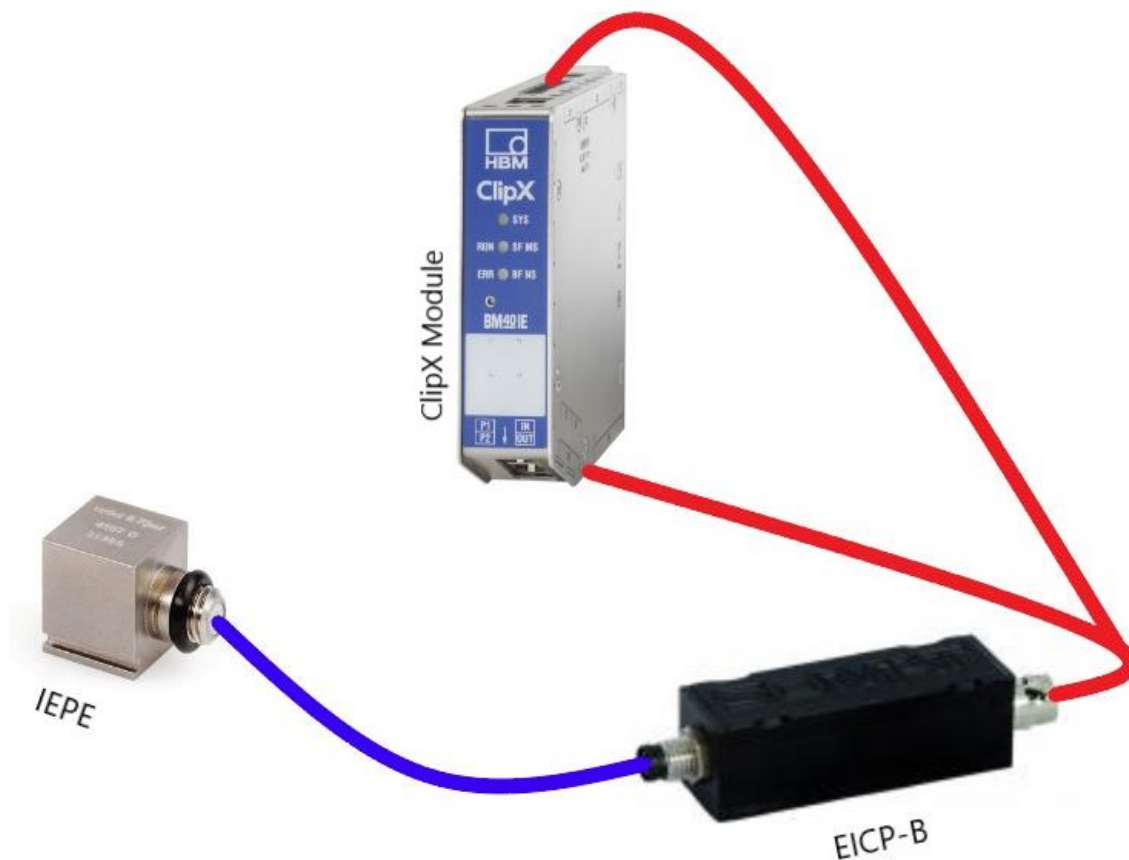


TECH NOTE :: Connecting an IEPE / ICP® transducer to ClipX over an external Smart Module

Version: 2018-10-18
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Status: HBM: Public

