Installation Manual



CWS-1xx

Compact Weather Monitoring Stations Series Installation and User Manual

VISIONSEN
Sensor Technology

www.visionsen.com
www.vsias.com

Vsias Engineering Industry Inc.

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1 WARRANTY CONDİTİONS

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

Product user manuals can be downloaded online from **www.visionsen.com**

- Products not manufactured by VSIAS but resold by VSIAS are warranted only within the limits extended by the original manufacturer.
- In case of unauthorized repair or modification of the sensor, the warranty conditions will be void.
- Short circuits and other faults that may occur due to not switching off the power source during electrical connections are not covered under warranty.
- Failures caused by cleaning the sensor and additional equipment with abrasive chemicals and similar substances are not covered under warranty.
- VSIAS's obligation under this warranty is limited to the repair or replacement of defective products (at VSIAS's discretion), which shall be the sole and exclusive remedy under this warranty.
- The customer bears all costs related to removal, reinstallation, and shipment of products deemed defective to VSIAS. VSIAS covers the return shipping costs of these products.
- This warranty shall not apply to products exposed to modification, misuse, negligence, improper service, natural disasters, or transportation damage.
- Programming according to customer specifications, electrical connections to products manufactured by VSIAS, and product-specific training services provided by VSIAS are part of VSIAS's product warranty.
- "VSIAS disclaims all express, implied, or statutory warranties and conditions relating to the products, except as expressly stated herein, to the extent permitted by applicable law."

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2 HELP SUPPORT

Products cannot be returned without prior authorization. The following contact information is directly for customers of VSİAS Mühendislik Endüstri A.Ş. Please use the contact addresses for returned products.

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3 SAFETY

THIS SCOPE RELATES TO THE INSTALLATION, USE, MAINTENANCE, AND WORK ON OR AROUND SENSORS, TRIPODS, MOUNTING STANDS, AND ALL TYPES OF EQUIPMENT AND COMPONENTS.

IMPROPER INSTALLATION, OPERATION, OR MAINTENANCE OF SENSORS, TRIPODS, MOUNTING STANDS, AND ALL TYPES OF EQUIPMENT AND COMPONENTS, AS WELL AS FAILURE TO FOLLOW WARNINGS, INCREASES THE RISK OF DEATH, ACCIDENTS, SERIOUS INJURY, PROPERTY DAMAGE, AND PRODUCT FAILURE. TAKE ALL REASONABLE PRECAUTIONS TO PREVENT THESE HAZARDS. BEFORE PERFORMING ANY WORK, CONSULT YOUR ORGANIZATION'S SAFETY COORDINATORS AND OCCUPATIONAL HEALTH SPECIALISTS REGARDING PROCEDURES AND REQUIRED PROTECTIVE EQUIPMENT.

Use sensors, tripods, mounting stands, and all types of equipment and components only for their intended purposes. Do not exceed design limits. Familiarize yourself with and comply with all instructions provided in the product manuals. Manuals are available at www.visionsen.com or through other contact addresses. You are responsible for compliance with applicable laws and regulations, including safety regulations, and for the integrity and positioning of the structures or systems where sensors, tripods, mounting stands, and all types of equipment and components are installed. Installation sites must be evaluated by a qualified engineer and processed by experienced technical personnel. If you have questions or concerns regarding the installation, operation, or maintenance of electrical connections of systems, consult a licensed and qualified engineer or experienced technical personnel.

3.1 General

- Obtain the necessary approvals and permits before carrying out field or installation work.
- Comply with occupational health guidelines.
- Only qualified personnel should be used for the installation, operation, and maintenance of all connections of mechanical parts. The use of licensed and qualified contractors is strongly recommended.
- Read all applicable instructions carefully and fully understand the procedures before starting work.
- If any drilling or cutting work is to be performed during installation, wear eye protection and take other appropriate safety measures.
- Do not allow unauthorized personnel to intervene in installed products.
- Only use parts, materials, and tools recommended by the manufacturer.

