FC-35B Unipolar Voltage or Current to Bipolar Voltage Signal Conditioner

Product Guide

AUTOMATIONDIRECT
3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860

Description:

The FC-35B is a DIN-rail or side-mount, selectable unipolar input to bipolar output signal conditioner with isolation between input and output, and isolation between 24-volt power and input/output. The FC-35B field configurable isolated signal conditioner is useful in eliminating ground loops and interfacing sensors to PLC analog input modules. It translates unipolar voltage inputs or current inputs to bipolar voltage outputs. The input and output signal levels are selected via DIP switches. In addition, the outputs can be either a direct conversion of the inputs or an inversion (a reverse acting operation). The user also has the option of customizing the input OFFSET (zero) and SPAN (full scale) adjustments that can be set to a percentage of the full scale via a pushbutton on the front panel.

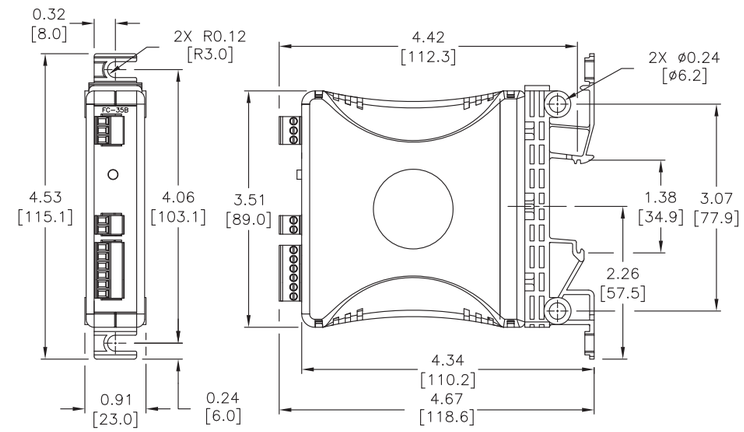
Version: Rev. A
September, 2014

Specifications	
Input Specifications	
Input Ranges	0-5V, 0-10V, 0-20 mA, 4-20 mA (DIP Switch Selectable/Invertable)
Input Impedance	410 kilohm voltage input, 250 ohm current input
Protection Type, Component	Polarity Protection Diode
External DC Power Required	24 VDC ±10%, 40 mA, Class 2
User Calibration Range	OFFSET (zero): 0-20% (e.g. 0-1.0V / 5V mode) SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1V / 5V mode)
Output Specifications	
Output Ranges	±50 mV, ±100 mV, ±5V, ±10V, ±15V
Load Impedance	2kilohm Minimum
Sample Duration Time	10 ms
Maximum Inaccuracy	0.1% FSO @ 25°C (1.0% 50 mV / 100 mV)
Accuracy vs. Temperature	±60 PPM of Full Scale/ °C Maximum
Output Current	±50 mV/±100 mV @ 2.5mA max, ±5V, ±10V, ±15V @ 7.5mA max
Terminal Block Specifications	
Field Wiring	Removable Screw Type Terminal Block
Number of Positions	2 (Dinkle: EC350V-02P), 3 (Dinkle: EC350V-03P), 6 (Dinkle: EC350V-06P)
Wire Range	28-14 AWG solid or stranded conductor; wire strip length 1/4" (6-7mm)
Screw Torque	1.7 inch-pounds (0.19 Nm)

