

Conversion Kit Training Aid

**Laser Sensors**



**Analog**



**Discrete**



PAVE • RETAIN • BUILD

Laser Probe Technology

THE TOTAL SOLUTION

*Columbia*

Analog Laser Sensor –

328.100.709AB or

328.100.709TI



For CPM Machines

PAVE • RETAIN • BUILD

[www.columbiamachine.com](http://www.columbiamachine.com)

### Requirements for Field Retrofits

#### Installation on Columbia's CPM

- Need one (1) spare – I/O slot in PLC rack.
- Existing PLC - TI545 or Allen Bradley SLC5/03, 04,05
- PLC Ladder & Panelmate programs need to be updated to accommodate the “Laser” section.
- A shielded cable needs to be installed, from CPM hopper to CPM control panel.
- Recommended for customer to send to Columbia:
  - Copy of existing PLC program.
  - Copy of existing Panelmate program.

**Analog Laser Sensor**

What is required to achieve consistent material level, cycle to cycle?

Recipe / Set-up Screen

PAGE 4 Recipe Setup #2 / Mold Life 12:34:56  
Coolant Pump Failed 12:34:56 P00  
Oil Pressure Low 12:34:56 P00  
Reduction Furnace Overtemp Clrd 12:34:56 P00  
Inbound Hopper Overweight Clrd 12:34:56 P00

CANCEL Silence Alarm Horn

MESSAGE	CURRENT	NEW VALUE	UNIT
PRODUCT OR MOLD #	12345	12345	
LOW AIR SETTING	12345	12345	PSI
HIGH AIR SETTING	12345	12345	PSI
COMP. HEAD AIR SETTING	12345	12345	PSI
STRIKE OFF HEIGHT	12345	12345	IN/MM
VIBRATOR COMP. SPEED	12345	12345	RPM
VIBRATOR FILL SPEED	12345	12345	RPM
LASER SENSOR CUTOFF LIMIT	12.34	12.34	IN/CM
LASER SENSOR HIGH LIMIT	12.34	12.34	IN/CM

MOLD LIFE COUNT/RECIPE SETUP #: 1234567890 CYCLES

CAUTION: THE USE OF THE RECIPE SETUP # TEMPLATE TO CHECK MOLD LIFE COUNTS WILL ALSO CHANGE THE CPM RECIPE SETUP #. THE CPM SHOULD NOT BE IN PRODUCTION AT THIS TIME.

View or Acknowledge Alarms

Get Page

Status Screen

PAGE 21 STATUS - LASER SENSOR 12:34:56  
Coolant Pump Failed 12:34:56 P00  
Oil Pressure Low 12:34:56 P00  
Reduction Furnace Overtemp Clrd 12:34:56 P00  
Inbound Hopper Overweight Clrd 12:34:56 P00

CANCEL Silence Alarm Horn

AVERAGE FEED DRAWER MATERIAL DEPTH  
COLOR CODES - AVERAGE CUT-OFF HIGH

90,000 INCHES  
0,0000

DEPTH 15,000 123456

MATERIAL SENSOR ALARM HIGH LIMIT LASER SENSOR STATUS  
PROBE ENABLE MATERIAL TOO HIGH ACTUAL 123,45  
AVERAGE 123,45

View or Acknowledge Alarms

Get Page

+

Analog Laser Sensor

# Columbia

## Component Preview

THE TOTAL SOLUTION

Laser Sensor  
(Analog) & Cable



Laser Sensor  
(Analog)



Warning: Laser Light  
Do not stare into beam  
Class 2 Laser product

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Analog Laser Sensor

# Columbia

THE TOTAL SOLUTION

## Kit Includes

- Machine Wiring Diagrams
- Wire Schedule
- Product Manual
- Parts List:
  - Laser Sensor
  - Sensor Bracket
  - 30 feet Quick Disconnect Laser Cable
  - Analog Input Card
  - Din Rail
  - 24 volt Power Supply (where applicable)
  - 150 feet Belden Cable
  - Junction Box (4x4x3)
  - Wire Connectors
  - 20 feet #14 AWG wire

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**Analog Laser Sensor**

[www.columbiamachine.com](http://www.columbiamachine.com)

# Columbia

## Installation Example

Feed Drawer Section



(Laser Sensor)



(Target Location)

Feed Drawer Section

(Picture may vary from actual product shipped)

Important: It is highly recommended that the Laser Sensor not be mounted to the machine. Vibration will impede the performance and may cause premature failure to the Laser Sensor.

