SIEMENS

MOBY® D

Configuration, Installation and Service

Manual

6GT2 697-4BA00-0EA2

Published in September 2003

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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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Order No. 6GT2 697-4BA00-0EA2

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General

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This manual on configuration, installation, and service will help you to plan and configure your MOBY D system. It contains the configuration and installation guidelines and all technical data on the individual components.

MOBY hotline

A MOBY hotline has been set up for optimum customer service to MOBY customers.

You can contact us Monday to Friday from 8.00 to 17.00 on the following telephone number:

++49(0)911/750-2882

Of course, you can also e-mail us your questions.

E-mail address: MOBY.HOTLINE@fthw.siemens.de

Internet

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

http://www.siemens.de/moby

E-mail

We can also answer special questions on products, give you a list of Siemens representatives in your area, clarify customer-specific requirements, and so on under the following e-mail address:

moby@fthw.siemens.de

Introduction – MOBY D

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MOBY D is an RF identification system based on the ISO/IEC 15693 standard in the 13.56 MHz range. ISO/IEC 15693 establishes for the first time a common basis for the smart labels of different vendors.
The areas of application range from simple identification (e.g. to replace or complement barcodes or delivery notes in rough conditions) to storage and distribution logistics and product identification.

MOBY D is connected directly to PCs running Windows 9x, 2000, and NT via a serial (RS 232) interface and is supported by a powerful C library.

It is integrated in SIMATIC S7 and PROFIBUS-DP-V1 by means of the proven MOBY interface modules:

- ASM 452
- ASM 473
- ASM 475

FC 45 gives the S7 user an easy-to-use interface.

Standardized low cost read/write transponders (smart labels based on ISO/IEC 15693, e. g. I-Code, Tag-it and my-d) can be processed by the MOBY D read/write device up to a distance of 600 mm (depending upon the transponder and antenna size).

Main applications

The structure of the transponders permits a variety of flexible designs in order to ensure optimal sizing for a diverse range of applications.

Cost-effective smart labels for high-volume applications:

- Container and box identification in open systems
- Distribution logistics and product identification
- Package and postal services, mail-order companies, and forwarding agents
- Baggage check-in and tracking
- Protection against plagiarism and theft

Up to 100 smart labels can be detected at the same time (bunch detection), and the data can be processed selectively (multitag mode).

Robust data memories with closed cycles:

- Container and box identification in logistics and distribution
- Production logistics and assembly lines with increased temperature requirements (e.g. paint shops, temperature range up to +200 °C)
- Parts identification (e.g. data storage unit fitted directly to product/pallet)

Technical data of MOBY D

Table 2-1 Technical data of MOBY D

MDS ...	D139/D160	D100/D124
Storage capacity	64 bytes	128 bytes
Serial number	8-byte ID number, fixed code	8-byte ID number, fixed code
Application memory	44 bytes	112 bytes
Configuration memory	12 bytes	8 bytes
Data organization		
PC, PLC of other manufacturer	4 bytes, blockwise	
SIMATIC S7, PROFIBUS-DP-V1	Address-oriented, bytewise	
Protection rating	IP65 to IP68	
Operating temperature	–25 °C up to +200 °C	
Data transmission speed (SLG - MDS)	≥ read 3.5 ms/byte ≥ write 9.5 ms/byte	
Read/write distance	up to 400 mm	
Can be connected to	PC, PLC of other manufacturer SIMATIC S7, PROFIBUS-DP-V1	

Overview of the MOBY D components

- MDS: Mobile data storage unit
- SLG: Read/write device
- ASM: Interface module
- STG: Service and test device

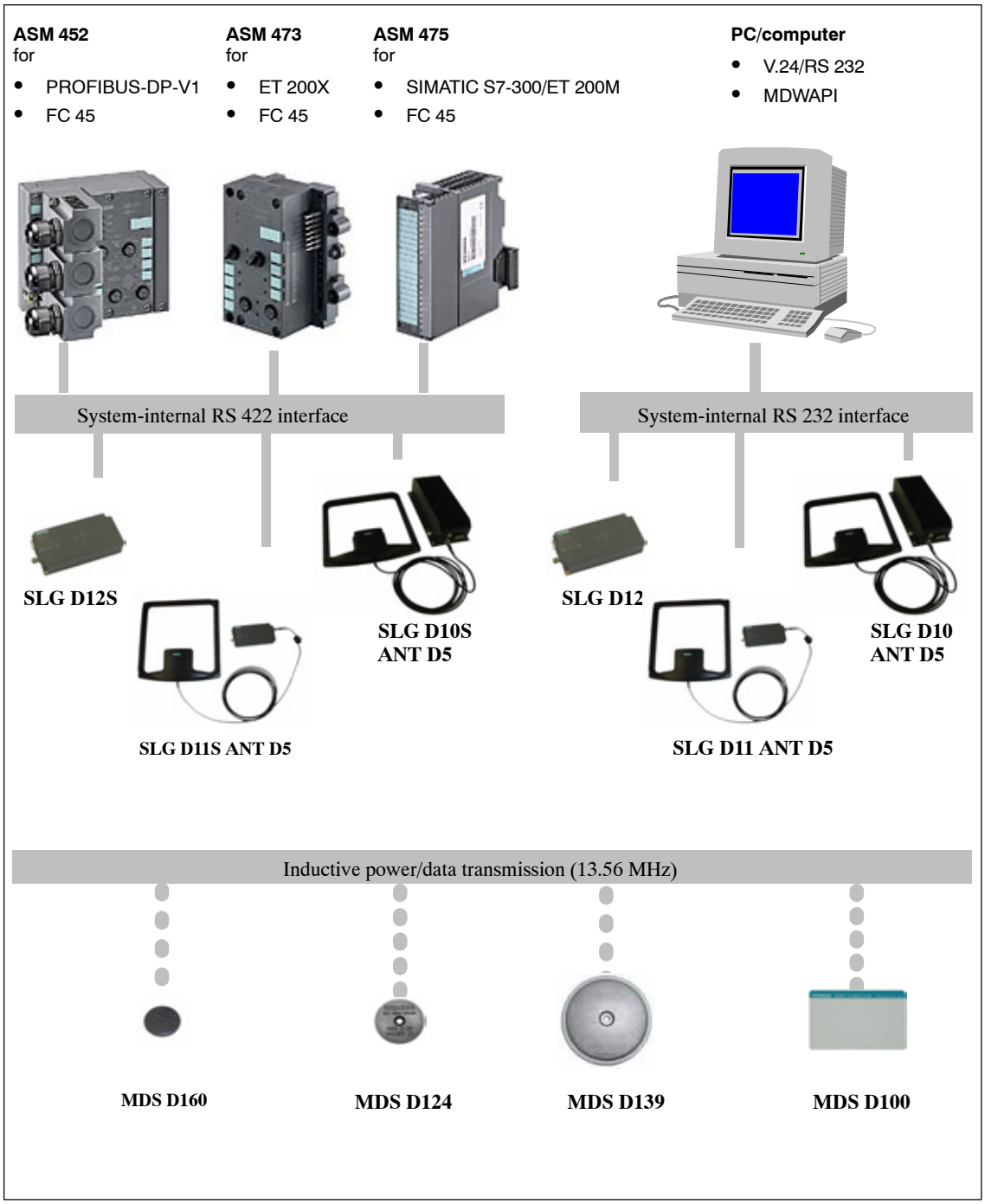


Figure 2-1 Overview of the MOBY D components

Configuration and Installation Guidelines 3

3.1 The Fundamentals

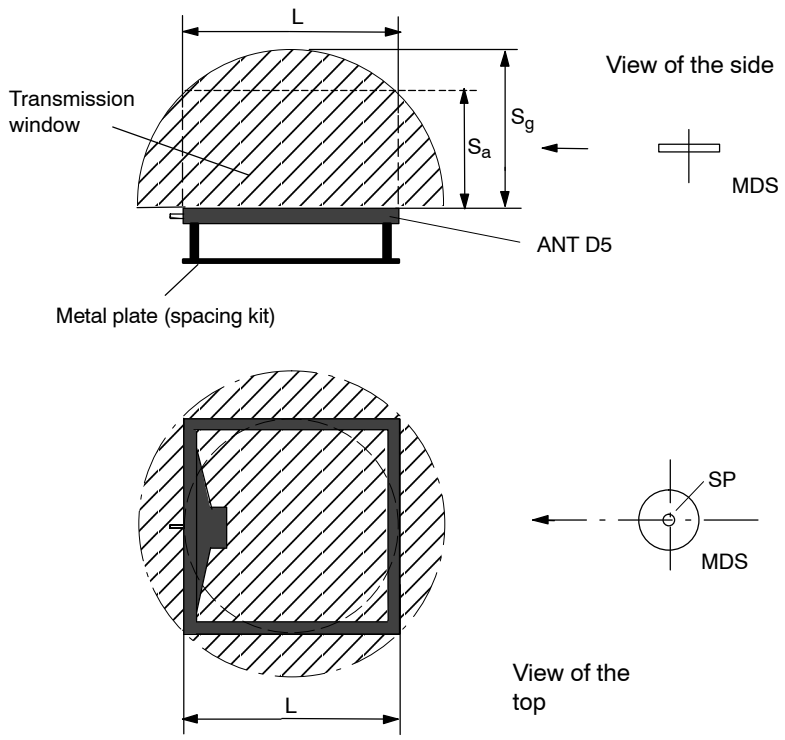
To choose the correct MOBY D components, apply the following criteria to your particular application.

- Transmission distance (i.e. read/write distance)
- The amount of data to be transferred
- Metal-free space around MDS and SLG (antenna)
- Static of dynamic transmission of the data
- Speed for dynamic transmission
- Tolerances of the tracking
- Ambient conditions such as humidity, temperature, chemicals, and so on
- Maximum write frequency per MDS
- System connection

3.1.1 Transmission Window

The read/write device (i.e. SLG) generates an inductive alternating field. The field is at its largest near the antenna, and decreases in size rapidly the greater the distance from the antenna. The distribution of the field depends on the structure and geometry of the antennas in the SLG and MDS.

In order to work, a minimum field strength must be reached on the MDS at a distance of S_g from the SLG. The figure below shows the transmission window between the MDS and the SLG.



S_a: Working distance between the MDS and SLG

S_g: Limit distance (the limit distance is the maximum clearance between the top side of the antenna and the MDS at which the transmission will still function under normal conditions)

L: Length of a transmission window

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. The direction of movement and rotation of the MDS is not important.

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

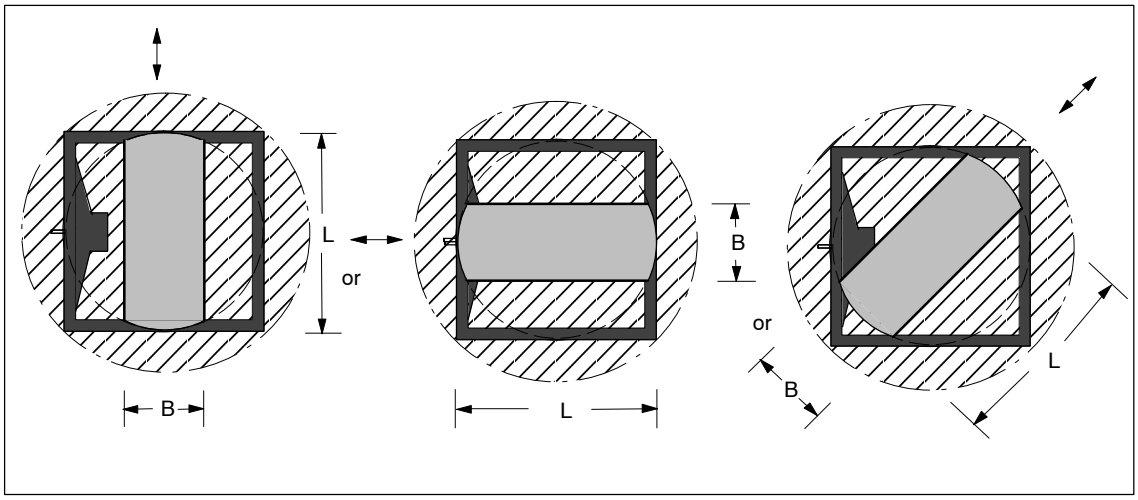


Figure 3-2 Direction of movement of the MDS

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 as shown below.

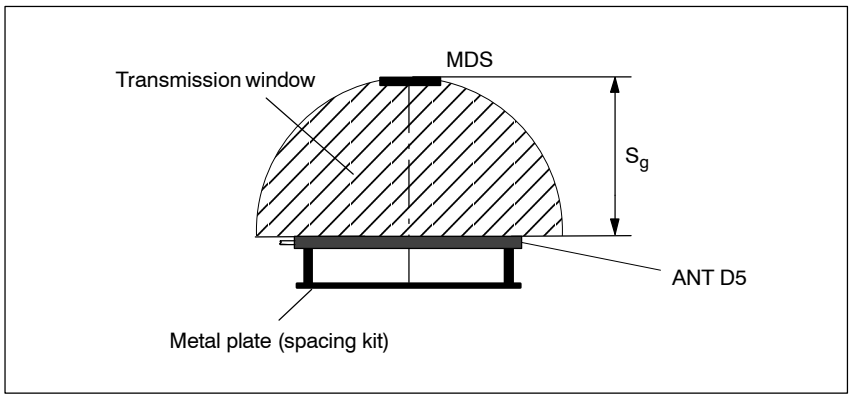


Figure 3-3 Working in static operation

Working in dynamic operation

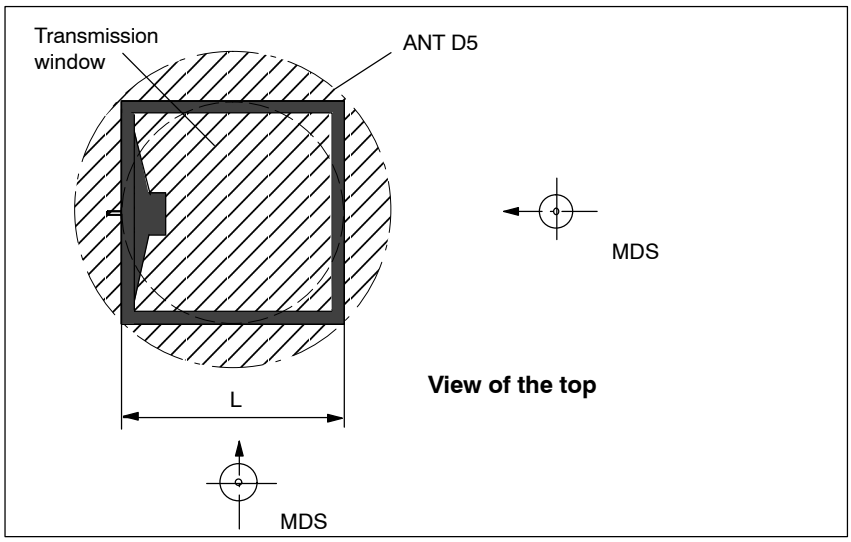


Figure 3-4 Working in dynamic operation

Transmission window with secondary fields

Secondary fields are almost always present. They should only be used by exception for a configuration, as the read/write intervals are limited. Precise details cannot be given of the field geometry of the secondary fields because the values depend greatly on the working distance and the application.

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.

Tolerances of the side allowance of the pallet

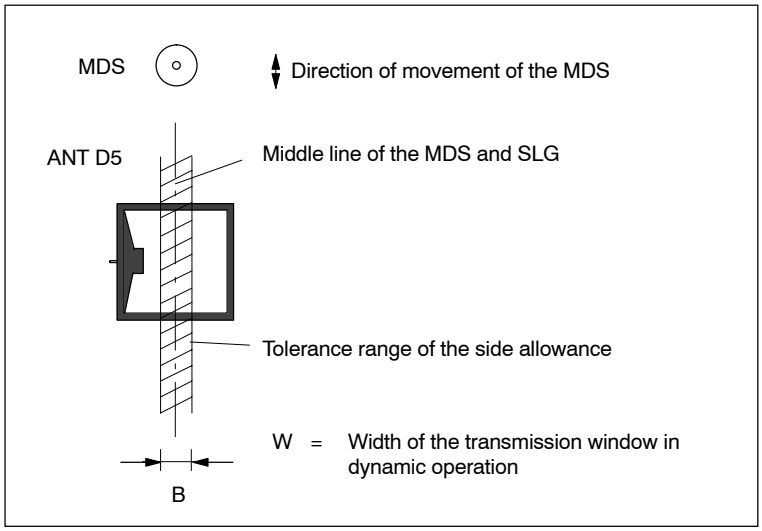


Figure 3-5 Tolerance of the side allowance of the pallet

3.1.2 Communication Between the SLG and MDS

The communication between SLG and MDS occurs asynchronously at a transmission speed of

- 19.2 kBaud with SLG D11S ANT D5/SLG D12S
- 38.4 kBaud with SLG D12/SLG D11 ANT D5
- 115.2 kBaud with SLG D10 ANT D5/SLG D10S ANT D5

Table 3-1 Data transmission speed, SLG – MDS

Read	≥ 3.5 ms/byte
Write	≥ 9.5 ms/byte

Table 3-2 Transmission time for the UID number (8 byte)

SLG D10 ANT D5/SLG D10S ANT D5	30 ms (at 115.2 kBaud)
SLG D11 ANT D5/SLG D12	60 ms (at 38.4 kBaud)
SLG D11S ANT D5/SLG D12S	90 ms (at 19.2 kBaud)

Table 3-3 SLG D1x target speed (with one transponder in the field)

	SLG D10 ANT D5	**SLG D11 ANT D5**	**SLG D12**	**SLG D10S ANT D5**	**SLG D11S ANT D5**	**SLG D12S**
UID number (8 byte)	≤ 5.0 m/ sec	≤ 3.5 m/ sec	≤ 2.5 m/ sec	≤ 2.0 m/sec	≤ 1.2 m/sec	≤ 1.0 m/sec
I-Code1, e. g. MDS D139						
Read (with 4 bytes of user data)	≤ 3.5 m/ sec	≤ 3.0 m/ sec	≤ 2.0 m/ sec	≤ 1.8 m/sec	≤ 1.0 m/sec	≤ 0.8 m/sec
Write (with 4 bytes of user data)	≤ 2.8 m/ sec	≤ 2.5 m/ sec	≤ 1.5 m/ sec	≤ 1.4 m/sec	≤ 0.8 m/sec	≤ 0.6 m/sec
Read (at 44 bytes complete user data)	≤ 2.0 m/ sec	≤ 1.8 m/ sec	≤ 1.0 m/ sec	≤ 1.5 m/sec	≤ 0.7 m/sec	≤ 0.6 m/sec
Write (at 44 bytes complete user data)	≤ 0.8 m/ sec	≤ 0.6 m/ sec	≤ 0.3 m/ sec	≤ 0.7 m/sec	≤ 0.5 m/sec	≤ 0.3 m/sec
I-Code SLI, e. g. MDS D100						
Read (with 4 bytes of user data)	≤ 3.5 m/ sec	≤ 1.6 m/ sec	≤ 1.2 m/ sec	≤ 2.2 m/sec	≤ 1.6 m/sec	≤ 1.2 m/sec
Write (with 4 bytes of user data)	≤ 3.0 m/ sec	≤ 1.2 m/ sec	≤ 1.0 m/ sec	≤ 1.8 m/sec	≤ 1.4 m/sec	≤ 1.0 m/sec
Read (with 112 bytes complete user data)	≤ 2.4 m/ sec	≤ 1.4 m/ sec	≤ 0.8 m/ sec	≤ 1.6 m/sec	≤ 1.0 m/sec	≤ 0.6 m/sec
Write (with 112 bytes complete user data)	≤ 0.6 m/ sec	≤ 0.4 m/ sec	≤ 0.2 m/ sec	≤ 0.6 m/sec	≤ 0.4 m/sec	≤ 0.2 m/sec

3.2 Field Data of MDS and SLG

The table below shows the field data of all MOBY D MDS, and SLG components. This makes selecting an MDS and an SLG particularly easy. All the technical data specified are typical data, based on an ambient room temperature of 0 to +50 °C. **Depending on production conditions and temperature, tolerances of ± 20 % are permissible.**

Note

In order to ensure optimal field data in surroundings where there is metal as well, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal.

Table 3-4 Field data of all MDSs and SLGs without the influence of metal

MDS / SLG	MDS D100	MDS D124	MDS D139	MDS D160
	Length of the transmission window in mm (L)			
SLG D12/SLG D12S	120	100	120	100
SLG D11 ANT D5 **SLG D11S ANT D5**	∅ 300	∅ 250	∅ 300	∅ 250
SLG D10 ANT D5 **SLG D10S ANT D5**	∅ 300	∅ 260	∅ 320	∅ 260
	Width of the transmission window in mm (W)			
SLG D12/SLG D12S	48	40	48	40
SLG D11 ANT D5 **SLG D11S ANT D5**	120	100	120	100
SLG D10 ANT D5 **SLG D10S ANT D5**	120	104	128	104
	Working distance in mm (S_a)			
SLG D12/SLG D12S	0 to 100	0 to 50	0 to 120	0 to 40
SLG D11 ANT D5 **SLG D11S ANT D5**	0 to 220	0 to 70	0 to 240	0 to 55
SLG D10 ANT D5 **SLG D10S ANT D5**	0 to 350	0 to 130	0 to 380	0 to 100
	Limit distance in mm (S_g)			
SLG D12/SLG D12S	140	70	150	60
SLG D11 ANT D5 **SLG D11S ANT D5**	280	110	300	70
SLG D10 ANT D5 **SLG D10S ANT D5**	400	180	450	140

Note

When the range of the SLG is inadequate ...

- Check the power supply unit/switched-mode power supply (electrical interference) (see Section 3.4 and 3.6).
- Monitor or other sources of interference close by? (see Chapter 3.4).
- Check the metal in the surroundings (see Section 3.3).
- In order to obtain the optimum read/write intervals with the ANT D 5 a metal plate at a distance of 100 mm is necessary (see Table 3-7 through 3-9).

Table 3-5 Minimum distance from MDS to MDS (without multitag operation)

	MDS D100/MDS D139	MDS D124/MDS D160
SLG D12 **SLG D12S**	≥ 0.5 m	≥ 0.3 m
SLG D11 ANT D5 **SLG D11S ANT D5**	≥ 1 m	≥ 0.8 m
SLG D10 ANT D5 **SLG D10S ANT D5**	≥ 1 m	≥ 0.8 m

A reduction of the minimum distance is permissible in multitag operation (SLG D10/SLG D11/SLG D12, RS 232).

Table 3-6 Minimum distance from SLG to SLG (antennas)

	SLG D12 SLG D12S	SLG D11 ANT D5 SLG D11S ANT D5	SLG D10 ANT D5 SLG D10S ANT D5
SLG D12 **SLG D12S**	≥ 0.5 m	≥ 1 m	> 1 m
SLG D11 ANT D5 **SLG D11S ANT D5**	≥ 1 m	≥ 2 m	> 2 m
SLG D10 ANT D5 **SLG D10S ANT D5**	≥ 1 m	≥ 2 m	> 2 m

Note

The values specified in the tables must be adhered to. 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.
If the values are not attained, a test is recommended.

3.3 Installation Guidelines

The MDS and SLG 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 antennas
  (See Table 3-6 or Chapter 5)
- Minimum distance between two adjacent data memories.
  (See Table 3-5 and Chapter 4).
- Metal-free area with flush installation of SLG in metal
- Installation of several antennas in metal frames or supports

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

3.3.1 Metal-free space

Metal-free space for the MDS

Mounting the MDS directly on metal or flush in metal is **not permissible**. Mounting the MDS directly on metal will interrupt all its functions.

The minimum distance of the MDS to metal is given in the sections on metal-free space in Chapter 4.

Metal-free space for the SLG

When mounting the SLG, remember that metal in the vicinity of the antennas may affect the field data. Typical distances to metal are given in the section on metal-free space in Chapter 5.

ANT D5

The ANT D5 should be set up in isolation. It is **not permissible** to mount it directly on metal.

The maximum field data (no influence = 100 %) apply when the ANT D5 antenna is mounted at a distance of 100 mm to metal (spacing kit 6GT2 690-0AB00).

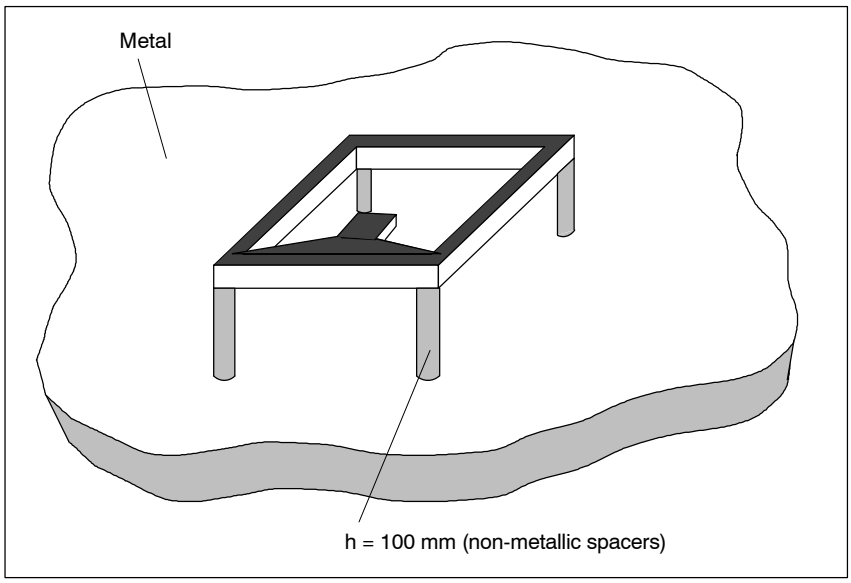


Figure 3-6 ANT D5: Isolated mounting on metal

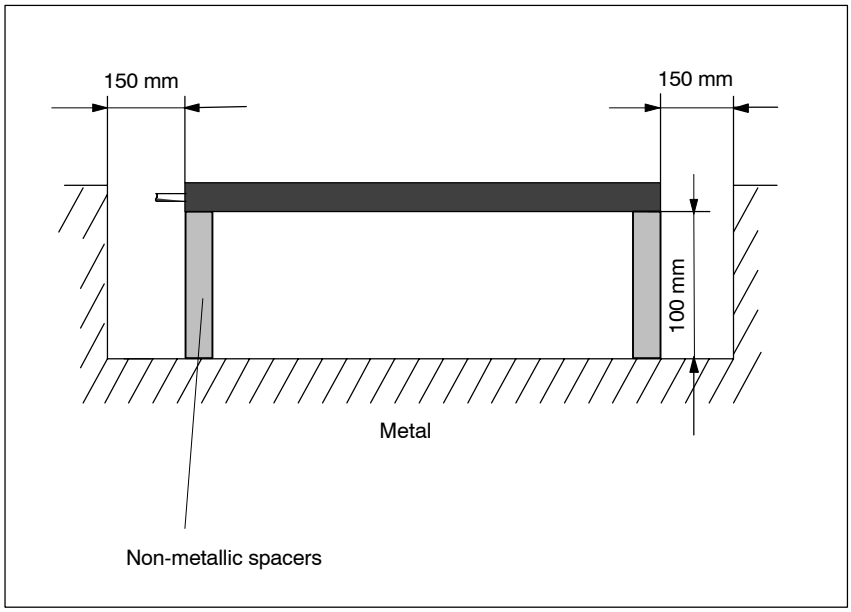


Figure 3-7 ANT D5: Mounting in metal

SLG D12
SLG D12S

For the SLG D12/SLG D12S with the integrated antenna, the height of the housing provides sufficient distance to the metallic subsurface; the device can be mounted directly on metal. When flush mounting is used, remember to maintain the specified distance to metal on the sides.

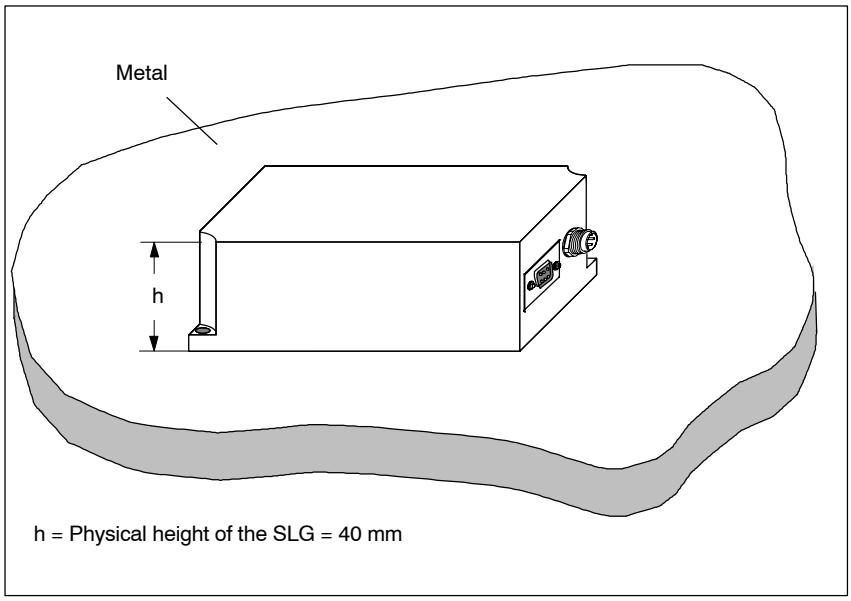


Figure 3-8 Mounting on metal: SLG D12/SLG D12S

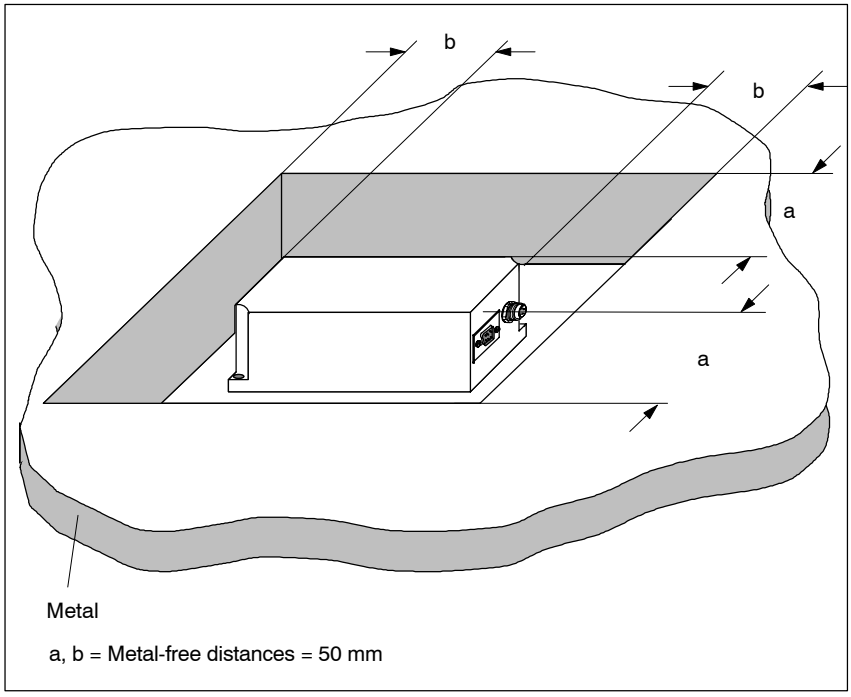


Figure 3-9 Flush mounting in metal: SLG D12/SLG D12S

3.3.2 Effect of Metal on the Transmission Window

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

- It is not permissible to mount the MDS and antennas directly on metal.
- If the components are mounted flush in metal, the field data are reduced.
- 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 critical applications, a test is to be recommended.
- In order to ensure optimal field data in surroundings where there is metal as well, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal (see Table 3-7 through 3-9).

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 % (no effect = 100 %).

Table 3-7 A reduction of the field data with SLG D12/SLG D12S (in %)

SLG D12 SLG D12S / MDS	No metal [%]	on metal [%]	Flush in metal Circumference 50 mm [%]
MDS D100			
MDS without metal	100	70	70
MDS on metal Distance 25 mm	70	60	60
MDS D124			
MDS without metal	100	70	70
MDS on metal Distance 25 mm	80	55	55
MDS D139			
MDS without metal	100	65	65
MDS on metal Distance 30 mm	90	65	65
MDS D160			
MDS without metal	100	80	80
MDS on metal Distance 25 mm	90	70	70

Table 3-8 Reduction of the field data with SLG D11 ANT D5/ SLG D11S ANT D5 (in %)

SLG D11 ANT D5 SLG D11S ANT D5 MDS	On metal Distance 100 mm [%]	Flush in metal Distance 100 mm Circumference 150 mm [%]
MDS D100		
MDS without metal	100	95
MDS on metal Distance 25 mm	60	55
MDS D124*		
MDS without metal	100	95
MDS on metal Distance 25 mm	Does not work	Does not work
MDS on metal Distance 50 mm	55	50
MDS D139		
MDS without metal	100	95
MDS on metal Distance 30 mm	80	75
MDS D160*		
MDS without metal	100	90
MDS on metal Distance 25 mm	Does not work	Does not work
MDS on metal Distance 50 mm	50	45

* The values apply to metal surfaces larger than 100 mm x 100 mm

Table 3-9 Reduction of the field data with SLG D10 ANT D5/ SLG D10S ANT D5 (in %)

SLG D10 ANT D5 SLG D10S ANT D5 MDS	On metal Distance 100 mm [%]	Flush in metal Distance 100 mm Circumference 150 mm [%]
MDS D100		
MDS without metal	100	95
MDS on metal Distance 25 mm	65	60
MDS D124*		
MDS without metal	100	95
MDS on metal Distance 25 mm	50	45
MDS D139		
MDS without metal	100	90
MDS on metal Distance 30 mm	80	70
MDS D160*		
MDS without metal	100	90
MDS on metal Distance 25 mm	Does not work	Does not work
MDS on metal Distance 50 mm	50	45

* The values apply to metal surfaces larger than 100 mm x 100 mm

Note

The values specified in the tables must be adhered to. 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.
If the values are not attained, a test is recommended.

In the following you can see how the transmission window is affected by metal using the example of the SLG D10 ANT D5 with the MDS D139.

The percentages specified describe the reduction of the field data of the ANT D5 and MDS in metal surroundings (100 % means no effect).

