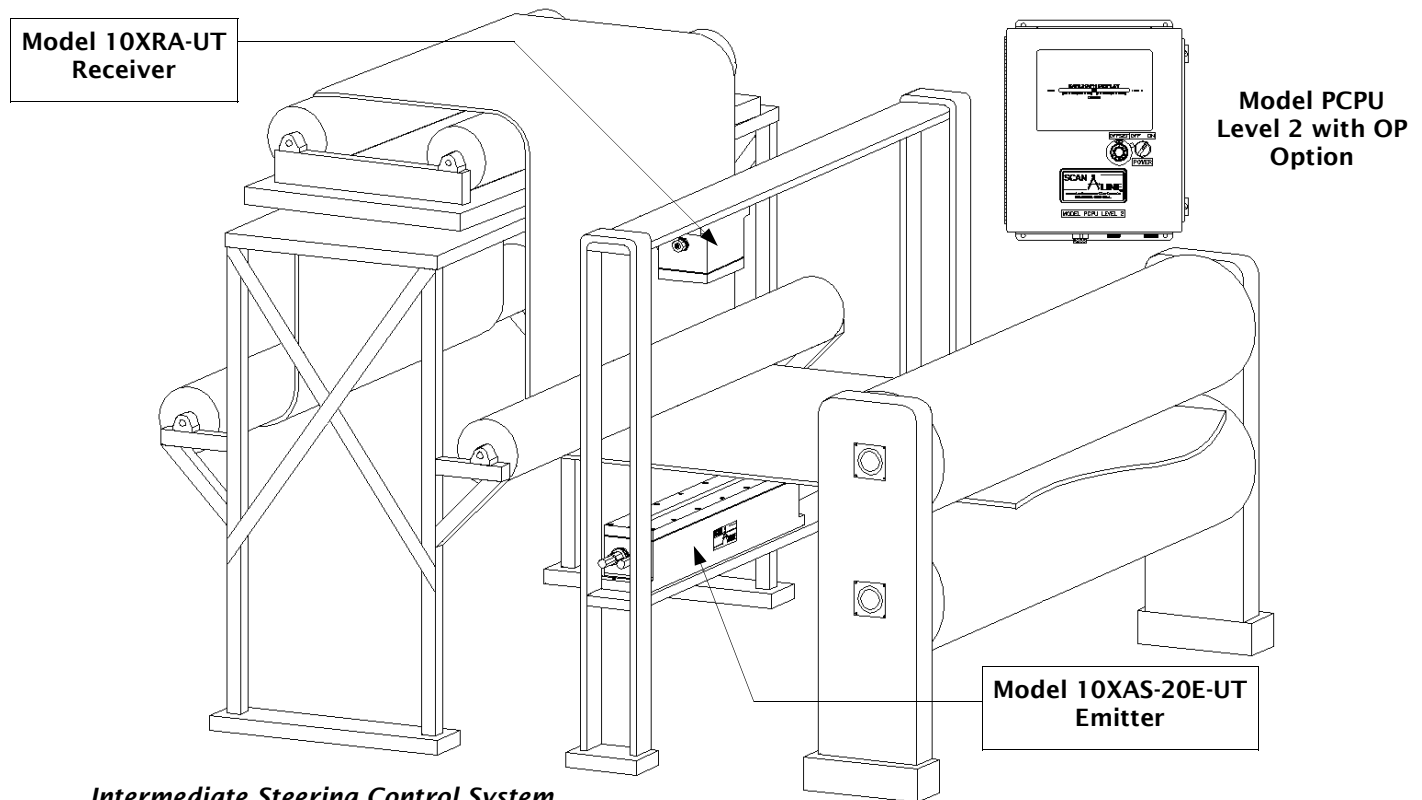


Intermediate Steering Control System



Intermediate Steering Control System

Many industrial strip and web processing lines require either centerline or edge position adjustments prior to critical operations (such as strip slitter, accumulator entry, etc.). These adjustments are generally referred to as intermediate steering operations. Intermediate steering sometimes presents unusual challenges for a strip guiding system.

Typically, strip position sensors consist of capacitive sensors, light-bar position sensing devices, or line scan camera devices. Unfortunately, these devices may drift with air temperature and humidity changes, become contaminated by coatings, lubricants and foreign material build-up. Smoke, dirt, and mist may introduce guiding errors, and they may require very careful fixturing and properly adjusted lighting to meet their specifications.

Unfortunately, these other devices can be more of a problem than a solution. With a SCAN-A-LINE™ Intermediate Steering Control System (ISC System) the savings in maintenance costs alone can pay for the replacement of unreliable steering systems.

