10XBR-Series Sensors
Passline Independent Sensor Systems

Overview

• Passline-Independent Width Measurement
• Passline-Independent Position Control (Guiding)

The SCAN-A-LINE™ 10XBR-Series Binocular-Receiver Sensor from Harris Instrument Corporation provides highly reliable and accurate edge position detection and width measurement for process lines with varying product passlines (wavy edges) or large thickness changes. An extension of the 10XAS-Series, the 10XBR-Series are non-contact, electro-optical sensors designed primarily for the edge position and width measurement applications. The 10XBR-Series uses two receivers to triangulate the position of the edge at varying passline heights.

Features

• Available in four sizes: 10” [254mm], 20” [508mm], 30” [762mm], 40” [1016mm] in Single or Dual Sensor operation
• Requires a PIC Based Measurement Processing Unit - Model MPX or Digital Control Processing Unit – Model DCPU
• Anodized Aluminum Housing with Lexan® bezel viewing window, neoprene gaskets and self-sealing, stainless steel hardware.
• Passline variation of up to 1’ [305mm] standard for Passline-Independent Dimensional Measurement or Position Control

Measurement Variation Criteria *

• Linearity: 0.024” [0.609mm] at 2-sigma with stable passline. (0.032” [0.812mm] with variable passline)
• Repeatability: ±0.005” [±0.127mm]
• Stability: Better than ±0.005” [±0.127mm]
• Reproducibility: ±0.010” [±0.254mm]

*Specifications based on a Model 10XBR-10 sensor at 20” [508mm] emitter-to-receiver separation and a 2” [51mm] to 14” [356mm] variable passline.
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Description

The 10XBR-Series sensor consists of an emitter, two receivers and all applicable cabling to connect the receivers with the emitter and with the processing unit (emitter-to-receiver cables are 15’ [4.39m] each and the emitter-to-processing unit cable is 20’ [6.1m] with a maximum of 50’ [15.4m] for both cables). The receivers contain a low-noise preamplifier, a silicon photocell and a cylindrical lens each. AlGaAs Light Emitting Diode (LED) arrays are used in SCAN-A-LINE™ emitters as the light sources. In addition to the LED counters, decoders and drivers, the emitter driver board contains a tuned amplifier for the video signals from the receivers. The 10” [254mm] long Model 10XBR-10 emitter uses a set of ten array sections. Each section is 1” [25.4mm] in length and is composed of ten LEDs spaced 0.1” [2.54mm] apart.

The SCAN-A-LINE™ 10XBR-Series sensor can be used individually (single-sensor systems) as centerline position sensors and dimensional measuring sensors. They can also be used in pairs to measure material dimensional size, as well as provide centerline position. Materials larger than the combined lengths of the modules can be accommodated by adding the separation between the emitters to the portion of each emitter covered. Reliable edge position detection’s can still be made with a 90% attenuation of optical signals, providing the attenuation is uniform over the lens area.

Each 10XBR-Series emitter and binocular receivers operate as a complete position sensing sub-system. When supplied with ±12VDC power, the emitter will provide a SYNC pulse, marking the beginning of a scan cycle. Because the scan speed is constant, the position of lighted LED in time, with respect to the SYNC pulse, can be directly translated into position information. Digital processing circuitry in the emitter counts the clock pulses of a predictable frequency and translates the binocular views into a sensor video signal. A simple counter is also being used to determine if the proper number of edges have been sensed. In a single edge application (typically a dual-sensor system, as each sensor only detects one edge), the lack of an edge transition or the presence of more than one edge indicates a FAULT event.

The patented binocular view of the strip material by the 10XBR-Series sensor creates a geometric relationship of the position of the strip material edges, which used by PIC Based Measurement Processing Unit - Model MPX or Digital Control Processing Unit – Model DCPU to calculate the height of the strip material. The height of the strip is then processed with the edge position signals to provide, in English or Metric, the width of the material independent of material product passline or material thickness.

<table>
<thead>
<tr>
<th>Sensor Size</th>
<th>Minimum Separation</th>
<th>Recommended Separation</th>
<th>Maximum Separation</th>
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<tbody>
<tr>
<td>10XBR-10</td>
<td>15” [381mm]</td>
<td>20” [508mm]</td>
<td>72” [1829mm]</td>
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<tr>
<td>10XBR-20</td>
<td>30” [762mm]</td>
<td>40” [1016mm]</td>
<td>72” [1829mm]</td>
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<tr>
<td>10XBR-30</td>
<td>45” [1143mm]</td>
<td>60” [1524mm]</td>
<td>72” [1829mm]</td>
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<tr>
<td>10XBR-40</td>
<td>60” [1524mm]</td>
<td>72” [1829mm]</td>
<td>72” [1829mm]</td>
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