

# User manual

## DES-300

### Digital environmental parameters sensor



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## 1. GENERAL INFORMATION

### 1.1. WARRANTED INFORMATION

**CEL-MAR Company** gives a two-year warranty on the **DES-300 sensor**. The warranty does not cover damage caused from improper use, materials consumption or any unauthorized changes. If the product does not function in accordance with the instructions, will be repaired or replaced.

All warranty and no warranty repairs must be returned with paid transport and insuring to the **CEL-MAR Company**.

**CEL-MAR Company** under no circumstances won't be responsible for ensuing damage from improper using the product or as a result of random causes: the lightning discharge, the flood, the fire and the like.

**CEL-MAR Company** is not be held responsible for damages and loss including: loss of profits, loss of data, pecuniary losses ensuing from using or the impossibility of using this product.

In specific cases **CEL-MAR Company** discontinue all warranties and in particular do not follow the user manual and do not accept terms of warranty by the user

### 1.2. GENERAL CONDITIONS FOR SAFE USE

The device should install in the safe and stable place, the connecting cable should be arranged this way isn't exposed to treading, catching or tear out from sensor

Do not put device on the wet surface.

Do not connect devices for nondescript powering sources,

Do not damage or crush powering wires.

Do not make connection with wet hands.

Do not adapt, open or make holes in casings of the device!

Do not immerse device in water or no other liquid.

Do not put the fire opened on device sources: candles, an oil lamps and the like.

### 1.3. CE LABEL



CE symbol on organizing the company CEL-MAR a conformity of the device to the directive of the electromagnetic **EMC 2014/30/WE** (Electromagnetic Compatibility Directive). The declaration of the agreement is accessible through the contact with the technical service at the address e-mail: [service@cel-mar.pl](mailto:service@cel-mar.pl) or on the phone at the +48 41 362-12-46.

### 1.4. ENVIRONMENTAL PRESERVATION



This sign on the device inform about putting expended device with other waste materials. Device should send to the recycling. (In accordance with the act about the Electronic Appliance Expended from day 29 of July 2005)

### 1.5. SERVICE AND CONSERVATION

It is recommended to check the status of cases and sensor connecting cables, to eliminate the effect of mechanical damage on the quality of measurement.

Technical support at the number: +48 41 362-12-46 in 8.00-16.00, from Monday to Friday

## 2. APPLICATION

DES-300 sensor is used to for measurement of environmental parameters like temperature, relative humidity, atmospheric pressure, illumination, concentration of CO<sub>2</sub> in :

- offices with the use of structured cabling
- flats
- houses

via the serial 1-WIRE Bus.

Application of 1-Wire bus enables:

- the cooperation of many sensors connected to the same data lines,
- the deployment of sensors in various locations up to 300m,
- powering the sensors from the bus,
- correct transmission of measurement data secure check sum CRC.