## Analog Laser Sensor

# THE TOTAL SOLUTION

# Columbia

**Product/Service**

**Features**

A characteristic of the product.

**Benefits-I**

A customer-originated value.

**Benefits-II**

**Analog  
Laser Sensor**

**Consistent  
Fill Depth**

**Consistent  
Product Texture**

**Satisfied  
Customers**

**Lower Reject  
Rate**

**More  
Inventory**

**Optimize Mold  
Changes**

**No Mechanical  
Probe to Remove**

**Quicker Mold  
Changes**

**Reduce Labor**

**Saves  
Money**

**Ease of  
Adjustment**

**Via Control  
Inputs**

**Production  
Efficiency**

**Clean-up**

**No Material  
Build-up.**

**Analog Laser Sensor**



# Columbia

## Cutsheet

# THE TOTAL SOLUTION

## THE TOTAL SOLUTION

Analog Laser Sensor Technology

# Columbia

**No more mechanical probe with build-up causing downtime for your CPM series machines**

Columbia Machine has designed an alternative solution to sensing material level in the Feed Drawer Hopper on CPM series machines.

**Features and Benefits:**

- Consistent fill depth
- Optimize mold changes
- Production efficiency
- Higher quality products
- No mechanical probe to remove
- Reduces labor cost & time
- Safety



Existing Mechanical Probe

**Minimum Requirements:**

This Laser Probe conversion is designed for CPM Machines with the following criteria; Control system having 525/545 Siemens PLC or Allen-Bradley SLC 5/03 PLC, both systems will require a available I/O slot for the placement of the new Analog module, and have an E-Pro, PanelMate or CommandView operator interface.

When placing your order, the parts representative will need to have your machine's electrical number. Example: 328.24.XXXX, this will assure that you receive the proper kit for your machine.

**Kit Includes:**

Machine Wiring Diagrams, Wire Schedule, Product Manual, Laser Sensor, Sensor Bracket, Quick Disconnect Laser Cable, Analog Input Card, DIN Rail, 24 Volt Power Supply (where applicable), Belden Cable (hopper to CPM), Junction Box, Wire Connectors, #14 AWG Wire (red, blue, green, white)



For more information on Columbia's Conversion Kits please visit [www.columbiemachine.com](http://www.columbiemachine.com) or call us at 1-360-694-1501 x573

[www.columbiemachine.com](http://www.columbiemachine.com)

## Analog Laser Sensor

[www.columbiemachine.com](http://www.columbiemachine.com)

*Columbia*

THE TOTAL SOLUTION



**End of “Analog”  
Sensor Slide Show**

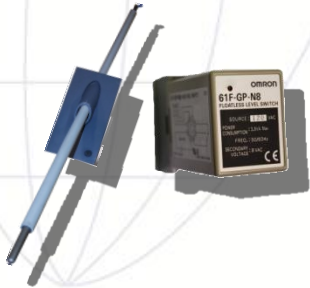
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Analog Laser Sensor

[www.columbiamachine.com](http://www.columbiamachine.com)

# Columbia

## Discrete Laser Sensor



**Single** Probe Applications  
328.100.1040

**Dual** Probe Applications  
328.100.1043



for Material Hoppers

### Single Probe Applications - #328.100.1040

Requirements for Field Retrofits

#### Compatible with systems that have

- Voltage, 120 VAC or 24 VDC
- Single Mechanical Probe in Hopper
- an Omron Floatless Level Switch
- an Hopper Low Input to the PLC

