Altech Corp. ®
by **BERNSTEIN**

To complement the extensive range of mechanical safety switches offered by BERNSTEIN, a new series of non-contact safety switches is now available. These safety sensors ensure that safety doors and protective guards remain closed when danger is present.

The non-contact safety technology offers the following advantages:

- Wear-free actuating
- Very easy to clean
- No actuator, therefore:
    - No mechanical damage possible
    - No hazards or restrictions caused by protruding actuator
- Switching function not affected by contaminants

BERNSTEIN offers two different technologies in the field of non-contact safety technology:

- Safety sensors on magnetic basis, MAK series
- Safety sensors on RFID basis, CSMS series

Safety sensors CSMS

The CSMS can be directly connected to contactors or to an evaluation unit (dependent on the respective model). The RRS version integrates an evaluation of a return circuit and start button with direct connection to contactors. With the CSMS, PL e and SIL 3 is achieved.
This is the case with only one CSMS and also with series circuits with up to 32 sensors the case.

Product features

- Performance Level e
- Up to 32 series circuits without leaving the PL e
- Power supply 24 V DC
- High coding level corresponding to the draft DIN EN ISO 14119
- No need of any additional external monitoring (dep. on the type)
- Connection of return circuit and start button possible (dep. on the type)
- Output current up to 250 mA per safety output
- Large diagnostic possibility
- 3 LEDs for status information of the CSMS
- Switching distance: 13 mm
- Dimensions: 110 mm x 30 mm x 15 mm
- IP 67

Safety sensors MAK

To achieve a PL or SIL value with the MAK safety sensors, it is necessary to connect them to a safety evaluation unit. The magnetic safety sensors are dual channel versions. The evaluation unit (BERNSTEIN designation: MÜZ) monitors the correct switching of the two MAK channels and a defined time window in which the two channels must switch.

With the combination of MAK and MÜZ, a PL d and a SIL 3 can be reached. Besides the 3 different types of magnetic safety switches, BERNSTEIN also offers two different evaluation units.

Product features

- Performance Level d
- Redundancy with NO and NC contacts
- Switching distance: 6 mm
- IP 67

Comparison CSMS – MAK

Product characteristics	CSMS	MAK
Operating principle	electro-magnetic, RFID	magnetic, Reed
Safety parameters	PL e, SIL3	PL d, SIL 3
Safety outputs	electrical outputs	mechanical contacts
Can be switched in series	yes, when a constant safety level is guaranteed	yes, with falling safety level
Evaluation unit required	no	yes
Actuator coding	high	low
Diagnostic interface	via LED and electronically	no
Mechanical sensitivity	low	very high
Approach possibility of the actuator	4	1
Safety outputs	2	1
Return circuit evaluation	yes	partially (depending on the evaluation unit)
Start button monitoring	yes	partially (depending on the evaluation unit)

CSMS - Non-Contact RFID Safety System

The CSMS non-contact electronical safety switch systems ensures that safety doors and protective guards remain closed.

In addition to high switching tolerances and fast reaction times, the contactless, coded communication between the sensor and the actuator also offers a high level of safety and protection against tampering.

The use of non-contact safety switches for monitoring movable safety doors, guards and gates offers the following advantages:

- **Simple adjustment**
- **No broken actuators**
- **High degree of tolerance to vibrations**
- **No wear**
- **Exceptionally easy cleaning**
- **Unique or Multiple Coding –** with unique coding pairs only one mated actuator with can be used with each switch; multiple coding pairs allow a common actuators to be used for multiple switches
- **Safety series connection** with max. 32 CSMS up to **PL e / SIL 3 (category 4)**
- **Reduction in cost –** no additional external monitoring is needed
- **Flexible application –** a manual and automatic start is possible with the same CSMS
- **Meets the latest requirements –** the CSMS fulfils the requirements of **ISO 14119** (the successor to EN 1088) regarding individual coding **(high-level coding)**
- **Economic system installation** due to the **simple** and **fast installation** with M12 plug technology
- **Time saving –** laborious troubleshooting as a result of wiring errors is now a thing of the past
- **Time saving –** the system status is displayed on the **diagnosis interface**

Advantages of fast shutdown:

Thanks to the fast shutdown, it is possible to significantly reduce the area of the dangerous movement which is to be protected.
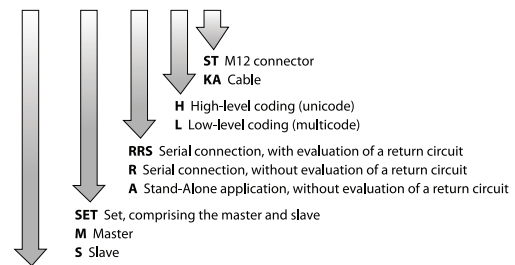This results in savings in both protective guards and hoods, as well as in space.

