CSMS Contactless Safety Monitoring Sensor

The CSMS is a future-proofed safety product. The CSMS is a contactless safety sensor that uses RFID technology. It can be used as a single device as well as being connected in series up to PL e and SIL 3. BERNSTEIN offers two general product versions.

⌘ CSMS-…-RRS… ❶

With this product version, safety sensors can be connected to contactors without using an evaluation device. The product has an integrated evaluation of the return circuit and allows connection of a start button.

⌘ CSMS-…-R… ❷

This product version can be connected to a safety evaluation unit. Optionally, another safety sensor can be connected to the first CSMS with OSSD output (e.g. light curtains).

Both versions have extensive diagnostic capabilities. This is transmitted over a communication channel to a diagnostic device. This is displayed via PNP outputs if the CSMS is opened or closed. Moreover, it is possible to obtain information about the system and the sensor via integrated LEDs.
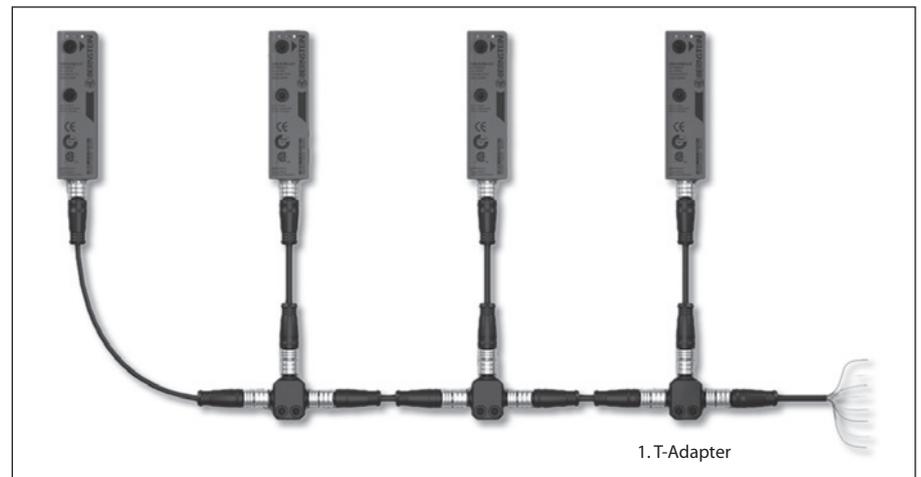
In order to ensure a particularly high manipulation protection (according to draft DIN EN ISO 14119), each sensor is assigned to one actuator. Thus, it is ensured that the CSMS cannot be "tricked" with different actuators.

The fast and accurate connection of the CSMS is realised by M12 connector cables and T-pieces.

⌘ CSMS-…-A… ❸

This product version allows a direct connection of several safety sensors to the safety controller by parallel wiring.

Connection example

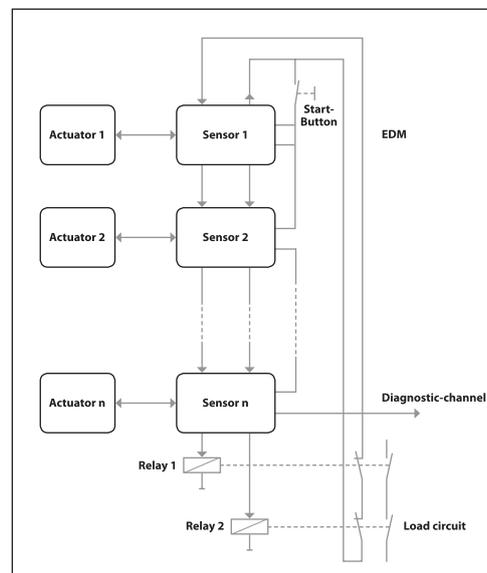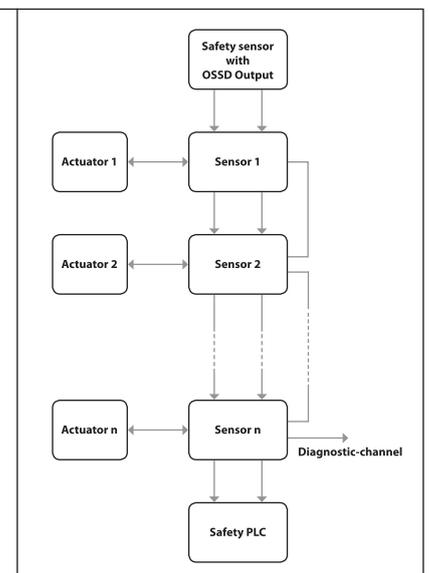1. T-Adapter

