



# ibaW-750

Central Unit for WAGO I/O System 750

Manual

Issue 1.6

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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>.

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**Certification**

The device is certified according to the European standards and directives. This device corresponds to the general safety and health requirements. Further international customary standards and directives have been observed.



Issue	Date	Revision	Chapter	Author	Version HW / FW
1.6	12-2023				
1.5	08-2023	Scope of delivery, ibaPDA GUI, Terminals discontinued			

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# 1 About this manual

This manual describes the construction, the use and the operation of the ibaW-750 device.

## 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

The following notations are used in this manual:

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 central unit ibaW-750 is designed to integrate I/O modules of the 750 series from WAGO and K-bus modules from Beckhoff into the iba system. The remote I/O system is connected to the ibaPDA system via standard Ethernet.

The WAGO I/O system of the 750 series is an ideal supplement to the iba system. Digital and analog I/O modules can be integrated into the system, as well as incremental encoders, SSI inputs, RTDs, thermocouples and measuring bridges.

A maximum of 250 WAGO I/O modules can be connected to an ibaW-750 device.

### Acquisition of measured values via Ethernet

ibaW-750 connects the K-bus I/O system to the ibaPDA data acquisition system via Ethernet. The signals are converted in the device and are available via the Ethernet interface. The ibaPDA system can be connected via a standard Ethernet card. ibaW-750 works with the ibaNet-E protocol. The two 10/100 Mbit Ethernet interfaces offer a switch function.

One connection to an ibaPDA system is possible per ibaW-750 unit, whereby the sampling rate is freely adjustable from 1 Hz to 1 kHz.

### Automatic detection

The device including the connected I/O modules are found automatically in ibaPDA, if ibaW-750 and the ibaPDA computer are in the same LAN. ibaPDA synchronizes all ibaW-750 systems connected to it, enabling isochronous measurement of multiple remote I/O systems via Ethernet.

### Coupling to K-bus

A maximum data volume of 2048 bytes can be transferred via the K-bus. The sampling rate depends on the cycle time on the K-bus.



#### Note

**I/O range:** Not all WAGO I/O modules may be usable. Please contact iba to make sure the specific module will work. This also applies to the (basically) compatible Beckhoff modules.

A description of the supported modules can be found in chapter 10.

Before project engineering, check for each module type which transmission capacity is required.

---



#### Note

**Module diagnostics:** Apart from complex modules no diagnostic information is supported.

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**ibaPDA restrictions**

While all iba devices normally deliver exactly 1 ms synchronized simultaneous snapshots of the process, this cannot be guaranteed when using the WAGO 750 I/O system. This is mainly due to the structure of the local serial I/O bus (K-bus). Further on, the cycle time depends on the number of channels connected to a station. Especially analog channels and counters (terminals with a high number of bits) decrease the bus cycle, and cycle times may take several milliseconds. When several stations are used simultaneously, different cycle times may cause phase differences of up to 10 ms. This means the simultaneous measurement of a huge number of signals < 10 ms cannot be guaranteed. Anyway, to measure some additional RTD or thermocouple inputs this timing is sufficient.

---

### 3 **Scope of delivery**

After unpacking check the completeness and intactness of the delivery.

The scope of delivery includes:

- ibaW-750 device

## 4 Safety instructions

### 4.1 Designated use

The device is an electrical equipment. The device is only allowed for use in the following applications:

- Measurement data acquisition and analysis
- Applications of iba software products (ibaPDA etc.)

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

### 4.2 Special advices

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**⚠ CAUTION**

The length of the supply line from the voltage source to the device must not exceed 30 m.

---

**Important note**

Do not open the device!

There are no serviceable parts inside the device.

Opening the device will void the warranty.

---

**Note**

Cleaning

To clean the device, use a dry or slightly moistened cloth. A note specifies special requirements or actions to be observed.

---

**Other documentation**

This manual describes only the properties of the WAGO devices which are relevant for iba systems integration.

For a detailed description of the single WAGO I/O modules with information on pin assignment, data format and A/D conversion, please refer to the original WAGO documentation.

Data sheets and manuals for WAGO components are available for download at [www.wago.com](http://www.wago.com).

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## 5 System requirements

### 5.1 Hardware

**For operation:**

24 V DC ( $\pm 10\%$ ) power supply

**For device parameterization and for measuring:**

- PC, recommended equipment for use with ibaPDA:
  - Multicore CPU 2 GHz, 2048 MB RAM, 100 GB HDD, or more
  - Standard Ethernet interface
  - Standard Ethernet patch cable
  - Optional: at least one free PCI/PCIe slot

On our homepage <http://www.iba-ag.com> you will find several PC systems suitable for desktop or industry use.

- Ethernet network specification:
  - Standard Ethernet topologies with router, switches, etc.

### 5.2 Software

- ibaPDA version 7.3.0 or higher for device configuration and for measuring and recording data

### 5.3 Firmware

- ibaW-750 version 02.02.002 or higher

## 6 Mounting and dismounting



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### Important note

Make sure the 24 V power supply is turned off when adding or removing modules.

---

### 6.1 Mounting

- Press the device slightly against the DIN-rail. When you hear the click the device is securely mounted.

### 6.2 Dismounting

- Remove all I/O connections.
- Pull the orange plastic leash out of the device until the lock is released and remove the module.

## 7 Device description

### 7.1 Properties

- 24 V DC direct current supply ( $\pm 10\%$ ), to supply the device and the K-bus.
- The power supply is able to supply I/O modules with a max of 1.7 A. If more current is needed, additional power supply modules must be integrated within the K-bus.
- Rugged plastic chassis with DIN-rail mounting
- LED indicators for operation, ibaPDA connection, K-bus and errors
- 2 10/100 Mbit Ethernet interfaces with switch function
- Automatic detection of devices and modules in ibaPDA (within the same LAN)
- Flexible adjustment of the sampling rate



#### Note

Please note, that some I/O modules may have no or just single power contacts (depending on the function of the module). Therefore the daisy chaining of power supplies from module to module may be interrupted. If it is necessary to supply subsequent modules (more right positioned), an additional power supply module is necessary. With some modules it is basically not possible to connect them together because the grooves for the blade contacts are closed at the top.

With the placement of a new power supply module, a new common power potential is generated, while the old one (to the left) is always interrupted. This means that a total new power definition may be defined from this point on, which can also include a potential change.

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#### Note

Please note, that some modules additionally require an own power supply (mostly 24 V DC). These are mainly complex modules, see chapter 10.

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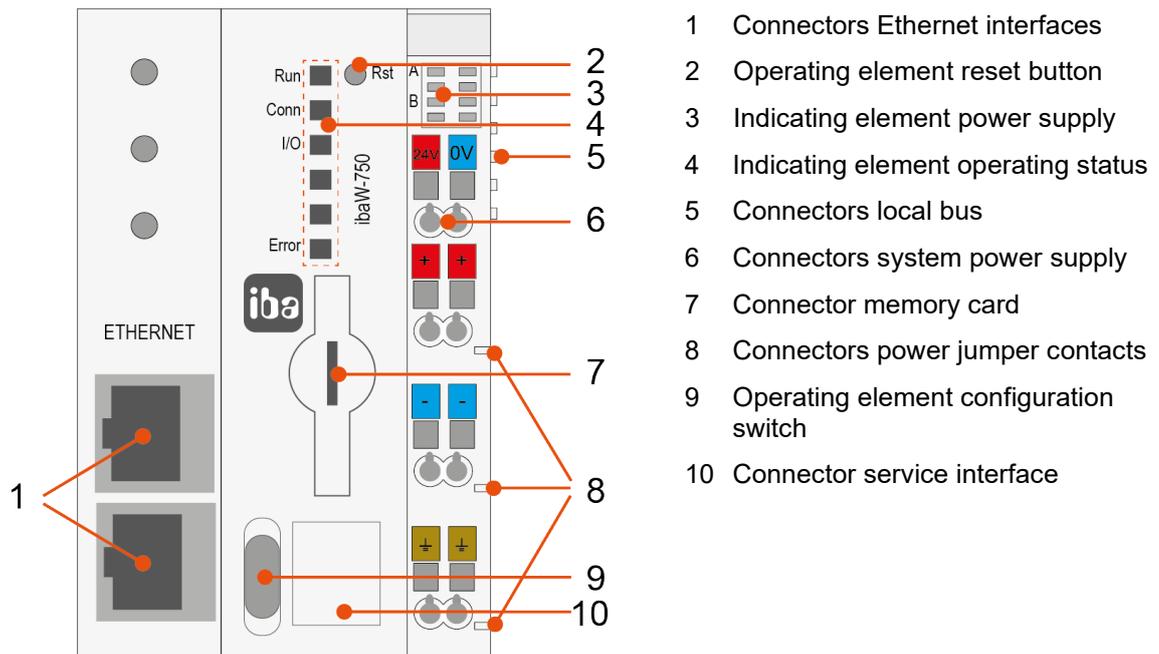


#### Other documentation

Please refer to the manufacturer's original manual(s) for more information.

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## 7.2 Device view



## 7.3 Indicating elements

The operating status of the device is shown by colored status LEDs.

### 7.3.1 Operating status

LED	Color	Status	Description
Run	Green	Off	Out of operation, no power supply
		Blinking	Ready for operation
		Blinking (fast)	Firmware update active
		On	Boot sequence
Conn	Green	Off	No connection to ibaPDA system
		On	Connection to ibaPDA system
I/O	Green	On	K-bus active
	Red	On	K-bus error
Error	Red	On	System error

Explanations of the K-bus error can be found in chapter 9.4.1.

### 7.3.2 Power supplies

LED	Color	Status	Description
A	Green	Off	No system supply present
		On	System supply present
B	Green	Off	No field supply present
		On	Field supply present

## 7.4 Operating elements

### 7.4.1 Reset button

The reset button can be used to reset the device to factory settings, see chapter 8.2.

### 7.4.2 Configuration switch

The configuration switch is used to configure IP settings in addition to the reset:

Position	Status	Description
Cfg	Switching	User-defined IP settings are used
Static	Switching	Fixed IP setting with IP 192.168.1.1 (factory setting)
Rst	Spring-return	Reset to factory settings, see chapter 8.2

## 7.5 Connectors

### 7.5.1 Ethernet interfaces

The device provides two 10/100 Mbit Ethernet interfaces with switch function.

The interfaces support:

- Auto-MDI
- Autonegotiation (10/100 Mbit and half/full duplex)

APIPA<sup>1</sup> is not supported.

### 7.5.2 Local bus

Communication between the central unit and I/O modules as well as the system supply of the I/O modules is provided via the local bus. The local bus consists of 6 data contacts designed as self-cleaning gold spring contacts.

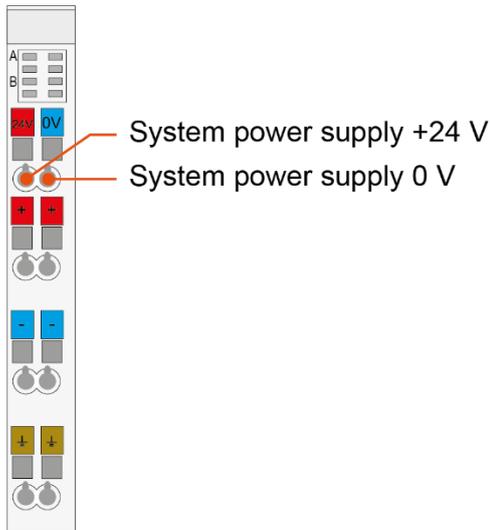
### 7.5.3 Power supply

The device requires two power supplies.

<sup>1</sup> Automatic Private IP Addressing = automatic IP addressing without DHCP server in the IP address range 169.254.x.x

### 7.5.3.1 System power supply

The device requires an external 24 V DC  $\pm 10\%$  power supply (unregulated) as system power supply. The supply voltage is to be connected via the appropriate connectors on the device and it is protected against reverse polarity.



If desired, you can order 24 V DIN rail or power supply units from iba.

The 24 V voltage is internally converted to a 5 V operating voltage (galvanically connected).

The voltage does not only supply the device, it also supplies connected modules via the local bus.

Up to 1700 mA can be used for both supplies.

If a higher load is necessary, additional system power supply modules are required (e.g. Wago 750-613)

Some modules do not need a supply voltage from the system supply, but use the additional field supply.

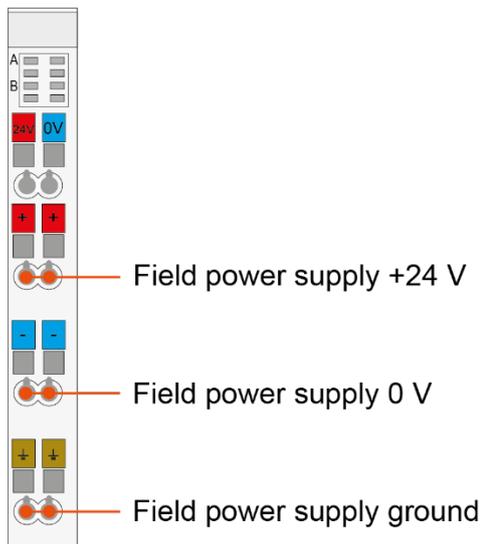
#### **CAUTION**

The length of the supply line from the voltage source to the device must not exceed 30 m.

