

Operating Instructions for CM Series Read Heads and Actuators

These operating instructions only apply in conjunction with the operating instructions for the relevant CM Series control units.

Correct use

The CM Series coded magnetic safety switches are a series of technical safety devices for monitoring moveable separating safety guards. They ensure that:

- dangerous work on machines can only be carried out if the safety guards are closed.
- a stop command is triggered if a safety guard is opened while the machine is running.

Before safety switches are used, a risk assessment must be performed on the machine in accordance with:

- EN 954-1, safety-related components of controls, Annex C
- EN 1050, machine safety, risk assessment.

Correct use includes compliance with the relevant requirements for installation and operation, particularly:

- EN 954-1, safety-related components of controls
- EN 1088, interlocking devices in conjunction with moving safety guards
- EN 60204-1, electrical equipment of machines
- EN 60947-5-3 Requirements for proximity switches.

⚠ Safety precautions

No responsibility whatever is accepted for the use of the technical safety functioning of the CM Series read heads or actuators without the relevant CM Series control units.


It is only possible to ensure technical safety functionality when used as a complete system.

If CM Series read heads and actuators are operated as technical safety components without the relevant CM Series control unit., this is then the responsibility of the manufacturer of the plant / machine.

Safety switches fulfill a personal protection function. Incorrect installation or manipulation can lead to severe injuries to personnel.

⚠ Safety switches must **not** be bypassed (bridging of contacts), turned away, removed or otherwise rendered ineffective.

⚠ The switching operation may only be triggered by actuators specifically supplied for this purpose which are permanently connected to the safety guard.

⚠ For use and operation as per the  requirements, a power supply with the feature "for use in class 2 circuits" must be used. They are not tested as safety components in the context of the UL definition (e.g. for potentially explosive atmospheres).

⚠ A complete safety-oriented system generally consists of several signalling devices, sensors, evaluation units and concepts for safe shut-off operations. The manufacturer of a machine or installation is responsible for correct and safe overall function.

⚠ Not all faults are detected. An accumulation of undetected faults can lead to the loss of the safety function. With this application, therefore, it is necessary to ensure that only one safety gate (door) is open at a time or that the status of each safety gate is checked in suitable intervals.

Assembly

⚠ Installation must be performed by authorized personnel only.

⚠ Read heads and actuators must not be used as a mechanical stop.

⚠ Read heads and actuators must not be used in an environment with strong magnetic fields.

⚠ Read heads and actuators must be positively locked to the safety guard, e.g. by using the security screws supplied.

The read head and actuator may be installed in any position. The alignment of the read head and the actuator must be kept in mind (see figure 1).

Install read head and actuator so that:

- they are accessible for inspection work and the installation of spare parts
- when the safety guard is closed, the active read head and actuator area are exactly aligned (see figure 1)
- the actuator is located in the read head's response area when the safety guard is closed.

- a guide and an extra stop must be fitted to the moveable part of the safety guard.
- a stopping mechanism must be fitted to the protective doors for closed position.

- If the read head and actuator are fitted flush, the switching distance is reduced depending on the installation depth and the safety guard material.
- If the read head and actuator are fitted on ferromagnetic material, the read distance is reduced.
- If the approach speed between the read head and the actuator is low and the control unit CM-S4 is used, the approach direction z (see figure 1) should be avoided.

- Round actuators are torque-resistant. In order to ensure that the actuator cannot be rotated when secured to the protective doors, a \varnothing 2 mm hole should be drilled for the safety lug during installation.

Electrical connection

⚠ Electrical connection must be performed by authorized personnel only.

The connection cable for the read heads must not be extended.

The read heads must be connected to the evaluation units in accordance with the wiring diagram (see operating instructions for control units).

Service and inspection

Remove iron swarf from the read head and actuator at regular intervals.

Only use solvent-free detergents for cleaning the actuators and read heads! In order to ensure lasting, trouble-free operation, **regular inspection** of the following is required:

- correct switching function
- secure mounting of components
- loose connections.

⚠ In the event of damage or wear and tear, the damaged system component must be replaced.

Functioning

The CM Series switch consists of a control unit, read head and actuator and is only functional in particular combinations (see combination options)!

The read head connected to the control unit contains reed contacts which are activated by the coded magnetic actuators. The control unit converts this information and transfers the safety guard state to the control system via a safety output.

Liability coverage is void under the following circumstances:

- if instructions are not followed
- non-compliance with safety regulations
- installation and electrical connection not performed
- by authorized personnel
- non-implementation of functional checks.