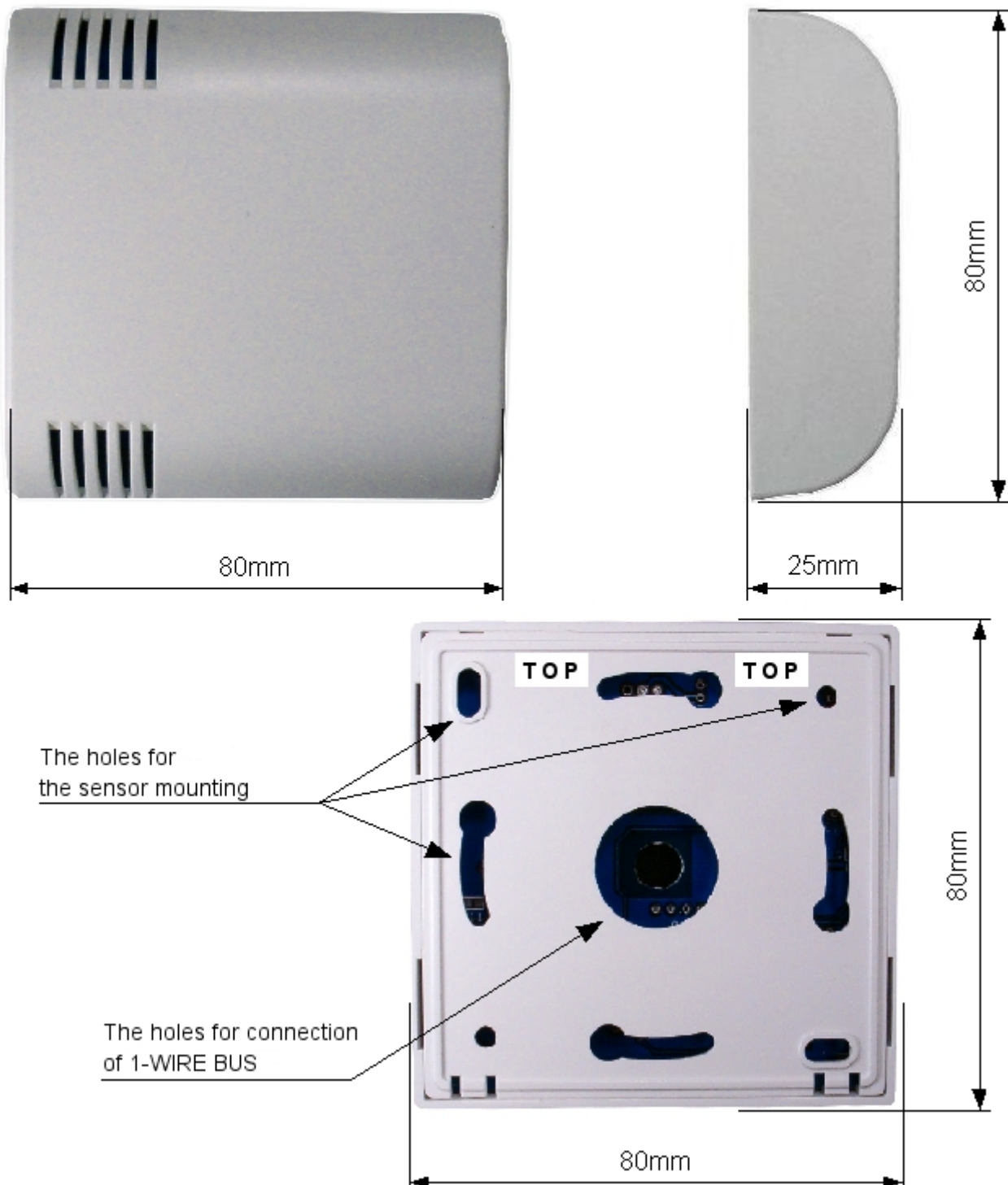
DES-300 sensor can be installed on wiring recessed cans or on the walls.

### 3. COOPERATION WITH OTHER 1-WIRE DEVICES

DES-300 sensor cooperates with 1-WIRE devices used for creation of monitoring and control systems for environmental parameters:

- ADA-401WP Measuring Module 1-WIRE to MODBUS-RTU,
- DNB-400 Passive 1-WIRE Bus Splitter,
- DNB-215 Passive 1-WIRE Bus Splitter,
- DNB-200 Passive 1-WIRE Bus Splitter,
- other 1-WIRE sensors eg. DTS-RJ45, DTS-103, DTS-107, DES-200, DES-216, DES-300.