MDS in metal-free environment

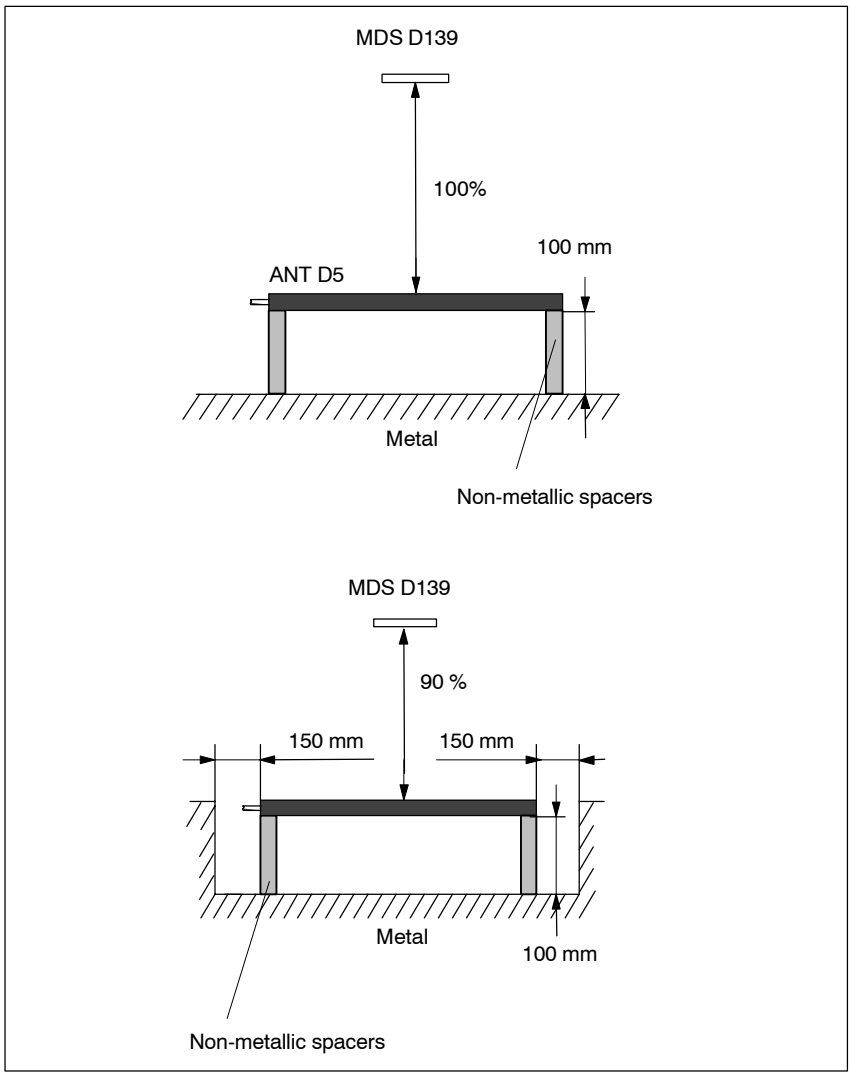


Figure 3-10 MDS in metal-free environment

MDS in metal surroundings

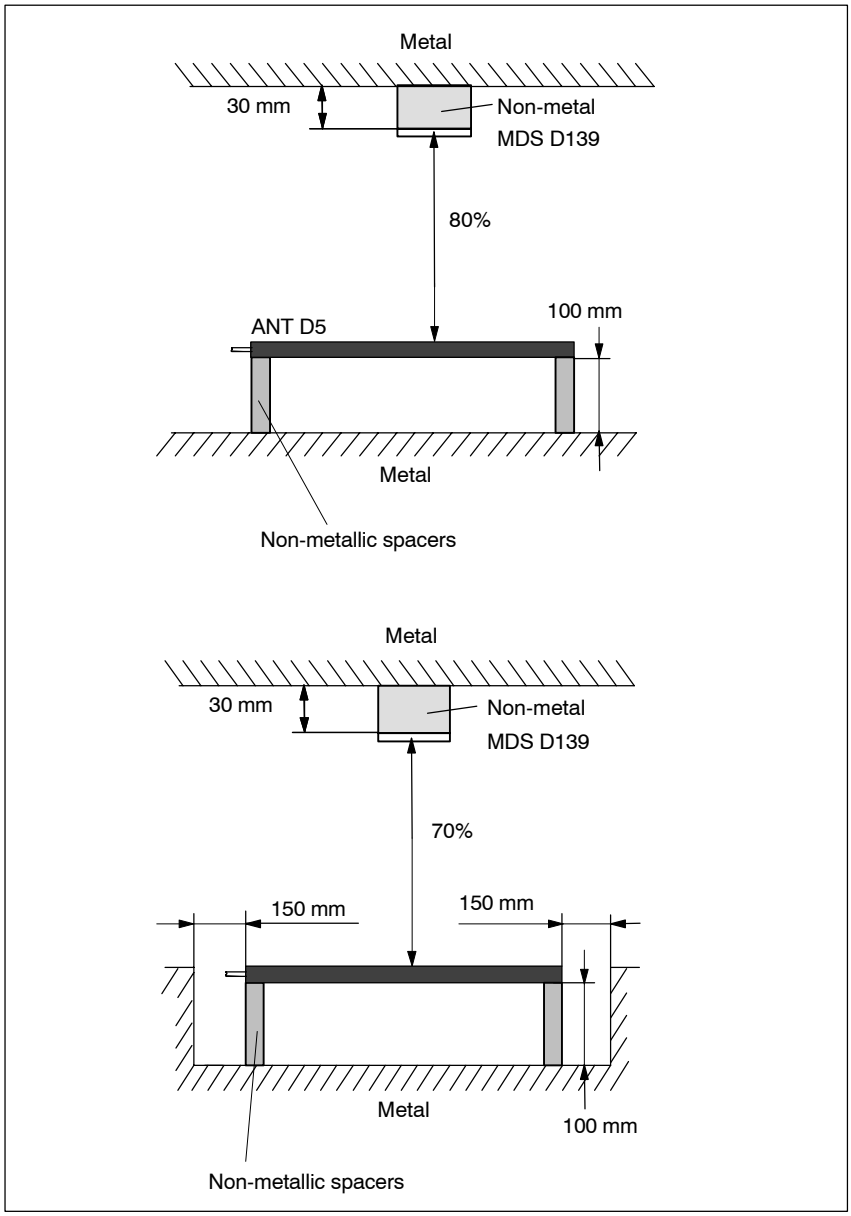


Figure 3-11 MDS in metal surroundings

3.3.3 Reducing the Effects of Metal

Interfering metal supports

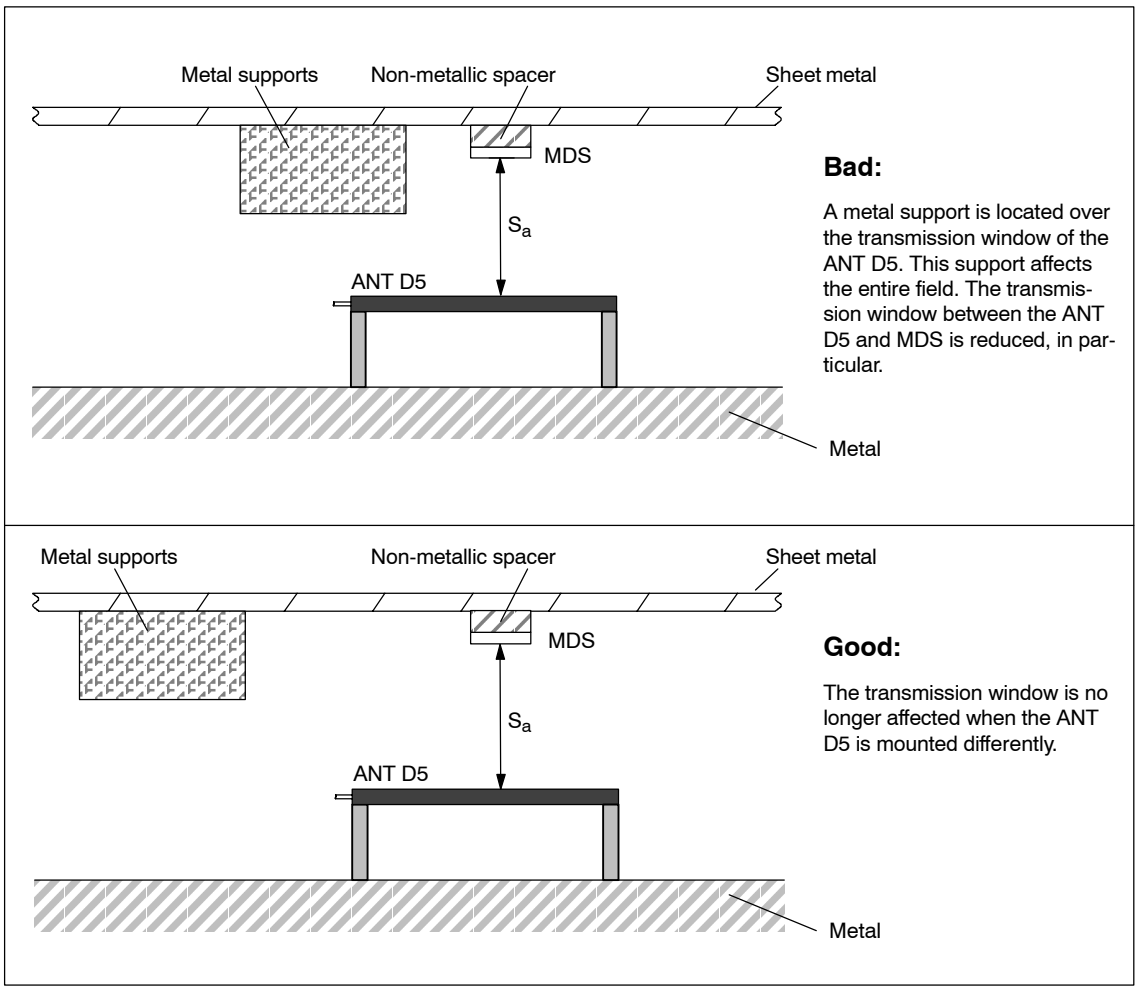


Figure 3-12 Interfering metal supports

Flush mounting

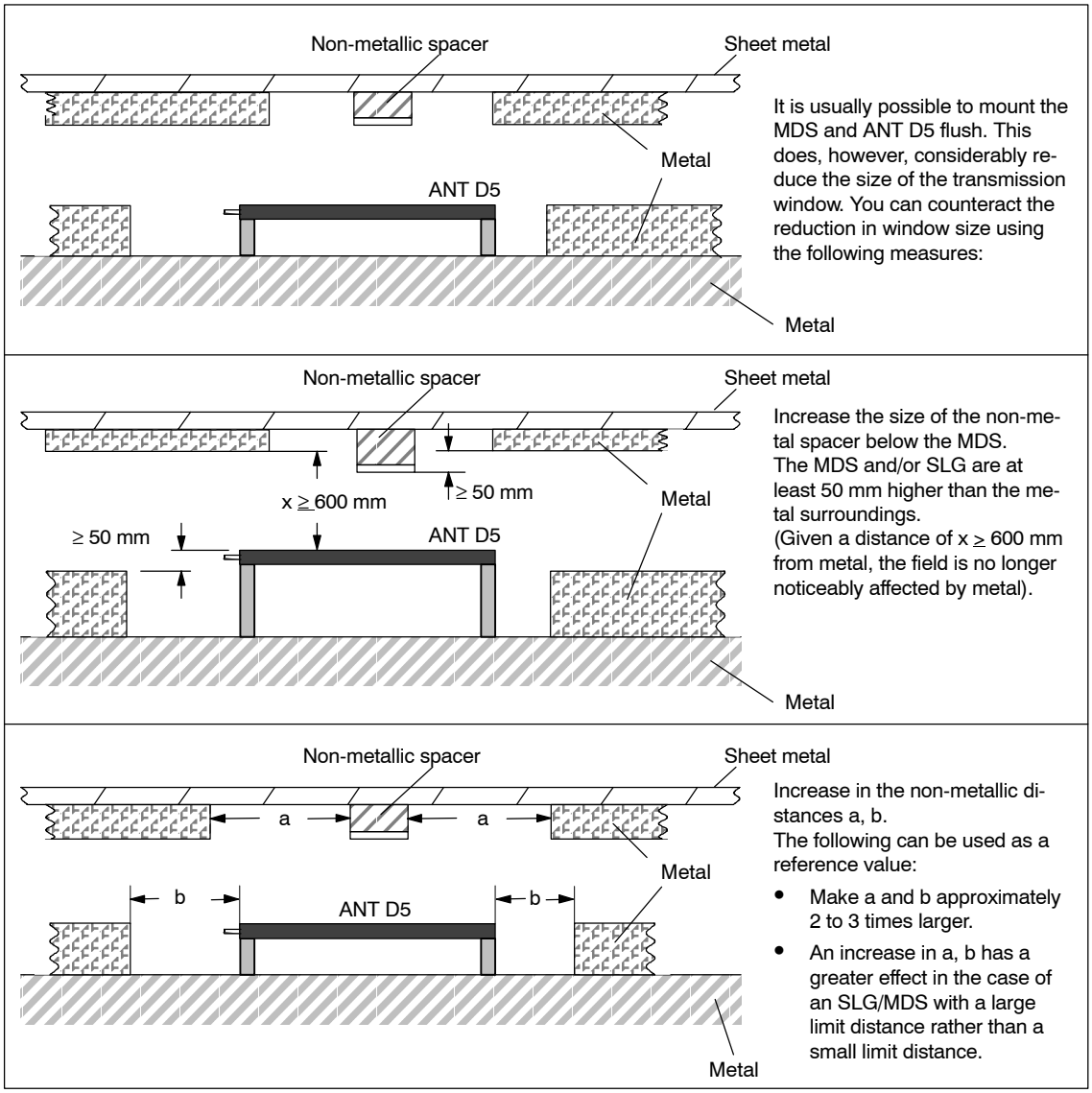


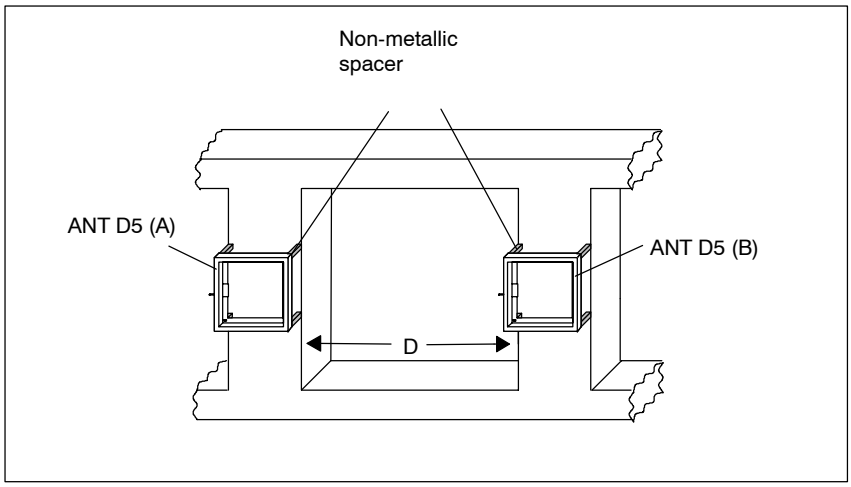
Figure 3-13 Flush mounting

Installation of several ANT D5 on metal frames or supports

Every ANT D5 which is mounted on metal and isolated also connects parts 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

Increase the distance D between the two antennas.



3.3.4 Chemical Resistance of the Mobile Data Storage Units

MDS D100

The housing of the MDS D100 is made of PVC.

The MDS D100 is chemically resistant the substances listed in the following table.

Table 3-10 Chemical Resistance of the MDS D100

Substance	Concentration
Saltwater	5 %
Sugared water	10%
Acetic acid, aqueous solution	5 %
Sodium carbonate, aqueous solution	5 %
Ethyl alcohol, aqueous solution	60 %
Ethylene glycol	50%
Fuel B	in accordance with ISO 1817
Human perspiration	

(reference: ISO 10373 / ISO 7810)

MDS D139

The housing of the heat-resistant MDS D139 data storage unit is made of polyphenylene sulfide (PPS). The chemical resistance of the data storage unit is excellent. We know of no solvent under 200 °C that will dissolve the plastic. A reduction in its mechanical properties can be observed in aqueous solutions of hydrochloric acid (HCl) and nitric acid (HNO_3) at 80 °C.

Resistance to all types of fuel, including methanol, is very good and worth emphasizing. The following table provides an overview of the chemicals examined.

Table 3-11 Chemical resistance of the MDS D139, which is made of polyphenylene sulfide

Substance	Test Conditions		Evaluation
	Time [Days]	Temperature [°C]	
Acetone	180	55	+
Butan-1-ol	180	80	+
Butan-2-one	180	60	+
Butyl acetate	180	80	+
Brake fluid	40	80	+
Calcium chloride (saturated)	40	80	+
Diesel fuel	180	80	+
Diethyl ether	40	23	+
Freon 113	40	23	+
Antifreezing agent	180	120	+
Kerosene	40	60	+
Methanol	180	60	+
Engine oil	40	80	+
Sodium chloride (saturated)	40	80	+
Sodium hydroxide (30%)	180	80	+
Sodium hypochlorite (5%)	30	80	/
	180	80	–
Sodium hydroxide solution (30%)	40	93	+
Nitric acid (10%)	40	23	+
Hydrochloric acid (10%)	40	80	–
Sulfuric acid (10%)	40	23	+
(10%)	40	80	/
(30%)	40	23	+
Test fuels:	40	80	+
(FAM-DIN 51 604-A)	180	80	/
Toluene			
1, 1, 1 trichloroethane	180	80	+
Xylene			
Zinc chloride (saturated)	180	80	/
	180	75	+
	180	80	+
	40	80	+

Evaluation:
+ Resistant, weight increase < 3 % or weight loss < 0.5 % and/or reduction in tear resistance < 15 %
/ Resistant with qualifications, weight increase 3 to 8 % or Weight loss 0.5 to 3 % and/or reduction in tear resistance 15 up to 30%
– Not resistant, weight increase > 8 % or Weight loss > 3 % and/or reduction in tear resistance > 30 %

MDS D124
MDS D160

The housing of the MDS D124/D160 is made of epoxy resin. The following table provides an overview of the chemical resistance.

Table 3-12 Chemical resistance of the MDS D124/D160 made of epoxy resin

	Concentration	20 °C	40 °C	60 °C
Formic acid	50%	■		
Ammonia, liquid, anhydrous		□		
Ethanol			■	■
Benzine, free from aromatic hydrocarbons/containing benzole		■		
Benzole, benzoic acid		■		
Borax				■
Boric acid		■		
Bromine, fluid, bromine water		□		
Butyric acid	100%	●		
Carbonates (ammonium, Na and similar.)				■
Chlorine, liquid		□		
Chlorobenzene		■		
Chloroform		□		
Chlorine water (saturated solution)		●		
Chromates (K, Na and similar)	Up to 50%		■	
Chromic acid	Up to 30%	□		
”Lemon acid”		■		
Cyanides (K, Na and similar)				■
Diethylene glycol				■
Dioxan		□		
Acetic acid	100%	●		
Fixing bath			■	
Fluorides (ammonium, K, Na and similar.)			■	
Hydrofluoric acid	Up to 40%	■		
Formaldehyde	50%	■		
Glycerol				■
Glycocoll				■
Urine, uric acid		■		
Hydroxides (Na and K)	40%	■		
Iodides (K, Na and similar)				■
Silicic acid				■
Methanol	100%		■	
Lactic acid	100%	●		
Mineral oils			■	
Nitrates (ammonium, K and similar)				■
Nitroglycerin		□		
Phosphates (ammonium, Na and similar)				■
Phosphoric acid	50%			■
Propyl alcohol		■		
Hydrochloric acid, nitric acid	10%	□		
Brine				□
Sulfur dioxide	100%	●		
Sulfuric acid	40%	□		
Soap solution				■
Sulfates (ammonium, Na and similar)				■
Sulfites (ammonium, Na and similar)				□

Table 3-12 Chemical resistance of the MDS D124/D160 made of epoxy resin

	Concentration	20 °C	40 °C	60 °C
Turpentine		■		
Trichlorethlylene		□		
Hydrogen peroxide	30%	■		
Tartaric acid		■		

Legend:

■	Resistant
●	Resistant with qualifications
□	No resistance

3.4 EMC Guidelines

3.4.1 Preface

These EMC guidelines give you information on the following topics.

- Why are the EMC guidelines necessary?
- What types of interference affect 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

This description is only meant for ”qualified personnel”:

- Project engineers and planners who are responsible for the plant configuration with the MOBY modules and have to adhere to the applicable guidelines
- Technicians and service engineers who have to install the connection cables based on this description or correct malfunctions covered by these guidelines

Warning

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

3.4.2 General

Increasing use of electrical and electronic devices creates the following situation.

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

The more automation, the greater the danger of the devices interfering with each other.

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.

- Internal interference immunity:
  Immunity to internal electrical interference
- External interference immunity:
  Immunity to outside electromagnetic interference
- Level of interference emission:
  Interference emission and effects of the electrical environment

All three areas must be considered when checking an electrical device.

The MOBY modules are tested for adherence to the limit values contained in the CE and BAPT guidelines. Since the MOBY modules are only part of a total system and sources of interference can be created just by combining different components, the setup of a plant must adhere to certain guidelines.

EMC measures usually comprise a whole package of measures which must all be taken to obtain an interference-immune plant.

Note

- The constructor of the plant is responsible for adherence to the EMC guidelines whereas the operator of the plant is responsible for radio interference suppression for the entire system.
- All measures taken while the plant is being set up prevent expensive modifications and removal of interference later on.
- Naturally, the country-specific rules and regulations must be adhered to. They are not part of this documentation.

3.4.3 Spreading of Interference

The following three components must be present before interference can occur in a plant.

- Source of interference
- Coupling path
- Potentially susceptible equipment

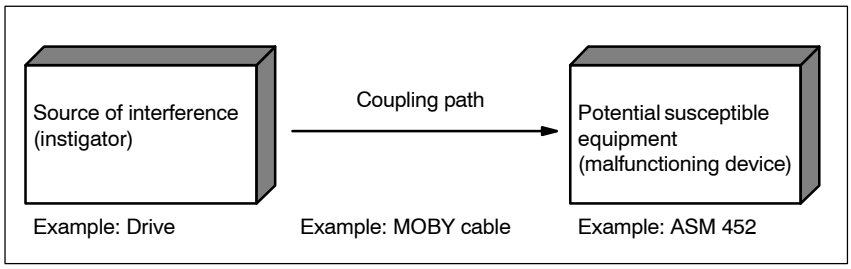


Figure 3-14 Spreading of interference

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

EMC measures affect all three components to prevent malfunctions caused by interference. When setting up a plant, the constructor must take all possible precautions to prevent the creation of interference.

- Only devices which meet limit value class A of VDE 0871 may be used in a plant.
- All interference-producing devices must be corrected. This includes all coils and windings.
- The cabinet must be designed to prevent mutual interference of the individual components or keep this as low as possible.
- Precautions must be taken to eliminate external interference.

The next few sections give you tips and hints on good plant setup.

Sources of interference

To obtain a high degree of electromagnetic compatibility and thus a plant with low interference, you must know the most frequent sources of interference. These sources of interference must then be removed.

Table 3-13 Sources of interference: origin and effect

Source of interference	Interference generator	Effect on susceptible equipment
Contactor, electronic valves	Contacts	Network interference
	Coils	Magnetic field
Electric motor	Collector	Electrical field
	Winding	Magnetic field
Electric welding device	Contacts	Electrical field
	Transformer	Magnetic field, network interference, equalizing current
Power pack, pulsed	Circuit	Electrical and magnetic field, network interference
High-frequency devices	Circuit	Electromagnetic field
Transmitter (e.g., plant radio)	Antenna	Electromagnetic field
Grounding or reference potential difference	Voltage difference	Equalizing current
Operator	Static charging	Electrical discharge current, electrical field
High-voltage cable	Current flow	Electrical and magnetic field, network interference
High-voltage cable	Voltage difference	Electrical field
Monitors	Circuit	Electromagnetic field
Faulty fluorescent lamps	Starters	System disturbance
Low-energy lamps	Circuit	Electromagnetic field
Computer, PC	Circuit	Electromagnetic field

Coupling paths

Before a source of interference can create actual interference, a coupling path is needed. There are four types of interference coupling.

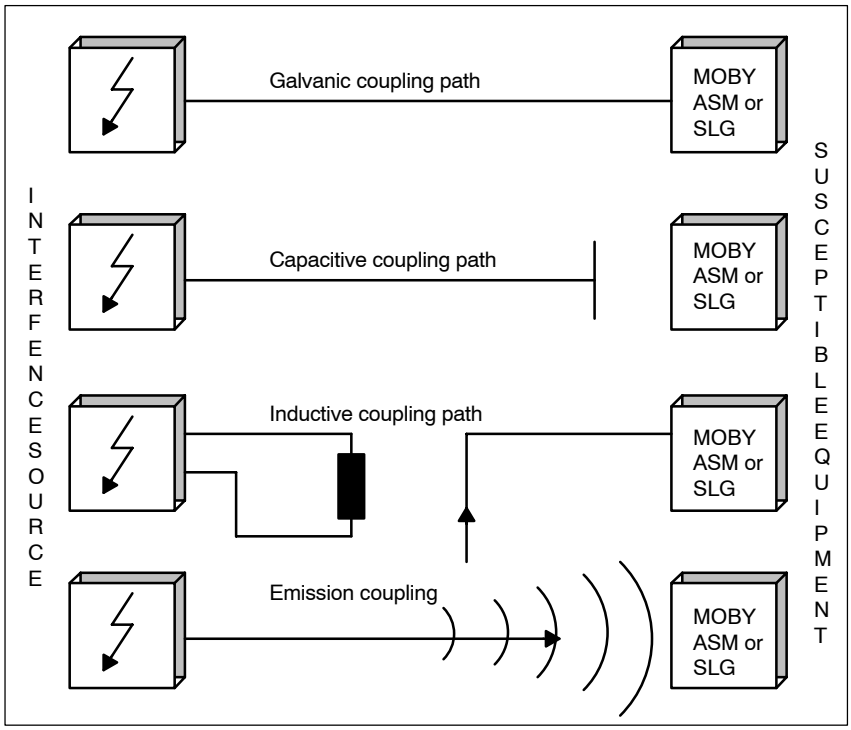


Figure 3-15 Possible interference coupling

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

Table 3-14 Causes of coupling paths

Coupling path	Caused by
Cables and lines	Wrong or poor installation
	Shield missing or connected incorrectly
	Poor location of the cables
Switching cabinet or SIMATIC housing	Equalizing line missing or incorrectly wired
	Grounding missing or faulty
	Unsuitable location
	Mounted modules not secure
	Poor cabinet layout

3.4.4 Cabinet Layout

User responsibility for the configuration of an interference-immune plant covers cabinet layout, cable installation, grounding connections and correct shielding of the cables.

Note

Information on EMC-proof cabinet layout can be taken from the setup guidelines of the SIMATIC controller.

Shielding by housing

Magnetic and electrical fields as well as electromagnetic waves can be kept away from susceptible equipment by providing a metallic housing. The better induced interference current is able to flow, the weaker the interference field becomes. For this reason all housing plates or plates in the cabinet must be connected with each other and good conductivity ensured.

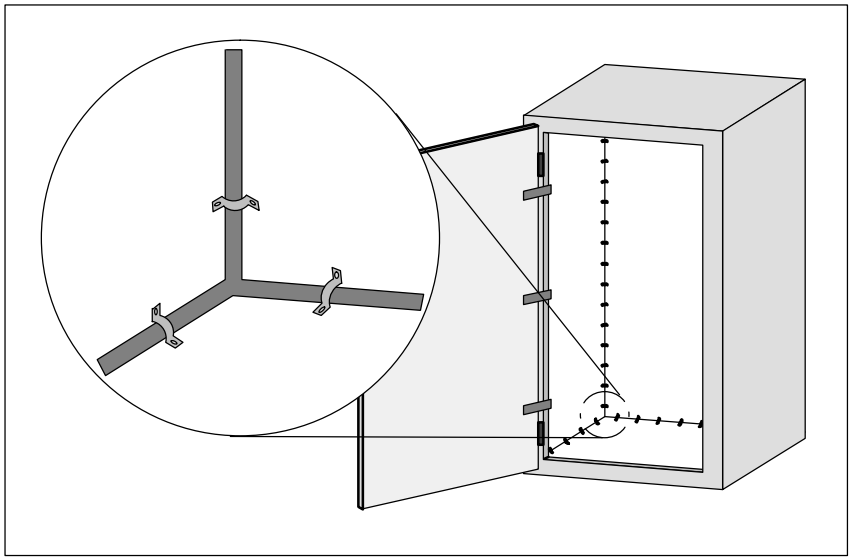


Figure 3-16 Shielding by the housing

When the plates of the switching cabinet are insulated against each other, this may create a high-frequency-conducting connection with ribbon cables and high-frequency terminals or RF conductive paste. The greater the connection surface, the better the high-frequency conductive capacity. Connection of simple wires cannot handle this task.

Avoidance of interference with optimized layout

Installation of SIMATIC controllers on conductive mounting plates (not painted) is a good way to get rid of interference. Adhering to the guidelines when laying out the switching cabinet is a simple way to avoid interference. Power components (transformers, drives, load power packs) should not be located in the same room with controller components (relay control parts, SIMATIC).

The following principles apply.

1. The effects of interference decrease the greater the distance between source of interference and susceptible equipment.
2. Interference can be decreased even more by installing shielding plates.
3. Power lines and high-voltage cables must be installed separately at least 10 cm away from signal lines.

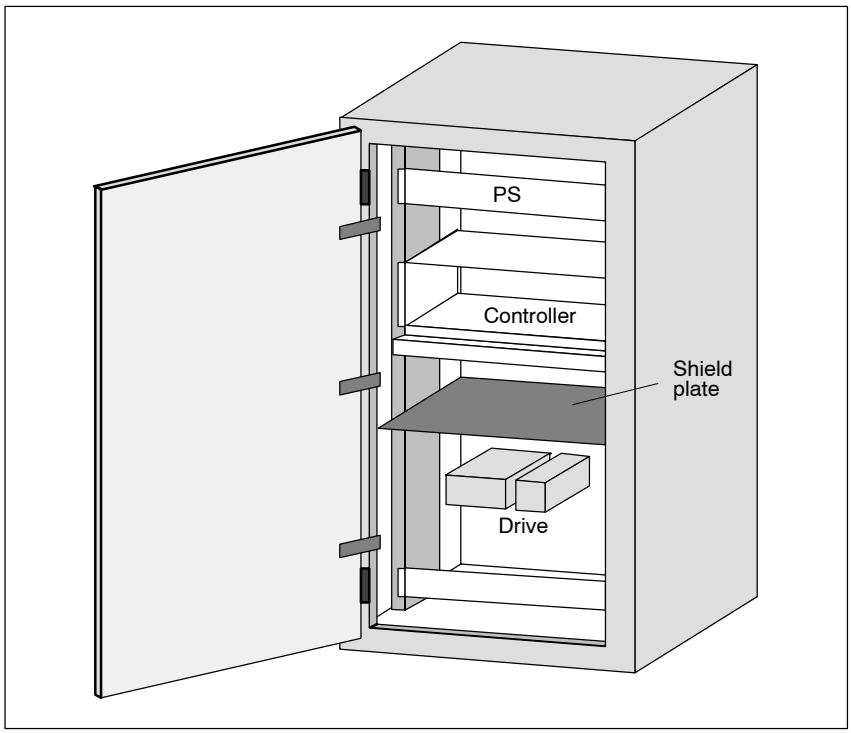


Figure 3-17 Avoidance of interference with optimal layout

Filtering the voltage

Power filters can be used to combat external interference over the power network. In addition to correct dimensioning, proper installation is very important. It is essential that the power filter be mounted directly on the cabinet leadin. This keeps interference current from entering the cabinet by filtering it out from the beginning.

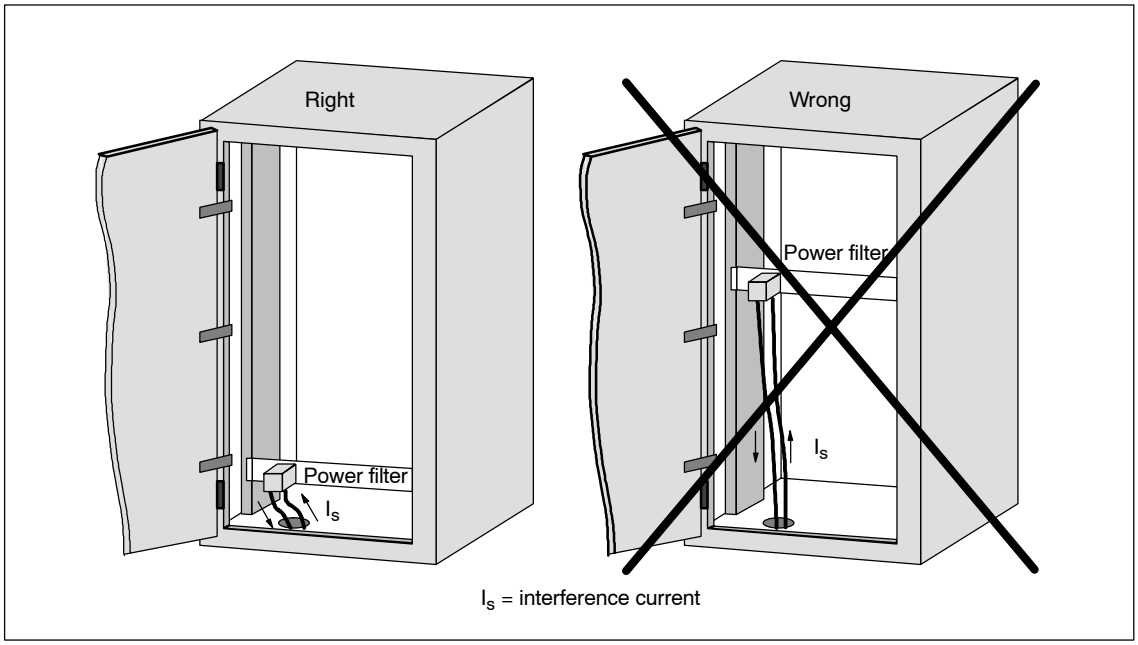


Figure 3-18 Filtering the voltage

3.4.5 Avoiding Sources of Interference

Inclusion of interference sources in a plant must be avoided to achieve a higher degree of interference immunity. All switched inductivity is frequently a source of interference in plants.

Suppression of inductivity

Relays, contactors, etc. generate interference voltages which must be suppressed with one of the following circuits.

24 V coils create up to 800 V even with small relays and 220 V coils generate interference voltages of several kV when the coil is switched. Free wheeling diodes or RC circuits can be used to prevent interference voltage and thus also inductivity in lines which must be installed parallel to the coil line.

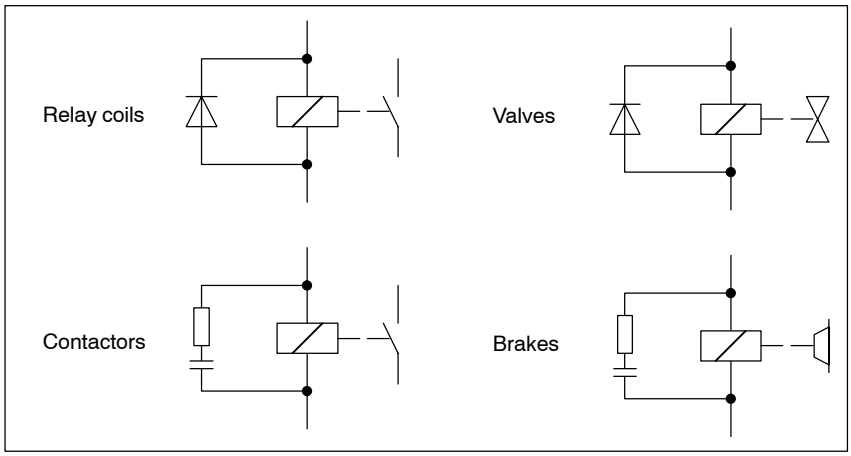


Figure 3-19 Suppression of inductivity

Note

All coils in the cabinet must be interference-suppressed. Don't forget the valves and motor brakes. A special check must be made for neon lamps in the switching cabinet.

3.4.6 Equipotential Bonding

Differences in potential may be created between the parts of the plant by differing layout of plant parts and differing voltage levels. When the parts of the plant are connected with signal lines, equalizing currents flow over the signal lines. These equalizing currents may distort the signals.

This makes it very important to provide correct equipotential bonding.

- The cross section of the equipotential bonding line must be large enough (at least 10 mm^2).
- The distance between signal cable and equipotential bonding line must be as short as possible (effects of antenna).
- A fine-wire line must be used (better high-frequency conductivity).
- When the equipotential bonding lines are connected to the central equipotential bonding rail, power components and non-power components must be combined.

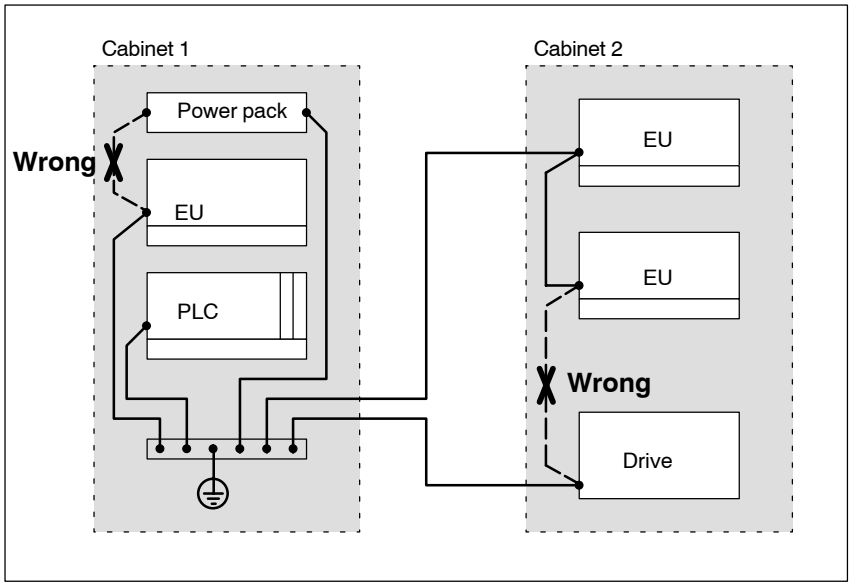


Figure 3-20 Equipotential bonding

The better the equipotential bonding in a plant, the less interference is created by potential fluctuations.

Don't confuse equipotential bonding with the protective ground of a plant. Protective ground prevents the creation of high touch voltages on defective devices.

3.4.7 Ground Fault Monitoring with MOBY

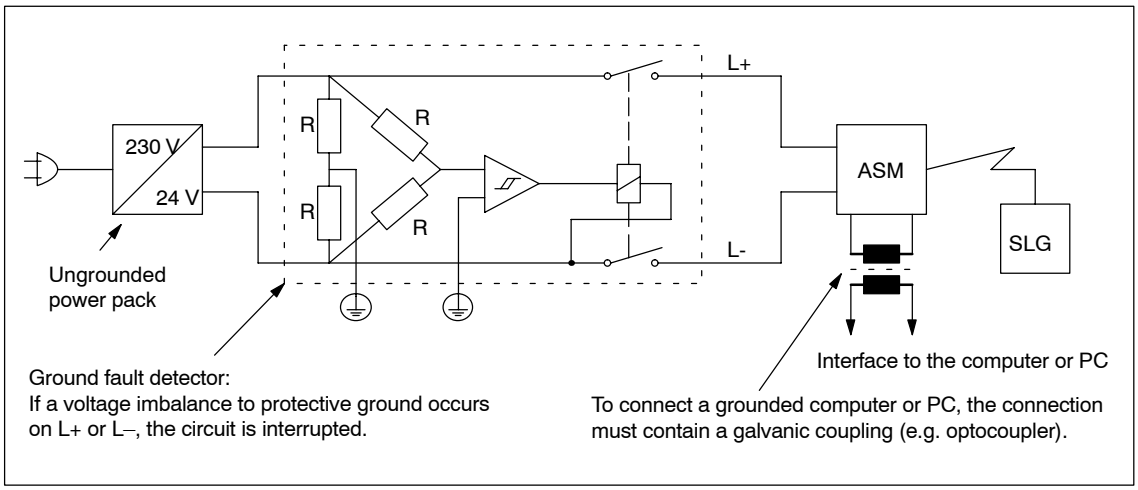


Figure 3-21 Circuit diagram of the principle of ground fault monitoring

3.4.8 Shielding the Cables

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

The best shielding is achieved by installation in steel tubing. However, this is only required when the signal line has to be led through high interference. Use of cables with braided shields is usually sufficient. In both cases, correct connection is decisive for shielding.

Note

A shield which is not connected or is not connected correctly is not a shield.

The following 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.

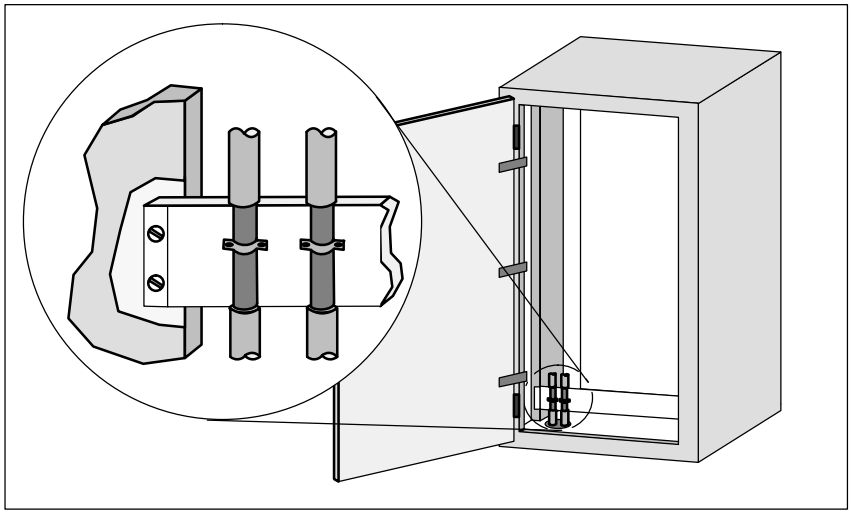


Figure 3-22 Shielding the cables

The shield bar must be connected (over a large surface for good conductivity) to the switching cabinet housing. It must be located as close as possible to the cable leadin. The cables are bared and then clamped to the shield bar (high-frequency clamps) or bound with cable binders. Make sure that the connection is very conductive.

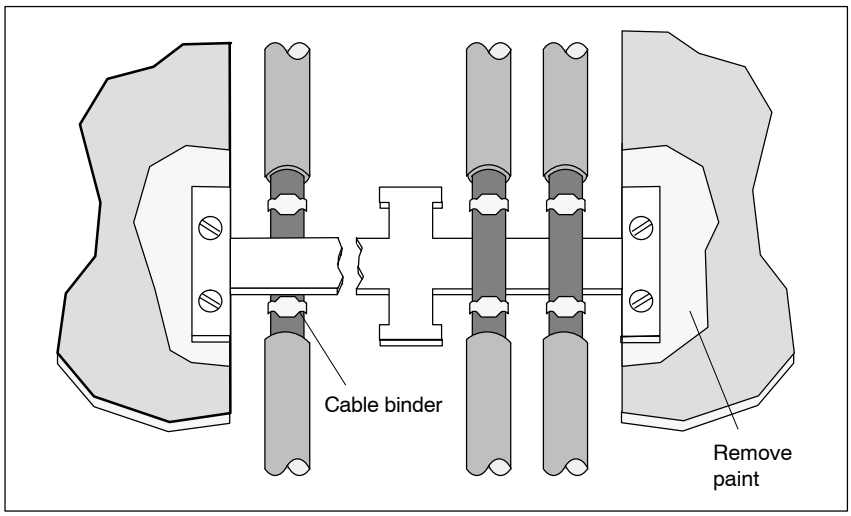


Figure 3-23 Connecting the shield bar

The shield bar must be connected with the PE bar.

If shielded cables have to be interrupted, the shield must be continued on the plug case. Only suitable plug connectors may be used.

