

# FC-ISO-D Encoder Signal Conditioner and Optical Isolator - Differential Line Driver Output

## Product Guide

### Description:

3505 HUTCHINSON ROAD  
CUMMING, GA 30040-5860

The FC-ISO-D high speed optical isolator module has the versatility to solve various interface problems between an incremental encoder signal and a PLC, servo drive, or other input device. Ideal for use with single ended (open collector, NPN, pull-up, push-pull, totem pole) or differential line driver encoder signals, the three complementary inputs (A, B, Z, A-not, B-not, Z-not) are rated for 4.5-7.5 and 12-26VDC and frequency response up to 1 MHz. Input terminals A, B, and Z can be internally connected together and complementary input terminals A-not, B-not, and Z-not can be internally connected to common through DIP switches for simplified wiring. The FC-ISO-D has three differential line driver outputs (A, B, Z, A-not, B-not, Z-not) rated for 5VDC. Optical isolation rated at 1800V separates the input signals from the outputs. The slim-line plastic housing includes an integral 35mm DIN rail mounting adapter, LED indication, and removable screw terminal blocks for easy installation and wiring. The FC-ISO-D module is UL508 listed and CE marked.

### Specifications

#### Input Specifications

<b>Input Voltage (DIP selectable)</b>	4.5-7.5 VDC	12-26 VDC
<b>Input Current</b>	7.5mA typical, 14mA maximum	
<b>Protection Type, Component</b>	Polarity/Surge, Polarity protection diode	
<b>Switching Threshold "0" Signal</b>	< 2.2 VDC	< 3.9 VDC
<b>Switching Threshold "1" Signal</b>	> 2.6 VDC	> 4.8 VDC

#### Output Specifications

<b>Output Circuit</b>	Differential line-driver; Sourcing	
<b>Output</b>	5 VDC	
<b>Continuous Output Current</b>	70mA maximum	
<b>Overcurrent Level</b>	Limited to 70mA	
<b>Quiescent Current</b>	1.0mA maximum	
<b>Output Voltage Protection</b>	None (not reverse polarity protected); Voltage less than -9 V or greater than 14V will damage chip	
<b>Voltage Drop at Max Continuous Current</b>	1.75VDC	
<b>Output Current Protection</b>	Short Circuit, Current Limiting, Thermal Shutdown, 15kV ESD Protection	

#### Timing Specifications

<b>Input to Frequency Response Time</b>	1.3µs
<b>Output Rise Time (<math>t_{on}</math>)</b>	<15ns
<b>Output Fall Time (<math>t_{off}</math>)</b>	<15ns
<b>Max Frequency Response</b>	1 MHz

#### Terminal Block Specifications

<b>Number of Positions</b>	2 pole (Dinkle: EC350V-02P), 8 pole (Dinkle: EC350V-08P)
<b>Wire Range</b>	28-16AWG Solid or Stranded Conductor; Wire strip length 9/32" (6-7mm)
<b>Screw Size (Slotted)</b>	M 2.5 size, 0.4 T x 2.5 W mm (Screwdriver part number DN-SS1)
<b>Screw Torque</b>	1.7 inch-pounds (0.19 Nm)

