Manual for SD-xxx devices

SD devices are IoT Monitoring devices for SensDesk Technology Portals.

Devices communicate via LAN / WiFi only.

1.1.1. Safety Notices

The device complies with regulations and standards enforced in the Czech Republic and the European Union. The device has been tested and is supplied in working order. To keep the device in this condition, it is necessary to adhere to the following safety and maintenance instructions.

Using the device in a manner other than prescribed by the manufacturer may cause its safeguards to fail!

The power supply outlet or disconnection point must be freely accessible.

The device must not be used in particular under any of the following conditions:

- The device is noticeably damaged
- The device does not function properly
- Unfastened parts can be heard moving inside the device
- The device has been exposed to moisture or rain
- The device has been serviced by unauthorized personnel
- The power adapter, power supply cable or PoE Ethernet cable is noticeably damaged
- If the device is used in a manner other than designed for, the protection provided by the device may fail
- The local electrical system must include a power switch or a circuit breaker and overcurrent protection.

The manufacturer warrants the device only if it is powered by the supplied power adapter or an approved power supply.

If you have any problems with installing or operating the device, please contact our technical support:

Web: www.hw-group.com
Email: support@hwg.cz
Phone: +420 222 511 918

HW group s.r.o.
Formanská 296
Prague, 149 00

Before contacting technical support, please have at hand the exact type of your device (at the type plate) and, if known, the firmware version (see later in this manual).

1.1.2. Table of Contents

1.1.1. IoT Monitoring products

All SD-xxx devices are IoT Monitoring devices which means they **have to be connected** to a SensDesk Technology portal.

All the SMS/email alerts, PDF reports, and central device management is realized **from the portal**.

The manufacturer provides a limited free-of-charge portal service (**HWg-cloud.com**) and a paid service (**SensDesk.com**).

You can also check other **Portal Providers** (your local distributors) for other available compatible portals.

2. SD-xxx devices product family

The SD-xxx Devices is a family of simple easy-to-install remote monitoring products with LAN / WiFi connectivity. All products feature a robust design and seamless integration with any portal based on SensDesk Technology.

2.1. SD-xxx devices product overview

2.1.1. SD-2x1Wire

A device for remote monitoring external 1W and 1W-UNI sensors (Temperature, Relative Humidity, Light intensity, ...). Two RJ11 ports for external sensors to measure up to 4 sensor values.

2.1.2. SD-2xIn

A device for remote monitoring of 2 DI (Digital Inputs) - state + pulse counter. Any dry contact can be connected - door contact, PIR motion detector, or a smoke/gas detector with a relay output, energy meters with S0 output (external power required).

2.1.3. SD-WLD

Water Leak Detection unit with 1 WLD zone input (external WLD Type A water sensing cable).

2.1.4. SD-2xOut

A module with 2 DO (relay outputs) controlled from the portal (HWg-cloud.com or others).

2.1.5. SD-4-20mA

A device with AI (Analog Input) for remote monitoring of external industrial sensors (4-20mA).

2.2. Shared features of the SD-xxx product family

- Robust metal design, 70×68×34mm d/w/h (without antenna)
- Ethernet or WiFi - 802.11 b/g/n (2.4GHz)
- Support for simultaneous Ethernet and WiFi operation (for easy setup)
- External antenna, SMA connector
- Plug&Play – connect power and the device is immediately available in the portal
- Device & communication settings (communication period, Safe Ranges) are configured in the SensDesk Technology portal
- Powered from a 5V adapter or PoE
- Embedded WEB server

For specifics of individual devices, including any differences in the measurement period, see the respective device page.

2.3. Measurements and data upload

2.3.1. Sensors measurement and data upload periods

The period for logging the measured values and uploading them to the portal is automatically fully configured by the portal.

2.3.2. Default SensDesk.com portal values

- Logging period (storing values in the internal memory): 5 minutes
- Data upload period (connecting to the portal and uploading all logged values): 15 minutes

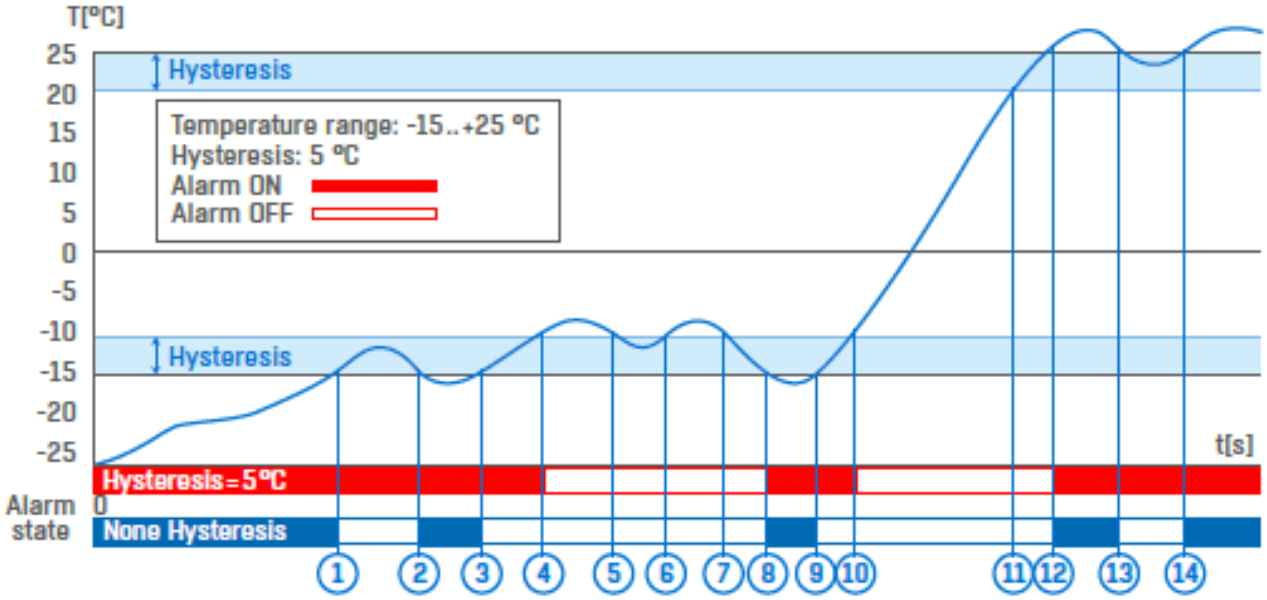
Only the Portal administrator may provide you with other than default Logging / Data update period settings (setup per each device).

2.3.3. SafeRange – range of allowed values

Safe Range is configured in the portal independently for each sensor. Whenever the measured value strays outside this range, a message to the portal gets sent (even out of the Data Upload period - default 15 minutes).

2.3.4. Hysteresis/Idle range (sensor value)

The Hysteresis setting defines a tolerance range for suppressing alarm alerts. The function prevents multiple alarm alerts (too many emails or SMS from the portal) if the reading oscillates around the specified threshold. Hysteresis is configured independently for each sensor.



The figure demonstrates two cases. Without the hysteresis idle range of 5 °C, the alarm raised in point 8 would end in point 9; however, the hysteresis function keeps the alarm active until the temperature reaches the upper limit of the tolerance band (point 10): 5 °C + (−15 °C) = −10 °C.

- Hysteresis = 5 °C – The portal sends 4 Email (SMS) messages. Alert is sent with beginning and end of Alarm State (points 4, 8, 10, 12)
- No hysteresis (0 °C) – The portal sends 8 Email (SMS) messages. Alert is sent with beginning and end of Alarm State (points 1, 2, 3, 8, 9, 12, 13, 14)

In determining when the Alarm ends, the Hysteresis value applies. The end of an Alarm is only notified when the measured value is within the Safe Range and further under the offset introduced by Hysteresis.

2.3.5. Safe Range vs. Notice Range

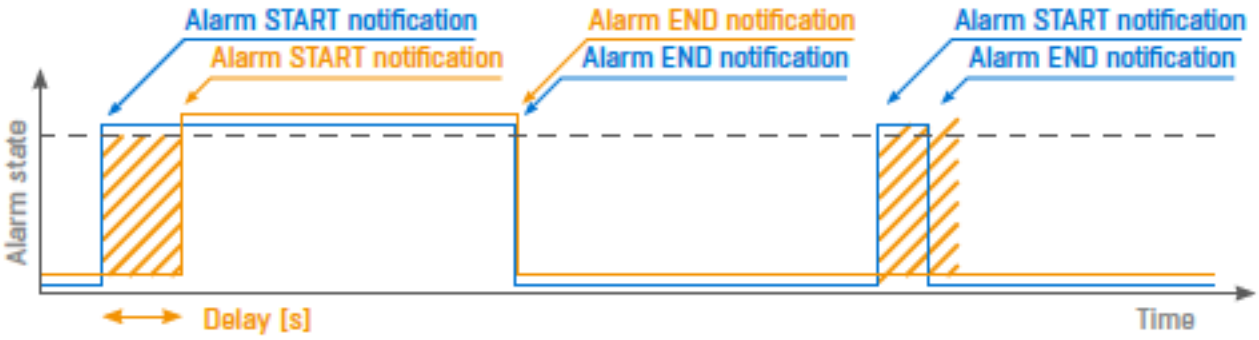
Each sensor has a set Safe Range. Faster communication to the portal when Safe Range is exceeded can be useful for some cases.

Additionally, you can set up several Notices on the Portal which use their own, independent Notice Range. These are used for setting up Actions. Using these, you can set up multiple behaviors for different value ranges, like escalating alarms etc.

2.3.6. *Alarm Delay*

You can set up a Delay value for each sensor. This means that if the measured value steps out of the sensors defined Safe Range and a Delay is set up, the device (and the user) won't be notified of the sensors Alarm State until the Delay period ends.

This can be useful for example if you have an open door with a Door contact sensor and don't want to raise an alarm each time someone opens it, but only after it is left open for 3 minutes.



Alarm status notification based on a Delay value:

- Blue: Delay = 0
- Yellow: Delay is non-zero

3. Setting up the device

3.1. Connecting the cables

1) Attach the external antenna
2) Connect the device to the Ethernet (with a patch cable to a switch, or a cross-over cable to a PC)
3) Plug the power adapter into a power outlet and connect it to the power connector. If you plugged the device into a PoE enabled switch or a PoE injector, you can use the device without the power adapter
4) The Power Mode (green) LED in the RJ45 connector lights up
5) If the Ethernet connection works properly, the LINK (amber) LED lights up after a short while and then flashes whenever any data transfer takes place (activity indication)
6) Rapidly flashing LINK (amber) LED indicates communication with the DHCP server

3.2. Configuring the IP address – HWg Config

3.2.1. Open HWg Config and find available devices

The tool is available for download at *www.HW-group.com -> Software ->* *HWg Config*

Double-click the icon to run **HWg-Config**. The program automatically searches for connected devices. You can also start a search manually by clicking the **Find Devices** icon.

The program searches for all available HWg devices in your local network.

3.2.2. Configure the network parameters

Click a MAC address (or double-click somewhere in the row) to open a basic device configuration dialog:

- Enable DHCP (this will have the rest of the seetings get configured automatically by your router)
- IP address / HTTP port (80 by default)
- Network mask
- Gateway IP address for your network
- Device name (optional)

Click **Apply Changes** to save the settings.

3.2.3. Restoring factory defaults

You can restore factory default settings in 3 ways:

Using HWg-Config

Right-click the device MAC address. Within 60 seconds of powering up the unit, factory defaults can be restored using HWg-Config by selecting Load default values.