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3 SAFETY

3.2 Electrical

- If the tripod, or any attachments or tools you install, construct, use, or maintain come into contact with overhead or underground power lines, you may be killed or suffer serious bodily injury.
- Maintain a distance from overhead power lines equal to at least one and a half times the height of the structure, or the distance required by applicable law (whichever is greater).
- Inform those persons or organizations that may be affected by the installation before carrying out field or installation work.
- Comply with all electrical regulations. Electrical equipment and related devices must be installed by licensed and experienced personnel.

3.3 Working at Height and Weather Conditions

- Exercise extreme caution when working at height.
- Use appropriate equipment and safety practices.
- Keep mechanical or electrical parts away from untrained or unnecessary personnel during installation and maintenance. Take precautions to prevent tools and objects from falling.
- Do not perform any work or maintenance in severe weather conditions such as wind, rain, snow, lightning, etc.
- Periodically (at least once a year), inspect for wear and damage including corrosion, stress cracks, worn cables, loose cable clamps, cable tension, etc., and take necessary corrective actions.
- Periodically (at least once a year), check electrical grounding connections.



VSIAS reserves the right to refuse service for products that have been exposed to contaminants that may pose health or safety risks to VSIAS employees.

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4 INTRODUCTION

Compact weather monitoring stations are systems used for collecting meteorological data that combine multiple sensor groups within a single mechanical structure.

These stations can measure atmospheric conditions such as ambient temperature, relative humidity, atmospheric pressure, wind speed, wind direction, solar radiation, and precipitation amount. Thanks to their integrated structure, compact weather monitoring stations enable easy installation and operation, allowing multiple data measurements to be collected within a single mechanical system.

These stations are generally used for fast and precise data collection needs. Their application areas include solar power plants, agriculture and greenhouse farming, natural disaster monitoring, maritime transportation and aviation, research and scientific studies, the energy sector, urban planning, and emergency management.

Advantages:

- Size
- Fast and Accurate Data Collection
- Low Cost
- Versatility
- Easy Installation
- Easy Mounting and Configuration
- Data Integration

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5 PRODUCT DESCRIPTION

Compact weather monitoring stations produced and developed under the Visionsen brand are widely used in applications such as solar power plants, agriculture and greenhouse farming, crane applications, bridge and viaduct applications, highway applications, dock applications, maritime applications, wind turbines, storage applications, natural disaster monitoring and aviation, research and scientific studies, the energy sector, urban planning, and emergency management.

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

Compact weather monitoring stations are integrated with a high-strength aluminum structure and UV-resistant plastic housing as protective construction. Thanks to their customizable structure depending on the measured parameter, different configurations of compact weather monitoring stations can be produced. An external under-panel temperature sensor can also be connected to the stations.

Thanks to Visionsen's product variety, compact weather monitoring stations can be manufactured according to different applications. Visionsen compact weather monitoring stations provide durability and reliability for outdoor environments with IP68-rated communication and power cables. The M12 circular connector also ensures easy installation during setup.

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6 INSTALLATION

Attention :

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 produce a large amount of water vapor, they can also influence the temperature and humidity readings of your station.

Tall objects may cause shading for your weather station. They may even eventually alter the wind direction and wind speed reaching the sensors. Therefore, your wind speed and wind direction readings may become inaccurate.

Dark-colored surfaces absorb or reflect a large amount of heat. Placing the station on a black roof under full sun means that temperature readings will be affected. The same applies to asphalt roads, concrete surfaces, or metal surfaces. These surfaces may continue to emit heat even when the outdoor temperature starts to drop.

For models equipped with a radiation sensor, first measure the panel angle using a spirit level, GPS, or a reliable inclinometer. Then loosen the wing nut located under the radiation sensor. Adjust the sensor(s) to match the measured tilt angle. Tighten the wing nut and ensure it is properly secured.

For station models with wind speed and wind direction sensors, ensure that the sensors are placed in a location that is not affected by wind flow disturbances.

All CWS-1xxx series compact weather monitoring stations are manufactured with a mounting bracket.

Installation can be easily carried out using 4 M4 screws at the installation site.

