Overview

MFA 4p motion failure alarm controller is a highly sensitive single setpoint motion sensor system, used with Milltronics MSP and XPP probes.
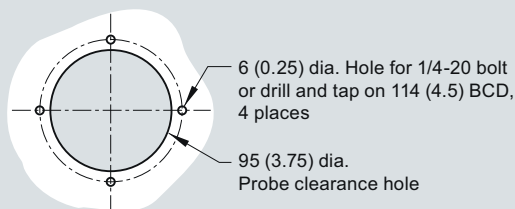
Benefits

- Up to 100 mm (4") gap between target and probe
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment 0.15 to 3000 PPM (pulses/minute)
- Adjustable start-up time delay
- Visual indication of probe operation and relay status
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability
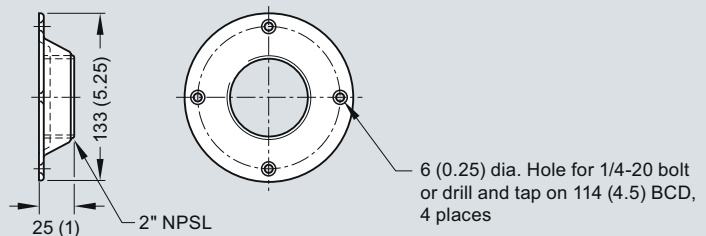
Application

The MFA 4p detects changes in the motion and speed of rotating, reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment.

The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

A special feature is the adjustable 0 to 60 second time delay, allowing the monitored device to accelerate to normal running speed before monitoring begins. A wide range of probes are available to suit specific needs, including high temperatures, corrosive, and Class I, II and III installations. The CE approval allows the MFA 4p to consistently meet the needs of the mining aggregate, cement and other primary and secondary industries.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

Mounting for Milltronics MSP-12, MSP-3, XPP-5

6 (0.25) dia. Hole for 1/4-20 bolt or drill and tap on 114 (4.5) BCD, 4 places

95 (3.75) dia. Probe clearance hole

Note: For **MSP-1** 1.125" (29 mm) clearance hole required.

133 (5.25)

25 (1)

2" NPSL

6 (0.25) dia. Hole for 1/4-20 bolt or drill and tap on 114 (4.5) BCD, 4 places

Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-9

6 (0.25) dia. Hole for 1/4-20 bolt or drill and tap on 114 (4.5) BCD, 4 places

95 (3.75) dia. Probe clearance hole

Panel

102 (4)

102 (4)

6 (0.25) dia. Hole for 1/4-20 bolt or drill and tap on 114 (4.5) BCD, 4 places

Probe flange
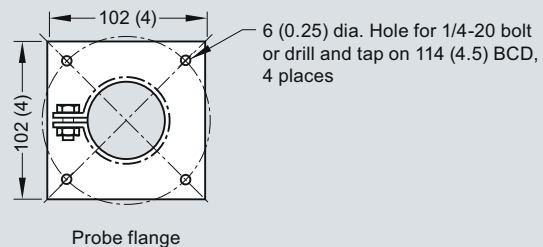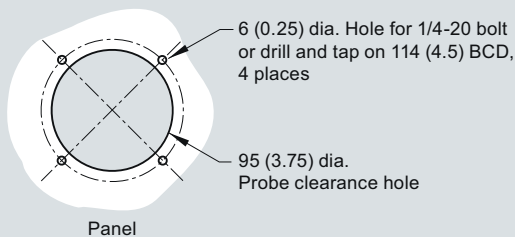
MSP-1, MSP-12, MSP-3, MSP-9, XPP-5 mounting, dimensions in mm (inch)

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Process Protection
Motion sensors

Milltronics MFA 4p

Probes

Standard Milltronics MSP-12
- Heavy-duty general purpose motion probe
- Long lasting phenolic body with internal amplifier
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 to 60 °C (-40 to 140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