Using the Reset button:

1. Turn the device off
2. Press and hold the Reset button
3. Turn the device on and hold the button for another 5 seconds
4. All LEDs light up in sequence
5. Release button, device restarts with restored factory defaults

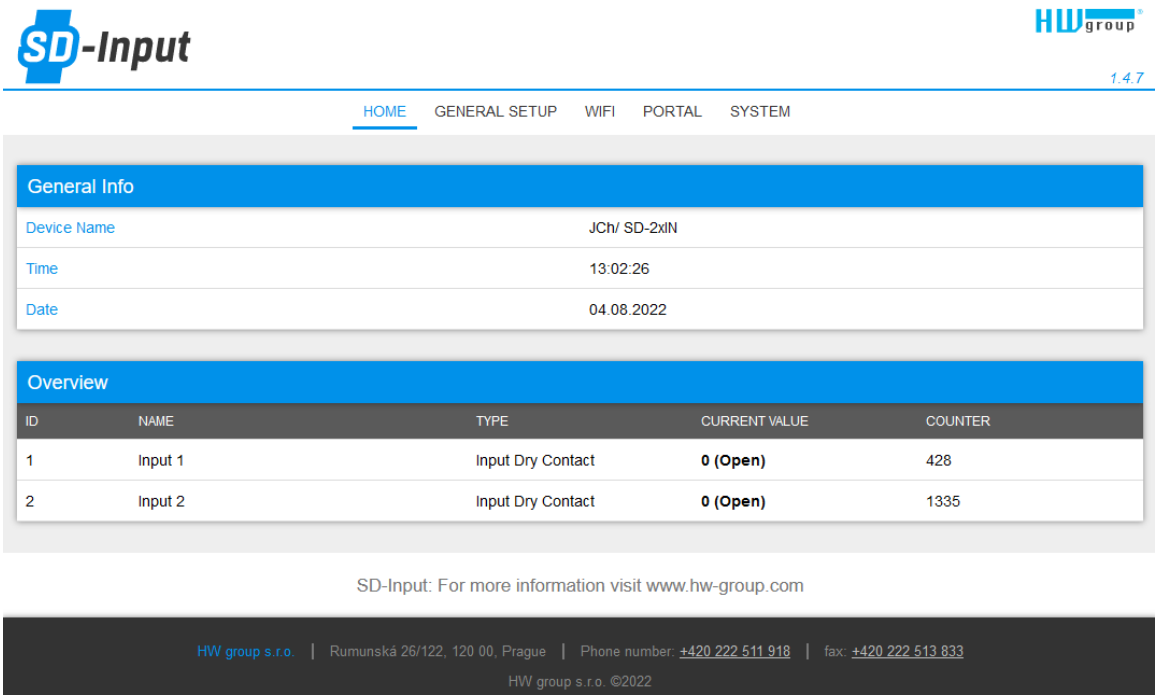
WWW interface of the device

1. Enter the device IP address in a web browser or click the underlined IP address shown in **HWg-Config**.
2. Go to the System tab
3. Click Factory reset

3.3. WWW interface

All SD devices have the same graphical WWW interface. They only differ in the logo and the I/O information.

3.3.1. Home



General Info

- **Device Name** – identify individual devices in larger installations and on a portal. If needed, device network name can be changed with HWg-Config utility (under device details settings).
- **Time** – current time on the device clock. It is configured only from the portal.
- **Date** – current date on the device clock. It is configured only from the portal.

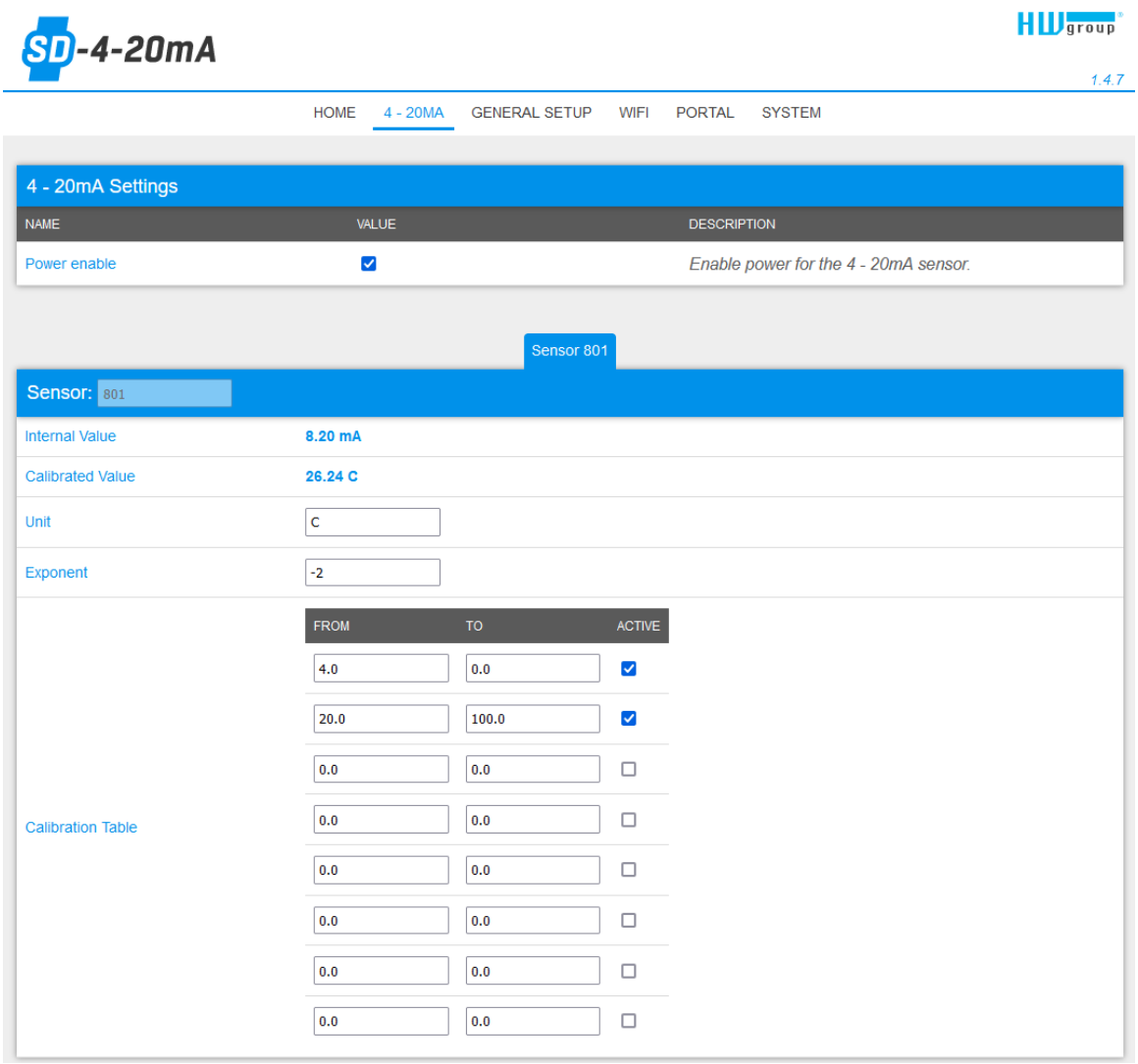
Overview

Lists current value readings and states

- **ID** – you can see the short ID for the sensor or input
- **Name** – sensor name, used for easier identification in large systems. Can be in format of 1-Wire sensor ID, which is also found physically on the sensor. Or sensor type, such as CO2 (for CO_2 sensor).
- **Type** – identifies the sensor/output type. SD-2xIn also provides additional *Counter* value per Input.
- **Current value** – current reading, including the unit (final)

3.3.2. 4–20mA

Available only in product SD-4-20mA.



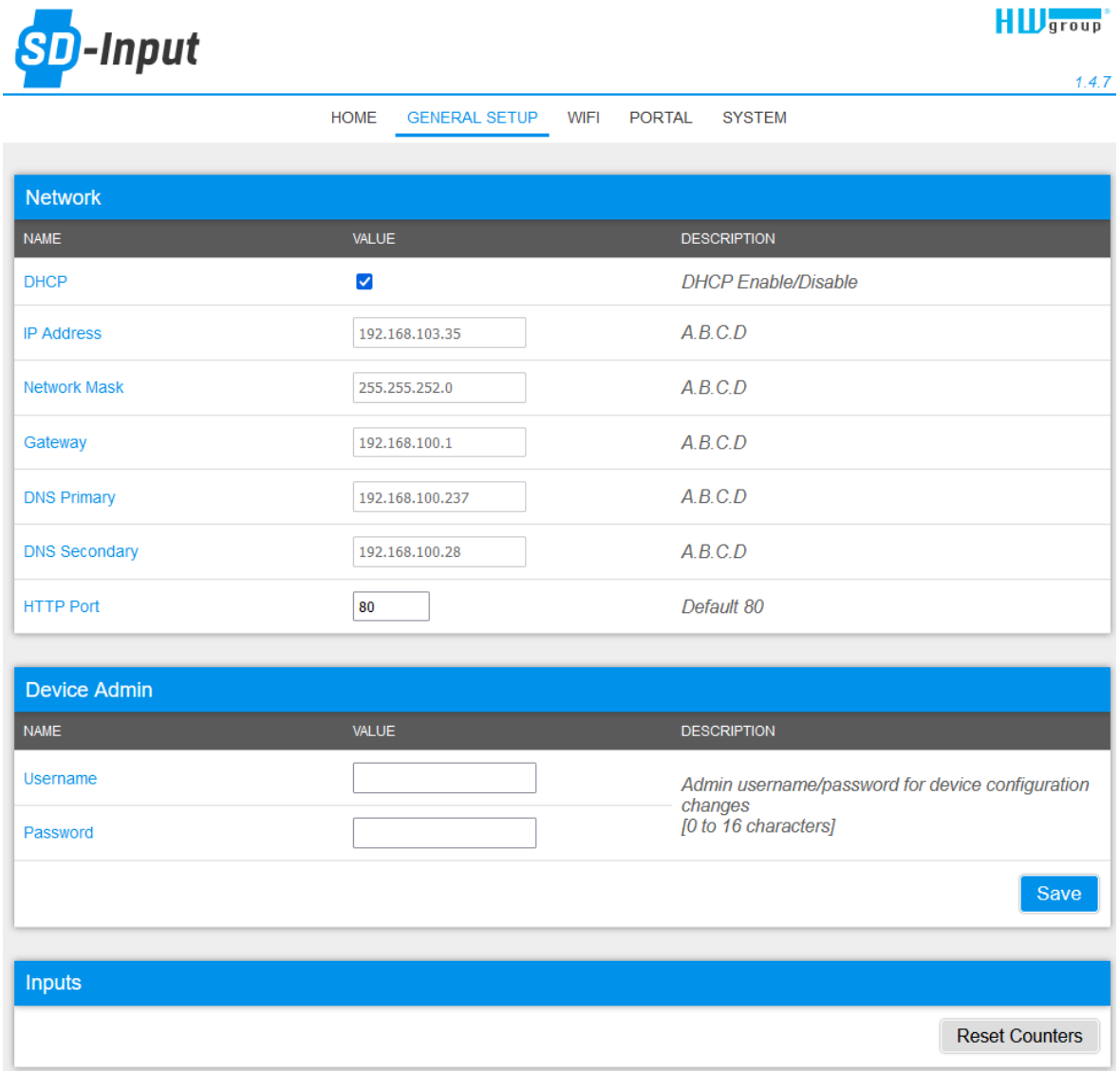
4-20mA Settings

- **Power enable** – enables power to the current loop of external sensor (4-20mA). Disabled = 0-20mA Analog Input = no power for external probe.
- **Internal Value** – shows the raw readout from the sensor
- **Calibrated Value** – shows the value that comes from the Internal Value being modified by the Calibration Table
- **Unit** – you can input the name of the unit you want displayed with the Calibrated value
- **Exponent** – changes the placement of the decimal point for the Calibrated Value
- **Calibration Table** – many sensors use the voltage Internal Value to measure a different value/unit. This table serves to mate Voltage readouts with their corresponding values for the unit the sensor is designed to measure.

For example a temperature sensor measures from 0° C to 100° C – the minimal internal value of a 4-20 mA sensor is 4 mA and the maximum is 20 mA. For this example, you would put 4 in the *FROM* column and 0 in the *TO* column (and °C in the Unit row above). In the next row, you would put 20 in the *FROM* column and 100 in the *TO* column.

