



# ibaMS8xIEPE

Input module for IEPE vibration sensors

Manual

Issue 2.1

Measurement Systems for Industry and Energy

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## Certification

The product is certified according to the European standards and directives. This product meets the general safety and health requirements.

Further international customary standards and directives have been observed.



Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Issue	Date	Revision	Chapter	Author	Version HW / FW
2.1	11-2023	Technical data (MTBF)			

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# 1 About this manual

In this manual, you learn a lot about the design of the ibaMS8xIEPE device and how to use and operate it. You can find a general description of the iba-modular system and further information about the design of the central units and how to use and operate them in separate manuals.



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## Note

The documentation for the iba-modular system is part of the data medium “iba Software & Manuals”. The documentation is also available at [www.iba-ag.com](http://www.iba-ag.com) in the download area.

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The documentation of the iba-modular system comprises the following manuals:

### □ Central units

The manuals of the central units, e.g. ibaPADU-S-IT-2x16 and ibaPADU-S-CM, contain the following information:

- Scope of delivery
- System requirements
- Description of the device
- Mounting/Demounting
- Start-up
- Configuration
- Technical data
- Accessories

### □ Modules

The manuals for the single modules contain specific information about the module. There are the following information classes:

- Short description
- Scope of delivery
- Product characteristics
- Configuration
- Description of the functions
- Technical data
- Connection diagram

## 1.1 Target group

This manual addresses in particular the qualified professionals who are familiar with handling electrical and electronic modules as well as communication and measurement technology. A person is regarded to as professional if he/she is capable of assessing safety and recognizing possible consequences and risks on the basis of his/her specialist training, knowledge and experience and knowledge of the standard regulations.

## 1.2 Notations

In this manual, the following notations are used:

Action	Notations
Menu command	Menu <i>Logic diagram</i>
Call of menu command	<i>Step 1 – Step 2 – Step 3 – Step x</i> Example: Select menu <i>Logic diagram – Add – New logic diagram</i>
Keys	<Key name> Example: <Alt>; <F1>
Press keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Button name> Example: <OK>; <Cancel>
File names, Paths	„File name“, „Path“ Example: „Test.doc“

## 1.3 Used symbols

If safety instructions or other notes are used in this manual, they mean:



### **⚠ DANGER**

The non-observance of this safety information may result in an imminent risk of death or severe injury:

- By an electric shock!
- Due to the improper handling of software products which are coupled to input and output procedures with control function!

If you do not observe the safety instructions regarding the process and the system or machine to be controlled, there is a risk of death or severe injury!



### **⚠ WARNING**

The non-observance of this safety information may result in a potential risk of death or severe injury!



### **⚠ CAUTION**

The non-observance of this safety information may result in a potential risk of injury or material damage!



### **Note**

A note specifies special requirements or actions to be observed.



### **Tip**

Tip or example as a helpful note or insider tip to make the work a little bit easier.



### **Other documentation**

Reference to additional documentation or further reading.

## 2 Introduction

The ibaMS8xIEPE module is member of the iba-modular system. The modular concept of the iba-modular system is designed on the basis of a backplane. You can plug on this backplane not only the CPU, but also up to 4 input/output modules. The power supply of the I/O modules is provided by the backplane bus.

The ibaMS8xIEPE module offers 8 analog inputs

### In brief:

- I/O module for the iba-modular system
- 8 analog inputs
- Galvanically isolated groups of 2 inputs each
- Constant current source 4 mA
- Typically for IEPE vibration sensors
- Detection of broken line and short circuit
- Analog and digital anti-aliasing filter
- Synchronous sampling
- 4 channels can be configured as  $\pm 24$  V voltage input
- High-pass 1 Hz or 0.1 Hz can be configured
- Sampling rate 1 kHz<sup>1</sup> ... 40 kHz, freely adjustable
- 24 bit resolution
- Rugged design, easy mounting
- Certification according to CE

### Fields of application

Measurement of mechanical vibration by means of IEPE vibration sensors:

- Wind turbines
- Condition Monitoring
- Test benches
- Monitoring of bearings
- Mill chatter monitoring

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<sup>1</sup> Due to the integrated filters, a minimum sampling rate of 1 kHz is recommended for the correct operation of this module, even if an even lower sampling rate (time base) can be set in the ibaPDA configuration.

### 3 Scope of delivery

After unpacking, check the delivery for completeness and possible damages.

The scope of delivery comprises:

- ibaMS8xIEPE device
- 2 x 12-pin multi-pin connector
- Data medium „iba Software & Manuals“ (only for single delivery)

### 4 Safety instructions

#### 4.1 Intended use

The device is an electrical apparatus. It is only allowed to use the device for the following applications:

- Measurement data acquisition
- Automation of industrial plants
- Applications with iba products (ibaPDA, ibaLogic etc.)

The device is only to be applied as shown in the Technical Data.

#### 4.2 Special safety instructions

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**⚠ DANGER**

**Strictly observe the measuring range (see Technical Data)!**

Never use damaged measuring cables!

Measuring cables must NOT be attached or detached to/from the device under voltage!

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**⚠ WARNING**

Modules must NOT be attached or detached to/from the rack under voltage!

Switch off the central unit or disconnect power supply before attaching or detaching the modules.

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**⚠ WARNING**

This is a Class A device. This equipment may cause radio interference in residential areas. In this case, the operator will be required to take appropriate measures.

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**Important note**

Do not open the device! Opening the device will void the warranty!

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**Note**

Clean the device only on the outside with a dry or slightly damp and statically discharged cloth.

## 5 System Requirements

### 5.1 Hardware

- Central unit: ibaPADU-S-IT-2x16 or ibaPADU-S-CM (version 02.12.004 or later)
- Backplane unit, e. g. ibaPADU-B4S

### 5.2 Software

- ibaPDA version 6.35.0 or later
- ibaLogic-V5 version 5.0.3 or later

## 6 Mounting, Connecting, Dismounting



### CAUTION

Works on the device must NOT be done when it is under voltage! Always disconnect the central unit from the power supply!



#### Note

Mount one or more modules on the right next to the central unit (slot X2 to X5 can be freely selected).

### 6.1 Mounting

1. Disconnect the central unit from the power supply.
2. Remove the cover from the backplane bus, to which the module should be attached.
3. Attach the device to the backplane bus and press it firmly against the backplane.
4. Secure the device with the fixing screws.



#### Important Note

Always screw tight the device and the modules. Otherwise, plugging or unplugging the connectors for the inputs/outputs can cause damage.

### 6.2 Connecting



#### Note

The backplane unit and the device must be connected to a protective conductor.

