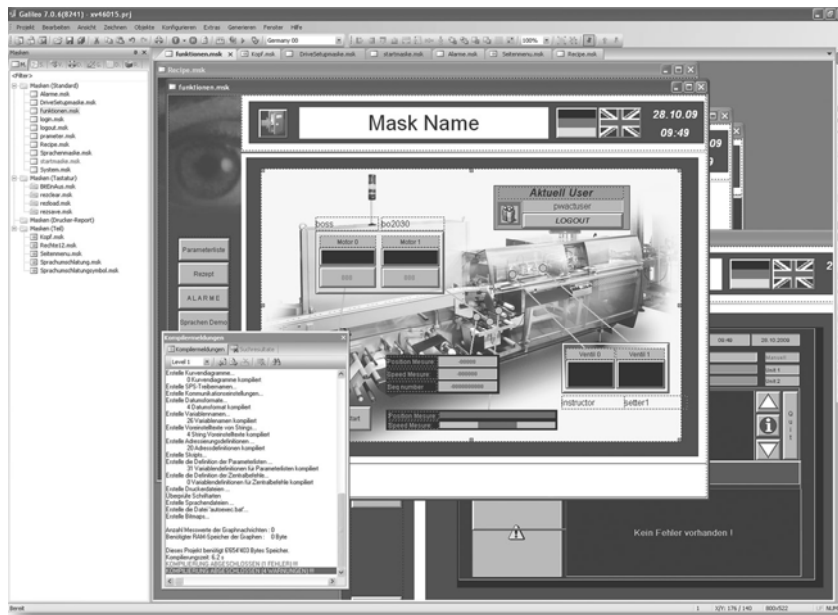


# Communication CANopen



# Imprint

## Manufacturer

Eaton Automation AG  
Spinnereistrasse 8-14  
CH-9008 St. Gallen  
Schweiz

[www.eaton-automation.com](http://www.eaton-automation.com)

[www.eaton.com](http://www.eaton.com)

## Support

### Region North America

Eaton Corporation  
Electrical Sector  
1111 Superior Ave.  
Cleveland, OH 44114  
United States  
877-ETN-CARE (877-386-2273)

[www.eaton.com](http://www.eaton.com)

### Other regions

Please contact your supplier or send an E-Mail to:

[automation@eaton.com](mailto:automation@eaton.com)

## Original instructions

The German version of this document is the original instructions.

## Editor

A.Schmid

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## 1 GENERAL

### 1.1 AIM AND PURPOSE OF THIS DOCUMENT

This documentation describes the connection of a MICRO PANEL via the CAN interface to different PLCs.

**Refer to your MICRO PANEL user manual for further information on connecting, commissioning and operating the MICRO PANEL.**

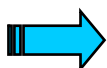
It is assumed that the following software is already installed and that you are familiar with its operation:

- Galileo HMI programming software

You should be familiar with the following specifications:

- CAN Application Layer specification (CiA DS-201 to DS-207)
- CANopen Communication Profile (CiA DS-301)

More information on CAN and CANopen can be obtained from the home page of the CiA user association (<http://www.can-cia.de>).



The dialogs shown from Galileo are from Version 6.1.3.

### 1.2 LIST OF DOCUMENTS

	Document	Doc. No.
[1]	System description Networks in Brief	MN05010009Z
[2]	System description Windows CE	MN05010007Z

(this list of documents is not final)

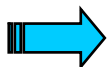
## 2 BASIC PRINCIPLES OF CANOPEN

### 2.1 IDENTIFIER

The CAN protocol is a frame based protocol. Corrupted frames are detected by means of several error detection mechanisms and are automatically repeated. The maximum data length of a CAN frame is 8 bytes. The frame is identified with an identifier. All nodes receive each frame at the same time and use the identifier to check whether the frame is relevant for them. The identifier also defines the priority of the frame. The lower the identifier of the frame, the higher its priority on the bus.

The CAN specification defines two different identifier formats:

- 11-bit identifiers, also known as the "Base frame format"
- 29-bit identifiers, also known as the "Extended frame format"



The MICRO PANEL supports the 11-bit identifier. (Base frame format)

### 2.2 OVERVIEW OF CANOPEN IDENTIFIERS

Object	Identifier (dec.)	Identifier (hex.)	Comm. parameters in the object dictionary	Function
NMT	0	0x0		Network management-, Bootup frame
SYNC	128	0x80		Sync frame
EMCY	129 - 255	0x81 - 0xFF	0x1014, 0x1015	Emergency frame
TIMESTAMP	256	0x100	0x1012, 0x1013	System time
1st Tx PDO	385 - 511	0x181 - 0x1FF	0x1800, 0x1A00	1st PDO transmit frame
1st Rx PDO	513 - 639	0x201 - 0x27F	0x1400, 0x1600	1st PDO receive frame
2nd Tx PDO	641 - 767	0x281 - 0x2FF	0x1801, 0x1A01	2nd PDO transmit frame
2nd Rx PDO	769 - 895	0x301 - 0x37F	0x1401, 0x1601	2nd PDO receive frame
3rdTx PDO	897 - 1023	0x381 - 0x3FF	0x1802, 0x1A02	3rd PDO transmit frame
3rd Rx PDO	1025 - 1151	0x401 - 0x47F	0x1402, 0x1602	3rd PDO receive frame
4thTx PDO	1153 - 1279	0x481 - 0x4FF	0x1802, 0x1A02	4th PDO transmit frame
4th Rx PDO	1281 - 1407	0x401 - 0x57F	0x1402, 0x1602	4th PDO receive frame
Tx SDO	1409 - 1535	0x581 - 0x5FF	0x1200	SDO transmit frame
Rx SDO	1537 - 1663	0x601 - 0x67F	0x1200	SDO receive frame
GUARDING	1793 - 1919	0x701 - 0x77F	0x100C, 0x100D 0x1016, 0x1017	Node guarding frame Heartbeat frame

### 2.3 PROCESS DATA COMMUNICATION (PDO)

Process data objects (PDO) are normally "real-time data" which are characterized by their low identifier and therefore have a high priority on the bus. These are usually used by remote peripheral devices for transferring I/O data. With CANopen each node contains 4 receive and 4 transmit PDOs which contain up to 8 bytes of user data.

The identifiers are calculated according to a fixed pattern. The node number is added to the offset.

Object	Offset of the identifier (hex)	Identifier for node no. 1 (hex.)	Identifier for node no. 31 (hex.)
1st Tx PDO	0x180	0x181	0x19F
1st Rx PDO	0x200	0x201	0x21F
2nd Tx PDO	0x280	0x281	0x29F
2nd Rx PDO	0x300	0x301	0x31F
3rd Tx PDO	0x380	0x381	0x39F
3rd Rx PDO	0x400	0x401	0x41F
4th Tx PDO	0x480	0x481	0x49F
4th Rx PDO	0x500	0x501	0x51F

Processdata objects (PDO) can either be transferred event-driven, cyclically, on demand, or from a combination of them.

- **Event-driven**  
An occurring event triggers the transfer of the PDO on the node. For example, this occurs in the event of a status change of the input on an input card.
- **Cyclical**  
The PDOs are transferred in a set time interval. For example, every 100 msec.
- **On Demand**  
A station waits for a request from another node. This can be a synchronization frame (SYNC) or Remote Transmit Request (RTR).