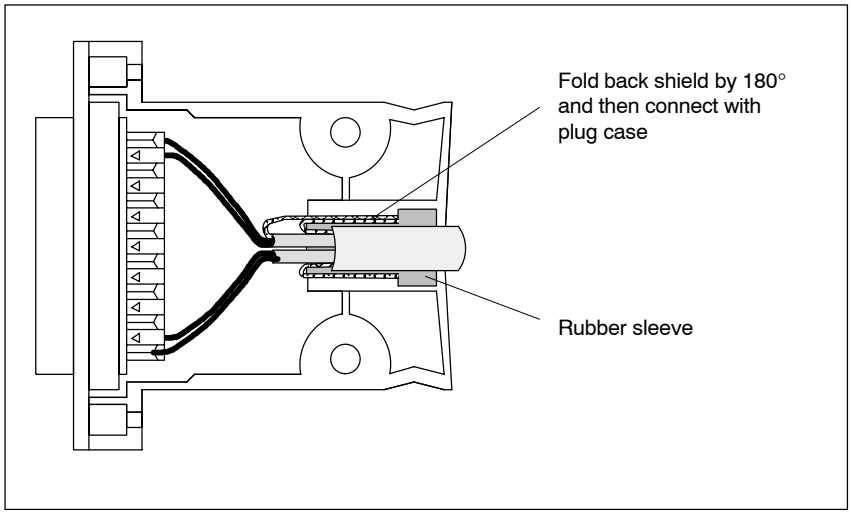


Figure 3-24 Interruption of shielded cables

If intermediate plug connectors which have no shield connection are used, the shield must be continued with cable clamps at the point of interruption. This gives you a large-surface, RF conductive connection.

3.4.9 Basic EMC Rules

Often the adherence to a few elementary rules is sufficient to ensure electromagnetic compatibility (EMC). The following rules should be observed when setting up the switching cabinet.

Shielding by the housing

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

Surface-shaped grounding connection

- Connect all inactive metallic parts over a large surface with low ohmic RF.
- Make a large-surface connection between the inactive metallic parts and the central grounding point.
- Don’t forget to include the shield bar in the grounding concept. This means that the shield bar itself must be connected over a large surface with ground.
- Do not use aluminum parts for grounding connections.

Planning the cable installation

- Divide the cables into groups and install the groups separately.
- Always install high-voltage cables and signal lines in separate ducts or bundles.
- Always have the entire cabling enter the cabinet on only one side and at only one level.
- Install the signal lines as close as possible to grounding surfaces.
- Twist the ”to” and ”from” conductors of individual cables in pairs.

Shielding the cables

- Shield the data transmission cables 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 cable shields over a large surface on the cabinet leadin on the shield bar and affix these with clamps.
- Continue the applied shield without interruption up to the module.
- Use braided shields and not foil shields.

Power and signal filters

- Only use power supply filters with metal housings.
- Connect the filter housing (over a large surface and with low ohmic RF) to cabinet ground.
- Never secure the filter housing on painted surfaces.
- Secure the filter on the cabinet's entry point or in the direction of the source of interference.

3.5 MOBY Shielding Concept

With MOBY the data are transferred between ASM and SLG via an RS 422 interface at different transmission rates. The distance between ASM and SLG can be up to 1000 m. With respect to cabling, MOBY should be handled like a data processing system. Special attention should be paid to shield installation for all data cables. The following figures shows the primary factors needed for a reliable setup.

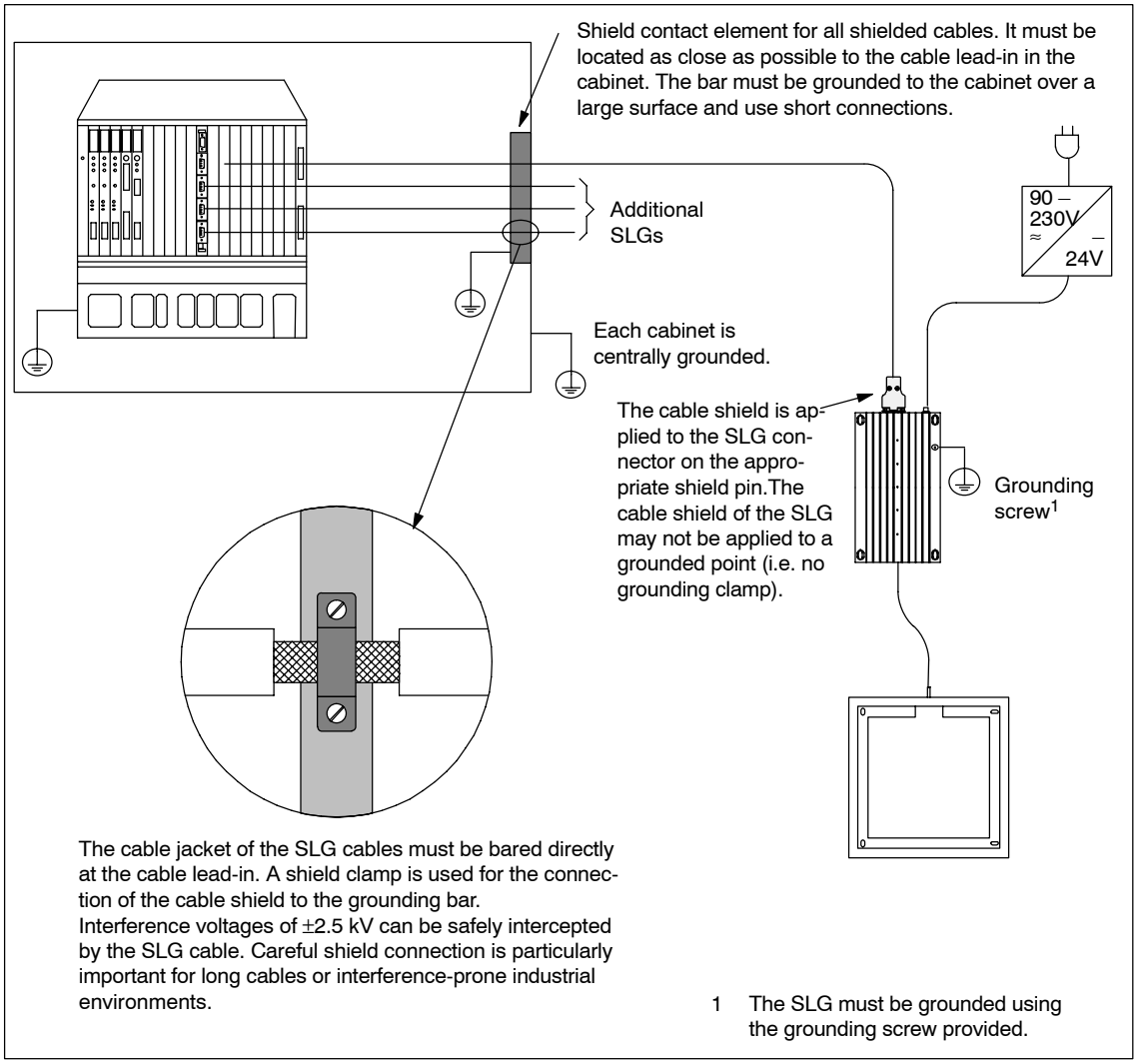


Figure 3-25 Shielding principle

Connection of other modules

To divert interference that can occur on the connecting cable to the SLG, proceed as shown in Figure 3-25.

Layout of an S7-300 with MOBY

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

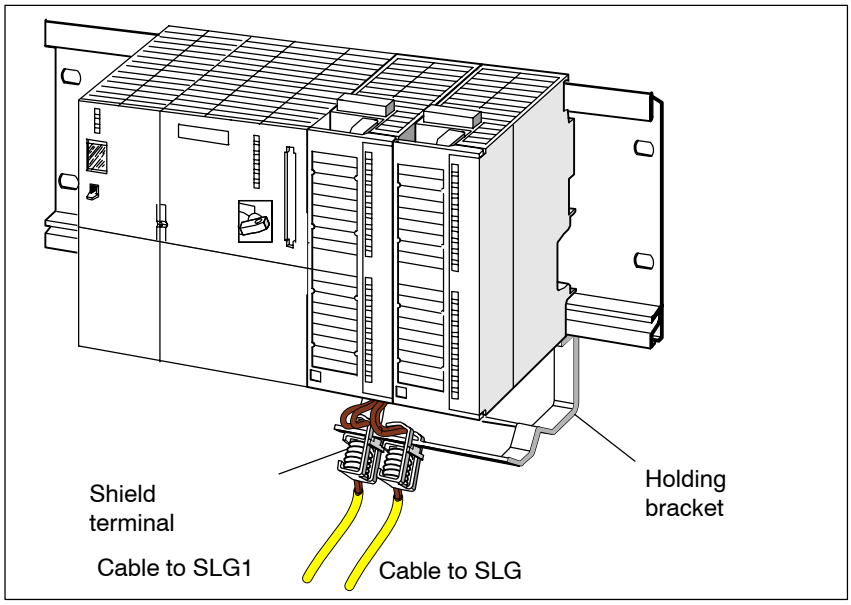


Figure 3-26 Layout of the ASM 475 with shield connecting element

Cabling for the ASM 475

To ensure EMC, an S7-300 shield contact element must be used for the SLG cable (see Figure 3-26). The shield of the SLG cable must be bared as shown in Figure 3-27.

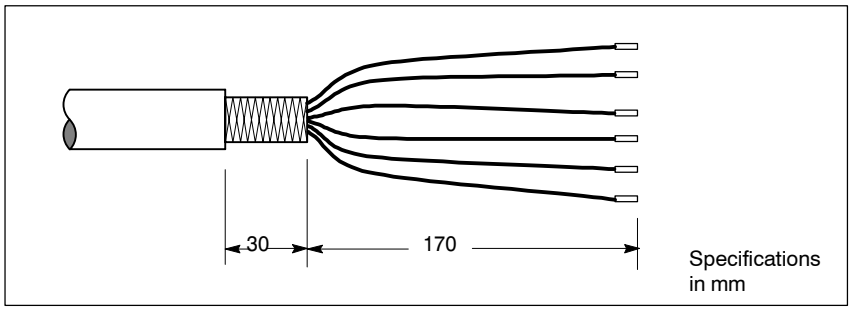


Figure 3-27 Baring of the cable shield

3.6 Cable and Connector Allocation

The cable jacket of standard SLG data cables used with MOBY is made of polyurethane (i.e. PUR in accordance with VDE 0250). This gives the cables very good resistance to oil, acid, lye and hydraulic fluid.

3.6.1 Cable Configuration

The cable between PC and SLG has three cores plus shield.
Regardless of the wire diameter, data can usually be transmitted up to a distance of 32 m.

Standard LiYC11Y cable recommended by Siemens (refer to Section 3.6.4 for information on standard cables).

Grounding of the SLG cable

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

Drum cable

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

Power supply SLG D1x

The power supply of the SLG D1x is connected by a 4-pin M12 connector.

Remember the voltage drop on the supply cable.

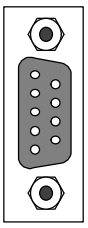
The permissible cable length of the supply voltage cable depends on the current consumption of the SLG and the ohmic resistance of the connecting cable.

Table 3-15 SLG D1x power supply

	SLG D10/SLG D10S	SLG D11/SLG D11S SLG D12/SLG D12S
Nominal value	24 VDC	24 VDC
Permissible range	24 V DC ±5 % (measured at the SLG connector)	20 to 30 V (measured at the connector of the SLG)
Current consumption		
Starting current Operation at 24 V	2.8 A/50 ms 0.9 A	0.6 A 0.15 A

3.6.2 Connector Pin Assignment of the SLG D1x (RS 232)

Serial interface



Pin on casing side (9-pin subminiature D connector with screw-type attachment)	**Name** **SLG D10/D11/D12 (RS 232)**
1	Cable shield
2	TxD (send)
3	RxD (receive)
4	Free
5	Ground (0 V)
6	Free
7	Free
8	Cable shield
9	Free
Housing	Free

Caution

When metallized subminiature D casings are used on the SLG side, the case must be connected to the cable shield.

Table 3-16 Ordering data for the mating connector for the SLG D1x

	Order No.
Mating connector IP65 for SLG D1x 9-pin submin D connector, socket	6GT2 490-1AA00

Voltage supply

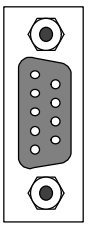
Pin on casing side 4-pin M12	**Name** **SLG D1x**
1	Ground (0 V)
2	+ 24 V
3	+ 24 V
4	Ground (0 V)

Table 3-17 Ordering data for the mating connector for the power supply

	Order No.
Mating connector for the power supply for the SLG D1x 4-pin M12 connector, socket	6GT2 390-1AB00

3.6.3 SLG D1xS Connector Pin Assignment (RS 422)

Serial interface



Pin on casing side (9-pin subminiature D connector with screw-type attachment)	**Name** **SLG D1xS (RS 422)**
1	Cable shield
2	+ Receive
3	+ Send
4	Free
5	– Sending
6	– Receive
7	Ground (0 V)
8	Cable shield
9	Free
Housing	Free

Caution

When metallized subminiature D casings are used on the SLG side, the case must be connected to the cable shield.

Table 3-18 Ordering data for the mating connector for the SLG D1xS

	Order No.
Mating connector IP65 for SLG D1x 9-pin subminiature D connector, socket	6GT2 490-1AA00

Voltage supply

Pin on casing side 4-pin M12	**Name** **SLG D1xS**
1	Ground (0 V)
2	+ 24 V
3	+ 24 V
4	Ground (0 V)

Table 3-19 Ordering data for the mating connector for the power supply

	Order No.
Mating connector for the power supply for the SLG D1x 4-pin M12 connector, socket	6GT2 390-1AB00

3.6.4 Connecting Cables

**24 V connecting cable
for the SLG D1x/D1xS
↔ MOBY wide-range
power pack
6GT2 491-1HH50**

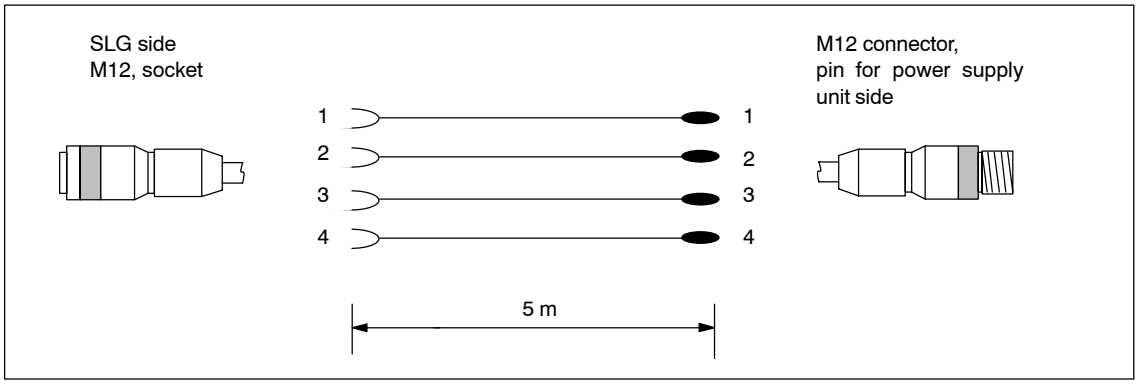


Figure 3-28 24 VDC connecting cable for the SLG D1x/D1xS and MOBY wide-range power pack (6GT2 494-0AA00)

**Cable for the SLG
D1x ↔ PC/RS 232
6GT2 691-0BH50
6GT2 691-0BN20**

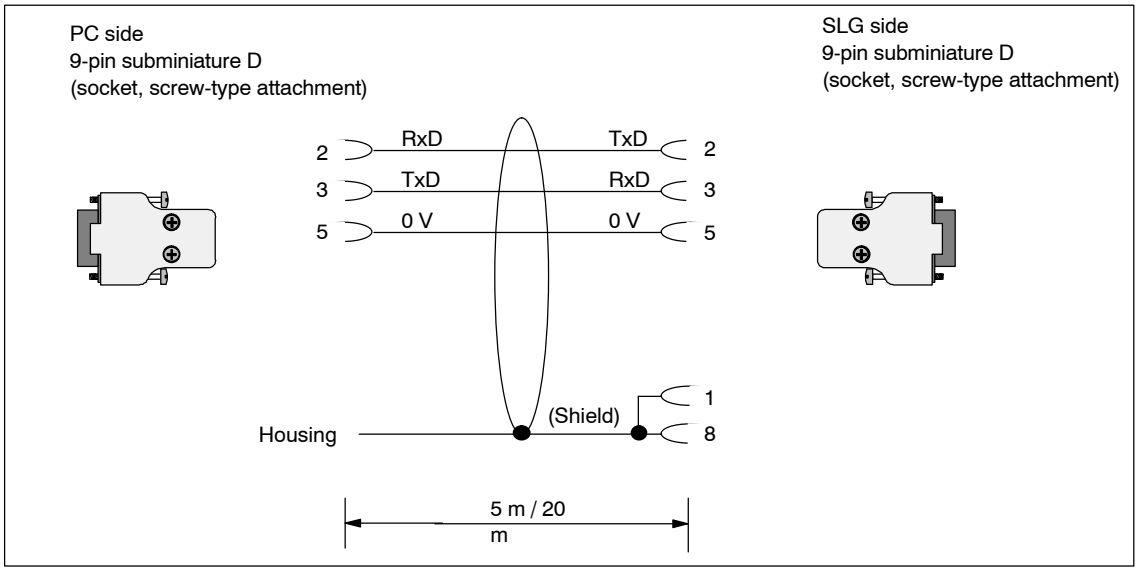


Figure 3-29 Connecting cable RS 232 PC ↔ SLG D1x

Connecting cable SLG D1xS ↔ ASM 452/473 6GT2 491-1CH20 6GT2 491-1CH50 6GT2 491-1CN20

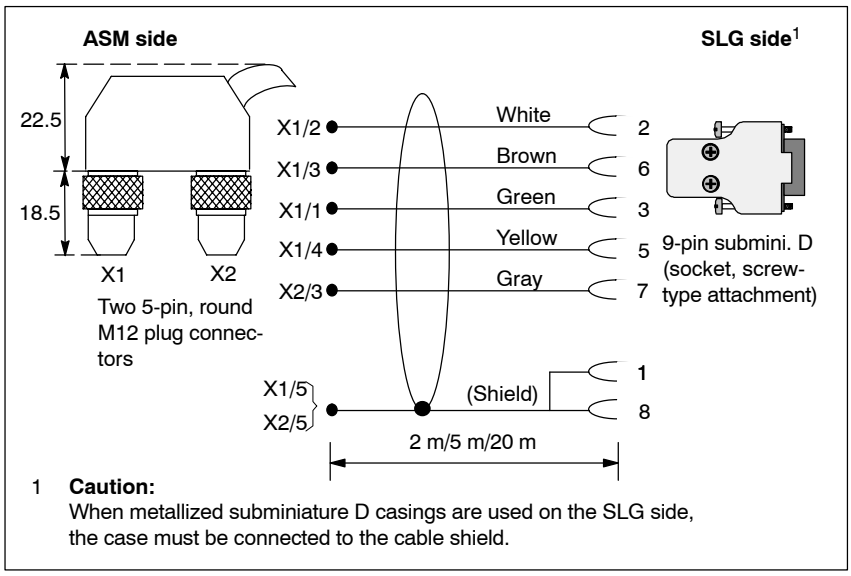


Figure 3-30 Connecting cable SLG D1xS ↔ ASM 452/473

Connecting cable SLG D1xS ↔ ASM 475 6GT2 491-0EH50 6GT2 491-0EN20 6GT2 491-0EN50

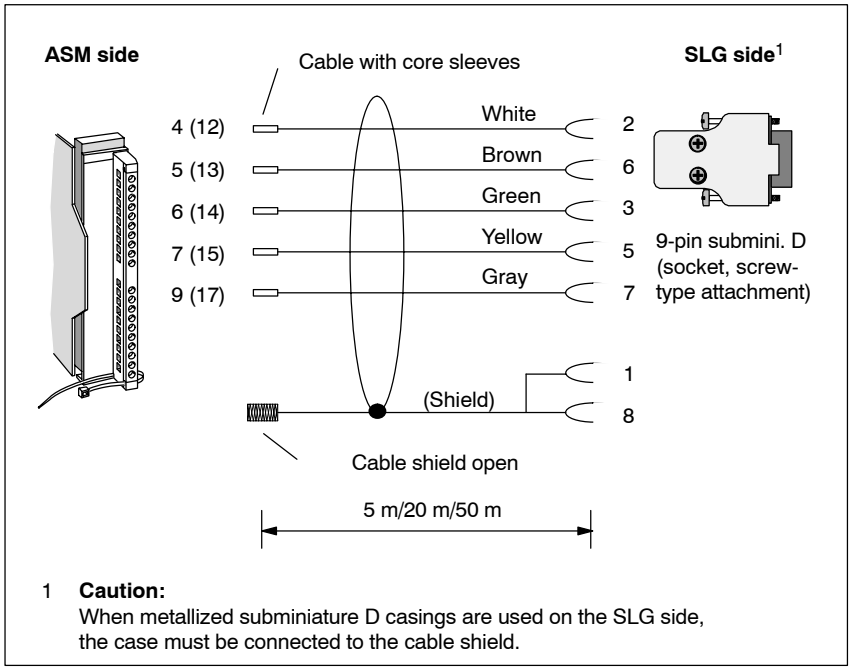


Figure 3-31 Connecting cable SLG D1xS ↔ ASM 475

4 Mobile Data Memories

4.1 Introduction

Application area

MOBY identification systems ensure automatic, rapid and reliable identification. The relevant information accompanies the product throughout the entire logistical and transportation flow. Data can be stored contact-free in the MDS on the unit to be identified and and updated or read out contact-free at any point in the material flow process. Different MDS formats permit the appropriate MDS to be selected for each application. The robust construction of the transponders permits them to be used in hostile environments at high temperatures and makes the MDS resistant to many chemical substances.

Design and functions

The mobile data storage units (MDSs) essentially consist of a logic component, an antenna, and EEPROM. When an MDS moves into the transmission field of the read-write device (SLG), 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 the MDS

MDS type	Memory size	Temperature range (during operation)	Measurements (L x W x H in mm)	Degree of protection
MDS D100	128 bytes EEPROM/large 112 net byte capacity	–25 to +60 °C	85 x 54 x 0.8	IP68
MDS D124	128 bytes EEPROM/gross 112 net byte capacity	–25 to +125 °C	∅ 27 x 4	IP67
MDS D139	64 bytes EEPROM/gross 44 net byte capacity	– 25 to + 100 °C + 200 °C for 4000 hours	∅ 85 x 15	IP68
MDS D160	64 bytes EEPROM/gross 44 net byte capacity	– 25 to + 85 °C	∅ 16 x 3	IP68

Definition of IP67:
- Protection against penetration of dust (i.e. dust-proof)
- Full protection against touch
- Protection against water under specific pressure and time conditions

Definition of IP68:
- Protection against penetration of dust (i.e. dust-proof)
- Full protection against touch
- The MDS can be continuously submerged in water. Ask manufacturer for conditions.

Operational requirements/ environmental requirements

Table 4-2 Operational requirements/environmental requirements of MDS

	MDS D100	MDS D124/MDS D139/ MDS D160
Proof of mechanical stability is provided by a vibration test in accordance with:	ISO 7810, ISO 10373	EN 60721-3-7, Class 7M3
Test conditions		
• Frequency range		2 to 500 Hz
• Amplitude of the displacement		7.5 mm (2 to 26 Hz)
• Acceleration		20 g (26 to 500 Hz)
• Test duration per axis		20 frequency cycles
• Speed of passage		1 octave/min.
Proof of mechanical stability is provided by a continuous shock test in accordance with:		EN 60721-3-7, Class 7M3
Test conditions		
Acceleration		100 g
Duration		6 ms
Test duration per axis		500 impacts per axis
Mechanical stability		
Isostatic pressure		300 bar for 5 min*
Axial pressure		1000 N for 10 s*
Radial pressure		1000 N for 10 s*
Torsion and bending stress	in accordance with ISO 10373/ ISO 7816-1	Not permitted
Protection rating in accordance with EN 60529	IP68	IP67/IP68
Ambient temperature		
in operation	–25 °C to +60 °C	–25 °C to +125/+200/+160 °C
in transit and storage	–25 °C to +60 °C	–40/–40/–25 °C to +150/+100/+85 °C

* Values only for MDS D160

Warning

The values for shock and vibration are maximum values and must not be reached on a continuous basis.

Memory division of the MDS D100 and MDS D124

Memory division for ISO 15693 transponders PC applications

The MDS D100 and MDS D124 are based on I-Code SLI technology and have 128 bytes of EEPROM, divided in 32 blocks. A block on the transponder is the smallest addressable memory area and is subdivided into areas 4 bytes in length for access.

The exception is the serial number of 8 bytes, which is only readable with the Inventory command.
Blocks –1 to –2 are configuration blocks and are only adressable by means of special ISO commands.
As of block 0 to 27 there are 112 bytes of user memory available to the user.

Note

There is a detailed description of the addresses in the MOBY D MDWAPI programming guide.

Table 4-3 MDS D100 and MDS D124 memory organization

ASM addressing (decimal)	I-CODE SLI-Block	Contents	Description	Remarks
–16	–4 ... –3	UID No.	Serial number (8 bytes)	Read only
– –	–2 –1	Configuration Configuration	AFI/DSFID Write-protection for user memory	read/write “read only” can only be set **once**
0 : : : 111	0 1 : : : 26 27	User	User memory	Read/write ”Read only” can be set

Memory division of the MDS D139 and MDS D160

Memory division for PC applications

The MDS D139 and MDS D160 are based on I-Code 1-technology and have 64 bytes of EEPROM, divided in 14 blocks. A block on the transponder is the smallest addressable memory area and is subdivided into areas 4 bytes in length for access.

The exception is the serial number of 8 bytes, which is only readable and exists in blocks 0 to 1.
Blocks 2 to 4 are configuration blocks.
As of block 5 to 15 there are 44 bytes of user memory available to the user.

Note

There is a detailed description of the addresses in the MOBY D MDWAPI programming guide.

ASM addressing

MOBY interface modules, which communicate with the MDS via an SLG (e.g. ASM 452, ASM 473, and ASM 475), only access the user memory via addresses. Data organization in the case of SIMATIC S7 and PROFIBUS-DPV1 is bytewise address-oriented. The block structure does not occur for the ASM user. The MDS can be processed linearly from address 0 to the end address. You can obtain the assignment of the ASM addressing to the block structure of the MDS from the table below.
The 8-byte serial number can be read as of address 16.

Table 4-4 MDS D139 and MDS D160 memory organization

ASM addressing (decimal)	I-Code1-Block	Contents	Description	Remarks
–16	0...1	UID No.	Serial number (8 bytes)	Read only
(no access with ASM)	2	Configuration	Conditions for write access	Read/write ”Read only” can be set
	3		Special functions (EAS, QUIET bit)	
	4		Family code/ application code	
0	5	User	User memory	Read/write (”Read only” can be set with SLG D1x RS 232)
	6			
	7			
	8			
:	9			
:	10			
:	11			
	12			
	13			
	14			
43	15			

Note

If data are written to a transponder, it must be ensured that the transponder remains entirely within the antenna field during the whole time.

4.2 MDS D100

Application area

The mobile data memory MDS D100 is a passive, maintenance-free transponder based on the ISO Standard 15693 with I-Code technology.
The application areas range from simple identification (e.g. to replace or complement barcodes)
to storage and distribution logistics and product identification.

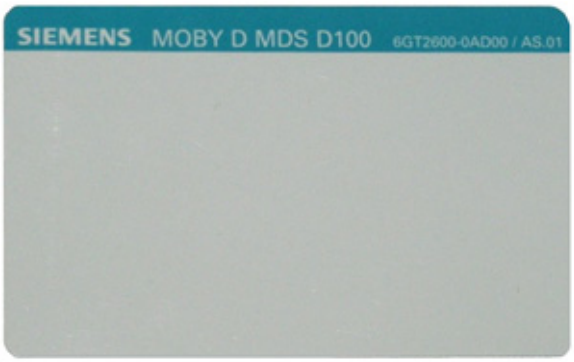


Figure 4-1 MDS D100

Ordering data

Table 4-5 Ordering data MDS D100

	Order No.
Mobile data memory card MDS D100 ISO CARD, 112 bytes EEPROM	6GT2 600-0AD00

Technical Data

Table 4-6 MDS D100 Technical Data

Memory Size	128 bytes
Memory configuration Serial Number Configurable Memory AFI/DSFID Application Memory	 8 bytes (hardcode) 6 bytes 2 bytes 112 bytes
Memory technology	EEPROM
Memory organization	See table 4-3
Protocol	in accordance with ISO 15693
Data retention (at +40 °C)	10 years
MTBF (at +40 °C)	2 x 10^6 hours
Read cycles Write cycles avg. Write cycles min.	Unlimited 200 000 100 000
Write/read distance (S_g)	See field data

Table 4-6 MDS D100 Technical Data

Recommended distance from metal	25 mm (approx. 30 % reduction of field data)
Multitag-capable	Yes
Power supply	Inductive power transmission (without battery)
Protection rating in accordance with EN 60529 Vibration Torsion and bending stress	IP68 ISO 10373/ISO 7810 ISO 10373/ISO 7816-1
Physical layout Color Material Measurements (L x B x H) in mm Mounting	laminated plastic card printable on both sides white/petrol PVC 85.6 x 54 x 0.76 Bonding, mounting bag
Ambient temperature in operation in transit and storage	 –25 °C to +60 °C –25 °C to +60 °C
Weight, approx.	5 g

Field data

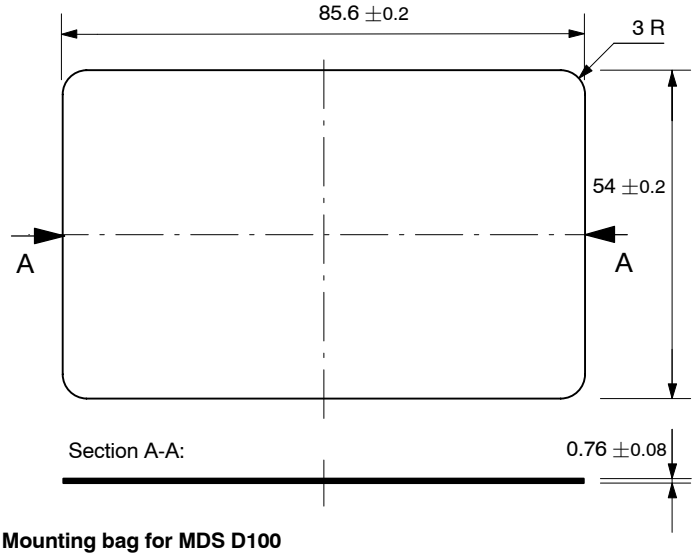
Table 4-7 Field data MDS D100

	SLG D 10/D10S ANT D5	**SLG D11/D11S ANT D5**	**SLG D12/ SLG D12S**
Working distance (S_a)	0 to 350 mm	0 to 220 mm	0 to 100 mm
Limit distance (S_g)	400 mm	280 mm	140 mm
Transmission window (L)	∅ 300 mm	∅ 300 mm	120 mm
Transmission window (B)	120 mm	120 mm	48 mm
Minimum distance from MDS to MDS	≥ 1 m	≥ 1 m	≥ 0.5 m

Measurements (in mm)

Dimensions

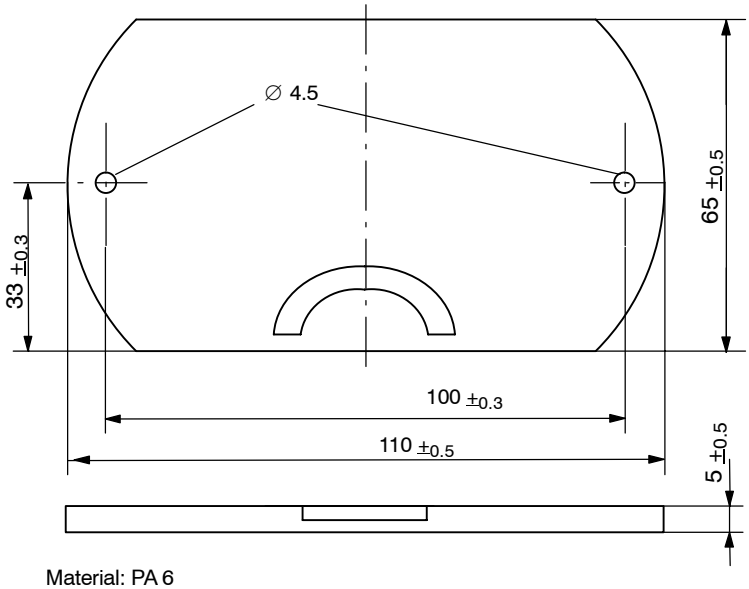
MDS D100



Mounting bag for MDS D100

Mounting bag is fastened by means of countersunk M4 screws in the provided holes to a non-metallic sub-surface.

Note!
The mounting bag depicted, with the order no.: 6GT2 390-0AA00, is not suitable for the spacer from Figure 4-3 (6GT2 190-0AA00).



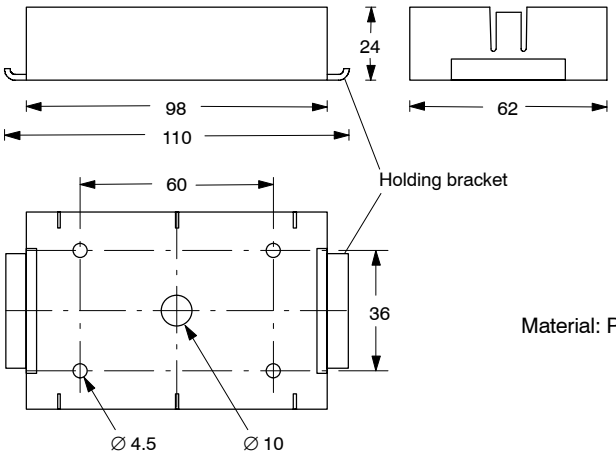
Material: PA 6

Note!
When mounting the MDS D100 on metal, the use of
fastening bag 6GT2 190-0AB00 is also possible; however, only together with the spacer 6GT2 190-0AA00 (for dimensions see Figure 4-3).

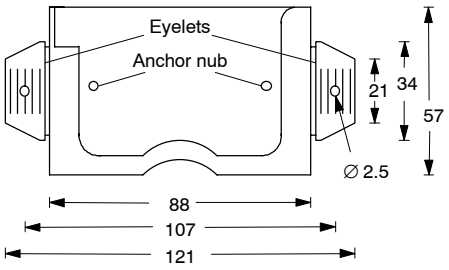
Figure 4-2 MDS D100 and associated mounting bag

Dimensions

Spacer: 6GT2 190-0AA00



Mounting bag: 6GT2 190-0AB00

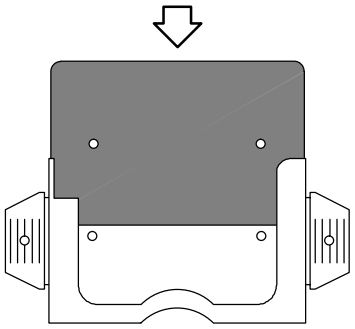


Material: PA 6

The spacer can be mounted directly on metal. Taken together with the fastening bag, a metal-free distance of 20 mm from the MDS to metal is provided.

Mounting:
- with 2 or 4 screws (M4)
- with rubber bands on the retainers (e.g. at the grid boxes)
- with cable ties on the retainers (e.g. at the grid boxes)

MDS with mounting bag

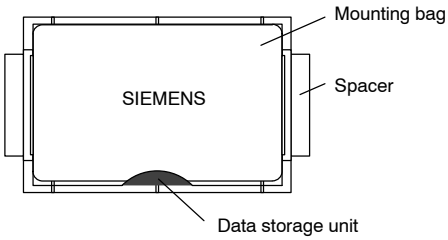


The MDS is then pushed inside the mounting bag. The locking occurs by means of the anchor nub of the mounting bag.

The mounting bag is mounted by the eyelets to a non-metallic sub-surface. This can be done with:
- screws in the provided holes
- rivets in the provided holes
- nails in the provided holes
- tacks through the eyelet plastic
- Place inside the spacers

The eyelets can also now be bent 90°.

MDS with mounting bag and spacer (assembled)



Assembly:
The MDS is put inside the mounting bag. Finally, the eyelets are bent 90° and in pushed inside the spacers. The mounting bag must be oriented in such a way that the MDS is covered (see Figure). The locking occurs automatically.

Figure 4-3 Spacer and mounting bag dimensions for MDS D100 (see note in Figure 4-2 for MDS D100 application)

Metal-free space

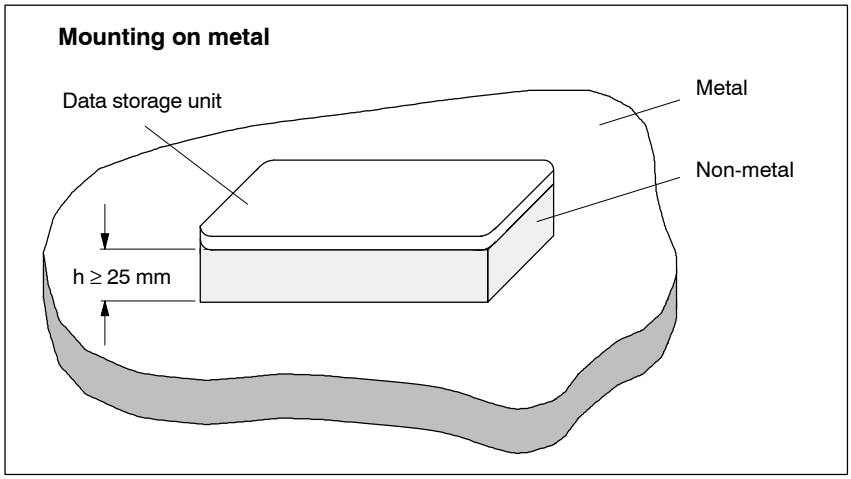


Figure 4-4 Metal-free space, MDS D100

Note

If the guide values (h) are violated, this results in a considerable reduction in the field data.

4.3 MDS D124

Application area

The MDS D124 is a passive, maintenance-free transponder based on the ISO Standard 15693 with I-Code technology. It was conceived of for application areas in the production and distribution logistics, as well as for product identification.
These mobile data memories can also be used without difficulty in harsh environments under extreme environmental conditions (e.g. at higher temperature levels).