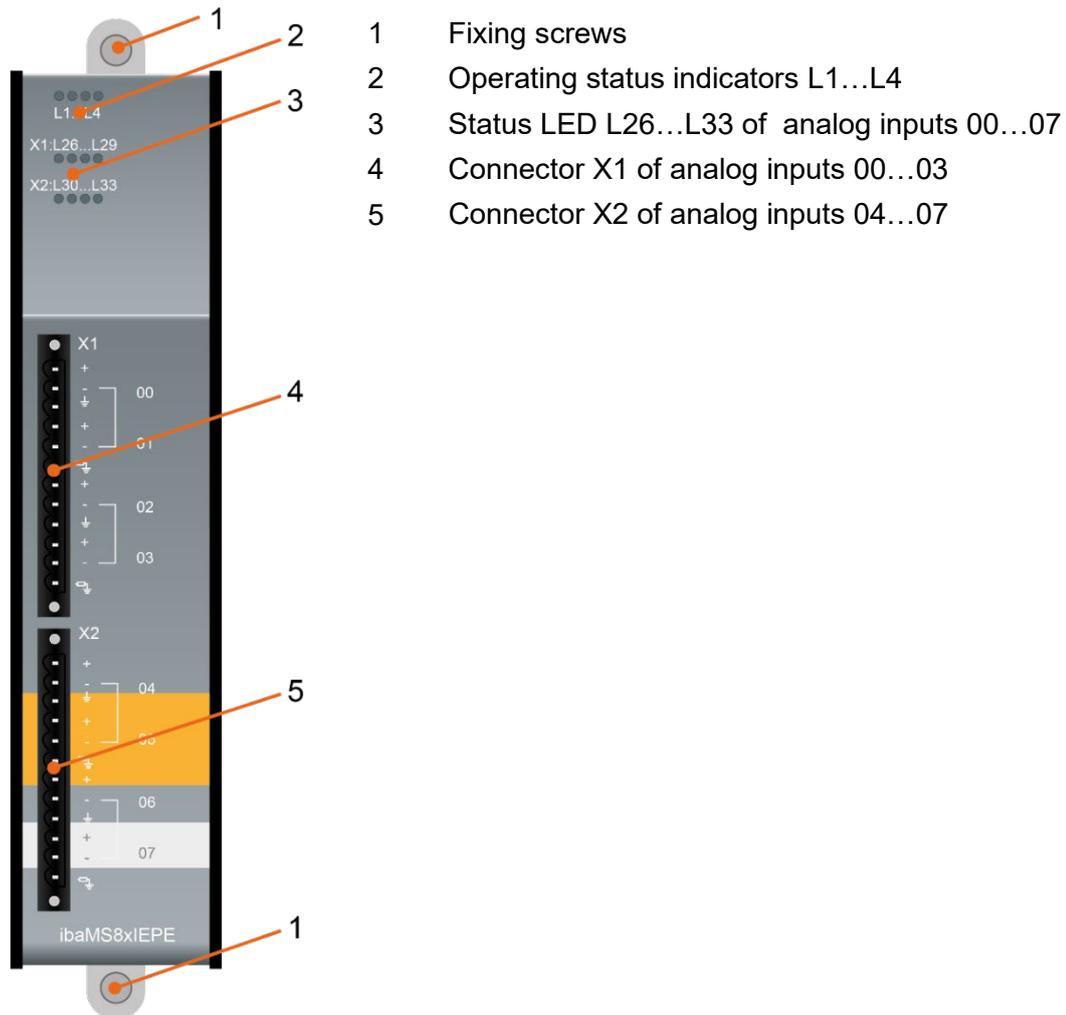
1. Connect all cables.
2. If all required cables are connected, connect the central unit to the power supply.
3. Switch on the central unit.

### 6.3 Dismounting

1. Disconnect the central unit from the power supply.
2. Remove all cables.
3. Remove the both fixing screws on the upper and the lower side of the device.
4. Pull the device straight from the backplane.
5. Put the cover on the backplane bus.

## 7 Device description

### 7.1 View



- 1 Fixing screws
- 2 Operating status indicators L1...L4
- 3 Status LED L26...L33 of analog inputs 00...07
- 4 Connector X1 of analog inputs 00...03
- 5 Connector X2 of analog inputs 04...07

## 7.2 Indicating elements

The operating status of the device and the status of the analog inputs are shown by colored status LEDs.

### 7.2.1 Operating status

LED	Status	Description
L1: green	Flashing / On	Device is working
	Off	Device is not working (switched off)
L2: yellow	On	Access to the backplane bus
L3: white	-	-
L4: red	Off	Normal status, no faults
	Flashing	Device failure



#### Important note

When the LED L4 indicates a failure, please contact the iba support.

## 7.2.2 Status of IEPE inputs

LED per channel	Status	IEPE mode	AI mode
L26 ... L33	Off	Channel not active	$\pm (0 \text{ V} \dots 0.3 \text{ V})$
	Green	$\pm (0 \text{ V} \dots 4.5 \text{ V})$ 0...90% inside measuring range	$\pm (0.3 \text{ V} \dots 21.6 \text{ V})$
	Yellow	$\pm (4.5 \text{ V} \dots 5.0 \text{ V})$ 90 ... 100% out of measuring range	$\pm (21.6 \text{ V} \dots 24 \text{ V})$
	Red	Not connected or broken line ( $V_{cc} > 20 \text{ V}$ )	Out of measuring range
	Red flashing	Shorted	

## 7.3 Analog inputs



### Important note

A channel requires a settling time of about 10 to 50 seconds after switching on. The settling time in IEPE 1 Hz mode is shorter than in IEPE 0.1 Hz mode.

This also applies, if the signal was overdriven for a short time.

The analog inputs can be adjusted to different operating modes per channel. The operating mode is configured in ibaPDA.

- IEPE input ( $\pm 5 \text{ V}$ ) with 1 Hz high-pass filter<sup>2</sup>
- IEPE input ( $\pm 5 \text{ V}$ ) with 0.1 Hz high-pass filter
- 24 V AC input (AI)
- 24 V DC input (AI)

4 inputs are adjusted permanently to IEPE mode. The mode of the second input of each root can be configured: IEPE, 24 V AC or 24 V DC. The following table shows the possible settings:

	IEPE 1 Hz	IEPE 0.1 Hz	AI-24 V AC	AI-24 V DC
Analog input 0	✓	✓	-	-
Analog input 1	✓	✓	✓	✓
Analog input 2	✓	✓	-	-
Analog input 3	✓	✓	✓	✓
Analog input 4	✓	✓	-	-
Analog input 5	✓	✓	✓	✓
Analog input 6	✓	✓	-	-
Analog input 7	✓	✓	✓	✓

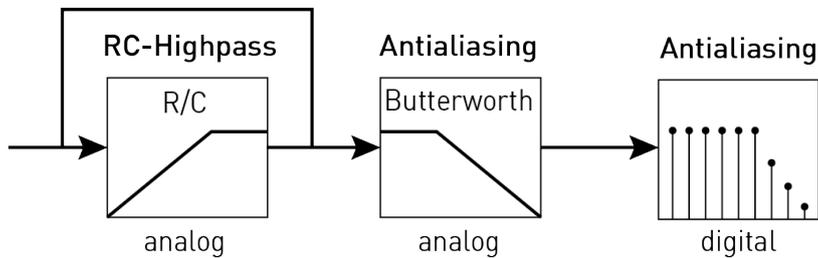
<sup>2</sup> Default setting

## ⚠ CAUTION

When set to IEPE mode (default setting) an integrated constant current source provides 4 mA (30 V DC) for the connection of IEPE sensors. However, when the inputs are used as 24 V input, the configuration to 24 V mode has to be done in ibaPDA **before wiring**, see chapter 9.1.2!

### 7.3.1 Filter

All used filters are permanently active.



