codes

The MICRO 1000 contains several internal diagnostic routines that verify correct operation and identify specific problems if they occur. Any problem with the system will turn off the **No Fault** output and display a flashing '99' error code on the numeric display.

99     0

Range: 0 to 5

99     6

99     7

99     8

99     9

99    1 0

99    1 1

**Motor drive over-temperature.** Check for short circuits in the actuator cable wiring or motor. Check ambient temperature. Check for guide oscillation or excessive actuator load (check web tension and/or guide friction).

**Power supply over-temperature.** Check ambient temperature. Check for guide oscillation or excessive actuator load (check web tension and/or guide friction).

**Ambient over-temperature.** Check ambient temperature. Consult the home office.

**Power supply under-voltage.** Check the 115/230 VAC voltage selector switch. Do not operate this switch while power is on. The unit may be damaged if the line voltage is 230 VAC and the voltage selector switch is set to 115 VAC.

**Power supply over-voltage.** The inertia of the mechanical load driven by the actuator is too high. Consult the home office.

**New software was installed during routine maintenance**

*or*

**Non-volatile memory contains invalid data or has malfunctioned.**

Reset all parameters to their default values. Refer to page 11, troubleshooting item 5.

**Actuator is malfunctioning.** The actuator is not responding to commands from the controller. The most likely causes are:

- Parameter 2 is set to the wrong value. Refer to page 16 for more information about setting controller parameters.
- The actuator cable is disconnected or has loose wiring screw-terminals or is mis-wired.
- The actuator end-of-travel potentiometer or limit switches have failed.
- The actuator is mechanically jammed.

**Note:** To clear the error code, press the EXIT button. If this does not work, turn the AC power off, wait until the switchpad LEDs turn off, then turn the AC power on. If the error code persists, contact AccuWeb for assistance. Refer to page 94 for servicing information.

### Appendix 3 / Oscillation Function (Optional)

This optional software feature allows the user to perform web oscillation electronically, thus replacing the mechanical hardware normally required for this function.

Web oscillation is primarily used for processing materials that need oscillation to reduce gauge-band build-up on re-wind rolls.

Web oscillation is accomplished by electronically moving the guide point to oscillate the web over a wide range of speeds and travel distance. The oscillation speed and travel can be programmed within the following ranges:

- Oscillation speed: 0 to 25.5 inches per minute
- Oscillation travel: 0 to 7.50 inches (or  $\pm$  linear actuator stroke)

When the oscillation function is turned off the guide point is fixed. The system moves the web as needed to keep the web's edge or centerline aligned with the fixed guide point.

When the oscillation function is turned on the guide point moves at a programmed speed over a programmed travel distance. The system moves the web continuously to keep the web's edge or centerline aligned with the moving guide point.

The AUXILIARY input can be used to turn the oscillation function on and off (parameter 52, option 3 or 4).

An additional oscillation mode (parameter 31, option 4) permits oscillation without using an edge sensor. This mode continuously oscillates the actuator between its In and Out end-of-travel limits. Oscillation speed is controlled by parameter 7. If using an actuator that has potentiometer feedback (MT, SF, and HF) the oscillation distance may be adjusted by setting the In and Out end-of-travel limits (parameters 9 and 10). Oscillation distance is fixed for actuators that have limit switches (MM, MME, MN, and MNE). MX-series actuators do not operate in this oscillation mode.

**Note:** Refer to page 16 for more information about setting controller parameters.

The oscillation function is configured by the following parameters. Refer to page 16 for more information about setting controller parameters.

#### Oscillation Mode

3 1     0

The oscillation function is off. **This is the default setting.**

3 1     1

The oscillation function is on.

3 1     2

**This option is reserved for future use.**

3 1     3

**This option is reserved for future use.**

3 1     4

The oscillation function is on. The actuator will oscillate between the In and Out end-of-travel limits. This mode will not work with MX-series actuators.

#### Oscillation Total Travel

3 2   7.5 0

This parameter sets the guide point's range of travel distance. This range is symmetrical around the system's fixed guide point. The position of the fixed guide point can be adjusted with the optional Remote Station. The range is from 0 to 7.50 inches (or  $\pm 3.75$  inches max). **The default setting is 1.00 inch ( $\pm 0.50$  inch).**

#### Oscillation Maximum Speed

3 3   1.0

This parameter sets the guide point's maximum oscillation speed. The range is from 0 to 25.5 inches per minute. **The default setting is 1.0 inch per minute.**

#### Oscillation Speed Multiplier

3 4   5 0

This parameter scales the guide point's oscillation speed by a fixed percentage. The range is from 0 to 100%. **The default setting is 50%.**



## Appendix 4 / Inhibit Input

The INHIBIT input allows the actuator to be turned off (inhibited) by a customer-supplied control signal.

There are four customer-selectable INHIBIT operating modes. These modes are controlled by parameter 19. Refer to page 16 for more information about setting controller parameters.

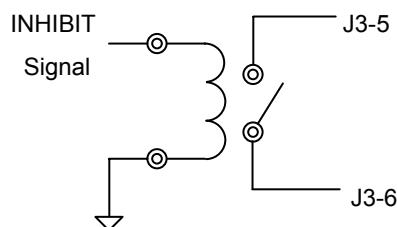
The INHIBIT input requires an isolated contact closure. To activate or deactivate the INHIBIT input, close (short) or open the connection between J3 terminals 5 and 6 (refer to the diagram below).

**Note:** The INHIBIT input will override all PLC I/O inputs. To allow the PLC I/O inputs to operate properly, the INHIBIT input must be inactive.

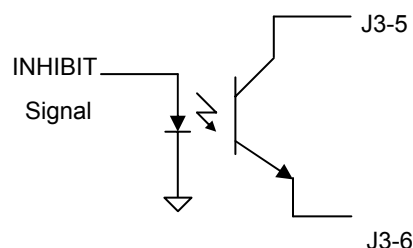
**Note:** The INHIBIT input is *not* opto-isolated. If your application requires an *opto-isolated* INHIBIT input, then set parameter 72 to 1. Refer to page 16 for more information about setting controller parameters.

### Electrical Specifications:

Non-isolated contact-closure input	
Description	This input must be connected to an isolated contact or a sink-connected (NPN) opto-coupled transistor output. It must not be connected to anything else.
Connector	J3
Terminals	5 – Signal input (connect to collector of customer-supplied opto-coupler) 6 – Signal GND (connect to emitter of customer-supplied opto-coupler)
Input voltage	Internally pulled to +5 VDC through a 5 K-ohm resistor
Input current	1 mA to turn on, 0.27 mA or less to turn off
Isolation	None, provided by customer



Relay Control



Solid State Control

## Appendix 5 / PLC I/O Board

The PLC I/O board allows the MICRO 1000 system to be remotely controlled by the customer's PLC. There are eight control inputs (SERVO-CENTER, EDGE A, EDGE B, LINE / CENTERLINE, MANUAL, IN, OUT, and AUXILIARY) and five status outputs (IN LIMIT, OUT LIMIT, SERVO-CENTER LIMIT, AUTO MODE, and NO FAULT). All inputs and outputs are opto-isolated.

**Warning:** It is the responsibility of the customer to insure machine safety. Changing the mode of operation from any source (front-panel switchpad or PLC I/O inputs) can cause machine motion.

**Note:** All PLC I/O board inputs are opto-isolated, including the AUXILIARY input. If your application requires a *non-isolated* AUXILIARY input, then set parameter 72 to 1. Refer to page 16 for more information about setting controller parameters.

### Electrical Specifications:

PLC I/O Board Inputs (per input)	
On-state voltage (activated)	12 VDC minimum 24 VDC nominal 31 VDC maximum
On-state current (activated)	5.0 mA minimum 8.0 mA nominal 14 mA maximum
Off-state voltage (deactivated)	2.7 VDC maximum
Input impedance	2.2 K-ohms minimum
Isolation	30 VAC max. between any terminal and ground
Duration ( <i>momentary</i> mode only)	100 ms minimum

PLC I/O Board Outputs (per output)	
Maximum customer-supplied voltage	31 VDC between any two terminals
Off-state leakage current	1.0 uA maximum
On-state resistance	2.5 ohms maximum
On-state continuous current	0.4 ADC maximum
On-state peak current	1.2 ADC for 100 msec, repeatable every 2 seconds
Isolation	30 VAC max. between any terminal and ground

**Field installation of PLC I/O board:**

1. Check header P2 on the controller board - straighten any bent pins.
2. Align the socket on the underside of the PLC I/O board with header P2 on the controller board.
3. Push the PLC I/O board firmly onto header P2.
4. Secure the PLC I/O board to the standoffs with four #4-40, 1/4 inch long machine screws and four #4 internal tooth star washers.

**PLC wiring:**

- Refer to the connection diagrams on page 97 for PLC wiring information.

**Operation:**

**Note:** Refer to page 16 for more information about setting controller parameters.

- The control inputs are either *maintained* or *momentary*, depending on the setting of parameter 27.

In the *maintained* mode, deactivating all inputs will cause the actuator to stop.

In the *momentary* mode, deactivating all inputs will cause the system to remain in the last valid operating mode. If the system is in Manual mode, deactivating all inputs will cause the actuator to stop. The IN and OUT inputs must be *maintained* in order to move the actuator.

- The function of the AUXILIARY, EDGE A, EDGE B, and LINE / CENTERLINE inputs depends on the setting of parameter 51 and 52.
- The INHIBIT input overrides all PLC I/O inputs. To allow the PLC I/O inputs to operate properly, the INHIBIT input must be inactive.

PLC I/O Board Inputs				
Input	Connector J1 terminal	AUXILIARY Input Function (Param 52)	Switchpad Type (Param 51)	Action performed when input is activated
AUXILIARY	8	selects AUTO mode	x	Select Automatic mode (guide the web using position feedback from sensors selected by the EDGE A, EDGE B, or LINE / CENTERLINE inputs).
		other function	x	Select other operating functions. See description of parameter 52.
SERVO-CENTER	2	x	x	Select Servo-Center mode (move actuator to servo-center position).
MANUAL	1	x	x	Select Manual mode (stop actuator).
IN	6	x	x	Select Manual mode and In mode (move actuator in).
OUT	7	x	x	Select Manual mode and Out mode (move actuator out).
EDGE A	3	selects AUTO mode	x	Select Input A.
		other function	x	Select Input A and Automatic mode.
EDGE B	4	selects AUTO mode	x	Select Input B.
		other function	x	Select Input B and Automatic mode.
LINE / CENTERLINE	5	selects AUTO mode	has CENTERLINE button	Select Centerline mode.
		other function	has CENTERLINE button	Select Centerline mode and Automatic mode.
		selects AUTO mode	has LINE button	Select Input C. <b>Note:</b> To select Centerline mode, activate the EDGE A and EDGE B inputs simultaneously.
		other function	has LINE button	Select Input C and Automatic mode. <b>Note:</b> To select Centerline mode, activate the EDGE A and EDGE B inputs simultaneously.
	9	x	x	This is the connector COMMON. For sourcing to the inputs, connect the - customer supplied voltage. For sinking from the inputs, connect the + customer supplied voltage.

**Note:** In all tables, **x** indicates *don't care* or *not used*.

PLC I/O Board Outputs		
Output	Connector J2 terminal	Description
<b>IN LIMIT</b>	2	This output is <i>on</i> when the actuator has reached the In limit and is <i>off</i> during normal operation. This output does not function if a MX-series actuator is installed.
<b>OUT LIMIT</b>	3	This output is <i>on</i> when the actuator has reached the Out limit and is <i>off</i> during normal operation. This output does not function if a MX-series actuator is installed.
<b>SERVO-CENTER</b>	4	This output is <i>on</i> when the actuator is at the servo-center position and is <i>off</i> during normal operation.
<b>AUTO MODE</b>	5	This output is <i>on</i> when the controller is operating in Automatic mode and is <i>off</i> during all other modes of operation.
<b>NO FAULT</b>	6	<p>This output is <i>on</i> when the controller is ready to operate and is <i>off</i> when any of the following conditions occur:</p> <ul style="list-style-type: none"> <li>• The controller is displaying an error code. Refer to page 36 for more information about error codes.</li> <li>• AC power is off.</li> <li>• An edge-loss or line-loss condition occurs. This option is enabled by setting parameter 47. Refer to page 16 for more information about setting controller parameters.</li> </ul>
	1	This is the connector COMMON. For sourcing to the outputs, connect the + customer supplied voltage. For sinking from the outputs, connect the - customer supplied voltage.

## Appendix 6 / Serial I/O Board

The Serial I/O board (AUX 4249) provides a serial interface for the Digital Line Guide and Remote Stations.

### Field installation of Serial I/O board:

5. Check header P2 on the controller board - straighten any bent pins.
6. Align the socket on the underside of the Serial I/O board with header P2 on the controller board.
7. Push the Serial I/O board firmly onto header P2.
8. Secure the Serial I/O board to the standoffs with four #4-40, 1/4 inch long machine screws and four #4 internal tooth star washers.

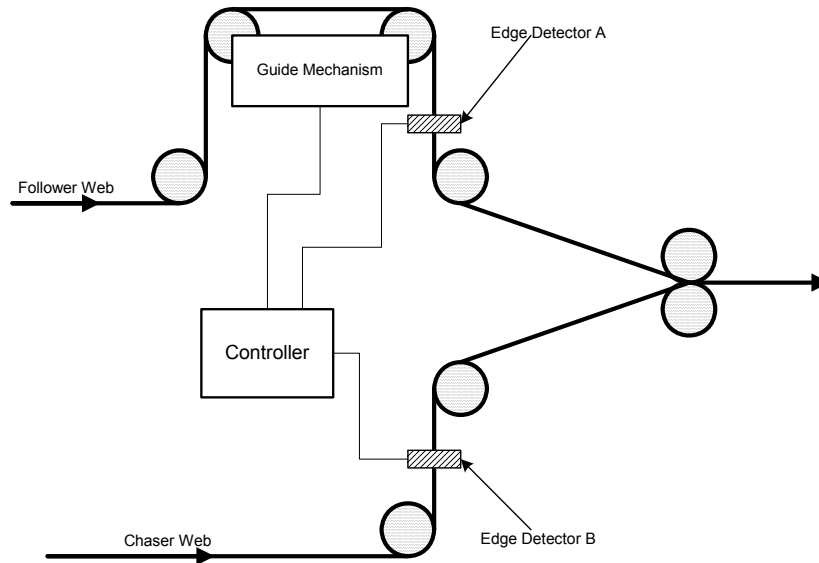
### Digital Line Guide and Remote Station wiring:

- Refer to the connection diagrams on page 97 for wiring information.

## Appendix 7 / Chaser-Follower Configuration

The Chaser-Follower configuration is used whenever there is a need to align two webs prior to joining them together.

The chaser sensor monitors the position of the first incoming web and the follower sensor controls a web guide that steers the second incoming web. The chaser sensor controls the guide point of the follower sensor, and this causes the web guide to align the second web with the first. The alignment of the two webs can be fine-tuned by adjusting Offset 1 through the Remote Station or parameter 60.



To configure the MICRO 1000 system for chaser-follower operation, set the controller parameters as shown in the table below. Refer to page 16 for more information about setting controller parameters.

**Note:** Sensor A is the follower sensor and Sensor B is the chaser sensor.

Parameter	Description	Range	Default	Setting	Notes
12	Input A type	0-2	1	1	
13	Input B type	0-2	0	1	
24	Sensor A length	2-128	2		see note 1
25	Sensor B length	2-128	2		see note 1
36	Sensor A gap	0-2	1		see note 1
37	Sensor B gap	0-2	1		see note 1
63	Integrator mode	0-3	0	3	
64	Integrator input 1 type	0-3	2	2	
65	Integrator input 2 type	0-3	0	0	

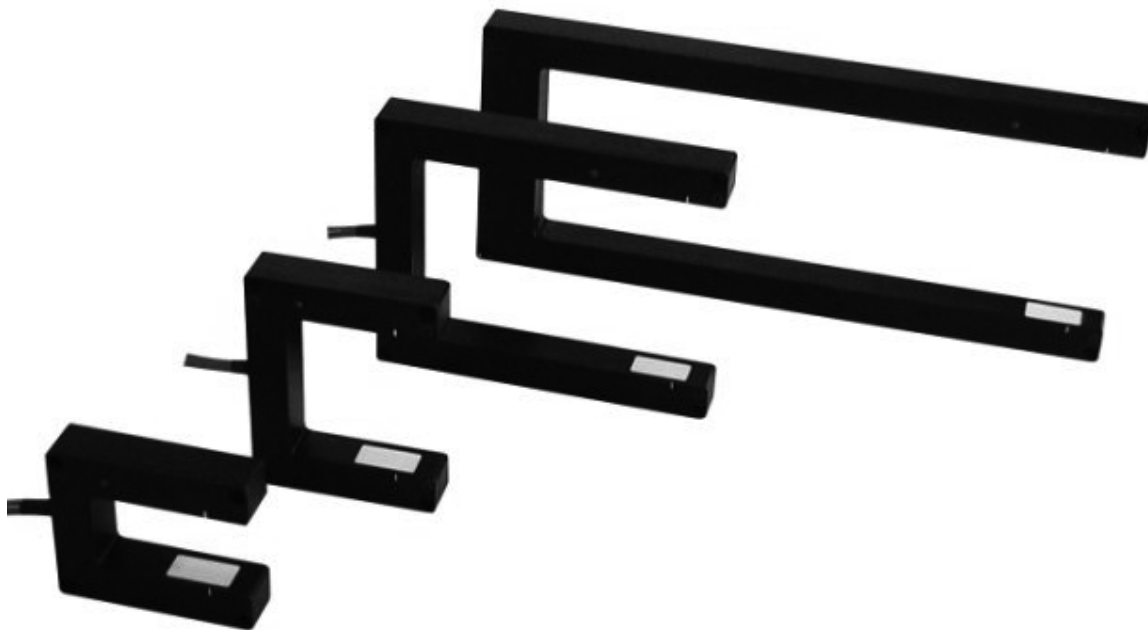
[continued on next page]

66	Integrator input 1 polarity	0, 1	0	0	
67	Integrator input 2 polarity	0, 1	0	1	
68	Integrator rate	.001-.255	.010	.100	
69	Integrator rate limit	.01-1.00	1.00	1.00	

<sup>1</sup> Refer to page 49 for more information about sensor setup.



