



# IQtronic Ethernet weather station

**IQWS 4000**

...makes your life more comfortable

## User guide



**IQWS-4000** is a weather station with Ethernet interface and embedded WEB server. Supported M2M communication protocols include SNMP, UDP and HTTP get. Unique features include:

- M2M protocol compatibility with previous model GIOM 3000
- Compact size and clean design (IQtronic proprietary TCPIP stack)
- High sensors accuracy
- Passive Power over Ethernet (PoE) with LED indication and up to 24V range with class A surge protection
- Reset to Default button
- Detachable sunshield of TH sensor
- Modern, simple and responsible WEB user interface.

Measured quantities:

Wind speed – instantaneous, average and gust • Wind direction • Beaufort • Windchill • Humidity – relative, absolute • Dewpoint • Absolute or relative pressure • Sunlight intensity • UV factor • Lightning strikes distance detector with last event logging including time.

## 1. Technical specifications – range and accuracy:

Wind Speed:	0 to 180 km/h (0 to 50m/s)
Resolution	0.1 m/s
Detection threshold	0.7 m/s
Measurement method	mechanical, contactless/HAL sensor, mHz out
Accuracy	5%
Time interval	1 – 10 seconds, depend on speed
Wind Direction	16 positions, 360°
Resolution	22.5°
Measurement method	Optical INFRA ENCODER, 950nm wavelength
Temperature	-40 to 120° C
Resolution	0.1 °C
Accuracy	+/- 0.1 °C
Relative Humidity	0 to 100 %
Resolution	0.1 %
Accuracy	+/- 1.5%
Absolute Pressure	300 to 1200hPa
Resolution	0.1 hPa
Accuracy	0.01 bar (0.1m)
Sunlight Intensity	0 to 1050 W/m2 (460 - 940 nm), uncalibrated
Resolution	0.1
Accuracy	10%
UV factor	0 to 20 (300 - 400 nm), uncalibrated
Resolution	0.1
Accuracy	0.5
Lightning detector	0 to 40km
Resolution	1km
Refresh Interval	1-10 seconds
Dimensions	250 x 277.6 x 77.9 mm
Power supply	12V/60mA
Interface	Passive Power over Ethernet (PoE) optional 12Vdc
Operation Temperature	-30 to +60 °C
Ethernet connection	Weatherproof RJ-45 junction with LED indication of power and activity on 0.3 m CAT6 cable
Ethernet	10/100M compatible
Default IP	192.168.0.100
Measurement units	metric, imperial

