![iba logo]

Edge Analytics –
Monitor processes locally in real time, integrate KPIs into cloud infrastructures

Edge Devices:

ibaDAQ/ibaDAQ-C
Universal edge analytics platform with easy to configure analysis and monitoring features

ibaPQU-S
Power quality monitoring

ibaCMU-S
Wear monitoring of mechanical components

ibaAnalyzer
Powerful analysis and automatic KPI calculation

ibaInSpectra
Monitoring of process vibrations in real time

ibaVision
Industrial image processing in real time

ibaInCycle
Monitoring and analysis of cyclical processes

ibaLogic
Signal processing and automation

Measurement Systems for Industry and Energy
www.iba-ag.com

Analyze measurement data where it is generated
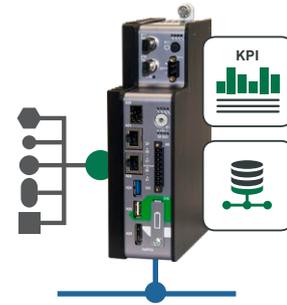
Edge analytics applications allow you to monitor processes locally in real time based on measurement data. The locally acquired measurement data can be autonomously processed directly where it is generated. A configurable alarming or output to control systems enable immediate reactions to deviations. Results and characteristic values can easily and securely be integrated in cloud infrastructures subsequently.

Comprehensive data from the process

The iba system provides a very comprehensive process connectivity, which makes it possible to acquire measurement data over the entire production process. All data is centrally available in one system time synchronously and in high-resolution: cyclical process data, controller data, sensor data, machine data and highly cyclical vibration and energy data. In addition, material and production data which provide additional information can also be integrated and read directly from databases.

With ibaPDA-PLC-Xplorer, for example, data from different controllers from different manufacturers can be acquired very easily. In addition to coupling digital and analog I/O data, data can be acquired from different field and drive buses as well as via Ethernet protocols or system connections.

Local analysis, reactions in real time

Edge devices from iba record data as high-resolution raw data in a well structured way provided

with a time stamp. The data can be stored locally and analyzed online on the device. Results immediately lead to outputs or alarms and are published as characteristic values (KPIs) to be used in superordinate systems, such as a cloud infrastructure, for global long term analysis.

## Application specific technology modules

The iba modular system with its different technology modules is ideally suited for the use as an edge device.

The technology module ibaCMU-S is designed for classic condition

monitoring applications. ibaPQU-S is used as a power quality unit to monitor the grid quality and realize all of the measurement tasks relevant for this purpose. The system measures grid-synchronously raw values, such as current and voltage, and internally calculates characteristic values according to EN 50160.

ibaDAQ provides an integrated ibaPDA system and can acquire data as a standalone device. The product ibaInSpectra can be used to realize vibration analyses and monitoring. The associated frequency analyses can be freely configured and carried out in real

Benefits

› Autonomous processing of measurement data directly on the edge
› Continuous process monitoring and alarming in real time
› Interfaces and protocols for easy connection to a cloud infrastructure
› Digitalization of processes, machines and plants
› Simple integration into brownfield applications and old systems
› Simple configuration of edge analytics applications
› Comprehensive process connectivity of ibaPDA
› Local storage of high-resolution measurement data on the edge device
› Global analysis of characteristic values with drill down to the raw data

Acquire data on the edge device and process it autonomously and automatically
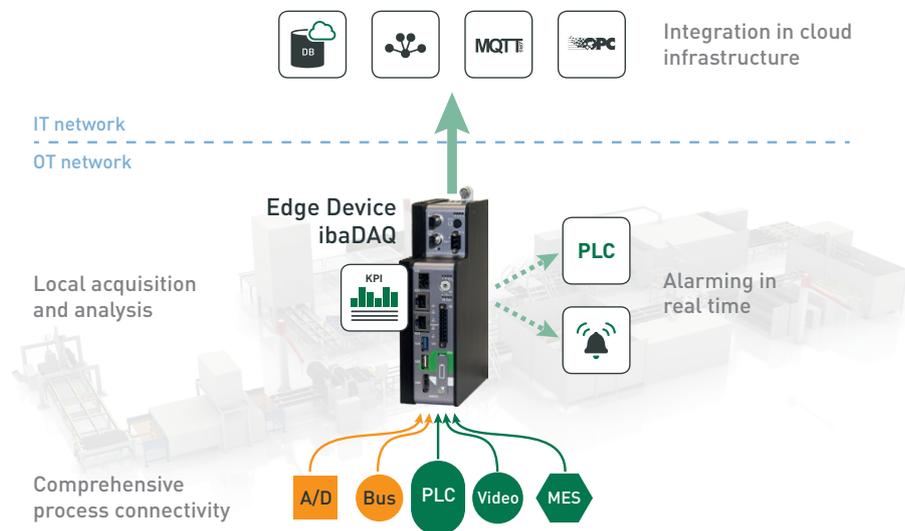
time. The product ibaInCycle can be used to monitor and analyze cyclical or rotating processes online.