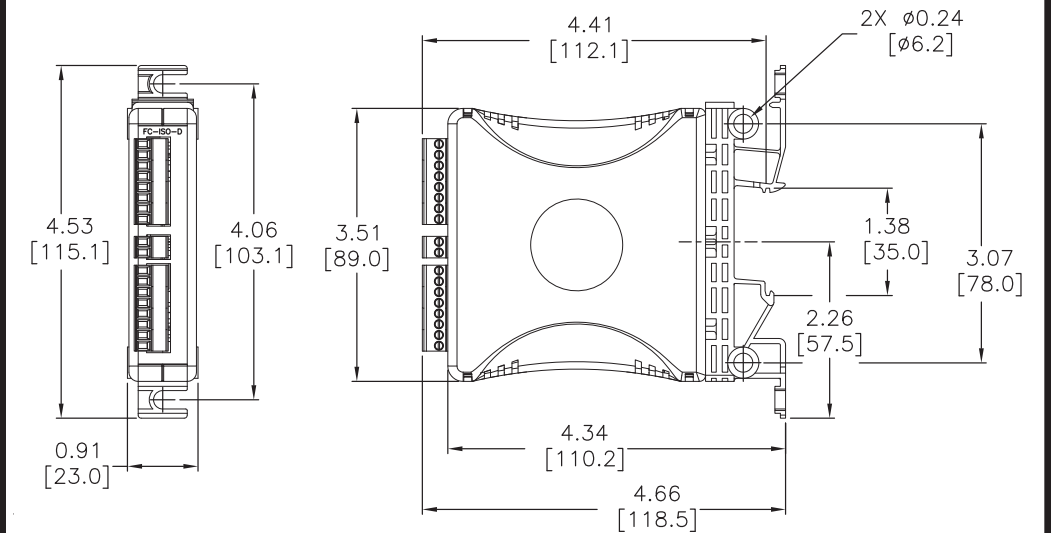
### Specifications (continued)

#### General Specifications

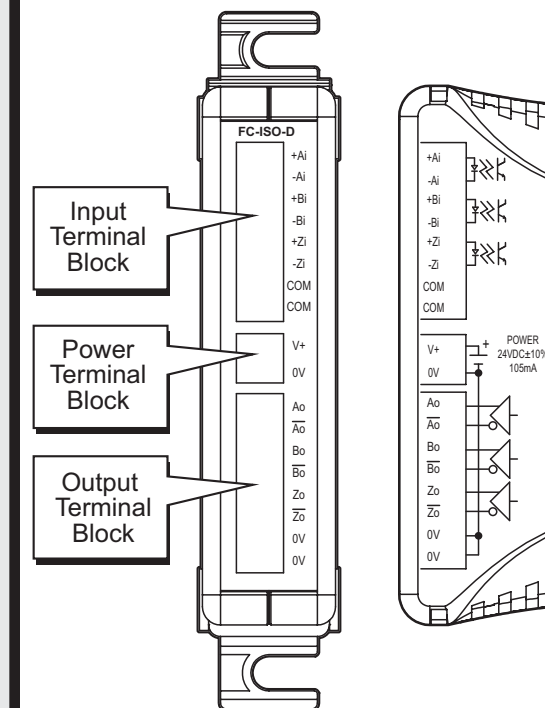
<b>External DC Power Required</b>	24VDC $\pm$ 10% @ 105mA*
<b>Power Dissipation Within Module</b>	9W (all outputs at max current at max voltage)
<b>Thermal Dissipation</b>	30.72 BTU/hr (1W = 3.413 BTU/hr)
<b>Isolation</b>	1800VAC input-output applied for 1 second
<b>Mounting</b>	35mm DIN Rail or panel mount (with no restrictions)
<b>Operating Temperature</b>	0 to 60°C (32 to 140°F) IEC 60068-2-14 (Test Nb, Thermal Shock)
<b>Storage Temperature</b>	-20 to 70°C (-4 to 158°F) IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat) IEC 60068-2-14 (Test Na, Thermal Shock)
<b>Humidity</b>	5 to 95% (non-condensing) IEC 60068-2-30 (Test Db, Damp Heat)
<b>Environmental Air</b>	No corrosive gases permitted (EN61131-2 pollution degree 1)
<b>Vibration</b>	MIL STD 810C 514.2 IEC 60068-2-6 (Test Fc)
<b>Shock</b>	MIL STD 810C 516.2 IEC 60068-2-27 (Test Ea)
<b>Insulation Resistance</b>	>10M $\Omega$ @ 500 VDC
<b>Noise Immunity</b>	NEMA ICS3-304 IEC 61000-4-2 (ESD) Impulse 1000V @ 1µs pulse IEC 61000-4-4 (FTB) RFI, (145MHz, 440MHz 5W @ 15cm) IEC 61000-4-3 (RFI)
<b>Agency Approvals</b>	UL*, cUL (File # E157382), CE

\* in order to comply with UL508 the supplied power must be less than 26VDC and fused at a maximum of 3 amps.

