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# COMPACT WEATHER STATIONS INSTALLATION AND USER MANUAL

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# VISIONSEN



Sensor Technology

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VSIAS INC. CO.  
IVEDİK OSB. MAH. 2224. CAD. NO:116/1 Yenimahalle/ANKARA

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# **W**ARRANTY CONDITIONS

Products manufactured by VSIAS under the brand VISIONSEN are warranted by VSIAS against defects in material and workmanship under normal use and service conditions for two years from the date of shipment, unless otherwise stated in the relevant product manual.



Product manuals can be viewed online at [www.visionsen.com](http://www.visionsen.com).

Products not manufactured by VSIAS but resold by VSIAS are warranted only to the limits extended by the original manufacturer.

VSIAS's liability under this warranty is limited to the repair or replacement (at VSIAS's discretion) of defective products, which will be the sole and exclusive remedy under this warranty.

The customer assumes all costs associated with removing, reinstalling, and shipping to VSIAS any products deemed to be defective. VSIAS undertakes the return costs of these products.

This warranty will not apply to products that have been subject to alteration, misuse, neglect, improper servicing, acts of god or accidents of god, or have been damaged in transit.

Warranty for installation services performed by VSIAS, such as programming according to customer specifications, electrical connections to products manufactured by VSIAS, and product-specific training, are part of VSIAS's product warranty.

“VSIAS disclaims all warranties and conditions, express, implied or statutory, regarding the products, except as expressly stated herein, to the fullest extent permitted by applicable law.”

# HELP

“Products cannot be returned without prior permission. The contact information below goes directly to VSIAS Engineering Industry Inc. Co. is aimed at its customers. Please use the contact addresses for the product you are returning.”



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# S AFETY

“THIS SCOPE RELATES TO THE INSTALLATION, USE, MAINTENANCE AND WORKING ON OR AROUND SENSORS, TRIPOTS, MOUNTING STANDS AND ANY EQUIPMENT AND PARTS.

FAILURE TO INSTALL AND OPERATE SENSORS, TRIPOTS, MOUNTING STANDS AND ALL KINDS OF EQUIPMENT AND PARTS PROPERLY, FAILURE TO MAINTAIN THEM AND FAILURE TO OBSERVE THE WARNINGS INCREASES THE RISK OF DEATH, ACCIDENT, SERIOUS INJURY, MATERIAL DAMAGE AND PRODUCT FAILURE. TAKE ALL REASONABLE PRECAUTIONS TO AVOID THESE HAZARDS. BEFORE PERFORMING ANY WORK, CONSULT YOUR ORGANIZATION'S SAFETY COORDINATORS AND OCCUPATIONAL HEALTH EXPERTS FOR PROCEDURES AND REQUIRED PROTECTIVE EQUIPMENT..”

Use sensors, tripods, mounting stands and any equipment and parts only for the purposes for which they were designed. Do not exceed design limits. Be familiar with and follow all instructions provided in the product manuals. The guides can be accessed at [www.visionsen.com](http://www.visionsen.com) or other contact addresses. You are responsible for compliance with applicable laws and regulations, including safety regulations, and for the integrity and location of any structure or system to which sensors, tripods, mounting stands and any equipment and parts are installed. Installation sites should be evaluated by a qualified engineer and handled by experienced technical personnel. If you have questions or concerns regarding the installation, use or maintenance of electrical connections of the systems, consult a licensed and qualified engineer or experienced technical personnel.

## GENERAL

- Obtain necessary approvals and permits before performing field or installation work.
- Comply with occupational health guidelines.
- Use only qualified personnel for the installation, use and maintenance of all connections of mechanical parts. It is highly recommended to use licensed and qualified contractors.
- Read all applicable instructions carefully and understand the procedures thoroughly before starting work..
- If any drilling or cutting operations are to be performed during the assembly phase, wear eye protection and take other appropriate safety precautions.

