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5.15 TesiMod - InterBus

5.15.1 Technical Description

TesiMod operating terminals can be conveniently connected to the InterBus via the 2-wire remote bus system. This makes TesiMod operating terminals a man-machine-interface ideally suited for systems incorporating the InterBus bus. In addition, the InterBus allows a large number of operating terminals to be connected to one master controller.

Usage of the InterBus offers the following advantages:

Bus Topology

The InterBus uses a ring structure with active connection of a maximum of 512 bus stations. The forward and return lines are routed in one single bus cable. Each remote bus station is also a repeater allowing a total distance of approximately 12.8 km to be bridged.
In the event of a malfunction, the outgoing remote bus can be disabled at each remote bus station and the ring can be short-circuited. This permits a precise fault diagnosis to the bus master with respect to error type and location, even in the case of a short-circuit of the bus line.

High-Speed Transmission Medium

The InterBus is operated with RS485-interface levels and a transmission rate of 500 kBit/s. A deterministic total frame transfer method (one message frame for all bus stations) ensures equidistant cycle times on the bus medium. With a total frame width of 256 bytes (2048 I/O points), the maximum InterBus cycle is 7.2 milliseconds.

With a data width of 8 bytes, every operating terminal on the InterBus adds approximately 0.4 milliseconds to the total cycle time.

Integration into an Open Field Bus Concept

The InterBus is an open field bus concept which is supported by a large variety of manufacturers in the field of sensor/actuator technology. Thus, in addition to the operating terminals, a large number of further stations can be connected to the controller via a common bus (decentralized inputs and outputs, etc.).
The InterBus standards are defined by DIN 19258.

The TesiMod operating terminal is operated as a slave on the 2-wire remote bus (9-pin SubminD) of the InterBus where the operating terminal occupies a data width of 4 words or 8 bytes. As a result, each operating terminal is mapped to the memory map of the controller with 8 bytes IN-data and 8 bytes OUT-data.

When the operating mode "Physikalische Adressierung" (physical addressing) is selected on the interface module, the input and output ranges of each station are mapped sequentially to the memory of the controller on the basis of the order in which each station is physically connected to the bus.

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When the operating mode "Logische Adressierung" (logical addressing) is selected, the location of the input and output ranges can be placed into the controller memory as necessary. In addition, the location of these ranges is independent of the order of the stations.

In accordance with the MMI-COM profile, there are three types of data channels on the InterBus:

Direct Process Data Channel

Direct process data are cyclic data that are constant for the operating period of the device. The transfer of direct process data via the process data channel takes place cyclically and unacknowledged (e.g. 16 inputs of an input module or bit information of a keypad - class A1 or B1 device).

Indirect Process Data Channel

Indirect process data are data which do not remain constant for the operating period of the device but vary with external events or requests. The structure of these data is determined by process data identifiers (PD index). The handshake between the two communication partners is defined through a status/control byte.

Parameter Channel

In addition to the process data channel, the parameter channel permits a FMS-like background communication whereby the bytes of an error-protected protocol are transmitted sequentially via the InterBus. This procedure is more suitable for low-speed communications involving larger volumes of data and does not delay the equidistant transmission of time-critical data.

On the InterBus, the operating terminal is operated on the **indirect process data channel**. The parameter channel and direct process data channel are not used. The user data are interpreted in accordance with the MMI-COM profile.

Connection of the operating terminal to the bus is by electrically isolated RS485 drivers. The actual bus protocol is handled by the InterBus protocol chip.

On the controller-end, a manufacturer-specific InterBus master interface module is required which should preferably be electrically isolated.

If the interface module in the controller has an 8-wire remote bus interface (25-pin), an adaptation to the 2-wire remote bus (9-pin) is required by means of the bus terminal **IBS 24 BK/LC2**.

Both the operating terminal/InterBus connection and the MMI-COM protocol are controller-independent. As a result, only variable numbers (but not real PLC addresses) are transferred within the MMI-COM protocol. Assignment of the variable number to the variable within the controller must be carried out **in the controller**.

A function block must be called in the main program of the controller. This function block is parameterized with the location of the IN and OUT-data and must be called for every operating terminal connected. When necessary, the function block evaluates the requests received from the operating terminal. During this process, either a read or write function block is called which is responsible for the

assignment between the variable number and actual PLC variable. That means that the data transfer from the PLC takes place event-controlled. This also allows the PLC to control which data are written and read by the operating terminal.

All services (requests) required for the operation of the operating terminal are initiated by the operating terminal. The operating terminal has a client functionality. The controller simply responds to the operating terminal's requests and thus functions as a server.

