



Installation Instructions

C-Series

Compact force sensor with flexible
installation options

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Click here to get more info about the C-series

<https://www.fms-technology.com/en/productfinder/detail/force-sensor/C>

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Bitte kontaktieren Sie Ihre nächstgelegene FMS Vertretung.**

1 Table of contents

1	TABLE OF CONTENTS	2
2	SAFETY INSTRUCTIONS.....	3
2.1	Presentation of safety information	3
2.1.1	Danger that could result in minor or moderate injuries.....	3
2.1.2	Note regarding proper function	3
2.2	General safety information	3
3	PRODUCT INFORMATION.....	4
3.1	Product description	4
3.2	Functional description	4
3.3	Scope of delivery.....	4
3.4	Order code	5
4	INSTALLATION.....	6
4.1	Installation options	6
4.1.1	PH Pilot mount.....	7
4.1.2	Flat mount.....	7
4.1.3	Installation bracket CA20X.MB (accessory)	8
4.2	Bearings	8
4.3	Electrical connections	9
5	TECHNICAL DATA	11
5.1	Dimensions C203.....	12
5.2	Dimensions C205 and C2Z5	13

2 Safety instructions

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to the equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not stress the equipment over the specification limits neither during assembly nor operation. To do so can be potentially harmful to persons or equipment in the event of a fault to the equipment.

2.1 Presentation of safety information

The following safety symbols appear in this manual.

2.1.1 Danger that could result in minor or moderate injuries



Danger, warning, caution

Failure to follow wiring instructions in this manual may result in equipment damage or personal injury.

2.1.2 Note regarding proper function



Note

Note regarding proper operation

Simplification of operation

Ensuring function

2.2 General safety information



The force sensors may not be stressed over the specification limits neither during assembly nor operation. The unit's overload protection value may not be exceeded.



The attachment points for the force sensor on the machine frame must be properly designed. The bearings need to be appropriately mounted.



For proper installation and operation, follow the electrical wiring diagram and instructions in this manual.

3 Product information

3.1 Product description

The C-Series force measuring sensor offers compact dimensions and flexible installation options, and is designed for the measurement of tension on continuous material processing lines where live shaft idler rolls are utilized. The product can be supplied with a Pilot or without a Pilot at the back the unit. In addition, flexible mounting options include the ability to install the unit utilizing either four fasteners from the front or a single fastener from the rear. The included dowel pin can also be incorporated between force measuring bearing and the machine frame to ensure proper unit orientation. For installations where a Pillow Block mount is required the optional bracket can be utilized.

3.2 Functional description

The C-Series force measuring sensor combines the bearing seat and the force sensor within the same housing, thus minimizing the required installation space. The substantial overload protection translates to eliminated / minimized calibration issues due to machine upset conditions. The design includes dual bending beams, and this serves to eliminate the load specific influence of torque. The movement of the bending beams, which is proportional to the applied force, is detected by strain gauges arranged in a full bridge circuit and then converted into an electrical signal. This simple measurement principle delivers precise results even with low material tension and small web wrap angles. The Red Point, as located on the sensor body, should be aligned with the direction of the resultant force due to web tension.

3.3 Scope of delivery

Included in scope of delivery

Force sensor, straight connector (female), clip ring,
installation option PH: 4 pcs. DIN912 M6 x 40,
installation option FL: dowel pin

Options

- H14 right-angle connector in scope of supply, replaces straight connector
- H16 temperature range up to 120 °C (248 °F)
- H21 electrical connection with PG gland with 5 m (16 ft.) cable, replaces connector
- H31 for vacuum applications to 1E-7 hPa , 1E-5 Torr, temperature range up to 120 °C (248 °F)
- H32 vacuum to 1E-7 hPa , 1E-5 Torr, up to 150 °C (302 °F), with pg-gland and 5 m (16 ft.) cable
- H33 temperature range up to 150 °C (302 °F), with pg-gland and 5 m (16 ft.) cable
- PH Flange mount with 4 screws, pilot hole for centering
- FL Flat face of force sensor, without shoulder, single screw mount, with dowel pin

