



iba Bus Monitors for Field and Drive Buses



CANopen

PROFIBUS

EtherCAT

EtherNet/IP

PROFINET

ABB

ibaBM-CAN

Bus monitor for CAN/CANopen

ibaBM-DP

Bus monitor for PROFIBUS

ibaBM-eCAT

Bus monitor for EtherCAT®

ibaBM-ENetIP

Bus monitor for EtherNet/IP

ibaBM-PN

Bus monitor for PROFINET

ibaBM-DDCS

Bus monitor for DDCS drive buses

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iba Bus Monitors

An essential feature of the iba system is the distinct connectivity to other automation systems and bus technologies. The iba bus monitors make it possible to connect to different field bus and drive technologies.



At a glance

- › Monitoring and recording of data traffic between automation and peripherals (sniffing) without interferences
- › Direct connectivity - no specific bus configuration required for the sniffer function
- › Configuration as active bus device in order to capture any given data
- › Data recording synchronized with other measuring signals in ibaPDA
- › Convenient configuration of devices and signals to be captured in ibaPDA
- › Diagnostic functions in ibaPDA

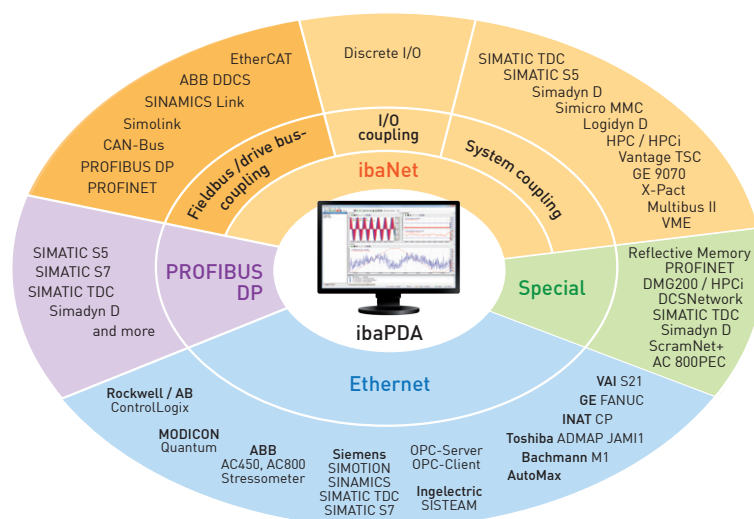
Coupling to Field and Drive Buses

The iba system offers various ways to access the values of control systems. In automated manufacturing, the components involved communicate frequently over field and drive buses. To date, different field and drive bus standards have been established in the industry. By using the iba bus monitors, an iba data acquisition system can be connected to standard bus technologies and acquire data from the buses and the connected hardware.

Monitors are available for:

- › CAN/CANopen
- › EtherCAT®
- › EtherNet/IP
- › PROFIBUS
- › PROFINET
- › drive bus DDCS by ABB.

All bus monitors are coupled without interferences in the bus and facilitate the monitoring and recording of data traffic between automation and peripherals, without compromising or straining the automation.



The coupling to field and drive buses is part of the comprehensive connectivity of the iba systems

Different Operating Modes

The iba bus monitors usually have two modes of operation. In sniffer mode (= listening), the values communicated via the bus are read and recorded as signals. Configuration changes are not required in this case. In the active mode, known as „active slave“, the bus monitor can receive the values sent to it from the control system. The bus monitor can be specifically addressed by the master and supplied with any measured values. All internal values can be collected in this way without having to place them on an analog or digital terminal.

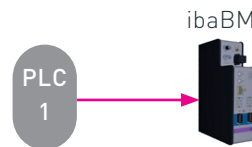
Diagnostics

The iba bus monitors offer a substantial amount of diagnostic information about the status of the field bus in order to be able to quickly detect bus errors. Information on the slaves is also displayed.

„Sniffer“
mode:



„Active slave“
mode:



Bus monitor operation modes

Convenient Configuration in ibaPDA

The configuration of signals is conveniently carried out in the I/O manager of ibaPDA. By using automatic detection in ibaPDA, the connected devices are detected in ibaPDA and displayed in the I/O manager. The required adjustments for the signals are made quickly thanks to the simple user interface and are stored in the devices.

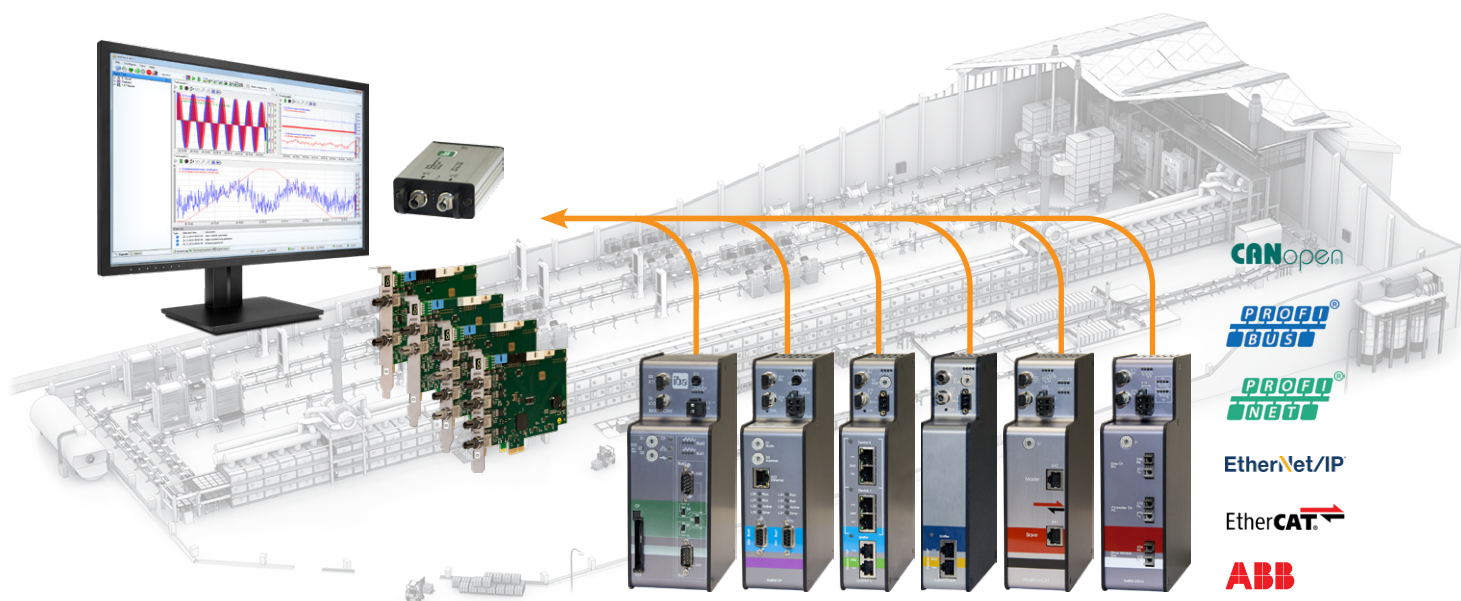
If the 32Mbit protocol is used, the measuring data is transferred via a unidirectional fiber optic connection to the ibaPDA

computer. In addition, an Ethernet connection is required to transfer configuration data.

