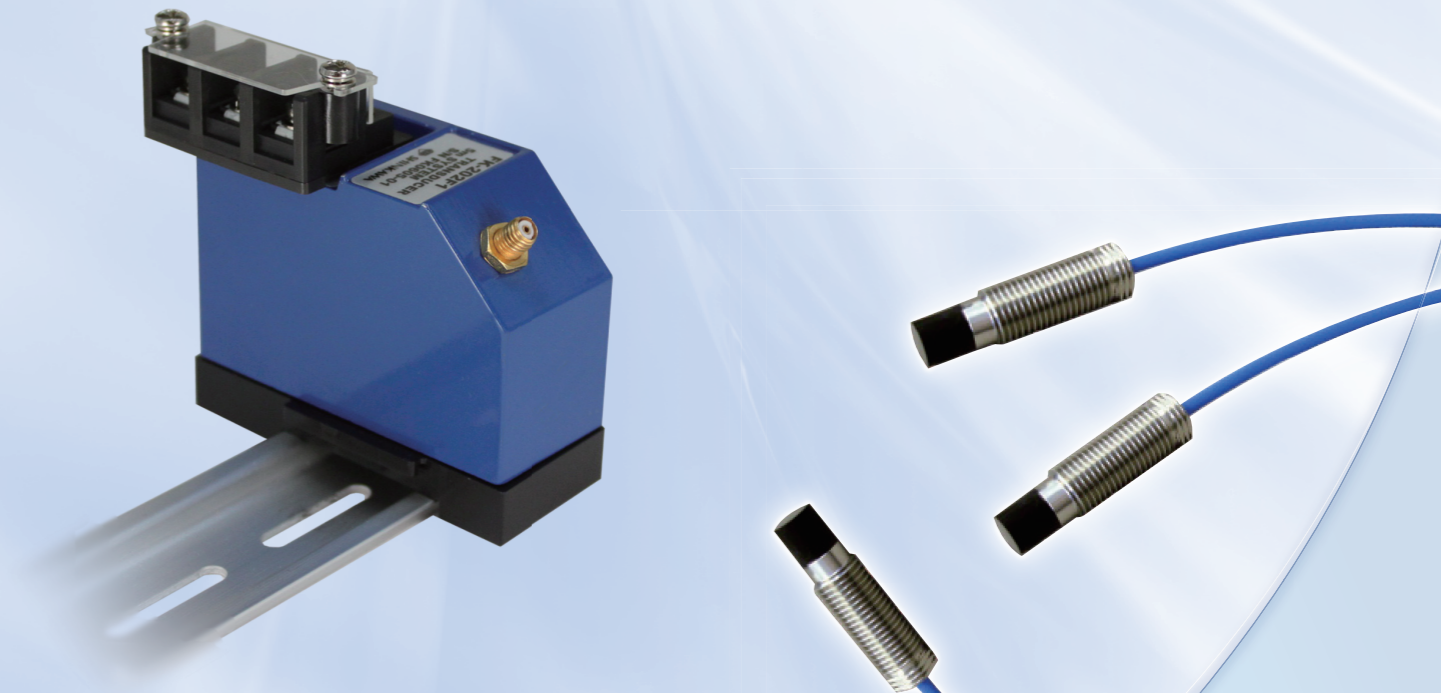


Noncontact Displacement/Vibration

FK series

FK series



Sales SHINKAWA Electric Co., Ltd.

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Manufacturing SHINKAWA Sensor Technology, Inc.

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Tel : 81-82-429-1118 Fax : 81-82-429-0804 E-mail : info@sst.shinkawa.co.jp
Web : <http://www.sst-shinkawa.co.jp>

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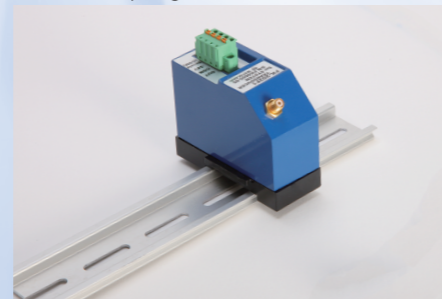
Suitable for measurements of shaft vibration, axial position, rotational speed, phase mark, eccentricity and differencial expansion on small high speed rotating machinery to large turbines and compressors

FK series transducer is an eddy current displacement sensor and it can be applied for condition monitoring of critical machines in a plant.

▼Case of Screw type terminal block(M4)