### 4. VIEW OF SENSOR



5. VIEW OF TEMPERATURE SENSOR WITH TEMPERATURE ADJUSTER DES-300-TTA



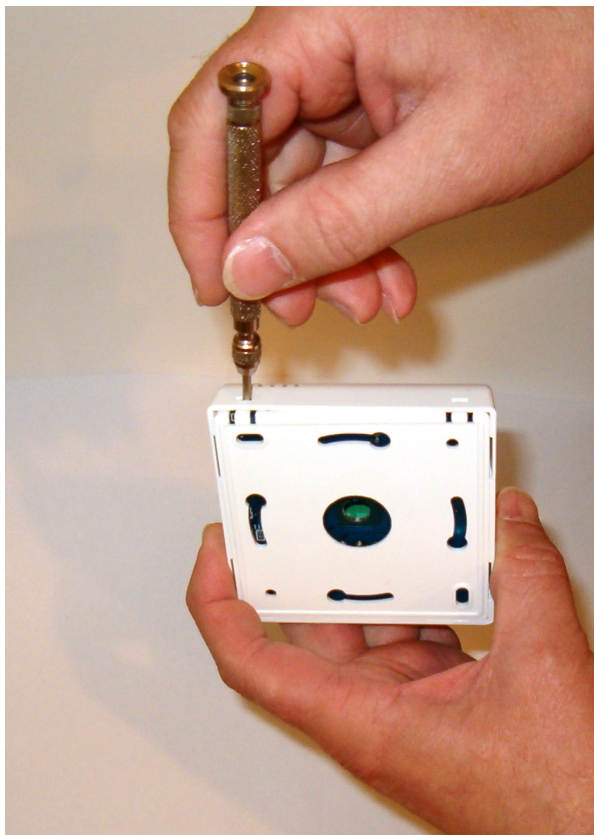
6. VIEW OF RELATIVE HUMIDITY SENSOR WITH PERCENT ADJUSTER DES-300-HPA



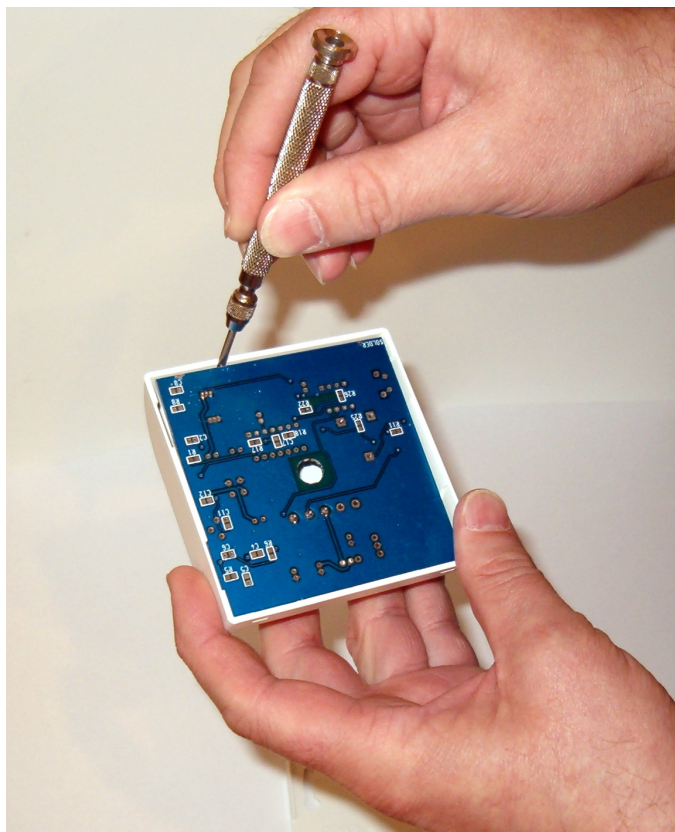
## 7. CONNECTION OF 1-WIRE BUS

In the purpose of connection the sensor to the bus you should:

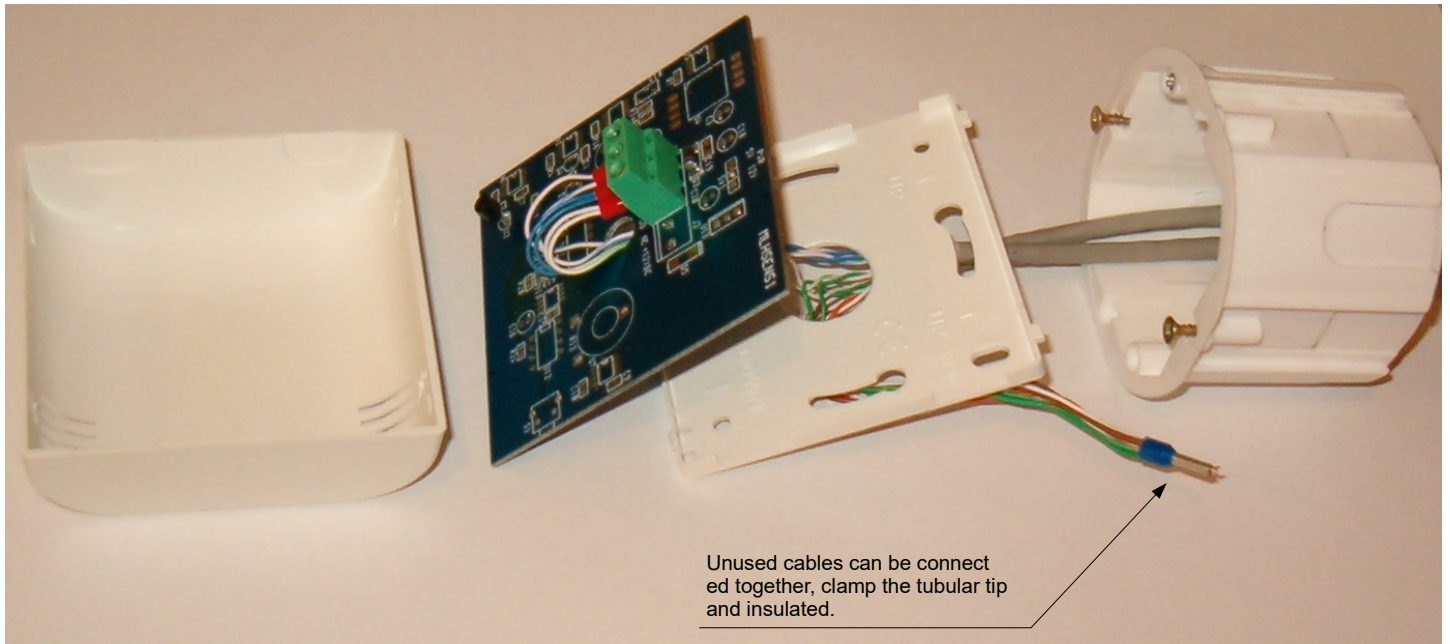
a) by the use of small screwdriver disassemble the rear panel as shown below