### 7.5.3.2 Field power supply

Individual module types connected to the ibaW-750 system require a 24 V voltage supply via the field supply.

This supply voltage must be applied via appropriate connectors on the device, it is a passive supply without protection.



If desired, you can order 24V DIN rail or power supply units from iba.

For power supply at field level please refer to chapter 7.5.5

#### 7.5.4 Memory card slot

Slot for microSD memory card for service purposes only.

#### 7.5.5 Power jumper contacts

The operating voltage is available for other modules as voltage supply via power modules. Power connections are made automatically from module to module via the internal power jumper contacts when snapping the modules together.

The power load of the power contacts must not permanently exceed 10 A.

When inserting a module without power jumper contacts or an additional power module the field supply fed through the power jumper contacts is interrupted.

If necessary, a new potential can be generated on the power jumper contacts by a power module (e. g. WAGO750-610 for 24 V DC, WAGO750-611 for 230 V AC).

### **CAUTION**

The length of the supply line from the voltage source to the device must not exceed 30 m.

Regarding the power supply, please refer to the manufacturer's original manual(s) for more information.

#### 7.5.6 Service interface

Service interface behind the flap for service purposes only.

## 8 System integration

The structure of an ibaW-750-System is always as follows:

- ibaW-750 central unit on the left side
- Modules (or terminals) of the WAGO I/O System 750 (I/O modules, power supply modules ...), the device supports up to 250 modules.
- One end module at the right end of the station to terminate the serial K-bus

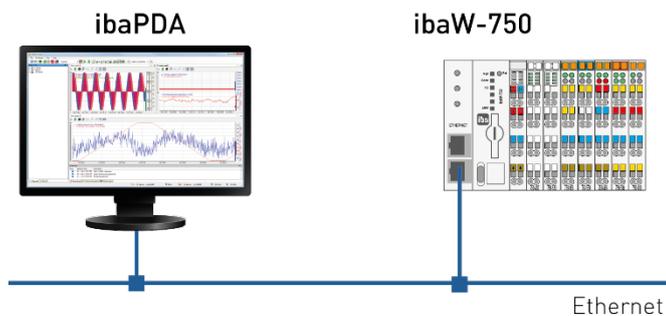


### Note

Before you integrate the device into your network, inform your IT administrator and ask for the appropriate procedure.

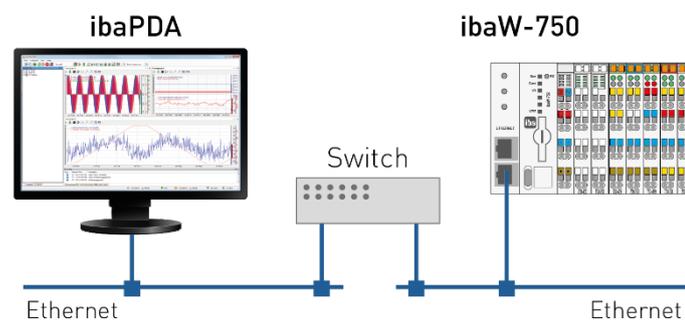
Notes on device configuration in the network can be found in chapter 9.2.

### 8.1 System integration with ibaNet-E via Ethernet

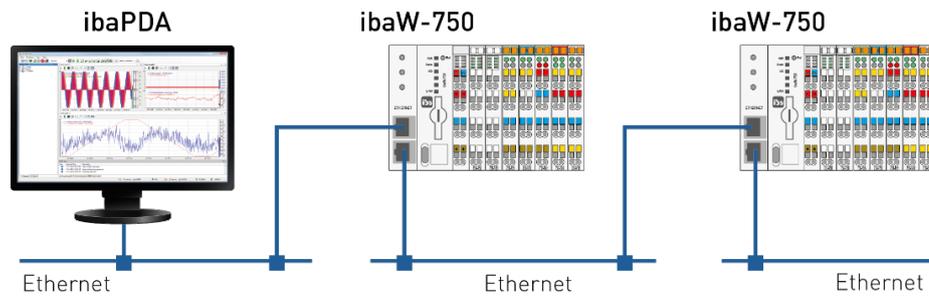


ibaW-750 is connected to the ibaPDA computer via a standard Ethernet network. It is not relevant which of the two Ethernet interfaces is used. The device works with the ibaNet-E protocol for the transmission of configuration and measurement data.

The network topology is not relevant here. The device can either be connected directly (P2P) to the ibaPDA computer, as in figure 2, or via a switch or router.



If several ibaW-750 are connected, the switch integrated in the device can also be used.



ibaPDA automatically detects the ibaW-750 device and the connected modules if ibaW-750 and the ibaPDA computer are in the same network (LAN).

The sampling rate can be freely adjusted from 1 Hz to 1 kHz. The maximum amount of data that can be transmitted depends on the selected sampling rate.

The following rule applies: the higher the sampling rate, the lower the data volume.

The update time of the signals is also limited by the update rate of the K-bus and the connected modules with their specific properties.

## 8.2 Reset to factory settings

The device can only be reset by a hardware reset on the device itself.

### 8.2.1 Procedure

Move the configuration switch to the *Rst* position, hold it and press the reset button at the same time. The reset button can be pressed with a suitable object (e.g. ballpoint pen).

If the reset is successful, the device restarts (blinking status indicators) and you can release both the reset button and the configuration switch.

Please note that the configuration switch only returns to the *Static* position and that you should set it to the *Cfg* switch position for user-defined IP settings.

### 8.2.2 Factory settings

#### 8.2.2.1 Device configuration

Owner:	none
Device name:	ibaW-<last 6 digits of the serial number>
IP address:	192.168.1.1
Subnet mask:	255.255.255.0
Gateway:	0.0.0.0
DHCP:	no

#### 8.2.2.2 Module configuration

A reset deletes the entire module configuration including the owner of this module configuration.

## 9 ibaPDA integration

With ibaPDA you can search for devices in the network and configure them for operation in the network, but ibaPDA can also be used to configure, acquire and record the analog and digital signals of the connected terminals, and output them.

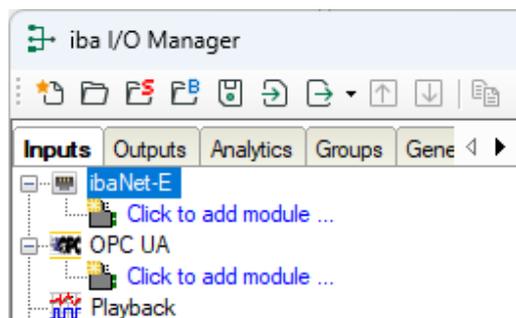
In both cases, first establish an Ethernet connection to the ibaPDA computer.

Start ibaPDA  and open the I/O Manager .

### 9.1 ibaNet-E interface

The ibaW-750 device is connected via a standard Ethernet network card built into the ibaPDA computer and the ibaPDA interface ibaNet-E.

Standard Ethernet infrastructure components can be used in this connection.



The ibaNet-E interface is available from ibaPDA version 7.1.7. The interface is license-free with ibaPDA version 7.3.0 or higher together with the firmware v02.01.001 or higher.

#### 9.1.1 Connections tab

General configurations for the ibaNet-E interface can be made in this tab:

- Stop acquisition when a broken connection is detected

If a connection to an ibaNet-E device is interrupted, the acquisition is stopped.

- Set signals to zero when no data is available

If the ibaNet-E connection is broken, all signals in the acquisition are set to zero. Otherwise, the signal values would show the last current value before the connection was lost.

All ibaNet-E connections are displayed in an overview:

- Module

The name of the connected module or device

- Destination

Address of the destination device.

If the device is connected via DHCP, the host name is displayed. Otherwise, its IP address is displayed.

- Type

Type of the ibaNet-E connection:

- ACQ: Typical connection type for a receive connection (Isochronous acquisition and telegram repetitions).

- PLC: Typical connection type for a send connection (always the most current value is sent, no repetition of sending in case of loss).

Direction

Input or output direction

- Input direction: Receiving data from the ibaNet-E device.
- Output direction: Send data to the ibaNet-E device

Messages

Number of telegrams for this connection

Ping time

Current ping time for this connection

A ping to the ibaNet-E device is performed cyclically during a valid ibaNet-E receive connection.

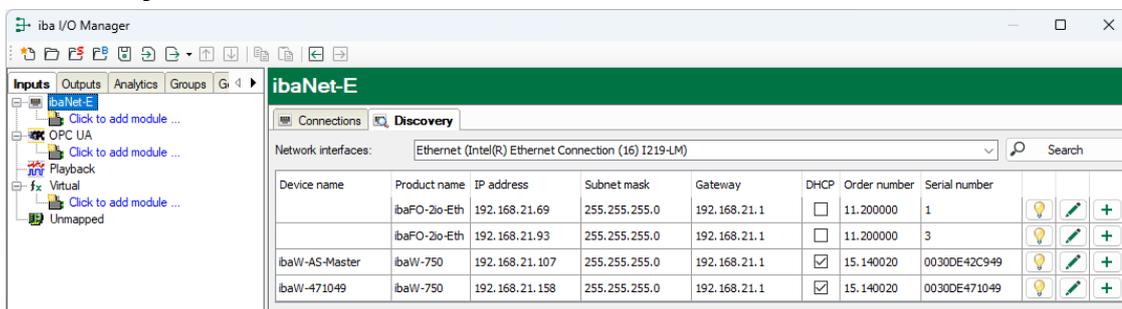
The measured time is displayed here and is a reference for the link quality of the Ethernet. The shorter this time is, the better the link quality and the more reliable the data transmission.

If the link quality is poor, the corresponding connection is highlighted in orange.

Example:

	Module	Destination	Type	Direction	Messages	Ping time
0	ibaW-750-DHCP (0)	ibaW-750-DHCP	ACQ	IN	3139	3,296 ms
1	ibaW-750-DHCP (0)	ibaW-750-DHCP	PLC	OUT	233	2,044 ms
2	ibaW-750-WLAN (5)	192.168.41.201	ACQ	IN	2977	74,049 ms
3	ibaW-750-LAN (10)	192.168.1.50	ACQ	IN	3141	3,108 ms
4	ibaW-750-LAN (10)	192.168.1.50	PLC	OUT	233	1,782 ms
5	?	?	?	?	?	?
6	?	?	?	?	?	?

### 9.1.2 Discovery tab



This tab is used to set the network interfaces via which ibaNet-E devices are to be searched.

Please note that this search can only be successful if the device is located in the same LAN as the ibaPDA computer or has also been preconfigured for this LAN.

In the *Network interfaces* field, select the network card(s) via which you can reach the ibaNet-E devices and start the search by clicking on <Search>.

## 9.2 Device configuration

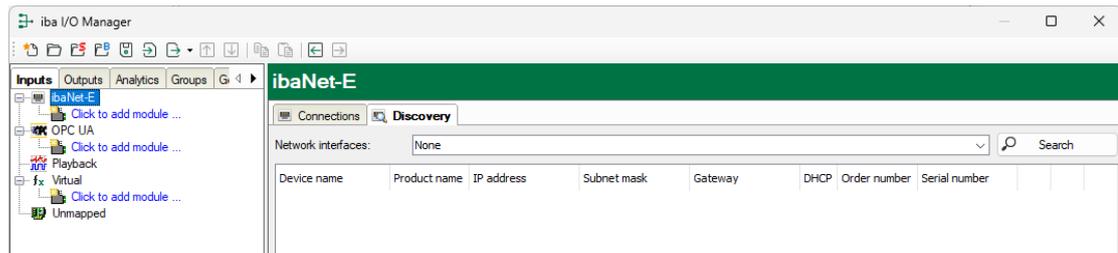
If ibaW-750 is not yet configured for the network or this configuration is not known, a search can be started in the I/O Manager of ibaPDA.

Please note that this search can only be successful if the device is located in the same LAN as the ibaPDA computer or has also been preconfigured for this LAN.

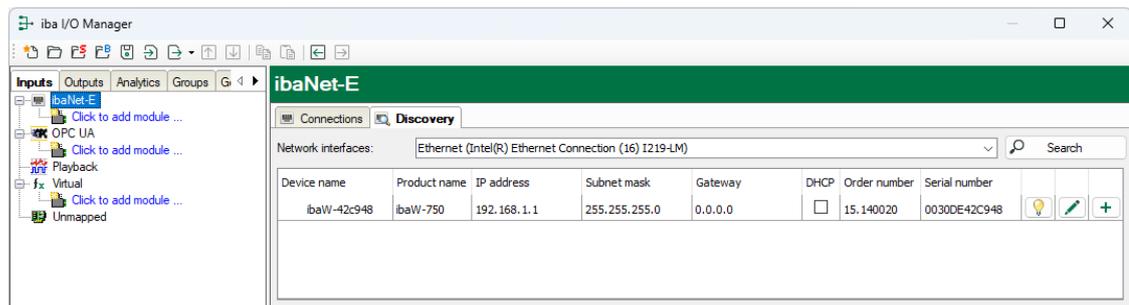
### 9.2.1 Search

Start ibaPDA  and open the I/O Manager .

Select the ibaNet-E interface and choose the *Discovery* tab:



In the field *Network interfaces* select the network card(s) via which you can reach the ibaW-750 device and start the search by clicking on <Search>:



Found devices are listed in the table and cannot be changed in this display.