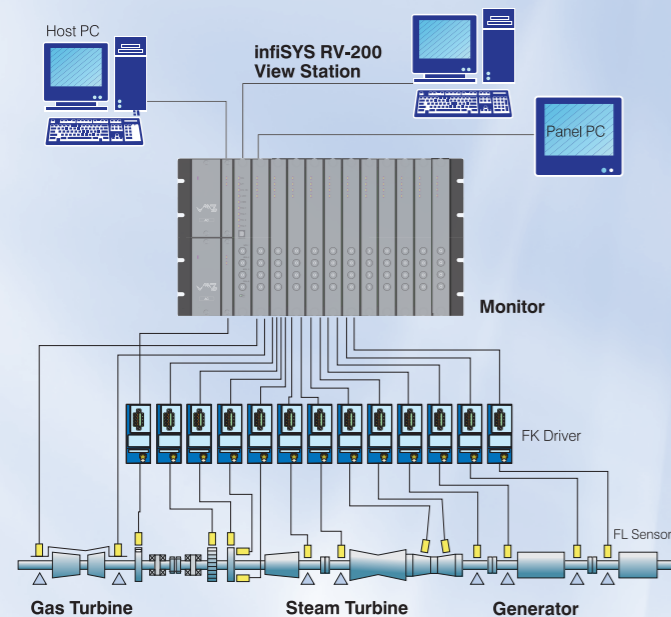


▼Case of Spring lock terminal



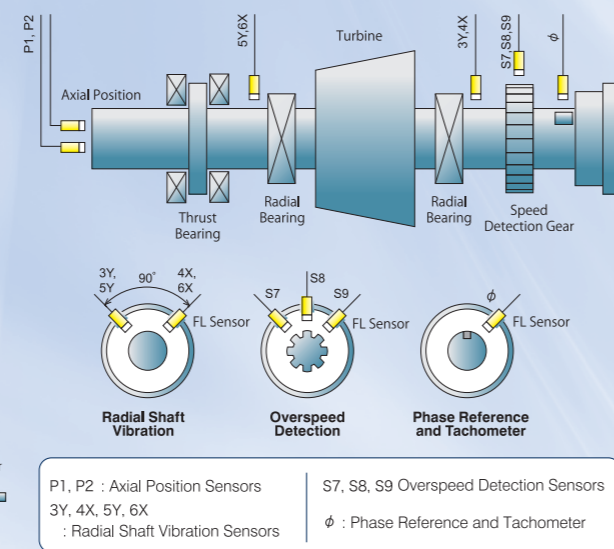
Example of Application

Typical System Configuration



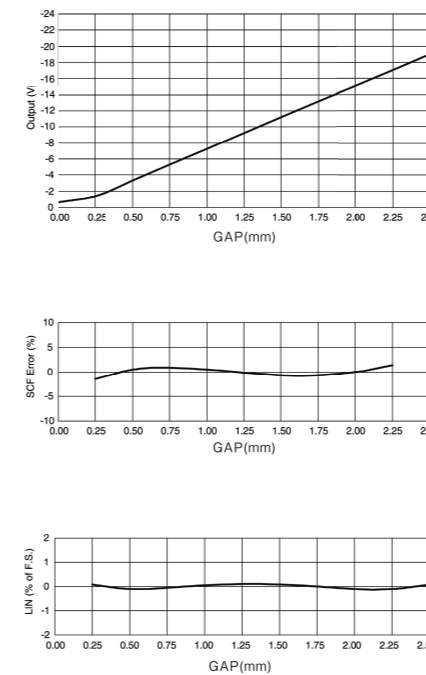
Typical system arrangement for a turbine

(Quotation from API 670 (5th Edition) Annex H)

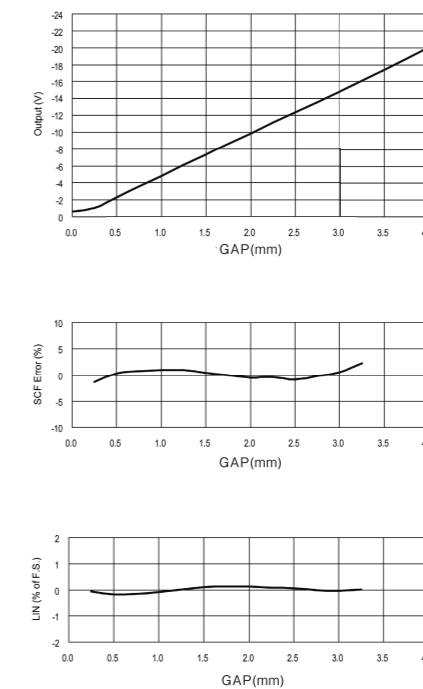


Characteristics Data (Target Material : SCM440 Flat Face Target Size: Triple Diameter or more of Sensor Tip)

