

# **Senstick Temperature Probe 2.0 LoRaWAN Protocol FW v3.1**

## 1. LoraWAN DATA Payload (Uplink)

<b>Parameter:</b>	stat	t	rh	ap	tp	bat	<b>SUM</b>
<b>Size:</b>	1B	2B	2B	1B	2B	1B	<b>9B</b>

Parameter	Name	Range	Size	Type	Description
Status	stat	0 - 15	1B	uint8	Status Codes: 0x00 - OK Bit0 - Movement Detected Packet Bit1 - Movement Detected Confirmed Bit2 - Battery Low Power Bit3 - Accelerometer Failure Bit4 - Internal Sensor Failure Bit5 - NFC Failure Bit6 - EUI Failure Bit7 - Temperature Probe Failure
Temperature	t	-40.00 - 85.00	2B	int16	Temperature (t / 100)
Relative Humidity	rh	0.00 - 100.00%	2B	uint16	Relative Humidity (rh / 100)
Air Pressure	ap	845 - 1100 mbar	1B	uint8	Air Pressure (ap + 845)
Temperature Probe	tp	-55.00 - 125.00	2B	uint16	Temperature Probe (t / 100)
Battery Level	bat	1 - 3.55 V	1B	uint8	Battery Level (bat/100 + 1)

NOTE: LoRaWAN Port 2 is used.

## 2. LoraWAN CONFIG Payload (Uplink)

<b>Param:</b>	period	movd	movt	ackco	hw	fw	<b>SUM</b>
<b>Size:</b>	1B	1B	1B	1B	1B	1B	<b>6B</b>

Parameter	Name	R/W	Size	Type	Default Value	Description
Send Period	period	R/W	1B	uint8	15 min	Data send period in minutes. Multiplications of 5 min are accepted (e.g. 5, 10, 15, 20,...).
Movement Send Delay	movd	R/W	1B	uint8	0 min	The Movement triggers movement send delay in minutes.
Movement Threshold	movt	R/W	1B	uint8	12 (1 - 127)	Movement threshold to send measurement. (16 x movt mg). 0 == OFF.
Packet Confirm	ackco	R/W	1B	uint8	24	Request confirmed packed every N transmissions. 0 == OFF.
Hardware Version	hw	R	1B	uint8	3.0	Hardware version (hw / 10).
Firmware Version	fw	R	1B	uint8	1.0	Firmware version (fw / 10).

NOTE: LoRaWAN Port 2 is used.

### 3. LoRaWAN RECEIVE Payload Config (Downlink)

<b>Param:</b>	period	movd	movt	ackco	<b>SUM</b>
<b>Size:</b>	1B	1B	1B	1B	<b>4B</b>

Parameter	Name	R/W	Size	Type	Default Value	Description
Period	period	R/W	1B	uint8	15 min	Data send period in minutes. Multiplications of 5 min are accepted (e.g. 5, 10, 15, 20,...).
Movement Send Delay	movd	R/W	1B	uint8	0 min	The Movement triggers movement send delay in minutes.
Movement Threshold	movt	R/W	1B	uint8	12 (1 - 127)	Movement threshold to send measurement. (16 x movt mg). 0 == OFF.
Packet Confirm	ackco	R/W	1B	uint8	24	Request confirmed packed every N transmissions. 0 == OFF.

DEFAULT DOWNLINK PACKET: 05 01 0C 18

NOTE: LoRaWAN Port 2 is used.

## 4. LoRaWAN CONFIG Payload (Downlink) - Send Period

<b>Param:</b>	sendp	<b>SUM</b>
<b>Size:</b>	1B	<b>1B</b>

Parameter	Name	R/W	Size	Type	Default Value	Description
Send Period	sendp	R/W	1B	uint8	15 min	Data send period in minutes. Multiplications of 5 min are accepted (e.g. 5, 10, 15, 20,...).

