

SIEMENS

SICAM BC

DO-5299+5298

System Element Manual

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Integrated Peripheral Element
DO-5299+5298

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Order Information

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**Note**

Please observe Notes and Warnings for your own safety in the Preface.

Disclaimer of Liability

Although we have carefully checked the contents of this publication for conformity with the hardware and software described, we cannot guarantee complete conformity since errors cannot be excluded. The information provided in this manual is checked at regular intervals and any corrections that might become necessary are included in the next releases. Any suggestions for improvement are welcome.

Subject to change without prior notice.

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Preface

This document is applicable to the following product(s):

- SICAM BC

Purpose of this manual

This manual describes the function and the manner of working of the peripheral element DO-5299+5298 and essentially contains

- Functional descriptions
- Technical specifications
- Descriptions of interfaces to the process and other system elements
- Possible Configurations

Target Group

The document you are reading right now is addressed to users, who are in charge of the following engineering tasks:

- Conceptual activities, as for example design and configuration
- Creation of the assembly technical documentation using the designated engineering tools
- System parameterization and system diagnostic, using the designated engineering tools
- Technical system maintenance

Placement in the Information Landscape

Document	Item no.
SICAM BC System Manual	DC5-014-2
SICAM RTUs Common Functions Peripheral Elements according to IEC 60870-5-101/104	DC0-011-2

Notes on Safety

This manual does not constitute a complete catalog of all safety measures required for operating the equipment (module, device) in question because special operating conditions might require additional measures. However, it does contain notes that must be adhered to for your own personal safety and to avoid damage to property. These notes are highlighted with a warning triangle and different keywords indicating different degrees of danger.

**Danger**

means that death, serious bodily injury or considerable property damage **will** occur, if the appropriate precautionary measures are not carried out.

**Warning**

means that death, serious bodily injury or considerable property damage **can** occur, if the appropriate precautionary measures are not carried out.

Caution

means that minor bodily injury or property damage could occur, if the appropriate precautionary measures are not carried out.

**Note**

is important information about the product, the handling of the product or the respective part of the documentation, to which special attention is to be given.

**Qualified Personnel**

Commissioning and operation of the equipment (module, device) described in this manual must be performed by qualified personnel only. As used in the safety notes contained in this manual, qualified personnel are those persons who are authorized to commission, release, ground, and tag devices, systems, and electrical circuits in accordance with safety standards.

Use as Prescribed

The equipment (device, module) must not be used for any other purposes than those described in the Catalog and the Technical Description. If it is used together with third-party devices and components, these must be recommended or approved by Siemens.

Correct and safe operation of the product requires adequate transportation, storage, installation, and mounting as well as appropriate use and maintenance.

During operation of electrical equipment, it is unavoidable that certain parts of this equipment will carry dangerous voltages. Severe injury or damage to property can occur if the appropriate measures are not taken:

- Before making any connections at all, ground the equipment at the PE terminal.
 - Hazardous voltages can be present on all switching components connected to the power supply.
 - Even after the supply voltage has been disconnected, hazardous voltages can still be present in the equipment (capacitor storage).
 - Equipment with current transformer circuits must not be operated while open.
 - The limit values indicated in the manual or the operating instructions must not be exceeded; that also applies to testing and commissioning.
-

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1 Introduction

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1.1 Application

The peripheral element DO-5299+5298 is used in automation units of the system SICAM BC. It is deployed in the field of telecontrol and automation. The peripheral element is used for checked output of pulse commands and single–point information.

System element type	Peripheral element
consists of	integrated peripheral element DO-5299 and submodule DO-5298
can be used in	SICAM BC/C
Engineering	SICAM TOOLBOX II with OPM II

1.2 Overview

Peripheral element (partly integrated, partly installed on the CP-5014/CPCX55 master control element) for checked command output

- Processing and output according to IEC 60870-5-101/104
 - 10 pulse commands (selective activation check and idle check, IC1), or
 - 10 single-point information
 - mixing pulse commands with single-point information is not supported

with the following features:

- 10 2-pole relay outputs in 3 groups
 - each group has a common return
 - signal voltage 24 to 220 VDC, 230 VAC

1.3 Architecture

The peripheral element DO-5299+5298 results from equipping the submodule DO-5298 on master control element CP-5014/CPCX55. It covers the functions of the integrated peripheral element DO-5299, expanded by those of submodule DO-5298.

