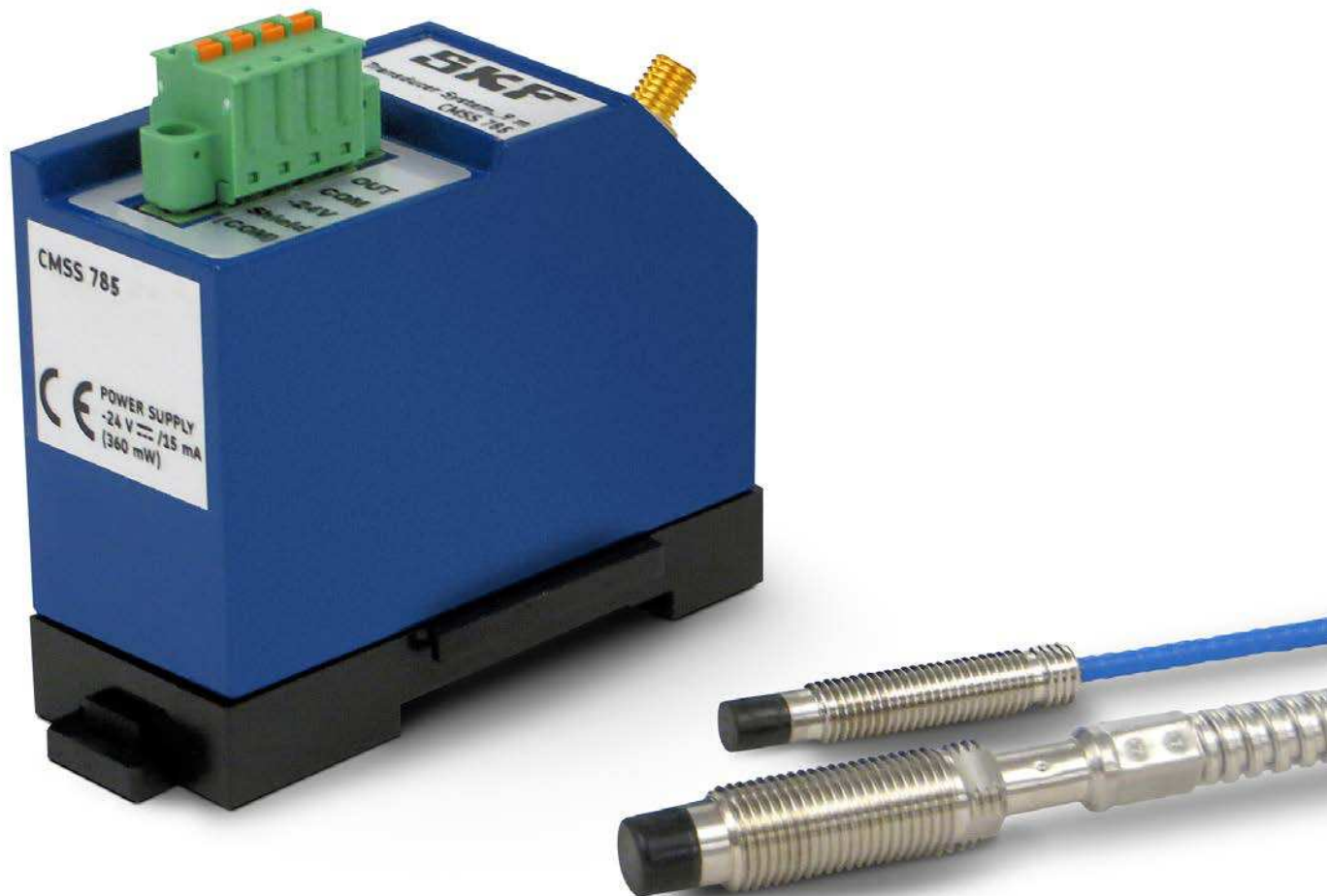


Eddy Current Probe System

API-670 Proximity transducer system, 5 mm and 8 mm



Eddy Current Probe System

The CMSS 785 system is an eddy current type non-contact displacement/vibration system, used for measuring Shaft Vibration, Axial Position, Rotating Speed and Phase from small rotating machinery to large critical machinery in Hazardous and non-Hazardous environments.

