SIEMENS

MOBY® E

Configuration, Installation and Service

Manual

Table of Contents

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Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:

Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Warning

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

Caution

indicates that minor personal injury or property damage can result if proper precautions are not taken.

Caution

indicates that property damage can result if proper precautions are not taken.

Note

draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

Qualified Personnel

The device/system may only be set up and operated in conjunction with this manual.

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage

Note the following:

Warning

This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

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General

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This configuration, installation and service manual will help you to plan and configure your MOBY E system. It covers the guidelines on configuration and installation and provides complete technical data on the individual components.

Technical support

The specialists of Technical Support are ready to advise and support you when you have questions on the functions and handling of our MOBY products.
You can reach us around the clock anywhere in the world.

Telephone: +49 (0) 180 5050-222
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E-mail: adsupport@siemens.com

Internet

General news on MOBY E or an overview of our other identification systems are available on the Internet under the following address.

http://www.siemens.de/moby

Introduction to MOBY E

2

MOBY E is an RF identification system with low-cost EEPROM data storage for optimization of material handling and production processes for the low-end and medium-range performance level. This powerful system offers high-speed data transmission between data memories (i.e. MDSs) and read/write devices (i.e. SLGs).

Principal application areas

MOBY E is primarily used when object identification must be inductive (i.e. without contact), reliable and fast and production and manufacturing parameters must be carried on the object.

- Storage, logistics, and distribution
- Merchandise distribution
- Product identification
- Container identification
- Assembly lines
- Tool identification

Technical data of MOBY E

Table 2-1 Technical data of MOBY E (field components)

Storage capacity	752 bytes for use as desired
Memory type	EEPROM
Data organization	Address-oriented
Protection rating	IP65 to IP68
Operating temperature	–25 to +125°C
Data transmission speed (SLG - MDS)	≥ 2.55 ms/byte for reading ≥ 2.8 ms/byte for writing
Read/write distance	0 to 100 mm
Can be connected to	SIMATIC S 5/S7, PCs, computers, PLCs of other manufacturers, and PROFIBUS

Overview of MOBY E components

- MDS: Mobile data memory
- SLA: Read/write antenna
- SLG: Read/write device
- SIM: Serial Interface Module
- ASM: Interface module
- Service and test device

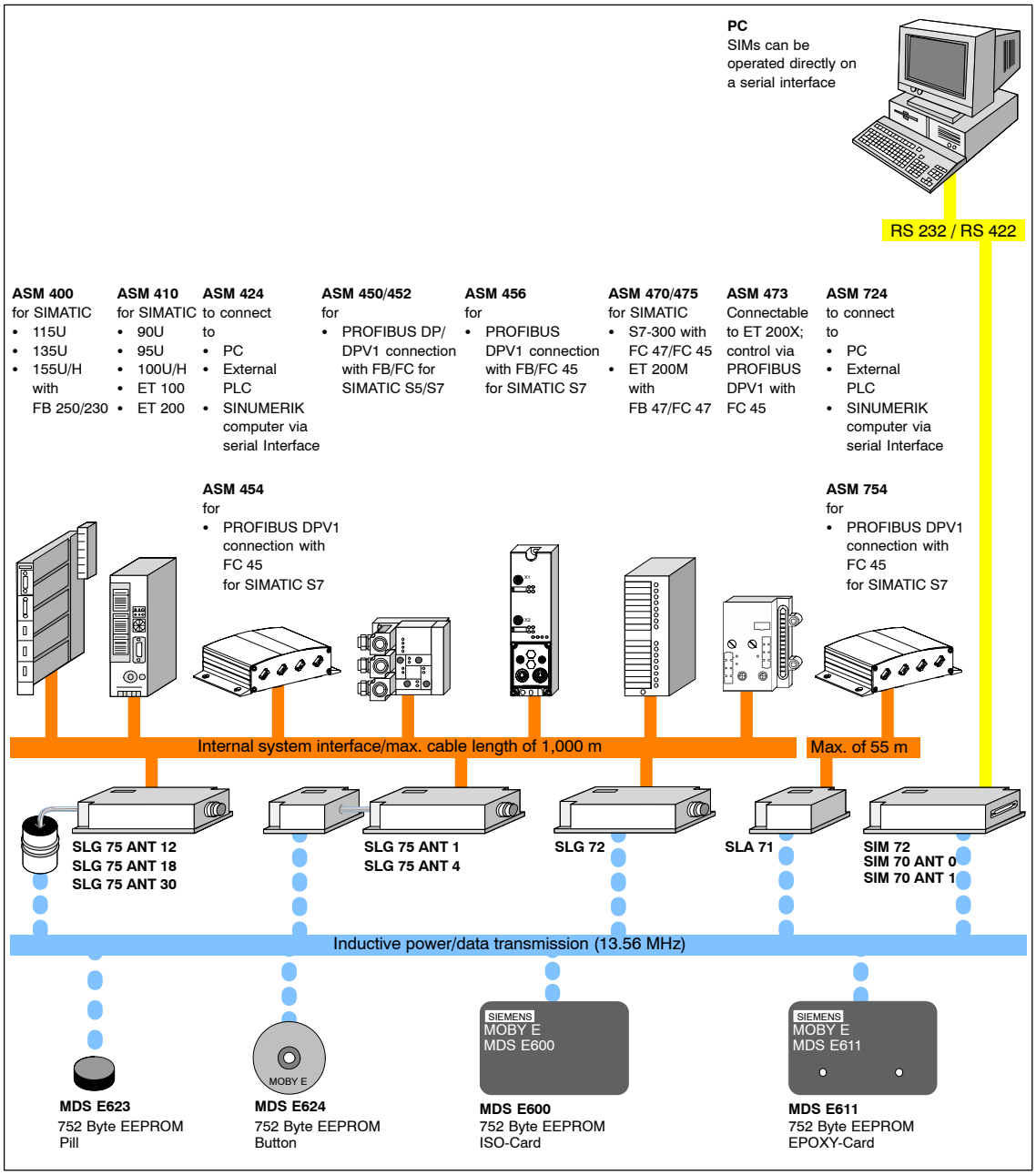


Figure 2-1 Overview of MOBY E components

Configuration and Mounting Guidelines 3

3.1 Basic Requirements

Warning

Do not make changes to the devices.
Violation will invalidate interference emission certification (BZT, FCC), CE and the manufacturer's warranty.

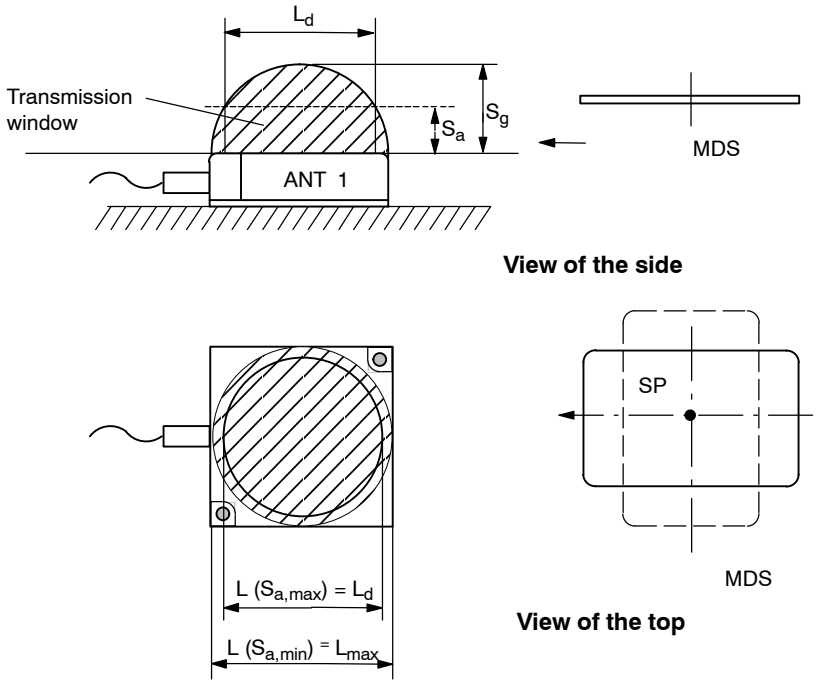
To choose the correct MOBY E components, apply the following criteria to your particular application.

- Transmission distance (i.e. read/write distance)
- The amount of data to be transferred
- Metal-free spaces for MDS and SLG/SLA
- Static of dynamic transmission of the data
- Speed for dynamic transmission
- Tolerances of the tracking
- Environmental conditions (e.g., moisture, temperature, chemical effects, and so on)
- Maximum write frequency per MDS

3.1.1 Transmission Window

The read/write device (i.e. SLG/SLA) generates an inductive alternating field. The field is strongest in the vicinity of the SLG/SLA and decreases in strength the further away from the SLG/SLA it moves. Distribution of the field depends on the layout and geometry of the antennas on the SLG/SLA and the MDS.

MDS functionality requires a minimum field strength on the MDS achieved at a distance of S_g from the SLG/SLA. The figure below shows the transmission window between the MDS and the SLG/SLA.



S_a: Working distance between the MDS and SLG/SLA

S_g: Limit distance (The limit distance is the maximum clearance between the top of the SLG/SLA and the top of the MDS at which the transmission will still function under normal conditions.)

L: Length of a transmission window.
The length L_d is valid for the calculation.
In the case of $S_{a,\,min}$, the field length increases from L_d to L_{max}.

PI: Point of intersection of the symmetry axes of the MDS

Figure 3-1 Transmission window

The active field to the MDS is a circle. See view from top.
The MDS can be processed as soon as the point of intersection (IP) of the MDS enters the circle of the transmission window.
If an MDS E600 or E611 enters the transmission window diagonally (hatched portion in Figure 3-1), the length of the field is reduced by approx. 15 percent.

The above figure also shows that operation in the area between S_a and S_g is possible. The greater the distance, the smaller the active working area becomes until it is reduced to one point at distance S_g. For this reason, only static operation should be used in the area between S_a and S_g.

Direction of movement of the MDS

The MDS and the SLG/SLA do **not** have a polarization axis (i.e. the MDS can come from any direction, assume any position and traverse the transmission window). The active area is shown below (i.e. for vertical, horizontal and diagonal operation).

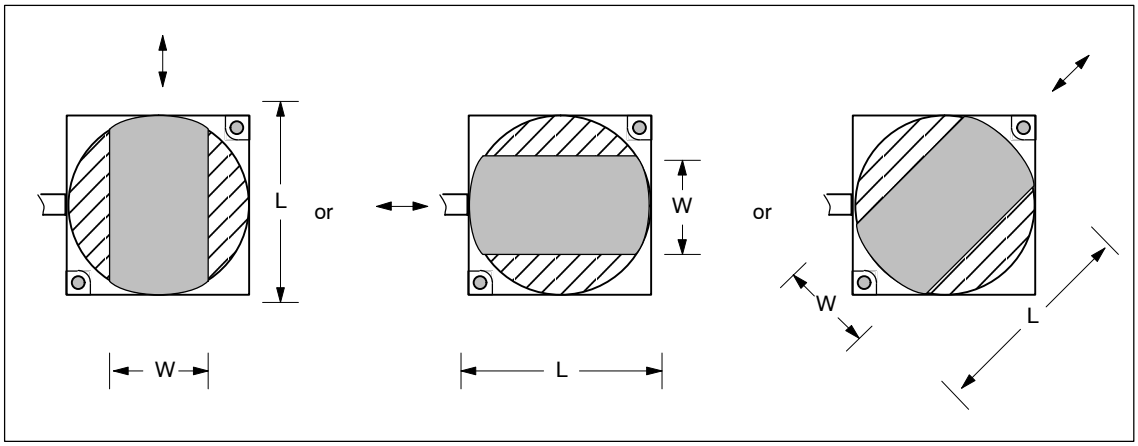


Figure 3-2 Direction of movement of the MDS

Working in static operation

When static operation is used, the MDS can be processed into the area of the limit distance (i.e. S_g). The MDS must be positioned exactly over the SLG/SLA as shown below.

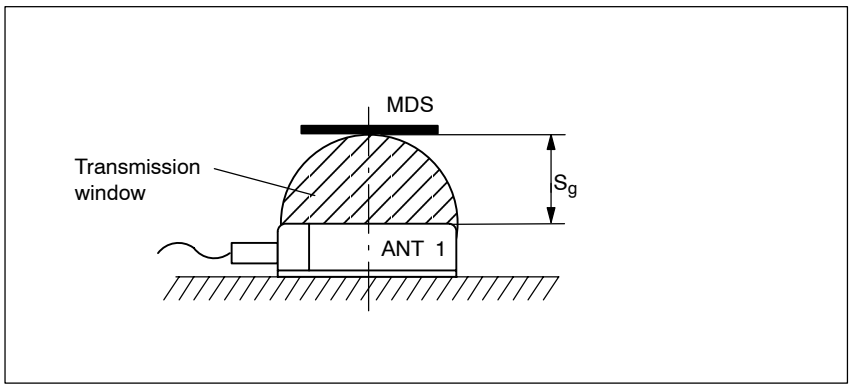


Figure 3-3 Working in static operation

Working in dynamic operation

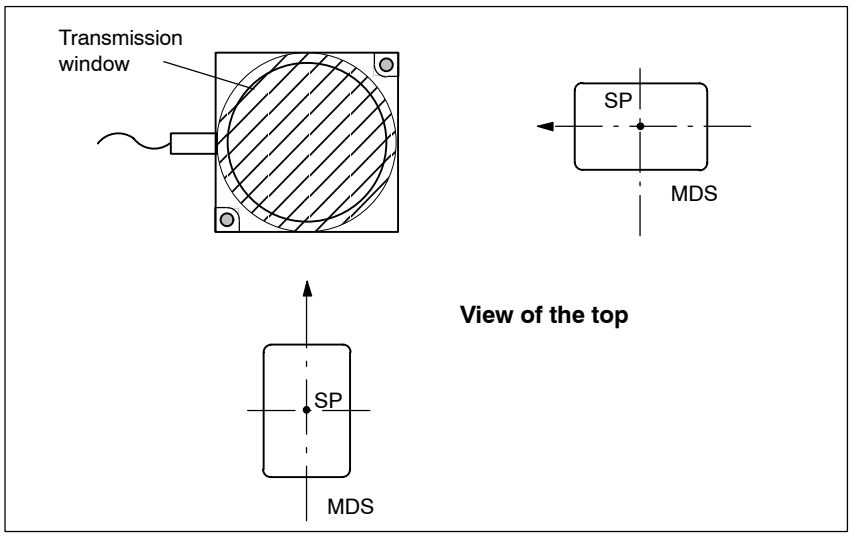


Figure 3-4 Working in dynamic operation

Width of the transmission window

The following approximation formula applies to practical applications:

$$B = 0,4 \cdot L$$

W: Width of the transmission window

L: Length of the transmission window

The width of the transmission window (W) is particularly important for the tolerance of mechanical tracking. When W is maintained, the formula can be used without restriction for the transmit period.

Transmission window with secondary fields

There are generally secondary fields in the range from 0 to 20 mm. However, they should only be considered for configuration in exceptional cases because the write/read intervals are only very limited. Exact details on the field geometry of the secondary fields cannot be provided because the values very much depend on the working distance and the application.

3.1.2 Transmit Period of the MDS

The transmit period is the time during which the MDS is located in the transmission window of an SLG/SLA. During this time, the SLG/SLA can exchange data with the MDS.

The formula used to calculate the transmit period is shown below.

$$t_V = \frac{L \cdot 0,8\,[m]}{V_{MDS}\,[m/s]}$$

t_V : Transmit period of the MDS

L: Length of the transmission window

V_{MDS}: Speed of the data memory in dynamic operation

0.8: Constant factor. Compensates for temperature influences and production tolerances.

During static operation, the transmit period can be any length of time. The transmit period must last at least as long as necessary to conclude communication with the MDS.

During dynamic operation, the transmit period is determined by the system environment. The amount of data to be transferred must be adjusted to the transmit period or vice versa.

General formula:

$$t_V \geq t_K$$

t_V : Transmit period of the data memory in the field of the SLG/SLA

t_K: Communication time between MDS and ASM

3.1.3 Communication between ASM, SLG/SLA and MDS

Communication between ASM, SLG/SLA and MDS is asynchronous with a transmission speed of 19200 baud.

General formula:

$$t_K = K + t_{Byte} \cdot n$$

Calculation of the maximum amount of user data:

$$n_{max} = \frac{t_V - K}{t_{Byte}}$$

t_K: Communication time between ASM, SLG/SLA and MDS

t_V: Transmit period

n: Amount of user data in bytes
To achieve optimal performance, “n” may not be set to more than 160.

n_{max}: Maximum amount of user data in bytes during dynamic operation

t_{Byte}: Transmission time for 1 byte (see Table 3-1)

K: Constant. The constant represents an internal system time. It contains the time required for power buildup on the MDS and the time required for command transmission (see Table 3-1).

Table 3-1 Time constants K and t_{byte}

K [ms]	t_{byte} [ms]	Operating Mode
35	2.55	Read; Normal operation
51	2.8	Write; Normal operation
20	–	Read ID number (4 bytes)

This table applies to all commands. When a user command consists of several subcommands, the formula for t_K must be applied to each subcommand.

The t_K calculation applies to interference-free transmission. When transmission is briefly interrupted due to external interference, the ASM continues the command automatically.

3.1.4 Communication between ASM and User Program

The time required for communication between ASM and user depends on the following factors.

- Cycle time, token rotation time and type of programmable controller
- Software used (FB 41, FB 47, FC 44, FC 45, FC 47, FB 240, FB 250)

Communication between the ASM 400 and the user can be divided into three steps.

a) The user issues a command and starts it. When the FB is called the next time, the command is transferred to the ASM and is acknowledged by the ASM.

b) The ASM executes the command with the MDS. The user and the FB are in wait status. Data communication with the MDS starts as soon as an MDS enters the transmission window of the SLG/SLA. The MDS data are stored intermediately on the ASM and checked for correctness.

c) Communication of the ASM with the MDS has been concluded. When the FB is called the next time, the read data or the results of a write command are transferred from the ASM to the user. The user receives a finished message.

See applicable documentation for the exact communication times between ASM and user.

3.1.5 Sample Calculation

Customer application

A transport system moves the pallets with the MDS at a maximum speed of V_{MDS} = 0.75 m/s. The following MOBY E components were selected.

- ASM 400 (with FB 250)
- SLG 75 ANT 1
- MDS E600

Task:

a) Physical specifications are to be provided to the constructor of the plant.

b) The maximum number of bytes in dynamic operation is to be provided to the programmer.

For technical data of the components, see the tables in Section 3.2 (”field data of MDS, SLG and SLA”).

Tolerance of the height allowance of the pallet

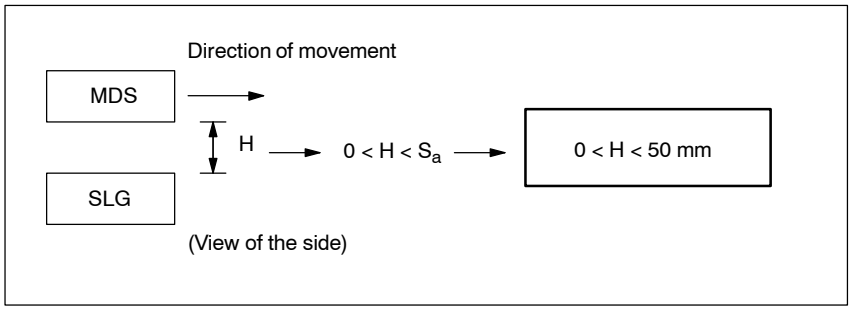


Figure 3-5 Tolerances of the side allowance of the pallet

Tolerances of the side allowance of the pallet

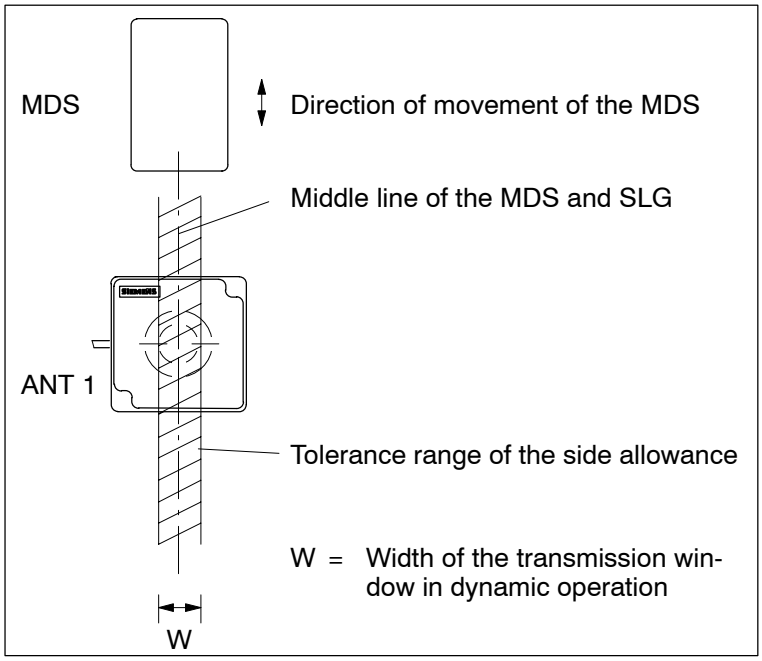


Figure 3-6 Tolerance of the side allowance of the pallet

Minimum distance between SLG/SLA and SLG/SLA

See Table 3-4 for this value.

Minimum distance between MDS and MDS

See Table 3-3 for this value.

Maximum number of bytes

$$t_v = \frac{L * 0,8}{V_{MDS}} = \frac{0,06\ m * 0,8}{0,75\ m/s} = 0,064\ s = 64\ ms$$

For normal operating mode, see Table 3-1 for the values of K and t_{byte}.

Calculation of n_{max}

Read:

$$\frac{tv - K}{t_{Byte}} = \frac{64\ ms - 35\ ms}{2,55\ ms} = 11,37 \Rightarrow n_{max} = 11\ Byte$$

Write:

$$\frac{tv - K}{t_{Byte}} = \frac{64\ ms - 51\ ms}{2,8\ ms} = 4,64 \Rightarrow n_{max} = 4\ Byte$$

Up to 11 bytes can be read or 4 bytes can be written when the MDS passes by.

3.2 Field Data of MDS, SLG and SLA

The table below shows the field data of all MOBY E MDS, SLG and SLA components. This makes selecting an MDS and an SLG/SLA particularly easy.

All technical data are typical data, based on an ambient room temperature of 0 to +50 °C, a supply voltage of 22 to 27 V DC, and metal-free surroundings. **Tolerances of ±20 % are permitted for production conditions and temperature fluctuations.**

Additional tolerances apply to the field data when the total voltage range from 20 V to 30 V DC is utilized for the SLG/SLA, and/or the entire temperature range is utilized for MDS and SLG/SLA.

Table 3-2 Field data of all MDSs, SLGs and SLAs without metal effects

MDS / SLG/SLA		MDS E600	MDS E611	MDS E623[3]	MDS E624
Length of the transmission window in mm (L)					
SLA 71	(L_d)	60[5]	80[5]	---	38
SLG 72	(L_x)[2] (L_y)[2]	75[5] 50[5]	90[5] 60[5]	---	60 40
SLG 75 ANT 1	(L_d)	60[5]	80[5]	---	38
SLG 75 ANT 4	(L_d)	220	250	---	200
SLG 75 ANT 12	(L_d)	---	---	8	---
SLG 75 ANT 18	(L_d)	---	---	4	12
SLG 75 ANT 30	(L_d)	---	---	---	14
Width of the transmission window in mm (W)					
SLA 71		24	32	---	15 (38)[1]
SLG 72	(W_x)[2] (W_y)[2]	30 20	36 24	---	24 16
SLG 75 ANT 1		24	32	---	15 (38)[1]
SLG 75 ANT 4		30	36	---	24
SLG 75 ANT 12		---	---	4	---
SLG 75 ANT 18		---	---	2[4]	5 (12)[1]
SLG 75 ANT 30		---	---	---	7

Table 3-2 Field data of all MDSs, SLGs and SLAs without metal effects

MDS / SLG/SLA	MDS E600	MDS E611	MDS E623[3]	MDS E624
Working distance in mm (S_a)				
SLA 71	0 to 50	10 to 70	---	0 to 25
SLG 72	0 to 50	10 to 70	---	0 to 30
SLG 75 ANT 1	0 to 50	10 to 70	---	0 to 25
SLG 75 ANT 4	0 to 50	10 to 70	---	0 to 25
SLG 75 ANT 12	---	---	0 to 4	---
SLG 75 ANT 18	---	---	0 to 6	0 to 8
SLG 75 ANT 30	---	---	---	0 to 18
Limit distance in mm (S_g)				
SLA 71	70	100	---	40
SLG 72	70	100	---	40
SLG 75 ANT 1	70	100	---	40
SLG 75 ANT 4	70	100	---	35
SLG 75 ANT 12	---	---	5	---
SLG 75 ANT 18	---	---	6	15
SLG 75 ANT 30	---	---	---	24

1 The width (W) contained in parentheses only applies to static MDS operation.
2 For the field geometry, see also Figure 5-2.
3 MDS E623 together with SIM 75 ANT 12 only in static operation.
4 A maximum average deviation of ±2 mm (without affecting the field data) is permitted in static operation.
5 Reduction by approx. 15 % when the MDS enters the transmission window diagonally. See also Figure 3-1.

Table 3-3 Minimum distance from MDS to MDS

	MDS E600	MDS E611	MDS E623	MDS E624
SLA 71	> 400 mm	> 400 mm	---	> 250 mm
SLG 72	> 400 mm	> 400 mm	---	> 250 mm
SLG 75 ANT 1	> 400 mm	> 400 mm	---	> 250 mm
SLG 75 ANT 4	> 400 mm	> 400 mm	---	> 250 mm
SLG 75 ANT 12	---	---	> 20 mm	---
SLG 75 ANT 18	---	---	> 30 mm	> 50 mm
SLG 75 ANT 30	---	---	---	> 60 mm

Table 3-4 Minimum distance from SLG/SLA to SLG/SLA

	SLA 71	SLG 72	SLG 75 ANT 1	SLG 75 ANT 4	SLG 75 ANT 12	SLG 75 ANT 18	SLG 75 ANT 30
SLA 71	> 800 mm	> 800 mm	> 800 mm	> 800 mm	---	> 400 mm	> 400 mm
SLG 72	> 800 mm	> 800 mm	> 800 mm	> 800 mm	---	> 400 mm	> 400 mm
SLG 75 ANT 1	> 800 mm	> 800 mm	> 800 mm	> 800 mm	---	> 400 mm	> 400 mm
SLG 75 ANT 4	> 800 mm	> 800 mm	> 800 mm	> 800 mm	---	> 400 mm	> 400 mm
SLG 75 ANT 12	---	---	---	---	> 80 mm	> 125 mm	---
SLG 75 ANT 18	> 400 mm	> 400 mm	> 400 mm	> 400 mm	> 125 mm	> 125 mm	> 200 mm
SLG 75 ANT 30	> 400 mm	> 400 mm	> 400 mm	> 400 mm	---	> 200 mm	> 200 mm

Note

Adherence to the values specified in Table 3-4 is essential. There is a danger of the influence of inductive fields if the values are underranged. This would increase the time for data transmission incalculably or a command would be terminated with errors.

3.3 Presentation of Speed to Amount of Data

The curves shown here will simplify selection of MOBY E MDS and SLG components for dynamic operation. Information from the table in Section 3.1.3 was used to calculate the curves. The curves apply to vertical operation with a single length of the transmission window (L_d).

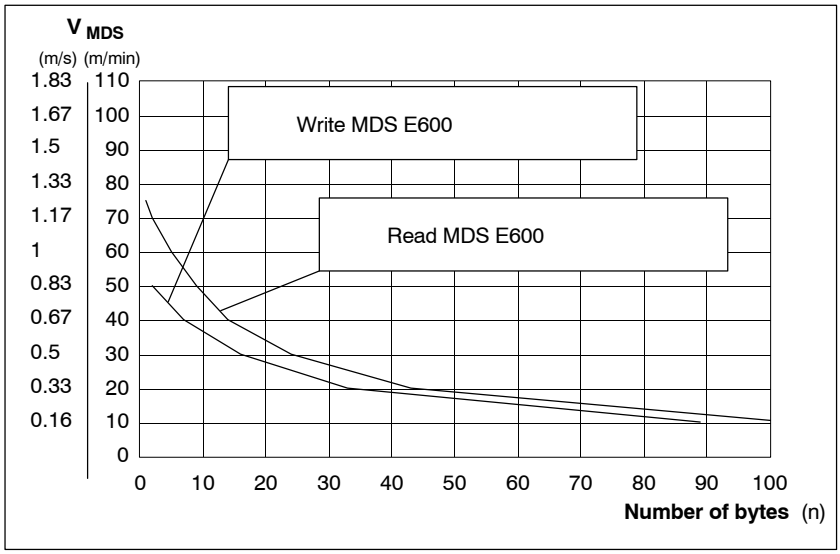


Figure 3-7 SLG 75 ANT 1/SLA 71 with MDS E600

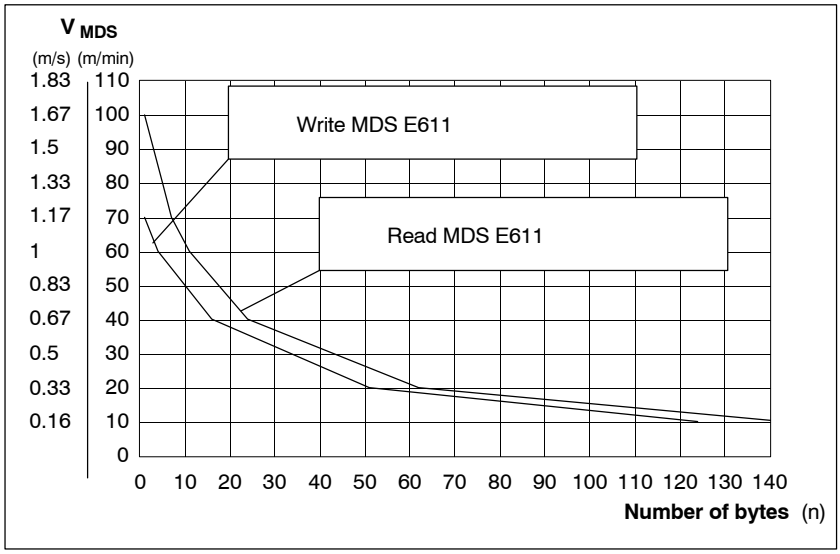


Figure 3-8 SLG 75 ANT 1/SLA 71 with MDS E611

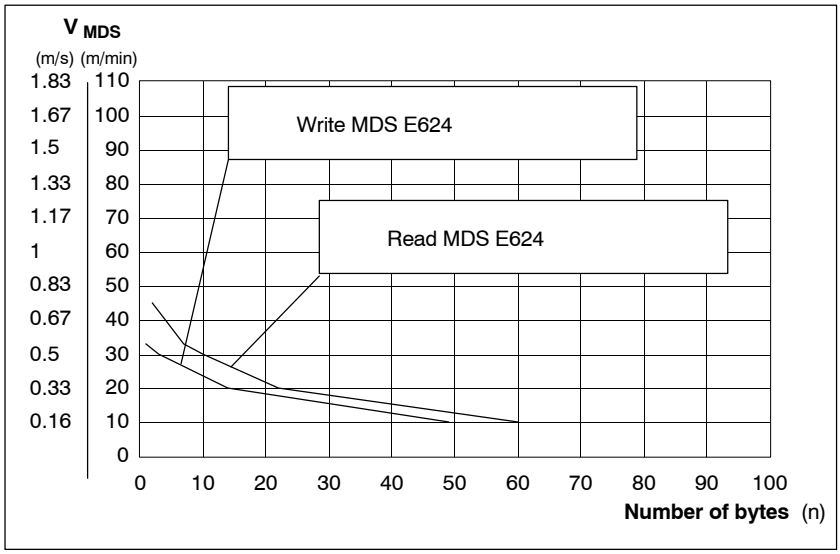


Figure 3-9 SLG 75 ANT 1/SLA 71 with MDS E624

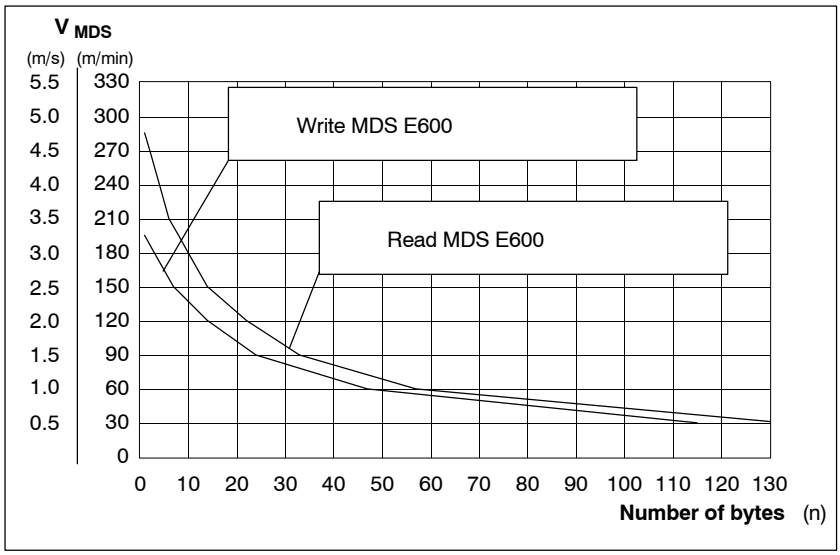


Figure 3-10 SLG 75 ANT 4 with MDS E600 (length L_x of the transmission window)

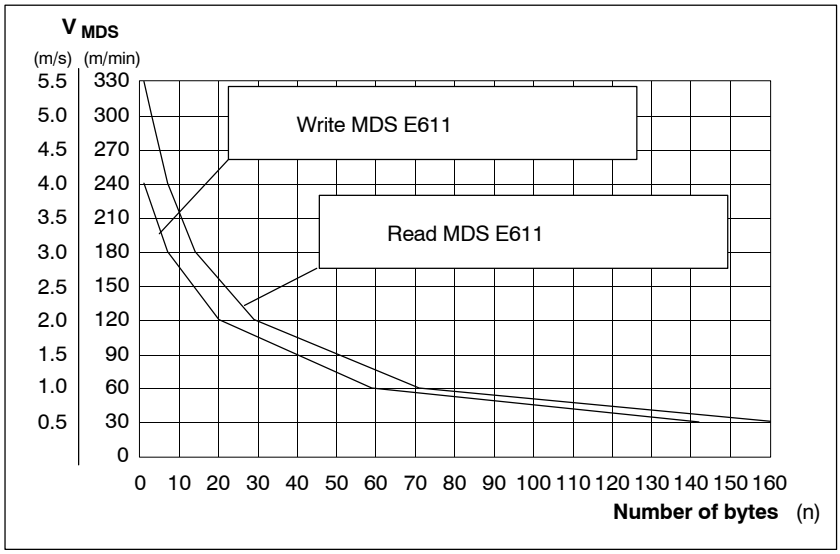


Figure 3-11 SLG 75 ANT 4 with MDS E611 (length L_x of the transmission window)

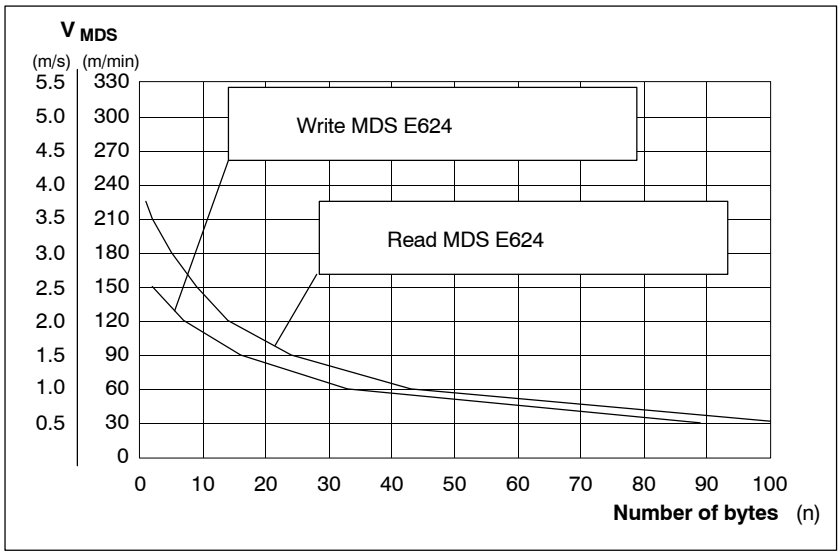


Figure 3-12 SLG 75 ANT 4 with MDS E624 (length L_x of the transmission window)

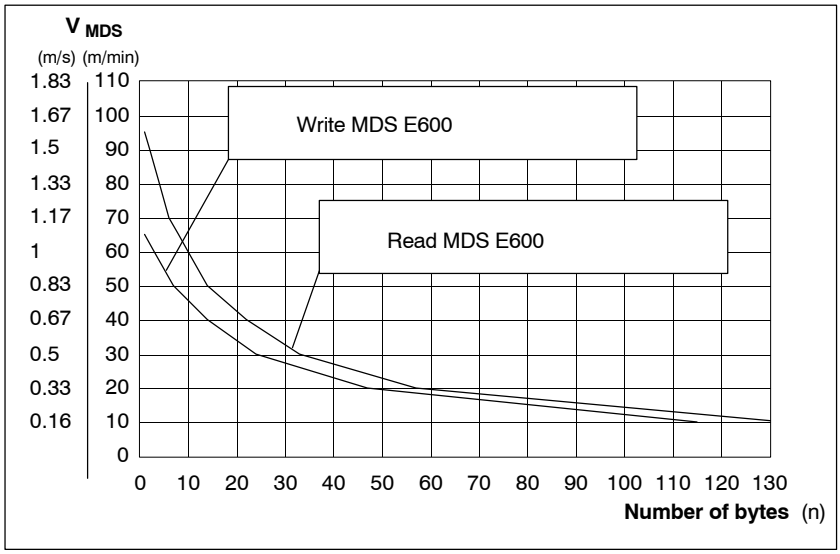


Figure 3-13 SLG 72 with MDS E600 (length L_x of the transmission window)

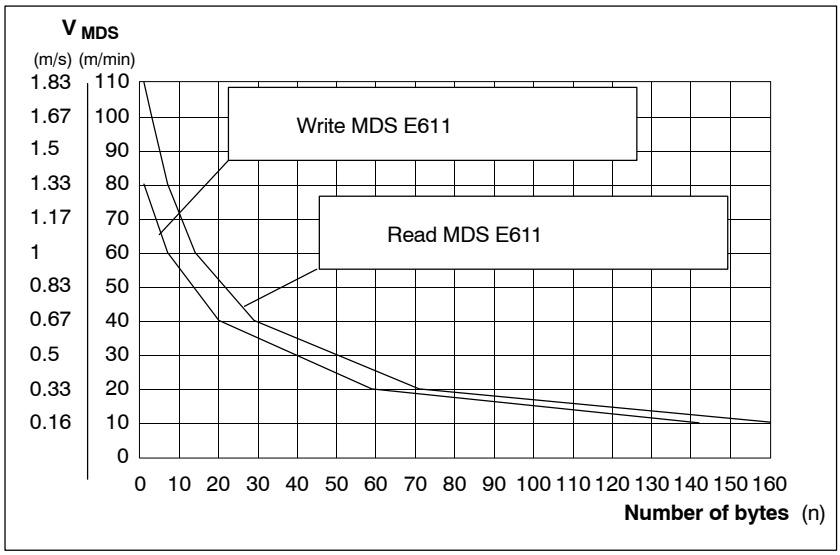


Figure 3-14 SLG 72 with MDS E611 (length L_x of the transmission window)

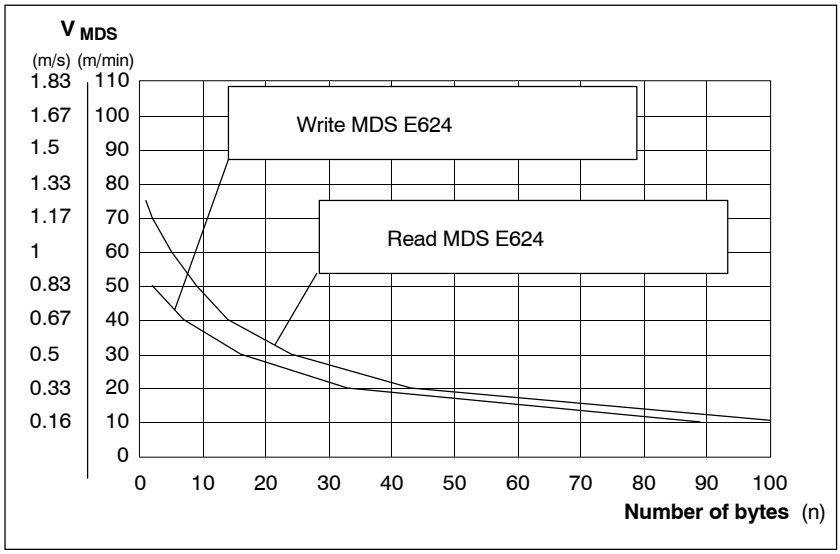


Figure 3-15 SLG 72 with MDS E624 (length L_x of the transmission window)

3.4 Installation Guidelines

The MDS, SLG and SLA are devices which work with induction. Every type of metal, particularly iron and ferromagnetic materials, in the vicinity of these devices influences their field geometry. To ensure that the field data described in Section 3.2 retain their validity, several points must be adhered to when configuring and installing the devices.

- Minimum distance between two read/write devices or read/write antennas. (See Table 3-4 and Chapter 5)
- Minimum distance between two adjacent data memories.
  (See Table 3-3 and Chapter 4)
- Metal-free area with flush installation of SLG/SLA and MDS in metal
- Installation of several SLGs/SLAs in metal frames or supports

The next few chapters describe how installation in metallic surroundings affects the identification system.

3.4.1 Definition of the Metal-Free Area

Metal-free space for MDS

Do not mount the MDS directly on metal (exception: MDS E623). Mounting the MDS directly on metal will interrupt all its functions. The following figures show the minimum distance of the MDS to metal.

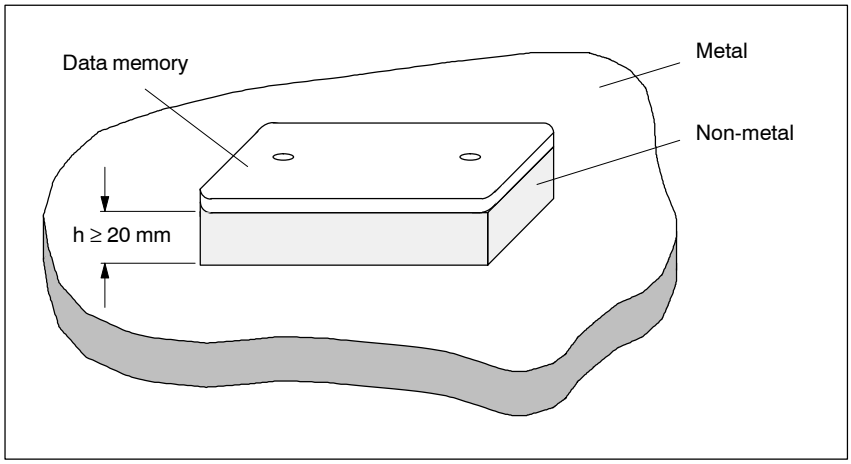


Figure 3-16 Mounting on metal: MDS E600/E611

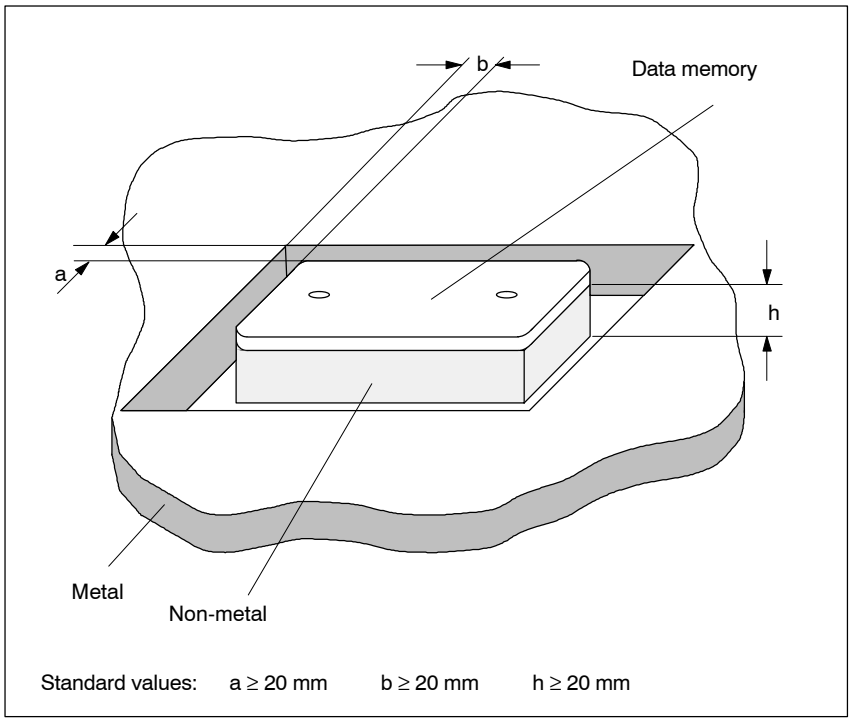


Figure 3-17 Flush mounting: MDS E600/E611

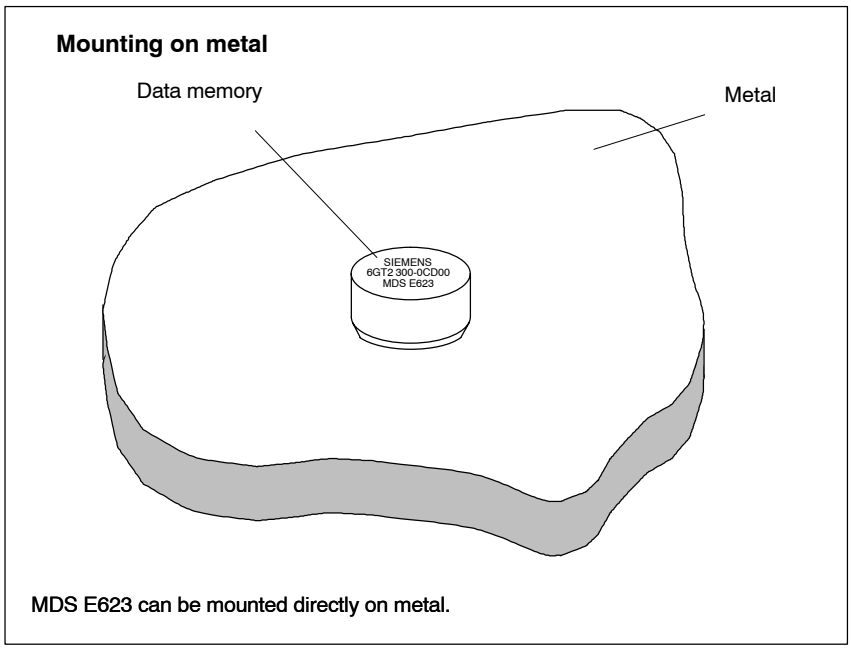


Figure 3-18 Mounting on metal: MDS E623

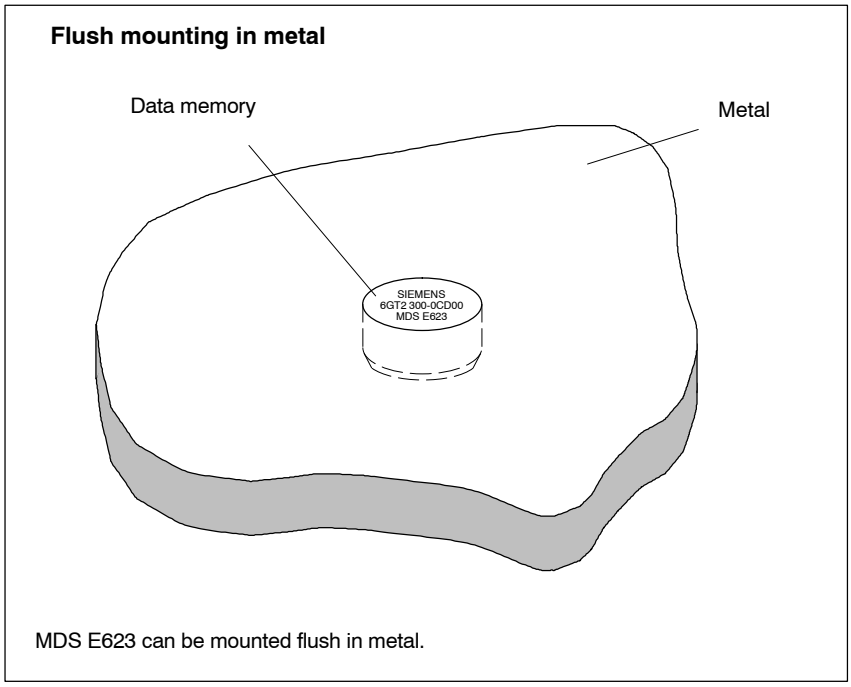


Figure 3-19 Metal-free space for MDS E623

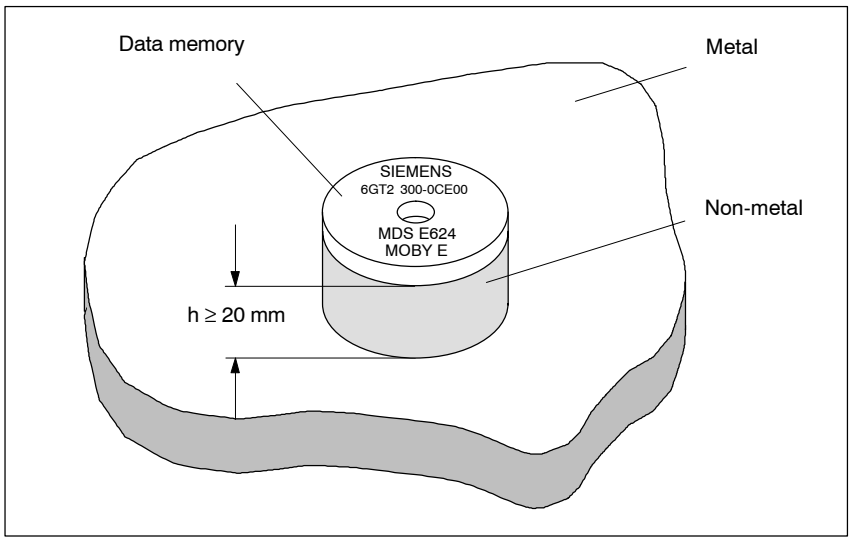


Figure 3-20 Mounting on metal: MDS E624

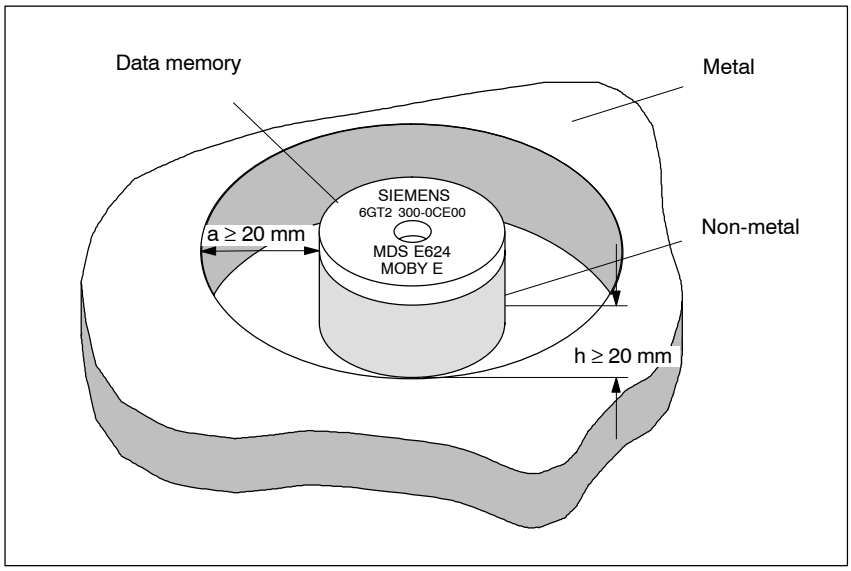


Figure 3-21 Flush mounting in metal (static): MDS E624

Underranging the standard values (i.e. a, b and h) will reduce the field data considerably. The MDS may be mounted with metal screws (i.e. M4 countersunk screws). This has no substantial effect on the range.

Metal-free space for SLG/SLA

When mounting the SLG/SLA, remember that metal in the vicinity of the antennas may affect the field data. Typical distances to metal are shown in the drawings below.

SLG 75 ANT 18

The cylindrical ANT 18 antenna can be mounted in metal with a minimum distance of 10 mm as shown in the following drawing. The field data are not affected.

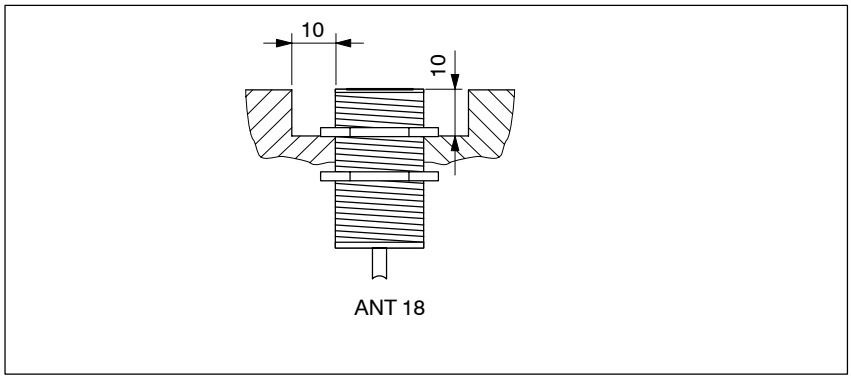


Figure 3-22 Flush mounting in metal (static): ANT 18

SLG 75 ANT 1, SLG 75 ANT 4

The ANT 1 resp. ANT 4 antenna can be mounted as shown in the following drawings. Remember that the field size may be reduced. (see Section 3.4.2)

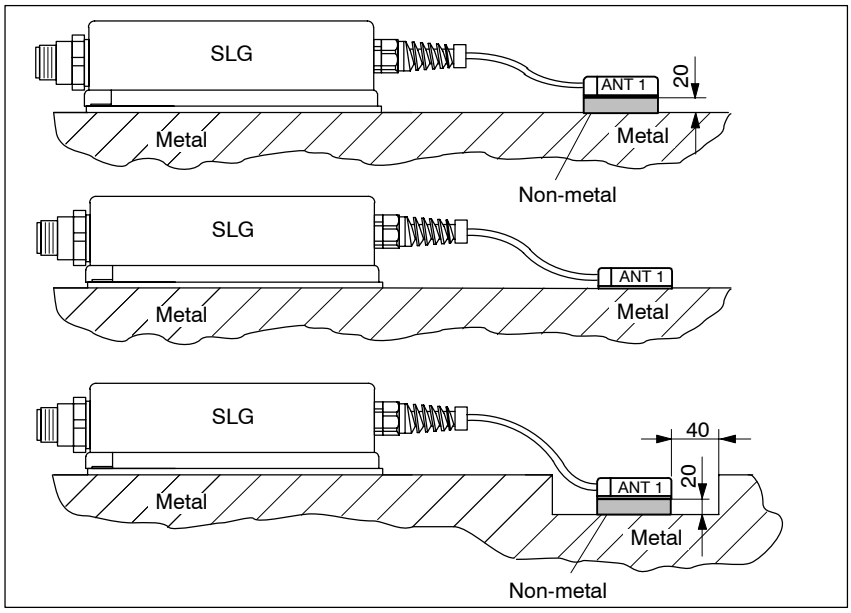


Figure 3-23 Mounting in a metallic environment: SLG 75 ANT 1

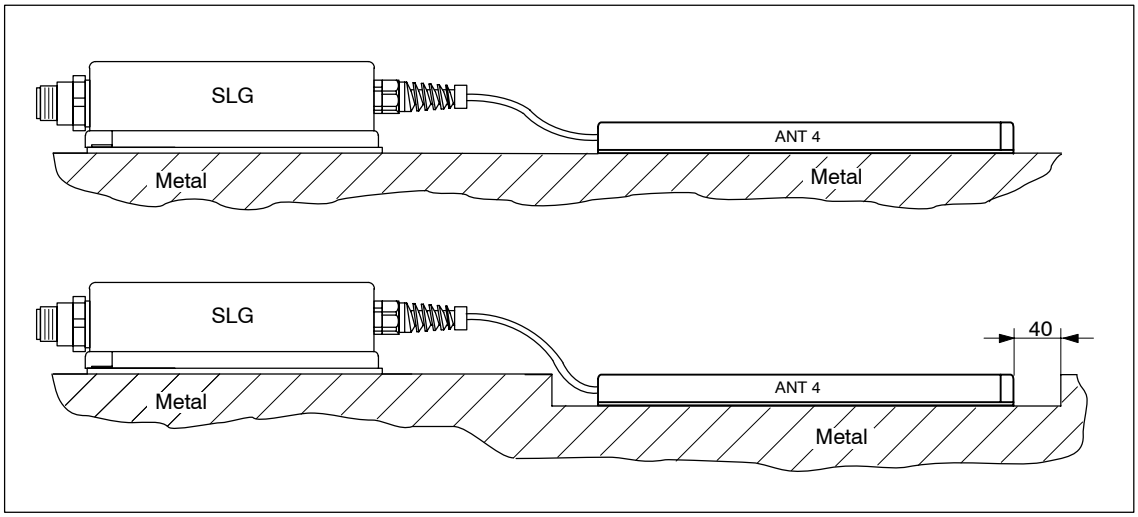


Figure 3-24 Mounting in a metallic environment: SLG 75 ANT 4

SLG 72

Since the height of the housing of the SLG 72 with integrated antenna provides a sufficient distance to the metallic base, the device can be mounted directly on metal. When flush mounting is used, remember to maintain the specified distance to metal on the sides.

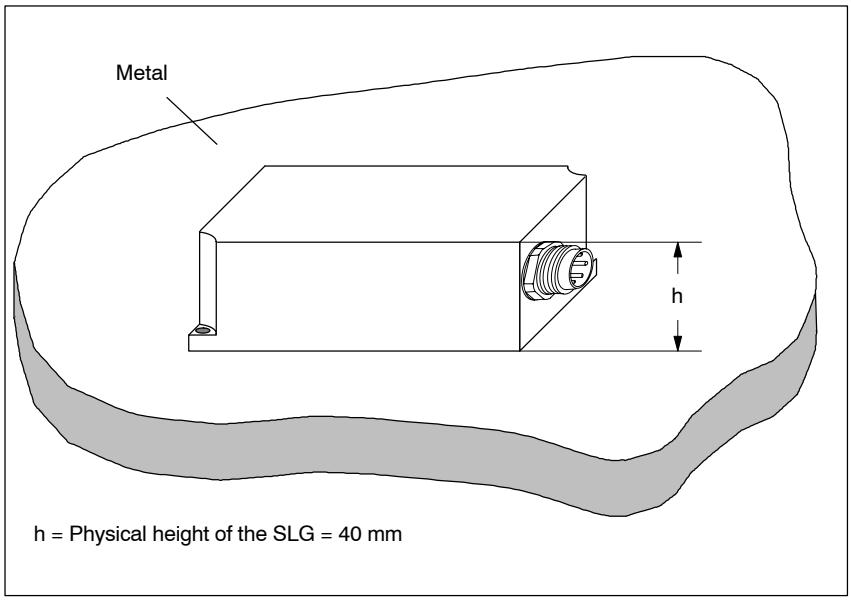


Figure 3-25 Mounting on metal: SLG 72

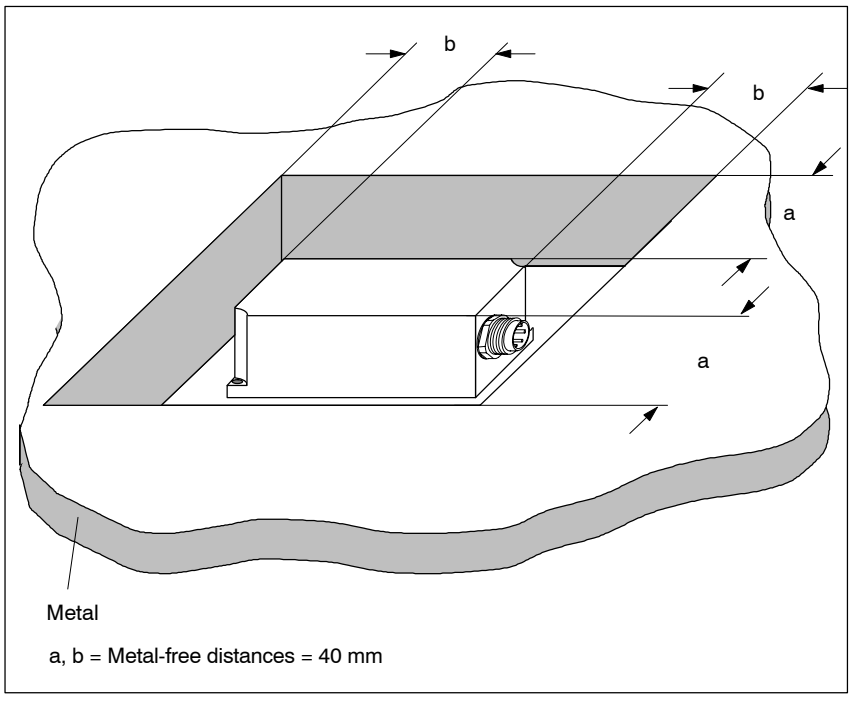


Figure 3-26 Flush mounting in metal: SLG 72

SLG 75 ANT 12

With the SLG 75 with ANT 12, the antenna can be mounted flush in metal. This reduces the working and limit distance (see Section 3.4.2)

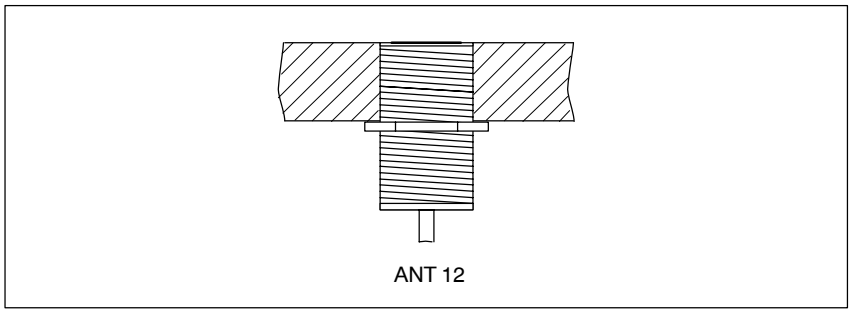


Figure 3-27 Flush mounting in metal: SLG 75 ANT 12

SLG 75 ANT 30

With the SLG 75 with ANT 30, the antenna can be mounted flush in metal. A distance of 20 mm must be maintained to the front of the antenna. This reduces the field data (see Section 3.4.2)

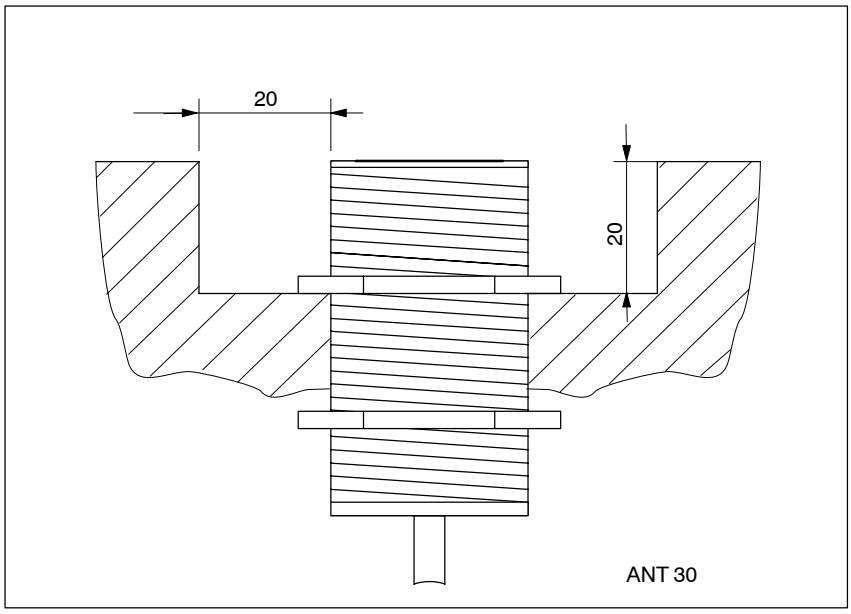


Figure 3-28 Flush mounting in metal: SLG 75 ANT 30

SLA 71

The SLA 71 can be mounted flush in metal. Remember that the field data may be reduced (see Section 3.4.2)

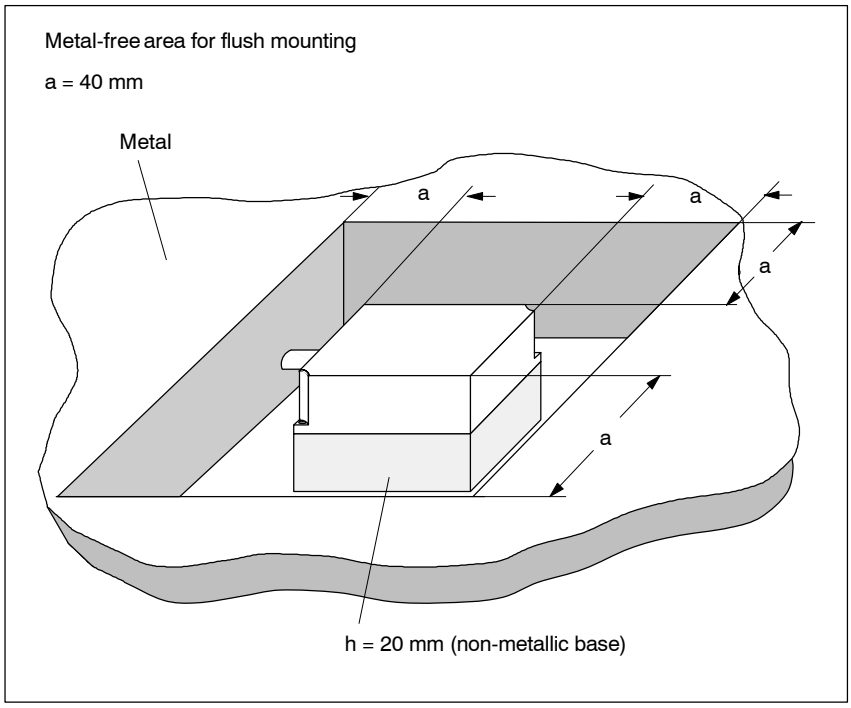


Figure 3-29 Flush mounting in metal: SLA 71

3.4.2 Effects of Metal on the Transmission Window

The following general points apply to the mounting of MOBY E components.

- The MDS may not be mounted directly on metal.
  (exception: MDS E623)
- Flush installation of the components in metal will reduce the field data. A test is recommended for critical applications.
- When working in the transmission window, make sure that metal rails or similar do not cut through the transmission field.
  The metal rail would affect the field data.
- In the case of the SLG 75 ANT 1/SIM 70 ANT 1, SLG 75 ANT 4 and SLG 72/SIM 72, the field is practically unaffected as of a distance of 40 mm to metal; in the case of the SIM 70 with the ANT 0 this is the case as of 10 mm.

Using tables and graphics, this chapter shows how the field data (i.e. S_g, S_a, L, and W) are affected by metal. The values in the tables represent the reduction of field data in % as related to non-metal (i.e. 100% stands for no effect).

MDS and SIM 70 with ANT 0 and SLG 75 and ANT 18/ANT 30

Table 3-5 Reduction in field data due to metal (in %):
MDS and SIM 70 with ANT 0 and SLG 75 with ANT 18/ANT 30

SIM 70 SLG 75 / **MDS**	No Metal [%]		Mounted Flush in Metal [%]	
	ANT 0 ANT 18	**ANT 30**	**ANT 0 ANT 18** Metal-free 10 mm circumference; 10 mm in depth	**ANT 30** Metal-free 20 mm circumference; 20 mm in depth
MDS E623				
MDS without metal	100	---	100	---
MDS on metal	80	---	80	---
MDS flush mounted in metal	60	---	60	---
MDS E624				
MDS without metal	100	100	100	80
MDS on metal Distance 20 mm	100	90	100	75
MDS flush mounted in metal Distance 20 mm/ Circumference 20 mm	100	75	100	70

MDS and SIM 70/ SLG 75 with ANT 1 and SLA 71

Table 3-6 Reduction in field data due to metal (in %):
MDS and SIM 70/SLG 75 with ANT 1 and SLA 71

MDS \ SIM 70 SLG 75 SLA 71	ANT 1/SLA 71 without Metal [%]	ANT 1/SLA 71 on Metal Distance 20 mm [%]	ANT 1/SLA 71 Flush in Metal Distance of 20 mm Circumference 40 mm [%]	ANT 1/SLA 71 on Metal [%]
MDS E600				
MDS without metal	100	100	80	70
MDS on metal Distance 20 mm	80	70	60	50
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	60	50	40
MDS E611				
MDS without metal	100	100	80	70
MDS on metal Distance 20 mm	75	75	55	45
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	70	50	40
MDS E624				
MDS without metal	100	100	80	60
MDS on metal Distance 20 mm	100	100	80	60
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	80	60	60	40

MDS and SLG 75 with ANT 4

Table 3-7 Reduction in field data due to metal (in %): MDS and SLG 75 with ANT 4

SLG 75 / MDS	ANT 4 without Metal [%]	ANT 4 on Metal [%]	ANT 4 Flush in Metal Circumference 40 mm [%]
MDS E600			
MDS without metal	100	80	70
MDS on metal Distance 20 mm	80	70	60
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	60	50
MDS E611			
MDS without metal	100	80	70
MDS on metal Distance 20 mm	80	70	60
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	60	50
MDS E624			
MDS without metal	100	80	80
MDS on metal Distance 20 mm	80	70	70
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	60	40	40

MDS and SLG 75 with ANT 12

Table 3-8 Reduction in field data due to metal (in %): MDS and SLG 75 with ANT 12

SLG 75 / MDS	ANT 12 without Metal [%]	ANT 12 Flush in Metal Distance 10 mm Circumference 10 mm [%]	ANT 12 Flush Mounted in Metal [%]
MDS E623			
MDS without metal	100	85	85
MDS on metal Distance 20 mm	100	85	85
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	75	75	60

MDS and SLG 72/SIM 72

Table 3-9 Reduction in field data due to metal (in %): MDS and SLG 72/SIM 72

SLG/SIM 72 / MDS	Without Metal [%]	On Metal [%]	Flush in Metal Circumference 40 mm [%]
MDS E600			
MDS without metal	100	100	100
MDS on metal Distance 20 mm	80	70	70
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	60	60
MDS E611			
MDS without metal	100	100	80
MDS on metal Distance 20 mm	80	70	70
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	70	60	60
MDS E624			
MDS without metal	100	100	80
MDS on metal Distance 20 mm	100	80	80
MDS mounted flush in metal Distance 20 mm/ circumference 20 mm	60	40	40

Below are figures using the ANT 1 with MDS E611 as an example to illustrate how metal affects the transmission window.

The percentages apply to field data reduction in relation to a metal-free environment (i.e. 100%).