### 2.4 SERVICE DATA COMMUNICATION (SDO)

**Service data objects (SDO)** are used for modifying and querying data of any size in an object dictionary. The data in an object dictionary is referenced with an index (16-bit) and a sub-index (8-bit). However, as the CAN frame contains a maximum of 8 bytes of user data, several frames are required to transfer a data type that is greater than 4 bytes. This results in three transfer frame types.

- **SDO Up/Download**  
Transfer of data up to 4 bytes with one CAN frame. (Expired Transfer)
- **SDO Up/Download Segment**  
Transfer of data greater than 4 bytes using several individually confirmed CAN frames.
- **SDO Block Up/Download**  
Transfer of data greater than 4 bytes using several unconfirmed CAN frames. The confirmation is sent after an agreed block size has been reached and after the last block has been sent with a checksum for the entire data block.

In accordance with CANopen, the object dictionary is divided into different areas. The most important ones are described in the following table.

Index (hex)	Sub-index (hex)	Object
0x1000 – 0x1FFF	0x0 – 0xFF	Communication profile (DS 301)
0x2000 – 0x5FFF	0x0 – 0xFF	Manufacturer-specific profile
0x6000 – 0x9FFF	0x0 – 0xFF	Standardized device profile
0xA000 – 0xFFFF	0x0 – 0xFF	Reserved for further use

Each node has an SDO channel which is assigned two identifiers. The identifiers are calculated according to a fixed pattern. The node number is added to the offset.

Object	Offset of the identifier (hex)	Identifier for node no. 1 (hex.)	Identifier for node no. 31 (hex.)
1st Tx SDO	0x580	0x581	0x59F
1st Rx SDO	0x600	0x601	0x61F

### 2.5 NETWORK MANAGEMENT

There is always only one NMT master (**Network Management**) in a CANopen network. The NMT master handles the control of the NMT slaves and can change their states. The following states are possible:

- **Initialization**  
This state is run through after the device is switched on or after a communication reset or node reset, and then changes automatically to the pre-operational state. In this moment a bootup frame is sent in order to report the presence of a new slave to the master.
- **Pre-Operational**  
In this state communication using SDOs is possible, however the node cannot communicate with PDOs. The node can be switched to the operational state using a Start Remote Node frame.
- **Operational**  
The node has full operational readiness, SDO and PDO communication is possible.
- **Stopped**  
The node can be switched to this state using the Stop Remote Node frame. Neither SDO nor PDO communication are possible in this state.

### 2.6 NODE MONITORING

Two mechanisms are available for monitoring the CANopen nodes.

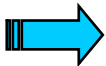
- **Node Guarding**  
The NMT master continuously sends frames to the nodes. A response to these frames must be received within a set time. If this does not occur, this is registered in the NMT master.
- **Heartbeat**  
Each node autonomously sends a "sign of life" signal which can be monitored from any other node.

### 3 OPERATING PRINCIPLE

#### 3.1 OVERVIEW

This document describes the following communication options:

- CANopen (On Board) - event  
PDO communication via OnBoard CAN interface.
- CANopen (On Board) - polling  
SDO communication via OnBoard CAN interface.
- CANopen – polling  
SDO communication via BCB-TP communication card.
- CANopen (On Board) - Lenze  
SDO communication via OnBoard CAN interface specifically for Lenze System CAN.
- Moeller XControl CANopen HMI (Onboard)  
PDO communication via OnBoard CAN interface.
- Selectron Modbus over CANopen (OnBoard)  
PDO communication via OnBoard CAN interface.

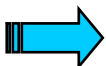


The CAN-Monitor software is available for analyzing the CANopen network. This is **not** part of the standard scope of delivery. The product must be purchased once and can be installed on any MICRO PANEL with Windows CE for permanent use.

#### 3.2 MICRO PANEL IN THE CANOPEN NETWORK

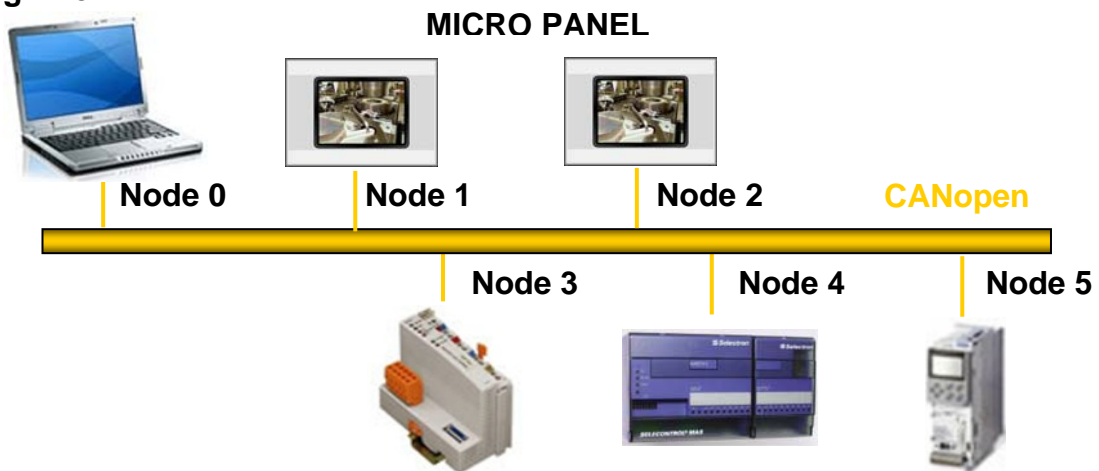
The device is connected to the PLC directly via the CAN Onboard port of the MICRO PANEL or via the BCB-TP communication card. Some protocols require the activation of function blocks and the entry of parameters. These are described in the respective chapter on the protocol.

The MICRO PANEL can be used in a CAN network with up to 127 nodes.



The MICRO PANEL does not require a node ID in every case, however PDO and/or SDO identifiers are used depending on the protocol.

Prog Dvc



### 3.3 BAUD RATE

The baud rate setting must be the same on all nodes in the CANopen network. The same baud rate must also be ensured when configuring several connections.

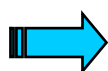
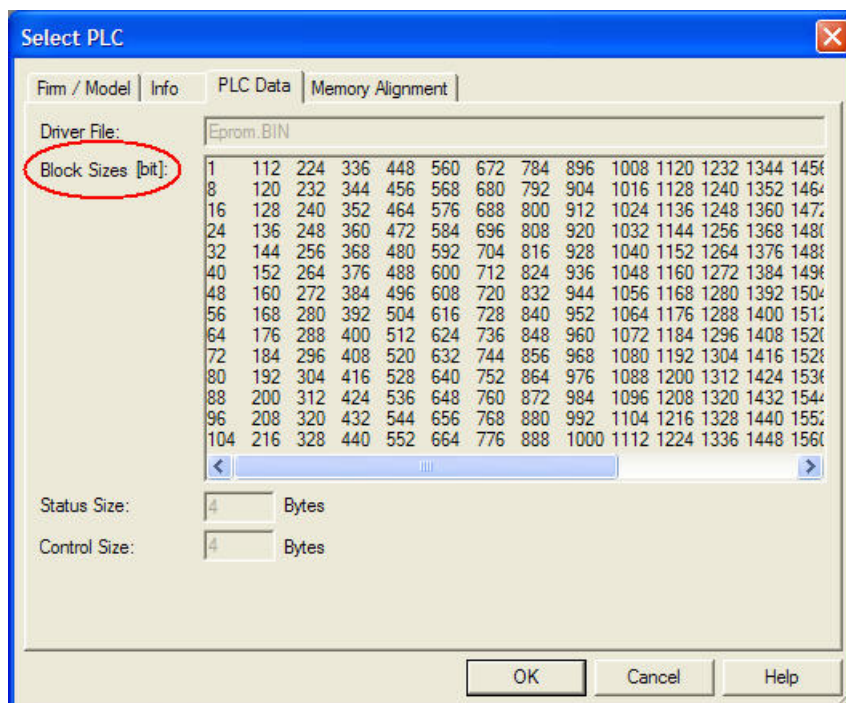
The following baud rates are supported:

- OnBoard CAN interface  
20k, 50k, 100k, 125k, 250k, 500k, 1M
- BCB-TP communication card  
100k, 125k, 250k, 500k

### 3.4 DATA BLOCK SIZE

The smallest possible format is 8-bit or 1 byte, i.e. individual bit communication is not possible. The maximum size of a data block depends on the communication selected. The structure or array size set in Galileo is therefore limited to this maximum value.