Filter sections

#### RC high-pass:

The cutoff frequency depends on the mode:

Mode	Cutoff frequency
IEPE 0.1 Hz	0.1 Hz
IEPE 1 Hz	1 Hz
24 V DC	-
24 V AC	1 Hz

#### Anti-aliasing Butterworth 4th order:

The cutoff frequency depends on the sampling rate:

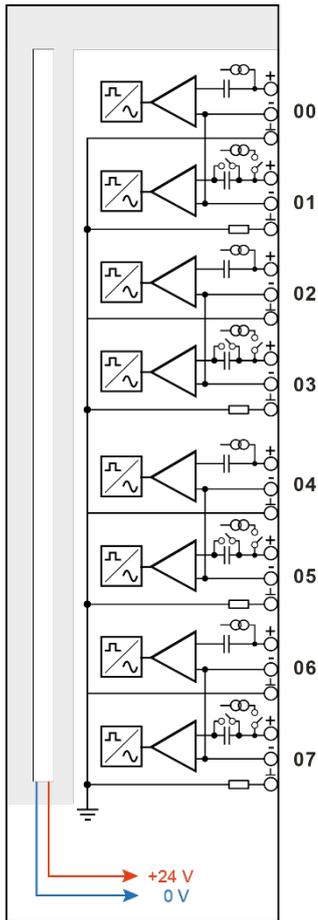
Sampling rate	Cutoff frequency
$\leq 8$ kHz	4 kHz
$> 8$ kHz	20 kHz

#### Digital anti-aliasing filter:

Parameter	Value
Group run time	$37 / f$
Settling time	$74 / f$
Pass bandwidth	$0.453 \times f$
-3 dB bandwidth	$0.49 \times f$
Stopband frequency	$0.547 \times f$
Stopband attenuation	100 dB

### 7.3.2 Connection diagram / pin assignment

Here, you can connect 8 input signals (0 ... 7), each bipolar plus grounding. 2 input channels are grouped to one root. Each connector /each root is galvanically isolated.



#### Pin assignment

Pin	Connection	LED	Pin	Connection	LED
1	Analog input 00 +	L26	1	Analog input 04 +	L30
2	Analog input 00 -		2	Analog input 04 -	
3	GND		3	GND	
4	Analog input 01 +	L27	4	Analog input 05 +	L31
5	Analog input 01 -		5	Analog input 05 -	
6	GND 50 Ω		6	GND 50 Ω	
7	Analog input 02 +	L28	7	Analog input 06 +	L32
8	Analog input 02 -		8	Analog input 06 -	
9	GND		9	GND	
10	Analog input 03+	L29	10	Analog input 07 +	L33
11	Analog input 03 -		11	Analog input 07 -	
12	GND 50 Ω		12	GND 50 Ω	

### 7.3.3 Error and status signals

The following table shows the error and status signals available in different operating modes:

	IEPE	AI-24 V AC	AI-24 V DC
<b>Status signal</b>			
Data valid	✓	✓	✓
<b>Error signal</b>			
Broken line	✓	-	-
Shorted	✓	-	-

#### 7.3.3.1 Data valid

The “data valid” signal (TRUE) indicates, when the settling process of the corresponding signal is completed.

If the measured input values are processed before the signal is TRUE, the resulting values may be falsified.

When an error occurs during IEPE operation (broken line, short circuit), the signal changes to FALSE.

#### 7.3.3.2 Broken line

The signal indicates both, a broken line and when a IEPE sensor is not connected.

When the sensor supply voltage exceeds 20 V, a broken line will be detected. After a delay of 10 seconds the error signal “Broken line” changes to TRUE.

When the sensor supply voltage decreases below 20 V again, the error state will be reset and the signal changes to FALSE with a 10 second delay.

#### 7.3.3.3 Shorted

In case of a short circuit, this error signal changes to TRUE with a delay of 10 seconds.

When the short circuit is eliminated and the sensor is connected properly again, the error state will be reset automatically and the signal changes to FALSE with a 10 second delay.

## 8 Start-up / Update



### Important note

Installing an update can take some minutes. Please do not switch off the device when an update is running. This might damage the device.

### 8.1 Auto-Update

After having mounted the module and applied the voltage to the central unit, the central unit detects the modules and checks the software version.

The central unit has a so called “overall release version“. This version contains the current software version of the central unit as well as the software versions of the modules. You can find the “overall release version“ on the website of the central unit on the „firmware“ tab.

When the software version of a module does not match the “overall release version“ of the central unit, the central unit does an automatic up- or downgrade of the module. Thereafter, the module is ready to be used.



### Important note

The “overall release version“ contains all modules developed up to the date of release of this firmware and the corresponding software versions. If a module cannot be detected, yet (i.e. it is more recent than the firmware version of the CPU), this module is ignored and outlined in red on the web interface.

In this case, a new update file has to be installed for the “overall release version“. If you want to get the current update file, please contact the iba support. You will also find it on the “iba Software & Manuals“ data medium included in delivery of the module (directory: 02\_iba\_Hardware\ibaPADU-S\01\_Firmware).

### 8.2 Overall Release Version

The „overall release version“ provides information about the software version of the entire iba-modular system. You can find it on the website of the central unit or in the I/O Manager of ibaPDA.



### Important note

If you require support, specify the „overall release version“.

### 8.3 Update

An update can be installed in two different ways.

- Web interface (only with ibaPADU-S-IT-2x16)
- ibaPDA

No matter which of the both ways you choose to install an update: the progress of the update is shown by the LEDs L5 ... L8. Beginning with L5, the LEDs are flashing one after another, at first in orange and then in green and at a slower rate. When the update is finished, the device will be rebooted.



### Important note

When updating the iba-modular system, a possible autostart of the ibaLogic PMAC is deactivated and the existing ibaLogic-V5 application deleted. Furthermore, an update of the ibaLogic-V5 software (ibaLogic Clients) might be necessary.

## 8.3.1 Update via web interface



### Important note

The web interface is available only with the central unit ibaPADU-S-IT-2x16.

- Start the website of the iba-modular system in your browser and select the central unit.
- On the “update“ tab, click on the <Browse...> button and choose the <padusit2x16\_v[xx.yy.zzz].iba> update file.
- By clicking on <Start Update>, you start the update.

#### Module 0 : ibaPADU-S-IT-2x16

## 8.3.2 Update via ibaPDA

- Open the ibaPDA I/O Manager and choose your iba-modular system in the tree structure.
- On the “Diagnostics“ tab, click on the <Write firmware> button and choose the „padusit2x16\_v[xx.yy.zzz].iba“ or „paduscm\_v[xx.yy.zzz].iba“ update file.
- You start the update by clicking on <OK>.

Slot	Type	Hardware version	Firmware version	FPGA version	Serial number
X1	ibaPADU-S-IT-2x16	A0	E2	v00.38.9523	29
X2	ibaMS16xAI-10V	B0	E0	v02.05.0039	999010
X3	ibaMS8xICP	A5	E0	v01.05.0009	60
X4	ibaMS4xJCO	A0	E0	v01.02.0025	5
X5	ibaMS3xAI-1A/100A	B0	E0	v02.04.0015	1000

## 8.4 Module Information / Diagnostics

### 8.4.1 Diagnostics

Important information about the iba-modular system, like hardware version, firmware version, FPGA version and serial number is displayed in the “Diagnostics” tab. Open the ibaPDA I/O Manager and choose your iba-modular system in the tree structure (see also the figure above).

### 8.4.2 Web interface

On the module website, general information about the module is displayed. You cannot change the values.



#### Important note

The web interface is available only with the central unit ibaPADU-S-IT-2x16.

