

SIEMENS

SICAM BC

DO-5203/BISO55

System Element Manual

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Peripheral Element DO-5203/BISO55

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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
- DO-5203/BISO55 (as of version -A)

Purpose of this manual

This manual describes the functioning of the system element DO-5203/BISO55 (**B**inary **S**ignal **O**utput) 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-5203/BISO55 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 output of single-point information.

Product	SICAM BC
System element type	Peripheral element
consists of	a module DO-5203 with firmware BISO55
can be used in	SICAM BC
Engineering	SICAM TOOLBOX II with OPM II

1.2. Overview

Peripheral element for processing and output according to IEC 60870-5-101/104 of:

- up to 16 single-point information units

With the following features:

- 16 1-pole relay outputs
- Signal voltage 24 to 220 VDC, 230 VAC

1.3. Architecture

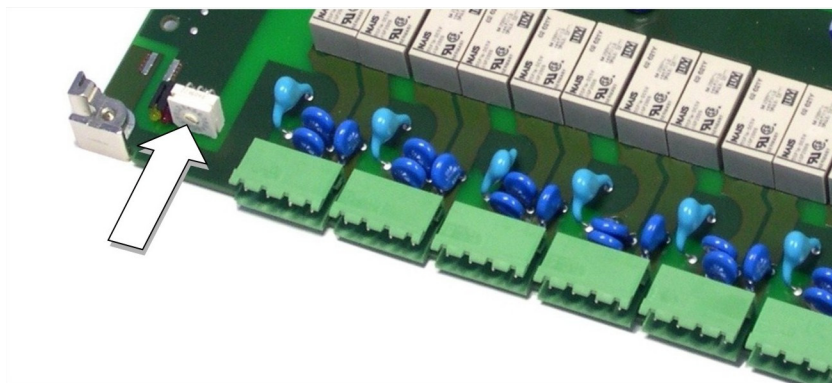
1.3.1. Mechanics

Module in double-euro format for equipping in a mounting rack.

1.3.2. Ax 1703 Peripheral Bus

The peripheral element is coupled to the basic system element via the Ax 1703 peripheral bus. The address of the peripheral element at the Ax 1703 peripheral bus is already specified during the assembly of the SICAM BC system.

This address can be changed afterwards also by a configuration change with the SICAM TOOLBOX II. This address is then to be set by means of the PBA switch (⇑) on the peripheral element.



2. Peripheral Element DO-5203/BISO55

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2.1. Features and Functions

The Output Functions in Detail

- **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



Note

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

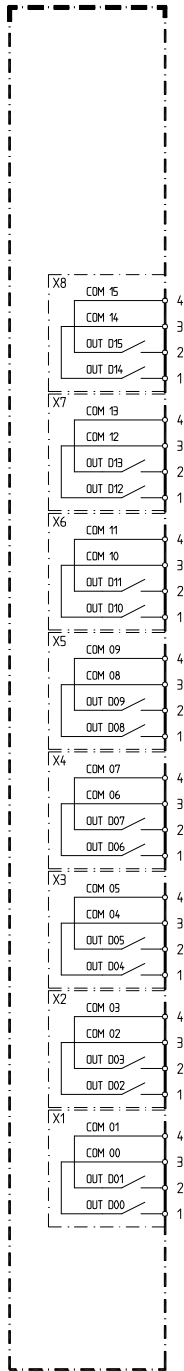
^t **Telecontrol**
the function affects process information which is **spontaneously** transmitted

^a **Automation**
the function affects process information which is **periodically** transmitted

