iba

Recording measurement data and events and making them available immediately

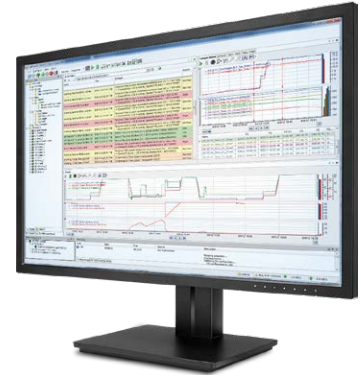**ibaHD-Server**

ibaHD-Server
Historical data available immediately

Historical data available immediately

ibaHD-Server allows you to continuously record data acquired with ibaPDA. Find events from the past with a mouse click, navigate and zoom quickly from the year, month or week view into the milliseconds range. Use ibaHD-Server to analyze your data over a long period of time and to automatically create day, shift or monthly reports.
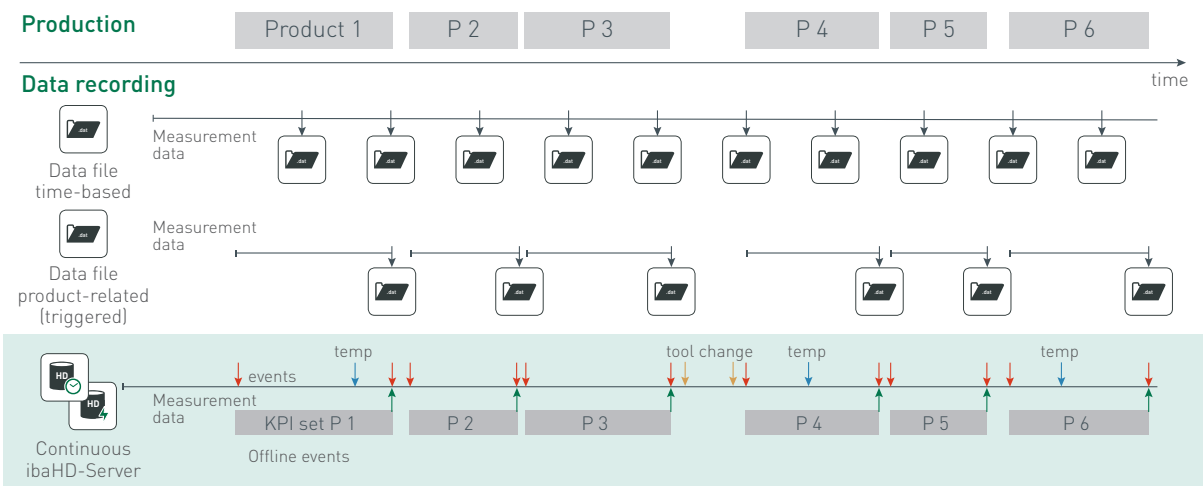
At a glance

› Continuous recording of measured data and events over a long time period
› Simultaneous recording from several ibaPDA systems and import of measurement files
› Direct access to historical data with intuitive use for visualization, such as scrolling, jumping to a date
› Quick zoom function from the annual, monthly or weekly overview down to the range of milliseconds
› Display and filtering of historical events and joint visualization with measurement data
› Long term analysis of historical data with ibaAnalyzer and ibaDaVIS
› Automatic calculation of KPIs and automatic reporting with ibaDatCoordinator and ibaAnalyzer
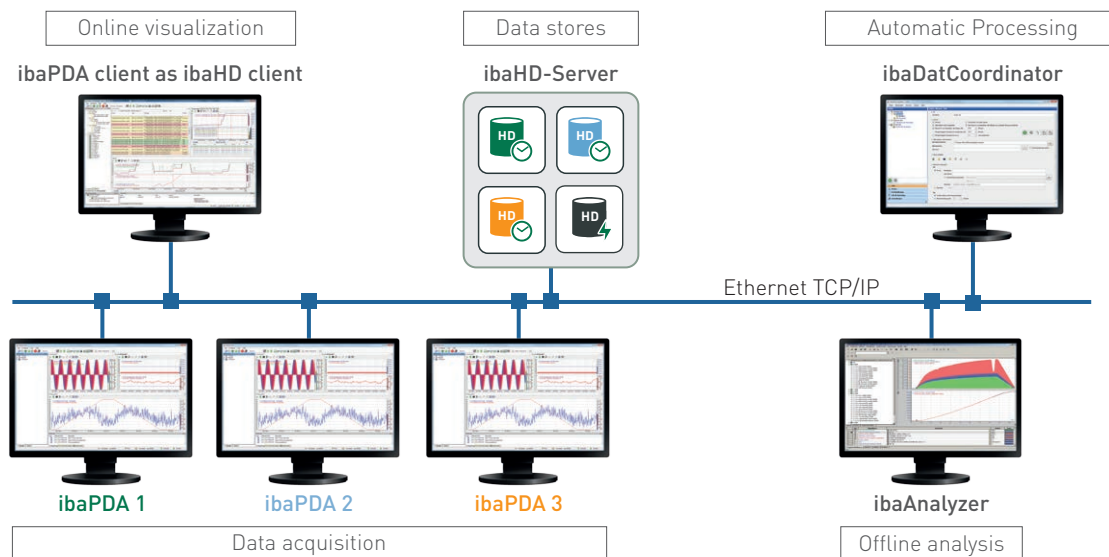› API for access to historical data from 3rd party applications

