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 48V 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 (12V recommended, range 6 - 48V)
Interface	Passive Power over Ethernet (PoE)
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

- 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.
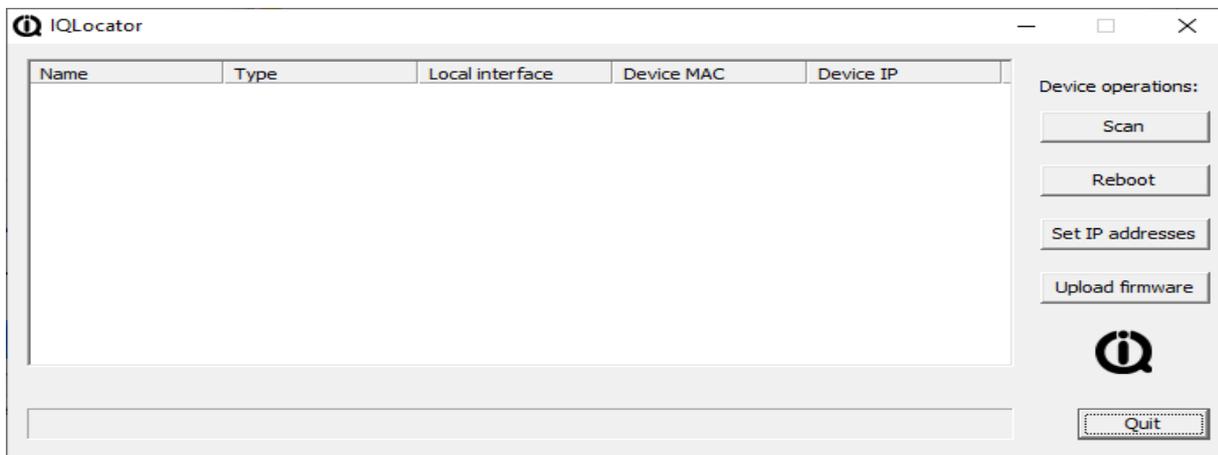
After clicking to **Scan,** the connected weather station will appear in the main window.
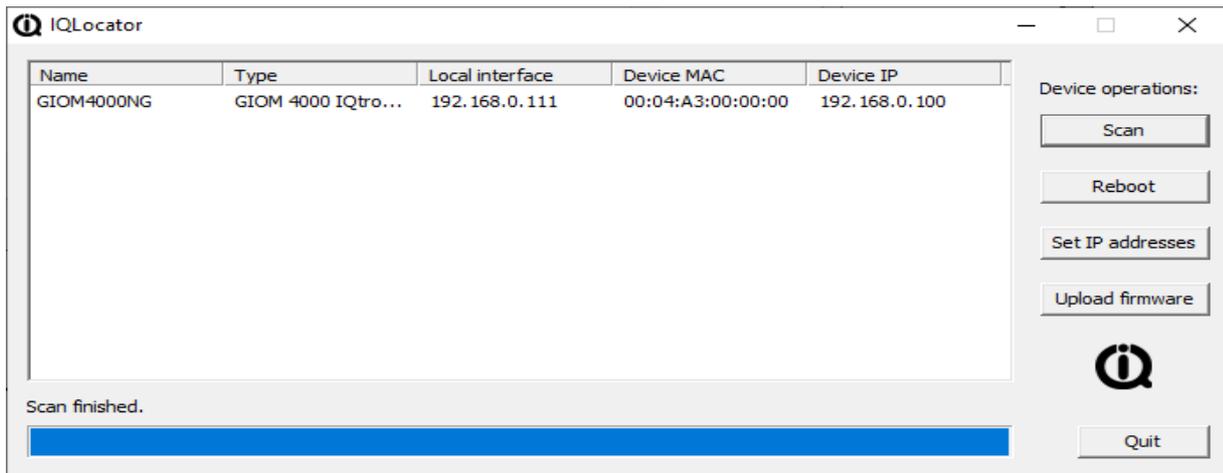
Button Set IP allows you to change the IP address of the weather station. This step is not necessary if the Ethernet network adapter of your PC is set to the same IP network, i.e. 192.168.0.1.

