

OPTICAL ISOLATOR MODULE APPLICATION GUIDE



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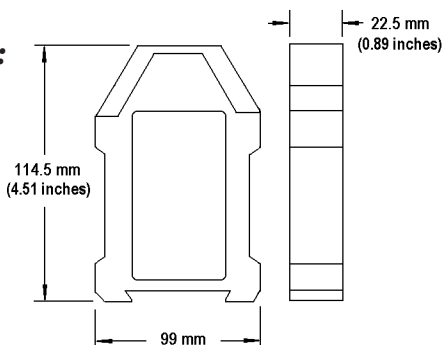
OPTICAL ISOLATOR MODULE

TECHNICAL SPECIFICATIONS:

This DIN rail mounted encoder interface lets you connect an encoder to a variety of controllers or to multiple input devices. It provides an optically isolated signal and is available with one of four output driver options making it compatible with all major counters, drives and PLC components. Multiple modules can be daisy-chained together and drive as many as eight different devices from a single encoder.

MECHANICAL SPECIFICATIONS:

Package dimensions are 114.4 mm high by 99 mm wide by 22.5 mm thick. The package mounts to a DIN rail type EN50 022 (35mm X 7.5 mm). A length of DIN rail is supplied with each module.



ELECTRICAL SPECIFICATIONS:



The optical isolator can be powered by an external power supply of anywhere from 5 to 24 VDC, depending on the model. It should never be connected directly to AC power mains. The module draws approximately 75 mA and a green LED indicates the unit is powered. The optical isolator module does not provide power to the encoder. Any encoders used in conjunction with this module must be connected to their own power supply.

DISCLAIMER: this application guide assumes a certain level of technical expertise including the ability to interpret simple electrical schematics and the ability to identify and use electric components. Should additional assistance be required please contact the factory.

Signal

Specifying an optical isolator module requires knowledge of three system parameters: the DC supply voltage available in the system; the encoder output type (logic levels and driver type); and the input signal specifications of the receiving electronics. If you need help specifying an optical isolator module please contact technical support at BEL.

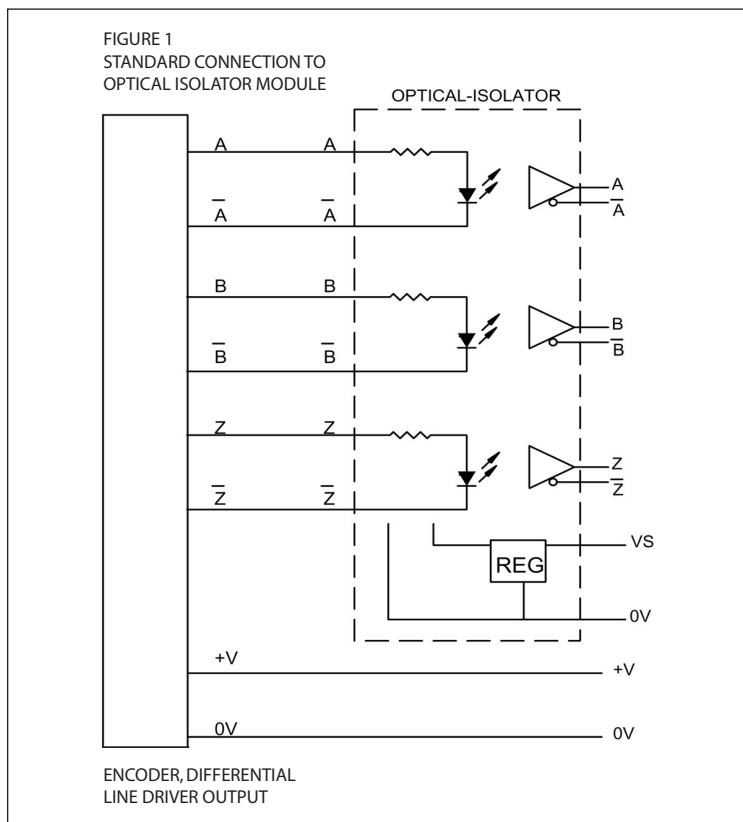
Output Code Format From Encoder	Dual channel in quadrature plus index and complements. Data lines are designated A, B, Z, A-, B-, Z- at the module
Output Signal Type From Encoder	<ul style="list-style-type: none"> • Differential line driver (Use Connection Instructions #1) • Single ended line driver (Use Connection Instructions #2) • Single ended open collector with pull-up resistors internal to encoder (Use Connection Instructions #3) • Single ended, open collector (Use Connection Instructions #3)
Output Signal Voltage Level From Encoder	<ul style="list-style-type: none"> • 5 VDC (TTL, RS422 compatible, line driver) • 12 – 15 VDC • 24 VDC
Frequency Response Of Optical Isolator	1 MHz, maximum
Power Requirements For Optical Isolator	<ul style="list-style-type: none"> • 5 – 15 VDC Supply, $V_{out} = V_{in}$ (Uses 4469 Output), 75 mA nominal • 5 – 24 VDC Supply, $V_{out} = 5$ volts (Uses 4469 Output), 75 mA nominal • 5 – 24 VDC Supply, $V_{out} = V_{in}$ (Uses 7272), 75 mA nominal • 5 – 24 VDC Supply, open collector out (Uses 7273), 75 mA nominal
Protection Level	Supply lines protected against over voltage to 60 volts and reverse voltage.