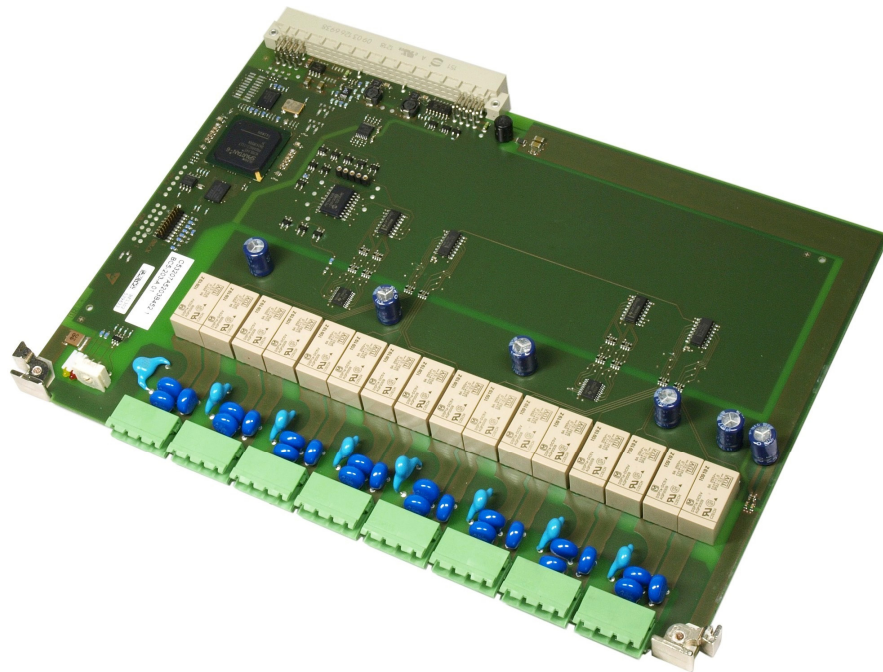
2.2. Engineering

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

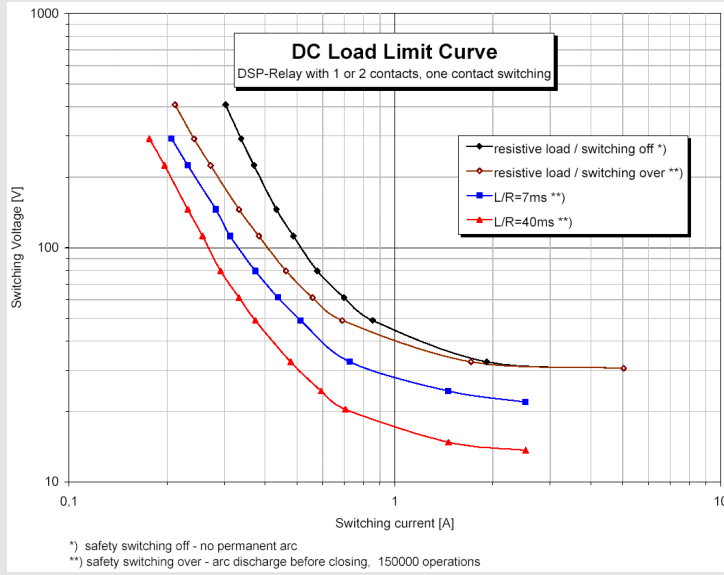


2.4. View



2.5. Technical Data

Processor and memory	
Processor	Xilinx Spartan 6 (XC6SLX45) mit Soft-IPcore
Clock pulse	16 MHz
Program memory	SPI-Flash 16 MBytes HW config 64 KBytes Program memory 192 KBytes FPGA factory image 1.572864 MBytes FPGA user image 1.572864 MBytes
Main memory	RAM 512 KByte Program memory in operation 192 KBytes Main memory in operation 64 KBytes
Parameter memory	EEPROM 2048 Byte (AT24C16A)
Binary information controller	
Processor	µC PIC16F628
Clock pulse	20 MHz, acc. to 5MIPS
Program memory	internal, 2048 Words
Main memory	internal, 224 Bytes
Parameter memory	internal, 128 Bytes
Binary outputs	
16 information outputs relay (X1...X8)	<ul style="list-style-type: none"> • With respect to insulation, the outputs form <ul style="list-style-type: none"> – 8 groups 2 inputs each • Each relay has one one-pole normally open contact • The outputs are galvanically insulated from logic circuits and ground by monostable relays • Each group is galvanically insulated from the other groups, logic circuits and ground (3 kV_{eff}) • Within the groups, the outputs are galvanically insulated from each other with basic insulation of 250 V
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"> • 10⁵ AC 250 V (≤ 5 A) @ cos φ = 1 • 5 × 10⁴ AC 250 V (≤ 5 A) @ cos φ = 0.4 • 1,5 × 10⁵ 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	≤ 250 V AC or DC The circuits are operated by means of an external voltage.

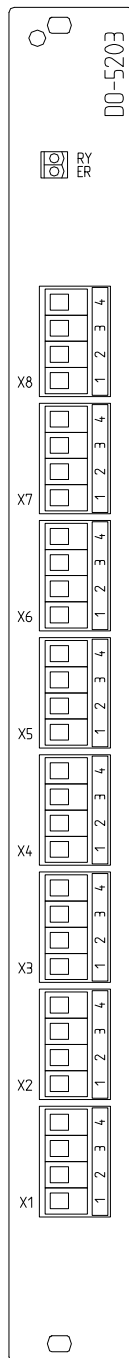
Binary outputs	
Maximum switching capacity AC	250 V 1250 VA (≤ 5 A) @ $\cos \varphi = 1$ 1000 VA (≤ 4 A) @ $\cos \varphi \geq 0.4$
Maximum switching-on capacity DC	24...100 V ≤ 10 A @ $L/R \leq 40$ ms 100...250 V ≤ 1000 W @ $L/R \leq 40$ ms
Breaking capacity DC	
	 <p>*) safety switching off - no permanent arc **) safety switching over - arc discharge before closing, 150000 operations</p>
Power supply	
Operating voltage	5 VDC $\pm 5\%$ approx. 1.0 W idle approx. 1.2 W if 50% of the relays activated approx. 1.2 W if all relays activated The voltage is picked off at the bus of mounting rack
Output circuits	The circuits are operated with external voltage
Mechanics and connectors	
Ax 1703 peripheral bus	Transmission rate 16 Mbps
Peripheral connector (X1...X8, front side)	Removable screw terminals Phoenix Contact MSTBT 2,5/x-ST-5,08 4-pin each
Dimensions	Double-euro format 233.4 x 160 mm, 4WU
Weight	Approx. 325 g