Figure 4-5 MDS D124

Ordering data

Table 4-8 Ordering data MDS D124

	Order No.
Mobile Data Memory MDS D124 Button, 112 byte EEPROM application memory	6GT2 600-0AC00

Technical Data

Table 4-9 MDS D124 Technical Data

Memory Size	128 bytes
Memory configuration Serial number Configurable memory AFI/DSFID Application memory	 8 byte (hardcode) 6 byte 2 byte 112 byte
Memory technology	EEPROM
Memory organization	See table 4-3
Protocol	in accordance with ISO 15693
Data retention (at +40 °C)	10 years
MTBF (at +40 °C)	≥ 1.5 x 10^6 hours
Data transmission speed Read Write	 approx. 3.5 ms/byte approx. 9.5 ms/byte

Table 4-9 MDS D124 Technical Data

Read cycles Write cycles avg. Write cycles min.	Unlimited 1 000 000 200 000
Write/read distance (S_g)	See field data
Recommended distance from metal	25 mm (see Chapter 3.3.2)
Multitag-capable	Yes
Anti-collision speed	Approx. 20 labels/s identifiable in parallel
Power supply	Inductive power transmission (without battery)
Protection rating in accordance with EN 60529 Shock in accordance with EN 60721-3-7 Class 7M3 Total shock response spectrum Type II Vibration in accordance with EN 60721-3-7 Class 7M3 Torsion and bending stress	IP67 100 g 20 g Not permitted
Housing dimensions (D x H) in mm Color Material Mounting	27 x 4 Black Epoxy resin Glue, screw M3
Torque at +20 °C	≤ 1 Nm (at higher temperatures the expansion coefficients of the materials used must be considered)
Ambient temperature in operation in transit and storage	 –25 °C to +125 °C –40 °C to +150 °C
Weight, approx.	5 g

Field data

Table 4-10 Field data MDS D124

	SLG D 10/D10S ANT D5	**SLG D11/D11S ANT D5**	**SLG D12/ SLG D12S**
Working distance (S_a)	0 to 130 mm	0 to 70 mm	0 to 50 mm
Limit distance (S_g)	180 mm	110 mm	70 mm
Transmission window (L)	∅ 260 mm	∅ 250 mm	100 mm
Transmission window (B)	104 mm	100 mm	40 mm
Minimum distance from MDS to MDS	≥ 0.8 m	≥ 0.8 m	≥ 0.3 m

Dimension (in mm)

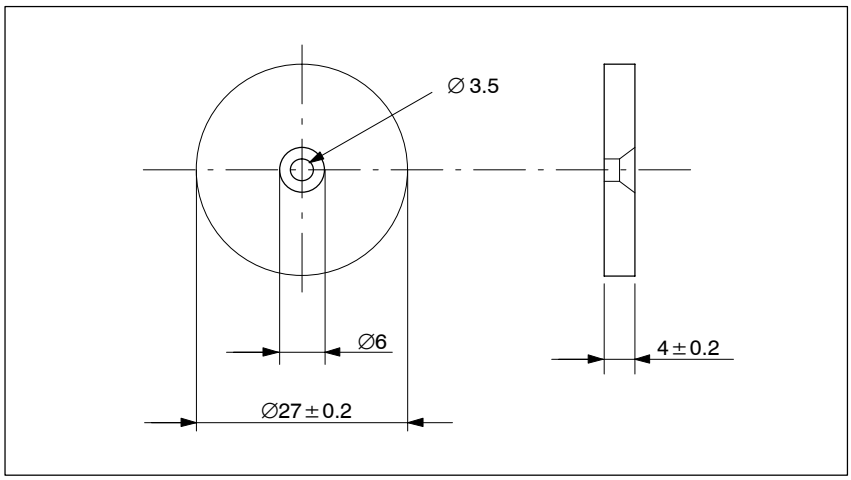


Figure 4-6 Dimensions MDS D124

Metal-free space

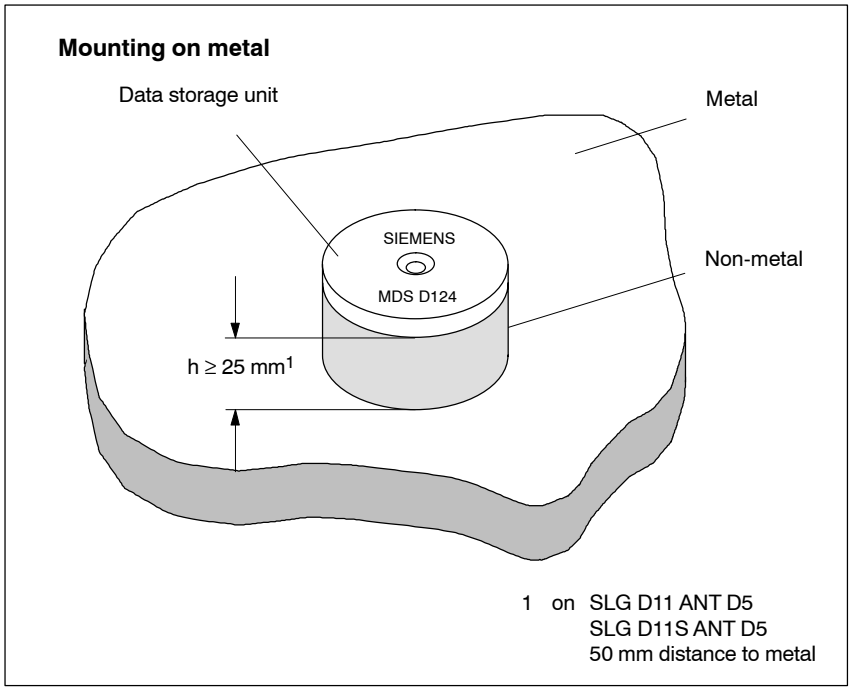


Figure 4-7 Metal-free space MDS D124

Note

If the guide values (h) are violated, this results in a considerable reduction in the field data. Mounting of the MDS with metal screws (M3 countersunk screw) is possible. This has no substantial effect on the range.

4.4 MDS D139

Application area

For applications in production logistics and assembly lines with high temperatures (up to +200 °C) these reusable, cyclical, heat-resistant transponders with a limited lifetime are required. The MDS D 139 is a passive, maintenance-free transponder with a 44 -byte application memory. On account of its simple design (without thermal insulation), but also its lack of complexity, this data storage unit is considerably less costly than today's heat-resistant mobile data storage units.

Figure 4-8 MDS D139

Ordering data

Table 4-11 Ordering data MDS D139

	Order No.
Mobile data storage unit MDS D139 Heat-resistant (r/w) up to max. +200 °C with 44 bytes of application memory	6GT2 600-0AA00
Accessories: Spacer	 6GT2 690-0AA00

Technical data

Table 4-12 Technical data of the MDS D139

Memory Size	64 bytes
Memory configuration Serial number Configuration memory Family Code/Application UID Application memory	 8 bytes (fixed code) 8 bytes 4 bytes 44 bytes
Memory technology	EEPROM
Memory organization	See table 4-4
Data retention	10 years
Read cycles Write cycles At + 40 °C, typ. At + 70 °C, min.	Unlimited 500 000 10 000
Write/read distance (S_g)	See field data
Recommended distance from metal	30 mm (see Chapter 3.3.2)
Multitag-capable	Yes
Power supply	Inductive power transmission (without battery)
Protection rating in accordance with EN 60529 Shock in accordance EN 60721-3-7 Class 7M3 Total shock reply spectrum type II Vibration in accordance with EN 60721-3-7 Class 7M3 Torsion and bending stress	IP68 50 g 20 g Not permitted
Housing dimensions (D x H) in mm Color Material Mounting	85 x 15 Black Plastic PPS 1x M5 screw
Tightening torque	3 Nm
Ambient temperature in operation in transit and storage	 –25 °C up to +100 °C permanent +140 °C 20 % reduction in the limit distance +200 °C* for 4000 hours –40 °C to +100 °C
Weight, approx.	50 g

* at greater than +140 °C no processing is possible

Field data

Table 4-13 Field data MDS D139

	SLG D10/D10S ANT D5	SLG D11/D11S ANT D5	SLG D12/ SLG D12S
Working distance (S_a)	0 to 380 mm	0 to 240 mm	0 to 120 mm
Limit distance (S_g)	450 mm	300 mm	150 mm
Transmission window (L)	∅ 320 mm	∅ 300 mm	120 mm
Minimum distance from MDS to MDS	≥ 1 m	≥ 1 m	≥ 0.5 m

Dimensions (in mm)

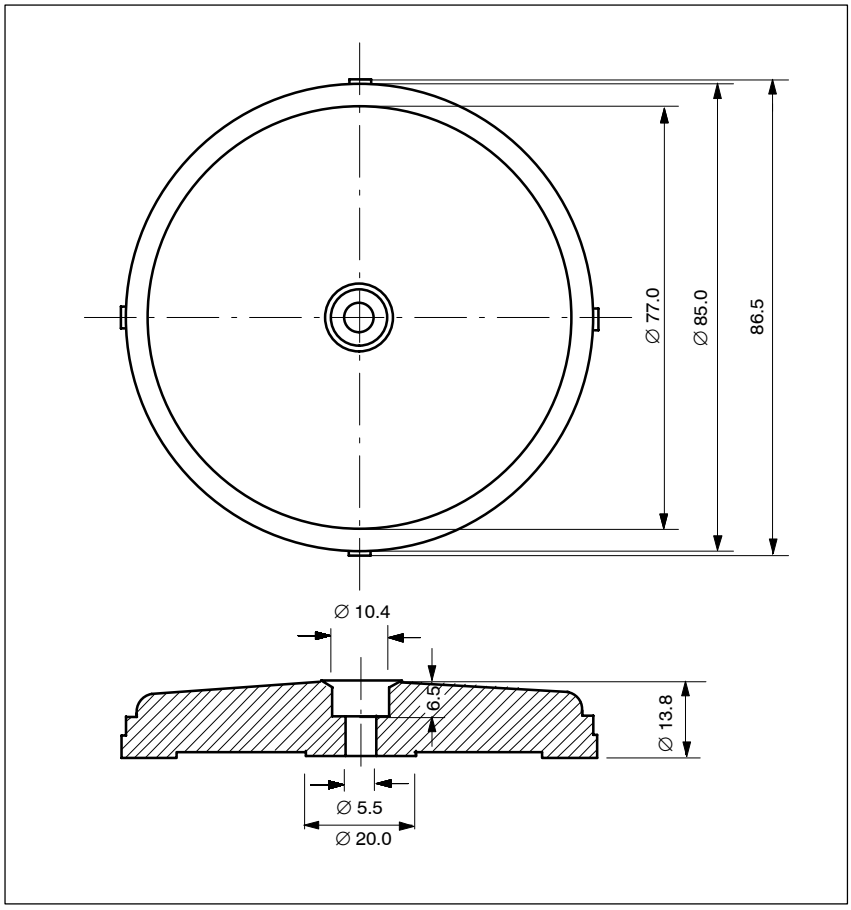


Figure 4-9 Dimensions of the MDS D139

Metal-free space

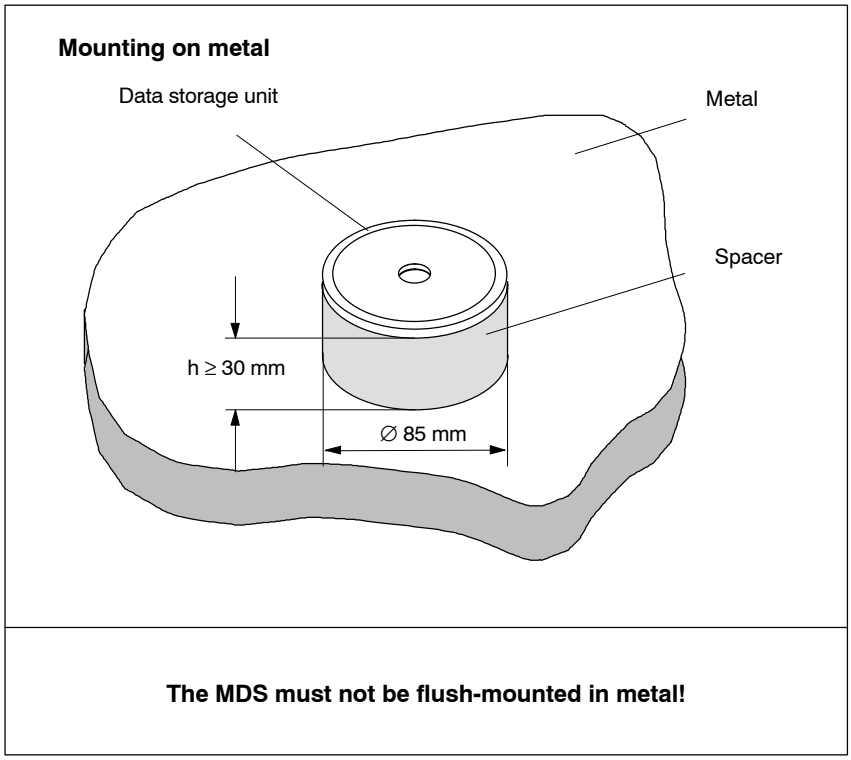


Figure 4-10 Metal-free space, MDS D139

Note

If the guide values (h) are violated, this results in a considerable reduction in the field data (see Section 3.3.2). The MDS may be mounted with metal screws (M5). This has no substantial effect on the range.
A test is recommended for critical applications.

4.5 MDS D160

Application area

This mobile data storage unit is a maintenance-free, passive, laundry tag for cyclic applications. Its robust packaging makes the MDS D160 a transponder that can also be used without problems in extreme ambient conditions. It is washable and resistant to heat and all the chemicals usually involved in the washing process.

Typical applications, for example, are:

- Clothes hire
- Hotel linen
- OP textiles
- Hospital clothing
- Dirt-absorbing mats
- Clothing for old people's homes

Figure 4-11 MDS D160

Ordering data

Table 4-14 Ordering data for the MDS D160

	Order No.
Mobile data storage unit MDS D160 Laundry tag for cyclic applications (r/w) to max. + 160 °C with 44 bytes of application memory	6GT2 600-0AB00

Technical data

Table 4-15 Technical data of the MDS D160

Memory Size	64 bytes
Memory configuration Serial number Configurable memory Family Code/Application UID Application memory	 8 bytes (hardcode) 8 bytes 4 bytes 44 bytes
Memory technology	EEPROM
Memory organization	See table 4-4
Data transmission speed write read	 approx. 3.5 ms/bytes approx. 9.5 ms/bytes
Bunch detection/multitag-capable	Yes
Data retention	10 years
Read cycles Write cycles At + 40 °C, typ.	Unlimited 1 000 000
Write/read distance (S_g)	See field data
Recommended distance from metal	25 mm (see Chapter 3.3.2)
Power supply	Inductive power transmission (without battery)
Protection rating in accordance with EN 60529 Torsion and bending stress	IP68 (24 hours, 2 m) Not permitted
Mechanical stability isostatic pressure axial pressure radial pressure	 300 bar for 5 min 1000 N for 10 s 1000 N for 10 s
Chemical Resistance	All chemicals typically used in the washing process
Wash cycle, min.	100
Physical layout Color Material Dimensions (D x H) in mm Mounting of the MDS	Molded, shock-resistant plastic black epoxy resin 16 x 3 ±0.1 Patch, sew, stick

Table 4-15 Technical data of the MDS D160

Ambient temperature		
in operation	–25 °C to	
	+85 °C	permanent
	+120 °C	for 1000 hours (20 % reduction in the limit distance)
	+160 °C*	for 35 hours
in transit and storage	–25 °C to +85 °C	
Weight, approx.	1.2 g	

* as of +140 °C processing not possible

Note

- The regeneration time for the MDS D160 between the wash cycles must be at least 24 hours.
- In critical applications, a test is to be recommended.

Field data

Table 4-16 Field data MDS D160

	SLG D10/D10S ANT D5	**SLG D11/D11S ANT D5**	**SLG D12/ SLG D12S**
Working distance (S_a)	0 to 100 mm	0 to 55 mm	0 to 40 mm
Limit distance (S_g)	140 mm	70 mm	60 mm
Transmission window (L)	∅ 260 mm	∅ 250 mm	100 mm
Minimum distance from MDS to MDS	≥ 0.8 m	≥ 0.8 m	≥ 0.3 m

Dimensions (in mm)

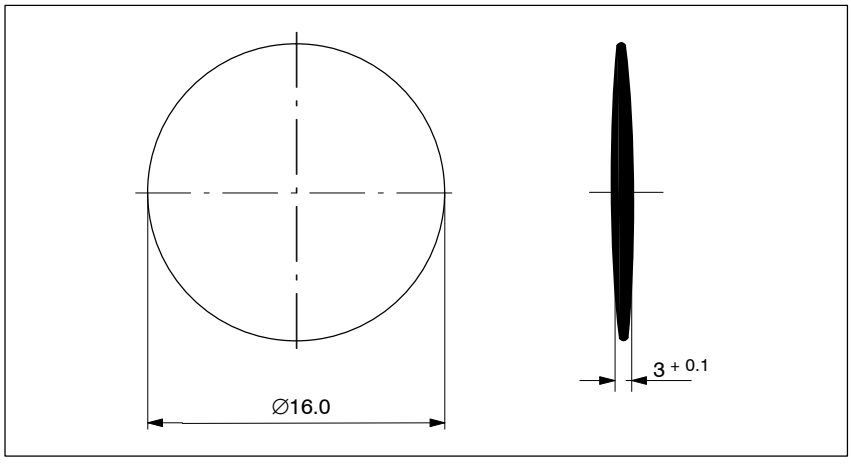


Figure 4-12 Dimensions of the MDS D160

Metal-free space

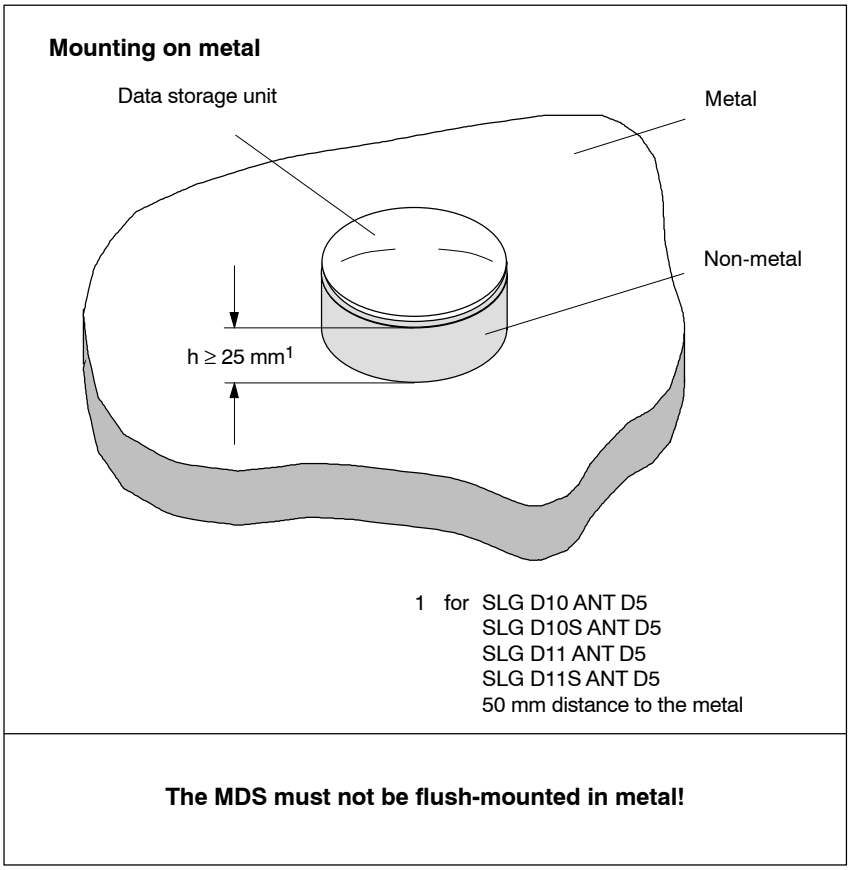


Figure 4-13 Metal-free space, MDS D160

Note

If the guide values (h) are violated, this results in a considerable reduction in the field data (see Section 3.3.2).
A test is recommended for critical applications.

Read/Write Devices

5

5.1 Introduction

5.1.1 SLG with RS 232 Serial Interface

Application area

The SLG with the RS 232 serial interface represents the communication interface between practically any superordinate computer systems/PCs and the mobile data storage unit (MDS).

In accordance with customer-specific requirements, the following variants are available:

- SLG D10 ANT D5
- SLG D11 ANT D5
- SLG D12

A robust housing and the high degree of protection (IP65) permit deployment in the most severe industrial environments.

Design and functions

The SLG is connected via a serial interface (RS 232) of the PC, which permits communication with PCs or external PLCs. Commands and the data to be written or read are converted via a modulator/demodulator circuit.

The amount of data that can be transferred between SLG and MDS depends on the following factors.

- The speed at which the MDS moves through the SLG's transmission window (antenna)
- The length of the transmission window

Use of the C++ library permits the SLG to be programmed quickly using applications under Windows 9x/2000 and NT 4.0.

Table 5-1 Table providing an overview of the SLG with an RS 232 serial interface

SLG Type	Working distance S_a (depending on MDS)	Limit distance S_a (dependent on the MDS)	Temperature range (during operation)	SLG dimensions (L x W x H) in mm	Antenna dimensions (L x W x H) in mm	Protection rating
SLG D10 ANT D5	0 to 380 mm	450 mm	–20 to +55 °C	320 x 145 x 100	340 x 325 x 38	IP65
SLG D11 ANT D5	0 to 240 mm	300 mm	–20 to +70 °C	160 x 80 x 40	340 x 325 x 38	IP65
SLG D12	0 to 120 mm	150 mm	–20 to +70 °C	160 x 80 x 40	–	IP65

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

Configuration
SLG – MDS
(via RS 232)

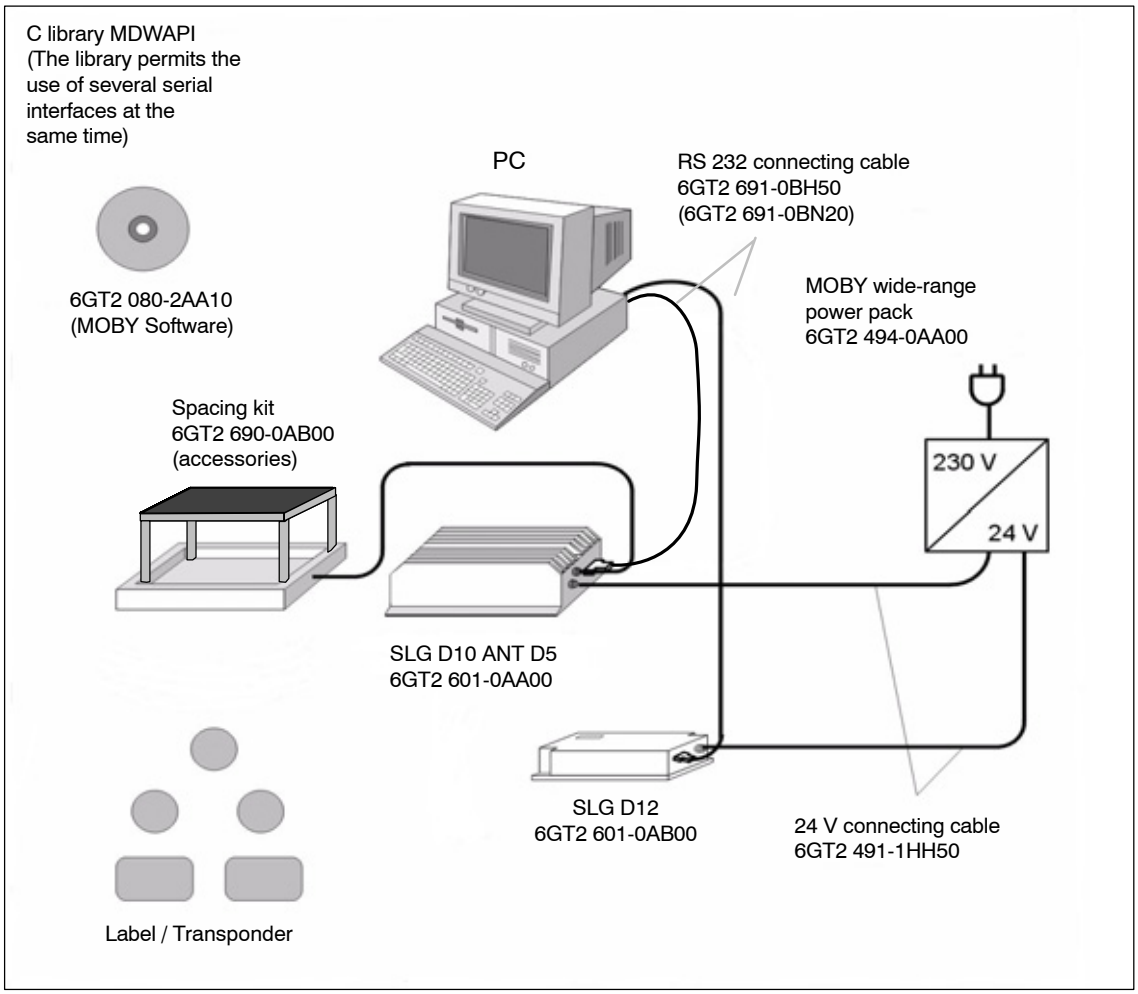


Figure 5-1 SLG – MDS configuration via RS 232

Programming of the SLG D 10, SLG D 11, and SLG D 12

Communication at the serial interface between the SLG and the superordinate computer system (host) takes place by means of an asynchronous 8-bit binary protocol. The frames are secured by means of a CRC 16.
Can be run on PC models as of the Pentium 2 processor with a serial interface and a Windows 9x/2000/NT 4.0 operating system.

The SLG is connected to a serial interface of the computer. Users work with the PC interfaces COM 1 and/or COM 2; 8 interfaces can be run with additional hardware.

A 32-bit library (MDWAPI for Windows 9x/2000 and NT 4.0) and a programming guide are available to the user for programming (Software MOBY CD).

For computers that do not run under Windows (e.g. UNIX), the communication specification is described in the programming guide (MDWAPI).

Parameter defaults

The configuration parameters are described in the programming guide (MDWAPI).

Table 5-2 Ordering data for the MOBY software

	Order No.
MOBY Software	6GT2 080-2AA10

Note

on MOBY software and licensing

When you purchase an ASM or SLG interface module, this does not include software or documentation. The**"Software MOBY"** CD-ROM, which contains all the available FBs/FCs for SIMATIC, C libraries for Windows, demo programs, etc., can be ordered **additionally**.

The CD-ROM also includes the complete set of MOBY documentation (German, English, and in some cases French) in PDF format. When you purchase an ASM or SLG interface module, the price for use of the software including documentation on the "Software MOBY" CD-ROM is included. The purchaser obtains 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.

5.1.2 SLG with RS 422 for SIMATIC S7 and PROFIBUS-DPV1

Application area

The SLG D1xS provides inductive communication with the mobile data storage units (MDSs) and the serial link to the interface modules (ASMs).
Various SLGs – for short, medium, and long distances to the MDS – are available to meet customer requirements.

- SLG D10S ANT D5
- SLG D11S ANT D5
- SLG D12S

A robust housing and the high degree of protection (IP65) permit deployment in the most severe industrial environments.

Design and functions

The SLG executes commands received from the interface module. These commands and the data to be read or written are converted via an appropriate modulator/demodulator circuit.
Communication between MDS and the SLG takes place via inductive alternating fields.

The amount of data that can be transferred between SLG and MDS depends on the following factors.

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

Table 5-3 Table providing an overview of the SLG with an RS 422 interface

SLG Type	Working distance S_a (depending on MDS)	Limit distance S_a (dependent on the MDS)	Temperature range (during operation)	SLG dimensions (L x W x H) in mm	Antenna dimensions (L x W x H) in mm	Protection rating
SLG D10S ANT D5	0 to 380 mm	450 mm	–20 to +55 °C	320 x 145 x 100	340 x 325 x 38	IP65
SLG D11S ANT D5	0 to 240 mm	300 mm	–20 to +70 °C	160 x 80 x 40	340 x 325 x 38	IP65
SLG D12S[1]	0 to 120 mm	150 mm	–20 to +70 °C	160 x 80 x 40	–	IP65

1 Integrated antenna

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

5.1.3 Troubleshooting

What should you do if nothing works?

1. Check the supply voltage directly on the SLG connector using a measuring instrument.
2. Check the cabling to the PC
   - Do the SLG and PC have the same physical interface?
   - Is the polarity of the connecting cable correct (RS 232)? (RxD of the SLG 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 programming guide (MDWAPI).

SLG range too low

If the SLG range is too low, check:

- The power supply unit/switched-mode power supply unit (see Section 3.4 on electrical interference)
- Whether there are monitors or other sources of interference in the vicinity (see Section 3.4)
- Whether there is metal in the immediate vicinity (see Section 3.3)
- To attain optimal read/write distances for the ANT D 5, a metal plate is required at a distance of 100 mm (see Table 3-8 and 3-9).

5.2 SLG D10 ANT D5

Application area

The SLG D10 ANT D5 is a high-performance read/write device with a serial interface and a separate antenna, designed specifically for storage, logistics, and distribution applications. It is designed for a range of up to 600 mm (depending on the label). The read/write device has an RS 232 serial interface (RS 422 interface on request), which permits communication with PCs or external PLCs.

For simple and rapid programming there is a C library available to the user that can be used under Windows 9x, 2000, and NT. The SLG D10 ANT D5 is multitag capable.

Figure 5-2 Read/write device SLG D10 ANT D5

Ordering data

Table 5-4 Ordering data for the SLG D10 ANT D5

	Order No.
Read/write device SLG D10 ANT D5 with an RS 232 serial interface for standard PCs, with a separate antenna	6GT2 601-0AA00
Accessories:	
Spacer kit for ANT D5	6GT2 690-0AB00
MOBY wide-range power pack	6GT2 494-0AA00
Cables and connectors	See Section 3.6

Technical data

Table 5-5 Technical data of the SLG D10 ANT D5

Inductive interface to MDS	
Transmission frequency	13.56 MHz
Supported transponders	Transponder in accordance with ISO 15693 (e.g. I-Code, Tag-it, my-d)
Serial interface to user	RS 232 (RS 422 on request)
Transmission protocol	Asynchronous 8 bit
Data transmission speed	9600 bps to 115.2 kbps (adjustable)
Data backup	CRC 16
Output power	4 W
SLG - MDS read/write distances	Typically 450 mm (see field data)[1]
Software functions	MDS: Read, write, initialize, access rights, multitag
Programming	Windows 9x, 2000, and NT, with available 32-bit DLL
Multitag	Yes
Anti-collision speed	Approx. 20 labels/s identifiable in parallel
Power supply	24 VDC ±5%
Current consumption	
Operation	0.9 A
Transient making current	2.8 A/50 ms
Line length, SLG – PC	
With RS 232	30 m
With RS 422	300 m
Antenna line length	3.60 m
Digital inputs/outputs	None
Housing	
Dimensions (in mm)	
For antenna [L x W x H]	340 x 325 x 38
For electronic components [L x W x H]	320 x 145 x 100 (without connector)
Color Antenna	Black
SLG housing	Anthracite
Material Antenna	Plastic ASA
SLG housing	Aluminum
Connector	TNC connector
Antenna (can be connected to the SLG)	
Mounting of SLG	4 M6 screws
Mounting of antenna	4 M5 screws
Ambient temperature	
in operation	–20 °C to +55 °C
in transit and storage	–25 °C to +70 °C

Table 5-5 Technical data of the SLG D10 ANT D5

Protection rating in accordance with EN 60529	
SLG and antenna	IP65
Shock in accordance with EN 60721-3-7 Class 7M2	30 g
Total shock response spectrum type II	
Vibration in accordance with EN 60721-3-7 Class 7M2	1 g (9 to 200 Hz)/ 1.5 g (200 to 500 Hz)
Weight, approx.	
SLG	3500 g
Antenna	1000 g
Certifications	Radio EN 300 330
	CE
	Safe for pacemakers

1 To ensure optimal field data in a metallic environment, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal.

Caution

The antenna cable is prepared in advance. If the cable is changed, the warranty and CE marking become invalid.

Field data

Table 5-6 Field data of the SLG D10 ANT D5

Limit distance (S_g)	Max. 450 mm (dependent on transponder)
Working distance (S_a)	0 to 380 mm (dependent on transponder)
Length of the transmission window (L_d)	320 mm
Width of the transmission window (W)	128 mm
Minimum distance from ANT D5 to ANT D5	≥ 2 m

Transmission window

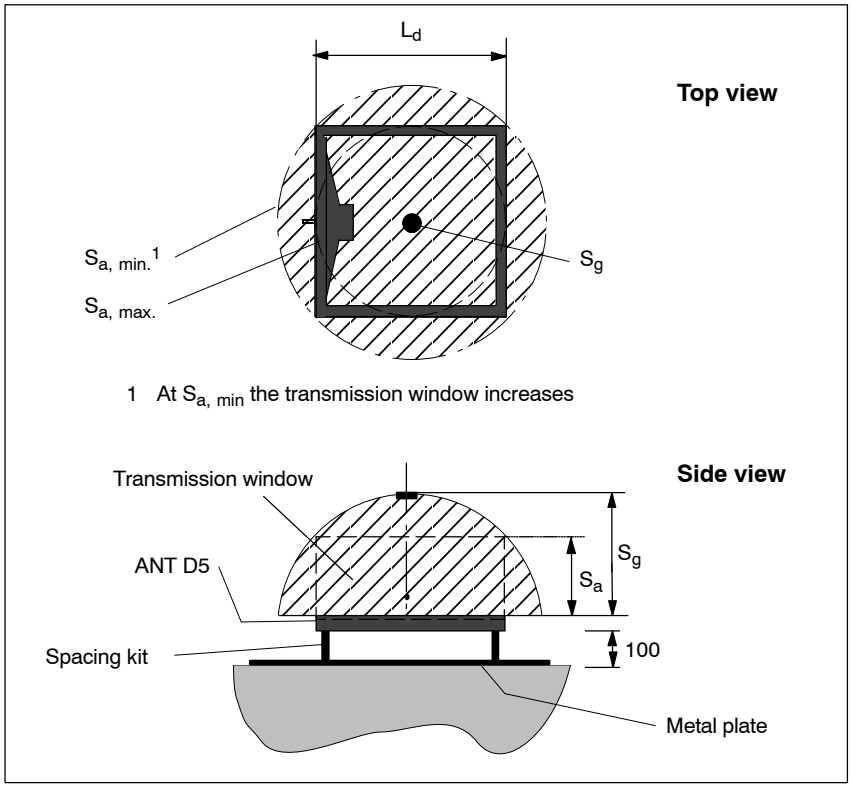


Figure 5-3 Transmission window with the SLG D10 ANT D5

Metal-free space

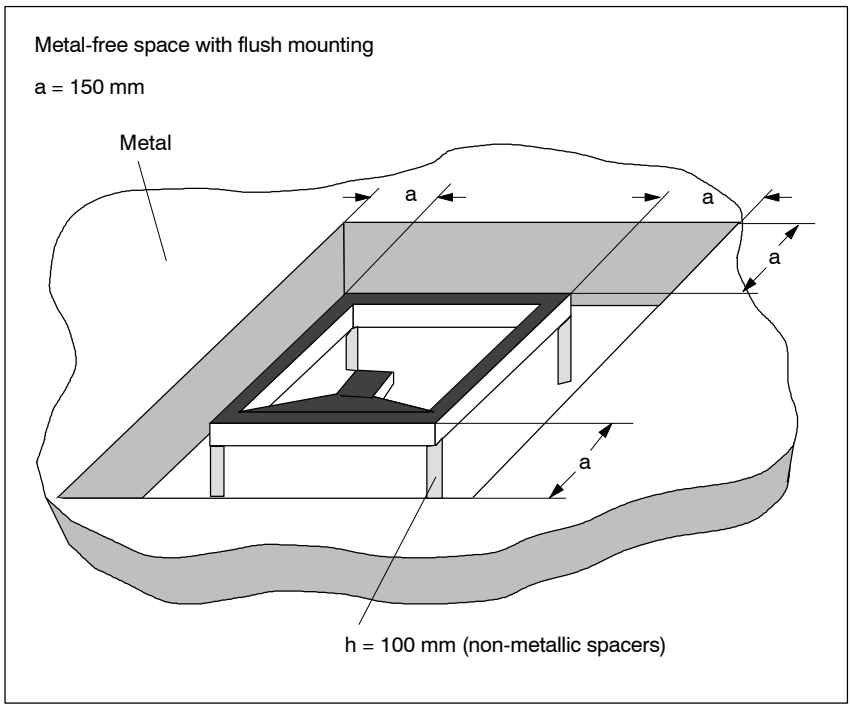


Figure 5-4 Metal-free space for the SLG D10 ANT D5

Definition of the distance D

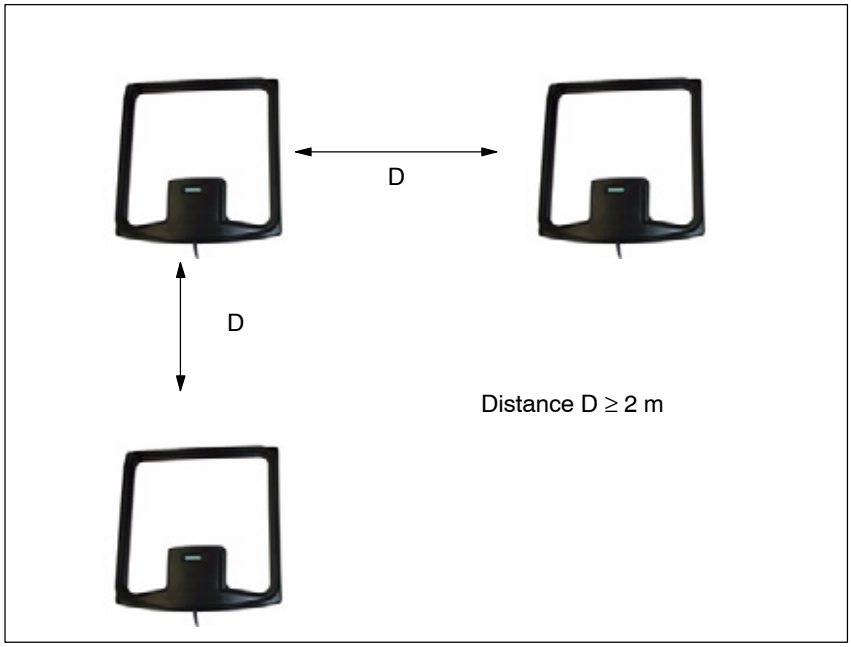


Figure 5-5 Distance D: SLG D10 ANT D5

Dimensions (in mm)

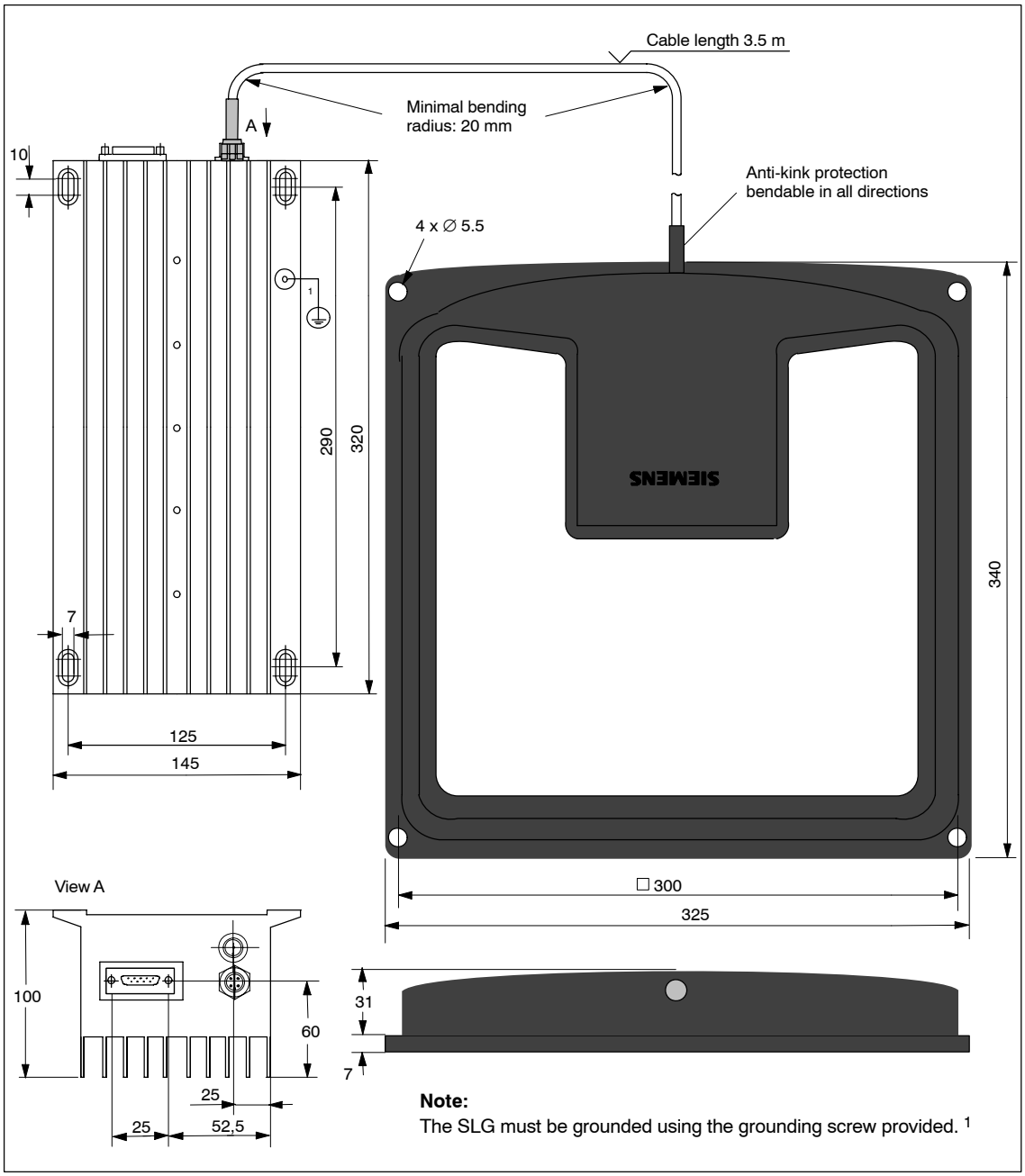


Figure 5-6 Dimensioned drawing of the SLG D10 ANT D5

Note

In order to ensure optimal field data in surroundings where there is metal as well, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal.

