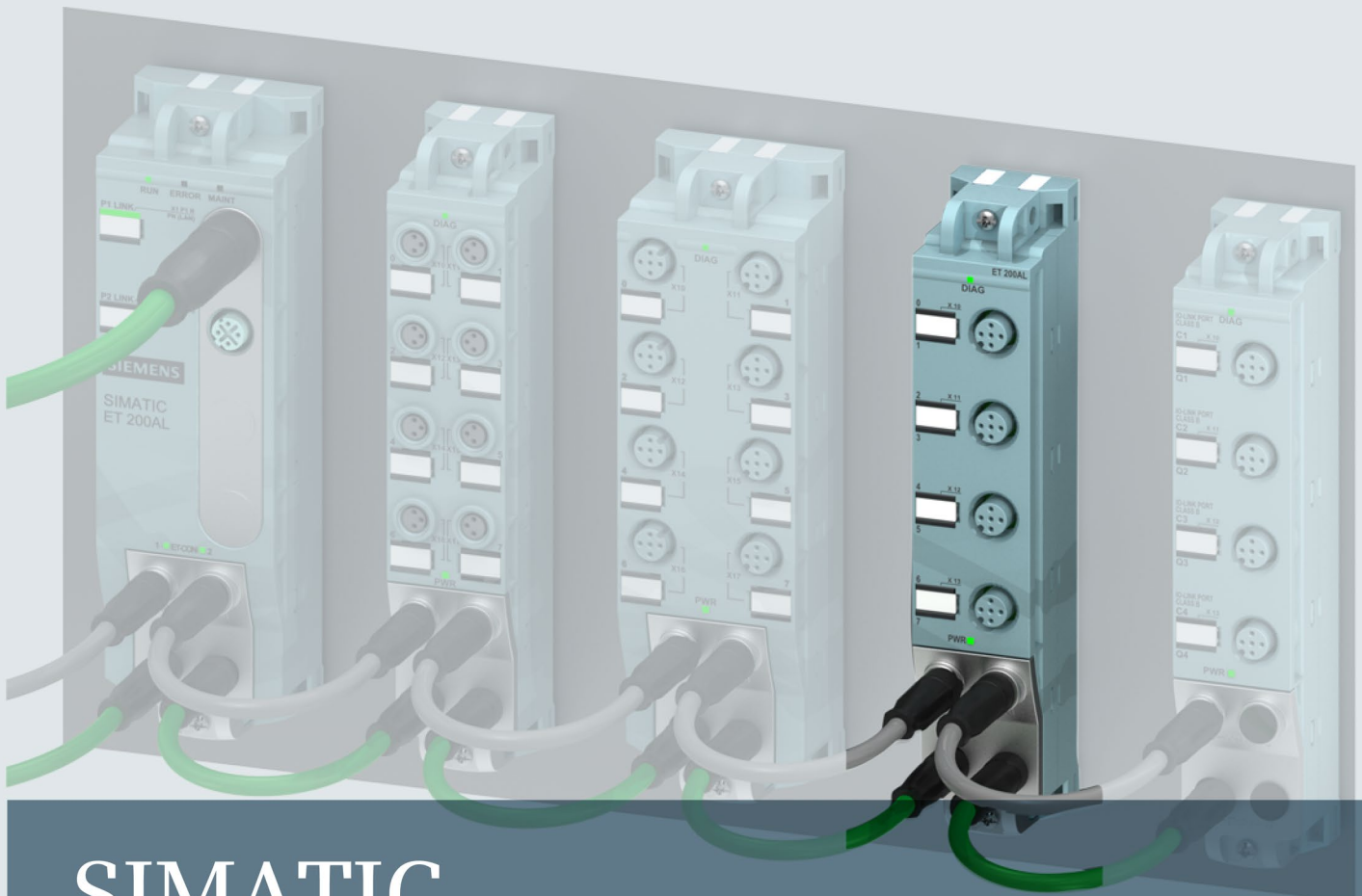


SIEMENS



SIMATIC

ET 200AL

Digital input / output module DIQ 4+DQ 4x24VDC/0.5A 4xM12 (6ES7143-5AF00-0BA0)

Manual

Edition

02/2016

Answers for industry.

SIMATIC

ET 200AL

Digital input/digital output module
DIQ 4+DQ 4x24VDC/0.5A 4xM12
(6ES7143-5AF00-0BA0)

Manual

Preface

Documentation guide

1

Product overview

2

Wiring

3

Parameters/address space

4

Interrupts/diagnostic alarms

5

Technical specifications

6

PROFInergy

7

Dimension drawing

A

Legal information

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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.

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WARNING

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

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

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Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Preface

Preface

Purpose of the documentation

This manual supplements the ET 200AL distributed I/O system (<https://support.industry.siemens.com/cs/us/en/view/89254965>) system manual. Functions that are generally applicable to the ET 200AL distributed I/O system are described there.

The information provided in the present manual, the system manual and the function manuals enables you to commission the ET 200AL distributed I/O system.

Conventions

Please also observe notes marked as follows:

Note

Indicates important product information to which particular attention should be paid.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered. You can find more information about industrial security on the Internet (<http://www.siemens.com/industrialsecurity>).