High temperature Milltronics MSP-3
- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures to 260 °C (500 °F)
- Cast aluminum probe with convenient mounting flange and locknut
- 1.5 m (5 ft) of high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4"), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Amplifier temperature rating -40 to 60 °C (-40 to 140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Stainless high temperature Milltronics MSP-9
- Heavy-duty, high temperature 304 stainless steel probe
- Special construction allows operation of probe in environment up to 260 °C (500 °F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4"), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Enclosure rating: Type/NEMA 4X, 6, IP67
- Amplifier temperature rating -40 to 60 °C (-40 to 140 °F)

Miniature Milltronics MSP-1
- Miniature probe for installations with limited mounting space
- CPVC probe body complete with locknuts
- 1.8 m (6 ft) cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4"), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Enclosure rating: Type/NEMA 4X, 6, IP67
- Due to smaller size, probe sensitivity is reduced, gap max. 13 mm (0.5")

Milltronics XPP-5
- CSA hazardous approval (Class I, Div. 1, Groups A, B, C & D; Class II, Div. 1, Groups E, F & G; Class III)
- Phenolic / aluminum body that is fully potted
- Convenient mounting flange and locknut
- 3/4" NPT male hub connection
- Operating temp. from -40 to 60 °C (-40 to 140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Milltronics RMA (Remote Mounted Amplifier)
- Available for internal mounting within Probe, or in enclosure for remote mounting
- Enclosures available in cast aluminum (½" NPT entry), painted steel (Type/NEMA 4 rating) or stainless steel (Type/NEMA 4X, IP65 rating)
- Operating temp. from -40 to 60 °C (-40 to 140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

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MFA 4p motion probes

Technical specifications

Mode of operation	
Measuring principle	Motion monitor and alarm
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	• Switch selectable overspeed or underspeed detection • Setpoint adjustment: 0.15 ... 3000 PPM • Adjustable start-up time delay: 0 ... 60 seconds • Visual indication of probe operation and relay status
Output	2 relays working in unison, each providing 1 SPDT Form C relay contact, rated 8 A @ 250 V AC resistive
Performance	
Repeatability	± 1 %
Dead band	± 0.25 %

Dynamic Range	0 ... 7200 PPM
Ambient Temperature Range	-20 ... +50 °C (-5 ... +122 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP65 (standard and optional stainless steel) Type 4/NEMA 4/IP65 (optional mild steel)
Enclosure dimensions	160 x 240 x 82 mm (6.3 x 9.5 x 3.2") optional: mild steel or 304 (1.4301) stainless steel 203 x 254 x 102 mm (8 x 10 x 4")
Enclosure material	Polycarbonate optional: mild steel or stainless steel
Power Supply	100/115/200/230 V AC switch selectable, 50/60 Hz, 15 VA ± 10 % of rated voltage
Certificates and approvals	CE, C-TICK, CSA$_{US/C}$, FM

Selection and Ordering data

MFA 4P Motion Failure Alarm Controller		Order No.
	C)	**7 M H 7 1 4 4 -** ▪▪▪▪

A highly sensitive single setpoint motion sensor system, used with MSP and XPP probes.

Enclosure

NEMA 4X, polycarbonate enclosure	**1**
NEMA 4, painted mild steel enclosure	**2**
NEMA 4X, 304 (1.4301) stainless steel enclosure	**3**

Input Voltage

100/115/200/230 V AC, 50/60 Hz, switch selectable	**A**

Speed detection version

Standard, underspeed (U/S) or overspeed (O/S), switch selectable	**A**
Slow speed (S/S), U/S or O/S detection, switch selectable (limit of 15 ppm)	**B**

Approvals

CE, C-TICK, CSA$_{US/C}$, FM	**2**

Selection and Ordering data

Further designs		Order code

Please add **"-Z"** to Order No. and specify Order code(s).