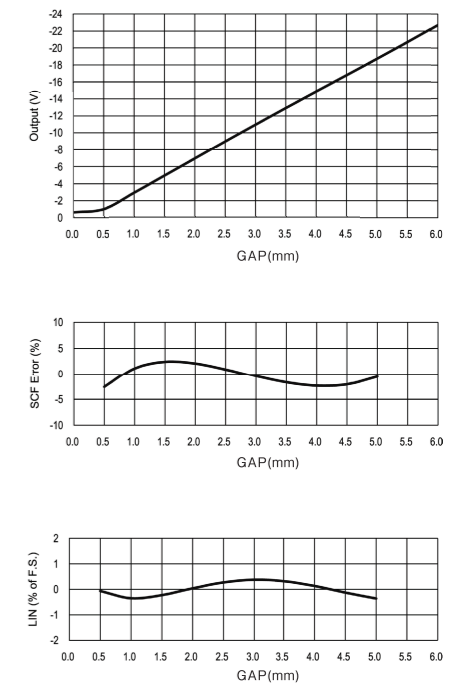
FK-202F



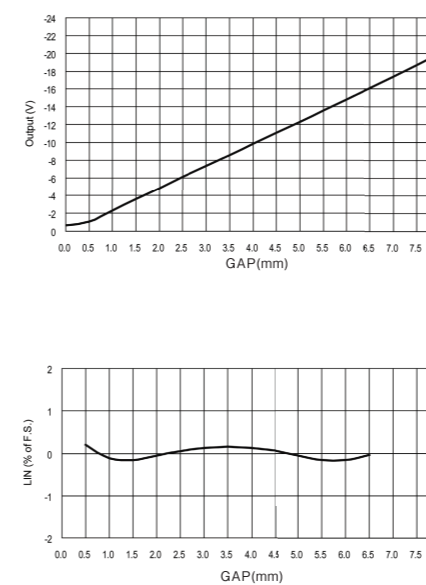
FK-302F



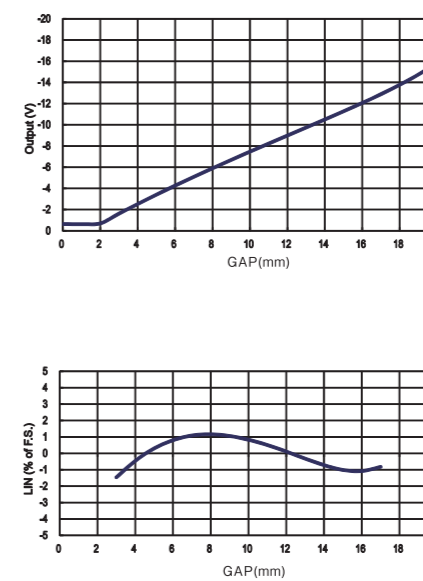
FK-452F



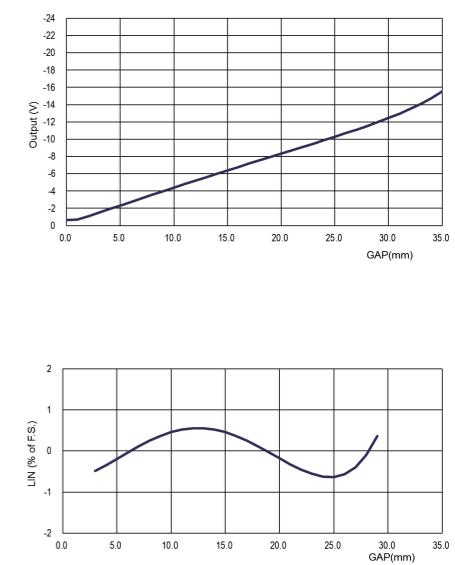
FK-602F



FK-143F



FK-263F



FL-263F

Model Code Number

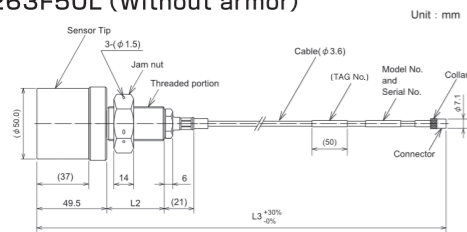
L2 L3

FL-263F50 - [] - [] - 00 - [] - []

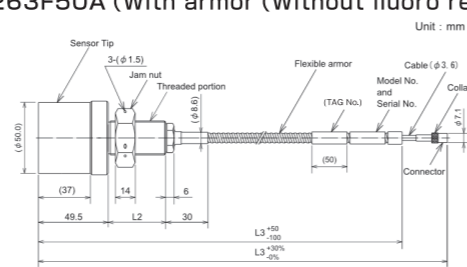
	Armor	Thread Size	Case Length	Cable Length	
L	Without armor	M1 M24 x 1.5	10 mm STEP, 40-100 mm e.g.) 10 = 100 mm	05	0.5 m
A	With armor (Without fluoro resin coating)	U1 1-12UNF	0.1 in. STEP, 1.6-3.9 in. e.g.) 35 = 3.5 in.	10	1.0 m
T	With armor (With fluoro resin coating)			50	5.0 m
				90	9.0 m

Specified in mm for M threaded sensor.
Specified in inch for UNF threaded sensor.

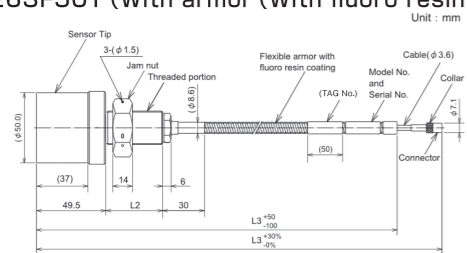
FL-263F50L (Without armor)



FL-263F50A (With armor (Without fluoro resin coating))



FL-263F50T (With armor (With fluoro resin coating))



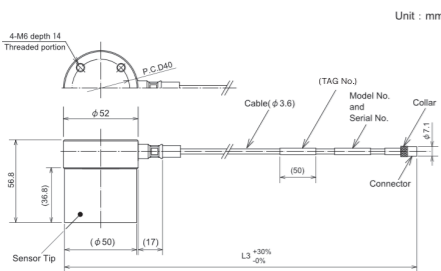
Model Code Number (Lateral cable connection type)

L3

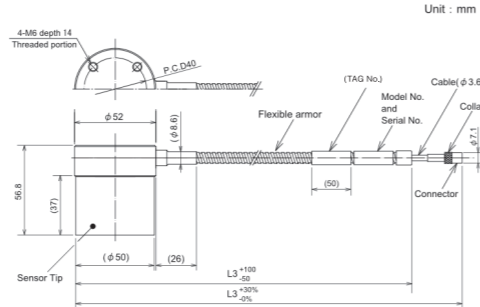
FL-263F55 - M1 - 00 - 00 - [] - []

	Armor	Cable Length
L	Without	05 0.5 m
A	With armor (Without fluoro resin coating)	10 1.0 m
T	With armor (With fluoro resin coating)	50 5.0 m
		90 9.0 m