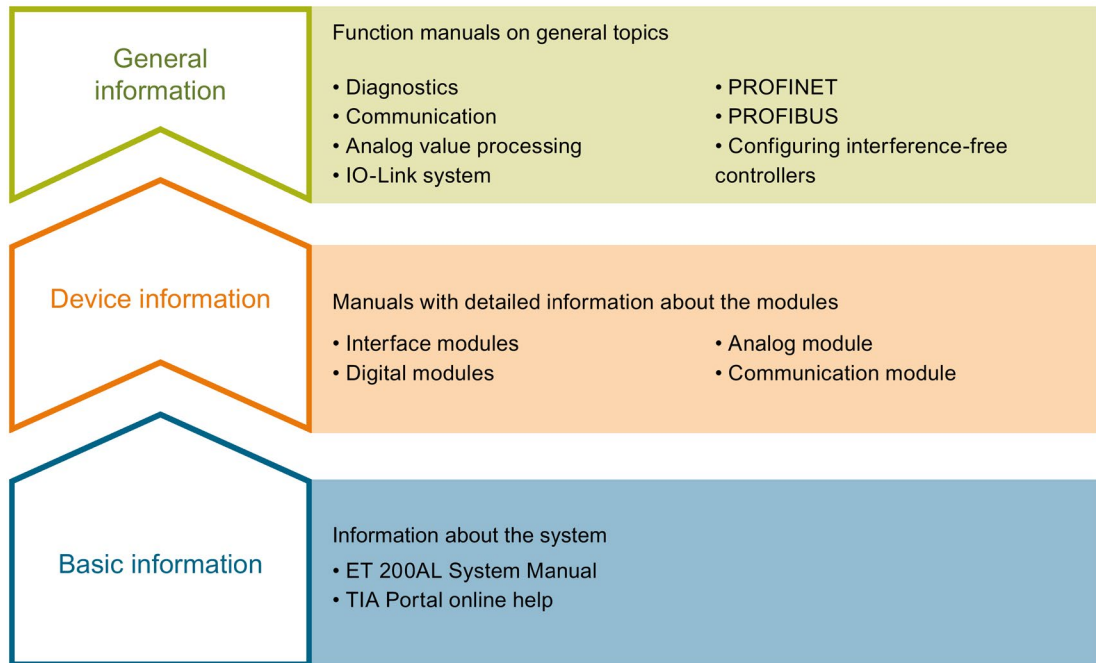
To stay informed about product updates as they occur, sign up for a product-specific newsletter. You can find more information on the Internet (<http://support.automation.siemens.com>).

Table of contents

	Preface	4
1	Documentation guide	6
2	Product overview	9
	2.1 Properties.....	9
	2.2 Operator controls and display elements	11
3	Wiring	12
	3.1 Terminal and block diagram	12
	3.2 Pin assignment	13
4	Parameters/address space	16
	4.1 Parameters	16
	4.2 Explanation of the parameters	16
	4.3 Address space	17
5	Interrupts/diagnostic alarms	19
	5.1 Status and error displays	19
	5.2 Interrupts	21
	5.3 Diagnostics alarms.....	21
6	Technical specifications	22
	6.1 Technical specifications	22
7	PROFenergy.....	26
	7.1 Pause function	26
	7.2 DI operating mode	27
	7.3 DQ operating mode.....	28
A	Dimension drawing	29

The documentation for the SIMATIC ET 200AL distributed I/O system is arranged into three areas.

This arrangement enables you to access the specific content you require.



Basic information

The System Manual and Getting Started describe in detail the configuration, installation, wiring and commissioning of the SIMATIC ET 200AL distributed I/O system. The STEP 7 online help supports you in the configuration and programming.

Device information

Product manuals contain a compact description of the module-specific information, such as properties, terminal diagrams, characteristics and technical specifications.

General information

The function manuals contain detailed descriptions on general topics regarding the SIMATIC ET 200AL distributed I/O system, e.g. diagnostics, communication, Motion Control, Web server.

You can download the documentation free of charge from the Internet (<http://w3.siemens.com/mcms/industrial-automation-systems-simatic/en/manual-overview/tech-doc-et200/Pages/Default.aspx>).

Manual Collection ET 200AL

The Manual Collection contains the complete documentation on the SIMATIC ET 200AL distributed I/O system gathered together in one file.

You can find the Manual Collection on the Internet
(<http://support.automation.siemens.com/WW/view/en/95242965>).

"mySupport"

With "mySupport", your personal workspace, you make the best out of your Industry Online Support.

In "mySupport", you can save filters, favorites and tags, request CAx data and compile your personal library in the Documentation area. In addition, your data is already filled out in support requests and you can get an overview of your current requests at any time.

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You can find "mySupport" on the Internet (<https://support.industry.siemens.com/My/ww/en>).

"mySupport" - Documentation

In the Documentation area in "mySupport" you can combine entire manuals or only parts of these to your own manual.

You can export the manual as PDF file or in a format that can be edited later.

You can find "mySupport" - Documentation on the Internet
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"mySupport" - CAx data

In the CAx data area in "mySupport", you can access the current product data for your CAx or CAe system.

You configure your own download package with a few clicks.