MDS in metal-free environment

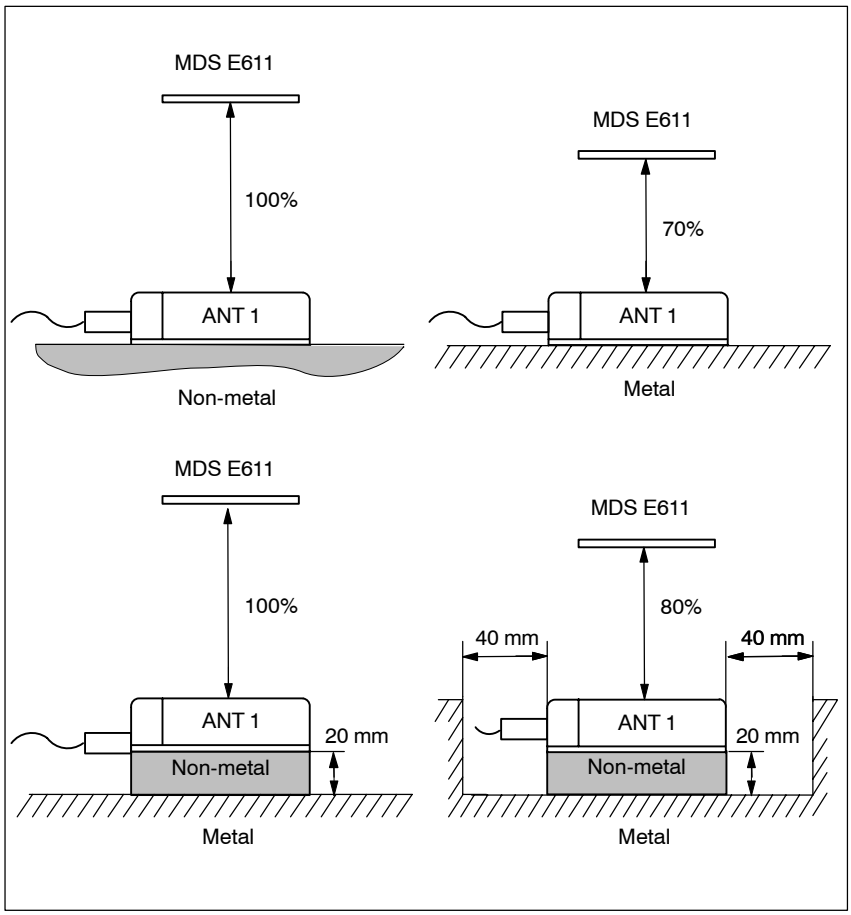


Figure 3-30 MDS in metal-free environment (example: MDS E 611)

MDS in metallic environment

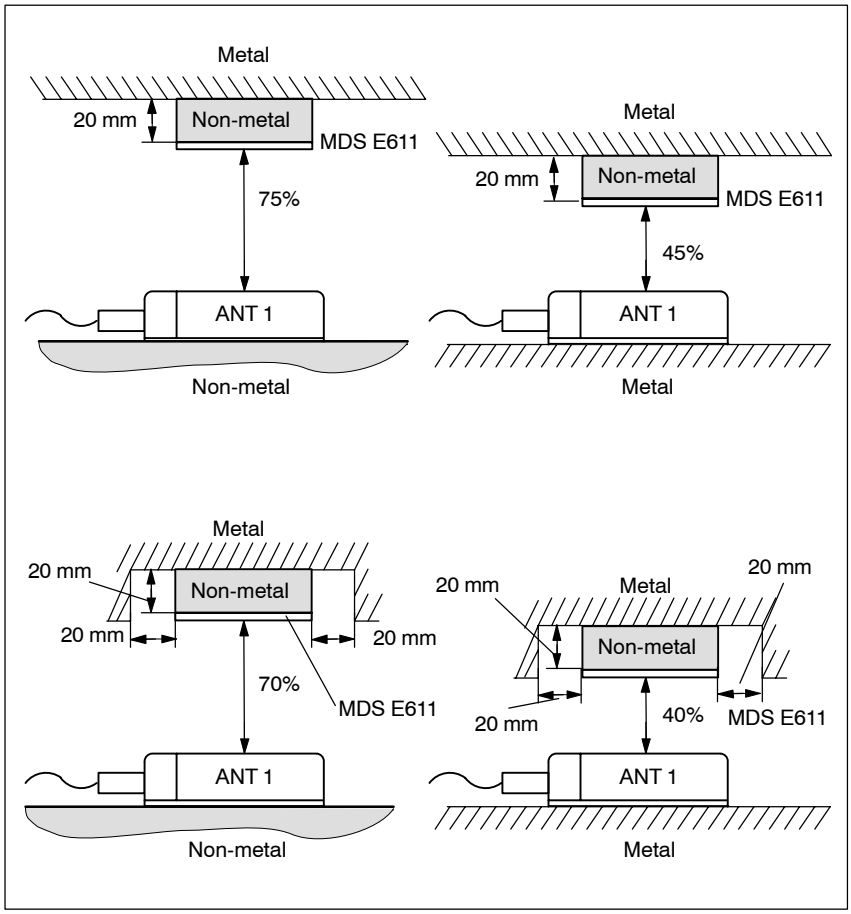


Figure 3-31 The MDS in a metallic environment (example: MDS E611)

3.4.3 Reduction of Metallic Effects

Interfering metal supports

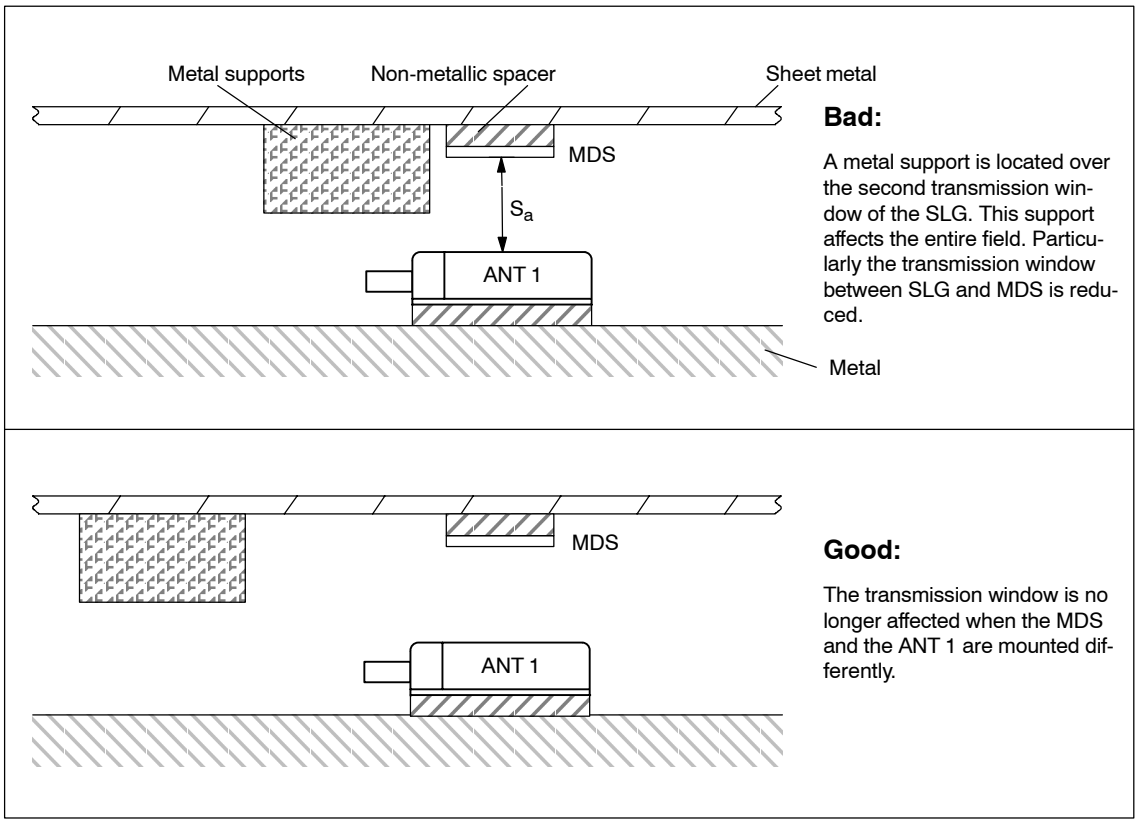


Figure 3-32 Interfering metal supports

Flush mounting

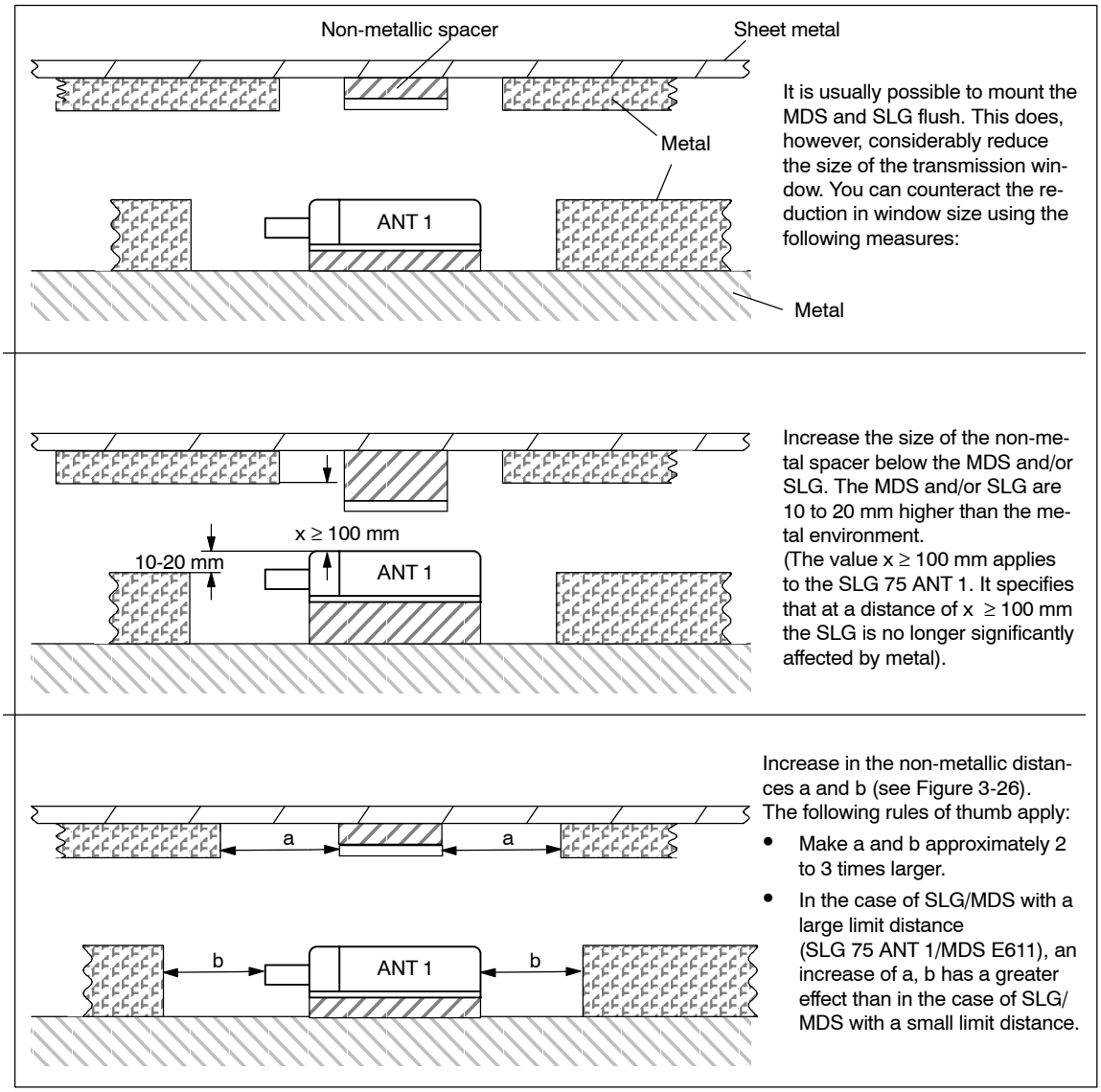


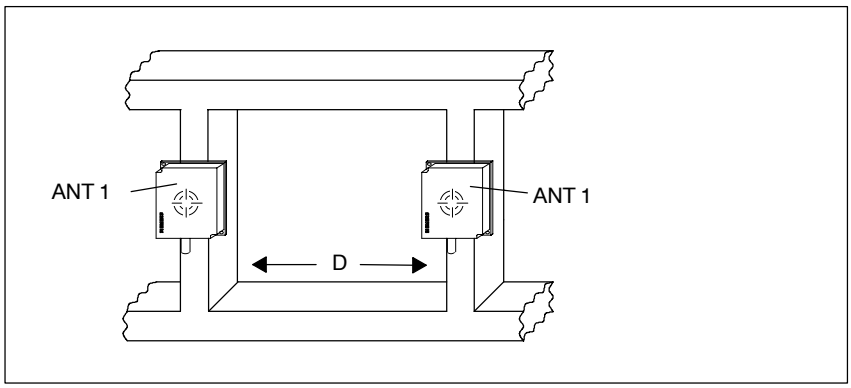
Figure 3-33 Flush mounting

Installation of several SLG/SLA on metal frames or supports

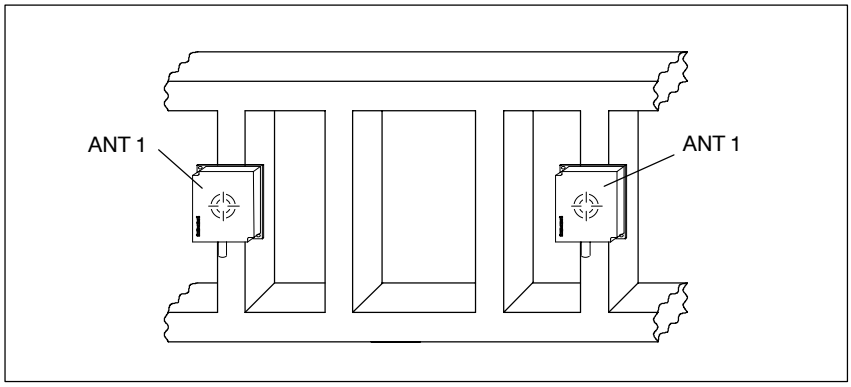
Each SLG/SLA mounted on metal connects part of the field to the metal support. When minimum distance D is maintaining and metal-free areas a and b are adhered to, there are usually no effects. However, when the location of an iron frame is particularly poor, there may be some effects. This will lengthen data transmission times or cause sporadic error messages on the interface.

Necessary actions

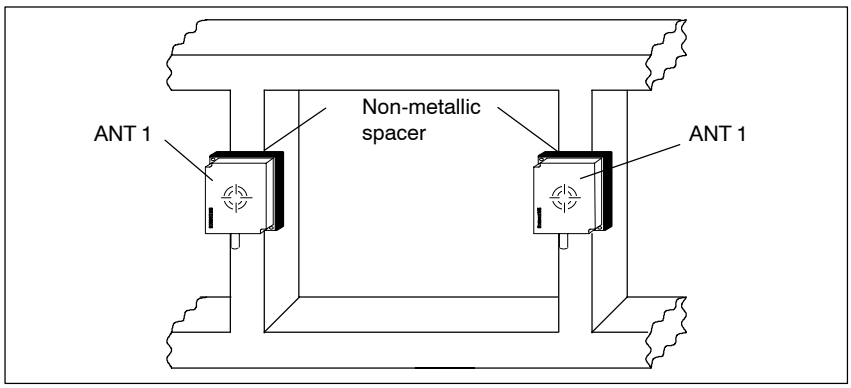
a) Lengthen distance D between the two ANT 1s



b) Install one or more iron struts to short circuit the parasitic fields



c) Install a non-metallic spacer of 20 to 40 mm in thickness between the ANT 1 and the iron frame. This significantly reduces parasitic coupling of the field on the support.



3.4.4 Chemical Resistance of the Mobile Data Memories

MDS E600

The MDS E600 is resistant to the substances listed in the following table.

Table 3-10 Chemical resistance of the MDS E600

Substance	Concentration
Salt water	5%
Sugar water	10%
Acetic acid, hydrous solution	5%
Sodium carbonate, hydrous solution	5%
Ethyl alcohol, hydrous solution	60%
Ethylene glycol	50%
Fuel, B	In accordance with ISO 1817
Human perspiration	

(Reference: ISO 10373 / ISO 7810)

MDS E611/ E623/E624

Table 3-11 Chemical resistance of data memories made of fiber glass reinforced epoxy resin (MDS E611/E623/E624)

	Concentration	20 °C	40 °C	60 °C
Allyl chloride		■		
Formic acid	50%	■		
	100%	●		
Ammonia, gaseous		■		
Ammonia, liquid, anhydrous		□		
Ammonium hydroxide	10%	■		
Ethanol			■	■
Ethyl acrylate		■		
Ethylene glycol				■
Gasoline, free of aromatic compounds		■		
Gasoline, unstripped		■		
Bezoates (Na, Ca and similar)			■	
Bezoic acid		■		
Benzine		■		
Benzene-sulfonic acid		■		
Benzyl chloride		□		
Borax				■
Boric acid		■		
Bromine, liquid		□		
Bromine, gaseous, dry		□		
Bromide (K, Na and similar)				■
Bromoform	100%	■		
Bromide water		□		
Butadiene (1.3–)		■		
Butane, gaseous		■		
Butanol		□		
Butyric acid	100%	●		
Carbonates (ammonium, Na and similar.)				■
Chlorine, liquid		□		
Chlorine, gaseous, dry	100%	□		
Chlorobenzene		■		
Chloride (ammonia, Na and similar)				■
Chloroform		□		
Chlorophyll		■		
Chlorosulfonic acid	100%	□		
Chlorine water (saturated solution)		●		
Chromates (K, Na and similar)	Up to 50%		■	
Chromic acid	Up to 30%	□		
Chromic sulfuric acid		□		
”Lemon acid”		■		
Cyanamide		■		
Cyanides (K, Na and similar)				■
Dextrine (hydrous solution)				■
Diethyl ether		■		
Diethylene glycol				■
Dimethyl ether		■		
Dioxan		□		
Developer			■	
Acetic acid	100%	●		
Fixing bath			■	
Fluorides (ammonium, K, Na and similar.)			■	
Hydrofluoric acid	Up to 40%	■		
Formaldehyde	50%	■		
Formamide	100%	■		

Table 3-11 Chemical resistance of data memories made of fiber glass reinforced epoxy resin (MDS E611/E623/E624)

	Concentration	20 °C	40 °C	60 °C
Gluconic acid		■		
Glycerol				■
Glycocoll				■
Urine		■		
Uric acid		■		
Hydroxides (ammonium)	10%	■		
Hydroxides (Na and K)	40%	■		
Hydroxides (alkaline earth metal)				■
Hypochlorites (K, Na and similar)				■
Iodides (K, Na and similar)				■
Silicic acid				■
Cresylol	Up to 90%	□		
Methanol	100%		■	
Methylene chloride		□		
Lactic acid	100%	●		
Mineral oils			■	
Nitrates (ammonium, K and similar)				■
Nitroglycerin		□		
Oxalic acid		■		
Phenol	1%	■		
Phosphates (ammonium, Na and similar)				■
Phosphoric acid	50%			■
	85%	■		
Propyl alcohol		■		
Nitric acid	25%	□		
Hydrochloric acid	10%	□		
Brine				□
Sulfur dioxide	100%	●		
Carbon bisulfide, 100%		□		
Sulfuric acid	40%	□		
Sulfurous acid		●		
Soap solution				■
Sulfates (ammonium, Na and similar)				■
Sulfites (ammonium, Na and similar)				□
Tar, free of aromatic compounds				■
Turpentine		■		
Trichlorethlylene		□		
Hydrogen peroxide	30%	■		
Tartaric acid		■		

Explanation of the symbols

■ Resistant
● Somewhat resistant
□ Not resistant

3.5 EMC Guidelines

3.5.1 Foreword

The EMC guidelines contain the following information.

- Why are the EMC guidelines necessary?
- What interference affects the controller from the outside?
- How can interference be prevented?
- How can interference be corrected?
- Which standards apply to the EMC guidelines?
- Examples of an interference-suppressed system setup

The description is directed to “qualified personnel.”

- Configuration engineers and planners who plan system configuration with the MOBY modules and who must adhere to the required guidelines.
- Skilled personnel and service engineers who install the connecting cables based on this description or who can correct deficiencies in this area when a malfunction occurs.

Warning

Non-adherence to especially highlighted notes can cause dangerous states in the system or destroy either single components or the entire system.

3.5.2 General

The continuously growing use of electrical and electronic devices brings with it the following characteristics.

- Greater concentration of components
- Increasing capacity of power electronics
- Rising switching speeds
- Lower current consumption of the components

The higher the degree of automation, the greater the danger that devices will interfere with one another.

Electromagnetic compatibility (i.e. EMC) is the ability of a piece of electrical or electronic equipment to function correctly in an electromagnetic environment without interfering with or adversely affecting its surroundings within certain limits.

EMC can be divided into three areas.

- Immunity to internal interference:
  Resistance to internal (i.e. own) electrical interference
- Immunity to external interference:
  Resistance to external electromagnetic interference
- Interference emission level:
  Noise radiation and the effect on the electrical environment

All three areas are included in the test of an electrical device.

The MOBY modules are tested for adherence to the limit values contained in the CE and BAPT guidelines. Since MOBY modules are only one of many components in a total system and the combination of various components may also create sources of interference, certain guidelines must be adhered to when setting up a system.

EMC measures usually consist of an entire package of measures all of which must be taken in order to obtain an interference-immune system.

Note

- The system provider is responsible for adherence to the EMC guidelines, while the user is responsible for the interference suppression of the complete system.
- All measures taken while the system is being set up will eliminate the need for expensive modifications and removal of interference sources later.
- Country-specific provisions and regulations must be complied with. This information is not covered in the documentation.

3.5.3 Spreading of Interference

Three components are required so that interference can affect a system.

- Source of interference
- Coupling path
- Potentially susceptible equipment

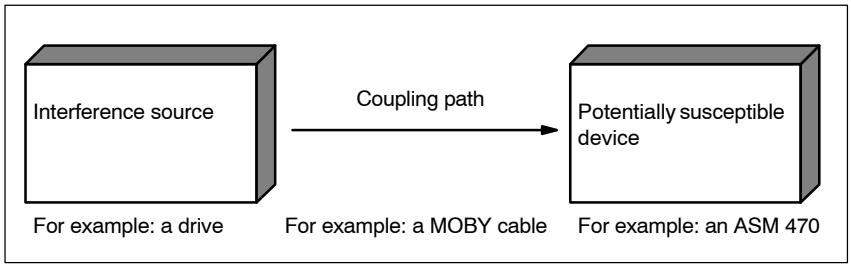


Figure 3-34 Spreading of Interference

If one of these components is missing (e.g., the coupling path between the source of the interference and the potentially susceptible device), the susceptible device will not be affected even when strong interference is being emitted.

The EMC measures affect all three components to prevent any malfunctions caused by interference. When a system is set up, the provider must take all possible measure to prevent the creation of sources of interference.

- Only equipment which meets limit value class A of VDE 0871 may be used in a system.
- All interference caused by devices must be suppressed. This includes all coils and windings.
- The layout of the cabinet must be such that reciprocal interference of the individual components is avoided or kept as low as possible.
- Measures must be taken to eliminate interference from external sources.

The next few chapters provide information and tips on how to set up a system.

Sources of interference

It is necessary to be familiar with the most frequent sources of interference in order to achieve a high degree of electromagnetic compatibility (i.e. a very low degree of interference in the environment) in a system. These sources of interference must be eliminated by taking appropriate measures.

Table 3-12 Sources of interference: origins and effects

Source of interference	Interference origin	Effect on potentially susceptible equipment
Contactor, electronic valves	Contacts	Power network malfunctions
	Coils	Magnetic field
Electric motor	Collector	Electrical field
	Winding	Magnetic field
Electric welding device	Contacts	Electrical field
	Transformer	Magnetic field, power network malfunction, equalizing currents
Power pack, switched-mode	Circuit	Electrical and magnetic field, power network malfunction
High-frequency devices	Circuit	Electromagnetic field
Sender (e.g., industrial radios)	Antenna	Electromagnetic field
Difference in grounding or reference potential	Voltage difference	Equalizing currents
Operator	Static charging	Electrical discharging currents, electrical field
High-voltage current cable	Current flow	Electrical and magnetic field, power network malfunction
High-voltage cable	Voltage difference	Electrical field

Coupling paths

A coupling path is required before interference generated by the source can take effect. There are four kinds of interference coupling.

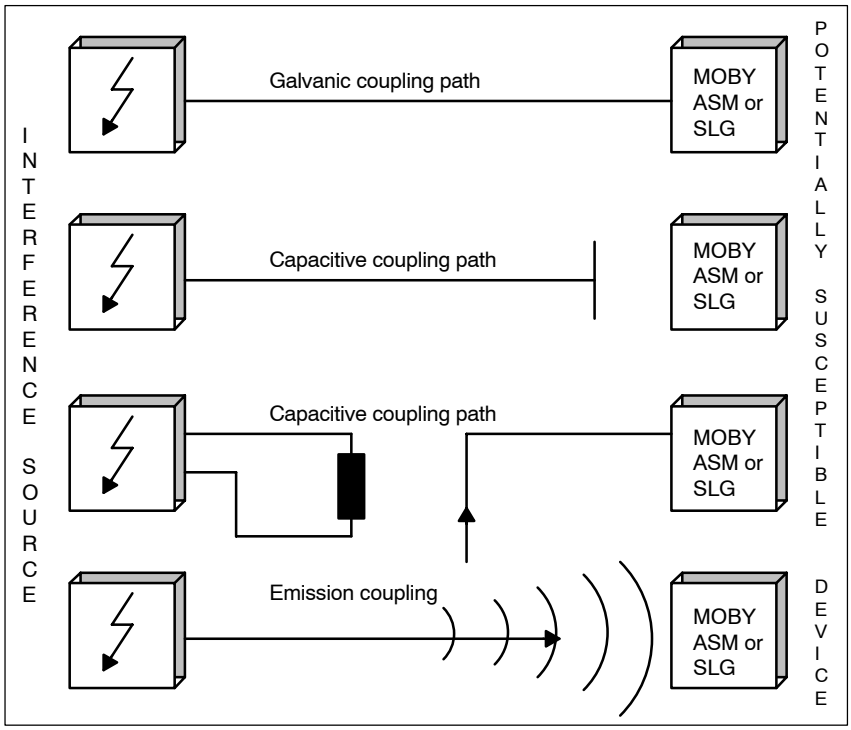


Figure 3-35 The four kinds of interference coupling

When MOBY modules are used, various components of the total system can act as coupling paths.

Table 3-13 Causes of coupling paths

Coupling path	Cause
Cables and lines	Incorrect or unfavorable installation
	Missing or incorrectly connected shields
	Cables spaced unfavorably
Switching cabinet or SIMATIC housing	Missing or incorrectly wired equalizing line
	Missing or incorrect grounding
	Cables spaced unfavorably
	Modules not installed securely
	Poor cabinet layout

3.5.4 Cabinet Layout

User influence on the configuration of an interference-immune system includes the cabinet layout, cable installation, grounding connections and correct shielding of lines.

Note

For notes on correct cabinet layout in accordance with EMC guidelines, see the layout guidelines of the SIMATIC controller.

Shielding via housing

Metal housings for potentially susceptible equipment can be used to keep out magnetic and electrical fields and electromagnetic waves. The better the induced interference current can flow, the greater the spontaneous weakening of the field of interference. All sheet metal on the housings or sheet metal in the cabinet must be well connected together (i.e. with a high degree of conductivity).

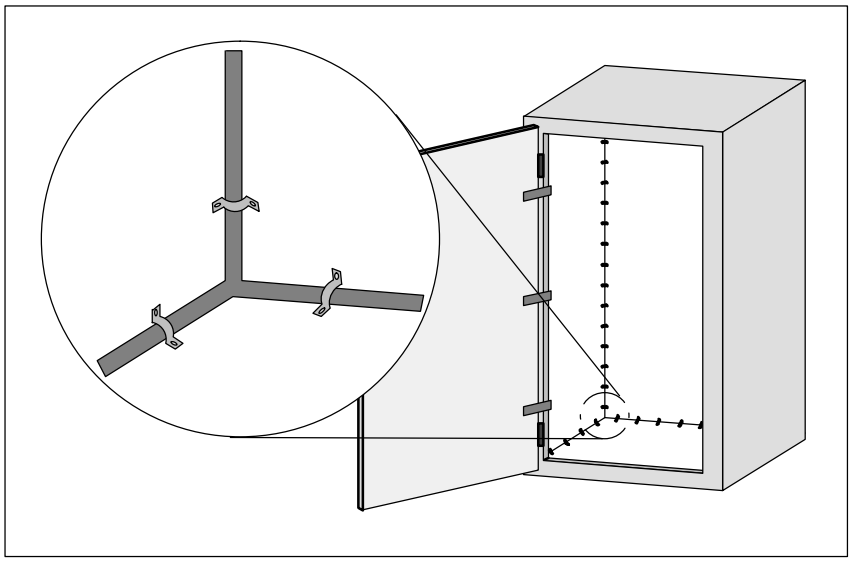


Figure 3-36 Shielding via housing

When the sheet metal parts of switching cabinets are insulated against each other, a high-frequency conductive connection with the ribbon cables and high-frequency terminals or HF conductive paste can be created. The greater the connection surface, the better the high-frequency conductive capacity. This cannot be achieved by connection with simple wires.

Avoiding interference via optimal layout

Good interference diversion is achieved by installing SIMATIC controllers on conductive mounting plates (unpainted). When setting up the switching cabinet, interference can be easily avoided by adhering to guidelines. Power components (e.g., transformers, drives and load power supplies) should be installed separately (i.e. separated by space) from the controller components (e.g., relay controllers and SIMATIC S5).

The following basic principles apply.

1. The effect of interference decreases the greater the distance between interference source and potentially susceptible equipment.
2. Interference is further reduced by installing shielding plates.
3. Load lines and high-voltage current cables must be installed separately from the signal lines at a distance of at least 10 cm.

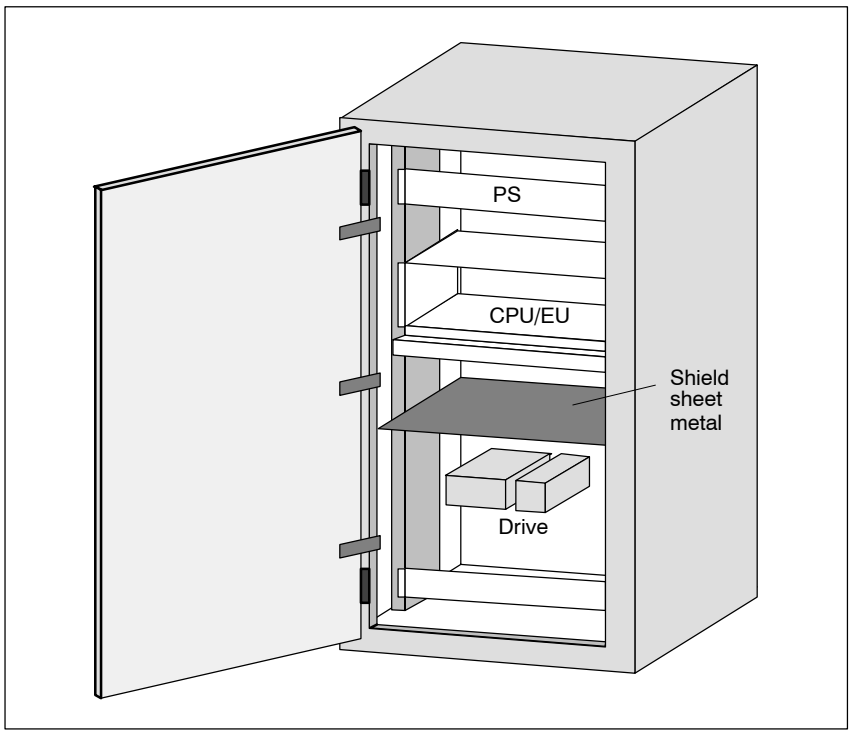


Figure 3-37 Avoidance of interference via optimal layout

Filtering the supply voltage

External interference from the power network can be avoided by installing power network filters. In addition to correct dimensioning, proper installation is very important. It is imperative that the power network filter be installed directly at the entrance to the cabinet. Interference currents are filtered out early at the entrance and not conducted through the cabinet.

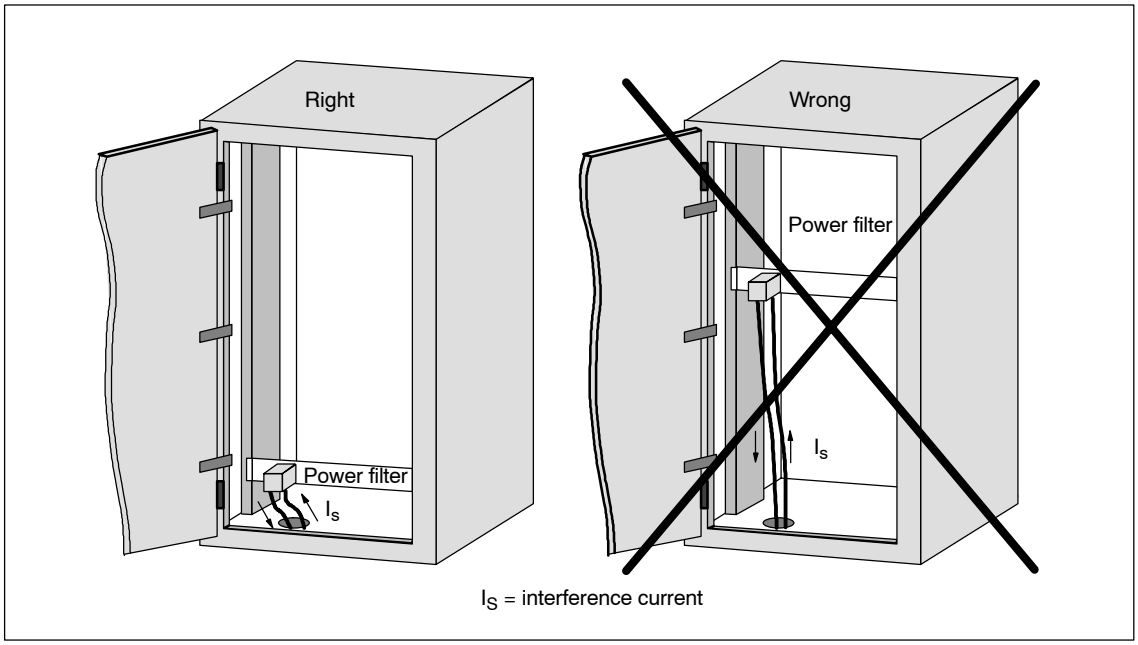


Figure 3-38 Filtering the supply voltage

3.5.5 Avoiding Interference Sources

Sources of interference in a system must be avoided so that a higher degree of interference immunity can be achieved. All circuited inductivities are a frequent cause of interference in a system.

Interference suppression of inductivities

Since relays, contactors and so on generate interference voltages, this interference must be suppressed with one of the following circuits.

When the coil is switched, up to 800 V can be created on 24 V coils even with small relays. Several kV can be created on 220 V coils. By using freewheeling diodes or RC circuitry, the interference voltage is prevented and, with it, the inductive interference in the lines parallel to the coil lines.

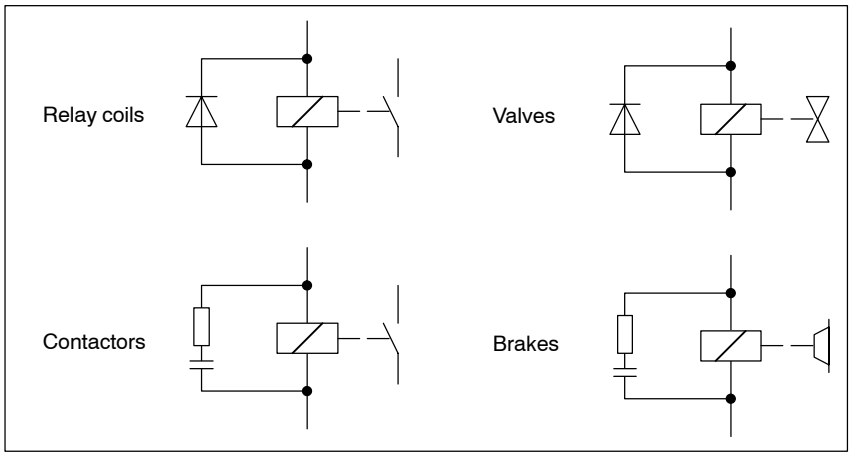


Figure 3-39 Inductive interference

Note

All coils in the cabinet must be interference-suppressed. Valves and motor brakes are frequently forgotten. Fluorescent lamps in the switching cabinet must be subjected to a special test.

3.5.6 Equipotential Bonding

Differing system part layouts and differing voltage levels can cause differences in potential between the parts of a system. When the system parts are connected via signal lines, equalizing currents flow through these signal lines. These equalizing currents can distort the signals.

This makes correct equipotential bonding imperative.

- The cross-section of the equipotential bonding line must be large enough (i.e. at least 10 mm^2).
- The space between signal cable and related equipotential bonding line must be kept as small as possible (i.e. antenna effect).
- A fine-wire line must be used (i.e. better conduction of high frequencies).
- When connecting equipotential bonding lines to the central equipotential bonding rail, power components and non-power components must be combined.

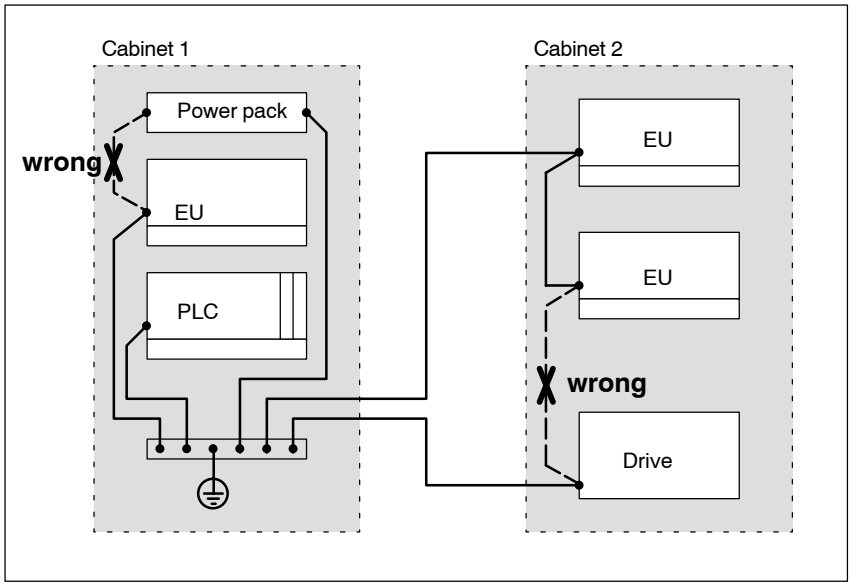


Figure 3-40 Equipotential bonding

The better the equipotential bonding in a system, the smaller the chance of interference caused by fluctuations in potential.

Equipotential bonding should not be confused with the protective grounding of a system. Protective grounding prevents the creation of excessive touch voltages when devices malfunction.

3.5.7 Ground Fault Monitoring with MOBY

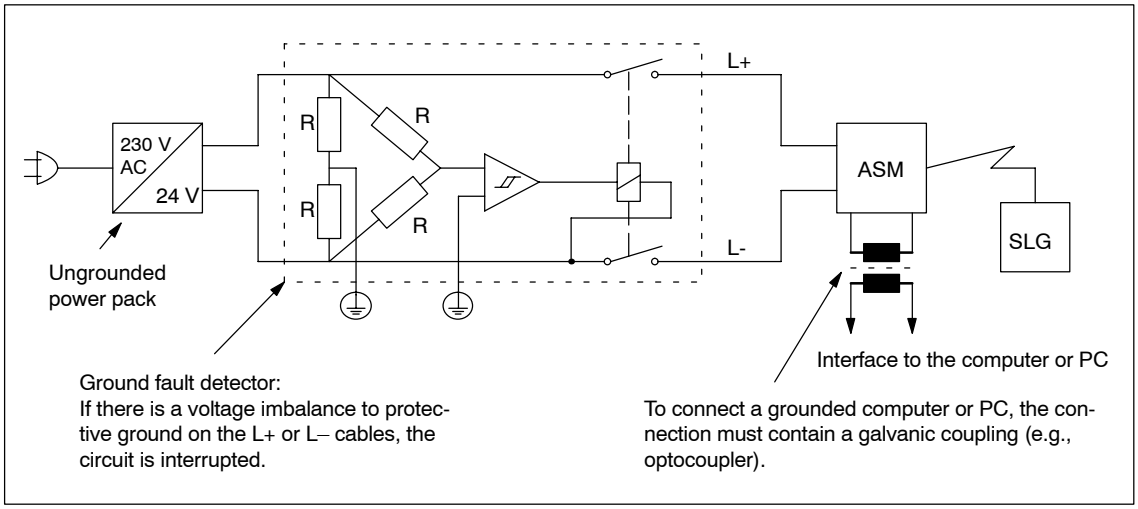


Figure 3-41 Circuit diagram of the principle of ground fault monitoring

SIMATIC with ASM 400

The SIMATIC is a grounded system. In the power pack of the SIMATIC, 0 V (i.e. signal ground) is connected to the housing. On the ASM 400, the 0 V signal of the external 24 V power pack is connected with 0 V of the SIMATIC. The connection between the ASM 400 (SIMATIC) and the SLG is equipotentially bonded (i.e. RS 422 interface without galvanic isolation). **A configuration with ground fault monitoring is not possible.** Proceed as described in the SIMATIC manual if ground fault monitoring is necessary.

SIMATIC AG 100U with ASM 410

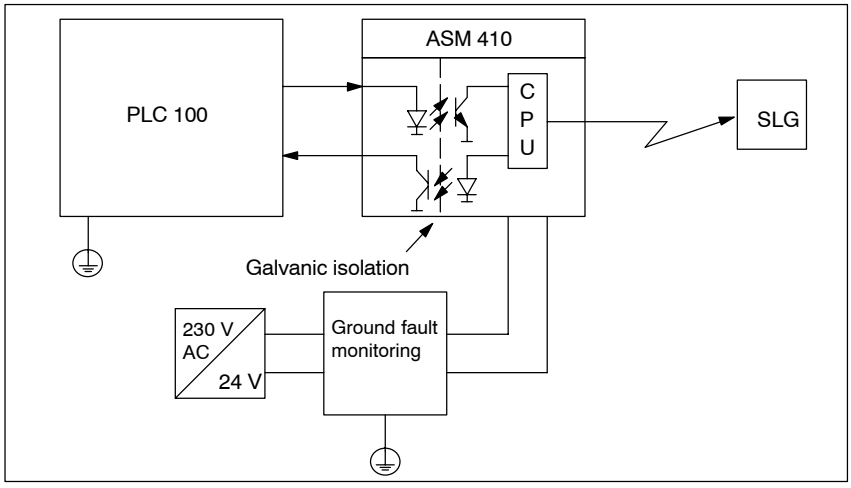


Figure 3-42 SIMATIC AG 100U with ASM 410

The ASM 410 is equipped with galvanic isolation to the SIMATIC CPU on the module. A configuration with ground fault monitoring is possible without any problems.

3.5.8 Shielding the Cables

To suppress interference in the signal cables, these cables must be shielded.

The best shielding effect is achieved by installation in steel piping. However, this is only necessary when the signal lines must pass through an interference-prone environment. In most cases, the use of braided shields is sufficient. In either situation, correct connection is decisive for the shielding action.

Note

A shield which is not connected at all or is connected incorrectly has no shielding effect.

The following basic principles apply.

- For analog signal lines, the shield connection must be one-sided and on the receiver side.
- For digital signal lines, the shield connection must be two-sided on the housing.
- Since interference signals are frequently in the HF range (i.e. > 10 kHz), connection of the HF-capacity shield must be provided over a large surface.

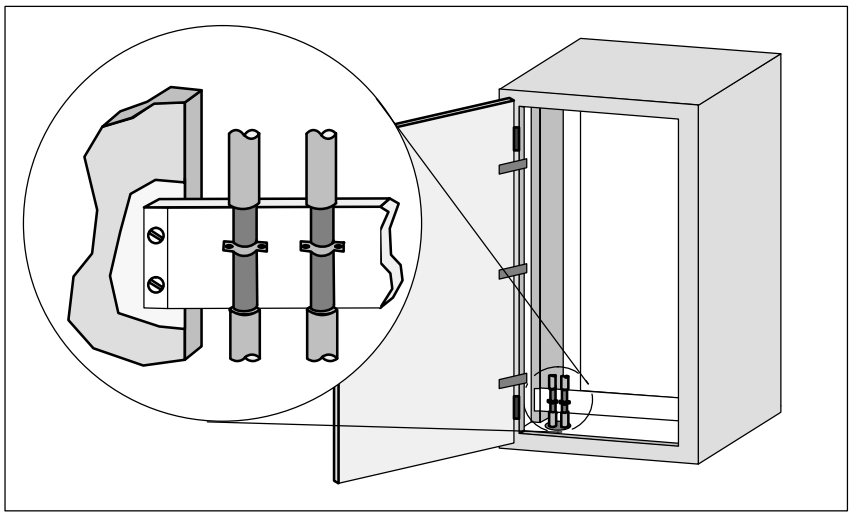


Figure 3-43 Shielding of the cables

The shield rail must be connected to the housing of the switching cabinet over a large surface (i.e. good conductivity) and must be located as close to the cable lead-in as possible. The cables must be bared and clamped (high-frequency clamp) to the shield rail or be bound with cable binders. The location must have good conductivity.

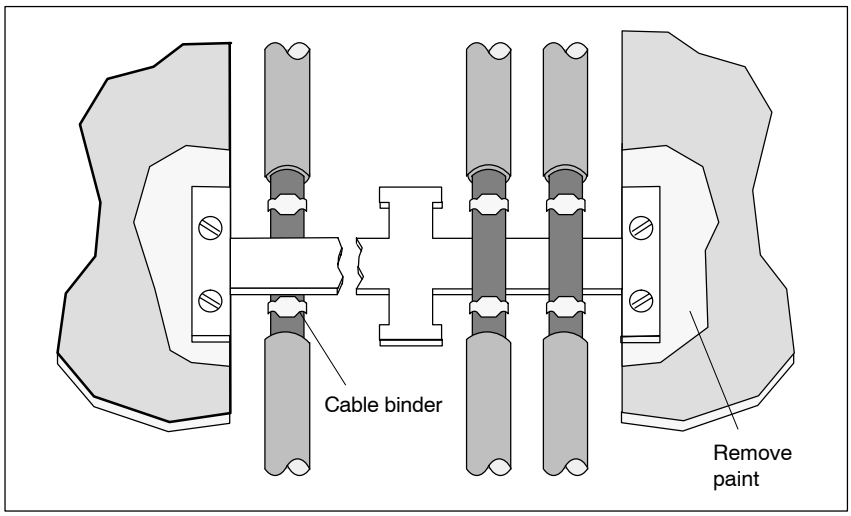


Figure 3-44 Connection of the shield rail

The shield bus must be connected with the protective ground (PE) bar.

When shielded cables must be interrupted, the shield must also be applied to the connector housing. Only suitable connectors may be used.

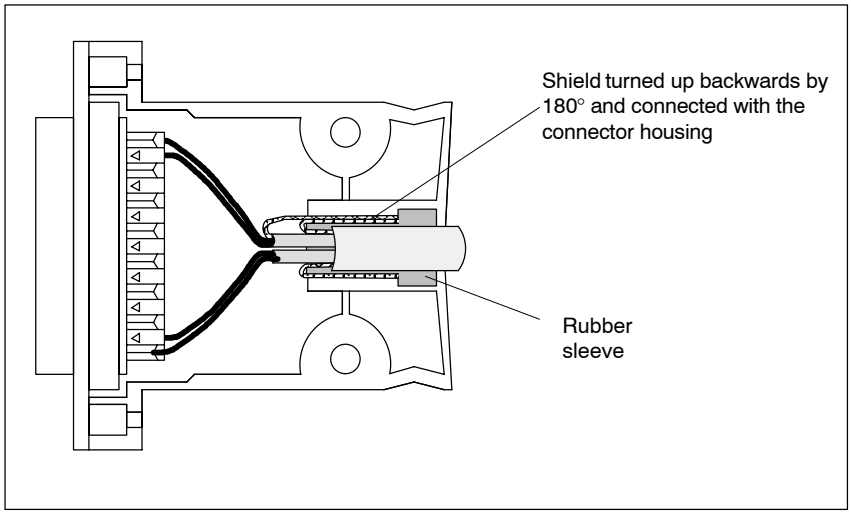


Figure 3-45 Interruption of shielded cables

When adapter plugs which do not have suitable shield termination are used, the shield must be continued through cable clamps to the point of interruption. This ensures a large-surface, HF conductive connection.

3.5.9 Basic Rules on EMC

Electromagnetic compatibility (i.e. EMC) can often be ensured by following a few elementary rules. Rules which apply to the layout of the cabinet are listed below.

Shielding via housing

- Protect the programmable controller from external interference by installing it in a cabinet or housing. The cabinet or the housing must be included in the grounding connection.
- Shield electromagnetic fields of inductivity from the programmable controller with separator plates.
- Use metallic plug housings for shielded data transmission lines.

Large-surface grounding connection

- Connect all inactive metal parts with low HF resistance over a large surface.
- Provide a large-surface connection between the inactive metal parts and the central grounding point.
- Remember to connect the shield bus to ground. This means that there must be a large-area connection of the shield bus to ground.
- Aluminum parts should not be used for grounding connections.

Planning the cabling

- Organize the cables into groups, and install these groups separately.
- Always install high-voltage current lines and signal lines in separate ducts or bundles.
- Introduce all cabling into the cabinet from only one side and, if possible, at one level.
- Install the signal lines as close to the grounding surfaces as possible.
- Twist the feeder and return conductors of individually installed conductors.

Shielding the lines

- Shield the data transmission lines, and apply the shield on both sides.
- Shield the analog lines, and apply the shield on one side (e.g., on the drive).
- Always apply the line shields at the cabinet entrance to the shield bus over a large surface, and secure these with clamps.
- Continue the applied shield without interruption to the module.
- Use braided shields and not foil shields.

Power supply and signal filter

- Only use power supply filters with metal housings.
- Connect the filter housing (i.e. connection must be low HF resistant and over a large surface) to cabinet ground.
- Never secure the filter housing to painted surfaces.
- Secure the filter at the cabinet entrance or in the direction of the interference source.

3.6 Concept of MOBY Shielding

With MOBY the data are transferred between ASM and SLG over an RS 422 interface at a speed of 19200 baud. The distance between ASM and SLG may be up to 1000 m. MOBY cable installation should be treated the same as that of a data processing system. Special attention should be paid to shielding of all data cables. The following figure shows the primary points required for a secure layout.

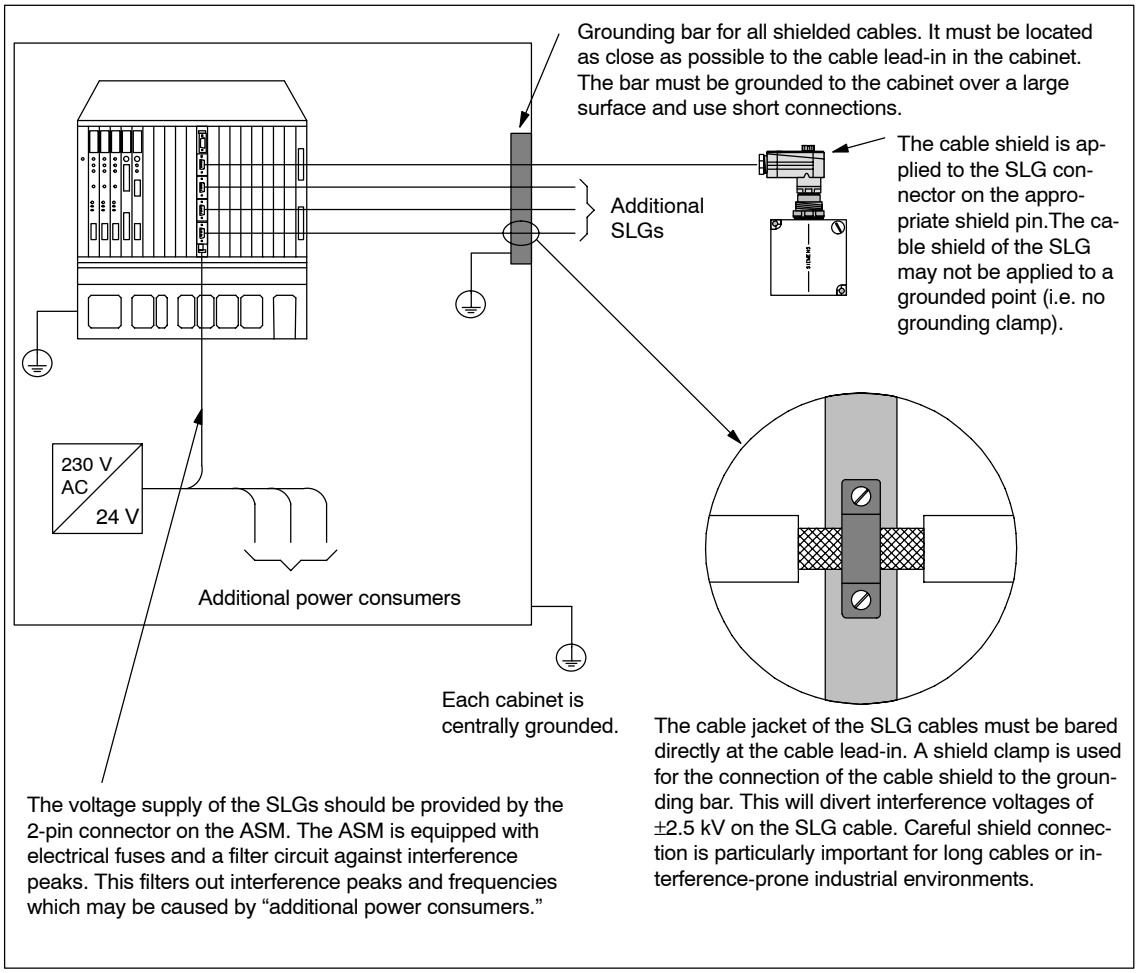


Figure 3-46 Simple layout with ASM 400

Layout of an S7-300 with MOBY

When the SLG is connected to the ASM 470/475, the cable must be laid via a shield terminal. Shield connection terminals and holders are standard components of the S7-300 product family.

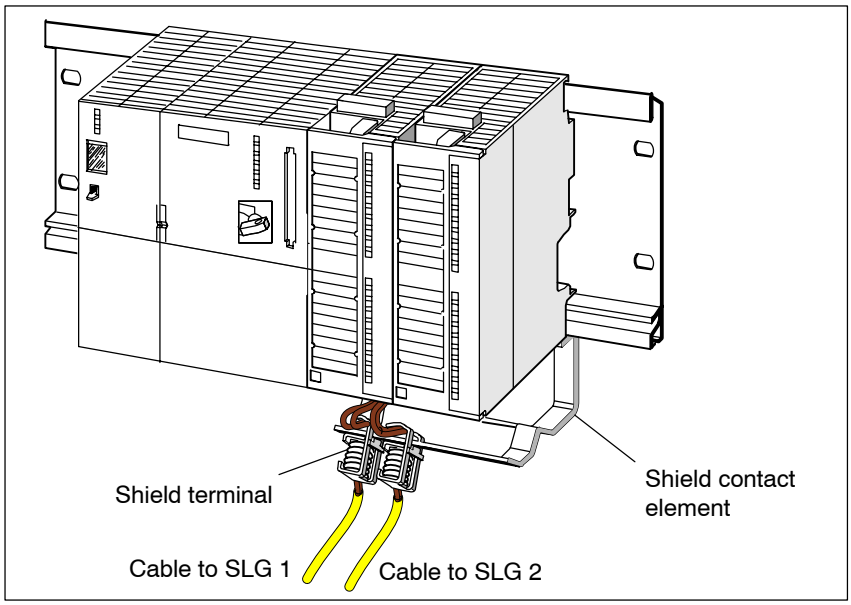


Figure 3-47 Layout of the ASM 470/475 with shield contact element

Cabling for ASM 470

To ensure EMC, an S7-300 shield contact element must be used for the SLG cable (see Figure 3-47). The shield of the SLG cable must be bared as shown in Figure 3-48.

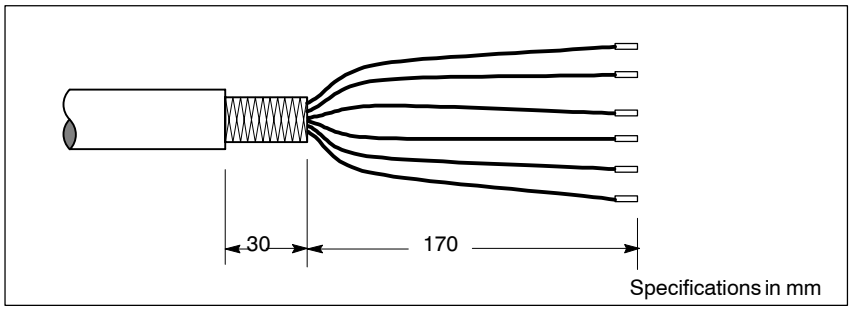


Figure 3-48 Baring of the cable shield

Voltage supply of the SLG with power pack

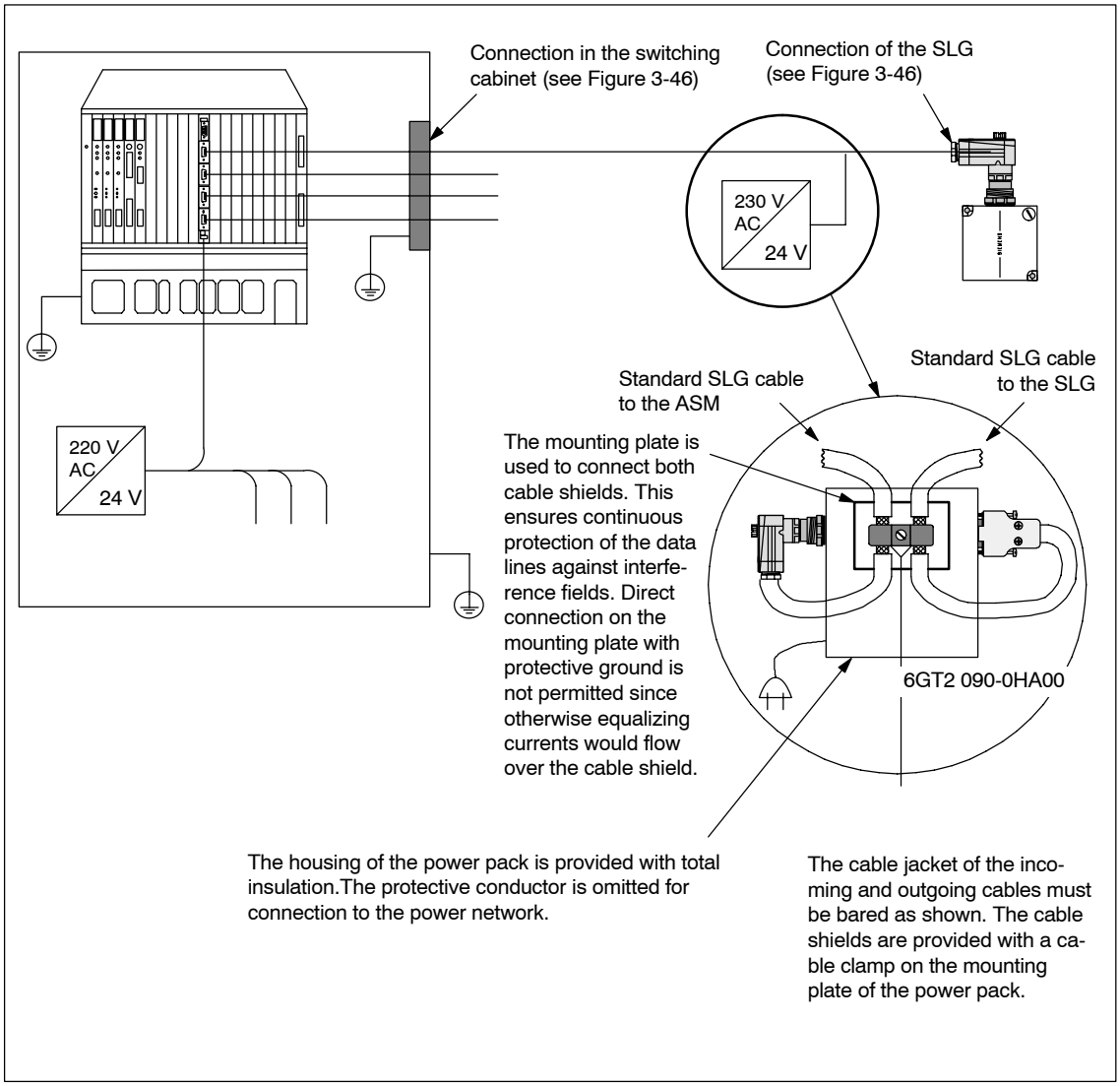


Figure 3-49 Voltage supply with power pack

Connection of other modules (e.g., ASM 410)

To divert interference which may occur on the connecting cable to the SLG, proceed as described for the ASM 400.

3.7 Cable and Connector Assignments

The cable jacket of standard SLG connecting cables used with MOBY is made of polyurethane (i.e. PUR in accordance with VDE 0250). This ensures very good cable resistance to oils, acids, caustic solutions, hydraulic fluids and high resistance to UV.

3.7.1 Cable Configuration

The cable between ASM and SLG requires six cores + shield. Four of these cores are assigned to the serial data interface. The power supply of the SLG requires two cores. The data can be transferred over distances of up to 1,000 m, almost without regard to the diameter of the wire.

The power consumption of the SLG causes the voltage on the connecting cable to drop. The permissible cable length is usually shorter than 1000 m. The length depends on the current consumption of SLG and the ohmic resistance of the connecting cable. The following table gives you an overview of the permitted cable lengths (for standard connecting cables see Table 3-22):

Table 3-14 Cable configuration

Conductor cross-section in mm^2	Conductor diameter in mm	Resistance Ω/km[1]	SLG 72 SLG 75 ANT 1/ANT 12/ ANT 18/ANT 30 max. cable length in m (I=180 mA)	
			U_V=24 V	U_V=30 V
0.07[2]	0.3[2]	550	40	100
0.2	0.5	185	120	300
0.5	0.8	70	310	790
0.8[2]	1.0[2]	50	440	1000
1.5[2]	1.4[2]	24	920	1000

1 The resistance values are average values. They refer to the forward and return conductors. A single wire has half the resistance.

2 Use of these conductor cross-sections requires crimp contacts (not included) in the SLG connector.

Field with gray background:
Recommended by Siemens: Standard cable, LiYC11Y, 6 x 0.25, shielded. The cable is available from Siemens under the order number 6GT2 090-0A...

Grounding of the cable

We recommend always applying the shield of the SLG cable to a grounding bar over a large surface.

Drum cable

The SLG/SIM can also be connected by means of a drum cable.
Recommended cable type: HPM Paartronic 3340-C-PUR 3 x 2 x 0.25

The cable can be customized according to your requirements.

Supplementary power pack for SLG

When an additional power pack is installed in the vicinity of the SLG, the max. 1000 m cable between the ASM and SLG can always be used.

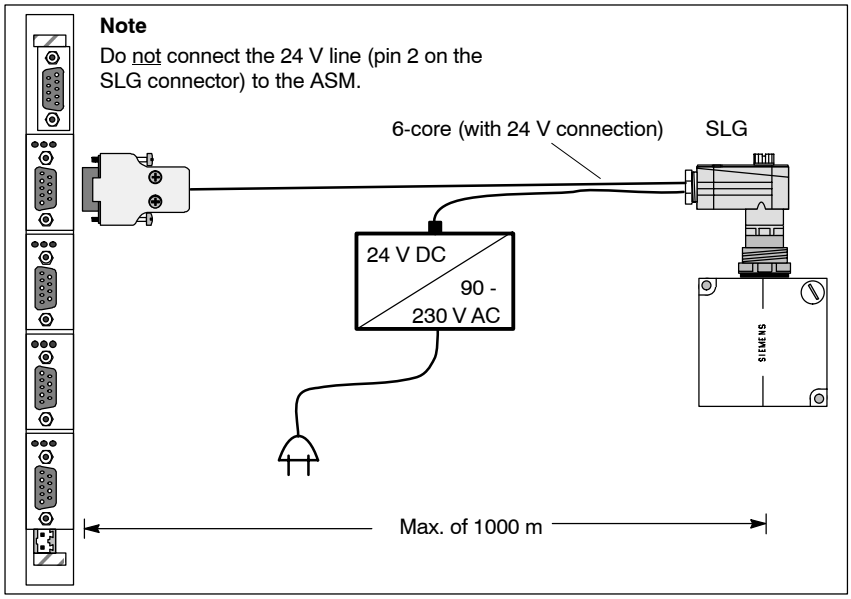


Figure 3-50 SLG with extra power pack

The power pack shown in the drawing can be ordered from Siemens under the number 6GT2 494-0AA00 (see Section 7.2)

Note

With some restrictions, the power pack can be used as the main power pack for the ASM 400, ASM 724, or ASM 754. See Figure 3-51.

The maximum current of the power pack (2.2 A) may not be exceeded.

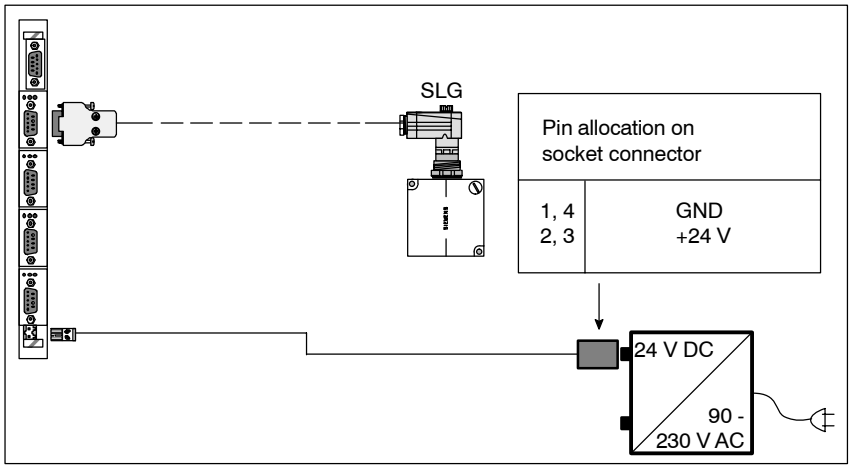


Figure 3-51 MOBY wide-range power pack on the ASM 400

3.7.2 Connector Assignment

SLG 72, SLG 75

Connector on the SLG

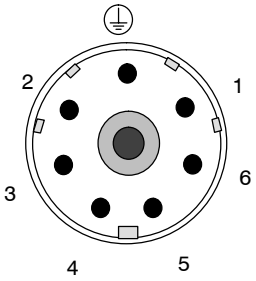
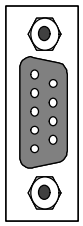


Table 3-15 Connector assignment of the SLG connector[1]

Pin	Designation
1	- Receiving
2	+ 24 V
3	Ground (0 V)
4	+ Sending
5	- Sending
6	+ Receiving
⏚	Cable shield

1 This connector can be used for: SLG 72, SLG 75 ANT 1/ANT 12/ANT 18/ANT 30

Connector on the ASM



9-pin subminiature D connector with screw-type attachment

Table 3-16 Connector assignment of the 9-pin subminiature D connector[1]

Pin	Designation
1	Not used
2	+ Sending
3	+ Receiving
4	Not used
5	- Receiving
6	- Sending
7	Ground (0 V)
8	+ 24 V (see caution note)
9	Not used
Housing	Cable shield

1 This connector assignment applies to ASM 400/424/454 => SLG; ES 030 => SLG

Note

When making your own cables, remember that the “sending” signal of the SLG must be connected to the “receiving” signal of the ASM, or vice versa.

Caution

When using the supplementary power pack in the vicinity of the SLG, do not wire this pin to the ASM. See Table 3-16.

SLA 71

Connector on the SLA

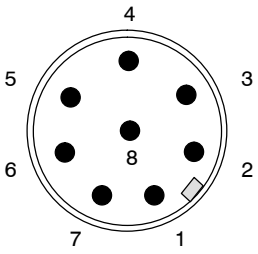


Table 3-17 Connector assignment of SLA connector[1]

Pin	Designation
1	+12 Volt
2	+ Sending
3	+ Receiving
4	Not used
5	- Receiving
6	- Sending
7	Not used
8	Ground (0 V)

1 This connector applies to: SLA 71

9-pin subminiature D connector with screw-type attachment

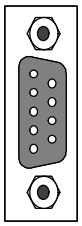
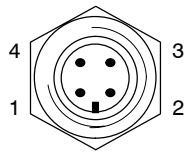


Table 3-18 Connector assignment of the 9-pin subminiature D connector[1]

Pin	Designation
1	+12 Volt
2	+ Sending
3	+ Receiving
4	Not used
5	- Receiving
6	- Sending
7	Ground (0 V)
8	Not used
9	Not used

1 This connector assignment applies to ASM 724, ASM 754 <=> SLA 71.

Power supply connector on the ASM 424/454/724/754



View of the top

Table 3-19 Connector assignment for 4-pin power supply connector (pin on the side of the housing)

Pin	Designation
1	Ground (0 V)
2	+ 24 V
3	+ 24 V
4	Ground (0 V)

Ordering data

Table 3-20 Ordering data for the power supply connector

Connector for power supply (socket) for ASM 424/454/724/754	6GT2 390-1AB00

Installing the SLG connector

If the SLG connector has to be turned in a different direction when using a prefabricated cable, proceed as shown in the drawing below to position the contact support differently.

The connector on the SLG cannot be turned.

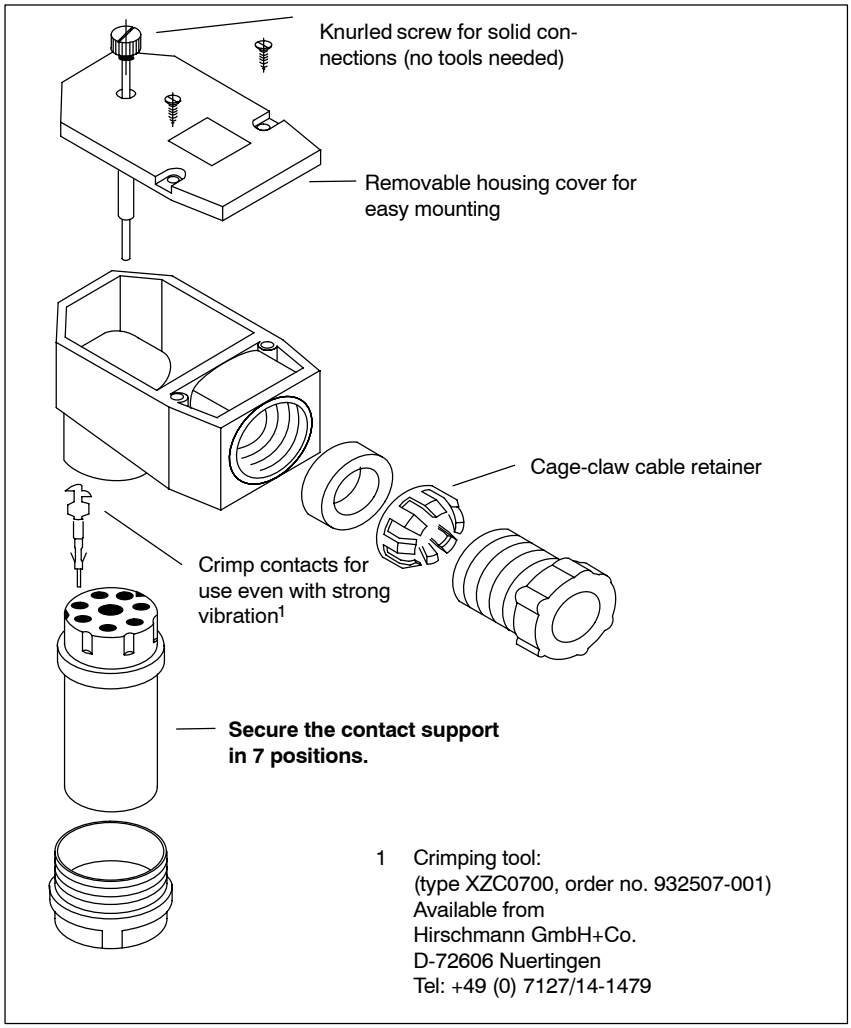


Figure 3-52 Drawing of mounting the SLG connector

Ordering data

Table 3-21 Ordering data for the SLG connector

Connector SLG-side, 6-pin connector with socket contacts for crimping angled (contact support can be fixed in 7 positions)	
• 1 unit	6GT2 090-0BA00
• 1 pack (10 units)	6GT2 090-0BA10
straight	
• 1 unit	6GT2 090-0UA00

3.7.3 Connecting Cables

Connecting cable ASM 400/424/454, ES 030 ↔ SLG 6GT2 091-0A... or 6GT2 091-2A...