Door is opened

Safety output DOOR 1 on

high

low

0 ms   13 ms

Safety output DOOR 1 off
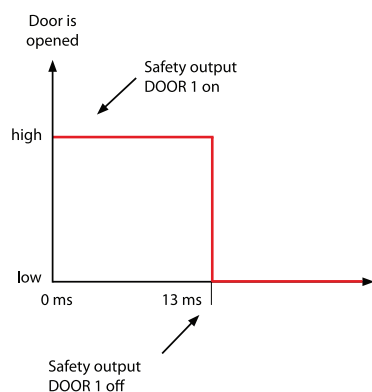
Rated sensing distance S_n	13 mm
Assured sensing distance – (On) S_{ao}	min. 10 mm
Assured sensing distance – (Off) S_{ar}	19 mm
Hysteresis H	0,5 mm

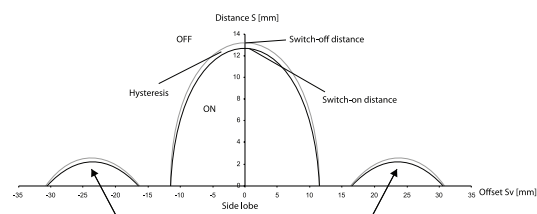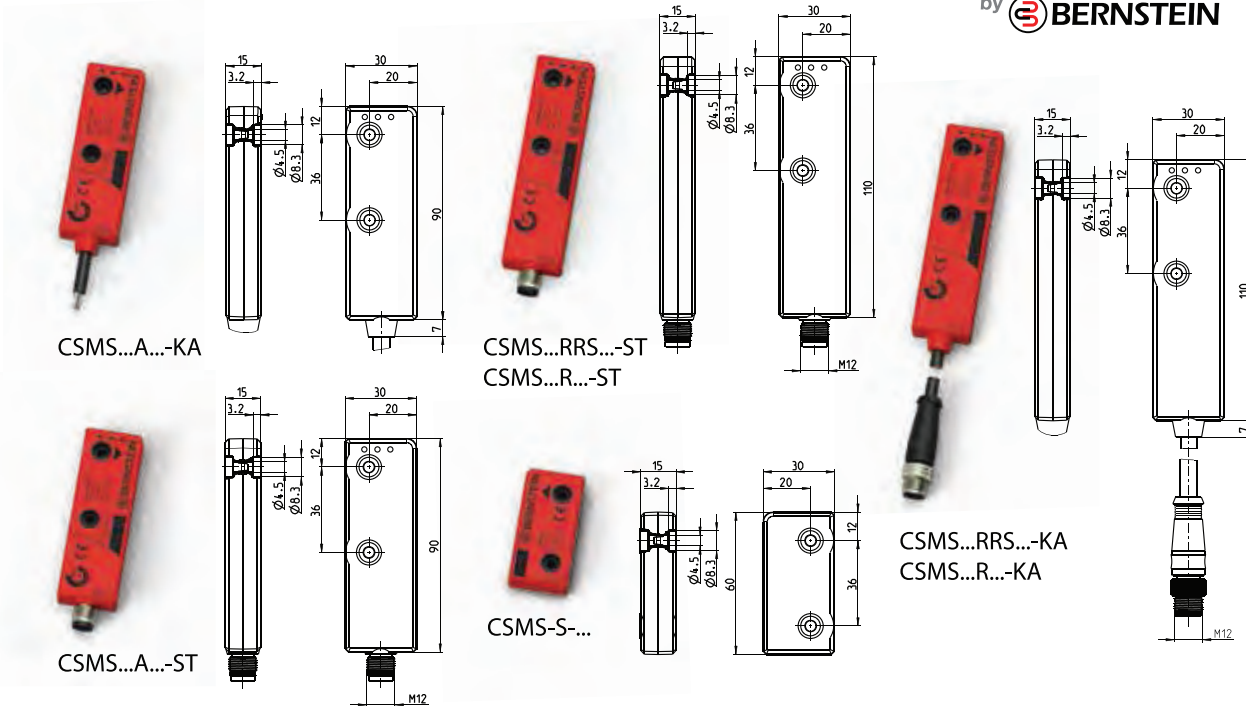**Please note:** Metal may also affect the sensing distance.

