



# ibaMS8xAI-110VAC

Input module for analog signals

Manual

Issue 2.1

Measurement Systems for Industry and Energy

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

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The content of this publication has been checked for compliance with the described hardware and software. Nevertheless, deviations cannot be excluded completely so that the full compliance is not guaranteed. However, the information in this publication is updated regularly. Required corrections are contained in the following regulations or can be downloaded on the Internet.

The current version is available for download on our web site <http://www.iba-ag.com>.

Issue	Date	Revision	Author	Version HW/FW
2.1	05-2025	Circuit diagram	st	B0/-

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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.

Other international and national standards were observed.

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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.

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# 1 About this documentation

This documentation describes the construction, the use and the operation of the device *ibaMS8xAI-110VAC*. 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.

---

## Other documentation



For a general description of the iba modular system and additional information about layout, application and operation of the modules, please refer to the dedicated documentations.

The documentation of the iba modular system is part of the data medium "iba Software & Manuals".

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

### ■ Central units

The manuals of the central units contain information about:

- Scope of delivery
- System requirements
- Device description
- Mounting/dismounting
- Start-up
- Configuration
- Technical data
- Accessories

### ■ Modules

The manuals of the single modules contain specific information on the individual module. For example:

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

## 1.1 Target group and previous knowledge

This documentation is aimed at qualified professionals who are familiar with handling electrical and electronic modules as well as communication and measurement technology. A person is regarded 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	Notation
Menu command	Menu <i>Logic diagram</i>
Calling the menu command	<i>Step 1 – Step 2 – Step 3 – Step x</i> Example: Select the menu <i>Logic diagram – Add – New function block</i> .
Keys	<Key name> Example: <Alt>; <F1>
Press the keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Key name> Example: <OK>; <Cancel>
Filenames, paths	<i>Filename, Path</i> Example: <i>Test.docx</i>

## 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:**

- Observe the specified measures.
- 

### Warning!



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

- Observe the specified measures.
- 

### Caution!



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

- Observe the specified measures
- 

### 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.

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## 2 About ibaMS8xAI

The module *ibaMS8xAI-110VAC* is part of the iba modular system. The modular concept 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 module is supplied with power via the backplane bus in the module rack. The *ibaMS8xAI-110VAC* module offers 8 analog inputs.

### A brief overview

- Extension module for the iba modular system
- 8 analog inputs, galvanically isolated
- Input signal 110 V AC
- 16 bit resolution
- Sampling rate up to 40 kHz, freely adjustable
- Real parallel data capturing with an A/D converter per channel
- Analog and digital filters per channel
- Power frequency measurement
- Rugged housing, easy mounting
- Certification according to CE

### Fields of application

Capturing analog input signals 110 V AC in the fields:

- Test benches
- Power factor compensation plants
- General voltage measurement
- Energy networks AC 110 V
- Condition monitoring

### 3 Scope of delivery

After unpacking, check that the delivery is complete and undamaged.

The scope of delivery includes:

- Device *ibaMS8xAI-110VAC*
- 16-pin connector with clamp type terminals
- Data medium “iba Software & Manuals” (only for single delivery)

## 4 Safety instructions

Observe the following safety instructions for *ibaMS8xAI-110VAC*.

### 4.1 Intended use

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

- Automation of industrial plants
- Measurement data acquisition and measurement data analysis
- Applications of software products (*ibaPDA*, *ibaLogic*, etc.) and hardware products of iba AG.

The device may only be operated in conditions as specified in the technical data, see ➔ *Technical data*, page 35.

### 4.2 Special safety instructions

---

#### Danger!



##### Risk of electric shock!

- The device is only designed for electrical measuring currents as specified in the "Technical data" chapter.
- Never use damaged measuring cables!
- Measuring cables must NOT be attached or detached to/from the device under voltage!

---

#### Warning!



The device must not be connected to CAT III and CAT IV categories!  
The device is approved for the use in CAT II<sup>1)</sup>.

---

#### 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.

---

#### Caution!



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.

---

<sup>1)</sup> For devices with hardware version B0 or higher

**Caution!**

Before working on or dismantling the device, disconnect it from the power supply.

---

**Note**

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

---

**Note**

To clean the device, use a dry or slightly moistened cloth.

---

## 5 System requirements

### Hardware

- Central unit: *ibaPADU-S-IT-2x16* or *ibaPADU-S-CM* (version 02.10.001 or later)
- Module rack, e. g. *ibaPADU-B4S*

### Software

- *ibaPDA* version 6.34.0 or later
- *ibaLogic-V5* version 5.0.2 or later

---

#### Note



The use of *ibaLogic-V5* requires the central unit *ibaPADU-S-IT-2x16*. If the module is used with the predecessor *ibaPADU-S-IT-16*, only *ibaLogic-V4* can be used.

---

### ibaMS8xAI-110VAC

- Hardware beginning with version B0

## 6 Mounting and dismounting

In the following, you will learn how to install, connect and dismount the modules *ibaMS8xAI-110VAC*. Also refer to the notes in chapter ↗ *Safety instructions*, page 11.

---

### Caution!



Before working on or dismounting the device, disconnect it 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

To mount the module *ibaMS8xAI-110VAC*, proceed as follows.

1. Disconnect the central unit from the power supply.
2. Remove the cover from the backplane bus onto which you want to attach the module.
3. Attach the module to the backplane bus and press it firmly against the module rack.
4. Screw the module to the top and bottom of the module rack using the fastening screws.

---

### Caution!



Always screw the device and the modules tightly. Plugging or unplugging the connectors for the inputs/outputs can otherwise cause damage.

- 
5. Connect the grounding screw on the bottom of the housing to the protective ground / grounding shield.

### 6.2 Connecting

---

### Note



The module rack 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

To dismount the module, proceed as follows.

1. Disconnect the central unit from the power supply.
2. Remove all cables.
3. Loosen the upper and lower fixing screws that secure the module to the module rack.
4. Pull the device straight from the backplane.
5. Put the cover on the backplane bus.

