

# CMSS 68/ CMSS 668 Series

## 8 mm Eddy Current Probe System



### INTRODUCTION

The Eddy Probe is used to measure radial or axial 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.

### SPECIFICATIONS

#### CMSS 68 EDDY CURRENT PROBE SYSTEM

Unless otherwise noted, the following specifications apply to a complete CMSS 68 Eddy Current Probe System comprising:

- CMSS 68 Eddy Current Probe
- CMSS 958 Extension Cable
- CMSS 668 or CMSS 668P Driver

At +23°C (+73°F), with a -24 VDC supply and target of AISI 4140 steel.

*These specifications may vary with different options and systems.*

#### ELECTRICAL

**Usable Range:** 2.3 mm (0.2 mm to 2.5 mm)  
90 mils (10 mils to 100 mils)

**Sensitivity:** 7.87 mV/ micron (200 mV/mil)

**Linearity:** ± 25.4 microns (1 mil) of best straight line over 2.3 mm (90 mil) range.

**Frequency Range:** DC to 10 kHz

DC to 600,000 CPM;

down maximum of 3 dB at 10 kHz

#### Driver Signal Output:

**Impedance:** Minimum calibrated load resistance of 3kΩ; output is protected against miswiring.

**Voltage:** Nominal 7.87 mV/micron (200 mV/mil) corresponding to -18 VDC at 2.3mm (90 mils) with -24 VDC supply.

**Power Supply Requirements:** 15 mA from -24 VDC to -30 VDC

**Interchangeability:** Probes, Extension Cables and Drivers are compliant to API 670 requirement and may be interchanged with 5% or less performance change without recalibration. All units factory calibrated at +23°C (+73°F). Trim calibration adjustment on Driver provides duplication of characteristics after replacement of any component.

#### ENVIRONMENTAL AND MECHANICAL

##### CMSS 68 PROBE

**Operating Temperature Range:** -34°C to +177°C (-29°F to +350°F)

*(Note: Ex i regulations restrict upper limit to +100°C)*

**Differential Pressure:** To 4 Bar (60 PSI)

##### Materials:

**Case:** 300 Stainless Steel

**Tip Material:** RYTON®

**Connectors:** Nickel plated stainless steel; weatherproof, sealable

**Cable:** Coaxial with Teflon® insulation; high tensile and flexible strength.

**Mounting:** Recommend minimum clearance of 1/2 Probe Tip diameter around the Probe Tip to maintain factory calibration.

##### CMSS 958 EXTENSION CABLE

Temperature ranges, connectors, cable same as CMSS 68 Eddy Current Probe.

**CMSS 668 AND CMSS 668P DRIVER**

**Operating Temperature Range:** 0°C to +65°C (+32°F to +149°F)

**Connections:** Power, Signal, GND

Five terminal removable and reversible compression terminal block accepting up to 2 mm<sup>2</sup> (14 AWG) wire. Three connections necessary per block (-24VDC; GND; Signal). The CMSS 668P has a permanent fixed connector with same connection characteristics.

**Mounting:** C-DIN Rail Mount which bolts onto Driver enclosure, or the standard four number 10 clearance holes in a square on 63.5 mm (2.5") centers.

**SYSTEM PERFORMANCE**

The following performance characteristics apply for the CMSS 68 Eddy Current Probe System in addition to quoted nominal specifications:

**Extended Temperatures:** With 1m probe and 4m extension cable operating in a range of -34°C to +120°C (-29°F to +248°F), and driver in the range of 0°C to +65°C (+32°F to +149°F):

**Sensitivity:** ± 10% of 7.87 mV/micron (200 mV/mil)

**Linearity:** ± 25.4 microns (1 mil) of best straight line over 2.3 mm (90 mil) range.

**Minimum Target Size:** *Flat Surface:* 16 mm (0.63")

*Shaft Diameter:* 24 mm (0.93")

**HAZARDOUS AREA APPROVALS****NORTH AMERICA**

Approvals granted by Factory Mutual (FM) and Canadian Standards Association (CSA).

**Class 1 Division 1 Groups A, B, C, D** when used with intrinsically safe zener barriers, or galvanic isolators. Contact representative for details.

**Class 1 Division 2 Groups A, B, C, D** when connected with National Electric Code (NEC) without Zener barriers or galvanic isolator. Contact representative for details.

**EUROPE**

Certification to ATEX Directive.