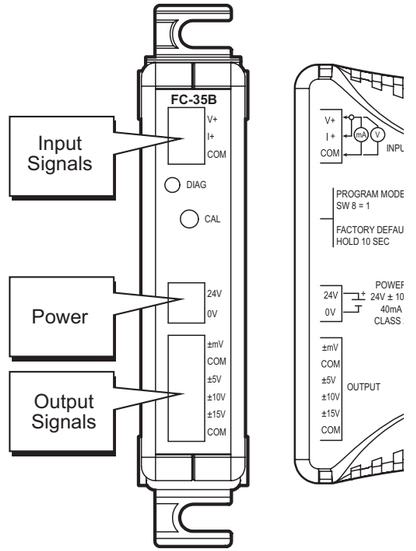
Specifications (continued)	
General Specifications	
Surrounding Air Temperature	0 to 60°C (32 to 140°F) IEC 60068-2-14 (Test Nb, Thermal Shock)
Storage Temperature	-20 to 70°C (-4 to 158°F) IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat) IEC 60068-2-14 (Test Na, Thermal Shock)
Humidity	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 @ 500 VDC
Noise Immunity	NEMA ICS3-304 IEC 61000-4-2 (ESD) Impulse 1000V @ 1µS pulse IEC 61000-4-4 (FTB) RFI, (145 MHz, 440 MHz 5W @ 15 cm) IEC 61000-4-3 (RFI)
Weight	0.3lbs
Isolation	1800 VDC Power to Input 1800 VDC Power to Output 1800 VDC Input to Output *applied for 1 second (100% tested)
Agency Approvals	UL508*, File Number: E157382, CE

**** In order to comply with UL508 Class 2 standards the supplied power must be less than 26 VDC and fused at a maximum of 3 amps.***

Dimensions
inches [mm]



Wiring Connections



Input Terminal Block	
Faceplate Label	***Description***
V+	Voltage In
I+	Current In
COM	Common

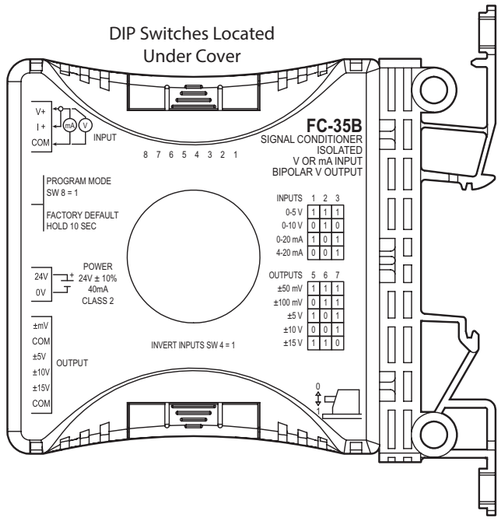
NOTE: V+ and I+ must be jumpered for Current input

External Power Terminal Block	
Faceplate Label	***Description***
24 V	24 VDC ±10% (Class 2)
0V	0V

Output Terminal Block	
Faceplate Label	***Description***
±mV	±50 mV or ±100 mV Output
COM	COM Connection (used with mV signals)
±5V	±5V Output
±10V	±10 V Output
±15V	±15 V Output
COM	COM Connection (used with non-mV signals)

Switch/LED Labels	
Faceplate Label	***Description***
DIAG	Diagnostic LED flashing indication
CAL	Push button switch input to initiate calibration, etc.

DIP Switch Settings

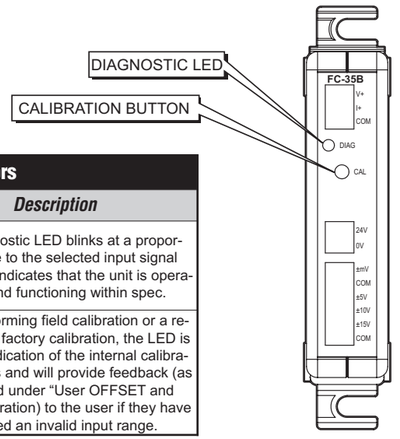


DIP Switch - 1, 2, 3			
Input Ranges	1	2	3
0-5V	1	1	1
0-10 V	0	1	0
0-20 mA	1	0	1
4-20 mA	0	0	1

DIP Switch - 5, 6, 7			
Output Ranges	5	6	7
±50 mV	1	1	1
±100 mV	0	1	1
±5V	1	0	1
±10 V	0	0	1
±15 V	1	1	0