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7 MECHANICAL INSTALLATION

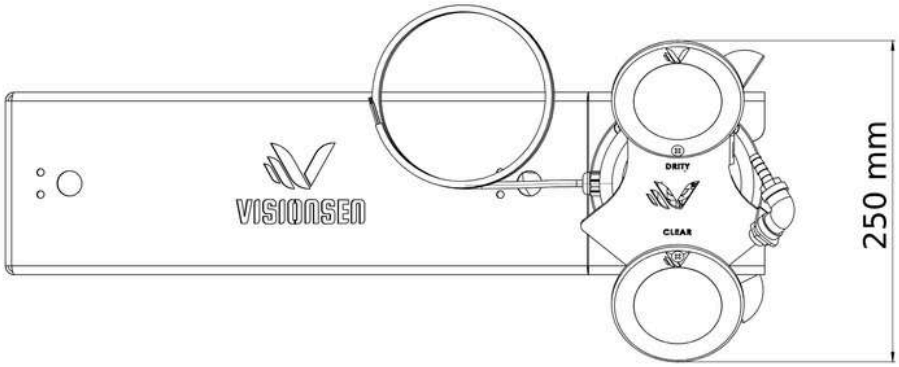
7.1 Dimensions and Measurements

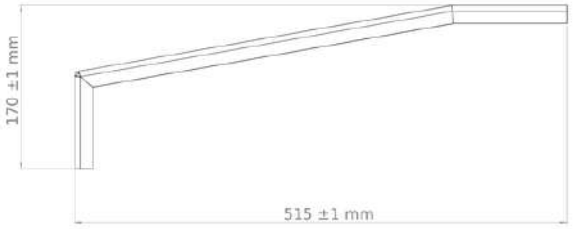
Sensor Dimensions

Weight	: 2.7 kg
Sensor	: 540 mm x 480 mm
Width	: 250 mm

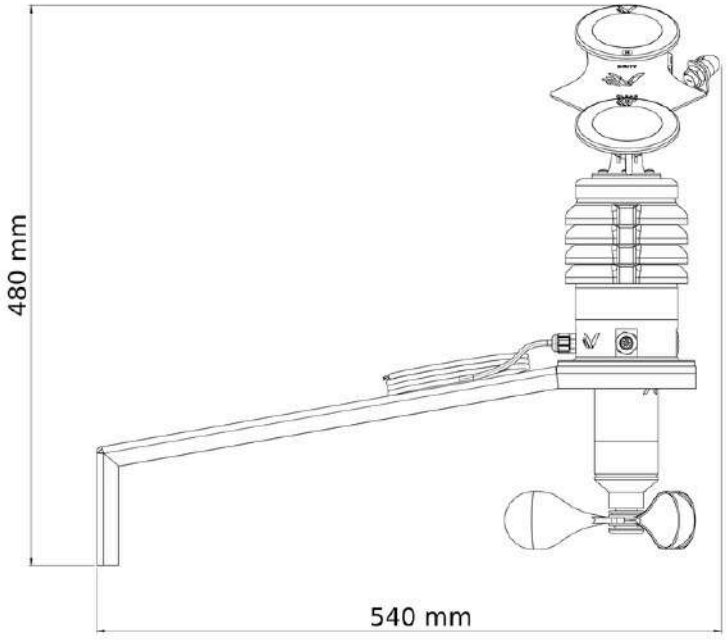
Mounting Dimensions

Weight	: 1.2 kg
Platform	: 515 mm x 170 mm
Width	: 124 mm









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7 MECHANICAL INSTALLATION

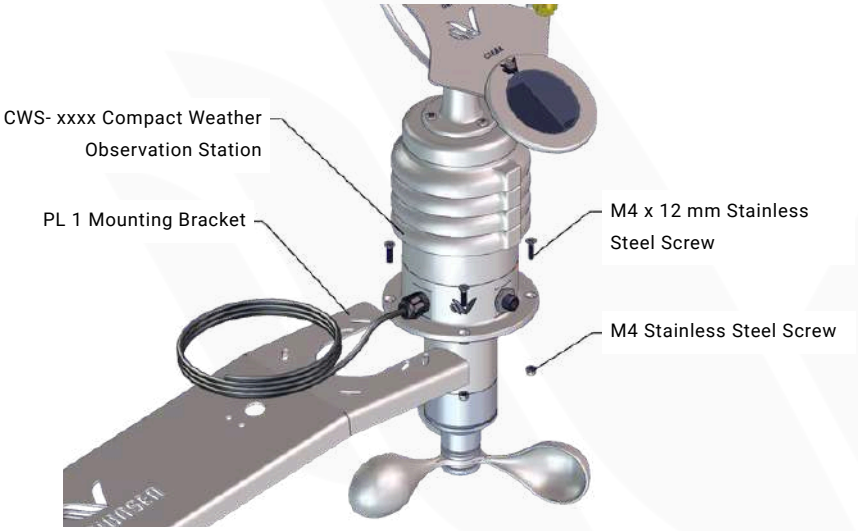
7.2 Pipe & Pole Mounting Installation

