

Protecting the optocoupler switch of the PLC



Overview

So, with the aim to adapt application voltage and/or current and provide as well the right galvanic isolation to the PLC, it is recommended to install per I/O the right interface providing both voltage-current level adaptation and isolation protection. Here I'll introduce programmable logic controller (PLC) input circuits using optocouplers. I'll also discuss the concepts of SOURCE and SINK. 1 illustrates. I am in the process of designing a custom ATmega328P-based PCB (5V) that needs to receive and send discrete digital signals to a PLC (24V). I will be communicating with this DL05 PLC from automation direct: <https://cdn.pdf> I am using EL817 (c) optocouplers:. Since a PLC typically operates at extra-low voltage, a transformer is employed to reduce the mains voltage to a suitable value, and consequently these surges in voltages are transferred through the transformer to the processor. Isolation is used to manage ground potential differences. The input signal is interpreted as a logic high or low using a voltage comparator. Opto-isolation provides electrical separation using light, protecting sensitive control electronics from high-voltage field devices. It mitigates risks associated with electrical noise, voltage spikes, and wiring mistakes that can damage PLC components. Unlike transformers or capacitors, which can only transfer AC signals across the isolation barrier, optocouplers can.

Article Content

Oct 25, 2025

PLC Safety and Protection

The main function of an opto-isolator is to block high voltages, voltage surges and transients. These are designed to prevent the system and other sensitive parts from damage and disruption of the PLC ...

Sep 08, 2025

How To Simplify Isolated 24V PLC Digital Input Module Designs

High Speed Operation : ISO121x offers 4Mbps data rate and 150ns latency - allowing much faster interfaces than general purpose optocouplers. No need for field side power supply: This saves cost ...

Nov 09, 2025

ATMega328P Communication with PLC using optocouplers

No, the optocoupler output to the ATmega will be LOW, as the phototransistor will be conducting. Correct for that in the ATmega328 code by detecting LOW == PLC output HIGH.

Jul 28, 2025

Product How-to: Isolated PLC digital inputs for industrial control

On-chip 8-to-1 serialization eliminates optocouplers needed for isolation. A multibit CRC code, transmitted through the SPI port for each 8 bits of data, ensures reliable communication in ...

Dec 26, 2025

ANO007 | Understanding Phototransistor Optocouplers

In some applications like motor control, relays and communication interfaces, the optocoupler is used as an isolated electronic switch, where the phototransistor is driven into conduction and blocking states ...

Jun 21, 2026

Opto-coupler Input Circuits for PLCs

Here I'll introduce programmable logic controller (PLC) input circuits using opto-couplers. We use these devices to interface high voltage sensors to low voltage microcontroller logic and to isolate sensitive ...

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Opto-Isolated PLC Inputs: Protection Circuits and Wiring Types

This design prevents direct electrical connections, thus protecting the PLC from high voltages and noise. The use of optocouplers allows for various types of input configurations, ...

Jan 22, 2026

Relays and Optocouplers

This interfacing is possible thanks to ABB's relays and optocouplers ranges, which offer wide adaptation in both voltage (from 5 to 400 V) and current (from 10-7 to 16 A) as well as high isolation between ...

Jan 13, 2026

Digital inputs: How to wire digital inputs

Internally, as part of the protection circuit, each digital input is pulled to ground through a 10K ohm resistor. This pull down resistor ensures that the digital input shows up as inactive when nothing is ...

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