## PointSource™ and WideArray™ Edge Detectors



## Introduction

The MICRO 1000 controller is compatible with AccuWeb's entire range of PointSource and WideArray ultrasonic and infrared edge detectors. Refer to page 49 for a list of standard models.

### PointSource and WideArray Compensated Edge Detectors

- Ultra-compact housing
- Available with sensing areas ranging from 0.2" to 18.6" wide [5mm to 472mm]
- Available with gap widths ranging from 1.5" to 4" [38mm to 102mm]
- Fully compensated for temperature, humidity, dust, and most other process contaminants
- Immune to passline variation and web flutter
- Suitable for long cable length applications
- Intrinsically-safe models available for hazardous environments
- Ultrasonic models are ideal for transparent or opaque film, paper, and foil web materials
- Infrared (IR) models are ideal for non-wovens and other porous web materials

## Setup

The following table lists all sensor models and the corresponding values for controller parameters 12, 13, 24, 25, 36, and 37. Refer to page 16 for more information about setting controller parameters. Refer to page 52 for more information about the Digital Line Guide.

Sensor Type	Sensor Model Number	Sensing Area Width inches [mm]	Guide Point Adjust Range inches [mm]	Parameter 12, 13, or 49	Parameter 24 or 25	Parameter 36 or 37	Parameter 55 or 56	Notes
PointSource Ultrasonic E/D	1.5x3U 4043-XX	0.2 [5]	0.06 [1.6]	1	2	x	0	
	3x3U 4050-XX	0.2 [5]	0.06 [1.6]	1	2	x	0	
	4x6U 4060-XX	0.2 [5]	0.06 [1.6]	1	2	x	0	
	4x12U 4090-XX	0.2 [5]	0.06 [1.6]	1	2	x	0	
Ultrasonic WideArray E/D	1.5x3.75U 4612-XX	1.4 [36]	1.2 [30]	1	10	0	0	
	4x3.75U 4621-XX	1.4 [36]	1.2 [30]	1	10	1	0	
	1.5x5U 4511-XX	2.6 [66]	2.4 [61]	1	16	0	0	
	4x5U 4500-XX	2.6 [66]	2.4 [61]	1	16	1	0	
	1.5x9U 4524-XX	6.6 [168]	6.4 [163]	1	36	0	0	
	4x9U 4520-XX	6.6 [168]	6.4 [163]	1	36	1	0	
	4x14U 4530-XX	11.4 [290]	11.2 [284]	1	60	1	0	
Hi-Temp Ultrasonic E/D	4x21U 4540-XX	18.6 [472]	18.4 [467]	1	96	1	0	
	UT 4068-XX	0.2 [5]	0.06 [1.6]	1	2	x	2	see note 1
PointSource Infrared E/D	1.5x3L 4044-XX	0.2 [5]	0.06 [1.6]	1	2	x	1	
	3x3L 4051-XX	0.2 [5]	0.06 [1.6]	1	2	x	1	
	4x6L 4061-XX	0.2 [5]	0.06 [1.6]	1	2	x	1	
	4x12L 4091-XX	0.2 [5]	0.06 [1.6]	1	2	x	1	
Infrared WideArray E/D	1.5x3.75L 4611-XX	1.4 [36]	1.2 [30]	1	10	0	1	
	4x3.75L 4620-XX	1.4 [36]	1.2 [30]	1	10	1	1	
	1.5x5L 4512-XX	2.6 [66]	2.4 [61]	1	16	0	1	
	4x5L 4501-XX	2.6 [66]	2.4 [61]	1	16	1	1	
	1.5x9L 4523-XX	6.6 [168]	6.4 [163]	1	36	0	1	
	4x9L 4521-XX	6.6 [168]	6.4 [163]	1	36	1	1	
	1.5x14L 4534-XX	11.4 [290]	11.2 [284]	1	60	0	1	
	4x14L 4532-XX	11.4 [290]	11.2 [284]	1	60	1	1	
Digital Line Guide	P/E 5100-XX	0.63 [16]	0.43 [11]	2	x	x	x	

In the table above, **x** indicates *don't care* or *not used*.

<sup>1</sup> The Hi-Temp edge detector is compatible only with the MICRO 4000 NET controller.

## Calibration

The compensated ultrasonic and infrared (IR) edge detectors may be calibrated to guide materials that are between 15% and 100% opaque to the detectors' sensing beam. During the calibration procedure the microprocessor records the signal level twice: once with the sensing beam unblocked, and then a second time with the sensing beam blocked by the material. After recording the signal levels the microprocessor calculates the opacity of the material and then displays it on the data display. When guiding a variety of materials with different opacities, best results are usually achieved when the system is calibrated for the material with the lowest opacity. Unless otherwise specified, the system is calibrated at the factory for materials with 100% opacity, and this setting is correct for most materials. The following procedure should be performed when unacceptable guiding occurs. Materials with an opacity reading lower than 15% may be guided with acceptable results but sensor resolution will decrease.

### Ultrasonic and Infrared Edge Detector Calibration Procedure:

**Note:** Refer to page 16 for more information about setting controller parameters.

- 1) Put the system in either Manual or Servo-Center mode.
- 2) Make sure that the detector is enabled by setting parameter 12, 13, or 49 to 1. The default settings are: detector A enabled, detector B disabled.
- 3) Clear any obstruction or web material from the detector gap.
- 4) Set the number on the CODE display to 20 (for detector A), or 21 (for detector B).
- 5) Set the number on the DATA display to 1 and press the ENTER button. While calibration is in progress the display will count down several times (calibration may take up to a minute with larger WideArray detectors). When done the display will show a number between 100 and 204 for several seconds, followed by a 0 to prompt the next step.
- 6) Place the web material that is being calibrated in the detector gap and completely cover the transducer area. If calibrating a Hi-Temp detector, cover the open ends of the waveguide tubes with the web material.

**Important:** Keep the web material at least 0.25 inch [6 mm] from either transducer during calibration.

- 7) Set the number on the DATA display to 2 and press the ENTER button. The display will show a number between 0 and 100 for several seconds. This number represents the opacity of the web material.
- 8) Remove the web material from the detector and wait for 15 seconds before guiding.

The edge detector is now calibrated.

## Maintenance

### **Ultrasonic Edge Detectors:**

The ultrasonic edge detectors require no periodic maintenance. If a loss of unblocked signal level is noticed, cleaning of the transducer faces may be required. Clean the transducer faces with a clean cloth dampened with water or a mild soap solution. DO NOT use harsh solvents as this may damage the transducer.

### **Infrared Edge Detectors:**

For best performance, clean the black optical windows if they become dusty or dirty. Use a clean, soft (non-abrasive) cloth dampened with a mild soap solution or a cleaning solution suitable for camera lenses.

### **Hi-Temp Edge Detectors:**

The Hi-Temp edge detectors require no periodic maintenance. If a loss of unblocked signal level is noticed, cleaning of the waveguide tubes may be required. Use a vacuum cleaner to remove debris accumulated within the tubes and wipe the inner surfaces of the angled reflectors (located on the tips of the tubes) with a clean cloth dampened with water or a mild soap solution.

## AccuBeam® 3 Digital Line Guide Sensor



## Introduction

This section describes the installation and operation of the AccuBeam 3 Digital Line Guide sensor. The Digital Line Guide uses reflected light to track a registration line printed on the web.

An optional remote station is available for applications where the sensor cannot be easily reached. The remote station duplicates the sensor's switchpad and display, and provides access to all parameters and graphic displays.

The Digital Line Guide provides a line-loss /edge-loss output signal through the MICRO 4000 NET or MICRO 1000 controllers. This option is enabled by setting parameter 47. Refer to page 16 for more information about setting controller parameters.

The Digital Line Guide is compatible with the following controllers and remote station:

### **MICRO 4000 NET or MICRO 1000 Controllers**

The Digital Line Guide requires an interface cable to connect to these controllers. Cables are available in standard lengths of 12' [3.6m], 25' [7.6m], 50' [15.2 m], 75' [22.8m], and 100' [30.5m].

The Digital Line Guide also requires a Serial I/O board (AUX 4249) to connect to the MICRO 1000 Controller.

### **Auxiliary Remote Station**

The Auxiliary Remote Station requires an interface cable and T-box assembly (CON 1000) to connect to the Digital Line Guide.

### **Product Specifications:**

- Sensor size (H x W x D): 3.25" [83mm] x 3.25" [83mm] x 2.13" [54mm]
- Power requirements: Supplied by controller
- Operating environment:

Maximum ambient temperature	120 deg F [48.9 deg C]
Humidity	0-90%, Non-condensing

## Installation

The Digital Line Guide can be mounted in a variety of ways. Refer to the application drawings and connection drawings on page 97 for installation information.

**Note:** The Digital Line Guide must be mounted 1.00" [25.4mm] above the web surface, and its sight-point scribe marks must be aligned with the roll center-line as shown in the application drawing.

### Sensor and Controller set-up

**Note:** Refer to page 16 for more information about setting controller parameters.

- 1) Verify that the parameters in the controller are set correctly. The Digital Line Guide can be configured to use Input A, Input B or Input C:
  - To use Input A (EDGE A), set controller parameter 12 to 2.
  - To use Input B (EDGE B), set controller parameter 13 to 2.
  - To use Input C (LINE), set controller parameter 49 to 2.
- 2) Press the SERVO-CENTER button on the controller and wait for the guide to move to its center of travel.
- 3) Attach the Digital Line Guide test pattern (page 74) to the backup roller. Orient the pattern with the direction of web travel as shown.
- 4) Using the UP and DOWN arrows on the switchpad, select the Calibrate parameter.
- 5) Rotate the backup roller and/or move the sensor laterally until the test pattern is approximately centered under the sensor.
- 6) Press the ENTER key then wait until the "Select line/edge" message appears.
- 7) The test pattern should now appear in the Digital Line Guide's graphic display. If the test pattern line is not approximately centered in the display then move the sensor until the line is centered, or press the DOWN arrow key until the selection window is centered on the line.
- 8) Press the ENTER key then wait until the sensor has finished saving the new settings.
- 9) Press the EDGE A, EDGE B or LINE button on the controller, depending on which input the sensor is configured for.
- 10) Press the AUTOMATIC button on the controller.
- 11) The guide should now steer the test pattern so that it is always in the center of the Digital Line Guide's field of view. If the guide moves the test pattern off to one side, then the controller's input polarity needs to be changed. Change the setting of controller parameter 3, 4, or 50.
- 12) Press the SERVO-CENTER button on the controller and wait for the guide to move to its center of travel.
- 13) Remove the test pattern from the backup roller.



## Operation

This section describes the Digital Line Guide's front panel keys and display, and outlines a basic operating procedure.

### Display:

- The 2-line LCD display is divided into four fields as shown:

PARAMETER	VALUE
GRAPHIC DISPLAY	CONTRAST

PARAMETER field: Name of the currently selected parameter.

VALUE field: Value of the currently selected parameter.

GRAPHIC DISPLAY field: Graphically displays what is in the sensor's field of view.

CONTRAST field: Contrast value of the highest contrast edges in the sensor's field of view.

- The parameters are described in the Parameters section of this manual (page 63).
- At power-up, a software identification message is displayed for several seconds then the display reverts to the format described above:

		A	c	c	u	B	e	a	m	3				
		D	L	G	x	x	.	x	x					

### Front panel keys:

- The front panel keys are defined as follows:



UP



DOWN



ENTER

- To select a parameter press the ENTER key until the cursor is in the PARAMETER field, then press the UP or DOWN keys until the desired parameter is displayed.
- To change a parameter's value press the ENTER key until the cursor is in the VALUE field, then press the UP or DOWN keys until the desired value is displayed.
- The keys automatically repeat if held down for more than one second.

### Operation:

- Press the SERVO-CENTER button and wait for the guide to move to its center of travel.
- Thread the web through the machine.
- Press the EDGE A, EDGE B, or LINE button.
- Align the sensor with the line or edge to be tracked on the web material.
- If this is the first time you are running this particular web material, perform the auto-calibration procedure described in the Calibration section of this manual (page 57).

- 6) Verify that the web pattern is visible in the sensor's graphic display and that the guide point indicator (a dot) is located under the line or edge you want to track. If the pattern or guide point indicator is not visible, perform the auto-calibration routine described on page 57.
- 7) Press the AUTOMATIC button. The system will now guide the web.

## Calibration

### Digital Line Guide Calibration Procedure:

This procedure automatically finds the optimum values for all line and edge tracking parameters. These parameters can also be examined and manually set as described in the Operation section of this manual (page 55). The parameters are described in more detail in the Parameters section of this manual (page 63).

The following steps provide a general outline of the auto-calibration procedure. A more detailed step-by-step procedure using specific examples appears on pages 58 and 60.

- 1) Position the sensor so that it is approximately centered over the registration line or edge.
- 2) Select the Calibration parameter and press ENTER to start the auto-calibration procedure.
- 3) When the "Select line/edge" message appears, a short horizontal line will simultaneously appear in the graphic display. This line is the *selection window*. The selection window can be moved horizontally and made smaller or larger so that you can indicate precisely which line or edge the sensor should track. This feature is particularly useful if there are multiple lines or edges in the sensor's field of view.
- 4) Move the selection window over the line or edge you want to track. Adjust the size of the selection window with the UP key and adjust its position with the DOWN key.

**Note:** It is usually not necessary to adjust the selection window if there is only one line or edge in the sensor's field of view and the sensor has been centered over this feature.

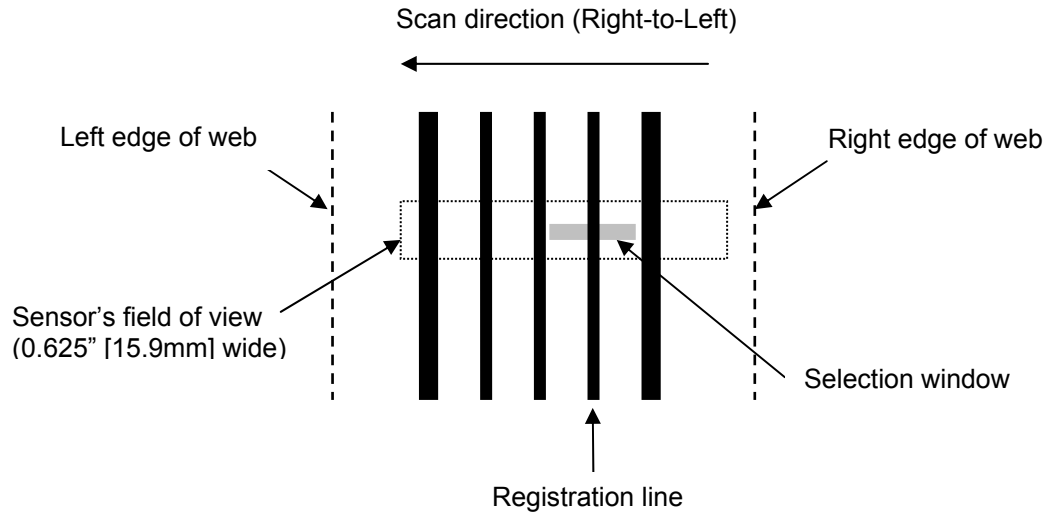
- 5) As you adjust the selection window size and position, the sensor will continuously analyze your selection and pick the best parameter settings to track the line or edge you selected. If it can reliably track this feature it will place an indicator dot directly under it in the display.
- 6) If the indicator dot is not visible or is in the wrong place, adjust the selection window size and position until the indicator appears under the desired line or edge.

**Tip:** To exit from the auto-calibration procedure without changing any settings, press the UP key repeatedly until the "Exit?" message appears, then press ENTER.

- 7) When the indicator dot is under the line or edge you want to track, press the ENTER key to complete the auto-calibration.

### Example # 1 - Tracking a line:

- 1) Suppose you have a series of dark lines printed on white paper, as shown below. The wide lines are 0.050" [1.3mm] wide, the narrow lines are 0.025" [0.6mm] wide, and the lanes between the lines are 0.100" [2.5mm] wide:



- 2) Now, let's assume you want to track the narrow line closest to the right edge of the web. Since there will probably be several lines in the sensor's field of view you will need to indicate which line you want the sensor to track.
  - a) Position the sensor so that it is approximately centered over the registration line.
  - b) Select the Calibration parameter and press ENTER to start the auto-calibration procedure.
  - c) When the "Select line/edge" message appears, adjust the position and width of the selection window so that it straddles the registration line and as much of the white area around it as possible. Make sure the window *does not* touch the other lines nearby. Use the DOWN key to adjust position and the UP key to adjust size.

**Note:** It may not be necessary to adjust the selection window if there is only one line in the sensor's field of view and the sensor has been centered over it.

- d) As you adjust the window size and position, the sensor will continuously analyze your selection and pick the best parameter settings to track the line you selected. If it can reliably track this line it will place an indicator dot directly under it.
- e) If the indicator dot is not visible or is in the wrong place, adjust the selection window size and position until the indicator appears under the desired line.

**Tip:** To exit from the auto-calibration procedure without changing any settings, press the UP key repeatedly until the "Exit?" message appears, then press ENTER.

**Tip:** To track lines that vary greatly in width, press the UP key repeatedly until you see the selection window double in thickness. This mode widens the Min/Max parameter tolerances to  $\pm 50\%$ . These parameters are described below.

- 3) When the indicator dot is under the line you want to track, press the ENTER key to complete the auto-calibration. The sensor will then store the new parameter values in the current Job

Profile's memory. For the material used in this example the parameters will be set to the following values:

- a) *Pattern* is set to Lt-Dk-Lt (Light-Dark-Light) because the registration line is darker than the surrounding background.
- b) *Scan Direction* is set to R-to-L (Right-to-Left) so that the sensor will evaluate objects in its field of view beginning with those on the far right. As it scans from right to left, the first line it encounters that satisfies the Min/Max width rules (described in the next step) will be the narrow line closest to the right edge of the web – the line we want to track.
- c) *Max Center* is set to 12 and *Min Center* is set to 9. These parameters define the maximum and minimum acceptable widths of the registration line. To accommodate some variation in line width the *Max Center* value is set 12.5% larger than the nominal width and the *Min Center* value is set 12.5% smaller than the nominal width.