#### Equipment

- WB6 Batch Mix, (all)
- WB8 Batch Mix, (all)
- MBS Batch Mix, (all)
- Block Machines, TI525 or AB PLC's



**Discrete Laser Sensor**

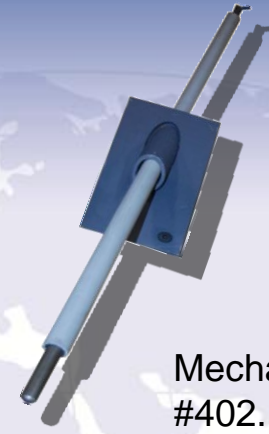
# Columbia

# THE TOTAL SOLUTION

Systems Having



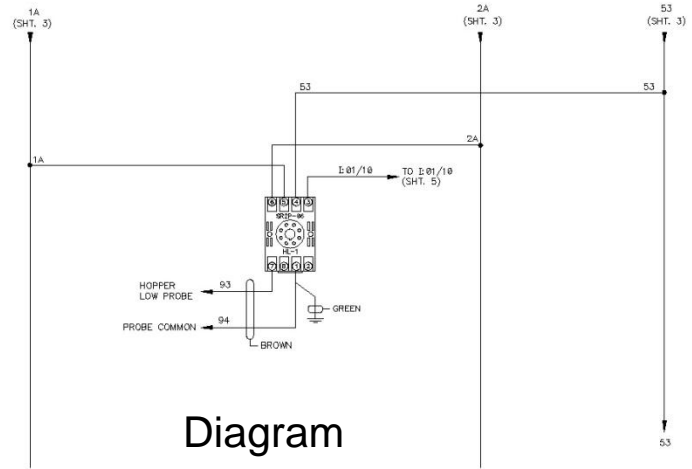
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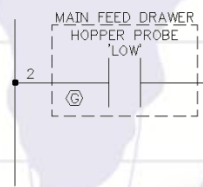
Mechanical - Probe/Bracket  
#402.1.48 / 402.1.50

Omron – Floatless Level  
Switch - #237090

## Typical Circuit



Diagram



PLC Input



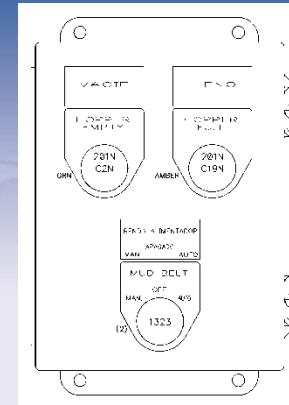
Discrete Laser Sensor

# Columbia

## THE TOTAL SOLUTION

### Kit Includes

- Machine Wiring Diagrams
- Installation Instructions
- Set-up Manual
- Parts List:
  - Laser Sensor
  - Sensor Bracket
  - 5M / 15FT Quick Disconnect Laser Cable
  - Cord Grip, with Locknut & Seal Ring
  - Junction Box (4x4x3)
  - P.B. Panel
- Note: Due to the many hopper / probe configurations, customer is responsible for supplying mounting hardware



### Discrete Laser Sensor

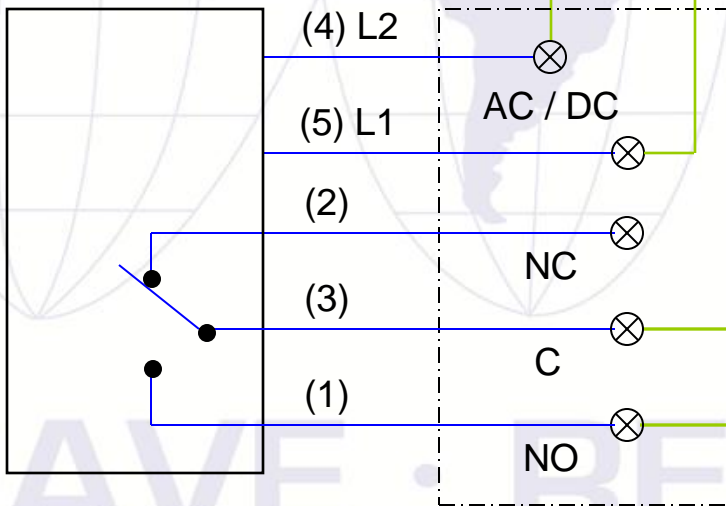
# Columbia (1 – Neutral)

