



Setup Guide
capaNCDT - Sensors

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1. Safety

System operation assumes knowledge of the operating instructions.

1.1 Symbols Used

The following symbols are used in these operating instructions:



Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.



Indicates a situation that may result in property damage if not avoided.



Indicates a user action.



Indicates a tip for users.

1.2 Warnings



Disconnect the power supply before touching the sensor surface.

> Risk of injury from static discharge

Connect the power supply and the display/output device according to the safety regulations for electrical equipment.

> Risk of injury

> Damage to or destruction of the sensor and controller



Avoid shocks and impacts to the sensor and controller.

> Damage to or destruction of the sensor and controller

The supply voltage must not exceed the specified limits.

> Damage to or destruction of the sensor and controller

Protect the sensor cable against damage.

> Destruction of the sensor

Do not insert or remove slots during operation.

> Damage to or destruction of the slots in the controller

1.3 Notes on Product Marking

The following applies to the product:

- Directive 2014/30/EU ("EMC")
- Directive 2011/65/EU ("RoHS")

Products which carry the CE marking satisfy the requirements of the EU Directives cited and the relevant applicable harmonized European standards (EN). The product is designed for use in industrial and laboratory 3 environments.

The EU Declaration of Conformity and the technical documentation are available to the responsible authorities according to the EU Directives.

1.4 Intended Use

- The measuring system is designed for use in industrial and laboratory applications. It is used for
 - measuring displacement, distance and thickness
 - measuring the position of parts or machine components
- The system must only be operated within the limits specified in the technical data,
- The system/sensor/controller must be used in such a way that no persons are endangered or machines and other material goods are damaged in the event of malfunction or total failure of the system/sensor/controller.
- Take additional precautions for safety and damage prevention in case of safety-related applications.

1.5 Proper Environment

Temperature range sensor	CSx, CSxHP CSEx CSEx/Mx	CSHx-CAMx CSHxFL-CRmx	CSGx-CAMx CSFx- CRgx	CSFx, CSGx
Storage	-50 ... +200 °C	-	-50 ... +100 °C	-40 ... +100 °C
Continuous operation plug	-50 ... +200 °C	-	-	-40 ... +100 °C
Continuous operation cable	-	-50 ... +200 °C	-50 ... +80°C	-
Operation, 10,000 h max. cable	-	-	-60 ... +100°C	-

Temperature range sensor cable	CCgx CCgx/90	CCmx CCmx/90	CCgxE
Storage	-50 ... +200 °C	-50 ... +200 °C	-20 ... +85 °C
Continuous operation	-20 ... +80 °C	-100 ... +200 C	-20 ... +85 °C
Operation, 10,000 h max.	-20 ... +100 °C	-	-40 ... +100 °C

- Humidity: 5 - 95 % (non-condensing)
- Ambient pressure: Atmospheric pressure
- The space between sensor surface and target must have an unchanging dielectric constant.
- The area between sensor surface and target must not be soiled (for example water, abrasion, dust, etc.).

2. Installation and Assembly

2.1 Sensor

No sharp or heavy objects should be allowed to affect the cable sheath.

i A damaged cable cannot be repaired. Tension on the cable is not permitted!



NOTICE

During installation, take care that the sensor front face is not scratched.

2.1.1 Radial Point Clamping with Grub Screw, Cylindric Sensors

This simple type of fixture is only recommended for a force and vibration-free installation position. The grub screw must be made of plastic so that it cannot damage or deform the sensor housing.

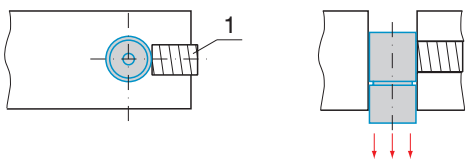


Abb. 1 Radial point clamping with grub screw

NOTICE

Danger of damaging the sensor.

> Do not use metal grub screws!

2.1.2 Circumferential Clamping, Cylindric Sensors

This sensor mounting option offers maximum reliability because the sensor is clamped around its cylindrical housing. It is absolutely necessary in difficult installation environments, for example on machines, production plants et cetera.

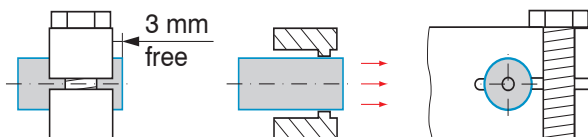
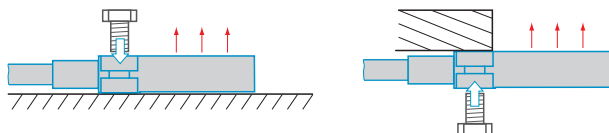


Abb. 2 Circumferential clamping

2.1.3 Flat sensors

Flat sensors are mounted by means of a tap hole for M2 (in case of sensors 0.2 and 0.5 mm) or by a through hole for M2 screws. The sensors can be bolted on top or below.



Screw connection from top Screw connection from Bottom

Abb. 3 Flat sensor screw connection top / bottom

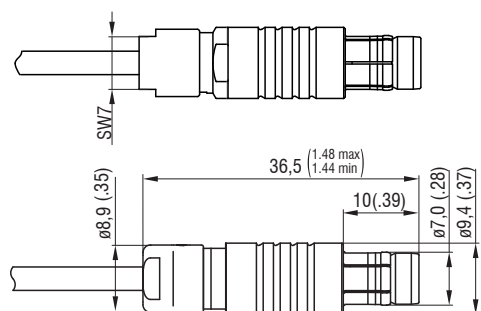
3. Dimensional Drawings Sensors

3.1 Overview of sensors

Model	Measuring range	Min. target diameter / nominal measuring range
CS005	0,05 mm	Ø 3 mm
CS02	0,2 mm	Ø 5 mm
CS08	0,8 mm	Ø 9 mm
CS1HP	1 mm	Ø 9 mm
CS-025	0,2 mm	Ø 5 mm
CS-05	0,5 mm	Ø 7 mm
CS-1	1 mm	Ø 9 mm
CS-2	2 mm	Ø 17 mm
CS-3	3 mm	Ø 27 mm
CS-5	5 mm	Ø 37 mm
CS-10	10 mm	Ø 57 mm
CSE01	0,1 mm	Ø 3 mm
CSE025	0,25 mm	Ø 4 mm
CSE05	0,5 mm	Ø 6 mm
CSE1	1 mm	Ø 8 mm
CSE1,25	1,25 mm	Ø 10 mm
CSE2	2 mm	Ø 14 mm
CSE3	3 mm	Ø 20 mm
CSE05/M8	0,5 mm	Ø 6 mm
CSE1/M12	1 mm	Ø 10 mm
CSE2/M16	2 mm	Ø 14 mm
CSE3/M24	3 mm	Ø 20 mm
CSE-1-HT/CA1,0	1 mm	Ø 8 mm
CSE-2-HT/CA1,0	2 mm	Ø 14 mm
CSE-5-HT/CA1,0	5 mm	Ø 30 mm
CSE-10-HT/CA1,0	10 mm	Ø 50 mm
CSH02-CAm1,4	0,2 mm	Ø 7 mm
CSH05-CAm1,4	0,5 mm	Ø 7 mm
CSH1-CAm1,4	1 mm	Ø 11 mm
CSH1,2 -CAm1,4	1,2 mm	Ø 11 mm
CSH2-CAm1,4	2 mm	Ø 17 mm
CSH02FL-CRm1,4	0,2 mm	Ø 7 mm
CSH05FL-CRm1,4	0,5 mm	Ø 7 mm
CSH1FL-CRm1,4	1 mm	Ø 11 mm
CSH1,2FL-CRm1,4	1,2 mm	Ø 11 mm
CSH2FL-CRm1,4	2 mm	Ø 17 mm
CSH3FL-CRm1,4	3 mm	Ø 24 mm
CSF2 / CSF2-CRg4,0	2 mm	ca. 50 x 13 mm
CSF4 / CSF4-CRg4,0	4 mm	ca. 90 x 17 mm
CSF6 / CSF6-CRg4,0	6 mm	ca. 160 x 24 mm
CSG0,50-CAm2,0	0,5 mm	ca. 7 x 8 mm
CSG1,00-CAm2,0	1 mm	ca. 8 x 9 mm
CSG0,5-CRg2,0	0,5 mm	ca. 10 x 10 mm
CSG1-CRg2,0	1 mm	ca. 12 x 12 mm
CSG-1/90/CRg2,0	1 mm	ca. 10 x 10 mm

3.2 Cylindric sensors

Sensor cable connector M 1:1

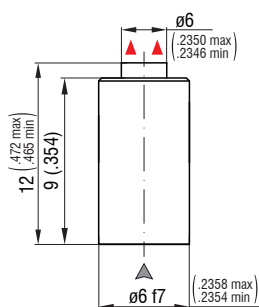


The sensor is connected to the controller by the sensor cable. The connection is made by simple plugging. The connector locks automatically.