DEFAULT DOWNLINK PACKET: 0F

## 5. LoRaWAN CONFIG Payload (Downlink) - Reboot

<b>Param:</b>	reboot	<b>SUM</b>
<b>Size:</b>	2B	<b>2B</b>

Parameter	Name	R/W	Size	Type	Default Value	Description
Reboot	reboot	W	2B	uint16	0xFFFF	Start REBOOT procedure.

DEFAULT DOWNLINK PACKET: FF FF

## 6. LoRaWAN CONFIG Payload (Downlink) - Factory Defaults

<b>Param:</b>	fdef	<b>SUM</b>
<b>Size:</b>	2B	<b>2B</b>

Parameter	Name	R/W	Size	Type	Default Value	Description
Factory Defaults	fdef	W	2B	uint16	0xEEEE	Erase NFC EEPROM.

DEFAULT DOWNLINK PACKET: EE EE

## 7. TTN Payload Decoder

### TTN PAYLOAD DECODER

```

/*
  _____
 /_____/  _____  _____  _____  _____  _____  _____
 \_____/  \_____/  \_____/  \_____/  \_____/  \_____/  \_____/  \_____/
 _____  _____  _____  _____  _____  _____  _____
 /_____/  /_____/  /_____/  /_____/  /_____/  /_____/  /_____/  /_____/
 \_____/  \_____/  \_____/  \_____/  \_____/  \_____/  \_____/  \_____/
  _____
  _____

STP20 - FW v3.1

*/

function Decoder(bytes) {

  // If Data Packet
  if (bytes.length == 9) {

    var Status = bytes[0];
    var Temperature100 = bytes[1] << 8 | bytes[2];
    var Humidity100 = bytes[3] << 8 | bytes[4];
    var AirPressure845 = bytes[5];
    var TemperatureProbe100 = bytes[6] << 8 | bytes[7];
    var BatteryLevel = bytes[8];

    return {
      Status: Status,
      Temperature: sintToDec(Temperature100),
      Humidity: Humidity100/100,
      AirPressure: AirPressure845+845,
      TemperatureProbe: sintToDec(TemperatureProbe100),
      BatteryLevel: (Battery+100)/100
    };
  }
  // If Config packet
  else {

    var SendPeriod = bytes[0];
    var MovementSendDelay = bytes[1];
    var MovementThreshold = bytes[2];
    var PacketConfirm = bytes[3];
    var HardwareVersion = bytes[4];
    var FirmwareVersion = bytes[5];

    return {
      SendPeriod: SendPeriod,
      MovementSendDelay: MovementSendDelay,
      MovementThreshold: MovementThreshold,
      HardwareVersion: HardwareVersion/10,
      FirmwareVersion: FirmwareVersion/10
    };
  }
}

```

## STP20 LORAWAN PROTOCOL

```
    }  
  }  
  
function sintToDec(T){  
  if (T > 32767) {  
    return ((T - 65536) / 100.0);  
  }  
  else {  
    return (T / 100.0);  
  }  
}
```

## 8. TTN Downlink Guide

**DOWNLINK**

**Scheduling**

**FPort**

→

2

→

Confirmed

**Payload**

01 02 0C 01 02 03
←
6 bytes

Application > Device > Overview > Downlink

**APPLICATION DATA** || pause 🗑 clear

Filters:

	time	counter	port	
▲	22:17:34	3889	2	payload: 00 07 A4 3F C8 14 00 BatteryLevel: 3 Distance: 1956 Reliability: 63 Status: 0 Temperature: 20
●	22:17:35	→	2	confirmed ack app id: sp_dev_001
▼	22:15:32	→	2	confirmed payload: 01 02 0C 01 02 03
▲	22:15:32	3888	2	payload: 00 07 AB 3F C5 14 5C BatteryLevel: 2.97 Distance: 1963 Reliability: 63 Status: 0 Temperature: 20
▼	22:15:19	→	2	scheduled confirmed payload: 01 02 0C 01 02 03

Application > Device > Data