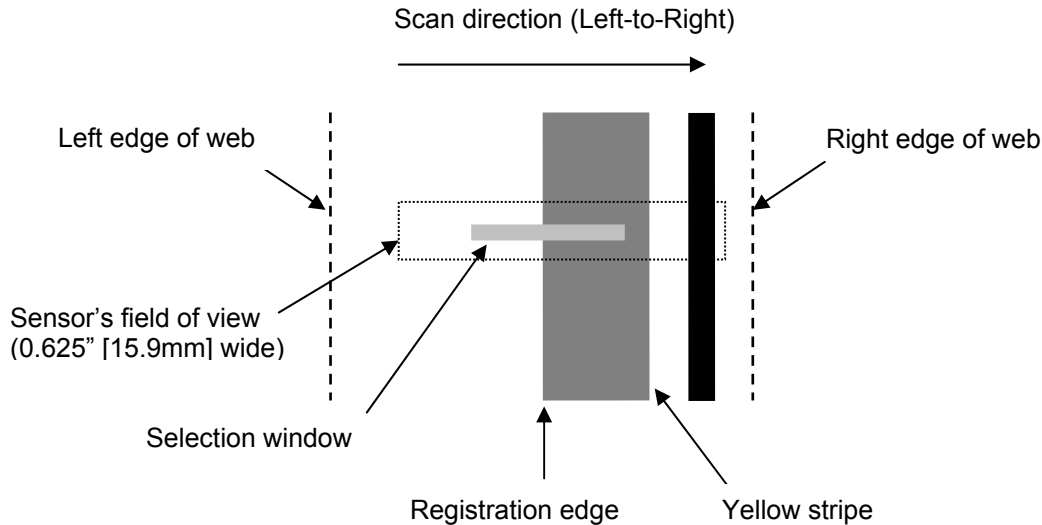
**Note:** Refer to page 62 for more information about the Min/Max parameters.

**Note:** The settings for the Min/Max parameters range from 0 to 127 and are scaled in units of “pixels”, or 0.0049” [0.124mm].

- d) *Min Left* and *Min Right* are both set to 36. These parameters define the minimum widths of the white areas covered by the selection window adjacent to the registration line. To accommodate some variation in these widths they are both set 12.5% smaller than their nominal widths.
- e) *Max Left* and *Max Right* are both set to 127. These parameters define the maximum widths of the white areas adjacent to the registration line. Setting them to 127 removes any restriction on the maximum width of these areas, so either one could extend beyond the edge of the sensor's field of view.
- f) *LED Color* is set to Red. Auto-calibration will select the lighting color that produces the greatest contrast between the registration line and background. For black and white patterns (like the one in this example) any LED color will work well, but for colored lines and backgrounds there will often be one particular LED color that produces a significantly greater contrast.
- g) *LED Angle* is set to Diffuse. This lighting angle provides the best contrast between the registration line and background on dull, non-glossy materials like the one used in this example. To track a dark line printed on metalized film or to track the edge of glossy film material, the best angle would be Reflective. For certain holographic materials the Side setting may work best.
- h) *Filter* is set to 4. This parameter helps the sensor ignore scratches, smudges, and other stray marks by deliberately blurring the image. Higher settings create more blurring, so the auto-calibration routine will select the highest setting that blurs the edges of the registration line without totally obscuring it. Generally, higher settings will be selected only for wider registration lines.
- i) *Threshold* is set to 10 - a value that is approximately 50% of the contrast value of the registration line's edges. This will filter out other edges in the sensor's field of view that fall below this value.

### Example # 2 - Tracking an edge:

- 1) Suppose you have a narrow black line and a wide yellow stripe printed on silver metalized film, as shown below:



- 2) Now, let's assume you want to track the left edge of the yellow stripe. Since there will probably be several edges in the sensor's field of view you will need to indicate which edge you want the sensor to track.
  - a) Position the sensor so that it is approximately centered over the left edge of the yellow stripe.
  - b) Select the Calibration parameter and press ENTER to start the auto-calibration procedure.
  - c) When the "Select line/edge" message appears, adjust the position and width of the selection window so that it straddles the left edge of the yellow stripe and covers roughly equal amounts of the stripe and metalized area to its left. Make sure the window *does not* touch the right edge of the stripe. Use the DOWN key to adjust position and the UP key to adjust size.

**Note:** It may not be necessary to adjust the selection window if there is only one edge in the sensor's field of view and the sensor has been centered over it.

- d) As you adjust the window size and position, the sensor will continuously analyze your selection and pick the best parameter settings to track the edge you selected. If it can reliably track this edge it will place an indicator dot directly under it.
- e) If the indicator dot is not visible or is in the wrong place, adjust the selection window size and position until the indicator appears under the desired edge.

**Tip:** To exit from the auto-calibration procedure without changing any settings, press the UP key repeatedly until the "Exit?" message appears, then press ENTER.

- 3) When the indicator dot is under the edge you want to track, press the ENTER key to complete the auto-calibration. The sensor will then store the new parameter values in the current Job Profile's memory. For the material used in this example the parameters will be set to the following values:

- a) *Pattern* is set to Lt-Dk (Light-Dark) because the metalized area to the left of the edge is lighter than the yellow stripe to the right of it.
- b) *Scan Direction* is set to L-to-R (Left-to-Right) so that the sensor will evaluate objects in its field of view beginning with those on the far left. As it scans from left to right, the first edge it encounters that satisfies the Min/Max width rules (described in the next step) will be the left edge of the yellow stripe – the edge we want to track.
- c) *Min Left* and *Min Right* are both set to 53. *Min Left* defines the minimum width of the metalized area to the left of the edge and *Min Right* defines the minimum width of the yellow stripe to the right of the edge. To accommodate some variation in these widths they are both set approximately 12.5% smaller than their nominal widths.

**Note:** Refer to page 62 for more information about the Min/Max parameters.

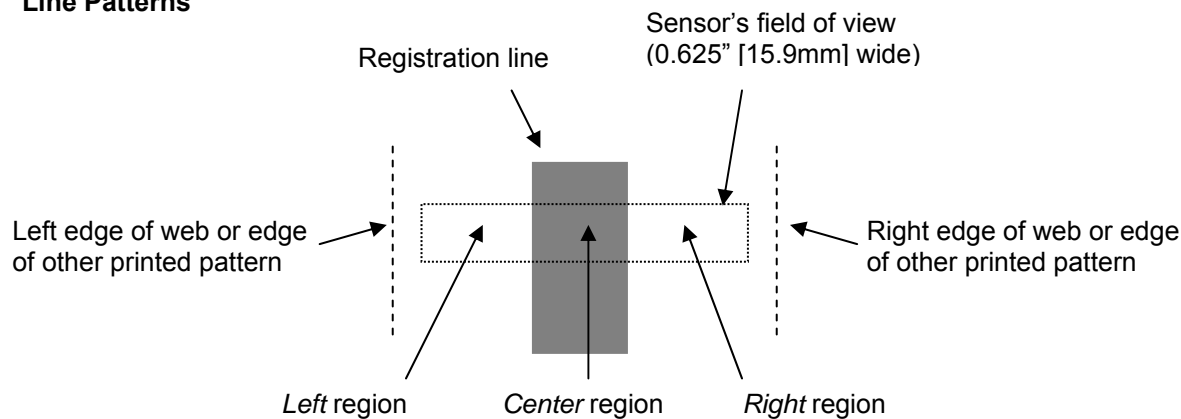
**Note:** The settings for the Min/Max parameters range from 0 to 127 and are scaled in units of “pixels”, or 0.0049” [0.1242mm].

- d) *Max Left* and *Max Right* are both set to 127. These parameters define the maximum widths of the Left and Right areas described in the previous step. Setting them to 127 removes any restriction on the maximum width of these areas, so either one could extend beyond the edge of the sensor’s field of view.
- e) *Max Center* and *Min Center* are set to their default values of 127 and 0, respectively. These parameters are not used for edge tracking.
- f) *LED Color* is set to Blue. Auto-calibration will select the lighting color that produces the greatest contrast between the registration edge and background. For yellow markings (like those in this example) blue typically produces a significantly greater contrast than other lighting colors.
- g) *LED Angle* is set to Reflective. This lighting angle provides the best contrast between the registration line and background on highly reflective or mirror-like materials like the one used in this example.
- h) *Filter* is set to 16. This parameter helps the sensor ignore scratches, smudges, and other stray marks by deliberately blurring the image. Higher settings create more blurring, so the auto-calibration routine will select the highest setting that blurs the edge of the registration stripe without totally obscuring it. Generally, higher settings will be selected only for wider registration stripes.
- i) *Threshold* is set to 12 - a value that is approximately 50% of the contrast value of the registration line’s edges. This will filter out other edges in the sensor’s field of view that fall below this value.

## Min/Max Parameters - Glossary:

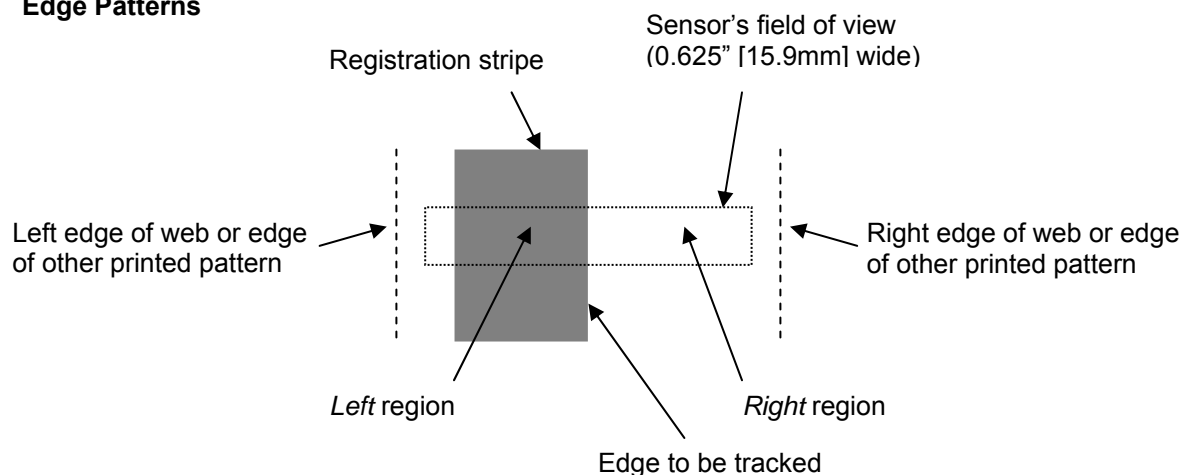
In order to understand the purpose and function of the Min/Max width parameters, it is necessary to define the various parts of standard Line and Edge patterns:

### Line Patterns



Line patterns are defined by three regions. The *Left* region is the area located to the left of the registration line, the *Center* region is the registration line itself, and the *Right* region is the area located to the right of the registration line. By defining the size of these regions using the Min/Max Left, Min/Max Center, and Min/Max Right parameters, the sensor can be configured to track the center of the registration line and ignore any other printing within its field of view.

### Edge Patterns



Edge patterns are defined by two regions. The *Left* region is the area located to the left of the edge to be tracked, and the *Right* region is the area located to the right of edge to be tracked. **[Note: Edge patterns do not have a *Center* region.]** By defining the size of these regions using the Min/Max Left and Min/Max Right parameters, the sensor can be configured to track the edge of the registration stripe and ignore any other printing within its field of view.



## Parameters

The AccuBeam 3 Digital Line Guide can track lines and edges printed on many different types of materials. There are twelve tracking parameters that can be adjusted to configure the sensor for a particular pattern and background material. These parameters include: LED Color, LED Angle, Filter, Threshold, Pattern, Scan Direction, Min/Max Left, Min/Max Center, and Min/Max Right.

**Tip:** The quickest and most reliable way to set the line and edge tracking parameters is to use the auto-calibration procedure (page 57). This procedure automatically finds the optimum values for all line and edge tracking parameters. These parameters can also be examined and manually set as described in the Operation section of this manual (page 55).

The Digital Line Guide can store up to 25 unique parameter configurations (called *job profiles*) that make material changeover faster and less error-prone. When a job profile is selected, all previously stored parameter settings for that job are instantly recalled.

The Digital Line Guide's parameters are described below:

### Job Profile

J	O	b		P	r	o	f	i	l	e							1
---	---	---	--	---	---	---	---	---	---	---	--	--	--	--	--	--	---

Range: 1 to 25

The Digital Line Guide can store up to 25 unique parameter configurations (called *job profiles*) that make material changeover faster and less error-prone. When a job profile is selected, all previously stored parameter settings for that job are instantly recalled.

To save a new job profile, select an unused profile number, then change the other parameters as needed.

To modify an existing job profile, select its profile number, then change the other parameters as needed.

To recall a job profile, select the profile number.

**Note:** When AC power is turned on the system will automatically reload the job profile that was selected and in use when AC power was lost.

**The default value is 1.**

### Offset

O	F	f	s	e	t							0	.	0	0	0
---	---	---	---	---	---	--	--	--	--	--	--	---	---	---	---	---

Range:  $\pm 16.300''$

The Offset parameter is typically used for setting the guide point position - when in Automatic mode the guide will maintain the web at this position. The offset is displayed in *inches*.

**The default value is 0.000.** After setting defaults this parameter will be hidden. Refer to the description of the Hidden parameter for more information about making this parameter visible.

## Calibrate

C	a	l	i	b	r	a	t	e						
---	---	---	---	---	---	---	---	---	--	--	--	--	--	--

This parameter initiates the auto-calibration procedure. This procedure automatically finds the optimum values for all line and edge tracking parameters. Complete instructions for using the auto-calibration procedure may be found on page 57.

## LED Color

(Tracking Parameter)

L	E	D		C	o	l	o	r			B	l	u	e
---	---	---	--	---	---	---	---	---	--	--	---	---	---	---

Range: Blue, Red, Green

This parameter selects the color of the light source. Select a color that maximizes the contrast between the line or edge and background material. This contrast value is displayed in the lower right corner of the display. **The default value is Blue.**

## LED Angle

(Tracking Parameter)

L	E	D		A	n	g	l	e			D	i	f	f
---	---	---	--	---	---	---	---	---	--	--	---	---	---	---

*Diffuse:* Use this setting for materials with a dull, non-glossy finish. **This is the default value.**

L	E	D		A	n	g	l	e			R	e	f	l
---	---	---	--	---	---	---	---	---	--	--	---	---	---	---

*Reflective:* Use this setting for highly reflective or glossy materials.

L	E	D		A	n	g	l	e			S	i	d	e
---	---	---	--	---	---	---	---	---	--	--	---	---	---	---

*Side:* Use this setting on holographic materials.

## Filter

(Tracking Parameter)

F	i	l	t	e	r									4
---	---	---	---	---	---	--	--	--	--	--	--	--	--	---

Range: 4, 8, or 16

This parameter helps the sensor ignore scratches, smudges, and other stray marks by deliberately blurring the image. Higher settings create more blurring, so should be selected only for wider registration lines or stripes. **The default value is 4.**

## Threshold

(Tracking Parameter)

T	h	r	e	s	h	o	l	d						4
---	---	---	---	---	---	---	---	---	--	--	--	--	--	---

Range: 1 to 127

This parameter helps the sensor reject low-contrast or blurry edges. Any edge that has a contrast value lower than this threshold will be ignored by the sensor. **The default value is 4.**

Pattern	(Tracking Parameter)
P A t t e r n L t - D k - L t	<i>Light-Dark-Light:</i> This setting will cause the sensor to track a dark line printed on a light background. <b>This is the default value.</b>
P A t t e r n D k - L t - D k	<i>Dark-Light-Dark:</i> This setting will cause the sensor to track a light line printed on a dark background.
P A t t e r n     L t - D k	<i>Light-Dark:</i> This setting will cause the sensor to track the <i>left</i> edge of a dark line or stripe printed on a light background, or the <i>right</i> edge of a light line or stripe printed on a dark background.
P A t t e r n     D k - L t	<i>Dark-Light:</i> This setting will cause the sensor to track the <i>right</i> edge of a dark line or stripe printed on a light background, or the <i>left</i> edge of a light line or stripe printed on a dark background.

Scan Direction	(Tracking Parameter)
S C a n D i r     R - t o - L	<i>Right-to-Left:</i> Scan the pattern from right to left. The sensor will evaluate objects in its field of view beginning with those on the far right. <b>This is the default value.</b>
S C a n D i r     L - t o - R	<i>Left-to-Right:</i> Scan the pattern from left to right. The sensor will evaluate objects in its field of view beginning with those on the far left.

Maximum Left	(Tracking Parameter)
M A x L e f t     1 2 7	This parameter specifies the maximum acceptable width of the area located to the left of the registration line or edge. <b>The default value is 127.</b>

Range: 0 to 127 pixels

**Note:** A setting of 127 *disables* this Min/Max rule.

**Note:** A “pixel” is equivalent to 0.0049” [0.124mm].

Minimum Left	(Tracking Parameter)
M i n L e f t     0	This parameter specifies the minimum acceptable width of the area located to the left of the registration line or edge. <b>The default value is 0.</b>

Range: 0 to 127 pixels

**Note:** A setting of 0 *disables* this Min/Max rule.

**Note:** A “pixel” is equivalent to 0.0049” [0.124mm].

**Maximum Center****(Tracking Parameter)**

M	a	x		C	e	n	t	e	r				1	2	7
---	---	---	--	---	---	---	---	---	---	--	--	--	---	---	---

Range: 0 to 127 half-pixels

This parameter specifies the maximum acceptable width of the registration line. This parameter is not used when tracking an edge. **The default value is 127.**

**Note:** A setting of 127 *disables* this Min/Max rule.

**Note:** A “pixel” is equivalent to 0.0049” [0.124mm].

**Minimum Center****(Tracking Parameter)**

M	i	n		C	e	n	t	e	r						0
---	---	---	--	---	---	---	---	---	---	--	--	--	--	--	---

Range: 0 to 127 pixels

This parameter specifies the minimum acceptable width of the registration line. This parameter is not used when tracking an edge. **The default value is 0.**

**Note:** A setting of 0 *disables* this Min/Max rule.

**Note:** A “pixel” is equivalent to 0.0049” [0.124mm].

**Maximum Right****(Tracking Parameter)**

M	a	x		R	i	g	h	t					1	2	7
---	---	---	--	---	---	---	---	---	--	--	--	--	---	---	---

Range: 0 to 127 half-pixels

This parameter specifies the maximum acceptable width of the area located to the right of the registration line or edge. **The default value is 127.**

**Note:** A setting of 127 *disables* this Min/Max rule.

**Note:** A “pixel” is equivalent to 0.0049” [0.124mm].

**Minimum Right****(Tracking Parameter)**

M	i	n		R	i	g	h	t							0
---	---	---	--	---	---	---	---	---	--	--	--	--	--	--	---

Range: 0 to 127 pixels

This parameter specifies the minimum acceptable width of the area located to the right of the registration line or edge. **The default value is 0.**

**Note:** A setting of 0 *disables* this Min/Max rule.

**Note:** A “pixel” is equivalent to 0.0049” [0.124mm].

## Backlight

B a c k l i g h t     O N

This parameter controls the LCD display backlight.

