

DRIP-PROOF HIGH ACCURACY CURRENT OUTPUT DIGITAL OUTPUT INCLINOMETERS MEMS TILT ANGLE SENSOR

ESC3000Z series

RoHS compliant



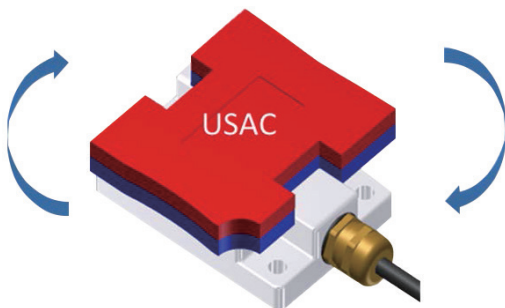
■ FEATURES

ESC-Series industrial inclinometers are high performance sensors used MEMS accelerometer to determine inclination in X and Y axes with excellent precision. Using Aluminum Die-Cast housing, the versions offer mechanical stability and encapsulated sensor, and in addition a high environmental protection in harsh industrial environments.

- Dual Axis Measurement : up to $\pm 80^\circ$
- High accuracy : Absolute Linearity $< \pm 0.5\%FS$
- Various Data Output : Voltage, Current, Serial RS-485
*Requesting other serial interface such as SAE J1939& CANopen, please contact us.
- Stable measurement under vibration
- Programmable Parameters : Inclination range, Baud Rate, Data Transmissions Period, Filter factor Transmissions Period, Filter factor.

■ NEW USER-FRIENDLY FUNCTIONS

● Easy Resetting Function for Index Point(0°)



※ Touch USAC 3 times each 180° CW rotation to ESC3000Z

Only 5 seconds to reset index point (0°) using User-Settable Adjustment Card. (USAC)

- (1) Please touch ESC 3 times with USAC.
- (2) Then current position ($\pm 5^\circ$ max./horizontality) will be changed to index point.

Any electrical connections do not needed.

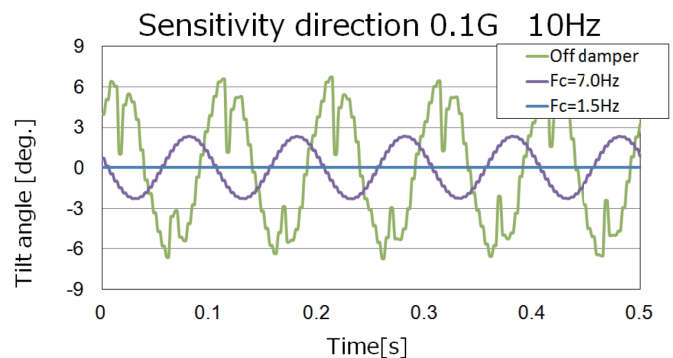
*Note: USAC is optional item

● Serial communication Function

This series has RS485 interface as standard function. Using RS-485 serial interface command, the following functions will be able to be used.

1. Retrieving of electrical angle position.
2. Retrieving of Serial number.
3. Teach-in setting of index (0°) point. (Option)

● Programmable Digital Damping Control Function



ESC3000Z series implements the digital filter that would remove external noise to give the user a choice of certain filter factor from 16 available settings.

Existing inclinometers have to add extra electrical low-pass filter or mechanical damping structure.

ESC30xxZ apply digital filter. It makes wider choice of cut-off frequency and easy to design frequency response.

*Note: Frequency response is set before shipping.