Device name  
Name of the device

Product name  
ibaW-750

IP address  
IP address of the device

Subnet mask  
The subnet mask of the IP settings

Gateway  
The gateway of the IP settings

DHCP  
The IP settings are obtained from a DHCP server (enabled) or not

Order number  
The iba order number of the ibaW-750 device

Serial number

The serial number of the ibaW-750 device

Meaning of the buttons:



„Identify device“

When this button is pressed, the status indicators (LEDs) on the front panel start blinking for a short time. In this way it is possible to identify the device directly.



„Edit device settings“

This button opens the window for the device settings and IP settings.



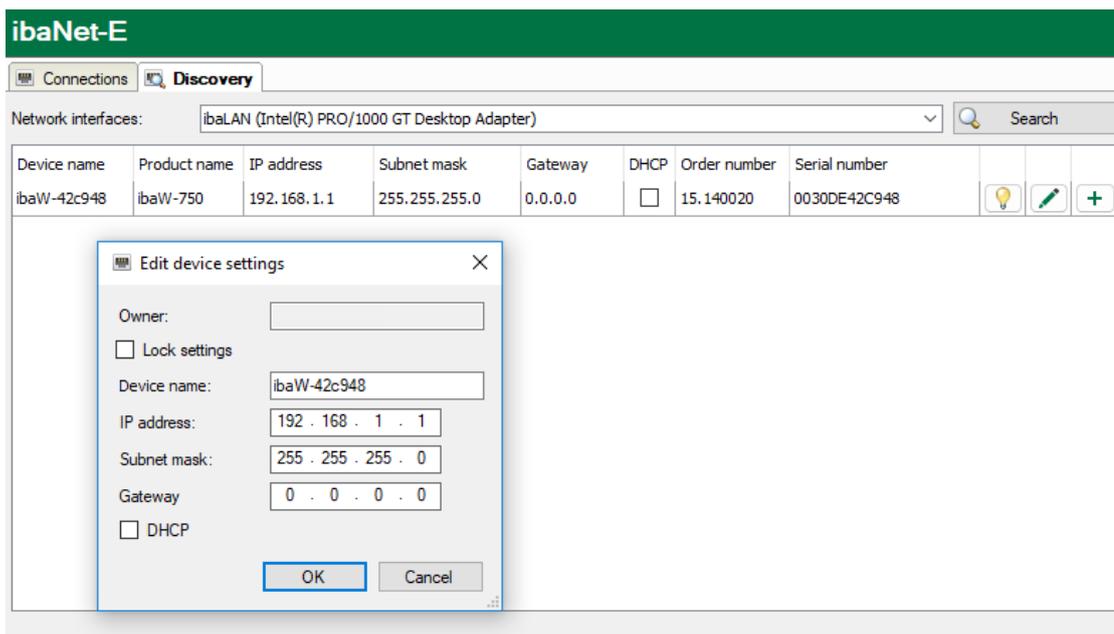
„Add device to I/O configuration“

With this button the device is added to the I/O configuration of the ibaNet-E interface in ibaPDA.

Connected modules are detected and added as far as possible.

## 9.2.2 Device settings

Open the dialog "Edit device settings" with the button . In the device settings, device-specific values are entered, which are mainly required for the network connection to the Ethernet:



Owner

If the device ibaW-750 has been configured before, the last owner is shown here, otherwise the field is empty (after delivery or resetting to factory settings).

The owner corresponds to the computer name on which ibaPDA is installed and by which this device was most recently configured. The entry is inserted automatically and is only readable.

Lock settings

If this function is enabled, read and write access to the device configuration is blocked towards other ibaPDA systems.

Device name

The name of the device.

If DHCP is enabled and a DHCP/DNS server is in the network, this name can be used to connect this device.

IP address

The IP address of the device.

This field is read-only when DHCP is enabled.

Subnet mask

The subnet mask of the IP settings.

This field is read-only when DHCP is enabled.

Gateway

The gateway of the IP settings.

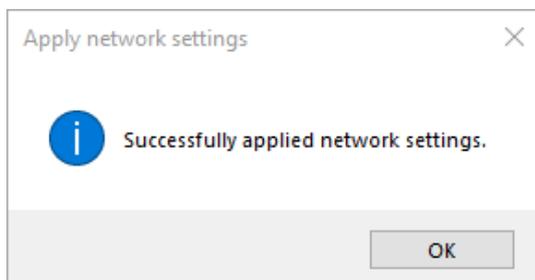
This field is read-only when DHCP is enabled.

DHCP

If DHCP is not enabled, a static IP address must be selected. If DHCP is enabled, the IP address of a DHCP server in the network is obtained, if possible.

Example of a device setting (with fixed IP address, without DHCP):

If the settings are applied with <OK>, the following message appears and the input window is closed.



The configured ibaW-750 device is displayed in the *Discovery* tab.

Device name	Product name	IP address	Subnet mask	Gateway	DHCP	Order number	Serial number			
ibaW-750	ibaW-750	192.168.1.10	255.255.255.0	0.0.0.0	<input type="checkbox"/>	15.140020	0030DE42C948			

### 9.2.3 Owner of the device settings

If the device settings are opened again after the configuration in chapter 9.2.2, an owner is displayed, because the ibaW-750 device has already been configured:

If the device settings are opened by the same owner, all configurations can still be changed here.

If another ibaPDA computer **had set** these settings most recently and **not locked** them, the following message would be displayed after confirming:

Since the configuration is not locked, it can be changed and applied.

If the other ibaPDA computer had most recently **set and locked** these settings, the window would look like this:

Since the configuration was locked by the other ibaPDA computer, it can neither be changed nor applied.

A locked device configuration can only be changed or reset by the original owner or deleted by resetting to the factory settings (see chapter 8.2).

## 9.2.4 Add ibaW-750

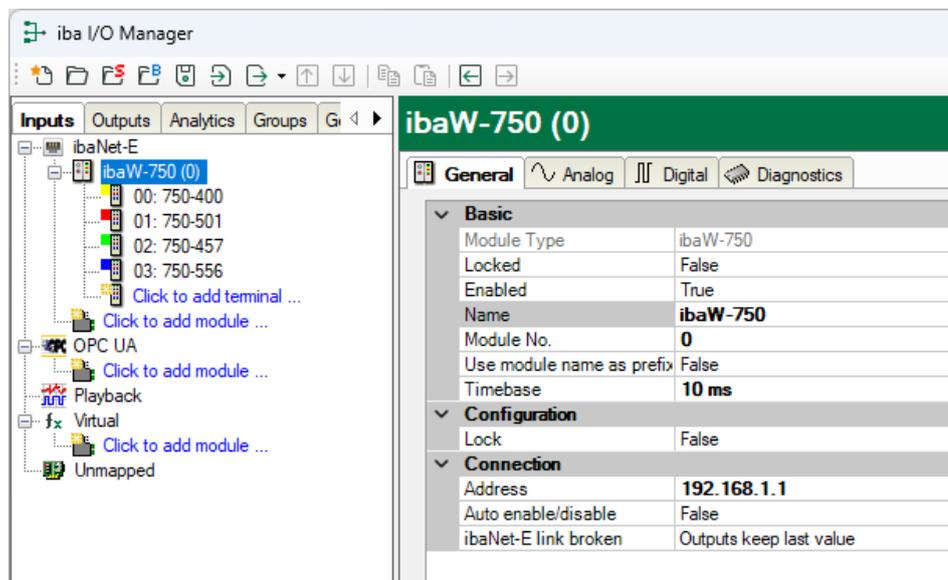
There are several ways to add the device in ibaPDA:

- Automatically - device is in the same LAN, device search and setup as described above
- Manually - device is not in the same LAN, previous separate device search and setup
- Offline – without connection of a device

### 9.2.4.1 Automatically

After the device has been configured via the search as in the previous steps, it can be added to the I/O configuration as a module in ibaPDA.

Select the ibaW-750 device in the *Discovery* tab of the ibaNet-E interface and click the button . The device appears in the module tree of the I/O Manager.



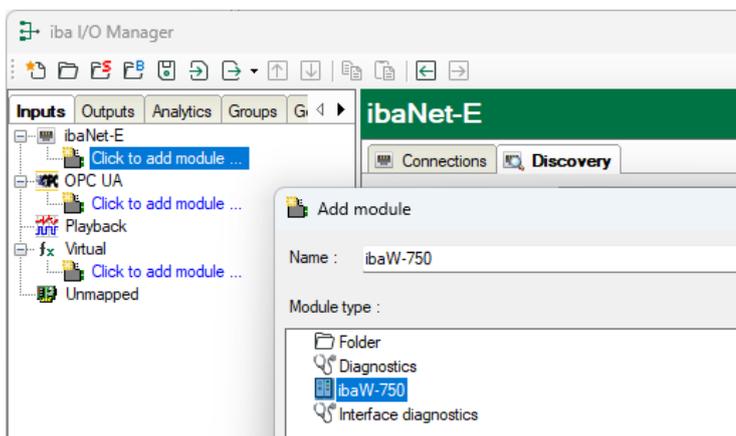
Connected terminals are automatically detected and added as far as possible.

If the device has already been configured for acquisition in ibaPDA, this existing configuration is also read out and displayed in the I/O configuration.

### 9.2.4.2 Manually

If ibaW-750 is not to be operated in the same LAN and therefore cannot be searched, recognized and added automatically, the device can also be added manually to the ibaNet-E interface in the I/O Manager.

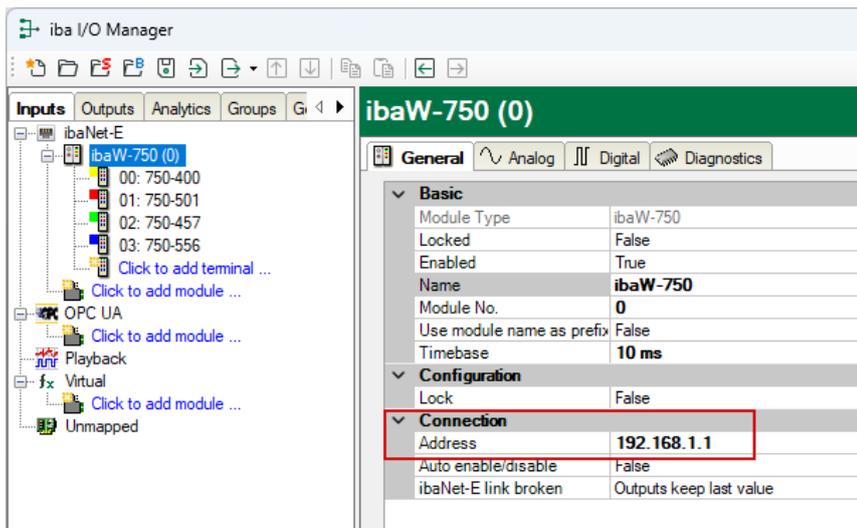
Click the link *Click to add module...* and select *ibaW-750*.



**Note**

Prerequisite for this is a previous separate device configuration of the ibaW-750 device. This configuration can only be carried out in the same LAN as described above. However, it can also be carried out by another ibaPDA system.

If the ibaW-750 module is added, the (network) address, by which ibaW-750 can be reached, must be specified first for a successful connection:



The address can be either a (fixed) IP address or the host name. The use of host name is recommended if the device is located in a DHCP network where the participants are not assigned fixed IP addresses.

Provided that the ibaW-750 device can be reached without restriction in the network via Ethernet by the entered address, it is now possible either to add only the connected terminals or additionally to read out the module configuration, if it is available on the device.

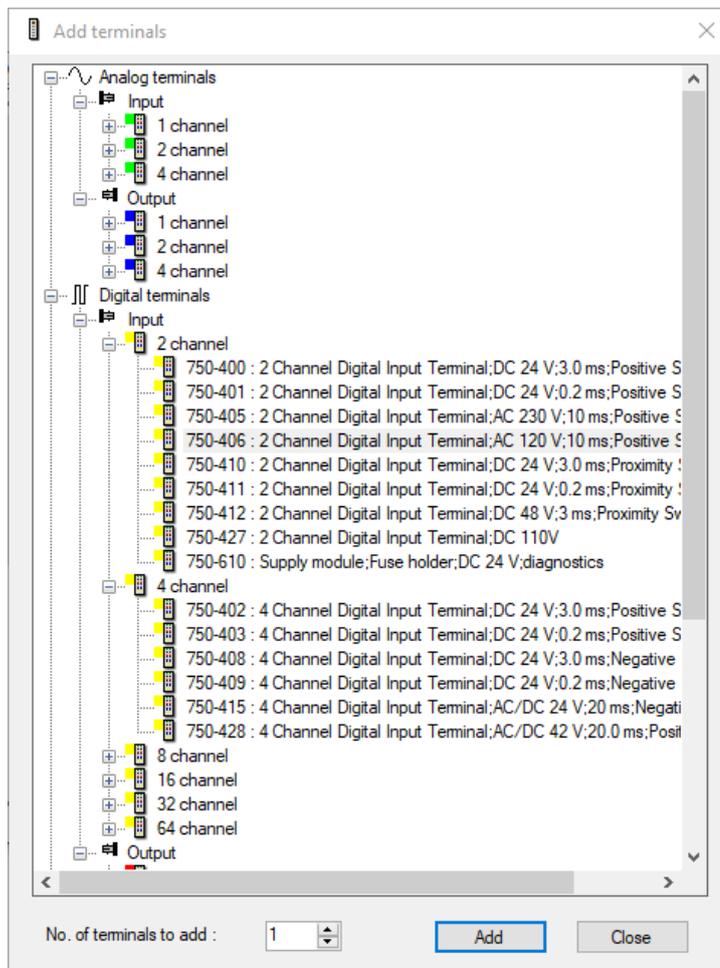
Use the two links at the bottom of the *General* tab "Autodetect terminals" and "Read configuration from device".

