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





#### **Overview**

The <u>FC-35B</u> is a 35mm 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 <u>FC-35B</u> 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 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.



Click on the above thumbnail or go to https://www.automationdirect.com/VID-PS-0003 for a short introductory video for the FC Series Signal Conditioners.

Spo	<b>Specifications</b>			
	ut Specifications			
Input Ranges	0-5V, 0-10 V, 0-20 mA, 4-20 mA (DIP Switch Selectable/Invertable)			
Input Impedance	410kΩ voltage input, 250Ω current input			
Protection Type, Component	Polarity Protection Diode			
External DC Power Required	24VDC ±10%, 40mA, 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)			
Outp	ut Specifications			
Output Ranges	±50 mV, ±100 mV, ±5V, ±10 V, ±15 V			
Load Impedance	2.5kΩ minimum on $\pm$ 50mV and $\pm$ 100mV Range 2kΩ minimum on $\pm$ 5V, $\pm$ 10V and $\pm$ 15V Range			
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, ±10 V, ±15 V @ 7.5mA max			
Terminal	Block Specifications			
	Removable Screw Type Terminal Blocks			
Field Wiring  Number of Positions	(Included) 2 (Dinkle: EC350V-02P), 3 (Dinkle: EC350V-03P),			
Wire Range	6 (Dinkle: EC350V-06P)  28-14 AWG solid or stranded conductor;			
	wire strip length 1/4" (6-7mm)			
Screw Torque 1.7 inch-pounds (0.19 Nm)				
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)			
Enclosure Rating IP20				
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 @ 500VDC			
Noise Immunity	NEMA ICS3-304 IEC 61000-4-2 (ESD) Impulse 1000 V @ 1µS pulse IEC 61000-4-4 (FTB) RFI, (145 MHz, 440 MHz 5W @ 15 cm) IEC 61000-4-3 (RFI)			
Weight	0.3lbs			
Isolation	1000VDC Power to Input 1800VDC Power to Output 1800VDC Input to Output applied for 1 second (100% tested)			
Agency Approvals UL508*, File Number: E157382, CE				
* In order to comply with UL508, the supplied power must be less than 26VDC and				

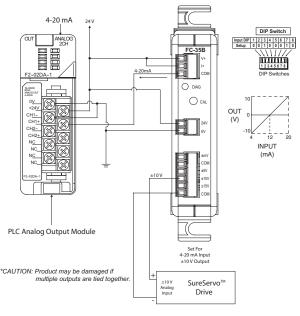
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fused at a maximum of 3 amps.

## FC-35B Applications and Dimensions

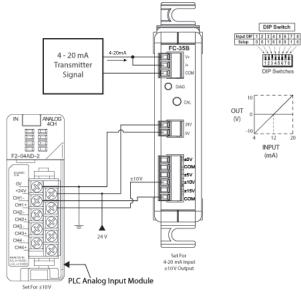
#### **Application Example 1**

Use the  $\underline{FC-35B}$  to convert a unipolar output from a PLC analog card to a bipolar  $\pm 10$ VDC signal to control a SureServo's External Velocity Command.



#### **Application Example 2**

Use the <u>FC-35B</u> to convert and isolate a unipolar output from a 4-20 mA sensor or transmitter to a bipolar  $\pm 10$ VDC signal for a PLC input.



\*CAUTION: Product may be damaged if multiple outputs are tied together

### **Wiring Connections**

<b>Input Terminal Block</b>		
Faceplate Description		
V+	Voltage In	
<i>I</i> +	Current In	
СОМ	Common	

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

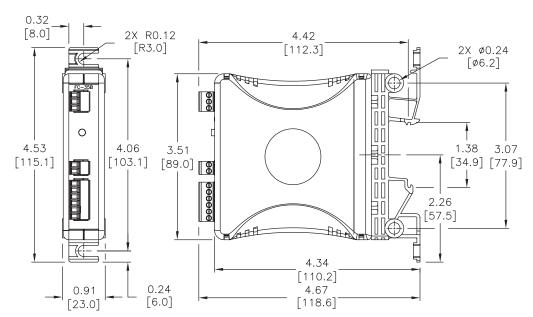
Output Terminal Block		
Faceplate Label	Description	
±mV	±50 mV or ±100 mV Output	
COM	COM Connection (used with mV signals)	
±5V	±5V Output	
±10 V	±10V Output	
±15 V	±15V Output	
сом	COM Connection (used with non-mV signals)	