Short description

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



Building sketch

Introduction

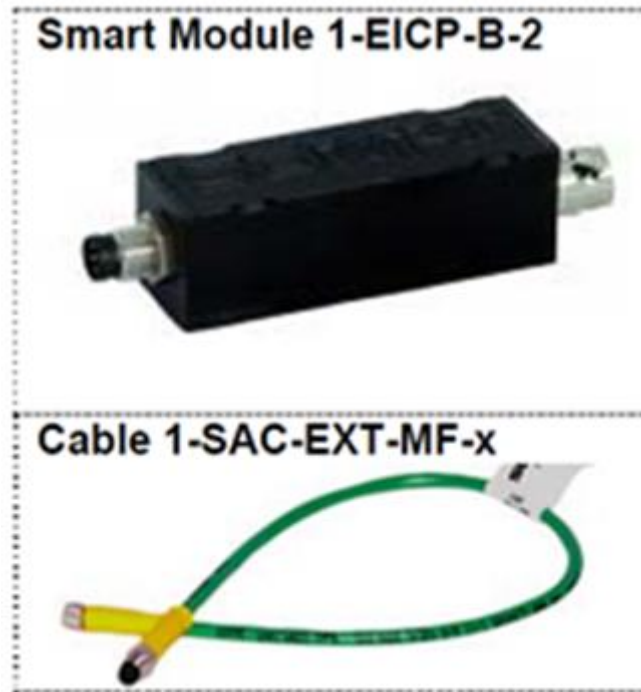
A 'current-fed piezo electric transducer' - short name 'IEPE' or 'ICP®' is connected to a voltage input channel of a ClipX module using HBM's External Smart Module (EICP) which works as a signal conditioner between the transducer and the **standardized voltage input of +/- 10 V**.

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:

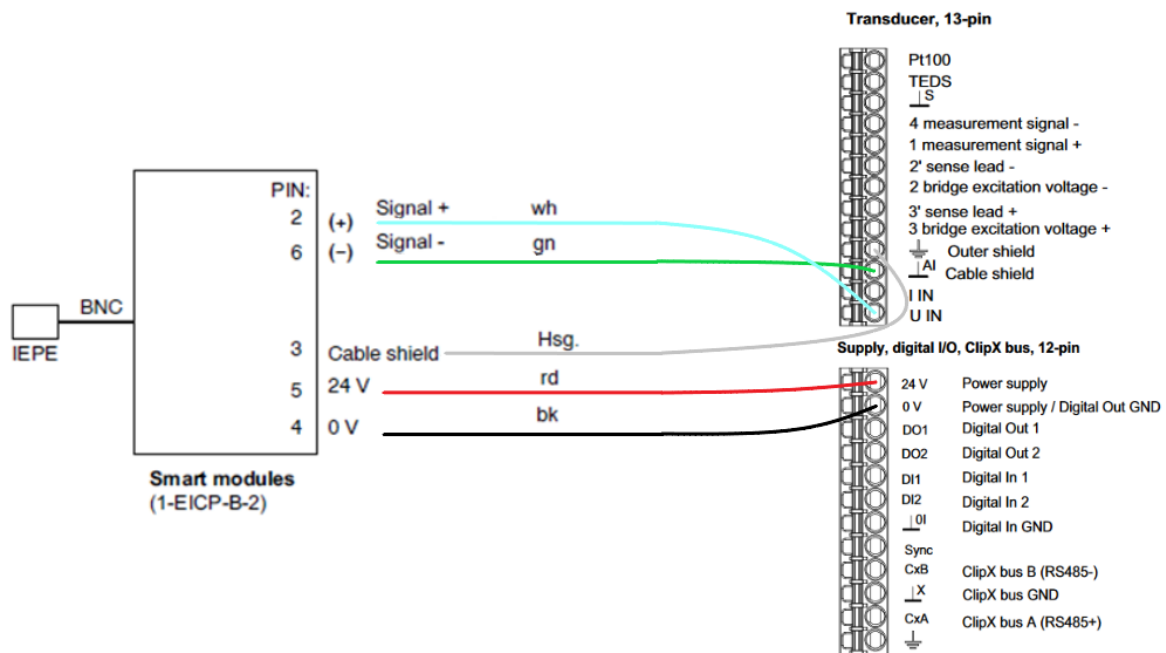
- ClipX-module
- Smart-module: 1-EICP-B-2 (BNC-plug to the IEPE-sensor)
- Cable SAC-EXT-MF-x (x = cable length in meters)
- Sensor (here: Brüel & Kjaer 4508-B-004 acceleration sensor)

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)