## Connection Diagram

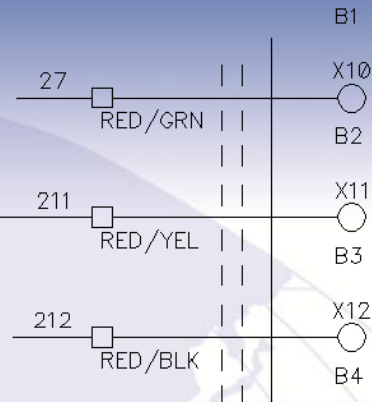
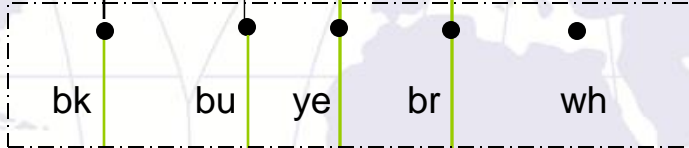
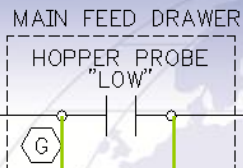
(120 VAC)

Laser Sensor  
Q60VR3LAF-  
#239259

5-Pin Plug



Typical - TI  
(PLC Input)



5-Pin Cable #2007821

Color-Code / pin #

- br = brown / pin 1
- bu = blue / pin 5
- ye = yellow / pin 3
- bk = black / pin 4
- wh = white / pin 2

**Discrete Laser Sensor**

# Columbia

(52, -VDC)

(53, +VDC)

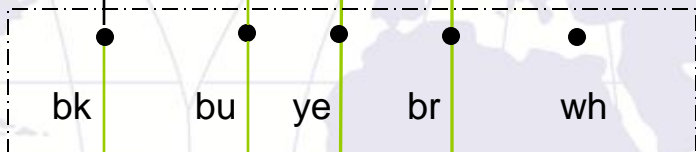
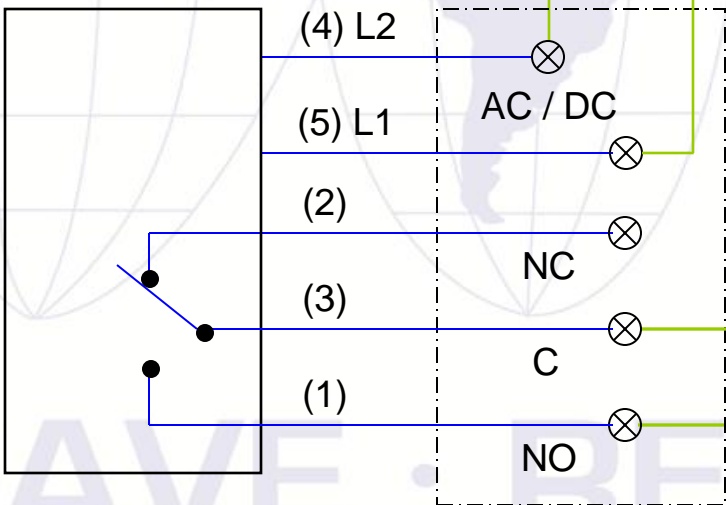
Typical - AB  
(PLC Input)

## Connection Diagram

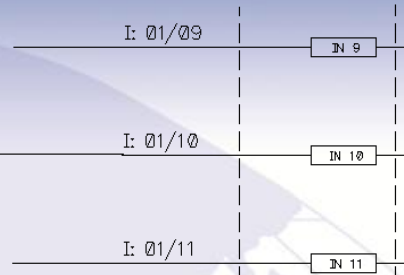
(24VDC)