b) by the use of small screwdriver removed from the cover the PCB as shown below



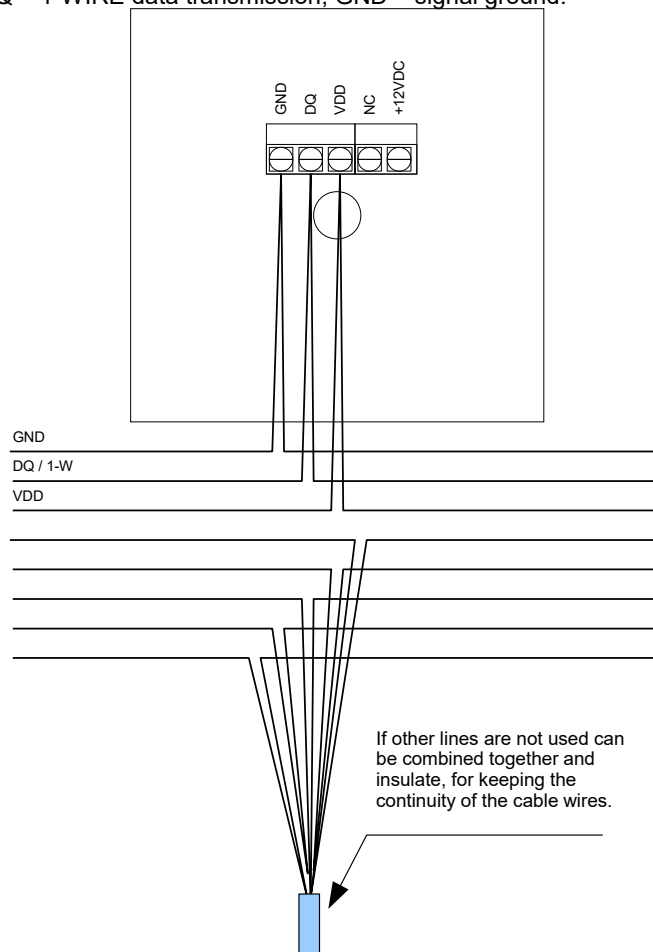
c) insert the wires of 1-WIRE BUS through the holes of rear panel and PCB as shown below



**7.1. POWERING THE SENSORS FROM THE MODULE ADA-401WP**

a) connect the bus to terminal block, described as below:

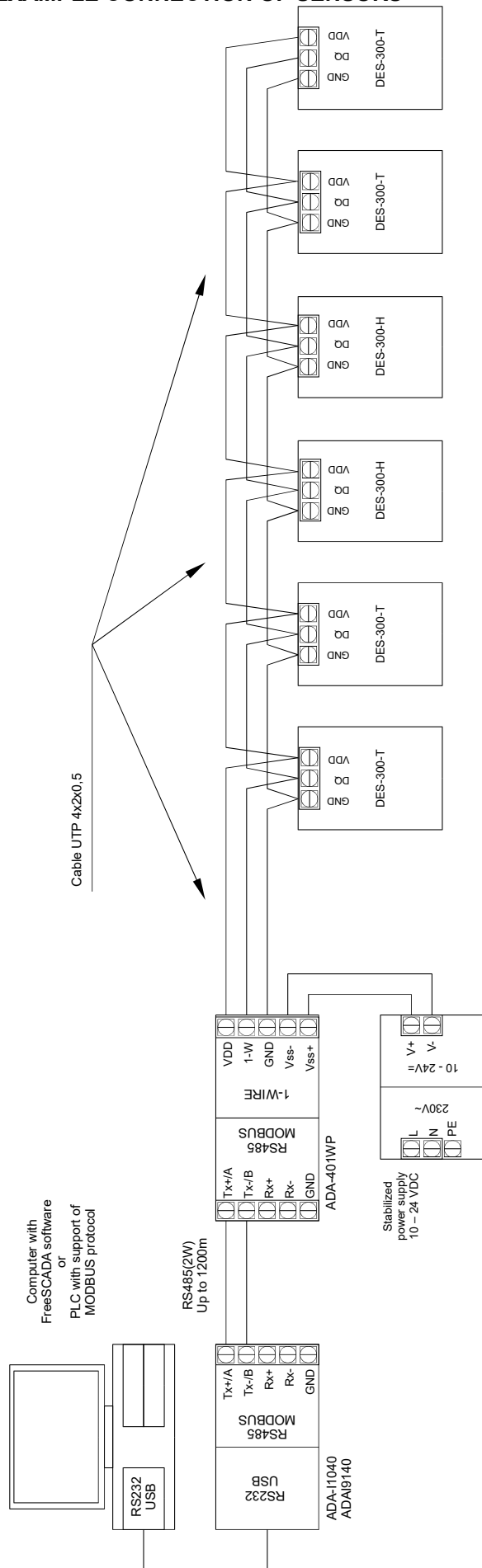
VDD – powering the bus +5VDC, DQ – 1-WIRE data transmission, GND – signal ground.



