MOBY®-I Identification System

ASM 470 Interface Module for ET 200M
Function Block FB 47 for the SIMATIC S5

Technical Description Release 12.98

SIEMENS

MOBY®-I

ASM 470 Interface Module for ET 200M Function Block FB 47 for the SIMATIC S5

Technical Description, Version 1.0

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Tables

System Overview

1

This chapter describes the primary features of the FB 47 function block, data transmission between FB 47 and MDS, and programming.

1.1 Short Description of the ASM 470

Configuring

The ASM 470 is designed for operation of MOBY in a SIMATIC S7-300 or with the decentralized I/O device ET 200M.
You will need the FC 47 and related descriptive documentation if you use the ASM 470 in a SIMATIC S7-300.

The documentation here describes using the FB 47 function block in a SIMATIC S5 with PROFIBUS-DP master IM 308-C. The ASM 470 is operated in this configuration with an ET 200M.
The ASM 470 module can be used with the following MOBY systems.

- MOBY-I
- MOBY-E
- MOBY-F
- MOBY-V
- MOBY-L

Two SLGs can be operated on the ASM 470 in time-multiplex operation.

The two SLGs must belong to the same MOBY system.

Up to 7 ASM 470 modules can be installed and operated in one ET 200M module rack.

SIMATIC S5

The FB 47 function block can be used in the SIMATIC S5-115U, S5-135U and S5-155U.

Compatibility

All SLGs and MDSs of the MOBY-I/L family can be used with the ASM 470.

Programming

The FB 47 function block ensures that programming the module is easy.

Error indication

ASM 470 error messages are indicated to the user via the LEDs of the ASM 470 and via the FB 47.

Dialog

“Dialog” operating mode can be set on the MOBY-I to establish a dialog between two MOBY-I interface modules.

ECC driver

The ASM 470 contains the MOBY-ECC driver. The driver can be parameterized with the FB 47 function block.

Setup of the ASM 470

Simple setup which is not sensitive to interference since the SLG and the ET 200M bus are galvanically isolated.

Operation in an ET 200M

The ASM 470 can be used without restriction in an ET 200M decentral I/O device. In this configuration, the FB 47 operates in either an S5-115U, S5-135U or S5-155U.

Front

Figure 1-1 shows the front of the ASM 470 with its indicator elements. You can fill in the data of your system on the included insert plate and place it in the space provided.

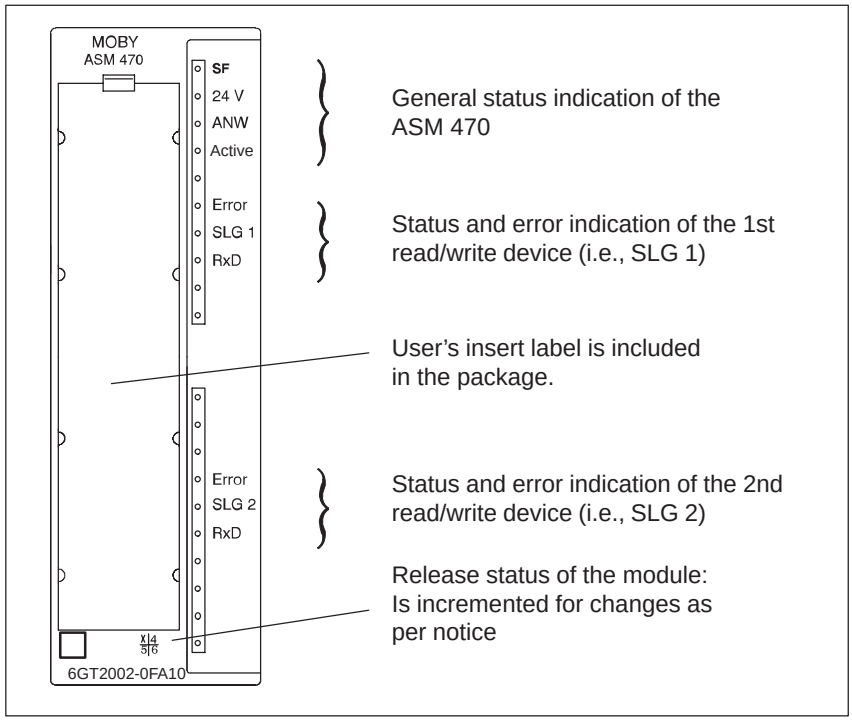


Figure 1-1 The front of the ASM 470

Circuit diagram of the ASM 470

Figure 1-2 shows a block circuit diagram of the ASM 470 with its primary function components.

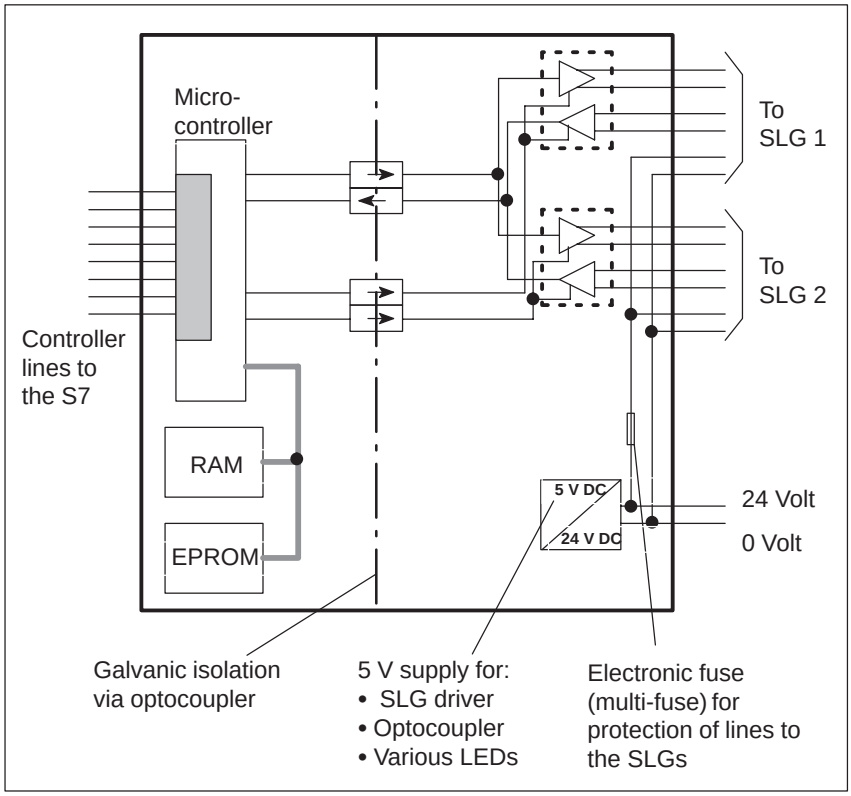


Figure 1-2 Circuit diagram of the ASM 470

Compatibility with active backplane bus

Starting with release status 3, the module has been assigned the new MLFB no. 6GT2002-0FA10. This new module permits use in a SIMATIC setup with ”active backplane bus”.

1.2 Short Description of the FB 47

Introduction

The FB 47 function block described here controls the data transmission between the S5 user program and the ASM 470 interface module.

The FB 47 can be used without modification in the S5-115U/135U/155U programmable controllers.

Primary functions

- Conversion of the data from user parameter assignment format to a format suitable for an ASM 470
- All communication with the ASM 470 using exchange of commands and data via PROFIBUS-DP
- Error handling: Conditioning of errors for the user

Data transmission

The procedure for data transmission between FB 47 and MDS can be divided into three steps.

1. Supplying the interface with the appropriate command and the data or parameters
2. Transmitting the data between interface and data memory
3. Supplying the S5 with the results or data from the interface

1.3 Programming

Figure 1-3 provides a flowchart showing how the FB 47 functions.

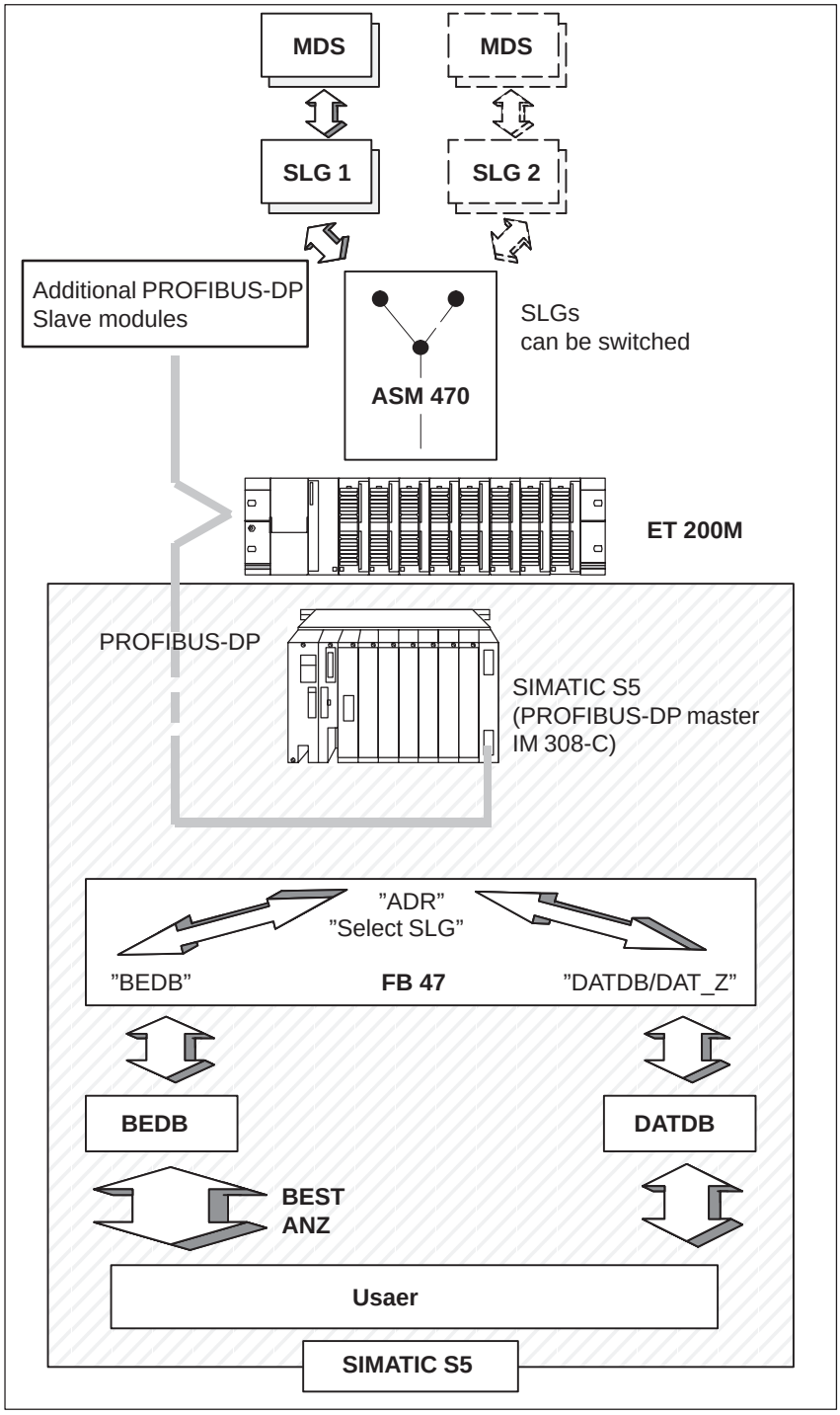


Figure 1-3 Programming

Specifications of the FB 47

2

This section contains the technical specifications of the FB 47, and describes the input parameters.

2.1 Technical Specifications

Description

The technical specifications of the FB 47 are listed in table 2-1.

Table 2-1 Technical specifications of the FB 47

Parameter	Value
Block number	FB 47 (can be changed by the user)
Block name	MOBY:47
Library number	11296
Block length	920
Blocks called	None
Data blocks used	BEDB and DATDB (if BEDB not equal DATDB)
Flags used	FY 238 to FY 255
Counters used	None
System commands used	None
Call	Cyclic call

Run times

Typical run times of the FB 47 (cycle load of the programmable controller in msec) are given in table 2-2.

Table 2-2 Run times of the FB 47

	Idle Pass	Start Command or Fetch Event
115U-941-7UB11	1	6.3
115U-942-7UB11	1	6.3
115U-943-7UB11	0.92	6.0
115U-944-7UB11	0.13	0.5
115U-945	0.04	0.15
135U-928	0.68	3.5
135U-928B	0.11	0.4
155U-948	0.07	0.2

Note

The times required by the ASM 470 for data exchange with the data memories are described in the catalog.

Transmission times to the MDS

The communication times between ASM and MDS are listed in section 2 of the MOBY catalog. The cycle time of the S5 must also be added during the entire duration of time from the start of the command to the result. The user sees this time when he/she starts a command while an MDS is already located in the transmission window of the SLG. Table 2-3 lists the total times.

Table 2-3 Transmission times to the MDS

	S5 CPUs, release status B
Transmission time for one command	At least 3 cycles [1] (i.e., SIMATIC cycles or PROFIBUS cycles)
Average value for reading/writing 255 bytes (cycle time = 16 msec; 22 commands are sent to the ASM)	1100 msec

1 Only applied to a user data length of ≦ 12 bytes.
For longer lengths: 3 cycles for each 12-byte block started

Communication

Hardware implementation of communication between S5/IM 308-C and ASM 470: read/write a 16-byte address area on the ASM 470

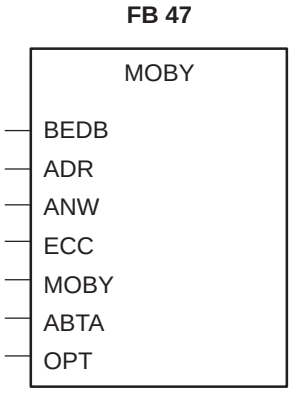
Note

FB 47 can be used to process up to 255 bytes with one command. Transmission of the data to the ASM and the further transmission to the MDS is performed in 12-byte blocks, however.

2.2 Interface to the User (Parameter Assignment)

Description

The FB 47 has the following input parameters (but no output parameters).



Explanation

The parameters of the FB 47 are explained in table 2-4.

Table 2-4 Parameters of the FB 47

Parameter	Class	Type	Permissible Values/ Characters	Description
BEDB	D	KF	1 to 255	Command data block
ADR	D	KY	Linear P-I/O of the S5: Address ≥ 128 P-page frame of the S5: Address ≥ 192	Start address of the ASM 470 in the ET 200M module rack
ANW	D	KF	0 or 1	Presence
ECC	D	KF	0 or 1	ECC operation
MOBY	D	KF	0, 1, 2, 3 or 4	MOBY operation mode
ABTA	D	KH	Any	Scan time for MDS 507 operation
OPT	D	KH	0000	Reserved for options

Note

The ASM 470 is an analog module.

BEDB

Command data block for internal FB 47 use

One BEDB must be set up by the user for each ASM 470.
Length: At least 19 words (DW 0 to DW 18); free for user starting with DW 19 (e.g., for DATDB with the user data)

Note

When **two read/write devices** are being operated on one ASM 470, **only one DEDB** is required.

