

# Tilting Sensor

## OVERVIEW:

The Dragino TS01 series is a **Tilting Sensor** for Internet of Things solution. TS01 is an outdoor Tilting Sensor specially designed for detecting the angle of trees, buildings or large scale equipment.

The Dragino TS01 series **measures pitch and roll angle** and converts to wireless data and sends to IoT platform via **LoRaWAN, NB-IoT or CAT-M1** network.

It supports **BLE configure and wireless OTA update** which make user easy to use.

The Dragino TS01 is powered by **8500mAh Li-SOCI2 battery** or **solar panel with Li-ion battery**, it is designed for long-term use up to several years.



## Application:



Building Detecting



Engineering Detecting



Tree Bending Monitoring















Landslide Monitoring

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# Model Variants

Variants	TS01-LB	TS01-LS	TS01-NB	TS01-NS	TS01-CB	TS01-CS
Connectivity						
Configure Method	TTL, BLE, LoRaWAN	TTL, BLE, LoRaWAN	TTL, BLE, NB-IoT	TTL, BLE, NB-IoT	TTL, BLE, NB-IoT, LTE-M	TTL, BLE, NB-IoT, LTE-M
Upgrade Method	TTL, BLE, LoRa	TTL, BLE, LoRa	TTL, BLE	TTL, BLE	TTL, BLE	TTL, BLE
Features	<p><b>Sensor /Probe:</b></p> <ul style="list-style-type: none"> <li>* Detect pitch and roll angle</li> <li>* Support Angle Alarm</li> <li>* Support Datalog feature</li> </ul> <p><b>General Features:</b></p> <ul style="list-style-type: none"> <li>* Ultra-low power consumption</li> <li>* Support Bluetooth v5.1 remote configure and OTA update firmware</li> <li>* Uplink on periodically</li> <li>* GNSS for Location Report ( for -CB &amp; -CS models only)</li> <li>* Downlink to change configure</li> </ul>					
Battery & Power	 * 8500 mAh Li/SOCI2 Battery	 * Solar + 3000 mAh Li-ion Battery	 * 8500 mAh Li/SOCI2 Battery	 * Solar + 3000 mAh Li-ion Battery	 * 8500 mAh Li/SOCI2 Battery	 * Solar + 3000 mAh Li-ion Battery
Power Consumption	* Sleep Mode: 5uA @ 3.3v * LoRa Transmit Mode: 125mA @ 20dBm, 82mA @ 14dBm	* Sleep mode: 74uA@3.8V * LoRa Transmit Mode: 206mA@14dBm, 236mA@20dBm	* Sleep mode: 14uA@3.3V * Max Transmit power: 350mA@3.3V	* Sleep mode: 74uA@3.4V * Max Transmit power: 350mA@3.4V	* Sleep mode: 14uA@3.3V * Max Transmit power: 350mA@3.3V	* Sleep mode: 74uA@3.4V * Max Transmit power: 350mA@3.4V
Supply Voltage	2.5v ~ 3.6v	3.7v ~ 4.2v	2.5v ~ 3.6v	3.7v ~ 4.2v	2.6v ~ 3.6v	3.7v ~ 4.2v
Operating Temperature	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C

## Battery & Enclosure Option:

### Li-SOCI2 Battery & Enclosure:



- Li/SOCI2 un-chargeable battery
- Capacity: 8500mAh
- Self-Discharge: <1% / Year @ 25°C
- Max continuously current: 130mA
- Max boost current: 2A, 1 second



### Solar Version & Enclosure:

- 3000mAh Re-chargeable battery
- 0.9W on board solar pannel Suitable to used in the place where sun is sufficient



- This icon means support location feature by: GPS/GLONASS/BDS/Galileo/QZSS

## Wireless Option:



- LoRaWAN 1.0.3 Class A
- Bands: CN470/EU433/KR920/US915/EU868/AS923/AU915/IN865
- OTAA or ABP Mode.
- World Wide Unique LoRaWAN Key
- RX sensitivity: down to -139 dBm.
- Max +22 dBm - 100 mW RF output



