PS-CA-LJC18A3

Capacitive Proximity Sensor

Wiring & Application Guide

www.vikingmachinery.co.nz

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0.0 Safety Statement

All machinery, especially CNC or automated machinery, has inherent dangers and risks. It is the responsibility of the system designer to ensure that any systems built using any Viking Machinery Ltd. products are safe for use. Any technical information is provided as a reference only, and does not constitute a recommendation as to the fitness of use in any particular application.

Viking Machinery Ltd. strongly urges customers to seek expert advice when dealing with potentially dangerous electrical voltages and sources of mechanical energy. Information contained in this document does not constitute a substitute for expert advice.

Under no circumstances should this product ever be used in a safety critical application.

1.0 Product Specifications

- Supply Voltage – 6-36VDC
- Operating Current – 13mA
- Current Ripple – 10% peak to peak maximum
- Maximum Output Current – 300mA
- Sensing Distance – 10mm maximum (8mm or less ideal)
- NPN Operation
- Operating temperature – -20°C - 80°C
- Response Frequency – 500Hz
- Sensing media – Dielectric Materials

2.0 Scope of Document

This document is designed to give an overview of the wiring options for the PS-CA-LJ18A3 capacitive proximity sensor. Wiring examples are given for typical CNC and microcontroller examples. These are by no means exhaustive, but are a good starting point for beginners.

3.0 Wire Colours & Connection

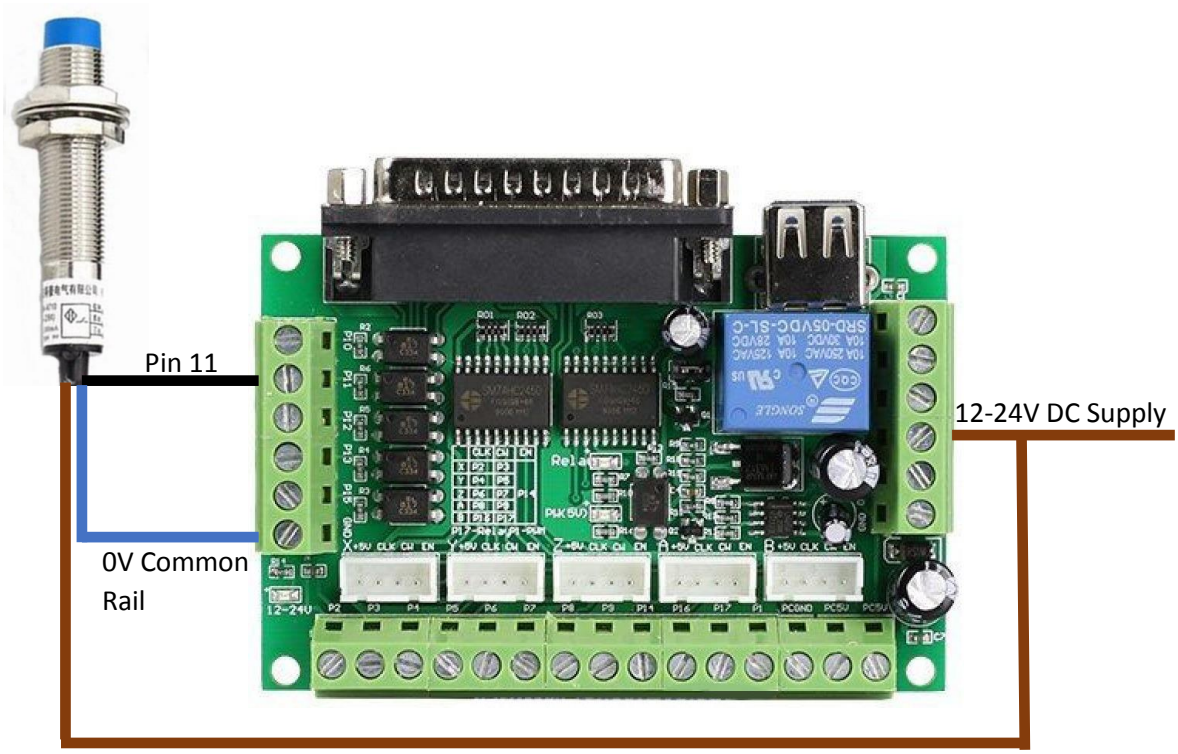
Your proximity sensor comes with a 1000mm flylead attached. This is unshielded and contains three Ø0.42mm wires. 1 Brown, 1 Blue and 1 Black.

The brown wire is to be connected to a 6-36V DC supply, and the blue is to be connected to the common DC 0V rail. It is important that all 0V terminals are connected in common between all devices used in the system, or else you risk damaging the sensor and equipment. At this point passing a metallic object in front of the sensor will cause a red LED to illuminate on the back end of the sensor.