5.15.2 Specification within the InterBus

TesiMod operating terminals are operated on the InterBus with the following parameters:

Data channel length:

indirect process data with status word:	**4 words** / 8 bytes
direct process data:	not used
parameter channel:	not used

Identcode:

0x2F(hex) / 47 (dec) PD channel with input and output data

Function group specification within the MMI-COM:

B3 variable input
G1 variable request

Services of the MMI-COM profile used:

PD Index 0x14: send variable - 1 byte (mandatory)
PD Index 0x15: send variable - 2 bytes (mandatory)
PD Index 0x16: send variable - 4 bytes
PD Index 0x40: request variable - 1 byte (mandatory)
PD Index 0x41: request variable - 2 bytes (mandatory)
PD Index 0x42: request variable - 4 bytes

Sütron-specific services:

PD Index 0x84: send variable - 1 byte (bit-based access)
PD Index 0x85: send variable - 2 bytes (bit-based access)

5.15.3 MMI-COM Profile

The MMI-COM profile specifies the uniform interpretation of the user data on the InterBus-S for operating and monitoring systems (**M**an - **M**achine - **I**nterface - **COM**unication).

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5.15.3.1 General Structure

The MMI-COM profile defines an 8-byte range within the indirect process data with the following structure:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Status / ControlByte	PD-Index	VariableNo High	VariableNo Low	User data	User data	User data	User data

User data 1 Byte : b7 .... b0
User data 2 Byte : b15 ..... b0
User data 4 Byte : b31 ..... b0

Since the data transfer must be carried out in both directions, every operating terminal connected to the InterBus is mapped to the controller memory with 8 bytes IN-data and 8 bytes OUT-data.

Assignment of the status/control byte:

Bit 7: Online bit
Bit 6: Malfunction bit
Bit 5: Handshake receiving
Bit 4: Handshake sending
Bit 3: Standard bit (always set to 1)
Bit 2: Index bit (always set to 1)
Bit 1: reserved
Bit 0: reserved

PD Index:

The PD index specifies the MMI-COM service being used (see 5.15.3.2).

Variable number:

Specifies the number of the variable which is to be accessed. The interpretation of the variable number is free, but must be the same in the operating terminal application and the PLC application.

User data (Useable data):

Specifies the user data to be used for the access to a variable.

Byte Order

Bit 7 in byte 5 is always the MSB (**m**ost significant **b**it). The byte order for ascending addresses is always HIGH — > LOW.

Important:
With some interface modules, the byte pairs are swapped to allow access to the data in word-mode from within the PLC program (example: Bosch interface module).

Floating point data

Floating point data are coded in the 4 bytes user data in accordance with the IEEE data format.

5.15.3.2 MMI-COM Standard Services Used

Write-access of the operating terminal or controller response to a request:

PD Index 0x14: send variable (1 byte)
PD Index 0x15: send variable (2 bytes)
PD Index 0x16: send variable (4 bytes)

Read-request of the operating terminal:

PD Index 0x40: request variable (1 byte)
PD Index 0x41: request variable (2 bytes)
PD Index 0x42: request variable (4 bytes)

5.15.3.3 Sütron-Specific Bit Write Services

Writing of bits is not a standard service of the MMI-COM profile. Therefore, Sütron has defined a bit write service of its own to generate a NON-standard service which is then associated with the following PD indices. Due to the non-standard nature, the standard bit in the control byte is deleted for these services.

PD Index 0x84: send variable - 1 byte (bit-based access)
PD Index 0x85: send variable - 2 bytes (bit-based access)

The controller acknowledges these services in its handshake receiving bit and with a set standard bit.

Control Byte	PD Index	Variable	Variable	Byte 5 High	Byte 6	Byte 7 Low	Byte 8
XX	0x84	XXXX	XXXX	And Mask		Or Mask	
XX	0x85	XXXX	XXXX	And Mask High	And Mask Low	Or Mask High	Or Mask Low

First, the controller has to read out the corresponding variable, link the read data with the AND-mask, then link the OR-mask with the result and transfer the data back.
Examples:

1.) The least-significant bit of a data word is to be set to the value 1
AND mask 0xFE
OR mask 0x01

2.) The least-significant bit of a data word is to be set to the value 0
AND mask 0xFE
OR mask 0x00

5.15.4 Tasks of the PLC Program

With respect to the operating terminal functions, the PLC program is responsible for handling the functions and services of the MMI-COM profile. This requires that a function block is called for every operating terminal connected. This function block interprets the received data, manages the handshake bits and decodes the requests from the operating terminal.

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Since the user data are located at different memory areas of the controller when several operating terminals are connected, the function block must be parameterizable with respect to the address location of the IN and OUT-data. In the event that the PLC can not read from the OUT-data addresses, the current status of the OUT-data (status/control byte and PD index only) must be stored in a buffer. (The OUT-data in the P-area of a Siemens controller can not be read back, for example).

