FK SERIES TRANSDUCER SPECIFICATIONS

FK-202F TRANSDUCER

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Model Code / Additional Spec. Code (No entry if additional spec. code is not specified.)

FK-202F										
System cable length		Mounting plate		Terminal block			Intrinsic safety (compliance with IEC standards) Geother		spec.	
1	5m	1	DIN Rail(35mm) Mount	1	Screw type terminal block (M4)	10	Japan : DEKRA Ex ia IIC T4 Ga			
2	9m	2	Screw mount (50.8 × 50.8mm)	2	Spring lock terminal		Canada / North America : CSA C/US Class I, Division 1, Groups A,B,C,D T4			
		3	Screw mount (92 × 31mm: For VK replacement)			40	Ex ia IIC T4 Ga Class I, Zone 0, AEx ia IIC T4 Ga			
		4	Screw mount Multi-pitch (50.8×50.8mm and 92×31mm)				Europe : ATEX Ex ia IIC T4 Ga			
				•		70	China : Ex-CCC Ex ia IIC T4 Ga			
						80	Korea : KCs Ex ia IIC T4 Ga			
						В0	Taiwan : TS Ex ia IIC T4 Ga			
						C0	Russia:TR-CU 0 Ex ia IIC T4 Ga X			
						D0	Oceania: IECEx Ex ia IIC T4 Ga			

^{*1} Above code shows model number of driver only. Refer to outline drawings for model number of sensor and extension cable.