ADR

Start address of the input/output areas of the ASM 470 in the I/O area of the SIMATIC S5

The ASM 470 can be operated in the linear P-I/O area starting at address 128 (i.e., analog area), or in the P-page frame area starting at address 192 of the SIMATIC S5.

Note

- The start address of the input/output areas must be an even number.
- The start address of both the input area and the output area must always be identical (FB 47 ADR parameter in KY format: specify the same value twice).

ANW

Set operating mode of the presence check

0 = Presence of the MDS in the field of the selected SLG is not checked.

1 = Presence of an MDS in the field of the selected SLG is checked, and stored in bit 8 of BEST.

ECC

Set ECC operation (all MDS types). (See section 3.1.6.)

0 = Normal operating mode. Processes all MDS types with ECC driver switched off.

1 = Operation with ECC. Processes all MDS types with ECC driver switched on.

MOBY

Setting of the MOBY operating mode in the ASM 470

0 = ASM 470 is a MOBY-I module. All MOBY-I field components and data carriers (except SLG 44 and MDS 507/407E) can be used on this ASM 470.

1 = ASM 470 is a MOBY-L module. All MOBY-L field components and data carriers can be used on this ASM 470.

2 = ASM 470 is a MOBY-I module for MDS 507 operation (see ABTA). Only field components MDS 507/407E and SLG 44 can be operated on the ASM 470.

3 = ASM 470 is a MOBY-I dialog module (ECC operation is not permitted). (See chapter 4.7)

4 = ASM 470 is a MOBY-V module. All MOBY-V field components can be operated on this ASM 470 (SLG 65). See the description of MOBY-I for MOBY-V handling of FB 47.

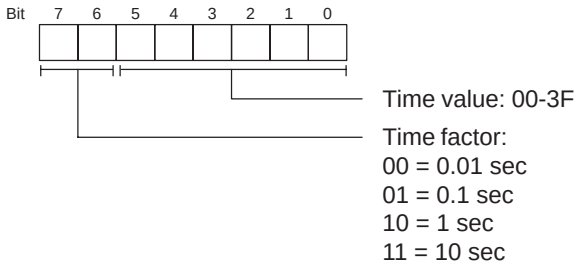
ABTA

Assignment of the parameters for the scan time for MDS 507 operating mode. The FB 47 does not use this parameter unless the MOBY=2 parameter has been set.

The MDS 507/407E was designed for read/write accesses performed over great distances. Among other features, it is equipped with a battery for communication with the SLG 44. To maximize the life of the battery and avoid discharging the battery too quickly, we recommend only processing the MDS 507/407E when actual data communication is to take place. If no command is queued for the MDS, its presence in the field of the SLG 44 is scanned at the assigned interval (set by the ABTA parameter). This reduces the load on the MDS battery.

However, if a command has been issued for the MDS, this is always processed immediately, regardless of the ABTA parameter.

The following applies to the scan time (ABTA).



Example:

A scan time of 1 second results in ABTA parameter = KH = 0081.

Note

For more information on configuring ABTA, see the configuring guide of the SLG 44/MDS 507/MDS 407E.

OPT

Reserved for additional options. Currently, must be assigned KH = 0000.

2.3 Addressing the Module

Slots

The address of the ASM 470 in the ET 200M setup depends on the slot selected. The ASM 470 can be used in slots 4 to 11.

Figure 2-1 shows the layout of an ET 200M with the available slots for the ASM 470.

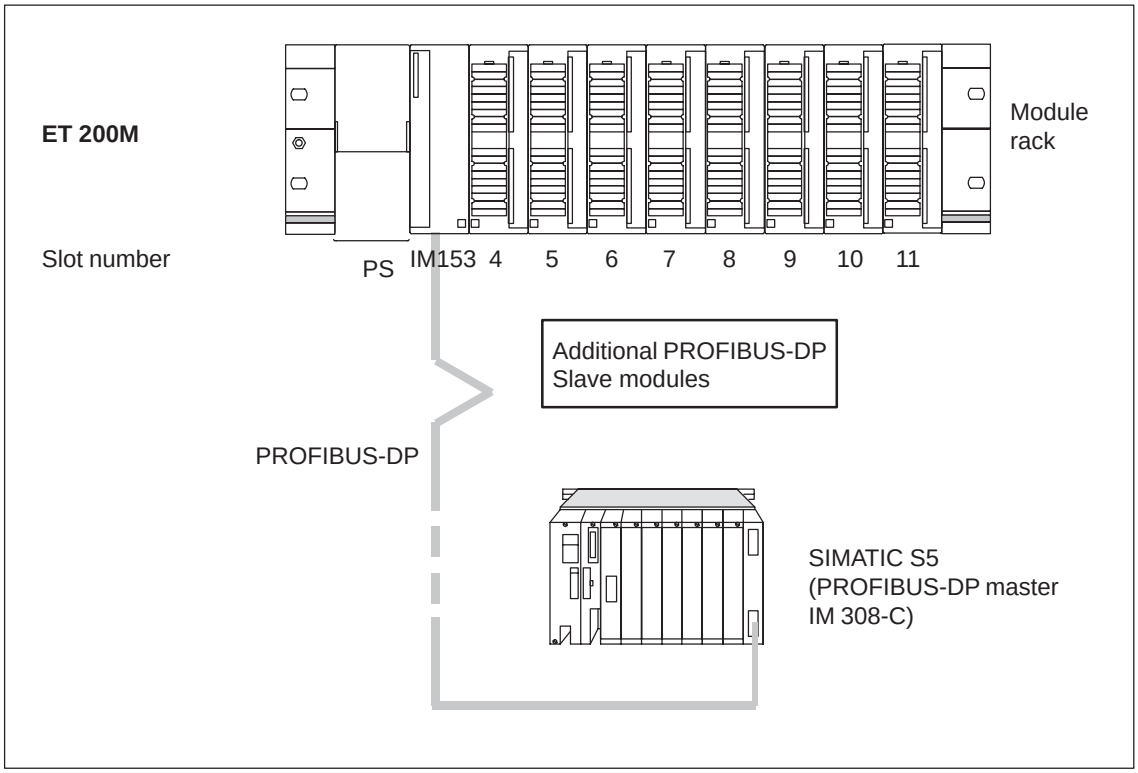


Figure 2-1 Slots of the ET 200M

Address assignment

Each ASM 470 occupies 8 input words and 8 output words in the address area of an ET 200M. The ET 200M in which an ASM 470 is operated must be configured in the **linear P-I/O area** or in the **P-page frame area.** The maximum configurations are listed in the table below.

Up to 7 ASM 470 interfaces can be operated in one ET 200M.

P-I/O Area			P-Page Frame Area
Number of ET 200M ...	**... Each configured with ASM 470 ...**	**... Results in a max. number of ASM 470**	Max. of 16 page frames per IM 308-C Equals max. of 48 ASM 470 on one PROFIBUS-DP line
1	7	7	Up to 4 IM 308-C master modules can be operated in one SIMATIC S5-135U/155U. That equals a max. of 4 x 48 = 192 ASM 470 in one SIMATIC S5-135U/155U setup.
2	4	8	
3	3/3/2	8	
4	2	8	
5	2/.../1	8	
6	2/2/1/...	8	
7	2/1/...	8	

Figure 2-2 Configurations of the ET 200M

Addressing a max. of 8 ASM 470s in one ET 200M using page frame operation

If up to eight ASM 470s are to be used in one ET 200M, ASM addressing must be spread over several page frames. Figure 2-3 below shows the solution.

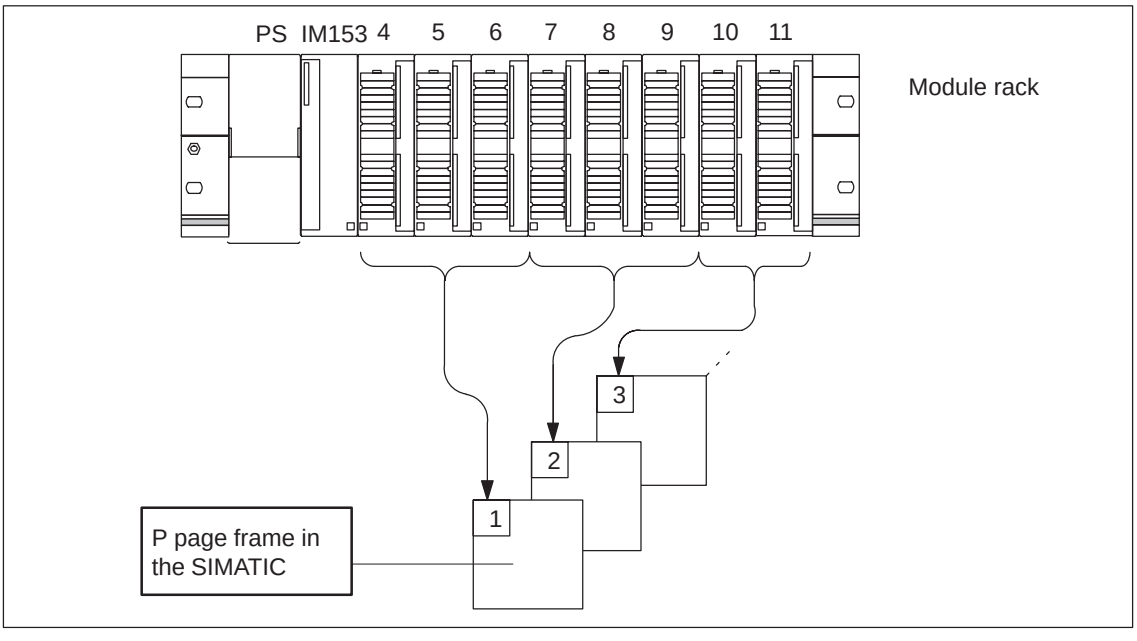


Figure 2-3 Example of a P page frame configuration

BEDB Command Data Block

3

This section describes the layout of the command data block and the assignment of the individual data words.

MOBY commands which can be handled by the FB 47 function block are presented.

Assignment of the parameters to the commands is explained.

Instructions for starting the commands are also provided.

3.1 Layout of the BEDB

Description

The FB 47 requires one BEDB command data block for each ASM 470. All control information is stored there (e.g., pointer to the data field (DATDB/DAT_Z), error messages, status bits and state bits). The BEDB is updated each time the cycle changes.

Layout

Figure 3-1 shows the layout of the BEDB command data block.

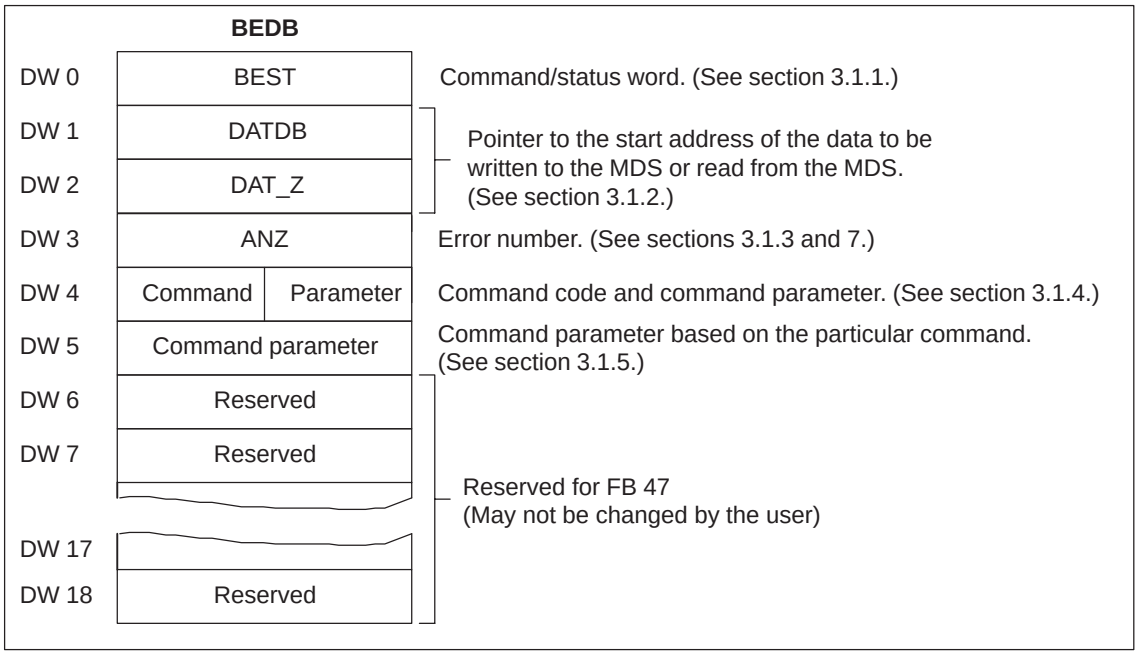


Figure 3-1 Layout of the BEDB

Note

The DEDB must be at least 19 data words in length (i.e., DW 0 up to and including DW 18).

Data words DW 0 to DW 5 of the BEDB are available to the user. Commands can be issued to the ASM 470 by read/write-accessing these data words or assigning parameters to them. Results and messages are indicated for the user.

3.1.1 Command andStatus Word “BEST”

Introduction

DW 0 = BEST

BEST is always valid and can always be scanned by the user.

Bit assignment

Figure 3-2 shows the assignment of the BEST command and status word.

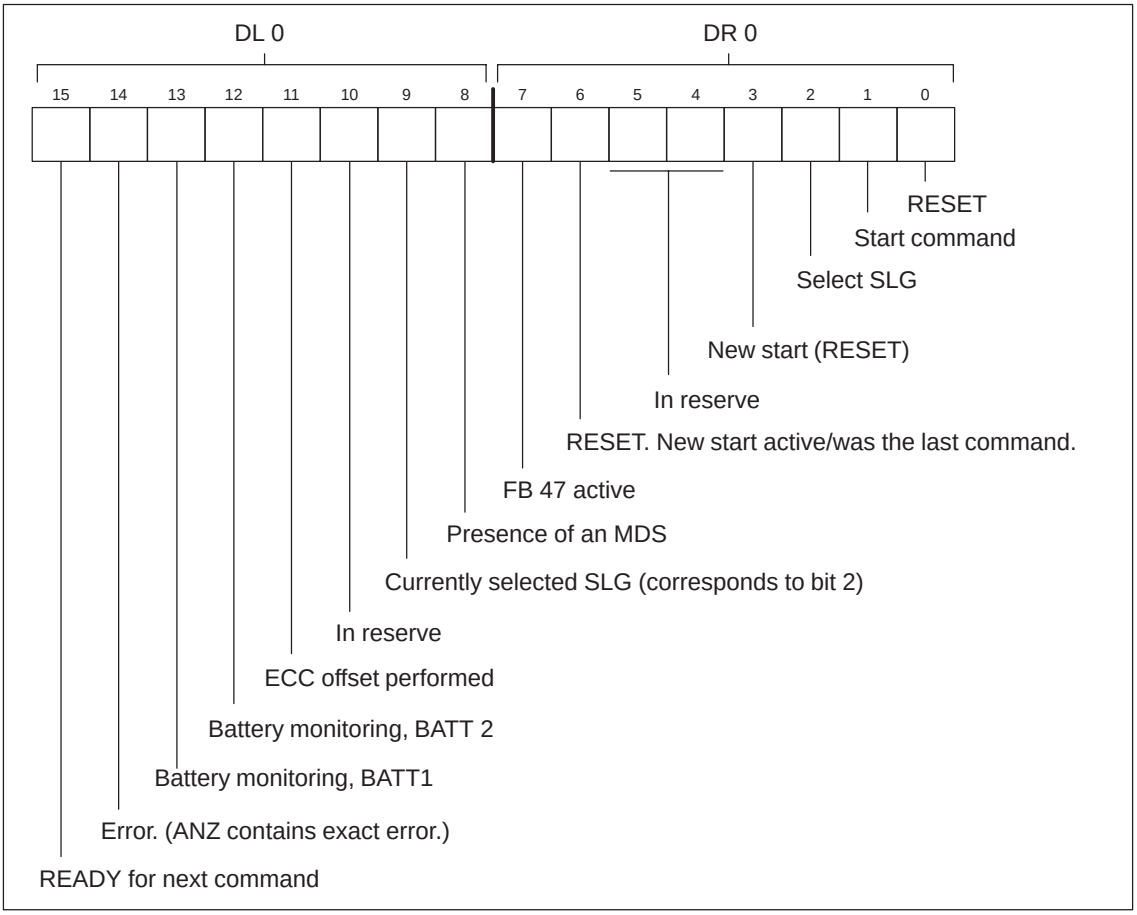


Figure 3-2 Assignment of the BEST command and status word

Note

The BEST parameter must be preset to 0008 H when a branch to new start or restart (OB 20, OB 21, OB 22) is made.