---

### Note



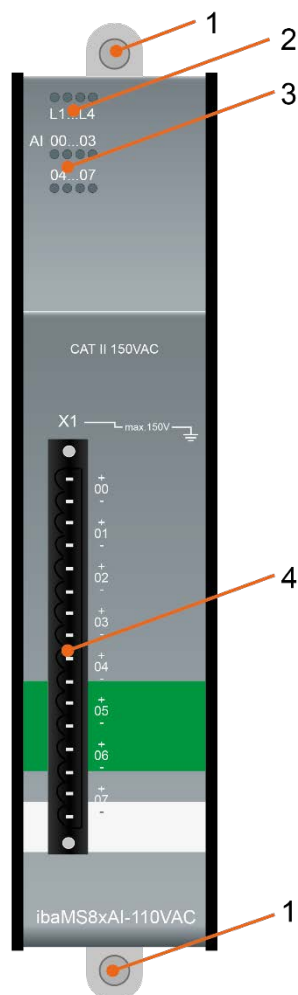
Safe disconnection from the supply takes place via the central unit. The connector X1 serves as a separator for the measuring circuits.

---

## 7 Device description

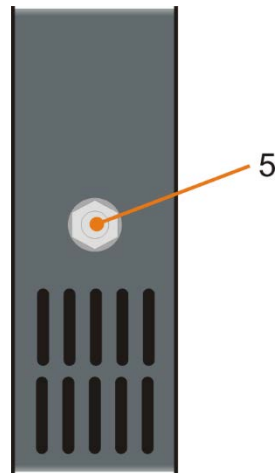
Here you will find views and descriptions of the device *ibaMS8xAI-110VAC*.

### 7.1 Device views



1	Fixing screws	3	Status LEDs L26 to L33 of the analog inputs 00 to 07
2	Operating status indicators L1 to L4	4	Connector X1 for analog inputs 00 to 07





5	Grounding screw
---	-----------------

## 7.2 Indicating elements

Colored LEDs on the device indicate the status of the device and the status of the analog inputs.

### 7.2.1 Operating state

The following overview shows the possible operating states of modules *ibaMS8xAI-110VAC*.

LED	Color	State	Description
L1	Green	flashing	Device ready for operation
		off	Device not ready for operation (switched off)
L2	Yellow	on	Access to the backplane bus
L3	White	-	-
L4	Red	off	Normal status, no errors
		flashing	Failure/error

#### Note



If an error is displayed on LED L4, contact iba support.

### 7.2.2 Indicators analog inputs

LED per channel	State/meaning		Description (approx. values)
L26...L33	Off	No signal, signal too low	$\pm (0 \text{ V} \dots 3 \text{ V})$
	Green	Within measuring range	$\pm (3 \text{ V} \dots 280 \text{ V})$
	Yellow	End of measuring range	$\pm (280 \text{ V} \dots 312 \text{ V})$
	Red	Out of measuring range	$> \pm 312 \text{ V}$

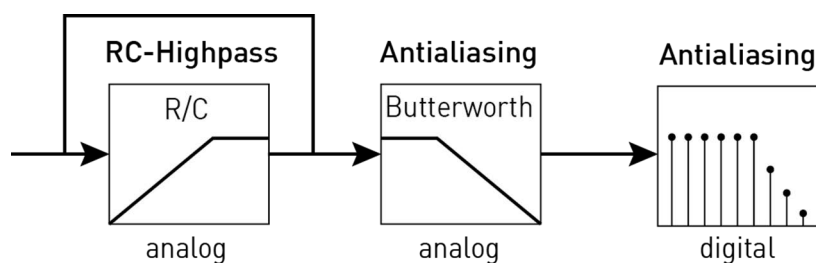
## 7.3 Analog inputs

### 7.3.1 Filters

There are the following filters per channel:

Filter type	Order	Cutoff frequency	in addition / permanent
R/C low-pass	1.	40 kHz	permanent
Analog anti-aliasing filter (Butterworth)	4.	20 kHz	in addition
Digital anti-aliasing filter (Tschebyscheff I)	8.	can be adjusted (100 Hz ... 0.5*sampling rate)	can be adjusted (100 Hz ... 0.5*sampling rate)

#### Filter sections



### 7.3.2 Power frequency measurement

Each channel provides power frequency measurement.

#### Note



In addition to the actual measured values, the power frequency signals are available as virtual signals in the signal tree and can be displayed, recorded and used for calculations like all other signals.

For information on parameterization, see [ibaMS8xAI-110VAC – Power frequency \[10Hz..80Hz\] tab](#), page 29.

#### Measuring properties

##### ■ Frequency

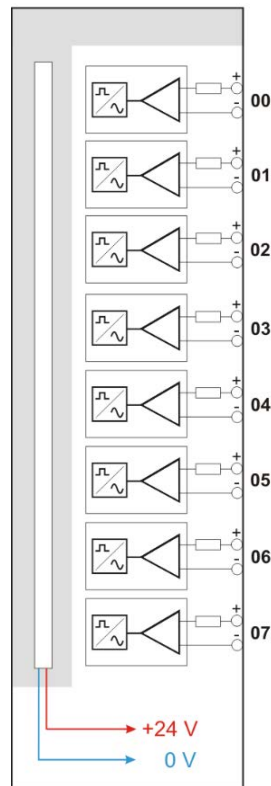
Frequencies between 10 Hz and 80 Hz are supported.

##### ■ Measuring interval

Measuring interval	Standard conformity	Accuracy
1 s	-	± 5 mHz
10 s	according to DIN EN 61000-4-30	± 0.5 mHz

### 7.3.3 Connection diagram and pin assignment

Here, you can connect eight input signals (0...7), each bipolar and electrically isolated. Each channel is connected by means of two-wire connection.