The CMSS 785 can be used in conjunction with the SKF On-line systems (IMx) in the following, typical industries:

- Petroleum refineries
- Petrochemical plants
- Power generation plants

Common applications for machinery protection include Turbines and Compressors.

Features

- Suitable for various applications: shaft vibration, axial position, rotating speed and phase mark of critical rotating machinery
- Environmentally friendly design: lead-free soldering, RoHS compliance and small footprint
- Flexible mounting options: DIN-rail adaptor or 8-screw plate adaptor
- API standard 670 (5th Edition) compliant
- Intrinsically safe (CSA & ATEX)
- CE compliant

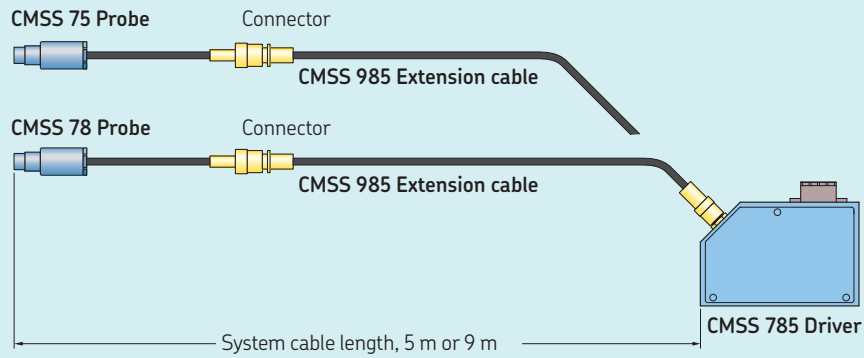
The eddy probe is used to measure radial or axial shaft motion. It is mounted through or to the side of a bearing cap and observes the shaft's movement relative to its mounting position. An eddy probe system comprises a probe, a driver (oscillator/demodulator) and an optional extension cable.

Eddy probe systems have excellent frequency response. They have no lower frequency limit and are used to measure shaft axial position as well as vibration.