- Do not allow installed products to be intervened by other than authorized personnel.
- Use only manufacturer-recommended parts, materials and tools.

## ELECTRIC

- You could be killed or suffer serious bodily injury if a tripod, attachment, or tool you are installing, building, using, or maintaining comes into contact with overhead or underground power lines.
- Maintain a distance between overhead power lines and the structure to be installed that is at least one and a half times the height of the structure or the distance required by applicable code, whichever is greater.
- Before carrying out field or installation work, inform people or institutions that may be affected by the installation.
- Follow all electrical rules. Electrical equipment and related devices must be installed by licensed and experienced personnel.

## WORKING AT HEIGHT AND WEATHER

- Be extremely careful when working at height.
- Use proper equipment and safety practices.
- Keep mechanical and electrical parts away from untrained or unnecessary personnel during installation and maintenance. Take precautions to prevent elevated tools and objects from falling.
- Wind, rain, snow, lightning, etc. Do not carry out any work or maintenance in harsh weather conditions such as.
- Periodically (at least once a year) check for corrosion, stress cracks, frayed cables, loose cable clamps, cable tightness, etc. Check for wear and damage and take necessary corrective action.
- Check electrical ground connections periodically (at least once a year).

*“VSIAS employees reserve the right to refuse service for products exposed to contaminants that may cause health or safety problems.”*

## **I** NFO

Compact weather stations are systems that combine multiple sensor groups in a single mechanical structure used to collect meteorological data.

These stations can measure atmospheric conditions such as ambient temperature, relative humidity, atmospheric pressure, wind speed, wind direction, irradiance. Compact weather stations allow collecting multiple data with a single mechanical structure, with easy installation and ease of use, thanks to their integrated structure.

These stations are generally used for the need for fast and precise data collection. As areas of use; It has wide usage areas such as solar power plants, agriculture and greenhouse cultivation, natural disaster monitoring, maritime transportation and aviation, research and scientific studies, energy sector, urban planning and emergency management.

The advantages are:

- Size
- Fast and Precise Data Collection
- Cost
- Diversibility
- Easy Installation and Use
- Data Integration

# **P** RODUCT INTRODUCTION

Compact weather systems produced under the Visionsen brand. It is widely used in areas such as stations, solar power plants, agriculture and greenhouse cultivation, natural disaster monitoring, maritime transportation and aviation, research and scientific studies, energy sector, urban planning and emergency management.

Communication of the end user is carried out through the Modbus RTU communication (RS485) protocol, which is widely used in the industry for system integration. Visionsen compact weather monitoring stations include a microprocessor structure that stores calibration data, eliminating the need to reprogram data loggers or SCADA systems when installing a new system.

Compact weather stations are integrated with high-strength aluminum structure and UV ABS structure as protective structure. Thanks to its customizable structure regarding the parameter to be measured, compact weather stations can be created in different variants. An external back of module temperature sensor can be connected to compact weather stations.

Thanks to its product diversity, Visionsen can produce compact weather stations for different applications.

Visionsen compact weather stations provide durability and reliability for outdoor environments with IP68 standard communication and power cables. It also provides easy installation during the installation phase with its M12 circular connector.



# **I** INSTALLATION

## **C** **aution!:**

When you place your compact weather monitoring station near a body of water, the temperature and humidity readings measured by your temperature and humidity sensor may be affected.

Because plants create a lot of water vapor, the temperature and humidity in your station can affect your readings.

Tall objects may cause shadowing for your weather station. They can even eventually change the direction and speed of the wind to your sensors. Therefore, your wind speed and wind direction readings may be inaccurate.

Dark surfaces absorb or reflect too much heat, meaning that placing the station on a black roof in full sun will change your temperature readings. The same applies to asphalt roads, concrete floors or metal surfaces. It can continue to give off heat even when the outside temperature begins to drop.