If the ibaNet protocol 32Mbit Flex is supported by the bus monitor, only a bidirectional fiber optic connection is required from the device to the ibaPDA computer to transmit both the configuration and measuring data.

Robust Design

All bus monitors are characterized by a robust housing that can be easily mounted on a top-hat rail.



ibaNet Protocols

The data collected from the buses are converted and transmitted over the ibaNet fiber optic interface. The data for ibaPDA is available via an input card in the computer of the card family ibaFOB-D, e.g. ibaFOB-2io-Dexp or ibaFOB-4i-Dexp.

The iba bus monitors support various ibaNet protocols. The following table shows which device supports what ibaNet protocol.

32Mbit Flex Protocol

32Mbit Flex works with a data transfer rate of 32 Mbit/s and supports up to 15 „flex-capable“ devices interconnected in a ring. The size of the data telegrams is flexible as long as the total data volume does not exceed 4060 Bytes.

The sampling rate can be adjusted flexibly for each bus monitor. Each bus monitor can

therefore work with its own sampling rate. The sampling rates only have to be a multiple of a basic sampling rate and the total data volume in the fiber optics must not be exceeded. The general rule is: The less data that is transferred, the higher the possible sampling rate.

	32Mbit Flex	32Mbit	3Mbit
ibaBM-CAN	-	●	-
ibaBM-DP	●	●	●
ibaBM-eCAT	●	-	-
ibaBM-ENetIP	●	-	-
ibaBM-PN	●	-	-
ibaBM-DDCS	●	-	-

ibaBM-CAN



ibaBM-CAN is a sniffer device for extraction of measured data from the CAN bus messages which can also be used for diagnostic purposes on the CAN bus.



Sniffing on the CAN Bus

When running in sniffer mode only a physical connection to the CAN bus is required to read data on the bus. The device can be inserted in an existing and terminated CAN bus with no effect on the physical behaviour of the bus. Also, the two bus lines of the device can be terminated separately, if necessary.

Furthermore, special messages containing additional information can be sent to the device.

The data received on the CAN bus are converted and transferred via the ibaNNet fiber optic interface

to the ibaPDA system with a data transmission rate of 32 Mbit/s.

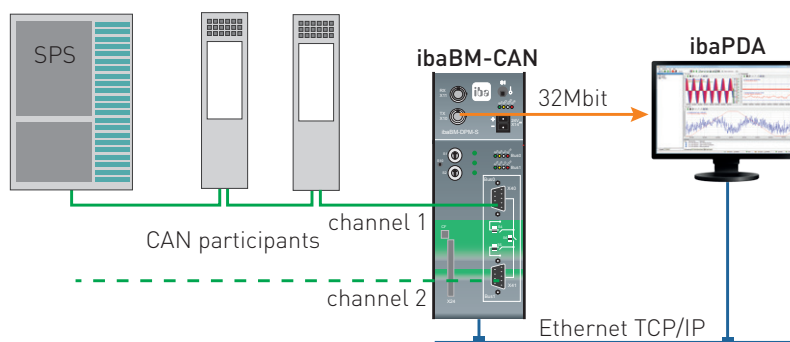
Diagnostics

An outstanding feature of the bus monitor is the ability to measure the cycle time. This is accomplished by gauging the time distance between the transmitted messages of each ID (in μs). These distance values can be graphically displayed in ibaPDA and used for trigger control or other processing.

This diagnostic feature enables the user to discover malfunctions caused by bus overload or insufficient priority of important IDs.

At a glance

- › Bus monitor for CAN/CANopen bus
- › Connections for 2 independent CAN/CANopen bus lines
- › To be used for interference free recording of the cyclic communication between master and slave (sniffer)
- › Acquisition and recording of up to 512 analog and 512 digital signals with ibaNNet protocol 32Mbit
- › Graphical diagnostic function for rating the deterministic behaviour of the CAN bus by measurement of cycle time (in μs) for each ID
- › USB and Ethernet interfaces for parameterization



Data acquisition on up to 2 CAN bus lines with ibaBM-CAN

Technical data ibaBM-CAN

Short description	
Name	ibaBM-CAN
Description	Bus monitor for CAN/CANopen
Order number	13.122000
CAN bus interfaces	
CAN bus connection	2 x 9-pin D-Sub connector for 2 CAN bus lines
No. of phys. CAN bus lines	1 or 2 (selection by switch)
CAN bus data rate	10 kbit/s to 1 Mbit/s
ID range	Standard IDs 11 bit, Extended IDs 29 bit
ibaNet interface	
Number	1 (e. g. for the connection to ibaPDA)
ibaNet protocol	32Mbit
Data transmission rate	32 Mbit/s
Sampling time	1 ms
Data volume	512 analog values (BYTE, INT, WORD, DINT, DWORD, FLOAT, Big/Little Endian) + 512 digital signals (bits) per ms
Connector type	2 ST connectors (62.5/125 µm) for RX and TX, up to 2000 m cable length without repeater
Further interfaces, operating and indicating elements	
Power supply	24 V DC ±10 % not stabilized 2-pin connector, clamp-type terminal (0.2 mm² to 2.5 mm²), included in delivery
Power consumption	Up to 14.4 W
Power switch	On/off switch for the entire device
Rotary switch	Reset to default settings
Termination switch	S4: termination resistor for bus 0 S5: termination resistor for bus 1
Bridging switch	S6: Connecting or disconnecting of bus 0 and bus 1
Indicators	4 LEDs for device status 4 LEDs for CAN bus status bus 0 4 LEDs for CAN bus status bus 1 1 LED per Compact flash, Ethernet interface, USB interface
Further interfaces	Ethernet (for parameterization) USB (for parameterization) Grounding socket
Operating and environmental conditions	
Cooling	Passive
Operating temperature	32 °F to 122 °F (0 °C to 50 °C)
Storage and transport temperature	13 °F to 158 °F (-25 °C to 70 °C)
Humidity class (DIN 40040)	F, no condensation
Protection class	IP20
Mounting	DIN rail, vertical
Standards	EMC: IEC 61326-1 FCC part 15 class A
Dimensions and weight	
Dimensions (width x height x depth)	2.72 in x 7.40 in x 5.55 in (69 mm x 188 mm x 141 mm), incl. DIN rail clip
Weight (incl. box and documentation)	Approx. 1.3 kg

ibaBM-DP



The bus monitor ibaBM-DP is used for the cyclical data acquisition in PROFIBUS DP networks via the acquisition software ibaPDA.

Data acquisition on PROFIBUS DP

The device can be connected to two separate PROFIBUS networks independently through two PROFIBUS connections. Transmission rates up to 12 Mbit/s are supported by the device and are automatically detected.

Using the sniffer function of ibaBM-DP, the cyclical data traffic on PROFIBUS (acc. to DP-V0) can be monitored and acquired. Internal slaves can be activated in parallel on the device and can have data written on them directly from the master.