3.3.3. General Setup

On this page you can configure network parameters, device security and reset the pulse counters (SD–2xIn only)

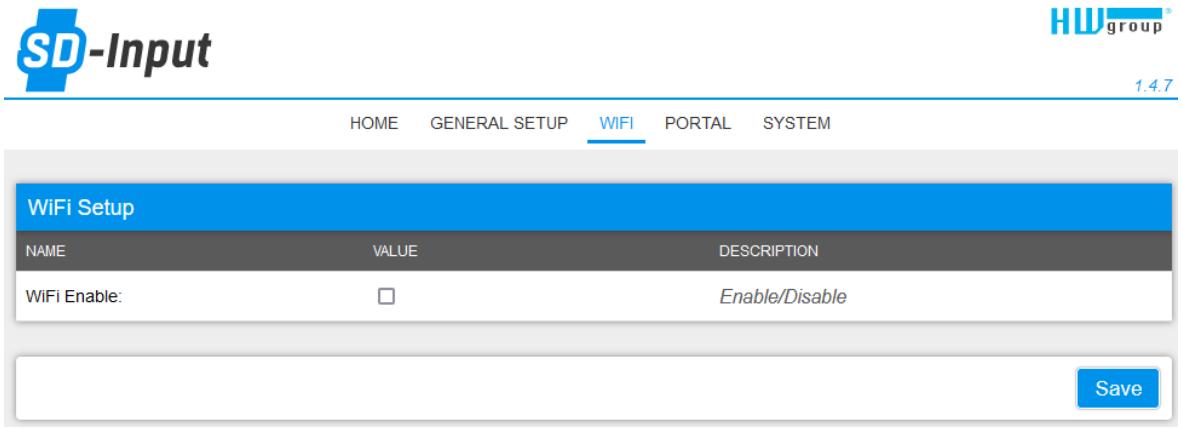


- **DHCP** – enables automatic IP address configuration via a DHCP server if available. Decision whether or not to enable DHCP depends on the user needs and your network administrator
- **IP Address** – IP address of the device - assigned by your network admin
- **Network Mask** – network mask - assigned by your network administrator
- **Gateway** – IP address of the default gateway - assigned by your network admin
- **DNS Primary / DNS Secondary** – IP address of your DNS server - assigned by your network administrator

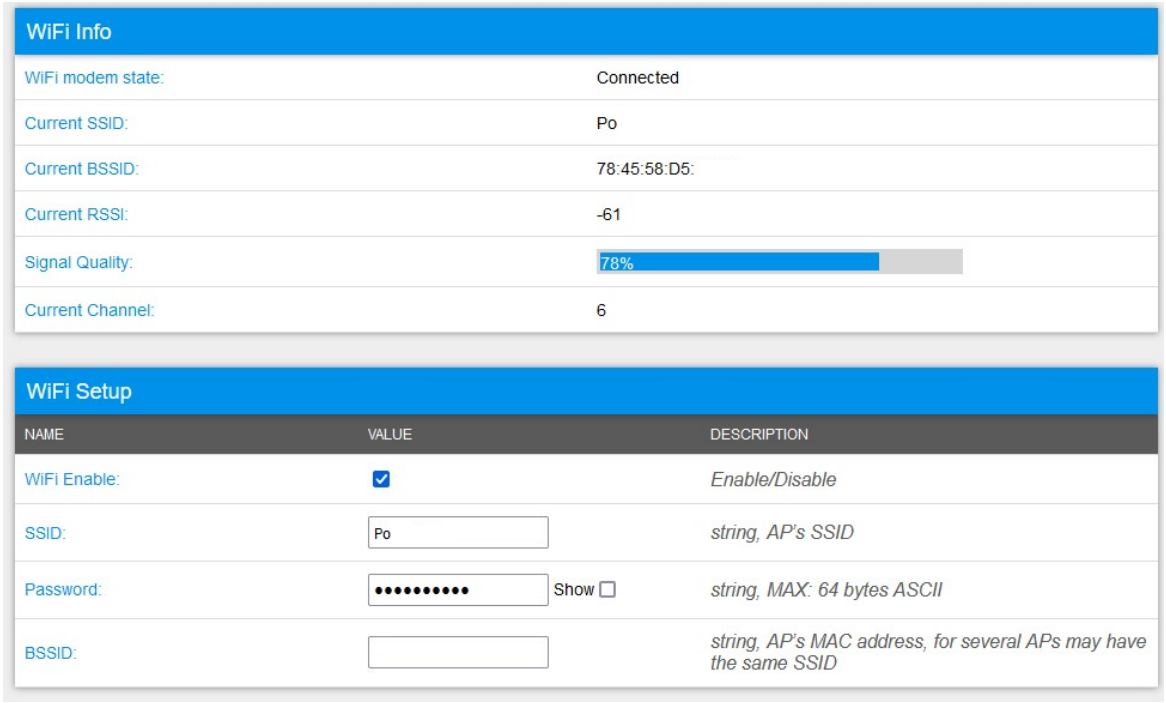
- **HTTP Port** – port where the built-in WWW server listens (default 80)
- **Username / Password** – user name and password for securing access to device
- **Inputs** (SD–2xIn only) – Reset Counters – resets the counter value to 0

3.3.4. WIFI

When WIFI is off, only the option to enable it is shown:



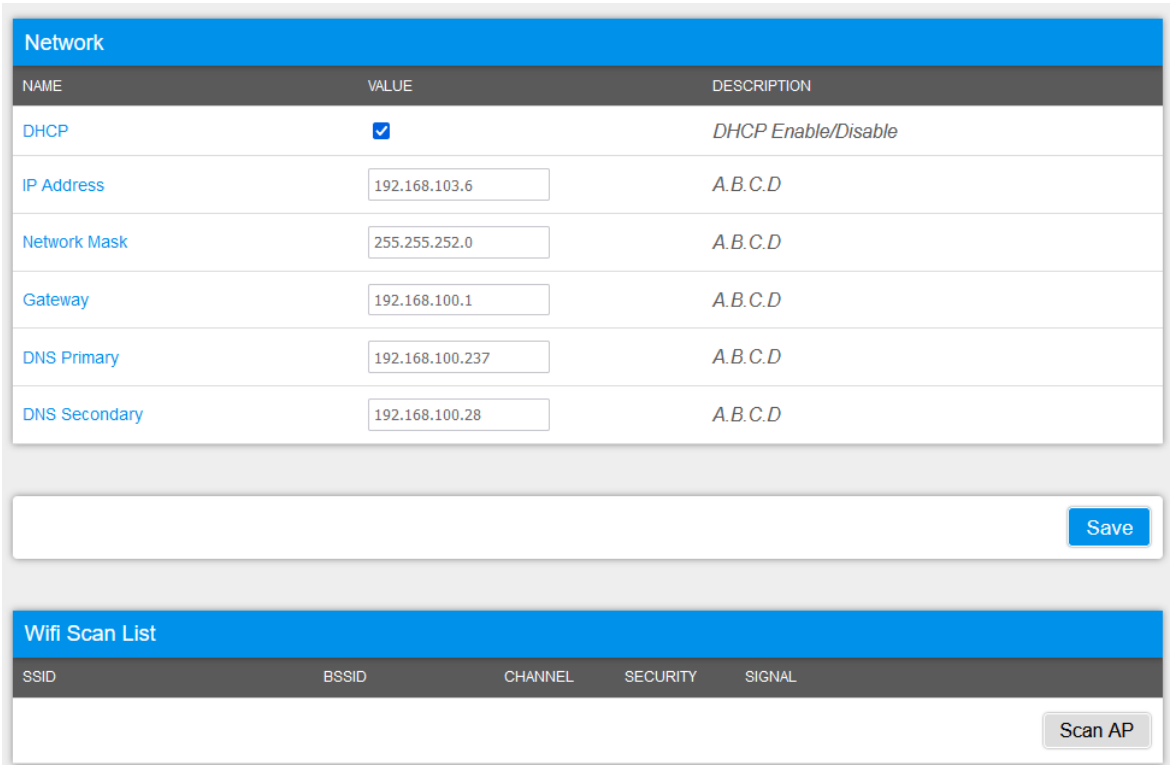
After enabling WiFi, more options become available:



WiFi Info

- ***Disable*** – WiFi turned off
- ***Wait for power on*** – waiting for the WiFi module to switch on
- ***Init*** – WiFi module is being initialized

- ***Connecting*** – connection is being established
- ***SSID check*** – SSID is being verified
- ***Connected*** – connected to the selected WiFi network
- ***Network WiFi scan*** – looking for available WiFi networks
- ***Wait for scan*** – waiting for the WiFi network scan to start
- **Current SSID** – name of the network to which the device is currently connected - the parameter is not shown if the device is not connected to any WiFi network
- **Current BSSID** – ID of the WiFi network access point to which the device is currently connected – the parameter is not shown if the device is not connected to any WiFi network
- **Current RSSI** – relative received signal strength indication - the higher the RSSI, the stronger the signal
- **Signal Quality** – WiFi signal strength in % and with a graphical indication
- **Current Channel** – WiFi channel used by the device for the connection - the parameter is not shown if the device is not connected to any WiFi network



WiFi Setup

- WiFi Enable – enables or disables WiFi. The wireless interface is disabled by default. After enabling, the device restarts
- SSID – name of the WiFi network to which the device should connect. If the network name is not known, use the Scan AP function at the bottom of the page
- Password – WiFi password. If you don't know it, contact your network administrator
- BSSID – WiFi access point identifier (MAC address) - optional

Network

WiFi network parameters. To configure Ethernet (RJ-45), use the General Setup tab

WiFi Info

- ***Disable*** – WiFi turned off
- ***Wait for power on*** – waiting for the WiFi module to switch on
- ***Init*** – WiFi module is being initialized
- ***Connecting*** – connection is being established
- ***SSID check*** – SSID is being verified
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- **Signal Quality** – WiFi signal strength in % and with a graphical indication

- **Current Channel** – WiFi channel used by the device for the connection - the parameter is not shown if the device is not connected to any WiFi network

WiFi Network

- **DHCP** – enables IP address configuration via a DHCP server if available. Decision whether or not to enable DHCP depends on the user needs and your network administrator
- **IP Address** – IP address of the device which is assigned by your network administrator
- **Network Mask** – assigned by your network administrator
- **Gateway** – IP address of the default gateway which is assigned by your network administrator
- **DNS Primary / DNS Secondary** – IP address of your DNS server, which is assigned by your network administrator

WiFi Scan List

- **SSID** – name of the discovered WiFi network
- **BSSID** – access point identifier (MAC address)
- **Channel** – WiFi channel used by the access point
- **Security** – WiFi security type
- **Signal** – signal level in decibels. The higher the value, the stronger the signal. Attention: -60 is better than -90! Highlighted row indicates the Access Point that is currently used.