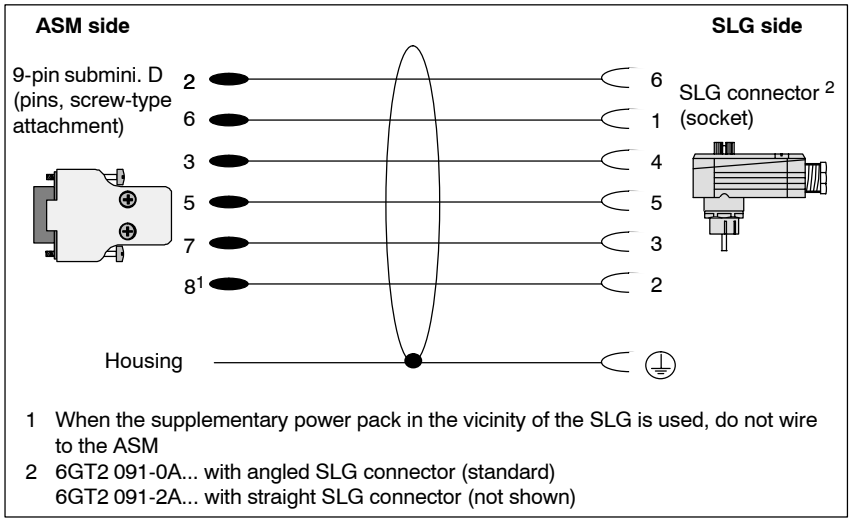


Figure 3-53 Connecting cable ASM 400/424/454, ES 030 ↔ SLG

Connecting cable ASM 410 ↔ SLG 6GT2 091-0D... or 6GT2 091-2D...

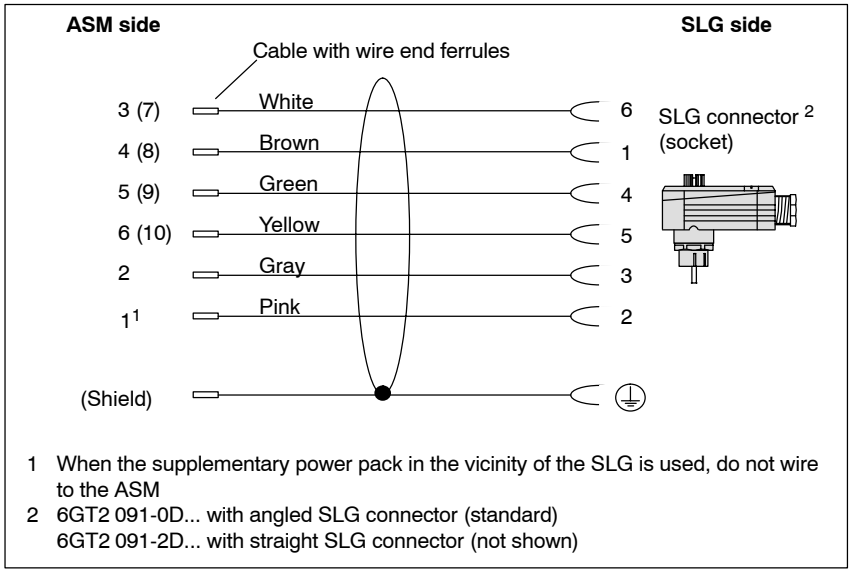


Figure 3-54 Connecting cable ASM 410 ↔ SLG

Caution

The cable shield must be secured with a shield clamp directly on the interface module and grounded on a grounding bar.

Connecting cable ASM 450/452/473 ↔ SLG 6GT2 091-1C... or 6GT2 091-2C...

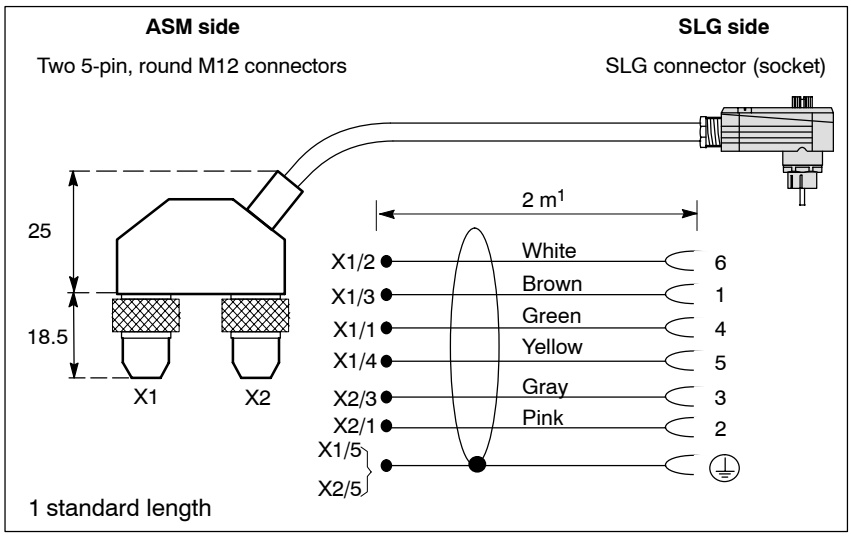


Figure 3-55 Connecting cable ASM 450/452/473 ↔ SLG

Connecting cable ASM 470/475 ↔ SLG 6GT2 091-0E... or 6GT2 091-2E...

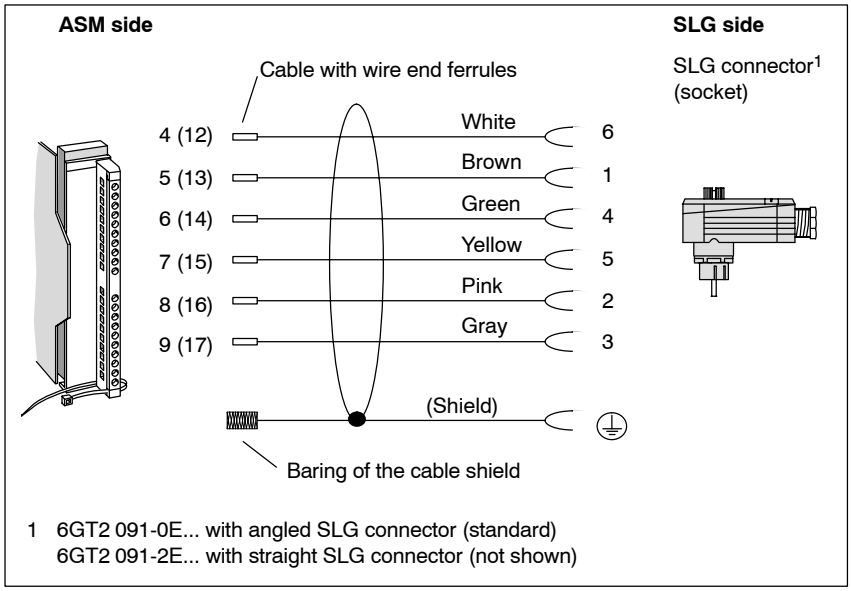


Figure 3-56 Connecting cable ASM 470/475 ↔ SLG

Connecting cable RS 232 PC ↔ ASM 424/724 6GT2 391-0BH50 or 6GT2 391-0BN20

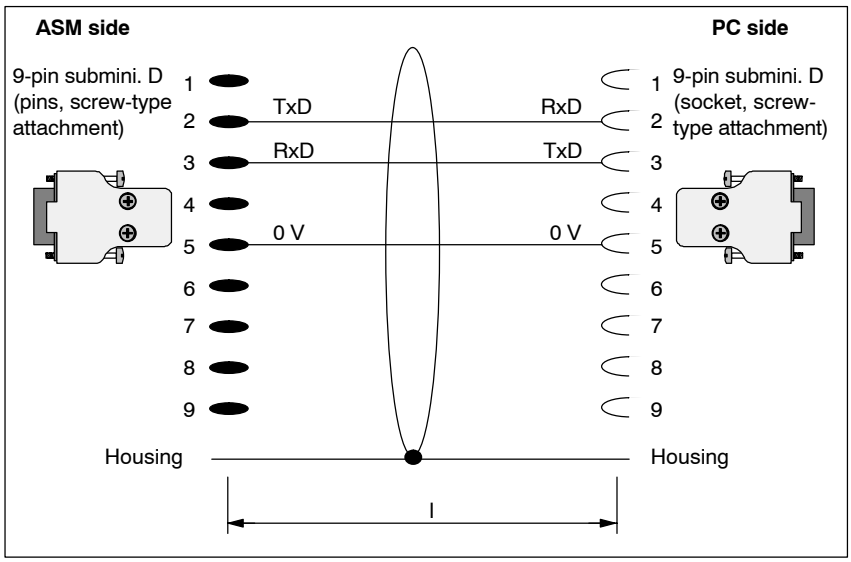


Figure 3-57 Connecting cable RS 232 PC ↔ ASM 424/724

Connecting cable ASM 724/754 ↔ SLA 71 6GT2 391-1AH50

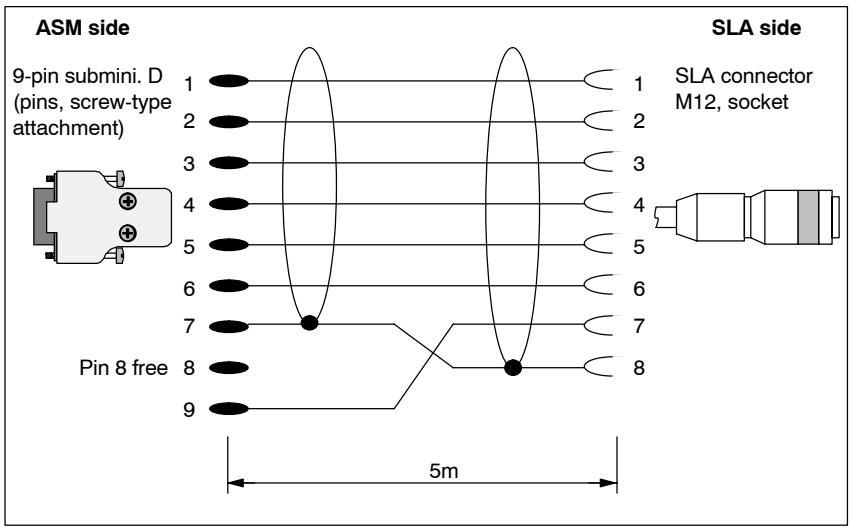


Figure 3-58 Connecting cable ASM 724/754 ↔ SLA 71

Extension cable ASM 724/754 ↔ SLA 71 6GT2 391-1BN10 or 6GT2 391-1BN25

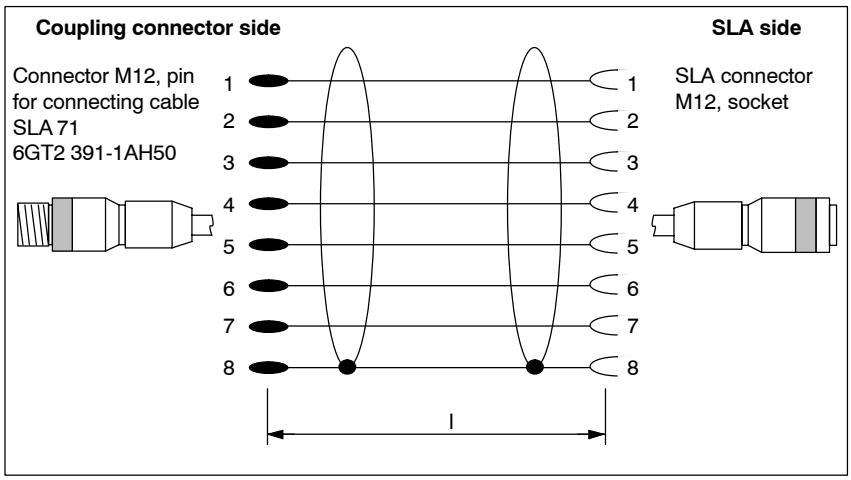


Figure 3-59 Extension cable ASM 724/754 ↔ SLA 71

Connecting cable ASM 456 ↔ SLG 6GT2 091-0FH20 or 6GT2 091-0FH50

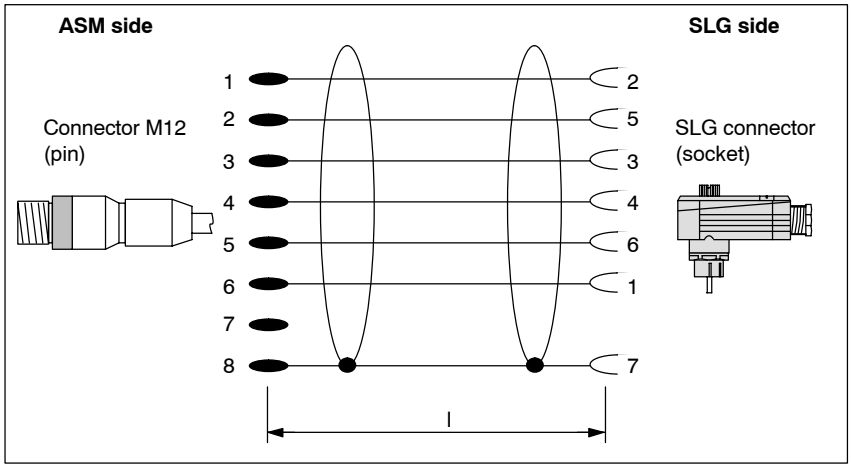


Figure 3-60 Connecting cable ASM 456 ↔ SLG

Extension cable ASM 456 ↔ SLG 6GT2 891-0F...

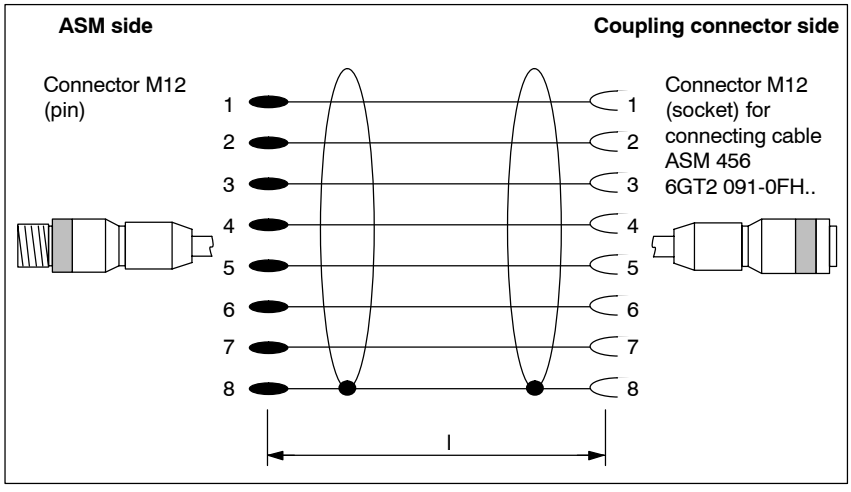
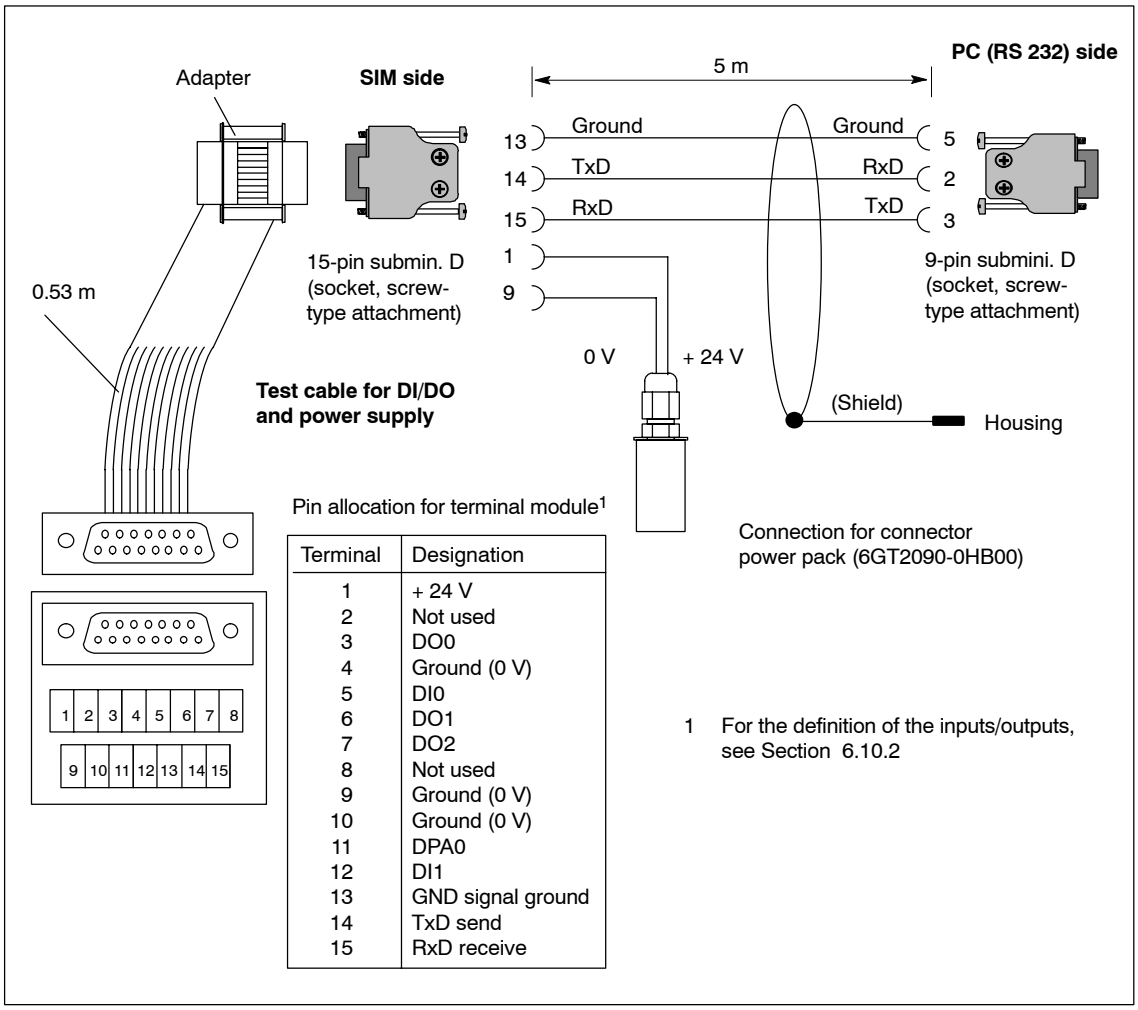


Figure 3-61 Extension cable ASM 456 ↔ SLG

Connecting cable
RS 232 PC ↔ SIM
6GT2 391-1DH50



Pin allocation for terminal module[1]

Terminal	Designation
1	+ 24 V
2	Not used
3	DO0
4	Ground (0 V)
5	DI0
6	DO1
7	DO2
8	Not used
9	Ground (0 V)
10	Ground (0 V)
11	DPA0
12	DI1
13	GND signal ground
14	TxD send
15	RxD receive

Connection for connector
power pack (6GT2090-0HB00)

1 For the definition of the inputs/outputs, see Section 6.10.2

Figure 3-62 Connecting cable for RS 232 PC ↔ SIM

3.7.4 Cable Lengths

The length key for MOBY cables is no longer supported as of 01.10.2001. After that, cables will only be available in certain lengths (see Table 3-22).

The cable lengths are based on the following general rules:

- Loose cables only come in lengths of 50 m, 120 m, and 800 m
- Prepared cables are only available in the lengths listed below

Cables can still be made to any length (see Table 3-14) by the customer.

Table 3-22 Ordering data for MOBY cables

SLG plug-in line, ready-made		
Between ASM 400/424/454, ES 030-K and SLG		
• Angled SLG connector		
Length:	5 m	6GT2 091-0AH50
	10 m	6GT2 091-0AN10
	20 m	6GT2 091-0AN20
	50 m	6GT2 091-0AN50
• Straight SLG connector		
Length:	10 m	6GT2 091-2AN10
	50 m	6GT2 091-2AN50
Between ASM 410 and SLG		
• Angled SLG connector		
Length:	5 m	6GT2 091-0DH50
	10 m	6GT2 091-0DN10
	20 m	6GT2 091-0DN20
• Straight SLG connector		
Length:	5 m	6GT2 091-2DH50
Between ASM 470/475 and SLG		
• Angled SLG connector		
Length:	2 m	6GT2 091-0EH20
	5 m	6GT2 091-0EH50
	10 m	6GT2 091-0EN10
	20 m	6GT2 091-0EN20
	50 m	6GT2 091-0EN50
• Straight SLG connector		
Length:	2 m	6GT2 091-2EH20
	5 m	6GT2 091-2EH50
	10 m	6GT2 091-2EN10
	50 m	6GT2 091-2EN50

Table 3-22 Ordering data for MOBY cables

SLG plug-in line, ready-made		
Between ASM 450/452/473 and SLG		
• Angled SLG connector		
Length:	2 m (Standard)	6GT2 091-1CH20
	5 m	6GT2 091-1CH50
	10 m	6GT2 091-1CN10
	20 m	6GT2 091-1CN20
	50 m	6GT2 091-1CN50
• Straight SLG connector		
Length:	2 m	6GT2 091-2CH20
Between ASM 456 and SLG		
• Angled SLG connector		
Length:	2 m (Standard)	6GT2 091-0FH20
	5 m	6GT2 091-0FH50
• Extension for 6GT2 091-0FH..		
Length:	2 m	6GT2 891-0FH20
	5 m	6GT2 891-0FH50
	10 m	6GT2 891-0FN10
	20 m	6GT2 891-0FN20
	50 m	6GT2 891-0FN50
Standard connecting cable between SLA 71 ↔ ASM 724/ASM 754 (length 5 m, not included with SLA 71)		6GT2 391-1AH50
Extension for antenna line 6GT2 391-1AH50		
Length:	10 m	6GT2 391-1BN10
	25 m	6GT2 391-1BN25
MOBY E SIM-RS 232 test cable with connecting line for DI/DO and connection for power supply (total length of 5 m)		6GT2 391-1DH50
Plug-in line, 24 V		
Plug-in line, 2-core for the 24 V DC power supply of the ASM 400. Plug-in line has plug connectors on both sides		
Length:	2 m	6GT2 091-0CH20
	5 m	6GT2 091-0CH50
24 V DC plug-in line for wide-range power supply unit 6GT2 494-0AA00 (length 5 m)		6GT2 491-1HH50
Plug-in line RS 232		
Between PC and ASM 424/724		
Length:	5 m	6GT2 391-0BH50
	20 m	6GT2 391-0BN20

Table 3-22 Ordering data for MOBY cables

Cable (without connector)		
SLG cable, without connector between ASM and SLG; Type 6 x 0.25 mm^2		
Length:	50 m	6GT2 090-0AN50
	120 m	6GT2 090-0AT12
	800 m	6GT2 090-0AT80

4 Mobile Data Memories

4.1 Introduction

Application area

MOBY identification systems ensure that useful data accompany a product from the very beginning.

Mobile data memories are attached to the product or its conveyor or its packaging unit and are written, changed and read - all without contact. All important information related to production and material flow control is included right on the product.

Its sturdy design permits use in rugged environments and makes the MDS insensitive to many chemical substances.

Layout and functions

The primary components of the mobile data memories (i.e. MDS) include logic, antenna and EEPROM.

When an MDS moves into the transmission field of the read-write device/ read-write antenna (i.e. SLG/SLA), the power supply unit generates and monitors the necessary power for all switching elements. The pulse-coded information is conditioned for further processing as purely digital signals. In addition to managing the various memories, the monitoring unit takes care of data handling and the check routines.

Overview

Table 4-1 Overview of MDS

MDS type	Memory size gross/net	Temperature range (during operation)	Dimensions (W x H x D in mm)	Protection rating
MDS E600	1.024 gross EEPROM bytes 752 net byte capacity	–25 to +60 °C	85x54x0.8	IP68
MDS E611	1.024 gross EEPROM bytes 752 net byte capacity	–25 to +70 °C	85x54x2.5	IP67
MDS E623	1.024 gross EEPROM bytes 752 net byte capacity	–25 to +85 °C	∅10x4.5	IP67
MDS E624	1.024 gross EEPROM bytes 752 net byte capacity	–25 to +125 °C	∅27x4	IP67

Definition of IP67:
- Protection against the penetration of dust (i.e. dustproof)
- Total protection again accidental touch
- Protection against water under certain pressure and time conditions

Definition of IP68:
- Protection against the penetration of dust (i.e. dustproof)
- Total protection again accidental touch
- MDS can be submerged in water. Contact the manufacturer for requirements.

Definition of IPx9K:
- Steam jet at distance of 150 mm
- 10 of 15 l water per minute
- Pressure: 100 bar
- Temperature: 75 °C

Operational requirements/ environmental requirements

Table 4-2 Operational requirements/environmental requirements of MDS

	MDS E600	MDS E611 / MDS E623 / MDS E624
Proof of physical strength is determined by an oscillation test. Test conditions: • Frequency range • Amplitude of the displacement • Acceleration • Test duration per axis • Throughput speed	ISO 7810, ISO 10373	EN 60721-3-7, class 7M3 2 to 500 Hz 7.5 mm (2 to 26 Hz) 20 g (26 to 500 Hz) 20 frequency cycles 1 octave/min.
Proof of physical strength is determined by continuous shock stress. Test conditions: Acceleration Duration Test duration per axis		EN 60721-3-7, class 7M3 100 g 6 ms 500 impacts per axis
Torsion and bending stress	In accordance with ISO 10373/ ISO 7816-1	Not permitted
Protection rating in accordance with EN 60529	IP68	IP67
Ambient temperature During operation During transportation and storage	 –25 °C to +60 °C –25 °C to +60 °C	 –25 °C to +70 °C/+85 °C/+125 °C –40 °C to +85 °C/+100 °C/+150 °C
Temperature gradient over storage temperature range in accordance with part 2-4 of DIN IEC 68	3 °C/min	3 °C/min
Temperature gradient for rapid temperature change in accordance with part 2-14 of DIN IEC 68	Duration of 30 min per maximum; Transition from one maximum to another: approx. 10 sec, 100 cycles	Duration of 30 min per maximum; Transition from one maximum to another: approx. 10 sec, 100 cycles

Warning

The values for shock and vibration are maximum values and may not occur continuously.

4.2 MDS E600

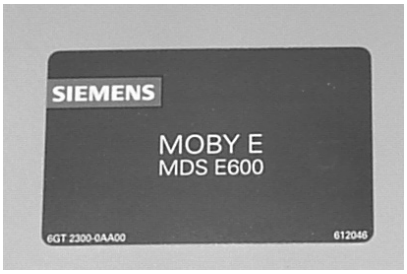


Figure 4-1 MDS E600

Ordering data

Table 4-3 Ordering data for MDS E600

	Order Number
MDS E600 mobile data memory with 752-byte EEPROM	6GT2 300-0AA00
Accessories: Mounting bracket	6GT2 390-0AA00

Technical data

Table 4-4 Technical data of the MDS E600

Memory size	1024-byte EEPROM, 752 bytes for use as desired
Memory organization	Access as desired
MTBF (at +40 °C)	2 x 10^6 hours
Read cycles	Unlimited
Minimum write cycles	200 000
Typical write cycles	1 000 000
Data retention time (at < +40 °C)	> 10 years
Read/write distances	See field data
Direction dependent	No
Vibration	ISO 10 373/ISO 7810
Torsion and bending stress	ISO 10373/ISO 7816-1
Mounting of the MDS	Adhesive/mounting bracket
Protection rating in accordance with EN 60529	IP68
Physical layout	Laminated PVC card, printable on one side
Color	Anthracite/white
Material	PVC
Dimensions (L x W x H) in mm	85.6 x 54 x 0.76

Table 4-4 Technical data of the MDS E600

Ambient temperature during operation during transportation and storage	 –25 °C to +60 °C –25 °C to +60 °C
Weight, approximate	6 g

Field data

Table 4-5 Field data of MDS E600

	SLG 75 ANT 1	**SLG 75 ANT 4**	**SLG 72**	**SLA 71**
Working distance (S_a)	0 to 50 mm	0 to 50 mm	0 to 50 mm	0 to 50 mm
Limit distance (S_g)	70 mm	70 mm	70 mm	70 mm
Transmission window (L)	60 mm (L_d)	220 mm (L_d)	75 mm (L_x)[1] 50 mm (L_y)[1]	60 mm (L_d)
Minimum distance from MDS to MDS	> 400 mm	> 400 mm	> 400 mm	> 400 mm

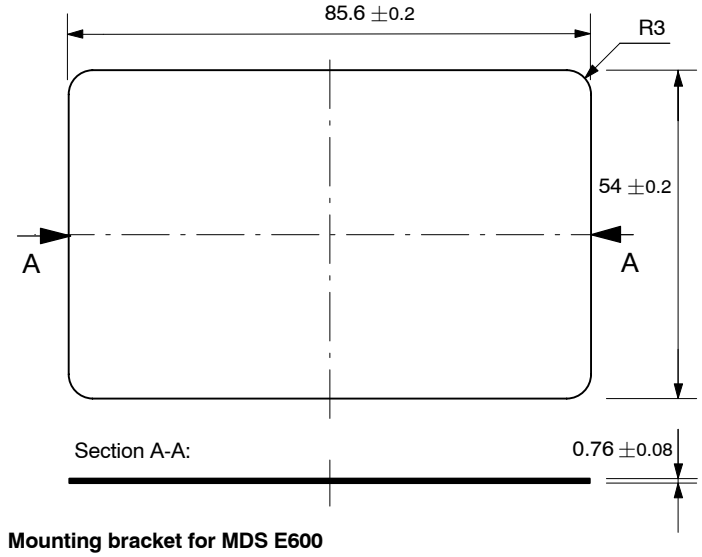
1 For the field geometry, see also Figure 5-2

The field data apply to read and write-accesses of the MDS.

Dimensions (in mm)

Dimensioned drawing

MDS E600

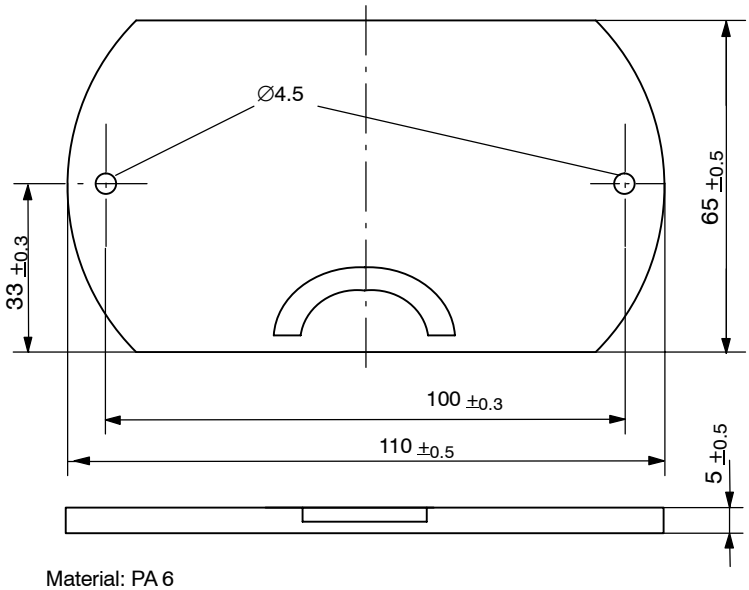


Mounting bracket for MDS E600

The mounting bracket is secured on a non-metallic base with M4 countersunk screws using the holes provided.

The mounting bracket must lay flat on the base. If not, locking will not work and the MDS may fall out of the mounting bracket.

Note
The mounting bracket shown here (i.e. order no. 6GT2 390-0AA00) is not suitable for the spacer shown in Figure 4-6 (6GT2 190-0AA00).



Material: PA 6

Note
You can also use the mounting bracket (6GT2 190-0AB00) when mounting the MDS E600 on metal, but only when used with the spacer (6GT2 190-0AA00) (for dimensions see Figure 4-6).

Figure 4-2 MDS E600 and its mounting bracket

Metal-free space

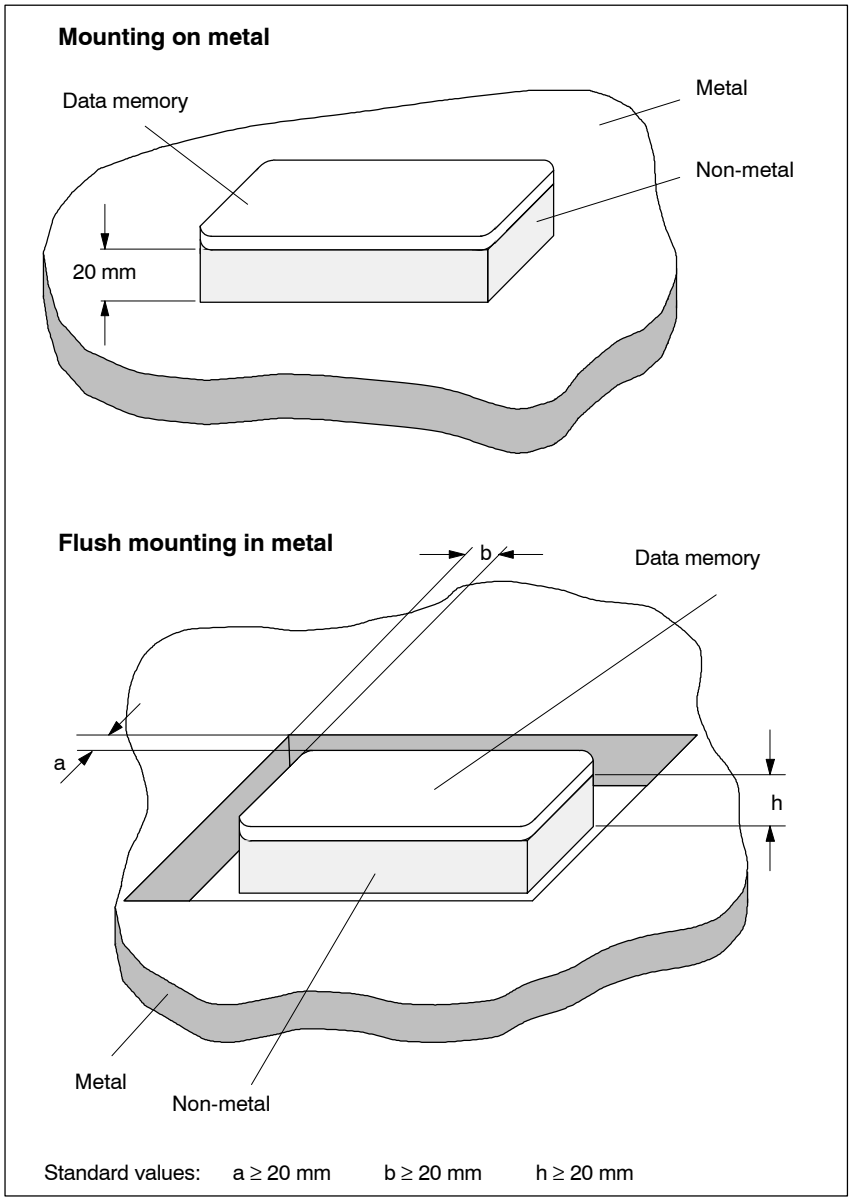


Figure 4-3 Metal-free space for MDS E600

Note

Underranging the standard values a, b and h will significantly reduce the field data.

For installation in metallic environment, read and adhere to the information in chapter 3.4.2.

4.3 MDS E611

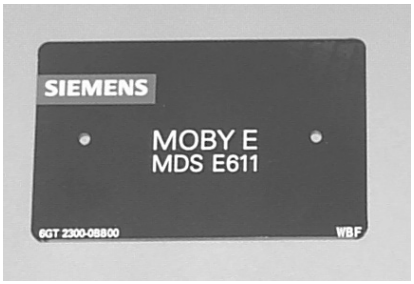


Figure 4-4 MDS E611

Ordering data

Table 4-6 Ordering data for MDS E611

	Order Number
MDS E611 mobile data memory with 752-byte EEPROM	6GT2 300-0BB00
Accessories: Spacer Mounting bracket	 6GT2 190-0AA00 6GT2 190-0AB00

Technical data

Table 4-7 Technical data of the MDS E611

Memory size	1024-byte EEPROM, 752 bytes for use as desired
Memory organization	Access as desired
MTBF (at +40 °C)	2.5 x 10^6 hours
Read cycles	Unlimited
Minimum write cycles	200 000
Typical write cycles	1 000 000
Data retention time (at < +40 °C)	> 10 years
Read/write distances	See field data
Direction dependent	No
Vibration	20 g
Shock	100 g
Torsion and bending stress	Not permitted
Mounting of the MDS	Adhesive/mounting bracket
Protection rating in accordance with EN 60529	IP67
Physical layout Color Material	Epoxy card Anthracite/black Fiber glass-reinforced epoxy resin

Table 4-7 Technical data of the MDS E611

Dimensions (L x W x H) in mm	85.8 x 54.1 x 2.5
Ambient temperature during operation during transportation and storage	 –25 °C to +70 °C –40 °C to +85 °C
Weight, approximate	21 g

Field data

Table 4-8 Field data of MDS E611

	SLG 75 ANT 1	**SLG 75 ANT 4**	**SLG 72**	**SLA 71**
Working distance (S_a)	10 to 70 mm	10 to 70 mm	10 to 70 mm	10 to 70 mm
Limit distance (S_g)	100 mm	90 mm	100 mm	100 mm
Transmission window (L)	80 mm (L_d)	250 mm (L_d)	90 mm (L_x)[1] 60 mm (L_y)[1]	80 mm (L_d)
Minimum distance from MDS to MDS	> 400 mm	> 400 mm	> 400 mm	> 400 mm

1 For the field geometry, see also Figure 5-2

The field data apply to read and write-accesses of the MDS.

Dimensions (in mm)

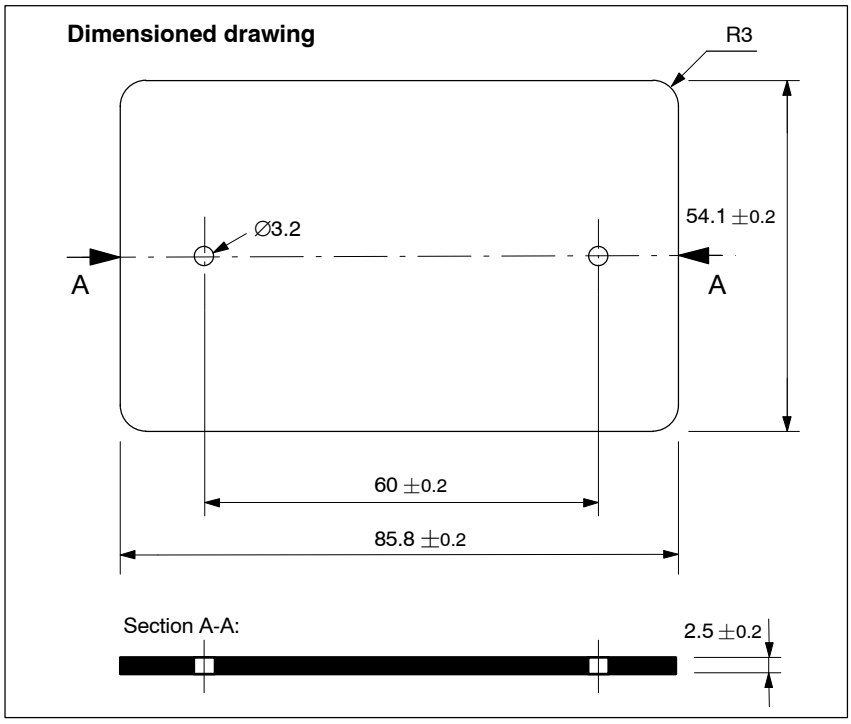
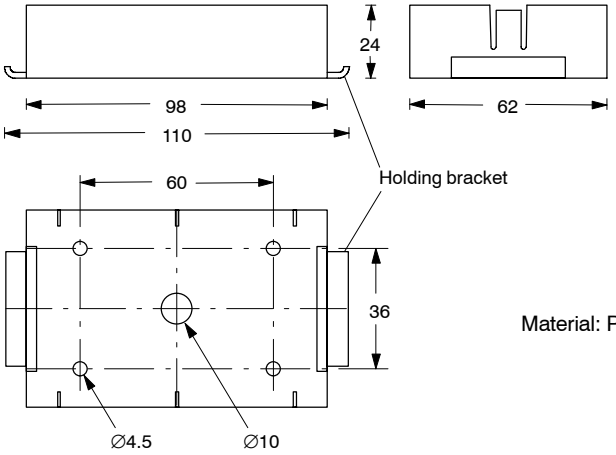


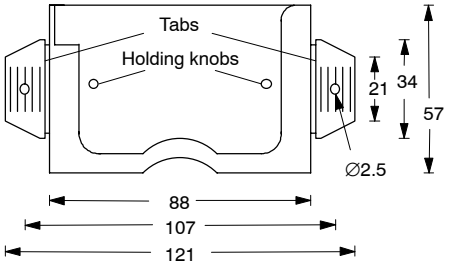
Figure 4-5 Dimensions of MDS E611

Dimensioned drawing

Spacker: 6GT2 190-0AA00



Mounting bracket: 6GT2 190-0AB00

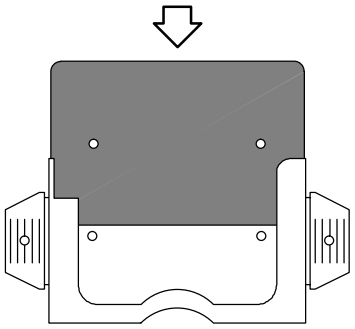


Material: PA 6

The spacer can be mounted directly on metal. Together with the mounting bracket, this results in a distance of 20 mm between the MDS and metal.

Mounting:
- With 2 or 4 M4 screws
- With rubber pads on the holding brackets (e.g., on mesh boxes)
- With cable binders on the holding brackets (e.g., on mesh boxes)

MDS with mounting bracket

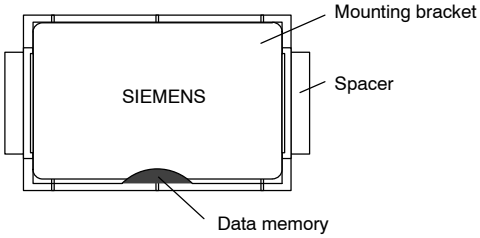


Slide the MDS into the mounting bracket. It is locked in place by means of the stop knobs in the mounting bracket.

The tabs of the mounting bracket are secured to a non-metal base as listed below. This can be done as follows:
- Screws in the holes provided
- Rivets in the holes provided
- Nails through the holes
- Staples through the plastic of the tabs
- Insertion in the spacer

The tabs can also be bent by 90°.

MDS with mounting bracket and spacer (assembled)



Assembly:
The MDS is pushed into the mounting bracket. The tabs are then bent by 90° and inserted in the spacer. Position the mounting bracket so that it covers the MDS as shown in the figure. It is automatically locked into place.

Figure 4-6 Dimensions of the spacer and mounting bracket for the MDS E611 (for use with the MDS E600, see note in Figure 4-2)

Metal-free space

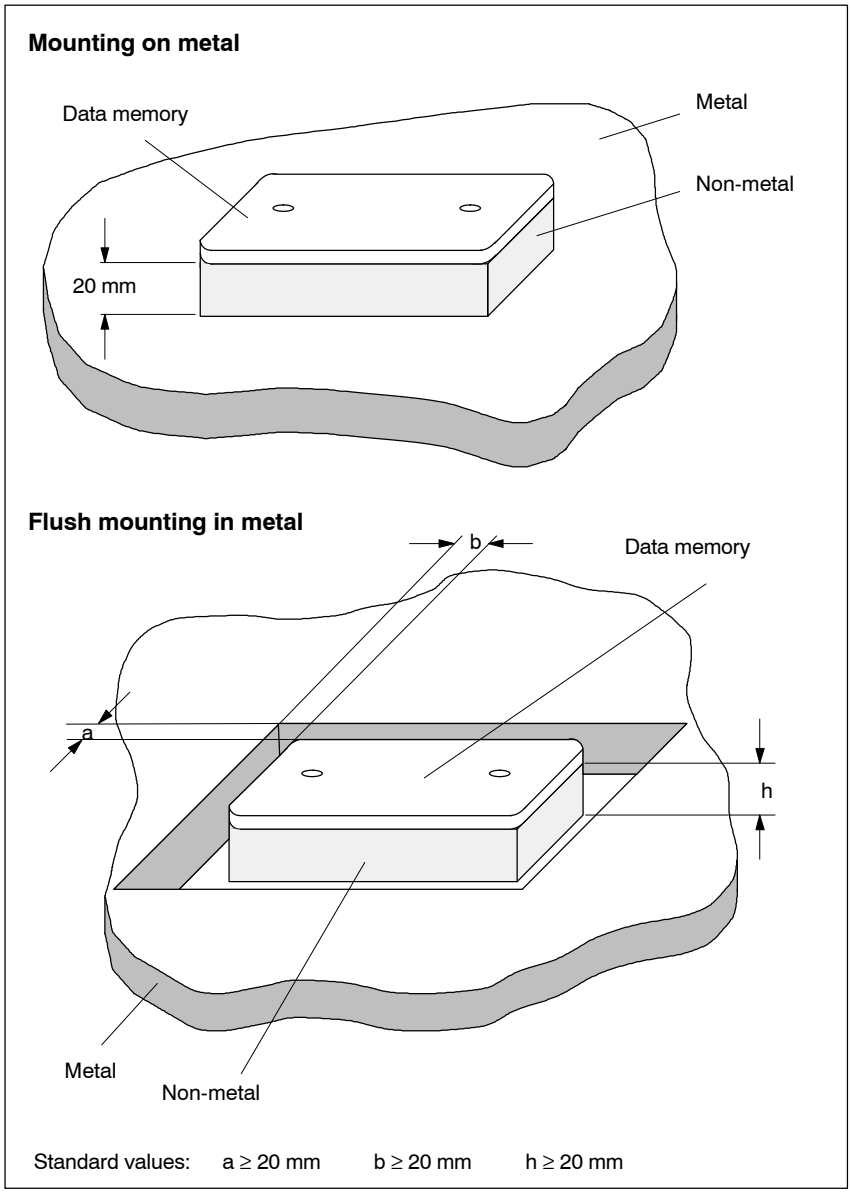


Figure 4-7 Metal-free space for MDS E611

Note

Underranging the standard values a, b and h will significantly reduce the field data. The MDS may be mounted with metal screws. This has no substantial effect on the range.

For installation in metallic environment, read and adhere to the information in chapter 3.4.2.

4.4 MDS E623

The MDS E623 was constructed for tool coding in accordance with DIN 69873. It can be used everywhere where small data carriers and precise positioning are required (e.g., tool identification).

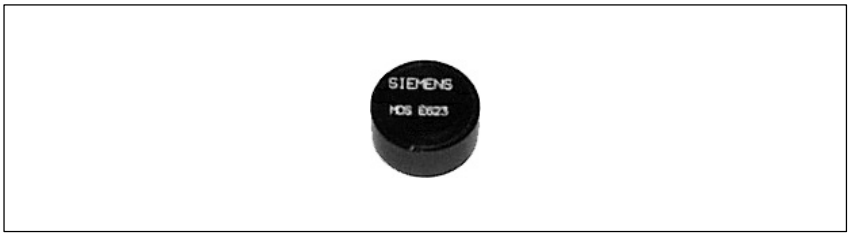


Figure 4-8 MDS E623

Ordering data

Table 4-9 Ordering data for MDS E623

	Order Number
MDS E623 mobile data memory	6GT2 300-0CD00

Technical data

Table 4-10 Technical data of the MDS E623

Memory size	1024-byte EEPROM, 752 bytes for use as desired
Memory organization	Access as desired
MTBF (at +40 °C)	2.5 x 10^6 hours
Read cycles	Unlimited
Minimum write cycles	200 000
Typical write cycles	1 000 000
Data retention time (at < +40 °C)	> 10 years
Read/write distances	See field data
Direction dependent	No
Vibration	20 g
Shock	100 g
Torsion and bending stress	Not permitted
Mounting of the MDS	Adhesive[1]; e.g. Araldit AW 2101/HW2951 or 2021; UHU-Plus endfest 300
Protection rating • In accordance with EN 60529 • In accordance with DIN 40050 (part 9)	 IP67 IPx9K (steamer: 150 mm; 10 to 15 l/min; 100 bar; 75 °C)

Table 4-10 Technical data of the MDS E623

Physical layout	Molded, shock-resistant plastic
Color	Black
Material	Epoxy resin
Dimensions (D x H) in mm (dimensions and tolerances in accordance with DIN 69873)	∅10 x 4.5 (chamfer on the underside 0.5 x 45°)
Ambient temperature during operation during transportation and storage	 –25 °C to +85 °C –40 °C to +100 °C
Weight, approximate	4 g

1 The processing specifications of the manufacturer must be adhered to.

Field data

Table 4-11 Field data MDS E623

	SIM 70 ANT 0	SLG 75 ANT 18	SLG 75 ANT 12
Metal-free installation (static)			
Working distance (S_a)	0 to 6 mm	0 to 6 mm	0 to 4 mm
Transmission window (L_d)	4 mm (average deviation ±2 mm)	4 mm (average deviation ±2 mm)	8 mm (average deviation ±4 mm)
Limit distance (S_g)	6 mm	6 mm	5 mm
Flush mounting in metal (static)			
Working distance (S_a)	0 to 3.5 mm	0 to 3.5 mm	0 to 3 mm
Transmission window (L_d)	4 mm (average deviation ±1.5 mm)	4 mm (average deviation ±1.5 mm)	4 mm (average deviation ±2 mm)
Limit distance (S_g)	4 mm	4 mm	4 mm
Minimum distance from MDS to MDS	> 30 mm	> 30 mm	> 20 mm

Note

The MDS E623 is only designed for static operation.

Metal-free space

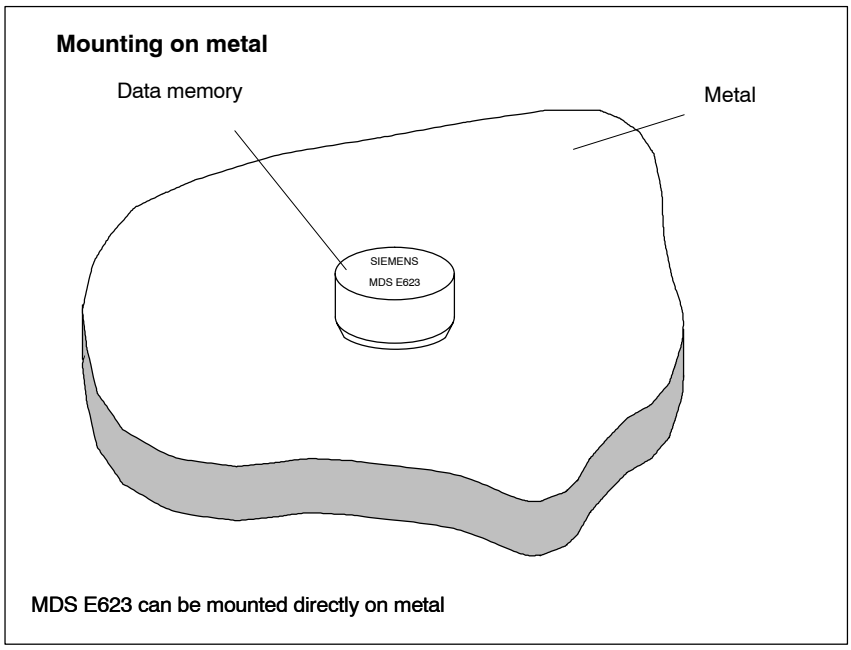


Figure 4-9 Mounting on metal: MDS E623

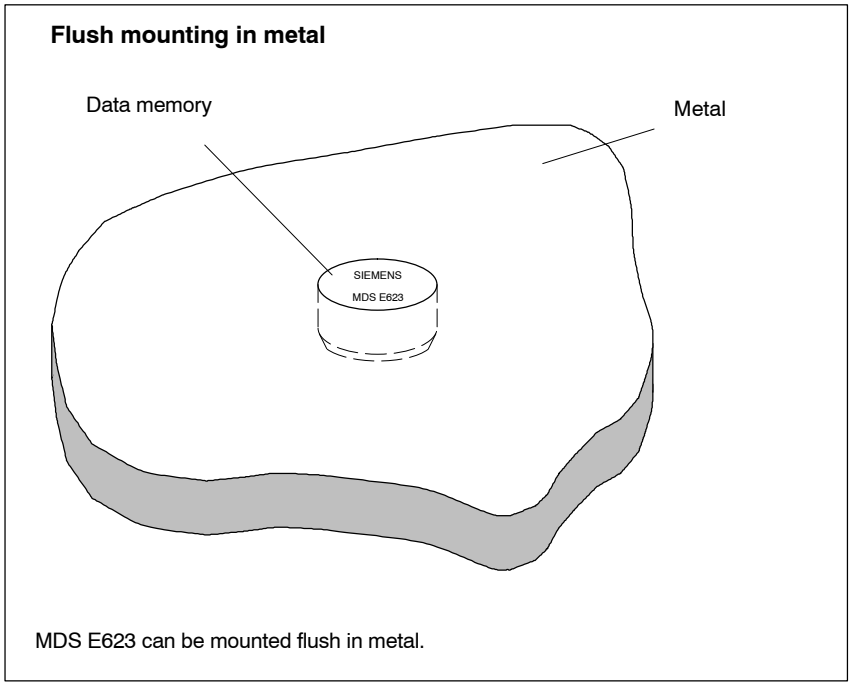


Figure 4-10 Metal-free space for MDS E623

For installation in metallic environment, read and adhere to the information in chapter 3.4.2.

Mounting the MDS E623 flush in metal with tools

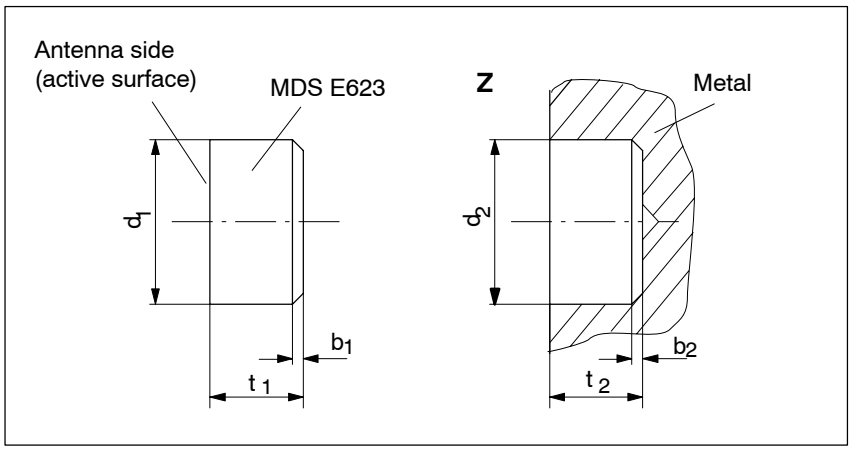


Figure 4-11 Dimensions and installation space for MDS E623

Table 4-12 Dimensions of MDS E623/installation space in accordance with DIN 69873

	MDS E623		Installation space
b_1	0.5 x 45°	b_2	0.3 x 45° or R 0.3
d_1	$10\ ^{-0.04}_{-0.13}$	d_2	$10\ ^{+0.09}_{0}$
t_1	$4{,}5\ ^{-0}_{-0.1}$	t_2	$4{,}6\ ^{+0.2}_{0}$

The MDS may not protrude out of the receptacle hole. It must be flush with the outside contours. Follow the installation instructions for the MDS and take into account the particular conditions of your project (e.g., scope speed, temperature and use of cooling lubricant).

Mounting with adhesive

- Bore mounting opening.
- The surface to which adhesive will be applied must be dry and free of dust, grease, stripping agents and other soil.
- Apply adhesive in accordance with the manufacturer's instructions.
- Press MDS E623 in by hand. Antenna side to outside (see Figure 4-11).
- Remove extra adhesive.
- Allow to harden in accordance with the instructions of the adhesive manufacturer.

Examples of mounting

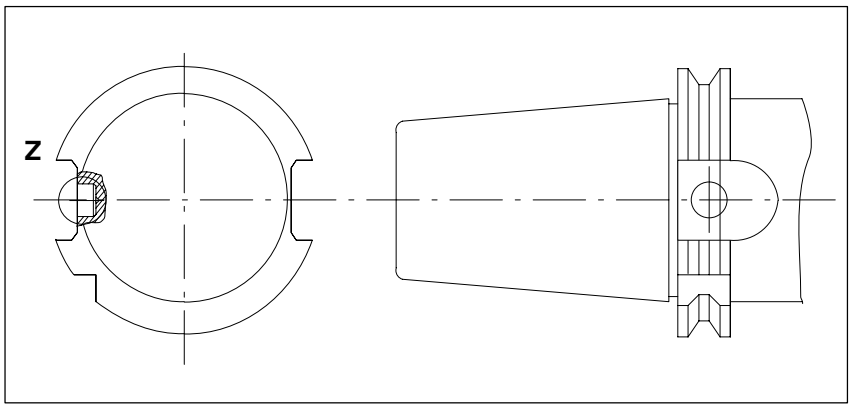


Figure 4-12 Example of mounting the MDS E623 in a quick-release taper shaft

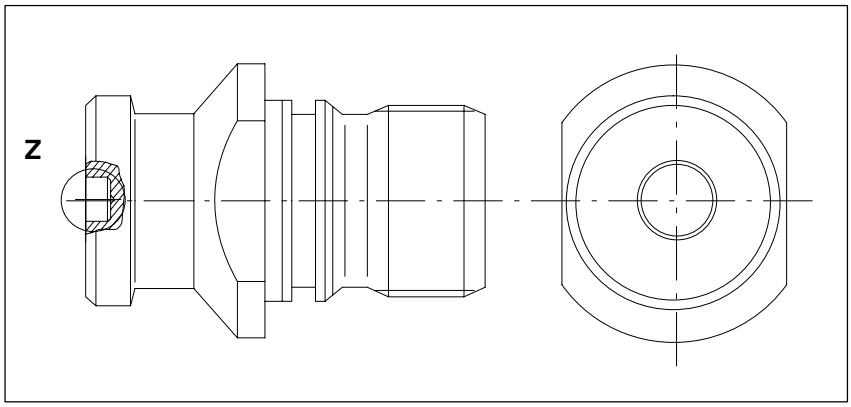


Figure 4-13 Example of mounting the MDS E623 in a retention shaft

4.5 MDS E624

Figure 4-14 MDS E624

Ordering data

Table 4-13 Ordering data for MDS E624

	Order Number
MDS E624 mobile data memory with 752-byte EEPROM	6GT2 300-0CE00

Technical data

Table 4-14 Technical data of the MDS E624

Memory size	1024-byte EEPROM, 752 bytes for use as desired
Memory organization	Access as desired
MTBF (at +40 °C)	2.5 x 10^6 hours
Read cycles	Unlimited
Minimum write cycles	200 000
Typical write cycles	1 000 000
Data retention time (at < +40 °C)	> 10 years
Read/write distances	See field data
Direction dependent	No
Vibration	20 g
Shock	100 g
Torsion and bending stress	Not permitted
Mounting of the MDS	Adhesive/M3 screw
Tightening torque at +20°C	≤ 1 Nm
Protection rating • In accordance with EN 60529 • In accordance with DIN 40050 (part 9)	 IP67 IPx9K (steamer: 150 mm; 10 to 15 l/min; 100 bar; 75 °C)

Table 4-14 Technical data of the MDS E624

Physical layout Color Material Dimensions (DxH) in mm	Molded, shock-resistant plastic Black Epoxy resin 27 x 4
Ambient temperature During operation During transportation and storage	 –25 °C to +125 °C –40 °C to +150 °C
Weight, approximate	5 g

Field data

Table 4-15 Field data of MDS E624

	SLG 75 ANT 18	SLG 75 ANT 1	SLG 75 ANT 4	SLG 72	SLG 75 ANT 30	SLA 71
Working distance (S_a)	0 to 8 mm	0 to 25 mm	0 to 25 mm	0 to 30 mm	0 to 18 mm	0 to 25 mm
Limit distance (S_g)	15 mm	40 mm	35 mm	40 mm	24 mm	40 mm
Transmission window (L)	12 mm (L_d)	38 mm (L_d)	200 mm (L_d)	60 mm (L_x)[1] 40 mm (L_y)[1]	14 mm (L_d)	38 mm (L_d)
Minimum distance from MDS to MDS	> 50 mm	> 250 mm	> 250 mm	> 250 mm	> 60 mm	> 250 mm

1 For the field geometry, see also Figure 5-2

The field data apply to read and write-accesses of the MDS.

Dimensions (in mm)

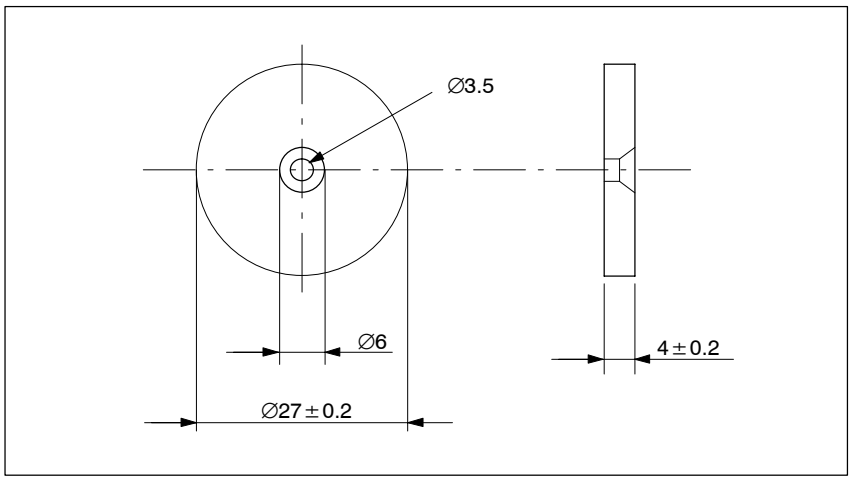


Figure 4-15 Dimensions of MDS E624

Metal-free space

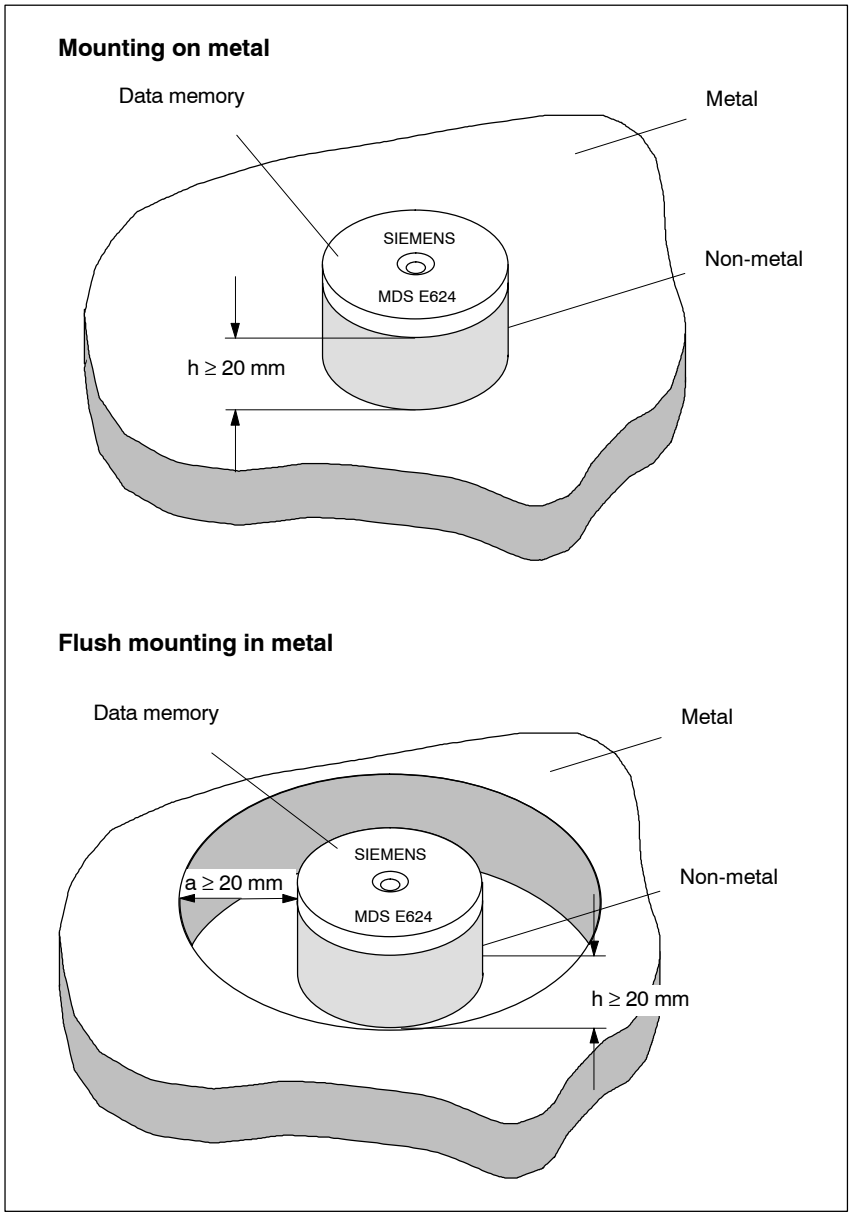


Figure 4-16 Metal-free space for MDS E624

Note

Underranging the standard values a and h will significantly reduce the field data. The MDS may be mounted with metal screws (i.e. M3 countersunk screws). This has no substantial effect on the range.

For installation in metallic environment, read and adhere to the information in chapter 3.4.2.

Read/Write Devices
Read/Write Antennas

5

5.1 Introduction

Application area

The SLGs/SLAs provide inductive communication with the mobile data memories (i.e. MDSs) and the serial link to the interfaces (i.e. ASMs).

Various SLG/SLA models – for short, medium and long distances to the MDS – are available to meet customer requirements.

Layout and functions

The SLG/SLA executes commands received from the interface. These commands for reading and writing data are converted via a modulator/demodulator circuit.

Communication between MDS and SLG/SLA takes place via inductive alternating fields.

The volume of data that can be transmitted between the SLG/SLA and MDS depends on the following:

- The speed at which the MDS moves through the SLG/SLA's transmission window
- The length of the transmission window

Table 5-1 Overview table of SLG/SLA

SLG Type	Working distance S_a (depending on MDS)	Limit distance S_g	Temperature range (during operation)	Circuit dimensions (L x W x H) in mm	Antenna dimensions (L x W x H) in mm	Protection rating
SLG 72	0 to 70 mm	100 mm	–25 to +70 °C	160 x 80 x 40	---	IP65
SLG 75 ANT 1	0 to 70 mm	100 mm	–25 to +70 °C	160 x 80 x 40	75 x 75 x 20	IP65
SLG 75 ANT 4	0 to 70 mm	100 mm	–25 to +70 °C	160 x 80 x 40	320 x 80 x 30	IP65
SLG 75 ANT 12	0 to 4 mm	5 mm	–25 to +70 °C	160 x 80 x 40	∅ M12 x 40	IP65
SLG 75 ANT 18	0 to 8 mm	15 mm	–25 to +70 °C	160 x 80 x 40	∅ M18 x 50	IP65
SLG 75 ANT 30	0 to 18 mm	24 mm	–25 to +70 °C	160 x 80 x 40	∅ M30 x 58	IP65
SLA 71	0 to 70 mm	100 mm	–25 to +70 °C	---	75 x 75 x 20	IP65

Definition of IP65:
- Protection against penetration of dust (i.e. dust-proof)
- Full protection against touch
- Protection against water jet

Definition of IP67:
- Protection against the penetration of dust (i.e. dustproof)
- Total protection again accidental touch
- Protection against water under specified pressure and time conditions

5.2 SLG 72

Application area

The SLG 72 is a read/write device in the medium performance range. Due to the larger dimensions of the antenna, the SLG 72 creates a greater field than the SLG 75 ANT 1. In dynamic operation greater volumes of data can be read/written by the MDS (see Section 3.3).

Figure 5-1 Read/write device SLG 72

Ordering data

Table 5-2 Ordering data for the SLG 72

Read/write device SLG 72	6GT2 301-0CA00
SLG connector and plug-in line	See Section 3.7

Technical data

Table 5-3 Technical data of the SLG 72

Inductive interface to MDS	
Max. SLG-MDS read/write distances	100 mm (see field data)
Transmission frequency	13.56 MHz
Serial interface to ASM	RS 422
Data transmission speed	19200 Baud
Max. ASM - SLG cable length (with 24 V DC and a conductor cross-section of 0.2 mm^2)	120 m
Max. data cable length. See cable configuration in Table 3-14.	1000 m

Table 5-3 Technical data of the SLG 72

Supply voltage (via serial interface) Nominal value Permissible range	 24 V DC 20 to 30 V DC
Current consumption Brief switch-on current Operation (at 24 V)	 Max. of 700 mA 180 mA (typical)
MTBF (at +40 °C)	2.5 x 10^5 hours
Housing Dimensions (in mm) Without connector (W x H x D) Color Material Connector	 160 x 80 x 40 Anthracite Polyamide 12 6-pin SLG connector in accordance with DIN 43651
Protection rating in accordance with EN 60529 Shock in accordance with EN 60721-3-7, class 7M2 Total shock response spectrum, type II Vibration in accordance with EN 60721-3-7, class 7M2	IP65 30 g[1] 1 g (9 to 200 Hz)[1] 1.5 g (200 to 500 Hz)[1]
Mounting of SLG Tightening torque at room temperature	2 M5 screws ≤ 2 Nm
Ambient temperature During operation During transportation and storage	 –25 °C to + 70 °C –40 °C to + 85 °C
Weight (approx.)	550 g

1 **Warning:** The values for shock and vibration are maximum values and must not occur continuously.

Field data

The exact field data are dependent on the type of MDS used.