Spacing kit for the MOBY D ANT D5

Table 5-7 Ordering data for the spacing kit MOBY D ANT D5

	Order No.
Spacing kit for the ANT D5 made of aluminum with plastic spacers including fixing screws	6GT2 690-0AB00
Individual parts	**Quantity**
Aluminum plate 380 x 380 x 2	1
Plastic bolts 100 x 20	4
Countersunk head screws M5 x 12	4
Cylinder head screws M5 x 15	4
Washer for M5	4
Spring lock washer for M5	4

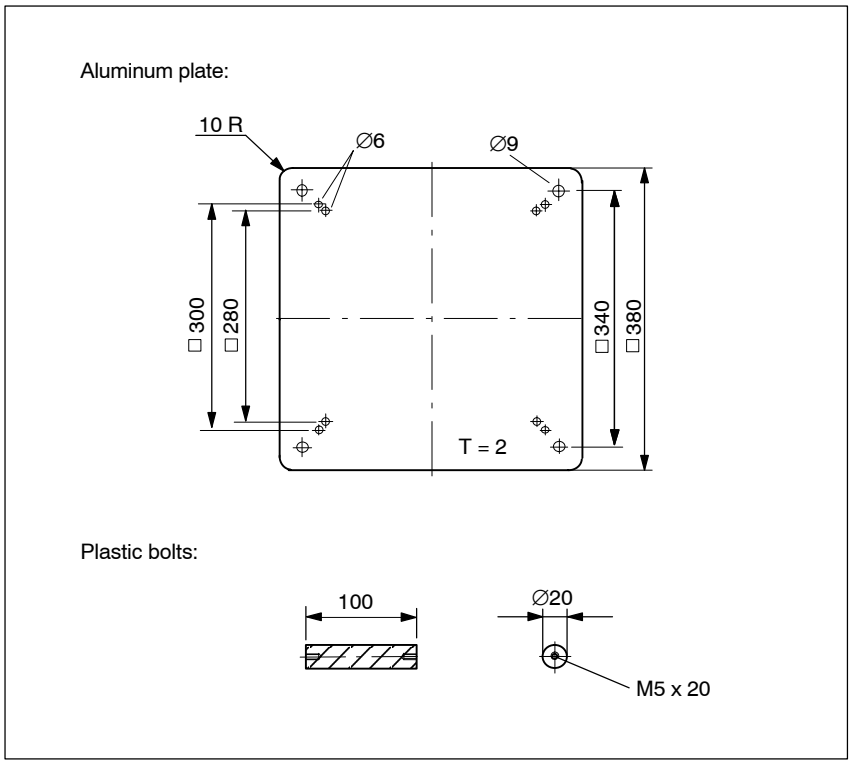


Figure 5-7 Dimensioned drawing for the spacing kit for the MOBY D ANT D5

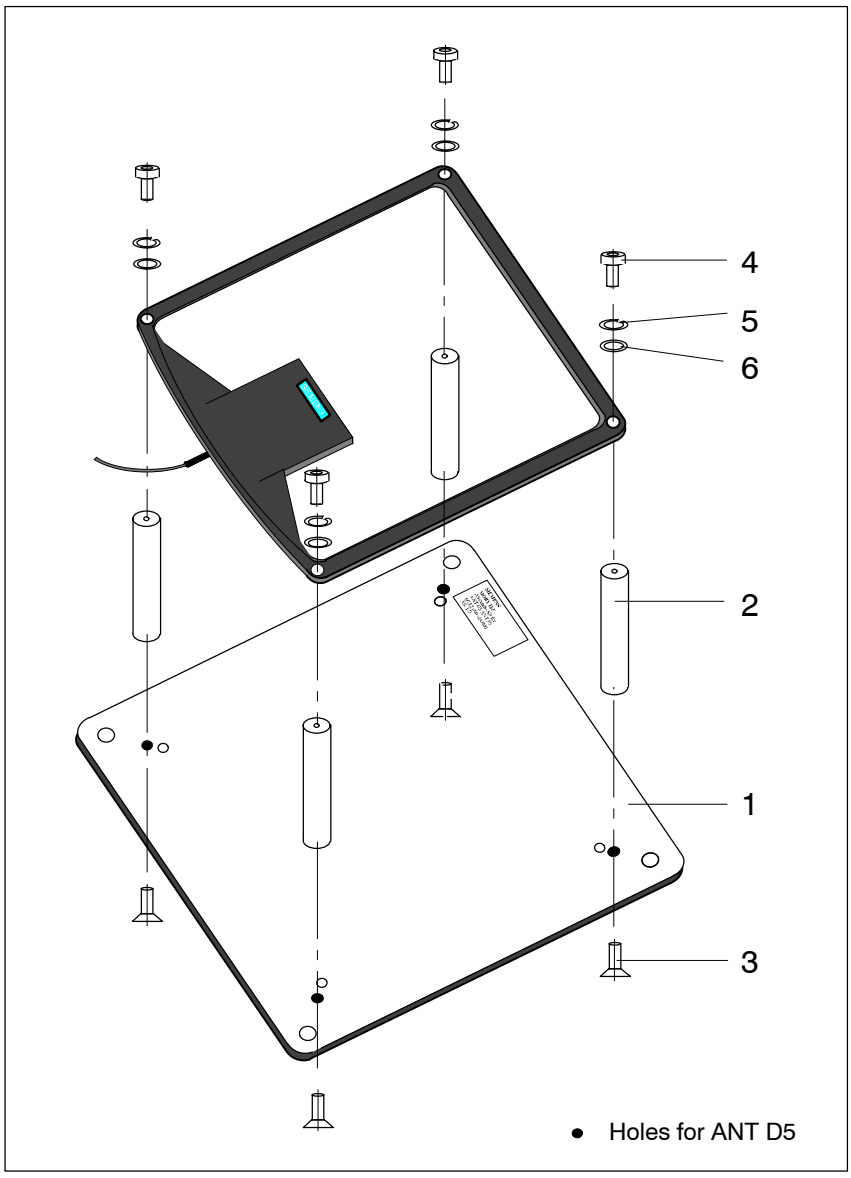


Figure 5-8 Mounting diagram for spacer kit

5.3 SLG D11 ANT D5

Application area

The SLG D11 ANT D5 is a medium-performance read/write device with a serial interface and a separate antenna, designed specifically for storage, logistics, and distribution applications. It is designed for a range of up to 300 mm (depending on the label).
The read/write device has an RS 232 serial interface (RS 422 interface on request), which permits communication with PCs or external PLCs.

For simple and rapid programming there is a C library available to the user that can be used under Windows 9x, 2000, and NT. The SLG D11 ANT D5 is multitag capable.

Figure 5-9 Read/write device SLG D11 ANT D5

Ordering data

Table 5-8 Ordering data for the SLG D11 ANT D5

	Order No.
Read/write device SLG D11 ANT D5 with an RS 232 serial interface for standard PCs, with a separate antenna	6GT2 601-0AC00
Accessories:	
ANT D5 spacer kit	6GT2 690-0AB00
MOBY wide-range power pack	6GT2 494-0AA00
Cable and connector	See Section 3.6

Technical data

Table 5-9 Technical data of the SLG D11 ANT D5

Inductive interface to MDS	
Transmission frequency	13.56 MHz
Supported transponders	Transponder in accordance with ISO 15693 (e.g. I-Code, Tag-it, my-d)
Serial interface to user	RS 232 (RS 422 on request)
Transmission protocol	Asynchronous 8 bit
Data transmission speed	9600 bps to 38.4 kbps (adjustable)
Data backup	CRC 16
Output power	1 W
SLG - MDS read/write distances	Typically 300 mm (see field data)[1]
Software functions	MDS: Read, write, initialize, access rights, multitag
Programming	Windows 9x, 2000, and NT, with available 32-bit DLL
Multitag	Yes
Anti-collision speed	Approx. 20 labels/s identifiable in parallel
Power supply	
Nominal value	24 VDC
Permissible range	20 to 30 VDC
Current consumption	
Operation	150 mA
Transient making current	600 mA
Line length, SLG – PC	
With RS 232	30 m
Antenna line length	3.60 m
Digital inputs/outputs	None
Housing	
Dimensions (in mm)	
For antenna [L x W x H]	340 x 325 x 38
For electronic components [L x W x H]	160 x 80 x 40 (without connector)
Color	Black
Antenna	Anthracite
SLG housing	Plastic ASA
Material	
Antenna	Plastic (PA 12)
SLG housing	
Connector	TNC connector
Antenna (can be connected to the SLG)	
Mounting of SLG	2 M5 screws
Mounting of antenna	4 M5 screws

Table 5-9 Technical data of the SLG D11 ANT D5

Ambient temperature	
in operation	–25 °C to +70 °C
in transit and storage	–25 °C to +70 °C
Protection rating in accordance with EN 60529	
SLG and antenna	IP65
Shock in accordance with EN 60721-3-7 Class 7M2	30 g
Total shock reply spectrum type II	
Vibration in accordance with EN 60721-3-7 Class 7M2	1 g (9 to 200 Hz)/ 1.5 g (200 to 500 Hz)
Weight, approx.	
SLG	600 g
Antenna	1000 g
Certifications	Radio EN 300 330
	CE
	Safe for pacemakers

1 To ensure optimal field data in a metallic environment, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal.

Caution

The antenna cable is prepared in advance. If the cable is changed, the warranty and CE marking become invalid.

Field data

Table 5-10 Field data of the SLG D11 ANT D5

Limit distance (S_g)	Max. 300 mm (dependent on transponder)
Working distance (S_a)	0 to 240 mm (dependent on transponder)
Length of the transmission window (L_d)	300 mm
Width of the transmission window (W)	120 mm
Minimum distance from ANT D5 to ANT D5	≥ 2 m

Transmission window

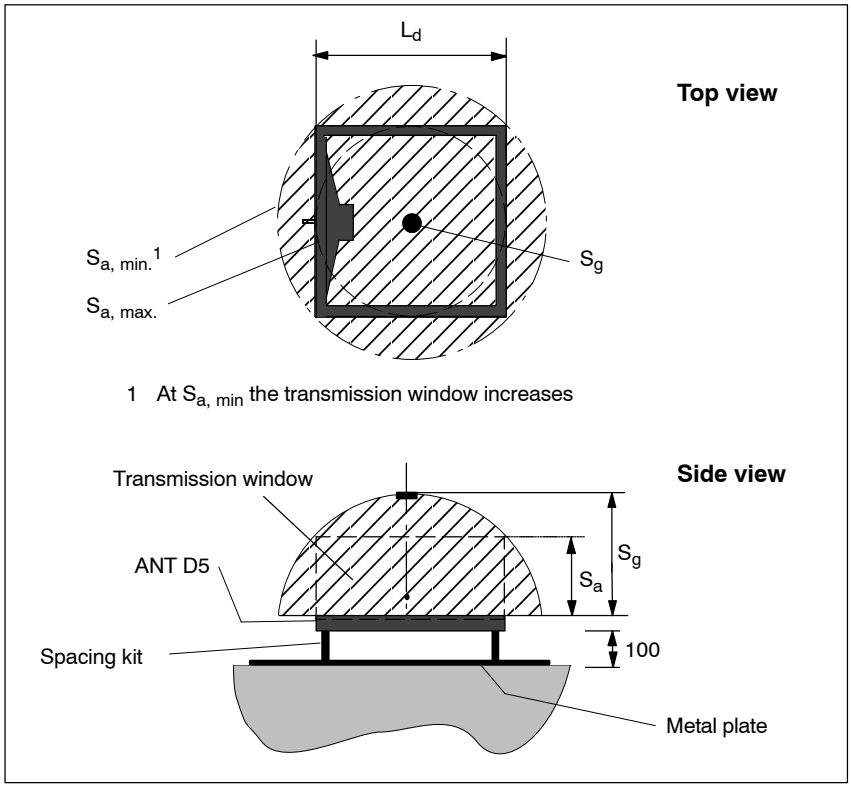


Figure 5-10 Transmission window with the SLG D11 ANT D5

Metal-free space

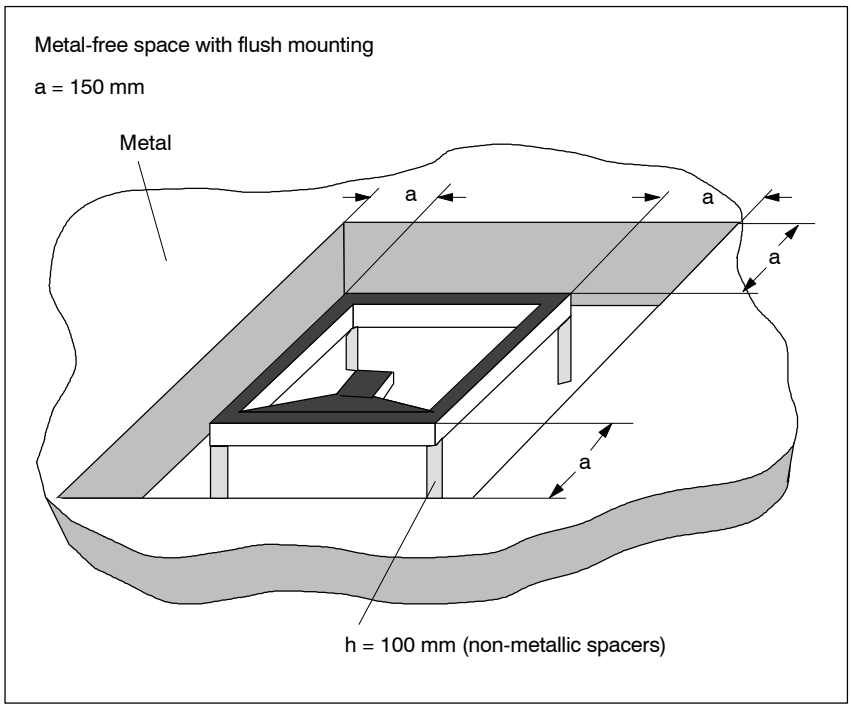


Figure 5-11 Metal-free space for the SLG D11 ANT D5

Definition of the distance D

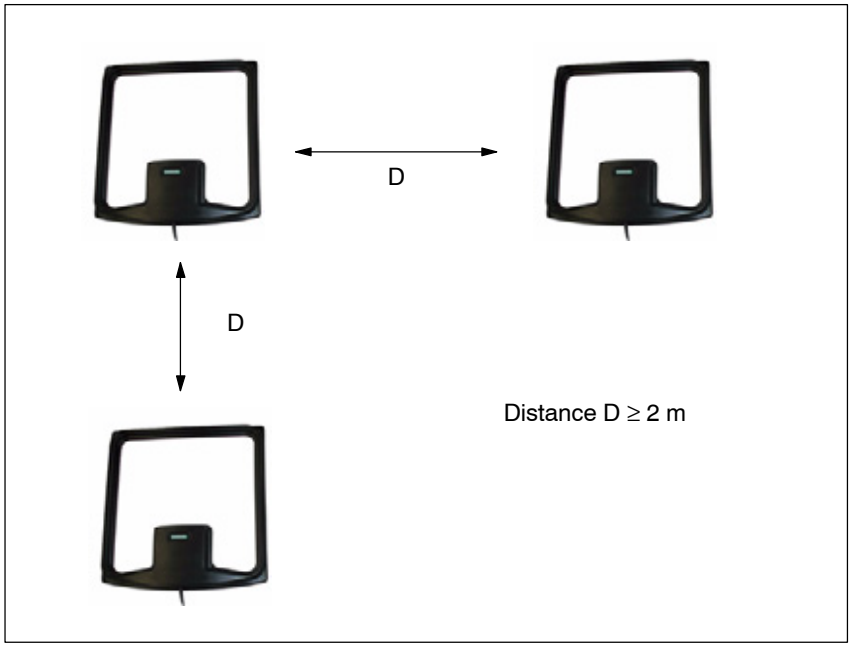


Figure 5-12 Distance D: SLG D11 ANT D5

Dimensions (in mm)

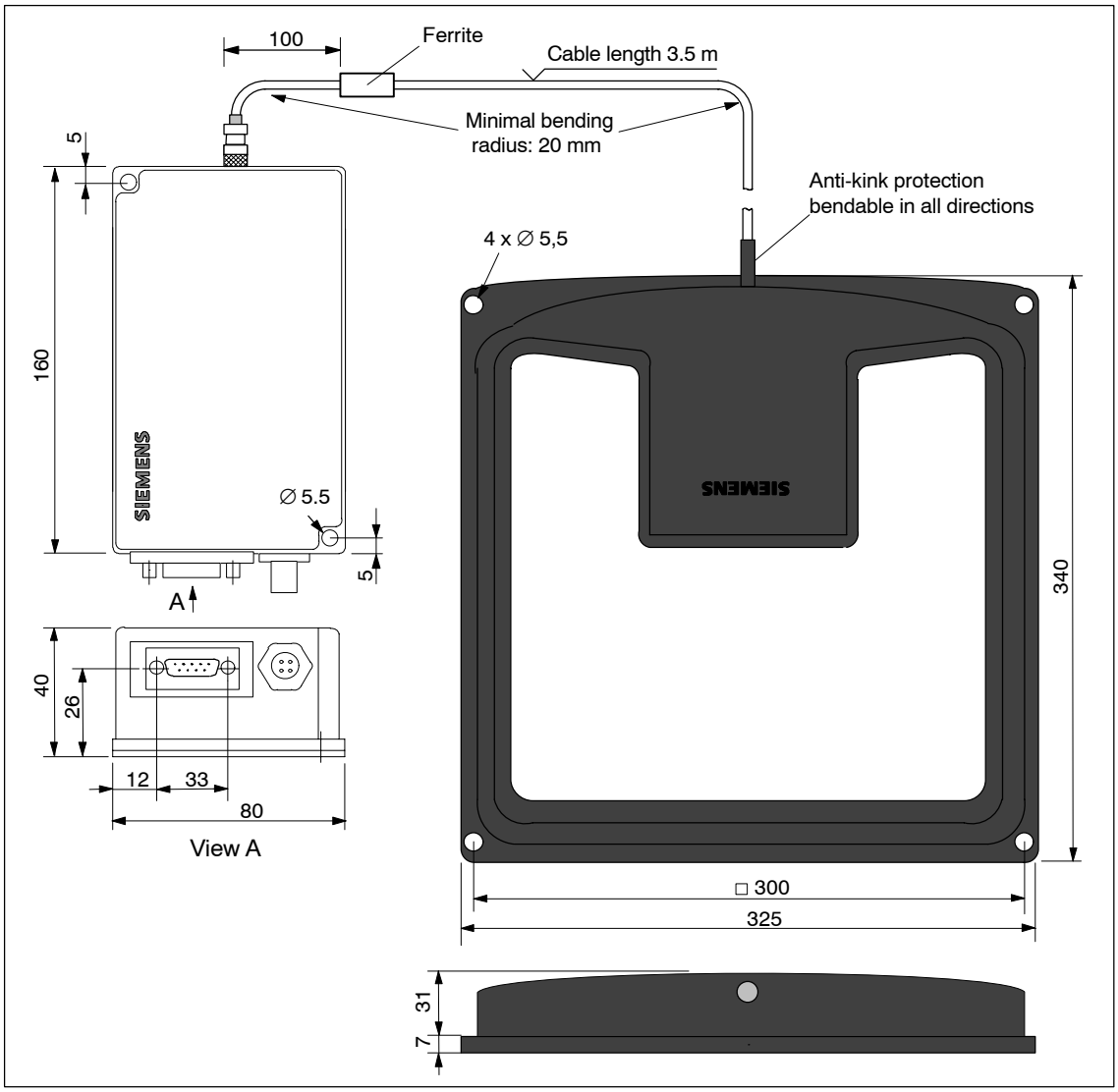


Figure 5-13 Dimensioned drawing of the SLG D11 ANT D5

Note

In order to ensure optimal field data in surroundings where there is metal as well, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal.

MOBY D ANT D5 spacer kit see Chapter 5.2

5.4 SLG D12

Application area

The SLG D12 is a medium-performance read/write device with a serial interface and an integrated antenna, designed for a range of up to 150 mm. The read/write device has an RS 232 serial interface (RS 422 interface on request), which permits communication with PCs or external PLCs.

For simple and rapid programming there is a C library available to the user that can be used under Windows 9x, 2000, and NT. The SLG D12 is multitag capable.

Figure 5-14 Read/write device SLG D12

Ordering data

Table 5-11 Ordering data for the SLG D12

	Order No.
Read/write device SLG D12 With an RS 232 serial interface for standard PCs, with an integrated antenna	6GT2 601-0AB00
Accessories: MOBY wide-range power pack Cables and connectors	 6GT2 494-0AA00 See Section 3.6

Technical data

Table 5-12 Technical data of the SLG D12

Inductive interface to MDS	
Transmission frequency	13.56 MHz
Supported transponders	Transponder in accordance with ISO 15693 (e.g. I-Code, Tag-it, my-d)
Serial interface to user	RS 232 (RS 422 on request)
Transmission protocol	Asynchronous 8 bit
Data transmission speed	9600 bps to 38.4 kbps (adjustable)
Data backup	CRC 16
SLG - MDS read/write distances	Typically 150 mm (see field data)
Software functions	MDS: Read, write, initialize, access rights, multitag
Programming	Windows 9x, 2000, and NT, with available 32-bit DLL
Multitag	Yes
Anti-collision speed	Approx. 20 labels/s identifiable in parallel
Power supply	
Nominal value	24 VDC
Permissible range	20 to 30 VDC
Current consumption	
Operation	150 mA
Transient making current	600 mA
Line length, SLG – PC	
With RS 232	30 m
Digital inputs/outputs	None
Housing	
Dimensions (L x B x H) in mm, without connector	160 x 80 x 40
Color	Anthracite
Material	Plastic (PA 12)
Mounting	2 M5 screws
Ambient temperature in operation in transit and storage	 –25 °C to +70 °C –25 °C to +70 °C
Protection rating in accordance with EN 60529	IP65
Shock in accordance with EN 60721-3-7 Class 7 M2 Total shock reply spectrum type II	30 g
Vibration in accordance with EN 60721-3-7 Class 7M2	1 g (9 to 200 Hz)/ 1.5 g (200 to 500 Hz)

Table 5-12 Technical data of the SLG D12

Weight, approx.	500 g
Certifications	Radio EN 300 330 CE Safe for pacemakers

Field data

Table 5-13 Field data SLG D12

Limit distance (S_g)	Max. 150 mm (dependent on transponder)
Working distance (S_a)	0 to 120 mm (dependent on transponder)
Length of the transmission window (L_d)	120 mm
Width of the transmission window (W)	48 mm
Minimum distance from SLG D12 to SLG D12	≥ 500 mm

Transmission window

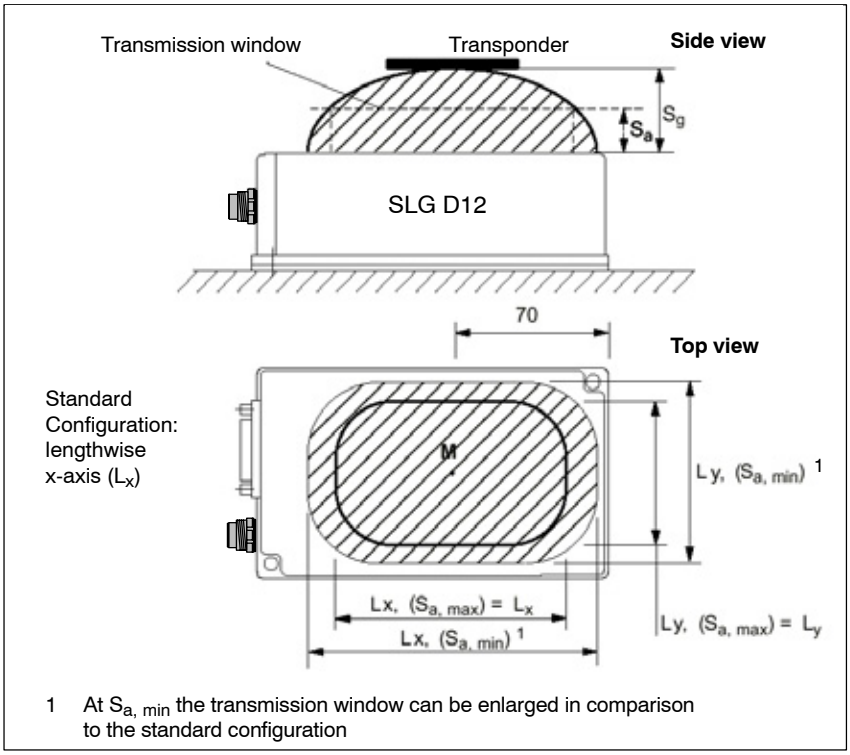


Figure 5-15 Transmission window of the SLG D12

Metal-free space

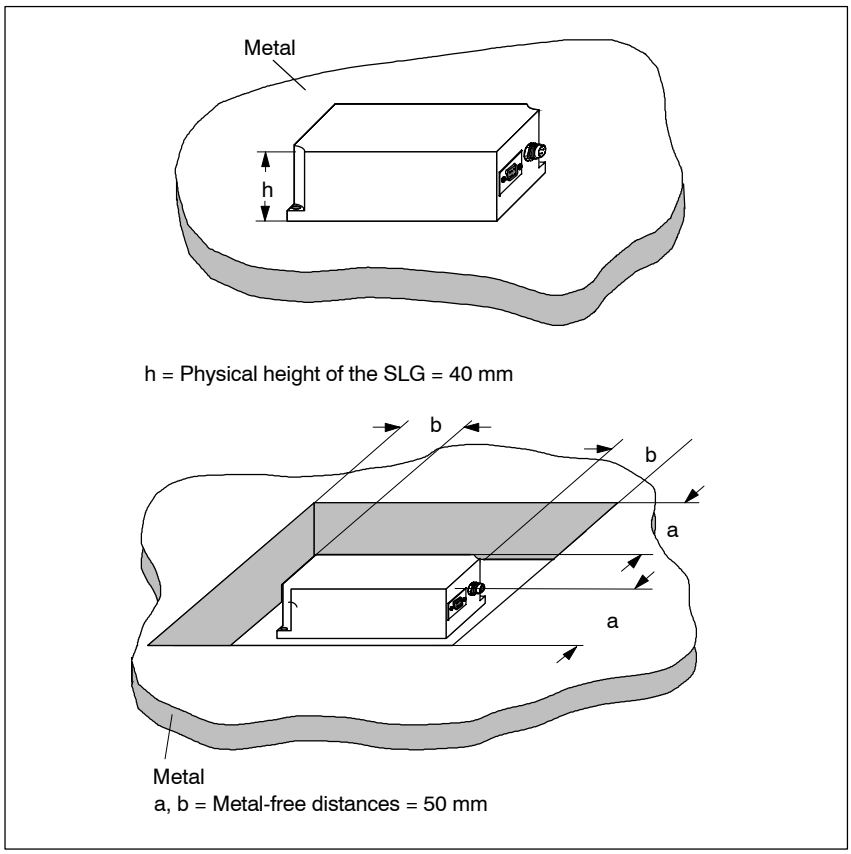


Figure 5-16 Metal-free space of SLG D12

Definition of distance D

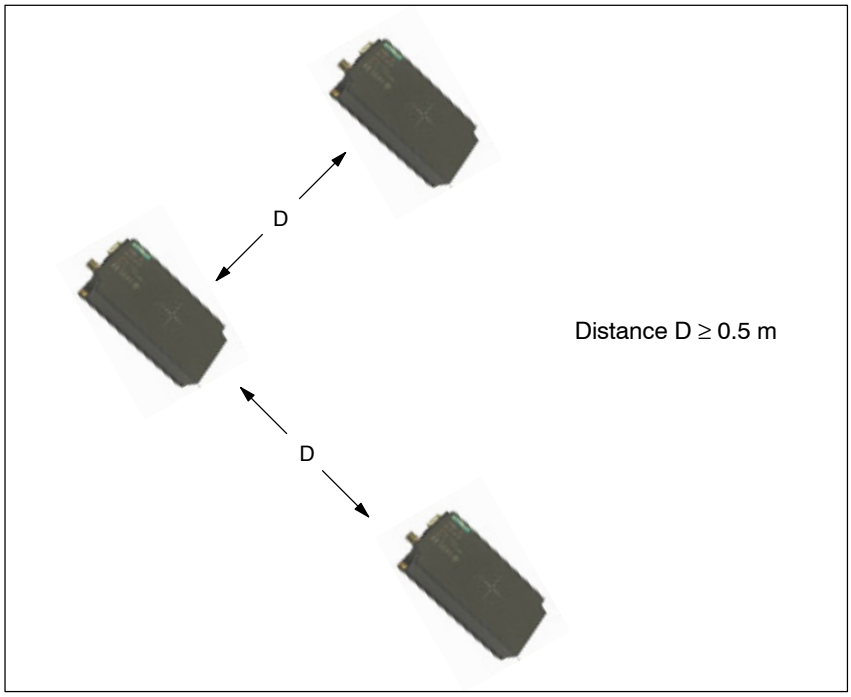


Figure 5-17 Distance D: SLG D12

Dimensions
(in mm)

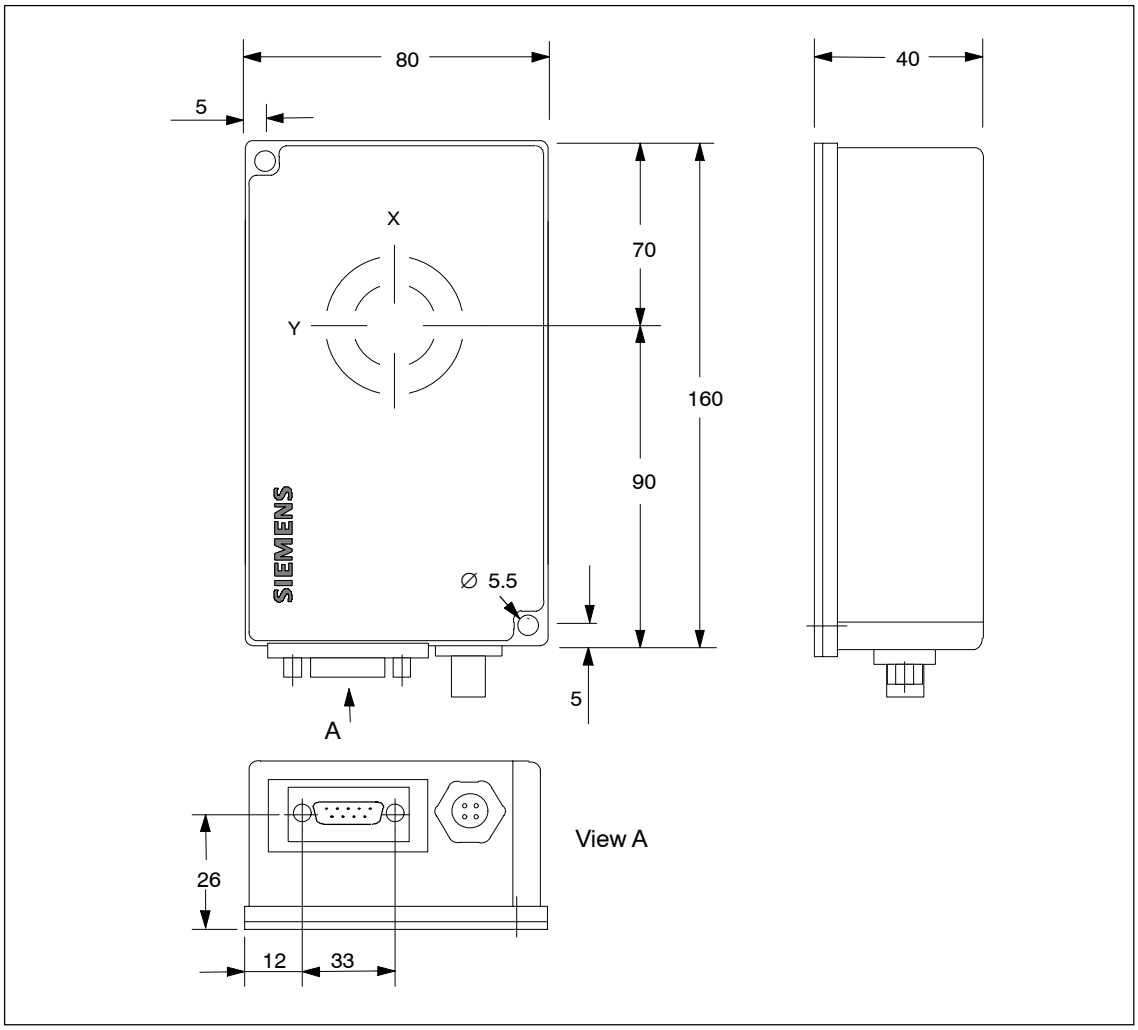


Figure 5-18 Dimensioned drawing of the SLG D12

5.5 SLG D10S ANT D5

Application area

The SLG D10S ANT D5 is a high-performance read/write device with a serial interface and a separate antenna, designed specifically for storage, logistics, and distribution applications. It is designed for a range of up to 600 mm (depending on the label). The read/write device has an RS 422 serial interface, which permits communication via interface modules (ASM 452, ASM 473 und ASM 475) to the SIMATIC S7 or PROFIBUS-DPV1.

FC 45 is available to the user for simple and rapid programming.
Due to the high degree of protection (IP65) and the use of high-quality materials, the SLG D10S ANT D5 ensures trouble-free use even under the most extreme industrial conditions.

Figure 5-19 Read/write device SLG D10S ANT D5

Ordering data

Table 5-14 Ordering data for the SLG D10S ANT D5

	Order No.
Read/write device SLG D10S ANT D5 With an RS 422 serial interface for connecting to an ASM 452, ASM 473, and ASM 475, with separate antenna	6GT2 602-0AA00
Accessories:	
ANT D5 spacer kit	6GT2 690-0AB00
MOBY wide-range power pack	6GT2 494-0AA00
Cables and connectors	See Section 3.6

Technical data

Table 5-15 Technical data of the SLG D10S ANT D5

Inductive interface to MDS	
Transmission frequency	13.56 MHz
Supported transponders	• I-Code1 (e. g. MDS D139, MDS D160) • Transponder in accordance with ISO 15693 (e. g. I-Code SLI, Tag-it HFI, my-d SRF 55V10P)
Serial interface to user	RS 422
Transmission protocol	Asynchronous 8 bit
Data transmission speed	19.2 bps to 115.2 kbps (ASM-dependent)
Data backup	CRC 16
Output power	4 W
SLG-MDS read/write distances	Typically 450 mm (see field data)[1]
Software functions	Read, write, initialize MDS The command Repeat is not permissible. The user has a maximum buffer of 256 bytes in the SLG for pipelining. Hence, a command string can only contain as many individual commands as such that the sum of the header and user data fields lengths of the individual messages does not exceed this value. The FC 45 limits the length of the user data fields to 233 bytes per individual message.
Programming	FC 45
Transmission protocol	3964 R
Multitag	in preparation
Power supply	24 VDC ± 5%

Table 5-15 Technical data of the SLG D10S ANT D5

Current consumption	
Operation	0.9 A
Transient making current	2.8 A/50 ms
Line length (SLG – SIMATIC S7)	
With RS 422	300 m
Antenna line length	3.60 m
Digital inputs/outputs	None
Housing	
Dimensions (in mm)	
For antenna [L x W x H]	340 x 325 x 38
For electronic components [L x W x H]	320 x 145 x 100 (without connector)
Color Antenna	Black
SLG housing	Anthracite
Material Antenna	Plastic ASA
SLG housing	Aluminum
Connector	
Antenna (can be connected to the SLG)	TNC connector
Mounting of SLG	4 M6 screws
Mounting of antenna	4 M5 screws
Ambient temperature in operation in transit and storage	 –20 °C to +55 °C –25 °C to +70 °C
Protection rating in accordance with EN 60529	
SLG and antenna	IP65
Shock in accordance with EN 60721-3-7 Class 7M2	30 g
Total shock response spectrum type II	
Vibration in accordance with EN 60721-3-7 Class 7M2	1 g (9 to 200 Hz)/ 1.5 g (200 to 500 Hz)
Weight, approx.	
SLG	3500 g
Antenna	1000 g
Certifications	Radio EN 300 330 CE Safe for pacemakers

1 To ensure optimal field data in a metallic environment, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal.

Caution

The antenna cable is prepared in advance. If the cable is changed, the warranty and CE marking become invalid.

Note

After the ANT D5 antenna is removed from the SLG and connected again (screwed on), an init_run must be executed.