2.6. I/O Assignment

The assignment of the single-point informations to the binary outputs and the dividing into galvanic isolated groups is done according to the following schema:

HW Pin	Data Point	Group
OUT D00+	Binary information output 00	0
OUT D01+	Binary information output 01	
OUT D02+	Binary information output 02	1
OUT D03+	Binary information output 03	
OUT D04+	Binary information output 04	2
OUT D05+	Binary information output 05	
OUT D06+	Binary information output 06	3
OUT D07+	Binary information output 07	
OUT D08+	Binary information output 08	4
OUT D09+	Binary information output 09	
OUT D10+	Binary information output 10	5
OUT D11+	Binary information output 11	
OUT D12+	Binary information output 12	6
OUT D13+	Binary information output 13	
OUT D14+	Binary information output 14	7
OUT D15+	Binary information output 15	

2.7. Front Panel



Meaning of the display elements:

RY Module ready for operation
ER Error

2.8. Pin Assignment

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

X8:

pin	signal
4	COM 15
3	COM 14
2	OUT D15
1	OUT D14

X7:

pin	signal
4	COM 13
3	COM 12
2	OUT D13
1	OUT D12

X6:

pin	signal
4	COM 11
3	COM 10
2	OUT D11
1	OUT D10

X5:

pin	signal
4	COM 09
3	COM 08
2	OUT D09
1	OUT D08

X4:

pin	signal
4	COM 07
3	COM 06
2	OUT D07
1	OUT D06

X3:

pin	signal
4	COM 05
3	COM 04
2	OUT D05
1	OUT D04

X2:

pin	signal
4	COM 03
3	COM 02
2	OUT D03
1	OUT D02

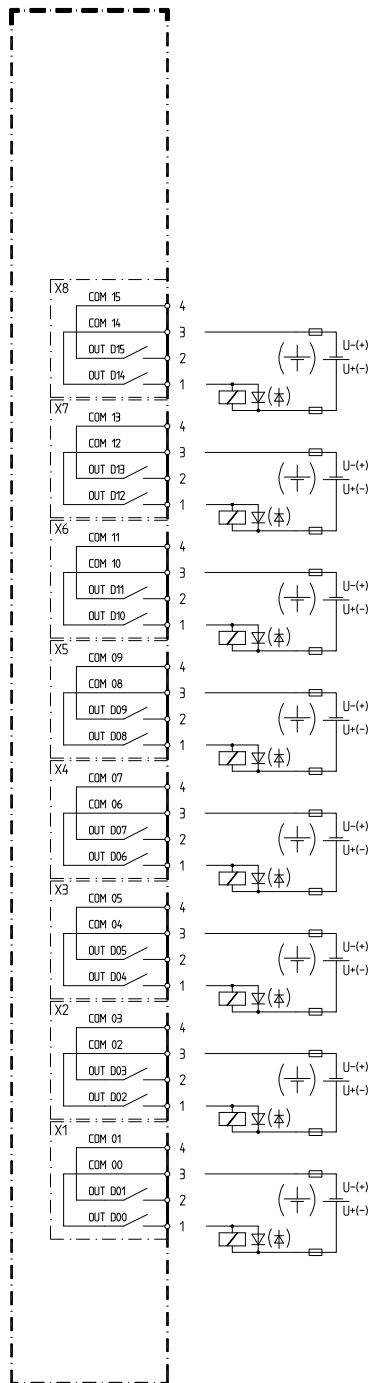
X1:

pin	signal
4	COM 01
3	COM 00
2	OUT D01
1	OUT D00

The abbreviations have the following meaning:

COM 00 ... COM 15 ... common contact of output 0 ... 15
 OUT D00 ... OUT D15 ... normally open contact, output 0 ... 15

2.9. External Circuit Elements



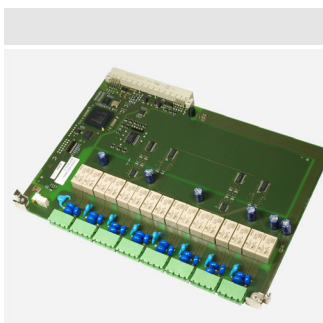
1-pole output

A. Order Information

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A.1. System Element



Designation	Item Number/MLFB
DO-5203/BISO55 Binary output (relays, 16x 1-pole, 24...220 VDC/230 VAC)	BC5-203 6MF10130FC030AA0