The compact weather monitoring station is supplied with the mounting apparatus specified below.

Box Contents:

- Compact Weather Observation Station
- Mounting Bracket
- 4 Pieces M4 x 12 mm Stainless Steel Screws
- 4 Pieces M4 Stainless Steel Nuts
- Modbus RTU Register Address Guide

Mounting Steps

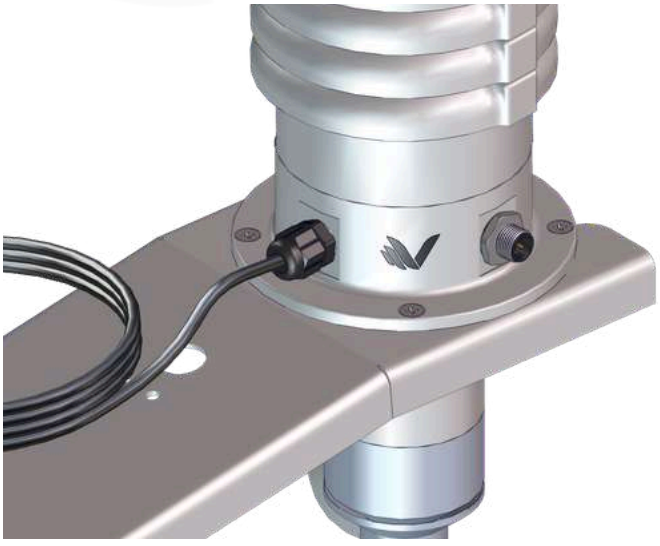


1.Step:

- Suitable wrench equipment is prepared for screws and nuts.
- As shown in the image, the sensor is placed into the opening on the mounting bracket.

2.Step:

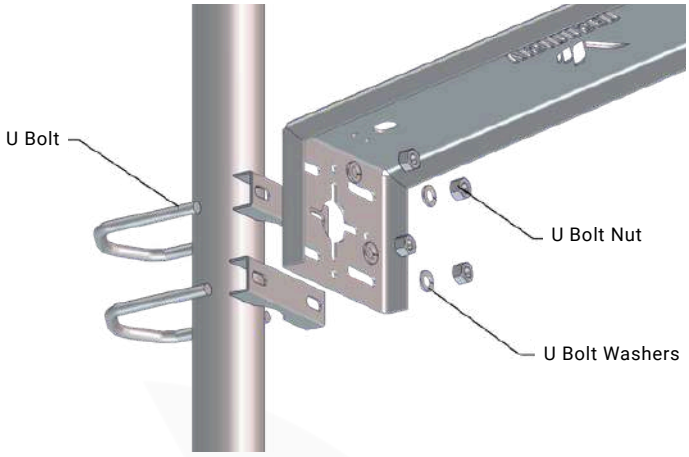
- The screws and nuts are tightened and secured using an appropriate wrench.