If valid requests from the operating terminal were detected, the variable number transferred must be assigned to the actual PLC address and the required data transferred by calling a read or write function block. The advantage is that only those data which are currently required by the operating terminal need to be managed in the PLC in an event-controlled manner. In addition, the PLC can control which data are accessed by the operating terminal at runtime.

Whenever the operating terminal sets the online bit to 0, the handshake bits in the controller must be erased. This permits the operating terminal to synchronize with the controller at any time.

5.15.4.1 MMI-COM Protocol Handling

Online Bit (Bit 7 of the status / control byte)

If the bus is in proper operating condition and the controller is active, the online bit must be set. The online bit indicates that the device is ready to receive data. The bit is set to 1, as standard.

Malfunction Bit (Bit 6 of the status / control byte)

This bit indicates a malfunction on the device. The bit is set to 0, as standard.

Handshake Receiving Bit (Bit 5 of the status / control byte)

This bit is used to acknowledge receipt of a telegram. This bit is inverted whenever the remote station signals a new telegram by inverting its handshake sending bit (bit 4) and this telegram has been read out by the receiving station.

This bit only indicates at the protocol level that the transmission channel involved is free again, it does not indicate, however, whether the corresponding application has already processed the telegram. Therefore, the telegram may still be classified as faulty by the application at a later date.

Handshake Sending Bit (Bit 4 of the status / control byte)

This bit is used to signal a new telegram. This bit may be inverted only if it matches the handshake receiving bit (bit 5) of the remote station and the remote station is ONLINE (bit 7). The transmission channel then remains enabled until the remote station has caused its handshake receiving bit to match the new value of its own handshake sending bit.

Standard and Index Bits (Bit 3 / 2 of the status / control byte)

These two bits indicate that these are standard functions, not manufacturer-specific functions. These two bits are always set to 1.

Reserved Bits (Bits 1 / 0 of the status / control byte)

The reserved bits must be set to 0.

Requests from the operating terminal:
All services required for the operation of the operating terminal are initiated by the operating terminal.

If the handshake sending bit of the operating terminal (IN-data area) and the handshake receiving bit of the controller (OUT-data area) do not match, a new request has been received from the operating terminal which must be processed by the PLC. Receipt of this request must be acknowledged by inverting the handshake receiving bit (OUT-data area) in the PLC and transmitting data back to the operating terminal, if necessary. These new transmitted data must be entered into the transmission data area (OUT-area) of the controller and the handshake sending bit must be inverted (OUT-area).

Read-access of the operating terminal (Request Variable service)

```
Operating Terminal                          PLC
                  ----  Request variable  ------->
                  <---  Send variable     --------
```

Write-access of the operating terminal (Send Variable service)

```
Operating Terminal                          PLC
                  ----  Send variable     ------->
```

5.15.4.2 Random Access to Data

Upon detection of a request from the operating terminal, certain program parts (function blocks) must be called which execute the read or write function. These function blocks carry out the assignment between the transferred variable number and the actual PLC address. Block call parameters are the PD index, variable number and user data. During write-accesses of the operating terminal, the user data (IN-area) must be written to the PLC variables while during read-accesses, the user data must be read from the PLC memory and written to the transmission area (OUT-area) of the controller.

Depending on the access used in the application (see 5.15.5.4), 1, 2 and 4 byte accesses to the variables are supported.

Suitable variable number ranges can be combined to logical ranges. This simplifies the decoding effort required within the read and write function blocks. (For example: the variable numbers 100 to 199 could correspond to the flag words 0 to 99.)

Data with a data length of more than 4 bytes (alphanumerical texts, tables, poll area, status messages, etc.) are subject to the following convention:

The data are processed with either a 1, 2 or 4 byte access, depending on the access mode. If further data are to be processed, it is assumed that these data are located at the **next higher variable number** (see 5.15.5.4).

When the operating terminal is started up, a 1 byte read access is performed to the variable with the number 0 as part of a test communication. During this process, the read data are not interpreted, i.e. this

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variable number does not have to be decoded by the read function block.

