

# TECH NOTE :: Connecting an IEPE / ICP<sup>®</sup> transducer to ClipX over an external Smart Module

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#### **Short description**

This is a quick start guide to connect an IEPE / ICP transducer to a ClipX system via an External Smart Module.



Building sketch

#### Introduction

A 'current-fed piezo electric transducer' - short name 'IEPE' or 'ICP<sup>®</sup>' is connected to a voltage input channel of a ClipX module using HBM's External Smart Module (EICP) which works as a signal conditioner between the transducer and the *standardized voltage input of +/- 10 V*.

The EICP Smart Module needs a **24** V DC active power supply and comes along with a **BNC connector**. Since the ClipX requires the same supply voltage, the power supply for the smart module can be taken from the ClipX.



In this example, the following parts are used:

- ClipX-module
- Smart-module: 1-EICP-B-2 (BNC-plug to the IEPE-sensor)
- Cable SAC-EXT-MF-x (x = cable length in meters)
- Sensor (here: Brüel & Kjaer 4508-B-004 acceleration sensor)

A variant called 1-EICP-M with microdot connector is also available.





### **Connecting the Smart Module to ClipX**

- The figure below shows the connection between the Smart Module and a ClipX module.



## Transducer

- In this example we use the following sensor: Brüel & Kjaer 4508-B-004 (acceleration sensor)

Data sheet 4508-B-004

#### Specifications – Miniature CCLD Accelerometer Type 4508

	Sensitivity	Sensitivity Tolerance	Measuring Range	Frequency Range, ±10%	Phase Response, ± 5∘	Built-in ID (TEDS)	Output Impedance	Bias Voltage	Start-up Time (±10% of final bias)	Inherent Noise (broadband)/	Equivalent Vibration Level	Temperature Coefficient of Sensitivity	Ambient Temperature Range	Sensing Element	Sealing	Humidity	Mounting Slots (pairs)
Units	mV/ms <sup>-2</sup>	96	ms <sup>-2</sup>	Hz	Hz		Ω	v	5	μV	μg	%/°C	°C			%	
4508	10	±5	700	0.3-8 k	2 – 5 k	No	<30	13±1	5	<35	<350	0.06	-54 to 121	PZ23	Hermetic	100	1
4508-001	1	±5	7000	0.1-8 k	0.5 – 5 k	No	<30	13±1	50	<8	<800	0.06	-54 to 121	PZ23	Hermetic	100	1
4508-002	100	±10	70	0.4-8 k	2-5 k	No	<30	13±2	5	<150	<150	0.12	-54 to 100	PZ27	Hermetic	100	1
4508-B	10	±5	700	0.3-8 k	2 – 5 k	Yes	<30	13±1	5	<35	<350	0.06	-54 to 121	PZ23	Hermetic	100	1
4508-B-001	1	±5	7000	0.1-8 k	0.5 – 5 k	Yes	<30	13±1	50	<8	<800	0.06	-54 to 121	PZ23	Hermetic	100	1
4508-B-002	100	±10	70	0.4-8 k	2-5 k	Yes	<30	13±2	5	<150	<150	0.12	-54 to 100	PZ27	Hermetic	100	1
4508-B-003	10	±5	700	0.3-8 k	2-5 k	Yes	<30	13±1	5	<35	<350	0.06	-54 to 121	PZ23	Hermetic	100	None
4508-B-004	50	±5	140	0.2-8 k	1-5k	Yes	<30	13±2	10	<80	<160	0.12	-54 to 100	PZ27	Hermetic	100	1



## **ClipX-Settings**

In the menu item 'Amplifier', the sensor type must be set to 'Voltage +/-10V' to get a valid signal. The physical unit is set to 'g' or 'm/s<sup>2</sup>' (1g =  $9.81 \text{ m/s}^2$ ).

НВМ		ClipX > Amplifier						
ŧ	Home	ClipX E Default name of parameter set (01)						
<···>	Network	Electrical Value	Gross					
ф	Device	Field value	Gross - Zero Value: 0 g · Zero Ta					
₽	Amplifier	Name Decimal Places	Name					
Σ	Calculated Channels	Electrical Value .000 -	Gross					
$\uparrow$	Peak Values	16/22	5/22					
0	Captured Values	Sensor Type						
	Limit Switches	Voltage +/-10V v						
٥	Digital I/O	Physical Unit						
Ω	Analog Output	۶	1 / 10					



After that, the scaling is done.

The required points are the following:

Point 1:	Physical:	0g = 0 m/s <sup>2</sup> (rest)
	Electrical:	$50\frac{mV}{m/s^2} * 0 m/s^2 = 0V$
Point 2:	Physical:	1g = 9,81 m/s <sup>2</sup>
	Electrical:	$50\frac{mV}{m/s^2} * 9.81 m/s^2 = 0.4905V$

ClipX > Amplifier				♦ @ ●
ClipX 📴 Default name of parameter set (01)				🜔 48 % Status: 🌒 Fieldbus: Off
Electrical Value Field value 0.000 V	<b>Gross</b> Gross - Zero Value: 0 g - Zero Target Va	ue: 0 g <b>0.001</b> g	Net Net	<b>0.001</b> g
Name Decimal Places Electrical Value .000 ~ 16 / 22	Name         Decima           Gross         .000           5 / 22	Places	Name Net	Decimal Places .000 ~ 3 / 22
Sensor Type Voltage +/-10V ~	S T	caling Type wo-point Scaling	Ŧ	
Physical Unit g	1. 0	Point Electrical		V MEASURE
Туре	1. 0	Point Physical		g
Bessel  - Cut-off Frequency (-3dB)		Point Electrical 4905		V MEASURE
100	Hz 2	Point Physical		g
	1.	Point Electrical set by	0	~
	2	Point Electrical set by	0	~

#### Disclaimer

This example is simply for the purpose of illustration. It cannot be used as the basis for any warranty or liability claims.