

Precision Calibrator

Type 5395B

Reference Standard for the Calibration of Signal Conditioners

The Type 5395B Precision Calibrator is the ultimate reference standard for calibrating charge amplifiers. It, furthermore, provides unparalleled performance for calibrating Piezotron/IEPE couplers, high-level voltage amplifiers and piezoresistive signal conditioners.

- Ultra-precision charge source
- Fully automated calibration of charge amplifiers and other signal conditioners
- Stand-alone operation for development, diagnostics and faultfinding of measurement systems
- Electrical standard for sensor calibration systems

The Precision Calibrator is a cornerstone of piezoelectric measurement technology. It is an important tool for the development, testing and calibration of charge amplifiers and related signal conditioners. It is also used as electrical standard in sensor calibration systems, thus making it an indispensable tool in the world of piezoelectric measurement.

Description

The Type 5395B is the culmination of decades of expertise in piezoelectric measurement systems and calibration. Its true beauty is hidden in the details; details in the combination of engineering without compromise and components from the upper echelons.

The Precision Calibrator's various sources serve to simulate the respective sensors, as input to the signal conditioner under test. The output of the unit under test is measured via the monitor input. The table below provides an overview of the available source and monitor modes.



Technical Data

Sensor Simulation

Charge	pC	±2 000 000
Voltage	mV	±10 000
Piezotron/IEPE	mV _{pk-pk}	20 000
Piezoresistive	mV/mA	10 ... 1 000

Monitor

Voltage	V	±30
Current	mA	±20

Calibration and Measurement Capability

Charge amplifiers	%	<0,03
Voltage amplifiers	%	<0,02
Piezoresistive amplifiers	%	<0,02
IEPE couplers	%	<0,03

A detailed overview of the technical data, incl. the uncertainty of measurement is shown in the tables on the following pages.

Source Mode	Source Control	Monitor Function
Constant	▪ Magnitude ▪ Polarity	▪ DC
Pulsed square wave	▪ Magnitude ▪ Offset ▪ Polarity	▪ Peak/valley, sample & hold, magnitude & offset ▪ Frequency (pulses per second)
Haversine	▪ Magnitude ▪ Offset ▪ Polarity ▪ Cycle time	Selectable ▪ Peak – Peak ▪ Max, min, RMS (without DC) ▪ Magnitude & offset ▪ Frequency (pulses per second)

Table 1: Source and monitor modes

This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.

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Technical Data

Sensor Simulation (Out)

Charge source		
Charge range	pC	±2 000 000
Source modes	pulsed square, sinusoidal, constant	
Voltage source		
Voltage range	V	±12
Output resistance	Ω	10
Source modes	pulsed square, sinusoidal, constant	
IEPE simulation		
Voltage range	V _{pk-pk}	20
Bias voltage	V	2 ... 15
Current sink	mA	2 ... 20
Source mode	sinusoidal	
Piezoresistive sensor simulation		
Sensor ratios	mV/mA	0, 10, 50, 100, 500, 1 000
Short circuit (0)	mV/mA	<1×10 ⁻³
Open circuit	mV/mA	>1×10 ⁸
Source mode	constant	

Source Modes

Pulsed square		
Pulse width T _p	ms	80
Cycle time T _c	ms	400
Sinusoidal		
Function	Haversine	
Frequency	Hz	0,1 ... 1 000
Pulse width	ms	10 000 ... 1
Pulse ratio (T _c /T _p)	1 ... 10	

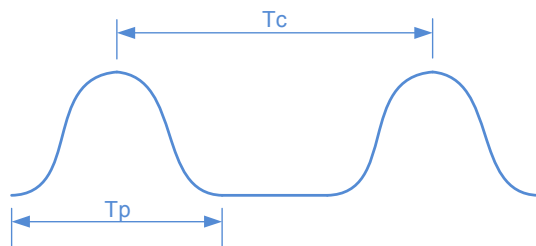


Fig. 1: Wave shape definition

Monitor

Voltage		
Voltage range	V	±30
Input resistance	MΩ	10
Current		
Current range	mA	±20
Load	Ω	500
Monitor modes		
DC, Peak-Peak, RMS, Frequency		

Connectors

Front	
Monitor (voltage & current)	BNC (female)
Charge source	BNC (female)
Voltage source	BNC (female)
IEPE	BNC (female)
Piezoresistive sensor simulation	Fischer 103 5 pin (female)
Rear	
Trigger for device synchronization	BNC (female)
Operate	BNC (female)
Ethernet	2x8P8C "RJ45"
USB for GPIB converter	USB Type A
Power	IEC 60320 C13/C14