Table 5-4 Field data of SLG 72

Working distance (S_a)	0 to 70 mm
Limit distance (S_g)	100 mm
Transmission window	Depends on MDS
Minimum distance from SLG to SLG (D)	D_a > 800 mm D_b > 800 mm

Transmission window

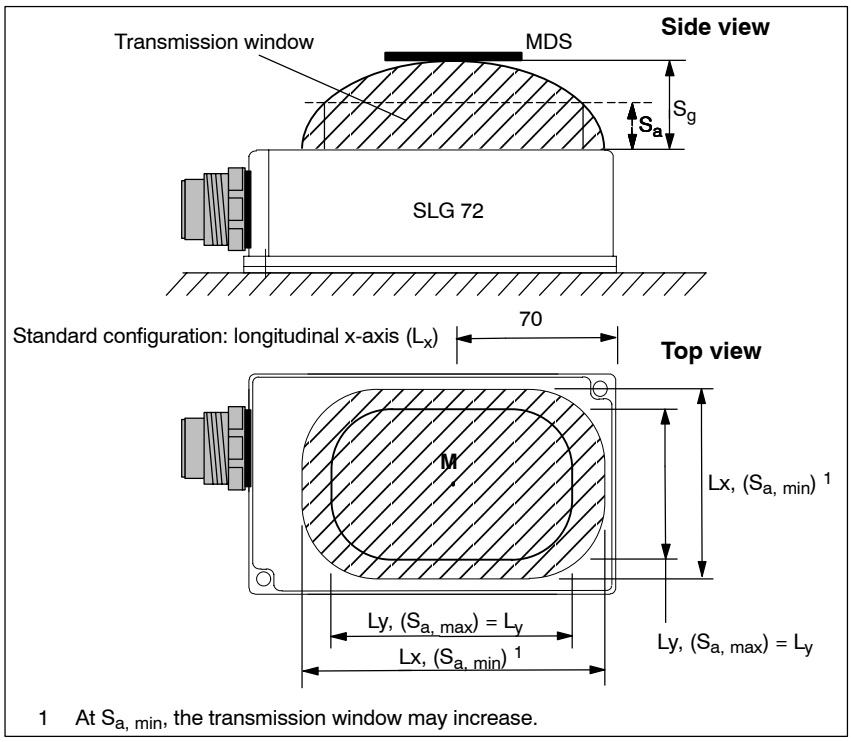


Figure 5-2 Transmission window of the SLG 72

Metal-free space

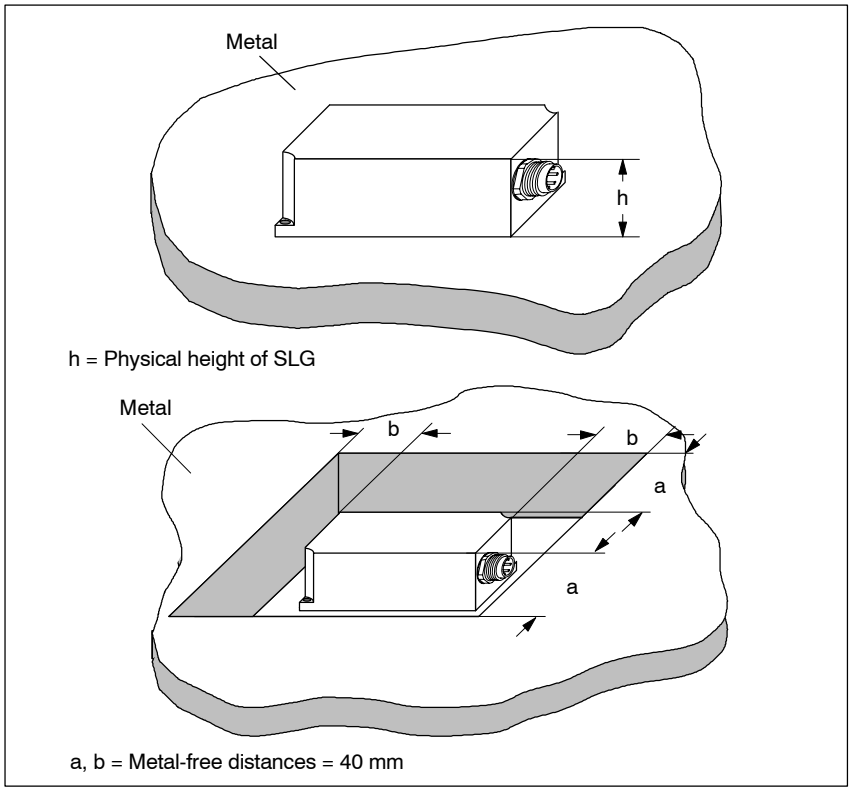


Figure 5-3 Metal-free space of SLG 72

FCC information

Made in Germany

SIEMENS MOBY E SLG 72

FCC ID: NXWMOBYE-SLG72

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized changes and modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Definition of the distance D

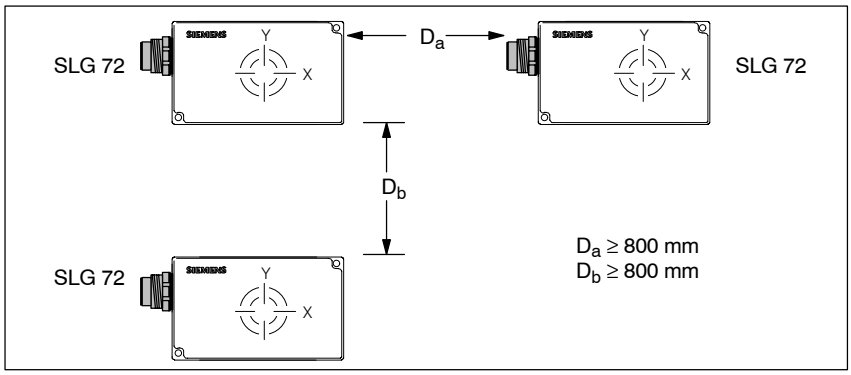


Figure 5-4 Distance D: SLG 72

Dimensions (in mm)

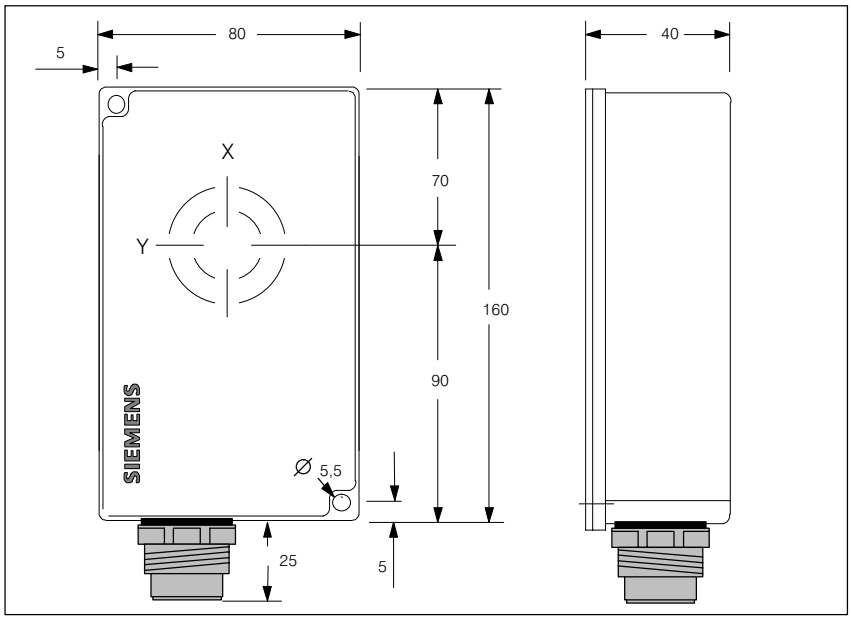


Figure 5-5 Dimensioned drawing SLG 72

5.3 SLG 75

Application area SLG 75

The SLG 75 ANT is a read/write device in the middle of the performance range. It can only be used with ANT 1, ANT 4, ANT 12, ANT 18 and ANT 30. The antennas can be very easily positioned for any application. The cable between the antenna and evaluation unit is 3 m long. The length cannot be changed.
The antenna cable can be connected on the SLG side.
The SLG 75 can be operated at the following interfaces:
ASM 400, ASM 410, ASM 424, ASM 450, ASM 452, ASM 454, ASM 470, ASM 473 and ASM 475.

Figure 5-6 Read/write device SLG 75

Areas of application of the antennas

ANT 1

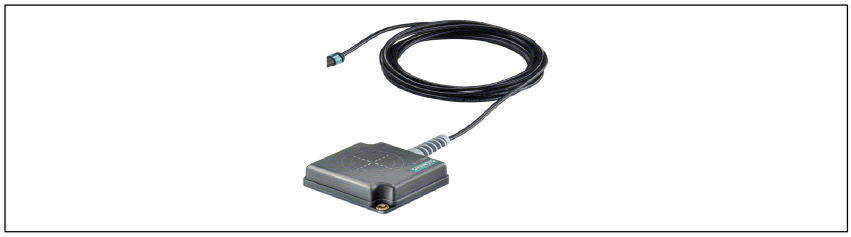


Figure 5-7 ANT 1 for SLG 75

The ANT 1 is an antenna in the middle of the performance range which is very useful in production plants and assembly lines because of its easily handled housing.
The antenna's dimensions make it possible to read/write large volumes of data from/to the MDS during operation. The antenna cable can be connected on the SLG side.

ANT 4

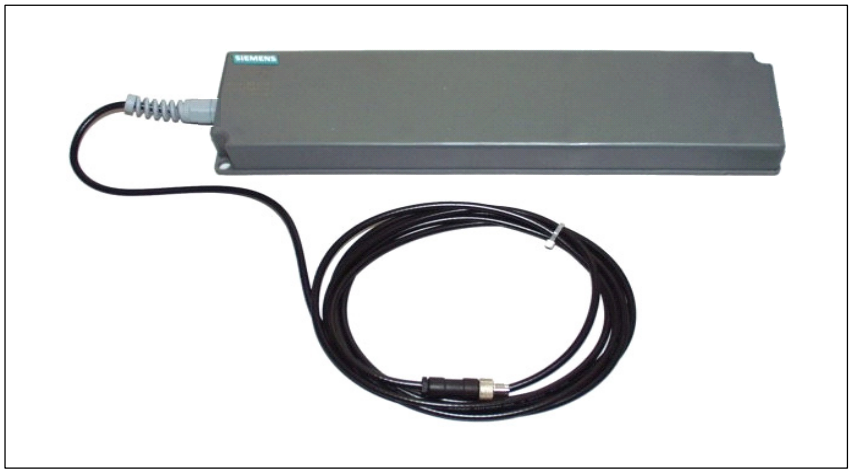


Figure 5-8 ANT 4 for SLG 75

The ANT 4 was specially conceived for use in manufacturing plans and assembly lines.
Due to its wide transmission area, the antenna can be used every where high speeds are required. The cable length between the antenna and the evaluating processor unit is 1 m and is connected to the electronics side.

ANT 12

Figure 5-9 ANT 12 for the SLG 75

The ANT 12 is intended primarily for tool identification. The very small size of the antenna permits very accurate positioning using the plastic nuts included with it. The antenna cable can be connected on the SLG side. Data carrier communication is only possible with the MDS E623 (tool pill) in static mode.

ANT 18

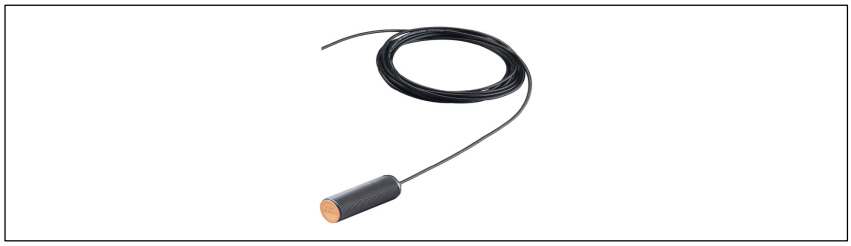


Figure 5-10 ANT 18 for the SLG 75

The ANT 18 was designed primarily for use in small assembly lines. The small, compact dimensions of the antenna with its two plastic nuts (included with the product) make it easy to position for any application. The antenna cable can be connected on the SLG side. Data carrier communication is only possible with the MDS E624 in static mode.

ANT 30

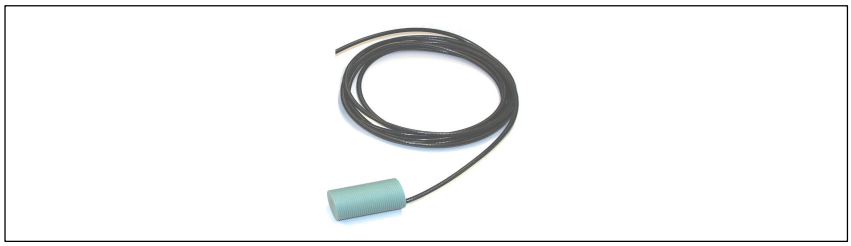


Figure 5-11 ANT 30 for the SLG 75

The ANT 30 was designed primarily for use in small assembly lines. The maximum read/write range is approximately 60% greater than the ANT 18. The compact dimensions of antenna with its two plastic nuts (included with the product) make it very easy to position for any application. The antenna cable can be connected on the SLG side. Data carrier communication is only possible with the MDS E624 in static mode.

Ordering data

Table 5-5 Ordering data for the SLG 75 and ANT xx

SLG 75 write/read device with RS 422 serial interface The antenna is not included with the SLG 75 and must be ordered separately.		6GT2 398-1AF00
Antennas:		
ANT 1	75 x 75 x 20 (L x W x H)	6GT2 398-1CB00
ANT 4	320 x 80 x 30 (L x W x H)	6GT2 398-1CE00
ANT 4	320 x 80 x 30 (L x W x H)	6GT2 398-1CE00-0AX0[1]
ANT 12	M12 x 1.0 x 40 (∅ x wght x L)	6GT2 398-1CC00
ANT 18	M18 x 1.0 x 55 (∅ x wght x L)	6GT2 398-1CA00
ANT 30	M30 x 1.5 x 58 (∅ x wght x L)	6GT2 398-1CD00
SLG connector and plug-in line		See Section 3.7

1 with antenna cable with hose

Technical data

Table 5-6 Technical data of the SLG 75

Read/write device	SLG 75
Inductive interface to MDS	
ANT-MDS read/write distances	See field data
Transmission frequency	13.56 MHz
Serial interface to ASM	RS 422
Data transmission speed	19200 Baud
Max. ASM - SLG cable length (with 24 V DC and a conductor cross-section of 0.2 mm^2)	120 m
Max. data cable length. See cable configuration in Table 3-14.	1000 m
MDS addressing command	Direct access via addresses Initialize MDS, read data from MDS, write data to MDS
Supply voltage (via serial interface)	
Nominal value Permissible range	24 V DC 20 to 30 V DC
Current consumption	
Switch-on current (brief) Operation (at 24 V DC)	Max. of 700 mA 180 mA (typical)
MTBF (at +40 °C)	2.5 x 10^5 hours
Housing	
Dimensions (in mm)	
Electronics w/o connectors (L x W x H)	160 x 80 x 40
Color	Anthracite
Material	Plastic (PA 12)
Connector	
Data	6-pin SLG connector in accordance with DIN 43651 (pin, device side)
Protection rating in accordance with EN 60529	IP65
Vibration in accordance with EN 60721-3-7/class 7M2	30 g[1]
Vibration in accordance with EN 60721-3-7/class 7M2	1 g (3 to 200 Hz)[1] 1.5 g (200 to 500 Hz)[1]
Mounting of SLG	2 M5 screws
Tightening torque at room temperature	≤ 3 Nm
Ambient temperature During operation During transportation and storage	 –25 °C to + 70 °C –40 °C to + 85 °C
Weight (approx.)	520 g
Certification	CE, UL/CSA, FCC

1 **Warning:** The values for shock and vibration are maximum values and must not occur continuously.

Table 5-7 Technical data of the antennas

Antenna	ANT 1	ANT 4	ANT 12	ANT 18	ANT 30
Write/read distance, max. ANT-MDS (S_g).	100 mm	100 mm	5 mm	15 mm	24 mm
Housing dimensions in mm	75 x 75 x 20 (L x W x H)	320 x 80 x 30 (L x W x H)	M12 x 1.0 x 40 (∅ x wght x L)	M18 x 1.0 x 55 (∅ x wght x L)	M30 x 1.5 x 58 (∅ x wght x L)
Color	Anthracite		Pastel turquoise		
Material	Plastic (PA 12)		Plastic Crastin		
Connector	4-pin pin, antenna side				
Antenna line length	3 m	1 m	3 m		
Protection rating in accordance with EN 60529	IP67		IP67 (front)		
Vibration in accordance with EN 60721-3-7/class 7M2 Vibration in accordance with EN 60721-3-7/class 7M2	50 g[1] 20 g (3 to 500 Hz)[1]				
Mounting of antenna	2 M5 screws		2 plastic nuts M12 x 1.0	2 plastic nuts M18 x 1.0	2 plastic nuts M30 x 1.5
Ambient temperature During operation During transportation and storage	 –25 °C to +70 °C –40 °C to +85 °C				
MTBF (at +40 °C)	2.5 x 10^5 hours				
Weight (approx.)	80 g	950 g	45 g	120 g	150 g

1 **Warning:** The values for shock and vibration are maximum values and must not occur continuously.

Table 5-8 Cable specification of the ANT 12 antenna

Type of line	Coaxial transmission line 50 Ω suitable for dragchain
Sheath	PUR
External diameter	5.2 mm
Mechanical stability Bending radius – one-time – repeated Dragchain	 ≥ 5 x External diameter ≥ 15 x External diameter ≥ 2 x 10^6 Cycles
Ambient temperature during operation – with fixed wiring – with flexible wiring	 –30 °C to +70 °C –5 °C to +50 °C
Approval	UL (in accordance with style 1354)

Field data

Table 5-9 Field data of the SLG 75 with antenna

SLG 75	ANT 1	ANT 4	ANT 12	ANT 18	ANT 30
Working distance (S_a)	0 to 70 mm	0 to 70 mm	0 to 4 mm	0 to 8 mm	0 to 18 mm
Limit distance (S_g)	100 mm	100 mm	5 mm	15 mm	24 mm
Diameter of the transmission window (L_d)	Depends on MDS	Depends on MDS	8 mm	Depends on MDS	14 mm
Minimum distance from SLG to SLG (D)	> 800 mm	> 800 mm	> 80 mm	> 125 mm	> 200 mm

Transmission window

Transmission window:
The antenna of the MDS must be positioned within this field to ensure reliable data transfer.

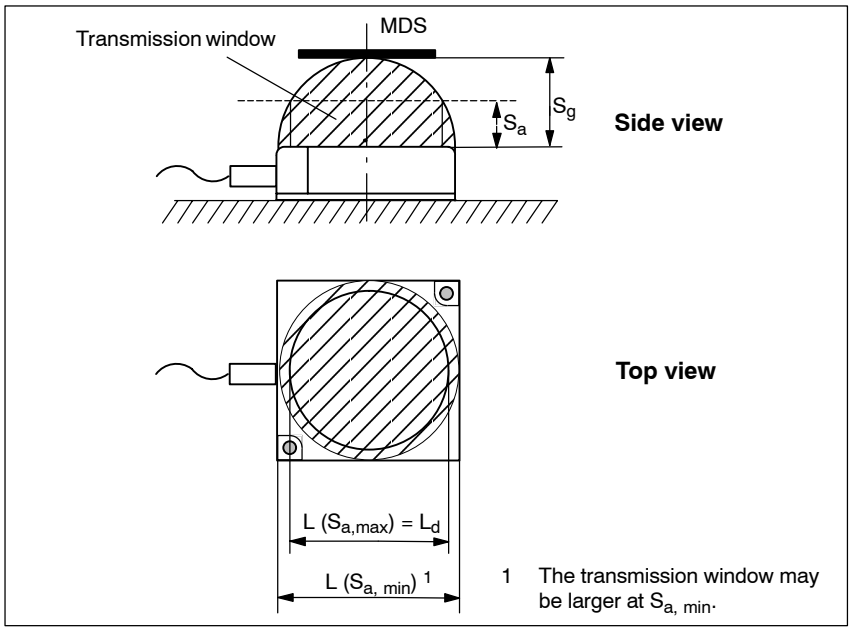


Figure 5-12 Transmission window of the ANT 1

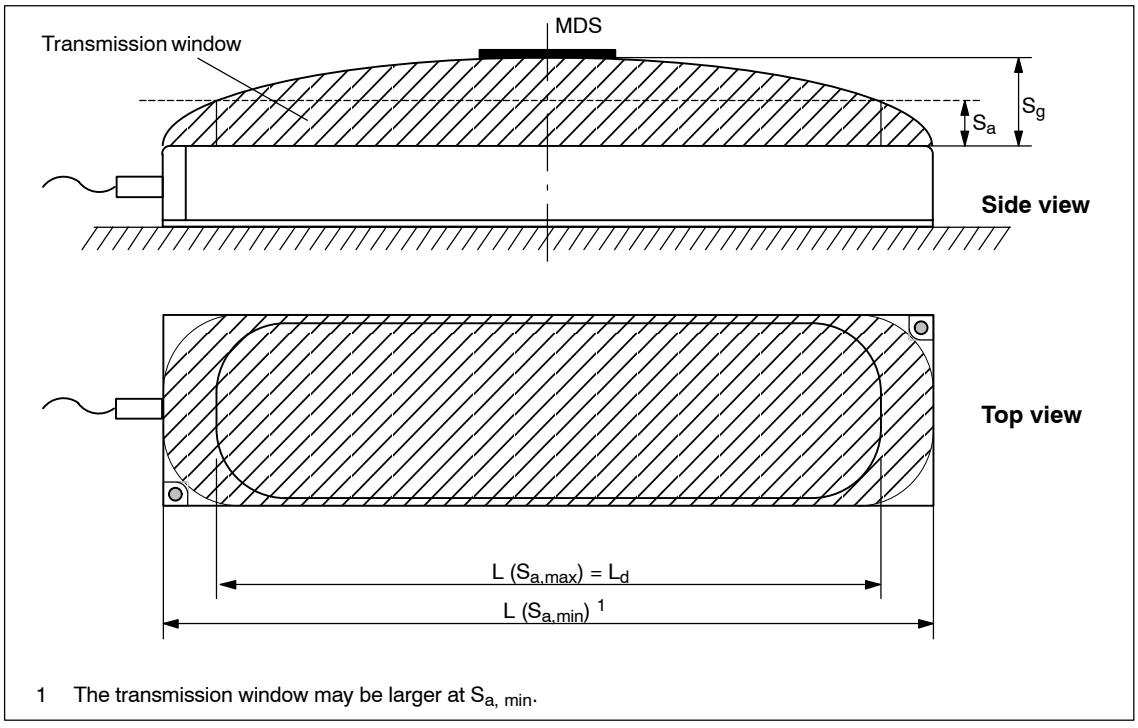


Figure 5-13 Transmission window of the ANT 4

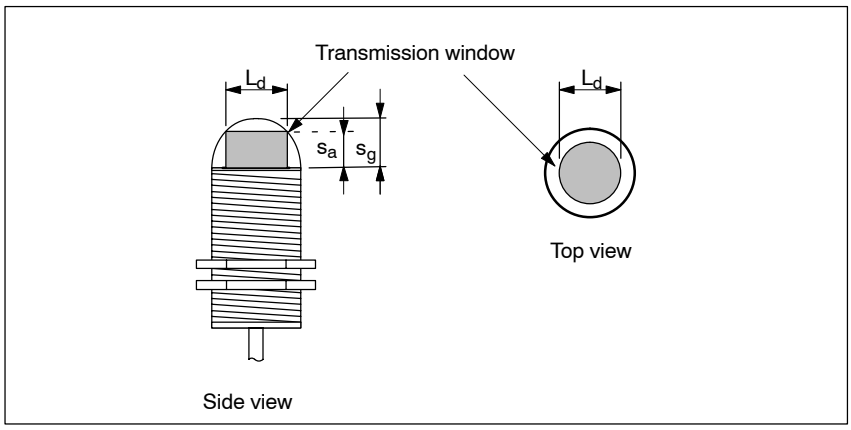


Figure 5-14 Transmission window of the ANT 12

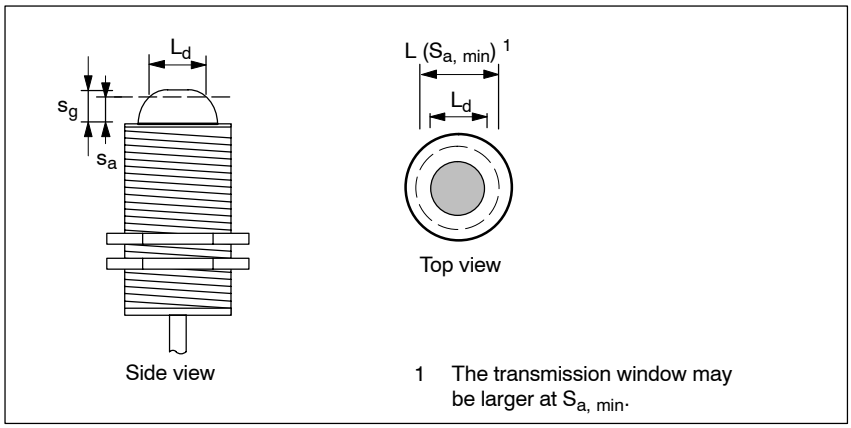


Figure 5-15 Transmission window of the ANT 18

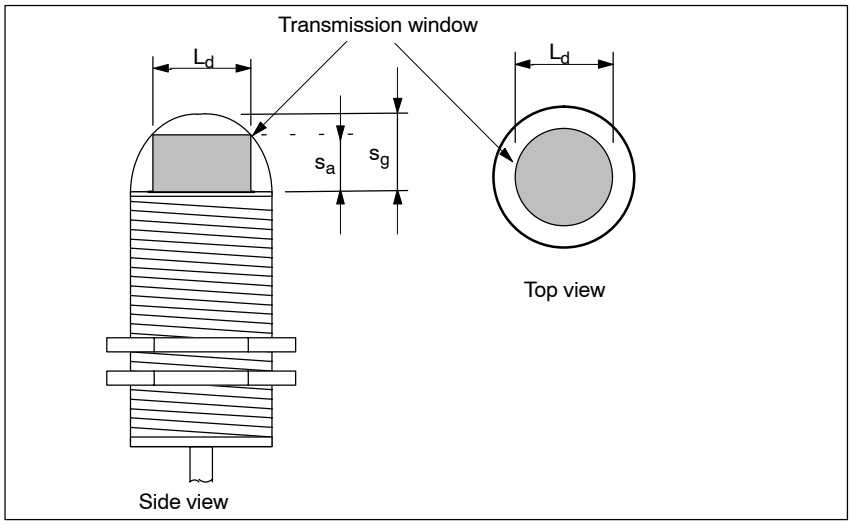


Figure 5-16 Transmission window of the ANT 30

Metal-free space

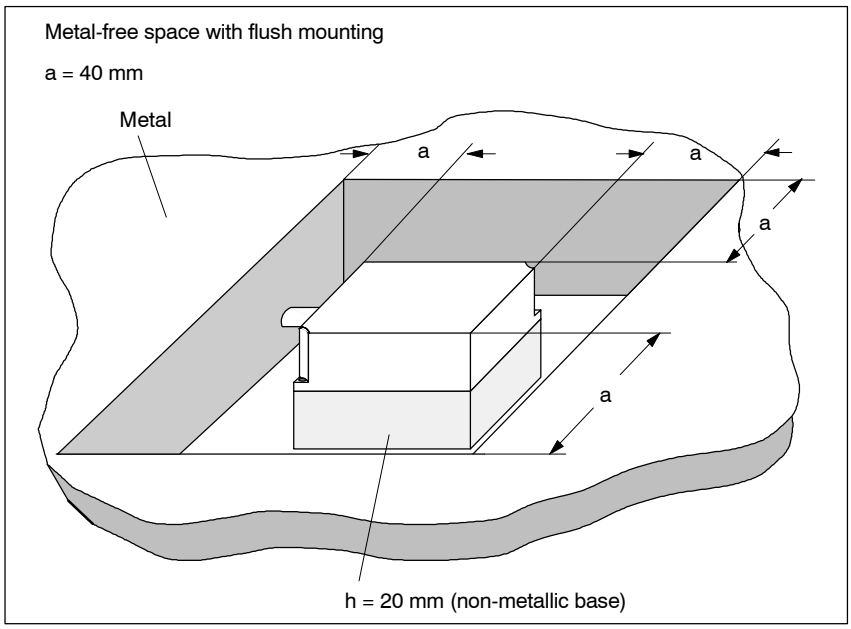


Figure 5-17 Metal-free space for the ANT 1

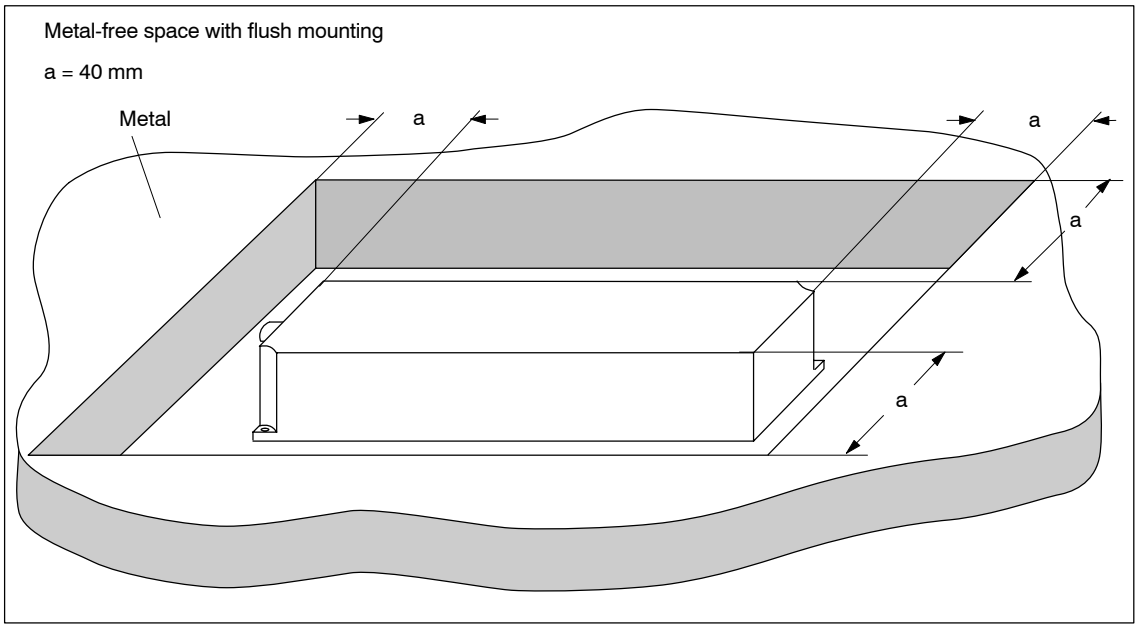


Figure 5-18 Metal-free space for the ANT 4

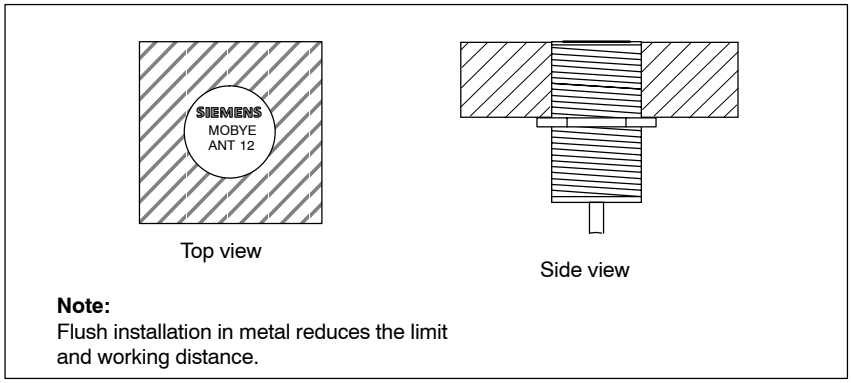


Figure 5-19 Metal-free space for the ANT 12

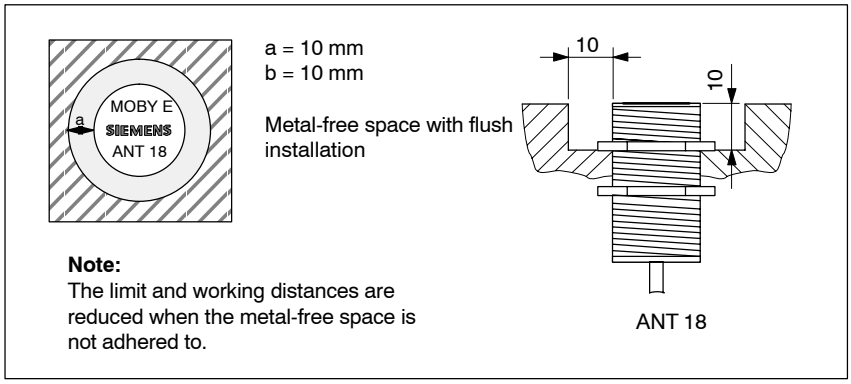


Figure 5-20 Metal-free space for the ANT 18

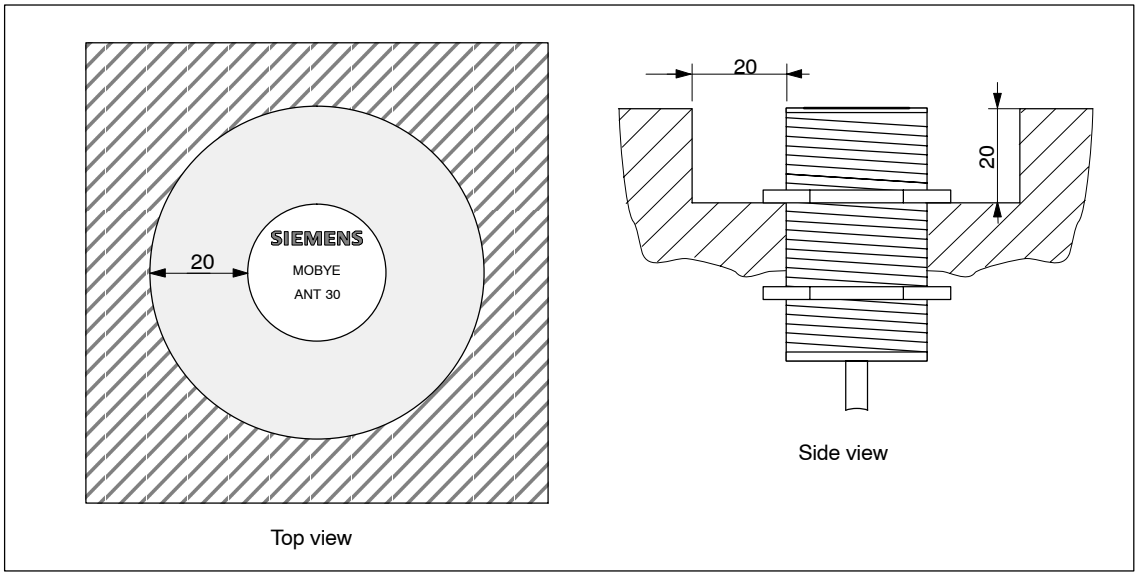


Figure 5-21 Metal-free space for the ANT 30

FCC information

Made in Germany

SIEMENS MOBY E SLG 75

FCC ID: NXWMOBYE-SLG75

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized changes and modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Definition of the Distance D

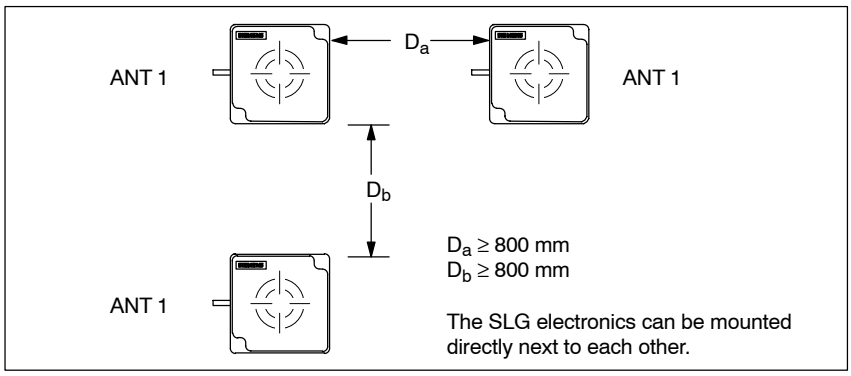


Figure 5-22 Distance D: ANT 1

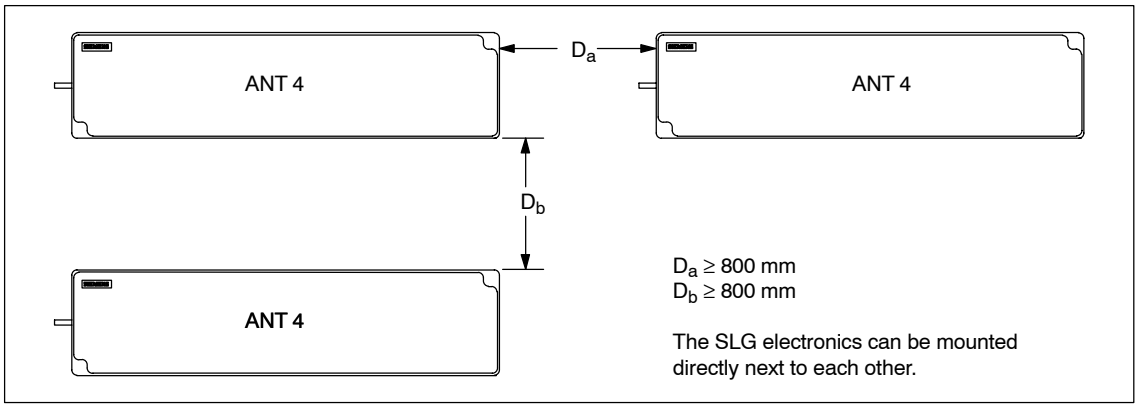


Figure 5-23 Distance D: ANT 4

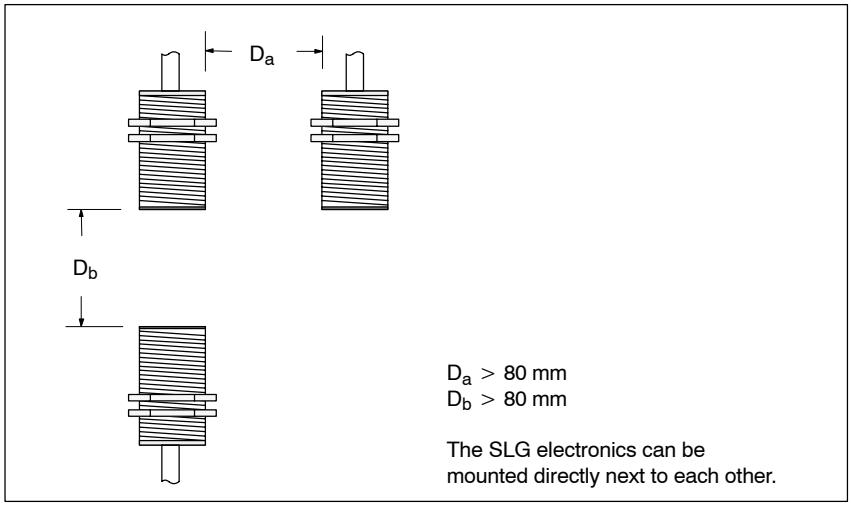


Figure 5-24 Distance D: ANT 12

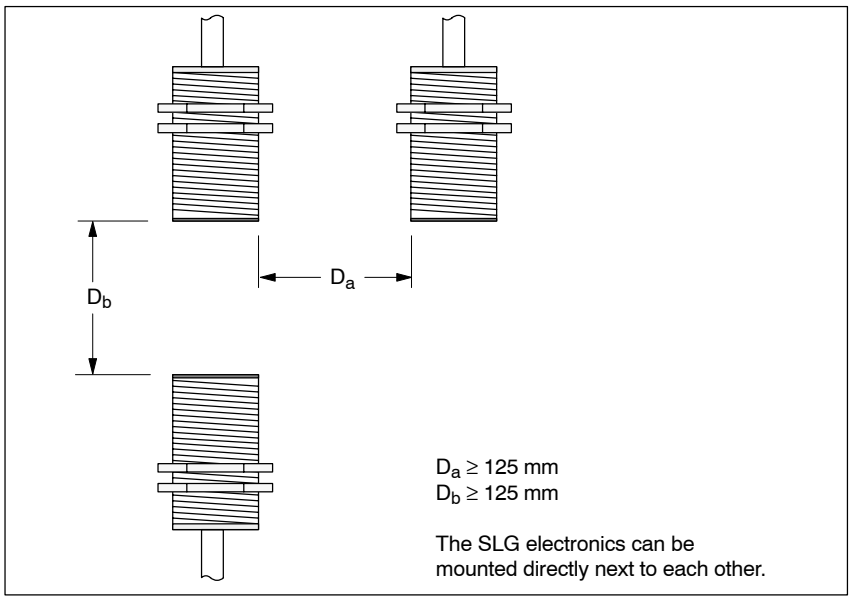


Figure 5-25 Distance D: ANT 18

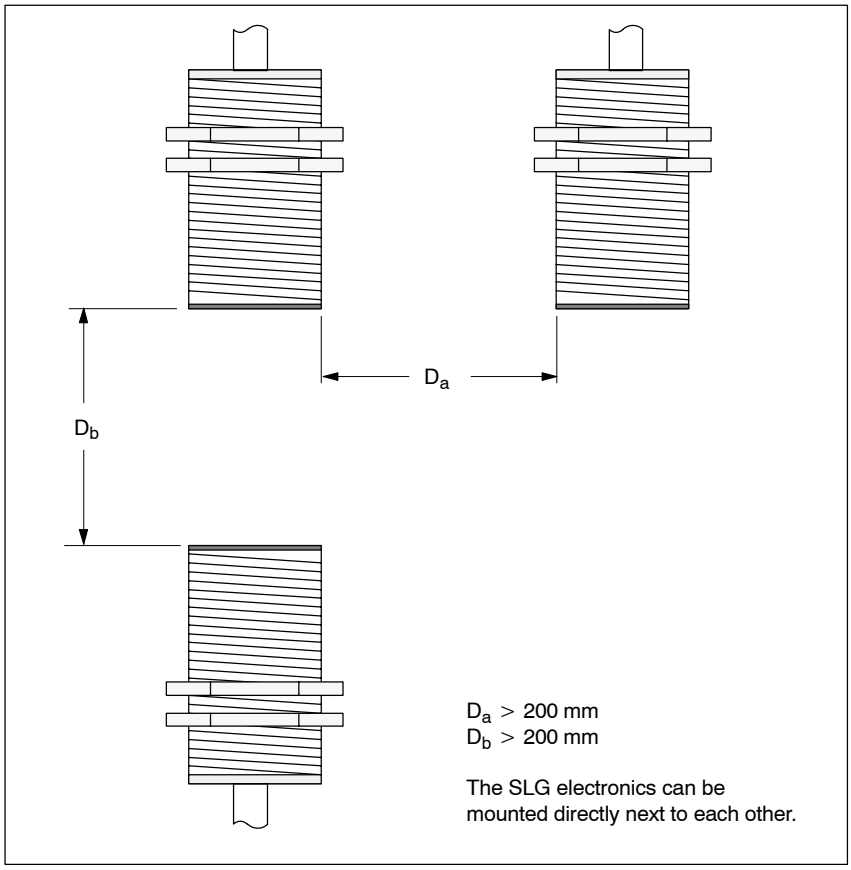


Figure 5-26 Distance D: ANT 30

Dimensions (in mm)

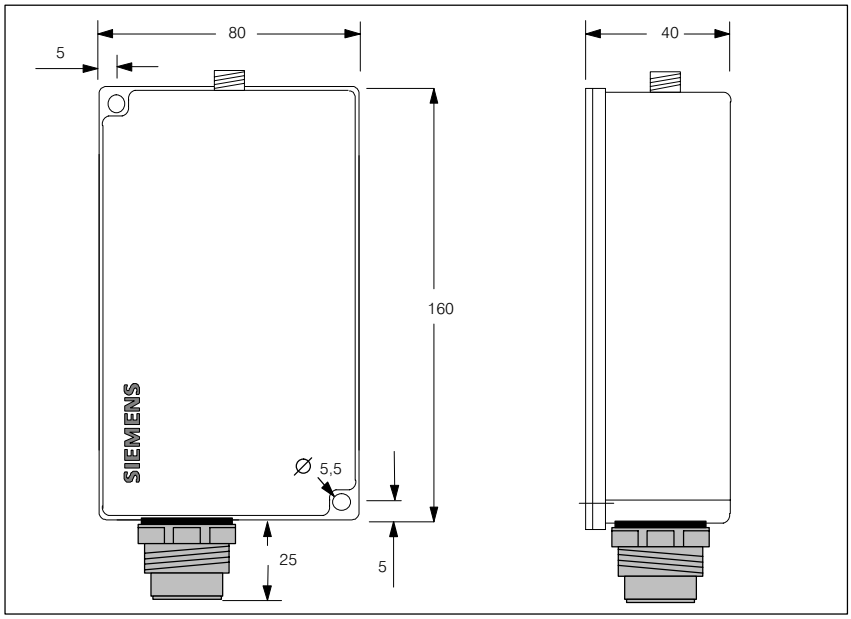


Figure 5-27 Dimensioned drawing of SLG 75

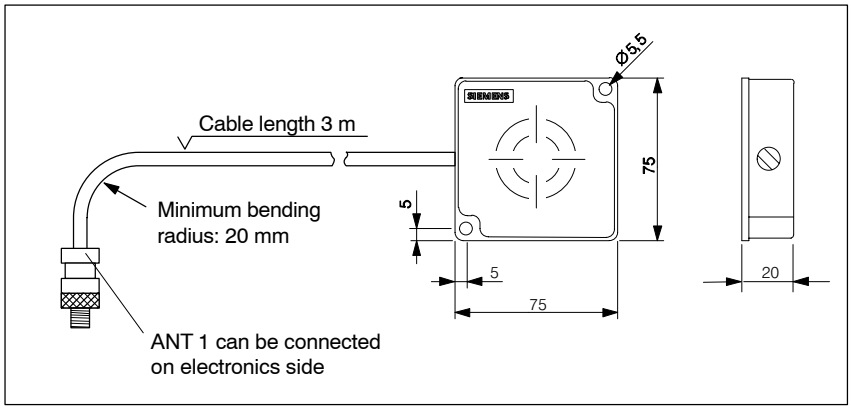


Figure 5-28 Dimensioned drawing of the ANT 1

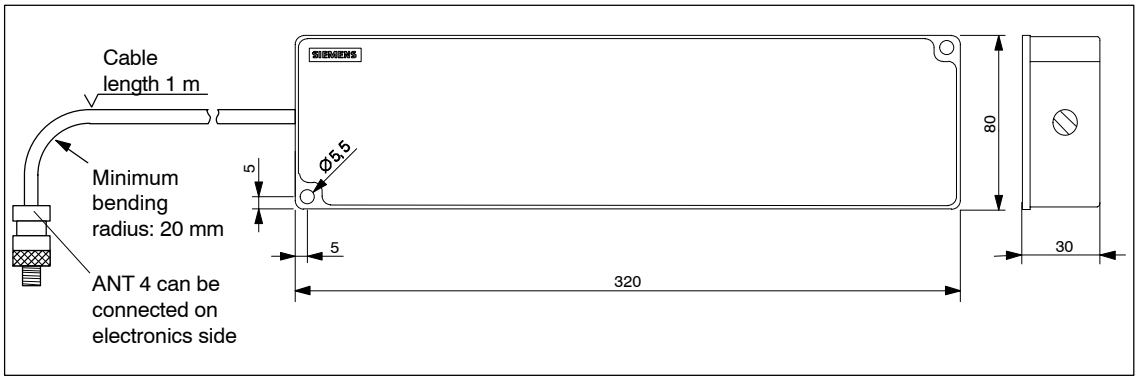


Figure 5-29 Dimensioned drawing of the ANT 4

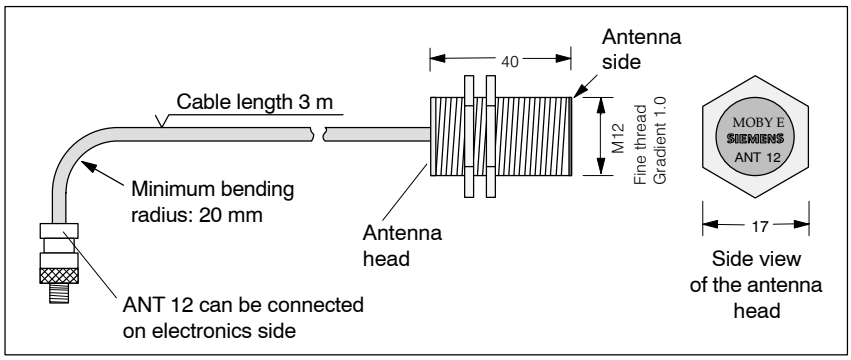


Figure 5-30 Dimensioned drawing of the ANT 12

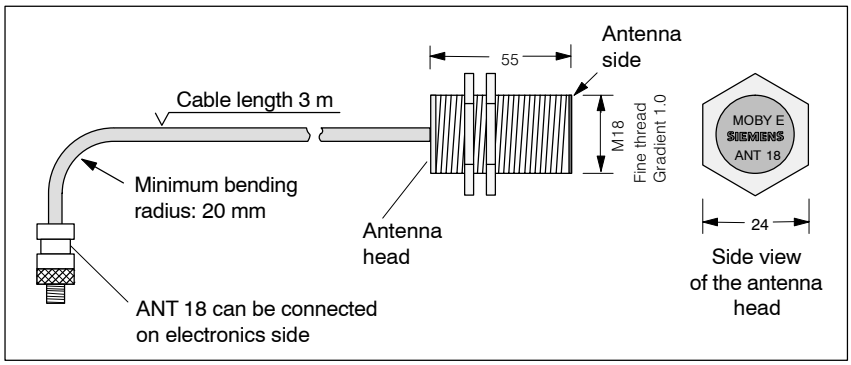


Figure 5-31 Dimensioned drawing of the ANT 18

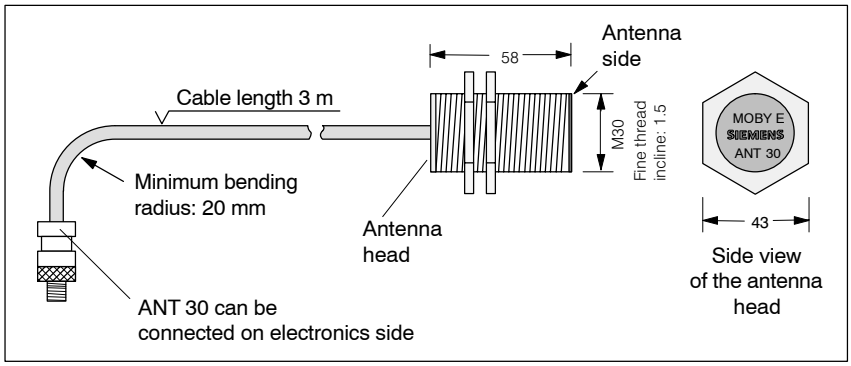


Figure 5-32 Dimensioned drawing of the ANT 30

Note

The length of the line between antenna and evaluation unit is 3 m. The length cannot be changed.

Caution

The antenna must not be removed in an energized state.

Cores to the SLG 75

Notes on mounting for split toroidal cores

Connect the 2 split toroidal cores included with the SLG 75 (order number 6GT2 398-1AF00) just behind the ASM plug connector if you are using standard SLG stub lines (see table 5-10) or cables which have made youself.

1. Close the plastic ferrite shells over the connecting cable.
2. Secure the ferrite shells using a cable binder to prevent them slipping (see Figure 5-33)

Table 5-10 Standard connecting cables which will take split toroidal cores

Connecting cables	Ordering number
SLG 75 – ASM 400/424/454	6GT2 091-0A...[1] 6GT2 091-2A...[1]
SLG 75 – ASM 410	6GT2 091-0D...[1] 6GT2 091-2D...[1]
SLG 75 – ASM 450/452/473	6GT2 091-1C...[1] 6GT2 091-2C...[1]
SLG 75 – ASM 470/475	6GT2 091-0E...[1] 6GT2 091-2E...[1]

1 For cable lengths, see chap. 3.7.4.

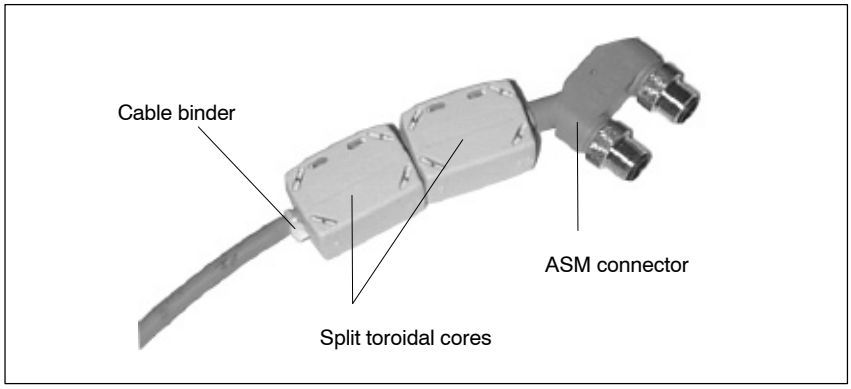


Figure 5-33 ASM 450 connecting cables with split toroidal cores (example)

Note

If your cables have diameters greater than 8 mm, please contact **Customer Support**:

Telephone: +49 (180) 5050-222

Fax: +49 (180) 5050-223

E-Mail: adsupport@siemens.com

Internet: http://www.siemens.com/automation/service&support

Notes on mounting for round cores

It may be necessary to install the included round cores on the antenna lines (ANT 1, ANT 4, ANT 12, ANT 18, ANT 30) under certain conditions:

- When several antennas are mounted close together
- When several antennas interfere with each other due to coupling via metallic structures (see chap. 3.4.3)

In this case, the round cores must be installed as shown in figure 5-34 directly behind the plug connector of the antenna line.
The cores prevent common-mode currents, among others, and ensure interference-free operation.

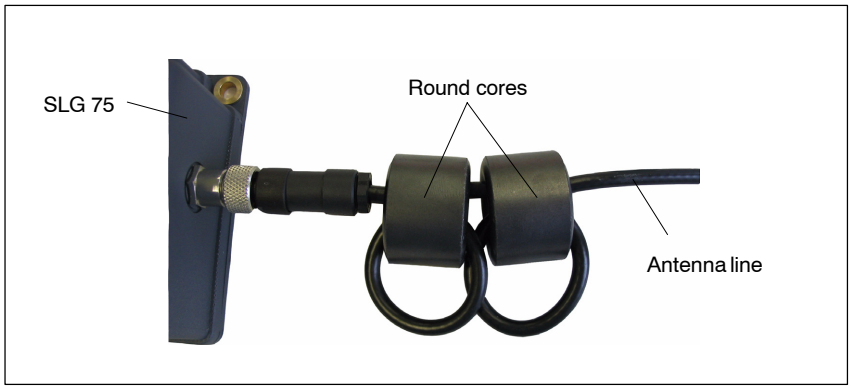


Figure 5-34 Antenna line with round cores

Note

When serveral SLG 75s are connected to one ASM, the antenna cables (ANT 1, ANT 4, ANT 12, ANT 18, ANT 30) of the individual SLGs must be installed **separately from each other** to prevent interference in communication.
Bundled installation of the antenna cables may cause communication problems.

5.4 SLA 71

Application area

The SLA 71 is a read/write antenna in the middle of the performance range. It permits greater distances to the evaluation unit (ASM).
The length of the line between antenna and evaluation unit is 55 m (max.).
The SLA 71 can be connected to the following: ASM 724 and ASM 754.

Figure 5-35 Read/write antenna SLA 71

Ordering data

Table 5-11 Ordering data for the SLA 71

Read/write antenna SLA 71	6GT2 301-2BB00
Accessories:	
Standard connecting cable between SLA 71 ↔ ASM 724 and ASM 754; length 5 m (not included with the product)	6GT2 391-1AH50
Extension for antenna line 6GT2 391-1AH50 Length 25 m	6GT2 391-1BN25

Technical data

Table 5-12 Technical data of the SLA 71

Inductive interface to MDS	
Read/write distances (SLG - MDS), max.	100 mm (see field data)
Transmission frequency	13.56 MHz
Serial interface to ASM	RS 422
Data transmission speed	106 kbps
Line length to ASM, max.	55 m
Voltage (only via ASM)	12 V DC
Current consumption at room temperature	160 mA (typical)
MTBF (at +40 °C)	1 x 10^5 hours

Table 5-12 Technical data of the SLA 71

Housing	
Dimensions without connecting cable (L x W x H in mm)	75 x 75 x 20
Color	Anthracite
Material	Polyamide 12
Connector	0.5 m cable with 8-pin M12 connector (pin on device side)
Protection rating in accordance with EN 60529	IP67
Shock in accordance with EN 60721-3-7/class 7M2 Total shock response spectrum, type II	30 g[1]
Vibration in accordance with EN 60721-3-7/class 7M2	5 g (9 to 200 Hz)[1] 10 g (200 to 500 Hz)[1]
Mounting of the SLA 71	2 M5 screws
Tightening torque at 20 °C	≤ 2 Nm
Ambient temperature	
During operation	–25 °C to +70 °C
During transportation and storage	–40 °C to +85 °C
Weight without connecting cable (approx.)	150 g

1 **Warning:** The values for shock and vibration are maximum values and must not occur continuously.

Field data

Table 5-13 Field data of SLA 71

Working distance (Sa)	10 to 70 mm
Limit distance (S_g)	100 mm
Diameter of the transmission window (L_d)	Depends on MDS
Minimum distance from SLA to SLA (D)	D_a > 800 mm

Transmission window

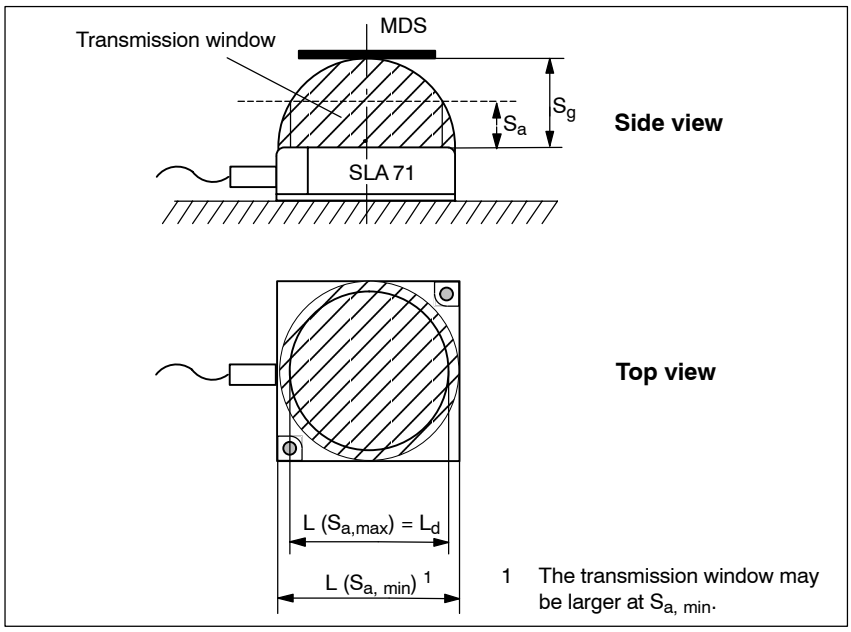


Figure 5-36 Transmission window of the SLA 71

Metal-free space

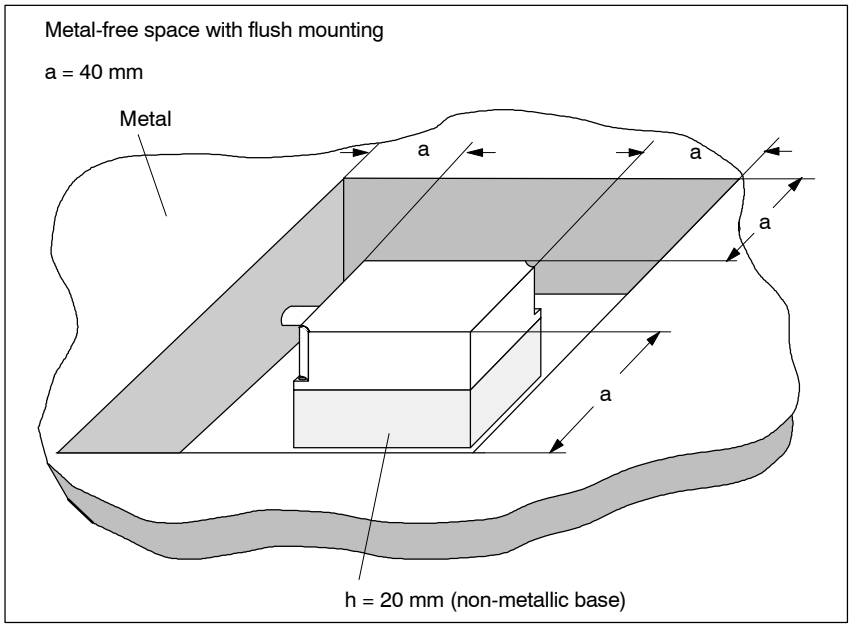


Figure 5-37 Metal-free space for SLA 71

FCC information

Made in Germany

SIEMENS MOBY E SLA 71

FCC ID: NXWMOBYE-SLA71

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized changes and modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Definition of the distance D

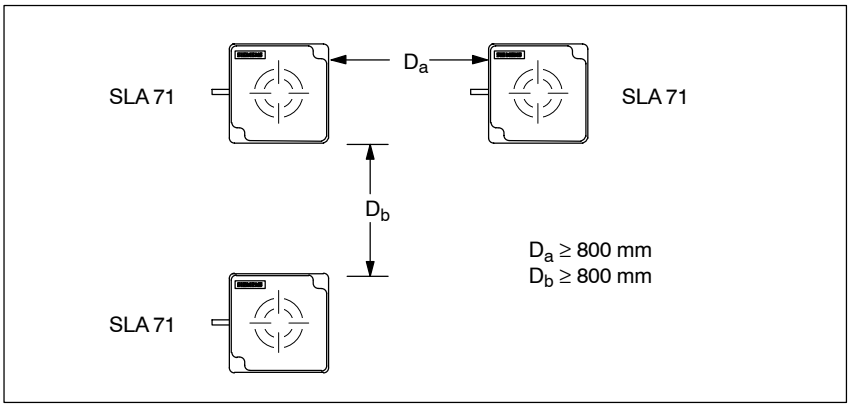


Figure 5-38 Distance D: SLA 71

Dimensions (in mm)

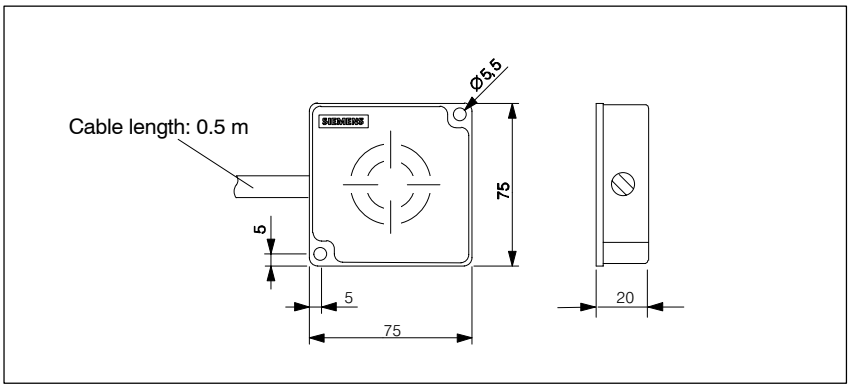


Figure 5-39 Dimensioned drawing of SLA 71

Interfaces

6

6.1 Introduction

Application area

ASM interfaces provide the link between MOBY E components (i.e. SLGs/ SLAs and MDSs) and higher level controllers (e.g., SIMATIC S 5/S7), PCs or computers. Up to four SLGs/SLAs can be connected depending on the interface used.

Layout and functions

An ASM consists of a microcontroller system with its own program stored on a PROM. The CPU receives commands via the user interface and stores these in the RAM. The user receives an acknowledgment that the command has arrived. When the command is correct, the CPU begins execution.

Overview

Table 6-1 Overview of the interfaces

ASM type	Interfaces to PC/computer	Interfaces to SLG/ SLA	Function blocks	SLG/ SLA connections	Dimensions (WxHxD in mm)	Temperature range (during operation)	Protection Rating
ASM 400	Can be installed in S5-115-155U	9-pin subminiature D socket	FB 250/ 230/252	1 per CM 4 per ASM		0 to +55°C	IP00
ASM 410	Can be installed in S5-100U/ ET 200U	Can be connected via bus module		2 (multiplex)	45 x 135 x 100	0 to +60°C	IP20
ASM 424	RS 232 RS 422	9-pin subminiature D socket	MOBY API	4 (parallel)	205 x 130 x 60	–25 to +55 °C	IP40
ASM 450	To PROFIBUS DP (screw connection)	2 5-pin proximity switch connectors	FC 46 FB 240	2 (multiplex)	134 x 110 x 55	0 to +55°C	IP67
ASM 452	PROFIBUS DPV1	2 5-pin proximity switch connectors	FC 45	2 (quasi-parallel)	134 x 110 x 55	0 to +55°C	IP67
ASM 454	PROFIBUS DPV1	9-pin subminiature D socket	FC 45	4 (parallel)	205 x 130 x 60	–25 to +55 °C	IP40
ASM 456	PROFIBUS DPV1	2 8-pin M12 connector socket	FC 45 FB 45 FC 55 FB 55	2 (parallel)	60 x 210 x 54 resp. 79	0 to +55 °C	IP67
ASM 470	Can be installed in S7-300/ ET 200M	Via screw terminals	FC 47 FB 47	2 (multiplex)	40 x 125 x 120	0 to +60°C	IP20

Table 6-1 Overview of the interfaces

ASM type	Interfaces to PC/computer	Interfaces to SLG/ SLA	Function blocks	SLG/ SLA connections	Dimensions (WxHxD in mm)	Temperature range (during operation)	Protection Rating
ASM 473	Connectable to the ET 200X	2 5-pin proximity switch connectors	FC 45	1	87 x 110 x 55	0 to +55°C	IP67
ASM 475	Can be installed in S7-300/ ET 200M	Via screw terminals	FC 45	2 (parallel)	40 x 125 x 120	0 to +60°C	IP20
ASM 724	RS 232/RS 422 (9-pin subminiature D socket)	9-pin subminiature D socket	MOBY API	4 x SLA (multiplex)	205 x 130 x 60	-25 to +55 °C	IP40
ASM 754	PROFIBUS DPV1 (9-pin subminiature D socket)	9-pin subminiature D socket	FC 45	4 x SLA (multiplex)	205 x 130 x 60	-25 to +55 °C	IP40
SIM 7x	RS 232/RS 422 (15-pin subminiature D connector)	Integrated	3964R driver MOBY API C-lib	---	160 x 80 x 40 (without ext. ANT)	-25 to +70 °C	IP67 (with special connector)

6.2 ASM 400

6.2.1 Overview

Application area

ASM 400/401 interfaces can be directly installed and operated in the following SIMATIC S5 programmable controllers.

- S5-115U/F (all CPUs)
- S5-135 U (all CPUs)
- S5-155U/H (all CPUs)

Configuration and functions

The ASM 400 interface modules consist of the basic module in double-height Eurocard format and the CM 422 channel module. The basic module can be configured with one to four channel modules. Mixed configuration is not permitted.

The ASM 400 interface module with the CM 422 works in the SIMATIC S5 I/O area. A maximum of 32 channel modules can be used with the FB 250 function block in one SIMATIC (this corresponds to eight four-channel interface modules). When the FB 252 is used, the maximum number of channel submodules is increased from 32 to 96 per SIMATIC S5. All MDS models can be processed via the FBs. The user addresses the data on the MDS via a command table in the data block. The user addresses user data via absolute addresses.

Note

To achieve optimal transmission times, the length of the block should not exceed 150 bytes per command.

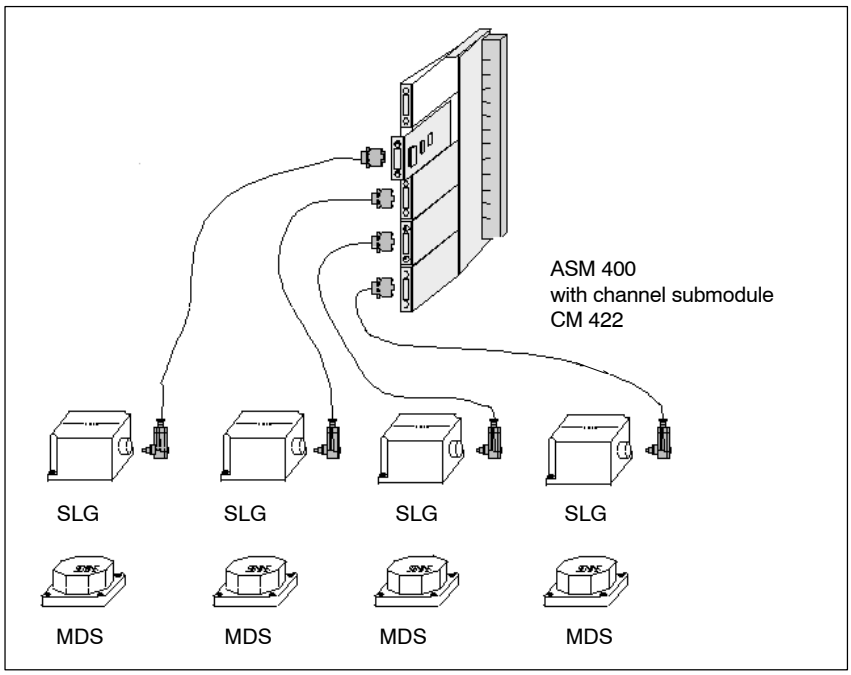


Figure 6-1 Configurator of ASM 400

Communication between ASM 400 and user program

Communication time between ASM 400 and user depends on two factors.

- Cycle time and type of programmable controller
- Software used (i.e. FB 250)

Communication between ASM 400 and user can be divided into three steps.

- The user issues a command and starts it. The next time the FB is called, the command is transferred to the ASM and acknowledged by the ASM.
- The ASM executes the command with the MDS. The user and the FB are in wait status. Data communication with the MDS begins as soon as an MDS enters the transmission window of the SLG. The MDS data are stored intermediately on the ASM and checked for correctness.
- ASM communication with the MDS is concluded. When the FB is called the next time, the data which have been read or written are transferred from the ASM to the user. The user receives a finished message.

Ordering data

Table 6-2 Ordering data for the ASM 400

	Order No.
ASM 400 interface consisting of a basic module and CM 422 channel submodule	
Basic module with connection to STG, with 4 slide-in slots for CM 422 channel module, without channel module	6GT2 002-0AA00
CM 422 channel module	6GT2 002-0AB00
Connector, ASM side, 9-pin subminiature D connector (pins) with screw-type terminal for plug-in line between an ASM 400 and SLG/STG	
• 1 unit	6GT2 090-0BB00
• 1 pack (10 units)	6GT2 090-0BB10
Connector, 2-pin connector with screw-type terminal for plug-in line up to 1.5 mm in diameter for 24 V DC connection (included with the ASM 400)	6GT2 090-0NA00
MOBY software[1] with FB230/240/250	6GT2 080-2AA10
Plug-in lines and accessories	See Section 3.7
Description of ASM 400/401 German English	Electronically available on “Software MOBY” CD
Description FB 250 for ASM 400 German English	Electronically available on “Software MOBY” CD

1 See Section 7.1

Technical data

Table 6-3 Technical data of the ASM 400

Channel module	CM 422	
Serial interface to SLG	RS 422	
Connector	9-pin subminiature D socket	
Max. interface/line length	RS 422/1000 m, depending on SLG type	
SLG which can be connected	1 SLG per CM	
Software functions		
Programming	With STEP 5 function block FB 250	
Commands	Read data, write data, initialize MDS	
	Access directly via addresses	
Supply voltage	5/24 V DC via internal bus	
Interfaces	**ASM 400**	
Interfaces for CM/SLG ASM 400 (max.)	4 CM 422	
Interface to STG 4F	RS 422, 9-pin subminiature D socket	
Interface for 24 V DC	2-pin connector (included)	
Supply voltage		
Nominal value	5/24 V DC	
Perm. range		
Internal (at 5 V)	4.75 to 5.25 V DC	
External (at 24 V)	20 to 30 V DC	
Max. current consumption		
internal (at 5 V)	1 channel	370 mA
	2 channels	490 mA
	3 channels	610 mA
	4 channels	730 mA
External (at 24 V)	1 channel	400 mA
	2 channels	800 mA
	3 channels	1200 mA
	4 channels	1600 mA
Fine-wire fuse	M 1.25 A/250 V	
Ambient temperature		
During operation	0 to +55 °C	
During transportation and storage	–20 to +70 °C	
Rel. humidity at 25 ° C	< 95 %	
Space requirements	1 SEP (1 SEP = 15.24 mm)	
Approximate weight		
ASM 400	0.44 kg	
CM 422	0.1 kg	

Function block FB 250

Function block FB 250 controls data transmission between the STEP5 program and the ASM 400 interface module.

FB 250 can be used on the following “programmable controllers.”

- 115U/F
- 135U-R/S
- 155U/H

FB 250 does not use system commands. All MDSs can be processed with FB 250.

Primary functions of FB 250

- Convert data from user parameterization structure to structure of an ASM
- All communication with the ASM via command data exchange
- Error handling: command repetition;
  Preparation of errors for the user

Chaining of several partial commands into one complete command

- Reading and writing with a user command
- Any address areas of a mobile data memory can be processed with one command.
- Control of PLC cycle load via the user

Data transmission between FB and MDS can be subdivided into three phases.

- Supply interface with the appropriate command and the data or parameter
- Transmit the data between ASM 400 and MDS
- Supply S5 with appropriate parameters or data from the interface

When the P address area is available, FB 252 also supports operation of the ASM 400 in the expanded Q address area.