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

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

#### **Dimensions**

inches [mm]



# FC-B34 Bipolar Voltage to Unipolar Voltage or Current Signal Conditioner

\$220.00





#### **Overview**

The <u>FC-B34</u> is a 35mm DIN-rail or side-mount, selectable bipolar input to unipolar output signal conditioner with isolation between input and output, and isolation between 24 volt power and input/output. The <u>FC-B34</u> field configurable isolated signal conditioner is useful in eliminating ground loops and interfacing sensors to PLC analog input modules. It translates bipolar voltage input to unipolar voltage output or bipolar voltage input to a current output. 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 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.



Click on the above thumbnail or go to https://www.automationdirect.com/VID-PS-0003 for a short introductory video for the FC Series Signal Conditioners.

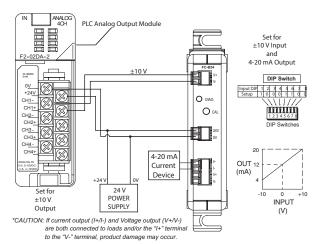
Input Specifications	<b>Specifications</b>					
15V, ±10V, ±5V, ±100mV, ±50mV						
Input Impedance	INI					
100mW = 2.68 kQ, 50mW = 1.27 kQ, -50mW = 1.19 kd, -100mW = 2.29 kQ, -50 = 8.07 kQ, -10V = 7.76 kQ, -15V = 7.64 kQ, -15V = 7	Input Ranges					
24VDC ±10%, 50mA, Class 2 OFFSET (zero): 0.20% (e.g4V 1 ±5V mode)	Input Impedance	100mV = 2.69kΩ, 50mV = 1.27kΩ, -50mV = 1.19k -100mV = 2.29kΩ, -5V = 8.07kΩ, -10V = 7.76kΩ				
OFFSET (zero): 0-20% (e.g4V / ±5V mode)	Protection Type, Component	Polarity Protection Diode				
SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1V / ±5V mode)	External DC Power Required					
Output Ranges   O-5V, 0-10 V, 0-20 mA, 4-20 mA (DIP Switch Selectable)	User Calibration Range	SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1V / ±5V				
DIP Switch Selectable   2κΩ Minimum, Voltage Output   550Ω Maximum, Current Output   550Ω Maximum, Current Output   550Ω Maximum, Current Output   550Ω Maximum, Current Output   1.5% FSO (±150*, ±10V, ±5V Inputs),   1.5% FSO (±150*, ±10V*, ±5V Inputs) @ 25°C   4ccuracy vs. Temperature   +/-60 PPM of Full Scale/ °C Maximum   21mA max for mA-Out mode   10mA max for Volt-out mode   10mA max for Volt-out mode   2 (Dinkle: EC350V-02P) a (Dinkle: EC350V-02P)   4 (Dinkle: EC350V-02P)   4 (Dinkle: EC350V-02P)   4 (Dinkle: EC350V-04P)   2 (Dinkle: EC350V-04P)   2 (Dinkle: EC350V-04P)   4 (Dinkle	Out					
Load Impedance     550Ω Maximum, Current Output       Sample Duration Time     10ms       Maximum Inaccuracy     0.1% FSO (±15V, ±10V, ±5V Inputs), 1.5% FSO (±100mV, ±50mV Inputs) @ 25°C       Accuracy vs. Temperature     +/-60 PPM of Full Scale/ °C Maximum       Output Current     21mA max for Ma-Out mode/ 10mA max for Volt-out mode       Terminal Block Specifications       Field Wiring     Removable Screw Type Terminal Blocks, (included Conductor, Wire EC350V-02P), 2 (Dinkle: EC350V-02P), 4 (Dinkle: EC350V-02P), 4 (Dinkle: EC350V-04P)       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)       General Specifications       Surrounding Air Temperature     1EC 60068-2-14 (Test Nb, Thermal Shock)       Elec 60068-2-14 (Test Nb, Thermal Shock)     -20 to 70°C (-4 to 158°F)       IEC 60068-2-14 (Test Nb, Thermal Shock)     1EC 60068-2-14 (Test Nb, Thermal Shock)       Enclosure Rating     IP20       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)       Wibration     MIL STD 810C 514.2       IEC 60068-2-27 (Test Ea)       Insulation Resistance     >10MQ @ 500VDC       Noise Immunity     REC 61000-4-2 (ESD)       Impulse 1000V @ 1µS pulse IEC 61000-4-2 (ESD) <th>Output Ranges</th> <th>(DIP Switch Selectable)</th>	Output Ranges	(DIP Switch Selectable)				
