CANrange
User's Guide

Revision 1.4

Cross The Road Electronics

www.ctr-electronics.com

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1. Device description

The CTR Electronics CANrange is a Time-of Flight CAN enabled sensor that measures the distance to objects in front of it and provides a configurable proximity detection to emulate popular no-contact proximity sensors. Users can utilize the CANrange to determine distance to a target or utilize it as a beam break sensor to determine when an object has entered a provided range.

1.1. Kit Contents

1.2. Features

- Small form factor
- Reverse polarity protection
- Factory calibrated distance measurements
- Enclosed housing
- 3M detectable distance in long range mode
- 100Hz maximum sensor update rate
- Can be used as a remote limit switch with CAN-enabled Phoenix motor controllers

1.3. Electrical Specifications

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Tamb	Ambient temperature		-40		+85	°C
Isupp	Supply Current	DC supply 12.0V		50	60	mA
Vdd	Supply voltage		6.0	12.0	16.0	V
	Weidmuller Input AWG		14		24	AWG
ESD Rating						
	ESD Protection Contact Discharge				±30	kV
	ESD Protection Air-Gap Discharge				±30	kV
Sensor Specifications						
	Field of View		6.75	27	27	deg
	Detection Distance	Short range mode	0		1	m
		Long range mode	0		3	m
	Sensor Update Rate	100 Hz short range mode		10		ms
		User-configured	20		200	ms

1.4. General/Mechanical Specifications

Description	Specification
Outside Dimensions	1.36" x 0.71" x 1.45"
Weight	0.6 ounces (17.0097g) w/o enclosure or wires
Hole Spacing	1" (compatible with WCP boxtube)

1.5. LED States

The CANrange has 2 LEDs located on the front of the CANrange. These LEDs indicate various state about the device, and is useful for diagnostics. The table below can be used to look up what corresponding LED color codes mean.

LED Color	LED State	Cause	Possible Fix
Off	**LEDS Off**	Device does not have power	Provide 12V to V+ and V- inputs.
Red/Off	**Alternating red**	Device does not have valid CAN	Ensure good connections from the CAN H and CAN L inputs to the robot, and that the robot controller is turned on.
Off/Orange	**Alternating orange**	Good CAN. Measured distance is not within detection threshold.	
Off/Green	**Alternating green**	Good CAN. Measured distance is within detection threshold.	
Red/Orange	**Alternating red/orange**	Damaged hardware.	Contact CTR Electronics.
Green/Orange	**Single LED alternating green/orange**	CANrange in bootloader.	Field upgrade device in Phoenix Tuner X.

Additionally, the LED blink rate can be used to get a rough estimate of measured distance. A faster LED blink rate indicates a shorter detection distance, and a slower blink rate indicates a longer detection distance.

2. Installation

The CANrange can be mounted using the two 1-inch spaced through-holes located on the CANrange. It's recommended that the CANrange be mounted securely to a rigid surface, to ensure consistent distance measurements. Optionally, the user may place the CANrange on a plate opposite the detection region, and cut a hole for it to look through, reducing the footprint of the CANrange in the detection region and eliminating risk of damage to the CANrange due to collisions with objects passing in the detection region.

2.1. Wiring the CANrange

The CANrange has 4 Weidmueller push-in connectors for CAN and power inputs. Users should first wire CAN L (green wire) and CAN H (yellow wire) into the CANrange. Ensure that no more than 3/8" strip length is not exceeded and that the input wire AWG is no larger than 14 AWG.

The CANrange does not have an integrated 120Ohm terminating resistor, so users should ensure that a standard CAN bus "chain" is maintained. It's recommended to create a CAN splitter that is tinned or soldered at the connector. An example of this is shown below. **Do not shove two separated wires into an input port of the CANrange**.

Once CAN has been wired, the user should follow the same wire specifications for wiring V+ and V-. **Do not exceed 16V** input or damage may occur.

2.2. Reflective Surfaces

Time-of-Flight sensors measure distance by sending out a beam of light, and measuring the time it takes to reflect. This means that accuracy and range of detection changes based on the material being detected. For the best results, the detection material should be a light-colored, opaque and matte surface that is parallel to the CANrange. If the surface is shiny or transparent, the user could cover the detection surface with a light-colored matte tape, such as gaffer's tape or painter's tape.

For best results, keep the detection surface and the CANrange parallel.

3. FAQ

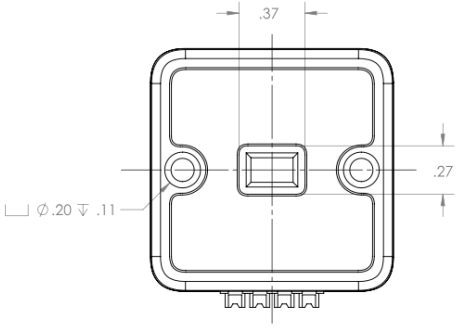
3.1 How sensitive is the CANrange to sunlight?

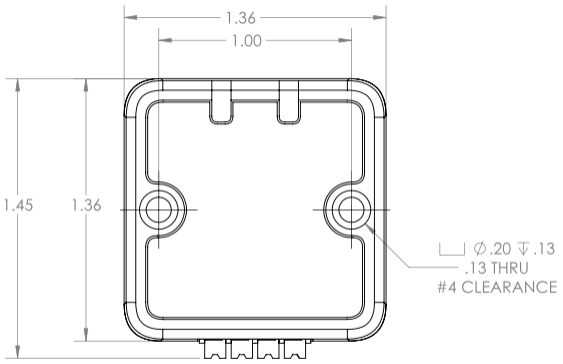
Time-of-Flight sensors are generally sensitive to ambient light. The brighter the ambient light, the more interference there will be. This results in an impact to accuracy of the detected distance, or the maximum detection range of the CANrange. Users should profile the CANrange in their application in expected ambient lighting conditions to determine how it performs in their use-case. Short-range detection mode may be used to reduce the impact of ambient infrared sources on the result, at the cost of reducing the overall detection range of the CANrange.

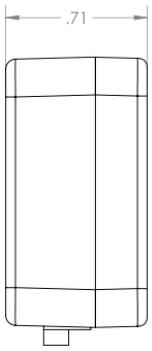
4. Software Information

Software information can be found on our documentation landing page at https://docs.ctr-electronics.com.

4. Mechanical Drawings







5. Revision History

Revision	Date	Description
1.0	26-Nov-2024	Initial Creation.