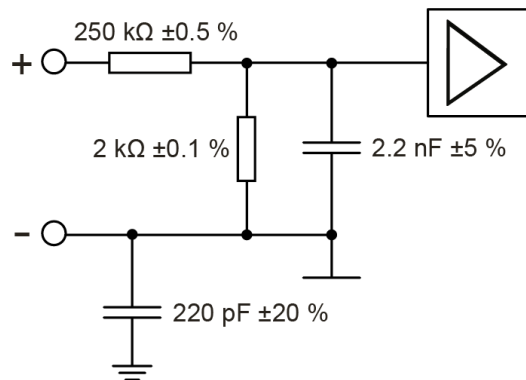


#### Pin assignment

X1: Pin	Connection	LED
1	Analog input 00 +	L26
2	Analog input 00 –	
3	Analog input 01 +	L27
4	Analog input 01 –	
5	Analog input 02 +	L28
6	Analog input 02 –	
7	Analog input 03 +	L29
8	Analog input 03 –	
9	Analog input 04 +	L30
10	Analog input 04 –	
11	Analog input 05 +	L31
12	Analog input 05 –	
13	Analog input 06 +	L32
14	Analog input 06 –	
15	Analog input 07 +	L33
16	Analog input 07 –	

**Circuit diagramm**

The input circuit diagram of one channel is shown here as an example.



## 8 Start-up and Update

### Note



Do not switch off the device during an update as you may damage the device. Installing an update can take some minutes.

### 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. After that the module is ready for use.

### Note



The “overall release version” contains all modules developed up to the date of release of this firmware and the corresponding software versions. If the module is not yet known (i.e. newer than the firmware version of the central unit), it is ignored and framed in red in the web interface.

In this case, a new update file has to be installed for the “overall release version”, see [➤ Update](#), page 21. Therefore, contact the iba support.

### 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*.

### Note



Specify the “overall release version” for support cases.

### 8.3 Update

An update can be installed in two different ways:

- Web interface (only with *ibaPADU-S-IT-2x16*)  
see [➤ Perform update via web interface](#), page 22

### ■ *ibaPDA*

see ↗ *Perform update via ibaPDA*, page 22

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.

#### 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 Perform update via web interface

#### Note



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

1. Open the website of the iba modular system in your browser and select the central unit.
2. On the *update* tab, click on the <Browse...> button and choose the `padusit2x16_v[xx.yy.zzz].iba` update file.
3. By clicking on <Start Update>, you start the update.

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

info	firmware	eventlog	passwords	network	time	backup	update
<p><b>Note:</b> any ibaLogic application will be aborted on updating firmware.  ibaLogic might not be compatible to the new firmware release after update  and therefore might not run properly.  <b>An update of ibaLogic might be required.</b></p>							
Install firmware:		<input type="text"/>		<input type="button" value="Durchsuchen..."/>		<input type="button" value="Start Update"/>	
Restart device:		<input type="button" value="Restart"/>					

### 8.3.2 Perform update via ibaPDA

1. Open the *ibaPDA* I/O Manager and navigate to your iba modular system in the tree structure.
2. On the *Diagnostics* tab, click on the <Write firmware> button and select the `padusit2x16_v[xx.yy.zzz].iba` or `paduscm_v[xx.yy.zzz].iba` update file.
3. You start the update by clicking on <OK>.

**PADU-S**

General Analog Digital **Diagnostics**

Version information

Hardware version: A0 Firmware version: v02.10.001

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	ibaMS4xUCO	A0	E0	v01.02.0025	5
X5	ibaMS3xAI-1A/100A	B0	E0	v02.04.0015	1000

Write firmware Reset to factory defaults

## 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.

**PADU-S**

General Analog Digital **Diagnostics**

Version information

Hardware version: A0 Firmware version: v02.10.001

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	ibaMS4xUCO	A0	E0	v01.02.0025	5
X5	ibaMS3xAI-1A/100A	B0	E0	v02.04.0015	1000

Write firmware Reset to factory defaults

### 8.4.2 Web interface

Only information on status and parameters is displayed on the module website. You cannot change the values.

#### 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	000006	
Hardware version	A3	
Firmware version	E2	
Process-IO		
analog input channels	8	
design	isolated channels	
nominal input voltage	+/-110	V AC
input voltage	+/-312	V DC
resolution	16	bits
accuracy	< 0.1	%
input impedance (on/off)	250	kΩ
sampling rate	max. 40	kHz
frequency range	0 ... 20	kHz
analog filters	RC filter, fixed Butterworth filter (4th order), switchable	40 kHz 20 kHz
digital filters	anti-aliasing filter (8th order), switchable	adjustable

### 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.

info

notes

This buffer is for your personal notes.

You can use it for linkage data, for example:

"Connector xyz must be connected to jack X5"

Its contents are stored in permanent storage on the cpu unit.

