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





#### **Overview**

The FC-35B is a 35 mm 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 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.



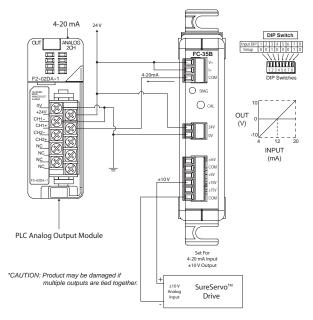
Click on the above thumbnail or go to
PS-0003 for a short
introductory video for the FC Series Signal Conditioners.

Input   Imput   Imput   Imput   Imput   Protection Type, Component   Polarity Protection Diode				
O-5V, O-10 V, O-20 mA, 4-20 mA (DIP Switch Selectable/Invertable Input Impedance   410 kilohm voltage input, 250 ohm curinput   Protection Type, Component   Polarity Protection Diode   External DC Power Required   24 VDC ±10%, 40 mA, Class 2   OFFSET (zero): 0-20% (e.g. 0-1.0V / 5V SPAN (full-scale): 80-102% (e.g. 4.0-5.1V mode)   SPAN (full-scale): 80-102% (e.g. 4.0-5.1V mode)   Output Specifications   ±50 mV, ±100 mV, ±5V, ±10 V, ±15				
Input Impedance   410 kilohm voltage input, 250 ohm curinput				
Input   Protection Type, Component   Polarity Protection Diode	)			
External DC Power Required  24 VDC ±10%, 40 mA, Class 2 OFFSET (zero): 0-20% (e.g. 0-1.0V / 5V SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1V mode)  Output Specifications  Output Ranges  ±50 mV, ±100 mV, ±5V, ±10 V, ±15 V 2KΩ minimum on ±50mV and ±100mV 2KΩ minimum on ±50mV and ±150 M 5 M 2KΩ minimum on ±50 M 5 0 mV / 100 M 5 0 mV / 100 M 5 0 mV / 100 M 6 PM of Full Scale / °C Maximum Inaccuracy  Output Current  Terminal Block Specifications  Field Wiring  Removable Screw Type Terminal Block (Included) 2 (Dinkle: EC350V-06P) Wire Range  1.7 inch-pounds (0.19 Nm)  General Specifications  Surrounding Air Temperature  10 0 0 60°C (32 to 140°F) IEC 60068-2-14 (Test Nb, Thermal She) IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat	410 kilohm voltage input, 250 ohm current input			
OFFSET (zero): 0-20% (e.g. 0-1.0V / 5V)         SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1V mode)         Output Specifications         Output Ranges       ±50 mV, ±100 mV, ±5V, ±10 V, ±15         Load Impedance       2.5KΩ minimum on ±50mV and ±100mV 2KΩ minimum on ±5V, ±10V and ±15V for an expensive state of the second of the	Polarity Protection Diode			
SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1V mode)   Output Specifications				
Output Specifications         Output Ranges       ±50 mV, ±100 mV, ±5V, ±10 V, ±15 V, V	OFFSET (zero): 0-20% (e.g. 0-1.0V / 5V mode) SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1V / 5V			
Dutput Ranges				
Load Impedance   2.5KΩ minimum on ±50mV and ±100mV 2KΩ minimum on ±50, ±10V and ±15V F 3 ample Duration Time   10 ms				
Maximum Inaccuracy  Accuracy vs. Temperature  Output Current  Edo PPM of Full Scale / °C Maximum  ### 150 mV/±100 mV @ 2.5mA max ### 250 mV/±100 mV @ 2.5mA max ### 550 mV/±100 mV @ 2.5mA max ### 150 mV/±100 mV @ 2.5mA	Range			
### Accuracy vs. Temperature  Output Current  ### 50 mV/±100 mV @ 2.5mA max, ±5V, ±10 V, ±15 V @ 7.5mA max £5V, ±10 V, ±10 V @ 7.5mA max £5V, ±10 V @ 7.5mA				
### Doutput Current  ### 100 mV @ 2.5mA max,  ### 250, ### 100 mV @ 2.5mA max,  ### 250, ### 100, ### 1250 mV, ### 150 mV, ###				
### ### ##############################				
Removable Screw Type Terminal Blo (Included)  2 (Dinkle: EC350V-02P), 3 (Dinkle: EC 03P), 6 (Dinkle: EC350V-06P)  Wire Range  28-14 AWG solid or stranded conduct wire strip length 1/4" (6-7mm)  Screw Torque  1.7 inch-pounds (0.19 Nm)  General Specifications  Surrounding Air Temperature  1 0 to 60°C (32 to 140°F) IEC 60068-2-14 (Test Nb, Thermal Sh -20 to 70°C (-4 to 158°F) IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat				
Company   Comp				
2 (Dinkle: EC350V-02P), 3 (Dinkle: EC. 03P), 6 (Dinkle: EC350V-06P)	Removable Screw Type Terminal Blocks			
Wire Range         28-14 AWG solid or stranded conduct 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 Sh           -20 to 70°C (-4 to 158°F) IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat	350V-			
Screw Torque	tor;			
General Specifications  Surrounding Air Temperature  0 to 60°C (32 to 140°F) IEC 60068-2-14 (Test Nb, Thermal Sh -20 to 70°C (-4 to 158°F) IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat				
Surrounding Air Temperature         0 to 60°C (32 to 140°F)           IEC 60068-2-14 (Test Nb, Thermal Sh           -20 to 70°C (-4 to 158°F)           IEC 60068-2-1 (Test Ab, Cold)           IEC 60068-2-2 (Test Bb, Dry Heat				
Surrounding Air Temperature  IEC 60068-2-14 (Test Nb, Thermal Sh  -20 to 70°C (-4 to 158°F)  IEC 60068-2-1 (Test Ab, Cold)  IEC 60068-2-2 (Test Bb, Dry Heat				
Storage Temperature IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat	ock)			
IEC 60068-2-14 (Test Na, Thermal Sh				
Enclosure Rating IP20	· · · · · · · · · · · · · · · · · · ·			
Humidity 5 to 95% (non-condensing) IEC 60068-2-30 (Test Db, Damp He	at)			
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				
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 α IEC 61000-4-3 (RFI)	cm)			
Weight 0.3lbs				
1000 VDC Power to Input 1800 VDC Power to Output 1800 VDC Input to Output 1800 VDC Input to Output applied for 1 second (100% tested				
Agency Approvals UL508*, File Number: E157382, C	l)			
* In order to comply with UL508, the supplied power must be less than 26 and fused at a maximum of 3 amps.	Ē			

