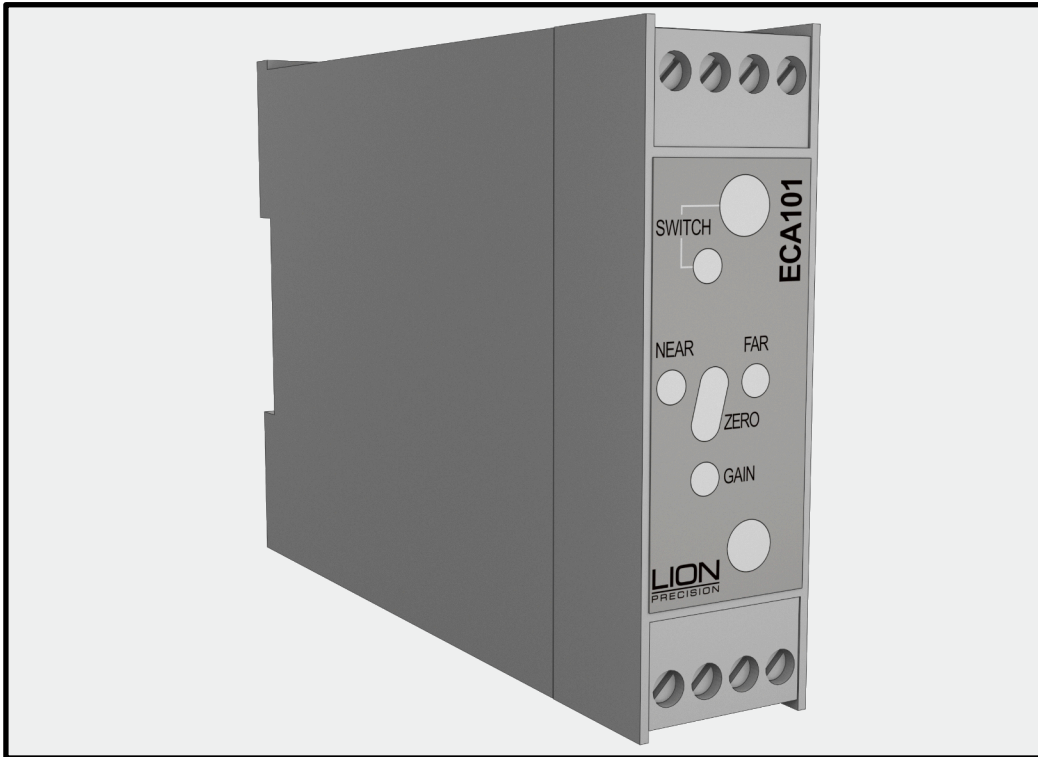


# LION

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## PRECISION



# ECA101 USER'S GUIDE

## Eddy-Current Displacement Sensor

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# APPROVALS AND SAFETY CONSIDERATIONS

The ECA101 is compliant with the following CE directives:

**Safety:** 61010-1:2001

**EMC:** 61326-1, 61326-2-3

To maintain compliance with these standards, the following operating conditions must be maintained:

- All I/O connecting cables must be less than three meters in length
- AC power cables must be rated at a minimum of 250 V and 5 A
- AC power must be connected to a grounded mains outlet rated less than 20 A
- Use the included CE approved power supply. If an alternative power supply is used, it must have equivalent CE certification and provide safety isolation from the mains according to IEC60950 or 61010.
- Sensors must not be attached to parts operating at hazardous voltages in excess of 30VRMS or 60VDC
- All external connections must be SELV (Safety Extra Low Voltage). Use of the equipment in any other manner may impair the safety and EMI protections of the equipment.

