DATA SHEET
OF
GYROSTAR®

Piezoelectric vibratory Gyroscope

MODEL: ENV-05F-03

TECHNICAL DATA

4.April.2000
PRODUCT ENGINEERING SECTION
SENSOR MODULE DEPERTMENT
CIRCUIT MODULE PRODUCTS DIVISION
MURATA MFG. CO., LTD.

Characteristics

Angular velocity - output characteristic

Incline - scale factor characteristic

Dependence on supply voltage

Linearity

Offset drift (Temperature)

Start up characteristics

Start up drift

Temperature coefficient of scale factor

Response (Frequency Vs phase)

Output noise

Cross coupling

Cross talk

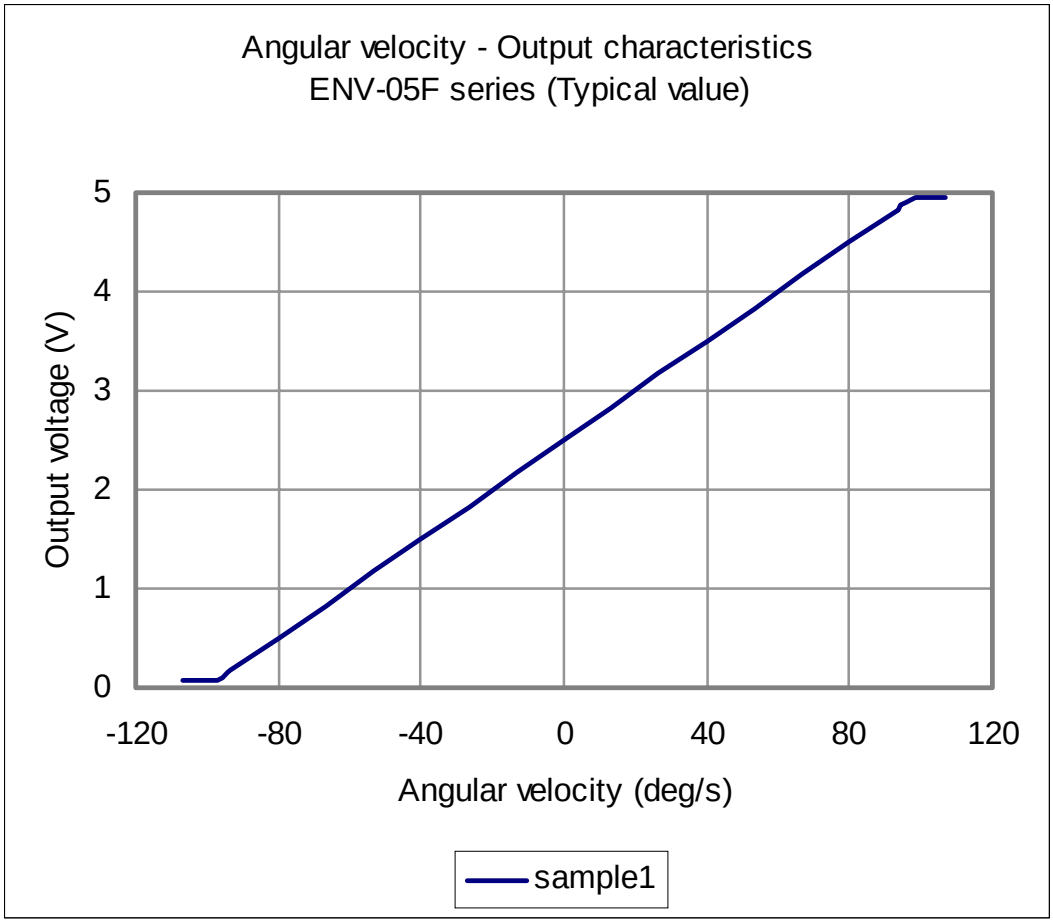
⚠CAUTION

1) Please consult our sales representatives or engineers before using our products listed in this manual for applications requiring especially high reliability what defects might directly cause damage to other party's life, body or property (listed below) or for other applications not specified in this manual.
   1. Aircraft equipment 2. Aerospace equipment 3. Undersea equipment
   4. Medical equipment 5. Traffic signal equipment
   6. Disaster prevention / crime prevention equipment 7. Data-processing equipment
   8. Applications of similar complexity or with reliability requirements comparable to the applications listed in the above.

2) All values listed in this technical data are typical values. Please confirm detailed specifications by checking the product specification document or requesting for the approval sheet for product specification, before ordering.