Laser Sensor  
Q60VR3LAF-  
#239259

5-Pin Plug



MAIN FEED DRAWER  
HOPPER LOW PROBE  
(SHT. 4)



5-Pin Cable #2007821

Color-Code / pin #

br = brown / pin 1

bu = blue / pin 5

ye = yellow / pin 3

bk = black / pin 4

wh = white / pin 2

## Discrete Laser Sensor



*Columbia*

Component Preview



Laser Sensor

Warning: Laser Light  
Do not stare into beam  
Class 2 Laser product

(Picture may vary from actual product shipped)

Important: It is highly recommended that the Laser Sensor **not** be mounted to the machine. Vibration will impede the performance and may cause premature failure to the Laser Sensor.

**Discrete Laser Sensor**

*Columbia*

**Set-up Buttons /  
Indicators**

Output  
Conducting  
Bi – color  
Yellow/Green

Dark Operate  
Selected

Push Button  
Lockout

Light Operate  
Selected

Light Sensed



Cutoff Adjustment  
Screw

ON/OFF delay  
Push Buttons  
and Indicators

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**Discrete Laser Sensor**

### Quick Reference Guide

**Setting up the Discrete Laser Sensor** – (for **Single Probe** application) Discrete laser sensor must be set-up before putting into use. Follow the steps below for proper set-up procedure.

1. Mount the laser sensor in a location free of material flow, and with-in proper range ( 8 to 80 inches / 200 mm to 2000 mm )
2. Wire laser sensor as per connection diagram (see diagram)
3. Laser sensor needs to be set to “Light Operate” (**LO**), if the “**LO**” indicator light is “Off” press the (OFF Delay & ON-Delay ) buttons concurrently (same time) three times , this will toggle from “DO” to “LO”. (see figure 1)

#### LO/DO Indicators

Dark Operate

Light Operate



Press  
Concurrently

(Figure 1)

### Discrete Laser Sensor

Columbia

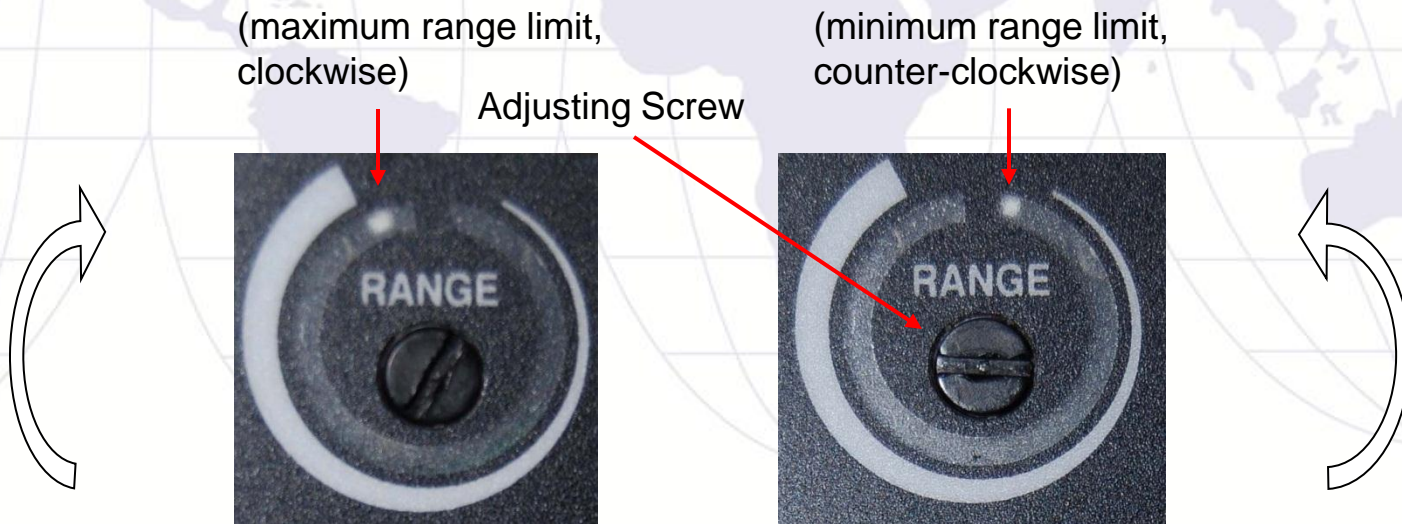
**4. Important Notice;** Before adjusting the range, the slotted adjusting screw, (2-turn), has mechanical stops (clockwise & counter-clockwise). **Over-turning the adjustment screw will cause damage, and will void warranty.**