### 9.2.4.3 Offline

It is also possible to add and configure the ibaW-750 device to the I/O Manager without simultaneous connection of the device.

To do this, proceed as described in section 9.2.4.2 with the exception that the terminals or the configuration cannot be automatically detected and read out at the end, but must be added manually:

When clicking on the link *Click to add terminals ...* the selection window for the terminals appears:



1. Mark the corresponding terminal and click on <Add> or double-click on the terminal and the terminal is added without closing the selection window.
2. If a terminal is to be added several times, enter the desired number in the field "No. of terminals to add" and the terminal is added as often as required.



### Note

Enter all terminals here, including the output terminals if any are present. These are then automatically created by ibaPDA in an output module under "Outputs" at the corresponding link.

3. Complete the terminal selection with <Close>.

With this offline option it is possible, for example, to export a device and module configuration or to save the entire I/O configuration of the I/O Manager.

For a detailed description please use the current ibaPDA manual.

## 9.3 Module configuration

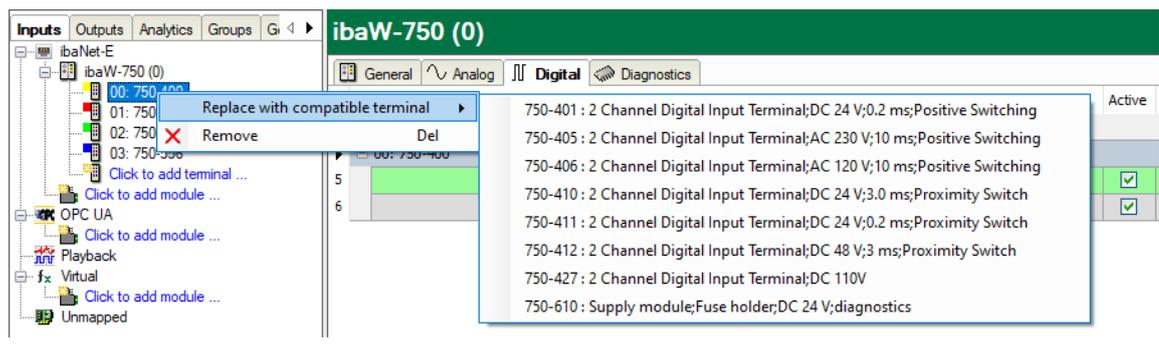
The module configuration in ibaPDA should only be carried out when the device and the connected terminals are correctly shown in the I/O Manager.



### Note

The exact terminal name of digital terminals cannot be read out via the K-bus. However, the terminal type is correctly detected and a terminal with the corresponding number of inputs and outputs is displayed in ibaPDA.

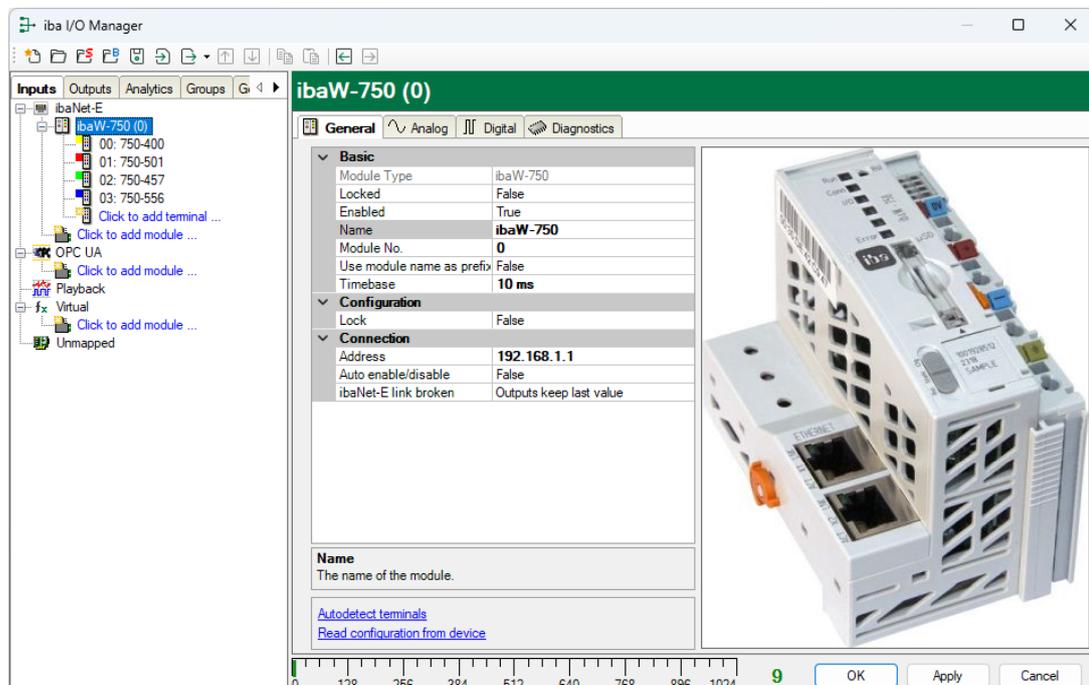
The displayed terminal can now be replaced with another compatible terminal: To do this, right-click on the terminal and select the desired terminal.



### 9.3.1 ibaW-750 - Hardware

The device module and the signal tables are described below.

#### 9.3.1.1 General tab



#### Basic settings

- Module type (read only)
- Display of the module type

Locked

A module can be locked in order to prevent accidental or unauthorized changes in the module settings.

 Enabled

Disabled modules are excluded from signal acquisition.

 Name

Enter here the name for the module as clear text.

 Module No.

Logical module no. for clearly referencing of signals, e.g. in expressions in virtual modules and ibaAnalyzer.

 Use name as prefix

The module name is placed in front of the signal name as prefix.

 Timebase

All signals of this module are acquired with this time base.

**Note**

The timebase given here is independent from the K-bus cycle time. The K-bus cycle time depends on the number and the type of the connected terminals and may vary. You can see the maximum cycle time on the K-bus on the *Diagnostics* tab in the field "maximum cycle time".

When each cycle is to be captured, iba recommends setting the ibaPDA timebase not more than half the maximum cycle time. It is always the actual data telegram that is captured.

**Configuration** Lock

This property determines if the configuration should be locked in the ibaNet-E device. When the configuration is locked, only the owner that sets the lock can change the configuration or remove the lock.

**Connection** Address

The IP address or host name of the ibaNet-E device

 Auto enable/disable

When this option is enabled and ibaPDA cannot connect to this device during the start of the acquisition then it will disable this module and start the acquisition without it. During the acquisition it will try to reconnect to the device. When it succeeds it will automatically restart the acquisition with this module enabled. If this option is not enabled then ibaPDA will not start the acquisition when it cannot connect to the device.

 ibaNet-E link broken

This property determines what happens with the outputs on the device when the ibaNet-E link to ibaPDA is broken. Possible options:

- Outputs keep last value
- Outputs are reset to zero

## Further functions

### Autodetect terminals

The connected terminals will be detected automatically

### Read configuration from the device

Reads the last saved configuration from the device

The changed settings become valid by clicking on <OK> or <Apply>.

## 9.3.1.2 Analog tab

The signal table for analog signals is automatically adjusted for each terminal type and is arranged in the order of addition.

Name	Unit	Gain	Offset	Active	Actual
K-Bus					
0 K-Bus cycle time (actual)	µs	1	0	<input checked="" type="checkbox"/>	
1 K-Bus cycle time (max)	µs	1	0	<input checked="" type="checkbox"/>	
02: 750-457					
5		1	0	<input checked="" type="checkbox"/>	
6		1	0	<input checked="" type="checkbox"/>	
7		1	0	<input checked="" type="checkbox"/>	
8		1	0	<input checked="" type="checkbox"/>	
04: 750-480					
9		1	0	<input checked="" type="checkbox"/>	
10		1	0	<input checked="" type="checkbox"/>	

The signals “K-bus cycle time (actual)” and “K-bus cycle time (max.)” are available by default. They can be enabled/disabled.

### Name

The WAGO terminal number is automatically applied. One row per channel is displayed. You can enter signal names and additionally two comments when clicking on the  symbol in the field “Name”.

### Unit

You can enter a unit for the analog signal.

### Gain / Offset

Gradient (Gain) and y axis intercept (Offset) of a linear equation. You can convert a standardized value transferred without a unit into a physical value.

For making the calculation of Gain/Offset easier, an auxiliary dialog appears when clicking on the co-ordinate cross in the „Gain“ or „Offset“ field. In this dialog, you only enter two points in the line equation. Gain and offset are then calculated automatically.

Active

Enabling/disabling the signals

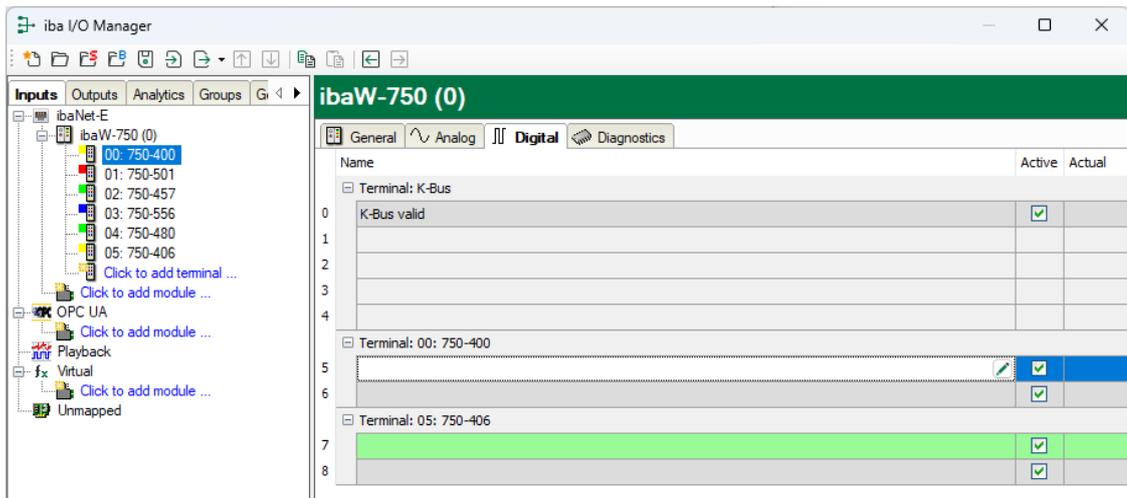
Actual

The actual measured value is displayed here

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

### 9.3.1.3 Digital tab

The signal table for digital signals is automatically adjusted for each terminal type and arranged in the order of addition.



The signal “K-bus valid” is available by default. It can be enabled/disabled.

If the K-bus is properly established and running, this signal is true. If a K-bus error occurs, the signal "K-bus valid" changes to false. See also chapter 9.4.1.

The meaning of the columns is the same as in the *Analog* tab. Here, however, there are not the columns Unit, Gain and Offset.

### 9.3.1.4 Diagnostics tab

The screenshot shows the 'iba I/O Manager' application window. The left sidebar displays a tree view of the system hierarchy, including 'ibaNet-E' and 'ibaW-750 (0)'. The main panel is titled 'ibaW-750 (0)' and has tabs for 'General', 'Analog', 'Digital', and 'Diagnostics'. The 'Diagnostics' tab is active, showing the following information:

- General:** Hardware version: A2, Firmware version: v01.01.001, Serial number: 0030DE42C948. Buttons: Write firmware, Reset device I/O configuration.
- Owner:** Current owner: iba-fue-wks336. Button: Refresh.
- K-Bus:** Status: Running. Current cycle time: 1845 µs, Maximum cycle time: 2234 µs, Number of initializations: 1.
- ibaNet-E:** A table showing connection details.

Connection	Phase	Connections Established	Connection Attempts	Disconnects	Ping time		
					Actual	Min	Max
IN (ACQ)	ONLINE	1	1	0	2,393 ms	1,753 ms	3,867 ms

At the bottom of the main panel, there is a 'Lost images' field with the value 0. The status bar at the bottom shows a progress indicator, the number 13, and buttons for OK, Apply, and Cancel.

#### General

The “General” section displays the version of hardware, firmware and FPGA, and the serial number of the device

#### Write firmware

Using the button <Write firmware> you can install a firmware update. Select the update file “w750\_v[xx.yy.zzz].iba” in the browser and start the update with <OK>.



#### Important note

The update may take several minutes and must not be interrupted.

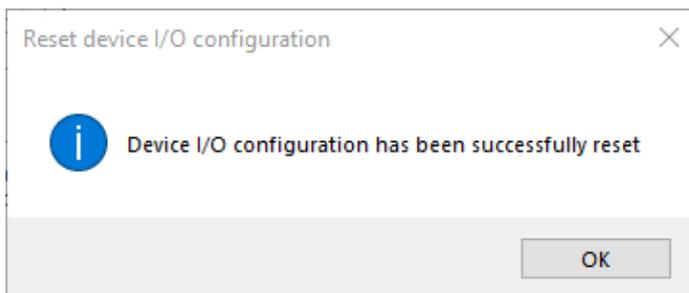
After an update, the device is automatically restarted

#### Reset device I/O configuration

With the button <Reset device I/O configuration> all settings are reset to the factory defaults after you have confirmed the following query with <Yes>.