# FC-35B Applications and Dimensions

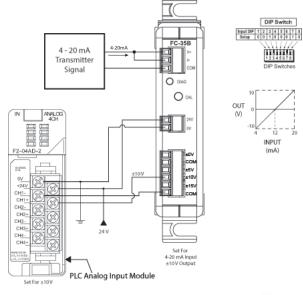
### **Application Example 1**

Use the 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 FC-35B 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	
l+	Current In	
СОМ	Common	

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

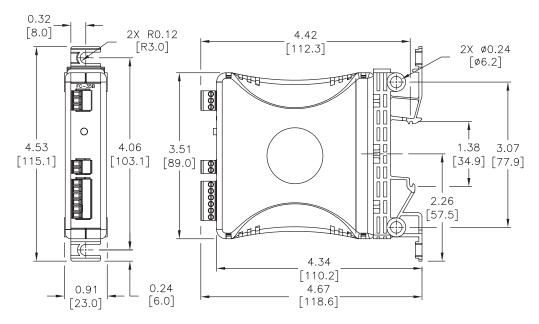
Output Terminal Block			
Faceplate Description			
±mV	±50 mV or ±100 mV Output		
СОМ	COM Connection (used with mV signals)		
±5V	±5V Output		
±10 V	±10 V Output		
±15 V	±15 V Output		
СОМ	COM Connection (used with non-mV signals)		

External Power Terminal Block			
Faceplate 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





#### **Overview**

The FC-B34 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 FC-B34 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.



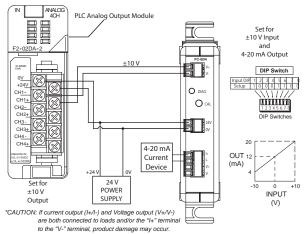
Click on the above thumbnail or go to
PS-0003 for a short
introductory video for the FC Series Signal Conditioners.

