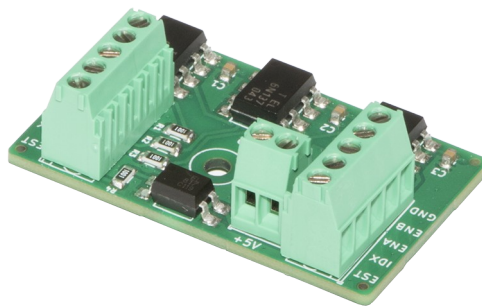




OptoCtrl 3/4 adapter

2022/03/24 Rev1.0



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Introduction

Overview

OptoCtrl 3/4 adapter is a device that opto-isolates Mk3/4 controller inputs from external devices such as rotary incremental encoders.

Its main function is to protect the input circuitry of Mk3/4 controller from any damage that may occur due to improper wiring or power surges at the side of externally connected device. Also, using this adapter reduces electrical noise influence at controller inputs and makes up for easy connection of rotary incremental encoders.

Features and specifications:

- Adapter is available in two versions: NPN and PNP. Version used, depends on the type of external hardware.
- Single adapter offers 3 high speed opto-isolated input channels for encoder and one opto isolated channel for estop button.
- Each input corresponds to its dedicated open collector output
- Voltage range of optoisolated input signal is 5-24VDC
- It can be used as a simple voltage level translator where you need to connect devices that function at different voltage levels (e.g. 5V, 12V, 24V)
- Adapter was designed specifically for Mk3/4 controller but it can be used with any other board that needs opto-isolated inputs.

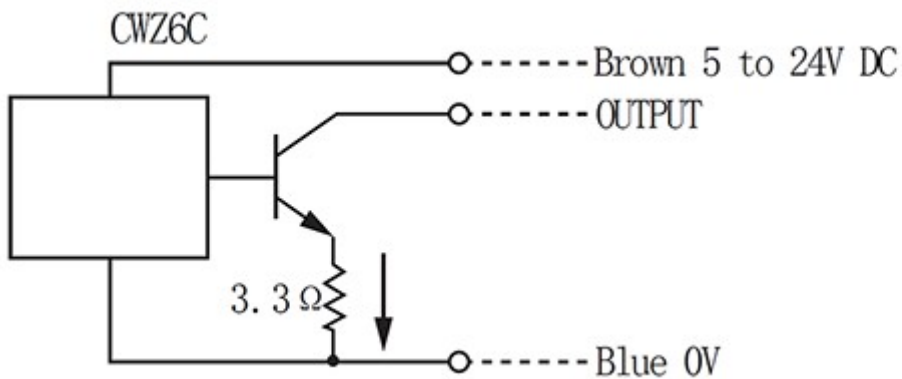
As an example or reference, we used an Omron E6B2 rotary encoder.

This encoder comes in multiple versions which differ from another based on its output circuit. Diagrams below will serve as an example on how to connect rotary encoder, depending on what type of output circuit encoder uses.

Common types of output circuits of rotary encoder are as such:

- NPN Open-collector output
- Voltage output
- Line driver output
- PNP Open-collector output
- Complementary output (aka Push Pull)

Rotary encoder with NPN Open-collector output

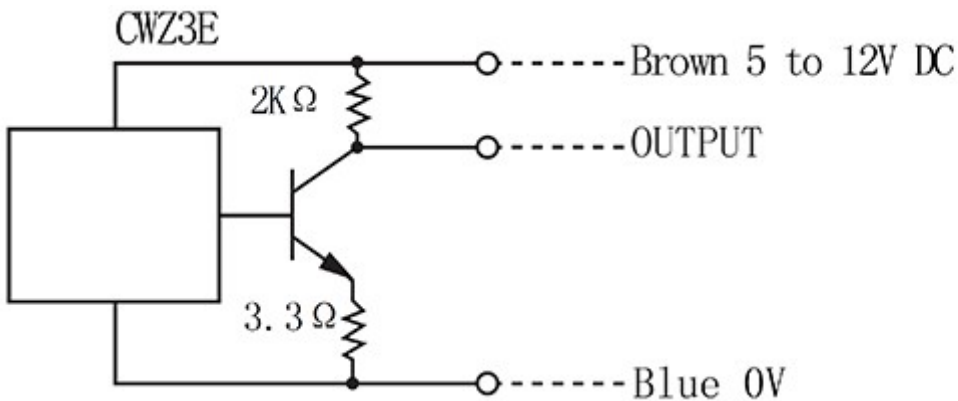


Use NPN OptoCtrl 3/4 adapter:

Output wires of E6B2 CWZ6C encoder:

- Black wire is encoder's OUTPUT A → connect to ENA input
- White wire is encoder's OUTPUT B → connect to ENB input
- Orange wire is encoder's OUTPUT Z → connect to IDX input

Rotary encoder with Voltage output

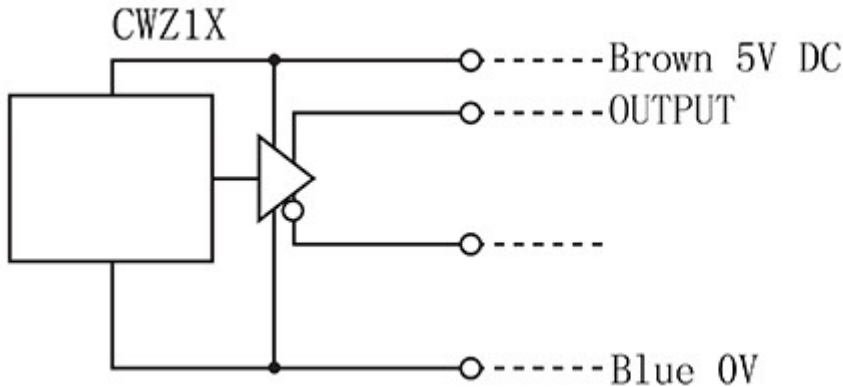


Use NPN OptoCtrl 3/4 adapter:

Output wires of E6B2 CWZ3E encoder:

- Black wire is encoder's OUTPUT A → connect to ENA input
- White wire is encoder's OUTPUT B → connect to ENB input
- Orange wire is encoder's OUTPUT Z → connect to IDX input

Rotary encoder with Line driver output



Use PNP OptoCtrl 3/4 adapter:

Output wires of E6B2 CWZ1X encoder:

Black wire is encoder's OUTPUT A → connect to ENA input

White wire is encoder's OUTPUT B → connect to ENB input

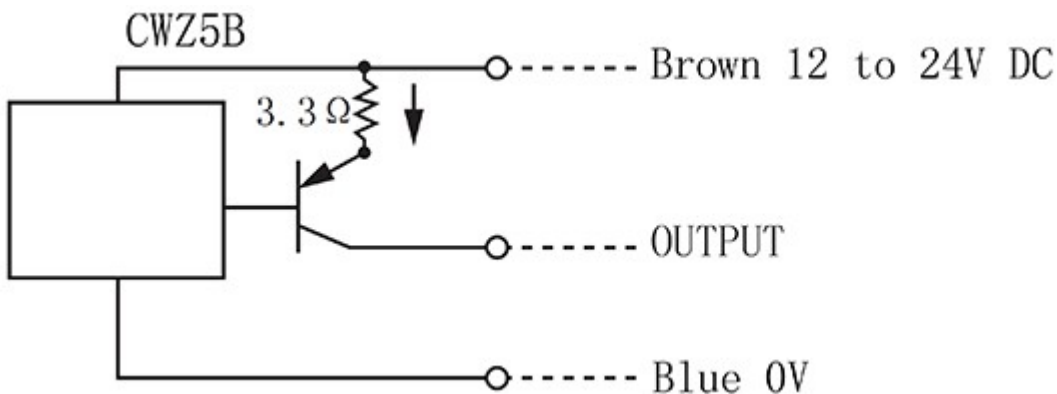
Orange wire is encoder's OUTPUT Z → connect to IDX input

Black/Red wire is encoder's OUTPUT /A → connect to GND

White/Red wire is encoder's OUTPUT /B → connect to GND

Orange/Red wire is encoder's OUTPUT /Z → connect to GND

Rotary encoder with PNP Open-collector output



Use PNP OptoCtrl 3/4 adapter:

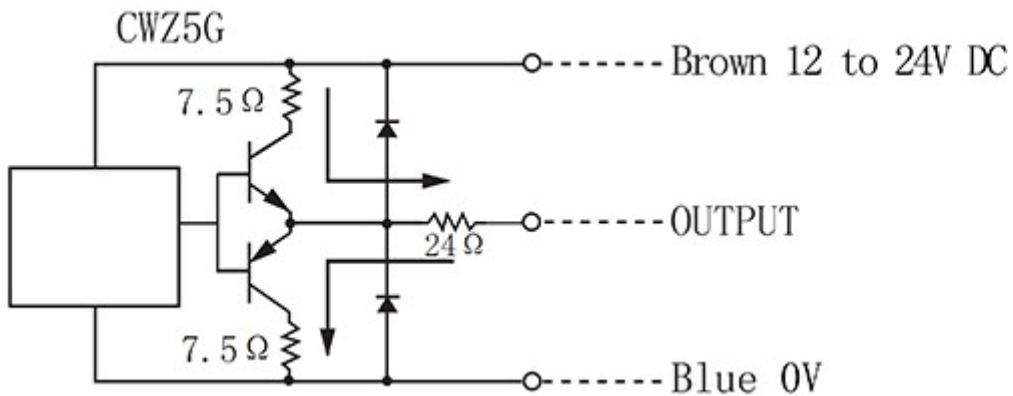
Output wires of E6B2 CWZ5B encoder:

Black wire is encoder's OUTPUT A → connect to ENA input

White wire is encoder's OUTPUT B → connect to ENB input

Orange wire is encoder's OUTPUT Z → connect to IDX input

Rotary encoder with Complementary output (aka Push Pull)



Use NPN OptoCtrl 3/4 adapter:

Output wires of E6B2 CWZ5G encoder:

- Black wire is encoder's OUTPUT A → connect to ENA input
- White wire is encoder's OUTPUT B → connect to ENB input
- Orange wire is encoder's OUTPUT Z → connect to IDX input

Use PNP OptoCtrl 3/4 adapter:

Output wires of E6B2 CWZ5B encoder:

- Black wire is encoder's OUTPUT A → connect to ENA input
- White wire is encoder's OUTPUT B → connect to ENB input
- Orange wire is encoder's OUTPUT Z → connect to IDX input

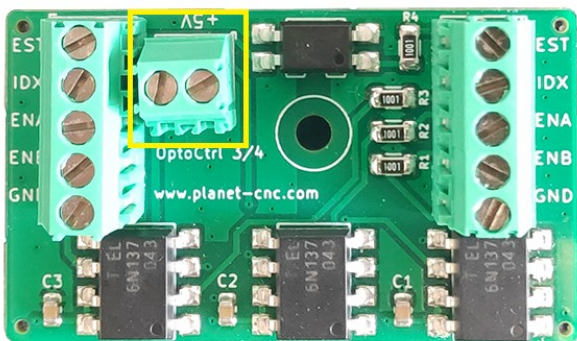
Connection diagrams

Warning!!!

Both, NPN and PNP OptoCtrl 3/4 versions of adapter need to be supplied with +5V from Mk3/4 controller. 5V from Output the output terminal should be used.

Both terminals of the +5V connector, located on the OptoCtrl 3/4 adapter are connected to 5V.

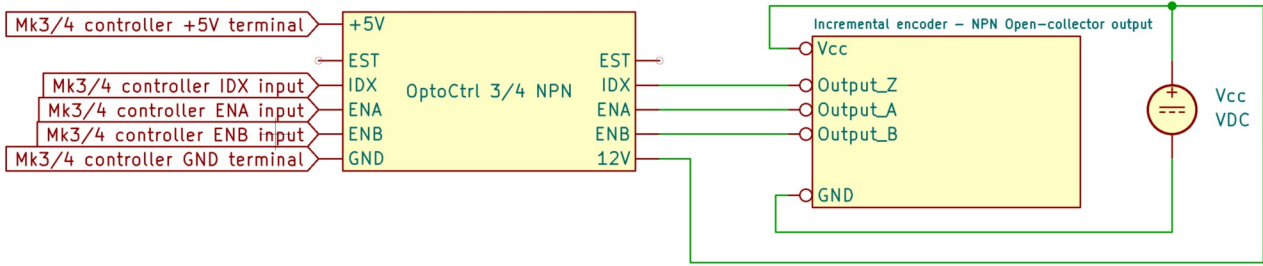
Do not connect GND signal wire to this connector!!!



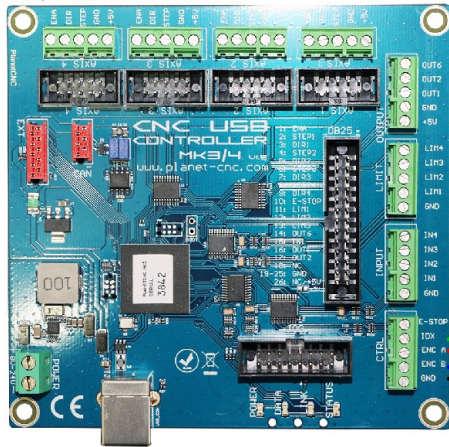
Do not connect GND to this connector.

This connector uses same 5V potential for both screw terminals.