Description Breakdown:

CSMS-SET-RRS-H-ST

ST M12 connector
KA Cable

H High-level coding (unicode)
L Low-level coding (multicode)

RRS Serial connection, with evaluation of a return circuit
R Serial connection, without evaluation of a return circuit
A Stand-Alone application, without evaluation of a return circuit

SET Set, comprising the master and slave
M Master
S Slave

CSMS Contactless Safety Monitoring Sensor

Sensing distance

Distance S [mm]

OFF

14
12
10
8
6
4
2
0

Switch-off distance

Hysteresis

ON

Switch-on distance

-35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30 35   Offset Sv [mm]

Side lobe

CSMS...A...-KA

CSMS...RRS...-ST
CSMS...R...-ST

CSMS...A...-ST

CSMS-S-...

CSMS...RRS...-KA
CSMS...R...-KA

Technical data

- Rated operating voltage 24 V, polarity reversal protection
- Open-circuit current ≤ 55 mA
- Repeatability 0,1 x S (within the limits Smin and Smax)
- Switching frequencies ≤ 1Hz
- Switch-off delay time 13 ms + 200 μs x down stream CSMS unit in serial connection

- Output current Safety contacts = 2x 250mA
- Enclosure Macromelt, red / PA 6, black
- Mounting through 2 holes Ø 4,5 (for M4 screws)
- Ambient temperature −25 °C to +70 °C
- Protection class IP 67
- Sensing distance S $_n$13 mm

Readiness delay t $_V$

- **CSMS...RRS with automatic start**
  1,8 s + 33 ms x following CSMS unit

- **CSMS...RRS with Start button**
  50 ms + 50 ms x following CSMS unit

- **CSMS...R**
  320 ms + 50 ms x following CSMS unit

Accessories CSMS

T-Adapters

Versions	Start function	1. T-Adapter	Following T-Adapter
Version RRS	Manual start	Grey	Black
	Automatic start	Black	Black
Version R		Grey	Black

1. T-Adapter

Cables

Article number	Designation	Description	
607.5989.038	CON-CAB.CSMS 0,5M G/G	Length: 0,5 m	
607.5989.039	CON-CAB.CSMS 1M G/G	Length: 1 m	Connection cable
607.5989.040	CON-CAB.CSMS 2M G/G	Length: 2 m	M12 / 8-pin
607.5989.041	CON-CAB.CSMS 5M G/G	Length: 5 m	male / female
607.5989.042	CON-CAB.CSMS 10M G/G	Length: 10 m	
607.5989.043	CON-CAB.CSMS 20M G/G	Length: 20 m	
607.5989.053	CON-CAB.CSMS 0,3 M G	Length: 0,3 m	Connection cable
607.5989.054	CON-CAB.CSMS 2 M G	Length: 2 m	M12 / 8-pin female / open
607.5989.036	T-Adapter AS	T-Adapter (black) for series circuits (see the table above)	
607.5989.037	T-Adapter MS	T-Adapter (grey) for series circuits (see the table above)	
607.3900.070	SPACER short		
607.5989.044	SPACER long		
607.5989.031	CSMS DIAGNOSE STANDARD 8	Diagnosis for 8 CSMS, 8 PNP outputs	
607.5989.032	CSMS DIAGNOSE STANDARD 16	Diagnosis for 16 CSMS, 16 PNP outputs	
607.5989.033	CSMS DIAGNOSE PROFIBUS	Diagnosis for up to 32 CSMS with Profibus Gateway	
607.5989.055	CSMS BASIS CONNECT. DEVICE	Connection device for easy and fast installation of the CSMS system	
607.5989.056	CSMS SLAVE TEACHADAPTER	Tool for teaching in a replacement actuator	

Drawing dimensions in mm

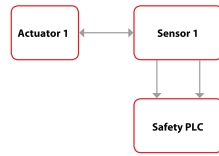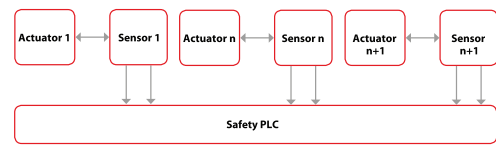## CSMS - A for direct connection to a control unit

Advantages

- Up to **PL e / SIL 3**
- Multi-coding
- Compact construction
- Connection to an external safety evaluation unit like the SCR-ON