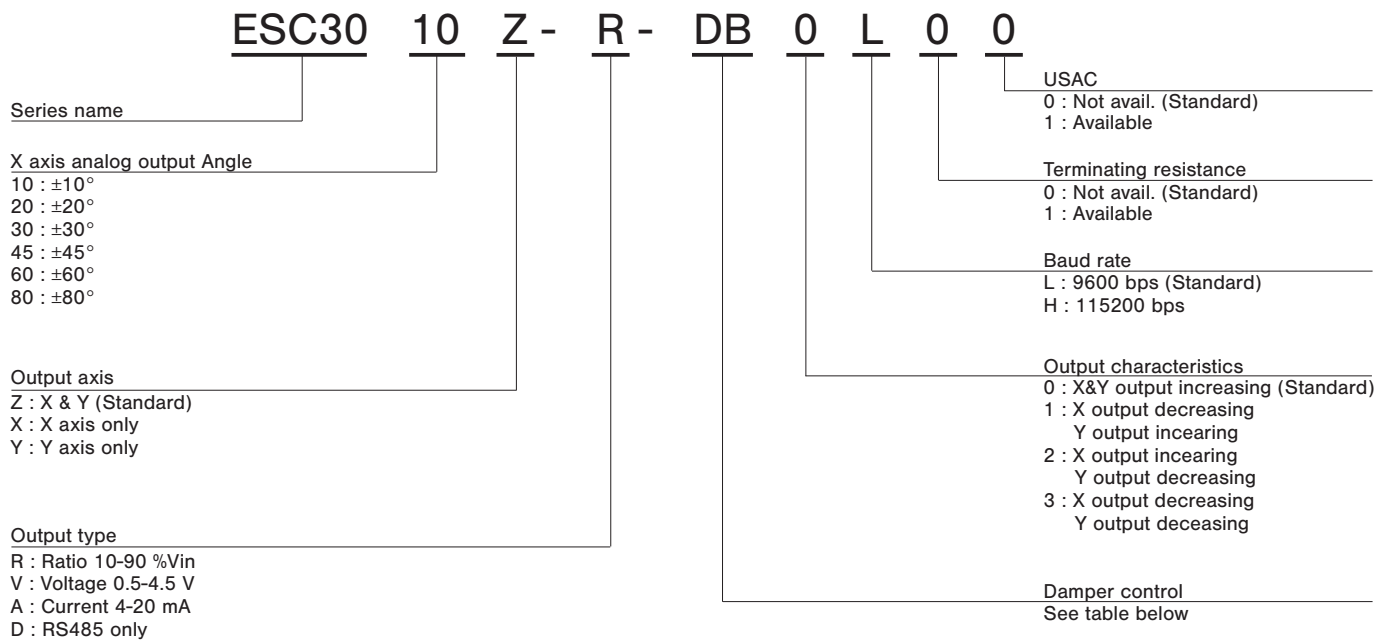
Programmable function will be option.

4. Changing of electrical analog angle range. (Option)
5. Changing damper setting. (Option)
6. Changing baud rate. (Option)
7. Changing output cycle of serial data. (Option)

ESC3000Z

INCLINOMETERS

PART NUMBER DESIGNATION



※ Cut-off frequency and Time constant against Damper time constant are shown the below table.
 It is possible to choose the best Damper time constant by operating speed and vibration condition

DAMPER TIME CONSTANT

Part No.	Level	Cut-off frequency	Time constant
D0	0	11.2 Hz	120 ms
D1	1	9.27 Hz	150 ms
D2	2	7.65 Hz	160 ms
D3	3	6.32 Hz	170 ms
D4	4	5.21 Hz	190 ms
D5	5	4.30 Hz	220 ms
D6	6	3.55 Hz	250 ms
D7	7	2.93 Hz	290 ms
D8	8	2.42 Hz	330 ms
D9	9	2.00 Hz	360 ms
DA	10	1.65 Hz	420 ms
DB	11	1.36 Hz	500 ms (Standard)
DC	12	1.21 Hz	590 ms
DD	13	0.92 Hz	700 ms
DE	14	0.76 Hz	810 ms
DF	15	0.62 Hz	970 ms

■ STANDARD SPECIFICATIONS

Item	Output	Voltage Ratio	Voltage	Current	Serial (RS-485)
Electrical Angle		$\pm 10^\circ, \pm 20^\circ, \pm 30^\circ, \pm 45^\circ, \pm 60^\circ, \pm 80^\circ$ Separate choice of X and Y axes (Option) Angle resetting function by RS-485 command is available (Option)			$\pm 80^\circ$
Absolute Linearity		$\pm 0.5\%$ FS			$\pm 0.1^\circ (\sim \pm 10^\circ)$ $\pm 0.2^\circ (\sim \pm 30^\circ)$ $\pm 0.5^\circ (\sim \pm 80^\circ)$
Input Voltage		5 $\pm$ 0.25 VDC	8 ~ 30 VDC	24 $\pm$ 4 VDC	–
Current Consumption		75 mA max.			
Output Range		10 ~ 90 %Vin	0.5 ~ 4.5 V	4 ~ 20 mA	–
Output Resolution		12bit equivalent			–
Damper Control		Time constant against input step : 443 ms (Standard) Selectable 16 steps during 70 ms ~ 900 ms (Option) Damper resetting function by RS-485 command is available (Option)			
Temp. Characteristics		0° position : $\pm 0.5^\circ$ (–30°C ~ 85°C deviation from 25°C)			
Mass		Approx. 300 g			
Cable		6 cores Cabtyre Cable, Outer diameter: dia. 7.4 mm, Core: 0.5 mm ²			
EMS		ISO 11452 corresponding $\pm 1\%$ output shifting at 10 MHz ~ 1 GHz 100 V/m (Ratio, Current, Serial), 50 V/m (Voltage)			
EMI		CISPR25 3rd.edit CLASS1 corresponding			
Operating Temp. Range		–30 ~ 85°C			
Vibration		70 m/s ² , 5 ~ 200 Hz /10min. 2 hours			
Shock		1000 m/s ² , Half sine wave 6ms			
IP Grade		IP67			
Index point Teach-in		Index point ($\pm 5^\circ$ max./horizontal) Teach-in setting (Option)			