Description of the control bits

Table 3-1 lists the individual bits and their meaning.

Table 3-1 Description of the control bits in the BEST command and status word

Bit No.	Designation	Meaning	Possible User Action
0	RESET	Reset a read or write command. To ensure that the parameters and command setup in BEDB are checked again, perform a RESET after initial commissioning and each time the BEDB, ADR, ANW, ECC, MOBY, ABTA and OPT parameters are changed.	Set the bit
1*	Start command	Start signal for the FB 47. Execution of the parameterized command with the SLG selected in bit 2. The bit is reset by the FB 47 after execution of the command has started.	Set the bit
2*	Select SLG	1. A command is to be started with bit 1. This SLG bit is used to set the active SLG as shown below. 0 = Execute command with SLG 1 1 = Execute command with SLG 2 2. Command is finished (READY bit = 1). This bit can be used to scan for the presence of an MDS in the field of the selected SLG (only when ANW = 1).	Set the bit
3	New start	Set by the user after a new start and after return of power. Same as RESET except that the bit is also scanned while the command is being processed.	Set the bit
4, 5		In reserve	–
6	RESET. "New start active" was the last command.	This bit is set after a RESET or a new start command was started. It indicates that one of these commands is active or was executed last.	Scan the bit
7	FB 47 active	The FB 47 is active with the execution of a command. If bit 7 is set, bit 15 is reset.	Scan the bit
8	Presence	This bit is not set unless a presence check was set on the ASM 470. (See also section 5.) 0 = No MDS in the field of the selected SLG 1 = MDS in the field of the selected SLG	Scan the bit
9	Currently selected SLG	Active SLG on the ASM 470 0 = SLG 1 is/was active. 1 = SLG 2 is/was active.	Scan the bit
10		In reserve	–
11	ECC offset	This bit is not set unless the ECC driver has performed an ECC offset. The command was concluded properly. The data are correct.	Scan the bit
12	BATT 2	Status of battery 2 of the MDS. This bit can assume any state if the MDS is not equipped with a 2nd battery.	Scan the bit
13	BATT 1	The battery monitor of the MDS has been triggered (only for MDS models equipped with RAM). Although the remaining battery capacity is sufficient to continue operation at room temperature for several months, we recommend replacing the battery of the MDS immediately (or replacing the entire MDS if it does not contain a replaceable battery).	Scan the bit

Table 3-1 Description of the control bits in the BEST command and status word

Bit No.	Designation	Meaning	Possible User Action
14*	Error	When a command is concluded incorrectly, the FB 47 sets this bit. Data word ANZ (DW 3) contains the exact cause of the error. Starting a new command resets the error bit. When an error occurs, the READY bit and the error bit are always set simultaneously.	Scan the bit
15*	READY	• The last command has been concluded. • The user may start a new command. **Attention:** Starting a RESET command does not require that the READY bit be set.	Scan the bit

Note

The user must set/scan the control bits marked with an *.

3.1.2 Data Field Pointer “DATDB/DAT_Z”

Description

Basically, the entire FB 47 command set can be divided into so-called “reading” commands and “writing” commands.

When a read command is started (e.g., read data from the MDS), the arriving data which have been read must be stored in a data block (DATDB).

When a write command is started (e.g., write data to the MDS), the data to be written to the MDS must also be fetched from a data block.

This means that when starting a command, you must specify a DATDB (set up beforehand in the PLC) to and from which the user data are to be transferred back and forth. The start address of the data in the DATDB is specified by the DAT_Z pointer.

Note

- DATDB can also be BEDB as long as DAT_Z $\geq$ 19.
- When starting a read or write command, a DATDB and a DAT_Z must have been specified in DW 1 and DW 2 of the BEDB.
- A DATDB up to a total length of 256 words (DW 0 to DW 255) is supported. Remember the positioning of DAT_Z.

Example

The example below gives an illustration of what we have been discussing.

The data to be written to the MDS are to be taken from data block DB 10 starting at data word DW 4. The data to be read from the MDS are to be stored in data block DB 12 starting at DW 160. The values for DATDB and DAT_Z must be entered in the data field pointer DW 1 and DW 2 of the BEDB before the FB 47 commands are started. (See figure 3-3.)

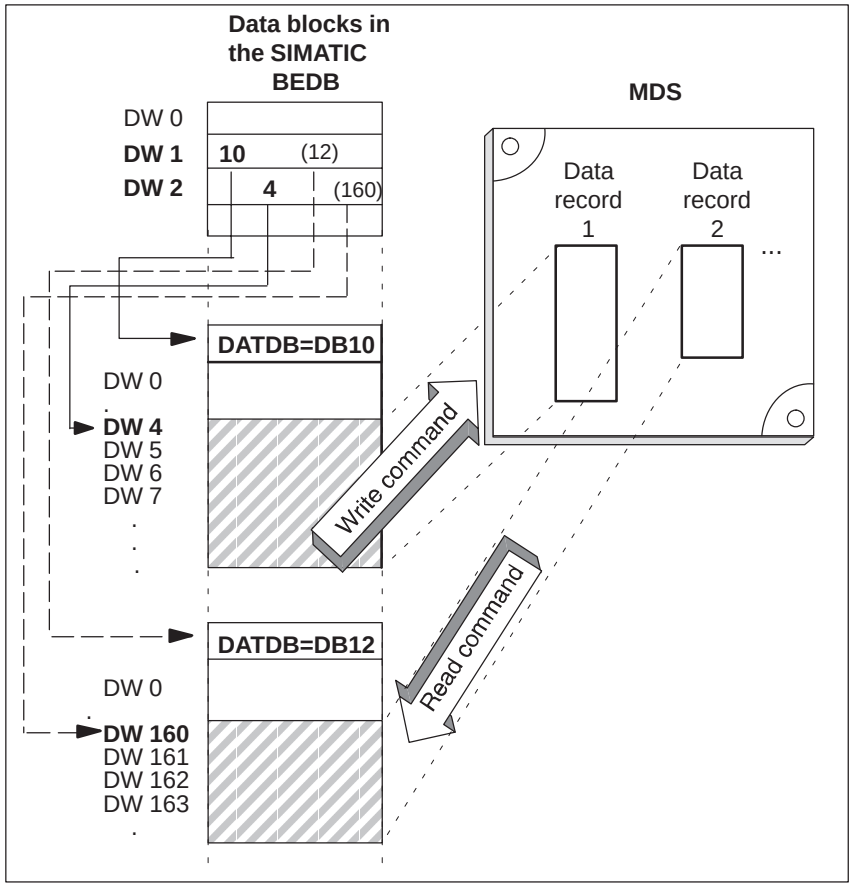


Figure 3-3 Function of the data field pointer

3.1.3 Error Indicator Word “ANZ”

Introduction

DW 3 = ANZ

ANZ is always valid when the READY bit or the READY bit and the error bit is/are set in BEST. The error indication is shown in dexadecimal representation (i.e., hex).

The following applies to ANZ:

- Set by FB
- Reset by FB
- Scanned by user

Assignment of the indicator word

Figure 3-4 shows the assignment of the indicator word. See section 7 for a detailed description of the errors.

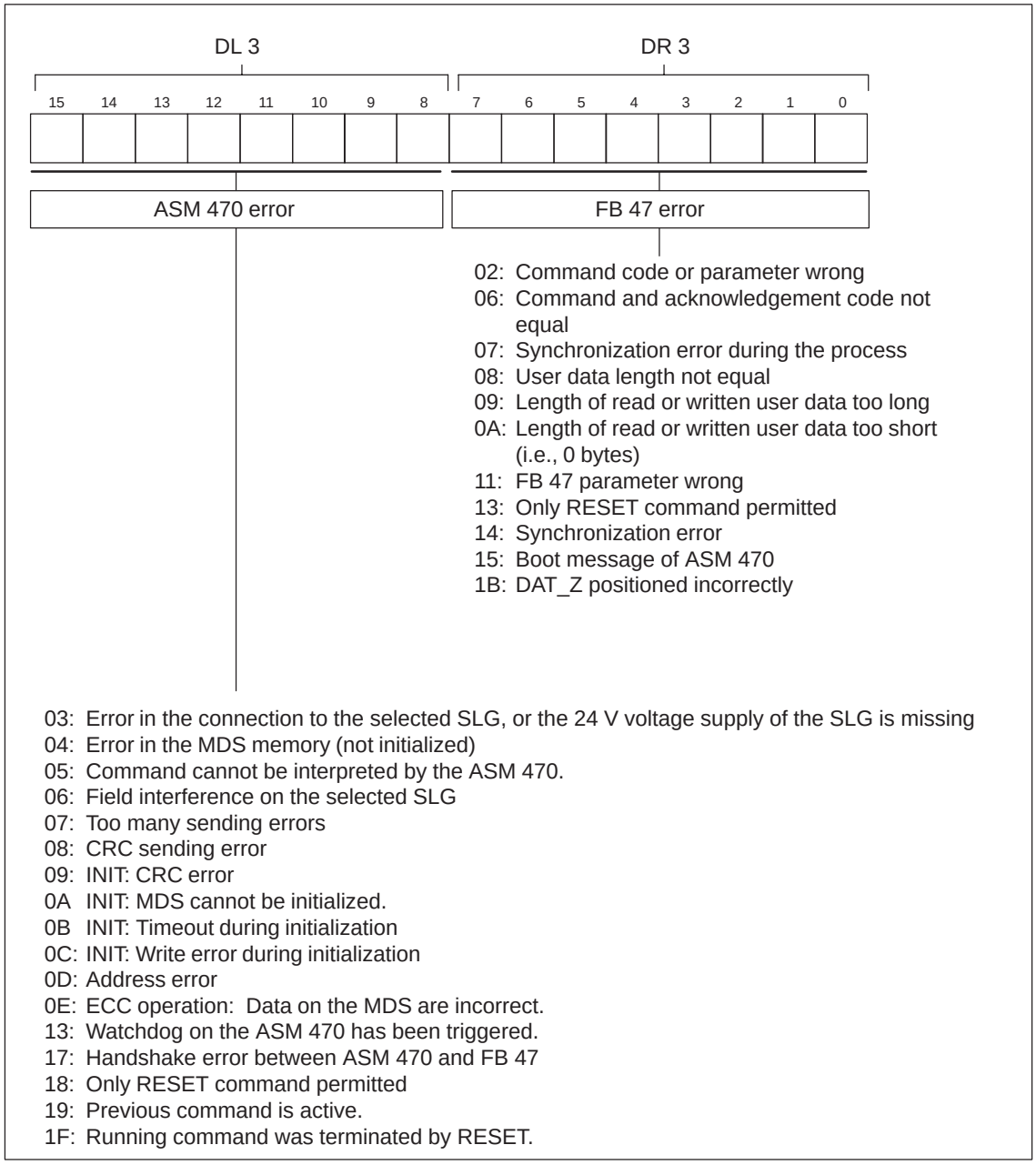


Figure 3-4 Assignment of indicator word ANZ

3.1.4 MOBY Commands

The MOBY commands listed in the table below are available to the FB 47 function block. The command code must be entered by the user in the BEDB (see section 3.1.5).

Table 3-2 Available MOBY commands

Command Code		Description	Remarks
(KH)	(KF)		
00	0	Reserved for RESET	Do not use this command. Set bit 0 or 3 in BEST instead.
01	1	Write data to the MDS	Communication with the data memory. Evaluate the status bits (i.e., battery and ECC offset) if necessary.
02	2	Read data from the MDS	
03	3	Initialize (INIT) the MDS	
--	-	RESET No command code exists here; is started by setting bit 0 in BEST	No communication with the data memory. Do not evaluate the status bits (i.e., battery and ECC offset).
--	-	New start No command code exists here; is started by setting bit 3 in BEST	

3.1.5 Assignment of Command Parameters

Before the listed commands can be started, the command parameters (DW 4 and DW 5) must first be preassigned appropriately in the BEDB.

Note

You cannot assign command parameters or start commands unless the READY bit (bit 15 in BEST) is set.

Write

The command parameters for writing data to the MDS must be assigned as shown in figure 3-5.

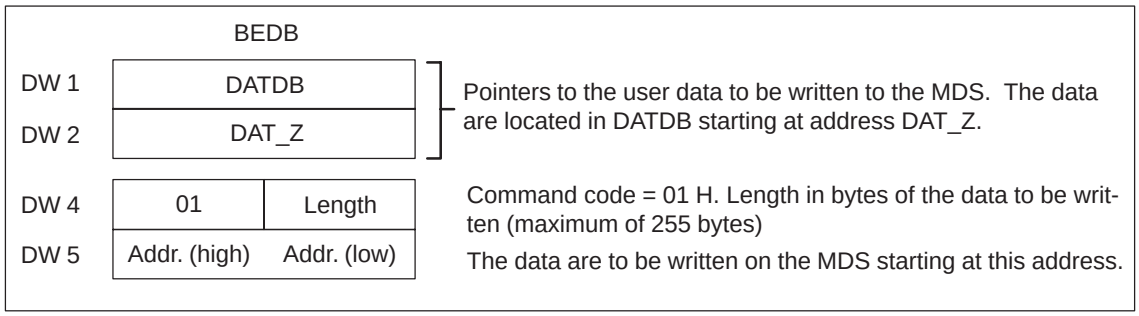


Figure 3-5 Writing data to the MDS

The READY bit (bit 15 in BEST) is set to show the user that the command has been started. The user data area of the user (DATDB) is not changed.