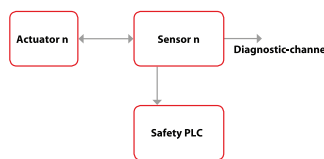### Individual application

Series application

Unique Code	Multicode	M12 connector	2 m cable	Article number	Designation	Description
	x	x		607.5988.072	CSMS-SET-A-L-ST	Switch & Actuator with 2M Cable
	x		x	607.5988.073	CSMS-SET-A-L-KA	Switch & Actuator with M12 Connector
	x		x	607.5985.070	CSMS-M-A-L-KA	Switch Only with 2M Cable
	x	x		607.5986.071	CSMS-M-A-L-ST	Switch Only with M12 Connector
	Replacement actuator Multicode			607.5980.065	CSMS-S-L	Multicode Actuator Only

CSMS - R for direct connection to a control unit, with diagnostic channel
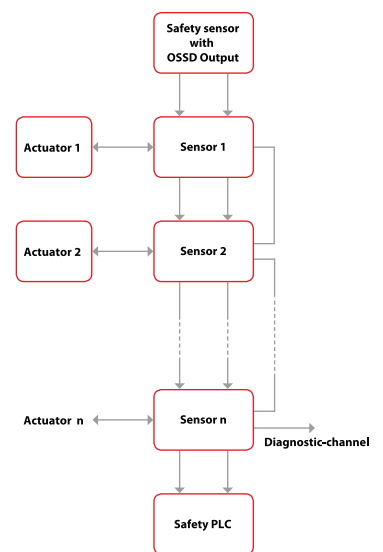
Advantages

- Safe serial connection with max. 32 CSMS up to **PL e**
- Connection to an external safety evaluation unit like the SCR ON
- Single or multiple coding
- Optional: Connection of a safety sensor (for ex. safety light curtain) with OSSD output to the first CSMS

Individual application

Series application

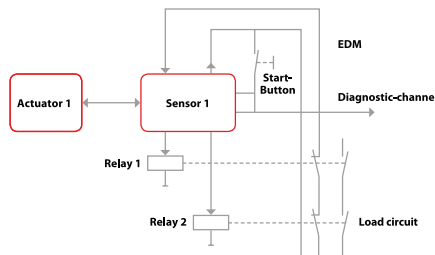| Unique Code	Multi Code	M12 connector	2 m cable with M12 connector	Article number	Designation	Description
x			x	607.5988.059	CSMS-SET-R-H-KA	Switch & Actuator+2M Cable/Connector
x		x		607.5988.060	CSMS-SET-R-H-ST	Switch & Actuator with M12 Connector
	x	x		607.5988.067	CSMS-SET-R-L-ST	Switch & Actuator+2M Cable/Connector
	x		x	607.5988.069	CSMS-SET-R-L-KA	Switch & Actuator with M12 Connector
x			x	607.5985.049	CSMS-M-R-H-KA	Switch Only + 2M Cable / Connector
x		x		607.5986.051	CSMS-M-R-H-ST	Switch Only with M12 Connector
	x		x	607.5985.063	CSMS-M-R-L-KA	Switch Only + 2M Cable / Connector
	x	x		607.5986.064	CSMS-M-R-L-ST	Switch Only with M12 Connector
	Replacement actuator Multicode			607.5980.065	CSMS-S-L	Multi code Actuator Only
	Replacement actuator Unicode			607.5980.052	CSMS-S-H*	Single code Actuator Only

*Must be taught in with 6075989056 (CSMS SLAVE TEACHADAPTER) for the master.

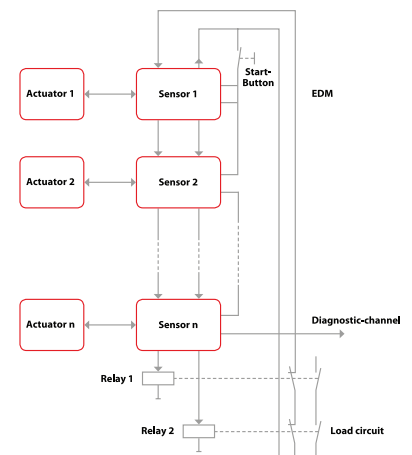## CSMS - RRS with external monitoring circuit

Advantages

- Individual CSMS or safe serial connection with max. 32 CSMS up to **PL e**
- Manual or automatic start
- No external safety evaluation unit required
- Unique or multi-coding
- Integrated evaluation of a return circuit and start button with direct connection to contactors