In models with a radiation sensor, first measure the angle of your panels with the help of a spirit level, GPS or an inclinometer whose accuracy you trust. Then loosen the wing nut located under the radiation sensor. Position the sensor(s) at the same angle as the degree of slope you measured. Tighten the wing nut. Make sure it is tightened properly.

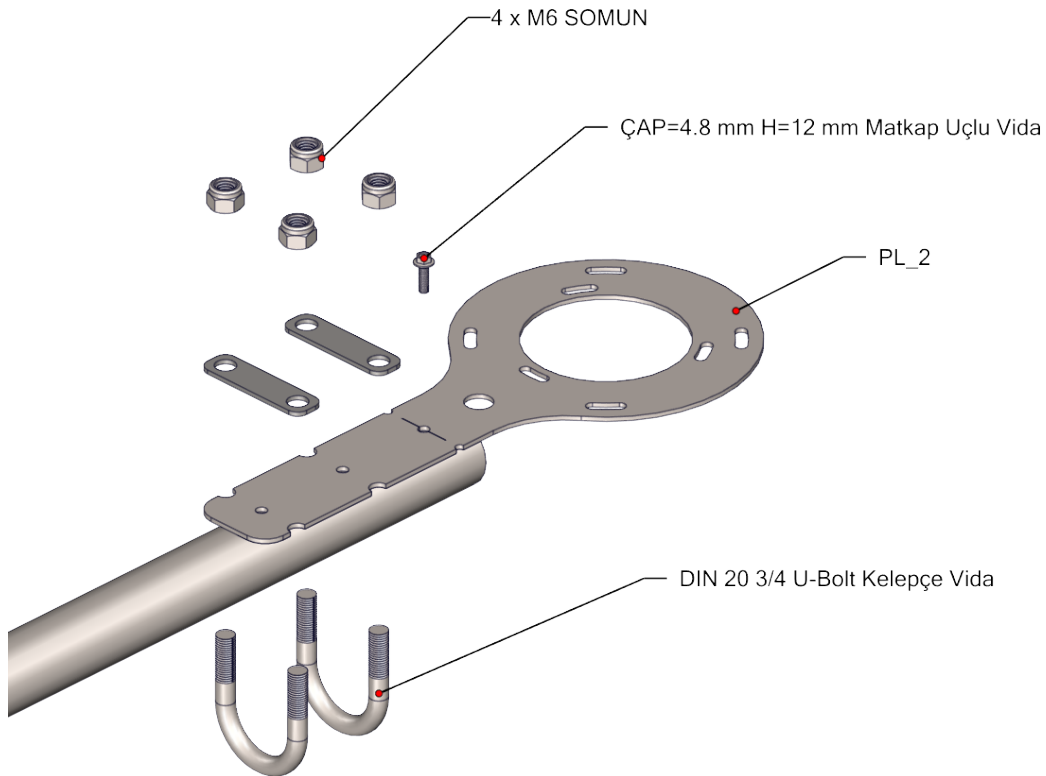
For station models with wind speed and direction; Make sure that the sensors are placed in a location that is not affected by wind flow.

All CWS series compact weather stations are produced with mounting hardware.

It can be easily installed in the mounting area with 3 M4 screws.

# M ECHANICAL INSTALLATION

All compact weather stations are produced assembled with the mounting apparatus below. While mounting, you can mount it on a flat surface with 3 M4 screws located at the end of the apparatus, or you can mount it on pipe type structures with the help of 2 3/4 U-Bolt clamp screws and M6 nuts.



# ELECTRICAL INSTALLATION

Compact weather stations have MODBUS RTU communication protocol. All models are produced with 5m high quality PUR FLEX cable with waterproof IP68 connector.

## POWER CONNECTION

The minimum supply voltage for all CWS Series models is 9 V DC. 12V DC voltage is recommended to ensure reliable performance. It is recommended to protect the output of the power supply with a fast-blow fuse with a maximum rating of 250 mA.