System specifications

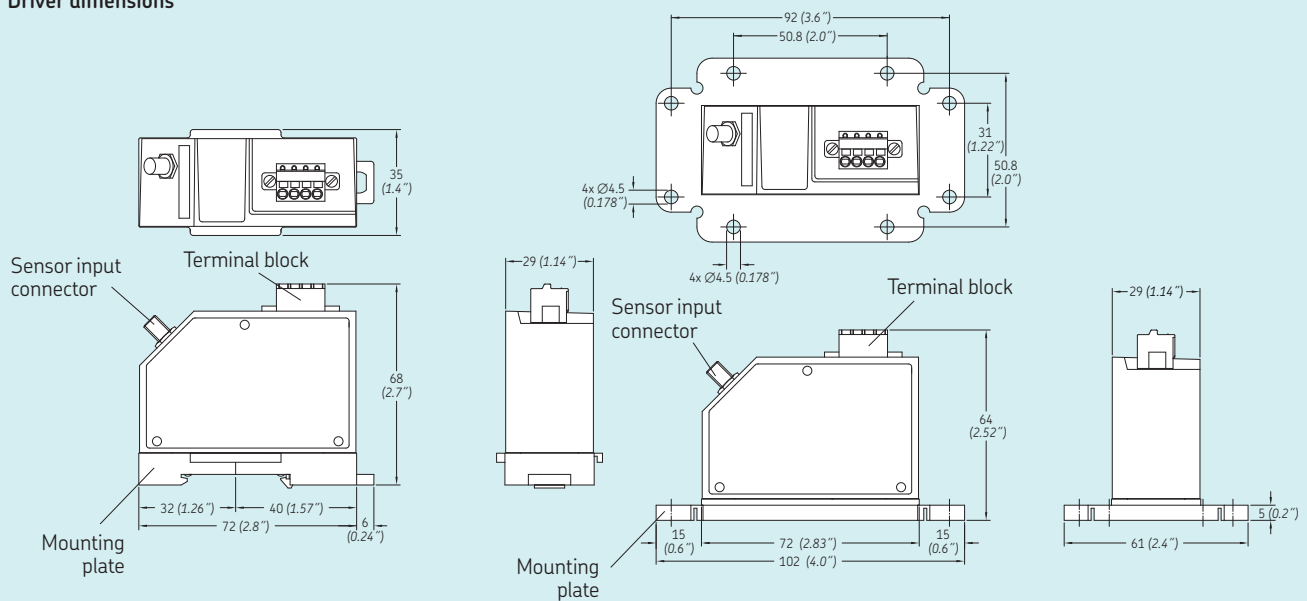
Standard calibration target:	JIS SCM440 flat surface (see notes)	
Measurement range:	0.25 to 2.25 mm (10 to 88.5 mil) from sensor tip	
Scale factor:	7.87 V/mm (200 mV/mil)	
Scale factor tolerance:	±5% for 5 m systems ± 6.5% for 9 m systems	
Linear characteristics:	Within ±25 µm (±1 mil) for a straight line of 7.87 V/mm (200 mV/mil) for 5 m systems Within ±38 µm (±1.5 mil) for a straight line of 7.87 V/mm (200 mV/mil) for 9 m systems Linear range: 2 mm (78.7 mil)	
Frequency response:	DC to 10 kHz (-3dB)	
Maximal output voltage:	Approximately -23 V DC	
Sensor abnormal output voltage:	Approximately -0.6 V DC (Sensor OPEN/ Sensor SHORT)	
Output impedance:	50 Ω, current 5 mA (maximum)	
Current consumption (10 kΩ load):	maximum -15 mA	
Output noise:	Approximately 15 mV _{pk-pk} + power supply noise	
Sensor tip diameter:	Approximately 5 mm and 8 mm	
System cable length:	5 m or 9 m	
Temperatures for non-agency approved systems		
Operational temperature	Probe:	-40 to +177 °C (-40 to +350 °F)
Range:	Extension Cable:	-40 to +177 °C
	Driver:	-40 to +80 °C (-40 to +176 °F)
Range of temperatures for agency approved systems (sensor, extension cable and driver)		
	ATEX	-35 to +80 °C (-31 to +176 °F)
	CSA	-20 to +85 °C (-4 to +185 °F)
Temperature characteristic		
Condition:	Gap = 2 mm	Target: JIS SCM440
0 to 80 °C (at 20 °C standard)	Sensor:	Less than ±3% of full scale
	Extension cable:	Less than ±4% of full scale
0 to 60 °C (at 20 °C standard)	Driver:	Less than ±3% of full scale
	Loop:	Less than ±6% of full scale
Operational humidity range:	30 to 95% RH (non-condensing, non-submerged) (Probe only is 100% RH)	
Power:	Within -24 V DC ±10%	
Dielectric strength of driver:	Between each terminal and mounting plate: 1 mA or less at 500 V AC for one minute	
Insulation resistance of driver:	Between each terminal and mounting plate: 100 MΩ or more at 500 V DC	
Terminal block:	Spring lock terminal	
Applicable wire gauge:	0.2 to 1.5 mm ²	
Weight driver:	Approximately 200 g (7 oz)	
Weight probe:	CMSS 75/78, non armoured cable 1 m: approximately 500 g (17.6 oz)	
Agency system approval:	CSA Class I Division 1, Groups A,B,C,D, Ex ia IIC T4, AEx ia IIC T4 ATEX Ex II G, Ex ia IIC T4 Ga	

Driver dimensions for DIN rail mount
 CMSS 785-11 and CMSS 785-21



CMSS 75 or CMSS 78 probe	CMSS 985 extension cable	System cable length	CMSS 785 driver
m			-
0.5	+ 4.5	= 5	→ CMSS 785-11/-12
1.0	+ 4.0	= 5	→ CMSS 785-11/-12
5.0	+ -	= 5	→ CMSS 785-11/-12
0.5	+ 8.5	= 9	→ CMSS 785-21/-22
1.0	+ 8.0	= 9	→ CMSS 785-21/-22
9.0	+ -	= 9	→ CMSS 785-21/-22