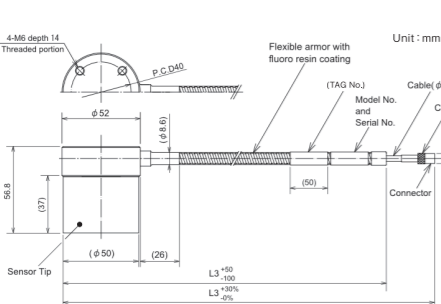
FL-263F55L (Without armor)



FL-263F55A (With armor (Without fluoro resin coating))



FL-263F55T (With armor (With fluoro resin coating))



Features

Environmental friendly design

lead-free soldering , RoHS compliance and reduced footprint

Flexible mounting options

DIN-rail adaptor, 4-screw-cramp plate adaptor (to replace VK series and others)

Quality sensor with excellent environmental resistance

sensor without impact of oil droplets and oil mist can be installed in two machines in principle

API Standard 670(5th Edition)compliant

Intrinsically safe (TIIS, CSA, ATEX, NEPSI, KTL), and marine certified (NK, LR, DNV)

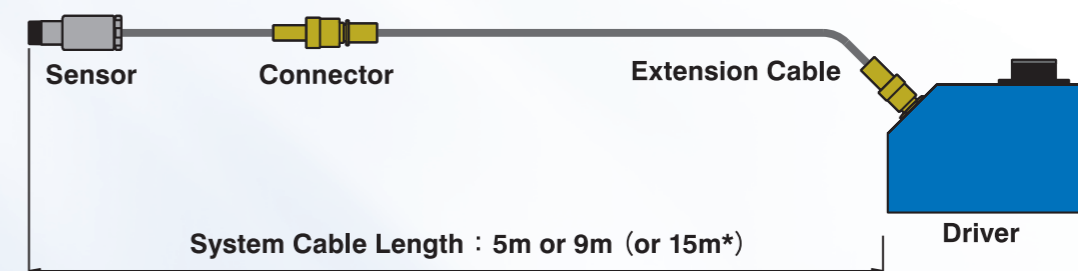
CE compliant

Applications

Condition monitoring of critical machines supported by journal bearings. Such as steam/gas turbines, generators, compressors and so on.



FK System Configuration



* FK-302F3 only

Specifications

	FK - 202F	FK - 302F	FK - 452F
Calibration Material	JIS SCM440 flat surface		
Measuring Range	0.25mm to 2.25mm from sensor tip	0.25mm to 3.25mm from sensor tip	0.5mm to 5.0mm from sensor tip
Scale Factor	7.87V/mm	5.0V/mm	3.94V/mm
Scale Factor Error ^{*1}	Within ±5% of 7.87V/mm (for 5m system) Within ±6.5% of 7.87V/mm (for 9m system) (including interchangeability errors) Step : 0.25mm, Linear range : 2mm	Within ±4% of 5.0V/mm (if calibrated as a system) Within ±10% of 5.0V/mm (including interchangeability errors) (including interchangeability errors) Step : 0.25mm, Linear range : 3mm	Within ±6% of 3.94V/mm (if calibrated as a system) Within ±10% of 3.94V/mm (including interchangeability errors) (including interchangeability errors) Step : 0.5mm, Linear range : 4mm
Linearity ^{*1}	Within ±25μm of 7.87V/mm Straight line : (for 5m system) Within ±38μm of 7.87V/mm Straight line : (for 9m system) (including interchangeability errors) Linear range : 2mm	Within ±30μm of 5.0V/mm Straight line: (if calibrated as a system) Within ±45μm of 5.0V/mm Straight line: (including interchangeability errors) Linear range : 3mm	Within ±50μm of 3.94V/mm Straight line: (if calibrated as a system) Within ±100μm of 3.94V/mm Straight line: (including interchangeability errors) Linear range : 4.5mm
Frequency Response ^{*1}	DC to 10kHz(-3dB)	DC to 10kHz or more(-3dB)	DC to 10kHz(-3dB)
Sensor Tip Diameter	Approx. 5mm or 8mm dia.	Approx. 10mm dia.	Approx. 11mm dia.
System Cable Length	5m, 9m, (15m ^{*)})		
Operating Temperature Range		Sensor : -40 to +177°C Extension Cable : -40 to +177°C Driver : -40 to +80°C	
Operating Humidity Range	30 to 95%RH (non-condensing, non-submerged)(Sensor body : 100%RH)		
Power Supply	-24VDC±10%		
Terminal Block	Screw type terminal block (M4) or Spring lock terminal		

*1 The above specification apply at 25°C with -24VDC power supply and load resistance 10kΩ and JIS SCM440 target.
*2 FK-302F3 only.

	FK - 602F	FK - 143F	FK - 263F
Calibration Material	JIS SCM440 flat surface		
Measuring Range	0.5mm to 6.5mm from sensor tip	3mm to 16.5mm from sensor tip	3mm to 29mm from sensor tip
Sensitivity ^{*1}	2.5V/mm	0.8V/mm	0.4V/mm
Sensitivity Error ^{*1}	Within ±4%		
Linearity ^{*1}	Within ±70μm of 2.5V/mm Straight line: (if calibrated as a system) Within ±90μm of 2.5V/mm Straight line: (including interchangeability errors) Linear range : 6mm	Within ±200μm of 0.8V/mm Straight line: (if calibrated as a system) Within ±270μm of 0.8V/mm Straight line: (including interchangeability errors) Linear range : 13.5mm	Within ±250μm of 0.4V/mm Straight line: (if calibrated as a system) Within ±400μm of 0.4V/mm Straight line: (including interchangeability errors) Linear range : 26mm
Frequency Response ^{*1}	DC to 10kHz or more(-3dB)	DC to 200Hz or more(-3dB)	
Sensor Tip Diameter	Approx. 18mm dia.	Approx. 27mm dia.	Approx. 50mm dia.
System Cable Length	5m or 9m		
Operating Temperature Range		Sensor : -40 to +125°C Extension Cable : -40 to +125°C Driver : -40 to +80°C	
Operating Humidity Range	30 to 95%RH (non-condensing, non-submerged)(Sensor body : 100%RH)		
Power Supply	-24VDC±10%		
Terminal Block	Screw type terminal block (M4) or Spring lock terminal		

*1 The above specification apply at 25°C with -24VDC power supply and load resistance 10kΩ and JIS SCM440 target.

