Datasheet

µeps iXS

Ultra low noise isotropic strain sensor

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Description

The µeps iXS is an ultra low noise, isotropic strain sensor with excellent sensitivity-to-mass ratio. It comprises an internal temperature sensor (LM235), stabilized IEPE voltage output and comes in a rugged aluminum case.

Key Features

- Large bandwidth
- Large dynamic range
- Ultra low noise

Applications (examples)

- High value asset monitoring (wind turbines)
- Dynamic strain monitoring of large scale structures (bridges)
- Observation of abnormalities in highly stressed materials

Properties

Performance	Value	Unit
Sensitivity	see options	
Sensitivity Tolerance	see options	
Frequency Response (+/-3dB)	see options	
Maximum Range	see options	
Maximum Shock protection	3000	g
Long Term Drift	Not determined	
Sensitivity Temperature Coefficient	Not determined	
Electrical	**Value**	**Unit**
IEPE Offset Voltage, temperature stabilized	13	V
IEPE Voltage Range	8 - 18	V
IEPE Supply Voltage	20 - 35	V
IEPE Supply Current	4	mA
Turn On Settling Time	10	S
Noise Performance	**Value**	**Unit**
Spectral Noise @ 0.1 Hz	5.5	µV/√Hz
Spectral Noise @ 1 Hz	4.5	µV/√Hz
Spectral Noise @ 10 Hz	1.7	µV/√Hz
Spectral Noise @ 100 Hz	1.0	µV/√Hz
Wide Band Noise 0.1…100 Hz (RMS)	14	µV
Temperature Sensor	**Value**	**Unit**
Sensor	LM235 Precision Temperature Sensor See datasheet for more details: https://www.st.com/resource/en/datasheet/lm235.pdf	
Type	2- terminal Zener, calibratable, breakdown voltage is directly proportional to the absolute temperature.	
Sensitivity	10	mV/K

Accuracy, uncalibrated	1 (typical)	°C
Accuracy, calibrated	0.5 (typical)	°C
Supply Current	0.45…5	mA
Environmental	Value	Unit
Operating Temperature	-40…85	°C
Storage Temperature	-40…85	°C
Shock & Vibration	Tested according to EN 60068-2 • EC 60068-2-6:2007 • IEC 60068-2-64:2008 • IEC 60068-2-27:2008 • IEC 60068-2-31:2008 • IEC 60068-2-2:2007 • IEC 60068-2-1:2007 • IEC 60068-2-14:2009 • IEC 60068-2-78:2012 • IEC 60068-2-30:2005 • IEC 60068-2-38:2009 • IEC 60529:2013 • IEC 60068-2-52:2017	
Electromagnetic Compatibility (EMC)	Tested according to DIN EN 61326-1 • DIN EN 55011 • DIN EN 61000-4-2 • DIN EN 61000-4-3 • DIN EN 61000-4-4 • DIN EN 61000-4-5 • DIN EN 61000-4-6 • DIN EN 61000-4-8:	
Ingress Protection	IP68	
Physical	Value	Unit
Dimensions	121 x 50 x 26	mm
Weight	150 (sensor) + 310 (optional cable)	gram
Case Material	Aluminium	
Mounting	Adhesive	
Connector	see options	

Typical Performance Characteristics & Options

Option A to D		Obsolete
Option E (µeps iXS E)	Value	Unit
Sensitivity	3,61 (uncalibrated, not guaranteed)*	mV/ppm
Sensitivity Tolerance	+ / - 3*	%
Frequency Response	+ / - 3 dB = 1 – 10.000 Hz (see Option F)	dB / Hz
Maximum Range	+ / - 1385	ppm
Cable/Connector	Premounted cable 5m, grey with 8-pin female Lumberg Connector 0322 08-1	
Option F (µeps iXS F)	Value	Unit
Sensitivity	2,89 (uncalibrated, not guaranteed)*	mV/ppm
Sensitivity Tolerance	+ / - 3*	%
Frequency Response	+ / - 3 dB = 1 – 10.000 Hz	dB / Hz
Maximum Range	+ / - 1730	ppm
Cable/Connector	Premounted cable 5m, grey with 8-pin female Lumberg Connector 0322 08-1	
Option G (µeps iXS G)	Value	Unit
Sensitivity	2,89 (uncalibrated, not guaranteed)*	mV/ppm
Sensitivity Tolerance	+ / - 3*	%
Frequency Response	+ / - 3 dB = 1 – 10.000 Hz (see Option F)	dB / Hz
Maximum Range	+ / - 1730	ppm
Cable/Connector	Premounted cable 5m, black with M12 A-coded 4-pol male connector	