save notes



## 9 iba Applications

### 9.1 Configuration with 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.

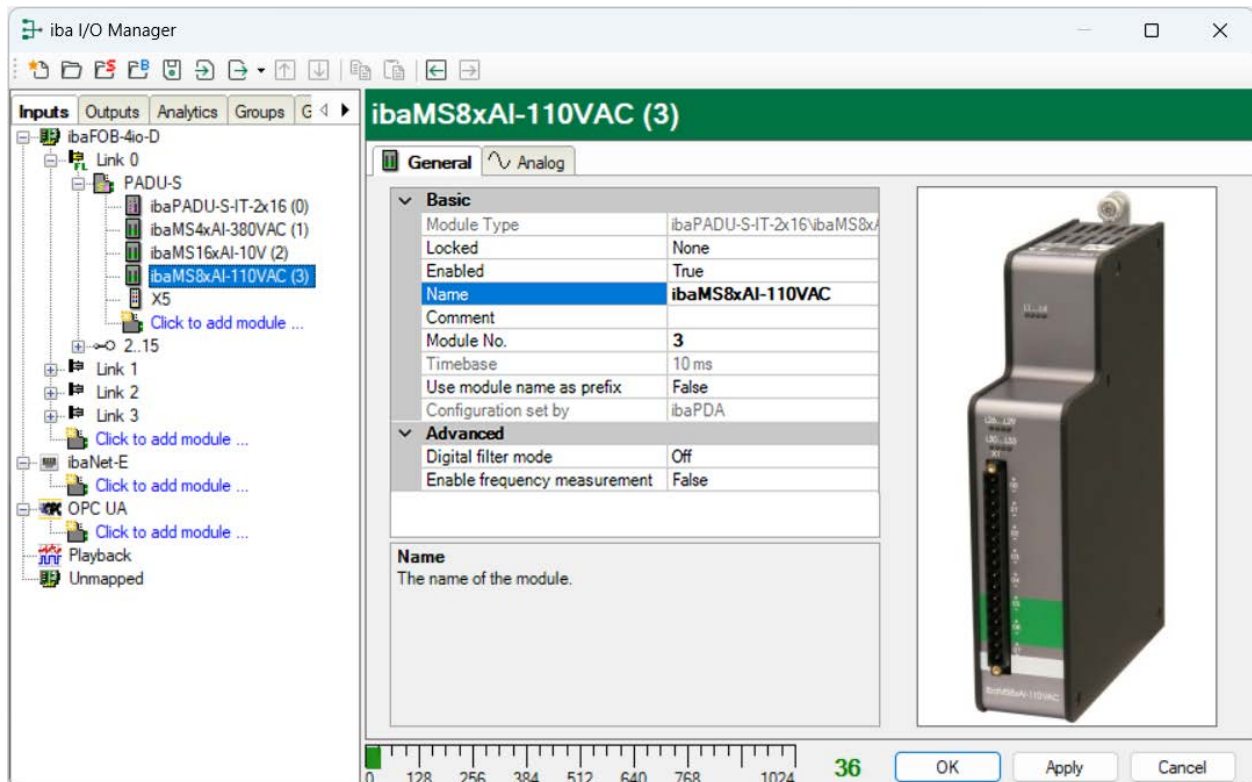
#### Other documentation



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 ibaMS8xAI-110VAC – General tab

If the module is detected, click on the module in the tree structure and the *General* tab appears.



## Basic settings

### Module Type (information only)

Indicates the type of the current module.

### Locked

You can lock a module to avoid unintentional or unauthorized changing of the module settings.

### Enabled

Enable the module to record signals.

### Name

You can enter a name for the module here.

### Comment

You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

### Module No.

This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

### Timebase

All signals of the module are sampled on this timebase.

Acquisition timebase specified in the PADU-S module

### Use module name as prefix

This option puts the module name in front of the signal names.

### 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
----------------------	--------

If *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

If 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 also possible to import user-defined signal names - assigned by the runtime configuration - into *ibaPDA* (Import signal names: True), if the embedded application supports this function.

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

*ibaPDA* reads out this configuration and uses it for acquisition in *ibaPDA*. Modules and signals which are not displayed in gray can be used in *ibaPDA*.

## Advanced

### Digital filter mode

Select "Anti-aliasing" if an additional digital anti-aliasing filter is to be enabled after the analog anti-aliasing filter. This digital anti-aliasing filter can be enabled only once per module and is then applied to all signals, that have the filter property enabled on the *Analog* tab.

For this reason, it can only be activated together with the analog filter via the filter option in the *Analog* tab.

The digital anti-aliasing filter can only be enabled with a sampling rate > 500 Hz (= timebase < 2 ms). If the digital filter is enabled, an additional field *Cutoff frequency* appears.

### Cutoff frequency

You can enter a value in Hz for the cut-off frequency of the digital anti-aliasing filter or select the "Auto" setting. When it is set to "Auto" the cutoff frequency is equal to one third of the sampling frequency.

The screenshot shows the configuration window for the ibaMS8xAI-110VAC (3) module. The window has two tabs: "General" and "Analog". The "General" tab is active, showing a table of configuration parameters. The "Basic" section includes fields for Module Type, Locked, Enabled, Name, Comment, Module No., Timebase, Use module name as prefix, and Configuration set by. The "Advanced" section includes fields for Digital filter mode, Cutoff frequency, and Enable frequency measurement. The "Cutoff frequency" field is set to "Auto". Below the table, there is a text box explaining the "Cutoff frequency" setting.

Basic	
Module Type	ibaPADU-S-IT-2x16\ibaMS8x/
Locked	None
Enabled	True
Name	ibaMS8xAI-110VAC
Comment	
Module No.	3
Timebase	10 ms
Use module name as prefix	False
Configuration set by	ibaPDA

Advanced	
Digital filter mode	Anti-aliasing
Cutoff frequency	Auto
Enable frequency measurement	False

**Cutoff frequency**  
This is the cutoff frequency of the digital anti-aliasing filter. You can enter a value in Hz or you can set it to 'Auto'. When it is set to 'Auto' then the cutoff frequency is equal to one third of the sampling frequency. The cutoff frequency should be between 100 Hz and half of the sampling frequency.

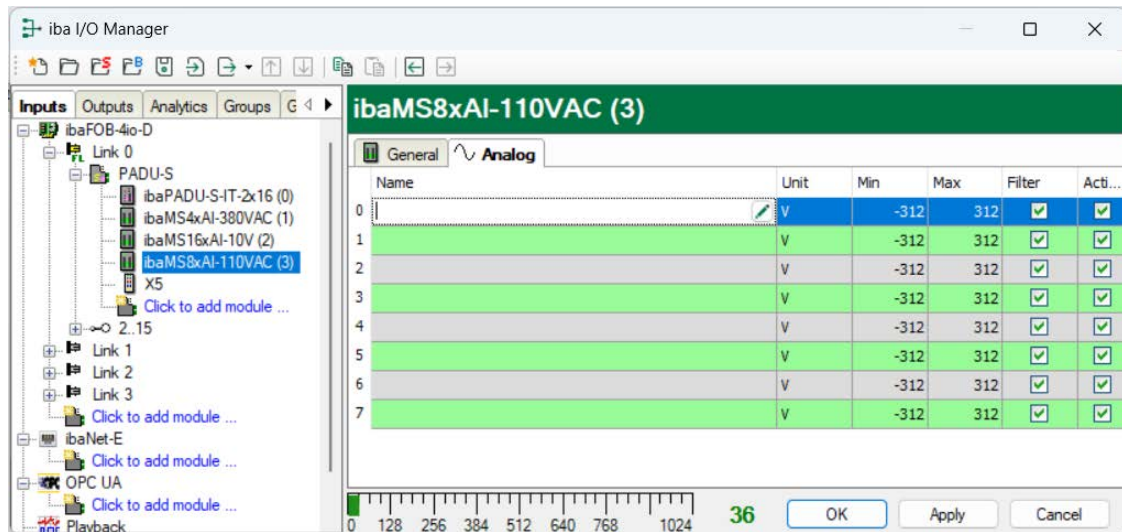
- Permissible values: 100 Hz ... 0.5\*sampling rate
- The entry "0" Hz corresponds to the setting "Auto".