3. Configuring the weather station

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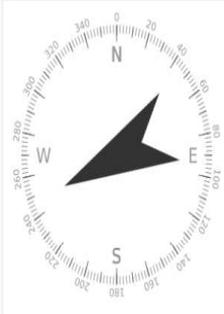- Open the 192.168.0.100 IP address via a web browser:

Status page of the weather station will be then displayed:

IQsocket

IQtronic

IQWS4000, WEATHER STATION

Name: GIOM4000NG , IP: 192.168 0.100	Sun, 10 Jan 2021 18:55:31 GMT	System 32.2 °C	Firmware v1.0 0

- Status
- Settings
- Calibration
- Utility

Dashboard

Wind / speed and direction of wind

INST SPEED	13.5 m/s	48.6 km/h	30.2 mph	26.24 knots	44.29 ft/s	6 Bft
AVG SPEED	13.5 m/s	48.6 km/h	30.2 mph	26.24 knots	44.29 ft/s	6 Bft
GUST	13.5 m/s	48.6 km/h	30.2 mph	26.24 knots	44.29 ft/s	6 Bft

Direction SWW, 247.5 deg

Pressure / atmosperic 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
Barometic altitude		541 m	0.54 km	0.34 mile	1774.93 feet	

Temperature and humidity / temperature , windchill, humidity and dew point   Sensor status: OK

Temperature	26.1 °C	78.98 °F	299.25 °K	110.85 °De	8.61 °N	538.65 °R
Humidity	47.4 %			11.3 g/m3		
Windchill	26.1 °C	78.98 °F	299.25 °K	110.85 °De	8.61 °N	538.65 °R
Dew point	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

Visibility	101.36 Lux	0.8 W/m2
UV factor	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

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
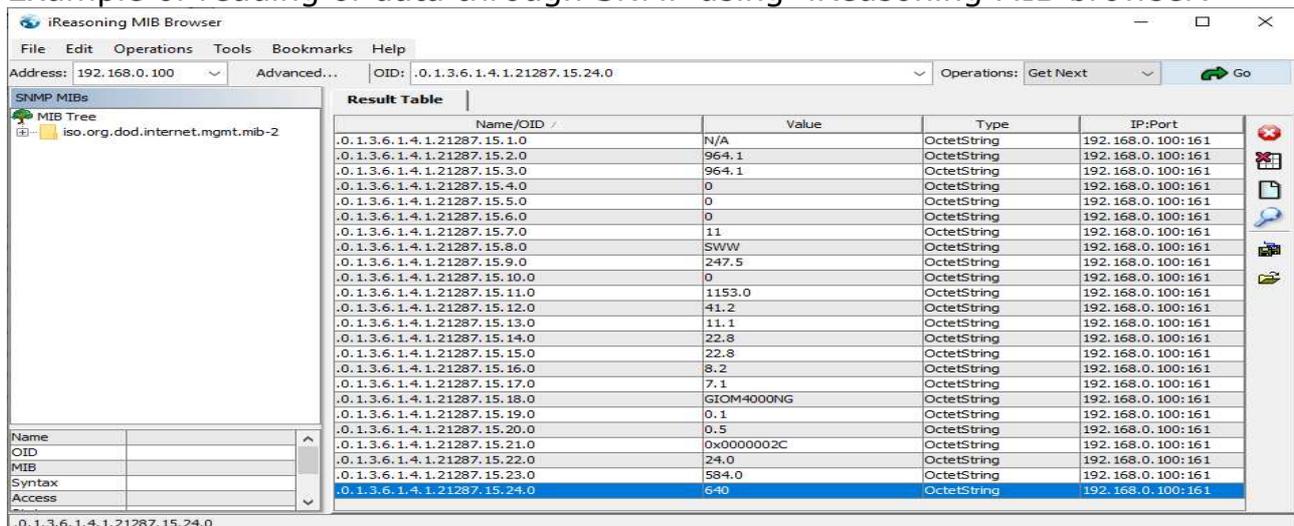
3.4. Reading values - SNMP

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:

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.