Accessories

Bearing, installation bracket, prefabricated cable (specify length) with connector (straight or right-angle)

3.4 Order code

C-Series : Order code					
C	203	.1000	.17	.PH	.H14.H16
					Optionen
					Installation option PH with pilot hole for centering
					Shaft diameter in mm
					Nominal force rating in N
					Size
					Series

Figure 1: order code

4 Installation

Force sensors are defined as “partly completed machinery” according to the Directives 2006/42/EC, article 2. In order to assure a proper functionality of the parts and assure the essential safety requirements of operators working with it, the following conditions for the assembly must be met:



The force sensor may not be stressed over the specification limits neither during assembly nor operation. The unit's overload protection value may not be exceeded.



The mounting points for the force sensor on the machine frame must be properly designed. The bearings need to be appropriately mounted.



For proper installation and operation, follow the electrical wiring diagram and instructions in this manual.

4.1 Installation options

The force sensors of the C-series can be installed in two different ways.



Screw down on contact surface

The force sensor should only be bolted down where it has contact to the machine frame.

PH - Flansch mit Zentrierschulter
PH - Flange with pilot hole for centering

FL - Flach mit Zentrierstift
FL - Flat with dowel pin

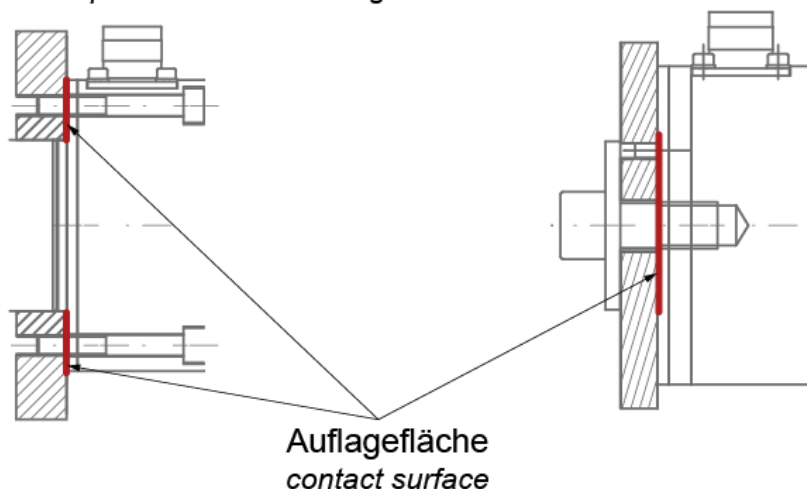
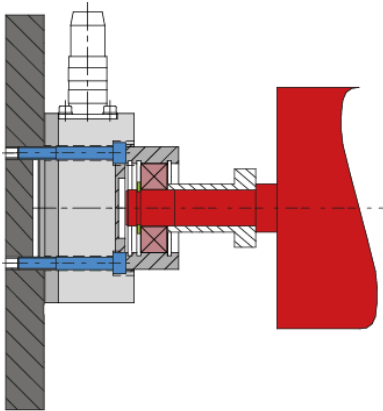