■ TEMPERATURE CHARACTERISTICS

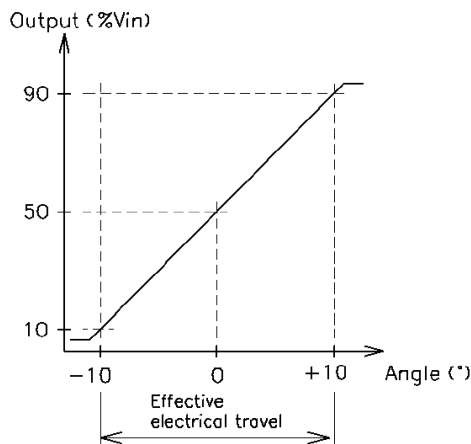
By our unique technology. ESC3000Z series is individually compensated temperature characteristics each unit.
 ESC3000Z series realized stable temperature characteristics.

ESC3000Z

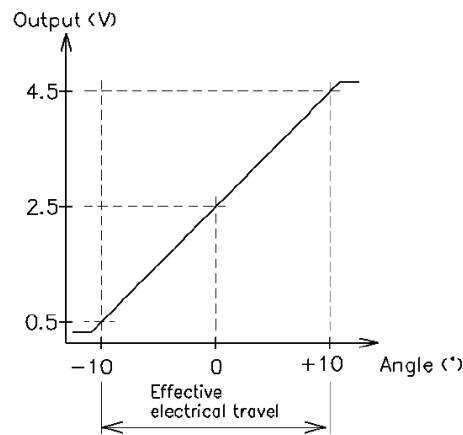
INCLINOMETERS

OUTPUT CHARACTERISTICS

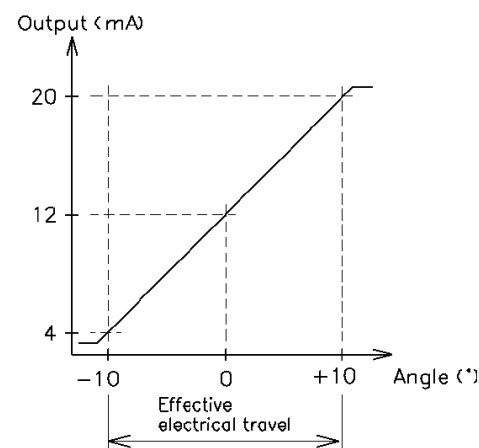
● Voltage Ratio



● Voltage

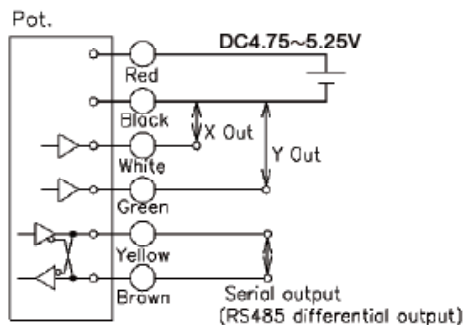


● Current

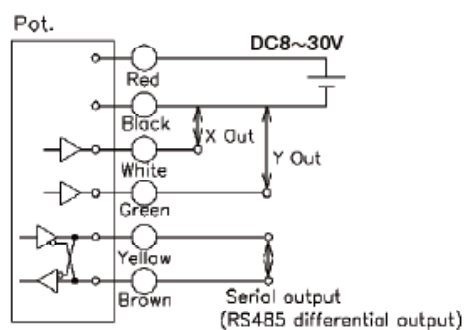


SCHEMATIC

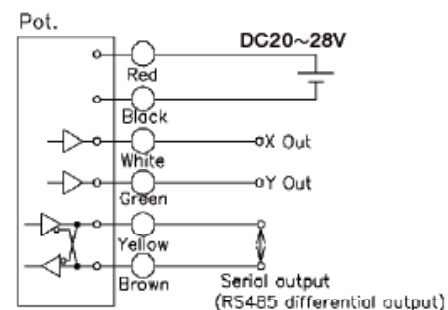
● Voltage Ratio



● Voltage



● Current



*Red, black, white, green, yellow, and brown indicate harness colors.