	Definition	Unit
Angular velocity		[deg/s]
Static output	Output change at angular velocity is 0 [deg/s]	[V]
Scale factor	$\frac{V_w - V_0}{w}$ V_0 : Static output w : Angular velocity V_w : Output voltage at angular velocity is w	[V/deg/s]

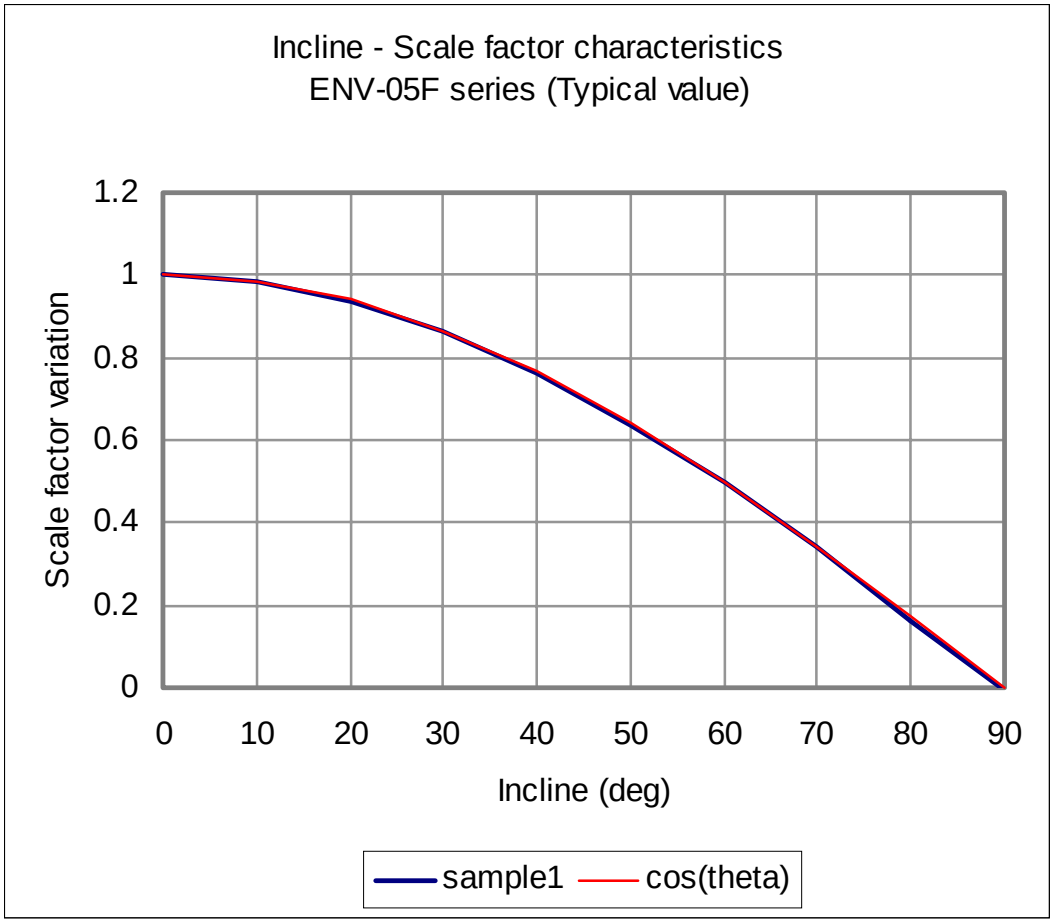
Angular velocity - output characteristic



The relationship between output voltage and angular velocity

Output voltage is in proportion to angular velocity.

Incline -scale factor characteristics



The scale factor change when installing the sensor inclined to rotation axis

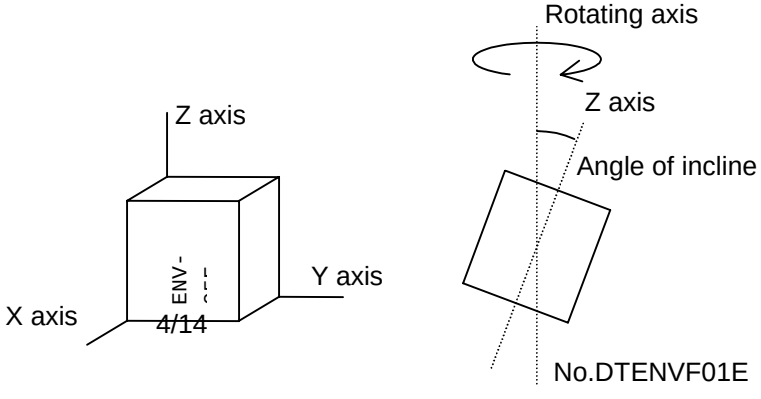
The scale factor variation obeys the following equation.