#### 8.4.2.1 „info“ tab

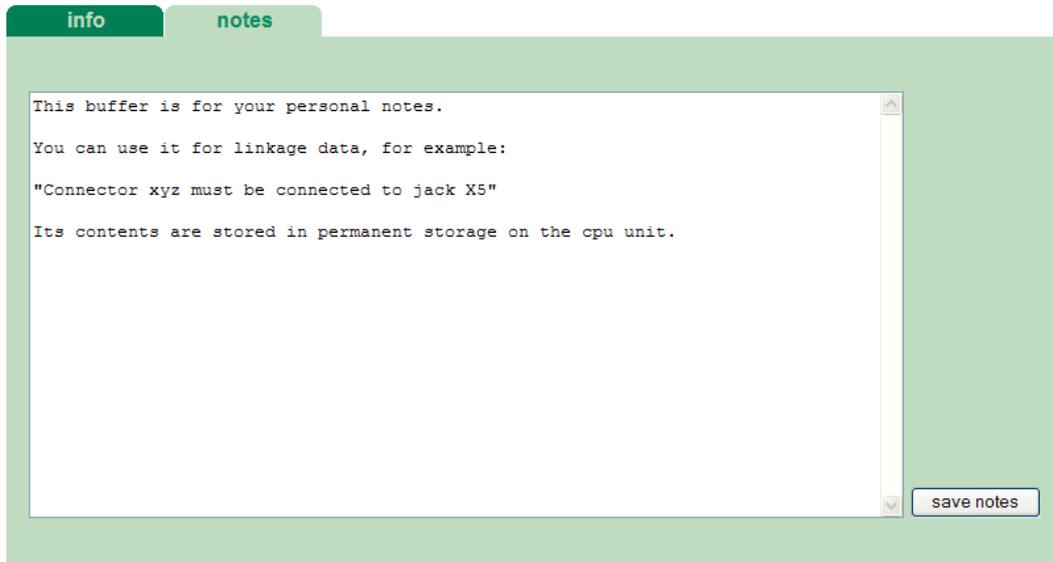
The „info“ tab displays general information and technical specifications of the I/O module.

info		notes
Serial number	000022	
Hardware version	A1	
Firmware version	E1	
Process-IO		
analog input channels	8	
design	isolated groups of 2 channels, input mode switchable	
input mode	IEPE / 24V DC / 24V AC	switchable
resolution	24	bits
analog filters	RC filters, Butterworth and anti-aliasing (Delta-Sigma), fixed and switchable	depending on input mode

### 8.4.2.2 „notes“ tab

On the “notes” tab, you can enter notes, e.g. for notes on wiring or on recording of changes.

By clicking on <save notes>, the notes are permanently stored on the device.



## 9 iba Applications

Please note the described use cases in the appendix for your configuration, see chapter 11.1.

### 9.1 Configuration in ibaPDA

You can configure the signals with the I/O Manager of ibaPDA. If the iba-modular system is already installed and you want to add a new module, click on „Read configuration from device“. The module will be detected automatically.

[Read configuration from device](#) 



#### Note

The automatic detection requires a bidirectional FO connection from the ibaPDA computer to the central unit.

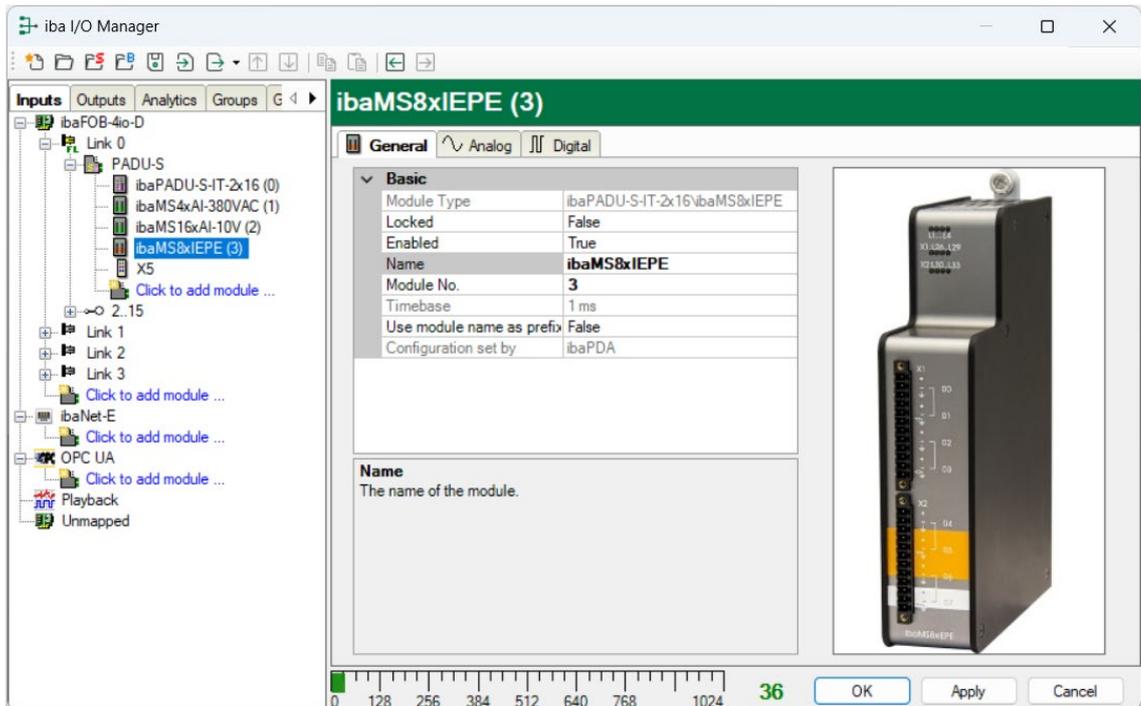


#### Other documentation

If you want to install the iba-modular system at first, refer to the manual of the central unit, chapter “Configuration with ibaPDA”.

#### 9.1.1 General settings

If the module is detected, click on the module in the signal tree and the “General” tab appears.



The screenshot shows the 'iba I/O Manager' window. On the left, a tree view shows the signal tree with 'ibaMS8xIEPE (3)' selected under 'Link 0'. The main window displays the 'General' tab for this module. The 'Basic' section contains the following configuration:

Module Type	ibaPADU-S-IT-2x16\ibaMS8xIEPE
Locked	False
Enabled	True
Name	ibaMS8xIEPE
Module No.	3
Timebase	1 ms
Use module name as prefix	False
Configuration set by	ibaPDA

Below the table, there is a 'Name' field with the label 'The name of the module.' To the right of the configuration table is a photograph of the ibaMS8xIEPE module. At the bottom of the window, there is a status bar showing '36' and buttons for 'OK', 'Apply', and 'Cancel'.

#### Basic

Module Type

Display of module type (read only)

Locked

True: the module can only be changed by an authorized user.

False: the module can be changed by any user.

 Enabled

Data capturing for this module is enabled.

 Name

You can enter a name for the module.

 Modul No.

Consecutive module number assigned by ibaPDA for clearly referencing the signals, e.g. in expressions or ibaAnalyzer. The number can be changed by the user.

 Timebase

Timebase, specified in the PADU-S module.

 Use name as prefix

Prefix the signal names of this module with the module name.