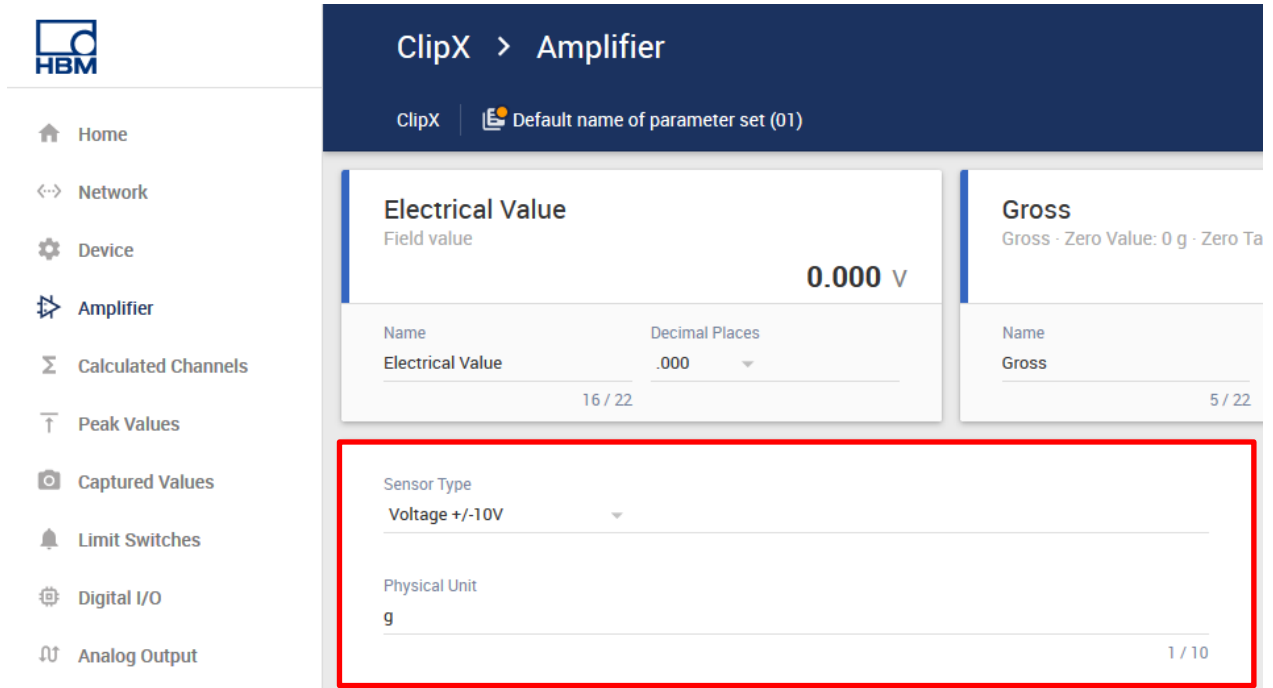
Data sheet 4508-B-004

Specifications – Miniature CCLD Accelerometer Type 4508

	Sensitivity	Sensitivity Tolerance	Measuring Range	Frequency Range, $\pm 10\%$	Phase Response, $\pm 5^\circ$	Built-in ID (TEDS)	Output Impedance	Bias Voltage	Start-up Time ($\pm 10\%$ 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 ⁻²	%	ms ⁻²	Hz	Hz		Ω	V	s	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	1–5 k	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/s²' (1g = 9.81 m/s²).



ClipX > Amplifier

ClipX | Default name of parameter set (01)