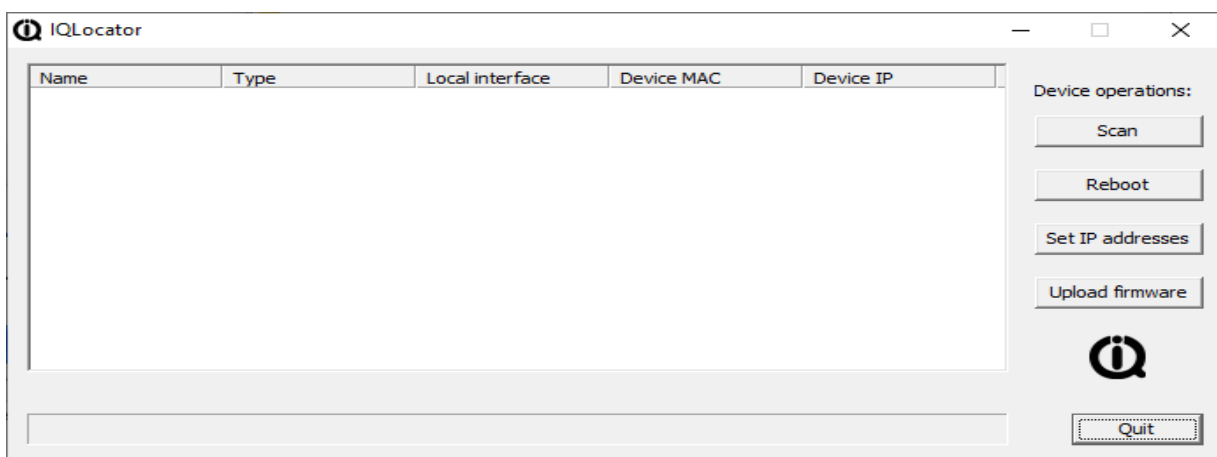
## 2. Installation

**Unpack the device from the paper box very carefully, using brute force can broke the device body and cups !**

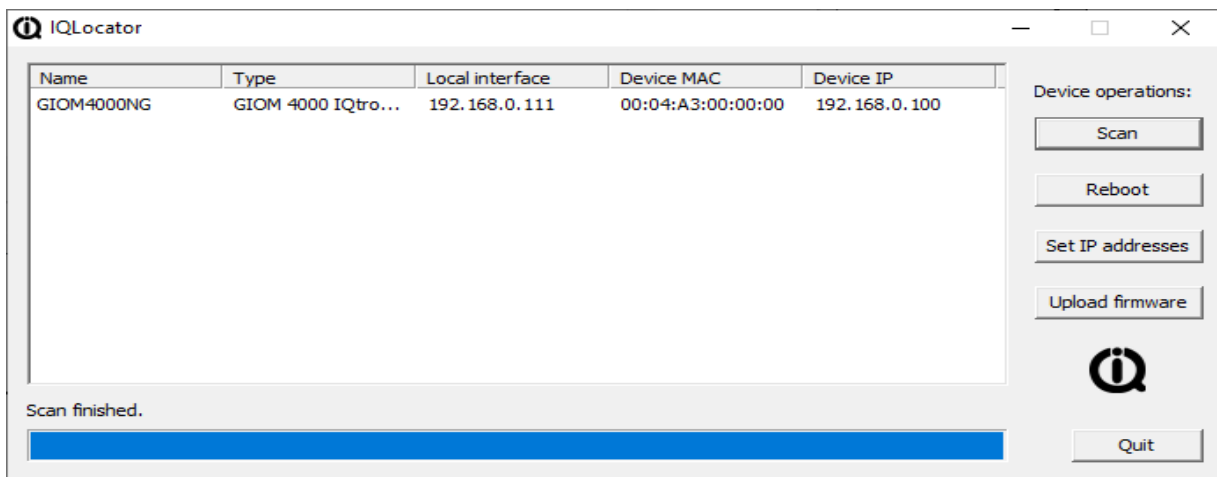
- Connect the IQWS 4000 weather station into a switch with Passive PoE function or use **a PoE injector and a 12V DC** adapter and then connect Ethernet with your PC. There might be incompatibility with some from GbE switches, Ethernet link might be not established. After plugging of the Ethernet cable with PoE power in, the LED indicator on the RJ45 socket will lit green, indicating that the weather station is powered on. The LED will then turn off of about 2 seconds and will then indicate Ethernet link with dimming indicating network activity.

Blinking of the LED with short intervals indicates failure of establishing of Ethernet link. The Ethernet junction must be properly sealed to keep IP66 rated protection, warranty is void if the RJ45 connector is mechanically damaged or corroded. Please note it is mandatory to deploy a suitable surge protection for installations in exposed, elevated places, such as roofs and masts.

- Run the IQ Locator application and perform search for the weather station by clicking to SCAN button. Please note the application works correctly only in presence of a single Ethernet interface in your PC, otherwise buttons Reboot and SET IP cannot work, as these functions operate on the MAC layer. It is also necessary to disable any firewall and/or antivirus applications, as these can block packets required by the IQ Locator application.



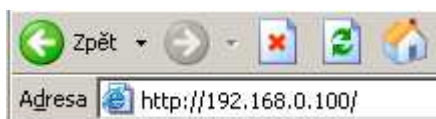
After clicking to **Scan**, the connected weather station will appear in the main window.



Button Set IP allows you to change the IP address of the weather station. This step is not necessary if the Ethernet network adapter of your PC is set to the same IP network, i.e. 192.168.0.1.