$$\text{Scale factor variation} = \frac{Sv_{theta}}{Sv_{theta=0}}$$

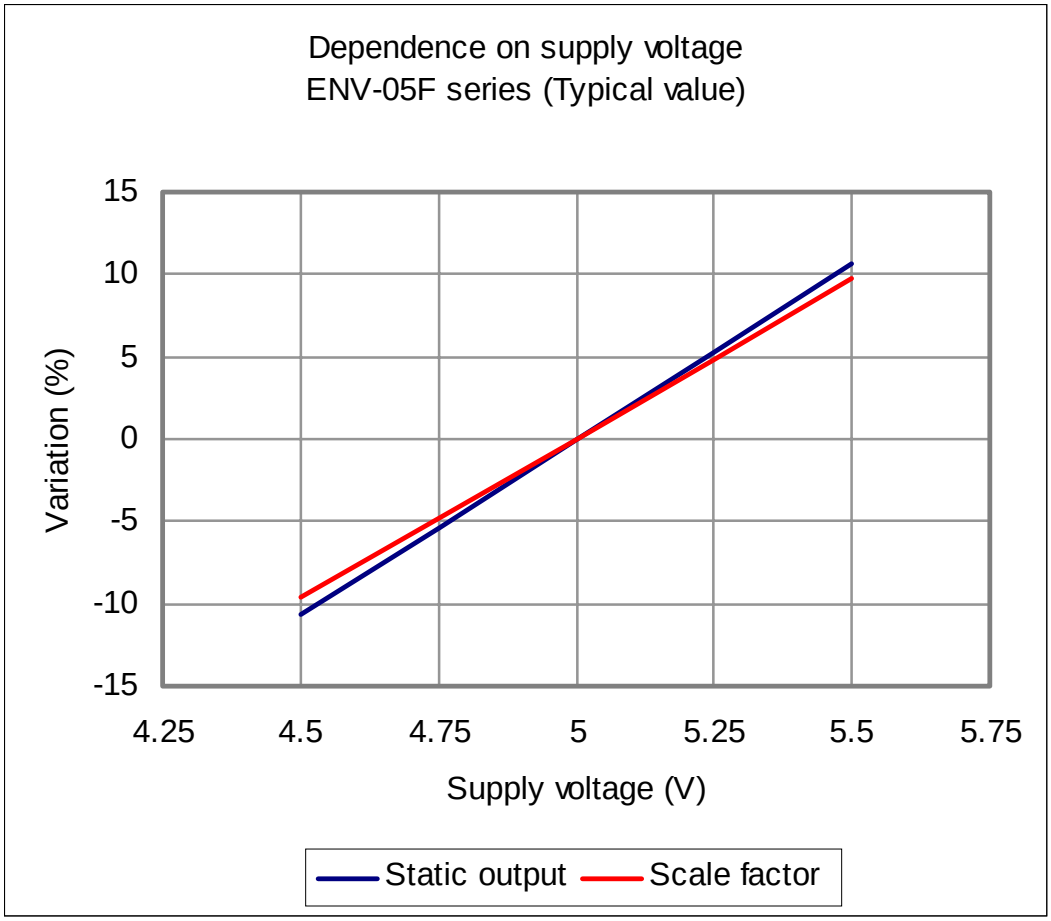
theta : Angle of incline [deg]

Sv_{theta} : Scale factor at incline is theta deg [mV/deg/s]

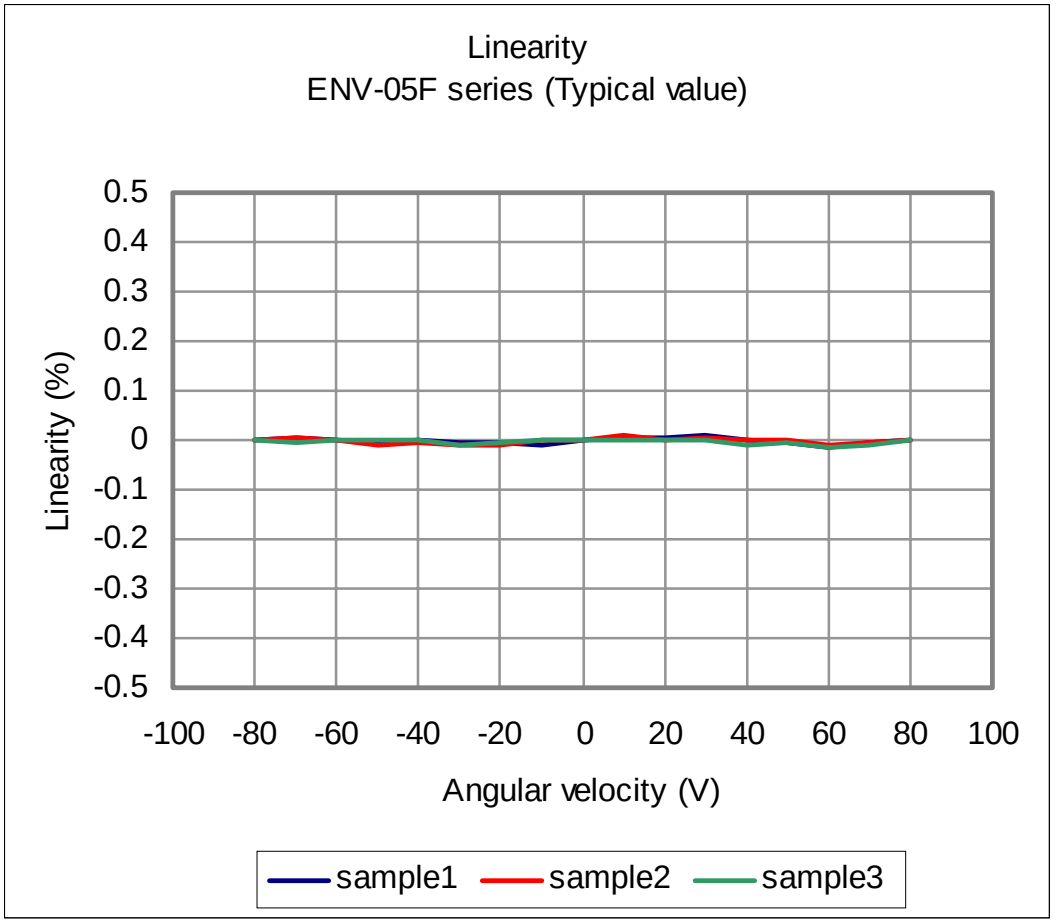
$Sv_{theta=0}$: Scale factor at incline is 0 deg [mV/deg/s]