**The default value is *on*.**

B a c k l i g h t     O F F

## Start-Up

S t a r t - U p     1 8

Range: 0 to 18

This parameter determines which parameter will be displayed first when the Digital Line Guide is powered-up.

Refer to the table below for the numeric code that corresponds to each parameter.

**The default value is 18 (Job Profile).**

Parameter	Start-Up Value
Job Profile	18
Offset	17
Calibrate	16
LED Color	15
LED Angle	14
Filter	13
Threshold	12
Pattern	11
Scan Direction	10
Maximum Left	9
Minimum Left	8
Maximum Center	7
Minimum Center	6
Maximum Right	5
Minimum Right	4
Backlight	3
Hidden	2
Read-Only	1
Start-Up	0

## Hidden

H	i	d	d	e	n					2	0	0	0	F
---	---	---	---	---	---	--	--	--	--	---	---	---	---	---

Range: 0 to FFFFF

This parameter can be configured to hide unused parameters. If a parameter is Hidden it cannot be selected or displayed.

The value of this parameter is a bit-field and is displayed in hexadecimal (hex) format. Each bit corresponds to a particular parameter – setting a bit to '1' hides the parameter, and setting it to '0' makes it visible. Refer to the tables on page 69 for bit definitions and hex conversion information.

To activate the Hidden feature the keypad must be Locked. If the keypad is Unlocked, then all parameters will be visible, regardless of the Hidden settings. Refer to page 70 for more information about this feature.

**The default value is 2000F.**

Example: The default value of 2000F (hex) corresponds to a bit-field pattern of 0010:0000:0000:0000:1111. This pattern hides the Offset, Backlight, Hidden, Read-Only, and Start-Up parameters.

## Read-Only

R	e	a	d	-	O	n	l	y						0
---	---	---	---	---	---	---	---	---	--	--	--	--	--	---

Range: 0 to FFFFF

This parameter can be configured to prevent accidental or unauthorized changes to parameters. If a parameter is Read-Only it can be displayed but not changed.

The value of this parameter is a bit-field and is displayed in hexadecimal (hex) format. Each bit corresponds to a particular parameter – setting a bit to '1' makes the parameter read-only, and setting it to '0' makes it changeable. Refer to the tables on page 69 for bit definitions and hex conversion information.

To activate the Read-Only feature the keypad must be Locked. If the keypad is Unlocked, then all parameters can be changed, regardless of the Read-Only settings. Refer to page 70 for more information about this feature.

**The default value is 0.**

Example: The default value of 0 (hex) corresponds to a bit-field pattern of 0000:0000:0000:0000:0000. This pattern makes all parameters changeable.

**Bit definitions:**

		Job Profile	Offset	Calibrate	LED Color	LED Angle	Filter	Threshold	Pattern	Scan Direction	Maximum Left	Minimum Left	Maximum Center	Minimum Center	Maximum Right	Minimum Right	Backlight	Hidden	Read-Only	Start-Up
Bit number	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Hex digit	fifth				fourth				third				second				first			

**Hexadecimal (hex) conversion:**

Bit-field				Hex digit
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	A
1	0	1	1	B
1	1	0	0	C
1	1	0	1	D
1	1	1	0	E
1	1	1	1	F

Example: Offset, Backlight, Hidden, Read-Only, and Start-up parameters are hidden

		Job Profile	Offset	Calibrate	LED Color	LED Angle	Filter	Threshold	Pattern	Scan Direction	Maximum Left	Minimum Left	Maximum Center	Minimum Center	Maximum Right	Minimum Right	Backlight	Hidden	Read-Only	Start-Up
Bit settings	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Hex digits	2				0				0				0				F			

## Keypad Lock

The Digital Line Guide's keypad can be Locked or Unlocked to control access to the parameters. This feature is typically used to prevent accidental or unauthorized changes to stored values and to simplify the menu by hiding unused parameters.

When the keypad is Locked, the Hidden and Read-Only parameters are activated. The Hidden parameter hides unused parameters (if a parameter is Hidden it cannot be selected or displayed), and the Read-Only parameter prevents changes to parameters (if a parameter is Read-Only it can be displayed but not changed).

When the keypad is Unlocked all parameters are visible and all parameter values can be changed.

- To Lock the keypad, press and hold the DOWN key while cycling AC power to the attached controller.
- To Unlock the keypad, press and hold the UP key while cycling AC power to the attached controller.



## Troubleshooting

The following checklist has been provided to assist in the analysis and repair of potential trouble situations with the Digital Line Guide. If a situation occurs that is not described in this list, contact AccuWeb for assistance.

Problem	Solution
The display does not display any characters.	Check item 1 in the table below.
The display is active but the keys do not work.	Check item 2 in the table below.
The system does not respond to parameter changes entered through the Digital Line Guide keypad.	Check item 1 in the table below.
The display shows "EEPROM error – Set defaults."	Check item 3 in the table below.
The display shows "Serial i/o error."	Check item 1 in the table below.
The sensor does not follow the line or edge.	Check item 4 in the table below.
The guide steers the web away from the sensor.	Check item 5 in the table below.

Item	Description / Repair Procedure
1	<b>Bad cable connection.</b> If the display is not working, check the interface cable and replace if bad.
2	<b>Keypad is disabled.</b> Refer to page 70 for more information about this feature.
3	<b>Non-volatile memory contains bad data.</b> Reset all parameters to their default values:  To reset all parameters to their default values, press and hold the ENTER key while cycling AC power to the attached controller. When the power-up message appears release the ENTER key.
4	<b>Sensor in wrong position.</b> The Digital Line Guide must be mounted 1.00" [25.4mm] above the web surface, and its sight-point scribe marks must be aligned with the roll center-line as shown in the application drawing on page 97. The sensor should be positioned so that the line or edge to be guided is centered in its field of view when the guide is in Servo-Center mode.
5	<b>Sensor polarity is wrong.</b> The value of controller parameter 3, 4, or 50 must be changed for the selected sensor. Refer to page 16 for more information about setting controller parameters.

## **Maintenance**

For best performance, clean the optical window on the underside of the unit if it becomes dusty or dirty. Use a clean, soft (non-abrasive) cloth dampened with a mild soap solution or a cleaning solution suitable for camera lenses.

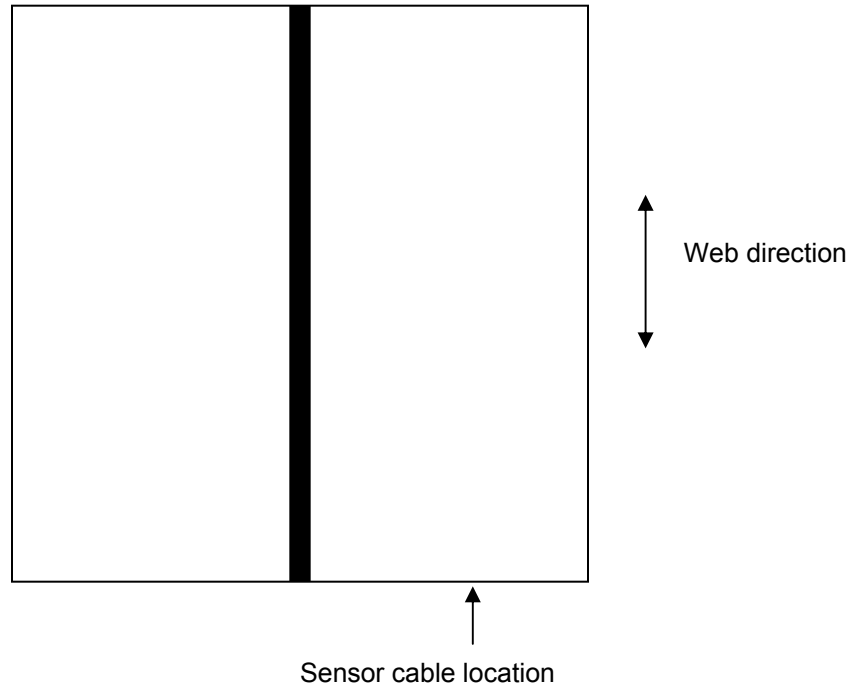
## Appendix 1 / Parameter Summary

Parameter	Range	Default	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5
Job Profile	1-25	1	1	2	3	4	5
Offset	± 16.300	0.000					
Calibrate							
LED Color	Blue Red Green	Blue					
LED Angle	Diff Refl Side	Diff					
Filter	4, 8, 16	4					
Threshold	1 to 127	4					
Pattern	Lt-Dk-Lt Dk-Lt-Dk Lt-Dk Dk-Lt	Lt-Dk-Lt					
Scan Dir	L-to-R R-to-L	L-to-R					
Max Left	0-127	127					
Min Left	0-127	0					
Max Center	0-127	127					
Min Center	0-127	0					
Max Right	0-127	127					
Min Right	0-127	0					
Backlight	Off On	On					
Hidden	0-FFFFFF	2000F					
Read Only	0-FFFFFF	0					
Start-Up	0-18	18					

## Appendix 2 / Line Guide Test Pattern

Use this test pattern to verify the proper installation and operation of the Digital Line Guide:

### Test pattern



## AccuWeb® Linear Actuators



## Introduction

AccuWeb linear actuators are available with a wide variety of motor technologies, power ratings, stroke lengths, and end-of-travel sensor options:

- Motor technologies include brush and brushless DC motors. Power ratings span the range of 20 to 746 watts (1.0 HP).
- Standard stroke lengths range from  $\pm 1"$  to  $\pm 6"$  [ $\pm 25\text{mm}$  to  $\pm 152\text{mm}$ ]. Other lengths are available upon request.
- End-of-travel options include limit switch or potentiometer feedback. Potentiometer feedback permits quick adjustment of end-of-travel and servo-center limits by setting controller parameters. All actuators have servo-center capability.

## Setup

Actuators with limit switches (MM, MME, MN, MNE, and MX) actuators require no setup. Their end-of-travel limits are factory set.

Actuators with potentiometer feedback (MT, SF, and HF) may require some setup. They have adjustable end-of-travel limits and these may need to be changed in order to prevent mechanical jamming of the actuator or guide mechanism. Use the following table to set the initial values of the In Limit, Out Limit, and Servo-Center Position parameters. Refer to page 16 for more information about setting controller parameters.

**Caution:** To prevent mechanical jamming of the actuator do not set the end-of-travel limits beyond the range of values shown in the table. Also, make sure the limits conform to the following relationship:

$$\text{In Limit} \leq \text{Servo-Center Limit} \leq \text{Out Limit}$$

End-of-Travel Limits				
Actuator Model Number	Stroke Range inches [mm]	In Limit (parameter 9)	Servo-Center (parameter 11)	Out Limit (parameter 10)
MT-1	2.00 [50.8]	$\geq 36$	128	$\leq 220$
MT-2, SF-2	4.00 [101.6]	$\geq 36$	128	$\leq 220$
MT-4, SF-4	8.00 [203.2]	$\geq 36$	128	$\leq 220$
MT-6, SF-6	12.00 [304.8]	$\geq 36$	128	$\leq 220$
HF-3	6.00 [152.4]	$\geq 51$	128	$\leq 205$
HF-6	12.00 [304.8]	$\geq 51$	128	$\leq 205$

## Maintenance

### Lubrication:

The only lubrication required for the linear actuator is the lead screw assembly. Lubricate the lead screw after every eighteen months of operation. Apply a small amount of white lithium grease to the lead screw.

**Recommended Grease:**

Available from AccuWeb P/N: 004033-02.

Lubriplate # 730-1 grease

Available from: Lubriplate Division

Fiske Brothers Refining Company

Newark, NJ 07105

or

Toledo, OH 43805

**Note:** If other than the recommended grease is used, the lead screw and nut **MUST** be thoroughly cleaned before applying the new grease. **DO NOT** mix greases.

**Actuators with potentiometer feedback (MT, SF, and HF) - LUBRICATION:**

- 1) Remove the actuator from the machine.
- 2) Extend the actuator to its Out end-of-travel limit.
- 3) Remove the three Allen nuts and end cap. Be careful not to damage the rubber seal.
- 4) Remove the barrel covering the lead screw.
- 5) Very lightly lubricate the lead screw with white lithium grease.

**Caution:** Do not over-lubricate the lead screw as this could bind the nut and lead screw.

- 6) Reassemble the actuator.
- 7) Retract and extend the actuator 20 times to distribute grease along the lead screw.
- 8) Reinstall the actuator and make sure the actuator shuts off before it reaches a mechanical stop.

### **Actuators with potentiometer feedback (MT, SF, and HF) – POTENTIOMETER REPLACEMENT:**

If the position potentiometer has failed, replace the potentiometer with the following procedure:

- 1) Remove the actuator from the machine.
- 2) Remove the side covers from the drive box.
- 3) Manually position the actuator to the center of its stroke. Refer to the following table for the correct distance from the end of the end cap (barrel) to the end of the thrust tube.

<b>Actuator Model</b>	<b>Servo-Center Length</b>
MT-1	1 1/8" [28.6mm]
MT-2, SF-2	2 13/16" [71.4mm]
MT-4, SF-4	4 11/16" [119.1mm]
MT-6, SF-6	6 13/16" [173.0mm]
HF-3	4 11/16" [119.1mm]
HF-6	8 7/16" [214.3mm]

- 4) Loosen the attaching bolt and remove the potentiometer mounting bracket.
- 5) Remove the worm gear from the potentiometer shaft and remove the defective potentiometer from the mounting bracket.
- 6) Install a new potentiometer on the mounting bracket and connect the wiring to the same terminals of the new potentiometer as the old potentiometer.
- 7) Install the new potentiometer onto the mounting bracket and reinstall the worm gear on the potentiometer shaft.
- 8) Turn the potentiometer to its CW mechanical stop.
- 9) Rotate the potentiometer exactly five turns CCW.
- 10) Reinstall the mounting bracket into the drive box. Leave the mounting bolt loose.
- 11) Adjust the position of the mounting bracket so there is a small amount of backlash between the potentiometer worm and worm gear.
- 12) Tighten the mounting bolt.
- 13) Lubricate the worm and worm gear.
- 14) Reinstall the side covers on the actuator.
- 15) Press the SERVO-CENTER button and verify that the actuator drives to the correct position and stops. Refer to the previous table for the exposed length of the thrust tube.
- 16) Reinstall the actuator in the machine.

### **Actuators with limit switches (MM, MME, MN, and MNE) - LUBRICATION:**

- 1) Remove the actuator from the machine.
- 2) Extend the actuator to its Out end-of-travel limit.
- 3) Remove the side covers or body extrusion by removing the hex-head screws.

<b>Note:</b> For some models this may require removing the thrust tube rod end and end cap.
---



- 4) Very lightly lubricate the lead screw with white lithium grease.

<b>Caution:</b> Do not over-lubricate the lead screw as this could bind the nut and lead screw.
---

- 5) Reassemble the actuator.
- 6) Retract and extend the actuator 20 times to distribute grease along the lead screw.
- 7) Reinstall the actuator and make sure the actuator shuts off before it reaches a mechanical stop.

**Actuators with limit switches (MX) - LUBRICATION:**

- 1) Press the MANUAL button, then press the OUT button to drive the actuator to its Out limit.
- 2) Remove the actuator from the positive displacement guide (PDG).
- 3) Gain access to the lead screw through the top of the actuator next to the cam follower and spacer. Very lightly lubricate the lead screw with white lithium grease.

<b>Caution:</b> Do not over-lubricate the lead screw as this could bind the nut and lead screw.
---

- 4) Reassemble the actuator in the reverse order as disassembly.
- 5) Retract and extend the actuator 20 times to distribute grease along the lead screw.
- 6) Reinstall the actuator into the PDG and make sure the actuator shuts off before it reaches a mechanical stop.

## Remote Station - Guide Point Adjust



## Introduction

The Guide Point Adjust Remote Station provides a convenient method of adjusting the system's guide point from a remote location.

The Guide Point Adjust Remote Station is compatible with the following controllers:

### **MICRO 4000 NET or MICRO 1000 Controllers**

The Guide Point Adjust Remote Station requires an interface cable to connect to these controllers. Cables are available in standard lengths of 12' [3.6m], 25' [7.6m], 50' [15.2 m], 75' [22.8m], and 100' [30.5m].

The Guide Point Adjust Remote Station also requires a Serial I/O board (AUX 4249) to connect to the MICRO 1000 Controller.

### **Product Specifications:**

- Remote Station size (H x W x D): 2.52" [64mm] x 3.86" [98mm] x 1.41" [36mm]
- Power requirements: Supplied by controller
- Operating environment:

Maximum ambient temperature	120 deg F [48.9 deg C]
Humidity	0-90%, Non-condensing

## Installation

The Remote Station can be mounted in a variety of ways. The enclosure design allows the user to easily remove the rear housing for panel-mount applications. Refer to the application drawings and connection diagrams on page 97 for installation information.

## Operation

This section describes the operation of the Remote Station front panel keys and display.

### Display:

- The 2-line LCD display is divided into three fields as shown:

PARAMETER	VALUE
POSITION	

PARAMETER field: Name of the currently selected parameter.

