

SIEMENS TIA PORTAL

Profinet Guide for BERNSTEIN Safety Controller

BERNSTEIN SMART Safety System

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Product Overview

**Implementation of GSDML
SIEMENS TIA-Portal**

**Direct communication
Safety controller**

**Diagnostic information
Safety Controller**

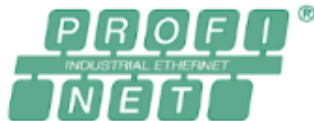
**Diagnostic information
DCD-Series
Series overview**

**Diagnostic information
DCD-Series
Individual status**

SCR P | Programmable Safety Relay

Basics

- Programmable safety relay
- Also suitable for products with our patented DCD diagnostic
- Integrated Ethernet interface



- 10 safety inputs for up to 5 safety circuits up to PL e / SIL 3
 - 4 Inputs with DCD diagnostic
 - Up to 64 DCD Devices
- Two independent relay outputs
 - 3 enabling paths each
 - Up to 6 A for each path



SCx | Expandable Safety Controller

Basics



- Expandable safety controller
- **Also suitable for products with our patented DCD diagnostic**
- **Integrated Ethernet interface**



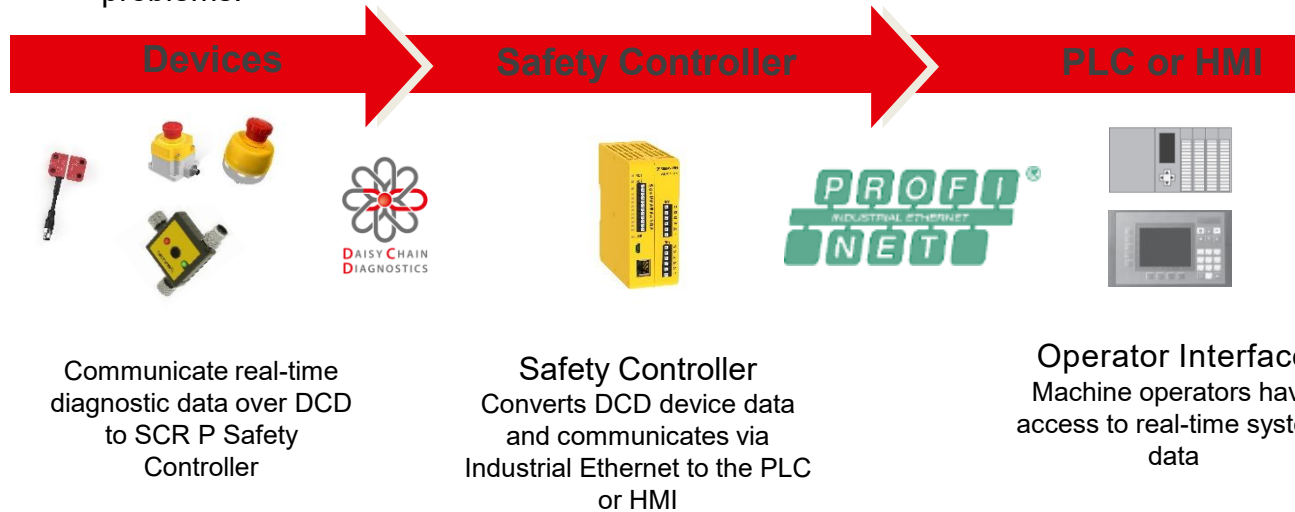
- 26 safety inputs up to PL e / SIL 3
 - 16 Inputs with DCD diagnostic
 - Up to 254 DCD Devices
- Two independent safety outputs
 - 2 enabling paths each
 - Splitable to 4 single channel outputs



DCD | Daisy Chain Diagnostic Basics



- Daisy Chain Diagnostic gives machine owners and operators greater insight into the health and performance of their equipment, making them less reliant on outside experts to solve system problems.



Prevent &
Reduce Downtime



Simple &
Cost Effective



Easy Access to
Real-Time Data

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Step 1 | Download GSD-File

- Special GSDML-File for **SCR P** and **SCx**
- Both files are downloadable via BERNSTEIN-Homepage
 - www.BERNSTEIN.eu -> Service -> Downloads -> Software



[DOWNLOAD](#)

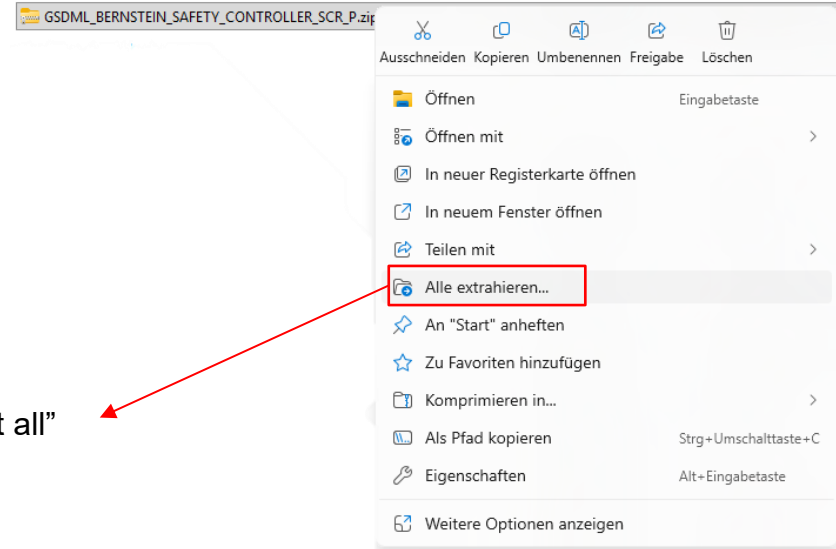


[DOWNLOAD](#)