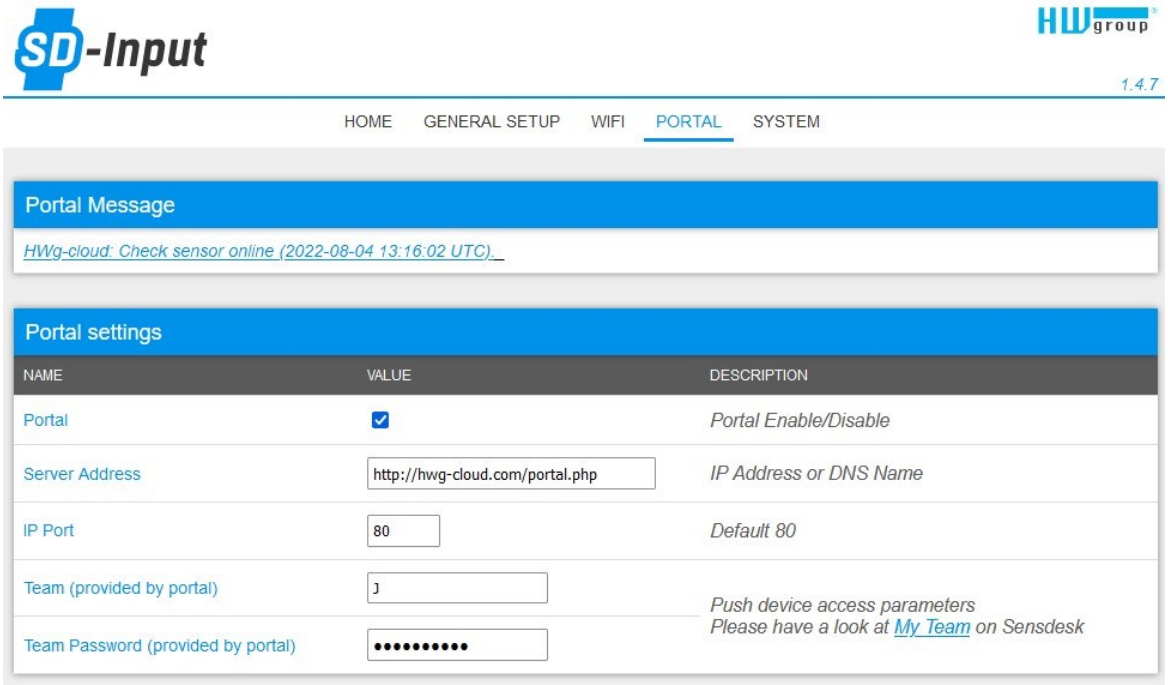
Connecting to a discovered WiFi

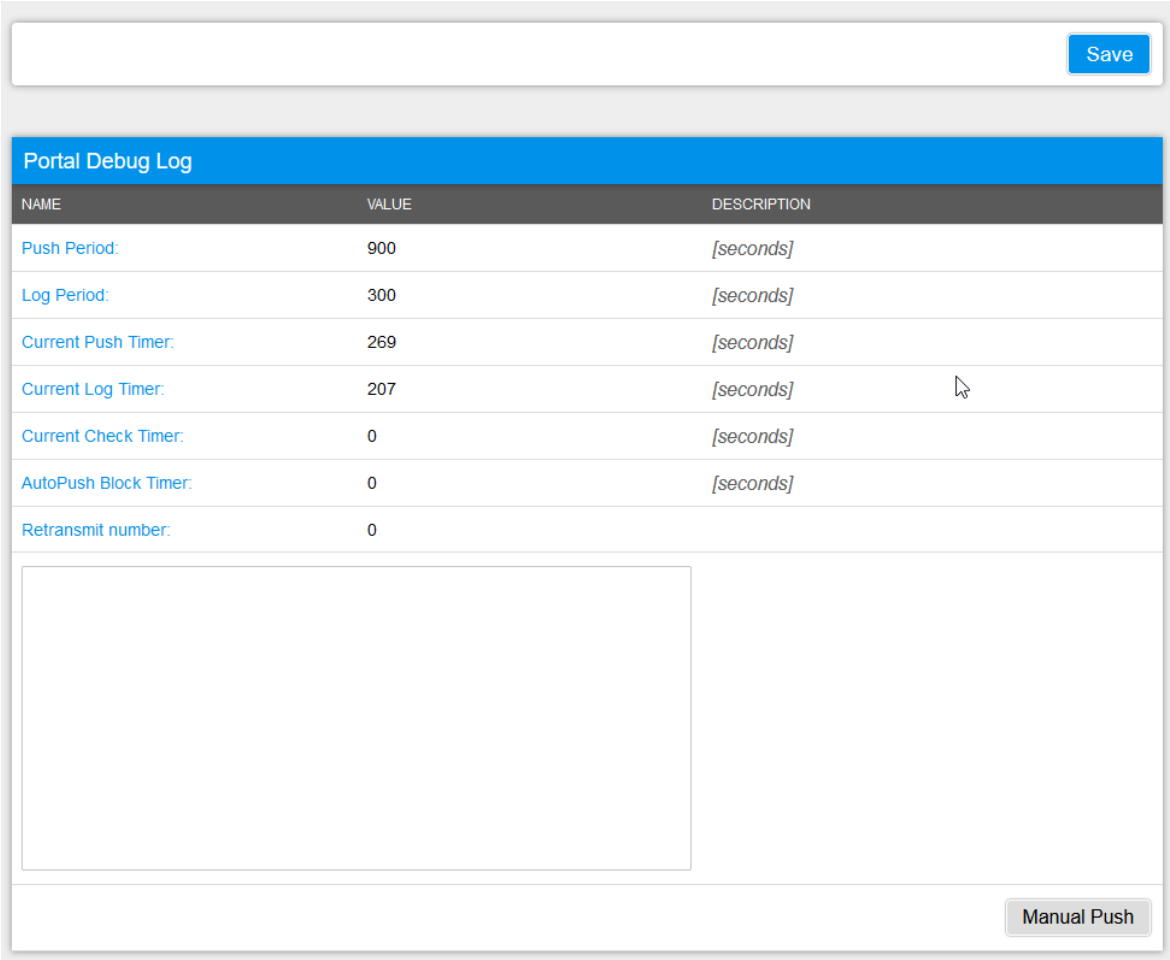
- By clicking the SSID of the discovered network, WiFi settings are filled in. Only the password needs to be specified manually. The BSSID field remains empty. This is the default setting. When the Access Point changes, the device reconnects automatically.

- By clicking the BSSID, the MAC address of the specific AP (BSSID) is filled in, in addition to the network name (SSID). The SD device then connects to this specific AP and will not try to change APs in multi-AP networks.

3.3.5. Portal

Configuration parameters for uploading data to a remote portal using the HWg-PUSH Protocol. For more information about the protocol and the support for portal solutions, see SensDesk technology.





Portal Message

Information from the portal, such as links to device or error status. Depends on the portal type.

Portal Config

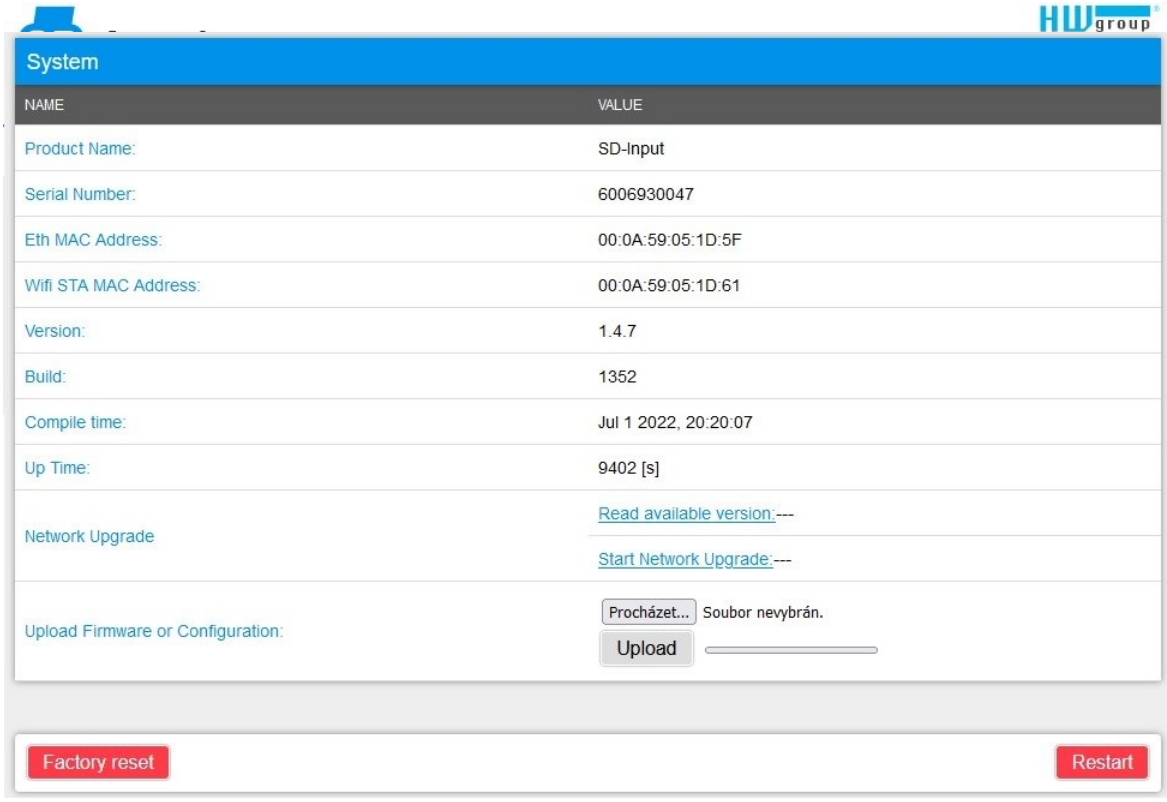
- Portal – turns this feature on or off
- Server address – complete URL of the remote server. Connection parameters for the http://www.hwg-cloud.com free portal are pre-filled. The default is always *http://hwg-cloud.com/portal.php*
- IP Port – port where the portal listens. The default is always 80
- **Team** – username for assigning the Portal team (company). You will receive it from your portal administrator
- **Team Password** – password for assigning an SD team. You will receive it from your portal administrator

Portal debug

Information used only for debugging

- **Push Period** – period of uploading data to the remote portal. The period is determined by the portal and cannot be changed by the user.
- **Log Period** – period for buffering data for the portal. The period is determined by the portal and cannot be changed by the user.
- **Current Push Timer** – indicates the time until the next upload of data to the portal
- **Current Log Timer** – indicates the time until the next reading of sensors
- **AutoPush Block Timer** – if the number of events exceeded limit within time window, the AutoPush function is temporary disabled temporarily by this countdown.
- **Retransmit number** – number of unsuccessful attempts to upload values to the portal
- **Manual Push** – button to immediately upload data to the portal independently from the Push Period

3.3.6. System



Download

- **Backup configuration** – backup of the device configuration in a BIN format. After configuring the SD device, click this link to save the current configuration in case it needs to be restored.
- **Online setup in XML** – device setup in the XML format

System

- **Product Name** – name (type) of the device
- **Serial Number** – serial number of the device
- **Eth MAC Address** – MAC address of the device for wired connections
- **WiFi STA MAC Address** – MAC address of the device for WiFi connections
- **Version** – currently installed version of the product firmware
- **Build** – build number of the currently installed firmware
- **Compile time** – exact date and time when the firmware was compiled – indicates the age of the currently installed version
- **UpTime** – time since the device was last powered on or restarted
- Read available version – displays the latest firmware version available at the HW group update server
- **Start Network Upgrade** – starts the firmware upgrade using the HW group update server
- **Upload Firmware or Configuration** – allows uploading a firmware or configuration file to the device from local storage. Restoring the configuration may fail if there is too much of a difference in firmware versions between the current configuration and the one being uploaded.

Factory reset

Restores factory default settings. The default IP address is 192.168.10.20 and no user name or password is defined.

Restart

Restarts the device

3.4. Connecting SD devices to SensDesk.com portal

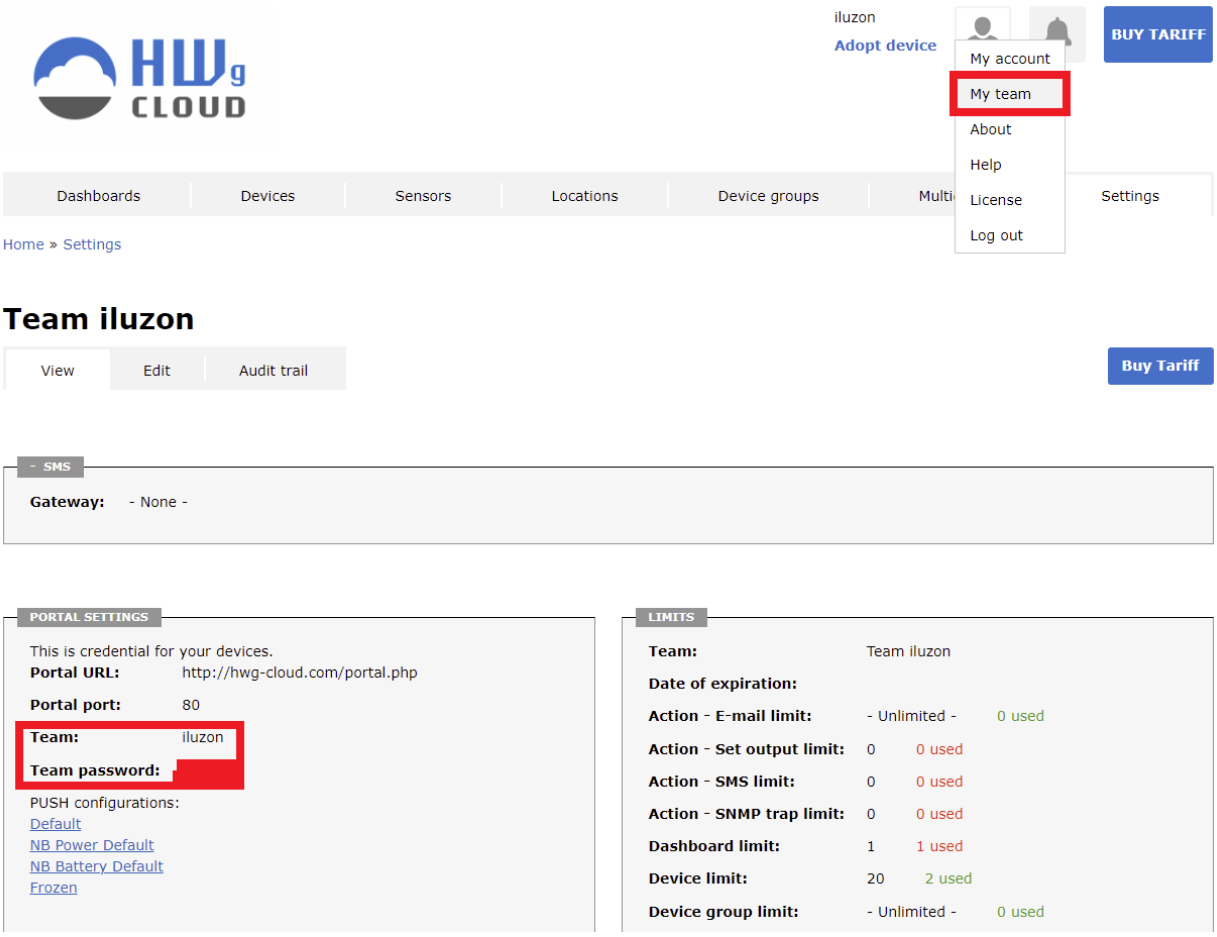
1. Connect the device to the network and configure the network parameters (see **Setting up**).
2. Open the device WWW interface
3. At the Portal tab, check the Portal box and click Save
4. Click the *SensDesk.com: register your SD device…* link in the Portal Message dialog box to go to the *SensDesk.com* login dialog.