Dependence on supply voltage



Linearity



The linearity of output voltage with angular velocity

The linearity of clock wise rotation obeys the following equation.

$$\frac{Sv_w - Sv_{wmax} \times \frac{w}{w_{max}}}{Sv_{wmax}} \times 100\ (\%)$$

w : Angular velocity [deg/s]

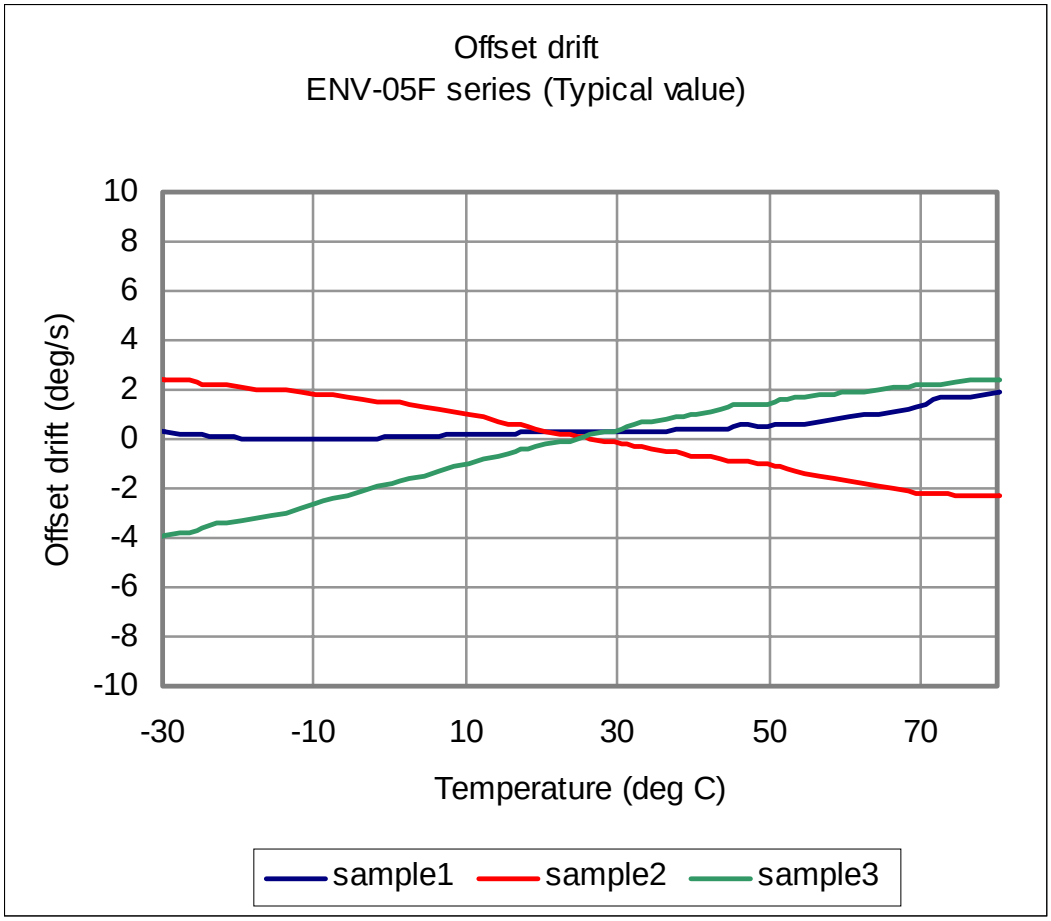
w_{max} : Maximum angular velocity : w_{max} =+80 [deg/s]

Sv_w : Scale factor at angular velocity is w [mV/deg/s]

Sv_{wmax} : Scale factor at angular velocity is w_{max} [mV/deg/s]

Similarly, the linearity of counter clock wise rotation is measured

Offset drift (Temperature)

