FC-ISO-C Encoder Signal Conditioner and Optical Isolator - Open Collector Output

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860

Description:

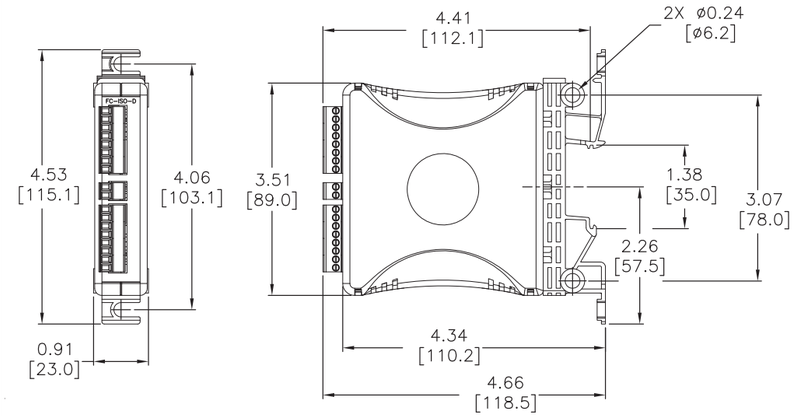
The FC-ISO-C high speed optical isolator module has the versatility to solve various interface problems between an incremental encoder signal and a PLC, servo drive, or other input device. Ideal for use with single ended (open collector, NPN, pull-up, push-pull, totem pole) or differential line driver 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-C has three complementary open collector outputs (A, B, Z, A-not, B-not, Z-not) rated for 5-36VDC that can be used in single ended configurations. The open collector output terminals can be connected to internal pull-up resistors through DIP switches for quick troubleshooting. 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-C module is UL508 listed and CE marked.

Specifications		
Input Specifications		
Input Voltage (DIP selectable)	4.5-7.5 VDC	12-26 VDC
Input Current	9mA typical, 18mA maximum	
Protection Type, Component	Surge, Suppressor Diode; Over current/temperature, Microprocessor	
Switching Threshold "0" Signal	< 2.2 VDC	< 3.9 VDC
Switching Threshold "1" Signal	> 2.6 VDC	> 4.8 VDC
Output Specifications		
Output Circuit	Open collector: 2-wire - floating or pull-up (DIP switch selectable); Sinking	
Output Rating	5-36VDC	
Continuous Output Current	65mA maximum	
Overcurrent Trip Level	76mA minimum	
Quiescent Current	25µA maximum	
Output Voltage Protection	Polarity reversal, surge voltage protection	
Output Current Protection	Short circuit/Over Current/Over Current Limiting/Thermal Shutdown on FC-ISO-C	
Timing Specifications		
Input to Output Response Time	1.3µs (max w/ 4.7k ohm internal pull-up resistor)	
Rise Time (t_{on} w/ 1k ohm Load)	250ns	
Fall Time (t_{off} w/ 1k ohm Load)	38ns	
Max Frequency Response w/ 1k ohm Load	1 MHz	
Rise Time (t_{on} w/ 2.2k ohm Load)	512ns	
Fall Time (t_{off} w/ 2.2k ohm Load)	56ns	
Max Frequency Response w/ 2.2k ohm Load	750kHz	
Rise Time (t_{on} w/ 4.7k Internal Pull-Up)	1.2µs	
Fall Time (t_{off} w/ 4.7k Internal Pull-Up)	25ns	
Max Frequency Response w/ 4.7k Internal Pull-Up	200kHz	
Terminal Block Specifications		
Number of Positions	2 pole (Dinkle: EC350V-02P), 8 pole (Dinkle: EC350V-08P)	
Wire Range	28-16AWG Solid or Stranded Conductor; Wire strip length 9/32" (6-7mm)	
Screw Size (Slotted)	M 2.5 size, 0.4 T x 2.5 W mm (Screwdriver part number DN-SS1)	
Screw Torque	1.7 inch-pounds (0.19 Nm)	