Figure 2: contact surface

4.1.1 PH Pilot mount



PH - Flange with pilot hole for centering

Figure 3: Pilot mount

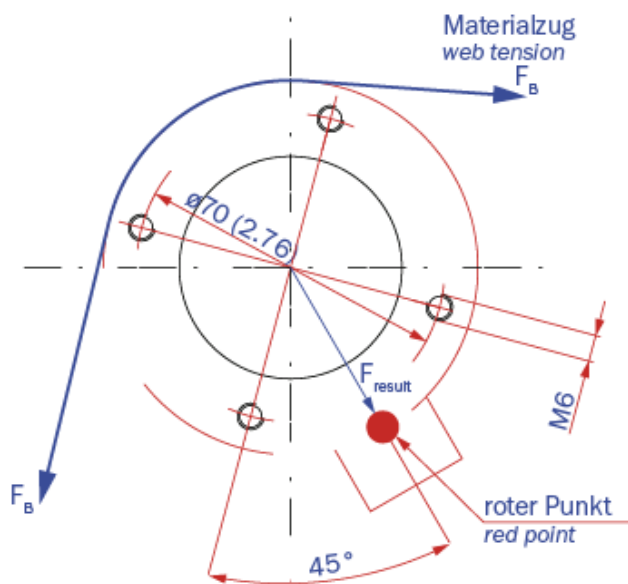
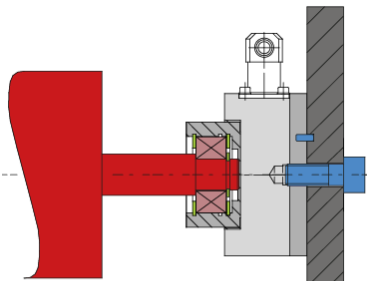


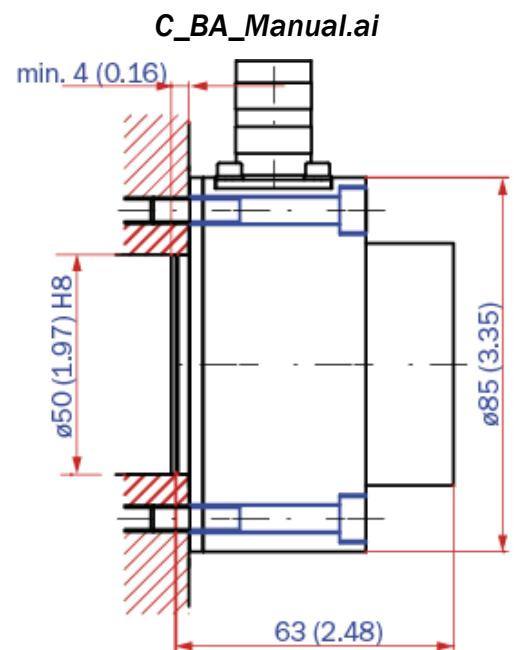
Figure 4: dimension machine frame for PH mount

