Acquisition, Recording and Online Visualization of Measured Data

ibaPDA

The modern classic of data acquisition

ibaHD-Server
Historical data immediately available

ibaQDR
Length-based recording of quality data

ibaQPanel
Displaying quality data - live and in color

ibaInSpectra
Real-time monitoring of process vibrations
ibaPDA
The modern classic of data acquisition 3

ibaQPanel
Display quality data - live and in color 10

ibaHD-Server
Historical data immediately available 14

ibaPDA-Multistation
Synchronizing several ibaPDA systems 18

ibaQDR
Length-based recording of quality data 20

ibaInSpectra
Real-time monitoring of process vibrations 22
As central part of the iba system, ibaPDA has been proving as being one of the most versatile data acquisition systems for maintenance and production over years. Client-server architecture, flexible recording, simple configuration due to auto-detect are just some of the convincing features.

At a glance
- Data acquisition system for maintenance, production and quality control
- Connection of automation systems of different manufacturers and generations
- Individually configurable online display with client-server architecture
- Several simultaneous acquisitions possible
- Central configuration dialog with integrated online diagnostics
- Additional information on text signals importable
- Output of messages and alarms
- Synchronization of several ibaPDA systems in multi-station operation with microsecond accuracy

Systematic Transparency
The ibaPDA system (Process Data Acquisition System) is the core product of iba applications. ibaPDA is an extremely powerful, PC-based acquisition and recording system for different measured data in automated technical processes. The modular product concept allows highly flexible configuration options and provides perfectly tailored solutions for varying needs – be it the continuous long-term acquisition of measured values to be able to further optimize automation processes or the specific search for faults or the use as disturbance recorder with triggered recording in case of failure. Moreover, already during acquisition, quality data and characteristics can be evaluated and processed from the signals.

A special feature of ibaPDA is its extraordinarily broad connectivity to all usual automation systems and acquisition methods allowing the connection of systems of various manufacturers and generations. This allows a consistent data acquisition of an entire system usually consisting of heterogeneous components. ibaPDA can carry out several recordings simultaneously which are tailored to different user groups if, e.g., different signals, characteristics or sampling rates are required. ibaPDA is scalable and suitable both for individual test stands and for cross-plant systems where several thousand of signals are recorded. The configuration of the system is extremely simple.

New Features in ibaPDA-V7
Until now, additional information could be stored in a measurement file as so-called technostrings. These are replaced by text signals in ibaPDA-V7 and consequently the possibilities of display and further processing are significantly extended. For example, text signals can also be generated from source texts using separators or from JSON objects. Measurement files can now be protected against unauthorized access by a password.

In addition, the new license model of ibaPDA-V7 offers a better adaptation to the respective needs due to the finer gradation of the number of signals.

Client-Server Architecture
The client-server architecture of ibaPDA allows the distribution of configuration, data acquisition, recording and online display to
different components. The ibaPDA server contains the interfaces to the process, acquires and stores the measured data while the client can configure the server and visualize the measured data online in different views.

Client software can run locally on the server computer or on another computer in the network. This way, multiple clients can access one server and visualize the measured data of the server.

Vice versa, a server can be configured from each client having a network connection to the server. Thus, several ibaPDA servers can be configured one after the other from a central workstation.

Every ibaPDA basic license includes two client licenses, one for the server computer and one for another computer. More client licenses may be released additionally according to your needs.

**Broad Connectivity**

A special feature of the ibaPDA system is the broad connectivity allowing to acquire data from programmable controllers of all common manufacturers. This includes different process signals, such as analog and digital I/O signals, signals from field and drive buses, data from programmable controllers, communication data, product characteristics, etc.

By means of fiber-optic cables, it is possible, for example, to directly interface analog and digital input/output modules and listen to data from different field buses (PROFIBUS DP, PROFINET, EtherCAT, etc.) without interferences and implement system interconnections.

Moreover, there are numerous software interfaces available, such as TCP/IP, UDP/IP, or OPC protocol, to capture the signals from different sources and different access mechanisms.

Different request solutions allow the acquisition of internal values directly from a control without having to intervene. For this purpose, special request blocks are integrated into the PLC program once.

The SINUMERIK-Xplorer interface allows the acquisition of machine tool data from SINUMERIK CNC controls.

**OPC Client and Server**

The standard function scope of ibaPDA includes an OPC DA client interface. Using the browser function, OPC tags can be conveniently selected and recorded as signals. ibaPDA also provides all signals acquired via all interfaces via an OPC DA server.

With additional licences, ibaPDA can be operated as an OPC UA server and acquire all signals via an OPC UA client interface.

**IEC 61850 Support**

The IEC 61850 client interface of ibaPDA allows to acquire and record data from IEC 61850 capable devices. With MMS modules (Manufacturing Message Specification), single attributes or complete data sets can be queried. The acquisition of GOOSE messages (Generic Object Oriented Substation Events) is also supported.

Sampled Values Streams can be acquired via the interface for IEC61850-9-2. ibaPDA can also act as an IEC 61850 server and publish data according to the IEC standard.

**Recording Audio Data**

The audio interface enables easy recording of sounds and noises. The audio data can be recorded via a standard sound card installed in the ibaPDA server system. The stored audio data can be replayed with the audio function in ibaAnalyzer.

Numerous display functions in ibaPDA support the user in online analysis.
Thanks to the extensive connectivity of the ibaPDA system, data from different sources are available consistently and synchronized in time across the entire production process. The user gets a seamless overview of the entire process and can detect interactions between the individual components which are difficult to see in distributed monitoring systems.

**Signals Galore**

ibaPDA is available in numerous variants with regard to the number of signals. Licenses are available for 64, 128, 256, 512, 1024, 2048, 4096, 8192 and an unlimited number of signals. The quantity refers to the total number of signals to be processed - analog, digital or text signals. An arbitrary number of signals may be configured. The limitation only refers to the number of signals actually being processed. The number of the signals used is displayed in the I/O Manager informing the user how far he has already used the license.

The ibaPDA-PLC-Xplorer provides a special license with 64 signals containing specific interfaces to SIMATIC S7, Allen Bradley, B&R, Bachmann, Beckhoff, CODESYS based, Mitsubishi MELSEC, and SIGMATEK systems.

**Scalable Sampling Timebase**

For usual acquisition of measured data, the timebase may be set between 1 and 1000 ms. For higher speeds regarding signal changes, special modules can realize shorter acquisition times of down to 10 µs. Here, it is possible to configure an individual sample time for each module that just has to be a multiple of the basic sample time.

**Simple Configuration with Auto-Detect**

All settings relevant to signals and modules are made in a central dialog, the I/O Manager. It provides clear and concise presentation of all necessary setup information. ibaPDA provides extensive support options for the user to make the configuration as simple as possible. An automatic fill function makes it easier to enter signal names of the same type. Signal names can also be comfortably inserted using Excel lists.

**Configuration Validation**

By means of the auto-detect function, ibaPDA automatically detects the connected devices and inserts them into the configuration. The configuration of the input modules provides user support by context sensitive selection menus in order to avoid configuration errors. Moreover, each change of configuration is always checked and verified by the system before being applied.

In practice, it is often required to carry out different measurements for different purposes. In order to facilitate the management of the various tasks, configurations once created can be stored as
The projects can be easily re-used by each client or used and modified as template.

**Integrated Online Diagnostics**
Integrated diagnostics in the I/O Manager provide status information and values for all connected data sources enabling the user to easily check the functioning of the system already during the configuration and localize error sources, if necessary.

**Versatile Text Signals**
In many cases, additional information on the pure measured values facilitates the subsequent assignment and analysis. This information can be transmitted to the ibaPDA system using text signals. This can be, for example, product names, characteristics or other information relevant to the production. Here, several text signal sources can be defined. This data can be shown in the digital text display and trend graphs, stored in the measurement file as additional information, used for the measurement file name or subsequently output in reports. Numerical information can be used for further evaluation, text signals can also be further processed using virtual functions.

**Virtual Signals and Expression Editor**
By means of arithmetical and logical connections, arbitrary “virtual signals” can be created in an expression editor. These virtual signals can be recorded just like measuring signals and can for instance be used to easily create trigger conditions to start recordings, or to detect that limit values have been exceeded. Moreover, virtual signals can be used to carry out arbitrary arithmetic operations or check for limit violations.

**Generation of Alarms**
While monitoring the process, it is important to immediately detect errors or deviations. Already during data acquisition, the signals can be checked for certain conditions, e.g. comparison with limit values, thus generating warnings and alarms. The output signals can be easily created by means of the expression editor and output via different output channels, like ibaFOB modules, Reflective Memory cards, the S7-Xplorer interface and via TCP/IP. Moreover, a message can be sent via email which may contain both free text and fields that are automatically filled.

**Flexible Recording**
The measurement and monitoring requirements of different systems are as manifold as the recording options of ibaPDA. Several data storages with specific parameters can be configured in one system. Each data storage creates its own measurement files, continuously or process-controlled, and uses own recording parameters, like sampling time or trigger conditions.

All storages can work simultaneously and create measurement files. Moreover, each data
storage can create an overlapping recording, consisting of two or more files. This way, data can be continuously acquired to consistently monitor the processes. On the other hand, individual storages can be started and stopped using triggers to get product-related data or to specifically analyze faults.

Comfortable Display and Operation
The display can be configured for each user individually using buttons and drag & drop. Any number of signal displays with any number of signals can be created in separate or common signal graphs. Different views with individual settings for scaling, signal composition, colors, etc. can be saved and switched anytime. In addition to the live display, the signal graphs provide a pause and scroll function. By means of markers, individual measured values or the difference of two values can be immediately read. Status windows for data storage, text signals and event log provide additional information.

Meaningful Displays
With a multi-client solution, online displays independent from each other can be realized on different clients. Thus, the focus can be on different information - according to your needs. Moreover, the ibaPDA client includes an oscilloscope view, an XY view and an FFT (Fast Fourier) view to display the frequency spectrum of several signals. The digital meter shows the current values of analog signals directly as numerical value.

