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DATA SHEET

labSG6 (Code 3727)

6-channel input module for connecting up to six measuring bridges (strain gauges) as well as sensors with symmetric or asymmetric outputs and unipolar or bipolar supply

Overview

*lab*SG6 is a flexible 6-channel input module for connecting resistive measuring bridges (full, half, and quarter bridges) as well as sensors with symmetric or asymmetric outputs and unipolar or bipolar supply.

Connecting a measuring bridge, a separate DC bridge voltage is adjustable for each channel. Two sense wires can be used to measure and adjust the bridge voltage. To perform an automatic bridge balance, an auto zero function is available.

Furthermore, it is possible to connect sensors with symmetric or asymmetric outputs and unipolar or bipolar supply. For these sensors the power supply can be adjusted channel-wise, too.

The module *lab*SG6 can be easily connected to other modules and forms a stable and easily-manageable unit.

Together with a Controller and a Power Box *lab*PWR, up to 10 *lab*SG6 can be assembled forming a system with 60 channels.

Depending on the processing power of the PC and the network utilization, larger systems with several Controllers, Power Boxes, and *lab*SG6 modules can record up to 300 channels at 24 kHz simultaneously.

Features

Connections to frontends from HEAD acoustics

- *lab*CTRL II.1/*lab*CTRL I.2 (HEAD*lab* Controller)
- *lab*HSU
  High-end dual-channel data acquisition system
- *lab*COMPACT12-V1/ *lab*COMPACT24-V1 (compact systems)
- SQuadriga III (mobile 8-channel recording and playback system)
- HMS V (artificial head measuring system)

Connecting Sensors

- Measuring bridges (full, half and quarter bridges with 1000, 750, 350 and 120 Ω)
  - Only resistive, DC, not inductive, capacitive measuring bridges, AC
  - 5 V max. bridge voltage at 120 Ω bridge; 10 V at ≥350 Ω bridge
- Sensors with output signals such as: ±10 V, ±5 V, 0 V to 10 V, 0 V to 5 V, 0 mA to 20 mA 3-wire, 4 mA to 20 mA 3-wire, 4 mA to 20 mA 2-wire
- Channel-wise adjustable power supply for sensors or measuring bridges, separately adjustable from ±1.3 V to ±12 V, respectively 2.6 V to 24 V ($P_{channel}$ max. 480 mW, respectively 24 V/20 mA)
- Bridge voltage measurement via sense wires
- Auto zero function for the automatic bridge balancing
- Shunt calibration of measuring bridges
- Electrical isolation of the module inputs

Functions

- DC coupling
- 24 bit A/D converter
- Variable sampling rate from 10 Hz to 48 kHz
- Max. ±10 V_p input voltage range
- 10 MΩ input impedance

Filters

- Switchable lowpass, 2nd order, 20 Hz to 500 Hz, switchable in steps

Power consumption

- Low power consumption, depending on connected sensors:
  - Max. 4 W without sensors
  - Max. 9.5 W with 6 sensors

Handling

- Silent (no fan), rugged design
- Integrated locking mechanism (the modules can easily be mated to a system)

Technical Data

General

Number of channels:	6 (LEMO 8-pin ECA codification)
Sampling frequencies (F_S):	10 Hz, 20 Hz, 50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 6 kHz, 12 kHz, 24 kHz, 48 kHz
Power supply:	9 V to 36 V
Resolution:	24 bit
Digital filter:	Yes
Power consumption:	4 W (without sensors) up to max. 9.5 W (with sensors) at 25 °C
Electrical isolation:	Yes
Maximum cable length to the Controller:	60 m (with cable CLL XI)
Cooling:	Convection, no fan
Dimensions: incl. locking mechanism and rubber pads:	140 x 173 x 42 mm (W x D x H) 148 x 173 x 48 mm (W x D x H)
Weight:	675 g
Operating temperature:	-10 °C to 60 °C
Storage temperature:	-20 °C to 70 °C

Inputs

Number of channels:	6 (LEMO 8-pin ECA codification)				
Electrical isolation:	85 V for each channel				
Ranges (voltage):	±1 mV, ±3 mV, ±10 mV, ±30 mV, ±100 mV, ±300 mV, ±1 V, ±3 V, ±5 V, ±10 V				
Range (current):	0 mA to 20 mA				
Configuration voltage input Bridge mode: Single ended input:	 Full, half, and quarter bridges (with external resistor) Sensors with symmetric or asymmetric outputs				
Configuration current input:	4 mA to 20 mA, 2-wire 0 mA to 20 mA, 3-wire				
Input impedance (differential/single ended):	10 MΩ				
Coupling:	DC				
Lowpass 2nd order (switchable), Butterworth 10% tolerance:	20 Hz, 30 Hz, 40 Hz, 50 Hz, 60 Hz, 100 Hz, 200 Hz, 300 Hz, 400 Hz, 500 Hz				
Electric strength:	Max. ±35 V				
Auto Zero correction 3 mV; 30 mV; 300 mV; 3 V; 10 V: 1 mV; 10 mV; 100 mV; 1 V; 5 V: Resolution:	 Up to 10% of the range Up to 100% of the range 0.25% of the measuring range				
Shunt calibration (with internal resistor; measuring bridges switchable V_{bridge}+ and In+) Resistance value:	 100 kΩ				
S/N 20 Hz to 20 kHz Ranges: Ranges:	 ±1 mV 54 dB ±300 mV 95 dB	±3 mV 64 dB ±1 V 92 dB	±10 mV 74 dB ±3 V 98 dB	±30 mV 83 dB ±5 V 97 dB	±100 mV 87 dB ±10 V 100 dB