Maximum Inaccuracy         0.1% FSO (±15V, ±10V, ±5V Inputs), 1.5% FSO (±100mV, ±50mV Inputs) @ 25°C           Accuracy vs. Temperature         +/-60 PPM of Full Scale/ °C Maximum           Output Current         21mA max for mA-Out mode/ 10mA max for Volt-out mode           Terminal Block Specifications         Removable Screw Type Terminal Blocks, (included Quality 10mA max for Volt-out mode           Number of Positions         Removable Screw Type Terminal Blocks, (included Quality 10mA max for Volt-out mode)           Number of Positions         2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P)           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)           General Specifications         0 to 60°C (32 to 140°F)           Surrounding Air Temperature         0 to 60°C (32 to 140°F)           EC 60068-2-14 (Test Nb, Thermal Shock)         -20 to 70°C (-4 to 158°F)           IEC 60068-2-14 (Test Nb, Thermal Shock)         P. 10 to 60°68-2-14 (Test Nb, Thermal Shock)           Enclosure Rating         IP20           Humidity         5 to 95% (non-condensing)           IEC 60068-2-14 (Test Nb, Thermal Shock)         P. 10 to 60°C (-4 to 158°F)           Environmental Air         No corrosive gases permitted (EN61131-2 pollution degree 1)           Wibration         MIL STD 810C 516.2           IEC 60068-2-2	Load Impedance					
1.5% FSO ( ±100mV, ±50mV Inputs) @ 25°C	Sample Duration Time	10ms				
Accuracy vs. Temperature	Maximum Inaccuracy					
21mA max for mA-Out mode/ 10mA max for Volt-out mode   10mA max for Vol						
Terminal Block Specifications	Accuracy vs. Temperature					
Field Wiring         Removable Screw Type Terminal Blocks, (included Number of Positions           Number of Positions         2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P) 4 (Dinkle: EC350V-04P)           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)           General Specifications           Surrounding Air Temperature         0 to 60°C (32 to 140°F)           IEC 60068-2-14 (Test Nb, Thermal Shock)         -20 to 70°C (-4 to 158°F)           IEC 60068-2-1 (Test Ab, Cold)         IEC 60068-2-1 (Test Ab, Cold)           IEC 60068-2-1 (Test Ab, Cold)         IEC 60068-2-1 (Test Db, Damp Heat)           Enclosure Rating         IP20           Humidity         5 to 95% (non-condensing)           IEC 60068-2-30 (Test Db, Damp Heat)         No corrosive gases permitted           Environmental Air         No corrosive gases permitted           Vibration         MIL STD 810C 514.2           IEC 60068-2-6 (Test Fc)         MIL STD 810C 516.2           IEC 60068-2-27 (Test Ea)         Image: No control of the permitted properties of the permitted properti	Output Current					
2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P)	Termina	al Block Specifications				
Wire Range   28-14 AWG solid or stranded conductor; wire strip length 1/4" (6-7mm)	Field Wiring	Removable Screw Type Terminal Blocks, (included)				
Wire Hange         wire strip length 1/4" (6-7mm)           Screw Torque         1.7 inch-pounds (0.19 Nm)           General Specifications           Surrounding Air Temperature         0 to 60°C (32 to 140°F)           IEC 60068-2-14 (Test Nb, Thermal Shock)         -20 to 70°C (-4 to 158°F)           IEC 60068-2-1 (Test Ab, Cold)         IEC 60068-2-1 (Test Bb, Dry Heat)           IEC 60068-2-1 (Test Na, Thermal Shock)         IP20           Humidity         5 to 95% (non-condensing)           IEC 60068-2-30 (Test Db, Damp Heat)         No corrosive gases permitted (EN61131-2 pollution degree 1)           