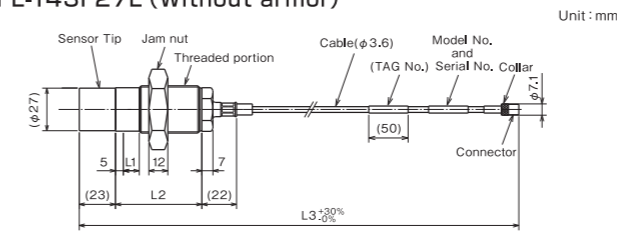
FL-143F

Model Code Number

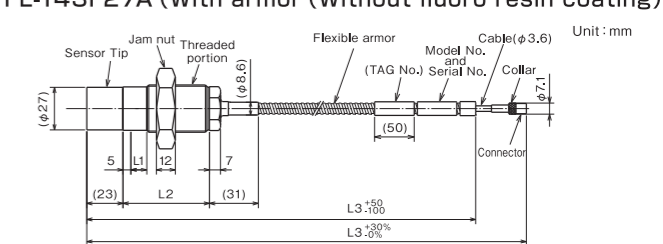
FL-143F27 □ - □ - □ - □ - □

	Armor	Thread Size	Unthreaded Length	Case Length	Cable Length
L	Without armor	M1 M30 × 1.5	10 mm STEP 0-60 mm L1 ≤ L2 - 40 mm e.g.) 02 = 20 mm	10 mm STEP, 40-100 mm e.g.) 10 = 100 mm	05 0.5 m 10 1.0 m 50 5.0 m 90 9.0 m
A	With armor (Without fluoro resin coating)	U1 11/4-12UNF	0.1 in. STEP, 0-2.4 in. L1 ≤ L2 - 1.5 in. e.g.) 04 = 0.4 in.	0.1 in. STEP, 1.6-3.9 in. e.g.) 35 = 3.5 in.	
T	With armor (With fluoro resin coating)		Specified in mm for M threaded sensor. Specified in inch for UNF threaded sensor.		

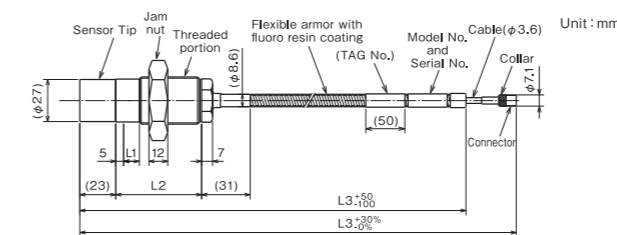
FL-143F27L (Without armor)



FL-143F27A (With armor (Without fluoro resin coating))



FL-143F27T (With armor (With fluoro resin coating))

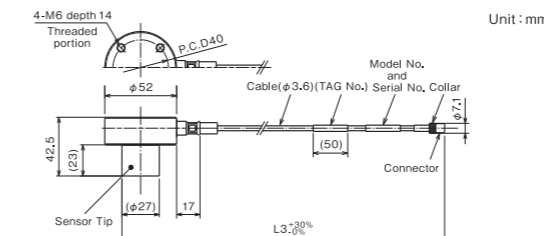


Model Code Number (Lateral cable connection type)

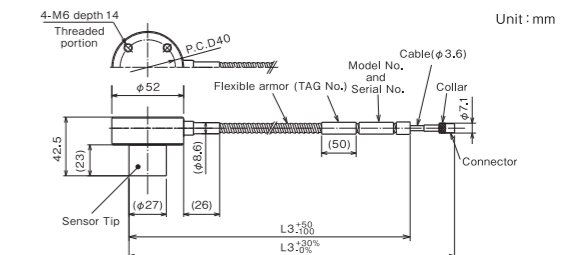
FL-143F28 □ - M1-00-00 - □

	Armor	Thread Size	Cable Length
L	Without armor	M1 4-M6 DEPTH 14	05 0.5 m 10 1.0 m 50 5.0 m 90 9.0 m
A	With armor (Without fluoro resin coating)		
T	With armor (With fluoro resin coating)		

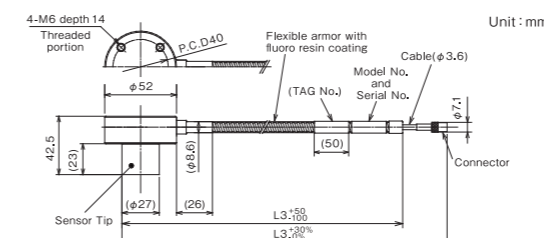
FL-143F28L (Without armor)



FL-143F28A (With armor (Without fluoro resin coating))



FL-143F28T (With armor (With fluoro resin coating))