Together with ibaCapture, videos can also be recorded synchronously with process data. The videos can be watched live in the ibaPDA client, playback can also be rewound and repeated.

Clearly arranged Signal Groups
When thousands of signals are to be recorded in large systems, there is the risk of losing track. For better overview, signals from different sources, but related by area of operation, can be combined into any number of signal groups. The signals are grouped accordingly in the signal tree. The signal group assignment is stored in the measurement file and is thus also available in ibaAnalyzer.

Integration in SNMP Monitoring
ibaPDA can be integrated in a company-wide network management system according to SNMP (Simple Network Management Protocol). ibaPDA serves as SNMP server and supports the SNMP protocols V1, V2c and V3.

Status information sent to the central management stations is available as SNMP objects and can be easily selected. The basic ibaPDA license contains objects for status monitoring of ibaPDA. For signal objects, an additional license ibaPDA-SNMP-Server+ is required.
Direct Writing to Databases/Clouds
Data can also be written time-based directly from ibaPDA to databases/clouds. For this purpose special data stores subject to licensing are available. The licenses are scaled according to the number of signals. Currently streaming to Oracle, SQL Server, MySQL, MariaDB, PostgreSQL, SAP HANA, as well as MindSphere, MQTT and Apache Kafka is supported.

SQL Interface for Input and Output
With the SQL interface it is possible to read and write data directly from/to databases. The SQL interface allows access to any table in the database. The data can be read using a user-defined SQL query and then recorded, visualized and processed in ibaPDA as usual.

In the output direction, data can be written with a user-defined statement. The databases Oracle, SQL Server, PostgreSQL, MySQL and SAP HANA are supported.

User Management
An arbitrary number of users can be defined for using ibaPDA and provided with different client and server rights. Access and actions a user is allowed to perform can be restricted in a very differentiated way to protect the configuration and operation of the system.

Language Variety for International Use
ibaPDA is available in several language versions. The languages German, English and French are included by default and can be easily switched.

Other languages are optionally available on request, for example Spanish, Portuguese, Italian, Russian, Chinese, Japanese.

Please contact your local iba subsidiary or the local iba sales partner.

Synchronization of Several ibaPDA Systems
With the additional license “ibaPDA-Multistation”, several ibaPDA systems can be synchronized via fiber optic cable. Synchronous data acquisition is sample-accurate with an acquisition time of down to 10 µs with a possible distance between the ibaPDA systems of up to 2 km. A multi-station master sends the synchronization signal via the output of an ibaFOB-D card, whereas the other ibaPDA systems act as multi-station slaves and receive the synchronization signal via an input of an ibaFOB-D card.

In case a fiber optic connection cannot be established for transferring the synchronization signals, the so-called „unsynchronized stations“ have been implemented. The multistation systems are connected via network and can exchange trigger signals. Thus, all stations can start and stop the data recording process simultaneously. Only a sample-accurate data acquisition cannot be performed.

Detailed information on the multi-station operation can be found on page 18.
ibaPDA Overview

<table>
<thead>
<tr>
<th>System</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>Client/server</td>
</tr>
<tr>
<td>Number of clients</td>
<td>2, expandable according to needs with single or multi-user licenses</td>
</tr>
<tr>
<td>Number of signals</td>
<td>Licenses signal-based; grades: 64, 128, 256, 512, 1024, 2048, 4096, 8192 and unlimited. Figures refer to analog, digital and text signals in total, free arrangement; Special license ibaPDA-PLC-Xplorer with 64 signals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Windows 7 [32/64 Bit], 8 [32/64 Bit], 8.1 [32/64 Bit], 10 [32/64 Bit], 2008 R2 [64 Bit], 2012 [64 Bit], 2012 R2 [64 Bit], 2016 [64 Bit], 2019 [64 Bit] .NET Framework 4.8 or higher required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Computer with Multicore CPU 2 GHz, 2048 MB RAM; we recommend using ibaRackline or ibaDeskline industrial computers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Configuration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O Manager</td>
<td>Central configuration of all devices (modules), signals, signal groups, text signals and alarms</td>
</tr>
<tr>
<td>Auto-detect</td>
<td>Automatic detection and display of connected hardware (plug &amp; play)</td>
</tr>
<tr>
<td>Online diagnostics</td>
<td>Module and device state, actual signal values</td>
</tr>
<tr>
<td>Signal groups</td>
<td>Any signals of different data sources can be grouped to provide a better overview. Number of groups unlimited.</td>
</tr>
<tr>
<td>Virtual signals/Expression editor</td>
<td>Virtual signals can be created, evaluated and connected with the help of an expression editor, Virtual signals may be displayed, recorded and combined with real signals</td>
</tr>
<tr>
<td>Alarm and signal outputs</td>
<td>Digital and analog output signals can be configured [expression editor], output cycle: &gt; 50 ms; output via ibaFOB card, PROFIBUS-DP, PROFINET or Reflective Memory, OPC DA, OPC UA, Ethernet/IP, MODBUS, TCP/IP Generic, S7-Xplorer</td>
</tr>
<tr>
<td>Module structure (device or data interface)</td>
<td>Number of signals per module dependent on the module type The number and allocation of analog and digital signals are freely configurable for some modules</td>
</tr>
<tr>
<td>Sample time</td>
<td>Basic sample time: 1 ms to 1000 ms, fast measurement with appropriate hardware down to 10 µs; output time for alarm outputs: ≥ 50 ms (server cycle); for each module, an individual sample time can be additionally set (multiple of basic sample time)</td>
</tr>
<tr>
<td>Data storage</td>
<td>2 independent data storages included in the basic package, further data storages require extra license. Each data storage can run in overlapping mode with 2 or more files. Change in data storage configuration does not force restart of data acquisition.</td>
</tr>
<tr>
<td>Storage profiles</td>
<td>Any number of storage profiles which can be used by all data storages</td>
</tr>
<tr>
<td>Signal compression</td>
<td>Signal recording with multiples of sample time; Optional: recording of actual, average, min or max value</td>
</tr>
<tr>
<td>Trigger</td>
<td>For each recording: 1 start and 1 stop trigger (or trigger group) to start or stop the recording. Optional: pre-trigger and post-trigger time can be configured.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signal presentation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal displays</td>
<td>Unlimited number as dockable windows side by side or one behind the other</td>
</tr>
<tr>
<td>Number of trends</td>
<td>Unlimited for each window and graph</td>
</tr>
<tr>
<td>Special views</td>
<td>Oscilloscope, FFT display, digitalmeter, QPanel, camera view, orbit view</td>
</tr>
<tr>
<td>Scaling</td>
<td>Separated or common Y-axes, manual or automatic scaling</td>
</tr>
<tr>
<td>Feed</td>
<td>Individual time base or feeding speed and direction for each display, feed may be stopped and restarted any time without affecting the data acquisition or recording; zooming is possible with the feed stopped</td>
</tr>
<tr>
<td>Layout configuration</td>
<td>Unlimited number of layouts can be configured and stored Switching between different layouts during operation is possible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation/information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Recorder status and text signal</td>
<td>Display of all defined recordings with their status, path and file name Text signal: display of status and contents</td>
</tr>
<tr>
<td>Event log</td>
<td>Logging of all events relevant to the system</td>
</tr>
<tr>
<td>User management</td>
<td>Flexible user administration with differentiated client and server rights to control usage and configuration</td>
</tr>
</tbody>
</table>
ibaQPanel

With ibaQPanel, process and quality data, conditions, events and video images in live mode can be displayed in a technology-related representation. It combines the functionality of an interactive measurement value display with elements from the area of HMI and can be integrated seamlessly in ibaPDA.

ibaQPanel is a software add-on that allows live display of process and quality data in an HMI image. ibaQPanel combines the functionality of technological representations of measured values with elements typical for HMI screens. It is seamlessly integrated in ibaPDA.

Online FFT analyses, flatness or temperature profiles as well as alpha numerical and condition-dependent information can be displayed with ibaQPanel in real time. Signal trends can be displayed both time or length related. Thus, measured values which are relevant for long or flat products’ quality may be displayed in relation to the length segment.

Video sequences that have been recorded with ibaCapture offer live insights in areas of special interest. In case of failure situations, the integrated Scenario Player switches trigger-controlled to the corresponding camera view.

All Advantages of ibaPDA
The complete connectivity of ibaPDA is available in ibaQPanel. All signals that are acquired by ibaPDA or ibaHD-Server, can also be displayed by ibaQPanel.

The panes for display, the so-called panels, are designed as dockable windows and can be arranged on the screen like usual signal monitors or like tab cards one behind another. Using the various graphical elements, even HMI-like displays can be realized. Entire plant layouts can be displayed with dynamic, signal-con-
trolled properties, for example, material flows or movements of parts. More display objects are constantly added.

**Technological Functions**
Besides the general display properties some objects have special technological functions. For example, coefficients for the polynomial calculation of the profile curve can be specified in a cross-profile display or a length signal for the display of length-related values can be fed into the trend display. In FFT displays, frequency ranges can be flexibly configured and be indicated online using markers and highlighted with different colors.

**Object Library and Language Switching Allow Comfortable Operation**
Displays can be created fast and intuitively. Any number of display objects can be taken from the „Toolbox“ and drawn to the panel using the mouse. All properties of the display objects, such as size, position, alignment, colors, font sizes, scalings etc. are configured in comprehensive dialogs. Measured signals can easily be assigned to the display objects by using drag & drop.

Display objects that have been created once, can be stored in a library and reused whenever needed. Moreover, for objects like text fields, buttons, etc., the user can switch between languages.

**Display of Web Pages**
The integrated web browser is used to display web pages or browser-enabled files, such as PDF and image files. The web browser can also be used to display data from ibaDaVIS in order to visualize data from databases.

**Application Example**

**Paperless Recorder**
The function of a paperless recorder is a typical application. ibaQPanel meets numerous requirements, that are typical for recording and visualization of production relevant quality data.