**Drivers:** Ex II 1 G EEx ia IIC T4

(-20°C ≤ Ta ≤ +75°C)

Certificate Number: BAS02ATEX1168X

**Probes:** Ex II 1 G EEx ia IIC T4 or T2

Certificate Number: BAS02ATEX1169

**System:** EEx ia IIC T4 or T2 (as per schedule)

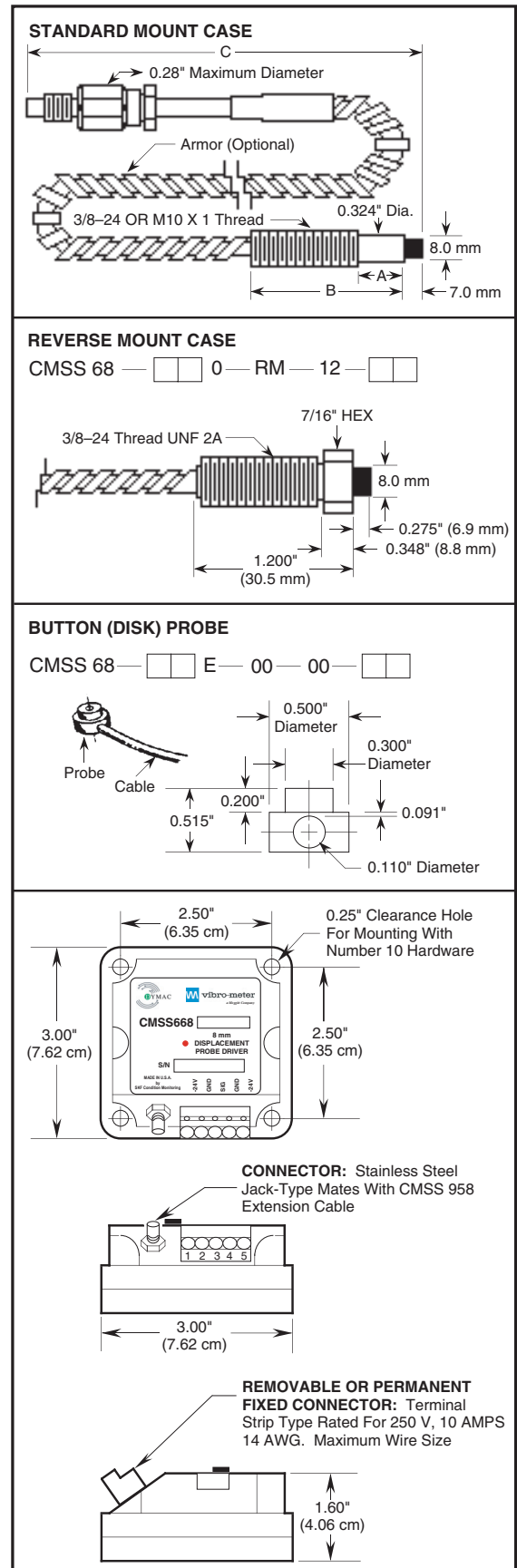
Certificate Number: Ex 02E2170

Intrinsic Safety requires use of zener barriers. Contact representative for details.

See ordering details for probe and driver designations for hazardous area approved models.

**ORDERING INFORMATION**

DIMENSIONS IN INCHES, EXCEPT AS NOTED



**ORDERING INFORMATION**

**Part 1: Eddy Current Probe (SKF Standard: CMSS 68-000-00-12-10)**

**CMSS 68**

CABLE	
Standard	00
Armored	01
Fiberglass Sleeved	02
CSA/FM/SIRA (ATEX)	07
(Intrinsically Safe) Certified	
CSA/FM/SIRA (ATEX)	08
(Intrinsically Safe) Certified and Armored	
FM (non-incendive)	09
FM (non-incendive) Armored	0B

CASE	
0	3/8-24 Threads (Standard)
1	M10 X 1 Threads
4	No Case
E	Button Probe (Fiberglass)

"A" UNTHREADED CASE LENGTH	
Fully Threaded	00
0.1 Inches To 5.0 Inches	01 To 50
Unthreaded	
5.1 Inches To 9.9 Inches	51 To 99
Reverse Mount, 3/8-24 Thread	RM

"B" CASE LENGTH	
Standards:	
No Case	00
0.8 Inches	08
1.2 Inches	12
1.5 Inches	15
2.0 Inches	20
2.5 Inches	25
3.0 Inches	30
4.0 Inches	40
4.7 Inches	47
6.0 Inches	60
9.0 Inches	90
SPECIALS	
0.9 To 5.9 Inches	09 To 59
9.1 To 9.9 Inches	91 To 99

"C" OVERALL LENGTH +1	
05	0.5 Meter
10	1.0 Meter
	(Standard)
5A	5.0 Meter
AA	10.0 Meter
FA	15.0 Meter

+1: Length is **Nominal Electrical**; physical length may vary.

**Compatible Systems:**

0.5 m Probe: 5.0 m System: CMSS 958 - XX - 045/CMSS 668

1.0 m Probe: 5.0 m System: CMSS 958 - XX - 040/CMSS 668

5.0 m Probe: 5.0 m System: CMSS 668

10.0 m Probe: 10.0 m System: CMSS 668-1

15.0 m Probe: 15.0 m System: CMSS 668-2

The 5A, AA, FA units have integral cable and mate directly to the Driver.