CONNECTION INSTRUCTIONS #1

Differential Line Driver

Encoder signal from 5 VDC to 24 VDC
(must specify the voltage when ordering)

Differential line driver: This is the preferred type of encoder output as it has the best noise immunity. Connect each encoder signal to its like optical isolator input (A to A, A- to A-, etc.) as shown in Figure 1.



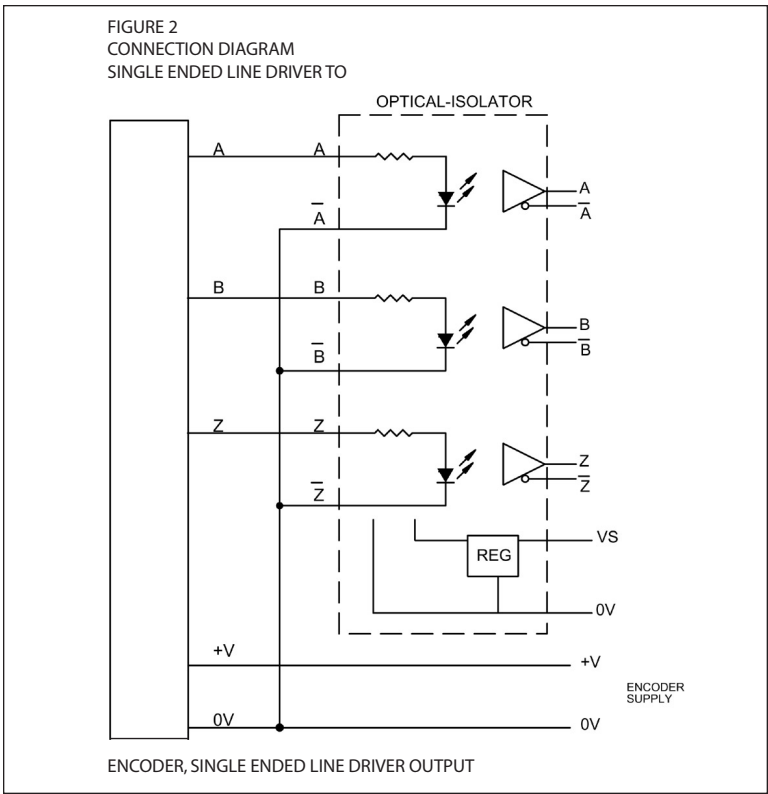
Note: Assure logic output levels of encoder match logic input specifications of optical isolator.

CONNECTION INSTRUCTIONS #2

Single Ended Line Driver

Encoder signal from 5 VDC to 24 VDC (must specify the voltage when ordering)

Single-ended line driver: Connect encoder output A to optical isolator module input channel A, B to B and Z to Z. Connect the A/, B/ and Z/ inputs of the optical isolator to circuit common of the encoder supply as shown in Figure 2. Single ended operation is limited to shorter cable runs and is more susceptible to noise.



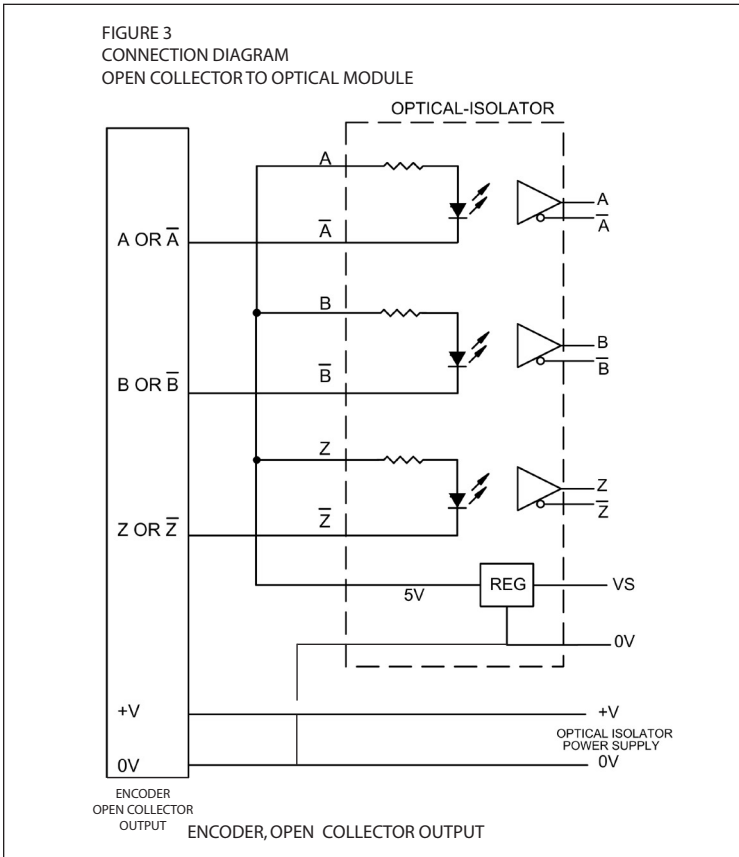
Note: Assure logic output levels of encoder match logic input specifications of optical isolator.

