Integrated Eddy current Displacement Sensor

Model: YDYT9800

Brief Introduction

YDYT9800 Series Integrated Eddy Current Displacement Sensor is widely used in electric power, petrochemical, metallurgy, machinery and other industries, monitoring the shaft displacement, shaft vibration, shaft speed and other parameter of the large rotating machinery for long-term, the instrument can analyze the working conditions and the cause of the equipment failure thus effectively protect the equipment and have predictive maintenance, the instrument can also measure the displacement, amplitude, speed, size, thickness,surface roughness etc.

Performance Indicators

Integrated eddy current displacement sensor designed and manufactured according to U.S. military specifications, the head of the probe using resistant to high / low temperature and injection molding protection by various chemical corrosion of polyphenylene sulfide (PPS), the coil is hermetically sealed；circuit using anti-acid stainless steel tube M16 × 1 thread and epoxy package, moisture and dust resistance;signal cable with shielded cable, stainless steel metal hose armor protection is available; with power polarity, output short circuit protection features ， any connection error will not cause damage ; Continuous operation under harsh environments is feasible。

1. Non-contact measurement, never worn.
2. Anti-interference ability, high reliability, long life.
3. Operating temperature: -50 ~ +120 ℃, drift 0.05% / ℃.
4. Output format: three-wire voltage or current output.
5. Frequency Response: 0 ~ 10kHz, amplitude-frequency characteristic 0 ~ 1kHz attenuation is less than 1%, 10kHz attenuation is less than 5%; Phase-frequency characteristic 0 ~ 1kHz phase difference is less than -10 °, 10kHz is less than -100 ° phase.
6. Form of the output voltage sensor power supply: +12 Vdc ~ +30 Vdc, output range 0.1 ~ 10.5V or 1 ~5V, Power consumption ≤ 12mA (excluding output current); current output form the sensor power supply: +18 Vdc ~ +30 Vdc, 4 ~ 20mA current output, power consumption ≤ 12mA (excluding output current).
7. Ripple when measured gap is constant, the maximum output noise peak-peak noise): sensor output ripple of the voltage output forms is less 20mV；sensor output ripple of the current output forms is less than 30uA.

8. Load capacity: sensor output impedance of the voltage output is greater than 10Ω, maximum current 40mA, maximum drive signal cable length 300m; 4 ~ 20mA current output sensor，the maximum load resistance is about 500Ω, maximum load resistance with output change -1%。

9. Measurement parameters

Diameter of the probe head(mm)	Linear range(mm)	Nonlinear error	The minimum area to be measured(mm)
Φ5	1 (Extended to 2)	≤±1%	Φ15
Φ8	2 (Extended to 4)	≤±1%	Φ25
Φ11	4 (Extended to 8)	≤±1%	Φ35
Φ18	8 (Extended to 12)	≤±1.5%	Φ45
Φ25	12(Extended to 22)	≤±1.5%	Φ50
Φ50	25 (Extended to 30)	≤±2%	Φ100

10. Dimensions

Diameter of the probe head(mm)	Optional casing thread	The length of minimum casing thread		The length of the probe head
		Without armored	Armored output	
Φ5	M10×1	75mm	85mm	5-8mm
	M16×1	50mm	60mm	
Φ8	M10×1	75mm	85mm	11-13mm
	M12×1	50mm	60mm	
	M16×1	50mm	60mm	
Φ11	M10×1	75mm	85mm	11-13mm
	M12×1	50mm	60mm	
	M16×1	50mm	60mm	
Φ25	M10×1	75mm	85mm	35mm
	M12×1	50mm	60mm	
	M16×1	50mm	60mm	
Φ50	M10×1	75mm	85mm	55mm
	M12×1	50mm	60mm	
	M16×1	50mm	60mm	

Installation instructions

When body as a round axis, the probe centerline and the axis line measured is orthogonal, it is generally required the diameter of the measured shaft is three times of the probe diameter, otherwise the sensitivity of the sensor will decrease, when the measured surface size is the same size as the diameter of the probe head, the sensitivity will drop to around 70%. Thickness of the measured body will also affects the measurement results. Generally，steel and other magnetic materials which thickness is more than 0.1mm or copper, aluminum and other weak magnetic materials which thickness is over 0.1mm ，the sensitivity will not be affected. Measured surface should be smooth, no nicks, holes, bosses, grooves and other defects(except the special set up for key-phase,speed measurement).Vibration measurement requirement，surface roughness of the measured body within 0.4 ~ 0.8um; surface roughness for the displacement measurement is generally not more than 0.8 ~ 1.6um. Except specified when ordering, usually the sensor calibrated by 45#steel before

delivery, only the tested material is the same series ，the resulting characteristic equation can be similar.

To avoid the adjacent interference，the installation distance between the sensor can not be too close. Please see below minimum distance of the sensor probe under normal circumstances.

Diameter of the probe head(mm)	Parallel installation for two probes DPX(mm)	Vertical installation for two probes(Measured body is round)DYC(MM)	Vertical installation for two probes(Measured body is square)DYC(MM)
Φ5	40.6	35.6	22.9
Φ8	40.6	35.6	22.9
Φ11	80	70	40
Φ25	150	120	80
Φ50	200	180	150

Ensure the distance between the probe head and the mounting surface is not less than a certain distance, engineering plastics head body should totally exposed to mounting surface, otherwise the mounting surface should be processed into flat-bottomed hole or chamfer. Strength of the stent for sensor installation should be as high as possible，to ensure the accuracy of measurement, the resonant frequency should at least ten times as machine rotary speed. Linear measurement range and measured gap variation of the sensor should be considered while install the sensor, when the total variation of the measured gap is close to the linear operating range of the sensor，particular attention should pay（linear range of the sensor should 15% greater than the measured gap when ordering the goods）.Generally，put the installation gap on the linear midpoint of the sensor when measure the vibration; when measure the displacement, according to the direction change of the displacement or the larger change direction of the displacement， setup of the installation gap can be decided. when displacement shift away to the direction which away from the probe tip， the installation gap should be set in the linear proximal; on the contrary, it should be located in the remote side. Adjusting the installation gap by measuring the sensor output, When the probe head has not been exposed on mounting holes, due to the influence of the metal around the mounting hole, It might cause the sensor output equal to the voltage or current value corresponding to the installation gap, but the probe not measure the required measured body at this moment. Adjust the probe to the correct installation position，the sensor output should be: first is the larger saturated output (the probe has not been installed into the hole at this moment), then is the smaller output(the probe has been installed into the hole at this moment)continue to screw the probe into the mounting hole, sensor output will change to a larger output (in this case the probe head exposed mounting holes, but a larger gap with the measured surface),then keeping screwed into the probe, the sensor output is equal to the corresponding value of the installation gap, then the probe is the correct installation space.

Calibration

If the sensor is not used for more than one year or continuous used for more than two years, it should be calibrated again. There is a small potentiometer at the tail end of the shell of the integrated eddy current sensor, by adjusting the potentiometer; it is easy to do the displacement calibration for the sensitivity and linearity of the sensor. We recommend the user to use YD20 static displacement calibrator of our company as the calibration device. After the calibration, please seal the potentiometer with silica gel firmly to prevent changing the resistance value of the potentiometer during the usage process.