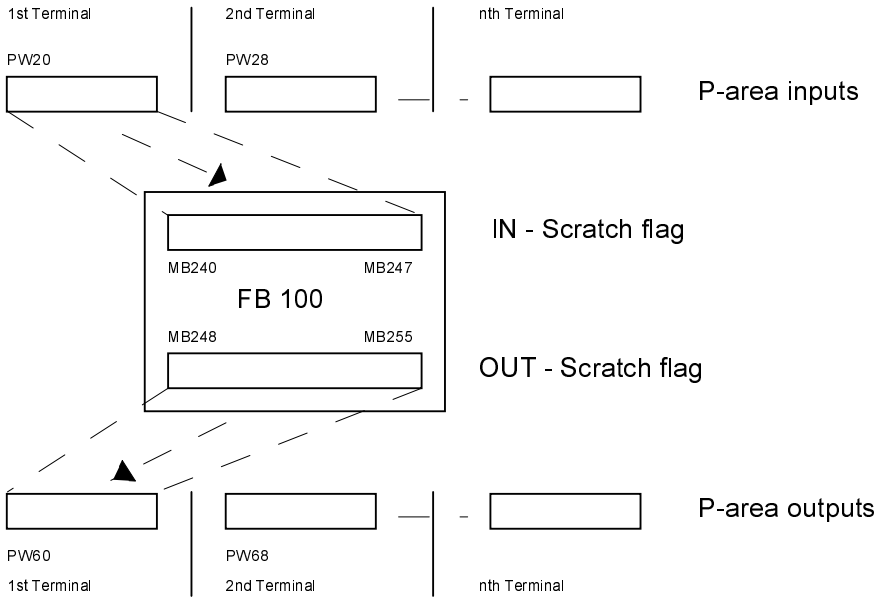
All editable variables must be decoded in both the read and write function block because they are generally first read and then also written.

5.15.4.3 Structure of the MMI-Function Block

Illustrated below is the structure of the MMI-function block using the InterBus connection to a Siemens PLC with the function block FB100 as an example. For connections to other controller types, the function block will have a similar structure.

The tasks of the function block FB100 are as follows:

- is called in the OB1 for every operating terminal on the network
- is parameterized with the address location of the data in the P-area of the controller (parameters PEIN and PAUS)
- manages the handshake bits and the PD index
- saves the first word of the OUT-data to a data block (parameters DBNR and WDNR)
- copies the IN/OUT-peripheral data to the IN/OUT-scratch flags MB240 to MB255
- branches to a read/write function block (when necessary)



MW238 will be used for the edit-function !

```
    BAUSTEIN#OB1
    BIB    #15033
00000    :
00002    :
00004    :SPA FB 100   1. Bedienterminal
    NAME #FB100
    PEIN =KF +20       Adresse IN-Daten
    PAUS =KF +60            Adresse OUT-Daten
    DBNR =KF +100           Datenbausteinnummer
    WDNR =KF +0             Wortnummer
00010    :
00012    :SPA FB 100   2. Bedienterminal
    NAME #FB100
    PEIN =KF +28       Adresse IN-Daten
    PAUS =KF +68            Adresse OUT-Daten
    DBNR =KF +100           Datenbausteinnummer
    WDNR =KF +1             Wortnummer
0001E    :BE
```

5.15.4.4 Structure of the Read Function Block

Illustrated below is the structure of the read function block using the InterBus connection to a Siemens PLC with the function block FB101 as an example. For connections to other controller types, the function block will have a similar structure.

The tasks of the function block FB101 are as follows:

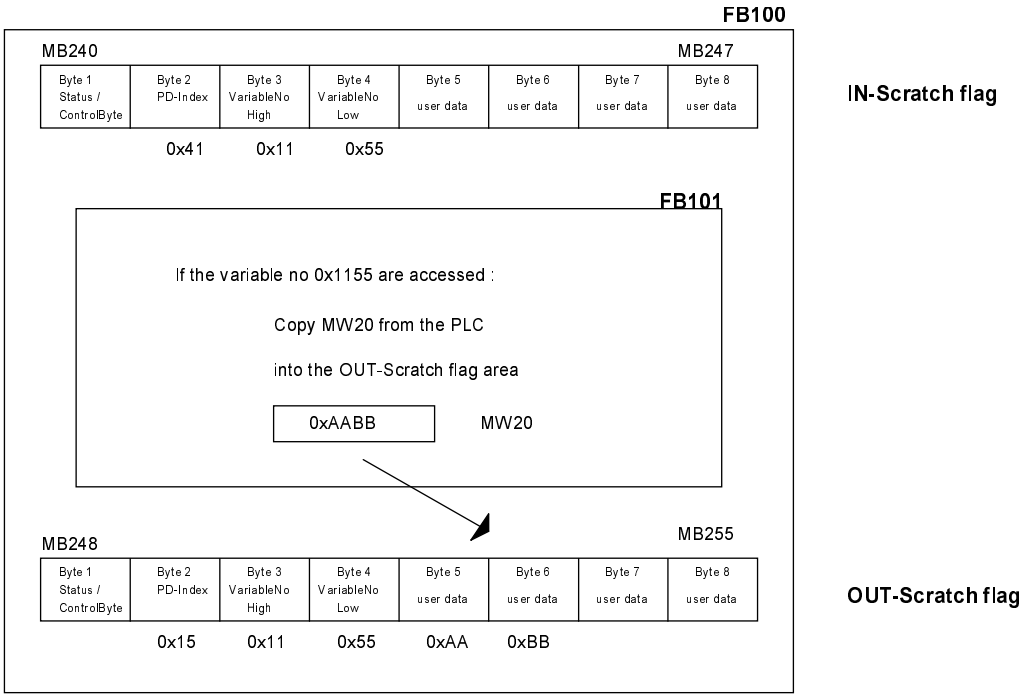
- implements the event-controlled read access
- evaluates PD index and variable number
- copies user data from the PLC memory to a scratch flag area