1.3.1 Mechanics

Submodule, integrated in CP-5014.

1.3.2 Ax 1703 Peripheral Bus

A peripheral element whose hardware consists of submodules - integrated in or installed on a basic system element - has no connection to the physical Ax 1703 peripheral bus.

The firmware connects the peripheral element to the Ax 1703 peripheral bus as a virtual bus device with a predefined peripheral board address (PBA).

2 Integrated Peripheral Element DO-5299+5298

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2.1 Features and Functions

The Output Functions in Detail

- Pulse Commands (IC) ^{t1}
- Checked output of pulse commands
 - 2-pole
- Single, double and regulating step commands
- Command Output with Internal Checks (IC1)
 - Selective activation check
 - Idle check
- Basic application functions and procedures according to IEC 60870-5-101/104
- Synchronization
- Switching sequences
- Revision
- Retry suppression
- Command locking
- Control location check
- Command prolongation
- Return information monitoring
- 1-out-of-n check
- Parameter-settable command output time
- Spontaneous transmission
- **Binary information output**
 - Selectable behavior on communication failure ^{ta} (deactivation or retention)
 - Deactivation on module failure ^{ta}
 - Selective activation check
 - Spontaneous transmission ^t or
 - Periodical transmission ^a



Hint

The above mentioned functions are described in detail in the document *SICAM RTUs Common Functions Peripheral Elements according to IEC 60870-5-101/104*.

^t **Telecontrol**

the function affects process information which is **spontaneously** transmitted

^{t1} **Telecontrol**

the function delivers (acquisition) **spontaneously** transmitted process information or is controlled by such information (output); partly, periodically transmitted information is also created/required