 Configuration set by

This item is only visible when ibaPADU-S-IT-2x16 is used as central unit. When an embedded application has been started on ibaPADU-S-IT-2x16 (e. g. ibaLogic), then ibaPDA cannot modify the configuration of the modules and signals. In this case the configuration is set by the embedded application. The following entries can be displayed:

- ibaPDA

Configuration set by	ibaPDA
----------------------	--------

When ibaPDA is displayed, an embedded application has not been started and the configuration can be set by ibaPDA.

- Embedded application

Configuration set by	Embedded application
Import signal names	False

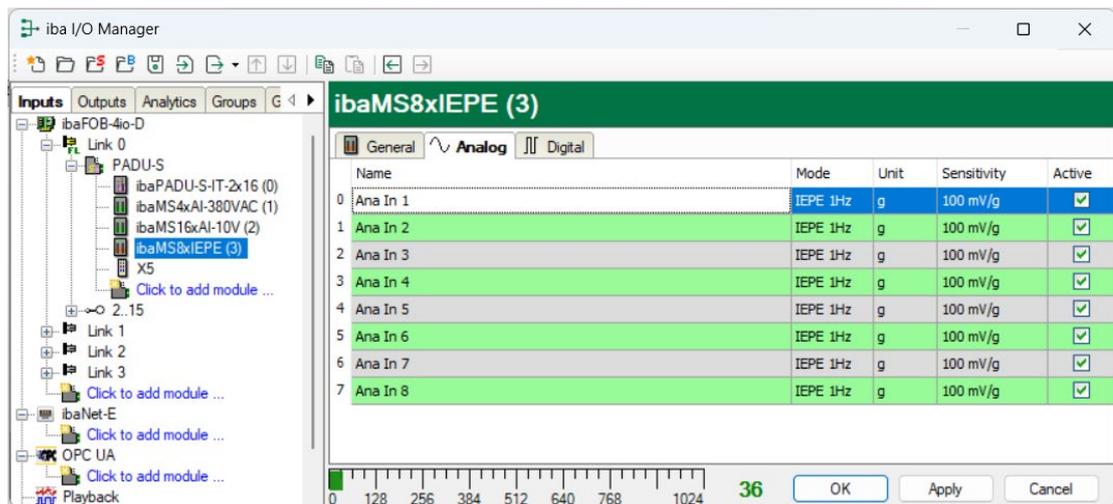
When embedded application is displayed, the configuration of the modules and signals is set by the embedded application on the device. In this case it is possible to import user-defined signal names, which are configured in the embedded application, provided that the embedded application supports this function (Import signal names: True).

The modules and signals configured by the embedded application cannot be configured in ibaPDA, they are displayed in gray in the respective fields.

The configuration is read by ibaPDA and used for the acquisition. Modules and signals which are not displayed in gray can be used in ibaPDA.

### 9.1.2 Configure inputs

The following settings apply to the “Analog” tab:



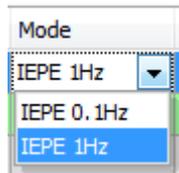
Name

You can enter a name for the signal and two additional comments (click on the  icon in the Name field).

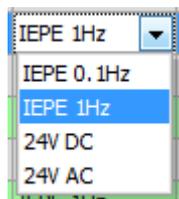
Mode

The mode can be selected from a dropdown menu, see chapter 7.3.

IEPE mode is the fixed setting for channels 0, 2, 4 and 6, but the filter can be selected:

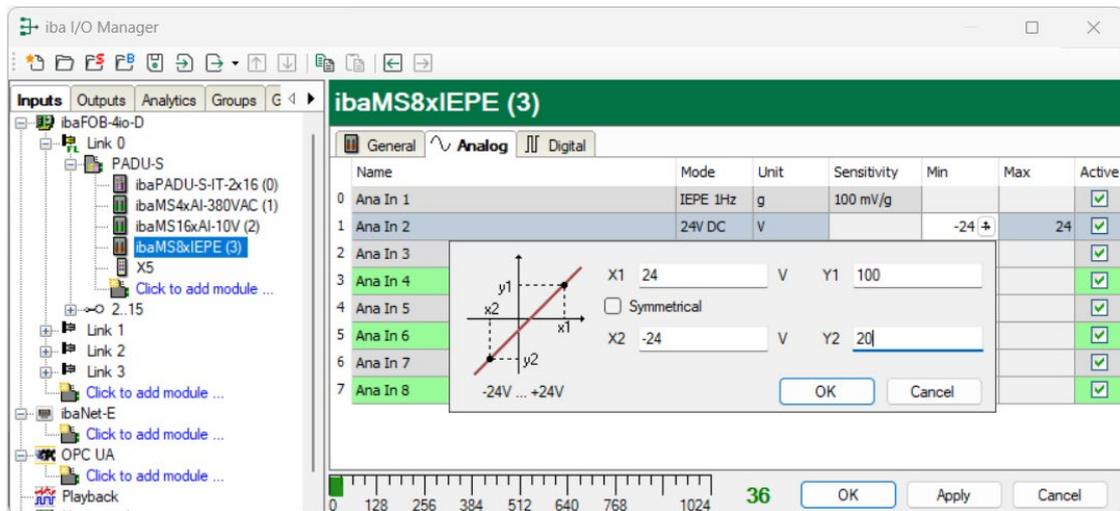


Mode selection for the channels 1, 3, 5 and 7:



Min/Max

When the modes 24V AC or 24V DC are selected, the columns „Min“ and „Max“ appear additionally. Here, you may define an upper and a lower limit of the measuring range. The nominal voltage level of +/-24 V is assigned to a physical value.



Unit

You can enter a unit, the default setting is „g“.

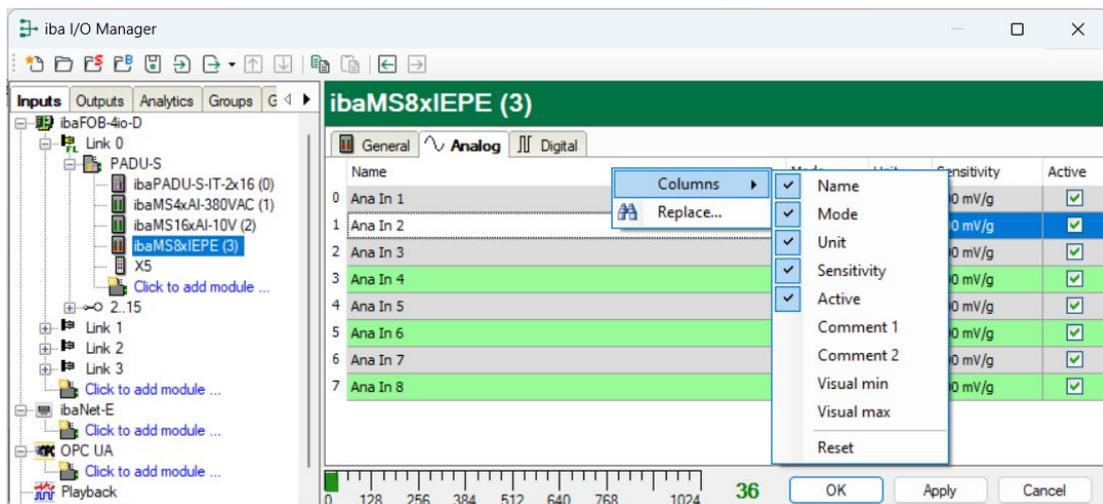
Sensitivity

Enter here the sensitivity according to the used IEPE sensor.