- Accurate to $\pm 0.005"$ [0.127mm] with linearity of $\pm 0.024"$ [0.6096mm] @ 2 sigma
- PID or Time Proportional Control
- Patented Scanned LED Technology
- Solid-state Reliability
- NO MOVING PARTS
- Dust, Mist, and Vibration Tolerant
- Easy to Install, Simple to Maintain
- Smart Sensor FAULT Detection Circuitry
- Clear or Translucent Material Position Control Available
- Several Analog Output Options Available
- Roll Position Feedback Available
- First Edge Detection Available

Intermediate Strip Control System Components:

- PID Control Processing Unit Level Two or Level Three
- TPC Control Processing Unit Level Two or Level Three
- SCAN-A-LINE™ Sensors: 10XAS-Series Auto-Sync Sensors
- Up to 20 feet [6.1m] of cabling between the sensors and the processing unit

The ISC System supplies complete signal processing for up to two SCAN-A-LINE™ 10XAS-Series sensors. A smart sensor FAULT detector circuit monitors sensor signals for valid edge detection information. Defective scans due to strobe light or falling debris interference are rejected.

Intermediate Strip Control Processing Unit Features:

Proportional/Integral/Derivative (PID) Control Processing Unit – Model PCPU Level 2 or 3

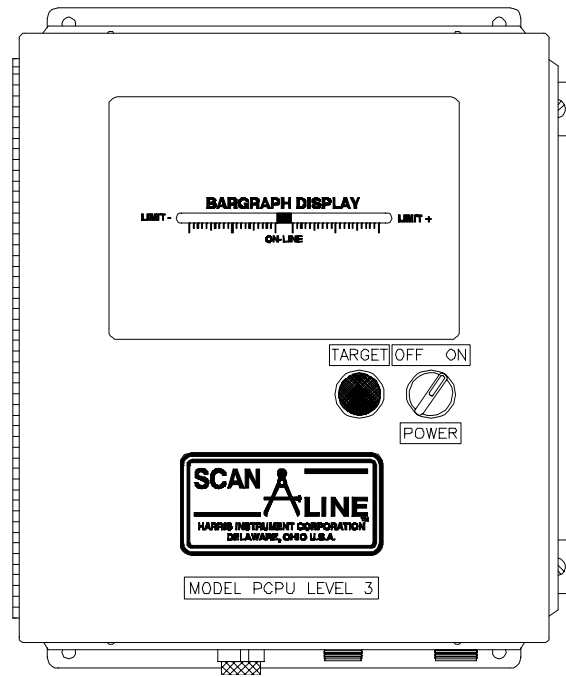
Interfaces with most pneumatic or hydraulic proportional control valves or servo-valves in closed loop process control lines. The PID Control Amplifier (PID Module) in the Model PCPU provides a fully tunable deviation (bipolar) control signal. The Model PCPU Level 2 is designed for single-sensor systems while the Level 3 is designed for dual 10XAS-Series sensor systems.

Time Proportional Control (TPC) Control Processing Unit – Model TCPU Level 2 or Level 3

Available where no proportional or servo steering control valves are available. The TPC Controller supplies relay contact outputs to operate in parallel with existing manual jog switches. Relays close for a time proportional to position error (fully adjustable), as well as deadband control and transport delay. The Model TCPU Level 2 is designed for single-sensor systems while the Level 3 is designed for dual 10XAS-Series sensor systems.

Bargraph Display [All Models]

All Control Processing Units come standard with a Bargraph Display to visually represent the difference between a predetermined material position and the detected material position. Also included are annunciators and limit relays.

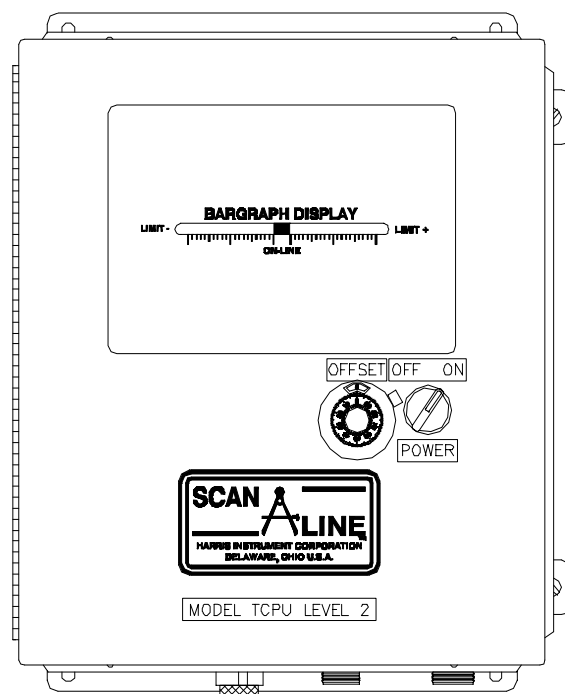


Model PCPU Level 3 with AZ Option

Analog Output Devices – DA3 Module or DA4 Module

Level 2 Single-Sensor Analog Output Device (DA3 Module) provides fault-interrupted deviation (bipolar) analog output update with relay output for use in a single-sensor centerline guiding application. Absolute (unipolar) analog width output is also available.