Continuous data recording over long periods of time

Thanks to its ability to store measurement data continuously over long periods of time, ibaHD-Server offers unique opportunities for analysis for different data and requirements as a central and open data platform.

Not only can time-based measurement data from ibaPDA be stored in the ibaHD-Server, but configurable events as well as comments and calculated KPIs (Key Performance Indicators) can also be stored.

The graphic illustrates the principle of time-based and product-related (triggered) data storage in measurement files, compared to continuous recording with ibaHD-Server. In ibaHD-Server, measurement data, online events and offline events can be stored and the data can be interactively or automatically evaluated based on different criteria in a time or event-based manner.

| Online visualization | Data stores | Automatic Processing |
| ibaPDA client as ibaHD client | ibaHD-Server | ibaDatCoordinator |

Ethernet TCP/IP

| ibaPDA 1 | ibaPDA 2 | ibaPDA 3 | ibaAnalyzer |
| Data acquisition | | | Offline analysis |

Several ibaPDA servers can write to different HD stores of an ibaHD-Server.
Event-based HD stores can receive data from multiple clients (ibaPDA, ibaDatCoordinator), such as offline events.

Events, such as the start and end of a production unit, exceeding limit values, etc. can be marked precisely in time and written in the ibaHD-Server. Events can also be used for delimiting and finding certain measurement data. In addition you can also save processed data or calculated characteristic values in the ibaHD-Server together with the events.

Global database allows a comprehensive process image
This means that measurement signals from live processes together with values from post-processing are directly available in a global database over a long period of time and open up completely new analysis opportunities.

Since data from the entire plant can be stored centrally from different places and measurement files can be imported from decentral ibaPDA systems, ibaHD-Server also offers a comprehensive image of the processes. You can choose exactly the time periods and measurement data in which you

are interested in the displays. For example, several locally recorded plants, machines or components can be visualized and compared together.

Visualization from the annual overview down to the milliseconds range
Thanks to the special storage principle for measurement data in ibaHD-Server, it is possible to display the measured signals over the entire acquisition period in one trend view in the ibaPDA client or in the trend view in ibaAnalyzer.

With a simple zoom function, the displayed time section can be quickly resolved down to months, weeks, days or even 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 offers far-reaching analysis opportunities, for example for maintenance or process techni-

cians, especially in continuous processes such as paper production, product refinement, casting processes or in the energy sector.

Rapid access to events in the past
Messages for product changes or noticeable process conditions can be defined as events and stored in the ibaHD-Server. The events are controlled by trigger conditions 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 the ibaPDA client in the filterable event table. By means of targeted queries, e. g. using a keyword search, you can rapidly localize certain events from the past and examine the circumstances in more detail. For example: 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 table, the associated measurement

Additional information, such as images, comments or reports can be added to the event table.

Measurement signals can be enlarged from the overview of the entire recording period down to the milliseconds range.

By means of several filter functions, you can quickly find events of the past in the event table. Clicking on the event displays the signal trends configured for this purpose at the time of the event.

data and saved videos at the time of the event are immediately shown. The combination of HD trend view and event table provides easy and effective navigation between products or registered process states.