Wibration         MIL STD 810C 514.2           IEC 60068-2-6 (Test Fc)         MIL STD 810C 516.2           IEC 60068-2-7 (Test Ea)         IEC 60068-2-17 (Test Ea)           Insulation Resistance         >10MΩ @ 500VDC           NeMA ICS3-304         IEC 61000-4-2 (ESD)           Impulse 1000V @ 1µS pulse         IEC 61000-4-2 (ESD)           Impulse 1000V @ 1µS pulse         IEC 61000-4-3 (RFI)           Weight         0.3lbs           1800VDC Power to Input         1800VDC Power to Output           1800VDC Power to Output         1800VDC Power to Output           1800VDC Power to Output         1800VDC Rested)           Weight         UL508*, File Number: E157382, CE  <	Number of Positions	2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P), 4 (Dinkle: EC350V-04P)				
Surrounding Air Temperature	Wire Range					
O to 60°C (32 to 140°F)     IEC 60068-2-14 (Test Nb, Thermal Shock)    -20 to 70°C (-4 to 158°F)     IEC 60068-2-1 (Test Ab, Cold)     IEC 60068-2-1 (Test Bb, Dry Heat)     IEC 60068-2-1 (Test Na, Thermal Shock)     IEC 60068-2-14 (Test Na, Thermal Shock)     IEC 60068-2-14 (Test Na, Thermal Shock)     IEC 60068-2-30 (Test Db, Damp Heat)     IEC 60068-2-6 (Test Fc)     IEC 60068-2-6 (Test Fc)     IEC 60068-2-27 (Test Ea)     IEC 60068-2-27 (Test Ea)     IEC 60068-2-27 (Test Ea)     IEC 61000-4-2 (ESD)     Impulse 1000V @ 1µS pulse     IEC 61000-4-2 (ESD)     Impulse 1000V @ 1µS pulse     IEC 61000-4-3 (RFI)     IEC 61000-4-3 (R	Screw Torque 1.7 inch-pounds (0.19 Nm)					
IEC 60068-2-14 (Test Nb, Thermal Shock)   -20 to 70°C (-4 to 158°F)     IEC 60068-2-1 (Test Ab, Cold)     IEC 60068-2-1 (Test Ab, Told)     IEC 60068-2-1 (Test Ab, Told)     IEC 60068-2-1 (Test Ab, Told)     IEC 60068-2-1 (Test Ab, Thermal Shock)     IEC 60068-2-14 (Test Na, Thermal Shock)     IEC 60068-2-14 (Test Na, Thermal Shock)     IEC 60068-2-30 (Test Db, Damp Heat)     IEC 610131-2 pollution degree 1)     IEC 60068-2-6 (Test Fc)     IEC 60068-2-6 (Test Fc)     IEC 60068-2-7 (Test Ea)     IEC 60068-2-7 (Test Ea)     IEC 61000-4-2 (ESD)     Impulse 1000V @ 1μS pulse     IEC 61000-4-2 (ESD)     Impulse 1000V @ 1μS pulse     IEC 61000-4-3 (RFI)     IEC 61000-4-3 (	Gen	eral Specifications				
IEC 60068-2-1 (Test Ab, Cold)   IEC 60068-2-1 (Test Bb, Dry Heat)   IEC 60068-2-14 (Test Na, Thermal Shock)	Surrounding Air Temperature					
Sto 95% (non-condensing)     IEC 60068-2-30 (Test Db, Damp Heat)     Environmental Air	Storage Temperature	IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat)				
IEC 60068-2-30 (Test Db, Damp Heat)	Enclosure Rating	IP20				
CEN61131-2 pollution degree 1	Humidity					
MIL STD 810C 514.2   IEC 60068-2-6 (Test Fc)	Environmental Air					
IEC 60068-2-27 (Test Ea)     Insulation Resistance	Vibration					
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)	Shock	MIL STD 810C 516.2				
IEC 61000-4-2 (ESD)	Insulation Resistance	>10MΩ @ 500VDC				
Isolation  1800VDC Power to Input 1800VDC Power to Output 1800VDC Input to Output 1800VDC Input to Output applied for 1 second (100% tested)  UL508*, File Number: E157382, CE	Noise Immunity	IEC 61000-4-2 (ESD) Impulse 1000V @ 1μS pulse IEC 61000-4-4 (FTB) RFI, (145 MHz, 440 MHz 5W @ 15 cm)				
Isolation  1800VDC Power to Output 1800VDC Input to Output applied for 1 second (100% tested)  Agency Approvals  UL508*, File Number: E157382, CE	Weight	0.3lbs				
	Isolation	1800VDC Power to Output 1800VDC Input to Output				
* Landard Control   10   11   200   10   10   11   11   1						
* In order to comply with UL508, the supplied power must be less than 26VDC and fused at a maximum of 3 amps.		e supplied power must be less than 26VDC and				