In doing so you can select:

- Product images, 2D dimension drawings, 3D models, internal circuit diagrams, EPLAN macro files
- Manuals, characteristics, operating manuals, certificates
- Product master data

You can find "mySupport" - CAx data on the Internet
(<http://support.industry.siemens.com/my/ww/en/CAxOnline>).

Application examples

The application examples support you with various tools and examples for solving your automation tasks. Solutions are shown in interplay with multiple components in the system - separated from the focus on individual products.

You will find the application examples on the Internet
(<https://support.industry.siemens.com/sc/ww/en/sc/2054>).

TIA Selection Tool

With the TIA Selection Tool, you can select, configure and order devices for Totally Integrated Automation (TIA).

This tool is the successor of the SIMATIC Selection Tool and combines the known configurators for automation technology into one tool.

With the TIA Selection Tool, you can generate a complete order list from your product selection or product configuration.

You can find the TIA Selection Tool on the Internet

(<http://w3.siemens.com/mcms/topics/en/simatic/tia-selection-tool>).

Product overview

2.1 Properties

Article number

6ES7143-5AF00-0BA0

View of the module

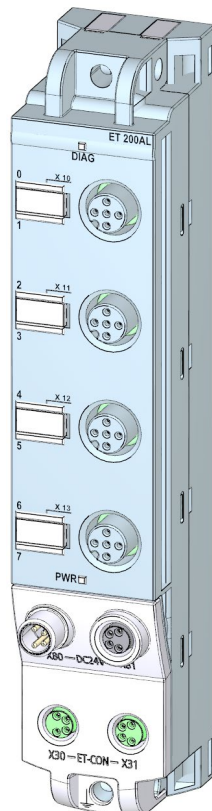


Image 2-1 View of the DIQ 4+DQ 4x24VDC/0.5A 4xM12 digital input/digital output module

Properties

The module has the following technical properties:

- 4 digital inputs or digital outputs and 4 digital outputs, depending on parameter assignment
 - DIQ signals connected to 1L+ (non-switched)
 - DQ signals connected to 2L+ (switched)
- M12 sockets for connection of sensors and actuators
- Digital inputs:
 - 24 V DC supply voltage
 - Configurable diagnostics can be set for each module
 - Typical input delay of 3 ms
 - Suitable for switches and proximity switches
- Digital outputs:
 - Rated load voltage 24 V DC
 - Suitable for solenoid valves, DC contactors, and indicator lights
 - Output current per output 0.5 A
 - Configurable diagnostics can be set for each module
- Dimensions 30 x 159 mm

The module supports the following functions:

- Firmware update
- Identification and maintenance data I&M0 to I&M3
- Value status (Quality Information)
- PROFinergy

Accessories

The following components are included in the module package:

- Identification labels
- Spacers

Other components

The following component can be ordered as spare part:

- Identification labels

The following components can be ordered as accessories:

- Connectors
- Cables
- Stripping Tool for ET-Connection
- M8 sealing cap
- M12 sealing cap

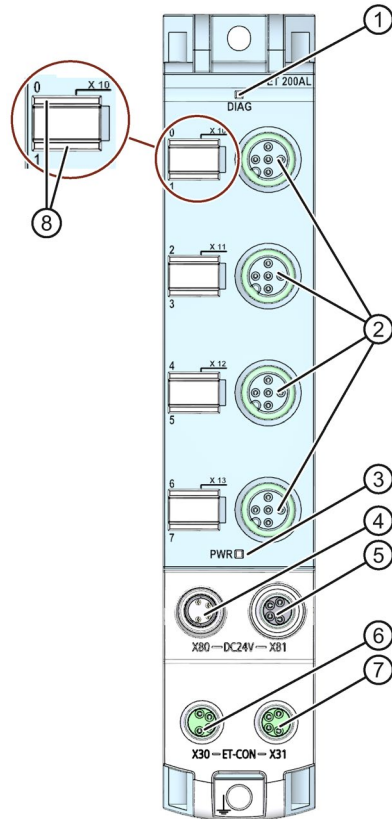
See also

You can find more information on accessories in the Accessories/spare parts section of the ET 200AL distributed I/O system

(<https://support.industry.siemens.com/cs/us/en/view/89254965>) system manual.

2.2 Operator controls and display elements

The figure below shows the operator controls and display elements of the DIQ 4+DQ 4x24VDC/0.5A 4xM12 digital input/digital output module.