6.2.2 Hardware Description

Connectors and their assignment

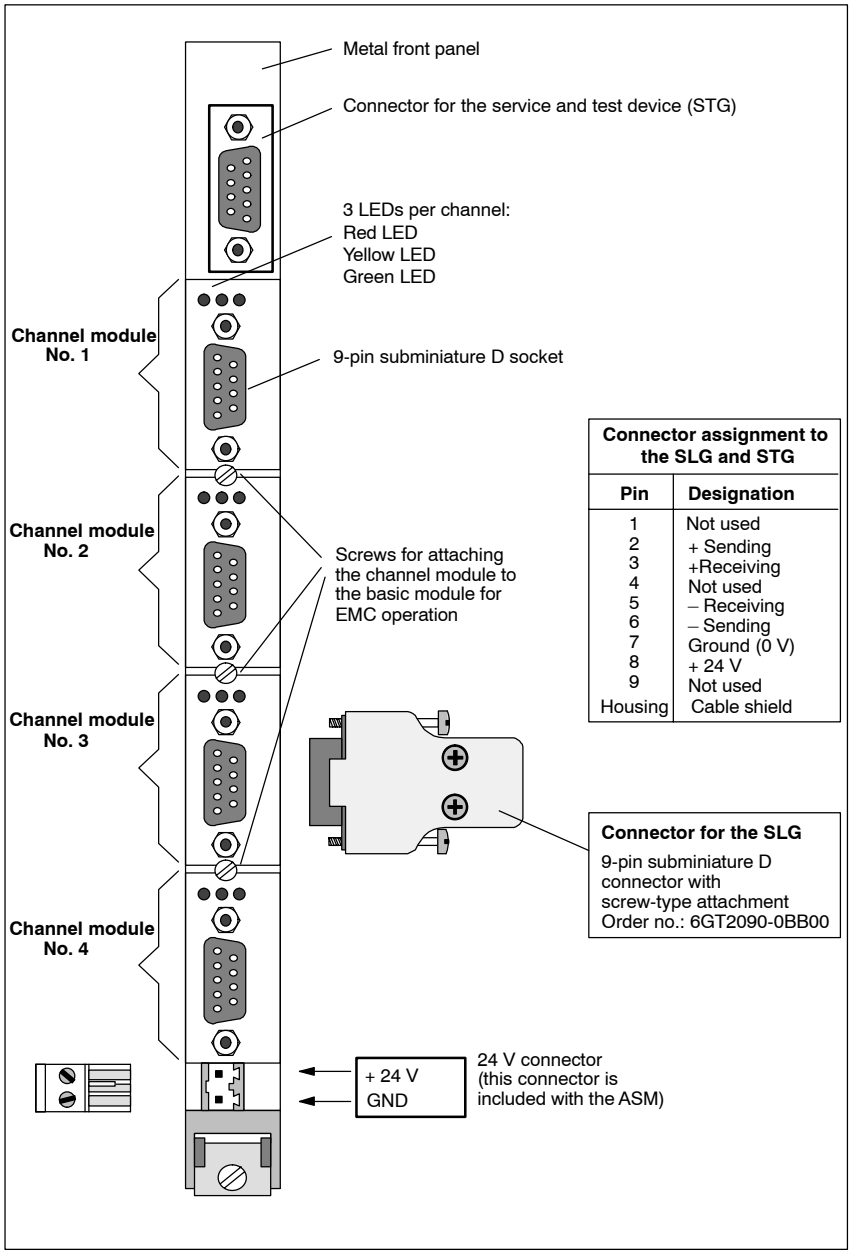


Figure 6-2 Connectors and their assignment for the ASM 400

Switches and plug-in jumpers

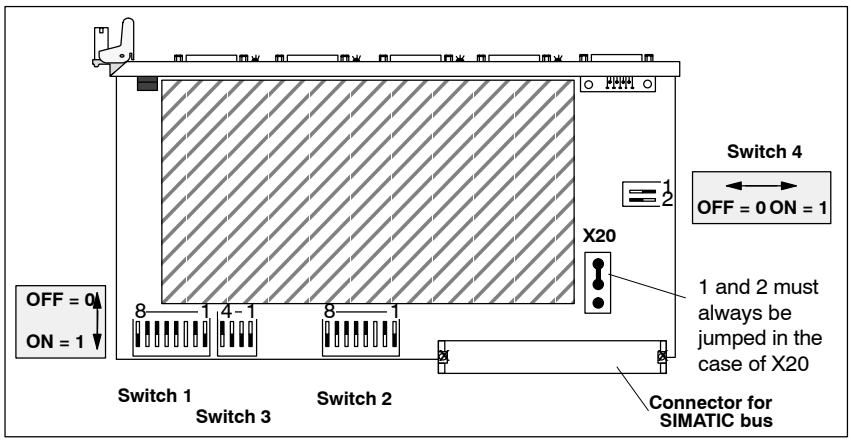


Figure 6-3 Switches and plug-in jumpers for the ASM 400

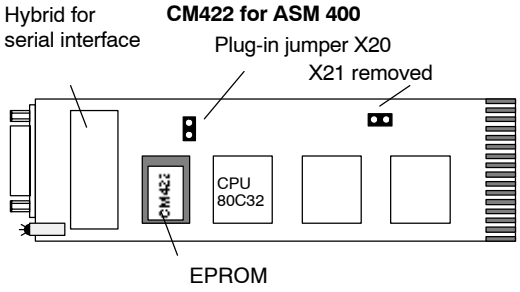
Address settings

S4 = setting the addressing mode
S2 = setting the page frame number
S3 = setting the module address (linear addressing with PESP)
S1 = address setting without PESP

Table 6-4 Address settings for ASM 400 with FB 250/252

ASM 400 switch setting			FB 250 parameterization		FB 252 parameterization	
Start address of ASM	**Switch S3 4 3 2 1**	**Switch S4 2 1**	**ADR**	**KAN***	**QADR**	**KAN**
0	0 0 0 0	0 1	Not available		0	1 - 4 (Corresponds to channel module 1 to 4)
16	0 0 0 1	This setting of switch 4 must always be used when the module is operated in standard mode.			16	
32	0 0 1 0				32	
48	0 0 1 1				48	
64	0 1 0 0				64	
80	0 1 0 1				80	
96	0 1 1 0				96	
112	0 1 1 1				112	
128	1 0 0 0		128	1 - 4 (Corresponds to channel module 1 to 4)	128	
144	1 0 0 1		144		144	
160	1 0 1 0		160		160	
176	1 0 1 1		176		176	
192	1 1 0 0		192		192	
208	1 1 0 1		208		208	
224	1 1 1 0		224		224	
240	1 1 1 1		240		240	

Settings on the channel module



Plug-in jumper X20:

- Removed:
  normal mode
- Inserted:
  test mode; dialog to the mobile data memory is aborted earlier when malfunctions occur. This helps to pinpoint weak spots and malfunctions during commissioning.

Figure 6-4 Settings on the channel module

6.2.3 SIMATIC S5 Configuration

Module rack CR 700-0LA (S5-115U)

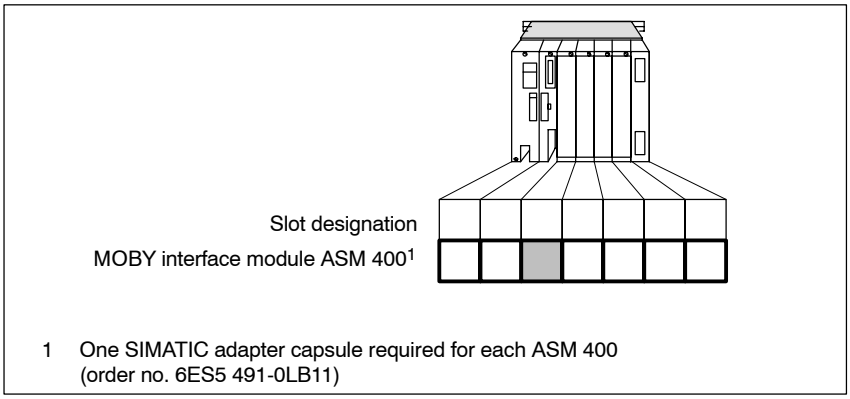


Figure 6-5 Module rack CR 700-0LA (S5-115U)

Module rack CR 700-0LB (S5-115U)

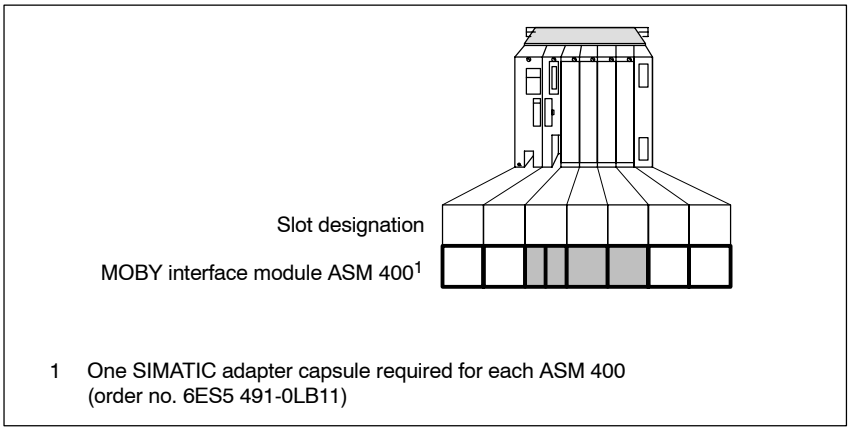


Figure 6-6 Module rack CR 700-0LB (S5-115U)

Module rack CR 700-1 (S5-115U)

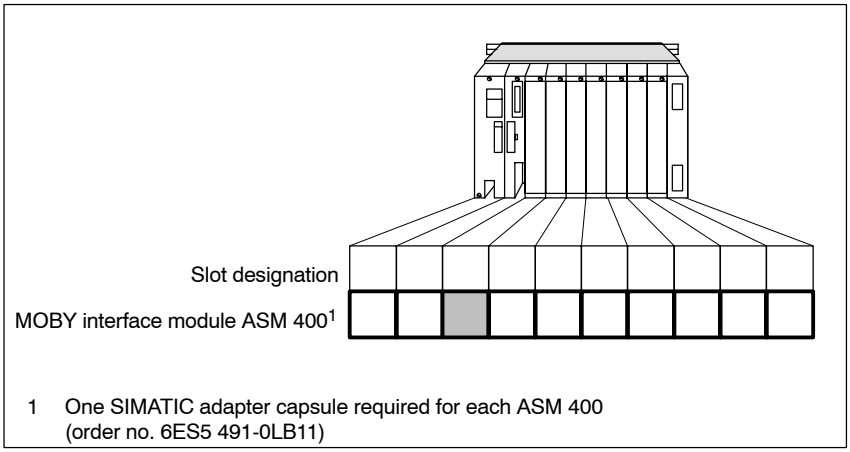


Figure 6-7 Module rack CR 700-1 (S5-115U)

Module rack CR 700-2 (S5-115U)

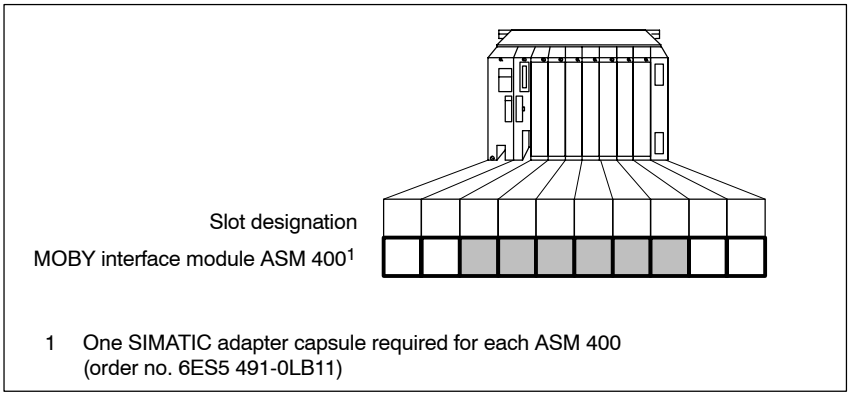


Figure 6-8 Module rack CR 700-2 (S5-115U)

Module rack CR 700-3 (S5-115U)

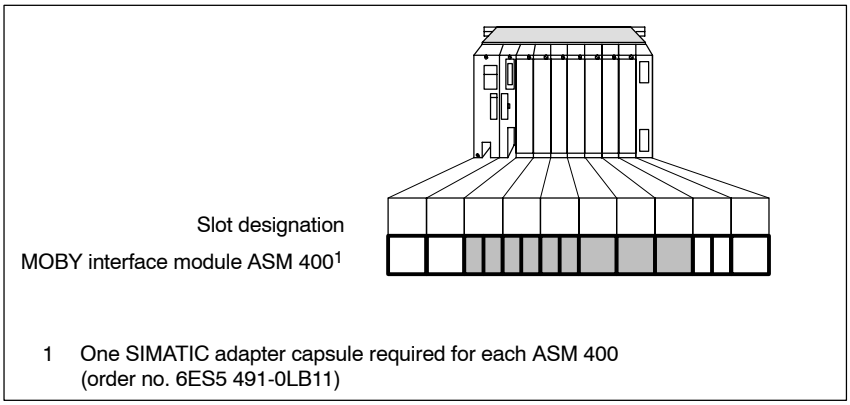


Figure 6-9 Module rack CR 700-3 (S5-115U)

Module rack ER 700-0; Rack ER 701-1 and ER 701-2

MOBY interface modules ASM 400 cannot be plugged in.

Module rack ER 701-3

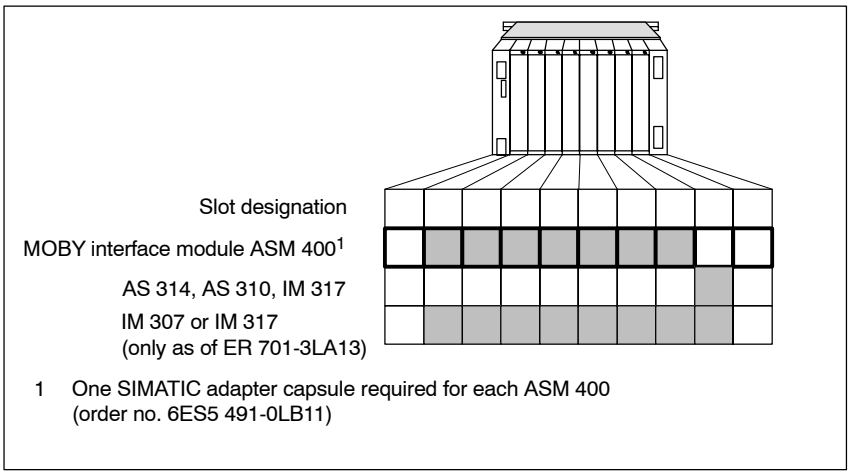


Figure 6-10 Module rack ER 701-3 (S5-115U)

Central controller S5-135U/ -155U

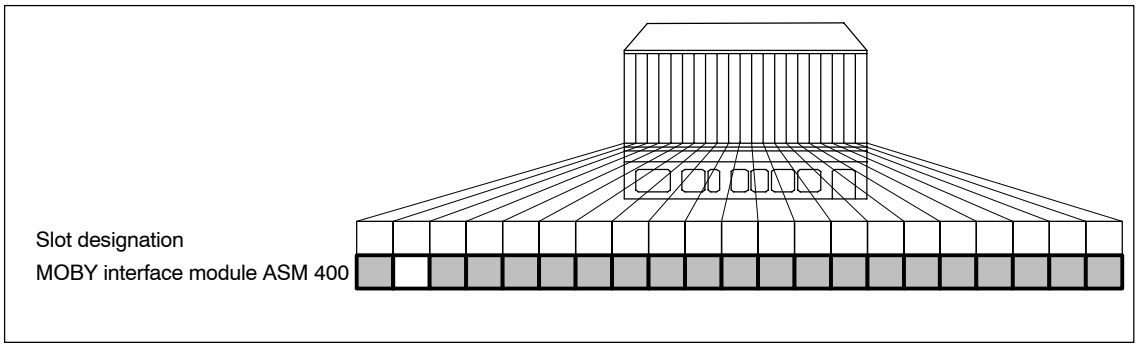


Figure 6-11 Central controller S5-135U/ -155U

Central controller S5-155U/ -155H

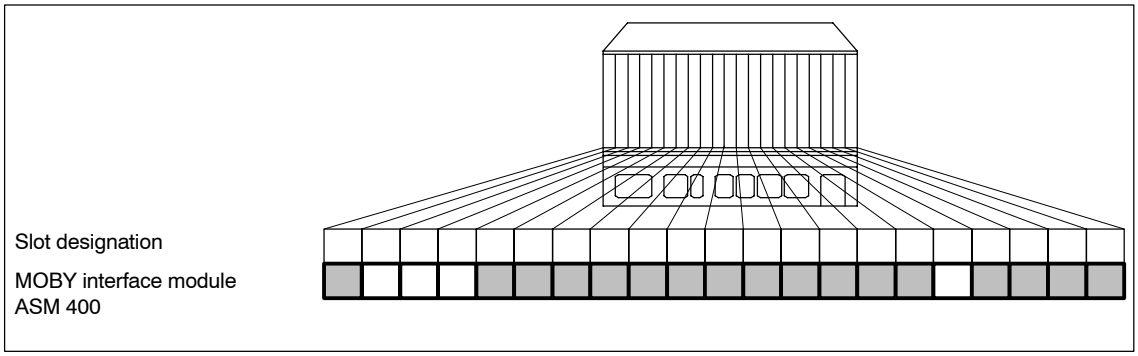


Figure 6-12 Central controller S5-155U/-155H

Expansion unit EG S5-183U

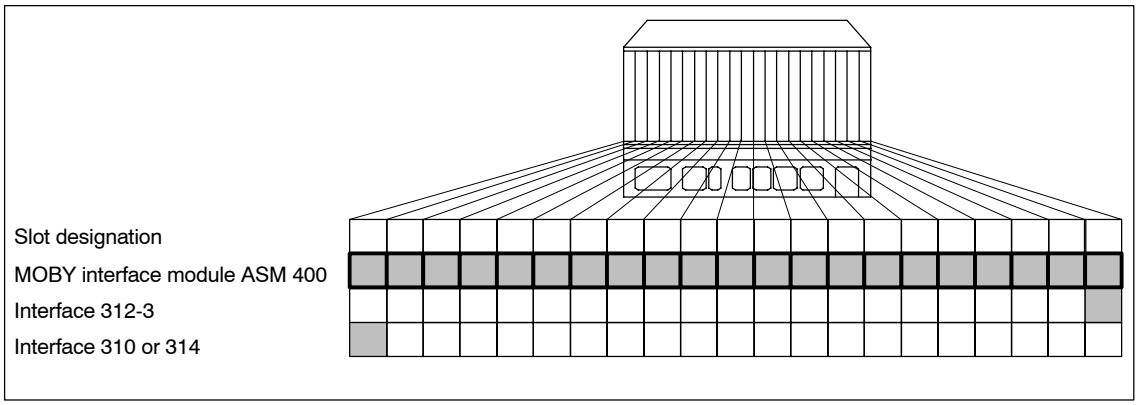


Figure 6-13 Expansion unit EG S5-183U for S5-135U/-155U

Expansion unit
EG S5-184U

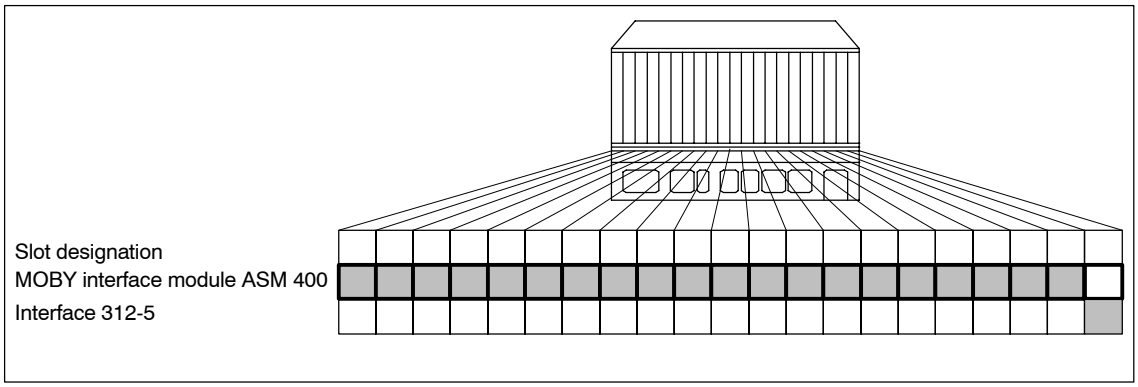


Figure 6-14 Expansion unit EG S5-184U for S5-135U/-155U

Expansion unit
EG S5-185U

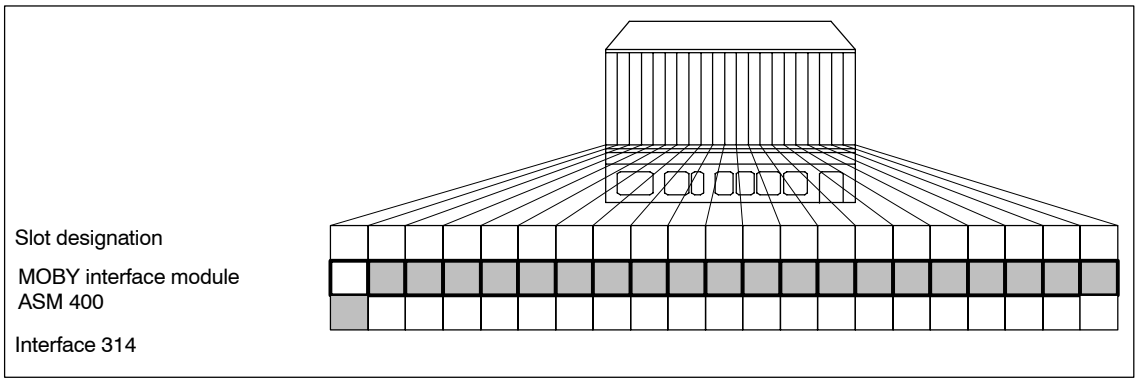


Figure 6-15 Expansion unit EG S5-185U for S5-135U/-155U/-155H

Expansion unit
EG S5-187U

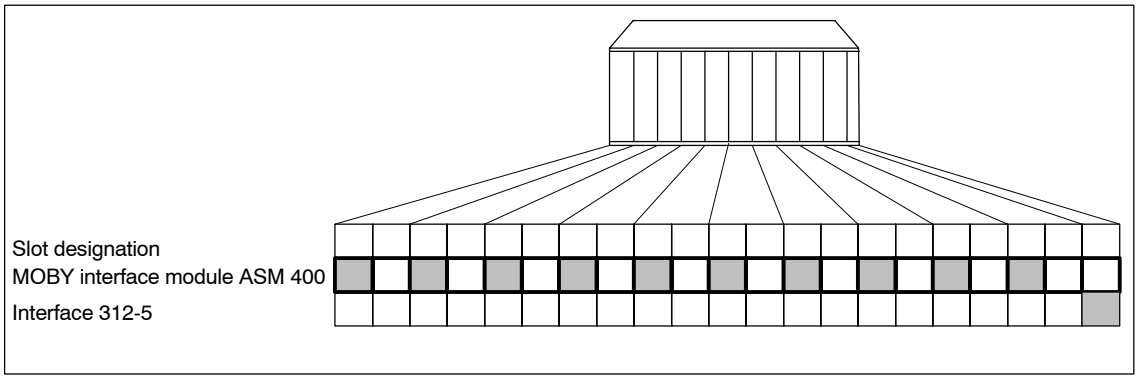


Figure 6-16 Expansion unit EG S5-187U for S5-135U/-155U

6.3 ASM 410

Application area

The ASM 410 interface can be used in the SIMATIC with the following:

- S5-90U (max. 2)
- S5-95U (max. 4)
- S5-100U (max. 8)
- ET 100U (max. 2)
- ET 200U (max. 4)

This ASM can be used with all mobile data memories, read/write devices and the STG service test device. Compatibility with all MOBY components is ensured.

Layout and function

LEDs for status and error indications are located on the front. Interference-immune design is provided by the galvanic isolation of the MOBY interface to the SIMATIC S5 bus. The MOBY commands are started and data are fetched by setting and scanning a few control bits in the process image (PIO/PII), and eight input/output bytes are assigned. In time-multiplex operation, one or two SLGs can be used. The MDS data are accessed via their absolute addresses.

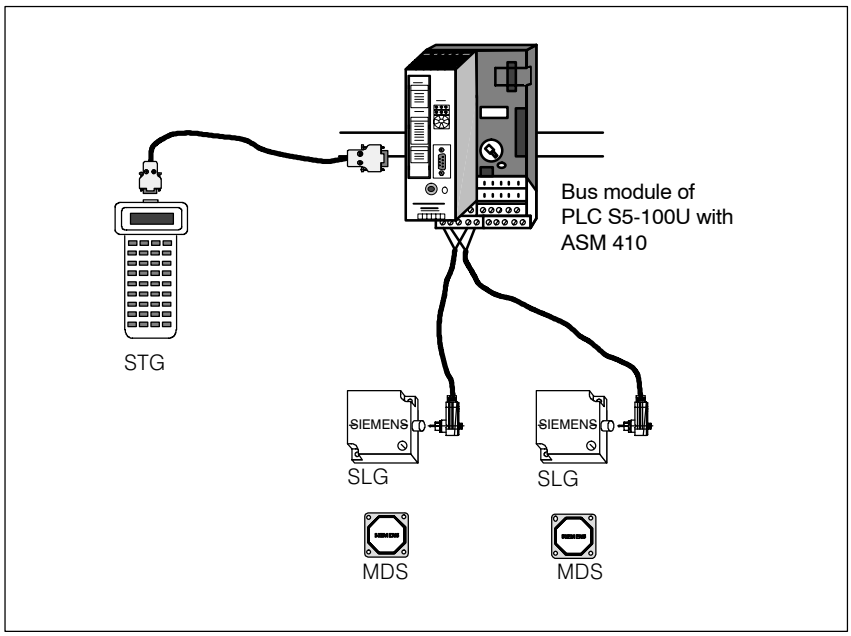


Figure 6-17 Configurator for ASM 410 in SIMATIC S5

Ordering data

Table 6-5 Ordering data for the ASM 410

	Order No.
ASM 410 interface	6GT2 002-0BA00
SIMATIC S5, bus module Screw-type connection Crimp connection, with crimp contacts, increased EMC resistance	 6ES5 700-8MA11 6ES5 700-8MA22
Plug-in lines and accessories	See Section 3.7
Description - ASM 410 German English	 Electronically available on “Software MOBY” CD

Technical data

Table 6-6 Technical data of the ASM 410

Serial interface to the SLG	RS 422
Max. connection	2 SLGs can be connected via a separate bus module
Line length/type, max.	1000 m/RS 422, depending on the SLG and cable type
SLG which can be connected	
• Static operation	2 SLG 7x
• Dynamic operation	1 SLG 7x
Interface to STG	RS 422, 9-pin subminiature D connector
Interface for 24 V DC	is fed via a separate bus module
Software functions	
Programming	With STEP 5 directly via process image (PIO/PII); no function block required; 5 bytes processed per command
Commands	Select channel 1 or 2, read MDS, write MDS, initialize MDS, etc.
Supply voltage	
Nominal value	24 V DC (residual ripple, max. of 10%)
Permissible range	20 to 30 V DC
Current consumption	
Internal (at 5 V) typical	20 to 60 mA (20 mA = long cycle time) (60 mA = short cycle time)
max.	110 mA (PLC in STOP)
External (at 24 V DC)	
All SLGs turned off	90 mA
Typical power consumption of the SLG (without SLG)	See SLG description 2.5 W
Cooling	Convection cooling
Isolation group	C in accordance with VDE 0110
Protection rating in accordance with EN 60529	IP20
Mech. stress	IEC 68-2-27
Ambient temperature	
During operation	
• Horizontal installation of SIMATIC	0 to +60 °C
• Vertical installation of SIMATIC	0 to +40 °C
During transportation and storage	–25 to +70 °C
Weight (approx.)	0.25 kg

Slots in the PLC S5-90U

The PLC S5-90U has a maximum of four slots available for additional modules. Up to two of these can be used by the ASM 410 module.

Slots in PLC S5-95U

ASM 410 in PLC S5-95U can only be operated with PLC S5-95U in slots 0 to 7. Up to four modules can be used on one PLC.
Starting with CPU release status -8MA-3, 8 modules can be used.

Slot on the S5-100U PLC

The ASM 410 in the S5-100U PLC can only be operated on slots 0 to 7. Up to eight modules can be used on one PLC. See the following table for slot-oriented addressing.

	0	1	2	3	4	5	6	7	8
S5-100U	64 to 71	72 to 79	80 to 87	88 to 95	96 to 103	104 to 111	112 to 119	120 to 127	

Slot number

Address assignment

Free slots for additional digital modules

Configuration of ASM 410 in ET 100U

The ASM 410 must be operated as an analog module in the ET 100U. When parameterizing the module with the "COM ET 100U" software, the module must be specified with "4AX" in the appropriate slot. The ASM 410 occupies eight input bytes and eight output bytes (= 16 bytes). Since a maximum of 32 bytes can be assigned per ET 100U in the address image of the main controller, a maximum of two modules per ET 100U are permitted. When other modules are used with an ET 100U in addition to the ASM 410, only one module can be connected.

On the ET 100U, the ASM 410 can be addressed via all address areas of the PLC (P, Q, IM3 and IM4).

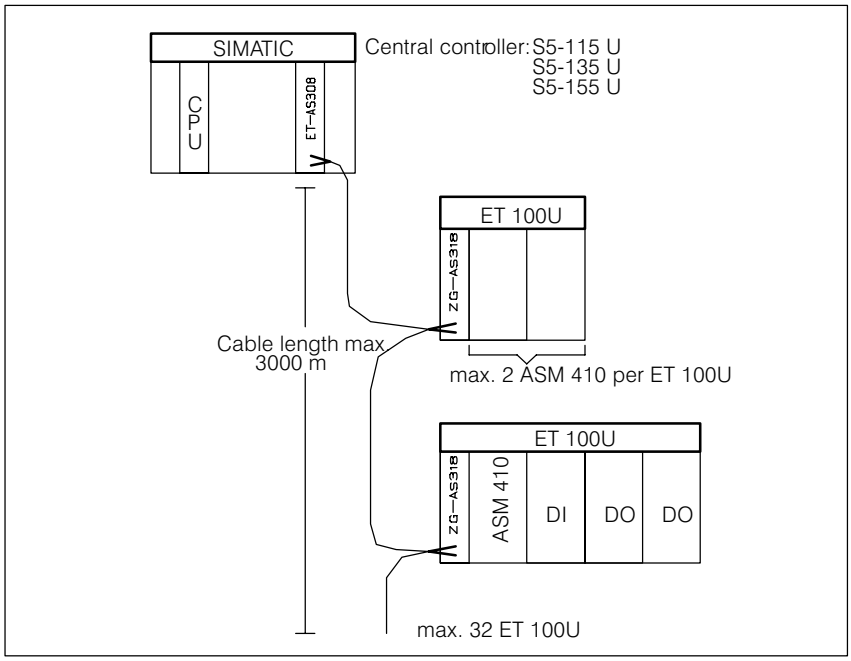


Figure 6-18 Configurator for ASM 410 in ET 100U

Configuration of ASM 410 in ET 200U

The ASM 410 can be used with the ET 200U under the following conditions.

- The ET 200U with an ASM 410 installed must be operated in "slow mode". See ET 200U manual for how to set "slow mode".
- The "COM ET 200U" software is used to parameterize the ASM 410. The ASM 410 module must be parameterized there with "095".
- Up to four ASM 410s can be used with one ET 200U. When DI/DO or other periphery is used with the ET 200U, fewer ASM 410s can be used.

Otherwise the same conditions as for the ET 100U apply.

Physical layout

The ASM 410 interface has the same dimensions as any standard module for the SIMATIC S5-100U. The interface can be installed directly on the bus module (6ES5 700-8MA11 or 6ES5 700-8MA22).

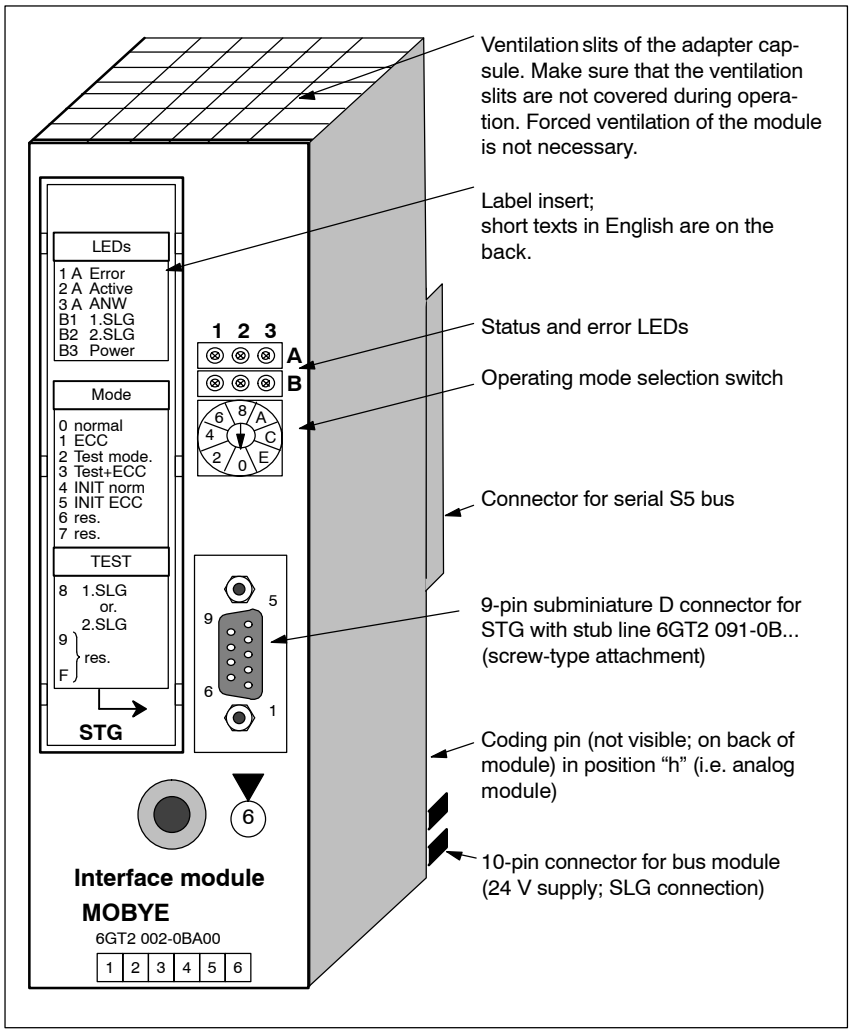


Figure 6-19 ASM 410 interface with operational and indicator elements

Table 6-7 Status and error LEDs of ASM 410

No.	Color	Meaning
1 A	Red	Error: The last command was concluded with an error, or the hardware of the module is defective.
2 A	Yellow	Rapid irregular flashing indicates running dialog with the SLG or mobile data memory (MDS). This LED is always on when the presence check is enabled.
3 A	Green	Data memory is in the field of the SLG. The SLG which detected the MDS is indicated via LEDs B1-B2. LED is only active when presence check is being used.
B1	Green	B1 = 1. SLG is in operation Note: Only one of the B1 or B2 LEDs can be on at once. If both LEDs are on, check the wiring to the SLG.
B2	Green	B2 = 2. SLG is in operation Note: Only one of the B1 or B2 LEDs can be on at once. If both LEDs are on, check the wiring to the SLG.
B3	Green	B3 = power on This LED is always on when 24 V is applied to the module. The interface module can be tested with the STG.

Setting the operating mode

The operating mode is set with the operating mode selection switch on the front of the ASM.

Position 0 to 7

Setting the operating mode:
The ASM 410 works with the serial S5 bus; the STG interface is switched off.

Position 8 to F

Test mode with the STG:
Message frames from the S5 are no longer processed (not in the case of MOBY E).

Note

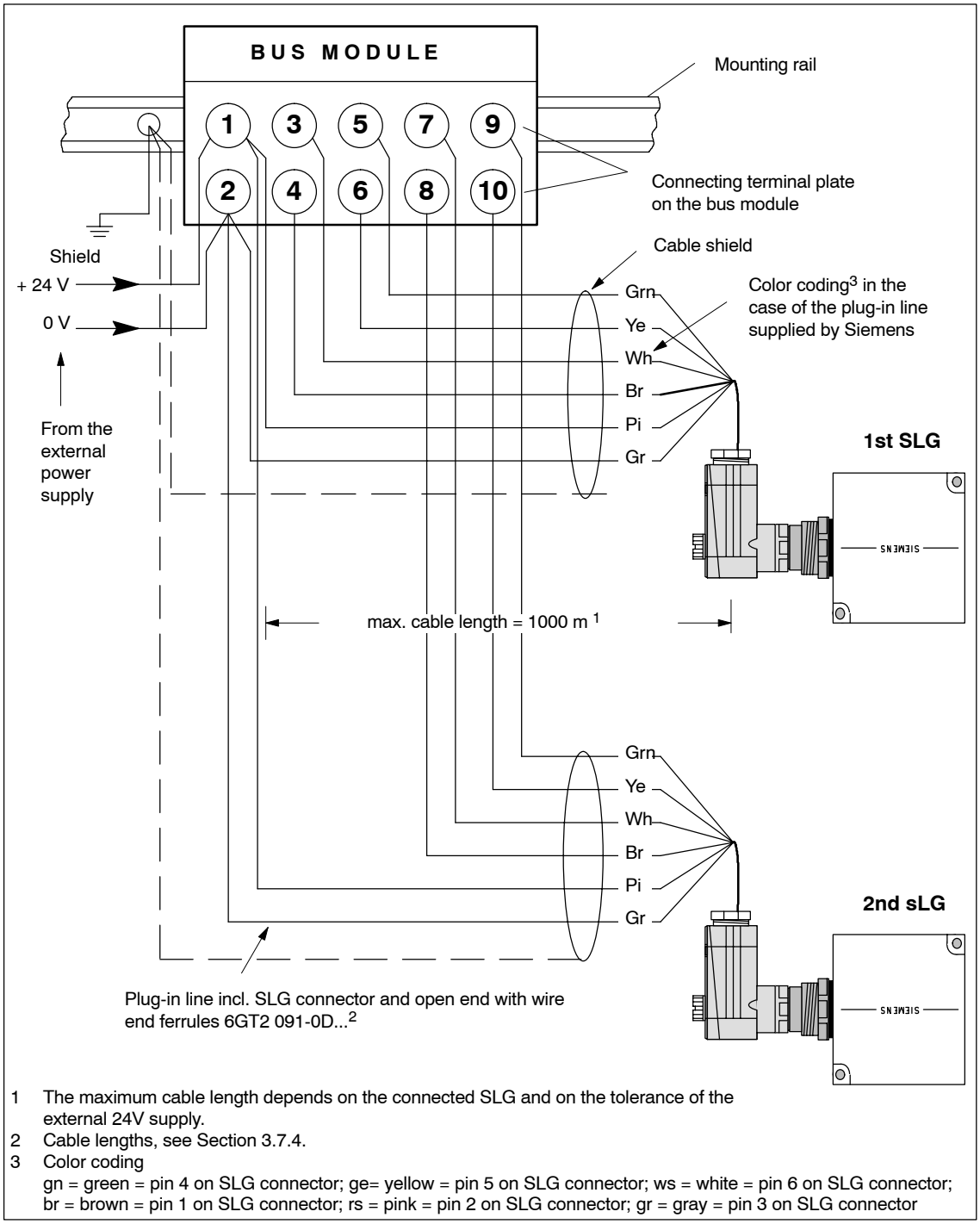
The serial S5 bus functions are not affected by switching to test operation since this interface has its own microprocessor and is not dependent on MOBY activities.

Table 6-8 Operating modes for ASM 410

Switch setting	Short description on label insert	Meaning
0	normal	Normal operation Read and write all MDS types; EEC driver is enabled.
1[1]	ECC driver	Read and write all MDS types; The ECC driver is enabled.
2	Test operation	All MDS types can be processed during test operation. The ASM 410 performs stricter error checks for communication with the MDS. This helps to pinpoint weak spots and malfunctions at commissioning.
3[1]	Test + ECC	The ECC driver is enabled. Otherwise same as switch setting 2.
4	INIT normal	Initializes the MDS. When a write command is started via the process image, an INIT command to the MDS is started. The contents of the MDS are deleted.
5[1]	INIT ECC	Initializes the MDS with ECC driver. Otherwise same as switch setting 4.
6	Reserved	
7	Reserved	
8[1]	Test of 1st or 2nd SLG	An STG can be connected via the 9-pin subminiature D connector. You can use this to test the entire hardware.
9 to F	Reserved	

1 Do not use switch positions 1, 3, 5 and 8 with MOBY E.

Wiring of one or two SLGs



1 The maximum cable length depends on the connected SLG and on the tolerance of the external 24V supply.
2 Cable lengths, see Section 3.7.4.
3 Color coding
gn = green = pin 4 on SLG connector; ge= yellow = pin 5 on SLG connector; ws = white = pin 6 on SLG connector; br = brown = pin 1 on SLG connector; rs = pink = pin 2 on SLG connector; gr = gray = pin 3 on SLG connector

Figure 6-20 Wiring of one or two SLGs for ASM 410

6.4 ASM 450/452

Application area

The ASM 450/452 interfaces are modules for the operation of MOBY components on the following systems via PROFIBUS DP / DPV1:

- All computers and PCs
- All controllers

When the interfaces are used on a SIMATIC S7, function blocks are available to the user.

Figure 6-21 ASM 450/452 interface

ASM 450

Data can be accessed directly in the MDS by means of physical addresses using the ASM 450.

The ASM 450 works with the function block FB 240 (S5) or FC 44 (S7) in cyclic operation. The description of FC 44 (appendix) must be read by the SIMATIC S5 user. All other users must read the description of the FC 44 function for the ASM 450.

Up to 2 SLGs can be connected to one ASM 450. Connection of two SLGs is only recommended when static operation is used. When MDSs are processed while passing by (i.e. dynamic operation), there is usually not enough time to switch over the second SLG.

ASM 452

The ASM 452 represents a logical step up from the well known ASM 450 interface module. You can achieve optimum data throughput even with large PROFIBUS configurations by using acyclic data exchange on the PROFIBUS DPV1. The minimum cyclical data load of the ASM 452 on PROFIBUS ensures for the user that other PROFIBUS stations (e.g. DI/DO) will continue to be processed very quickly.
Up to 2 SLGs can be operated on the ASM 452 in quasi-parallel mode. In quasi-parallel mode the user can start a command (via the FC 45) in parallel on 2 SLGs although the ASM only has one serial channel. The ASM automatically accepts multiplex operation between the SLG 1 and SLG 2. The SLG on which an MDS is currently located is processed. This delays the processing of the second MDS. It is therefore recommended you only process the MDS statically when 2 SLGs are connected to it.
The MDS data are accessed by means of the physical addressing of the MDS. FC 45 is available for this in SIMATIC S7. FC 45 provides the S7 user with an easy-to-use interface with powerful commands (processing of a complete MDS with one command, command chaining, S7 data structures via UDTs).

Ordering data

Table 6-9 Ordering data for the ASM 450/452

ASM 450 interface module for PROFIBUS DP Max. of 2 SLGs connectable	6GT2 002-0EB00
ASM 452 interface module for PROFIBUS DPV1 max. 2 SLGs connectable	6GT2 002-0EB20
Accessories	
Connector for PROFIBUS DP connection and 24 V supply	6ES7 194-1AA01-0XA0
Connecting cable ASM 450/452 ↔ SLG length 2 m; Standard: additional lengths See Section 3.7.4	6GT2 091-1CH20
Opt. connector ASM 450/452 ↔ SLG	6GT2 090-0BC00
M12 screw caps for unused SLG connection (ASM 450 and ASM 452 only) 1 pack = 10 units	3RX9 802-0AA0
Software MOBY[1] with FB 240, FC 44, FC 45, DDB file	6GT2 080-2AA10
Additional accessories for the ASM 450 (network components)	See the SIMATIC catalog ST 70 and SIMATIC ET 200X manual
Replacement part:	
Connector plate; T functionality for PROFIBUS connection	6ES7 194-1FC00-0XA0
Description - ASM 450/FC 44 German English French	Electronically available on “Software MOBY” CD
Description of FC 45 (for ASM 452) German English French	Electronically available on “Software MOBY” CD

1 See Section 7.1

Technical data

Table 6-10 Technical data of the ASM 450/452

	ASM 450	ASM 452
Serial interface to user	PROFIBUS DP	PROFIBUS DPV1
Procedure after	EN 50170 Vol. 2, PROFIBUS	
Connection	PG 11 screw connection PROFIBUS and power supply connectors are not included.	
Transmission speed	9600 bps to 12 Mbps (automatic recognition)	
Max. block length	208 bytes	2 words (cyclic)/ 240 bytes (acyclic)
Serial interface to SLG		
Connector	2 coupling connectors (M12)	
Line length (max.)	1000 m, depends on SLG (2 m = standard length, other cables made: 5 m, 10 m, 20 m)	
SLG which can be connected	2 SLG 7x (multiplex operation)	2x SLG 7x (quasi-parallel operation)
Software functions		
Programming	Depends on PROFIBUS DP master	
Function blocks for SIMATIC S5	FB 240	–
SIMATIC S7	FC 44	FC 45
MDS addressing	Direct access via addresses	
Commands	Initialize MDS, read data from MDS, write data to MDS, and so on	
Supply voltage		
Nominal value	24 V DC	
Permissible range	20 to 30 V DC	
Current consumption	max. 180 mA; typ. 130 mA (without SLG, DO not loaded)	

Table 6-10 Technical data of the ASM 450/452

	ASM 450	ASM 452
Digital inputs		
Number	2	None
Galvanic isolation	Yes	
Input voltage for Logical “0” Logical “1”	 0 to 5 V DC 13 to 30 V DC	
Input current for signal “1”	typ. 7 mA	
Delay time	< 10 ms	
Digital outputs		
Number	2	None
Galvanic isolation	Yes	
Max. permissible current Short-circuit protection	0.5 A Yes; electronic	
Line length (max.)	30 m	
Ambient temperature During operation During transportation and storage	 0 to +55 °C –40 to +70 °C	
Dimensions (WxHxD) in mm	134 x 110 x 55 (without bus connector)	
Mounting	4 M5 screws; mounting on any plate or wall	
Weight (approx.)	0.5 kg	
Protection rating in accordance with EN 60529	IP67	
MTBF (at 40 °C)	$30 \cdot 10^4$ hours = 34 years	

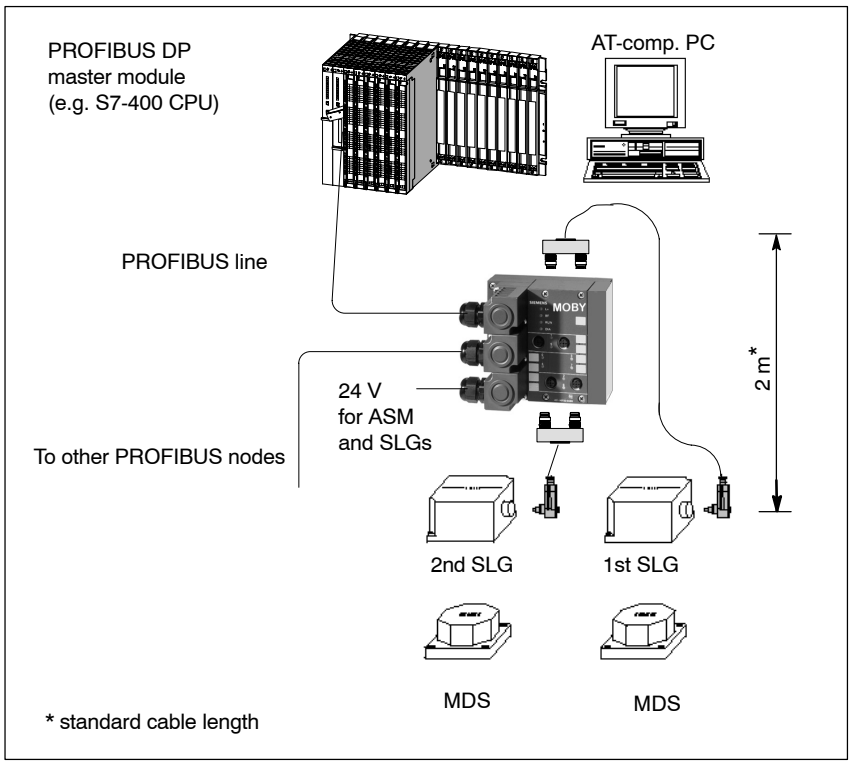


Figure 6-22 Configurator for ASM 450/452

Hardware description

The ASM 450/452 has the same housing as the ET 200X distributed I/O device. General information on the ASM 450/452 (for example, mounting, operation, wiring, and general technical specifications) can be found in the ET 200X manual (order no. 6ES7 198-8FA00-8AA0). Accessories and power supply components are also described in this manual.

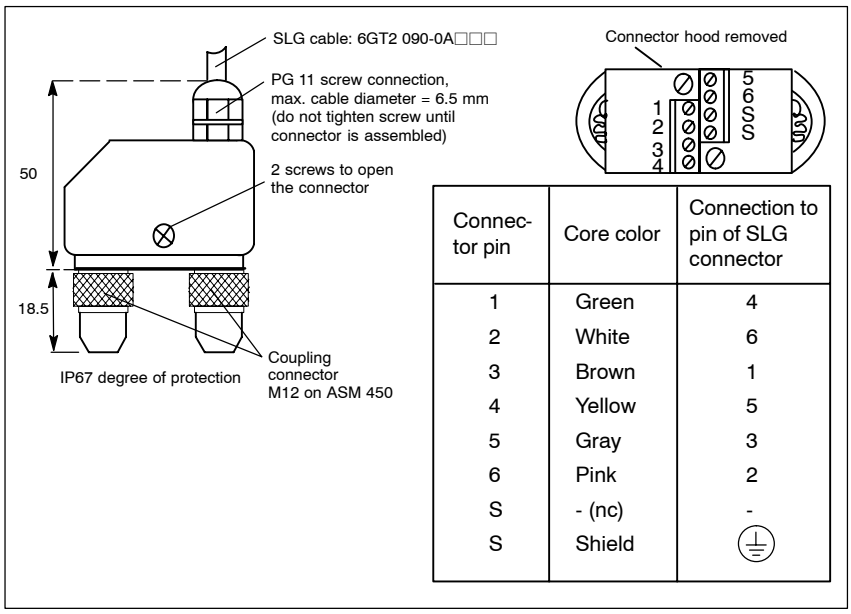
PROFIBUS configuration

The ASM 450/452 is integrated in the hardware configuration by means of a DDB file. The ASM can then be configured using SIMATIC Manager's HWCONFIG or another PROFIBUS tool. The MOBY software contains a DDB file for each ASM version.

SLG connection method

An SLG always occupies two M12 connection sockets on the ASM 450/452. To ensure the simplest SLG connection, use a preprepared cable (see Figure 6-24 and Section 3.7). The standard version of the connecting cable is 2 m in length (for other cable lengths: see Section 3.7.4).

An SLG connector with screw-type terminals is available for users who want to make their own cable (see Figure 6-23). Cables and SLG connectors can be ordered from the MOBY catalog.



Connec-tor pin	Core color	Connection to pin of SLG connector
1	Green	4
2	White	6
3	Brown	1
4	Yellow	5
5	Gray	3
6	Pink	2
S	- (nc)	-
S	Shield	⏚

Figure 6-23 Connector ASM 450/452/473 ↔ SLG (6GT2 090-0BC00)

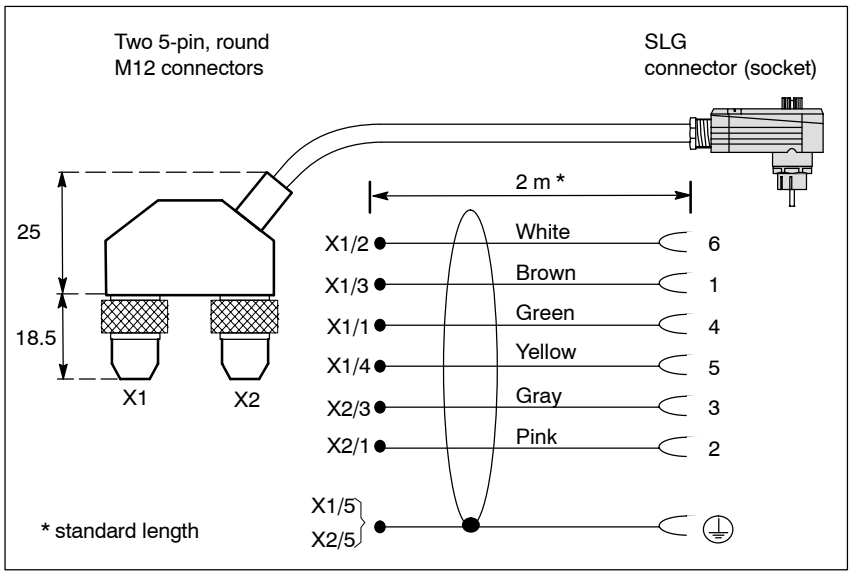


Figure 6-24 Connecting cable ASM 450/452/473 ↔ SLG (6GT2 091-1CH20)

PROFIBUS cable with 24 V supply

The ASM 450/452 can also be operated with the “green” PROFIBUS cable. Make sure that a 24 V cable leads from X12 to X13. The 24 V cable can be connected to pin 5 or 6 in connector X12.

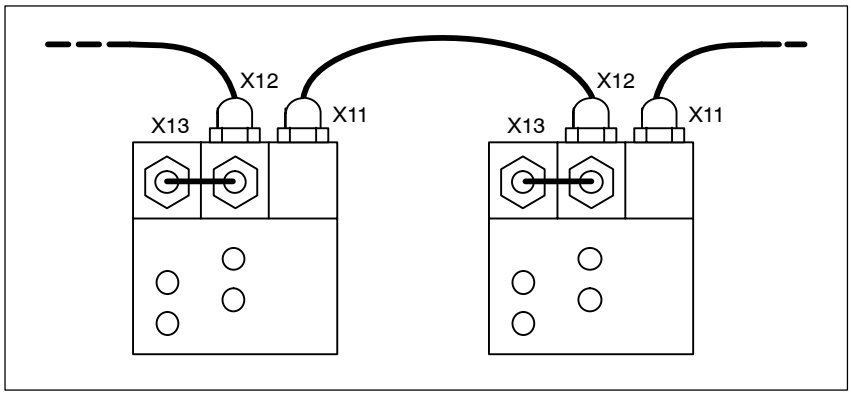
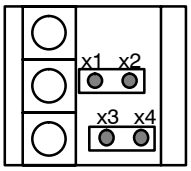


Figure 6-25 PROFIBUS cable with 24 V supply

SLG and DI/DO configuration for ASM 450/452



ASM 450

Connector \ Config	1st	2nd	3rd	4th	5. *
x1 – x2	SLG	-	SLG	2xDO	SLG
x3 – x4	-	SLG	2xDI	SLG	SLG

ASM 452

Connector \ Config	1st	2nd	3. *
x1 – x2	SLG	-	SLG
x3 – x4	-	SLG	SLG

* Only static processing of the MDS is permissible in this configuration

Figure 6-26 SLG and DI/DO configuration for ASM 450/452

The versions shown in Figure 6-26 can be set up with the standard cables of MOBY or ET 200X.

Note

The configuration with 2 SLGs + DI + DO is also possible with the ASM 450. However, it requires customer-specific wiring of the components.

Dimensioned drawing of the ASM 450/452 with mounting holes

The following figure shows the dimensioned drawing of an ASM 450/452 with bus connectors. You must add the length of the PG screw connection and the radius of the cable used to the total width and depth specified.

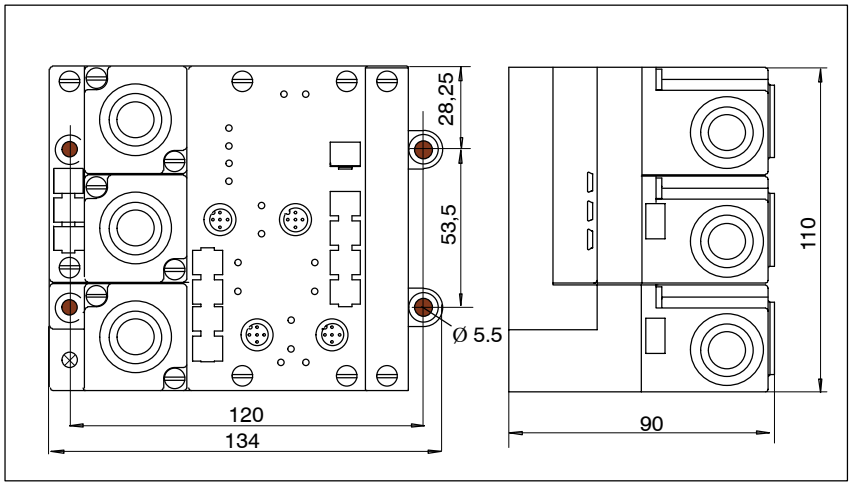
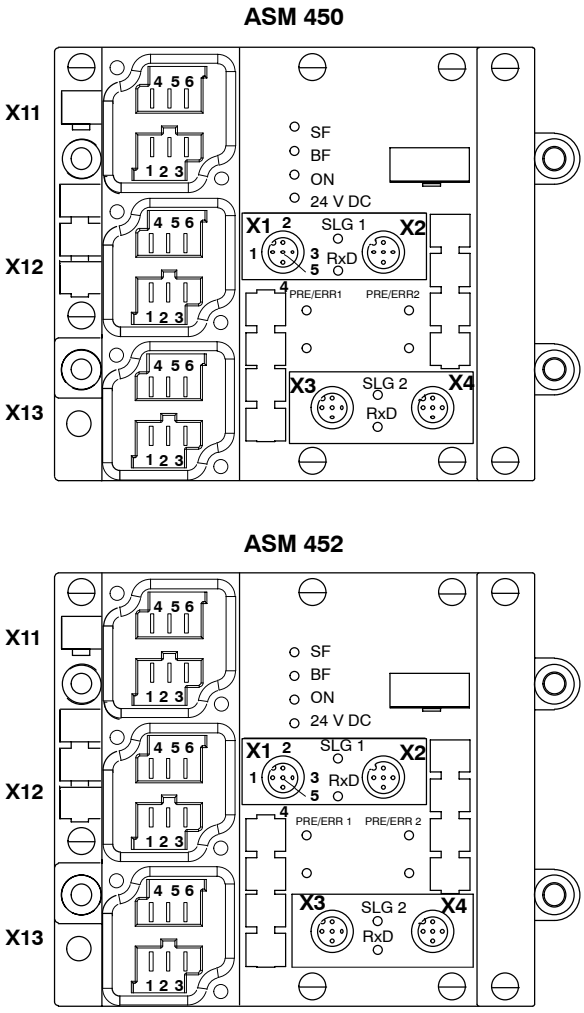


Figure 6-27 Dimensioned drawing of the ASM 450/452

Pin assignments The following figure shows the pin assignment of the ASM 450/452.



LEDs for PROFIBUS DP

SF: System Fault (see Table 6-11)

BF: Bus Fault (see Table 6-11)

ON: On when the logic voltage is present on the ASM (is generated from the 24 V supply voltage)

24 V DC: On when the 24 V supply voltage is connected to the ASM.

LEDs for MOBY and ASM 450

RxD: SLG active
ANW: MDS present and status of DO1
ERR: Error display and status of DO0
SLG1/2: Indicates the selected SLG. Only SLG 1 or SLG 2 can be selected.
DE0/1 : Status of the digital inputs

LEDs for MOBY and ASM 452

RxD: SLG with active command
PRE/ERR 1, PRE/ERR 2: MDS present or error display
For each SLG (the "MDS present" display always has priority. The error display only occurs when there is no MDS present.)

MDS present :
The LED is permanently ON. If there is more than one MDS in the field, the number of MDS is indicated by short breaks in the light. There is no error output.

Error display:
The LED is permanently OFF. The last error number is indicated by a short light pulse.

SLG 1: SLG 1 is selected.
SLG 2: SLG 2 is selected.
Only SLG 1 or SLG 2 can be selected.

Socket	Pin Allocation	
X11 and X12 (PROFIBUS DP)	1	Signal B (red)
	2	PE
	3*	PE
	4	Signal A (green)
	5*	L+
	6*	M
X13 (supply voltage)	1	PE
	2	L+
	3	M
	4	PE
	5	L+
	6	M

* Do not wire

Socket	Pin assignment (SLG)		
X1/X3	1	+RxD	
	2	+TxD	
	3	-TxD	
	4	-RxD	
	5	PE	
X2/X4		**X2**	**X4**
	1	+24 V	+ 24 V
	2	DO1	DI1
	3	0 V	0 V
	4	DO0	DI0
	5	PE	PE

Figure 6-28 Pin assignment and LEDs of the ASM 450/452

PROFIBUS diagnostics

The following table lists the possible error displays, what they mean and how to eliminate the cause of the fault.

Table 6-11 LEDs for PROFIBUS diagnostics

LED "BF"	LED "SF"	Cause	Error handling:
On	*	• ASM 450/452 is starting up.	–
		• The connection to the DP master has failed. • The ASM 450/452 cannot detect a transmission rate.	• Check the PROFIBUS DP connection. • Check the DP master.
		• Bus interruption • DP master is out of operation	• Check all the cables in your PROFIBUS DP network. • Check whether the PROFIBUS DP connector is plugged in correctly on the ASM 450/452.
Flashes	On	• The configuration data sent from the DP master to the ASM 450/452 do not correspond to the configuration of the ASM 450/452.	• Check the configuration of the ASM 450/452 (input/output, PROFIBUS address). • Correct DDB file used? – SIEM804C.GSD for ASM 450 – SIEM80B6.GSD for ASM 452
Flashes	Off	• The ASM 450/452 has detected the transmission rate but is not addressed by the DP master. • The ASM 450/452 was not configured.	• Check the PROFIBUS address set in the ASM 450/452 or in the configuration software. • Check the configuration of the ASM 450/452 (station type).
On	Flashes	• There is a hardware defect in the ASM 450/452.	• Replace the ASM 450/452.

* Status is not relevant

Example for bared lengths

The following figure shows an example of bared lengths. The lengths are valid for all cables which you can connect to the connector. Any shield braiding must be twisted, inserted in a core end sleeve, and the excess cut off.

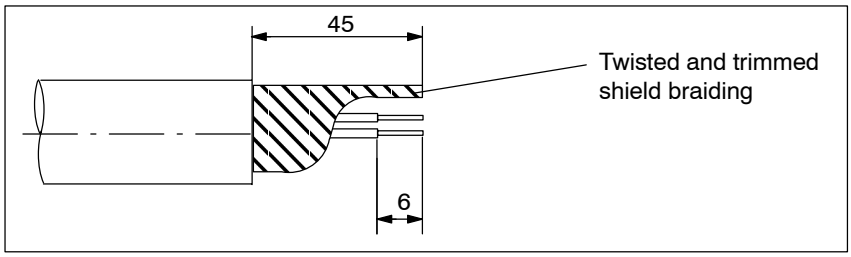


Figure 6-29 Length of baring for a PROFIBUS cable

PROFIBUS address and terminating resistor

The connector plate of the ASM must be removed before you canset the PROFIBUS address or turn on the terminating resistor. The connector plate covers the DIPswitches. The following figure shows the location of the DIPswitches on the ASM and a sample setting of each.

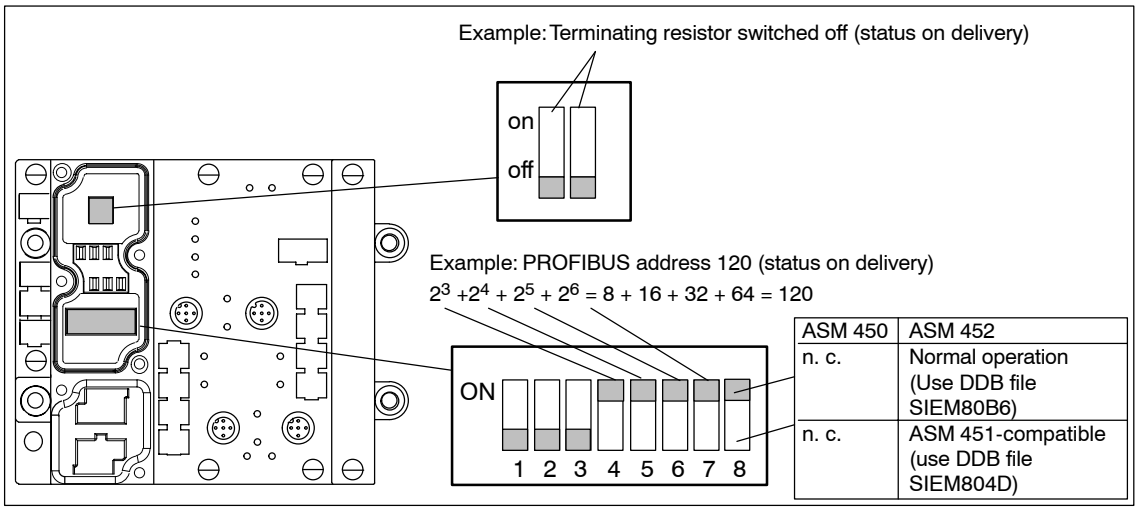


Figure 6-30 Setting the PROFIBUS address and circuiting the terminating resistance

Note

- The PROFIBUS address on the ASM 450/452 must always correspond to the PROFIBUS address specified for this ASM in the configuration software.
- For correct functioning of the terminating resistor, always switch **both** DIPswitches of the terminating resistor to “on” or “off”.

6.5 ASM 454/424

Application area

The ASM 454/424 interfaces are designed for distributed configurations in assembly lines. The robust and attractive housing can be mounted anywhere. Up to four write/read devices in the MOBY E range can be connected and run in parallel. This ensures dynamic operation of the connected SLGs. The user has a choice of two interfaces.

- PROFIBUS DPV1 (ASM 454)
- RS 232; serial interface for the PC (ASM 424)

Figure 6-31 ASM 454/424 interface

ASM 454

Data can be accessed directly in the MDS by means of physical addresses using the ASM 454. Communication to the user is by means of the acyclic PROFIBUS DPV1 protocol service. The function FC 45 is available to SIMATIC S7 users as a simple means of integration.

The description of the PROFIBUS DPV1 implementation (see appendix of FC 45 description) is available to programmers of controllers of other manufacturers.

ASM 424

Data can be accessed directly in the by means of physical addresses using the ASM 424. Communication with the user is via a serial RS 232 interface using the 3964R protocol. This makes it easy to connect PCs and controllers of other manufacturers to the MOBY E identification system. A C library (MOBY API) is available to PC users for their applications.

Ordering data

Table 6-12 Ordering data for the ASM 454/424

ASM 454 interface for the operation of MOBY E components via PROFIBUS DPV1, without filehandler	6GT2 002-2EE00
ASM 424 interface With serial RS 232/RS 422 interface; 3964R procedure for PC, SICOMP and controllers of other manufacturers	6GT2 002-2CE00
Accessories	
RS 232 plug-in line between PC ↔ ASM 424 Can be made to a maximum length of 32 m (see Section 3.7.4)	6GT2 391-0B...
SLG plug-in line (see Section 3.7)	6GT2 091-0A...
Connector for power supply (socket) for ASM 454/424	6GT2 390-1AB00
Adapter floor plate for top-hat rail mounting	6GT2 390-0BA00
Wide-range power supply unit 100-230 V AC/24 V DC; 2.2 A (without 24 V cable)	6GT2 494-0AA00
24 V DC plug-in line for wide-range power supply unit 6GT2 494-0AA00 (see Section 7.2) Length: 5 m	6GT2 491-1HH50
PROFIBUS connector 9-pin subminiature D connector for 2 plug-in lines	6ES7 972-0BA11-0XA0 (for other connectors, see catalog ST 70 or IK PI)
MOBY software[1] with C library for the ASM 424 (MOBY API) and FC 45, DDB file for the ASM 454	6GT2 080-2AA10
Description of FC 45 (for the ASM 454) German English French	Electronically available on “Software MOBY” CD
Description of MOBY API (C library for the ASM 424) German English	Electronically available on “Software MOBY” CD

1 See Section 7.1

Technical data

Table 6-13 Technical data of the ASM 454/424

	ASM 454	ASM 424
Serial interface to user	PROFIBUS DPV1	RS 232/RS 422
Max. cable length	See PROFIBUS configuration.	30/500 m
Procedure/protocol	EN 50170 Vol. 2, PROFIBUS	3964R
Connection	9-pin submin. D socket (screw-type attachment)	
Transmission speed	9600 bps to 12 Mbps (automatic recognition)	38.4 kbps
Max. block length	4 words (cyclic)/238 bytes (acyclic)	238 bytes
Serial interface to SLG	4 x 9-pin submin. D socket (screw-type attachment)	
Cable length	Max. of 1000 m SLG-dependent (see Section 3.7)	
SLG which can be connected	4 x SLG 7x (parallel operation)	
Software functions		
Programming	Depends on PROFIBUS DPV1 master	MOBY API: C-Lib for PCs with Windows 98/NT
Function block SIMATIC S7	FC 45	–
MDS addressing	Direct access via addresses	
Commands	Initialize MDS, read data from MDS, write data to MDS	
Supply voltage		
Connector	4-pin, M12 round connector (pin)	
Nominal value	24 V DC	
Permissible range	20 to 30 V DC	
Current consumption (max.)	250 mA (without SLG)	
Max. current consumption	1.1 A (without SLG)	
UL/CSA	Yes, in connection with a power supply of NEC Class 2	
Ambient temperature During operation During transportation and storage	 –25 to +55 °C (no condensation) –40 to +85 °C (no condensation)	
Housing		
Dimensions (WxHxD) in mm	205 x 130 x 60 (without connector)	
Material	Aluminum	
Color	Anthracite	

Table 6-13 Technical data of the ASM 454/424

	ASM 454	ASM 424
Mounting Tightening torque	4 M5 screws Optional: top-hat rail mounting ≤ 3 Nm	
Weight (approx.) Protection rating in accordance with EN 60529 MTBF (at 40 °C)	1300 g IP40 (higher rating on request) $1 \cdot 10^5$ hours	

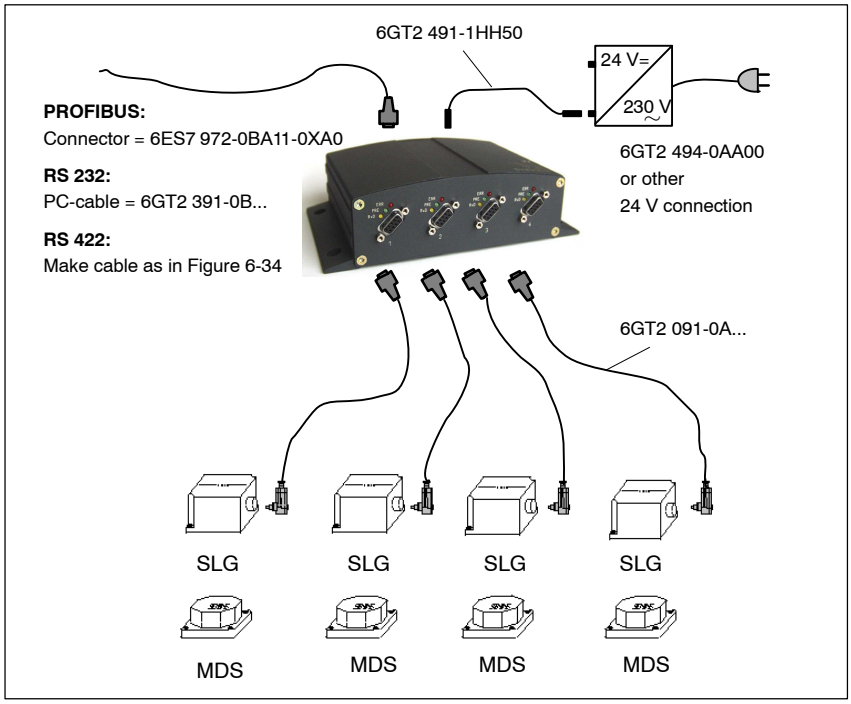
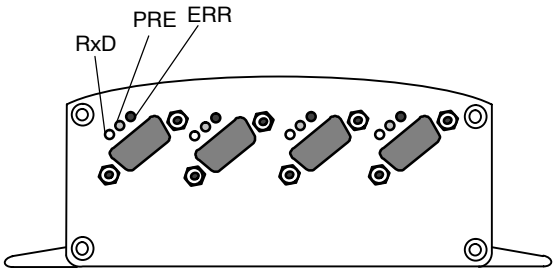


Figure 6-32 Configurator for the ASM 454/424

Pin assignment and switches



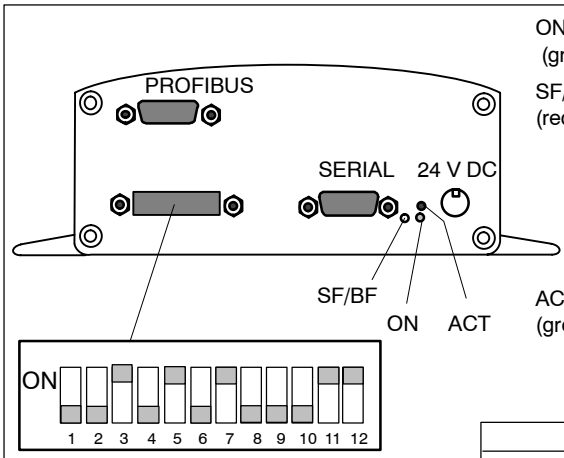
Connector 1 to 4 to the SLG	
Socket	**Designation**
1	Not used
2	+ Sending
3	+Receiving
4	Not used
5	– Receiving
6	– Sending
7	Ground (0 V)
8	+ 24 V
9	Not used
Housing	Cable shield

RxD: SLG with command active

PRE: "Presence" indicates the presence of an MDS in the transmission window

ERR: Error indicated by flashing LED (under preparation)

Figure 6-33 Serial interfaces of the ASM 454/424 to the SLG



ON: (green) 24 V are applied to the ASM

SF/BF: (red) System fault/bus Fault RAM error

ASM 424: flashes after power up; flashing stops after the first correct message frame

ACT: (green) This LED flashes once briefly when a command has finished being processed.

