

Kistler LabAmp

Type 5165A...

Charge Amplifier and Data Acquisition Unit for Dynamic Measurements

This universal laboratory charge amplifier can be used wherever dynamic signals¹⁾ of mechanical quantities are measured with piezoelectric sensors, Piezotron® sensors (IEPE) or sensors with voltage output. Piezoelectric sensors produce an electric charge which varies in direct proportion with the load acting on the sensor. The amplifier converts this charge directly into digital values or a proportional output voltage.

- 1 or 4 channel amplifier for piezoelectric sensors (charge), Piezotron sensors (IEPE) and voltage
- Integrated 24-bit data acquisition with up to 200 kSps per channel
- Continuous digital signal processing at minimal latency
- Fully flexible low-pass, high-pass and notch filter adjustment¹⁾
- Low-noise design
- TEDS (IEEE 1541.4) for Piezotron sensors
- 1 or 4 analog outputs with fully flexible 2-point scaling and internal routing
- Status indication per channel via LED
- Configuration and control in a standard web-browser
- Virtual instrument driver for LabVIEW™
- Two Ethernet interfaces with included switch functionality

Description

The Kistler LabAmp Type 5165A... is not only an outstanding low-noise charge amplifier for dynamic signals but also a powerful data acquisition device delivering the digitized measurement values directly to a host computer for further analysis. It is configured and operated in a web-interface, conveniently accessible by a standard web-browser.

Thanks to advanced signal processing technology, the Kistler LabAmp Type 5165A... offers impressive flexibility. The frequencies of the highpass, low-pass and notch filters can be directly entered as numeric values in Hertz. The input signals can be flexibly routed to the analog outputs.



The graphical user interface not only offers a simple and intuitive way to configure the device but also displays different measurement values (e.g. live value, peak value, root mean square). Furthermore, the browser-based data download allows the acquired data to be processed in an analysis software. For more advanced tasks or direct analysis, the amplifier can be integrated directly into LabVIEW™ thanks to the provided Virtual Instruments Driver.

¹⁾ dynamic PE/IEPE signals from 0,1 Hz (time constant ≈1,6 s) / voltage signals from 0 Hz; not suitable for quasi-static charge measurements

Technical Data

Connections

Number of channels		
Type 5165A1		1
Type 5165A4		4
Input connector type		BNC neg.
Analog output connector type		BNC neg.
Ethernet interface		2xRJ45

Charge Input

Measuring range	pC	±100 ... 1 000 000
Frequency range (–3dB)	Hz	0,1 ... 100 000
Input noise (typ.)		
1 Hz ... 100 kHz		
100 pC	pC _{rms}	0,006
1 000 pC	pC _{rms}	0,008
10 000 pC	pC _{rms}	0,048
100 000 pC	pC _{rms}	0,67
1 000 000 pC	pC _{rms}	4,6
1 Hz ... 10 kHz		
100 pC	pC _{rms}	0,006
1 000 pC	pC _{rms}	0,007
10 000 pC	pC _{rms}	0,03
100 000 pC	pC _{rms}	0,35
1 000 000 pC	pC _{rms}	2,8
Maximum input voltage	V	±30
Measurement uncertainty		
Measuring range <100 pC	%	<1
Measuring range ≥100 pC	%	<0,5
Crosstalk between channels	dB	≤–80
Sensor impedance	MΩ	>10

Piezotron Input

Gain		1/10
Sensor supply voltage	V	22
Power supply	mA	4/10
Frequency range (–3dB)	Hz	0,1 ... 100 000
Input noise (typ., 0 Ω shunt at input)		
1 Hz ... 100 kHz		
Gain 10	μV _{rms}	6
Gain 1	μV _{rms}	45
1 Hz ... 10 kHz		
Gain 10	μV _{rms}	3,5
Gain 1	μV _{rms}	28

Maximum input voltage	V	±30
Measurement uncertainty		
Gain 10	%	<1
Gain 1	%	<0,5
Crosstalk between channels	dB	≤–80