The back wire is our signal wire. We will use this wire to switch our device later. For now we can test the switch by connecting our multimeter (on the DC Volts setting) between the blue wire and the black wire. In its normal state the multimeter should read “12V” (assuming we are using a 12V test voltage). Placing a metal object in front of the sensor will illuminate the LED and drop the voltage on the multimeter to “0V”.

4.0 Wiring to a CNC B.O.B

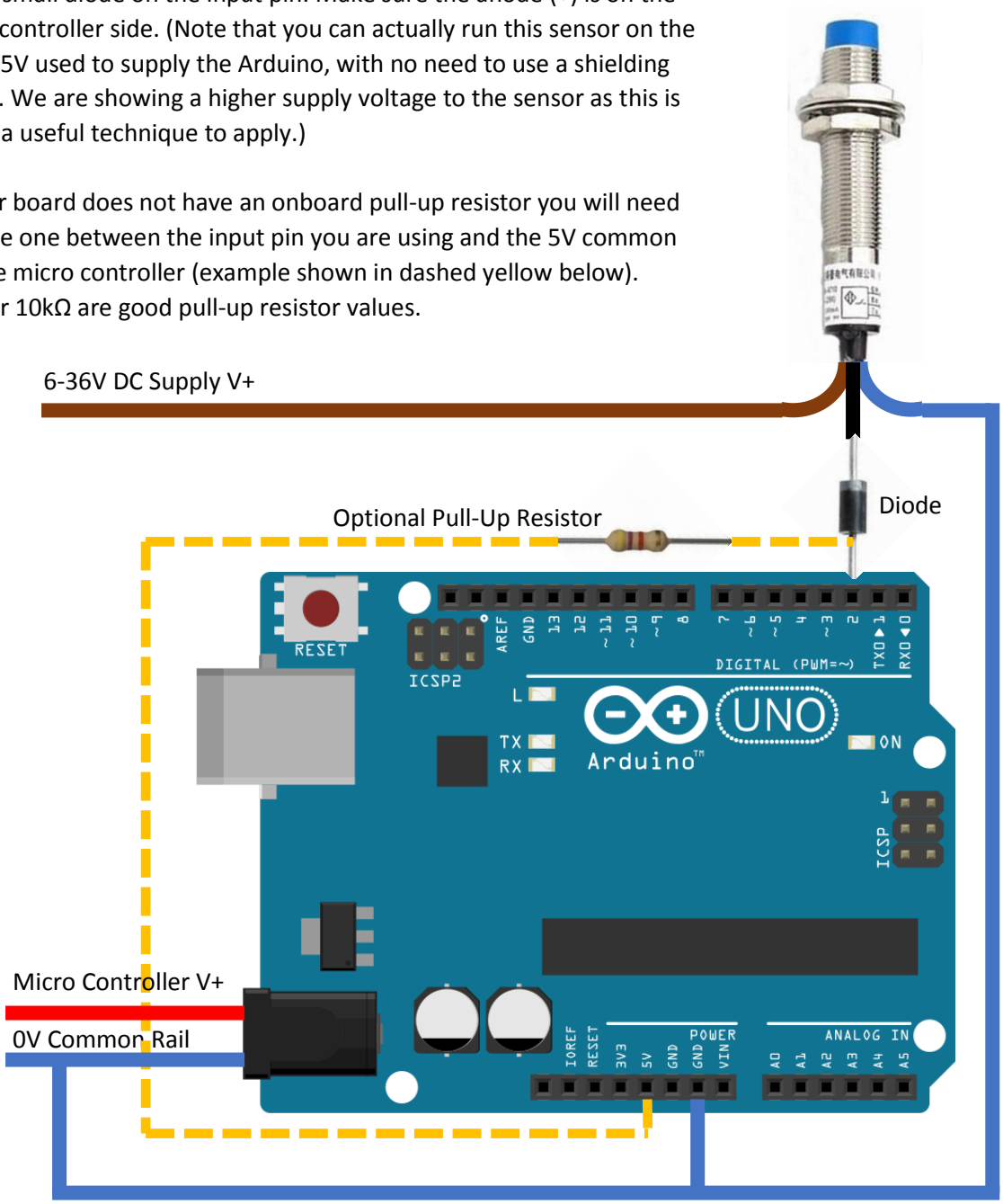
The 5 axis CNC breakout board that Viking Machinery supplies can be wired as shown. This breakout board has the correct voltages across all input pins for the voltage that the sensor is supplying. If your BOB has inputs that are at a logic voltage (5V typically) then you may need to protect the inputs from the voltage coming from the sensor if you choose to run it at a higher voltage that 5V (which you may do for electrical noise suppression reasons). Please refer to section 5.0 for details on interfacing to a logic level micro controller.