Switch 1 to 7: PROFIBUS address [1]

Switch 1 ON:2^0

Switch 2 ON: 2^1

:

Switch 7 ON: 2^6

Example: PROFIBUS-Address= 84

($2^2 + 2^4 + 2^6$)

Switch 8: Interface [2]

ON: RS 422

OFF: RS 232

Switch 9 to 12: free

24 VDC	
Pin	**Designation**
1	Ground
2	+ 24 V
3	+ 24 V
4	Ground

PROFIBUS[1]	
Socket	**Designation**
1	Not used
2	Not used
3	B-line (red)
4	Request to send (RTS)
5	Ground 5 V (M5)
6	Potential 5 V (floating; 60 mA)
7	Not used
8	A-line (green)
9	Not used
Housing	Cable shield

SERIAL [2]		
Socket	**RS 232**	**RS 422**
1	Not used	Not used
2	TxD (send)	–TxD
3	RxD (receive)	–RxD
4	Not used	Not used
5	Ground (0 V)	Ground
6	Not used	Not used
7	Not used	Not used
8	Not used	+TxD
9	Not used	+RxD
Housing	Cable shield	Cable shield

1 Only in the case of the ASM 454

2 Only in the case of the ASM 424

Figure 6-34 Serial interfaces of the ASM 454/424 to the user

Dimensioned drawing with mounting holes

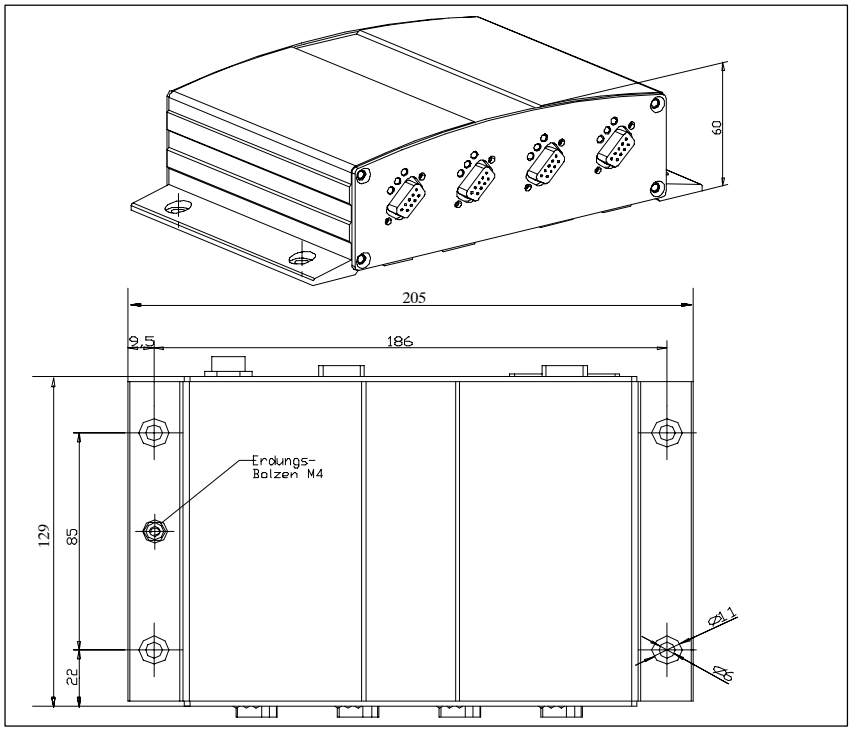
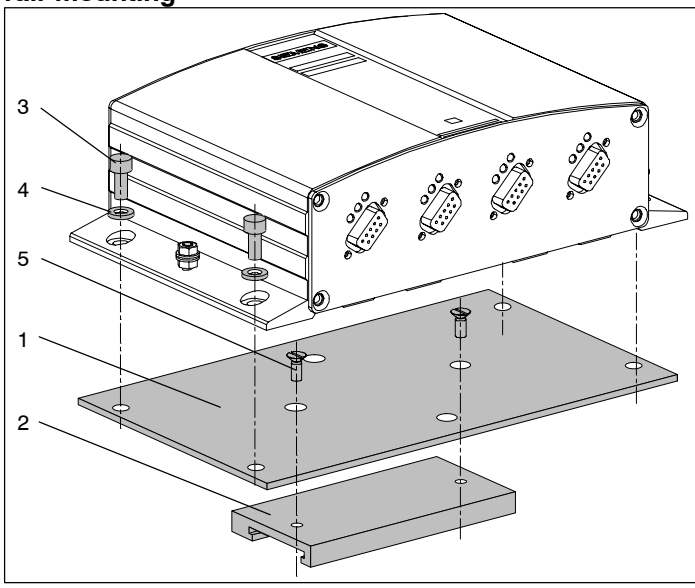


Figure 6-35 Dimensioned drawing of the ASM 454/424

Adapter floor plate for top-hat rail mounting



Item	Designation	Quantity
1	Floor plate	1
2	Profile section	1
3	Oval head screw (M5 x 10)	4
4	Washer (A5.3)	4
5	Countersunk screw (M4 x 10)	2

Figure 6-36 How to mount the adapter plate

Note

The profile section (item 2) can be turned by 90° on the floor plate before mounting if the situation requires it.

6.6 ASM 456

6.6.1 Description

Area of application

The ASM 456 interface modules are slave modules for operating MOBY components via the PROFIBUS DP/DPV1 on any control systems.

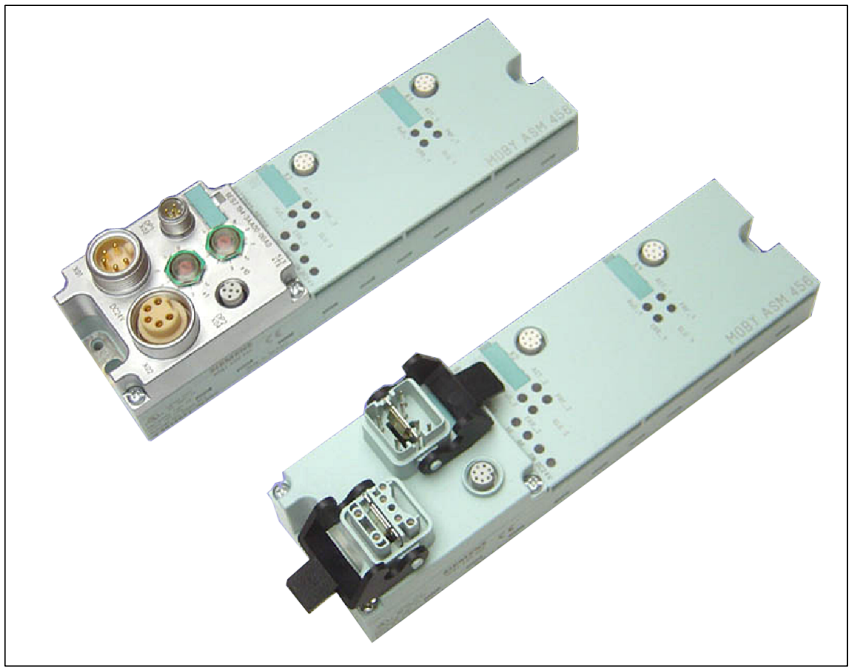


Figure 6-37 Interface module ASM 456 with M12, 7/8" or ECOFAST connection block

When operating the interface module on a SIMATIC S7, convenient function modules are made available to the user.

Features

The ASM 456 replaces the ASM 452 in terms of functionality and provides a simplified connection system. You can continue to use the user software from ASM 452. Optimum data throughput can be achieved through acyclic data traffic on the PROFIBUS DPV1 even when using large PROFIBUS configurations. The minimum cyclic data load of the ASM 456 on the PROFIBUS provides the user with the guarantee that other PROFIBUS consumers (e.g. DI/DO) can still be processed at great speed.
Up to 2 read/write devices (SLG) can be operated in parallel on the ASM 456. The user can start a command in parallel on 2 SLGs (via the corresponding FB/FC).

The mobile data memory (MDS) data is accessed by means of physical addressing of the MDS. In SIMATIC S7, the FB/FC 45 is available for this purpose. The FB/FC 45 provides the S7 user with a easy-to-use interface with powerful commands (processing one complete MDS with one command; command linking; S7 data structures via UDTs).

Other features

- Degree of protection IP67
- System integration with ECOFAST or M12, 7/8” concept
- T functionality, that is, a component can be replaced without adversely affecting other modules with regard to bus communication and voltage supply.
- Standardized PROFIBUS user interface for identification systems with PIB (Proxy Ident Function Block; with later firmware version).
- Firmware update
- PROFIBUS interface module up to 12 Mbit/s with automatic transfer rate detection
- Parameterizable device-related diagnostics data with text display
- Support for I&M functionality (a mechanism for reading out information via the module and saving system information such as function, installation date, installation location, and comments.)

Design

The ASM 456 has the same housing as the distributed I/O system ET 200eco.

The ASM has a connection block for connecting up to the PROFIBUS DP which is available in ECOFAST version or M12, 7/8” version optionally.

The following figure shows the basic design of the ASM 456.

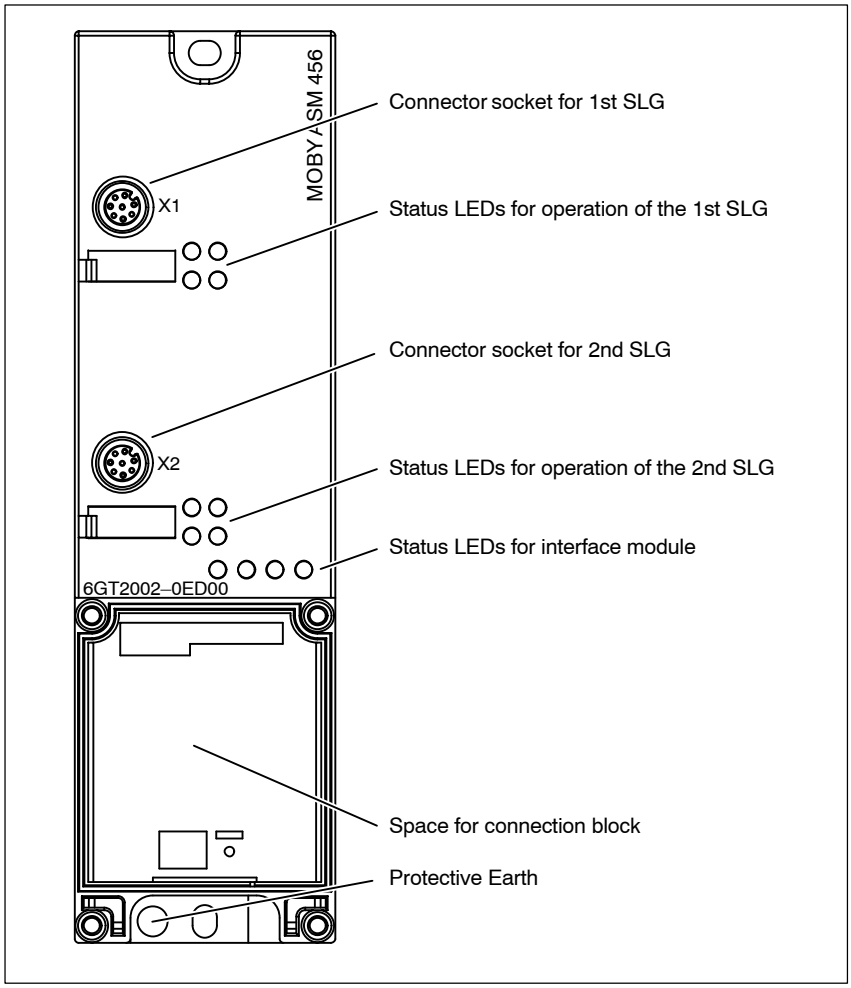


Figure 6-38 Basic design of the ASM 456

Integration

The following figure shows how the ASM 456 is integrated in an automation system.

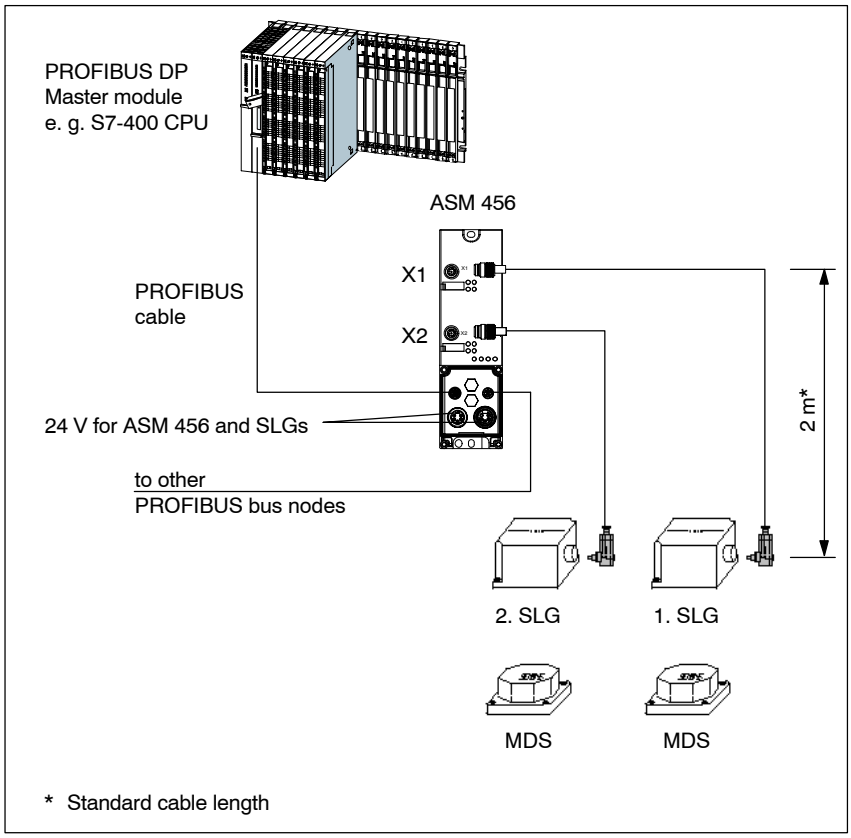


Figure 6-39 Configurator ASM 456

The ASM 456 is integrated into the hardware configuration by means of a GSD file. The ASM can then be configured using the hardware configuration of the SIMATIC manager or another PROFIBUS tool (e.g. operating mode). The GSD file can be found on the “Software MOBY” CD or on the Internet.

6.6.2 Setting the PROFIBUS Address

Features

The PROFIBUS address defines the address at which the ASM 456 distributed I/O system is found on the PROFIBUS DP.

Requirements

- The PROFIBUS DP address for the ASM 456 is set on the connection block.
- Each address can be assigned only once on the PROFIBUS DP.
- The PROFIBUS address set must match the PROFIBUS address defined in the configuring software (for the ASM 456).
- Changes to the PROFIBUS DP address only take effect once the mains have been switched ON on the ASM 456.

Tools required for M12, 7/8" connection block

- Socket wrench 14 mm
- Screwdriver 2.5 mm

Setting PROFIBUS DP addresses on connection block M12, 7/8”

Valid PROFIBUS DP addresses are 1 to 99.

1. Remove the two seal caps from the rotary switches (if necessary, use a 14 mm socket wrench).
2. Set the required PROFIBUS address on the rotary switches using a screwdriver.
   - Lower rotary switch: 1st position
   - Upper rotary switch: 10th position
3. Screw the two seal caps back onto the rotary switches (torque: 0.5 to 0.8 Nm).

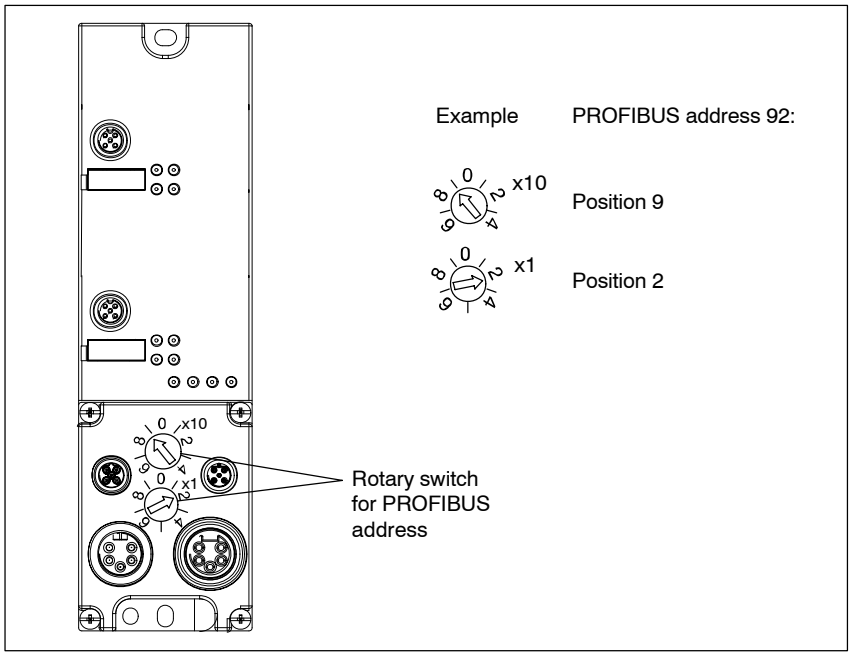


Figure 6-40 Setting PROFIBUS addresses on connection block M12, 7/8”

Setting PROFIBUS DP addresses on connection block ECOFAST

Valid PROFIBUS DP addresses are 1 to 99.

1. Loosen the screw connection of the configuration plug with the ECOFAST connection block and remove the plug.

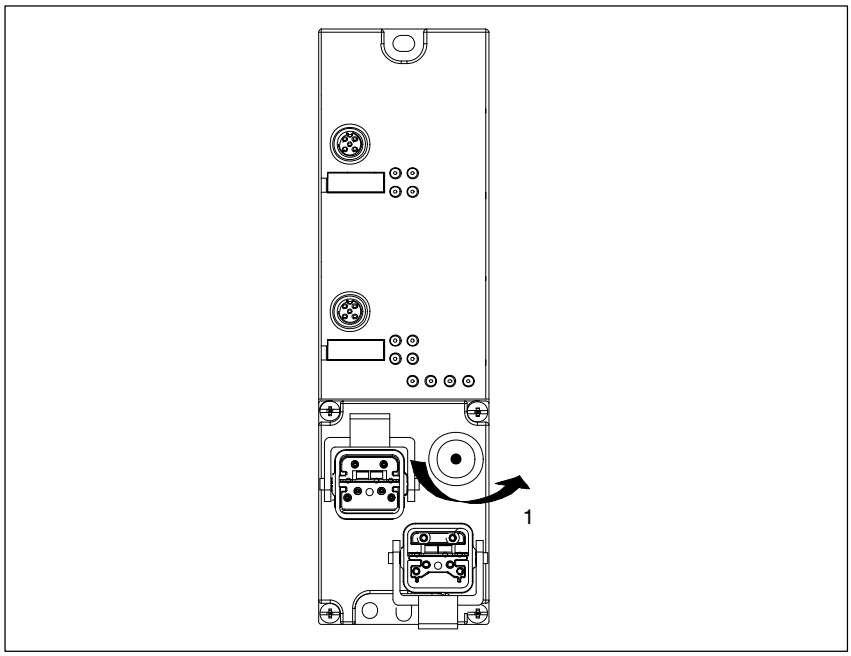


Figure 6-41 Loosening the configuration plug's screw connection

2. Loosen the screw connection for the cover cap on the configuration plug and remove the latter.
3. Set the PROFIBUS address using the DIL switches.

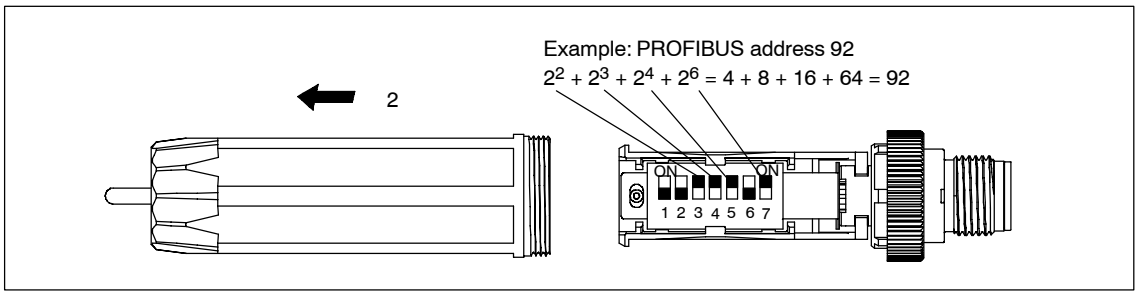


Figure 6-42 Setting PROFIBUS address on configuration plug

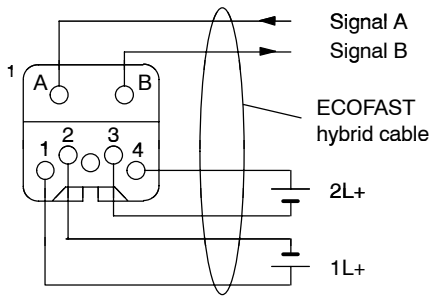
4. Screw the cover cap back down, plug the configuration plug onto the connection block and screw the configuration plug to the connection block.

6.6.3 Wiring ASM 456

Wiring ECOFAST connector plugs

The table below contains the connector assignment for the ECOFAST connector plugs:

Table 6-14 Connection assignment for ECOFAST connector plugs

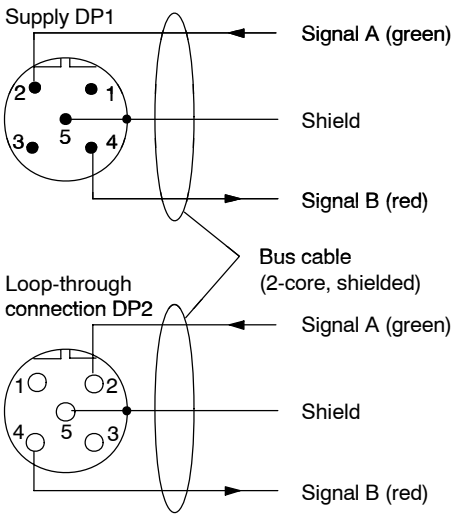
Pin	Assignment	View of ECOFAST connector plug (wiring end for supply and loop-through connection)
A	PROFIBUS DP signal A	
B	PROFIBUS DP signal B	
1	Electronic/encoder supply (1L+) (voltage supply for ASM 456 and SLG)	
2	Ground for electronic / encoder supply (1M)	
3	Ground for load voltage supply (2M)	
4	Load voltage supply (2L+) (unused on ASM 456)	

1 You will find the assembly instructions in the packaging of the Han Brid Cu cable connector and/or Han Brid Cu cable socket.

Wiring M12, 7/8" connector

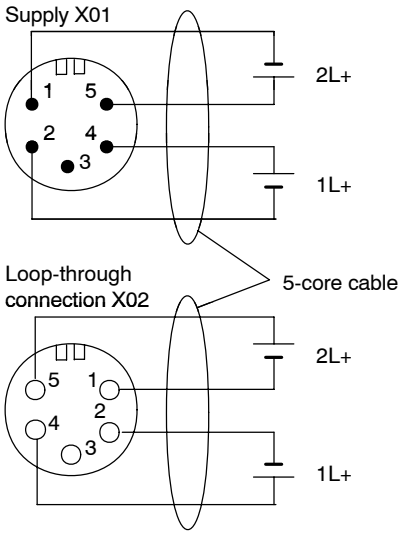
The tables below contain the connector assignment for the M12, 7/8" connector:

Table 6-15 Connection assignment for M12 connector (PROFIBUS DP)

Pin	Assignment	View of M12 connector (wiring side)
1	Supply positive (P5V2) [1]	
2	Data line A (RxD / TxD-N)	
3	Data reference potential (M5V2) [1]	
4	Data line B (RxD / TxD-P)	
5	Shield	
Thread	Shield	

1 Can only be used for the M12 terminating resistor. Looping the voltage through to the next connector via a 5-core cable is not permitted.

Table 6-16 Connection assignment for 7/8" connector (supply voltages)

Pin	Assignment	View of 7/8" connector (wiring side)
1	Ground for load voltage supply (2M)	
2	Ground for electronic / encoder supply (1M)	
3	PE	
4	Electronic/encoder supply (1L+) (voltage supply for ASM 456 and SLG)	
5	Load voltage supply (2L+) (unused on ASM 456)	

Note

When connecting up the supply voltage, we recommend the cable specified in section 6.6.7 (cable 5 x 1.5 mm^2 pre-assembled with 7/8" connectors).

If you want to assemble the cable yourself, then the conductor cross-section should be 1.5 mm^2.

Connecting the ASM 456 up to protective earth

1. Isolate the grounding cable and secure the cable lug.
2. Screw the cable lug down to the ASM 456 (M5 retaining bolt). The torque is 3 Nm.

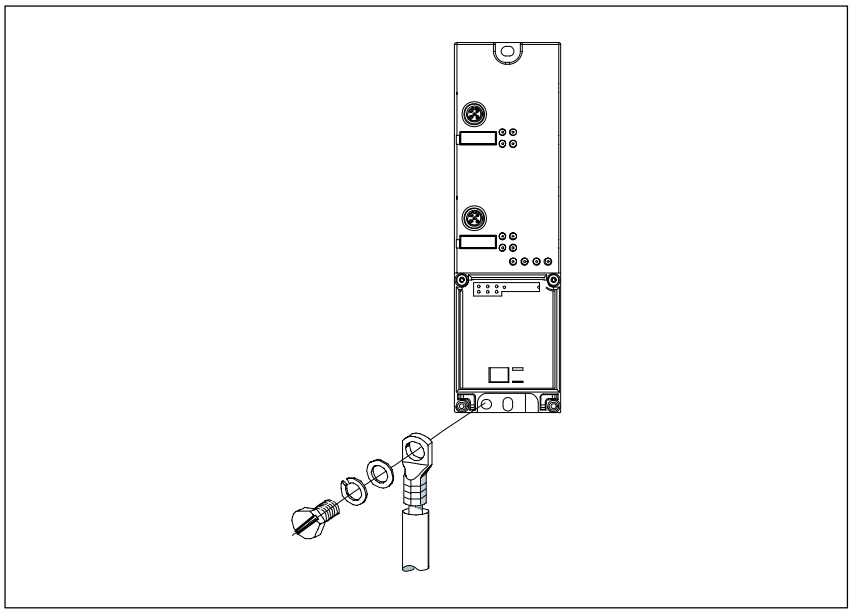


Figure 6-43 Connecting the ASM 456 up to protective earth

Connecting SLG to ASM 456

Standard cable

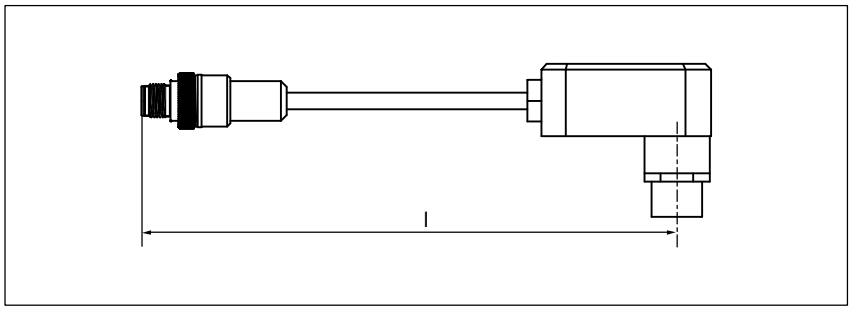


Figure 6-44 Connecting cable ASM 456 ↔ SLG; l = 2 m, 5 m

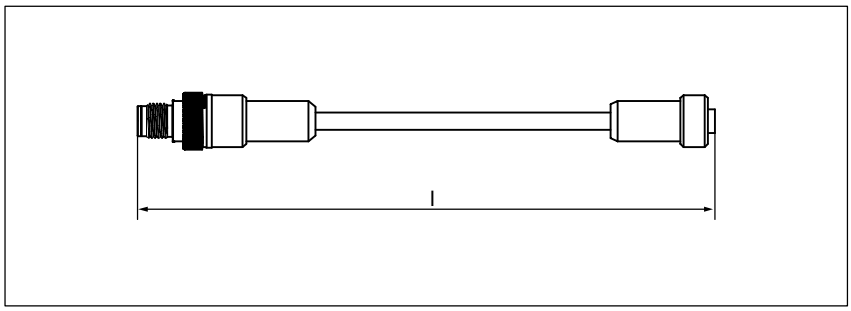


Figure 6-45 Extension cable ASM 456 ↔ SLG; l = 2 m, 5 m, 10 m, 20 m, 50 m

Maximum cable length

The ASM 456 can be operated with any SLG configuration with a maximum cable length of 50 m.
Longer connecting cables of up to 1000 m are possible in some instances. The current consumption of the connected SLG must however be taken into account.
Sequential arrangement of several sub-sections to form a long section of cable must be avoided due to the additional contact resistances.

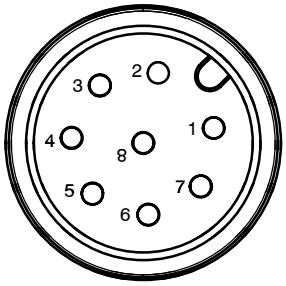
Customer cable fabricating

A SLG connector plug with screw-on clamps is provided for users who want to individually pre-assemble their own cables. Cables and SLG connector plugs can be ordered from the MOBY catalog.

You will need cables of the following specifications for self-assembled cables:
7 x 0.25 mm^2
LiYC11Y 7 x 0.25
M12 connectors can be obtained from the relevant specialist dealers (e. g. Binder).

The pin assignment is listed in the following table.

Table 6-17 Pin assignment

Socket X1, X2	Pin	Signal	Core color
	1	+24 V	Note data sheet provided by cable manufacturer
	2	–RxD	
	3	0 V	
	4	RxD	
	5	TxD	
	6	–TxD	
	7	Free	
	8	PE / shield	

6.6.4 Diagnosis using LEDs

The following figure shows details of the LEDs of the ASM 456.

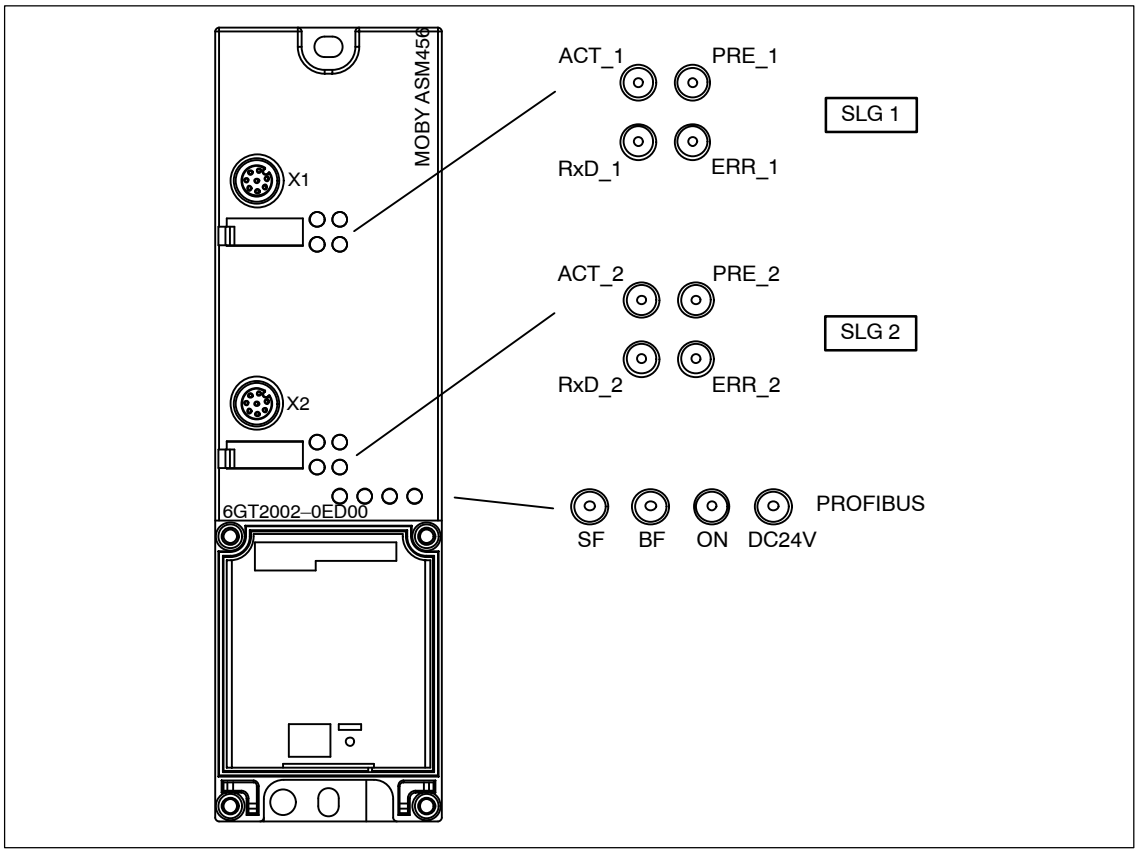


Figure 6-46 LEDs of the ASM 456

Table 6-18 Status LEDs for ASM 456

LEDs	Meaning[1]
ON	Lights up when there is logic voltage at the ASM (is generated by the 24 V supply voltage.)
DC 24 V	Lights up when the 24 V supply voltage is connected to the ASM.
ACT_1, ACT_2	The corresponding SLG is active in processing a user command.
ERR_1, ERR_2 [1]	A flashing pattern indicates the last error to occur.
PRE_1, PRE_2 [2]	Indicates the presence of an MDS.
RxD_1, RxD_2	Indicates live communication with the SLG. Faults on the SLG may also cause this display to light up.

1 The meaning of the individual flash patterns and the associated fault descriptions can be found in the relevant FB and FC documentation.
2 In multitag mode, this LED uses a flash interval to indicate the number of data media currently within the range of influence of the SLG.

Table 6-19 LED display for PROFIBUS diagnosis

BF	SF	Cause of error	Error handling
On	–	• ASM is in start-up mode.	–
		• Connection to DP Master failed. • ASM not detecting a baud rate	• Check the PROFIBUS DP connection. • Check the DP Master
		• Bus interrupt • DP Master not functioning	• Check all cables in your PROFIBUS DP network. • Check whether the connector plugs for the PROFIBUS DP are securely plugged into the ASM.
flashes	On	• The project data sent to the ASM by the DP Master do not match the configuration of the ASM.	• Check the project for the ASM (input/output, PROFIBUS address). • Correct GSD file being used?
flashes	–	• ASM has detected the baud rate, but is not activated by the DP Master. • ASM has not been assigned project plans	• Check the PROFIBUS address set in ASM and/or in the project software. • Check the project for the ASM (station type).
On	flashes	• There is a hardware defect in the ASM.	• Replace the ASM.
Off	On	• Diagnosis available	• Evaluate the diagnostic information.
On	Off	• The set PROFIBUS address is incorrect or greater than 99.	• Set the address in the range 1 to 99 and carry out new ramp-up.

– = Status not relevant

Other ASM operating modes are indicated by the PRE, ERR, ACT, SF and ON LEDs:

ON	SF	PRE_1	ERR_1	ACT_1	PRE_2	ERR_2	ACT_2	Description
On	Off	Off	Off	On	Off	Off	Off	Ramp-up active
Off	On	Off	On	Off	Off	Off	Off	Checksum error at ramp-up
Off	On	Off	Off	Off	Off	On	Off	Firmware invalid
On	On	On	On	On	On	On	On	LED test for approximately 4 seconds; otherwise firmware fault
Off	On	Off	On	On	Off	On	On	Checksum error at ramp-up
Off	On	On	On	On	Off	On	On	Checksum error of the firmware
Off	On	On	On	On	On	On	On	External RAM defective
Off	On	On	Off	On	On	On	On	DPC-RAM defective
Off	On	Off	On	On	On	On	On	ID error firmware
On	–	Off	1 x flash every 3 s	Off	Off	1 x flash every 3 s	Off	ASM successfully ramped up, waiting for reset command
On	–	–	Flashing	Rapid flashing	–	Flashing	Rapid flashing	Firmware update; alternate flashing of the error LEDs at approximately 1 Hz

– = not relevant

6.6.5 Technical data

Table 6-20 Technical data of ASM 456

Serial interface to the user	PROFIBUS DPV1
Procedure after connection	EN 50170 Vol. 2 PROFIBUS M12 and 7/8" technology / ECOFAST
Transfer rate	9600 baud to 12 Mbaud (automatic detection)
Block length, max.	2 words cyclic /240 byte acyclic
Serial interface to SLG	
Connector	2x coupling connector M12
Line length, max.	1000 m; depends on SLG; 2 m = standard length; other fabricatable cables = 5 m (up to 1000 m on request) Extenxion cables = 2 m, 5 m, 10 m, 20 m, 50 m
Connectable SLG	2x SLG
Software functions	
Programming	Depending on the PROFIBUS DP Master
Function modules for	
SIMATIC S5	–
SIMATIC S7	FB/FC 45 (normal addressing without multitag) FB/FC 55 (normal addressing with multitag)
MDS addressing	accessed directly via addresses
Commands	Initialize MDS, read data from MDS, write data to MDS, etc.
Supply voltage: [2]	
Rated value	DC 24 V
Permissible range	DC 20 V to 30 V
Current consumption [1]	Max. 800 mA; typ. 80 mA (without SLG)
Potential isolation	Yes
Ambient temperature	
during operations	0 °C to +55 °C
during transport and storage	–40 °C to +70 °C
Dimensions (W x H x D) in mm	
only ASM 456	60 x 210 x 30
ASM 456 with ECOFAST connection block	60 x 210 x 60
Weight	Approx. 210 g
Degree of protection	IP67
MTBF (at 40 °C)	122 years

1 The power supply must deliver the required current of up to 800 mA for brief power failures ≤ 20 ms.
2 All supply voltages and signal voltages must be protective low level voltage (SELV/PELV acc. to EN 60950)
24V DC supply: fused (electrical) isolation of low level voltage (SELV/PELV acc. to EN 60950)

6.6.6 Dimensional drawings

The following figure shows the dimensional drawing of an ASM 456 with bus connection block.

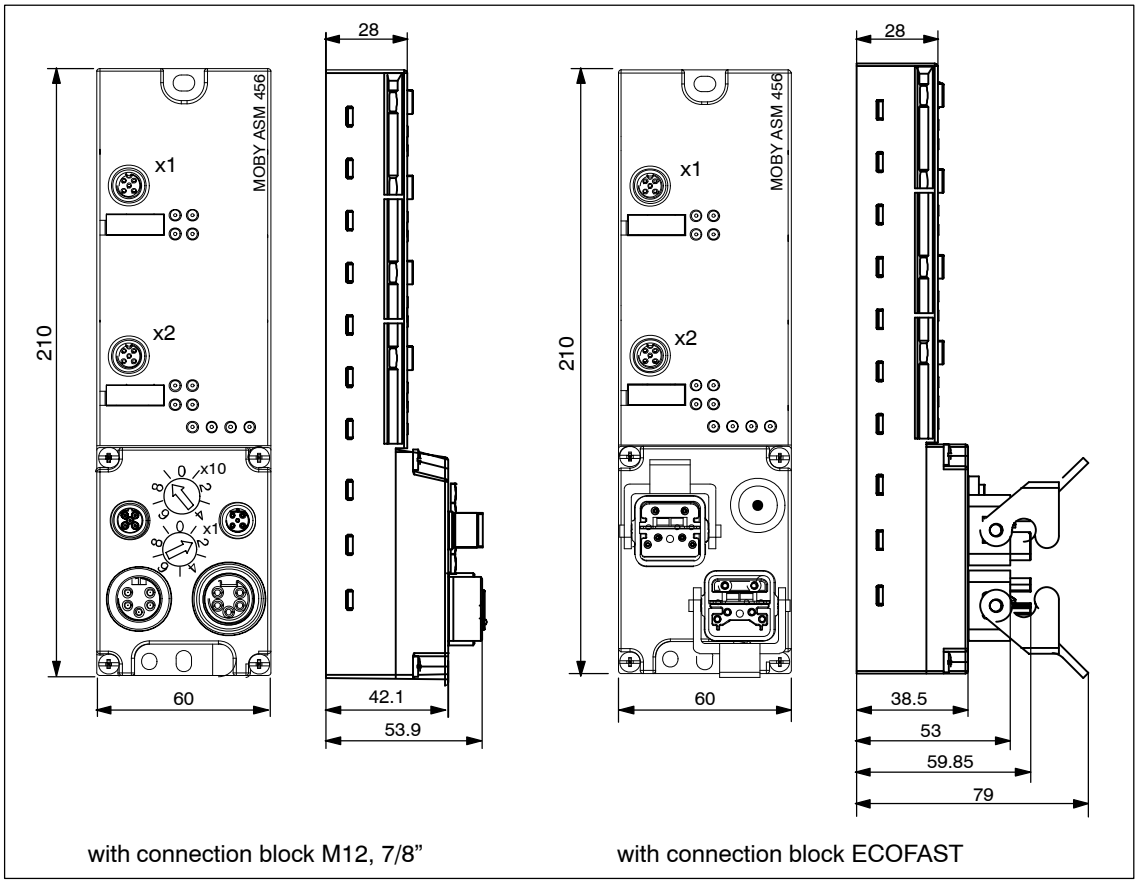


Figure 6-47 Dimensional drawing of ASM 456 (in mm)

6.6.7 Ordering data

Table 6-21 Ordering data of ASM 456

Interface ASM 456 for PROFIBUS DPV1, max. 2 SLG can be connected up	6GT2 002-0ED00
Accessories for ECOFAST connection:	
Connection block ECOFAST	6ES7 194-3AA00-0AA0
PROFIBUS ECOFAST hybrid plug 180	
• with pin insert (5 per pack)	6GK1 905-0CA00
• with socket insert (5 per pack)	6GK1 905-0CB00
PROFIBUS ECOFAST termination plug with terminating resistor	6GK1 905-0DA10
ECOFAST hybrid cable (pre-assembled)	6XV1 830-7B... [1]
ECOFAST hybrid cable (not pre-assembled, sold by the meter)	6XV1 830-7AH10
Accessories for M12 7/8” connection:	
Connection block M12	6ES7 194-3AA00-0BA0
M12 terminal resistor for PROFIBUS (5 per pack)	6GK1 905-0EC00
PROFIBUS cable with pre-assembled M12 connectors	6XV1 830-3D... [1]
Cable for supply voltage with pre-assembled 7/8” connectors	6XV1 822-5B... [1]
PROFIBUS FC standard non-pre-assembled cable; max. length 1000 m	6VX1 830-0EH10
PROFIBUS M12 connector plug (5 per pack)	
• with pin insert	6GK1 905-0EA00
• with socket insert	6GK1 905-0EB00
Connector plug 7/8” for supply voltage (5 per pack)	
• with pin insert	6GK1 905-0FA00
• with socket insert	6GK1 905-0FB00
Accessories for MOBY:	
Connecting cable ASM ↔ SLG See section 3.7.4.	6GT2 091-0FH..
Extension cable ASM ↔ SLG See section 3.7.4.	6GT2 891-0F...
MOBY Software [2] with FB/FC 45, FB/FC 55, FB/FC 56, GSD file	6GT2 080-2AA10
Other accessories for ASM 456 (network components)	ET 200eco manual 6ES7 198-8GA00-8AA0
Description of FB/FC 45 (for ASM 456) German English French	Electronically available on “Software MOBY” CD

1 These cables are available in different lengths. See Catalog IK PI for more details
2 See section 7.1

6.7 ASM 470/475

Application area

The ASM 470 475 interface can be installed in the SIMATIC S7-300 and ET 200M. It can be used for all MOBY systems.

Up to eight ASM 470/475 interface modules can be installed and operated in a single module rack of the SIMATIC S7-300. When a layout with several module racks (maximum of four) is used, the ASM 470/475 can be installed and operated in each of these module racks. In a maximum SIMATIC S7-300 configuration, up to 32 ASMs can be used. The ASMs can also be operated on the ET 200M distributed I/O system on PROFIBUS. This makes operation in an S7-400 environment possible without any problems. Up to 7 ASMs can be run on one ET 200M.

Error messages and operational states are indicated with LEDs.
Galvanic isolation between the SLG and the SIMATIC S7-300 bus ensures configurations are not susceptible to interference.

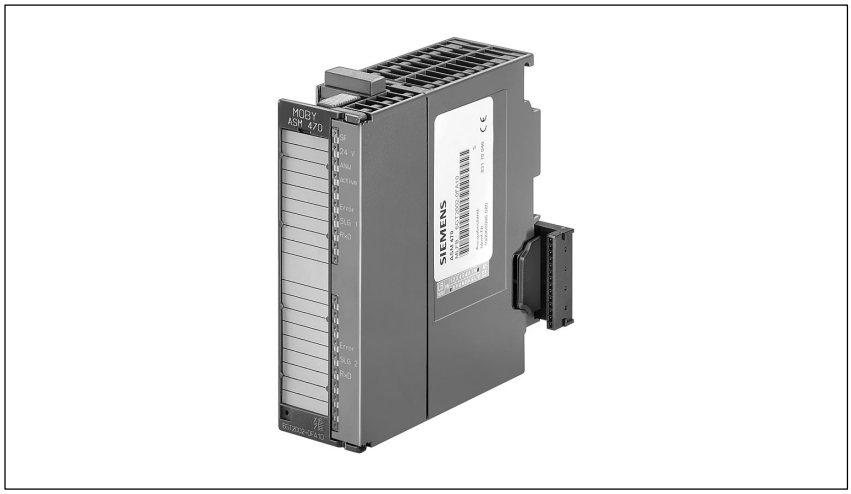


Figure 6-48 ASM 470/475 interface

ASM 470

In multiplex operation, up to two SLGs can be connected to the ASM 470. The FC 47 function ensures simple programming via SIMATIC S7 tools. FC 47 can be used with both the S7-300 and the S7-400. The ET 200M can also be used to operate the ASM 470 in a SIMATIC S5 environment. FB 47 is available for PLCs 115U to 155U.

On the hardware side, communication between the ASM 470 and the S7-300 CPU takes place via a 16-byte address area so that up to 12 bytes of user data can be transferred with each read/write command.

ASM 475

The ASM 475 with the order number 6GT2 002-0GA10 is a parameterizable module. The basic functions of the module are therefore already defined when the module is configured in HWCONFIG (e.g. normal addressing or filehandler).

ASM 475 (normal addressing)

The ASM 475 accesses data on the MDS directly by means of physical addresses. The FC 45 function controls operation in a SIMATIC S7.

The ASM 475 and FC 45 form a unit with which the MDS data can be easily read at optimum speed. A 32 KB MDS memory is read in 24 s almost independently of the S7 cycle time.

ASM 475 (Filehandler)

The filehandler function is not available in MOBY E.

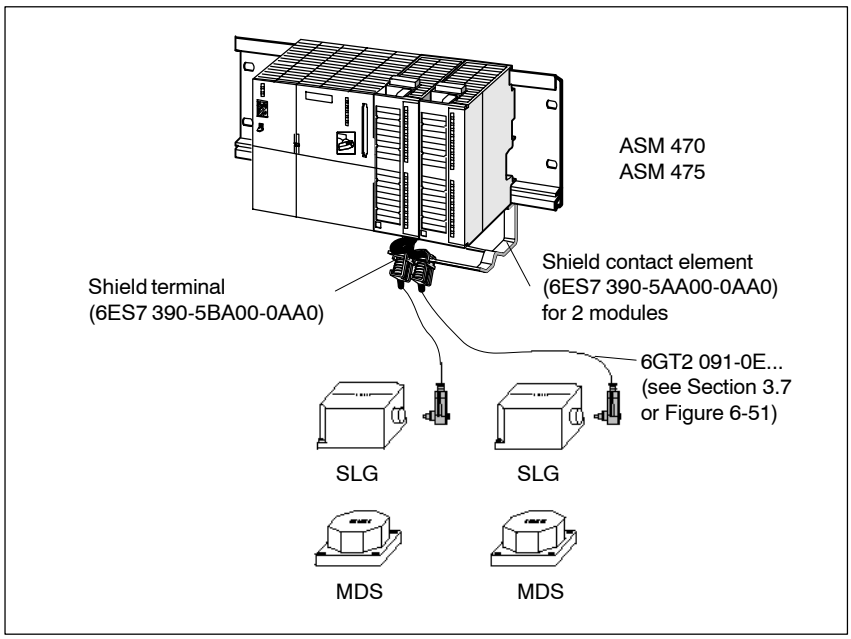


Figure 6-49 Configurator for the ASM 470/475

Ordering data

Table 6-22 Ordering data for the ASM 470/475

ASM 470 interface For SIMATIC S7-300; 2 SLG multiplex without a front connector	6GT2 002-0FA10
ASM 475 interface For SIMATIC S7-300; 2 SLG parallel; normal addressing; without a front connector	6GT2 002-0GA10
Accessories: front connector (1x per ASM)	6ES7 392-1AJ00-0AA0
Shield terminal (1 per SLG cable)	6ES7 390-5BA00-0AA0
Shield contact element (1 per 2 ASMs)	6ES7 390-5AA00-0AA0
Connecting cable ASM ↔ SLG (see Section 3.7.4)	6GT2 091-0E...
MOBY software [1] with FC 47, FB 47 for the ASM 470 and FC 45 for the ASM 475	6GT2 080-2AA10
Description of ASM 470/FC 47 for S7 German English	Electronically available on "Software MOBY" CD
Description of ASM 470/FB 47 for S5 German English	Electronically available on "Software MOBY" CD
Description of FC 45 (for ASM 475) German English French	Electronically available on "Software MOBY" CD

1 See Section 7.1

Technical data

Table 6-23 Technical data of the ASM 470/475

ASM type	ASM 470	ASM 475
Interface to S7-300 or ET 200M	P bus; distributed input and output	P bus; cyclic and acyclic services
Communication	16 bytes I/O	2 words (cyclic); 238 bytes (acyclic)
Command buffer in the ASM	1 x 12 bytes per ASM	70 x 238 bytes per SLG
Serial interface to SLG		
Connector	With screw terminals on the front connector The front connector is not included with the product	
Line length (max.)	Ready-made standard cable = 2 m, 5 m, 10 m, 20 m, 50 m (up to 1000 m on request)	
Supported MOBY systems	I/E/F/V	I/E/F
Connectable SLGs	Multiplex operation 2 x SLG	Parallel operation 2 x SLG
Software functions		
Programming	SIMATIC user: via FC/FB Third-party user: message frame description as in the appendix of the FC description	
Function block		
SIMATIC S7	FC 47	FC 45
SIMATIC S5	FB 47	–
MDS addressing	Direct access via addresses	
Commands	Initialize MDS, read data from MDS, write data to MDS	
PROFIBUS diagnosis	Yes, can be assigned via RESET	
S7 diagnosis	No	Yes, can be called via S7 OM
Firmware can be loaded	No	Yes, via S7 OM
Supply voltage		
Nominal value	24 V DC	
Perm. range	20 V DC to 30 V	20.4 to 28.8 V DC
Current consumption		
• without SLG at U = 24 V DC, max.	50 mA	350 mA
• with connected SLGs	Max. 600 mA with one SLG Max. 300 mA per SLG if two SLGs are connected	Max. 500 mA per connected SLG
Power loss of the module, typically	1 W	2 W
Current consumption from P bus, max.	100 mA	80 mA
Galvanic isolation between S7-300 and MOBY	Conditional (100 kΩ between S7-300 and 24 V DC)	Yes, use a separate power supply unit for the ASM for ungrounded operation

Table 6-23 Technical data of the ASM 470/475

ASM type	ASM 470	ASM 475
24 V fuse to the SLG	Yes, electronic	Yes, electronic
Ambient temperature		
During operation		
• Horizontal installation of SIMATIC	0 °C to +60 °C	
• Vertical installation of SIMATIC	0 °C to +40 °C	
During transportation and storage	–40 °C to +70 °C	
Dimensions in mm (WxHxD)	40 x 125 x 120	
Weight (approx.)	0.2 kg	
MTBF (at 40 °C)	$1 \cdot 10^6$ hours	

Wiring

The ASM 470/475 is commissioned with the following steps.

- Mount module
- Mount module on the S7-300 mounting rail. See S7-300 manual.

Note

The CPU of the S7-300 must be switched to STOP status before the module is mounted.

Warning

The S7-300 may only be wired when the voltage is off.

Note

To ensure interference-free operation of the ASM 475, make sure that the ASM and SIMATIC CPU (or the ASM and IM 153 in the case of the ET 200M) use the same voltage.
If not, error indicators which light up on the CPU when the ASM is turned on may not go off.

Front panel

The following figure shows the front plate of the ASM 470/475 and the inside of the front door with the related terminal assignment diagram. The SLGs must be connected to the ASM as shown in the terminal assignment diagram.

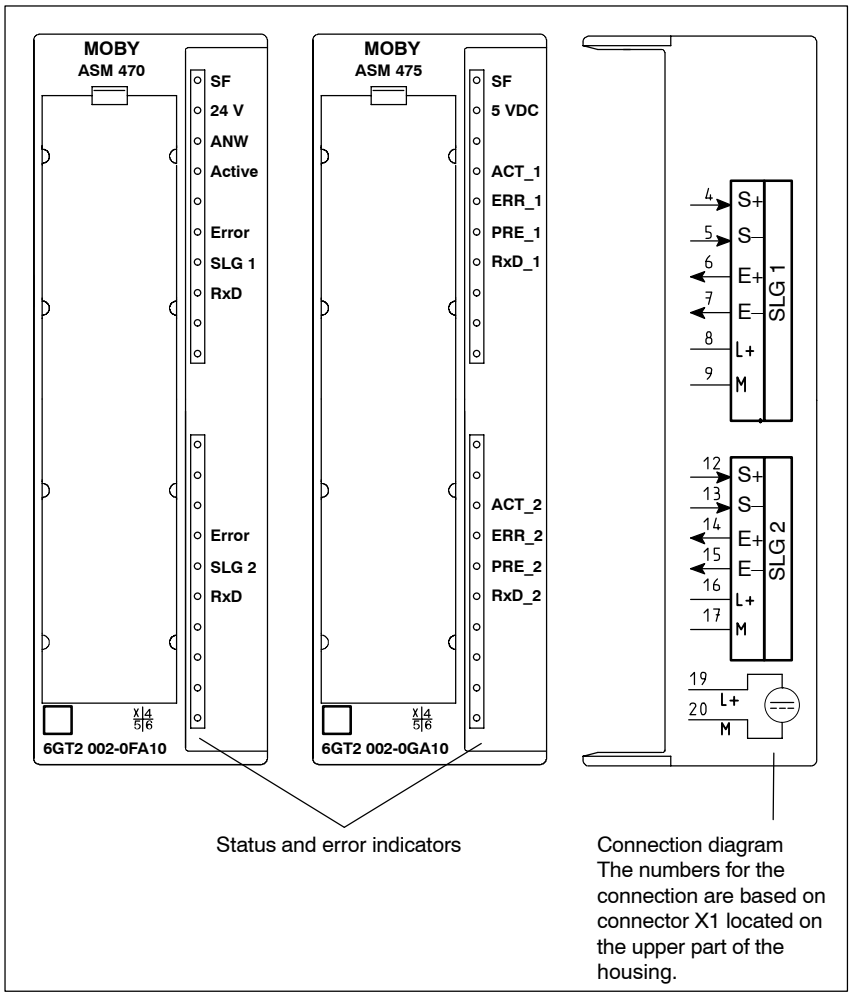


Figure 6-50 Front plate and inside of the front door of the ASM 470/475

Display elements on the ASM

Table 6-24 Function of the LEDs on the ASM 470/475

ASM 470	ASM 475	Meaning
SF	SF	System fault (hardware error in the ASM)
24 V	5 V DC	24 V are connected to the ASM and the 5 V voltage in the ASM is okay
Active	ACT_1, ACT_2	The corresponding SLG is active when a user command is processed.
Error	ERR_1, ERR_2	A flashing pattern shows the error that occurred last. This indicator can be reset with the parameter Option_1.
ANW	PRE_1, PRE_2	Indicates the presence of an MDS
RxD	RxD_1, RxD_2	Indicates current communication with the SLG; interference on the SLG can also cause this indicator to go on.
SLG 1, SLG 2	–	Indicates the SLG that has been selected by the user command. Only one of the LEDs may be on at a time (multiplex operation).

The LEDs PRE, ERR and SF on the ASM 475 indicate additional operating states.

Table 6-25 Operating states shown by LEDs on the ASM 475

SF	PRE_1	ERR_1	PRE_2	ERR_2	Description, causes, remedy
ON	OFF/ON	ON (perm.)	OFF/ON	ON (perm.)	Hardware is defective (RAM, flash, etc.).
ON	OFF	ON	OFF	OFF	Loader is defective (can only be fixed at the plant).
OFF	2 Hz	OFF	2 Hz	OFF	Firmware loading procedure is active or no firmware detected → Load firmware → Don't turn off ASM during this.
OFF	2 Hz	2 Hz	2 Hz	2 Hz	Firmware loading terminated with error → New start is required → Load firmware again → Check update files
Any	5 Hz	5 Hz	5 Hz	5 Hz	Operating system error → Turn ASM off/on.
OFF	OFF	1 flash every 2 s	OFF	1 flash every 2 s	ASM has started up and is waiting for a RESET (init_run) from the user

Wiring to the SLG

The figure below shows a connecting cable between the ASM and SLG. The colors apply to the standard MOBY cable for the ASM 470. See Section 3.7.3.

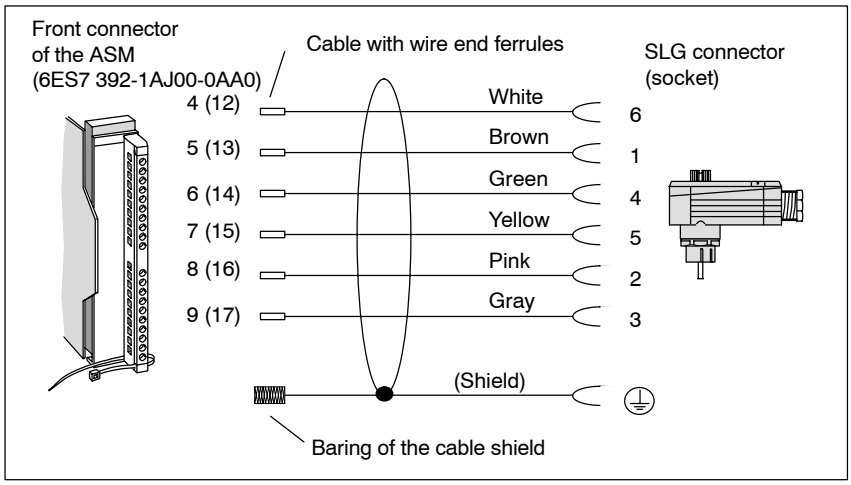


Figure 6-51 Wiring from the ASM 470/475 to the SLG (6GT2 091-0E...)

Shield connection

See Section 3.6 or Figure 6-49.

Lightning protection

Implement the lightning protection and grounding measures required for your application. Lightning protection measures always require individual consideration of the entire system.

Cable made by the customer

To ensure EMC, the SLG cable must be led over an S7-300 shield contact element (see Figure 3-47). When customers make their own cables, the shield of the SLG cable must be bared as shown in Figure 6-52.

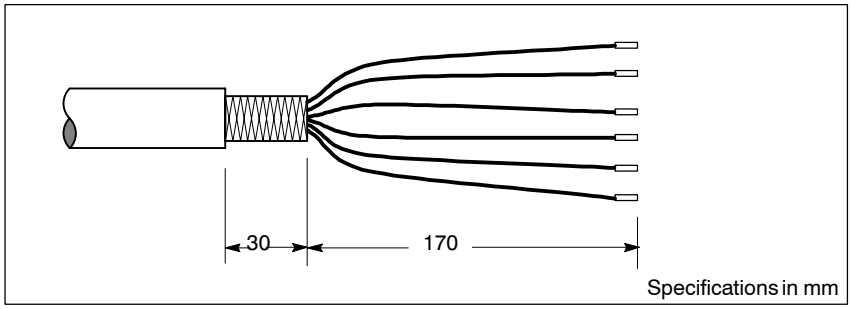


Figure 6-52 Baring of the cable shield for a cable made by the customer

Configuration of the ASM for SIMATIC S7 under STEP 7

Note

Installation of MOBY requires that functional STEP 7 software has been installed on the PC/PG.

Installation and configuration of the ASM 470/475 in the SIMATIC is handled by an installation program. The installation program is included with the "MOBY software" product (6GT2 080-2AA10).

Installation

The installation files are in the S7_om subdirectory on the MOBY software. Installation is largely automatic once Setup.exe has been called. The specified steps during SETUP must be responded to.

Note

Note that you have to execute a separate setup for the installation of the ASM 470 and ASM 475.

The ASM 470/ 475 module is located in the hardware catalog of HWCONFIG under the following subdirectory for hardware configuration of the SIMATIC S7.

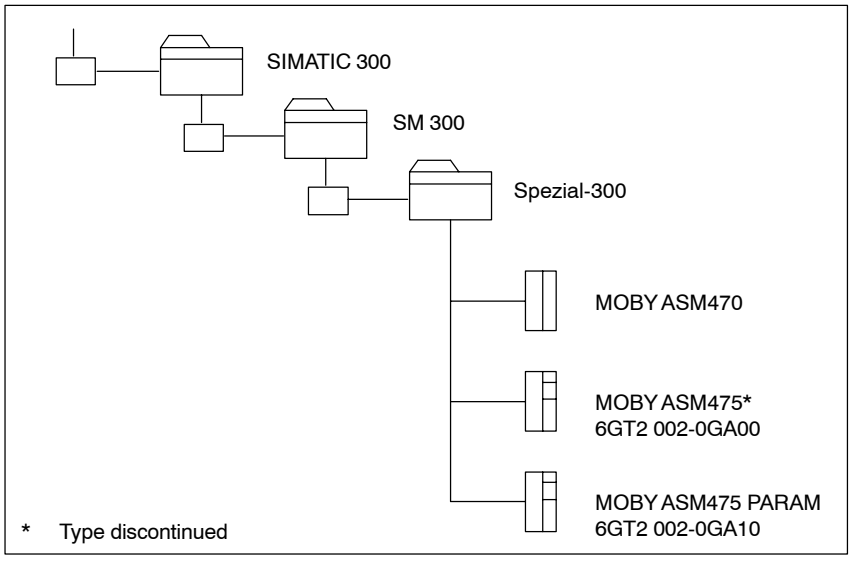


Figure 6-53 ASM 470/475 directory in the hardware catalog

FC 45/47 with sample project

You can use the file dearchiving function of SIMATIC Manager to load the FC with a sample project from the relevant subdirectory of “Software MOBY”. The sample project is located in the S7PROJ directory of SIMATIC Manager.

ASM type	Directory in MOBY software	Project name in SIMATIC Manager	Path name in SIMATIC Manager
ASM 470	FC 47	ASM470_CPU416	ASM470_C
ASM 475	FC 45	MOBY FC45	Moby_f_1

6.8 ASM 473

Application

The ASM 473 interface is a MOBY module for the SIMATIC S7. It can be inserted in the ET 200X distributed I/O device and DESINA. Communication from the ET 200X to the user runs via PROFIBUS DPV1. You can use an S7-300 or S7-400 with an integrated PROFIBUS connection as a programmable controller.

The ASM 473 supplements the SIMATIC S7 MOBY interface modules ASM 470 and ASM 475. With the IP67 degree of protection, it can be installed and operated directly without an additional protective housing.

The data are accessed on the MDS by means of physical addresses.

The function FC 45 is available for operation on a SIMATIC S7. The hardware configuration of the ASM 473 is performed with an object manager (OM) integrated in SIMATIC Manager.

Other features:

- Up to 7 ASM 473s can be run in parallel on one ET 200X station.
- All I/O modules from the ET 200X family can be run parallel to the ASM 473.

Figure 6-54 ASM 473 interface

Ordering data

Table 6-26 Ordering data for the ASM 473

Interface module ASM 473	6GT2 002-0HA10
Accessories: SLG cable (2 m = standard cable) For additional lengths see Section 3.7.4	6GT2 091-1CH20
Opt. ASM connector without SLG cable (for cable lengths > 20 m)	6GT2 090-0BC00
Software MOBY[1] with FC 45 incl. documentation	6GT2 080-2AA10
Description - FC 45 German English French	Electronically available on “Software MOBY” CD

1 See Section 7.1

Technical data

Table 6-27 Technical data of the ASM 473

Interface to ET200X	SIMATIC S7 P bus, cyclic/acyclic services
Communication	2 words (cyclic)/ 238 bytes (acyclic)
Command buffer in ASM	70 x 238 bytes
Serial interface to SLG	
Connector	2 x coupling connectors M12
Line length (max.)	20 m; 2 m (standard cable length) Additional ready-made cables = 5 m, 10 m, 20 m (up to 1000 m on request)
Connectable SLGs	1 x SLG 4x
Software functions	
Programming	Depends on PROFIBUS DP master
SIMATIC S7 function block	FC 45
MDS addressing	Direct access via addresses
Commands	Initialize MDS, read data from MDS, write data to MDS
PROFIBUS diagnosis	yes; in accordance with ET 200X basis station
S7 diagnosis	Yes, can be called via S7 OM
Firmware can be loaded	yes, via SIMATIC Manager

Table 6-27 Technical data of the ASM 473

Supply voltage	
Nominal value	24 V DC
Perm. range	20.4 to 28.8 V DC
Current consumption	
• From sensor voltage	typ. 75 mA
• From load voltage (SLG supply)	Max. 500 mA (or see technical data of the connected SLG)
Power loss of the module	typ. 1.6 W
Digital inputs	Via expansion modules from the ET 200X family
Digital outputs	Via expansion modules from the ET 200X family
Ambient temperature	
During operation	0 °C to +55 °C
During transportation and storage	–40 °C to +70 °C
Dimensions (WxHxD) in mm	
Single device dimensions	87 x 110 x 55
Scaling interval	60 x 110 x 55
Mounting	2 M5 screws (supplied by customer) 2 M3 screws (supplied by device)
Protection rating in accordance with EN 60529	IP67
Weight	0.275 kg

For information on setup and other general technical data, see the ET 200X manual (order no. 6ES7 198-8FA01-8AA0).

Configuration

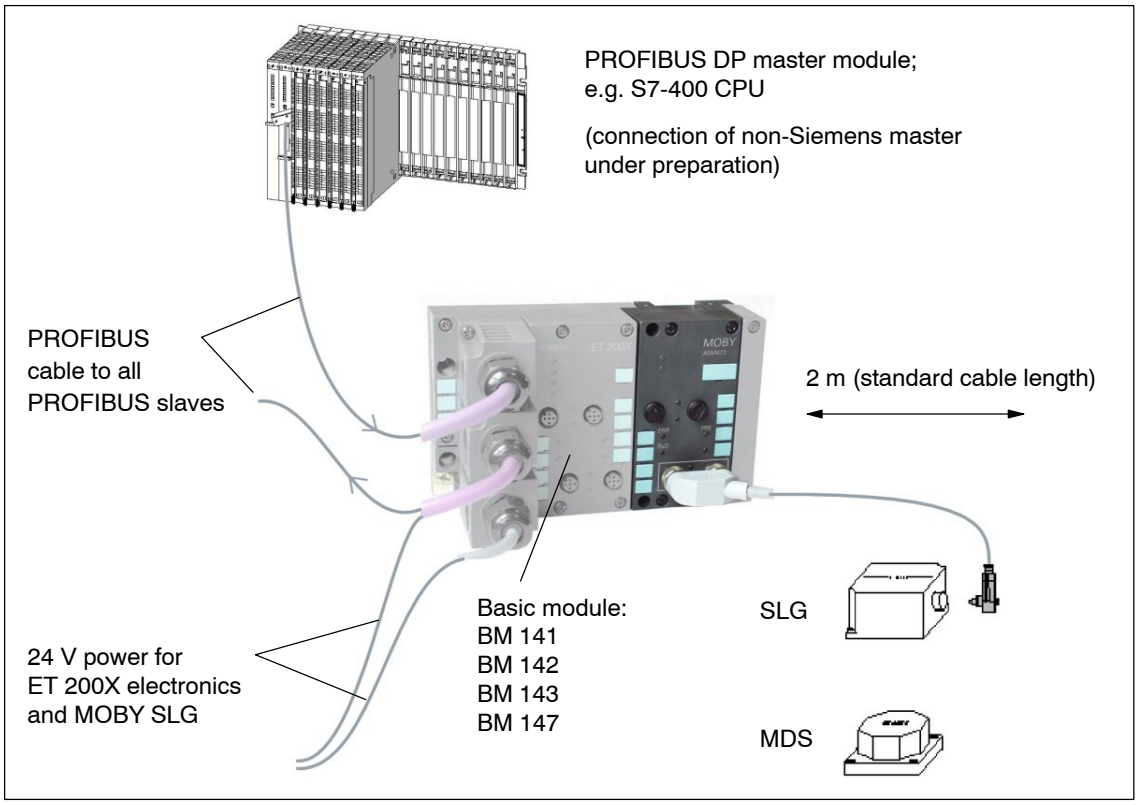


Figure 6-55 Configurator for the ASM 473

Note

The ET 200X differs from the ASM 45x (see Figure 6-22) in that the 24 V must be fed to the PROFIBUS connector and the load voltage connector. See the ET 200X manual.

Basic module – prerequisite for operation of the ASM 473

The following table shows the status of the ET 200X basic modules at 10/2002. The functionality of new basic modules is stored in HWCONFIG in SIMATIC Manager.

Table 6-28 Prerequisite for operation of the ASM 473

Order number of the ET 200X basic module	To be operated with the ASM 473 (6GT2 002-0HA00)*	To be operated with the ASM 473 PARAM (6GT2 002-0HA10)
6ES7 141-1BF00-0XB0	No	No
6ES7 141-1BF00-0AB0	Yes	Yes
6ES7 141-1BF01-0XB0	No	No
6ES7 141-1BF10-0XB0	No	No
6ES7 141-1BF11-0XB0	Yes	Yes
6ES7 141-1BF40-0AB0	Yes	Yes
6ES7 142-1BD10-0XB0	No	No
6ES7 142-1BD11-0XB0	No	No
6ES7 142-1BD20-0XB0	No	No
6ES7 142-1BD21-0XB0	Yes	Yes
6ES7 142-1BD22-0XB0	No	yes**
6ES7 143-1BF00-0AB0	Yes	Yes
6ES7 143-1BF00-0XB0	Yes	Yes
6ES7 147-1AA00-0XB0	No	No
6ES7 147-1AA01-0XB0	No	Yes

* Type discontinued

** Prerequisite for operation: please parameterize the module 6ES7 142-1BD21-0XB0 in HWCONFIG.

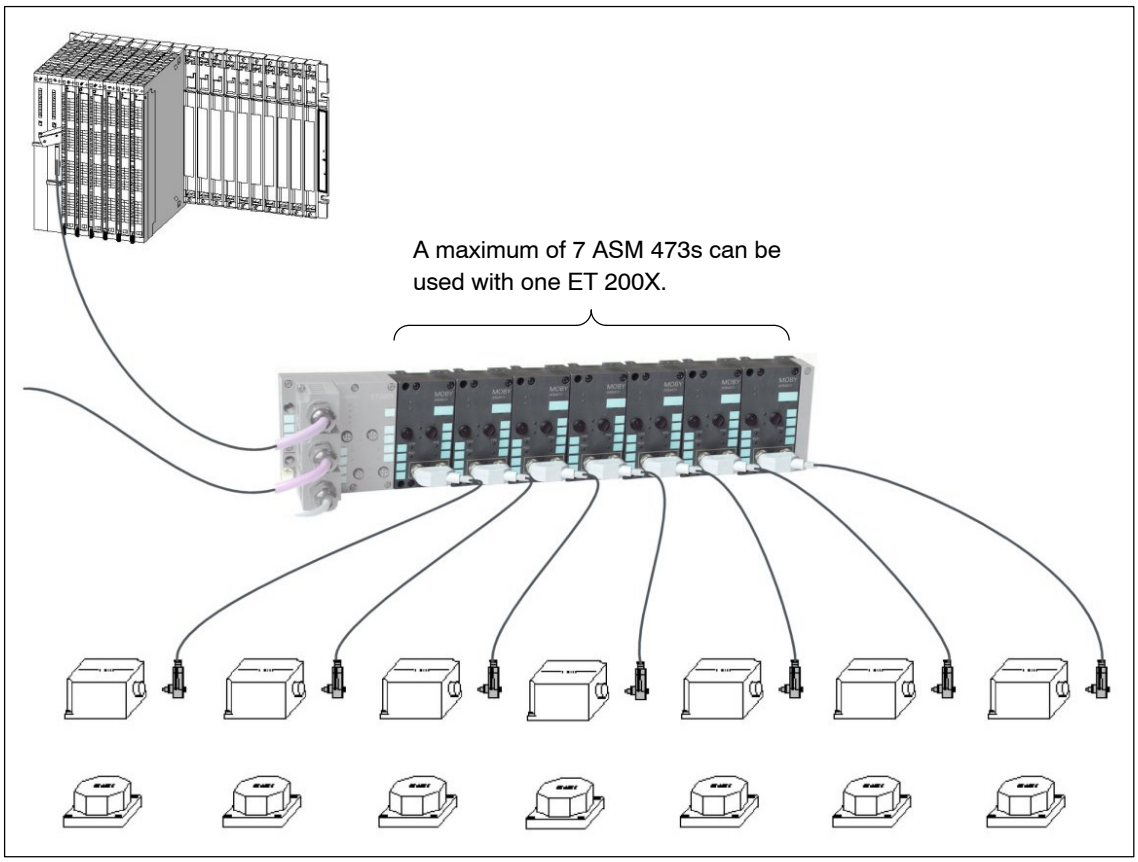


Figure 6-56 Maximum configuration of the ASM 473 on one ET 200X

Depending on the PROFIBUS master, up to 123 ET 200X modules can be operated on one PROFIBUS branch.