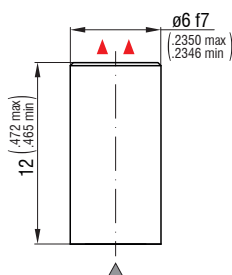
The tight fit can be checked by pulling the connector housing (cable bushing). The lock can be released and the connector can be opened by pulling the knurled housing sleeve of the cable bushing.

3.2.1 CSx

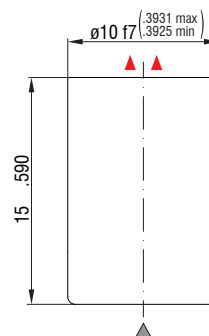
CS005 M 2:1



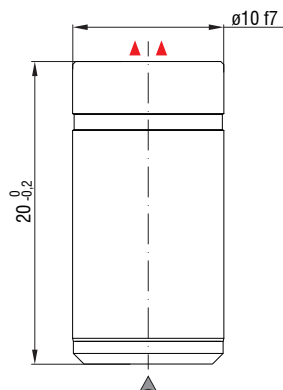
CS02 M 2:1



CS08 M 2:1



CS1HP M 2:1

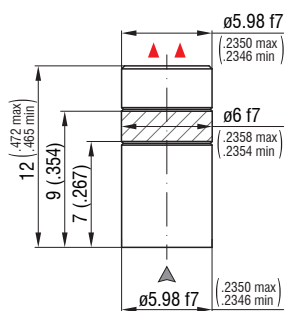


▲ Connector side

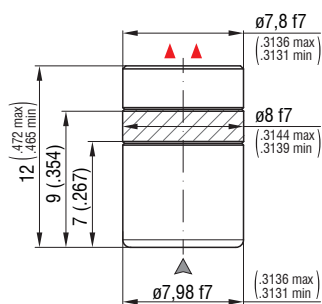
▲▲ Active measuring surface sensor

3.2.2 CS-x

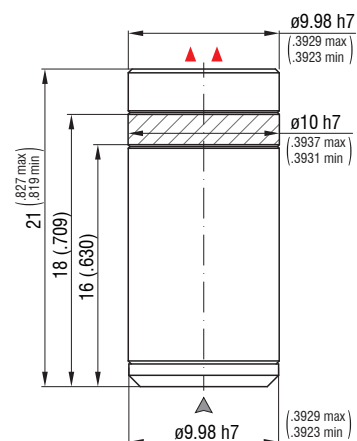
CS-025 M 2:1



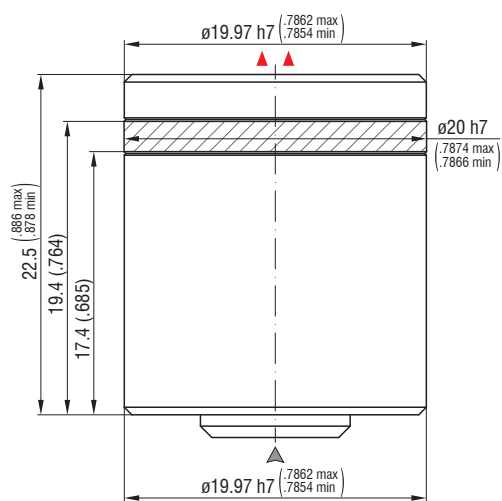
CS-05 M 2:1



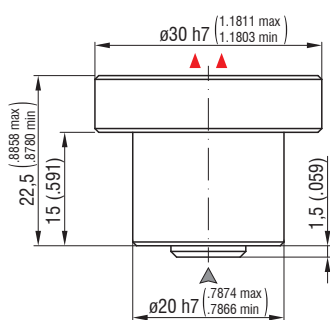
CS-1 M 2:1



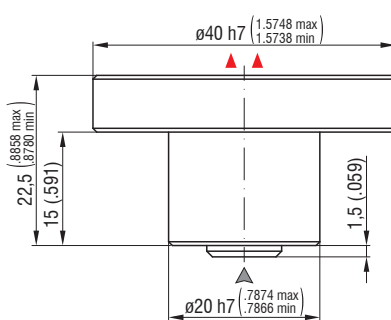
CS-2 M 2:1



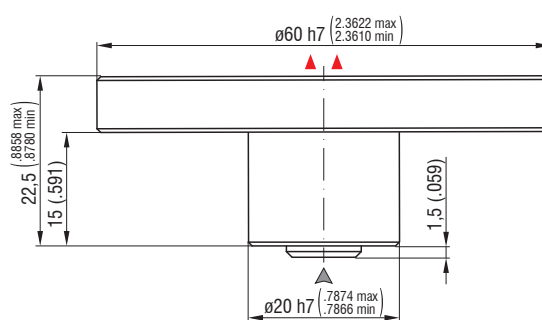
CS-3 M 2:1



CS-5 M 2:1

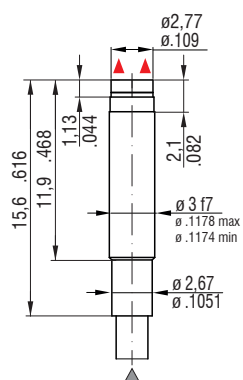


CS-10 M 2:1

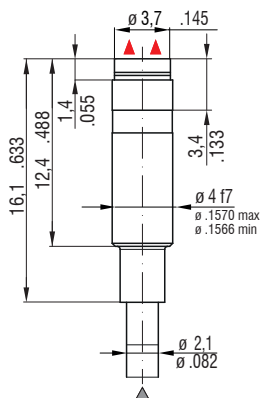


3.2.3 CSEx