b) after connection 1-WIRE BUS to terminals Vdd, DQ, GND:

- set the PWR switch to 5V position (not applicable of temperature sensor DES-300-TE),
- fix the rear panel of sensor on electro-installation box or a wall,
- insert the PCB to the cover, terminals to inside or insert DS18B20 with screw terminal block in case of DES-300-TE sensor,
- put the cover on rear panel.

7.1.1. EXAMPLE CONNECTION OF SENSORS



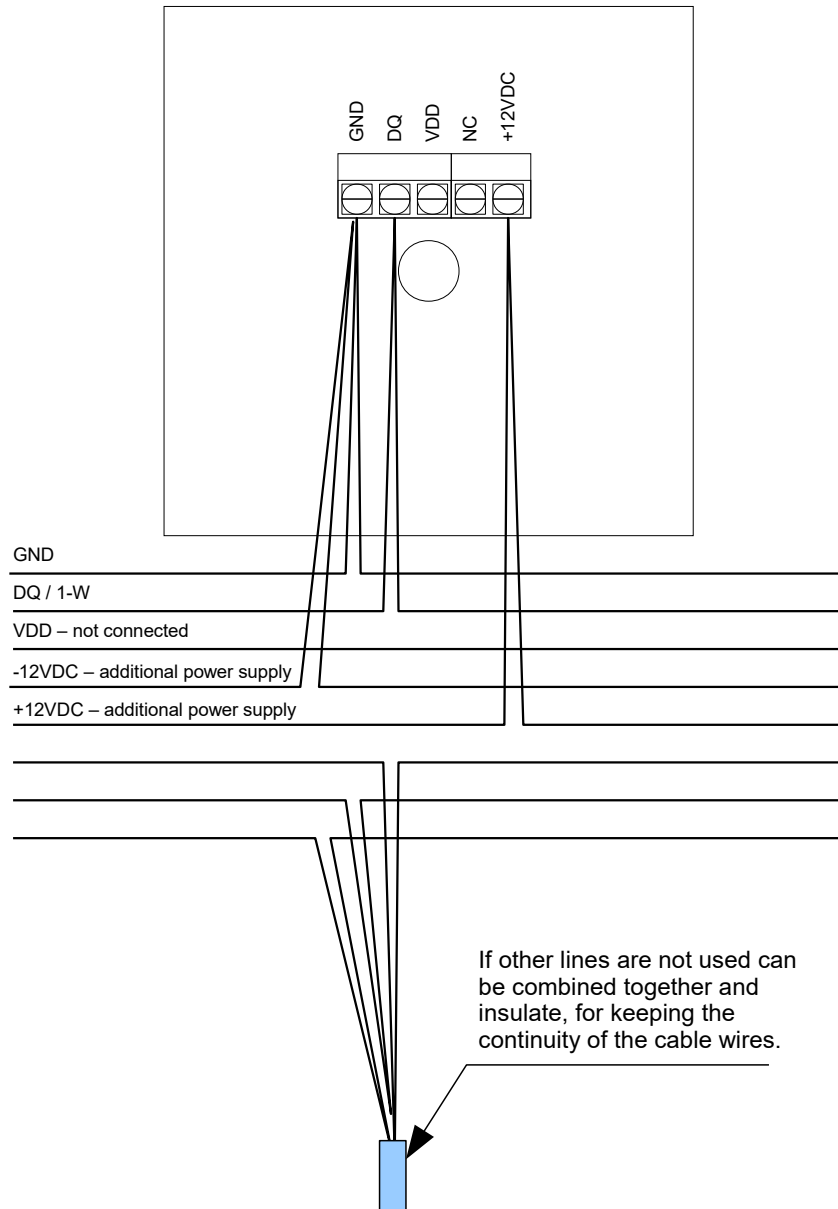


## 7.2. POWERING THE SENSORS FROM THE MODULE ADA-401WP AND 12VDC POWER SUPPLY

The following points do not relate to temperature sensor in version DES-300-TE.

a) connect the bus to terminal block, described as below:

VDD – powering the bus +5VDC, DQ – 1-WIRE data transmission, GND – signal ground, +12VDC – powering from additional 12VDC power supply.