### Dimensions inch [mm]



### Wiring Connections



#### Input Terminal Block

Faceplate Label	Description
+Ai	A Input Non-Inverted
-Ai	A Input Inverted
+Bi	B Input Non-Inverted
-Bi	B Input Inverted
+Zi	Z Input Non-Inverted
-Zi	Z Input Inverted
COM	Input Common
COM	Input Common

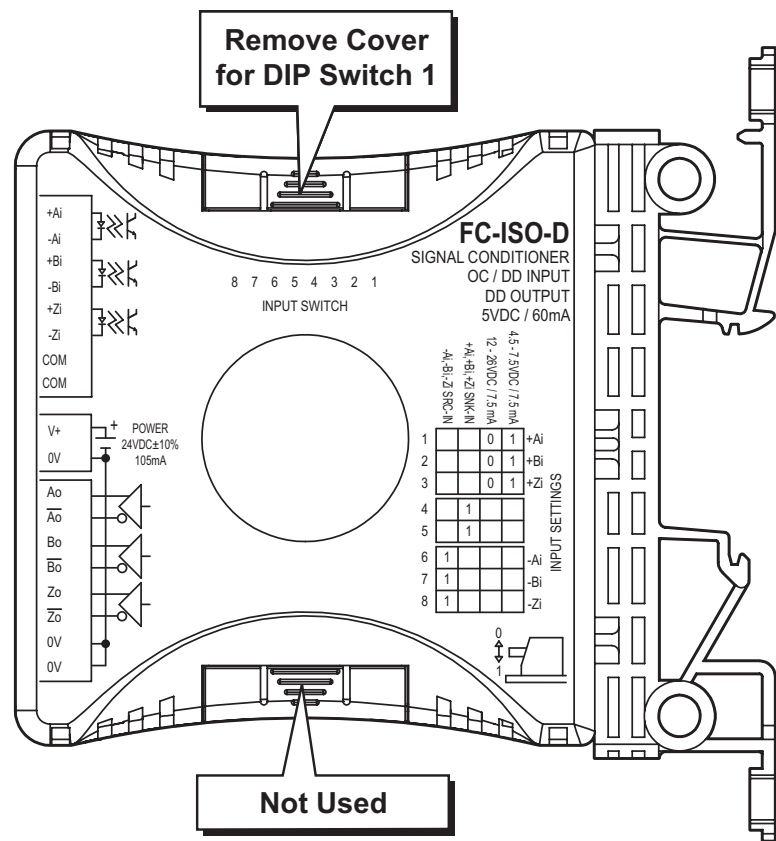
#### External Power Terminal Block

Faceplate Label	Description
V+	24VDC $\pm$ 10%
0V	0V Connection

#### Output Terminal Block

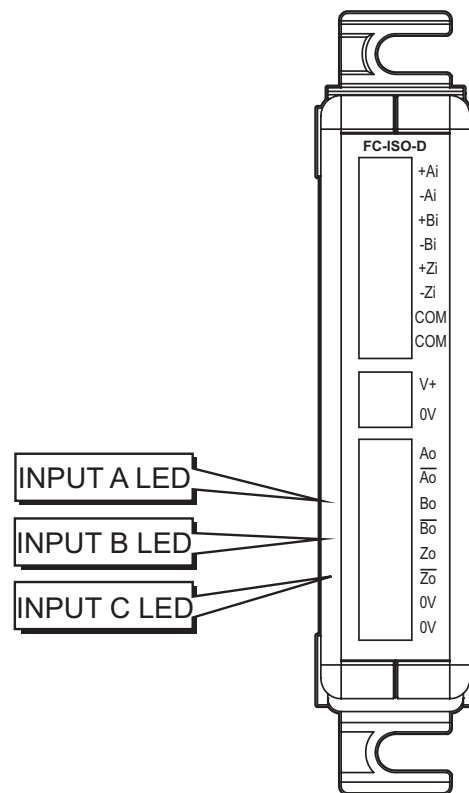
Faceplate Label	Description
Ao	A Output Non-Inverted
A $\bar{o}$	A Output Inverted