⚠ ***Attention :*** ***Ensure that all screws and nuts are fully tightened. Otherwise, it may cause incorrect measurements.***

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7 MECHANICAL INSTALLATION



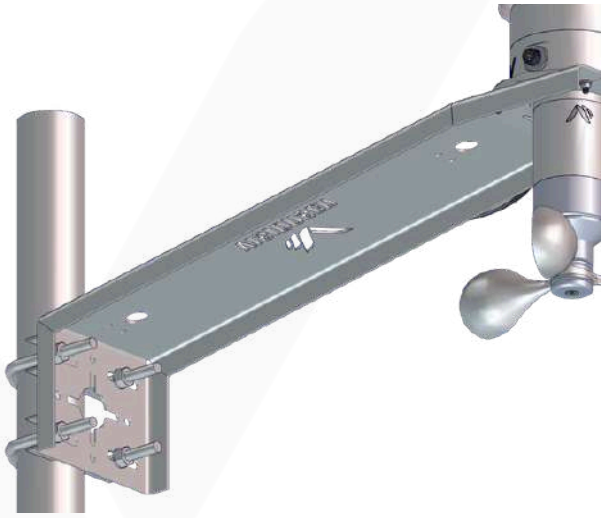
3.Step:

- An appropriate wrench is selected for the U-bolt clamp screw.

4.Step:

- The screws and nuts are tightened and secured using a suitable wrench.

Attention : ***If the U-bolt clamp is not properly tightened and secured, it may shift over time in the mounting direction and cause measurement errors.***





5.Step:

- Ensure that the mounting pole is level.
- Ensure that there are no loose screws or nuts.
- Ensure that the application area and field layout are level.

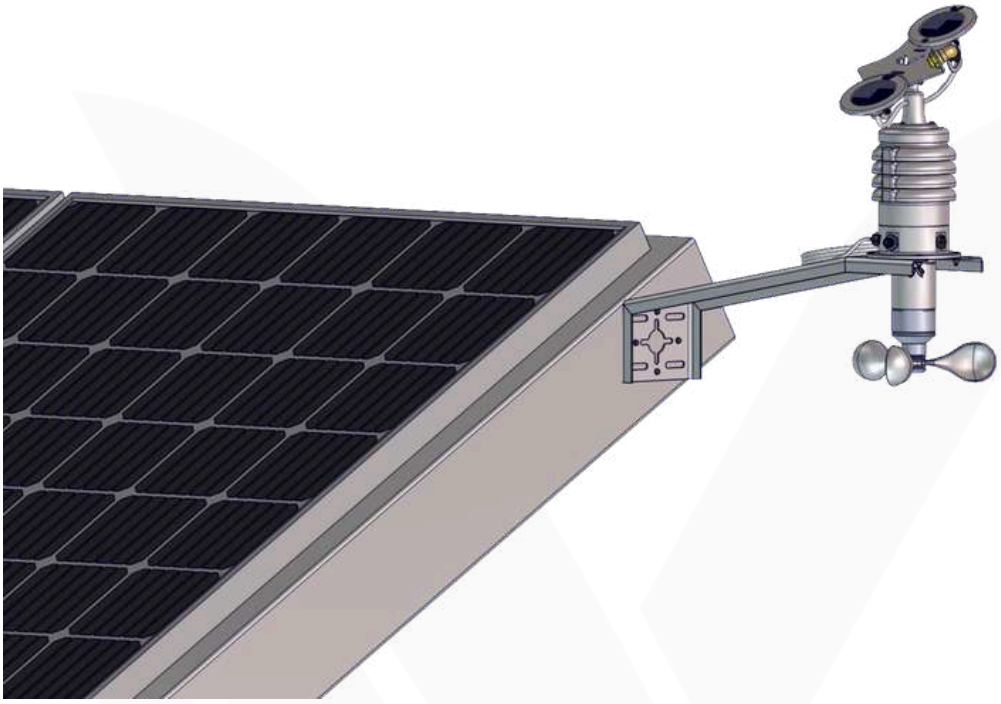
Attention : ***Any installation-related damage to plastic components, reference cell, aluminum housing, connectors, and other parts during installation will not be covered under warranty.***