MEASURING RANGE 0.25mm to 2.25mm from sensor tip SENSITIVITY'2 7.87V/mm Within ±4% Within ±4% Within ±4% Within ±5% of 7.87V/mm (for 5m system) (including interchangeability errors) Step : 0.25mm, Linear range : 2mm Dict Condition : 339, and 7.87V/mm straight line : (for 5m system) Within ±25, and 0.7.87V/mm straight line : (for 5m system) Within ±38, and 0.7.87V/mm straight line : (for 5m system) Union arrange : 2mm Dict Condition : Gap=2mm, Target : JIS SCM440 Union to 60°C (at 20°C standard) Driver Less than ±3% of F.S. Condition : Gap=2mm, Target : JIS SCM440 Union to 60°C (at 20°C standard) Driver Less than ±3% of F.S. Condition : Gap=2mm, Target : JIS SCM440 Union to 60°C (at 20°C standard) Driver Less than ±3% of F.S. Condition : Gap=2mm, Target : JIS SCM440 Union to 60°C (at 20°C standard) Driver Less than ±3% of F.S. Condition : Gap=2mm, Target : JIS SCM440 Union to 60°C (at 20°C standard) Driver Less than ±3% of F.S. Condition : Gap=2mm, Target : JIS SCM440 Union to 60°C (at 20°C standard) Driver Less than ±3% of F.S. Condition : Gap=2mm, Target : JIS SCM440 Union to 60°C (at 20°C standard) Union		SPECIFI	CATIONS			
SENSITIVITY*2	CALIBRATION MATERIAL	JIS SCM440 flat surface	TEMPERATURE	Sensor : Less than ±3% of F.S.		
SENSITIVITY ERROR'2 Within ±4% Within ±5% of 7.87V/mm (for 5m system) Within ±5% of 7.87V/mm (for 5m system) Within ±5% of 7.87V/mm (for 5m system) Univer : Less than ±5% of 7.87V/mm (for 5m system) Univer : Less than ±5% of 7.87V/mm (for 5m system) Univer : Less than ±5% of 7.87V/mm (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm tsraight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) Univer : Less than ±5% of 7.87V/mm straight line : (for 5m system) U	MEASURING RANGE	0.25mm to 2.25mm from sensor tip	CHARACTERISTIC	Extension Cable : Less than ±4% of F.S.		
SENSTINITY ERROR*2	SENSITIVITY*2	7.87V/mm	1	Condition : Gap=2mm, Target : JIS SCM440 0 to 80°C (at 20°C standard)		
Driver Less than ±3% of F.S.	SENSITIVITY ERROR*2	Within ±4%	1			
Condiding Mithin ±6.5% of 7.87V/mm (for 9m system) Loop : Less than ±6% of F.S.	SCALE FACTOR ERROR*2	Within ±5% of 7.87V/mm (for 5m system)	1			
Interchangeability errors Step : 0.25mm, Linear range : 2mm	(including					
(including interchangeability errors) (for 5m system) (for 5m system) OPERATING (Sensor body: 100%RH) 30 to 95% RH (non-condensing, non-submerged) Within ±38,m of 7.87V/mm straight line: (for 9m system) (Linear range: 2mm DC to 10kHz (-3dB) DE to 10kHz (-3dB) STRENGTH OF DRIVER 1mA or less at 500VAC for one minute MAX. OUTPUT VOLTAGE*2 Approx23VDC INSULATION Between each terminals and mounting plate: STRENGTH OF DRIVER 1nA or less at 500VAC for one minute MAX. OUTPUT VOLTAGE*2 Approx0.6VDC (Sensor OPEN/Sensor SHORT) NSULATION Between each terminals and mounting plate: 1nSULATION Between each terminals and mounting plate: 1nSULATION Between each terminals and mounting plate: 1nSULATION RESISTANCE OF DRIVER 100MΩ or more at 500VAC 1nOMΩ or more at 500VAC APPICABLE WIRE SIZE Screw type terminal block (M4): 0.75 to 2mm² Spring lock terminal 0.2 to 1.5mm² Other OUTPUT NOISE*2 Approx. 15mVpk-pk + power supply noise Approx. 200g Other Other Other OPERATING Sensor - 40 to +177°C Extension Cable & Driver) Extension Cable &	interchangeability errors)					
Mthin ±38 μm of 7.8 PV/mm straight line :	LINEARITY*2	Within ±25 µm of 7.87V/mm straight line :	1	0 to 60°C (at 20°C standard)		
Mthin ±38 μm of 7.8 PV/mm straight line :	(including	(for 5m system)	OPERATING	30 to 95% RH (non-condensing, non-submerged)		
Linear range : 2mm	interchangeability errors)	Within ±38 µm of 7.87V/mm straight line:	HUMIDITY RANGE			
FREQUENCY RESPONCE*2 DC to 10kHz (-3dB) Aprox23VDC Approx23VDC Approx23VDC Approx23VDC Approx0.6VDC (Sensor OPEN/Sensor SHORT) Approx0.6VDC (Sensor SHO		(for 9m system)	POWER SUPPLY	-24VDC ± 10%		
MAX. OUTPUT VOLTAGE*2 Approx23VDC SENSOR ABNORMAL Approx0.6VDC (Sensor OPEN/Sensor SHORT) Approx0.6VDC (Sensor SHORT) Approx0.7STD		Linear range : 2mm	DIELECTRIC	Between each terminals and mounting plate :		