Bo	B Output Non-Inverted
B $\bar{o}$	B Output Inverted
Zo	Z Output Non-Inverted
Z $\bar{o}$	Z Output Inverted
0V	Output 0V Reference
0V	Output 0V Reference

## DIP Switch Settings



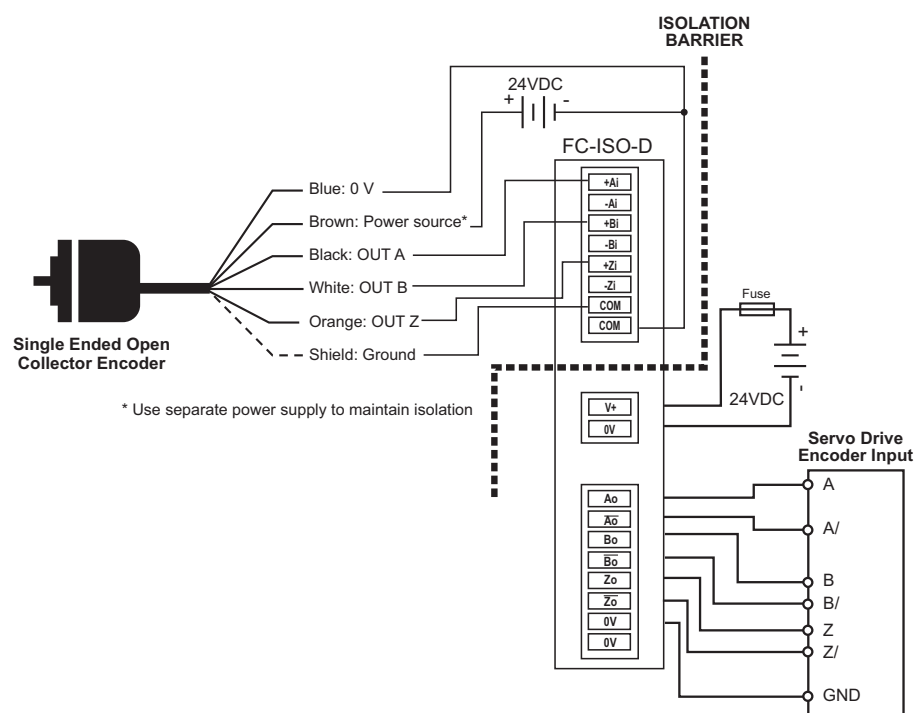
## Status Indicators

Status Indicators		
Indicator	Status	Description
Input A LED	On	Input A is receiving signal
	Off	No signal receiving on input channel A
Input B LED	On	Input B is receiving signal
	Off	No signal receiving on input channel B
Input Z LED	On	Input Z is receiving signal
	Off	No signal receiving on input channel Z