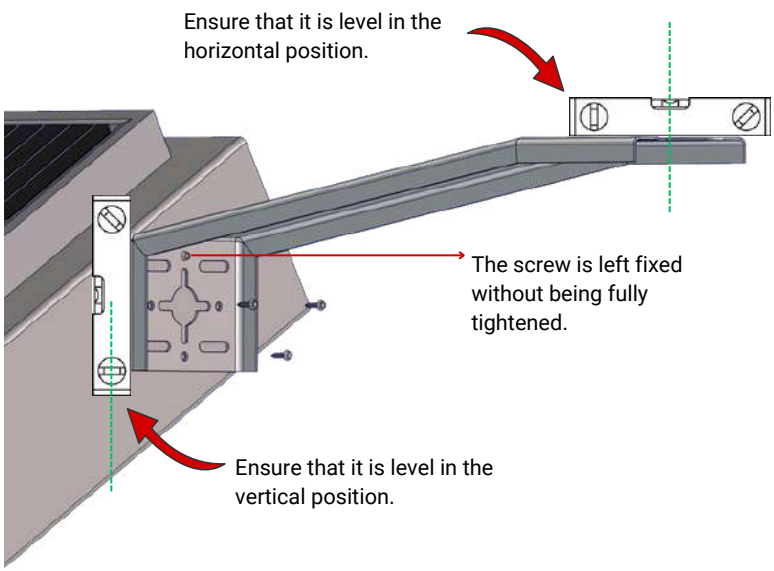
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7 MECHANICAL INSTALLATION

7.3 Field Panel Mounting Installation

Mounting Steps





1.Step:

- Ensure that the mounting platform is perfectly balanced in both horizontal and vertical directions.
- Tighten the 3 screws at the appropriate points.
- Tighten the previously loosely secured screw to ensure balance.

The platform drilling template can be found at www.visionsen.com/vidalama-sablonlari/

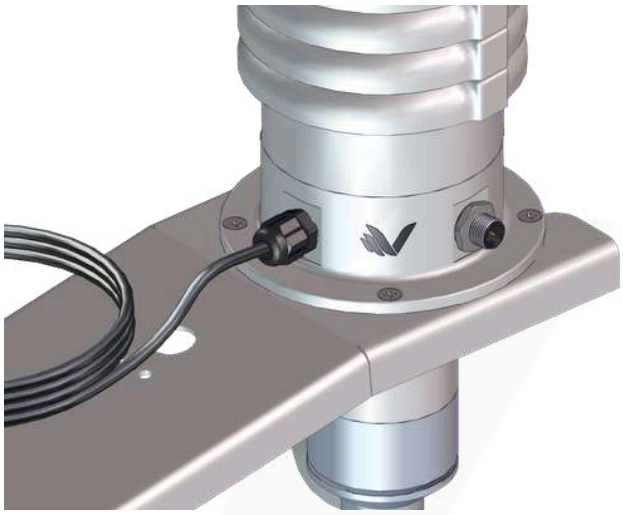
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7 MECHANICAL INSTALLATION

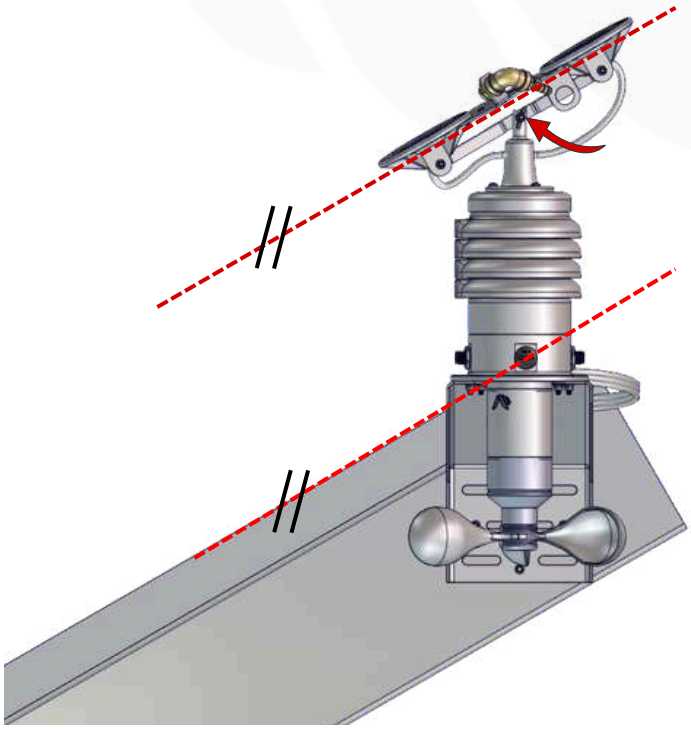
7.3 Field Panel Mounting Installation

2.Step:

- The sensor is placed into the opening on the mounting bracket.
- The M4 screws and nuts are tightened and secured using an appropriate wrench.