Voltage Input

Input type		single-ended
Measuring range	V	±1 ... 10
Input impedance	MΩ	10
Frequency range (–3dB)	Hz	0 ... 100 000
Input noise (typ.)		
1 Hz ... 100 kHz		
Measuring range 1 V	μV _{rms}	6
Measuring range 10 V	μV _{rms}	45
1 Hz ... 10 kHz		
Measuring range 1 V	μV _{rms}	3,5
Measuring range 10 V	μV _{rms}	28
Max. input voltage	V	±30
Measurement uncertainty		
Measuring range <1 V	%	<1
Measuring range ≥1 V	%	<0,5
Crosstalk between channels	dB	≤–80

Voltage Output

Nominal output range	V	±10
Output impedance	Ω	10
Max. common mode voltage between input and output ground	V	±14
Output noise (all ranges)		
1 Hz ... 100 kHz, typ.	mV _{rms}	0,046
1 Hz ... 10 kHz, typ.	mV _{rms}	0,041
Frequency range (–3dB)	Hz	0 ... 100 000
Group delay (input to output, filters off)	μs	≤12
Zero error	mV	<±2
DAC resolution (analog out)	Bit	16

Technical Data (Continuation)

Data Acquisition

ADC resolution	Bit	24
ADC sampling rate	kSps	625
Output update rate per channel (adjustable)	kSps	≤200

Note: For the data acquisition an anti-aliasing filter is automatically set with a corner frequency of 0,3 x selected output update rate.

Digital High-Pass Filter

Order		1.
Cutoff-frequency (-3dB) selection in 0,1 Hz steps	Hz	≥0,1 ... 10 000
Tolerance (typ.)	%	<1

Digital Low-Pass Filter

Filter type		Bessel or Butterworth
Order		2./4.
Cutoff-frequency (-3dB) selection in 1 Hz steps	Hz	≥10
Tolerance (typ.)	%	<1

Digital Notch Filter

Center frequency selection in 1 Hz steps	Hz	≥10
Tolerance (typ.)	%	<1
Q factor		0,8 ... 1 000

Application

The instrument has been designed for use in research, development and the laboratory. The Kistler LabAmp Type 5165A... is the perfect choice wherever dynamic signals need to be measured precisely and with high resolution. Acceleration and vibration measurements, pulsating pressure applications or force measurements of fast machining procedures are just a few examples where the Kistler LabAmp Type 5165A... can demonstrate his strengths.

Operation

All settings are configured in a standard web-browser through the graphical user interface. Simply connect to the Kistler LabAmp Type 5165A... by its network name and start working. A simple data acquisition is also implemented, offering a data download controlled by a start/stop button. In addition, an API is available to perform automated measuring tasks PC-based.

Ethernet Interface

Data rate	MBit	100
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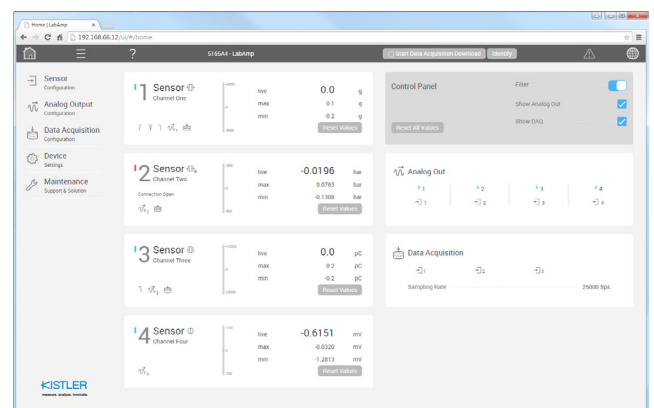
Power Supply Requirements

Supply voltage range	VDC	18 ... 30
Power consumption	W	<15
Socket for barrel jack plug (IEC 60130-10 Type A)	mm	5,5x2,5x9,5
Power supply requirements		– galvanic isolation – PE and GND not connected

General Data

Operating temperature range	°C	0 ... 60
Storage temperature range	°C	-10 ... 70
Rel. humidity, not condensing	%	≤90
Degree of protection (EN 60529)		IP20
Outer dimensions incl. feet and connectors (WxHxD)	mm	≈218x150x223
Weight	kg	1,2