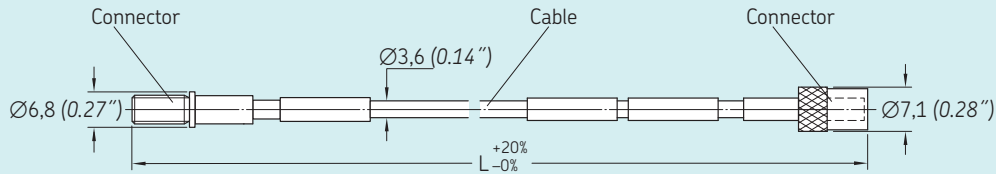
Driver dimensions



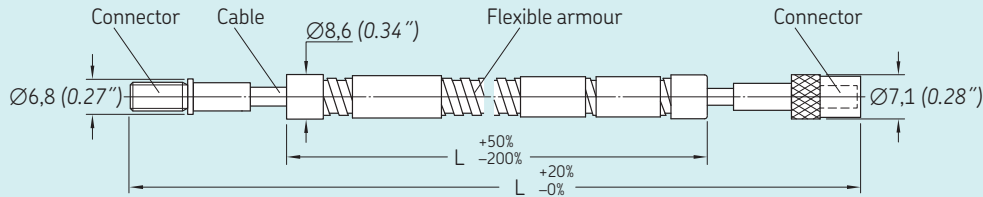
Driver Standard part ID	DIN Rail (35 mm) mount	Standard part ID	Screw mount
CMSS 785-11	5 mm/ 8 mm, 5 m cable length, DIN Rail mount	CMSS 785-12	5 mm/ 8 mm, 5 m cable length, screw mount
CMSS 785-21	5 mm/ 8 mm, 9 m cable length, DIN Rail mount	CMSS 785-22	5 mm/ 8 mm, 9 m cable length, screw mount

Extension cables

CMSS 985-L extension cable without armour



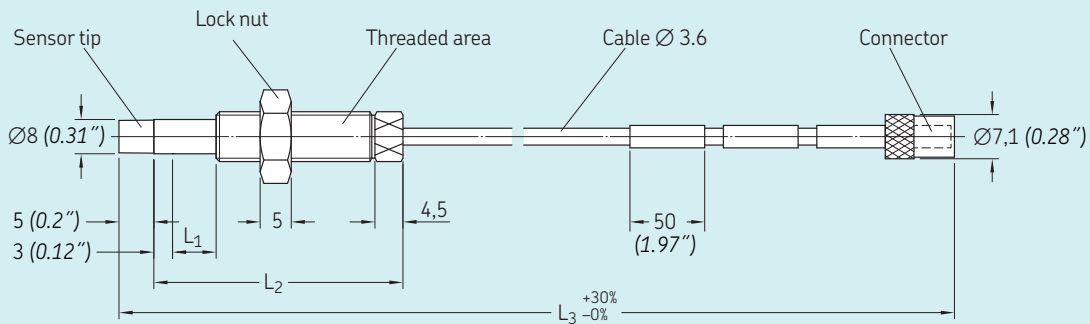
CMSS 985-A extension cable with armour



Extension cable

CMSS 985-L-40	No armour, 4.0 m length
CMSS 985-L-45	No armour, 4.5 m length
CMSS 985-L-80	No armour, 8.0 m length
CMSS 985-L-85	No armour, 8.5 m length
CMSS 985-A-40	Armoured, 4.0 m length
CMSS 985-A-45	Armoured, 4.5 m length
CMSS 985-A-80	Armoured, 8.0 m length
CMSS 985-A-85	Armoured, 8.5 m length

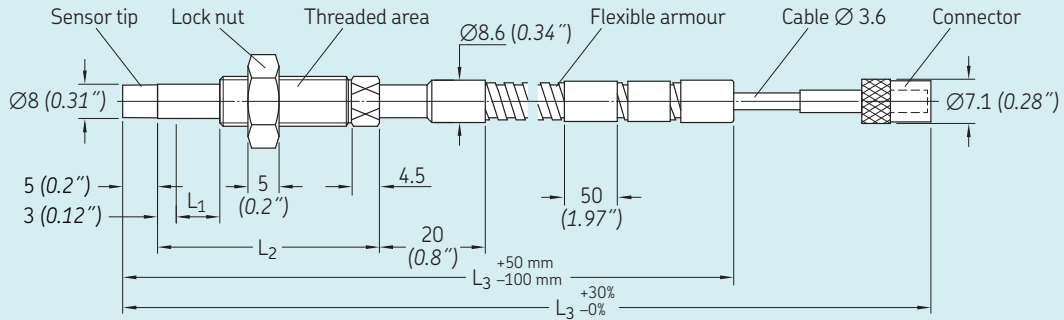
CMSS 78-L standard probe (without armour)



