MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6ES7650-8DK80-1AA0

COATED 32-CHANNEL DIGITAL INPUT MODULE

Used with the applicable SIMATIC ET 200PA SMART configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens ET 200PA SMART Operating Instructions, A5E34192013-AC, May 2020; coated DI32 section.

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Operating Instructions

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05/2020
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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

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

NOTICE

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

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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Note the following:

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG
Digital Industries
Postfach 48 48
90026 NÜRNBERG
GERMANY

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ET 200PA SMART I/O modules

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10.1 Module overview

The following I/O modules are available in the ET 200PA SMART system:

Module	Article no.	Article no. (with conformal coating)
Digital input module DI16xDC24V	6ES7650-8DK70-0AA0	6ES7650-8DK70-1AA0
Digital input module DI32xDC24V	6ES7650-8DK80-0AA0	6ES7650-8DK80-1AA0
Digital output module DO16xDC24V/0.5A	6ES7650-8EK70-0AA0	6ES7650-8EK70-1AA0
Digital output module DO32xDC24V/0.5A	6ES7650-8EK80-0AA0	6ES7650-8EK80-1AA0
Analog input module AI8x13Bit	6ES7650-8AE60-0AA0	6ES7650-8AE60-1AA0
Analog input module AI8x16Bit	6ES7650-8AK60-0AA0	6ES7650-8AK60-1AA0
Analog input module AI16x16Bit	6ES7650-8AK70-0AA0	6ES7650-8AK70-1AA0
Analog input module AI8xTC/4xRTD	6ES7650-8AR60-0AA0	6ES7650-8AR60-1AA0
Analog input module AI 8 x 16-bit HART[1]	6ES7650-8AT60-0AA0	6ES7650-8AT60-1AA0
Analog output module AO8x12Bit	6ES7650-8BK60-0AA0	6ES7650-8BK60-1AA0
Analog output module AO 8 x 16-bit HART[1]	6ES7650-8BT60-0AA0	6ES7650-8BT60-1AA0

[1] Available as of PCS 7 V9.0 SP2 and the corresponding update collection

In addition to the ET 200PA SMART I/O modules specified in this table, the following modules can also be used in an ET 200PA SMART system.

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

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

- Automation System S7-300, Module Data (http://support.automation.siemens.com/WW/view/en/8859629)
- ET 200M, Signal Modules for Process Automation (http://support.automation.siemens.com/WW/view/en/7215812)
- ET 200M Distributed I/O Device HART Analog Modules (http://support.automation.siemens.com/WW/view/en/22063748)

Non-assignable diagnostic messages are always provided by the module regardless of whether the diagnostics is enabled.

Pending diagnostic information is displayed via the group error display (SF LED).

Diagnostic interrupts are only signaled by the I/O modules if "Diagnostic interrupt" is enabled via the respective parameter assignment dialog.

Group error display (SF LED)

The group error display (SF LED) of the ET 200PA SMART modules indicates the following:

- Operation of the ET 200PA SMART module centrally in an S7-300 system or an ET 200M station. In this case, the SF LED flashes at 2 Hz. The ET200PA SMART module is not ready for operation.
  All the remaining modules can be operated without restriction.
- Error state of the respective module in the case of modules with diagnostic capability The SF LED lights up as soon as diagnostic information of a module is detected. It goes out when all causes of the diagnostic information (errors) are eliminated.

Internal module defects are indicated for modules with and without diagnostic capability. The SF-LED lights up when a module defect has been detected.

10.2 Digital input modules

Overview of properties

The table below presents the ET 200PA SMART digital input modules based on their most important properties.