For special applications, additional operating modes such as redundancy mode*, simulation mode*, mirror mode*, mapping mode* and P2P mode are available.

ibaNet Protocols

ibaBM-DP works with the ibaNet protocol 32Mbit Flex by default on the fiber optic side. Thus, measurement and configuration data are transferred via a bidirectional fiber optic connection. Therefore, a FO card ibaFOB-D is required at the ibaPDA side. The sampling rate and the data formats can be flexibly adjusted. Up to 4060 Bytes max. can be transmitted with a cycle time of 1.4 ms. The amount of data falls with faster sampling rates.

The device also offers modes of compatibility for the ibaNet protocols 32Mbit and 3Mbit. This makes it possible to exchange the

previous devices ibaBM-DPM-S and ibaBM-DPM-S-64 without changing the configuration in ibaPDA. The compatibility modes can also be used with previous FO cards.

Comfortable Request Procedure

For a convenient measurement over PROFIBUS, the request* procedure for SIMATIC S7, FM458, and for TDC can be used by ibaPDA. Using the request procedure, internal variables of the PLC can be freely requested. The values to be measured can be selected simply using their symbolic names and/or operands.

Sniffer Function

Due to the sniffer function, ibaBM-DP can read all data sent on PROFIBUS DP (cyclical data exchange to DP-V0). The device must merely be connected to PROFIBUS. The device does not need to be configured as a PROFIBUS slave in order to use the sniffer function.

Active Slave

Up to 8 slaves (extension to 16 slaves possible with additional license) can be activated on the ibaBM-DP bus monitor. The maximum output data range of each slave is 244 Bytes, which can be written by the master. Active slaves have to be configured by means of the provided GSD file. The active slaves can be distributed to both PROFIBUS

At a glance

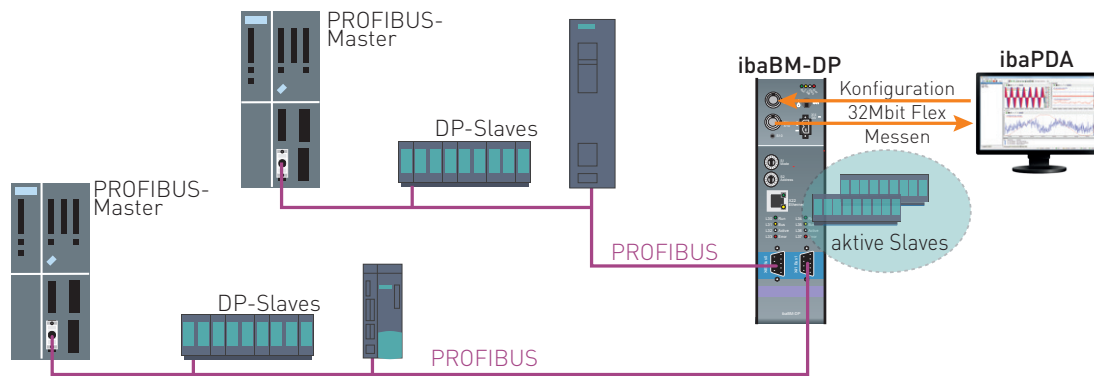
- › Bus monitor for PROFIBUS DP
- › Connectors for 2 PROFIBUS lines up to 12 Mbit/s
- › Sniffer function for interference free acquisition of the cyclic master slave communication (DP-V0)
- › Up to 8 or 16* active slaves can be configured
- › Acquisition of up to 244 Bytes per active slave
- › Flexible configuration of sampling rate, data format and data volume
- › Support of ibaNet protocol 32Mbit Flex
- › Additional options for special fields of application: redundancy*-, simulation*-, mirror*-, mapping*-, and P2P mode

BUS connections. The sniffer function and the active slaves can be used simultaneously.

Active slaves can also be used to send data via PROFIBUS from ibaPDA to a master. For example, certain signal values can be monitored and, if a limit value is exceeded, a warning message can be issued or other events indicated.

Redundancy Mode

With the 'redundancy mode' option, ibaBM-DP can read and acquire data on redundant



With ibaBM-DP, the sniffer function and active slaves can be simultaneously used.

PROFIBUS lines on S7-400H control systems, both as sniffer and as active slave.

ibaBM-DP monitors the telegram traffic on both PROFIBUS lines and dynamically detects, over which line valid data are currently being sent that are recorded with ibaPDA. This procedure offers the advantage that data do not need to be acquired twice.

ibaBM-DP immediately identifies error situations such as the transition of a CPU to STOP, the failure of a slave connection or broken cables and automatically switches to the intact bus system.

Simulation Mode

With the 'simulation mode' option, software and the configuration of a DP master station can be tested without the need for a peripheral system of the PROFIBUS to be physically present. This means, for example, that a new control program can be tested in a test environment. This way, expensive down times during commissioning can be reduced.

ibaBM-DP simulates the slaves as they are configured in the master. It is not necessary to carry out a PROFIBUS configuration in ibaBM-DP since the configura-

tion telegrams of the master are evaluated for the simulation.

The input values of the slaves are simulated using a TCP/IP telegram interface and the output values are requested. The use of this TCP/IP interface for the simulation of the plant is possible using any tools (e.g. ibaLogic).

Mirror Mode

The 'mirror mode' option is ideally suitable for modernizations where a new control system needs to run in test mode alongside the plant in operation. ibaBM-DP is coupled into the original PROFIBUS link via a PROFIBUS connection. The second connection is connected to the new control system. ibaBM-DP mirrors resp. simulates the slaves from the original line in the parallel system and the input data are also copied in this process. Thus, a new control system can be tested in parallel with the original slaves and the real input data. Signals from the original and parallel system can be recorded and compared simultaneously with ibaPDA using the sniffer function.

P2P Mode

The P2P mode (peer-to-peer) enables a bidirectional system in-

terconnection via PROFIBUS with iba devices with an ibaNet 32Mbit interface (e.g. via ibaLink-VME to VME-based control systems). For this purpose, the data from the ibaNet interface are mapped on up to 8 PROFIBUS slaves.

Mapping Mode

The mapping mode offers extensive possibilities for exchanging data between two connected PROFIBUS systems. The functionality is suitable for modernization, but also for pure data coupling at PROFIBUS level. A classic DP-DP coupler mode is available, in which data can be exchanged bidirectionally between slaves on both PROFIBUS systems. In addition, the data from slaves of the first PROFIBUS system can also be read and transferred to a slave of the second PROFIBUS system. In total, up to 8 assignments can be used (even 16 if the number of active slaves is extended).

Diagnostics

There are numerous diagnostic functions available in ibaPDA for assessing the operating status of the device and PROFIBUS communication.

In the I/O manager of ibaPDA, the operating states of the

masters and slaves are highlighted in color.

Further diagnostic displays provide information about the bus (baud rate, cycle time and number of slaves) as well as about the individual slaves (status, telegram counter, hex views of input, output, configuration, and parameter telegrams).

Diagnostic information can be, as well as other signals, captured via slave or bus diagnostic modules. This allows a non-stop recording.

ibaBM-DP measures the bus voltage of the slaves with integrated A/D converters. These values are displayed as a bar chart in the I/O manager. The voltages recorded by the diagnostic modules secure a long-term surveillance of the PROFIBUS system.