NPN OptoCtrl Mk3/4 adapter and encoder with NPN Open collector output



Mk3/4 controller



Rotary encoder with NPN Open-collector output



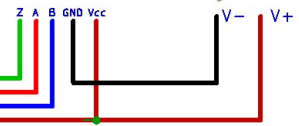
Power supply



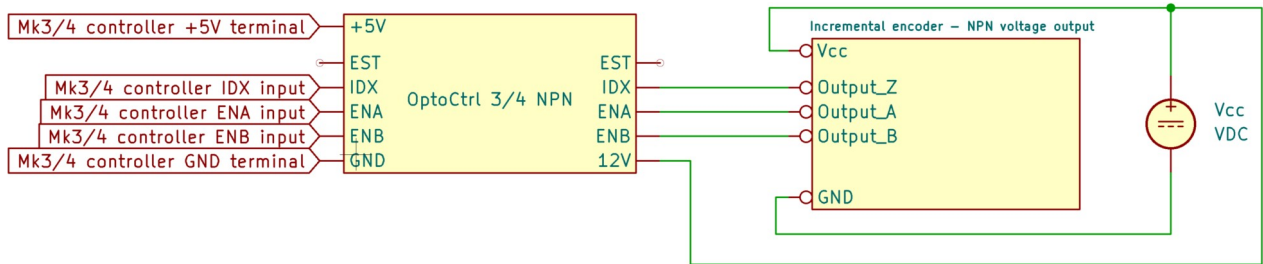
Z A B GND Vcc

V- V+

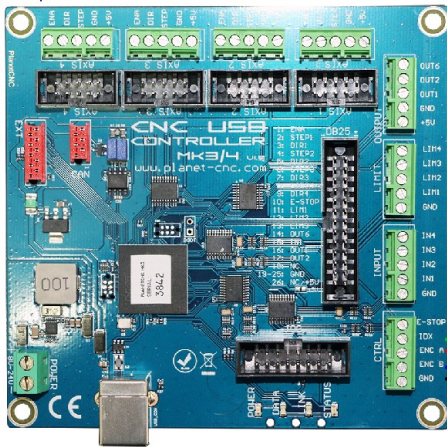
NPN OptoCtrl 3/4 adapter



NPN OptoCtrl Mk3/4 adapter and encoder with Voltage output



Mk3/4 controller



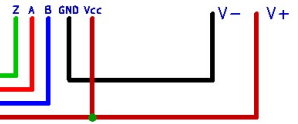