### Enable frequency measurement


Select „TRUE“, if you want to measure power frequency of the connected signals. The *Power frequency [10Hz..80Hz]* tab appears additionally.

### 9.1.2 ibaMS8xAI-110VAC – Analog tab

The following settings apply to the *Analog* tab:



#### Name

You can enter a signal name and additionally two comments when clicking on the  symbol in the *Name* field.

#### Unit

You can enter a unit, the default setting is “V”.

#### Min

You can define a lower limit for the measuring range. The analog normalized value of -312 V is assigned to a physical value, e.g. -20 °C.



#### Max

Here, you can define an upper limit for the measuring range. The analog normalized value of +312 V is assigned to a physical value, e.g. +100 °C.

#### Filters

You can select the antialiasing filter Butterworth 4th order 20 kHz, see [↗ Technical data](#), page 35.

#### Active

Enabling/disabling the signal.

You can display or hide additional columns using the context menu (right mouse click in the heading line).

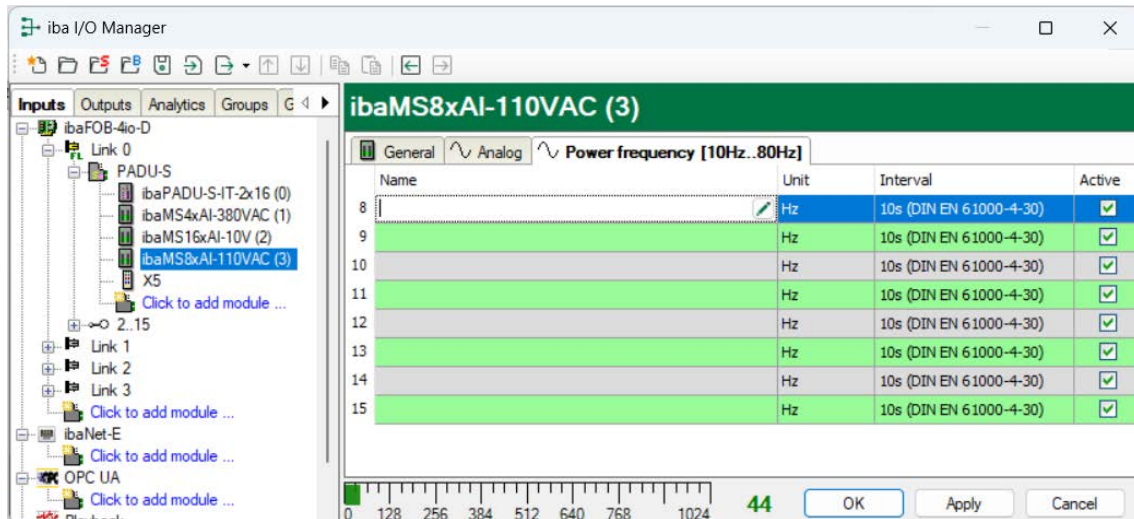
## Other documentation




Detailed descriptions of the columns and how to fill in the signal tables can be found in the documentation for *ibaPDA*.

### 9.1.3 ibaMS8xAI-110VAC – Power frequency [10Hz..80Hz] tab

When power frequency measurement is enabled, this tab appears additionally.



#### Name

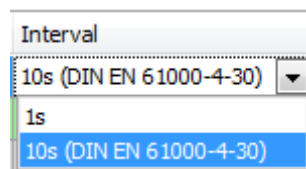
You can enter a signal name and additionally two comments when clicking on the  symbol in the *Name* field.

#### Unit

Default value is „Hz“.

#### Interval

You can select the measuring interval via a drop-down list: "1s" or "10s" (according to DIN EN 61000-4-30)



#### Active

Enabling/disabling the signal.

You can display or hide additional columns using the context menu (right mouse click in the heading line).

## 9.2 Configuration with ibaLogic-V5

Combined with *ibaLogic-V5*, an *ibaPADU-S-IT-2x16* device can be used to realize individual signal preprocessing or stand-alone applications.