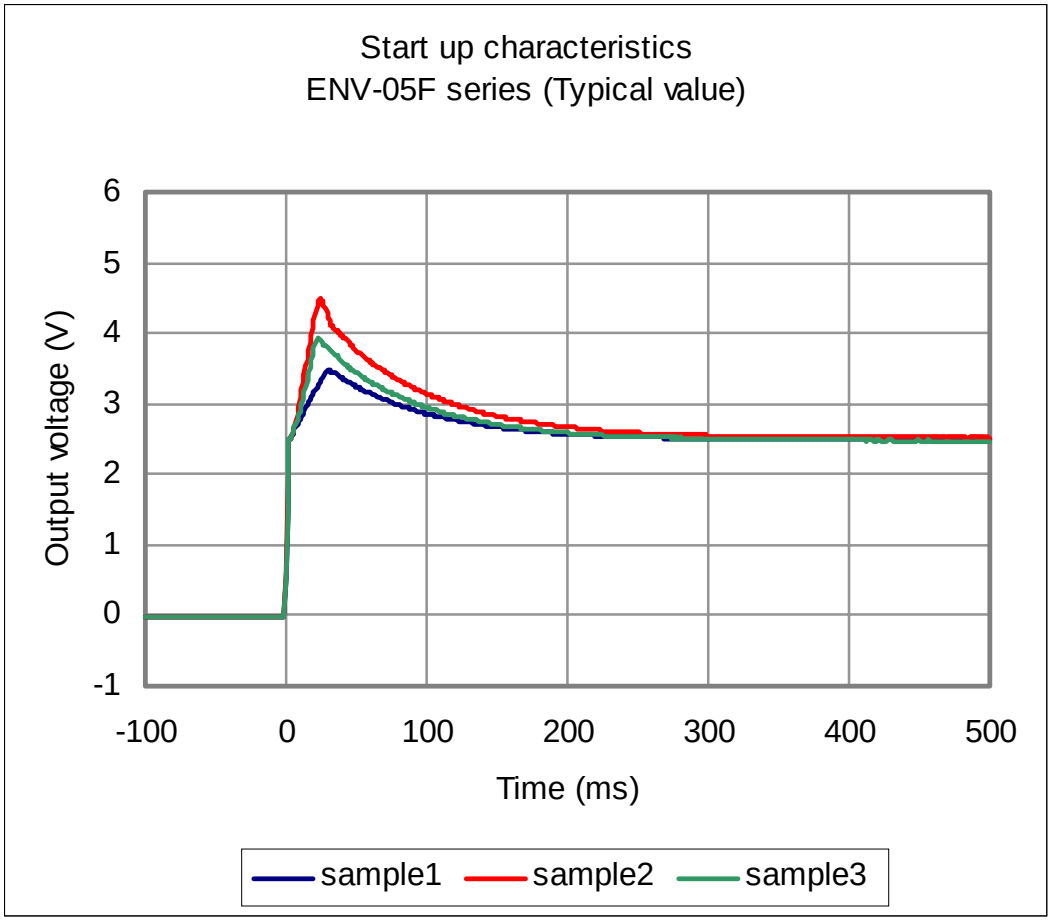


The static output change over operation temperature.

The temperature change obeys temperature pattern in figure.

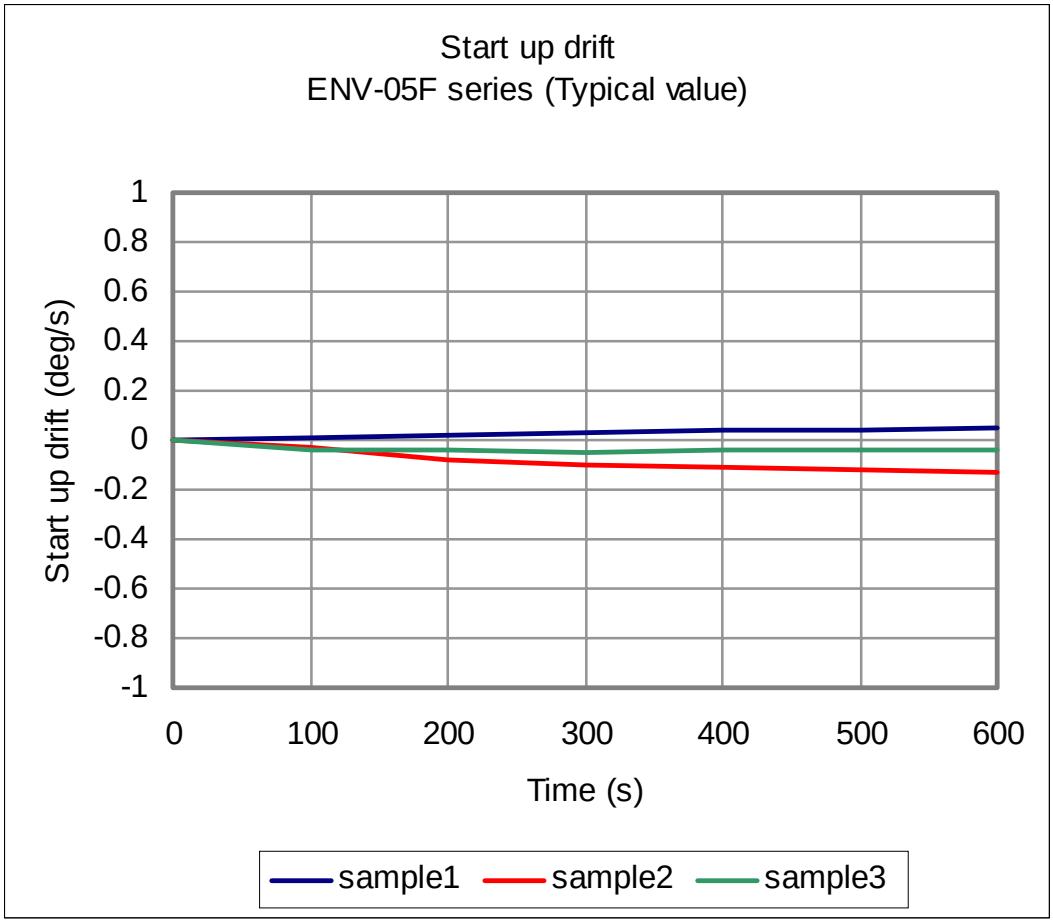
Each product shows individual tendency.

Start up characteristics



The static output characteristic after the first application of supply voltage.