Rotary encoder with NPN voltage output



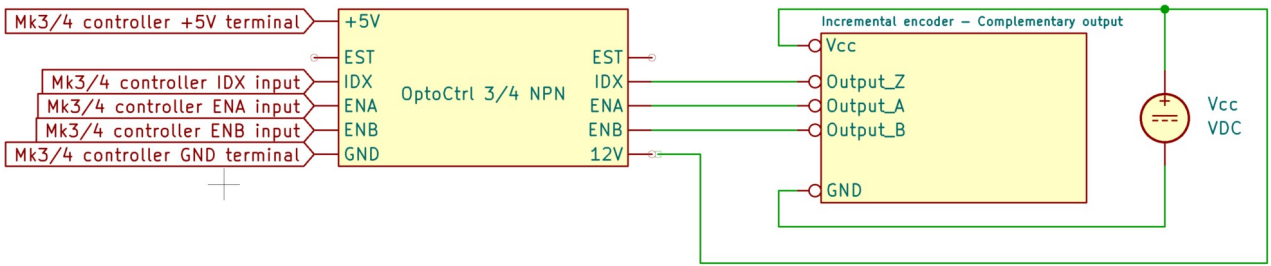
Power supply



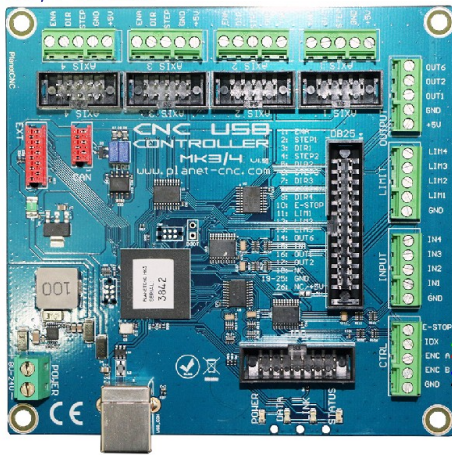
NPN OptoCtrl 3/4 adapter



NPN OptoCtrl Mk3/4 adapter and encoder with Complementary output

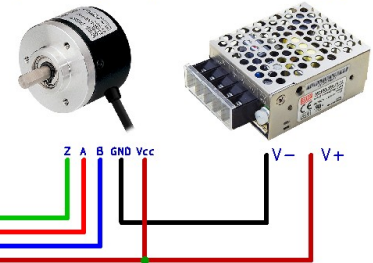


Mk3/4 controller



Rotary encoder with NPN complementary output

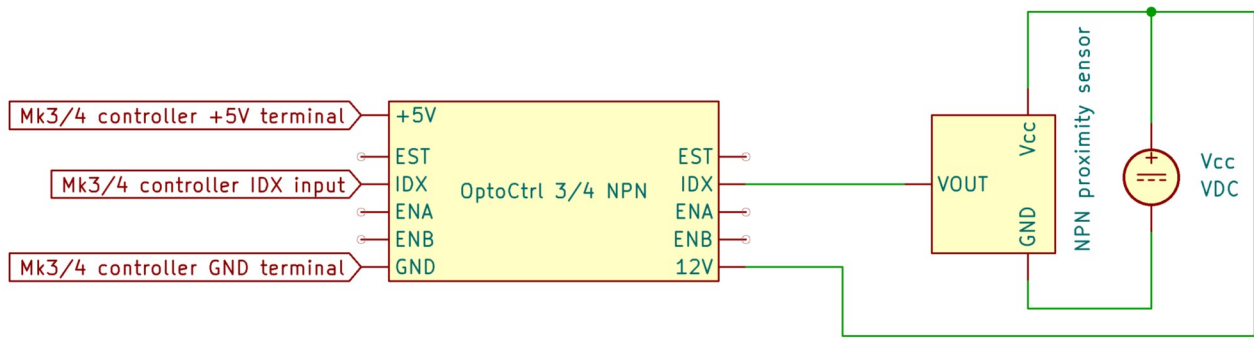
Power supply



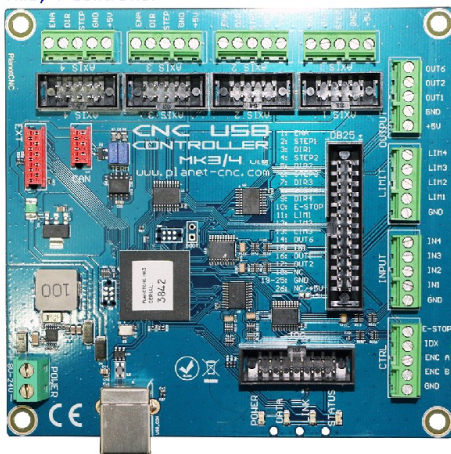