T-Adapters to be used

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

Application examples
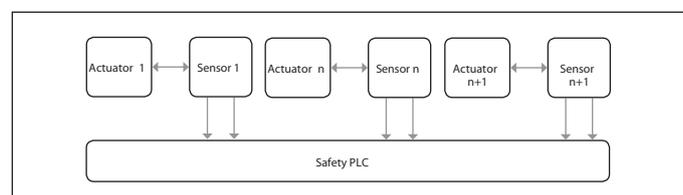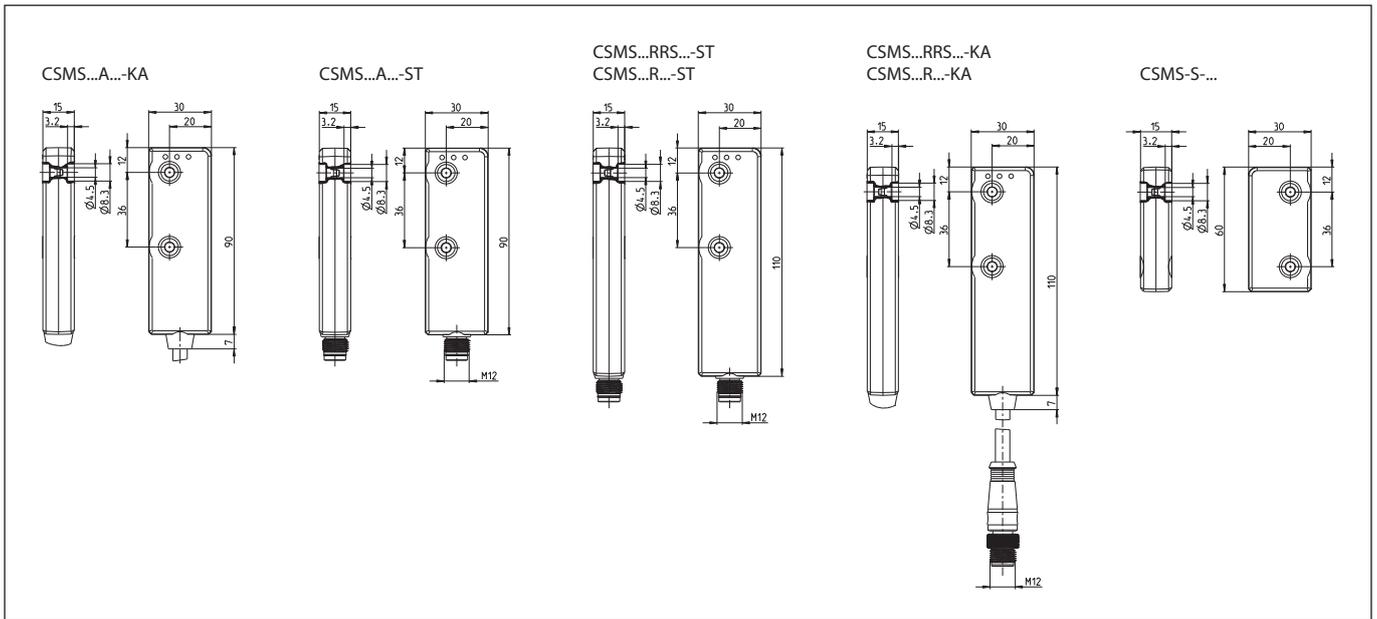
❶ CSMS
Series circuits without additional evaluation