## Typical Application

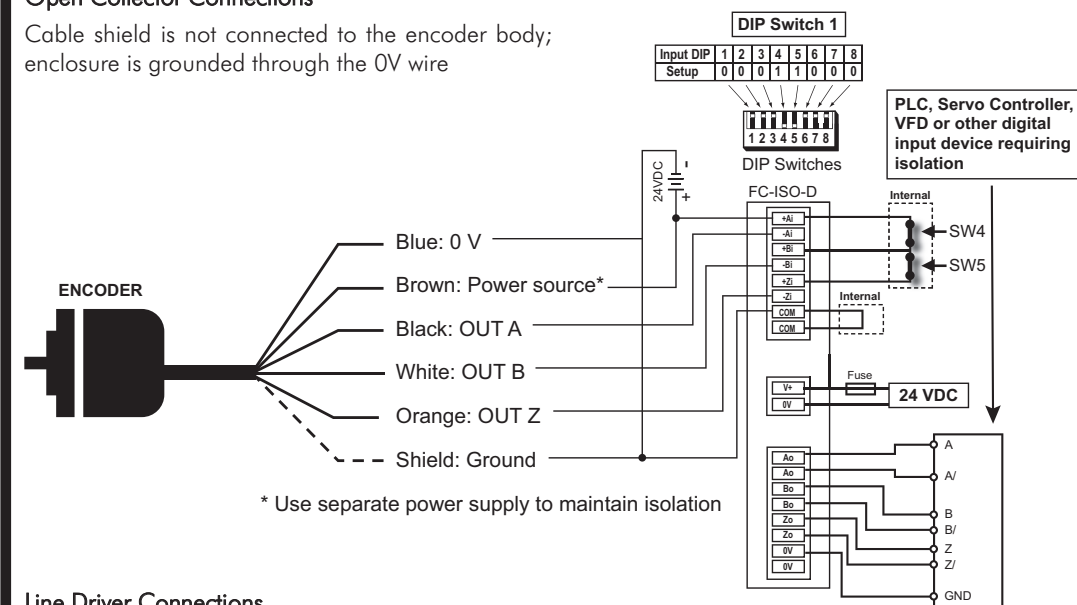
Convert a 24VDC single ended open collector encoder signal to a 5VDC differential line driver signal compatible with the encoder input on a servo drive.



## Typical Wiring Diagrams

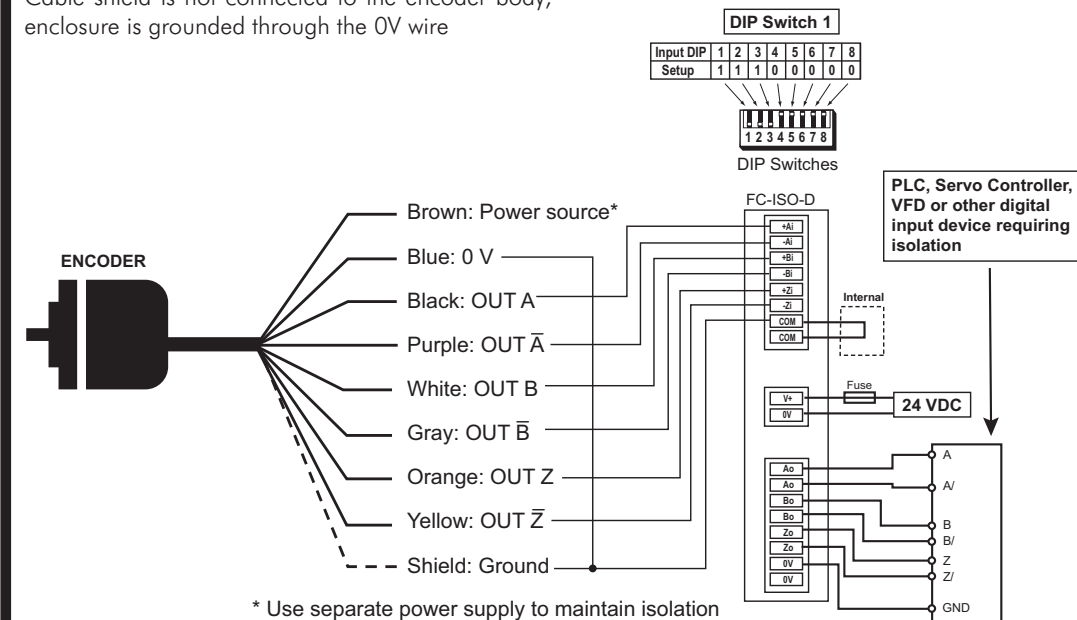
### Open Collector Connections

Cable shield is not connected to the encoder body; enclosure is grounded through the 0V wire