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# FC-B34 Applications and Dimensions

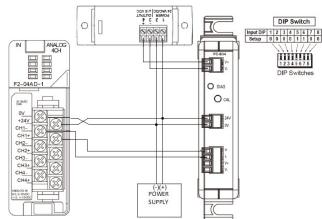
## **Application Example 1**

The  $\underline{\text{FC-B34}}$  can be used to convert a bipolar  $\pm 10 \text{VDC}$  signal to a 4-20 mA signal.



#### **Application Example 2**

The  $\underline{FC-B34}$  can be used to convert the bipolar  $\pm 10 \text{VDC}$  from a DCT100-10B-24S current transducer to a 4-20 mA or 0-10 VDC that can be used by a PLC.



#### **Wiring Connections**

Input Terminal Block			
Faceplate Description			
V+	Signal In +		
V-	Signal In -		

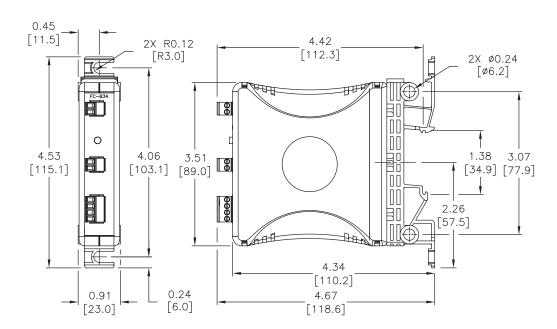
Output Terminal Block		
Faceplate Description		
/+ Current		
I-	Current	
V+	Voltage	
V-	Voltage	

Externa	l Power Terminal	
Block		
Faceplate Label	Description	
24 V	24VDC ±10% (Class 2)	
OV	0V	

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

#### **Dimensions**

inches [mm]



## **FC Series Accessories**





FC-35MM

### **Description**

Universal terminal block replacements for the FC Series signal conditioners. Each packcage includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

	FC Series Terminal Blocks			
FC Series Model	Terminal Block Replacement Part Number	Package Includes		
FC-11				
FC-33	EO EMM	(2) 2-pole blocks		
FC-R1	FC-5MM	(2) 3-pole blocks (1) 4-pole blocks		
FC-T1		(.) . ps.o blooks		
FC-ISO-C				
FC-ISO-D		(6) 2-pole blocks		
FC-B34		(2) 3-pole blocks		
FC-35B	FC-35MM	(2) 4-pole blocks (1) 5-pole blocks		
FC-P3		(1) 6-pole blocks		
FC-3RLY2		(2) 8-pole blocks		
FC-3RLY4				

Note: Depending on the model, some terminal blocks in the package may be unused.

Universal Signal Conditioners				
Part No.		Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

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