### **3. Configuring the weather station**

- Default IP address of the weather station is 192.168.0.100
- Open the 192.168.0.100 IP address via a web browser:



Status page of the weather station will be then displayed:

## Dashboard

Status 

Settings 

Calibration 

Utility 

### Wind / speed and direction of wind



Direction SWW, 247.5 deg

<b>INST SPEED</b>	13.5 m/s	48.6 km/h	30.2 mph	26.24 knots	44.29 ft/s	6 Bit
<b>AVG SPEED</b>	13.5 m/s	48.6 km/h	30.2 mph	26.24 knots	44.29 ft/s	6 Bit
<b>GUST</b>	13.5 m/s	48.6 km/h	30.2 mph	26.24 knots	44.29 ft/s	6 Bit

### Pressure / atmospheric pressure

Sensor status: OK

952.2 hPa	95.22 kpa	0.95 Bar	13.81 psi	714.21 mm Hg	714.21 Tor	28.12 inch Hg
<b>Barometric altitude</b>		541 m	0.54 km	0.34 mile	1774.93 feet	

### Temperature and humidity / temperature , windchill, humidity and dew point

Sensor status: OK

<b>Temperature</b>	26.1 °C	78.98 °F	299.25 °K	110.85 °De	8.61 °N	538.65 °R
<b>Humidity</b>	47.4 %			11.3 g/m3		
<b>Windchill</b>	26.1 °C	78.98 °F	299.25 °K	110.85 °De	8.61 °N	538.65 °R
<b>Dew point</b>	15.6 °C	60.08 °F	288.75 °K	126.6 °De	5.15 °N	519.75 °R