## ECA101

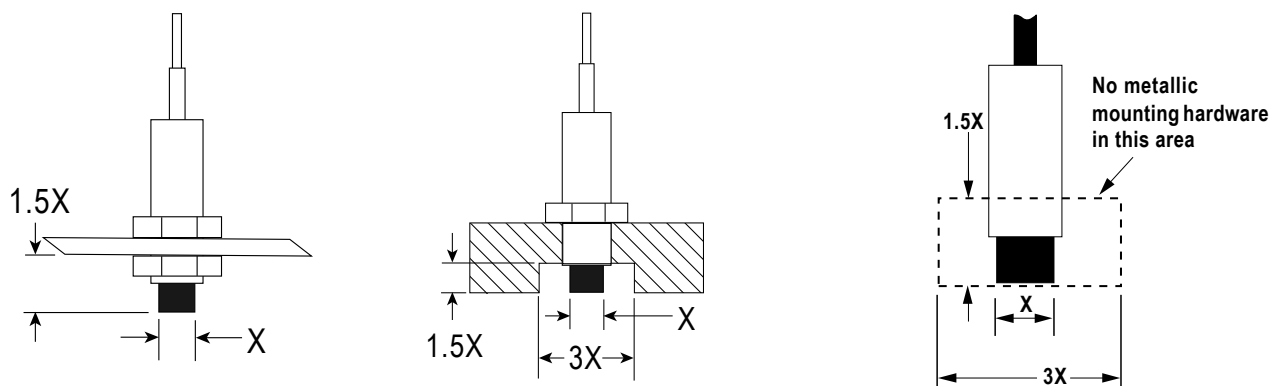
### Description

The ECA101 produces a 0-10 VDC output which is proportional to the distance between the probe and the target. The further the probe is from the target, the more positive the output voltage. The ECA101 also includes an adjustable setpoint switched output.

## PROBE MOUNTING

Probes must be mounted to avoid interaction between the sensing field and the mounting hardware. The area within 3 probe diameters to the sides and 1.5 diameters behind should be kept clear of any metallic objects other than the object to be measured.

If this is not possible, custom calibration may be required.

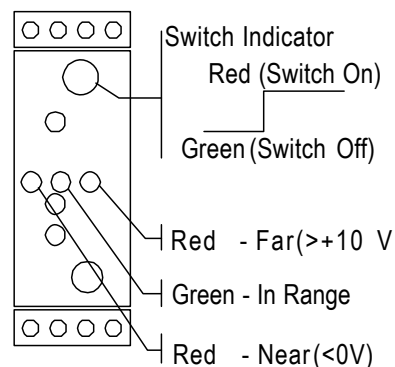


## EXTENSION CABLES

If a probe extension cable is included, the sensor is calibrated with the extension cable attached. Operating the sensor without the extension cable may cause inaccurate results.

## SWITCH LED OPERATION

The Switch LED indicates the status of the setpoint switch output. Red indicates a voltage above the setpoint and the switch is closed. Green indicates a voltage below the setpoint and the switch is open.



## RANGE LED OPERATION

LEDs indicate the relative position of the target as shown. The center, green LED indicates that the probe is in the active range (0-10 V). Red LEDs indicate if the probe is too near (<0 V) or too far (>+10 V) the target.

## QUICK START INSTRUCTION

1. Verify that the probe serial number (heat shrink label on probe cable) matches the probe serial number on the driver side panel label.
2. Install the driver on a standard EN 50 022 symmetrical DIN mounting rail in an area consistent with IP-40 requirements.
3. Connect power and output according to side panel label (or this guide).
4. Install the probe and route the probe cable to the driver. Fasten probe cable in place every 18"-24". Use care not to cut or crimp the probe cable.
5. Plug probe connector into the front panel driver connector. Do not twist probe connector.
6. Apply power, adjust Gain and Zero if necessary to suit the application and begin making measurements. Front panel LEDs will indicate relative target-to-probe position, see driver side panel for explanation.

## CALIBRATION

The quality of the calibration is dependent on the ability to accurately set the probe/target gap to the minimum (offset), and maximum points for the calibration.

