USER MANUAL

MB3 OPC Server v7.20-15f

OPC Server for ABB MasterBus 300
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MB3 OPC Server

OPC Server for ABB MasterBus 300

Program version 7.20-15f

Version information

Revision	Date	Description
7.20-1	2005-05-31	Created
7.20-2	2005-11-02	Added TANKCON
7.20-3	2006-03-02	Modified
7.20-4	2006-07-12	Added A&E OPC functionality
7.20-5	2006-10-24	Added TTD logs, DRICONS, DRICONE
7.20-6	2007-04-25	Added MMI number functionality
7.20-7	2007-06-18	Added Data Set
7.20-8	2007-10-24	Modified
7.20-9	2008-04-01	Added AC System Status objects
7.20-9c	2011-07-08	Added clock synch master
7.20-9d	2012-02-20	Added fast cyclic control
7.20-10	2012-02-24	Added MultiDAT object
7.20-11	2012-02-24	Merged versions for Win 7 and 2008 support
7.20-12	2012-11-02	Added device control address “!PRI_STAT”
7.20-13	2013-01-01	Added TTD subscription
7.20-14	2013-06-27	Added redundant network support
7.20-15	2016-02-09	Modified

CONTENTS

1 About the MB3 OPC Server

The MB3 OPC server is a version 7.20 OPC server developed using GE's OPC Server Toolkit and PCAUSA's Rawether for Windows. This MB3 OPC server provides the interface and communications protocol between ABB Controllers and your process control software using the Masterbus 300 protocol.

The Masterbus 300 protocol is operating on a standard IEEE 802.3 bus using 10 Mb half duplex.

1.1 References

- ABB GCOM Multidrop User's Guide 3BSE 000 165R0001
- ABB MasterNet User's Guide 3BSE 003 839R301

1.2 Abbreviations

Name	Description
MB300	MasterBus 300
MB3	MasterBus 300 OPC server three letter abbreviation.
Channel	In MB3 OPC server, the channel represents one network connection, e.g. one ABB Net
Device	In MB3 OPC server, the device represents one controller
Data Block	In MB3 OPC server, the Data Block represents one ABB process object, e.g. a PIDCON
Group	In an OPC client a group is a collection of objects that have the configuration in common.
Item	Each item in an OPC client represents one value, e.g. the MV for a PIDCON collected Cyclically. All items belong to a group.
AC	ABB Advant Controller
MP	ABB Master Piece
OS	ABB Operator Station

2 General Information

2.1 What is MasterBus 300

MasterBus 300 is the system communication used for older ABB systems like MP280, MV230, AC410, AC 450, IMS and OS520. It is an Ethernet communication that works in 10 MBit/s half duplex. The bus can work in a redundant or in a non-redundant way.

The same network is used for communication between AC's and between AC and OS. This means that interlocks etc between AC's coexist with indications to operator display.

2.2 ABB Communication

ABB communication consists of three types of subscriptions.

- **On Event** - This means that if event handling is enabled in the ABB object in the AC or MP, an update is received every time the status word changes for the object (including analogue objects) or an order is made towards the object. A request like this is automatically made if a Cyclic subscription is made.
- **Cyclic** - This exists in 1, 3 and 9 second subscriptions. This means that an update is received on a regular basis until an unsubscribe is performed.
- **On Demand** - This means that a poll is made every time an update is requested.

In a normal operator display in ABB OS520, every object is configured for a 9 sec cyclic update together with an event update if anything changes in the meantime. That means that if a display is opened, a 9 second subscription is started and when the display is closed it is cancelled.

If an object dialogue is opened (pop-up for a specific object), an one second cyclic update is activated and that one times out after about 120 seconds.

This means that for every given time, the majority of the objects have 9 sec update rate and very few have 3 or 1 second update.

If no process displays are open, then there is no update traffic continuously on the bus, except for historical trend handling

2.2.1 Process Objects

Process objects are function blocks that exist in the ABB Controller and that is used to build up the Controller Application.

This MB3 OPC server supports the following process object types:

- AI
- AO
- DI
- DO
- PIDCON
- PIDCONA
- RATIO
- MANSTN
- VALVECON
- MOTCON
- MMCX
- SEQ
- GENUSD
- GENBIN
- GENCON
- DAT
- TEXT
- TANKCON
- DRICONS

- DRICONE
- MULTIDAT

2.2.2 Data Set

Data Set is used for communication between Controllers. It consists of 24 DAT objects that are set up to be transmitted on a regular basis between two nodes. The MB3 OPC server can be set up to use Data Sets both receiving and sending.

2.2.3 System Objects

The ABB systems contain many system objects that are used when system pictures should be displayed. A system picture could contain Network Status, Node Status etc. These graphical displays are automatically generated on the OS Stations.

The MB3 OPC server contains system status objects to show system pictures for an Advant Controller 410 or 450.

2.2.4 TTD Historical Logs

These are log files that is set up in the ABB Controller through the function blocks TTDLOG and TTDVAR. These files can later be collected for historical trending in for example IMS.

The MB3 OPC server can collect primary TTD logs and write them to Proficy Historian via the Proficy Historian user API or write them to CSV files that can be imported.

2.2.5 Process Events

These events are used to build up the alarm list in the OS station. The handling for this is set up in the Controller. If configured there, the event is automatically sent to all participants on the bus that has subscribed for the events.

The MB3 OPC server has not full implementation of process events. If a process event is received then the object sending the event is extracted and a one-shot On-Demand poll is made for that object. The MB3 A&E OPC server can receive these events an show them with the time stamp from the controller.

The MB3 OPC server will write the process events to an internal text address. The MB3 OPC server has a buffer that can store up to 200 process events per device. The events in the buffer are removed one by one when they are read by a client. See 14.1.4b Device Control Item Ids. It will also be written to the MB3 OPC server window as information text.

You can choose between 4 different Process Event Text formats. This is set up at the device level for each controller in the MB3 Power Tool.

2.2.5a Format 1

This is the old format used in the 2 first versions of the MB3 OPC server.

The format of the text is:

- "Code:%d Reason:%d from Object:%s LF:%d LR:%d with Value:%d"

Where:

Field	Description
Code	Property code of the event. 1 – 239 and 65502 – 65535 Examples of event codes are: IND VALUE = 2 ERROR = 3 HI LIM2 = 4 HI LIM1 = 5 LO LIM1 = 6 LO LIM2 = 7

	ACT VALUE = 8 PRINT_BLK = 9 ALARM_BLK = 10 UPD_BLK = 11 DISTURBANCE = 12 See 24 Appendix D, Process Event Reasons and Codes
Reason	Reason of the event 0 - 13 NORMAL= 0 BLOCKED = 1 DEBLOCKED = 2 ALARM_ON = 3 ALARM_OFF = 4 SYS_TEXT = 5 VAL_CHANGE = 6 ACK_LIST = 7 CLEAR_PERSIST = 8 EVENT_ON = 9 EVENT_OFF = 10 STATCHK_ON = 11 UNACK_ON = 12 UNACK_OFF = 13 See 24 Appendix D, Process Event Reasons and Codes
Object	Object name that caused the process event
LF	Logical file number of the object that caused the process event
LR	Logical record number of the object that caused the process event
Value	The value sent with the process event. Can be a limit value or the actual value.

One example of a Process event text is:

- Code: 5 Reason: 3 from Object CALC_AI1 LF: 6 LR:17 with Value 80,00

This is an “alarm on” event from the AI object CALC_AI1 that it’s value has passed the hi limit1 value 80,00.

2.2.5b Format 2

The different parameters of the Process Event is split with the list separator setup in the Windows control panel, e.g. "," or ";".

The format of the text is:

Objectname,Description,Value,Unit,Reason,Property,TreatRef,GroupRef,PropTxt,EventTxt,LF,LR,Subsys,Class

Where:

Field	**Description**
Objectname	Object name sent with the Process Event. 1-20 characters
Description	Object Description sent with the Process Event. 1 – 28 characters
Value	The value sent with the Process Event. Can be a limit value or the actual value.
Unit	Unit of the value sent with the Process Event. 1 – 6 characters
Reason	Reason number sent with the Process Event. Values 0 – 13
Property	Property code sent with the Process Event. 1 – 239 and 65502 – 65535
TreatRef	Treat Reference sent with the Process Event.
GroupRef	Group Reference sent with the Process Event.
PropTxt	Property Text number sent with the Process Event
EventTxt	Event Text number sent with the Process Event
LF	Logical File of the object sent with the Process Event
LR	Logical Record of the object sent with the Process Event

SubSys	Subsystem (Process Section) of the object received with the Process Event
Class	Class of the object received with the Process Event

One example of a Process event text when the list separator is set to ",":

- "OBJECT1","OBJDESC",13.00,"hl",3,7,4,0,2,2,6,201,1,0

This is an “alarm on” event from the AI object OBJECT1 that it’s value has passed the lo limit2 value 13,00.

2.2.5c Format 3

The different parameters of the Process Event is split with the list separator setup in the Windows control panel, e.g. "," or ";". This is the same format as format 2 with the addition that it shows the date and time in the text.

The format of the text is:

DateTime,Objectname,Description,Value,Unit,Reason,Property,TreatRef,GroupRef,PropTxt,EventTxt,LF,LR,Subsys,Class

Where:

Field	Description
DateTime	Received date and time of the Process Event. Format is "YYYY-MM-DD HH:MM:SS.sss" where: YYYY = Year MM = Month DD = Day HH = Hour MM = Minute SS = Second sss = Millisecond
Objectname	Object name sent with the Process Event. 1-20 characters
Description	Object Description sent with the Process Event. 1 – 28 characters
Value	The value sent with the Process Event. Can be a limit value or the actual value.
Unit	Unit of the value sent with the Process Event. 1 – 6 characters
Reason	Reason number sent with the Process Event. Values 0 – 13
Property	Property code sent with the Process Event. 1 – 239 and 65502 – 65535
TreatRef	Treat Reference sent with the Process Event.
GroupRef	Group Reference sent with the Process Event.
PropTxt	Property Text number sent with the Process Event
EventTxt	Event Text number sent with the Process Event
LF	Logical File of the object sent with the Process Event
LR	Logical Record of the object sent with the Process Event
SubSys	Subsystem (Process Section) of the object received with the Process Event
Class	Class of the object received with the Process Event

One example of a Process event text when the list separator is set to ",":

- "2005-12-21 15:30:22.123","OBJECT1","OBJDESC",13.00,"hl",3,7,4,0,2,2,6,201,1,0

This is an “alarm on” event from the AI object OBJECT1 that it’s value has passed the lo limit2 value 13,00. The process event occurred the 21st december 2005 at 15:30:22.123.

2.2.5d Format 4

The different parameters of the Process Event is split with the list separator setup in the Windows control panel, e.g. "," or ";". This is the same format as format 3 with the addition that it has added the quality of the date and time.

The format of the text is:

DateTime,Objectname,Description,Value,Unit,Reason,Property,TreatRef,GroupRef,PropTxt,EventTxt,LF,LR,Subsys,Class,TimeQuality

Where:

Field	Description
DateTime	Received date and time of the Process Event. Format is "YYYY-MM-DD HH:MM:SS.sss" where: YYYY = Year MM = Month DD = Day HH = Hour MM = Minute SS = Second sss = Millisecond
Objectname	Object name sent with the Process Event. 1-20 characters
Description	Object Description sent with the Process Event. 1 – 28 characters
Value	The value sent with the Process Event. Can be a limit value or the actual value.
Unit	Unit of the value sent with the Process Event. 1 – 6 characters
Reason	Reason number sent with the Process Event. Values 0 – 13
Property	Property code sent with the Process Event. 1 – 239 and 65502 – 65535
TreatRef	Treat Reference sent with the Process Event.
GroupRef	Group Reference sent with the Process Event.
PropTxt	Property Text number sent with the Process Event
EventTxt	Event Text number sent with the Process Event
LF	Logical File of the object sent with the Process Event
LR	Logical Record of the object sent with the Process Event
SubSys	Subsystem (Process Section) of the object received with the Process Event
Class	Class of the object received with the Process Event
TimeQuality	Quality of the timestamp 0 = Good 1 = No time 2 = Uncertain

One example of a Process event text when the list separator is set to ",":

- "2005-12-21 15:30:22.123","OBJECT1","OBJDESC",13.00,"hl",3,7,4,0,2,2,6,201,1,0,0

This is an “alarm on” event from the AI object OBJECT1 that it’s value has passed the lo limit2 value 13,00. The process event occurred the 21st december 2005 at 15:30:22.123 with good time quality.

2.2.6 System Events

These events are used to build up the System Event list in the OS. The type of alarms that occur is typically when a Node is disconnected from the Net etc.

The MB3 A&E OPC server can receive these events an show them with the time stamp from the controller.

The MB3 OPC server writes these values to an internal text address. The MB3 OPC server has a buffer that can store up to 100 system events per device. The events in the buffer are removed one by one when they are read by a client. See 14.1.4b Device Control Item Ids. The events will also be written to the MB3 OPC server window as information text.

The format of the text is:

- Event Text: Real Parameter Int Parameters Ascii Parameters Digital Parameter

Where:

Field	Description

Event text	This text is received as a text index and then translated to a text from a text table inside the MB3 OPC server. If the MB3 OPC server recieves a text index it cannot translate it will write “Unknown System Event Text %d” with the text index received.
Real parameter	1 float parameter that can be transferred together with the system event. If no real parameter is sent then this field is blank. Format: “RealPar: value”
Int Parameters	2 int parameters that can be transferred together with the system event. If no int parameters are sent then this field is blank. Format1: “Int1: value1” with 1 int parameter Format2: “Int1: value1 Int2: value2” with 2 int parameters
Ascii Parameters	5 ascii parameters that can be transferred together with the system event. If no ascii parameters are sent then this field is blank. Format1: “Ascii1: value1” Format2: “Ascii1: value1 Ascii2: value2” Format3: “Ascii1: value1 Ascii2: value2 Ascii3: value3” Format4: “Ascii1: value1 Ascii2: value2 Ascii3: value3 Ascii4: value4” Format5: “Ascii1: value1 Ascii2: value2 Ascii3: value3 Ascii4: value4 Ascii5: value5”
Digital Parameter	1 digital parameter that can be transferred together with the system event. If no digital parameter is sent then this field is blank. Format: “DigPar: value”

One example of a System event text is:

- MN STATUS Conn. with netw/node: Int1: 31 Ascii1: 11 Ascii2: 10

This is a system event from node 10 on network 11 that it has established a connection with node 31.

2.2.7 System Texts

If an order is illegal then the MB3 OPC server receives a system text. These texts are sent out typically when an operator tries to set a value outside its limits.

The MB3 A&E OPC server can receive these events and show them as simple events.

The MB3 OPC server will write these system texts to an internal text address. The MB3 OPC server has a buffer that can store up to 100 system texts per device. The texts in the buffer are removed one by one when they are read by a client. See 14.1.4b Device Control Item Ids. The texts will also be written to the MB3 OPC server window as warning text.

In the OPC DA interface the texts will start with a local time stamp in the format “YYYY-MM-DD HH:MM:SS.sss”.

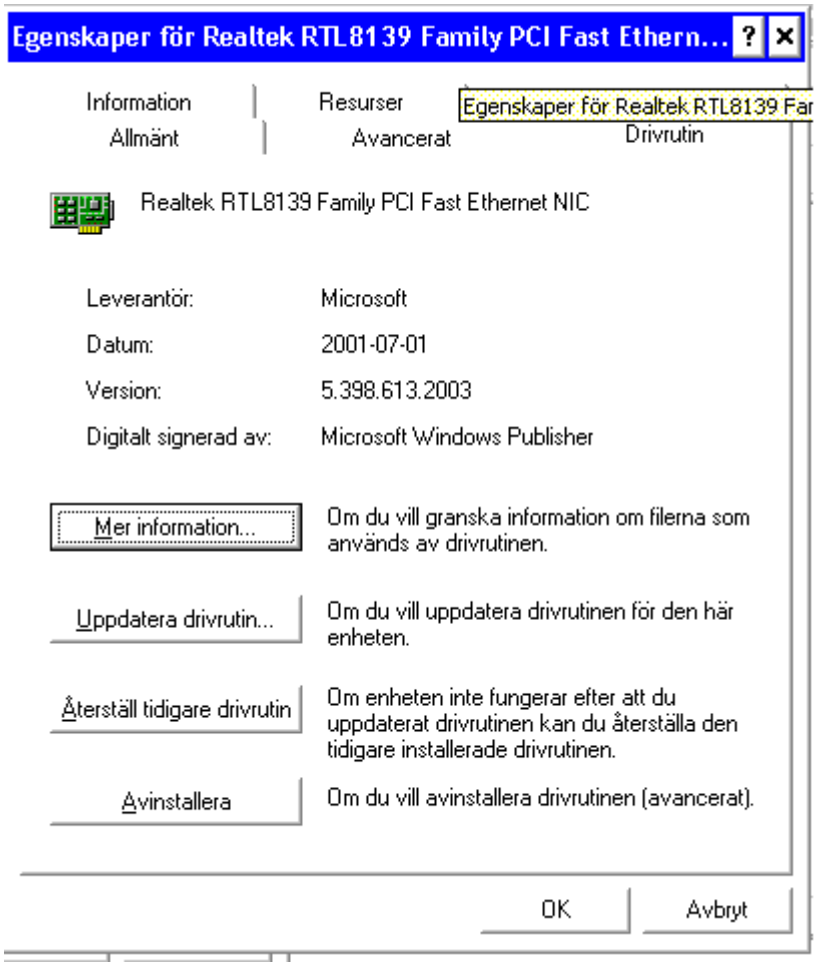
Every text starts with “MMI:X” where X is the MMI number the text is intended for and then follows the received text. The text is received as a text index and is then translated to a text from a text table inside the MB3 OPC server. If the MB3 OPC server receives a text index it cannot translate it will write “Unknown System text received. Text Index [%d]” with the text index received.

3 Supported Hardware

3.1 In the Local Computer

The MB3 OPC server uses a standard 802.3 Ethernet adapter. Make sure to set up the Ethernet Adapter as described in chapter 9 Setting Up the Adapter in the Local Computer.

Note! We have seen problems using an integrated Ethernet adapter of the type shown in the picture below. This type of adapter filtered some messages that are needed for the Masterbus 300 protocol to work in a right way.



3.2 In ABB

On the ABB Master side, the Masterbus 300 communication software is implemented on a microprocessor- based communication board.

- DSCS 140 in MG230/1 and MP260/1, MP280/1
- Communication module CS513 in processor module PM 150 in AC410
- Communication module CS513 with Carrier board SC510 or SC520 in AC450

Check the ABB MasterNet Users guide for more information and see 5 Tested Communication Configurations for tested setup in the controllers.

4 Software

4.1 Supported Software

4.1.1 OPC Clients

The MB3 OPC server supports “OPC Data Access 1.0a” and “OPC Data Access 2.05” and can be accessed from OPC clients.

4.1.2 GE Software

iFIX version 2.1 or greater

4.1.3 Operating System

Windows XP
Windows 2003 server
Windows 7, 32 and 64 bit
Windows 10
Windows 2008, 32 and 64 bit
Windows 2012 R2
Windows Server 2016
Windows Server 2019
Windows Server 2022

4.2 Required Software

4.2.1 Rawether for Windows

The Ethernet adapter is accessed via PCAUSA’s Rawether for Windows software. The following PCAUSA’s Rawether for Windows files will be installed when the MB3 OPC server is installed.

- “W32N55.DLL” to the installation directory
- “MB3SP50.SYS” or “MB3SP60.SYS” in the “System32\Drivers” directory.

An Administrator must do the installation. For Windows Vista or above the setup must be executed with “Run As Administrator” privileges.

4.2.2 In the ABB Controller

The ABB controller must be loaded with a Operator Functions module. See name of the module below:

- QCxx-OPFxx in AC410
- QCxx-OPFxx in AC450
- QMV800 in MP200/1

5 Tested Communication Configurations

The MB3 OPC server has been tested with ABB controllers with the following communication setup.

5.1 MB3 OPC Server

The channel settings for the MB3 OPC server communicating with the controllers have been set as below.

5.1.1 Channel Settings

- Protocol MB300
- Cycle Time 10
- Idle Tmo -1
- Connect Tmo 1000
- Disconnect Tmo 100
- Re-assembly Tmo -1
- Between Ack 3
- Credit 4
- Retries 3

5.2 ABB Master Piece 280/1

5.2.1 Hardware

- DSCS140 with Switches S10 and S11 set to F = variable frame size.

5.2.2 Software

5.2.2a Network Layer (NL)

- DISTSIZE 51
- FILTER 0
- OVERRIDE 0

5.2.2b TL Data Base Element

- PCLASS 4
- NUMTCCB 132

5.2.2c TU Data Base Element

- MAXSLEN 512
- IDLET -1
- CONT 1000
- DISCT 1000
- REAST -1
- BTWACK 3
- CREDIT 4

5.2.2d BM DataBase Element

- BLKSIZE 2
- LOWCLASS 700
- HICLASS 300

5.2.2e NM Data Base Element

- STASIZE 4096
- LPSIZE 125

5.3 ABB Advant Controller 410

5.3.1 Hardware

- CS513 with strap group S1 set to protocol type 1 = MB300 standard.

5.3.2 Software

5.3.2a Network Layer Data Base Element (NETWL)

- PROT MB300
- CYCLET 10
- DIST 51
- FILTER 0
- OVERRID 0
- RECBUFF 42

5.3.2b TL Data Base Element

- PCLASS 4
- NUMTCCB 200

5.3.2c TU Data Base Element

- MAXSLEN 512
- IDLET -1
- CONT 1000
- DISCT 100
- REAST -1
- BTWACK 3
- CREDIT 4

5.3.2d BM Data Base Element

- BLKSIZE 2
- LOWCLASS 700
- HICLASS 300

5.3.2e NM Data Base Element

- STASIZE 4096
- LPSIZE 125

5.4 ABB Advant Controller 450

5.4.1 Hardware

- CS513 with strap group S1 set to protocol type 1 = MB300 standard.

5.4.2 Software

5.4.2a Network Layer Data Base Element (NETWL)

- PROT MB300
- CYCLET 10
- DIST 51
- FILTER 0
- OVERRID 0
- RECBUFF 42

5.4.2b TL Data Base Element

- PCLASS 4
- NUMTCCB 200

5.4.2c TU Data Base Element

- MAXSLEN 512
- IDLET -1
- CONT 1000
- DISCT 100
- REAST -1
- BTWACK 3
- CREDIT 4

5.4.2d BM Data Base Element

- BLKSIZE 2
- LOWCLASS 700
- HICLASS 300

5.4.2e NM Data Base Element

- STASIZE 4096
- LPSIZE 125

6 Application Design Considerations Using OPC Clients

6.1 General

The main design consideration that should guide the application is to minimize bus load. The MB3 OPC server will not request any subscriptions if there aren't any requests from any OPC clients. The startup OPC Quality of all data blocks is Uncertain. The OPC Quality will not change until a client requests for data from a data block or if the MB3 OPC server receives a process event that trigs a demand one shot poll of a data block.

Note! The MasterBus 300 bus load must not exceed 2000 signals per second because, if it does, the response time increases drastically.

6.1.1 Access Time

All Data Blocks in the MB3 OPC server can have an Access Time configured. The access time handles whether or not that type of communication should be active or not. If we look at, for example, an AI that is connected to an operator display through 9 sec Cyclic Subscription.

- When the operator display is opened, *the OPC client must set the OPC Flag called Active to TRUE* for the AI Object. When the active flag is set the MB3 OPC server sets up a Cyclic subscription. At the same time the Controller sets up an Event Subscription automatically.
- As long as the operator display is open, an update is received every 9 sec and/or when an event occurs (e.g. alarm)
- When the display closes, *the OPC client must set the OPC Flag called Active to FALSE* for the AI Object. Then the Access time starts to count down. When it has expired, the subscription is cleared and the bus load is minimized.

6.2 Display Addressing

All objects in an operator display should be addressed to 9 sec Cyclic updates or an even higher On-Demand rate.

6.2.1 Pop-up

When a pop-up is selected in a process display, then a specific bit in the MB3 OPC server for the data block should be set (Data Block Control Item !C_FAST). That bit tells the MB3 OPC server to subscribe for Fast Cyclic updates. After two minutes the fast cyclic updates falls back to normal cyclic updates.

If any orders is made in the pop-up, then the bit should be set again to reset the two minutes timer for fast updates. If the display is closed, the bit that trigs for Normal Cyclic updates (Data Block Control Item !C_NORMAL) should be set to minimize bus load.

6.3 Alarms

All items that should generate alarms in the client system should be addressed to the status bits of the object with the subtype set to "E" = the Event address in the MB3 OPC server. If an operator display is active at the time of the alarm, then there is an active Event Subscription and the object will be updated.

If no operator display is open, then the MB3 OPC server will receive a Process Event. When that occurs, there will be a one-shot On-Demand poll for the object that sent out the Process Event. You can turn off the Demand poll option per controller if you don't want the MB3 OPC server to do demand polls when it receives process events.

Note! If the MB3 OPC server receives many process events within one second from the same obejct it will not manage to do a demand poll for each of those events, but at least one demand poll will be sent.

This means that there are two requirements for making alarms work:

- All Process Objects that should be able to generate alarms/events must be configured in the MB3 OPC server.
- All alarm conditions should be configured and generated in the ABB Controller and not on the client side. This means that if a limit alarm for an AI is requested, that should be set up in the

Controller so that the controller sends the alarm event driven. One should never collect a process object continuously and then set the limits on the client side. This will cause too much bus load.

6.4 Continuously Update of Object

6.4.1 Historical Trends

Most signals should be connected with a 30 sec On-Demand polling. The rest could normally be connected to 9 sec Cyclic request. Primary TTD logs can be collected and written to Proficy Historian via the Proficy Historian user API or written to CSV files that can be imported.

One should always be aware of the bus load that historical values generate.

6.5 Sending Orders to Objects

Before you can send any orders to a object in the ABB controller the object has to be selected. Each object type except DAT objects has a selected bit. This bit can typically be used in object pop-up pictures. When you open a pop-up picture for an object the selected bit can be set and then you can do your orders to the object. When you close the pop-up picture for the object you must do deselect to let other nodes access the object.

You can use the datablock control Item ID "!ORDER_MMI:Name" to control the MMI number 1 – 4 to use when sending orders to the object configured in the datablock. Default the MB3 OPC server uses MMI number 1.

Selection and deselection is taken cared of automatically in the MB3 OPC server when sending orders to DAT objects. The MB3 OPC server first selects the DAT object, then sends the VALUE order and finally deselects the DAT object. DAT objects always uses MMI number 1.

6.6 Continuously Order to Object

This type of communication normally invokes data mirroring between different brands of PLC Systems. This could also apply to supervisory control systems.

This type of orders should be handled through Data Set communication to minimize bus load. If this not is possible DAT objects are the best solution for data mirroring.

Note! If you use DAT booleans for data mirroring then have separate DAT booleans for reading and writing to avoid that bits are overwritten with old data. DAT booleans are written with all 32 bits in one message.

6.7 Building the MB3 OPC Server Configuration

If a node sends out a request for a name translation of an object name that does not exist in any database on the MB300 network then this name translation request will be sent around on the network forever. The only way to remove those name translation requests from the network is to use special software from ABB. The best way to avoid non-existent object names in your configuration is to create a CSV configuration file that is based of object names from reported BAX files from the ABB controllers. The BAX file is a text file dump of the database in a controller.

7 Application Design Considerations Using FIX

7.1 General

The main design consideration that should guide the application is to minimize bus load. The MB3 OPC server will not request any subscriptions if there aren't any requests from database blocks from FIX database. The startup Quality of all data blocks is Uncertain. The OPC Quality will not change until a FIX database block requests for data from a data block or if the MB3 OPC server receives a process event that trigs a demand one-shot poll of a data block.

Note! The MasterBus 300 bus load must not exceed 2000 signals per second because, if it does, the response time increases drastically.

7.1.1 Access Time

Use Analog Register and Digital Register database blocks for all values in process displays. All Data Blocks in the MB3 OPC server can have an Access Time configured. The access time handles whether or not that type of communication should be active or not. If we look at, for example, an AI process object that is connected to an operator display through 9 sec Cyclic Subscription.

- When the operator display is opened the Analog Register or Digital Register database block accesses the AI Object data block. When the data block is accessed the MB3 OPC server sets up a Cyclic subscription. At the same time the Controller sets up an Event Subscription automatically.
- As long as the operator display is open, an update is received every 9 sec and/or when an event occurs (e.g. alarm)
- When the operator display closes the Analog Register or Digital Register stops accessing the AI Object data block. Then the Access time starts to count down. When it has expired, the subscription is cleared and the bus load is minimized.

7.2 Display Addressing

All objects in an operator display should be addressed to 9 sec Cyclic updates or an even higher On-Demand rate used together with Analog or Digital Register database blocks.

7.2.1 Pop-up

When a pop-up is selected in a process display, then a specific bit in the MB3 OPC server for the data block should be set (Data Block Control I/O address !C_FAST). That bit tells the MB3 OPC server to subscribe for Fast Cyclic updates. After two minutes the fast cyclic updates falls back to normal cyclic updates.

If any orders is made in the pop-up, then the bit should be set again to reset the two minutes timer for fast updates. If the display is closed, the bit that trigs for Normal Cyclic updates (Data Block Control I/O address !C_NORMAL) should be set to minimize bus load.

7.3 Alarms

All database blocks that should generate alarms in the FIX system should be addressed to the status bits of the object with the subtype set to "E" = the Event address in the MB3 OPC server. If an operator display is active at the time of the alarm, then there is an active Event Subscription and the object will be updated.

If no operator display is open, then the MB3 OPC server will receive a Process Event. When that occurs, there will be a one-shot On-Demand poll for the object that sent out the Process Event. You can turn off the Demand poll option per controller if you don't want the MB3 OPC server to do demand polls when it receives process events.

Note! If the MB3 OPC server receives many process events within one second from the same obejct it will not manage to do a demand poll for each of those events, but at least one demand poll will be sent.

This means that there are two requirements for making alarms work:

- All Process Objects that should be able to generate alarms/events must be configured in the MB3 OPC server.
- All alarm conditions should be configured and generated in the ABB Controller and not on the client side. This means that if a limit alarm for an AI is requested, that should be set up in the Controller so that the controller sends the alarm event driven. One should never collect a process object continuously and then set the limits on the client side. This will cause too much bus load.

7.4 Continuously Update of Object

7.4.1 Historical trends

Most signals should be connected with a 30 sec On-Demand polling. The rest could normally be connected to 9 sec Cyclic request. Primary TTD logs can be collected and written to Proficy Historian via the Proficy Historian user API or written to CSV files that can be imported.

One should always be aware of the bus load that historical values generate.

7.5 Sending Orders to Objects

Before you can send any orders to a object in the ABB controller the object has to be selected. Each object type except DAT objects has a selected bit. This bit can typically be used in object pop-up pictures. When you open a pop-up picture for an object the selected bit can be set and then you can do your orders to the object. When you close the pop-up picture for the object you must do deselect to let other nodes access the object.

You can use the datablock control I/O address "!ORDER_MMI:Name" to control the MMI number 1 – 4 to use when sending orders to the object configured in the datablock. Default the MB3 OPC server uses MMI number 1.

Selection and deselection is taken cared of automatically in the MB3 OPC server when sending orders to DAT objects. The MB3 OPC server first selects the DAT object, then sends the VALUE order and finally deselects the DAT object. DAT objects always uses MMI number 1.

7.6 Continuously Order to Object

This type of communication normally invokes data mirroring between different brands of PLC Systems. Could also apply to supervisory control systems.

This type of orders should be handled through Data Set communication to minimize bus load. If this not is possible then DAT objects are the best solution for data mirroring.

Note! If you use DAT booleans for data mirroring then have separate DAT booleans for reading and writing to avoid that bits are overwritten with old data. DAT booleans are written with all 32 bits in one message.

7.7 Building the MB3 OPC Server Configuration

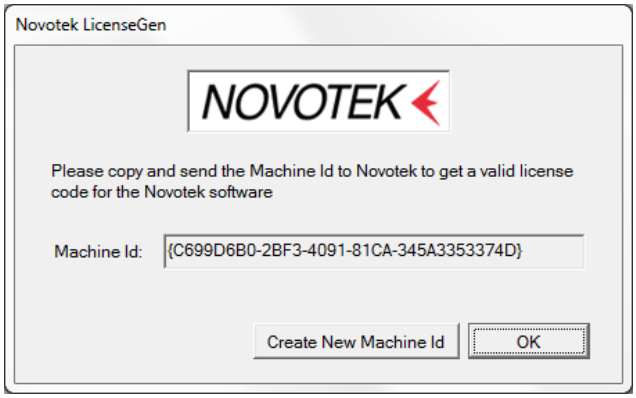
If a node sends out a request for a name translation of an object name that does not exist in any database on the MB300 network then this name translation request will be sent around on the network forever. The only way to remove those name translation requests from the network is to use special software from ABB. The best way to avoid non-existent object names in your configuration is to create a CSV configuration file that is based of object names from reported BAX files from the ABB controllers. The BAX file is a text file dump of the database in a controller.

8 Installation

8.1 Novotek LicenseGen Software

This software is needed to create a software "Machine Id" on the machine where the MB3 OPC server shall be installed and licensed.

Run the "NovotekLicenseGen.exe" file from the Licensing folder on the MB3 OPC server installation CD. The following dialog appears.

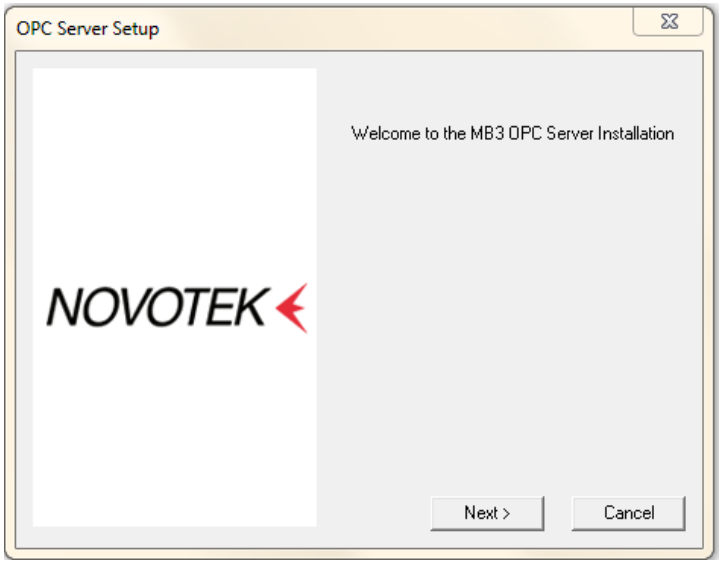


When the program starts it creates or shows an existing "Machine Id" on the machine. Copy the text in the "Machine Id" field and send it to Novotek to get a valid license code.

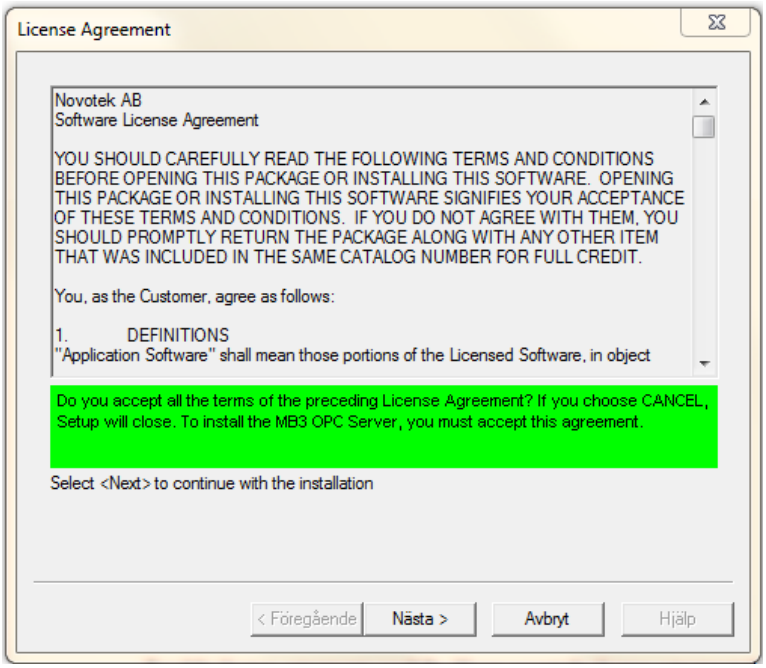
8.2 MB3 OPC Server Installation

An Administrator must do the installation. For Windows Vista or above the setup must be executed with "Run As Administrator" privileges.

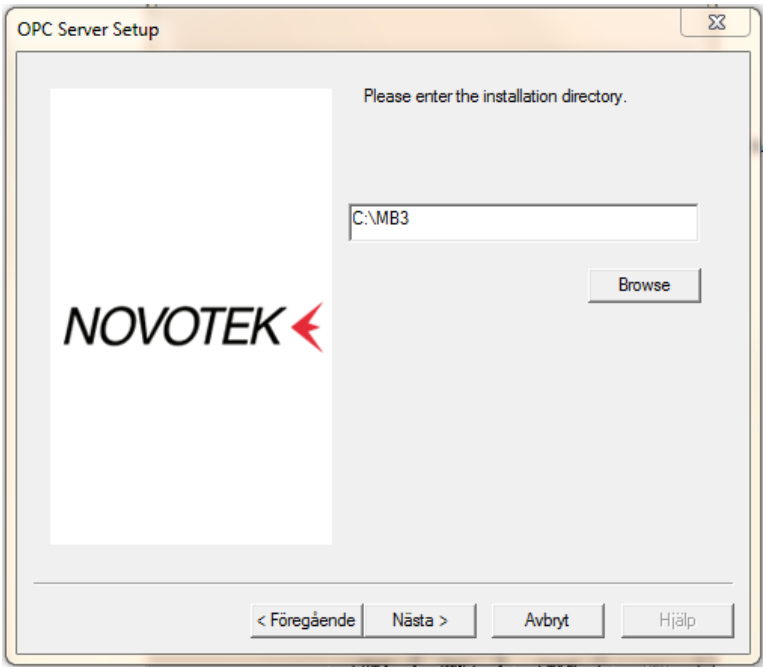
Run "Setup.exe" from the Disk folder on the MB3 OPC server installation CD. The following dialog appears:



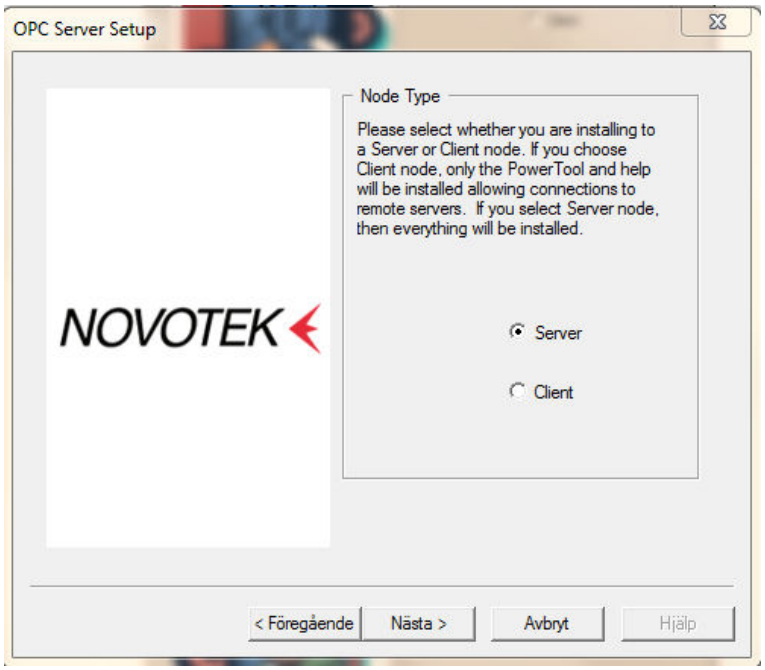
Click on the Next button.



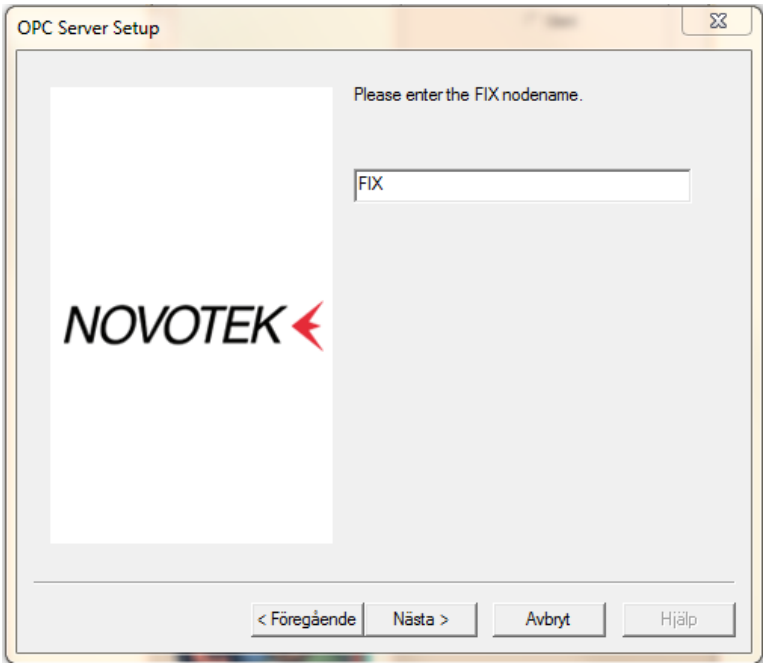
Read the license agreement carefully. If you accept the license agreement then Click on the Next button else end the installation with a Click on the Cancel button



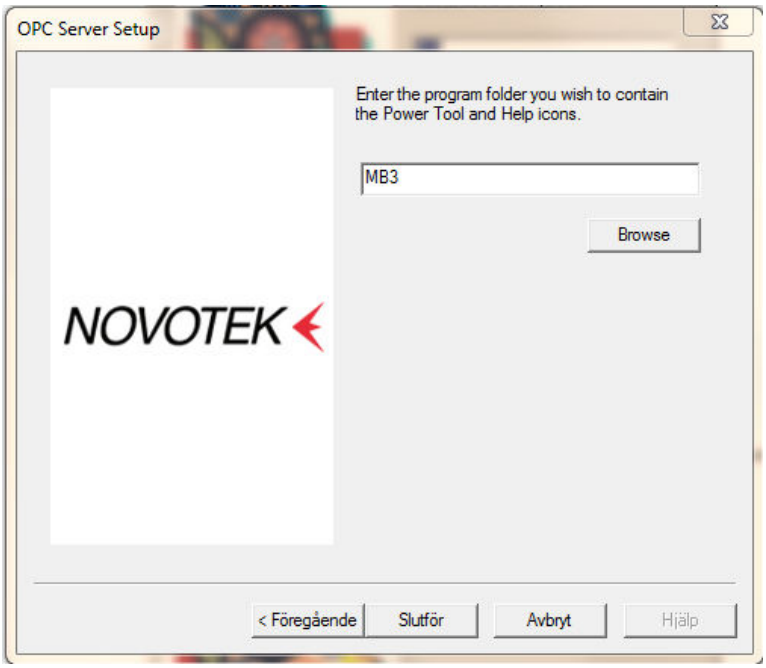
Enter the installation directory and click on the Next button. If iFix is installed then iFix directory will be the default directory.



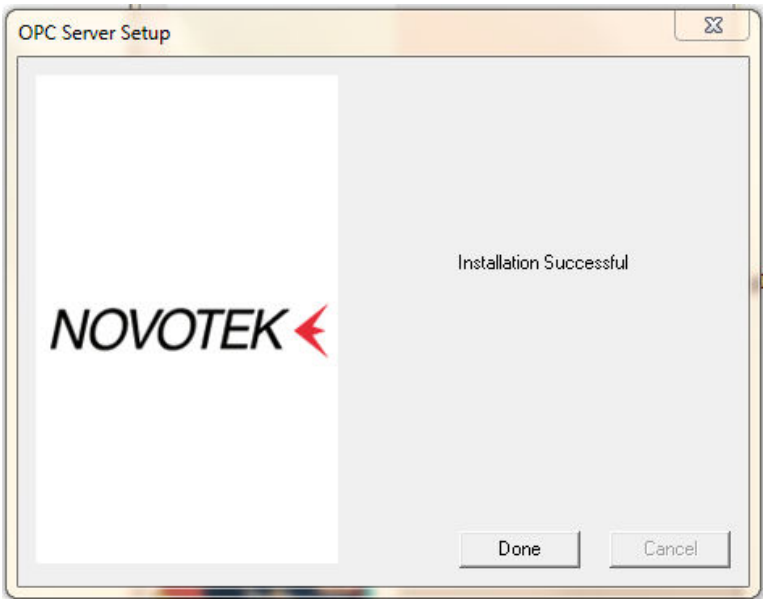
Select Server or Client installation and click on the Next button.



If iFix is installed then you will be prompted to enter the FIX node name where you want to install the MB3 OPC server. If iFix not is installed this dialog will not be showed. Enter Node name and Click on the Next button.



Enter the Program folder, in Windows Start menu, where you want to place the MB3 Power Tool icon and help file and then click on the Finish button.

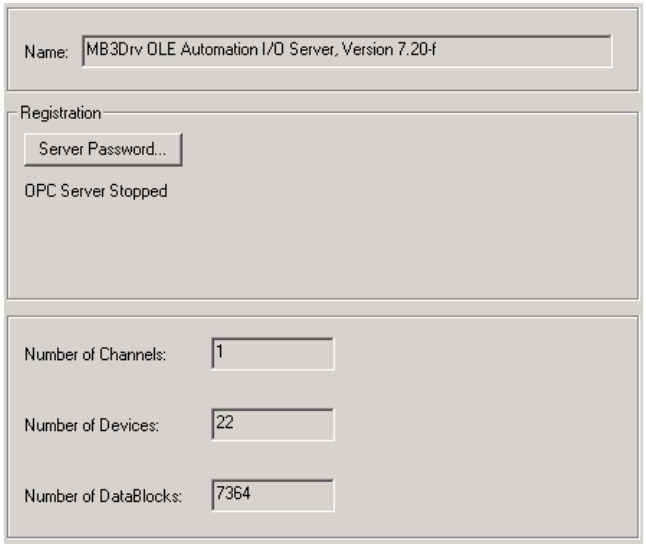


The installation is ready. Click on the Done button.

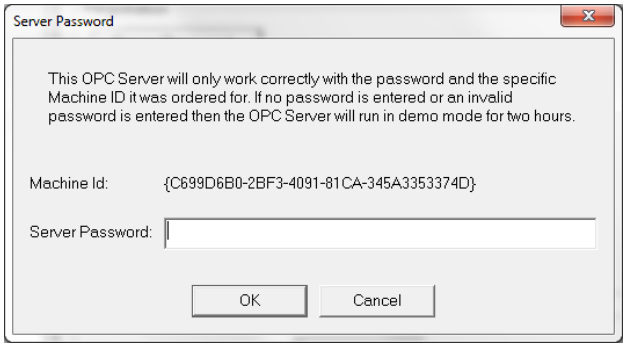
8.3 MB3 OPC Server Registration

The server needs to be registered together with the specific “Machine Id” it was ordered for to run properly. If the server not is registered then it will run in demo mode for two hours.

Start the MB3 Power Tool to register your MB3 OPC server. The startup dialog contains a button named “Server Password…”



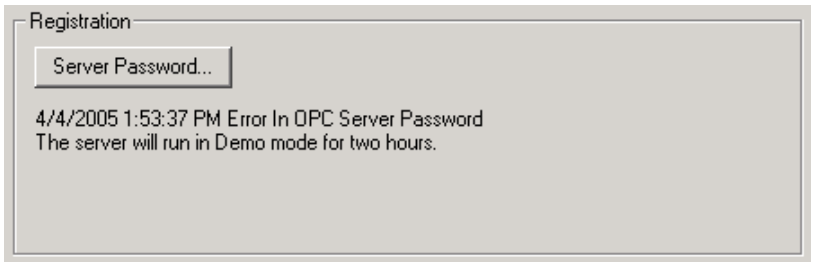
Click on the "Server Password…" button and the dialog box below shall appear.



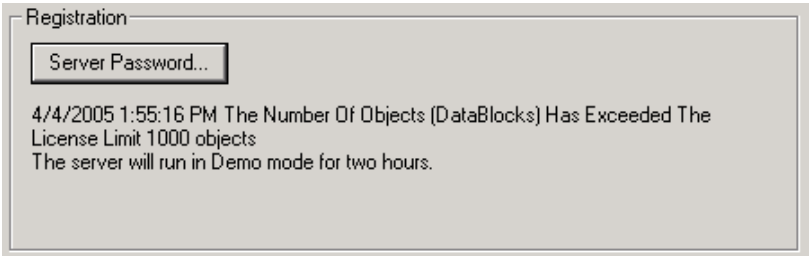
Your actual "Machine Id" is shown in the dialog. Check that this "Machine Id" matches with the "Machine Id" you ordered the server license for. Enter the server password for your server in the server password field. Click on the OK button to save the server password.

If you have entered the right server password then status text OK will appear when the server is started.

If you have entered wrong server password then a status text telling that the server runs in demo mode will appear.



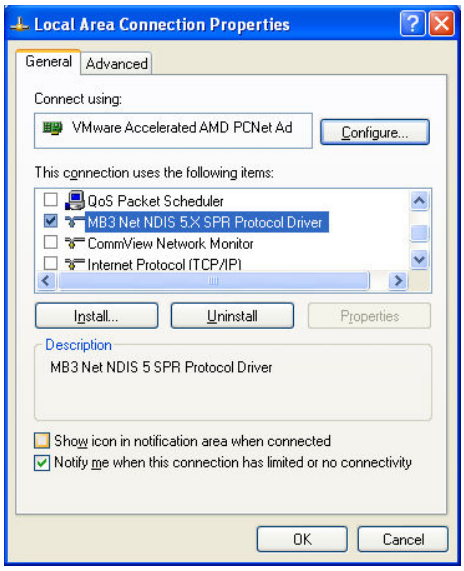
If your configuration contains more objects (Data Blocks) than your server license accepts then the server will run in demo mode and show the following status text.



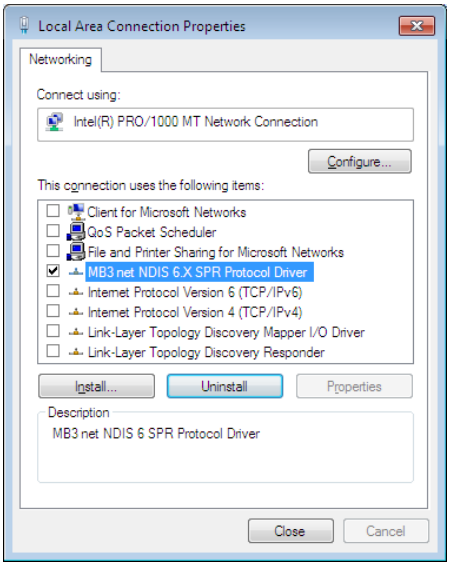
9 Setting Up the Adapter in the Local Computer

9.1 Network Configuration

Make sure to only have the MB3 NDIS protocol checked for the Local area connection as shown in the pictures below.

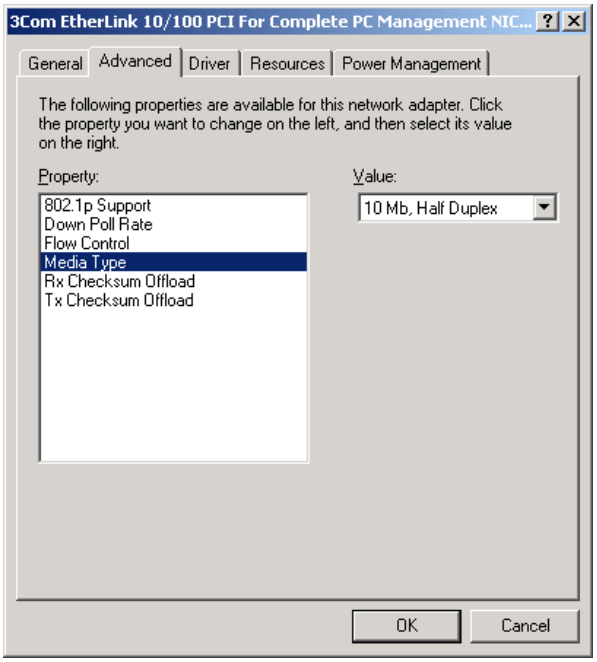


MB3 NDIS 5.x for XP and Win 2003



MB3 NDIS 6.x for Vista and later

Make sure to set the Adapters Media Type to 10Mb Half duplex as shown in the picture below.



9.2 Adapter MAC Address

The Ethernet adapters MAC address must have the syntax “00:00:23:00:XX:00” where XX is the Masterbus 300 node number of the local computer in hexadecimal format. Make sure to set the Local computer node number under channel settings in MB3 Power Tool to the same node number. One example: If you want your local computer to have node number 31 on the Masterbus 300 network then the MAC address of the adapter shall have the following format: “00:00:23:00:1F:00” where 1F is the node number 31 in hexadecimal notation. There are two ways to override the hardware MAC address of the ethernet adapter.

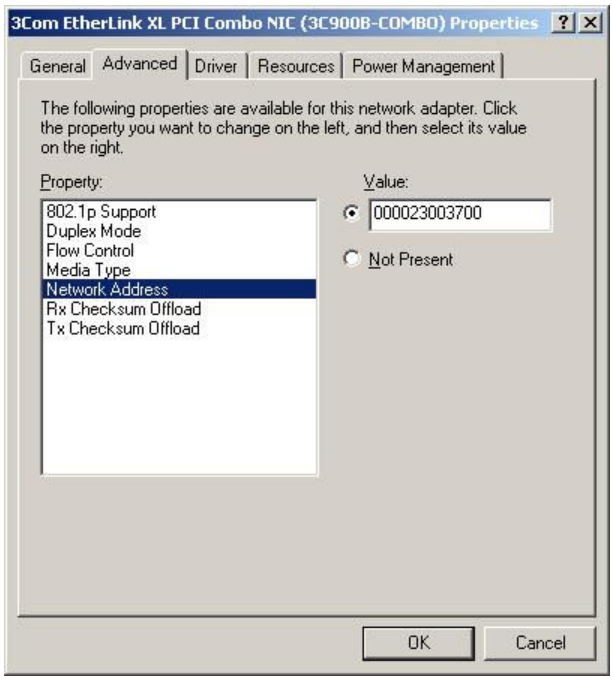
Note! If the MAC address doesn't match with the ABB format then the MB3 OPC server will not start. If the Local node number configured under the channel settings doesn't match with the MAC address then the MB3 OPC server will not start.

9.2.1 Method 1

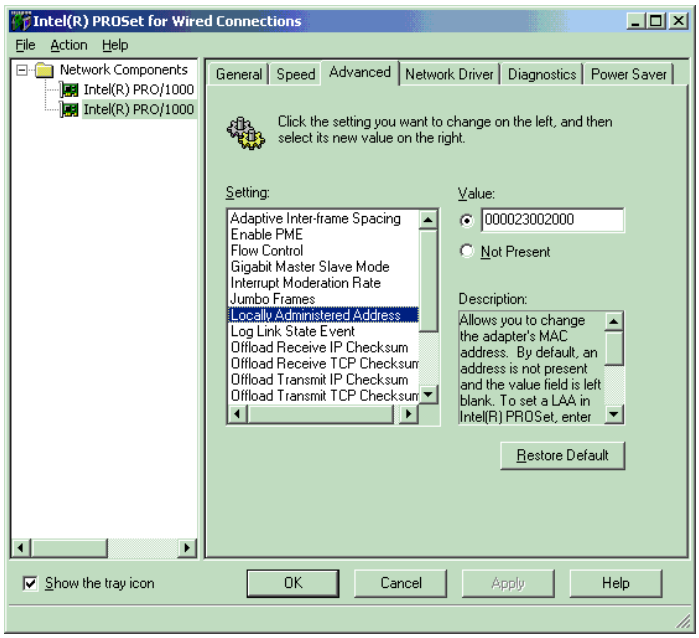
This method is used if your adapter supports Clone MAC address under the network settings. If you have an adapter that doesn't support Clone MAC address under the network settings, then you have to go to the second method.