### Irradiance / visibility and UV factor

Sensor status: OK

<b>Visibility</b>	101.36 Lux	0.8 W/m2
<b>UV factor</b>	0.5	

### Storm detector / last event time, distance and energy

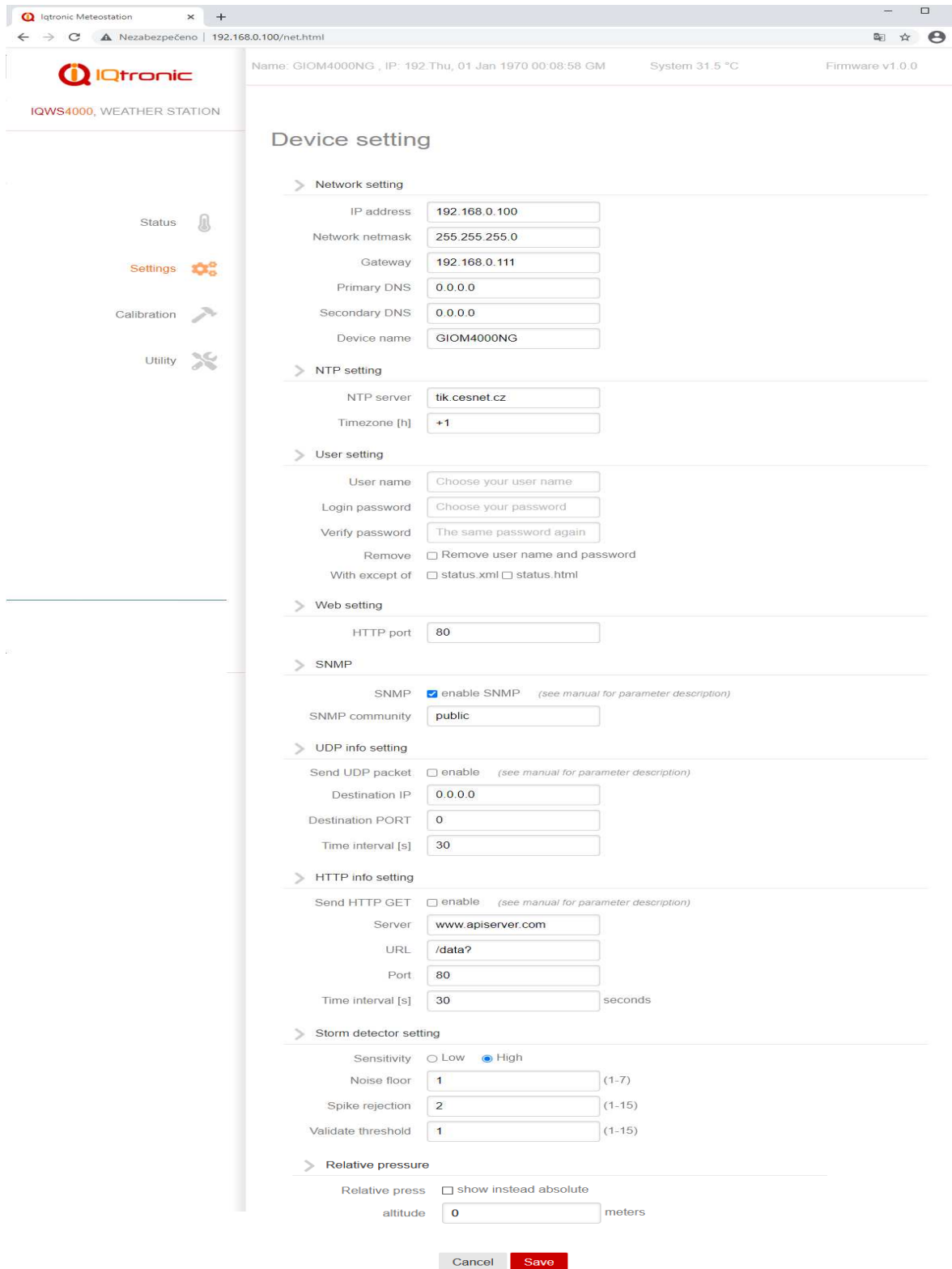
Sensor status: OK

	UTC date	Distance	Energy
Last event	N/A	24 km	438

### **3.1. Description of values**

System	Internal temperature of the weather station
INST SPEED	Instantaneous wind speed
AVG SPEED	Average wind speed from last 10 measurements
GUST	Maximal wind speed, actualized after every data query (WEB, SNMP, HTTP GET, UDP)
DIRECTION	Direction of wind
PRESSURE	Absolute pressure
TEMPERATURE	Temperature
HUMIDITY	Humidity absolute and relative
Windchill	Feels like temperature due to wind
Dew point	Temperature at which water in air start condensing
Visibility	Intensity of visible sunlight
UV factor	UV factor
STORM detector	Distance and energy of detected lightning strikes

### 3.3. Configuration of parameters



IQtronic  
IQWS4000, WEATHER STATION

Name: GIOM4000NG, IP: 192.168.0.100, Thu, 01 Jan 1970 00:08:58 GM System 31.5 °C Firmware v1.0.0

#### Device setting

- Network setting**
  - IP address: 192.168.0.100
  - Network netmask: 255.255.255.0
  - Gateway: 192.168.0.111
  - Primary DNS: 0.0.0.0
  - Secondary DNS: 0.0.0.0
  - Device name: GIOM4000NG
- NTP setting**
  - NTP server: tik.cesnet.cz
  - Timezone [h]: +1
- User setting**
  - User name: Choose your user name
  - Login password: Choose your password
  - Verify password: The same password again
  - Remove:  Remove user name and password
  - With except of:  status.xml  status.html
- Web setting**
  - HTTP port: 80
- SNMP**
  - SNMP:  enable SNMP (see manual for parameter description)
  - SNMP community: public
- UDP info setting**
  - Send UDP packet:  enable (see manual for parameter description)
  - Destination IP: 0.0.0.0
  - Destination PORT: 0
  - Time interval [s]: 30
- HTTP info setting**
  - Send HTTP GET:  enable (see manual for parameter description)
  - Server: www.apiserver.com
  - URL: /data?
  - Port: 80
  - Time interval [s]: 30 seconds
- Storm detector setting**
  - Sensitivity:  Low  High
  - Noise floor: 1 (1-7)
  - Spike rejection: 2 (1-15)
  - Validate threshold: 1 (1-15)
- Relative pressure**
  - Relative press:  show instead absolute
  - altitude: 0 meters

Cancel Save

When the **Relative pressure** option is enabled, the status page will display the relative pressure corrected for entered altitude value instead of the absolute pressure