After the reset the following message appears:



### Note

The device address is not reset.

### Owner

If a module configuration has already been defined on the ibaW-750 device, the current owner of this module configuration is displayed here.

After delivery or resetting to factory settings, this field is empty.

The owner corresponds to the computer name on which ibaPDA is installed and from which this ibaW-750 device was most recently configured.

With the button <Refresh> the current owner of the module configuration can be retrieved from the device at any time.

Meaning of the colors:

Green     The ibaPDA system currently accessing it is the owner

Orange    Another ibaPDA system is the owner, but has not locked the module configuration

Red        Another ibaPDA system is the owner and has locked the module configuration

### K-bus

#### Status

Running (K-bus acquisition is running)

I/O error (K-bus interrupted)

Configuration error (The device configuration is different from the connected terminals)

#### Current cycle time

Current sampling time

#### Maximum cycle time

Maximum sampling time

#### Number of initializations

Number of K-bus initializations

### ibaNet-E

#### Connection

Direction and type of the ibaNet-E connection

Phase

ibaNet-E phase of the connection

Connections established

Number of connections established since acquisition start

Connection attempts

Number of connection attempts since acquisition start

Disconnects

Number of connection interruptions since acquisition start

Ping time

Separately measured reaction time for the evaluation of the link quality

Lost images

Number of lost I/O images created at the sampling clock

Depending on the ibaNet-E phase of the connection it can be highlighted with different colors:

Orange The connection is "online", but the link quality of the Ethernet is not optimal

ibaNet-E								
Connection	Phase	Connections Established	Connection Attempts	Disconnects	Ping time			
					Actual	Min	Max	
IN (ACQ)	ONLINE	1	1	0	25,108 ms	2,384 ms	88,354 ms	

Red During the ibaNet-E phases "WAIT" (phase during connection establishment) and "WAIT\_SYNCRESP" (phase during connection interruption)

ibaNet-E								
Connection	Phase	Connections Established	Connection Attempts	Disconnects	Ping time			
					Actual	Min	Max	
IN (ACQ)	WAIT	5	1	5	7,252 ms	2,347 ms	26,804 ms	

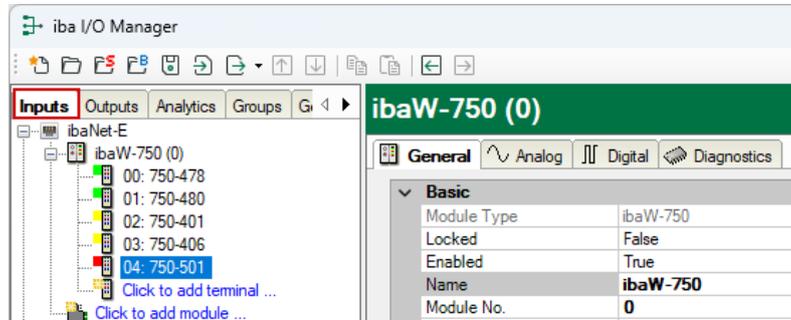
  

ibaNet-E								
Connection	Phase	Connections Established	Connection Attempts	Disconnects	Ping time			
					Actual	Min	Max	
IN (ACQ)	WAIT_SYNCRESP	1	0	1	0,000 ms	0,000 ms	0,000 ms	

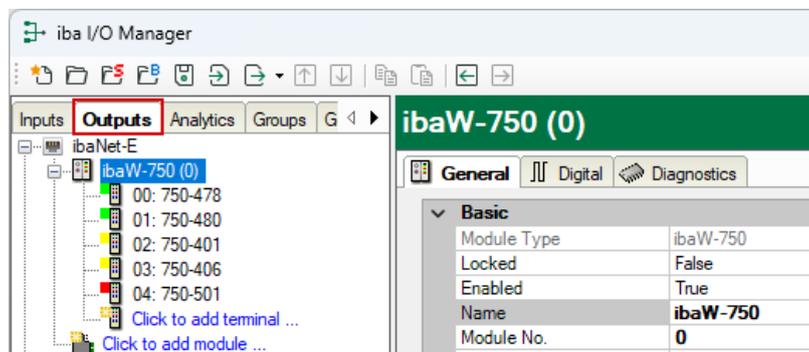
### 9.3.2 ibaW-750 - Outputs

All terminals, you have manually configured at the input side ("Inputs" tab) or that are detected automatically, are also displayed at the output side ("Outputs" tab).

An *Analog* and a *Digital* tab are automatically created for the analog and digital output terminals.

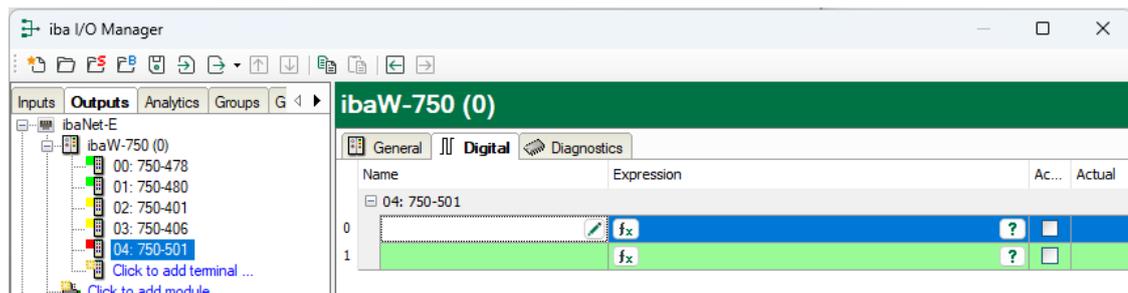


The ibaW-750 device module is displayed as well under the menu item "Outputs" at the corresponding link:



The digital signals are listed in the *Digital* tab and the analog signals are listed in the *Analog* tab.

Using the expression builder, signals can be assigned to the output terminals.



#### Note

If the ibaNet-E connection to the ibaW-750 device is interrupted, the output signals behave according to the set property "ibaNet-E link broken", which can be found in the *General* tab.

### 9.3.3 Diagnostics

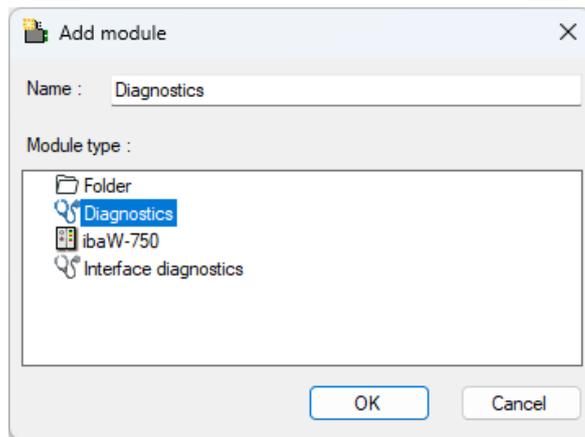
With the *Diagnostics* module, information about the ibaNet-E connection can be acquired as signals.

#### 9.3.3.1 Add and assign diagnostic module

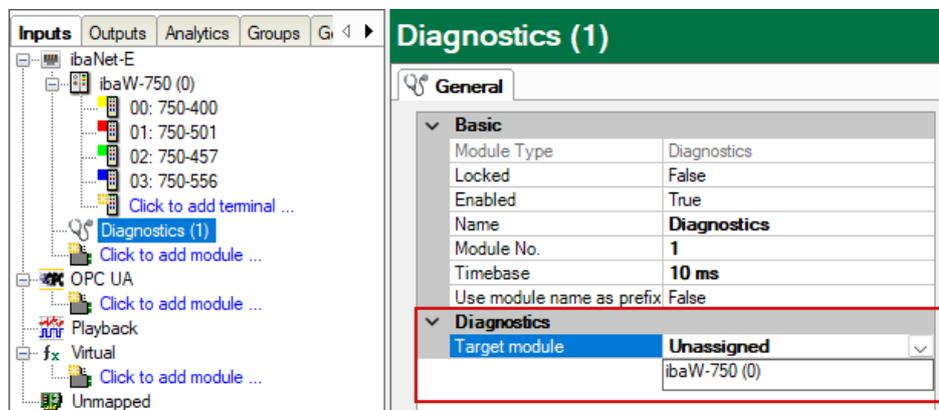
A diagnostic module becomes active only after assignment to an ibaW-750 module and provides its connection information. By using a diagnostic module you can record and analyze the diagnostic information continuously in the ibaPDA system

Diagnostics modules do not consume any license connections, since they do not establish their own connection, but refer to another module.

To add a diagnostic module, select the type "Diagnostics" in the dialog "Add module".

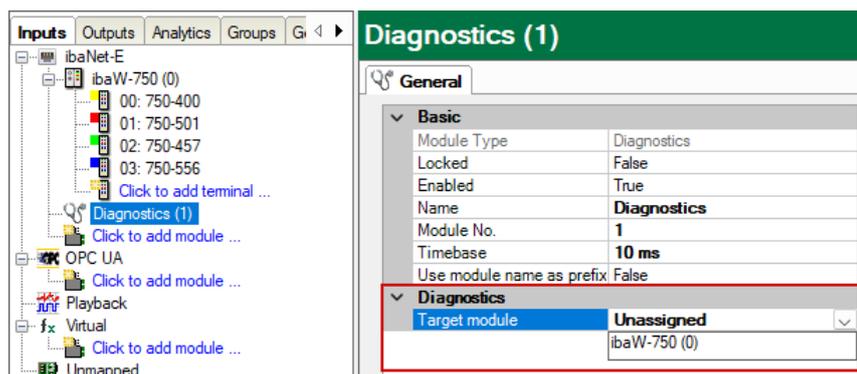


Then the target module is assigned.



#### 9.3.3.2 General tab

After the assignment, the following settings can be made on the *General* tab:



### Basic settings

The basic settings of a diagnostic module equal those of other modules.

### Diagnostics

Target module

By selecting the target module, you assign the diagnostic module to the module on which you want to acquire information about the connection.

#### 9.3.3.3 Diagnostic signals

When having selected a module, the available diagnostic signals are immediately added to the *Analog* and *Digital* tabs.

ibaW-750 Diagnostics (1)						
<input checked="" type="checkbox"/> General <input checked="" type="checkbox"/> Analog <input type="checkbox"/> Digital						
Name	Unit	Gain	Offset	Active	Actual	
0	Messages received since configuration		1	0	<input checked="" type="checkbox"/>	0
1	Messages sent since configuration		1	0	<input checked="" type="checkbox"/>	0
2	Messages received since connection start		1	0	<input checked="" type="checkbox"/>	0
3	Messages sent since connection start		1	0	<input checked="" type="checkbox"/>	0
4	Connection attempts (in)		1	0	<input checked="" type="checkbox"/>	0
5	Connection attempts (out)		1	0	<input checked="" type="checkbox"/>	0
6	Connections established (in)		1	0	<input checked="" type="checkbox"/>	0
7	Connections established (out)		1	0	<input checked="" type="checkbox"/>	0
8	Disconnects (in)		1	0	<input checked="" type="checkbox"/>	0
9	Disconnects (out)		1	0	<input checked="" type="checkbox"/>	0
10	Retransmission requests		1	0	<input checked="" type="checkbox"/>	0
11	Connection phase (in)		1	0	<input checked="" type="checkbox"/>	0
12	Connection phase (out)		1	0	<input checked="" type="checkbox"/>	0
13	Ping time (actual)	ms	1	0	<input checked="" type="checkbox"/>	0 ms
14	Time offset (actual)	ms	1	0	<input checked="" type="checkbox"/>	0 ms
15	Lost images		1	0	<input checked="" type="checkbox"/>	0
16	Duplicated images		1	0	<input checked="" type="checkbox"/>	0
17	Discarded images		1	0	<input checked="" type="checkbox"/>	0
18	Clock drift (PPB)		1	0	<input checked="" type="checkbox"/>	0
19	Clock drift (deviation average)	ns	1	0	<input checked="" type="checkbox"/>	0 ns
20	Clock drift (PI output)		1	0	<input checked="" type="checkbox"/>	0
21	Clock drift (PI limit counter)		1	0	<input checked="" type="checkbox"/>	0
22	Sender time difference	s	1	0	<input checked="" type="checkbox"/>	0 s
23	Calculated time difference	s	1	0	<input checked="" type="checkbox"/>	0 s
24	Image counter		1	0	<input checked="" type="checkbox"/>	0

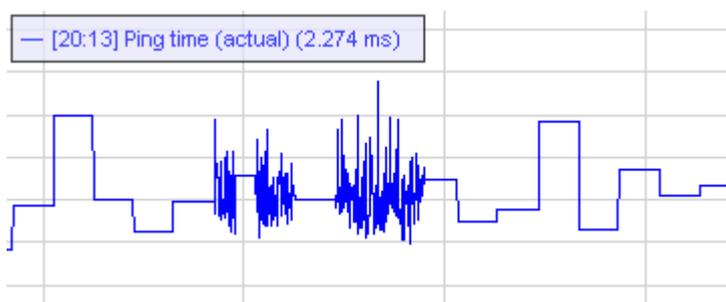
ibaW-750 Diagnostics (1)			
<input checked="" type="checkbox"/> General <input checked="" type="checkbox"/> Analog <input type="checkbox"/> Digital			
Name	Active	Actual	
0	Synchronization	<input checked="" type="checkbox"/>	0
1	Connected (in)	<input checked="" type="checkbox"/>	0
2	Connected (out)	<input checked="" type="checkbox"/>	0

The signals are all enabled by default.