Manufacturer's test certificate M to DIN 55 350, Part 18 and to ISO 9000	**C11**
Acrylic coated, stainless steel tag [69 x 50 mm (2.7 x 1.97")]: Measuring-point number/identification (max. 16 characters), specify in plain text	**Y15**
Painted mild steel, heated enclosure with viewing window for use down to -50 °C (-58 °F) (finished unit is mounted inside enclosure) 483 X 584 X 203 mm (19 X 23 X 8")	**A35**

Operating Instructions		Order No.
English	C)	**7ML1998-5FM01**
French	C)	**7ML1998-5FM11**
Spanish	C)	**7ML1998-5FM21**
German	C)	**7ML1998-5FM31**

Note: The operating instructions should be ordered as a separate item on the order.

Spare Parts		
Relay		**7MH7723-1DW**
Transformer		**7MH7723-1DX**
Circuit Card, standard	C)	**7MH7723-1DU**
Circuit Card, Slow speed	C)	**7MH7723-1DV**
Lid with overlay for MFA 4p	C)	**7MH7723-1GY**

C) Subject to export regulations AL: N, ECCN: EAR99.

Selection and Ordering data

Milltronics RMA Remote Mounted Amplifier		Order No.
	C)	**7MH7145-** 0▪

Remote mounted amplifier for Milltronics MSP-1, MSP-3 and MSP-9 motion sensing probes.

Enclosure

Aluminum enclosure, Type/NEMA 4X, IP651/2" NPT entry	**A**
Painted steel, Type/NEMA 4, IP65 rating	**C**
304 (1.4301) stainless steel enclosure, Type/NEMA 4X, IP65 rating	**D**
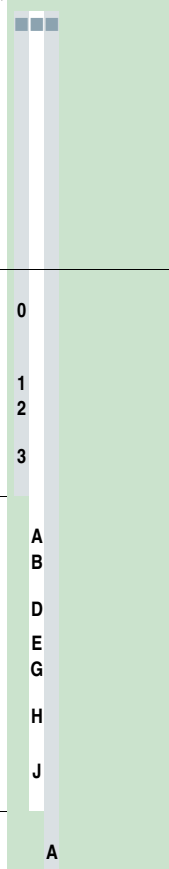
Selection and Ordering data

Further designs	Order code

Please add **"-Z"** to Order No. and specify Order code(s).

Manufacturer's test certificate M to DIN 55 350, Part 18 and to ISO 9000	**C11**
Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2")]: Measuring-point number/identification (max. 16 characters), specify in plain text	**Y18**

Operating Instructions		Order No.
English	C)	**7ML1998-5FM01**
French	C)	**7ML1998-5FM11**
Spanish	C)	**7ML1998-5FM21**
German	C)	**7ML1998-5FM31**

Note: The operating instructions should be ordered as a separate item on the order.
This device is shipped with the Siemens Milltronics manual CD containing the complete operating instructions library.

Spare Parts		
Card, RMA	C)	**7MH7723-1DT**

C) Subject to export regulations AL: N, ECCN: EAR99.

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Process Protection
Motion sensors

Milltronics MFA 4p

Selection and Ordering data	Order No.
Milltronics Motion Sensing Probes	C) **7 M H 7 1 4 6 -**
	▪▪▪
A series of motion sensing probes used with the MFA 4p.	
Milltronics MSP-1: miniature motion sensing probe Milltronics MSP-3: heavy-duty, high temperature aluminum Milltronics MSP-9: heavy-duty, high temperature stainless steel Milltronics MSP-12: heavy-duty, general purpose Milltronics XPP-5: hazardous rated	
Note: Milltronics MSP-1, MSP-3 and MSP-9 probes require the use of Milltronics RMA (amplifier)	
Cable Length	
Standard length (as described in Model options)[1]	**0**
Add order code Y01 and plain text: "Total cable length ... m"	
Extended cable length 2 ... 30 m (6.6 ... 98.4 ft)	**1**
Extended cable length 31 ... 50 m (101.7 ... 164 ft)[2]	**2**
Extended cable length 51 ... 100 m (167.3 ... 328.1 ft)[2]	**3**
Model [standard cable length/type]	
MSP-1 [1.8 m (6 ft)]	**A**
MSP-3, ½" NPT cable inlet [1.5 m (5 ft) high temperature cable]	**B**
MSP-9 [1.5 m (5 ft) high temperature cable]	**D**
MSP-12, ½" NPT cable inlet	**E**
XPP-5 [1.5 m (5 ft) cable, (CSA Class I, Group A, B, C and D; Class II Group E, F and G)]	**G**
XPP-5 [10 m (32.8 ft) cable, (CSA Class I, Group A, B, C and D; Class II Group E, F and G)]	**H**
XPP-5 [15 m (49.2 ft) cable, (CSA Class I, Group A, B, C and D; Class II Group E, F and G)]	**J**
Approvals	
CE, C-TICK	**A**