4.1.2 Flat mount



FL - Flat with dowel pin

Figure 5: Flat mount



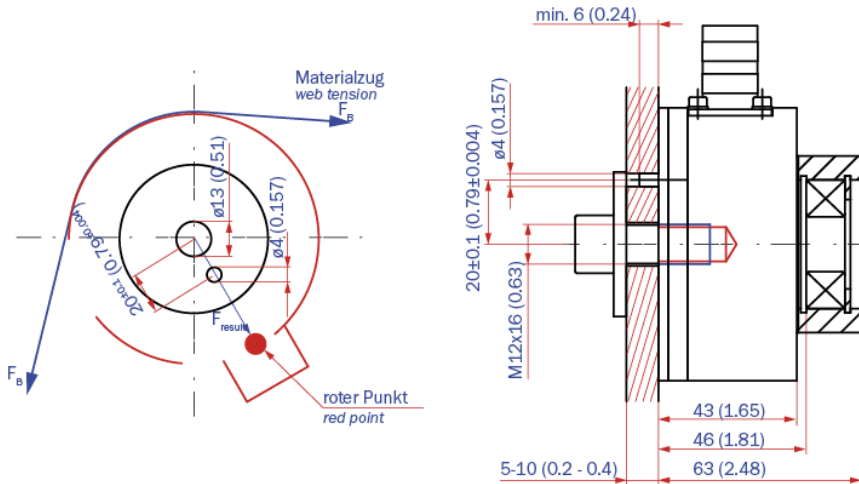


Figure 6: dimension machine frame for FL mount

4.1.3 Installation bracket CA20X.MB (accessory)

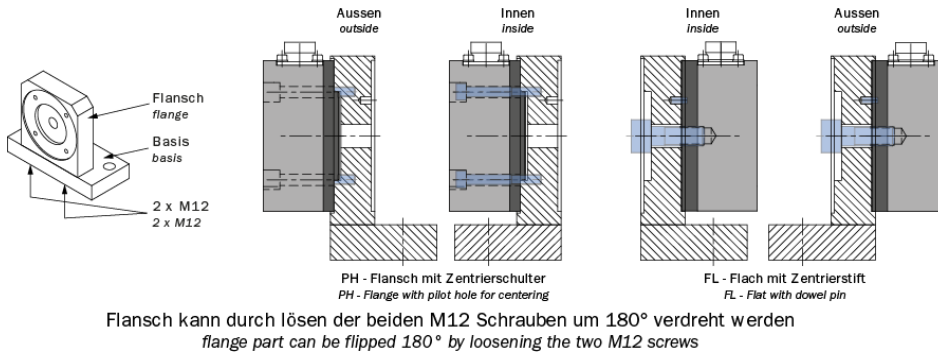


Figure 7: installation bracket CA20X.MB

4.2 Bearings

Recommendd bearings	
Size	Type
C203	1203, 2203
C205	1205, 2205
C2Z5	NLJ1

Self-aligning bearings

We recommend to use self-aligning bearings



If the installation bores on both sides of the machine's frames are not aligned properly, this will cause a preload of the roller and bearings. In this case the measuring result of the force sensors will be faulty.

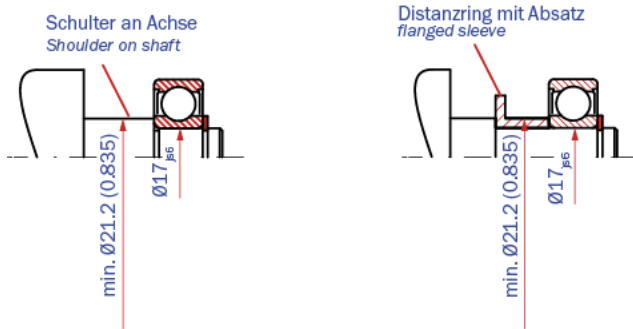


Figure 8: shaft installation

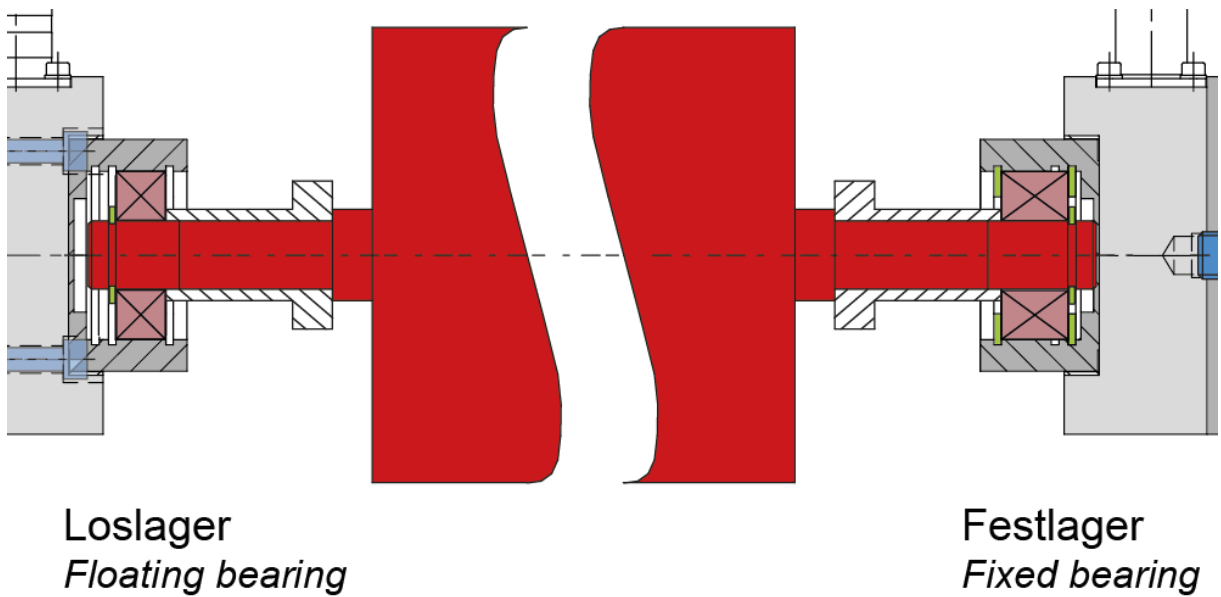


Figure 9: Fixed and floating bearing installation, illustrated with different types of bearings