Active

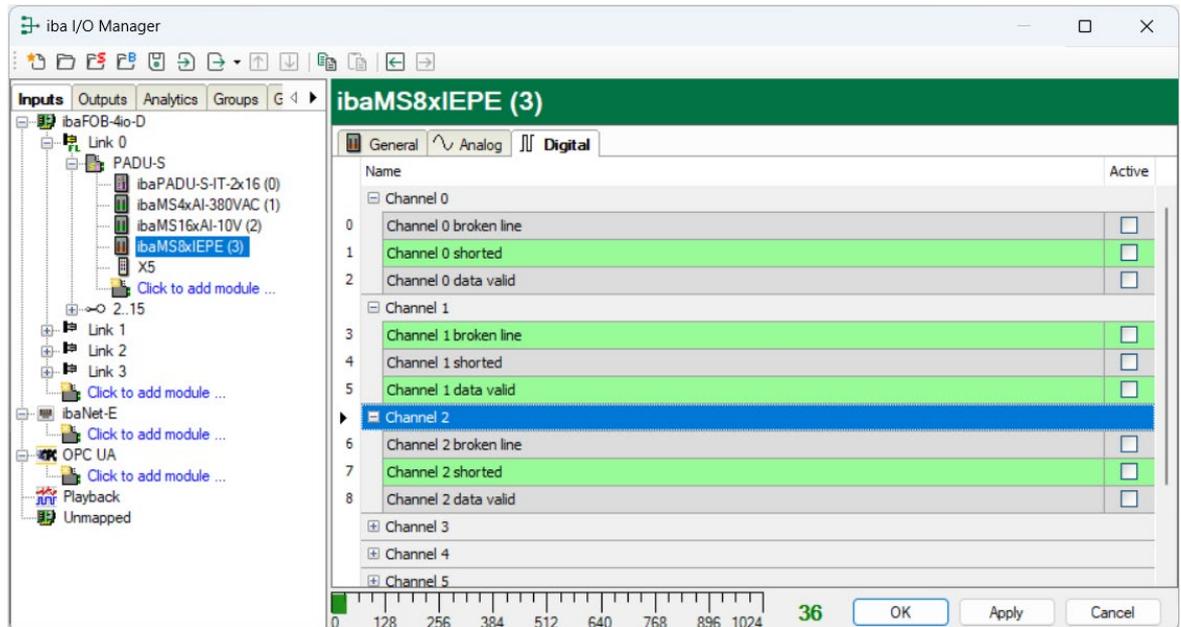
Enabling/disabling the signal.

You can show or hide more columns via the context menu (click with the right mouse button in the headline).



### 9.1.3 Error and status signals

Depending on the operating mode, error and status signals can be enabled for each channel in the „Digital“ tab, see also chapter 7.3.3.



Name

The signal names are already pre-defined, you can enter two additional comments (click on the  icon in the Name field).

- Channel [...] broken line (only in IEPE mode)  
Status signal indicates, whether there is a broken line or a channel is not connected.
- Channel [...] shorted (only in IEPE mode)  
Status signal indicates a short circuit of the channel.
- Channel [...] data valid (in IEPE and AI mode)  
Status signal indicates, whether the data is valid.  
When AI mode is selected, only the signal „Channel [...] data valid“ can be selected:

Channel	Signal Name	Active
Channel 1		
3	Channel 1 broken line	<input type="checkbox"/>
4	Channel 1 shorted	<input type="checkbox"/>
5	Channel 1 data valid	<input type="checkbox"/>

Active

Enabling/disabling the signal.

## 9.2 Configuration with ibaLogic-V5

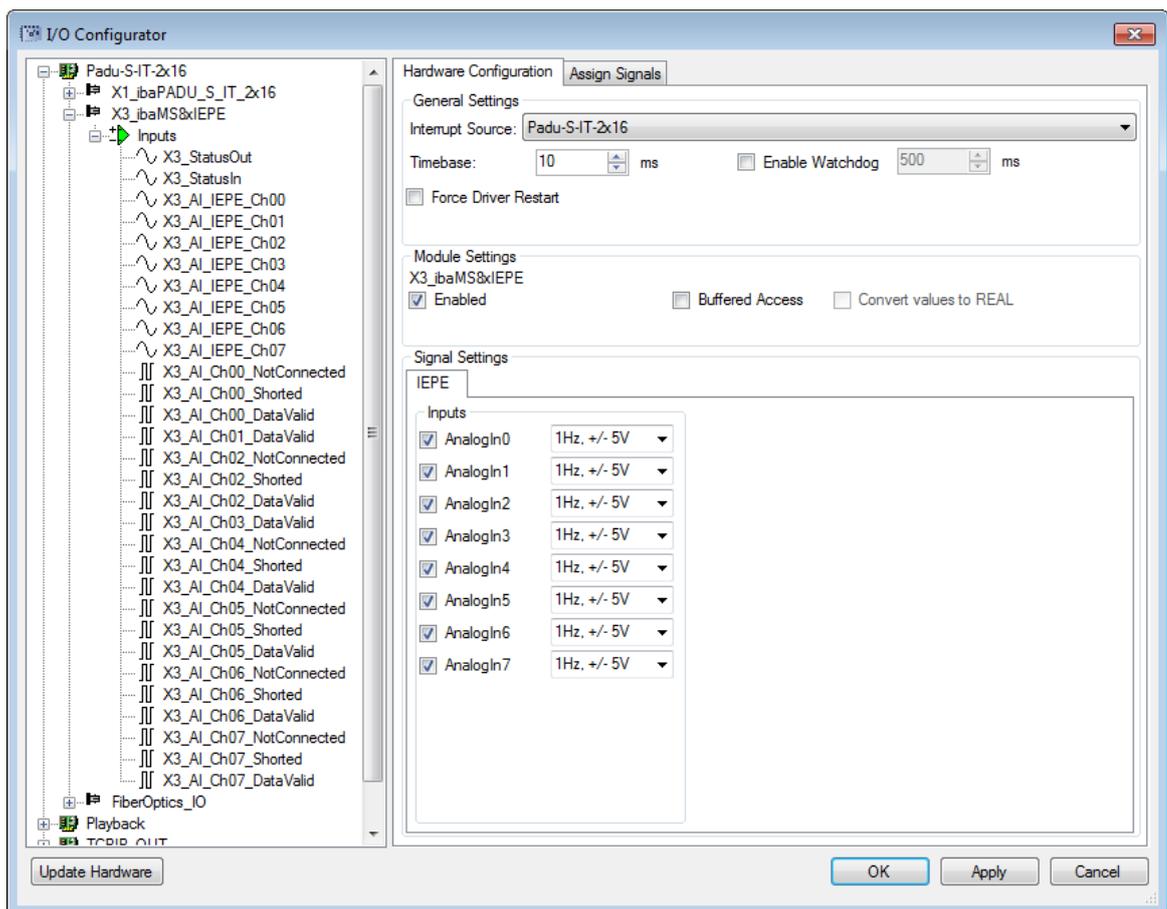


### Other documentation

Combined with ibaLogic-V5, an ibaPADU-S-IT-2x16 device can be used to realize individual signal pre-processing or stand-alone applications. You find the basic way of proceeding description in the separate ibaPADU-S-IT-2x16 manual. This manual describes only the signals belonging to this module.