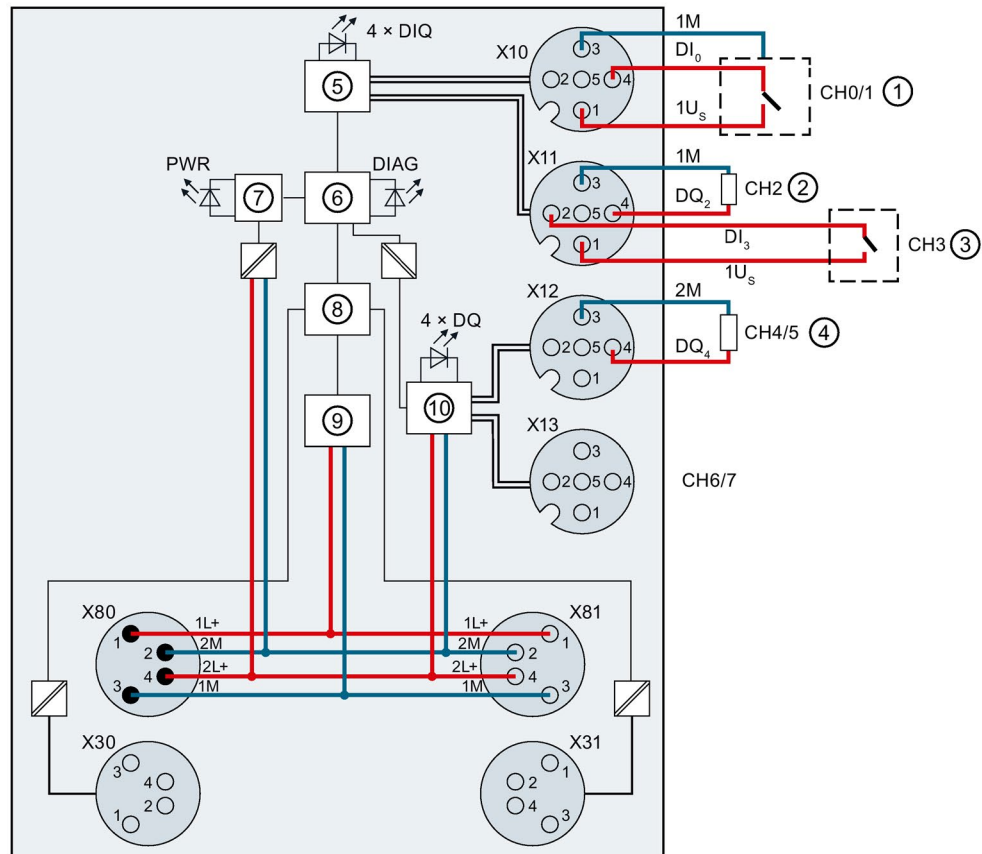
- ① DIAG: LED display for the diagnostic status
- ② X10 to X13: Sockets for the input/output signal
- ③ PWR: LED display for load voltage 2L+
- ④ X80: Connector for infeed of the supply voltage (POWER input)
- ⑤ X81: Socket for loop-through of the supply voltage (POWER output)
- ⑥ X30: Socket for ET-Connection IN
- ⑦ X31: Socket for ET-Connection OUT
- ⑧ LED displays 0 to 7 for the channel status

Image 2-2 Operator controls and display elements

Wiring

3.1 Terminal and block diagram

The figure below shows an example of the pin assignment of signal inputs with 2-wire and 3-wire connection as well as signal outputs.



①	Configured as input: 3-wire connection	X30	Infeed of the ET-Connection
②	Configured as output	X31	Loop-through of the ET-Connection
③	Configured as input: 2-wire connection	1L+	Supply voltage 1L+ (non-switched)
④	Output	1M	Ground 1M (non-switched)
⑤	DI/DQ circuit	2L+	Load voltage 2L+ (switched)
⑥	Microcontroller	2M	Ground 2M (switched)
⑦	Monitoring	1Us	24 V encoder supply
⑧	ET-Connection interface	DIQ _n	Input/output signal
⑨	Internal supply voltage	DQ _n	Output signal
⑩	DQ circuit	DIQ	LEDs channel status (0, 1, 2 and 3) (green)
X10 to X13	Channels 0 to 7	DQ	LEDs channel status (4, 5, 6 and 7) (green)
X80	Infeed of supply voltages	DIAG	LED diagnostic status (red/green)
X81	Loop-through of supply voltages	PWR	LED supply voltage 2L+ (green)

Image 3-1 Terminal and block diagram

3.2 Pin assignment

Note

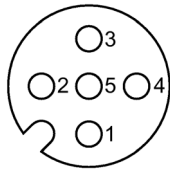
Color coding

The sockets for ET-Connection and the power supply of the modules are color-coded. These colors correspond to the colors of the offered cables.

Pin assignment of the sockets for digital inputs/digital outputs

The tables below show the pin assignments of the 4 sockets for connection of the digital inputs/digital outputs.

Table 3- 1 Pin assignment for digital inputs/digital outputs

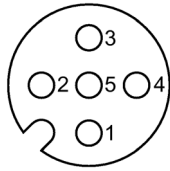
Pin	Assignment	Front view of the sockets
	X10 and X11 - sockets for digital inputs/digital outputs	X10, X11
1	24 V encoder supply 1Us (derived from 1L+ non-switched)	
2	Input/output signal DIQ1: Connector X10 Input/output signal DIQ3: Connector X11	
3	Encoder supply ground 1M	
4	Input/output signal DIQ0: Connector X10 Input/output signal DIQ2: Connector X11	
5	Functional earth FE	

NOTICE

24 V encoder supply 1Us

Use only the 24 V encoder supply 1Us provided by the digital input/digital output module to supply power to the encoder.