If you already have a user account, enter your login credentials. The device is then automatically linked to your account.

If you don't have a user account yet, click the *Register to Portal* link. The registration form displays:

Enter your **login** credentials and a valid **e-mail address**. The e-mail address must be unique within the portal, it must not have been already registered. After clicking **Create new account**, your account is created and a confirmation e-mail is sent to the address specified:

When logged on the portal, check the **My team** tab, find the **Team** (name) + **Team Password**. These credentials are needed for communication between the device and portal. The **Team Password** cannot be changed, and for security reasons it is different from the user account password:

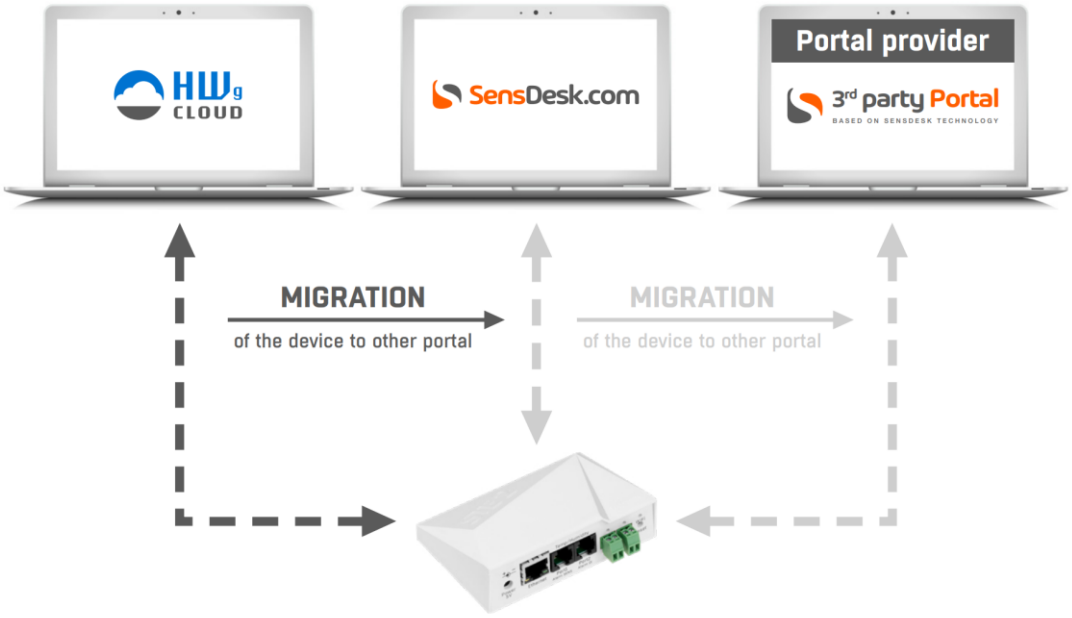


This **Team** (name) and **Team password** can be manually entered in the portal settings in the web interface of the device in order to avoid the need to register and sign in:

3.5. Device Migration to another portal

When the device is visible in a portal, it can be migrated to another user account on another portal (SensDesk Technology based).

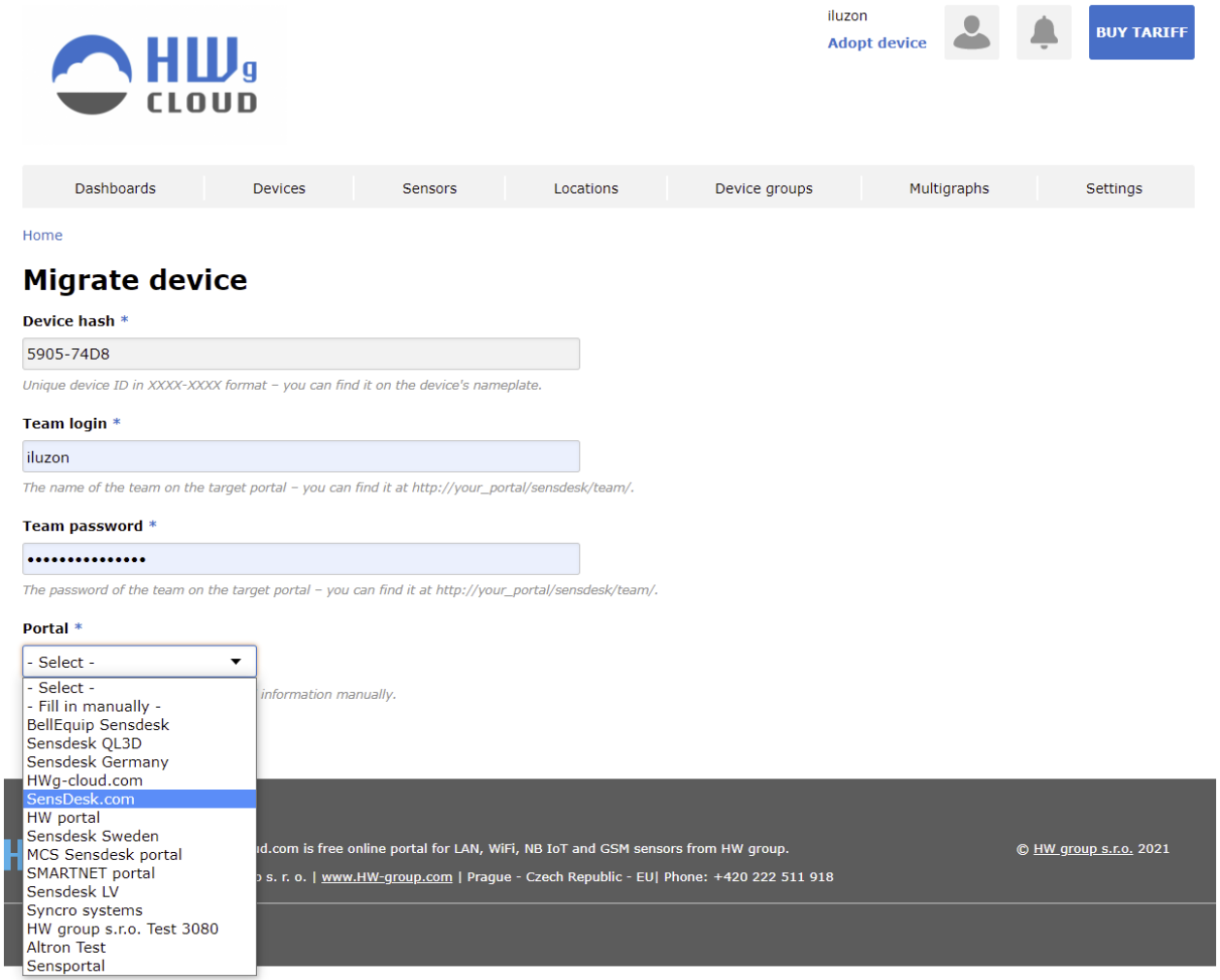
A connected and working device can also be easily migrated from one portal to another. For example in this case from the free HWg-cloud.com to the paid portal SensDesk.com.



Look up your *Team login* and *Team password*. You can find them under your user profile on the *My team* page.

Click on Migrate device to another SensDesk technology based portal

Fill in the *Team login* and *Team password* (of target portal), choose the right SensDesk Technology based portal.



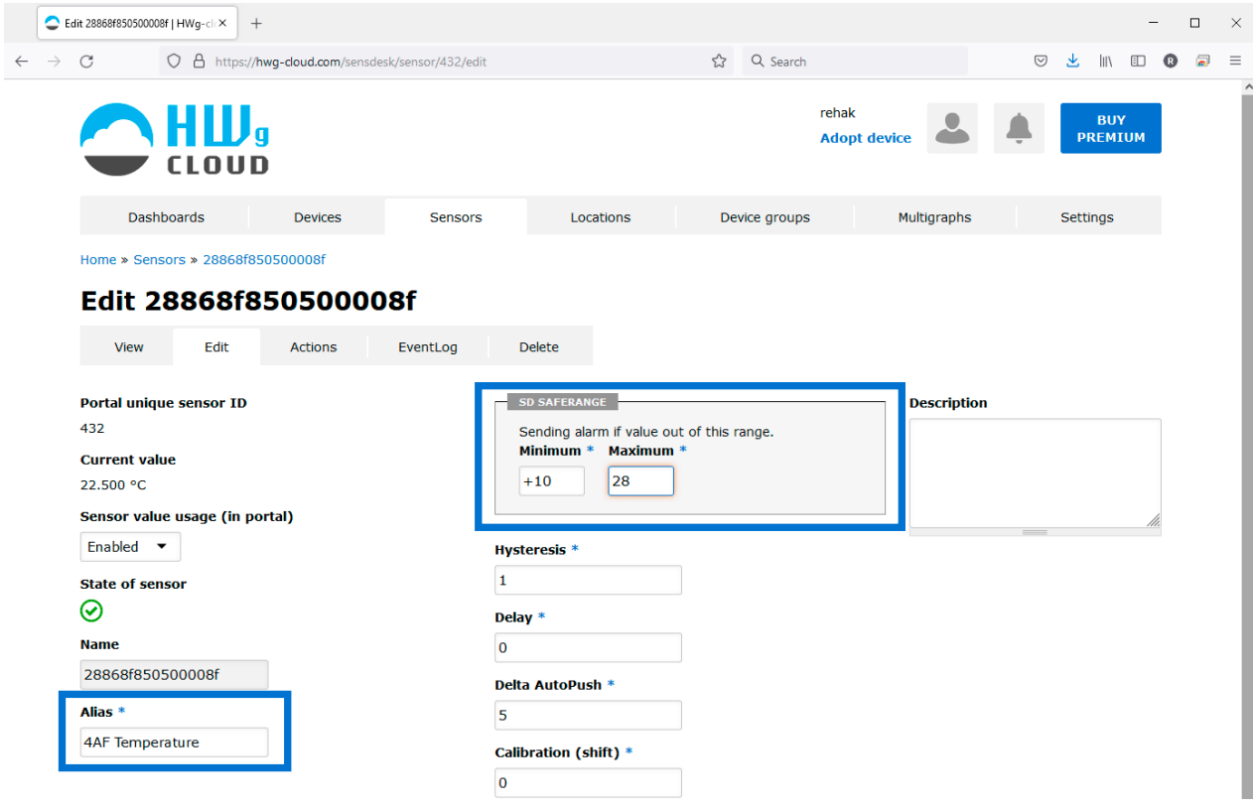
Restart the device.

