Artifex Engineering
Optoelectronics & Engineering Services

TZA200

High Speed Transimpedance Amplifier

HIGHLIGHTS

- Small signal rise time (10-90%) 35 ns
- Bandwidth 10 MHz
- Maximum input current 4.5 mA
- Noise equivalent current (NEI_{RMS}) 1 µA

APPLICATIONS

- Production automation (eg: connectorization, pigtailing)
- Component testing
- Quality control
- OEM (eg: laser noise monitoring)

MEASUREMENT PRINCIPLE

The TZA200 amplifier employs precision single ended transimpedance input stages to provide for low offset and high linearity throughout the full dynamic range. The single ended input stage is required for applications where the current source is inherently grounded externally.

FIELDS OF APPLICATION

These transimpedance amplifiers are particularly useful for the measurement of current from photodiodes. The output is a voltage linearly proportional to input current and thus, to input power in photodiode monitoring applications. The fast response time at high signal-noise-ratio makes the TZA200 series particularly useful in systems control feedback loops.

These amplifiers have a particularly high bandwidth of 10MHz allowing monitoring of high frequency noise components of many light sources.

The TZA200 series is insensitive to electromagnetic interference by design, an important factor when working in „dirty“ industrial environments. These units are provided in OEM-style enclosures. The case wings provide for mounting on standard 25mm and 1“ optical table tops and for OEM applications.

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ABSOLUTE MAXIMUM RATINGS

Average Current	15mA
Temperature Range	0 – 60 °C

ORDERING INFORMATION

Full order code: TZA 200 c n

	Options	Description
Case style (c):	G	OEM gull wing
	L	Lab style
Number of channels (n):	1 to 4	

For example, a 2 channel, OEM style unit would be ordered as:

TZA200G2

For customized systems, please contact us.

SPECIFICATIONS

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT					
Input range (full scale)				4.5	mA
Noise equivalent current (NEI_{RMS})				1	µA
Connectors			BNC[1]		
OUTPUT					
Function			Linear analogue V_{out} = scale x I_{in}		
Output range (full scale)	High-Z termination 50Ω termination	4.0 2.0		4.5 2.25	V
Connectors			BNC[1]		
Output scale	High-Z termination 50Ω termination		1 0.5		V / mA
Rise / Fall time (10% - 90%)	Source capacitance < 100pF			35	ns
Settling time (1%)	Source capacitance < 100pF			100	ns
Bandwidth (-3dB)				10	MHz
Accuracy		± 1			%
Output impedance				50	Ω
POWER SUPPLY					
Type			Wall plug (supplied)		
DIMENSIONS	1 channel	102 x 45 x 116 mm (w x h x l)			mm
	4 channels	102 x 106 x 116 mm (w x h x l)			mm
	19” rack modules	3U			

APPLICATIONS EXAMPLES

Typical applications may be found in measuring currents from photodiodes, photomultipliers, ionisation detectors, etc. with applications in component manufacture and testing, OEM, spectroscopy, as preamplifiers for lock-ins, A/D-converters, etc.

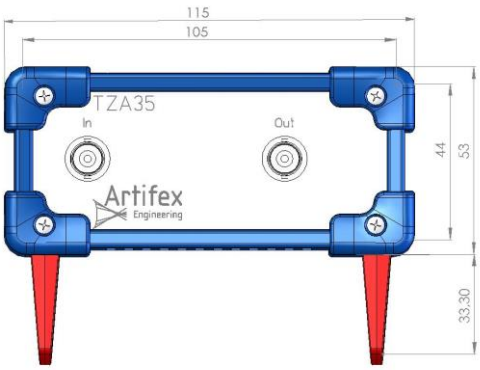
[1] Adapters for other connector systems available.

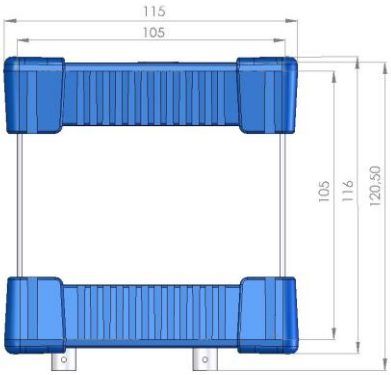
[2] 130 mm including case wings

CASE STYLES

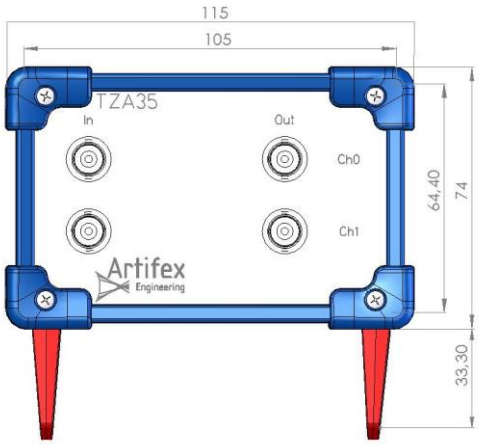
(Lab style)