Field data

Table 5-16 Field data of the SLG D10S ANT D5

Limit distance (S_g)	Max. 450 mm (dependent on transponder)
Working distance (S_a)	0 to 380 mm (dependent on transponder)
Length of the transmission window (L_d)	320 mm
Width of the transmission window (W)	128 mm
Minimum distance from ANT D5 to ANT D5	≥ 2 m

Transmission window

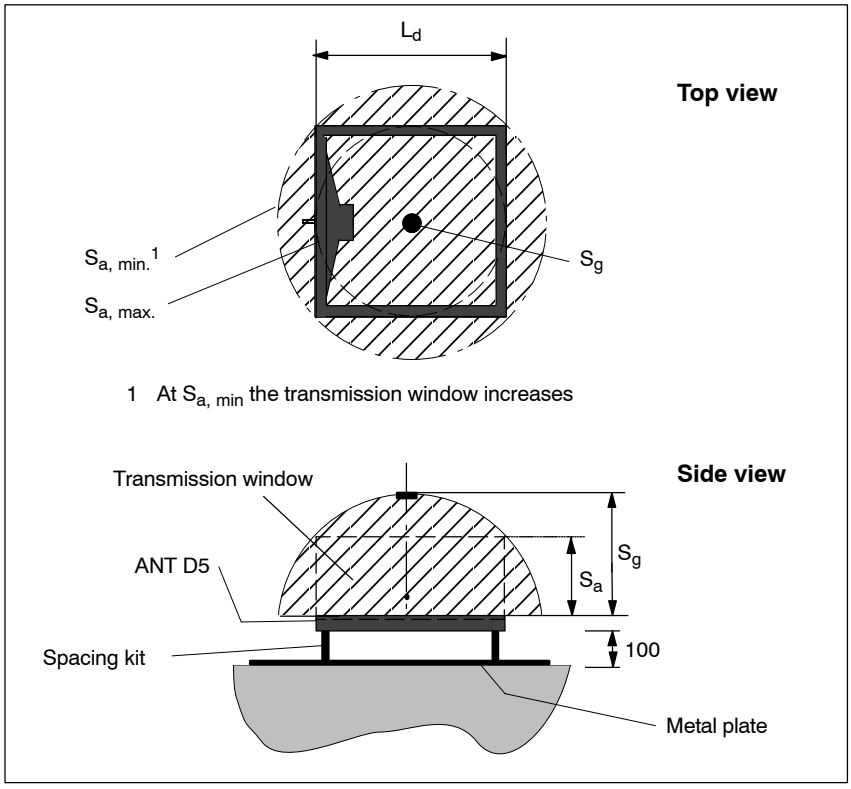


Figure 5-20 Transmission window with the SLG D10S ANT D5

Metal-free space

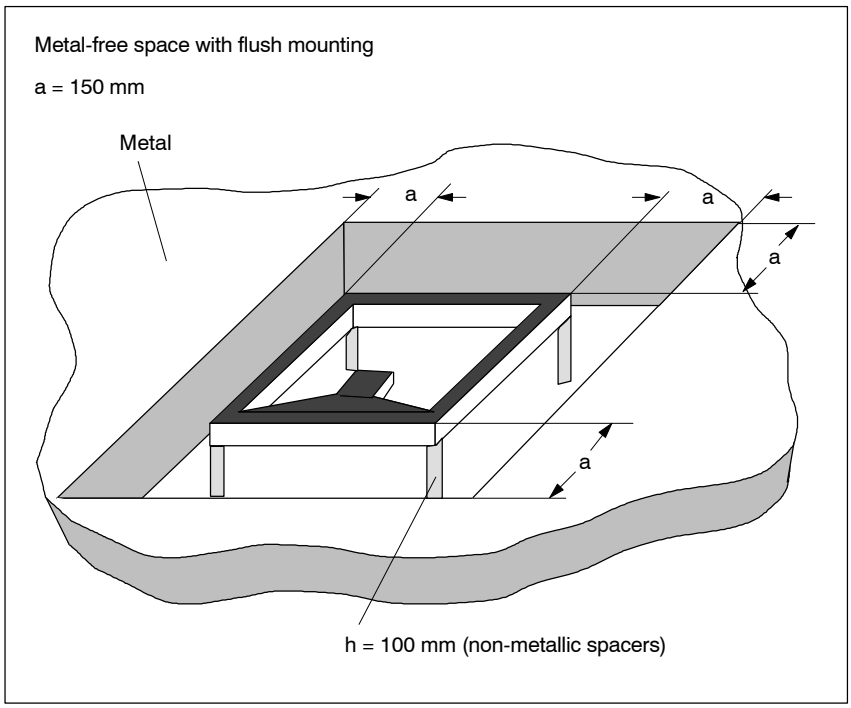


Figure 5-21 Metal-free space for the SLG D10S ANT D5

Definition of the distance D

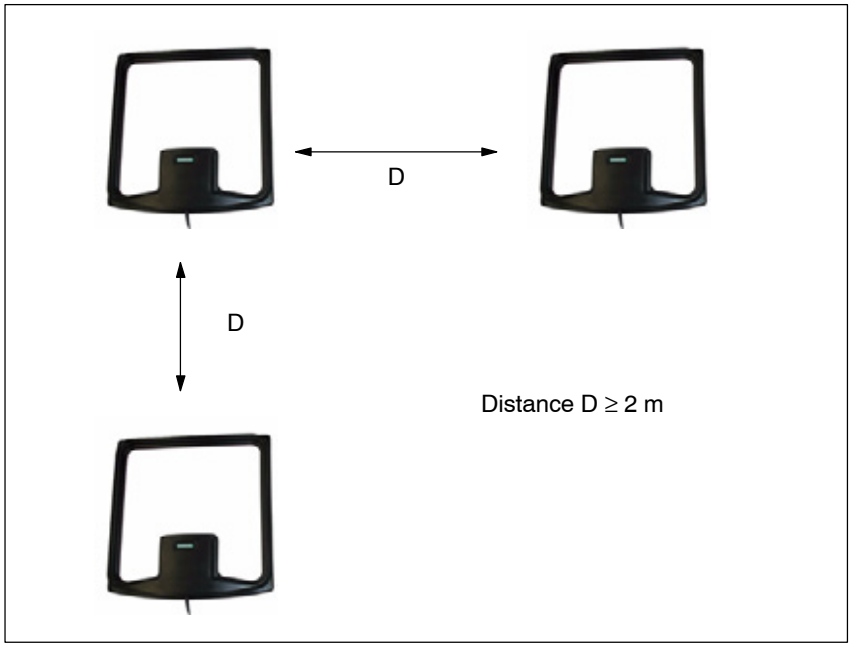


Figure 5-22 Distance D: SLG D10S ANT D5

Dimensions (in mm)

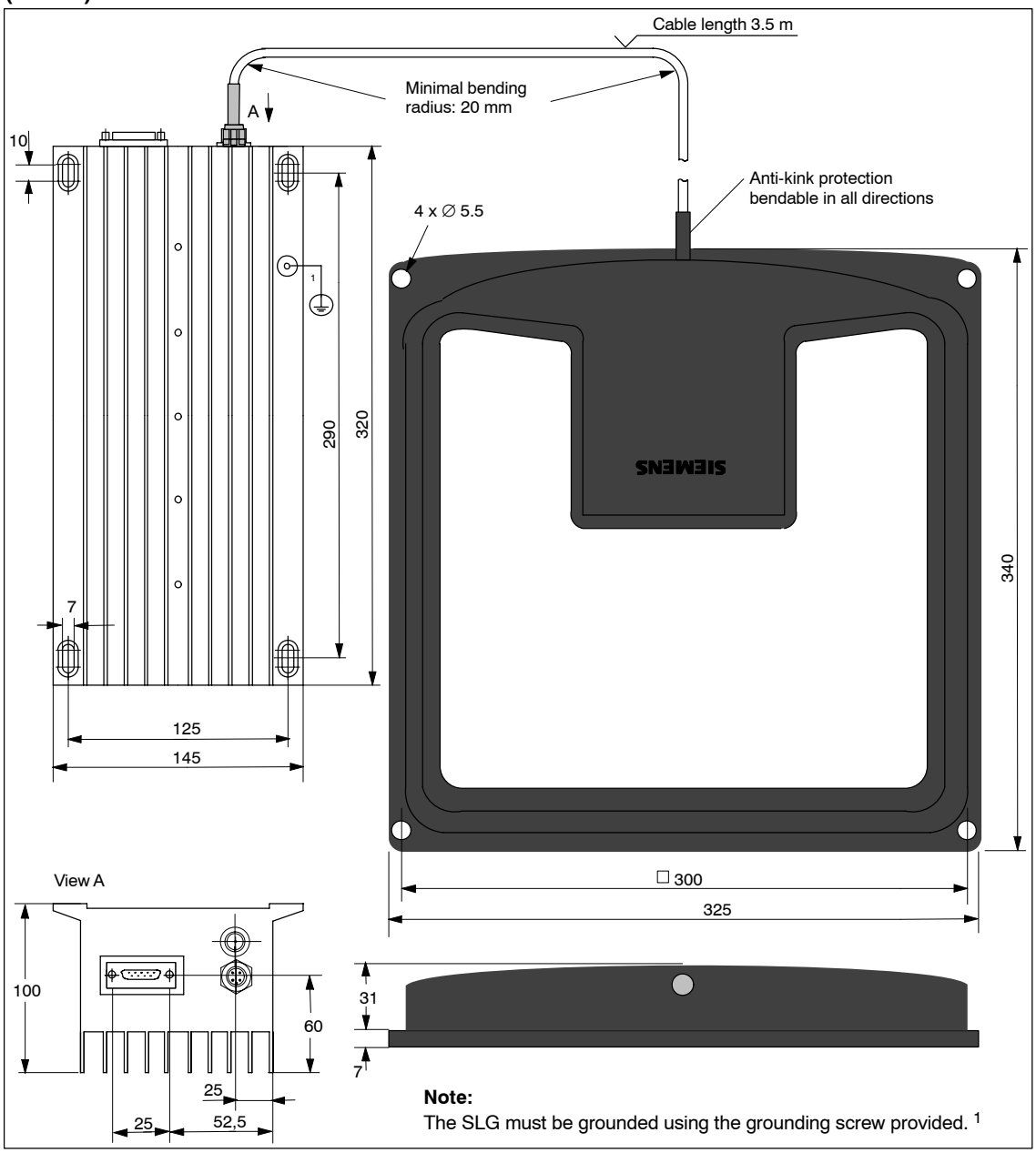


Figure 5-23 Dimensioned drawing of the SLG D10S ANT D5

Note

In order to ensure optimal field data in surroundings where there is metal as well, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal.

MOBY D ANT D5 spacer kit see Chapter 5.2

5.6 SLG D11S ANT D5

Application area

The SLG D11 ANT D5 is a medium-performance read/write device with a serial interface and a separate antenna, designed specifically for storage, logistics, and distribution applications. It is designed for a range of up to 300 mm (depending on the label).
The read/write device has an RS 422, serial interface, which permits communication via interface modules (ASM 452, ASM 473 und ASM 475) to the SIMATIC S7 or PROFIBUS-DPV1.

FC 45 is available to the user for simple and rapid programming.
A robust housing and the high degree of protection (IP65) permit deployment in the most severe industrial environments.

Figure 5-24 Read/write device SLG D11S ANT D5

Ordering information

Table 5-17 SLG D11S ANT D5 ordering information

	Order No.
Read/write device SLG D11S ANT D5 With an RS 422 serial interface for connecting to an ASM 452, ASM 473 and ASM 475, with separate antenna	6GT2 602-0AC00
Accessories:	
Spacer kit for ANT D5	6GT2 690-0AB00
MOBY DC 24 V wide-range power pack	6GT2 494-0AA00
Cables and connectors	See Section 3.6

Technical data

Table 5-18 SLG D11S ANT D5 technical data

Inductive interface to MDS	
Transmission frequency	13.56 MHz
Supported transponders	• I-Code1 (e. g. MDS D139, MDS D160) • Transponder in accordance with ISO 15693 (e. g. I-Code SLI, Tag-it HFI, my-d SRF 55V10P)
Serial interface to user	RS 422
Transmission protocol	Asynchronous 8 bit
Data transmission speed	19.2 kBaud
Data backup	CRC 16
Output power	1 W
SLG – MDS read/write distances	Typically 300 mm (see field data)[1]
Software functions	MDS read, write, initialize Command strings are not permitted. The Repeat command has not been implemented. The greatest possible length of the user data field in a command is 233 bytes.
Programming	FC 45
Transmission protocol	3964 R
Multitag	No
Power supply	
Operation	24 VDC
Permissible range	20 V to 30 VDC
Current consumption	
Operation	150 mA
Transient making current	600 mA
Line length (SLG – SIMATIC S 7)	
With RS 422	300 m
Antenna line length	3.60 m
Digital inputs/outputs	None

Table 5-18 SLG D11S ANT D5 technical data

Housing		
Dimensions (in mm)		
	For antenna [L x W x H]	340 x 325 x 38
	for the electronics [L x B x H]	160 x 80 x 40 (without connector)
Color	Antenna	Black
	SLG housing	Anthracite
Material	Antenna	Plastic ASA
	SLG housing	Plastic (PA 12)
Connector		
Antenna (can be connected to the SLG)		TNC connector
Mounting of SLG		2 M5 screws
Mounting of antenna		4 M5 screws
Ambient temperature		
in operation		–25 °C to +70 °C
in transport and storage		–25 °C to +70 °C
Protection rating in accordance with EN 60529		
SLG and antenna		IP65
Shock in accordance with EN 60721-3-7 Class 7M2 Total shock reply spectrum type II		30 g
Vibration in accordance with EN 60721-3-7 Class 7M2		1 g (9 to 200 Hz)/ 1.5 g (200 to 500 Hz)
Weight, approx.		
SLG		Approx. 600 g
Antenna		Approx. 1000 g
Certifications		Radio EN 300 330 CE Safe for pacemakers

1 To ensure optimal field data in a metallic environment, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal.

Field data

Table 5-19 SLG D11S ANT D5 field data

Limit distance (S_g)	Max. 300 mm (dependent on transponder)
Working distance (S_a)	0 to 240 mm (dependent on transponder)
Length of the transmission window (L_d)	300 mm

Table 5-19 SLG D11S ANT D5 field data

Width of the transmission window (W)	120 mm
Minimum distance from ANT D5 to ANT D5	≥ 2 m

Transmission window

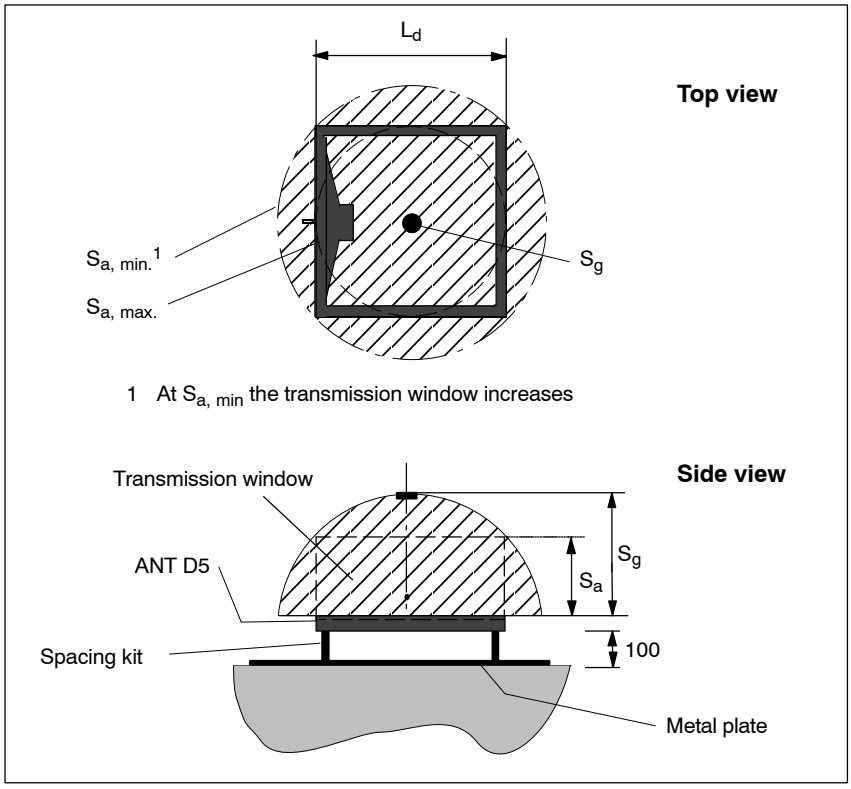


Figure 5-25 SLG D11S ANT D5 transmission window

Metal-free space

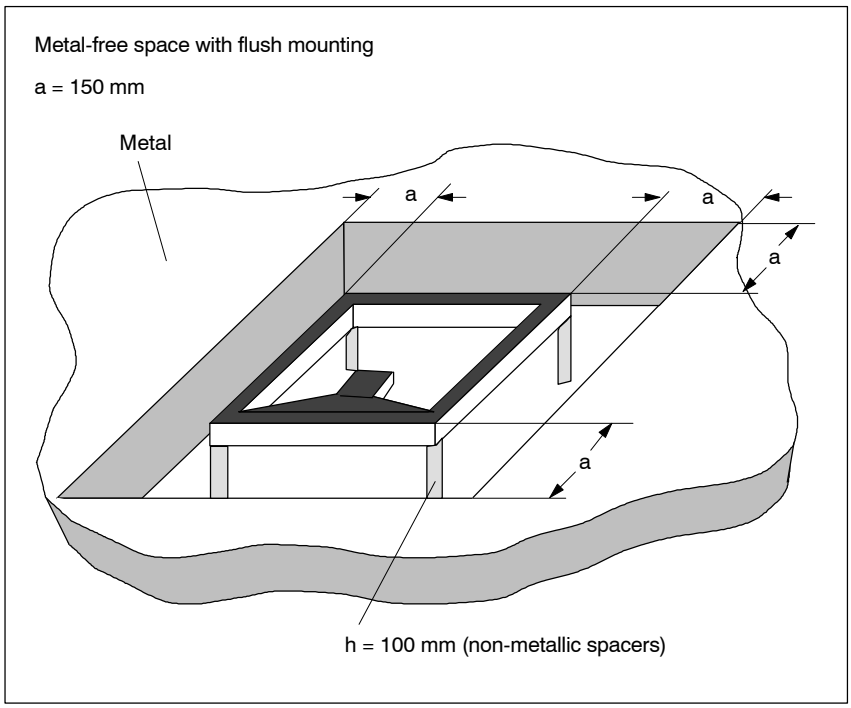


Figure 5-26 SLG D11S ANT D5 metal-free space

Definition of the distance D

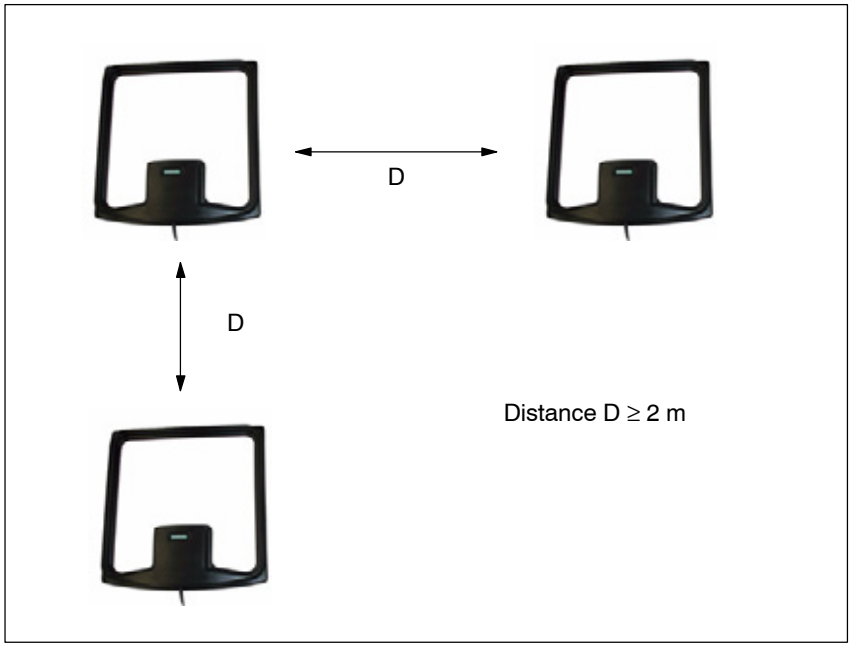


Figure 5-27 Distance D: SLG D11S ANT D5

Dimensions (in mm)

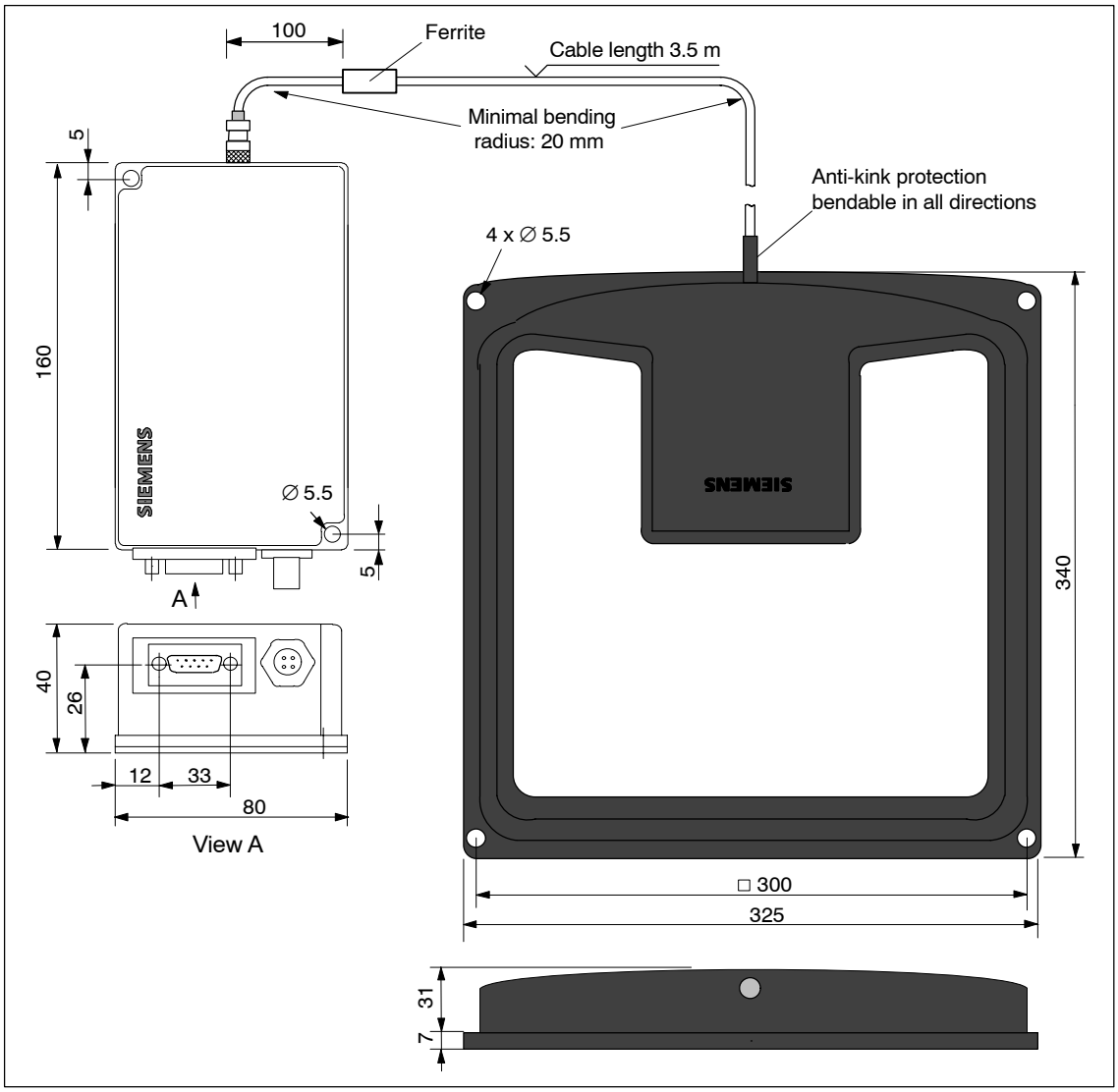


Figure 5-28 SLG D11S ANT D5 dimensioned drawing

Note

In order to ensure optimal field data in surroundings where there is metal as well, the ANT D5 is calibrated at the factory at a distance of 100 mm from metal.

MOBY D ANT D5 spacer kit

See Chapter 5.2

5.7 SLG D12S

Application area

The SLG D12 is a medium-performance read/write device with a serial interface and an integrated antenna, designed for a range of up to 150 mm (depending upon the label). The read/write device has an RS 422 serial interface, which permits communication via interface modules (ASM 452, ASM 473 und ASM 475) to the SIMATIC S7 or PROFIBUS-DP-V1.

FC 45 is available to the user for simple and rapid programming.
A robust housing and the high degree of protection (IP65) permit deployment in the most severe industrial environments.

Figure 5-29 SLG D12S read/write device

Ordering information

Table 5-20 SLG D12S ordering information

	Order No.
SLG D12S read/write device With an RS 422 serial interface for connecting to an ASM 452, ASM 473 und ASM 475, with integrated antenna	6GT2 602-0AB00
Accessories:	
MOBY DC 24 V wide-range power pack	6GT2 494-0AA00
Cables and Connectors	See Section 3.6

Technical data

Table 5-21 SLG D12S technical data

Inductive interface to MDS	
Transmission frequency	13.56 MHz
Supported transponders	• I-Code1 (e. g. MDS D139, MDS D160) • Transponder in accordance with ISO 15693 (e. g. I-Code SLI, Tag-it HFI, my-d SRF 55V10P)
Serial interface to user	RS 422
Transmission protocol	Asynchronous 8 bit
Data transmission speed	19.2 kBaud
Data backup	CRC 16
Output power	1 W
SLG – MDS read/write distances	Typically 150 mm (see field data)
Software functions	MDS read, write, initialize Command strings are not permitted. The Repeat command has not been implemented. The greatest possible length of the user data field in a command is 233 bytes.
Programming	FC 45
Transmission protocol	3964 R
Multitag	No
Power supply	
Operation	24 VDC
Permissible range	20 V to 30 VDC
Current consumption	
Operation	150 mA
Transient making current	600 mA
Line length (SLG – SIMATIC S 7)	
With RS 422	300 m
Digital inputs/outputs	None
Housing	
Dimensions (L x B x H) in mm, without connectors	160 x 80 x 40
Color	Anthracite
Material	Plastic (PA 12)
Mounting	2 M5 screws
Ambient temperature	
in operation	–25 °C to +70 °C
in transit and storage	–25 °C to +70 °C

Table 5-21 SLG D12S technical data

Protection rating in accordance with EN 60529	IP65
Shock in accordance with EN 60721-3-7 Class 7 M2 Total shock response spectrum Type II	30 g
Vibration in accordance with EN 60721-3-7 Class 7M2	1 g (9 to 200 Hz)/ 1.5 g (200 to 500 Hz)
Weight, approx.	600 g
Certifications	Radio EN 300 330 CE Safe for pacemakers

Field data

Table 5-22 SLG D12S field data

Limit distance (S_g)	Max. 150 mm (dependent on transponder)
Working distance (S_a)	0 to 120 mm (dependent on transponder)
Length of the transmission window (L_d)	120 mm
Width of the transmission window (W)	48 mm
Minimal distance from SLG D12S to SLG D12S	≥ 500 mm

Transmission window

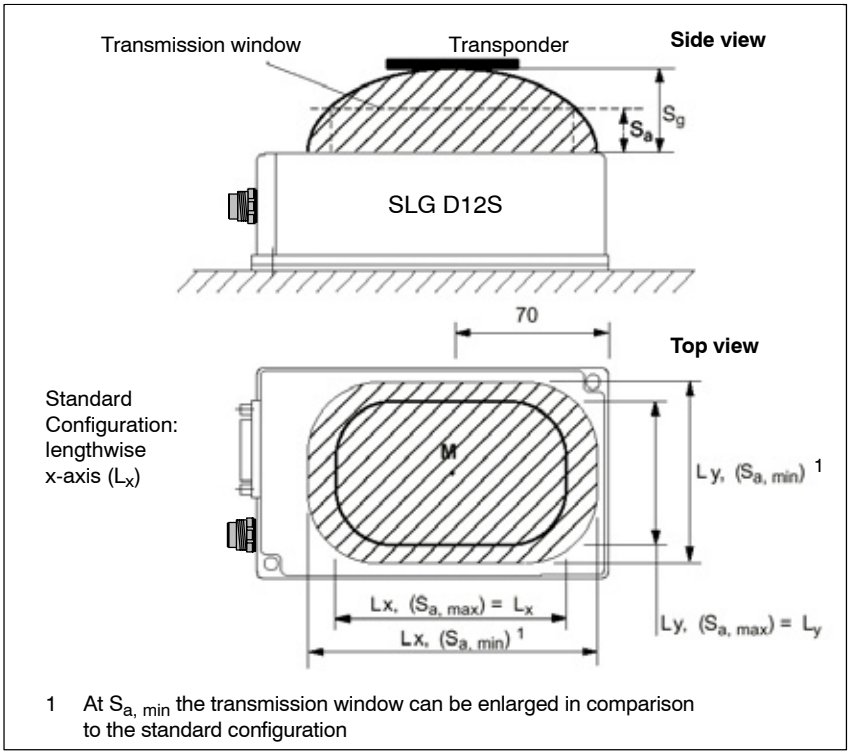


Figure 5-30 Transmission window of the SLG D12S

Metal-free space

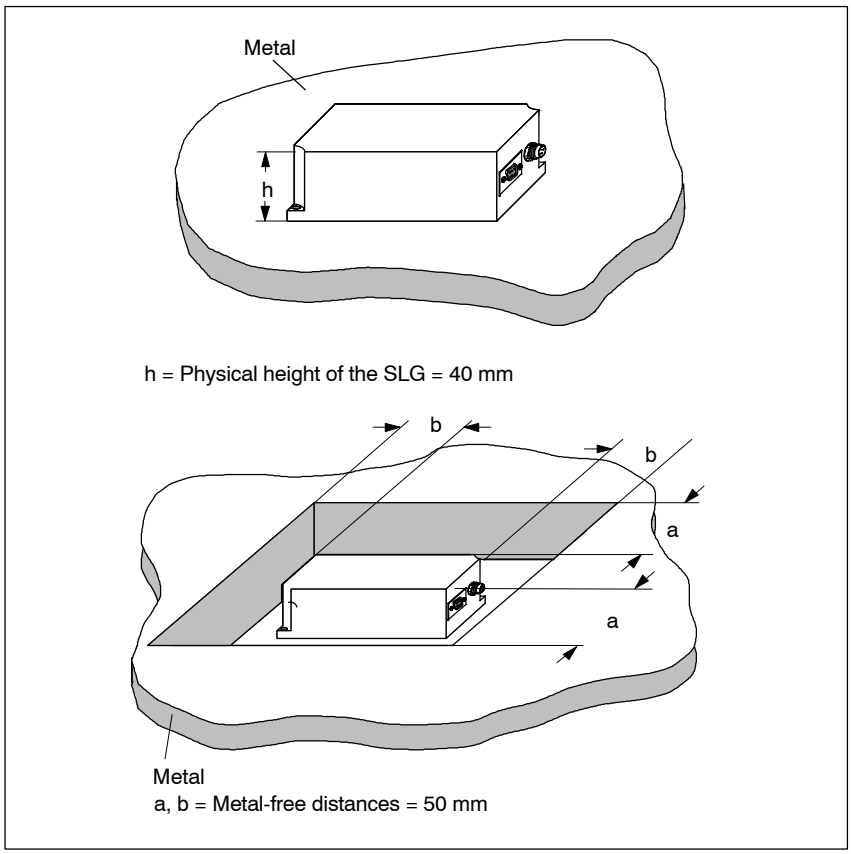


Figure 5-31 SLG D12S metal-free space

Definition of the Distance D

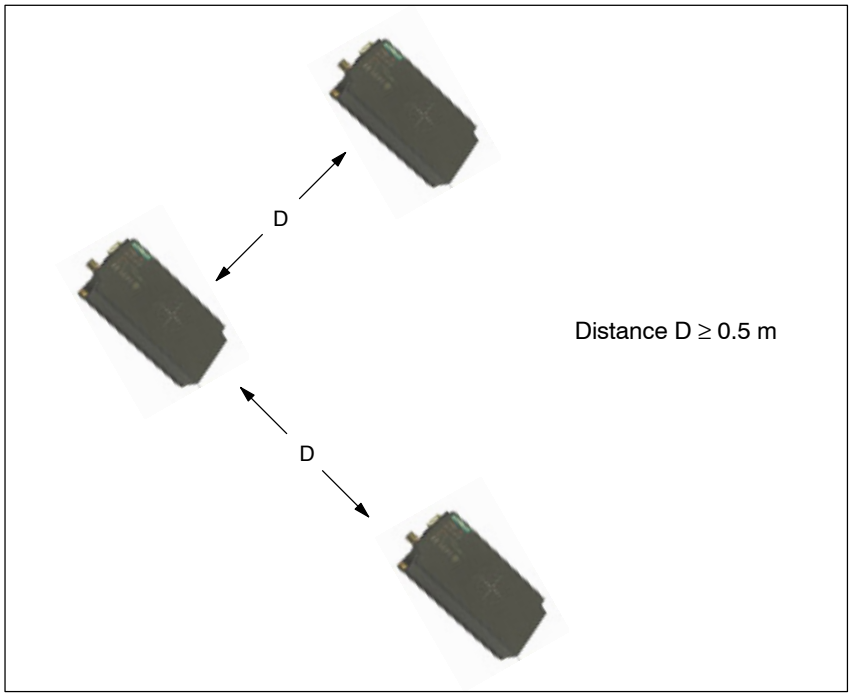


Figure 5-32 Distance D: SLG D12S

Dimensions (in mm)

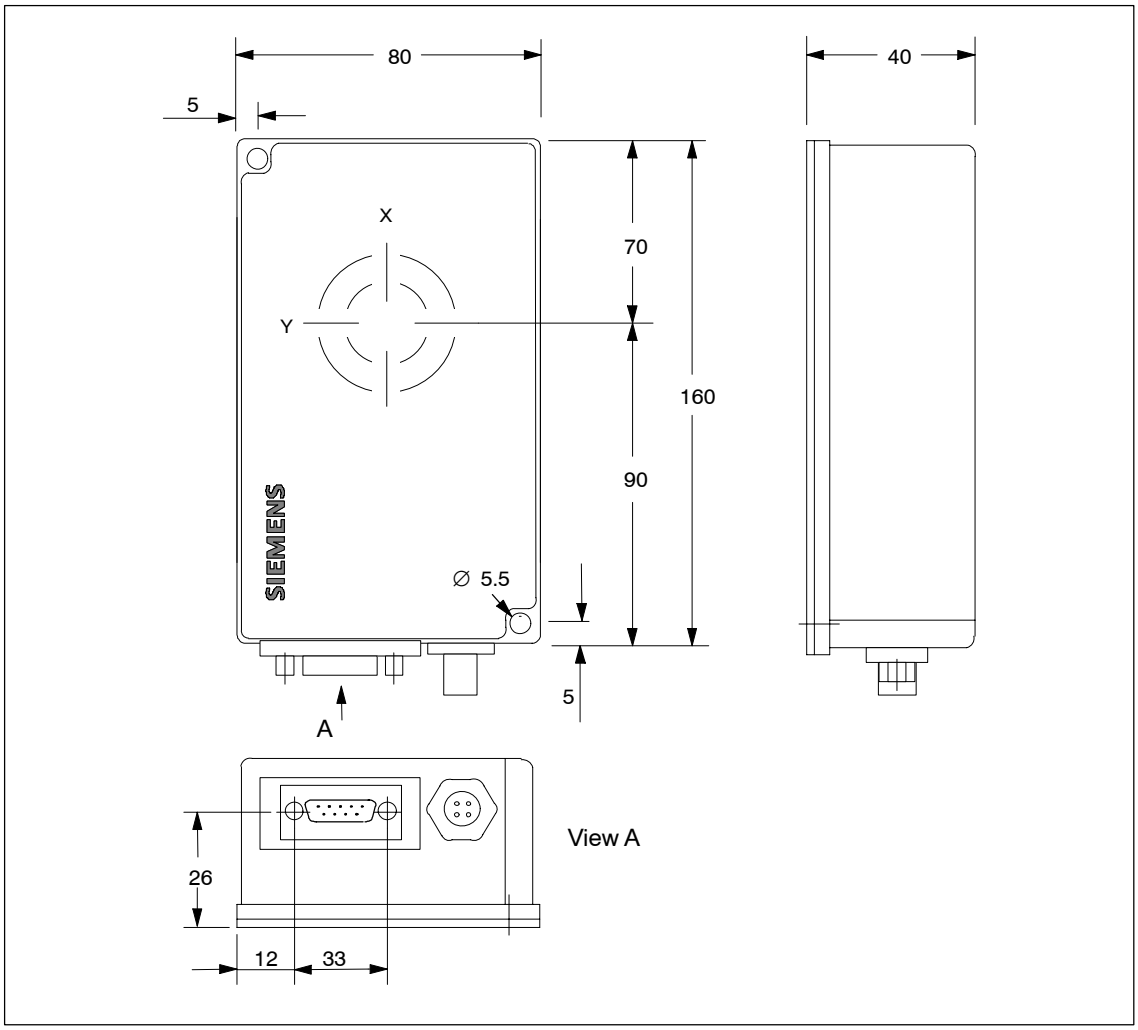


Figure 5-33 Dimensioned drawing SLG D12S

Interfaces

6

6.1 Introduction

Application area

The ASM interfaces are the link between the MOBY D components (SLGs/ MDSs) and the high-level controllers (e.g., SIMATIC S7) or PCs or computers. Depending on the interface used, up to two SLGs can be connected.

Setup and functions

An ASM consists of a microcontroller system with its own program (PROM). The CPU receives the commands over the user interface and stores these in the RAM. The user receives an acknowledgment that the command has arrived. If the command is okay, the CPU begins executing it.

Overview

Table 6-1 Overview of the interfaces

ASM Type	Interfaces to PC/ computer	Interfaces to SLG	Function blocks	SLG connections	Dimensions (W x H x D in mm)	Temperature range (operation)	Degree of protection
ASM 452	PROFIBUS-DP-V1	2 x 5-pin prox. switch connector	FC 45	1	134 x 110 x 55	0 to +55 °C	IP67
ASM 473	Can be plugged into ET 200X	2 x 5-pin prox. switch connector	FC 45	1	87 x 110 x 55	0 to +55 °C	IP67
ASM 475	Can be plugged into S7-300/ ET 200M	Via screw terminals	FC 45	2 (parallel)	40 x 125 x 120	0 to +60 °C	IP20

6.2 ASM 452

Application area

The ASM 452 interface module is a MOBY module for use with MOBY components via PROFIBUS-DP-V1 on the following devices:

- All computers and PCs
- All controllers

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

Figure 6-1 Interface module ASM 452

The ASM 452 is the result of rigorous further development of the well-known ASM 450 interface modules. As a result of the use of acyclic data traffic on the PROFIBUS-DPV1, optimal data throughput is obtained even in large PROFIBUS configurations. The minimum cyclic data load of the ASM 452 on PROFIBUS guarantees the user that other PROFIBUS stations (e.g. DI/DO) will continue to be processed very quickly.

The ASM 452 is an interface module for communication between PROFIBUS and the SLG D1xS with RS 422. Via the ASM 452 the data can be addressed physically to the MDS D139/D160 (”normal” addressing).