**Part 2: Extension Cable (SKF Standard: CMSS 958-00-040)**

**CMSS 958**

CABLE	
Standard	00
Armored	01
Fiberglass Sleeved	02
CSA/FM/SIRA (ATEX)	09
(Intrinsically Safe) Certified	
CSA/FM/SIRA (ATEX)	0A
(Intrinsically Safe) Certified and Armored	
FM (non-incendive)	0H
FM (non-incendive) Armored	0J

LENGTH (Compatible System Listed)	
CMSS 668, 1.0 m	040
CMSS 668, 0.5 m	045
CMSS 668-1, 1.0 m	090
CMSS 668-1, 0.5 m	095
CMSS 668-2, 1.0 m	140
CMSS 668	

**Part 3: Driver (SKF Standard: CMSS 668)**

Drivers containing the "P" in the model number, denote those models with permanent fixed connector.

**DRIVER (5 METRE SYSTEM)**

**CMSS 668/CMSS 668P**

7.87 mV/ micron (200 mV/mil). Use with:

- 1 m Probe and 4 m Extension Cable
- 0.5 m Probe and 4.5 m Extension Cable
- or 5 m Probe

**DRIVER (10 METRE SYSTEM)**

**CMSS 668-1/CMSS 668P-1**

Use with:

- 1 m Probe and 9 m Extension Cable
- or 10 m Probe

**Usable Range:** 2.3 mm (0.25 mm to 2.5 mm)  
90 mils (10 mils to 100 mils)

**Sensitivity:** 7.87 mV/ micron (200 mV/mil) ± 10% of 200 mV/mil

**Linearity:** ± 38 microns (1.5 mil) from best straight line

**ENHANCED ENVIRONMENTAL PROTECTION**

**CMSS 668-8/CMSS 668P-8**

Specifications same as standard driver, however is also filled with potting material to provide additional measure of protection when operated in adverse environmental conditions. Sensitivity 7.87 mV/micron (200 mV/mil).

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## Part 3: Driver (SKF Standard: CMSS 668) (continued)

Drivers containing the “P” in the model number, denote those models with permanent fixed connector.

### HAZARDOUS AREA APPROVAL (INTRINSIC SAFETY) WITH 4140 STAINLESS STEEL TARGET

#### CMSS 668-16-9/CMSS 668P-16-9

CSA/FM/SIRA (Intrinsically Safe) Certified Driver for 5 m System. Use with CSA/FM/SIRA (Intrinsically Safe) Certified 1 m CMSS 68 Probe and 4 m CMSS 958 Extension Cable. For intrinsic safety installations, drivers must be installed with intrinsic safety (I-S) barriers.

**Barriers:** For FM Approval

Power: Stahl 8901/30-280/085/00

Signal: Stahl 8901/30-199/038/00

For CSA and SIRA Approval

Power/Signal: MTL 7096 Dual (neg)

Contact representative for more details.

**Usable Range:** 1.6 mm (0.25 mm to 1.9 mm)

65 mils (10 mils to 75 mils)

**Sensitivity:** 7.87 mV/ micron (200 mV/mil)

**Linearity:** ± 25.4 microns (1 mil) from best straight line over 1.15 mm (45 mil) range.

#### CMSS 668-16-xx/CMSS 668P-16-xx

CSA/FM/SIRA (Intrinsically Safe) Certified Driver for 5 m System calibrated for shaft materials other than standard 4140 stainless steel. Use with CSA/FM/SIRA (Intrinsically Safe) Certified 1 m CMSS 68 Probe and 4 m CMSS 958 Extension Cable. For intrinsic safety installations, drivers must be

installed with intrinsic safety (I-S) barriers (see CMSS 668-16-9).

**Usable Range:** Best attainable for specific shaft material provided. Customer to provide identification of shaft material and sample (approximately 2.0" diameter disk, 0.5" thick). Range not expected to exceed the 65 mils of standard unit.

**Sensitivity:** 200 mV/mil, ± to be determined (TBD) percentage of 200 mV/mil dependent on the shaft sample material (-24 VDC supply).

**Linearity:** ± the minimum deviation (in microns or mils) from the best straight line attainable for the sample shaft material provided.

### HAZARDOUS AREA APPROVAL (NON-INCENDIVE) WITH 4140 STAINLESS STEEL TARGET

#### CMSS 668-20-00/CMSS 668P-20-00

FM (non-incendive) Certified Driver for the 5 m System. Use with FM (non-incendive) Certified 1 m CMSS 68 Probe and CMSS 958 Extension Cable.

**Usable Range:** 2.3 mm (0.25 mm to 2.5 mm)

90 mils (10 mils to 100 mils)

**Sensitivity:** 7.87 mV/ micron (200 mV/mil)

**Linearity:** ± 25.4 microns (1 mil) of best straight line over 2.3 mm (90 mil) range.

#### NOTE:

All circuit boards used in SKF CMSS 668 Series Drivers are conformal coated as standard procedure.



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#### Vibro-Meter SA

Rte de Moncor 4 • P. O. Box 1071  
CH-1701 Fribourg • Switzerland  
Telephone (+41) 26 407 11 11 • FAX (+41) 26 407 13 01  
Email: industrial&marine@vibro-meter.ch  
**Web Site: www.vibro-meter.com**

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### SKF Reliability Systems

4141 Ruffin Road • San Diego, California 92123 • USA  
Telephone: (+1) 858-496-3400 • FAX: (+1) 858-496-3531  
**Web Site: www.skfreliability.com**



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