SIEMENS

SIMATIC

S7-400
S7-400 Automation System
Module Data

Reference Manual

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PROFIBUS DP master interface IM 467/IM 467 FO 8

8.1 PROFIBUS DP master interface IM 467/IM 467 FO

8.1.1 Overview

Order numbers

IM 467	6ES7467-5GJ02-0AB0 (RS 485)
IM 467 FO	6ES7467-5FJ00-0AB0 (F0)

Application

PROFIBUS DP, standardized in accordance with IEC 61784-1:2002 Ed1 CP 3/1, enables rapid communication in the field between programmable controllers, PCs and field devices. Field devices are devices such as: ET 200 distributed I/O devices, drives, valve terminals, switchgear and many others.

The IM 467/IM 467 FO interface module is meant to be used in an S7-400 programmable controller. It permits the S7-400 to be connected to PROFIBUS DP.

Note

The PROFIBUS DP master interface IM 467 and IM 467 FO is not a DP master in accordance with DVP 1.

Design

- Designed for S7-400
- Can be operated without a fan
- A maximum of 4 IM 467/IM 467 FO can be used in the central rack. There are no slot rules.
- The IM 467/IM 467 FO and the CP 443-5 Extended cannot be used together.
- The transmission rate of 9.6 Kbps to 12 Mbps can be set in steps using software
- Configuration and programming are possible via PROFIBUS DP. You should **not**, however, change the PROFIBUS DP parameters.

- IM 467 with 9-pin sub D socket for connection to PROFIBUS DP (6ES7467-5GJ02-0AB0)
- IM 467 FO with fiber-optic cable for connection to PROFIBUS DP (6ES7467-5FJ00-0AB0)

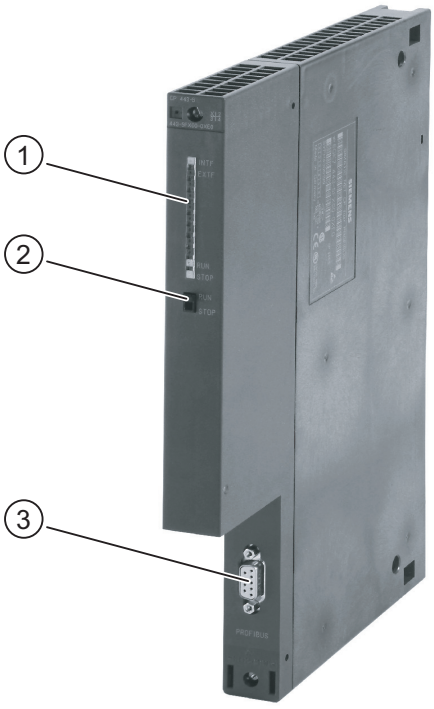


Figure 8-1 Configuration of the IM 467/467 FO

(1) LED
(2) Mode selector
(3) PROFIBUS-DP interface
9-pin sub D

Communication services

The IM 467/IM 467 FO offers two communication services:

- PROFIBUS DP
  The IM 467/IM 467 FO is a PROFIBUS DP master in accordance with EN 50 170. It is configured entirely with STEP 7. It behaves in basically the same way as the integrated PROFIBUS DP interfaces on the CPU modules (see the specifications of the IM 467/IM 467 FO for the differences).
  DP communication does not require any function calls in the STEP 7 user program.
- S7 functions
  The S7 functions guarantee optimal and easy communication in a SIMATIC S7/M7/C7 automation solution. The following S7 functions are enabled for the IM 467/IM 467 FO:
  - Programming device functions via PROFIBUS DP
  - Operator control and monitoring functions via PROFIBUS DP

  Communication takes place without any additional configuration on the IM 467/IM 467 FO. S7 functions can be used on their own or in parallel with the PROFIBUS DP protocol. If they are used in parallel with DP communication, this affects the PROFIBUS DP bus cycle time.

8.1.2 Indicators and the mode selector

LED

The LED strip on the front panel of the IM 467/IM 467 FO has the following four indicators:

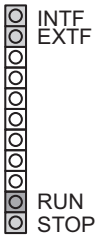


Figure 8-2 LEDs of the IM 467/467 FO

IM operating mode

The LEDs indicate the operating mode of the IM in accordance with the following table:

Table 8-1 Operating modes of the IM 467/467 FO

STOP LED (yellow)	RUN LED (green)	EXTF LED (red)	INTF LED (red)	CP Operating Mode
On	Flashing	Off	Off	Startup
Off	On	Off	Off	RUN
Flashing	On	Off	Off	STOPPING
On	Off	Off	Off	STOP
On	Off	Off	On	STOP with internal error (IM not configured, for example)
Flashing	Off	Off	Off	Waiting for FW update (takes 10 sec. after power up)
Flashing	Off	On	On	Waiting for FW update (IM currently contains an incomplete FW version).
Off	On	On	Off	RUN and PROFIBUS DP bus fault
Off	On	Flashing	Off	RUN; but there are faults on the DP line (the DP slave is not taking part in data transfer, or the module in the DP slave is faulty, for example)
Flashing	Flashing	Flashing	Flashing	Module error / system error

Controlling the operating status

There are two ways to control the operating status of the IM 467/IM 467 FO:

- Mode selector
- By using the programming device/PC

Mode selector

You can switch operating modes as follows using the mode selector:

- From STOP to RUN
  All the configured communication services and S7 communication services are available in RUN.
  The IM operating mode can only be controlled from the programming device/PC when the switch is in the RUN position.
- From RUN to STOP
  The IM goes into STOP mode. Any existing S7 connections are cleared down, and the DP slaves are no longer supplied.

Loadable firmware

The IM 467/IM 467 FO supports the updating of firmware (FW) by means of the FW loader. The FW loader is a component of the NCM S7 configuration software for PROFIBUS DP. Authorization is not required for this. After a FW update, the central rack must be switched off and on again before normal operation can be resumed.

Note

You can find additional information on loading firmware in the *NCM S7 for PROFIBUS-DP* manual and in the readme file of the *NCM S7 for PROFIBUS-DP* configuration software.

An optical bus terminal (OBT) is required to load FW in the IM 467 FO.

8.2 Configuration

Introduction

The IM 467/IM 467 FO is configured with STEP 7. The configuration data are retained even in the event of a power failure; a memory module is not required. Using the S7 functions it is possible to program and configure remotely all the IM 467/IM 467 FO connected to the network and all the CPUs connected via the SIMATIC S7-400 backplane bus.

SIMATIC STEP 7, version 5.00 or higher is required.

Module replacement without a programming device

The configuration data are stored in the load memory of the CPU. The non-volatile storage of configuration data in the CPU is ensured by battery backup or EPROM module cards.

The IM 467/IM 467 FO can be replaced without the need to explicitly reload the configuration data.

It is only possible to remove and insert the IM 467/IM 467 FO in a de-energized state.

Multiprocessor operation

The connected DP slaves can only be assigned to and processed by one CPU.

Configuration and diagnostics cannot be carried out simultaneously

When configuration is in progress, the IM 467/IM 467 FO cannot be diagnosed at the same time via MPI.

Note

The transmission rates 3 Mbit/s and 6 Mbit/s are not approved for IM467-FO.

8.3 Connection to PROFIBUS DP

8.3.1 Connection options

Overview

There are two ways of connecting to PROFIBUS DP:

- Electrical connection via a bus connector
- Optical connection using a fiber-optic cable

8.3.2 Bus connector

Wiring

Only with 6ES7467-5GJ02-0AB0.

The bus cable is connected to the IM 467 by means of this connector. (See the detailed description in the section on networking in the *S7-400, Hardware and Installation manual*.)

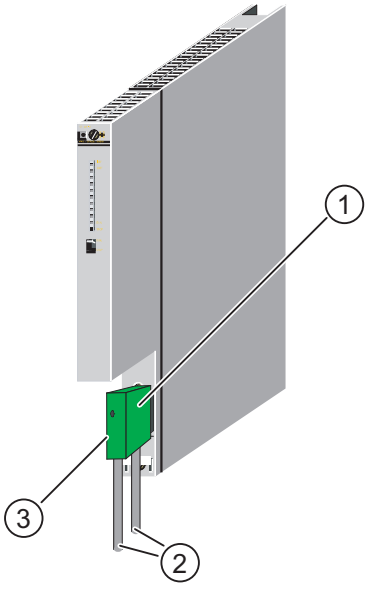


Figure 8-3 Connecting the bus connector to the IM 467

(1) Switch for bus terminator resistor

(2) PROFIBUS_DP bus line

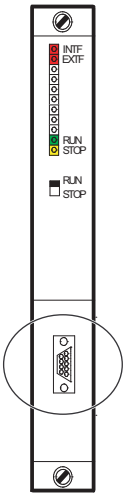
(3) Bus connector

Maximum cable lengths for PROFIBUS DP

Transmission speed in Kbps	9,6	19,2	93,75	187,5	500	1500	3000	6000	12000
Max. length of a bus segment in m	1.000	1.000	1.000	1.000	400	200	100	100	100
Max. number of bus segments 1	10	10	10	10	10	10	10	10	10
Max. length in m	10.000	10.000	10.000	10.000	4.000	2.000	1.000	1.000	1.000
[1] Bus segments are interconnected with RS 485 repeaters									

Connector pin assignment

The electrical interface used to connect to PROFIBUS DP (9-pin sub D socket) is specified in the following table.