Step 2 | Extract downloaded file

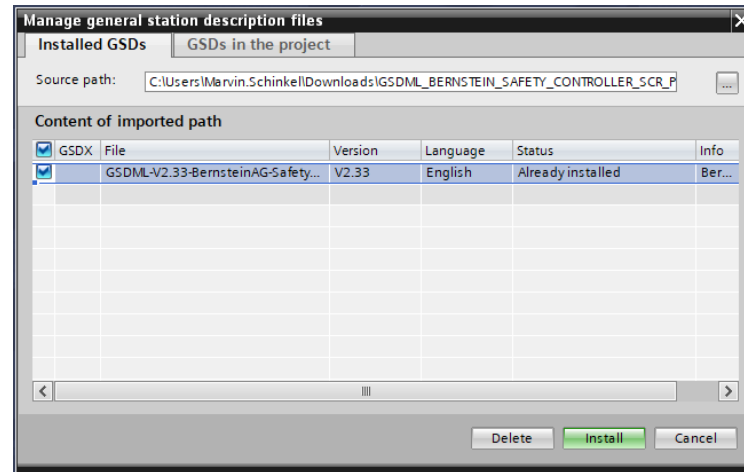
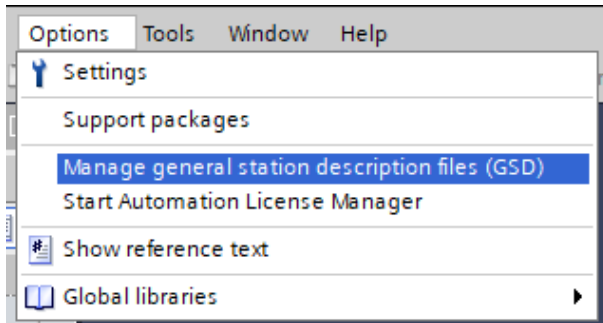
- The downloaded file is stored in a ZIP-Container
- Extract the complete file inside Windows Explorer

“extract all”



Step 3 | Install GSD-File into TIA-Portal

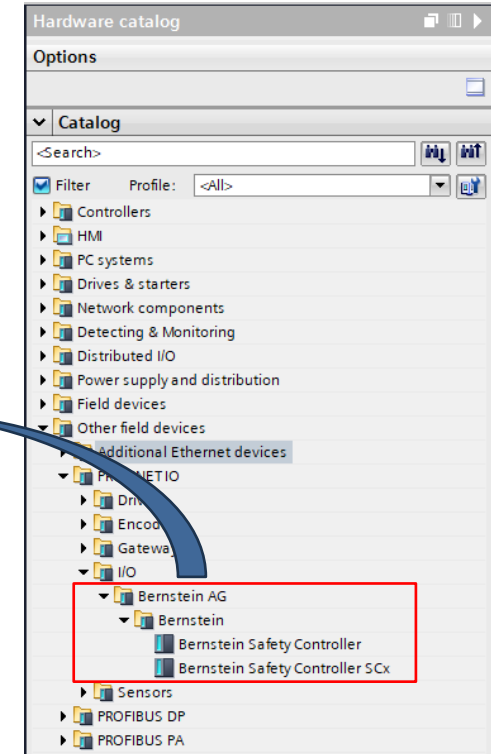
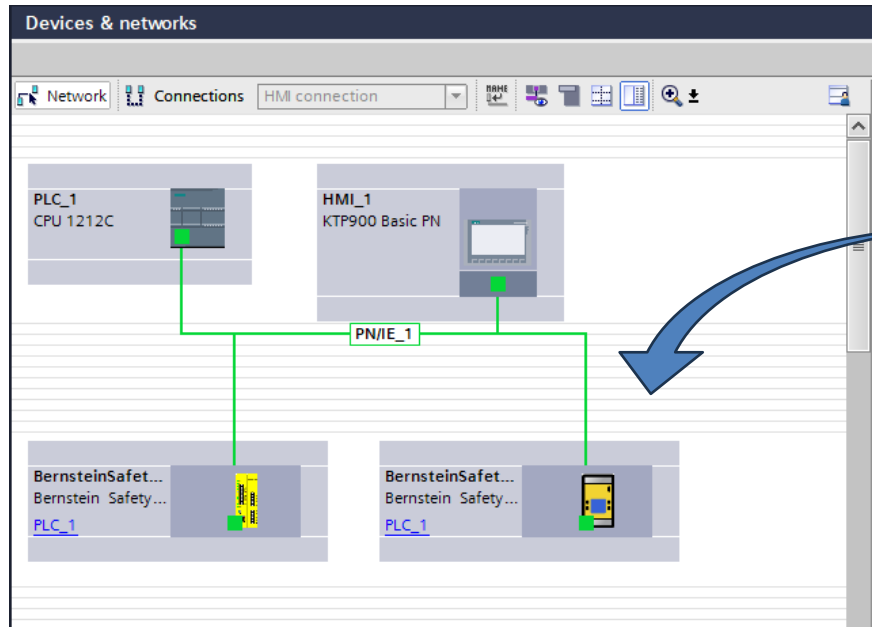
- Go to GSD-File Manager inside SIEMENS TIA-Portal
 - Attention: Open only one Instance of TIA-Portal for GSD-Import
- Set correct Source path to downloaded GSDML-File
- Select the BERNSTEIN GSDML-File and press Install