1. Set the probe/target gap at the minimum distance (offset)
2. Adjust Zero for 0 VDC output
3. Set the probe/target gap to the maximum distance of the desired range
4. Adjust Gain for desired output voltage (typically 10 VDC)
5. If the output cannot be adjusted to 10V, then the system is not capable of the desired range. A smaller range must be chosen.

## ADJUSTING THE SETPOINT SWITCH OUTPUT

1. Install the probe in the application.
2. Set the probe/target gap to the desired setpoint condition.
3. Turn the Switch adjustment to the point where the switch LED changes from green to red.

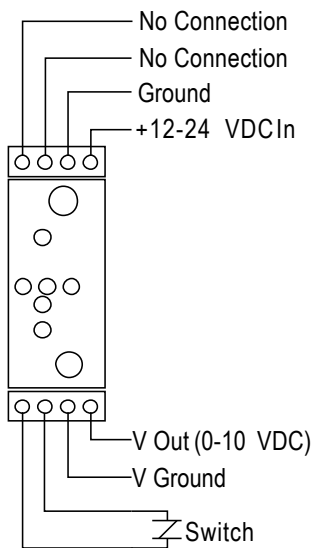
## SETPOINT SWITCH OUTPUT

The switched output is an optically isolated, solid-state version of a mechanical relay. It operates like a mechanical switch.

### Hysteresis:

To prevent switch oscillation, the setpoint voltage is changed by 0.1 V when the switch activates. For example, if the setpoint is set to 5 V, the setpoint voltage will change to 4.9V when the switch is ON. The setpoint will return to 5 V when the switch is OFF.

## DRIVER CONNECTIONS



No Connection	No input or output connections to this terminal.
No Connection	No input or output connections to this terminal.
Ground	Input voltage ground reference (return)
VDC In	+12 to +24 VDC @ 150 mA power input. Input voltage ripple must be <40 mV p-p to maintain specifications (use linear supply).
V Out	0-10 VDC calibrated output. When the probe is out of its calibrated range, the output voltage can range from -5 to +Vin
V Out Ground	Internally connected to power input ground.
Switch	Switch closes when output voltage exceeds the adjustable setpoint. See Setpoint Switch Output Details on next page.

# SPECIFICATIONS

Analog Output		0-10 VDC (typical), 0 $\Omega$
Resolution*		0.2% @ 10 kHz
Bandwidth		10 kHz (-10%/+30%)
Probe Thermal Drift at Mid-Range		$\pm 0.2\%FS/^{\circ}C$
Setpoint Switched Output	Maximum Voltage	30 VAC/60 VDC
	Maximum Current	250 mA
	ON resistance	2.5 $\Omega$
	Hysteresis	0. 1V
	Response Time	0.25 mS On; 0.05 mS Off
Input Power		12-24 VDC, 2 W
Driver Operating Environment		4 $^{\circ}C$ to 50 $^{\circ}C$ , IP40
Probe Operating Environment	Standard Probes	-25 $^{\circ}C$ to 125 $^{\circ}C$ , IP67
	High Temperature Probes	-25 $^{\circ}C$ to 200 $^{\circ}C$ , IP63

\* Specifications are based on Aluminum and/or 4140 Steel targets.

In high EMI environments (10 V/m) output level may shift and noise levels may rise to 600 mV RMS (6% resolution)

## MORE INFORMATION

For more detailed information on the theory of operation and application of eddy-current displacement sensors see our web site at [www.lionprecision.com](http://www.lionprecision.com). or [www.eddycurrentsensing.com](http://www.eddycurrentsensing.com)

**NOTE**

**The probe/driver model numbers and serial number(s) when contacting Lion Precision for assistance.**

**For applications assistance or customer service:**

**Call:** 651-484-6544

**E-mail:** [info@lionprecision.com](mailto:info@lionprecision.com)

Be confident when you do  
**business with Lion Precision**