Read

The command parameters for reading data from the MDS must be assigned as shown in figure 3-6.

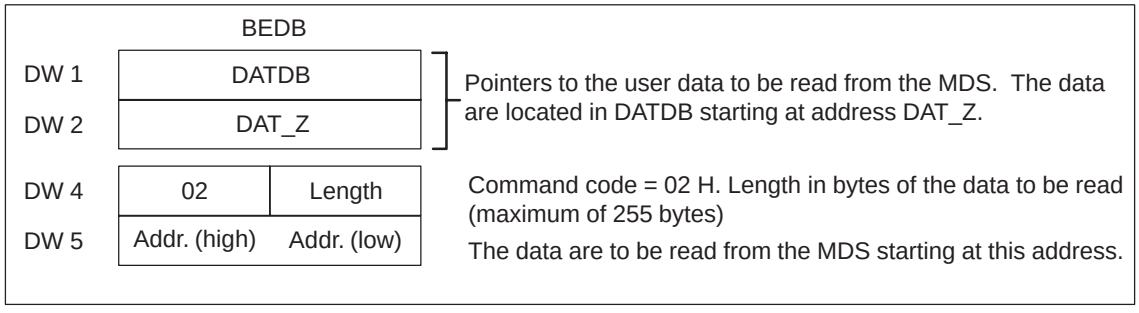


Figure 3-6 Reading data from the MDS

The READY bit (bit 15 in BEST) is set to show the user that the command has been started. The data which have been read are located in the DATDB starting at address DAT_Z.

Initialize (INIT)

The command parameters for initializing the MDS must be assigned as shown in figure 3-7.

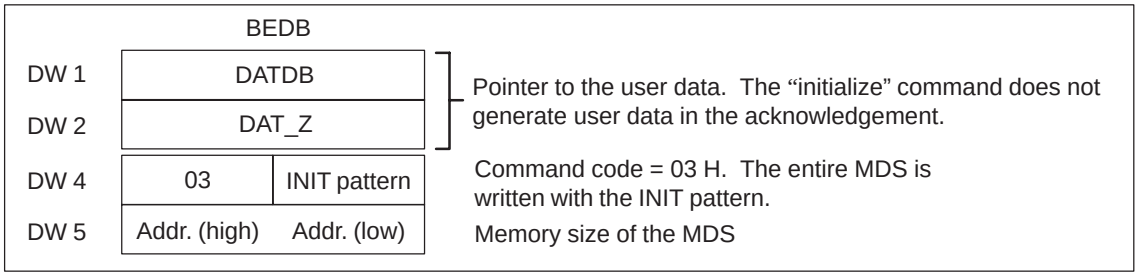


Figure 3-7 Initializing the MDS

Table 3-3 Initializing the MDS

MDS Model	Duration of INIT (in sec)		Memory Size
	Without ECC	With ECC	
62-byte RAM	0.1	0.2	00 40
128-byte EEPROM	6	11	00 80
2-Kbyte RAM	0.2	4	08 00
8-Kbyte EEPROM	18	48	20 00
32-Kbyte RAM	1.8	54	80 00
752-byte EEPROM (MOBY-E)	0.8	2.9	02 F0
256-byte EEPROM (MOBY-F)	2.2	–	00 C0
32-byte EEPROM (MOBY-F)	–	–	00 10

The READY bit (bit 15 in BEST) is set to show the user that the command has been started. The user data area of the user (DATDB) is not changed.

RESET

Resetting a read or write command

A RESET must be performed after initial commissioning, after some error messages (see section 3.1.3), or each time the parameters BEDB, ADR, ANW, ECC, MOBY, ABTA and OPT are changed. The RESET ensures that the parameter check and the command setup in the BEDB are performed again, and the connection between FB 47 and ASM 470 is initialized and synchronized again.

The RESET command is started by setting bit 0 in BEST (DW 0). **The READY bit (bit 15 in BEST) is set to show the user that the command has been started. The user data area of the user (DATDB) is not changed.**

New start

Set by the user after new start and after return of power

Same as RESET except that the bit is also scanned while the command is being processed.

The new start command is started by setting bit 3 of BEST (DW 0). **The READY bit (bit 15 in BEST) is set to show the user that the command has been started. The user data area of the user (DATDB) is not changed.**

3.1.6 ECC Driver Enabled (All MDS Models)

The ECC driver (i.e., Error Correction Code) can be enabled by parameter assignment of the FB 47.

Application

The ECC driver provides additional assurance that the data on the MDS are correct. The memory manufacturer of MDS models equipped with EEPROM only guarantees 10,000 write accesses. Enabling the ECC driver permits the user to use the MDS until the **actual** end of its life and still be assured of the same data security.

If required for security purposes, the ECC driver can also be used for MDS models equipped with RAM memory under conditions in which extremely strong interference fields may affect communication.

Data correction

If 1 bit of data in the MDS memory should be lost at some time (e.g., EEPROM MDSs which have been write-accessed very frequently), the ECC driver is able to reconstruct the data bit which was lost. The user is assured of correct data.

A status bit in BEST (bit 11) can be used to scan and evaluate the data correction (e.g., to initiate prompt replacement of the old MDS).

Function

The ECC driver divides the MDS memory into blocks of 16 bytes each. 14 of these bytes contain user data, and 2 contain ECC information. Each time the MDS is accessed, at least one block is read or written even when only 1 byte has been programmed by the user. This increases access time to the MDS data (see catalog).

When an ECC MDS is read without the ECC driver, the ECC bytes can be seen between the user data. When an ECC MDS is written without the ECC driver, the data structure of the MDS is destroyed. The MDS (the destroyed block of data) can no longer be read with the ECC driver.

Note

- Access times to MDS data are increased, and less data can be processed during dynamic operation.
- The net capacity of the MDS is reduced (see section 4.2).
- Performance of a data correction may delay results by up to one second.
- A “normal” MDS must be initialized with ECC driver enabled, prior to commissioning (e.g., with the STG 4F).

Example

A 62-byte MDS has the data structure shown in table 3-4. This information is only provided for explanatory purposes, and is invisible to the programmer and user.

Table 3-4 Data structure of a 62-byte MDS

MDS Address from the User's Point of View	Address on MDS	Meaning
0 1 . . . 13	0 1 . . . 13 14 15	14 bytes of user data ECC ECC 1st block
14 15 . . . 27	16 17 . . . 29 30 31	14 bytes of user data ECC ECC 2nd block
28 29 . . . 41	32 33 . . . 45 46 47	14 bytes of user data ECC ECC 3rd block
	48 . . 61	An incomplete block at the end of the MDS memory is no longer available for user data.

3.2 Starting the Commands

There are two ways to start a command.

Direct start

Only the RESET and the new start commands can be started directly. These commands are started by setting bit 0 or 3 in BEST.

Start with "Start" bit

All other commands (i.e., read, write, and initialize) are started by setting bit 1 (start command) in BEST. Prior to this, the command parameters must be assigned as described in section 3.1.4/3.1.5.

4 Examples of Use

This section covers the following subjects.

- A flowchart of the FB 47 scan
- Processing data memories
- Initializing data memories
- A few examples of programming
- The setup of a dialog system with ASM 470 as virtual MDS

4.1 FB 47 Scan by the User

The FB 47 scan is performed as shown in the structogram of figure 4-1.

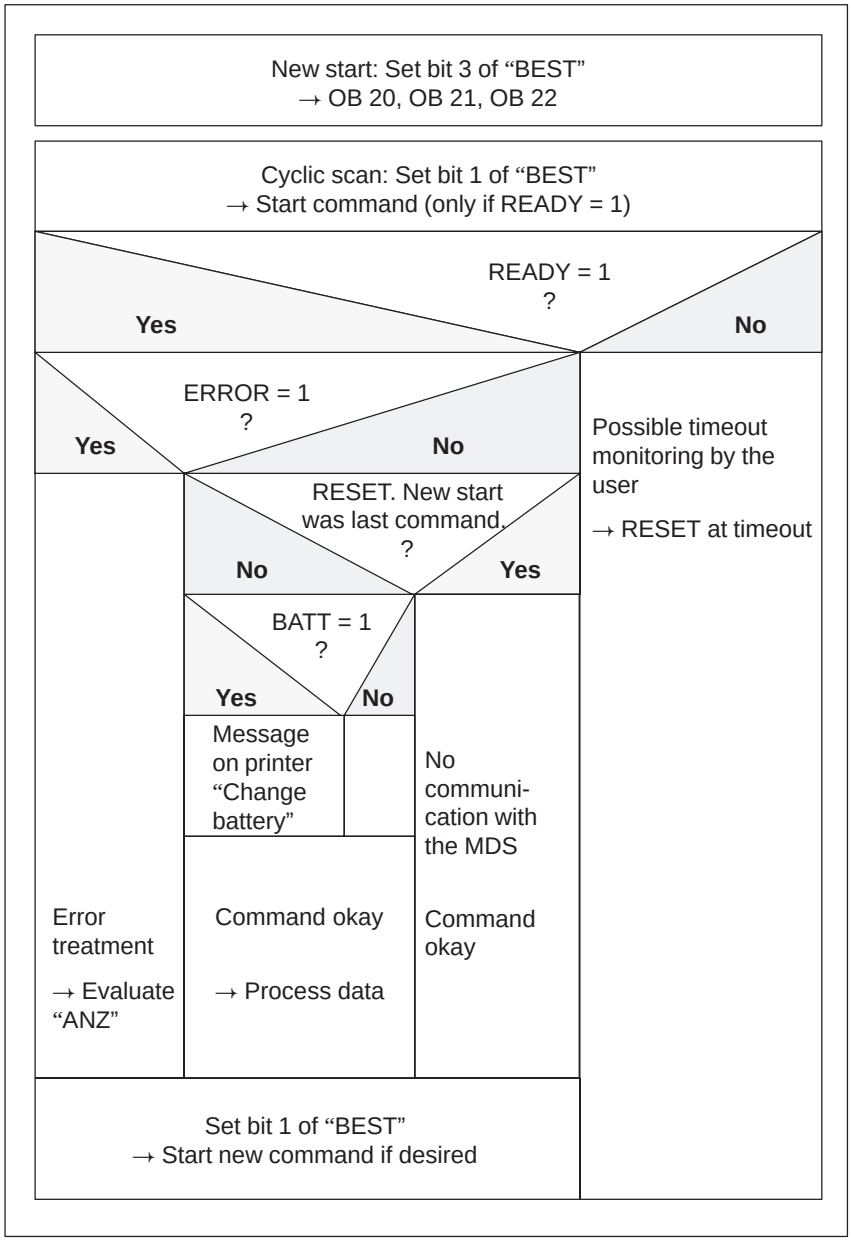


Figure 4-1 Structogram of the FB 47 scan

4.2 Processing Data Memories

Types of data memories

Mobile data memories with various memories are available to the user. Table 4-1 lists the memory capacities which are currently available.

Table 4-1 Memory capacities available

Memory Capacity	Type	MDS Model
62 (42) bytes	RAM	Example: MDS 114
128 (112) bytes	EEPROM	Example: MDS 213E
2 (1.7) Kbytes	RAM	Example: MDS 302
8 (7) Kbytes	EEPROM	Example: MDS 413E
32 (28) Kbytes	RAM	Example: MDS 514
752 (658) Bytes	EEPROM	Example: MDS E600 (MOBY-E)
5 bytes	Fixed code	Example: MDS F125 (MOBY-F)
256 bytes	4-byte fixed code 192-byte EEPROM (r/w)	Example: MDS F415 (MOBY-F)

The values in parentheses indicate net capacity with ECC driver enabled.

Addressing

Addressing of the data memory is performed linearly from address 0000 to the end address. The ASM 470 automatically recognizes the size of the memory installed on the MDS. The user receives an error message if the end address of the MDS is exceeded.

Table 4-2 shows the address area of the individual MDS models.

Table 4-2 Address area of the various MDSs

Addressing	KH		KF	
	Normal	With ECC	Normal	With ECC
62-byte data memory on RAM				
Start address	0000	0000	+0	+0
End address	003D	0029	+61	+41
128-byte data memory on EEPROM				
Start address	0000	0000	+0	+0
End address	007F	006F	+127	+111
2-Kbyte data memory on RAM				
Start address	0000	0000	+0	+0
End address	07FC	06F1	+2044	+1777

Table 4-2 Address area of the various MDSs

Addressing	KH		KF	
	Normal	**With ECC**	**Normal**	**With ECC**
8-Kbyte data memory on EEPROM				
Start address	0000	0000	+0	+0
End address	1FFC	1BF1	+8188	+7153
32-Kbyte data memory on RAM				
Start address	0000	0000	+0	+0
End address	7FFC	6FF1	+32764	+28657
752-byte data memory with EEPROM (MOBY-E)				
Start address	0000	0000	+0	+0
End address	02EF	0291	+751	+657
Read ID no. (can only be read together)				
Start address	1FF0	–	+8176	–
Length	0004	–	+4	–
MOBY-F: MDS F1xx (5 bytes)				
Start address	0000	–	+0	–
Length	0004	–	+4	–
MOBY-F: MDS F4xx (256 bytes)				
Start address	0040	–	+64	–
End address	00FF	–	+255	–
Read ID no. (can only be read together)				
Start address	0000	–	+0	–
Length	0004	–	+4	–

4.3 Initializing the Data Memories

Description

The entire data memory is written with the INIT pattern (see “initialize” command).

Required for:

- A new data memory which has never been write-accessed
- After battery failure or replacement
- You want to operate the data memory in ECC mode (i.e., read/write with ECC).

The “error in the RAM of the data memory” ASM 470 error (04 H) is deleted. Initialization is performed by starting the initialization command with or without ECC.

The initialization command is not required during normal operation.

Note

An error message is generated if the memory cannot be initialized.

Example of parameter assignment

The following program shows an example of calling the FB 47 and assigning parameters for initialization.

```
STL                          Explanation
      A DB 100               Open BEDB
      JU FB 47
BEDB  :KF + 100              DB 100 is BEDB
ADR   :KY 288, 128           ASM 470 is parameterized to address 128, 128
ANW   :KF + 1                Presence check on
ECC   :KF 0                  No ECC
MOBY  :KF 0                  MOBY-I
ABTA  :KH 0000               ABTA is not evaluated
OPT   :KH 0000               Must currently be assigned with 0
      L     DW 0             Load BEST
      T     FW250            and store intermediately
      UN    F 250.7          Ready?
      BEB                    Call FB 47 again unconditionally, wait for READY
      UN    F 10.0           If the auxiliary flag has not...
      S     F 251.0          ... yet been set, perform RESET...
      S     F 10.0           ...(Example of RESET is optional)
      JC =  END
      L     KF + 10          DATDB = 10, set
      T     DW 1             any value
      L     KF + 100         DAT_Z = 100, set
      T     DW 2             any value
      L     KH 0300          Set initialization without ECC with
      T     DW 4             pattern = 00 H
      L     KH 8000          Set memory size of 32 Kbytes
      T     DW 5
      S     F 251.1          Start command
ENDE: L     FW250            Reload flag word 250
      T     DW 0             again after BEST
      BE
```

Time required for initialization

After the MDS is positioned in the field of the SLG, initialization is performed in the times specified in table 4-3.