All data block sizes are shown on the PLC Data tab of the Select PLC dialog.



The BOOLEAN data type is transferred as a bit sequence with the length of 1 and therefore takes up one byte in the CAN frame. For further details see CiA DS-301.

### 3.5 MEMORY ALIGNMENT

The memory alignment defines how the individual tag variables of a structure are mapped in the PLC memory or the PDO/SDO. Refer to the Galileo documentation or the Online Help for more information on memory alignment.

### 3.6 STATUS REFRESH

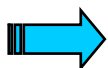
See Galileo Online Help.

## 4 CANOPEN (ONBOARD) – EVENT

### 4.1 HARDWARE REQUIREMENTS

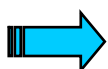
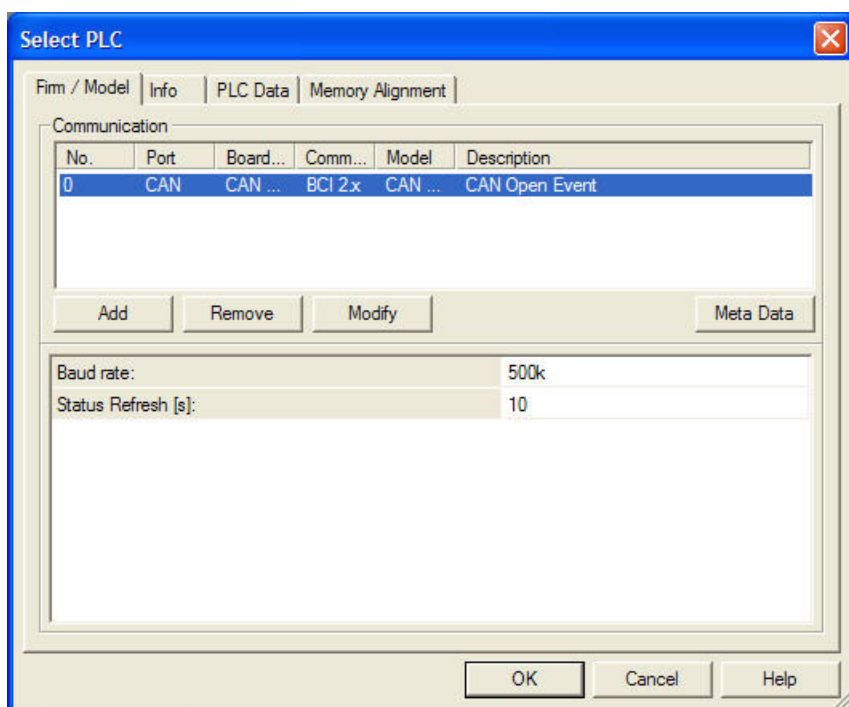
This communication requires a MICRO PANEL with an OnBoard CAN interface.

At least 40 additional license points must be available on the device, regardless of the number of connections!



If you have any questions on license products, please contact your local MICRO PANEL sales distributor.

### 4.2 SELECT PLC



Galileo supports several connections for the OnBoard interface, i.e. several connections can therefore be configured on the same interface. This makes it possible to address the tags including the system structures on several PLCs. The baud rate must be the same for all connections.

In the Select PLC... dialog choose CAN Open (OnBoard) - event. The dialog shown will then appear for setting the parameters required for this communication.

#### 4.2.1 BAUD RATE

Parameter setting for baud rate (→ chap. 3.3)

#### 4.2.2 STATUS REFRESH

See Galileo Online Help.

### 4.2.3 ADDRESSING

This communication is based on PDO communication (→ chap. 2.3 ).

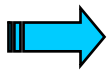
The addressing is implemented with the identifier of the PDO. This must be entered in hexadecimal notation and can be between 0 and 7FF.

If Read (PLC -> MMI) is selected On Demand or At Startup, a remote transmit request (RTR) is sent, to which the PLC must respond with the appropriate PDO. A communication error is generated if the PLC does not respond.

If Write (MMI -> PLC) is selected On Demand the PDO is sent when the tag value changes.

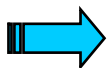
Defining a tag as a read and write tag is not advisable since a PDO is normally defined as a Tx or Rx PDO and can only be sent or received by the relevant node. Most nodes also do not support the sending and receiving of the same PDO. However, the possibility for this is retained in order to allow for any exceptional circumstances.

If Read (PLC -> MMI) is not selected On Demand, the values obtained via the PDO after the MICRO PANEL is started up are stored in a local image. These values only change when a node actively sends this PDO to the bus. The MICRO PANEL always works with the value from the image.



The values in the image are not stored retentively and are initialized with the default value after the GRS (Galileo Runtime System) is started unless " Read (PLC -> MMI) At Startup" is selected.

Used	Address	Link Name	Description
yes	382	CAN Open - event	CAN Open Event



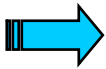
Char-Arrays are not supported.

## 5 CANOPEN (ONBOARD) - POLLING

### 5.1 HARDWARE REQUIREMENTS

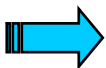
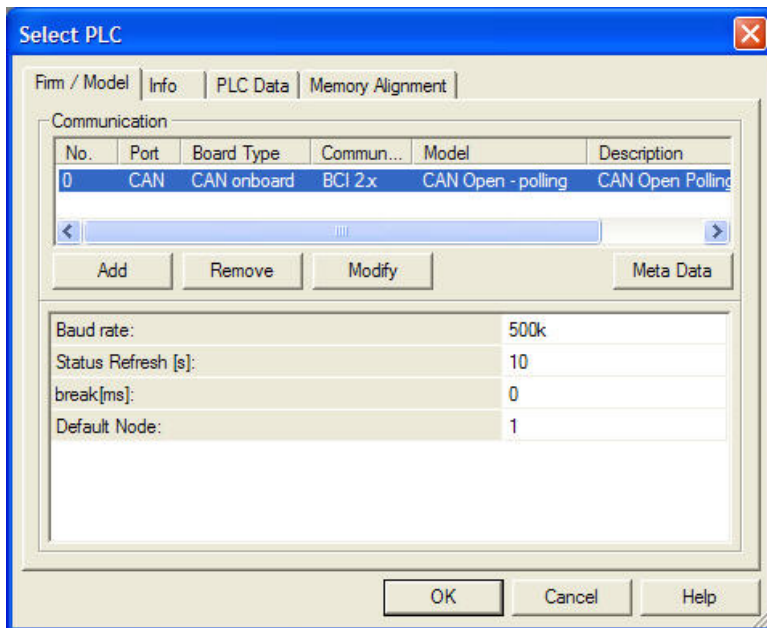
This communication requires a MICRO PANEL with an OnBoard CAN interface.