FK-452F

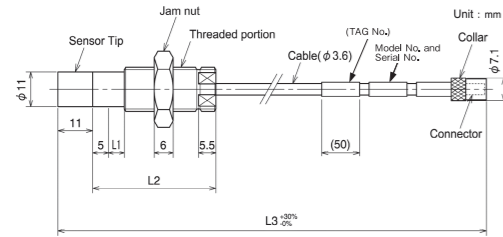
■ Model Code Number

FL-452F11-□-□-□-□-□

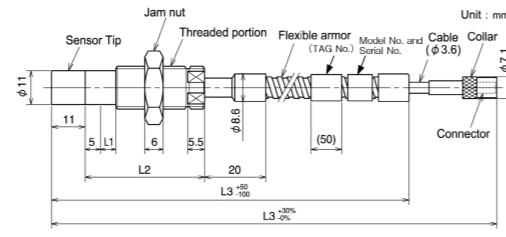
Armor	Thread Size	Unthreaded Length	Case Length	Cable Length	
L Without armor	M1 M14 × 1.5	10 mm STEP, 0-100 mm	10 mm STEP, 20 - 120 mm	05	0.5 m
A With armor (Without fluoro resin coating)	U1 1/2 - 20UNF	L1 ≤ L2 - 20 mm e.g.) 02 = 20 mm	e.g.) 10 = 100 mm	10	1.0 m
T With armor (With fluoro resin coating)		0.1 in. STEP, 0 - 4.0 in. L1 ≤ L2 - 0.7 in. e.g.) 04 = 0.4 in.	0.1 in. STEP, 0.8 - 4.7 in. e.g.) 35 = 3.5 in.	50	5.0 m
				90	9.0 m

Specified in mm for M threaded sensor.
Specified in inch for UNF threaded sensor.

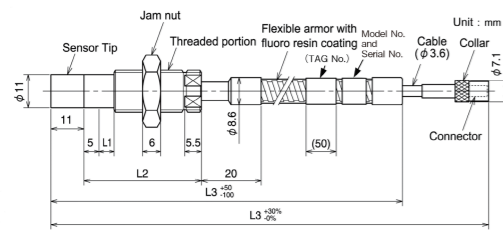
FL-452F11L (Without armor)



FL-452F11A (With armor (Without fluoro resin coating))



FL-452F11T (With armor (With fluoro resin coating))



FL-602F

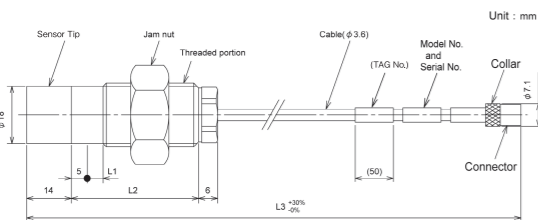
■ Model Code Number

FL-602F18-□-□-□-□-□

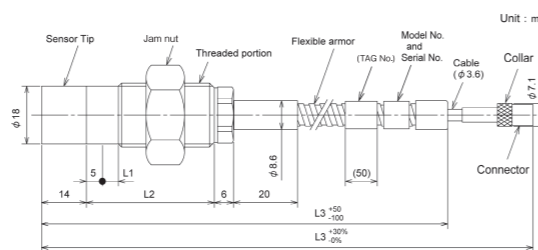
Armor	Thread Size	Unthreaded Length	Case Length	Cable Length	
L Without armor	M1 M20 × 1.5	10 mm STEP, 0-80 mm	10 mm STEP, 40-120 mm	05	0.5 m
A With armor (Without fluoro resin coating)	U1 7/8-14UNF	L1 ≤ L2 - 40 mm e.g.) 02=20 mm	e.g.) 10=100 mm	10	1.0 m
T With armor (With fluoro resin coating)		0.1 in. STEP, 0-3.1 in. L1 ≤ L2 - 1.6 in. e.g.) 04=0.4 in.	0.1 in. STEP, 1.6-4.7 in. e.g.) 35=3.5 in.	50	5.0 m
				90	9.0 m

Specified in mm for M threaded sensor.
Specified in inch for UNF threaded sensor.

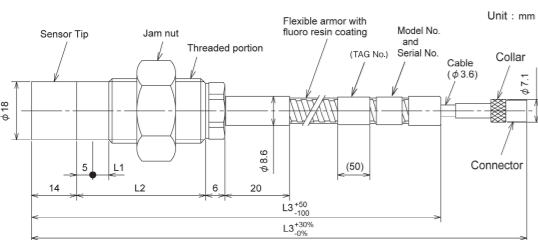
FL-602F18L (Without armor)



FL-602F18A (With armor (Without fluoro resin coating))



FL-602F18T (With armor (With fluoro resin coating))