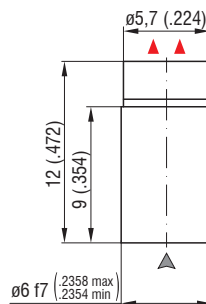
CSE01 M 2:1



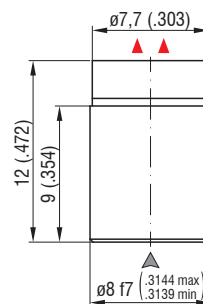
CSE025 M 2:1



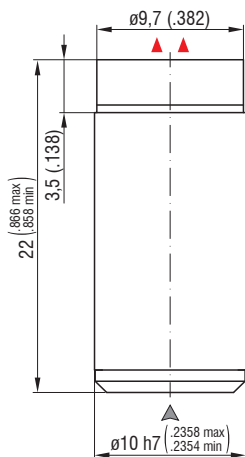
CSE05 M 2:1



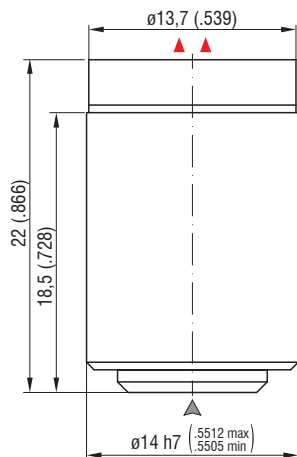
CSE1 M 2:1



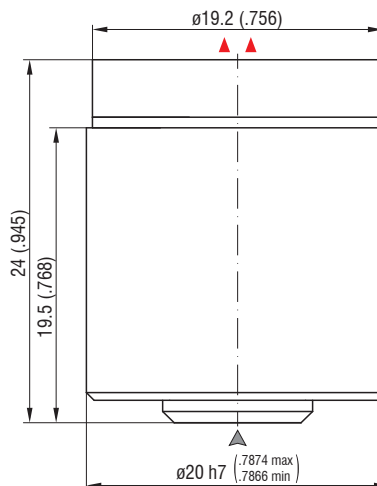
CSE1,25 M 2:1



CSE2 M 2:1

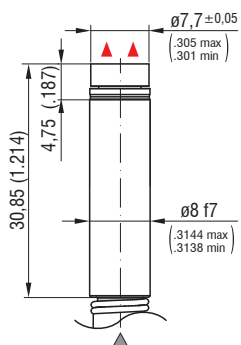


CSE3 M 2:1

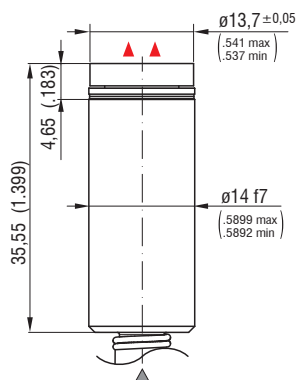


3.2.4 CSEx-HT

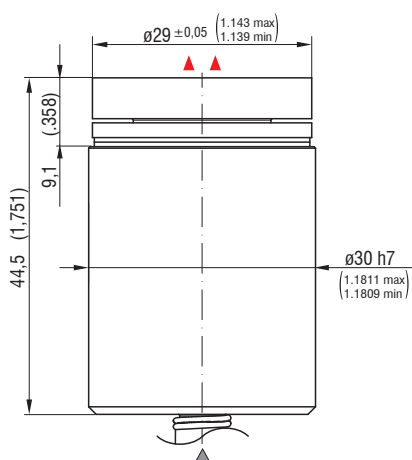
CSE1-HT M 2:1



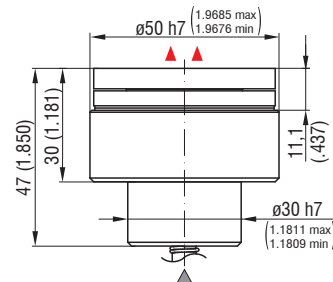
CSE2-HT M 2:1



CSE5-HT M 2:1

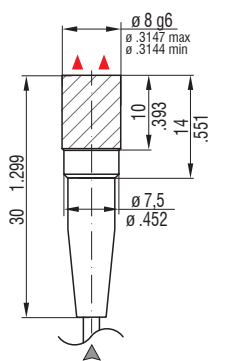


CSE10-HT M 1:1

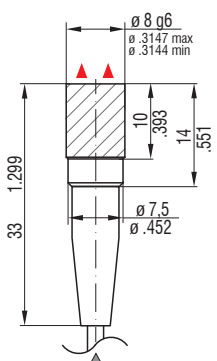


3.2.5 CSHx

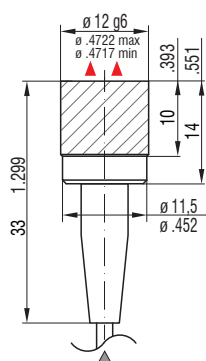
CSH02 M 1:1



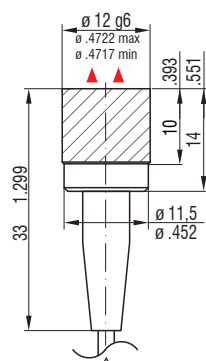
CSH05 M 1:1



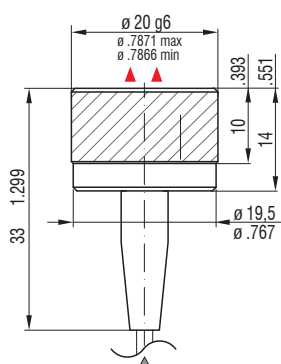
CSH1 M 1:1



CSH1,2 M 1:1



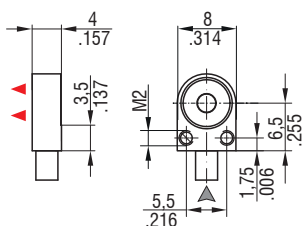
CSH2 M 1:1



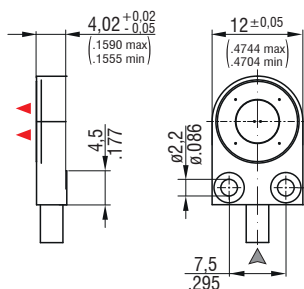
3.3 Flat sensor

3.3.1 CSHxFL