The signals run in different trend graphs - clearly grouped and can be easily identified using different colours. The graphs can be displayed time or length based, the feed rate can be selected individually. If required, the signals can be displayed or hidden by a single mouse click.

To switch to other views, you just have to click on the buttons in the header bar. The buttons can also be assigned to functions like printing or copying into the clipboard.

For scrolling back and forth in the display, or zooming a section, the chart feed of the recorder can be stopped. By means of markers, the user can measure single values or sections.

In ibaQPanel, data from the ibaHD-Server can be displayed as well. Thus, the user can scroll back over a period of several months or display events. The event table of the ibaHD-Server also offers in ibaQPanel its usual functionality, like the event query configurator for targeted finding of events or dynamic display of events as text channel in the trend chart.

Thus, information can be filtered rapidly for product number, date or exceeded limit values. Double-clicking on the event opens the trend directly at the time of the event.

The configuration of the display elements and the layout are stored centrally on the ibaPDA server, whereas several clients at different locations can call the ibaQPanel display.
Application Examples

Integration in an HMI System

In this example, the ibaQPanel display is integrated as ActiveX-Control in a proprietary HMI system. Once again, ibaQPanel offers the same functionality, the possibilities of layout and the rapid display as in an ibaPDA client.

Using the zoom function, the signals can be displayed with acquisition times as low as 1 ms or even down to 10 µs. In contrast, common HMI systems usually record the signal sequence significantly slower.

In our example, a 2D-colored top-view chart (outer left) visualizes comprehensively the temperature distribution in a cooling section by assigning different temperature ranges to different colors. With the length-based representation, the user immediately has an overview of the temperature behavior of the strip over the whole length and width. The false color display is especially suited for visualizing profiles, like flatness or deviations in thickness.

The bar chart above visualizes the deviation in temperature from the nominal value. The trend graphs show the deviation in thickness in a length-based manner; the measuring location and the nominal value are displayed via a text signal. By means of buttons, the user can navigate to further views of the HMI system.

ibaCapture with Scenario Player

If parts of a plant are being monitored using ibaCapture, the views of multiple cameras can be displayed in ibaQPanel. The user can arrange the camera views according to his needs. In addition to the live display, the playback function offers the possibility to rewind along the time axis, to change the playback speed or zoom in certain screen areas.

By means of the Scenario Player, the user can switch by triggering to a certain camera view. For example, the cameras of a certain area in the plant can be switched in, when an emergency stop has been caused there. The operating personnel immediately gets insight in the area at risk. Not only the live picture is displayed, but the video playback can also be started with a pre-trigger time in relation to the triggering event in order to detect the cause that triggered the emergency stop. The link to the measured signals offers more insight in that issue.
Further Display Objects

Pictures, Symbols, Shapes
Not only pictures can be loaded statically, dynamically or triggered, but also vector-oriented graphics in SVC format can be imported as symbols. This way, whole plants, flow charts or site plans can be visualized, movements can be simulated or optical warning messages can be issued depending on a certain status.

Shapes such as lines, rectangles, ellipses and polygons can be freely created as in graphics programs and fill them with lines, fillings and gradients.

With the dynamic modification function, the graphical objects can be moved across the screen and changed in size, orientation, and color.

Text Labels
Instead of pictures, also texts can be loaded statically or dynamically into text fields and freely positioned. Text labels enable the display of signal values, text signals or other status messages. The text can be configured freely, regarding color, font and size.

Offline Trend Graph
The offline trend graph offers the possibility to compare completed measurements to the current display. From measurement or text files, time and length based signals can be displayed simultaneously to the current recording. All information fields contained in the measurement file are loaded, including the signal tree. It is also possible to load files automatically or triggered in the offline display, e.g. whenever a measurement file has been completed.

With the file scanner and file picker functions, the user can search selectively for data files. The found files can be displayed either automatically or selected from a drop down menu.

Input Objects
The input objects can be used to write previously defined values to a signal. With the radiobutton and checkbox objects, one or more values can be selected. The object slider offers the possibility to select a value from a range.

The switch is a graphical input element for switching signals. Each status can be displayed with an own picture.

Text can be entered manually using the text input control and thus saved as additional information.

Chart
The chart display object offers the highest possible flexibility of visualization. The signal can be represented as graph, line or by points. Colors and transparencies can be chosen freely; additionally dynamic color ranges can be defined. Also the cursor can be defined freely concerning color, size and symbol. Moreover, an XY display allows a display similar to that of an oscilloscope.

License Model
The license ibaQPanel-V7-Add-On contains the display objects and is an add-on license for ibaPDA-V7 or ibaHD-Server-V2. The license requires an ibaPDA client, which has to be licensed in addition if needed.

System Requirements
› ibaPDA license
› Operating system: see ibaPDA
› PC with at least P4 1 GHz, 256 MB RAM, 40 GB HDD; recommended: additional graphics card
› For client PCs in the network: network connection to the ibaPDA server
ibaPDA Add-on

### ibaHD-Server

Find past events rapidly, using the high resolution Historical Data (HD) server - also for continuous and long running processes. With the zoom function, browsing from annual, monthly or weekly overview down to the millisecond range is possible with just a mouseclick.

---

**At a glance**

- Continuous recording of data over a long period of time
- Direct access to historical data from ibaPDA
- Intuitive interface for visualizing historical data, e.g. functions like browsing, scrolling, jumping at a certain date
- Fast zoom function for displaying data from annual, monthly or weekly overview down to a millisecond range
- Combined display of current and historical data within one application
- Recording and display of event-triggered messages
- Quick finding of events in the past
- The same ibaHD-Server can be used for multiple HD data stores filled by different ibaPDA systems

**Continuous Data Recording over Long Periods of Time**

ibaHD-Server is basically used as data storage for measured data from ibaPDA server. For this purpose, ibaPDA server sends measured data directly to the ibaHD-Server via TCP/IP connection. At the same time, the measured data available in ibaHD-Servers can be visualized on different ibaPDA clients.

Due to the special storage principle for measured data in ibaHD-Server it is possible to display the measured signals over the entire acquisition period in one trend graph. With a simple zoom function, the displayed time section can be quickly resolved down to milliseconds. Thus, suddenly occurring irregularities in a continuous process can be detected as well as slowly developing trend deviations.

Long-term recording of measurement data with ibaHD-Server is particularly interesting for maintenance or in continuous processes such as paper production, product refinement, casting processes or in the energy sector.

**Navigation and Zoom Function in the ibaHD Trend View**

With the ibaPDA client, measured signals can be selected from time ranges such as seconds, hours, weeks, months or even years and displayed. The selected signals are displayed as a trend in the ibaPDA client in no time. With the navigation and zoom function, the displayed time range can be enlarged or reduced to the highest resolution at a mouse click.

With just a few mouse clicks you can navigate from the overview over longer periods of time up to individual samples.
The necessary data for the trend graph display are retrieved directly from ibaHD-Server and visualized. The displayed trend can include all measured values ever recorded up to the last newly recorded sample.

**Rapid Access to Events from the Past**

Messages for product changes or noticeable process states can be formulated as events and stored in the ibaHD-Server. The messages are controlled by trigger signals and stored as events in an event-based HD store with the current time stamp. The messages can be assigned a priority and they can be supplemented with information about the current state from text signals or directly from measurement signals from ibaPDA server.

The events are displayed in ibaPDA client in the filterable event list. By means of targeted queries, you can rapidly find events from the past in the event table. When did a signal exceed a certain threshold? When was new material fed in? When has a production unit been finished?

If you click on an event in the event list, an HD trend graph that is also shown, jumps directly at the time of the event. The combination of HD trend graph and event list provides easy and effective navigation between products or registered process states.

**Attach Additional Information Directly at the Origin Time**

Predefined or free texts can be added as annotations directly in the trend graph. This additional information can be supplemented by images, PDF documents or other files. In the event list, annotations can be displayed, sorted, filtered or searched in a selective way. The annotations are immediately available to other users. They facilitate navigation, for example, for commented product changes or the laboratory report submitted subsequently for a particular batch.

**User Management**

In order to protect the data in the ibaHD-Server against unauthorized access, the user management offers the possibility to assign authorizations to individual users. The permissions not only concern the configuration of the ibaHD-Server, but also read and write permissions for individual HD stores as well as permissions to configure them.

By means of several filters you can find quickly events of the past in the event table and display the appropriate signal views.
Video Images Extend Analysis Options
The combination of historical data and video images offers completely new possibilities for analyzing processes or disturbances. Video images provide additional visual information wherever processes are difficult to measure or cannot be reliably detected by sensors. Now it is possible to synchronize the recording of historical data with video recordings in ibaCapture.

In ibaAnalyzer, historical data and video sequences can then be viewed and evaluated synchronously - precisely to the sample. As a result, correlations can often be identified more quickly and troubleshooting can be carried out more efficiently.

One Single Server for more than one Data Store
One ibaHD-Server can be used for administrating more than one HD data store. Both the time-based and length-based recording of signals as well as the recording of event messages are treated like normal data recording in ibaPDA. An ibaPDA system can supply several HD data stores on the same or on different servers with data. Likewise, several ibaPDA systems can write their data to the same ibaHD-Server, but in different HD data stores. Events from several ibaPDA server systems can be merged in a single event-based data store.

This way, the ibaHD-Server can be used as a higher level system for recording data from different plants of one factory.

Generate Offline Events
The ibaDatCoordinator software can generate offline events during post-processing on the basis of DAT files or HD data. Calculated process parameters or product and batch information are stored as offline events in the event-based data store. The offline events can be displayed, evaluated and used in reports together with the data acquired online with ibaPDA.

Saving Data Using Backups
A backup function offers flexible options for individual backup strategies for HD data stores, like e.g. automated data backups according to a defined schedule or manual backups with customized parameters.

A backup can include the entire HD data store as full backup, or as differential backup the last part of the HD data store that has not yet been archived.