Attach additional information directly at the origin time

Pre-defined or free texts can be placed as annotations in the HD trend view. This means additional information can be documented with the correct time and also supplemented by images, PDF documents or other files.

In the event table, annotations can be displayed, sorted, filtered or searched specifically. The annotations are immediately visible to other users. They facilitate navigation, for example, for commented product changes or the laboratory report submitted subsequently for a particular batch.

Video images extend analysis options

The combination of historical data and video images expands the possibilities for analyzing processes or failures. 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.

More than saving data with backups

The backup function offers flexible options for individual backup strategies for HD stores. In this way,

the data backup can be automated or manually done according to custom parameters. A full backup includes the entire HD store, while a differential backup includes the last part of the HD store that has not yet been archived.

The backups are primarily used as a backup copy and can be restored if required. However, existing backup data can also be attached to existing HD stores and is then available there for additional analysis.

The data storage in 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 comparison when replacing legacy systems, for example.

Central management and configuration

Configure HD stores
Create, restore, attach and mount backups
Import iba data files
User management
SNMP

ibaHD-Manager → Administration & configuration → ibaHD-Server

Convenient administration with ibaHD-Manager

The ibaHD-Manager is used for diagnostics, administration and configuration of the ibaHD-Server service as a central management tool. It provides status information about the active HD clients and HD stores, such as the number of signals and disk space. In addition, the HD stores can be configured, projects managed, backups created and data files imported in the ibaHD-Manager.

One single server for more than one data store

One ibaHD-Server can be used for administrating more than one HD store. Both the time-based and length-based recording of signals as well as the recording of event messages are treated like the recording of a measurement file in ibaPDA. An ibaPDA system can supply several HD stores on the same or on different ibaHD-Servers with data. Likewise, several ibaPDA systems can write their data to the same ibaHD-Server, but in different HD 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 data storage from different plants of one factory.

Simply import data files

Measurement files in DAT format created with ibaPDA can be integrated into an HD store via an import process. For this purpose it is possible to import data files or entire data file directories into an HD store and measurement data can be entered with the correct time.

This means that data files coming from older inventories can be merged into one HD store so that this data can be accessed directly.

In addition, data files can be imported, which were recorded by several independent ibaPDA systems (e. g. with ibaDAQ on cranes or conveyor vehicles). In this way, measurement data from several independent systems can be accessed jointly to visualize the data together, to analyze it or to display the data in a report (shift, day or monthly report).

Using the software ibaDatCoordinator, you can even automate the import of measurement files automat-

ically. ibaDatCoordinator is easy to configure and relieves the user of routine tasks.

User management

In order to protect the data in ibaHD-Server against unauthorized access, the user management offers the possibility to assign authorizations to individual users. The permissions, for example, concern the configuration of the ibaHD-Server, read and write rights for individual HD stores, configuration of HD stores, creating backups from HD data or restoring HD data from the backup.

SNMP

ibaHD-Server has an integrated SNMP server and can be integrated into a company-wide network management system according to the SNMP protocol. SNMP protocols V1, V2c and V3 are supported. The SNMP server provides by default information about the license, ibaHD-Server service, HD stores, reading and writing clients as well as backups.

Tailor-made analyses of HD data

Interactive analysis with ibaAnalyzer

Data from ibaHD-Server can be conveniently retrieved, displayed and analyzed with the ibaAnalyzer analysis program. It is just as easy to access HD data as it is to open a measurement file.

The big advantage of ibaHD-Server is that the aggregated data can be displayed over a larger period of time than is possible with measurement files - for example over a week, a month or even longer period of time.

The data can be easily selected using markers in a preview or directly by specifying the time period. Depending on the time period selected, the matching aggregation level is selected automatically.

You can calculate statistical values over the selected time period as well as identify long-term trends. Despite the aggregation, outliers can also be detected due to the so-called sub-signals minimum and maximum added to each signal in the HD stores. If data is to be examined in detail, e. g. irregularities in a production shift, then the drill down function ensures

HD backup

(without ibaHD client license)