SENSOR ABNORMAL OUTPUT VOLTAGE*2 Approx0.6VDC (Sensor OPEN/Sensor SHORT) RESISTANCE OF DRIVER APPLICABLE WIRE SIZE 100MΩ or more at 500VDC OUTPUT IMPEDANCE*2 50Ω Current 5mA(max.) Screw type terminal block (M4) : 0.75 to 2mm² CURRENT CONSUMPTION (10kΩ load) Max15mA DRIVER MASS Approx. 200g OUTPUT NOISE*2 Approx. 5mm or 8mm dia. Other SENSOR TIP DIAMETER Approx. 5mm or 8mm dia. Approx. 7.1mm dia. SYSTEM CABLE LENGTH 5m or 9m Sensor : -40 to +177°C Extension Cable & Driver) STEMPERATURE RANGE (Refer to NOTICE 8) E10 : -40 to +80°C(Sensor, Extension Cable & Driver) E50 : -40 to +80°C(Sensor, Extension Cable & Driver) E50 : -40 to +80°C(Sensor, Extension Cable & Driver) E00 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E00 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E00 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver)	FREQUENCY RESPONCE*2	DC to 10kHz (-3dB)	STRENGTH OF DRIVER			
SENSOR ABNORMAL OUTPUT VOLTAGE*2 Approx0.6VDC (Sensor OPEN/Sensor SHORT) RESISTANCE OF DRIVER APPLICABLE WIRE SIZE 100MΩ or more at 500VDC OUTPUT IMPEDANCE*2 50Ω Current 5mA(max.) Screw type terminal block (M4) : 0.75 to 2mm² CURRENT CONSUMPTION (10kΩ load) Max15mA DRIVER MASS Approx. 200g OUTPUT NOISE*2 Approx. 5mm or 8mm dia. Other SENSOR TIP DIAMETER Approx. 5mm or 8mm dia. Approx. 7.1mm dia. SYSTEM CABLE LENGTH 5m or 9m Sensor : -40 to +177°C Extension Cable & Driver) STEMPERATURE RANGE (Refer to NOTICE 8) E10 : -40 to +80°C(Sensor, Extension Cable & Driver) E50 : -40 to +80°C(Sensor, Extension Cable & Driver) E50 : -40 to +80°C(Sensor, Extension Cable & Driver) E00 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E00 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E00 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver) E60 : -40 to +80°C(Sensor, Extension Cable & Driver)	MAX. OUTPUT VOLTAGE*2	Approx23VDC	INSULATION	Between each terminals and mounting plate :		
OUTPUT IMPEDANCE*2 SOΩ Current 5mA(max.) Sorew type terminal block (M4) 10.75 to 2mm*	SENSOR ABNORMAL		RESISTANCE OF DRIVER			
OUTPUT IMPEDANCE*2 50Ω Current 5mA(max.) Spring lock terminal : 0.2 to 1.5mm²	OUTPUT VOLTAGE*2	Approx0.6VDC (Sensor OPEN/Sensor SHORT)	APPLICABLE WIRE SIZE	Screw type terminal block (M4) : 0.75 to 2mm ²		
Other Other	OUTPUT IMPEDANCE*2	50Ω Current 5mA(max.)	1	Spring lock terminal : 0.2 to 1.5mm ²		
Other Other	CURRENT CONSUMPTION		DRIVER MASS	Approx. 200g		
SENSOR TIP DIAMETER	(10kΩ load)	Max15mA	Other			
CABLE DIAMETER	OUTPUT NOISE*2	Approx. 15mVpk-pk + power supply noise				
CONNECTOR DIAMETER	SENSOR TIP DIAMETER	Approx. 5mm or 8mm dia.				
SYSTEM CABLE LENGTH	CABLE DIAMETER	Approx. 2.7mm or 3.6mm dia.				
OPERATING	CONNECTOR DIAMETER					
Extension Cable : -40 to +177°C	SYSTEM CABLE LENGTH					
Refer to NOTICE 8 Driver : -40 to +80°C RANGE OF TEMPERATURE E10 : -40 to +80°C (Sensor, Extension Cable & Driver) AT EXPLOSION PROOF E40 : -40 to +80°C (Sensor, Extension Cable & Driver) CONSTRUCTION E50 : -40 to +80°C (Sensor, Extension Cable & Driver) E70 : -40 to +80°C (Sensor, Extension Cable & Driver) E80 : -40 to +80°C (Sensor, Extension Cable & Driver) E80 : -40 to +80°C (Sensor, Extension Cable & Driver) E80 : -40 to +80°C (Sensor, Extension Cable & Driver) E00 : -40 to +8						
RANGE OF TEMPERATURE						
AT EXPLOSION PROOF CONSTRUCTION E50 : -40 to +80°C(Sensor, Extension Cable & Driver) E70 : -40 to +80°C(Sensor, Extension Cable & Driver) E80 : -40 to +80°C(Sensor, Extension Cable & Driver) E80 : -40 to +80°C(Sensor, Extension Cable & Driver) E80 : -40 to +80°C(Sensor, Extension Cable & Driver) E70 : -40 to +80°C(Sensor, Extension Cable & Driver) E70 : -40 to +80°C(Sensor, Extension Cable & Driver) E70 : -40 to +80°C(Sensor, Extension Cable & Driver) E70 : -40 to +80°C(Sensor, Extension Cable & Driver)						
E50						
E70 : -40 to +80°C(Sensor, Extension Cable & Driver) E80 : -40 to +80°C(Sensor, Extension Cable & Driver) EB0 : -40 to +80°C(Sensor, Extension Cable & Driver) EC0 : -40 to +80°C(Sensor, Extension Cable & Driver) ED0 : -40 to +80°C(Sensor, Extension Cable & Driver) ED0 : -40 to +80°C(Sensor, Extension Cable & Driver)						
E80 : -40 to +80°C(Sensor, Extension Cable & Driver) EB0 : -40 to +80°C(Sensor, Extension Cable & Driver) EC0 : -40 to +80°C(Sensor, Extension Cable & Driver) ED0 : -40 to +80°C(Sensor, Extension Cable & Driver)	CONSTRUCTION			-		
EB0 : -40 to +80°C(Sensor, Extension Cable & Driver) EC0 : -40 to +80°C(Sensor, Extension Cable & Driver) ED0 : -40 to +80°C(Sensor, Extension Cable & Driver)				-		
EC0 : -40 to +80°C(Sensor, Extension Cable & Driver) ED0 : -40 to +80°C(Sensor, Extension Cable & Driver)						
ED0 : -40 to +80°C(Sensor, Extension Cable & Driver)						
	RANGE OF TEMPERATURE	-25 to +70°C(Sensor, Extension Cable & Driver)	*2 The above specification at	only at 25°C with -24VDC power supply and		
	FOR MARINE APPLICATIONS	20 to 170 O(Ochoo), Extension Capic & Dilver)				