The backups are primarily used as a backup copy and can be restored if required. Another way to use backups is to attach the backup data to an existing data store.

The data recording in the ibaHD-Server complies with the ring storage principle, so that the oldest data is overwritten by new data. An attached backup is not overwritten and can be used as a reference data set for a com-
parison when replacing legacy systems, for example.

**License-free Offline Analysis**
Backups of HD data can be opened as read-only HD data store for analysis purposes without a license on the analysis computer. The data can comfortably be evaluated and used for reports with ibaAnalyzer. Even current plant conditions can be easily compared with the data from the backup.

**Simply Import Data Files**
Measurement files recorded with ibaPDA in DAT format can also be integrated into the concept of long-term recording. For this purpose it is possible to import measurement files into an HD data store and transfer them to the HD data store at the correct time.

Optionally, individual measurement files or entire measurement file directories can be imported. This way, measurement files from older databases or those recorded with a separate ibaPDA system can be merged and managed consistently.

Using the free software ibaDatCoordinator you can even automate the import of measurement files automatically. ibaDatCoordinator is easy to configure and relieves the user of routine tasks.

**Analysis in ibaAnalyzer**
Data from ibaHD-Server can be conveniently retrieved and displayed with the ibaAnalyzer analysis program. The data can be easily selected using markers in a preview of the HD trend graph or directly by specifying the desired time period.

Data from the ibaHD-Server can be handled in ibaAnalyzer in the same way as measurement files in DAT format. They can be exported or reports can be generated.

In addition to the time-based selection of measured data, it is also possible to select ranges in the ibaHD-Server by means of signal conditions, so-called triggers.

For example, it is possible to search for outliers and limit violations, or to select a production step from the material supply to the next step.

Signal conditions can be easily created with the available analog, digital and virtual signals or a combination of them.

**Modular Product Design for Customized Needs**
The basic licenses for ibaHD-Server are graded according to the number of signals and comprise one ibaHD-Server, two HD data stores and two HD clients. For the number of the needed HD data stores, it does not matter which kind of data store is chosen - time-based, length-based or event-based.

For a further extension of the system, you can get licenses for more HD data stores (on the same server) and more HD clients which allow access to the historical data of an ibaHD-Server from multiple iba-clients. For each workstation that is supposed to display historical data, an HD client license and the ibaPDA client software is required.

**System Requirements**
- Online data acquisition system ibaPDA (v7.2.0 or higher)
- Operating system: Windows 7, 8, 8.1 or 10 (32/64 Bit), Windows Server 2008 (32/64 Bit), Windows Server 2012 or 2016 (64 Bit)
- .NET-Framework 4.5.2
- Computer equipment according to the requirements of the data recording (number of measuring channels, sampling time, dimension of archive)
- Analyzing with ibaAnalyzer v7.0.0 or higher
When operating in multistation mode, all measurement channels of several ibaPDA systems are recorded synchronously and accurately to the sample. Simultaneous triggering of all stations is also possible by each station.

At a glance
- Synchronization of several ibaPDA systems with a sample accuracy between the systems
- One multi-station master and up to 4 multi-station slaves are synchronized via fiber optics
- Suitable for plants with an extremely high number of signals
- Starting and stopping the acquisition of all ibaPDA systems at exactly the same time
- Simultaneous triggering of all stations is possible by each station
- Trigger name can be included in the data file name
- Related data files can be opened and compared in ibaAnalyzer with identical samples
- Easy configuration in the I/O Manager of ibaPDA
- Specific rules ensure resuming the measurement, if one system fails

Together in Time
If a computer has not enough slots for input cards to record all measurement channels that are transmitted from a plant to the ibaPDA system, the only option is to install further ibaPDA PCs and distribute their inputs to the systems. Although the systems may basically have the same time via PTP, DCF77 or similar time synchronisation methods, a sample-accurate synchronous measurement of all systems is not possible that way. Furthermore, these are independent ibaPDA systems, which can start and stop at different times and create data files with different starting times. When viewing the data files with ibaAnalyzer, it would be difficult to accurately overlay the files.

Requirements from Energy Transmission Technology
The highest requirements result from the use of ibaPDA as a Transient Fault Recorder (TFR) for energy measurement, e.g. in high-voltage direct current transmission systems (HVDC transmission). In these complex systems, thousands of signals are often to be measured and recorded synchronously at a high sampling rate. Therefore, mainly A/D converters of the ibaPADU-S series are used as well as system connections, such as ibaLink-VME. A maximum of five ibaFOB-4i PCIe cards can be accommodated on a single computer. In addition, processing and storage capacity of the PC are limited by the physical memory; thus, the number of signals being processed at a high sampling rate (e.g. 20 kHz) is limited.

The only solution is to add additional computers to the system.

Concept
The ibaPDA multi-station concept takes into account the fact that even in very complex systems, an event at one point may have effects at another point only a few microseconds later. Accordingly, all ibaPDA systems involved must be able to capture and record the signals absolutely synchronously and accurately to the sample.

An ibaPDA system is operated as a multi-station master and synchronizes the connected multi-station slave systems via a special fiber optic connection. In addition the computers in a multi-station network are connected via a separate Ethernet network used for the transmission of time, start, stop and trigger information. The multi-station network can be configured in the I/O Manager of the participating stations.
Start and Stop of the Measurement

In multi-station operation, the participating ibaPDA systems interact as if there was only one system. If the start command is given on one of the participating computers (regardless of whether it acts as master or slave), this command is given automatically to the other stations. When all stations report start readiness, the measurement is started. If the measurement is stopped on one of the participating computers, it will stop automatically on all other computers as well.

There are specific rules for various operation scenarios and malfunctions, in order to ensure that the system is not completely blocked, e.g. due to a computer failure.

Synchronization

For synchronization during acquisition, each slave is linked to the master via an ibaNet FO cable. The master computer uses special ibaFOB outputs to provide the synchronization clock to which the slaves adjust with a deviation of less than one microsecond. So, the samples are captured synchronously on all participating systems.

Further synchronization is not necessary as the system time of the multi-station master is used for all stations.

Triggering the Data Recording

For application in HVDC transmission plants or energy facilities, mainly event-triggered data recordings are used. Accordingly, many trigger signals may serve as start and stop triggers for the recording. These triggers are configured in trigger pools in the individual stations.

So-called „global triggers“ can trigger at one station and start data recording at several stations simultaneously. In order to later assign the data files to a trigger event, the trigger name can be included in the data file name. Later, the related data files can be opened simultaneously in ibaAnalyzer with identical starting time and samples for all files.

This mode of the so-called „unsynchronized stations“ means that if the trigger is released on one station, it is passed on to the other stations. The recordings can start and stop simultaneously. The triggering station also sends the absolute UTC time. The receiving stations compare their time with the UTC time and synchronize the data acquisition accordingly. For this method, we recommend synchronizing the individual ibaPDA systems externally, e.g. via PTP, IEC 1131 or ibaClock.

System Requirements

- ibaPDA V6.31.0 or higher
- ibaPDA V6.37 when using „unsynchronized stations“
- Ethernet connection between multi-station master and multi-station slaves
- Fiber optic connection from multi-station master to the multi-station slaves
Continuous processing lines need length-based quality data for product qualification. The quality data recording system ibaQDR acquires data time-based at different measuring locations and assigns the measurement values precisely to the length position of the product.

**Length-based Quality Data in any Resolution**

Quality data acquisition of today, is an essential part of the production process for every manufacturer of high-quality products. The quality data recording system ibaQDR is smoothly integrated in ibaPDA as an add-on. The user has the same look-and-feel like in ibaPDA. This offers a transparent quality data acquisition and an efficient data management.

A product (coil)-related analysis of quality data only makes sense, if the relevant measured values can be mapped exactly to the product. In case of long products, a length-based mapping of the data over the product is usually required, e.g. feet-wise or meter-wise.

ibaQDR does this mapping based on the previous time-based recorded data in combination with accurate data of the material tracking. The successively recorded (time-based) data are mapped exactly to the product at the point where they have been measured.

The system has been optimized for rolling mills, processing lines and inspection plants within the metal industry but it can also be used for reversing rolling processes in hot rolling mills or other processes.

**Quality relevant data are:**
- Product dimensions (width, thickness, ...)
- Cross profiles (strip coating, thickness cross-profile, ...)
- Production parameters (rolling forces, tensions, ...)
- Reference values and consumption figures etc.

**At a glance**
- Recording system for quality data, based on ibaPDA architecture
- Technological process description of strip processing lines
- Length normalization to the final product (exit coil) and synchronization of all measured data
- Consideration of strip elongation in the process and all cuts
- Standard length resolution: 1 m (fully adjustable incl. unit)
- Scalable number of measuring locations and signals
- Integration of ibaCapture data
- Additional time-based recording as an option
- Data storage in iba *.dat format related to the exit coil and additional to the entry coil

**Easy Configuration and wide Range of Interfaces**

ibaQDR is based completely on ibaPDA and the iba hardware. Therefore the whole iba connectivity is available. The signals to be measured are configured in the same I/O Manager as in ibaPDA. The ibaQDR recording functions can be configured in a user-friendly GUI.

**Functional Principle**

The production line is divided into several sections (measuring locations), where the quality relevant data are acquired. At first, the measuring data are recorded separately based on the measuring locations, together with the material ID and the position (length) of the strip in relation to the measuring location.

This creates as many measurement files as measurement locations. When the product (coil) is finished (e.g. defined by shear cut) the measurement data are extracted from the temporary single
files based on the material ID and the length positions and will be written into a new file – the QDR data file. All measurement values belonging to the recently produced strip are stored scaled to the final product length. Production-related material elongations are taken into account.

In addition (optional) it is possible to save QDR data defined by the entry coils too. That means that parallel to the exit coil data files, a data file for each entry coil will be also generated by ibaQDR.

**Online Status Display**
The status of the recording is monitored continuously in a special window showing the current material-ID and length at the measuring location, no matter whether a recording is running or not. Furthermore, file name and elapsed time are displayed. This is valuable information, particularly during the commission of the system.