Step 4 | Add Device from Hardware catalog

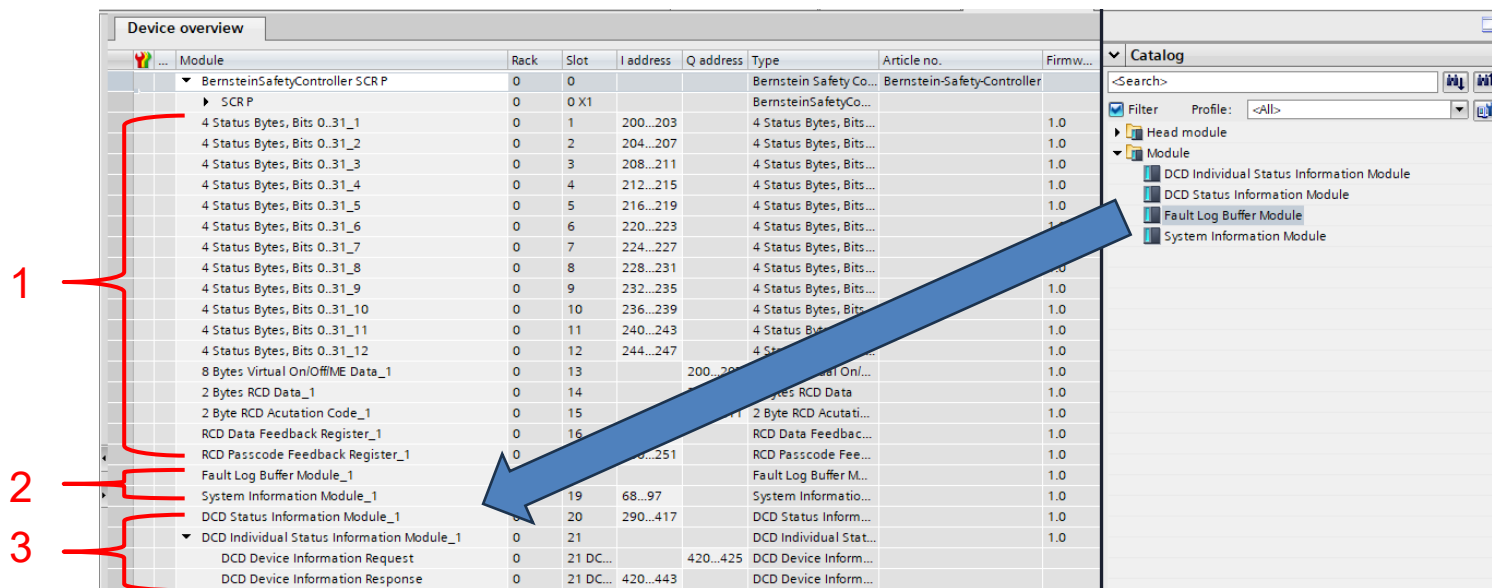


- Insert the Device from the updated hardware catalog:
- Other field devices > PROFINET IO > BERNSTEIN AG > BERNSTEIN > BERNSTEIN Safety Controller (SCx)



Step 5 | Device Hardware Configuration

- | | | | | | |
|---|--|---|---|---|--|
| 1 | <ul style="list-style-type: none"> • Direct Information from safety controller • <u>Fixed data field</u> | 2 | <ul style="list-style-type: none"> • System and fault information from safety controller • <u>Optional data field</u> | 3 | <ul style="list-style-type: none"> • Diagnostic information from connected DCD-Series • <u>Optional data field</u> |
|---|--|---|---|---|--|



Module	Rack	Slot	I address	Q address	Type	Article no.	Firmw...
BernsteinSafetyController SCR P	0	0			Bernstein Safety Co...	Bernstein-Safety-Controller	
↳ SCR P	0	0 X1			BernsteinSafetyCo...		
4 Status Bytes, Bits 0..31_1	0	1	200...203		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_2	0	2	204...207		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_3	0	3	208...211		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_4	0	4	212...215		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_5	0	5	216...219		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_6	0	6	220...223		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_7	0	7	224...227		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_8	0	8	228...231		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_9	0	9	232...235		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_10	0	10	236...239		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_11	0	11	240...243		4 Status Bytes, Bits...		1.0
4 Status Bytes, Bits 0..31_12	0	12	244...247		4 Status Bytes, Bits...		1.0
8 Bytes Virtual On/Off/IME Data_1	0	13		200...203	8 Bytes Virtual On/...		1.0
2 Bytes RCD Data_1	0	14			2 Bytes RCD Data...		1.0
2 Byte RCD Actuation Code_1	0	15			2 Byte RCD Actuat...		1.0
RCD Data Feedback Register_1	0	16			RCD Data Feedbac...		1.0
RCD Passcode Feedback Register_1	0				RCD Passcode Fee...		1.0
Fault Log Buffer Module_1	0				Fault Log Buffer M...		1.0
System Information Module_1	0	19	68...97		System Informatio...		1.0
DCD Status Information Module_1	0	20	290...417		DCD Status Inform...		1.0
↳ DCD Individual Status Information Module_1	0	21			DCD Individual Stat...		1.0
DCD Device Information Request	0	21 DC...		420...425	DCD Device Inform...		
DCD Device Information Response	0	21 DC...	420...443		DCD Device Inform...		

Catalog

<Search>

Filter Profile: <All>

- Head module
- Module
 - DCD Individual Status Information Module
 - DCD Status Information Module
 - Fault Log Buffer Module
 - System Information Module

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Safety controller | Direct communication

Safety controller outputs -> PLC inputs



- Binary information
- Every bit on safety controller equals one bit in PLC

Equipment	Functional View	Wiring Diagram	Ladder Logic	Industrial Ethernet	Configuration Summary	DCD						
PROFINET	Clear All	Auto Configure	Virtual Status Outputs	Export								
User-Defined		Faults			Inputs		Outputs					
Byte/Bit	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8	Slot 9	Slot 10	Slot 11	Slot 12
0:0												
0:1												
0:2												
0:3												
0:4												
0:5												
0:6												
0:7												
1:0												
1:1												
1:2												
1:3												
1:4												
1:5												
1:6												
1:7												
2:0												
2:1												
2:2												
2:3												
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2:5												
2:6												
2:7												
3:0												
3:1												
3:2												
3:3												
3:4												
3:5												
3:6												
3:7												

BERNSTEIN Safety Controller Software

Device overview					
Module	Rack	Slot	I address	Q address	Type
▼ BernsteinSafetyController SCR P	0	0			Bernstein Safety Co...
► SCR P	0	0 X1			BernsteinSafetyCo...
4 Status Bytes, Bits 0..31_1	0	1	200...203		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_2	0	2	204...207		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_3	0	3	208...211		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_4	0	4	212...215		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_5	0	5	216...219		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_6	0	6	220...223		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_7	0	7	224...227		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_8	0	8	228...231		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_9	0	9	232...235		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_10	0	10	236...239		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_11	0	11	240...243		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_12	0	12	244...247		4 Status Bytes, Bits...
8 Bytes Virtual On/Off/IME Data_1	0	13		200...207	8 Bytes Virtual On/...
2 Bytes RCD Data_1	0	14		208...209	2 Bytes RCD Data
2 Byte RCD Acutation Code_1	0	15		210...211	2 Byte RCD Acutati...
RCD Data Feedback Register_1	0	16	248...249		RCD Data Feedbac...
RCD Passcode Feedback Register_1	0	17	250...251		RCD Passcode Fee...
Fault Log Buffer Module_1	0	18			Fault Log Buffer M...
System Information Module_1	0	19	68...97		System Informatio...
DCD Status Information Module_1	0	20	290...417		DCD Status Inform...
▼ DCD Individual Status Information Module_1	0	21			DCD Individual Stat...
DCD Device Information Request	0	21 DC...		420...425	DCD Device Inform...
DCD Device Information Response	0	21 DC...	420...443		DCD Device Inform...