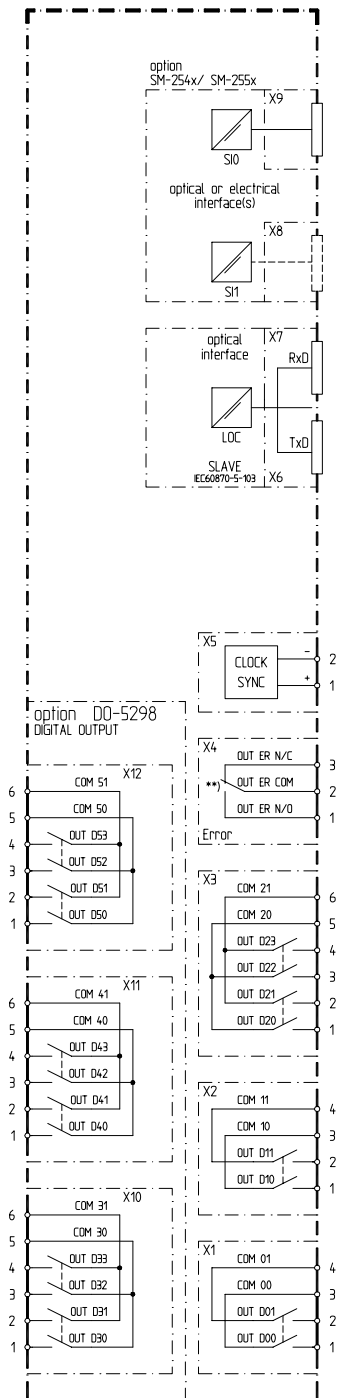
^a **Automation**

the function affects process information which is **periodically** transmitted

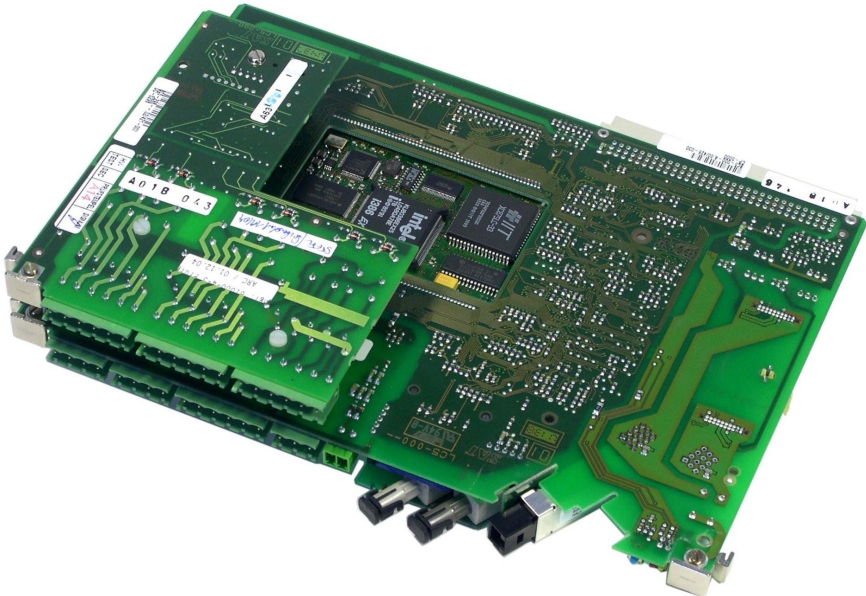
2.2 Engineering

For diagnosis, testing, parameter setting or documentation, the system element is supported by the engineering tools of SICAM TOOLBOX II. OPM II is required.

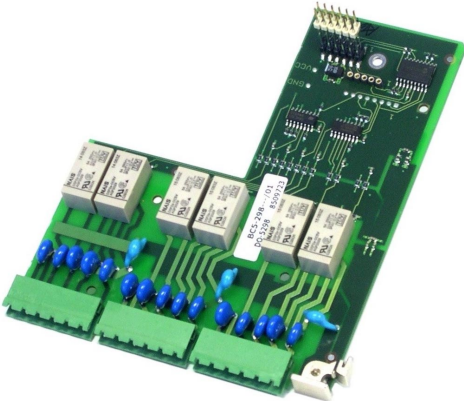
2.3 Block Diagram



2.4 View



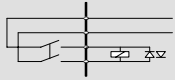
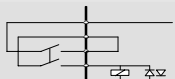

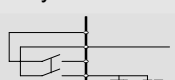
DO-5298 installed on CP-5014 (solder side)



Submodule DO-5298 (component side)

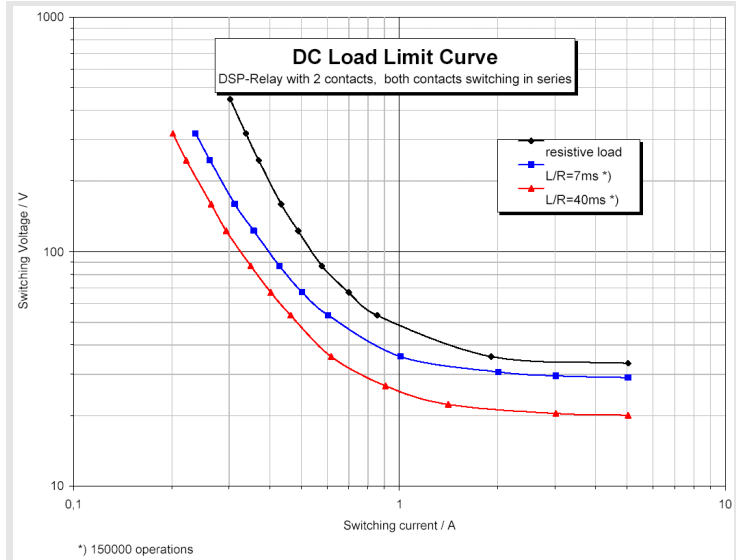
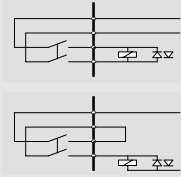
2.5 Technical Specifications