Hardware configuration

The ASM 473 is integrated in the hardware configuration of SIMATIC Manager by calling Setup.exe in the data\S7_OM directory on the “Software MOBY” CD. At the moment the ASM 473 cannot be integrated in a non-Siemens master.

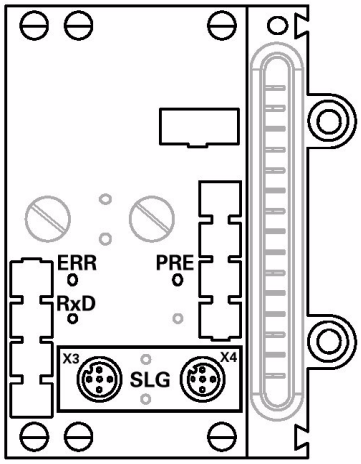
SLG connection method

An SLG always occupies the two M12 connection sockets, X3 and X4, on the ASM 473. To ensure the simplest SLG connection, use a preprepared cable (see Figure 6-24 and Section 3.7). The standard version of the connecting cable has a length of 2 m.
Other lengths are available on request.

An SLG connector with screw-type terminals is available for users who want to make their own cable (see Figure 6-23). Cables and SLG connectors can be ordered from the MOBY catalog.

Pin assignments

The following figure shows the pin assignment to the SLG and describes the display elements.



Socket	Pin assignment (SLG)	
X3	1	+RxD
	2	+TxD
	3	–TxD
	4	–RxD
	5	PE
X4	1	+ 24 V
	2	n. c.
	3	0 V
	4	n. c.
	5	PE

LEDs for PROFIBUS DP

General operating LEDs (SF, BF, ON, 24 V DC) are located on the basic module of the ET 200X.

LEDs for MOBY

RxD: SLG is active with a command
PRE: Indicates the presence of an MDS
ERR: Error indicated by flashing pattern (see Appendix B.1)

The PRE and ERR LEDs indicate other operational states of the ASM.

PRE	ERR	Description, causes, remedies
OFF/ON	ON (perm.)	Hardware is defective (RAM, flash, etc.).
ON	OFF	Loader is defective (can only be fixed at the plant).
2 Hz	OFF	Firmware loading procedure is active or no firmware detected → Load firmware → Don't turn off ASM during this.
2 Hz	2 Hz	Firmware loading terminated with error → New start is required → Load firmware again → Check update files
5 Hz	5 Hz	Operating system error → Turn ASM or ET 200X basis station off/on.
OFF	1 flash every 2 s	ASM has started up and is waiting for a RESET (init_run) from the user.

Figure 6-57 Pin assignment and LEDs of the ASM 473

Dimensioned drawing of mounting holes

The figure below shows the dimensions for the positions of the holes for the mounting screws for one basic module and one ASM 473 expansion module.

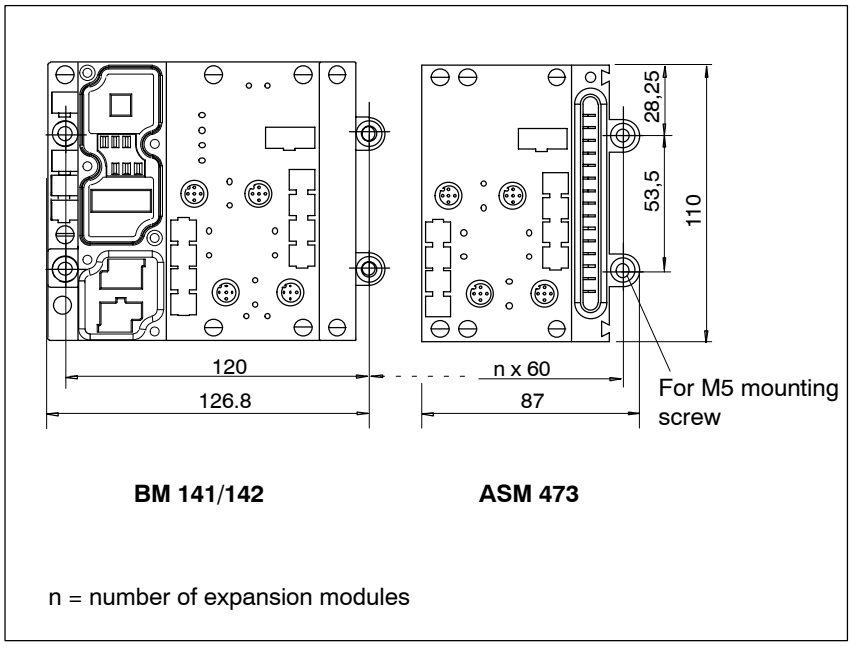


Figure 6-58 Dimensions for mounting holes for basic and expansion modules

6.9 ASM 724/754

Application area

The ASM 724/754 interfaces are designed for the distributed configuration of identification systems for warehousing, logistics, distribution and assembly lines. The robust and functional housing can be mounted almost anywhere. Up to four read/write antennas can be connected and operated in quasi parallel.
When more than one SLA 71 is connected, the data are processed sequentially on the device.
The MOBY wide-range power pack (6GT2 494-0AA00) can be used to supply the power on the ASM 724 and ASM 754. The read/write antenna (SLA 71) and stub lines must be ordered separately. The user has a choice of two interfaces.

- PROFIBUS DPV1 (ASM 754)
- RS 232/RS 422; Serial interface to the PC and PC-compatible controllers (e.g., SICOMP IMC) and to controllers of other manufacturers (ASM 724). Other operating systems on request.

Figure 6-59 ASM 724/754 interface

ASM 724

The ASM 724 accesses the data on the MDS directly with physical addresses. Communication with the user is handled by a serial RS 232/RS 422 interface with the 3964R protocol. This makes it easy to connect PCs and controllers of other manufacturers to the MOBY E identification system. A C library (MOBY API) with basic functions is available to PC users for their applications (Windows 98/NT 4.0).

ASM 754

The ASM 754 accesses the data on the MDS directly with physical addresses. Communication to the user is by means of the acyclic PROFIBUS DPV1 protocol service. The function FC 45 is available to SIMATIC S7-300/400 users as a simple means of integration. The description of the PROFIBUS DPV1 implementation (see the appendix of the FC 45 description) is available to programmers of controllers of other manufacturers.

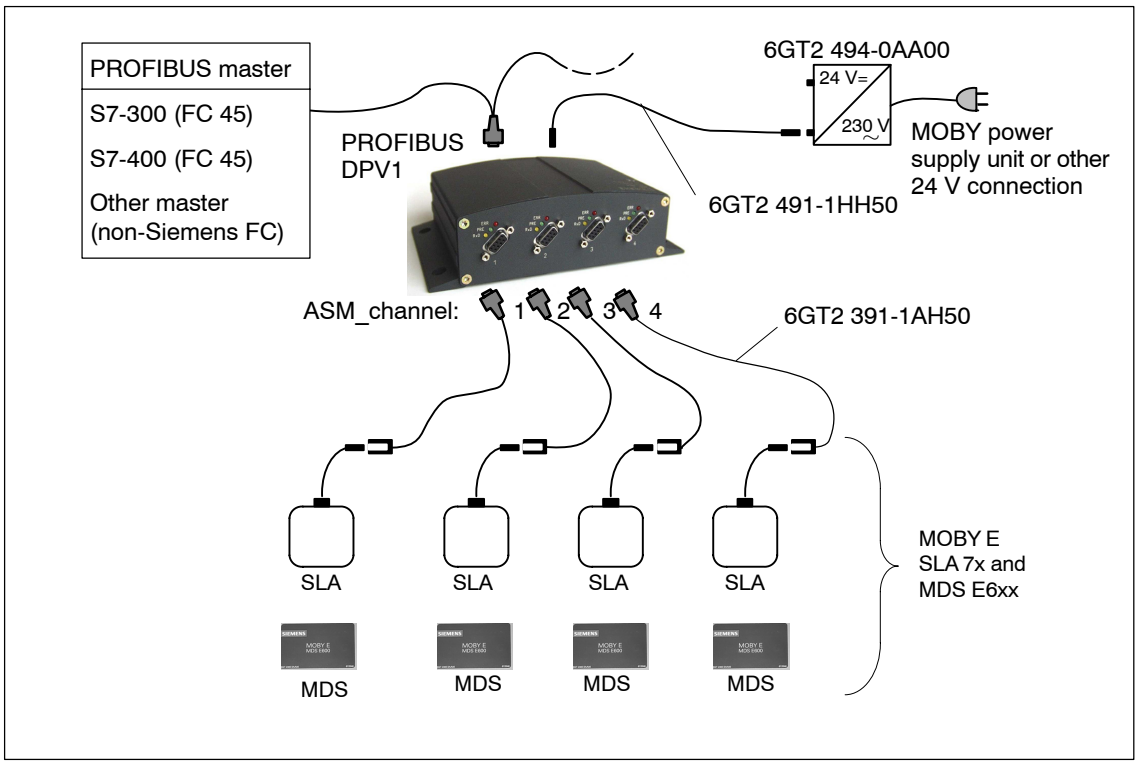


Figure 6-60 Configurator for the ASM 724 and ASM 754

Ordering data

Table 6-29 Ordering data for the ASM 724/754

ASM 724 interface With serial RS 232/RS 422 interface; 3964R procedure for PC, SICOMP and controllers of other manufacturers for 4 SLA 71	6GT2 302-2CE00
ASM 754 interfaces for the operation of MOBY E components via PROFIBUS DPV1, without filehandler for 4 SLA 71	6GT2 302-2EE00
Accessories	
SLA 71 read/write antenna	6GT2 301-2BB00
Standard connecting cable between SLA 71 ↔ ASM 724 and ASM 754; Length: 5 m	6GT2 391-1AH50
Extension for antenna line 6GT2 391-1AH50 Length: 10 m 25 m	6GT2 391-1BN10 6GT2 391-1BN25
Extension for antenna line 6GT2 391-1AH50 Length: 25 m	6GT2 391-1BN25
Wide-range power supply unit 100-230 V AC/ 24 V DC; 2.2 A (24 V cable not included with the product)	6GT2 494-0AA00
24 V DC plug-in line for wide-range power supply unit 6GT2 494-0AA00; Length: 5 m	6GT2 491-1HH50
RS 232 plug-in cable between PC and ASM 724; (for cable lengths see Section 3.7.4)	6GT2 391-0B...
Connector for power supply (socket) for the ASM 724 and ASM 754	6GT2 390-1AB00
PROFIBUS connector 9-pin subminiature D connector for 2 plug-in lines	6ES7 972-0BA11-0XA0 (for other connectors, see catalog ST 70 or IK PI)
Adapter floor plate for top-hat rail mounting of ASM 724/ASM 754	6GT2 390-0BA00
C-library for ASM 724 (MOBY API)	On the “Software MOBY” CD (see Section 7.1)
FC 45 for ASM 754	On the “Software MOBY” CD (see Section 7.1)
Description of FC 45 For ASM 754 programming German English French	 Electronically available on “Software MOBY” CD
Description MOBY API (C-Lib for ASM 754) German English	 Electronically available on “Software MOBY” CD

Technical data

Table 6-30 Technical data of the ASM 724/754

	ASM 754	ASM 724
Serial interface to user	PROFIBUS DPV1	RS 232/RS 422
Max. cable length	See PROFIBUS configuration.	30/500 m
Procedure/protocol	EN 50170 Vol. 2, PROFIBUS	3964R
Connection	9-pin submin. D socket (screw-type attachment)	
Transmission speed	9600 bps to 12 Mbps (automatic recognition)	9.6 kbps 19.2 kbps 38.4 kbps (automatic recognition)
Max. block length	4 words (cyclic)/238 bytes (acyclic)	238 bytes
Serial interface to the SLA	9-pin submin. D socket (screw-type attachment)	
Cable length (ASM to SLA)	Max. of 55 mm	
No. of SLAs connectable	4 SLA 71 devices	
Software functions		
Programming	Depends on PROFIBUS DPV1 master	MOBY API: C-Lib for PC with Windows 98/NT 4.0
Function block SIMATIC S7	FC 45	–
MDS addressing	Direct access via addresses	
Commands	Initialize MDS, read data from MDS, write data to MDS	
Digital inputs	None	
Digital outputs	None	
Supply voltage		
Connector	4-pin, M12 round connector (pin)	
Nominal value	24 V DC	
Perm. range	20 to 30 V DC	
Current consumption	250 mA (without SLA)	
max. current consumption	1.1 A (without SLA)	
UL/CSA	Yes, in connection with a power supply of NEC Class 2	
Ambient temperature		
Operation	–25 to +55 °C (no condensation)	
Transportation and storage	–40 to +85 °C (no condensation)	
Housing		
Dimensions (L x W x H)	205 x 130 x 60 (without connector)	
Material	Aluminum	
Color	Anthracite	

Table 6-30 Technical data of the ASM 724/754

	ASM 754	ASM 724
Mounting Tightening torque (at room temperature)	4 M5 screws Optional: top-hat rail mounting ≤ 3 Nm	
Weight (approx.) Protection rating in accordance with EN 60529	1300 g IP40 (higher rating on request)	
Vibration in accordance with EN 60721-3-7/ class 7M2 Vibration in accordance with EN 60721-3-7/ class 7M2	30 g 1 g (9 to 200 Hz) 1.5 g (200 to 500 Hz)	
MTBF (at +40 °C)	$1 \cdot 10^5$ hours	
Certification	CE	

Dynamic operation of the ASM 724/754

The ASM 724/754 is a multi-channel module. The user can operate up to 4 channels in parallel but internally the SLA 71 is controlled by a multiplexer. This operation is also described as quasi-parallel. The ASM 724/754 is therefore not suitable for dynamic operation.

If the traversing speed is sufficiently slow, dynamic MDS processing can be considered in individual cases.

The following example gives you an idea of how this works.

Task:
The MDS E624 is to be processed dynamically on 4 SLAs at a traversing speed of 15 m/min.

Configuration:

- ASM 754 with 4 SLA 71s
- PROFIBUS with 3 Mbps
- Controller with CPU 315-2 DP

Read requirement:
One to 16 bytes is to be read as of address 0 on all SLA 71s.

Result of the measurements:
$t_{(read)}$ = 520 ms
This means that in the worst case an MDS must be in the field for 520 ms to ensure that it can be still be read dynamically if 4 SLAs are being operated. If fewer than 4 SLAs are being used on the ASM 754, the time is divided accordingly between the SLAs:

Number of SLAs	Time [ms]
4	520
3	390
2	260
1*	130

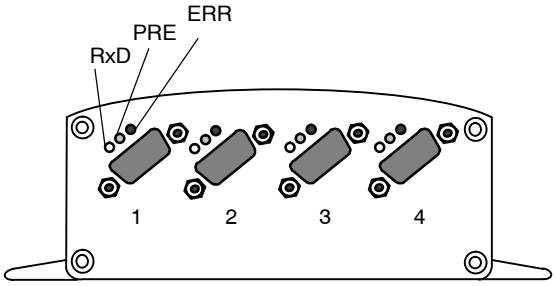
* If only one SLA 71 is inserted on the ASM 724/754, the time is reduced to < 100 ms.

If you compare this time with the speed of the MDS or the different MDSs, the result is as follows:

Number of SLAs	MDS type	V max. dyn. [m/s]	V max. dyn. [m/min]
4	MDS E624	0.07	4.2
3	MDS E624	0.10	6.0
2	MDS E624	0.15	9.0
1	MDS E624	0.29	17.4
4	MDS E600	0.12	7.2
3	MDS E600	0.15	9.0
2	MDS E600	0.23	13.8
1	MDS E600	0.46	27.6
4	MDS E611	0.15	9.0
3	MDS E611	0.21	12.6
2	MDS E611	0.31	18.6
1	MDS E611	0.62	37.2

Conclusion:
Dynamic processing of the MDS E624 on 4 SLA 71s at a speed of 15 m/min is not possible.

Pin assignment and switches



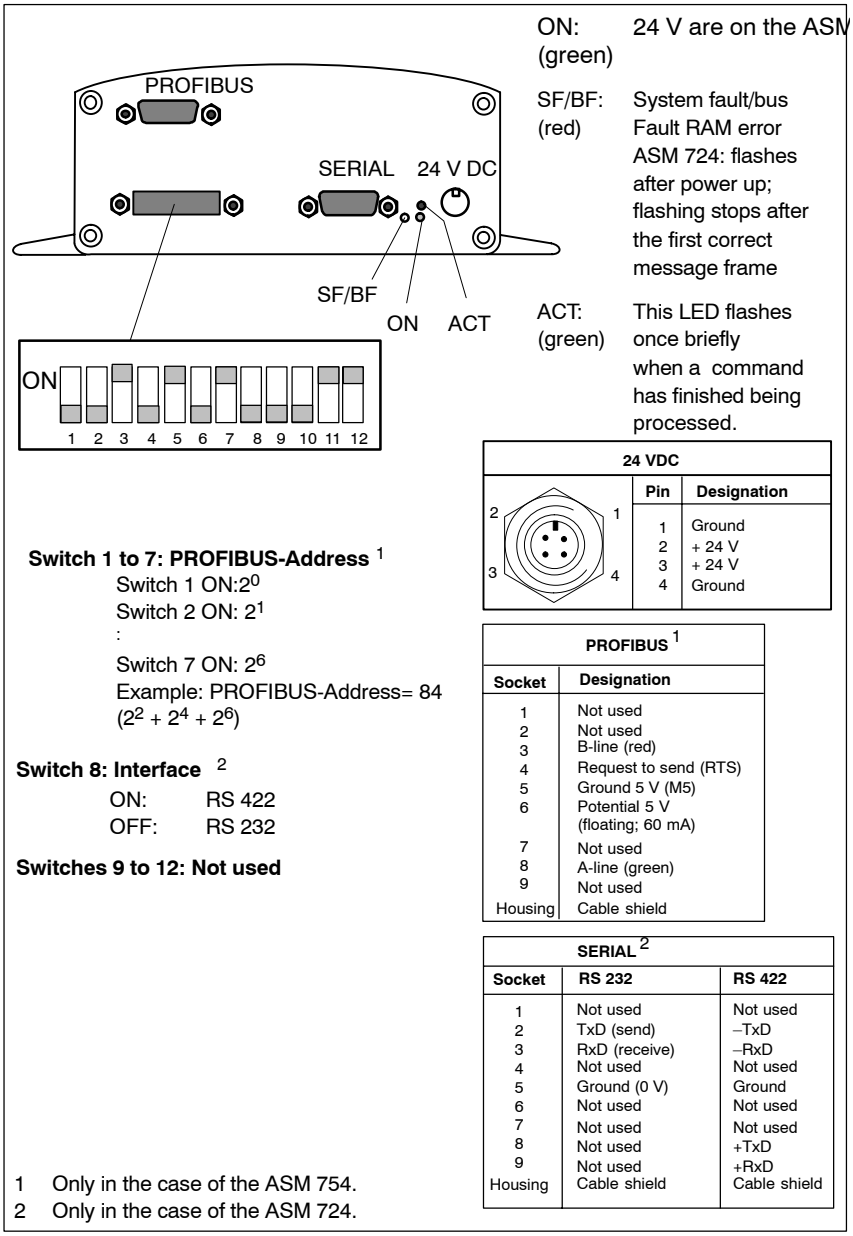
Connector 1 to 4 to the SLA	
Socket	**Designation**
1	+ 12 V
2	+ Sending
3	+Receiving
4	Not used
5	– Receiving
6	– Sending
7	Ground (0 V)
8	+ 24 V
9	Not used
Housing	Cable shield

RxD (yellow): Connection indicator; lights up if the connection to the SLA is working properly

PRE (green): "Presence" indicates the presence of an MDS in the transmission window

ERR (red): Error indicated by flashing LED (under preparation)

Figure 6-61 Serial interfaces of the ASM 724/754 to the SLA 71



24 VDC

Pin	Designation
1	Ground
2	+ 24 V
3	+ 24 V
4	Ground

PROFIBUS [1]

Socket	Designation
1	Not used
2	Not used
3	B-line (red)
4	Request to send (RTS)
5	Ground 5 V (M5)
6	Potential 5 V (floating; 60 mA)
7	Not used
8	A-line (green)
9	Not used
Housing	Cable shield

SERIAL [2]

Socket	RS 232	RS 422
1	Not used	Not used
2	TxD (send)	–TxD
3	RxD (receive)	–RxD
4	Not used	Not used
5	Ground (0 V)	Ground
6	Not used	Not used
7	Not used	Not used
8	Not used	+TxD
9	Not used	+RxD
Housing	Cable shield	Cable shield

Figure 6-62 Serial interfaces of the ASM 724/754 to the user

Dimensions (in mm)

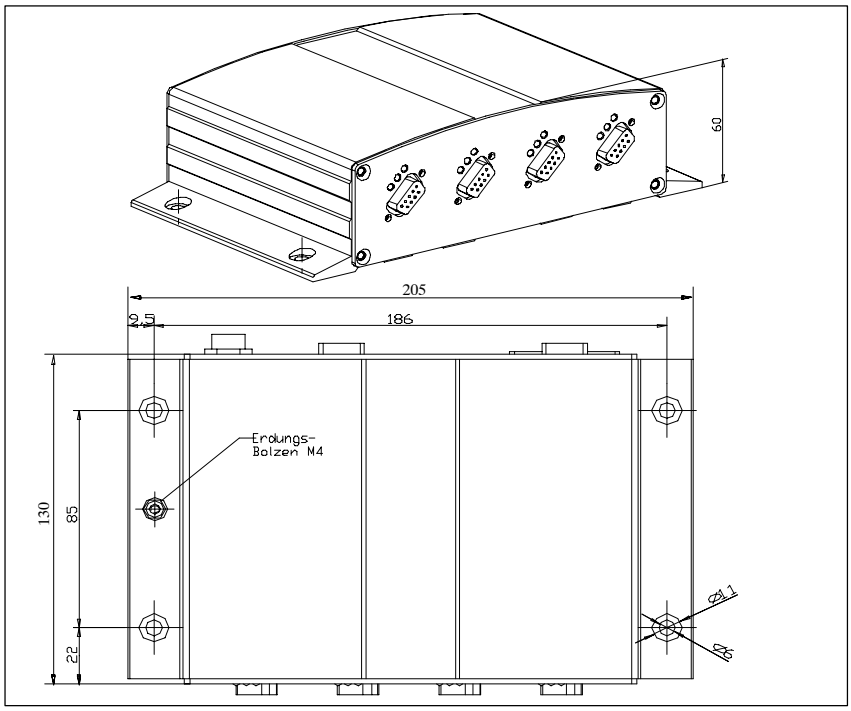
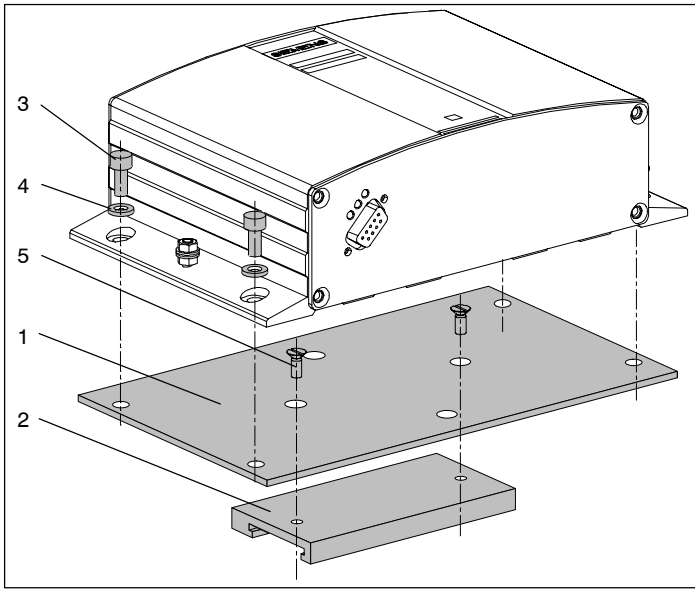


Figure 6-63 Dimensioned drawing of the ASM 724/754 with mounting holes

Adapter floor plate for top-hat rail mounting



Item	Designation	Quantity
1	Floor plate	1
2	Profile section	1
3	Oval head screw (M5 x 10)	4
4	Washer (A5.3)	4
5	Countersunk screw (M4 x 10)	2

Figure 6-64 How to mount the adapter plate

Note

The profile section (item 2) can be turned by 90° on the floor plate before mounting if the situation requires it.

6.10 SIM Serial Interface Module

6.10.1 Overview

Application area

The primary application areas of the MOBY E SIM are data acquisition, trade and commerce, warehousing, logistics, assembly lines and tool identification. For acquisition support, development and pilot installation, the MIFARE Demokit is available.
The serial interface module (SIM) is a universal module for the operation of MOBY E via a serial interface on any

- Computer
- PC and
- Non-Siemens PLC.

Its sturdy housing permits use in rugged environments and makes it insensitive to many chemical substances.

Layout and function

SIM combines an ASM interface and an SLG read/write device in one housing. It is delivered with RS 232 and RS 422 interfaces.

The following versions are available for MOBY E.

- SIM 70 ANT 0
- SIM 70 ANT 1
- SIM 72

All SIM models are operated with a 3964R procedure.

The SIM is connected via a serial interface of the PC (models with processors starting at 80486SX) and run with the 3964R protocol. Driver software is available for the 3964R protocol. C libraries with functions based on the 3964R driver platform are available for fast and easy programming.

The use of the C libraries makes it possible to operate the SIM through applications under Windows 95/NT 4.0.
Other operating systems on request.

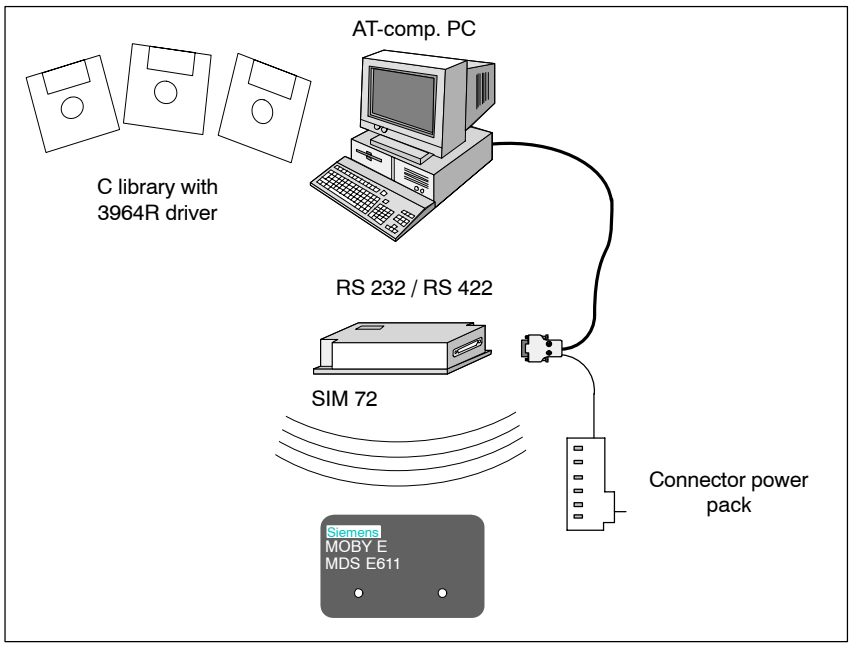


Figure 6-65 Configurator for SIM (example)

Data structure of the MOBY E data memory MDS E6xx with SIM

MOBY E MDS E 6xx data memories and the MIFARE® card share the same protocol but use different access keys. MDS E6xx and MIFARE have different access keys.
The MDS has an 8-kbit EEPROM memory which is divided into 16 sectors (i.e. sectors 0 to 15). Each sector consists of four blocks. The block is 16 bytes in length and is the smallest addressable memory area on the MDS. With one exception, each sector consists of three blocks of user data (i.e. blocks 0 to 2) and a sector trailer (i.e. block 3). Sector 0 is the exception. It contains the card manufacturer data block in block 0 and can only be read-accessed.

Access to the MOBY E MDS is protected by two keys (i.e. A and B) per sector with individual access conditions for each block of the sector. These keys and the individual access conditions must be specified and stored in the appropriate sector trailer when the card is personalized.

With MOBY E data memories, key A is reserved and is not available for programming. All MOBY E SIMs use this key.
Key B is available for user programming. This permits the SIM to be used to access general MIFARE data memories. The transport key is required to switch the SIM to another B key. Which is: 0xB0B1B2B3B4B5.

Note

Key assignment and access conditions can only be changed with the SIM.

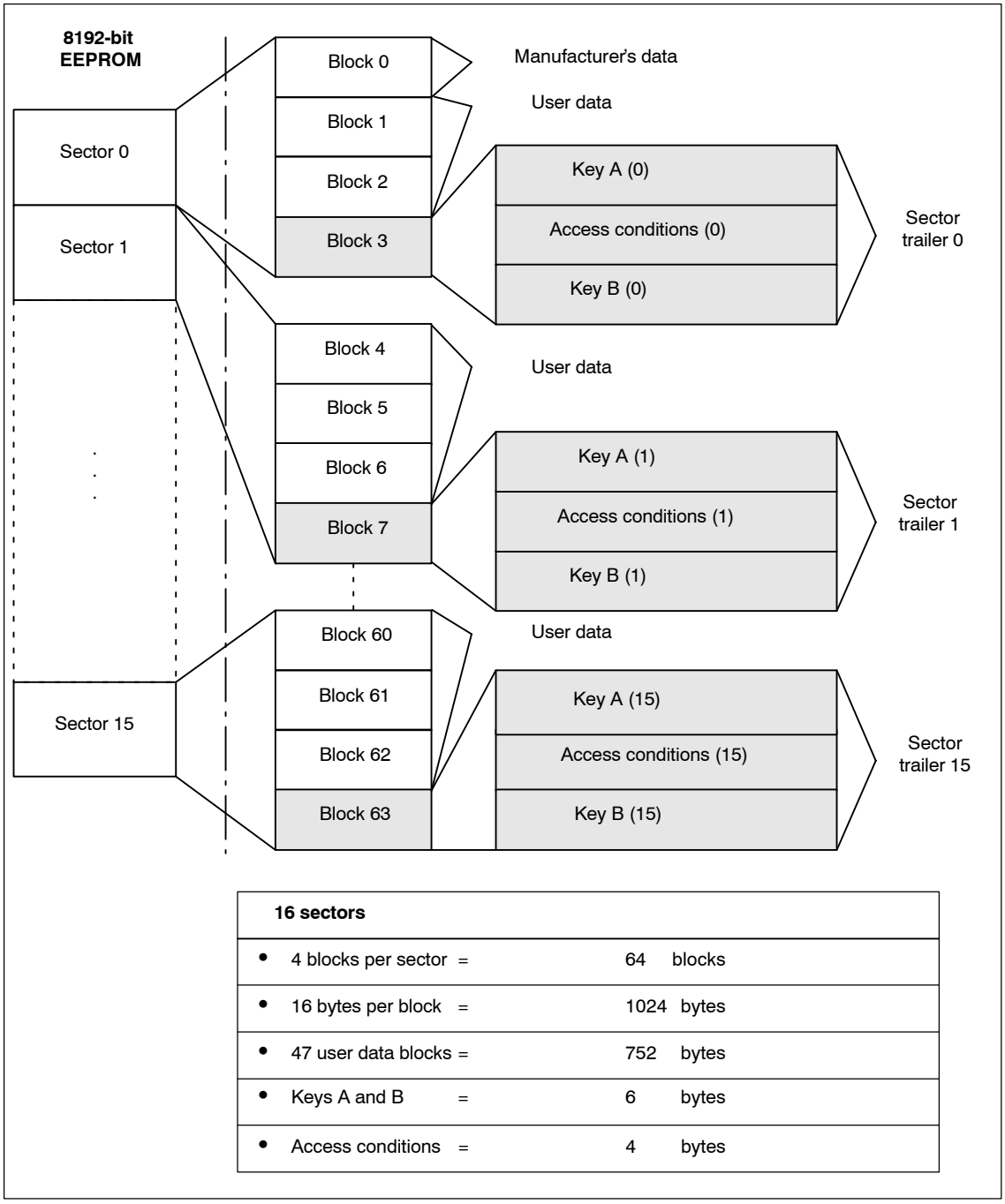


Figure 6-66 Data structure of the MOBY E MDS (MIFARE®) with SIM

The MOBY interface modules which work with the MDS via an SLG (e.g., ASM 400, ASM 450, ASM 470, and so on) **only** access the user data via addresses. The figure below shows the assignment of the ASM addressing to the block structure of the MDS.

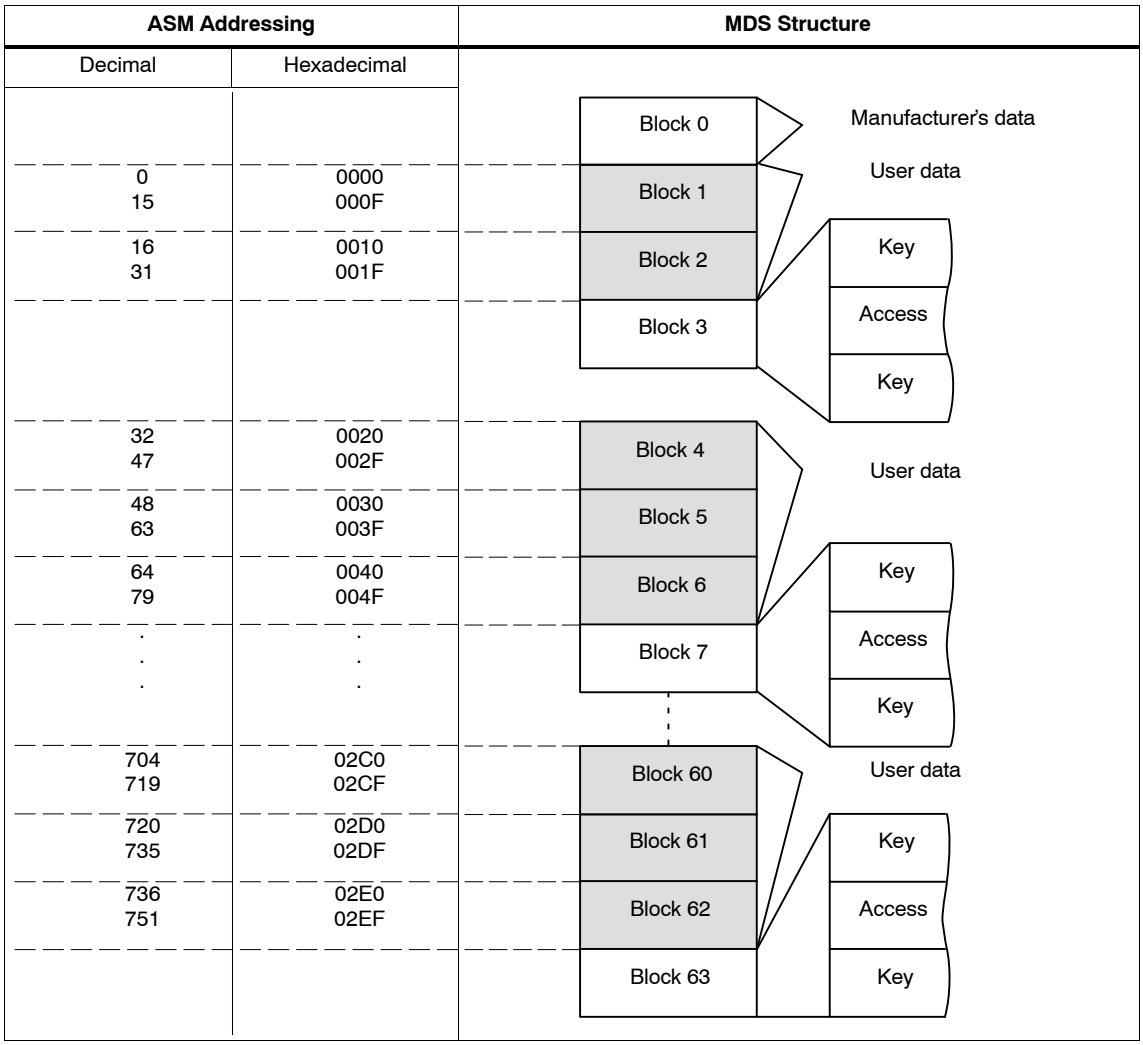


Figure 6-67 Assignment of the ASM addressing to the block structure of the MDS

Field data of the MDS and SIM

The following tables provide the field data of all MOBY E components of MDS and SIM.

All technical data are typical data, based on an ambient room temperature of 0 to +50 °C, a supply voltage of 22 to 27 V DC, and metal-free surroundings. **Tolerances of ± 20 % are permitted for production conditions and temperature fluctuations.**

The field data are subject to additional tolerances when the entire voltage range on SIM from 12 to 30 V DC and/or the entire temperature range of MDS and SIM is/are utilized.

Table 6-31 Field data of all MDSs and SIMs without the influence of metal

MDS / SIM		MDS E600	MDS E611	MDS E623[3]	MDS E624
Length of the transmission window in mm (L)					
SIM 70 ANT 0	(L_d)	---	---	4	12
SIM 70 ANT 1	(L_d)	60[5]	80[5]	---	38
SIM 72	(L_x)[2] (L_y)[2]	75[5] 50[5]	90[5] 60[5]	---	60 40
Width of the transmission window in mm (W)					
SIM 70 ANT 0		---	---	2[4]	5 (12)[1]
SIM 70 ANT 1		24	32	---	15 (38)[1]
SIM 72	(W_x)[2] (W_y)[2]	30 20	36 24	---	24 16
Working distance in mm (S_a)					
SIM 70 ANT 0		---	---	0 to 6	0 to 8
SIM 70 ANT 1		0 to 50	10 to 70	---	0 to 25
SIM 72		0 to 50	10 to 70	---	0 to 30
Limit distance in mm (S_g)					
SIM 70 ANT 0		---	---	6	15
SIM 70 ANT 1		70	100	---	40
SIM 72		70	100	---	40

1 The width (W) contained in parentheses only applies to static MDS operation.
2 See also Figure 6-85 for the field geometry.
3 MDS E623 together with SIM 70 ANT 0 only in static operation
4 In static operation, a maximum median deviation of ± 2 mm is permitted.
5 Reduction by approx. 15% when the MDS enters the transmission window diagonally. See also Figure 3-1.

Note

For effects of metal on the transmission window, see Sections 3.4.2 and 3.4.3.

Table 6-32 Minimum distance from MDS to MDS

	MDS E600	MDS E611	MDS E623	MDS E624
SIM 70 ANT 0	---	---	> 30 mm	> 50 mm
SIM 70 ANT 1	> 400 mm	> 400 mm	---	> 250 mm
SIM 72	> 400 mm	> 400 mm	---	> 250 mm

Table 6-33 Minimum distance from SIM to SIM

	SIM 70 ANT 0	SIM 70 ANT 1	SIM 72
SIM 70 ANT 0	> 200 mm	> 400 mm	> 400 mm
SIM 70 ANT 1	> 400 mm	> 800 mm	> 800 mm
SIM 72	> 400 mm	> 800 mm	> 800 mm

Note

Adherence to the values specified in Table 6-33 is essential. There is a danger of the influence of inductive fields if the values are underranged. This would increase the time for data transmission incalculably or a command would be terminated with errors.

6.10.2 Cable and Connector Allocation

The 15-pin subminiature D connector (i.e. pin) is used for the following purposes.

- The voltage supply of SIM
- The connection to the PC/computer
- The connection of the inputs and outputs

Table 6-34 Overview of the SIM connector allocation

Pin	Meaning	
	RS 232 Interface	**RS 422 Interface**
7	–	D + (Send)
8	–	E + (Receive)
14	TxD (Transmit Data)	D – (Send)
15	RxD (Receive Data)	E + (Receive)
13	GND (Signal Ground)	GND[6] (Connect Signal Ground if required)
12	E1 [1 5] Input for interface switchover only	E1 [1 5] Input for interface switchover only
1	+ 24 V	
9	0V (Ground) Power supply of the SIM (12 to 30 V)	
2	Not assigned	
10	0V (Ground) For the power output	
11	DPA0 [3 4] (Power output 24 V max. 0.5 A resistive load)	
4	0V (Ground) for DA	0V (Ground) for DA
5	DI0 [1]	DI0 [1]
3	DO0 [2 3]	DO0 [2 3]
6	DO1 [2]	DO1 [2]
7	DO2 [2] (only with RS 232)	——

1 logical “0”: –2 V < log 0 < 5 V / logical “1”: 12 V < log 1 < 33 V
2 Signal level and load corresponds to RS 232; $R_{i\,min}$ = 3 kΩ (logical “0” = < –5 V to 3 kΩ / logical “1” = ≥ 5 V to 3 kΩ)
3 Output DPA0 and DO0 are parallel in function.
4 logical “0”: < 2 V to 50 Ω / logical “1”: 22 V to 50 Ω
5 RS 232 interface switchover: E1 logical “0”/RS 422: E1 logical “1”
6 Correct recognition requires that GND-SIM and GND-PC be connected with each other.

Suggested cabling

Shielded data cables must be used.
Recommended by Siemens: Standard cable, LiYC11Y, shielded.

Wiring varies depending on the ambient conditions and the cable lengths.

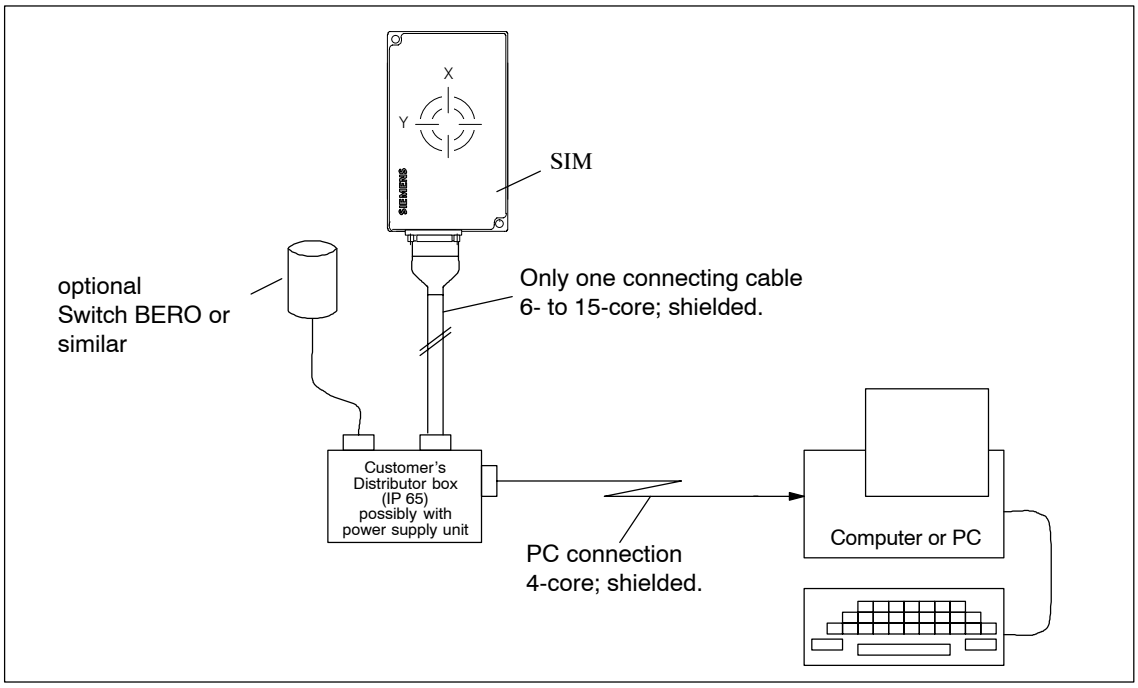


Figure 6-68 Installation with one connecting cable for rugged environments

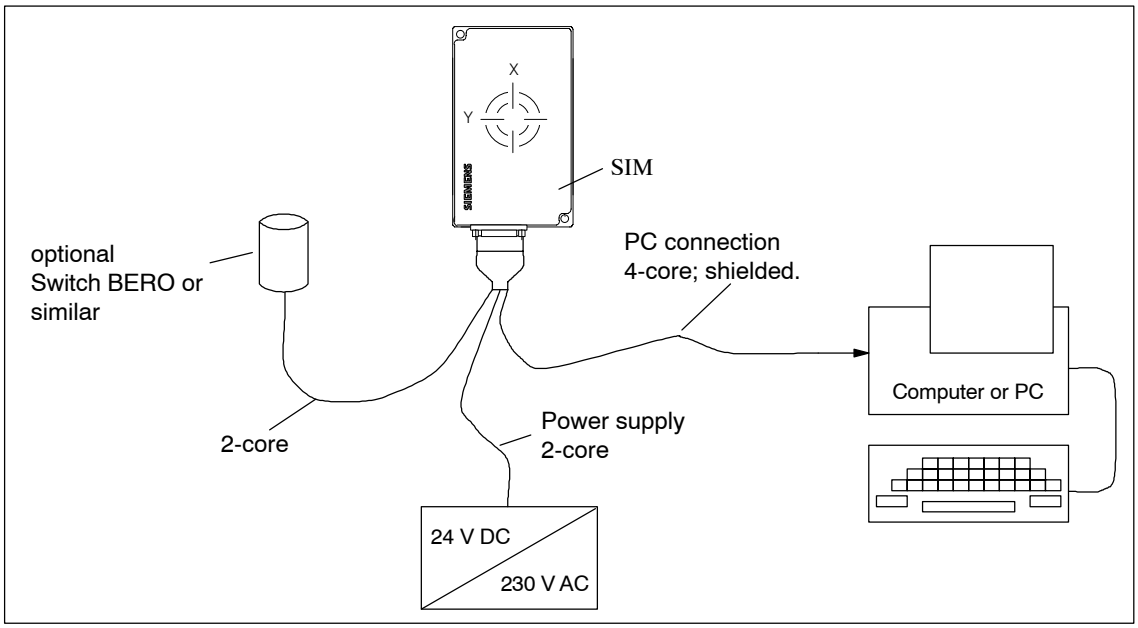


Figure 6-69 Installation with several connecting cable on the SIM connector

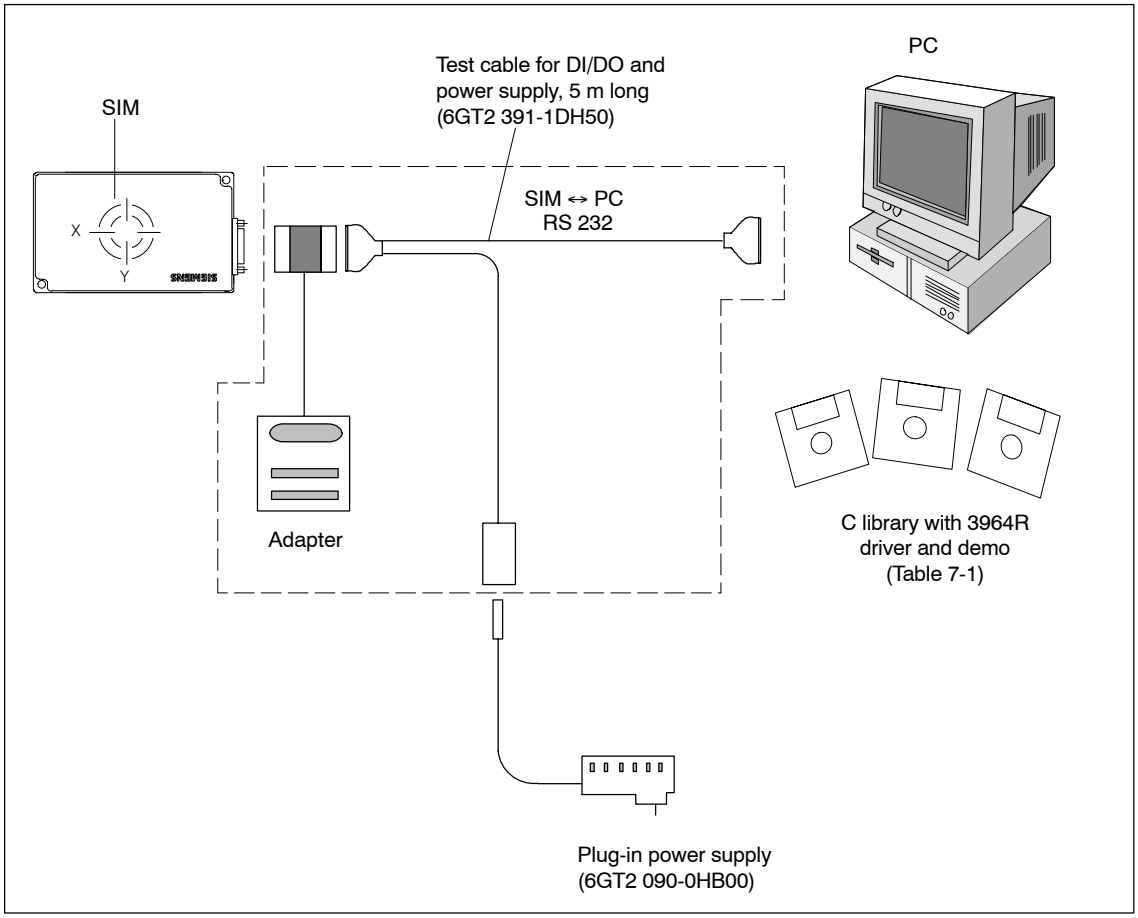


Figure 6-70 Installation with test cable and plug-in power supply (see Section 3.7.3)

Voltage supply

Table 6-35 Voltage supply of SIM

Nominal value	24 V DC	
Permissible range	12 to 30 V DC U_{ripple} 1 V_{ss} (measured on the SIM connector)	f_{ripple} 0 < f < 1 MHz
Current consumption Starting current		700 mA
at 24 V and room temperature	Without DO With DO	180 mA 700 mA
at 12 V and room temperature	Without DO With DO	330 mA 1.03 A

The voltage can be supplied via cores of the data cable or via a separate cable. Remember the voltage drop on the supply cable. Check the input voltage on the SIM during commissioning.

The permissible cable length is usually shorter than 1000 m. The length depends on the current consumption of SIM and the ohmic resistance of the connecting cable.

The following table provides an overview of permissible cable lengths.

Table 6-36 Cable configuration SIM

Conductor cross-section in mm²	**Conductor diameter in mm**	**Resistance in Ω/km [1]**	**Max. cable length in m [2]**	
			DO unloaded	**DO max. of 500 mA**
0.07	0.3	550	40	30
0.2	0.5	185	120	85
0.5	0.8	70	310	230
0.8	1.0	50	440	320
1.5	1.4	24	920	660

1 The resistance values are average values. They refer to the forward and return conductors. A single wire has half the resistance.

2 The output voltage on the power supply unit is 24 V DC; with a supply voltage of 30 V DC the cable lengths increase accordingly.

Field with gray background:

Recommended by Siemens: standard cable, LiYC11Y, 6 x 0.25, shielded). The cable is available from Siemens under the order number 6GT2 090-0A...

Standard cabling with RS 232 interface

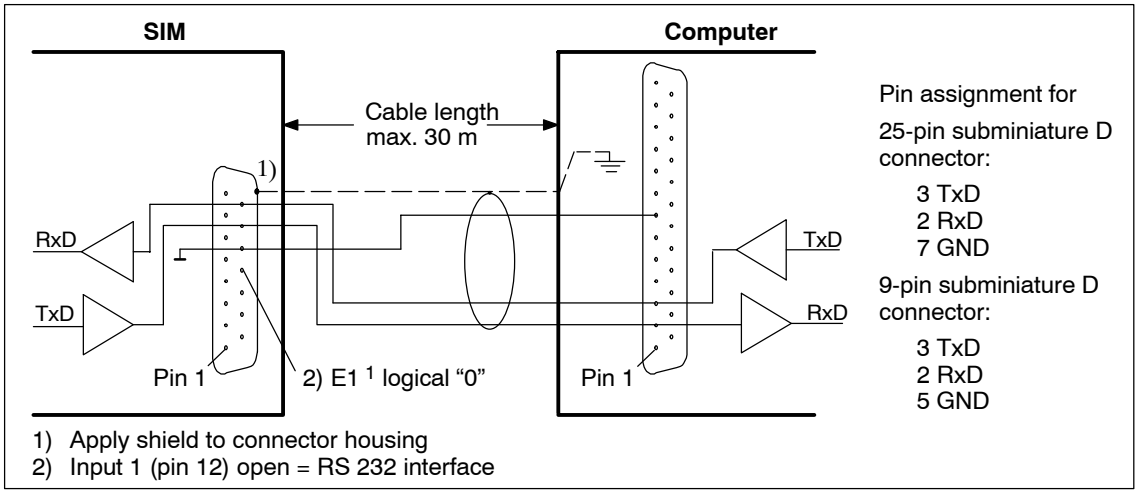


Figure 6-71 Standard cabling for PC/SIM, RS 232

The SIM has a standard RS 232 (V.24) interface with signal lines on pins 14 and 15.
V.24 control lines (e.g. DSR, DTR, RTS, CTS) are not supported by SIM.
The data are acknowledged at procedure level.

Standard cabling with RS 422 interface

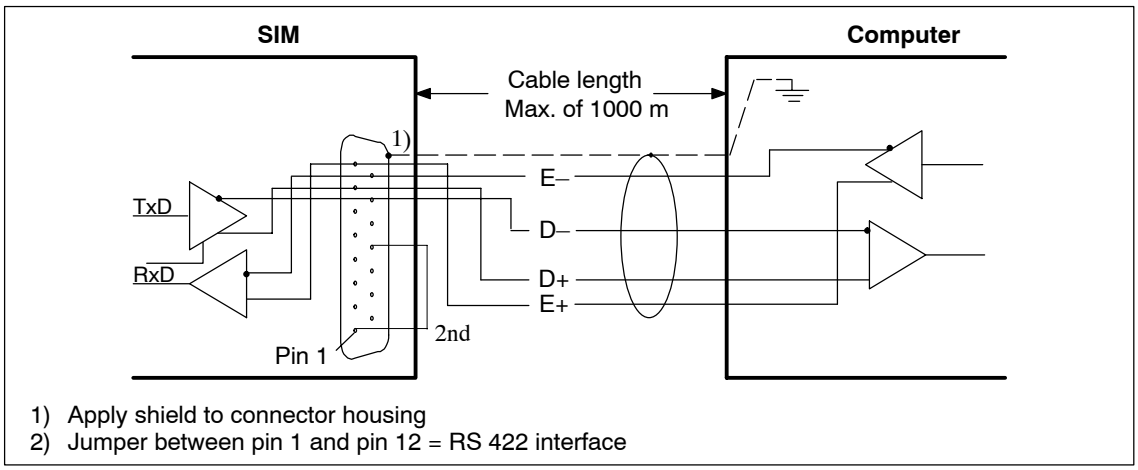
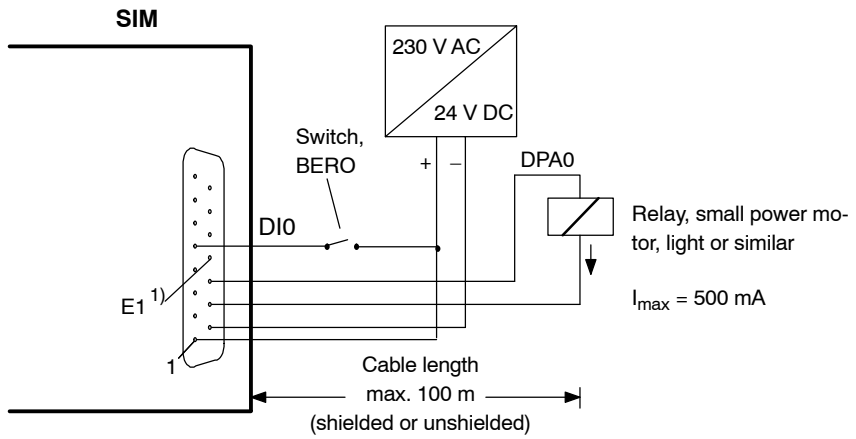


Figure 6-72 Standard cabling for PC/SIM, RS 422

The interface switchover from RS 232/RS 422 takes place via the E1 input (pin 12).
Logical "0" is RS 232
Logical "1" is RS 422

DI/DO cabling with power supply and interface switchover



1) Input 1 (pin 12) is only used for interface switchover and is not available to the user for applications
Logical “0” is RS 232
Logical “1” is RS 422

Figure 6-73 DI/DO cabling with power supply

Warning

If DPA0 (i.e. power output) is used, PIN 10 must be used as ground reference. Otherwise the SIM may be destroyed.

What should you do if nothing works?

a) Check the supply voltage directly on the SIM connector using a measuring instrument.

b) Check the cabling to the PC

- Do the SIM and PC have the same physical interface?
- Is the polarity of the connecting cable correct (RS 232 and RS 422)?
- Are the data cables correctly wired?
  (RxD of the SIM must be connected to TxD of the PC and vice versa)
- Is the cable shield applied correctly?

Error messages

Error messages are described in the individual programming guides.

6.10.3 Programming the SIM Module with the 3964R Procedure

Telegrams can only be transmitted with the 3964R procedure. This procedure ensures secure data transmission for a point-to-point connection.

The following C libraries and programming guides which can be ordered separately are available to the user for the computers.

C libraries

- CCT32 (Windows 95/NT 4.0)

Programming guide for

- CCT32 (Windows 95/NT 4.0) German
- CCT32 (Windows 95/NT 4.0) English

PC users:
3964R driver for Windows 95/NT 4.0 users;
works with PC interface 1 and/or 2;
four interfaces can be operated with the driver using additional hardware.

Can be run on PC models as of 80486SX with a serial interface and a Windows 95/NT 4.0 operating system.

The communication specifications are described in the Windows programming guidelines (CCT 32, Windows 95/NT) for computers which do not use Windows (e.g., Unix).

Note

The MOBY API library is not suitable for the SIM 7x.

Interface presetting

Parameter	Presetting
Transmission speed	9600 bit/sec
Bits per character	8 data bits
Parity	Odd
Stop bits	1
Priority	PC = master

Depending on the operating system being used, these interface parameters must be set in the C library using Control Panel (in the case of Windows 95/NT, button: 3964R/Run).

6.10.4 SIM 70 ANT 0

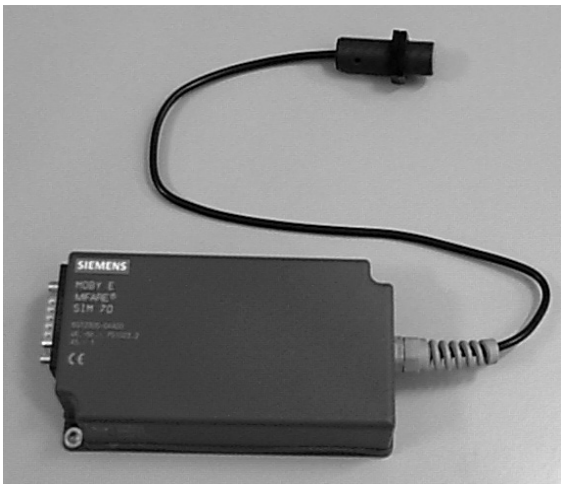


Figure 6-74 SIM 70 ANT 0

Ordering data

Table 6-37 Ordering data for SIM 70 ANT 0

Serial interface SIM 70 ANT 0	6GT2 305-0AA00
15-pin subminiature D special connector (socket) for IP65	6GT2 390-1AA00
SIM-RS 232 test cable with connection line for DI/DO and connection for power supply (total length of 5 m)	6GT2 391-1DH50
Plug-in power pack, primary: 90 V to 264 V AC secondary: 24 V DC/1250 mA for SIM-RS 232 test cable	6GT2 090-0HB00
Software	See Section 7.1
Programming guide	See appendix A

Technical data

Table 6-38 Technical data of the SIM 70 ANT 0

Serial interface	RS 232 and RS 422
Transmission speed	9600 bps
Procedure	3964R (C library contains driver for PC)
Plug-in connection	15-pin subminiature connector (pin on device side)
Data line length, max.	1000 m (shielded), RS 422 30 m (shielded), RS 232
Antenna line length, max.	0.45 m

Table 6-38 Technical data of the SIM 70 ANT 0

Software functions	MDS: Read, write, initialize, access rights, multitag (see programming guide)
Programming	Depends on computer, PC, PLC of other manufacturer
The following C libraries are available for the PC.	CCT32 (Windows 95/NT 4.0)
Digital input (R_i = 10 kΩ)	Via 15-pin subminiature D connector
Number	1
Input voltage for	
Logical “0”	– 2 V < log 0 < 5 V [1]
Logical “1”	12 V < log 1 < 33 V [1]
Non-floating	Yes
Digital outputs	Via 15-pin subminiature D connector
Number	1 (power output) I_{max} = 500 mA At 24 V (output voltage of 22 V)
Input voltage for	
Logical “0”	< 2 V at 50 Ω
Logical “1”	22 V at 50 Ω (I_{max})
Galvanic isolation	No
Short-circuit immunity	Yes
Inductive interface to the MDS (SLG integrated)	
Read/write distance, max	15 mm (see field data)
Transmission frequency	13.56 MHz
Supply voltage	
Nominal value	24 V DC
Permissible range	12 to 30 V DC [1]
Current consumption at room temperature Without DO	
Inrush current, brief	700 mA, typical
Operation (at 12 V)	330 mA, typical
Operation (at 24 V)	180 mA, typical
MTBF (at +40 °C)	2.5 x 10^5 hours
Housing, dimensions in mm	
for antenna head (∅ x weight x L)	M18 x 1.0 x 50
For electronics without connector (L x W x H)	160 x 80 x 40
Color (Antenna)	Anthracite with orange head
Color (SIM housing)	Anthracite
Material (Antenna)	Crastin
Material (SIM housing)	Polyamide 12

Table 6-38 Technical data of the SIM 70 ANT 0

Protection rating in accordance with EN 60529	
SIM housing	IP65 (using a special plug: 6GT2 390-1AA00)
Antenna	IP67 (front)
Vibration in accordance with EN 60721-3-7, class 7M2	1 g (9 to 200 Hz)[2] 1.5 g (200 to 500 Hz)[2]
Shock in accordance with EN 60721-3-7, class 7M2 Total shock response spectrum, type II	30 g[2]
Mounting of the SIM	2 M5 screws
Tightening torque (at room temperature)	≥ 2 Nm
Mounting of the antenna	2 plastic nuts, M18 x 1.5
Ambient temperature	
During operation	–25 °C to +70 °C
During transportation and storage	–40 °C to +85 °C
Weight (approx.)	510 g

1 Voltage measured on SIM
2 **Warning:** The values for shock and vibration are maximum values and must not occur continuously.

Definition of distance D

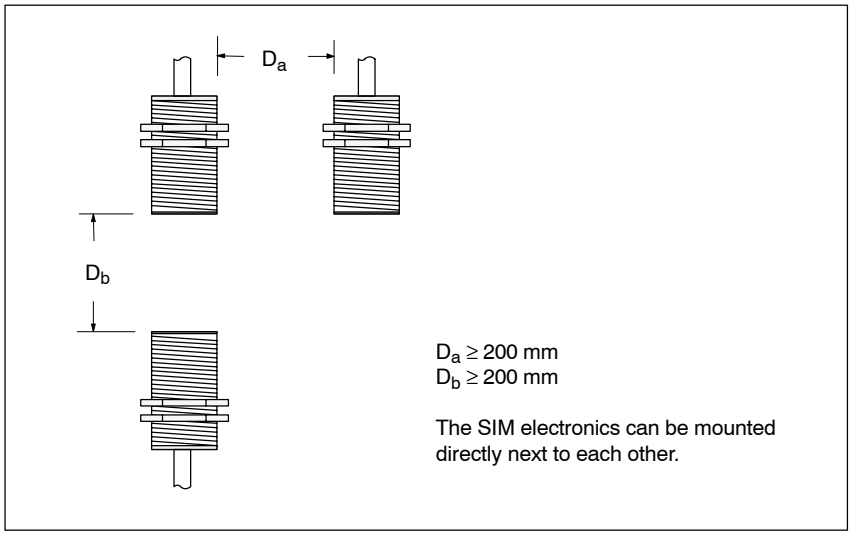


Figure 6-75 Distance D: SIM 70 ANT 0

Dimensions (in mm)

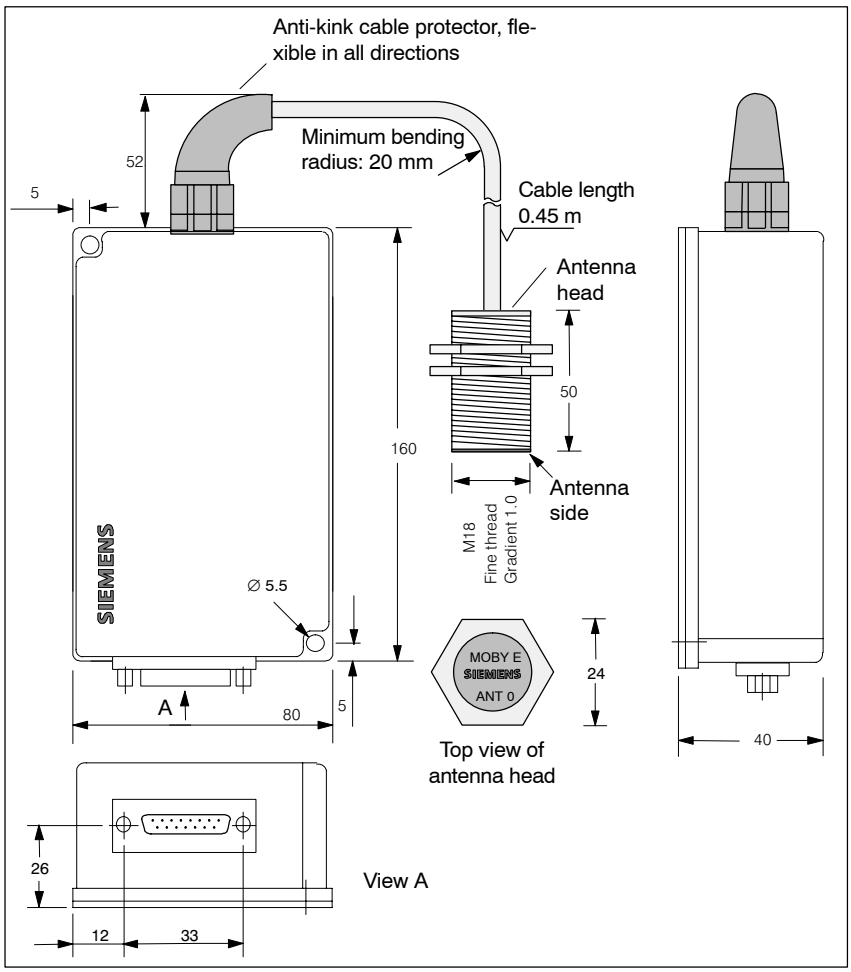


Figure 6-76 Dimensioned drawing of the SIM 70 ANT 0

Transmission window

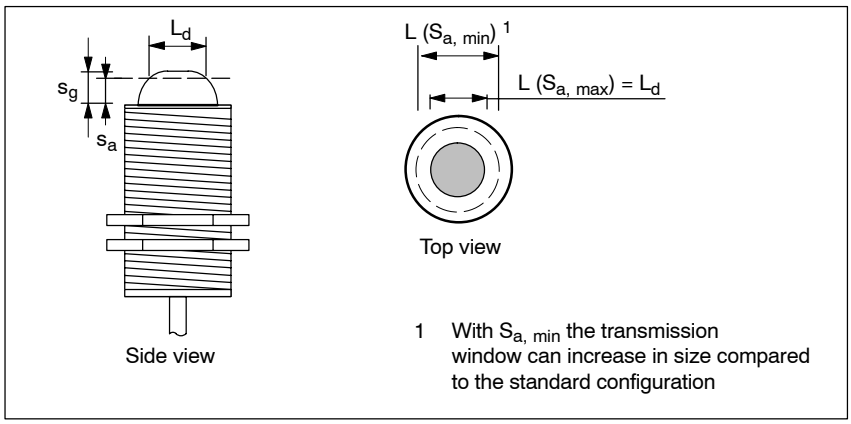


Figure 6-77 Transmission window of the SIM 70 ANT 0

Transmission window:
The antenna of the MDS must be positioned inside this field to ensure reliable data communication.

Metal-free space

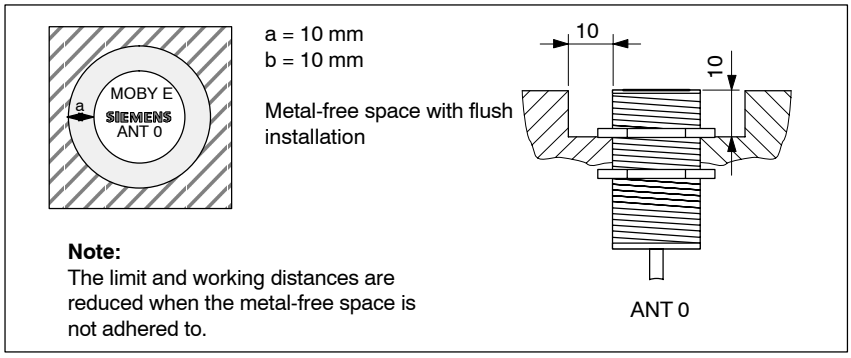


Figure 6-78 Metal-free space for the SIM 70 ANT 0

FCC information

Made in Germany

SIEMENS MOBY E SIM 70 ANT 0

FCC ID: NXWMOBYE-SIM70ANT0

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized changes and modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

6.10.5 SIM 70 ANT 1

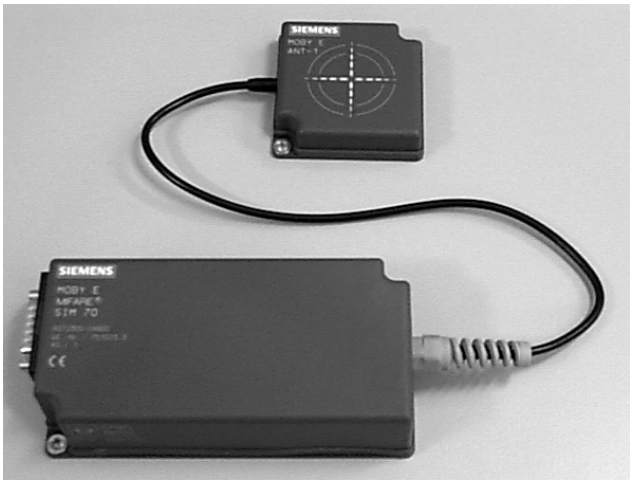


Figure 6-79 SIM 70 ANT 1

Ordering data

Table 6-39 Ordering data for SIM 70 ANT 1

Serial interface SIM 70 ANT 1	6GT2 305-0AB00
15-pin subminiature D special connector (socket) for IP65	6GT2 390-1AA00
SIM-RS 232 test cable with connection line for DI/DO and connection for power supply (total length of 5 m)	6GT2 391-1DH50
Plug-in power pack, primary: 90 V to 264 V AC secondary: 24 V DC/1250 mA for SIM-RS 232 test cable	6GT2 090-0HB00
Software	See Section 7.1
Programming guide	See appendix A

Technical data

Table 6-40 Technical data of the SIM 70 ANT 1

Serial interface	RS 232 and RS 422
Transmission speed	9600 bps
Procedure	3964R (C library contains driver for PC)
Plug-in connection	15-pin subminiature connector (pin on device side)
Data line length, max.	1000 m (shielded), RS 422 30 m (shielded), RS 232
Antenna line length, max.	0.45 m

Table 6-40 Technical data of the SIM 70 ANT 1

Software functions	MDS: Read, write, initialize, access rights, multitag (see programming guide)
Programming	Depends on computer, PC, PLC of other manufacturer
The following C libraries are available for the PC:	CCT32 (Windows 95/NT 4.0)
Digital input (R_i = 10 kΩ)	Via 15-pin subminiature D connector
Number	1
Input voltage for Logical “0” Logical “1”	 – 2 V < log 0 < 5 V [1] 12 V < log 1 < 33 V [1]
Non-floating	Yes
Digital outputs	Via 15-pin subminiature D connector
Number	1 (power output) I_{max} = 500 mA At 24 V (output voltage of 22 V)
Input voltage for Logical “0” Logical “1”	 < 2 V at 50 Ω 22 V at 50 Ω (I_{max})
Galvanic isolation	No
Short-circuit immunity	Yes
Inductive interface to the MDS (SLG integrated)	
Read/write distance, max	100 mm (see field data)
Transmission frequency	13.56 MHz
Supply voltage	
Nominal value Permissible range	24 V DC 12 to 30 V DC [1]
Current consumption at room temperature Without DO	
Inrush current, brief Operation (at 12 V) Operation (at 24 V)	700 mA, typical 330 mA, typical 180 mA, typical
MTBF (at +40 °C)	2.5 x 10^5 hours
Housing, dimensions in mm	
For antenna head (L x W x H)	75 x 75 x 20
For electronics without connector (L x W x H)	160 x 80 x 40
Color (Antenna) (SIM housing)	Anthracite Anthracite
Material (Antenna) (SIM housing)	Polyamide 12 Polyamide 12

Table 6-40 Technical data of the SIM 70 ANT 1

Protection rating in accordance with EN 60529	
SIM housing	IP65 (using a special plug: 6GT2 390-1AA00)
Antenna	IP67
Vibration in accordance with EN 60721-3-7, class 7M2	1 g (9 to 200 Hz)[2] 1.5 g (200 to 500 Hz)[2]
Shock in accordance with EN 60721-3-7, class 7M2 Total shock response spectrum, type II	30 g[2]
Mounting of the SIM	2 M5 screws
Mounting of the antenna	2 M5 screws
Tightening torque (at room temperature)	≥ 2 Nm
Ambient temperature During operation During transportation and storage	 –25 °C to + 70 °C –40 °C to + 85 °C
Weight (approx.)	620 g

1 Voltage measured on SIM
2 **Warning:** The values for shock and vibration are maximum values and must not occur continuously.