[1] No Y01 needed in order code for standard length
[2] Available with Model options G, H, and J only

Selection and Ordering data	Order code
Further designs	
Please add **"-Z"** to Order No. and specify Order code(s).	
Total cable length: enter the total cable length in plain text description	**Y01**
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 16 characters), specify in plain text	**Y17**
Cable gland kit	**A57**
Manufacturer's test certificate M to DIN 55 350, Part 18 and to ISO 9000	**C11**
Operating Instructions	Order No.
English	C) **7ML1998-5FM01**
French	C) **7ML1998-5FM11**
Spanish	C) **7ML1998-5FM21**
German	C) **7ML1998-5FM31**
Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete operating instructions library.	
Spare Parts	
Locknut, for MSP-1	**7MH7723-1CQ**
Locknut, for MSP-3, MSP-4, MSP-12, XPP-5	C) **7MH7723-1CR**
Mounting flange, for MSP-3, MSP-4, MSP-12, XPP-5	**7MH7723-1CS**
Mounting bracket for MSP-9	**7MH7723-1CT**
Lid, 1/2" NPT cable inlet, for MSP-3, MSP-12	**7MH7723-1CU**
Lid for MSP-9	**7MH7723-1CV**
Lid gasket, for MSP-3, MSP-9	F) **7MH7723-1CW**
Lid gasket, for MSP-12	F) **7MH7723-1CX**
Cable gland kit	**7MH7723-1JN**

C) Subject to export regulations AL: N, ECCN: EAR99.
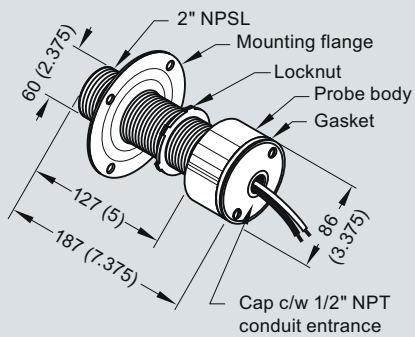F) Subject to export regulations AL: 9I999, ECCN: N.

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Dimensional drawings
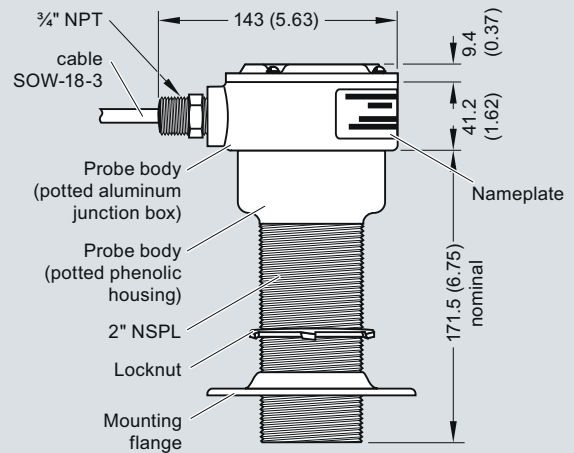
Type 4X/NEMA 4X/IP65 Polycarbonate Enclosure

160 (6.325)
131 (5.138)
82 (3.225)

Lid screws, 4 places

228 (8.975)
240 (9.455)

PROBE
RELAY

Lid
Enclosure
Mounting screw

Suitable location for conduit entrances.