2.5.1 Integrated Peripheral Element DO-5299

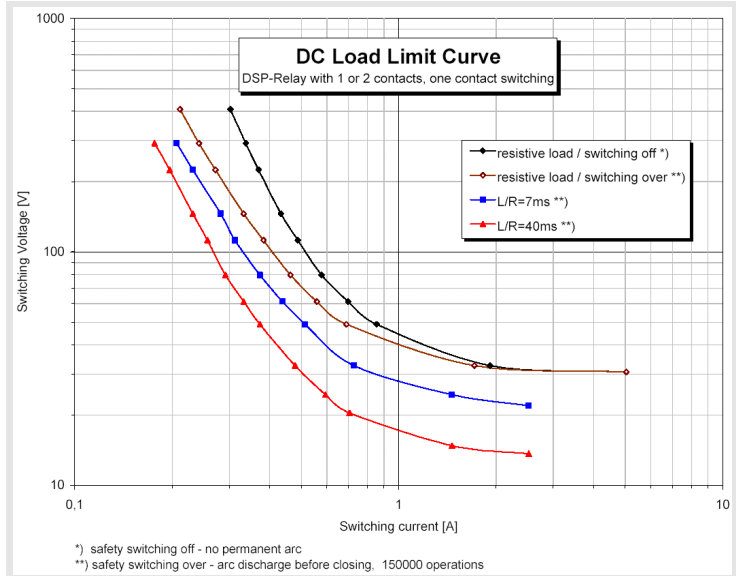
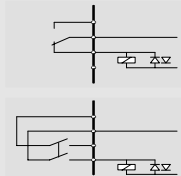
Binary Outputs	
4 command outputs relay (X1, X2, X3)	<ul style="list-style-type: none"> All outputs are of 2-pole make 2 outputs (2x) have a common return the outputs (0x) and (1x) run separately to the terminals The outputs are galvanically insulated from logic circuits and ground by monostable relays
Maximum output current	5 A AC or DC permanent
Maximum short-time current	<ul style="list-style-type: none"> 20 A for 0.5 s 30 A for 0.2 s
Maximum switching voltage	250 V AC or DC
Minimum number of switching cycles	<ul style="list-style-type: none"> 10^5 AC 250 V (≤ 5 A) @ $\cos \varphi = 1$ $5 \cdot 10^4$ AC 250 V (≤ 5 A) @ $\cos \varphi = 0,4$ $1,5 \cdot 10^5$ DC according to DC Load Limit Curve
Minimum switching capacity	1 mW
Electric strength with open contacts	1.0 kV AC or DC for 1 min
Output circuits	<p>≤ 250 V AC or DC</p> <p>The circuits are operated by means of an external voltage.</p>
Maximum switching capacity AC	250 V 1250 VA (≤ 5 A) @ $\cos \varphi \geq 0.4$
	
Maximum switching-on capacity DC	<p>24...33 V ≤ 30 A @ $L/R \leq 40$ ms</p> <p>33...250 V ≤ 1000 W @ $L/R \leq 40$ ms</p>
	
Maximum switching capacity AC	<p>250 V 1250 VA (≤ 5 A) @ $\cos \varphi = 1$</p> <p>1000 VA (≤ 4 A) @ $\cos \varphi \geq 0.4$</p>
	
Maximum switching-on capacity DC	<p>24...100 V ≤ 10 A @ $L/R \leq 40$ ms</p> <p>100...250 V ≤ 1000 W @ $L/R \leq 40$ ms</p>
	

Binary Outputs

Breaking capacity DC



Breaking capacity DC



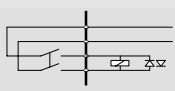
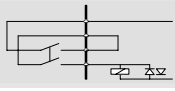
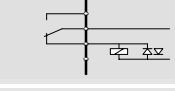

Connectors

Peripheral connector

Removable screw terminals Phoenix Contact MSTBT 2,5/x-ST-5,08

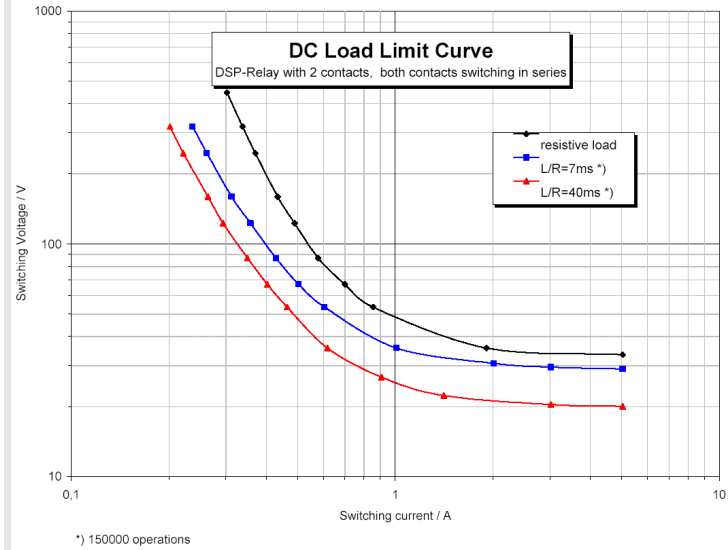
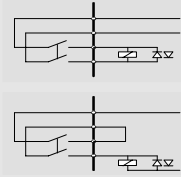
- 2x 1 output X1,X2 1x 4-pin each
- 1x 2 outputs X3 1x 6-pin