HD store

Productive PC with ibaHD-Server license

Analysis PC

that the data is available up to the highest resolution in ibaAnalyzer.
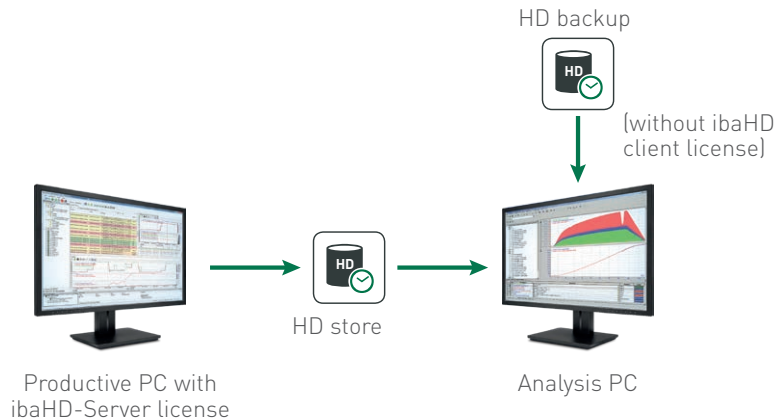
Searching signal conditions

It is also possible to search signal conditions in any given time period and, for example, to find outliers and limit value exceedances. When searching, several conditions can be linked with AND or OR in ibaAnalyzer to search complex conditions as well. It is also possible to search for events and to query event parameters, such as the product number or alarm values.

A practical example is searching for a signal, here the rolling force exceedance, in a specified time period. All points are displayed as

a result where a corresponding rolling force exceedance occurred. The signals and events of the found occurrences can be extracted into measurement files and processed further. The rolling forces of different products can then be superimposed and compared.

License-free offline analysis with backups

Backups generated with ibaHD-Server can be read and analyzed with ibaAnalyzer for free without a license. In this way, you can analyze HD data independently of the productive system. Very long periods of time can also be analyzed with attached backups.

Query of time series and events

Query when using signal conditions

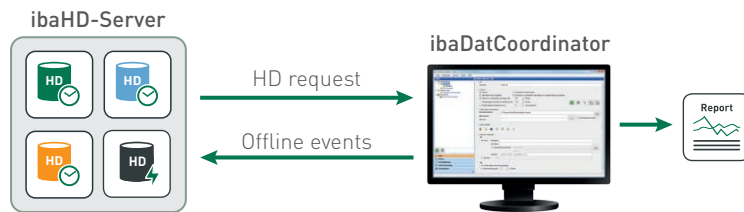# Automatically post-process HD data and extract information

HD data can be automatically processed with the software ibaDatCoordinator. A time period can be configured in ibaDatCoordinator for which the data from ibaHD-Server is to be read and processed. Based on the HD data, so-called offline events can also be generated or the data can be processed like measurement files, for example to calculate characteristic values (KPIs) and extract these KPIs into databases or to use them in reports.

Generate offline events

The ibaDatCoordinator software can generate so-called offline events during post-processing on the basis of data files or HD data. Calculated process parameters or product and batch information are stored as offline events in the event-based HD store.

The offline events can be displayed, evaluated and used in reports together with the data acquired online with ibaPDA.

ibaHD-Server makes it possible to jointly store high-resolution real-time data and calculated characteristic values that were configured in ibaDatCoordinator.

ibaDatCoordinator can be used to save calculated KPIs as so-called offline events in the ibaHD-Server, but HD queries can also be automatically executed.
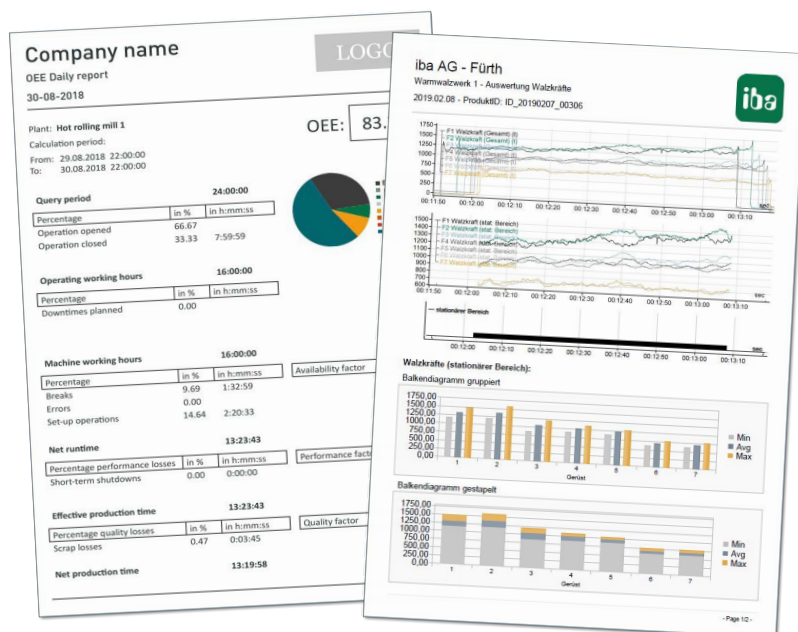
Automatic characteristic value calculation and reporting