The device will appear on the target portal.

Only sensor names will be transferred between portals. Device configuration and data history will not be migrated!

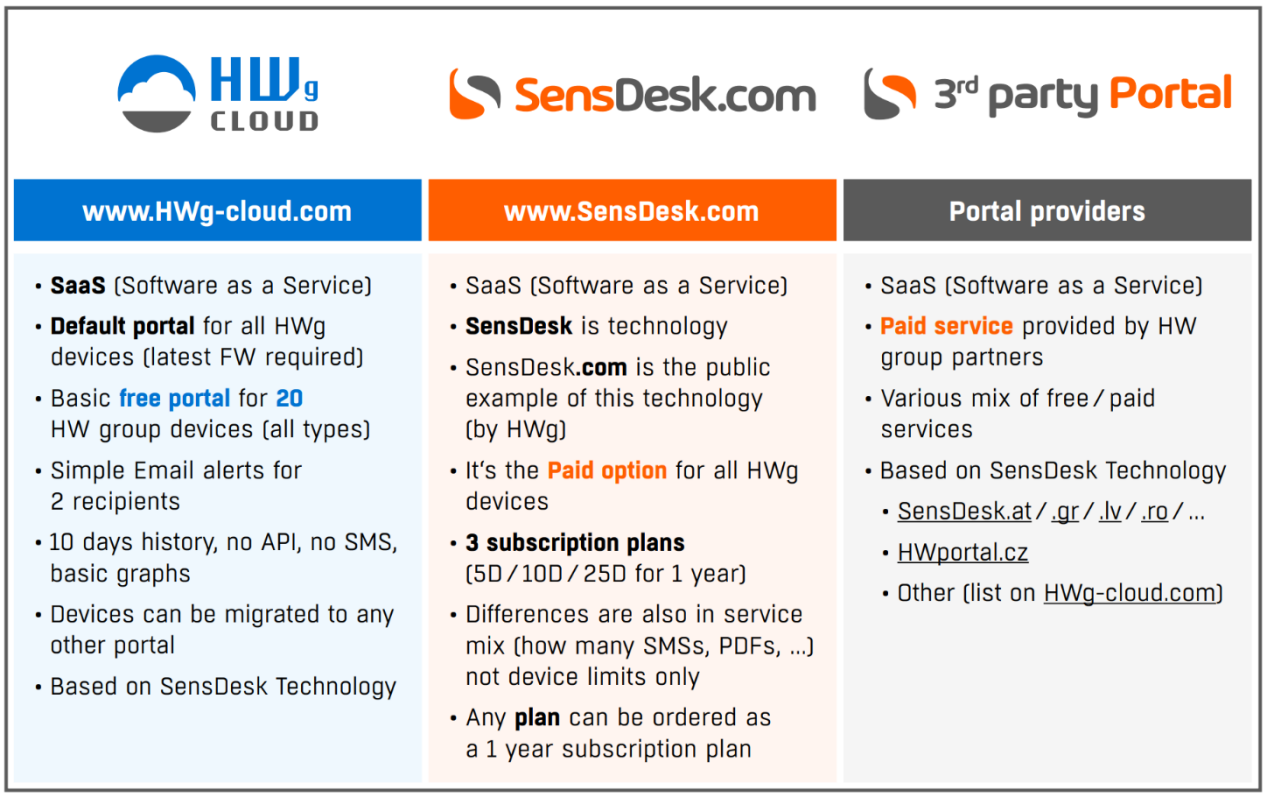
3.6. Define sensor name & SD SafeRange for each sensor

Part of the device installation is to define the device name, the sensor names (*Alias*) and the *SD SafeRange* for each sensor.



4. SensDesk Technology Portals

4.1. SD Devices have to be connected to a Portal



4.2. Portal options

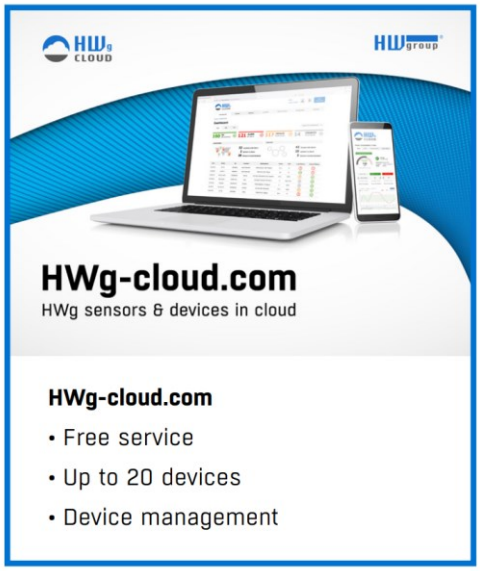
All SD-xxx devices have to be connected to an online Portal based on SensDesk Technology.

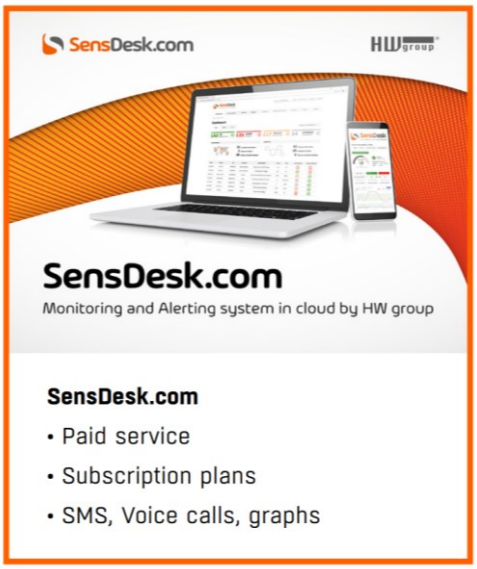
4.2.1. HWg-cloud.com

HWg-cloud.com is a free portal provided by the manufacturer with limited functionality.

4.2.2. SensDesk.com

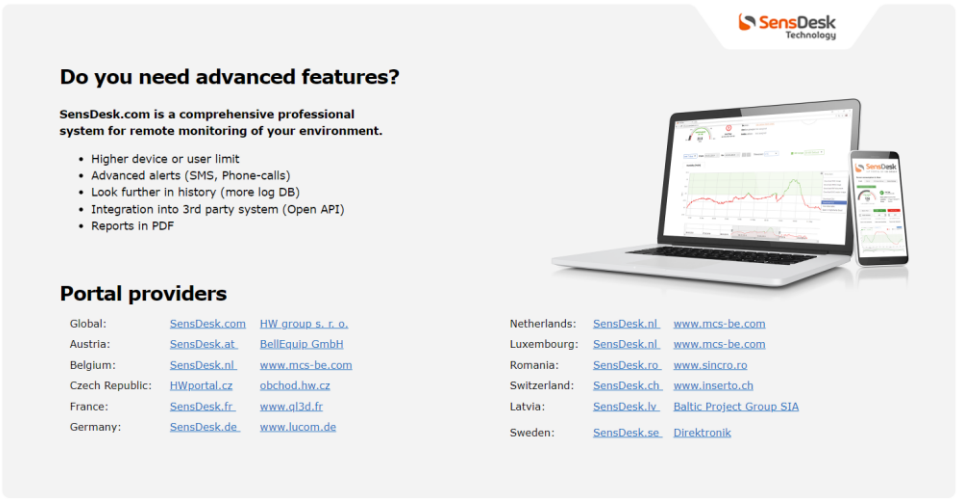
SensDesk.com is a paid portal provided by the manufacturer with advanced features.





4.2.3. Portal providers

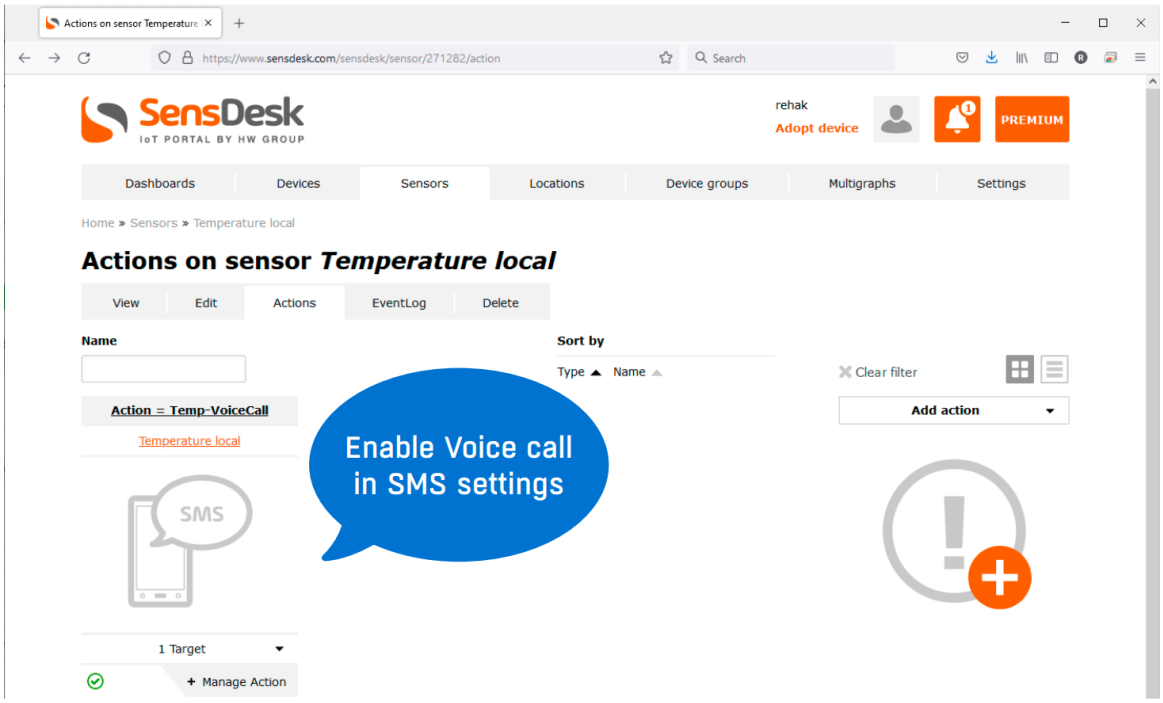
Portal providers are independent companies running their own compatible portals. A list of them can be found on **HWg-cloud.com** main page as Portal Providers.



4.3. SensDesk.com portal features

4.3.1. SMS & Voice call alerts

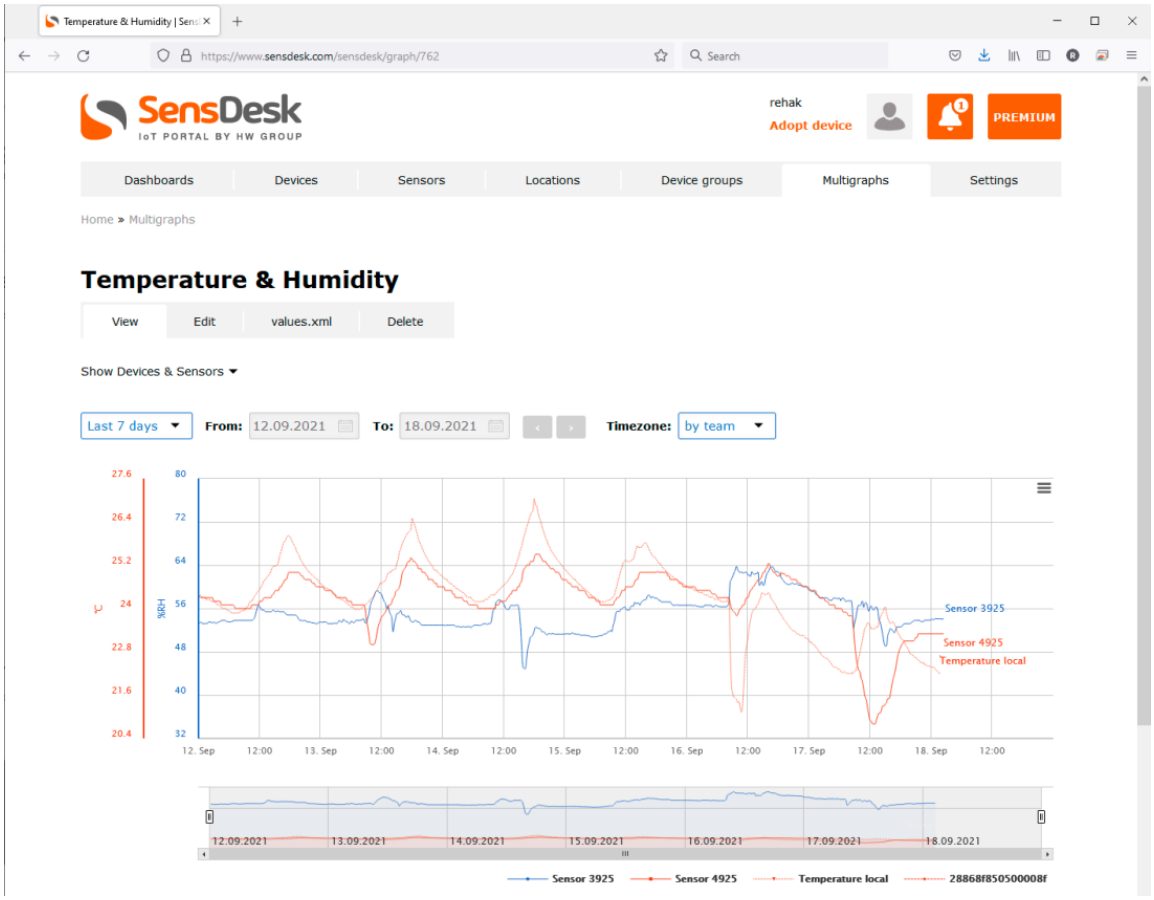
* not available on HWg-cloud.com portal.