Table 10-1 ET 200PA SMART digital input modules

	Module	
	DI 16 x DC24V	DI 32 x DC24V
Properties	6ES7650-8DK70-xAA0	6ES7650-8DK80-xAA0
Number of inputs	16 Isolated in groups of 16	32 Isolated in groups of 16
Rated input voltage	24 V DC	24 V DC
Suitable for...	2-/3-/4-wire proximity switches (BEROs)	
Configurable diagnostics	Yes	No
Diagnostic interrupt	Yes	No
Adjustable input delays	Yes, for entire module	No

10.2.1 Digital input module DI 32 x DC 24 V

Article numbers

Standard module: 6ES7 650-8DK80-0AA0

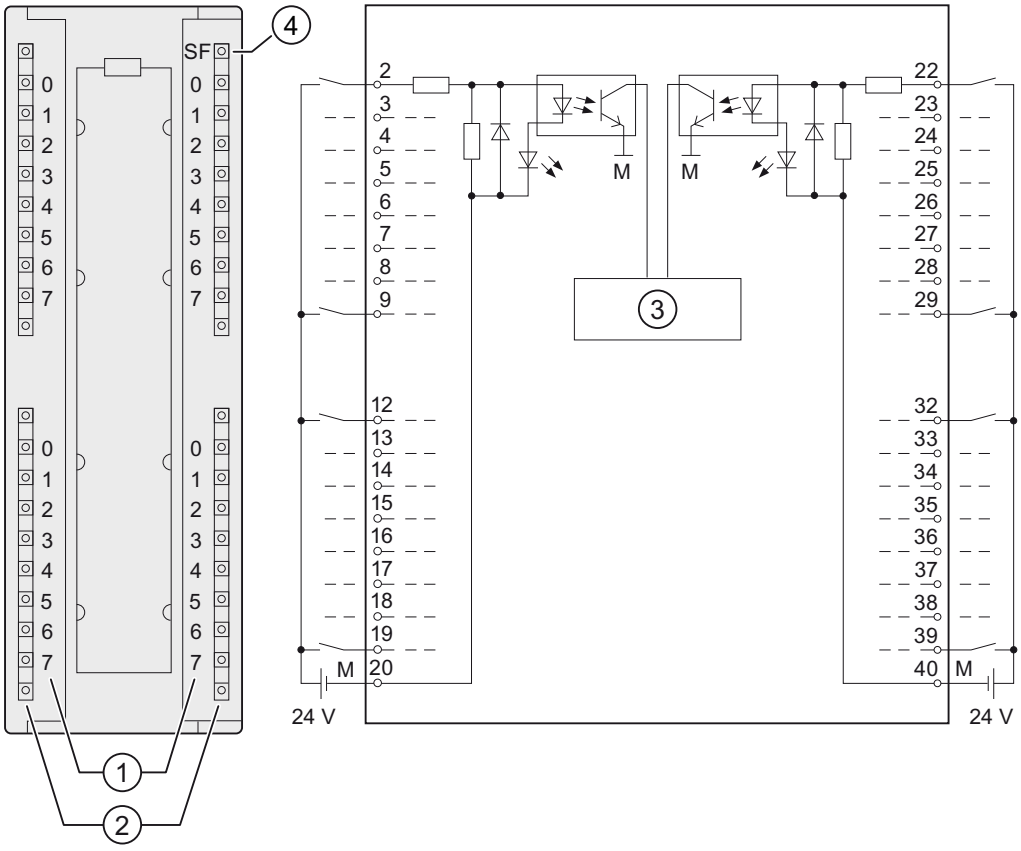
Module with conformal coating: 6ES7 650-8DK80-1AA0

Properties of the DI 32xDC24V

The DI 32 x DC 24 V is characterized by the following properties:

- 32 inputs, isolated in groups of 16
- Rated input voltage 24 V DC
- Suitable for switches and 2-/3-/4-wire proximity switches (BEROs)
- Group error display (SF LED)

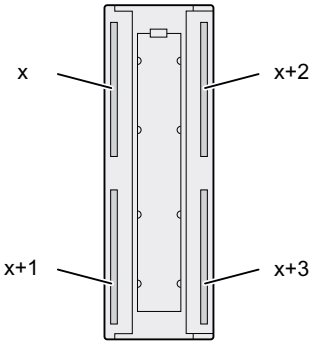
Wiring and block diagram of the DI 32 x DC 24 V