## POWER CONSUMPTION

Models	V DC	Current (mA)	Power (mW)	Models	V DC	Current (mA)	Power (mW)
CWS-101	9	24	216	CWS-107	9	36	324
	12	18	216		12	27	324
	24	9	216		24	13,5	324
CWS-102	9	24	216	CWS-108	9	36	324
	12	18	216		12	27	324
	24	9	216		24	13,5	324
CWS-103	9	24	216	CWS-109	9	16	144
	12	18	216		12	12	144
	24	9	216		24	6	144
CWS-104	9	40	360	CWS-110	9	16	144
	12	30	360		12	12	144
	24	15	360		24	6	144
CWS-105	9	40	360	CWS-111	9	16	144
	12	30	360		12	12	144
	24	15	360		24	6	144
CWS-106	9	28	252	CWS-112	9	16	144
	12	21	252		12	12	144
	24	10,5	252		24	6	144

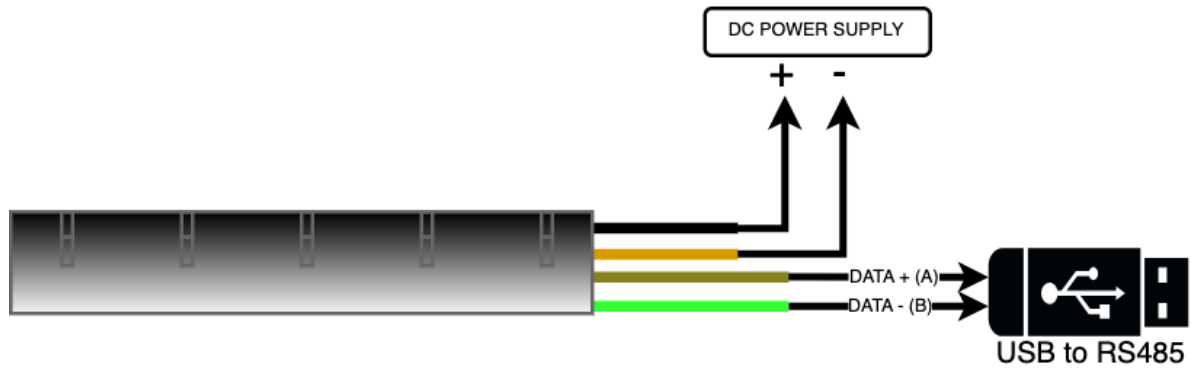
Maximum power consumption 360 mW at highest input voltage.

- Maximum input current 3 mA at lowest input voltage.
- Maximum inrush current 100 mA.

## COMPUTER CONNECTION



Power supply units for portable computers such as laptops can produce large voltage peaks. This may damage the digital interface of the device. **Make sure there is galvanic separation between the inputs and outputs of the transducer.**



Cable Color	Definition
White	9-28 V DC (+)
Brown	9-28 V DC (-)
Yellow	Data (+)
Green	Data (-)

# C OMMUNICATION

Visionsen Smart Tool software allows the configuration of Modbus®-based compact weather stations and the observation of real-time data.

## CONNECTION SETTINGS

After connecting it to your computer with the USB-RS485 converter, you can observe the COM Port, Baud Rate, Stop Bits, Parity and Address settings of the sensor with Modbus® RTU communication protocol with the help of the Visionsen Smart Tool software you downloaded from [www.visionsen.com](http://www.visionsen.com) after the connection is made. After configuring your new connection settings, you can click the "Send Settings" button.

The screenshot displays the Visionsen Smart Tool software interface. The window title is "Visionsen Smart Tool". The interface is divided into four tabs: "Bağlantı Ayarları" (selected), "Register Adresleri", "Cihaz Ayarları", and "Kalibrasyon".