4.3 Electrical connections

Connection between the Force Measuring Rollers and machine controller is realized by means of a 5-pole cable with a cross-section of 0.25mm². The cable must be installed separate from power lines.

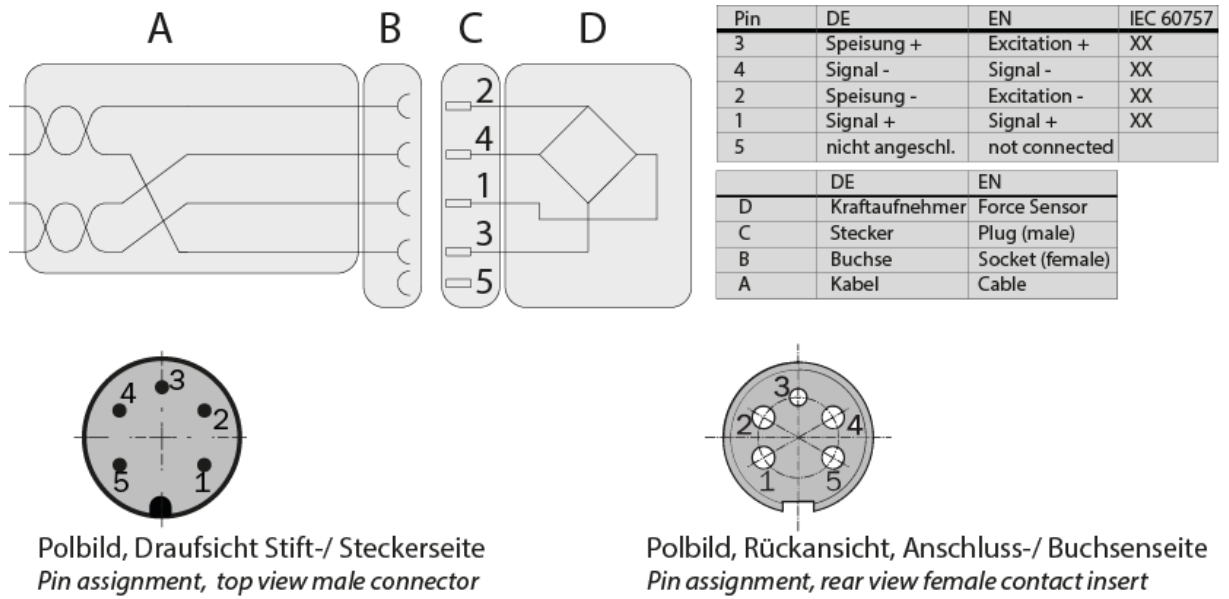


Figure 10: pin assignment M12

5 Technical data

Technical data	
Sensitivity	1.8 mV/V
Tolerance of sensitivity	<± 0.5 %
Accuracy class	±0.5% of nominal force rating
Temperature coefficient	±0.1%/10K
Temperature range	-10 to +60°C
Input resistance	350Ω
Excitation voltage	1 to 10 VDC
Overload protection	10 times nominal force
Material	Stainless steel
Protection class	IP42
Electrical connection	Male receptacle, flange mounting, M14x1, 5-pole
Measuring range	30:1

