



ibaBM-DDCS

Bus monitor for the DDCS drive bus from ABB

Manual
Issue2.1

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The content of this publication has been checked for compliance with the described hardware and software. Nevertheless, deviations cannot be excluded completely so that the full compliance is not guaranteed. However, the information in this publication is updated regularly. Required corrections are contained in the following regulations or can be downloaded on the Internet.

The current version is available for download on our website www.iba-ag.com and can be found in the iba Help center docs.iba-ag.com.

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2.1	03-2026	ibaPDA GUI, small corrections	st	02.06. 001

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Certification

The product is certified according to the European standards and directives. This product meets the general safety and health requirements.

Other international and national standards were observed.

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1 About this documentation

This documentation describes the construction, the use and the operation of the device *ibaBM-DDCS*.

1.1 Target group

This documentation is aimed at qualified professionals who are familiar with handling electrical and electronic modules as well as communication and measurement technology. A person is regarded as professional if they are capable of assessing safety and recognizing possible consequences and risks on the basis of their specialist training, knowledge and experience and knowledge of the standard regulations.

1.2 Notations

In this manual, the following notations are used:

Action	Notation
Menu command	Menu <i>Logic diagram</i>
Calling the menu command	<i>Step 1 – Step 2 – Step 3 – Step x</i> Example: Select the menu <i>Logic diagram – Add – New function block</i> .
Keys	<Key name> Example: <Alt>; <F1>
Press the keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Key name> Example: <OK>; <Cancel>
Filenames, paths	<i>Filename, Path</i> Example: <i>Test.docx</i>

1.3 Used symbols

If safety instructions or other notes are used in this manual, they mean:

Danger!



The non-observance of this safety information may result in an imminent risk of death or severe injury!

Observe the specified measures.

Warning!



The non-observance of this safety information may result in a potential risk of death or severe injury!

Observe the specified measures.

Caution!



The non-observance of this safety information may result in a potential risk of injury or material damage!

Observe the specified measures.

Note



A note specifies special requirements or actions to be observed.

Tip



Tip or example as a helpful note or insider tip to make the work a little bit easier.

Other documentation



Reference to additional documentation or further reading.

2 About ibaBM-DDCS

The *ibaBM-DDCS* device is a bus monitor for the DDCS communication bus from ABB.

The device can be used for capturing of signals and their transmission to an *ibaPDA* system in order to record data continuously or triggered by event.

The purpose of this device is:

- to be able to locate errors quickly
- to be able to assess the quality of the closed-loop control and derive conclusions about the status of the machine
- to optimize the drive.

The *ibaBM-DDCS* enables free and reactionless access to the drive's parameter and to the communication telegrams between drive and controller. The desired data is selected with the I/O Manager of the *ibaPDA* software.

The communication between *ibaPDA* and *ibaBM-DDCS* is handled by the bidirectional iba fiber optic protocol 32Mbit Flex, which requires an I/O card of the ibaFOB-D generation, e. g. *ibaFOB-2io-D*. 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.

Fields of application

The device is intended for:

- the permanent connection of an *ibaPDA* system
- the connection of an *ibaPDA* system only when needed (errors/problems)
- the temporary connection of a mobile computer or notebook

The *ibaPDA* recording software is optimized for large amounts of data. Depending on the *ibaPDA* license and computer capacity, any number of analog and/or digital signals can be captured, visualized and recorded. Measurements with a sampling time of down to 25 µs are possible.

Furthermore, iba has other modules, connections and software components for connecting a variety of PLC systems, which can be connected in parallel to the *ibaBM-DDCS* device.

3 Scope of delivery

After unpacking, check that the delivery is complete and undamaged.

The scope of delivery includes:

- Device *ibaBM-DDCS*
- 2 pin plug for power supply

For additional accessories not included in the scope of delivery, see www.iba-ag.com.

4 System requirements

Hardware

- PC equipped as follows:
 - a free PCI slot or PCIe slot
 - ExpressCard slot (notebook)Visit www.iba-ag.com to find suitable computer systems with desktop and industry housing.
- A fiber optic interface card of the ibaFOB-D generation with firmware version v2.00 (build 172) or higher:
 - *ibaFOB-io-D* or *-Dexp*
 - *ibaFOB-2io-D* or *-Dexp*
 - *ibaFOB-2i-D* or *-Dexp* with ad-on module *ibaFOB-4o-D*
 - *ibaFOB-4i-D* or *-Dexp* with ad-on module *ibaFOB-4o-D*
 - *ibaFOB-io-USB* adapter
- One ibaNet fiber optics patch cable (duplex) for connection of *ibaBM-DDCS* and *ibaPDA* computer

Software

- *ibaPDA* v6.26 or higher for capturing, recording and displaying the measurement data and for configuring the device
- *ibaAnalyzer* for displaying and analyzing the recorded data (optional)

ibaBM-DDCS

- Firmware beginning with version v02.06.001
- Hardware beginning with version A7

Converter and automation systems

- Converter of systems from ABB which support the DDCS protocol
 - Converters of current design: DCS800, AC80, AC400, AC800, ACS800, ACS6000
 - Converters of older design: DCS600 and ACS600
- NDBU-95 branching unit for connecting ibaBM-DDCS to the DDCS bus
- Plastic fiber optic cable to connect ibaBM-DDCS and ABB equipment

For more information, please contact the service of ABB Mannheim.

5 Safety instructions

Observe the following safety instructions for *ibaBM-DDCS*.

5.1 Intended use

The device is an electrical apparatus. It must only be used for the following applications:

- Measurement data acquisition and analysis
- Automation of industrial plants
- Applications of software products (e.g. *ibaPDA*) and hardware products of iba AG.

The device must only be used as defined in the "Technical Data" chapter.

5.2 Special safety instructions

Caution!



Observe the operating voltage range

The device may not be operated at voltages exceeding +24 V DC ($\pm 10\%$). An overly high operating voltage destroys the device!

Note



Do not open the device! Opening the device will void the warranty!

Note



To clean the device, use a dry or slightly moistened cloth.

6 Mounting and dismounting

The device is designed for mounting on a DIN rail.

6.1 Mounting

1. Place the mounting rail clip attached to the device on the DIN-rail.
2. Press the device down in such a way that the clip of the DIN-rail engages with a click.
3. Connect the power supply. Observe the correct polarity.
4. Connect the other cables.

6.2 Dismounting

1. Disconnect the power supply.
2. Remove all cables.
3. Close the free inputs and outputs of the fiber optics connection with a cover.
4. Secure the device to prevent it from falling down and press the device down slightly.
5. After that pull the device and lift it up. The clip of the DIN-rail will disengage with a click.
6. Remove the device.
7. When storing or transporting the device observe the values specified in the technical data.

7 Device description

Features at a glance:

- Bus monitor for the ABB DDCS bus
- Automatic detection of the system configuration
- Logging of data sent to and from the drive control
- Recording of drive-internal measured values and parameters
- Configuration and data recording with ibaPDA via bidirectional fiber optic cables (32Mbit Flex protocol)
- Sampling rate up to 40 kHz and data size up to 4060 Byte
- Additional connection options for computers with DriveWindow
- Rugged design, DIN rail mounting
- Connection of up to 15 devices in a fiber optics ring with 32Mbit Flex protocol

7.1 Functions

The device is used to record DDCS bus signals, as used in ABB drives.

The device offers connections for 3 fiber optic cable pairs in order to realize the following functions:

- Logging of signals exchanged between the controller and drive (data set channel).
- Active querying of additional measurements and parameters from the drives (parameter channel).
- Loophrough of configuration and measurement queries of an external computer with DriveWindow.

7.2 Configuration

The values to be measured are selected via a configuration dialog in the ibaPDA software which is installed on the computer.

The device automatically detects the connected drives with the associated signals. The signals to be recorded can be selected in the I/O Manager of the ibaPDA software.

7.3 Computer side

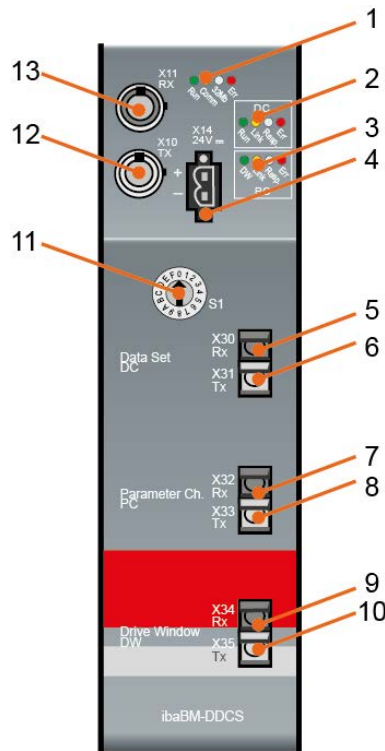
On the computer side, the *ibaFOB-io-D*, *ibaFOB-2io-D*, or *ibaFOB-4i-D* modules are used with the *ibaFOB-4o-D* add-on module.

Parallel to this, discrete signals can be coupled via other fiber optic connections, e.g. using ibaPADU or *ibaNet750-BM*. The option of coupling in signals from other systems using system connections and bus monitors is also available.

The *ibaFOB-io-ExpressCard* or a *ibaFOB-io-USB* adapter are used to couple notebooks.

7.4 Device view

Front view



1	Operating state display	8	X33 Tx (Link1 = Parameter channel, CH3)
2	Status LED Data Set query	9	X34 Rx (Link2 = DriveWindow)
3	Status LED Parameter query	10	X35 Tx (Link2 = DriveWindow)
4	Plug for power supply	11	Rotary switch S1
5	X30 Rx (Link0 = Data Set channel, CH0)	12	FO output X10 TX
6	X31 Tx (Link0 = Rx mirror, do not connect)	13	FO input X11 RX
7	X32 Rx (Link1 = Parameter channel, CH3)		

7.4.1 Operating status display (status LEDs)

LED	Status	Description
Run (green/red)	on (red)	start-up sequence; once the device has booted, the LED changes to green
	green blinking	device is operating; flickering indicates device overload
	off	no power
Comm (yellow)	off	no measurement
	on	measurement in progress
32Mb (white)	off	no data reception 32 Mbit/s at X11
	on	data reception 32 Mbit/s at X11 OK
	flashing	data reception at X11, but signal is wrong
Err (rot)	off	normal state, everything OK
	flashing	error occurred within the device

7.4.2 Status LED Data Set query

LED	Status	Description
Run (green)	flashing	data query OK
	off or on	function problems / device is defective
Link (yellow)	flashing	flashes when a message is received (steadily lit when several messages are being received)
Resp (white)	on	data requested, all data arriving
	flashing rapidly	data requested, data are not arriving
	flashing slowly	data requested, only some data arriving
	off	no data requested
Err (red)	on	corrupted message received received (possible cause: the topology setting of the drives connected to the NDBU-95 is wrong, see chapter ↗ Star topology with NDBU mode RE-GEN, page 20)
	off	normal state, everything OK

7.4.3 Status LED Parameter query

LED	Status	Description
DW (white)	on	connection for DriveWindow released
	off	connection for ibaBM-DDCS released
Link (yellow)	flashing	flashes when a message is received (steadily lit when several messages are being received)
Resp (white)	on	data requested, all data arriving
	flashing rapidly	data requested, data are not arriving
	flashing slowly	data requested, only some data arriving
	off	no data requested
Err (red)	on	corrupted message received
	off	normal state, everything OK

7.4.4 24 V power supply

A DC voltage of 24 V (20 V to 30 V) must be applied to the 2-pin Phoenix threaded coupling connector provided for the power supply.

Note



Make sure the polarity is correct!

7.4.5 X30 Rx and X31 Tx

Interface via X30 (Rx) to the data set channel in the DDCS network (CH0). The data received on X30 is mirrored to the output X31 (Tx).

X31 must not be connected to the input of the branching unit NDBU. This connection leads to malfunctioning.

7.4.6 X32 Rx and X33 Tx

Interface to the parameter channel in the DDCS network (CH3).

7.4.7 X34 Rx and X35 Tx

Connection for looping through an external computer with DriveWindow.

7.4.8 Rotary switch S1

Up to 15 *ibaBM-DDCS* devices can be interconnected in a ring structure. The devices are addressed via the S1 rotary switch.

Device number in the cascade	Position of the rotary switch
not permitted	0
1. device	1
2. device	2
...	...
14. device	E
15. device	F

7.4.9 Fiber optics connections X10 TX and X11 RX

X11: FO receiving interface(RX)

X10: FO sending interface(TX)

A fiber optic card of type *ibaFOB-D* must be installed in the *ibaPDA* computer in order to receive and transmit data.

Maximum distance of fiber optic connections

The maximum distance of fiber optic connections between 2 devices depends on various influencing factors. This includes, for example, the specification of the fiber (e.g. 50/125 μm , 62.5/125 μm , etc.), or the attenuation of other components in the fiber optic cable plant such as couplers or patch panels.