Field	POS	LEN	Packet data							
IP/UDP header	0	41	X	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 WW   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	www.apiserver.com	
URL	/data?	
Port	80	
Time interval [s]	30	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	1	(0-7)
Spike rejection	2	(0-15)
Validate threshold	1	(0-15)

Cancel   **Save**

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	
µVrms	µVrms	
630	45	1
860	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.
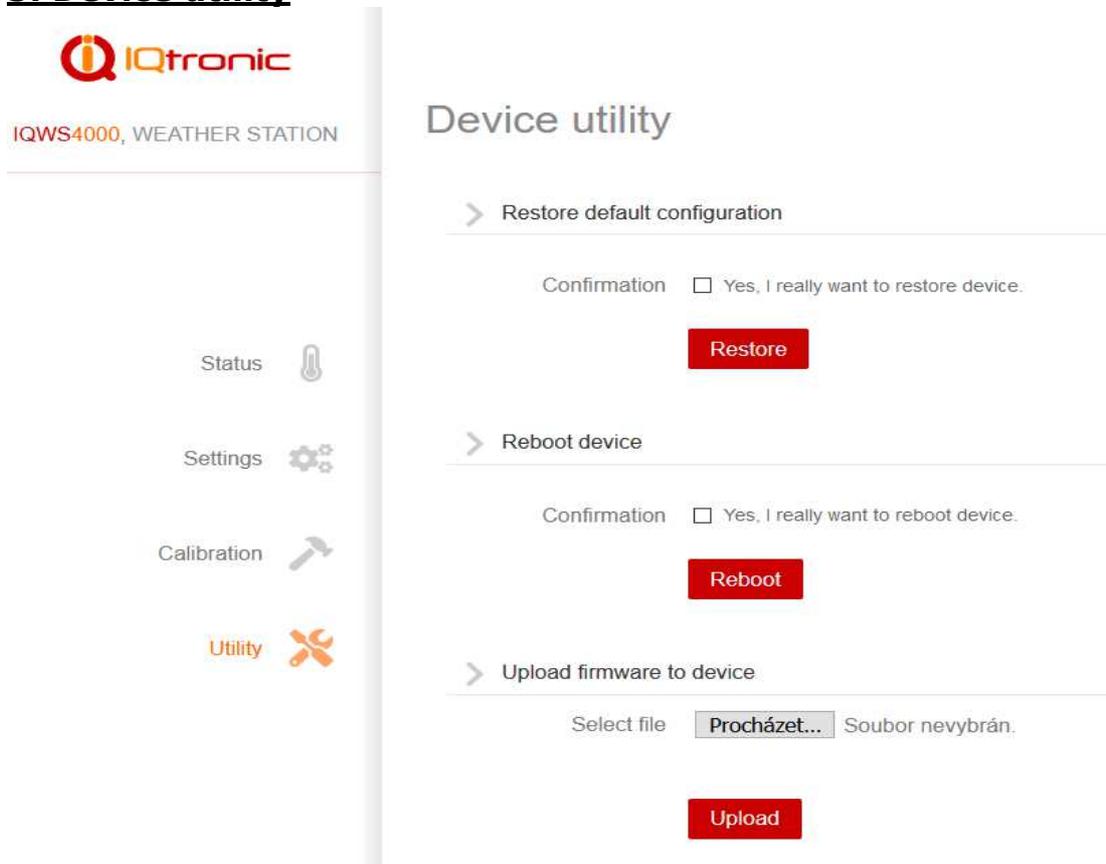
4. Calibration of sensors

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

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.