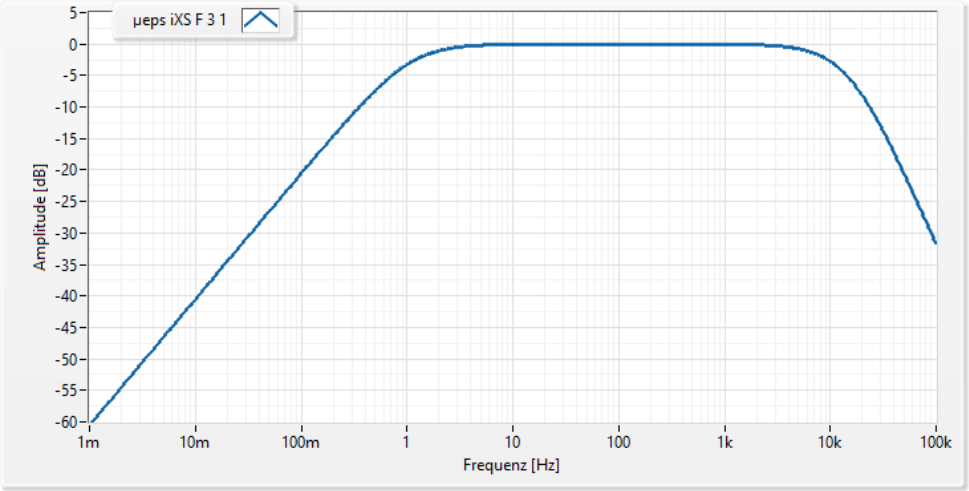
* As with any precision sensor, mechanical shocks can affect calibration.

See next page for more options.

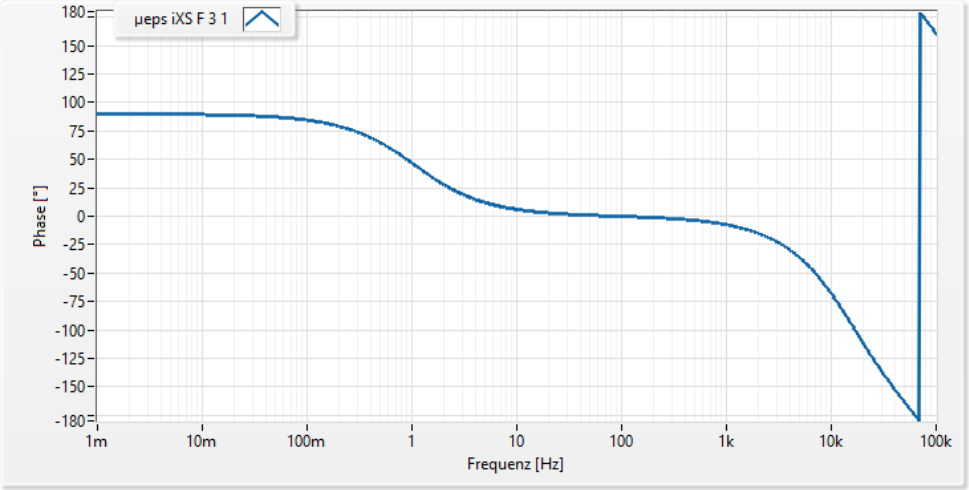
Option J (µeps iXS J)	Value	Unit
Sensitivity	2,89 (uncalibrated, not guaranteed)*	mV/ppm
Sensitivity Tolerance	+ / - 3*	%
Frequency Response	+ / - 3 dB = 1 – 10.000 Hz (see Option F)	dB / Hz
Maximum Range	+ / - 1730	ppm
Cable/Connector	No cable, M12 A-coded 4-pol male connector	

* As with any precision sensor, mechanical shocks can affect calibration.