Alarming and reactions in real time

The measurement data is processed on the edge device without the previous transmission into superordinate systems. Anyhow it would not be easily possible due to the data volume, the available band width, the latency and reliability, the interactions and safety precautions between the OT and IT network in general.

Results and characteristic values are analyzed and monitored online. Anomalies or limit violations are detected immediately. This is the only way an immediate response is possible, such as an alarming, notification by e-mail or an output to the controller. Process and quality data can thus be monitored directly in real time in the

plant and not only subsequently in a separate analysis system.

Process-synchronous data handling

In addition to time-based and time-synchronous acquisition of different measurement data, data can also be acquired in a triggered manner, for example for a certain production process. This is the best way to compare different workpieces with each other within a production process. Of course, characteristic values can also be calculated and monitored online synchronously to the process, i.e. after the production of a product.

Offline detailed analysis

The characteristic values calculated on the edge device can be output to superordinate systems for long term analysis. The big advantage of the iba system is that a drill down to the raw data

is possible at any time in order to perform detailed analyses later, for example for a root cause analysis.

Scalable digitialization

iba edge devices offer efficient solutions for digitalizing processes, plants and machines. Thanks to their modularity and scalability, edge devices are ideally suited for retrofitting in brownfield projects and existing plants and machines.

Simple integration into superordinate systems:

› Cloud infrastructures, e.g. Siemens MindSphere
› Apache Kafka
› MQTT
› Databases, e.g. SAP HANA, Oracle, PostgreSQL, SQL Server, Azure SQL, MySQL and MariaDB
› OPC DA/OPC UA

Web-based analysis tool
ibaDaVIS is a web-based analysis tool for visualization and analysis that can be used to create indi- vidual dashboards with different graphic elements to analyze the long-term behavior of the mon- itored processes and product quality. Interactive and flexible filter options allow you to analyze characteristic values calculated on the edge device for any questions.

iba edge devices

ibaDAQ-C

› Compact edge device
› Acquisition via Ethernet-based protocols
› Integrated ibaPDA system
› Data acquisition directly from different controllers

› OPC UA server
› Data streaming into MindSphere and MQTT broker
› Data acquisition via MQTT broker

🛈 Brochure: "The ibaDAQ family"

iba modular system

› Modular edge systems with fast analog/digital inputs
› A CPU can be combined with up to four input and output modules.

› Different CPUs offer appli- cation-specific calculations: ibaDAQ, ibaCMU-S, ibaPQU-S

🛈 Brochure: "The iba modular system"

ibaDAQ

› Standalone data acquisition with integrated ibaPDA system
› Easy to configure analysis and monitoring features

› Comprehensive process connec- tivity of the iba system

🛈 Brochure: "The ibaDAQ family"

ibaCMU-S/ibaCMC

› Condition monitoring
› Calculation of CM-specific char- acteristic values
› Complex functions for spectral analyses, that can be configured

individually for the measurement location and the part of the plant that is to be monitored
› Configuration, long-term trend and alarming with ibaCMC

🛈 Brochure: "Predictive maintenance and vibration monitoring"

ibaPQU-S

› Online power quality measurement
› Grid-synchronous measurement of current and voltage
› Calculation of frequency and characteristic values according to EN 50160

› Calculation according to the stan- dard IEC 61000-4-30, class A
› Record of data and characteristic values in ibaPDA

🛈 Brochure: "Safety and quality in energy grids"

Applications for technology-specific edge analytics solutions

Based on the high-frequency acquisition of raw data, the iba applications enable application-specific compression of data resulting in an automatic KPI calculation online on the edge device. Depending on the application, these characteristic values can be checked directly on the edge device for exceeding or falling below the limit values.

ibaAnalyzer

› Calculation of statistical product or batch-related characteristic values (per measurement file)
› Limits can be individually defined (product/customer-dependent)