#### Analog diagnostic signals

- Messages received since configuration:
  - Number of received data telegrams (in) since start of acquisition

- Messages sent since configuration:  
Number of sent data telegrams (out) since start of acquisition
- Messages received since connection start:  
Number of received data telegrams (in) since the start of the last connection setup.  
Reset with each connection loss.
- Messages sent since connection start:  
Number of sent data telegrams (out) since the start of the last connection setup.  
Reset with each connection loss.
- Connection attempts (in):  
Number of attempts to establish the receive connection (in).
- Connection attempts (out):  
Number of attempts to establish the send connection (out).
- Connections established (in):  
Number of currently valid data connections for reception (in)
- Connections established (out):  
Number of currently valid data connections for sending (out).
- Disconnects (in):  
Number of currently interrupted data connections for reception (in).
- Disconnects (out):  
Number of currently interrupted data connections for sending (out).
- Retransmission requests:  
Number of data telegrams requested again (in) in case of loss or delay.
- Connection phase (in):  
Status of the ibaNet-E data connection for reception (in).
- Connection phase (out):  
Status of the ibaNet-E data connection for sending (out).
- Ping time (actual):  
A feature of the link quality for the Ethernet:  
In regular operation, a ping to the ibaNet-E device is performed every one second and the measured time is displayed here.  
The shorter this time is, the better the link quality and the more secure the data transmission.  
For the synchronization at the start of the acquisition and sporadically during the acquisition, this ping is performed at a much higher frequency.



- Time offset (actual)  
Measured time difference of synchronicity between ibaPDA and the ibaNet-E device.

- Lost images:  
Number of lost images (in) that were not received even after a retransmission.

### Digital diagnostic signals

- Synchronization:  
The device is synchronized for isochronous acquisition.  
This is always mandatory at the start of data acquisition, but can also be performed sporadically during data acquisition.
- Connected (in):  
A valid data connection for the reception (in) is available.
- Connected (out):  
A valid data connection for sending (out) is available.

## 9.4 Error handling

### 9.4.1 K-bus error

Usually, a K-bus error occurs when either the bus is not terminated via the end terminal or a terminal within the system has a damage and thus the K-bus cannot be operated properly.



#### Note

Please note that you should always restart the system once or again after each K-bus troubleshooting operation.

---

If a K-bus error occurs during the configuration, ibaPDA issues an error:

- K-bus error: No modules found

### 9.4.2 Configuration error

During the configuration phase, various errors or messages can be displayed in ibaPDA, such as:

- Configured module not found: Module No <X> (Slot <X-1>) not connected

The ibaPDA configuration does not match the actual system configuration. A difference has been detected at position X. The difference detected first is always displayed. If there are several differences between the ibaPDA configuration and the system, only the first detected one is displayed.

**Note**

Please note that the ibaW-750 device reads out the terminal configuration only once during start-up. All subsequent changes during terminal removal can only be detected by the ibaW-750 device when it is restarted.

However, a terminal modification at runtime also causes a K-bus error. After such an error, the system should always be restarted (see note chapter 9.4.1).

---

## 10 Terminal types

There are 5 different terminal types:

- Digital I/O terminals
- Analog I/O terminals
- Complex terminals that generate multiple I/O and calculated signals for data and status
- Configurable terminals which have to be configured before use
- Miscellaneous terminals such as end terminals and terminals that do not provide I/O or status signals and are therefore usually not displayed in ibaPDA.



### Further information

This manual describes only the properties of the WAGO devices which are relevant for iba systems integration.

For a detailed description of the individual WAGO modules with information on pin assignment, data format and A/D conversion, please use the original WAGO documentation.

Data sheets and manuals for WAGO components are available for download at [www.wago.com](http://www.wago.com).

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## 10.1 Supported terminals

ibaPDA currently supports the following terminals from the manufacturers WAGO and Beckhoff. In later firmware versions further modules may have been added. Modules available from iba are listed with the iba order number.

Manufac.	Original order no.	Iba order no.	Description
<b>Digital inputs</b>			
WAGO	750-1400		16 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Positive Switching
WAGO	750-1405		16 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Positive Switching
WAGO	750-1406		16 Channel Digital Input Terminal; DC 24 V; 0.2 ms; Positive Switching
WAGO	750-400	15.144000	2 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Positive Switching
WAGO	750-401	15.144010	2 Channel Digital Input Terminal; DC 24 V; 0.2 ms; Positive Switching
WAGO	750-402	15.144020	4 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Positive Switching
WAGO	750-402/025-000	15.144021	4 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Positive Switching, extended temperature range
WAGO	750-403	15.144030	4 Channel Digital Input Terminal; DC 24 V; 0.2 ms; Positive Switching
WAGO	750-405	15.144050	2 Channel Digital Input Terminal; AC 230 V; 10 ms; Positive Switching
WAGO	750-406	15.144060	2 Channel Digital Input Terminal; AC 120 V; 10 ms; Positive Switching
WAGO	750-408	15.144080	4 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Negative Switching
WAGO	750-409		4 Channel Digital Input Terminal; DC 24 V; 0.2 ms; Negative Switching
WAGO	750-410	15.144100	2 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Proximity Switch
WAGO	750-411		2 Channel Digital Input Terminal; DC 24 V; 0.2 ms; Proximity Switch
WAGO	750-412	15.144120	2 Channel Digital Input Terminal; DC 48 V; 3 ms; Proximity Switch
WAGO	750-415	15.144150	4 Channel Digital Input Terminal; AC/DC 24 V; 20 ms; Negative Switching
WAGO	750-427		2 Channel Digital Input Terminal; DC 110V
WAGO	750-428		4 Channel Digital Input Terminal; AC/DC 42 V; 20.0 ms; Positive Switching
WAGO	750-430	15.144300	8 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Positive Switching
WAGO	750-431	15.144310	8 Channel Digital Input Terminal; DC 24 V; 0.2 ms; Positive Switching
WAGO	753-434		8 Channel Digital Input Terminal; DC 5/12 V; 0.2 ms; Positive Switching
Beckhoff	KL1408		8 Channel Digital Input Terminal;
Beckhoff	KM1002		16 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Positive Switching
Beckhoff	KM1004		32 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Positive Switching

Manufac.	Original order no.	Iba order no.	Description
Beckhoff	KM1008		64 Channel Digital Input Terminal; DC 24 V; 3.0 ms; Positive Switching
Beckhoff	KM1012		16 Channel Digital Input Terminal; DC 24 V; 0.2 ms; Positive Switching
Beckhoff	KM1014		32 Channel Digital Input Terminal; DC 24 V; 0.2 ms; Positive Switching
Beckhoff	KM1018		64 Channel Digital Input Terminal; DC 24 V; 0.2 ms; Positive Switching
<b>Digital outputs</b>			
WAGO	750-1500		16 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching; Ribbon cable
WAGO	750-1504		16 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching
WAGO	750-501	15.145010	2 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching
WAGO	750-502	15.145020	2 Channel Digital Output Terminal; DC 24 V; 2.0 A; Positive Switching
WAGO	750-504	15.145040	4 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching
WAGO	750-506		2 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching; Diagnostics
WAGO	750-507	15.145070	2 Channel Digital Output Terminal; DC 24 V; 2.0 A; Positive Switching; Diagnostics
WAGO	750-508		2 Channel Digital Output Terminal; DC 24 V; 2.0 A; Positive Switching; Diagnostics
WAGO	750-512	15.145120	2 Channel Digital Output Terminal; Relay; AC 230 V, DC 30 V, AC/DC 2 A; non-floating; 2 make contacts
WAGO	750-513	15.145130	2 Channel Digital Output Terminal; Relay; AC 230 V, DC 30 V, AC/DC 2 A; Isolated outputs; 2 make contacts
WAGO	750-514	15.145140	2 Channel Digital Output Terminal; Relay; AC 125 V, AC 0.5 A, DC 30 V, DC 1 A; Isolated outputs; 2 changeover contacts
WAGO	750-517	15.145170	2 Channel Digital Output Terminal; Relay; AC 230 V, 1 A; Isolated outputs; 2 changeover contacts
WAGO	750-530	15.145300	8 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching
WAGO	750-531		4 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching
WAGO	750-532		4 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching; Diagnostics
WAGO	750-537		8 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching; Diagnostics
Beckhoff	KL2408		8 Channel Digital Output Terminal;
Beckhoff	KM2002		16 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching
Beckhoff	KM2004		32 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching
Beckhoff	KM2008		64 Channel Digital Output Terminal; DC 24 V; 0.5 A; Positive Switching
<b>Digital inputs and outputs</b>			
WAGO	750-1506		8 Channel Digital Input/Output Terminal; DC 24 V; 0.5 A; Positive Switching
<b>Analog inputs</b>			
WAGO	750-452	15.144520	2 Channel Analog Input Terminal; 0-20 mA; Differential Input

Manufac.	Original order no.	Iba order no.	Description
WAGO	750-453	15.144530	4 Channel Analog Input Terminal; 0-20 mA; Single Ended
WAGO	750-454	15.144540	2 Channel Analog Input Terminal; 4-20 mA; Differential Input
WAGO	750-455	15.144550	4 Channel Analog Input Terminal; 4-20 mA; Single Ended
WAGO	750-456	15.144560	2 Channel Analog Input Terminal; $\pm 10V$ ; Differential Input
WAGO	750-457	15.144570	4 Channel Analog Input Terminal; $\pm 10V$ ; Single Ended
WAGO	750-459		4 Channel Analog Input Terminal; 0-10 V; Single Ended
WAGO	750-460	15.144600	4 Channel Analog Input Terminal; PT100 (RTD)
WAGO	750-460/000-003	15.144603	4 Channel Analog Input Terminal; PT1000 (RTD)
WAGO	750-461	15.144610	2 Channel Analog Input Terminal; PT100 (RTD)
WAGO	750-461/000-003	15.144613	2 Channel Analog Input Terminal; PT1000 (RTD)
WAGO	750-462	15.144620	2 Channel Analog Input Terminal for Thermo Elements
WAGO	750-465	15.144650	2 Channel Analog Input Terminal; 0-20 mA; Single Ended
WAGO	750-466	15.144660	2 Channel Analog Input Terminal; 4-20 mA; Single Ended
WAGO	750-467	15.144670	2 Channel Analog Input Terminal; 0-10 V; Single Ended
WAGO	750-468		4 Channel Analog Input Terminal; 0-10 V; Single Ended
WAGO	750-469	15.144690	2 Channel Analog Input Terminal; Thermocouple, Type K
WAGO	006	15.144696	2 Channel Analog Input Terminal; Thermocouple, Type J
WAGO	750-472		2 Channel Analog Input Terminal; 0-20 mA; Single Ended
WAGO	750-473		2 Channel Analog Input Terminal; 4-20 mA; Single Ended
WAGO	750-474		2 Channel Analog Input Terminal; 4-20 mA; Single Ended
WAGO	750-475	15.144750	2 Channel Analog Input Terminal; 0-1 A AC/DC; Differential Input
WAGO	750-476		2 Channel Analog Input Terminal; $\pm 10V$ ; Single Ended
WAGO	750-477		2 Channel Analog Input Terminal; 0-10 V AC/DC; Differential Input
WAGO	750-478		2 Channel Analog Input Terminal; 0-10 V; Single Ended
WAGO	750-479	15.144790	2 Channel Analog Input Terminal; $\pm 10V$ ; Differential Input
WAGO	750-480		2 Channel Analog Input Terminal; 0-20 mA; Differential Input
WAGO	750-483		2 Channel Analog Input Terminal; 0-30 V; Differential Input
WAGO	750-491	15.144910	1 Channel Analog Input Terminal for Resistance Jumpers (DMS)
WAGO	750-491/000-001	15.144911	1 Channel Analog Input Terminal for Resistance Jumpers (DMS); 125ms