At least 40 additional license points must be available on the device, regardless of the number of connections!



If you have any questions on license products, please contact your local MICRO PANEL sales distributor.

### 5.2 SELECT PLC



Galileo supports several connections for the OnBoard interface, i.e. several connections can therefore be configured on the same interface. This makes it possible to address the tags including the system structures on several PLCs. The baud rate must be the same for all connections.

In the Select PLC... dialog choose CAN Open (OnBoard) - polling. The dialog shown will then appear for setting the parameters required for this communication.

#### 5.2.1 BAUD RATE

Parameter setting for baud rate (→ chap. 3.3)

#### 5.2.2 STATUS REFRESH

See Galileo Online Help.

#### 5.2.3 PAUSE

General pause time in milliseconds to be observed between two communication cycles. As GRS (Galileo Runtime System) has a very fast polling rate, it may be necessary to set a pause time. This firstly reduces the network load and also reduces the load on the PLC.

5.2.4 DEFAULT NODE

The default node number (Default Node) is used if a node number is not stated in the address (→ chap. 5.2.5). This has a direct effect on the SDO channel used and therefore on the node addressed.

5.2.5 ADDRESSING

This communication is based on SDO communication (→ chap. 2.4 ). The SDO Up/Download and SDO Up/Download segment functions are used.

The identifier used for communication depends on the node number entered for the address. Data structures of up to 256 bytes can be addressed. Addressing consists of the index and sub-index of the object dictionary. The Panel is not assigned a node number on the CAN bus.

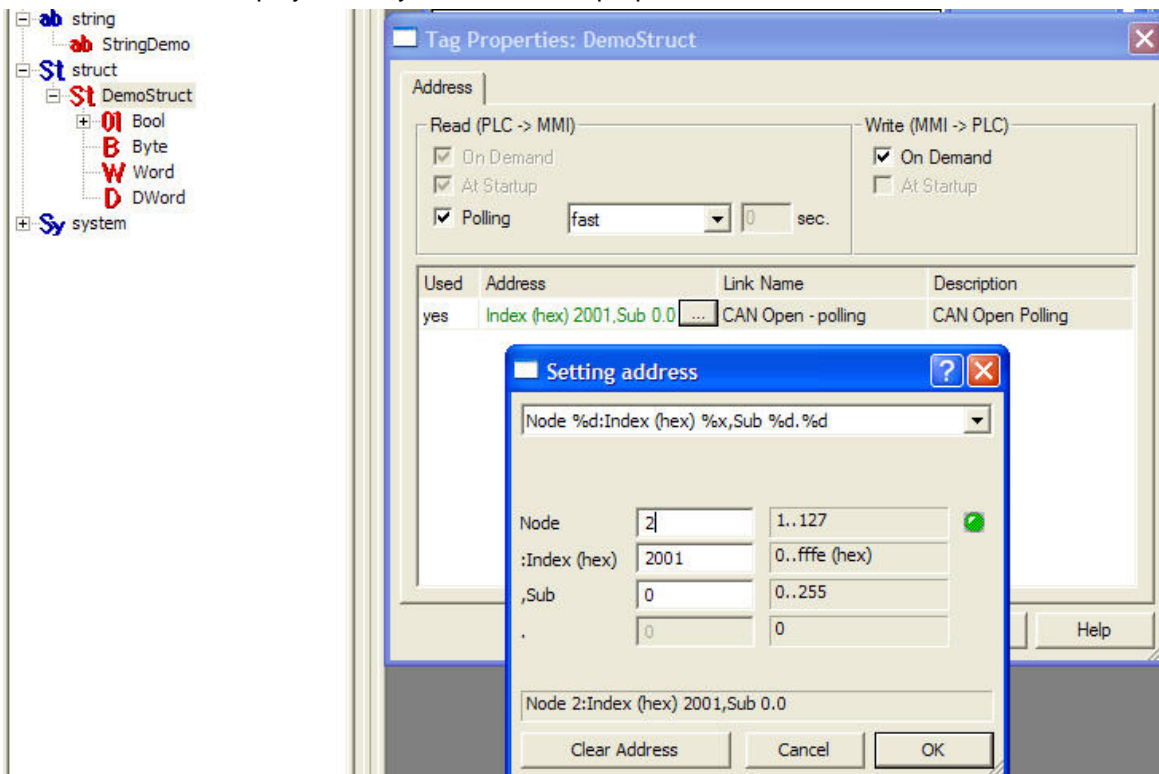
Addressing format without node number	Data area
Index (hex) %x, %d.%d	Index, sub-index.bit in the object directory
Index %d, %d.%d	Index, sub-index.bit in the object directory

Addressing format with node number	Data area
Node %d : Index (hex) %x, %d.%d	Node number: Index, sub-index.bit in the object directory
Node %d : Index %d, %d.%d	Node number: Index, sub-index.bit in the object directory

The placeholder %d represents a decimal number, the placeholder %x represents a hexadecimal number which must be entered for addressing the individual tag variables.

The bit address is displayed solely for information purposes.



## 6 CANOPEN - POLLING

### 6.1 HARDWARE REQUIREMENTS

This communication requires the BCB-TP communication card and therefore requires a MICRO PANEL with a communication slot.

Information on the configuration and commissioning of the BCB-TP communication card is provided in the "Card description BCB-TP".

No additional license points must be available on the device.

### 6.2 BCB-TP SETTINGS

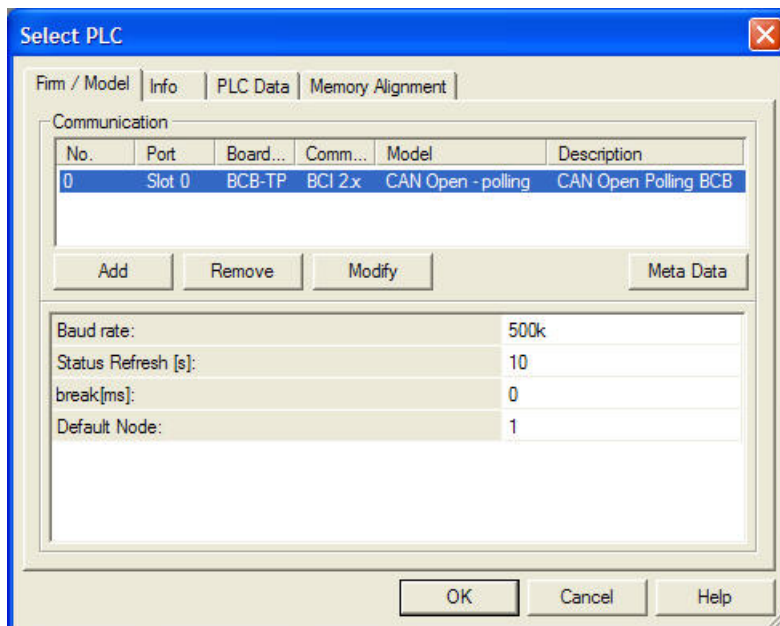
The configuration switch S1 of the BCB-TP communication card has no function in this user profile.

The card is supplied with an EPROM that is suitable for the user profile.