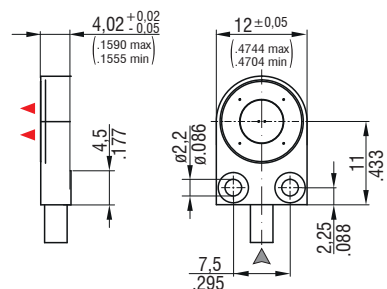
CSH02FL M 1:1



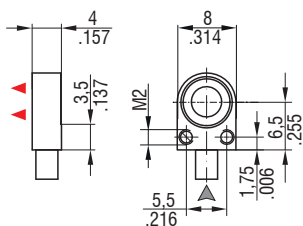
CSH1FL M 1:1



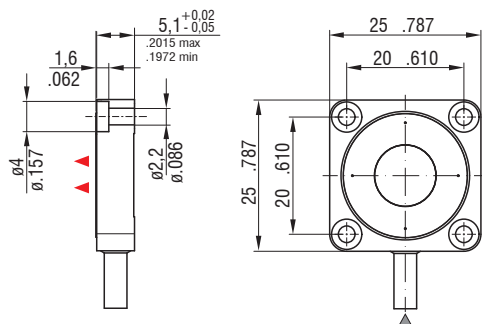
CSH1,2FL M 1:1



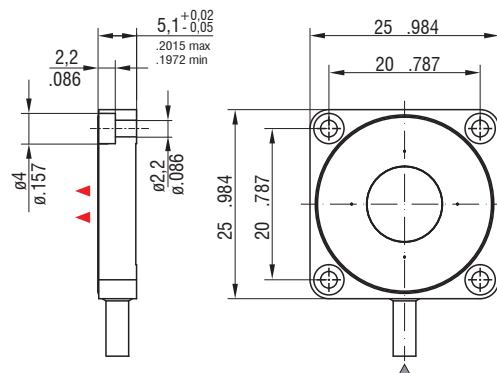
CSH05FL M 1:1



CSH2FL M 1:1



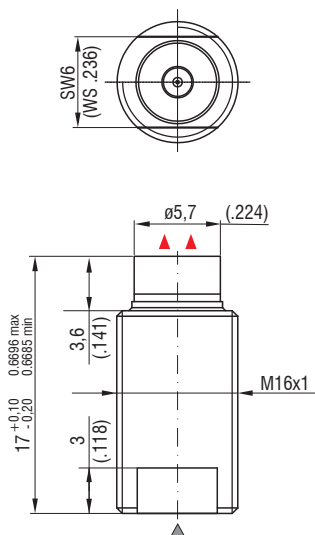
CSH3FL M 1:1



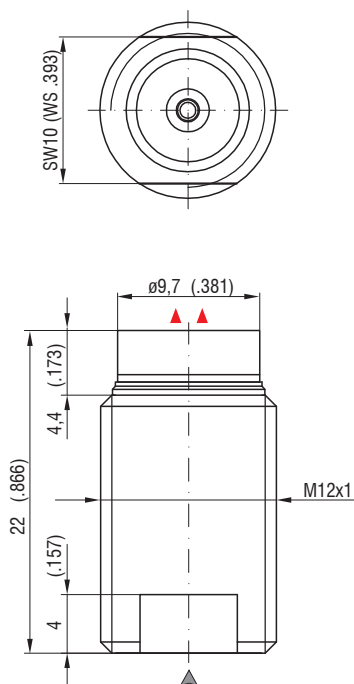
3.4 Cylindrical sensors with thread

3.4.1 CSEx - Mx

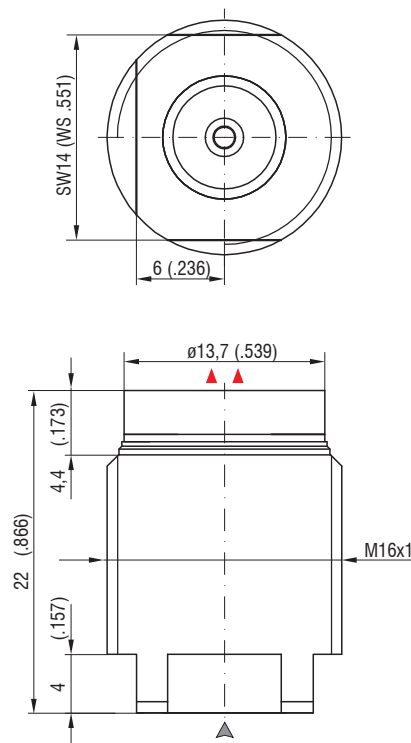
CSE05 - M8 M 2:1



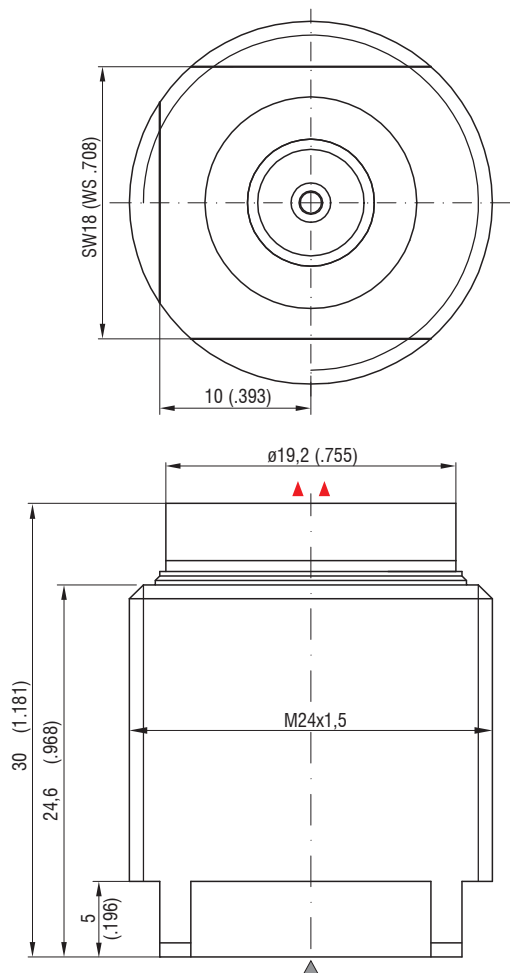
CSE1,25 - M12 M 2:1



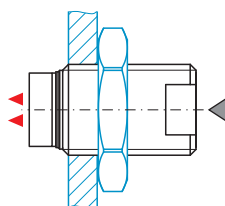
CSE2 - M16 M 2:1



CSE3 - M24 M 2:1



Sensor	Torque
CSE05/M8	2,5 Nm max.
CSE1,5/M12	10 Nm max.
CSE2/M16	20 Nm max.
CSE3/M24	70 Nm max.



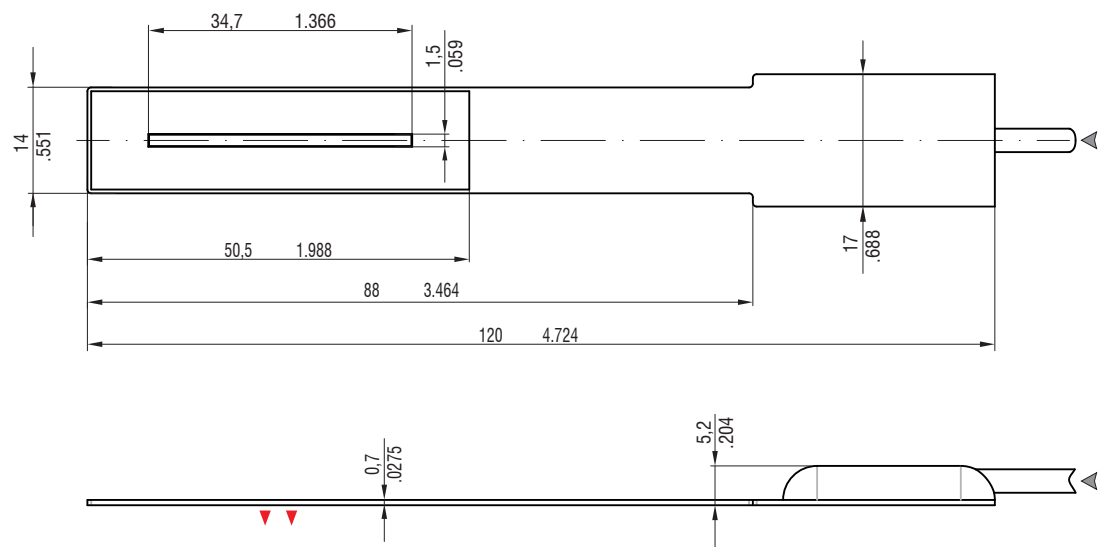
Preferred mounting:

- ➡ Screw the sensor into the sensor holder.
- ➡ Turn the mounting nut on. Do not exceed torques.

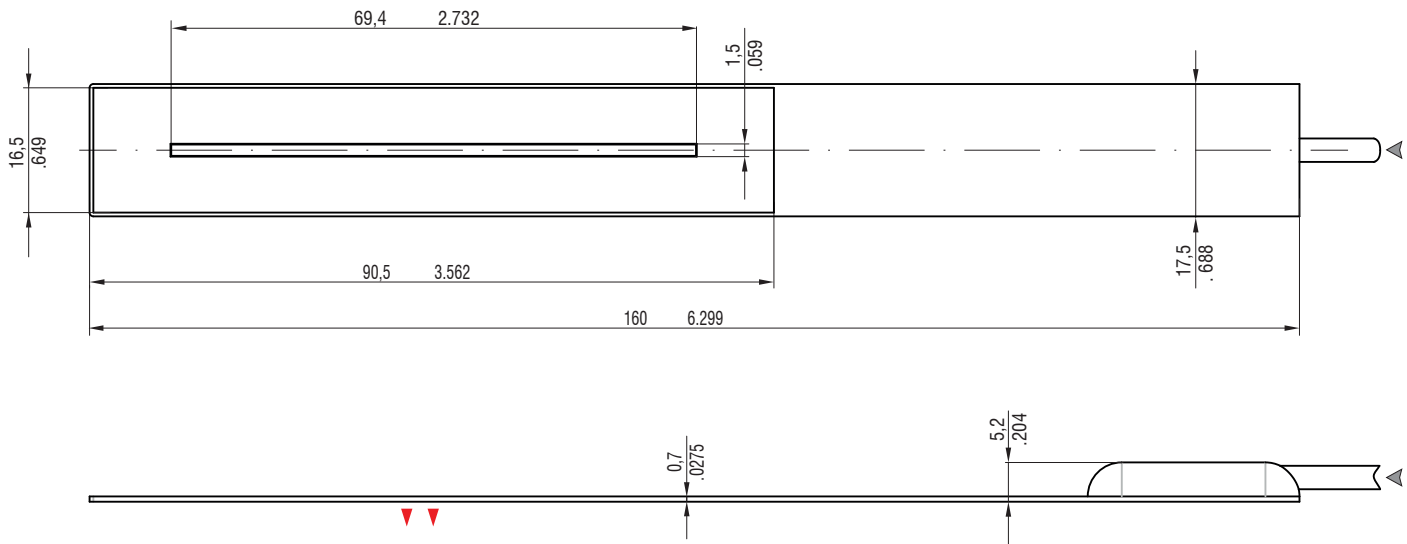
3.5 Flat sensors with integrated sensor cable