Table 4-3 Time required for initialization

Memory Capacity	Duration of Initialization (in sec)	
	Without ECC	With ECC
62-byte MDS (RAM)	Approx. 0.1	0.2
128-byte MDS (EEPROM)	Approx. 6	11
2-Kbyte MDS (RAM)	Approx. 0.2	4
8-Kbyte MDS (EEPROM)	Approx. 18	48
32-Kbyte MDS (RAM)	Approx. 1.8	54

4.4 Cyclic Call of the FB 47 (e.g., in OB 1)

OB 1

The following program shows an example of calling the FB 47. A command is started when flag 0.0 is set.

```
STL                          Explanation
      A DB 100               Open BEDB used
      JU FB 47
BEDB  :KF + 100              DB 100 is BEDB
ADR   :KY 128, 128           ASM 470 is parameterized to address 128, 128
ANW   :KF + 1                Presence check on
ECC   :KF 0                  No ECC
MOBY  :KF 0                  MOBY-I
ABTA  :KH 0000               ABTA is not evaluated
OPT   :KH 0000               Must currently be assigned with 0
      L     DW 0             Load BEST
      T     FW250            and store intermediately
      UN    F 250.7          Ready?
      BEB                    Call FB 47 again
      U     F 250.6          Scan for errors
      BEB                    If error, don't start new command
      UN    F 0.0            Start MOBY command again?
      BEB                    -> No
      L     KF + 10          DATDB = 10
      T     DW 1
      L     KF 0             DAT_Z = 0
      T     DW 2
      L     KH 010C          Command = 1 -> write, length = 12 bytes
      T     DW 4
      L     KH 4711          Set starting with address 4711 H
      T     DW 5             on the MDS
      U     F 0.0
      S     F 251.1          Start the MOBY command again in BEST
      R     F 0.0            MOBY command started
      L     FW250            ...and bring back the start bit
      T     DW 0             ...to BEDB
      BE
```

4.5 Preassignment of BEDB

DATDB equal to BEDB

Assumption: DB 100 is BEDB and DATDB.

```
                          Explanation
DB 100
       DW 0   KH 0008      Preassign new start in OB 100
       DW 1   KH 0064      DATDB=100
       DW 2   KH 0013      DAT_Z=19
       DW 3   KH 0000      Remember:    19 is the minimum value for DAT_Z.
       DW 4   KH 0000                   Larger values are possible. DW 1 and
       DW 5   KH 0000                   DW 2 can also be preassigned
       DW 6   KH 0000                   in OB 20, OB 21 and OB 22.
       DW 7   KH 0000
       DW 8   KH 0000
       DW 9   KH 0000
       DW 10  KH 0000
       DW 11  KH 0000
       DW 12  KH 0000
       DW 13  KH 0000
       DW 14  KH 0000
       DW 15  KH 0000
       DW 16  KH 0000
       DW 17  KH 0000
       DW 18  KH 0000      BEDB is assigned for FB 47 up to DW 18 (incl.).
       DW 19  'MOBY-I from SIEMENS'
```

DATDB not equal to BEDB

Assumption: DB 100 is BEDB, and DB 10 is DATDB.

```
                                Explanation
DB 100
       DW 0   KH 0008       Preassign new start in OB 20, OB 21, OB 22
       DW 1   KH 000A       DATDB=10
       DW 2   KH 0004       DAT_Z=4
       DW 3   KH 0000
       DW 4   KH 0000
       DW 5   KH 0000
       DW 6   KH 0000
       DW 7   KH 0000
       DW 8   KH 0000
       DW 9   KH 0000
       DW 10  KH 0000
       DW 11  KH 0000
       DW 12  KH 0000
       DW 13  KH 0000
       DW 14  KH 0000
       DW 15  KH 0000
       DW 16  KH 0000
       DW 17  KH 0000
       DW 18  KH 0000       BEDB is assigned for FB 47 up to DW 18 (incl.)
DB 10
       DW 0   KH 0000
       DW 1   KH 0000
       DW 2   KH 0000
       DW 3   KH 0000
       DW 4   'MOBY-I from SIEMENS'
```

4.6 Programming New Start and Restart

Assumption DB 100 is BEDB; DB 10 is DATDB; and DW 0 is DAT_Z in DATDB.

STL			Explanation
OB 20			Not required for PLC 115U
	A	DB 100	Open BEDB
	L	KH 0008	New start bit
	T	DW 0	to BEST
	L	KF + 10	DATDB=10
	T	DW 1	Or preassign in BEDB directly
	L	KF 0	DAT_Z=0
	T	DW 2	See also section 3.1.2.
	BE		
OB 21			Required for all types of PLCs
	A	DB 100	Open BEDB
	L	KH 0008	New start bit
	T	DW 0	to BEST
	L	KF + 10	DATDB=10
	T	DW 1	Or preassign in BEDB directly
	L	KF 0	DAT_Z=0
	T	DW 2	See also section 3.1.2.
	BE		
OB 22			This block processed after “POWER ON” and is required for all types of PLCs
	A	DB 100	Open BEDB
	L	KH 0008	New start bit
	T	DW 0	to BEST
	L	KF + 10	DATDB=10
	T	DW 1	Or preassign in BEDB directly
	L	KF 0	DAT_Z=0
	T	DW 2	See also section 3.1.2.
	BE		

4.7 Setup of a Dialog Transmission with ASM 470

Function

The dialog function of MOBY-I can be used to transfer data from one interface module to another interface module.

Parameterizing the dialog function

To activate dialog operation on the ASM 470, the MOBY parameter must be set to ”3” when the FB 47 is called.

Note

An activated dialog operation can only be reset by switching off the module.

4.7.1 How Is the MOBY-I Dialog Set Up ?

Dialog setup

Figure 4-2 shows the setup of dialog communication for MOBY-I.

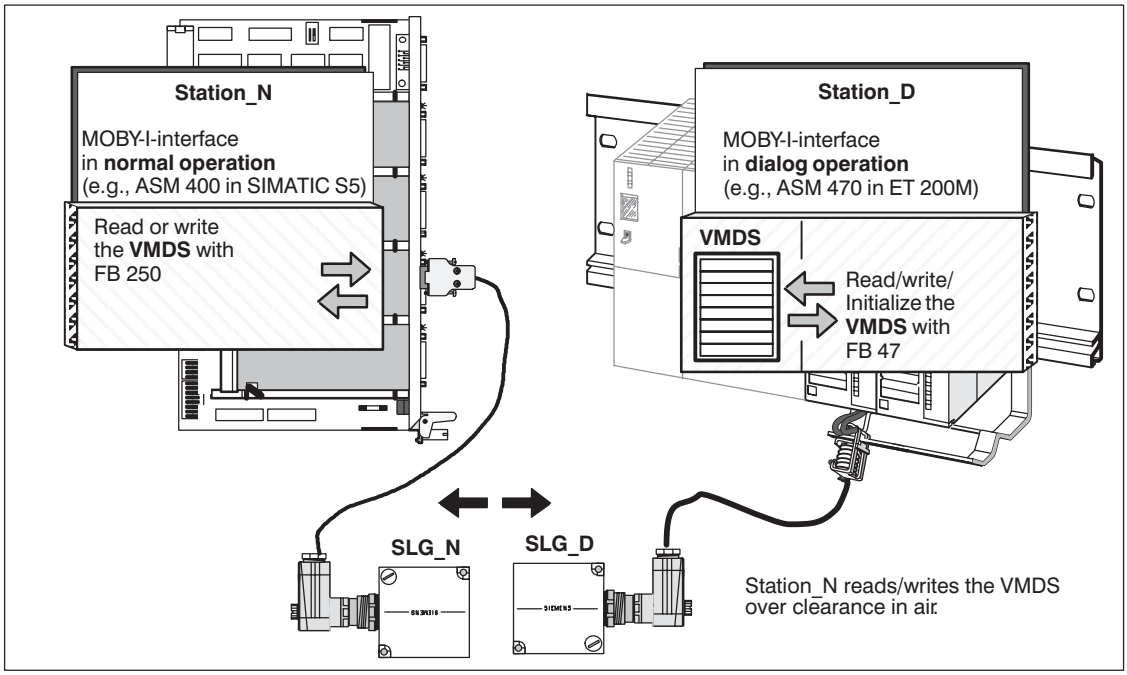


Figure 4-2 Dialog setup for MOBY-I

Table 4-4 Definitions of terms

Term	Explanation
Station_N	Normal ASM of MOBY-I (ASM 400, ASM 410, ASM 420, ASM 440, ASM 470, SIM4x) The user operates station_N as usual (i.e., as if he/she wanted to exchange data with an MDS).
SLG_N	An SLG (SLG 41, SLG 42, SLG 43, SLG 44) which is connected to station_N
Station_D	Dialog ASM of MOBY-I (ASM 400, ASM 410, ASM 470) When turned on, station_D is parameterized as dialog ASM with a user command. A 16-Kbyte memory area is defined in station_D during parameter assignment. This memory area is called VMDS (i.e., virtual MDS). It is used as communication memory. Processing of station_D by the user is identical to the program in station_N. Station_D uses the same tools as station_N (e.g., FB 47).
SLG_D	An SLG (SLG 41, SLG 42, SLG 43, SLG 44) which is connected to station_D
VMDS	Virtual mobile data memory. The VMDS is a 16-Kbyte area of memory on station_D. This VMDS is defined and cleared when station_D is turned on and parameterized.

4.7.2 How does the User Work with MOBY-I-Dialog?

Example

The user program in station_D issues a write command with the data to be transferred. The command is executed immediately. The data are now located in the VMDS. This concludes work in station_D. The user program in station_N issues a read command. SLG_N and SLG_D do not yet have to be positioned opposite each other in the transmission window. Reading of the desired data starts as soon as SLG_D moves into the transmission window of SLG_N. The data are read from the VMDS and transferred to the user on station_N.

Communication time during dialog

The same times as described in the MOBY catalog apply for configuration of the communication time.

$$t_K = 16\ msec + 0.8\ msec * n_{Bytes}$$

Transmission window during dialog

The transmission window from SLG_D to SLG_N has a polarization direction (i.e., SLG_D and SLG_N must be directed toward each other at a certain angle). Figure 4-3 shows the transmission window during dialog.

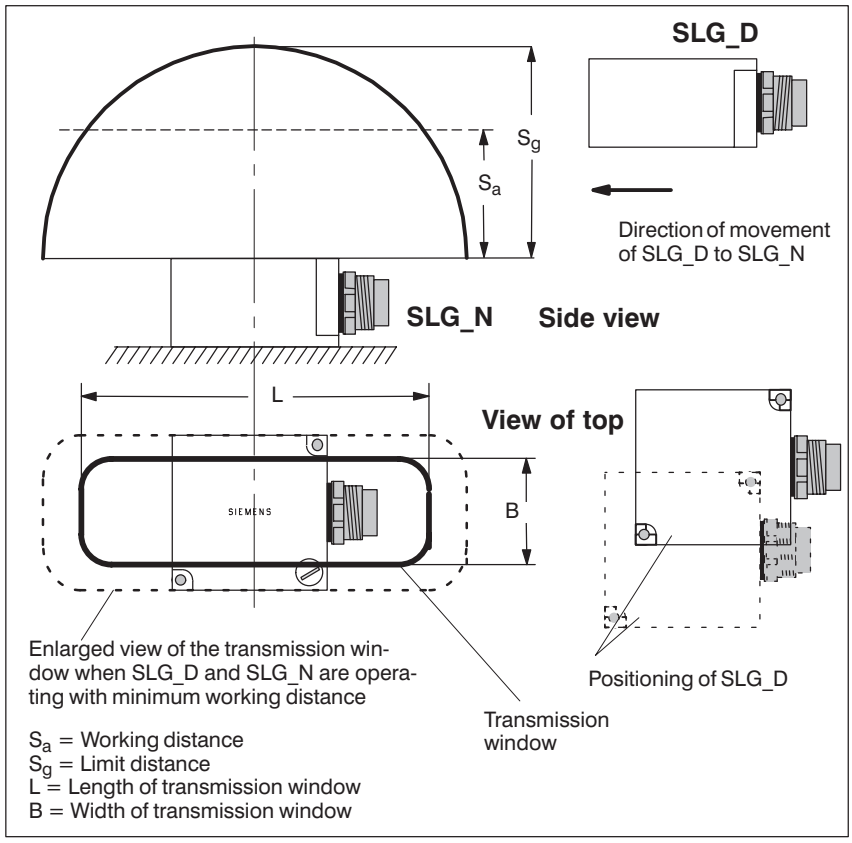


Figure 4-3 Transmission window during dialog

Field data during dialog operation

Table 4-5 shows the field data during dialog operation. Dimensions are specified in mm.

Table 4-5 The field data during diealog

all dimensions in mm	**SLG 41-SLG 41**	**SLG 42-SLG 42**	**SLG 43-SLG 43**	**SLG 44-SLG 44**
Length of the transmission window (L)	60	230	600	3000
Width of the transmission window (B)	30	80	280	1300
Working distance (S_a)	0 to 15	0 to 70	20 to 250	200 to 1000
Limit distance (S_g)	30	130	450	2500
Distance from SLG to SLG (D)	> 200	> 800	> 2000	> 10000

Multiplex operation of 2 SLGs on ASM 470

Although multiplex operation of 2 SLGs is possible during dialog, this usually serves no useful purpose for most applications since the user of station_D always reads/writes his/her data from/to the same VMDS.

Multiplex operation can be used to double the field length of SLG_D. The user of station_D must then always switch the SLG from 1 to 2 after SLG_N has left the field of the first SLG. The ANW signal can be used to control this.

Dialog with ECC

ECC operation must always be deactivated during dialog operation.

Presence Check

5

This section provides a detailed description of the presence check function. The function of the “select SLG” bit (i.e., bit 2 in BEST) is also discussed.

5.1 Definition of Terms

Presence check

The presence check is a recognition logic which is part of the firmware of the ASM 470. This logic recognizes whether a mobile data memory is presently in the vicinity of the selected SLG.

The firmware of the ASM 470 continuously scans this area via a magnetic field to determine whether a mobile data memory is present. A hysteresis function largely prevents the presence recognition from flipping back and forth continuously when a mobile data memory stops right on the boundary of the scanned field.

The presence check in the ASM 470 is only enabled when the FB 47 input parameter has been set to ANW = 1. No presence check is performed when ANW = 0.

“Select SLG”

Two SLGs can be connected to the ASM 470. The SLG required to process the command can be selected with the “select SLG” bit (i.e., bit 2 in BEST). This bit must be set or reset before the start of the command.

If you are operating with the presence check and no command is active, you can scan for the presence of an MDS in the field of the SLG selected.

The ASM 470 indicates the validity of the selected SLG with bit 9 in BEST.

Presence

A mobile data memory is currently located in the field of influence of the selected SLG. The presence bit (i.e., bit 8 in BEST) is set. The validity of the selected SLG is indicated by the ASM 470 in bit 9.