**Configuration of the Measuring Location**
Besides the name of a measuring location further information is entered in the configuration dialog, such as control signals from material tracking, like material-ID and actual length position. Moreover, the assignment of quality relevant signals and measuring location has to be done here with a mouse click. Two actual length values (entry and exit) can be configured for each measuring location in order to provide an appropriate consideration of an elongation of the product, for example at rolling stands.

**Scalable System Size**
An appropriate number of measuring locations can be defined throughout the line. Another arbitrary number of measuring signals can be assigned to each measuring location. An ibaQDR system can also perform (time-based) data recording for maintenance in respect to the size of the plant. In case of large scale plants and high availability requirements we recommend a separated ibaPDA system in addition to the ibaQDR for maintenance and fault analysis.

**Analyzing with Standard Tools**
The data files which are generated by ibaQDR can be analyzed and displayed with ibaAnalyzer.

**Demanding reports can be generated with the powerful report generator.**

**Quality Data Management**
Using the software ibaAnalyzer-DB the recorded data can be provided to higher level systems, such as MES (Manufacturing Execution System), DataWarehouse or individual applications in a plain and transparent database structure. In ibaAnalyzer-DB, statistical parameters or KPIs (Key Performance Indicators) can be determined and made available for other systems.

Supported database systems are Oracle, SQL-Server, DB2-UDB, PostgreSQL, MySQL and other ODBC databases.

**Sales Note**
As ibaQDR works in close relation to the segment mapping of the automation, a detailed knowledge of the functioning of the automation is required for its configuration. Therefore we recommend the integration of the system through a qualified supplier or together with support services (consulting, training, support).
With ibaInSpectra, any vibrations are monitored continuously and possible error sources can be detected in an early stage. As the ibaInSpectra library is integrated in ibaPDA, not only pure vibration analyses can be done, but also possible relations between vibrational effects and process behavior can be determined.

**Open and Versatile**

In contrast to many other Condition Monitoring systems, ibaInSpectra is not a manufacturer-specific system or limited to individual machines, but uses the broad connectivity of iba products. Thus, it is perfectly made for the use in heterogeneous automation structures, that are characterized by a great number of different technical disciplines and controller types.

Due to the smooth integration in ibaPDA, vibrational measurement data as well as other machine, process, material and quality data can be acquired centrally and related to each other. Hence, besides the pure vibration analysis of a single machine, also possible effects of the vibrations on the process stability and product quality can be detected.

**Real-time Analysis**

Many systems for Condition Monitoring are designed for long-term trends and often analyze the vibration sensors in intervals of hours or days for a short time. However, with ibaInSpectra, the sensors can be monitored time-synchronously and continuously and the current frequency analyses can be displayed in real-time. Negative trends as well as significant correlations can be detected early in the process. Cri-
tical conditions or exceeded limit values can be signaled immediately, which contributes significantly to the protection of man, machine and material. Moreover, process parameters that influence the vibrational behavior, can be adapted automatically online.

Flexible Configuration
Designed as integrated technology module of ibaPDA, ibaInSpectra serves as software for band parameter analysis preferably for mechanic vibrations. ibaInSpectra offers different modules that are configured in the I/O Manager of ibaPDA.

› The expert module offers the most diverse opportunities for parameterizing the frequency band analysis and is the favored tool for experts in the field of vibrations.
› The auto-adapting module automatically learns spectra under different process conditions and uses them as reference to detect changes in spectrum over time
› The universal module can be configured in an easy way and calculates the most common characteristic values for vibration monitoring in the time domain.
› The fan module is made for monitoring fans and calculates especially indicators for the status of fans.
› The orbit module is used for monitoring and analyzing the shaft movement, for example of bearings.

Operation and Visualization
ibaInSpectra modules have an own branch in the ibaPDA signal tree. For the display, only an suitable view needs to be opened and the ibaInSpectra module has to be dragged in by means of drag & drop. The views offer various display options such as waterfall, contour, orbit view, etc. and can be customized as required.

Consistency up to the Offline Analysis
When recording with ibaPDA, the ibaInSpectra modules are stored completely with all the calculated characteristic values in the measured data file. In ibaAnalyzer, all modules are available in the signal tree and the determined characteristic values can be dragged via drag & drop into the trend view or used for other calculations.

With the new product ibaAnalyzer-InSpectra, module configurations can also be exchanged between ibaPDA and ibaAnalyzer. It is now possible to configure and validate the monitoring modules offline on the basis of recorded data without interfering with the production system.
Online Monitoring of Vibrations with the ibaInSpectra Expert Module

Versatile Module for individual Vibration Analysis

The ibaInSpectra Expert module monitors and analyzes vibrations in the frequency spectrum generated by FFT analysis. Due to the great flexibility and versatility of the module, it can be used for a wide variety of applications.

In the expert module, the frequency bands that are to be monitored can be defined freely, statically as well as dynamically depending on other measurement values. The following parameters are determined as result of the analysis for every frequency band:

- Peak
- RMS (root mean square)
- Peak frequency

Based on these parameters and process parameters, freely configurable characteristic values can be calculated. In addition, it is possible to define two limit values (warning, alarm) for each characteristic value or individual band parameter.

Besides the values from the frequency domain, further values like minimum, maximum, average value, RMS or Crest factor are determined in the time domain of the signal.

The calculation bases for the analysis can be adapted individually by the user on many levels and stored as profiles.

Especially the sensor type, the spectrum type and FFT calculation parameters like the number of samples, window type and overlap percentage can be set.

Different methods for determining the average value are available as well as the possibility of detrending for compensating a slow drift of the measured value. Profiles that have been defined once, can be stored and then used several times.

Order Analysis and Calculation of Envelope Curves

In the calculation profile of the ibaInSpectra Expert module, the user can select a speed signal for resampling the input signal depending on the rotation speed. This speed signal can be a pulse sequence, a pulse counter or an absolute speed value.

By means of resampling, the order analysis for changing speeds is displayed in a much more comprehensive way than by means of rescaling the x-axis.

Moreover, signals can be pre-processed with the ibaInSpectra Expert module. Thus, the vibration signals can be filtered and mathematical precalculations can be done. An envelope calculation with freely configurable bandpass filter is also available as a signal pre-processing profile. Parameters for calculation profiles are listed in the table on the right.

At a glance

- Comprehensive configuration options
- Calculation profile for multiple use
- Visualization according to requirements
- Waterfall display, single spectrum or contour plot
- Calculation of combined characteristic values
- Display of frequency bands and characteristic values
- Alarming in case of exceeded limit values
- Correlation of vibration and process data
- Order and envelope spectrum
Control elements for the display

Frequency spectrum of the input signal, displayed as single spectrum, contour plot or as isometric waterfall diagram with order tracking (marker)

Display of the configured frequency bands with display of peak, peak frequency, RMS, limit values for alert and alarm, display of values on mouse hovering, changing color when limit values are exceeded

Table with the characteristic values of the configured bands

Acquired values of the input signal for calculating the FFT, displayed in the time domain

**Alert and Alarm**

When configuring the alert and alarm limit values, the ibalnSpectra Expert module automatically supplies analog or digital signals which are activated as soon as the limit values are exceeded. Via the output interfaces of ibaPDA, these signals can be made available to other systems for alerting or interventions in the process control.

**Parameters for calculation profiles**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>Displacement, velocity, acceleration</td>
</tr>
<tr>
<td>Spectrum type</td>
<td>Displacement, velocity, acceleration</td>
</tr>
<tr>
<td>Speed type (optional)</td>
<td>Pulse sequence, pulse counter, direct speed</td>
</tr>
<tr>
<td>Order analysis</td>
<td>Number of samples per revolution</td>
</tr>
<tr>
<td>Number of lines</td>
<td>up to 204800</td>
</tr>
<tr>
<td>Number of samples</td>
<td>up to 524288 (depending on the number of lines)</td>
</tr>
<tr>
<td>Overlap percentage</td>
<td>0 to 95 %</td>
</tr>
<tr>
<td>Suppress DC</td>
<td>yes/no</td>
</tr>
<tr>
<td>Drift compensation</td>
<td>yes/no</td>
</tr>
<tr>
<td>Window type</td>
<td>Bartlett, Blackman, Blackman-Harris, Hamming, Hanning, Rectangular, Flattop</td>
</tr>
<tr>
<td>Normalized</td>
<td>yes/no</td>
</tr>
<tr>
<td>Method</td>
<td>Magnitude/Power</td>
</tr>
<tr>
<td>Calculation of average value for frequency ranges</td>
<td>Linear/Exponential/Peak hold</td>
</tr>
</tbody>
</table>
Monitoring of the Shaft Motion using the ibaInSpectra Orbit Module

**Calculation of speed-dependent Characteristic Values**

The ibaInSpectra orbit module can be used to monitor the shaft motion relative to bearing housing and therefore allows a reliable monitoring and evaluation of the machine condition.

For a stable calculation of the characteristic values at different speeds, the input signals are sampled relative to speed. This ensures not only reliable results for all conditions but also allows an averaging of the orbit over several revolutions. An average value can be calculated (linearly) based on the maximum values of the corresponding rotation angle.

Characteristic values calculated by the ibaInSpectra orbit module:

- Orbit counter: Number of calculated orbits
- X/Y: Current shaft position
- Centerline X/Y: Position of the shaft center
- Peak to Peak max: S(p-p)max, maximum distance between two points in the orbit
- Peak to Peak max angle: Angle of the S(p-p)max
- Peak to Peak max shaft angle: Rotation angle of the shaft to which S(p-p)max occurs relative to the phase reference
- Eccentricity: Eccentricity of the shaft
- Distance to clearance: Minimum distance of the shaft to the clearance circle (bearing shell)

More in planning

**Better Insight thanks to a flexible Visualization**

The orbit view offers various possibilities to adjust the visualization of the shaft motion individually. So the shaft motion can be visualized including phase reference. In addition, the movement history of the shaft center can be displayed over a time period. Another option is e.g. to display different acceleration levels during the start-up of the machine.