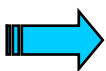
The following information is noted on the EPROM:

<b>CAN SDO</b> Version 1.02 MI 18.08.03 27C256 – DC96
--

### 6.3 SELECT PLC



In the Select PLC... dialog choose CAN Open (OnBoard) - polling. The dialog shown will then appear for setting the parameters required for this communication.



The BCB-TP communication card supports exactly **one** connection, however, this allows several SDO channels to several nodes to be addressed.

### 6.3.1 BAUD RATE

Parameter setting for baud rate (→ chap. 3.3)

### 6.3.2 STATUS REFRESH

See Galileo Online Help.

### 6.3.3 BREAK

See "CAN open(OnBoard) – polling" (→ chap.5.2.3)

### 6.3.4 DEFAULT NODE

See "CAN open(OnBoard) – polling" (→ chap.5.2.4)

### 6.3.5 ADDRESSING

This communication is based on SDO communication (→ chap. 2.4 ). The SDO Up/Download functions are used. Unlike with "CAN open(OnBoard) – polling", data structures of up to 4 bytes can be addressed.

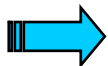
Otherwise addressing is identical to "CAN open(OnBoard) – polling" (→chap.5.2.5).

## 7 CANOPEN (ONBOARD) – LENZE

### 7.1 HARDWARE REQUIREMENTS

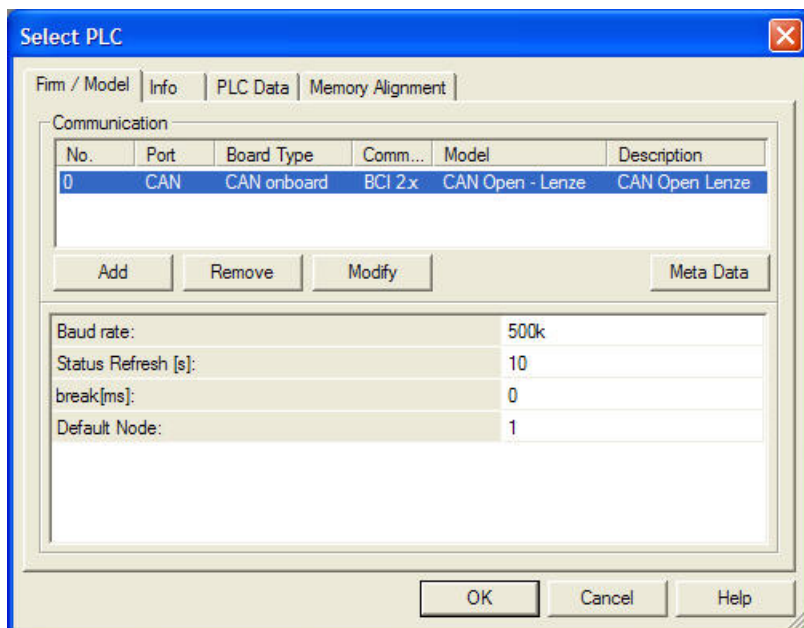
This communication requires a MICRO PANEL with an OnBoard CAN interface.

At least 40 additional license points must be available on the device, regardless of the number of connections!

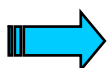


If you have any questions on license products, please contact your local MICRO PANEL sales distributor.

### 7.2 SELECT PLC



In the Select PLC... dialog choose CAN Open (OnBoard) - Lenze. The dialog shown will then appear for setting the parameters required for this communication.



Galileo supports several connections for the OnBoard interface, i.e. several connections can therefore be configured on the same interface. This makes it possible to address the tags including the system structures on several PLCs. The baud rate must be the same for all connections.

#### 7.2.1 BAUD RATE

Parameter setting for baud rate (→ chap. 3.3)

#### 7.2.2 STATUS REFRESH

See Galileo Online Help.

#### 7.2.3 BREAK

See "CAN open(OnBoard) – polling" (→ chap.5.2.3)

#### 7.2.4 DEFAULT NODE

See "CAN open(OnBoard) – polling" (→ chap.5.2.4)

### 7.2.5 ADDRESSING

This communication is based on SDO communication (→ chap. 2.4 ). The SDO Up/Download functions are used. Unlike with "CAN open(OnBoard) – polling", data structures of up to 4 bytes can be addressed.

The tags are addressed via the Lenze specific code number and if necessary via the subcode.

The index and sub-index for the SDO transfer are calculated according to the following formula:

Index = 24575 – Lenze code number -2000 x (parameter set – 1)

Sub-index = Lenze subcode (if there is no subcode, sub-index must = 0)

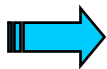
Example:

Index of C0012 (startup time) in parameter set 1 = 24575 -12 -0 = 24563 = 0x5FF3

The Lenze devices can manage several parameter sets. The parameter sets are moved by the offset 2000 in the object dictionary.

In order to address the C0012 startup time in parameter set 2, the code number C2012 must be addressed in Galileo. For C0012 startup time in the parameter set 3, C4012 and C6012 must be entered for the 4th parameter set.

The CAN node number of the Lenze device corresponds to the device address. Unlike standard CANopen slaves, the devices have 2 SDO channels. The first corresponds to the standard SDO channel (0x580 and 0x600 + node number). The second SDO channel uses the identifier of the node number + 64 (0x5C0 and 0x640 + node number). A network can consist of up to 64 nodes.



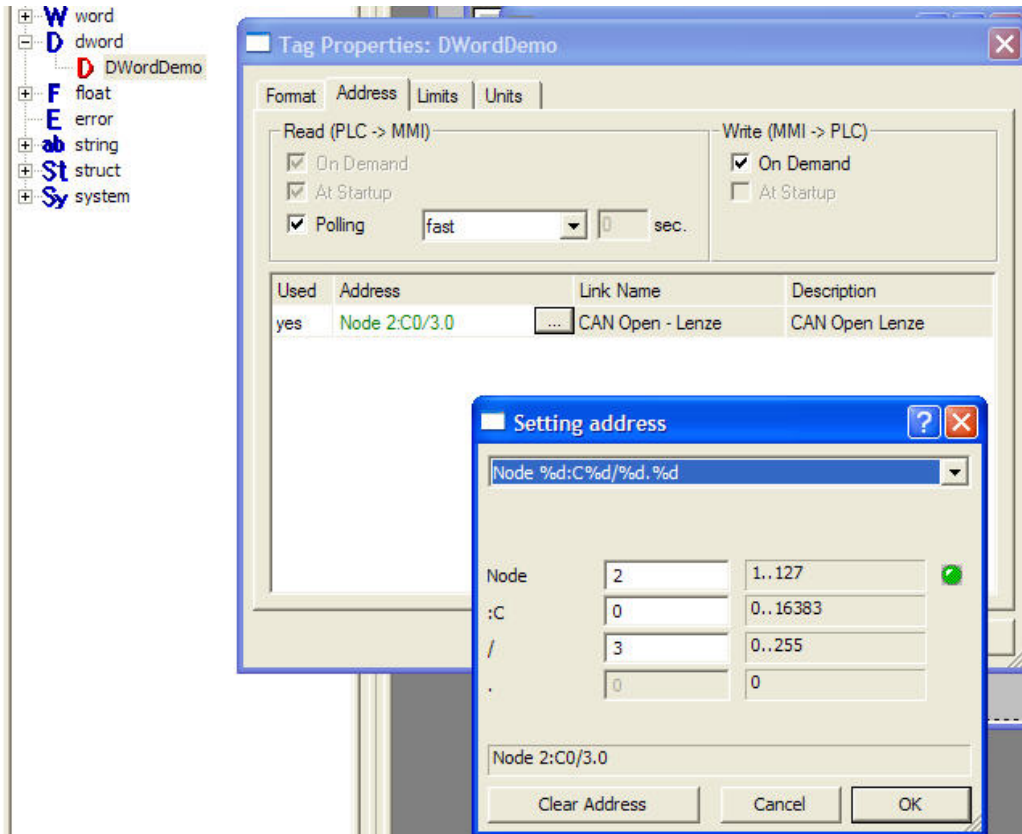
Refer to the Lenze documentation for further information on addressing the devices.