Example:

Variable file : SOLLWERT W 4437

Variable number : 0x1155 or 4437 (dec)
Location in the PLC : MW 20 containing : 0xAABB or 43707 (dec)
PD Index : 0x41 (request 2 bytes) /
0x15 (send 2 bytes)

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5.15.4.5 Structure of the Write Function Block

Illustrated below is the structure of the write function block using the InterBus connection to a Siemens PLC with the function block FB102 as an example. For connections to other controller types, the function block will have a similar structure.

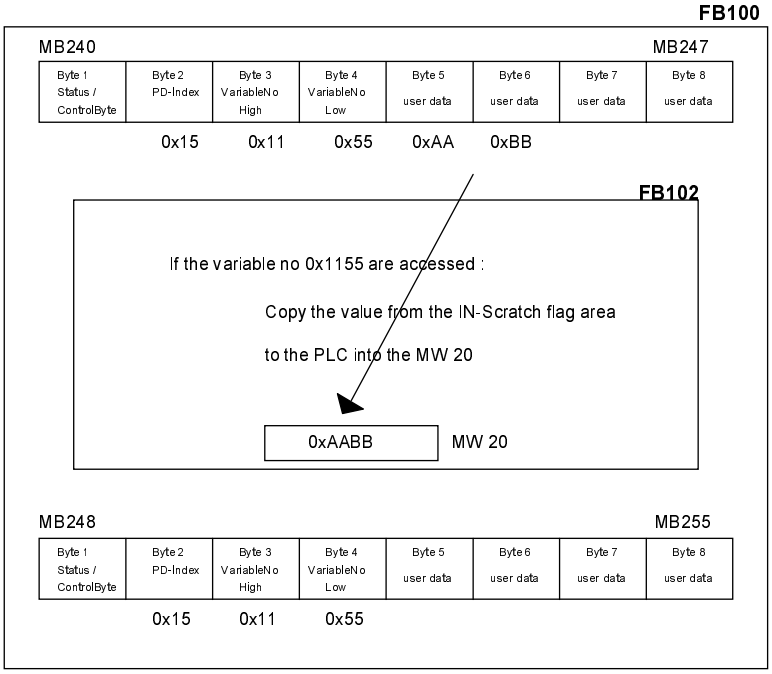
The tasks of the function block FB102 are as follows :

- implements the event-controlled write access
- evaluates PD index, variable number and user data
- copies user data from the scratch flag area to the PLC memory

Example:

Variable file	: SOLLWERT	W	4437

Variable number	: 0x1155 or 4437 (dec)
Location in the PLC	: MW 20
Value	: 0xAABB or 43707 (dec)
PD Index	: 0x15 (transmit 2 bytes)



IN-Scratch flag

OUT-Scratch flag

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5.15.4.6 Simplified Communication via one Data Block

Communicating via only one data block can considerably facilitate the decoding effort within the read and write function blocks.

For this process, the transferred variable number is interpreted as a word number directly within a data block. In this case only word accesses are carried out. The function blocks (in the example of the Siemens connection the function blocks FB101 and FB102) are then application-independent. The user has complete control over the variables within the programming environment of the operating terminal.

In this case, the function blocks FB101 and FB102 have the following appearance:

```
    BAUSTEIN#FB101
    BSTNAME #FB101
    BIB    #4010
0000A       :                       ---------------------------------
0000C       :                       Dieser Baustein liest Variablen
0000E       :                       - - - - - - - - - - - - - - - -
00010       :                       Übergabe der Daten in folgenden
00012       :                       Schmiermerkern
00014       :
00016       :                       Aufrufparameter :
00018       :                       PD-Index          : MB 241
0001A       :                       Variablennummer   : MW 242
0001C       :
0001E       :                       Returnparameter :
00020       :                       Nutzdaten         : MB252 .. MB255
00022       :                       ---------------------------------
00024       :
00026       :A   DB XYZ             Datenbaustein aktivieren
00028       :B   MW 242
0002A       :L   DW 0               Wort aus Datenbaustein lesen
0002C       :T   MW 252             in den Ziel-Schmiermerkerbereich
0002E       :                       transferieren
00030       :BE
```

```
    BAUSTEIN#FB102
    BSTNAME #FB102
    BIB    #4010
0000A       :                       -----------------------------------------
0000C       :                       Dieser Baustein schreibt Variablen
0000E       :                       - - - - - - - - - - - - - - - -
00010       :                       Übergabe der Daten in folgenden
00012       :                       Schmiermerkern
```

```
00014     :
00016     :                    Aufrufparameter :
00018     :                    PD-Index      : MB 241
0001A     :                    Variablennummer : MW 242
0001C     :                    Nutzdaten     : MB244 .. MB247
0001E     :                    ------------------------------------------
00020     :
00022     :A   DB XYZ
00024     :L   MW 244          Nutzdaten in Akku laden
00026     :B   MW 242
00028     :T   DW 0            In den Datenbaustein schreiben
0002A     :
0002C     :BE
```

