

Sensedge WaterSense 3.0 LoRaWAN Protocol

WaterSense - LoRaWAN

1. LoraWAN SEND Payload (Uplink)

Parameter:	stat	dist	rela	batt	temp	SUM
Size:	1B	2B	1B	1B	2B	7B

Parameter	Name	Range	Size	Type	Description
Status	stat	0 - 1	1B	uint8	Status Codes: Bit 0 - Accelerometer Sensor Failure, Bit 1 - NFC IC Failure, Bit 2 - EUI IC Failure, Bit 3 - Distance Sensor Failure, Bit 4 - Recalibration, Bit 5 - Battery Low, Bit 6 - Movement Confirmed, Bit 7 - Movement Detected
Distance	dist	20 - 2.500	2B	uint16	The distance measured in mm. FOI 21°. Accuracy ±5%.
Reliability	rela	0 - 63	1B	uint8	Reliability of the measurement.
Battery Level	batt	1 - 3.55V	1B	uint8	Battery Level (bat / 100 + 1)
Temperature	temp	0 - 255	1B	uint8	Internal temperature from MCU
Temperature Dec	temp01	0.0 - 0.99	1B	uint8	Internal temperature - dec (t01 * 100)

NOTE: LoRaWAN Port 2 is used.

2. LoRaWAN SEND Payload Config (Uplink)

Param:	period	movd	movt	ackco	hw	fw	SUM
Size:	1B	1B	1B	1B	1B	1B	6B

Parameter	Name	R/W	Size	Type	Default Value	Description
Send Period	period	R/W	1B	uint8	15 min	Data send period in minutes.
Movement Send Delay	movd	R/W	1B	uint8	1 min	The Movement triggers movement send delay in minutes.
Movement Threshold	movt	R/W	1B	uint8	24 (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	N/A	Hardware version.
Firmware Version	fw	R	1B	uint8	N/A	Firmware version.

NOTE: LoRaWAN Port 2 is used.

3. LoRaWAN RECEIVE Payload Config (Downlink)

Param:	period	movd	movt	ackco	SUM
Size:	1B	1B	1B	1B	4B

Parameter	Name	R/W	Size	Type	Default Value	Description
Period	period	R/W	1B	uint8	15 min	Data send period in minutes.
Movement Send Delay	movd	R/W	1B	uint8	1 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

[DOWNLINK PACKET GENERATOR](#)

NOTE: LoRaWAN Port 2 is used.

4. LoRaWAN CONFIG Payload (Downlink) - Send Period

Param:	sendp	SUM
Size:	1B	1B

Parameter	Name	R/W	Size	Type	Default Value	Description
Send Period	sendp	R/W	1B	uint8	15 min	Data send period in minutes.

DEFAULT DOWNLINK PACKET: 0F

5. LoRaWAN RECEIVE Payload Calibration (Downlink)

Param:	cali	SUM
Size:	2B	2B

Parameter	Name	R/W	Size	Type	Default Value	Description
Calibrate	cali	R/W	2B	uint8	0xCC00	0xCC00 - No change, 0xCC63 (c) - Start calibrate procedure, 0xCC64 (d) - Set default calibrate parameters*, 0xCC6F (o) - Calculate offset.

DEFAULT DOWNLINK PACKET: 0xCC00

NOTE: LoRaWAN Port 2 is used.

NOTE: To Confirm the received packet, the same packet is sent back to the network.

* DEFAULT CALIBRATION PARAMETERS:

0x61, 0x6a, 0x02, 0xa5, 0x05, 0x20, 0x46, 0x8c, 0x05, 0x0b, 0x04, 0x08, 0x00, 0x04

6. LoRaWAN CONFIG Payload (Downlink) - Reboot

Param:	reboot	SUM
Size:	2B	2B

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

DEFAULT DOWNLINK PACKET: FF FF

7. LoRaWAN CONFIG Payload (Downlink) - Factory Defaults

Param:	fdef	SUM
Size:	2B	2B

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

DEFAULT DOWNLINK PACKET: EE EE

WaterSense - TTN Payload Decoder

TTN PAYLOAD DECODER

```

/*

WS30
*/

function Decoder(bytes) {
  // If Data Packet
  if (bytes.length == 7) {
    var Status = bytes[0];
    var Distance = bytes[1] << 8 | bytes[2];
    var Reliability = bytes[3];
    var Battery = bytes[4];
    var TC1 = bytes[5];
    var TC01 = bytes[6];

    return {
      Status: Status,
      Distance: Distance,
      Reliability: Reliability,
      Temperature: +temp(TC1,TC01).toFixed(2),
      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 HW = bytes[4];
    var FW = bytes[5];

    return {
      SendPeriod: SendPeriod,
      MovementSendDelay: MovementSendDelay,
      MovementThreshold: MovementThreshold,
      PacketConfirm: PacketConfirm,
      HW: HW/10,
      FW: FW/10
    };
  }
}

function temp(T1,T01){
  if (T1 !== 0 || T01 > 0){
    return (T1 > 128) ? (0 - (256 - (T1 - (256 - T01) / 100 ))) : (T1 + T01 / 100); }
  else{
    return (0 - (T1 + (256 - T01) / 100 ));
  }
}

```

WaterSense - TTN Downlink Guide

DOWNLINK

Scheduling

FPort

Confirmed

Payload

01 02 0C 01 02 03
6 bytes

Application > Device > Overview > Downlink

APPLICATION DATA || pause

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