**Notice the white dot**, this shows the maximum / minimum range limit positions (see figure 2, next page). Current position of white dot is shown full counter-clockwise.

Discrete Laser Sensor

- To set the range, first adjust the laser beam so that it is pointing at the bottom of the bottom of the hopper, with the slotted adjusting screw, adjust white dot to the minimum range (see figure 3, next page), block the laser beam with piece of paper at the desired cut-off / fill position, then slowly turn the adjusting screw clockwise until the "SIG" indicator turns "On" (see figure 4, next page).



(Figure 2)

### Discrete Laser Sensor

**Range / Distance;** is measured from the laser sensor to the cutoff / target;

**Minimum;** turning counter-clockwise decreases distance from the laser sensor

**Maximum;** turning clockwise increases the distance from the laser sensor.



(Figure 5)

(Figure 4)

(Figure 3)

### Discrete Laser Sensor

# Columbia

## Example Installations of Mechanical Probes



Creative Designs



Material Build-up



Bent Probe



Wiring Issues



Broken Wires

**Discrete Laser Sensor**

*Columbia*

**Example Installations  
of Discrete Laser Probe**



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**Discrete Laser Sensor**



# THE TOTAL SOLUTION

# Columbia

**Product/Service**

**Features**

A characteristic of the product.

**Benefits-I**

A customer-originated value.

**Benefits-II**

**Discrete Laser Sensor**

**Consistent Fill Depth**

**Consistent Product Texture**

**Satisfied Customers**

**Lower Reject Rate**

**More Inventory**

**Optimize Mold Changes**

**No Mechanical Probe to Remove**

**Quicker Mold Changes**

**Reduce Labor**

**Saves Money**

**Production Efficiency**

**Clean-up**

**No Material Build-up.**

**Discrete Laser Sensor**

# Columbia

## Cutsheet

# THE TOTAL SOLUTION

Discrete Laser Sensor Technology

### THE TOTAL SOLUTION

# Columbia

**Are you tired of loss production time due to broken wires and concrete build-up on your hopper probe?**

Solution, Columbia Machine, Inc. has designed a low-cost hopper probe replacement, by using a discrete laser sensor for detecting material level within the hopper.

- Features and Benefits:
- Consistent fill depth
  - No mechanical probe to remove
  - Reduces labor cost & time during mold changes
  - Adjustable output off/on delay and cutoff distance
  - Clean-up is minimal, no material build-up on probe
  - Universal voltage

Minimum Requirements:  
This Laser Probe conversion is designed for machines with a PLC control that has a (hopper low) PLC input. Due to the many hopper/probe configurations, customer is responsible for supplying mounting hardware.

When placing your order, the parts representative will need to have your machine's electrical number. Example: 328.XX.XXXX, this will ensure that you receive the proper kit for your machine.

Kit Includes:  
Laser Sensor, Laser Sensor Mounting Bracket, Cable (5m/15ft length), Wiring Diagram and Set-up Manual.