1. Go to Start->Settings->Control Panel and double click on Network and Dial-up Connections.
2. Right click on the Adapter you want to change the MAC address for and click on properties.
3. Under "General" tab, click on the "Configure" button
4. Click on "Advanced" tab
5. Under "Property section", you should see an item called "Network Address" or "Locally Administered Address", click on it.
6. On the right side, under "Value", type in the New MAC address you want to assign to your adapter. Usually this value is entered without the ":" between the MAC address numbers. Save your new settings and leave the network settings.
7. Reboot your system.

In the two example pictures below both property "Network Address" and property "Locally Administered Address" are shown.



In the example shown above the node number of the adapter is set to 37 hex = 55 dec.

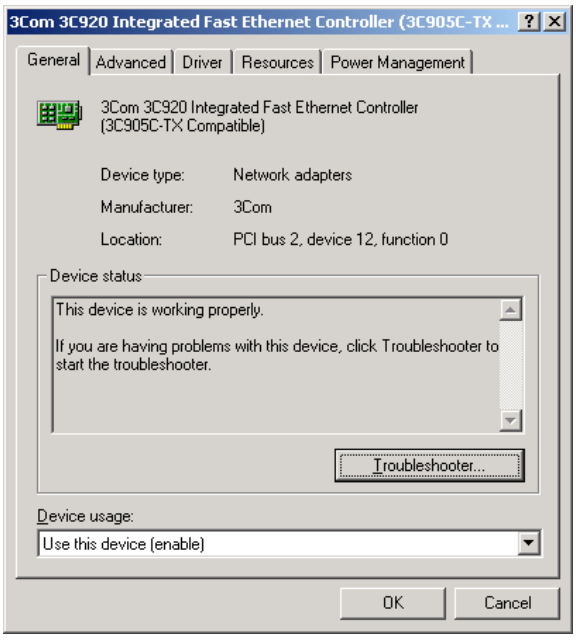


In the example shown above the node number of the adapter is set to 20 hex = 32 dec.

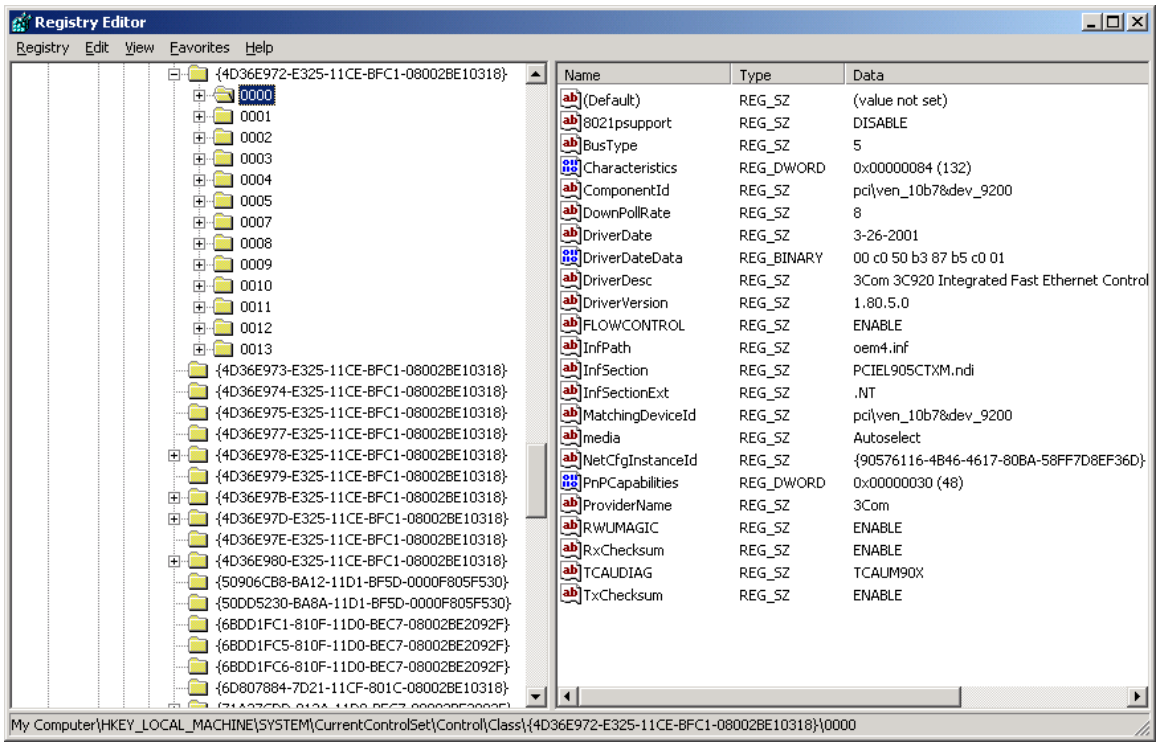
9.2.2 Method 2

Not all adapters let you set the MAC address in its advanced settings. Then there is a possibility to set it via the registry.

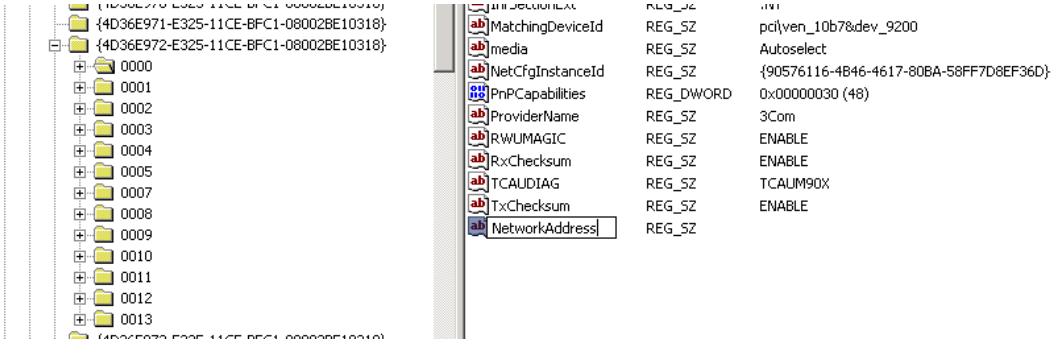
1. Go to Start->Settings->Control Panel and double click on Network and Dial-up Connections.
2. Right click on the Adapter you want to change the MAC address for and click on properties.
3. Under “General” tab, click on the “Configure” button. Record the **Description** for the Adapter you want to change. In the picture below it is ”3Com 3C920 Integrated Fast Ethernet controller”.



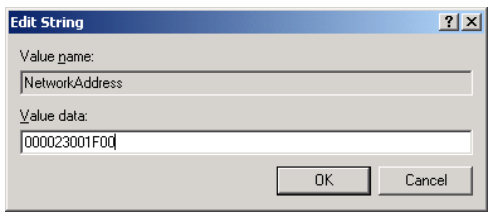
4. Go to Start -> Run, type “regedit” to start registry editor.
5. Go to “HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-11CE-BFC1-08002BE10318}. Double click on it to expand the tree. The subkeys are 4-digit numbers, which represent particular network adapters. You should see it starts with 0000, then 0001, 0002, 0003 and so on.



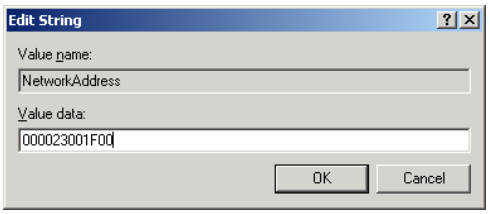
6. Go through each subkey that starts with 0000. Click on 0000, check **DriverDesc** keyword on the right to see if that's the Adapter you want to change the MAC address for. The **DriveDesc** should match the **Description** you recorded from step 3. If there is no match, then move on to 0001, 0002, 0003, and so on, until you find the one you want. Usually 0000 contains the first Adapter you installed on the computer. In this demonstration, 0000 is the Adapter selected.
7. Once you selected the subkey (i.e. 0000), check if there is a keyword "NetworkAddress" that exist in the right side of the window.
8. If "**NetworkAddress**" keyword does not exist, then create this new keyword:
    - Click on the drop down menu “Edit -> New -> String Value”.
    - Set the name of the string value to ”NetworkAddress”



- Double click on the ”NetworkAddress” name and enter the new MAC address you want to use. Then click OK. (There should not be any "-" in this address. Your entry should only consist of 12 digits as seen in the figure below)



9. If "**NetworkAddress**" keyword exists, make sure the keyword type is REG_SZ. This keyword might not have a value at this time.
   - Double click on the keyword **NetworkAddress** and the String Editor window will pop up.



   - Enter the new MAC address you want to use. Then click OK. (There should not be any "-" in this address. Your entry should only consist of 12 digits as seen in the figure above)

10. There are 2 ways to make the new MAC address active. Either Reboot your system or follow the steps below.
    - Goto Start->Setting->Control Panel, and double click on ”Network and Dial-up Connections".
    - Select the Network Adaptor for which you just changed the MAC address.
    - Right click on the selected Network Adaptor and click "Disable." Verify the status column for this adaptor changes to "Disabled"
    - Right click on the selected Network Adaptor and click "Enable.” Verify the status column for this adaptor changes to "Enabled"
    - If for any reason it cannot be disabled or re-enabled, you have to reboot your system to make the changes effective.

9.2.3 Restore the TRUE Hardware Burned-in MAC Address

You maybe for some reason want to restore the hardware burned in MAC address of your adapter.
If you followed Method 1, then go back to the advanced properties window and remove the entry you added.
If you followed Method 2, then remove the "NetworkAddress" keyword you added in the registry.
Reboot the computer to activate the change you made.

10 Event Treat File and Unacknowledge of Object Alarms

When the MB3 OPC server is installed an Event Treat file, "MB3_Event_Treatments.txt", is copied to the installation directory. When the MB3 OPC server is started it tries to read this Event Treat file. The parameters AL_TOBLK and AL_FRBLK for each Event Treat block in the file will decide how the MB3 OPC server sends unackowledge back to the ABB controllers when it receives new object alarm Process Events. The behavior of the MB3 OPC server will be:

1. If the MB3 OPC server can't find the "MB3_Event_Treatments.txt" file when it starts then no object alarm Process Event will be unacknowledged from the MB3 OPC server.
2. If the MB3 OPC server receives an object "alarm on" Process Event and the parameter AL_TOBLK in the Event Treat block the process event belongs to is set to NO, then an unacknowledge for this object will be sent to the ABB controller.
3. If the MB3 OPC server receives an object "alarm on" Process Event and the parameter AL_TOBLK in the Event Treat block the process event belongs to is set to YES, then no unacknowledge for this object will be sent to the ABB controller.
4. If the MB3 OPC server receives an object "alarm off" Process Event and the parameter AL_FRBLK in the Event Treat block the process event belongs to is set to NO, then an unacknowledge for this object will be sent to the ABB controller.
5. If the MB3 OPC server receives an object "alarm off" Process Event and the parameter AL_FRBLK in the Event Treat block the process event belongs to is set to YES, then no unacknowledge for this object will be sent to the ABB controller.

If you don't want the MB3 OPC server to send any unacknowledges for any object alarms then you can either rename the "MB3_Event_Treatments.txt" file or set all AL_TOBLK and AL_FRBLK parameters in the file to YES. You must restart the MB3 OPC server before it will try to read the file again.

11 MB3 Power Tool

The MB3 Power Tool is your main configuration utility for setting up and maintaining the MB3 OPC server. It provides fields for specifying the properties of channels, devices, and data blocks.

The Power Tool provides:

- The Template dialog box for specifying channel, device, and data block defaults.
- The Setup dialog box for defining the default name and default path for configuration files.
- The Server Connection dialog box for connecting to a remote or local OPC server.
- The Tree Browser for an overall view of your system configuration.
- A movable Tree Browser and toolbars.
- A Statistics View for displaying the statistics of your server while it is running. Statistics are provided for levels: channel, device, and data block.
- A Configuration View for displaying and modifying driver, channel, device, and data block properties.

Access Methods
From the Windows Start menu

- Select Programs from the Start menu.
- Select the folder selected during installation from the Programs submenu.
- Select MB3 Power Tool from the submenu.

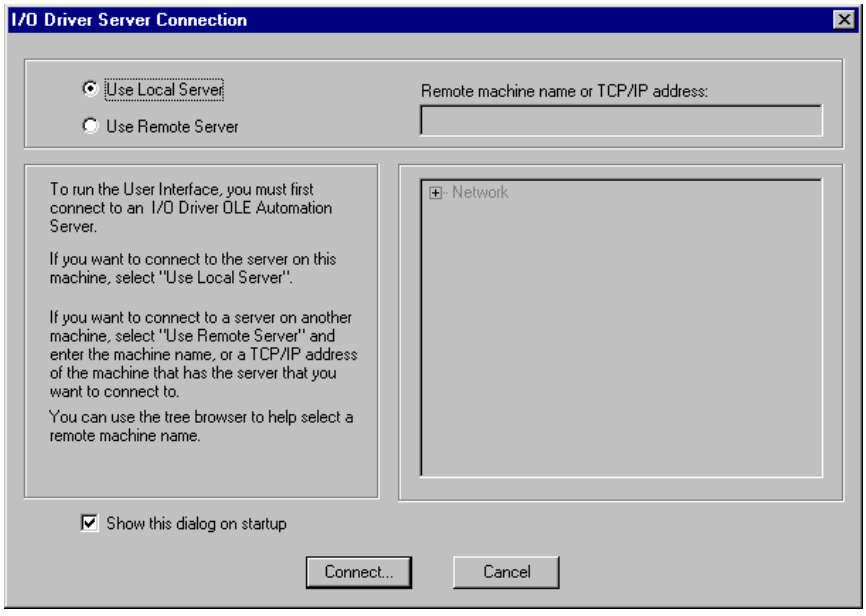
From FIX Database Builder

- Select MB3 from the Drivers menu.

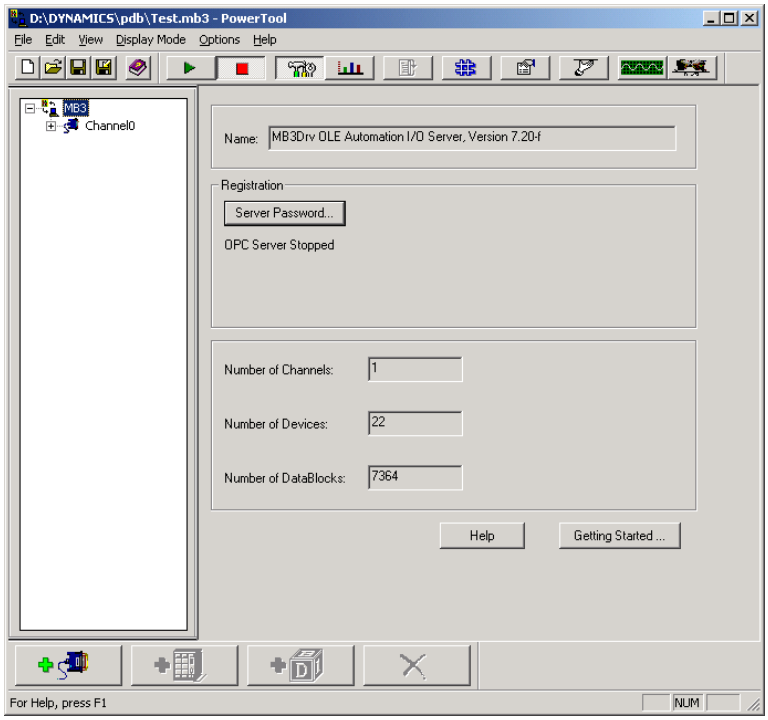
From the FIX System Configuration Utility (SCU)

- Select SCADA from the Configure menu.
- Double-click your OPC server from the Configured I/O Drivers list box.

When you first start the Power Tool, the Server Connection dialog box appears. This dialog box lets you choose the OPC server that the Power Tool communicates with. You can choose either the Local Server (on your computer) or a Remote Server (on the network).



Once you choose an OPC server, the Power Tool attempts to connect to the OPC server. If the connection is successful, a message appears telling you that the connection is established. Then the main window of the Power Tool appears.



This window is comprised of:

- The Properties Viewer
- The Menu Bar

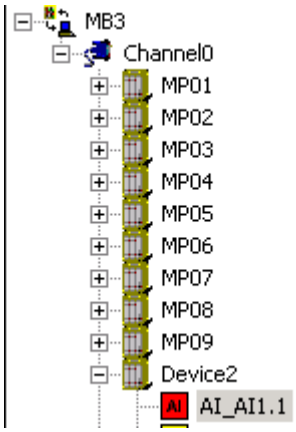
By default, the following additional components also appear:

- Tree Browser
- Main Toolbar
- Configuration Toolbar
- Run-time Toolbar
- Status Bar

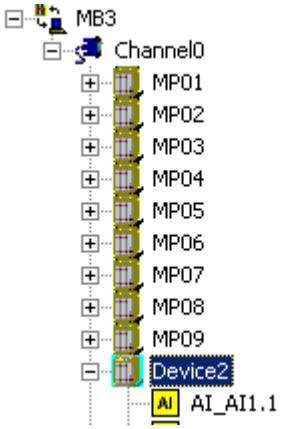
You can show or hide any of the components by selecting a command from the View menu. You can also customize the Power Tool's appearance by dragging the toolbars or the Tree Browser to the location you want. You can also make the toolbars or the Tree Browser float above the Power Tool by dragging them to the center on the screen. Later, you can dock them or resize them, as needed.

Tree Browser

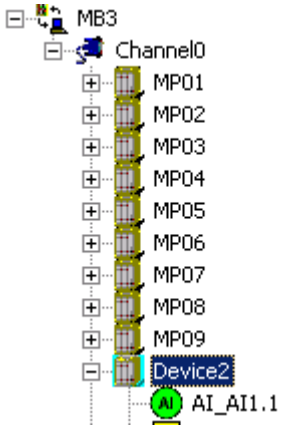
The Tree Browser displays a hierarchical list of the MB3 OPC server and its channels, devices, and data blocks. The MB3 OPC server appears at the top of the tree. When you select an item in the Tree Browser, its properties display in the Properties Viewer. You can choose to view the item's configuration or statistics properties by clicking buttons on the Run-time toolbar. All data blocks are sorted by name in the tree. The data blocks have different icons depending of the object type, if its symbolic name is translated or not, if communication is good or bad and if the configured object type matches the name translated object type. See examples below. Use **F5** to refresh the Tree.



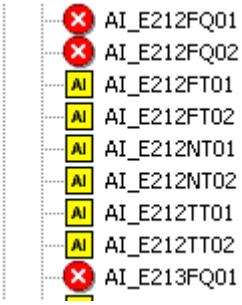
An AI object with object name AI1.1 that hasn't been translated has the shape of a rectangle with red color.



An AI object with object name AI1.1 that has been translated but communication is bad or uncertain has the shape of a rectangle with yellow color.



An AI object with object name AI1.1 that has been translated and the communication is good has the shape of a circle with green color.



An object that is configured as one object type and reported as another object type from the controller during name translation is marked with a error symbol in the browser tree. No subscriptions will be sent for the obejct until it is configured with the right type. Check the statisitcs for the object to see the name translated object type.

Main Toolbar

Same as Menu File New. Creates a new empty configuration. This is not allowed when the MB3 OPC server is started.

Same as Menu File Open. Open a configuration file or a CSV import file. This is not allowed when the MB3 OPC server is started.

Same as Menu File Save. Saves the configuration file.

Same as Menu File Save As. Lets you enter a filename to save the file as. Can either be saved as a configuration file or as a reported CSV file.

Same as Menu Help Help Topics. Opens a Help file.

Configuration Toolbar

Same as Menu Edit Add Channel. Adds a Channel to the configuration.

Same as Menu Edit Add Device. Adds a Device to the configuration.

Same as Menu Edit Add Data Block. Adds a Data Block to the configuration.

Same as Menu Edit Delete. Deletes the selected Channel, Device or Data Block from the configuration.

Runtime Toolbar

Same as Menu Display Mode Start. Starts the MB3 OPC server.

Same as Menu Display Mode Stop. Stops the MB3 OPC server.

Same as Menu Display Mode Config Mode. Shows the configuration window for the selected Channel, Device or Data Block.

Same as Menu Display Mode Stats Mode. Shows the statistics window for the selected Channel, Device or Data Block.

Same as Menu Options Reset Counters. Resets the counters in the statistics window for the selected Channel, Device or Data Block. This button is only accessible when the Power Tool is in Statistics Mode. Click the Statistics button shown above to enable Statistics Mode.

Same as Menu Options Templates. Opens the Templates dialog where default configuration values can be set for Channel, Device and Data Block.

Same as Menu Options Setup Lets you select the way the Power Tool displays statistics, enter defaults for the MB3 OPC server configuration file name and path, and make advanced settings.

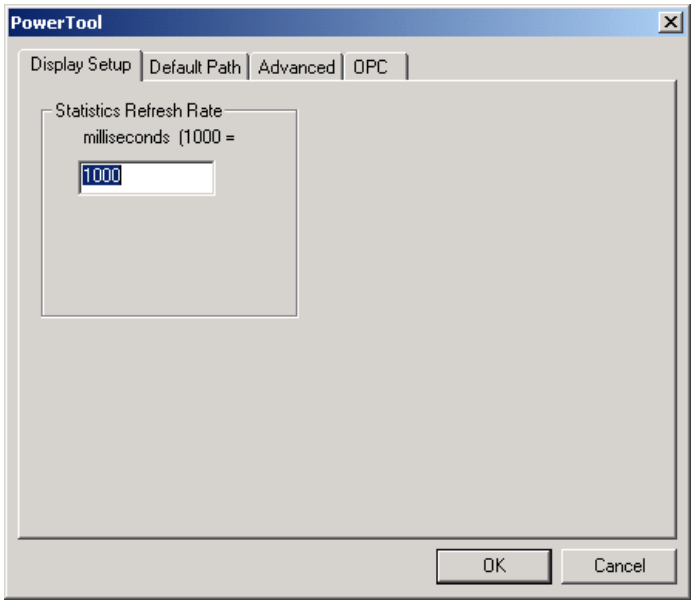
Same as Menu Options OLE server. Let you select an OLE server.

Same as Menu Options DataScope. Displays the data scope for this MB3 OPC server. Any objects that have the data scope enabled send messages to this window.

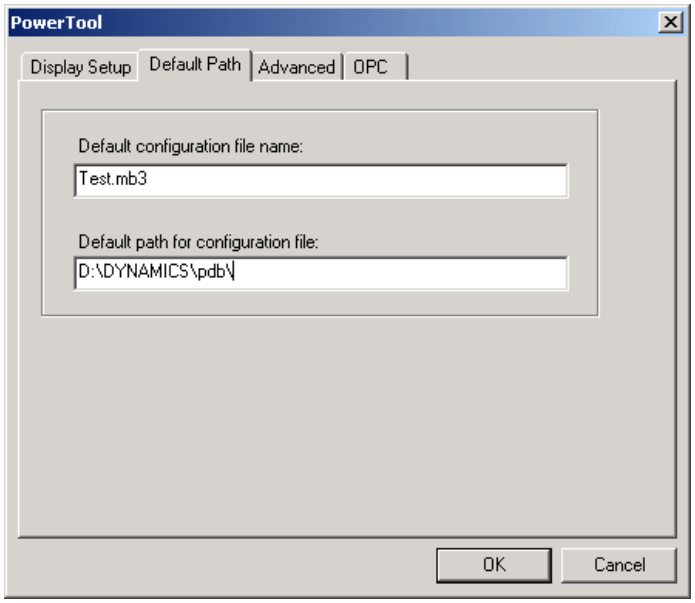
Same as Menu Options Show Server. Shows or hides the MB3 server window. At startup the MB3 server window is hidden. If the MB3 OPC server is running as a service then the window cannot be shown.

11.1 Setting Up the Power Tools and MB3 OPC Servers Environment

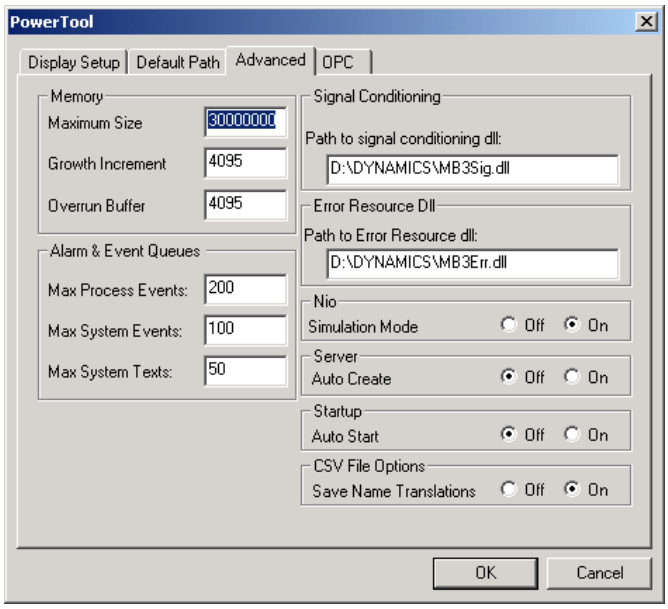
You can set up the environment by displaying the Setup dialog box and completing each tab. The Setup dialog box lets you do the following:



Set the statistics refresh rate.



Set the default configuration file name and default path for the configuration file. This is the configuration file the MB3 OPC server will use when it is started.

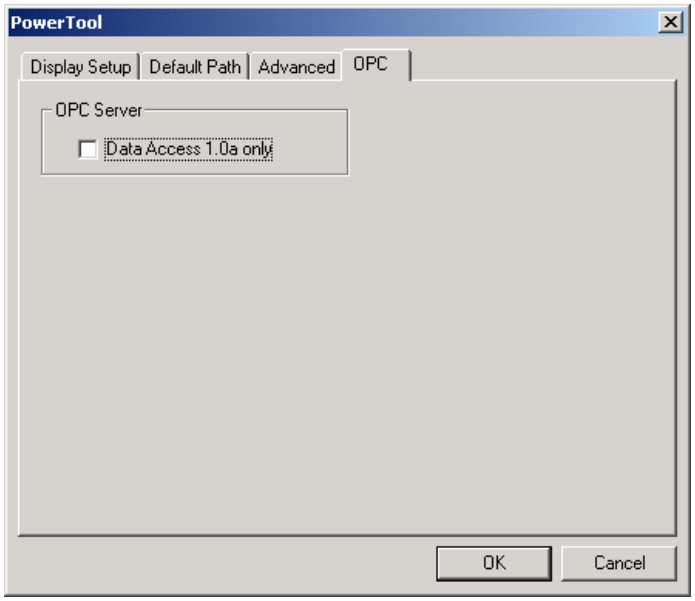


Make advanced settings for your MB3 OPC server. Advanced settings are for fine-tuning your MB3 OPC server and should not be changed unless you have an intimate knowledge of how the MB3 OPC server operates and know that you need to make some adjustments.

Field	Description
Memory – Maximum Size	Specifies the maximum amount of memory that the MB3 OPC server requires. The amount of memory specified is allocated and reserved, but not committed until needed. The MB3 OPC server rounds up the value you enter to the nearest value supported by your operating system. Each data block requires 520 bytes of memory. Each device allocates 2800 * 371 = 1038800 bytes of memory for its AC system objects. This means that with the default maximum size 30000000 bytes and if you have 10 devices in your configuration a maximum of around 37700 data blocks can be allocated. If you need more data blocks the maximum size has to be increased. Default Value 30000000 bytes
Memory – Growth Increment	Specifies the increment that MB3 OPC server memory grows by when more memory is needed. The MB3 OPC server rounds up the value you enter to the nearest value supported by your operating system. Default Value 4095 bytes
Memory – Overrun Buffer	Specifies an area of memory that immediately follows MB3 OPC server main memory and is defined by the Maximum Size field. The MB3 OPC server rounds up the value you enter to the nearest value supported by your operating system. If you try to access memory in this area, an error is generated. You will also experience problems with your MB3 OPC server if your system attempts to use memory in the overrun buffer. Default Value 4095 bytes
Alarm & Event Queues – Max Process Events	How many Process Events, the MB3 DA OPC server can store when no MB3 A&E OPC server is connected to it. When a MB3 A&E OPC server connects the stored events will be sent to it one by one. Set to 0 to disable the queueing of events. If you make changes to the value then you must restart the MB3 DA OPC server before it will take effect.

	Default Value: 200
Alarm & Event Queues – Max System Events	How many System Events, the MB3 DA OPC server can store when no MB3 A&E OPC server is connected to it. When a MB3 A&E OPC server connects the stored events will be sent to it one by one. Set to 0 to disable the queueing of events. If you make changes to the value then you must restart the MB3 DA OPC server before it will take effect. Default Value: 100
Alarm & Event Queues – Max System Texts	How many System Texts, the MB3 DA OPC server can store when no MB3 A&E OPC server is connected to it. When a MB3 A&E OPC server connects the stored events will be sent to it one by one. Set to 0 to disable the queueing of events. If you make changes to the value then you must restart the MB3 DA OPC server before it will take effect. Default Value: 50
Path to signal conditioning dll	Specifies the path to the DLL that provides signal conditioning for the MB3 OPC server (most likely MB3SIG.DLL). Do not make entries in this field unless you are having problems finding the signal conditionings.
Path to Error Resource dll	Specifies the path to the DLL that provides all the error codes and text error messages for the MB3 OPC server. Windows also uses this DLL to provide messages to the Event Viewer.
Simulation Mode	On - Enables simulation mode for the MB3 OPC server. All writes go directly to the data blocks instead of the process hardware. Off – Disables simulation mode for the MB3 OPC server. All writes go directly to the process hardware. Default Off
Auto Create	On - Let you create data blocks automatically. When a client application attempts to access a non-existent data block, the current data block expands, if possible, or the MB3 OPC server creates a new data block. Off – Prohibits you from creating data blocks automatically from clients. If this option is selected, you must use the Power Tool to create data blocks. Default Off
Auto Start	On - Lets the MB3 OPC server automatically start polling the process hardware for data. When you set up the MB3 OPC server to run as a service, this option lets the MB3 OPC server collect data immediately on startup. Off - Prohibits the MB3 OPC server from collecting data automatically. As a result, you must start the MB3 OPC server yourself, or use FIX to start it for you. Default Off
CSV File Options – Save Name Translations	On – The name translated Logical File, Logical Record and Objecttype are saved to the CSV file for the datablocks. Off – No name translations are saved to the CSV file. Default

	Off



If your OPC client only support the OPC Data Access 1.0a standard then check the checkbox under the OPC tab. Default it is unchecked.

11.2 Channel Configuration

A channel object represents one network connection with the MB3 OPC server's local node number. **Note!** The MB3 OPC Server only supports one channel, i.e. one connection to a single or a redundant Masterbus network.

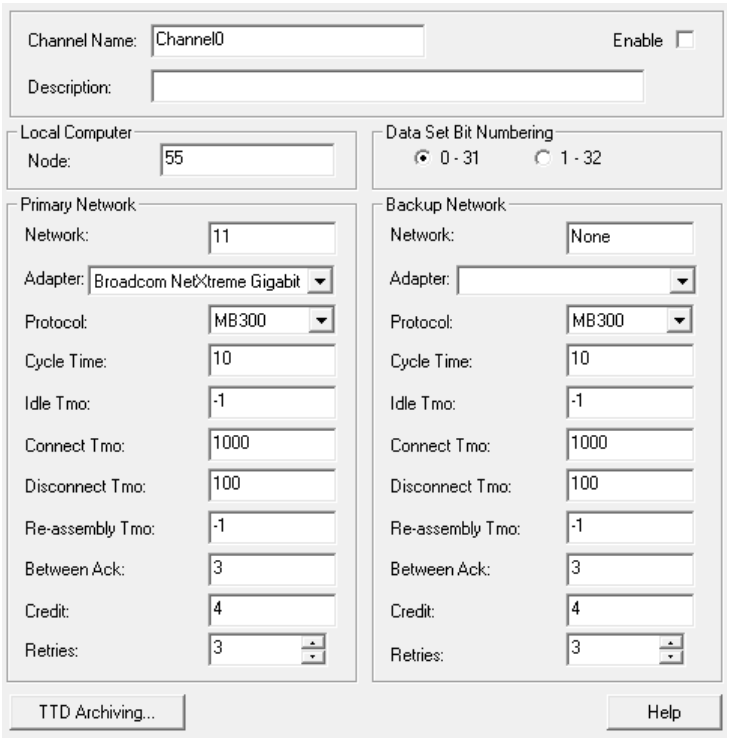
To add a new channel to your MB3 OPC server configuration

1. Click the Add Channel button on the Configuration toolbar. The new channel appears in the Tree Browser and the fields for entering channel properties appear in the Properties Viewer.
2. Enter the properties for the new channel. Edits to a field do not take effect until you remove the focus (or cursor) from the field.
3. Select the Enable check box to enable communication for the new channel.

To modify an existing channel

1. Select the channel you want to modify from the Tree Browser.
2. Edit the channel's fields as needed.

Note! Do not modify any channel fields when the MB3 OPC server is started.



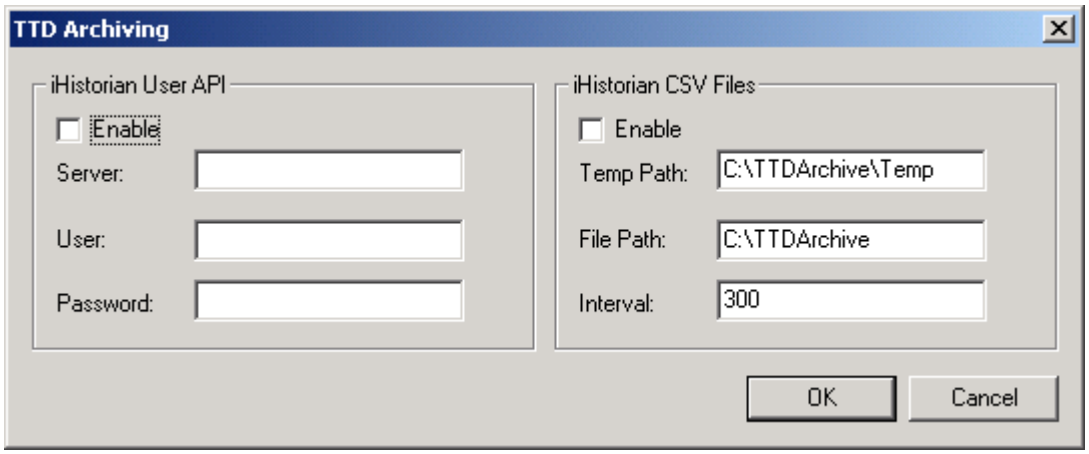
Field	Description
Name	Specifies the name of the selected channel. Up to 30 alphanumeric characters, including underscores (_) and hyphens (-).
Description	Lets you enter text about the selected channel. Entries in this field can be very helpful when you go back to look at old configuration or report files, or when you need to modify an existing configuration. The more detailed and specific the information you enter in this field, the easier it is to identify the channel. Up to 40 alphanumeric characters and symbols.
Enabled	Enables the MB3 OPC server to communicate through this channel. If you clear the check box, the MB3 OPC server does not communicate on this channel.

Node	The MB300 node number that the MB3 OPC server is set up to use on this channel. This node number must match the MAC address of the Adapter configured for this channel. Valid entries are 1 – 127
Primary and Backup Network – Network	The MB300 network number that the Adapter is connected to. Valid entries are 11 – 99 and 111 – 119 If no backup is used then set it to blank which will set it to None.
Primary and Backup Network – Adapter	The Adapter in the Local Computer that is connected to the MB300 network The list box contains all adapters of 802.3 type in the computer. Make sure the adapter is set up as described in section "4 Setting up the Adapter in the Local Computer". If backup is used then both primary and backup adapter should have the same MAC address.
Primary and Backup Network – Protocol	The protocol used by this Adapter. Only MB300 standard can be chosen right now.
Primary and Backup Network – Cycle Time	Routing transmit cycle time. Controls the generation of routing messages sent on the network from the MB3 OPC server. Default value 10 generates one message per second. Valid entries are 10 – 127
Primary and Backup Network – Idle Tmo	Specifies how long time a transport connection with low or medium priority is allowed to be unused while in data transfer state. If it expires the transport connection disconnects. Expressed in 10ms units. Default is –1 = infinite.
Primary and Backup Network – Connect Tmo	Transport connection request timeout. Specifies the maximum time to wait for a transport connection to be established when the MB3 OPC server has requested a connection. Expressed in 10ms units. Default is 1000.
Primary and Backup Network – Disconnect Tmo	Transport disconnect timeout. Specifies the maximum time a transport connection is allowed to be in the disconnecting state when the MB3 OPC server has requested a disconnection. Expressed in 10ms units. Default is 100.
Primary and Backup Network – Re-assembly Tmo	Re assembly timeout. Maximum time that can elapse before a Transport Service Data Unit (TSDU) is successfully re-assembled on a transport connection with low or normal priority. If it expires the transport connection is disconnected. Expressed in 10ms units. Default = –1 which means infinite.
Primary and Backup Network – Between Ack	Between Acknowledgement. Specifies for low and normal priority transport connections when it is time to send an acknowledgment with new credit to allow the sending node to continue to send. Expressed in number of received Transport Protocol Data Units (TPDU). Default value is 3. Valid entries 1 – 15
Primary and Backup Network – Credit	Credit. Specifies the maximum number of TPDUs that the MB3 OPC server allows other nodes to send on a transport connection with low or normal priority. Default value is 4. Valid entries 1 – 15
Primary and Backup Network – Retries	Number of times a TPDU is resent without acknowledgement before the MB3 OPC server considers that the telegram has failed. Default is 3. Valid entries 1 – 9
Data Set Bit Numbering	Selects how to address data set bits in the I/O Address in a Fix database block or in the Item ID in a OPC client. Valid values are: 0 – 31

	1 – 32 Default is 0 – 31.
TTD Archiving…	A click on this button opens up the TTD Archiving dialog.

11.2.1 TTD Archiving

This dialog contains the configuration of how the collected TTD logs shall be archived. You can choose to store the logs to Proficy Historian via the user API or to store the logs to CSV files.



Field	Description
iHistorian User API - Enable	Enable this check box if you want the MB3 OPC server to write the collected TTD logs to Proficy Historian using the Proficy Historian user API. The tags must exist in Proficy Historian. If the MB3 OPC server fails to write the TTD log via the user API then it will try to write the TTD log values to a CSV file irrespective of the iHistorian CSV Files Enable flag .
iHistorian User API - Server	Proficy Historian server name to connect to. If the field is left blank, then the connection attempt will be to the default server. The default server can be configured using the Historian administration tool.
iHistorian User API - User / Password	If left empty, then the username that owns the process is used. Most of the time this is the same as the user logged into the operating system. However, in the case of a program running as a service you can specify a username and password that the process should use.
iHistorian CSV Files - Enable	Enable this check box if you want the MB3 OPC server to create CSV archive files for the collected TTD logs.
iHistorian CSV Files - Temp Path	The MB3 OPC server creates the collected TTD logs CSV archive files in this folder. When the TTD Archiving Interval timer has timed out then the file is moved from this folder to the File Path from where a file collector can import the file. Default is "C:\TTDArchive\Temp".
iHistorian CSV Files - File Path	The path to where the CSV archive files created in the Temp Path shall be moved when the Interval time has timed out. A file collector can import the files from this path . For the Proficy Historian File Collector this path is normally set to "C:\Program Files\Proficy\Proficy Historian\ImportFiles\Incoming". Default is "C:\TTDArchive".
iHistorian CSV Files - Interval	The time in seconds that the MB3 OPC server will wait before it moves any iHistorian CSV archive file for this channel from the temp path to the file path. Default is 300 seconds. Valid values are 0 – 900 seconds. If set to 0 then an interval of 500ms will be used.

11.2.2 Override Local Node, Network Number and Adapter Name

When the MB3 OPC server is installed there is created a key in the registry called "HKEY_LOCAL_MACHINE\SOFTWARE\Novotek\Drivers\MB3\Redundancy". Under this key there are two DWORD values and one String value with default settings as described in the table below.

Value	Description
ChannelLocalNode	DWORD value with default settings 0.
ChannelPrimNetwork	DWORD value with default settings 0.
ChannelPrimAdapter	String value with default settings empty string.

If any of these values are set with a valid value then they will override what is set in the mb3 configuration file when the MB3 OPC server is started. The default values will not override the values set in the mb3 configuration file.

This can be useful if you have two machines with identical configurations except these three values and want to copy the configuration files between the two machines.

Note! If you use primary and backup networks then don't use these registry settings!

11.3 Device Configuration

A device object represents a node on the Masterbus 300 network.

To add a new device to your MB3 OPC server configuration

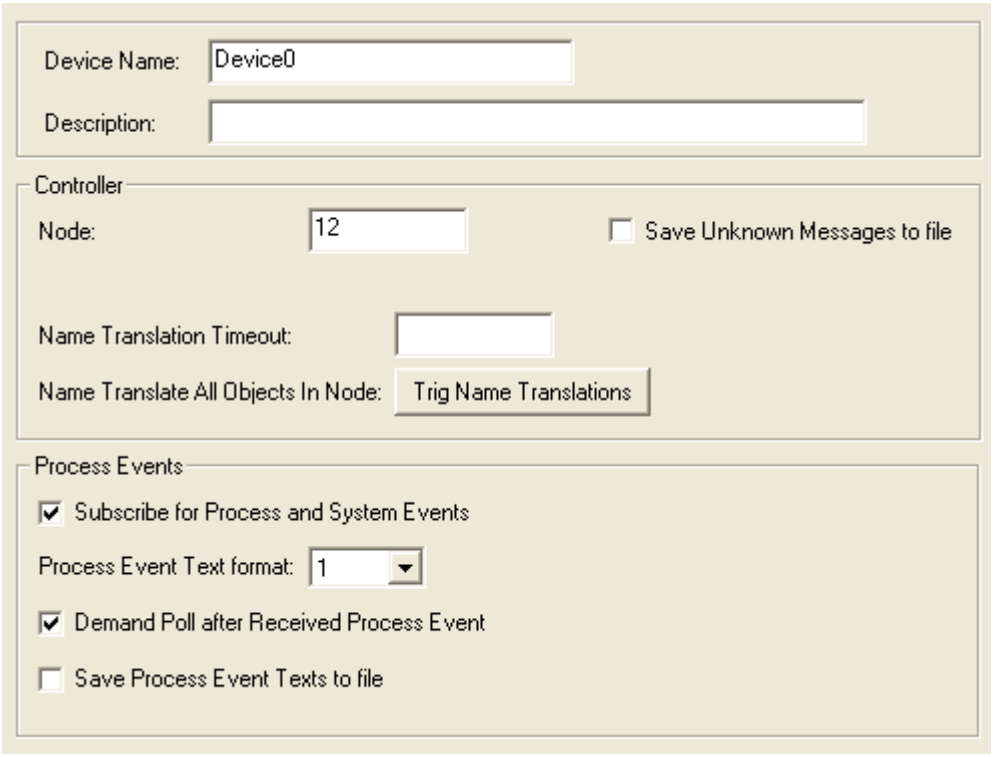
1. From the Tree Browser, select the channel you want to add the device to.
2. Click the Add Device button on the Configuration toolbar. The new device appears in the Tree Browser and the fields for entering device properties appear in the Properties Viewer.
3. Enter the properties for the new device. Edits to a field do not take effect until you remove the focus (or cursor) from the field.
4. Select the Enable check box to enable communication for the new device.

To modify an existing device

1. Select the device you want to modify from the Tree Browser.
2. Edit the device's fields as needed. The device updates automatically.

Note 1! If the MB3 OPC server receives a routing message from a node not in its configuration then it will add a device representing that node automatically to its configuration.

Note 2! You are not allowed to remove any devices or to change the node number when the MB3 OPC server is started.



Field	Description
Name	Specifies the name of the selected device. Any application requesting data from the MB3 OPC server uses this name to access points on the device. Each device that the MB3 OPC server communicates with should have a unique device name regardless of the device's channel. Up to 30 alphanumeric characters including underscores (_) and hyphens (-).
Description	Contains text about the selected device. Entries in this field can be very helpful when you go back to look at old configuration or report files, or when you need to modify an existing configuration that you did not

	make. The more detailed and specific the information you enter in this field, the easier it will be to identify the device at a later date. Up to 40 alphanumeric characters and symbols.
Node	The MasterNet node number that the controller/OS station uses on the network Valid entries are 1 – 127
Save Unknown Messages to file	If this checkbox is set then the MB3 OPC server will save all messages it cannot recognize to a file. This file is stored in the same path where the default configuration file is stored. The files will be named "YYYYMMDDHH_MB3LOG.CCF" where YYYY is year, MM is month, DD is day and HH is hour when the file was created. These files can be viewed in the Network monitoring program CommView from TamoSoft Inc, www.tamos.com.
Name Translation Timeout	The time that the MB3 OPC server waits for a response, before declaring a symboilc name translation request as timed out. Only one name translation request are active per node at a time. Valid Entries Accepts the time format: days:hours:minutes:seconds up to a maximum of 6:23:59:59. Min value is 30 seconds. Default value 1:00
Trig Name translation	A Click on this button will trig the MB3 OPC server to name translate all object names, configured in the data blocks under this device, into Logical Files and Logical Records. What it actually does is disabling/enabling all the data blocks configured under this device.
Subscribe for Process and System Events	Enable/Disable if the MB3 OPC server should subscribe for process and system events from this node. Controllers not loaded with an Operator Functions module will not send any process or system events and for these controllers you should disable this functionality to avoid unnecessary communication. For all other nodes you should enable this functionality. Default is enabled.
Process Event Text Format	Set which Text format you want to view in your client or in the text files. Valid entries 1 – 4 Default 1 See 2.2.5 Process Events for more information about the text formats.
Deamand Poll After Received Process Event	Set this checkbox if you want the MB3 OPC server to do a one-shot On-Demand poll for the object that sent out the Process Event from this controller. If disabled the MB3 OPC server will not send any one-shot On-Demand polls for the Process Events from this controller **Note!** If the MB3 OPC server receives many process events within one second from the same obejct it will not manage to do a demand poll for each of those events, but at least one demand poll will be sent. Default: Enabled
Save Process Events Texts to file	Set this checkbox if you want the MB3 OPC server to save the Process Event Texts to file. The Process Event Texts will follow the format defined with "Process Event Text Format". The files will contain one Process Event per row. The files will be stored in the MB3 OPC servers default configuration file path.

	The files will be named "YYYYMMDDHH_DEVICE.CSV" where YYYY is year, MM is month, DD is day and HH is hour when the file was created. DEVICE is the device name configured for the controller.

11.4 Data Block Configuration

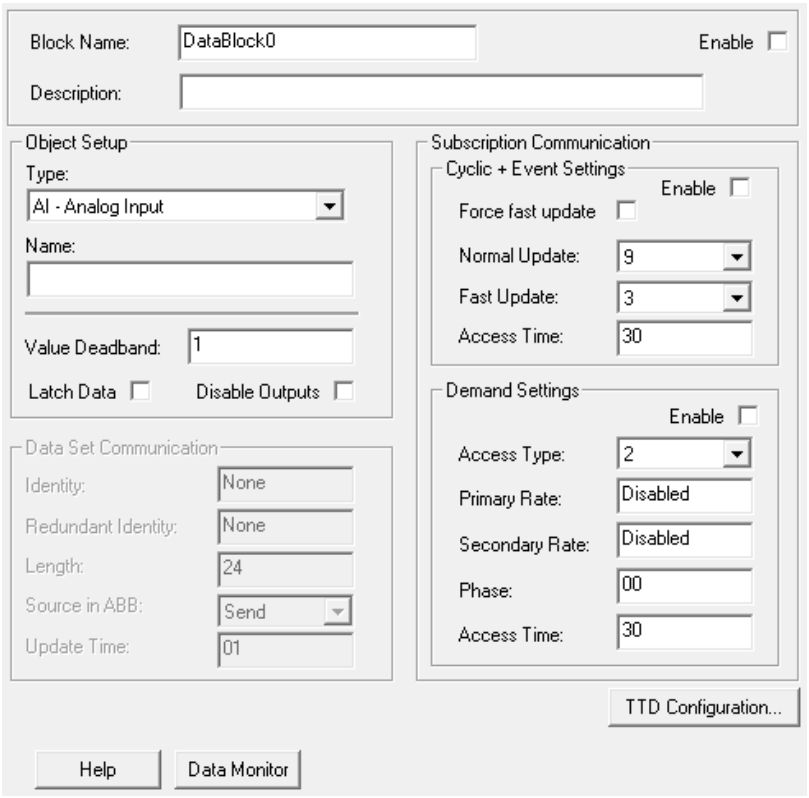
For the MB3 OPC server, a data block represent a process object defined in an ABB controller database.

To add a new data block to your MB3 OPC server configuration

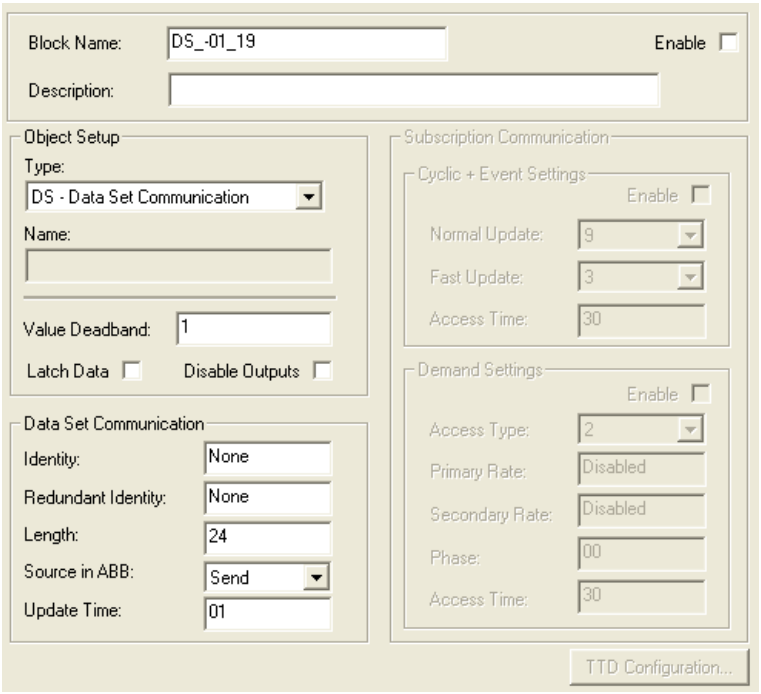
1. From the Tree Browser, select the device you want to add a data block to.
2. Click the Add Data Block button on the Configuration toolbar. The new data block appears in the Tree Browser and the fields for entering data block properties appear in the Properties Viewer.
3. Enter the properties for the new data block. Edits to a field do not take effect until you remove the focus (or cursor) from the field.
4. Select the Enable check box to enable communication for the new data block.

To modify an existing data block

1. Select the data block you want to modify from the Tree Browser.
2. Edit the data block's fields as needed. If the Enable check box is selected, your changes take effect as soon as you remove focus from the field.



A data block representing an AI object



A data block representing a Data Set

Field	Description
Name	Specifies the name of the selected data block. The name is created from object type and object name. Do not change these names as the Data Blocks are sorted by name in the Tree Browser. This name format makes it easy to find the wanted object in the Tree Browser. Up to 35 characters are allowed.
Description	Contains text about the selected data block. Entries in this field can be very helpful when you go back to look at old configuration or report files, or when you need to modify an existing configuration that you did not make. The more detailed and specific the information you enter in this field, the easier it will be to identify the data block at a later date. Up to 40 alphanumeric characters and symbols.
Enable	Enables/Disables the MB3 OPC server to use the data block for communication with the controller. If the data block is enabled and it hasn't been name translated it will send out a name translation request to translate the object name into logical file and logical record numbers. It will only do one try per enable. If you disable a data block the data block will loose its Logical Record and Logical File received from symbolic name translation response. A new symbolic name translation will be made when it is enabled again. If a symbolic name translation has failed for the data block you can disable the data block and enable it again to send out a new symbolic name translation request.
Object Setup– Type	The type of object this data block represents. The list box contains the following object types: AI – Analog Input AO – Analog Output DI – Digital Input DO – Digital Output DAT – DAT Object

	MDAT – MultiDAT Object PIDCON - Process Controller RATIOSTN - Ratio Station MANSTN – Manual Station MMCX – User Control VALVECON – Valve Control MOTCON – Motor Control TEXT – Text Data GENUSD – User Defined Ctrl GENBIN – Binary Control GENCON – PI Controller SEQ – Sequence Control PIDCONA – Adaptive Controller TANKCON – Tank Control DRICONS – Standard Drive DRICONE – Engineering Drive
Object Setup – Name	Enter the name of the object in the ABB controller database. Up to 12 characters for DAT and MDAT objects Up to 20 characters for all other object types.
Object Setup – Latch Data	Controls what an operator sees in a link when a communication error occurs. **When you...** / **The operator sees...** Select the check box / The last good value in the link. Clear the check box / A series of question marks (?????) It will return the OPC substatus SS_LAST_USABLE. In FIX applications, the link's current alarm status changes to COMM instead of question marks to indicate a communication problem.
Object Setup – Disable Outputs	Prevents output from the MB3 OPC server to the selected data block when you select this check box.
Data Set – Identity	The Data Set number.This value corresponds to the IDENT parameter of the DS block in the ABB System. Valid entries are 1 – 255
Data Set – Redundant Identity	This field is used only if you have redundant Scadas communicating with the same PLCs and you want to have the same database in both redundant Scadas (two Scadas can not access the same Data Set in a PLC). The identity set in the Data Set Identity field will still be used in the database I/O addressing but the identity set in this Data Set Redundant Identity field will be used in the communciation with the PLC. Valid entries are 1 – 255 or None. Set to blank to disable. One example: Data Set - Identity = 2 Data Set - Redundant Identity = 12 Data Set - Source in ABB = Send The I/O Address in the database block will look as below if we want to read value 3 from the Data Set. Device:DS:2:3 The datablock will receive messages with Data Set number 12 from the PLC.
Data Set – Length	The number of values this Data Set consists of. Valid entries are 1 – 24

Data Set – Source in ABB	Data Set direction. Valid entries are Send ABB System sends the Data Set to I/O server Receive ABB System receives Data Set from I/O server. You must trig the I/O server to start sending the data set. See special datablock control addresses "!START_DS:Name".
Data Set – Update Time	How often, in seconds, the Data Set is transferred between the ABB System and the I/O server. Default is 1 Valid entries: Accepts the time format: days:hours:minutes:seconds up to a maximum of 6:23:59:59. If the Data Set is set up as Send then the I/O server will check if it has received a Data Set update within a specified amount of time. If this time times out then it will set the data block to communication error.
Subscription Communication– Cyclic + Event Enable	Enables/ Disables Cyclic + Event data updates for this data block.
Subscription Communication– Cyclic Force fast update	If set then the data block will always subscribe for fast cyclic updates, set in the Fast Update property, if an active item with the ":C" flag is connected to the data block. The fast cyclic updates will not time out after two minutes with this property set. If a normal cyclic subscription is active when this property is set then the normal subscription will be unsubscribed and the fast will be subscribed instead.
Subscription Communication– Cyclic Normal Update	How often the ABB controller will send Cyclic data updates to the MB3 OPC server during normal communication. Valid entries are 3 seconds 9 seconds The MB3 OPC server will check if it has received a Cyclic update within a specified amount of time. If this time timeout then it will set the data block to communication error.
Subscription Communication– Cyclic Fast Update	How often the ABB controller will send Cyclic data updates to the MB3 OPC server when the fast update flag for the data block is set. This flag can be set from pop up object dialogs to get faster updates when focus is set to this object. The fast update flag will be reset after a two-minute timeout and then the object will go back to the normal update rate again. Valid entries are 1 second 3 seconds Also See the "Force fast update" property. The MB3 OPC server will check if it has received a Cyclic update within a specified amount of time. If this time timeout then it will set the data block to communication error.
Subscription Communication– Cyclic + Event Access Time	Specifies how long time the MB3 OPC server subscribes for cyclic and event updates for a data block when your process control software no longer requests data from that data block. Whenever your process control software requests cyclic data from a data block, the MB3 OPC server resets the cyclic access time for that data block. Once cyclic data requests stop for the data block and the access time expires, the MB3

	OPC server unsubscribe the cyclic updates for the data block from the ABB controller. Default value 30 seconds Valid Entries Accepts the time format: days:hours:minutes:seconds and Disabled
Subscription Communication– Demand Enable	Enables/ Disables Demand data updates for this data block. Use this option when fresh data for objects is needed infrequently.
Subscription Communication– Demand Access Type	The Access Type specifies which parameters will be sent back from the object when the MB3 OPC server sends a demand subscription request to the ABB controller. A cyclic data subscription first gives a demand update with the parameters specified by this access type, and thereafter, on event and cyclic updates. See tables in appendix which parameters for each object type are sent back for the access types. Default is set to 2. Valid entries: 1 – 2 for object type DI, DO, DAT and TEXT Valid entries: 1 – 3 for object type AO Valid entries: 1 – 4 for all other object types MultiDAT have no Access Type.
Subscription Communication– Demand Primary Rate	Defines how often the MB3 OPC server will send out a Demand data subscription request for this data block. Valid Entries Accepts the time format: days:hours:minutes:seconds up to a maximum of 6:23:59:59 and Disabled.
Subscription Communication– Demand Secondary Rate	Specifies the rate at which the MB3 OPC server will send out a Demand data subscription request after the demand access time expires. The MB3 OPC server maintains this poll rate on the data block until there is another request for data. The secondary poll rate runs in conjunction with the primary poll rate. Enter a secondary poll rate that is longer than the primary poll rate to help minimize the CPU time while ensuring that the data block is always polled. Valid Entries Accepts the time format: days:hours:minutes:seconds up to a maximum of 6:23:59:59 and Disabled.
Subscription Communication– Demand Phase	Sets the length of delay before the MB3 OPC server first attempts to read Demand data subscription for the data block. When the phase time expires, the MB3 OPC server resumes reading the data block at the specified primary or secondary poll rate. Valid Entries Accepts the time format: days:hours:minutes:seconds.
Subscription Communication– Demand Access Time	Specifies how long time the MB3 OPC server sends demand subscription requests for a data block by its primary poll rate when your process control software no longer requests data from that data block. Whenever your process control software requests demand subscription data from a data block, the MB3 OPC server resets the access time for that data block. Once demand data requests stop for the data block and the demand access time expires, the MB3 OPC server scans the data block by its secondary poll rate. If you set the secondary poll rate to DISABLED, polling for that data block stops until there is another request for data.