Example

CMSS 78-LU2-00-12-10 8 mm diameter probe, no armour, 3/8-24 UNF thread, unthreaded case length (L_1) 0 in, case length (L_2) 1.2 in, pigtail cable length (L_3) 1 m

CMSS 78-A standard probe (with armour)

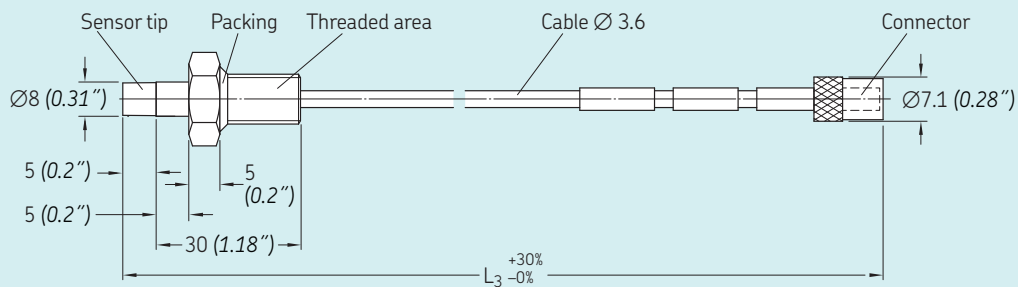


Example

CMSS 78-AM2-04-20-90 8 mm diameter probe, armoured, M10x1 thread, unthreaded case length (L_1) 40 mm, case length (L_2) 200 mm, pigtail cable length (L_3) 9.0 m

Without fluoro resin coating

CMSS 78-R reverse mount

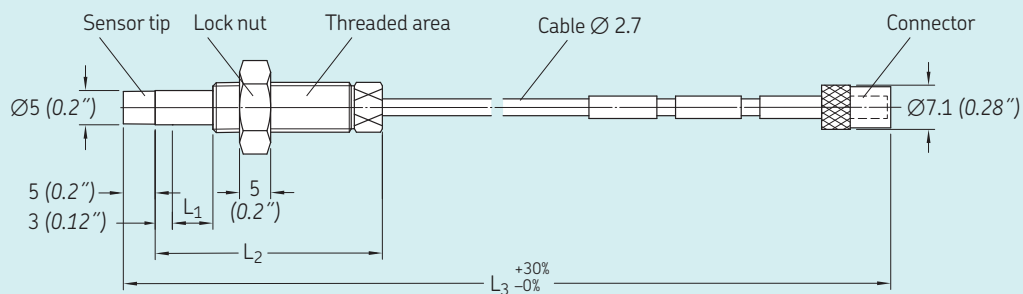


Example

CMSS 78-RM2-05-03-05 8 mm probe, reverse mount, no armour, thread size M10x1, unthreaded length (L_1) 5 mm, case length (L_2) 30 mm (03 = 30 mm), cable length (L_3) 0.5 m

CMSS 78-RU2-02-12-90 8 mm probe, reverse mount, no armour, thread size 3/8-24 UNF, unthreaded length (L_1) 0.2 in, case length (L_2) 1.2 in (12 = 1.2 in), cable length (L_3) 9.0 m

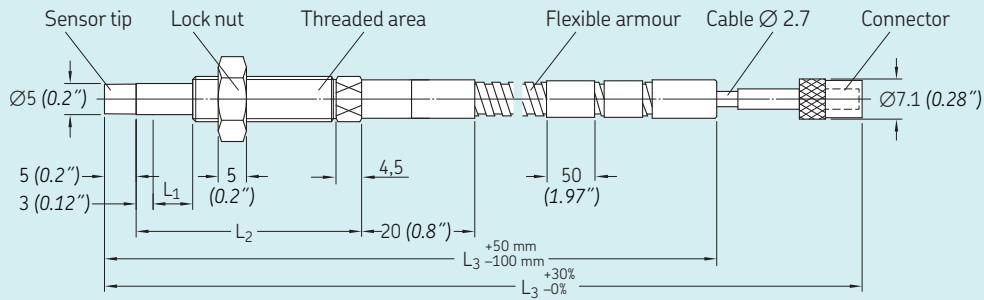
CMSS 75-L standard probe (without armour)