FC 45 is available for ”normal” addressing with SIMATIC S7.

FC 45 gives the S7 user an easy-to-use interface with powerful commands. The FC 45 provides additional pipelining (not for the SLG D11S ANT D5 und SLG D12S) and S7 data structures by means of UDTs.

Ordering data

Table 6-2 Ordering data of the ASM 452

ASM 452 interface module for PROFIBUS-DPV1 1x SLG D1xS with RS 422 connectable	6GT2 002-0EB20
Accessories: Connector for PROFIBUS-DP connection and 24 V power	6ES7 194-1AA00-0XA0
SLG cable ASM 452 ↔ SLG D1xS Length 2 m; standard cable Other lengths: 5 m 20 m	 6GT2 491-1CH20 6GT2 491-1CH50 6GT2 491-1CN20
Opt. Cable connector without SLG cable (for cable lengths > 20 m) (see Figure 6-3) ASM 452 ↔ SLG	6GT2 090-0BC00
M12 covering caps for unused SLG connections (1 package = 10 units)	3RX9 802-0AA00
MOBY software[1)] with FC 45, DDB file	6GT2 080-2AA10
Replacement part: Connector plate; T functionality for PROFIBUS connection	 6ES7 194-1FC00-0XA0
Description of FC 45 German English	 6GT2 097-3AM00-0DA1 6GT2 097-3AM00-0DA2

1) See Chapter 5.1.1

Technical data

Table 6-3 Technical data of ASM 452

	ASM 452 with FC 45
Serial interface to user	PROFIBUS DP V1
Procedure after connection	EN 50170, vol. 2, PROFIBUS
	PG 11 screw connection PROFIBUS and power supply connectors are not included.
Transmission speed	9600 baud to 12 MBaud (automatic recognition)
Max. block length	2 words (cyclic)/240 bytes (non-cyclic)
Serial interface to SLG	
Connector	2 M12 coupling connectors
Line length, max.	2 m = standard length; Other prefabricated cables: 5 m, 20 m (up to 1000 m on request)
SLGs which can be connected	1x SLG D1xS with RS 422
Software functions	
Programming	Depends on the PROFIBUS DP master
Function blocks for SIMATIC S7	FC 45
MDS addressing	Direct access with addresses
Commands	Initialize MDS, read data from MDS, write data to MDS, and so on
Multi-tag capability	No
S7 data structures via UDTs	Yes
Voltage[1]	
Nominal value	24 VDC
Permissible range	20 to 30 VDC
Current consumption	Max. 180 mA; typ. 130 mA (without SLG, DO not loaded)
Digital inputs	None
Digital outputs	None
Ambient temperature in operation in transit and storage	 0 to +55 °C –40 to +70 °C
Dimensions (W x H x D) in mm	134 x 110 x 55 (without bus connector)
Mounting	4 M5 screws; mounting possible on any plate or wall
Weight, approx.	0.5 kg
Degree of protection	IP67
MTBF (at 40 °C)	$30 \bullet 10^4$ hours = 34 years

1 The SLG power supply for the MOBY D cannot be connected via the ASM.

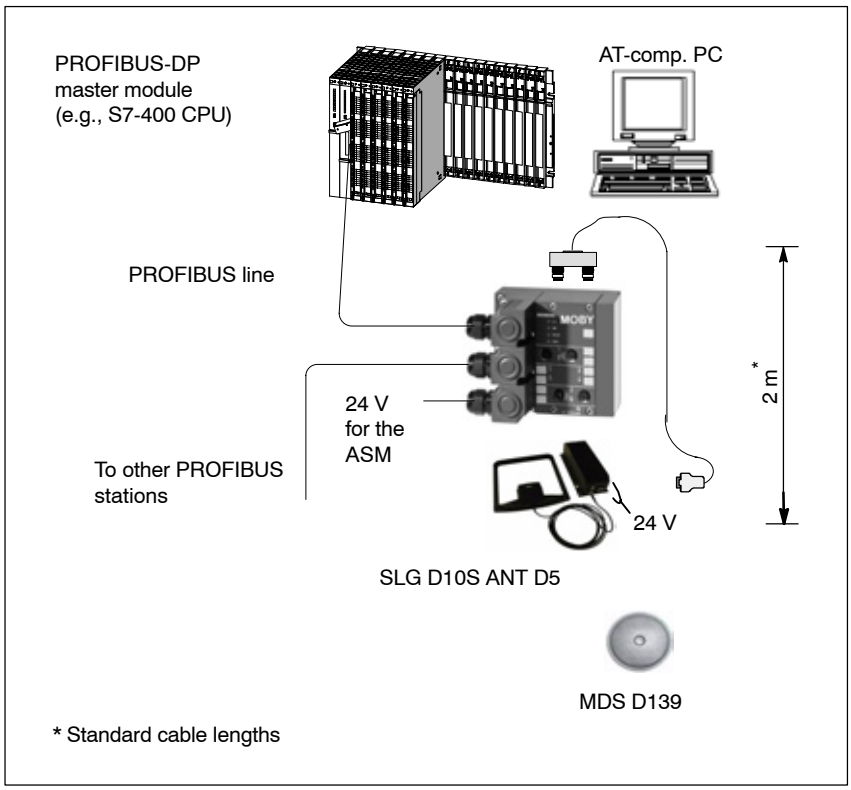


Figure 6-2 Configurator – ASM 452

Hardware description

The ASM 452 has the same housing as the distributed I/O device ET 200X. For the general chapters on the ASM 452 (e.g., mounting, operation and wiring, general technical data) see the ET 200X manual (order no. 6ES7 198-8FA00-8AA0). Accessories and network components are also covered by this manual.

PROFIBUS configuration

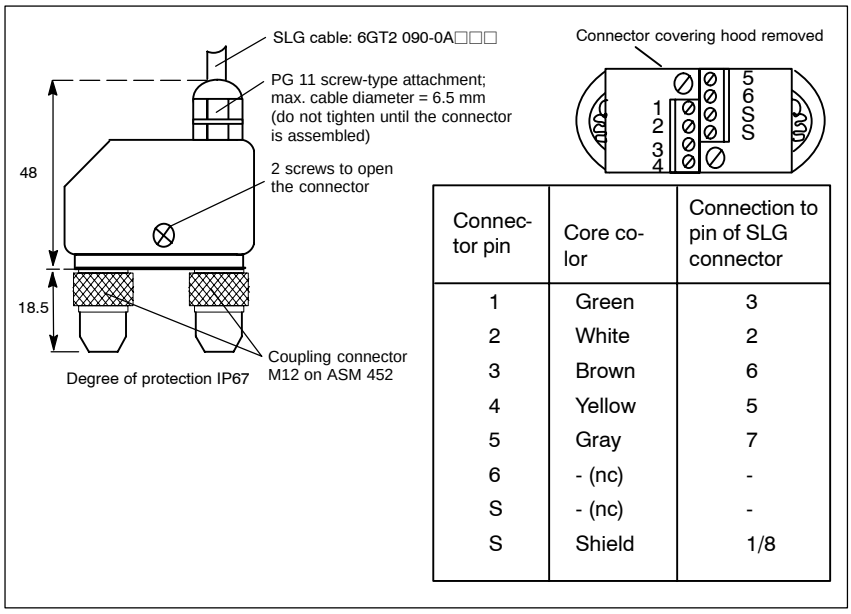
The ASM 452 is integrated in the hardware configuration with a DDB file. The ASM can then be configured using SIMATIC Manager's HWCONFIG or another PROFIBUS tool.
The ASM is then configured with HWCONFIG of SIMATIC Manager or another PROFIBUS tool. "Software MOBY" contains a DDB file for the ASM 452.

ASM 452 operating mode

The approved mode operating modes of the ASM 452 are described in the GSD file. Setting up is performed by means of the hardware configuration tool (e.g. STEP 7 HW-Config).

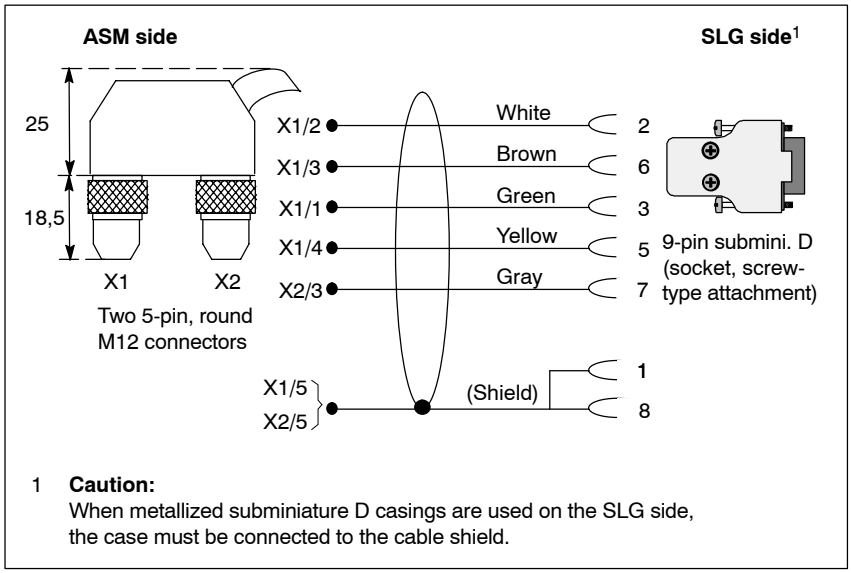
SLG connection system

An SLG always occupies two M12 connection sockets on the ASM 452.
A prefabricated cable therefore ensures an easy, optimal connection (see Figure 6-4). As standard, the connecting cable has a length of 2 m; it can also be supplied with a length of 5 m or 20 m.
For users who want to make their own cable, an SLG cable connector with screw-type terminals is available (see Figure 6-3). Cables and SLG connectors can be ordered from the MOBY catalog.



Connector pin	Core color	Connection to pin of SLG connector
1	Green	3
2	White	2
3	Brown	6
4	Yellow	5
5	Gray	7
6	- (nc)	-
S	- (nc)	-
S	Shield	1/8

Figure 6-3 Cable connector ASM 452/473 ↔ SLG D1xS with RS 422 (6GT2 090-0BC00)



1 **Caution:**
When metallized subminiature D casings are used on the SLG side, the case must be connected to the cable shield.

Figure 6-4 Connecting cable ASM 452/473 ↔ SLG D1xS with RS 422 (6GT2 491-1CH20)

PROFIBUS cable with 24 V supply

The ASM 452 can also be operated with the “green” PROFIBUS cable. Please note that a 24 V cable leads from X12 to X13. Thereby the 24 V cable can be connected to plug X12 an Pin 5, 6.

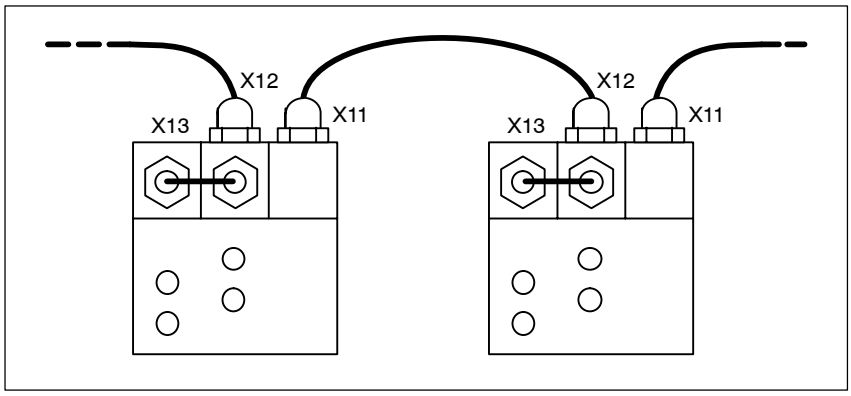


Figure 6-5 PROFIBUS cable with 24 V power supply

Dimensional drawing

The following diagram shows a dimensional drawing of the ASM 452 with bus connectors. The length of the PG screws and the radius of the cable must both be added to the total width and depth specified below.

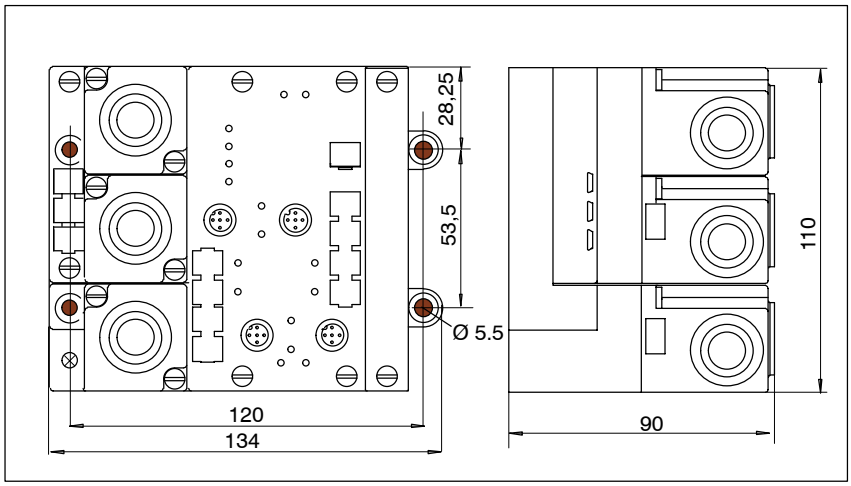
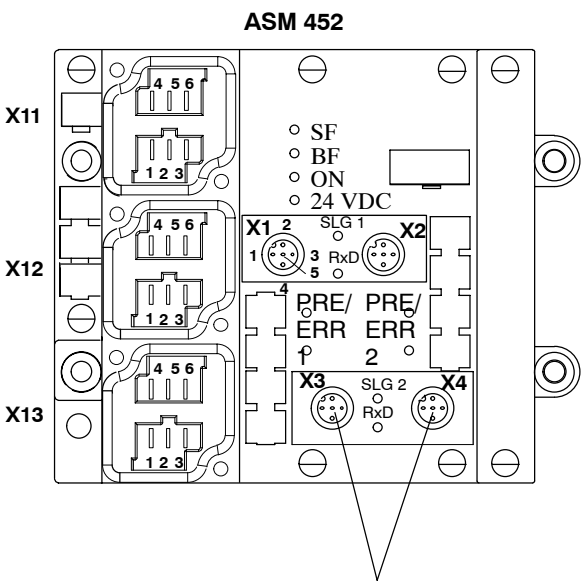


Figure 6-6 Dimensional drawing of the ASM 452

Pin allocations The figure below shows the pin allocations of the ASM 452.



LEDs for PROFIBUS-DP

SF: System Fault (see Table 6-4)

BF: Bus Fault (see Table 6-4)

ON: lights up when for the ASM the logic power is active (is generated by 24 V power supply).

24 VDC: lights up when for the ASM the 24 V power supply has been connected.

LEDs for MOBY and ASM 452

RxD: SLG is active with a command

PRE/ERR 1 MDS is present or there is an error indication

(PRE/ERR 2) for the SLG (the display "MDS present" always has priority. The Error indication only occurs if no MDS is present.)

MDS present:
The LED is permanently ON. If more than one MDS is in the field, then the number of MDSs is displayed by flashing pattern. No error output occurs.

Error indication:
The LED is permanently OFF. Die last Error number is displayed by flashing pattern.

SLG 1: SLG 1 has been selected.

(SLG 2) (SLG 2 has been selected.)
Only SLG 1 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 (power supply)	1	PE
	2	L+
	3	M
	4	PE
	5	L+
	6	M

* Don't circuit

Socket	Pin allocation (SLG)		
X1 (X3)	1	+RxD	
	2	+TxD	
	3	-TxD	
	4	-RxD	
	5	PE	
X2 (X4)		**X2**	**X4**
	1	+24 V	+24 V
	2	DA1	DE1
	3	0 V	0 V
	4	DA0	DE0
	5	PE	PE

Figure 6-7 ASM 452 pin layout and LEDs

Note

The SLG power supply for the MOBY D cannot be connected via the ASM.

PROFIBUS Diagnostics

In the following tables you will find possible error messages together with their meanings and corrective actions.

Table 6-4 LED indication for PROFIBUS diagnostics

LED "BF"	LED "SF"	Cause of error	corrective action
on	*	• ASM 452 is starting up.	–
		• The connection to the DP-Master has dropped out. • ASM 452 doesn't recognize a baudrate.	• Check the PROFIBUS-DP connection. • Check the DP-Master.
		• Bus interruption • DP-Master is out of service	• Check all cables in your PROFIBUS-DP network. • Check whether or not the connectors for the PROFIBUS-DP are firmly connected to the ASM 452.
flash-ing	on	• The configuration data sent by the DP-Master to the ASM 452 do not match those of the ASM 452 setup.	• Check the ASM 452 configuration (input/output, PROFIBUS addresses). • is the proper GSD file being used? – SIEM80B6.GSD for ASM 452
flash-ing	off	• ASM 452 recognized the baudrate, is not, however, being addressed by the DP-Master. • ASM 452 was not configured.	• Check the preset PROFIBUS addresses in the ASM 452 as well as in the configuration software. • Check the ASM 452 configuration (terminal type).
on	flash-ing	• There is a hardware defect in the AMS 452.	• Replace the ASM 452.

* The status is not relevant

Example of how much cable to bare

The following figure shows an example of how to bare a cable. The lengths apply to all cables which you can connect to the connectors. Twist existing shield braiding, stick in a core sleeve, and trim off excess.

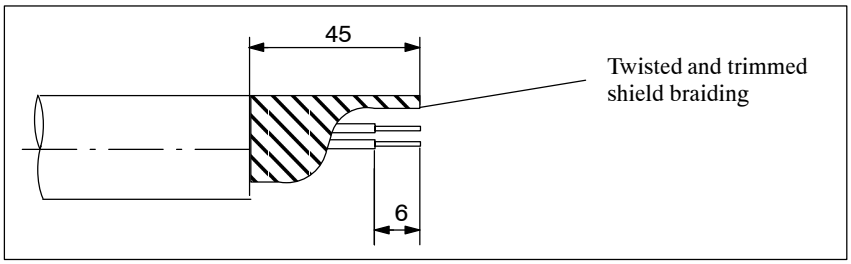


Figure 6-8 Length of bared cable for PROFIBUS cable

PROFIBUS address and terminating resistor

The connector plate of the ASM must be removed before you can set the PROFIBUS address or connect the terminating resistor. The connector plate covers the DIP switches. The following figure shows the location of the DIP switches on the ASM and the applicable sample setting.

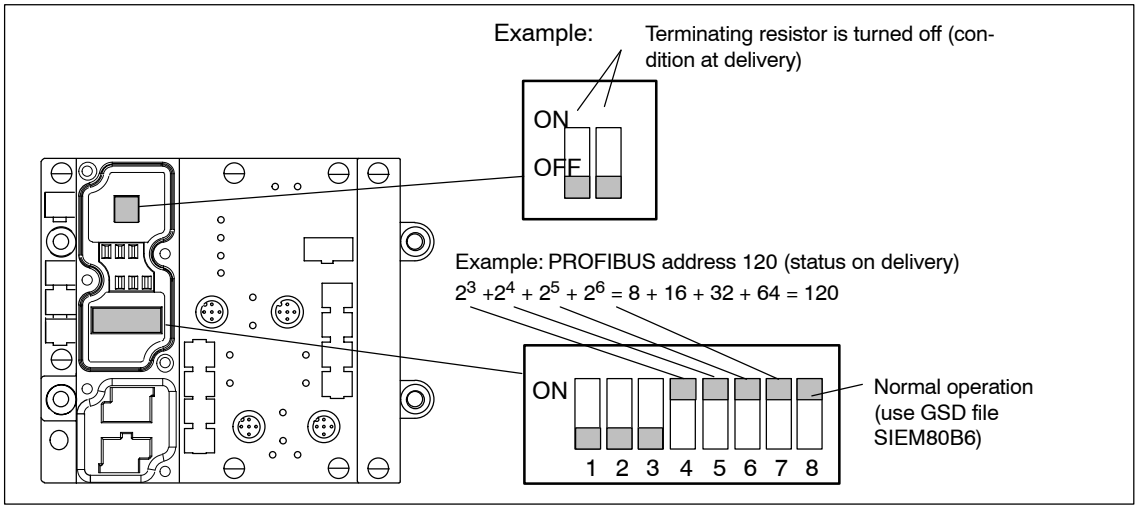


Figure 6-9 Setting PROFIBUS address/turning on terminating resistance

Note

- The PROFIBUS address on the ASM 452 must always be the same as the PROFIBUS address specified for this ASM in the configuration software.
- You must always turn **both** DIP switches either on or off so that the terminating resistance is correct.

6.3 ASM 473

Application area

The ASM 473 is a MOBY module for the SIMATIC S7. It can be connected to the ET 200X distributed I/O device and DESINA. The ET 200X is operated via PROFIBUS-DPV1. An S7-300 or S7-400 with an integrated PROFIBUS connection can be used as the programmable logic controller.

The ASM 473 complements the SIMATIC S7 MOBY ASM 475 interface module. Due to its IP67 protection, it can be set up and operated in the process directly without an additional protective housing.

An ET 200X basic module (BM 141/142) with the order number 6ES7 141-1BF11-0XB0 or 6ES7 142-1BD21-0XB0 or a BM 143 is a prerequisite for using the ASM 473.

The data are accessed on the MDS with physical addresses.

Function FC 45 is available for operation with SIMATIC S7. The hardware configuration of the ASM 473 is performed with an Object Manager (OM) which is 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 6-10 Interface module ASM 473

Ordering data

Table 6-5 Ordering data of the ASM 473

ASM 473 interface module 1x SLG D1xS connectable with RS 422	6GT2 002-0HA10
Accessory: SLG cable ASM 473 ↔ SLG D1xS Length 2 m; standard cable Other lengths: 5 m 20 m Opt. connector without SLG cable ASM 473 ↔ SLG (for cable lengths > 20 m) (see Figure 6-3) MOBY software[1] with FC 45, DDB file	 6GT2 491-1CH20 6GT2 491-1CH50 6GT2 491-1CN20 6GT2 090-0BC00 6GT2 080-2AA10
Description - FC 45 German English	 6GT2 097-3AM00-0DA1 6GT2 097-3AM00-0DA2

1 See Chapter 5.1.1

Technical data

Table 6-6 Technical data of the ASM 473

Interface to the ET 200X	SIMATIC S7 P bus, cyclic/non-cyclic services
Communication	2 words (cyclic)/ 238 bytes (non-cyclic)
Command buffer on ASM	142 x 238 bytes
Serial interface to SLG	
Connector	2 M12 coupling connectors
Line length, max.	2 m = standard length; other prefabricated cables = 5 m, 20 m (up to 1000 m on request)
SLGs which can be connected	1 x SLG D1xS with RS 422
Software functions	
Programming	Depends on PROFIBUS-DP master
Function blocks for SIMATIC S7	FC 45
MDS addressing	Direct access with addresses
Commands	Initialize MDS, read data from MDS, write data to MDS, and so on
PROFIBUS diagnosis	Yes; in accordance with ET 200X base station
S7 diagnosis	Yes, can be called via S7 OEM
Firmware can be loaded.	Yes, via S7 OEM

Table 6-6 Technical data of the ASM 473

Voltage[1]	
Nominal value	24 VDC
Permissible range	20.4 V to 28.8 VDC
Current consumption	Typ. 75 mA; Max. 500 mA (or see technical data of the connected SLG)
Power loss of the module	Typ. 1.6 W
Digital inputs/outputs	Via expansion modules from the ET 200X family
Ambient temperature	
in operation	0 °C to +55 °C
in transit and storage	–40 °C to +70 °C
Dimensions (W x H x D) in mm	
Single device	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)
Degree of protection	IP67
Weight, approx.	0.275 kg

1 The SLG power supply for the MOBY D cannot be connected via the ASM.

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

Configuration

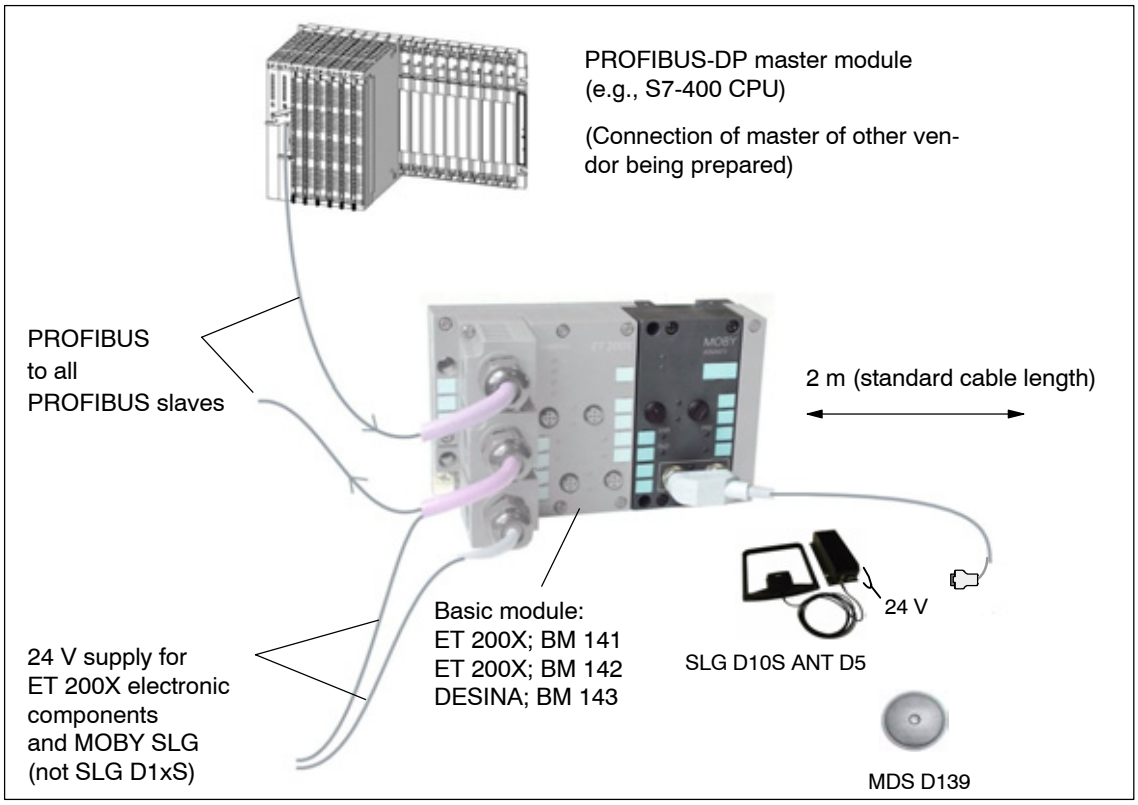


Figure 6-11 Configurator for an ASM 473

Note

The ET 200X differs from the ASM 452 (see figure 6-2) in that the 24 V must be fed to the PROFIBUS connector and the load voltage connector (see ET 200X manual for more information).

Basic module – prerequisite for operating the ASM 473

The following table shows the status of the ET 200X basic module from 10/2002. The functionality of newer basic modules is stored in the HW-Config of the SIMATIC-Manager.

Table 6-7 Prerequisite for operating the ASM 473

Order number for the ET 200X basic module	To be operated with ASM 473 (6GT2 002-0HA00)*	To be operated with 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 canceled

** Prerequisite for operation: please assign parameters to the module 6ES7 142-1BD21-0XB0 in the HW-Config.

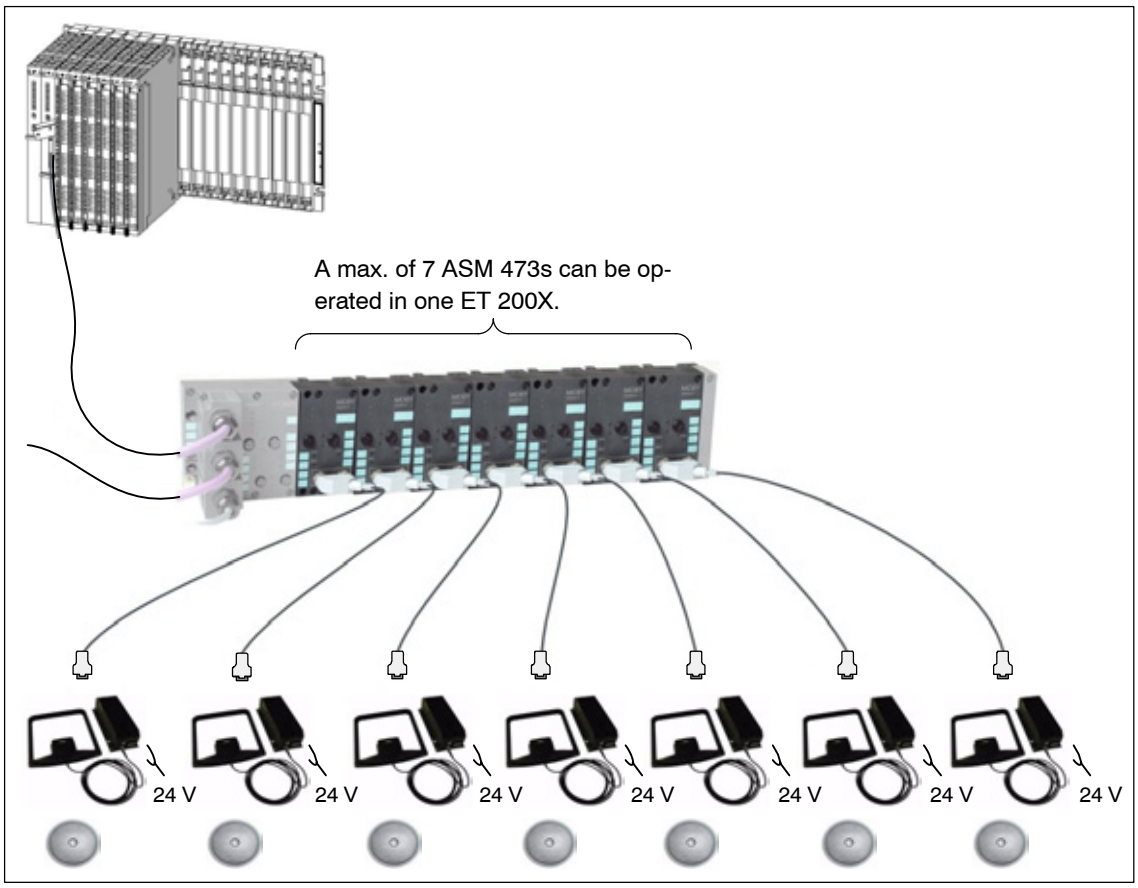


Figure 6-12 Maximum configuration of ASM 473s on one ET 200X

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

Hardware configuration

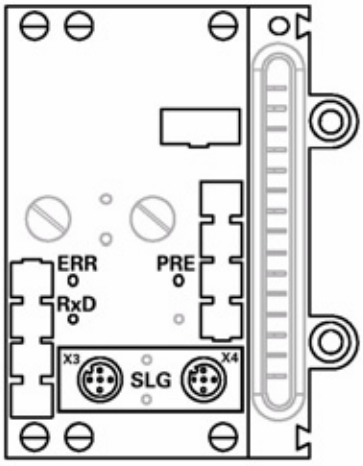
The ASM 473 is integrated in the hardware configuration of SIMATIC Manager by calling Setup.exe in the data/S7_OM directory on the ”Software MOBY” CD. At the moment the ASM 473 cannot be integrated on the master of another manufacturer.

SLG connection system

An SLG always occupies the two M12 connection sockets X3 and X4 on the ASM 473. A prefabricated cable therefore ensures easy, optimal connection of the SLG (see Figure 6-4). The standard version of the connection cable has a length of 2 m. Other lengths are available on request.
An SLG connector with screw terminals is available for users who want to make their own cables (see Figure 6-3). Cables and SLG connectors can be ordered from the MOBY catalog.

Pin allocations

The following figure shows the pin allocation to the SLG and describes the indicator elements.



Socket	Pin allocation (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 VDC) 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 sec	ASM has started up and is waiting for a RESET (init_run) from the user.

Figure 6-13 Interfaces and LEDs of the ASM 473

Note

The SLG power supply for the MOBY D cannot be connected via the ASM.

Dimensional 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.

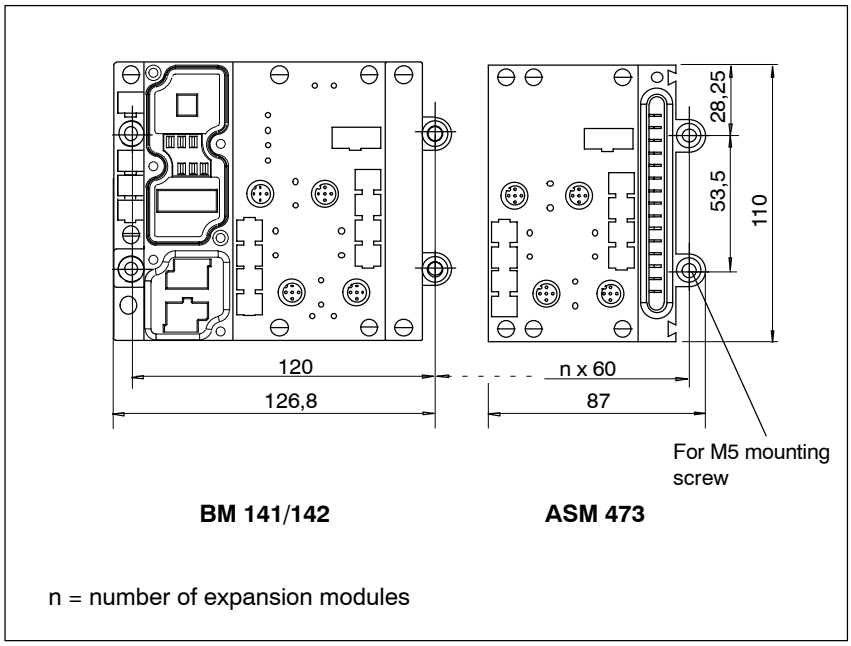


Figure 6-14 Dimensions for mounting holes for basic and expansion modules

6.4 ASM 475

Application area

The interface module ASM 475 can be installed in the SIMATIC S7-300 and ET 200M, and can be utilized for all MOBY systems.

Up to eight ASM 475 interface modules can be installed and run in one module rack of the SIMATIC S7-300. When a setup with several module racks (max. of four) is used, the ASM 475 can be installed and run in every rack. In its maximum configuration, one SIMATIC S7-300 can handle up to 32 ASMs centrally. The ASMs can just as well be run on the distributed I/O ET 200M on PROFIBUS. This makes operation in an S7-400 environment possible. Up to 7 ASMs can be run on one ET 200M.

Error messages and operational states are indicated with LEDs.
The galvanic isolation between SLG and the SIMATIC S7-300 bus permits interference-immune operation.

Figure 6-15 Interface ASM 475

The ASM 475 with the order number 6GT2 002-0GA10 is eine programmable module. Basic functions of the module are then determined and set during the cofiguration of the module in the HW-Config (e. g. standard addressing).

With the ASM 475 the data are accessed on the MDS through physical addresses. SIMATIC S7 operation is controlled by the FC 45 function.

The ASM 475 and FC 45 together form a single unit, which allows for simple and optimal reading of MDS data. A 32 KB MDS memory is read in 24 s, largely independent of the S7 cycle time.

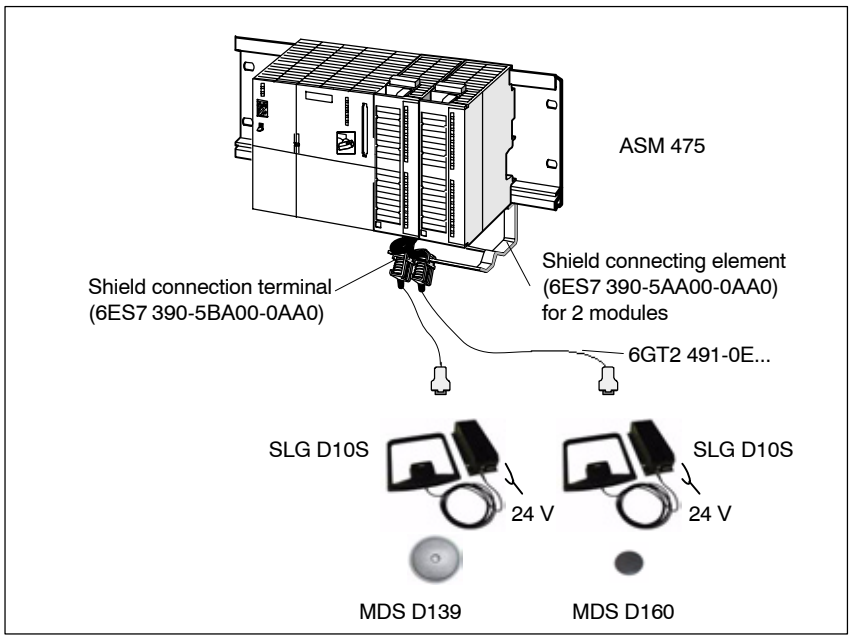


Figure 6-16 Configuration for the ASM 475 (central)

Ordering data

Table 6-8 Ordering data for ASM 475

ASM 475 interface module for SIMATIC S7 2 x SLG D1xS with RS 422 can be connected in parallel, without a front connector	6GT2 002-0GA10
Accessories:	
Front connector (1 per ASM)	6ES7 392-1AJ00-0AA0
SLG cable ASM 475 ↔ SLG D1xS Lengths: 5 m 20 m 50 m	 6GT2 491-0EH50 6GT2 491-0EN20 6GT2 491-0EN50
Opt. connector without SLG cable (for cable lengths > 50 m) (see Figure 6-3) ASM 475 ↔ SLG	6GT2 090-0BC00
Shield connection terminal (1 per SLG cable) Shield connecting element	6ES7 390-5BA00 -0AA0 6ES7 390-5AA00 -0AA0
MOBY software [1)] with FC 45, S7 Object Manager	6GT2 080-2AA10
Description - FC 45	
German	6GT2 097-3AM00-0DA1
English	6GT2 097-3AM00-0DA2

1) See Chapter 5.1.1

Technical data

Table 6-9 Technical data of the ASM 475

	ASM 475 with FC 45
Serial interface to SIMATIC S7-300 or ET 200M	P bus; cyclic and acyclic services
Communication	2 words (cyclic)/238 bytes (non-cyclic)
Command buffer on ASM 475	70 x 238 bytes per SLG D1xS
Serial interface to SLG	
Connector	With screw terminal on front connector The front connector is included.
Line length, max.	Prefabricated cables = 5 m, 20 m, 50 m (up to 1000 m on request)
SLGs which can be connected	2x SLG D1xS with RS 422 Parallel operation
Software functions	
Programming	Depends on the PROFIBUS DP master
Function blocks for SIMATIC S7	FC 45
MDS addressing	Access directly via addresses
Commands	Initialize MDS, read MDS data, write on MDS
Multitag mode	No
S7 data structures via UDTs	Yes
Voltage[1]	
Nominal value	24 VDC
Permissible range	20.4 to 28.8 VDC
Current consumption	
• Without SLG at U = 24 VDC, max.	350 mA
• With connected SLGs, max.	500 mA, per connected SLG
Power loss of the module(typ.)	2 W
Current consumption from P bus, max.	80 mA
Potential isolation between S7-300 and MOBY	Yes
24 V fuse to the SLG	Yes, electronic

	ASM 475 with FC 45
Ambient temperature in operation	
• Horizontal setup of SIMATIC	0 to +60 °C
• Vertical setup of SIMATIC	0 to +40 °C
in transit and storage	–40 to +70 °C
Dimensions (W x H x D) in mm	40 x 125 x 120
Weight, approx.	0.2 kg

1 The SLG power supply for the MOBY D cannot be connected via the ASM.

Wiring

The ASM 475 is commissioned in the following steps.