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Block Diagram

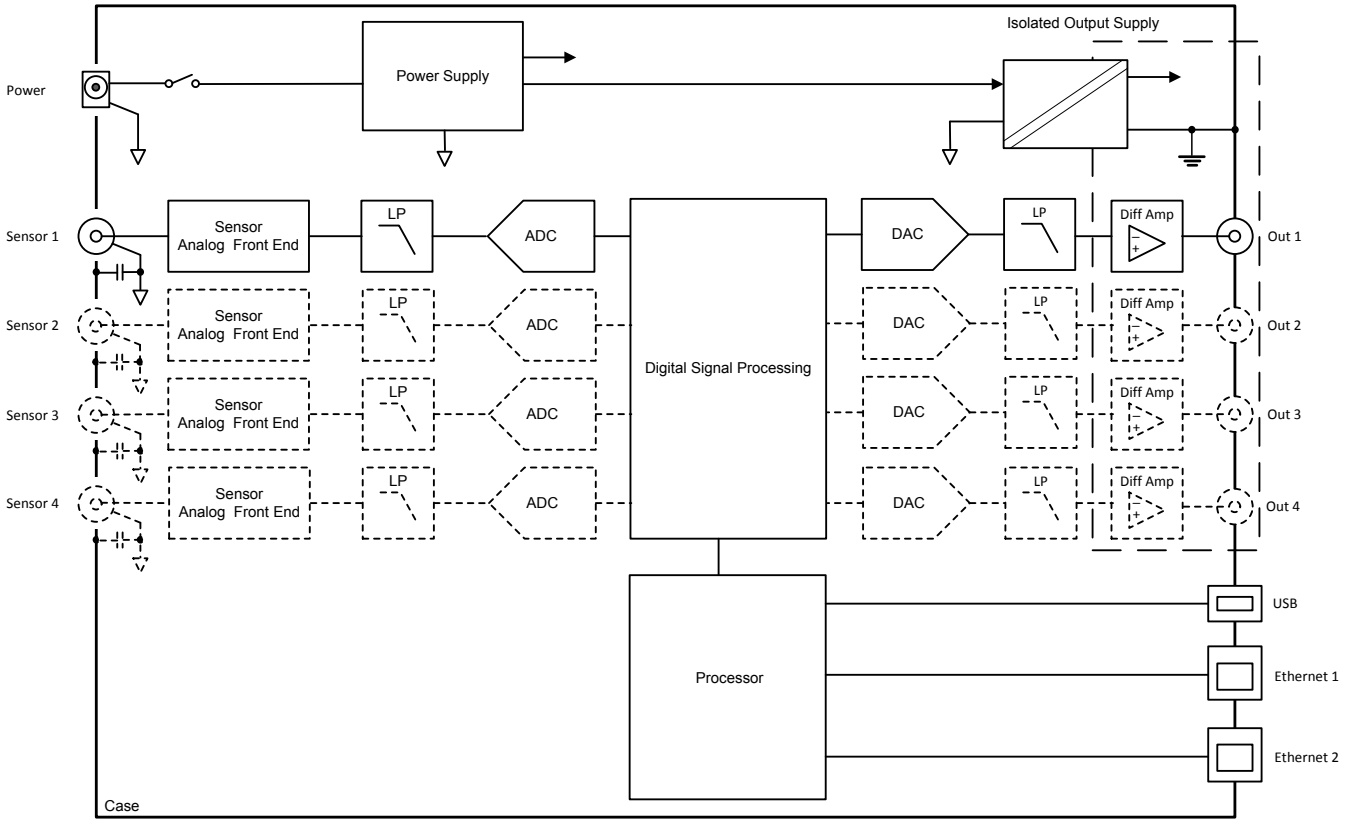


Fig. 1: Block diagram of the Kistler LabAmp Type 5165A...