4.3.2. Graphs of values

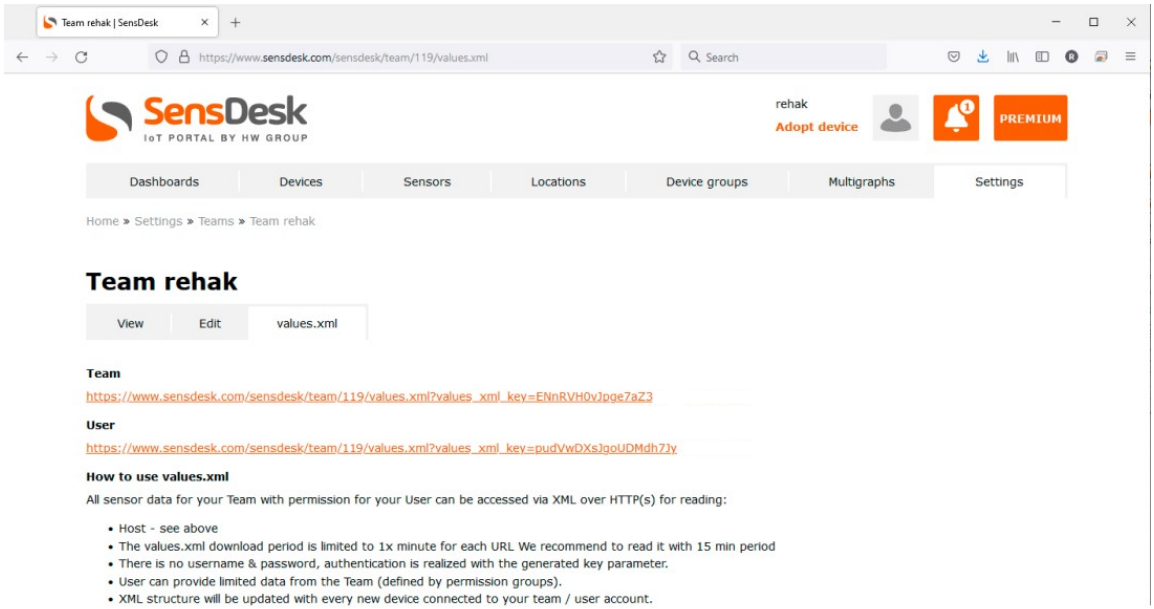
4.3.3. Multigraphs of several values

* not available on HWg-cloud.com portal.



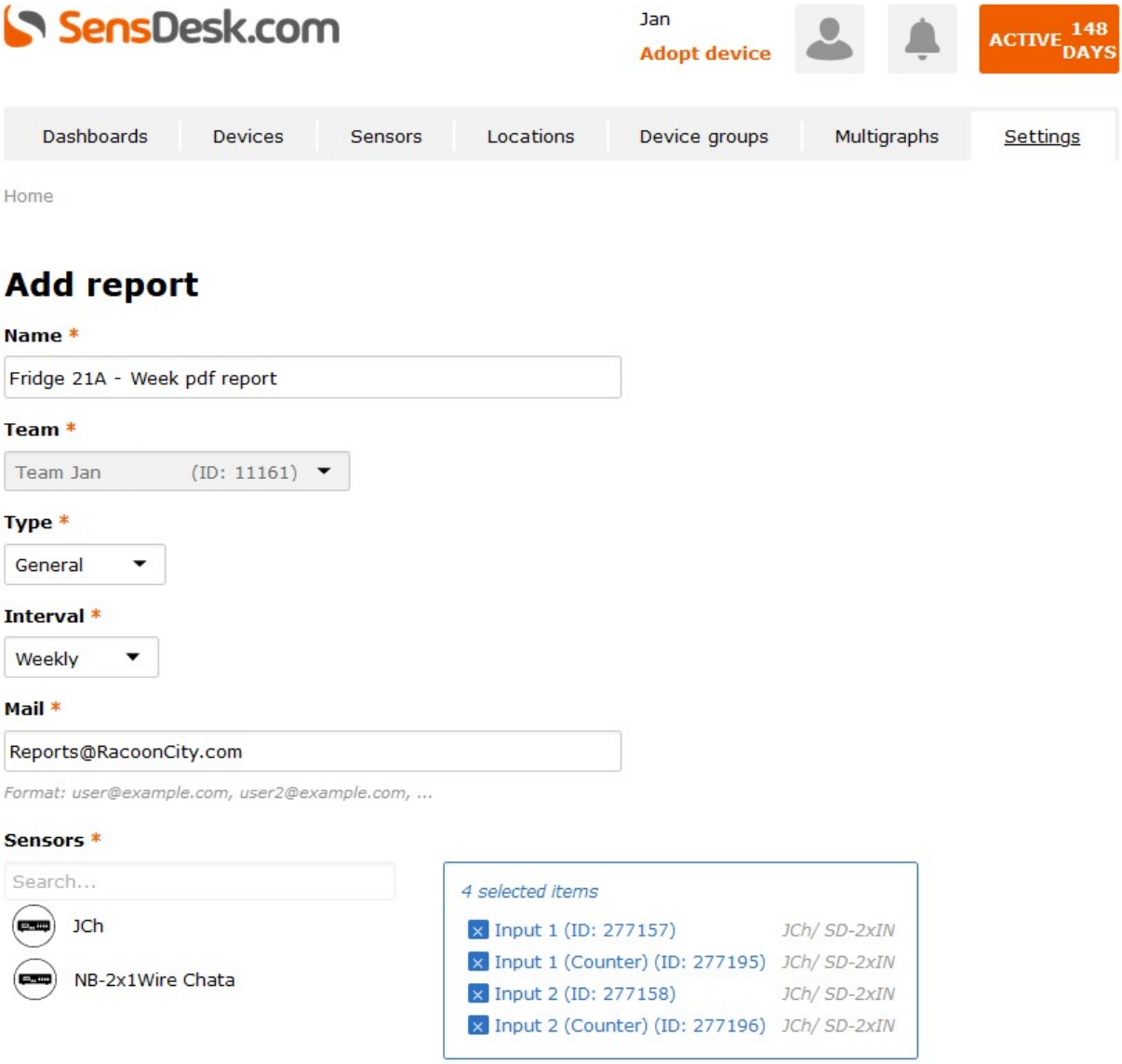
4.3.4. Open API (SNMP & XML)

* not available on HWg-cloud.com portal.



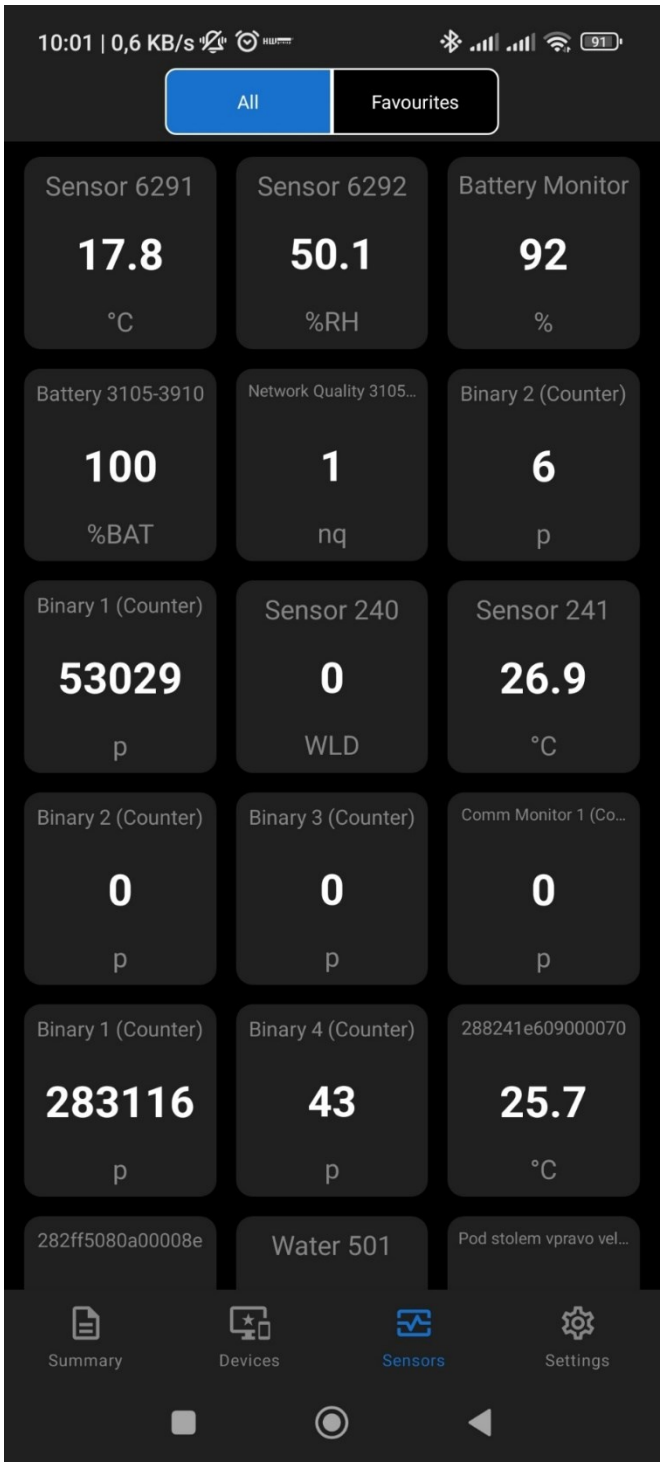
4.3.5. PDF reports & Portal settings

* not available on HWg-cloud.com portal.



4.3.6. Mobile Monitoring app

* not available on HWg-cloud.com portal.



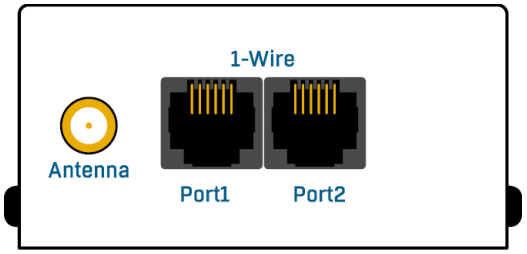
5. SD-Devices models and their specific features

5.1. SD-2x1Wire

SD-2x1Wire is a device for connecting external sensors of Temperature, Relative Humidity, Voltage, or other values via the RJ11 1-Wire (UNI) bus. 2 RJ11 ports allow connecting several external physical sensors to measure up to 4 sensor values simultaneously.