- Mount module
- Mount module on profile rail of the S7-300 (see manual of the S7-300)

Note

Before mounting the module, switch the CPU of the S7-300 to STOP.

Warning

Wire the S7-300 only when the power is off.

Note

To ensure interference-free operation of the ASM 475, make sure that ASM and SIMATIC CPU (or ASM and IM 153 with ET 200M operation) 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 plate

The following figure shows the front plate of the ASM 475 and the inside of the front door with the connection diagram. The SLGs must be connected with the ASM as shown in the connection diagram.

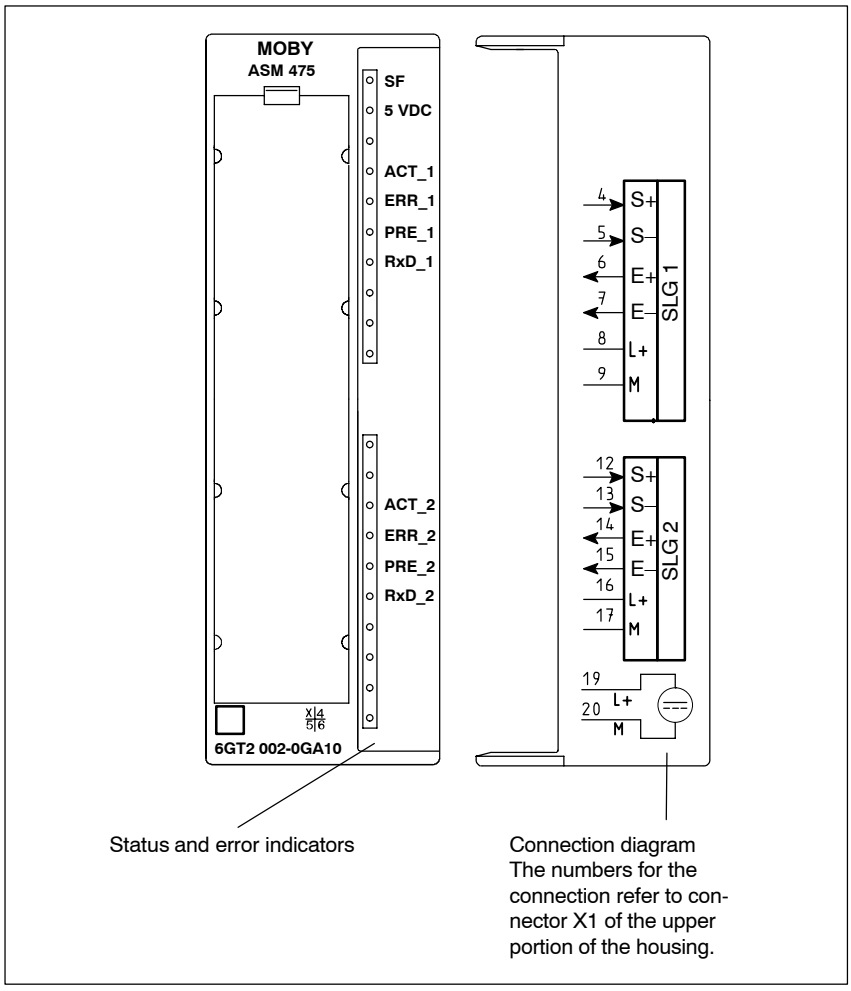


Figure 6-17 Front plate and inside of the front door of the ASM 475

Note

The SLG power supply for the MOBY D cannot be connected via the ASM.

Display elements on the ASM

Table 6-10 Function of the LEDs on the ASM 475

LED	Meaning
SF	System Fault (hardware error on ASM)
5 VDC	24 V are connected on ASM and the 5 V on the ASM are okay
ACT_1, ACT_2	The SLG is active with execution of a user command.
ERR_1, ERR_2	A flashing pattern shows the error that occurred last. This indicator can be reset with the parameter Option_1.
PRE_1, PRE_2	Shows the presence of an MDS
RxD_1, RxD_2	Indicates running communication with the SLG. Interference on SLG can also cause this indicator to go on.

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

Table 6-11 Operating states shown by LEDs on the ASM 475

SF	PRE_1	ERR_1	PRE_2	ERR_2	Meaning
ON ON	OFF/ON	ON (perm.)	OFF/ON	ON (perm.)	Hardware is defective (RAM, Flash, etc.).
	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 was 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 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 sec	OFF	1 flash every 2 sec	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 specified colors apply to the standard MOBY cable for the ASM 475.

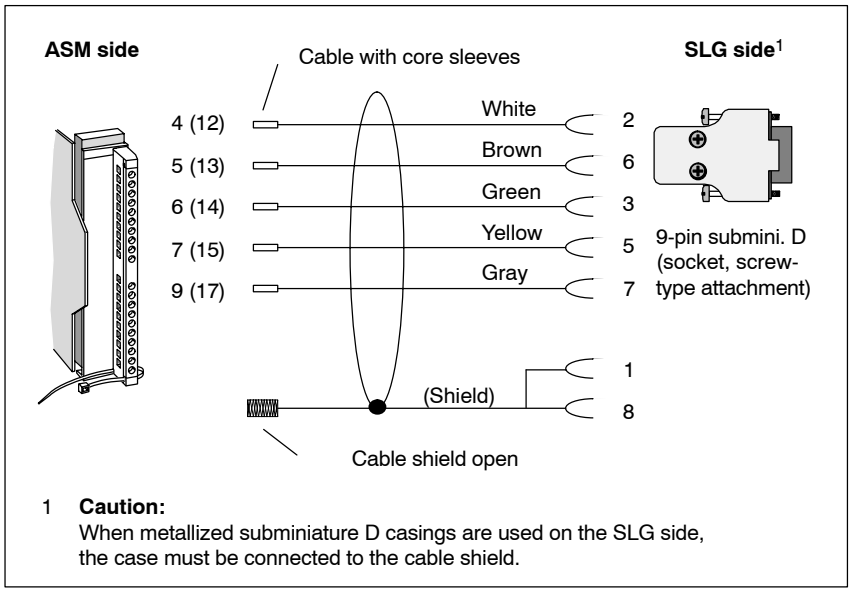


Figure 6-18 Wiring of the ASM 475 to the SLG D1xS with RS 422 (6GT2 491-0E...)

Shield connection

See Figure 3-26 or 6-16.

Lightning rods

Implement lightning rods and grounding measures if required for your application. Protection against lightning always requires an individual look at the entire plant.

Cable fabrication by the customer

To ensure EMC, the SLG cable must be led over an S7-300 shield connecting element (see Figure 6-16). When customers make their own cables, the shield of the SLG cable must be bared as shown in Figure 6-19.

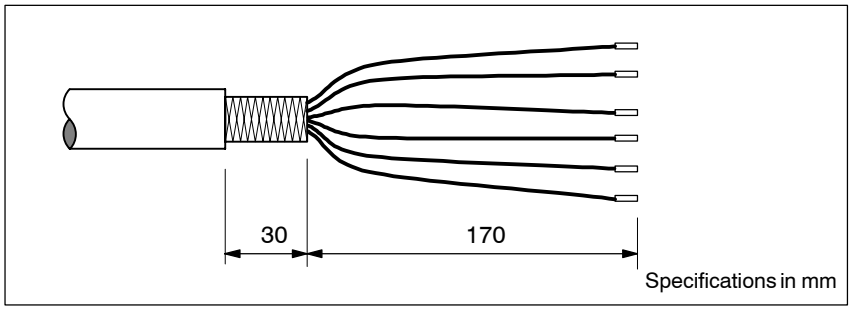


Figure 6-19 Baring of the cable shield for customer-fabricated cable

Configuration of the ASM for SIMATIC S7 under STEP 7

Note

Installation of MOBY requires functional STEP 7 software on a PC/ PG.Please remember to use the latest version of STEP 7.

Installation and configuration of the ASM 475 in the SIMATIC is performed with an installation program. The installation program is included on the ”Software MOBY” CD product (6GT2 080-2AA10).

Installation

Installation information can be found on the ”Software MOBY” CD.

FC 45 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.

Directory in MOBY Software	Project name in SIMATIC Manager	Path name in SIMATIC Manager
FC 45	MOBY FC45	Moby_f_l

7 Accessories

7.1 MOBY Wide-Range Power Pack

Description

The MOBY® wide-range power pack is a compact, primary-pulsed power supply, designed for use on single-phase, alternating current networks with two DC outputs (socket connector, circuited in parallel).
The robust physical construction is comprised of an aluminum housing which gives the finely-adjusted system a good blend of physical strength, protection against electromagnetic interference and optimum heat dissipation.
The primary-pulsed power supply is protected against overload with a built-in power limitation circuit and is permanently short-circuit proof.
The overvoltage fuse (SIOV) integrated as standard protects the electronics from excessively high voltages.

Figure 7-1 MOBY wide-range power pack

Ordering data

Table 7-1 Ordering data for the MOBY wide-range power pack

	Order No.
MOBY wide-range power pack, 100 - 230 VAC/VDC 24 V/2.2 A; incl. 2 mating connectors for the output voltage	6GT2 494-0AA00
24 V connecting cable for the SLG D1x/SLG D1xS; length 5 m	6GT2 491-1HH50

Technical data

Table 7-2 Technical data of the MOBY wide-range power pack

Input	
Input voltage	
Nominal value	100 to 230 VAC
Range	90 to 253 VAC
Frequency	50/60 Hz
Input current	0.85 to 0.45 A
Efficiency	$\geq$ 80 % at full load
Power connection	2 m power cable with ground contact connector
Power failure bypass	$\geq$ 10 ms
Undervoltage switchoff	Yes
Overvoltage protection	SIOV
Output	Socket contacts
Nominal output voltage	24 VDC
Nominal output current	2.2 A
Residual ripple	20 mV_{ss} to 160 kHz 50 mV_{ss} > 160 kHz
Startup current limitation	NTC
Permanent short-circuit proof	Yes
Ambient conditions	
Ambient temperature	
in operation	-20 °C to +40 °C (max. +60 °C; see the safety guidelines)
in transit and storage	-40 °C to +80 °C
Cooling	Convection
General information	
Dimensions of power supply, incl. mounting plate (L x W x H) in mm	205 x 80 x 60 (without connectors)
Weight, approx.	1000 g
Color	Anthracite
Electromagnetic compatibility	
Interference emission (EN 50081-1)	Class B in accordance with EN 55022
Interference immunity (EN 50082-2)	EN 61000-4-2
Safety	
Certifications	CE, GS
Electrical safety test	EN 60950/VDE 0805 and VDE 106 Part 1
Potential isolation, primary/secondary	AC 4 kV
Protection class	I, in accordance with EN 60950 (VDE 0805)
Degree of protection	IP65, in accordance with EN 60529 (only when installed)

Connector allocation of 24 V output

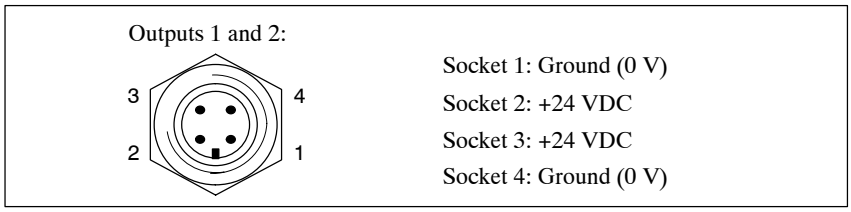


Figure 7-2 Connector allocation of 24 V output

Dimensions (in mm)

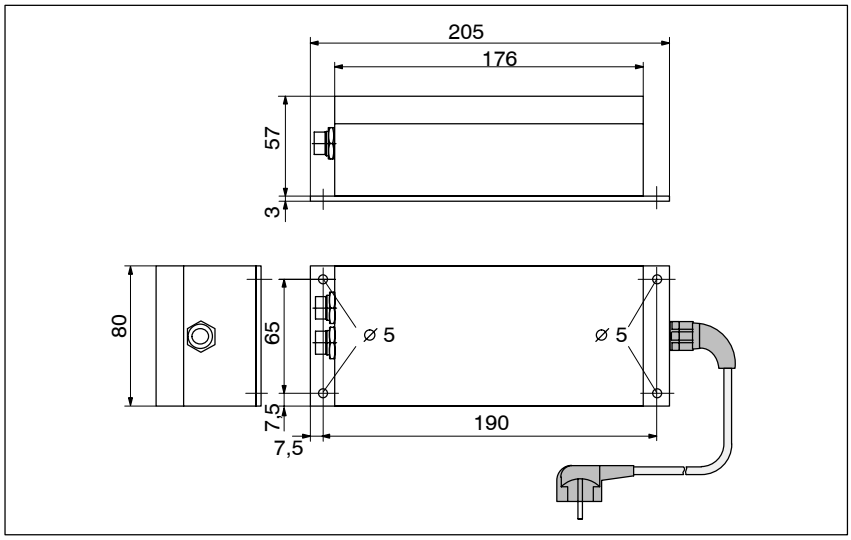


Figure 7-3 Dimensions of MOBY wide-range power pack

Notes on safety

Caution

Do not open the devices or modify them.
Failure to adhere will invalidate the CE and the manufacturer's warranty.
Applicable DIN/VDE regulations or country-specific specifications must be observed when installing the power pack.
The field of application of the power supply unit is limited to information technology of office machines in the EN 60950/VDE 0805 standard.
Only qualified personnel may commission and operate the device.
For the purposes of this manual, qualified personnel are 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 is dependent on correct storage, setup and installation as well as careful use and maintenance.
During installation, make sure that sufficient space is available so that the electrical output can be accessed.
The housing may heat up during operation to up to +40 °C. This is no cause for worry. However, make sure that the power pack is covered when the ambient temperature exceeds +40 °C to prevent people from touching the excessively hot housing. The power pack must also have sufficient ventilation.

7.2 MOBY STG D Hand-Held Terminal

Application areas

The STG E adds to the MOBY D identification system a powerful mobile hand-held terminal for applications in the areas of storage, logistics, distribution, and service. The service and test device (STG D) is an indispensable aid for commissioning and testing. All MOBY D data memories can be read and write-accessed inductively.

Figure 7-4 MOBY STG D hand-held terminal

Design and functions

The STG D 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 D 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 D data memories.

- Read data from the data storage unit
- Write data to the data storage unit
- Read and display the UID number of the data storage unit
- 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 the PSION Workabout must be installed on the PC. The development package can be obtained directly from PSION (see: http://www.psion.com/industrial/).
- Hand-held terminal — PSION Workabout with wall attachment and power supply unit. We recommend using the MOBY hand-held terminal STG D.
- PC cable — You will require a 3-link adapter cable from PSION Adapter cable from PSION (see: http://www.psion.com/industrial/). The cable is only required when it is not included in the C development package.
- C library — The following files are required: MOBY_D.H, MOBY_STG.LIB. They are supplied 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.

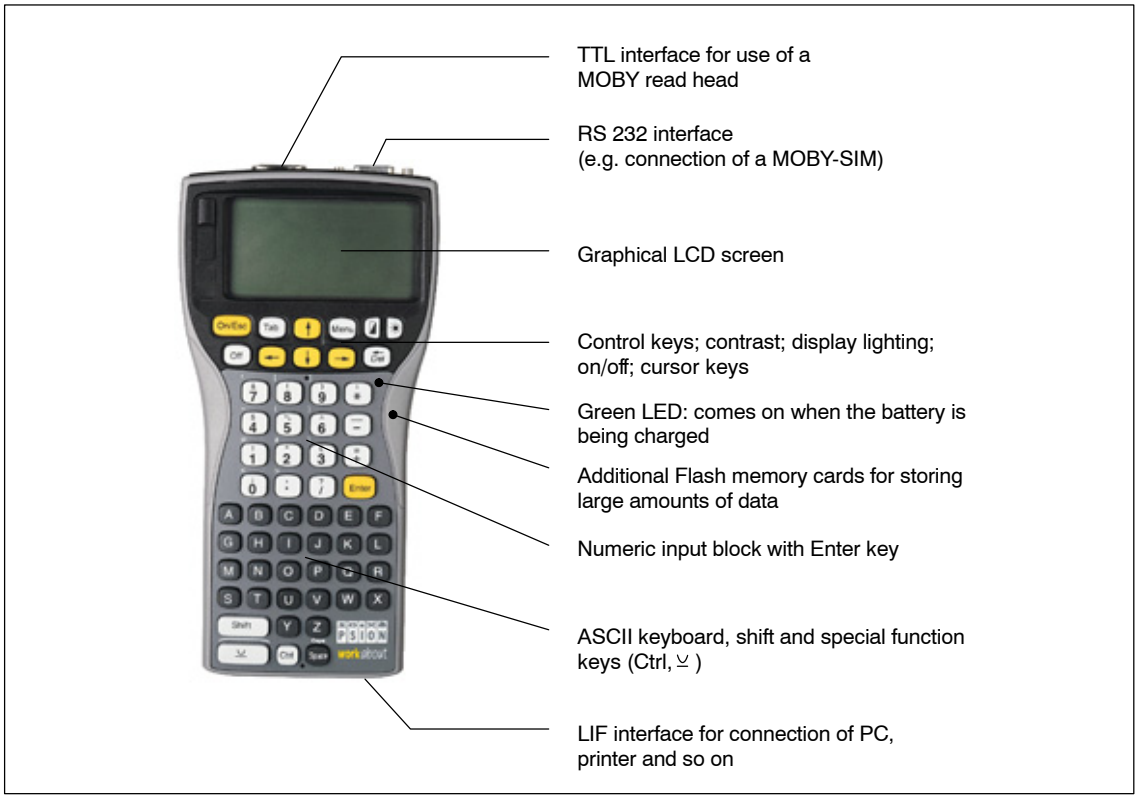


Figure 7-5 Hardware of the STG D

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 7-3 Ordering data for the STG D

STG D mobile hand-held terminal Basic device (PSION Workabout^{mx}) with MOBY D read/write head, battery, standard software, including STG functionality on EEPROM card, operating manual, without charging unit	6GT2 603-0AA00
Charging station for a mobile hand-held terminal with 230 VAC, plug-in power pack	6GT2 303-1DA00
Accessories:	
MOBY D read/write head, 13.56 MHz, without software or description	6GT2 603-1AA00
Memory card with STG software and filehandler software for MOBY E, MOBY F and MOBY I, incl. operating manual	6GT2 303-1CA00
C-library for MOBY D, MOBY E, MOBY F and MOBY I, for development of customer-specific screen dialogs, without development tools, incl. description	6GT2 381-1AB00
Extra battery	6GT2 094-0AB00 or 2 AA batteries (NiCd, Ni-MH, Alkali)
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 7-4 Technical data of the STG D hand-held terminal

Hardware	
Processor	NEC V30mx 27.68 MHz, 80C86-compatible
RAM memory	2 MB; of which approx. 1.8 MB can be used as desired
ROM memory	2 Mbytes for operating system
User program	256 Kbytes with MOBY service and test program
Monitor screen	Graphics LCD screen with 240 x 100 pixels: gray scale; backlighting possible
Keyboard	Alphanumeric with 57 keys
Sound	Piezo signal encoder
Power supply Operation time	NiCd battery pack with 2 cells of type AA (850 mAh) high-speed rechargeable; automatic switch-off 20 hours (read head inactive, display unlit) 4.5 hours (read head active, display unlit) 10 hours (read head inactive, display lit)
Interfaces	LIF interface (Low Insertion Force) for battery charging and communication with PC and printer (3link cable not included); RS 232 and TTL interface for connecting a MOBY read head
Security	Locking mechanism for battery and program memory

Table 7-4 Technical data of the STG D hand-held terminal

Software		
Operating system File management	EPOC/16 multitasking, graphics support, GUI interface, Interpreter similar to MS-DOS MS-DOS-compatible	
Integrated software MOBY STG program	MOBY service and test program spreadsheet; database; pocket calculator; communication Read, write, delete MDS, read MDS UID; save and load MDS data; menu language German or English; input and display of data in ASCII or HEX format	
Technical data	**Complete device (incl. ACCUs)**	**Read head**
Dimensions Weight	260 x 90 x 35 [mm] Approx. 440 g	90 x 64 x 35 [mm] Approx. 110 g
Temperature Relative humidity Protection rating Impact resistance EMC Electrostatic; RF; EFT	Operation: –20 °C to +60 °C Storage: –25 °C to +80 °C (without battery) 0% to 90%, no condensation IP54 (protected against splashed water) Max. falling height on concrete: 1 m EN 55022 IEC 801-2; IEC 801-3; IEC 801-4	
RF read/write head		
MOBY D	13.56 MHz	
Max. read/write distances	MDS type	Distance in mm
	D100 D124 D139 D160	60 25 60 25

Documentation

A

Descriptions, bound

Table A-1 Ordering data for descriptions

	Order No.
Description of FC 45 German English	 6GT2 097-3AM00-0DA1 6GT2 097-3AM00-0DA2
Description - 3964R for Windows 95/NT (German/English)	On MOBY Software CD

Programming guides

Table A-2 Ordering data for programming guides

MDWAPI C library for Windows 9x/ 2000/NT and protocol description (German/English)	On MOBY Software CD

Error Messages

B

This appendix gives you the error messages of MOBY D. The messages are divided into two groups.

B.1 Error Messages and Causes in MOBY D with ASM and FC 45 (Direct MDS Addressing)

B.2 Error Messages and Causes for MOBY D in Conjunction with the MDWAPI Library

B.1 Error Messages and Causes in MOBY D with ASM and FC 45 (Direct MDS Addressing)

B.1.1 General Errors

Programmable controller goes into STOP mode

- OB 86 not programmed and a slave has failed.
- OB 122 not programmed and a slave has failed.

The error only occurs when FC 45 is called.

- The pointers Params_DB, command_DB, and DAT_DB are not present or indicate an unavailable address area.

B.1.2 Error Messages

There will always be an error status in FC 45 if the ”error” variable is set for a channel. If this is the case, the exact cause of the error can be established in the ”error_MOBY”, ”error_FC”, or ”error_BUS” variables.

Table B-1 Classification of the error messages

Error variable	Classification
error_MOBY	This error is reported by the MOBY ASM/SLG. There are two main causes: • There are communication errors between the ASM and SLG or between the SLG and MDS. • The ASM/SLG cannot process the command. error_MOBY is displayed on the ASM with a flashing ERR LED.
error_FC	FC 45 reports this error. Main cause • The parameter assignment of ”Params_DB” or ”command_DB” is incorrect.
error_BUS	The transport layer of PROFIBUS reports an error. It is very useful to use a PROFIBUS tracer and PROFIBUS tester (BT 200; MLFB no. 6ES7 181-0AA00-0AA0) for precise error tracing and analysis. The system diagnostics of PROFIBUS can provide further information on the cause of the error. The error indicated here is reported by the SFC 58/59 system function in the RET_VAL parameter. You will find a detailed description of the RET_VAL parameter in the SIMATIC S7 system manuals (see the S7-300/400 system software).

Note

If several errors occur in succession in the case of chained commands, the error variable will always show the first error detected.

error_MOBY

Table B-2 Error messages of the MOBY ASM/SLG via the error_MOBY variable

Error Code in Hex	ERR LED flashes	Cause, Remedy
00	–	No error; result is o.k.
–	1x	See error code 0F.
01	2x	Presence error: The MDS has moved out of the transmission window of the SLG. The MOBY command was only partially executed. Read command: No data are supplied to FC 45. Write command: The data storage unit that has just left the field has an incomplete data record. → Working distance from the SLG to the MDS is not adhered to. → Configuration error: the data block to be processed is too large (in dynamic operation) The next command (READ, WRITE) automatically applies to the next MDS. **Note:** The red error LED on the front panel outputs the error code 02 in this case.
02	2x	Presence error: → A mobile data storage unit moved past the SLG but was not processed by a command. **Note:** The red error LED does not distinguish between errors 01 and 02 (see error code 01).
03	3x	Error in the connection to the SLG → Voltage of the ASM < 20 V or ASM not connected → 24 V voltage has voltage dips or is not connected or switched off → Fuse on the ASM has blown. Check wiring → Cable between ASM and SLG incorrectly wired or cable break → Hardware defective: ASM or SLG → Interference coupling on the SLG cable or bus cable → Run init_run after error has been eliminated
04	4x	Error in memory of MDS The data storage unit has never been written or has lost its contents due to battery failure. → Initialize data storage unit with the STG → With the SLG: Call initialization command → Check battery of MDS or change MDS → Data storage unit is defective
05	5x	Unknown command Unknown command code in byte 2 of the frame SLG reports data length error (check frame) → Incorrect length of user data

Table B-2 Error messages of the MOBY ASM/SLG via the error_MOBY variable

Error Code in Hex	ERR LED flashes	Cause, Remedy
06	6x	Field interference on SLG The SLG is receiving interference from its surroundings. → MDS left the field during communication → Communication between SLG and MDS terminated due to external interference → Distance between two SLGs is too small and does not adhere to configuration guidelines Antenna error → Antenna unscrewed
0 A	10x	In the case of initialization only: MDS cannot execute the initialization command. → The MDS is defective.
0B	11x	Memory of the MDS cannot be correctly read
0 C	12x	Memory of the MDS cannot be written. → Memory of the MDS is defective
0D	13x	Address error (address area exceeded) → Specified address does not exist on the MDS → Check and correct command for message format → MDS is the wrong type.
0F	15x	Startup message The ASM sends this message after every startup. (A startup occurs each time the voltage is applied, each time the front switch is activated, after a reset via connector X1 or after a bus error.) The startup message remains queued until the user sends a RESET command to the ASM. This gives the user a chance to know when power returns to the ASM (i.e., ASM is ready again). → Perform init_run.
10	16x	NEXT command is not possible. → SLG does not know NEXT command
11	17x	Short circuit or overload of the 24 V outputs Next command must be a RESET command. → The affected output is switched off → All the 24 V outputs are switched off in the event of a total overload → A reset can only be performed by switching the power off and on again → Then start init_run
12	18x	Internal ASM communication error → Connector contact problem on the ASM (send ASM away for repair) → Hardware of ASM defective → EMC interference → Start init_run after error has been eliminated
13	19x	There isn't enough buffer storage space in the ASM/SLG to store the command temporarily
14	20x	Internal ASM error or SLG error (watchdog) → Program execution error on the ASM → Switch the 24 V power off and on again → Program execution error on the SLG → Start init_run after error has been eliminated

Table B-2 Error messages of the MOBY ASM/SLG via the error_MOBY variable

Error Code in Hex	ERR LED flashes	Cause, Remedy
15	21x	Incorrect parameter assignment of the ASM/SLG → Check INPUT parameter in UDT 10 → RESET command incorrectly parameterized → The ASM hasn't received init_run after power-up
16	22x	The command cannot be executed with the current bus configuration. → Input or output areas are too small for the frame length Correct DDB file used? → Write or read command too long. Data length > 233 bytes. → Adapt bus configuration on the master module.
17	23x	Communication error between FC 45 and MOBY ASM Handshake error → Params_DB (UDT 10) in this ASM station is overwritten by other program sections → Check the parameter assignment of the MOBY ASM in UDT 10 → Check the FC 45 command that results in this error → Start init_run after error has been eliminated
18	24x	An error has occurred that has to be acknowledged with init_run → A temporary short circuit has occurred on PROFIBUS → The RESET command is invalid → Start init_run after error has been eliminated
19	25x	The previous command is active or there is a buffer overflow The user sent a new command to the ASM/SLG although the last command was still active. → The active command can only be terminated with init_run → Before the start of a new command, the READY bit must = 1; Exception init_run → Two FC 45 calls were parameterized with the same parameters: "ASM_address" and "ASM_channel" → Two FC 45 calls are working with the same Params_DB pointer → Start init_run after error has been eliminated → No data has been picked up by the MDS whilst working with command repetition (e.g. fixed-code MDS). The data buffer in the ASM has overflowed. MDS data have been lost.
1A	26 x	PROFIBUS-DP error occurred → PROFIBUS-DP bus connection was interrupted → Wire break on the bus → Bus connector on the ASM temporarily removed → PROFIBUS-DP master no longer addresses the ASM → Perform init_run. → The ASM has detected a message frame interruption on the bus. The PROFIBUS may have been reconfigured (with HWCONFIG, for example). This error is only displayed if response monitoring was activated at PROFIBUS configuration.

Table B-2 Error messages of the MOBY ASM/SLG via the error_MOBY variable

Error Code in Hex	ERR LED flashes	Cause, Remedy
1C	28 x	The antenna of the SLG is off/on and is to be switched off/on again. The antenna is off and a MDS command is to be executed in this state. The antenna is to be switched off although an MDS command is pending. → Antenna is off. → Antenna is on. → Mode in SET-ANT command is unknown. → Antenna cannot be switched off, since an MDS command is pending. → Antenna is off. The MDS command cannot be executed.
1D	29 x	There are more MDSs in the transmission window than the SLG can process simultaneously. → Only one MDS can be processed at any one time with FC 45
1E	30 x	Errors during the processing of the function → The data in UDT 10 are invalid; Check UDT 10, and execute init_run → ASM hardware defective: With init_run the ASM receives invalid data → QB byte does not correspond to user data length.
1F	31 x	The current command terminated with RESET (init_run or cancel) or the bus connector was removed → Communication with the MDS was terminated with init_run → This error can only be returned with init_run or cancel

error_FC

Table B-3 ”error_FC” error variable

Error code (B#16#..)	Description
00	No error; default value, if everything is o.k.
01	Params_DB does not exist on the SIMATIC.
02	Params_DB is too small. → UDT 10/11 was not used in the definition. → Params_DB must be 300 bytes long (for each channel). → Check Params_DB, Params_ADDR for correctness.
03	The DB after the ”command_DB_number” pointer does not exist on the SIMATIC.
04	”Command_DB” on SIMATIC is too small. → UDT 20/21 was not used in the command definition. → The last command in ”command_DB” is a chained command; reset the chaining bit
05	Invalid type of command → Check the command_DB_number/command_DB_address command pointer → Check the current values in command_DB → Perform init_run.
06	The received acknowledgment is not the expected acknowledgment. The parameters of the command and acknowledgment message frames do not match (command, length, address_MDS). → The user changed the command_DB_number/-_address pointer while the command was being processed. → The user changed the command parameters in the MOBY CMD data block (UDT 20) while the command was being processed. → Check the parameter assignment of ASM_address and ASM_channel. ASM_address and ASM_channel have the same parameter assignment for different channels. → Acknowledgment and command counters between the ASM and FC are no longer synchronous →Perform init_run.
07	The parameter MOBY_mode or MDS_control (defined in UDT 10) has an impermissible value.
08	A bus error has occurred which was reported by the system functions SFC 58/59. More information on the error is available in the error_Bus variable. → ASM_address or ASM_channel not present → Perform init_run.
09	The ASM has failed. → Power failure on MOBY ASM → PROFIBUS connector pulled or PROFIBUS cable broken → ASM_address or ASM_channel not present The error is indicated when the ASM_Failure bit was set in OB 122. OB 122 is called when the FC 45 can no longer access the cyclic word for the MOBY ASM.
0A	The user started another init_run without waiting for ready while the first init_run command was still being processed. → Do <u>not</u> set init_run cyclically → The same physical ASM channel is used in two (or more) UDT 10 structures. Check the ASM_address and ASM_channel in <u>all</u> UDT 10 structures.

Table B-3 ”error_FC” error variable

Error code (B#16#..)	Description
0B	init_run cannot be executed; cyclic process image to the ASM is faulty; FC 45 reports timeout of the process image to the ASM It is possible to fix this error by writing the value #00 to the address DBB 58 in UDT 10. However, in certain error situations, the FC 45s do not generate an error message, and they then hang.) → ASM_address in UDT 10 is parameterized incorrectly. ASM_address may be on the wrong module. → The ASM_channel is 16 or ≤ 0 parameterized. → ASM hardware/firmware is defective. → The same physical ASM channel is used in two (or more) UDT 10 structures. Check the ASM_address and ASM_channel in all UDT 10 structures.
0C	Range length area in block move of FC 45. → DAT_DB does not exist or is too small. Check DAT_DB_number and DAT_DB_address in UDT 20. → Perform init_run.
0D	An init_run was not correctly terminated. The process image is not consistent. → Execute init_run again → Switch ASM off and on again → The RUN-STOP switch was operated rapidly several times on the CPU (particularly in the case of slow PROFIBUS transmission rates) → The same physical ASM channel is used in two (or more) UDT 10 structures. Check the ASM_address and ASM_channel in all UDT 10 structures.

error_BUS

Table B-4 ”error_Bus” error variable

Error code (W#16#...)	Description
800A	ASM is not ready (temporary message). → This message is sent to a user who is not using FC 45 and queries the ASM acyclically in very rapid succession.
8x7F	Internal error in parameter x. Cannot be corrected by the user.
8 x 22 8 x 23	Area length error while reading a parameter Area length error while writing a parameter This error code indicates that the parameter x is completely or partially outside the operand range or the length of a bit field for an ANY parameter is not divisible by 8.
8 x 24 8 x 25	Area error while reading a parameter Area error while writing a parameter This error code indicates that the parameter x is located in an area that is impermissible for the system function.
8 x 26	The parameter contains number of a time cell which is too large.
8 x 27	The parameter contains number of a counter cell which is too large.
8 x 28 8 x 29	Direction error while reading a parameter Direction error while writing a parameter The reference to parameter x is an operand whose bit address is not 0.
8 x 30 8 x 31	The parameter is located in the write-protected global DB. The parameter is located in the write-protected instance DB.
8x32 8x34 8x35	The parameter has a DB number that is too large. The parameter has an FC number that is too large. The parameter has an FB number that is too large.
8x3A 8x3C 8x3E	The parameter has the number of a DB which is not loaded. The parameter has the number of an FC which is not loaded. The parameter has the number of an FB which is not loaded.
8 x 42 8 x 43	An access error occurred while the system was trying to read a parameter from the I/O area of the inputs. An access error occurred while the system was trying to write a parameter to the I/O area of the outputs.
8 x 44 8 x 45	Error during nth (n > 1) read access after an error occurred Error during nth (n > 1) write access after an error occurred
8090	Specified logical base address invalid: There is no assignment in SDB1/SDB2x, or there is no base address.
8092	A type other than BYTE was specified in an ANY reference.
8093	The area identifier obtained when the logical address was configured (SDB1, SDB2x) is not permitted for these SFCs. Permissible are: • 0 = S7-400 • 1 = S7-300 • 2, 7 = DP modules

Table B-4 ”error_Bus” error variable

Error code (W#16#...)	Description
80A0	Negative acknowledgment when reading from the module; FC picks up acknowledgment although there is none ready to be picked up A user who is not working with FC 45 wants to pick up DS 101 (or DS 102 to DS 104), but there is no acknowledgment yet available. → Execute init_run for a resynchronization between the ASM and application
80A1	Negative acknowledgment when writing to the module; FC sends command although the ASM cannot receive a command
80A2	DP protocol error for layer 2, possible hardware defect.
80A3	DP protocol error with direct-data-link-mapper or user interface/user, possible hardware error.
80B0	• SFC not possible for this type of module. • Module does not know the data record. • Data record number 241 is not permissible. • Data records 0 and 1 are not permissible with SFC58 ”WR_REC”.
80B1	The length specified in the RECORD parameter is wrong.
80B2	The configured slot is not occupied.
80B3	The actual module type is not the required module type in SDB1
80C0	• RDREC: The module has the data record but no read data have arrived yet. • WRREC: The ASM is not ready to receive new data → Wait for the cyclic counter to count up
80C1	The data of the preceding write job on the module for the same data record have not yet been processed by the module.
80C2	The module is processing the maximum possible number of jobs for one CPU.
80C3	Required resources (memory, etc.) are busy at the moment. This error is not reported by FC 45. In the event of this error, FC 45 waits until the resources are made available again by the system.
80C4	Communication error • Parity error • SW ready not set • Error in block length management • Checksum error on CPU side • Checksum error on module side
80C5	Distributed I/O not available.

B.2 Error Messages and Causes for MOBY D in Conjunction with the MDWAPI Library

Table B-5 General errors

Error code in hex	Cause, Remedy
0x00	**OK:** • Data/parameters read or saved without errors • Control command executed

Table B-6 Transponder status

Error code in hex	Cause, Remedy
0x01	**No transponder:** • No transponder within the reader's detection field • Transponder in the detection field set to mute • Fault in communication between the reader and transponder. The reader can no longer detect the transponder.
0x02	**Invalid data:** • CRC16 checksum error in the data received
0x03	**Write error:** Plausibility test of the written data failed: • An attempt was made to write to a read-only area. • The distance between the transponder and reader antenna is too great. • An attempt was made to write when there was too much ambient noise
0x04	**Addressing error:** The required data are outside the logical or physical address area of the transponder: • The address is outside the maximum address area of the transponder • The address is outside the configured address area of the transponder
0x05	**Incorrect transponder type:** This command is not supported by this transponder: • Write or read attempt with a transponder • A specific command is not supported by the transponder.
0x06	**Read error:** Plausibility test of the read data failed: • The distance between the transponder and reader antenna is too great. • An attempt was made to read when there was too much ambient noise

Table B-7 Parameter status

Error Code in Hex	Cause, Remedy
0x10	**EEPROM error:** • The EEPROM of the reader cannot be written • An incorrect parameter checksum occurred before writing to the EEPROM.
0x11	**Parameter outside the valid range:** • Valid parameter range exceeded.

Table B-8 Interface status

Error Code in Hex	Cause, Remedy
0x80	**Unknown command:** • Selected function not supported by the reader
0x81	**Length error:** • Too short or too long
0x82	**Command not possible:**
0x83	**RF communication error:** An error occurred during communication between the transponder and reader. Possible causes: • Algorithm for collision handling was not executed long enough until no more collisions were detected. Causes of the interruption: – Timeout in communication with the host
0x94	**Other data:** • More transponder records are requested than the transponder protocol can transmit at one time.
0x95	**ISO error:** • Additional error code for ISO transponder was sent with the reply data

Table B-9 Error codes for ISO transponder

Error Code in Hex	Explanation of the error codes in the transponder reply
0x01	Unsupported command (the query code was not recognized)
0x02	Unrecognized command (because of a format error, for example)
0x03	Unsupported option
0x0F	Unknown error
0x10	Specified block does not exist
0x11	Specified block is already disabled and cannot be enabled again
0x12	Specified block is disabled; its contents cannot be changed
0x13	Unsuccessful attempt to program the specified block
0x14	Unsuccessful attempt to disable the specified block
0xA0 – 0xDF	Error codes for user-specific commands
All others	Reserved for future use

ASCII Table

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																

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Numbers

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TO:
Siemens AG
A&D SE EWF MS
PO Box 2355
D-90713 Fuerth

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- ❐ Electrical industry
- ❐ Foodstuffs
- ❐ Process control technology
- ❐ 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 ? ☐
2. Is it easy to find the information you need ? ☐
3. Is the information written in an easy-to-understand manner ? ☐
4. Does the amount of technical detail meet your requirements ? ☐
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If you encountered concrete problems, please use this space to explain.

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