### Other documentation



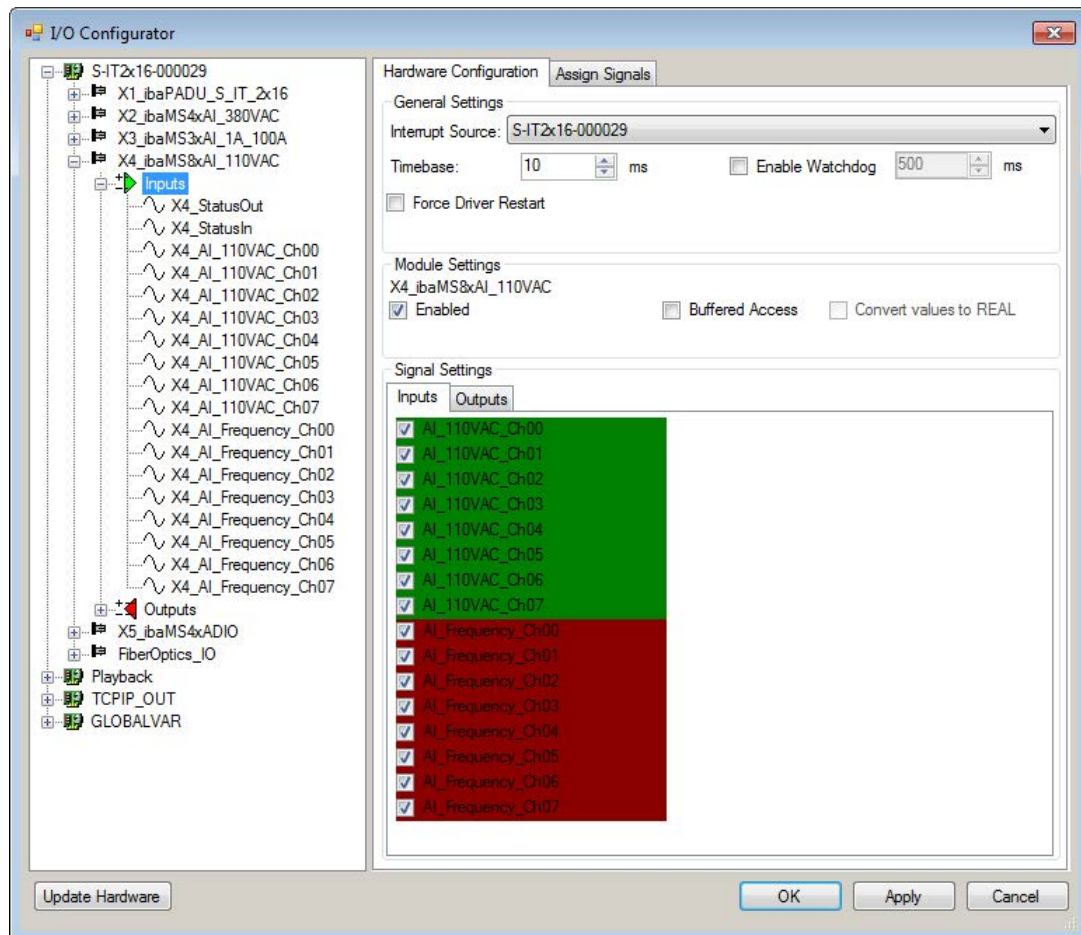
The basic procedure with *ibaLogic-V5* is described in the manual for the *ibaPADU-S-IT-2x16* central unit. This manual only describes the signals belonging to this module.

### 9.2.1 Configuring signals

The signals can be configured in the I/O Configurator of *ibaLogic-V5*.

1. Open the I/O Configurator in the *Tools – I/O Configurator* menu.
2. Click on the <Update hardware> button.

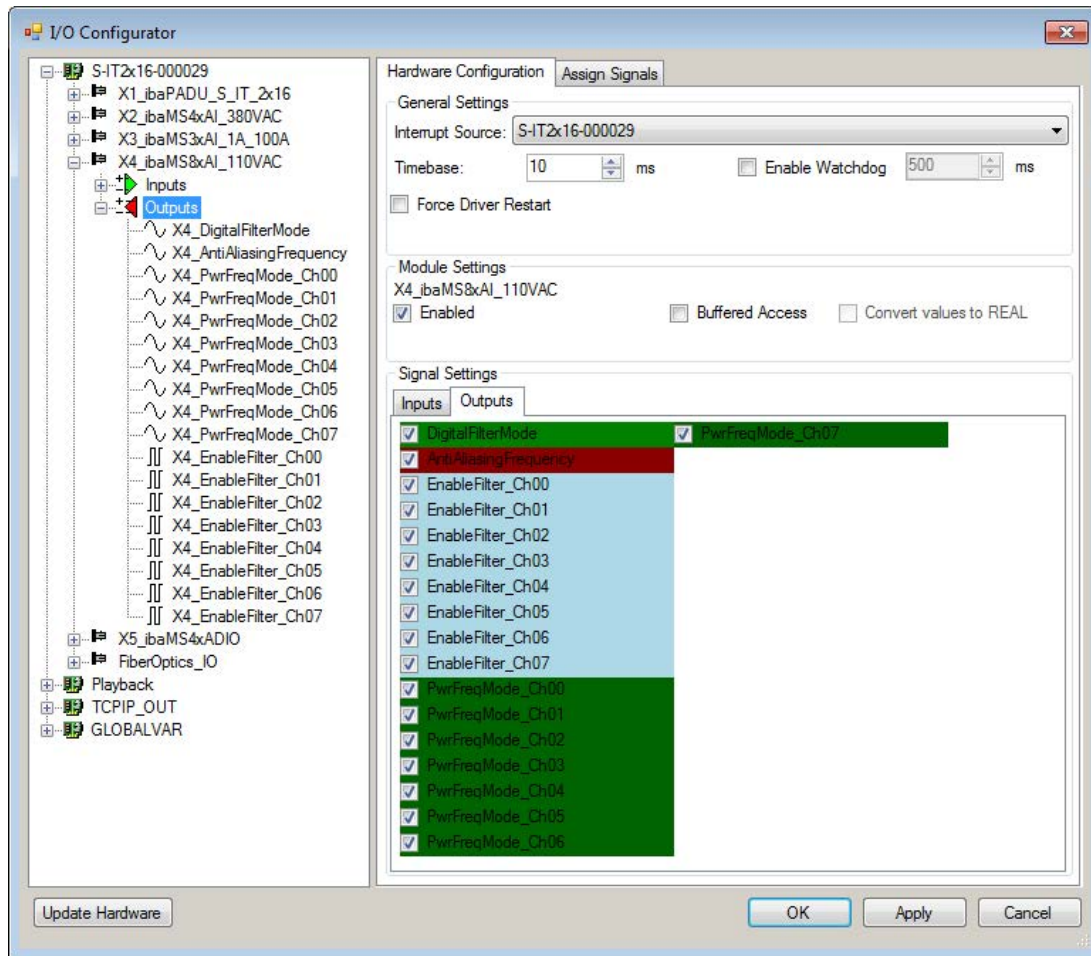
→ *ibaLogic-V5* detects the module.