3.5.1 CSFx-Crg

CSF2-CRg4,0 M 1:1

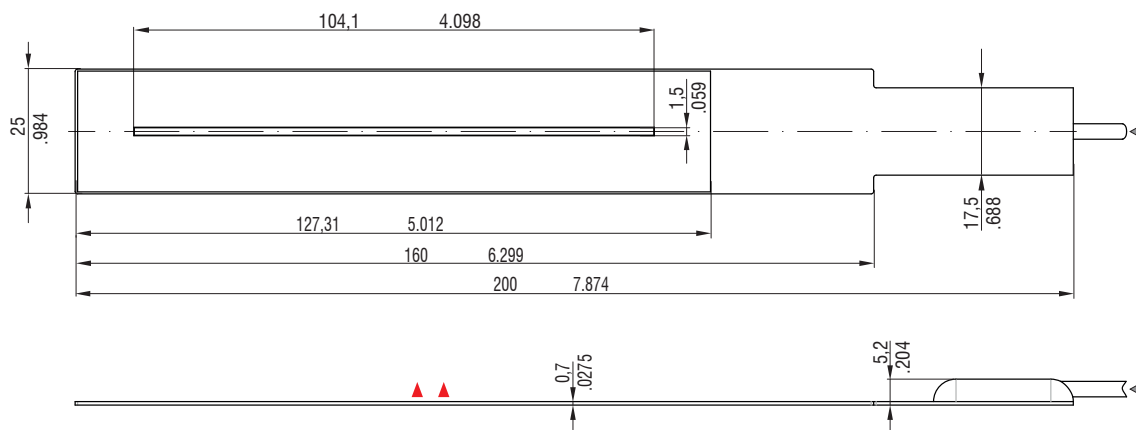


CSF4-CRg4,0 M 1:1



CSF6-CRg4,0

M 1:1,5

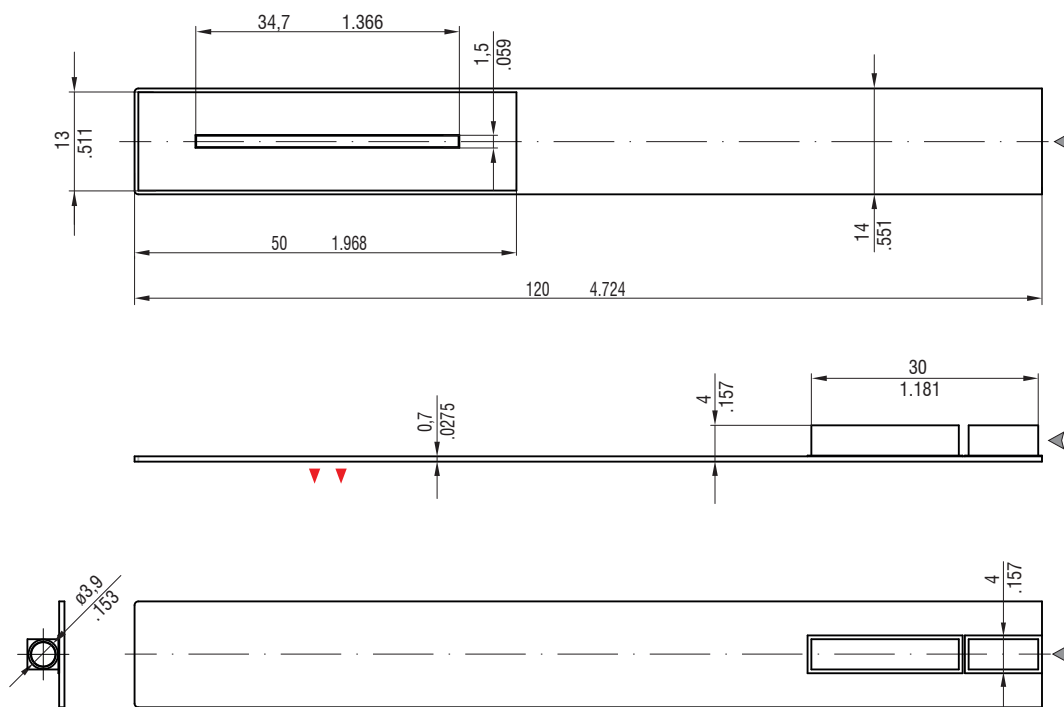


3.6 Flat sensors without integrated sensor cable

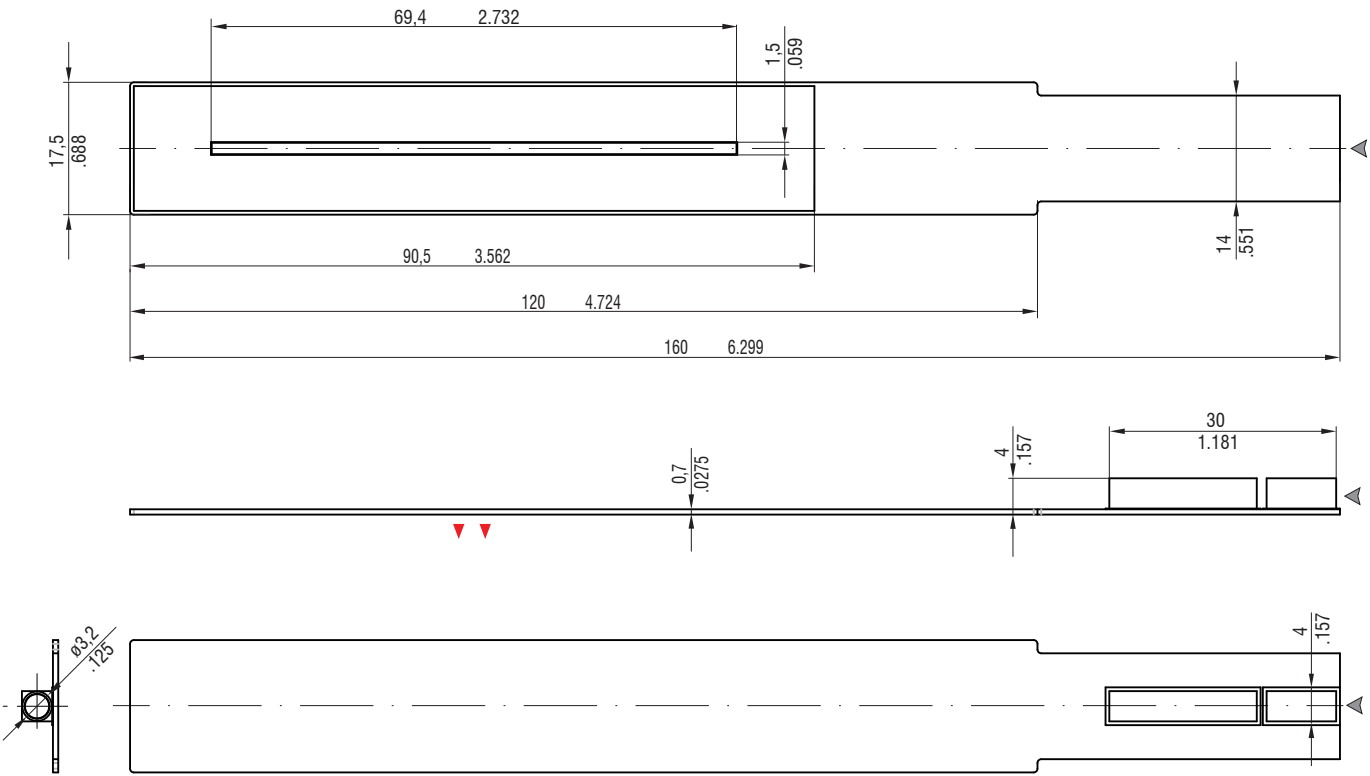
3.6.1 CSFx

CSF2

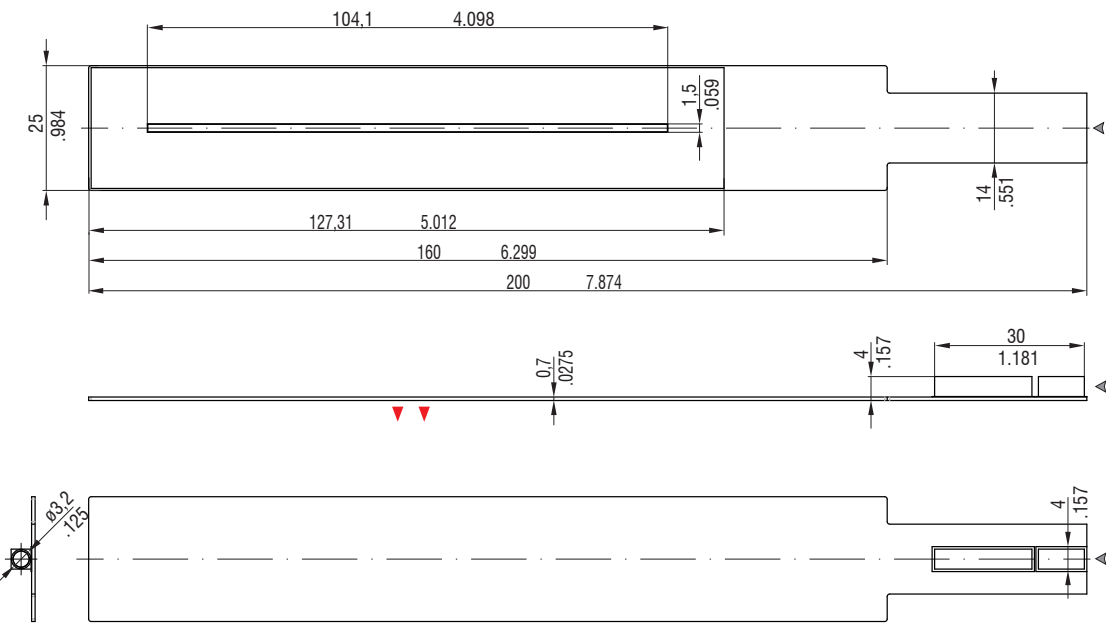
M 1:1



CSF4 M 1:1



CSF6 M 1:1,5



▲ Connector side