VALUE field: Value of the currently selected parameter.

POSITION field: Current web position. This field is continuously updated.

- Dimensional values that indicate length, position or offset are displayed in *inches* or *millimeters*, depending on the setting of the Units parameter.
- The parameters are described in the Parameters section of this manual (page 83).
- At power-up, a software identification message is displayed for several seconds then the display reverts to the format described above:

R	e	m	o	t	e	S	t	a	t	i	o	n
R	M	T	0	3	G	P	x	x	.	x	x	

### Front panel keys:

- The front panel keys are defined as follows:



UP



DOWN



ENTER

- To select a parameter press the ENTER key until the cursor is in the PARAMETER field, then press the UP or DOWN keys until the desired parameter is displayed.
- To change a parameter's value press the ENTER key until the cursor is in the VALUE field, then press the UP or DOWN keys until the desired value is displayed.
- Numeric values can be changed by increments of 0.001, 0.01, 0.1, or 1 inches (or 0.1, 1, 10, or 100 millimeters) by positioning the cursor on the corresponding digit in the VALUE field.
- The keys automatically repeat if held down for more than one second.

Parameters	
------------	--

This section provides a basic procedure for setting the Remote Station parameters and also describes each parameter in detail.

The Operation section of this manual (page 82) describes the operation of the Remote Station front panel keys and display.

## Job Profile

J	o	b		P	r	o	f	i	e					1
---	---	---	--	---	---	---	---	---	---	--	--	--	--	---

Range: 1 to 25

The Remote Station can store up to 25 unique parameter configurations (called *job profiles*) that make material changeover faster and less error-prone. When a job profile is selected, all previously stored parameter settings for that job are instantly recalled.

To save a new job profile, select an unused profile number, then change the other parameters as needed.

To modify an existing job profile, select its profile number, then change the other parameters as needed.

To recall a job profile, select the profile number.

**Note:** When AC power is turned on the system will automatically reload the job profile that was selected and in use when AC power was lost.

**The default value is 1.**

## Offset 1

O	f	f	s	e	t	1				0	.	0	0	0
---	---	---	---	---	---	---	--	--	--	---	---	---	---	---

Range:  $\pm 16.300''$  [ $\pm 414.0$  mm]

Offset 1 is typically used for setting the guide point position - when in Automatic mode the guide will maintain the web at this position. The offset is displayed in *inches* or *millimeters*.

**The default value is 0.000.**

## Offset 2

O	f	f	s	e	t	2				0	.	0	0	0
---	---	---	---	---	---	---	--	--	--	---	---	---	---	---

Range:  $\pm 16.300''$  [ $\pm 414.0$  mm]

Offset 2 is typically used for setting a *second* guide point position in applications that require PLC control of guide point position. The controller's AUXILIARY input determines which offset is active – Offset 1 or Offset 2. Refer to page 40 for more information about the AUXILIARY input. The offset is displayed in *inches* or *millimeters*.

**The default value is 0.000.**

### Display Units

U n i t s      E N G L I S H

U n i t s      M E T R I C

This parameter specifies the units of measurement for all dimensional values. In ENGLISH mode all dimensional values are displayed in *inches*. In METRIC mode all dimensional values are displayed in *millimeters*. The setpoint resolution in ENGLISH mode is 0.001 inch. The setpoint resolution in METRIC mode is 0.1 millimeter.

**The default value is ENGLISH.**

### Backlight

B a c k l i g h t      O N

This parameter controls the LCD display backlight.

**The default value is *on*.**

B a c k l i g h t      O F F

### Start-Up

S t a r t - U p      6

Range: 0 to 7

This parameter determines which parameter will be displayed first when the Remote Station is powered-up.

Refer to the table below for the numeric code that corresponds to each parameter.

**The default value is 6 (Offset 1).**

Parameter	Start-Up Value
Job Profile	7
Offset 1	6
Offset 2	5
Units	4
Backlight	3
Hidden	2
Read-Only	1
Start-Up	0

## Hidden

H	i	d	d	e	n													2	F
---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	---	---

Range: 0 to FFFF

This parameter can be configured to hide unused parameters. If a parameter is Hidden it cannot be selected or displayed.

The value of this parameter is a bit-field and is displayed in hexadecimal (hex) format. Each bit corresponds to a particular parameter – setting a bit to '1' hides the parameter, and setting it to '0' makes it visible. Refer to the tables on page 86 for bit definitions and hex conversion information.

To activate the Hidden feature the keypad must be Locked. If the keypad is Unlocked, then all parameters will be visible, regardless of the Hidden settings. Refer to page 87 for more information about this feature.

**The default value is 2F.**

Example: The default value of 2F (hex) corresponds to a bit-field pattern of 0000:0000:0000:0010:1111. This pattern hides the Offset 2, Backlight, Hidden, Read-Only, and Start-Up parameters.

## Read-Only

R	e	a	d	-	O	n	l	y											0
---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	---

Range: 0 to FFFF

This parameter can be configured to prevent accidental or unauthorized changes to parameters. If a parameter is Read-Only it can be displayed but not changed.

The value of this parameter is a bit-field and is displayed in hexadecimal (hex) format. Each bit corresponds to a particular parameter – setting a bit to '1' makes the parameter read-only, and setting it to '0' makes it changeable. Refer to the tables on page 86 for bit definitions and hex conversion information.

To activate the Read-Only feature the keypad must be Locked. If the keypad is Unlocked, then all parameters can be changed, regardless of the Read-Only settings. Refer to page 87 for more information about this feature.

**The default value is 0.**

Example: The default value of 0 (hex) corresponds to a bit-field pattern of 0000:0000:0000:0000:0000. This pattern makes all parameters changeable.

**Bit definitions:**

	not used	not used	not used	not used	not used	not used	not used	not used	not used	not used	not used	not used	Job Profile	Offset 1	Offset 2	Units	Backlight	Hidden	Read-Only	Start-Up
<b>Bit number</b>	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
<b>Hex digit</b>	fifth				fourth				third				second				first			

**Hexadecimal (hex) conversion:**

Bit-field				Hex digit
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	A
1	0	1	1	B
1	1	0	0	C
1	1	0	1	D
1	1	1	0	E
1	1	1	1	F

**Example: Offset 2, Backlight, Hidden, Read-Only, and Start-up parameters are hidden**

	not used	not used	not used	not used	not used	not used	not used	not used	not used	not used	not used	not used	Job Profile	Offset 1	Offset 2	Units	Backlight	Hidden	Read-Only	Start-Up
<b>Bit settings</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
<b>Hex digits</b>	0				0				0				2				F			



## Keypad Lock

The Remote Station's keypad can be Locked or Unlocked to control access to the parameters. This feature is typically used to prevent accidental or unauthorized changes to stored values and to simplify the menu by hiding unused parameters.

When the keypad is Locked, the Hidden and Read-Only parameters are activated. The Hidden parameter hides unused parameters (if a parameter is Hidden it cannot be selected or displayed), and the Read-Only parameter prevents changes to parameters (if a parameter is Read-Only it can be displayed but not changed).

When the keypad is Unlocked all parameters are visible and all parameter values can be changed.

- To Lock the keypad, press and hold the DOWN key while cycling AC power to the attached controller.
- To Unlock the keypad, press and hold the UP key while cycling AC power to the attached controller.

## Troubleshooting

The following checklist has been provided to assist in the analysis and repair of potential trouble situations with the Remote Station. If a situation occurs that is not described in this list, contact AccuWeb for assistance.

Problem	Solution
The display does not display any characters.	Check item 1 in the table below.
The display is active but the keys do not work.	Check item 2 in the table below.
The POSITION display does not respond to changes in web position.	Check item 1 in the table below.
The system does not respond to parameter changes entered through the Remote Station keypad.	Check item 1 in the table below.
The display shows "EEPROM error – Set defaults."	Check item 3 in the table below.
The display shows "Serial i/o error."	Check item 1 in the table below.

Item	Description / Repair Procedure
1	<b>Bad cable connection.</b> If the display is not working, check the interface cable and replace if bad.
2	<b>Keypad is disabled.</b> Refer to page 87 for more information about this feature.
3	<p><b>Non-volatile memory contains bad data.</b> Reset all parameters to their default values:</p> <p>To reset all parameters to their default values, press and hold the ENTER key while cycling AC power to the attached controller. When the power-up message appears release the ENTER key.</p>

## Remote Station - Auxiliary



## Introduction

The Auxiliary Remote Station is intended for systems that require two Remote Stations. The other station must be either a Guide Point Adjust Remote Station or a Web Width Monitor Remote Station.

The Auxiliary Remote Station is also compatible with the Digital Line Guide and provides a convenient method of adjusting the Line Guide's parameters from a remote location.

The Auxiliary Remote Station is compatible with the following controllers, sensor, and remote stations:

### **MICRO 4000 NET or MICRO 1000 Controllers**

The Auxiliary Remote Station requires an interface cable to connect to these controllers. Cables are available in standard lengths of 12' [3.6m], 25' [7.6m], 50' [15.2 m], 75' [22.8m], and 100' [30.5m].

The Auxiliary Remote Station also requires a Serial I/O board (AUX 4249) to connect to the MICRO 1000 Controller.

### **AccuBeam 3 Digital Line Guide Sensor**

The Auxiliary Remote Station requires an interface cable and T-box assembly (CON 1000) to connect to the Digital Line Guide.

### **Guide Point Adjust Remote Station or Web Width Monitor Remote Station**

The Auxiliary Remote Station requires an interface cable and T-box assembly (CON 1000) to connect to these remote stations.

### **Product Specifications:**

- Remote Station size (H x W x D): 2.52" [64mm] x 3.86" [98mm] x 1.41" [36mm]
- Power requirements: Supplied by controller
- Operating environment:

Maximum ambient temperature	120 deg F [48.9 deg C]
Humidity	0-90%, Non-condensing

## Installation

The Remote Station can be mounted in a variety of ways. The enclosure design allows the user to easily remove the rear housing for panel-mount applications. Refer to the application drawings and connection diagrams on page 97 for installation information.

## Operation

The Auxiliary Remote Station duplicates the front-panel display and keypad of the other installed remote station or digital line guide.

At power-up, a software identification message is displayed for several seconds:

	R	e	m	o	t	e		S	t	a	t	i	o	n	
	R	M	T	0	3		A	R	x	x	.	x	x		

After a delay of several seconds, the Auxiliary Remote Station will then mirror the other remote station or digital line guide's display. Initially, this will be the other unit's power-up software identification message:

	A	c	c	u	B	e	a	m		3					
	D	L	G		x	x	.	x	x						

or

	R	e	m	o	t	e		S	t	a	t	i	o	n	
	R	M	T	0	3		G	P	x	x	.	x	x		

or

	R	e	m	o	t	e		S	t	a	t	i	o	n	
	R	M	T	0	3		W	W	x	x	.	x	x		

## Keypad Lock

The Remote Station's keypad can be Locked or Unlocked to control access to the parameters. This feature is typically used to prevent accidental or unauthorized changes to stored values and to simplify the menu by hiding unused parameters.

When the keypad is Locked, the Hidden and Read-Only parameters are activated. The Hidden parameter hides unused parameters (if a parameter is Hidden it cannot be selected or displayed), and the Read-Only parameter prevents changes to parameters (if a parameter is Read-Only it can be displayed but not changed).

When the keypad is Unlocked all parameters are visible and all parameter values can be changed.

- To Lock the keypad, press and hold the DOWN key while cycling AC power to the attached controller.
- To Unlock the keypad, press and hold the UP key while cycling AC power to the attached controller.

## Troubleshooting

The following checklist has been provided to assist in the analysis and repair of potential trouble situations with the Remote Station. If a situation occurs that is not described in this list, contact AccuWeb for assistance.

Problem	Solution
The display does not display any characters.	Check item 1 in the table below.
The display is active but the keys do not work.	Check item 2 in the table below.
The display shows "EEPROM error – Set defaults."	Check item 3 in the table below.
The display shows "Serial i/o error."	Check items 1, 4 and 5 in the table below.

Item	Description / Repair Procedure
1	<b>Bad cable connection.</b> If the display is not working, check the interface cable and replace if bad.
2	<b>Keypad is disabled.</b> Refer to page 92 for more information about this feature.
3	<b>Non-volatile memory contains bad data.</b> Reset all parameters to their default values:  To reset all parameters to their default values, press and hold the ENTER key while cycling AC power to the attached controller. When the power-up message appears release the ENTER key.
4	<b>Other remote station is malfunctioning:</b> Make sure that the other remote station is connected and operating properly. The non-volatile memory in the other remote station may need to be reset.
5	<b>Digital line guide is malfunctioning:</b> Make sure that the digital line guide is connected and operating properly. The non-volatile memory in the digital line guide may need to be reset.

## Service / Return Authorization

### Service:

For questions concerning your equipment or conditions not covered by the Troubleshooting sections in this manual, please contact AccuWeb for assistance:

AccuWeb, Inc.

P.O. Box 7816

Madison, WI 53707

Tel: (608) 223-0625

Fax: (608) 223-0074

Email: [frontdesk@accuweb.com](mailto:frontdesk@accuweb.com)

Web site: [www.accuweb.com](http://www.accuweb.com)

### Shipping address:

AccuWeb, Inc.

4249 Argosy Ct.

Madison, WI 53714

Please have the system model number and serial number available prior to your call or include it in your correspondence.

Field service is available to assist in installation and/or troubleshooting. Contact AccuWeb for price and availability.

**Important:** Before returning equipment to AccuWeb please verify that all mechanical and electronic components are secured for shipping. If you are returning mechanical equipment, make sure all clamps and spreaders are re-installed. If you are returning electronic equipment, make sure all circuit boards are securely mounted in their enclosures. If you are returning individual circuit boards, enclose each board in an anti-static bag and cushion it with bubble-wrap.

**International Returns:** All items being returned from a foreign country must clearly state on the shipping paperwork that the goods were manufactured in the USA and are being returned for repair. Failure to do so will result in additional customer costs for import duties and other charges. These additional costs will be added to the customer invoice.

### Return Authorization:

Parts being returned for repair must have a return authorization (RA) number issued before returning.

Please call for and request a return authorization so that your repair can be processed quickly.



## **Restocking Policy**

The following is our restocking policy:

### **Restocking Charge:**

The exchange or return of parts and/or equipment will be subject to inspection in seller's plant.

- a) All returned parts will include a restocking charge. The only exception will be when the exchange is required because of mistakes by the seller.
- b) New, unused parts returned within 30 days shall carry a 10% restocking charge.
- c) New, unused parts returned within 6 months shall carry a 20% restocking charge.
- d) New, unused parts returned after 6 months shall be reviewed individually by the Service Department in the seller's plant and shall carry a minimum 30% restocking charge. This is required because of the continued modification and redesign of standard components and parts.
- e) Fabricated items such as positive displacement guides, steering rolls, rollers, etc. will be reviewed individually and will have a minimum 50% restocking charge. There may be cases where the seller will not be able to accept the return of the equipment for credit.
- f) All returned control cables will have a minimum 50% restocking charge. There may be cases where the seller will not be able to accept the return of the cables for credit. The only exception will be when the exchange is required because of mistakes by the seller.
- g) Buyer pays freight both ways. The only exception will be when the exchange is required because of mistakes by the seller.

## Warranty Policy

### **Warranty:**

Except as otherwise noted by any attachments hereto, AccuWeb, Inc. products are warranted to be free from defects in design, materials and workmanship for a period of one (1) year from date of delivery. On web guide systems installed by the buyer, AccuWeb, Inc. will replace or repair, at its option, any defective parts returned to AccuWeb, Inc., freight and customs duties prepaid, at no charge to the buyer.

The following items are excluded from this warranty:

1. Routine maintenance and adjustment, as specified in the equipment instruction manual.
2. Failure due to improper installation by the buyer or inadequate maintenance by the buyer.
3. Malfunctions that occur as a result of buyer-supplied interfacing.
4. Physical damage resulting from an accident, misuse or abnormal condition of operation.

NO other warranty is expressed or implied including warranties or merchantability and fitness for any particular purpose. We are not liable for incidental or consequential damage such as, but not limited to, lost profits, loss or use of other equipment, or increases in operating costs or expenses.