Level 3 Dual-Sensor Analog Output Device (DA4 Module) includes three real-time analog outputs and three reference analog outputs. Required for Auto-Zero and LCR Option.



Model TCPU Level 2 with OP Option

Options for ISC System Processing Units:

Auto-Zero Push-button (AZ Option) provides the selection of any material position as a reference position. Fully compatible with PID Module and TPC Module, though not recommended with OP Option. The AZ Option is a momentary push-button mounted on door and may be mounted remotely (AZ50 Option). {Model PCPU Level 3 or Model TCPU Level 3 only.}

Control Offset Multi-dial (OP Option) allows operator to introduce a finely-tuned offset to the control signal for final material positioning. Fully compatible with Model PCPU and Model TCPU (not recommended with AZ Option). Control Offset Multi-dial is also available in a remote mount configuration.

Roll Position Feedback (RPF Option) is intended to compensate for the delayed strip movement typical of non-positive displacement guide rolls. Feedback from a roll position potentiometer is used to correct the control signal output for the delay caused by such guide rolls. {Model PCPU Level 3 and Model TCPU Level 3 only.}

Left/Center/Right Selector (LCR Option) provides a means of selecting the desired guide point for automatic control. Flexible selection of the left edge, right edge, or centerline of the material as a guide position. May be remotely mounted (LCR/50 Option). {Model PCPU Level 3 and Model TCPU Level 3 only.}

Line Driver/Receiver (LDR Option) connects a Control Processing Unit with a another processing unit (such as a Model GPU Level 2). This becomes necessary when 10XAS-Series sensors for the system must be located more than fifty linear cable feet [15m] from the processing unit. Maximum operational distance is 4000 linear cable feet [1200m]. Compatible with all Control Processing Unit features and options.

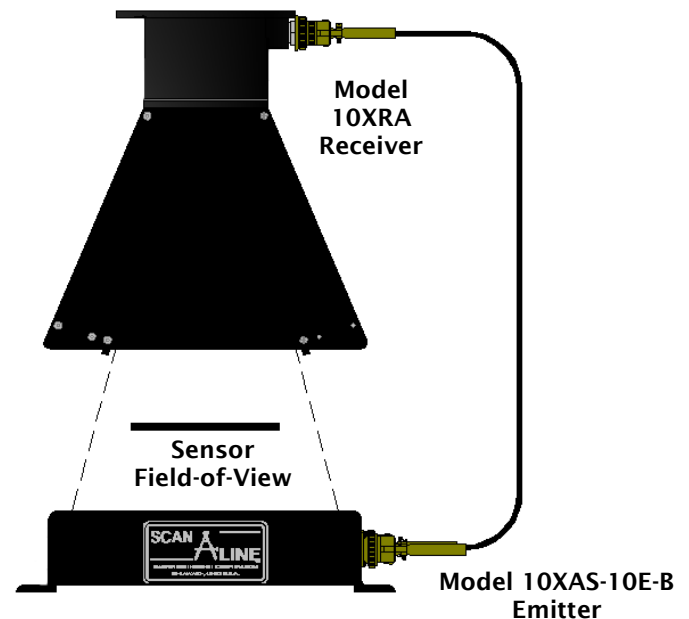
4/20mA Current Loop (4/20 Option) provides an isolated, long distance routing of analog signals from the Control Processing Unit to a PLC (or other analog input device).

Remote Bargraph Display (BGA/50 Option) utilizes the Bargraph Display normally mounted on the front door of the Control Processing Unit, allowing mounting of the display up to fifty linear cable feet [15m] from the processing unit.

First Edge Video Pre-Processor (FEV Option) detects first edge viewed as the first edge of material, ignoring all other edges. {Model PCPU Level 3 and Model TCPU Level 3 only.}