HANDLING INSTRUCTION

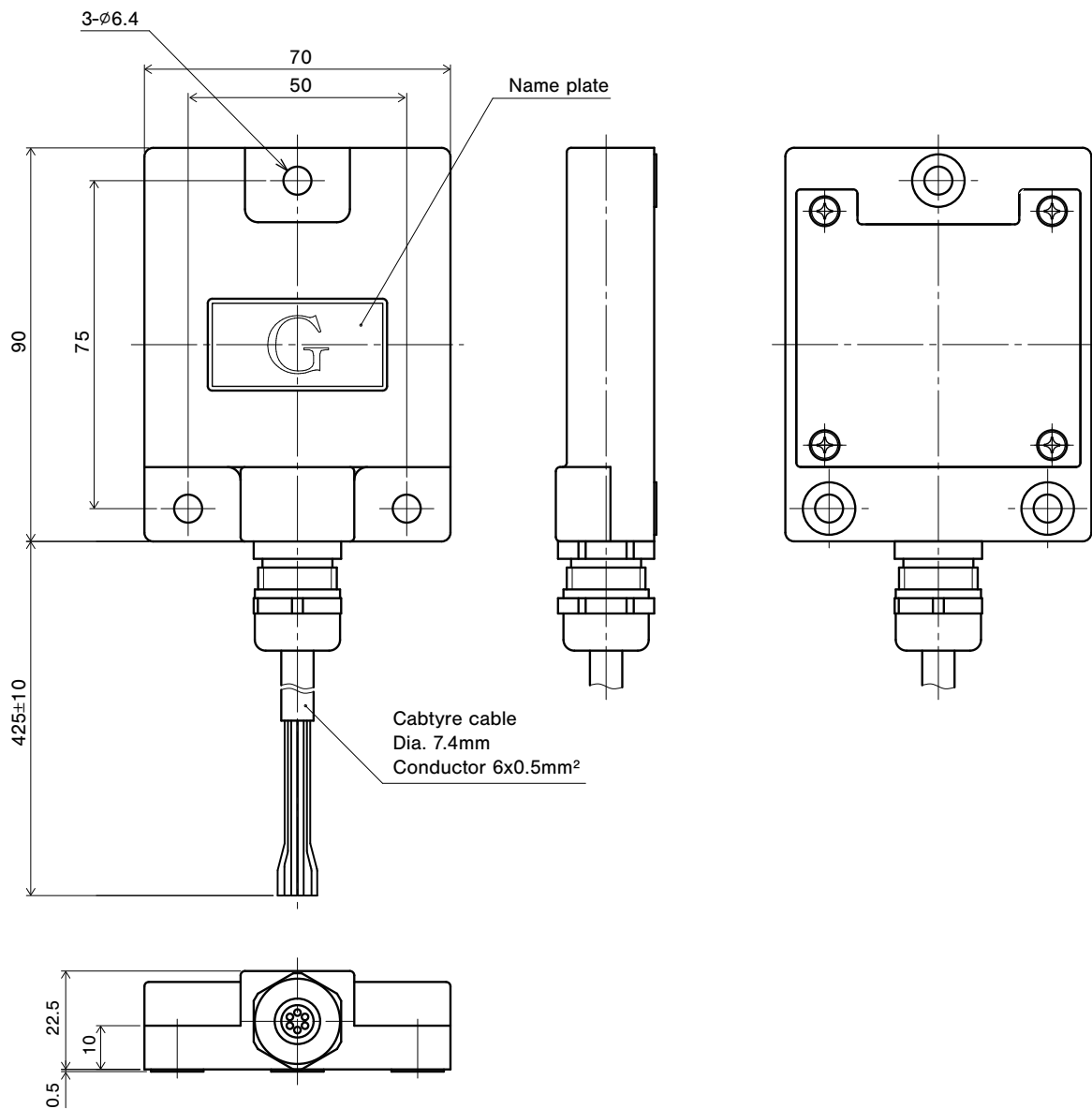
- Hall-IC sensor is impossible to measure resistance value as a variable resistor.
- Use this sensor in the place where is protected from ESD.
- Under acceleration 12 m/s² or Vibration min.3000 Hz, angle may not measured accurately.
- In certain temperature environment, output at 0° may be shifted by aging effect.

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INCLINOMETERS

OUTLINE DIMENSIONS

(Unit:mm)



TILT ANGLE DIRECTION