The "Bağlantı Ayarları" tab is further divided into two sections:

- Seri Bağlantı Ayarları**: This section contains the following settings:
  - COM Port: A dropdown menu showing "COM3" and a "Yenile" button.
  - Baud Rate: A dropdown menu showing "9600".
  - Stop Bits: Radio buttons for "1" (selected) and "2".
  - Parity: Checkboxes for "None" (checked), "Even", and "Odd".
  - Address: A text input field containing "1".
  - A "Bağlantıyı Kes" button is located below the Address field.
- Yeni Bağlantı Ayarları**: This section contains the following settings:
  - Baud Rate: A dropdown menu showing "9600".
  - Stop Bits: Radio buttons for "1" (selected) and "2".
  - Parity: Checkboxes for "None" (checked), "Even", and "Odd".
  - Address: An empty text input field.
  - An "Ayar Gönder" button is located below the Address field.

## REGISTER ADDRESSES

If you want to change the register addresses defined in the Modbus® map, the desired address can be written in the section of the relevant sensor and a new register address can be defined after pressing the "Send Settings" button.

Visionsen Smart Tool
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Bağlantı Ayarları
Register Adresleri
Cihaz Ayarları
Kalibrasyon

Işınım 1	31
Işınım 2	32
Sıcaklık 1	15
Sıcaklık 2	19
Nem	16
Basınç	17
Rüzgar Yön	21
Rüzgar Hız	20
Oransal Işınım	0
Kirlilik Anlık	0
Kirlilik Oto	33
Sıcaklık 3	40

Adresleri Değiştir
Ayar Gönder

Işınım 1	61 W/m <sup>2</sup>	Basınç	NA	Kirli. Oto	NA
Işınım 2	0 W/m <sup>2</sup>	Rüz Yön	NA	Oran. Işın.	NA
Sıcaklık 1	NA	Rüz Hız	NA		
Sıcaklık 2	NA	Sıcaklık 3	NA		
Nem	NA	Kirli. Anlık	NA		

Bağlantı Başarılı
⋮

## DEVICE SETTINGS

For models with dual angle irradiance sensor in the compact weather station, after writing the proportional values for each orientation, you need to press the send settings button to get the effective (proportional) radiation value. After connecting the device, you can also view the serial number, firmware and hardware information and current values of the device.

Visionsen Smart Tool
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Bağlantı Ayarları
Register Adresleri
Cihaz Ayarları
Kalibrasyon

**Çift Işınım Oranı**

Işınım 1 Yüzdesi  %      Işınım 2 Yüzdesi  %

**Otomatik Toz Temizleme Süresi**

Başlangıç Saati         Püskürtme Adeti

**Otomatik Toz Pompa ve Ölçüm Süresi**

Pompa Açık Kalma (ms)       Temizleme Aralığı (dk)

Pompa Kapalı Kalma (ms)       Ölçüm Bekleme (dk)

**Versiyonlar**

Serial No       Firmware       Hardware

Işınım 1	<input type="text" value="60 W/m&lt;sup&gt;2&lt;/sup&gt;"/>	Basınç	<input type="text" value="NA"/>	Kirli. Oto	<input type="text" value="% 0"/>
Işınım 2	<input type="text" value="0 W/m&lt;sup&gt;2&lt;/sup&gt;"/>	Rüz Yön	<input type="text" value="NA"/>	Oran. Işın.	<input type="text" value="30 W/m&lt;sup&gt;2&lt;/sup&gt;"/>
Sıcaklık 1	<input type="text" value="NA"/>	Rüz Hız	<input type="text" value="NA"/>		
Sıcaklık 2	<input type="text" value="NA"/>	Sıcaklık 3	<input type="text" value="NA"/>		
Nem	<input type="text" value="NA"/>	Kirli. Anlık	<input type="text" value="NA"/>		

Bağlantı Başarılı

## MODBUS® TABLE AND CONFIGURATION SETTINGS

Default communication parameters for irradiance sensors are as follows:

Modbus® Baud Rate:9600

Parity: None

Data Bits:1

Stop Bits:1

Address:1

If you are using the software on-premise, make sure the software is pre-installed on the laptop.