ibaHD-Server offers the major advantage that measurement data can be accessed over a long period of time on a time basis without opening several measurement files, or that only time ranges of a measurement file can be taken into consideration.

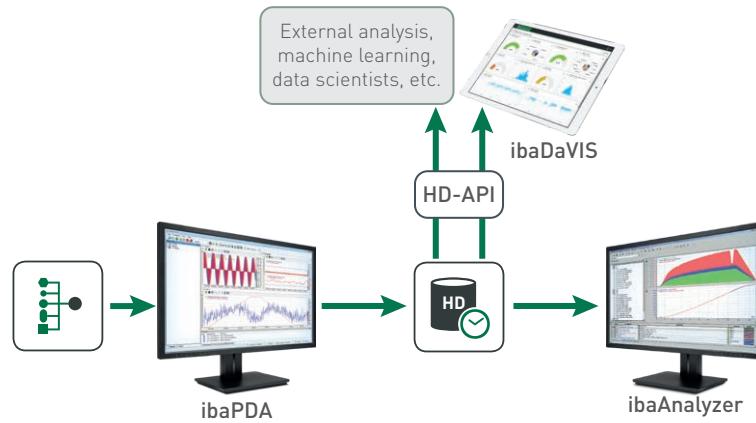Characteristic values can therefore be easily calculated over any configurable periods of time, such as a shift, day, week or month. These characteristic values can then be loaded into external databases with ibaAnalyzer-DB or used in time-based reports with ibaAnalyzer-Reportgenerator. In this way, automatic reports can be created for a shift, a day or a month, such as energy and consumption reports.

Moreover, reports can also be configured based on HD events. Whenever an event occurs and is saved in ibaHD-Server, an event-based report is automatically created, such as an error report.

Example of automatically created time-related reports

Open data platform for any type of data analysis

Access to HD data with customer-specific systems

The product ibaHD-Server-V2-API-Read is a programming interface (API: Application Programming Interface) that can be used to query historical data and events from the HD stores by external systems.

The API enables custom systems and users such as data scientists to flexibly read stored signals and events. The database available in ibaHD-Server can thus be used for modeling, machine learning, benchmarking, anomaly detection, etc. It is possible to access exactly those time periods that are needed for the respective requirement.

The programming interface is based on the gRPC framework and offers tools to generate client code for different programming languages, such as Android Java, C# / .NET, C++, Go, Java, Kotlin/JVM, Node.js, Objective-C, PHP, Python. Programming examples for selected languages are available by request.

ibaHD-Server-V2-API-Read is licensed separately. The prerequisite is an ibaHD-Server license. The number of clients connected via the API or the number of queries are not limited.

Analyzing HD data web-based with ibaDaVIS

The programming interface ibaHD-Server-V2-API-Read is used internally at iba to analyze and visualize data from ibaHD-Server in ibaDaVIS. ibaDaVIS makes it possible to visualize and analyze process data and characteristic values in the web browser.

The entire functionality of ibaDaVIS can also be applied on time-based or event-based data from ibaHD-Server. This also requires a license for the API.

Event table and trend viewer of HD data in ibaDaVIS

Modular Product Design

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. The licensed HD data stores can be used for time-, length- or event-based data stores.

For a further extension, licenses are available for further HD data stores (on the same server) and further HD clients which allow the access from several clients to the historical data of an ibaHD-Server. For each workstation that is supposed to display historical data, an ibaHD-Server client license and the ibaPDA client software are necessary.

Virtualized environment and ibaHD-Server

ibaHD-Server can be operated in a virtualized Windows PC. The performance capability of the virtual machine and the data volume to be processed by the ibaHD-Server must suitably matched to each other. In principle, it is preferable to use a physical machine for operating ibaHD-Server, because the algorithms for data storage and management are highly optimized regarding the use of dedicated hardware. The hardware can also be better tailored to the requirements of ibaHD-Server.