	Make sure you specify an access time that is greater than the scan time entered for the associated database block. Otherwise, your process control software receives old data. Default value 30 seconds Valid Entries Accepts the time format: days:hours:minutes:seconds and Disabled
TTD Configuration…	Opens the TTD configuration dialog box for this object.

11.4.1 One Shot Demand Polling

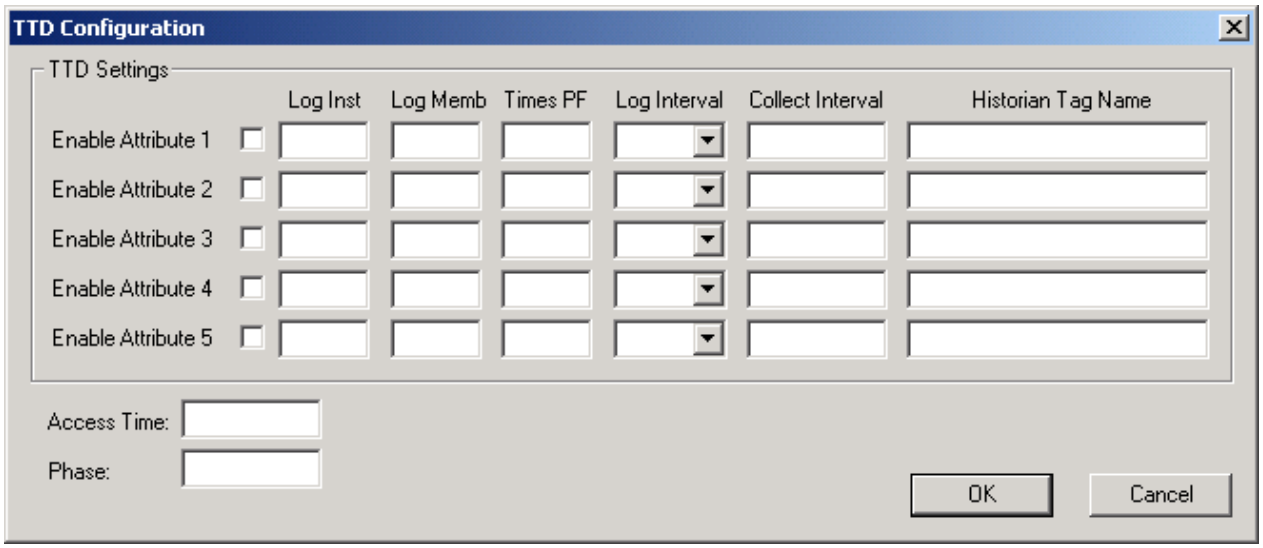
You can set up the data blocks to use one shot demand polling. Use the following setting:

- Primary Rate Disabled
- Secondary Rate Disabled

When your process control software accesses the data block for demand updates for the first time the data block will send out a one shot demand subscription request for data. As long as the process control software accesses the data block for demand updates the demand access time will not expire and no more demand subscription requests will be sent for the data block. When the process control software stops accessing the data block for demand updates the demand access time will expire. The next time the process control software accesses the data block for demand updates the data block will send out a one-shot demand subscription request.

11.4.2 TTD Configuration

The TTD configuration dialog contains the TTD log configuration for one object. The MB3 OPC server can collect values for one primary TTD log per object and attribute. The number of attributes shown in the dialog depends on the object type.



Field	Description
Enable Attribute 1 – 5	Enable this check box if you want the MB3 OPC server to be able to collect TTD log values for this attribute.
Log Inst 1 – 5	TTDLog instance number 1 – 15. Use the LOG INST number from the corresponding TTDVAR in the ABB configuration.
Log Memb 1 – 5	TTDLog variable number 1 – 127. Use the LOG MEMB number from the corresponding TTDVAR in the ABB configuration.
Times PF 1 – 5	Total number of TIMES on the Primary File for the TTDLog in the AC or MP.

	Use TIMESPF from the corresponding TTDLOG in the ABB configuration.
Log Interval 1 – 5	Log Interval of the log. Use LOG INT from the corresponding TTDLOG in the ABB configuration. Valid values are: 1s 2s 3s 4s 5s 6s 10s 12s 15s 20s 30s 1m 2m 3m 4m 5m 6m 10m 12m 15m 20m 30m 1h 2h 3h 4h 6h 12h 24h
Collect Interval 1 – 5	Defines how often the MB3 OPC server will send out a TTD request for this variables TTDLog. Valid Entries Accepts the time format: days:hours:minutes:seconds up to a maximum of 6:23:59:59 and Disabled. The collect interval must be an even multiple of the log interval. For example if the log interval is 2m then valid collect intervals are 2:00, 4:00, 6:00 and so on. The collect interval will be adjusted to not collect more than 402 values or the configured "Times PF" number if that number is smaller than 402. At startup or if the variable hasn't been accessed for a while and a client requests TTD log data then the complete log will be fetched. After that it will be updated with the collect interval.
Historian Tag Name 1 – 5	The tag name of the variable in Proficy Historian or CSV file.
Access Time	Specifies how long time the MB3 OPC server sends TTD requests for a object by its collect interval when your process control software no longer requests TTD log data from that data block. Whenever your process control software requests TTD log data from a data block, the MB3 OPC server resets the TTD access time for that data block. Once TTD requests stop for the data block and the TTD access time expires, TTD request polling for that data block stops until there is another request for TTD log data. Default value 30 seconds Valid Entries Accepts the time format: days:hours:minutes:seconds and Disabled This TTD access time is common for all TTD attributes for the data block. If set to Disabled then the MB3 OPC server will continue to collect TTD log data even if TTD requests stops for the data block. Note! The MB3 OPC server will not start to collect TTD log data if no client has requested it.
Phase	Sets the length of delay before the MB3 OPC server first attempts to send a TTD log request for the data block. When the phase time expires, the MB3 OPC server resumes reading the TTD logs at the specified collect intervals. Valid Entries Accepts the time format: days:hours:minutes:seconds.

	This TTD phase is common for all TTD attributes for the data block.

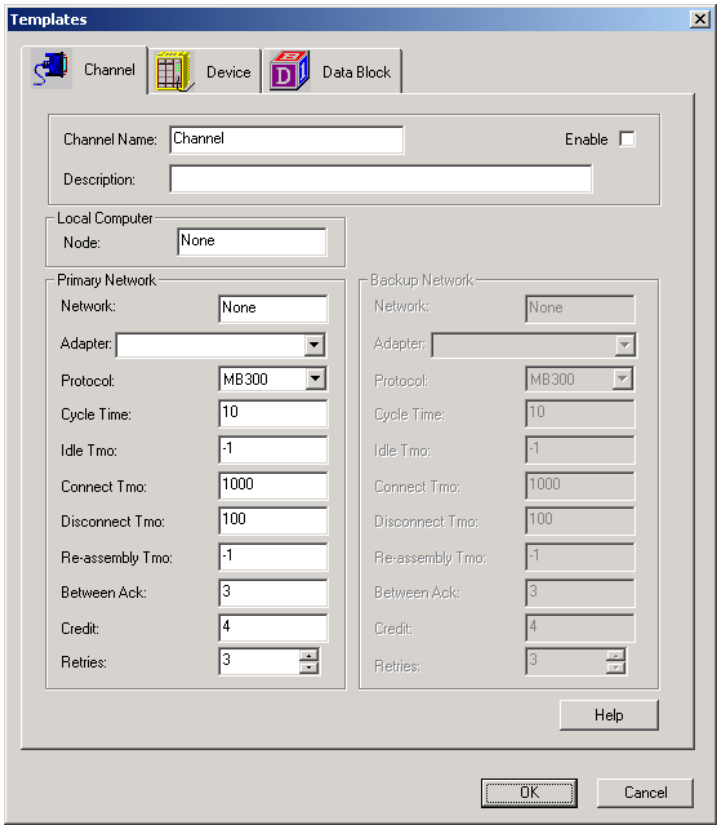
11.4.2a Available Object TTD Attributes

The attribute positions for each object type are hardcoded in the MB3 OPC server. The table below describes in which position for each object type the TTD attributes should be configured. N/A = Not Available.

Object Type	Attribute 1	Attribute 2	Attribute 3	Attribute 4	Attribute 5
AI	VALUE	N/A	N/A	N/A	N/A
AO	VALUE	N/A	N/A	N/A	N/A
DI	VALUE	N/A	N/A	N/A	N/A
DO	VALUE	N/A	N/A	N/A	N/A
PIDCON	MV	WSP	OUT	DEVIATION	PRES1
RATIOSTN	MV	WRATIO	OUT	N/A	N/A
MANSTN	MV	OUT	PRES1	N/A	N/A
PIDCONA	MV_NONF	WSP	OUT	DEVIATION	ACTPOS
GENCON	MV	SP	OUT	N/A	N/A
GENUSD	MV	MV_INTL	SP	N/A	N/A
GENBIN	MV	N/A	N/A	N/A	N/A
MOTCON	R_RES	N/A	N/A	N/A	N/A
VALVECON	VALVP	N/A	N/A	N/A	N/A
DAT (R)	VALUE	N/A	N/A	N/A	N/A
DAT (I)	VALUE	N/A	N/A	N/A	N/A
DAT (IL)	VALUE	N/A	N/A	N/A	N/A
DAT (B)	B1	B2	B3	N/A	N/A
TANKCON	MV	MV_INTL	SP	N/A	N/A
DRICONS	R_RES	REAL_C	REAL_A	N/A	N/A
DRICONE	R_RES	REAL_C	REAL_A	N/A	N/A

11.5 Channel, Device and Data Block Templates

You can enter defaults for channel, device, and data block properties by clicking the Templates button,  , in the MB3 Power Tools Run-time toolbar and displaying the Templates dialog box.



The MB3 OPC server uses the defaults you enter when you:

Add addresses to the MB3 OPC server configuration from a client application or FIX Database Builder, or
Are configuring the MB3 OPC server from the Power Tool.

The Power Tool stores the default channel, device, and data block properties that you enter in the Registry on the computer you installed the MB3 OPC server. For example, if you run the Power Tool and connect to an MB3 OPC server on another computer, the default values you enter are written to the remote MB3 OPC server.

Setting default values can significantly decrease MB3 OPC server configuration time.

11.6 CSV File Format

You can use a MB3 OPC server report file (.CSV) file to document, create, or upgrade the MB3 OPC server configuration binary file. CSV files are Comma Separated Value files that you can view and edit in a text editor or Microsoft Excel. The file uses the Windows system locale settings.

The best way to avoid non-existent object names in your configuration is to create a CSV configuration file that is based of object names from reported BAX files from the ABB controllers. The BAX file is a text file dump of the database in a controller.

MB3 OPC server .CSV files have the following sections:

Section	Description
Report Header	Header is informational and contains the MB3 OPC server name and the date of the report.
Channel Header	Channel Header contains a list of all the channel properties. The channel header must start with an exclamation point (!).

Channel Data	Contains the values of the channel properties for your MB3 OPC server configuration. The number of data values must match the number of channel properties listed in the channel header. If you do not specify a value for a property, it uses the default value for that property.
Device Header	Contains a list of all the device properties. The device header must start with an at-sign (@).
Device Data	Contains the values of the device properties for your MB3 OPC server configuration. The number of data values must match the number of device properties listed in the device header. If you do not specify a value for a property, it uses the default value for that property.
Data Block Header	Contains a list of all the data block properties. The data block header must start with a pound sign (#).
Data Block Data	Contains the values of the data block properties for your MB3 OPC server configuration. The number of data values must match the number of data block properties listed in the data block header. If you do not specify a value for a property, it uses the default value for that property.

An example of a .CSV file with one channel, one device and one data block of each object type opened in a text editor.

[MB3 I/O Driver Configuration Report, Monday October 23 2006, 09:54 AM]

!Name,Description,Node,PrimaryNetwork,PrimaryAdapter,PrimaryProtocol,PrimaryCycleTime,PrimaryIdleTmo,PrimaryConnectTmo,PrimaryDisconnectTmo,PrimaryReAssemblyTmo,PrimaryBtwAck,PrimaryCredit,PrimaryRetries,BackupNetwork,BackupAdapter,BackupProtocol,BackupCycleTime,BackupIdleTmo,BackupConnectTmo,BackupDisconnectTmo,BackupReAssemblyTmo,BackupBtwAck,BackupCredit,BackupRetries,DataSetBitNumbering,Enabled,iHistUserApi,iHistServer,iHistUserName,iHistPassword,iHistCSV,ArchiveTempPath,iHistArchivePath,iHistInterval
Channel0,,31,11,3Com 3C920 Integrated Fast Ethernet Controller (3C905C-TX Compatible),MB300,10,-1,1000,100,-1,3,4,3,,,MB300,10,-1,1000,100,-1,3,4,3,0,1,0,,,,0,C:\TTDArchive\Temp,C:\TTDArchive,300

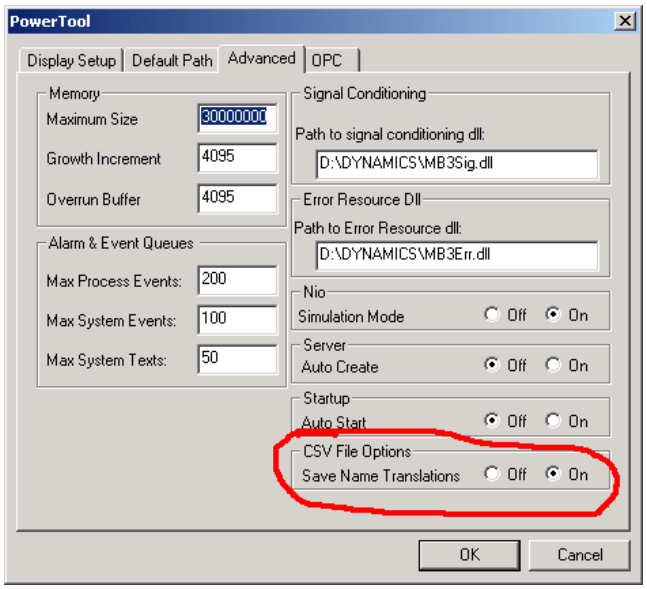
@Channel,Name,Description,Node,NameTransTmo,Enabled,SaveUnknown,ProEventDemand,ProEventFormat,ProEventSaveFile
Channel0,Device0,,12,01:00,1,0,1,1,0

#Device,Name,Description,ObjectType,ObjectName,DeadBand,LatchData,OutputDisabled,EnableEvent,EventAccessTime,EnableCyclic,CyclicScanTime,CyclicScanFast,CyclicAccessTime,EnableDemand,DemandAccessType,PrimaryPollTime,SecondaryPollTime,Phase,AccessTime,DataSetIdentity,DataSetRedId,DataSetLength,DataSetScanTime,DataSetSource,Enabled,TTDAccessTime,TTDPhase,TTDLogInst1,TTDLogInst2,TTDLogInst3,TTDLogInst4,TTDLogInst5,TTDLogMemb1,TTDLogMemb2,TTDLogMemb3,TTDLogMemb4,TTDLogMemb5,TTDTimesPF1,TTDTimesPF2,TTDTimesPF3,TTDTimesPF4,TTDTimesPF5,TTDLogInterval1,TTDLogInterval2,TTDLogInterval3,TTDLogInterval4,TTDLogInterval5,TTDCollectInterval1,TTDCollectInterval2,TTDCollectInterval3,TTDCollectInterval4,TTDCollectInterval5,TTDTagName1,TTDTagName2,TTDTagName3,TTDTagName4,TTDTagName5,TTDEnable1,TTDEnable2,TTDEnable3,TTDEnable4,TTDEnable5
Device0,AI_AI1,,AI – Analog
Input,AI1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,AO_AO1,,AO - Analog
Output,AO1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,DI_DI1,,DI - Digital
Input,DI1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,DO_DO1,,DO - Digital
Output,DO1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,DAT_DAT1,,DAT - DAT
Object,DAT1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,PIDCON_PIDCON1,,PIDCON - Process
Controller,PIDCON1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,RATIOSTN_RATIOSTN1,,RATIOSTN - Ratio
Station,RATIOSTN1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,MANSTN_MANSTN1,,MANSTN - Manual
Station,MANSTN1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,MMCX_MMCX1,,MMCX - User
Control,MMCX1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,VALVEC_VALVECON1,,VALVECON - Valve
Control,VALVECON1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,MOTC_MOTCON1,,MOTCON - Motor
Control,MOTCON1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0
Device0,TEXT_TEXT1,,TEXT - Text
Data,TEXT1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,,,,,,,0,0,0,0,0

```
Device0,GENUSD_GENUSD1,,GENUSD - User Definded
Ctrl,GENUSD1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,, ,,,,,,0,0,0,0,
0
Device0,GENBIN_GENBIN1,,GENBIN - Binary
Control,GENBIN1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,, ,,,,,,,,0,0,
0,0,0
Device0,GENCON_GENCON1,,GENCON - PI
Controller,GENCON1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2 m,,,,,,,,,,
0,0,0,0,0
Device0,SEQ_SEQ1,,SEQ - Sequence
Control,SEQ1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m,,,,, ,,,,,0,0,0,0,0
Device0,PIDCONA_PIDCONA1,,PIDCONA - Adaptive
Controller,PIDCONA1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m, 2m,,,,,,,,,,
0,0,0,0,0
Device0,TANKCON_TANKCON1,,TANKCON - Tank
Control,TANKCON1,1,0,0,0,30,0,9,3,30,0,2,,,00,30,,,24,01,Send,1,30,00,0,0,0,0,0,0,0,0,0,0,240,240,240,240,240,2m,2m,2m,2m,2m, ,,,,,,,,,0,
0,0,0,0
```

11.6.1 Saving DataBlock Name Translations to CSV file

If you want to save the name translated Logical File, Logical Record and Objecttype to the CSV file then you have to enable it under the Advanced options in the MB3 Power Tool.



If this is enabled then the following properties will be added to the Data Block header:

,StatusObjectType,LogicalFile,LogicalRecord

The Data Block data lines will contain three new fields.

The StatusObjectType data field shall contain:

Status of Name Translation	**Type in ABB**	**StatusObjectType in CSV file**
Not Translated		Empty
Translated and configured as AI - Analog Input	All AI types	AI
Translated and configured as AO - Analog Output	All AO types	AO
Translated and configured as DI - Digital Input	All DI types	DI
Translated and configured as DO - Digital Output	All DO types	DO
Translated and configured as DAT - DAT Object	DAT	DAT
Translated and configured as PIDCON - Process Controller	PIDCON	PIDCON
Translated and configured as RATIOSTN - Ratio Station	RATIOSTN	RATIOSTN
Translated and configured as MANSTN - Manual Station	MANSTN	MANSTN
Translated and configured as MMCX - User Control	MMCX39	MMCX39

Translated and configured as MMCX - User Control	MMCX32	MMCX32
Translated and configured as MMCX - User Control	MMCX33	MMCX33
Translated and configured as MMCX - User Control	MMCX34	MMCX34
Translated and configured as MMCX - User Control	MMCX35	MMCX35
Translated and configured as MMCX - User Control	MMCX36	MMCX36
Translated and configured as MMCX - User Control	MMCX37	MMCX37
Translated and configured as MMCX - User Control	MMCX38	MMCX38
Translated and configured as VALVECON - Valve Control	VALVECON	VALVECON
Translated and configured as MOTCON - Motor Control	MOTCON	MOTCON
Translated and configured as TEXT - Text Data	TEXT	TEXT
Translated and configured as GENUSD - User Definded Ctrl	GENUSD GU1	GENUSD
Translated and configured as GENUSD - User Definded Ctrl	GENUSD GU2	GU2
Translated and configured as GENUSD - User Definded Ctrl	GENUSD GU3	GU3
Translated and configured as GENUSD - User Definded Ctrl	GENUSD GU4	GU4
Translated and configured as GENUSD - User Definded Ctrl	GENUSD GU5	GU5
Translated and configured as GENUSD - User Definded Ctrl	GENUSD GU6	GU6
Translated and configured as GENBIN - Binary Control	GENBIN	GENBIN
Translated and configured as GENCON - PI Controller	GENCON	GENCON
Translated and configured as SEQ - Sequence Control	SEQ	SEQ
Translated and configured as PIDCONA - Adaptive Controller	PIDCONA	PIDCONA
Translated and configured as TANKCON - Tank Control	TANKCON	TANKCON
Translated and configured as DRICONS - Standard Drive	DRICONS	DRICONS
Translated and configured as DRICONE – Engineered Drive	DRICONE	DRICONE

The LogicalFile data field shall contain

Status of Name Translation	**LogicalFile in CSV file**
Not translated	The text “Not Translated”
Translated	The logical file number
Data Set	The text “Not Used”

The LogicalRecord data field shall contain

Status of Name Translation	**LogicalRecord in CSV file**
Not translated	The text “Not Translated”
Translated	The logical record number
Data Set	The text “Not Used”

12 Symbolic Name Translation

Consider you have created a new configuration and are ready to start the MB3 OPC server for the first time. The first thing the MB3 OPC server will do is to send the symbolic name translation requests for all of the configuration's enabled data blocks containing object names. The ABB controllers translate the names to logical database references (LF and LR) and return them to the MB3 OPC server. If a data block object in the MB3 Power Tool tree browser is yellow or green it has been translated. If a data block object is red in the MB3 Power Tool tree browser then it has not been translated yet. In the MB3 Power Tool you can see the LF and LR for each object in the data block Statistics window. In some ABB configurations, object symbolic name translation can be a time consuming process.

12.1 New Configuration

The best way to avoid non-existent object names in your configuration is to create a CSV configuration file that is based of object names from reported BAX files from the ABB controllers. The BAX file is a text file dump of the database in a controller.

Note! The logical database reference (LF and LR) for each object is not saved to configuration CSV report files. So if you import a configuration CSV report file and saves it as an mb3 configuration file you will have to make new symbolic name translations.

Do the following to do a complete symbolic name translation from a new configuration.

1. Create all data blocks offline. Save the file as an mb3 file.
2. Check that the Channel local node number match with the adapters MAC address. If it doesn't the MB3 OPC server will not start.
3. Start the MB3 OPC server without any clients connected. Wait until all data blocks have been translated (All data blocks are yellow or green in the MB3 Power Tool tree browser). Use F5 to refresh the tree.
4. When all data blocks have been translated then save the configuration. The logical database reference (LF and LR) for each object is saved in the configuration so the next time the MB3 OPC server is started the MB3 OPC server will not need to translate all symbolic object names again.

In an application containing ten AC 450 and one AC 410 with a total of 7400 objects in the configuration the name translation took about 6 minutes to complete when there was no client connected to the MB3 OPC server and low load on the controllers. We have seen that it takes longer time in a MP than in an AC and the time increases when the controller has higher load.

12.2 Failed Name Translations

If the MB3 OPC server has failed to translate an object name in a data block then check that the data blocks configured object name exist in the ABB controller's database. If it does then try to disable and enable the data block. This will force the MB3 OPC server to send out a new symbolic name translation request for the object.

12.3 Online Name Translations

12.3.1 All Data Blocks in a Device

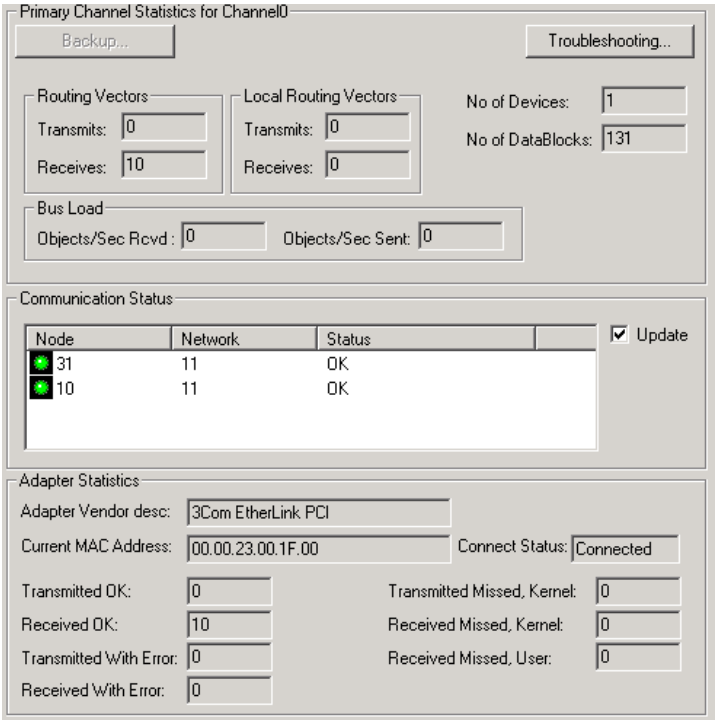
You can trig the MB3 OPC server to retranslate all data blocks in a device with a button in the device dialog in the MB3 Power Tool or via a special device control address. Remember to save your configuration when the translation is ready.

12.3.2 One Data Block

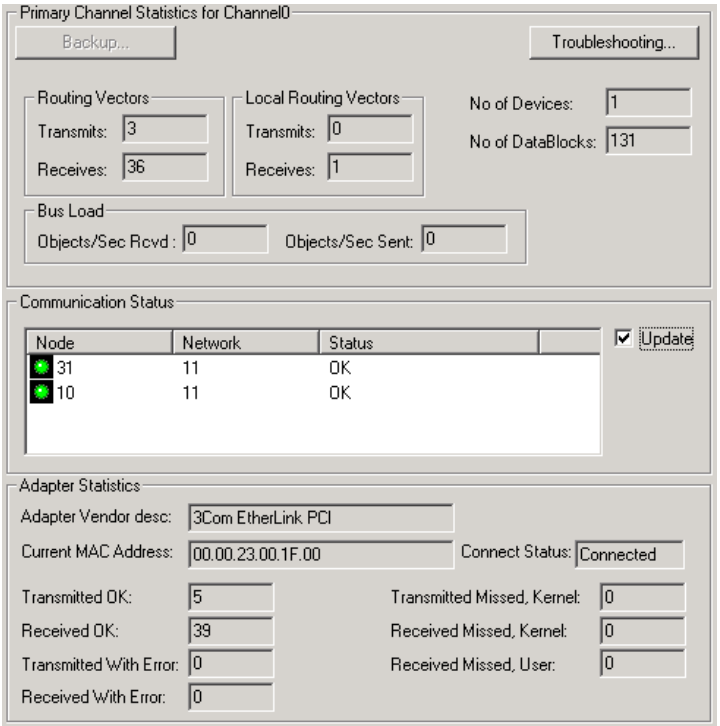
If you add one data block online then enable the data block. This will force the MB3 OPC server to send out a symbolic name translation request for the object. Remember to save your configuration when the translation is ready.

13 Startup of the MB3 OPC Server

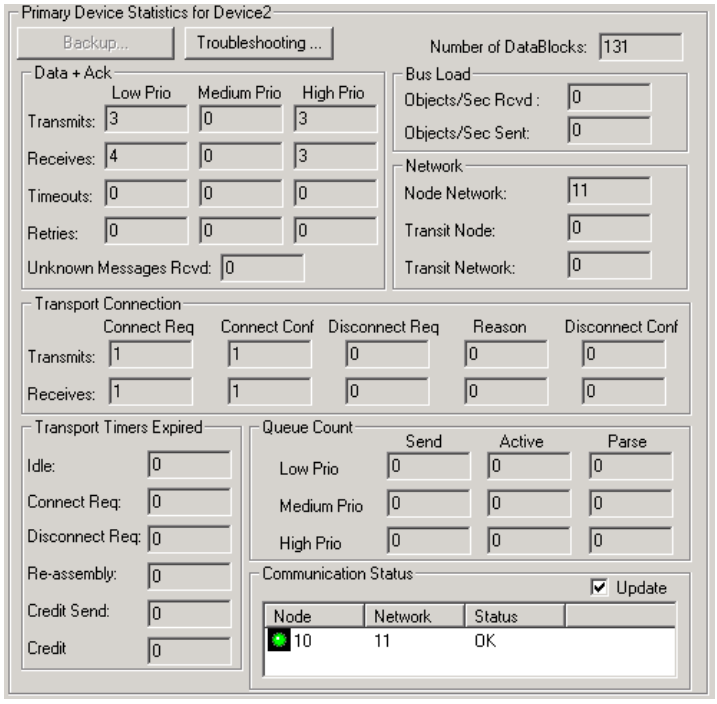
When the MB3 OPC server is started it will start to receive messages immediately. You can look in the channel statistics dialog that it is receiving routing vectors from the other nodes on the network. The pictures below show a configuration with one controller node 10 and the MB3 OPC server as node 31.



After about 30 seconds the MB3 OPC server starts to send routing vector messages and registers itself on the MB300 network.



The MB3 OPC server will then connect on the Transport connections with the nodes available on the network. You can check that under the device statistics Transport connections counters. Depending on which types of messages needed the different priorities will be connected.



If the network cable is unplugged from the MB3 OPC server's adapter and then put back again the MB3 OPC server will behave like it has been restarted.

14 Accessing the MB3 OPC Server from OPC Clients

The MB3 OPC server's Prog ID is "Novotek.MB3OPC". Your client may require you to specify this value, but other clients may present a list of available servers.

Once the MB3 OPC server is connected then define groups to hold your items.

After you have created groups you can add items to your groups. This is done by providing a Item ID. The MB3 OPC server uses this information to find the data you are interested in. The Access Path is not used by the MB3 OPC server.

14.1 Item ID Format

14.1.1 Format for Process Objects

Item id for process objects will have the format as below:

- Device:ObjectType:ObejctName:Field[:bit]:SubType

Where:

Component	Description
Device	The device name configured in MB3 Power Tool
ObjectType	AI, AO, DI ,DO ,DAT, PIDCON, RATIOSTN, MANSTN, MMCX, VALVECON, MOTCON, TEXT, GENUSD, GENBIN, GENCON, SEQ, PIDCONA, TANKCON
ObjectName	The name of the object
Field	"21 Appendix A, Object Type Maps" for fields available for each object type.
[Bit]	Used to read/write bit values from a field. Valid values are 0 – 31.
SubType	The subscription type used to read this value. Valid entries are "C" = Cyclic, "D" = Demand, "E" = Event, "S" = Seamless, "T" = TTD. See 6 Application Design Considerations Using OPC Clients for more info of how to minimize the MB300 bus load. "21 Appendix A, Object Type Maps" for supported subtypes for each field for each object type. • "E" is default. With this subtype the object will only put load on the bus, with a one-shot demand poll, when the MB3 OPC server receives a process event from the ABB controller for this object. • "C" Cyclic. With this subtype the MB3 OPC server will subscribe for cyclic updates for this object when the item is accessed from the client. • "D" Demand. With this subtype the MB3 OPC server will poll demand subscriptions with the Primary Rate set up in the data block configuration when the item is accessed from the client. • "S" Seamless. Is a alias for "C" cyclic but it will additoinally do a one shot TTD request for the object when a cyclic subscription is started. Only available for the fields that can be logged to TTD logs. • "T" TTD. Keeps the TTD Access Timer alive and keeps the TTD request polling alive. It will also receive values from cyclic, demand and event updates. Only available for the fields that can be logged to TTD logs.

Item ID examples:

I/O Address	Req Data Type	Description
12_12:AI:R64KT3.1MV:VALUE:C	Empty	To read value from AI object R64KT3.1MV in device "12_12" with cyclic subscription.
12_12:DI:N6GTFV:STATUS:8:C	Empty	To read value from DI object N6GTFV in device "12_12" with cyclic subscription.

12_12:DAT:K963.ST:VALUE:C	Float	To read/write value in DAT object K963.ST of Real data type in device ”12_12” with cyclic subscription.
12_12:DAT:K963.ST:VALUE:C	Long	To read/write value in DAT object K963.ST of Integer Long data type in device ”12_12” with cyclic subscription.
12_12:DAT:K963.ST:VALUE:C	Int	To read/write value in DAT object K963.ST of Integer data type in device ”12_12” with cyclic subscription.
12_12:DAT:K963.ST:VALUE:2:C	Long	To read/write bit 2 from value in DAT object K963.ST of Integer Long data type in device ”12_12” with cyclic subscription.
12_12:DAT:K963.ST:VALUE:0:C	Bool	To read/write bit 0 from value in DAT object K963.ST of Boolean data type in device ”12_12” with cyclic subscription.

14.1.2 Format for Data Set

Item id for Data Set will have the format as below:

- Device:ObjectType:DSType:DSIdentity:Item[:bit]

Where:

Component	Description
Device	The devicename configured in MB3 Power Tool
ObjectType	DS
DSType	The Data Set type. Valid entries are: RAW Raw Data Set values. Communication status will set the quality. IMSA IMS Analog values. The analog values are in item 2-24 of the data set. Status of the analog values are in the first 23 bits in the first item. Status bit value 1 = Bad, 0 = Good. The I/O server will set the quality of the analog values from the status bits. IMSB IMS Boolean values. The Boolean values are in item 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22 and 24. Status of the Boolean values are in item 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21 and 23. Status 1 = Bad, 0 = Good. The I/O server will set the quality of the Boolean values from the status bits.
DS_Identity	The Data Set identity number. Valid values are 1 – 255
Item	The item in the Data Set to get data from. Valid items are 1 – 24
[Bit]	Used to read/write bit data from one item. Valid values are 0 – 31 or 1 – 32 depending on what is set under the channels Data Set Bit Numbering configuration in the MB3 Power Tool. See Channel Configuration where to set this parameter. Default is 0 – 31.

Item ID examples:

I/O Address	Req Data Type	Description
D22_23:DS:RAW:233:3	Float	To read/write raw Float value 3 in Data Set 233 in Device ”D22_33” in an Analog database block.
D22_23:DS:IMSB:25:14:5	Bool	To read/write bit 5 in IMSB item 14 in Data Set 25 in Device ”D22_33”.

D22_23:DS:IMSA:10:2	Long	To read/write IMSA Long item 2 in Data Set 10 in Device ”D22_33”.
D22_23:DS:RAW:12:2	Int	To read/write raw Int item 2 in Data Set 12 in Device ”D22_33”.

14.1.3 Format for System Status Objects

Item id for system status objects will have the format as below:

- Device:ControllerType:SystemStatusObject:Field[:bit]:SubType

Where:

Component	Description
Device	The device name configured in MB3 Power Tool
ControllerType	AC = Advant Controller
SystemStatusObject	The name of the system status object. Valid AC system status objects are: • OVERVIEW • NODE • NET • FIELDBUS_1 – FIELDBUS_7 • SEL_FIELDBUS_1_1 – SEL_FIEDLBUS_1_50 • SEL_FIELDBUS_2_1 – SEL_FIEDLBUS_2_50 • SEL_FIELDBUS_3_1 – SEL_FIEDLBUS_3_50 • SEL_FIELDBUS_4_1 – SEL_FIEDLBUS_4_50 • SEL_FIELDBUS_5_1 – SEL_FIEDLBUS_5_50 • SEL_FIELDBUS_6_1 – SEL_FIEDLBUS_6_50 • SEL_FIELDBUS_7_1 – SEL_FIEDLBUS_7_50 • MASTER_FIELDBUS_1 – MASTER_FIELDBUS_7 • S100_IO • S100_IO2 • S100_RED • S100_EXT
Field	The data to read from the system status object. See 22 Appendix B, System Status Objects for fields available for each system status object.
[Bit]	Used to read/write bit values from a field. Valid values are 0 – 31.
SubType	The subscription type used to read this value. Valid entries are ”D” = Demand and “E” = Event • ”D” Demand. With this subtype the MB3 OPC server will poll demand subscriptions for the system status object with a poll rate of 15 seconds. If no client is connected to the system status object then no demand polls will be sent for it. If a client activates a system status object item for demand polls and then sets the item to inactive the MB3 OPC server will stop demand poll the system status object after 20 seconds. • “E” Event. With this subtype the object will only put load on the bus if another item accesses it with a “D” Demand subscription type.

AC System status Item ID examples:

I/O Address	Req Data Type	Description
12_12:AC:OVERVIEW.STATUS:D	Empty	To read status of the AC OVERVIEW system status.
12_12:AC:NODE:C_POW_A:0:D	Empty	To read bit 0 of the Controller Power A status bits in the AC NODE system status

12_12:AC:NET:NET1:D	Empty	To read net number of first node in the AC NET system status.
12_12:AC:NET:NODE1:D	Empty	To read node number of first node in the AC NET system status.
12_12:AC:NET:STATUS1:D	Empty	To read status of first node in the AC NET system status.
12_12:AC:FIELDBUS_1:NAME1:D	Empty	To read name of first fieldbus on page 1 in the AC FIELDBUS system status.
12_12:AC:S100_IO:AI:STATUS1:0:D	Empty	To read bit 0 of status for AI board 1 in the AC S100_IO system status.
12_12:AC:SEL_FIELDBUS_1_1:AF100_NAME:D	Empty	To read the AF100 name of the selected AF100 unit on filedbus 1 and index 1 in the AC SEL_FIELDBUS system status.
12_12:AC:SEL_FIELDBUS_1_2:S800S_NAME:D	Empty	To read the S800 station name of the selected S800 bus on fieldbus 1 and index 2 in the AC SEL_FIELDBUS system status.
12_12:AC:SEL_FIELDBUS_1_2:S800M2_NAME:D	Empty	To read the S800 module 2 name of the selected S800 bus on fieldbus 1 and index 2 in the AC SEL_FIELDBUS system status.

14.1.4 Control Format

There are some special Item IDs in the MB3 OPC server that can be used to control and supervise channels, devices and data blocks in the MB3 OPC server. These special control Item IDs are explained in the tables below. Name in the Item IDs are the channel, device or data block names configured in the MB3 Power Tool.

14.1.4a Channel Control Item Ids

Item ID	Data Type	Description
!MODE:Name	Boolean	Write Only. Enables the channel specified with “Name” when a value of 1 is written. Disabling the channel occurs when a value of 0 is written.
!POLL:Name	Boolean	Write Only. Trigs the channel specified with “Name” to send demand subscription requests for all its data blocks.
!PRI_REC:Name	Long Integer	Read Only. Number of received objects per second on the primary adapter. Maximum number for the whole MB 300 is 2000 per second.
!PRI_TRANS:Name	Long Integer	Read Only. Number of sent objects per second on the primary adapter. Maximum number for the whole MB 300 is 2000 per second.
!DCOM_WD:Name	Long Integer	Accesses a internal value in the MB3 OPC server which toggles between 0 and 1 every second when the server is started. Can be used as a DCOM watchdog. See for more information.
!CS_DATE:Name	Long Integer	Latest Clock Sync Date received from a broadcast clock sync telegram. The format is in number of days since 1 January 1980. 1 January 1980 is day 1.
!CS_TIME:Name	Long Integer	Latest Clock Sync Time received from a broadcast clock sync telegram. The format is in number of 0,1 milliseconds since midnight.
!BLOCK:Name	Boolean	Flag that can be used to block data subscriptions and orders for all objects on this channel. If set to TRUE then all active subscriptions will be unsubscribed and no new subscriptions or orders will be sent for the objects. The MB3 OPC server will still receive System and Process Events. When set to FALSE again then all objects that are accessed will send subscriptions for update.
!START_CM:Name	Long Integer	Whenever this tag is set <> 0, the MB3 OPC server sends clock synch-broadcast message every 10 minutes. The 'state' of the tag is saved in the registry, at :HKLM\Software\Novotek\Drivers\MB3\SendCM

		A clock synch-broadcast is also sent every time an OPC client writes <> 0 to the !START_CM tag. The nodes on the network must be set up to listen for time synchronization messages. LOC_TIME in the controllers must be set to 3 “Listen to Time Set Telegram and High Precision Time Synchronization Telegram”.
!SWITCH:Name		Not implemented in this version
!BACK_REC:Name		Read Only. Number of received objects per second on the backup adapter. Maximum number for the whole MB 300 is 2000 per second.
!BACK_TRANS:Name		Read Only. Number of sent objects per second on the backup adapter. Maximum number for the whole MB 300 is 2000 per second.

14.1.4b Device Control Item Ids

Item ID	Data Type	Description
!POLL:Name	Boolean	Write Only. Trigs the device specified with “Name” to send demand subscription requests for all its data blocks.
!PRI_REC:Name	Long Integer	Read Only. Number of received objects per second on the primary adapter for this device.
!PRI_TRANS:Name	Long Integer	Read Only. Number of sent objects per second on the primary adapter for this device.
!BACK_REC:Name	Long Integer	Read Only. Number of received objects per second on the backup adapter for this device.
!BACK_TRANS:Name	Long Integer	Read Only. Number of sent objects per second on the backup adapter for this device.
!PROCEVENTS:Name	String	Read Only. A text describing received Process event for this device. The OPC time stamp is the time stamp received with the Process Event from the ABB controller. The MB3 OPC server has a buffer that can store up to 200 process events per device. The events in the buffer are removed one by one when they are read by a client. See 2.2.5 Process Events for more information about the text formats.
!SYSEVENTS:Name	String	Read Only. A text describing received System Event for this device. The OPC time stamp is the time stamp received with the System Event from the ABB controller. The MB3 OPC server has a buffer that can store up to 100 system events per device. The events in the buffer are removed one by one when they are read by a client. See 2.2.6 System Events for more information about the text format.
!SYSTEXTS:Name	String	Read Only. A text describing the received System Text for this device. These are texts showing illegal orders etc as information. For example “Limit out of range. Input ignored”. The MB3 OPC server has a buffer that can store up to 100 system texts per device. The system texts in the buffer are removed one by one when they are read by a client. See 2.2.7 System Texts for more information about system texts.
!RESOLVE:Name	Boolean	Write Only. Trigs a name translation of all data blocks configured under this device. Same functionality as the device button “Trig Name Translations” in the MB3 Power Tool.
!UNKNOWN_CNT:Name	Long Integer	Read Only. A counter value of received unknown telegrams for this device. If the device checkbox “Save unknown messages to file” in the MB3 Power Tool is checked then there will be an entry in a CCF file each time this counter increases.
!CS_DATE:Name	Long Integer	Latest Clock Sync Date received from this node's clock sync telegram. The format is in number of days since 1 January 1980. 1 January 1980 is day 1.

!CS_TIME:Name	Long Integer	Latest Clock Sync Time received from this node's clock sync telegram. The format is in number of 0,1 milliseconds since midnight.
!PECount:Name	Long Integer	Used to read the number of events in the Process Events buffer for the Device in the MB3 OPC Server.
!SECount:Name	Long Integer	Used to read the number of events in the System Events buffer for the Device in the MB3 OPC Server.
!STCount:Name	Long Integer	Used to read the number of events in the System Texts Events buffer for the Device in the MB3 OPC Server.
!PRI_STAT:Name	Long Integer	Read the status of the node on primary network. Values: 1 = OK 0 = INACTIVE
!BACK_STAT:Name	Long Integer	Read the status of the node on backup network. Values: 1 = OK 0 = INACTIVE
!PRI_DIST:Name	Long Integer	Read the distance to the node on the primary network. Values: 1 = OK (one of the networks are connected) 8 = INACTIVE (both networks are disconnected or this network has not been connected since both networks were disconnected)
!BACK_DIST:Name	Long Integer	Read the distance to the node on the backup network. Values: 1 = OK (one of the networks are connected) 8 = INACTIVE (both networks are disconnected or this network has not been connected since both networks were disconnected)

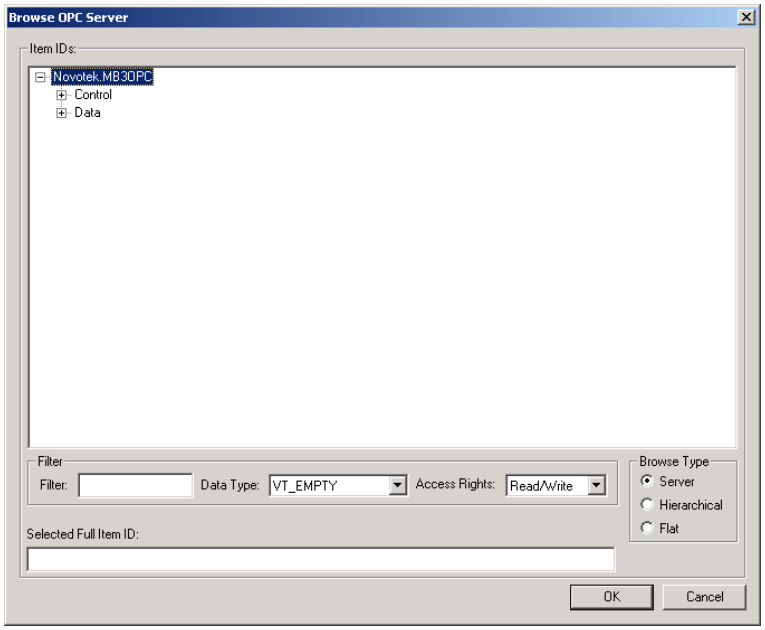
14.1.4c Data Block Control Item Ids

Item ID	Data Type	Description
!MODE:Name	Boolean	Write Only. Enables the data block specified with “Name” when a value of 1 is written. Disabling the data block occurs when a value of 0 is written. This also controls new name translations for the data blocks object name into logical file and logical record numbers.
!POLL:Name	Boolean	Write Only. Trigs the data block specified with “Name” to send a demand subscription request.
!C_FAST:Name	Boolean	Write Only. Trigs the data block to unsubscribe the normal cyclic updates and subscribe for cyclic data updates with the fast cyclic update period. The fast cyclic updates will timeout after two minutes and switch back to normal cyclic updates again. This will only have affect if the data block is enabled for cyclic updates.
!C_NORMAL:Name	Boolean	Write Only. Trigs the data block to unsubscribe the fast cyclic updates and subscribe for cyclic data updates with the normal cyclic update period. This will only have affect if the data block is enabled for cyclic updates.
!C_FAST_ACTIVE:Name	Long Integer	Read Only. Is set to TRUE if fast cyclic update is active for the data block.
!C_NORMAL_ACTIVE:Name	Long Integer	Read Only. Is set to TRUE if normal cyclic update is active for the data block.
!DEMAND_ACTIVE:Name	Long Integer	Read Only. Is set to TRUE if fast demand update is active for the data block.

!ORDER_MMI:Name	Long Integer	Read/Write. Can be used by a client to set the MMI number for orders to this object (data block). In this way a client can select more than one object per controller. The MB3 OPC server will always use MMI number 1 if this item isn't used. Default value is 1 Valid values are 1 – 4 Examples of how this item can be used: When a client wants to select an object it can do the following: 1. Check if the object already is selected 2. Set the desired MMI number 1 - 4 with this item 3. Select the object and then do the orders using the set MMI number. 4. Deselect the object using the set MMI number. Alternatively the client can always set the MMI number item before any orders to the object.
!START_DS:Name	Long Integer	Read/Write. Is used to control sending of data set values from the I/O server to a controller. Fill in all the startup values for the data set and trig the I/O server to start sending the data set to the controller via this trigger. Value > 0 => send data set Value = 0 => stop send data set
!BLOCKCYCLIC:Name	Boolean	When set to True no cyclic subscriptions will be sent for the object connected to the data block. If there is an active cyclic subscription for the data block then it will be unsubscribed. When set to False cyclic subscriptions will be sent if there are active items with the ":C" flag connected to the data block. Demand subscriptions and process events will not be affected by this block property.
!C_FORCEFAST:Name	Boolean	If set then the data block will always subscribe for fast cyclic updates if an active item with the ":C" flag is connected to the data block. The fast cyclic updates will not time out after two minutes with this property set. If a normal cyclic subscription is active when this property is set then the normal subscription will be unsubscribed and the fast will be subscribed instead. This property has higher priority than the "!C_NORMAL" and "!C_FAST" triggers.
!TTD_SUB:Name	Boolean	Write Only. Trigs the data block to collect the TTD log data until now and subscribe for TTD sub updates for the TTD variables configured in the data block. Update period from the controller for the TTD sub updates is the same as the log interval of the variable in the TTD log. Disabled variables or variables with collect interval set to Disabled will not be trigged.
!TTD_UNSUB:Name	Boolean	Write Only. Trigs the data block to unsubscribe the active TTD sub updates for the TTD variables configured in the data block.

14.2 Browsing the MB3 OPC Server

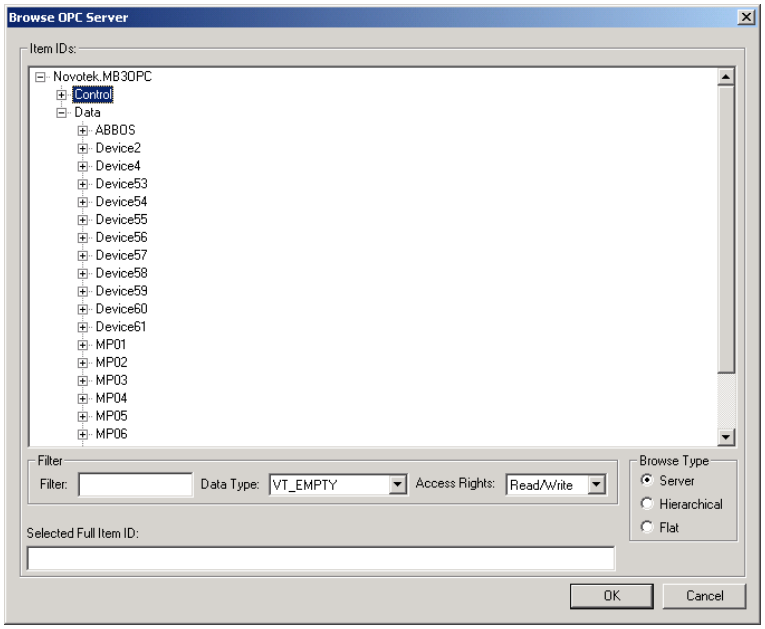
You can browse the MB3 OPC server configuration for items you want to access. The picture below shows the start level browser tree for the MB3 OPC server if you browse it hierarchical.



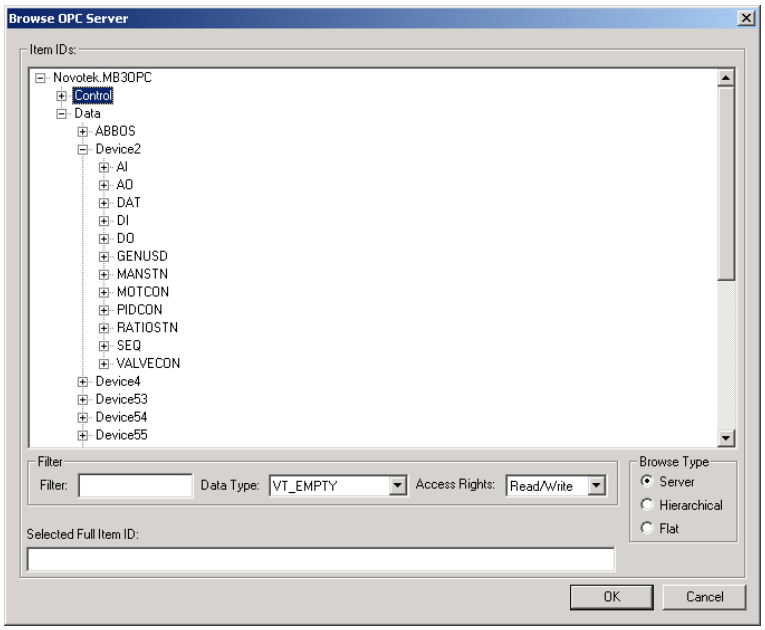
The browse tree is split into one Control branch and one Data branch. The Control branch holds all the Channel, Device and Data block control Item Ids. The Data branch holds all the process object data Item Ids.