CONNECTION INSTRUCTIONS #3

Open Collector with or without internal pull-up resistors

Encoder can be supplied with 5-24 VDC.

Open collector with or without internal pull-up resistor. Connect encoder output A to optical isolator module input A/, B to B/ and Z to Z/. Connect the A, B and Z inputs of the optical isolator to the 5 V output terminal on the optical isolator module as shown in Figure 3. This connection results in a logic inversion within the optical isolator module. To compensate for the logic reversal, swap A for A/, B for B/ and Z for Z/ at the optical isolator outputs.

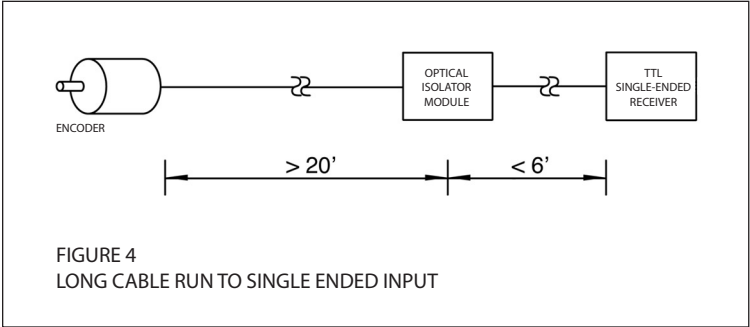


Note: Assure logic output levels of encoder match logic input specifications of optical isolator.

USES FOR OPTICAL ISOLATOR MODULES

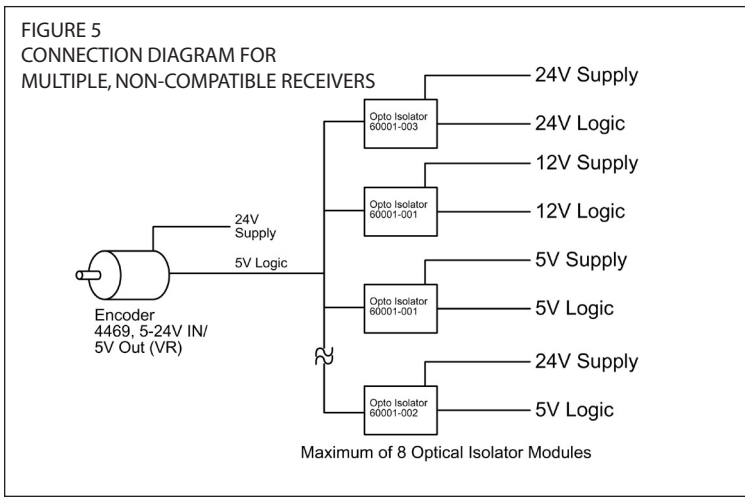
Resolve an electrical conflict between the encoder output and the receiving electronics.

Sometimes system constraints result in an incompatibility between the encoder output and the receiving electronics or the cabling. A typical symptom of this problem is missed or intermittent counts. As an example, a single-ended TTL receiver that is more than 20 feet from the encoder may not be able to compensate for the signal attenuation and ringing caused by the encoder cabling. An optical isolator module installed near the receiver as shown in Figure 4 can receive the signal, rejecting the cable effects and produce a signal compatible with the input device.



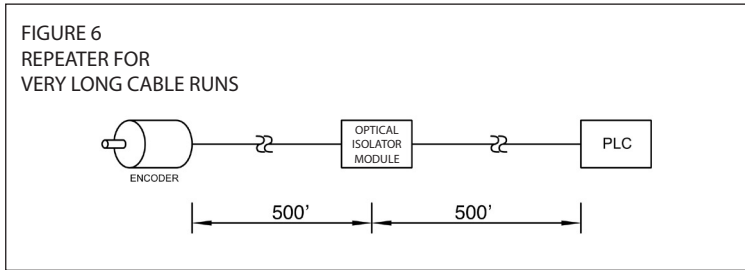
Signal splitter

The optical isolator can be used to connect a single encoder to multiple devices. Optical isolators can be used to split an encoder output to drive up to 8 devices as shown in Figure 5. One optical isolator module is used to drive each receiver. Optical isolator modules can be specified with outputs to match receiver inputs; i.e. an encoder signal can be split to drive a differential TTL input with one module, a 24 V line driver with another module and provide an open collector, NPN signal with another module.



Repeater

On extremely long cable runs (greater than 500 feet), an optical isolator module may be needed as a mid-point repeater to receive, amplify and re-broadcast the signal. An example is illustrated in Figure 6.



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