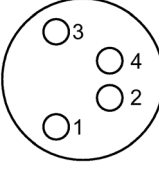
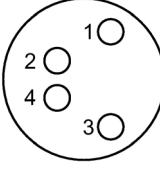
Table 3- 2 Pin assignment for digital outputs

Pin	Assignment	Front view of the sockets
	X12 and X13 sockets for digital outputs	X12, X13
1	Unassigned	
2	Output signal DQ5: Connector X12 Output signal DQ7: Connector X13	
3	Ground 2M	
4	Output signal DQ4: Connector X12 Output signal DQ6: Connector X13	
5	Functional earth FE	

Pin assignment of the sockets for ET-Connection

The table below shows the pin assignments of the 2 sockets for the connection of ET-Connection.

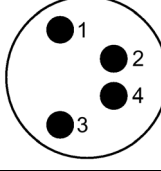
Table 3- 3 Pin assignment for ET-Connection

Pin	Assignment		Assignment of the wire color of the bus line cable for ET-Connection	Front view of the sockets	
	X30 socket (ET-Connection IN)	X31 socket (ET-Connection OUT)		X30	X31
1	TXP	RXP	Yellow		
2	RXP	TXP	White		
3	RXN	TXN	Blue		
4	TXN	RXN	Orange		
Shielding	Functional earth FE		-		

Pin assignment of the connector for infeed of the supply voltage

The table below shows the pin assignment of the connector for infeed of the supply voltage.

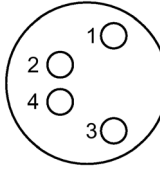
Table 3- 4 Pin assignment of the supply voltage connector

Pin	Assignment	Assignment of the wire color of the power line cable	Front view of the connector
	X80 connector (POWER input)		
1	Supply voltage 1L+ (non-switched)	Brown	
2	Ground 2M (switched)	White	
3	Ground 1M (non-switched)	Blue	
4	Load voltage 2L+ (switched)	Black	

Pin assignment of the socket for loop-through of the supply voltage

The table below shows the pin assignment of the socket for loop-through of the supply voltage.

Table 3- 5 Pin assignment of the supply voltage socket

Pin	Assignment	Assignment of the wire color of the power line cable	Front view of the socket
	X81 socket (POWER output)		
1	Supply voltage 1L+ (non-switched)	Brown	
2	Ground 2M (switched)	White	
3	Ground 1M (non-switched)	Blue	
4	Load voltage 2L+ (switched)	Black	

NOTICE**ET-Connection/supply voltage**

Observe the correct wiring of the M8 sockets for ET-Connection and the supply voltage.

Mixing up the ET-Connection connectors and the connectors for the supply voltage can destroy the module.

Parameters/address space

4.1 Parameters

The table below shows the parameters for the DIQ 4+DQ 4x24VDC/0.5A 4xM12 digital input/digital output module.

Table 4- 1 Parameters

Parameters	Value range	Default	Scope
Diagnostics: Missing load voltage 2L+	<ul style="list-style-type: none"> Disable Enable 	Disable	Module
Diagnostics: Short-circuit to ground	<ul style="list-style-type: none"> Disable Enable 	Disable	Module (Short-circuit of encoder supply or of the output to ground)
Freely assignable channel 0 ... 3	<ul style="list-style-type: none"> DI DQ 	DI	Channel
Reaction to CPU/master STOP	<ul style="list-style-type: none"> Shut down Keep last value Output substitute value 	Shut down	Module (digital outputs)
Substitute value channel 0 ... 7	<ul style="list-style-type: none"> 0 1 	0	Channel (digital outputs)

4.2 Explanation of the parameters

Diagnostics: Missing load voltage 2L+

Enabling of the diagnostics for missing or insufficient load voltage 2L+.

Diagnostics: Short-circuit to ground

Enabling of the diagnostics for short-circuit of the encoder supply or output to ground.

Freely assignable channel n

With this parameter, you set whether the channel is to be operated as an input or output.

Reaction to CPU/master STOP

With this parameter, you set the reaction of the digital outputs of the digital input/digital output module after a CPU/master STOP:

- Shut down: The digital output is de-energized.
- Keep last value: The last value of the digital output remains activated.
- Output substitute value: The module outputs a configured substitute value.

Substitute value channel 0 ... 7

With this parameter, you set substitute values for the digital outputs.

4.3 Address space

The figure below shows the assignment of the address space for the digital input/digital output module DIQ 4+DQ 4x24VDC/0.5A 4xM12 with value status (Quality Information, QI).

The address space for the value status is allocated by the module, if the value status is configured using the PROFINET interface module.

Assignment in the process image input (PII)

	7	6	5	4	3	2	1	0	
IB x	0	0	0	0					Input values at channels 0 to 3
	7	6	5	4	3	2	1	0	
IB x + 1	0	0	0	0					Value status (QI) for inputs at channels 0 to 3
	7	6	5	4	3	2	1	0	
IB x + 2									Value status (QI) for outputs at channels 0 to 7

Assignment in the process image output (PIQ)

	7	6	5	4	3	2	1	0	
QB x									Output values at channels 0 to 7

Image 4-1 Address space

Note

Parameter assignment of the channels

Parameters for the first four channels can be freely assigned.

For the channels 0 ... 3 that are configured as input, the corresponding values in the output data do not trigger any reaction.

For the channels 0 ... 3 that are configured as output, the input value in the process image is 0.