14.2.1 Data Branch

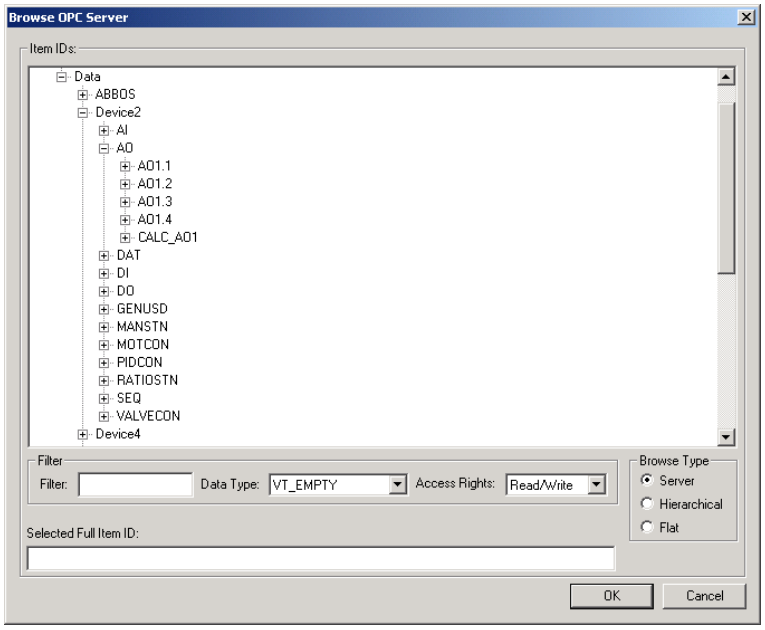
If you expand the Data branch then all configured devices will appear as branches. See picture below:



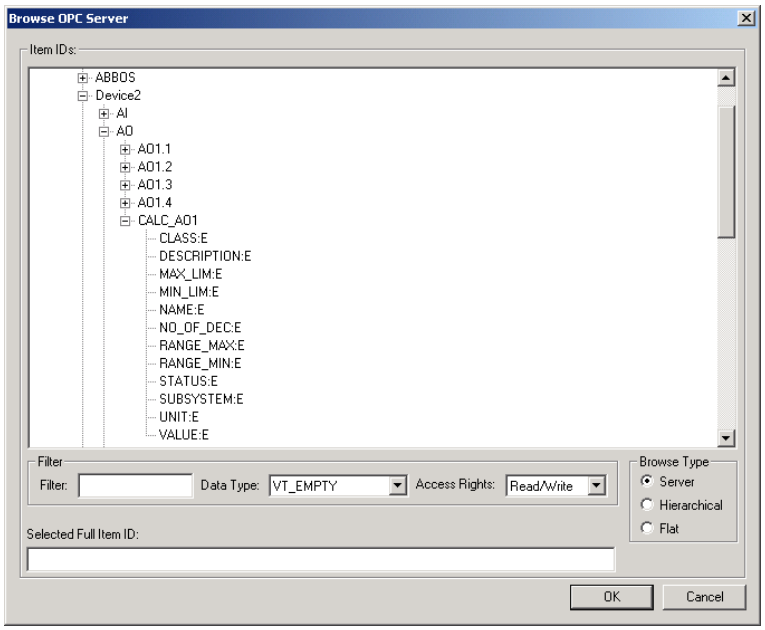
If you expand a device then all configured object types under that device will appear as branches. See picture below:



If you expand an object type then all configured object names of that type in that device will appear as branches. See picture below:



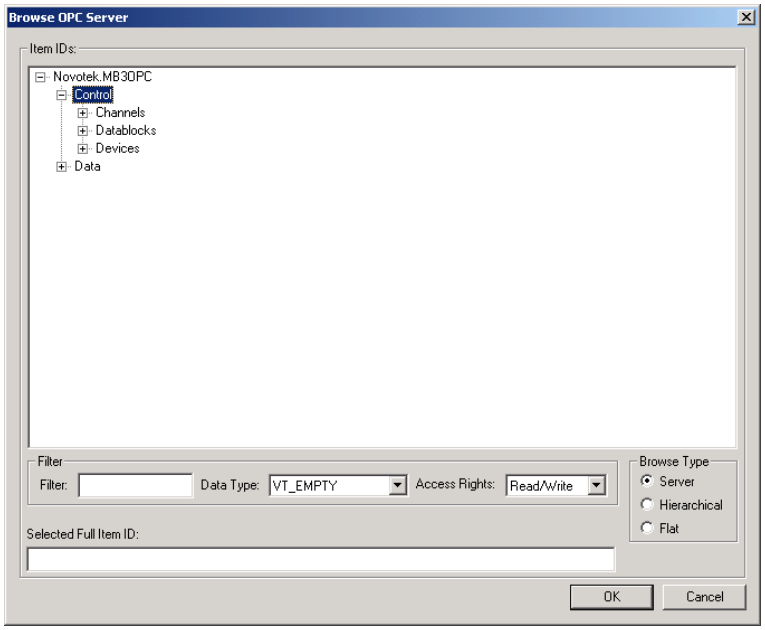
If you expand an object name then all fields of that object type will appear as leafs. See picture below:



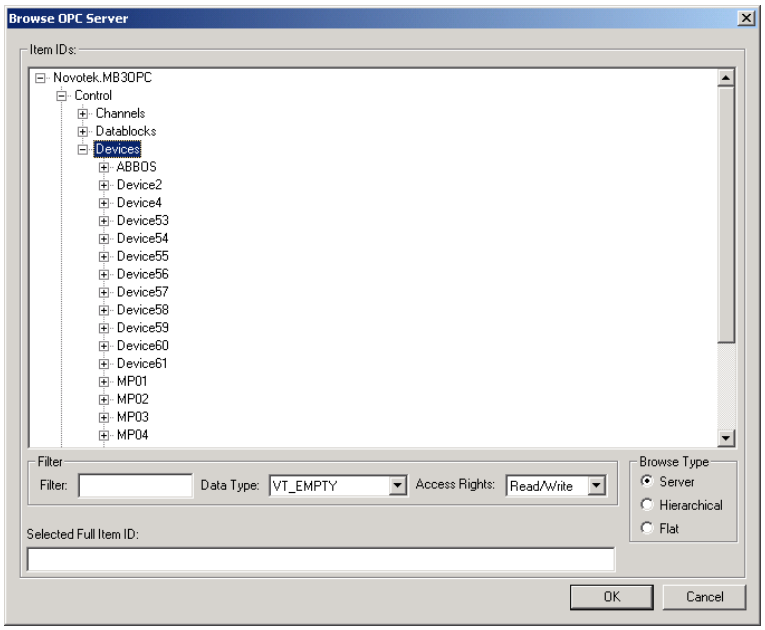
When you select one these leafs the full Item Id will be returned to your client. By default the browser shows a default subscription type “E”. You can change this subscription type to “C” or “D” if you want cyclic or demand updates. See chapter 6 Application Design Considerations Using OPC Clients how to configure your system in an efficient way. For some fields you might want to use bit information. Add the bit information, inserted between the field name and the subtype, to the Item Id manually before adding the item to your client’s configuration.

14.2.2 Control Branch

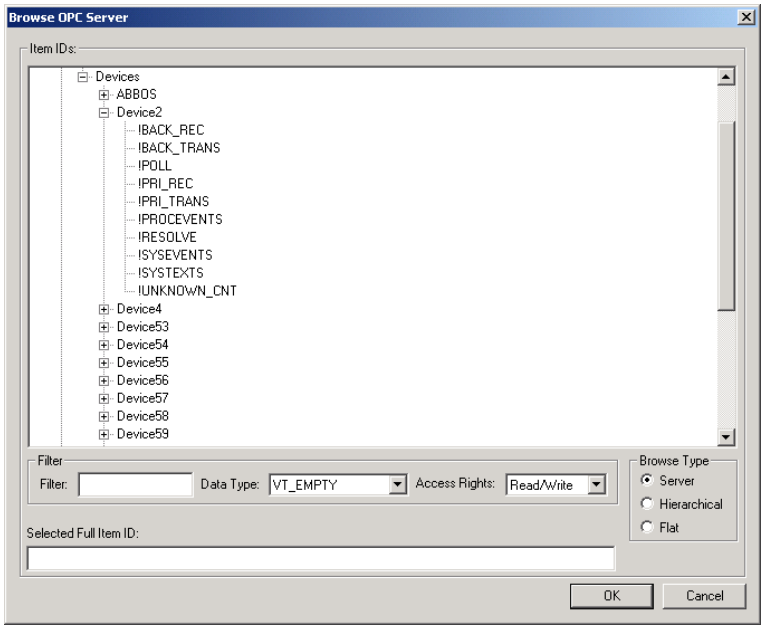
If you expand the Control branch then three branches, Channels, Devices and Data blocks, will appear. See picture below:



If you expand any of these branches then either all channel names, device names or data block names will appear as branches. See example picture below with device names:



If you expand any of the names then the control addresses for that type will appear as leafs. See picture below for device control leafs:



14.3 Client Requested Data Type

For all objects except DAT and Data Set objects you can use the Empty/Default requested data type (also called server in some cases) in your OPC client.

To access DAT object VALUE data or Data Set data in the MB3 OPC server from the OPC client use the following requested data types in the client.

DAT or Data Set type	OPC client data type	
Real	Float	(VT_R4)
IntegerLong	Integer	(VT_I4)
Integer	Short Integer	(VT_I2)
Boolean	Boolean	(VT_BOOL) or Integer (VT_I4). See note below.

The Empty/Default returned data type for DAT objects and Data Sets is Integer (VT_I4) or Boolean (VT_BOOL) if a bit is specified in the Item Id.

Note! If you set the requested data type to Boolean (VT_BOOL) then you will only be able to write to bit 0 of a DAT object. To be able to write to all bits then set the requested data type to Integer (VT_I4) and specify the bit number in the Item ID. In this way the bit is masked in with all the other bits and the MB3 OPC server writes all 32 bits in one message.

Note! The MultiDAT objects have only been tested with the requested data type of 'Array of Float' (VT_ARRAY + VT_R4).

14.4 Extra Item ID Information

If your client can't set the requested data type then you can add some extra information to the Item ID to inform the server the requested data type. This extra information is needed to access the right data in Data Set or DAT objects if your client can't set the requested data type. The extra information is separated from the Item ID with a '|' character. There are two formats for the extra information.

14.4.1 Format 1

Item ID|Hardware Option

Where:

- Hardware Option = requested data type

The Hardware Option is used to specify the requested data type. Use the following translation table to access right data in your Data Set or DAT object.

Object type	Hardware Option
Boolean	Bool or Long. See note below.
Integer	Int
IntegerLong	Long
Real	Float
Digital data	Bool or Long. See note below.

Note! If you set the requested data type to Hardware Option Bool then you will only be able to write to bit 0 of a DAT object. To be able to write to the other bits then set the requested data type to Hardware Option Long and specify the bit number in the Item ID.

One example:
To read/write Float value in DAT object DATREAL1 then enter the following Item ID with extra information:

D22_23:DAT:DATREAL1:VALUE:C|Float

14.4.2 Format 2

Item ID|Signal Conditioning,Lo EGU,Hi EGU,Hardware Option

Where:

- Signal Conditioning – Type of scaling. Only LIN is supported
- Lo EGU – the low range of the value to scale to
- Hi EGU – the high range of the value to scale to
- Hardware Option – requested data type

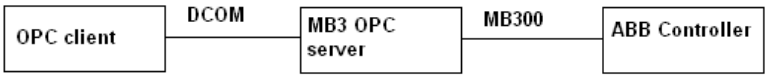
This format is used if you want to set the data type and also wants to scale the raw value to the EGU values entered in the extra information. You can only scale the 16 bit integer values and you can only use the Signal Conditioning LIN, which uses linear scaling for the raw value interval –32768 - +32767.

One example:

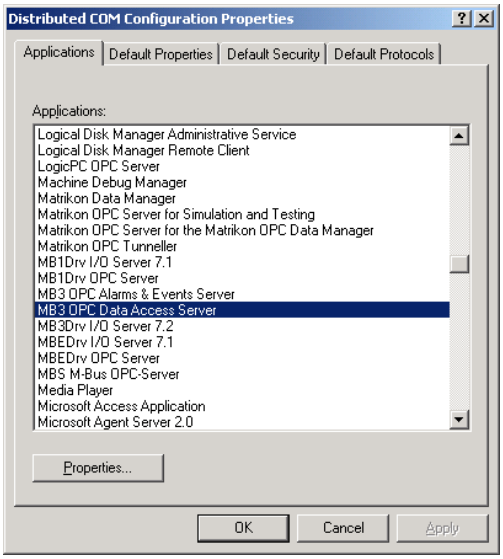
You want to scale the raw value –32768 - +32767 of a DAT object of Integer type to the EGU values 0 – 100. The DAT objects name is K963.ST and it is in Device D12_12. Enter the following Item ID with extra information:

D12_12:DAT:K963.ST:VALUE:C|LIN,0,100,Int

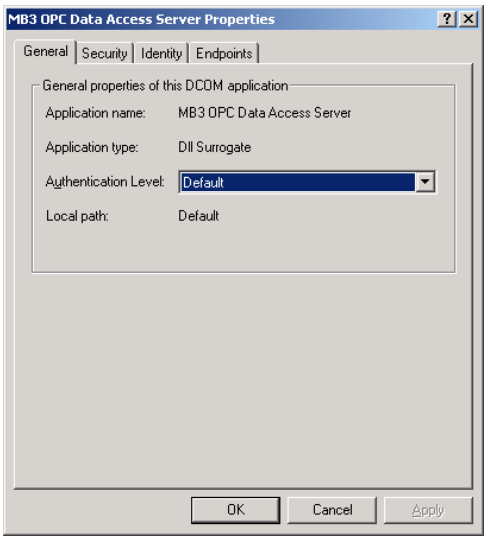
14.5 Accessing the MB3 OPC Server via DCOM



OPC clients can access the MB3 OPC server via networks via DCOM as shown in the picture above. You must set up the MB3 OPC server machines DCOM configuration to allow the OPC client machine to connect to the MB3 OPC server. This is done in the "DCOMCNFG.EXE" program located in the Windows\System32 directory on the machine running the MB3 OPC server. When "DCOMCNFG.EXE" is started then choose "MB3 OPC Data Access Server" from the Applications list as shown in the picture below and click on the "Properties…" button.



Set all the settings for Security and Identity so the OPC client can connect and access the MB3 OPC server in a right way. If you are using Windows XP with service pack 2 then read the white paper "Using OPC via DCOM with Windows XP Service Pack 2" on OPC Foundations webpage, www.opcfoundation.org.



14.5.1 Problem When Using DCOM

When accessing the MB3 OPC server via DCOM a problem can come up.

- The OPC client is accessing items for cyclic updates in the MB3 OPC server. The active flag is set in the MB3 OPC server for these items and cyclic subscriptions is sent out to the ABB controllers.
- The network cable between the OPC client and the MB3 OPC server is unplugged.
- The OPC client sets the items to inactive when the network cable is unplugged.
- The network cable is reconnected before the ten minute timeout of DCOM has expired. (If the ten minute timeout had expired then the problem will not appear because then the client will be disconnected from the server)
- The MB3 OPC server will never get the information that the items has gone to inactive in the OPC client. The items will be subscribed from the ABB controllers until the OPC client accesses these items again and then sets them to inactive.

This can cause a lot of unnecessary traffic on the Masterbus 300 network. There is a way for the server to detect that the client no longer is connected. You can use a DCOM watchdog as explained in the chapter below.

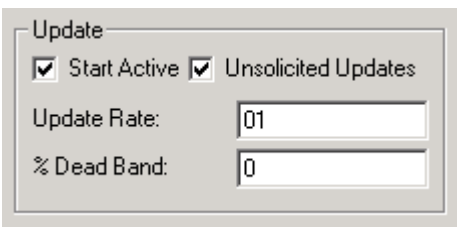
14.5.2 DCOM Watchdog

The watchdog will only work if your OPC client supports the “IOPCDataCallBack::OnDataChange” interface.

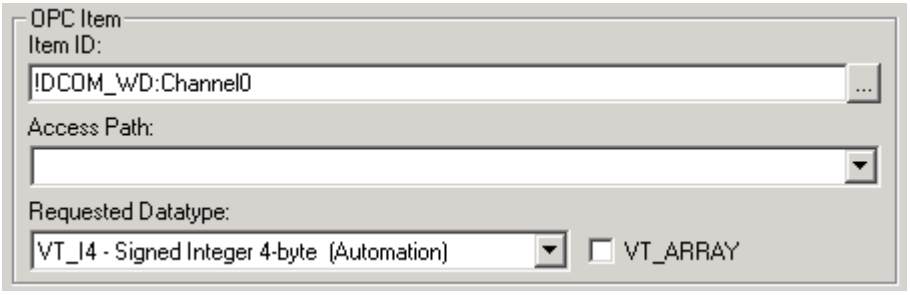
Do the following:

- Create an active group in your OPC client with callbacks enabled. Set the update rate to 1 second.
- Add an active item to the group. This item shall access the Channel Control Item Id “!DCOM_WD:Name” with the datatype set to integer long (VT_I4) and deadband set to 0.

See Example below



Group settings.



Item settings. In this case the the name of the channel is Channel0 and that's why the Item ID is set to "!DCOM_WD:Channel0". The item shall be created active and shall remain active.

Function of the watchdog:
The item "!DCOM_WD:Name" is an internal item in the MB3 OPC server that toggles between the values 0 and 1 every second when the MB3 OPC server is started. If the client sets up a group and item as explained above then the MB3 OPC server will try to send a OnDataChange update to the OPC client every second. If you unplug the network cable between the OPC client and the MB3 OPC server the MB3 OPC server will fail to send the OnDataChange updates to the OPC client. When the MB3 OPC server receieves the error "The RPC server is unavailable" then it sets all it's items, except the watchdog, connected to the OPC client to inactive. When the network cable is reconnected the OPC client has to set the items it requests to active again.

15 FIX Database Configuration

Tags must be created and configured in the FIX database for the FIX application to have access to ABB controller data. The fields in a FIX database block that connects it to the MB3 OPC server are:

- Device
- Hardware Option
- I/O Address
- Signal Conditioning

15.1 Device

Identifies the OPC server that the database block accesses. This field accepts the three-letter acronym for the OPC server. The default for this field is the first driver listed in the Configured I/O Driver list box in the SCU SCADA Configuration dialog box. For the MB3 OPC server, enter MB3 in this field.

15.2 Hardware Option

Hardware Option is only used with Data Set and DAT objects.

Valid Hardware Options are:

Hardware Option	Description
Float	32 bits Float data
Uint	16 bit unsigned integer
Int	16 bit signed integer
Ulong	32 bit unsigned long
Long	32 bit signed long
Bool	Bit data

Use the following translation table to access right data in your Data Set or DAT objects

DAT object type	Hardware Option
Boolean	Bool or Long. See note below.
Integer	Int
IntegerLong	Long
Real	Float

Note! If you set the Hardware Option to Bool then you will only be able to write to bit 0 of a DAT object. To be able to write to the all bits then set the requested data type to Hardware Option Long and specify the bit number in the Item ID. In this way the bit is masked in with all the other bits and the MB3 OPC server writes all 32 bits in one message.

15.3 I/O Address Format

The I/O Address connects the database block to a value in an object.

15.3.1 Process Object Address Format

Device:ObjectType:ObjectName:Field[:Bit]:SubType

Where:

Component	Description
Device	The device name configured in MB3 Power Tool
ObjectType	AI, AO, DI ,DO ,DAT, PIDCON, RATIOSTN, MANSTN, MMCX, VALVECON, MOTCON, TEXT, GENUSD, GENBIN, GENCON, SEQ, PIDCONA, TANKCON
ObjectName	The name of the object
Field	See “21 Appendix A, Object Type Maps” for fields available for each object type.
[Bit]	Used to read/write bit values from a field. Valid values are 0 – 31.
SubType	The subscription type used to read this value. Valid entries are ”C” = Cyclic, ”D” = Demand, ”E” = Event, "S" = Seamless, "T" = TTD. See chapter 7 Application Design Considerations Using FIX for more info of how to minimize the MB300 bus load. “21 Appendix A, Object Type Maps” for supported subtypes for each field for each object type. • ”E” is default. With this subtype the object will only put load on the bus, with a one-shot demand poll, when the MB3 OPC server receives a process event from the ABB controller for this object. • ”C” Cyclic. With this subtype the MB3 OPC server will subscribe for cyclic updates for this object when the database block is accessed from FIX. • ”D” Demand. With this subtype the MB3 OPC server will poll demand subscriptions with the Primary Rate set up in the data block configuration when the database block is accessed from FIX. • "S" Seamless. Is a alias for "C" cyclic but it will additoinally do a oneshot TTD request for the object when a cyclic subscription is started. Only available for the fields that can be logged to TTD logs. • "T" TTD. Keeps the TTD Access Timer alive which keeps the collecting of TTD logs alive. It will also receive values from cyclic, demand and event updates. Only available for the fields that can be logged to TTD logs.

I/O Address examples:

I/O Address	Hardware Option	Description
12_12:AI:R64KT3.1MV:VALUE:C	Not used	To read value from AI object R64KT3.1MV in device ”12_12” with cyclic subscription.
12_12:DI:N6GTFV:STATUS:8:C	Not used	To read value from DI object N6GTFV in device ”12_12” with cyclic subscription.
12_12:DAT:K963.ST:VALUE:C	Float	To read/write value in DAT object K963.ST of Real data type in device ”12_12” with cyclic subscription.
12_12:DAT:K963.ST:VALUE:C	Long	To read/write value in DAT object K963.ST of Integer Long data type in device ”12_12” with cyclic subscription.
12_12:DAT:K963.ST:VALUE:C	Int	To read/write value in DAT object K963.ST of Integer data type in device ”12_12” with cyclic subscription.
12_12:DAT:K963.ST:VALUE:2:C	Long	To read/write bit 2 from value in DAT object K963.ST of Integer Long data type in device ”12_12” with cyclic subscription.

12_12:DAT:K963.ST:VALUE:0:C	Bool	To read/write bit 0 from value in DAT object K963.ST of Boolean data type in device ”12_12” with cyclic subscription.

15.3.2 Format for Data Set

I/O Address for Data Set will have the format as below:

- Device:ObjectType:DSType:DSIdentity:Item[:bit]

Where:

Component	Description
Device	The devicename configured in MB3 Power Tool
ObjectType	DS
DSType	The Data Set type. Valid entries are: RAW Raw Data Set values. Communication status will set the quality. IMSA IMS Analog values. The analog values are in item 2-24 of the data set. Status of the analog values are in the first 23 bits in the first item. Status bit value 1 = Bad, 0 = Good. The I/O server will set the quality of the analog values from the status bits. IMSB IMS Boolean values. The Boolean values are in item 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22 and 24. Status of the Boolean values are in item 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21 and 23. Status 1 = Bad, 0 = Good. The I/O server will set the quality of the Boolean values from the status bits.
DS_Identity	The Data Set identity number. Valid values are 1 – 255
Item	The item in the Data Set to get data from. Valid items are 1 – 24
[Bit]	Used to read/write bit data from one item. Valid values are 0 – 31 or 1 – 32 depending on what is set under the channels Data Set Bit Numbering configuration in the MB3 Power Tool. See Channel Configuration where to set this parameter. Default is 0 – 31.

I/O Address examples:

I/O Address	Hardware Option	Description
D22_23:DS:RAW:233:3	Float	To read/write raw Float value 3 in Data Set 233 in Device ”D22_33” in an Analog database block.
D22_23:DS:IMSB:25:14:5	Bool	To read/write bit 5 in IMSB item 14 in Data Set 25 in Device ”D22_33”.
D22_23:DS:IMSA:10:2	Long	To read/write IMSA Long item 2 in Data Set 10 in Device ”D22_33”.
D22_23:DS:RAW:12:2	Int	To read/write raw Int item 2 in Data Set 12 in Device ”D22_33”.

15.3.3 Format for System Status Objects

I/O Address for system status objects will have the format as below:

- Device:ControllerType:SystemStatusObject:Field[:bit]:SubType

Where:

Component	Description

Device	The device name configured in MB3 Power Tool
ControllerType	AC = Advant Controller
SystemStatusObject	The name of the system status object. Valid AC system status objects are: • OVERVIEW • NODE • NET • FIELDBUS_1 – FIELDBUS_7 • SEL_FIELDBUS_1_1 – SEL_FIEDLBUS_1_50 • SEL_FIELDBUS_2_1 – SEL_FIEDLBUS_2_50 • SEL_FIELDBUS_3_1 – SEL_FIEDLBUS_3_50 • SEL_FIELDBUS_4_1 – SEL_FIEDLBUS_4_50 • SEL_FIELDBUS_5_1 – SEL_FIEDLBUS_5_50 • SEL_FIELDBUS_6_1 – SEL_FIEDLBUS_6_50 • SEL_FIELDBUS_7_1 – SEL_FIEDLBUS_7_50 • MASTER_FIELDBUS_1 – MASTER_FIELDBUS_7 • S100_IO • S100_IO2 • S100_RED • S100_EXT
Field	The data to read from the system status object. See 22 Appendix B, System Status Objects for fields available for each system status object.
[Bit]	Used to read/write bit values from a field. Valid values are 0 – 31.
SubType	The subscription type used to read this value. Valid entries are ”D” = Demand, “E” = Event • ”D” Demand. With this subtype the MB3 OPC server will poll demand subscriptions for the system status object with a poll rate of 15 seconds. If no client is connected to the system status object then no demand polls will be sent for it. If a client activates a system status object item for demand polls and then sets the item to inactive the MB3 OPC server will stop demand poll the system status object after 20 seconds. • “E” Event. With this subtype the object will only put load on the bus if another database block accesses it with a “D” Demand subscription type. Use subscription type “E” with TXT database blocks for the system status texts and use subscription type “D” together with AR or DR database blocks for the analog and digital status values.

AC System status I/O Address examples:

I/O Address	Database Block	Description
12_12:AC:OVERVIEW.STATUS:0:D	DR	To read bit 0 of status of the AC OVERVIEW system status.
12_12:AC:NODE:C_POW_A:0:D	DR	To read bit 0 of the Controller Power A status bits in the AC NODE system status
12_12:AC:NET:NET1:D	AR	To read net number of first node in the AC NET system status.
12_12:AC:NET:NODE1:D	AR	To read node number of first node in the AC NET system status.
12_12:AC:NET:STATUS1:D	AR	To read status of first node in the AC NET system status.
12_12:AC:FIELDBUS_1:NAME1:E	TXT	To read name of first fieldbus on page 1 in the AC FIELDBUS system status.

12_12:AC:S100_IO:AI:STATUS1:0:D	DR	To read bit 0 of status for AI board 1 in the AC S100_IO system status.
12_12:AC:SEL_FIELDBUS_1_1:AF100_NAME:E	TXT	To read the AF100 name of the selected AF100 unit on filedbus 1 and index 1 in the AC SEL_FIELDBUS system status.
12_12:AC:SEL_FIELDBUS_1_2:S800S_NAME:E	TXT	To read the S800 station name of the selected S800 bus on fieldbus 1 and index 2 in the AC SEL_FIELDBUS system status.
12_12:AC:SEL_FIELDBUS_1_2:S800M2_NAME:E	TXT	To read the S800 module 2 name of the selected S800 bus on fieldbus 1 and index 2 in the AC SEL_FIELDBUS system status.

15.3.4 Special Control I/O Addresses

You can enter the following special control addresses into the I/O Address field that can be used to control and supervise channels, devices and data blocks in the MB3 OPC server. These special control I/O addresses are explained in the tables below. Name in the I/O address are the channel, device or data block names configured in the MB3 Power Tool.

15.3.4a Channel Control I/O Addresses

I/O Address	Database Block	Description
!MODE:Name	DO	Write Only. Enables the channel specified with “Name” when a value of 1 is written. Disabling the channel occurs when a value of 0 is written.
!POLL:Name	DO	Write Only. Trigs the channel specified with “Name” to send demand subscription requests for all its data blocks.
!PRI_REC:Name	AI	Read Only. Number of received objects per second on the primary adapter. Maximum number for the whole MB 300 is 2000 per second.
!PRI_TRANS:Name	AI	Read Only. Number of sent objects per second on the primary adapter. Maximum number for the whole MB 300 is 2000 per second.
!CS_DATE:Name	AI, TXT	Latest Clock Sync Date received from a broadcast clock sync telegram. The format is in number of days since 1 January 1980. 1 January 1980 is day 1.
!CS_TIME:Name	AI, TXT	Latest Clock Sync Time received from a broadcast clock sync telegram. The format is in number of 0,1 milliseconds since midnight.
!BLOCK:Name	DI with Output enabled	Flag that can be used to block data subscriptions and orders for all objects on this channel. If set to TRUE then all active subscriptions will be unsubscribed and no new subscriptions or orders will be sent for the objects. The MB3 OPC server will still receive System and Process Events. When set to FALSE again then all objects that are accessed will send subscriptions for update.
!START_CM:Name	AI with output enabled	Whenever this tag is set <> 0, the MB3 OPC server will send clock synch-broadcast message every 10 minutes. The 'state' of the tag is saved in the registry, at :HKLM\Software\Novotek\Drivers\MB3\SendCM A clock synch-broadcast is also sent every time a value <> 0 is written to the !START_CM tag. The nodes on the network must be set up to listen for time synchronization messages. LOC_TIME in the controllers must be set to 3 “Listen to Time Set Telegram and High Precision Time Synchronization Telegram”.
!SWITCH:Name		Not implemented in this version

!BACK_REC:Name	AI	Read Only. Number of received objects per second on the backup adapter. Maximum number for the whole MB 300 is 2000 per second.
!BACK_TRANS:Name	AI	Read Only. Number of sent objects per second on the backup adapter. Maximum number for the whole MB 300 is 2000 per second.

15.3.4b Device Control I/O Addresses

I/O Address	Database Block	Description
!POLL:Name	DO	Write Only. Trigs the device specified with "Name" to send demand subscription requests for all its data blocks.
!PRI_REC:Name	AI	Read Only. Number of received objects per second on the primary adapter for this device.
!PRI_TRANS:Name	AI	Read Only. Number of sent objects per second on the primary adapter for this device.
!BACK_REC:Name		Not implemented in this version
!BACK_TRANS:Name		Not implemented in this version
!PROCEVENTS:Name	TXT	Read Only. A text describing received Process event for this device. The OPC time stamp is the time stamp received with the Process Event from the ABB controller. The MB3 OPC server has a buffer that can store up to 200 process events per device. The events in the buffer are removed one by one when they are scanned by a TXT database block . See 2.2.5 Process Events for more information about the text format.
!SYSEVENTS:Name	TXT	Read Only. A text describing received System Event for this device. The OPC time stamp is the time stamp received with the System Event from the ABB controller. The MB3 OPC server has a buffer that can store up to 100 system events per device. The events in the buffer are removed one by one when they are scanned by a TXT database block . See 2.2.6 System Events for more information about the text format.
!SYSTEXTS:Name	TXT	Read Only. A text describing received System Text for this device. These are texts showing illegal orders etc as information. For example "Limit out of range. Input ignored". The MB3 OPC server has a buffer that can store up to 100 process events per device. The system texts in the buffer are removed one by one when they are scanned by a TXT database block See 2.2.7 System Texts for more information about system texts.
!RESOLVE:Name	DO	Write Only. Trigs a name translation of all data blocks configured under this device. Same functionality as the device button "Trig Name Translations" in the MB3 Power Tool.
!UNKNOWN_CNT:Name	AI	Read Only. A counter value of received unknown telegrams for this device. If the device checkbox "Save unknown messages to file" in the MB3 Power Tool is checked then there will be an entry in a CCF file each time this counter increases.
!CS_DATE:Name	AI, TXT	Latest Clock Sync Date received from this node's clock sync telegram. The format is in number of days since 1 January 1980. 1 January 1980 is day 1.
!CS_TIME:Name	AI, TXT	Latest Clock Sync Time received from this node's clock sync telegram. The format is in number of 0,1 milliseconds since midnight.
!PECount:Name	AI	Used to read the number of events in the Process Events buffer for the Device in the MB3 OPC Server.
!SECount:Name	AI	Used to read the number of events in the System Events buffer for the Device in the MB3 OPC Server.
!STCount:Name	AI	Used to read the number of events in the System Texts Events buffer for the Device in the MB3 OPC Server.

!PRI_STAT:Name	AI	Read the status of the node on primary network. Values: 1 = OK 0 = INACTIVE
!BACK_STAT:Name	AI	Read the status of the node on backup network. Values: 1 = OK 0 = INACTIVE
!PRI_DIST:Name	AI	Read the distance to the node on the primary network. Values: 1 = OK (one of the networks are connected) 8 = INACTIVE (both networks are disconnected or this network has not been connected since both networks were disconnected)
!BACK_DIST:Name	AI	Read the distance to the node on the backup network. Values: 1 = OK (one of the networks are connected) 8 = INACTIVE (both networks are disconnected or this network has not been connected since both networks were disconnected)

15.3.4c Data Block Control I/O Addresses

I/O Address	**Database Block**	**Description**
!MODE:Name	DO	Write Only. Enables the data block specified with "Name" when a value of 1 is written. Disabling the data block occurs when a value of 0 is written. This also controls new name translations for the data blocks object name into logical file and logical record numbers.
!POLL:Name	DO	Write Only. Trigs the data block specified with "Name" to send a demand subscription request.
!C_FAST:Name	DO	Write Only. Trigs the data block to unsubscribe the normal cyclic updates and subscribe for cyclic data updates with the fast cyclic update period. The fast cyclic updates will timeout after two minutes and switch back to normal cyclic updates again. This will only have affect if the data block is enabled for cyclic updates.
!C_NORMAL:Name	DO	Write Only. Trigs the data block to unsubscribe the fast cyclic updates and subscribe for cyclic data updates with the normal cyclic update period. This will only have affect if the data block is enabled for cyclic updates.
!C_FAST_ACTIVE:Name	DI	Read Only. Is set to TRUE if fast cyclic update is active for the data block.
!C_NORMAL_ACTIVE:Name	DI	Read Only. Is set to TRUE if normal cyclic update is active for the data block.
!DEMAND_ACTIVE:Name	DI	Read Only. Is set to TRUE if fast demand update is active for the data block.
!ORDER_MMI:Name	AI with Output enabled	Read/Write. Can be used to set the MMI number for orders to this object (data block). In this way a client can select more than one object per controller. The MB3 OPC server will always use MMI number 1 if this block isn't used . Default value is 1 Valid values are 1 – 4 Examples of how this block can be used:

		When a client wants to select an object it can do the following: 1. Check if the object already is selected 2. Set the desired MMI number 1 - 4 with this block 3. Select the object and then do the orders using the set MMI number. 4. Deselect the object using the set MMI number. Alternatively the client can always set the MMI number block before any orders to the object.
!START_DS:Name	AI with output enabled	Read/Write. Is used to control sending of data set values from the I/O server to a controller. Fill in all the startup values for the data set and trig the I/O server to start sending the data set to the controller via this trigger. Value > 0 => send data set Value = 0 => stop send data set
!BLOCKCYCLIC:Name	DI with output enabled	When set to True no cyclic subscriptions will be sent for the object connected to the data block. If there is an active cyclic subscription for the data block then it will be unsubscribed. When set to False cyclic subscriptions will be sent if there are active items with the ":C" flag connected to the data block. Demand subscriptions and process events will not be affected by this block property.
!C_FORCEFAST:Name	DI with output enabled	If set then the data block will always subscribe for fast cyclic updates if an active item with the ":C" flag is connected to the data block. The fast cyclic updates will not time out after two minutes with this property set. If a normal cyclic subscription is active when this property is set then the normal subscription will be unsubscribed and the fast will be subscribed instead. This property has higher priority than the "!C_NORMAL" and "!C_FAST" triggers
!TTD_SUB:Name	DO	Write Only. Trigs the data block to collect the TTD log data until now and subscribe for TTD sub updates for the TTD variables configured in the data block. Update period from the controller for the TTD sub updates is the same as the log interval of the variable in the TTD log. Disabled variables or variables with collect interval set to Disabled will not be trigged.
!TTD_UNSUB:Name	DO	Write Only. Trigs the data block to unsubscribe the active TTD sub updates for the TTD variables configured in the data block.

15.4 Signal Conditioning

Signal conditioning does not support 32 bit values.

16 bit signed values only support LIN signal conditioning.

Name	Description	Input Range	Scaling
NONE	No signal conditioning	No scaling	Ignores EGU range in database block.
12BN	12-bit binary number	0 – 4095	Scales 12-bit binary values to the database block's EGU range. Ignores the most significant nibble (4-bits).

12AL	12-bit binary number (with alarming)	0 – 4095	Scales 12-bit binary values to the database block's EGU range.
15BN	15-bit binary number.	0 – 32767	Scales 15-bit binary values to the database block's EGU range. Ignores most significant bit.
15AL	15-bit binary number. (with alarming)	0 – 32767	Scales 15-bit binary values to the database block's EGU range.
LIN	16-bit binary number.	0 – 65535 or –32768 - +32767; the OPC server automatically determines which input range to use.	Scales 16-bit binary values to the database block's EGU range.
3BCD	3-digit Binary Coded Decimal value	0 – 999	Scales 3-digit Binary Coded Decimal values to the database block's EGU range.
4BCD	4-digit Binary Coded Decimal value.	0 – 9999	Scales 4-digit Binary Coded Decimal values to the database block's EGU range.
13BN	13-bit binary number.	0 – 8191	Scales 13-bit binary values to the database block's EGU range. Ignores most significant 3 bits.
13AL	13-bit binary number. (with alarming)	0 – 8191	Scales 13-bit binary values to the database block's EGU range.
8BN	8-bit binary number.	0 – 255	Scales 8-bit binary values to the database block's EGU range. Ignores most significant byte.
8AL	8-bit binary number. (with alarming)	0 – 255	Scales 8-bit binary values to the database block's EGU range.

Important: Signal conditioning types with alarming return values with all 16 bits and generate an OVER or UNDER range alarm if a value is outside the EGU range of the database block. Alarms are based on the number of bits used for the specific signal conditioning type configured for the block.

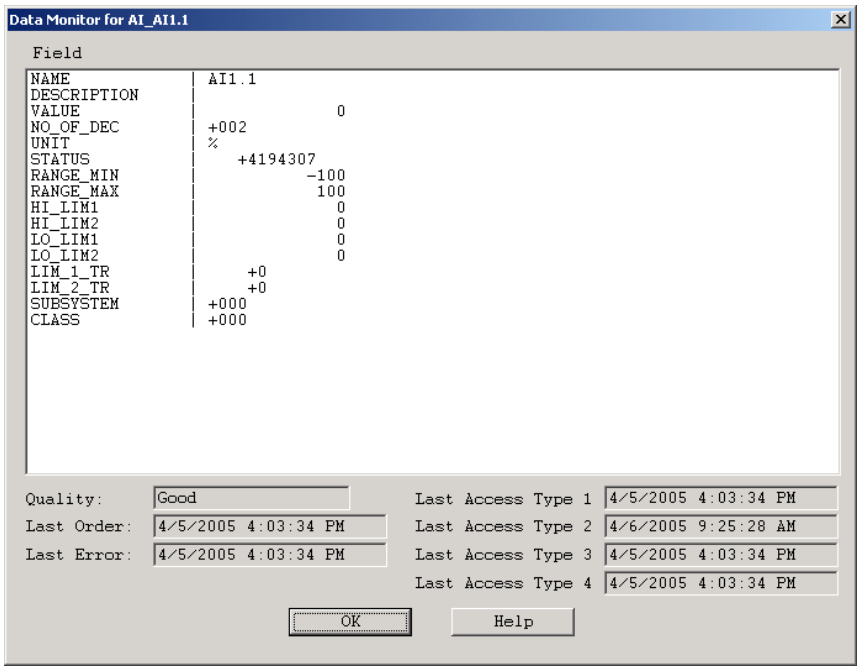
15.5 Offset Addressing with Analog and Digital Register Database Blocks

With register database blocks it is possible to use offset addresses. Instead of the field F_CV you can specify F_0, F_1, F_2 and so on. The meaning of the offset is different for analog and digital register database blocks.

15.5.1 Analog Register Database Blocks

You can use AR database blocks to read all analog parameters from an object with one database block. Use the Data Monitor in the MB3 Power Tool to find out in which order the parameters exist in the object. For Data Sets you can read all analog items in the Data Set through one AR database block.

We use an AI object as an example:
We choose the AI object "AI1.1" from the MB3 Power Tools data block tree browser. When we have selected the AI object "AI1.1" we click on the "Data Monitor" button in the data block dialog. The Data Monitor dialog for object "AI1.1" appears.



All the available fields in the AI object type are shown. The first analog parameter from the list is the VALUE field. We create an AR database block with the I/O address ”Device1:AI:AI1.1:VALUE:C”. The analog register field F_CV and F_0 will both address the value in ”Device1:AI:AI1.1:VALUE:C”. Field F_1 will address the NO_OF_DEC parameter, field F_3 will address the analog value of the STATUS parameter, field F_4 will address the RANGE_MIN parameter field and so on. See table below for the AI object:

AR I/O Address	Offset	AI Object parameter accessed
Device1:AI:AI1.1:VALUE:C	F_CV or F_0	VALUE
Device1:AI:AI1.1:VALUE:C	F_1	NO_OF_DEC
Device1:AI:AI1.1:VALUE:C	F_3	STATUS
Device1:AI:AI1.1:VALUE:C	F_4	RANGE_MIN
Device1:AI:AI1.1:VALUE:C	F_5	RANGE_MAX
Device1:AI:AI1.1:VALUE:C	F_6	HI_LIM1
Device1:AI:AI1.1:VALUE:C	F_7	HI_LIM2
Device1:AI:AI1.1:VALUE:C	F_8	LO_LIM1
Device1:AI:AI1.1:VALUE:C	F_9	LO_LIM2
Device1:AI:AI1.1:VALUE:C	F_10	LIM_1_TR
Device1:AI:AI1.1:VALUE:C	F_11	LIM_2_TR
Device1:AI:AI1.1:VALUE:C	F_12	SUBSYSTEM
Device1:AI:AI1.1:VALUE:C	F_13	CLASS

To find out the offset addresses for System Status Objects then use the tables in chapter 22 Appendix B, System Status Objects. The offset addresses for the FIELDBUS_1 System Status object are shown below as an example:

AR I/O Address	Offset	FIELDBUS_1 Object parameter accessed
Device1:AC:FIEDLBUS_1:BUS1:D	F_CV or F_0	BUS1
Device1:AC:FIEDLBUS_1:BUS1:D	F_1	STN1
Device1:AC:FIEDLBUS_1:BUS1:D	F_2	TYPE1
Device1:AC:FIEDLBUS_1:BUS1:D	F_3	STATUS1
Device1:AC:FIEDLBUS_1:BUS1:D	F_6	BUS2
Device1:AC:FIEDLBUS_1:BUS1:D	F_7	STN2
Device1:AC:FIEDLBUS_1:BUS1:D	F_8	TYPE2
Device1:AC:FIEDLBUS_1:BUS1:D	F_9	STATUS2
Device1:AC:FIEDLBUS_1:BUS1:D	F_12	BUS3
Device1:AC:FIEDLBUS_1:BUS1:D	F_13	STN3
Device1:AC:FIEDLBUS_1:BUS1:D	F_14	TYPE3

Device1:AC:FIEDLBUS_1:BUS1:D	F_15	STATUS3
……		
Device1:AC:FIEDLBUS_1:BUS1:D	F_294	BUS50
Device1:AC:FIEDLBUS_1:BUS1:D	F_295	STN50
Device1:AC:FIEDLBUS_1:BUS1:D	F_296	TYPE50
Device1:AC:FIEDLBUS_1:BUS1:D	F_297	STATUS50

15.5.2 Digital Register Database Blocks

You can use DR database blocks with offset addressing to read all bits from a parameter with one database block. For Data Sets you can read all bits in the Data Set through one DR database block.

One example:
In a digital register block with I/O address "Device1:AI:AI1:STATUS:0:C" the field F_CV and F_0 will address the value in "Device1:AI:AI1:STATUS:0:C". Field F_1 will address the value in "Device1:AI:AI1:STATUS:1:C" and so on up to field F_31 that will address the value in "Device1:AI:AI1:STATUS:31:C".

16 Auto Configuration of Data Blocks from Client Applications

By enabling the Auto Create option in the MB3 Power Tool, you can automatically create data blocks from your client application by specifying an undefined I/O address. Once you enter the address, the MB3 OPC server automatically creates a data block for it and adds the new data block to your MB3 OPC server configuration. As a result, you do not have to start the Power Tool and create your data blocks before you design your process database.

Note! You cannot auto create channels and devices, only data blocks.

Note! If a node sends out a request for a name translation of an object name that does not exist in any database on the MB300 network then this name translation request will be sent around on the network forever. The only way to remove those name translation requests from the network is to use special software from ABB. The best way to avoid non-existent object names in your configuration is to create Item IDs or I/O addresses that are based of object names from reported BAX files from the ABB controllers. The BAX file is a text file dump of the database in a controller.

Example of Auto Configuration from FIX database

1. Start the MB3 Power Tool and click the Setup button from the Run-time toolbar.
2. Click the Advanced tab and select Auto Create On in the Server area.
3. Close the Setup dialog box and click the Templates button from the Run-time toolbar.
4. Enter the default values in the Templates dialog box.
5. Use the buttons on the Configuration toolbar to add Channel and Devices but do not create any data blocks.
6. Open FIX Database Builder and create database blocks with valid I/O Addresses.
7. Open the Power Tool. The new data blocks should now exist in your configuration under the devices you specified in the FIX database blocks I/O Address.

Note! If you import a GDB database file to auto create your data blocks then make sure the MB3 OPC server is stopped.

Note! The only way to remove auto configured data blocks is to open the MB3 Power Tool and delete the data block.

17 Running as a Service

The MB3 OPC server can run as a Windows Service. Running your OPC server as a Windows service lets users log on and off the operating system without shutting down the OPC server.

By default, the MB3 OPC Server does **NOT** run as a Windows service. To set up the MB3 OPC Server to run as a service, you must register it as a service. During installation, the Setup wizard automatically registers the server as a regular server process. To register it to run as a service, you must run the server on the command line, specifying that you wish to register it as a service. Once the server is running as a service, you may need to re-register it in certain situations, such as when you need to change the logon account.

Before you register the I/O Server to run as a service, follow these steps to ensure that it is not currently running:

- If the driver is currently running as a regular server, you must stop the process by shutting down all clients to the server, such as the PowerTool or iFIX.
- If the driver is currently running as a service, you must stop the process by shutting down all clients to the server, and you must also perform these tasks on your operating system:

  From Control Panel, select Administrative Tools, then select Services. A list of all services configured on the machine displays. Locate MB3 Server. If the status is Started, right click and Stop the server.

Once you stop the server from running, select the Process tab from the Task Manager and verify that the MB3DRV.exe process is no longer listed.

17.1 Registering the MB3 OPC Server as a Service

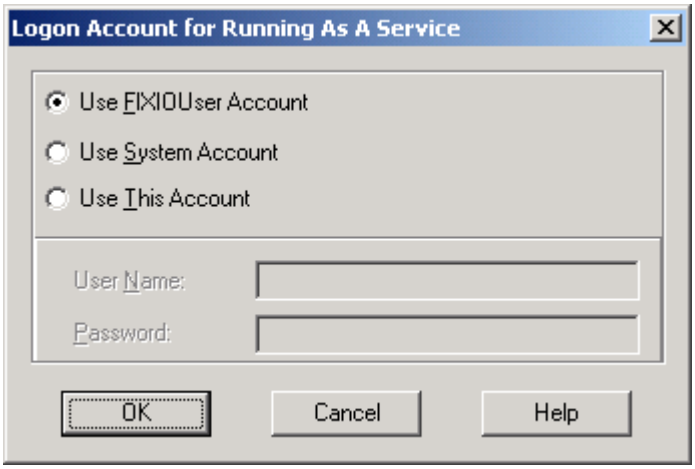
To register the MB3 OPC Server as a service:

1. Select Run from the Windows Start menu.
2. Enter the following text and click OK:

   MB3Drv REGSERVICE

The registration process now allows the user to specify a logon account. This provides flexibility with the user's choice of security settings.

The Logon Account for Running As A Service dialog box appears after the user enters the command and clicks OK:



This dialog box allows the user to select one of these accounts when registering the MB3 OPC server to run as a service:

FixIOUser Account uses the FixIOUser account to log on the MB3 OPC Server. This conventional account uses a hard-coded password and has the necessary privileges to log on as a service. You should not modify this account if one or more 7.x drivers use this as the logon account when running the Server as a service. If you do modify this account, those drivers will not be able to start as a Windows service. The FixIOUser account may not be created if it does not conform to your local IT department's security policies. If this account does not exist, you must select one of the other two options.
NOTE: If you previously ran the MB3 OPC Server as a service without incident, you should continue to run it using the FixIOUser account.

System Account uses the local system account to log on the MB3 OPC Server. This pre-defined account is useful when your local IT department's security policy requires password expiration.

This Account uses an account specified by the user to log on the MB3 OPC Server. This account is useful if you need to specify a domain account. The account used here must be an existing account with both Administrator and Logon as a Service privileges to run the server as a service. To determine if the account has Administrator privileges, refer to the manual provided with your operating system. For example, to determine Administrator privileges in Windows 2000, select Administrative Tools from Control panel, and then select Users and Passwords. Use the Local Security Policy Setting tool to grant the account Logon as a Service privilege.

Once you register the MB3 OPC server, complete these steps:

1. Start the Power Tool and make sure the Auto Start option is enabled.
2. Configure DCOM (Distributed Component Object Model).
3. If your Human-Machine Interface (HMI) software is FIX or iFIX, start FIX or iFIX. When either program runs, it will start the MB3 Server as a service.

If your HMI is a third-party package, then complete the following steps instead:

- Open the Services icon in Control Panel and change the MB3 Server startup from Manual to Automatic.
- Start your HMI software.

You can reset the server to be a regular server process again, by re-registering it as:

```
MB3Drv  REGSERVER
```

NOTE: Before you register the I/O Server to run as a regular server, you must ensure that it is not currently running.

When registering the server this way, it will run, perform the necessary registration work, and then exit. You can then start the server by using more conventional methods such as starting iFIX, starting the Power Tool, or any client program capable of communicating with the server.

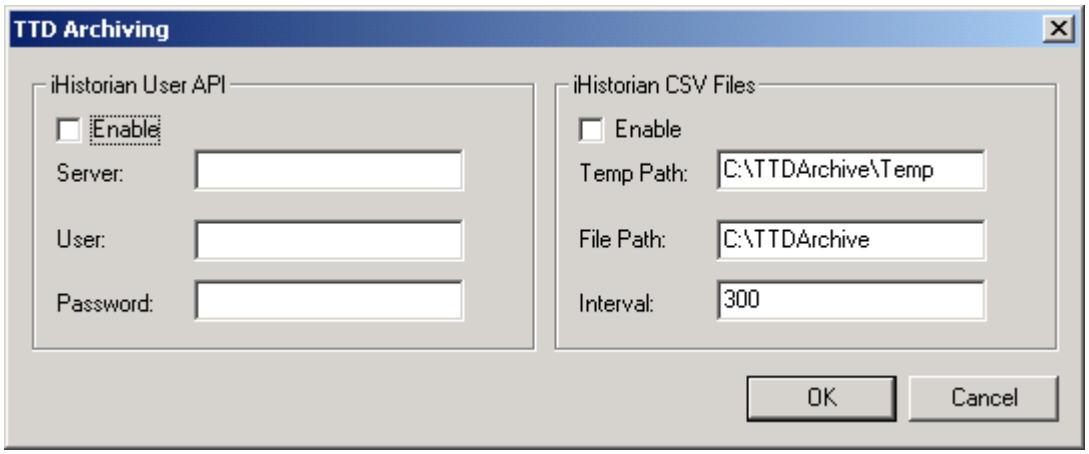
NOTE: You cannot display the MB3 server window using Alt + Shift + S when the server running as a service.

18 Collecting TTD Variable Data

An Advant Controller or Master Piece can be set up to collect data for its object attributes and store them in circle buffers with a specified log interval. These buffers are called TTD logs. The MB3 OPC server can be set up to collect one primary TTD log per object attribute and store them either to Proficy Historian via the Proficy Historian user API or to a CSV file. The CSV file format is compatible with the Proficy Historian file collectors format. The Tags must exist in Proficy Historian before the MB3 OPC server can add values to them.

18.1 TTD Archiving Configuration

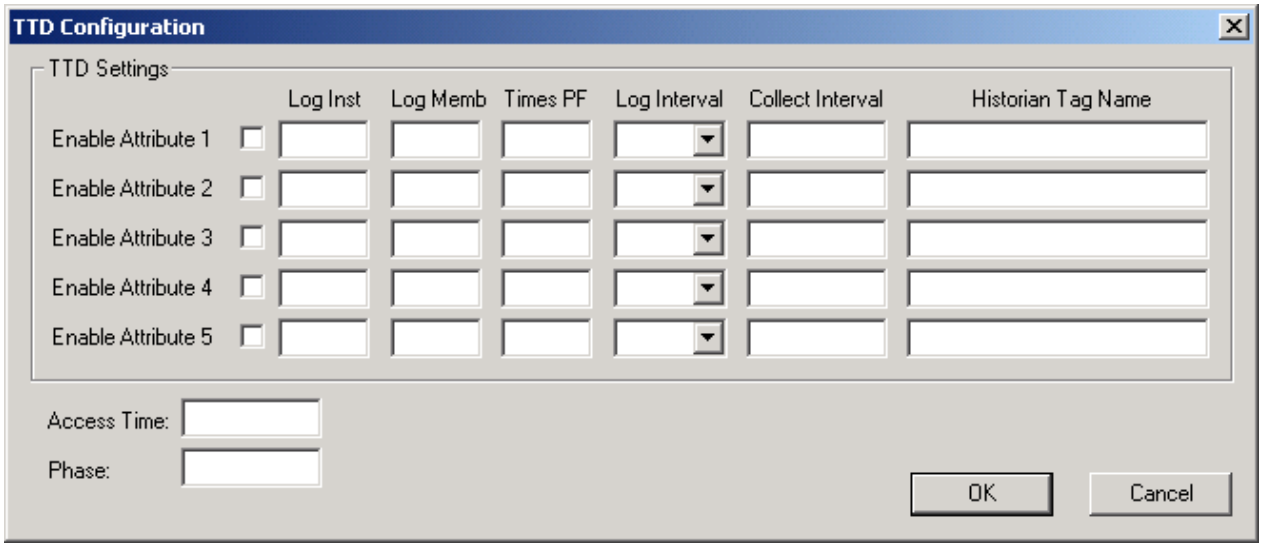
The dialog is opened from the "TTD Archiving…" button in the channel dialog. This dialog contains the configuration of how the collected TTD logs shall be archived. You can choose to store the logs to Proficy Historian via the user API or to store the logs to CSV files.



Field	Description
iHistorian User API - Enable	Enable this check box if you want the MB3 OPC server to write the collected TTD logs to Proficy Historian using the Proficy Historian user API. The tags must exist in Proficy Historian. If the MB3 OPC server fails to write the TTD log via the user API then it will try to write the TTD log values to a CSV file irrespective of the iHistorian CSV Files Enable check box.
iHistorian User API - Server	Proficy Historian server name to connect to. If the field is left blank, then the connection attempt will be to the default server. The default server can be configured using the Historian administration tool.
iHistorian User API - User / Password	If left empty, then the username that owns the process is used. Most of the time this is the same as the user logged into the operating system. However, in the case of a program running as a service you can specify a username and password that the process should use.
iHistorian CSV Files - Enable	Enable this check box if you want the MB3 OPC server to create CSV archive files for the collected TTD logs.
iHistorian CSV Files - Temp Path	The MB3 OPC server creates the collected TTD logs CSV archive files in this folder. When the TTD Archiving Interval timer has timed out then the file is moved from this folder to the File Path from where a file collector can import the file. Default is "C:\TTDArchive\Temp".
iHistorian CSV Files - File Path	The path to where the CSV archive files created in the Temp Path shall be moved when the Interval time has timed out. A file collector can import the files from this path . For the Proficy Historian File Collector this path is normally set to "C:\Program Files\Proficy\Proficy Historian\ImportFiles\Incoming". Default is "C:\TTDArchive".
iHistorian CSV Files - Interval	The time in seconds that the MB3 OPC server will wait before it moves any iHistorian CSV archive file for this channel from the temp path to the file path. Default is 300 seconds. Valid values are 0 – 900 seconds. If set to 0 then an interval of 500ms will be used.

18.2 TTD Object Configuration

This dialog is opened from the "TTD Configuration…" button in the datablock dialog. The TTD configuration dialog contains the TTD log configuration for one object. The MB3 OPC server can collect values for one primary TTD log per object and attribute. The number of attributes shown in the dialog depends on the object type.