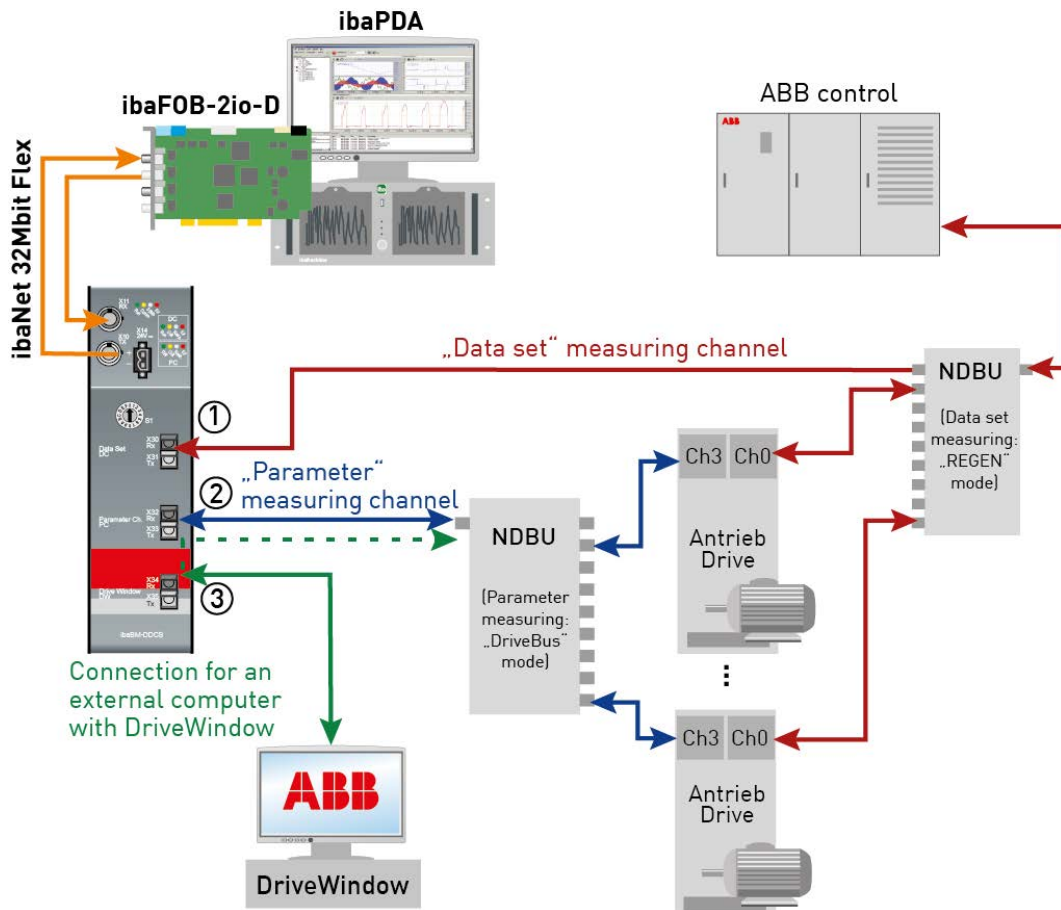
However, the maximum distance can be estimated on the basis of the output power of the transmitting interface (TX) or the sensitivity of the receiving interface (RX). A model calculation can be found in chapter [➤ Example for FO budget calculation, page 51](#).

The specification of the transmitter's output power and the receiver's sensitivity of the fiber optic components installed in the device can be found in chapter *Technical data*.

8 ibaBM-DDCS in ABB environment

Various configurations with *ibaBM-DDCS* are described below.

8.1 Configuration with data set and parameter channel



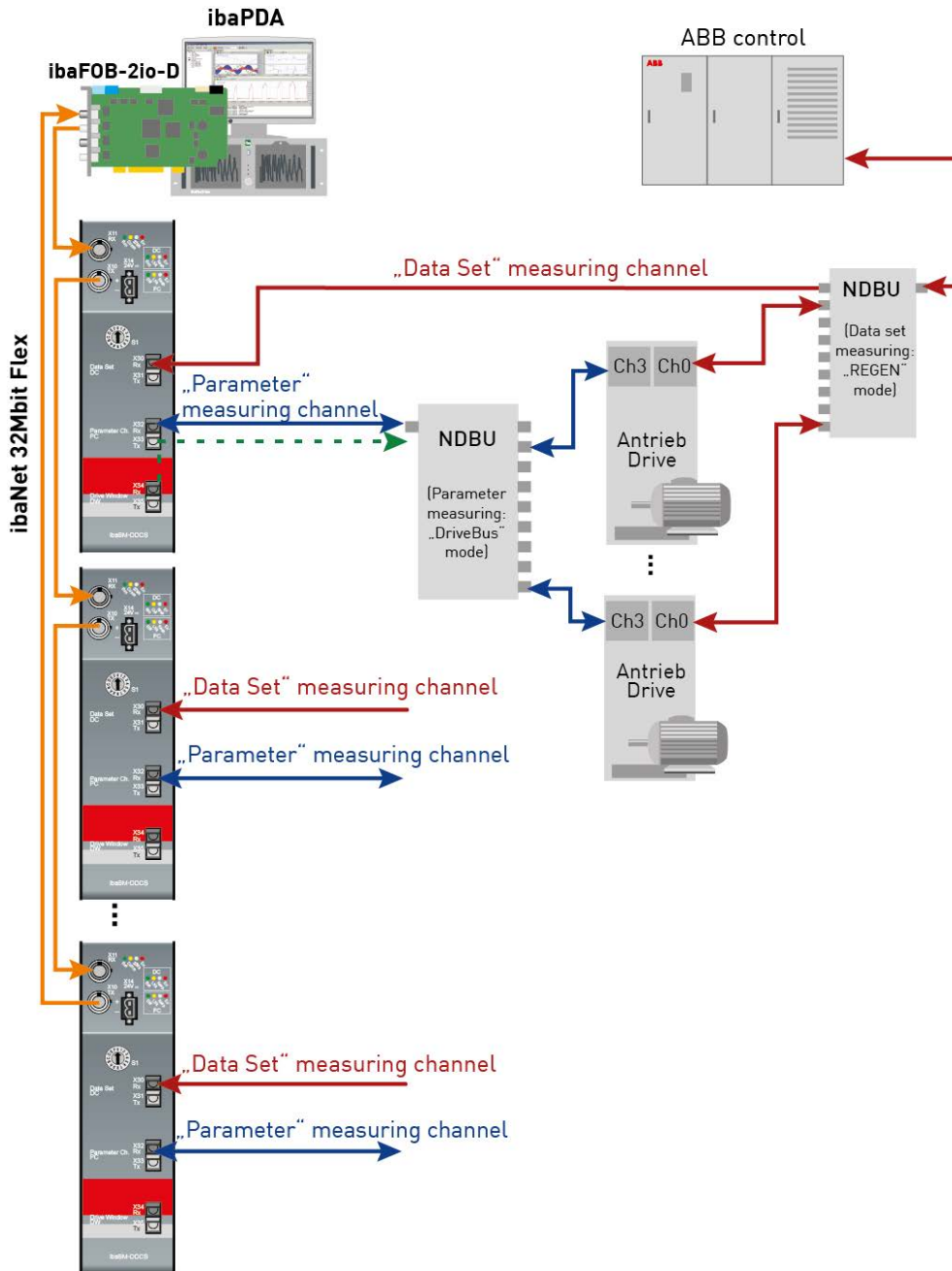
ibaBM-DDCS offers 2 options for capturing and recording measured signals:

1. Logging of the signals in the data set channel (CH0 connection of the drives). **Simplex** fiber optic connection between *ibaBM-DDCS* X30 and an arbitrary channel of the NDBU-95 (NDBU operation mode: „REGEN“). The X31 output must not be connected to the NDBU-95. Alternative connection: *ibaBM-DDCS* is integrated in the connection between NDBU-95 and ABB control. See also chapter ↗ *Star topology with NDBU mode DDCS/DRIVE BUS*, page 22.
2. Querying of other values from the drives in the parameter data channel (CH3 connection of the drives). **Duplex** fiber optic connection between *ibaBM-DDCS* X32/X33 and the CH3 port of a drive or the MSTR port of a NDBU-95 (NDBU operation mode: „DDCS/DRIVEBUS“).
3. Furthermore, *ibaBM-DDCS* offers a connection to loopthrough configuration and measurement queries of an external computer with DriveWindow. The DriveWindow computer is connected to the drives via the parameter channel if needed. **Duplex** fiber optic connection between *ibaBM-DDCS* X34/X35 and the DriveWindow computer.

8.2 Cascading ibaBM-DDCS devices

Up to 15 iba devices that support the 32Mbit Flex protocol (e.g., *ibaPADU-S-IT*, *ibaBM-eCAT*) can be connected in a fiber optic ring per I/O link of an ibaFOB-D card. The rotary switch S1 has to be set to a unique device number at each device.

Please note that the total data rate in the fiber optic ring must be distributed among the connected devices.



Other documentation



For more information, refer to the description of the 32Mbit Flex protocol in the *ibaFOB-D* manual.

8.3 Data Set channel

8.3.1 Data Sets

The ABB control uses “data sets” to exchange information with the drives (CH0).

Every data set consists of three 16-bit Integer values (indices). A data set number and the data set index provide a given measurement or status value with ABB.

Data set xx.yy

Value 1	Index 1
Value 2	Index 2
Value 3	Index 3

The ABB controller sends even data set numbers (2n) to the drives, which respond with the next odd data set number (2n + 1).

ABB control	Drive
<i>Query</i>	<i>response</i>
Data Set 10->	Data Set 11<-
Data Set 12->	Data Set 13<-

The desired signals are selected with *ibaPDA* via the following parameters

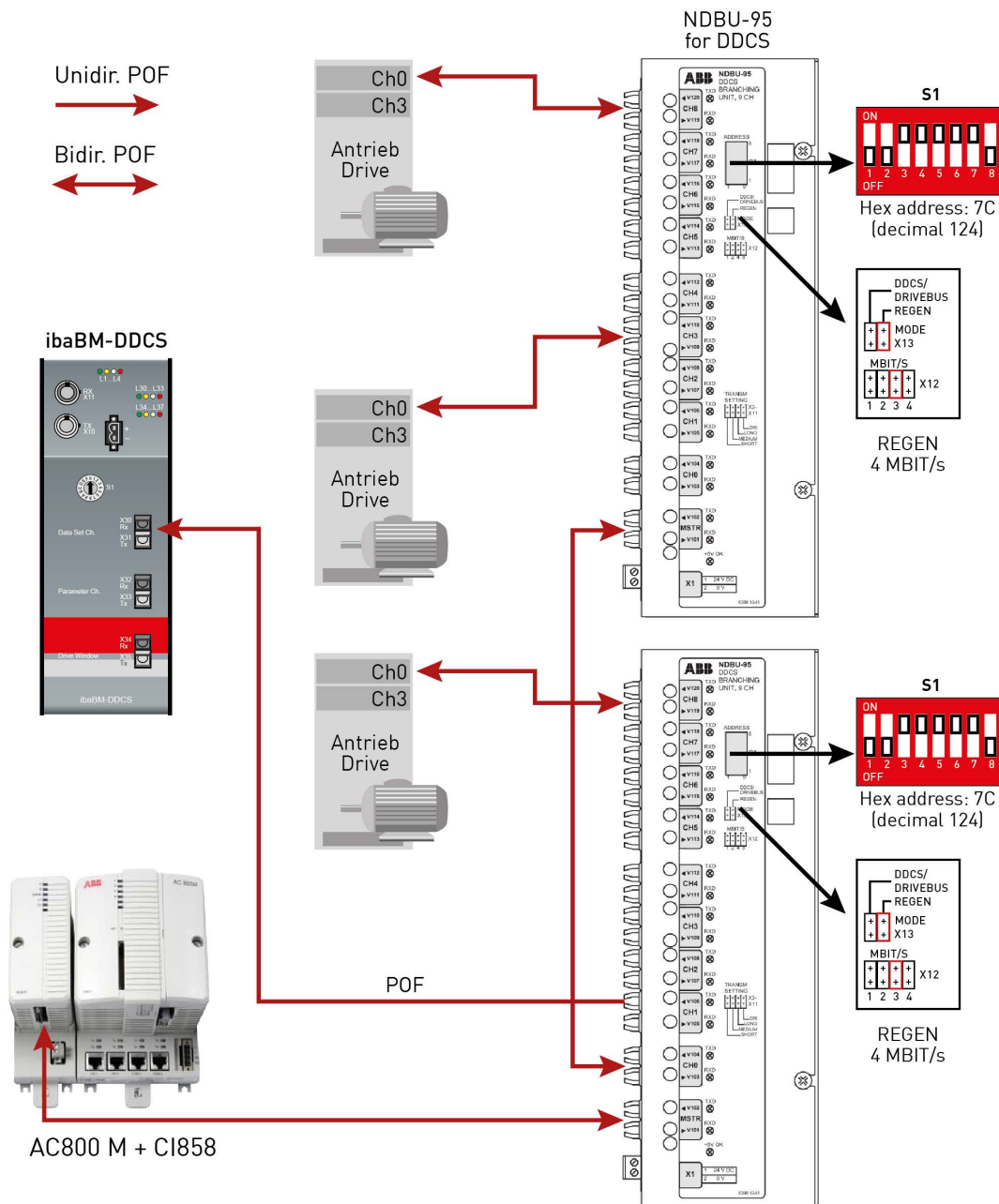
- Node number (drive)
- Data Set number
- Index

The *ibaBM-DDCS* device can read all data sets that the controller requests from and sends to the drives.

8.3.2 Star topology with NDBU mode REGEN

One or more NDBU-95 devices (DDCS branching unit) are used to distribute the DDCS telegrams. 8 drives can be connected to each NDBU-95. Up to 16 NDBU-95 devices can be cascaded.

The device *ibaBM-DDCS* must be connected via a unidirectional FO cable to the NDBU-95 that is also connected to the controller. To monitor all telegrams, including the response telegrams from the drives, this NDBU-95 must be operated in "REGEN" mode.