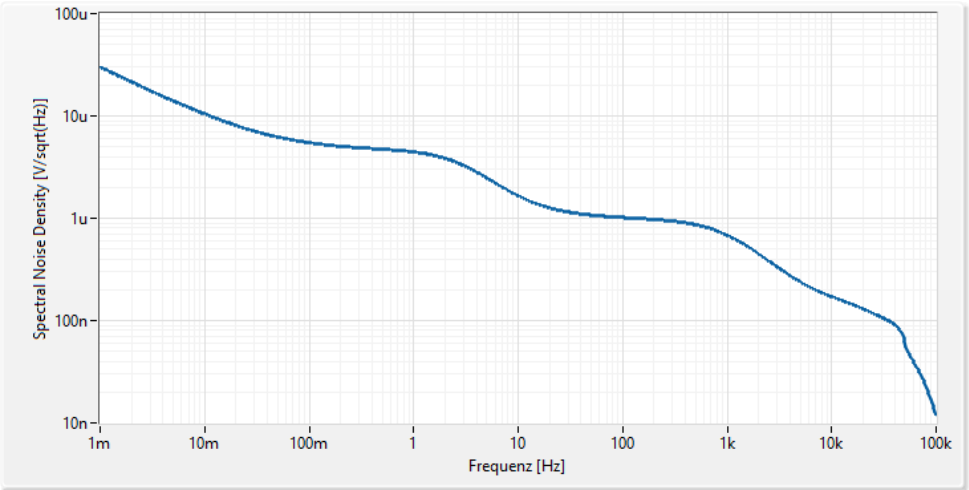
Transfer Amplitude



Transfer Phase



Noise Spectrum



Application Information

For installation the sensor must be glued to the surface on which the strain measurement shall be performed. The sensor must be mounted with the full sensor bottom surface to ensure reliable measurement. **Bonding processes require special attention to the preparation.**

General surface preparation

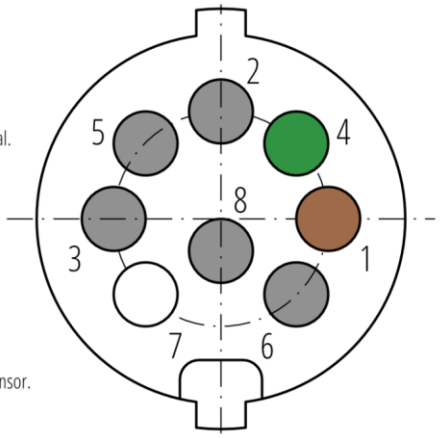
A critical factor when bonding aluminium is the fast oxidation ability of aluminium. The oxide layer is inherently brittle, porous and acts as a separating layer, which in the long term leads to detachment of the adhesive. Especially if strength values above approx. 15 N/ mm2 (breaking point of aluminium oxide) are to be achieved, a through surface preparation before bonding is therefore essential. It improves the wetting with adhesive.

First of all, oils, greases, dirt particles should be removed with grease soluble cleaners such as acetone, nitro thinner, isopropanol or (wash) primers. Afterwards do not touch the housing and the structure the sensor shall be applied to with bare hands.

This is followed by mechanical surface pretreatment process (grinding between grain size P120 up to P600, brushing or sandblasting). Abrasion creates a fresh and thus chemically more active surface – a prerequisite for good “adhesive bonding”. Bonding must then take place as quickly as possible, up to a maximum of 10 minutes after sanding, so that no oxide layer is formed. The following applies: Clean or degrease first, and then blast or grind. Otherwise, impurities could be blasted/ ground deep into the metal during the grinding process, which would still have a separating effect on the adhesive.