To improve the understanding of the movement, the clearance diameter, rotation direction, sensor positions and the position of the phase reference can be displayed.

**Offline Detail Analysis with Playback Function**

For a detailed offline analysis the recorded data can be opened together with the calculation profiles in ibaAnalyzer-InSpectra. Shaft motions can be analyzed subsequently and can be compared with other process data to recognize correlations. Additionally, the behavior can be reproduced at certain points of time, using the playback function.

The gap-point representation of the phase reference allows you to distinguish between forward and backward precession.

At a glance

- Calculation of characteristic values for validation and monitoring
- Display of one or several shaft motions (orbit)
- Display of the shaft center motion (centerline)
- Speed-dependent resampling
- Visualization of acceleration levels
- Calculation profiles for multiple usage
- Customized visualization
- Display of the phase reference
- Averaging over several rotations (linear or peak hold)
Learning Spectral Analysis automatically with the Auto-Adapting Module

Detecting Damage at an early Stage

The auto-adapting module is able to use a series of spectra to learn what the ideal spectrum should look like. The so-called reference spectrum can be learned for various process states, which, for example, relate to different speeds, materials or load areas, etc.

Since ibaInSpectra is seamlessly integrated into ibaPDA, the full ibaPDA connectivity is available to acquire all possible process signals in a system and to be used to define the states.

Comparing with the ideal spectrum and the quantification of the deviation allows the end user to detect changes in process behavior at a particularly early stage before quality issues occur. The auto-adapting module also identifies the areas with the biggest deviations.

Learning and Monitoring

Instead of having to manually configure a frequency analysis for certain ranges, all ranges of the spectrum are considered in the auto-adapting module. In the process, the spectrum can be individually divided into any number of ranges. In the learning phase, characteristic values are calculated and taught in across all ranges of the spectrum and a reference spectrum is determined from this. In the monitoring phase, the auto-adapting monitoring compares the current spectrum with the reference spectrum.

Since the auto-adapting module is based on the ibaInSpectra Expert module, it offers the same extensive options for configuring FFT calculation parameters in profiles and signal pre-processing.

Permitted deviations can be configured individually. For alerts and alarms, percentage limits can be defined that relate to a maximum or average reference spectrum.

Convincing characteristic Values

The auto-adapting module calculates meaningful characteristic values for every state:
- Absolute delta: Total difference between the actual spectrum and the threshold values from the reference spectrum.
- Relative delta: The relative percentage difference between the actual spectrum and the threshold values from the reference spectrum.

At a glance

- Self-learning InSpectra module for spectral analysis
- Reference spectra for various process conditions
- Analysis across the entire spectrum
- Automatic learning of reference values
- Individual definition of warning and alarm limits
- Online visualization in real time
- Early detection of changes and damage

The auto-adapting module visualizes the current spectrum and the reference spectra of the warning and alarm threshold in the FFT view.
### Order Information

**ibaPDA**

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.770064</td>
<td>ibaPDA-V7-64</td>
<td>Basic package with server/client application, for 64 measuring signals</td>
</tr>
<tr>
<td>30.770128</td>
<td>ibaPDA-V7-128</td>
<td>Basic package with server/client application, for 128 measuring signals</td>
</tr>
<tr>
<td>30.770256</td>
<td>ibaPDA-V7-256</td>
<td>Basic package with server/client application, for 256 measuring signals</td>
</tr>
<tr>
<td>30.770512</td>
<td>ibaPDA-V7-512</td>
<td>Basic package with server/client application, for 512 measuring signals</td>
</tr>
<tr>
<td>30.771024</td>
<td>ibaPDA-V7-1024</td>
<td>Basic package with server/client application, for 1024 measuring signals</td>
</tr>
<tr>
<td>30.772048</td>
<td>ibaPDA-V7-2048</td>
<td>Basic package with server/client application, for 2048 measuring signals</td>
</tr>
<tr>
<td>30.774096</td>
<td>ibaPDA-V7-4096</td>
<td>Basic package with server/client application, for 4096 measuring signals</td>
</tr>
<tr>
<td>30.778192</td>
<td>ibaPDA-V7-8192</td>
<td>Basic package with server/client application, for 8192 measuring signals</td>
</tr>
<tr>
<td>30.779999</td>
<td>ibaPDA-V7-unlimited</td>
<td>Basic package with server/client application, for unlimited measuring signals</td>
</tr>
<tr>
<td>30.770022</td>
<td>ibaPDA-V7-Data-Store</td>
<td>Add-on license for writing two more measurement files (*.dat)</td>
</tr>
<tr>
<td>30.770023</td>
<td>ibaPDA-V7-Ultra-Data-Store</td>
<td>Add-on license for additional data-storage, 255 measurement files (*.dat) with 20 signals each. Number of files will be reduced, with more signals.</td>
</tr>
<tr>
<td>30.770024</td>
<td>ibaPDA-V7-Client</td>
<td>Extension with one more client</td>
</tr>
<tr>
<td>30.770025</td>
<td>ibaPDA-V7-Multi Client</td>
<td>Extension with five more clients</td>
</tr>
<tr>
<td>30.001930</td>
<td>ibaPDA Multistation</td>
<td>License extension Multi-station application</td>
</tr>
<tr>
<td>30.670050</td>
<td>ibaPDA-SNMP-Server+</td>
<td>Advanced SNMP Server function</td>
</tr>
<tr>
<td>30.670051</td>
<td>ibaPDA-OPC-UA-Server+</td>
<td>Advanced OPC UA Server function</td>
</tr>
<tr>
<td>30.670052</td>
<td>ibaPDA-IEC61850-Server</td>
<td>Add-on license IEC61850-Server</td>
</tr>
</tbody>
</table>

**ibaPDA Communication Interfaces**

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.000001</td>
<td>ibaPDA-Interface-S7-Xplorer</td>
<td>Xplorer interface for Simatic S7-200/300/400/1200/1500/WinAC/Logo!</td>
</tr>
<tr>
<td>31.000002</td>
<td>ibaPDA-Interface-Codesys-Xplorer</td>
<td>Xplorer interface for Codesys-based systems (V2 and V3)</td>
</tr>
<tr>
<td>31.000003</td>
<td>ibaPDA-Interface-AB-Xplorer</td>
<td>Xplorer interface for Allen-Bradley PLCs and SLC500</td>
</tr>
<tr>
<td>31.000004</td>
<td>ibaPDA-Interface-Sigmatek-Xplorer</td>
<td>Xplorer interface for Sigmatek systems</td>
</tr>
<tr>
<td>31.000005</td>
<td>ibaPDA-Interface-TwinCAT-Xplorer</td>
<td>Xplorer interface for Beckhoff systems</td>
</tr>
<tr>
<td>31.000006</td>
<td>ibaPDA-Interface-B&amp;R-Xplorer</td>
<td>Xplorer interface for B&amp;R systems</td>
</tr>
<tr>
<td>31.000007</td>
<td>ibaPDA-Interface-Logix-Xplorer</td>
<td>Xplorer interface for Allen-Bradley Logix systems</td>
</tr>
<tr>
<td>31.100008</td>
<td>ibaPDA-Interface-MELSEC-Xplorer</td>
<td>Xplorer interface for Mitsubishi MELSEC systems</td>
</tr>
<tr>
<td>31.000030</td>
<td>ibaPDA-Interface-SINAMICS-Xplorer</td>
<td>Xplorer interface for SINAMICS drives</td>
</tr>
<tr>
<td>31.000031</td>
<td>ibaPDA-Interface-SIMOTION-Xplorer</td>
<td>Xplorer interface for SIMOTION systems</td>
</tr>
<tr>
<td>31.000033</td>
<td>ibaPDA-Interface-SINUMERIK-Xplorer</td>
<td>Xplorer interface for SINUMERIK CNC controls</td>
</tr>
<tr>
<td>31.000034</td>
<td>ibaPDA-Interface-Bachmann-Xplorer</td>
<td>Xplorer interface for Bachmann M1 systems</td>
</tr>
<tr>
<td>31.001044</td>
<td>ibaPDA-Interface-Drive-Xplorer</td>
<td>Xplorer interfaces for drives (SIMOTION, SINAMICS)</td>
</tr>
<tr>
<td>31.001005</td>
<td>ibaPDA-Interface-EtherNet/IP</td>
<td>EtherNet/IP communication interface</td>
</tr>
<tr>
<td>31.001009</td>
<td>ibaPDA-Interface-HPCI-DGM200E</td>
<td>HPCI-DGM200E communication interface</td>
</tr>
<tr>
<td>31.001010</td>
<td>ibaPDA-Interface-HPCI-DGM200P</td>
<td>HPCI-DGM200P communication interface</td>
</tr>
<tr>
<td>31.001011</td>
<td>ibaPDA-Interface-LANDSCAN</td>
<td>LANDSCAN communication interface (infrared line scanner)</td>
</tr>
<tr>
<td>31.001012</td>
<td>ibaPDA-Interface-LMI-Gocator</td>
<td>LMI Gocator communication interface (laser profile sensor)</td>
</tr>
<tr>
<td>31.001013</td>
<td>ibaPDA-Interface-Raytek</td>
<td>Raytek communication interface (infrared line scanner)</td>
</tr>
<tr>
<td>31.001015</td>
<td>ibaPDA-Interface-ibaLogic-TCP</td>
<td>ibaLogic TCP communication interface</td>
</tr>
<tr>
<td>31.001016</td>
<td>ibaPDA-Interface-Micro-Epsilon</td>
<td>Micro-Epsilon laser scanner communication interface</td>
</tr>
<tr>
<td>31.001020</td>
<td>ibaPDA-Interface-Modbus-TCP-Server</td>
<td>Modbus TCP/IP communication interface; Modbus Server</td>
</tr>
</tbody>
</table>
### ibaPDA Request