5.15.5 Parameterizing the Protocol

5.15.5.1 MMI-COM Handshake Timeout Parameter

Specifies the period of time, in milliseconds, that the operating terminal waits for the acknowledgement from the PLC (change of the handshake bits). If no acknowledgement is provided by the PLC within this period of time, the operating terminal will display a communication error (see 5.15.9).

The valid range of values is: 0 to 65000 milliseconds.

5.15.5.2 Parameter - Delay until Connection Set-up

This delay time (in seconds) delays the first transfer of the MMI-COM services. This prevents the operating terminal from detecting a communication error during the start-up phase on account of the bus and/or controller not being ready for operation yet.
If the PLC and the respective interface module require more time for the power-up phase than the operating terminal, this can be compensated by increasing the delay time.

The valid range of values is: 1 to 20 seconds.

5.15.5.3 Parameter - Floating Point Numbers in the Siemens Format

This option is used to define whether the floating point data are transferred to the controller in the IEEE format or in the Siemens-specific format.

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5.15.5.4 Data Types

The data types define the number of bytes that are assigned to a single variable.

Data Type	Access to	Length of a Single Variable	Comment
BY	Byte (and Bit)	1 Byte	next byte is located 1 address higher
W	Word	2 Bytes	next word is located 1 address higher
W-2	Word	2 Bytes	next word is located 2 addresses higher
DW	Double Word	4 Bytes	next double word is located 1 address higher
DW-2	Double Word	4 Bytes	next double word is located 2 addresses higher
DW-4	Double Word	8 Bytes	next double word is located 4 addresses higher

The data types W-2, DW-2 and DW-4 are available from firmware version 6.0.

The access parameter determines the data length which is evaluated by the operating terminal. In addition, it defines which MMI-COM service is used to process the variable.

Important:
Data with a data length of more than 4 bytes (alphanumerical texts, tables, poll area, status messages, etc.) are subject to the following convention:

The data are processed with a 1, 2 or 4 byte access, depending on the access mode.
If further data are to be processed, it is assumed that these data are located at the **next higher variable number**.
Example: A 10-character text starting from variable 100 (access W - word) consists of the variables 100 to 104.

5.15.5.5 Variable Number

With the MMI-COM profile, data are assigned in an controller-independent manner by way of a variable number. That means that the assignment of a fixed controller address to a variable number is only carried out in the controller (for example: flag 32.0 is to be assigned to the variable number 50). The variable number can be entered either in a decimal (no identifier) or hexadecimal (followed by a H) format (hexadecimal input from driver version 4.5).

Example: variable number 100 or 64H

5.15.6 Additional Functions

Since the MMI-COM profile supports accesses of up to a maximum of 4 bytes only, the execution of the following additional functions requires multiple accesses.

To achieve a defined byte order, 2-byte accesses must be used for the following additional functions. That means that the access mode W (word) must always be selected when assigning the start variable number.

5.15.6.1 Poll Area

The poll area is used to manage the write coordination byte (KBS), the message channel and the LEDs of the function keys. This area is continuously polled by the operating terminal. The structure of the poll area is as illustrated below:

Stucture of 2 Byte - Variables

15 8	7 0	Bit-Number
KBS	Reserved	Variable X
Serial Message Highbyte	Serial Message Lowbyte	Variable X+1
LEDs 1 to 4	LEDs 5 to 8	Variable X+2
LEDs 9 to 12	LEDs 13 to 16	Variable X+3
LEDs 17 to 20	LEDs 21 to 24	Variable X+4
LEDs 25 to 28	LEDs 29 to 32	Variable X+5

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5.15.6.2 Status Messages

The term Status Messages refers to the static assignment of flags (bits) in the controller to plain text messages in the operating terminal. The structure of the status messages is as described below.