❷ CSMS
Series circuits with evaluation device

❸ CSMS
Parallel connection to a safety controller

CSMS...A...-KA   CSMS...A...-ST   CSMS...RRS...-ST   CSMS...RRS...-KA   CSMS-S-...
CSMS...R...-ST   CSMS...R...-KA

According to ISO 14119, interlocking devices are mechanical or electrical devices which are designed to prevent the operation of a machine element for as long as the movable safety guard is left open.
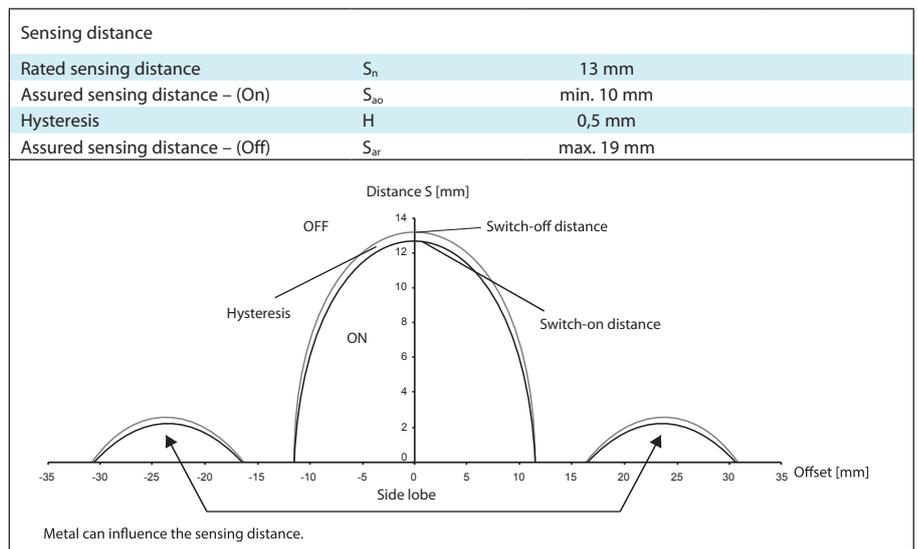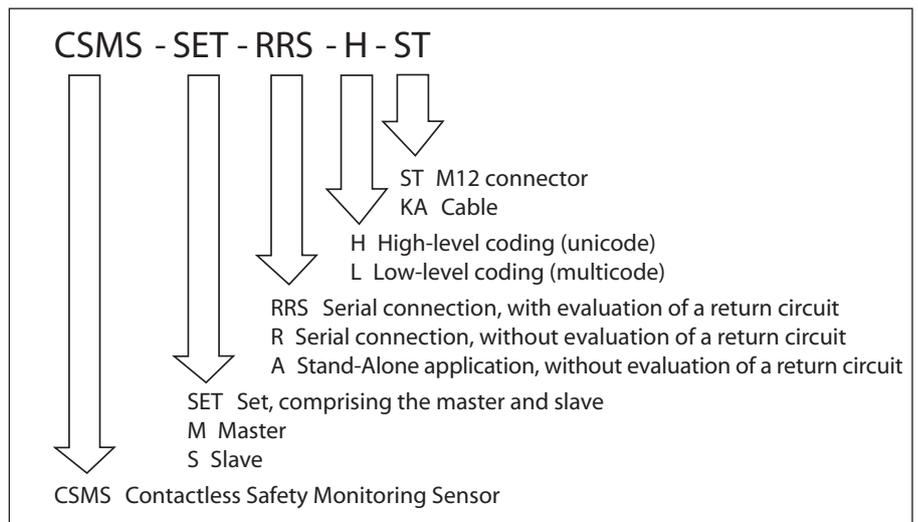
The CSMS based on RFID is contactless and fulfils the highest requirement (high-level coding) of protection against manipulation of ISO 14119.

The BERNSTEIN CSMS offers both a high-level coding and a low-level coding, in order to provide the optimum protection against manipulation for each application.

The safety-related capacity of the CSMS is demonstrated through full observation of the following standards:

⌘ Requirements for safety-related parts of control systems up to PL e in accordance with ISO 13849-1

⌘ Functional safety up to SIL 3 in accordance with IEC 62061

⌘ Choice and use of safety-related interlocking devices of type 4 in accordance with ISO 14119

unicode/high coding:
Sensor accepts only one actuator
multicode/low coding:
Sensor accepts several actuators

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

Distance S [mm]

OFF
Switch-off distance
Hysteresis
Switch-on distance
ON
Side lobe
Offset [mm]

Metal can influence the sensing distance.

To achieve the stated sensing distances on metal substrates, CSMS spacers must be used.

CSMS-RRS
with evaluation of a return 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

⌘ Uni- or multi-coding

⌘ Integrated evaluation of a return circuit and start button with direct connection to contactors

Unicode	Multicode	M12 connector	2 m cable + M12 connector	Article number	Designation
x			x	6075988057	CSMS-SET-RRS-H-KA
x		x		6075988058	CSMS-SET-RRS-H-ST
	x	x		6075988066	CSMS-SET-RRS-L-ST
	x		x	6075988068	CSMS-SET-RRS-L-KA
x			x	6075985048	CSMS-M-RRS-H-KA
x		x		6075986050	CSMS-M-RRS-H-ST
	x		x	6075985061	CSMS-M-RRS-L-KA
	x	x		6075986062	CSMS-M-RRS-L-ST
Replacement actuator Multicode				6075980065	CSMS-S-L
Replacement actuator Unicode				6075980052	CSMS-S-H*

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

CSMS-R
for the connection to a safety evaluation unit

Advantages

⌘ Safe serial connection with max. 32 CSMS up to PL e

⌘ Connection to an external safety evaluation unit for ex. SCR ON

⌘ Optional: Connection of a safety sensor (for ex. safety light curtain) with OSSD output to the first CSMS