General

Weight & dimensions		
Width	mm	218
Height	mm	85
Depth	mm	262
Weight	kg	2,6
Power supply		
Supply voltage	VAC	85 ... 264
Supply frequency	Hz	47 ... 63
Power	W	15

Technical Data (Continuation)

Uncertainty of Measurement¹⁾

Sensor simulation (out)		
Charge		
100 ... 2 000 000 pC	%	<0,03
Voltage		
100 ... 10 000 mV	%	<0,01
Piezoresistive		
100 ... 1 000 mV/mA	%	<0,01
Monitor (in)		
Voltage monitor		
100 ... 1 000 mV	%	<0,02
1 000 ... 30 000 mV	%	<0,01
Current monitor		
2 ... 20 mA	%	0,01
Signal conditioner calibration (out & in)		
Charge amplifiers		
100 ... 2 000 000 pC	%	<0,03
Voltage amplifiers		
100 ... 10 000 mV	%	<0,02
Piezoresistive amplifiers		
10 ... 1 000 mV/mA	%	<0,02
IEPE Couplers		
100 ... 5 000 mV _{pk-pk}	%	<0,03

¹⁾ The uncertainty of measurement estimates for the respective sensor simulation and monitor modes are given for the boundary conditions shown in the table below. These conditions also apply for the calibration and measurement capabilities stated for signal conditioner calibration.

Environmental Conditions

Ambient temperature	°C	23 ±1
Relative humidity	%	<60

Sensor Simulation

	Charge amplifiers, Voltage amplifiers	IEPE Couplers	Piezoresistive amplifiers
Wave shape	pulsed square	sinusoidal	constant
Frequency	–	100 Hz	–
Bias voltage	–	11 V	–

Signal conditioner settings

Analog output range	±10 V	5 V _{pk-pk}	±10 V
Sensor excitation	–	4 mA	1 mA

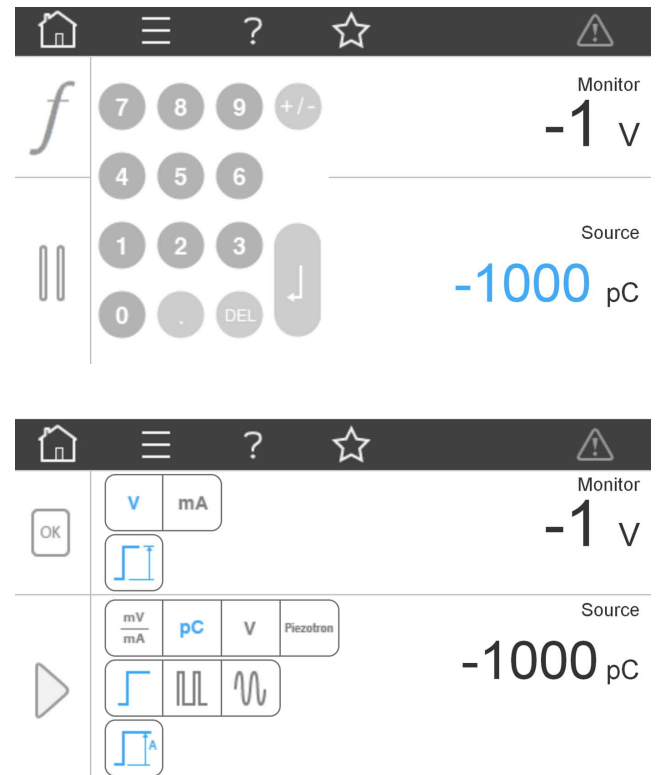


Fig. 2: Examples of the touch-screen device interface

Included Accessories

- Calibrate™ software
Kistler's calibration software suite for automated amplifier calibration
- BNC cables (Qty: 2)
High-insulation cables for connection of the amplifier under test

Type/Mat. No.

Z18906A-40

1601

Optional Accessories

- USB-GPIB
GPIB (IEEE 488.2) controller to connect the precision calibrator to a GPIB network. Ensures backwards compatibility to Type 5395A
- 19" mounting base
for precision calibrator Type 5395B
Facilitates the mounting of up to two devices into a standard 19" rack

Type/Mat. No.

Z21014-0034

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