① Channel number
② Status display - green
③ Backplane bus interface
④ Group error display - red (SF LED)

Terminal assignment of the DI 32 x DC 24 V

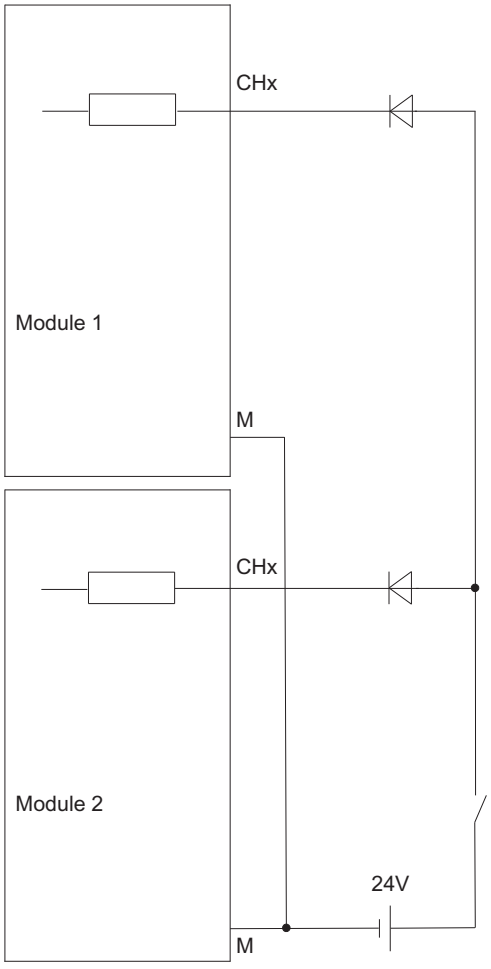
The figure below shows the assignment of channels to addresses (input byte x up to input byte x+3).



Redundant use

External diodes must also be wired to the inputs so that, for example, no impermissible states are detected when one of the two redundant modules is pulled out.

Suitable diodes include diode types from the 1N4003 to 1N4007 series or any other diode with U_r >=200 V and I_F >= 1 A



Technical specifications of the DI 32 x DC 24 V

Technical specifications	
Dimensions and weight	
Dimensions W x H x D (mm)	40 x 125 x 120
Weight	Approx. 260 g
Module-specific data	
Number of inputs	32

Technical specifications	
Cable length	
• Unshielded	Max. 600 m
• Shielded	Max. 1000 m
Front connector	40-pin
Voltages, currents, potentials	
Number of simultaneously controllable inputs	
• Horizontal mounting position Up to 40 °C Up to 60 °C	 32 16
• Vertical mounting position Up to 40 °C	 32
Electrical isolation	
• Between channels and backplane bus	Yes
• Between channels	Yes
– in groups of	16
Isolation, designed for basic isolation	
• Between different circuits	75 V DC / 60 V AC
Isolation tested with	500 V AC or 707 V DC, type test
Current consumption	
• From backplane bus	Max. 50 mA
Power loss of the module	Typ. 6.5 W
Status, interrupts, diagnostics	
Status display	Green LED per channel
Group error display (SF LED)	Yes
Diagnostic interrupts	None
Diagnostic functions	None
Sensor selection data	
Input voltage	
• Rated value	24 V DC
• For "1" signal	13 V to 30 V
• For "0" signal	- 30 V to + 5 V
Input current	
• When signal "1" is present	Typ. 7 mA
Input delay	
• At "0" to "1" transition	Typically 3 ms
• At "1" to "0" transition	Typically 3 ms
Input characteristics	According to IEC 61131, Type 1
Connection of 2-wire BEROs	Supported
• Permissible quiescent current	Max. 1.5 mA
Connecting the signal transmitter	Using a 40-pin front connector