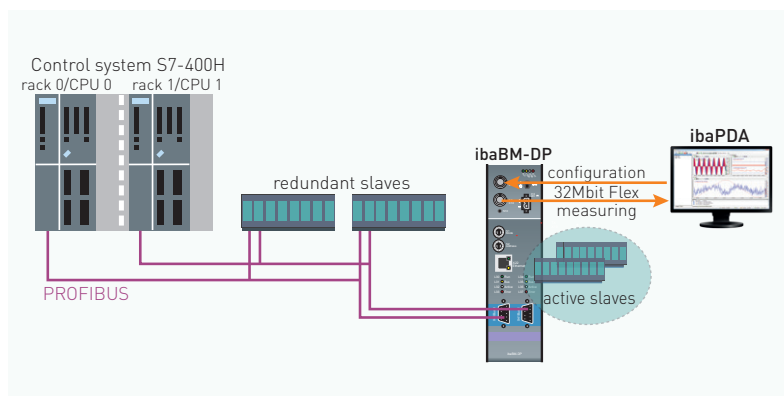
All status changes at the PROFIBUS that are recognized, are recorded in an event log report fitted with a time stamp. Additionally, a filter function facilitates the search for certain events.

License Model

In the standard version, the device offers the sniffer function and up to 8 configurable active slaves. With an additional license, the number of active slaves can be extended to 16.

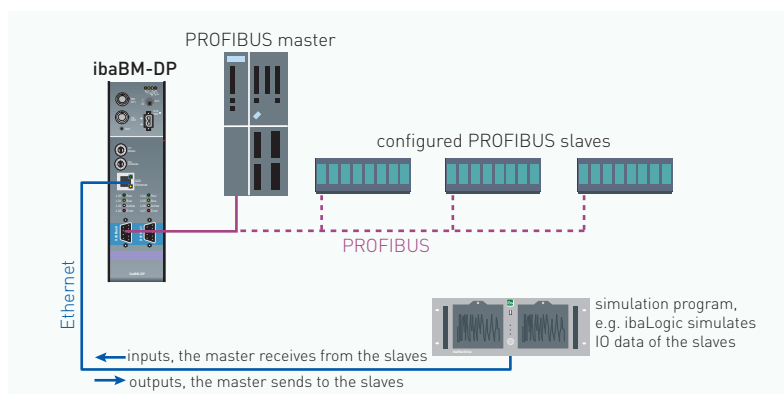
Additional licenses are also required to use redundancy, simulation, mirror and mapping modes. All licenses are linked to the serial number of the device and can also be activated subsequently.

Application examples



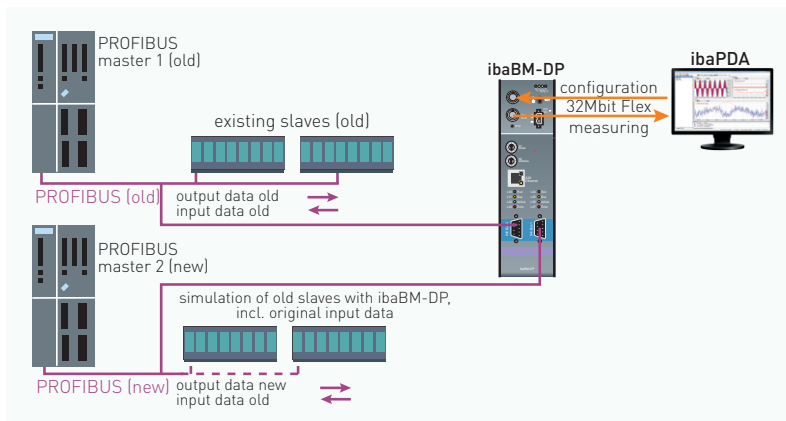
Redundancy mode

- › Data acquisition on redundant PROFIBUS lines of SIMATIC S7-400H systems
- › Combined use of sniffer function and active slaves
- › In case of failures automatic change to the intact bus system



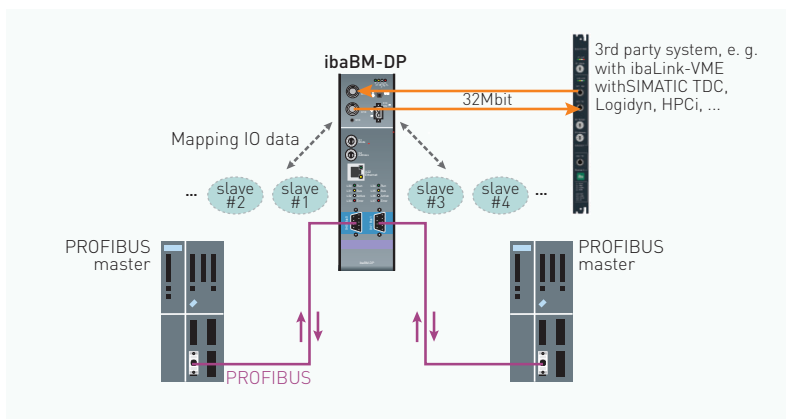
Simulation mode

- › Simulation of PROFIBUS slaves by ibaBM-DP
- › TCP/IP telegram interface for connecting a simulation program in order to simulate the system
- › Identification of errors already in the test environment
- › Reduces commissioning times



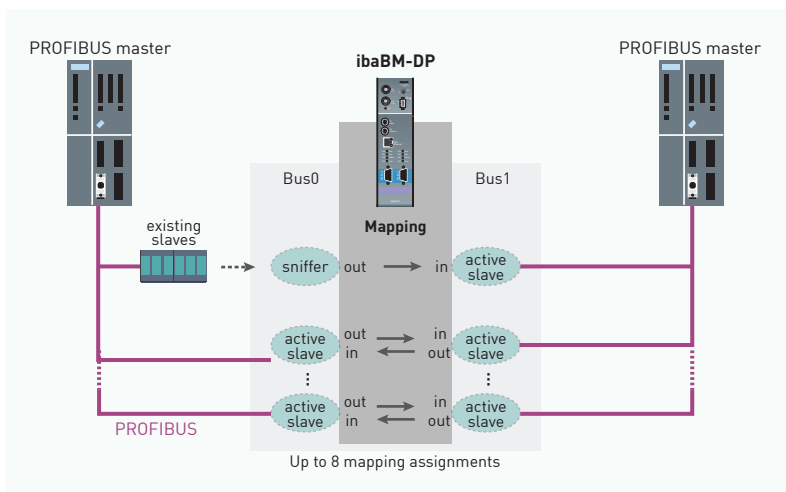
Mirror mode

- › Connection of a new control system to a PROFIBUS in parallel during operation
- › Slaves from the old PROFIBUS are simulated on the new PROFIBUS including input data
- › Comparison of both control systems by means of recording in ibaPDA
- › Facilitates the change to a new control system



P2P mode

- › Bidirectional coupling between PROFIBUS and devices with ibaNet 32Mbit interface
- › Mapping the data from the ibaNet interface on up to 8 PROFIBUS slaves



Mapping mode

- › Data exchange between two PROFIBUS systems connected to Bus0 and Bus1
- › Bidirectional exchange via active slaves
- › Read output data of existing slaves on Bus0 and make them available via active slave in Bus1
- › Up to 8 mapping assignments (up to 16 with extension of the active slaves)