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.001021</td>
<td>ibaPDA-Interface-Modbus-Serial</td>
</tr>
<tr>
<td>31.001022</td>
<td>ibaPDA-Interface-Modbus-TCP-Client</td>
</tr>
<tr>
<td>31.001026</td>
<td>ibaPDA-Interface-AN-X-DCSNet</td>
</tr>
<tr>
<td>31.001030</td>
<td>ibaPDA-Interface-RAW-Ethernet</td>
</tr>
<tr>
<td>31.001040</td>
<td>ibaPDA-Interface-S7-TCP/UDP</td>
</tr>
<tr>
<td>31.001042</td>
<td>ibaPDA-Interface-PLC-Xplorer</td>
</tr>
<tr>
<td>31.001045</td>
<td>ibaPDA-Interface-SCRAM-Net</td>
</tr>
<tr>
<td>31.001046</td>
<td>ibaPDA-Interface-Toshiba-ADMAP JAMI1</td>
</tr>
<tr>
<td>31.001047</td>
<td>ibaPDA-Interface-TC-net</td>
</tr>
<tr>
<td>31.001055</td>
<td>ibaPDA-Interface-Sisteam-TCP/IP</td>
</tr>
<tr>
<td>31.001056</td>
<td>ibaPDA-Interface-TDC-TCP/UDP</td>
</tr>
<tr>
<td>31.001065</td>
<td>ibaPDA-Interface-VIP-TCP/UDP</td>
</tr>
<tr>
<td>31.001070</td>
<td>ibaPDA-Interface-EGD</td>
</tr>
<tr>
<td>31.001075</td>
<td>ibaPDA-Interface-Generic-UDP</td>
</tr>
<tr>
<td>31.001076</td>
<td>ibaPDA-Interface-Generic-TCP</td>
</tr>
<tr>
<td>31.001080</td>
<td>ibaPDA-Interface-GOCOM</td>
</tr>
<tr>
<td>31.001090</td>
<td>ibaPDA-Interface-IEC61850-Client</td>
</tr>
<tr>
<td>31.001101</td>
<td>ibaPDA-Interface-Audio</td>
</tr>
<tr>
<td>31.001111</td>
<td>ibaPDA-Interface-DPC-UA-Client</td>
</tr>
<tr>
<td>31.001112</td>
<td>ibaPDA-Interface-MQTT</td>
</tr>
<tr>
<td>31.001113</td>
<td>ibaPDA-Interface-Oracle</td>
</tr>
<tr>
<td>31.001114</td>
<td>ibaPDA-Interface-SQL-Server</td>
</tr>
<tr>
<td>31.001115</td>
<td>ibaPDA-Interface-PostgreSQL</td>
</tr>
<tr>
<td>31.001116</td>
<td>ibaPDA-Interface-MySQL</td>
</tr>
<tr>
<td>31.001117</td>
<td>ibaPDA-Interface-SAP-HANA</td>
</tr>
<tr>
<td>31.001220</td>
<td>ibaPDA-Interface-Reflective-Memory</td>
</tr>
<tr>
<td>31.001350</td>
<td>ibaPDA-Interface-Profinet-CP</td>
</tr>
<tr>
<td>31.001400</td>
<td>ibaPDA-Interface-IEC61850-9-2</td>
</tr>
</tbody>
</table>

### ibaPDA Request

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.001301</td>
<td>ibaPDA-Request-HPCI</td>
</tr>
<tr>
<td>31.001302</td>
<td>ibaPDA-Request-HiPAC</td>
</tr>
<tr>
<td>31.001303</td>
<td>ibaPDA-Request-TwinCAT</td>
</tr>
<tr>
<td>31.001310</td>
<td>ibaPDA-Request-S7-DP/PN</td>
</tr>
<tr>
<td>31.001311</td>
<td>ibaPDA-Request-S7-UDP</td>
</tr>
<tr>
<td>31.001320</td>
<td>ibaPDA-Request-SD</td>
</tr>
<tr>
<td>31.001330</td>
<td>ibaPDA-Request-TDC</td>
</tr>
<tr>
<td>31.001340</td>
<td>ibaPDA-Request-X-Pact</td>
</tr>
<tr>
<td>31.001360</td>
<td>ibaPDA-Request-FM458/TDC</td>
</tr>
<tr>
<td>31.001380</td>
<td>ibaPDA-Request-DTBox-128</td>
</tr>
<tr>
<td>31.001381</td>
<td>ibaPDA-Request-DTBox-1024</td>
</tr>
<tr>
<td>31.001382</td>
<td>ibaPDA-Request-DTBox-unlimited</td>
</tr>
</tbody>
</table>
### Data Store DB/Cloud

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Signals</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.670141</td>
<td>ibaPDA-Data-Store-SAP-HANA-64</td>
<td>Data streaming into SAP HANA DB/Cloud; 64 signals</td>
</tr>
<tr>
<td>30.670142</td>
<td>ibaPDA-Data-Store-SAP-HANA-256</td>
<td>Data streaming into SAP HANA DB/Cloud; 256 signals</td>
</tr>
<tr>
<td>30.670143</td>
<td>ibaPDA-Data-Store-SAP-HANA-1024</td>
<td>Data streaming into SAP HANA DB/Cloud; 1024 signals</td>
</tr>
<tr>
<td>30.670160</td>
<td>ibaPDA-Data-Store-Kafka-16</td>
<td>Data streaming into Apache Kafka cluster; 16 signals</td>
</tr>
<tr>
<td>30.670161</td>
<td>ibaPDA-Data-Store-Kafka-64</td>
<td>Data streaming into Apache Kafka cluster; 64 signals</td>
</tr>
<tr>
<td>30.670162</td>
<td>ibaPDA-Data-Store-Kafka-256</td>
<td>Data streaming into Apache Kafka cluster; 256 signals</td>
</tr>
<tr>
<td>30.670163</td>
<td>ibaPDA-Data-Store-Kafka-1024</td>
<td>Data streaming into Apache Kafka cluster; 1024 signals</td>
</tr>
<tr>
<td>30.670180</td>
<td>ibaPDA-Data-Store-MindSphere-16</td>
<td>Data streaming into MindSphere Cloud; 16 signals</td>
</tr>
<tr>
<td>30.670181</td>
<td>ibaPDA-Data-Store-MindSphere-64</td>
<td>Data streaming into MindSphere Cloud; 64 signals</td>
</tr>
<tr>
<td>30.670182</td>
<td>ibaPDA-Data-Store-MindSphere-256</td>
<td>Data streaming into MindSphere Cloud; 256 signals</td>
</tr>
<tr>
<td>30.670183</td>
<td>ibaPDA-Data-Store-MindSphere-1024</td>
<td>Data streaming into MindSphere Cloud; 1024 signals</td>
</tr>
<tr>
<td>30.671000</td>
<td>ibaPDA-Data-Store-MQTT-16</td>
<td>Data streaming into MQTT broker; 16 signals</td>
</tr>
<tr>
<td>30.671001</td>
<td>ibaPDA-Data-Store-MQTT-64</td>
<td>Data streaming into MQTT broker; 64 signals</td>
</tr>
<tr>
<td>30.671002</td>
<td>ibaPDA-Data-Store-MQTT-256</td>
<td>Data streaming into MQTT broker; 256 signals</td>
</tr>
<tr>
<td>30.671003</td>
<td>ibaPDA-Data-Store-MQTT-1024</td>
<td>Data streaming into MQTT broker; 1024 signals</td>
</tr>
<tr>
<td>30.671020</td>
<td>ibaPDA-Data-Store-Oracle-64</td>
<td>Data streaming into Oracle DB/Cloud; 64 signals</td>
</tr>
<tr>
<td>30.671021</td>
<td>ibaPDA-Data-Store-Oracle-256</td>
<td>Data streaming into Oracle DB/Cloud; 256 signals</td>
</tr>
<tr>
<td>30.671022</td>
<td>ibaPDA-Data-Store-Oracle-1024</td>
<td>Data streaming into Oracle DB/Cloud; 1024 signals</td>
</tr>
<tr>
<td>30.671030</td>
<td>ibaPDA-Data-Store-SQL-Server-64</td>
<td>Data streaming into SQL Server DB/Cloud; 64 signals</td>
</tr>
<tr>
<td>30.671031</td>
<td>ibaPDA-Data-Store-SQL-Server-256</td>
<td>Data streaming into SQL Server DB/Cloud; 256 signals</td>
</tr>
<tr>
<td>30.671032</td>
<td>ibaPDA-Data-Store-SQL-Server-1024</td>
<td>Data streaming into SQL Server DB/Cloud; 1024 signals</td>
</tr>
<tr>
<td>30.671040</td>
<td>ibaPDA-Data-Store-PostgreSQL-64</td>
<td>Data streaming into PostgreSQL DB/Cloud; 64 signals</td>
</tr>
<tr>
<td>30.671041</td>
<td>ibaPDA-Data-Store-PostgreSQL-256</td>
<td>Data streaming into PostgreSQL DB/Cloud; 256 signals</td>
</tr>
<tr>
<td>30.671042</td>
<td>ibaPDA-Data-Store-PostgreSQL-1024</td>
<td>Data streaming into PostgreSQL DB/Cloud; 1024 signals</td>
</tr>
<tr>
<td>30.671050</td>
<td>ibaPDA-Data-Store-MySQL-64</td>
<td>Data streaming into MySQL DB/Cloud; 64 signals</td>
</tr>
<tr>
<td>30.671051</td>
<td>ibaPDA-Data-Store-MySQL-256</td>
<td>Data streaming into MySQL DB/Cloud; 256 signals</td>
</tr>
<tr>
<td>30.671052</td>
<td>ibaPDA-Data-Store-MySQL-1024</td>
<td>Data streaming into MySQL DB/Cloud; 1024 signals</td>
</tr>
</tbody>
</table>

For the different data stores, license extensions are also available for upgrading to a higher number of signals.