That is why ibaRackline-PC HD is equipped with an NVMe SSD by default, which can be configured as a so-called intermediate store. This performance does not exist to the same extent if ibaHD-Server is operated in virtualized environments. We can help you to find the right configuration for your tasks.

For virtualized environments, iba offers the ability to provide the hardware dongle and therefore the ibaHD-Server license to the virtual ibaHD-Server with the USB dongle server. Please contact our support or A&C team for more information about the available options.

Requirements:

› ibaPDA (v7.2.0 or higher)
› Operating system: Windows 7, 8, 8.1 or 10 (32/64 Bit), Windows Server 2008 (32/64 Bit), 2012, 2016 (64 Bit) or 2019 (64 Bit)
› .NET-Framework 4.5.2.NET-Framework 4.5.2 or higher
› Computer equipment according to the requirements of the recording (number of the measuring channels, sampling cycle, volume of the archive)
› Analyzing with ibaAnalyzer v7.0.0 or higher
› Analysis and visualization of HD data with ibaDaVIS v2.8.0 or higher

ℹ You can find additional information about the computer and the USB dongle server in the brochure"Powerful industrial PCs, PC connections, FO infrastructure"

ibaRackline-PC HD

Estimation of storage capacity

Number of signals	Resolution	Occupied storage*		
		Recording time 24 h	Recording time 7 days	Recording time 30 days
100 analog	100 ms	0.5 GB	3 GB	14 GB
100 analog	10 ms	4.5 GB	31 GB	135 GB
100 analog	1 ms	45 GB	310 GB	1350 GB
100 digital	100 ms	10 MB	50 MB	200 MB
100 digital	10 ms	30 MB	160 MB	660 MB
100 digital	1 ms	100 MB	650 MB	2650 MB
10 events	1 event per second	100 MB (864000 registered events)	780 MB	3 GB

*The values shown here for the occupied storage capacity are synthetically determined. For the estimation, test signals were used that can only be slightly compressed in ibaHD-Server with the compression algorithms. In real operation, the compression algorithms are very effective and far less storage capacity is needed for analog or digital signals.

Order information

ibaHD-Server

30.800064	ibaHD-Server-V2-T-64	Basic license ibaHD-Server-V2 for 64 tags (signals), including 2 HD clients and 2 HD stores
30.800256	ibaHD-Server-V2-T-256	Basic license ibaHD-Server-V2 for 256 tags, including 2 HD clients and 2 HD stores
30.801024	ibaHD-Server-V2-T-1024	Basic license ibaHD-Server-V2 for 1024 tags, incl. 2 HD clients and 2 HD stores
30.802048	ibaHD-Server-V2-T-2048	Basic license ibaHD-Server-V2 for 2048 tags, incl. 2 HD clients and 2 HD stores
30.806666	ibaHD-Server-V2-T-unlimited	Basic license ibaHD-Server-V2 for unlimited number of tags, including 2 HD clients and 2 HD stores
30.700010	ibaHD-Server Single Client	License extension ibaHD-Server: single client
30.700015	ibaHD-Server Multi Client	License extension ibaHD-Server: 5 additional HD client interfaces
30.700002	Upgrade-HD-T-64 to HD-T-256	License extension ibaHD-Server: 64 tags to 256 tags
30.700003	Upgrade-HD-T-256 to HD-T-1024	License extension ibaHD-Server: 256 tags to 1024 tags
30.700004	Upgrade-HD-T-1024 to HD-T-2048	License extension ibaHD-Server: 1024 tags to 2048 tags
30.700005	Upgrade-HD-T-2048 to HD-T-unlimited	License extension ibaHD-Server: more than 2048 tags
30.700020	ibaHD-Server Data Store	License extension HD-Server: 2 more HD data stores
30.800001	ibaHD-Server-API-Read	gRPC-API interface to query saved signals and events from existing HD stores

Computer system

40.005031	ibaRackline-PC HD, XEON E, Win10	ibaRackline for measurement data recording
19.000012	Dongle server Pro	USB dongle server

Training

61.100000	Measuring, analyzing and automatic reporting with iba	3-day compact course
61.000200	Measuring and analyzing with the iba system	2-day basic course
61.000400	Long-term acquisition of data and events using ibaHD-Server	2-day advanced course

10

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