Electrical Value
Field value
0.000 V

Name	Decimal Places
Electrical Value	.000

16 / 22

Gross
Gross · Zero Value: 0 g · Zero Ta

Name
Gross

5 / 22

Sensor Type
Voltage +/-10V

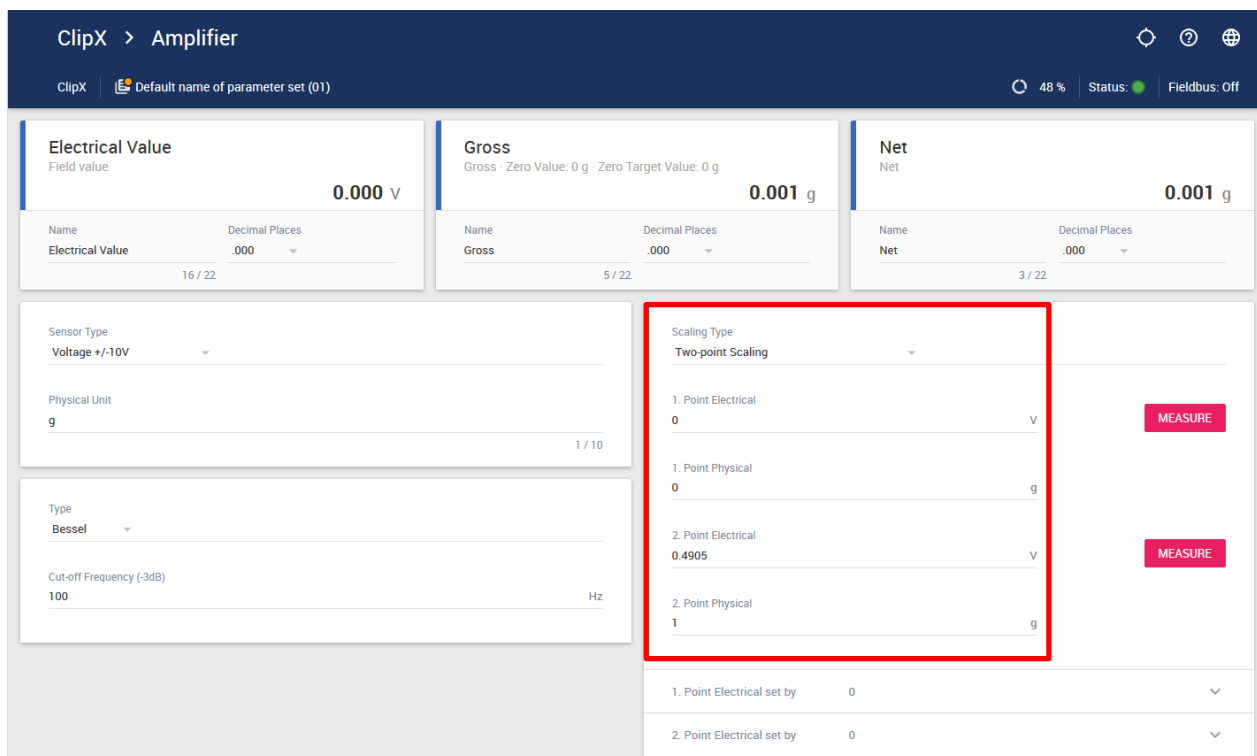
Physical Unit
g

1 / 10

After that, the scaling is done.

The required points are the following:

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



The screenshot shows the 'ClipX > Amplifier' configuration page. At the top, there are status indicators: '48 %', 'Status: [green dot]', and 'Fieldbus: Off'. The main configuration area is divided into several sections:

- Electrical Value:** Displays '0.000 V'. Below it, a table shows 'Name: Electrical Value' and 'Decimal Places: .000'.
- Gross:** Displays '0.001 g'. Below it, a table shows 'Name: Gross' and 'Decimal Places: .000'.
- Net:** Displays '0.001 g'. Below it, a table shows 'Name: Net' and 'Decimal Places: .000'.
- Sensor Type:** Set to 'Voltage +/-10V'.
- Physical Unit:** Set to 'g'.
- Type:** Set to 'Bessel'.
- Cut-off Frequency (-3dB):** Set to '100 Hz'.
- Scaling Type:** Set to 'Two-point Scaling'. This section is highlighted with a red box. It contains two rows of scaling points:

Point	Electrical	Physical	Unit	Action
1. Point Electrical	0		V	MEASURE
1. Point Physical		0	g	
2. Point Electrical	0.4905		V	MEASURE
2. Point Physical		1	g	
- Summary:** At the bottom, it shows '1. Point Electrical set by 0' and '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.