FK Driver Model Code Number and Outline Drawing

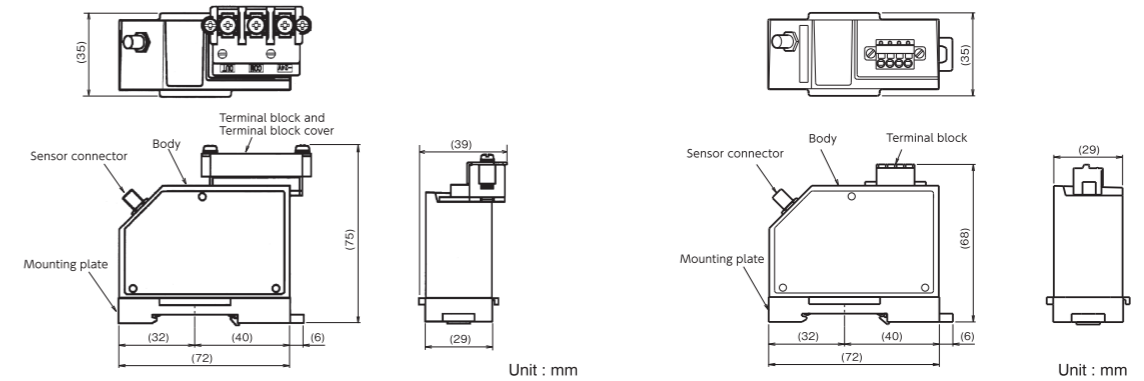
■ Model Code Number FK-□□□F□-□-□

Linear Range	System Cable Length	Mounting Plate		Terminal block	
202 2mm	1 5m	1	DIN rail (35mm) mount	1	Screw type terminal block (M4)
302 3mm	2 9m	2	Screw mount (50.8×50.8mm)	2	Spring lock terminal
452 4.5mm	3 15m ^{*1}	3	Screw mount (92×31mm : for VK replacement)		
602 6mm		4	Screw mount multi-pitch (50.8×50.8mm and 92×31mm)		
143 13.5mm					
263 26mm					

^{*1} FK-302F3 only.

■ FK-□□□F□-1-1 Screw type terminal block (M4)

■ FK-□□□F□-1-2 Spring lock terminal

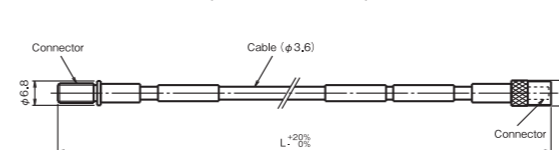


FW Extension Cable Model Code Number and Outline Drawing

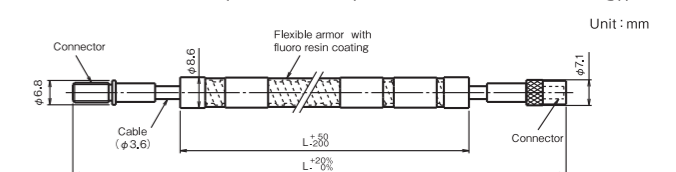
■ Model Code Number FW-□□□F□-□

Linear Range	Armor	Cable Length	
202 2mm	L Without armor	40	4.0m
302 3mm	A With armor (Without fluoro resin coating)	45	4.5m
452 4.5mm		80	8.0m
602 6mm	T With armor (With fluoro resin coating)	85	8.5m
143 13.5mm			
263 26mm			

■ FW-□□□FL (Without armor)



■ FW-□□□FT (With armor (With fluoro resin coating))



FL-202F (Linear Range : 2mm)

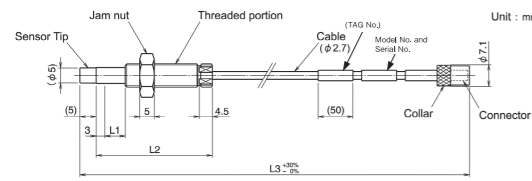
Model Code Number

FL-202F05 - [] - [] - [] - []

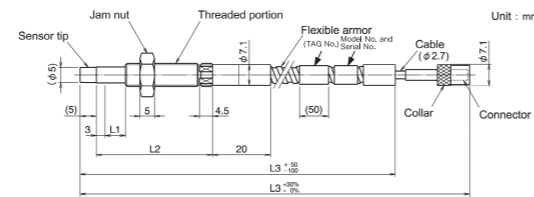
Armor	Thread Size	Unthreaded Length	Case Length	Cable Length
L Without armor	M1 M8 × 1	10mm STEP, 0-230mm L1 ≤ L2 - 20mm e.g.) 06=60mm	10mm STEP, 20-250mm e.g.) 25=250mm	05 0.5m 10 1.0m 50 5.0m 90 9.0m
A With armor (Without fluoro resin coating)	U1 1/4-28UNF	0.1in. STEP, 0-9.2in. L1 ≤ L2 - 0.7in. e.g.) 04=0.4in.	0.1in. STEP, 0.8-9.9in. e.g.) 35=3.5in.	
T With armor (With fluoro resin coating)				

Specified in mm for M threaded sensor.
Specified in inch for UNF threaded sensor.

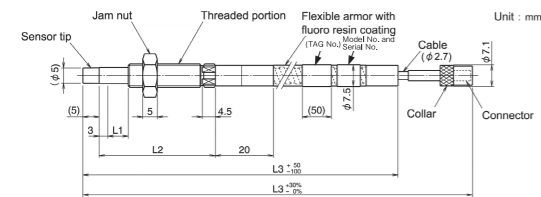
FL-202F05L (Without armor)



FL-202F05A (With armor (Without fluoro resin coating))



FL-202F05T (With armor (With fluoro resin coating))



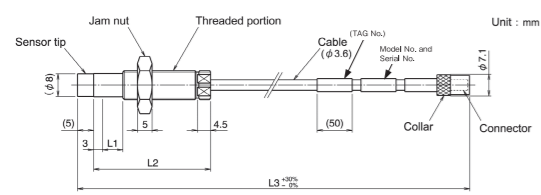
Model Code Number

FL-202F08 - [] - [] - [] - []

