

SIMATIC

PCS 7 Process Control System ET 200PA SMART

Operating Instructions

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	Module	Article no.	As of product version
Active bus modules (BM)	Bus module (BM) PS/IM	6ES7650 8PA00-xAA0	01
	Bus module (BM) 2x40	6ES7650 8PC00-xAA0	01
	Bus module (BM) IM/IM	6ES7650 8PB00-xAA0	01

x = 1: Module with conformal coating for use under elevated ambient conditions

x = 0: Standard module

Convention: In the following, the designation IM 650 is used in the operating instructions for the 650-8PH interface module.

For new versions of the ET 200PA SMART components, we reserve the right to enclose product information containing current information about the respective module or the operating instructions.

This product information can also be found on the Internet (<http://support.automation.siemens.com>). Search there for "ET 200PA SMART", for example.

Approvals, standards and certificates

See section "Standards and approvals".

Position in the Information Landscape

This manual contains a complete description of the ET 200PA SMART Distributed I/O system.

If you are using I/O modules from the S7-300 series of modules, you can find information on them in the following manuals:

Manual	Contents
Automation System S7-300, Module Data (http://support.automation.siemens.com/WW/view/en/8859629)	• General technical specifications • Power supply modules • Digital modules • Analog modules • Order numbers for S7-300
ET 200M Signal Modules for Process Automation (http://support.automation.siemens.com/WW/view/en/7215812)	• Overview of the use in process automation • Parameter assignment with <i>SIMATIC PDM</i> • Digital input module • Digital output module
ET 200M Distributed I/O Device HART Analog Modules (http://support.automation.siemens.com/WW/view/en/22063748)	• HART analog modules • Expanded input data (HART auxiliary variables)

Assignment planning

2.1 Configuration variants

Limit conditions

The IM 650 allows you to configure an ET 200PA SMART with input/output modules.

You can use the following I/O modules.

- ET 200PA SMART I/O modules
- All S7-300 standard I/O modules and HART analog modules that are approved for use in an ET 200PA SMART (see the list of released modules for PCS 7 (V8.1)).
- All counter modules and point-to-point couplings that are approved for use in an ET 200PA SMART (see the list of released modules for PCS 7 (V8.1)).

You can only operate the IM 650 interface module on the integrated PROFIBUS DP interface of a CPU 410-5H or a CPU 410 SMART with firmware version 8.1 or higher.

You may only configure an ET 200PA SMART station with active bus modules.

You can operate an ET 200PA SMART station both non-redundantly as well as redundantly:

For a non-redundant configuration, use an IM 650 on an active PS/IM bus module (6ES7650 8PA00-xAA0)

For a redundant configuration, use two IM 650 modules on an active IM/IM bus module (6ES7650 8PB00-xAA0)

2.2 Configuring the mechanical structure

2.2.1 Horizontal or vertical configuration

Possible configurations

You can mount the ET 200PA SMART horizontally or vertically.

Always arrange the power supply and IM 650 on the left or at the bottom.

2.2.3 Arrangement of the modules for the function "Change During Operation" and / or "Redundancy"

Arrangement rules

The following rules apply to the arrangement of the modules in an ET 200PA SMART:

- An ET 200PA SMART must be mounted on one rack only (mounting rail). It is not permitted to use interface modules to connect to other racks.
- You may insert a maximum of 12 assemblies to the right of the IM 650.
- You must plug the IM 650 and all modules into active bus modules.

Note

The active bus modules 6ES7650 8PA00-xAA0 and 6ES7650 8PB00-xAA0 have yellow markings for easier identification. The purpose of these markings is to indicate that only IM 650 interface modules may be plugged into these bus modules.

- Use the mounting rails for "Module replacement in runtime" (only these allow mounting of the active bus modules).
- Close unused slots with the backplane bus cover. Close the last bus module with the bus module cover. The bus module cover is included with the bus module BM PS/IM or BM IM/IM. The backplane bus cover has to be ordered.