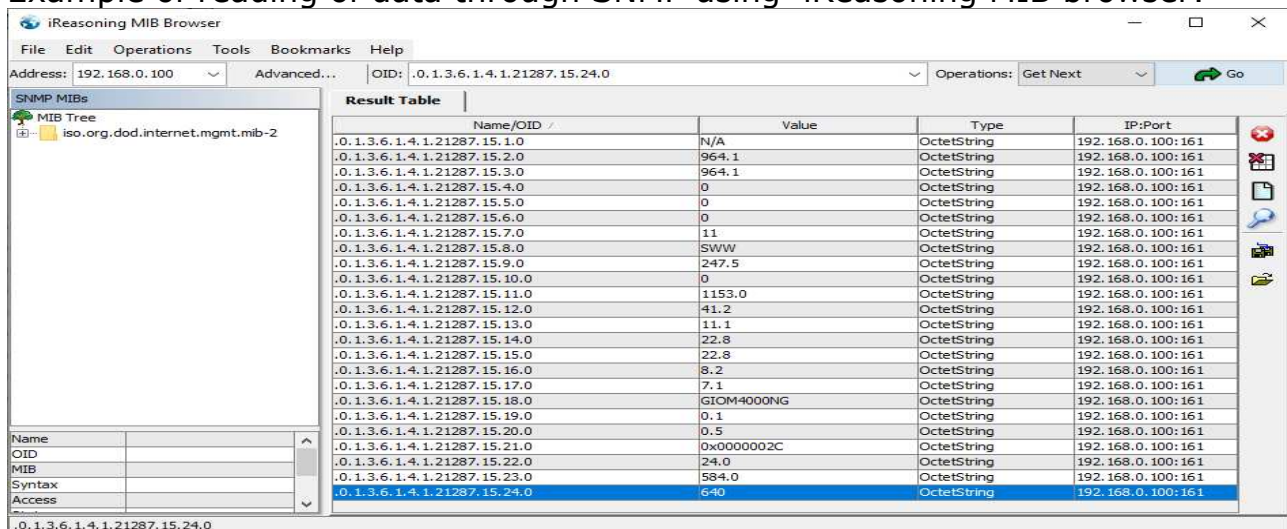
### 3.4. Reading values - SNMP

The weather station supports SNMP protocol ver 1.

OID tree dump:

GET Barometric altitude	0.1.3.6.1.4.1.21287.15.1.0
GET Absolute Pressure	0.1.3.6.1.4.1.21287.15.2.0
GET Relative Pressure	0.1.3.6.1.4.1.21287.15.3.0
GET Wind SPEED	0.1.3.6.1.4.1.21287.15.4.0
GET Wind GUST	0.1.3.6.1.4.1.21287.15.5.0
GET Wind AVG	0.1.3.6.1.4.1.21287.15.6.0
GET Wind direction number	0.1.3.6.1.4.1.21287.15.7.0
GET Wind direction text	0.1.3.6.1.4.1.21287.15.8.0
GET Wind direction degr.	0.1.3.6.1.4.1.21287.15.9.0
GET Wind Beaufort	0.1.3.6.1.4.1.21287.15.10.0
Saturated Steam Pressure	0.1.3.6.1.4.1.21287.15.11.0
GET Rel. humidity	0.1.3.6.1.4.1.21287.15.12.0
GET Dew point	0.1.3.6.1.4.1.21287.15.13.0
GET Temperature	0.1.3.6.1.4.1.21287.15.14.0
GET Windchill	0.1.3.6.1.4.1.21287.15.15.0
GET Abs. humidity g/m3	0.1.3.6.1.4.1.21287.15.16.0
GET Abs. humidity g/kg	0.1.3.6.1.4.1.21287.15.17.0
GET Device name	0.1.3.6.1.4.1.21287.15.18.0
GET Visibility	0.1.3.6.1.4.1.21287.15.19.0
GET UV factor	0.1.3.6.1.4.1.21287.15.20.0
GET Strom UTC time	0.1.3.6.1.4.1.21287.15.21.0
GET Storm distance	0.1.3.6.1.4.1.21287.15.22.0
GET Strom energy	0.1.3.6.1.4.1.21287.15.23.0

Example of reading of data through SNMP using iReasoning MIB browser:



The screenshot shows the iReasoning MIB Browser interface. The address is 192.168.0.100 and the OID is .0.1.3.6.1.4.1.21287.15.24.0. The operations are set to 'Get Next'. The main window displays a 'Result Table' with the following data:

Name/OID	Value	Type	IP:Port
.0.1.3.6.1.4.1.21287.15.1.0	N/A	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.2.0	964.1	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.3.0	964.1	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.4.0	0	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.5.0	0	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.6.0	0	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.7.0	11	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.8.0	SWW	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.9.0	247.5	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.10.0	0	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.11.0	1153.0	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.12.0	41.2	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.13.0	11.1	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.14.0	22.8	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.15.0	22.8	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.16.0	8.2	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.17.0	7.1	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.18.0	GIOM4000NG	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.19.0	0.1	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.20.0	0.5	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.21.0	0x0000002C	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.22.0	24.0	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.23.0	584.0	OctetString	192.168.0.100:161
.0.1.3.6.1.4.1.21287.15.24.0	640	OctetString	192.168.0.100:161

UTC time is interpreted as a hexadecimal number, sum of NTP seconds + number of seconds of time zone.