No More Build-Up



No More Broken Wires



No More Mechanical Probe

For more information on Columbia's Conversion Kits please visit [www.columbiamachine.com](http://www.columbiamachine.com) or call us at **1-360-694-1501** x573

[www.columbiamachine.com](http://www.columbiamachine.com)

## Discrete Laser Sensor

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**End of “Single”  
Discrete Sensor  
Slide Show**

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**Discrete Laser Sensor**

[www.columbiamachine.com](http://www.columbiamachine.com)

# Columbia

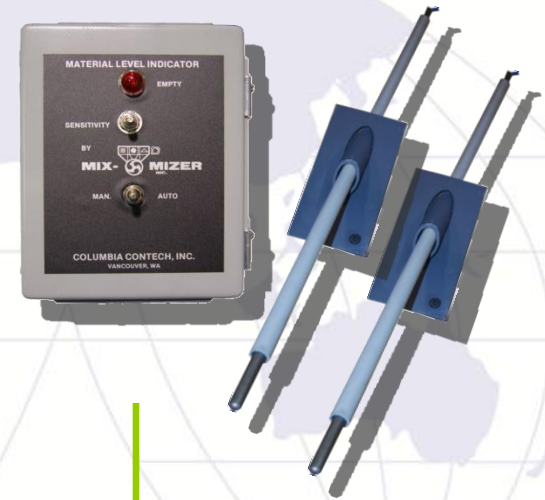
## THE TOTAL SOLUTION

**Dual Probe Applications – #328.100.1043**

**Stand-alone Meter Feed Belt Control**

For systems that have the Mix-Mizer Material Level Control package – #328.145.7 / MZ540051

Columbia has designed a two (2) probe Discrete Laser Control for replacing the Mix-Mizer Level Control package.



**Discrete Dual Laser Sensor**

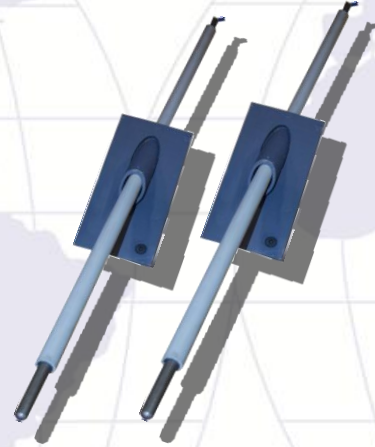
### Dual Probe Applications

#### Systems Having

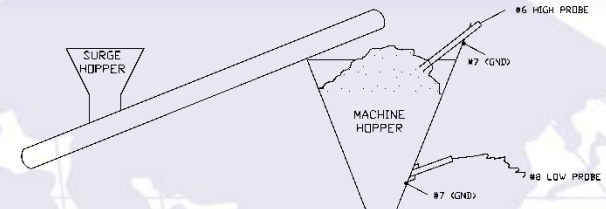
Mix-Mizer – Material Level  
Control package #328.145.7 =



+

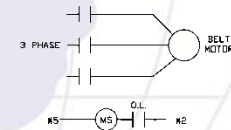


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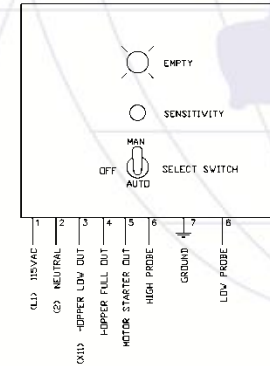


Mix-Mizer – Material Level  
Indicator #MZ540051

Mechanical - Probe/Bracket  
#402.1.48 / 402.1.50



(HOPPER LEVEL INDICATOR - PART NO. MZ-540051)



Schematic -  
#328.145.7.1

### Discrete Dual Laser Sensor

### Dual Probe Applications

#### Kit Includes

- Machine Wiring Diagrams
- Installation Instructions
- Set-up Manual
- Parts List:
  - 2 - Laser Sensors
  - 2 - Sensor Bracket
  - 2 - 5M / 15FT Quick Disconnect Laser Cable
  - 2 - Cord Grip, with Locknut & Seal Ring
  - 1 - Junction Box (4x4x3)
- Note: Due to the many hopper / probe configurations, customer is responsible for supplying mounting hardware