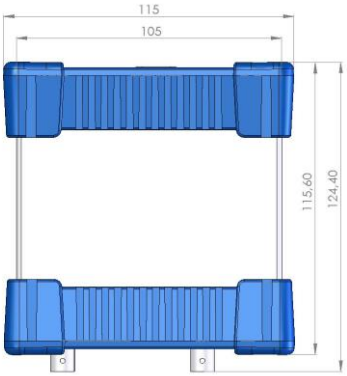
1 CHANNEL



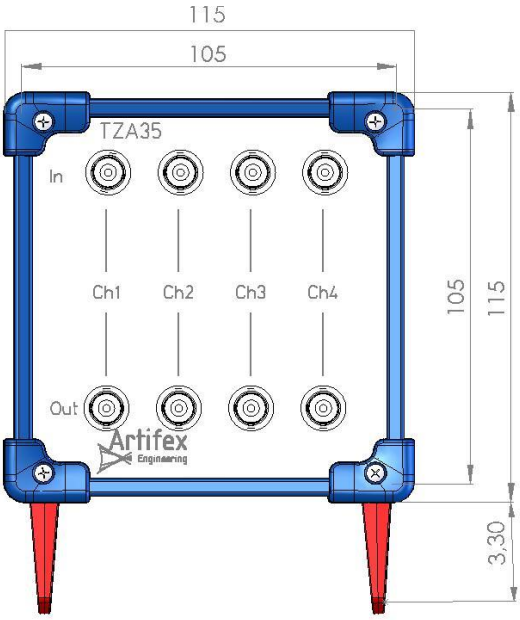


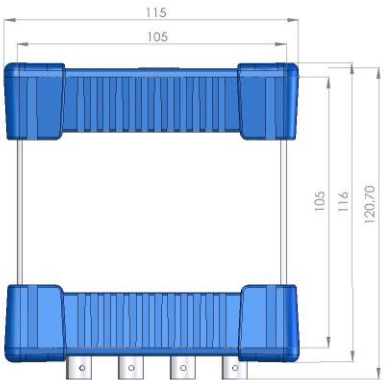
2 CHANNEL





4 CHANNEL

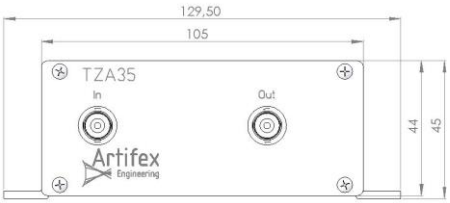


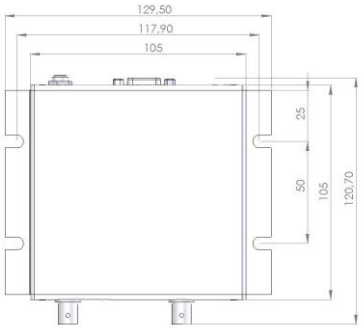


CASE STYLES

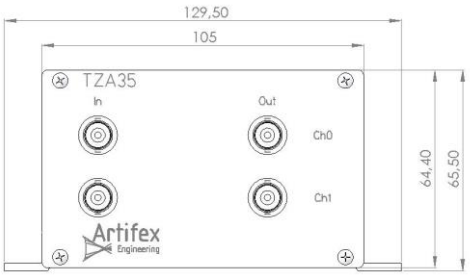
(OEM style)