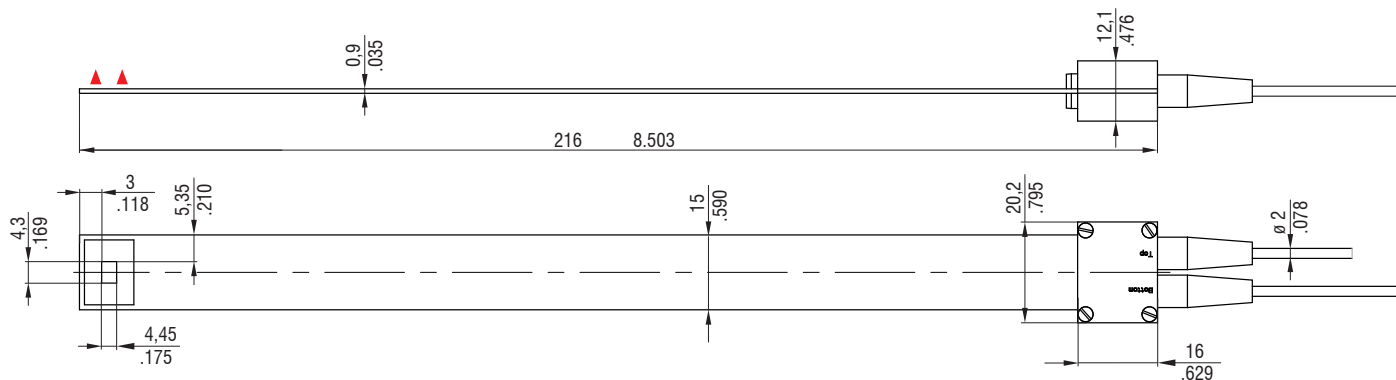
▲▲ Active measuring surface sensor

3.7 Capacitive gap sensors

3.7.1 CSGx

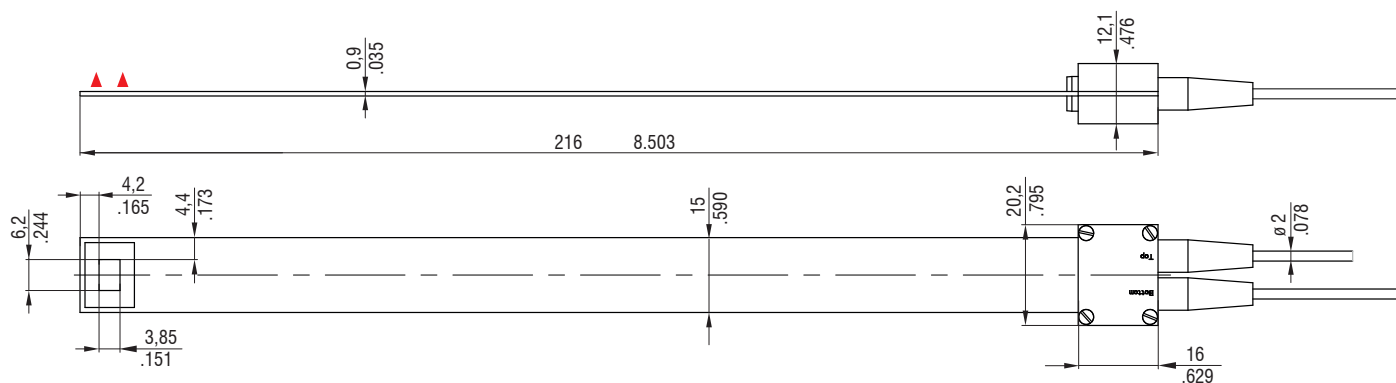
CSG0,50-CAm2,0

M 1:1,5



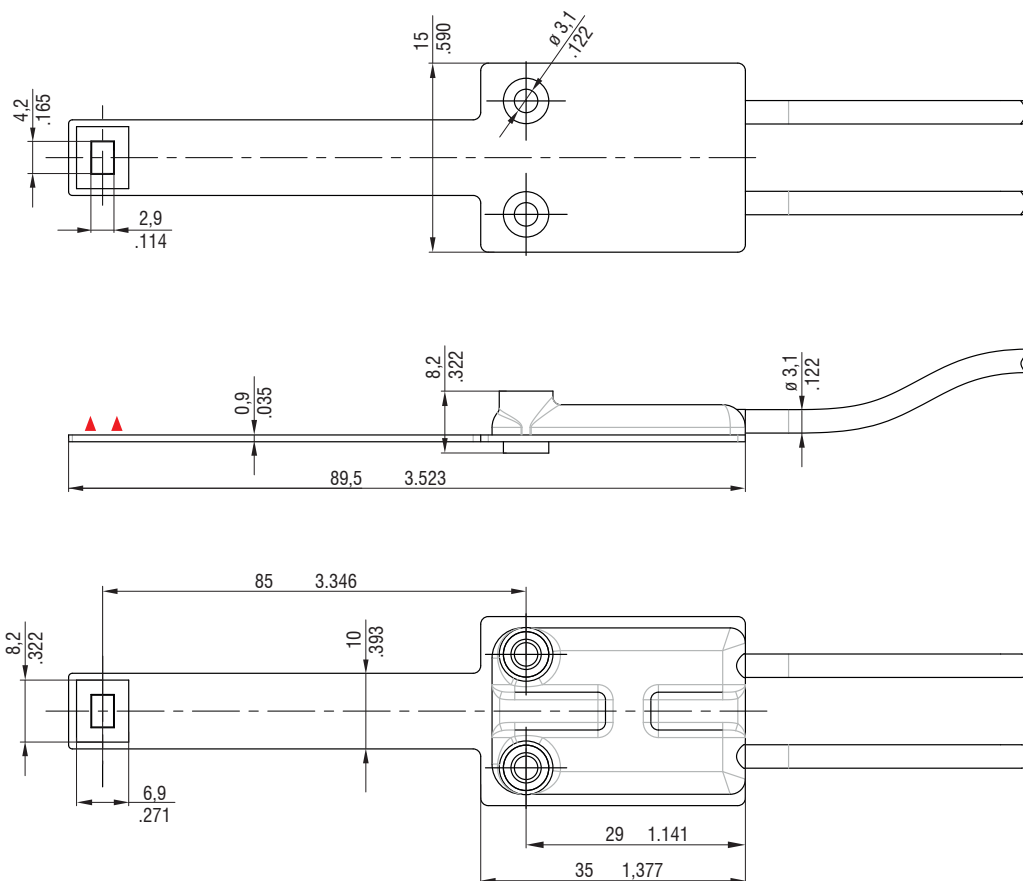
CSG1,00-CAm2,0

M 1:1,5



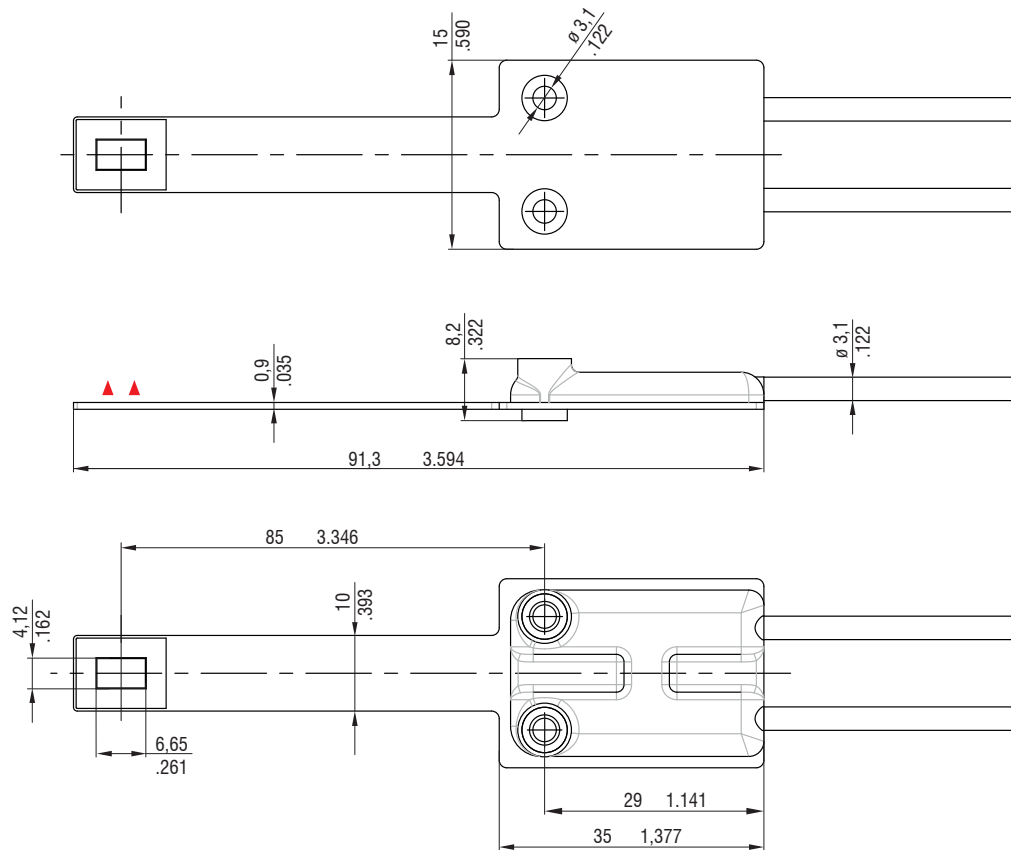
CSG0,5-CRg2,0

M 1:1



CSG1-CRg2,0

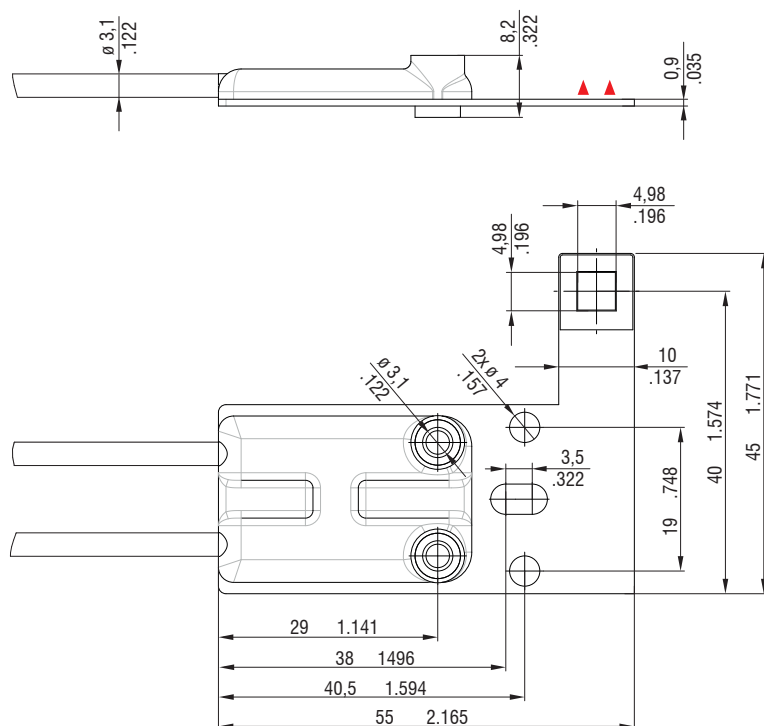
M 1:1



