

## **Digital Advanced Sensors**

Sensing Control Leading | Sensor Specialized Company

## **Underwater Inclinometer**

# UWT2

High performance MEMS inclinometer for underwater. Strong environmental durability from shock and flooding. For measurement and controlling of water gates, dams. Customized specifications : various direction, range and output

## **Underwater Inclinometer**



MEMS Inclinometer UWT2 is specialized for using in underwater with fully sealed stainless-steel housing, polyurethane cable and strong environmental durability. UWT2 is suitable for long-term measurement and controlling of water gates, dams and underwater structures.





Specific	cifications
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Item	Speciication		Remarks
Measuring	Uniaxial	$\pm 180^{\circ}$	Settable
Range	Biaxial	$\pm 90^{\circ}$	Settable
Resolution	0.1°		
Non-linearity	0.25% FS		
Response	< 0.1 sec		
Output	0.5 ~ 4.5Vdc 4.32 ~ 19.68mA RS485		
Power Source	10 ~ 30Vdc		
Current Consumption	<60mA		@12Vdc
Operating Temp.	-20℃ ~ +85℃		
Waterproof	IP68		
Dimensions	ø79 x H20mm		Without mount
Weight	600g		
Cables	PU, 3000mm		

- Measuring Range
  e.g. -30° ~ +90° / 0° ~ +120°
- For 2-axis specifications, individual measurement ranges can be specified for each axis.
   For the ±90° (deg) specification, the error range increases at angles exceeding ±85° (deg).
- The min/max angle must satisfy each axis' designated range.

Uniaxial  $-0.5^{\circ} \sim +0.5^{\circ}$  etc. cannot be less than  $\pm 1^{\circ}$ Biaxial  $-3^{\circ} \sim +3^{\circ}$  etc. cannot be less than  $\pm 5^{\circ}$ 

## Sensing Directions



• Indicates the reference direction for measuring angles in UWT2.

## Wiring Connection

Axial	Color	Analog	RS485
Uniaxial	RED	V+	
	BLACK	GND (공통)	
	GREEN	X+	A(T+)
Biaxial	WHITE	Y+	B(T-)

• RS485 has always 4Color.



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## Analog Data Descriptions

- Deg. from Analog Vdc output
- $= \left(\frac{\text{Measung Range}}{\text{Output V Range}}\right) \times (\text{Output V} \text{Zero offset})$
- Measuring Range = Max angle Min angle
- Output V Range = Max V output Min V output = 4.5V – 0.5V = 4V
- Zero offset = 2.5V

#### e.g. Measuring range ±90°, output 3.5V,

$$\left(\frac{+90 - (-90)}{4}\right) \times (3.5 - 2.5) = +45^{\circ}$$

• Deg. from Analog – mA output

 $= \left(\frac{\text{Measung Range}}{\text{Output mA Range}}\right) \times (\text{Output mA} - \text{Zero offset})$ 

- Output mA range = Max mA output Min mA output =19.68 – 4.32 = 15.36mA
- Zero offset = 12mA

### Ordering Code

1	S	Uniaxial	D	Biaxial	
	MV	0.5	~ 4.5Vdc out	put	
2	MA	4.32	~ 19.68mA o	utput	
	485	RS485 output			
3	Measuring Range	Specify the measurement angle range			
4	F	Floor Mount	W	Wall Mount	

- Code format : UWT2-1-2-3-4
  e.g. UWT2-S-MA-90-F
- Cable length : additional cost per meter.

### RS485 Protocol

1) Communication Standards

Baud rate	9,600	Data Bits	8
Stop Bits	1	Parity	None

- 2) Data Format (ASCII)= STX + Xdeg+ SP + Ydeg + ETB + Check Sum + \$
- [SP + Y deg] is skipped for uniaxial.
- Check Sum : Substitute ASCII of each bytes for HEX and calculate by XOR.
- Commands (not case sensitive)
  Carriage Return and Line Feed must be attached to end of commands.

#### e.g. #Data + CR + LF

#DATA	Measure data once.
#READ	Measure data continuously.
#STOP	Stop measuring.
#INFO	Get sensor information.
#DAS1178	Enter ID set mode.
#ID {NO}	Set ID to {NO}.

- ID can be set within 0~80. (in HEX, plus B0 to ID : B0~FF)
- To complete ID set, Set ID on ID set mode, power off and on again.
- Multiple sensors on parallel connection, can measure individual sensor data; set individual sensor ID and send below command in HEX. (CR+LF is unnecessary.)
- Command : Sensor ID [B0~FF] + 05
  e.g. B1 05

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### Notes

- 1) Ground connection is recommended in noise occurred environment.
- MEMS based inclinometer (tilt sensor) measures tilt (degree) by gravity. Check sensing directions before use.
- 3) Check wiring connections before use.
- 12 months warranty is provided after released. Warranty provided only in case of using for designed purpose correctly.
- 5) Specifications, design and components can be changed without prior notice to improve its performances.

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