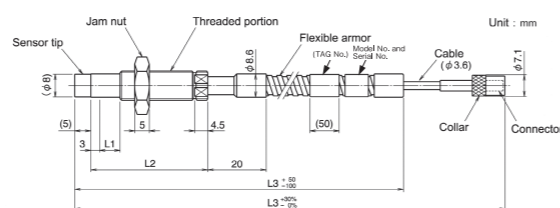
Armor	Thread Size	Unthreaded Length	Case Length	Cable Length
L Without armor	M2 M10 × 1	10mm STEP, 0-230mm L1 ≤ L2 - 20mm e.g.) 06=60mm	10mm STEP, 20-250mm e.g.) 25=250mm	05 0.5m 10 1.0m 50 5.0m 90 9.0m
A With armor (Without fluoro resin coating)	U2 3/8-24UNF	0.1in. STEP, 0-9.2in. L1 ≤ L2 - 0.7in. e.g.) 04=0.4in.	0.1in. STEP, 0.8-9.9in. e.g.) 35=3.5in.	
T With armor (With fluoro resin coating)				

Specified in mm for M threaded sensor.
Specified in inch for UNF threaded sensor.

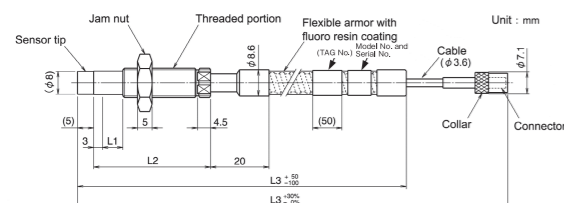
FL-202F08L (Without armor)



FL-202F08A (With armor (Without fluoro resin coating))



FL-202F08T (With armor (With fluoro resin coating))



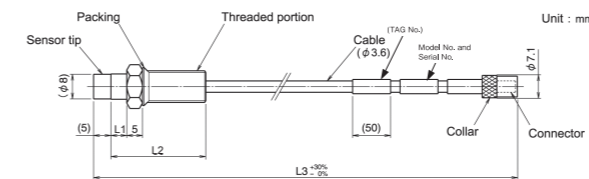
Model Code Number

FL-202F08R - [] - [] - [] - []

Thread Size	Unthreaded Length	Case Length	Cable Length
M2 M10 × 1	R5=5mm	03=30mm	05 0.5m 10 1.0m 50 5.0m 90 9.0m
U2 3/8-24UNF	02=0.2in.	12=1.2in.	

Specified in mm for M threaded sensor.
Specified in inch for UNF threaded sensor.

FL-202F08R (Reverse mount type)



FL-302F (Linear Range : 3mm)

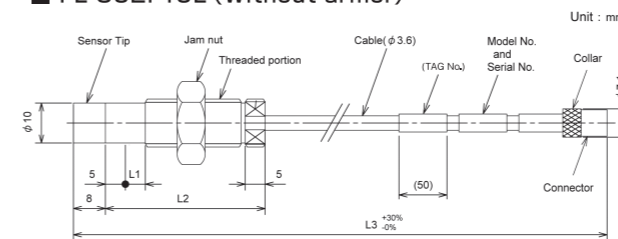
Model Code Number

FL-302F10 - [] - [] - [] - []

Armor	Thread Size	Unthreaded Length	Case Length	Cable Length
L Without armor	M1 M12 × 1.25	10mmSTEP,0-100mm L1 ≤ L2 - 20mm e.g.) 02=20mm	10mmSTEP, 20-120mm e.g.) 10=100mm	05 0.5m 10 1.0m 50 5.0m 90 9.0m
A With armor (Without fluoro resin coating)	U1 1/2-20UNF	0.1in. STEP, 0-4.0in. L1 ≤ L2 - 0.7in. e.g.) 04=0.4in.	0.1in. STEP, 0.8-4.7in. e.g.) 35=3.5in.	
T With armor (With fluoro resin coating)				

Specified in mm for M threaded sensor.
Specified in inch for UNF threaded sensor.

FL-302F10L (Without armor)



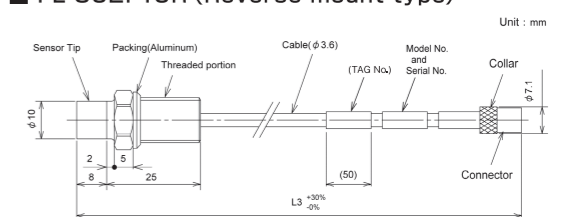
Model Code Number (Reverse mount type)

FL-302F10R - [] - [] - [] - []

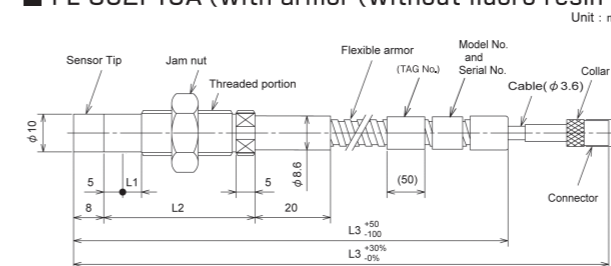
Thread Size	Unthreaded Length	Case Length	Cable Length
M1 M12 × 1.25	R2=2mm	03=25mm	05 0.5m 10 1.0m 50 5.0m 90 9.0m
U1 1/2-20UNF	01=0.1in.	10=1.0in.	

Specified in mm for M threaded sensor.
Specified in inch for UNF threaded sensor.

FL-302F10R (Reverse mount type)



FL-302F10A (With armor (Without fluoro resin coating))



FL-302F10T (With armor (With fluoro resin coating))