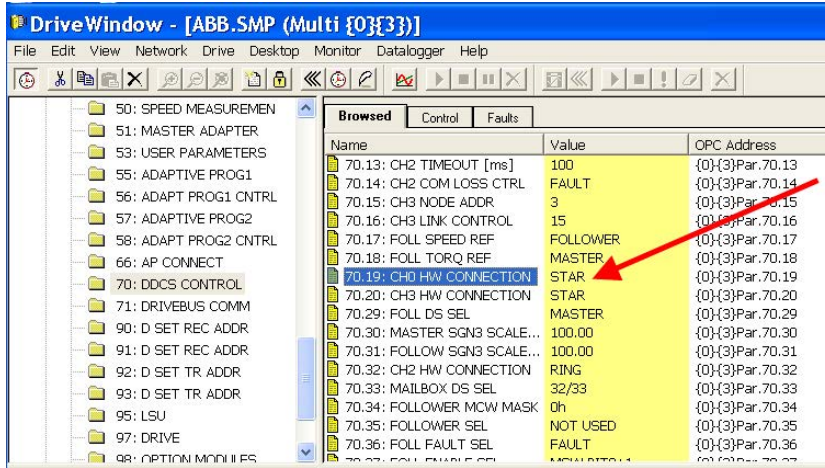


Note



When acquiring data sets in a star topology, ensure that the connected drives are set to “Star” topology.

In DriveWindow, the parameter “CH0 HW CONNECTION” in the parameter set “DDCS Control” of each drive has to be checked and set to “STAR”¹⁾



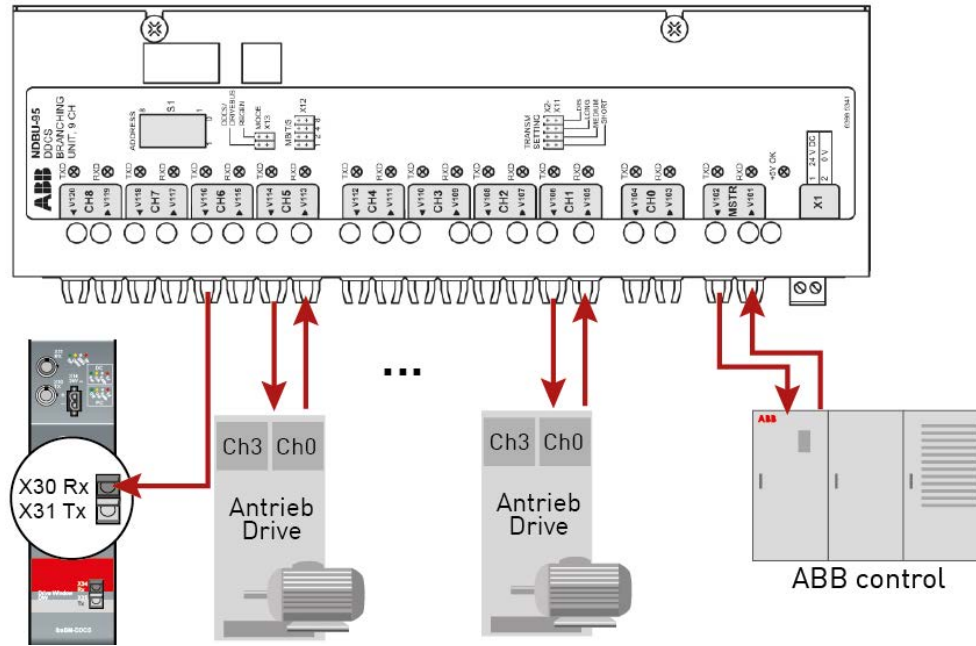
In some drives, e.g. ACC800, there are several user sets. The topology setting must be set in all used user sets. The user sets can be loaded and saved in the parameter “APPLICATION MACRO” of the set “START-UP DATA” (z.B. Par. 99.03).

Settings at the branching unit NDBU-95

<p>Address setting (S1): Address range 76 ... 124 Default: (01111100) = 0x7C</p>	
<p>Operating mode selection (X13): adjust to REGEN mode.</p>	
<p>Transfer rate (X12): Default setting CH0: 4 Mbit/s</p>	

¹⁾ The parameter set is in the protected area (set 105) in some drives, e.g. ACC800. In this case, a 4-digit code has to be entered in the parameter „PASS CODE“ of the set „SYST CTR INPUTS“ (e.g. Par 16.03) in order to have access to the protected area. Please contact ABB, when the code is unknown.

ibaBM-DDCS connection to NDBU-95, REGEN mode

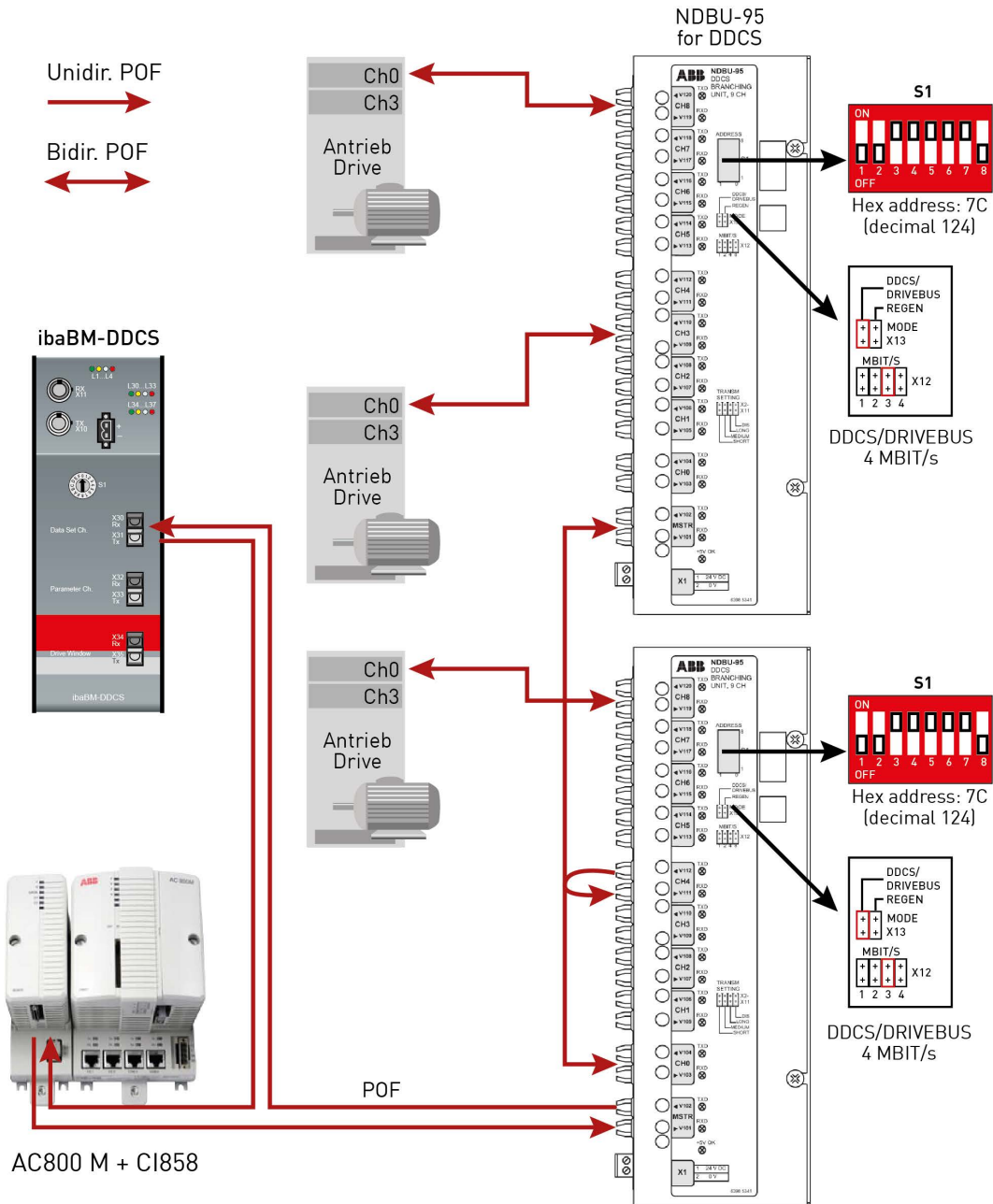


8.3.3 Star topology with NDBU mode DDCS/DRIVE BUS

This is an alternative configuration, if the NDBU-95 cannot be adjusted to REGEN mode.

One or more NDBU-95 devices (DDCS branching unit) are used to distribute the DDCS telegrams. 8 drives can be connected to each NDBU-95. Up to 16 NDBU-95 devices can be cascaded.

The device *ibaBM-DDCS* is coupled into the FO connection between NDBU-95 (MSTR.TX) and the controller (DDCS.RX). *ibaBM-DDCS* can read all telegrams sent from the drives to the controller. In order to read the output telegrams from the controller, a „bridge“ has to be integrated at a free NDBU-95 port, i.e. the TX and the RX port must be connected via a FO cable.



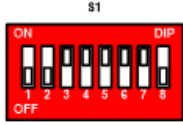
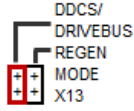
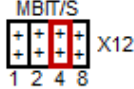
Note



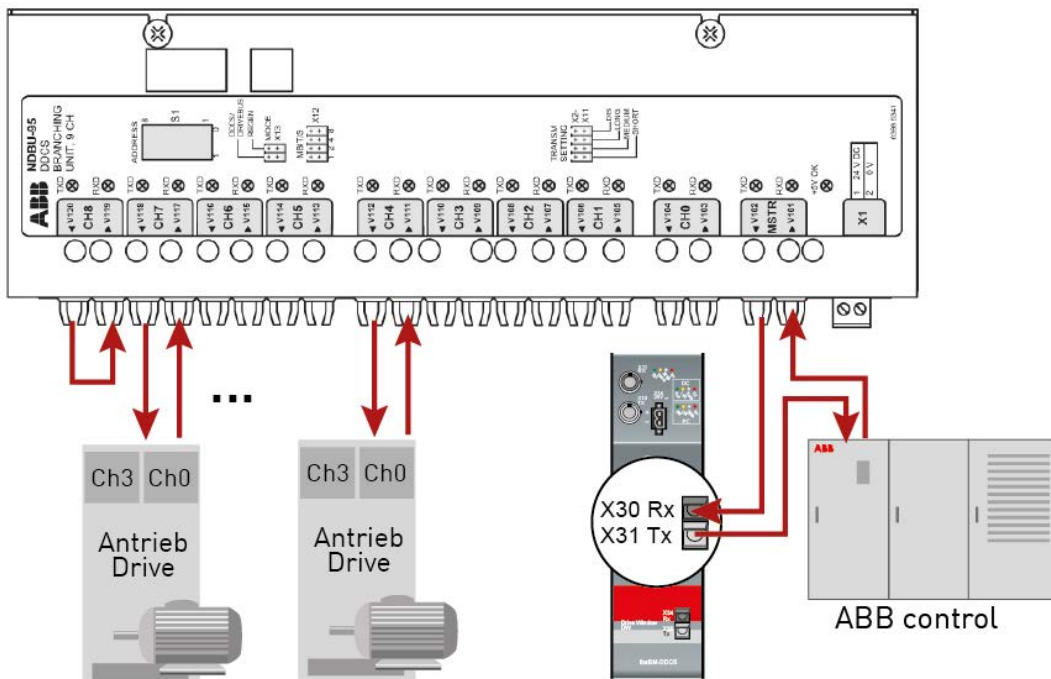
When acquiring data sets in a star topology, ensure that the connected drives are set to “Star” topology.

In DriveWindow, the parameter “CH0 HW CONNECTION” in the parameter set “DDCS Control” of each drive has to be checked and set to “STAR”.

Settings at the branching unit NDBU-95

Address setting (S1): Address range 76 ... 124 Default: (01111100) = 0x7C	
Operating mode selection (X13): Adjust to DDCS/DRIVEBUS	
Transfer rate (X12): Default setting CH0: 4 Mbit/s	

ibaBM-DDCS connection to NDBU-95, DDCS/DRIVEBUS mode

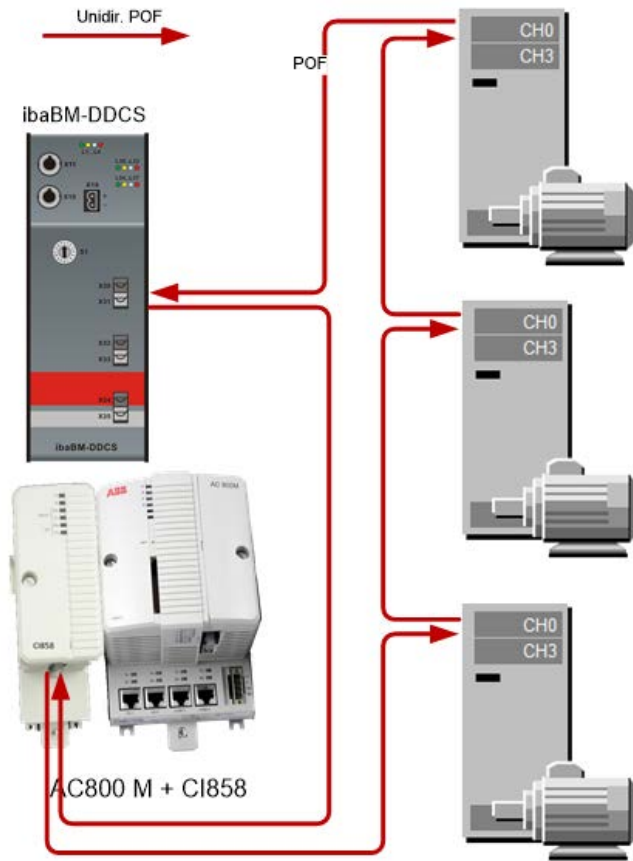


8.3.4 Ring topology

A ring topology may often be found in older plants.