### 3.4. Sending values via UDP protocol

In order to keep backward compatibility with the GIOM3000, UDP format is kept identical with the format used by the GIOM3000 – new values were not added due to currently very limited usage. Protocol can use port 1024 and higher.

UDP info packet description									
Field	POS	LEN	Packet data						
IP/UDP header	0	41	X	X	X	X	X	X	X
Barometric ALT	42	8				4	0	7	. 0
Absolute Press	50	8				9	6	2	. 5
Relative Press	58	8				9	9	7	. 5
Wind SPEED	66	8					2	6	. 2
Wind GUST	74	8					4	2	. 0
Wind AVG	82	8					2	1	. 0
Wind dir	90	8							1
Wind dir text	98	8						N	N E
Wind dir deg	106	8					2	2	. 5
Wind Beaufort	114	8							1 0
Steam Press	122	8			1	1	5	3	. 6
Rel. humidity	130	8					3	3	. 1
Rel. humidity	138	8						9	. 0
Temperature	146	8					2	6	. 5
Windchill	154	8					2	6	. 4
Abs. hum. g/m3	162	8						8	. 2
Abs. hum. g/kg	170	8						7	. 4
Device name	178	8	G	I	O	M		3	0 0
Checksum = 0x60	186	1	*						

A hexadecimal number calculated by exclusive OR of all bytes from position 42 till 185 include. (green fields). For this case equals 0x60. Blank data is equals 0x20 (SPACE).

```

0000 00 13 3b 2f b8 0e 00 04 a3 00 00 00 08 00 45 00  ..;/.....E..
0010 00 ad 00 0b 00 00 64 11 d4 11 c0 a8 00 64 c0 a8  .....d.....d..
0020 00 6f 08 0a 07 d0 00 99 ee 40 20 20 20 20 20 4e  ..o.....@..N
0030 2f 41 20 20 20 39 36 38 2e 31 20 20 20 39 36 38  /A 968 .1 968
0040 2e 31 20 20 20 20 20 20 20 30 20 20 20 20 20 20  .1 0
0050 20 30 20 20 20 20 20 20 20 30 20 20 20 20 20 20  0 0
0060 31 31 20 20 20 20 20 53 57 57 20 20 20 32 34 37  11 S W 247
0070 2e 35 20 20 20 20 20 20 20 30 20 20 31 30 38 30  .5 0 1080
0080 2e 38 20 20 20 20 34 30 2e 38 20 20 20 20 31 30  .8 40 .8 10
0090 2e 31 20 20 20 20 32 31 2e 39 20 20 20 20 32 31  .1 21 .9 21
00a0 2e 39 20 20 20 20 20 37 2e 37 20 20 20 20 20 36  .9 7 .7 6
00b0 2e 37 47 49 4f 4d 34 30 30 30 63  .7GIOM40 00c

```

### 3.5. Sending values via HTTP GET protocol

> HTTP info setting

---

Send HTTP GET  enable (see manual for parameter description)

Server

URL

Port

Time interval [s]  seconds

When this option is enabled, the weather station will send values to a remote server in following syntax:

```
http://www.apiserver.com/data?&field1=11.3&field2=15.8&field3=247.5&field4=968.2&field5=21.7&field6=41.2&field7=10.0&field8=110.0&field9=0.4&field10=0x000002BC&field11=1.0&field12=25&field13=IQWS-4000&field14=0x6020651E
```

http://www.apiserver.com/data? followed by fields

field1	-	average wind speed	11.3	[m/s]
field2	-	wind gust	15.8	[m/s]
field3	-	wind direction	247.5	[deg]
field4	-	absolute pressure	968.2	[hPa]
field5	-	temperature	21.7	[degC]
field6	-	relative humidity	41.2	[%]
field7	-	dew point	10.0	[degC]
field8	-	sunlight intensity	110.0	[W/m2]
field9	-	UV factor	0.4	
field10	-	time of last lightning	0x000002B	[UTC hex]
field11	-	distance of lightning	1.0	[km]
field12	-	reserved	25	
field13	-	Device name	IQWS-4000	
field14	-	UTC time when data sent	0x6020651E	