Field	Description
Enable Attribute 1 – 5	Enable this check box if you want the MB3 OPC server to be able to collect TTD log values for this attribute.
Log Inst 1 – 5	TTDLog instance number 1 – 15. Use the LOG INST number from the corresponding TTDVAR in the ABB configuration.
Log Memb 1 – 5	TTDLog variable number 1 – 127. Use the LOG MEMB number from the corresponding TTDVAR in the ABB configuration.
Times PF 1 – 5	Total number of TIMES on the Primary File for the TTDLog in the AC or MP. Use TIMESPF from the corresponding TTDLOG in the ABB configuration.
Log Interval 1 – 5	Log Interval of the log. Use LOG INT from the corresponding TTDLOG in the ABB configuration. Valid values are: 1s 2s 3s 4s 5s 6s 10s 12s 15s 20s 30s 1m 2m 3m 4m 5m 6m 10m 12m 15m 20m 30m 1h 2h 3h 4h 6h 12h 24h
Collect Interval 1 – 5	Defines how often the MB3 OPC server will send out a TTD request for this variables TTDLog. Valid Entries

	Accepts the time format: days:hours:minutes:seconds up to a maximum of 6:23:59:59 and Disabled. The collect interval must be an even multiple of the log interval. For example if the log interval is 2m then valid collect intervals are 2:00, 4:00, 6:00 and so on. The collect interval will be adjusted to not collect more than 402 values or the configured "Times PF" number if that number is smaller than 402. At startup or if the variable hasn't been accessed for a while and a client requests TTD log data then the complete log will be fetched. After that it will be updated with the collect interval.
Historian Tag Name 1 – 5	The tag name of the variable in Proficy Historian or CSV file.
Access Time	Specifies how long time the MB3 OPC server sends TTD requests for a object by its collect interval when your process control software no longer requests TTD log data from that data block. Whenever your process control software requests TTD log data from a data block, the MB3 OPC server resets the TTD access time for that data block. Once TTD requests stop for the data block and the TTD access time expires, TTD request polling for that data block stops until there is another request for TTD log data. Default value 30 seconds Valid Entries Accepts the time format: days:hours:minutes:seconds and Disabled This TTD access time is common for all TTD attributes for the data block. If set to Disabled then the MB3 OPC server will continue to collect TTD log data even if TTD requests stops for the data block. Note! The MB3 OPC server will not start to collect TTD log data if no client has requested it.
Phase	Sets the length of delay before the MB3 OPC server first attempts to send a TTD log request for the data block. When the phase time expires, the MB3 OPC server resumes reading the TTD logs at the specified collect intervals. Valid Entries Accepts the time format: days:hours:minutes:seconds. This TTD phase is common for all TTD attributes for the data block.

18.2.1 Available Object TTD Attributes

The attribute positions for each object type are hardcoded in the MB3 OPC server. The table below describes in which position for each object type the TTD attributes should be configured. N/A = Not Available.

Object Type	Attribute 1	Attribute 2	Attribute 3	Attribute 4	Attribute 5
AI	VALUE	N/A	N/A	N/A	N/A
AO	VALUE	N/A	N/A	N/A	N/A
DI	VALUE	N/A	N/A	N/A	N/A
DO	VALUE	N/A	N/A	N/A	N/A
PIDCON	MV	WSP	OUT	DEVIATION	PRES1
RATIOSTN	MV	WRATIO	OUT	N/A	N/A
MANSTN	MV	OUT	PRES1	N/A	N/A
PIDCONA	MV_NONF	WSP	OUT	DEVIATION	ACTPOS
GENCON	MV	SP	OUT	N/A	N/A
GENUSD	MV	MV_INTL	SP	N/A	N/A
GENBIN	MV	N/A	N/A	N/A	N/A
MOTCON	R_RES	N/A	N/A	N/A	N/A
VALVECON	VALVP	N/A	N/A	N/A	N/A
DAT (R)	VALUE	N/A	N/A	N/A	N/A

DAT (I)	VALUE	N/A	N/A	N/A	N/A
DAT (IL)	VALUE	N/A	N/A	N/A	N/A
DAT (B)	B1	B2	B3	N/A	N/A
TANKCON	MV	MV_INTL	SP	N/A	N/A
DRICONS	R_RES	REAL_C	REAL_A	N/A	N/A
DRICONE	R_RES	REAL_C	REAL_A	N/A	N/A

18.2.2 Mapping Between Attribute Name and TTDVAR Terminal VAR PROP

For a TTDVAR there is a terminal called VAR PROP. This terminal holds the referenced variable property number. The table below describes the mapping between these variable property numbers and the attribute names in the MB3 OPC server.

Object Type	**Attribute Number**	**Attribute Name**	**VAR PROP Number**
AI	1	VALUE	19
AO	1	VALUE	10
DI	1	VALUE	12
DO	1	VALUE	12
PIDCON	1	MV	78
	2	WSP	80
	3	OUT	86
	4	DEVIATION	81
	5	PRES1	159
RATIOSTN	1	MV	57
	2	WRATIO	59
	3	OUT	60
MANSTN	1	MV	48
	2	OUT	52
	3	PRES1	98
PIDCONA	1	MV_NONF	77
	2	WSP	74
	3	OUT	76
	4	DEVIATION	75
	5	ACTPOS	83
GENCON	1	MV	92
	2	SP	94
	3	OUT	95
GENUSD	1	MV	92
	2	MV_INTL	93
	3	SP	94
GENBIN	1	MV	92
MOTCON	1	R_RES	108
VALVECON	1	VALVP	82
DAT (R)	1	VALUE	38
DAT (IL)	1	VALUE	37
DAT (I)	1	VALUE	36
DAT (B)	1	B1	4
	2	B2	5
	3	B3	6
TANKCON	1	MV	92
	2	MV_INTL	93
	3	SP	94
DRICONS	1	R_RES	108
	2	REAL_C	221
	3	REAL_A	219
DRICONE	1	R_RES	108
	2	REAL_C	221

	3	REAL_A	219

18.3 TTD Log Item IDs

The following fields for each object type can be logged to TTD logs. Note! The Attribute and field doesn't always have the same name. The subtypes used for TTD log Item Ids are:

- "S" Seamless. Is a alias for "C" cyclic but it will additionally do a oneshot TTD request for the objects configured TTD attributes when a cyclic subscription is started. Use this together with a trend chart client (e.g. NovotekTrendView) that can integrate real time data with historical TTD data, see example later.
- "T" TTD. Keeps the TTD Access Timer alive which keeps the collecting of TTD logs alive. It will also receive values from active cyclic, demand and event updates for this object. Use this for the Item IDs set in the tags source address field for the OPC collector in Proficy Historian.

If you don't want that your Proficy Historian tags shall receive any cyclic, demand or event updates but only the TTD log data then set the source address field to empty for the tag and set the TTD Access Time to Disabled for the object.

18.3.1 AI Object

Attribute	Field	SubType	Item ID Examples
VALUE	VALUE	S,T	Node22:AI:TESTAI:VALUE:T Node22:AI:TESTAI:VALUE:S

18.3.2 AO Object

Attribute	Field	SubType	Item ID Examples
VALUE	VALUE	S,T	Node22:AO:TESTAO:VALUE:T Node22:AO:TESTAO:VALUE:S

18.3.3 DI Object

Attribute	Field	SubType	Item ID Examples
VALUE	STATUS:8	S,T	Node22:DI:TESTDI:STATUS:8:T Node22:DI:TESTDI:STATUS:8:S

18.3.4 DO Object

Attribute	Field	SubType	Item ID Examples
VALUE	STATUS:8	S,T	Node22:DO:TESTDO:STATUS:8:T Node22:DO:TESTDO:STATUS:8:S

18.3.5 PIDCON Object

Attribute	Field	SubType	Item ID Examples
MV	MV	S,T	Node22:PIDCON:TESTPIDCON:MV:T Node22:PIDCON:TESTPIDCON:MV:S
WSP	WSP	S,T	Node22:PIDCON:TESTPIDCON:WSP:T Node22:PIDCON:TESTPIDCON:WSP:S
OUT	OUT	S,T	Node22:PIDCON:TESTPIDCON:OUT:T Node22:PIDCON:TESTPIDCON:OUT:S
DEVIATION	DEVIATION	S,T	Node22:PIDCON:TESTPIDCON:DEVIATION:T

			Node22:PIDCON:TESTPIDCON:DEVIATION:S
PRES1	PRES1	S,T	Node22:PIDCON:TESTPIDCON:PRES1:T Node22:PIDCON:TESTPIDCON:PRES1:S

18.3.6 RATIOSTN Object

Attrbiute	Field	SubType	Item ID Examples
MV	MV	S,T	Node22:RATIOSTN:TESTRATIOSTN:MV:T Node22:RATIOSTN:TESTRATIOSTN:MV:S
WRATIO	WRATIO	S,T	Node22:RATIOSTN:TESTRATIOSTN:WRATIO:T Node22:RATIOSTN:TESTRATIOSTN:WRATIO:S
OUT	OUT	S,T	Node22:RATIOSTN:TESTRATIOSTN:OUT:T Node22:RATIOSTN:TESTRATIOSTN:OUT:S

18.3.7 MANSTN Object

Attribute	Field	SubType	Item ID Examples
MV	MV	S,T	Node22:MANSTN:TESTMANSTN:MV:T Node22:MANSTN:TESTMANSTN:MV:S
OUT	OUT	S,T	Node22:MANSTN:TESTMANSTN:OUT:T Node22:MANSTN:TESTMANSTN:OUT:S
PRES1	PRES1	S,T	Node22:MANSTN:TESTMANSTN:PRES1:T Node22:MANSTN:TESTMANSTN:PRES1:S

18.3.8 PIDCONA Object

Attribute	Field	SubType	Item ID Examples
MV_NONF	MV_NONFILTERED	S,T	Node22:PIDCONA:TESTPIDCONA:MV_NONFILTERED:T Node22:PIDCONA:TESTPIDCONA:MV_NONFILTERED:S
WSP	WSP	S,T	Node22:PIDCONA:TESTPIDCONA:WSP:T Node22:PIDCONA:TESTPIDCONA:WSP:S
OUT	OUT	S,T	Node22:PIDCONA:TESTPIDCONA:OUT:T Node22:PIDCONA:TESTPIDCONA:OUT:S
DEVIATION	DEVIATION	S,T	Node22:PIDCONA:TESTPIDCONA:DEVIATION:T Node22:PIDCONA:TESTPIDCONA:DEVIATION:S
ACTPOS	ACTPOS	S,T	Node22:PIDCONA:TESTPIDCONA:ACTPOS:T Node22:PIDCONA:TESTPIDCONA:ACTPOS:S

18.3.9 GENCON Object

Attribute	Field	SubType	Item ID Examples
MV	MV	S,T	Node22:GENCON:TESTGENCON:MV:T Node22:GENCON:TESTGENCON:MV:S
SP	SP	S,T	Node22:GENCON:TESTGENCON:SP:T Node22:GENCON:TESTGENCON:SP:S

OUT	OUT	S,T	Node22:GENCON:TESTGENCON:OUT:T Node22:GENCON:TESTGENCON:OUT:S

18.3.10 GENUSD Object

Attribute	Field	SubType	Item ID Examples
MV	MV	S,T	Node22:GENUSD:TESTGENUSD:MV:T Node22:GENUSD:TESTGENUSD:MV:S
MV_INTL	MV_INTL	S,T	Node22:GENUSD:TESTGENUSD:MV_INTL:T Node22:GENUSD:TESTGENUSD:MV_INTL:S
OUT	OUT	S,T	Node22:GENUSD:TESTGENUSD:OUT:T Node22:GENUSD:TESTGENUSD:OUT:S

18.3.11 GENBIN Object

Attribute	Field	SubType	Item ID Examples
MV	MV	S,T	Node22:GENBIN:TESTGENBIN:MV:T Node22:GENBIN:TESTGENBIN:MV:S

18.3.12 MOTCON Object

Attribute	Field	SubType	Item ID Examples
R_RES	R_RES	S,T	Node22:MOTCON:TESTMOTCON:R_RES:T Node22:MOTCON:TESTMOTCON:R_RES:S

18.3.13 VALVECON Object

Attribute	Field	SubType	Item ID Examples
VALVP	IND1:12	S,T	Node22:VALVECON:TESTVALVECON:IND1:12:T Node22:VALVECON:TESTVALVECON:IND1:12:S

18.3.14 DAT(R) Object

Attribute	Field	SubType	Item ID Examples
VALUE	VALUE	S,T	Node22:DAT:TESTDATR:VALUE:T|Float Node22:DAT:TESTDATR:VALUE:S|Float

18.3.15 DAT(I) Object

Attribute	Field	SubType	Item ID Examples
VALUE	VALUE	S,T	Node22:DAT:TESTDATI:VALUE:T|Int Node22:DAT:TESTDATI:VALUE:S|Int

18.3.16 DAT(IL) Object

Attribute	Field	SubType	Item ID Examples
VALUE	VALUE	S,T	Node22:DAT:TESTDATIL:VALUE:T|Long Node22:DAT:TESTDATIL:VALUE:S|Long

18.3.17 DAT(B) Object

Attribute	Field	SubType	Item ID Examples
B1	VALUE:0	S,T	Node22:DAT:TESTDATB:VALUE:0:T|Bool Node22:DAT:TESTDATI:VALUE:0:S|Bool
B2	VALUE:1	S,T	Node22:DAT:TESTDATI:VALUE:1:T|Bool Node22:DAT:TESTDATI:VALUE:1:S|Bool
B3	VALUE:2	S,T	Node22:DAT:TESTDATI:VALUE:2:T|Bool Node22:DAT:TESTDATI:VALUE:2:S|Bool

18.3.18 TANKCON Object

Attribute	Field	SubType	Item ID Examples
MV	MV	S,T	Node22:TANKCON:TESTTANKCON:MV:T Node22:TANKCON:TESTTANKCON:MV:S
MV_INTL	MV_INTL	S,T	Node22:TANKCON:TESTTANKCON:MV_INTL:T Node22:TANKCON:TESTTANKCON:MV_INTL:S
OUT	OUT	S,T	Node22:TANKCON:TESTTANKCON:OUT:T Node22:TANKCON:TESTTANKCON:OUT:S

18.3.19 DRICONS Object

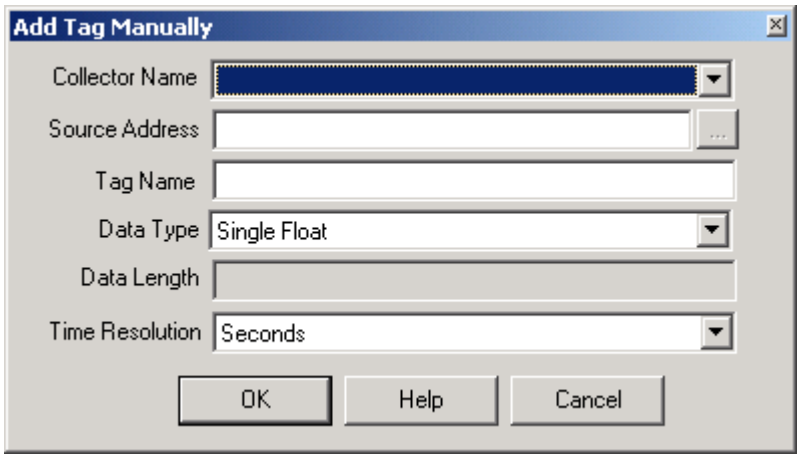
Attribute	Field	SubType	Item ID Examples
R_RES	R_RES	S,T	Node22:DRICONS:TESTDRICONS:R_RES:T Node22:DRICONS:TESTDRICONS:R_RES:S
REAL_C	REAL_C	S,T	Node22:DRICONS:TESTDRICONS:REAL_C:T Node22:DRICONS:TESTDRICONS:REAL_C:S
REAL_A	REAL_A	S,T	Node22:DRICONS:TESTDRICONS:REAL_A:T Node22:DRICONS:TESTDRICONS:REAL_A:S

18.3.20 DRICONE Object

Attribute	Field	SubType	Item ID Examples
R_RES	R_RES	S,T	Node22:DRICONE:TESTDRICONE:R_RES:T Node22:DRICONE:TESTDRICONE:R_RES:S
REAL_C	REAL_C	S,T	Node22:DRICONE:TESTDRICONE:REAL_C:T Node22:DRICONE:TESTDRICONE:REAL_C:S
REAL_A	REAL_A	S,T	Node22:DRICONE:TESTDRICONE:REAL_A:T Node22:DRICONE:TESTDRICONE:REAL_A:S

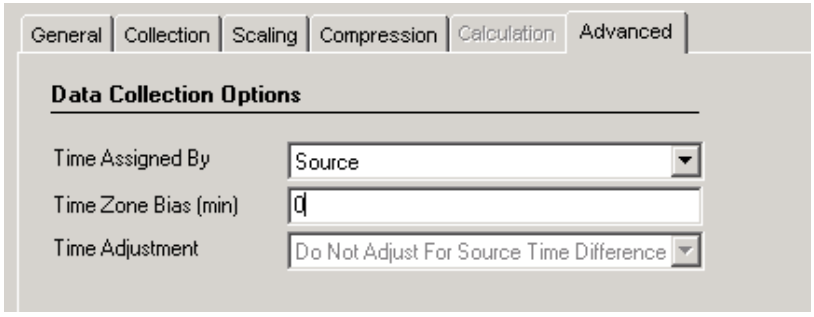
18.4 Proficy Historian Tag Configuration

If you choose to create the tags manually from the Proficy Historian Administrator then the following dialog box is shown.



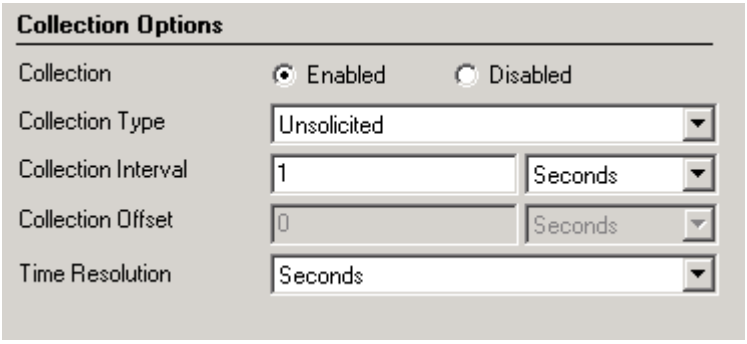
Field	Description
Collector Name	If you want the tag to receive cyclic, demand and event update data then choose the installed MB3 OPC server collector from the list. If you just want your tag to receive TTD log data then leave this field blank.
Source Address	If you want the tag to receive cyclic, demand and event update data then enter the Item ID for the object attribute with subtype set to ":T". See Item ID examples for each object attribute in the section above. If you just want your tag to receive TTD log data then leave this field blank.
Tag Name	Enter the tagname of the Proficy Historian tag. This must be the same name that is configured as Historian Tag Name in the object TTD Configuration.
Data Type	The datatype of the tag.
Time Resolution	The precision of the timestamps for the tag.

When the tag is created then select the Advanced tab.



Field	Description
Time Assigned By	Choose Source from the drop down list. This will ensure that the timestamps comes from the MB3 OPC server and not from the collector.

When you select the Collection tab for the tag there is a Collection Type option.



Here you can select Unsolicited or Polled. It will only affect the collection of cyclic, demand and event update data for the tag from the OPC collector. TTD log data will not be affected.

- Unsolicited – When a 9 sec cyclic subscription starts then the tag will get updates with a timestamp from the cyclic update if the value has changed from the last update collected by the OPC collector.
- Polled – When a 9 sec cyclic subscription starts then the tag will get updates with a timestamp from the cyclic update for every update, if the collection interval is less than the cyclic update interval, even if they haven't changed.

18.5 CSV File Format

The value CSV file contains two rows of header as shown below where each field is separated by the list separator set in Regional settings:

[Data]
Tagname,TimeStamp,Value,DataQuality

For each sample of a signal there will be created a row under the header in the CSV file. The Tagname will be the name defined with Historian Tag Name in the objects TTD configuration for the attribute. The value is the value for the attribute and sample. Data Quality is either Good or Bad .

The list separator set in Regional settings in Windows Control Panel shall separate each field on the row. The values use the decimal separator set in Windows Control Panel.

There are some limitations to the settings in the Regional settings in the Windows Control Panel. These are:
The time format must be 24H
The list separator must be ”,” or ”;”
The decimal separator must be ”.” or “,”
The date format must be short format.

18.5.1 CSV File Example

[Data]
Tagname;TimeStamp;Value;DataQuality
FC2315A51_MV;06-10-17 10:42:00,000;23;Good
FC2315A51_MV;06-10-17 10:42:15,000;23;Good
FC2315A51_MV;06-10-17 10:42:30,000;23;Good
FC2315A51_MV;06-10-17 10:42:45,000;23;Good
FC2315A51_MV;06-10-17 10:43:00,000;23;Good
FC2315A51_MV;06-10-17 10:43:15,000;23;Good
FC2315A51_MV;06-10-17 10:43:30,000;23;Good
FC2315A51_MV;06-10-17 10:43:45,000;23;Good
FC2315A51_MV;06-10-17 10:44:00,000;23;Good

18.6 Time Synchronization

The computer where the MB3 OPC server is installed must be in time sync with the AC and MP stations it shall collect TTD logs from.

There are two options.

1. The MB3 OPC server is the clock master and sends broadcast clock synch telegrams every 10 minute.
2. Another node on the network is clock master and the MB3 OPC server receives the clock synch telegram and sets the clock in the PC from it.

18.6.1 MB3 OPC server is clock master

There is a channel item that can be used to control the MB3 OPC server as a clock synch master on the Masterbus network.

ItemID	Type	Description
!START_CM:ChannelName	Long Integer	Whenever this tag is set <> 0, the MB3 OPC server sends clock synch-broadcast message every 10 minutes. The 'state' of the tag is saved in the registry, at :HKLM\Software\Novotek\Drivers\MB3\SendCM A clock synch-broadcast is also sent every time an OPC client writes <> 0 to the !START_CM tag. The nodes on the network must be set up to listen for time synchronization messages. LOC_TIME in the controllers must be set to 3 “Listen to Time Set Telegram and High Precision Time Synchronization Telegram”.

18.6.2 Another node on the Masterbus network is clock master

From an OPC DA client it is possible to read the latest received clock sync date and time and from those values then set the clock in the computer. There are two possible clock sync telegrams that the MB3 DA OPC server might receive a broadcast clock sync telegram or a clock sync telegram sent from a specific node addressed to the MB3 DA OPC server. In the MB3 DA OPC server it is possible to address both of these clock sync date and times as items.

Broadcast clock sync telegram (Clock Master is set to CLK_SEND = 3):

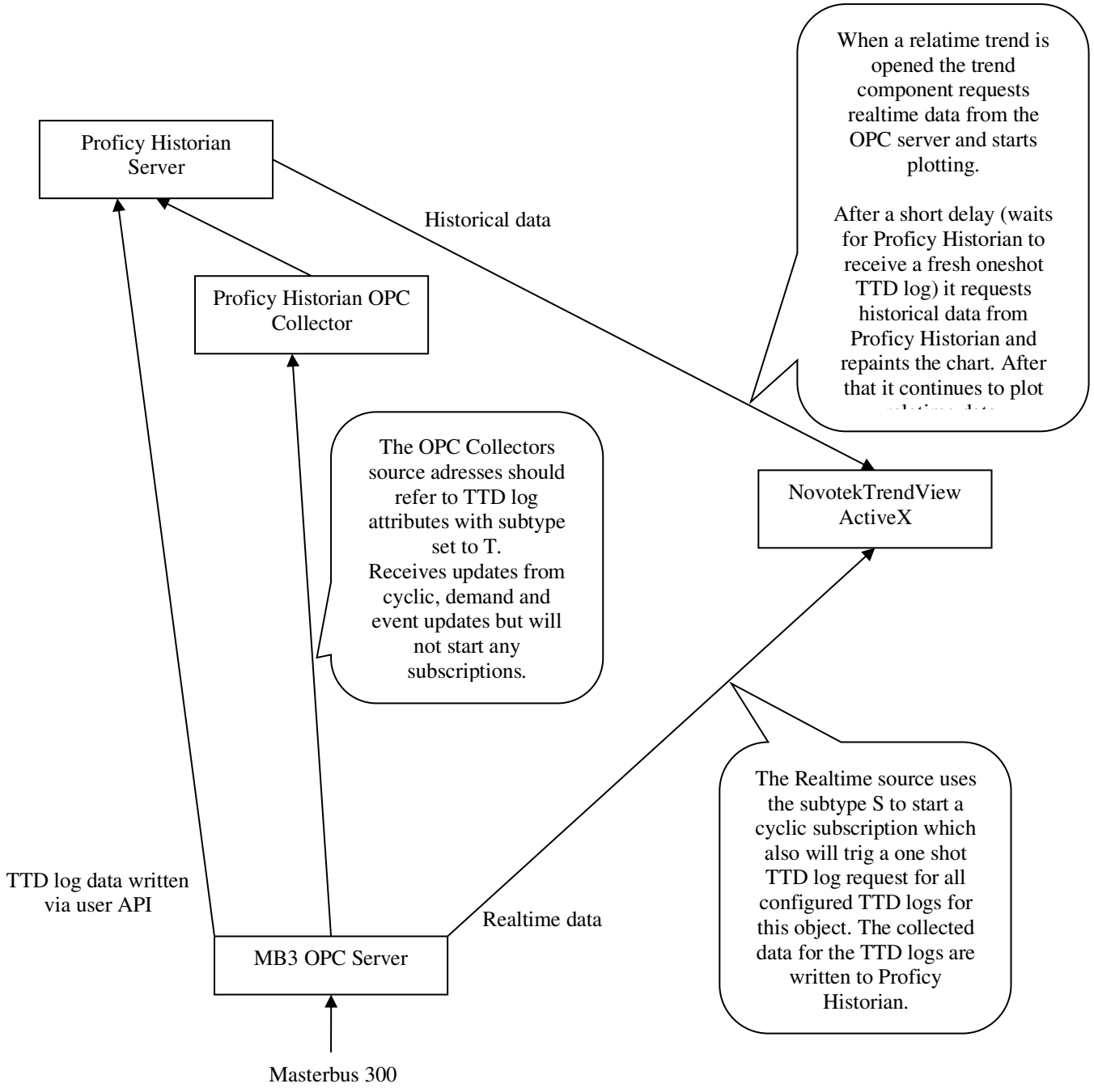
ItemID	Type	Description
!CS_DATE:ChannelName	Long Integer	Latest Clock Sync Date received from a broadcast clock sync telegram. The format is in number of days since 1 January 1980. 1 January 1980 is day 1.
!CS_TIME:ChannelName	Long Integer	Latest Clock Sync Time received from a broadcast clock sync telegram. The format is in number of 0,1 milliseconds since midnight.

Clock sync from a node (Clock Master is set to CLK_SEND = 2):

ItemID	Type	Description
!CS_DATE:DeviceName	Long Integer	Latest Clock Sync Date received from this node's clock sync telegram. The format is in number of days since 1 January 1980. 1 January 1980 is day 1.
!CS_TIME:DeviceName	Long Integer	Latest Clock Sync Time received from this node's clock sync telegram. The format is in number of 0,1 milliseconds since midnight.

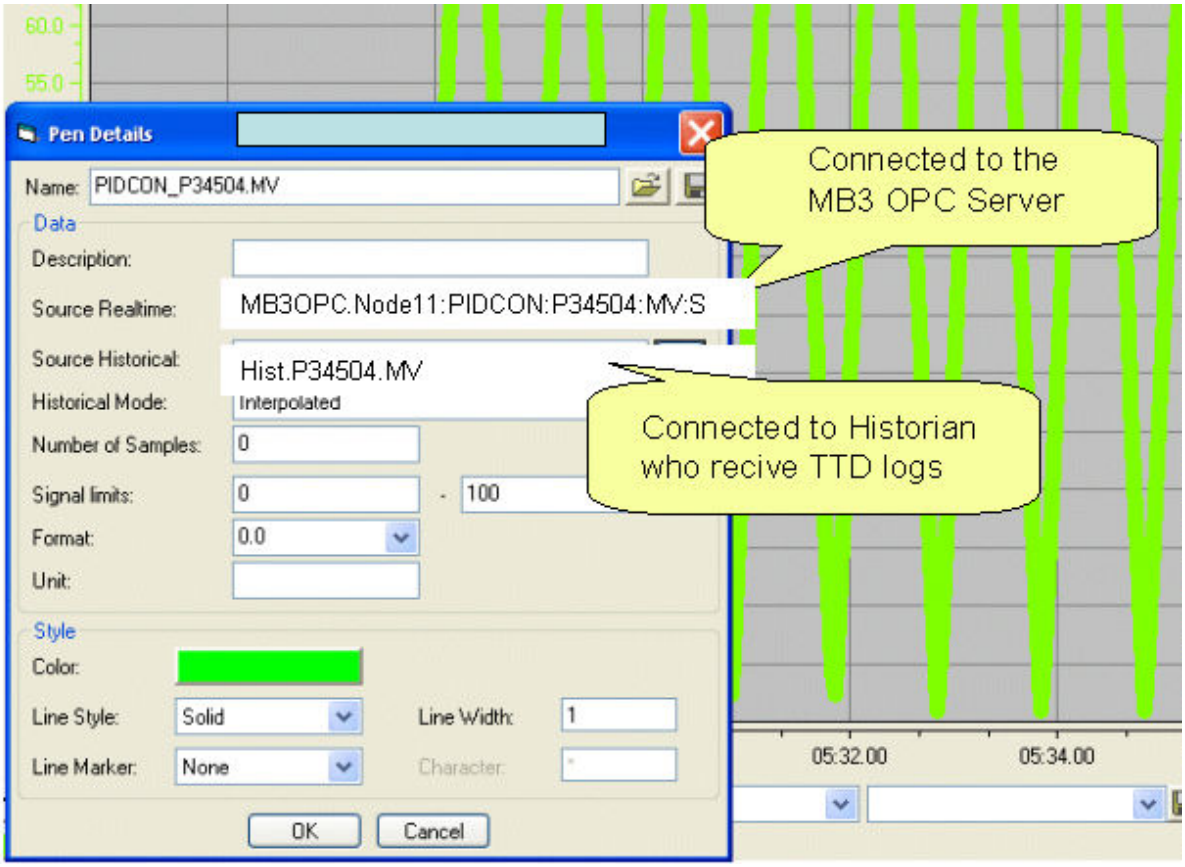
There is installed an OPC DA client program for clock synchronization together with the MB3 OPC server. The program is named “MB3ClockSync.exe” and it has an own manual “MB3 Clock Sync User Manual” for further information.

18.7 Seamless Integration with NovotekTrendView component



18.7.1 NovotekTrendView Pen Configuration

In the NovotekTrendView ActiveX component you can configure one realtime source and one historical source for each pen. See picture below.



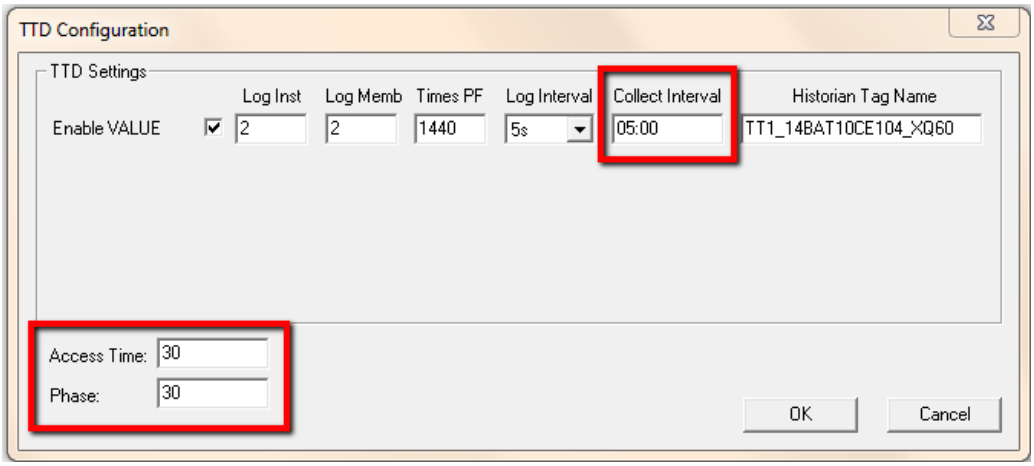
To setup the NovotekTrendView for seamless integration between realtime and TTD historical data with the MB3 OPC server then setup the realtime and historical source as described below:

- Source Realtime – Connect to the MB3 OPC server with a Itemd Id with the subtype set to S for the attribute. When a chart for this pen is opened it will start a cyclic subscritpion for this object and get realtime values with the cyclic update rate. It will also trig a oneshot TTD request for TTD values up to now for this objects configured TTD attributes. These TTD values will be written to Proficy Historian from the MB3 OPC server.
- Source Historical – Connect to the tag in Proficy Historian which is setup to receive the TTD log values for the object attribute entered in the realtime source.

18.8 ABB TTD Functionality

18.8.1 IMS Functionality with Stagger

An ABB IMS station can be set up to stagger the load of the controller when it requests TTD log data. In the MB3 OPC server you can use the settings described below to distribute (stagger) the load of the controller when the MB3 OPC server requests TTD log data.



- Set the collect interval to how often the TTD log data should be collected to the historian archives.
- Set the Access Time to a higher value than the update rate of the active OPC items that access the data blocks TTD log variables (item that ends with ":T"). If all the OPC items connected to the data blocks TTD logs are set to inactive then the OPC server will stop collect the data blocks TTD logs after the access time has elapsed. If no OPC item is connected to the data blocks TTD log variables then no collection will be started for the data block.
- The Phase is used to implement the stagger functionality. If the TTD log collection for a data block is inactive and it is accessed from an OPC item it will start to collect the TTD log after the phase time has elapsed. After that it will use the collect interval. In this way you can stagger the load by setting different phase times for the data blocks.

18.8.2 OS Functionality Showing TTD Data in Curves

When opening a curve with TTD data in an ABB OS station it first collects the TTD log for the variable(s) until now and then fills data to the curve with the same speed as the TTD variable(s) logs data.

Two items have been implemented to control this:

Item	Description
!TTD_SUB:DataBlockName	Write Only. Trigs the data block to collect the TTD log data until now and subscribe for TTD sub updates for the TTD variables configured in the data block. Update period from the controller for the TTD sub updates is the same as the log interval of the variable in the TTD log. Disabled variables or variables with collect interval set to Disabled will not be trigged.
!TTD_UNSUB:DataBlockName	Write Only. Trigs the data block to unsubscribe the active TTD sub updates for the TTD variables configured in the data block.

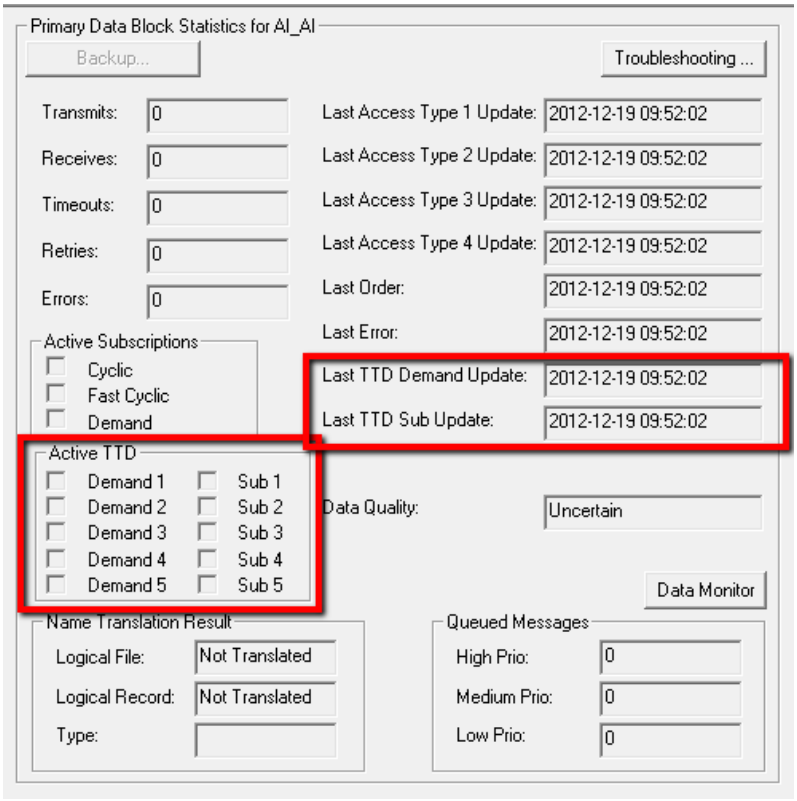
- Trigging a collection will not affect the collect interval set for the TTD variables.
- The OPC server will calculate and save the next start time from the last received timestamp and number of values from the TTD variable. The next polled collection will start from this calculated timestamp. This will avoid that the same value is collected twice.
- All received TTD updates, both polled collection and sub updates, is saved to the CSV file or to Proficy Historian.

Scenario:

1. Open the display with the curve.
2. Write to the “!TTD_SUB:DataBlockName” OPC items for the variables in the curve to trig a collection of TTD data until now and to subscribe for TTD sub updates.
3. Update the curve in the display with data collected to the CSV files or Proficy Historian.
4. Close the display.
5. Write to the “!TTD_UNSUB:DataBlockName” OPC items for the variables in the curve to trig an unsubscription of the active TTD sub updates.

18.9 TTD Debug

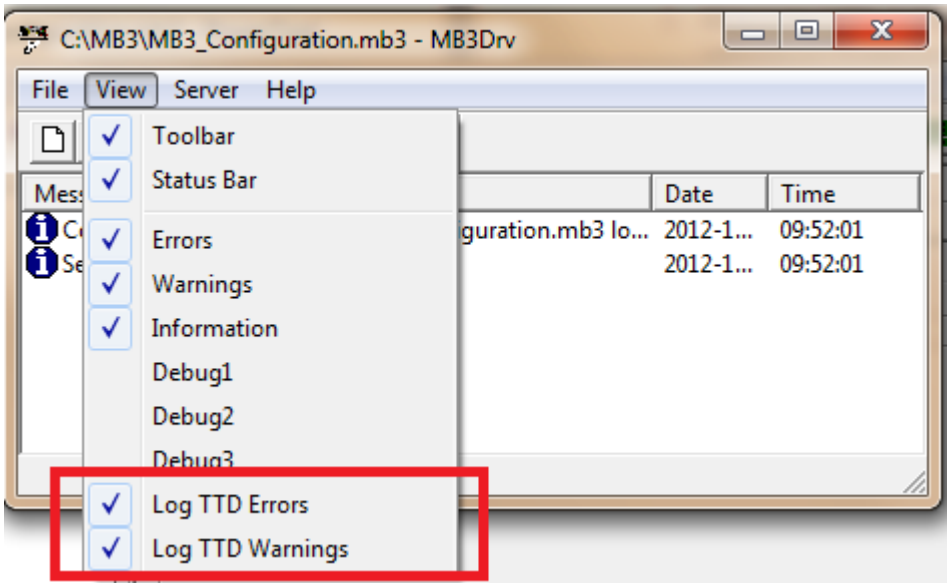
18.9.1 TTD Statistics



The data block statistics contains some info about the status of the TTD variables configured for the data block.

Statistics	**Description**
Active TTD	Demand 1 – Demand 5 These checkboxes will be set if any of the TTD variables 1 – 5 are active collecting data with the collect interval. Sub 1 – Sub 5 These checkboxes will be set if any of the TTD variables 1 – 5 are active subscribing for TTD sub data.
Last TTD Demand Update	This timestamp will be updated when the data block receives a TTD data update for any of the TTD variables in the data block.
Last TTD Sub Update	This timestamp will be updated when the data block receives a TTD sub update for any of the TTD variables in the data block.

18.9.2 Log TTD debug to file



In the MB3 server window two options in the View menu are used for TTD debug. These are:

- Log TTD Errrors
- Log TTD Warnings

If any of these are checked received TTD errors or warnings will be logged to a file. The file is named "YYYYMMDDHH_MB3TTDINFO.LOG" where YYYY = year, MM = month, DD = day and HH = hour when the file was created. The files will be located in the same folder as where the MB3 OPC server is installed. Files older than 10 days will be removed automatically.

Option	Description
Log TTD Errors	The OPC server is looking for two type of error that will be logged to the files: 1. The received log interval of the variable doesn't match the configured log interval. The consequence of this will probably cause the OPC server to ask for data outside of the log interval. 2. The received log instance and log member doesn't match the configured log instance and log member for the variable. If any of these errors occur then no data will be saved to the CSV file.
Log TTD Warnings	The OPC server will log a warning to the file if the received TTD request status isn't 0 (OK) and none of the two errors above have occurred.

The format of the log is:

Row	Description
Type	The text "ERROR" or" WARNING"
Timestamp	Timestamp in format "YYYY-MM-DD HH:MM:SS" when the entry in the log was written.
Description	A description text of the error or warning
DataBlock name	The name of the data block in the OPC server with the TTD variable.
Configured Sample Time (ms)	The configured log interval in the OPC server of the TTD variable in ms.
Configured Log Ref	The configured log reference (log inst) in the OPC server of the TTD variable
Configured Var Ref	The configured variable reference (log memb) in the OPC server of the TTD variable
Received TTD Log name	The received TTD log name

Received TTD Variable name	The received TTD variable name
Received TTD Log Ref	The received TTD log reference.
Received TTD Var Ref	The received TTD variable reference
Received TTD Start Time	The received start time in format ““YYYY-MM-DD HH:MM:SS” for the first value (oldest value)
Received TTD Sample Time (ms)	The received log interval for the variable in ms.
Received TTD status	The received TTD request status with a descriptive text.
Received TTD Num values	The number of received values

Each entry in the log starts and ends with line **********

Two log entry examples:
****
ERROR
TimeStamp: 2012-12-19 10:10:42
Description: Configured sample time does not match the received sample time!
DataBlock name: TestDataBlock1
Configured Sample Time(ms): 5000
Configured Log Ref: 3
Configured Var Ref: 2
Received TTD Log name: ReceivedLogName
Received TTD Variable name: ReceivedVariableName
Received TTD Log Ref: 3
Received TTD Var Ref: 2
Received TTD Start Time: 2012-12-07 09:17:30.000
Received TTD Sample Time(ms): 10000
Received TTD status: 08 = time(s) out of range, completely
Received TTD Num Values: 0
****
****
WARNING
TimeStamp: 2012-12-19 10:10:42
Description: Received TTD request status byte is not 0 (OK)!
DataBlock name: TestDataBlock3
Configured Sample Time(ms): 5000
Configured Log Ref: 3
Configured Var Ref: 2
Received TTD Log name: ReceivedLogName
Received TTD Variable name: ReceivedVariableName
Received TTD Log Ref: 3
Received TTD Var Ref: 2
Received TTD Start Time: 2012-12-07 09:17:30.000
Received TTD Sample Time(ms): 5000
Received TTD status: 9 = time(s) out of range, oldest limit
Received TTD Num Values: 0
****

18.9.3 TTD OutputDebugString

When the OPC server posts a new request to collect TTD data or to subscribe/unsubscribe for TTD sub data an entry will be written to the OutputDebugString. The formats of the strings are:

“MB3 TTD Demand request……”
“MB3 TTD Subscribe request……”
“MB3 TTD Unsubscribe request……”

Where each string also contain some parameters like node number, object name, log ref, variable ref, start time, number of values etc.

When the OPC server receives a TTD Data update or TTD sub update an entry is written to the OutputDebugString. The formats of the strings are:

"MB3 TTD Demand Rcv……."
"MB3 TTD Sub Rcv……."

Where each string also contain some parameters like node number, object name, log ref, variable ref, start time, number of values, status, next calculated start time etc.

You can use the program DebugView from Microsoft (http://technet.microsoft.com/en-us/sysinternals/bb896647.aspx) to catch the strings sent from OutputDebugString. You can set a filter like "MB3 TTD*" to only catch the TTD log outputs from the OPC server (other programs might also write entries).

18.9.4 Analysis of the received TTD request status

The statuses shown in the table below can be received from the controller when requesting TTD variable data. In the description field is described what the consequences are for the collection if any of these statuses are received.

Status	**Description**
"9 - time out of range oldest limit	The MB3 OPC server has asked for data outside the oldest limit of the log in the controller. The controller will send values with quality set to BAD for the old values outside the old limit. The MB3 OPC server will filter these BAD old values and these will not be written to the CSV file or Proficy Historian.
"10 – time out of range youngest limit"	The MB3 OPC server has asked for data outside the youngest limit of the log in the controller. The controller will send values with quality set to BAD for the young values outside the youngest limit. The MB3 OPC server will remove these values from the log so it will start asking from the last good sample the next poll of data collection.
"11 – time out of range both limits"	The MB3 OPC server has asked for data outside both the oldest and the youngest limit of the log in the controller. The controller will send values with BAD data for the old and young values outside the limits. The MB3 OPC server will filter the old BAD values and remove the young BAD values so it will start asking from the last good sample the next poll of data collection.
"8 – time out of range completely"	The MB3 OPC server has asked for data completely outside of the time range of the log in the controller. The controller will not send any data in the answer (number of values will be 0). This probably is a consequence of a mismatch of the configuration of the variable in the MB3 OPC server and the settings for the log variable in the controller. Probably the log interval doesn't match.

19 Troubleshooting

There are several ways to troubleshoot the MB3 OPC server.

19.1 Problems Starting the MB3 OPC Server

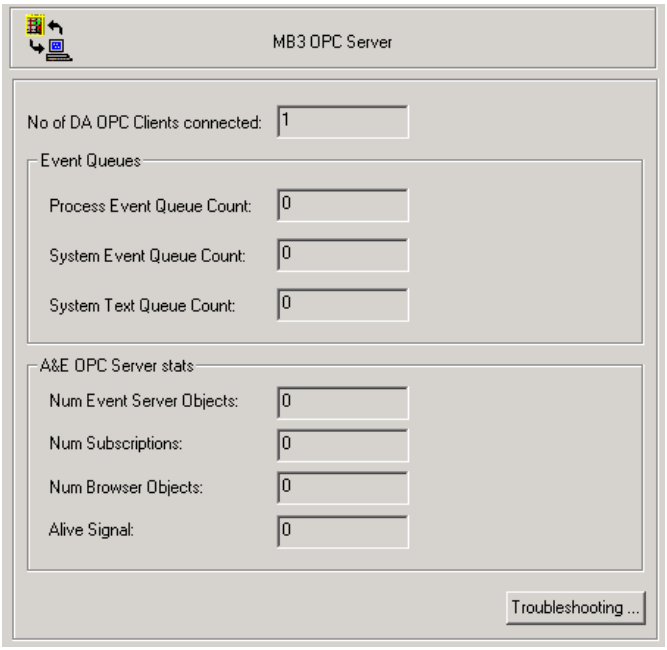
When the MB3 OPC starts up it will do some checks before it really starts to communicate on the network.

- The MB3 OPC server checks your hardware key together with the entered license number. If they match the server starts up OK. If not the MB3 OPC server will run in demo mode for two hours. You can check in the MB3 Power Tools Registration field if the MB3 OPC server started OK.
- The MB3 OPC server checks if the MAC address of the adapter connected to the MB300 network match with the ABB MAC address format 00:00:23:00:XX:00. If not the MB3 OPC server stops.
- The MB3 OPC server checks if the MAC address of the adapter connected to the MB300 network match with the local node configured for the channel in MB3 Power Tool. If not the MB3 OPC server stops.

19.2 Communication Statistics

The MB3 Power Tool permits viewing of communication statistics. Communication statistics are useful for troubleshooting communication problems.

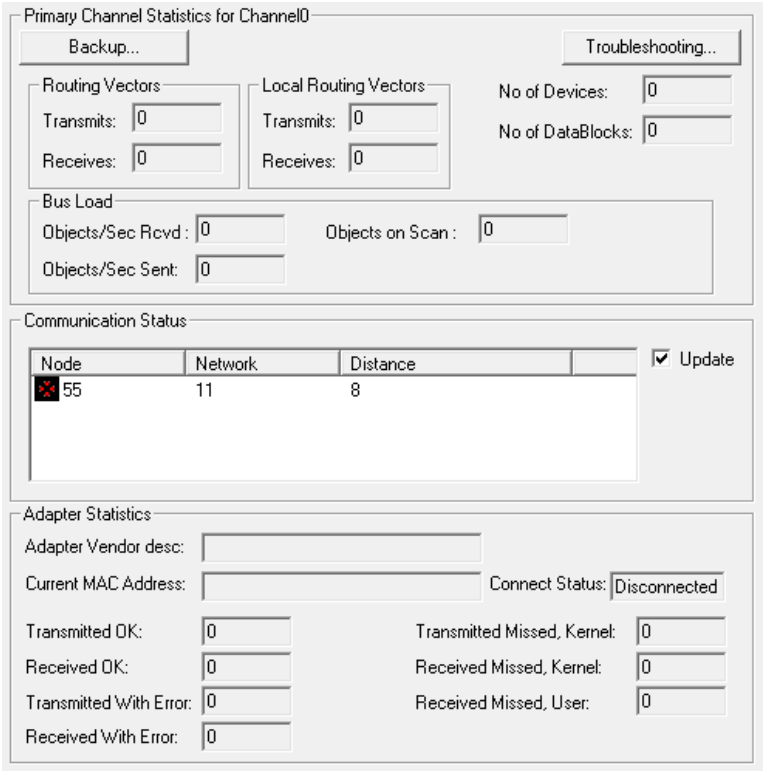
19.2.1 Server Statistics



Field	Description
No of DA OPC Clients connected	Number of DA OPC clients connected to the MB3 OPC server.
Event Queues – Process Event Queue Count	Number of Process Events stored and not sent over to the MB3 A&E OPC server.
Event Queues – System Events Queue Count	Number of System Events stored and not sent over to the MB3 A&E OPC server.
Event Queues – System Text Queue Count	Number of System Texts stored and not sent over to the MB3 A&E OPC server.
A&E OPC Server stats – Num Event Server Objects	Indicates how many clients are connected to the MB3 A&E OPC server

A&E OPC Server stats – Num Subcriptions	Indicates how many subscriptions have been created in the MB3 A&E OPC server.
A&E OPC Server stats – Num Browser Objects	Indicates how many browse sessions are underway in the MB3 A&E OPC server.
A&E OPC Server stats – Alive Signal	Toggles between 1 and 0 every third second in the MB3 A&E OPC server to show that there is contact.

19.2.2 Channel Statistics

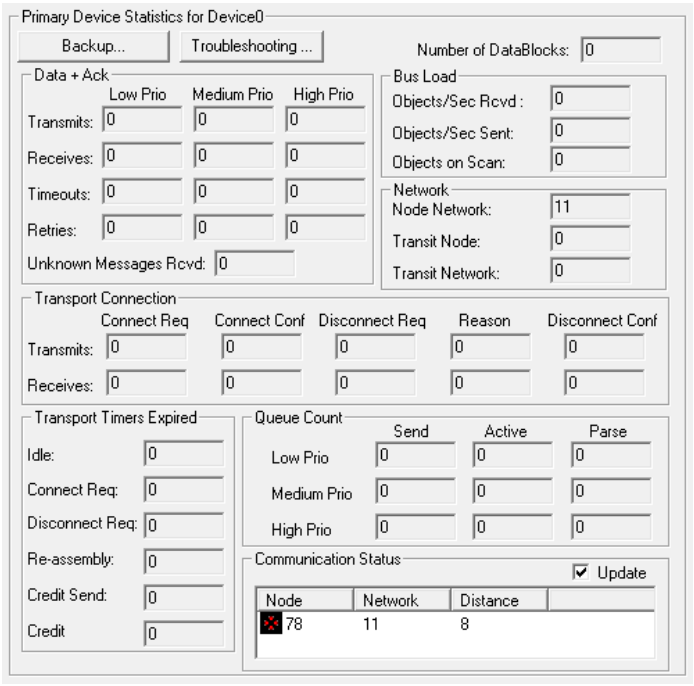


Click on the "Backup…" to see statistics for the backup channel. Go back to the primary statistics by clicking on the "Primary…" button.

Field	Description
Routing Vectors - Transmits	Number of routing vectors sent from the MB3 OPC server.
Routing Vectors – Receives	Number of routing vectors received from other nodes.
Local Routing Vectors – Transmits	Number of local routing vectors sent from the MB3 OPC server.
Local Routing Vectors – Receives	Number of local routing vectors received from other nodes.
Bus Load – Objects/Sec Rcvd	Number of objects received per second from all nodes connected to this network.
Bus Load – Objects/Sec Sent	Number of objects sent per second from the MB3 OPC server to all nodes connected to this network.
Bus Load – Objects on Scan	Number of objects in the MB3 OPC server that are on active cyclic or demand scan.
Number of Devices	Displays the number of devices configured for the selected channel.
Number of Data Blocks	Displays the number of data blocks configured on all the devices for the selected channel.
Communication Status – List	The MB3 OPC server builds up a status list of all its configured nodes. If the node is available on the network a green circle,  , is shown.

	If the node is unavailable on the network a red circle with a cross,  , is shown. The distance shows: 0 - if it is the local node and active. 1 - if node is active on primary and/or backup network. 8 – if node is inactive on both networks.
Communication Status – Update	If this checkbox is checked then the list is updated continuously with the statistics refresh rate. If the list of nodes is longer than the list box window size then you can uncheck this checkbox to scroll down in the list.
Adapter Statistics – Adapter Vendor desc	The adapters vendor description.
Adapter Statistics – Current MAC Address	The adapters current MAC address, which is in use.
Adapter Statistics – Connect Status	The adapters connect status to the network.
Adapter Statistics – Transmitted OK	The number of packets that the MB3SP# protocol driver believes that it has transmitted correctly on the specified adapter.
Adapter Statistics – Received OK	The number of packets that the MB3SP# protocol driver believes that it has received correctly on the specified adapter and passed up to the Win32 application.
Adapter Statistics – Transmitted With Error	The number of frames a NIC fails to transmit. OID_GEN_XMIT_ERROR
Adapter Statistics – Received With Error	The number of frames a NIC receives but does not indicate to the protocols due to errors. OID_GEN_RCV_ERROR
Adapter Statistics – Transmitted Missed Kernel	The number of packets which could not be transmitted on the specified adapter because the MB3SP# protocol driver could not allocate a kernel-mode resource (typically a NDIS_PACKET or NDIS_BUFFER) needed to process the packet.
Adapter Statistics – Received Missed Kernel	The number of packets received on the specified adapter which were tossed because the MB3SP# protocol driver could not allocate a kernel-mode resource (typically a NDIS_PACKET or NDIS_BUFFER) needed to process the packet.
Adapter Statistics – Received Missed User	The number of packets received on the specified adapter which were tossed because the MB3SP# protocol driver did not have a pending Win32 packet read when it was needed to process the packet.