Safety controller | Direct communication

Safety controller inputs -> PLC outputs



Equipment											
Functional View											
Wiring Diagram											
Ladder Logic											
Industrial Ethernet											
Configuration Summary											
DCD											
PROFINET											
Clear All											
Auto Configure											
Virtual Non-Safety Inputs											
Export											
On/Off, Mute Enable				Reset, Cancel Delay				Actuation Code			
Control		Feedback		Control		Feedback		Control		Feedback	
Byte:Bit	Slot 13	Byte:Bit	Slot 13	Byte:Bit	Slot 14	Byte:Bit	Slot 16	Word	Slot 15	Word	Slot 17
0:0		4:0		0:0		0:0		0		0	
0:1		4:1		0:1		0:1					
0:2		4:2		0:2		0:2					
0:3		4:3		0:3		0:3					
0:4		4:4		0:4		0:4					
0:5		4:5		0:5		0:5					
0:6		4:6		0:6		0:6					
0:7		4:7		0:7		0:7					
1:0		5:0		1:0		1:0					
1:1		5:1		1:1		1:1					
1:2		5:2		1:2		1:2					
1:3		5:3		1:3		1:3					
1:4		5:4		1:4		1:4					
1:5		5:5		1:5		1:5					
1:6		5:6		1:6		1:6					
1:7		5:7		1:7		1:7					
2:0		6:0									
2:1		6:1									
2:2		6:2									
2:3		6:3									
2:4		6:4									
2:5		6:5									
2:6		6:6									
2:7		6:7									
...		...									

- Binary information (except actuation code)
- Every bit on PLC equals one bit in safety controller
- Feedback is ON (same code), when Control is accepted (see manual)

Device overview					
	Module	Rack	Slot	I address	Q address
	▼ BernsteinSafetyController SCR P	0	0		
	► SCR P	0	0 X1		
	4 Status Bytes, Bits 0..31_1	0	1	200...203	
	4 Status Bytes, Bits 0..31_2	0	2	204...207	
	4 Status Bytes, Bits 0..31_3	0	3	208...211	
	4 Status Bytes, Bits 0..31_4	0	4	212...215	
	4 Status Bytes, Bits 0..31_5	0	5	216...219	
	4 Status Bytes, Bits 0..31_6	0	6	220...223	
	4 Status Bytes, Bits 0..31_7	0	7	224...227	
	4 Status Bytes, Bits 0..31_8	0	8	228...231	
	4 Status Bytes, Bits 0..31_9	0	9	232...235	
	4 Status Bytes, Bits 0..31_10	0	10	236...239	
	4 Status Bytes, Bits 0..31_11	0	11	240...243	
	4 Status Bytes, Bits 0..31_12	0	12	244...247	
	8 Bytes Virtual On/Off/IME Data_1	0	13		200...207
	2 Bytes RCD Data_1	0	14		208...209
	2 Byte RCD Actuation Code_1	0	15		210...211
	RCD Data Feedback Register_1	0	16	248...249	
	RCD Passcode Feedback Register_1	0	17	250...251	
	Fault Log Buffer Module_1	0	18		
	System Information Module_1	0	19	68...97	
	DCD Status Information Module_1	0	20	290...417	
	▼ DCD Individual Status Information Module_1	0	21		
	DCD Device Information Request	0	21 DC...		420...425
	DCD Device Information Response	0	21 DC...	420...443	

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Safety controller | Direct communication

Safety controller fault log



12.6.5.10 Error log entries

The optional error log buffer module can be plugged into slot 18.

PLC input data name	Input data type
Error log entry 1 (most recent)	15 words
Error log entry 2	15 words
Error log entry 3	15 words
Error log entry 4	15 words
Error log entry 5	15 words
Error log entry 6	15 words
Error log entry 7	15 words
Error log entry 8	15 words
Error log entry 9	15 words
Error log entry 10 (oldest)	15 words

Error log entry	Type	Length (words)
Timestamp	UDINT	2
Name Length	DWORD	2
Name string	String	6
Error code	WORD	1
Extended error code	WORD	1
Error index message	WORD	1
reserved	WORD	2

- Error log of latest 10 log entries
- Every Log Entry is a struct with detailed error information

Device overview						
	Module	Rack	Slot	I address	Q address	Type
	▼ BernsteinSafetyController SCR P	0	0			Bernstein Safety Co...
	► SCR P	0	0 X1			BernsteinSafetyCo...
	4 Status Bytes, Bits 0..31_1	0	1	200...203		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_2	0	2	204...207		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_3	0	3	208...211		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_4	0	4	212...215		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_5	0	5	216...219		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_6	0	6	220...223		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_7	0	7	224...227		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_8	0	8	228...231		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_9	0	9	232...235		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_10	0	10	236...239		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_11	0	11	240...243		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_12	0	12	244...247		4 Status Bytes, Bits...
	8 Bytes Virtual On/Off/IME Data_1	0	13		200...207	8 Bytes Virtual On/...
	2 Bytes RCD Data_1	0	14		208...209	2 Bytes RCD Data
	2 Byte RCD Acutation Code_1	0	15		210...211	2 Byte RCD Acutati...
	RCD Data Feedback Register_1	0	16	248...249		RCD Data Feedbac...
	RCD Passcode Feedback Register_1	0	17	250...251		RCD Passcode Fee...
	Fault Log Buffer Module_1	0	18			Fault Log Buffer M...
	System Information Module_1	0	19	68...97		System Informatio...
	DCD Status Information Module_1	0	20	290...417		DCD Status Inform...
	▼ DCD Individual Status Information Module_1	0	21			DCD Individual Stat...
	DCD Device Information Request	0	21 DC...		420...425	DCD Device Inform...
	DCD Device Information Response	0	21 DC...	420...443		DCD Device Inform...