### Discrete Dual Laser Sensor

# Columbia

## Cutsheet

# THE TOTAL SOLUTION

**Discrete Dual Laser Sensor Technology**

### THE TOTAL SOLUTION

# Columbia

**Are you tired of loss production time due to broken wires and concrete build-up on your hopper probes?**

Solution, Columbia Machine, Inc. has designed a low-cost hopper material level control replacement, by using two discrete laser sensors for detecting material level within the hopper. This kit replaces the Mix-Mizer hopper level control #32B-145.7/MZ-54005.1.

**Features and Benefits:**

- Consistent fill depth
- No mechanical probe to remove
- Reduces labor cost & time during mold changes
- Adjustable output off/on delay and cutoff distance
- Clean-up is minimal, no material build-up on probe
- Universal voltage

**Minimum Requirements:**

This Laser Probe conversion is designed for meter feed belt control. Due to the many hopper/probe configurations, customer is responsible for supplying mounting hardware.

When placing your order, the parts representative will need to have your machine's electrical number. Example: 32B-XX-XXXX, this will ensure that you receive the proper kit for your machine.

**Kit Includes:**

2 Laser Sensors, 2 Laser Sensor Mounting Brackets, 2 Cables (5m/15ft length), J-Box, Wiring Diagram and Set-up Manual.



No More Material Build-Up



No More Broken Wires



No More Mechanical Probes



For more information on Columbia's Conversion Kits please visit [www.columbiamachine.com](http://www.columbiamachine.com) or call us at **1-360-694-1501** x573

[www.columbiamachine.com](http://www.columbiamachine.com)

## Discrete Dual Laser Sensor

[www.columbiamachine.com](http://www.columbiamachine.com)

### Quick Reference

Description	Part #	Applications
Analog Laser Sensor – “ <b>AB</b> ”	328.100.709AB	Earlier CPM machines, this kit requires service installation (not included in price)
Analog Laser Sensor – “ <b>TI</b> ”	328.100.709TI	Earlier CPM machines, this kit requires service installation (not included in price)
Discrete Laser Sensor – “ <b>Single</b> ”	328.100.1040	For machines with PLC control that have a hopper low input
Discrete Laser Sensor – “ <b>Dual</b> ”	328.100.1043	Replaces Mix-Mizer Hopper Level – 328.145.7 / MZ540051

### Laser Sensor Technology



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**Questions?**

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### Recap

1. The purpose of the Discrete Laser Sensor is to:
  - a) Control the flow of material to the block machine
  - b) Stop the block machine if no material in hopper
  - c) Measure the amount of material in hopper
  - d) All of the above
2. The Discrete Laser Sensor can not be used on the:
  - a) WB6 Batching & Mixing
  - b) Block Machines using TI/AB controls
  - c) Automatic Offbearer
  - d) MBS Batching & Mixing
  - e) All of the above
3. What application is the Dual Discrete Laser Sensor designed to replace:
  - a) Systems using the Omron Floatless Level Switch
  - b) Mix-Mizer Material Level Indicator
  - c) Mix-Mizer Model 4
  - d) Meter Feed Belt Control
  - e) None of the above

### Quiz continued

4. Single Discrete Laser Sensor can be used to control the meter feed belt above the block machine.

True  False

5. The Single Discrete Laser Sensor is a replacement for the Analog Laser Sensor.

True  False

6. Which conversion kit is Service Installation included

- a) Single Discrete Laser Sensor
- b) Dual Discrete Laser Sensor
- c) Analog Laser Sensor
- d) None of the above
- e) All of the above

7. Which conversion kit can be installed by customer

- a) Single Discrete Laser Sensor
- b) Dual Discrete Laser Sensor
- c) Analog Laser Sensor
- d) All of the above
- e) None of the above

**Laser Sensor Technology**

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**End of Slide  
Show**

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**Laser Sensor Technology**

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