i To ensure a consistently accurate measured value, the “blow-off and stabilization device” is available as an optional accessory for the capacitive gap sensors CSG0.5-CRg2.0/KB and CSG1-CRg4.0B/ET.

CSG-1/90/CRg2,0

M 1:1



3.8 Sensor cable

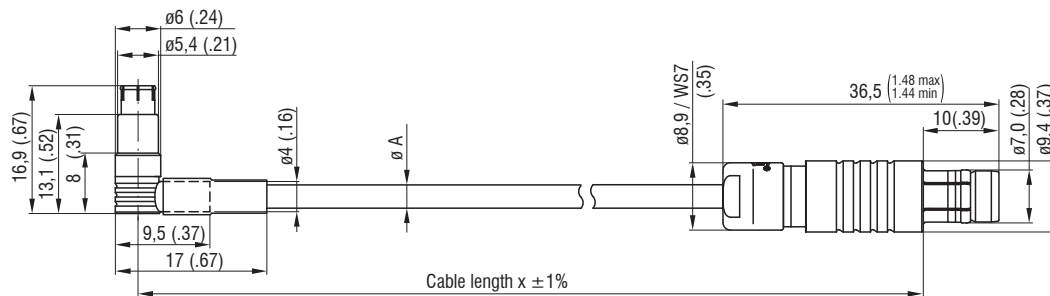
The sensor and controller are connected with a special, double-shielded sensor cable.
A damaged cable cannot be repaired.