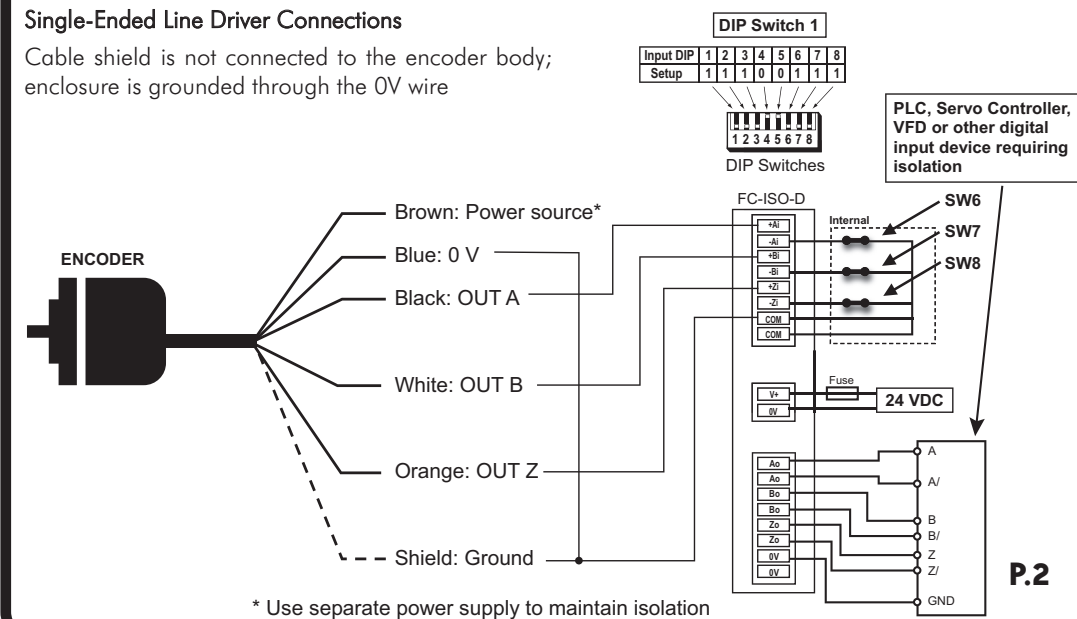
### Line Driver Connections

Cable shield is not connected to the encoder body; enclosure is grounded through the 0V wire



### Single-Ended Line Driver Connections

Cable shield is not connected to the encoder body; enclosure is grounded through the 0V wire



DIP Switch 1 - Switches 1, 2, 3			
Input Voltage Level Selection	1	2	3
4.5V - 7.5VDC Ai	1	-	-
12V - 26VDC Ai	0	-	-
4.5V - 7.5VDC Bi	-	1	-
12V - 26VDC Bi	-	0	-
4.5V - 7.5VDC Zi	-	-	1
12V - 26VDC Zi	-	-	0

DIP Switch 1 - Switches 4, 5			
Input Connection Options	4	5	
Internally Connect Ai+ to Bi+	1	-	
Internally Connect Bi+ to Zi+	-	1	
Internally Connect Ai+, Bi+, and Zi+	1	1	
No internal connection between Ai+, Bi+, Zi+	0	0	

Dip Switch 1 - Switches 6, 7, 8			
Input Connection Options	6	7	8
Internally Connect Ai- to COM	1	-	-
Internally Connect Bi- to COM	-	1	-
Internally Connect Zi- to COM	-	-	1
Internally Connect Ai-, Bi-, Zi- to COM	1	1	1
No internal connection from Ai+, Bi+, Zi+ to COM	0	0	0