Example

CMSS 75-LM1-06-25-10 5 mm, no armour, thread size M8x1, unthreaded length (L_1) 60 mm (06 = 60 mm), case length (L_2) 250 mm (25 = 250 mm), cable length (L_3) 1.0 m

CMSS 75-A armoured probe



Example

CMSS 75-AU1-02-10-05 5 mm, armour, thread size UNF 1/4-28, unthreaded length (L_1) 0.2 in, case length (L_2) 1.0 in, cable length (L_3) 0.5 m

Ordering information

CMSS 75 Eddy current probe

Part number CMSS 75-ab1-cc-dd-ee

a	Armour
L	Standard (without armour)
A	Armoured
b1	Thread size
M1	ISO M8x1
U1	UNF 1/4-28

CMSS 78 Eddy current probe

Part number CMSS 78-ab2-cc-dd-ee

a	Armour
L	Standard (without armour)
A	Armoured
b2	Thread size
M2	ISO M10x1
U2	UNF 3/8-24

ee	Cable length (L_3)
05	0.5 m
10	1.0 m
50	5.0 m
90	9.0 m

dd	Case length (L_2)
	For ISO thread, 10 mm increments from 20 to 250 mm, Example: 25 = 250 mm
	For UNF thread, 0.1 in increments from 0.8 to 9.9 in, Example: 35 = 3.5 in

cc	Unthreaded length (L_1)
	For ISO thread, 10 mm increments, from 0 to 230 mm, $L_1 \leq L_2 - 20$ mm, Example: 06 = 60 mm
	For UNF thread, 0.1 in increments, from 0 to 9.2 in, $L_1 \leq L_2 - 0.7$ in, Example: 04 = 0.4 in

CMSS 78-R: 8 mm reverse mount probe

Part number

CMSS 78-R**b2**-**cc**-**dd**-**ee**

b2 Thread size
M2 ISO M10x1
U2 UNF 3/8-24

cc Unthreaded length (L_1)
05 5 mm
02 0.2 inches

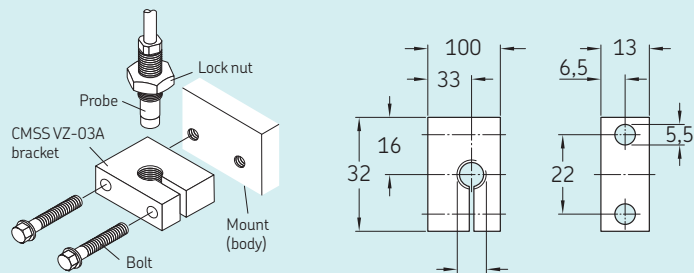
dd Case length (L_2)
03 30 mm
12 1.2 inches

ee Cable length (L_3)
05 0.5 m
10 1.0 m
50 5.0 m
90 9.0 m

Mounting Accessories:

CMSS VZ-03A

The CMSS VZ-03A sensor mounting bracket is used to fix the CMSS 78 series (8 mm) probe in those installations requiring mounting in the machine's internal area. Threaded M10 x 1 or 3/8-24-UNF, for a firm grip on the probe allowing adjustment to final operating position. Two mounting holes accommodate up to 5.5 mm diameter bolts (not provided). Material Aluminium.