Pin no.	Signal name	Profibus designation	Assigned to RS 485
1	PE	Protective earth	Yes
2		-	-
3	RxD/TxD-P	Data transfer line B	Yes
4	RTS (AG)	Control A	-
5	M5V2	Data reference potential	Yes
6	P5V2	Supply plus	Yes
7	BATT	-	-
8	RxDT/TxD-N	Data transfer line A	Yes
9	-	-	-

8.3.3 Optical connection to PROFIBUS DP

Wiring

Only in the case of 6ES7467-5FJ00-0AB0.

The IM 467 F0 with an integrated fiber-optic cable interface is available for connecting to the optical version of PROFIBUS DP.



Figure 8-4 Optical connection to PROFIBUS DP

(1) PROFIBUS DP bus cable

8.3.4 Connecting a fiber-optic cable to the IM 467 FO

Required accessories

- Package with simplex connectors and polishing sets (6GK1901-0FB00-0AA0)
- Pack of plug-in adapters (6ES7195-1BE00-0XA0)

Installing connectors

1. Remove approximately 30 cm of the sheath of the fiber-optic duplex cable.
2. Install the fiber-optic duplex cable with the associated simplex connectors. You can find a detailed description of simplex connectors in the *SIMATIC NET PROFIBUS Networks* manual.
   TIP: Close the two simplex connectors together rather than separately to obtain a duplex connector. In this manner you will achieve a better hold in the plug adapter.
   IMPORTANT: The polished surface of the plastic fibers must be absolutely smooth and even. Likewise, the plastic jacket must not protrude or be cut unevenly. Every irregularity causes strong attenuation of the light signal over the fiber-optic cable!
3. Place the simplex connectors in the plug-in adapter for the IM 467 FO and the fiber-optic cable in the cable guides provided. Insert the plug-in adapter until you hear the sides clearly latch into position.
   Make sure when you insert the plugs in the plug-in adapter that the transmitter is always at the top and the receiver is underneath.

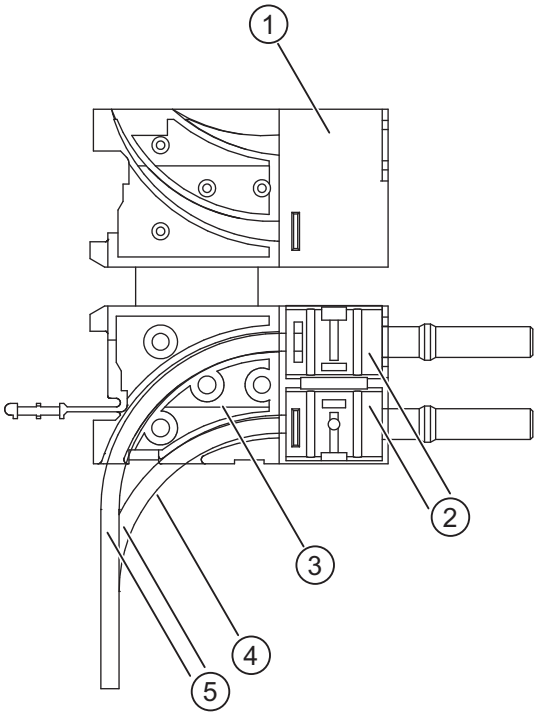


Figure 8-5 Installing the connector

(1) Plug-in adapter for the IM 467 FO

(2) Snap the two simplex connectors closed together such that you get a "duplex connector".

(3) **Tip**: Cut the lower cable approx. 10 mm shorter than the upper one to achieve better cable routing in the cable duct of the IM 467 FO.

(4) Max. 30 mm bending radius

(5) Fiber-optic duplex cable

Reusing fiber-optic cable

Note

If you insert previously used fiber-optic cable into the plug adapter, you must shorten both fiber-optic cores by the amount of the curved lengths and reinstall the simplex connectors.

This will prevent any attenuation losses caused by repeatedly bent, heavily stressed portions of the fiber-optic duplex core.

Inserting the fiber-optic cables into the IM 467 FO

Insert the fiber-optic cable with the mounted plug adapters into the IM 467 FO. Fold the protruding plug grip upward.

Make sure that it is correctly positioned: The transmitter fiber-optic cable is plugged into the receiver socket, and the receiver fiber-optic cable is inserted into the transmitter socket of the fiber-optic interface of the IM 467 FO.