Safety controller | Direct communication

Safety controller system information



- General information about status of the safety controller and installed programmed configuration

Buffer for system information	Type	Length (words)
Seconds since system start	UDINT	2
Operating mode	WORD	1
Length of the configuration name	DWORD	2
Configuration name	String	8
Config. CRC	WORD	2

Seconds since system start

The 32-bit integer representation of the number of seconds since the safety evaluation was switched on.

Operating mode

The current operating status of the safety evaluation.

Value for operating mode	Description
1 (0x01)	Normal operation (including I/O errors, if present)
2 (0x02)	Configuration mode
4 (0x04)	System lock
65 (0x41)	Waiting for system reset/exiting configuration mode
129 (0x81)	Calling up the configuration mode

Length of the configuration name

The number of ASCII characters in the "Configuration name".

Configuration name

An ASCII string describing the origin of the error.

Config. CRC

The value of the cyclic redundancy check (CRC) for the current safety evaluation configuration

Device overview						
	Module	Rack	Slot	I address	Q address	Type
	▼ BernsteinSafetyController SCR P	0	0			Bernstein Safety Co...
	► SCR P	0	0 X1			BernsteinSafetyCo...
	4 Status Bytes, Bits 0..31_1	0	1	200...203		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_2	0	2	204...207		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_3	0	3	208...211		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_4	0	4	212...215		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_5	0	5	216...219		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_6	0	6	220...223		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_7	0	7	224...227		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_8	0	8	228...231		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_9	0	9	232...235		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_10	0	10	236...239		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_11	0	11	240...243		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_12	0	12	244...247		4 Status Bytes, Bits...
	8 Bytes Virtual On/Off/IME Data_1	0	13		200...207	8 Bytes Virtual On/...
	2 Bytes RCD Data_1	0	14		208...209	2 Bytes RCD Data
	2 Byte RCD Acutation Code_1	0	15		210...211	2 Byte RCD Acutati...
	RCD Data Feedback Register_1	0	16	248...249		RCD Data Feedbac...
	RCD Passcode Feedback Register_1	0	17	250...251		RCD Passcode Fee...
	Fault Log Buffer Module_1	0	18			Fault Log Buffer M...
	System Information Module_1	0	19	68...97		System Informatio...
	DCD Status Information Module_1	0	20	290...417		DCD Status Inform...
	▼ DCD Individual Status Information Module_1	0	21			DCD Individual Stat...
	DCD Device Information Request	0	21 DC...		420...425	DCD Device Inform...
	DCD Device Information Response	0	21 DC...	420...443		DCD Device Inform...

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Safety controller | DCD communication

DCD Status Information Module



- Summarized status of the connected DCD-series

▼ SCR_P_DCD_GEN	*typeSCR_P_DC...	%I290.0
DeviceCount_CH1	Byte	%IB290
Res_1	Byte	%IB291
Res_2	Byte	%IB292
Res_3	Byte	%IB293
DeviceCount_CH2	Byte	%IB294
Res_4	Byte	%IB295
Res_5	Byte	%IB296
Res_6	Byte	%IB297
▶ DeviceOnOff_CH1	Array[1..32] of ...	%I298.0
▶ DeviceOnOff_CH2	Array[1..32] of ...	%I302.0
▶ DeviceFault_CH1	Array[1..32] of ...	%I306.0
▶ DeviceFault_CH2	Array[1..32] of ...	%I310.0
▶ DeviceMargin_CH1	Array[1..32] of ...	%I314.0
▶ DeviceMargin_CH2	Array[1..32] of ...	%I318.0
▶ DeviceAlert_CH1	Array[1..32] of ...	%I322.0
▶ DeviceAlert_CH2	Array[1..32] of ...	%I326.0
▶ DeviceReset_CH1	Array[1..32] of ...	%I330.0
▶ DeviceReset_CH2	Array[1..32] of ...	%I334.0
▶ DeviceActuatorRec_CH1	Array[1..32] of ...	%I338.0
▶ DeviceActuatorRec_CH2	Array[1..32] of ...	%I342.0
▶ SeriesStatus_CH1	Struct	%I346.0
▶ SeriesStatus_CH2	Struct	%I350.0

Channel 1 -> DCD-Series 1 (SCR: IN5+6 ; SCx: IN1+2)

Channel 2 -> DCD-Series 2 (SCR: IN3+4 ; SCx: IN3+4)

Device overview						
	Module	Rack	Slot	I address	Q address	Type
	▼ BernsteinSafetyController SCR P	0	0			Bernstein Safety Co.
	▶ SCR P	0	0 X1			BernsteinSafetyCo...
	4 Status Bytes, Bits 0..31_1	0	1	200...203		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_2	0	2	204...207		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_3	0	3	208...211		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_4	0	4	212...215		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_5	0	5	216...219		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_6	0	6	220...223		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_7	0	7	224...227		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_8	0	8	228...231		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_9	0	9	232...235		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_10	0	10	236...239		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_11	0	11	240...243		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_12	0	12	244...247		4 Status Bytes, Bits...
	8 Bytes Virtual On/Off/IME Data_1	0	13		200...207	8 Bytes Virtual On/...
	2 Bytes RCD Data_1	0	14		208...209	2 Bytes RCD Data
	2 Byte RCD Acuation Code_1	0	15		210...211	2 Byte RCD Acutati...
	RCD Data Feedback Register_1	0	16	248...249		RCD Data Feedbac...
	RCD Passcode Feedback Register_1	0	17	250...251		RCD Passcode Fee...
	Fault Log Buffer Module_1	0	18			Fault Log Buffer M...
	System Information Module_1	0	19	68...97		System Informatio...
	DCD Status Information Module_1	0	20	290...417		DCD Status Inform...
	▼ DCD Individual Status Information Module_1	0	21			DCD Individual Stat...
	DCD Device Information Request	0	21 DC...		420...425	DCD Device Inform...
	DCD Device Information Response	0	21 DC...	420...443		DCD Device Inform...