Individual application

Series application

Unique Code	Multi Code	M12 connector	2 m cable with M12 connector	Article number	Designation	Description
x			x	607.5988.057	CSMS-SET-RRS-H-KA	Switch & Actuator+2M Cable/Connector
x		x		607.5988.058	CSMS-SET-RRS-H-ST	Switch & Actuator with M12 Connector
	x	x		607.5988.066	CSMS-SET-RRS-L-ST	Switch & Actuator+2M Cable/Connector
	x		x	607.5988.068	CSMS-SET-RRS-L-KA	Switch & Actuator with M12 Connector
x			x	607.5985.048	CSMS-M-RRS-H-KA	Switch Only + 2M Cable / Connector
x		x		607.5986.050	CSMS-M-RRS-H-ST	Switch Only with M12 Connector
	x		x	607.5985.061	CSMS-M-RRS-L-KA	Switch Only + 2M Cable / Connector
	x	x		607.5986.062	CSMS-M-RRS-L-ST	Switch Only with M12 Connector
	Replacement actuator Multicode			607.5980.065	CSMS-S-L	Multi code Actuator Only
	Replacement actuator Unicode			607.5980.052	CSMS-S-H*	Single code Actuator Only

*Must be taught in with 6075989056 (CSMS SLAVE TEACHADAPTER) for the master.

Altech Corp.® • 35 Royal Road • Flemington, NJ 08822-6000 • P (908)806-9400 • F (908)806-9490 • www.altechcorp.com

Altech Corp.®
by **BERNSTEIN**

SCR ON

For processing signals from the BERNSTEIN CSMS-R and CSMS-A, the safety relay series SCR ON can be used.

Features

● Monitoring of sensors with PNP output

● **PL e** according to **ISO 13849**

● Monitored start / automatic start

● Three enabling current paths (NO)

● Evaluation of a return circuit
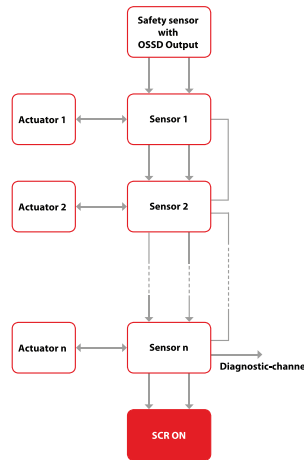
Article number	Designation
6075111020	SCR ON4-W22-3.6-S

CSMS diagnosis

The CSMS product family offers one of the **largest diagnostic options** on the market.   Opened protective gates and guards as well as failures can be rapidly and precisely identified. With the optional diagnostic devices monitor, the status of each CSMS switch can be read from the security network.

Features

● Status display of each CSMS in the security chain

● Electronical outputs or bus interface
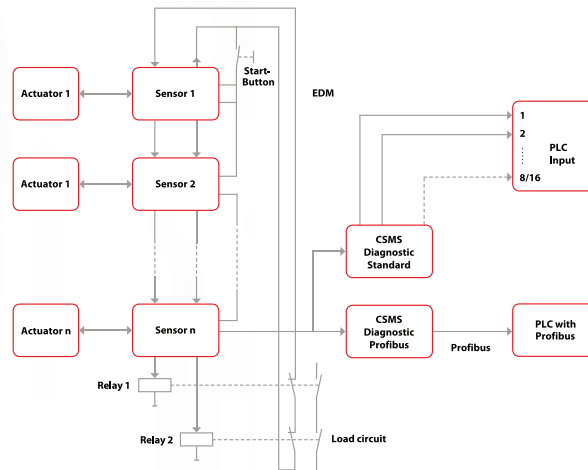
Article number	Designation	Description
6075989031	CSMS DIAGNOSE STANDARD 8	Diagnosis for 8 CSMS
6075989032	CSMS DIAGNOSE STANDARD 16	Diagnosis for 16 CSMS
6075989033	CSMS DIAGNOSE PROFIBUS	Profibus Gateway

Safety basis monitor

The Safety Basis Monitor is a graphically programmable safe "miniature control unit", which supports up to 35 inputs.

Features

● Evaluation of a return circuit
● Manual / automatic start
● Up to **PL e / SIL 3**

● Two safe electronic outputs
● Time delay for safe outputs
● Graphically programmable

Up to 35 contactless safety sensors can be connected

Article number	Designation
6073100084	ASI BASISMONITOR EXP. FUNCTION
6073800079	ASI PROG. SOFTWARE
6073100078	USB-CA. F. ASI BASISMONITOR