The status message area has the following structure:

Structure of 2-Byte Variables

15 8	7 0	Bit Number
Message 16 to 9	Message 8 to 1	Variable X
Message 32 to 25	Message 24 to 17	Variable X+1
Message etc.	Message etc.	Variable X+2

5.15.6.3 Siemens Timer/Counter Formats

Format: Siemens Counter
If the Counter format was selected for the representation method, the data are accessed binary. Any status bits of the timer are masked out during read operations or are overwritten during write operations.

Format: Siemens Timer
If the Timer format was selected for the representation method and read operations are performed, the time value and time base are converted to a terminal-internal unsigned 4-byte variable which represents the time value with respect to the time base of 0.01 second.

Example: A range of 10 (time base is 1.0 second) and a time value of 999 are represented or edited, in the terminal by the value 99900.

When writing timer variables, the terminal-internal unsigned 4-byte number is converted to a time value and the smallest possible time base.

5.15.7 Diagnostic LEDs

Diagnostic LED +5V (Operating voltage)

The green LED +5V indicates that the InterBus logic is supplied with power.

Diagnostic LED RC (**R**emote bus **c**heck)

The green LED RC allows the incoming remote bus to be monitored. The RC is active if the cable connection is in proper operating condition and the InterBus Master (interface module of the controller) is not in the reset mode. During an InterBus reset or power-up reset, the LED RC becomes inactive.

Diagnostic LED BA (**B**us-**A**ctive)

The green LED BA signals that an InterBus transmission is taking place. The LED has an off-delay of 640 ms.

Diagnostic LED TR (**T**ransmit/**R**eceive)

The green LED TR becomes active, when this station carries out PCP-communication. Because within the MMI-COM profile, the operating terminal does not carry out PCP-communication via the parameter channel, the LED remains inactive.

Diagnostic LED RD (**R**emote bus **d**isable)

The red LED RD signals that the outgoing remote bus is disabled. This is a result of either a reset having been performed or of the master´s attempt to disable the outgoing interface within the ID cycle.

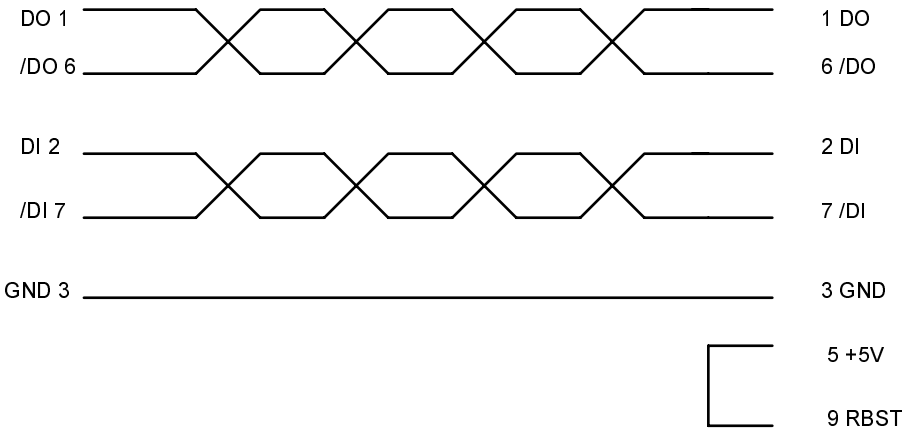
5.15.8 Physical Interfacing

Connectors on the TesiMod Operating Terminal for Connection to the Remote Bus

	Remotebus In	**Remotebus Out**
1	DO	DO
2	DI	DI
3	GND	GND
4	-	-
5	-	+5V
6	/DO	/DO
7	/DI	/DI
8	-	-
9	-	RBST

/000-8203/ Technical details are subject to change without prior notice
TESI_T_eng_V20.3005150QK0