Safety controller | DCD communication for **SCx**

DCD Status Information Module



- SCx is capable of communication with up to **8 DCD-Series**
- DataType is always "DCD_GEN"
- **Use DataType "DCD_GEN" 4 times**

SCx_DCD_GEN_CH1_2	"typeSCR_P_DCD_GEN_IN"
SCx_DCD_GEN_CH3_4	"typeSCR_P_DCD_GEN_IN"
SCx_DCD_IND_IN	"typeSCR_P_DCD_IND_IN"
SCx_DCD_IND_OUT	"typeSCR_P_DCD_IND_OUT"
SCx_DCD_GEN_CH5_6	"typeSCR_P_DCD_GEN_IN"
SCx_DCD_GEN_CH7_8	"typeSCR_P_DCD_GEN_IN"

Channel 1 -> DCD-Series 1	(SCx: IN1+2)
Channel 2 -> DCD-Series 2	(SCx: IN3+4)
Channel 3 -> DCD-Series 3	(SCx: IN5+6)
Channel 4 -> DCD-Series 4	(SCx: IN7+8)
Channel 5 -> DCD-Series 5	(SCx: IN9+10)
Channel 6 -> DCD-Series 6	(SCx: IN11+12)
Channel 7 -> DCD-Series 7	(SCx: IN13+14)
Channel 8 -> DCD-Series 8	(SCx: IN15+16)

Device overview					
Module	Rack	Slot	I address	Q address	Type
BernsteinSafetyController SCx	0	0			Bernstein Safety Co...
SCx	0	0 X1			BernsteinSafetyCo...
4 Status Bytes, Bits 0..31_1	0	1	600...603		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_2	0	2	604...607		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_3	0	3	608...611		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_4	0	4	612...615		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_5	0	5	616...619		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_6	0	6	620...623		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_7	0	7	624...627		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_8	0	8	628...631		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_9	0	9	632...635		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_10	0	10	636...639		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_11	0	11	640...643		4 Status Bytes, Bits...
4 Status Bytes, Bits 0..31_12	0	12	644...647		4 Status Bytes, Bits...
8 Bytes Virtual On/Off/ME Data_1	0	13		600...607	8 Bytes Virtual On/...
2 Bytes RCD Data_1	0	14		608...609	2 Bytes RCD Data
2 Byte RCD Acutation Code_1	0	15		610...611	2 Byte RCD Acutati...
RCD Data Feedback Register_1	0	16	648...649		RCD Data Feedbac...
RCD Passcode Feedback Register_1	0	17	650...651		RCD Passcode Fee...
	0	18			
	0	19			
DCD Status Information Module 4 Chain_1	0	20	690...817		DCD Status Inform...
DCD Individual Status Information Module_1	0	21			DCD Individual Stat...
DCD Device Information Request	0	21 DC...		820...825	DCD Device Inform...
DCD Device Information Response	0	21 DC...	820...843		DCD Device Inform...
DCD Status Information Module 8 Chain_1	0	22			DCD Status Inform...
	0	23			

Safety controller | DCD communication

DCD Status Information Module



▼ SCR_P_DCD_GEN	*typeSCR_P_DC...	%I290.0
DeviceCount_CH1	Byte	%IB290
Res_1	Byte	%IB291
Res_2	Byte	%IB292
Res_3	Byte	%IB293
DeviceCount_CH2	Byte	%IB294
Res_4	Byte	%IB295
Res_5	Byte	%IB296
Res_6	Byte	%IB297
▶ DeviceOnOff_CH1	Array[1..32] of ...	%I298.0
▶ DeviceOnOff_CH2	Array[1..32] of ...	%I302.0
▶ DeviceFault_CH1	Array[1..32] of ...	%I306.0
▶ DeviceFault_CH2	Array[1..32] of ...	%I310.0
▶ DeviceMargin_CH1	Array[1..32] of ...	%I314.0
▶ DeviceMargin_CH2	Array[1..32] of ...	%I318.0
▶ DeviceAlert_CH1	Array[1..32] of ...	%I322.0
▶ DeviceAlert_CH2	Array[1..32] of ...	%I326.0
▶ DeviceReset_CH1	Array[1..32] of ...	%I330.0
▶ DeviceReset_CH2	Array[1..32] of ...	%I334.0
▶ DeviceActuatorRec_CH1	Array[1..32] of ...	%I338.0
▶ DeviceActuatorRec_CH2	Array[1..32] of ...	%I342.0
▶ SeriesStatus_CH1	Struct	%I346.0
▶ SeriesStatus_CH2	Struct	%I350.0

Number of connected DCD-Devices in Channel 1

Number of connected DCD-Devices in Channel 2

Status of safety outputs of devices in Channel 1+2

Error status of devices in Channel 1+2

Actuator on edge of detection in Channel 1+2 (SRF only)

Alert status of devices in Channel 1+2

Device is waiting for local reset in Channel 1+2 (Device with local reset only)

Actuator detected in Channel 1+2 (SRF only)

Summarized status of Channel 1+2 (SRF only)

Channel 1 -> DCD-Series 1 (SCR: IN5+6 ; SCx: IN1+2)

Channel 2 -> DCD-Series 2 (SCR: IN3+4 ; SCx: IN3+4)