Attention : ***Ensure that all screws and nuts are fully tightened. Otherwise, it may cause incorrect measurements.***



3.Step:

- The sensor head is adjusted to be parallel to the panel array plane.
- The wing nut indicated by the arrow is tightened.
- During tightening of the wing nut, ensure that the sensor block does not deviate from the panel array plane.

Attention : ***If the radiation sensor is not parallel to the panel array plane, the measured data will be incorrect.***

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8 ELECTRICAL INSTALLATION

Compact weather monitoring stations support the MODBUS RTU communication protocol. All models are manufactured with a 5 m high-quality PUR FLEX cable and a waterproof IP68 connector.

8.1 Power Connection

The minimum supply voltage for all CWS series models is 9 V DC. A supply voltage of 12 V DC is recommended to ensure reliable performance. It is recommended that the power supply output be protected with a fast-blow fuse rated at a maximum of 250 mA.

8.2 Power Consumption

Modeller	V DC	Akım (mA)	Güç (mW)	Modeller	V DC	Akım (mA)	Güç (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				
	12	30	360				
	24	15	360				
CWS-106	9	28	252				
	12	21	252				
	24	10,5	252				

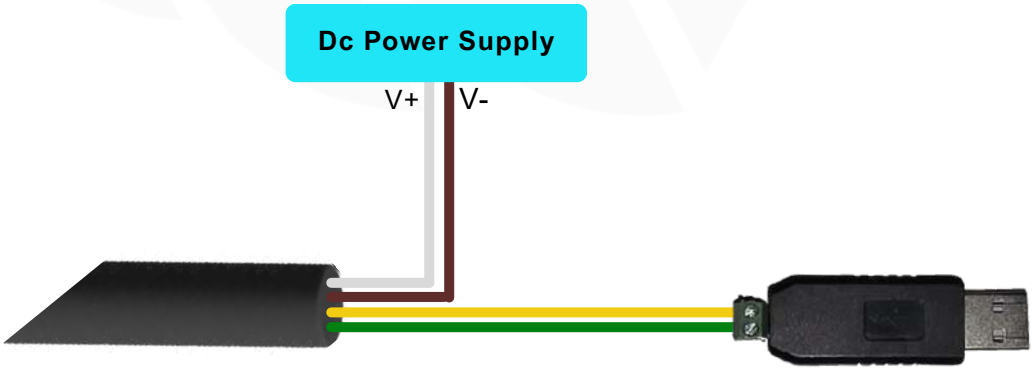
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9 COMPUTER CONNECTION

Power supply units of portable computers such as laptops can generate high voltage spikes. This may damage the device's digital interface. Ensure that there is galvanic isolation between the input and output of the converter.

	Cable Color	Description	
	White	9 - 28 V DC (+)	
	Brown	9 - 28 V DC (-)	
	Yellow	A	Data (+)
	Green	B	Data (-)

Attention : ***"The white cable is the positive (+) terminal, and the brown cable is the negative (-) terminal. Faults arising from incorrect connections are not covered under warranty."***



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10 COMMUNICATION

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

10.1 Connection Settings



- You can download the Visionsen Smart Tool application from www.visionsen.com.
- After downloading the application, install it.
- Plug the converter into the computer's USB port.
- Select the COM port.
- Baud Rate: 9600
- Stop Bits: 1
- Parity: None
- Address: 1
- Press the Connect button.
- If the connection is established, the current sensor data will automatically start being read in the lower section.

Configure the appropriate connection settings from the "New Connection Settings" section and complete the setup by clicking the "Send Settings" button.