### **Receipt of Shipment:**

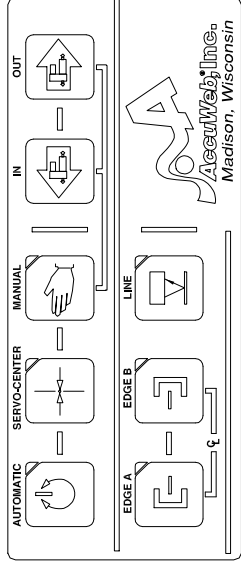
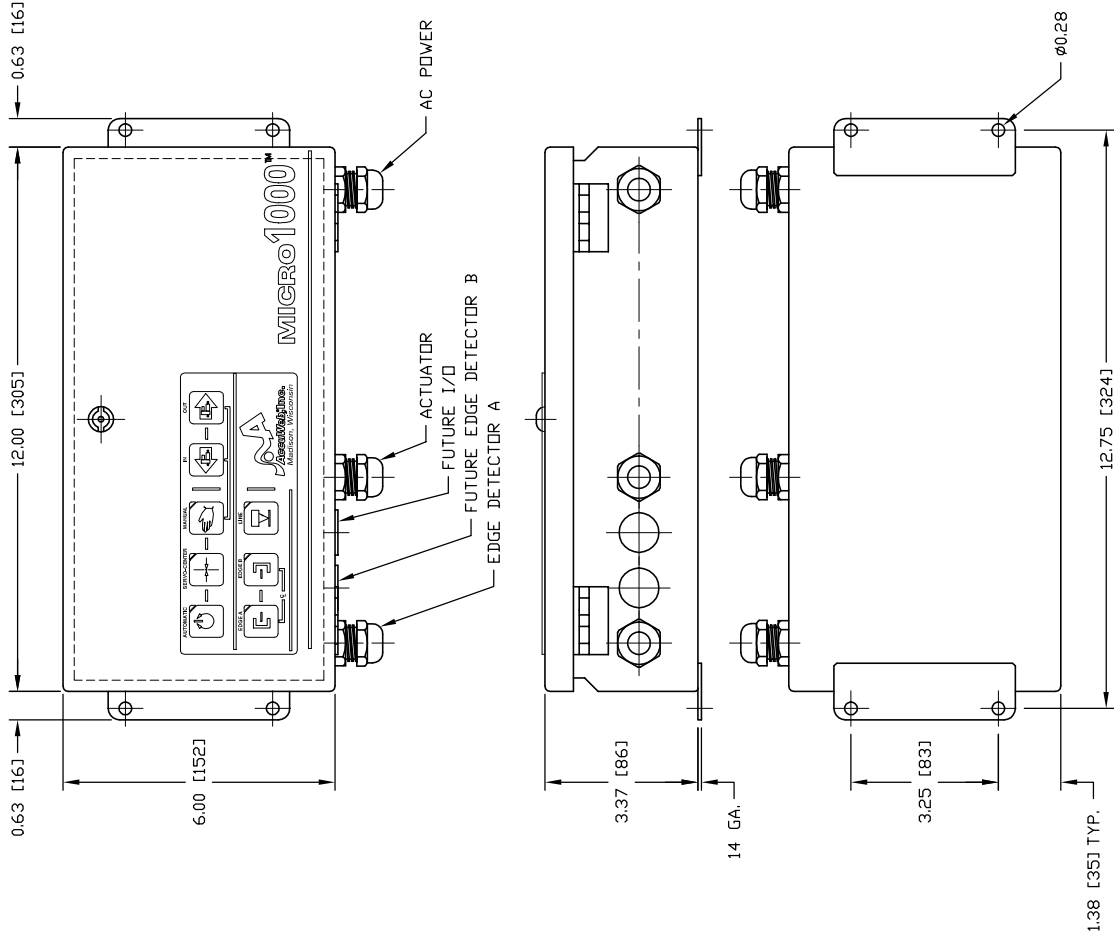
All equipment is tested before shipment, and is shipped in good condition. Any damages or shortages evident when the equipment is received must be immediately reported to the commercial carrier who transported the equipment. If required, assistance is available from the nearest AccuWeb representative. Always refer to the AccuWeb order number, model number, and serial number when contacting AccuWeb, Inc.

**Note:** The information contained herein is accurate at the time of publication. AccuWeb, Inc. reserves the right to make design changes to equipment described in this manual at any time and without notice.

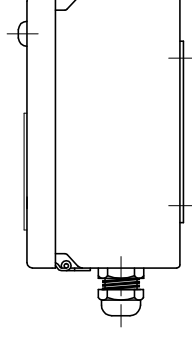
## Installation Drawings

Refer to these drawings to make installation easier:

1. Application drawing # AC-4656  
This drawing shows the enclosure mounting hole pattern.
2. Connection diagram #EB-9042  
This drawing shows the connections for the PLC I/O board.
3. Connection diagram #EB-10238  
This drawing shows how to wire the controller to the user's system.
4. Application drawing # AB-8815  
This application drawing shows the Remote Station mounting hole pattern.
5. Connection diagram # EB-8415  
This drawing shows how to wire the Remote Station and Digital Line Guide to the controller.
6. Application drawing # AC-6844  
This application drawing shows the Digital Line Guide mounting hole pattern.
7. Application drawing for various PDG web paths #C-7634  
This drawing shows the different web path configurations that can be used with a positive displacement guide (PDG).
8. Application drawing for Intermediate Guiding #AC-7635  
This drawing shows how to install a positive displacement guide (PDG).
9. Application drawing for Intermediate Guiding #AC-7636  
This drawing shows how to install a single roll steering roll (SRSR).
10. Application drawing for Intermediate Guiding #AC-7637  
This drawing shows how to install a double roll steering roll (DRSR).
11. Application drawing for Winder/Rewind Guiding #AC-7638  
This drawing shows how to install a shifting base for rewind guiding.
12. Application drawing for Unwind Guiding #AC-7639  
This drawing shows how to install a shifting base for unwind guiding.



SWITCH PAD DETAIL  
SHOWN FULL SCALE



FINISH: RAL 7035 ROUGH TEXTURED LIGHT GRAY.  
LATCH: 1/4 TURN TAMPER PROOF WITH KEY.  
RATING: IP66

in. [mm.]

**AccuWeb, Inc.**  
P.O. BOX 7816  
MADISON, WI 53707

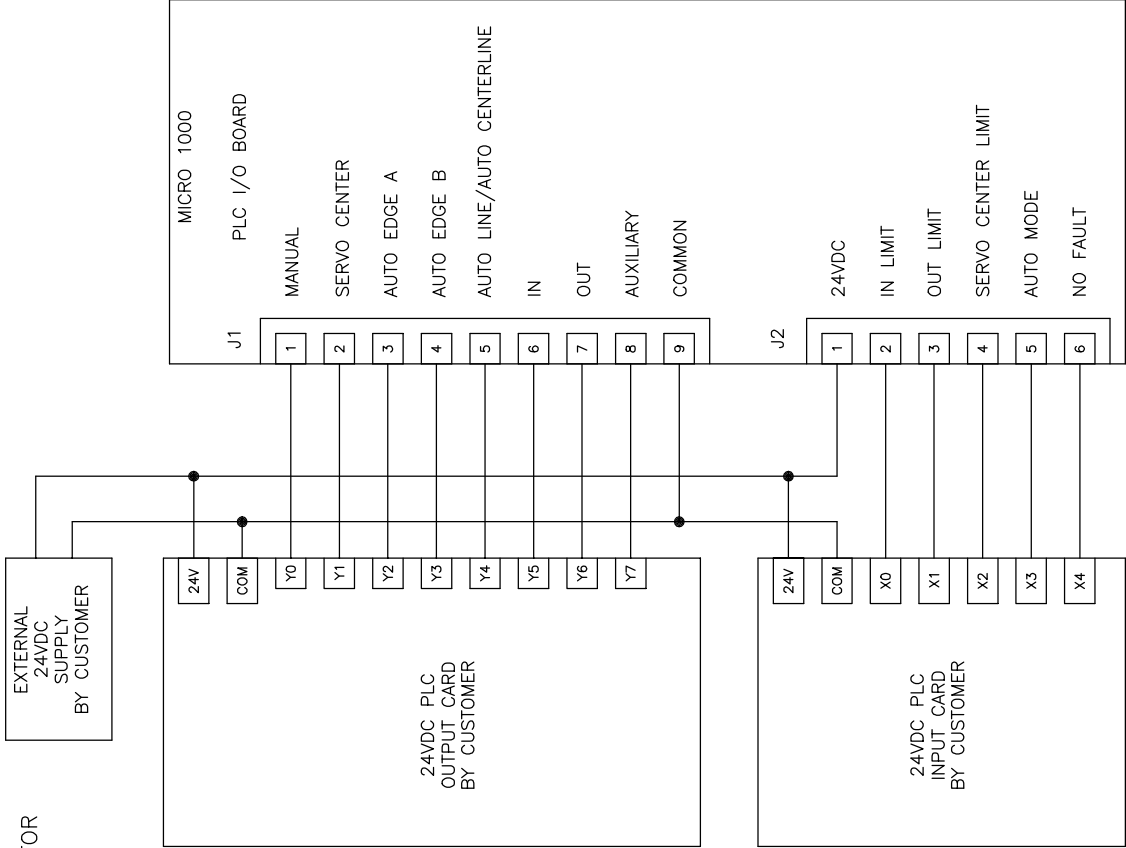
TITLE			
ENCLOSURE APPLICATION			
MICRO 1000			
DWG. BY: DR	SCALE: 1/2 = 1	DWG. NO.	REV.
CKD. BY.	DATE: 7-1-96	AC-4656	A

A	REVISED SWITCH PAD, CHANGE LATCH.	6-4-01	DR	1219
REV NO.	DESCRIPTION	DATE	INT.	ECN

NOTE:  
This drawing and information contained therein are the proprietary property of AccuWeb, Inc.

NOTES:

REFER TO THE INSTRUCTION MANUAL FOR  
INSTALLATION AND OPERATION DETAILS.



TITLE: CONNECTION DIAGRAM, MICRO 1000 PLC INTERFACE, 24VDC			
DWG. BY: RJO	SCALE: N.T.S.	DWG. NO:	REV:
CKD. BY:	DATE: 2-23-01	EB-9042	

REV. NO.	DESCRIPTION	DATE	REV. BY	ECN NO.

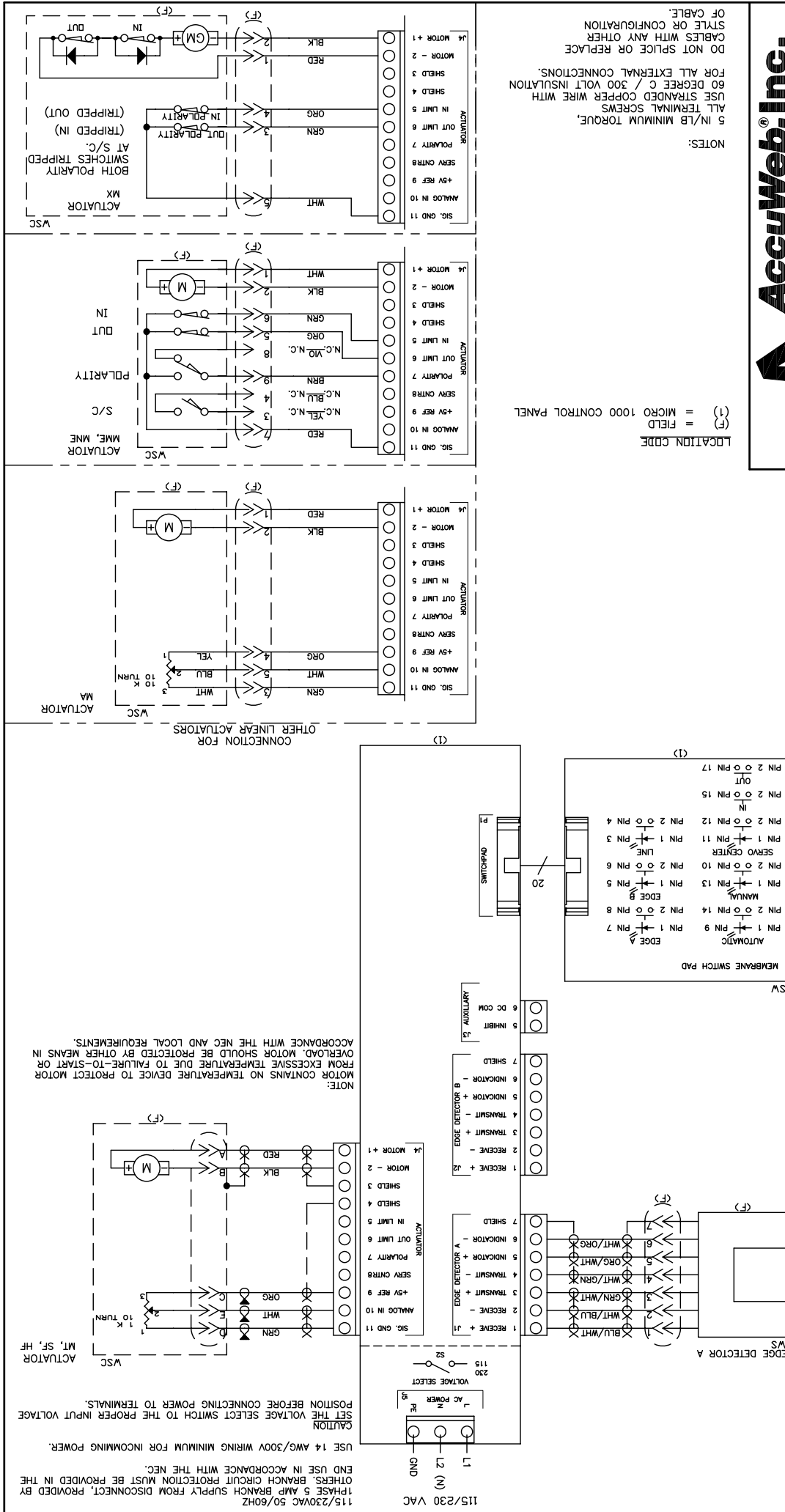
NOTE: This drawing and information contained therein are the proprietary property of AccuWeb, Inc.

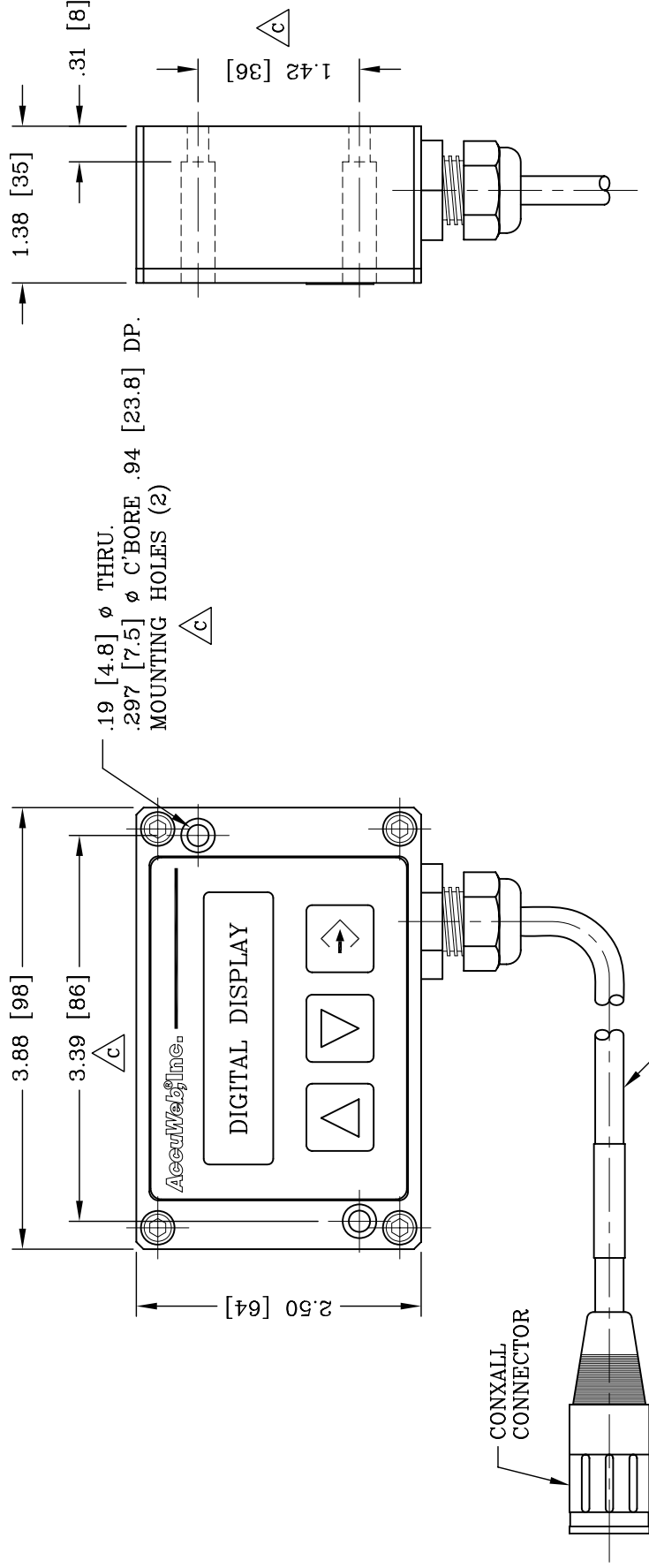
DWG. NO: 10030  
REV: A

TITLE:



5 IN/1LB MINIMUM TORQUE,  
ALL TERMINAL SCREWS  
USE STRANDED COPPER WIRE WITH  
60 DEGREE C / 300 VOLT INSULATION  
DO NOT SPICE OR REPLACE  
CABLES WITH ANY OTHER  
STYLE OR CONFIGURATION  
OF CABLE.



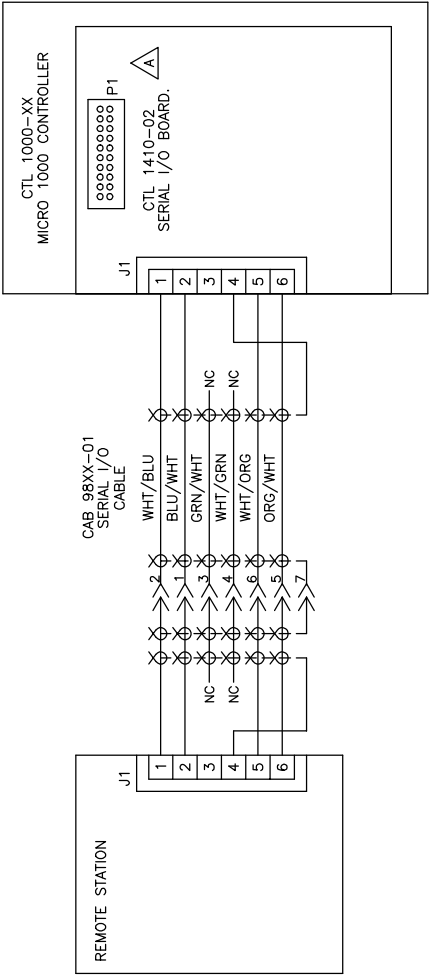


in. [mm.]