Addressing format without node number	Data area
C%d.%d	Code in the Lenze code table
C%d/ %d.%d	Code / subcode.bit in the Lenze code table
Addressing format with node number	Data area
Node %d : C%d.%d	Node number: Code in the Lenze code table
Node %d : C%d/ %d.%d	Code / subcode.bit in the Lenze code table

The placeholder %d represents a decimal number which must be entered for addressing the individual tag variables.

The bit address is displayed solely for information purposes.

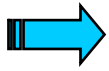
## 7 CANopen (OnBoard) – Lenze



## 8 MOELLER XCONTROL CANOPEN HMI (ONBOARD)

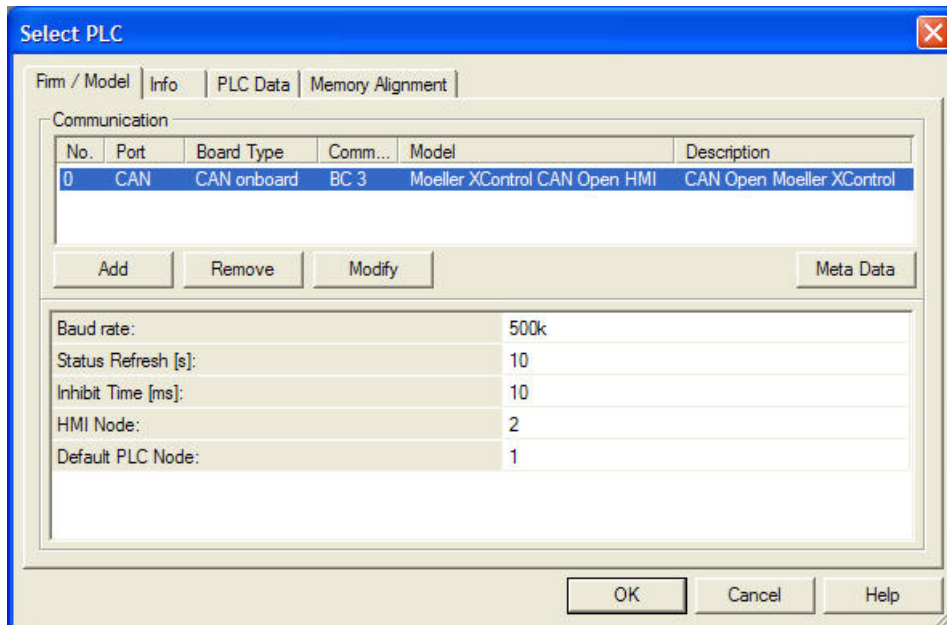
This communication requires a MICRO PANEL with an OnBoard CAN interface.

At least 40 additional license points must be available on the device, regardless of the number of connections!

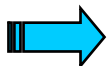


If you have any questions on license products, please contact your local MICRO PANEL sales distributor.

### 8.1 SELECT PLC



In the Select PLC... dialog choose Moeller XControl CANopen HMI (Onboard). The dialog shown will then appear for setting the parameters required for this communication.



Galileo supports several connections for the OnBoard interface, i.e. several connections can therefore be configured on the same interface. This makes it possible to address the tags including the system structures on several PLCs. The baud rate must be the same for all connections.

#### 8.1.1 BAUD RATE

Parameter setting for baud rate (→ chap. 3.3)

#### 8.1.2 STATUS REFRESH

See Galileo Online Help.

#### 8.1.3 INHIBIT TIME

General pause time in milliseconds to be observed between two communication cycles. As GRS (Galileo Runtime System) has a very fast polling rate, it may be necessary to set a pause time. This firstly reduces the network load and also reduces the load on the PLC.

#### 8.1.4 HMI NODE

Node number the CANopen network assigned to the MICRO PANEL.

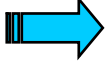
#### 8.1.5 DEFAULT PLC NODE

The default node number (Default PLC Node) is used if a node number is not stated in the tag address ( chap. ).

## 8 Moeller XControl CANopen HMI (OnBoard)

### 8.1.6 ADDRESSING

This communication is based on a Eaton-specific transmission protocol which can be exchanged on a CAN bus via a PDO channel (→ chap.2.3). The MICRO PANEL must be integrated as a CAN slave in the Moeller XControl PLC via an EDS file. A data handling function block (FB) also has to be included in the Moeller XControl program in order to communicate with the MICRO PANEL.



Further information on connecting to the XControl PLC is provided in the relevant Eaton (Moeller) documentation (AN2700117G).

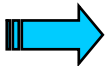
Data structure up to 4 bytes in size can be addressed.

The tags are addressed via the marker address in the Moeller XControl. The size of this marker area in the XControl is limited.

Addressing format without node number	Data area
M%d.%d	Marker byte.bit
MB%d	Marker byte
MW%d	Marker word
MD%d	Marker double word integer32
MF%d	Marker double word as float

Addressing format with PLC number	Data area
PLC%d M%d.%d	Marker byte.bit
PLC%d MB%d	Marker byte
PLC%d MW%d	Marker word
PLC%d MD%d	Marker double word integer32
PLC%d MF%d	Marker double word as float

The placeholder %d represents a decimal number which must be entered for addressing the individual tag variables. The bit address is displayed solely for information purposes.

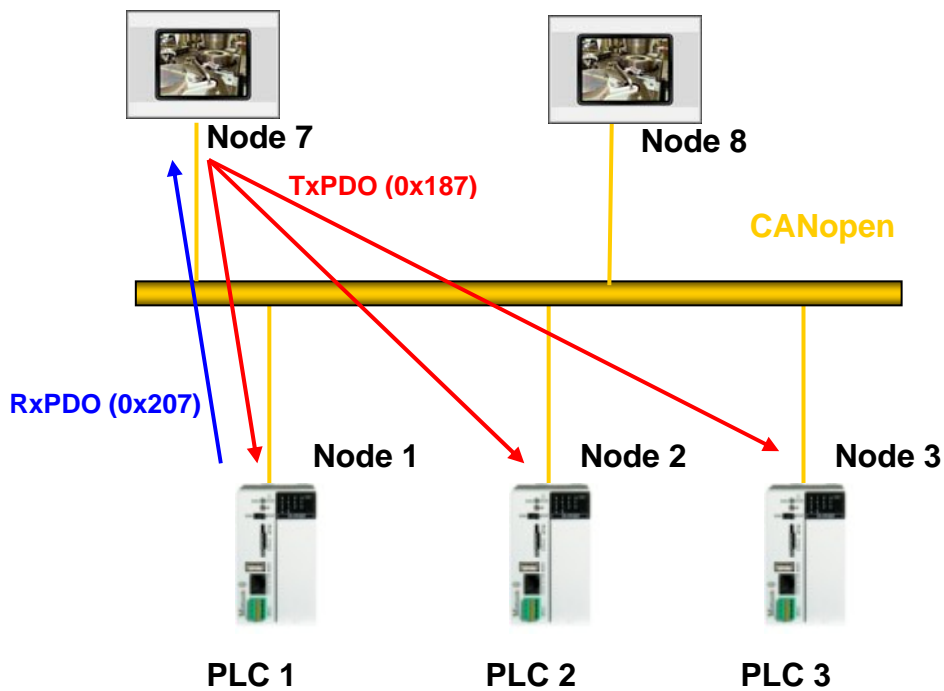


The PLC must be interpreted by the data handling function block in the XControl PLC and does not change the PDO channel of the CAN transfer. The PLC number is used to define which PLC interprets the protocol and responds to it.