› Powerful expression builder for calculations and defining conditions

Brochure:
"Analyzing and evaluating of measured data"

ibaInSpectra

› Online vibration analysis and monitoring
› Frequency analyses in real time
› Freely definable frequency bands
› Results per frequency band

› Freely definable characteristic values
› Self-learning module for different process conditions (auto-adapting)

Brochure:
"Acquisition, recording and online visualization of measured data"

ibaVision

› Online process monitoring
› Integration of industrial image processing in the iba system
› Extraction of information from video files as visual signals

› Use of visual information for process analysis and monitoring
› Recording of visual signals in ibaPDA

Brochure:
"Record and analyze videos and measurement data synchronously"

ibaLogic/ ibaPADU-S-IT

› Online data processing
› Signal processing and automation
› Graphical programming according to IEC 61131-3
› User-specific function blocks and data types

› Integration of existing C(++) algorithms
› Runs on ibaPADU-S-IT-2x16 (CPU of the iba modular system)

Brochure:
"Measurement and automation in one system"

ibaInCycle

› Online anomaly detection, quality assurance and machine diagnosis
› Online monitoring and analysis of cyclical processes or rotation movements

› Self-learning module for different process conditions (auto-adapting)

Brochure:
"Online monitoring of cyclical processes for quality assurance and machine diagnosis"

You will find additional information in subject-specific brochures in the download area of www.iba.ag.com

Order information

Hardware

Order no.	Name	Description
10.170001	ibaDAQ	CPU for standalone data acquisition (including license for ibaPDA-V7-64)
10.170002	ibaDAQ-C	Compact device for standalone data acquisition (including licenses for ibaPDA-V7-64, ibaPDA-Interface-PLC-Xplorer, ibaPDA-OPC-UA-Server+, ibaPDA-Data-Store-MindSphere-16, ibaPDA-Interface-MQTT, ibaPDA-Data-Store-MQTT-16
10.150000	ibaPQU-S	CPU for power quality monitoring applications
10.125010	ibaCMU-S	CPU for condition monitoring applications

Software

Order no.	Name	Description
30.681215	ibaInCycle	Analysis of cyclical processes, 4 modules
30.770064	ibaPDA-V7-64	Basic package server/client bundle for 64 signals
30.770128	ibaPDA-V7-128	Basic package server/client bundle for 128 signals
30.770256	ibaPDA-V7-256	Basic package server/client bundle for 256 signals
30.770512	ibaPDA-V7-512	Basic package server/client bundle for 512 signals
30.771024	ibaPDA-V7-1024	Basic package server/client bundle for 1024 signals
33.010000	ibaAnalyzer-V7	Offline analysis package for iba measurement data
30.681222	ibaInSpectra bundle	ibaPDA license extension, spectrum analysis library, Includes ibaInSpectra and ibaAnalyzer-InSpectra
30.681221	ibaInSpectra-lite	Spectrum analysis library, limited to 8 modules
38.100000	ibaVision-V2	Application for image recognition tasks, HALCON runtime license not included in the scope of delivery
38.100001	ibaVision-V2 with HALCON Runtime license	Application for image recognition tasks, including HALCON runtime license
32.500001	ibaLogic-V5	PMAC runtime system

Data storage, DB/cloud

Order no.	Name	Description
30.670141/2/3	ibaPDA-Data-Store-SAP-HANA-64/256/1024	Data streaming into SAP HANA DB/Cloud; 64/256/1024 signals
30.670160/1/2/3	ibaPDA-Data-Store-Kafka-16/64/256/1024	Data streaming into Apache Kafka cluster, 16/64/256/1024 signals
30.670180/1/2/3	ibaPDA-Data-Store-MindSphere-16/64/256/1024	Data streaming into MindSphere cloud, 16/64/256/1024 signals
30.671000/1/2/3	ibaPDA-Data-Store-MQTT-16/64/256/1024	Data streaming into MQTT broker, 16/64/256/1024 signals
30.671020/1/2	ibaPDA-Data-Store-Oracle-64/256/1024	Data streaming into Oracle DB/Cloud; 64/256/1024 signals
30.671030/1/2	ibaPDA-Data-Store-SQL-Server-64/256/1024	Data streaming into SQL Server DB/Cloud; 64/256/1024 signals
30.671040/1/2	ibaPDA-Data-Store-PostgreSQL-64/256/1024	Data streaming into PostgreSQL DB/Cloud; 64/256/1024 signals
30.671050/1/2	ibaPDA-Data-Store-MySQL-64/256/1024	Data streaming into MySQL DB/Cloud; 64/256/1024 signals

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