Manufac.	Original order no.	Iba order no.	Description
WAGO	750-492		2 Channel Analog Input Terminal; 4-20 mA; Differential Input
Beckhoff	KL3001		1 Channel Analog Input Terminal; -10 V ... 10 V
Beckhoff	KL3002		2 Channel Analog Input Terminal; -10 V ... 10 V
Beckhoff	KL3011		1 Channel Analog Input Terminal; 0 ... 20 mA
Beckhoff	KL3012		2 Channel Analog Input Terminal; 0 ... 20 mA
Beckhoff	KL3021		1 Channel Analog Input Terminal; 4 ... 20 mA
Beckhoff	KL3022		2 Channel Analog Input Terminal; 4 ... 20 mA
Beckhoff	KL3041		1 Channel Loop-Powered Input Terminal; 0 ... 20 mA
Beckhoff	KL3042		2 Channel Loop-Powered Input Terminal; 0 ... 20 mA
Beckhoff	KL3044		4 Channel Input Terminal; 0 ... 20 mA
Beckhoff	KL3051		1 Channel Loop-Powered Input Terminal; 4 ... 20 mA
Beckhoff	KL3052		2 Channel Loop-Powered Input Terminal; 4 ... 20 mA
Beckhoff	KL3054		4 Channel Input Terminal; 4 ... 20 mA
Beckhoff	KL3061		1 Channel Analog Input Terminal; 0 ... 10 V
Beckhoff	KL3062		2 Channel Analog Input Terminal; 0 ... 10 V
Beckhoff	KL3064		4 Channel Analog Input Terminal; 0 ... 10 V
Beckhoff	KL3102		2 Channel Analog Input Terminal; -10 V ... 10 V
Beckhoff	KL3112		2 Channel Input Terminal; 0 ... 20 mA
Beckhoff	KL3122		2 Channel Input Terminal; 4 ... 20 mA
Beckhoff	KL3201		1 Channel Input Terminal PT100 (RTD)
Beckhoff	KL3202		2 Channel Input Terminal PT100 (RTD)
Beckhoff	KL3204		4 Channel Input Terminal PT100 (RTD)
Beckhoff	KL3311		1 Channel Thermocouple Input Terminal
Beckhoff	KL3312		2 Channel Thermocouple Input Terminal; Open-Circuit Recognition
Beckhoff	KL3314		4 Channel Thermocouple Input Terminal; Open-Circuit Recognition
<b>Analog outputs</b>			
WAGO	750-550	15.145500	2 Channel Analog Output Terminal; 0-10 V
WAGO	750-552	15.145520	2 Channel Analog Output Terminal; 0-20 mA
WAGO	750-554	15.145540	2 Channel Analog Output Terminal; 4-20 mA

Manufac.	Original order no.	Iba order no.	Description
WAGO	750-555	15.145550	4 Channel Analog Output Terminal; 4-20mA
WAGO	750-556	15.145560	2 Channel Analog Output Terminal; $\pm 10V$
WAGO	750-557	15.145570	4 Channel Analog Output Terminal; 0-10 V
WAGO	750-559		4 Channel Analog Output Terminal; $\pm 10V$
WAGO	750-585		2 Channel Analog Output Terminal; 0-20 mA; Ex i
Beckhoff	KL4001		1 Channel Analog Output Terminal; 0 ... 10 V
Beckhoff	KL4002		2 Channel Analog Output Terminal; 0 ... 10 V
Beckhoff	KL4004		4 Channel Analog Output Terminal; 0 ... 10 V
Beckhoff	KL4011		1 Channel Analog Output Terminal; 0 ... 20 mA
Beckhoff	KL4012		2 Channel Analog Output Terminal; 0 ... 20 mA
Beckhoff	KL4021		1 Channel Analog Output Terminal; 4 ... 20 mA
Beckhoff	KL4022		2 Channel Analog Output Terminal; 4 ... 20 mA
Beckhoff	KL4031		1 Channel Analog Output Terminal; -10 V ... 10 V
Beckhoff	KL4032		2 Channel Analog Output Terminal; -10 V ... 10 V
Beckhoff	KL4034		4 Channel Analog Output Terminal; -10 V ... 10 V
Beckhoff	KL4112		2 Channel Analog Output Terminal; 0 ... 20 mA
Beckhoff	KL4132		2 Channel Analog Output Terminal; -10 V ... +10 V
Beckhoff	KL4404		4 Channel Analog Output Terminal; 0 ... 10 V
<b>Complex terminals</b>			
WAGO	750-404		Up/Down Counter DC 24 V
WAGO	750-404/000-001	15.144041	Up Counter DC 24 V; Release Input
WAGO	750-404/000-003	15.144043	Frequency Counter DC 24 V
WAGO	750-404/000-004		Up/Down Counter DC 24 V; Switching Output
WAGO	750-630	15.146300	SSI-Interface
WAGO	750-631		Incremental Encoder
WAGO	750-631/000-004	15.146310	Incremental Encoder; RS422 (differential)
WAGO	750-637	15.146370	Incremental Encoder
<b>Configurable terminals</b>			
WAGO	750-494	15.144940	3-Phase Power Measurement Module (480V/1A)

Manufac.	Original order no.	Iba order no.	Description
WAGO	750-494/000-001	15.144941	3-Phase Power Measurement Module (480V/5A)
WAGO	750-494/000-005		3-Phase Power Measurement Module (480V/ ext. Shunts)
WAGO	750-494/025-000		3-Phase Power Measurement Module (480V/1A), extended temperature range
WAGO	750-494/025-001		3-Phase Power Measurement Module (480V/5A) , extended temperature range
WAGO	750-495	15.144950	3-Phase Power Measurement Module (690V/1A)
WAGO	750-495/000-001	15.144951	3-Phase Power Measurement Module (690V/5A)
WAGO	750-495/000-002		3-Phase Power Measurement Module (690V/RC) Rogowski-Coils
WAGO	750-495/040-000		3-Phase Power Measurement Module (690V/1A), extended temperature range
WAGO	750-495/040-001		3-Phase Power Measurement Module (690V/5A), extended temperature range
WAGO	750-495/040-002		3-Phase Power Measurement Module (690V/RC) Rogowski-Coils, extended temperature range
<b>Miscellaneous terminals</b>			
WAGO	750-600	15.146000	End Module
WAGO	750-602	15.146020	Supply Module; Field; DC 24 V
WAGO	750-610	15.146100	Supply Module; Field; DC 24 V; Fuse Holder; Diagnostics
WAGO	750-612	15.146120	Supply Module; Field; AC/DC 230 V
WAGO	750-613		Supply Module; System/Field; DC 24 V;
WAGO	750-614	15.146140	Supply/Distribution Module; Field; AC/DC 230 V
WAGO	750-624		Supply/Filter Module; Field; DC 24 V
WAGO	750-627	15.146270	End Module; Bus Extension; Outgoing
WAGO	750-628	15.146280	Coupler Module; Bus Extension; Incoming/Outgoing
Beckhoff	KL9010		End Module

## 10.2 Configurable terminals

### 10.2.1 3-phase power measurement terminals (WAGO module -494/495)

3-phase power measurement terminals are used to record and measure electrical data and characteristic values of a three-phase supply network.

Before use, these terminals must be parameterized to adapt them to the supply network and to determine which data and characteristics are to be recorded in ibaPDA.

Parameterization is carried out conveniently in ibaPDA.

The maximum number of power measurement terminals on an ibaW-750 device is not restricted. The maximum number is based on the usual terminal limitation, see chapter 12.1, and on the update times of the process data of the terminal and the measured values in ibaPDA.



#### Restrictions when operating with ibaW-750

The scope of functions is limited when operating with ibaW-750 compared to the guaranteed scope of functions of WAGO:

- Only the measured values of the AC measured value collections are transmitted.
- Measured values of the harmonic analyses (harmonic measured values) for both terminal types, but also the DC measured values for the WAGO750-494 terminal, are omitted.

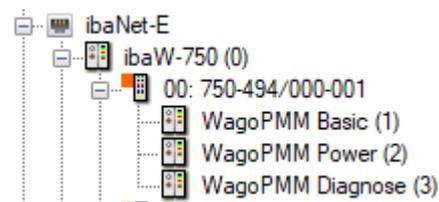
If one of the two terminals is added manually in the I/O Manager, two basic types are available for selection:

- 3-Phase Power Measurement Module 480V
- 3-Phase Power Measurement Module 690V



Selection of basic types

If the terminal is detected via automatic detection or the manually added terminal is applied in the I/O Manager, the corresponding terminal type is also updated.



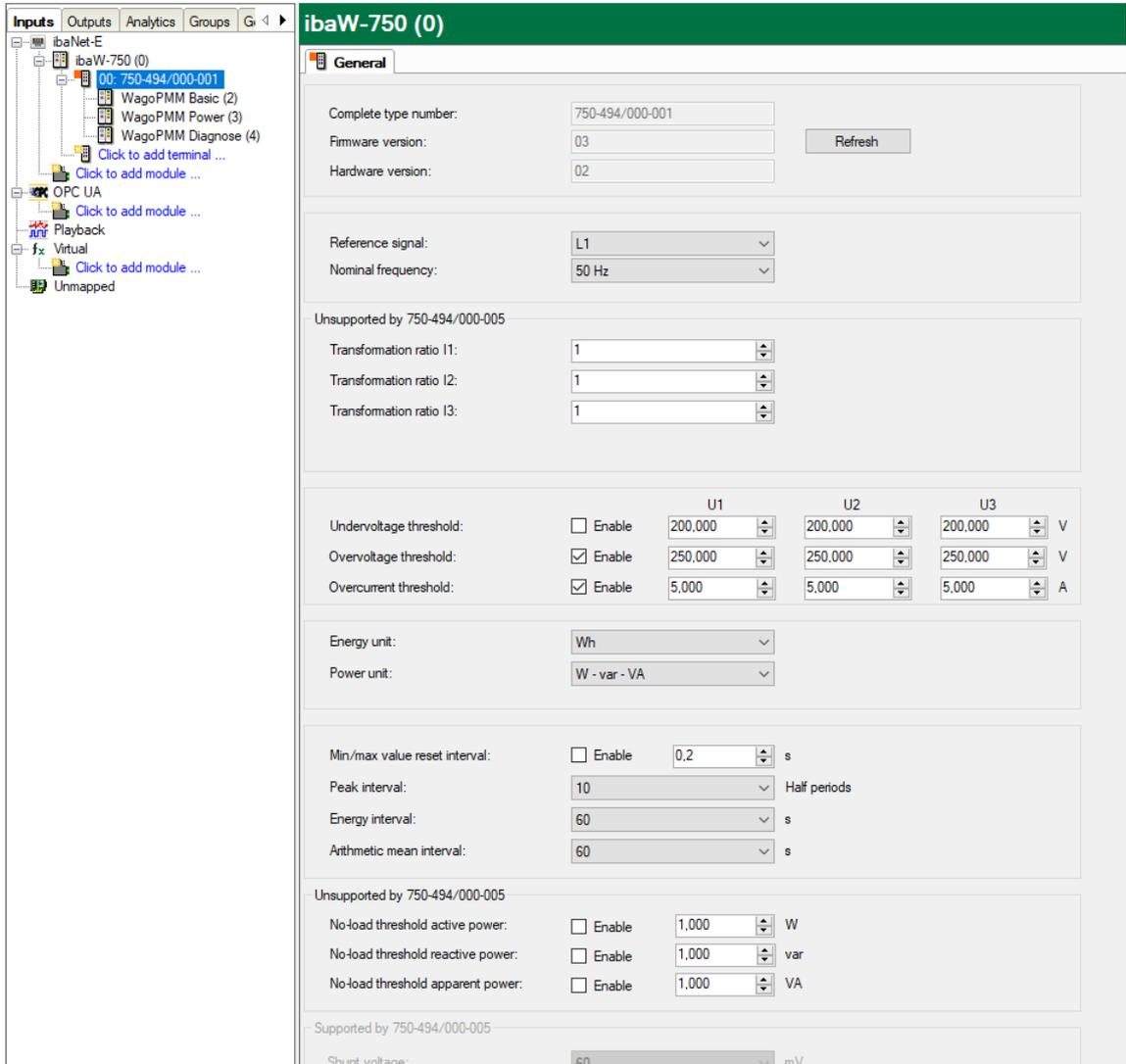
Terminal in the module tree

In addition to the detection of the terminal type, the firmware and hardware versions are also detected and displayed in the "General" tab.



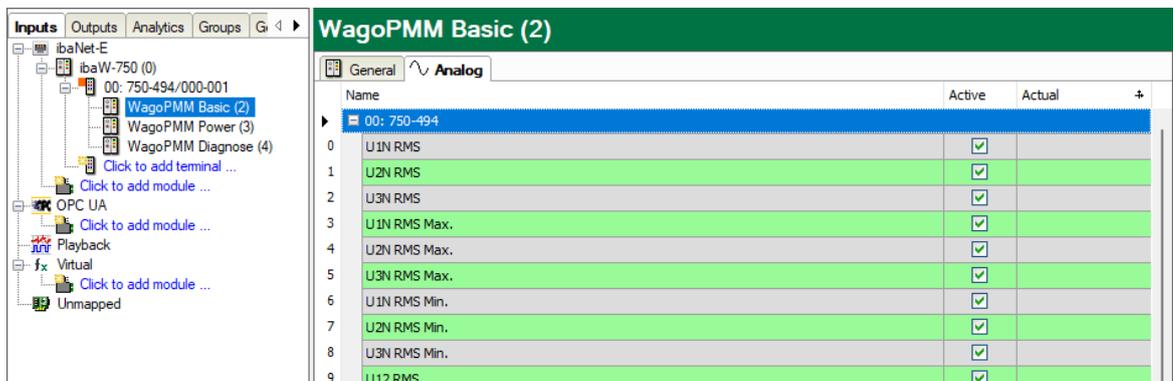
Via <Refresh> you can also read this information directly from the terminal at any time.

According to the detected terminal type, the input dialog is automatically adjusted.