### 8.1.7 EXAMPLE

The MICRO PANEL is a CAN slave and is configured by the NMT master on Startup. The PLC configuration of the NMT master is used to define whether node guarding is to be used. The PDO channel of the MICRO PANEL is also defined. For the MICRO PANEL with node 7 this is 0x187 by default for the TxPDO and 0x207 for the RxPDO.

A query is then sent via the TxPDO to all nodes. The PLC number inside the protocol enables the nodes to detect whether this query is relevant for them. The node with the addressed PLC number then sends the response via the RxPDO.

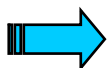


## 9 SELECTRON MODBUS OVER CANOPEN (ONBOARD)

### 9.1 HARDWARE REQUIREMENTS

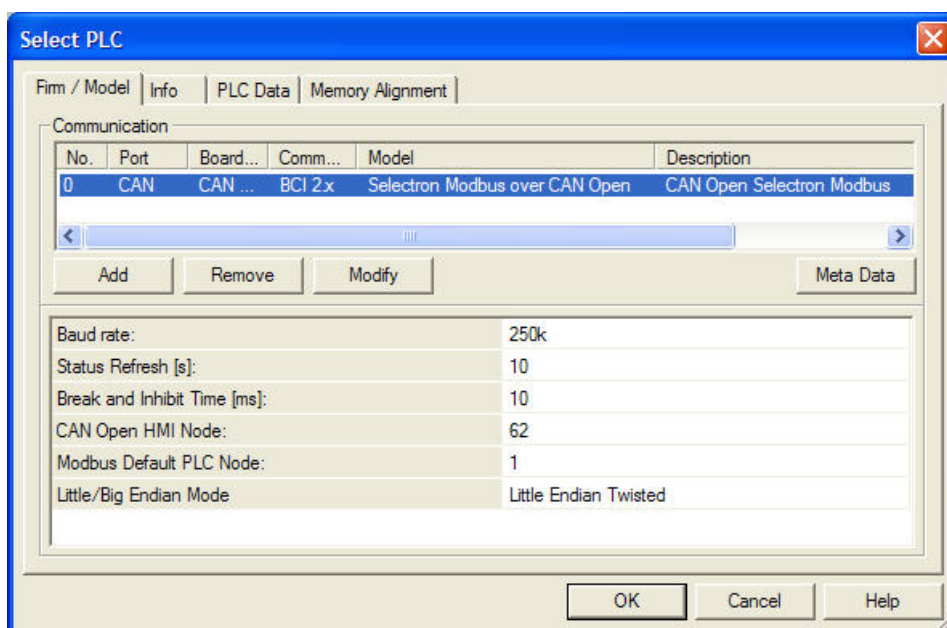
This communication requires a MICRO PANEL with an OnBoard CAN interface.

At least 40 additional license points must be available on the device, regardless of the number of connections!



If you have any questions on license products, please contact your local MICRO PANEL sales distributor.

### 9.2 SELECT PLC



In the Select PLC... dialog choose Selectron Modbus over CANopen (Onboard). The dialog shown will then appear for setting the parameters required for this communication.



Galileo supports several connections for the OnBoard interface, i.e. several connections can therefore be configured on the same interface. This makes it possible to address the tags including the system structures on several PLCs. The baud rate must be the same for all connections. As each connection is a point-to-point connection, the MICRO PANEL can establish communication on each connection for exactly **one** PLC. A node number is then assigned to each connection in the CANopen network.

#### 9.2.1 BAUD RATE

Parameter setting for baud rate (→ chap. 3.3)

#### 9.2.2 STATUS REFRESH

See Galileo Online Help.

### 9.2.3 BREAK AND INHIBIT TIME

General pause time in milliseconds to be observed between two communication cycles. As GRS (Galileo Runtime System) has a very fast polling rate, it may be necessary to set a pause time. This firstly reduces the network load and also reduces the load on the PLC. This time is also used to initialize the inhibit time (break between two CAN frames). This inhibit time can be changed by the CAN master on Startup by means of the SDO transfer.

### 9.2.4 CAN OPEN HMI NODE

Node number the CANopen network assigned to the MICRO PANEL.

### 9.2.5 MODBUS DEFAULT PLC NODE

The default node number (Modbus default PLC node) is used if a node number is not stated in the address. The station is set to 1 by default.

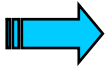
### 9.2.6 LITTLE/BIG ENDIAN MODE

The data transfer mode can be selected here between Big Endian (Modbus default byte order) and Little Endian Twisted (specific interpretation of the Selectron PLC).

## 9 Selectron Modbus over CANopen (OnBoard)

### 9.2.7 ADDRESSING

This communication is based on the Modbus RTU protocol which can be exchanged via a PDO channel (→ chap.2.3). The MICRO PANEL functions here as a Modbus client. The Modbus server on the Selectron PLC must be activated. The Selectron PLC configures the MICRO PANEL on Startup via the SDO transfer.



Further information on connecting to the Selectron PLC is provided in the relevant Selectron documentation.

Further information on the Modbus protocol is provided on the official Modbus home page (<http://www.modbus.org>)

Data structure up to 128 bytes in size can be addressed.

The tags are addressed via the Modbus tab in the Selectron PLC.

The following Modbus function codes are supported:

- 01 Read Coil
- 02 Read Discrete Inputs
- 03 Read Holding Register
- 04 Read Input Register
- 15 Write Multiple Coils
- 16 Write Multiple Register

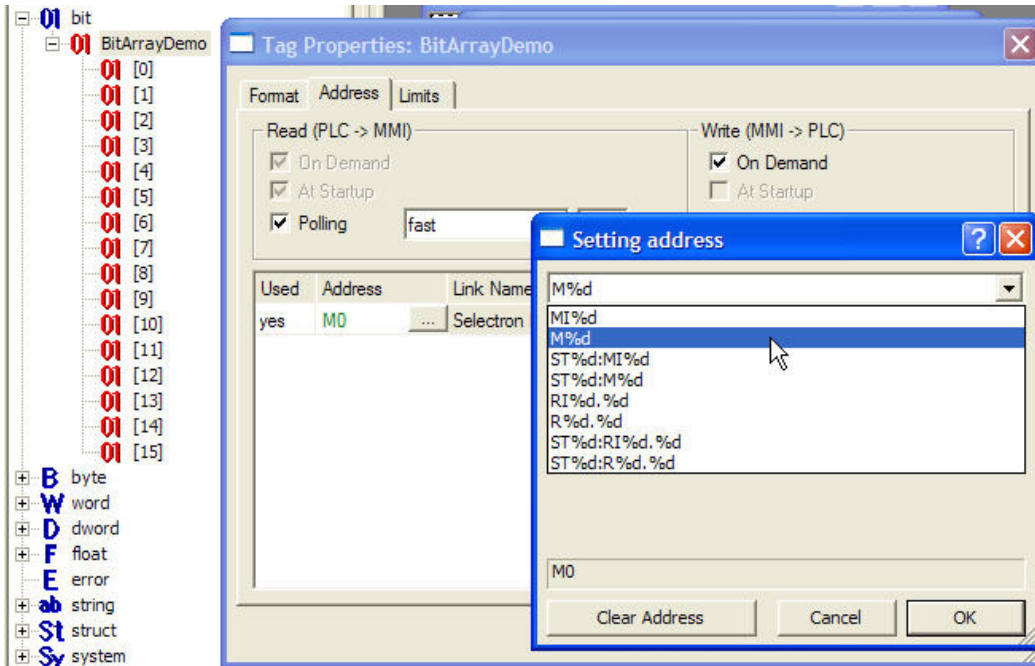
Addressing format without node number	Data area
M%d	Coils (read/write)
MI%d	Discrete Inputs (read only)
R%d.%d	Holding Registers (read/write)
RI%d.%d	Input Registers (read only)