→ The analog input channels and the power frequency signals are displayed in the „Inputs“ tab.

3. The filters are enabled and configured by means of signal outputs as well as the mode for power frequency measurement.





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	Meaning
<b>Inputs</b>	
AI_110VAC_Ch[00...07]	Analog input signals
AI_Frequency_Ch[00...07]	Calculated grid frequencies
StatusIn	Status information about the plugged input module (for output module without function):  0 = module not initialized 1 = module running >1 = error (e.g. Module cannot be initialized)

Signal	Meaning
StatusOut	Status information about the plugged module (for input module without function):  0 = module not initialized 1 = module running >1 = error (e.g. Module cannot be initialized)
<b>Outputs</b>	
DigitalFilterMode	Activates the digital anti-aliasing filter in addition to the analog anti-aliasing filter (if activated)
AntiAliasingFrequency	Setting of the cutoff frequency of the digital anti-aliasing filter
EnableFilter_Ch[00...07]	Enables the analog antialiasing filters (per channel)
PwrFrqMode_Ch[00...07]	Setting of the measuring interval for power frequency measurement (per channel)
<b>Additional input signals for buffered access</b>	
AI_110VAC_Ch[00...07]_buf	Input buffer of analog signals:
AI_Frequency_Ch[00...07]_buf	Input buffer of calculated grid frequencies
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

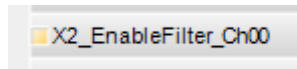


## 9.2.2 Additional functions

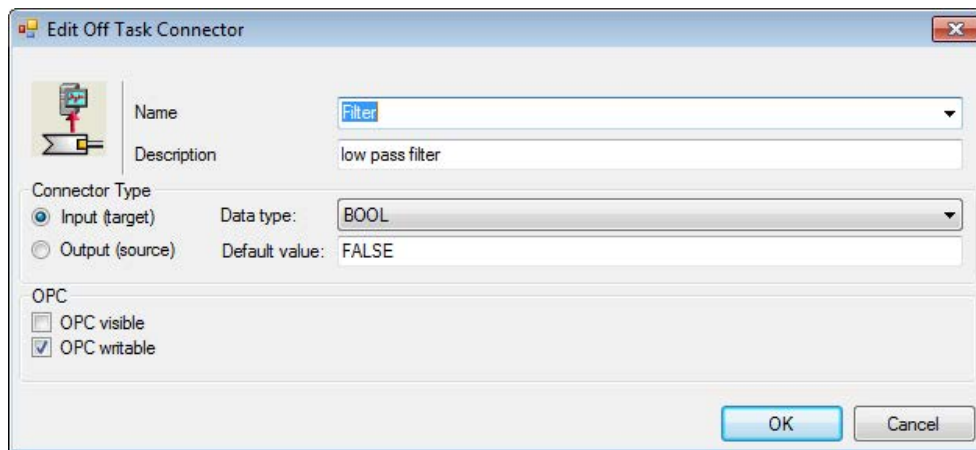
### Activating analog filters

If you want to use anti-aliasing filters, these are set up as configuration output and configured as Off-task connector (OTC) or function block.

First, drag the output signals defined in the I/O Configurator to the margin of the programming surface, in this example “X2\_EnableFilter\_Ch00” for the analog input 0.



Create a new off-task connector in the programming window, assign a meaningful name, e.g. “filter” and select the type Input. The data type must also be defined as a BOOL.



Meaning of the default values for the anti-aliasing filter:

FALSE = switched-off

TRUE = switched-on

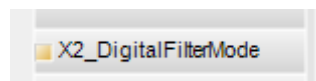
Now, connect the OTC and the signal on the margin of the programming surface.



The configuration of the following functions is similar to the analog filter configuration as described above. The meaning of the parameters in detail:

### Digital anti-aliasing filter (DigitalFilterMode)

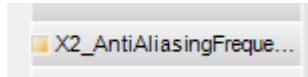
The digital anti-aliasing filter can only be enabled when sampling rate > 500 Hz.



0: Off (default setting)

2: Digital anti-aliasing filter activated (once for all channels)

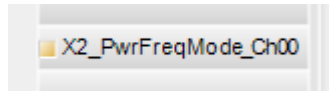
Data type: DINT

**Cutoff frequency of the digital anti-aliasing filter (AntiAliasingFrequency)**

= 0: Auto = 1/3 of the sampling rate (default setting)

> 0: Cutoff frequency in Hz (permissible values: 100 Hz ... 0.5\*sampling rate)

Data type: LREAL

**Setting of the interval for power frequency measurement (PwrFrwqMode)**

1: Measuring interval 1 s

2: Measuring interval 10 s (according to DIN EN 61000-4-30)

Data type: USINT

## 10 Technical data

In the following you will find the technical data and dimensions for *ibaMS8xAI-110VAC*.

### 10.1 Main data

#### Short description

Name	ibaMS8xAI-110VAC
Description	Input module with 8 analog voltage inputs
Order number	10.124500

#### Supply

Power supply	24 V DC, internal via backplane bus
Power consumption max.	8 W

#### Interfaces, operating and indicating elements

Indicators (LEDs)	4 LEDs for device status 8 LEDs for state of the analog inputs
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#### Operating and environmental conditions

Temperature ranges	
Operation	32 °F to 122 °F (0 °C to 50 °C)
Storage/transport	-13 °F to 158 °F (-25 °C to 70 °C)
Mounting position	Vertical, plugged into backplane bus
Installation height	Up to 6562 ft (2000 m)
Cooling	Passive
Humidity class	F, no condensation
Protection class	IP20
Certification/Standards	EMC: IEC 61326-1 Safety: IEC 61010-2-030 (CAT II 150 V) FCC part 15 class A
MTBF <sup>2)</sup>	225,984 hours / 25 years
Dimensions (width x height x depth)	43 mm x 214 mm x 148 mm
Weight (incl. packaging and documentation)	1.1 kg