Table 1: technical data

5.1 Dimensions C203

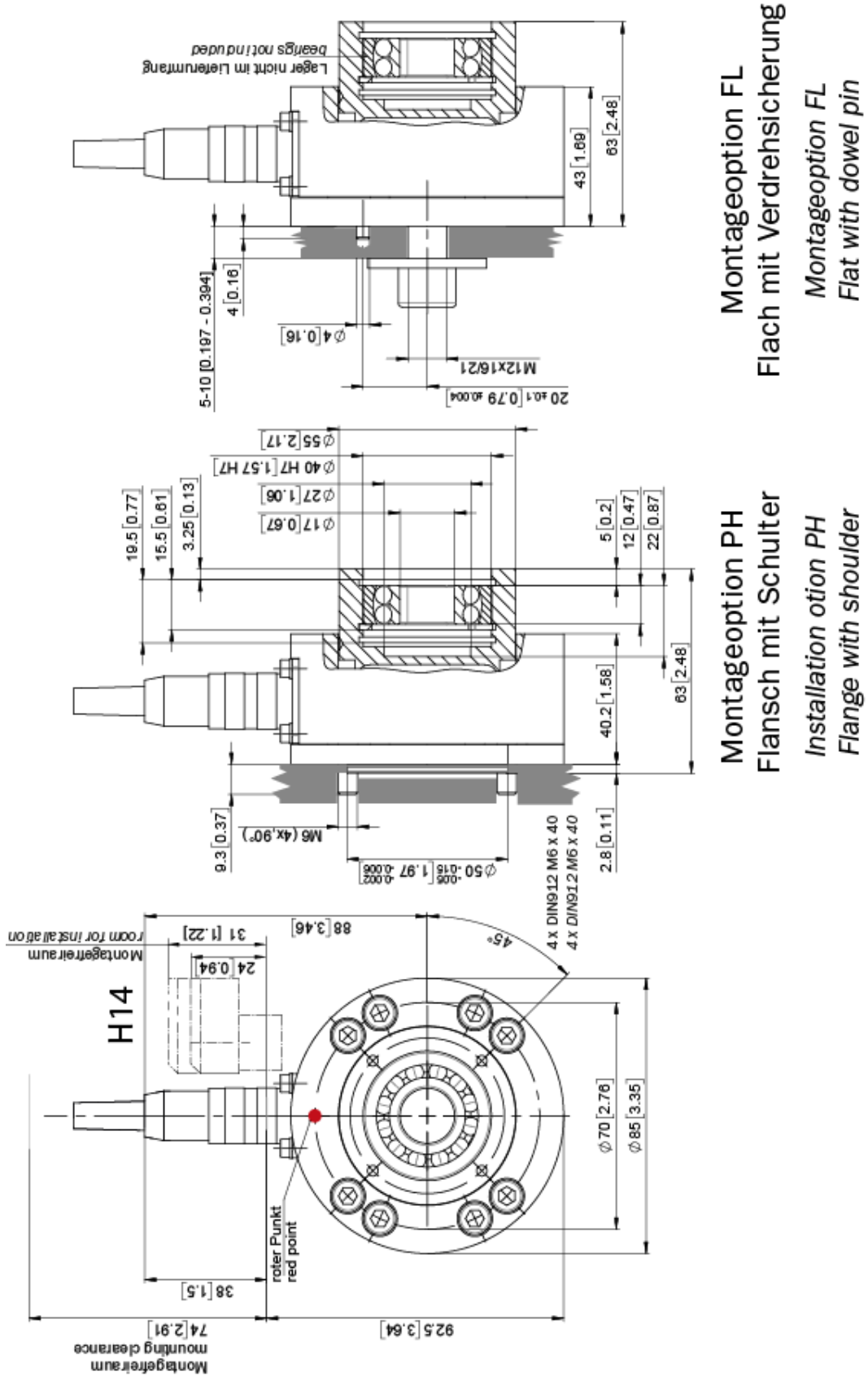


Figure 11: Dimensions C203

5.2 Dimensions C205 and C2Z5

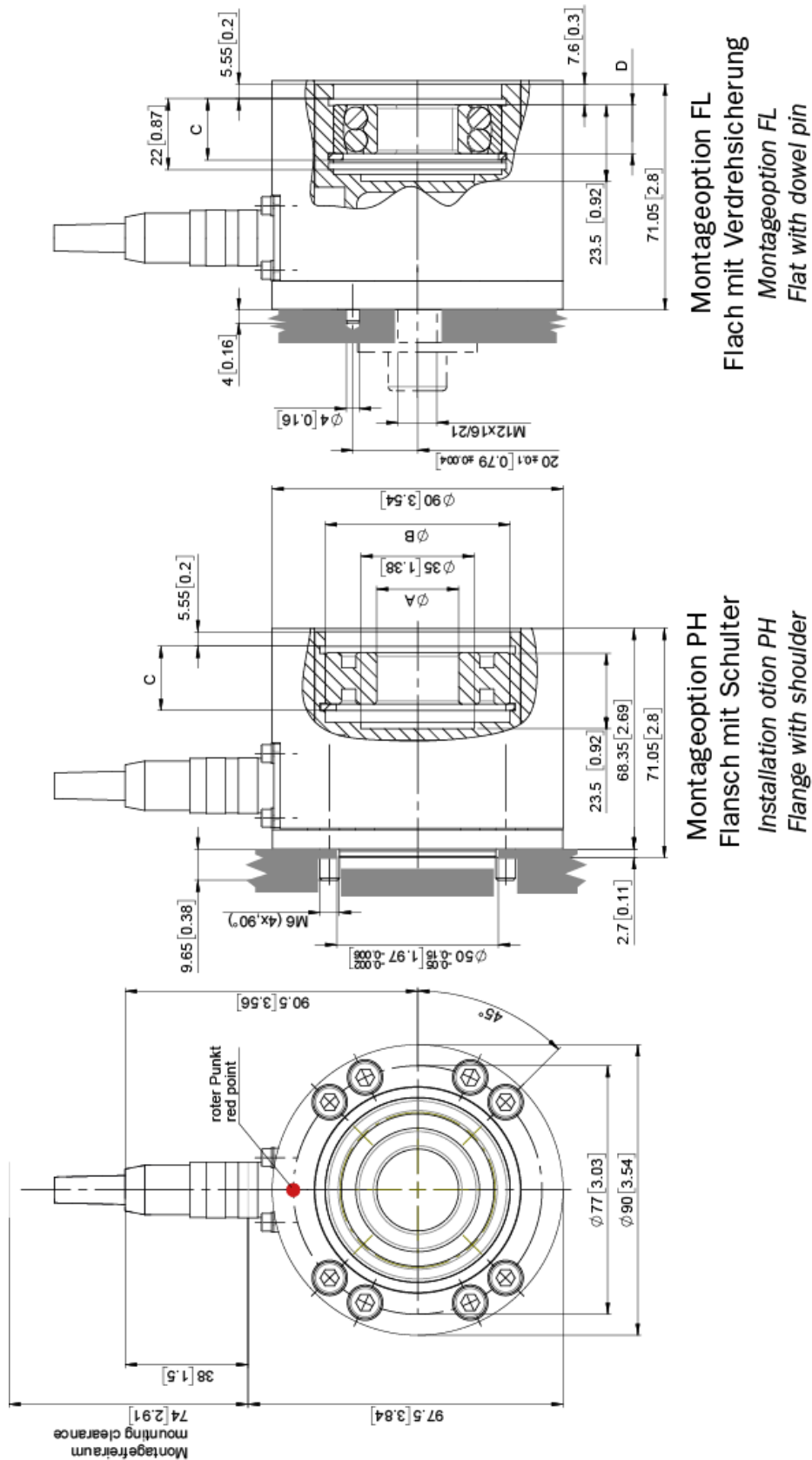


Figure 12: Dimensions C205 and C2Z5

C-Series : C205 and C2Z5 dimensions								
Size	A mm (in.)		B mm (in.)		C mm (in.)		D mm (in.)	
C205	25	(0.98)	52	(2.05)	19	(0.75)	15	(0.590)
C2Z5	25.4	(1.00)	57.15	(2.25)	19.88	(0.78)	15.88	(0.625)

Figure 13: Dimensions C205 and C2Z5



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