The telegrams are sent from one drive (CH0) to the next one via a FO ring. Every drive (CH0) takes the data which are addressed to it from the data stream and sends the reply data to the next drive. The last drive sends back the data to the controller.

The *ibaBM-DDCS* device is coupled into the ring between the last drive and the controller.

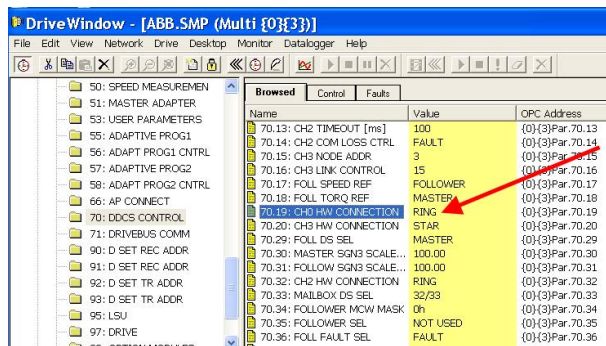


Note



When acquiring data sets in a ring topology, ensure that the connected drives are set to “Ring” topology.

In DriveWindow, the parameter “CH0 HW CONNECTION” in the parameter set “DDCS Control” of each drive has to be checked and set to “RING”.



8.4 Parameter channel

8.4.1 Parameter

ibaBM-DDCS can access the service channel (CH3) of the ABB drives and query parameters there, independent from a communication connection to a controller. *ibaBM-DDCS* acts here as master and reads the current parameter values of the drives.

ibaBM-DDCS is directly connected to the CH3 port of a drive or to the master port of the NDBU-95, which is connected to the drives (CH3).

Note



The parameter channel is only for acquiring supplementary information from drives or slow values, e.g. temperatures.

We recommend acquiring data via the data set channel for typical application.

Note

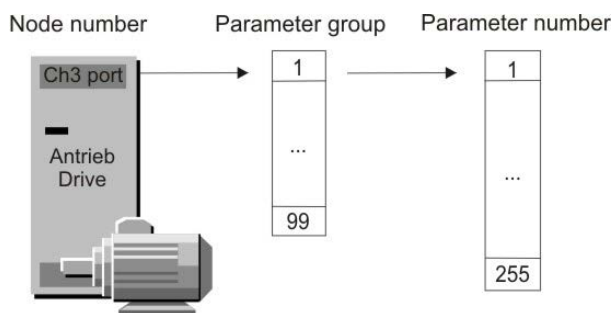


Since every parameter is requested via handshake (request – response) by the drive, the access cycle depends directly on the number of requested values. Typical request requires approx. 2ms per analog value and approx. 2 ms per 16 digital bits.

Request times become very high when many drives are connected. In order to improve this behavior, iba recommends using several *ibaBM-DDCS* devices, see tip in chapter ↗ *Time response, page 32*.

The desired Parameter are selected with *ibaPDA* as follows:

- Node number (drive)
- Parameter group
- Parameter number



Like in DriveWindow, the parameters can be selected in *ibaPDA* with a symbolic browser, where the user can see the node names, the parameter groups and the parameters as text.

If DriveWindow and *ibaPDA* shall be operated in parallel, DriveWindow is connected to the X34 (RX/TX) port of *ibaBM-DDCS*. The accesses to the drives are looped through *ibaBM-DDCS*. In contrast to DriveWindow, *ibaPDA* can only read the parameters.

ibaPDA only supports the acquisition of analog parameter values in 32-bit IEEE-Float format and digital parameter values.

Note



Analog parameters in other data formats, such as DINT, are displayed incorrectly in *ibaPDA*.

When there is only one drive, *ibaBM-DDCS* can be connected directly to the CH3 port (service channel) of the drive. When there are several drives, the communication can be established using a NDBU-95 in star or ring topology.

8.4.2 Star topology

Several drives can be accessed via one or more NDBU-95 devices (DDCS branching unit). 8 drives can be connected to each NDBU-95. Up to 16 NDBU-95 devices can be cascaded.

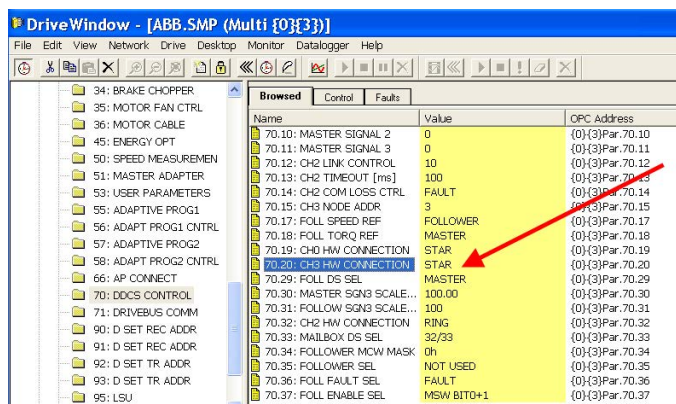
ibaBM-DDCS is connected to the MSTR port of the NDBU-95 with a bidirectional FO cable.

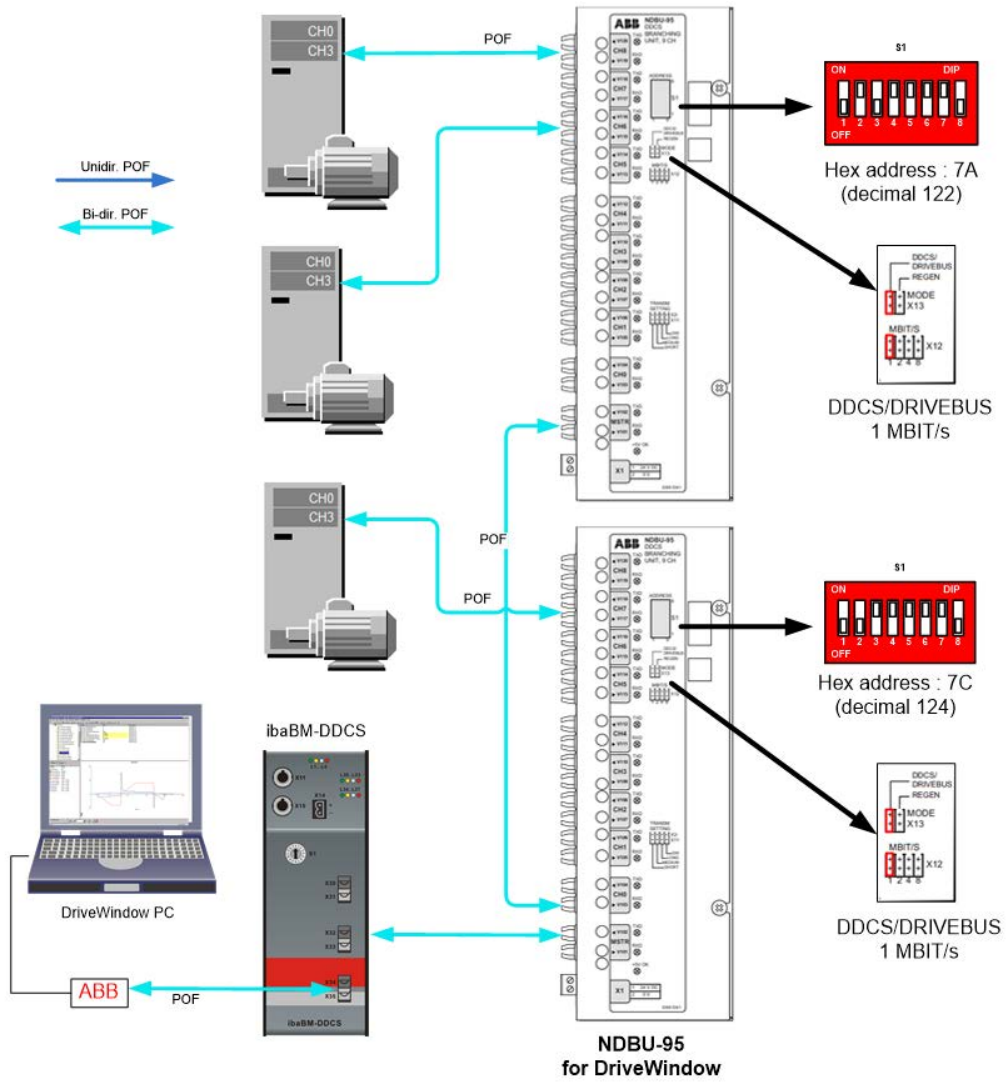
Note



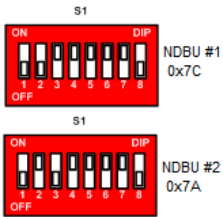
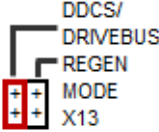
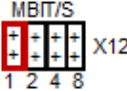
When acquiring parameter in a star topology, ensure that the connected drives are set to “Star” mode.

In DriveWindow, the parameter “CH3 HW CONNECTION” in the parameter set “DDCS Control” of each drive has to be checked and set to “STAR”.

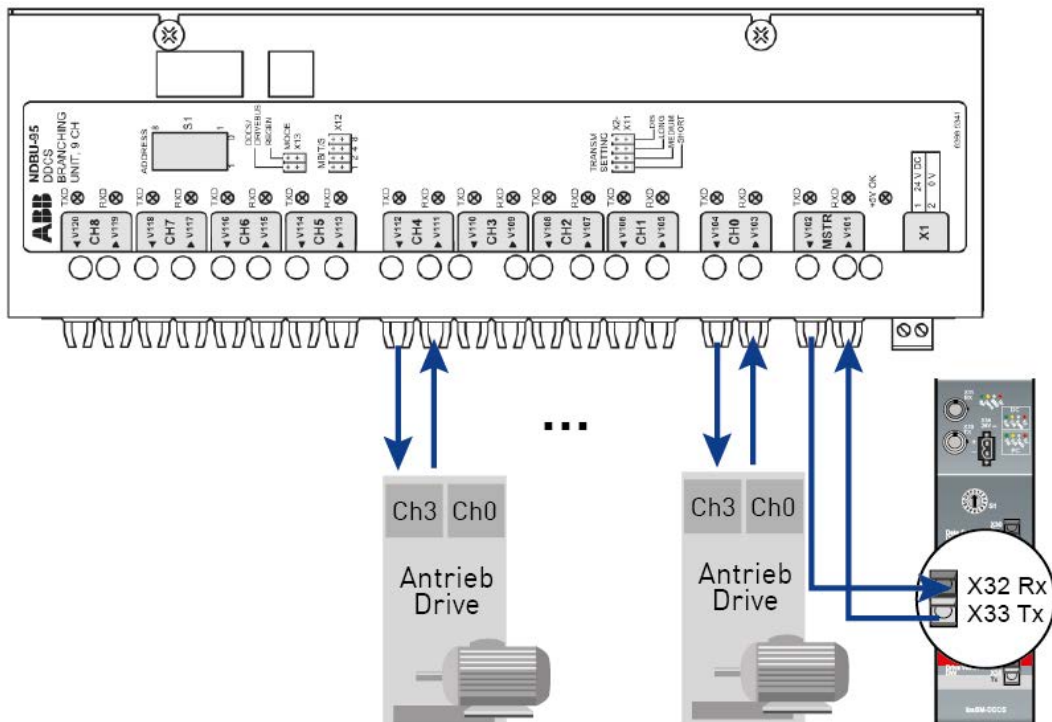




Settings at the branching unit NDBU-95

<p>Address setting (S1): Address range 76 ... 124 (01001100 ... 01111100) = 0x4C ... 0x7C</p> <p>Note: When NDBU-95 units are cascaded, each unit must have a unique address between 76 and 124. Units with higher addresses must be closer to the ibaBM-DDCS within the cascade. Use only even-numbered addresses.</p>	
<p>Operating mode selection (X13): Adjust to DDCCS/DRIVEBUS mode.</p>	
<p>Transfer rate (X12): Default setting CH3: 1 Mbit/s</p>	

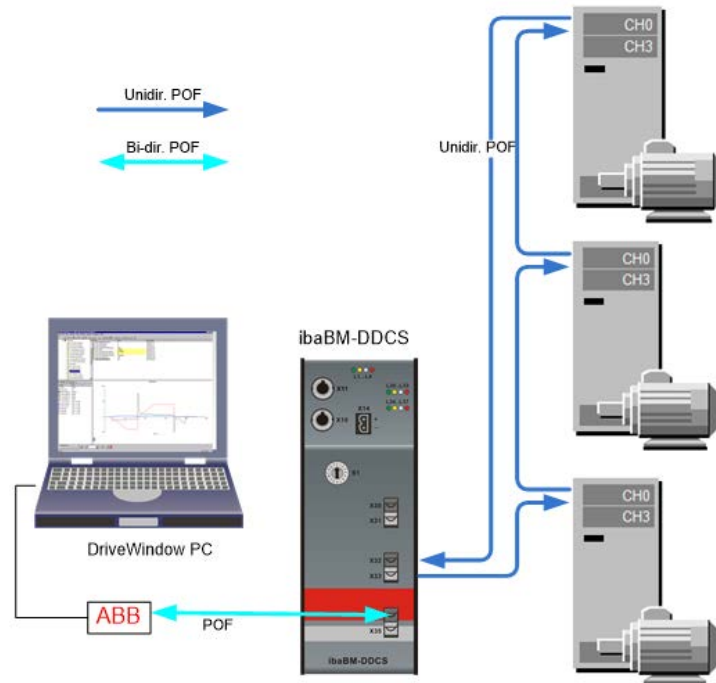
ibaBM-DDCS connection to NDBU-95 (parameter channel)



8.4.3 Ring topology

A ring topology may often be found in older plants.