### ATTENTION !!!

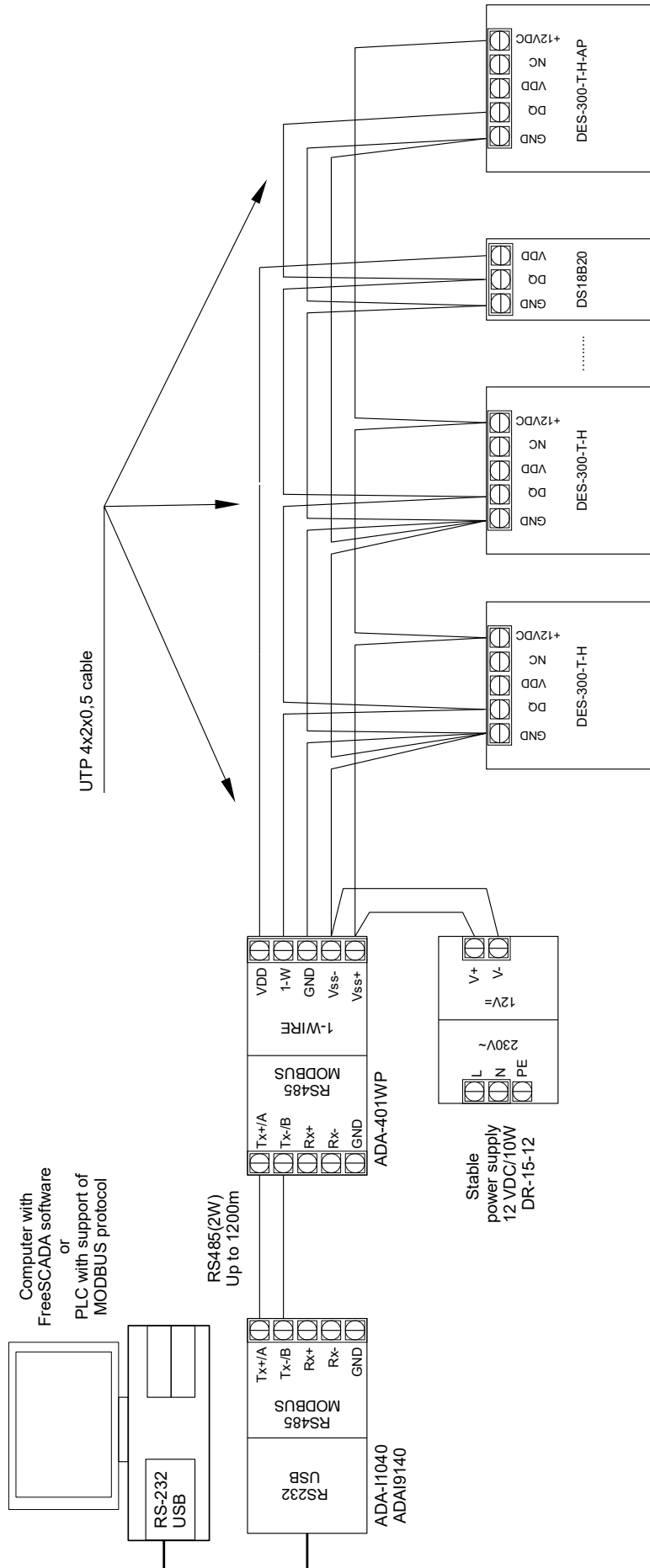
in case of powering sensor from additional power supply NOT connect the power VDD from the ADA-401WP module to VDD terminal block of DES-300 sensor.

Connection may damage the ADA-401WP module!

b) after connection 1-WIRE BUS to terminals +12VDC, DQ, GND:

- set the PWR switch to 12V position,
- fix the rear panel of sensor on electro-installation box or a wall,
- insert the PCB to the cover, terminals to inside,
- put the cover on rear panel.