NPN OptoCtrl 3/4 adapter



NPN OptoCtrl Mk3/4 adapter and NPN proximity sensor

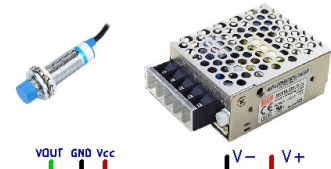


Mk3/4 controller

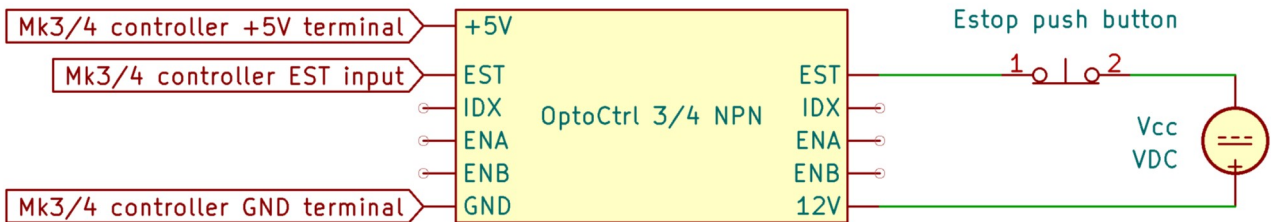


NPN OptoCtrl 3/4 adapter

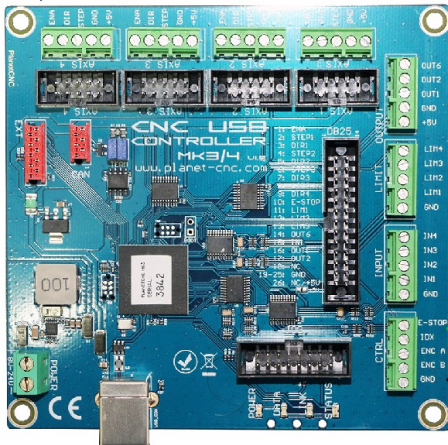
NPN proximity sensor Power supply



NPN OptoCtrl Mk3/4 adapter and Estop button



Mk3/4 controller

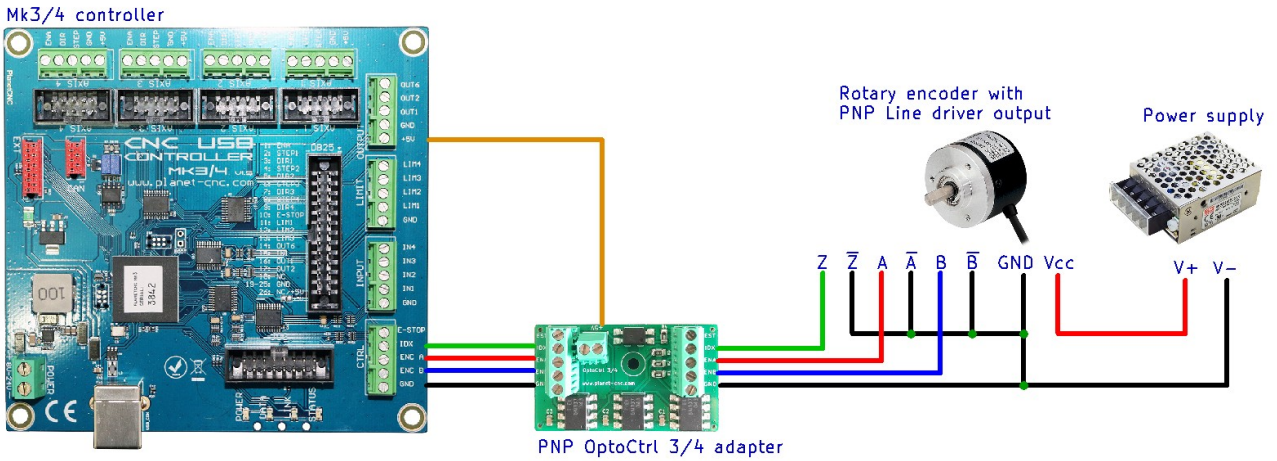
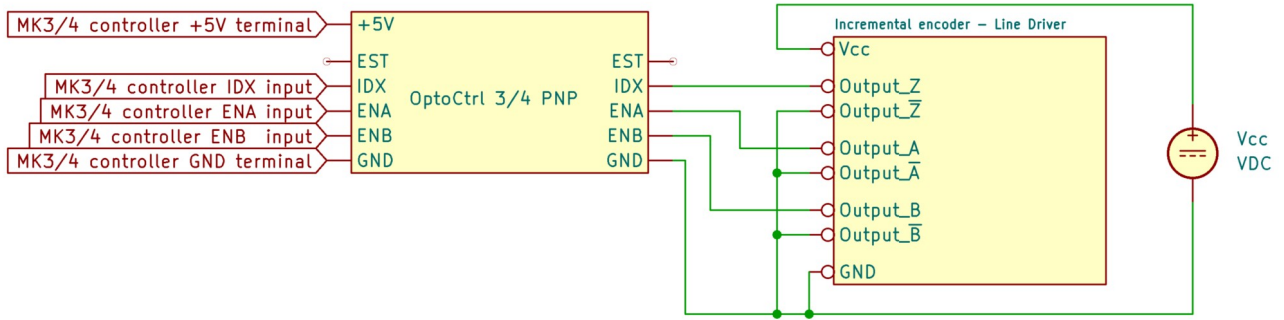