Technical data

Parameter	Value
Read heads	
Housing material	reinforced PPS
Ambient temperature	-20 ... +60 °C
Degree of protection	IP 67 according to EN IEC 60529
Installation position	Any, alignment with actuator should be kept in mind (markings)
Connection type	Molded cable with crimped ferrules
Switching voltage	24 V
Switching current I_e max.	0.5 A
Contact status indication	(only CMS-A-AXR...)
Switching voltage	24 V
Switching current I_e max.	0.01 A
Method of operation	Magnetic, reed contact
Mech. life	100x10 ⁶ operating cycles
Vibration resistance	10 ... 55 Hz, amplitude 1 mm
Shock resistance	30 g/11 ms
EMC compliance	acc. to EN 60947-5-3
Center offset m from actuator	\pm 2.5 mm at a distance of $s = 3$ mm
Switch on distance S_{ao}	
Switch off distance S_{ar}	See table listing combination options
Reset spacing S_{reset}	
Logic elements	
Actuator	
Housing material	Reinforced PPS
Ambient temperature	-20 ... +60 °C
Degree of protection	IP 67 according to IEC 60529
Installation position	Any, alignment with read head should be kept in mind (markings)
Method of operation	Magnetic
Vibration resistance	10 ... 55 Hz, amplitude 1 mm
Shock resistance	30 g/11 ms
Center offset m from read head	\pm 2.5 mm at a distance of $s = 3$ mm
Switch on distance S_{ao}	
Switch off distance S_{ar}	See table listing combination options
Reset spacing S_{reset}	

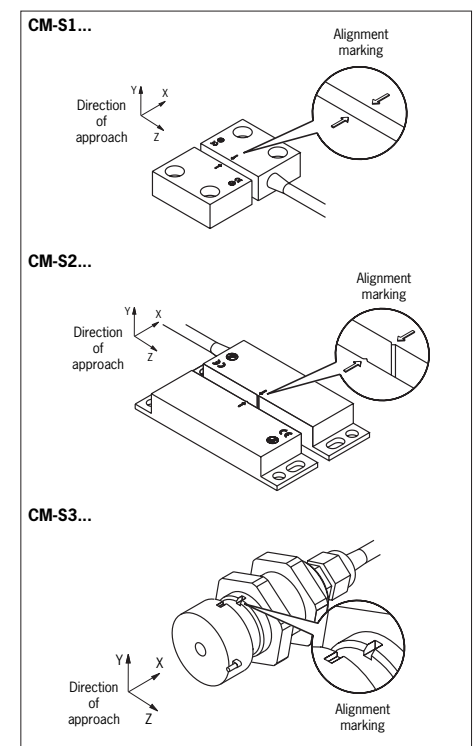


Fig. 1: Alignment of read head and actuator

CM Series

Operating Instructions for CM Series Read Heads and Actuators

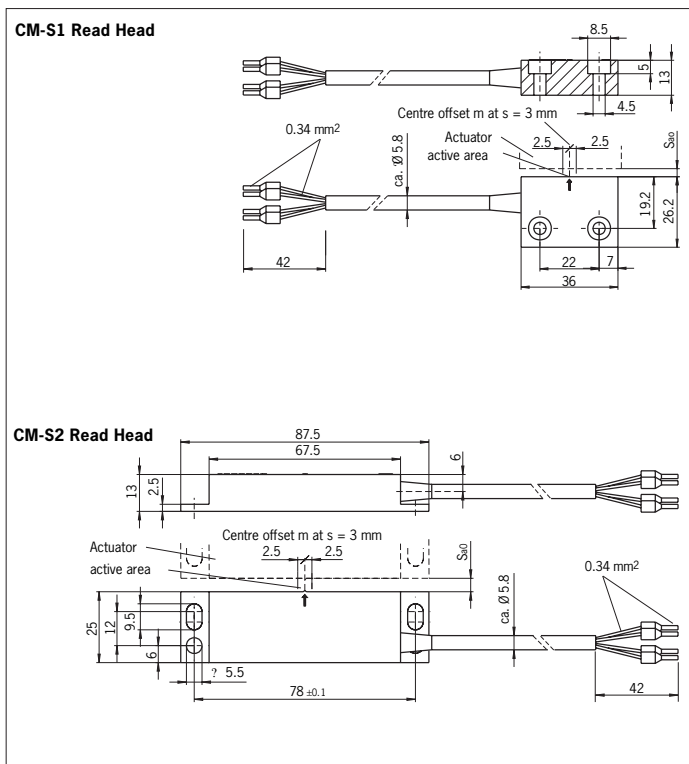


Fig. 2: Dimensions for CM-S1 and CM-S2 Read Heads and Actuators

Combination options

Design	Read head	Circuit diagram not actuated	Actuator	Minimum Switch on distance S_{90} [mm] ¹⁾	Maximum Switch off distance S_{9r} [mm]	Max. Reset dist. S_{reset} [mm]
CM-S4 Control Unit	CM-S1 Read Head		CM-S1 Actuator	3	8	11
	CM-S2 Read Head		CM-S2 Actuator	6	13	30
	CM-S3 Read Head		CM-S3 Actuator	6	13	16

¹⁾ There must be no ferromagnetic material in the vicinity of the read head or the actuator. All the data applies to the frontal direction of approach and a centre offset of $m = 0$.