2.5.2 Submodule DO-5298

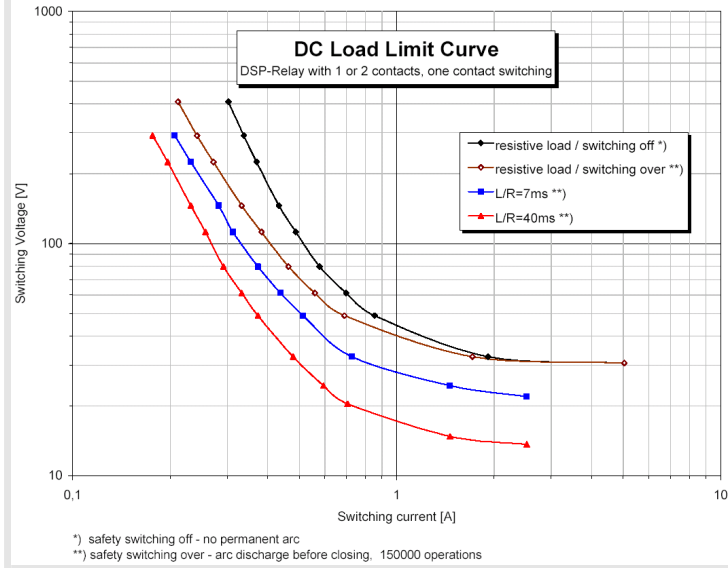
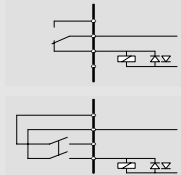
Processor and Memory	
Processor	PIC16F628, 4 MHz
Program memory	integrated, 2048 words 14 bits each
Main memory	internal, 208 bytes
Parameter memory	EEPROM 256 Bytes
Binary Outputs	
6 command outputs relay (X10, X11, X12)	<ul style="list-style-type: none"> • Every 2 outputs (2-pole) form a group (groups 3x, 4x, 5x) • Each group has a common return • The outputs are galvanically insulated from logic circuits and ground by monostable relays
Maximum output current	5 A AC or DC permanent
Maximum short-time current	<ul style="list-style-type: none"> • 20 A for 0.5 s • 30 A for 0.2 s
Maximum switching voltage	250 V AC or DC
Minimum number of switching cycles	<ul style="list-style-type: none"> • 10^5 AC 250 V (≤ 5 A) @ $\cos \varphi = 1$ • 5×10^4 AC 250 V (≤ 5 A) @ $\cos \varphi = 0.4$ • $1,5 \times 10^5$ DC according to DC Load Limit Curve
Minimum switching capacity	1 mW
Electric strength with open contacts	1.0 kV AC or DC for 1 min
Output circuits	<p>≤ 250 V AC or DC</p> <p>The circuits are operated by means of an external voltage.</p>
Maximum switching capacity AC	250 V 1250 VA (≤ 5 A) @ $\cos \varphi \geq 0.4$
	
Maximum switching-on capacity DC	<p>24...33 V ≤ 30 A @ $L/R \leq 40$ ms</p> <p>33...250 V ≤ 1000 W @ $L/R \leq 40$ ms</p>
	
Maximum switching capacity AC	<p>250 V 1250 VA (≤ 5 A) @ $\cos \varphi = 1$</p> <p>1000 VA (≤ 4 A) @ $\cos \varphi \geq 0.4$</p>
	
Maximum switching-on capacity DC	<p>24...100 V ≤ 10 A @ $L/R \leq 40$ ms</p> <p>100...250 V ≤ 1000 W @ $L/R \leq 40$ ms</p>
	