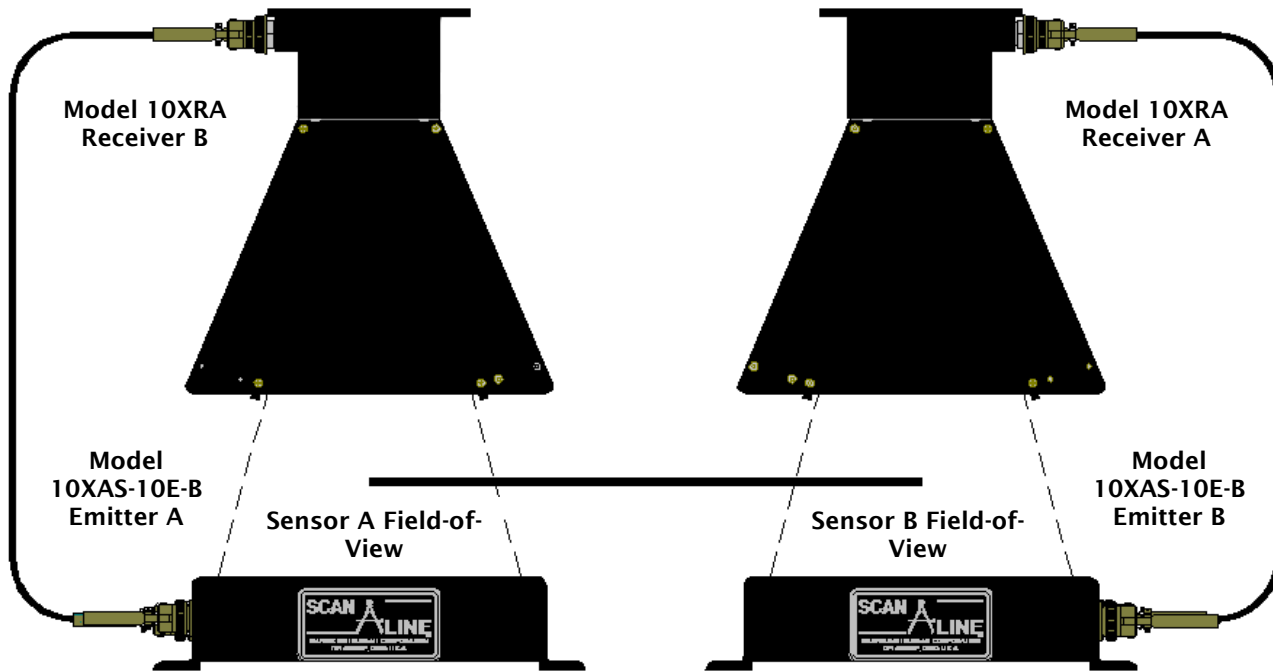
SCAN-A-LINE™ 10XAS-Series Sensors:

- High-speed edge position tracking for proportional position control
- Precise 2000 inch [508cm] per second scan velocity
- Position information is a function of time rather than light intensity
- Quartz Crystal controlled — won't drift out of adjustment
- Smoke, steam, dust and dirt have no effect on edge detection
- Nothing to burn out and *NO MOVING PARTS* mean virtually no maintenance worries
- LED's rated at 275-year mean-time-between-failure (MTBF) and carry a lifetime guarantee



Model 10XAS-10E-B Single Sensor Centerline System

SCAN-A-LINE™ 10XAS-Series Auto-Sync sensors allow for the greatest position size variation in material guiding. They may be configured as a single-sensor or dual-sensor system, depending upon the size of the material to be guided, without any special hardware. 10XAS-Series sensors come in ten inch [25.4cm] increment lengths ranging from ten inches [25.4cm] up to forty inches [101.6cm].



10XAS-Series Dual Sensor System

10XAS-Series Single-Sensor System includes one emitter, one receiver, and up to twenty feet [6.1m] of interconnection cabling. A single-sensor system can accommodate materials measuring between one-half inch [12.7mm] and thirty-eight inches [96.5cm]. Single-sensor systems require the use of the Model PCPU Level 2 or Model TCPU Level 2 for conversion of the digital sensor signal into analog control signal for interfacing with process line controls.

10XAS-Series Dual-Sensor System includes two emitters, two receivers and up to twenty feet [6.1m] of interconnection cabling. A dual-sensor system can accommodate materials measuring between six inches and up to an almost infinite maximum size (Note: if guiding materials both narrow and wide, overall maximum material width may be limited.). Dual-sensor systems require the use of the Model PCPU Level 3 or Model TCPU Level 3 for conversion of the digital sensor signals into analog control signal for interfacing with process line controls.



Model 10XAS-10E-UT Emitter



Options for ISC System Sensors:

- **Infrared LED (IR Option):** Designed for operation in extremely hazy conditions that attenuate material detection. Also used for visible light intolerant materials.
- **ULTRA-TOUGH™ enclosures (UT Option):** For applications where physical abuse and damage cannot be avoided.
- **On-Line Balance (OLB Option):** Allows sensor to be balanced on-line for peak performance.
- **Clear Material (CLR Option):** Provides for detection of clear, translucent or loosely woven products (requires On-Line Balance Option).
- **End Alignment (EA Configuration):** Designed for measurement applications where product thickness varies.

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