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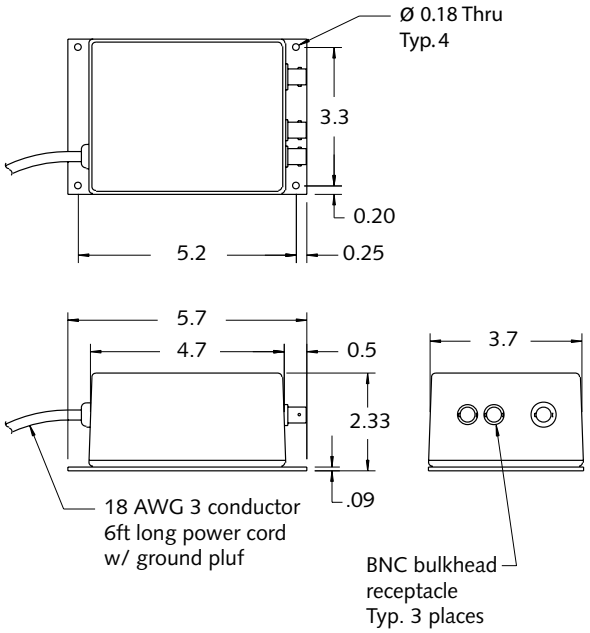
Charge Amplifier

Type 5014A...

Single Range Charge Amplifier

A simple to use single range, line powered charge amplifier that converts the charge signal from a high impedance piezoelectric force, pressure or acceleration type sensor into a high level output voltage.

- Single range, factory calibrated for measuring range
- Rugged industrial package
- Simple to operate
- AC Line powered



Description

The 5014A... is a rugged industrial charge amplifier for use with charge mode, piezoelectric sensors. It is housed in a rugged a environmentally protected, aluminum case attached to a mounting plate. Measuring range and time constants are factory set according to the customer range specifications and measurement conditions. BNC receptacles are provided for input and output signals as well as remote reset. Options include a differential input and a high current (±50mA) output. The standard unit is supplied with a MOSFET input transistor; an optional JFET input transistor is also available. The JFET input transistor version is recommended for industrial applications where static discharges could damage the MOSFET. The MOSFET is ideal for making short-term static measurements.

The operate and reset function of the 5014A... is controlled by a built-in relay. To place the amplifier into "Operate" Mode, the Reset connector center pin must be connected to the connector outer shell; ground. Due to amplifier drift, measuring errors may occur if the amplifier is left in operate mode for an extended length of time. Before each measuring cycle, the Operate/Reset connection to the connector ground should be opened to reset the amplifier. For purely dynamic measurements, the need for resetting can be eliminated by the selection of a shorter time constant.

Application

The primary use for the 5014A... charge amplifier is to convert the charge signal from a high impedance piezoelectric force, pressure or acceleration type sensor into a high level output voltage. Since the amplifier electronics is contained in an industrial rated type housing, it is used along with a force type sensor as a system element for monitoring and controlling manufacturing assembly operations during component insertion, crimping, clinching, stamping and testing.

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Technical Data

Type	Unit	5014A…
Measuring Range ±10V output	pC	±100 … ±1000000
Insulation Resistance min.		
MOSFET	Ω	$>10^{14}$
JFET	Ω	$>10^{12}$
Frequency Response nom. C r =1000pF	kHz	0…180
Time Constant:		
MOSFET input, Cr 100 pf min.	sec	10000 (1)
JFET input, Cr 1000 pf, min.	sec	1000
Noise max.	µVrms	200
Amplitude Non-linearity mid range to FS	%	<0.1
Drift:		
(MOSFET leakage current)	pC/s	≤ ±0.03
(JFET Leakage Current)	pC/s	≤ ±0.25
Output:		
Impedance ±5%	Ω	100
Voltage FS	V	±10
Current	mA	±5 (2)
Connectors	type	BNC neg.
Temperature Range Operating	°F	32 ... 158
Power:		
Voltage	VAC VAC	100 … 130 200 … 230
Consumption max.	VA	5
Frequency	Hz	50 ... 400
Weight	lbs	1.75

(1) Time Constant (seconds) = Range Capacitor (Cr) x Time Constant Resistor (Rt)

(2) ±50 mA, optional

1 g = 9.80665 m/s², 1 inch = 25.4 mm, 1 gram = 0.03527 oz, 1 lbf-in = 0.113 Nm

Mounting

The 5014A… single range charge amplifier is supplied with a mounting adaptor plate attached. Four 0.18 inch diameter through holes positioned at the four corners of the adaptor plate can be used to attach the amplifier to the machine structure.

Ordering Information

- **Specify calibration range e.g.:**
  Full scale MU for 10V output
  where: MU (Mechanical Units) = psi, lb, g, etc.

- Time Constant (sec) = Range Capacitor (Cr) x Time Constant Resistor (Rt)

  where:
  Cr = Sensor Sensitivity (pC/MU) x Full Scale MU/10
  Rt = Selected from the Option Matrix below: (Kistler can assist with the correct selection)

Ordering Key

5014A □ □ □ □

Amplifier Type	
single ended	0
Differential	1

Input Transister	
MOSFET	0
JFET	1

Output Current	
±5mA	0
±50mA	1

Time Constat Resistor	
none	0
10^{11} Ω	1
10^{10} Ω	2
10^{9} Ω	3
10^{12} Ω	4

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