Binary Outputs

Breaking capacity DC



Breaking capacity DC

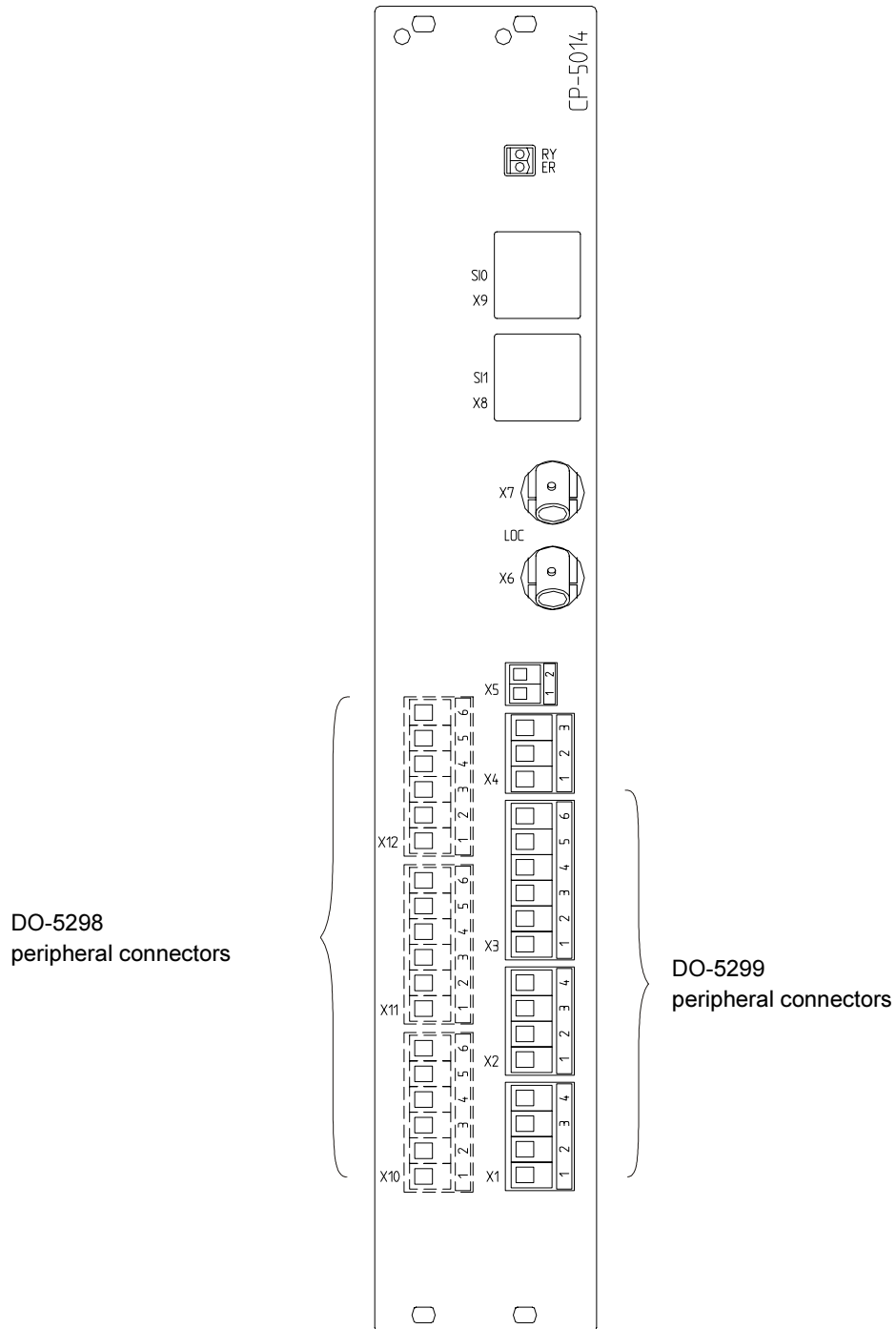


Connectors

Peripheral connector

Removable screw terminals Phoenix Contact MSTBT 2,5/x-ST-5,08
 • 3x 2 outputs X10, X11, X12 1x 6-pin each

2.6 Front Panel



2.7 Pin Assignment

Removeable screw terminals are used as peripheral connectors. They are assigned according to the following tables:

X12:

pin	signal
6	COM51
5	COM50
4	OUT D53
3	OUT D52
2	OUT D51
1	OUT D50

X3:

pin	signal
6	COM21
5	COM20
4	OUT D23
3	OUT D22
2	OUT D21
1	OUT D20

X11:

pin	signal
6	COM41
5	COM40
4	OUT D43
3	OUT D42
2	OUT D41
1	OUT D40

X2:

pin	signal
4	COM11
3	COM10
2	OUT D11
1	OUT D10

X1:

pin	signal
4	COM01
3	COM00
2	OUT D01
1	OUT D00

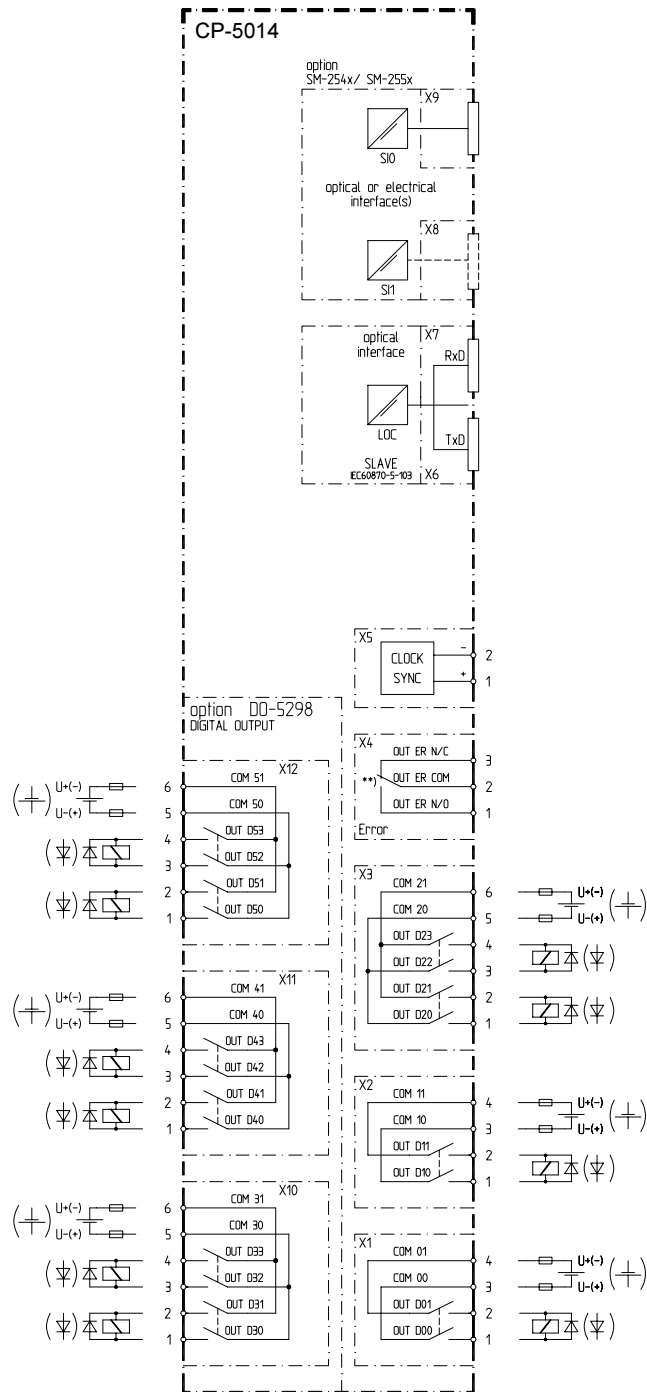
X10:

pin	signal
6	COM31
5	COM30
4	OUT D33
3	OUT D32
2	OUT D31
1	OUT D30

The abbreviations have the following meaning:

COMx0 ... COMx1 common contact of group x
 IN Dxy inputs y of group x
 OUT Dxy normally open contact, group x, outputs y
 OUT ER N/C error, normally closed contact
 OUT ER COM error, common contact
 OUT ER N/O error, normally open contact

2.8 External Circuit Elements

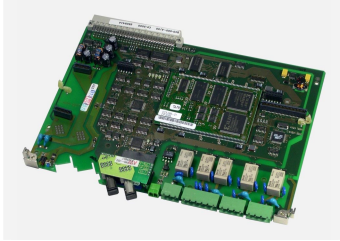


A Order Information

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A.1 System Elements



Designation	Item Number/MLFB
CP-5014 Central processing with integrated peripheral element DO-5299	BC5-014 6MF10130FA140AA0
DO-5298 Binary output relay 3x 2, 24...220 VDC	BC5-298 6MF10131FC080AA0