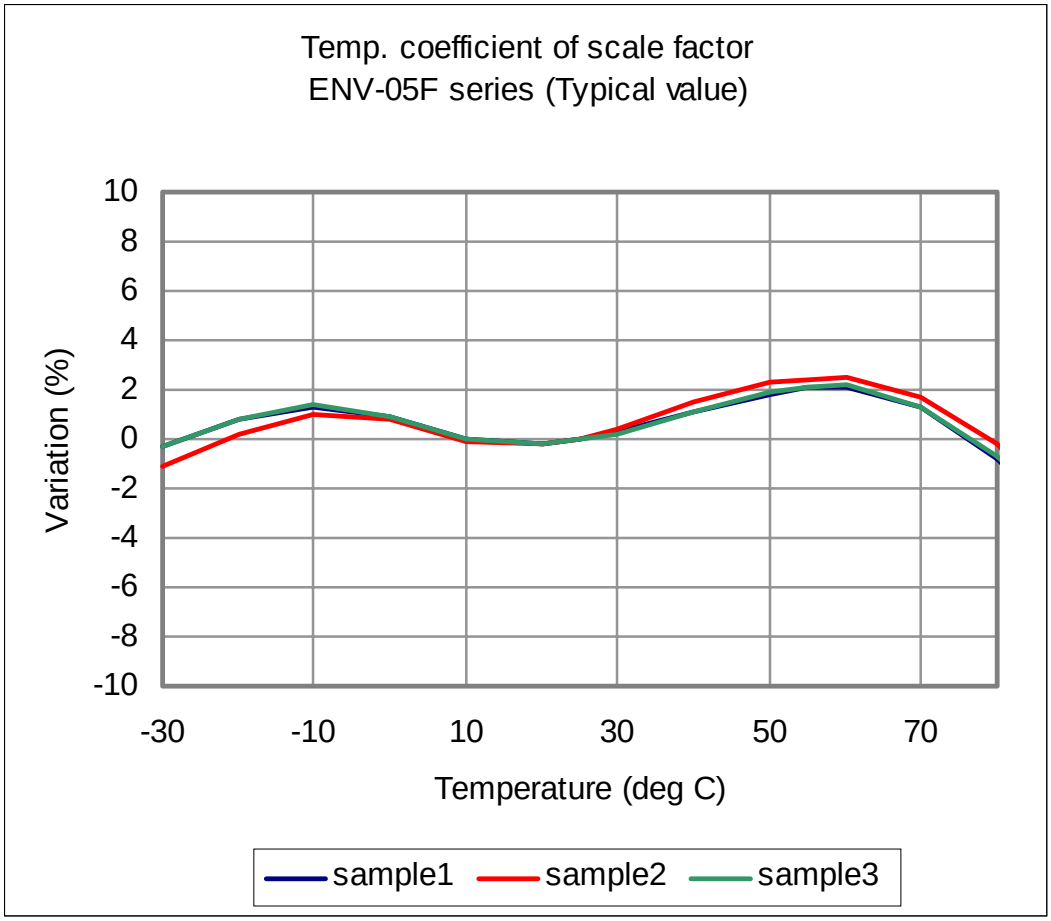
Start up drift



The static output change for 10 minute period beginning ten seconds from the first application of supply voltage.

Each product shows individual tendency.

Temperature coefficient of scale factor



The scale factor change over operation temperature.

The reference temperature of scale factor variation is 25 deg C.

The scale factor variation obeys the following equation.

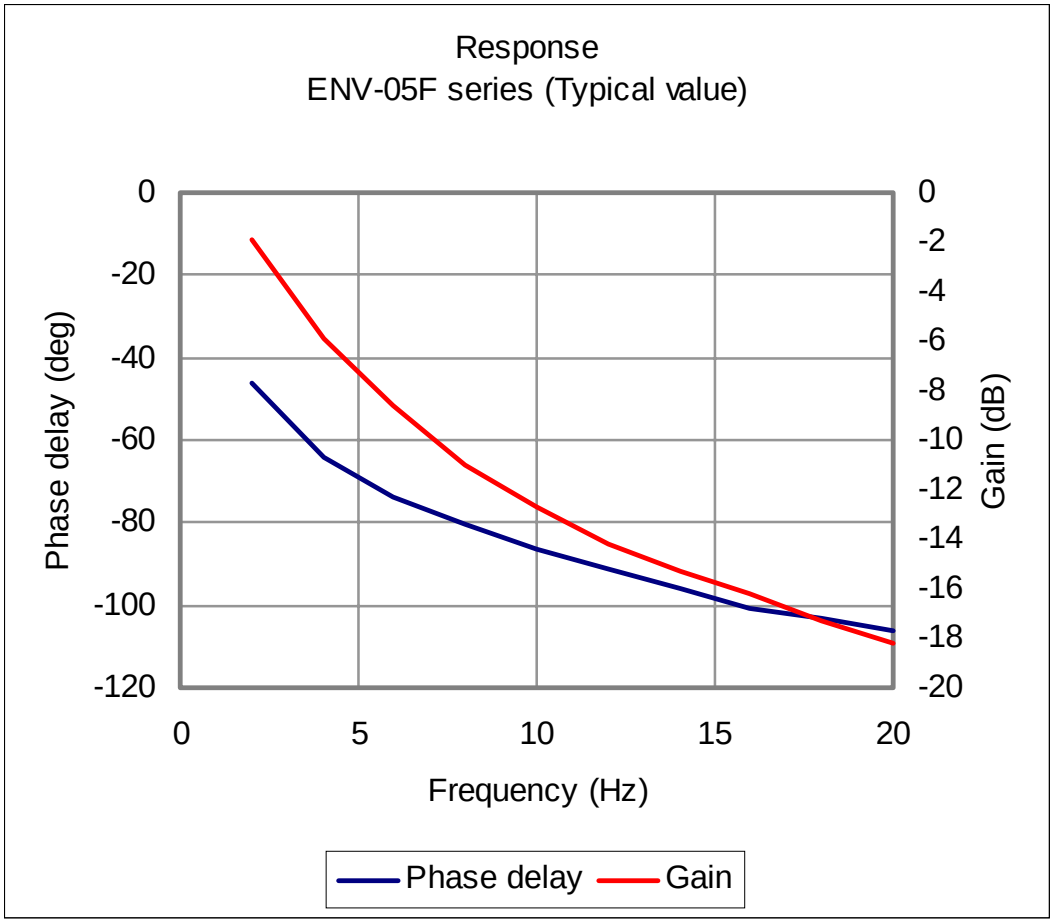
$(Sv_t - Sv_{t=25}) / Sv_{t=25} \times 100$ [%]