If the IM 467 FO is the last node in the fiber-optic network, you must close the unoccupied fiber-optic cable interface with blanking plugs (the plugs are already in place when the IM 467 FO is delivered).

⚠ CAUTION

Do not look directly into the opening of the optical sender diodes.

The emitted light beam could damage your eyes.

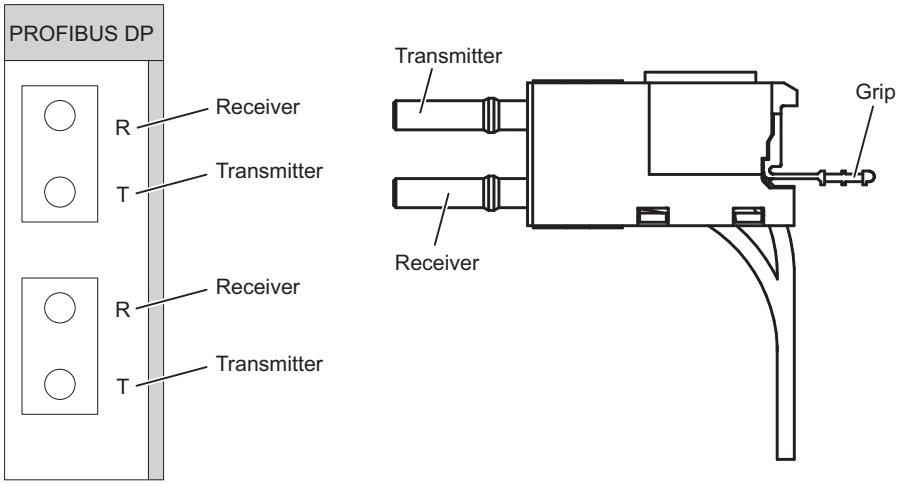


Figure 8-6 Inserting the fiber-optic cables into the IM 467 FO

Bending radius for the fiber-optic cable

When placing the fiber-optic duplex core into the plug adapter and routing the cable, be sure not to exceed the permissible bending radius of 30 mm. See also the installation guidelines on fiber-optic cables in the SIMATIC NET PROFIBUS Networks manual.

8.4 Specifications

8.4.1 Specifications of the IM 467 (6ES7467-5GJ02-0AB0))

Dimensions and weight	
Dimensions W x H x D (mm) Weight	25 x 290 x 210 700 g
PROFIBUS DP	
• Standard	PROFIBUS DP, EN 50 170
• Transmission rate	9.6 Kbps to 12 Mbps, configurable in steps
• Transmission technology	RS 485 via 9-pin sub D socket
Current consumption	
Current consumption from the S7-400 bus (24 VDC) The IM does not consume any current at 24 V, and it only makes this voltage available at the MPI/DP interface.	Total current consumption of the components connected to the DP interfaces, with a maximum of 150 mA
PROFIBUS DP	
Operating conditions	
Can be used in	SIMATIC S7-400, max. 4 IM 467 in the central rack
IM 467 cannot be used with the CP 443-5	
Supply voltage	5 VDC via the backplane bus
Current consumption	
• From 5 VDC	1.3 A
Addressing range	Max. 4 KB for inputs and 4 KB for outputs
DP master	Yes
• DPV 1	No
• Enable/disable	No
Number of connectable I/O devices (slaves)	96
Number of connections for S7 functions for the programming device and operator control and monitoring	32 + 1 diagnostic connection
Data volume per slave	Max. 244 bytes

Consistency	Max. 128 bytes
Configuration software	STEP 7
DP slave	No
Deviations from the DP interface integrated in the CPU	
• Different SSL IDs for system diagnostics • Possibly extended SFC run times • Additional return codes for SFC 14 and SFC 15	

8.4.2 Specifications of the IM 467 FO (6ES7467-5FJ00-0AB0)

Dimensions and weight	
Dimensions W x H x D (mm) Weight	25 x 290 x 210 700 g
PROFIBUS DP	
• Standard	PROFIBUS DP, EN 50 170
• Transmission rate	9.6 Kbps to 12 Mbps, configurable in steps (3 Mbps and 6 Mbps not possible)
• Transmission technology	FOC; Wave length l = 660 nm 2 x duplex sockets
Current consumption	
Current consumption from the S7-400 bus (24 VDC) The IM does not consume any current at 24 V, and it only makes this voltage available at the MPI/DP interface.	Total current consumption of the components connected to the DP interfaces, with a maximum of 150 mA
PROFIBUS DP	
Operating conditions	
Can be used in	SIMATIC S7-400, max. 4 IM 467 in the central rack
IM 467 cannot be used with the CP 443-5	
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