Technical data ibaBM-DP

Short description		
Name	ibaBM-DP	
Description	Bus monitor for PROFIBUS	
Order number	13.121001	
PROFIBUS interfaces		
DP connections	2 x 9-pin D-Sub connectors (bus 0, bus 1) for 2 PROFIBUS lines	
PROFIBUS data rate	9.6 kbit/s to 12 Mbit/s	
DP slaves (can be configured as active slave on the device)	Up to 8 or 16 ¹ , to be distributed freely on both PROFIBUS lines	
Address range of the slaves	1 to 126	
ibaNet interface		
Number	1 (e. g. for the connection to ibaPDA)	
ibaNet protocols	Sampling time	Number of signals
32Mbit Flex	selectable from 0.5 ms (1540 Bytes), data volume dependent on cycle time	up to 1024 analog values (BYTE, INT, WORD, DINT, DWORD, FLOAT, Big/Little Endian) + up to 1024 digital signals (bits), a total of max. 4060 Bytes
32Mbit (compatibility mode)	1 ms	up to 512 analog values (BYTE, INT, WORD, DINT, DWORD, FLOAT, Big/Little Endian; up to 1984 Bytes) + up to 512 digital signals (bits)
3Mbit (compatibility mode)	1 ms	up to 64 analog values (INT or FLOAT) + up to 64 digital signals (bits)
Connectors	2 ST connectors (62.5/125 µm) for RX and TX, up to 2000 m cable length without repeater	
Further interfaces, operating and indicating elements		
Power supply	24 V DC ±10 % not stabilized 2-pin connector, clamp-type terminal (0.2 mm² to 2.5 mm²), screw connection, included in delivery	
Power consumption	Up to 12 W	
Rotary switch	Operating modes, device address (in the cascade)	
Indicators	4 LEDs for device status 4 LEDs for PROFIBUS status bus 0 4 LEDs for PROFIBUS status bus 1 2 LEDs for Ethernet interface	
Ethernet	10/100 Mbit/s, RJ45 socket	
Further interfaces	USB (for service purposes only) Grounding socket	
Operating and environmental conditions		
Cooling	Passive	
Operating temperature	32 °F to 122 °F (0 °C to 50 °C)	
Storage and transport temperature	13 °F to 158 °F (-25 °C to 70 °C)	
Humidity class (DIN 40040)	F, no condensation	
Protection class	IP20	
Mounting	DIN rail, vertical	
Standards	EMC: IEC 61326-1 FCC part 15 class A	
MTBF ²	1,428,860 hours / 163 years	
Dimensions and weight		
Dimensions (width x height x depth)	2.13 in x 7.40 in x 5.55 in (54 mm x 188 mm x 141 mm), incl. DIN rail clip	
Weight (incl. box and documentation)	Approx. 1.0 kg	

¹ Additional license required

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

ibaBM-eCAT

EtherCAT®

The device ibaBM-eCAT can be used for recording of data transmitted over an EtherCAT line with ibaPDA.



Sniffer

In order to record data transmitted over an EtherCAT line with ibaPDA, ibaBM-eCAT should be connected directly to the EtherCAT wire, positioned in line right next to the EtherCAT master.

The setup of the signals can be retrieved from the EtherCAT project file from the automation system, provided that the ENI export file of the EtherCAT configuration has been imported in ibaPDA.

Hence, the signals of all configured terminals are available in ibaPDA. The signals can be comfortably selected just by a mouse-click using the symbol browser.

Alternatively it is possible to address the signals directly.

EtherCAT Slave

Moreover, you can configure ibaBM-eCAT as EtherCAT slave on the EtherCAT line. Hence, it can be addressed by the EtherCAT master. This way, the EtherCAT master can address exactly the user data that is needed for recording with ibaPDA. Those signals are regarded as outputs from the EtherCAT bus' view.

For ibaBM-eCAT as sniffer and/or slave applies: ibaPDA can acquire up to a total of 512 analog and 512 digital values in each signal direction according to the sampling rate configured on the EtherCAT bus¹.

The following data types are supported: BYTE, SINT,

WORD, INT, DWORD, DINT, REAL, FLOAT and LREAL.

EtherCAT Browser and Diagnostics

If no ENI export file of the EtherCAT configuration is available, the symbol browser cannot be used for signal selection. Using the EtherCAT browser, it is optionally possible to select the values for acquisition directly from the EtherCAT bus.

The EtherCAT browser also contains diagnostic functions of the bus. For example, the individual telegrams can be analyzed and cycle and turnaround times can be displayed. A large number of diagnostic signals describing the EtherCAT bus are available for acquisition in ibaPDA.

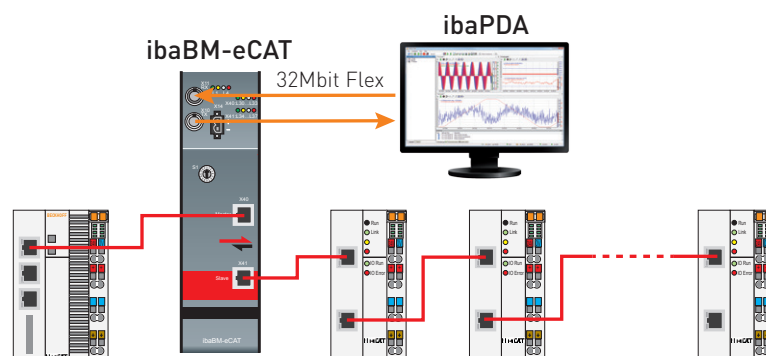
Comfortable Request Procedure

For a convenient measurement over EtherCAT, the request procedure² can be used by ibaPDA. Using the request procedure, in-

At a glance

- › Bus monitor for EtherCAT
- › Integration into the EtherCAT bus next to the master
- › To be used for interference free recording of the communication between master and slave (sniffer function)
- › Optional configurable as EtherCAT slave
- › Acquisition and recording of up to 512 analog and 512 digital signals in each signal direction (up to 4060 Bytes)
- › Numerous diagnostic options for rating and monitoring the EtherCAT bus
- › Support of ibaNNet protocol 32Mbit Flex

ternal variables of the PLC can be freely requested via ibaBM-eCAT. The values to be measured can be addressed with their symbolic names and simply selected in ibaPDA using a browser.



ibaBM-eCAT with EtherCAT master and slaves

¹If cycle time is below 500 µs, there are restrictions on the number of values ²Additional license required