²⁾ The minimal switching distance S_{0mm} between read head and actuator is 1 mm. If the distance falls below 1 mm, the evaluation unit could go into fault condition.

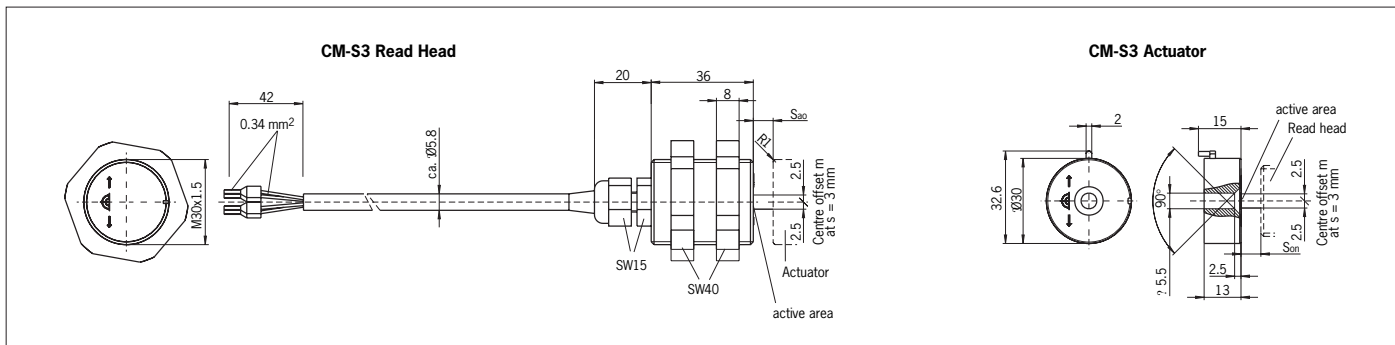


Fig. 3: Dimensions for CM-S3 Read Heads and Actuators

ST Safety, Technology & Innovation

OMRON

OMRON SCIENTIFIC TECHNOLOGIES, INC.

6550 Dumbarton Circle, Fremont CA 94555-3605 USA

Tel: 1/510/608-3400

Fax: 1/510/744-1442

E-mail: sales@sti.com

www.sti.com

UK Sales Office
Tel: +44 (0) 1395-273-209
Fax: +44 (0) 1395-276-183

European Tech Support
Tel: +49 (0) 52 58 93 87 76
Fax: +49 (0) 52 58 93 56 90

©2007 Omron Scientific Technologies, Inc. All rights reserved.
Subject to technical modifications. Drawing Number 092580-04-09/07

OMRON AUTOMATION AND SAFETY • THE AMERICAS HEADQUARTERS • Chicago, IL USA • 847.843.7900 • 800.556.6766 • www.omron247.com

OMRON CANADA, INC. • HEAD OFFICE

Toronto, ON, Canada • 416.286.6465 • 866.986.6766 • www.omron247.com

OMRON ELECTRONICS DE MEXICO • HEAD OFFICE

México DF • 52.55.59.01.43.00 • 01-800-226-6766 • mela@omron.com

OMRON ELECTRONICS DE MEXICO • SALES OFFICE

Apodaca, N.L. • 52.81.11.56.99.20 • 01-800-226-6766 • mela@omron.com

OMRON ELETRÔNICA DO BRASIL LTDA • HEAD OFFICE

São Paulo, SP, Brasil • 55.11.2101.6300 • www.omron.com.br

OMRON ARGENTINA • SALES OFFICE

Cono Sur • 54.11.4783.5300

OMRON CHILE • SALES OFFICE

Santiago • 56.9.9917.3920

OTHER OMRON LATIN AMERICA SALES

54.11.4783.5300

OMRON EUROPE B.V. • Wegalaan 67-69, NL-2132 JD, Hoofddorp, The Netherlands. • +31 (0) 23 568 13 00 • www.industrial.omron.eu

Authorized Distributor:

Automation Control Systems

- Machine Automation Controllers (MAC) • Programmable Controllers (PLC)
- Operator interfaces (HMI) • Distributed I/O • Software

Drives & Motion Controls

- Servo & AC Drives • Motion Controllers & Encoders

Temperature & Process Controllers

- Single and Multi-loop Controllers

Sensors & Vision

- Proximity Sensors • Photoelectric Sensors • Fiber-Optic Sensors
- Amplified Photomicrosensors • Measurement Sensors
- Ultrasonic Sensors • Vision Sensors

Industrial Components

- RFID/Code Readers • Relays • Pushbuttons & Indicators
- Limit and Basic Switches • Timers • Counters • Metering Devices
- Power Supplies

Safety

- Laser Scanners • Safety Mats • Edges and Bumpers • Programmable Safety Controllers • Light Curtains • Safety Relays • Safety Interlock Switches