5.0 Wiring to a Microcontroller

For this example, we will use the popular Arduino micro controller. The principle is the same for most 5V TTL input devices. We need to add a small diode on the input pin. Make sure the anode (+) is on the microcontroller side. (Note that you can actually run this sensor on the same 5V used to supply the Arduino, with no need to use a shielding diode. We are showing a higher supply voltage to the sensor as this is often a useful technique to apply.)

If your board does not have an onboard pull-up resistor you will need to wire one between the input pin you are using and the 5V common on the micro controller (example shown in dashed yellow below). 5kΩ or 10kΩ are good pull-up resistor values.

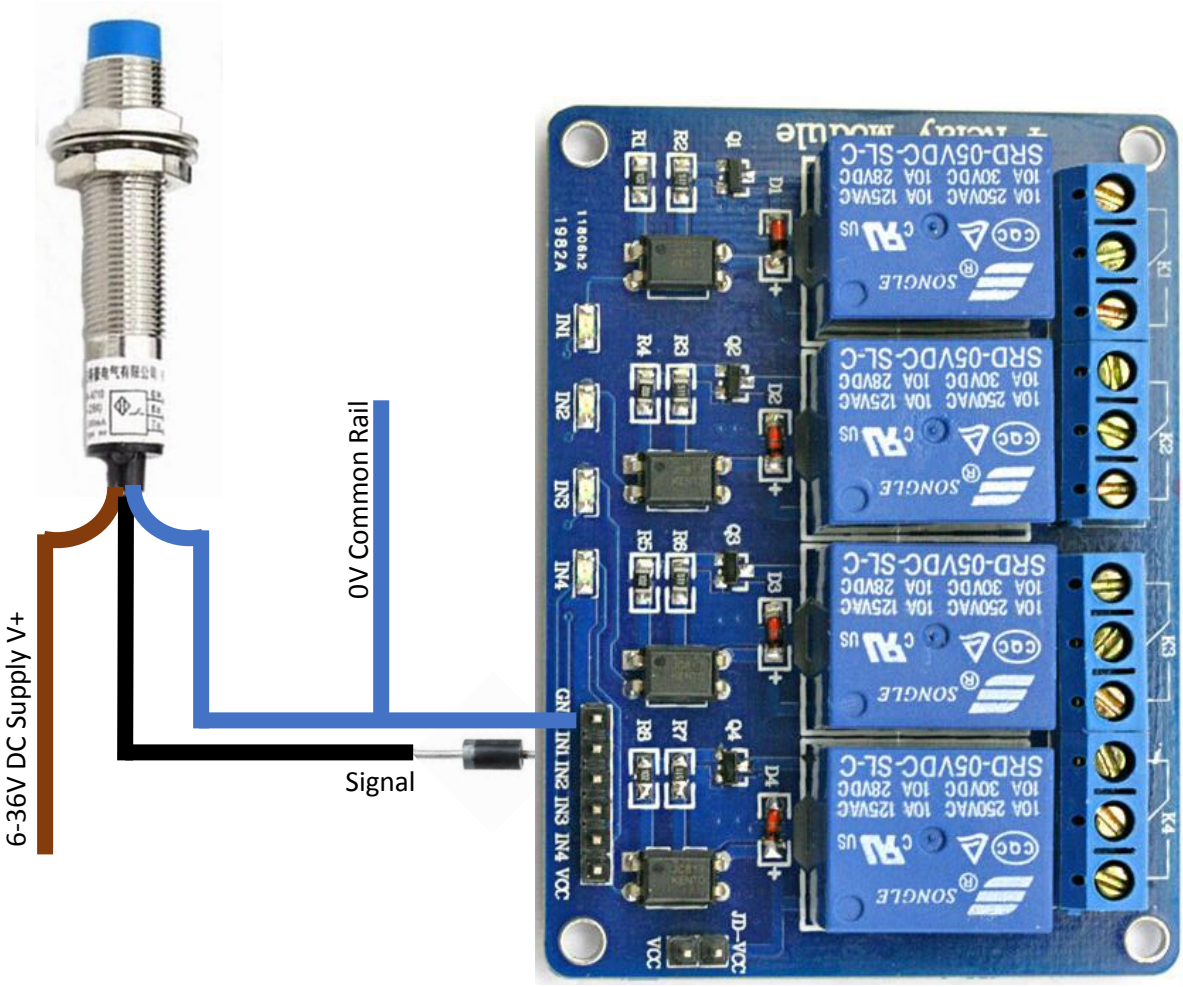


For this example, we would need to set pin 2 to INPUT (with external pull-up resistor wired) or INPUT_PULLUP to use the onboard pullup resistor.

When the sensor is activated, it will allow current flow out of pin 2, dropping the voltage to near zero and reading as a logic signal. When the sensor is deactivated, the voltage rises on the sensor side of the diode, blocking the current flow. The pull-up resistor now does its magic and gives us a nice clean 5V signal on the pin.