Technical data ibaBM-eCAT

Short description		
Name		ibaBM-eCAT
Description		Bus monitor for EtherCAT
Order number		13.127000
EtherCAT interfaces		
Number		2 (1x master and 1x slave) for 1 EtherCAT bus
Data recording		
	Sniffer	without additional bus configuration
	Slave (optional)	additional direct addressing of signals with a device-specific ESI file (IO device file) for the bus configuration
Data volume		
	Sniffer	Up to 512 analog and 512 digital values in each signal direction (up to 4060 Bytes) at lowest ibaNet sampling rate
	Slave	Addressing of up to 512 analog and 512 digital outputs (≤ 32 Bit) on the bus, up to 2 x 1360 Bytes (also when values > 32 Bit)
Sampling time		According to bus cycle time (if cycle time is below 500 μs, there are restrictions on the number of values)
Signal delay		355 ns to 570 ns
Supported EtherCAT address range		4 GByte for both logical and physical allocation
Supported signal types		Digital with 1 bit Analog as integer values with 8 bit, 16 bit or 32 bit (signed and unsigned) or as IEEE 32 bit and 64 bit floating point values
Connector type		2 x RJ45 socket (EtherCAT 100 Mbit/s)
ibaNet interface		
Number		1 (e. g. for the connection to ibaPDA)
ibaNet protocol		32Mbit Flex
Data transmission rate		32 Mbit/s
Sampling time		Down to 25 μs, freely adjustable
Connector type		2 ST connectors (62.5/125 μm) for RX and TX, up to 2000 m cable length without repeater
Further interfaces, operating and indicating elements		
Power supply		24 V DC ±10 % not stabilized 2-pin connector, clamp-type terminal (0.2 mm² to 2.5 mm²), screw connection, included in delivery
Power consumption		Up to 8 W
Rotary switch		Device address (in a cascade)
Indicators		4 LEDs for device status 4 LEDs for both EtherCAT channels 4 LEDs for slave function
Operating and environmental conditions		
Cooling		Passive
Operating temperature		32 °F to 122 °F (0 °C to 50 °C)
Storage and transport temperature		-13 °F to 158 °F (-25 °C to 70 °C)
Humidity class (DIN 40040)		F, no condensation
Protection class		IP20
Mounting		DIN rail, vertical
Standards		EMC: IEC 61326-1 FCC part 15 class A
MTBF¹		1,765,555 hours / 201 years
Dimensions and weight		
Dimensions (width x height x depth)		2.13 in x 7.40 in x 5.55 in (54 mm x 188 mm x 141 mm), incl. DIN rail clip
Weight (incl. box and documentation)		Approx. 1.1 kg

¹ MTBF (mean time between failure) according to Telcordia 3 SR232 (Reliability Prediction Procedure of Electronic Equipment; Issue 3 Jan. 2011 and NPRD, Non-electronic Parts Reliability Data 2011

ibaBM-ENetIP

EtherNet/IP

The bus monitor ibaBM-ENetIP is used for cyclic data acquisition in EtherNet/IP networks with ibaPDA.



Sniffer in the EtherNet/IP network

The EtherNet/IP bus monitor ibaBM-ENetIP is a device for acquiring the cyclical data exchange between EtherNet/IP scanners (master) and adapters (slaves). The device can be integrated into an existing EtherNet/IP network with one or more EtherNet/IP scanners (master).

The ibaBM-ENetIP bus monitor can be operated with the TAP-interface (Ethernet) in an EtherNet/IP network without interferences. As sniffer, the device listens to the cyclic data exchange of the IO data (implicit messaging) between EtherNet/IP scanner (master) and adapters (slaves).

Recording with external network analysis tool

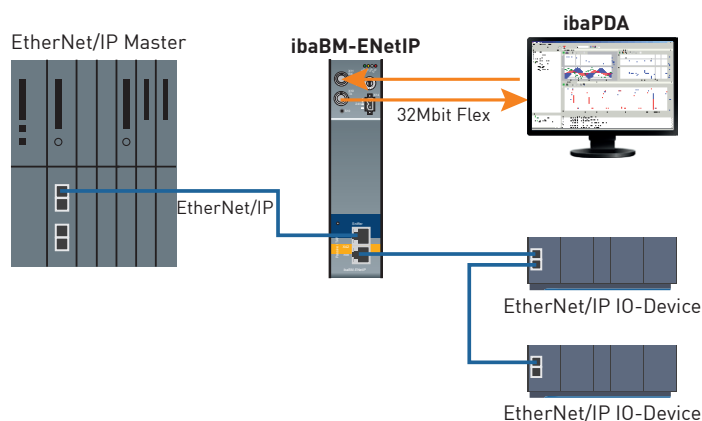
The entire communication via the TAP-interface is being mirrored to a monitor port and can be recorded using an external network analysis tool.

ibaNet protocol 32Mbit Flex

On the optical-fiber side, ibaBM-ENetIP works with the ibaNet protocol 32Mbit Flex. With this protocol, measuring and configuration data are transferred via a bidirectional fiber optic connection. The sampling rate and the data formats can be configured flexibly.

At a glance

- › Bus monitor for EtherNet/IP
- › TAP interface for sniffer function
- › Data acquisition with ibaPDA
- › Simple configuration and measurement via bidirectional fiber optic connection with ibaNet protocol 32Mbit Flex
- › Flexible adjustment of sampling rate and data formats with 32Mbit Flex
- › Monitor interface for connecting a network analysis tool



Data acquisition in the EtherNet/IP network with TAP/sniffer

Technical data ibaBM-ENetIP

Short description	
Name	ibaBM-ENetIP
Description	Bus monitor for Ethernet/IP
Order number	13.120010
Ethernet/IP interface	
TAP interface (sniffer)	2-port TAP, 2x RJ45 socket, 10/100 Mbit/s
ibaNet interface	
Number	1 (e. g. for the connection to ibaPDA)
ibaNet protocol	32Mbit Flex (bidirectional)
Data transmission rate	32 Mbit/s
Sampling time	from 1 ms, freely adjustable
Number of signals	up to 1024 analog signals (BYTE, INT, WORD, DINT, DWORD, FLOAT, Big/Little Endian) + up to 1024 digital signals (BOOL) up to 4060 Bytes at 1.4 ms cycle time
Connector type	2 ST connections (62.5/125 µm) for RX and TX, up to 2000 m cable length without repeater
Further interfaces, operating and indicating elements	
Power supply	DC 24 V ±10 % not stabilized 2-pin connector, clamp-type terminal (0.2 mm² to 2.5 mm²), screw connection, included in delivery
Power consumption	Up to 9.6 W
Rotary switch	Device address (in a cascade)
Indicators	4 LEDs for device status Multi-color LED TAP interface
Monitor interface	Ethernet RJ45, 1 Gbit/s
Service interface	Ethernet RJ45, 10/100/1000 Mbit/s
Grounding screw	
Operating and environmental conditions	
Cooling	Passive
Operating temperature	32 °F to 122 °F (0 °C to 50 °C)
Storage and transport temperature	-13 °F to 158 °F (-25 °C to 70 °C)
Humidity class (DIN 40040)	F, no condensation
Protection class	IP20
Mounting	DIN rail, vertical
Standards	EMC: IEC 61326-1 FCC part 15 class A
Dimensions and weight	
Dimensions (width x height x depth)	1.61 in x 7.87 in x 5.51 in (41 mm x 200 mm x 140 mm), incl. DIN rail clip
Weight (incl. packaging and manual)	approx. 1.0 kg

ibaBM-PN



The ibaBM-PN bus monitor is used for cyclical data acquisition in PROFINET IO networks with ibaPDA.

Targeted Data Acquisition in PROFINET

The ibaBM-PN bus monitor supports PROFINET specification V2.3.