NPN OptoCtrl 3/4 adapter

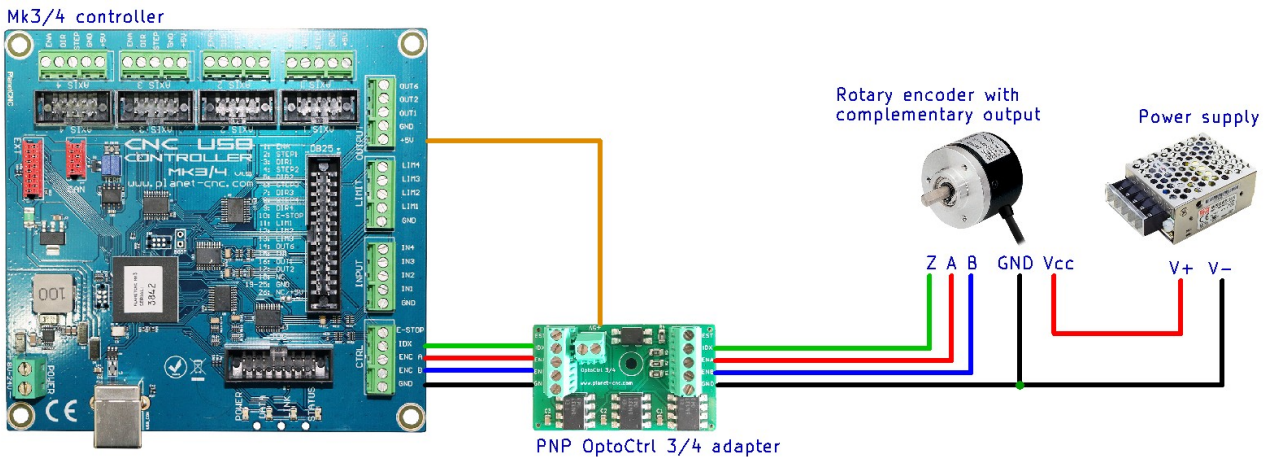
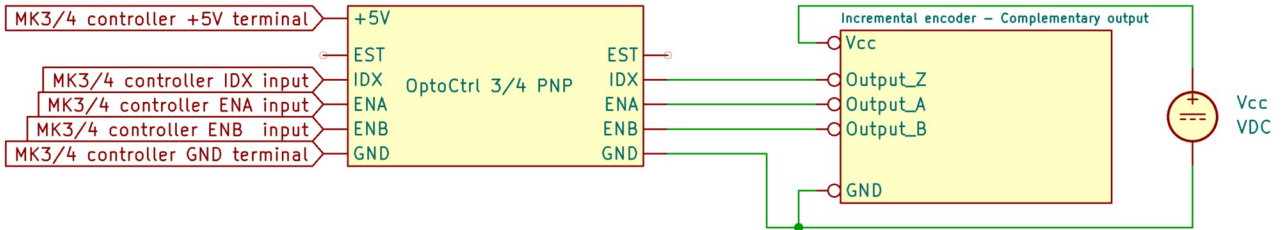
Estop push button Power supply



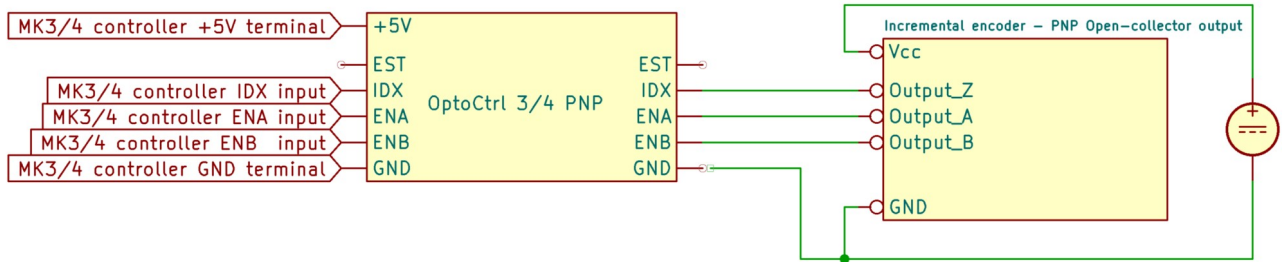
PNP OptoCtrl Mk3/4 adapter and encoder with Line driver output



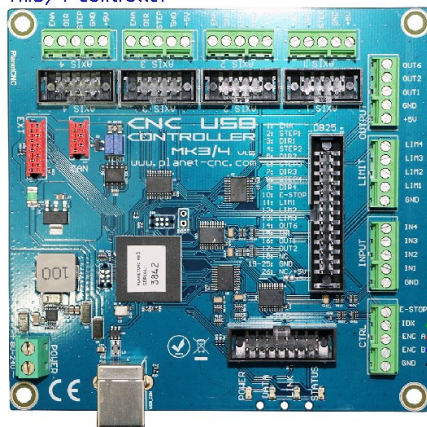
PNP OptoCtrl Mk3/4 adapter and encoder with Complementary output



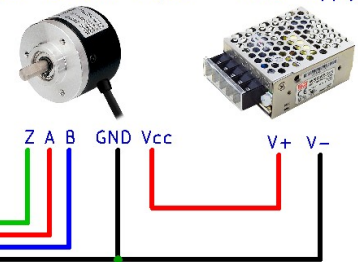
PNP OptoCtrl Mk3/4 adapter and encoder with PNP Open-collector output