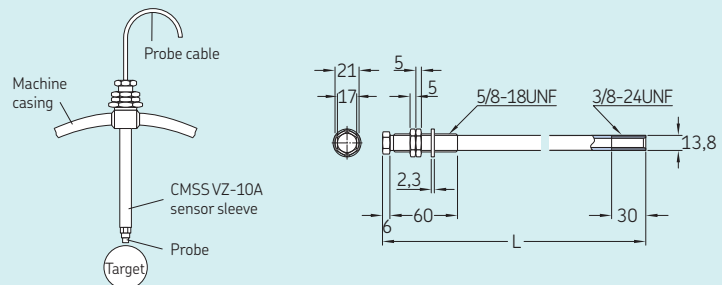
CMSS VZ-03A-3 = CMSS 78 Sensor Mounting Bracket, thread M10 x 1

CMSS VZ-03A-4 = CMSS 78 Sensor Mounting Bracket, thread 3/8-24-UNF

CMSS VZ-10A

The CMSS VZ-10A sensor sleeve (Probe Holder) provide a rigid mounting with provision for external gap adjustment. Used in those installations requiring probe mounting in the machine's internal area. Use Reverse Mount probes or, 3/8-24 UNF probes with a case length 30 mm or less.

Two lengths (L) are available, 150 mm or 300 mm, probe holder is stainless steel and can be cut to size and re-tapped.



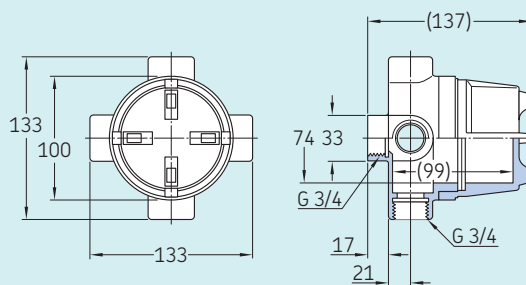
CMSS VZ-10A-215 = CMSS 78 Sensor sleeve, 3/8-24 UNF, 150 mm

CMSS VZ-10A-230 = CMSS 78 Sensor Sleeve, 3/8-24 UNF, 300 mm

CMSS VZ-05C

The CMSS VZ-05C sensor housing can be used by sleeve (Probe Holder) and mounting bracket installations. The housing protects the probe cable exit and permits easy access for probe adjustment without machine disassembly.

The housing has G 3/4 NPT threaded hub for conduit attachment or cable gland.



- CMSS VZ-05C = Sensor Housing
- CMSS VZ-07A-2 = NPT Probe Adapter, 3/4NPT, for CMSS VZ-05C housing and CMSS VZ-10A Sensor Sleeve
- CMSS VZ-07B-2 = NPT Probe Adapter, 3/4NPT, Cable Seal, for CMSS VZ-05C housing and CMSS VZ-03A mounting bracket

Installation notes

1 Calibration material

Model CMSS 785 Transducer systems are calibrated for JIS SCM440 flat surface, target to exceed 15 mm (0.6 in) in diameter. (JIS SCM440 is an equivalent to AISI 4140).

If the measured target is not JIS SCM440 flat surface, the system may have different characteristics. In this case, calibration with the connected equipment (e.g. monitor) is recommended for system verification.

2 Shield wire connection

To avoid noise being induced into the system, connect the shield wire of the signal cable (a 3-wire shielded cable between driver and monitor) to the driver's "Shield" terminal and monitor's "COM" terminal.

3 Connector isolation

The sensor and the extension cable connector shall be insulated with insulation sleeve (transparent shrink tube) or fluoro resin insulation tape.

A vinyl-insulating tape shall not be used with temperatures exceeding 80 °C, to avoid possible trouble with wiring.

The connector shall not be located in oil environment. Penetration of oil into the cable through the connector may cause sensitivity to change, caused by change in the cable capacitance.

4 Megger test of signal cable

If an insulation resistance test has been performed on the signal cable (3-wire shielded cable), be sure to discharge the electric load before connecting the cable to the driver to avoid damaging the driver.

5 Transducer system installation

The driver is not resistant to rain water, so avoid outdoor use and mount in appropriate enclosures. Water intrusion can lead to a change in sensitivity and insulation breakdown.

6 Scale factor error

The scale factor error margin provided is based on test results performed in a controlled environment. This regulated value may not be applicable to test results onsite.

7 Safety barrier

When use of a zener barrier is specified in intrinsically safe systems, the MTL 7796-safety barrier is recommended. The Linear range is reduced approximately 5% in intrinsic safety systems using barriers. Use of galvanic isolators does not affect range.