DIP Switch - 4, 8		
Input Connection Options	4	8
Invert Acting	1	0
Calibration Enable	0	1

Status Indicators



Status Indicators		
Indicator	*Status*	*Description*
Diagnostic LED	Normal Operation	The Diagnostic LED blinks at a proportional rate to the selected input signal level. This indicates that the unit is operational and functioning within spec.
	Calibration	When performing field calibration or a restore to the factory calibration, the LED is used for indication of the internal calibration process and will provide feedback (as described under "User OFFSET and SPAN Calibration) to the user if they have selected an invalid input range.

User OFFSET and SPAN Calibration

Application adjustments to calibrate the input signal level:

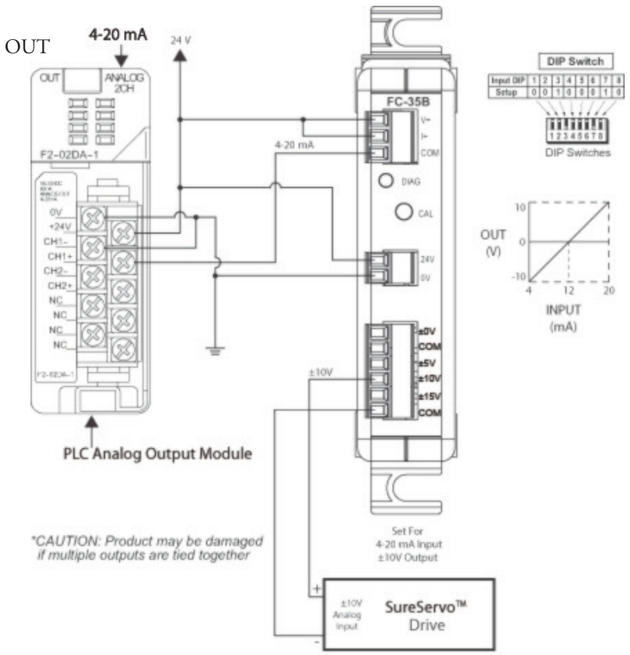
1) Select the input and output signal modes via the dipswitches.
2) Connect 24 volt power to the signal conditioner.
3) Connect the **minimum** (OFFSET) input signal level desired.
4) Move Switch 8 "CAL EN" to ON, press and hold the CAL pushbutton and release after approximately 3 seconds. The DIAG LED comes ON steady once pressed. If the pushbutton is held >3 seconds, the LED will turn off indicating the User Cal feature is no longer available. The unit returns to normal processing of input data and another press needs to occur to recapture the input minimum value if a User Cal is desired. If the pushbutton is released in <3 seconds, the minimum input value will not be captured and another press needs to occur. If the push button is pressed longer than 10 seconds, the unit will go into "Restore Factory Cal" mode.
5) If the input is within the user calibration, once the pushbutton is released at 3 seconds, the LED will flash 2-3 times. If the input is out of range, the LED will flash several times rapidly. If the out of range occurs, the input needs to be adjusted to the allowable range. In order to remove the User Cal, press and hold the pushbutton for > 10 seconds.
6) Move the Switch 8 "Cal En" to OFF. Connect the maximum (SPAN) input signal level desired and repeat steps 4 and 5.
7) Move Switch 8 "CAL EN" to OFF.

Restore Factory Calibration

1) Move switch 8 "CAL EN" to ON, press and hold CAL pushbutton. Once the push button is held and released after 10 seconds, the LED will flash several times indicating a valid restore has taken place. The unit has now been returned to factory calibration. If the push button is released before the 10 seconds has expired, the press will be ignored and go back to regular signal processing based on previous calibration coefficients.
2) Move Switch 8 "CAL EN" to OFF.
3) Start conversion with no power cycle required.

Typical Application #1

DC Motor Drive
4-20 mA IN to ±10 V OUT



Typical Application #2

4-20 mA IN to ±10V OUT