NOTICE

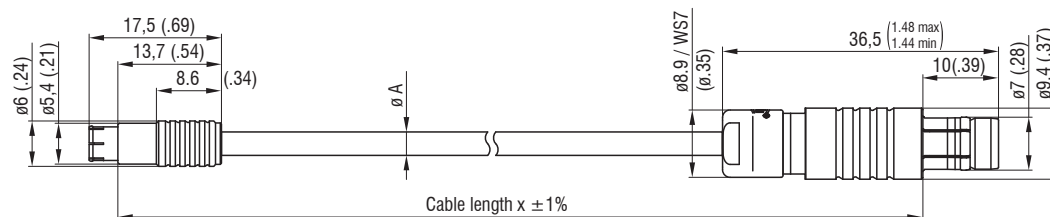
- Switch off the device when plugging or unplugging connectors.
- Do not crush the cable.
- Do not shorten or modify the sensor cable.
- Loss of functionality!

3.8.1 Cable with type C plug

CCGxC/90 M 1:1

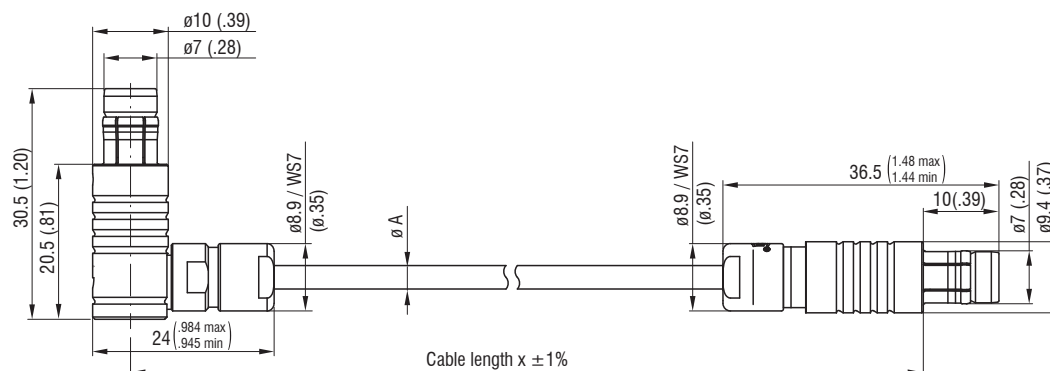


CCGxC M 1:1

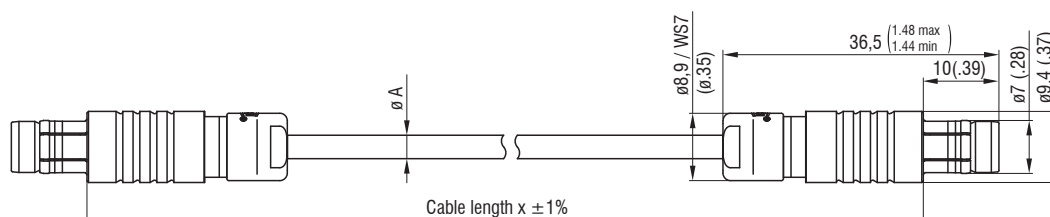


3.8.2 Cable with type B plug

CCGxB/90 M 1:1



CCGxB M 1:1



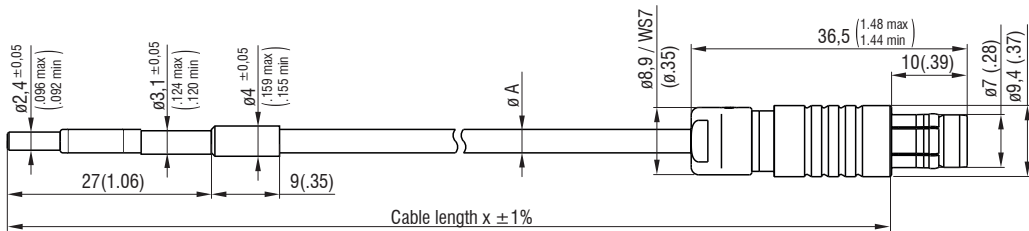
Model	Cable lenght	Cable -ø A	2 axial connector	1x axial + 1x 90 °	For sensors	Min. bending radius	
CCgxC/90	2/4 or 6 m	3,1 mm		•	0,05 - 0,8 mm	10 mm (permanently)	22 mm (flexible)
CCgxC	2/4 or 6 m	3,1 mm	•		0,05 - 0,8 mm		
CCgxB/90	2/4 or 6 m	3,1 mm		•	1 ... 10 mm		
CCgxB	2/4 or 6 m	3,1 mm	•		1 ... 10 mm		
CCmxC/90	1,4/2,8 or 4,2 m	2,1 mm		•	0,05 - 0,8 mm	7 mm (permanently)	15 mm (flexible)
CCmxC	1,4/2,8 or 4,2 m	2,1 mm	•		0,05 - 0,8 mm		
CCmxB/90	1,4/2,8 or 4,2 m	2,1 mm		•	1 ... 10 mm		
CCmxB	1,4/2,8 or 4,2 m	2,1 mm	•		1 ... 10 mm		

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- The sensor cable type B can be connected to both a sensor and a controller at both ends
 - The CSH type sensors have an integrated 1.4 m long sensor cable. Cable lengths of 2.8 m are also available if required. Other cable lengths are also available on request.
 - The CSE1 sensor model (measuring range 1 mm) has a type C connector.

3.8.3 Cable with type E plug

CCgxE M 1:1



Model	Cable lenght	Cable-ø A	2 Stecker axial	1x axial + 1x 90 °	For sensors	Min. bending radius	
CCgE	4 m	3,1 mm	•		CSF2 CSF4 CSF6	10 mm (permanently)	22 mm (flexible)

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The patented miniature connector type E is only suitable for the flat sensors CS2, CS4 and CS6!

4. Operation and Maintenance

Please take care of the following:

- Make sure that the sensor surface is always clean.
 - Switch off the power supply before cleaning.
 - Clean with a damp cloth; then rub the sensor surface dry.

Changing the target or very long operating times can lead to slight reductions in the operating quality (long term errors). These can be eliminated by recalibration.

CAUTION

- Static discharge, danger of injury.

 - Disconnect the power supply before touching the sensor surface.

5. Service, Repair

If the sensor or sensor cable is defective:

- If possible, save the current sensor settings in a parameter set to reload them into the sensor after the repair.
- Please send us the affected parts for repair or exchange.

If the cause of a fault cannot be clearly identified, please send the entire measuring system to:

MICRO-EPSILON MESSTECHNIK

GmbH & Co. KG

Koenigbacher Str. 15

94496 Ortenburg / Deutschland

Tel: +49 (0) 8542 / 168-0

Fax: +49 (0) 8542 / 168-90

info@micro-epsilon.com

<https://www.micro-epsilon.com>

6. Decommissioning, Disposal

In order to avoid the release of environmentally harmful substances and to ensure the reuse of valuable raw materials, we draw your attention to the following regulations and obligations:

- Remove all cables from the sensor and/or controller.
- Dispose of the sensor and/or the controller, its components and accessories, as well as the packaging materials in compliance with the applicable country-specific waste treatment and disposal regulations of the region of use.
- You are obliged to comply with all relevant national laws and regulations.

For Germany / the EU, the following (disposal) instructions apply in particular:

- Waste equipment marked with a crossed garbage can must not be disposed of with normal industrial waste (e.g. residual waste can or the yellow recycling bin) and must be disposed of separately. This avoids hazards to the environment due to incorrect disposal and ensures proper recycling of the old appliances.
- A list of national laws and contacts in the EU member states can be found at https://ec.europa.eu/environment/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee_en. Here you can inform yourself about the respective national collection and return points.
- Old devices can also be returned for disposal to Micro-Epsilon at the address given in the legal details at <https://www.micro-epsilon.com/legal-details/>.
- We would like to point out that you are responsible for deleting the measurement-specific and personal data on the old devices to be disposed of.
- Under the registration number WEEE-Reg.-Nr. DE28605721, we are registered at the foundation Elektro-Altgeräte Register, Nordostpark 72, 90411 Nuremberg, as a manufacturer of electrical and/or electronic equipment.





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