For more details about installation, monitoring and data recording, you can contact the contact addresses.

Adress		Type	Gain	Unit	Description
Hexadecimal	Decimal				
0x0F	31	uint16	10	°C	Ambient Temperature
0X10	32	uint16	10	%	Relative Humidity
0X11	34	uint16	10	mbar	Atmospheric Pressure
0x13	19	int16	10	°C	Back of Module Temperature
0x14	20	uint16	10	m/s	Wind Speed
0x15	21	uint16	10	0-360°	Wind Direction
0x1F	31	uint16	10	W/m2	Irradiance 1, TC
0x20	32	uint16	10	W/m2	Irradiance 2, tc
0x28	40	int16	10	W/m2	Eff, Irradiance



# MODELS

## COMPACT WEATHER STATIONS MODELS

 <p><b>CWS-101</b></p> <p>Wind Speed Sensor Ambient Temperature Sensor Atmospheric Pressure Sensor Relative Humidity Sensor</p>	 <p><b>CWS-102</b></p> <p>Wind Direction Sensor Ambient Temperature Sensor Atmospheric Pressure Sensor Relative Humidity Sensor</p>	 <p><b>CWS-103</b></p> <p>Irradiance Sensor Ambient Temperature Sensor Atmospheric Pressure Sensor Relative Humidity Sensor</p>
 <p><b>CWS-104</b></p> <p>Angle PERC Reference Irradiance Sensor Wind Speed Sensor Ambient Temperature Sensor Atmospheric Pressure Sensor Relative Humidity Sensor</p>	 <p><b>CWS-105</b></p> <p>Angle PERC Reference Irradiance Sensor Wind Direction Sensor Ambient Temperature Sensor Atmospheric Pressure Sensor Relative Humidity Sensor</p>	 <p><b>CWS-106</b></p> <p>Dual Angle PERC Reference Irradiance Sensor Ambient Temperature Sensor Atmospheric Pressure Sensor Relative Humidity Sensor</p>
 <p><b>CWS-107</b></p> <p>Dual Angle PERC Reference Irradiance Sensor Wind Speed Sensor Ambient Temperature Sensor Atmospheric Pressure Sensor Relative Humidity Sensor</p>	 <p><b>CWS-108</b></p> <p>Dual Angle PERC Reference Irradiance Sensor Wind Direction Sensor Ambient Temperature Sensor Atmospheric Pressure Sensor Relative Humidity Sensor</p>	 <p><b>CWS-109</b></p> <p>Wind Speed Sensor Wind Direction Sensor</p>
 <p><b>CWS-110</b></p> <p>Ambient Temperature Sensor Atmospheric Pressure Sensor Relative Humidity Sensor</p>		

## OPTIONS

**CWS-101:** Optionally, 2 back of module temperature sensors (MTS-P) and 1 wind direction sensor (WDS-P) can be connected.

**CWS-102:** Optionally, 2 back of module temperature sensors (MTS-P) and 1 wind speed sensor (WSS-PL) can be connected.

**CWS-103:** Optionally, 2 back of module temperature sensors (MTS-P), 1 wind speed sensor (WSS-PL) and 1 wind direction sensor (WDS-P) can be connected.

**CWS-104:** Optionally, 2 back of module temperature sensors (MTS-P) and 1 wind direction sensor (WDS-P) can be connected.

**CWS-105:** Optionally, 2 back of module temperature sensors (MTS-P) and 1 wind speed sensor (WSS-PL) can be connected.

**CWS-106:** Optionally, 2 back of module temperature sensors (MTS-P), 1 wind speed sensor (WSS-PL) and 1 wind direction sensor (WDS-P) can be connected.

**CWS-107:** Optionally, 2 back of module temperature sensors (MTS-P) and 1 wind direction sensor (WDS-P) can be connected.

**CWS-108:** Optionally, 2 back of module temperature sensors (MTS-P) and 1 wind speed sensor (WSS-PL) can be connected.