Mk3/4 controller



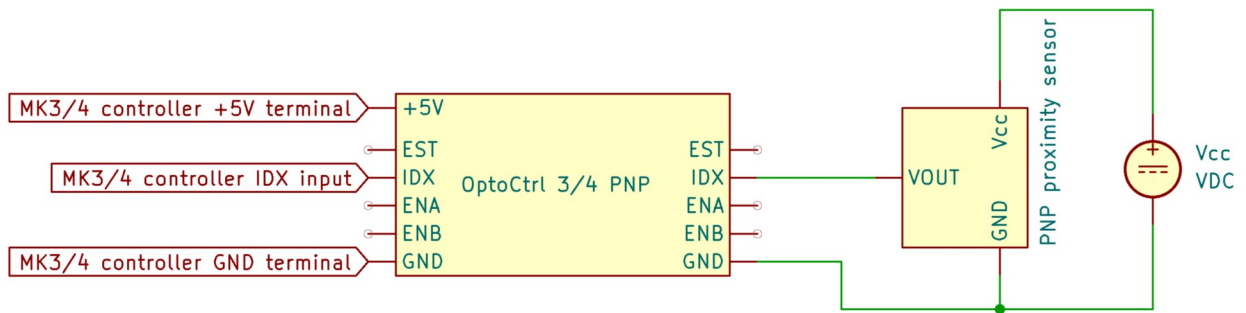
Rotary encoder with PNP Open-collector output Power supply



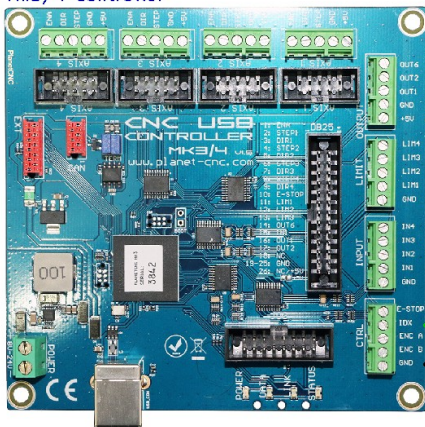
PNP OptoCtrl 3/4 adapter



PNP OptoCtrl Mk3/4 adapter and PNP proximity sensor

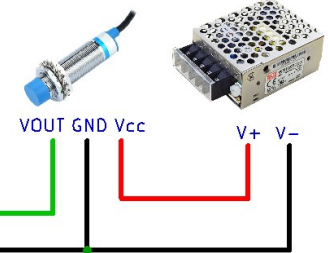


Mk3/4 controller

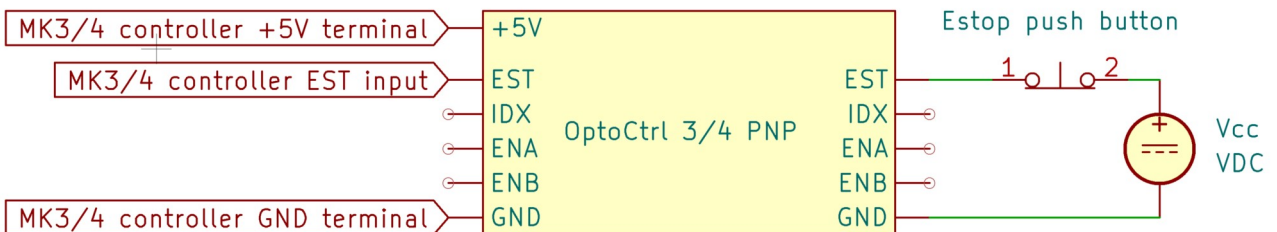


PNP OptoCtrl 3/4 adapter

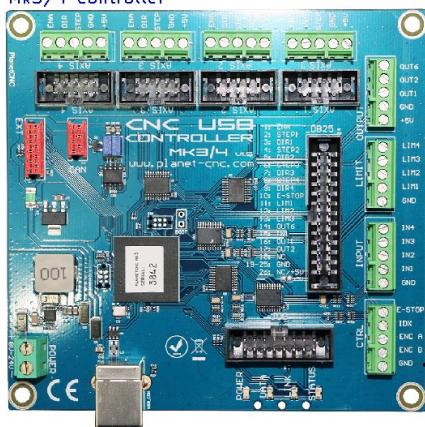
PNP proximity sensor Power supply



PNP OptoCtrl Mk3/4 adapter and Estop button



Mk3/4 controller



PNP OptoCtrl 3/4 adapter

Estop push button Power supply

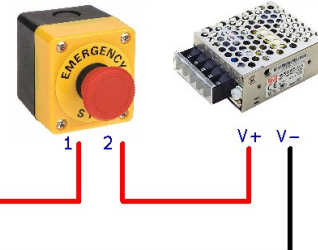


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