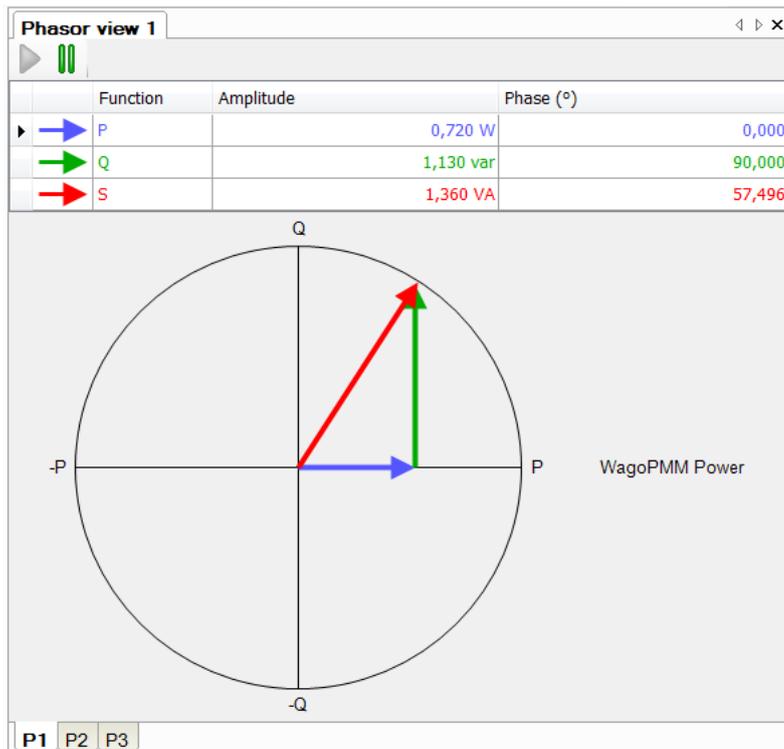


Parameterization using the example of terminal 750-494/000-001

Three "WagoPMM" modules with corresponding assigned signals are available below the terminal:



The special feature of the "WagoPMM Power" module is that it can be used for a phasor view.



#### Special behavior in ibaPDA:

- Due to the system, the terminal parameterization is not reset when ibaW-750 is reset to factory settings.  
The parameterization is stored in the terminal, even if it is switched off.
- All values of this terminal type are transmitted to ibaPDA in 32 bit format, regardless of the format of this value in the terminal.



#### The following generally applies to the update times of the measured values:

As the measured values are retrieved serially from the terminals via the K-bus, the update time of the measured values in ibaPDA depends on the number of values to be transmitted via the terminal bus. The more values are to be transferred, the longer the K-bus cycle time takes (see also appendix, chapter 11.1).

However, the update time also depends on the update time of the process data in the module (see chapter "Process data update" in the original documentation of the WAGO modules).



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**Other documentation**

For a detailed description of the single WAGO terminals with information on pin assignment, data format, measured value collection and process data update, please refer to the original WAGO documentation.

Data sheets and manuals for WAGO components are available for download at [www.wago.com](http://www.wago.com).

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## 11 K-bus notes

### 11.1 Cycle time of the K-bus

The K-bus of the ibaW-750 device is asynchronous, i.e. independent from the ibaNet-E sampling rate and the adjusted time base in ibaPDA.

The cycle time on the K-bus depends on the number and type of the connected terminals and may vary. Different terminals have different influence on the K-bus: digital have low influence, analog terminals have more and complex terminals the most influence.

The current cycle time on the K-bus is measured with each cycle and is displayed on the Diagnostics tab in the “Current cycle time” field.

Please note that the K-bus cycle time of the ibaW-750 can be only 1 ms (1000  $\mu$ s) minimum, due to the system.

Unfortunately, the cycle time cannot be calculated in advance in ibaW-750.

The actual K-bus cycle time can be seen in ibaPDA only after initial operation.

Here are some examples with measured cycle times:

#### Digital terminals

- ❑ 1 x 2-channel digital input terminal WAGO750-405

K-Bus	
Status:	Running
Current cycle time:	1000 $\mu$ s
Maximum cycle time:	1298 $\mu$ s
Number of initializations:	1

- ❑ 2 x 2-channel digital input terminal WAGO750-405

K-Bus	
Status:	Running
Current cycle time:	1000 $\mu$ s
Maximum cycle time:	1393 $\mu$ s
Number of initializations:	1

- ❑ 1 x 2-channel digital output terminal WAGO750-502

K-Bus	
Status:	Running
Current cycle time:	1016 $\mu$ s
Maximum cycle time:	1481 $\mu$ s
Number of initializations:	1

❑ 2 x 2-channel digital output terminal WAGO750-502

K-Bus	
Status:	Running
Current cycle time:	1037 $\mu$ s
Maximum cycle time:	1402 $\mu$ s
Number of initializations:	1

❑ 2 x 2-channel digital input terminal WAGO750-405 und 2 x 2-channel digital output terminal WAGO750-502

K-Bus	
Status:	Running
Current cycle time:	1103 $\mu$ s
Maximum cycle time:	1380 $\mu$ s
Number of initializations:	1

**Analog terminals**

❑ 1 x 2-channel analog input terminal WAGO750-456

K-Bus	
Status:	Running
Current cycle time:	1200 $\mu$ s
Maximum cycle time:	1485 $\mu$ s
Number of initializations:	1

❑ 2 x 2-channel analog input terminal WAGO750-456

K-Bus	
Status:	Running
Current cycle time:	1265 $\mu$ s
Maximum cycle time:	1708 $\mu$ s
Number of initializations:	1

❑ 1 x 2-channel analog output terminal WAGO750-556

❑ 2 x 2-channel analog output terminal WAGO750-556

❑ 2 x 2-channel analog input terminal WAGO750-456 und 2 x 2-channel analog output terminal WAGO750-556

**Digital and analog terminals combined**

Connection	Phase	Connections Established

### Complex and configurable terminals

❑ 1 x SSI encoder interface WAGO750-630

K-Bus	
Status:	Running
Current cycle time:	1901 µs
Maximum cycle time:	2251 µs
Number of initializations:	1

❑ 1 x 3-phase power measurement terminal WAGO750-494

K-Bus	
Status:	Running
Current cycle time:	2577 µs
Maximum cycle time:	2766 µs
Number of initializations:	1

❑ 2 x 3-phase power measurement terminal WAGO750-494

K-Bus	
Status:	Running
Current cycle time:	3015 µs
Maximum cycle time:	3299 µs
Number of initializations:	1

ibaNet-E		
Connection	Phase	Connections Established

### Digital, analog, complex and configurable terminals combined

When operating with mixed bus terminals (digital, analog, complex and configurable), the K-bus cycle time increases to over 5 ms with only 16 bus terminals connected.

The screenshot displays the IbaNet-E configuration interface. On the left, a tree view shows the 'ibaW-750 (0)' device with 17 terminals, including digital terminals (00-16) and WagoPMM modules (51-63). On the right, the 'K-Bus' status window shows the bus is 'Running' with a current cycle time of 5629 μs and a maximum cycle time of 6148 μs. Below this, the 'ibaNet-E' connection table shows two active connections: 'IN (ACQ)' and 'OUT (PLC)', both in 'ONLINE' phase with 1 connection established. At the bottom, the 'Lost images' counter is set to 0.

Connection	Phase	Connections Established
IN (ACQ)	ONLINE	1
OUT (PLC)	ONLINE	1

## 11.2 Update rate of the signals

Independent from the K-bus cycle time, the input filters of the digital terminals and the conversion time of the analog terminals have to be considered.

These two factors mainly affect the update rate of the single input signals.

The following is essential:

If a new, changed value should be acquired with a minimum delay, the time base in ibaPDA should be set as small as possible. It has also to be considered, that the data volume in the IbaNet is limited.

The time difference between the value conversion in the K-bus and the IbaNet is smallest, when a small time base is used.

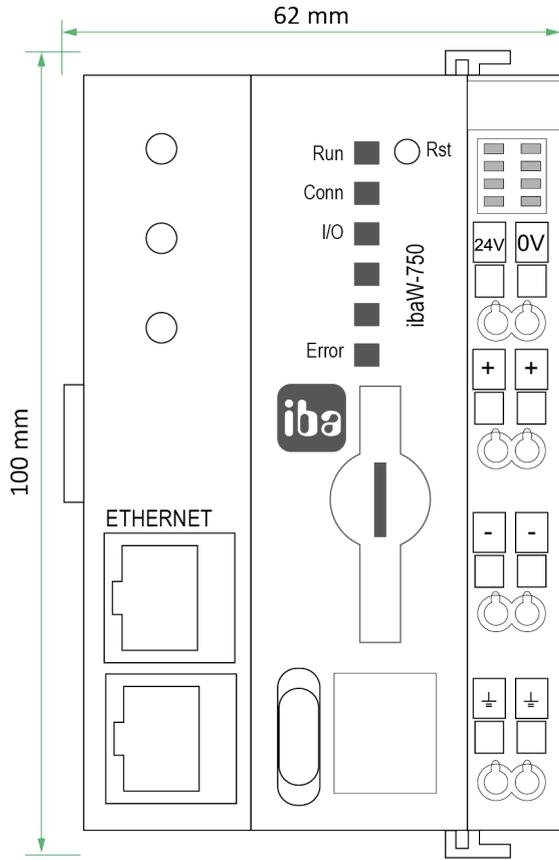
## 12 Technical data

### 12.1 Main data

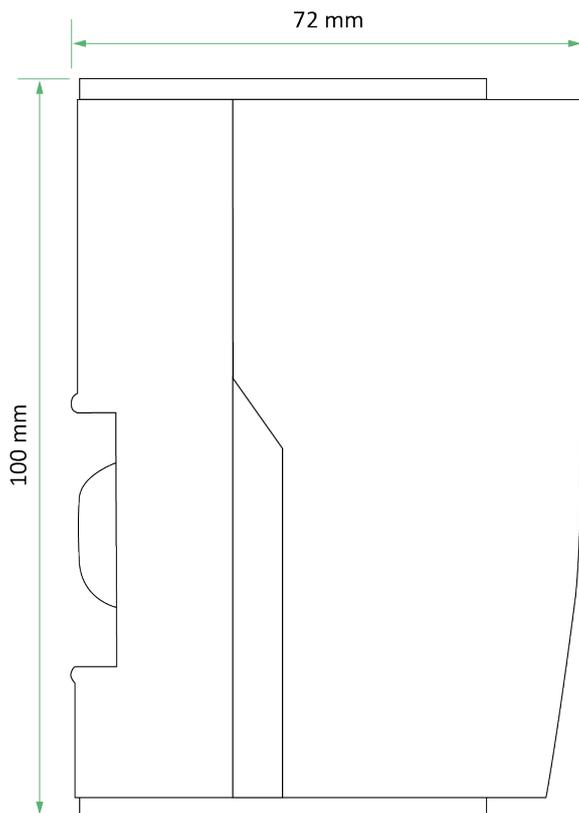
<b>Short description</b>	
Name	ibaW-750
Description	Central unit for WAGO I/O system 750
Order no.	15.140020
<b>Bus interface (K-bus)</b>	
Number	1
Design	Local bus
Data volume	Up to 2048 Bytes
Number of I/O modules	Up to 64, 250 with bus extension
Sampling rate	According to the bus cycle time, system-dependent minimum 1 ms  The update time of the signals may differ from the bus cycle due to specific properties of the I/O modules.
Connector type	6 sliding contacts, according to WAGO I/O system 750, incl. power supply
<b>ibaNet interface</b>	
Number	2
Design	Standard Ethernet
ibaNet protocol	ibaNet-E
Number of ibaPDA connections	1
Data volume	min. 320 Bytes at max. ibaNet-E sampling rate (1 kHz), depending on ibaNet-E sampling rate
Sampling rate	1 Hz - 1 kHz, freely adjustable
Connector type	2 x RJ45 socket (10/100 Mbit/s), switched
<b>System supply</b>	
Voltage supply	24 V DC ( $\pm 10\%$ )
Max. power consumption	550 mA
Connector type	2 CAGE CLAMP® contacts, 0.08 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> , AWG 28-14
Total current for I/O modules max.	1700 mA (DC 5 V)
<b>Field supply</b>	
Voltage supply	24 V DC ( $\pm 10\%$ ), without protection
Max. power consumption	10 A
Connector type	2 x 2 CAGE CLAMP® contacts, 0.08 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> , AWG 28-14
<b>Further interfaces, operating and indicating elements</b>	
Indicators (LEDs)	Status indicators for operation, ibaPDA connection, K-bus and error
SD card	For service purposes only

Switch	1, Reset and IP configuration
Protective earth connection	2 CAGE CLAMP® contacts, 0.08 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> , AWG 28-14
<b>Operating and environmental conditions</b>	
Temperature ranges	
Operation	0 °C ... +55 °C (32 °F ... 131 °F)
Storage / transport	-25 °C ... +85 °C (-13 °F ... 185 °F)
Mounting	DIN rail according to EN 50022 (TS 35, DIN Rail 35)
Cooling	passive
Relative humidity	Up to 95%, no condensation
Protection class	IP20
Standards	CE, EMV (EN 61000-6-2 / EN 61000-6-3), UL508
Dimensions (w x h x d / from upper edge of rail)	62 mm x 100 mm x 72 / 65 mm
Weight / incl. box and documentation	0.16 kg / approx. 0.3 kg

## 12.2 Dimensions



Dimensions ibaW-750 front view (dimension in mm)



Dimensions ibaW-750 side view (dimensions in mm)

## 13 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)**.