Sv_t : Scale factor at angular velocity is t deg C [mV/deg/s]

$Sv_{t=25}$: Scale factor at angular velocity is 25 deg C [mV/deg/s]

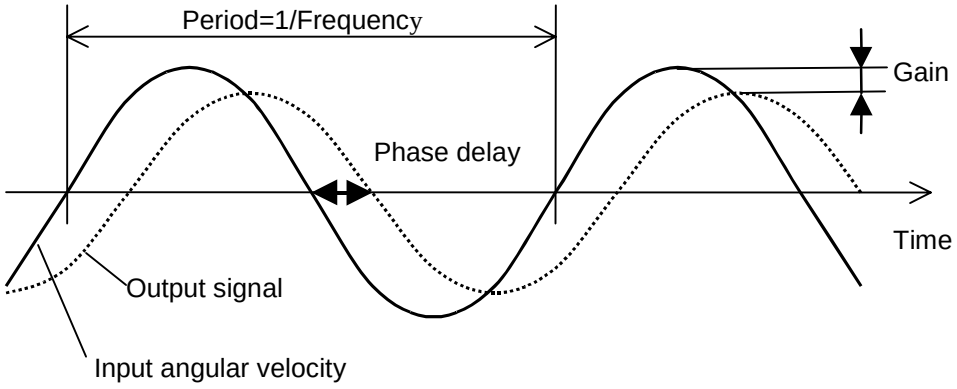
Each product shows individual tendency

Response (Frequency Vs phase)

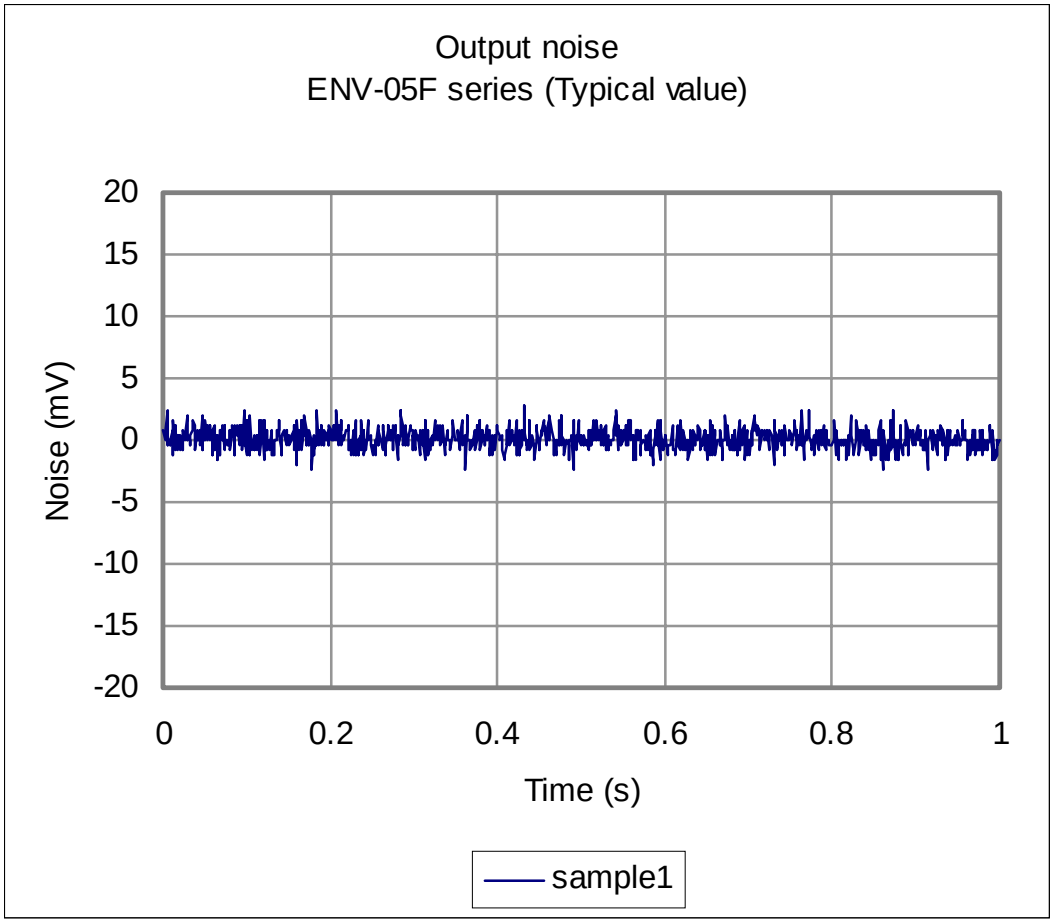


The phase delay with input angular velocity

The response is defined as a 90 degree phase delay.