5.2 Presence Check Switched Off

Description

The magnetic field of the selected SLG is only switched on when a valid MDS command (i.e., read, write or initialize) is started. The selected SLG is switched off again after a data memory has been detected and the command has been executed.

This permits implementation of projects in which the specified distance between SLGs can be underranged as desired. There is one requirement, however. The SLG stations which are close together must be addressed in multiplex mode.

This may be required by applications in which large amounts of data have to be transferred during dynamic operation. The conveyor belt does not need to be stopped since the data is divided up and distributed over several SLGs in succession.

5.3 Presence Check Switched On

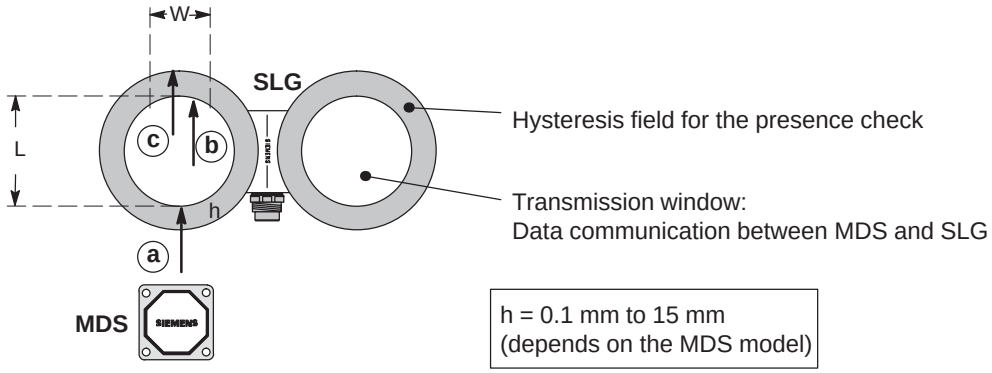
Description

After a new start or restart of the programmable logic controller (PLC) or after a new start or RESET command of the FB 47, the selected SLG is switched on and remains active until the PLC or the ASM 470 is turned off.

The ASM 470 starts to continuously scan the field around the selected SLG for the presence of a data memory. When the ASM 470 finds a data memory, the user receives "presence bit" = 1 (i.e., bit 8 in BEST) during the next bus cycle or the next time the FB is called. Similarly, bit 8 of BEST becomes 0 when the data memory leaves the field of the selected SLG. In addition, the ASM 470 uses bit 9 of BEST to confirm the validity of the SLG selected by the user. Figure 5-1 shows a diagram of how fields are scanned.

If the data memory stops right on the boundary of the magnetic field of the selected SLG, a hysteresis function ensures that the "presence bit" does not flip back and forth continuously. This hysteresis function is handled by the processor on the ASM 470.

Read/write commands can be sent completely transparently to the FB 47 for the presence check. In addition, the "presence bit" retains its unrestricted validity after the start of a command.



L, W: Dimensions of the transmission window of an SLG at a working distance to the MDS (see MOBY-I catalog). L = field length; W = field width.

h: Hysteresis: Area in which a presence bit remains set once it has been set

(a) Point at which the mobile data memory is detected by the SLG. Starting at this point, the queued MOBY command is executed with the MDS. The presence bit remains set.

(b) The MOBY command must have been executed by this point since the data memory is leaving the transmission window. The presence bit still remains set.

(c) Cancellation of the presence bit in BEST. The MDS has left the recognition field of the SLG. A command which has not yet been processed remains queued.

Figure 5-1 Scanning the field

5.4 Startup Behavior of the ASM 470

Introduction

The ASM 470 always boots after the ET 200M is switched on or reset.

After an extensive self test, the ASM 470 reports with the boot message (FB 47 error message, 15 H, see section 3.1.3). This message tells the user that the ASM 470 is ready for operation. Booting requires a maximum of 3 seconds.

Note

After the boot message, you must start a RESET or a new start command.

Presence check

The procedure for recognition of whether an MDS is located in the field of the selected SLG is always the same for the first RESET command after the ASM 470 boots with ANW = 1.

The ASM 470 scans its surroundings for a mobile data memory for approximately 100 msec (i.e., processing of the RESET command by the user requires approximately 100 msec).

Mounting and Commissioning

6

This section describes how to mount and commission the ASM 470 with the FB 47 function block.

Note

For configuration of the SLG and MDS and installation guidelines, see the MOBY-I catalog (section 2) and the installation and service manual.

All types of SLGs can be connected to the ASM 470, and all types of MDSs can be used.

6.1 Wiring the ASM 470

Proceed as follows to commission the ASM 470.

Mounting the module

Mount the module on the rail of the ET 200M (see ET 200M manual).

Warning

Before wiring the ET 200M, make sure that there is no voltage present on it.

Wiring the ASM 470

Figure 6-1 shows the front plate of the ASM 470 and the inside of the front door with the corresponding connection diagram. Connect the SLGs to the ASM 470 as shown in this diagram.

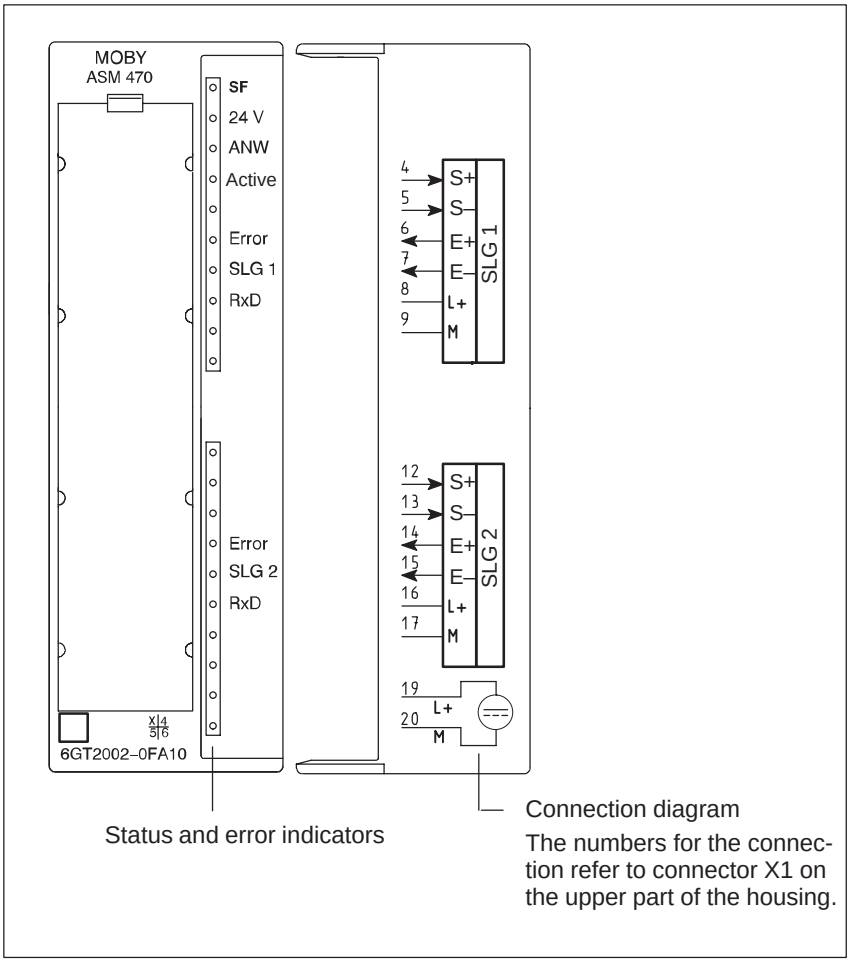


Figure 6-1 Connection diagram and front of the ASM 470

Wiring to the SLG

Figure 6-2 shows the layout of a connection cable between the ASM 470 and the SLG. The specified colors apply to the standard MOBY cable for the ASM 470 (6GT2091–0E...[2]).

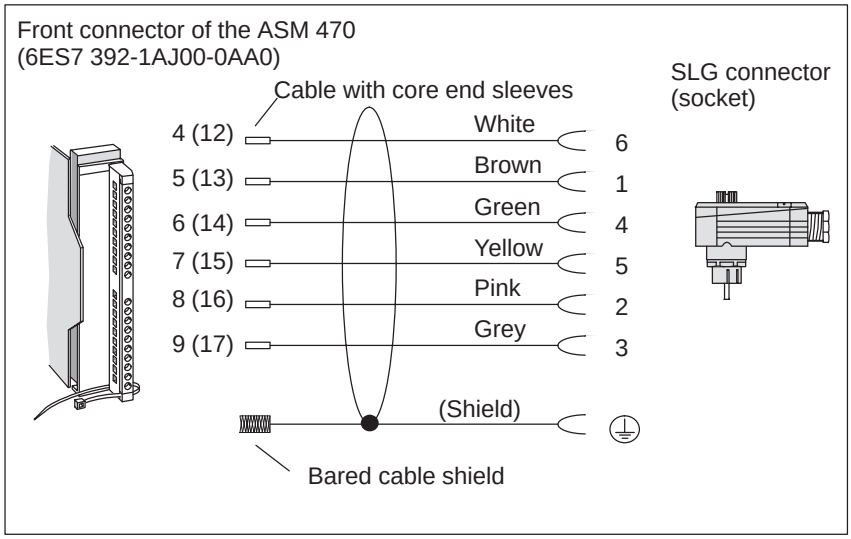


Figure 6-2 Connection cable from the ASM 470 to the SLG

Connecting the shielding

To ensure electromagnetic compatibility, the SLG cable must be applied to an ET 200M shield holder element (see figure 6-4). The shield of the SLG cable must be bared as shown in figure 6-3.

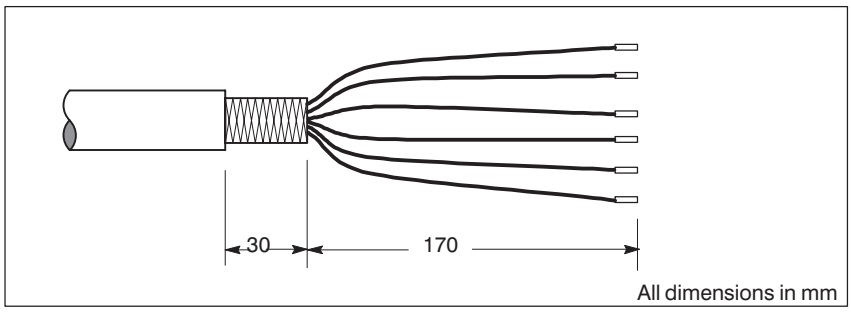


Figure 6-3 Baring of the cable shield

Protection against lightning

Implement the anti-lightning and grounding measures necessary for your particular application. Anti-lightning measures always require a look at your entire system.

2 See length key in the MOBY catalog.

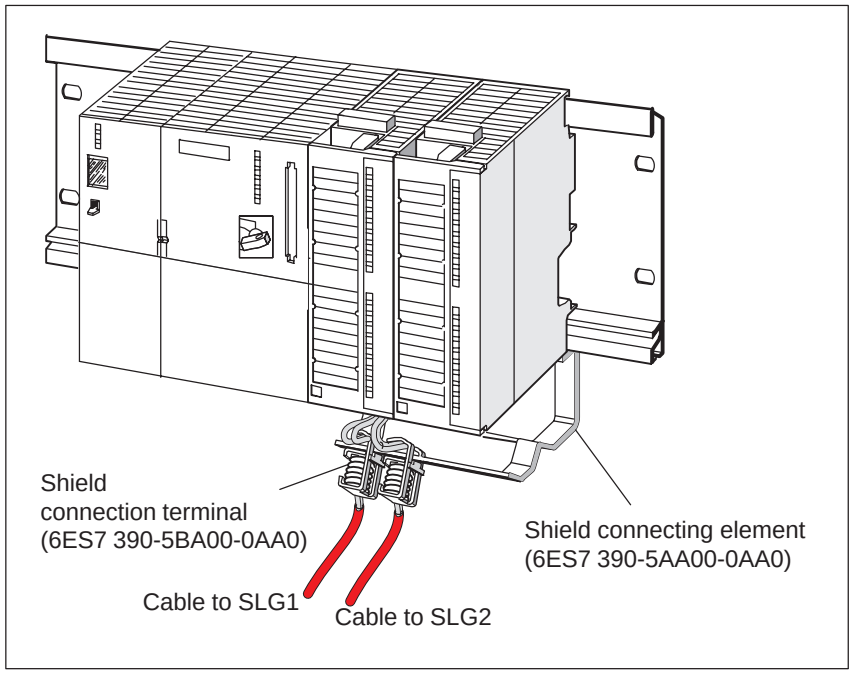


Figure 6-4 Layout of the ASM 470 with shield holder element

6.2 Parameterizing the ASM 470 with COM ET 200

The user of the ASM 470 with ET 200M must copy the included type file in the appropriate type file subdirectory of the COMWIN parameterization software.

The ET 200M station type (ASM 470) required to parameterize the ASM 470 slave station is located behind field ET 200 and ET 200M.
For more information, see the ET 200M manual and the description of the COM ET 200.

Inputting the system parameters

The SIMATIC S5 maste IM 308-C module is parameterized with the COM ET 200 parameterization software. All relevant PROFIBUS-DP parameters (e.g., station number of the IM 308-C, transmission speed, bus profile, host type, response monitoring, and so on) are set during parameterization.

Configuration of the ET 200M with the ASM 470 slave station(s) is performed next. The following parameters are specified.

- Station number of the ET 200M: This station number specified via COM ET 200 must match the switch setting on the ET 200M.
- Specification of the I/O area of the SIMATIC in which the ET 200M is to be operated with the ASM 470 (i.e., **linear P-I/O area** or **P-page frame area**).
- Specification of the slave station type (ASM 470 here). The type file SI801DVD.200 is supplied on floppy disk and must be copied to the appropriate COM ET 200 directory before parameterization.
- Start address of the imput/output areas of the ASM 470 in the parameterized I/O area of the SIMATIC. This start address must always be the same for both the input area and the output area of the ASM 470, and must match the FB 47 parameter ADR. The start address must be an even number.
  Start address in linear P-I/O area for analog modules: 128

  Start address in P-page frame area: 192
- Size of the input/output areas is determined by the ASM 470 (i.e., 8 words).

Note

- The start address of the input/output areas of the ASM 470 must be the same, and must also match the FB 47 parameter ADR.
- The start address of the input/output areas of the ASM 470 in the parameterized I/O area of the SIMATIC must be an even number.
- The ASM 470 is an analog module. The use of the S7 format of analog values is mandatory. It is preset correctly in the type file.

The configuration is transferred to the memory card and installed in the IM 308-C master module.

Note

- The user should be familiar with the COM ET 200 parameterization software and the PROFIBUS-DP.
- The IM 308-C must be installed in a SIMATIC slot provided for it. For details, see description of the IM 308-C, SIMATIC catalog, and/or COM ET 200 manual.

Telegram handshake between ASM 470 and FB 47

The S5 program processing cycle in the PLC is totally asynchronous with the PROFIBUS-DP cycle. The FB 47 handles the synchronization of both cycles and data consistency.