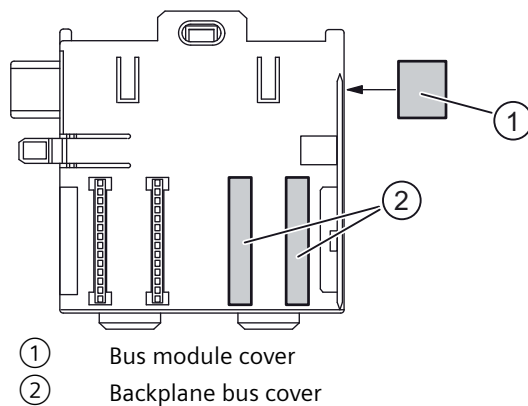


Figure 2-3 Example: Bus module 2 x 40 (6ES7 650 8PC00-0AA0)

- To use the ET 200PA SMART in the intrinsically safe area, use the Ex partition - preferably between the modules in the intrinsically safe area and the modules in the non-intrinsically safe area.

Restrictions

Use of the high-accuracy time stamp (1 ms accuracy) is only possible with 8 modules. In the ET 200PA SMART, you may use a maximum of 8 input modules after the IM 650 interface module for this.

The time stamp is only possible for input modules series of modules from the S7-300 series of modules. Signals of ET 200PA SMART input modules cannot be time-stamped.

Possible configurations

The length of the mounting rail determines how many active bus modules can be plugged.

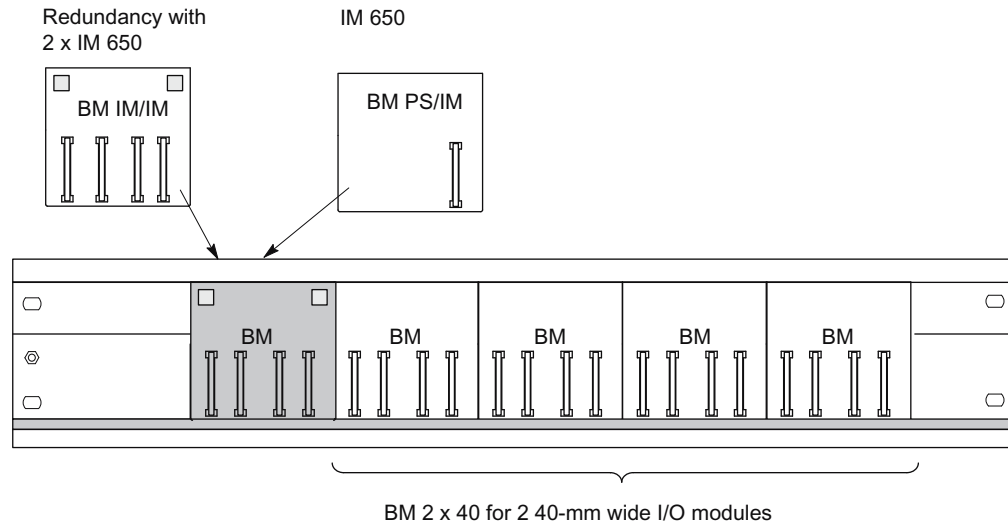


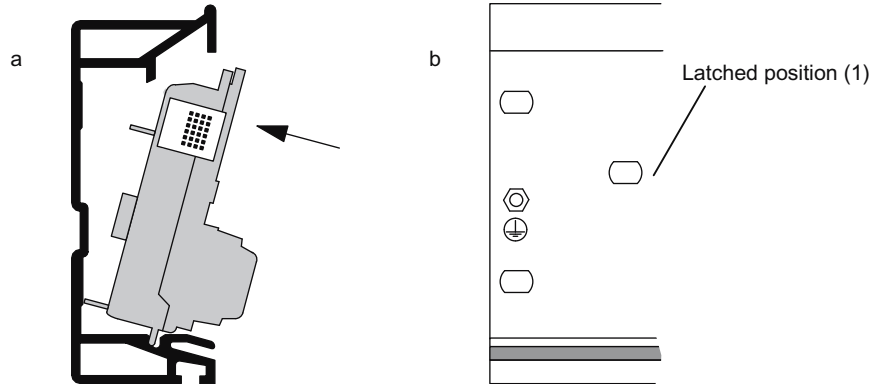
Figure 2-4 Configuration with active bus modules

Placement of the PS 307 power supply modules

Redundancy with 2 x IM 650	If you are using the 530 mm mounting rail, place the BM IM/IM in the rightmost latched position of the two latched positions on the rail. Then you can mount either 2 x PS 307; 2A or 1 x PS 307; 5A on the rail to the left of the BM IM/IM. Otherwise you must mount the power supply modules on a separate S7 standard mounting rail. Recommendation: each IM 650 should have its own PS. PS 307; 2A fits next to the IM 650 on the BM PS/IM. PS 307; 5A and 10A do not fit on the BM PS/IM. You must mount these on a separate S7 standard mounting rail.
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Only install the active bus modules in a de-energized state.