19.2.3 Device Statistics



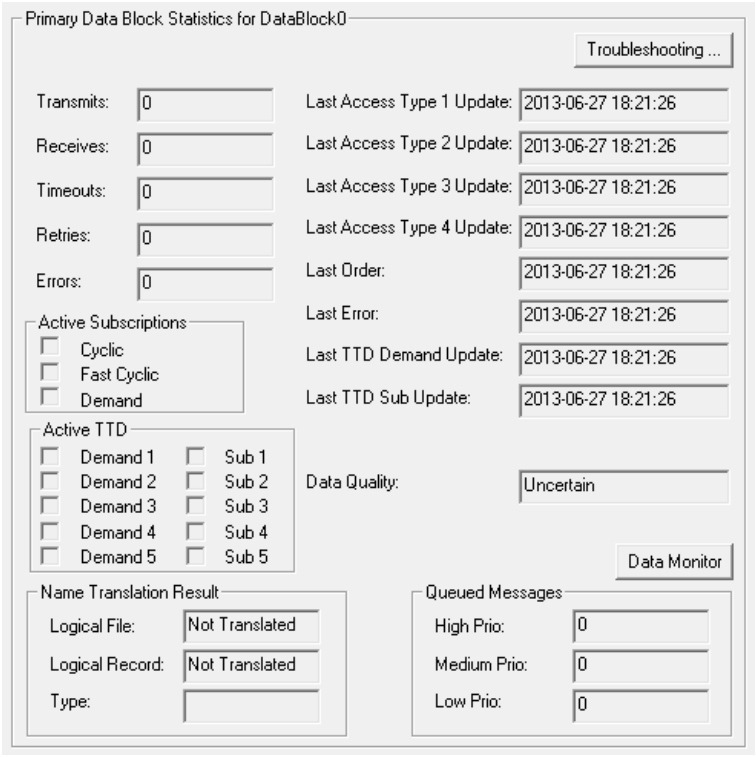
Click on the "Backup…" to see statistics for the backup channel. Go back to the primary statistics by clicking on the "Primary…" button.

Field	Description
Data + Ack Low Prio Transmits	Number of sent data packets and acknowledge packets with low priority.
Data + Ack Low Prio Receives	Number of received data packets and acknowledge packets with low priority.
Data + Ack Low Prio Timeouts	Number of timed out data packets and acknowledge packets with low priority.
Data + Ack Low Prio Retries	Number of retried data packets and acknowledge packets with low priority.
Data + Ack Medium Prio Transmits	Number of sent data packets and acknowledge packets with medium priority.
Data + Ack Medium Prio Receives	Number of received data packets and acknowledge packets with medium priority.
Data + Ack Medium Prio Timeouts	Number of timed out data packets and acknowledge packets with medium priority.
Data + Ack Medium Prio Retries	Number of retried data packets and acknowledge packets with medium priority.
Data + Ack High Prio Transmits	Number of sent data packets and acknowledge packets with high priority.
Data + Ack High Prio Receives	Number of received data packets and acknowledge packets with high priority.
Data + Ack High Prio Timeouts	Number of timed out data packets and acknowledge packets with high priority.
Data + Ack High Prio Retries	Number of retried data packets and acknowledge packets with high priority.
Data + Ack Unknown Messages Rcvd	Number of unknown data packets received from this node. If the checkbox “Save Unknown Messages to File” is checked for the device then the MB3 OPC server will save all received messages from this device it cannot recognize to a file. This file is stored in the same path where the default configuration file is stored. The files will be named “YYYYMMDDHH_MB3LOG.CCF” where YYYY is year, MM is month, DD is day and HH is hour when the file was created. These files can be viewed in the network-monitoring program CommView from TamoSoft Inc, www.tamos.com.
Number of Data Blocks	Displays the total number of data blocks configured for the selected device.
Bus Load – Objects/Sec Rcvd	Number of objects received per second from this node.
Bus Load – Objects/Sec Sent	Number of objects sent per second from the MB3 OPC server to this node.
Bus Load – Objects on Scan	Number of objects for this device that are on active cyclic or demand scan.
Network – Node Network	The local network where the node exist.
Network – Transit Node	The transit node number. This is the node on the local network that all messages have to go through to reach this node on another network. If it is 0 then the node exists on the local network.
Network – Transit Network	The transit network number. This is the network where the node exists if the transit node is set to something else than 0. If it is 0 then the node exists on the local network.
Transport Connection – Connect Req Transmits	Number of Transport connection requests sent to this node.
Transport Connection – Connect Req Receives	Number of Transport connection requests received from this node.
Transport Connection – Connect Conf Transmits	Number of Transport connection confirms sent to this node.
Transport Connection – Connect Conf Receives	Number of Transport connection confirms received from this node.
Transport Connection –	Number of Transport disconnect requests sent to this node.

Disconnect Req Transmits	
Transport Connection – Disconnect Req Receives	Number of Transport disconnect requests received from this node.
Transport Connection – Reason Transmits	Last disconnect reason sent with the latest sent disconnect request. Values: 254 - transport timeout
Transport Connection – Reason Receives	Last disconnect reason received from the latest received disconnect request. Values: From the ISO specification 0 - Reason not specified 1 - Congestion at TSAP 2 - Session entity not attached to TSAP 3 - Address unknown 128 + 0 - Normal disconnect initiated by session entity 128 + 1 - Remote transport entity congestion at connect request time 128 + 2 - Connection negotiation failed (i.e. proposed class(es) not supported) 128 + 3 - Duplicate source reference detected for the same pair of NSAPS. 128 + 4 - Mismatched references 128 + 5 - Protocol error 128 + 6 - Not used 128 + 7 - Reference overflow 128 + 8 - Connection request refused on this network connection 128 + 9 - Not used 128 + 10- Header or parameter length invalid Also seen on the MB300 bus 254 - transport timeout 255 - error in connect request parameters
Transport Connection – Disconnect Conf Transmits	Number of Transport disconnect confirms sent to this node.
Transport Connection – Disconnect Conf Receives	Number of Transport disconnect confirms received from this node.
Transport Timers Expired – Idle	Number of times the transport idle timer has expired for any of the transport priorities.
Transport Timers Expired – Connect Req	Number of times the connect request timer has expired for any of the transport priorities.
Transport Timers Expired – Disconnect Req	Number of times the disconnect request timer has expired for any of the transport priorities.
Transport Timers Expired – Re-assembly	Number of times the re assembly timer has expired for any of the transport priorities.
Transport Timers Expired – Credit Send	Not implemented.
Transport Timers Expired – Credit	Number of times the MB3 OPC server has timed out a message with no credit to send a retry.
Queue Count – Low Prio Send	Number of low priority data packets that are waiting to be sent out on the network to this node.
Queue Count – Low Prio Active	Number of low priority data packets that has been sent out on the network for this device waiting for acknowledgement.
Queue Count – Low Prio Parse	Number of low priority data packets received from this node waiting to be parsed into the right data blocks.
Queue Count – Medium Prio Send	Number of medium priority data packets that are waiting to be sent out on the network to this node.
Queue Count – Medium Prio Active	Number of medium priority data packets that has been sent out on the network for this device waiting for acknowledgement.
Queue Count – Medium Prio Parse	Number of medium priority data packets received from this node waiting to be parsed into the right data blocks.

Queue Count – High Prio Send	Number of high priority data packets that are waiting to be sent out on the network to this node.
Queue Count – High Prio Active	Number of high priority data packets that has been sent out on the network for this device waiting for acknowledgement.
Queue Count – High Prio Parse	Number of high priority data packets received from this node waiting to be parsed into the right data blocks.
Communication Status – List	If the node is available on the network a green circle,  , is shown. If the node is unavailable on the network a red circle with a cross,  , is shown. The distance shows: 1 - if node is active on primary and/or backup network. 8 – if node is inactive on both networks.
Communication Status – Update	If this checkbox is checked then the list is updated continuously with the statistics refresh rate. If the list of nodes is longer than the list box window size then you can uncheck this checkbox to scroll down in the list.

19.2.4 Data Block Statistics

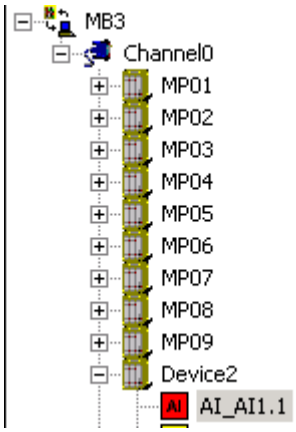


Field	Description
Transmits	Displays the number of messages sent to the process hardware from the selected data block.
Receives	Displays the total number of messages the data block received from the process hardware.
Timeouts	Displays the total number of messages sent to the process hardware from the selected data block that did not receive a reply.
Retries	Displays the total number of messages resent to the process hardware because of errors. A value in the Retries field for a device does not indicate a communication problem. It may, for example, indicate that the process hardware is slow replying to MB3 OPC server requests.
Errors	Displays the total number of protocol errors that were sent from the process hardware and received by the selected data block.
Last Access Type 1 Update	Displays the last time and date that the MB3 OPC server successfully received an update with parameters for Access Type 1 from the selected object. Access Type 1 is normally Cyclic update except for SEQ objects.

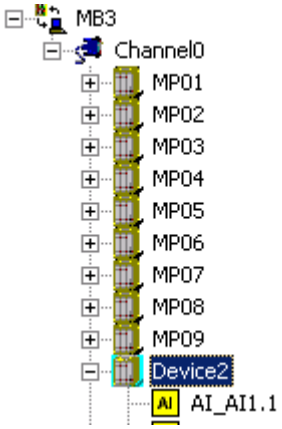
Last Access Type 2 Update	Displays the last time and date that the MB3 OPC server successfully received an update with parameters for Access Type 2 from the selected object. Access Type 2 is Cyclic update for SEQ objects.
Last Access Type 3 Update	Displays the last time and date that the MB3 OPC server successfully received an update with parameters for Access Type 3 from the selected object.
Last Access Type 4 Update	Displays the last time and date that the MB3 OPC server successfully received an update with parameters for Access Type 4 from the selected object.
Last Order	Displays the last time and date that the MB3 OPC server successfully wrote data to the selected data block.
Last Error	Displays the last time and date that the MB3 OPC server had an error for this data block.
Last TTD Demand Update	Displays the last time and date that the MB3 OPC server received a TTD demand update for this data block.
Last TTD Sub Update	Displays the last time and date that the MB3 OPC server received a TTD subscription update for this data block.
Data Quality	Displays the OPC quality of data in the data block. Data Quality will be Uncertain at startup and will not change to Good until your process control software asks for data from the data block.
Active Subscriptions Cyclic	This flag will be set if there is an active subscription for cyclic updates for the data block. When your process control software stops asking for the cyclic data the cyclic access timer expires and the cyclic subscription is cleared. Then this flag is reset.
Active Subscriptions Fast Cyclic	This flag will be set if there is an active subscription for fast cyclic updates for the data block. Fast cyclic subscriptions are typically trigged from your process control software when showing pop up displays for the object. There is a two minute timer starting when a fast cyclic subscription is trigged and when it expires the MB3 OPC server goes back to normal cyclic updates again. Then this flag is reset.
Active Subscriptions Demand	This flag will be set if there is an active subscription for demand updates for the data block.
Active TTD	Shows if there are any active TTD demand requests or TTD subscriptions for this data block.
Logical File	Shows the Logical File (LF) number received from a symbolic name translation response for the selected data block.
Logical Record	Shows the Logical Record (LR) number received from a symbolic name translation response for the selected data block.
Type	Shows the object type received from a symbolic name translation response for the selected data block. If this object type doesn't correspond with the configured object type then the data subscriptions will not work. Change your configured object type to be the same as the translated one.
Queued Messages – High Prio	Number of messages with high priority waiting to be sent to the node.
Queued Messages – Medium Prio	Number of messages with medium priority waiting to be sent to the node.
Queued Messages – Low Prio	Number of messages with low priority waiting to be sent to the node.

19.3 MB3 Power Tool Tree Browser

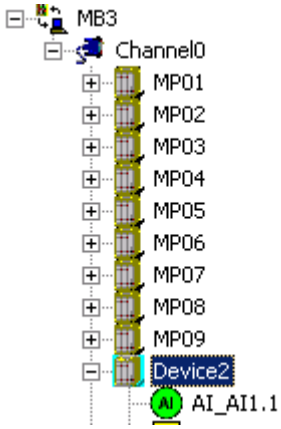
The Tree Browser in the MB3 Power Tool can be used to find data blocks that have problems with the communication. Every data block is sorted by its name in the Tree Browser. All data block names are created from the object type and object name. This makes it easy to find an object in the tree since all the data blocks of the same object type are sorted together. The data blocks have different icons depending of the object type, if its symbolic name is translated or not, if communication is good or bad and if configured object type matches name translated object type. Use F5 to refresh the Tree. See examples below.



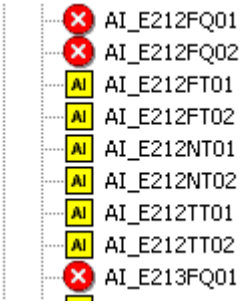
An AI object with object name AI1.1 that hasn't been translated has the shape of a rectangle with red color.



An AI object with object name AI1.1 that has been translated but communication is bad or uncertain has the shape of a rectangle with yellow color.



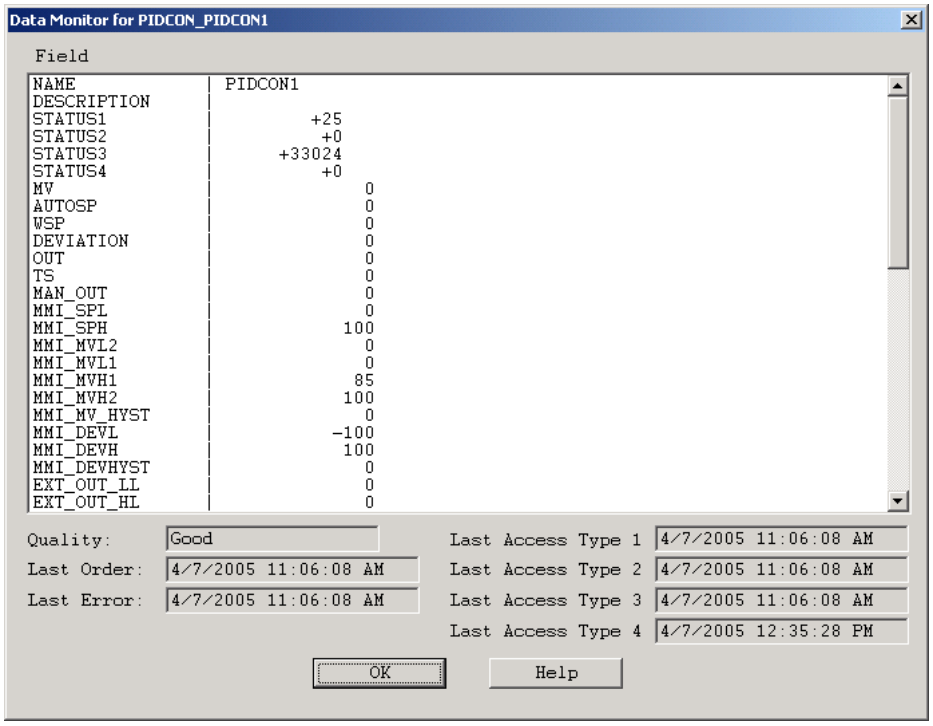
An AI object with object name AI1.1 that has been translated and the communication is good has the shape of a circle with green color.



An object that is configured as one object type and reported as another object type from the controller during name translation is marked with a error symbol in the browser tree. No subscriptions will be sent for the obejct until it is configured with the right type. Check the statisitcs for the object to see the name translated object type.

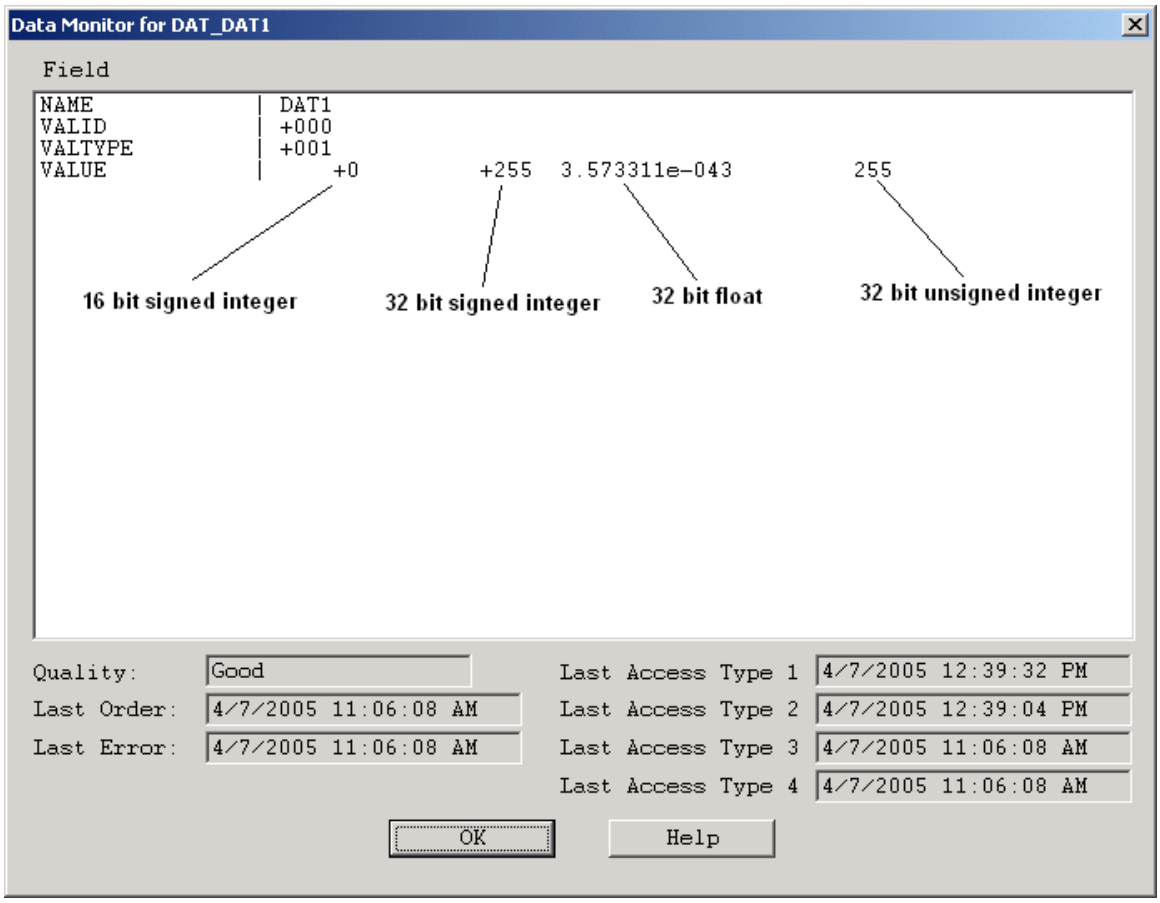
19.4 Data Block Data Monitor in Power Tool

In the data block configuration dialog and in the data block statistics dialog there is a button named “Data Monitor”. If you click on this button a dialog will appear that contains the configured objects all parameter fields with real time values. See the data monitor dialog example below for a data block configured to access a PIDCON object in a controller.



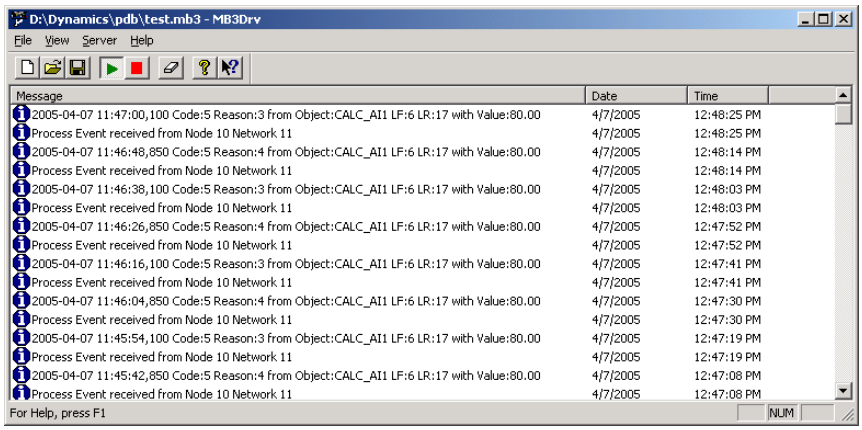
The Quality and the time stamps are the same as those shown in the data blocks statistics dialog fields.

If you open a Data monitor dialog for a DAT object the actual value for the VALUE parameter will be presented in four different formats. These formats are as shown in the picture below:

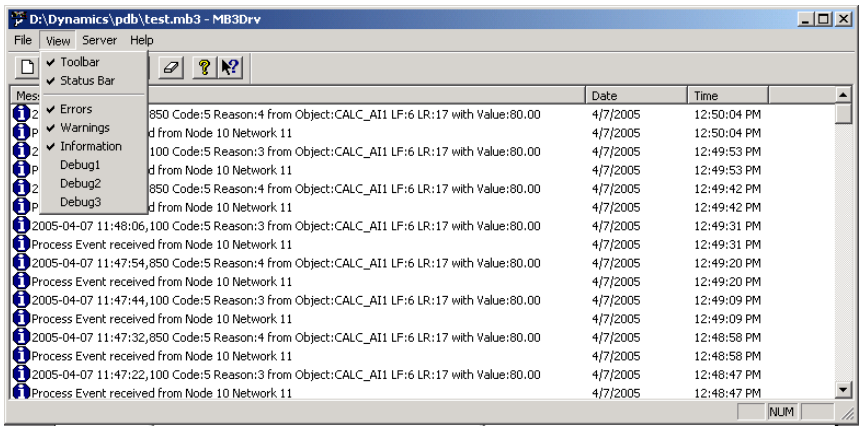


19.5 MB3 OPC Server Window

At startup the MB3 OPC server window is hidden. To make it visible then click on the Show/Hide Server button,  , in the MB3 Power Tools Runtime Configuration toolbar or select Show Server from the Options menu. The server window appears. If you run the MB3 OPC server as a service then this window will not be available.



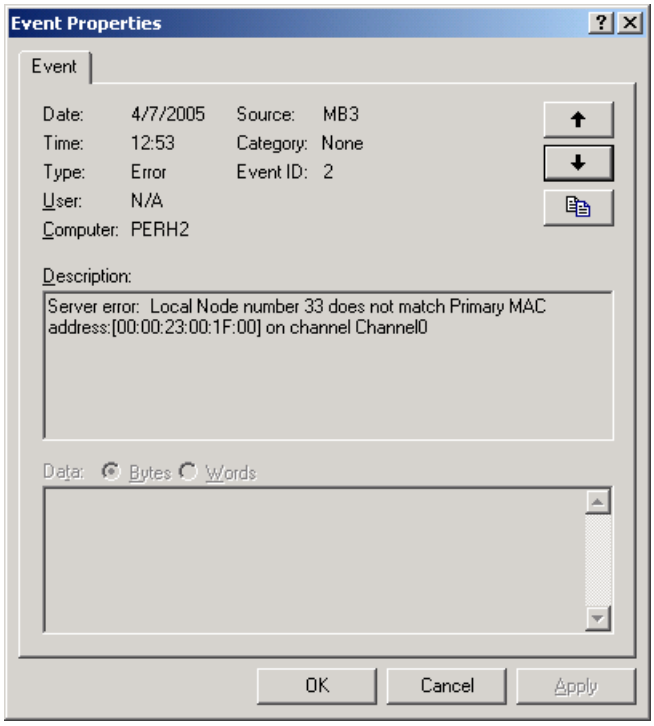
In the MB3 OPC server window's View menu you can set up to view information at different levels.



Level	Description
Fatal	Fatal errors. When these occur then the MB3 OPC server will not start. Check the Event Viewers Application log for more information. A message box from the server will also appear.
Errors	Internal server errors, which may be the result of, invalid configuration data, invalid OLE Automation calls or problems to open the Ethernet adapter. Some of these messages are also written to the computers Event Viewer Application log.
Warnings	Internal server warnings, which may be the result of invalid configuration data or invalid, OLE Automation calls. System Texts received from the ABB controllers is shown as a Warning text.
Information	General server informational or status messages. System Events and Process Events received from ABB controllers is showed as Information texts.
Debug1	Debug messages about received symbolic name translations that could not be parsed.
Debug2	From Channel object • Messages with unknown DSAP and SSAP. • Unknown broadcast messages. • Messages received from nodes not in the configuration. • Messages received not meant for the local node. • Broadcast time synch • Proficy Historian user API errors when writing TTD logs. From Device object • Known messages received but deleted • Messages received but no object found in configuration to parse the values. • Node Resp received from node • Node Init received from node From Data Block object • Update received but object type do not match • Update received but data block was not enabled to parse it.
Debug3	From Driver object • Info about components connected From Device object • Information about received Credit 0 • Information when a retry not is inside send window From Transport objects • Unexpected received transport messages

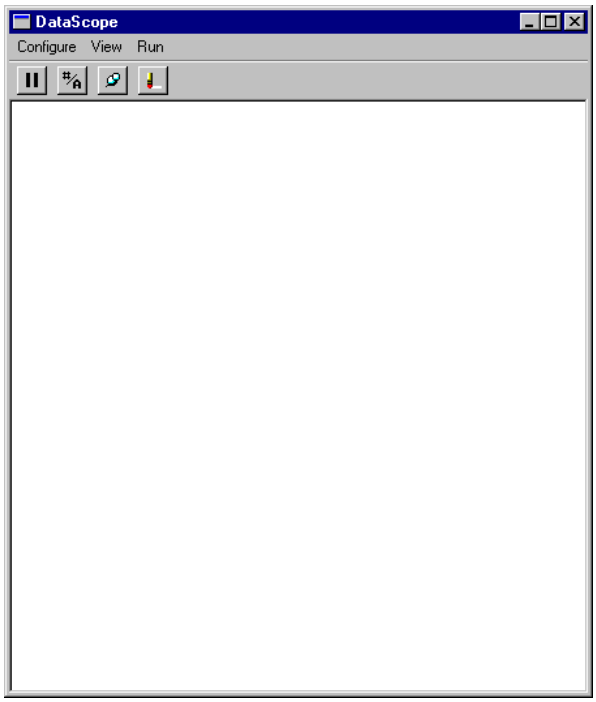
19.6 Event Viewer

Some fatal errors are written to the Windows Event Viewers Application log. The errors written are errors accessing the adapter etc. See example below when the MB3 OPC server was started with a mismatch between the channels local node number and the MAC address of the adapter.



19.7 DataScope

The DataScope can be used to troubleshoot your communication. You display the DataScope for the MB3 OPC server by clicking on the Datascope button,  , in the MB3 Power Tools Runtime Configuration toolbar or select DataScope from the Options menu.



Any object that has the datascope enabled sends messages to this window. To enable the datascope for an object in the configuration then right click on the object in the MB3 Power Tools tree browser and select Datascope On.

Do only enable datascope for the data blocks you want to troubleshoot. The Datascope only displays the object dependent data from the updates sent from the ABB controllers.

Do not enable the datascope for to many objects because this will take to much load from the MB3 OPC server's performance.

The best way to troubleshoot your communication is to connect a separate network-monitoring program.

20 QCS profiles and the MultiDAT implementation.

The current implementation of the MultiDAT data type in the MB3 OPC server is used primarily for fetching ABB-AccuRay sensors profiles and has the following limitations:

- Always fetches 50 values to each MultiDAT object.
- The data type is fixed to 'array of 4-byte-floats'. (VT_ARRAY + VT_R4).
- MultiDAT's can only be fetched 'on demand' from the MasterBus. (This is a limitation of the ABB protocol, not the implementation.)

Since MultiDAT's can only be fetched 'on demand' from the MasterBus, the MB3 OPC Server need to expose some means for an OPC client to request an update of the MultiDAT from the MasterBus. The OPC-DA standard gives an OPC client the option of requesting data from the OPC server's 'CACHE' or from the OPC server's 'DEVICE'. OPC clients are recommended by the standard to always request data from the CACHE, and thereby letting the OPC server decide whenever it need to fetch data from its device(s).
We now use this, as a way for the OPC client's to request an update of a MultiDAT.

- An OPC client requesting a MultiDAT value in the OPC server 'from DEVICE', will render a demand-request on the MasterBus.
- An OPC client requesting a MultiDAT value from 'CACHE', will receive the last fetched values, and not render any traffic on the MasterBus.

Since not many stock OPC-clients are 'programmable' with such logic, we provide a separate application which can do this.

The typical use of MB3Trigger is to configure it to listen on the QCS 'EndOfScan' signal and perform an update of the profiles MultiDAT's whenever the EOS signals a completed scan. (And a new profile is available.)

See the "MB3MultiDAT Instructions" manual for details.

21 Appendix A, Object Type Maps

21.1 AI Object

Field	R/W	Data Type	Sub Type	Access Type	Description
NAME	R	STRING	D,E	2,3,4	AI object name
DESCRIPTION	R	STRING	D,E	2,3,4	A description of the object
VALUE	R/W	FLOAT	C,D,E, T,S	1,2,3,4	The value of the object. Is only affected by writes when status bit 3 UPD_BLK = 1
NO_OF_DEC	R	BYTE	C,D,E	1,2,3,4	The number of decimals for the value
UNIT	R	STRING	D,E	2,3,4	Engineering unit of the value
STATUS	R	LONG	C,D,E	1,2,3,4	32 Status bits. See AI STATUS bits table
RANGE_MIN	R	FLOAT	D,E	2,3,4	Min input value
RANGE_MAX	R	FLOAT	D,E	2,3,4	Max input value
HI_LIM1	R/W	FLOAT	D,E	3,4	Limitation value High 1
HI_LIM2	R/W	FLOAT	D,E	3,4	Limitation value High 2
LO_LIM1	R/W	FLOAT	D,E	3,4	Limitation value Low 1
LO_LIM2	R/W	FLOAT	D,E	3,4	Limitation value Low 2
LIM1_TR	R	WORD	D,E	4	Value of event treatment definitions
LIM2_TR	R	WORD	D,E	4	Value of event treatment definitions
CLASS	R	BYTE	D,E	4	Class
SUBSYSTEM	R	BYTE	D,E	4	Process section

21.1.1 AI STATUS bits

Bit	R/W	Description
0	R	IMPLEMENTED
1	R	ERROR
2	R	UPDATED
3	R/W	UPD_BLK
4	R	MAN_ENTRY
5	R/W	SELECTED
6	R	NORMAL_OBJ_TREAT
7	R	H2_REPEAT_FAIL_CONTROL
8	R	ABOVE_HI_LIM2
9	R	ABOVE_HI_LIM1
10	R	BELOW_LO_LIM1
11	R	BELOW_ LO_LIM2
12	R/W	ALARM_UNACK Write 1 = Acknowledge all alarms for the object
13	R	Hl_REPEAT_FAIL_CONTROL
14	R	DISTURBANCE
15	R	OVERFLOW
16	R/W	ALARM_BLK
17	R	ALARM_PERIOD_BLK
18	R/W	PRINT_BLK
19	R	L1_R_FCL
20	R	LINKED
21	R	RELINK
22	R	NOERR_AT_OVF
23	R	TESTED
24	R	ACC-ERR
25	R	LOCK
26	R	L2_REPEAT_FAIL_CONTROL
27	R	ERROR_REPEAT_FAIL_CONTROL
28	R	REPEAT_FAIL_CONTROL

29	R	AI_ACTION
30	R	AI_RETRY
31	R	ERR_CTRL

21.2 AO Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2,3	AO object name
DESCRIPTION	R	STRING	D,E	2,3	A description of the object
VALUE	R/W	FLOAT	C,D,E,T,S	1,2,3	The value of the object
NO_OF_DEC	R	BYTE	C,D,E	1,2,3	The number of decimals for the value
UNIT	R	STRING	D,E	2,3	Engineering unit of the value
STATUS	R	LONG	C,D,E	1,2,3	32 Status bits. See AO STATUS bits table.
RANGE_MIN	R	FLOAT	D,E	2,3	Min value for VALUE
RANGE_MAX	R	FLOAT	D,E	2,3	Max value for VALUE
SUBSYSTEM	R	BYTE	D,E	3	Process section
CLASS	R	BYTE	D,E	3	Class
MAX_LIM	R/W	FLOAT	D,E	3	Maximum limit
MIN_LIM	R/W	FLOAT	D,E	3	Minimum limit

21.2.1 AO STATUS bits

Bit	R/W	Description
0	R	IMPLEMENTED
1	R	ERROR
3	R/W	OUTP_BLK
4	R	MAN_ENTRY
5	R/W	SELECTED
6	R	NORMAL_OBJ_TREAT
7	R/W	MAN_MODE
8	R	ON_MAX_LIM
11	R	ON_MIN_LIM
12	R/W	ALARM_UNACK Write 1 = Acknowledge all alarms for the object
16	R/W	ALARM_BLK
17	R	ALARM_PERIOD_BLK
18	R/W	PRINT_BLK
19	R	OUTP_RESTART
20	R	LOCK
21	R	USE_MAX_LIM
22	R	USE_MIN_LIM
23	R	TESTED
26	R	LINKED

21.3 DI Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2	DI object name
DESCRIPTION	R	STRING	D,E	2	A description of the object
STATUS	R	LONG	C,D,E,T,S	1,2	32 Status bits. See DI STATUS bits table. Note! VALUE is bit 8 in STATUS
SUBSYSTEM	R	BYTE	D,E	2	Process section
CLASS	R	BYTE	D,E	2	Class
VALUE_TREAT	R	WORD	D,E	2	Value treatment.

					0 = No event report, 1 = Event report no alarm, 2 = Event and alarm

21.3.1 DI STATUS bits

Bit	R/W	Description
0	R	IMPLEMENTED
1	R	ERROR
2	R	UPDATED
3	R/W	UPD_BLK
4	R	MAN_ENTRY
5	R/W	SELECTED
6	R	NORMAL_OBJ_TREAT
7	R	ERR_CTRL
8	R/W	VALUE. Writes only affects when UPD_BLK = 1
9	R	SEC_VALUE
10	R	NORM_POSN
11	R	SEC_NORM_POSN
12	R/W	ALARM_UNACK Write 1 = Acknowledge all alarms for the object
13	R	REPEAT_FAIL_BLK
14	R	DISTURBANCE
15	R	CALC_VALUE
16	R/W	ALARM_BLK
17	R	ALARM_PERIOD_BLK
18	R/W	PRINT_BLK
19	R	REPEAT_FAIL_CTRL
20	R	LOCK
21	R	INVERTED
22	R	DUAL_IND
23	R	TESTED
25	R	V9_CONTROL
26	R	LINKED
27	R	DI_RETRY
28	R	DIC_IND_RED
29	R	DI_ACTION
30	R	DIC_IND_YELLOW
31	R	DIC_IND_GREEN

21.4 DO Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2	DI object name
DESCRIPTION	R	STRING	D,E	2	A description of the object
STATUS	R	LONG	C,D,E,T,S	1,2	32 Status bits. See DO STATUS bits table. Note! VALUE is bit 8 in STATUS
SUBSYSTEM	R	BYTE	D,E	2	Process section
CLASS	R	BYTE	D,E	2	Class
VALUE_TREAT	R	WORD	D,E	2	Value treatment. 0 = No event report, 1 = Event report no alarm, 2 = Event and alarm

21.4.1 DO STATUS bits

Bit	R/W	Description

0	R	IMPLEMENTED
1	R	ERROR
3	R/W	OUTP_BLK
5	R/W	SELECTED
6	R	NORMAL_OBJ_TREAT
7	R/W	MAN_MODE
8	R/W	VALUE
10	R	START_VALUE
12	R/W	ALARM_UNACK Write 1 = Acknowledge all alarms for the object
15	R	USER_DEF1
16	R/W	ALARM_BLK
17	R	ALARM_PERIOD_BLK
18	R/W	PRINT_BLK
19	R	OUTP_RESTART
20	R	LOCK
21	R	INVERTED
23	R	TESTED
24	R	ORDER_TO
25	R	ORDER_FROM
26	R	LINKED
27	R	USER_DEF2
28	R	USER_DEF3
29	R	USER_DEF4
30	R	USER_DEF5

21.5 DAT Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D	2	DAT object name
VALID	R	BYTE	C,D	1,2	Valid flag
VALTYPE	R	BYTE	C,D	1,2	Type of DAT object. 1= Boolean, 2 = Integer, 3 = IntegerLong, 4 = Real
VALUE	R/W		C,D,T,S	1,2	Value of object. Data type is dependent of DAT object type. Use the OPC Requested data type to set the data type. DAT Type: Req Data type: Boolean Bool or Long Int Integer Short Int IntegerLong Long Int Real Float **Note!** If you set the Requested data type to Bool then writes will only affect the least significant bit. You can read/write bits in DAT objects of type Integer and IntegerLong. For Integer valid bits are 0 – 15. For IntegerLong valid bits are 0 – 31. In this way the bit is masked in with all the other bits and the MB3

					OPC server writes all 32 bits in one message. Use Requested data types as described above.

21.6 MDAT Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	N/A	N/A	DAT object name
VALUE	R	Array of Float.	D	N/A	Value of object. The value is represented as an 'Array of Float'.

21.7 PIDCON Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2,3,4	PIDCON object name
DESCRIPTION	R	STRING	D,E	2,3,4	A description of the object
STATUS1	R	LONG	C,D,E	1,2,3,4	32 Status bits. See PIDCON STATUS1 bits table
STATUS2	R	LONG	C,D,E	1,2,3,4	32 Status bits. See PIDCON STATUS2 bits table
STATUS3	R	LONG	C,D,E	1,2,3,4	32 Status bits. See PIDCON STATUS3 bits table
STATUS4	R	LONG	C,D,E	1,2,3,4	32 Status bits. See PIDCON STATUS4 bits table
MV	R	FLOAT	C,D,E,T,S	1,2,3,4	Measured Value
AUTOSP	R	FLOAT	C,D,E	1,2,3,4	Auto Setpoint
WSP	R	FLOAT	C,D,E,T,S	1,2,3,4	Working Setpoint
DEVIATION	R	FLOAT	C,D,E,T,S	1,2,3,4	Deviation = MV- WSP
OUT	R	FLOAT	C,D,E,T,S	1,2,3,4	Output Value
TS	R	FLOAT	C,D,E	1,2,3,4	Sample Time
MAN_OUT	R	FLOAT	C,D,E	1,2,3,4	Manual Output
MMI_SPL	R/W	FLOAT	D,E	3,4	Limitation Value, Setpoint Low
MMI_SPH	R/W	FLOAT	D,E	3,4	Limitation Value, Setpoint High
MMI_MVL2	R/W	FLOAT	D,E	3,4	Alarm Limit value L2, for measured value
MMI_MVL1	R/W	FLOAT	D,E	3,4	Alarm Limit value L1, for measured value
MMI_MVH1	R/W	FLOAT	D,E	3,4	Alarm Limit value H1, for measured value
MMI_MVH2	R/W	FLOAT	D,E	3,4	Alarm Limit value H2, for measured value
MMI_MV_HYST	R	FLOAT	D,E	3,4	Alarm unit hysteresis, measured value
MMI_DEVL	R/W	FLOAT	D,E	3,4	Alarm limit value low, for deviation value
MMI_DEVH	R/W	FLOAT	D,E	3,4	Alarm limit value high, for deviation value
MMI_DEVHYST	R	FLOAT	D,E	3,4	Alarm limit hysteresis, deviation value
EXT_OUT_LL	R	FLOAT	C,D,E	1,2,3,4	External limitation value, Low, for output
EXT_OUT_HL	R	FLOAT	C,D,E	1,2,3,4	External limitation value, High, for output
EXT_GAIN	R	FLOAT	C,D,E	1,2,3,4	External Gain value
EXT_TI	R	FLOAT	C,D,E	1,2,3,4	External TI value
EXT_TD	R	FLOAT	C,D,E	1,2,3,4	External TD value

EXT_TF	R	FLOAT	C,D,E	1,2,3,4	External TF value
PRES1	R	FLOAT	C,D,E,T,S	1,2,3,4	Pres1 value
PRES2	R	FLOAT	C,D,E	1,2,3,4	Pres2 value
POUT	R	FLOAT	C,D,E	1,2,3,4	Presentation Out
MNO_OF_DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals
MRANGE_MIN	R	FLOAT	D,E	2,3,4	Minimum value
MRANGE_MAX	R	FLOAT	D,E	2,3,4	Maximum value
MUNIT	R	STRING	D,E	3,4	Engineering unit for values
MMI_SP	R/W	FLOAT	D,E	4	Setpoint value
MMI_MAN_OUT	R/W	FLOAT	D,E	4	Manual output value
MMI_GAIN	R/W	FLOAT	D,E	4	Gain value
MMI_TI	R/W	FLOAT	D,E	4	Integration time constant
MMI_TD	R/W	FLOAT	D,E	4	Derivation time constant
MMI_TF	R/W	FLOAT	D,E	4	Filter time constant
SCALE_A	R	FLOAT	D,E	4	Scaling constant A
SCALE_B	R	FLOAT	D,E	4	Scaling constant B
MMI_OUT_LL	R/W	FLOAT	D,E	4	Out low limit
MMI_OUT_HL	R/W	FLOAT	D,E	4	Out high limit
DEADZ	R/W	FLOAT	D,E	4	Deadzone
P1RANGE_MAX	R	FLOAT	D,E	4	PRES1 range max.
P1RANGE_MIN	R	FLOAT	D,E	4	PRES1 range min.
PERC_MAX	R	FLOAT	D,E	4	
PERC_MIN	R	FLOAT	D,E	4	
P1NO_OF_DEC	R	BYTE	D,E	4	PRES1 number of decimals.
SUBSYSTEM	R	BYTE	D,E	4	Process section
P1UNIT	R	STRING	D,E	4	PRES1 unit
E1_NAME	R	STRING	D,E	4	Name of external reference 1
E2_NAME	R	STRING	D,E	4	Name of external reference 2
E3_NAME	R	STRING	D,E	4	Name of external reference 3

21.7.1 PIDCON STATUS1 bits

Bit	R/W	Description
0	R	IMPLEMENTED
2	R	RUNNING
3	R	ACTUATOR
4	R	MVDIR
5	R/W	SELECTED
7	R	TESTED
8	R	PANEL_CTRL
9	R	ON_OFF_CTRL
16	R/W	ALARM_UNACK Write 1 = Acknowledge
17	R	REPEAT_FAIL_BLK
18	R	DIST
19	R/W	ALARM_F1_BLK
20	R	ALARM_F1_PERIOD_BLK
21	R/W	ALARM_F2_BLK
22	R	ALARM_F2_PERIOD_BLK
24	R	OUT=LL
25	R	OUT=HL
26	R	SP=LL
27	R	SP=HL

21.7.2 PIDCON STATUS2 bits

Bit	R/W	Description
0	R	TS_MV<L1

1	R	TS_MV>H1
2	R	TS_DEV<L
3	R	TS_DEV>H
4	R	TS_MV<L2
5	R	TS_MV>H2
6	R	TS_LOCAL_FL
7	R	TS_MAN_FL
8	R	TS_AUTO_FL
9	R	TS_E1_FL
10	R	TS_E2_FL
11	R	TS_E3_FL
12	R	AI_ERROR
13	R	AO_ERROR
14	R	DCM_ERROR
15	R	PC_BLK
16	R	SERVUC
17	R	HW_ERR
24	R/W	MMI_MANF
25	R/W	MMI_MAN
26	R/W	MMI_AUTO
27	R/W	MMI_INT_BLK
28	R/W	MMI_DER_BLK
29	R/W	MMI_E1
30	R/W	MMI_E2
31	R/W	MMI_E3

21.7.3 PIDCON STATUS3 bits

Bit	R/W	Description
0	R	REMOTE
1	R	CENTRAL
2	R	LOCAL
3	R	SERVICE_UNIT
16	R	BAL
17	R	MAN
18	R	AUTO
19	R	E1
20	R	E2
21	R	E3
22	R	LOCAL_OUT
23	R	CLAMP_OUT
24	R	EXT_OUT_LIMIT
25	R	EXT_GAIN_ENBL
26	R	EXT_TI_ENBL
27	R	EXT_TD_ENBL
28	R	EXT_TF_ENBL
29	R	EXT_INT_BLK
30	R	EXT_DER_BLK

21.7.4 PIDCON STATUS4 bits

Bit	R/W	Description
2	R/W	PRINT_F1_BLK
3	R	REPEAT_F1_FAIL_CTRL
10	R/W	PRINT_F2_BLK
11	R	REPEAT_F2_FAIL_CTRL
16	R	AU_MV<L1

17	R	AU_MV>H1
18	R	AU_DEV<L
19	R	U_DEV>H
24	R	AU_MV<L2
25	R	AU_MV>H2

21.8 PIDCONA Object

Field	R/W	Data Type	Sub Type	Access Type	Description
NAME	R	STRING	D,E	3,4	PIDCONA object name
DESCRIPTION	R	STRING	D,E	3,4	A description of the object
STATUS1	R	LONG	C,D,E	1,2,3,4	32 Status bits. See PIDCONA STATUS1 bits table
STATUS2	R	LONG	C,D,E	1,2,3,4	32 Status bits. See PIDCONA STATUS2 bits table
STATUS3	R	LONG	C,D,E	1,2,3,4	32 Status bits. See PIDCONA STATUS3 bits table
STATUS4	R	LONG	C,D,E	1,2,3,4	32 Status bits. See PIDCONA STATUS4 bits table
STATUS5	R	LONG	C,D,E	1,2,3,4	32 Status bits. See PIDCONA STATUS5 bits table
MV_NONFILTERED	R	FLOAT	C,D,E,T, S	1,2,3,4	Measured Value.
AUTOSP	R	FLOAT	C,D,E	1,2,3,4	AUTO Set Point.
WSP	R	FLOAT	C,D,E,T, S	1,2,3,4	Working SetPoint.
DEVIATION	R	FLOAT	C,D,E,T, S	1,2,3,4	DEViation.
OUT	R	FLOAT	C,D,E,T, S	1,2,3,4	OUTput.
MV_AAFILTERED	R	FLOAT	C,D,E	1,2,3,4	Measured Value, Anti-Alias Filtered.
EXTREF1	R	FLOAT	C,D,E	1,2,3,4	EXTernal REFerence 1
EXTREF2	R	FLOAT	C,D,E	1,2,3,4	EXTernal REFerence 2
EXTREF3	R	FLOAT	C,D,E	1,2,3,4	EXTernal REFerence 3
EXT_OUT_LL	R	FLOAT	C,D,E	1,2,3,4	External Output Low Limit.
EXT_OUT_HL	R	FLOAT	C,D,E	1,2,3,4	External Output High Limit.
ACTPOS	R	FLOAT	C,D,E,T, S	1,2,3,4	ACTuator POSition
WUNDEF2	R	WORD	C,D,E	1,2,3,4	Unknown word value
WUNDEF3	R	WORD	C,D,E	1,2,3,4	Unknown word value
WUNDEF4	R	WORD	C,D,E	1,2,3,4	Unknown word value
FUNDEF1	R	FLOAT	C,D,E	1,2,3,4	Unknown float value
SAVED_GAIN	R	FLOAT	C,D,E	1,2,3,4	Saved GAIN value.
SAVED_TI	R	FLOAT	C,D,E	1,2,3,4	Saved Integration Time in seconds.
SAVED_TD	R	FLOAT	C,D,E	1,2,3,4	Saved Derivation Time in seconds.
SAVED_BETA	R	FLOAT	C,D,E	1,2,3,4	Saved Setpoint factor (BETA) in P part.
SAVED_TS	R	FLOAT	C,D,E	1,2,3,4	Saved Sampling Time (period) in seconds.
FUNDEF2	R	FLOAT	C,D,E	1,2,3,4	Saved Dom Freq
SCHED_IN	R	FLOAT	C,D,E	1,2,3,4	SCHEDuling Input value
ZLIM_12	R	FLOAT	C,D,E	1,2,3,4	Zone LIMit between zones 1 and 2.
ZLIM_23	R	FLOAT	C,D,E	1,2,3,4	Zone LIMit between zones 2 and 3.
ZLIM_34	R	FLOAT	C,D,E	1,2,3,4	Zone LIMit between zones 3 and 4.
ZLIM_45	R	FLOAT	C,D,E	1,2,3,4	Zone LIMit between zones 4 and 5.
WUNDEF5	R	WORD	C,D,E	1,2,3,4	Unknown word value
WUNDEF6	R	WORD	C,D,E	1,2,3,4	Unknown word value

NO_OF_DEC	R	BYTE	C,D,E	1,2,3,4	The number of DECimals for MV
UNIT	R	STRING	D,E	2,3,4	The UNIT of the measured value
MIN	R	FLOAT	D,E	2,3,4	The MINimum value of measuring range
MAX	R	FLOAT	D,E	2,3,4	The MAXimum value of measuring range
ONO_OF_DEC	R	BYTE	C,D,E	1,2,3,4	The number of DECimals for OUTput
OUT_UNIT	R	STRING	D,E	2,3,4	The UNIT of the OUTput value
OUT_MIN	R	FLOAT	D,E	2,3,4	The MINimum value of the OUTput range.
OUT_MAX	R	FLOAT	D,E	2,3,4	The MAXimum value of the OUTput range.
SUBSYSTEM	R	BYTE	D,E	4	PROCess SECtion
CLASS	R	BYTE	D,E	4	CLASS
E1NAME	R	STRING	D,E	4	NAME of mode E1
E2NAME	R	STRING	D,E	4	NAME of mode E2
E3NAME	R	STRING	D,E	4	NAME of mode E3
FUNDEF3	R	FLOAT	D,E	4	TS Time Base
MMI_SP	R/W	FLOAT	D,E	4	MMI SetPoint
MMI_MANOUT	R/W	FLOAT	D,E	4	MMI Manual Output
PRESENT_GAIN	R/W	FLOAT	D,E	4	Present GAIN value.
PRESENT_TI	R/W	FLOAT	D,E	4	Present Integration Time in seconds.
PRESENT_TD	R/W	FLOAT	D,E	4	Present Derivation Time in seconds.
PRESENT_BETA	R/W	FLOAT	D,E	4	Present Setpoint factor (BETA) in P part.
PRESENT_TS	R/W	FLOAT	D,E	4	Present Sampling Time (period) in seconds.
PRESENT_DOM_FREQ	R	FLOAT	D,E	4	Present Dom Freq
SCALE_A_MV	R	FLOAT	D,E	4	Scaling constant A
SCALE_B_MV	R	FLOAT	D,E	4	Scaling constant B
SCALE_A_OUT	R	FLOAT	D,E	4	Scaling constant A
SCALE_B_OUT	R	FLOAT	D,E	4	Scaling constant B
MMI_OUT_LL	R/W	FLOAT	D,E	4	Low Limit Output value
MMI_OUT_HL	R/W	FLOAT	D,E	4	Hi Limit Output value
DEADZONE	R/W	FLOAT	D,E	4	Deadzone %
MMI_SETPL	R/W	FLOAT	D,E	4	Low Limit of Setpoint
MMI_SETPH	R/W	FLOAT	D,E	4	High Limit of Setpoint
MMI_MVL2	R/W	FLOAT	D,E	4	Alarm limit L2 of Measured Value.
MMI_MVL1	R/W	FLOAT	D,E	4	Alarm limit L1 of Measured Value.
MMI_MVH2	R/W	FLOAT	D,E	4	Alarm limit H2 of Measured Value.
MMI_MVH1	R/W	FLOAT	D,E	4	Alarm limit H1 of Measured Value.
MMI_MVHYST	R	FLOAT	D,E	4	HYSTeresis for alarm limits of Measured Value.
MMI_DEVL1	R/W	FLOAT	D,E	4	Low alarm limit 1 for control DEViation.
MMI_DEVH1	R/W	FLOAT	D,E	4	High alarm limit 1 for control DEViation.
MMI_DEVHYST	R	FLOAT	D,E	4	HYSTeresis for alarm limits for DEViation.
FUNDEF4	R	FLOAT	D,E	4	Param15_Spare01
FUNDEF5	R	FLOAT	D,E	4	Param15_Spare02
FREQLIM	R/W	FLOAT	D,E	4	Maximum speed of dominant poles. "No limit" is shown for values 1000000 or greater, other values numerically. "No limit" trigged results in 1000000 being stored.
EXCL_OUT	R/W	FLOAT	D,E	4	EXCitation Level for the OUTput.

EXCL_SP	R/W	FLOAT	D,E	4	EXCitation Level for the SetPoint.
RESPTYPE	R	BYTE	D,E	4	RESPonse TYPE. 5 = EXTRA FAST 4 = FAST 3 = NORMAL 2 = DAMPED 1 = EXTRA DAMPED
SCH_MIN	R	FLOAT	D,E	4	The MINimum value of the SCHed in range.
SCH_MAX	R	FLOAT	D,E	4	The MAXimum value of the SCHed in range.
AT_COUNT	R	BYTE	C,D,E	1,2,3,4	Autotuning counter
AT_PHASE	R	BYTE	C,D,E	1,2,3,4	Autotuning phase. 1 = Off 4 = Listen 8 = Relay ? = Excitation ? = Verification
ORDERS	W	LONG			Write only. Use bit 0 – 14. See PIDCONA ORDERS bit table below.

21.8.1 PIDCONA STATUS1 bits

Bit	R/W	Description
0	R	IMPLEMENTED
1	R	ACTUATOR
2	R	MVDIR
3	R/W	SELECTED
4	R	MANPREF
5	R	SHOW_ACT
6	R	SHOW_SCHED
7	R	AUTOSP_tracking
16	R/W	ALARM_UNACK Write 1 = Acknowledge
17	R	DISTURBANCE
19	R/W	ALARM_F1_BLK
21	R/W	ALARM_F2_BLK
24	R	OUT=LL
25	R	OUT=HL
26	R	SP=LL
27	R	SP=HL

21.8.2 PIDCONA STATUS2 bits

Bit	R/W	Description
0	R	TS_MV<L1
1	R	TS_MV>H1
2	R	TS_DEV<L
3	R	TS_DEV>H
4	R	TS_MV<L2
5	R	TS_MV>H2
6	R	TS_LOCAL
7	R	TS_MAN
8	R	TS_AUTO
9	R	TS_E1
10	R	TS_E2
11	R	TS_E3
12	R	TS_AI_ERROR

13	R	TS_AT_PC_ABORTED
14	R	TS_AT_FAILED
15	R	TS_AT_ALERT
16	R	TS_INV_TSAMP
17	R	TS_ADAP_FAIL

21.8.3 PIDCONA STATUS3 bits

Bit	R/W	Description
0	R	BAL
1	R/W	MAN
2	R/W	AUTO
3	R/W	E1
4	R/W	E2
5	R/W	E3
6	R	LOCAL_OUT
7	R	CLAMP_OUT
8	R	EXT_OUT_LIMIT
9	R	BAD_SN
10	R	OUTSIDE_START_ZONE
11	R	AT_TIMEOUT
12	R	VERFIY_UNCERTAIN
13	R	AT_INDICATOR
14	R	AD_INDICATOR
15	R	ATEnable
16	R	GSEnable
24	R/W	MMI_MAN Forced
25	R	MMI_MAN
26	R	MMI_AUTO
29	R	MMI_E1
30	R	MMI_E2
31	R	MMI_E3

21.8.4 PIDCONA STATUS4 bits

Bit	R/W	Description
0	R	ALARM_F1_BLK
1	R	ALARM_F1_PERIOD
2	R/W	PRINT_F1_BLK
8	R	ALARM_F2_BLK
9	R	ALARM_F2_PERIOD
10	R/W	PRINT_F2_BLK
16	R	UNACK MV<L1
17	R	UNACK MV>H1
18	R	UNACK DEV<L
19	R	UNACK DEV>H
24	R	UNACK MV<L2
25	R	UNACK MV>H2

21.8.5 PIDCONA STATUS5 bits

Bit	R/W	Description
0	R	UNACK AT PC ABORTED
1	R	UNACK AT FAILED
2	R	UNACK AT ALERT
3	R	UNACK INV TSAMP
4	R	UNACK AT FAIL
16	R	START TUNE

17	R	CONT TUNE
18	R	SAVE REQUEST
19	R	RESTORE REQUEST
20	R/W	ADAP_ENABLED
21	R/W	FREQ_UNLIMITED
22	R	VERIFY REQUEST
23	R	RETRIEVE
24	R	RETRIEVE ALLOWED

21.8.6 PIDCONA ORDERS bits

Trig by writing a 1.