The telegrams are sent from one drive to the next one via a FO ring. Every drive takes the data which are addressed to it from the data stream and sends the reply data to the next drive.

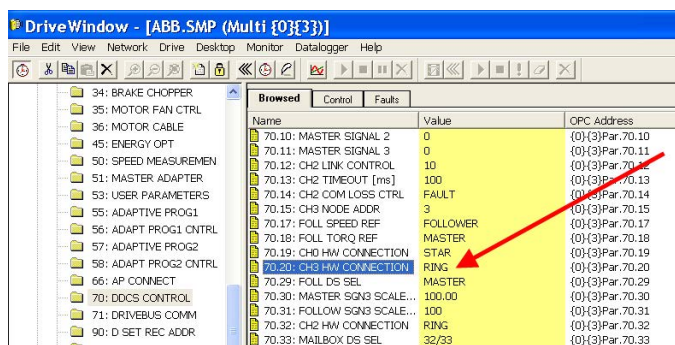


Note



When acquiring parameter in a ring topology, ensure that the connected drives are set to “Ring” topology.

In DriveWindow, the parameter “CH3 HW CONNECTION” in the parameter set “DDCS Control” of each drive has to be checked and set to “RING”.



8.4.4 Connection of a computer with DriveWindow

ibaBM-DDCS offers a third fiber optic connection for connecting an external computer with DriveWindow software. The communication between the DriveWindow computer and the drives is looped through ibaBM-DDCS, there is no active data exchange with ibaBM-DDCS.

Note

As long as the DriveWindow computer is active, *ibaBM-DDCS* slows down the active data query on the parameter channel and passes on the DriveWindow computer query via this connection. The passive logging of the signals (data set query) continues as usual.

8.5 Time response

The data acquisition cycle depends on the following parameters:

Timebase of the ibaBM-DDCS interface in ibaPDA:

Can be set in the *ibaPDA* I/O Manager under “ibaBM-DDCS - General - Time base”. Default value: *ibaPDA* acquisition timebase (I/O Manager – General).

The fastest time that can be set, depends on the number of values that is transferred via the FO connection, including all devices that are connected to the same link via cascade.

The data size is limited to 4060 Byte, the fastest timebase is 0.025 ms. *ibaPDA* gives a warning note, if the data size is too large or the timebase is too fast. Under “FOB-xx-D - Link x – Info” (connection status), you can see the current number of bytes that are transferred.

Access via Data Set:

The data cycle depends on the limitation on the FO side, which is described above.

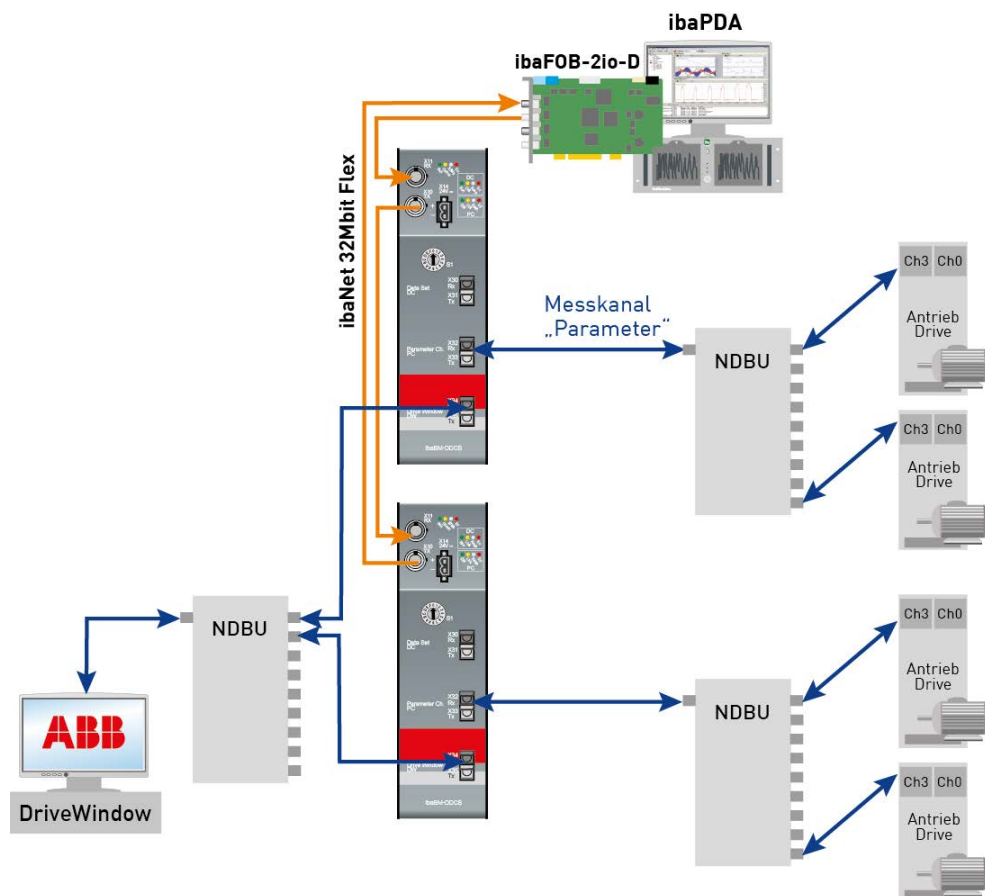
Access via Parameter:

As every variable is requested via handshake (request – response), the data cycle depends on the number of values (approx. 2 ms per analog value and per 16 digital bits), i.e. the fastest data cycle for 100 analog values is approx. 200 ms.

Tip



Request times become very high when many drives are connected. In order to improve this behavior, iba recommends using several *ibaBM-DDCS* devices.

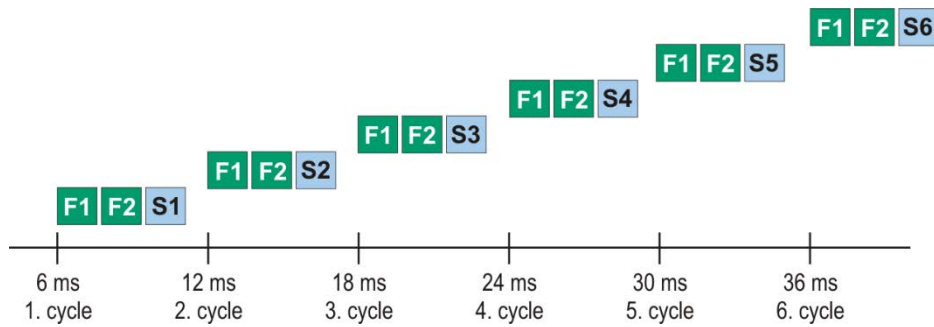


In *ibaPDA* you can assign the setting “Fast” to the parameter values. The sequence of the requested parameter values can be influenced by this setting. Values which are set to “Fast” are sent in each cycle. Additionally, only one slow parameter value (“Fast” not activated) will be sent with each cycle.

Example:

8 analog parameter values are captured in total: 2 values which are set to “Fast” and 6 slow values. The 2 fast values and 1 slow value are sent with each cycle, in total 3 values. Hence, one cycle takes 6 ms.

Each slow value is captured in every 6th cycle, that means every 36 ms.



Legend:	F1 F2	1st and 2nd parameter value „Fast“
	S1 ... S6	1st to 6th parameter value „Slow“

9 Configuration in ibaPDA

Note

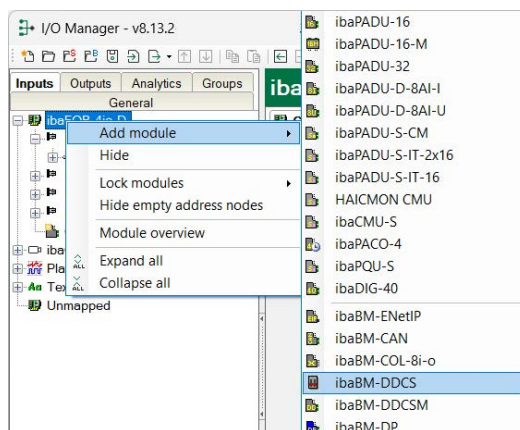


If the firmware version of the ibaFOB-D card is older than V2.00 (build 172), first update the firmware and then install the new version of the *ibaPDA* software. Please contact the iba support.

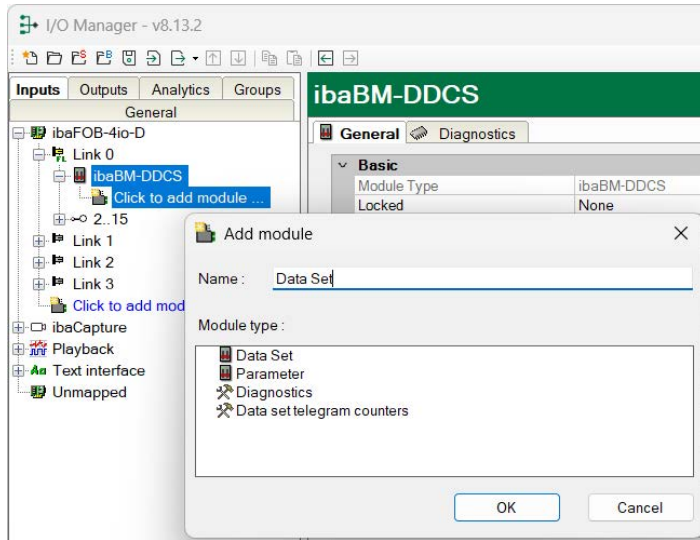
9.1 Configuration in the I/O Manager

If you want to use *ibaBM-DDCS* with *ibaPDA*, you have to configure the device in the *ibaPDA* I/O Manager.

1. Start the ibaPDA client and open the I/O Manager .
 2. Select the appropriate link of the ibaFOB card to which ibaBM-DDCS is connected.
 3. Click on the link with the right mouse button and select *Add module - ibaBM-DDCS*.
- *ibaBM-DDCS* is now displayed below the link for your FOB-D card.

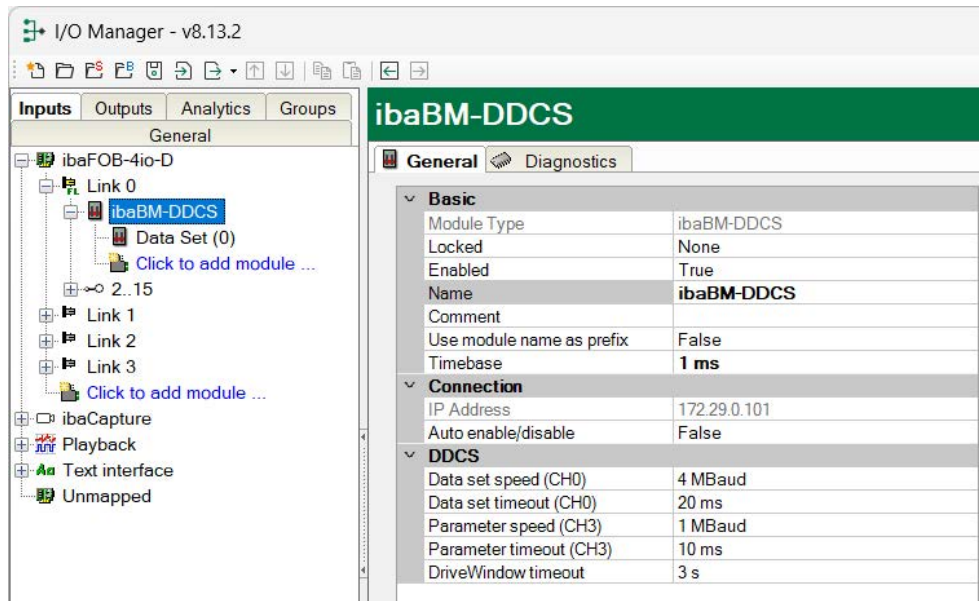


4. When the device has already been connected, select “Auto detect” in the context menu or click on the <New configuration> icon. Then, the connected devices will be automatically detected, the configured data will be read and the corresponding modules will be entered in the I/O Manager.
5. Right-click on the *ibaBM-DDCS* link and you can add the “Data Set,” “Parameters,” and “Diagnostics” modules. Starting with *ibaPDA* version 6.35, there is an additional module of the type “Data Set Telegram Counter.”



9.1.1 ibaBM-DDCS – General tab

In the *General* tab, make the basic settings and settings for the DDCS-specific channels.



Basic

Module Type (information only)

Indicates the type of the current module.

Locked

You can lock a module to avoid unintentional or unauthorized changing of the module settings.

Enabled

Enable the module to record signals.

Name

You can enter a name for the module here.

Comment

You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

Timebase

All signals of the module are sampled on this timebase.

Use module name as prefix

This option puts the module name in front of the signal names.

DDCS**Data set speed (CH0)**

Here you can select the speed of the data set channel; the default setting is 4 MBaud.

Data Set Timeout (CH0)

Here you can set a timeout for the data set channel.

Parameter speed (CH3)

Here you can select the speed of the parameter channel, default value: 1 MBaud

Parameter Timeout (CH3)

Here you can set a timeout for the parameter channel.

DriveWindow Timeout

Here you can set a timeout for the parameter channel.

Note

Make sure that the baud rates set here match the settings of the connected NDBU-95.

Connection**IP address**

The IP address of the device in the FOB-D network is displayed here. Please refer to the description in the ibaFOB-D manual.