7.2.1. EXAMPLE CONNECTION OF SENSORS

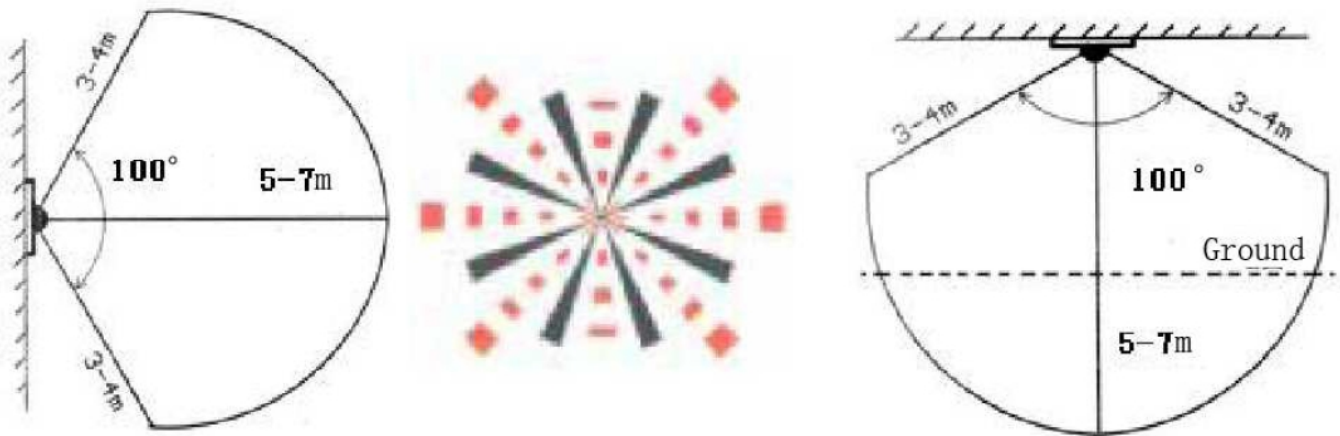


**8. PARAMETERS AND CONFIGURATION OF PIR SENSOR**

**8.1. PIR SENSOR PARAMETERS**

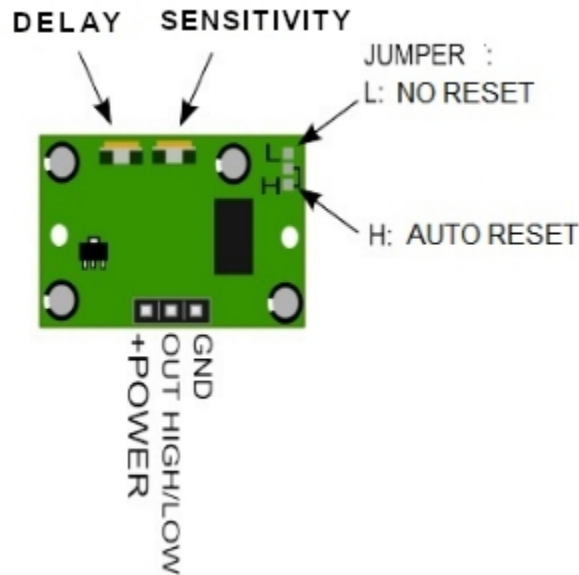
<i>Parameters</i>	<i>Value</i>
Measurement range	max. 7 m
Viewing angle	Up to 100 °
Alarm output OUT	State High - object detected : ~3,3VDC State Low – no object : 0VDC
Operating temperature	from -15°C to +70°C

**Operating range**



**8.2. PIR SENSOR CONFIGURATION**

The PIR transmitter can be configured by using regulatory elements as shown below.



By the use of the DELAY and SENSITIVITY potentiometers, can be regulated:

DELAY - duration of high state after detecting an object,

SENSITIVITY - sensor sensitivity (distance from the transducer in which the movement of the object is detected).

By the use of the JUMPER, can be selected the operating mode like:

AUTO RESET (jumper in H position) – OUTPUT reaches High state after detecting an object and it is kept, all the time detecting the movement.

NO RESET (jumper in L position) - OUTPUT reaches high state only once after detecting an object, then goes to Low state, regardless of whether there is further movement.

**9. VERSIONS**

DES-300 - X-X-X-X		
<b>Sensor Type:</b>		
Temperature sensor (-20°C ... +70°C)	<b>T</b>	<p><b>The basic sensor types can be mixed together except CO2 sensor.</b></p> <p><b>Order example:</b></p> <p>Product symbol: <b>DES-300-T-H</b></p> <p><b>T-H</b> - temperature and relative humidity</p> <p>Product symbol: <b>DES-300-T-H-AP</b></p> <p><b>T-H-AP</b> - temperature and relative humidity and atmospheric pressure</p>
Temperature sensor (-20°C ... +70°C) simplified – cover + DS18B20 with screw terminal block	<b>TE</b>	
Relative humidity sensor ( 0% ... 100%)	<b>H</b>	
Atmospheric pressure sensor ( 150hPa ... 1150hPa)	<b>AP</b>	
Temperature adjuster (+5°C ... +40°C)	<b>TA</b>	
Percentage adjuster ( 0% ... 100%)	<b>PA</b>	
Lighting sensor	<b>L</b>	
Sunlight sensor	<b>SL</b>	
PIR motion sensor	<b>PIR</b>	
IN PREPARING – CO2 concentration sensor	<b>CO2</b>	

### 9.1. COMBINING MEASUREMENTS/SENSORS

In DES-300 sensor can be combine measurements/sensors together, as in the table below.