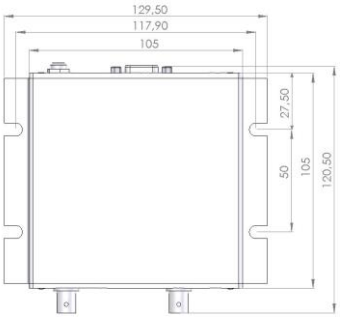
1 CHANNEL



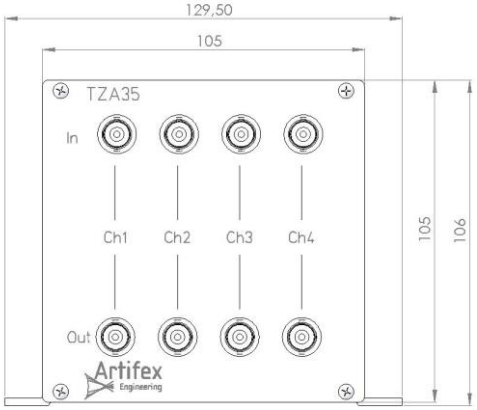


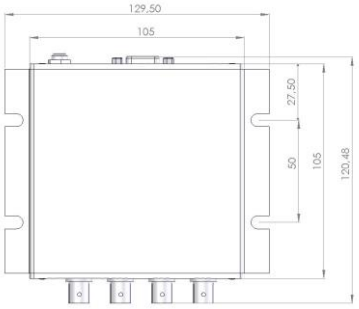
2 CHANNEL





4 CHANNEL





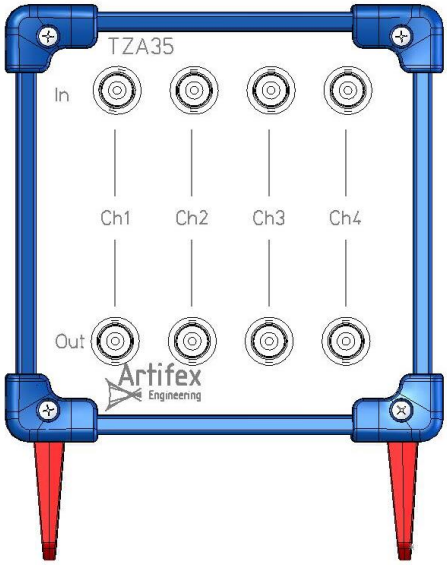
THE FRONT PANEL

The front panel contains the input and output BNC connectors.

The upper row of BNC connectors is for the current inputs. The channel count begins at the left. If the current source is a photodiode then the cathode is to be connected to the centre pin of the BNC. If a current source other than a photodiode is to be used, then the current drain is to be connected to the centre pin.

The lower row of BNC connectors is for the amplifier outputs. The output is 0-4.5V, linearly proportional to the current input. The channel count begins at the left.

A switch labelled “Detector Bias” is found on the front panel. This bias is –5V applied to the outer electrode of the input connector. The bias voltage decreases the response time of many photodiodes. Before using this feature, please ensure that the photodiode (or other detector) can withstand the bias voltage without damage. Many InGaAs-photodiodes for example cannot withstand 5V reverse bias.



INSTRUCTIONS FOR MEASUREMENT

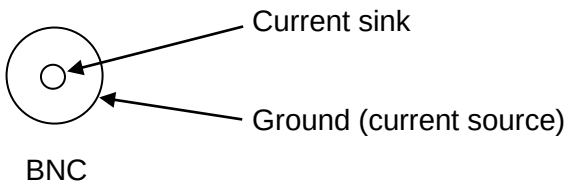
The TZA200 transimpedance amplifier comprises one to four independent measurement channels, depending on the model chosen. Each channel consists of a BNC receptacled current input and a BNC-output. These two user interfaces are arranged in logical groups (see „The Front Panel“).

To make a measurement, proceed as follows:

1. Turn the unit on. For the most accurate measurement, please allow for a 15 minute warm up before using.
2. Connect a single ended output current source to the desired channel via the corresponding receptacle.
3. Connect a BNC-cable from the BNC-socket directly underneath the chosen receptacle to a suitable measurement instrument (voltmeter, oscilloscope, I/O card, etc.). Alternatively, the output may be taken from the interface receptacle on the back panel.
4. Turn on the current source to be measured.
5. Read the voltage output and convert to current using the appropriate conversion factor given under “Absolute Maximum Ratings”.

INPUTS

The connections of the BNC-input connector is as follows:



BNC

Note that when connecting photodiodes as the signal source, the photodiode anode is the current source and the cathode is the current sink.

DAMAGE

The unit may be damaged by exceeding the maximum average input current. Please read „Absolute Maximum Ratings“ for these maximum values before working with the instrument.

Use only the power supply and power supply cable provided with the unit.

TROUBLESHOOTING

In the event that a measurement is not successful, the following possibilities should be analysed:

Symptom	Possible Errors	Correction
No output	• System is not switched on	• Ensure the power cord is connected at both ends and switch the system on.
	• Fuse blown[3]	
No output	• Input power too low	• Increase input power
	• Input or output connection not correct	• Ensure that the connectors are inserted correctly and locked. In multichannel units, ensure that the channel being monitored corresponds to the input channel. Ensure that the interface plug is securely seated and the screws fastened.
Output at full scale, independant of input current	• Input power too high	• Reduce input power.

In the unlikely event that you are not able to obtain a measurement in spite of these troubleshooting measures, please contact us. We will be pleased to help you solve your problem.

[3] Secondary, internal self resetting fuses, only. In the event that a secondary fuse „blows“, shut off the power, correct the fault and wait a few minutes before switching the power back on.

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