Auto enable/disable

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

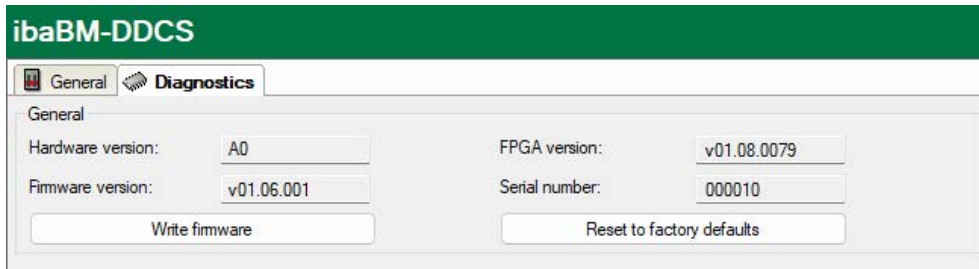
If this option is not enabled then *ibaPDA* will not start the acquisition when it cannot connect to the device.

Read configuration from device

This command allows you to read a configuration directly from the device.

9.1.2 ibaBM-DDCS - Diagnostics tab

In the *Diagnostics* tab, you can see the current version information and the serial number of the device.



Write firmware

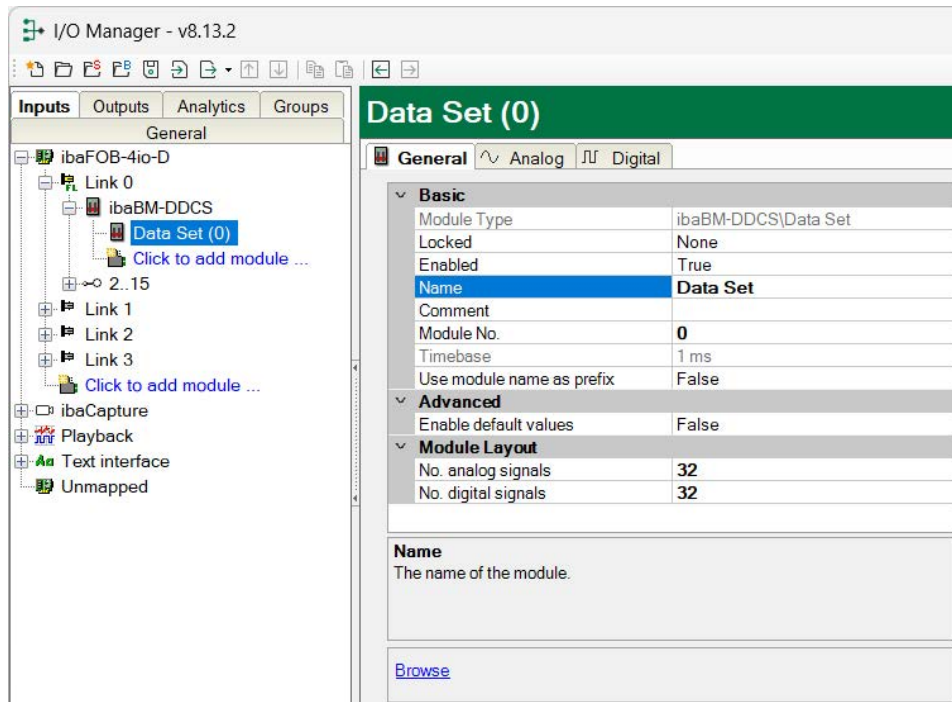
With this button it is possible to perform firmware updates. Select the update file [bmddds_XXX.iba](#) in the browser and start the update with <OK>. The update takes several minutes and must not be interrupted.

Reset to factory defaults

Any saved configurations will be deleted.

9.1.3 Module type Data Set

Here you can configure the basic settings for the Data Set module and select Data Set signals.



Basic

Module Type (information only)

Indicates the type of the current module.

Locked

You can lock a module to avoid unintentional or unauthorized changing of the module settings.

Enabled

Enable the module to record signals.

Name

You can enter a name for the module here.

Comment

You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

Modul No.

This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

Timebase

All signals of the module are sampled on this timebase.

Use module name as prefix

This option puts the module name in front of the signal names.

Advanced**Enable default values**

True: In case of a timeout, the last transmitted value is overwritten by the default value. The default value can be preset in the *Analog* and *Digital* tabs.

False: In case of a timeout, the last transmitted value will remain.

Module layout**No. analog signals**

Number of lines in the *Analog* tab

No. digital signals

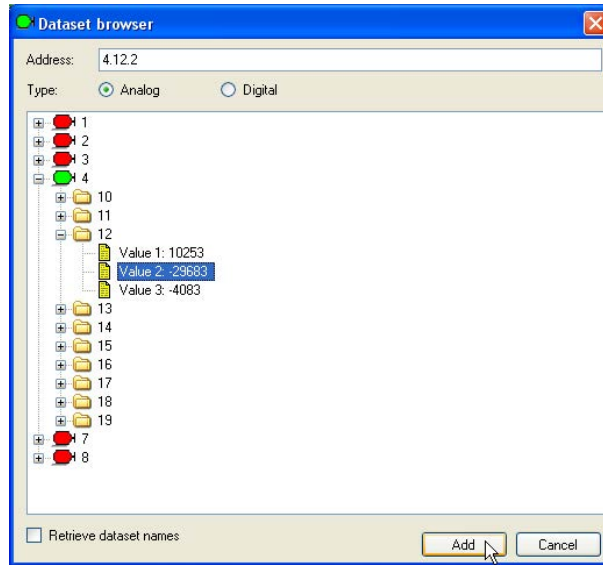
Number of lines in the *Digital* tab

Browse

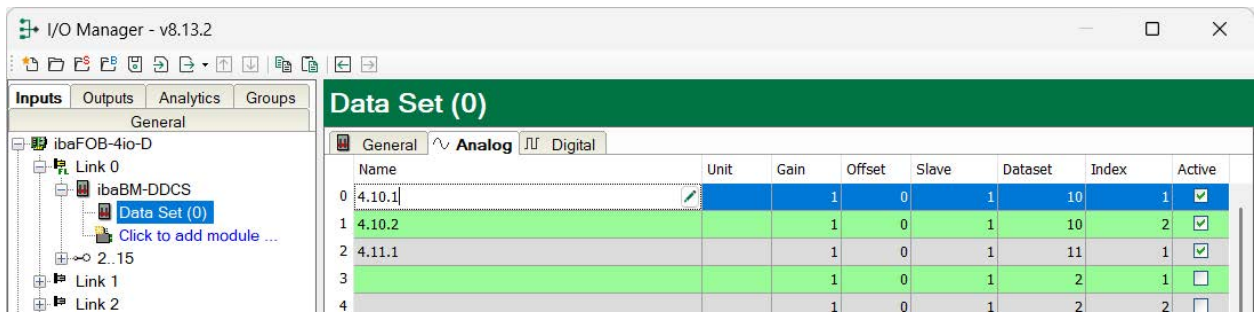
In order to select the data set signals, click on "Browse" in the bottom field. The data set browser will open and the nodes (drives) will be displayed. The symbols mean;

- Red node: no response received from the node
- Green node: response received from the node

In the tree structure, select the signal via the node number, the data set number and the index. The signal is added to the signal grid by double clicking on the desired signal or clicking on the <Add> button.



Depending on whether the selected type is analog or digital, the signal will appear on the *Analog* or *Digital* tab. Node number (slave), data set number and index are entered automatically.



Complete control words, status words and fault words can be captured as analog value and itemized by 16 bit-decoders in *ibaPDA*.

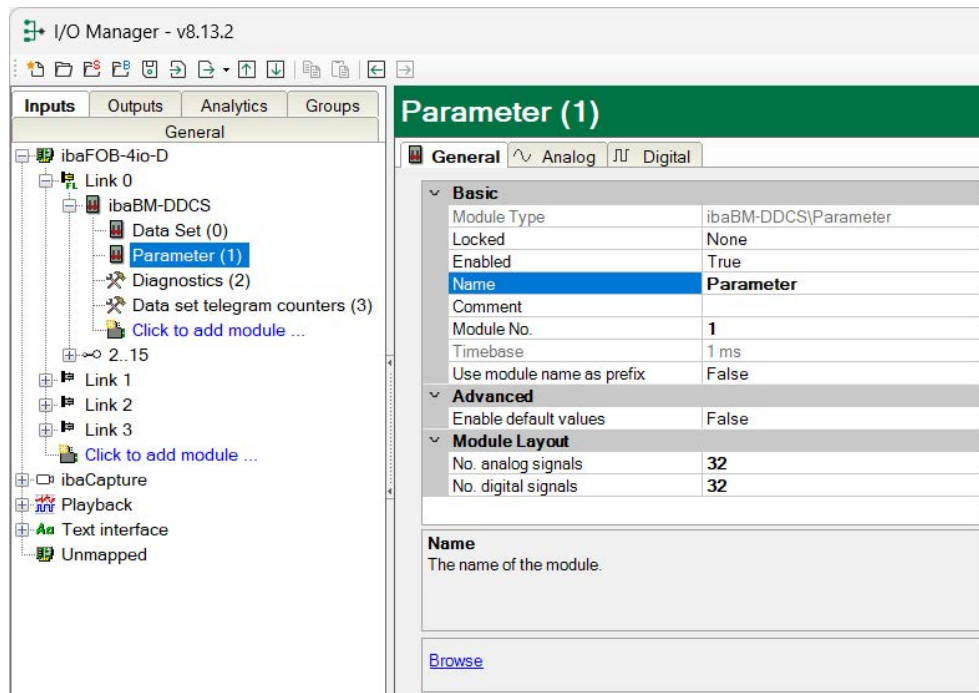
Note



Make sure, that a signal is not requested twice. In case of duplicate signals *ibaPDA* displays an error message when starting the acquisition.

9.1.4 Module type Parameter

Here you can configure the basic settings for the parameter module and select parameter signals.



Basic

Module Type (information only)

Indicates the type of the current module.

Locked

You can lock a module to avoid unintentional or unauthorized changing of the module settings.

Enabled

Enable the module to record signals.

Name

You can enter a name for the module here.

Comment

You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

Modul No.

This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

Timebase

All signals of the module are sampled on this timebase.

Use module name as prefix

This option puts the module name in front of the signal names.

Advanced

Enable default values

True: In case of a timeout, the last transmitted value is overwritten by the default value. The default value can be preset in the *Analog* and *Digital* tabs.

False: In case of a timeout, the last transmitted value will remain.

Module layout

No. analog signals

Number of lines in the *Analog* tab

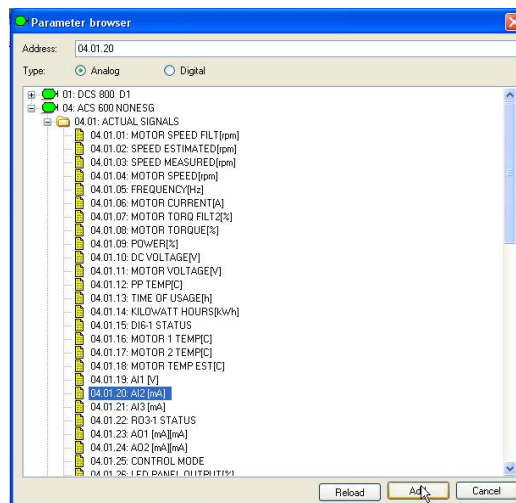
No. digital signals

Number of lines in the *Digital* tab

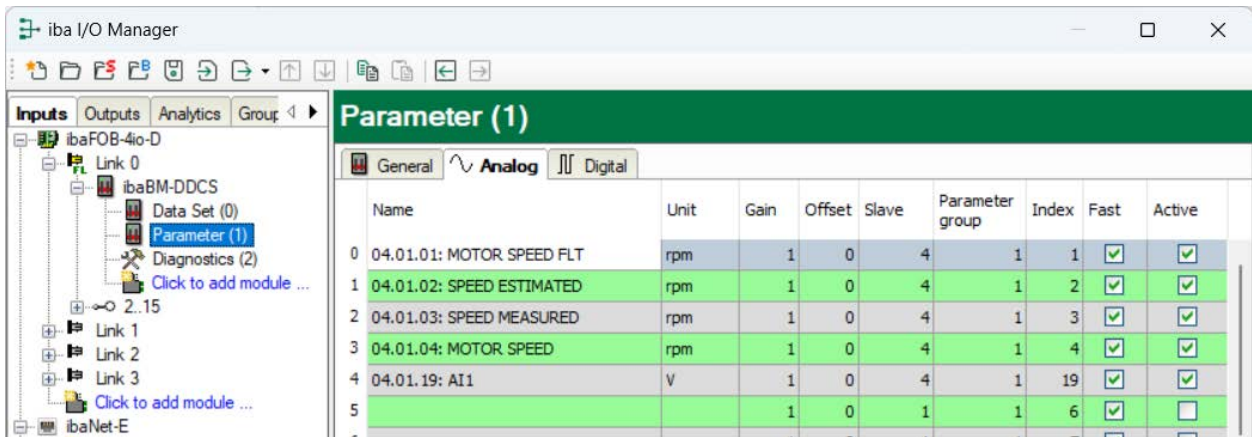
Browse

In order to select the parameter signals, click on “Browse” in the bottom field. The parameter browser will open and the nodes (drives) will be displayed. Only the active nodes (drives) will be displayed here.

In the tree structure, select the signal via the node number, the parameter group and the index number. The signal is added to the signal grid by double clicking on the desired signal or clicking on the <Add> button.



Depending on whether the selected type is analog or digital, the signal will appear on the *Analog* or *Digital* tab. Node number (slave), parameter number (parameter group) number and index are entered automatically.



A fast sampling rate is enabled by default in the column “Fast”. For signal values which change slowly, this setting can be manually disabled in order to reduce the load, see chapter ↗ *Time response*, page 32.

Complete control words, status words and fault words can be captured as analog value and itemized by 32 bit-decoders in *ibaPDA*.

