

Senstick Soil 2.2 LoRaWAN Protocol FW v1.8

1. LoraWAN DATA Payload (Uplink)

Parameter:	stat	t	rh	ap	mov	bat	soil	SUM
Size:	1B	2B	2B	1B	1B	1B	2B	10B

Parameter	Name	Range	Size	Type	Description
Status	stat	0 - 255	1B	uint8	Status Codes: 0x00 - OK, Bit0 - Movement Detected, Bit1 - Accelerometer Failure, Bit2 - T/RH Sensor Failure, Bit3 - AP Sensor Failure, Bit4 - VOC Sensor Failure, Bit5 - NFC Failure, Bit6 - Reserved, Bit7 - Reserved
Temperature	t	-128.00 - 127.00	2B	int16	Temperature (t / 100)
Relative Humidity	rh	0.00 - 100.00%	2B	uint16	Relative Humidity (rh1 / 100)
Air Pressure	ap	845 - 1100 mbar	1B	uint8	Air Pressure (ap1 + 845)
Movement	mov	0 - 2.00G	1B	uint8	Acceleration on the max axis (mov / 100)
Battery Level	bat	1 - 3.55V	1B	uint8	Battery Level (bat / 100 + 1) (min. 2.2V)
Soil Moisture	soil	0 - 1023	2B	uint16	Soil Moisture (soil / 27.5)

NOTE: LoRaWAN Port 2 is used.

3. LoraWAN CONFIG Payload (Uplink)

Par	sendp	joinr	joinp1	joinp2	adren	dr	accen	tmpen	apen	vocen	accth	ackco	fww	S
Size	2B	2B	2B	2B	1b	3b	1b	1b	1b	1b	1B	1B	1B	11B

Parameter	Name	R/W	Size	Type	Default Value	Description
Send Period	sendp	R/W	2B	uint16	900 sec	Send period in seconds.
Join Retries	joinr	R/W	2B	uint16	25	A number of Join retries after boot using Join Retry Period 1.
Join Retry Period 1	joinp1	R/W	2B	uint16	60 sec	First Join Retry Period after boot.
Join Retry Period 2	joinp2	R/W	2B	uint16	1800 sec	Second Join Retry Period after all Join Retries failed.
Enable ADR	adren	R/W	1b	bool	True	Enable Adaptive Data Rate. If False always use Data Rate settings.
Data Rate	dr	R/W	3b	uint3	0	Use only if Enable ADR is False. DR0 - DR7 (x = DRx).
Accelerometer Enabled	accen	R/W	1b	bool	True	Accelerometer enabled.
Temp/Humidity Enabled	tmpen	R/W	1b	bool	True	HDC2080 enabled.
Air Pressure Enabled	apen	R/W	1b	bool	True	DPS310 enabled.
VOC Enabled	vocen	R/W	1b	bool	False	BMP680 enabled.
Accelerometer Threshold (x, y, z)	accth	R/W	1B	uint8	10 % max value	If accelerometer x, y or z-axis value is greater than the threshold value, wakeup system.
Packet Confirm	ackco	R/W	1B	uint8	4	Request confirmed packed every N transmissions. 0 == OFF.
Firmware Version	fww	R	1B	uint8	1.8	Firmware Version (fww / 10).

NOTE: LoRaWAN Port 2 is used.

4. LoRaWAN CONFIG Payload (Downlink) - Send Period

Param:	sendp	SUM
Size:	2B	2B

Parameter	Name	R/W	Size	Type	Default Value	Description
Send Period	sendp	R/W	2B	uint16	900 sec	Send period in seconds.

DEFAULT DOWNLINK PACKET: 0384

5. LoRaWAN CONFIG Payload (Downlink) - Reboot

Param:	rejoin	SUM
Size:	1B	1B

Parameter	Name	R/W	Size	Type	Default Value	Description
Rejoin	reboot	W	1B	uint8	1	Start REBOOT procedure.

DEFAULT DOWNLINK PACKET: 01

6. LoRaWAN CONFIG Payload (Downlink)

Param	sendp	joinr	joinp1	joinp2	adren	dr	accen	tmpen	apen	vocen	accth	ackco	SUM
Size:	2B	2B	2B	2B	1b	3b	1b	1b	1b	1b	1B	1B	10B

Parameter	Name	R/W	Size	Type	Default Value	Description
Send Period	sendp	R/W	2B	uint16	900 sec	Send period in seconds.
Join Retries	joinr	R/W	2B	uint16	25	A number of Join retries after boot using Join Retry Period 1.
Join Retry Period 1	joinp1	R/W	2B	uint16	60 sec	First Join Retry Period after boot.
Join Retry Period 2	joinp2	R/W	2B	uint16	1800 sec	Second Join Retry Period after all Join Retries failed.
Enable ADR	adren	R/W	1b	bool	True	Enable Adaptive Data Rate. If False always use Data Rate settings.
Data Rate	dr	R/W	3b	uint3	0	Use only if Enable ADR is False. DR0 - DR7 (x = DRx).
Accelerometer Enabled	accen	R/W	1b	bool	True	Accelerometer enabled.
Temp/Humidity Enabled	tmpen	R/W	1b	bool	True	HDC2080 enabled.
Air Pressure Enabled	apen	R/W	1b	bool	True	DPS310 enabled.
VOC Enabled	vocen	R/W	1b	bool	False	BMP680 enabled.
Accelerometer Threshold (x, y, z)	accth	R/W	1B	uint8	10 % max value	If accelerometer x, y or z-axis value is greater than the threshold value, wakeup system.
Packet Confirm	ackco	R/W	1B	uint8	4	Request confirmed packed every N transmissions. 0 == OFF.

DEFAULT DOWNLINK PACKET: 03840019003C07088E3204

[PACKET GENERATOR](#)


```
// If Data Packet
else if (bytes.length == 10) {

    var S = bytes[0];
    var T = (bytes[1] << 8) + bytes[2];
    var H = (bytes[3] << 8) + bytes[4];
    var AP1 = bytes[5];
    var MOV = bytes[6];
    var BAT = bytes[7];
    var VADC3 = (bytes[8] << 8) + bytes[9];

    if (AP1 != 0) AP1 = AP1 + 845;

    return {
        Status: S,
        Temperature: sintToDec(T),
        Humidity: H / 100.0,
        AirPressure: AP1,
        Movement: MOV / 100,
        BatteryLevel: (BAT + 100) / 100,
        SoilMoisture: Math.round(VADC3 / 27.5) // % Max = 2750 mV
    };

}

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

8. TTN Downlink Guide

DOWNLINK

Scheduling

replace first last

FPort

2

Payload

bytes fields

01 02 0C 01 02 03

6 bytes

Confirmed

Application > Device > Overview > Downlink

APPLICATION DATA

|| pause 🗑 clear

Filters

uplink downlink activation ack error

	time	counter	port	payload	BatteryLevel: 3 Distance: 1956 Reliability: 63 Status: 0 Temperature: 20
▲	22:17:34	3889	2	payload: 00 07 A4 3F C8 14 00	
●	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