6H19-026 Rev.6 Issued : Apr. 2020 Revised : Jan. 2022

FK SERIES TRANSDUCER SPECIFICATIONS

FK-202F TRANSDUCER

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NOTICE

1. CALIBRATION MATERIAL

MODEL FK-202F Transducers are calibrated for JIS SCM440 flat surface (more than 15mm dia.).

If the measured target is other than JIS SCM440 flat surface, it will present a different characteristics. In such a case, calibration by the connected equipment (e.g. monitor) side should be required for system operation.
2. SHIELD WIRE CONNECTION

Connect shield wire of signal cable (3-wire shielded cable between driver and monitor) to driver's "COM" terminal (Spring lock terminal: "Shield" terminal) and monitor's "COM" terminal.

If this is not adhered to, noise may be caused.

3. CONNECTOR ISOLATION, etc.

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

The vinyl-insulating tape shall not be used, which may cause the wiring trouble in the case of temperature more than 80°C.

The connector shall not be located in the oil environment. The oil penetration to cable through the connector may cause the sensitivity change, due to the change of the cable capacitance.

MEGGER TEST OF SIGNAL CABLE

If megger test is made on the signal cable (3-wire shielded cable), be sure to discharge the charged electric load before connecting the cable to driver.If this caution is not adhered the driver could be dameged.

SENSOR INSTALLATION

Not available for rain water at out door use.

It may cause the sensitivity change and insulation down.

SCALE FACTOR ERROR and LINEARITY

The scale factor error margin and linearity margin provides for examination result in our factory.

This regulated value is not applied to the examination result in the site.

SAFETY BARRIER

In case of the intrinsically safe specification, the approved following safety barrier is recommended.

MTL 7796-

Please use in combination with the barrier which has explosion-proof certification in the country of use.

Linear range reduces when intrinsic safety system with barrier.(to approx. 95%)
OPERATING TEMPERATURE RANGE OF CONNECTOR

The operating temperature (upper limit) for connectors of the sensors and the extension cables shipped on July 31, 2011 or earlier is 125 $^{\circ}\text{C}.$

If you are unsure of the operating temperature of your connector please contact

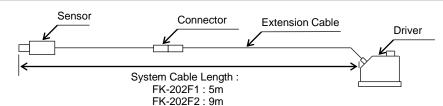
The instructions manual contains important information such as conditions necessary for safe handling of the system.

Such information and conditions are important and indispensable for ensuring safety. Therefore, be sure to read the instructions manual thoroughly before handling the system.

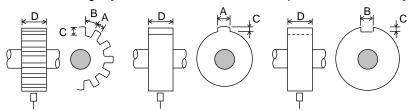
- Cable length 5.0m sensor is designed for 5m system only. Can not use for 9m system.
- In the intrinsically safe system, the product cannot be used in combination with a sensor/extension cable/driver with the intrinsically safe code "/EX \square
- 12. INSTALLATION CONDITIONS of SENSORS for MARINE APPLICATIONS When using a long case length sensor, fix it so that the protruding dimension of the sensor (dimension from the tip of the sensor to the fixed position) is as

• FL-202F05□ : 135mm or less • FL-202F08□ : 160mm or less

CONFIGURATION



Dimension of target [recommended for rotational speed measurement]



Dimension of	A ≥ 6		
Target	B≥7		
[recommended]	C ≥ 2.5		
(mm)	D ≥16		
Set gap			
[recommended]	1.0 to 1.5		
(mm)			

6H19-026 Rev.6 Issued: Apr. 2020 Revised: Jan. 2022