Bit	R/W	Description
0	W	Extra Damped
1	W	Damped
2	W	Normal
3	W	Fast
4	W	Extra Fast
7	W	Start Tune
8	W	Continue Tune
9	W	Verify
10	W	Accept & Save
11	W	Stop & Restore
12	W	Retrieve Aborted
13	W	Save
14	W	Restore

21.9 RATIOSTN Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2,3,4	RATIOSTN object name
DESCRIPTION	R	STRING	D,E	2,3,4	A description of the object
STATUS1	R	LONG	C,D,E	1,2,3,4	32 Status bits. See RATIOSTN STATUS1 bits table
STATUS2	R	LONG	C,D,E	1,2,3,4	32 Status bits. See RATIOSTN STATUS2 bits table
STATUS3	R	LONG	C,D,E	1,2,3,4	32 Status bits. See RATIOSTN STATUS3 bits table
STATUS4	R	LONG	C,D,E	1,2,3,4	32 Status bits. See RATIOSTN STATUS4 bits table
MMI_RATIOREF	R/W	FLOAT	C,D,E	1,2,3,4	Ratio reference value
MMI_MAN_OUT	R/W	FLOAT	C,D,E	1,2,3,4	Manual output value
MMI_BIAS	R/W	FLOAT	C,D,E	1,2,3,4	BIAS value
MMI_OUT_LL	R/W	FLOAT	C,D,E	1,2,3,4	Low limitation value for output from MMC
MMI_OUT_HL	R/W	FLOAT	C,D,E	1,2,3,4	High limitation value for output from MMC
MV	R	FLOAT	C,D,E,T,S	1,2,3,4	Measured value
RATIOREF	R	FLOAT	C,D,E	1,2,3,4	Ratio reference
WRATIO	R	FLOAT	C,D,E,T,S	1,2,3,4	Working setpoint
OUT	R	FLOAT	C,D,E,T,S	1,2,3,4	Output value
MAN_OUT	R	FLOAT	C,D,E	1,2,3,4	Manual output reference value
TS	R	FLOAT	C,D,E	1,2,3,4	TS
MMI_RATIOL	R/W	FLOAT	D,E	3,4	Limitation value, Ratio low
MMI_RATIOH	R/W	FLOAT	D,E	3,4	Limitation value, Ratio high
MMI_MVL2	R/W	FLOAT	D,E	3,4	Alarm limit value, L2, for measured value

MMI_MVL1	R/W	FLOAT	D,E	3,4	Alarm limit value, L1, for measured value
MMI_MVH1	R/W	FLOAT	D,E	3,4	Alarm limit value, H1, for measured value
MMI_MVH2	R/W	FLOAT	D,E	3,4	Alarm limit value, H2, for measured value
MMI_MV_HYST	R	FLOAT	D,E	3,4	Alarm unit hysteresis, measured value
EXT_OUT_LL	R	FLOAT	C,D,E	1,2,3,4	External limitation value, Low, for output
EXT_OUT_HL	R	FLOAT	C,D,E	1,2,3,4	External limitation value, High, for output
EXT_BIAS	R	FLOAT	C,D,E	1,2,3,4	External BIAS
POUT	R	FLOAT	C,D,E	1,2,3,4	Presentation Output
MNO_OF_DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals for measured value
RNO_OF_DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals for ratio factor
P0NO_OF_DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals for process output
MRANGE_MIN	R	FLOAT	D,E	2,3,4	Min value of measured value
MRANGE_MAX	R	FLOAT	D,E	2,3,4	Max value of measured value
MUNIT	R	STRING	D,E	3,4	Engineering unit for measured value
RRUNIT	R	STRING	D,E	3,4	Engineering unit for ratio factor
P0UNIT	R	STRING	D,E	3,4	Engineering unit for process output
CLASS	R	BYTE	D,E	4	Class
SUBSYSTEM	R	BYTE	D,E	4	Process section
E1_NAME	R	STRING	D,E	4	Name of external reference 1

21.9.1 RATIOSTN STATUS1 bits

Bit	R/W	Description
0	R	IMPLEMENTED
2	R	RUNNING
5	R/W	SELECTED
7	R	TESTED
8	R	PANEL_CTRL
16	R/W	ALARM_UNACK Write 1 = Acknowledge
17	R	REPEAT_FAIL_BLK
18	R	DIST
19	R/W	ALARM_F1_BLK
20	R	ALARM_F1_PERIOD_BLK
21	R/W	ALARM_F2_BLK
22	R	ALARM_F2_PERIOD_BLK
24	R	OUT=LL
25	R	OUT=HL
26	R	RATIO=LL
27	R	RATIO=HL

21.9.2 RATIOSTN STATUS2 bits

Bit	R/W	Description
0	R	TS_MV<L1
1	R	TS_MV>H1
2	R	TS_MV<L2
3	R	TS_MV>H2

4	R	AI_ERROR
6	R	DCM_ERROR
7	R	PC_BLK
8	R	SERVUC
9	R	HW_ERR
24	R	MMI_MAN
25	R	MMI_AUTO
26	R	MMI_E1

21.9.3 RATIOSTN STATUS3 bits

Bit	R/W	Description
0	R	REMOTE
1	R	CENTRAL
2	R	LOCAL
3	R	SERVICE_UNIT
16	R	TRACK_B
17	R/W	MAN
18	R/W	AUTO
19	R/W	E1
20	R	EXT_BIAS_ENBL
21	R	EXT_OUT_LIMIT

21.9.4 RATIOSTN STATUS4 bits

Bit	R/W	Description
2	R/W	PRINT_F1_BLK
3	R	REPEAT_F1_FAIL_CTRL
10	R/W	PRINT_F2_BLK
11	R	REPEAT_F2_FAIL_CTRL
16	R	AU_MV<L1
17	R	AU_MV>H1
24	R	AU_MV<L2
25	R	AU_MV>H2

21.10 MANSTN Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2,3,4	MANSTN object name
DESCRIPTION	R	STRING	D,E	2,3,4	A description of the object
STATUS1	R	LONG	C,D,E	1,2,3,4	32 Status bits. See table MANSTN STATUS1 bits
STATUS2	R	LONG	C,D,E	1,2,3,4	32 Status bits. See table MANSTN STATUS2 bits
STATUS3	R	LONG	C,D,E	1,2,3,4	32 Status bits. See table MANSTN STATUS3 bits
STATUS4	R	LONG	C,D,E	1,2,3,4	32 Status bits. See table MANSTN STATUS4 bits
MV	R	FLOAT	C,D,E,T,S	1,2,3,4	Measured value to MMC
OUTREF	R	FLOAT	C,D,E	1,2,3,4	Output reference value
OUT	R	FLOAT	C,D,E,T,S	1,2,3,4	Output value to MMC
TS	R	FLOAT	C,D,E	1,2,3,4	TS
MMI_MVL2	R/W	FLOAT	D,E	3,4	Alarm limit value, L2, for measured value
MMI_MVL1	R/W	FLOAT	D,E	3,4	Alarm limit value, L1, for measured value
MMI_MVH1	R/W	FLOAT	D,E	3,4	Alarm limit value, H1, for measured value

MMI_MVH2	R/W	FLOAT	D,E	3,4	Alarm limit value, H2, for measured value
MMI_MV_HYST	R	FLOAT	D,E	3,4	Alarm unit hysteresis, measured value
POUT	R	FLOAT	C,D,E	1,2,3,4	Presentation Output
PRES1	R	FLOAT	C,D,E,T,S	1,2,3,4	Pres1
MNO_OF_DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals for measured value
P0NO_OF_DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals for process output
P1NO_OF_DEC	R	BYTE	D,E	3,4	Number of decimals for process output
MRANGE_MIN	R	FLOAT	D,E	2,3,4	Min value of measured value
MRANGE_MAX	R	FLOAT	D,E	2,3,4	Max value of measured value
P0RANGE_MIN	R	FLOAT	D,E	3,4	Process output minimum
P0RANGE_MAX	R	FLOAT	D,E	3,4	Process output maximum
P1RANGE_MIN	R	FLOAT	D,E	3,4	Process output minimum
P1RANGE_MAX	R	FLOAT	D,E	3,4	Process output maximum
MUNIT	R	STRING	D,E	3,4	Engineering unit for measured value
P0UNIT	R	STRING	D,E	3,4	Engineering unit for process output
P1UNIT	R	STRING	D,E	3,4	Engineering unit for process output
MMI_OUT_REF	R/W	FLOAT	D,E	4	Manual output reference value
MMI_OUT_LL	R/W	FLOAT	D,E	4	Out low limit value
MMI_OUT_HL	R/W	FLOAT	D,E	4	Out high limit value
CLASS	R	BYTE	D,E	4	Class
SUBSYSTEM	R	BYTE	D,E	4	Process section
PERC_MIN	R	FLOAT	D,E	4	
PERC_MAX	R	FLOAT	D,E	4	
E1_NAME	R	STRING	D,E	4	Name of external reference 1.

21.10.1 MANSTN STATUS1 bits

Bit	R/W	Description
0	R	IMPLEMENTED
2	R	RUNNING
3	R	ACTUATOR
4	R	MVDIR
5	R/W	SELECTED
7	R	TESTED
8	R	PANEL_CTRL
9	R	ON_OFF_CTRL
16	R/W	ALARM_UNACK Write 1 = Acknowledge
17	R	REPEAT_FAIL_BLK
18	R	DIST
19	R/W	ALARM_F1_BLK
20	R	ALARM_F1_PERIOD_BLK
21	R/W	ALARM_F2_BLK
22	R	ALARM_F2_PERIOD_BLK
24	R	OUT=LL
25	R	OUT=HL

21.10.2 MANSTN STATUS2 bits

Bit	R/W	Description
0	R	TS_MV<L1

1	R	TS_MV>H1
2	R	TS_MV<L2
3	R	TS_MV>H2
4	R	AI_ERROR
5	R	AO_ERROR
6	R	DCM_ERROR
7	R	PC_BLK
8	R	SERVUC
9	R	HW_ERR
24	R	MMI_MAN
25	R	MMI_E1

21.10.3 MANSTN STATUS3 bits

Bit	R/W	Description
0	R	REMOTE
1	R	CENTRAL
2	R	LOCAL
3	R	SERVICE_UNIT
16	R	TRACK_B
17	R/W	MAN
18	R/W	E1

21.10.4 MANSTN STATUS4 bits

Bit	R/W	Description
2	R/W	PRINT_F1_BLK
3	R	REPEAT_F1_FAIL_CTRL
10	R/W	PRINT_F2_BLK
11	R	REPEAT_F2_FAIL_CTRL
16	R	AU_MV<L1
17	R	AU_MV>H1
24	R	AU_MV<L2
25	R	AU_MV>H2

21.11 MMCX Object

Field	R/W	Data Type	Sub Type	Access Type	Description
NAME	R	STRING	D,E	3,4	Object name
DESCRIPTION	R	STRING	D,E	3,4	Object description
RTYPE	R	BYTE	C,D,E	1,2,3,4	Reference TYPE for GROUP.
BOOL_A_H	R	BYTE	C,D,E	1,2,3,4	BOOLean A - H. Extra free flags to be used by PC program. BOOL A = Bit 0 BOOL B = Bit 1 . . BOOL H = Bit 7
STATUS	R/W	WORD	C,D,E	1,2,3,4	Status bits 0 - 7 See status bits table below
ALARM_UNACK	R	LONG	C,D,E	1,2,3,4	Bit 0 = Indicates if there is an unacknowledged alarm for bit number 0 in the IND1 word . . .

					Bit 31 = Indicates if there is an unacknowledged alarm for bit number 15 in the IND2 word
IND1	R	WORD	C,D,E	1,2,3,4	The INDication 1 terminal contains status indications from PC.
IND2	R	WORD	C,D,E	1,2,3,4	The INDication 2 terminal contains status indications from PC.
R_RES	R	FLOAT	C,D,E	1,2,3,4	Real RESult from PC.
I_RES	R	LONG	C,D,E	1,2,3,4	Long Integer RESult from PC.
INTWA	R	WORD	C,D,E	1,2,3,4	INTeger Word A. Integer word to be used by PC program.
INTWB	R	WORD	C,D,E	1,2,3,4	INTeger Word B. Integer word to be used by PC program.
PRES_A	R	STRING	D,E	2,3,4	PRES A. Freely usable text. 10 chars
PRES_B	R	STRING	D,E	2,3,4	PRES B. Freely usable text. 10 chars
ACT_PRES_TXT	R	STRING	C,D,E	1,2,3,4	Presentation of active interlocks. The string comes from one of the texts I2_08TXT to I2_14TXT. The text is prioritized by the active signal with the lowest number among the signals IND2_08 to IND2_14.
REALA	R	FLOAT	C,D,E	1,2,3,4	REAL A. Extra real values to be used for presentation by PC program.
REALB	R	FLOAT	C,D,E	1,2,3,4	REAL B. Extra real values to be used for presentation by PC program.
REALC	R	FLOAT	C,D,E	1,2,3,4	REAL C. Extra real values to be used for presentation by PC program.
REALD	R	FLOAT	C,D,E	1,2,3,4	REAL D. Extra real values to be used for presentation by PC program.
REALE	R	FLOAT	C,D,E	1,2,3,4	REAL E. Extra real values to be used for presentation by PC program.
REAL_PARAM	R	FLOAT	D,E	3,4	A real value, used by AMPL.
INTL_PARAM	R	LONG	D,E	3,4	A long value, used by AMPL.
RRES_HL	R	FLOAT	D,E	3,4	Real RES High Limit. Highest limit used by PC for limit check of the real value REAL RES.
RRES_LL	R	FLOAT	D,E	3,4	Real RES Low Limit. Lowest limit used by PC for limit check of the real value REAL RES.
RRES_MIN	R	FLOAT	D,E	3,4	Real RES MINimum. Minimum value of REAL RES.
RRES_MAX	R	FLOAT	D,E	3,4	Real RES MAXimum. Maximum value of REAL RES.
IRES_MIN	R	LONG	D,E	3,4	Intl RES MINimum. Minimum value of INTL RES.
IRES_MAX	R	LONG	D,E	3,4	Intl RES MAXimum. Maximum value of INTL RES.
REALA_MIN	R	FLOAT	D,E	3,4	MINimum value of REAL A.
REALA_MAX	R	FLOAT	D,E	3,4	MAXimum value of REAL A.
REALB_MIN	R	FLOAT	D,E	3,4	MINimum value of REAL B.
REALB_MAX	R	FLOAT	D,E	3,4	MAXimum value of REAL B.
REALC_MIN	R	FLOAT	D,E	3,4	MINimum value of REAL C.
REALC_MAX	R	FLOAT	D,E	3,4	MAXimum value of REAL C.
REALD_MIN	R	FLOAT	D,E	3,4	MINimum value of REAL D.
REALD_MAX	R	FLOAT	D,E	3,4	MAXimum value of REAL D.
REALE_MIN	R	FLOAT	D,E	3,4	MINimum value of REAL E.
REALE_MAX	R	FLOAT	D,E	3,4	MAXimum value of REAL E.

IND_REPEAT_BLK	R	LONG	D,E	3,4	Shows which of the signals IND1_00 to IND2_15 that have repeated error blocks. Bit 0 = IND1_00 . . Bit 31 = IND2_15
I2_08TXT	R	STRING	D,E	4	Text 20 chars
I2_09TXT	R	STRING	D,E	4	Text 20 chars
I2_10TXT	R	STRING	D,E	4	Text 20 chars
I2_11TXT	R	STRING	D,E	4	Text 20 chars
I2_12TXT	R	STRING	D,E	4	Text 20 chars
I2_13TXT	R	STRING	D,E	4	Text 20 chars
I2_14TXT	R	STRING	D,E	4	Text 20 chars
MORD	Write Only	WORD			Group data for Manual ORDers from the operator. Use bit 0 – 15 See MORD bits table below

21.11.1 MMCX STATUS bits

Bit	R/W	Description	
0	R	IMPLEMENTED	
1	R/W	ALARM_BLK	Write: 1 = Block alarm, 0 = Deblock alarm
2	R	ALARM_PER_BLK	
3	R/W	PRINT_BLK	Write: 1 = Block Printer, 0 = Deblock printer
4	R	IND1_DIST	
5	R	IND2_DIST	
6	R/W	SELECTED	Write 1 = Select, 0 = Deselect
7	R/W	AU_IND	Write 1 = Acknowledge alarms

21.11.2 MMCX MORD bits

Group data for Manual ORDers from the operator.
At an application the MORD bits for MMCX objects was used in the following way. Only the Set commands was used.
Bit 9 = ACIS inside
Bit 10 = Start
Bit 11 = Stop
Bit 12 = ACIS outside

Bit	R/W	DB Ref	Description
0	W	MORD0	Set/Reset bit 0
1	W	MORD1	Set/Reset bit 1
2	W	MORD2	Set/Reset bit 2
3	W	MORD3	Set/Reset bit 3
4	W	MORD4	Set/Reset bit 4
5	W	MORD5	Set/Reset bit 5
6	W	MORD6	Set/Reset bit 6
7	W	MORD7	Set/Reset bit 7
8	W	MORD8	Set/Reset bit 8
9	W	MORD9	Set/Reset bit 9
10	W	MORD10	Set/Reset bit 10
11	W	MORD11	Set/Reset bit 11
12	W	MORD12	Set/Reset bit 12
13	W	MORD13	Set/Reset bit 13
14	W	MORD14	Set/Reset bit 14
15	W	MORD15	Set/Reset bit 15

21.12 VALVECON Object

Field	R/W	Data Type	Sub Type	Access Type	Description
STATUS	R/W	WORD	C,D,E	1,2,3,4	Status bits 0 - 7 See status bits table below
IND1	R	WORD	C,D,E, T,S	1,2,3,4	IND1 status bits 0 – 15 See IND1 bits table below
IND2	R	WORD	C,D,E	1,2,3,4	IND2 status bits 0 – 15 See IND2 bits table below
MORD	Write only	WORD			Group data for Manual ORDers from the operator. Use bit 0 – 15 See MORD bits table below

21.12.1 VALVECON STATUS bits

Bit	R/W	Description	
0	R	IMPLEMENTED	
1	R/W	ALARM_BLK	Write: 1 = Block alarm, 0 = Deblock alarm
2	R	ALARM_PER_BLK	
3	R/W	PRINT_BLK	Write: 1 = Block Printer, 0 = Deblock printer
4	R	IND1_DIST	
5	R	IND2_DIST	
6	R/W	SELECTED	Write 1 = Select, 0 = Deselect
7	R/W	AU_IND	Write 1 = Acknowledge alarms

21.12.2 VALVECON IND1 bits

Bit	R/W	Description
0	R	External fault 1
1	R	External fault 2
2	R	Position error open
3	R	Position error closed
4	R	Limit passed
7	R	Limit switch for open position
8	R	Collective fault indication
9	R	Collective unacknowledged fault
11	R	Limit switch closed position
12	R	Open
13	R	Close. (Use this bit as TTD log adress with SubType :T. See "18. Collecting TTD Variable Data")
15	R	Intermediate position.

21.12.3 VALVECON IND2 bits

Bit	R/W	Description
0	R	Blocked IB 1 and IB3
1	R	Point of control LOCAL
2	R	Point of control TEST
3	R	Point of control STANDBY
4	R	Point of control SEQUENCE
5	R	Control mode AUTO=1 / MAN=0 (According to ABB manuals but seems to be the opposite in testings)
7	R	Ready to run
8	R	Active interlocking IC1

9	R	Active interlocking IC2
10	R	Active interlocking IB1
11	R	Active interlocking IB2
12	R	Active interlocking IB3
13	R	Active interlocking IB4
14	R	Active interlocking IA

21.12.4 VALVECON MORD bits

Trig by writing 1 to the bit

Bit	R/W	PC-Element Ref	Description
0	W	MORD_00	Point of control switch-over to LOCAL
1	W	MORD_01	Point of control switch-over to TEST
2	W	MORD_02	Point of control switch-over to STANDBY
3	W	MORD_03	Point of control switch-over to CENTRAL
4	W	MORD_04	Auto
5	W	MORD_05	Man
6	W	MORD_06	Interlock Set
7	W	MORD_07	Interlock Reset
8	W	MORD_08	Open
9	W	MORD_09	Close
10	W	MORD_10	Point of control switch-over to SEQUENCE

21.13 MOTCON Object

Field	R/W	Data Type	Sub Type	Access Type	Description
STATUS	R/W	WORD	C,D,E	1,2,3,4	Status bits 0 - 7 See status bits table below
R_RES	R	FLOAT	C,D,E, T,S	1,2,3,4	Motor current as a % of rated current.
RRESHL	R	FLOAT	D,E	3,4	The NOMinal CURRent of the motor expressed in amperes. This value is used for limit check of motor current.
IND1	R	WORD	C,D,E	1,2,3,4	IND1 status bits 0 –15 See IND1 bits table below.
IND2	R	WORD	C,D,E	1,2,3,4	IND2 status bits 0 – 15. See IND2 bits table below.
MORD	Write only	WORD			Group data for Manual ORDers from the operator. Use bit 0 – 15 See MORD bits table below

21.13.1 MOTCON STATUS bits

Bit	R/W	Description	
0	R	IMPLEMENTED	
1	R/W	ALARM_BLK	Write: 1 = Block alarm, 0 = Deblock alarm
2	R	ALARM_PER_BLK	
3	R/W	PRINT_BLK	Write: 1 = Block Printer, 0 = Deblock printer
4	R	IND1_DIST	
5	R	IND2_DIST	
6	R/W	SELECTED	Write 1 = Select, 0 = Deselect
7	R/W	AU_IND	Write 1 = Acknowledge alarms

21.13.2 MOTCON IND1 bits

Bit	R/W	Description
0	R	Control Voltage fault
1	R	Bimetal relay fault
2	R	Local stop
3	R	Safety monitor
4	R	Contactor fault
5	R	Monitor V1 tripped (Mon Low)
6	R	Monitor V2 tripped (Mon High)
7	R	X1 external ind/alarm (Pos A)
8	R	Collective fault indication
9	R	Collective unacknowledged fault
10	R	High motor current
11	R	X2 external ind/alarm (Pos B)
12	R	Run
13	R	Preselected start order 1
14	R	Preselected start order 2
15	R	Exchange of start order in progress.

21.13.3 MOTCON IND2 bits

Bit	R/W	Description
0	R	Blocked IB 1 and IB3
1	R	Point of control LOCAL
2	R	Point of control TEST
3	R	Point of control STANDBY
4	R	Point of control SEQUENCE
5	R	Control mode AUTO=1/MAN=0
6	R	Started in AUTO
7	R	Ready to run
8	R	Active interlocking IC1
9	R	Active interlocking IC2
10	R	Active interlocking IB3
11	R	Active interlocking IB4
12	R	Active interlocking IB1
13	R	Active interlocking IB2
14	R	Active interlocking IA
15	R	Block. B-interlocking active

21.13.4 MOTCON MORD bits

Trig by writing 1 to the bit

Bit	R/W	PC-element Ref	Description
0	W	MORD_00	Point of control switch-over to LOCAL
1	W	MORD_01	Point of control switch-over to TEST
2	W	MORD_02	Point of control switch-over to STANDBY
3	W	MORD_03	Point of control switch-over to CENTRAL
4	W	MORD_04	Auto
5	W	MORD_05	Man
6	W	MORD_06	Intelock Set
7	W	MORD_07	Interlock Reset
8	W	MORD_08	Forward
9	W	MORD_09	Reverse
10	W	MORD_10	Start
11	W	MORD_11	Stop
12	W	MORD_12	Y1 (Control of external logic)
13	W	MORD_13	Y2 (Control of external logic)

14	W	MORD_14	Y3 (Control of external logic)
15	W	MORD_15	Point of control switch-over to SEQUENCE

21.14 TEXT Object

Field	R/W	Data Type	Sub Type	Access Type	Description
NAME	R	STRING	D,E	2	Object name
DEC	R	INTB	C,D,E	1,2	Number of decimals
STATUS	R/W	WORD	C,D,E	1,2	Status bits 0 – 13 See status bits table below
INT_LONG	R/W	LONG	C,D,E	1,2	Text integer long value
REAL	R/W	FLOAT	C,D,E	1,2	Text float value
DISP_MAX	R	FLOAT	D,E	2	Max value to enter for REAL value
DISP_MIN	R	FLOAT	D,E	2	Min value to enter for REAL value
TEXT	R/W	STRING	C,D,E	1,2	Text value. 20, 48 or 72 characters long

21.14.1 TEXT STATUS bits

Bit	R/W	Description	
0	R	VALID	
1	R/W	SELECTED	Write: 1 = Select, 0 = Deselect
2	R/W	MAN	Write: 1 = Man, 0 = Auto
3	R/W	BOOLEAN	Text boolean value
4	R	COLOUR1	
5	R	COLOUR2	
6	R	BLANKT	
7	R	BLANKB	
8	R	BLANKR	
9	R	BLANKIL	
10	R/W	B1_VAL	
11	R/W	B2_VAL	
12	R/W	B3_VAL	
13	R/W	B4_VAL	

21.15 GENUSD Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2,3,4	GENUSD object name
DESCRIPTION	R	STRING	D,E	3,4	A description of the object
STATUS1	R	LONG	C,D,E	1,2,3,4	See status1 bit table below
STATUS2	R	LONG	C,D,E	1,2,3,4	See status 2 bit table below
MV	R	FLOAT	C,D,E,T,S	1,2,3,4	Measured value.
MV_INTL	R	LONG	C,D,E,T,S	1,2,3,4	Measured integer value.
SP	R	FLOAT	C,D,E,T,S	1,2,3,4	Setpoint value.
OUT	R	FLOAT	C,D,E	1,2,3,4	Output value.
SP_MMC	R/W	FLOAT	D,E	4	Preferred setpoint value set by the operator.
SP_INTL_MMC	R/W	LONG	D,E	4	Setpoint integer value.
OUT_MMC	R	FLOAT	D,E	4	Preferred output value set by the operator.
MVH2	R/W	FLOAT	C,D,E	1,2,3,4	Upper alarm limit H2.
MVH1	R/W	FLOAT	D,E	3,4	Upper alarm limit H1.
MVL1	R/W	FLOAT	D,E	3,4	Lower alarm limit L1.
MVL2	R/W	FLOAT	C,D,E	1,2,3,4	Lower alarm limit L2.
MAX	R	FLOAT	D,E	2,3,4	Maximum measured value.
MIN	R	FLOAT	D,E	2,3,4	Minimum measured value.

SETPH	R/W	FLOAT	D,E	3,4	Maximum setpoint value.
SETPL	R/W	FLOAT	D,E	3,4	Minimum setpoint value.
OUTH	R	FLOAT	D,E	3,4	Maximum output value.
OUTL	R	FLOAT	D,E	3,4	Minimum output value.
MAX_INTL	R/W	LONG	D,E	3,4	Maximum integer value.
MIN_INTL	R/W	LONG	D,E	3,4	Minimum integer value.
UNIT1	R	STRING	D,E	3,4	The unit of the measured value and setpoint, in percentage, in engineering unit.
UNIT2	R	STRING	D,E	3,4	The unit of the measured value 2 and setpoint 2, in percentage, in engineering unit.
SUBSYSTEM	R	BYTE	D,E	4	Process section 0 -16.
CLASS	R	BYTE	D,E	4	Class.
DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals.
MORD	Write only	WORD			Group data for Manual ORDers from the operator. Use bit 0 – 15 See MORD bits table below

21.15.1 GENUSD STATUS1 bits

Bit	R/W	Description
0	R	IMPLEMENTED, Implemented
1	R/W	ALARM_BLK, Alarm is blocked.
2	R	AL_PE_BLK, Alarm period block.
3	R/W	PRINT_BLK, Printout is blocked.
4	R	REP_FAIL_BLK, Repeats failed block
5	R/W	EVENT_BLK, Event is blocked.
6	R/W	SELECTED, Object is selected.
7	R	MORD_EV_BLK, Not used.
8	R/W	AU_ST_00, Unacknowledged signal error 1. Write 1 = Acknowledge
9	R	AU_ST_01, Unacknowledged signal error 2.
10	R	AU_ST_02, Unacknowledged alarm 1.
11	R	AU_ST_03, Unacknowledged alarm 2.
12	R	AU_ST_04, Unacknowledged alarm 3.
13	R	AU_ST_05, Unacknowledged alarm 4.
14	R	AU_ST_06, Unacknowledged alarm 5.
15	R	AU_ST_07, Unacknowledged alarm 6.
16	R	PC_ST_00, Signal error 1.
17	R	PC_ST_01, Signal error 2.
18	R	PC_ST_02, Alarm 1.
19	R	PC_ST_03, Alarm 2.
20	R	PC_ST_04, Alarm 3.
21	R	PC_ST_05, Alarm 4.
22	R	PC_ST_06, Alarm 5.
23	R	PC_ST_07, Alarm 6.
24	R	PC_ST_08, Interlock 1.
25	R	PC_ST_09, Interlock 2.
26	R	PC_ST_10, Interlock 3.
27	R	PC_ST_11, Interlock 4.
28	R	PC_ST_12, Interlock 5.
29	R	PC_ST_13, Interlock 6.
30	R	PC_ST_14, Not used.
31	R	PC_ST_15, Not used.

21.15.2 GENUSD STATUS2 bits

Bit	R/W	Description
0	W	C1 user def command 1 (Write here for backward compatibility, use MORD bits instead)
1	W	C2 user def command 2 (Write here for backward compatibility, use MORD bits instead)
2	W	C3 user def command 3 (Write here for backward compatibility, use MORD bits instead)
3	W	C4 user def command 4 (Write here for backward compatibility, use MORD bits instead)
4	W	C5 user def command 5 (Write here for backward compatibility, use MORD bits instead)
5	W	C6 user def command 6 (Write here for backward compatibility, use MORD bits instead)
6	W	C7 user def command 7 (Write here for backward compatibility, use MORD bits instead)
7	W	C8 user def command 8 (Write here for backward compatibility, use MORD bits instead)
16	R/W	Operator position M1. (Write here for backward compatibility, use MORD bits instead)
17	R/W	Operator position M2. (Write here for backward compatibility, use MORD bits instead)
18	R/W	Operator position M3. (Write here for backward compatibility, use MORD bits instead)
19	R/W	Auto mode. (Write here for backward compatibility, use MORD bits instead)
20	R/W	Manual mode. (Write here for backward compatibility, use MORD bits instead)
21	R/W	Blocked mode. (Write here for backward compatibility, use MORD bits instead)
22	R/W	Standby mode. (Write here for backward compatibility, use MORD bits instead)
24	R	On/Off square indication.
25	R	On/Off square indication.
26	R	On/Off square indication.
27	R	On/Off square indication.

21.15.3 GENUSD MORD bits

Write only.

Bit	R/W	DB Ref	PC-element ref	Description
0	W	MORD 1	ORDM1	ORDer output operator position M1.
1	W	MORD 2	ORDM2	ORDer output operator position M2.
2	W	MORD 3	ORDM3	ORDer output operator position M3.
3	W	MORD 4	ORDMAN	ORDer output MANual mode.
4	W	MORD 5	ORDAUTO	ORDer output AUTO mode.
5	W	MORD 6	ORDBLK	ORDer output BLocKed mode.
6	W	MORD 7	ORDSTDBY	ORDer output STand BY mode.
8	W	MORD 9	ORDC1	ORDer output C1. User def command 1
9	W	MORD 10	ORDC2	ORDer output C2. User def command 2
10	W	MORD 11	ORDC3	ORDer output C3. User def command 3
11	W	MORD 12	ORDC4	ORDer output C4. User def command 4
12	W	MORD 13	ORDC5	ORDer output C5. User def command 5
13	W	MORD 14	ORDC6	ORDer output C6. User def command 6
14	W	MORD 15	ORDC7	ORDer output C7. User def command 7
15	W	MORD 16	ORDC8	ORDer output C8. User def command 8

21.16 GENCON Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2,3,4	GENUSD object name
DESCRIPTION	R	STRING	D,E	3,4	A description of the object
STATUS1	R	LONG	C,D,E	1,2,3,4	See status1 bit table below
STATUS2	R	LONG	C,D,E	1,2,3,4	See status2 bit table below
MV	R	FLOAT	C,D,E,T,S	1,2,3,4	Measured value.
MV_INTL	R	LONG	C,D,E	1,2,3,4	Measured integer value.
SP	R	FLOAT	C,D,E,T,S	1,2,3,4	Setpoint value.
OUT	R	FLOAT	C,D,E,T,S	1,2,3,4	Output value.
SP_MMC	R/W	FLOAT	D,E	4	Preferred setpoint value set by the operator.
SP_INTL_MMC	R	LONG	D,E	4	Setpoint integer value.

OUT_MMC	R/W	FLOAT	D,E	4	Preferred output value set by the operator.
MVH2	R/W	FLOAT	C,D,E	1,2,3,4	Upper alarm limit H2.
MVH1	R/W	FLOAT	D,E	3,4	Upper alarm limit H1.
MVL1	R/W	FLOAT	D,E	3,4	Lower alarm limit L1.
MVL2	R/W	FLOAT	C,D,E	1,2,3,4	Lower alarm limit L2.
MAX	R	FLOAT	D,E	2,3,4	Maximum measured value.
MIN	R	FLOAT	D,E	2,3,4	Minimum measured value.
SETPH	R/W	FLOAT	D,E	3,4	Maximum setpoint value.
SETPL	R/W	FLOAT	D,E	3,4	Minimum setpoint value.
OUTH	R/W	FLOAT	D,E	3,4	Maximum output value.
OUTL	R/W	FLOAT	D,E	3,4	Minimum output value.
MAX_INTL	R	LONG	D,E	3,4	Maximum integer value.
MIN_INTL	R	LONG	D,E	3,4	Minimum integer value.
UNIT1	R	STRING	D,E	3,4	The unit of the measured value and setpoint, in percentage, in engineering unit.
UNIT2	R	STRING	D,E	3,4	The unit of the measured value 2 and setpoint 2, in percentage, in engineering unit.
SUBSYSTEM	R	BYTE	D,E	4	Process section 0 -16.
CLASS	R	BYTE	D,E	4	Class.
DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals.
MORD	Write only	WORD			Group data for Manual ORDers from the operator. Use bit 0 – 15 See MORD bits table below

21.16.1 GENCON STATUS1 bits

Bit	R/W	Description
0	R	IMPLEMENTED, Implemented
1	R/W	ALARM_BLK, Alarm is blocked.
2	R	AL_PE_BLK, Alarm period block.
3	R	PRINT_BLK, Printout is blocked.
4	R	REP_FAIL_BLK, Repeated fail blocked.
5	R	EVENT_BLK, Event is blocked.
6	R/W	SELECTED, Object is selected.
7	R	MORD_EV_BLK, Not used.
8	R/W	AU_ST_00, Unacknowledged signal error. Write 1 = Acknowledge
9	R	AU_ST_01, Not used.
10	R	AU_ST_02, Not used.
11	R	AU_ST_03, Unacknowledged alarm deviation.
12	R	AU_ST_04, Unacknowledged alarm high limit 2.
13	R	AU_ST_05, Unacknowledged alarm high limit 1.
14	R	AU_ST_06, Unacknowledged alarm low limit 1.
15	R	AU_ST_07, Unacknowledged alarm low limit 2.
16	R	PC_ST_00, Signal error.
17	R	PC_ST_01, Not used.
18	R	PC_ST_02, Not used.
19	R	PC_ST_03, Alarm deviation.
20	R	PC_ST_04, Alarm high limit 2.
21	R	PC_ST_05, Alarm high limit 1.
22	R	PC_ST_06, Alarm low limit 1.
23	R	PC_ST_07, Alarm low limit 2.
24	R	PC_ST_08, Gives warning for high setpoint limit.
25	R	PC_ST_09, Gives warning for low setpoint limit.

26	R	PC_ST_10, Gives warning for high output limit.
27	R	PC_ST_11, Gives warning for low output limit.
28	R	PC_ST_12, Not used.
29	R	PC_ST_13, Not used.
30	R	PC_ST_14, Not used.
31	R	PC_ST_15, Not used.

21.16.2 GENCON STATUS2 bits

Bit	R/W	Description
16	R	Balanced mode.
17	R/W	Manual forced mode. (Write here for backward compatibility, use MORD bits instead)
18	R/W	Manual mode. (Write here for backward compatibility, use MORD bits instead)
19	R/W	Auto mode. (Write here for backward compatibility, use MORD bits instead)
20	R/W	External reference E1. (Write here for backward compatibility, use MORD bits instead)
21	R/W	External reference E2. (Write here for backward compatibility, use MORD bits instead)
24	R	Order output ON/Open.
25	R	Order output OFF/Close.

21.16.3 GENCON MORD bits

Write only.

Bit	R/W	DB Ref	PC-element ref	Description
1	W	MORD 2	ORDMANF	ORDer output MANual Forced mode.
2	W	MORD 3	ORDMAN	ORDer output MANual mode.
3	W	MORD 4	ORDAUTO	ORDer output AUTO mode.
4	W	MORD 5	ORDE1	ORDer output E1 mode.
5	W	MORD 6	ORDE2	ORDer output E2 mode.

21.17 GENBIN Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2,3,4	GENUSD object name
DESCRIPTION	R	STRING	D,E	3,4	A description of the object
STATUS1	R	LONG	C,D,E	1,2,3,4	See status1 bit table below
STATUS2	R	LONG	C,D,E	1,2,3,4	See status2 bit table below
MV	R	FLOAT	C,D,E,T,S	1,2,3,4	Measured value.
MV_INTL	R	LONG	C,D,E	1,2,3,4	Measured integer value.
SP	R	FLOAT	C,D,E	1,2,3,4	Setpoint value.
OUT	R	FLOAT	C,D,E	1,2,3,4	Output value.
SP_MMC	R	FLOAT	D,E	4	Preferred setpoint value set by the operator.
SP_INTL_MMC	R	LONG	D,E	4	Setpoint integer value.
OUT_MMC	R	FLOAT	D,E	4	Preferred output value set by the operator.
MVH2	R/W	FLOAT	C,D,E	1,2,3,4	Upper alarm limit H2.
MVH1	R/W	FLOAT	D,E	3,4	Upper alarm limit H1.
MVL1	R/W	FLOAT	D,E	3,4	Lower alarm limit L1.
MVL2	R/W	FLOAT	C,D,E	1,2,3,4	Lower alarm limit L2.
MAX	R	FLOAT	D,E	2,3,4	Maximum measured value.
MIN	R	FLOAT	D,E	2,3,4	Minimum measured value.
SETPH	R	FLOAT	D,E	3,4	Maximum setpoint value.
SETPL	R	FLOAT	D,E	3,4	Minimum setpoint value.
OUTH	R	FLOAT	D,E	3,4	Maximum output value.
OUTL	R	FLOAT	D,E	3,4	Minimum output value.
MAX_INTL	R	LONG	D,E	3,4	Maximum integer value.
MIN_INTL	R	LONG	D,E	3,4	Minimum integer value.

UNIT1	R	STRING	D,E	3,4	The unit of the measured value and setpoint, in percentage, in engineering unit.
UNIT2	R	STRING	D,E	3,4	The unit of the measured value 2 and setpoint 2, in percentage, in engineering unit.
SUBSYSTEM	R	BYTE	D,E	4	Process section 0 -16.
CLASS	R	BYTE	D,E	4	Class.
DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals.
MORD	Write only	WORD			Group data for Manual ORDers from the operator. Use bit 0 – 15 See MORD bits table below

21.17.1 GENBIN STATUS1 bits

Bit	R/W	Description
0	R	IMPLEMENTED, Implemented
1	R/W	ALARM_BLK, Alarm is blocked.
2	R	AL_PE_BLK, Alarm period block.
3	R	PRINT_BLK, Printout is blocked.
4	R	REP_FAIL_BLK, Repeated fail blocked.
5	R	EVENT_BLK, Event is blocked.
6	R/W	SELECTED, Object is selected.
7	R	MORD_EV_BLK, Not used.
8	R/W	AU_ST_00, Unacknowledged signal error. Write 1 = Acknowledge
9	R	AU_ST_01, Unacknowledged alarm feedback error.
10	R	AU_ST_02, Not used.
11	R	AU_ST_03, Not used.
12	R	AU_ST_04, Unacknowledged alarm high limit 2.
13	R	AU_ST_05, Unacknowledged alarm high limit 1.
14	R	AU_ST_06, Unacknowledged alarm low limit 1.
15	R	AU_ST_07, Unacknowledged alarm low limit 2.
16	R	PC_ST_00, Signal error.
17	R	PC_ST_01, Alarm feedback error.
18	R	PC_ST_02, Not used.
19	R	PC_ST_03, Not used.
20	R	PC_ST_04, Alarm high limit 2.
21	R	PC_ST_05, Alarm high limit 1.
22	R	PC_ST_06, Alarm low limit 1.
23	R	PC_ST_07, Alarm low limit 2.
24	R	PC_ST_08, Interlock mode.
25	R	PC_ST_09, Interlock process.
26	R	PC_ST_10, Interlock switch-gear.
27	R	PC_ST_11, Interlock emergency trip.
28	R	PC_ST_12, Not used.
29	R	PC_ST_13, Not used.
30	R	PC_ST_14, Not used.
31	R	PC_ST_15, Not used.

21.17.2 GENBIN STATUS2 bits

Bit	R/W	Description
16	R/W	Central mode. (Write here for backward compatibility, use MORD bits instead)
17	R/W	Local mode. (Write here for backward compatibility, use MORD bits instead)
18	R/W	Remote mode. (Write here for backward compatibility, use MORD bits instead)
19	R/W	Auto mode. (Write here for backward compatibility, use MORD bits instead)
20	R/W	Manual mode. (Write here for backward compatibility, use MORD bits instead)

21	R/W	Blocked mode. (Write here for backward compatibility, use MORD bits instead)
22	R/W	Standby mode. (Write here for backward compatibility, use MORD bits instead)
23	R	Not used.
24	R/W	Order output ON/Open. (Write here for backward compatibility, use MORD bits instead)
25	R/W	Order output OFF/Close. (Write here for backward compatibility, use MORD bits instead)

21.17.3 GENBIN MORD bits

Write only.

Bit	R/W	DB Ref	PC-element ref	Description
0	W	MORD 1	ORDCEN	ORDer output operator position CENtral.
1	W	MORD 2	ORDLOC	ORDer output operation position LOCal.
2	W	MORD 3	ORDREM	ORDer output operator position REMote.
3	W	MORD 4	ORDMAN	ORDer output MANual mode.
4	W	MORD 5	ORDAUTO	ORDer output AUTO mode.
5	W	MORD 6	ORDBLK	ORDer output BLocKed mode.
6	W	MORD 7	ORDSTDBY	ORDer output STand BY mode.
7	W	MORD 8	ORDONOP	ORDer output ON/OPen.
8	W	MORD 9	ORDOFCL	ORDer output OFf/CLose.

21.18 SEQ Object

The extended structures returned with Access Types 2 and 4 uses the extended SEQ database from release MP200/1*3.0.

Field	R/W	Data Type	Sub Type	Access Type	Description
NAME	R	STRING	D,E	1,3,4	SEQ object name
DESCRIPTION	R	STRING	D,E	3,4	A description of the object
STATUS1	R	LONG	C,D,E	1,2,2E,3,4,4E	See status1 bit tables below
STATUS2	R	LONG	C,D,E	1,2,2E,3,4,4E	See status2 bit tables below
STATUS3	R	LONG	C,D,E	1,2,2E,4,4E	See status3 bit tables below
POSN	R	WORD	C,D,E	2,2E,3,4	Position
SEQTD	R	LONG	C,D,E	2,2E,3,4	SEQuence Time Delay.
SEQTE	R	LONG	C,D,E	2,2E,3,4	SEQuence Time Elapsed.
STEPTD	R	LONG	C,D,E	2,2E,3,4	STEP Time Delay
STEPTE	R	LONG	C,D,E	2,2E,3,4	STEP Time Elapsed
JPOSN_OUTP	R/W	WORD	C,D,E	2,2E,3,4	Jump POSition.
ACT_TURN	R	WORD	C,D,E	2,2E,4	ACTual TURN
INTERV_TIME_EL	R	LONG	C,D,E	2,2E,4	INTerVal Time Elapsed
STEPSTAT	R	LONG	C,D,E	2E,4E	See stepstat bit tables below.
INFVAL	R	FLOAT	C,D,E	2E,4E	INFormation VALue. Value associated with INFTXT.
NEXTSTEP	R	WORD	C,D,E	2E,4E	NEXT STEP. No of next step by manual mode jumping.
INTERV_TIME_DEL	R/W	LONG	D,E	4	INTerVal Time Delay Output
TURNS_OUTP	R/W	WORD	D,E	4	TURNS Output is the indication terminal of turns.
CLASS	R	BYTE	D,E	4	Class
SUBSYSTEM	R	BYTE	D,E	4	PROCess SECtion 1 – 16
PREPOS	R	WORD	D,E	4E	PREvious POSition.
NXTPOS	R	WORD	D,E	4E	NeXT step POSition.
JPOS1	R	WORD	D,E	4E	Jump POSition x. For x=1..4. Position of the step to which a jump will take place if condition x is fulfilled.

JPOS2	R	WORD	D,E	4E	Jump POSition x. For x=1..4. Position of the step to which a jump will take place if condition x is fulfilled.
JPOS3	R	WORD	D,E	4E	Jump POSition x. For x=1..4. Position of the step to which a jump will take place if condition x is fulfilled.
JPOS4	R	WORD	D,E	4E	Jump POSition x. For x=1..4. Position of the step to which a jump will take place if condition x is fulfilled.
PRENAME	R	STRING	D,E	4E	PREvious step NAME.
STEPNAME	R	STRING	D,E	4E	Current STEP NAME.
NXTNAME	R	STRING	D,E	4E	NeXT step NAME.
JNAME1	R	STRING	D,E	4E	Jump NAME x. For x=1..4. Name of the step to which a jump will take place if condition x is fulfilled.
JNAME2	R	STRING	D,E	4E	Jump NAME x. For x=1..4. Name of the step to which a jump will take place if condition x is fulfilled.
JNAME3	R	STRING	D,E	4E	Jump NAME x. For x=1..4. Name of the step to which a jump will take place if condition x is fulfilled.
JNAME4	R	STRING	D,E	4E	Jump NAME x. For x=1..4. Name of the step to which a jump will take place if condition x is fulfilled.
INFTXT	R	STRING	D,E	4E	INFormation TeXT.
ACTTXT1	R	STRING	D,E	4E	ACTivity TeXT x. For x=1..4. Text describing activity x for current step.
ACTTXT2	R	STRING	D,E	4E	ACTivity TeXT x. For x=1..4. Text describing activity x for current step.
ACTTXT3	R	STRING	D,E	4E	ACTivity TeXT x. For x=1..4. Text describing activity x for current step.
ACTTXT4	R	STRING	D,E	4E	ACTivity TeXT x. For x=1..4. Text describing activity x for current step.
CONDTXT1	R	STRING	D,E	4E	Transition CONDition TeXT x. For x=1..8. Text describing transition condition x for current step.
CONDTXT2	R	STRING	D,E	4E	
CONDTXT3	R	STRING	D,E	4E	
CONDTXT4	R	STRING	D,E	4E	
CONDTXT5	R	STRING	D,E	4E	
CONDTXT6	R	STRING	D,E	4E	
CONDTXT7	R	STRING	D,E	4E	
CONDTXT8	R	STRING	D,E	4E	
JCTXT1	R	STRING	D,E	4E	Jump Condition TeXT x. For x=1..4. Text describing jump condition x for current step.
JCTXT2	R	STRING	D,E	4E	

JCTXT3	R	STRING	D,E	4E	
JCTXT4	R	STRING	D,E	4E	

21.18.1 SEQ STATUS1 bits

Bit	R/W	Description	
0	R	IMPLEMENTED	
3	R/W	BLOCKED	
5	R/W	SELECTED	
7	R	TESTED	
8	W	STEP	Trigger Write only
9	W	RESET	Trigger Write only
10	W	JUMP	Trigger Write only
12	R/W	DI2_AL_UNACK	Write 1 = Acknowledge
13	R	DI2_RE_F_BLK	
14	R	DI2_DIST	
16	R/W	AUTOM	
17	R/W	MANM	
18	R/W	HOLDM	
19	R/W	UNCONDM	1 = Uncond, 0 = Cond
20	R/W	RUN	Write 1 = Start, Write 0 = Stop
21	R	END	
22	R	NEXT	
24	R	DI1_ALM_BLK	Disturbance CTRL1 Alarm block
25	R	DI1_ALM_PER_BLK	Disturbance CTRL1 Alarm period block
26	R	DI1_PR_BLK	Disturbance CTRL1 Print block
27	R	DI1_R_F_CTRL	Disturbance CTRL1 Repeat fail CTRL
28	R	DI1_S_F_BLK	Disturbance CTRL1 Second fail block

21.18.2 SEQ STATUS2 bits

Bit	R/W	Description
0	R	COMMAND
1	R	CENTRAL
2	R	LOCAL
3	R	SERVICE_UNIT
16	R	TS_SPARE_00
17	R	TS_POSN_F
18	R	TS_SERVUC
19	R	TS_SEQAL
20	R	TS_STEPAL

21.18.3 SEQ STATUS3 bits

Bit	R/W	Description	
0	R/W	PT_ALARM_BLK	Position
2	R/W	PT_PRINT_BLK	Position
8	R/W	SI_ALARM_BLK	Sequence ind.
10	R/W	SI_PRINT_BLK	Sequence ind.
24	R/W	TF_ALARM_BLK	Type fault CTRL Alarm block
25	R	TF_ALM_P_BLK	Type fault CTRL Alarm period block
26	R/W	TF_PRINT_BLK	Type fault CTRL Print block
27	R	TF_R_F_CTRL	Type fault CTRL Repeat fail CTRL

21.18.4 SEQ STEPSTAT bits

Contains status to texts.

Bit	R/W	Description

1	R	CONDSTA1	transition CONDition STAtus 1
2	R	CONDSTA2	transition CONDition STAtus 2
3	R	CONDSTA3	transition CONDition STAtus 3
4	R	CONDSTA4	transition CONDition STAtus 4
5	R	CONDSTA5	transition CONDition STAtus 5
6	R	CONDSTA6	transition CONDition STAtus 6
7	R	CONDSTA7	transition CONDition STAtus 7
8	R	CONDSTA8	transition CONDition STAtus 8
9	R	ACTSTA1	ACTivity STAtus 1
10	R	ACTSTA2	ACTivity STAtus 2
11	R	ACTSTA3	ACTivity STAtus 3
12	R	ACTSTA4	ACTivity STAtus 4
13	R	ALLACT	ALL ACTivities status
14	R	BLANKINF	BLANK INFormation field
15	R	LOAD_DB	LOAD DataBase
16	R	NXTCOND	NEXT CONDition
17	R	JCSTA1	Jump Condition STAtus 1
18	R	JCSTA2	Jump Condition STAtus 2
19	R	JCSTA3	Jump Condition STAtus 3
20	R	JCSTA4	Jump Condition STAtus 4

Alternative bit table:

Bit	R/W	Description	
8	R	JCSTA1	Jump Condition STAtus 1
9	R	JCSTA2	Jump Condition STAtus 2
10	R	JCSTA3	Jump Condition STAtus 3
11	R	JCSTA4	Jump Condition STAtus 4
16	R	ACTSTA1	ACTivity STAtus 1
17	R	ACTSTA2	ACTivity STAtus 2
18	R	ACTSTA3	ACTivity STAtus 3
19	R	ACTSTA4	ACTivity STAtus 4
20	R	ALLACT	ALL ACTivities status
21	R	BLANKINF	BLANK INFormation field
22	R	LOAD_DB	LOAD DataBase
23	R	NXTCOND	NEXT CONDition
24	R	CONDSTA1	transition CONDition STAtus 1
25	R	CONDSTA2	transition CONDition STAtus 2
26	R	CONDSTA3	transition CONDition STAtus 3
27	R	CONDSTA4	transition CONDition STAtus 4
28	R	CONDSTA5	transition CONDition STAtus 5
29	R	CONDSTA6	transition CONDition STAtus 6
30	R	CONDSTA7	transition CONDition STAtus 7
31	R	CONDSTA8	transition CONDition STAtus 8

21.19 TANKCON Object

Field	R/W	Data Type	SubType	Access Type	Description
NAME	R	STRING	D,E	2,3,4	TANKCON object name
DESCRIPTION	R	STRING	D,E	3,4	A description of the object
STATUS1	R	LONG	C,D,E	1,2,3,4	See status1 bit table below
STATUS2	R	LONG	C,D,E	1,2,3,4	See status 2 bit table below
MV	R	FLOAT	C,D,E,T,S	1,2,3,4	Quantity
MV_INTL	R	LONG	C,D,E,T,S	1,2,3,4	LOT identity
SP	R	FLOAT	C,D,E,T,S	1,2,3,4	Not used.
OUT	R	FLOAT	C,D,E	1,2,3,4	Material code.
SP_MMC	R/W	FLOAT	D,E	4	Quantity order
SP_INTL_MMC	R/W	LONG	D,E	4	LOT identity order.

OUT_MMC	R/W	FLOAT	D,E	4	Material code order
MVH2	R/W	FLOAT	C,D,E	1,2,3,4	Upper alarm limit H2.
MVH1	R/W	FLOAT	D,E	3,4	Upper alarm limit H1.
MVL1	R/W	FLOAT	D,E	3,4	Lower alarm limit L1.
MVL2	R/W	FLOAT	C,D,E	1,2,3,4	Lower alarm limit L2.
MAX	R	FLOAT	D,E	2,3,4	Quantity max
MIN	R	FLOAT	D,E	2,3,4	Quantity min.
SETPH	R/W	FLOAT	D,E	3,4	Delta Q.
SETPL	R/W	FLOAT	D,E	3,4	Material code download.
OUTH	R	FLOAT	D,E	3,4	Not used.
OUTL	R	FLOAT	D,E	3,4	Not used.
MAX_INTL	R/W	LONG	D,E	3,4	Xref.
MIN_INTL	R/W	LONG	D,E	3,4	Operator code.
UNIT1	R	STRING	D,E	3,4	Unit of quantity
UNIT2	R	STRING	D,E	3,4	Not used.
SUBSYSTEM	R	BYTE	D,E	4	Process section 0 -16.
CLASS	R	BYTE	D,E	4	Class.
DEC	R	BYTE	C,D,E	1,2,3,4	Number of decimals.