1. Hook the lower edge of the bus module BM PS/IM or BM IM/IM in the rail, and then press the module into the rail (a) and slide it to the left up to the latched position (b).



Are you using the 530 mm mounting rail and the BM IM/IM?

If you position the BM IM/IM in the rightmost of the two latched positions (1), you can also install either 2 x PS 307; 2A or 1 x PS 307; 5A to the left of the BM IM/IM.

2. Hook the next bus module (bus module BM 2 x 40) into the rail and press it onto the rail. Slide it towards the left bus module, so that the module connector has contact.
3. Are you installing the ET 200PA SMART in intrinsically safe areas?
If yes, then you require the Ex partition between the modules in the intrinsically safe and the non-intrinsically safe areas. To do this, simply insert the Ex partition on the right lateral guide of the bus module.
4. Hook the modules into the rail and swing them down into place. Use the side guides of the bus modules to do so. When you screw in the modules, you fix the bus module to the mounting rail at the same time
5. Plug the bus module cover onto the last bus module. If there is a slot with no module, also plug in the backplane bus cover on the unoccupied slot.

Additional information on time synchronization can be found in function manual "PCS 7 Process Control System, Time Synchronization".

Operating steps for activation

You activate the time synchronization on the I/O bus using the following steps:

PROFIBUS DP:

1. Complete the PROFIBUS DP with a time-of-day master.
2. Activate the time synchronization in the properties of the DP master.

Note

In the H-system, you must insert a time-of-day master in both the PROFIBUS DP systems and activate the time synchronization.

Configuration of the IM 650:

1. In HW-Config, open the dialog **DP slave properties > Time-of-day Synchronization**.
2. Select the **Time synchronization** check box.
3. Enter the synchronization interval active on the PROFIBUS DP (e.g. 10 s) as the synchronization interval.

7.6 Redundancy with IM 650

Use

In a redundant configuration, the IM 650 interface modules can be operated redundantly in conjunction with a CPU 410-5H or CPU 410 SMART.

Requirements for the ET 200PA SMART

- Both IM 650 modules are plugged into an active bus module BM IM/IM. The arrangement rules indicated in section "Installation (Page 33)" apply to the active bus modules and interface modules used.
- The SYNC / FREEZE function must not be activated in redundant mode.

Note

If the SYNC / FREEZE function is nevertheless activated in a redundant system, the user bears the responsibility for the behavior of the redundant system (e.g. during changeovers).

7.8.1 I&M data for PROFIBUS DP

Note

Only one DP master can access the I&M data of an ET 200PA SMART at a time.

Reading and writing I&M data with SIMATIC Manager

The I&M data is displayed in the "Module status - IM 650" and "Properties - DP Slave" tabs in SIMATIC Manager.

The M-data of modules can be entered in HW Config (e.g., in a dialog box during configuration).

The access to the I&M data takes place in accordance with IEC 61158-6.

In the H-system, the interface module from which the I&M data is to be read must be accessible online.

Reading and writing I&M data without SIMATIC Manager

If you want to use the I&M data without using PCS 7 or SIMATIC Manager, you must access the data in accordance with the specifications of the PROFIBUS Guideline – Order No. 3.502, Version 1.1 May 2003.

In the AS 410H, you must address the interface module (slot 245 or 246) from which the I&M data is to be read. Slot 245 designates the left interface module and slot 246 the right interface module on the BM IM/IM.

Example of reading the I&M data

You can selectively access specific I&M data using **Read data record**. A two-level access is necessary for this:

1. Data record 248 has a directory containing the associated data record numbers for the various indices (refer to the following table).

Table 7-1 Structure of DS 248 for the IM 650

Contents	Length (bytes)	Coding (hex)
Header information		
ID of the contents list	2	00 01
Index of the contents list	2	00 00
Length of the following blocks in bytes	2	00 08
Number of blocks	2	00 05
Block information for the I&M data		
SSL ID	2	F1 11
Associated data record number	2	00 E7
Length of the data record	2	00 40
Index	2	00 01