Mounting holes 4,3 (0.17) diameter, 4 places
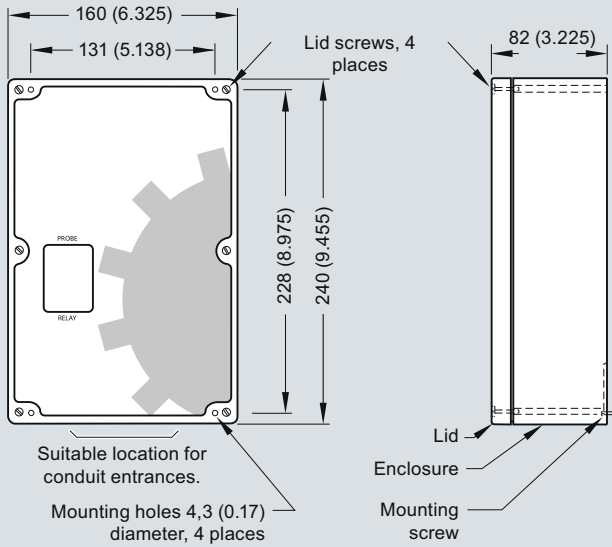
Type 4/NEMA 4/IP65 Painted Steel Enclosure & Type 4X/NEMA 4X/IP65 Stainless Steel Enclosure

203 (8.0)
152 (6.0)
19 (0.75)

273 (10.75)
254 (10.0)

19 (0.75)

Ø8 (0.31)
178 (7.0)

227 (8.94)

102 (4)
21 (0.83)

Suitable location for Conduit Entrance (customer specified)

Standard Probe MSP-12

2" NPSL
Mounting flange
Locknut
Probe body
Gasket

60 (2.375)
127 (5)
187 (7.375)
86 (3.375)

Cap c/w 1/2" NPT conduit entrance
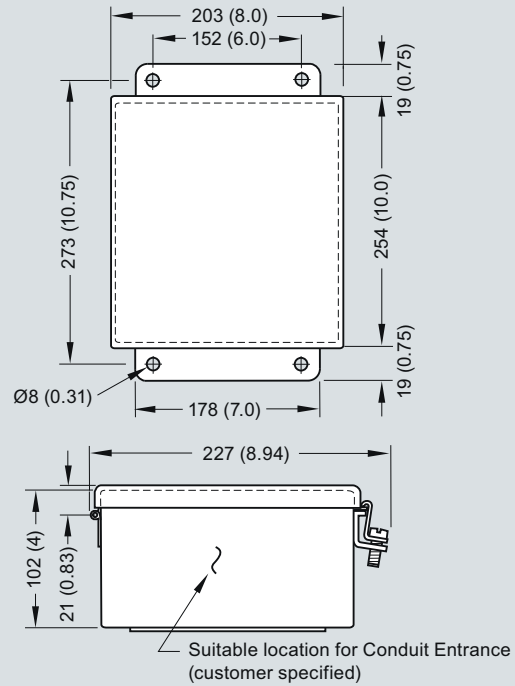
Hazardous Locations XPP-5

¾" NPT
143 (5.63)
9.4 (0.37)

cable SOW-18-3

41.2 (1.62)

Probe body (potted aluminum junction box)

Nameplate

Probe body (potted phenolic housing)