21.19.1 TANKCON STATUS1 bits

Bit	R/W	Description
0	R	IMPLEMENTED, Implemented
1	R/W	ALARM_BLK, Alarm is blocked.
2	R	AL_PE_BLK, Alarm period block.
3	R/W	PRINT_BLK, Printout is blocked.
4	R	REP_FAIL_BLK, Repeats failed block
5	R/W	EVENT_BLK, Event is blocked.
6	R/W	SELECTED, Object is selected.
7	R	MORD_EV_BLK
8	R/W	AU_ST_00, Unacknowledged signal error 1. Write 1 = Acknowledge
9	R	AU_ST_01, Unacknowledged signal error 2.
10	R	AU_ST_02, Unacknowledged alarm 1.
11	R	AU_ST_03, Unacknowledged alarm 2.
12	R	AU_ST_04, Unacknowledged alarm 3.
13	R	AU_ST_05, Unacknowledged alarm 4.
14	R	AU_ST_06, Unacknowledged alarm 5.
15	R	AU_ST_07, Unacknowledged alarm 6.
16	R	PC_ST_00, Signal error 1.
17	R	PC_ST_01, Signal error 2.
18	R	PC_ST_02, Alarm 1. Quantity > H2
19	R	PC_ST_03, Alarm 2. Quantity > H1
20	R	PC_ST_04, Alarm 3. Quantity < L1
21	R	PC_ST_05, Alarm 4. Quantity < L2
22	R	PC_ST_06, Alarm 5.
23	R	PC_ST_07, Alarm 6.
24	R	PC_ST_08, Interlock 1.
25	R	PC_ST_09, Interlock 2.
26	R	PC_ST_10, Interlock 3.
27	R	PC_ST_11, Interlock 4.
28	R	PC_ST_12, Interlock 5.
29	R	PC_ST_13, Interlock 6.
30	R	PC_ST_14, Not used.
31	R	PC_ST_15, Block Indication

21.19.2 TANKCON STATUS2 bits

Bit	R/W	Description	
3	W	Adjust Quantity MV	Trig order by writing 1
5	W	Download BCS	Trig order by writing 1
6	W	Status change MV	Trig order by writing 1
7	W	Value change MV	Trig order by writing 1
8	W	Used order	Trig order by writing 1
9	W	Filling block order	Trig order by writing 1
10	W	Emptying block order	Trig order by writing 1
13	W	Cleaned order	Trig order by writing 1
14	W	Spare 1 order	Trig order by writing 1
15	W	Spare 2 order	Trig order by writing 1
16	R	Value changed.	
17	R	Spare 1.	
18	R	Spare 2.	
19	R	Used.	
21	R	Filling blocked.	
22	R	Emptying blocked.	
23	R	Downloaded.	
25	R	Full.	
26	R	Empty.	
27	R	Cleaned.	
31	R	PC-PGM running	

21.20 DRICONS Object

Field	R/W	Data Type	Sub Type	Access Type	Description
NAME	R	STRING	D,E	3,4	Object name
DESCRIPTION	R	STRING	D,E	3,4	Object description
RTYPE	R	BYTE	C,D,E	1,2,3,4	DRICONS ref. type is 42.
BOOL_A_H	R	BYTE	C,D,E	1,2,3,4	BOOLean A - H. Extra free flags to be used by PC program. BOOL A = Bit 0 BOOL B = Bit 1 . . BOOL H = Bit 7 See BOOL_A_H bits table below
STATUS	R/W	WORD	C,D,E	1,2,3,4	Status bits 0 - 7 See status bits table below
ALARM_UNACK	R	LONG	C,D,E	1,2,3,4	Bit 0 = Indicates if there is an unacknowledged alarm for bit number 0 in the IND1 word . . . Bit 31 = Indicates if there is an unacknowledged alarm for bit number 15 in the IND2 word
IND1	R	WORD	C,D,E	1,2,3,4	The INDication 1 terminal contains status indications from PC. See IND1 bits table below.
IND2	R	WORD	C,D,E	1,2,3,4	The INDication 2 terminal contains status indications from PC.

					See IND2 bits table below.
R_RES	R	FLOAT	C,D,E, T,S	1,2,3,4	In main MMCX DB = Motor current value
I_RES	R	LONG	C,D,E	1,2,3,4	In main MMCX DB = Nominal speed value
INTWA	R	WORD	C,D,E	1,2,3,4	In main MMCX DB = The integer word is used to indicate different configuration alternative regarding help MMCX DB element. See INTWA bits table below.
INTWB	R	WORD	C,D,E	1,2,3,4	In main MMCX DB = Integer indicates different visibility possibilities for the presentation. See INTWB bits table below.
PRES_A	R	STRING	D,E	2,3,4	In main MMCX DB = Characters 1 - 5 is used for absolute speed unit, 6 - 10 is used for REAL_B unit.
PRES_B	R	STRING	D,E	2,3,4	Not used
ACT_PRES_TXT	R	STRING	C,D,E	1,2,3,4	Presentation of active interlocks. The string comes from one of the texts I2_08TXT to I2_14TXT. The text is prioritized by the active signal with the lowest number among the signals IND2_08 to IND2_14.
REAL_A	R	FLOAT	C,D,E, T,S	1,2,3,4	In main MMCX DB = Actual Torque
REAL_B	R	FLOAT	C,D,E	1,2,3,4	In main MMCX DB = Arbitrarily value (frequency, power etc.)
REAL_C	R	FLOAT	C,D,E, T,S	1,2,3,4	In main MMCX DB = Actual speed
REAL_D	R	FLOAT	C,D,E	1,2,3,4	In main MMCX DB = External speed setpoint in % In help MMCX DB = External speed setpoint in rpm
REAL_E	R	FLOAT	C,D,E	1,2,3,4	In main MMCX DB = External torque setpoint in % or External PID setpoint in % In help MMCX DB = Nominal power
REAL_PARAM	R/W	FLOAT	D,E	3,4	In main MMCX DB = Operator controlled setpoint (speed, torque, PID) in % In help MMCX DB = Operator controlled setpoint (speed) in rpm
INTL_PARAM	R	LONG	D,E	3,4	Not used.
RRES_HL	R	FLOAT	D,E	3,4	In main MMCX DB = Highest limit used by PC for limit check of the Motor current.
RRES_LL	R	FLOAT	D,E	3,4	In main MMCX DB = Lowest limit used by PC for limit check of the Motor current.
RRES_MIN	R	FLOAT	D,E	3,4	In main MMCX DB =

					Minimum value of Motor Current.
RRES_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = Maximum value of Motor Current.
IRES_MIN	R	LONG	D,E	3,4	Not used
IRES_MAX	R	LONG	D,E	3,4	Not used
REALA_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = Torque minimum value
REALA_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = Torque maximum value
REALB_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = Minimum value an arbitrarily value from Drive (frequency, power and so on)
REALB_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = Maximum value an arbitrarily value from Drive (frequency, power and so on)
REALC_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = Actual speed minimum value.
REALC_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = Actual speed maximum value.
REALD_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = External speed setpoint in % minimum value.
REALD_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = External speed setpoint in % maximum value.
REALE_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = External torque setpoint in % minimum value. In help MMCX DB = Nominal current
REALE_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = External torque setpoint in % maximum value. In help MMCX DB = Nominal torque
IND_REPEAT_BLK	R	LONG	D,E	3,4	Shows which of the signals IND1_00 to IND2_15 that have repeated error blocks. Bit 0 = IND1_00 . . Bit 31 = IND2_15
I2_08TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IC1 Text
I2_09TXT	R	STRING	D,E	4	Not used
I2_10TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IB1 Text
I2_11TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IB2 Text
I2_12TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IB3 Text
I2_13TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IB4 Text
I2_14TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IA Text

MORD	Write Only	WORD			Group data for Manual ORDers from the operator. Use bit 0 – 15 See MORD bits table below

21.20.1 DRICONS STATUS bits

Bit	R/W	Description	
0	R	IMPLEMENTED	
1	R/W	ALARM_BLK	Write: 1 = Block alarm, 0 = Deblock alarm
2	R	ALARM_PER_BLK	
3	R/W	PRINT_BLK	Write: 1 = Block Printer, 0 = Deblock printer
4	R	IND1_DIST	
5	R	IND2_DIST	
6	R/W	SELECTED	Write 1 = Select, 0 = Deselect
7	R/W	AU_IND	Write 1 = Acknowledge alarms

21.20.2 DRICONS BOOL_A_H bits

Bit	R/W	Description
0	R	MAN
1	R	AUTO
2	R	JOG is point of control
3	R	LOCAL is point of control
4	R	External setpoint handling
5	R	Start interlocks IBF are used
6	R	Not used
7	R	0=ACS type of Drive. 1=DCS type of Drive.

21.20.3 DRICONS INTWA bits

Bit 0 of INTWA in main MMCX DB-element indicates whether there is a help MMCX DB-element

Bit	R/W	Description
0	R	Use help MMCX DB-element

21.20.4 DRICONS INTWB bits

INTWB in main MMCX DB-element controls the visibility of setpoints and actual values. Setpoints and actual values which are going to presented should have their corresponding bit set in INTWB.

Bit	R/W	Description
0	R	Speed
1	R	Current
2	R	Torque
3	R	Frequency
4	R	Power
5	R	Outputv
6	R	Arbitrarily value
7	R	Ref.
8	R	Con dev
9	R	Actual 1
10	R	Actual 2
11	R	Speed in rpm
12	R	Speed in %
13	R	Pid setpoint
14	R	Torque setpoint

21.20.5 DRICONS IND1 bits

Status data for an ACS 600 single Drive with software version 3.0.

Bit	R/W	Description
9	R	1=Drive at limit 0=Drive not at limit
10	R	1=Active warning in Drive 0=No active warning in Drive
11	R	1=Active fault in Drive 0=No active faults in Drive

Status data for a standard drive with ABB Drive profile.

Bit	R/W	Description
9	R	1=Frequency or speed value equals or is greater than supervision limit 0=Frequency or speed value is within supervision limit
10	R	1=Active Warning/alarm in Drive 0=No Warning/active alarm in Drive
11	R	1=Active fault in Drive 0=No active fault in Drive

21.20.6 DRICONS IND2 bits

Status data for an ACS 600 single Drive with software version 3.0.

Bit	R/W	Description
0	R	1=Drive is ready to start 0=Initialising or initialization error
1	R	1=Enabled 0=Disabled
2	R	1=Drive is running 0=Drive is stopped
7	R	1=Drive at reference 0=Drive not at reference
8	R	Interlock IC1
9	R	1=Drive in Remote Mode 0=Drive in Local mode
10	R	Interlock IB1
11	R	Interlock IB2
12	R	Interlock IB3
13	R	Interlock IB4
14	R	Interlock IA

Status data for a standard drive with ABB Drive profile.

Bit	R/W	Description
0	R	1=Drive is ready to switch on 0=Drive is not ready to switch on
1	R	1=Ready to be started 0=Not ready
2	R	1=Drive is running 0=Drive is stopped
4	R	1=No emergency (OFF2 inactive) 0=Emergency coast stop
5	R	1=No emergency stop (OFF3 inactive) 0=Fast Emergency stop
6	R	1=Swich on inhibit 0=Switch on allowed
7	R	1=Drive at reference 0=Drive not at reference
8	R	Interlock IC1

9	R	1=Drive control location is REMOTE 0=Drive control location is LOCAL
10	R	Interlock IB1
11	R	Interlock IB2
12	R	Interlock IB3
13	R	Interlock IB4
14	R	Interlock IA

21.20.7 DRICONS MORD bits

Trig by writing 1 to the bit

Bit	R/W	DB Ref	Description
0	W	MORD0	
1	W	MORD1	
2	W	MORD2	Start Drive
3	W	MORD3	Stop Drive
4	W	MORD4	Block interlocks IB1 and IB3
5	W	MORD5	Reset block interlocks IB1 and IB3
6	W	MORD6	Operator controlled setpoint
7	W	MORD7	External controlled setpoint
8	W	MORD8	Reset drive fault
9	W	MORD9	
10	W	MORD10	Point of control is CENTRAL, sets the enable flag of the drive to 1
11	W	MORD11	Point of control is LOCAL, sets the enable flag of the drive to 1
12	W	MORD12	Point of control is JOG, sets the enable flag of the drive to 1
13	W	MORD13	Point of control is OUT OF SERVICE, sets the enable flag of the drive to 0
14	W	MORD14	Control mode is MAN
15	W	MORD15	Control mode is AUTO

21.21 DRICONE Object

Field	R/W	Data Type	Sub Type	Access Type	Description
NAME	R	STRING	D,E	3,4	Object name
DESCRIPTION	R	STRING	D,E	3,4	Object description
RTYPE	R	BYTE	C,D,E	1,2,3,4	DRICONE ref. type is 49.
BOOL_A_H	R	BYTE	C,D,E	1,2,3,4	BOOLean A - H. Extra free flags to be used by PC program. BOOL A = Bit 0 BOOL B = Bit 1 . . BOOL H = Bit 7 See BOOL_A_H bits table below
STATUS	R/W	WORD	C,D,E	1,2,3,4	Status bits 0 - 7 See status bits table below
ALARM_UNACK	R	LONG	C,D,E	1,2,3,4	Bit 0 = Indicates if there is an unacknowledged alarm for bit number 0 in the IND1 word . . . Bit 31 = Indicates if there is an unacknowledged alarm for bit number 15 in the IND2 word
IND1	R	WORD	C,D,E	1,2,3,4	The INDication 1 terminal contains status indications from PC.

					See IND1 bits table below.
IND2	R	WORD	C,D,E	1,2,3,4	The INDication 2 terminal contains status indications from PC. See IND2 bits table below.
R_RES	R	FLOAT	C,D,E, T,S	1,2,3,4	In main MMCX DB = Motor current value
I_RES	R	LONG	C,D,E	1,2,3,4	In main MMCX DB = Nominal speed value
INTWA	R	WORD	C,D,E	1,2,3,4	In main MMCX DB = The integer word is used to indicate different configuration alternative regarding help MMCX DB element. See INTWA bits table below.
INTWB	R	WORD	C,D,E	1,2,3,4	In main MMCX DB = Integer indicates different visibility possibilities for the presentation. See INTWB bits table below.
PRES_A	R	STRING	D,E	2,3,4	In main MMCX DB = Characters 1 - 5 is used for absolute speed unit, 6 - 10 is used for REAL_B unit.
PRES_B	R	STRING	D,E	2,3,4	In main MMCX DB = Used for free text of variable shown for REAL_B.
ACT_PRES_TXT	R	STRING	C,D,E	1,2,3,4	Presentation of active interlocks. The string comes from one of the texts I2_08TXT to I2_14TXT. The text is prioritized by the active signal with the lowest number among the signals IND2_08 to IND2_14.
REAL_A	R	FLOAT	C,D,E, T,S	1,2,3,4	In main MMCX DB = Actual Torque
REAL_B	R	FLOAT	C,D,E	1,2,3,4	In main MMCX DB = Arbitrarily value (frequency, power etc.)
REAL_C	R	FLOAT	C,D,E, T,S	1,2,3,4	In main MMCX DB = Actual speed
REAL_D	R	FLOAT	C,D,E	1,2,3,4	In main MMCX DB = External speed setpoint in % In fault MMCX DB = External speed setpoint in rpm
REAL_E	R	FLOAT	C,D,E	1,2,3,4	In main MMCX DB = External torque setpoint in % In fault MMCX DB = Nominal power
REAL_PARAM	R/W	FLOAT	D,E	3,4	In main MMCX DB = Operator controlled setpoint (speed, torque) in % In fault MMCX DB = Operator controlled setpoint (speed) in rpm
INTL_PARAM	R	LONG	D,E	3,4	Not used.
RRES_HL	R	FLOAT	D,E	3,4	In main MMCX DB =

					Highest limit used by PC for limit check of the Motor current.
RRES_LL	R	FLOAT	D,E	3,4	In main MMCX DB = Lowest limit used by PC for limit check of the Motor current.
RRES_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = Minimum value of Motor Current.
RRES_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = Maximum value of Motor Current.
IRES_MIN	R	LONG	D,E	3,4	Not used
IRES_MAX	R	LONG	D,E	3,4	Not used
REALA_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = Torque minimum value
REALA_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = Torque maximum value
REALB_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = Minimum value an arbitrarily value from Drive (frequency, power and so on)
REALB_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = Maximum value an arbitrarily value from Drive (frequency, power and so on)
REALC_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = Actual speed minimum value.
REALC_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = Actual speed maximum value.
REALD_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = External speed setpoint in % minimum value.
REALD_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = External speed setpoint in % maximum value.
REALE_MIN	R	FLOAT	D,E	3,4	In main MMCX DB = External torque setpoint in % minimum value. In fault MMCX DB = Nominal current
REALE_MAX	R	FLOAT	D,E	3,4	In main MMCX DB = External torque setpoint in % maximum value. In fault MMCX DB = Nominal torque
IND_REPEAT_BLK	R	LONG	D,E	3,4	Shows which of the signals IND1_00 to IND2_15 that have repeated error blocks. Bit 0 = IND1_00 . . Bit 31 = IND2_15
I2_08TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IC1 Text
I2_09TXT	R	STRING	D,E	4	Not used
I2_10TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IB1 Text
I2_11TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IB2 Text
I2_12TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IB3 Text

I2_13TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IB4 Text
I2_14TXT	R	STRING	D,E	4	In main MMCX DB = Interlock IA Text
MORD	Write Only	WORD			Group data for Manual ORDers from the operator. Use bit 0 – 15 See MORD bits table below

21.21.1 DRICONE STATUS bits

Bit	R/W	Description	
0	R	IMPLEMENTED	
1	R/W	ALARM_BLK	Write: 1 = Block alarm, 0 = Deblock alarm
2	R	ALARM_PER_BLK	
3	R/W	PRINT_BLK	Write: 1 = Block Printer, 0 = Deblock printer
4	R	IND1_DIST	
5	R	IND2_DIST	
6	R/W	SELECTED	Write 1 = Select, 0 = Deselect
7	R/W	AU_IND	Write 1 = Acknowledge alarms

21.21.2 DRICONE BOOL_A_H bits

Bit	R/W	Description
0	R	MAN
1	R	AUTO
2	R	JOG is point of control
3	R	LOCAL is point of control
4	R	External setpoint handling
5	R	Start interlocks IBF are used
6	R	Flag to indicate if there is changes in the status word or in the limit word.
7	R	0=ACS type of Drive. 1=DCS type of Drive.

21.21.3 DRICONE INTWA bits

Bit 0 and 1 of INTWA in main MMCX DB-element indicates whether there is a fault or an alarm MMCX DB-element.

Bit	R/W	Description
0	R	Use fault MMCX DB-element
1	R	Use alarm MMCX DB-element

Limit Information in INTWA of fault MMCX DB-Element

Bit	R/W	Description
0	R	Torque Motor Limit
1	R	SPC Torque Min. Limit
2	R	SPC Torque Max Limit
3	R	Torque User Current Limit
4	R	Torque Inverter Current Limit
5	R	Torque Min. Limit
6	R	Torque Max Limit
7	R	Torque Reference Min. Limit
8	R	Torque Reference Max Limit
9	R	Flux Min. Limit
10	R	Frequency Min. Limit
11	R	Frequency Max Limit
12	R	DC Under Voltage Limit
13	R	DC Over Voltage Limit

14	R	Torque Limit
15	R	Frequency Limit

21.21.4 DRICONE INTWB bits

INTWB in main MMCX DB-element controls the visibility of setpoints and actual values. Setpoints and actual values which are going to presented should have their corresponding bit set in INTWB.

Bit	R/W	Description
0	R	Speed
1	R	Current
2	R	Torque
3	R	Arbitrarily value
11	R	Speed in rpm
12	R	Speed in %
14	R	Torque setpoint

Auxiliary Status Information in INTWB of fault MMCX DB-Element

Bit	R/W	Description
0	R	Log Data Ready
3	R	Motor Magnetized
5	R	Synch Ready
7	R	Identity Run Done
10	R	Torque Control (Could be bit 9 as the ABB documentation says both bit 9 and 10)
11	R	Zero Speed (Could be bit 10 as the ABB documentation says both bit 10 and 11)

21.21.5 DRICONE IND1 bits

Status data for an engineered drive with ABB Drive profile.

Bit	R/W	Description
1	R	Speed is outside tolerance window.
2	R	Emergency stop function has failed.
4	R	External interlocking in the Drive prevents the run.
6	R	Not started after the parameters are set in group 99. (Not valid for DCS 600)
7	R	1=Active alarm in drive 0=No active alarm in drive
8	R	Inhibit of start (Not valid for DCS 600)
9	R	Drive has reached one or several of its limits
11	R	1=Active fault in Drive 0=No active faults in Drive

Status data for a DCS 500 drive.

Bit	R/W	Description
7	R	1=Active alarm in drive 0=No active alarm in drive
11	R	1=Active fault in Drive 0=No active fault in Drive

21.21.6 DRICONE IND2 bits

Status data for an engineered drive with ABB Drive profile.

Bit	R/W	Description
0	R	1=Drive is ready to switch on 0=Drive is not ready to switch on
1	R	1=Ready to be started 0=Not ready
2	R	1=Drive is running 0=Drive is stopped
4	R	1=No emergency (OFF2 inactive)

		0=Emergency coast stop
5	R	1=No emergency stop (OFF3 inactive) 0=Fast Emergency stop
6	R	1=Swich on inhibit 0=Switch on allowed
7	R	1=Drive at reference 0=Drive not at reference
8	R	Interlock IC1
9	R	1=Drive in Remote Mode 0=Drive in Local mode
10	R	Interlock IB1
11	R	Interlock IB2
12	R	Interlock IB3
13	R	Interlock IB4
14	R	Interlock IA

Status data for a DCS 500 drive.

Bit	R/W	Description
0	R	1=Drive is ready to switch on 0=Drive is not ready to switch on
1	R	1=Ready to be started 0=Not ready
2	R	1=Drive is running 0=Drive is stopped
5	R	1=No emergency stop 0=Emergency stop
8	R	Interlock IC1
10	R	Interlock IB1
11	R	Interlock IB2
12	R	Interlock IB3
13	R	Interlock IB4
14	R	Interlock IA

21.21.7 DRICONE MORD bits

Trig by writing 1 to the bit

Bit	R/W	DB Ref	Description
0	W	MORD0	
1	W	MORD1	
2	W	MORD2	Start Drive
3	W	MORD3	Stop Drive
4	W	MORD4	Block interlocks IB1 and IB3
5	W	MORD5	Reset block interlocks IB1 and IB3
6	W	MORD6	Operator controlled setpoint
7	W	MORD7	External controlled setpoint
8	W	MORD8	Reset drive fault
9	W	MORD9	
10	W	MORD10	Point of control is CENTRAL, sets the enable flag of the drive to 1
11	W	MORD11	Point of control is LOCAL, sets the enable flag of the drive to 1
12	W	MORD12	Point of control is JOG, sets the enable flag of the drive to 1
13	W	MORD13	Point of control is OUT OF SERVICE, sets the enable flag of the drive to 0
14	W	MORD14	Control mode is MAN
15	W	MORD15	Control mode is AUTO

22 Appendix B, System Status Objects

The MB3 OPC server contain objects for manual supervision and fault tracing of Advant Controller 410 or 450 nodes. These objects are created automatically for each device. If a device has no objects configured then the system status objects will not be browse able from an OPC client for the device. The available system status objects for a device are:

Object	Description
AC OVERVIEW	System status overview of a node, including node, net, description and status.
AC NODE	System status of the peripheral equipment of the selected node. It includes status for Power Supply, Processors, Program Cards, Free Programmable Modules, 500 Modules, Fan, S100 I/O Bus Extender, Additional (user defined - & PC triggered supervision) Devices, Terminals, Printers and External Communication.
AC NET	System status of the masternet connected to the selected node.
AC FIELDBUS_1 - AC FIELDBUS_7	System status showing the status of Advant Fieldbus 100 devices (AC110, S800 station. Drives systems etc) and Profibus DP devices. There are seven objects representing 7 pages with max 50 devices on each page.
AC SEL_FIELDBUS_1_1 - AC SEL_FIELDBUS_7_50	System status showing the status of the selected fieldbus device 1- 50 from one of the fieldbus pages 1 – 7. It can either be an AF100 bus unit or a S800 I/O station with its I/O modules. There are 7 * 50 = 350 system objects representing each selected fieldbus device.
AC MASTER_FIELDBUS_1 - AC MASTER_FIEDLBUS_7	System status showing the status of S400 remote boards. There are seven objects representing 7 buses of S400 remote boards.
AC S100_IO	System status showing the status of local single S100 I/O boards.
AC S100_IO2	System status showing the status of miscellaneous S100 boards.
AC S100_RED	System status showing the status of redundant S100 I/O boards.
AC S100_EXT	System status showing the status of the S100 I/O Bus extenders.

22.1 AC OVERVIEW Object

Field	R/W	Data Type	Sub Type	Description
TYPE	R	WORD	D,E	The node type: AC = 64
NETW	R	BYTE	D,E	The nodes network number.
NODE	R	BYTE	D,E	The nodes node number.
STATUS	R	LONG	D,E	The nodes overview status. See bits in table below.
DESC	R	STRING	D,E	The nodes overview description. This description is set in the controller database element AC10 or AC450.

22.1.1 AC OVERVIEW STATUS bits

Bit	R/W	Description
0	R	Implemented
1	R	Valid
2	R	Error

22.2 AC NODE Object

Field	R/W	Data Type	Sub Type	Description
C_POW_A	R	LONG	D,E	Controller Power Supply A status bits. See table STATUS bits 1 below.

C_POW_B	R	LONG	D,E	Controller Power Supply B status bits. See table STATUS bits 1 below.
C_REG_RED	R	LONG	D,E	Controller Regulator redundancy status bits. See table STATUS bits 1 below.
C_REG_1	R	LONG	D,E	Controller Regulator 1 status bits. See table STATUS bits 1 below.
C_REG_2	R	LONG	D,E	Controller Regulator 2 status bits. See table STATUS bits 1 below.
C_REG_3	R	LONG	D,E	Controller Regulator 3 status bits. See table STATUS bits 1 below.
C_REG_4	R	LONG	D,E	Controller Regulator 4 status bits. See table STATUS bits 1 below.
C_BAT	R	LONG	D,E	Controller Battery status bits. See table C_BAT STATUS bits below.
IO_POW_A	R	LONG	D,E	I/O Power supply A status bits. See table STATUS bits 1 below.
IO_POW_B	R	LONG	D,E	I/O Power supply B status bits. See table STATUS bits 1 below.
IO_REG_RED	R	LONG	D,E	IO Regulator Redundancy status bits. See table STATUS bits 1 below.
CPU_LR	R	LONG	D,E	Processor module L and R and S100 I/O Bus extension status bits. See table CPU_LR STATUS bits below.
PR_CARD1	R	LONG	D,E	Program card 1 status bits. See table STATUS bits 2 below.
PR_CARD1_POS	R	BYTE	D,E	Program card 1 position.
PR_CARD1_SUBPOS	R	BYTE	D,E	Program card 1 sub position.
PR_CARD2	R	LONG	D,E	Program card 2 status bits. See table STATUS bits 2 below.
PR_CARD2_POS	R	BYTE	D,E	Program card 2 position.
PR_CARD2_SUBPOS	R	BYTE	D,E	Program card 2 sub position.
PR_CARD3	R	LONG	D,E	Program card 3 status bits. See table STATUS bits 2 below.
PR_CARD3_POS	R	BYTE	D,E	Program card 3 position.
PR_CARD3_SUBPOS	R	BYTE	D,E	Program card 3 sub position.
PR_CARD4	R	LONG	D,E	Program card 4 status bits. See table STATUS bits 2 below.
PR_CARD4_POS	R	BYTE	D,E	Program card 4 position.
PR_CARD4_SUBPOS	R	BYTE	D,E	Program card 4 sub position.
LOC_BRD1	R	LONG	D,E	Local board 1 status bits. See table STATUS bits 2 below.
LOC_BRD1_TYPE	R	WORD	D,E	Local board 1 type.
LOC_BRD1_NAME	R	STRING	D,E	Local board 1 name.
LOC_BRD2	R	LONG	D,E	Local board 2 status bits. See table STATUS bits 2 below.
LOC_BRD2_TYPE	R	WORD	D,E	Local board 2 type.
LOC_BRD2_NAME	R	STRING	D,E	Local board 2 name.
LOC_BRD3	R	LONG	D,E	Local board 3 status bits. See table STATUS bits 2 below.
LOC_BRD3_TYPE	R	WORD	D,E	Local board 3 type.
LOC_BRD3_NAME	R	STRING	D,E	Local board 3 name.
LOC_BRD4	R	LONG	D,E	Local board 4 status bits. See table STATUS bits 2 below.
LOC_BRD4_TYPE	R	WORD	D,E	Local board 4 type.
LOC_BRD4_NAME	R	STRING	D,E	Local board 4 name.
LOC_BRD5	R	LONG	D,E	Local board 5 status bits. See table STATUS bits 2 below.
LOC_BRD5_TYPE	R	WORD	D,E	Local board 5 type.

LOC_BRD5_NAME	R	STRING	D,E	Local board 5 name.
LOC_BRD6	R	LONG	D,E	Local board 6 status bits. See table STATUS bits 2 below.
LOC_BRD6_TYPE	R	WORD	D,E	Local board 6 type.
LOC_BRD6_NAME	R	STRING	D,E	Local board 6 name.
LOC_BRD7	R	LONG	D,E	Local board 7 status bits. See table STATUS bits 2 below.
LOC_BRD7_TYPE	R	WORD	D,E	Local board 7 type.
LOC_BRD7_NAME	R	STRING	D,E	Local board 7 name.
LOC_BRD8	R	LONG	D,E	Local board 8 status bits. See table STATUS bits 2 below.
LOC_BRD8_TYPE	R	WORD	D,E	Local board 8 type.
LOC_BRD8_NAME	R	STRING	D,E	Local board 8 name.
LOC_BRD9	R	LONG	D,E	Local board 9 status bits. See table STATUS bits 2 below.
LOC_BRD9_TYPE	R	WORD	D,E	Local board 9 type.
LOC_BRD9_NAME	R	STRING	D,E	Local board 9 name.
LOC_BRD10	R	LONG	D,E	Local board 10 status bits. See table STATUS bits 2 below.
LOC_BRD10_TYPE	R	WORD	D,E	Local board 10 type.
LOC_BRD10_NAME	R	STRING	D,E	Local board 10 name.
LOC_BRD11	R	LONG	D,E	Local board 11 status bits. See table STATUS bits 2 below.
LOC_BRD11_TYPE	R	WORD	D,E	Local board 11 type.
LOC_BRD11_NAME	R	STRING	D,E	Local board 11 name.
LOC_BRD12	R	LONG	D,E	Local board 12 status bits. See table STATUS bits 2 below.
LOC_BRD12_TYPE	R	WORD	D,E	Local board 12 type.
LOC_BRD12_NAME	R	STRING	D,E	Local board 12 name.
LOC_BRD13	R	LONG	D,E	Local board 13 status bits. See table STATUS bits 2 below.
LOC_BRD13_TYPE	R	WORD	D,E	Local board 13 type.
LOC_BRD13_NAME	R	STRING	D,E	Local board 13 name.
LOC_BRD14	R	LONG	D,E	Local board 14 status bits. See table STATUS bits 2 below.
LOC_BRD14_TYPE	R	WORD	D,E	Local board 14 type.
LOC_BRD14_NAME	R	STRING	D,E	Local board 14 name.
LOC_BRD15	R	LONG	D,E	Local board 15 status bits. See table STATUS bits 2 below.
LOC_BRD15_TYPE	R	WORD	D,E	Local board 15 type.
LOC_BRD15_NAME	R	STRING	D,E	Local board 15 name.
C_FAN	R	LONG	D,E	Controller Fan status bits. See table STATUS bits 1 below.
IO_FAN	R	LONG	D,E	I/O Fan status bits. See table STATUS bits 1 below.
USR_SUP1	R	LONG	D,E	User supervision 1 status bits. See table STATUS bits 1 below.
USR_SUP1_NAME	R	STRING	D,E	User supervision 1 name.
USR_SUP2	R	LONG	D,E	User supervision 2 status bits. See table STATUS bits 1 below.
USR_SUP2_NAME	R	STRING	D,E	User supervision 2 name.
USR_SUP3	R	LONG	D,E	User supervision 3 status bits. See table STATUS bits 1 below.
USR_SUP3_NAME	R	STRING	D,E	User supervision 3 name.
USR_SUP4	R	LONG	D,E	User supervision 4 status bits. See table STATUS bits 1 below.
USR_SUP4_NAME	R	STRING	D,E	User supervision 4 name.

PC_SUP1	R	LONG	D,E	PC supervision 1 status bits. See table STATUS bits 1 below.
PC_SUP1_NAME	R	STRING	D,E	PC supervision 1 name.
PC_SUP2	R	LONG	D,E	PC supervision 2 status bits. See table STATUS bits 1 below.
PC_SUP2_NAME	R	STRING	D,E	PC supervision 2 name.
PC_SUP3	R	LONG	D,E	PC supervision 3 status bits. See table STATUS bits 1 below.
PC_SUP3_NAME	R	STRING	D,E	PC supervision 3 name.
PC_SUP4	R	LONG	D,E	PC supervision 4 status bits. See table STATUS bits 1 below.
PC_SUP4_NAME	R	STRING	D,E	PC supervision 4 name.
TERM1	R	LONG	D,E	Terminal 1 status bits. See table STATUS bits 1 below.
TERM2	R	LONG	D,E	Terminal 2 status bits. See table STATUS bits 1 below.
TERM3	R	LONG	D,E	Terminal 3 status bits. See table STATUS bits 1 below.
TERM4	R	LONG	D,E	Terminal 4 status bits. See table STATUS bits 1 below.
PRINT	R	LONG	D,E	Printer status bits. See table STATUS bits 1 below.
XCOM1	R	LONG	D,E	Xcom 1 status bits. See table STATUS bits 1 below.
XCOM2	R	LONG	D,E	Xcom 2 status bits. See table STATUS bits 1 below.
XCOM3	R	LONG	D,E	Xcom 3 status bits. See table STATUS bits 1 below.

22.2.1 AC NODE – STATUS bits 1

Bit	R/W	Description
0	R	Implemented
1	R	Error

22.2.2 AC NODE – C_BAT STATUS bits

Bit	R/W	Description
0	R	Battery A Implemented
1	R	Battery Back A Error
2	R	Battery Channel A Error
3	R	Battery B Implemented
4	R	Battery Back B Error
5	R	Battery Channel B Error

22.2.3 NODE - CPU_LR STATUS bits

Bit	R/W	Description
0	R	CPU L Implemented
1	R	CPU L Standby
2	R	CPU L Error
3	R	CPU L Warning
4	R	CPU R Implemented
5	R	CPU R Standby
6	R	CPU R Error
7	R	CPU R Warning
8	R	S100 I/O Bus Extension Error 1

9	R	S100 I/O Bus Extension Error 2
10	R	S100 I/O Bus Extension Connected 1
11	R	S100 I/O Bus Extension Connected 2

22.2.4 AC NODE –STATUS bits 2

Bit	R/W	Description
0	R	Implemented
1	R	Error
2	R	Warning

22.3 NET Object

Field	R/W	Data Type	Sub Type	Description
NET1	R	BYTE	D,E	Net number of first node on the masternet.
NODE1	R	BYTE	D,E	Node number of first node on the masternet.
STATUS1	R	LONG	D,E	Status of the first node on the masternet. See table below.
……				
NET180	R	BYTE	D,E	Net number of 180th node on the masternet.
NODE180	R	BYTE	D,E	Node number of 180th node on the masternet.
STATUS180	R	LONG	D,E	Status of the 180th node on the masternet. See table below.

22.3.1 AC NET – STATUS bits

Bit	R/W	Description
0	R	Link down
1	R	Error
2	R	Bus A Error
3	R	Bus B Error
4	R	Master
5	R	MB100
6	R	MB200
7	R	MB300
9	R	MNET
10	R	UNIDENTIFIED
11	R	GCOM
12	R	RCOM
13	R	MVI
14	R	MB300E
15	R	MB300R

22.4 AC FIELDBUS_x Object

X is a number for fieldbus page 1 – 7

Field	R/W	Data Type	Sub Type	Description
NAME1	R	STRING	D,E	Name of first AF100 fieldbus device or Profibus DP device on page x.
TYPEN1	R	STRING	D,E	Type name of first AF100 fieldbus device or Profibus DP device on page x. Type name is only shown if Advant Controller 400 has version 1.3 or later.

BUS1	R	BYTE	D,E	Bus number of first AF100 fieldbus device or Profibus DP device on page x.
STN1	R	BYTE	D,E	Station number of first AF100 fieldbus device or Profibus DP device on page x.
TYPE1	R	BYTE	D,E	Type of first AF100 fieldbus device or Profibus DP device on page x.
STATUS1	R	WORD	D,E	Status of first AF100 fieldbus device or Profibus DP device on page x. See table below.
……...				
NAME50	R	STRING	D,E	Name of 50th AF100 fieldbus device or Profibus DP device on page x.
TYPEN50	R	STRING	D,E	Type name of 50th AF100 fieldbus device or Profibus DP device on page x. Type name is only shown if Advant Controller 400 has version 1.3 or later.
BUS50	R	BYTE	D,E	Bus number of 50th AF100 fieldbus device or Profibus DP device on page x.
STN50	R	BYTE	D,E	Station number of 50th AF100 fieldbus device or Profibus DP device on page x.
TYPE50	R	BYTE	D,E	Type of 50th AF100 fieldbus device or Profibus DP device on page x.
STATUS50	R	WORD	D,E	Status of 50th AF100 fieldbus device or Profibus DP device on page x. See table below.

22.4.1 AC FIELDBUS_x – STATUS bits

Bit	R/W	Description
0	R	Implemented
1	R	Error
2	R	Warning
3	R	Bus 1 Red cables
4	R	Bus 1 Cable 1 Error
5	R	Bus 1 Cable 2 Error
6	R	Bus 2 Red Cables
7	R	Bus 2 Cable 1 Error
8	R	Bus 2 Cable 2 Error
9	R	In service
10	R	Redundant
11	R	Error 1
12	R	Error 2
13	R	Master
14	R	AF100 Station

22.5 AC SEL_FIELDBUS_x_y Object

X is a number for fieldbus page 1 – 7
Y is a number for fieldbus index 1 – 50 per page.

You can get more information of an AF100 bus unit or a S800 I/O station from the FIELDBUS_x page. Create a SEL_FIELDBUS_x_y block for the page and index where the AF100 bus unit or S800 I/O station is located. The MB3 OPC server has to read the FIELDBUS_x object where the AF100 bus unit or S800 I/O station is located at least once before it can read the SEL_FIELDBUS_x_y object for the AF100 bus unit or S800 I/O station.

If the selected fieldbus device in position x, y is an Advant fieldbus 100 unit then the following fields are used:

Field	R/W	Data Type	Sub Type	Description

AF100_NAME	R	STRING	D,E	The name of the selected AF100 bus unit.
AF100_TYPE	R	STRING	D,E	The type name of the selected AF100 bus unit.
AF100_STATUS	R/W	LONG	D,E	The status bits of the selected AF100 bus unit. See table below. Write: 2 = Change Over if redundant.
AF100_BUS	R	BYTE	D,E	The bus number of the selected AF100 bus unit
AF100_STN	R	BYTE	D,E	The station number of the selected AF100 bus unit
AF100_POS1	R	BYTE	D,E	The position 1 of the selected AF100 bus unit
AF100_SUBPOS1	R	BYTE	D,E	The sub position 1 of the selected AF100 bus unit
AF100_POS2	R	BYTE	D,E	The position 2 of the selected AF100 bus unit
AF100_SUBPOS2	R	BYTE	D,E	The sub position 2 of the selected AF100 bus unit

If the selected fieldbus device in position x, y is a S800 I/O station then the following fields are used:

Field	**R/W**	**Data Type**	**Sub Type**	**Description**
S800S_NAME	R	STRING	D,E	The name of the selected S800 I/O station.
S800S_TYPE	R	STRING	D,E	The type name of the selected S800 I/O station.
S800S_STATUS	R/W	LONG	D,E	The status bits of the selected S800 I/O station. See table below. Write: 0 = Deactivate 1 = Activate 2 = Change Over if redundant
S800S_BUS1	R	BYTE	D,E	The bus 1 number of the S800 I/O station.
S800S_STN1	R	BYTE	D,E	The station 1 number of the S800 I/O station.
S800S_POS1	R	WORD	D,E	The position 1 number of the S800 I/O station.
S800S_BUS2	R	BYTE	D,E	The bus 2 number of the S800 I/O station.
S800S_STN2	R	BYTE	D,E	The station 2 number of the S800 I/O station.
S800S_POS2	R	WORD	D,E	The position 2 number of the S800 I/O station.
S800S_F1	R	STRING	D,E	Power supply text 1
S800S_F2	R	STRING	D,E	Power supply text 2
S800M1_NAME	R	STRING	D,E	The name of S800 module 1 of the selected S800 I/O station.
S800M1_TYPE	R	STRING	D,E	The type name of S800 module 1 of the selected S800 I/O station.
S800M1_STATUS	R/W	LONG	D,E	The status bits of S800 module 1 of the selected S800 I/O station. See table below. Write: 0 = Deactivate 1 = Activate
S800M1_BUS1	R	BYTE	D,E	The bus 1 number of S800 module 1 of the selected S800 I/O station.
S800M1_STN1	R	BYTE	D,E	The station 1 number of S800 module 1 of the selected S800 I/O station.
S800M1_POS1	R	WORD	D,E	The position 1 number of S800 module 1 of the selected S800 I/O station.
S800M1_BUS2	R	BYTE	D,E	The bus 2 number of S800 module 1 of the selected S800 I/O station.
S800M1_STN2	R	BYTE	D,E	The station 2 number of S800 module 1 of the selected S800 I/O station.
S800M1_POS2	R	WORD	D,E	The position 2 number of S800 module 1 of the selected S800 I/O station.

S800M1_CHSTATE	R	WORD	D,E	The channel state of S800 module 1 of the selected S800 I/O station.
S800M1_CHSTATUS	R	WORD	D,E	The channel status of S800 module 1 of the selected S800 I/O station.
S800M1_CHANNEL	R	WORD	D,E	The channel of S800 module 1 of the selected S800 I/O station.
…….				
S800M24_NAME	R	STRING	D,E	The name of S800 module 24 of the selected S800 I/O station.
S800M24_TYPE	R	STRING	D,E	The type name of S800 module 24 of the selected S800 I/O station.
S800M24_STATUS	R/W	LONG	D,E	The status of S800 module 24 of the selected S800 I/O station. See table below. Write: 0 = Deactivate 1 = Activate
S800M24_BUS1	R	BYTE	D,E	The bus 1 number of S800 module 24 of the selected S800 I/O station.
S800M24_STN1	R	BYTE	D,E	The station 1 number of S800 module 24 of the selected S800 I/O station.
S800M24_POS1	R	WORD	D,E	The position 1 number of S800 module 24 of the selected S800 I/O station.
S800M24_BUS2	R	BYTE	D,E	The bus 2 number of S800 module 24 of the selected S800 I/O station.
S800M24_STN2	R	BYTE	D,E	The station 2 number of S800 module 24 of the selected S800 I/O station.
S800M24_POS2	R	WORD	D,E	The position 2 number of S800 module 24 of the selected S800 I/O station.
S800M24_CHSTATE	R	WORD	D,E	The channel state of S800 module 24 of the selected S800 I/O station.
S800M24_CHSTATUS	R	WORD	D,E	The channel status of S800 module 24 of the selected S800 I/O station.
S800M24_CHANNEL	R	WORD	D,E	The channel of S800 module 24 of the selected S800 I/O station.

22.5.1 AC SEL_FIELDBUS_x_y – AF100_STATUS bits

Bit	R/W	Description
0	R	Implemented
1	R	Error
2	R	Warning
3	R	Bus 1 Red Cables
4	R	Bus 1 Cable 1 Error
5	R	Bus 1 Cable 2 Error
6	R	Bus 2 Red Cables
7	R	Bus 2 Cable 1 Error
8	R	Bus 2 Cable 2 Error
10	R	Redundant
11	R	Error 1
12	R	Error 2
13	R	Master mode
15	R	Warning 1
16	R	Warning 2

22.5.2 AC SEL_FIELDBUS_x_y – S800S_STATUS bits

Bit	R/W	Description
0	R	Implemented
1	R	Error
2	R	Warning
3	R	Red Cables
4	R	Bus Cable 1 Error
5	R	Bus Cable 2 Error
6	R	Red Cables R
7	R	Bus 2 Cable 1 Error
8	R	Bus 2 Cable 2 Error
9	R	In service
10	R	Redundant
11	R	Error 1
12	R	Error 2
13	R	Master mode
14	R	Selectable
15	R	Supervision Power Supply
16	R	External Supervision Power Supply
17	R	Redundant Power A
18	R	Redundant Power B
19	R	Enable status A
20	R	Enable status B
21	R	Status A
22	R	Status B
23	R	Warning 1
24	R	Warning 2

22.5.3 AC SEL_FIELDBUS_x_y – S800Mx_STATUS bits

Bit	R/W	Description
0	R	Implemented
1	R	Error
2	R	Warning
9	R	In service
10	R	Redundant
11	R	Error 1
12	R	Error 2
13	R	Master mode
14	R	OSP
15	R	Warning 1
16	R	Warning 2

22.6 AC MASTER_FIELDBUS_x Object

X = master fieldbus number 1 – 7.

Field	R/W	Data Type	Sub Type	Description
NAME1	R	STRING	D,E	Name of first master fieldbus unit on bus x.
STATUS1	R	LONG	D,E	Status of first master fieldbus unit on bus x. See table below.
……..				
NAME17	R	STRING	D,E	Name of 17th master fieldbus unit on bus x.

STATUS17	R	LONG	D,E	Status of 17th master fieldbus unit on bus x. See table below.

22.6.1 AC MASTER_FIELDBUS_x – STATUS bits

Bit	R/W	Description
0	R	Error
1	R	Warning
2	R	Red buses
3	R	Bus A Error flag
4	R	Bus B Error flag
5	R	Implemented flag

22.7 AC S100_IO Object

Field	R/W	Data Type	Sub Type	Description
AI_NAME1	R	STRING	D,E	Name of first S100 AI board.
AI_STATUS1	R/W	LONG	D,E	Status of first S100 AI board. See table below. Write: 0 = Deactivate 1 = Activate
……..				
AI_NAME50	R	STRING	D,E	Name of 50th S100 AI board.
AI_STATUS50	R	LONG	D,E	Status of 50th S100 AI board. See table below. Write: 0 = Deactivate 1 = Activate
AO_NAME1	R	STRING	D,E	Name of first S100 AO board.
AO_STATUS1	R	LONG	D,E	Status of first S100 AO board. See table below. Write: 0 = Deactivate 1 = Activate
……..				
AO_NAME50	R	STRING	D,E	Name of 50th S100 AO board.
AO_STATUS50	R	LONG	D,E	Status of 50th S100 AO board. See table below. Write: 0 = Deactivate 1 = Activate
DI_NAME1	R	STRING	D,E	Name of first S100 DI board.
DI_STATUS1	R	LONG	D,E	Status of first S100 DI board. See table below. Write: 0 = Deactivate 1 = Activate
……..				
DI_NAME50	R	STRING	D,E	Name of 50th S100 DI board.

DI_STATUS50	R	LONG	D,E	Status of 50th S100 DI board. See table below. Write: 0 = Deactivate 1 = Activate
DO_NAME1	R	STRING	D,E	Name of first S100 DO board.
DO_STATUS1	R	LONG	D,E	Status of first S100 DO board. See table below. Write: 0 = Deactivate 1 = Activate
……...				
DO_NAME50	R	STRING	D,E	Name of 50th S100 DO board.
DO_STATUS50	R	LONG	D,E	Status of 50th S100 DO board. See table below. Write: 0 = Deactivate 1 = Activate

22.7.1 AC S100_IO – STATUS bits

Bit	R/W	Description
0	R	Error
1	R	Out of service

22.8 AC S100_IO2 Object

Field	R/W	Data Type	Sub Type	Description
NAME1	R	STRING	D,E	Name of first S100 misc board.
STATUS1	R/W	LONG	D,E	Status of first S100 misc board. See table below.
……...				
NAME60	R	STRING	D,E	Name of 60th S100 misc board.
STATUS60	R	LONG	D,E	Status of 60th S100 misc board. See table below.

22.8.1 AC S100_IO2 – STATUS bits

Bit	R/W	Description
0	R	Error
1	R	Warning

22.9 AC S100_RED Object

Field	R/W	Data Type	Sub Type	Description
NAME1	R	STRING	D,E	Name of first redundant I/O board.
STATUS1	R/W	LONG	D,E	Status of first redundant board. See table below. Write: 0 = Deactivate 1 = Activate 2 = Change Over
……...				

NAME60	R	STRING	D,E	Name of 60th redundant I/O board.
STATUS60	R	LONG	D,E	Status of 60th redundant I/O board. See table below. Write: 0 = Deactivate 1 = Activate 2 = Change Over

22.9.1 AC S100_RED – STATUS bits

Bit	R/W	Description
0	R	Error
1	R	Type
2	R	Implemented
3	R	Warning
4	R	Redundant
5	R	IO Board 1 Error
6	R	I/O Board 2 Error
7	R	Master
8	R	In service
31	R	Empty space

22.10 AC S100_EXT Object

Field	R/W	Data Type	Sub Type	Description
NAME1	R	STRING	D,E	Name of first S100 I/O bus extender.
STATUS1	R	LONG	D,E	Status of first S100 I/O bus extender. See table below.
DESC1	R	STRING	D,E	Description of first S100 I/O bus extender.
TYPE1	R	STRING	D,E	Type name of first S100 I/O bus extender.
……..				
NAME25	R	STRING	D,E	Name of 25th S100 I/O bus extender.
STATUS25	R	LONG	D,E	Status of 25th S100 I/O bus extender. See table below.
DESC25	R	STRING	D,E	Description of 25th S100 I/O bus extender.
TYPE25	R	STRING	D,E	Type name of 25th S100 I/O bus extender.

22.10.1 AC S100_EXT – STATUS bits

Bit	R/W	Description
0	R	Implemented
3	R	Active 1
4	R	Active 2
5	R	Warning 1
6	R	Warning 2
7	R	Error 1
8	R	Error 2
10	R	S100 Connect 1
11	R	S100 Connect 2

23 Appendix C, MB3NLS.INI File Format

```
[MB3NLS]
Å=]
Ä=[
Ö=\
```

Enter your own national language characters and their replacements in this file. These replacements will be used when the MB3 OPC server sends out symbolic name translation messages to the ABB controllers. If the file is empty or the characters to the right of the equal sign is empty then no replacements will occur. The location of the file is the working directory of the MB3 OPC server.

The example above shows the file for Sweden. This is the file that is installed with the MB3 OPC server.
The character 'Å' has the value ']' in the ABB controller.
The character 'Ä' has the value '[' in the ABB controller.
The character 'Ö' has the value '\' in the ABB controller.

These replacements are needed because of different character tables in the ABB controller and in the MB3 OPC server.

This file is also used to translate all object texts to the right format, both when reading and writing.

24 Appendix D, Process Event Reasons and Codes

Reason Number	Reason
0	NORMAL
1	BLOCKED
2	DEBLOCKED
3	ALARM_ON
4	ALARM_OFF
5	SYS_TEXT
6	VAL_CHANGE
7	ACK_LIST
8	CLEAR_PERSIST
9	EVENT_ON
10	EVENT_OFF
11	STATCHK_ON
12	UNACK_ON
13	UNACK_OFF

Code Number	Event
1	E_DUM_EV_PROP
2	E_IND_VALUE
3	E_ERROR
4	E_HI_LIM2
5	E_HI_LIM1
6	E_LO_LIM1
7	E_LO_LIM2
8	E_ACT_VALUE
9	E_DIST_PRINT
10	E_DIST_ALARM
11	E_PROC_UPDATE
12	E_DISTURB
13	E_OTRAVI
14	E_CTRAVI
15	E_VC_N
16	E_VO_N
17	E_SPAREM
18	E_EMERGM
19	E_POSF
20	E_POSINDF
21	E_SWGF
22	E_POWF
23	E_ALTF
24	E_DCM_ERR
25	E_SERVUC
26	E_PC_BLK
27	E_HW_ERR
28	E_MANUAL
29	E_AUTO
30	E_JUMPERROR
31	E_ACKPOSFAULT
32	E_GENNOVERR
33	E_ORDER
34	E_INCREASE
35	E_DECREASE
36	E_STARTOFF
37	E_POSALARM
38	E_POSPRINT

39	E_FAULTALARM
40	E_FAULTPRINT
41	E_P0_N
42	E_P1_N
43	E_SEQAL
44	E_STEPAL
45	E_POS
46	E_HOLD
47	E_START
48	E_RESET
49	E_STEP
50	E_UNCOND
51	E_JUMP
52	E_JPOS
53	E_NOOFT
54	E_INTERVT
55	E_RUN
56	E_END
57	E_COND
58	E_AUTOIND
59	E_MANIND
60	E_HOLDIND
61	E_UNCONDIND
62	E_MVL2
63	E_MVL1
64	E_MVH1
65	E_MVH2
66	E_DEVL
67	E_DEVH
68	E_LOCALFL
69	E_MANFL
70	E_AUTOFL
71	E_E1FL
72	E_E2FL
73	E_E3FL
74	E_AUXERR
75	E_MAXLIM
76	E_MINLIM
77	E_GENBSLOC
78	E_GENBSMAN
79	E_MMCORDER
80	E_AIERR
81	E_AOERR
82	E_E1
83	E_E2
84	E_F1ALARM
85	E_F1PRINT
86	E_F2ALARM
87	E_F2PRINT
88	E_F3ALARM
89	E_F3PRINT
90	E_F4ALARM
91	E_F4PRINT
92	E_E3
93	E_TORQF
94	E_MANFORCE

95	E_STOP
96	E_NEXT
97	E_SEQINDPRINT
98	E_SEQINDALARM
99	E_OUTPUT
100	E_GEN16STATUS
101	E_GEN17STATUS
102	E_GEN18STATUS
103	E_GEN19STATUS
104	E_GEN20STATUS
105	E_GEN21STATUS
106	E_GEN22STATUS
107	E_GEN23STATUS
150	E_GEN00STATUS
151	E_GEN01STATUS
152	E_GEN02STATUS
153	E_GEN03STATUS
154	E_GEN04STATUS
155	E_GEN05STATUS
156	E_GEN06STATUS
157	E_GEN07STATUS
158	E_GEN08STATUS
159	E_GEN09STATUS
160	E_GEN10STATUS
161	E_GEN11STATUS
162	E_GEN12STATUS
163	E_GEN13STATUS
164	E_GEN14STATUS
165	E_GEN15STATUS
166	E_GEN24STATUS
167	E_GEN25STATUS
168	E_GEN26STATUS
169	E_GEN27STATUS
170	E_GEN28STATUS
171	E_GEN29STATUS
172	E_GEN30STATUS
173	E_GEN31STATUS
174	E_GEN01MORD
175	E_GEN02MORD
176	E_GEN03MORD
177	E_GEN04MORD
178	E_GEN05MORD
179	E_GEN06MORD
180	E_GEN07MORD
181	E_GEN08MORD
182	E_GEN09MORD
183	E_GEN10MORD
184	E_GEN11MORD
185	E_GEN12MORD
186	E_GEN13MORD
187	E_GEN14MORD
188	E_GEN15MORD
189	E_GEN16MORD
190	E_GENSP
191	E_GENSPI
192	E_GENOP

193	E_GENMVMAX
194	E_GENMVMIN
195	E_GENOPMAX
196	E_GENOPMIN
197	E_GENSPMAX
198	E_GENSPMIN
199	E_GENMAXINTL
200	E_GENMININTL
201	E_GEN_ALARM
202	E_GEN_PRINT
203	E_GEN_EVENT
204	E_GENFBERR
205	E_GENUMODE
206	E_GENUPC
207	E_GENSWGF
208	E_GENETRIP
209	E_GENCENTRAL
210	E_GENLOCAL
211	E_GENREMOTE
212	E_GENCTRLBLK
213	E_GENSTBY
214	E_GENOTRAVI
215	E_GENAIERR
216	E_GENDEV
217	E_GENBAL
218	E_GENMANFD
219	E_GENON
220	E_GENOFF
221	E_CALCVALUE
232	E_GENCHANGE
233	E_GENWARNING
238	E_GENADAP
239	E_GENLOAD
65523	E_IND1_00
65522	E_IND1_01
65521	E_IND1_02
65520	E_IND1_03
65519	E_IND1_04
65518	E_IND1_05
65517	E_IND1_06
65516	E_IND1_07
65515	E_IND1_08
65514	E_IND1_09
65513	E_IND1_10
65512	E_IND1_11
65511	E_IND1_12
65510	E_IND1_13
65509	E_IND1_14
65508	E_IND1_15
65507	E_IND2_00
65506	E_IND2_01
65503	E_IND2_02
65502	E_IND2_03
65535	E_IND2_04
65534	E_IND2_05
65533	E_IND2_06

65532	E_IND2_07
65531	E_IND2_08
65530	E_IND2_09
65529	E_IND2_10
65528	E_IND2_11
65527	E_IND2_12
65526	E_IND2_13
65525	E_IND2_14
65524	E_IND2_15