### 3.6. XML status file

```
<status>
<windspeed>11.3</windspeed>
<winddir>11</winddir>
<wdird>247.5</wdird>
<windgust>15.8</windgust>
<pressure>968.2</pressure>
<systemp>31.2</systemp>
<temperature>21.7</temperature>
<baraltitude>360</baraltitude>
<windchill>21.7</windchill>
<relhumidity>41.2</relhumidity>
<abshumidity>7.6</abshumidity>
<dewpoint>10.0</dewpoint>
<devname>GIOM4000NG </devname>
<spower>110.0</spower>
<uf>0.4</uf>
<stime>N/A</stime>
<sdist>1.0</sdist>
```

```
<senr>2167.0</senr>
<lpd>1018</lpd>
</status>
```

### **3.7. Lightning strike detector setup**

> Storm detector setting

---

Sensitivity  Low  High

Noise floor  (0-7)

Spike rejection  (0-15)

Validate threshold  (0-15)

In order to avoid false lightning strikes detection, is possible to decrease detector sensitivity.

**Sensitivity** – coarse adjustment of sensitivity HIGH, LOW

**Noise level** - 0 – 7

Fine adjustment of sensitivity, determines the threshold, when a detected signal is considered as valid.

HIGH	LOW	
$\mu\text{Vrms}$	$\mu\text{Vrms}$	
630	45	1
<b>860</b>	62	2
1100	78	3
1140	95	4
1570	112	5
1800	130	6
2000	146	7

**Spike rejection** - 0 – 15

Mitigation of random interference spikes. With higher value, rejection of spikes is higher, but probability of detection of real lightning strikes is lower.

**Validate threshold** – 0 – 15

Value determining length of valid lightning strike. Higher value causes detection of longer lightning strikes and eliminates detection of random interference spikes.

## 4. Calibration of sensors



IQWS4000, WEATHER STATION

Status Settings Calibration Utility 

### Device calibration

#### > Wind calibration

	raw	result
0	<input type="text" value="0"/>	<input type="text" value="0"/>
1	<input type="text" value="300"/>	<input type="text" value="25400"/>
3	<input type="text" value="500"/>	<input type="text" value="37300"/>