### Language Packages

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.770030</td>
<td>ibaPDA-Lang-CN</td>
<td>Chinese</td>
</tr>
<tr>
<td>30.770031</td>
<td>ibaPDA-Lang-IT</td>
<td>Italian</td>
</tr>
<tr>
<td>30.770032</td>
<td>ibaPDA-Lang-RU</td>
<td>Russian</td>
</tr>
<tr>
<td>30.770033</td>
<td>ibaPDA-Lang-ES</td>
<td>Spanish</td>
</tr>
<tr>
<td>30.770034</td>
<td>ibaPDA-Lang-PT</td>
<td>Portuguese</td>
</tr>
<tr>
<td>30.770037</td>
<td>ibaPDA-Lang-JP</td>
<td>Japanese</td>
</tr>
</tbody>
</table>

The language packages are available on request from the local iba subsidiaries and iba sales partners.
### ibaQDR

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.800064</td>
<td>ibaQDR-V7-Measuring-Location</td>
<td>Basic license ibaQDR-V7, 64 tags [signals], incl. 2 HD clients and 2 HD data stores</td>
</tr>
<tr>
<td>35.800256</td>
<td>ibaQDR-V7-256-6</td>
<td>Basic license ibaQDR-V7, 256 tags, incl. 2 HD clients and 2 HD data stores</td>
</tr>
<tr>
<td>35.801024</td>
<td>ibaQDR-V7-1024-32</td>
<td>Basic license ibaQDR-V7, 1024 tags [signals], incl. 2 HD clients and 2 HD data stores</td>
</tr>
<tr>
<td>35.802048</td>
<td>ibaQDR-V7-2048-48</td>
<td>Basic license ibaQDR-V7, 2048 tags [signals], incl. 2 HD clients and 2 HD data stores</td>
</tr>
<tr>
<td>35.806666</td>
<td>ibaQDR-V7-V2-unlimited</td>
<td>Basic license ibaQDR-V7, unlimited tags [signals], incl. 2 HD clients and 2 HD data stores</td>
</tr>
<tr>
<td>30.700010</td>
<td>ibaQDR-Server Single Client</td>
<td>License extension HD-Server: single client</td>
</tr>
<tr>
<td>30.700015</td>
<td>ibaQDR-Server Multi Client</td>
<td>License extension HD-Server: 5 additional HD access points</td>
</tr>
<tr>
<td>30.700020</td>
<td>Upgrade-HD-T-64 to HD-T-256</td>
<td>License extension HD-Server: 64 tags to 256 tags</td>
</tr>
<tr>
<td>30.700037</td>
<td>Upgrade-HD-T-256 to HD-T-1024</td>
<td>License extension HD-Server: 256 tags to 1024 tags</td>
</tr>
<tr>
<td>30.700024</td>
<td>Upgrade-HD-T-1024 to HD-T-2048</td>
<td>License extension HD-Server: 1024 tags to 2048 tags</td>
</tr>
<tr>
<td>30.700020</td>
<td>Upgrade-HD-T-2048 to HD-T-unlimited</td>
<td>License extension HD-Server: more than 2048 tags</td>
</tr>
<tr>
<td>30.700020</td>
<td>ibaQDR-Server Data Store</td>
<td>License extension HD-Server: 2 more HD data stores</td>
</tr>
</tbody>
</table>

### ibaQPDA

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.670040</td>
<td>ibaQPDA-V7-Add-On</td>
</tr>
</tbody>
</table>

### ibaInSpectra

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.681222</td>
<td>ibaInSpectra.Bundle</td>
</tr>
<tr>
<td>30.681221</td>
<td>ibaInSpectra-lite</td>
</tr>
</tbody>
</table>

### ibaHD-Server

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.800064</td>
<td>ibaHD-Server-V2-T-64</td>
</tr>
<tr>
<td>30.800256</td>
<td>ibaHD-Server-V2-T-256</td>
</tr>
<tr>
<td>30.801024</td>
<td>ibaHD-Server-V2-T-1024</td>
</tr>
<tr>
<td>30.802048</td>
<td>ibaHD-Server-V2-T-2048</td>
</tr>
<tr>
<td>30.806666</td>
<td>ibaHD-Server-V2-T-unlimited</td>
</tr>
<tr>
<td>30.700001</td>
<td>ibaHD-Server Single Client</td>
</tr>
<tr>
<td>30.700015</td>
<td>ibaHD-Server Multi Client</td>
</tr>
<tr>
<td>30.700020</td>
<td>Upgrade-HD-T-64 to HD-T-256</td>
</tr>
<tr>
<td>30.700037</td>
<td>Upgrade-HD-T-256 to HD-T-1024</td>
</tr>
<tr>
<td>30.700024</td>
<td>Upgrade-HD-T-1024 to HD-T-2048</td>
</tr>
<tr>
<td>30.700020</td>
<td>Upgrade-HD-T-2048 to HD-T-unlimited</td>
</tr>
<tr>
<td>30.700020</td>
<td>ibaHD-Server Data Store</td>
</tr>
</tbody>
</table>

### QDR Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.700001</td>
<td>ibaQDR-V7-Measuring-Location</td>
</tr>
<tr>
<td>35.702560</td>
<td>ibaQDR-V7-256-6</td>
</tr>
<tr>
<td>35.710240</td>
<td>ibaQDR-V7-1024-32</td>
</tr>
<tr>
<td>35.720480</td>
<td>ibaQDR-V7-2048-48</td>
</tr>
<tr>
<td>35.799999</td>
<td>ibaQDR-V7-unlimited-64</td>
</tr>
<tr>
<td>35.799999</td>
<td>ibaQDR-V7-unlimited-96</td>
</tr>
<tr>
<td>60.700201</td>
<td>QDR Requirements</td>
</tr>
</tbody>
</table>

### Training

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>61.100000</td>
<td>Measurement, data evaluation and automatic reporting with iba</td>
<td>3-day compact course</td>
</tr>
<tr>
<td>61.000200</td>
<td>Measurement and data evaluation with the iba system</td>
<td>2-day basic course</td>
</tr>
<tr>
<td>61.000400</td>
<td>Long-term data archiving and evaluation with ibaHD-Server</td>
<td>2-day advanced course</td>
</tr>
<tr>
<td>61.000700</td>
<td>Monitoring and analysis of vibration data with ibaInSpectra</td>
<td>2-day advanced course</td>
</tr>
<tr>
<td>61.000210</td>
<td>Visualization of measurement data and quality data using ibaQPDA</td>
<td>2-day advanced course</td>
</tr>
<tr>
<td>61.000220</td>
<td>Data acquisition from a PLC SIMATIC S7</td>
<td>1-day advanced course</td>
</tr>
</tbody>
</table>

The entire training program is available under www.iba-ag.com/training.
Headquarters
Germany
iba AG
Office address
Koenigs wanderstr. 44
D-90762 Fuerth
Mailing address
P.O. box 1828
D-90708 Fuerth
Tel.: +49 (911) 97282-0
Fax: +49 (911) 97282-33
www.iba-ag.com
info@iba-ag.com

Europe
iba Benelux BV
Belgium, the Netherlands, Luxembourg,
France, Ireland, Great Britain, French-speaking
Switzerland, Maghreb, Senegal
sales@iba-benelux.com

iba Ibérica
Spain, Portugal
christian.giusti@iba-benelux.com

iba Italia S.R.L.
Italy, Slovenia, Croatia, Italian-
speaking Switzerland
sales@iba-italia.com

iba Scandinavia
Denmark, Finland, Norway, Sweden
c/o Begner Agenturer AB
info@iba-scandinavia.com

iba Polska
c/o ADEGIS Sp. z o.o. Sp.k.
support@iba-polska.com

000 iba Russia
dmitry.rubanov@iba-russia.com

Asia
iba Asia GmbH & Co. KG
Western and Central Asia, Philippines,
Cambodia, Laos, Myanmar, Bangladesh,
Bhutan, Nepal, Sri Lanka
henry.regn@iba-asia.com

iba China Ltd.
juila.wang@iba-china.com

iba Gulf
Saudi Arabia, UAE, Qatar,
Kuwait, Bahrain and Oman
c/o a.mgboull@iba-gulf.com

iba Indonesia
c/o PT. Indahjaya Ekaperkasa
sandhi.sugiarto@iba-indonesia.com

iba Korea System Co. Ltd.
Korea
hj.park@ibakorea.co.kr

iba Korea System Co. Ltd.
Korea
sh.lee@ibakorea.co.kr

iba Malaysia
c/o iba Engineering & Consulting
(Malaysia) SDN. BHD.
bruno.marot@iba-malaysia.com

iba Singapore
c/o iba (S.E.A.) Engineering &
Consulting Pte. Ltd.
bruno.marot@iba-sea.com

iba Systems India Pvt. Ltd.
shraddhap@iba-india.com

iba Thailand
c/o SOLCO Siam Co. Ltd.
pairote@iba-thai.com

iba Turkey Ltd.
ahmet@iba-turkey.com

iba Vietnam
c/o Tang Minh Phat Co., Ltd
sales@iba-vietnam.com

Australia and Oceania
iba Oceania Systems Pty Ltd.
Australia, New Zealand, PNG, Micronesia and
South Pacific Islands (except US territories)
fritz.woller@iba-oceania.com

Central and South America
iba LAT, S.A.
eric.diluzio@iba-lat.com

iba LAT Argentina
alejandro.gonzalez@iba-lat.com

iba LAT Bolivia
mario.mendizabal@iba-lat.com

iba Brasil
iba@iba-brasil.com

iba Chile
iba@iba-chile.com

North America (NAFTA)
iba America, LLC
USA
esnyder@iba-america.com

iba America, LLC
Canada
dkober@iba-america.com

iba America, LLC
Mexico
jgiraldo@iba-america.com

Africa
iba Benelux BV
Maghreb (Morocco, Algeria, Tunisia), Senegal
sales@iba-benelux.com

iba Africa
South Africa
c/o Variable Speed Systems cc
danie@iba-africa.com

iba AG is represented worldwide by
subsidiaries and sales partners.
Technical changes and errors excepted.