Configuration options of the digital input/digital output module DIQ 4+DQ 4x24VDC/0.5A 4xM12

You have the following configuration options:

- Configuration 1: without value status
- Configuration 2: with value status

Evaluating the value status

An additional two bytes are occupied in the input address space if you enable the value status for the digital input/digital output module. The value status of the inputs is assigned to bits 0 to 3 in input byte $x + 1$. The value status of the outputs is assigned to bits 0 to 7 in input byte $x + 2$. This additional information provides information regarding the validity of the digital values or channel status.

Bit = 1: No error on channel.

Bit = 0: Error on channel.

If the channel is configured as input, this means:

- Short-circuit to ground at sensor supply or
- Parameter error

If the channel is configured as output, this means:

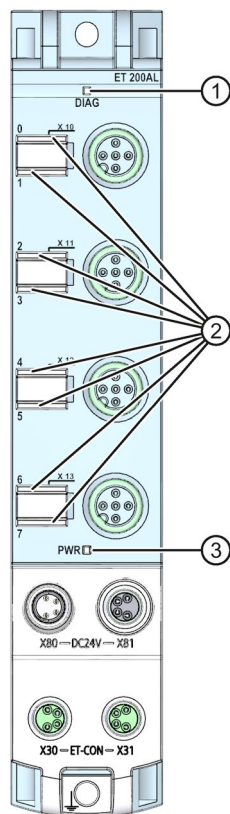
- Short-circuit of output to ground or
- Parameter error or
- For channels 4 ... 7: Missing load voltage 2L+

Interrupts/diagnostic alarms

5.1 Status and error displays

LED displays

The figure below shows the LED displays (status and error displays) of the digital input/digital output module DIQ 4+DQ 4x24VDC/0.5A 4xM12.



- | | | |
|---|--------------------------|-------------|
| ① | Diagnostic status (DIAG) | (red/green) |
| ② | Channel status (0 to 7) | (green) |
| ③ | Load voltage 2L+ (PWR) | (green) |





Image 5-1 LED displays

Meaning of the LEDs

The following tables set out the meaning of the status and error displays. Remedial measures for diagnostic alarms can be found in the section Diagnostics alarms (Page 21).



DIAG LED

Table 5- 1 Error display of the DIAG LED

DIAG LED	Meaning
 Off	No supply voltage 1L+
 Flashes	<ul style="list-style-type: none"> Module parameters not assigned Loading firmware (while the firmware update is being performed, all LEDs retain their current status)
 On	Module parameters assigned and no module diagnostics
 Flashes	Module parameters assigned and module diagnostics



LED channel status

Table 5- 2 LED channel status display

LED channel status	Meaning
 Off	Process signal = 0
 On	Process signal = 1

PWR LED

Table 5- 3 Status display of the PWR LED

PWR LED	Meaning
 Off	Load voltage 2L+ is missing or too low
 On	Load voltage 2L+ present

5.2 Interrupts

The DIQ 4+DQ 4x24VDC/0.5A 4xM12 digital input/digital output module supports diagnostic interrupts.

Diagnostic interrupt

The digital input/digital output module generates a diagnostic interrupt at the following events:

- Short-circuit of encoder supply to ground
- Short-circuit of outputs to ground
- Load voltage 2L+ missing or too low

5.3 Diagnostics alarms

A diagnostic alarm is output for each diagnostic event and the DIAG LED flashes red on the digital input/digital output module.

You can read out the diagnostics alarms, for example, from the diagnostics buffer of the CPU. You can evaluate the error codes with the user program.

Table 5- 4 Diagnostics alarms, their meanings and corrective measures

Diagnostics alarm	Error code	Meaning	Remedy
Short-circuit*	1H	Short-circuit encoder supply to ground	<ul style="list-style-type: none"> • Eliminate the short-circuit
		Short-circuit of outputs to ground	
Load voltage 2L+ missing**	11H	Load voltage 2L+ missing or too low	<ul style="list-style-type: none"> • Check the supply voltage • Check the module
<p>* If a short-circuit of the encoder supply to ground is detected, the diagnostic alarm "Short-circuit" is always output. This alarm is output even if all channels are configured as outputs.</p> <p>** If you are using ET 200AL modules in connection with the ET 200SP distributed I/O system, the diagnostic alarm "Load voltage missing" is displayed.</p>			

Note

Channel type

The digital input/digital output module is always signaled as a mixed module (channel type "Input/Output") in the case of diagnostic events, even if you have configured the digital input/digital output module exclusively as an output module.

Technical specifications

6.1 Technical specifications

Technical specifications of the DIQ 4+DQ 4x24VDC/0.5A 4xM12 digital input/digital output module

