

Charge Amplifier

Type 5010B...

Dual Mode Charge Amplifier with Piezotron® Operating Mode

Versatile, simple to use multi-range, line powered amplifier that converts Kistler sensor signals into proportionally controlled voltage. The dual mode allows for signals from either charge (high impedance) type pressure, force or acceleration sensors or voltage (low impedance) types to be processed.

- High and low impedance sensors
- Dynamic and quasistatic measurements
- Automatic zero adjustments
- RS-232C interface
- Ultra high accuracy and low noise
- Ground isolates I/O connectors



Description

Type 5010B... is a versatile, line-powered, dual mode amplifier for use with high impedance (charge mode) or low impedance (voltage mode) sensors. In the charge mode, the unit converts the input charge signal into a voltage proportional to the measurand. The voltage mode provides sensor source current for powering low impedance sensors.

The dual mode charge amplifier can be used to measure dynamic pressure, force, strain and acceleration from piezoelectric sensors. A long time constant mode permits the user to measure short duration static (quasi-static) events. The scale and sensitivity settings are designed to provide a direct readout in volts per mechanical unit eliminating mathematical manipulations. A rear panel receptacle is provided for remote control of the Reset and Operate modes.

A micro-controller controls all Type 5010B... functions and constantly monitors the unit's condition. Additionally, it continuously checks for input overload and condition of low impedance sensors. LEDs provide operational status while the LCD provides an indication of error overload, sensitivity, scale, time constant, bias and baud rate when RS-232C is activated.

Each unit is extensively tested using an automatic test and calibration system to ensure the highest possible accuracy and quality. A detailed NIST traceable calibration certificate is furnished with each unit.

Application

The primary use for Type 5010B... 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 and provide excitation power along with signal processing for voltage mode type sensors. When Type 5010B... is used with a voltage mode sensor, the signal polarity as it passes through the amplifier becomes inverted. The dual mode charge amplifier is considered a laboratory type instrument and should be well protected if used in an industrial environment.

Technical Data

Specification	Unit	Type 5010B
Measurement range	pC	±10 ... 999000
Scale settings 1,2,3,4,5 sequence	MU/V ⁽¹⁾	0.0002 ... 10000000
Sensor sensitivity	pC/MU	0.01 ... 9990
	mV/MU	0.01 ... 9990

Input

Connector charge, voltage		BNC neg., ground isolated
Impedance charge mode	Ω	70
Impedance voltage mode	Ω	100k parallel with 1 nF
Voltage max.	V	50
Insulation resistance at input	Ω	10 ¹⁴
Sensor power voltage mode	mA	4 (2 ... 18 optional)

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Frequency response: standard filter, Type 5311 (3dB)	Hz	180000
Accuracy (Long time constant)	%	≤ ± 0.50

Time constant (range dependent)

Long	sec	0 ... 100000
Medium	sec	1 ... 10000
Short	sec	0.01 ... 100

Time constant resistor

Long	Ω	>10 ¹⁴
Medium	Ω	10 ¹¹
Short	Ω	10 ⁹

Noise

Referred to with input shield	pCrms	0.0036
1 pC/V max. ⁽²⁾	μVrms	500
100 pC/V typical ⁽²⁾	μVrms	300
100000 pC/V typical ⁽²⁾	μVrms	200

Drift MOSFET leakage current	pC/s	<±0.03
Zero offset in reset typical	mV	0.50

Output:

Connector, ground isolated		BNC neg.
Impedance	Ω	100
Voltage range	V	±10
Current limit	mA	5
Display	Type	LCD 16 chars.

Serial interface (RS-232C)

Connector		9 pin D-Sub.
Baud Rates		150 ... 9600
Maximum cable length	ft	65 (2500 pF)

Remote control connector		DIN 45322 6-pol neg.
Temperature range operating	°F	32 ... 122
Temperature range storage	°F	-4 ... 158
Humidity non-condensing	%	10 ... 90

Power line

Voltage	VAC	89 ... 135
Frequency	Hz	48 ... 62
Power consumption max.	VA	14

Weight without case	lb	2.8
Dimensions without case	in	2.8 x 5.1 x 7.25

(1) MU = mechanical unit (e.g., psi, lb, g, etc)
(2) Referred to output with input shielded

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

Accessories Included

- Power cord Type 1508
- Remote reset connector 1564
- Plug-in filter, 180 kHz 5311

Optional Accessories

- 5 m remote control cable Type 1455A5
- Remote control box 5663
- Rack adaptor for 6 each 5010B... 5730

Plug-In low pass filters; see filter options below

Filter Options-Bandwidth Limiting


- 1, 1.5, 2.2, 3.3, 4.7, 6.8, 10, 15, 22, 33, 47 Type 5311A(x)kHz
- 10, 15, 22, 33, 47, 68, 100, 150, 220, 330, 68, 100, 150, 220, 330, 470, 680 5313A(x)Hz

Low pass, 12 dB/Octave Roll-off
x = cut-off frequency (-3db)

Ordering Key

Variant

Single channel with RS-232C interface	010B0
Single channel with case and RS-232C interface	010B1
Three channel with case and RS-232C interface, charge only	5814

Type 5 

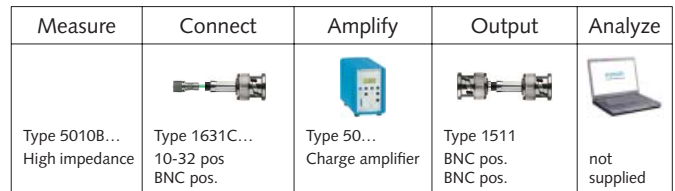


Fig. 1: High impedance measuring chain

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