Sensor	T	TE	H	AP	TA/PA	L	SL	PIR	CO2
T	-	-	+	+	+	+	+	+	-
TE	-	-	-	-	-	-	-	-	-
H	+	-	-	+	+	+	+	+	-
AP	+	-	+	-	+	+	+	+	-
TA/PA	+	-	+	+	-	+	+	-	-
L	+	-	+	+	+	-	+	+	-
SL	+	-	+	+	+	+	-	+	-
PIR	+	-	+	+	-	+	+	-	-
CO2	-	-	-	-	-	-	-	-	-

+ - measurements/sensors can be combine

- - measurements/sensors can not be combine

### 10. SPECIFICATIONS

<i>Parameters</i>	<i>Data</i>
<b>Parameters of Temperature Sensor</b>	
Measuring range of temperature	-55°C ... +125°C
1-WIRE Transducer	DS18B20
Measuring accuracy of temperature transducer	+/-0,5°C in the scope -10°C...+85°C
Temperature transducer resolution	12 bits (0,06°C)
Operating temperature	-55°C ... +125°C
<b>Parameters of Humidity Sensor</b>	
Measuring range of relative humidity	0% ... 100% RH
Measuring accuracy of relative humidity	+/-3,50% RH
Operating temperature	-40°C ... +85°C
<b>Parameters of Atmospheric Pressure Sensor</b>	
Measuring range of atmospheric pressure	150 hPa ... 1150 hPa
Measuring accuracy of atmospheric pressure	+/-15 hPa
Operating temperature	-40°C ... +85°C
<b>Parameters of Temperature Adjuster</b>	
Range of temperature adjuster	+5°C ... +40°C
Accuracy of temperature adjuster	+/-1 °C
Operating temperature	-20°C ... +75°C
<b>Parameters of Percent Value Adjuster</b>	
Range of values adjuster	0% ... 100%
Accuracy of values adjuster	+/-1 %
Operating temperature	-20°C ... +75°C
<b>Parameters of Lighting Sensor</b>	
Measuring range of lighting	0% ... 100% Lux
Measuring accuracy of lighting	+/-0,5% Lux
Operating temperature	-30°C ... +70°C
<b>Parameters of Sunlight Sensor</b>	

<b>Parameters</b>	<b>Data</b>
Measuring range of sunlight	0% ... 100% SLux
Measuring accuracy of sunlight	+/-0,5% SLux
Operating temperature	-40°C ... +85°C
<b>Parameters of Motion Sensor (PIR)</b>	
Measuring range	max. 7 m
Viewing angle	Up to 100 °
Alarm output OUT	State High - object detected : ~3,3VDC State Low – no object : 0VDC
Operating temperature	-15°C ... +70°C
<b>(IN PREPARATION) Parameters of CO<sub>2</sub> concentration Sensor</b>	
Measuring range of CO <sub>2</sub> concentration	0 ... 5000 ppm
Measuring accuracy of CO <sub>2</sub> concentration	+/- 50 ppm + 3 % readout
Operating temperature	0°C ... +50°C
<b>General Parameters</b>	
Supply voltage	From 1-WIRE bus, VDD=5VDC or from 12VDC stable power supply
Max. power	10mW – 600mW (depend on version)
Protection from reverse power polarization	YES <b>Warning! for reverse power on is shorted VDD to GND</b>
Bus cabling	Recommended UTP 4x2x0.5 AWG24 twisted cable
Cover operating temperature	-20°C ..... +70°C
Material	ABS
Protection degree	IP20
Dimensions	80 x 80 x 25 mm
Weight	0,05 kg
<b>Storing and Transportation</b>	
Storage temperature	-20°C ÷ +70°C
Humidity	5 ÷ 95% - non-condensing



**Dear Customer,**

Thank you for purchasing **CEL-MAR Company** products.

We hope that this user manual helped you to connect and start up the purchased device. We also wish to inform you that we are a manufacturer of: data transmission converters with interface RS232, RS485, RS422, USB, Current Loop, Fiber Optic Converters, 1-Wire, ETHERNET, Wi-Fi; digital sensors as: temperature, humidity, pressure, illumination; power supply

**Please express your opinion by e-mail or phone on this product, and advise us how we can satisfy you present and future of expecting.**

**CEL-MAR sp.j.**

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