	6ES7143-5AF00-0BA0
General information	
Product type designation	DIQ 4+DQ 4X24VDC/0,5A, 4XM12
Hardware functional status	E01
Firmware version	V1.0.x
Product function	
I&M data	Yes; I&M0 to I&M3
Engineering with	
STEP 7 TIA Portal can be configured/integrated as of version	As of STEP 7 V13 SP1
STEP 7 can be configured/integrated as of version	V5.5 SP4 Hotfix 7 or higher
PROFIBUS as of GSD version/GSD revision	GSD as of revision 5
PROFINET as of GSD version/GSD revision	GSDML V2.3.1
Supply voltage	
Load voltage 1L+	
Rated value (DC)	24 V
Low limit of permitted range (DC)	20.4 V
High limit of permitted range (DC)	28.8 V
Reverse polarity protection	Yes; against destruction; encoder supply outputs are connected with reverse polarity, loads will be activated
Load voltage 2L+	
Rated value (DC)	24 V
Low limit of permitted range (DC)	20.4 V
High limit of permitted range (DC)	28.8 V
Reverse polarity protection	Yes; against destruction; loads will be activated
Input current	
Current consumption (rated value)	40 mA; no load
From load voltage 1L+ (unswitched voltage)	4 A; maximum value
From load voltage 2L+, max.	4 A; maximum value
Encoder supply	
Number of outputs	4
24 V encoder supply	
Short-circuit protection	Yes; per module, electronic
Output current, max.	0.7 A; total current of all encoders

	6ES7143-5AF00-0BA0
Power loss	
Power loss, typ.	2.5 W
Digital inputs	
Number of inputs	4; can be configured as DIQ
Input characteristic curve acc. to IEC 61131, type 3	Yes
Number of inputs that can be controlled simultaneously	
All mounting positions	
<ul style="list-style-type: none"> up to 55 °C, max. 	4
Input voltage	
Type of input voltage	DC
Rated value (DC)	24 V
For signal "0"	-3 ... +5 V
For signal "1"	+11 ... +30 V
Input current	
For signal "1", typ.	3.2 mA
Input delay (for rated value of input voltage)	
For standard inputs	
<ul style="list-style-type: none"> at "0" to "1", min. 	1.2 ms
<ul style="list-style-type: none"> at "0" to "1", max. 	4.8 ms
<ul style="list-style-type: none"> at "1" to "0", min. 	1.2 ms
<ul style="list-style-type: none"> at "1" to "0", max. 	4.8 ms
Cable length	
Unshielded, max.	30 m
Digital outputs	
Number of outputs	8; 4 DQ fixed, 4 DIQ can be assigned
<ul style="list-style-type: none"> In groups of 	4; 2 load groups for 4 outputs each
Short-circuit protection	Yes; per channel, electronic
<ul style="list-style-type: none"> Response threshold, typ. 	0.7 A
Limitation of inductive shutdown voltage to	2L+ (-47 V)
Switching capacity of outputs	
With lamp load, max.	5 W
Load resistance range	
Low limit	48 Ω
High limit	4 kΩ
Output voltage	
For signal "1", min.	L+ (-0.8 V)
Output current	
For signal "1" rated value	0.5 A
For signal "0" residual current, max.	0.5 mA

	6ES7143-5AF00-0BA0
Switching frequency	
With resistive load, max.	100 Hz
With inductive load, max.	0.5 Hz
With lamp load, max.	1 Hz
Total current of outputs	
Current per group, max.	2 A
Cable length	
Unshielded, max.	30 m
Encoders	
Connectable encoders	
2-wire sensor	Yes
<ul style="list-style-type: none"> Permissible quiescent current (2-wire sensor), max. 	1.5 mA
Interrupts/diagnostics/status information	
Substitute values can be applied	Yes; channel-based, configurable
Interrupts	
Diagnostic interrupt	Yes; configurable
Diagnostics alarms	
Short-circuit	Yes; outputs to ground; encoder supply to ground; module-based
Diagnostics indicator LED	
Channel status display	Yes; green LED
For module diagnostics	Yes; green/red LED
For load voltage monitoring	Yes; green LED
Electrical isolation	
Between load voltages	Yes
Electrical isolation of channels	
Between the channels, in groups of	4; DIQ channels are electrically isolated from DQ channels
Between the channels and backplane bus	Yes
Between the channels and power supply of the electronics	No; DIQ channels are non-isolated and DQ channels are isolated from supply voltage 1L+
Insulation	
Insulation tested with	707 V DC (type test)
Degree of protection and protection class	
Degree of protection according to EN 60529	
<ul style="list-style-type: none"> IP65 	Yes
<ul style="list-style-type: none"> IP67 	Yes
Ambient conditions	
Ambient temperature in operation	
Min.	-25 °C
Max.	55 °C

	6ES7143-5AF00-0BA0
Connection technology	
Inputs/outputs	M12, 5-pin
Power supply	M8, 4-pin
ET-Connection	
ET-Connection	M8, 4-pin, shielded
Dimensions	
Width	30 mm
Height	159 mm
Depth	40 mm
Weights	
Weight, approx.	145 g

PROFenergy

7.1 Pause function

Introduction

PROFenergy is a PROFINET-based data interface for switching off consumers centrally and in a coordinated manner during pause times regardless of the manufacturer or device type. This has the aim that the process is only provided with the energy that is absolutely required. In so doing, the majority of the energy savings come from the process itself; the PROFINET device contributes only a few watts to the possible savings. In PROFenergy, this operating state is referred to as a "pause".

Start and end of a pause

You enable and disable the pause function of the system at the beginning and end of pauses, respectively; the IO controller then sends the PROFenergy command "Start_Pause" or "End_Pause" to the modules.

Use the "Start_Pause" command to start a pause.

Use the "End_Pause" command to end a pause.