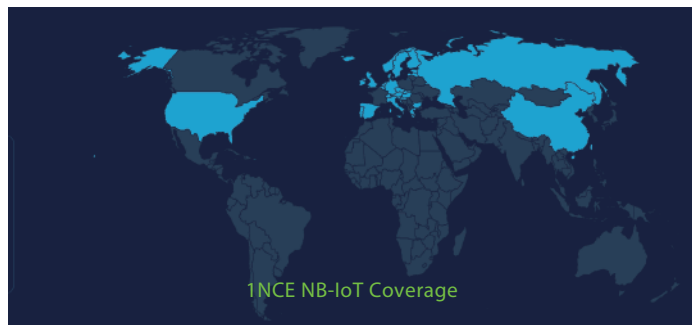
- **CAT NB2 Bands:**
  - For -NB & -NS: B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B28/B66/B70/B85
  - For -CB & -CS: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85
- Uplink via MQTT, MQTTs, TCP, UDP or CoAP
- Multiply Sampling and one uplink



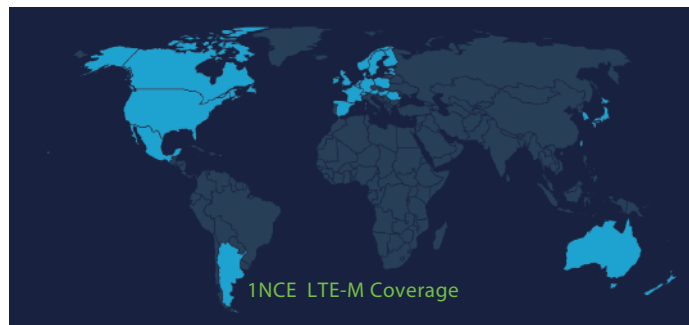
- CAT-M1 / LTE-M Bands: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85
- Uplink via MQTT, MQTTs, TCP, UDP or CoAP
- Multiply Sampling and one uplink

# What is 1T version for NB-IoT version?

The 1T version of NB-IoT Tilting Sensor is with 1) 1NCE SIM Card & 2) ThingsEye Pre-configured.  
1NCE SIM Card (10 Years Cellular service with 500MB Data Traffic, Enough for devices to uplink 10 years at 1hour interval).



NB-IoT Network : Austria, Belgium, Bulgaria, China, Croatia, Czech Republic, Denmark, Estonia, Finland, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Malta, Netherlands, Norway, Portugal, Puerto Rico, Russia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, USA, US Virgin Islands.



LTE-M Network : Argentina, Austria, Australia, Belgium, Canada, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary, Ireland, Japan, Jersey, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Puerto Rico, Romania, Spain, Sweden, Switzerland, Taiwan, USA, US Virgin Islands.

## ThingsEye.io platform:

1T version with ThingsEye IoT service pre-installed. This save a lot of work from user side to configure IoT server.

Below is Dash Board is the demo in ThingsEye.io.



## Order Info:



Part Number: TS01-LB-XX

XX: The default frequency band

- XX: Frequency Bands, options: EU433,CN470, EU868,IN865,KR920,AS923,AU915,US915

Part Number: TS01-LS-XX

XX: The default frequency band

- XX: Frequency Bands, options: EU433,CN470, EU868,IN865,KR920,AS923,AU915,US915



Part Number: TS01-NB-XX

XX:

- **GE**: General version (Exclude SIM card)
- **1T**: with 1NCE\* 10 years 500MB SIM card Pre-configure to ThingsEye server

Part Number: TS01-NS-XX

XX:

- **GE**: General version (Exclude SIM card)
- **1T**: with 1NCE\* 10 years 500MB SIM card Pre-configure to ThingsEye server



Part Number: TS01-CB-XX

XX:

- **GE**: General version (Exclude SIM card)
- **1T**: with 1NCE\* 10 years 500MB SIM card Pre-configure to ThingsEye server

Part Number: TS01-CS-XX

XX:

- **GE**: General version (Exclude SIM card)
- **1T**: with 1NCE\* 10 years 500MB SIM card Pre-configure to ThingsEye server

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