6.0 Wiring to a Relay Module

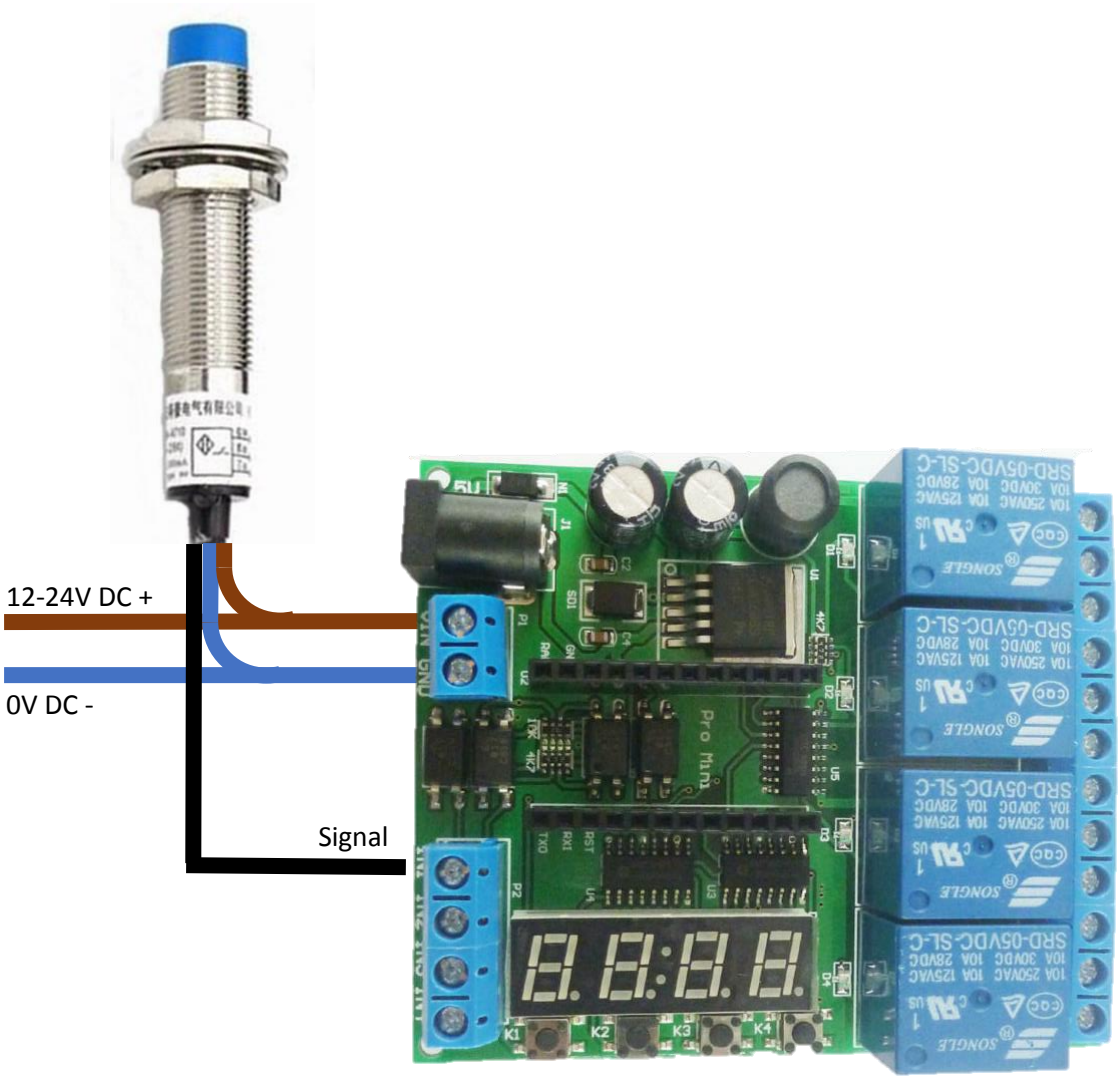
Sometimes you will want to switch a power load with a proximity sensor. The easiest way to do this is to use a relay module. The wiring diagram below shows the typical wiring for one channel on our four-channel relay module. Again, we use a small diode to protect the 5V logic circuit from the higher voltage on the sensor. This particular board has inbuilt pull-up resistors so you do not need to wire an external one here.



7.0 Wiring to the PLC Shield

Wiring to the PLC shield that Viking Machinery sells is easily accomplished in the manner shown below. The PLC shield will run on 12-24V DC, which makes wiring into the sensor very convenient.

The PLC shield supports up to four proximity sensor inputs, four relay outputs and allows logic processing using the plug in Arduino Pro Mini.



7.0 Reference Links

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