⌘ Uni- or multi-coding

Unicode	Multicode	M12 connector	2 m cable + M12 connector	Article number	Designation
x			x	6075988059	CSMS-SET-R-H-KA
x		x		6075988060	CSMS-SET-R-H-ST
	x	x		6075988067	CSMS-SET-R-L-ST
	x		x	6075988069	CSMS-SET-R-L-KA
x			x	6075985049	CSMS-M-R-H-KA
x		x		6075986051	CSMS-M-R-H-ST
	x		x	6075985063	CSMS-M-R-L-KA
	x	x		6075986064	CSMS-M-R-L-ST
Replacement actuator Multicode				6075980065	CSMS-S-L
Replacement actuator Unicode				6075980052	CSMS-S-H*

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

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 for ex. SCR ON

Unicode	Multicode	M12 connector	2 m cable	Article number	Designation
	x	x		6075988072	CSMS-SET-A-L-ST
	x		x	6075988073	CSMS-SET-A-L-KA
	x		x	6075985070	CSMS-M-A-L-KA
	x	x		6075986071	CSMS-M-A-L-ST
Replacement actuator Multicode				6075980065	CSMS-S-L

CSMS diagnosis

The CSMS product family offers one of the largest diagnostic options on the market. Opened protective devices or actuators in the transitional area as well as system failures can be rapidly and precisely identified. Due to the optional diagnostic devices, the status of each CSMS appears in the security chain.

⌘ Status display of each CSMS in the security chain
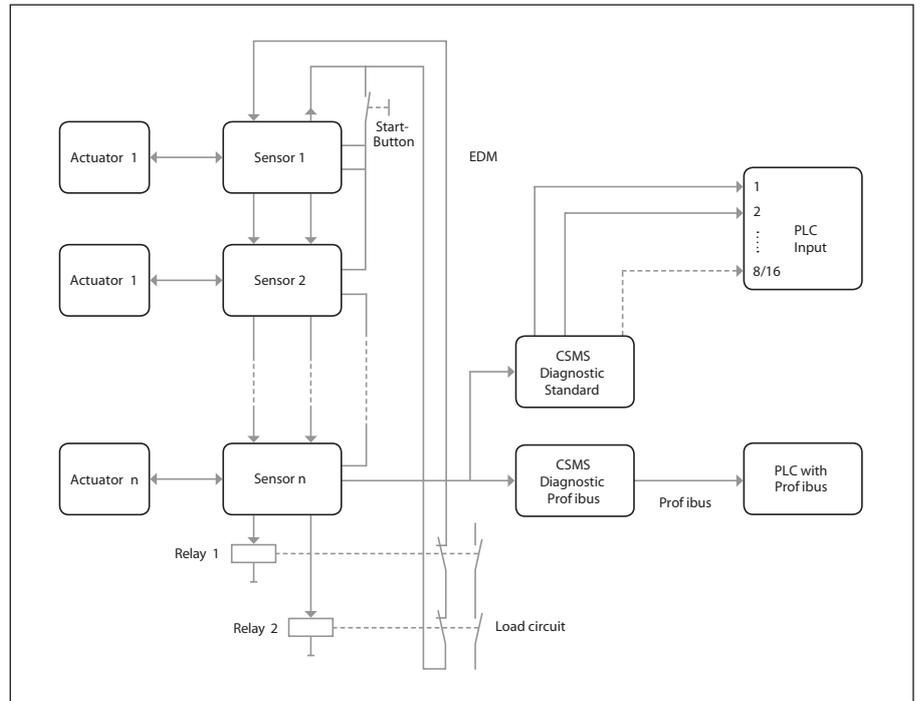
⌘ Electronical outputs or bus interface

CSMS Standard Diagnosis

The CSMS Standard Diagnosis has 8 or 16 electronic outputs. Each output is assigned to one CSMS. It is possible to switch on the output, even at the maximum operating distance. The output is switched on by dip switches on the diagnostic device. In maximum system conception, the status of all 32 CSMS can be displayed simply by cascading the diagnostic devices.

CSMS Diagnosis Profibus

The CSMS Diagnosis Profibus with Profibus interface ensures the direct transmission of the diagnostic information from each CSMS to the control unit.
Advantages include considerably reduced wiring expenses, a clearer arrangement and a substantially higher functionality.
As well as protective devices in an open position or in the transitional area, attempts to tamper with the machine and system errors can also be detected.
The machine down time can be reduced to a minimum by the extensive diagnostic options.
Further bus systems on request.

Parallel connection

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