5.15.8.1 2-Conductor Remote Bus Cable



D-SUB 9-pin
Female connectors

Remotebus-In

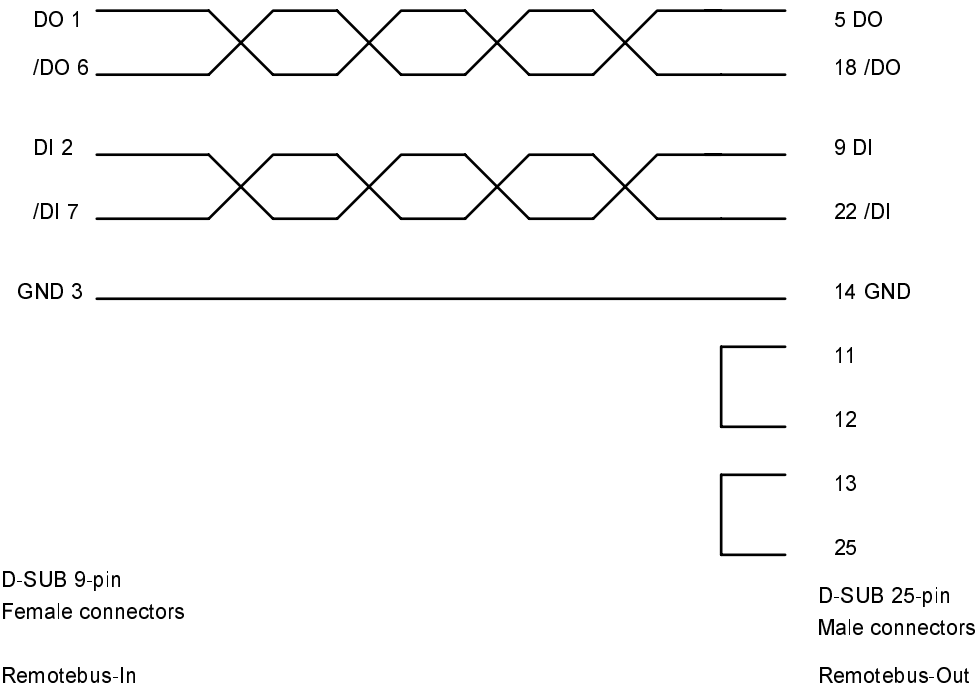
D-SUB 9-pin
Male connectors

Remotebus-Out

LI-YCY- 3 x 2 x 0.25 mm²
Twisted pairs
Common shield connected to connector housing at both sides

5.15.8.2 Conversion 8-Conductor Protocol to 2-Conductor Protocol

with Bus Terminal IBS 24 BK/LC2 :



LI-YCY- 3 x 2 x 0.25 mm²
Twisted pairs
Common shield connected to connector housing at both sides

/000-8203/ Technical details are subject to change without prior notice
TESI_T_eng_V20.3005150QK0

5.15.9 Error Messages

Possible Error Messages:

Code	2	E_PROTOKOL	The controller has transferred data to the operating terminal that were not requested by the operating terminal. The subcode specifies the received PD index in the decimal format.
	40	E_SYS_ADDRESS	Wrong system variable.
	50	E_STOERUNG	Controller operating as a remote station has set the malfunction bit. The subcode specifies the received status/control byte in the decimal format.(**)
	51	E_OFFLINE	Controller operating as a remote station is offline. The subcode specifies the received status/control byte in the decimal format.(**)

Possible Causes for the Error:
- OB13 loaded, points to scratch flag
- OB1 with wrong PAA and PAE address
- Data overwrite the back-up word of the PAA data (controller/status byte, parameterized for example as OB1, DW0, DB100)

52	E_NON_STANDARD	The controller has transmitted a service with an index bit and/or standard bit that was not set. The subcode specifies the received status/control byte in the decimal format.(**)
53	E_ILLEGAL_PDINDEX	A PD index has been received which is not supported. The sub-code specifies the received PD index in the decimal format.(**)
54	E_TIMEOUT_HANDSHAKEBITS	The controller operating as a remote station has failed to respond by inverting the handshake bit within the timeout period.

Possible Causes for the Error:
- This could be a result of the InterBus not being in operation, the PLC being in the stop mode or the function block required for the operation of the operating terminal not being active in the PLC. The subcode specifies the variable number which was processed when the error occurred in the decimal format.

55 E_TIMEOUT_ANSWER ..... The controller operating as a remote station has failed to respond to a variable request service with a variable send service within the timeout period. The subcode specifies the variable number, which was processed when the error occurred, in the decimal format.

56 E_BASESIZE ..... Invalid access type and thus invalid basic data size in the variable list. The subcode specifies the variable number, which was processed when the error occurred, in the decimal format.

57 E_HANDSHAKEBITS ..... The settings of the handshake bits of the remote station were such that the operating terminal was unable to transfer further requests. The subcode specifies the variable number, which was processed when the error occurred, in the decimal format.

58 E_SUPI ..... The SUPI protocol chip is no longer addressable.

Possible Causes for the Error:
- No valid data cycles may be performed on the bus. The subcode specifies the variable number, which was processed when the error occurred, in the decimal format.

59 E_WRONG_VARNR ..... During a read request, the PLC has returned an incorrect variable number.

Possible Causes for the Error:
- The 8 bytes of user data may not be consistent. The subcode specifies the received variable number in the decimal format.(**)

/000-8203/ Technical details are subject to change without prior notice
TESI_T_eng_V20.3005150QK0

60 E_WRONG_PDINDEX ..... During a read request, the PLC has returned an incorrect PD index.

Possible Causes for the Error:

- The 8 bytes of user data may not be consistent. The subcode specifies the received PD index in the decimal format.(**)

(**) Subcode from driver version 4.3