By clicking on the <OK> button, all the settings will be applied to the device and the measurement will automatically start.

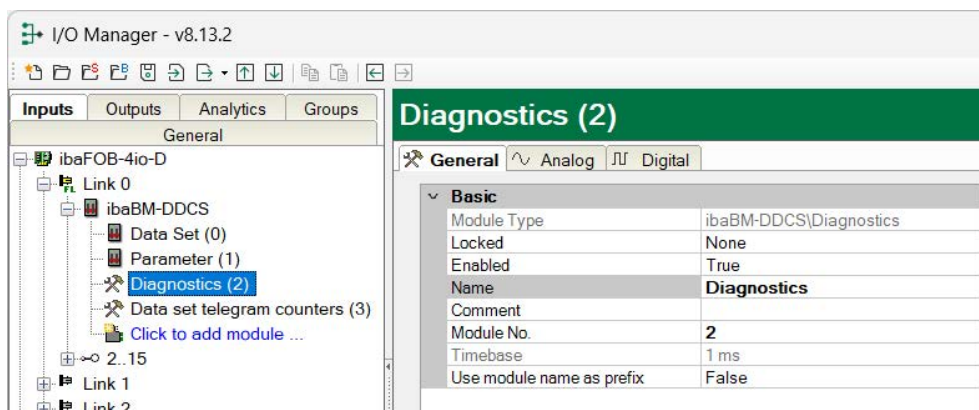
Note



Make sure, that a signal is not requested twice. In case of duplicate signals *ibaPDA* displays an error message when starting the acquisition.

9.1.5 Module type Diagnostics

Here you can configure the basic settings for the *Diagnostics* module.



Basic

Module Type (information only)

Indicates the type of the current module.

Locked

You can lock a module to avoid unintentional or unauthorized changing of the module settings.

Enabled

Enable the module to record signals.

Name

You can enter a name for the module here.

Comment

You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

Modul No.

This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

Timebase

All signals of the module are sampled on this timebase.

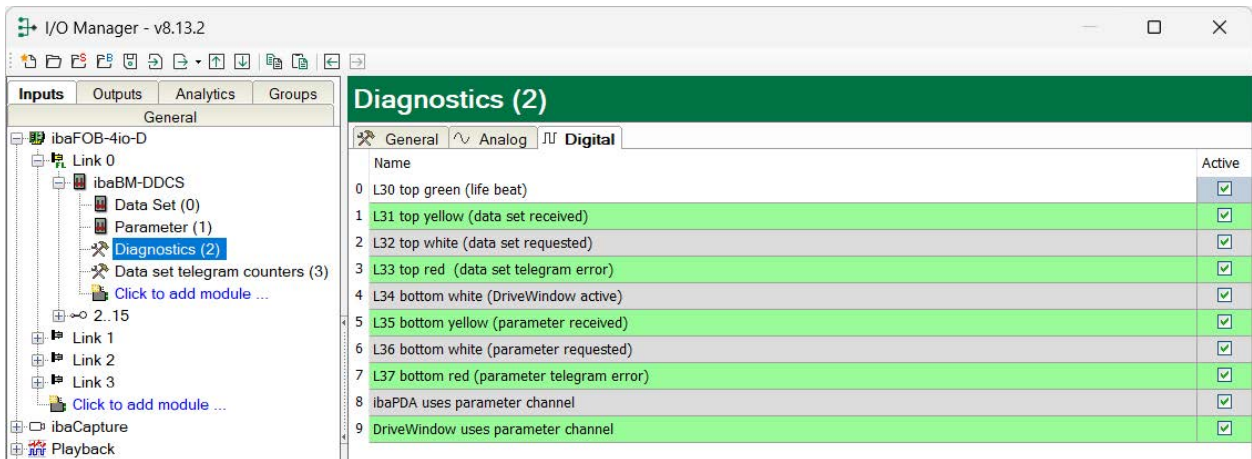
Use module name as prefix

This option puts the module name in front of the signal names.

The diagnostic data is pre-defined in the *Analog* and *Digital* tab. The diagnostic data can be visualized and saved like measured values.

The screenshot shows the 'I/O Manager - v8.13.2' window. On the left, a tree view shows the hierarchy: 'ibaFOB-4io-D' > 'Link 0' > 'ibaBM-DDCS' > 'Diagnostics (2)'. The main window displays the 'Diagnostics (2)' configuration tab, which is divided into 'General', 'Analog', and 'Digital' sub-tabs. The 'Analog' tab is active, showing a table of diagnostic parameters.

Name	Unit	Gain	Offset	Active
0 Counter "New configuration (request)"			1 0	<input checked="" type="checkbox"/>
1 Counter "New configuration (acknowledge)"			1 0	<input checked="" type="checkbox"/>
2 Number of data sets controller --> drives			1 0	<input checked="" type="checkbox"/>
3 Number of data sets drives --> controller			1 0	<input checked="" type="checkbox"/>
4 Access cycle time parameters FAST	ms		1 0	<input checked="" type="checkbox"/>
5 Access cycle time parameters SLOW	ms		1 0	<input checked="" type="checkbox"/>
6 Life counter 100ms			1 0	<input checked="" type="checkbox"/>
7 Life counter 1ms			1 0	<input checked="" type="checkbox"/>
8 Counter data set telegram OK			1 0	<input checked="" type="checkbox"/>
9 Counter parameter telegram OK			1 0	<input checked="" type="checkbox"/>
10 Counter data set telegram error			1 0	<input checked="" type="checkbox"/>
11 Counter parameter telegram error			1 0	<input checked="" type="checkbox"/>
12 Number of digital data set values			1 0	<input checked="" type="checkbox"/>
13 Number of analog data set values			1 0	<input checked="" type="checkbox"/>
14 Number of digital parameter values			1 0	<input checked="" type="checkbox"/>
15 Number of analog parameter values			1 0	<input checked="" type="checkbox"/>



Note



Beginning with *ibaPDA* version 6.35, the diagnose data is pre-defined by *ibaPDA*.

In *ibaPDA* version 6.34 or older, the user had to manually enter the diagnose data.

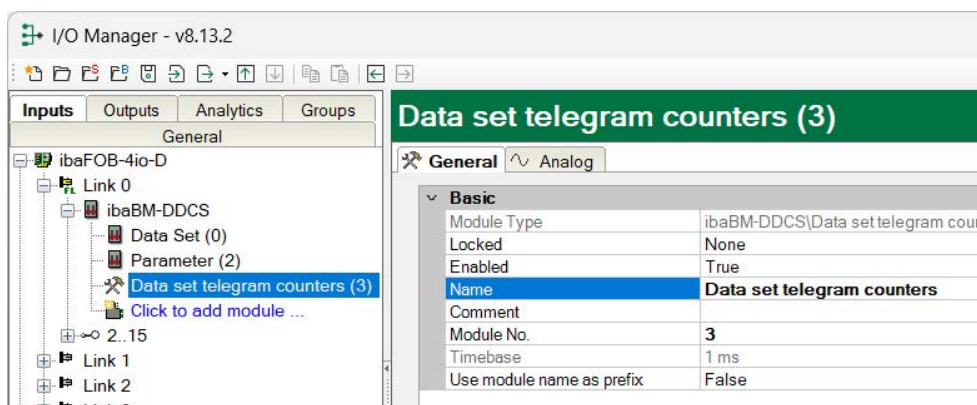
In this case, the number of analog and digital signals had to be entered in the *General* tab and the diagnose values with address and designation had to be manually entered in the *Analog* and *Digital* tabs.

For an easier configuration, pre-configured diagnose modules for the most important diagnostic data were available on the data medium “*iba Software & Manuals*”, which is included in delivery. The modules could be imported in the I/O Manager.

- Module 290: diagnostic counter for data set telegrams drive 1 – 16
- Module 291: diagnostic counter for data set telegrams drive 17 – 32
- Module 299: general diagnostic values, counter, error displays

9.1.6 Module type Data Set telegram counters

Here you can configure the basic settings for the *Data set telegram counters* module.



Basic

Module Type (information only)

Indicates the type of the current module.

Locked

You can lock a module to avoid unintentional or unauthorized changing of the module settings.

Enabled

Enable the module to record signals.

Name

You can enter a name for the module here.

Comment

You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

Modul No.

This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

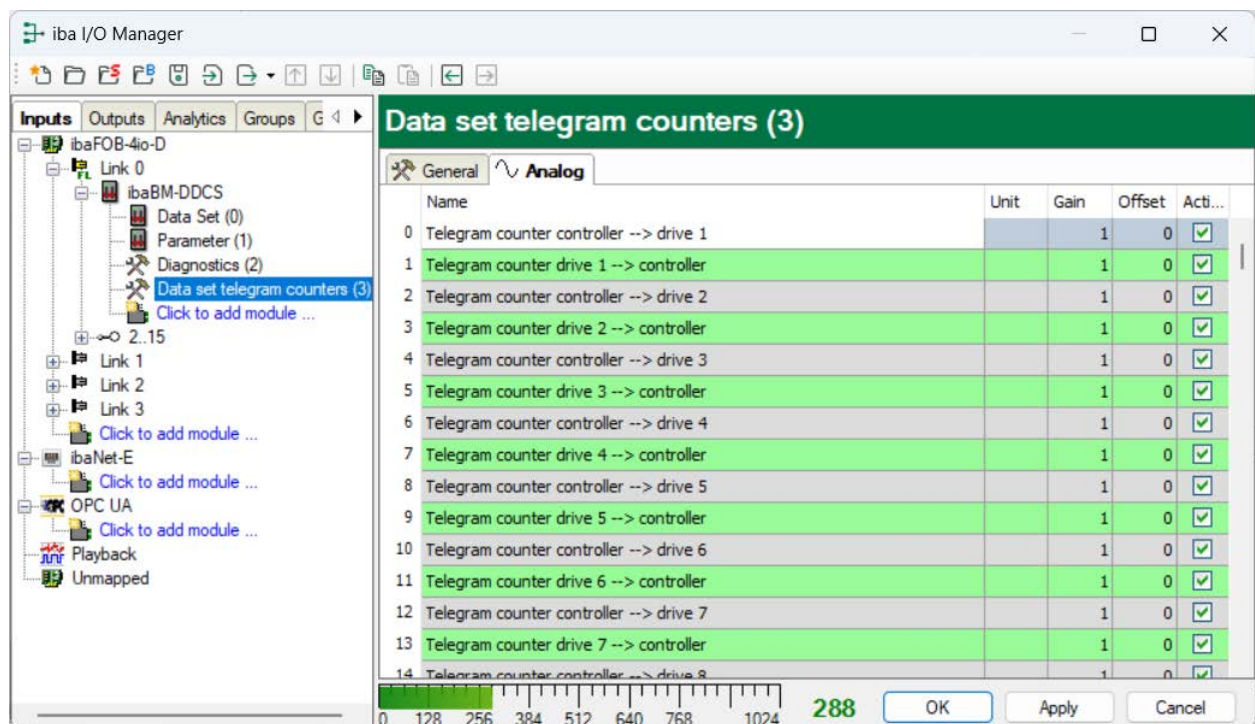
Timebase

All signals of the module are sampled on this timebase.

Use module name as prefix

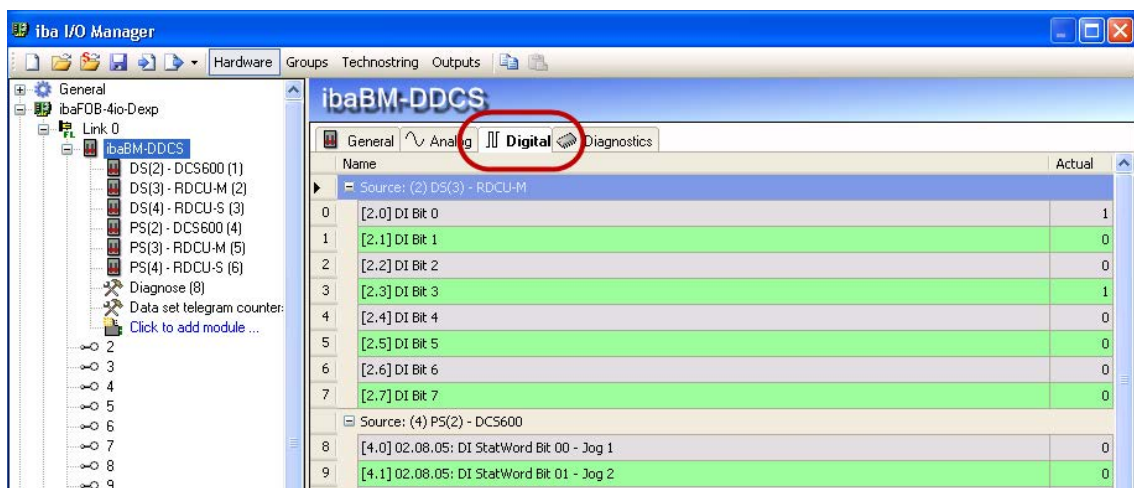
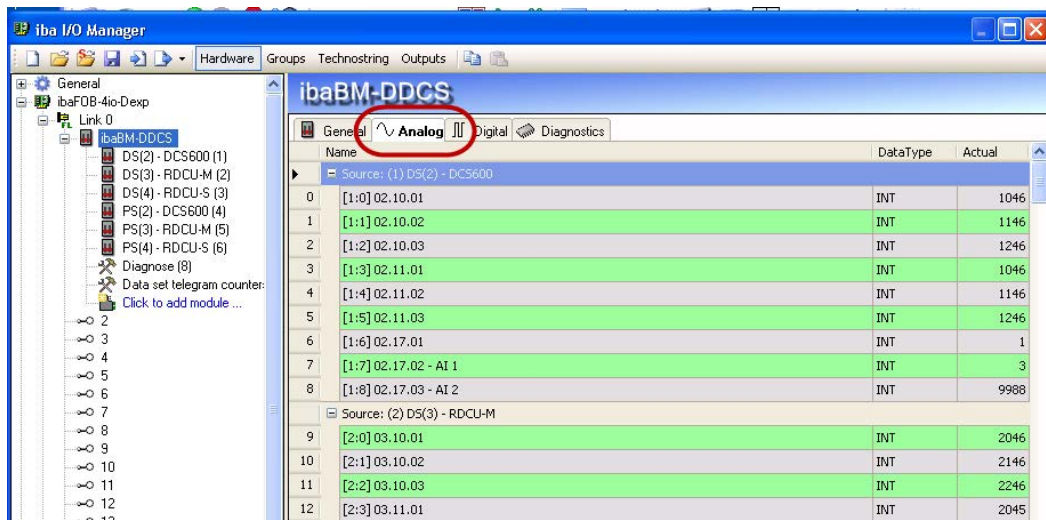
This option puts the module name in front of the signal names.

