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DATA SHEET

*lab*CF6 (Code 3725)

6-channel charge/ICP input module with integrated charge amplifiers

Overview

*lab*CF6 is used for connecting charge and ICP sensors, whereby each channel can be used individually in charge or ICP mode.

In charge mode, *lab*CF6 is equipped with charge amplifiers for charge sensors.

A *lab*CF6 highlight is the "0 Hz ICP/DC coupling" developed by HEAD acoustics, which allows ICP measurements from 0 Hz to 45 kHz. For example, users are allowed to connect seismic ICP sensors for measuring extremely low-frequency signals.

The premium and flexible module *lab*CF6 can be easily connected to other modules and forms a stable and easily-manageable unit.

Features

- Input module with integrated charge amplifiers for 6 charge or ICP sensors

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)
- HMS V (artificial head measuring system)
- MMF III.0/MMF III.0-V1 (Brake*OBSERVER* frontends)

Connections for sensors

- Each channel can be used in charge or ICP mode
- Charge mode
  (via Microdot-Adapter CMB I)
  - Charge amplifiers for charge sensors (individually shielded)
  - Fixed measuring ranges can be adjusted per channel: 10 pC, 100 pC, 1 nC, 10 nC, 100 nC, 1 μC
- ICP mode
  - ICP switchable for AC/DC coupling
  - Fixed measuring ranges can be adjusted per channel: 10 mV, 100 mV, 1 V, 10 V, 30 V

0 Hz ICP/DC coupling from HEAD acoustics

- 0 Hz to 45 kHz frequency range

Functions

- Low power consumption (8 W)
- Peak detector function (for each channel)
- Charge overload function (e.g. when connecting mismatched sensors)
- Power supply via HEAD*link* interface
- Electrical isolation of *lab*CF6 inputs to inputs of other HEAD*lab* modules and the PC interface

Filters

- Analog low-pass filters (switchable): 1 kHz and 5 kHz
- Analog high-pass filter 0.16 Hz, 1. order, not switchable in AC mode
- Analog high-pass filter (switchable): 22 Hz, 2nd order

Handling

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

Scope of supply

- *lab*CF6 (Code 3725)
  6-channel charge/ICP input module
- 6 x CMB I (Code 3798)
  Adapter Microdot
  [BNC ↔ Microdot]

Optional

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

Technical data

General

Connectors data acquisition/data generation	6 x Charge In or alternatively Line-/ICP In
Communication interfaces	1 x HEAD*link*
Supply connection	HEAD*link*
Supply voltage	10 V_{DC} to 28 V_{DC}
Max. power consumption stand-alone operation	7.2 W
Max. power consumption with sensors connected	8 W
System sampling frequency	44.1 kHz, 48 kHz, 51.2 kHz
Min. to max. sampling frequency @ 44.1 kHz	1.837 kHz to 88.1 kHz
Min. to max. sampling frequency @ 48 kHz	2 kHz to 96 kHz
Min. to max. sampling frequency @ 51.2 kHz	2.133 kHz to 102.4 kHz
Synchronization	External HEAD*link*
Max. sampling frequency	102.4 kHz
Cooling	Convection, no fan
Operating temperature	-10 °C to +60 °C
Storage temperature	-20 °C to +70 °C
Dimensions	148 x 173 x 48 mm (W x D x H)
Weight	840 g

Digital HEAD*link*

Connector	1 x Lemo 8-pin
Number of interfaces	1
Supply voltage	10 V_{DC} to 28 V_{DC}
HEAD*link* version	HEAD*link* 1.0
Electrical isolation	Yes
Synchronization	44.1 kHz, 48 kHz, 51.2 kHz
Maximum cable length	60 m

Analog input voltage/ICP

Connector	6 x BNC
Number of channels	6
Quantity	Voltage
Ranges	0.01 Vp, 0.1 Vp, 1 Vp, 10 Vp, 30 Vp
Input impedance	1000 kΩ
Frequency range	0 Hz to 45 kHz
Coupling	DC, AC, ICP, ICP-DC
Analog highpass filter	0.16 Hz, 1st order, ±10% 22 Hz, 2nd order, switchable, ±10%
Analog lowpass filter	1 kHz, 2nd order, switchable, ±10% 5 kHz, 2nd order, switchable, ±10%
Digital highpass filter @ fs = 48 kHz, proportional to fs	1 Hz
Digital lowpass filter @ fs = 48 kHz, proportional to fs	21.6 kHz
Resolution	24 bit (delta sigma ADC and DA converter)
Electrical isolation input/output	Yes
Electrical isolation channel by channel	No
Electric strength	±35 V
TEDS (IEEE 1451.4) read	TEDS class 1, shared signal wire (version 0.9 and 1.0)
ICP voltage	22.4 V
ICP current	4 mA (±25%)

Analog input charge

Connector	6 x BNC
Number of channels	6
Quantity	Charge
Ranges	10 pC, 100 pC, 1000 pC, 10000 pC, 100000 pC, 1000000 pC
Input impedance	10 GΩ (10 pC, 100 pC), … , 10 MΩ (100 nC, 1 uC)
Coupling	DC, AC, ICP
Analog highpass filter	0.16 Hz, 1st order, ±10% 22 Hz, 2nd order, switchable, ±10%
Analog lowpass filter	1 kHz, 2nd order, switchable, ±10% 5 kHz, 2nd order, switchable, ±10%
Digital highpass filter @ fs = 48 kHz, proportional to fs	1 Hz
Resolution	24 bit
Electrical isolation input/output	Yes
Electrical isolation channel by channel	No
Electric strength	±35 V

Analog input voltage/ICP – ranges

Range	10 mVp	100 mVp	1 Vp	10 Vp	30 Vp
S/N	79.6 dB(A)	98 dB(A)	108 dB(A)	108 dB(A)	89 dB(A)
THD+N	-73.5 dB	-91.5 dB	-100.5 dB	-99 dB	-82.5 dB
Frequency response 20 Hz to 20 kHz @ fs = 48 kHz Tolerance	 0.26 dB 3%	 0.061 dB 0,7%	 0.061 dB 0,7%	 0.061 dB 0,7%	 0.061 dB 0,7%
DC accuracy DC mode at 0 Hz Tolerance	 0.16 dB 1.8%	 0.0173 dB 0.2%	 0.009 dB 0.1%	 0.009 dB 0.1%	 0.009 dB 0.1%

Analog input charge – ranges

Range	10 pCp	100 pCp	1 nCp	10 nCp	100 nCp	1 μCp
S/N	73 dB	93 dB	108.5 dB	107.5 dB	108 dB	108.5 dB
THD+N	-68.5 dB	-88.5 dB	-99.5 dB	-100 dB	-101.5 dB	-102.5 dB
Frequency response 20 Hz to 20 kHz @ fs = 48 kHz	0.052 dB	0.052 dB	0.052 dB	0.052 dB	0.052 dB	0.052 dB