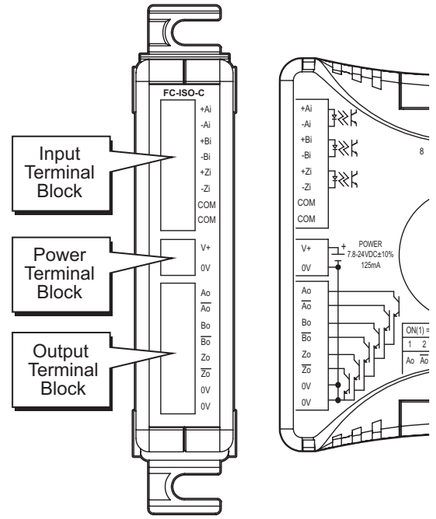
Specifications (continued)	
General Specifications	
External DC Power Required	7.8-24VDC ± 10% @ 125mA, 3.5W*
Power Dissipation Within Module	10W (maximum power with all outputs at max current and max voltage)
Thermal Dissipation	34.13 BTU/hr (1W = 3.413 BTU/hr)
Isolation	1800VAC input-output applied for 1 second
Mounting	35mm DIN Rail or panel mount (with no restrictions)
Operating Temperature	0 to 60°C (32 to 140°F) IEC 60068-2-14 (Test Nb, Thermal Shock)
Storage Temperature	-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)
Humidity	5 to 95% (non-condensing) IEC 60068-2-30 (Test Db, Damp Heat)
Environmental Air	No corrosive gases permitted (EN61131-2 pollution degree 1)
Vibration	MIL STD 810C 514.2 IEC 60068-2-6 (Test Fc)
Shock	MIL STD 810C 516.2 IEC 60068-2-27 (Test Ea)
Insulation Resistance	>10M Ω @ 500 VDC
Noise Immunity	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)
Weight	0.3 lbs
Agency Approvals	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

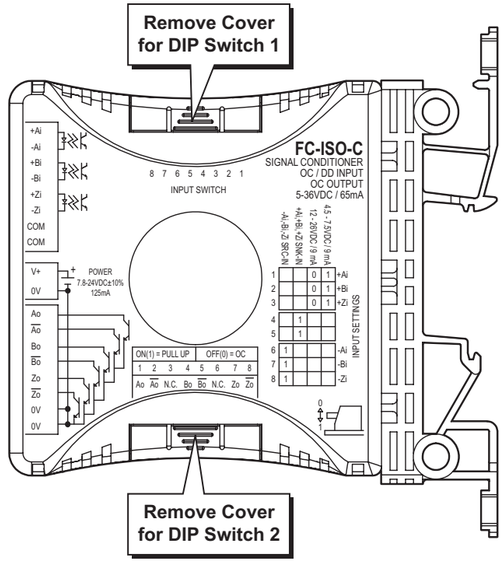


Input Terminal Block	
Faceplate Label	***Description***
+Ai	A Input Non-Inverted
-Ai	A Input Inverted
+Bi	B Input Non-Inverted
-Bi	B Input Inverted
+Zi	Z Input Non-Inverted
-Zi	Z Input Inverted
COM	Input Common
COM	Input Common

External Power Terminal Block	
Faceplate Label	***Description***
V+	7.8VDC to 24VDC ±10%
0V	0V Connection

Output Terminal Block	
Faceplate Label	***Description***
Ao	A Output Non-Inverted
$\overline{Ao}$	A Output Inverted
Bo	B Output Non-Inverted
$\overline{Bo}$	B Output Inverted
Zo	Z Output Non-Inverted
$\overline{Zo}$	Z Output Inverted
0V	Output 0V Reference
0V	Output 0V Reference

DIP Switch Settings



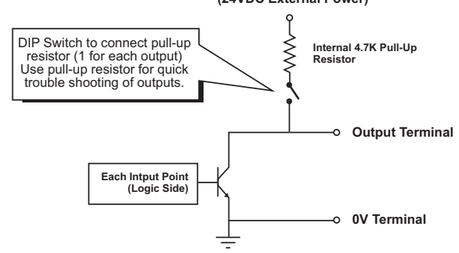
DIP Switch 1 - Switches 1, 2, 3			
Input Voltage Level Selection	*1*	*2*	*3*
4.5V - 7.5VDC Ai	1	-	-
12V - 26VDC Ai	0	-	-
4.5V - 7.5VDC Bi	-	1	-
12V - 26VDC Bi	-	0	-
4.5V - 7.5VDC Zi	-	-	1
12V - 26VDC Zi	-	-	0

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

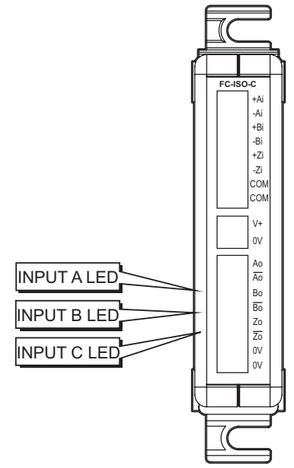
DIP Switch 2 - Switches 1 to 8 (see output equivalent circuit diagram)								
Output Settings	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Ao 4.7kΩ Pull-Up	1	-	-	-	-	-	-	-
Ao Open Collector	0	-	-	-	-	-	-	-
Ao NOT 4.7kΩ Pull-Up	-	1	-	-	-	-	-	-
Ao NOT Open Collector	-	0	-	-	-	-	-	-
Bo 4.7kΩ Pull-Up	-	-	-	1	-	-	-	-
Bo Open Collector	-	-	-	0	-	-	-	-
Bo NOT 4.7kΩ Pull-Up	-	-	-	-	1	-	-	-
Bo NOT Open Collector	-	-	-	-	0	-	-	-
Zo 4.7kΩ Pull-Up	-	-	-	-	-	-	1	-
Zo Open Collector	-	-	-	-	-	-	0	-
Zo NOT 4.7kΩ Pull-Up	-	-	-	-	-	-	-	1
Zo NOT Open Collector	-	-	-	-	-	-	-	0