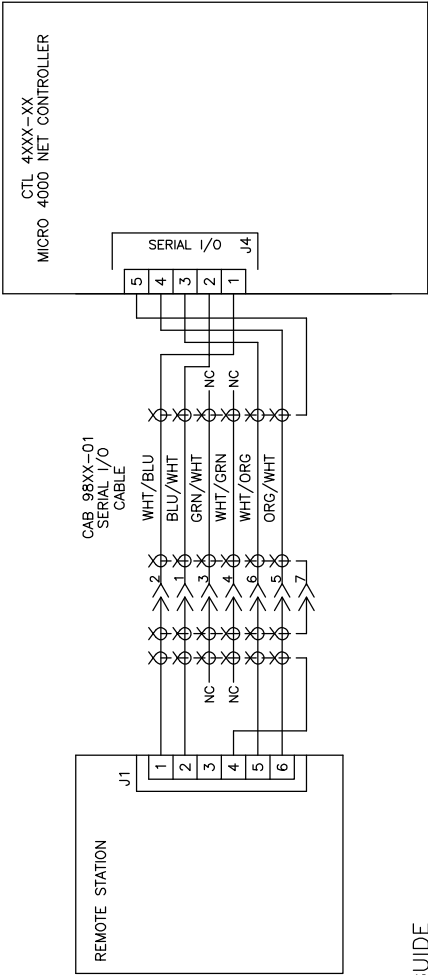
**AccuWeb, Inc.**  
Madison, Wisconsin, U.S.A.  
608-223-0625

NOTE: This drawing & information contained therein are the proprietary property of AccuWeb, Inc.	C	ADDED HOLES IN COVER, DIMS WERE 1.50 & 3.50	6-1-10	MSB	1343	TITLE: THREE BUTTON REMOTE STATION, APPLICATION
	B	REPLACED CASTED ENCLOSURE WITH MACHINED ENCLOSURE.	2-25-10	DR	13348	
	A	WAS 2.15, WAS 3.15, WAS 1.26, MOVED COVER SCREWS, MOVED MTG. HOLE LOCATION.	3-19-03	DR		
	REV. NO.	DESCRIPTION	DATE	REV. BY	ECN NO.	
			DWG. BY: DR	SCALE: FULL	DWG. NO:	
		CKD. BY:	DATE: 4 5-00	AB-8815	C	

MICRO 1000 CONNECTION



MICRO 4000 NET CONNECTION



NOTE:  
REMOTE STATIONS INCLUDE:  
P/E 5000-02 DIGITAL LINE GUIDE  
RGPA 1000-01 2 BUTTON REMOTE GUIDE POINT ADJUST STATION  
RMT 1003-01 3 BUTTON REMOTE STATION.

CABLE LENGTHS AVAILABLE:

- 6' [1.8M]
- 12' [3.6M]
- 25' [7.6M]
- 50' [15.2M]
- 75' [22.8M]
- 100' [30.4M]



TITLE:  
CONNECTION DIAGRAM  
SERIAL I/O

A	WAS CTL 1410-01, TITLE WAS MICRO 1000 ADD MICRO 4000 NET CONNECTION.	4-6-00	DR	ECN NO.	DWG. BY: DR	SCALE: N.T.S.	DWG. NO:	REV:
					CKD. BY:	DATE: 2-10-99	EB-8415	

NOTE: This drawing and information contained therein are the proprietary property of AccuWeb, Inc.



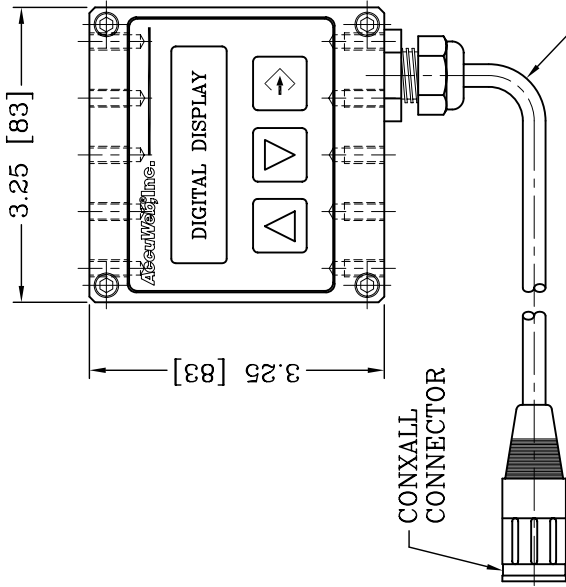
S.	W.
PART MODEL	<input type="checkbox"/>
ASSY. MODEL	<input type="checkbox"/>
PIC. MODEL	<input checked="" type="checkbox"/>
APP. DWG.	<input type="checkbox"/>
DETAIL DWG.	<input type="checkbox"/>
ASSY. DWG.	<input type="checkbox"/>

1.25 [32] TYP. →

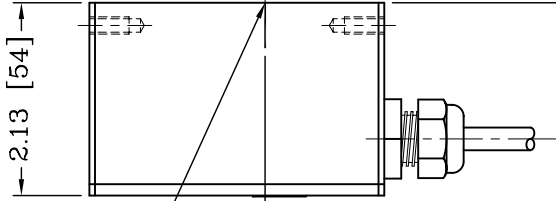
M5-.8 MTG. HOLE  $\Delta$   
.44 [11] DP. (4)

→ 0.25 [6] TYP.

#10-24UNC  
MTG. HOLE  
.44 [11] DP. (6)

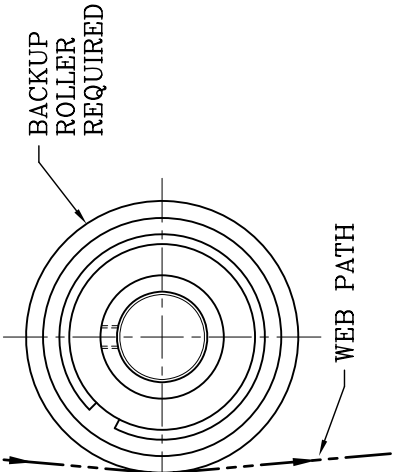


1.94 [49] TYP.




ROLL SIGHT  
POINT (2)  
MUST ALIGN  
WITH ROLL  
CENTER LINE  
AS SHOWN

THE WEB MUST BE IN  
CONTINUOUS CONTACT WITH  
THE BACKUP ROLL TO  
MAINTAIN FOCAL DISTANCE.



CABLE LENGTH = 18 [457]  
CABLE DIA. = .26 [7]  
MIN. CABLE BEND RAD. = 2.75 [70]  
CONNECTOR OD. = .75 [19]

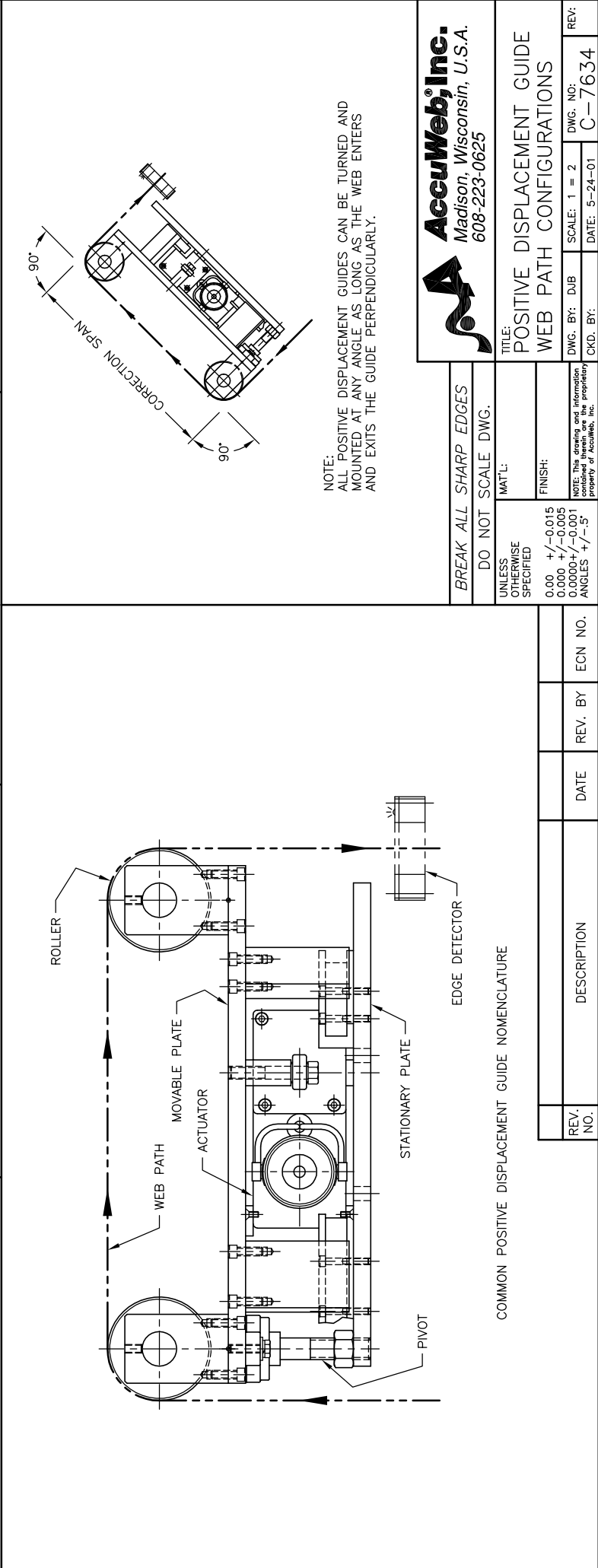
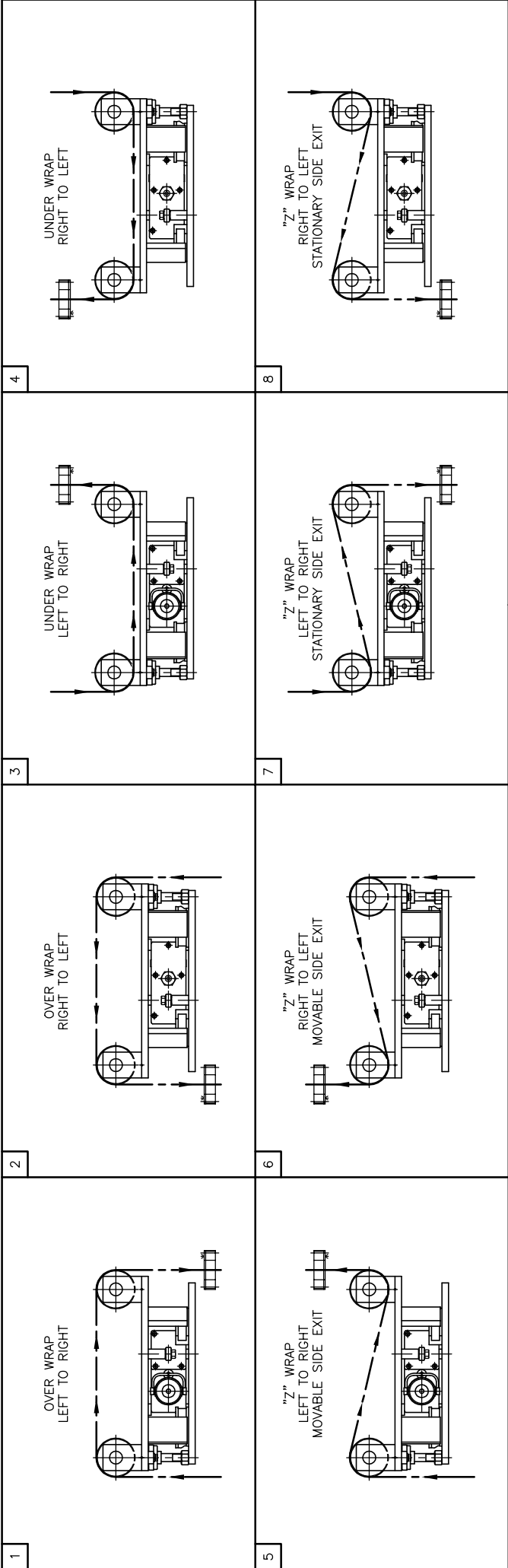
in. [mm.]

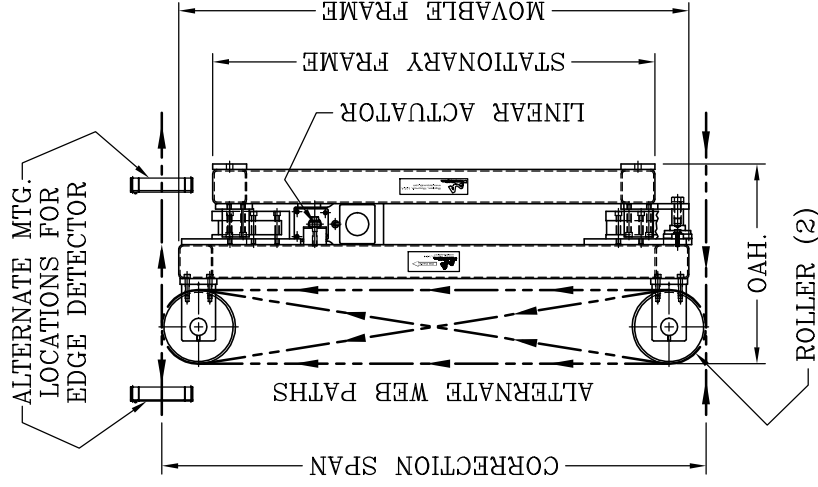
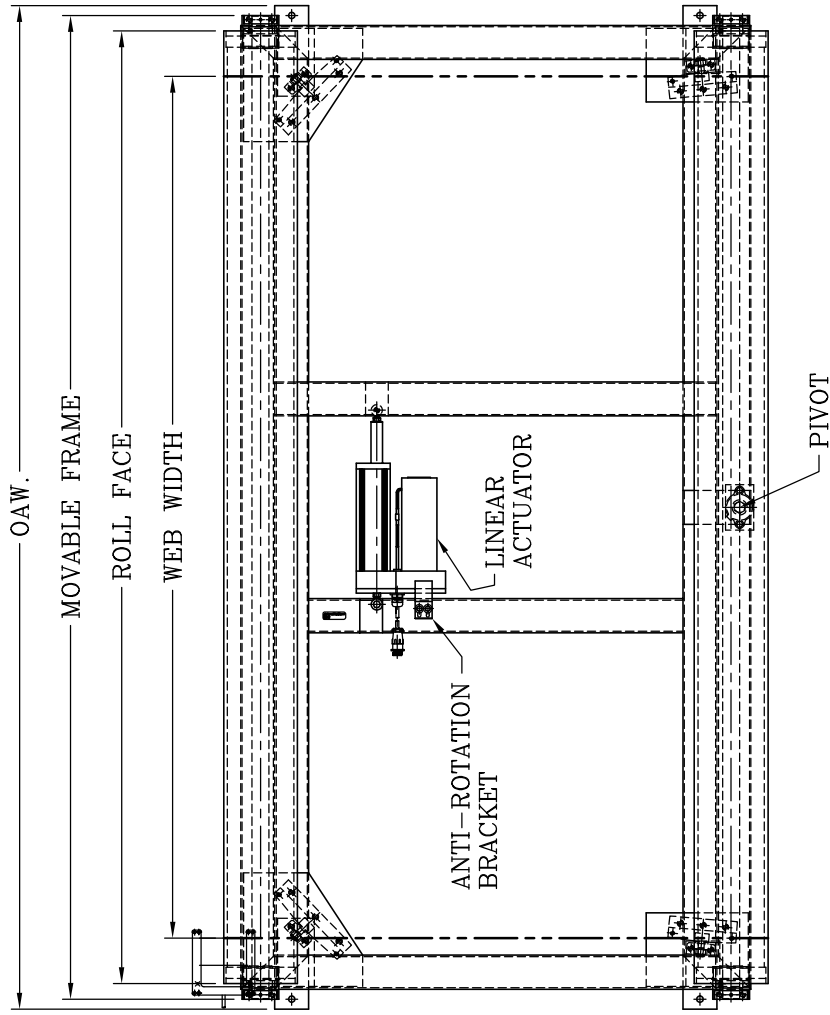


**AccuWeb, Inc.**  
Madison, Wisconsin, U.S.A.  
608-223-0625

TITLE: DIGITAL LINE GUIDE, APPLICATION		DR 1329	
REV. NO.		DATE	REV. BY
A TITLE WAS P/B 5000-02, ADD METRIC MTG. HOLES		10-30-07	ECN NO.
DESCRIPTION		DATE	REV. BY
REV. NO.		10-30-07	ECN NO.
DWG. BY: WJR		SCALE: FULL	DWG. NO: AC-6844
CKD. BY:		DATE: 9-27-99	REV: A

NOTE:  
This drawing and information contained therein are the proprietary property of AccuWeb, Inc.



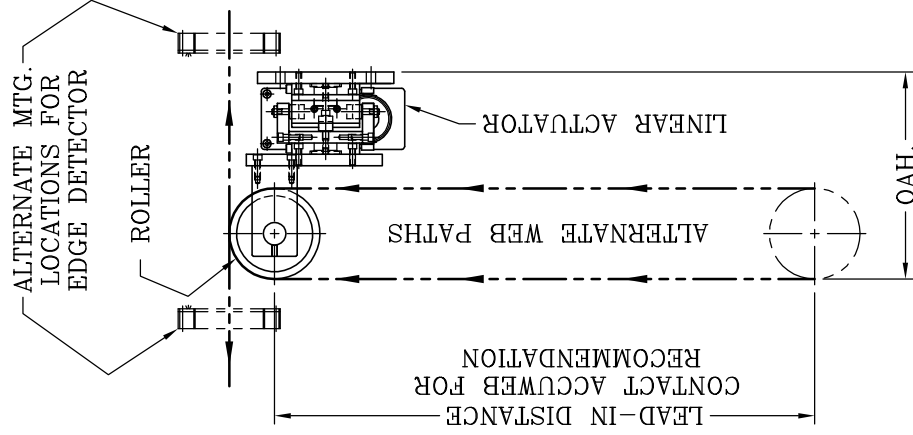
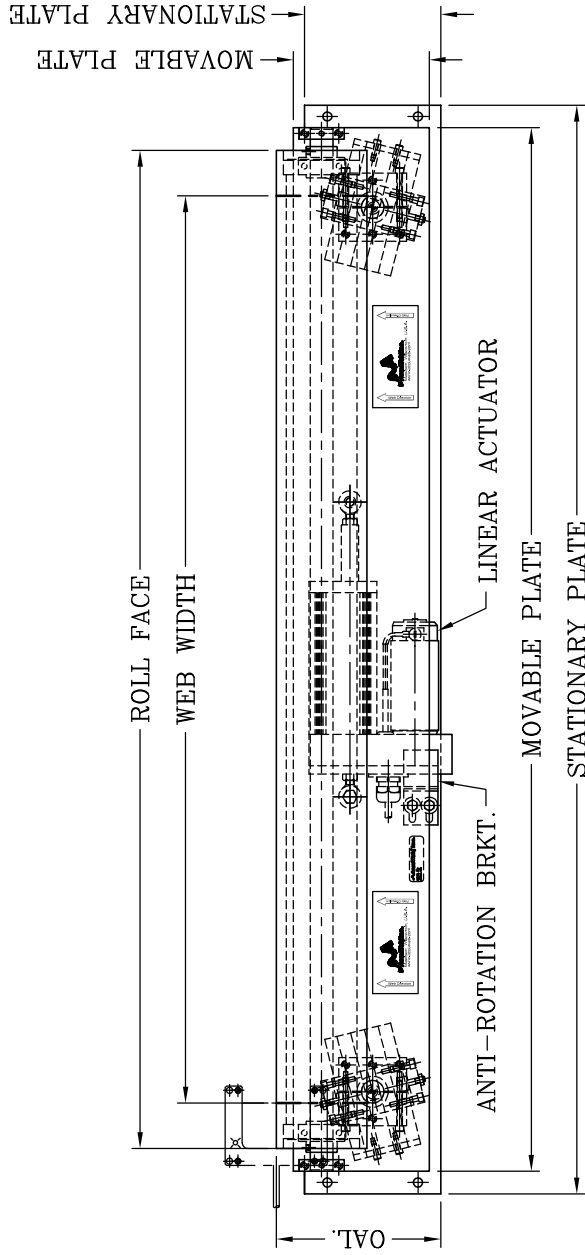


NOTE:  
THE PROPER LOCATION FOR THE LINEAR ACTUATOR IS BETWEEN THE FRAMES AND NEAR THE EXITING ROLLER AS SHOWN.  
BOLT THE LINEAR ACTUATOR TO THE FRAMES WITH GRADE #5 OR GRADE #8 FASTENERS. ADJUST THE ANTI-ROTATION BRACKET TO ALLOW 1/32 TO 1/16 ACTUATOR MOVEMENT.  
CONTACT ACCUWEB FOR RECOMMENDED LEAD-IN AND LEAD-OUT DIMENSIONS.