### 9.2.1 Configuring signals

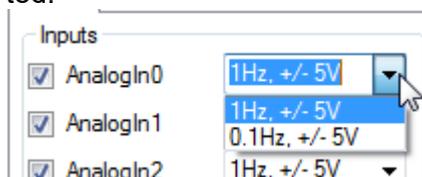
The signals can be configured in the I/O Configurator of ibaLogic-V5. Open the I/O Configurator in the “Tools – I/O Configurator“ menu. When you click on the <Update hardware> button, then ibaLogic detects the module.



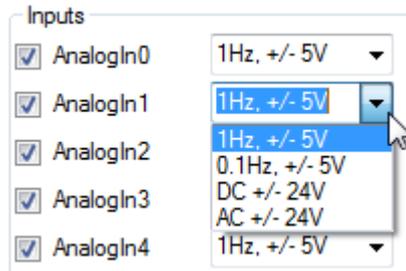
The analog input channels and the status signals are displayed in the „Inputs“ tab.

The inputs' operating mode can be selected from a dropdown-menu, see chapter 7.3:

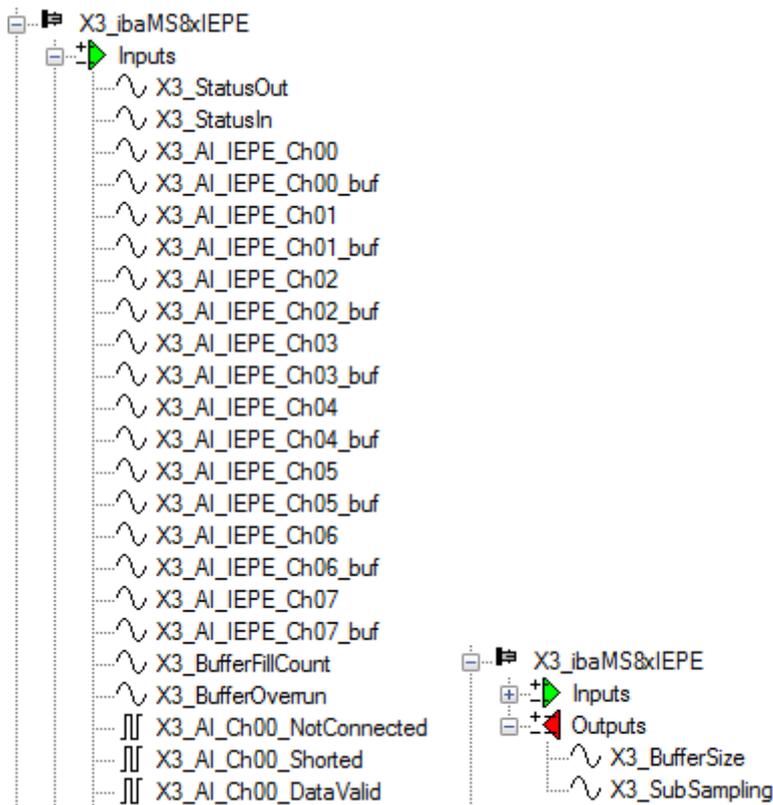
- IEPE mode is the fixed setting for channels 0, 2, 4 and 6, but the filter can be selected:



- ❑ Mode selection for the channels 1, 3, 5 and 7:



If “Buffered Access” is enabled, you can see additional input and output signals:



**Note**

You need to apply the “Buffered Access” by clicking on the <Apply> button. Only then, you will see additional signals in the signal tree that can be configured as output or input resources.

Signal	Description
<b>Inputs</b>	
AI_IEPE_Ch[00...07]	Analog input signals
AI_Ch[00...07]_NotConnected	Status signal indicates, whether there is a broken line or a channel is not connected (only in IEPE mode)
AI_Ch[00...07]_Shorted	Status signal indicates a short circuit (only in IEPE mode)
AI_Ch[00...07]_DataValid	Status signal indicates, whether the data is valid

StatusIn	Status information about the plugged input module (for output module without function): 0 = Module not initialized 1 = Module running >1 = Mistake (e.g. module cannot be initialized)
StatusOut	Status information about the plugged output module (for input module without function): 0 = Module not initialized 1 = Module running >1 = Mistake (e.g. module cannot be initialized)
<b>Additional input signals for buffered access</b>	
AI_IEPE_Ch[00...07]_buf	Input buffer of analog input signals
BufferFillCount	Counter, when buffer is filled
BufferOverrun	Counter for Buffer-overrun
<b>Additional output signals for buffered access</b>	
BufferSize	Buffersize
SubSampling	Subsampling of the signals

## 10 Technical Data

### 10.1 Main data

<b>Short description</b>					
Name	ibaMS8xIEPE				
Description	Input module with 8 analog inputs and different modes: DC, AC and IEPE: 4 x IEPE non-adjustable, 4 x IEPE / DC / AC adjustable				
Order no.	10.124302				
<b>Power supply</b>					
Power supply	24 V DC, internal via backplane bus				
Power consumption max.	8 W				
<b>Indicating elements</b>					
Indicators (LEDs)	4 LEDs for device status 8 LEDs for status of the analog inputs				
<b>Operating and environmental conditions</b>					
Temperature ranges	<table border="0"> <tr> <td style="text-align: right;">Operation</td> <td>2 °F to 122 °F (0 °C to 50 °C)</td> </tr> <tr> <td style="text-align: right;">Storage/transport</td> <td>-13 °F to 158 °F (-25 °C to 70 °C)</td> </tr> </table>	Operation	2 °F to 122 °F (0 °C to 50 °C)	Storage/transport	-13 °F to 158 °F (-25 °C to 70 °C)
Operation	2 °F to 122 °F (0 °C to 50 °C)				
Storage/transport	-13 °F to 158 °F (-25 °C to 70 °C)				
Installation position	Vertical, plugged into backplane bus				
Cooling	Passive				
Humidity class	F, no condensation				
Protection class	IP20				
Certification/Standards	EMC: IEC 61326-1 FCC part 15 class A				
MTBF <sup>3</sup>	1,840,484 hours / 210 years				
Dimensions (width x height x depth)	1.69 in x 8.43 in x 5.83 in (43 mm x 214 mm x 148 mm)				
Weight (incl. packaging and documentation)	approx. 2.43 lbs (1.1 kg)				

<sup>3</sup> According to: Telcordia Issue 4 SR332 (Reliability Prediction Procedure of Electronic Equipment; Issue Mar. 2016) and NPRD (Non-electronic Parts Reliability Data 2011)

**Supplier's Declaration of Conformity**  
**47 CFR § 2.1077 Compliance Information**

**Unique Identifier:** 10.124302 ibaMS8xIEPE

**Responsible Party - U.S. Contact Information**

iba America, LLC  
 370 Winkler Drive, Suite C  
 Alpharetta, Georgia  
 30004

(770) 886-2318-102  
[www.iba-america.com](http://www.iba-america.com)