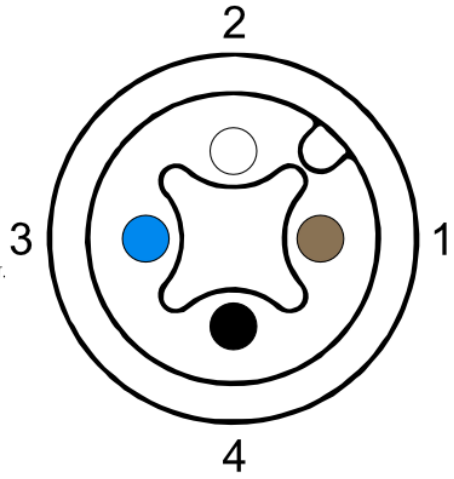
Pin Allocation

Allocation Lumberg 0322 08-1 series (view from inside to the outside)



1. IEPE plus (strain)	●	Current input terminal for IEPE conditioned strain sensor signal.
2. not connected	●	
3. not connected	●	
4. IEPE minus / Temp minus	●	Common ground pin.
5. not connected	●	
6. not connected	●	
7. Temp plus	○	Current input/positive voltage input of LM235 temperature sensor. See LM235 datasheet for details.
8. not connected	●	

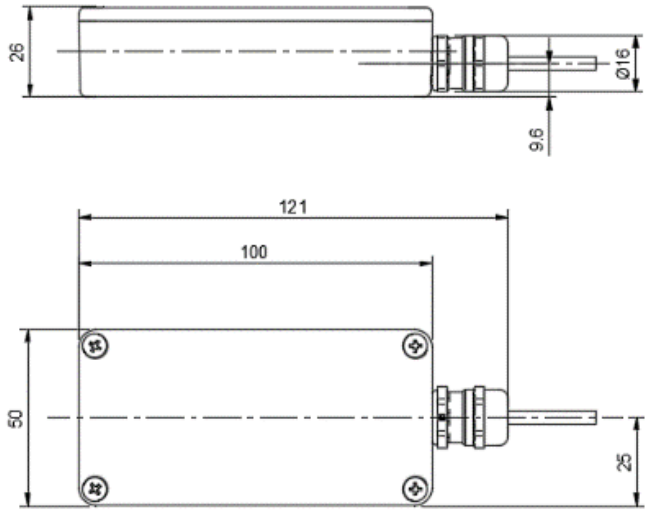
Allocation 4-pin M12

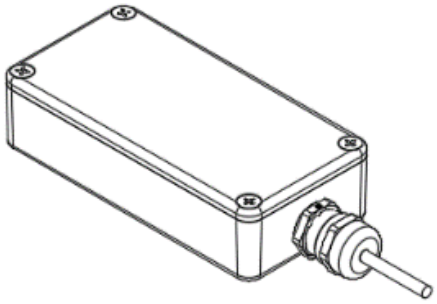


1. IEPE plus (strain)	●	Current input terminal for IEPE conditioned strain sensor signal.
2. not connected	○	
3. Temp plus	●	Current input/positive voltage input of LM235 temperatur sensor. See LM235 datasheet for details.
4. IEPE minus / Temp minus	●	Common ground pin.

Technical Drawings

- All dimensions in mm
- The sensitive face is the sensor bottom side, opposite the the lid.





Declaration of Conformity

- CE
- RoHS
- Reach
- 3TG

Legal Disclaimer

Product Use

iNDTact products may only be used within the parameters of this product data sheet. They are not fit for use in life- sustaining or security sensitive systems. Security sensitive systems are those for which a malfunction is expected to lead to bodily harm or significant property damage. The resale and / or use of products are at the purchaser´s own risk and his own responsibility. The examination of fitness for the intended use is the sole responsibility of the purchaser. The purchaser shall indemnify iNDTact from all third party claims arising from any product use not covered by the parameters of this product data sheet or not approved by iNDTact and reimburse iNDTact for all costs in connection with such claims. The purchaser must monitor the market for the purchased products, particularly with regard to product safety, and inform iNDTact without delay of all security relevant incidents.

Application Examples

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