Output noise



Cross coupling

The cross coupling signifies output error applied unnecessary rotation with the exception of sensing axis.

The cross coupling of X axis obeys the following equation.

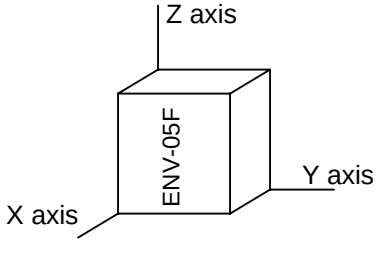
(Vwx - Vo)/Sv [deg/s]

Vwx : Output voltage at angular velocity of X axis is w [V]

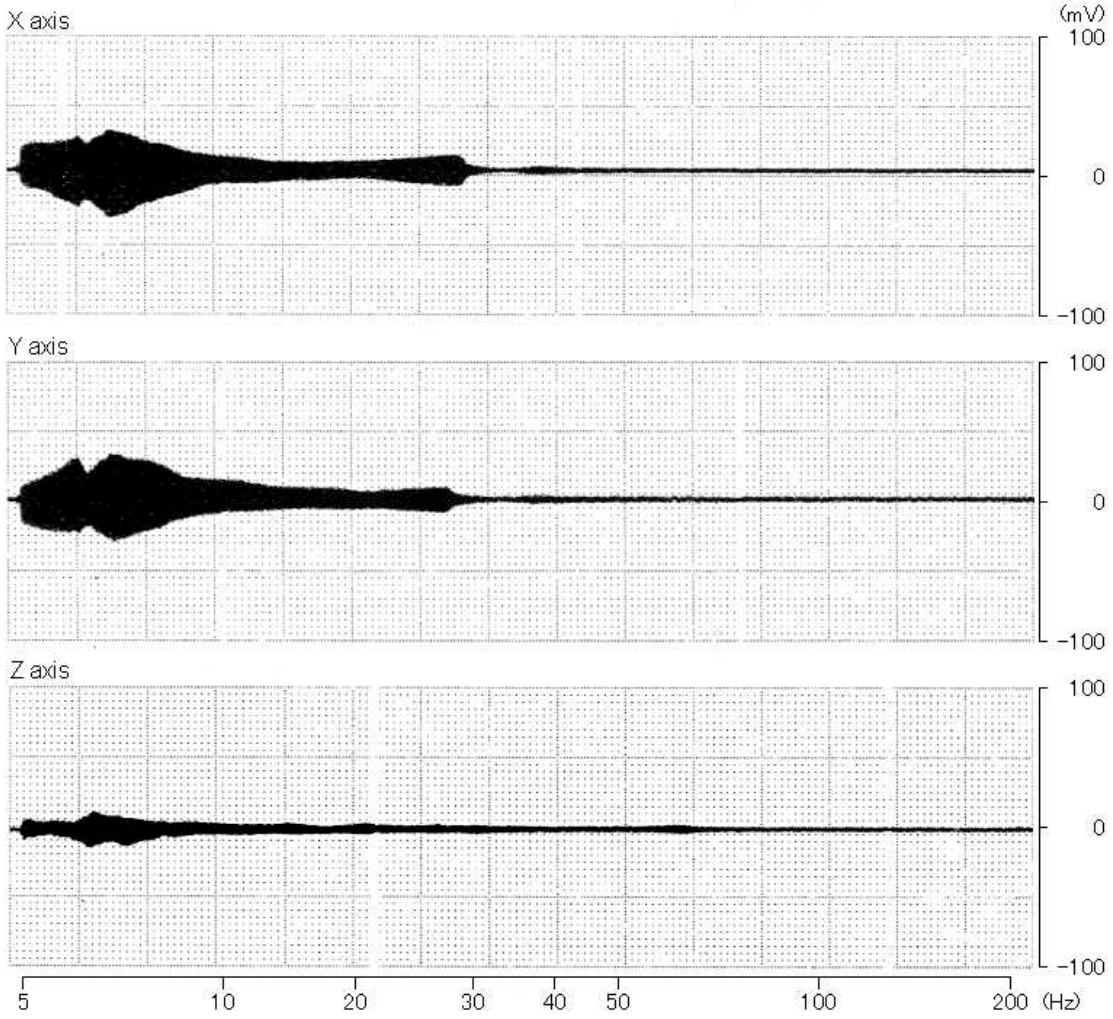
V_0 : Static output [V]

Sv : Scale factor [mV/deg/s]

Similarly, the cross coupling of Y axis is measured.



Cross talk



The static output under the vibration of which frequency is 5~200Hz and of which acceleration is 1G.