Inputs[1]

THD+N 20 Hz to 20 kHz					
Ranges:	±1 mV	±3 mV	±10 mV	±30 mV	±100 mV
	-51 dB	-60 dB	-70 dB	-70 dB	-83 dB
Ranges:	±300 mV	±1 V	±3 V	±5 V	±10 V
	-71 dB	-83,5 dB	-71,5 dB	-82 dB	-82 dB
Crosstalk 1 kHz Sinus					
Ranges:	±1 mV	±3 mV	±10 mV	±30 mV	±100 mV
	133 dB	133 dB	133 dB	133 dB	127 dB
Ranges:	±300 mV	±1 V	±3 V	±5 V	±10 V
	125 dB	111 dB	107 dB	103 dB	100 dB
Frequency response[2] 20 Hz to 10 kHz					
Ranges:	±1 mV	±3 mV	±10 mV	±30 mV	±100 mV
	2.9 dB	1.2 dB	0.4 dB	0.13 dB	0.06 dB
Ranges:	±300 mV	±1 V	±3 V	±5 V	±10 V
	0.11 dB	0.06 dB	0.11 dB	0.08 dB	0.06 dB dB
DC accuracy[2]					
Ranges:	±1 mV	±3 mV	±10 mV	±30 mV	±100 mV
	5%	2%	1.5%	1.5%	0.2%
Ranges:	±300 mV	±1 V	±3 V	±5 V	±10 V
	0.2%	0.1%	0.1%	0.1%	0.1%
DC accuracy 4 mA to 20 mA:	Max. 0.1%				
Common mode rejection (50/60 Hz), range 1 V					
Single input:	>52 dB				
Diff. input:	>90 dB				
TEDS (IEEE 1451.4), read:	Class 2				

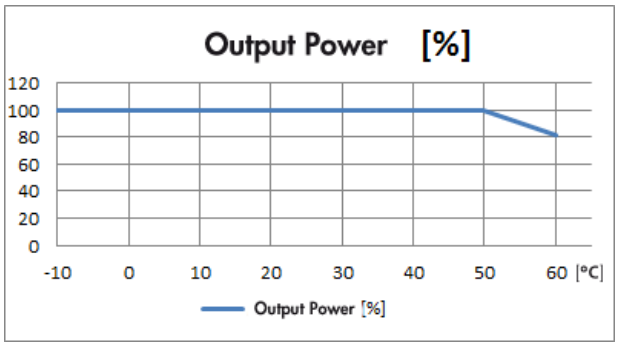
[1] Valid for: ambient temperature 23 °C/73 °F (±3 °C/37 °F), operating duration ≥1 h. Vibration excitation of the device can cause deviation.

[2] All measuring ranges receive a calibration by the factory. The measuring ranges ±30 mV to ±10 V can additionally be calibrated in the calibration laboratory of HEAD acoustics GmbH accredited according to DIN EN ISO 17025.

Sensor Supply

Sensor supply		
Symmetric:	±1.3 V to ±12 V	
Asymmetric:	2.6 V to 24 V	
Sensor supply	V_{bridge}/V_{sensor}	Max. sensor current
Voltage:	2.6 V to 5 V (±1.3 V to ±2.5 V)	43.8 mA
Voltage:	>5 V to 14 V (±2,5 V to ±7 V)	28.6 mA
Voltage:	>14 V to 24 V (±7 V to ±12 V)	20 mA
Voltage in the range of ±10 V:	>10 V to 24 V (± 5 V to ±12 V)	20 mA
Current 2-wire:	9 V to 24 V	20 mA
Current 3-wire:	9 V to 18 V	25 mA
Bridge feedback measurement:	Max. 10 V	

Derating -10 °C to 50 °C: 60 °C:	 100% (at a power of 0,48 W per channel) 81.25% (at a power of 0,48 W per channel)



At maximum load on all sensors, there is a derating of the output power.

Supported Sensor Types, such as

Measuring bridges (full, half and quarter bridges):	Strain gauges Strain transducers Force transducers Pressure transducers Load cells
Displacement transducers: Position sensors Current and current pulse sensors	E. g. potentiomeric linear transducers

HEADlink (HEAD acoustics standard)

Controlling/data transfer via Controller:	LEMO 8-pin

Scope of supply

- *lab*SG6 (Code 3727)
  6-channel input module for connecting of up to six measuring bridges and sensors

Optional

- CLL X.xx (Code 3780-xx)
  Cable HEAD*link*
  LEMO 8-pin ↔ LEMO 8-pin

Highly recommended

- CDL III.1 (Code 9818-1)
  Adapter cable LEMO 8-pin ↔ D-Sub 9-pin, 1 m