Note

Consistency cannot be used when the input/output areas of the ASM 470 are configured with COM ET 200.

6.3 Commissioning the FB 47

Loading the FB 47

The FB 47 is stored in directory FB 47 on the “MOBY software” floppy disk. The FB47S5ST.S5D file must be copied from the floppy disk to the hard disk.

Presetting the organization block

Preset the BEST parameter with 0008 H in OB 20, OB 21, OB 22 for new start.

Setting up BEDB and DATDB

- Set up data block DATDB.
- A different BEDB must be set up for each ASM 470. This BEDB applies to SLG 1 and SLG 2 of the respective ASM 470.

Calling the FB 47 in the user program

- Always call FB 47 unconditionally.
- Parameters BEDB, ADR, ANW, ECC, MOBY, ABTA and OPT must be specified (see parameter assignment in section 2.2).

Program processing

Program the user program (e.g., in OB 1), and call FB 47 cyclically.

Loading the user program in the PLC

Select all blocks belonging to the user program, and load them to the PLC.

Starting program processing

Switch the operating mode switch of the CPU from STOP to RUN.

Function check

Using “FORCE VAR”, you can perform a function check of the ASM 470 with the PG. The BEST parameter (i.e., DW 0 of BEDB) is indicated on the monitor screen.

Program processing running; no command being processed

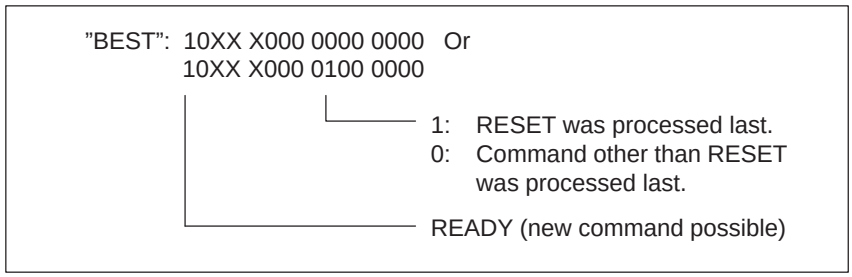


Figure 6-5 BEST parameter: No command

If the status of BEST differs from that shown above, issue a RESET command. If the status of BEST still differs from that shown above, see section 7 on the treatment of errors.

Command is started

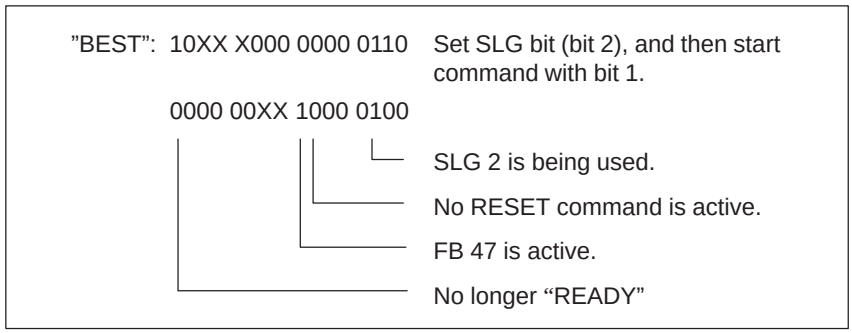


Figure 6-6 BEST parameter: Starting the command

The status of BEST is retained until an MDS enters the field of influence of the selected SLG and the command is correctly executed with the MDS.

Command is executed

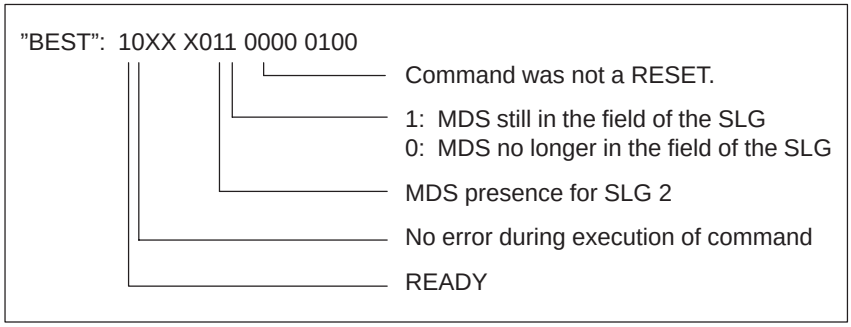


Figure 6-7 BEST parameter: Executing the command

After the command has been executed, BEST returns to its basic state.

If an error was detected, and one of the parameters differs from the status shown in the figure, proceed as described in section 7.

Trouble-Shooting and Error Messages 7

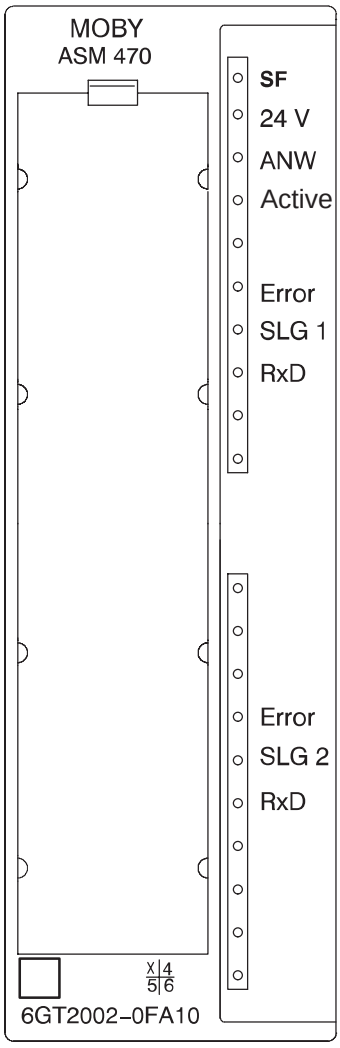
This section provides information on trouble-shooting. The meaning of the indicator LEDs is described.

In addition, this section contains a detailed description of possible errors and their causes. Possible remedies are also suggested.

7.1 Error Indicators on the ASM 470

Introduction

The front of the ASM 470 contains various LEDs which are used for error and status indication. Figure 7-1 shows their location.



General Status Indicators of the ASM 470	
Red	Group error
Green	The power supply on the ASM is okay.
Green	An MDS is located in the field of the selected SLG.
Green	The ASM is executing a user command.

Status and Error Indicators from SLG 1	
Red	Last error code (flashing pattern) from SLG 1
Green	SLG 1 has been selected by the ASM.
Yellow	Receiving line from SLG 1

Status and Error Indicators from SLG 2	
Red	Last error code (flashing pattern) from SLG 2
Green	SLG 2 has been selected by the ASM.
Yellow	Receiving line from SLG 2

Figure 7-1 Front of the ASM 470 with its status and error indicators

Meaning of the LEDs for the general status display

The four LEDs for indication of the general status have the following meaning.

RED (SF)

The group error indicates that the ASM 470 is totally unready for operation. The following errors are indicated here.

- RAM/EPROM on ASM 470 is defective.
- 24 V is not connected to ASM 470.
- Watchdog error

GREEN (24 V)

The LED indicates that the 24 V supply voltage is present on the front connector.

Note

Even if the 24 V voltage is not present, the ASM 470 is still fully functional in the ET 200M.

GREEN (ANW)

This LED has only one function. When the user has enabled the presence check, the LED indicates the presence of an MDS in the field of the selected SLG.

OFF = No data memory present or presence check is not enabled.

ON = An MDS is currently located in the field of influence of the selected SLG.

GREEN (active)

The ASM 470 has received a command from the S5/IM 308-C (or the user) and is occupied with its execution. The READY bit in BEST has been reset.

Meaning of the LEDs for SLG 1/SLG 2

The three LEDs for the respective SLG have the following meaning.

RED (error)

LED flashes to indicate errors for the selected SLG.

The error which was detected last is always indicated. A new error overwrites the last error. The only way to reset this error indicator is to turn off the ET 200M.

Note

As long as the system continues to operate correctly, the flashing of the red LED during normal operation is of secondary importance to the user. The programmer can evaluate and react to some of these errors in his/her program.

This error LED is a particular help when commissioning or servicing the system.

GREEN (SLG 1/2)

Indicates the currently selected SLG

YELLOW (RxD)

Rapid, irregular flashing indicates that dialog with the selected SLG or mobile data memory (MDS) is taking place. This LED stays on continuously when the presence check is enabled.

Errors indicators

An error is indicated by the red LEDs ”SF” and ”Error”.

- Hardware error on the ASM 470

  After a hardware error, the ASM 470 can no longer be addressed and must be replaced. The error is not sent to the user. The SF-LED is on. Both error LEDs have the following meaning.

  – Permanently ON (bright)

    The PROM of the ASM 470 is defective.

  – Permanently ON (dim)

    The CPU of the ASM 470 is defective.

  – Medium fast flashing (approx. 4 Hz)

    External RAM of the ASM 470 is defective.

  – Error LED is off.

    Watchdog error or 24 V not connected to ASM 470

- Flashing pattern

  All other errors are indicated by easy-to-understand flashing patterns. To read the pattern, count the number of pulses between two long pulse pauses. The number of pulses corresponds to the error message output by the ASM 470. The SF-LED remains off for these errors.

What do I do when nothing at all functions ...

- Test to determine whether the ASM 470 hardware functions in general. Proceed as described in section 6.
- Check the parameter assignment of the FB 47.

7.2 General Errors

Program doesn't function

After a new start or a restart, the program does not function.

Cause:

- OB 20, OB 21, OB 22 (for new start and restart) was not preassigned as shown in the FB 47 description.
- There is no PROFIBUS-DP link between the S5/IM 308-C and the ET 200M.

PLC stops

- The PLC stops after the MOBY blocks are loaded.

  Cause:

  Parameterized BEDB does not exist or is too short.

  – COM ET 200 parameters have been assigned incorrectly.

  – Output the I-STACK on the programmer for a precise error analysis.
- PLC stops after start is performed or a command is executed.

  Cause:

  – DATDB does not exist in the PLC or is too short.

  – The data word addressed in DATDB does not exist. (DATDB is too short, or DAT_Z is illegal.)

  – No RESET was performed after BEDB was loaded.

  – The ADR parameter is not assigned correctly or does not match the assignment of the ASM 470's parameters.

PROFIBUS not in RUN

- Check parameterization of FROFIBUS-DP with the appropriate tools. Cf. chapter 6.2.
- Check cabling of PROFIBUS-DP.

7.3 Evaluation of the ANZ Error Indication

When the FB 47 is not functioning properly, you can locate additional errors by evaluating the "ANZ" parameter.

Error messages of the FB 47: Right byte of ANZ (DR 3 in BEDB)

The red LED does not flash for the error messages of the FB 47. DR 3 is in hexadecimal format (i.e., H) and specified as a fixed point number (i.e., D in KY format) also. (See table 7-1.)

Table 7-1 Error messages of the FB 47

ANZ (Right Byte)	Description
02 H/ 02 D	Illegal command code or command parameter was entered. • Correct the assignment of the parameters of the data words in BEDB (see command description).
06 H/ 06 D	The command code and the acknowledgement code received are not equal. • Parameter assignment of the ASM 470 is incorrect. • Internal error • BEDB is overwritten by other parts of the program.
07 H/ 07 D	Synchronization error for the FB 47 • Internal error • BEDB is overwritten by other parts of the program.
08 H/ 08 D	The parameter assignment of the user data length of the read/write command and the received user data length of the acknowledgement are not equal. • Parameter assignment of the ASM 470 is incorrect. • BEDB is overwritten by other parts of the program.
09 H/ 09 D	Too much user data has been received/written. • Parameter assignment of the ASM 470 is incorrect. • Read command: The specified length of the data to be read is too long (a maximum of 12 bytes are permitted; see section 3.1.5).
0A H/ 10 D	Not enough user data has been read/written. The length of the user data is 0. • Internal error • BEDB is overwritten by other parts of the program.
11 H/ 17 D	The parameters of the formal operands of the FB 47 were assigned incorrectly. • Correct the assignment of the FB 47 parameters. • Then start a RESET command.

Table 7-1 Error messages of the FB 47

ANZ (Right Byte)	Description
13 H/ 19 D	The FB 47 reports that only a RESET command is permitted as the next command. • No RESET was performed after the boot message of the ASM 470. • No RESET was performed following an error message for which a RESET command is mandatory as the next command. • Then start a RESET command.
14 H/ 20 D	Synchronization error between ASM 470 and FB 47 • The handshake of the command and acknowledgement telegrams is out of step. A contact may be loose, or the power supply may be unstable. • BEDB is overwritten by other parts of the program. • Then start a RESET command.
15 H/ 21 D	The ASM 470 has booted. • There may be a problem with the connector contact of the ASM 470 in the ET 200M. • The power supply of the ASM 470 may be unstable. • Interferencepulse • BEDB is overwritten by other parts of the program. • Then start a RESET command.
1B H/ 27 D	DAT_Z is positioned incorrectly in DATDB. • The data field (number of user data bytes) between DAT_Z and the end of DATDB (exception: DATDB consists of 256 data words DW 0 to DW 255) is smaller than the length used in the write command (DR 4 in DEDB). • DAT_Z must be adjusted to the user data length. Shorten DAT_Z. • Shorten length of the read/write data. • Then start RESET command.

Error messages of the ASM 470: Left byte of ANZ (DL 3 in BEDB)

The red LED flashes for the error messages of the ASM 470. DL 3 is in hexadecimal format (i.e., H) and specified as a fixed point numbers (i.e., D in KY format) also. (See table 7-2).

Table 7-2 Error messages of the ASM 470

ANZ (Left Byte)	Flashing of the Red LED	Description
00 H/ 00 D	-	No error Standard value when everything is okay
	1 x	No error The ASM 470 has booted and is waiting for a RESET or new start command (see section 5.4).
03 H/ 03 D	3 x	Error in the cable connection to the selected SLG. The selected SLG does not respond. No 24 V voltage supply on the SLG. • The cable between the ASM 470 and the selected SLG is wired incorrectly, or a cable break has occurred. • The 24 V supply voltage is not connected or is switched off. Check the 24 V LED. • Electronic fuse on the ASM 470 has been triggered. Check the wiring of the selected SLG. • Hardware defect: on ASM 470 or selected SLG • Another SLG is in the vicinity or is switched active. • The parameters of the ASM 470 are not assigned correctly.
04 H/ 04 D	4 x	MDS memory error The MDS has never been write-accessed or has lost the contents of its memory due to a battery failure. This error cannot occur with the MDS model equipped with the 128-byte EEPROM. • Replace the MDS if the battery bit is set. • Initialize the MDS with the STG. • Initialize the MDS with the FB 47 via SIMATIC (see section 4.2).
05 H/ 05 D	5 x	Unknown command The FB 47 has sent an unknown command to the ASM 470. • BEDB was overwritten by the user. • The MDS has reported an address error. • Check MDS address at start of command.