## Protection Type, Component External DC Power Required    Polarity Protection Diode   24VDC ±10%, 50mA, Class 2	0			
Input Ranges				
Input Impedance	Input			
Input Impedance	Input Ranges	(DIP Switch Selectable)		
External DC Power Required  User Calibration Range  OFFSET (zero): 0-20% (e.g4V / ±5V mos SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1 ±5V mode)  Output Specifications  Output Ranges  O-5V, 0-10 V, 0-20 mA, 4-20 mA (DIP Switch Selectable)  Load Impedance  Sample Duration Time  10 ms  Maximum Inaccuracy Accuracy vs. Temperature  Output Current  Output Current  Output Current  Terminal Block Specifications  Field Wiring  Removable Screw Type Terminal Blocks (included)  Output Current  Output Current  1.7 inch-pounds (0.19 km)  Screw Torque  1.7 inch-pounds (0.19 km)  General Specifications  Surrounding Air Temperature  1.7 inch-pounds (0.19 km)  General Specifications  Surrounding Air Temperature  IEC 60068-2-14 (Test Nb, Thermal Shoctobes-2-14 (Tes	Input Impedance	500Ω maximum for ranges ±100mV and		
OFFSET (zero): 0-20% (e.g4V / ±5V mos   SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1 ±5V mode)     Output Ranges	Protection Type, Component	Polarity Protection Diode		
SPAN (full-scale): 80-102% (e.g. 4.0 - 5.1 ±5V mode)     Output Specifications   O-5V, 0-10 V, 0-20 mA, 4-20 mA (DIP Switch Selectable)     Load Impedance   2KΩ Minimum, Voltage Output 550ΩMaximum, Current Output Sample Duration Time   10 ms     Maximum Inaccuracy   0.1% FSO (±15V, ±10V, ±5V Inputs), 1.5% FSO (±100mV, ±50mV Inputs) @ 2     Accuracy vs. Temperature   +/-60 PPM of Full Scale/ °C Maximum Output Current   21mA max for vA-Out mode   10mA max for Volt-out mode   10mA max for Volt-out mode   2 (Dinkle: EC350V-02P), 3 (Dinkle: EC350V-02P), 4 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P), 3 (Dinkle: EC350V-02P), 3 (Dinkle: EC350V-02P), 4 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P),	External DC Power Required			
Dutput Ranges   0-5V, 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 mode)		
Comparison   Co	Output Specifications			
Sample Duration Time   10 ms	Output Ranges	(DIP Switch Selectable)		
Maximum Inaccuracy       0.1% FSO (±15V, ±10V, ±5V Inputs), 1.5% FSO (±100mV, ±50mV Inputs) @ 2         Accuracy vs. Temperature       +/-60 PPM of Full Scale/ °C Maximum 21mA max for mA-Out mode/ 10mA max for Volt-out mode         Terminal Block Specifications         Field Wiring       Removable Screw Type Terminal Blocks (included)         2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P), 4 (Dinkle: EC350V-04P)       2 (Dinkle: EC350V-02P), 2 (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 1EC 60068-2-1 (Test Ab, Cold)       1EC 60068-2-1 (Test Ab, Cold)         IEC 60068-2-1 (Test Na, Thermal Shock 1EC 60068-2-1 (Test Na, Thermal Shock 1EC 60068-2-30 (Test Db, Damp Heat)       1EC 60068-2-30 (Test Db, Damp Heat)         Final Air       No corrosive gases permitted (EN61131-2 pollution degree 1)         Wibration       MIL STD 810C 514.2 1EC 60068-2-6 (Test Fc)         Shock       MIL STD 810C 516.2 1EC 60068-2-7 (Test Ea)         Insulation Resistance       > 10MΩ @ 500VDC         Noise Immunity       NEMA ICS3-304 1EC 61000-4-2 (ESD) 1mpulse 1000V @ 1µS pulse 1EC 61000-4-2 (ESD)         Impulse 1000V @ 1µS pulse 1EC 61000-4-4 (FTB)	Load Impedance			
1.5% FSO ( ±100mV, ±50mV Inputs) @ 2   Accuracy vs. Temperature	Sample Duration Time			
Dutput Current   21mA max for mA-Out mode/ 10mA max for Volt-out mode	•	1.5% FSO ( ±100mV, ±50mV Inputs) @ 25°C		
Terminal Block Specifications   Removable Screw Type Terminal Block (included)	Accuracy vs. Temperature	.,		
Removable Screw Type Terminal Blocks (included)   2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-04P)   Wire Range		10mA max for Volt-out mode		
Company				
2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-02P), 4 (Dinkle: EC350V-04P)     4 (Dinkle: EC350V-04P)     5 (Dinkle: EC350V-04P)     5 (Dinkle: EC350V-04P)     6 (Dinkle: EC350V-04P)     8 (Dinkle: EC350V-04P)     9 (Dinkle: EC350V-04P)     1 (Dinkle: EC350V-04P)     4 (Dinkle: EC350V-04P)     4 (Dinkle: EC350V-04P)     4 (Dinkle: EC350V-02P), 2 (Dinkle: EC350V-04P), 2 (Dinkle: EC350V-04P	Field Wiring	(included)		
28-14 AWG solid or stranded conductor wire strip length 1/4" (6-7mm)	Number of Positions	02P),		
Surrounding Air Temperature	Wire Range	28-14 AWG solid or stranded conductor;		
O to 60°C (32 to 140°F)     IEC 60068-2-14 (Test Nb, Thermal Shood	Screw Torque	1.7 inch-pounds (0.19 Nm)		
IEC 60068-2-14 (Test Nb, Thermal Shock	Genera	al Specifications		
Storage Temperature	Surrounding Air Temperature	0 to 60°C (32 to 140°F) IEC 60068-2-14 (Test Nb, Thermal Shock)		
IEC 60068-2-2 (Test Bb, Dry Heat)     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 60068-2-14 (Test Na, Thermal Shock   IP20	Storage Temperature			
This is a second content of the c		IEC 60068-2-14 (Test Na, Thermal Shock)		
IEC 60068-2-30 (Test Db, Damp Heat)   Environmental Air	Enclosure Rating			
Vibration   (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   >10MΩ @ 500VDC     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)     RFI, (145 MHz, 440 MHz 5W @ 15 cm)   RFI, (145 MHz, 440 MHz 5W @ 15 cm)   RFI, (145 MHz, 440 MHz 5W @ 15 cm)     Noise Immunity   RFI, (145 MHz, 440 MHz 5W @ 15 cm)   RFI, (145 MHZ, 440 MHz 5W @ 15 cm)   RFI, (145 MHZ, 440 MHZ 5W	Humidity	5 to 95% (non-condensing) IEC 60068-2-30 (Test Db, Damp Heat)		
IEC 60068-2-6 (Test Fc)	Environmental Air			
MIL STD 810C 516.2   IEC 60068-2-27 (Test Ea)     Insulation Resistance   >10MΩ @ 500VDC     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)	Vibration			
Insulation Resistance   >10MΩ @ 500VDC	Shock			
IEC 61000-4-2 (ESD)   Impulse 1000V @ 1μS pulse   IEC 61000-4-4 (FTB)   RFI, (145 MHz, 440 MHz 5W @ 15 cm	Insulation Resistance			
Moise Immunity   Impulse 1000V @ 1µS pulse   IEC 61000-4-4 (FTB)   RFI, (145 MHz, 440 MHz 5W @ 15 cm				
IEC 61000-4-4 (FTB) RFI, (145 MHz, 440 MHz 5W @ 15 cm	Noise Immunity			
RFI, (145 MHz, 440 MHz 5W @ 15 cm		IEC 61000-4-4 (FTB)		
ILC 01000-4-3 (KI I)		RFI, (145 MHz, 440 MHz 5W @ 15 cm) IEC 61000-4-3 (RFI)		
Weight 0.3lbs	Weight	0.3lbs		
1800VDC Power to Input				
1800VDC Power to Output 1800VDC Input to Output	Isolation			
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 26 V and fused at a maximum of 3 amps.				