The telegram counters for the data exchange from controller to the drives 1 to 127 are pre-defined in the *Analog* tab. The telegram counters can be visualized and saved like measured values.



9.1.7 Display of the measured values

The Analog and Digital registers of the *ibaBM-DDCS* module display the current analog and digital measured values and diagnostic values.



All selected signals will be displayed in the *ibaPDA* signal tree. You can acquire and record the measured values as usual.



10 Technical data

10.1 Main data

Short description		
Name	ibaBM-DDCS	
Description	Bus monitor for DDCS drive bus	
Order number	13.120710	
DDCS interface		
Number	3 for one DDCS drive bus	
Connection technology	2 HBFV Versatile Link connector (1 mm POF) for RX and TX, simplex, duplex, without interlocking (per link)	
Typical application	Link0: Connected with control (only Rx is used here) Link1: Connected with measurement interface of the drives Link2: 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 transfer rate	32 Mbit/s	
Sampling rate	max. 40 kHz, freely adjustable	
Connection technology	2 ST connectors for RX and TX; iba recommends the use of FO with multimode fibers of type 50/125 µm or 62.5/125 µm; For information on cable length, see chap. . ↗ <i>Example for FO budget calculation, page 51</i>	
Transmitting interface (TX)		
Output power	50/125 µm FO cable	-19.8 dBm to -12.8 dBm
	62.5/125 µm FO cable	-16 dBm to -9 dBm
	100/140 µm FO cable	-12.5 dBm to -5.5 dBm
	200 µm FO cable	-8.5 dBm to -1.5 dBm
Temperature range	-40 °F to 185 °F (-40 °C to 85 °C)	
Light wavelength	850 nm	
Receiving interface (RX)		
Receiving sensibility ²⁾	100/140 µm FO cable	-33.2 dBm to -26.7 dBm
Temperature	-40 °F to 185 °F (-40 °C to 85 °C)	
Further interfaces, operating and indicating elements		

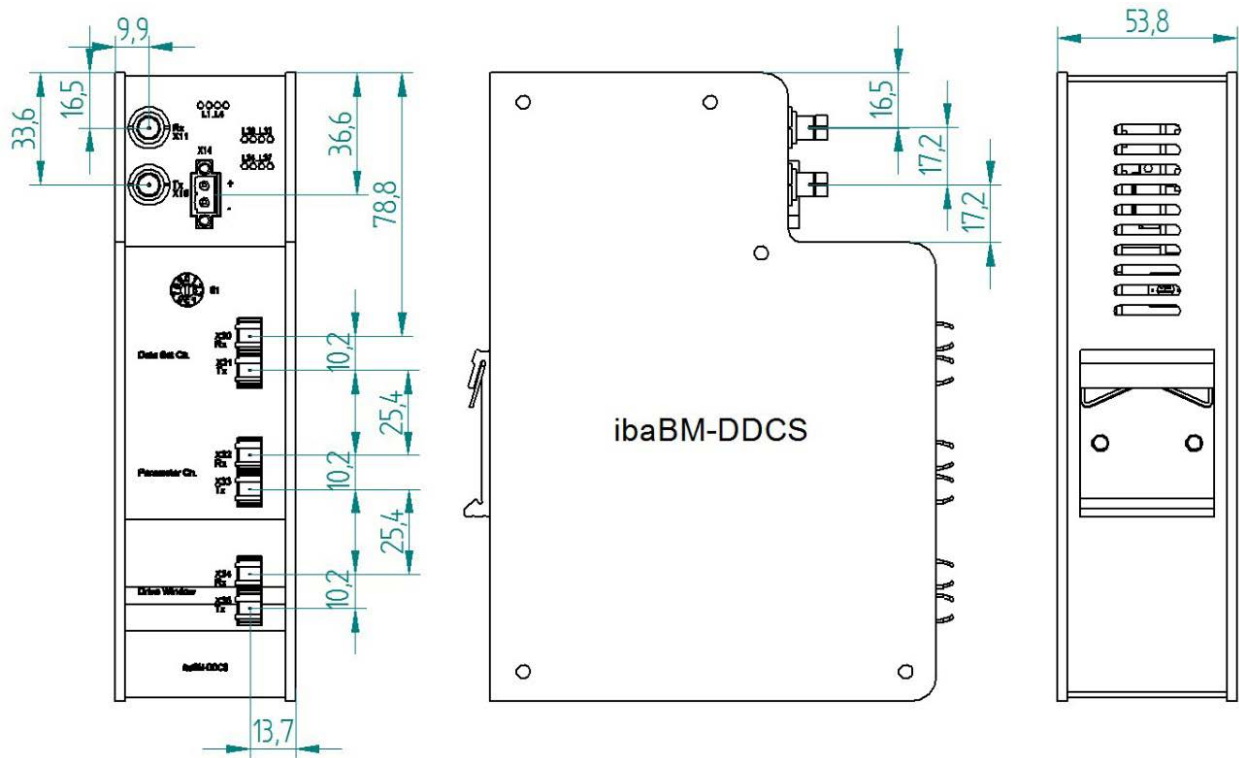
²⁾ Information on other fiber optic cable diameters not specified

Power supply	+24 V DC ±10 % not stabilized 2-pin connector, clamp-type terminal (0.2 mm ² to 2.5 mm ²), screw connection, included in delivery
Power consumption	max. 15 W
Rotary switch	Device address (in the cascade)
Indicators	4 LEDs for operating status of the device 8 LEDs for channel status
Operating and environmental conditions	
Cooling	passive
Operating temperature	-40 °F to 185 °F (0 °C to 50 °C)
Storage and transport temperature	-40 °F to 185 °F (-25 °C to 70 °C)
Humidity class acc. to DIN 40040	F, no condensation
Protection class	IP20
Mounting	DIN-rail mounting , vertical
Norms and standards	EMC: IEC 61326-1 FCC part 15 class A
Dimensions and weight	
Dimensions (Width x height x depth)	2.1 in x 7.4 in x 5.6 in (54 mm x 188 mm x 140 mm), including DIN-rail clip
Weight (incl. packaging)	approx. 2.2 lb (ca. 1.5 kg)

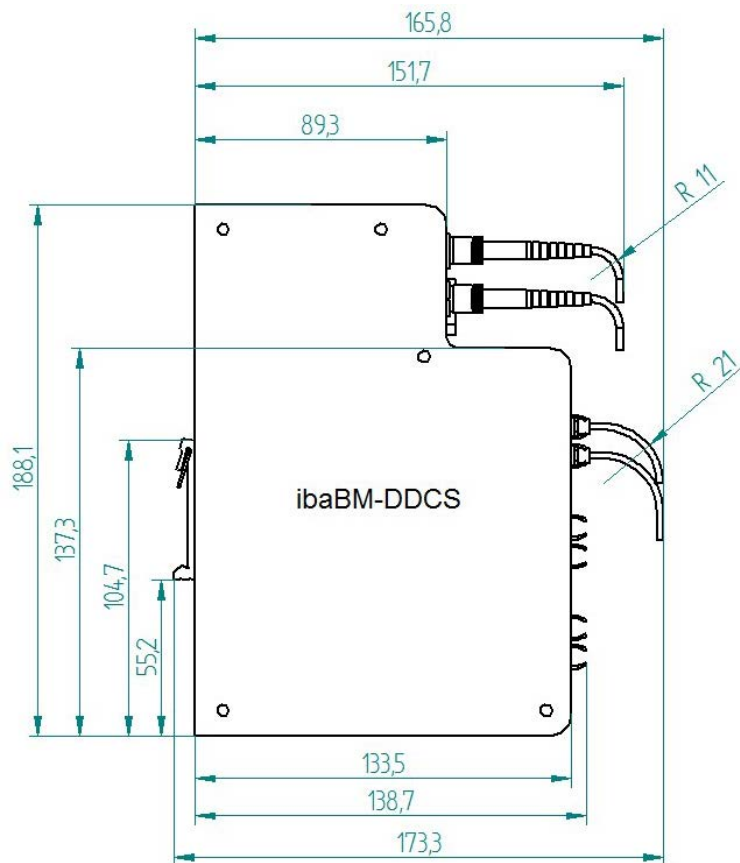
10.2 Declaration of conformity

<p>Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information</p> <p>Unique Identifier: 13.120710 ibaBM-DDCS</p> <p>Responsible Party - U.S. Contact Information iba America, LLC 370 Winkler Drive, Suite C Alpharetta, Georgia 30004 (770) 886-2318-102 www.iba-america.com</p> <p>FCC Compliance Statement This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.</p>

10.3 Dimensions



Dimensions *ibaBM-DDCS* (dimensions in mm)

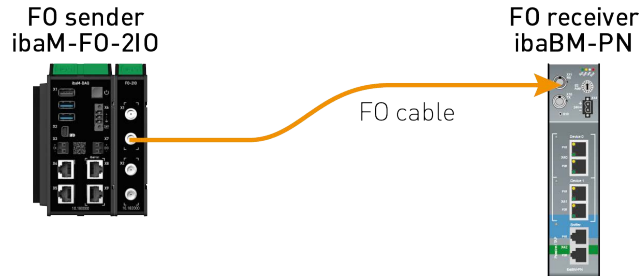


Dimensions *ibaBM-DDCS* with cable (dimensions in mm)

10.4 Example for FO budget calculation

A fiber optic link from an *ibaM-FO-2IO* module (FO transmitter) to an *ibaBM-PN* device (FO receiver) is used as an example.

The example only considers the transmission direction from the *ibaM-FO-2IO* module to the *ibaBM-PN* device. In actual operation, a connection from the *ibaBM-PN* device to the *ibaM-FO-2IO* module is also required.



The example refers to a P2P connection with an FO cable of type 62.5/125 μm . The light wavelength used is 850 nm.

The range of the minimum and maximum values of the output power or receiver sensitivity depends on the component and, among other things, on temperature and aging.

For the calculation, the specified output power of the transmitting device and, on the other side, the specified sensitivity of the receiving device must be used in each case. You will find the corresponding values in the relevant device manual in the chapter "Technical data" under "ibaNet interface".

ibaM-FO-2IO specification

Output power of FO transmitting interface		
FO cable in μm	Min.	Max.
62.5/125	-16 dBm	-9 dBm

ibaBM-PN specification

Sensitivity of FO receiving interface		
FO cable in μm	Min.	Max.
62.5/125	-30 dBm	

Specification FO cable

Refer to the data sheet for the fiber optic cable used:

FO cable	62.5/125 μm
Connector loss	0.5 dB connector
Cable attenuation at 850 nm wavelength	3.5 dB / km

Equation for calculating the FO budget (A_{Budget}):

$$A_{Budget} = |(P_{Receiver} - P_{Sender})|$$

$P_{Receiver}$ = sensitivity of FO receiving interface

P_{Sender} = output power of FO transmitting interface

Equation for calculating the fiber optic cable length (l_{Max}):

$$l_{Max} = \frac{A_{Budget} - (2 \cdot A_{Connector})}{A_{Fiberoptic}}$$

$A_{Connector}$ = connector loss

$A_{Fiberoptic}$ = cable attenuation

Calculation for the example ibaM-FO-2IO -> ibaBM-PN in the best case:

$$A_{Budget} = |(-30 \text{ dBm} - (-9 \text{ dBm}))| = 21 \text{ dB}$$

$$l_{Max} = \frac{21 \text{ dB} - (2 \cdot 0.5 \text{ dB})}{3.5 \frac{\text{dB}}{\text{km}}} = 5.71 \text{ km}$$

Calculation for the example ibaM-FO-2IO -> ibaBM-PN in the worst case:

$$A_{Budget} = |-30 \text{ dBm} - (-16 \text{ dBm})| = 14 \text{ dB}$$

$$l_{Max} = \frac{14 \text{ dB} - (2 \cdot 0.5 \text{ dB})}{3.5 \frac{\text{dB}}{\text{km}}} = 3.71 \text{ km}$$

Note

When connecting several devices as a daisy chain or as a ring (e.g., *ibaPADU-S-CM* with 32Mbit Flex), the maximum distance applies to the section between two devices. The FO signals are re-amplified in each device.

Note

When using fiber optics of the 50/125 μm type, a reduced distance (by approx. 30–40%) must be expected.

Note

In addition to conventional multimode cable types OM1 (62.5/125 μm) and OM2 (50/125 μm), the other cable types OM3, OM4 and OM5 of the 50/125 μm fiber can also be used.

11 Support and contact

Support

Phone: +49 911 97282-14

Email: support@iba-ag.com

Note



If you need support for software products, please state the number of the license container. For hardware products, please have the serial number of the device ready.

Contact

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