Table 7-2 Error messages of the ASM 470

ANZ (Left Byte)	Flash-ing of the Red LED	Description
06 H/ 06 D	6 x	Field interference on the SLG The selected SLG is receiving interference from its environment. • External interference field. The field of interference can be located with the inductive field indicator of the STG. • Two SLGs are too close together and no longer conform to the configuration guidelines. • The connection cable to the selected SLG is faulty, is too long, or does not meet specifications.
07 H/ 07 D	7 x	Too many sending fields Even after several attempts, the MDS was unable to receive the command or the write data correctly from the ASM 470. • The MDS is positioned exactly on the boundary area of the transmission window. • Data transmission to the MDS is being affected by external interference.
08 H/ 08 D	8 x	CRC sending error • Receiving monitor has detected a sending error. – Cause same as for error 06 HEX/06 DEC • The MDS has reported CRC errors very frequently. – The MDS is located in the boundary area of the selected SLG. – The MDS and/or the selected SLG have a hardware defect.
09 H/ 09 D	9 x	Only during initialization: CRC error while acknowledging receipt by the MDS • Cause same as for error 06 H/06 D
0A H/ 10 D	10 x	Only during initialization: The MDS is unable to execute the initialization command. • MDS is defective.
0B H/ 11 D	11 x	Only during initialization: Timeout during initialization of the MDS • The MDS is positioned exactly on the boundary area of the transmission window. • The MDS is using too much current (i.e., is defective). • Only for MDS 507/407E: Check the FB 47 parameter “ABTA”.
0C H/ 12 D	12 x	The MDS memory cannot be write-accessed. • MDS memory is defective. • EEPROM-MDS has been write-accessed too often and has reached the end of its life.

Table 7-2 Error messages of the ASM 470

ANZ (Left Byte)	Flash-ing of the Red LED	Description
0D H/ 13 D	13 x	Address error • The address area of the MDS was exceeded. • The start address in BEDB for the command start is wrong. • The wrong model of the MDS is being used.
0E H/ 14 D	14 x	ECC error • The data cannot be read by the MDS. • MDS data have been lost (i.e., MDS is defective). • The MDS was not initialized by the ECC driver. – Initialize the MDS. • The EEPROM-MDS has reached the end of its life. The data have been lost. – Replace the MDS. • The MDS was moved out of the field while being write-accessed. – The MDS is not positioned correctly.
13 H/ 19 D	19 x	Watchdog on the ASM 470 has been triggered. • Perform RESET command to ASM 470.
17 H/ 23 D	23 x	Communication error between the FB 47 and the ASM 470. Handshake error. • The BEDB of the ASM 470 station was overwritten by other parts of the program. • Check ASM 470 parameter assignment. • Check FB 47 command causing this error. • Then start RESET command.
18 H/ 24 D	– –	An error has occurred which must be acknowledged with a RESET. • Then start RESET command.

Table 7-2 Error messages of the ASM 470

ANZ (Left Byte)	Flash-ing of the Red LED	Description
19 H/ 25 D	– –	The previous command is active. The user sent a new command to the ASM 470 even though the previous command was still active. • Active command can only be terminated by a RESET. • Before a new command can be started, the READY bit must = 1. Exception: RESET • Two FB 47 calls were assigned the same “ADR” parameters. • Two FB 47 calls are working with the same BEDB. • Then start a RESET command.
1F H/ 31 D	– –	Running command terminated by a RESET • Communication with the MDS was terminated with a RESET command. • This error can only be reported back with a RESET command.

7.4 Pure Hardware Errors

When the ASM 470 is not working properly and you cannot find errors in the program, check the following points (see table 7-3).

Table 7-3 Pure hardware errors

Points to Check	Cause of Error
Voltage supply	Measure 24 V under load.
Wiring of ground	Check wiring (see installation guidelines in the catalog). Otherwise the wiring guidelines for SIMATIC apply.
Shielding	Apply shield (see installation and service manual).
Cable (see MOBY catalog)	• Have you used the correct cable to the SLG ? • Check cable length (comply with cable configuration specifications).
Wiring	• Is the connector from the SLG to the ASM 470 correct ? • Are distributor boxes installed in the connection ?
Installation	• Nonferrous space provided ? (See installation guidelines in the catalog.) • Correct operating distances adhered to ? (See technical specifications in the catalog.) • Minimum operating distances adhered to ? (See technical specifications in the catalog.) – MDS ↔ MDS; – SLG ↔ SLG • Is the MDS guide within the specified transmission window ?
Communication via PROFIBUS-DP	• Check correct functioning of the IM 308-C. • Check PROFIBUS-DP cable. • Check COM ET 200 parameterization. • Check ASM 470, and replace if necessary

Technical Specifications of the ASM 470

8

Climatic Environmental Requirements	
Operating temperature • Horizontal setup of the S7-300 • Vertical setup of the S7-300 • Temperature gradient	 0 ° C to +60 ° C 0 ° C to +40 ° C ≤ 10 degrees/hr
Storage temperature • Temperature gradient	–40 ° C to +70 ° C ≤ 20 degrees/hr
Protection class in accordance with IEC 529	IP20

Serial Interface (to the SLG)	
Connection plug	6ES7 392-1AJ00-0AA0 Front plug connector with screw-type terminals. Cf. ST70 catalog. The front plug connector is not included.
Transmission speed	19200 baud
Procedure	MOBY protocol
Cable length	• Depends on the SLG • Max. of 1000 m (See cable configuration in the MOBY catalog.)

Power Supply	
Range	20 V to 30 V DC
Non cyclic overvoltage • Limit value • Duration • Recovery time	 35 V 500 msec (single pulse) 10 sec
Ripple	3.6 V_{ss} (0 to 100 Hz)
Max. current consumption (without SLG)	50 mA (at U = 24 V)
Max. current consumption of the connected SLG	Max. of 600 mA for one SLG Max. of 300 mA for two SLGs

Potential isolation between ET 200M and MOBY	Yes
Power loss of the module	1 W (typical)
Current consumption from S7 bus	Max. of 100 mA

Dimensions and Weight	
W x H x D	40 x 125 x 120 mm
Weight (without front connector)	200 g

MOBY Times with Presence Check	
MDS recognized, no command active (presence 0 → 1)	70 msec (typical)
MDS departing (presence 1 → 0)	110 msec (typical)
MDS recognized, command active on ASM 470 (presence 0 → 1)	20 msec (typical)
Switchover time of SLG 1 ↔ SLG 2 (no command active)	100 msec (typical)
Switchover time of SLG 1 ↔ SLG 2 when a command is started at the same time	0 msec (typical)
Response message of the selected SLG after start of command	10 msec to 100 msec

Dialog Operating Mode	
Memory size of the virtual MDS (i.e., VMDS) on the interface module in dialog operating mode	16 Kbytes (not retentive)

Warnings

9

Deutsch

Warnung

Beim Betrieb elektrischer Geräte stehen zwangsläufig bestimmte Teile dieser Geräte unter gefährlicher Spannung.

Sicherer Betrieb der Geräte setzt voraus, daß diese von qualifiziertem Personal sachgemäß unter Beachtung der im MOBY-Katalog[1] und der technischen Beschreibung enthaltenen Hinweise eingesetzt werden.

Bei Nichtbeachtung können Tod, schwere Körperverletzung oder erheblicher Sachschaden die Folge sein.

Beachten Sie daher auch bei Instandhaltungsmaßnahmen an diesem Gerät alle hier und auf dem Produkt selbst aufgeführten Hinweise.

- Vor Beginn jeglicher Arbeiten ist das Gerät vom Netz zu trennen und zu erden.
- Es dürfen nur vom Hersteller zugelassene Ersatzteile verwendet werden.
- Die vorgeschriebenen Wartungsintervalle sowie die Anweisungen für Reparatur und Austausch sind unbedingt einzuhalten.
- Bei einem mobilen Datenspeicher mit RAM ist eine Lithiumbatterie integriert, hierzu sind folgende Hinweise zu beachten:

  Vermeiden Sie das Risiko von Feuer, Explosionen und schweren Verbrennungen. Die Batterie darf nicht nachgeladen, auseinandergebaut, über 100 ° Celsius erwärmt, entzündet oder ihr Inhalt mit Wasser in Berührung gebracht werden.

Beim hitzefesten Datenträger sind die besonderen Hinweise zu berücksichtigen.

[1] Sollten Sie nicht im Besitz des MOBY-Katalogs sein, so kann er über jede örtliche SIEMENS-Niederlassung bestellt werden.

English

Warning

Hazardous voltages are present in this equipment during operation.

To ensure safe operation of the equipment, maintenance shall only be performed by qualified personnel in accordance with the instructions in the MOBY catalog[1] and technical description.

Failure to observe these instructions can result in death, severe personal injury or substantial damage to property.

The following instructions and those on all product labels must be followed when carrying out any maintenance work.

- Always disconnect and earth the equipment before starting any maintenance.
- Use only spare parts authorized by the manufacturer.
- The servicing intervals as well as the instructions for repair and replacement shall be duly observed.
- A lithium battery is contained in mobile data memories with RAM. The following instructions must be observed:

  To avoid the risk of fire, explosion and severe burns, the battery should not be recharged, dismantled, exposed to heat over 100 degrees Celsius, ignited, or brought into contact with water.

The special instructions must be followed when using heat-resistant data storage media.

[1] Should you not be in possession of the MOBY catalog, it can be obtained through your local Siemens office.

Français

Attention

Le fonctionnement d'un équipement électrique implique nécessairement la présence de tensions dangereuses sur certaines de ses parties.

L'exploitation sûre de cet équipement implique qu'il soit mis en oeuvre de façon adéquate par des personnes qualifiées, en respectant les consignes de sécurité figurant au catalogue MOBY[1] et aux descriptions techniques.

Le non-respect des consignes de sécurité peut conduire à la mort, à des lésions corporelles graves ou à un dommage matériel important.

Ne procéder à l'entretien que dans le plus grand respect des règles de sécurité énoncées ici ou figurant sur le produit.

- Avant toute intervention, mettre l'appareil hors tension et à la terre.
- N'utiliser que des pièces de rechange autorisées.
- Respecter la périodicité d'entretien et les instructions de réparation et de remplacement.
- Les mémoires embarquées (RAM) sont équipées d'une pile au lithium.

  Ne pas exposer la pile au feu, danger d'explosion et de lésions graves. La pile ne doit pas être rechargée, ouverte exposée à des températures supérieures à 100° C ou exposée au feu. Son contenu ne doit pas entrer en contact avec de l'eau.

En ce qui concerne les supports de données résistants à la chaleur, respecter les consignes spécifiques.

1 Si vous ne disposez pas ou du catalogue MOBY, ce peuvent être commandés auprès de votre agence SIEMENS.

Italiano

Pericolo

Durante il funzionamento di apparecchi elettrici, determinate parti di tali apparecchi si trovano inevitabilmente sotto tensione pericolosa.

Per un funzionamento sicuro di questi apparecchi è necessario che essi vengano adoperati, nel modo opportuno, solo da personale qualificato, che osservi le indicazioni contenute nel catalogo[1] per gli apparecchi MOBY e nella descrizione tecnica.

In caso di non osservanza si possono verificare la morte, gravi lesioni alle persone o notevoli vanni alle cose.

Per questo motivo è necessario che le avvertenze riportate qui e sul prodotto stesso vengano rispettate anche nel caso di misure di manutenzione degli apparecchi.

- Prima di iniziare qualsiasi lavoro è necessario staccare l'apparecchio dalla rete ed effettuare una messa a terra.
- Possono essere utilizzati solo pezzi di ricambio prodotti dal costruttore.
- E'assolutamente necessario rispettare i tempi di manutenzione previsti e le indicazioni riguardanti il ricambio e la riparazione.
- In una memoria dati mobile dotata di RAM è integrata una batteria al litio; in questo caso è necessario osservare le seguenti indicazioni:

  evitare il pericolo di incendio, di esplosioni e di gravi ustioni. E'vietato ricaricare, smontare, riscaldare oltre i 100° C o incendiare la batteria, oppure mettere il suo contenuto a contatto con acqua.

Nel caso di un supporto dati resistente al calore è necessario osservare le indicazioni speciali al riguardo.

1 Se non doveste essere in possesso del catalogo MOBY, potete ordinarlo presso qualsiasi filiale SIEMENS di zona.

Español

Precaución

Durante el funcionamiento de los equipos eléctricos hay partes de los mismos que se encuentran forzosamente bajo tensión peligrosa.

Un funcionamiento seguro de los equipos presupone que han sido instalados correctamente por personal calificado observando las indicaciones contenidas en el Catálogo[1] de los equipos MOBY y la Descripción técnica.

La no observación de dichas indicaciones puede provocar la muerte, lesiones corporales graves o daños materiales considerables.

Por este motivo es preciso observar también durante las operaciones de mantenimiento y reparación en dicho equipo todas las indicaciones que figuran aquí y en el producto.

- Antes de comenzar cualquier trabajo es preciso seccionar de la red el equipo y ponerlo a tierra.
- Solo deben utilizarse repuestos homologados por el fabricante.
- Es imprescindible observar los intervalos de mantenimiento especificados asi como las instrucciones de reparación y reemplazo.
- Las memorias de datos móviles con RAM tienen integrada una batería de litio; al respecto es preciso observar las indicaciones siguientes:

  Evite riesgos de fuego, explosiones y quemaduras graves. La batería no debe ser recargada, desmontada, calentada a mas de 100 grados centígrados, inflamada: su contenido no deberá ponerse en contacto con agua.

En los soportes de datos con protección térmica es preciso observar las indicaciones particulares respectivas.

1 Si no dispone del catálogo MOBY, estos pueden pedirse a través de cualquier sucursal local de SIEMENS.

Svensk

Varning

Vid drift av elektrisk utrustning ligger det alltid en farlig spänning på vissa delar av utrustningen.

Säker drift av utrustningen förutsätter att den utförs av kvalificerad personal med uppmärksamhet på anvisningarna i MOBY-katalogen[1] samt de anvisningarsom ges i den tekniska beskrivningen.

Om dessa anvisningar ej beaktas kan följden bli dödsfall, svår kroppskada eller avsevärda materielskador.

Uppmärksamma vid underhållsarbete också anvisningar som ges här och på själva produkten.

- Före allt arbete skall utrustningen skiljas fran nätet och jordas.
- Bara reservdelar som godkänts av tillverkaren får användas.
- lakttag alltid föreskrivna underhållsintervall samt de anvisningar som givits rörande reparation och utbyte.
- Det mobila dataminnet med RAM innehåller et litiumbatteri. För detta gäller följande anvisningar:

  Undvik risk för öppen låga, explosioner och förbränning. Batteriet får inte efterladdas, tas isär, värmas upp över 100° C eller tändas på., och dess innehåll får ej komma i beröring med vatten.

För värmebeständiga datamedier gäller speciella anvisningar, som måste beaktas.

1 Om Ni inte har ett exemplar av MOBY-katalogen så kan den beställas från närmaste SIEMENS-kontor.

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D–90713 Fuerth

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Remarks/Suggestions

Your remarks and suggestions help us to improve the quality of our documentation. Please complete this questionnaire as soon as you have time, and return it to Siemens.

Title of your manual:_ _

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Please enter your personal evaluation from 1 (good) to 5 (poor).

1. Do the contents of this manual meet your requirements ? ☐
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