**AccuWeb, Inc.**  
Madison, Wisconsin, U.S.A.  
608-223-0625

TITLE:		CONFIGURATION FOR		POSITIVE DISPLACEMENT GUIDE		REV:	
DWG. BY: DJB		SCALE: 1 = 8		DWG. NO:		AC-7635	
CRD. BY:		DATE: 5-24-01					
REV. NO.		DESCRIPTION		DATE		REV. BY	
						ECN NO.	

NOTE:  
This drawing and information contained therein are the proprietary property of AccuWeb, Inc.



NOTE:  
 THE PROPER LOCATION FOR THE LINEAR ACTUATOR IS BETWEEN THE PLATES AND UNDER THE LOAD AS SHOWN.  
 BOLT THE LINEAR ACTUATOR TO THE PLATES WITH GRADE #5 OR GRADE #8 FASTENERS.  
 ADJUST THE ANTI-ROTATION BRACKET TO ALLOW 1/32 TO 1/16 ACTUATOR MOVEMENT.



**AccuWeb, Inc.**  
 Madison, Wisconsin, U.S.A.  
 608-223-0625

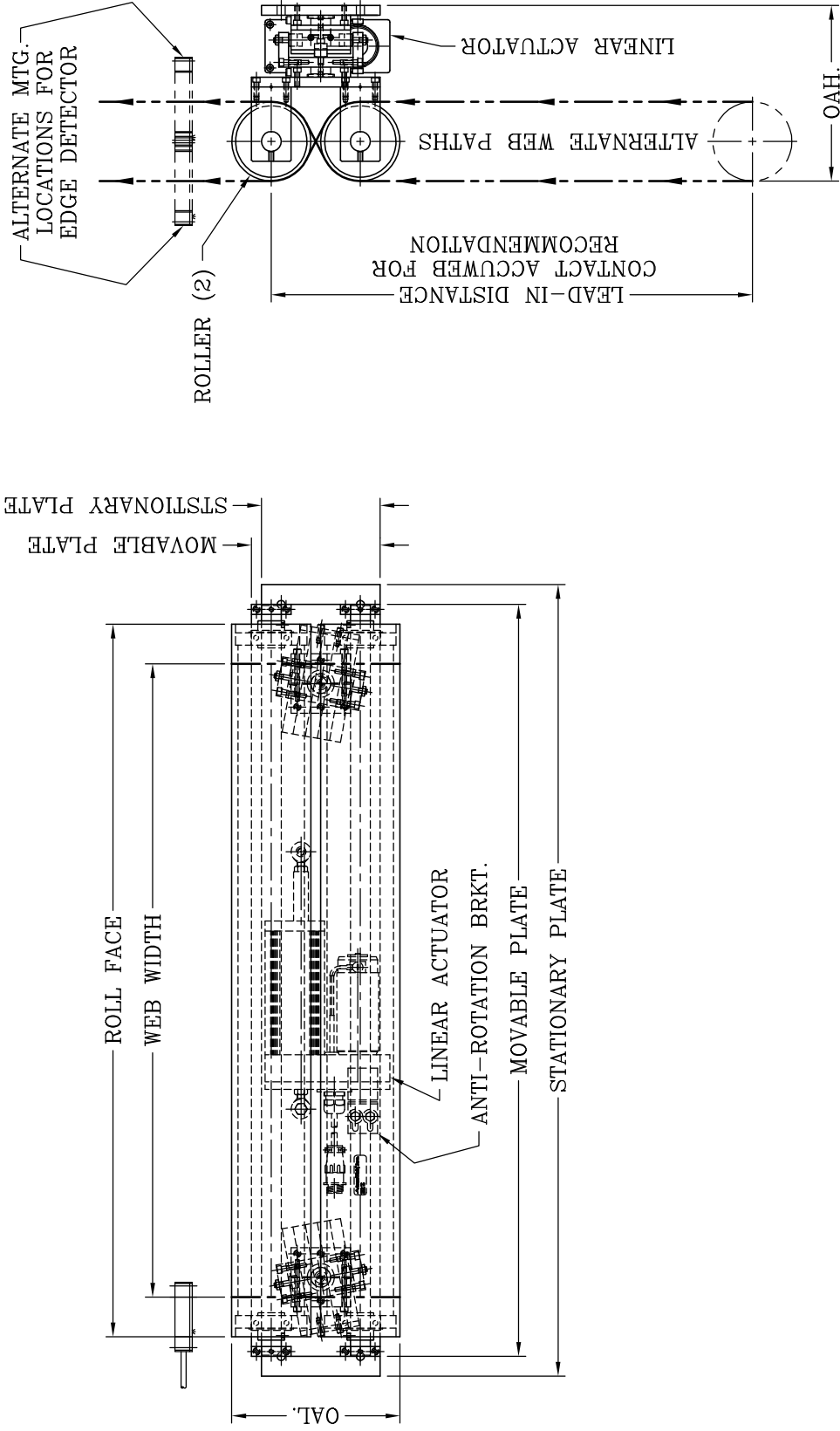
TITLE:

CONFIGURATION FOR  
 SINGLE ROLL STEERING ROLL

DWG. BY: DJB	SCALE: 1 = 4	DWG. NO:	REV:
CKD. BY:	DATE: 5-23-01	AC-7636	

NOTE:  
 This drawing and information contained therein are the proprietary property of AccuWeb, Inc.

REV. NO.	DESCRIPTION	DATE	REV. BY	ECN NO.



NOTE:  
 THE PROPER LOCATION FOR THE LINEAR ACTUATOR IS BETWEEN THE PLATES AND UNDER THE LOAD AS SHOWN.  
 BOLT THE LINEAR ACTUATOR TO THE PLATES WITH GRADE #5 OR GRADE #8 FASTENERS.  
 ADJUST THE ANTI-ROTATION BRACKET TO ALLOW 1/32 TO 1/16 ACTUATOR MOVEMENT.

in. [mm.]



**AccuWeb, Inc.**  
 Madison, Wisconsin, U.S.A.  
 608-223-0625

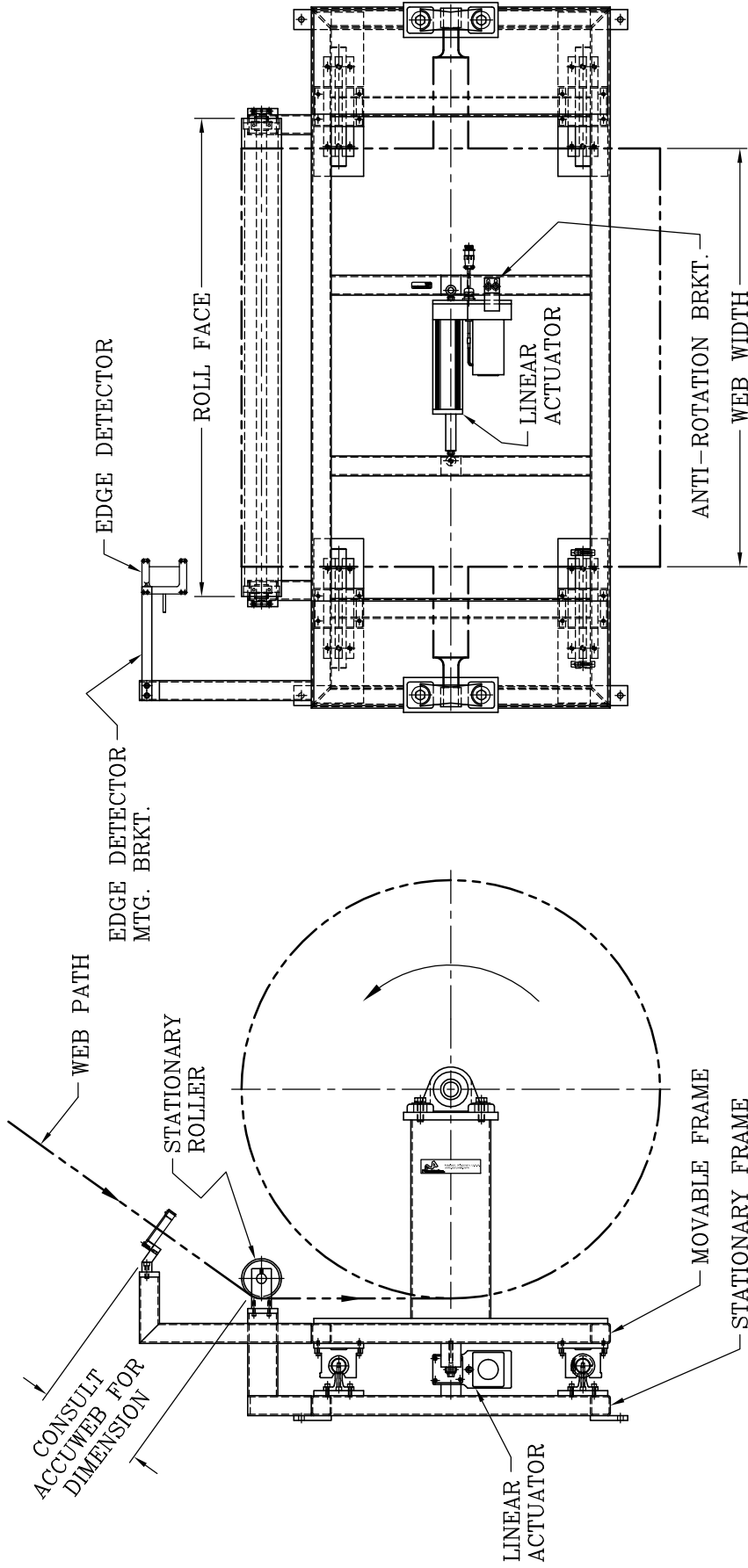
TITLE:

CONFIGURATION FOR  
 DOUBLE ROLL STEERING ROLL

DWG. BY: DJB	SCALE: 1 = 4	DWG. NO:	REV:
CKD. BY:	DATE: 05-24-01	AC-7637	

NOTE:  
 This drawing and information contained therein are the proprietary property of AccuWeb, Inc.

REV. NO.	DESCRIPTION	DATE	REV. BY	ECN NO.



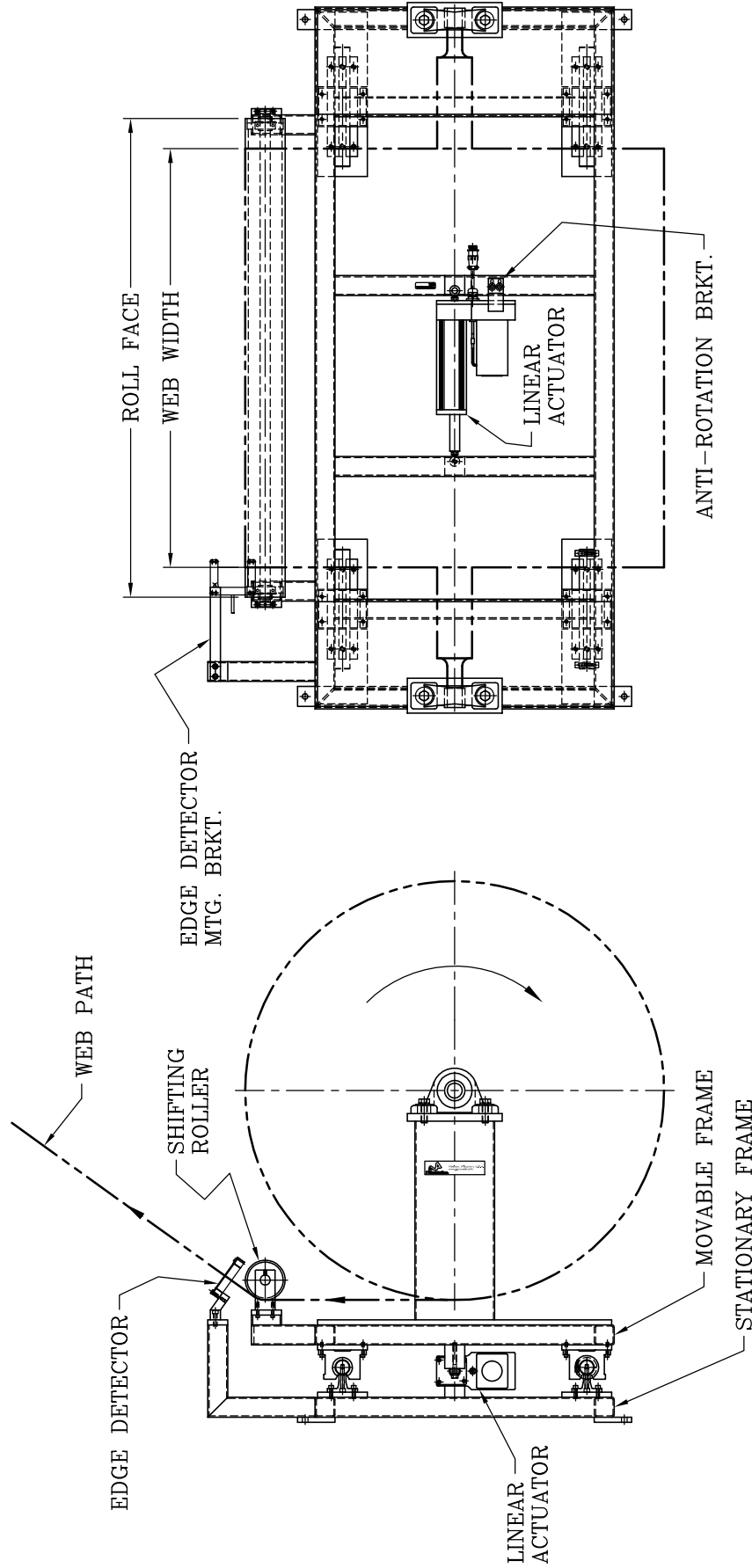
NOTE:  
 THE PROPER LOCATION FOR THE LINEAR ACTUATOR IS BETWEEN THE FRAMES AND UNDER THE LOAD AS SHOWN.  
 BOLT THE LINEAR ACTUATOR TO THE FRAMES WITH GRADE #5 OR GRADE #8 FASTENERS.  
 ADJUST THE ANTI-ROTATION BRACKET TO ALLOW 1/32 TO 1/16 ACTUATOR MOVEMENT.  
 THE EDGE DETECTOR MUST BE MOUNTED TO THE MOVABLE FRAME.  
 THE STATIONARY ROLLER MUST BE MOUNTED BETWEEN THE EDGE DETECTOR AND THE STAND.

**AccuWeb, Inc.**  
 Madison, Wisconsin, U.S.A.  
 608-223-0625

TITLE:  
**REWIND CONFIGURATION FOR  
 SHIFTING BASE**

REV. NO.		DESCRIPTION	DATE	REV. BY	ECN NO.	DWG. BY: DJB	SCALE: 1 = 8	DWG. NO:	REV:
							DATE: 5-25-01	AC-7638	

NOTE:  
 This drawing and information contained therein are the proprietary property of AccuWeb, Inc.



NOTE:  
 THE PROPER LOCATION FOR THE LINEAR ACTUATOR IS BETWEEN THE FRAMES AND UNDER THE LOAD AS SHOWN.  
 BOLT THE LINEAR ACTUATOR TO THE FRAMES WITH GRADE #5 OR GRADE #8 FASTENERS.  
 ADJUST THE ANTI-ROTATION BRACKET TO ALLOW 1/32 TO 1/16 ACTUATOR MOVEMENT.  
 THE SHIFTING ROLLER MUST BE MOUNTED TO THE MOVABLE FRAME.  
 THE EDGE DETECTOR MUST BE STATIONARY AND LOCATED IMMEDIATELY AFTER THE SHIFTING ROLLER.

**AccuWeb, Inc.**  
 Madison, Wisconsin, U.S.A.  
 608-223-0625

TITLE:  
 UNWIND CONFIGURATION FOR  
 SHIFTING BASE

DWG. BY: DJB SCALE: 1 = 8  
 CKD. BY: DATE: 5-25-01  
 REV: AC-7639

NOTE:  
 This drawing and information contained therein are the proprietary property of AccuWeb, Inc.

REV. NO.	DESCRIPTION	DATE	REV. BY	ECN NO.

## NOTES



## NOTES

## NOTES

## NOTES

## NOTES