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Dimensions

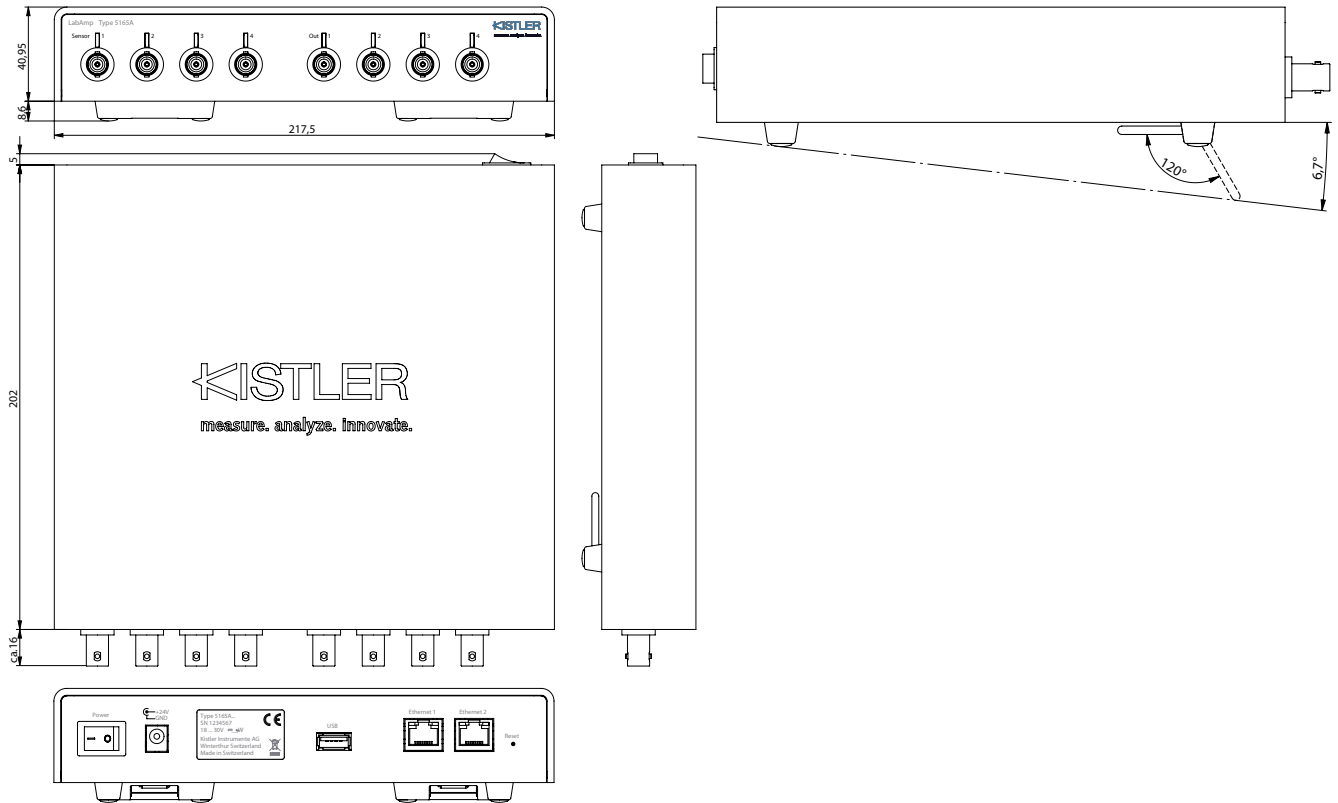


Fig. 2: Dimensions of Kistler LabAmp Type 5165A4

Included Accessories

- Calibration sheet
- Quick-start guide

Optional Accessories

- Power supply* 24 V incl. country-specific plug
- Ethernet cable, l = 2 m*
- 19" rack mounting tablet
- Dummy panel for empty 19" position

* Available as combined kit together with the amplifier

Type/Mat. No.

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Type/Mat. No.

- 5779A2
- tbd
- 5748A1
- 5748A2

Ordering Key

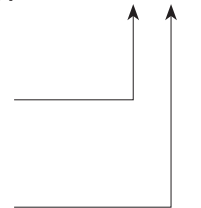
LabAmp

Single-channel	1
4 channels	4

Amplifier only

Kit with amplifier, 24 V power supply, 2 m Ethernet cable	–
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Type 5165A



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