

PRODUCT DATA

Differential Amplifier Types 2697 and 2697-A

Differential Amplifier Types 2697 and 2697-A are high-stability, ultra low-noise differential amplifiers. Their main application is in analysis and calibration systems which use bridge transducers such as variable capacitance accelerometers, piezoresistive accelerometers and pressure transducers. The amplifiers can be used in a wide range of environments in terms of temperature, humidity and other environmental conditions.

The amplifiers enable you to connect bridge transducers to Brüel & Kjær® data acquisition and signal conditioning hardware via the standard 7-pin LEMO microphone socket. The connection supplies power to the amplifier and the transducer.



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Uses and features

Uses

- Analysis and calibration systems that use bridge transducers
- Powering and connecting bridge transducers via standard 7-pin LEMO microphone sockets

Features

- Transducer excitation voltage
- Low-pass filter
- Built-in TEDS conforms to IEEE 1451.4 Class 1
- Low output impedance




Which amplifier should I choose?

The two amplifiers have many common features. They have a very high input impedance, which presents virtually no load to the transducer. They have built-in TEDS and low-pass filters. The amplifiers (and connected transducer) can be powered via 7-pin LEMO® sockets on data acquisition and signal conditioning hardware. Both amplifiers have a low output impedance, which means you can use up to 30 m of cable between the preamplifier and the measurement equipment without introducing distortion.

The difference between the two amplifiers lies in the ability to customise the configuration of the amplifier. Type 2697 has a fixed configuration while Type 2697-A has options for the signal coupling, gain and excitation voltage which can be selected when ordering. Please contact your local HBK representative for further information.

Table 1 Overview of Types 2697 and 2697-A configurations

	TYPE 2697	TYPE 2697-A
	Fixed configuration	Configuration options
Signal coupling	DC	DC or AC
Gain	0 dB	0 or 20 dB
Excitation voltage	+10 V	+2.5, +5 or +10 V

  	<p>The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives.</p> <p>RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME.</p> <p>China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China.</p> <p>WEEE mark indicates compliance with the EU WEEE Directive</p>
SAFETY	<p>EN/IEC 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use.</p> <p>UL 61010B-1: Standard for Safety – Electrical measuring and test equipment</p>
EMC EMISSION	<p>EN/IEC 61000-6-3: Generic emission standard for residential, commercial and light industrial environments.</p> <p>EN/IEC 61000-6-4: Generic emission standard for industrial environments.</p> <p>CISPR 32: Radio disturbance characteristics of information technology equipment. Class B Limits.</p> <p>FCC Rules, Part 15: Complies with the limits for a Class B digital device.</p>
EMC IMMUNITY	<p>EN/IEC 61000-6-1: Generic standards – Immunity for residential, commercial and light industrial environments.</p> <p>EN/IEC 61000-6-2: Generic standards – Immunity for industrial environments.</p> <p>EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements.</p> <p>Note: The above is only guaranteed using accessories listed in this document.</p>
TEMPERATURE	<p>IEC 60068-2-1 & IEC 60068-2-2: Environmental Testing. Cold and Dry Heat.</p> <p>Operating Temperature: –10 to +50 °C (14 to 122 °F)</p> <p>Storage Temperature: –25 to +70 °C (–13 to 158 °F)</p>
HUMIDITY	IEC 60068-2-78: Damp Heat: 93% RH (non-condensing at 40 °C (104 °F))
MECHANICAL	<p>Non-operating:</p> <p>IEC 60068-2-6: Vibration: 0.3 mm, 20 m/s², 10–500 Hz</p> <p>IEC 60068-2-27: Shock: 1000 m/s²</p> <p>IEC 60068-2-29: Bump: 3 × 1000 bumps at 400 m/s²</p>
ENCLOSURE	IEC 60529: Protection provided by enclosures: IP 20

	TYPE 2697	TYPE 2697-A
INPUT		
Input impedance	>3 M Ω	
Input range	± 8 V (DC + V ACpeak)/Gain	
Connector	6-pin socket, LEMO 0B	
Common mode	DC + ACpeak * Gain <8 V including signal 50 Vpeak without damage	
Transducer mode	—	1/1-bridge transducer
Signal coupling	DC	Selectable when ordering: AC (default) or DC
Input balance adjustment	—	± 350 mV by potentiometer
Common mode rejection	55 dB (DC coupled) at 100 Hz	70 dB at $\times 1$ (AC coupled) at 100 Hz
OUTPUT		
Minimum output load impedance	2 k Ω , single ended, short-circuit protected	
Output impedance	0.5 Ω	
Maximum output	8 Vpeak	
Current output	25 mA max. peak	
Connector	7-pin socket, LEMO 1B Outer screen connected to signal ground (default)	
Output offset adjustment	—	± 1.9 V by potentiometer
Output DC bias stability	± 2 μ V/ $^{\circ}$ C	$\pm (2$ μ V/ $^{\circ}$ C + 0.33 μ V/ $^{\circ}$ C for 100 μ V of input offset voltage) Outer screen connected to signal ground (default), 'Floating' selectable when ordering
EXCITATION		
Excitation voltage	+Exc.: +10 V	Selectable when ordering: +Exc.: +10, +5, +2.5 V
Excitation voltage accuracy	$\pm 0.1\%$ (1 k Ω bridge)	
Excitation current	30 mA max. depending on the power supplied from the microphone plug	

	TYPE 2697	TYPE 2697-A
NOISE		
Typical input noise (at f_0 =10 kHz)	10 nV/√Hz	
Typical output noise (at f_0 =10 kHz)	65 nV/√Hz	
TRANSFER CHARACTERISTICS		
Gain	×1	Selectable when ordering: ×1 or ×10
Accuracy	<0.1% at 25 °C and 1 kHz	<0.1% at ×0.997(×1) and ×9.97(×10)
Stability	Better than ±20 ppm/°C	Better than ±100 ppm/°C
Frequency response	±10% DC to 100 kHz ref to 1 kHz –3 dB point >200 kHz	±10% from 0.2 kHz to 100 kHz ref to 1 kHz
GENERAL		
Noise	Typically 15 μV rms broadband (20 Hz to 20 kHz)	—
Noise and ripple	<0.2 mV rms from 2 to 20 kHz <0.5 mV from 2 to 200 kHz	
TEDS	Conforms to IEEE1451.4	
Low-pass filter type	Single pole (6 dB/octave)	
Power requirements	±14 V to ±16 V DC supply (from data acquisition or signal conditioning unit)	
Current	8 mA plus excitation current for transducer	
Power dissipation	300 mW max.	
Maximum permitted cable length	30 m (98.4 ft)	
Housing material	Stainless steel	
WEIGHT AND DIMENSIONS		
Length	130 mm (5.12 in)	
Diameter	15 mm (0.59 in)	
Weight	50 g (1.76 oz)	

Ordering information

Type 2697 Differential Amplifier, fixed configuration
Type 2697-A Differential Amplifier, configured when ordering

Included accessories

JP-0628 6-pin LEMO, plug size 0B for 3 mm cable

Optional accessories

WB-3479 Junction Box for Microphone Plug, signal and supply ± 15 V for calibration purposes
WB-3494 Junction Box for Transducer Plug, differential input signal and \pm excitation supply measurements for calibration purposes

Secondary calibration services

BK-0068-026-CAI Initial accredited calibration of conditioning amplifiers
BK-0068-026-CAF Accredited calibration of conditioning amplifiers

hbkworld.com · info@hbkworld.com
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