The bus monitor has two independent, internal PROFINET devices that can be supplied with data by PROFINET controllers. A bus monitor can communicate with up to 8 PN controllers. For this purpose, the device has to be integrated in a PN engineering project. Integration in line or star topologies is possible, as well as connection to two independent PROFINET lines.

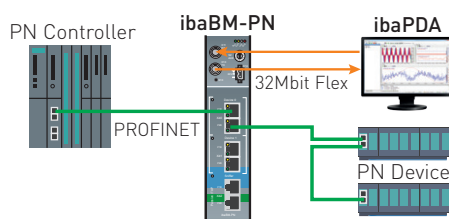
The both internal PN devices of the bus monitor can be configured independently in ibaPDA. Each of the internal PN devices can capture up to 1440 Bytes (incl. status bytes) per cycle.

The devices can also be used to send data via PROFINET from ibaPDA to a controller. Certain signal values can be monitored for example, and, if a limit value is exceeded, a warning message can be issued or other events indicated. A data volume of up to 1440 Bytes per device is possible.

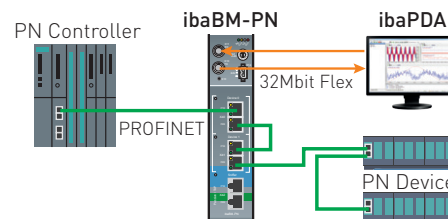
At a glance

- › Bus monitor for PROFINET IO (PN)
- › 2 independent, internal PN devices for connecting to 1 or 2 PROFINET lines
- › Capturing and recording up to 1440 Bytes per PN device
- › Sniffer function for interference free recording of the cyclic IO communication
- › Supports RT (real time) and IRT communication (isochronous real time)
- › Supports MRP (media redundancy protocol) and MRPD (Media Redundancy for Planned Duplication)
- › S2 system redundancy
- › Flexible adjustment of sampling rate and data formats with 32Mbit Flex

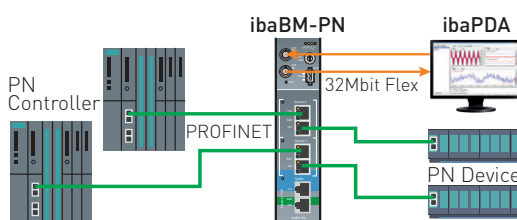
System integration examples as active device



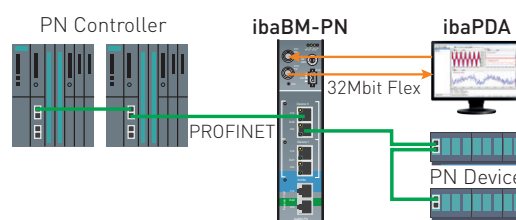
A PROFINET device of ibaBM-PN is used by a PROFINET controller.



Both PROFINET devices of ibaBM-PN are used by a shared PROFINET controller (twice the amount of data possible).



The two PROFINET devices of ibaBM-PN are each used by different PROFINET controllers.



A PROFINET device of ibaBM-PN is used by several PROFINET controllers (shared device).

S2 System Redundancy

Each of the two PN devices supports S2 system redundancy¹ independently of each other. This means that configurations using one or two PROFINET devices are possible. Example topology see diagram below left.

Protocols for PROFINET

PROFINET distinguishes between real time (RT) communication and synchronous isochronous real-time (IRT) communication. ibaBM-PN supports both types of communication, where cycle times up to 250 μ s are possible. In addition, ibaBM-PN supports as a client the Media Redundancy Protocol (MRP) as well as Media Redundancy for Planned Duplication (MRPD), which are used in ring structures.

The device complies with NetLoad Class III.

Sniffer Function

To act as a sniffer, ibaBM-PN can be coupled with the TAP interface (Ethernet) without interference in the PROFINET network. As a sniff-

er, the device monitors the entire data exchange on the line and can therefore read the data sent.

The entire communication via the TAP interface is also mirrored to a monitor port where it can be recorded using an external network analysis tool. Integration into the configuration of the PROFINET controller is not necessary.

Sniffer at SINAMICS Link

Furthermore, ibaBM-PN provides the function of acquiring and recording data as sniffer on a SINAMICS link, thus replacing the bus monitor ibaBM-SiLink in a function-compatible way.

SINAMICS Link is a special type of PROFINET communication for exchanging PROFINET IRT data between Siemens SINAMICS controllers (CU320-2PN and CU320-2DP or CUD). SINAMICS Link is based on a strict, straight network topology with a maximum of 64 PROFINET (PN) controllers.

Each controller sends data that ibaBM-PN can read and acquire.

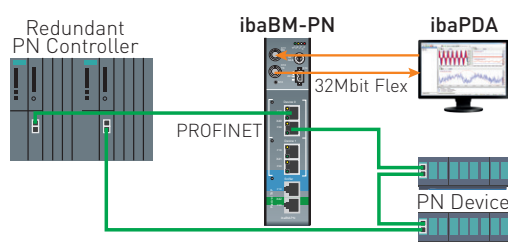
Comfortable Request Procedure

For a convenient measurement using PROFINET, the request¹ procedure of ibaPDA can be used for SIMATIC S7. Using the request procedure, internal variables of the PLC can be freely requested. The values to be measured can be selected by means of their symbolic names.

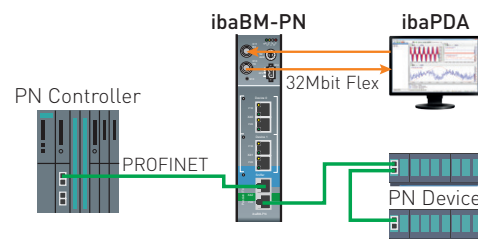
ibaNet Protocol 32Mbit Flex

On the fiber optic side, ibaBM-PN works with the ibaNet protocol 32Mbit Flex. Thus, measuring and configuration data are transferred via a bidirectional fiber optic connection. The sampling rate and data formats can be adjusted flexibly.

Up to 4060 Bytes can be transmitted with a cycle time of 1.4 ms.



Each of the two PROFINET devices of the ibaBM-PN supports S2 redundancy separately.



For the sniffer function, the TAP interface is used to capture the transmitted data without interference.