<sup>2)</sup> MTBF (mean time between failure) according to Telcordia 3 SR232 (Reliability Prediction Procedure of Electronic Equipment; Issue 3 Jan. 2011 and NPRD, Non-electronic Parts Reliability Data 2011

## 10.2 Declaration of conformity

### Supplier's Declaration of Conformity

#### 47 CFR § 2.1077 Compliance Information

**Unique Identifier:** 10.124500 ibaMS8xAI-110VAC

#### 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.

## 10.3 Analog inputs

Number	8
Version	Galvanically isolated, single ended
Resolution	16 bit
Filters	
permanent	R/C low-pass, 1st order, 40 kHz
in addition	Analog anti-aliasing filter (Butterworth), 4th order, 20 kHz Digital anti-aliasing filter (Chebyshev I) <sup>3)</sup> , 8th order, cutoff frequency adjustable
Input signal	110 V AC
Upper range value	±312 V
Input impedance	
Device switched off	250 kΩ
Device switched on	252 kΩ
Input capacity	8.5 pF
Sampling rate	Max. 40 kHz, freely adjustable
Frequency range	0 Hz to 20 kHz
Accuracy	< 0.1 % of total measuring range
Electrical isolation	
Channel-channel	1.5 kV AC
Channel –housing/ power supply	1.5 kV AC

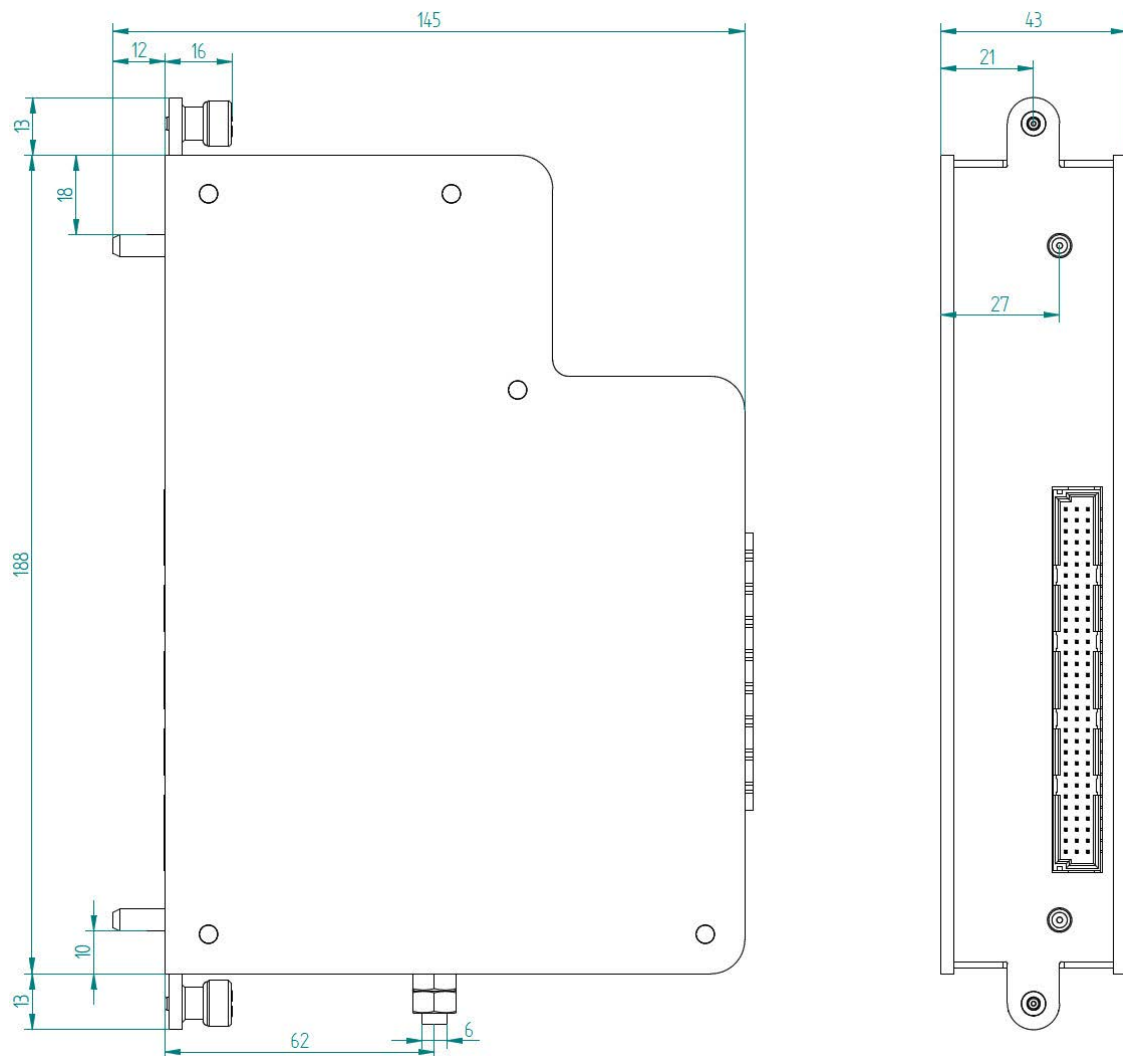
<sup>3)</sup> can be switched on if sampling rate > 500 Hz, cut-off frequency adjustable from 100 Hz to 0.5\* sampling rate

Measuring overvoltage	1500 V transient overvoltage
Connector type inputs	16-pin multi-pin connector; clamp-type terminal (0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> ), screw connection. included in delivery

## 10.4 Additional functions

Power frequency measurement	Interval
10 Hz ... 80 Hz	1 s / 10 s (according to DIN EN 61000-4-30)

## 10.5 Dimensions



Module dimensions (in mm)

# 11 Support and contact

## Support

Phone: +49 911 97282-14  
Email: [support@iba-ag.com](mailto:support@iba-ag.com)

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### Note



If you need support for software products, please state the number of the license container. For hardware products, please have the serial number of the device ready.

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## Contact

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