Output Equivalent Circuit



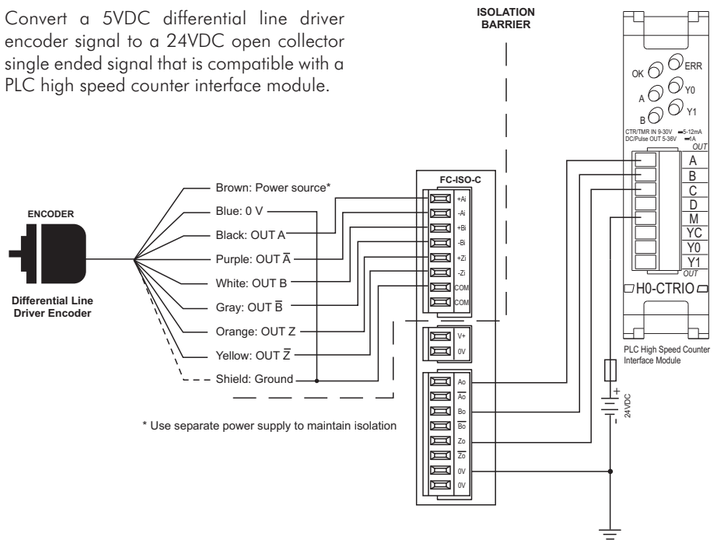
Status Indicators

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

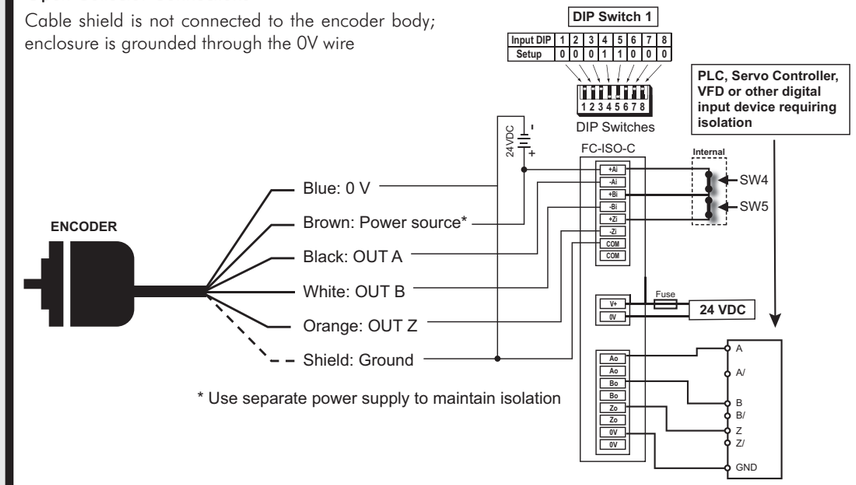
Convert a 5VDC differential line driver encoder signal to a 24VDC open collector single ended signal that is compatible with a PLC high speed counter interface module.



Typical Wiring Diagrams

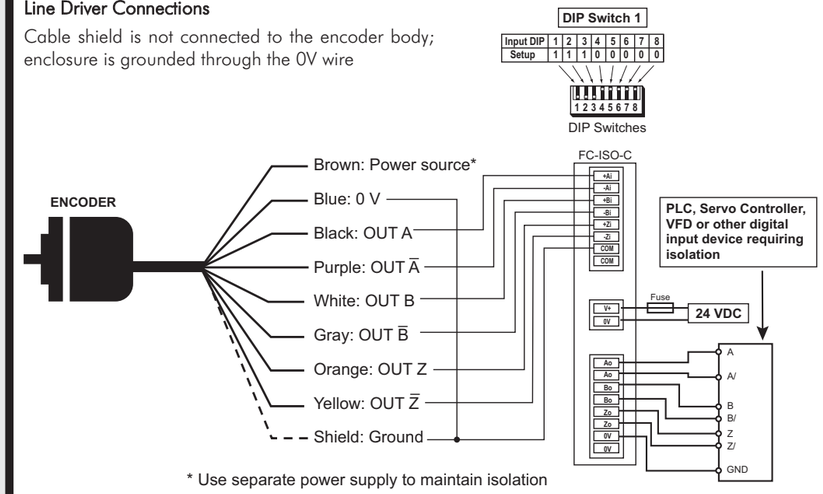
Open Collector Connections

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