Addressing format with PLC number	Data area
ST%d:M%d	Station : Coils (read/write)
ST%d:MI%d	Station : Discrete Inputs (read only)
ST%d:R%d.%d	Station : Holding Registers (read/write)
ST%d:RI%d.%d	Station : Input Registers (read only)

The placeholder %d represents a decimal number which must be entered for addressing the individual tag variables.

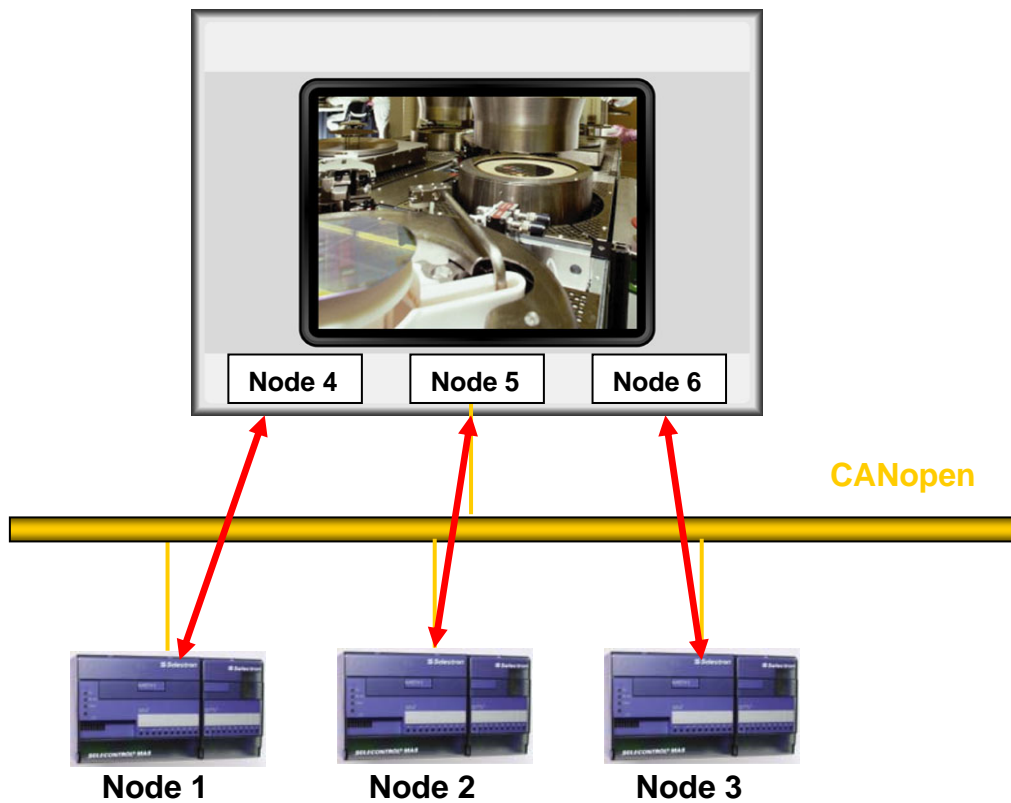
The bit address is displayed solely for information purposes.

The ST (station) must be interpreted by the Selectron PLC and can be used if required for routing, although this does not change the PDO channel of the CAN transfer.



9.2.8 EXAMPLE

In this example, three connections are established to three nodes. A node number is then assigned to each connection in the CANopen network.

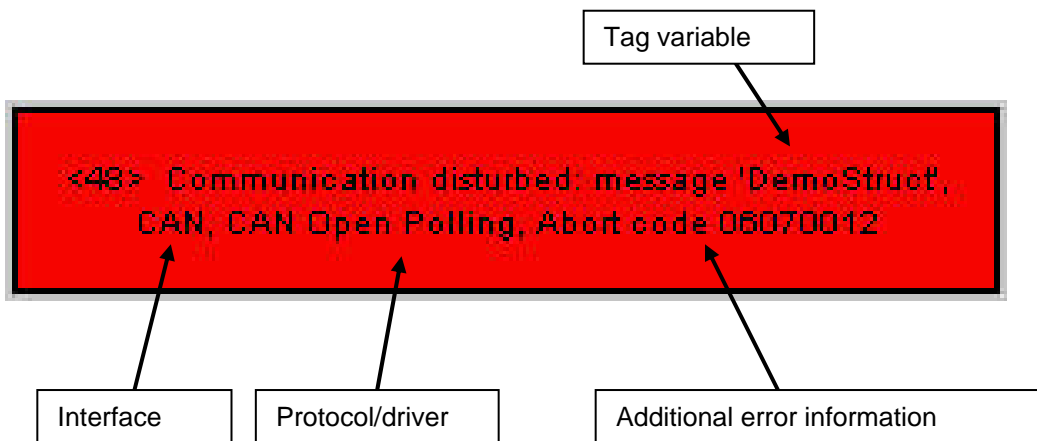


## 10 COMMUNICATION ERRORS

### 10.1 ERROR MESSAGES

Different system error messages are generated in response to any communication errors that occur. These system error messages provide different information:

- The tag variable name indicates the variable in which a problem was found.
- The interface information indicates the MICRO PANEL interface on which the problem was found.
- The protocol/driver version indicates which communication driver is active.
- The node number of the affected PLC is displayed if necessary.
- The additional information may indicate the possible cause of an error in plain text. This information can, however, also be generated from lower software layers. Its content cannot therefore always be interpreted without an in-depth knowledge of the system. The troubleshooting procedure is nevertheless the same in all cases.



### 10.2 RECTIFICATION

Checking the following points is recommended:

- Check the cabling, connections and termination resistors on the MICRO PANEL and the PLC.
- When using a BCB-TP communication card, the jumper settings (Line Termination) and the loaded driver with the version on the EEPROM must be checked ( → Card description BCB-TP).
- Check the settings of the baud rate. This setting must be the same for all nodes. Check all other parameters in the Select PLC... dialog.
- Check the CAN addresses in the network. Is the node number indicated in the system error message present or available in the CAN network? A node number must only be present once.
- Is the address of the tag variable indicated in the system error message present in the corresponding station?
- Is the CAN communication overloaded?
- Use the CAN Monitor or a CAN analyzer to observe the CAN data traffic.

If the problem continues, contact our Customer Support at [automation@eaton.com](mailto:automation@eaton.com).