Sensedge
Senspuck Water Level SWL10
LoRaWAN Protocol

LoRaWAN

1. LoraWAN SEND Payload (Uplink)

Parameter:	stat	dist	rela	temp	**SUM**
Size:	1B	2B	1B	2B	**6B**

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.
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.

NOTE: Battery Low when battery voltage is below 3.2V.

1. 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.

2. 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.

3. 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

4. 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

5. 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

6. 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

TTN Payload Decoder

TTN PAYLOAD DECODER

```
/*
  ____                          _              ____                                   _
 / ___|  ___ _ __  ___  ___  __| | __ _  ___  / ___|  ___ _ __  ___ _ __  _   _  ___| | __
 \___ \ / _ \ '_ \/ __|/ _ \/ _` |/ _` |/ _ \ \___ \ / _ \ '_ \/ __| '_ \| | | |/ __| |/ /
  ___) |  __/ | | \__ \  __/ (_| | (_| |  __/  ___) |  __/ | | \__ \ |_) | |_| | (__|   <
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                                  |___/                            |_|

  Senspuck Water Level SWL10 FW 4.0
*/


function Decoder(bytes) {

  // If Config Packet (HW Version == 40)
  if (bytes.length == 6 && bytes[4] == 40) {

    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
    };

  }
  // If Data Packet
  else {

    var Status = bytes[0];
    var Distance = bytes[1] << 8 | bytes[2];
    var Reliability = bytes[3];
    var TC1 = bytes[4];
    var TC01 = bytes[5];

    return {
      Status: Status,
      Distance: Distance,
      Reliability: Reliability,
      Temperature: +temp(TC1,TC01).toFixed(2)
    };

  }
}

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 ));
  }
}
```
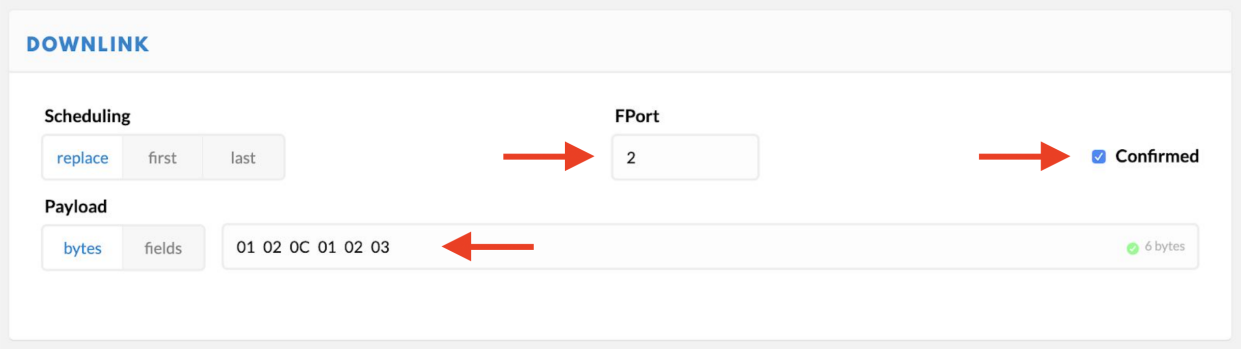
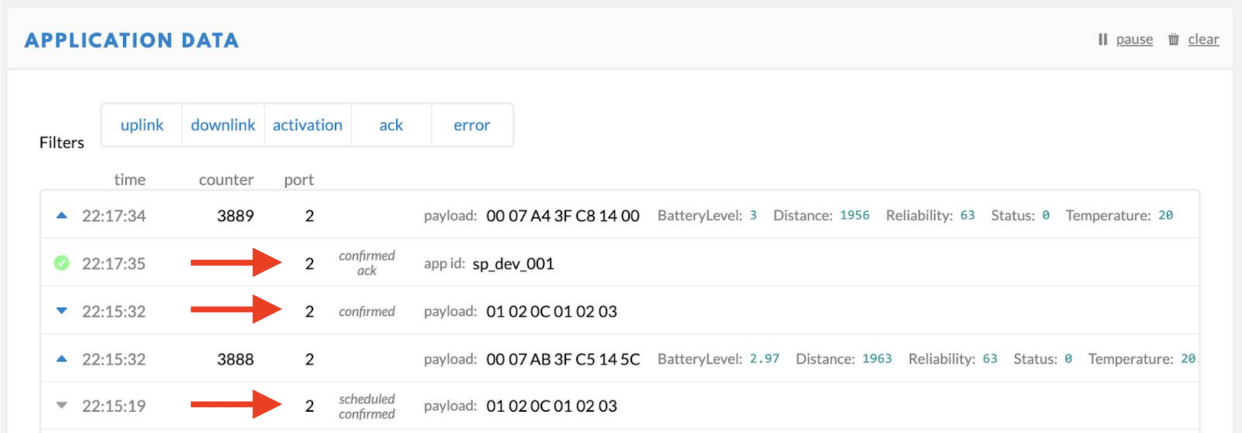

TTN Downlink Guide



Application > Device > Overview > Downlink



Application > Device > Data