Technical data ibaBM-PN

Short description	
Name	ibaBM-PN
Description	Bus monitor for PROFINET
Order number	13.120000
PROFINET interfaces	
Number	3 (2 x PROFINET devices for up to 2 PROFINET lines, 1 x sniffer)
PROFINET devices	2 x 2-port switches Each with 2x RJ45 socket, 10/100 Mbit/s, autonegotiation With the autonegotiation switched off, the port P2R of each device works as uplink port
TAP interface (sniffer)	2-port switch, 2x RJ45 socket, 10/100 Mbit/s
Functions	2x PROFINET device, shared device (up to 4 controllers), RT, IRT (> 250 µs), MRP and MRPD Client, NetLoad Class III, S2 system redundancy
ibaNet interface	
Number	1 (e. g. for the connection to ibaPDA)
ibaNet protocol	32Mbit Flex
Data transmission rate	32 Mbit/s
Sampling time	From 125 µs, freely adjustable
Number of signals	up to 1024 analog signals (BYTE, INT, WORD, DINT, DWORD, FLOAT, Big/Little Endian) + up to 1024 digital signals (BOOL) up to 4060 Bytes at 1.4 ms cycle time
Supported profiles as sniffer at SINAMICS Link	64 participants, 16 words, 1 or 2 ms 16 participants, 16 words, 500 µs 12 participants, 24 words, 500 µs 8 participants, 32 words, 500 µs
Connector type	2 ST connectors (62.5/125 µm) for RX and TX, up to 2000 m cable length without repeater
Further interfaces, operating and indicating elements	
Power supply	24 V DC ±10 % not stabilized 2-pin connector, clamp-type terminal (0.2 mm² to 2.5 mm²), screw connection, included in delivery
Power consumption	Up to 9.6 W
Rotary switch	Device address (in the cascade)
Indicators	4 LEDs for device status Multi-color LED per PROFINET device/TAP interface
Monitor interface	Ethernet RJ45, 1 Gbit/s
Service interface	Ethernet RJ45, 10/100/1000 Mbit/s
Grounding screw	
Operating and environmental conditions	
Cooling	Passive
Operating temperature	32 °F to 122 °F (0 °C to 50 °C)
Storage and transport temperature	-13 °F to 158 °F (-25 °C to 70 °C)
Humidity class (DIN 40040)	F, no condensation
Protection class	IP20
Mounting	DIN rail, vertical
Standards	EMC: IEC 61326-1 FCC part 15 class A
MTBF ¹	1,661,625 hours / 189 years
Dimensions and weight	
Dimensions (width x height x depth)	1.61 in x 7.87 in x 5.51 in (41 mm x 200 mm x 140 mm), incl. DIN rail clip
Weight (incl. box and documentation)	Approx. 1.0 kg

¹ MTBF (mean time between failure) according to Telcordia 3 SR232 (Reliability Prediction Procedure of Electronic Equipment; Issue 3 Jan. 2011 and NPRD, Non-electronic Parts Reliability Data 2011

ibaBM-DDCS



The device can be used for recording of control signals as they are used by ABB drives and transmitted over the DDCS bus.



Passive Recording, Active Retrieving

The device has 3 pairs of fiber optic links which provide the functions as follows:

- › Passive recording of signals sent to/received by the control system (Data Set measuring channel)
- › Active retrieving of other measured values from the drives (Parameter measuring channel)
- › Routing of configuration and measurement requests of external computers with DriveWindow

Automatic Detection

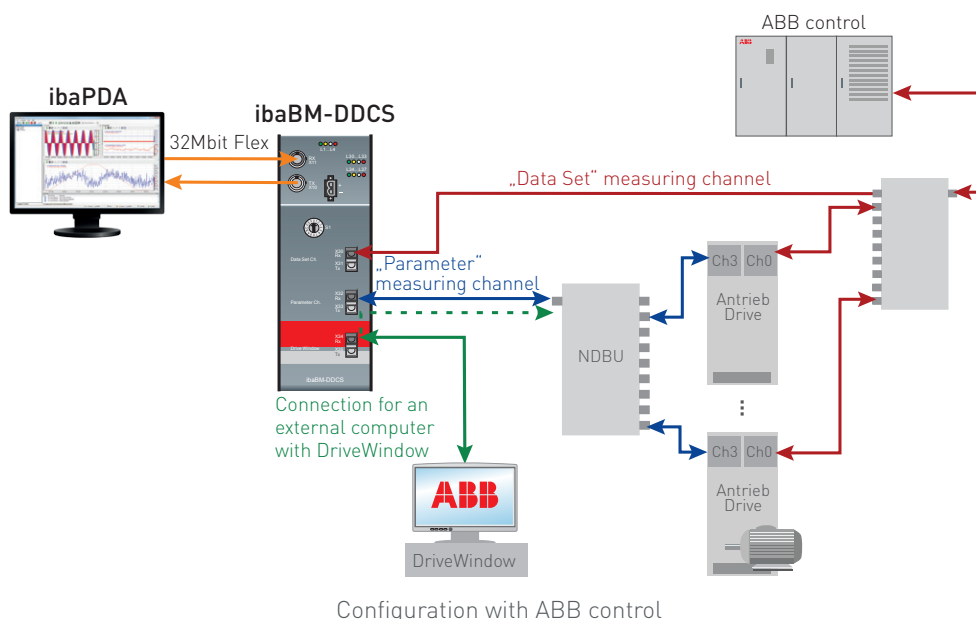
ibaBM-DDCS detects the connected drives with the corresponding signals automatically. The device enables free and interference free access to the drive's parameter and to the communication telegrams between drive and controller.

ibaBM-DDCS supports the ibaNet protocol 32Mbit Flex. The sampling rate can be up to 40 kHz, whereby up to 4060 Byte can be transmitted over the fiber optics to the ibaPDA computer.

One ibaBM-DDCS device can simultaneously monitor all drives which are connected to a common bus line. In theory this can be over 100 drives per device.

At a glance

- › Bus monitor for the drives bus DDCS of ABB
- › Acquisition of internal values and parameters from the drives at the service channel
- › To be used for interference free recording of the communication between controllers and drives
- › Acquisition and recording of up to 4060 Bytes payload per cycle
- › Connection to a free port of the NDBU-95 branching unit
- › Additional connection option for a computer with DriveWindow
- › Support of ibaNet protocol 32Mbit Flex



Technical data ibaBM-DDCS

Short description	
Name	ibaBM-DDCS
Description	Bus monitor for DDCS drive bus
Order number	13.120710
DDCS interfaces	
Number	3 for 1 DDCS drive bus
Design	Fiber optical link, bidirectional, compliant to DDCS standard, 1, 2, 4 or 8 Mbit/s
Typical application	Link 0: connected to control system (only RX is used) Link 1: connected to measurement interface of the drives Link 2: connected to computer with DriveWindow for configuration and measurement, if required
ibaNet interface	
Number	1 (e. g. for the connection to ibaPDA)
ibaNet protocol	32Mbit Flex
Data transmission rate	32 Mbit/s
Sampling time	From 25 µs to 2 ms, freely adjustable
Connector type	2 ST connectors (62.5/125 µm) for RX and TX, up to 2000 m cable length without repeater
Further interfaces, operating and indicating elements	
Power supply	24 V DC ±10 % not stabilized 2-pin connector, clamp-type terminal (0.2 mm² to 2.5 mm²), screw connection, included in delivery
Power consumption	Up to 15 W
Rotary switch	Device address (in a cascade)
Indicators	4 LEDs for device status 8 LEDs for channel status
Operating and environmental conditions	
Cooling	Passive
Operating temperature	32 °F to 122 °F (0 °C to 50 °C)
Storage and transport temperature	-13 °F to 158 °F (-25 °C to 70 °C)
Humidity class (DIN 40040)	F, no condensation
Protection class	IP20
Mounting	DIN rail, vertical
Standards	EMC: IEC 61326-1 FCC part 15 class A
Dimensions and weight	
Dimensions (width x height x depth)	2.13 in x 7.40 in x 5.55 in (54 mm x 188 mm x 141 mm), incl. DIN rail clip
Weight (incl. box and documentation)	Approx. 1.5 kg



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