Transmission window

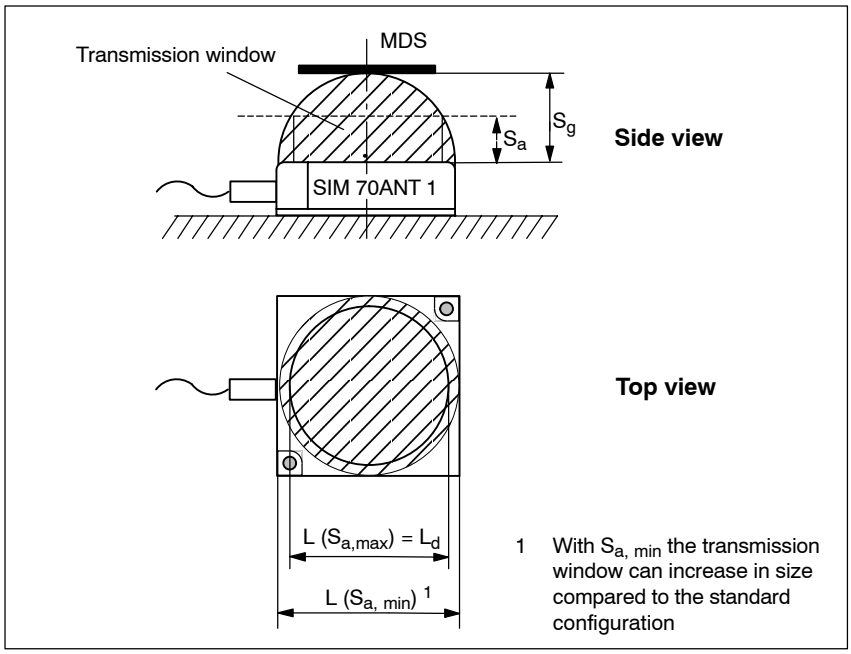


Figure 6-80 Transmission window of the SIM 70 ANT 1

Metal-free space

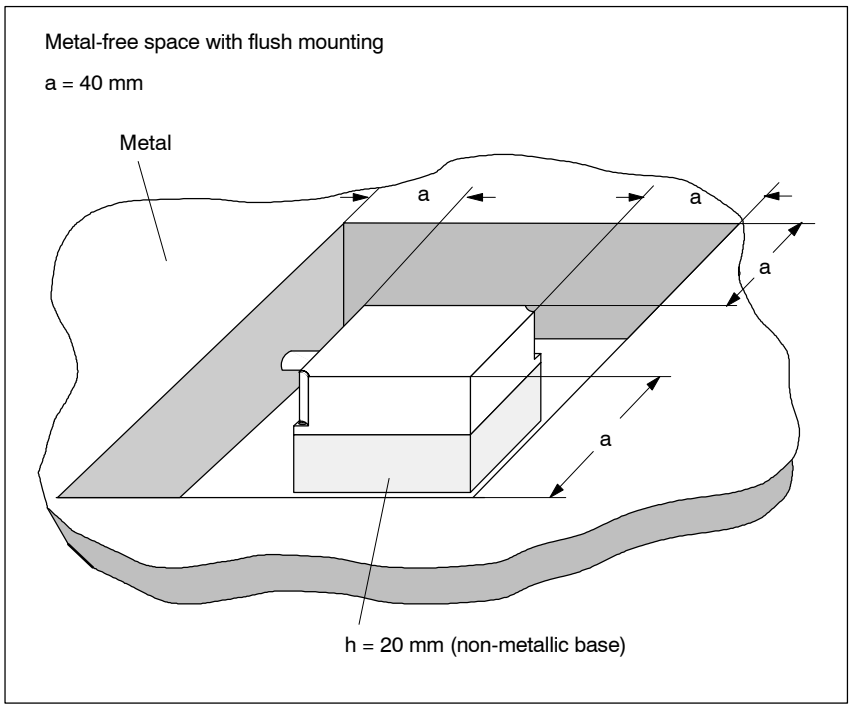


Figure 6-81 Metal-free space for SIM 70 ANT 1

FCC information

Made in Germany

SIEMENS MOBY E SIM 70 ANT 1

FCC ID: NXWMOBYE-SIM70ANT1

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized changes and modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Definition of distance D

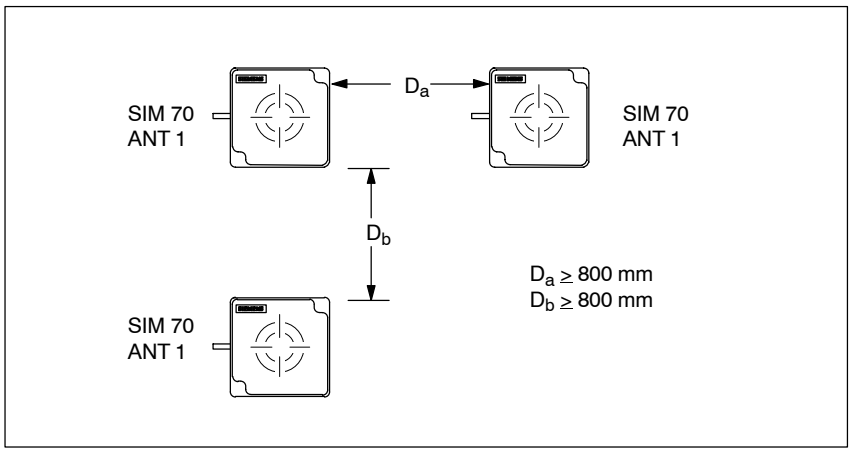


Figure 6-82 Distance D: SIM 70 ANT 1

Dimensions (in mm)

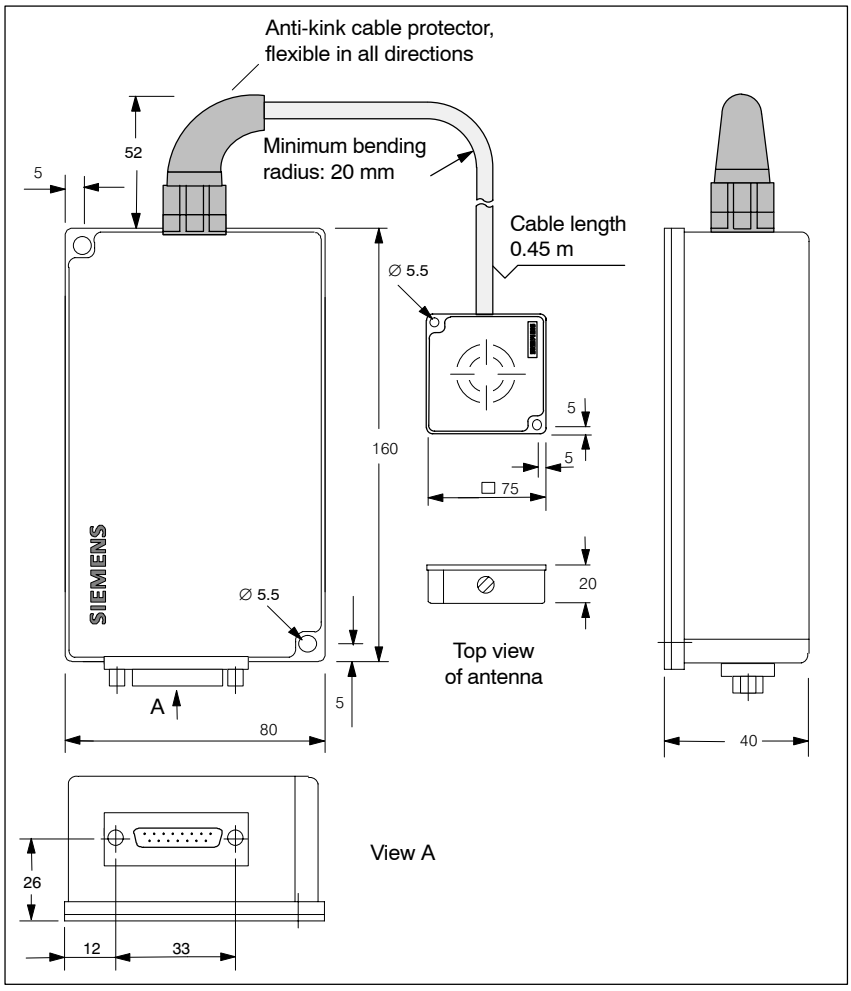


Figure 6-83 Dimensioned drawing of the SIM 70 ANT 1

6.10.6 SIM 72

Figure 6-84 SIM 72

Ordering data

Table 6-41 Ordering data for the SIM 72

SIM 72 serial interface	6GT2 305-0CA00
15-pin subminiature D special connector (socket) for IP65	6GT2 390-1AA00
SIM-RS 232 test cable with connection line for DI/DO and connection for power supply (total length of 5 m)	6GT2 391-1DH50
Plug-in power pack, primary: 90 V to 264 V AC secondary: 24 V DC/1250 mA for SIM-RS 232 test cable	6GT2 090-0HB00
Software	See Section 7.1
Programming guide	See appendix A

Technical data

Table 6-42 Technical data of the SIM 72

Serial interface	RS 232 and RS 422
Transmission speed	9600 bps
Procedure	3964R (C library contains driver for PC)
Plug-in connection	15-pin subminiature connector (pin on device side)
Data line length, max.	1000 m (shielded), RS 422 30 m (shielded), RS 232

Table 6-42 Technical data of the SIM 72

Software functions	MDS: Read, write, initialize, access rights, multitag (see programming guide)
Programming	Depends on computer, PC, PLC of other manufacturer
The following C libraries are available for the PC:	CCT32 (Windows 95/NT 4.0)
Digital inputs (R_i = 10 kΩ)	Via 15-pin subminiature D connector
Number	1
Input voltage for Logical "0" Logical "1"	 – 2 V < log 0 < 5 V [1] 12 V < log 1 < 33 V [1]
Non-floating	Yes
Digital outputs	Via 15-pin subminiature D connector
Number	1 (power output) I_{max} = 500 mA At 24 V (output voltage of 22 V)
Input voltage for Logical "0" Logical "1"	 < 2 V at 50 Ω 22 V at 50 Ω (I_{max})
Galvanic isolation	No
Short-circuit immunity	Yes
Inductive interface to the MDS (SLG integrated)	
Read/write distance, max	100 mm (see field data)
Transmission frequency	13.56 MHz
Supply voltage Nominal value Permissible range	 24 V DC 12 to 30 V DC [1]
Current consumption at room temperature Without DO Inrush current, brief Operation (at 12 V) Operation (at 24 V)	 700 mA, typical 330 mA, typical 180 mA, typical
MTBF (at +40 °C)	2.5 x 10^5 hours
Housing, dimensions in mm For electronics without connector (L x W x H)	 160 x 80 x 40
Color	Anthracite
Material	Polyamide 12
Protection rating in accordance with EN 60529	IP65 (using a special plug: 6GT2 390-1AA00)
Vibration in accordance with EN 60721-3-7, class 7M2	1 g (9 to 200 Hz)[2] 1.5 g (200 to 500 Hz)[2]

Table 6-42 Technical data of the SIM 72

Shock in accordance with EN 60721-3-7, class 7M2 Total shock response spectrum, type II	 30 g[2]
Mounting of the SIM Tightening torque (at room temperature)	2 M5 screws ≥ 2 Nm
Ambient temperature During operation During transportation and storage	 –25 °C to +70 °C –40 °C to +85 °C
Weight (approx.)	550 g

1 Voltage measured on SIM
2 **Warning:** The values for shock and vibration are maximum values and must not occur continuously.

Transmission window

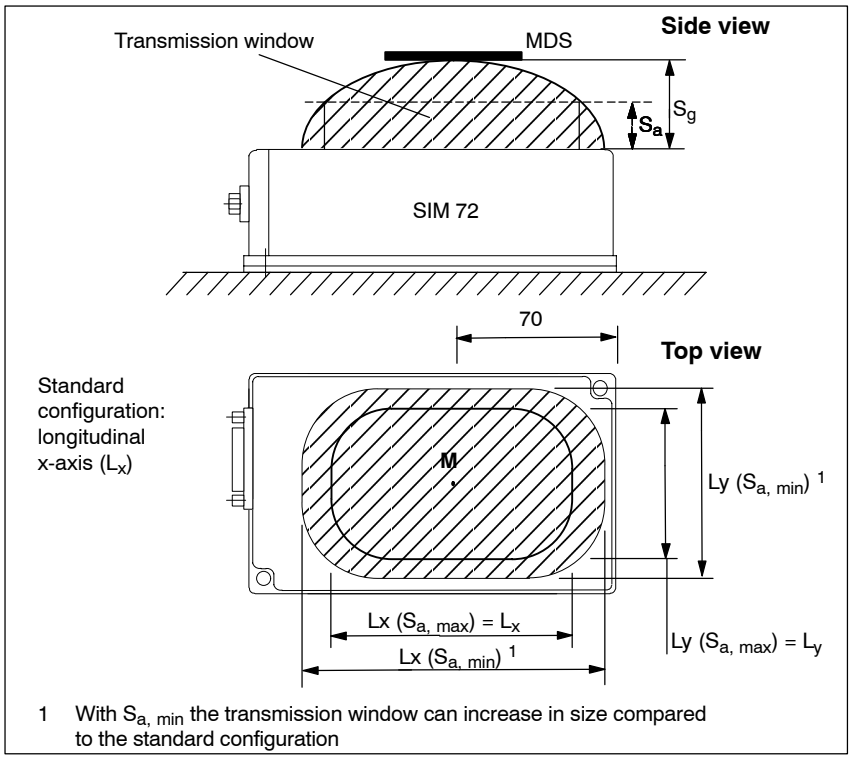


Figure 6-85 Transmission window of the SIM 72

Metal-free space

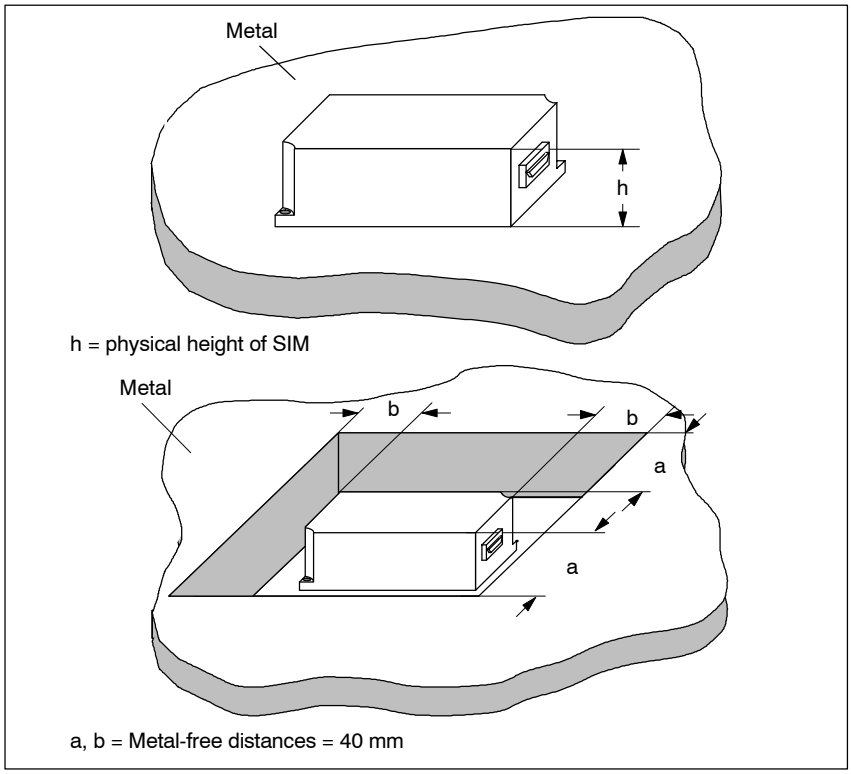


Figure 6-86 Metal-free space of the SIM 72

FCC information

Made in Germany

SIEMENS MOBY E SIM 72

FCC ID: NXWMOBYE-SIM72

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Note

The manufacturer is not responsible for any radio or TV interference caused by unauthorized changes and modifications to this equipment:
Such modifications could void the user's authority to operate the equipment.

Definition of distance D

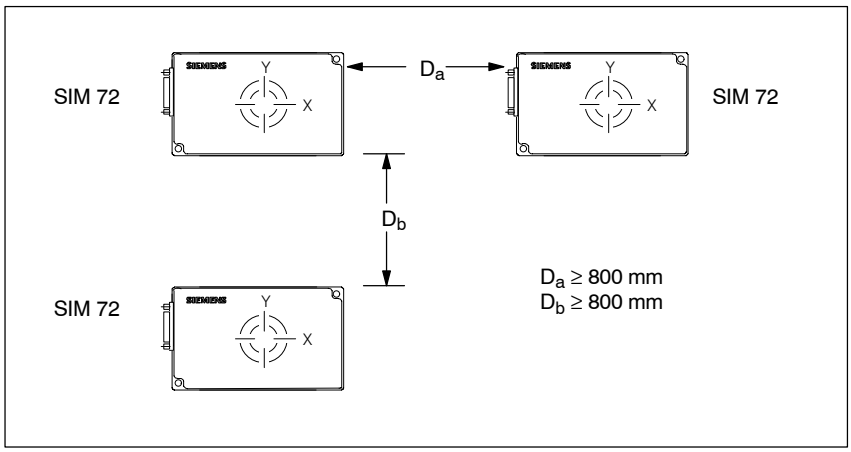


Figure 6-87 Distance D: SIM 72

Dimensions (in mm)

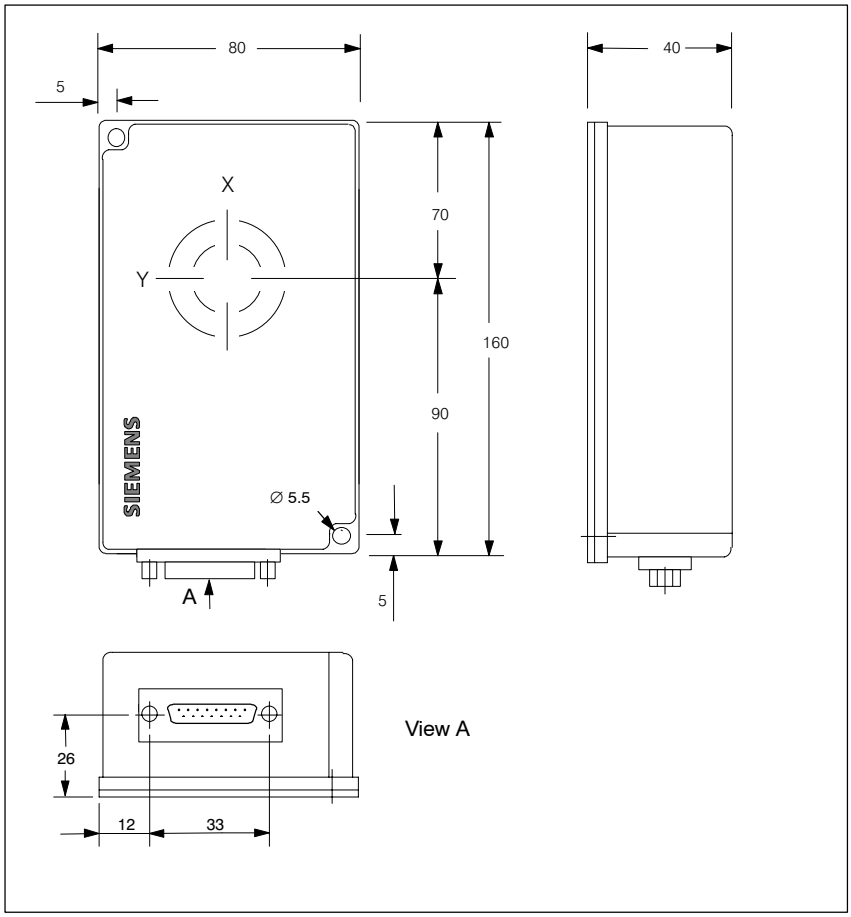


Figure 6-88 Dimensioned drawing of the SIM 72

Accessories

7

7.1 MOBY Software

Starting with version 3.0, the “MOBY Software” product is delivered on CD. It includes all function blocks and drivers for MOBY. The “readme” file in the main directory of the CD offers a short description of the programs.

- FB 240: function block for the ASM 450. MOBY on PROFIBUS DP with SIMATIC S5 (including master device file for PROFIBUS DP).
- FB 250: function block for the ASM 400.
- The FB 41 contains a function block for the ASM 410. The FB has an almost identical call interface to the FB 250. When programming, use the description for the FB 250.
- FC 44 permits the ASM 450 to be used in a SIMATIC S7 environment. Be sure to read the “Read_me” file in the FC 44 directory carefully. The description of FC 44 for ASM 450 is available for operation of ASM 450.
- FC 45: S7 function for the ASM 754
- Function FC 47 for ASM 470
- FB 47 contains a function block for the SIMATIC S5 115U - 155U. This enables you to operate the ASM 470 via an ET 200M in a SIMATIC S5 environment.
- Load program for the ES 030 and a master device file for connecting the ES 030 to PROFIBUS DP
- Test and demonstrator programs for presenting the functions (such as “read from MDS” or “write to MDS” and so on) on a PC (Windows). The ASM 424/724 and SIM MOBY modules are connected to the PC by a serial interface cable (i.e. COM1 or COM2).
- Brief explanations of the individual directories in German or English. See “les_mich.txt” or “read_me.txt”.
- 3964R driver for DOS, Windows 95 and Windows NT.
- C-library CCT32 for Windows 95/NT 4.0.
- C-library MOBY API for Windows 98/NT 4.0.
- Current release of MOBY documentation in pdf format.
- Tools: Useful programs for MOBY configuration.

Operator prompting

The “Software MOBY” CD has user-friendly operator prompting using HTML. After calling Start.exe, a window appears with the following entries in the upper menu bar:

- FC for S7
- FB for S5
- PC Support
- Documentation
- Tools
- Demo
- News

Note

on MOBY software and licensing

When you buy an interface module or SIM no software or documentation is included with the product. The **“MOBY software”** CD-ROM, which contains all the available FBs/FCs for SIMATIC, C libraries for Windows 98/NT, demo programs, etc., has to be **ordered separately**. The CD-ROM also includes the complete set of MOBY documentation (German, English and French) in PDF format.

When you purchase an ASM or SIM interface module, the price for use of the software including documentation on the “MOBY Software” CD-ROM is included. The purchaser is granted the right to make copies (duplication license) as needed for customer applications or system development for the plant.

The enclosed contract also applies to the use of software products for a one-off charge.

C-library CCT32

The import library is written in C++.
The following functions are supported.

- Read MDS
- Initialize MDS
- Write MDS
- Password protection and access rights
- Multi-tag recognition
- Personalization of the cards
  (only with the hardware of the MIFARE demo kit)

Driver software is available for the 3964R protocol.

For a description of the functions, see applicable programming instructions. See also appendix A.

In addition, the C library Windows 95/NT contains a simple demo program.

C-library MOBY API

The import library is written in C++.
The following functions are supported.

- Read MDS
- Initialize MDS
- Write MDS

Driver software is available for the 3964R protocol.

The programming guide is available as a pdf file on the “MOBY Software” CD.

Ordering data

Table 7-1 Ordering data for MOBY software

	Order No.
MOBY software	6GT2 080-2AA10

7.2 MOBY Wide-Range Power Supply

Description

The MOBY® wide-range power pack is a compact, primary-pulsed power supply. It is designed for use on single-phase, alternating current networks with two DC outputs (socket connector, parallel circuited).
Its robust construction features an aluminum housing which gives the fine-tuned system physical strength while protecting it from electromagnetic interference and providing it with optimal heat dissipation.
A built-in current limitation circuit protects the primary-pulsed power supply against overload and ensures continuous short circuit resistance.
The integrated overvoltage protection (SIOV) which is standard protects the connected electronics from excessively high voltage.

Figure 7-1 MOBY wide-range power supply

Ordering data

Table 7-2 Ordering data for the MOBY wide-range power pack

	Order No.
Wide-range power supply unit MOBY, AC 100 - 230 V/DC 24 V/2.2 A; including 2 mating connectors for the output voltage	6GT2 494-0AA00
24 V plug-in line for ASM 424, ASM 454, ASM 724, ASM 754; Length 5 m	6GT2 491-1HH50

Technical data

Table 7-3 Technical data of the MOBY wide-range power supply

Input	
Input voltage	
Rated value	100 to 230 V AC
Range	90 to 253 V AC
Frequency	50/60 Hz
Input current	0.85 to 0.45 A
Efficiency	≥ 80% at full load
Power supply	2 m power cable with ground-protected connector
Power failure bypass	≥ 10 ms
Undervoltage switchoff	Yes
Overvoltage protection	SIOV

Table 7-3 Technical data of the MOBY wide-range power supply

Output	Socket contacts
Nominal output voltage	24 V DC
Nominal output current	2.2 A
Residual ripple	20 mV_{ss} to 160 kHz 50 mV_{ss} Greater than 160 kHz
Startup current limitation	NTC
Permanent short-circuit proof	Yes
Ambient conditions	
Ambient temperature	
During operation	–20 °C to +40 °C (max. +60 °C; see Safety Guidelines)
During transportation and storage	–40 °C to +80 °C
Cooling	Convection
General information	
Dimensions for power supply incl. mounting plate, (L x W x H) in mm	205 x 80 x 60 (without connector)
Weight	Approx. 1000 g
Color	anthracite
Electromagnetic compatibility	
Emitted interference (EN 50081-1)	Class B in accordance with EN 55022
Noise immunity (EN 50082-2)	EN 61000-4-2
Safety	
Certificates and approvals	CE, GS
Electrical safety test	EN 60950/VDE 0805 and VDE 106 part 1
Primary/secondary isolation	4 kV AC
Safety class to EN 60950 (VDE 0805)	I
Degree of protection to EN 60529	IP65 (only in inserted state)

Connector pin assignment 24 V output

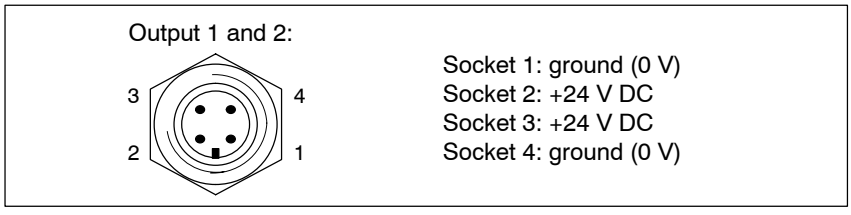


Figure 7-2 Connector pin assignment 24 V output

Dimensions (in mm)

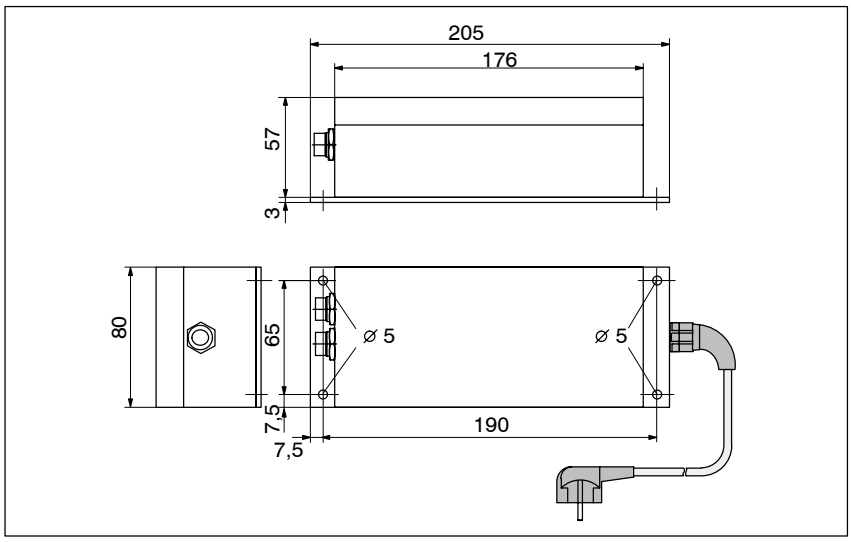


Figure 7-3 Dimensions of the MOBY wide-range power supply

Safety guidelines

Caution

Do not open the devices or modify them.
Non-adherence will invalidate CE certification and the manufacturer's warranty. When installing the power pack, adhere to the applicable DIN/VDE regulations of your country.
The field of application of the power supply unit is limited to information technology in electrical office equipment within the scope of EN 60950/VDE 0805.
A device can only be set up and operated by qualified personnel.
For the purposes of the safety notes on this product, qualified personnel are those persons who are authorized to commission, ground and tag devices, systems and electrical circuits in accordance with safety standards. The device may only be used for the applications described in the catalog and technical description and only in connection with devices and components recommended by Siemens. If devices and components of other manufacturers are used, they must be recommended or approved by Siemens.
Correct operation of the product requires proper storage, setup and mounting, and careful operator control and maintenance.
When installing, make sure that the power outlet socket can be easily accessed. During operation, the housing may heat up to +40 °C. This is no cause for concern. However, at an ambient temperature of more than +40° C, be sure to cover the power pack so that people cannot touch the hot housing. The power pack must still receive sufficient ventilation.

7.3 Wide-Range Connector Power Pack

The MOBY wide-range connector power pack is designed for use on single-phase alternating current networks with a DC output (socket connector). The primary-pulsed power supply is protected against overload with a built-in current limitation circuit and is permanently immune to short-circuiting. The integrated overvoltage protection protects the connected electronics from excessively high voltages.

Technical data

Table 7-4 Technical data of the wide-range connector power pack

Input voltage range	90 V to 264 V AC (wide-range input)
Frequency range of the input voltage	47 Hz to 63 Hz
Nominal input current	700 mA
Nominal output voltage	24 V DC
Nominal output current	1.25 A
Basic load	None
Short-circuit immunity	Yes
Ambient temperature for transportation, storage and operation	0 °C to +40 °C with 90% humidity, no condensation
Power supply dimensions in mm (L x W x H)	105 x 68 x 39 (without connector)
Output cable	2 x 0.75 mm^2 / 2 m in length
Primary connector can be changed	Euro connector, UK connector, USA connector (included)
Housing material	Plastic (PPEV1)
Color	Black
Weight	Approx. 260 g
CE	Yes
UL	Yes
Interference emission	EN 55011, 55014 and 55022/B
Interference immunity	EN 61000-4-2 to -4-6
Electrical safety test	In accordance with EN 60950
Galvanic isolation, primary/secondary	3 kV AC
Safety class to EN 60950 (VDE 0805)	2
Protection rating in accordance with EN 60529	IP30

Ordering data

Table 7-5 Ordering data for the wide-range, plug-in power pack

	Order No.
Wide-range, plug-in power pack, 90 - 264 V AC/24 V DC; 1.25 A	6GT2 090-0HB00
Connecting cable, RS 232 PC ↔ SIM	6GT2 391-1DH50

7.4 MOBY STG E Hand-Held Terminal

Application areas

The STG E adds to the MOBY E identification system a powerful mobile hand-held terminal for applications in the areas of logistics, distribution and service. The service and test device (STG E) is an indispensable aid for commissioning and testing. All MOBY E data memories can be read and write-accessed inductively.

Figure 7-4 MOBY STG E hand-held terminal

Setup and function

The STG E mobile hand-held terminal consists of a basic device (PSION Workabout^{mx}) and a plug-in compact read/write head. It has a housing which is protected against splashed water (IP54), an LCD monitor screen with 240 x 100 pixels, an alphanumeric keyboard and various interfaces (for EEPROM card, charging battery, RS 232/TTL for MOBY E read head, battery charging interface including RS 232 for the PC coupling, and so on). The included MOBY software (memory card) provides service and test functions for reading, writing, etc. of all MOBY E data memories.

- Read data from the data memory
- Write data to the data memory
- Read and display the ID number of the data memory
- Present and edit the data in hexadecimal or ASCII format
- Enable/disable password protection

Using the optional C library as a basis, it is very easy to program your own applications including a customized screen user interface for reading and writing data memories. Various development tools are available for the PC, and a large selection of accessories is available directly from PSION. New applications are opened up in the area of logistics and distribution (e.g., goods commissioning data can be recorded offline with the hand-held terminal or processed and forwarded to the PC/computer later).

Optional components

See http //www.psion.com/industrial/ on the Internet.

- 3link adapter cable to the PC for easy exchange of data between PC and PSION Workabout^{mx}
- PSION Workabout^{mx} basic device with large function keys and numeric keyboard
- Additional memory card with up to 8 Mbytes of memory
- Docking station including high-speed charging device and software for convenient data exchange between PSION Workabout^{mx} and PC

System prerequisites

The following prerequisites must be met when the library for SIBO 'C' (SIBO 'C' is the C developmental environment for the PSION Workabout) is used.

• PC	The C development package for PSION Workabout must be installed on the PC. You can obtain the development package directly from PSION (see: http://www.psion.com/industrial/).
• Hand-held terminal	PSION Workabout with wall attachment and power supply unit. If you prefer, you can use the MOBY STG E hand-held terminal.
• PC cable	You will need a 3-link adapter cable from PSION for the connection to the PC (see: http://www.psion.com/industrial/). The cable is only required if it is not included in the C development package.
• C library	The following files are required: MOBY_E.H, MOBY_STG.LIB. They are delivered with the MOBY SIBO C library from Siemens.

Note

In principle, applications can also be developed in the Basic programming language OVAL. However, you cannot use the MOBY library.

Hardware

The following figure shows the primary hardware interfaces which you can use to write your own applications.

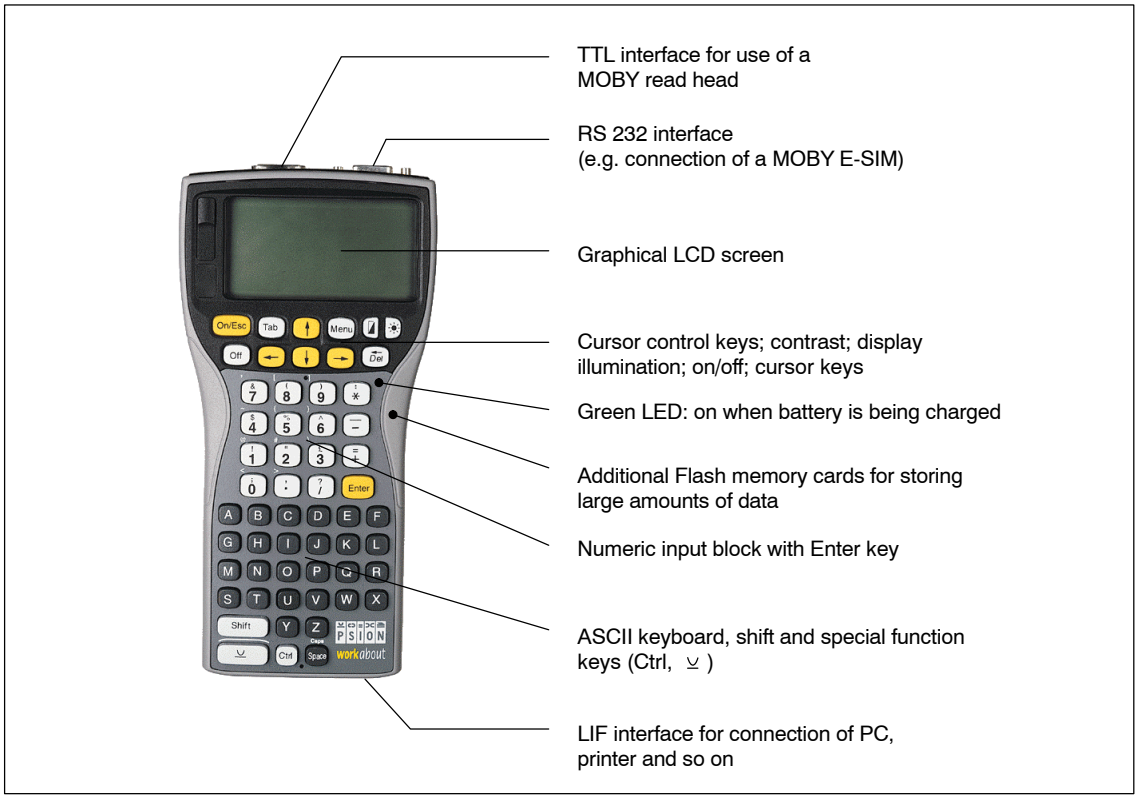


Figure 7-5 Hardware of the STG E

If you are using another type of PSION Workabout, other interfaces are also available. A few examples are listed below.

- Infrared interface
- Numeric keyboard and function keys

Ordering data

Table 7-6 Ordering data for the STG E

STG E mobile hand-held terminal, basic device (PSION Workabout^{mx}), with MOBY E read/ write head, battery, standard software incl. STG functions on EEPROM card, user's guide, without charging station	6GT2 303-0AA00
Charging station for a mobile hand-held terminal with 230 V AC, plug-in power pack	6GT2 303-1DA00
Accessories:	
MOBY E read/write head, 13.56 MHz, without software and description	6GT2 303-1AA00
Memory card with STG software and filehandler software for MOBY D/E/F/I/U, incl. user's guide	6GT2 303-1CA00
C-library for MOBY D/E/F/I/U, for development of customer-specific screen dialogs, without development tools, incl. description	6GT2 381-1AB00
Extra battery	6GT2 094-0AB00 or 2 x AA batteries (NiCd, Ni-MH, alkaline)
Additional PSION components (e.g., 3link cable and C developmental user interface)	Obtainable from local dealers or PSION (http://www.psion.com/industrial/)

Technical data

Table 7-7 Technical data of the STG E hand-held terminal

Hardware	
Processor	NEC V30mx 27.68 MHz, 80C86-compatible
RAM memory	2 MB; of which approx. 1.8 Mbytes can be used as desired
ROM memory	2 Mbytes for operating system
User program	1 MB with MOBY service and test program
Monitor screen	Graphic LCD monitor screen with 240 x 100 pixels, graystage scale, backlighting can be turned on
Keyboard	Alphanumeric with 57 keys
Sound	Piezo signal encoder
Power supply	NiCd battery pack with 2 type-AA cells (850 mAh) High-speed chargeable, automatic switch-off
Operation time	20 hours (Read head inactive, display not lighted) 4.5 hours (Read head active, display not lighted) 10 hours (Read head inactive, display lighted)
Interfaces	LIF interface (LIF = Low Insertion Force) for battery charging and communication with PC and printer (3link cable not included) RS 232 and TTL interface for connection of a MOBY read head
Security	Locking mechanism for battery and program memory
Software	

Table 7-7 Technical data of the STG E hand-held terminal

Operating system	EPOC/16 multitasking, graphics support, GUI interface, Interpreter similar to MS-DOS	
File management	MS-DOS-compatible	
Integrated software	MOBY service and test program spreadsheet; database; calculator; communication	
MOBY STG program	Read, write, delete MDS, read MDS ID; store and load MDS data; German or English menu language; data input and display in ASCII or HEX	
Technical data	**Complete device (incl. ACCUs)**	**Read head**
Dimensions	260 x 90 x 35 [mm]	90 x 64 x 35 [mm]
Weight	Approx. 440 g	Approx. 110 g
Temperature	Operation: –20 °C to +60 °C Storage: –25 °C to +80 °C (without battery)	
Relative humidity	0% to 90%, no condensation	
Protection rating in accordance with EN 60529	IP54 (protected against splashed water)	
Impact resistance	Max. drop on concrete: 1 m	
EMC	EN 55022; FCC Part 15 Low Power Transmitter	
Electrostatic; RF; EFT	IEC 801-2; IEC 801-3; IEC 801-4	
RF read/write head		
MOBY E	13.56 MHz (MIFARE)	
Max. read/write distances	MDS type	Distance in mm
	E611	30
	E600	18
	E624	10
	E623	5
	E623, installed in metal	3

7.5 Acquisition Station ES 030-K

Application area

Acquisition station ES 030-K is a microprocessor-controlled terminal for general-purpose use in all sectors of industry. It offers several interfaces. This station is particularly suitable for use with the MOBY I, E, L and M identification systems and with barcodes to reduce the load on higher-level host systems. Its modular design permits configuration of functions and design to meet the requirements of individual applications.

Features/layout

- Can be programmed as desired with PG and PC in programming language STEP5
- Dialog or process-oriented with keys which can be assigned as desired
- Sturdy construction (IP54) for industrial environments (e.g., for control even when operator is wearing protective gloves)
- Flexible hardware layout
- Serial interfaces; TTY, RS 485, (RS 422), V.24 for connection to higher-level computers, PLCs or printer with run, 3964R, SINEC L1 and PROFIBUS DP procedures
- Additional interfaces for MOBY I, MOBY E and MOBY L identification systems, barcode wands, scanners and swipe readers
- Integrated function blocks for frequently used functions
- With master/slave function for SINEC L1

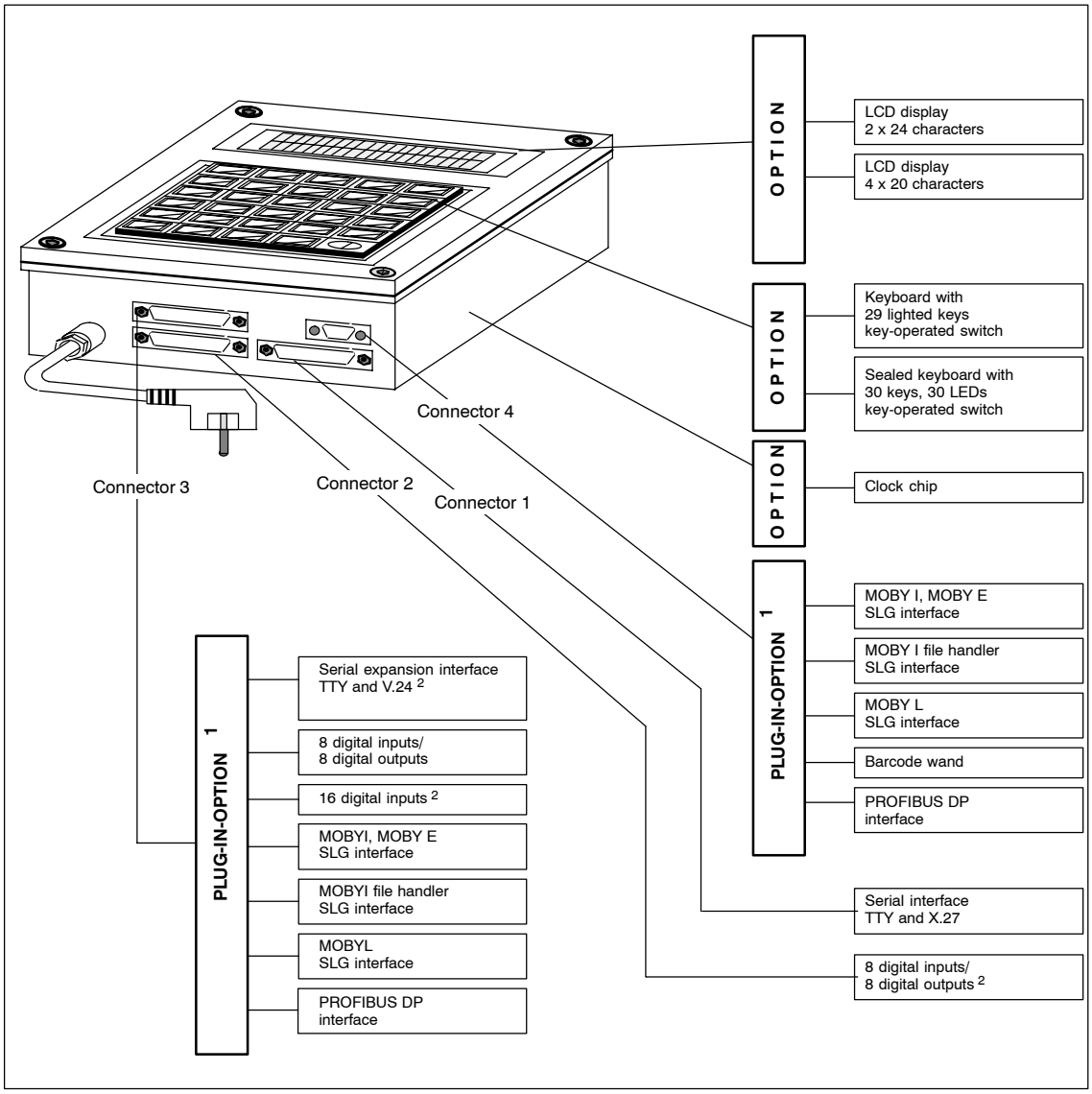


Figure 7-6 Configurator of ES 030-K

1 Each plug-in option is a hardware module requiring one slot on the ES 030-K.
2 The options “serial expansion interface” and “16 digital inputs” can also be led out on connector 2 as a special version.

Ordering data

Table 7-8 Ordering data for the ES 030-K

		Order No.
ES 030-K acquisition station with TTY, X.27 serial interface on connector 1 8 DI + 8 DO on connector 2	6AW5 451-	■ ■ ■ ■ 3
Display		
without Display		0
LCD 2 x 24 characters		1
LCD 4 x 20 characters		2
Connector 3		
Not used		A
MOBY I, MOBY E interface		C
8 DI + 8 DO		D
16 DI		E
MOBY I file handler		F
MOBY L interface		L
PROFIBUS DP interface[1]		P
serial interface (TTY, V.24)		S
Connector 4		
Not used		A
Barcode (incl. wand)		B
MOBY I, MOBY E interface		C
MOBY I file handler		F
MOBY L interface		L
Barcode (without wand)		N
PROFIBUS DP interface[1]		P
Keyboard		
No keyboard		0
Sealed keyboard, 30 keys, 30 LEDs		2
Keyboard with 29 illuminated keys		3
Loading kit for ES 030	6AW5 451-8AU	

1 Alternatively: preferably on connector 4.

Technical data

Table 7-9 Technical data of the ES 030-K

Microprocessor	80C32
Clock pulse frequency	14.7 MHz
Memory capacity of the basic unit	
EEPROM	32 Kbytes = 16 K instructions
RAM	128 Kbytes battery buffer for approx. 8 years (DB1-DB120)
Command set (STEP5)	Almost as for the SIMATIC 100U: e.g. logic instructions, storage operations, load and transfer operations, time and counting operations, comparison operations, and processing operations
Display	2 x 24-character LCD or 4 x 20-character LCD
Digital input/output Always present: Optional module: Optional module:	 8 DI and 8 DO, isolated 8 DI and 8 DO, isolated 16 DI, isolated
• Digital input	logical „0”: –2 to +2 V logical „1”: 16 to 33 V (Ri = approx.5 kΩ) Shared grounding of all DI
• Digital output	logical „1”: +24 V I = 100 mA I = 50 mA Short-circuit proof Shared +24 V of all DO
Serial interface (connector 1) Procedure Velocity	 TTY or RS 485 3964R, run, SINEC L1 150 to 19200 bps
Serial interface (Socket 3)	Interface module 20 mA single current active/passive or V.24 procedure: run or 3964R
Field bus	PROFIBUS DP (slave) certified in accordance with part III of DIN 19245
Transmission speed	9.6 kbps to 1.5 Mbps
Connection	9-pin subminiature D connector on connector 4 (optional on connector 3)
Barcode interface (max. 2) can be connected	 Reading wand, swipe reader, hand-held laser scanner
MOBY E Connectable SLGs (max. of 2)	 SLG 72 SLG 75 ANT 12 SLG 75 ANT 30

Table 7-9 Technical data of the ES 030-K

MOBY I Connectable SLGs (max. of 2)	 SLG 40/SLG 40-S SLG 41/SLG 41-S/SLG 41C SLG 42 SLG 43 SLG 44
MOBY L Connectable SLGs (max. of 2)	 SLG 52
Connection to SIMATIC S5	RS 485, V.24, TTY or SINEC L1
Keyboard Momentary-contact keyboard Sealed keyboard Power supply, normal Optional Current consumption RAM/clock backup	 29 keys, illuminated 1 key-operated switch 30 keys, 30 LEDs, 1 key-operated switch 230 V AC ± 10 %; 48-62 Hz 24 V DC (20-30 V) approx. 20 VA Backup battery for approx. 8 years
Radio interference suppression	Interference class B in accordance with VDE 0871
Protection rating in accordance with EN 60529 Ambient temperature During operation During transportation and storage Rel. air humidity Housing Dimensions (WxHxD) in mm	IP54 0 °C to +40 °C –40 °C to +70 °C up to 95% Zinc die-casting 180 x 280 x 95
Weight (approx.)	5 kg

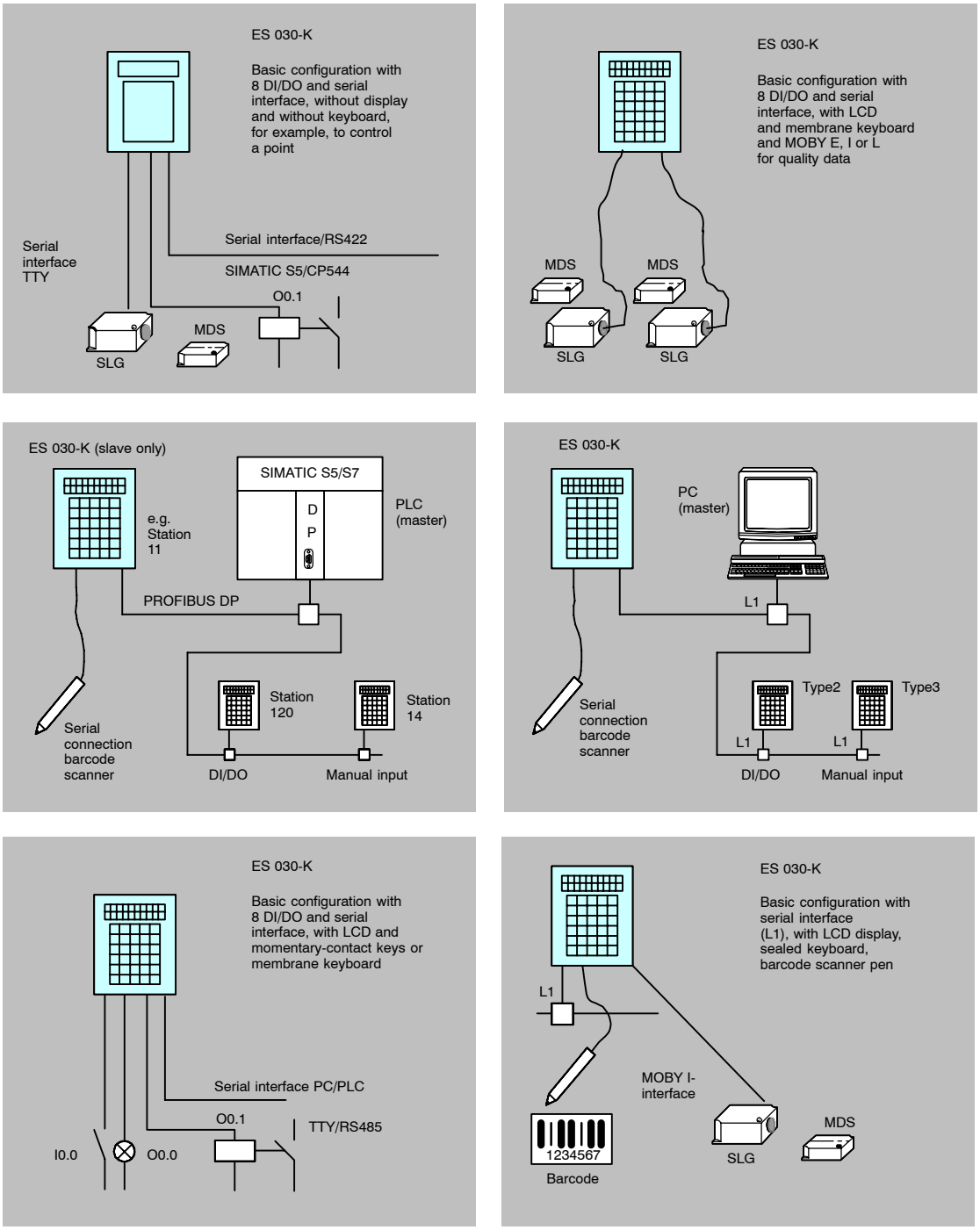


Figure 7-7 Configuration example ES 030-K

Documentation

A

Starting 10.01.2004, the technical documentation of MOBY is only available electronically on the “Software MOBY” CD with the order number 6GT2 080-2AA10.

Technical descriptions

- Description ASM 400/401 (German/English)
- Description ASM 410 (German/English)
- Description ASM 450/FC 44 (German/English/French)
- Description FC 45 (German/English/French)
- Description ASM 470/FC 47 for SIMATIC S7 (German/English)
- Description ASM470/FB 47 for SIMATIC S5 (German/English)
- Description FB 240 (German/English)
- Description FB 250 for ASM 400/401 (German/English)
- Description 3964 R for Windows 95/NT (German/English)
- Description T3964R for DOS (German/English)
- Description MOBY API (German/English)
- Description C/C++-library CCT32 for Windows 95/NT (German/English)

Operator control guides

- Operator control guide for STG MOBY hand-held terminal (English/ German) (also included with STG E)
- Programming instructions for STG MOBY hand-held terminal (English/ German)

Manuals

- Equipment manual for ES 030-K (German/English)

Error Messages

B

This chapter contains a list of MOBY I, E error messages. These messages are divided into three groups.

B.1 Error numbers 01 hex to 1F hex are described in the first section. These messages are the same for all interfaces which use direct MDS addressing.

B.2 Some function blocks (e.g., FB 250, FB 240 and FC 47) provide additional messages on the status of the hardware. These special messages are description in the second section.

B.1 General Errors

The following error codes can occur during MOBY I, E operation. They are transferred in the status byte during telegram communication or via the red LED on the front plate. On most ASM modules, this LED always indicates the last error even when this error has already been corrected.

On ASM 450, the error codes can also be optionally reported via PROFIBUS as device-related diagnoses.

Table B-1 General Errors

Error Code in Hex	LED	Cause/Remedy	SIN[1]
00	00	no error; result is ok	0000
–	01	See error code 0F	
01	02	Presence error: MDS has moved out of the transmission window of the SLG. The MOBY command could only be executed partially. Read command: No data are supplied to the computer. Write command: The data memory which just left the field contains an incomplete data record. → S_a (working distance from SLG to MDS) not adhered to → Configuration error: the data block to be processed is too large (in dynamic operation). The next command (READ, WRITE or NEXT) is automatically related to the next MDS. **Note:** The error display with the red LED on the front panel issues the error code 02 in this case.	0003
02	02	Presence error. → A mobile data memory has passed the SLG and was not processed with a command or concluded with the NEXT command. → An INIT command was aborted with RESET. This error message cannot be transferred until the next command (read, write, status, RESET, DI/DO or NEXT). The command is not executed but causes this error message. The ASM executes the next command correctly again. Error 02 is reported immediately via external diagnosis. **Note:** The error output with the red error LED does not differentiate between error 01 and 02 (see error code 01).	0005
03	03	Errors in the connection to the SLG → Supply voltage of the ASM < 20 V or not connected → 24 V power has dips → Fuse on the ASM has blown Check wiring → Cable wired incorrectly between the ASM and SLG or broken cable → Defective hardware: ASM or SLG → Other SLG active nearby	0040
04	04	Error in memory of the MDS The data memory has never been write-accessed or has lost its contents due to a battery failure. → Initialize data memory with the STG →With the ASM: call the initialization command → Check battery of MDS or change MDS (battery bit) → Data memory is defective → Initialization was executed with incorrect memory size	0041
05	05	– Unknown command code in byte 2 of the telegram – MDS reports address error (check message frame)	0002/ 0004

Table B-1 General Errors

Error Code in Hex	LED	Cause/Remedy	SIN[1]
06	06	Field interference on SLG The SLG is receiving interference pulses from its surroundings. → External interference field. The interference field can be documented with the ”inductive field indicator” of the STG! → The distance between two SLGs is too small and does not adhere to the configuration guidelines! → The connecting cable to the SLG is defective, too long or does not meet specifications.	0044
07	07	Too many sending errors The MDS was unable to receive the command or the write data from the SLG even after several attempts. → The MDS is positioned directly in the boundary area of the transmission window → Data transmission to the MDS is being bothered by external interference.	0045
08	08	CRC transmission error. – The monitoring circuit has detected an error during sending. → Cause of error same as for error 06 – The MDS very often reports a CRC error → The MDS is positioned in the tolerance range of the SLG → The MDS and/or the SLG have a hardware defect	0044
09	09	Only at initialization: CRC error when acknowledgment received by MDS → Cause of error same as for error 06	-
0 A	10	Only at initialization: MDS cannot execute the INIT command → The MDS is defective.	-
0B	11	Only at initialization: timeout at initialization of the MDS → The MDS is positioned directly in the tolerance range of the transmission window → The MDS is using too much current (defective).	-
0C	12	Memory of the MDS cannot be written. → Memory of the MDS is defective. → The EEPROM of the MDS was written too often and has reached the end of its life. → An incorrect end address was parameterized with the INIT command	0046
0D	13	Address error (address area exceeded) → Specified address doesn’t exist on the MDS. → Check and correct command for message frame structure. → The status byte in the command does not have the value 00	0002/ 0004
0E	14	ECC error The data cannot be read from the MDS. → MDS data have been lost (MDS defective). → The MDS was not initialized with ECC driver. → Initialize MDS → MDS with EEPROM has reached the end of its life. The data have been lost. → Replace MDS. → The MDS moved out of the field while being written. → The MDS is positioned incorrectly.	0047

Table B-1 General Errors

Error Code in Hex	LED	Cause/Remedy	SIN[1]
0F	01	Startup message The ASM always sends this message after every startup. A startup is considered performed after operational voltage is applied, after the front switch is activated, after a reset via connector X1 or after a bus error. The startup message is retained until the user issues a RESET command to the ASM. This enables the user to recognize when voltage returns to the ASM (i.e. readiness for operation).	
10	16	NEXT command is not possible or is not permitted. → ASM working without presence check → ASM has already received a NEXT command	1043
11	17	Short circuit or overload of the 24 V outputs Next command must be a RESET command. → The affected output is switched off → All 24 V outputs are switched off when a total overload occurs → Reset can only be performed by turning the power off and on again.	
12	18	Internal ASM communication error The connection to the MOBY processor is defective. The next command must be a RESET command. → Hardware of ASM defective → EMC interference	
14	20	Internal ASM error Stack overflow. The next command must be a RESET command. → Turn 24 V power off and on again.	
15	21	Incorrect operational parameter assignment → Check the switch on the ASM	
16	22	The command cannot be executed with the current bus configuration. → Input or output areas are too small for the size of the message frame. → Write or read command too long → Adapt bus configuration on the master module.	
17	23	Handshake error Next command must be a RESET command. → The user has set an incorrect bit in the command byte of the message frame during the handshake process → Check user program and correct.	
18	24	Only RESET command permissible → An error has occurred that must be acknowledged by a RESET command	

Table B-1 General Errors

Error Code in Hex	LED	Cause/Remedy	SIN[1]
19	25	Previous command active A new command was sent to the ASM although the last command is still active. → An active command can only be terminated with a RESET command. →The new command was terminated with error 19 hex and the old command is executed by the ASM and reported after processing as completed.	0042
1 A	26	PROFIBUS DP error occurred → Bus connection interrupted (wire break, connector removed) → Master won't address ASM anymore. → Error reported as soon as the bus connection is working again	-
1E	30	– The message frame does not have the correct form. – QB byte does not correspond to user data length. → Check and correct the message frames in the user program.	
1F	31	Communication with the MDS was terminated with RESET. This error can only be returned with a RESET command.	-
20 (binary xx1x xxxx)	32	**No error messages!** Only occurs if you are working with the ECC driver turned on. It indicates that the driver has detected and corrected a 1 bit error. The read/write data are correct.	0052[2]
40 (binary x1xx xxxx)	64	**No error messages!** This bit is normally always set. It is reserved for the status display of the 2nd	0051[2]
80 (binary 1xxx xxxx)	128	**No error message!** Battery voltage of the MDS has fallen beneath the threshold value. We recommend you replace the MDS immediately! In MDS variants with EEPROM this status bit is always set. In SINUMERIK the battery message appears without the "F" identifier in the identification. The "fnr" field can be evaluated to detect a bad battery at a single point in the overall system.	0050[2]

1 SIN = equivalent error number in SIM in operating mode SINUMERIK
2 If several statuses occur at the same time, the following order applies: 0052, 0050, 0051

B.2 ASM-specific error

B.2.1 ASM 400 with FB 250

The messages listed in Table B-2 are displayed in data word 5 of FBDB.

Table B-2 Error messages of FB 250

Error messages	Cause/Remedy
Bit 1 = "1": synchronization error	• The FB 250 has received the result for a command that is not (at this point) in the ZUWDB. The pointer (ZUW) may have been changed to ZUWDB while a command was active. • As a result of EMC interference, the ASM processed a different command to the one programmed by the user. → Check the whole SIMATIC system; check the grounding concept.
Bit 2 = "1": FB 250 is synchronized (SYNCH)	General communications option with a channel module of the ASM 400 module. This bit is set after a positive check of the FB parameter assignment. This occurs at the first RESET directly following the initial downloading of the programs and data blocks. If the RESET command does not work, the bit is not set or reset. ASM 400 module cannot be addressed by the FB. • Incorrect address set on the ASM 400 • ASM 400 defective → RESET must always be initiated in the case of a reset synchronization bit
Bit 4 = "1": parameter assignment error	• The "ADR" parameter does not contain the correct values. • The "KAN" parameter is incorrectly specified. Permitted values are 1 or 2. • The "TYP" parameter was incorrectly specified. Permitted values are 0, 1, 3, 5, 6. • The "ANW" parameter is not "0" or "1" • The command in ZUWDB is not allowed.
Bit 5 = "1": ASM error	• The exact ASM error is in bit 8 to 15 of DISP If bit 8 to 15 = 0: • After the command was transferred, the FB did not receive an acknowledgment from the ASM in time. • After the command was started, FB 250 was not called by the user for longer than 4 seconds (no cyclical call of the FB). • The user has changed data in the FBDB (DW 0 - DW 24) (specifically DW 0/1).

Table B-2 Error messages of FB 250

Error messages	Cause/Remedy
Bit 6 = "1": timing error	Monitoring by loop counter triggered in FB 250. • The command data could not, or not completely, be transferred to the ASM 400. • The ASM 400 cannot be addressed by the FB. It is possible that the "ADR" parameter does not correspond to the S3 switch position on the ASM 400. • A length of 0 was transferred for a write command. • The AG parameter is set incorrectly. • The user has changed data in the FBDB (specifically DW 0/1) → Check the ASM 400 hardware, addressing, parameter assignment, and user program
Bit 7 = "1": repetition error	The command to the ASM 400 was repeated • Error in BEST = 0: After command repetition the command was terminated correctly (no error) • Error in BEST = 1: There is a communication problem between the ASM and FB250. In spite of the fact that the command was repeated, it could not be processed correctly. If the repetition bit is set occasionally, all the hardware must be checked. Special attention should be paid to the grounding concept.
Bit 8 to 12	Error message in accordance with Table B-1
Bit 13 = "1":	ECC correction carried out
Bit 14 = "1":	Dialog battery under threshold value
Bit 15 = "1":	RAM battery under threshold value

B.2.2 ASM 470 with FB 47/FC 47

The status word in the case of the FC 47 is DBB 6/7.
The status word in the case of the FB 47 is DW 3.

- The MOBY errors are displayed in DBB 6 or DL 3 (see Table B-1).
- Internal errors of the function block are displayed in DBB 7 or DR 3 (see Table B-3). The red LED does not flash in the case of these error messages of FB 47/FC 47. The contents of the byte are specified as a hexadecimal number (HEX) and a fixed-point number (DEC).

Table B-3 Error messages of FB 47/FC 47

DISP (right byte)	Meaning
02 HEX/ 02 DEC	An impermissible command code or command parameter was entered. • Parameterize data words in BEDB correctly in accordance with the command description
06 HEX/ 06 DEC	The command code and acknowledgment code received are not the same. • ASM 470 not correctly parameterized • Internal runtime error • BEDB is overwritten by other program sections
07 HEX/ 07 DEC	Synchronization error in the execution of FB 47/FC 47 • Internal runtime error • BEDB is overwritten by other program sections
08 HEX/ 08 DEC	The parameterized user data length of the read/write command and the received user data length of the acknowledgment are not the same. • ASM 470 not correctly parameterized • BEDB is overwritten by other program sections
09 HEX/ 09 DEC	The user data received or written is too long. • ASM 470 not correctly parameterized • Read command: the specified length of the read data is too long (a maximum of 12 bytes is permissible)
0A HEX/ 10 DEC	Read or written user data length too small. User data length is 0 bytes. • Internal runtime error • BEDB is overwritten by other program sections
11 HEX/ 17 DEC	The formal operands of FB 47/FC 47 were parameterized incorrectly. • Parameterize FB 47/FC 47 correctly • Then start the RESET command

Table B-3 Error messages of FB 47/FC 47

DISP (right byte)	Meaning
13 HEX/ 19 DEC	FB 47/FC 47 reports that only a RESET is permissible as the next command. • A RESET was not carried out after a startup message of the ASM 470 • A RESET was not carried out after an error message that requires a RESET as the next command • Then start the RESET command
14 HEX/ 20 DEC	Synchronization error between the ASM 470 and FB 47/FC 47. • The handshake of the command and acknowledgment message frames is out of step. There may be a contact problem, or the supply voltage may be unstable. • BEDB is overwritten by other program sections • Then start the RESET command
15 HEX/ 21 DEC	The ASM 470 has carried out a startup • There may be a plug-in contact problem of the ASM 470 in the S7-300 • The supply voltage of the ASM 470 is unstable • Interference pulse • BEDB is overwritten by other program sections • Then start the RESET command
1BH/ 27D[1]	• The data field (number of user data bytes) between DAT-Z and the end of the DATDB (assuming DATDB consists of 256 data words, DW0 to DW255) is smaller than the length defined by the write command (DR4 in BEDB) • DAT-Z must be adjusted to the user data length (make DAT-Z smaller) • Reduce the length of the write/read data • Then start the RESET command

1 Can only occur in the case of FB 47

B.2.3 ASM 450 with FB 240

The error displays (DISP) of FB 240 take place in data word DW 2 of BEDB:

- The MOBY errors are indicated in accordance with Table B-1 in the data word on the left (DL 2).
- FB-internal errors are indicated in the data word on the right (DR 2). The red LED does not flash in the case of these error messages of FB 240. The contents of the byte are specified as binary, a hexadecimal number (H), and a fixed-point number (D).

Table B-4 Error messages of FB 240

DISP (right byte)	Meaning
00000010 (02H/02D)	An impermissible command code or command parameter was entered. • Parameterize data words in BEDB correctly in accordance with the command description
00000110 (06H/06D)	The command code and acknowledgment code received are not the same. • Input and output area of the ASM 450 not parameterized adequately • Parameterize the master module correctly
00000111/ (07H/07D)	The length of the acknowledgment received is too large. • Input and output area of the ASM 450 not parameterized adequately (not 32 bytes) • Read command: the specified length of the data to be read is too large • Parameterize the master module correctly
00001000 (08H/08D)	The parameterized user data length of the read/write command with the received user data length of the acknowledgment is not identical. • Input and output area of the ASM 450 not parameterized adequately • Parameterize the master module correctly
00001001 (09H/09D)	The user data received is too long. • Input and output area of the ASM 450 not parameterized adequately (not 32 bytes) • Read command: the specified length of the data to be read is too large • Parameterize the master module correctly
00010001 (11H/17D)	The formal operands of FB 240 were parameterized incorrectly, or the parameterization in the EPROM of the IM 308-B is incorrect. • Parameterize FB 240 correctly • Parameterize the master module correctly, and check the ADR parameter, in particular • Then start the RESET command

Table B-4 Error messages of FB 240

DISP (right byte)	Meaning
00010011 (13H/19D)	FB 240 reports that only a RESET is permissible as the next command. • A RESET was not carried out after a startup message of the ASM 450 • A RESET was not carried out after an error message that requires a RESET as the next command • Then start the RESET command
00010100 (14H/20D)	Synchronization error between the ASM 450 and FB 240. • The handshake of the command and acknowledgment message frames is out of step. There may be a contact problem, or the supply voltage may be unstable. • Then start the RESET command
00010101 (15H/21D)	ASM 450 carried out a startup or there was a PROFIBUS DP bus fault. • There may be a plug-in contact problem of the ASM 450 in the rack • The supply voltage of the ASM 450 is unstable • Interference pulse at the reset input of the base connector X1 • PROFIBUS DP error occurred (e.g. bus connection interrupted) • Then start the RESET command

ASCII Table

C

dec.		+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12	+13	+14	+15
	hex.	+00	+01	+02	+03	+04	+05	+06	+07	+08	+09	+0A	+0B	+0C	+0D	+0E	+0F
0	0x00																
16	0x10																
32	0x20																
48	0x30																
64	0x40																
80	0x50																
96	0x60																
112	0x70																
128	0x80																
144	0x90																
160	0xA0																
176	0xB0																
192	0xC0																
208	0xD0																
224	0xE0																
240	0xF0																

Compatibility

D

The following table contains a list of all the discontinued components in the MOBY E range for both customers and service personnel.
You will also find these type designations on each component.
You can use this table in particular to find replacements for models that have been discontinued.

Table D-1 Compatibility of MOBY E components (as at July 2003)

Type designation	MLFB-No.	Description/note	Replace-ment type	MLFB-No.
SLG 70 ANT 0	6GT2 301-0AA00	Discontinued as of June 1, 2003 The replacement is compatible as regards its technical specifications. Difference: The antenna cable is 3 m long and can be plugged in at the side of the SLG. Note: The antenna is not included with the SLG 75. It must be ordered separately.	SLG 75 ANT 18	6GT2 398-1AF00 6GT2 398-1CA00
SLG 70 ANT 1	6GT2 301-0AB00	Discontinued as of June 1, 2003 The replacement is compatible as regards its technical specifications. Difference: The antenna cable is 3 m long and can be plugged in at the side of the SLG. Note: The antenna is not included with the SLG 75. It must be ordered separately.	SLG 75 ANT 1	6GT2 398-1AF00 6GT2 398-1CB00

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Siemens AG
A&D SE EWF MS
PO Box 2355
D-90713 Fuerth

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- ❐ Automotive industry
- ❐ Chemical industry
- ❐ Electrical industry
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- ❐ Mechanical engineering
- ❐ Petrochemistry
- ❐ Pharmaceutics industry
- ❐ Plastics processing
- ❐ Paper industry
- ❐ Textiles industry
- ❐ Transportation industry
- ❐ Other _ _ _ _ _ _ _ _ _ _ _ _ _

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:_ _

Order number of your manual:_ _

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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3. Is the information written in an easy-to-understand manner ? ☐
4. Does the amount of technical detail meet your requirements ? ☐
5. What is your opinion of the figures and tables ? ☐

If you encountered concrete problems, please use this space to explain.

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