2" NSPL

Locknut

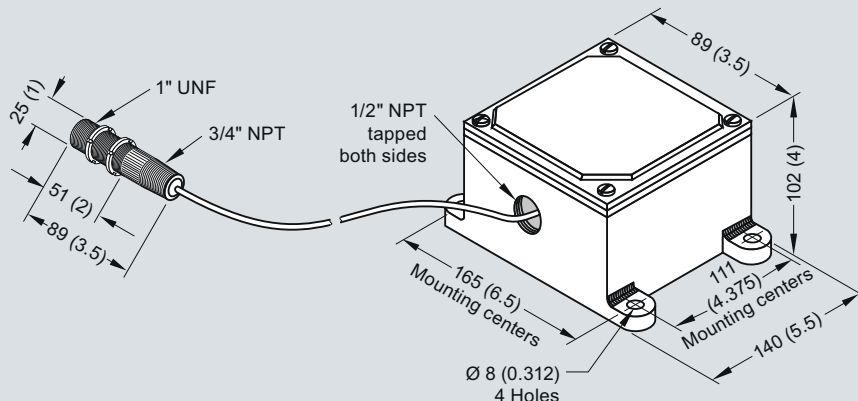171.5 (6.75) nominal

Mounting flange

MFA 4p and probe, dimensions in mm (inch)
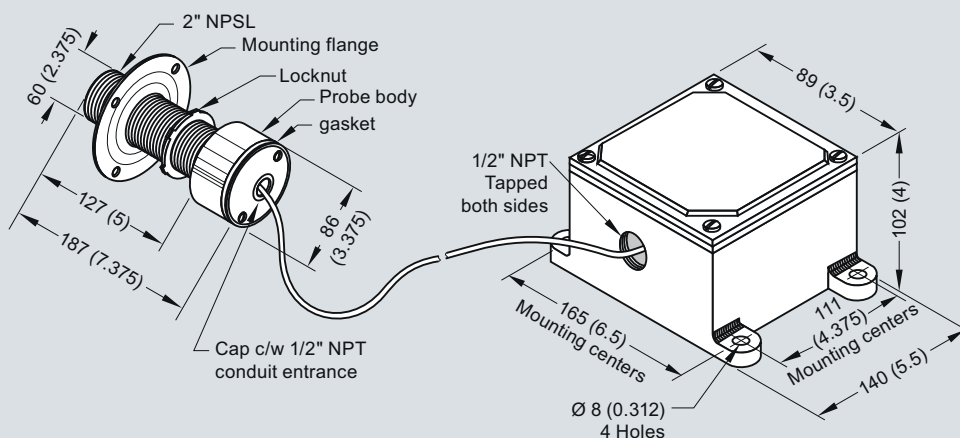
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Process Protection
Motion sensors

Milltronics MFA 4p

Mini Sensing Probe MSP-1

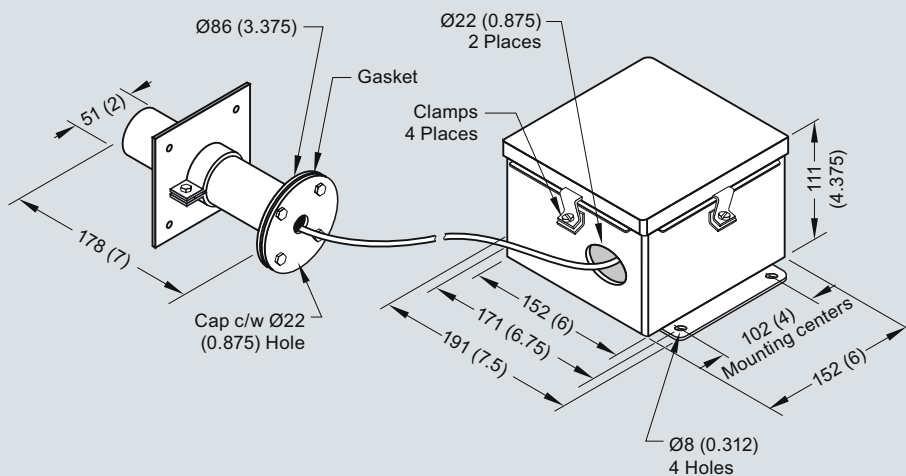**High Temperature Probe MSP-3**

High Temperature Stainless Steel Probe MSP-9

Probe, dimensions in mm (inch)

7