Safety controller | DCD communication

DCD Status Information Module



▼ SCR_P_DCD_GEN	*typeSCR_P_DC...	%I290	▼ DeviceOnOff_CH1	Array[1..32] of ...	%I298.0
DeviceCount_CH1	Byte	%I829	DeviceOnOff_CH1[1]	Bool	%I298.0
Res_1	Byte	%I829	DeviceOnOff_CH1[2]	Bool	%I298.1
Res_2	Byte	%I829	DeviceOnOff_CH1[3]	Bool	%I298.2
Res_3	Byte	%I829	DeviceOnOff_CH1[4]	Bool	%I298.3
DeviceCount_CH2	Byte	%I829	DeviceOnOff_CH1[5]	Bool	%I298.4
Res_4	Byte	%I829	DeviceOnOff_CH1[6]	Bool	%I298.5
Res_5	Byte	%I829	DeviceOnOff_CH1[7]	Bool	%I298.6
Res_6	Byte	%I829	DeviceOnOff_CH1[8]	Bool	%I298.7
▶ DeviceOnOff_CH1	Array[1..32] of ...	%I298	DeviceOnOff_CH1[9]	Bool	%I299.0
▶ DeviceOnOff_CH2	Array[1..32] of ...	%I300	DeviceOnOff_CH1[10]	Bool	%I299.1
▶ DeviceFault_CH1	Array[1..32] of ...	%I300	DeviceOnOff_CH1[11]	Bool	%I299.2
▶ DeviceFault_CH2	Array[1..32] of ...	%I310	DeviceOnOff_CH1[12]	Bool	%I299.3
▶ DeviceMargin_CH1	Array[1..32] of ...	%I314	DeviceOnOff_CH1[13]	Bool	%I299.4
▶ DeviceMargin_CH2	Array[1..32] of ...	%I318	DeviceOnOff_CH1[14]	Bool	%I299.5
▶ DeviceAlert_CH1	Array[1..32] of ...	%I322	DeviceOnOff_CH1[15]	Bool	%I299.6
▶ DeviceAlert_CH2	Array[1..32] of ...	%I326	DeviceOnOff_CH1[16]	Bool	%I299.7
▶ DeviceReset_CH1	Array[1..32] of ...	%I330	DeviceOnOff_CH1[17]	Bool	%I300.0
▶ DeviceReset_CH2	Array[1..32] of ...	%I334	DeviceOnOff_CH1[18]	Bool	%I300.1
▶ DeviceActuatorRec_CH1	Array[1..32] of ...	%I338	DeviceOnOff_CH1[19]	Bool	%I300.2
▶ DeviceActuatorRec_CH2	Array[1..32] of ...	%I342	DeviceOnOff_CH1[20]	Bool	%I300.3
▶ SeriesStatus_CH1	Struct	%I346	DeviceOnOff_CH1[21]	Bool	%I300.4
▶ SeriesStatus_CH2	Struct	%I350	DeviceOnOff_CH1[22]	Bool	%I300.5
			DeviceOnOff_CH1[23]	Bool	%I300.6
			DeviceOnOff_CH1[24]	Bool	%I300.7
			DeviceOnOff_CH1[25]	Bool	%I301.0
			DeviceOnOff_CH1[26]	Bool	%I301.1
			DeviceOnOff_CH1[27]	Bool	%I301.2
			DeviceOnOff_CH1[28]	Bool	%I301.3
			DeviceOnOff_CH1[29]	Bool	%I301.4
			DeviceOnOff_CH1[30]	Bool	%I301.5
			DeviceOnOff_CH1[31]	Bool	%I301.6
			DeviceOnOff_CH1[32]	Bool	%I301.7

- Binary information for each device in the DCD-Series

Example:

- %I298.0 is true -> First Device in Series (Channel) 1 is OK and safety outputs are turned ON
- Applies for all Array of Bool in DCD Status information module

Channel 1 -> DCD-Series 1 (SCR: IN5+6 ; SCx: IN1+2)

Channel 2 -> DCD-Series 2 (SCR: IN3+4 ; SCx: IN3+4)

Safety controller | DCD communication

DCD Status Information Module



▼ SCR_P_DCD_GEN	*typeSCR_P_DC...	%I290.0
DeviceCount_CH1	Byte	%IB290
Res_1	Byte	%IB291
Res_2	Byte	%IB292
Res_3	Byte	%IB293
DeviceCount_CH2	Byte	%IB294
Res_4	Byte	%IB295
Res_5	Byte	%IB296
Res_6	Byte	%IB297
▶ DeviceOnOff_CH1	Array[1..32] of ...	%I298
▶ DeviceOnOff_CH2	Array[1..32] of ...	%I300
▶ DeviceFault_CH1	Array[1..32] of ...	%I304
▶ DeviceFault_CH2	Array[1..32] of ...	%I310
▶ DeviceMargin_CH1	Array[1..32] of ...	%I314
▶ DeviceMargin_CH2	Array[1..32] of ...	%I318
▶ DeviceAlert_CH1	Array[1..32] of ...	%I322
▶ DeviceAlert_CH2	Array[1..32] of ...	%I326
▶ DeviceReset_CH1	Array[1..32] of ...	%I330
▶ DeviceReset_CH2	Array[1..32] of ...	%I334
▶ DeviceActuatorRec_CH1	Array[1..32] of ...	%I338
▶ DeviceActuatorRec_CH2	Array[1..32] of ...	%I342
▶ SeriesStatus_CH1	Struct	%I346.0
▶ SeriesStatus_CH2	Struct	%I350.0

▼ SeriesStatus_CH1	Struct	%I346.0
DeviceCountMismatch	Bool	%I346.0
DeviceOrderMismatch	Bool	%I346.1
NoDiagDataDetected	Bool	%I346.2
DiagDetectedNotConfig...	Bool	%I346.3
IncompatibleDevice	Bool	%I346.4
TerminatorMissing	Bool	%I346.5
ActuatorNotTaught	Bool	%I346.6
WrongActuator	Bool	%I346.7
InternalSrfErrors	Bool	%I347.0
OutputFaultDetection	Bool	%I347.1
Res_2_2	Bool	%I347.2
Res_2_3	Bool	%I347.3
SeriesOssdStatus	Bool	%I347.4
Res_2_5	Bool	%I347.5
Res_2_6	Bool	%I347.6
Res_2_7	Bool	%I347.7
Res_3	Byte	%IB348
Res_4	Byte	%IB349

- Binary information for general status of the connected DCD-Series
- See manual for detailed information

Channel 1 -> DCD-Series 1 (SCR: IN5+6 ; SCx: IN1+2)

Channel 2 -> DCD-Series 2 (SCR: IN3+4 ; SCx: IN3+4)