#### > Pressure calibration

Increase for  

#### > Wind direction calibration

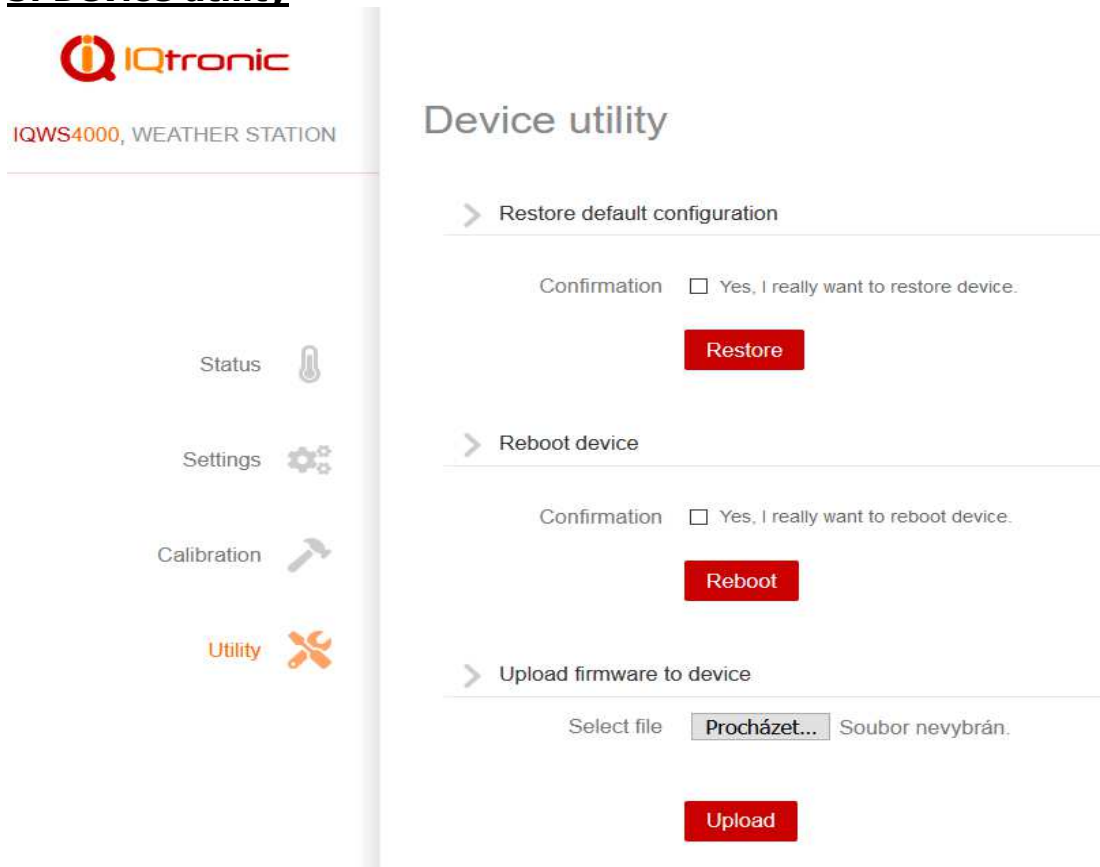
Rotation offset   
(0-15)

**Wind calibration**, calibration curve between measured mHz pulses and dm/s per measurement in a wind tunnel.

**Pressure calibration** – constant which shifts absolute value pressure reading – displayed value is increased by this constant

**Wind direction calibration** – shift of orientation of wind direction 0 – 15; one step represents 22.5 degree, for situations when the weather station cannot be installed to be oriented to the south side.

## 5. Device utility



**IQtronic**  
IQWS4000, WEATHER STATION

**Device utility**

- > Restore default configuration
  - Confirmation  Yes, I really want to restore device.
  - Restore**
- > Reboot device
  - Confirmation  Yes, I really want to reboot device.
  - Reboot**
- > Upload firmware to device
  - Select file  Soubor nevybrán.
  - Upload**



**Restore default configuration** – to recall factory default values, this is also possible by pressing the internal Reset push button, which is located at the bottom side of the weather station, marked by the arrow symbol – press and hold it for time longer than 5 seconds. Metallic pin to press the reset button is included in the package.

**Reboot device** – to reboot the weather station, for example to apply changes of configuration

**Upload firmware to device** – to upgrade weater station’s firmware; this can be also performed via **IQ Locator** application

## 6. Declaration of Conformity

IQtronic technologies Europe s.r.o hereby declares, that this IQWS-4000 is in compliance with the essential requirements and other relevant provisions of Directive 2004/108/EC, 2006/95/EC. Standards EN 61000-6-4:2006, cl.7, tab1 IEC 61000-4-3:2006, Z1,A2,cl. 7.1, cl. 7.3,cl. 8.2, EN 61000-6-2:2007, cl.7, tab1

## 7. Warranty

The supplier provides a warranty for IQWS-400 for up to 24 months starting from the purchase date. This warranty does not apply to damage resulting from abnormal use, and from breaking the operation recommendations as listed in the user guide. Further, the warranty does not apply to mechanical and electric damage caused by overvoltage.

Serial number	Date of sale	Signature and stamp of seller

Warranty is void, if defects have been caused by mechanical damage, improper use (installation in unsuitable environment, caustics poured over the product, and others). Further, this warranty does not cover situations if defects have been caused by any outside event (overvoltage in network, electromagnetic field, improper range of work temperatures, disaster, and others), if incorrect voltage has been used to power of the product, in case of intervention of an unauthorized person, if the product has been modified or repaired.

This warranty becomes void if any person has made modifications or adapted the product in such a way that it will have more functions, or to operate the product in other conditions than it was designed for, manufactured and approved for. This warranty does not affect any rights, which the consumer may have according to valid legal regulations.