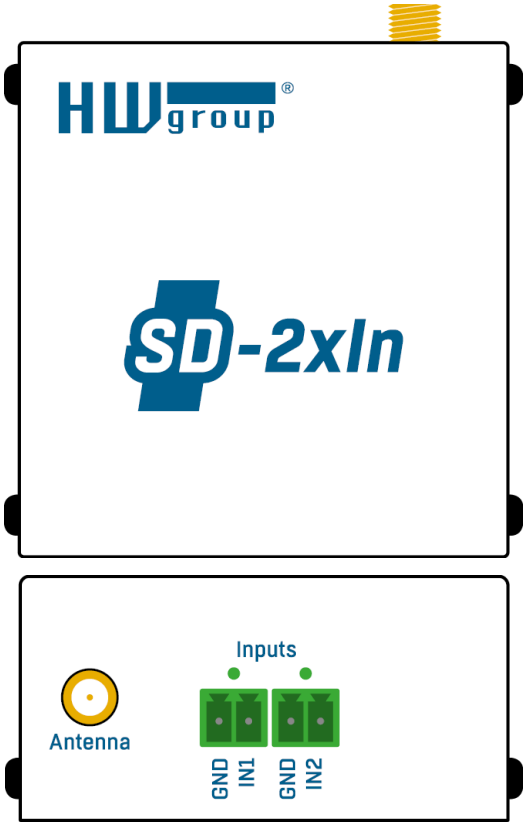
The sensors are detected whenever power is connected to the device or the Setup button is pressed.

The device can be powered from an external 5V adapter or via PoE. The ethernet is also used for initial configuration in case of WiFi operation.



External sensors	
Port/connector	Port1, Port2/RJ11 (1-Wire, 1-Wire UNI)
What can be connected	2 ports for external sensors, up to 4 sensor values total
Sensor types	Only sensors by HW group s.r.o.
Sensors/distance	4 values, max. 2 probes per port (max. 60m total length per port)
Alarm LED	Alarm Port1 – Alarm SENS – lights up if the sensor is in alarm

5.2. SD-2xIn



Remote monitoring device for connecting external detectors to 2x DI (Digital Input). To each DI input, you can connect a door or window contact, a PIR motion detector, or a smoke/gas detector with a dry contact (relay) output.

5.2.1. Pulse counter (S0)

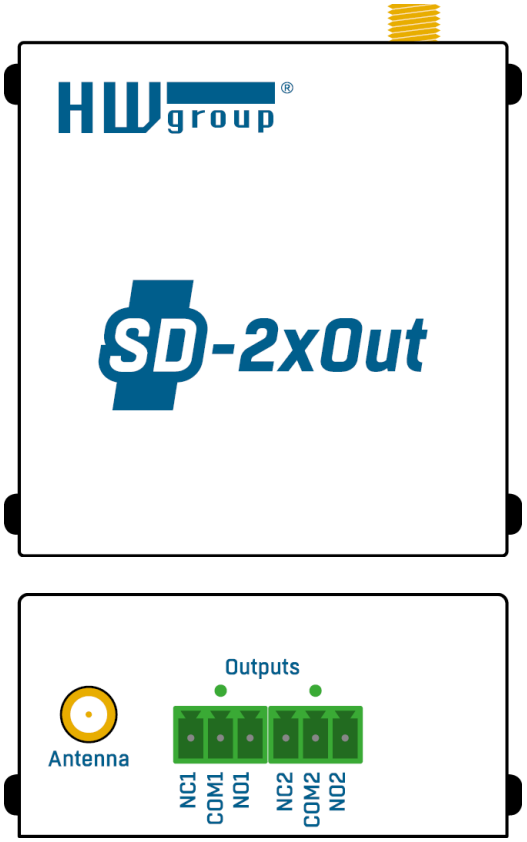
An advanced feature of each DI input is a 4bytes pulse counter for counting pulses. To each DI Digital Input, you can connect an energy or water meter with pulses (S0) output. Only pulses longer than 35ms are detected.

5.2.2. LED indication

The default mode is the counter mode (i.e. Alarm level = Not defined). When DI input is activated (=1/contact closed) and the device is connected to power, the respective green LED lights up.

DI – Dry Contact Inputs	
Port/connector	I1, I2/terminal block ø2mm
Type	Digital Input (supports NO/NC dry contact)
Sensitivity	1 (On) = 0–500 Ω
Max. distance	50m
Counter sensitivity	35ms
LED	2× green – input contact closed

5.3. SD-2xOut



IoT monitoring device with 2x DO (Digital Output) controlled from the portal over LAN or WiFi. In the case of WiFi operation, the initial configuration has to be made via Ethernet.

Without a SensDesk Technology portal, the device doesn't work. For reliable output relay functionality it is important to enable Check period in the Device settings (Edit tab) on the portal.

5.3.1. LED indication

Output states are signaled by a green LED when output=1.

Note: *The device is not suitable for mobile applications due to vibration issues (in cars for example) affecting the relay mechanism.*

Relay outputs	
Type	Latching (bipolar) relay
Connector	Terminal block
Rating	Max. 500mA at 125VAC, 1A at 30VDC
LED	2× green – output contact closed

5.4. SD-WLD

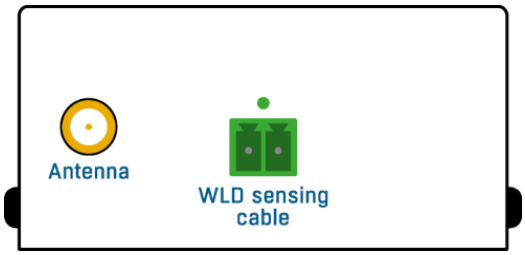
Water Leak Detection unit with 1 zone input (external WLD Type A moisture-sensing cable). The length of the external cable can be max. 60m (any combination of WLD sensing + non-sensing prolong cable).

LED indication

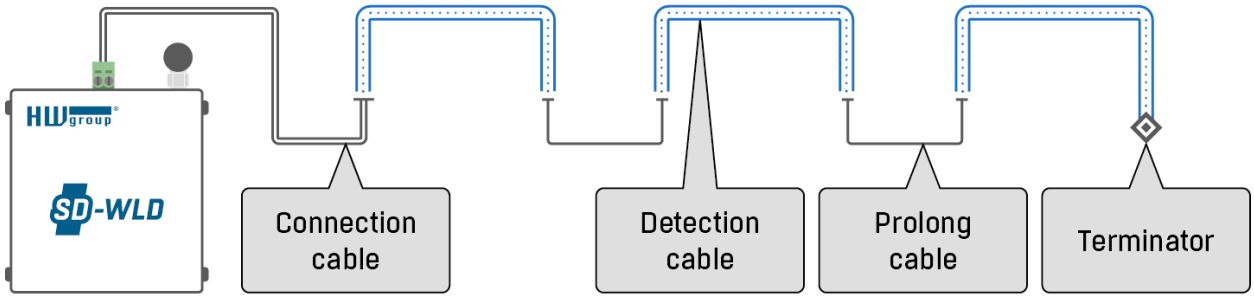
If the cable is flooded or disconnected, the green LED lights up.

5.4.1. Termination

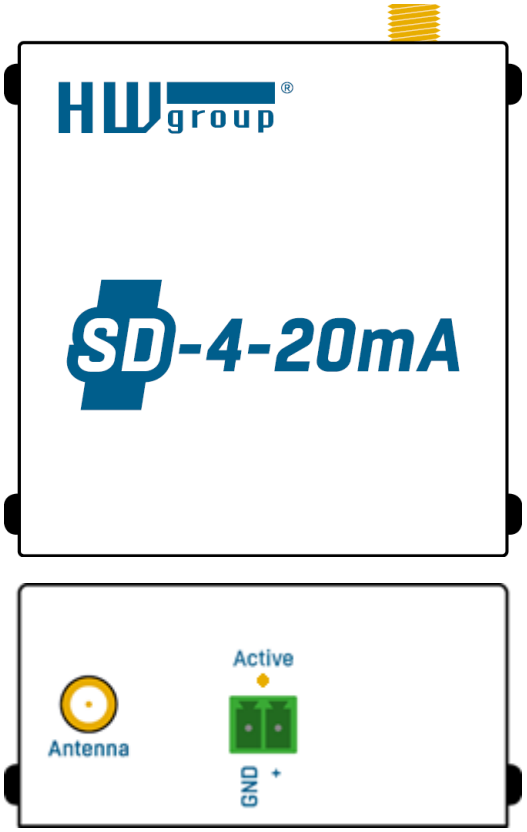
It is important for the end of the cable to be ended by the included terminator. If that doesn't happen, the device will keep being in the Cable Disconnected state.



DI – Dry Contact Inputs	
Connector	Terminal block
Type	Water (WLD) sensing cable
Sensor states	0 = OK, 1 = Flooded, 2 = Cable disconnected
Sensing cable length	Max. 60m in total (WLD sensing cable + prolong cable)
Cable extension	May be extended by AWG 24 cable
LED	1× green – flooded or cable disconnected



5.5. SD-4-20mA



Simple Device with AI (Analog Input) for remote monitoring of external industrial sensor (4-20mA). SD-4-20mA is an IoT Monitoring device with Ethernet and WiFi connectivity.

Any industrial probe (sensor) with 4-20 or 0-20mA analog output can be connected to this device.

Default AI port configuration (4-20mA) provides also power for external current loop.

5.5.1. LED indication

When the LED (amber) indicator is lit, that signals that power to the 4-20mA sensor is on.

Analog Input	
Connector	Terminal block
Type	Analog input
Indication	On = 4-20mA, Off = 0-20mA
Sensing resolution	0.01mA
LED	1x amber – when sensor is connected

6. Technical specifications for all models

Power	
Supply voltage	5VDC/120mA
Connector	Jack Ø3.5x1.35/10mm, RJ-45 PoE

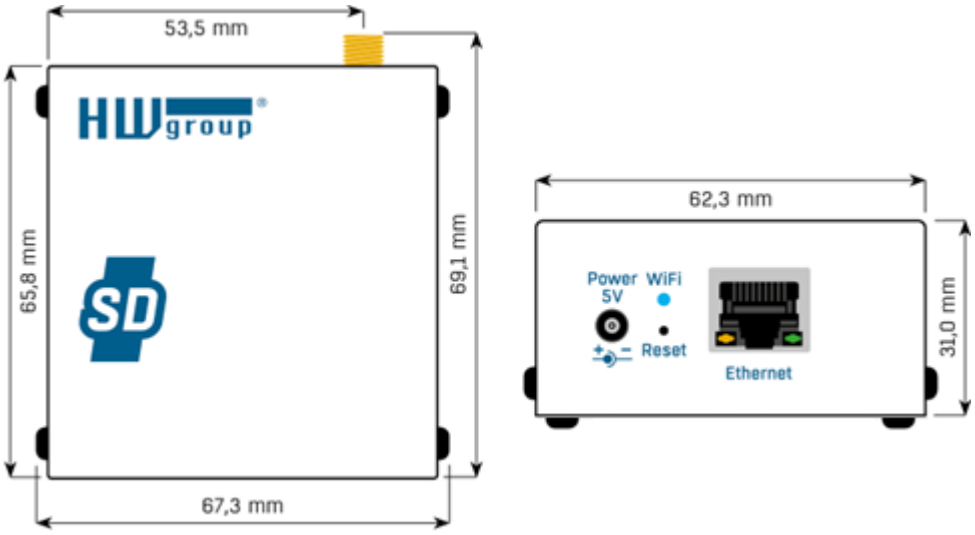
Button	
Reset	To restore factory defaults: press and hold for 5 seconds after connecting power

Miscellaneous	
Operating temperature	-10 to +80 °C (for the device – sensors may support different operating ranges)
Dimensions/Weight	67×78×33mm/151g (143g without antenna)
Electromagnetic radiation	CE/FCC Part 15, Class B
EMC	EN 55022, EN 55024, EN 61000

Ethernet	
Interfaces	RJ45 (10/100BASE-T)
Supported protocols	IP: ARP, TCP/IP (HTTP, HWg-Push)

WiFi	
Supported standards	802.11 b/g/n
Frequency	2,4 GHz
Output power	+19.55 dBm output power in 802.11 b mode +16 dBm for 802.115n
Security	WEP / WPA / WPA2 PSK / WPA2 TSK
Antenna	External, RPSMA

7. Mechanical dimensions



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