The following conditions will also cause a pause to be ended:

- Reconfiguration in RUN
- Controller failure
- Firmware update
- Station stop
- Restart of the interface module through:
 - POWER OFF/POWER ON of an interface module
 - POWER OFF/POWER ON of an I/O module
 - Termination of ET-Connection1 or ET-Connection2

The specific behavior of the digital input/digital output module is explained in the following sections.

Additional information

You can find additional information on working with PROFenergy in the "PROFenergy" section of the manual IM 157-1 PN interface module (<https://support.industry.siemens.com/cs/ww/en/view/89254863>) and the "Saving energy with PROFenergy" section of function manual PROFINET with STEP 7 V13 (<https://support.industry.siemens.com/cs/ww/en/view/49948856>).

Application examples (<https://support.industry.siemens.com/cs/ww/en/view/41986454>) are also available on the Internet.

7.2 DI operating mode

Display

The channel status LEDs are directly influenced by the signal level at the socket.
If the encoder supply is switched off, this causes the channel status LEDs to also switch off.

Response to error detection

All channels that are in pause mode on "PE_MODE_PROCEED" report their diagnostic status as in productive mode.

The following applies for all channels which switch to a different pause mode:

- Encoder supply switch-off upon the start of "pause" does not result in the "Short-circuit" alarms.
- During the "pause", error detection of "Short circuit" is not possible:
 - Alarms for errors already pending before the "pause" are retained.
 - After the "pause" is over, the error status is updated and incoming/outgoing errors are reported correspondingly.

Mode parameter

The following table shows the "Mode" parameter.

Table 7- 1 Mode parameter

Element	Code	Explanation
Mode	0 _D : PE_MODE_PROCEED	Proceed at "pause" • Value status "GOOD"
	1 _D : PE_MODE_SHUTDOWN	Switch off at "pause" • Supply voltage U _S switched off ¹ • Pause substitute value: 0 _B • Value status "BAD"
	3 _D : PE_MODE_LAST_VALUE	Last value at "pause" • Supply voltage U _S switched off ¹ • Pause substitute value: Last input value • Value status "BAD"
	4 _D : PE_MODE_SUBST_VALUE	Substitute value at "pause" • Supply voltage U _S switched off ¹ • Pause substitute value: Configured pause substitute value • Value status "BAD"

¹ As there is only one encoder supply U_S for all channels, the supply can only be switched off at "pause" if all channels are configured to switch off.

7.3 DQ operating mode

Display

The channel status LEDs are directly affected by the signal level at the socket.

Response to error detection

All channels that are in pause mode on "PE_MODE_PROCEED" report their diagnostic status as in productive mode.

The following applies for all channels which switch to a different pause mode:

- During the "pause", error detection of "Short circuit" is not possible:
 - Alarms for errors already pending before the "pause" are retained.
 - After the "pause" is over, the error status is updated and incoming/outgoing errors are reported correspondingly.

Mode parameter

The following table shows the "Mode" parameter.

Table 7- 2 Mode parameter

Element	Code	Explanation
Mode	0 _D : PE_MODE_PROCEED	Proceed at "pause" <ul style="list-style-type: none"> • Value status "GOOD"
	1 _D : PE_MODE_SHUTDOWN	Switch off at "pause" <ul style="list-style-type: none"> • Pause substitute value: 0_B • Value status "BAD"
	3 _D : PE_MODE_LAST_VALUE	Last value at "pause" <ul style="list-style-type: none"> • Pause substitute value: Last output value is maintained • Value status "BAD"
	4 _D : PE_MODE_SUBST_VALUE	Substitute value at "pause" <ul style="list-style-type: none"> • Pause substitute value: Configured pause substitute value is output • Value status "BAD"

Dimension drawing

The figure below shows the dimension drawing of the DIQ 4+DQ 4x24VDC/0.5A 4xM12 digital input/digital output module in front and side views.

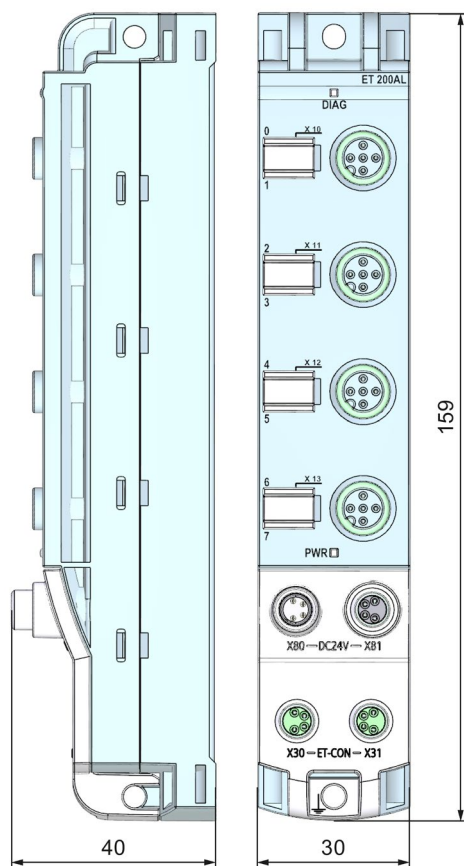


Image A-1 Dimension drawing