# FC-B34 Applications and Dimensions

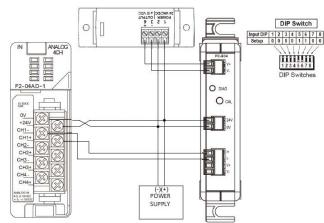
## **Application Example 1**

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



## **Application Example 2**

The 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 Label	Description	
V+	Signal In +	
V-	Signal In -	

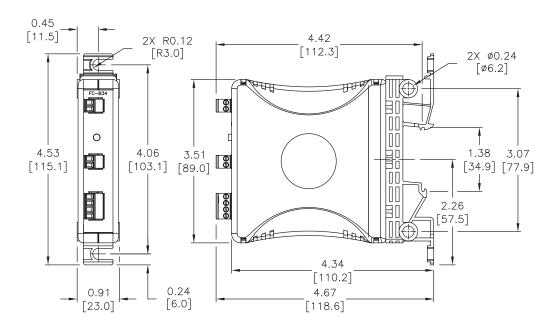
Output Terminal Block		
Faceplate Label	Description	
I+	Current	
I-	Current	
V+	Voltage	
Voltage		

Externa	I 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	EC EMM	(2) 2-pole blocks	
FC-R1	FC-5MM	(2) 3-pole blocks (1) 4-pole blocks	
FC-T1			
FC-ISO-C			
FC-ISO-D		(6) 2-pole blocks (2) 3-pole blocks	
FC-B34			
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
FC-5MM	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	
FC-35MM	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	