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SIEMENS TIA-Portal**

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Safety controller | DCD communication

DCD Individual Status Information Module



- Individual status of each device in the connected DCD-series
- No automatic update, request and response principle

▼ SCR_P_DCD_IND_IN	*typeSCR_P_DC...	%I420.0
RequestAck	Word	%IW420
SelectedSeriesAck	Word	%IW422
SelectedDeviceAck	Word	%IW424
▼ DCD_Data	Struct	%I426.0
BasicData	Word	%IW426
SetupAndRemTeach	Byte	%IB428
IdAndCounter_01	Byte	%IB429
IdAndCounter_02	Word	%IW430
Adc_Temp	Byte	%IB432
Adc_Dist	Byte	%IB433
Adc_Supply	Byte	%IB434
CompanyExpRec	Byte	%IB435
RFID_Exp	Word	%IW436
RFID_Rec	Word	%IW438
SRF_ErrorA	Word	%IW440
SRF_ErrorB	Word	%IW442
▼ SCR_P_DCD_IND_OUT	*typeSCR_P_DC...	%Q420.0
Request	Word	%QW420
SelectedSeries	Word	%QW422
SelectedDevice	Word	%QW424

Device overview						
	Module	Rack	Slot	I address	Q address	Type
	▼ BernsteinSafetyController SCR P	0	0			Bernstein Safety Co.
	► SCR P	0	0 X1			BernsteinSafetyCo...
	4 Status Bytes, Bits 0..31_1	0	1	200...203		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_2	0	2	204...207		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_3	0	3	208...211		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_4	0	4	212...215		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_5	0	5	216...219		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_6	0	6	220...223		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_7	0	7	224...227		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_8	0	8	228...231		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_9	0	9	232...235		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_10	0	10	236...239		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_11	0	11	240...243		4 Status Bytes, Bits...
	4 Status Bytes, Bits 0..31_12	0	12	244...247		4 Status Bytes, Bits...
	8 Bytes Virtual On/Off/IME Data_1	0	13		200...207	8 Bytes Virtual On/...
	2 Bytes RCD Data_1	0	14		208...209	2 Bytes RCD Data
	2 Byte RCD Acutation Code_1	0	15		210...211	2 Byte RCD Acutati...
	RCD Data Feedback Register_1	0	16	248...249		RCD Data Feedbac...
	RCD Passcode Feedback Register_1	0	17	250...251		RCD Passcode Fee...
	Fault Log Buffer Module_1	0	18			Fault Log Buffer M...
	System Information Module_1	0	19	68...97		System Informatio...
	DCD Status Information Module_1	0	20	290...417		DCD Status Inform...
	▼ DCD Individual Status Information Module_1	0	21			DCD Individual Stat...
	DCD Device Information Request	0	21 DC...		420...425	DCD Device Inform...
	DCD Device Information Response	0	21 DC...	420...443		DCD Device Inform...

Safety controller | DCD communication

DCD Individual Status Information Module



▼ SCR_P_DCD_IND_IN	*typeSCR_P_DC...	%I420.0
RequestAck	Word	%IW420
SelectedSeriesAck	Word	%IW422
SelectedDeviceAck	Word	%IW424
▼ DCD_Data	Struct	%I426.0
BasicData	Word	%IW426
SetupAndRemTeach	Byte	%IB428
IdAndCounter_01	Byte	%IB429
IdAndCounter_02	Word	%IW430
Adc_Temp	Byte	%IB432
Adc_Dist	Byte	%IB433
Adc_Supply	Byte	%IB434
CompanyExpRec	Byte	%IB435
RFID_Exp	Word	%IW436
RFID_Rec	Word	%IW438
SRF_ErrorA	Word	%IW440
SRF_ErrorB	Word	%IW442
▼ SCR_P_DCD_IND_OUT	*typeSCR_P_DC...	%Q420.0
Request	Word	%QW420
SelectedSeries	Word	%QW422
SelectedDevice	Word	%QW424



2

- Check: Request == Acknowledge



3

- Detailed individual information from requested Device



1

- SET Series (Channel “1” or “2”)
- SET Device in Series (1-32)
- SET Request := true

Safety controller | DCD communication

DCD Individual Status Information Module



▼ SCR_P_DCD_IND_IN	*typeSCR_P_DC...	%I420.0
RequestAck	Word	%IW420
SelectedSeriesAck	Word	%IW422
SelectedDeviceAck	Word	%IW424
▼ DCD_Data	Struct	%I426.0
BasicData	Word	%IW426
SetupAndRemTeach	Byte	%IB428
IdAndCounter_01	Byte	%IB429
IdAndCounter_02	Word	%IW430
Adc_Temp	Byte	%IB432
Adc_Dist	Byte	%IB433
Adc_Supply	Byte	%IB434
CompanyExpRec	Byte	%IB435
RFID_Exp	Word	%IW436
RFID_Rec	Word	%IW438
SRF_ErrorA	Word	%IW440
SRF_ErrorB	Word	%IW442
▼ SCR_P_DCD_IND_OUT	*typeSCR_P_DC...	%Q420.0
Request	Word	%QW420
SelectedSeries	Word	%QW422
SelectedDevice	Word	%QW424

- Detailed Diagnostic information from one single device
- See manual for detailed information

typeDeviceBasic			
	Name	Data type	Default value
[-]	ActuatorDetected	Bool	false
[-]	DetectionZone	Bool	false
[-]	WrongActuator	Bool	false
[-]	NotTeached	Bool	false
[-]	LocalResetExpected	Bool	false
[-]	SafetyContact_1	Bool	false
[-]	SafetyContact_2	Bool	false
[-]	SafetyInput_1	Bool	false
[-]	SafetyInput_2	Bool	false
[-]	SafetyOutput_1	Bool	false
[-]	SafetyOutput_2	Bool	false
[-]	StopMode	Bool	false
[-]	OperatingVoltageError	Bool	false
[-]	OperatingVoltageWarning	Bool	false
[-]	CrossCircuit	Bool	false
[-]	InputError	Bool	false
[-]	ErrorDCD	Bool	false

Thank you for your attention