**FCC Compliance Statement**

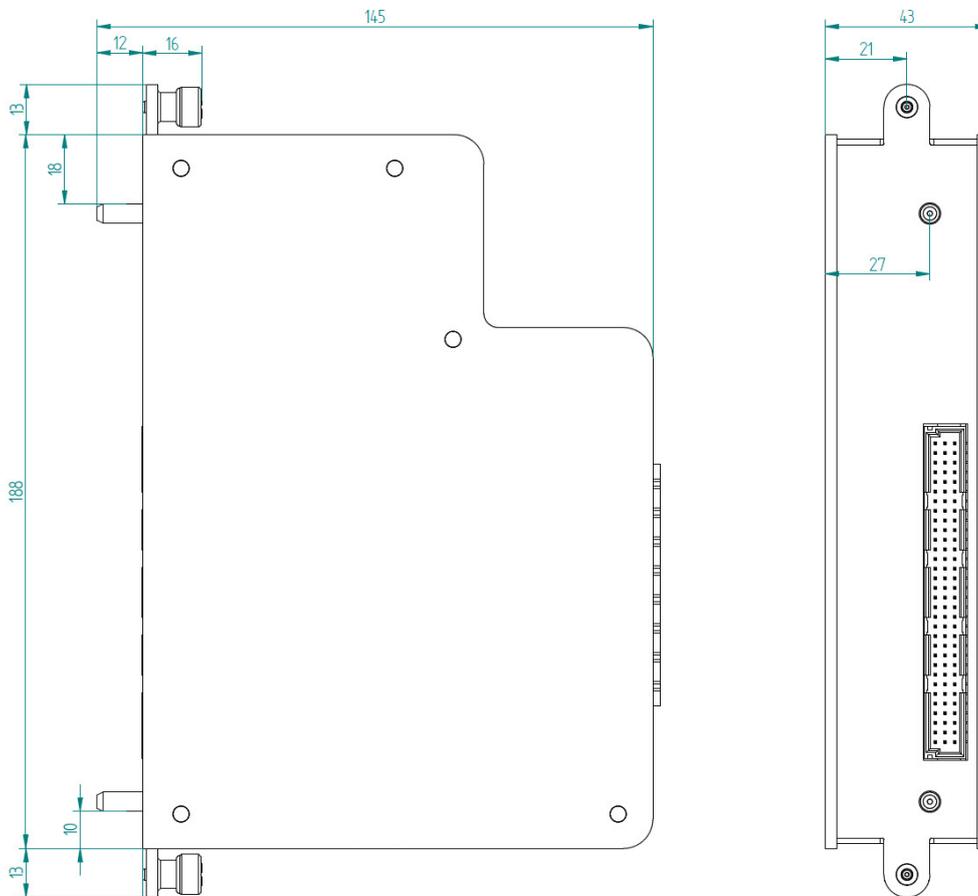
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:  
 (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## 10.2 Analog inputs

Analog inputs	
Number	8
Design	4 galvanically isolated roots with 2 inputs each, single ended The second input of each root can be adjusted: IEPE or AI-24 V DC or AI-24 V AC 1 GND and 1 GND with 50 Ohm per root IEPE Integrated constant current source +4 mA (up to 30 V DC) for direct connection and supply of IEPE sensors
Resolution	24 Bit (delta-sigma)
Delay	37 / sampling rate
Filter	
RC filter	
AI-24 V DC	R/C low-pass, 1st order, 25 kHz
AI-24 V AC	Like AI-24 V DC, in addition R/C high-pass, 1st order, 1 Hz
IEPE	R/C high-pass, 1st order, 1 Hz or 0.1 Hz, can be adjusted
Analog filter	
AI-24 V DC / AI-24 V AC / IEPE	Analog anti-aliasing filter (Butterworth), 4th order Sampling rate ≤ 8 kHz: cutoff frequency = 4 kHz Sampling rate > 8 kHz: cutoff frequency = 20 kHz
Digital filter	
AI-24 V DC / AI-24 V AC / IEPE	Analog anti-aliasing filter (delta-sigma) Oversampling = 16 * sampling rate Cutoff frequency = 0.49 * sampling rate
Input signal range	
AI-24 V DC / AC	-24.0 V to +24.0 V
IEPE	-5.0 V to +5.0 V (at ~160 Hz)

Max. input voltage	±60 V permanent
Input gain IEPE	none
Sampling rate	1 kHz <sup>4</sup> ... 40 kHz, freely adjustable
Frequency range	0.1 Hz to 20 kHz
Error and status signals (per channel) AI-24 V DC / AC IEPE	Data valid Data valid, broken line, shorted
Electrical isolation Root-root Root-housing/power supply	AC 1.5 kV AC 1.5 kV
Connector type inputs	2x 12-pin multi-pin connector, screw-type terminal (0.14 mm <sup>2</sup> to 1.5 mm <sup>2</sup> ), screw connection, included in delivery
Sensor cable length	Up to 30 m at 100 pF/m cable capacitance and a bandwidth of used signals up to 20 kHz

### 10.3 Dimensions



(Dimensions in mm)

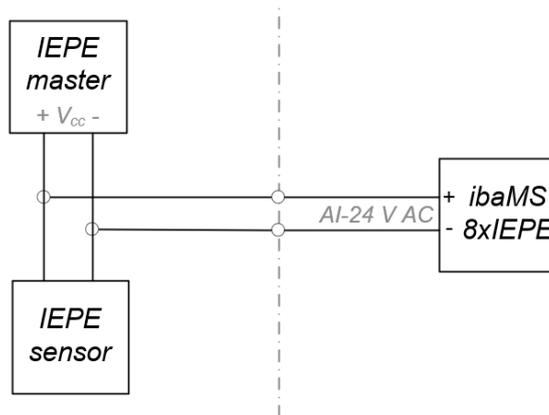
<sup>4</sup> Due to the integrated filters, a minimum sampling rate of 1 kHz is recommended for the correct operation of this module, even if an even lower sampling rate (time base) can be set in the ibaPDA configuration.

## 11 Appendix

### 11.1 Use cases

#### 11.1.1 Monitoring

If the iba system is used to monitor IEPE sensors that are already present and supplied from another side, this is possible with the "AI-24 V AC" mode.



This mode is available on four of the eight input channels (channel 01, 03, 05 and 07) and can be configured via the iba application.

Please note that the R/C filter is active at 1 Hz in this mode.

#### 11.1.2 Adjust measurement delays

During measurements within the iba modular system, where signals of different input modules are to be compared to each other, it has to be observed that the measurement delays of the ibaMS8xIEPE module are increased compared to the other input modules in the system.

Due to the delta-sigma converter used in the input circuit, the ibaMS8xIEPE module causes an internal delay of  $37 \cdot$  sampling time.

Other iba input modules do not have such a delay.

This leads to time differences when signals of the IEPE module are to be compared with those of other input modules within a system.

This time delay can be compensated if necessary. Three options are available:

1. In a subsequent offline analysis with ibaAnalyzer, the signal can be shifted by  $37 \cdot$  sampling time with the function `ShI()`.
2. During the running acquisition (online), the signals of the other input modules to be compared can be delayed by  $37 \cdot$  sampling time in ibaPDA with the help of a virtual module and the function `Delay()`.
3. Four of the eight input channels of the IEPE module (channel 01, 03, 05 and 07) can also be used as analog inputs with 24 V. This measurement mode "AI-24 V DC" is configured via the iba application.  
Signals measured via these inputs have the same delay as IEPE signals at the other inputs.

## 12 Support and contact

### Support

Phone: +49 911 97282-14

Fax: +49 911 97282-33

E-Mail: [support@iba-ag.com](mailto:support@iba-ag.com)



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### Note

If you require support, specify the serial number (iba-S/N) of the product.

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### Contact

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**[www.iba-ag.com](http://www.iba-ag.com)**