Attention : ***Before changing the address, ensure that no other sensor is defined with the same address. Record the updated connection settings together with the sensor serial number.***

Attention : ***If the converter port cannot be found in the COM Port section, repeat the connection process by following the steps below.***

In case the COM port cannot be found:

1. Perform a USB driver update.
2. Search for "Device Manager" in the computer search box.
3. Device Manager > Ports (COM & LPT) > USB-SERIAL CH----, and check the port status.
4. If the Ports section does not appear when the USB-RS485 converter is connected, check and update the driver.
5. Restart your computer.
6. Repeat the checks starting from Step 2.

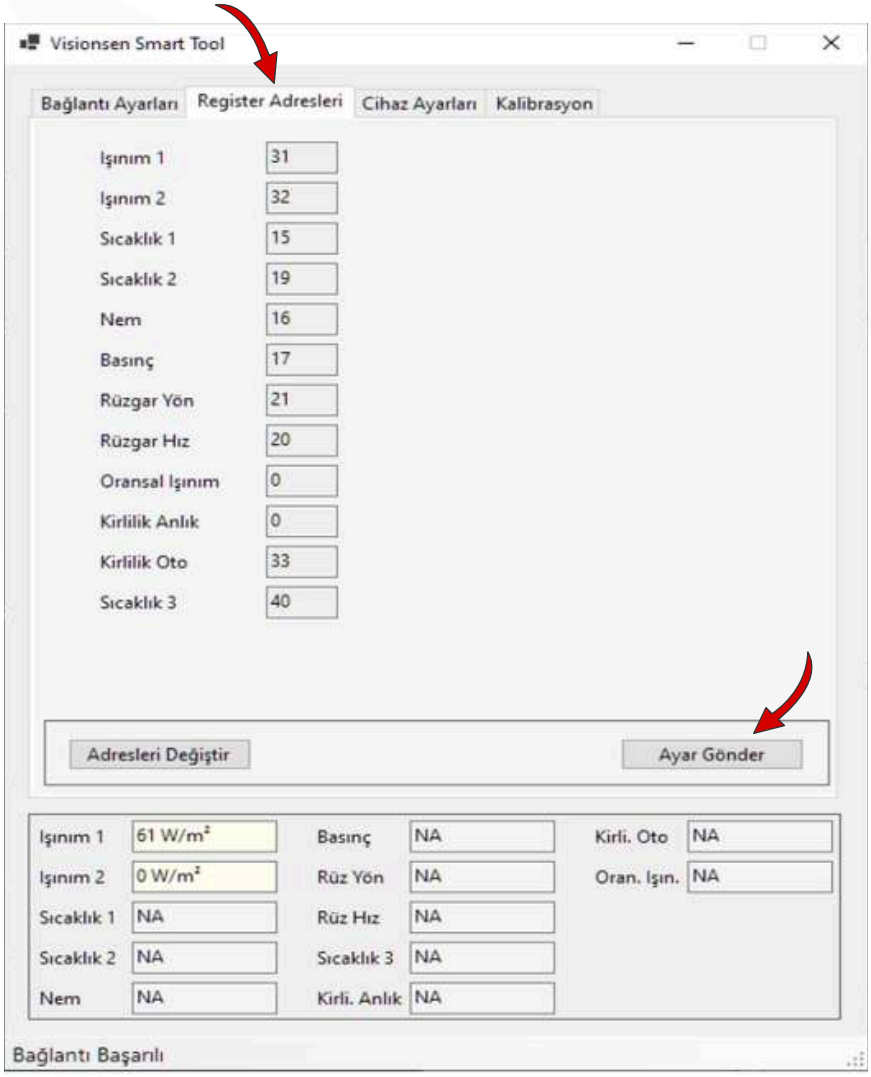
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10 COMMUNICATION

10.2 Register Addresses

If it is desired to change the register addresses defined in the Modbus® map:

- From the tab menu, “Register Addresses” is selected.
- The new address for the desired sensor is entered into the box.
- After pressing the “Send Settings” button, a new register address assignment can be made.



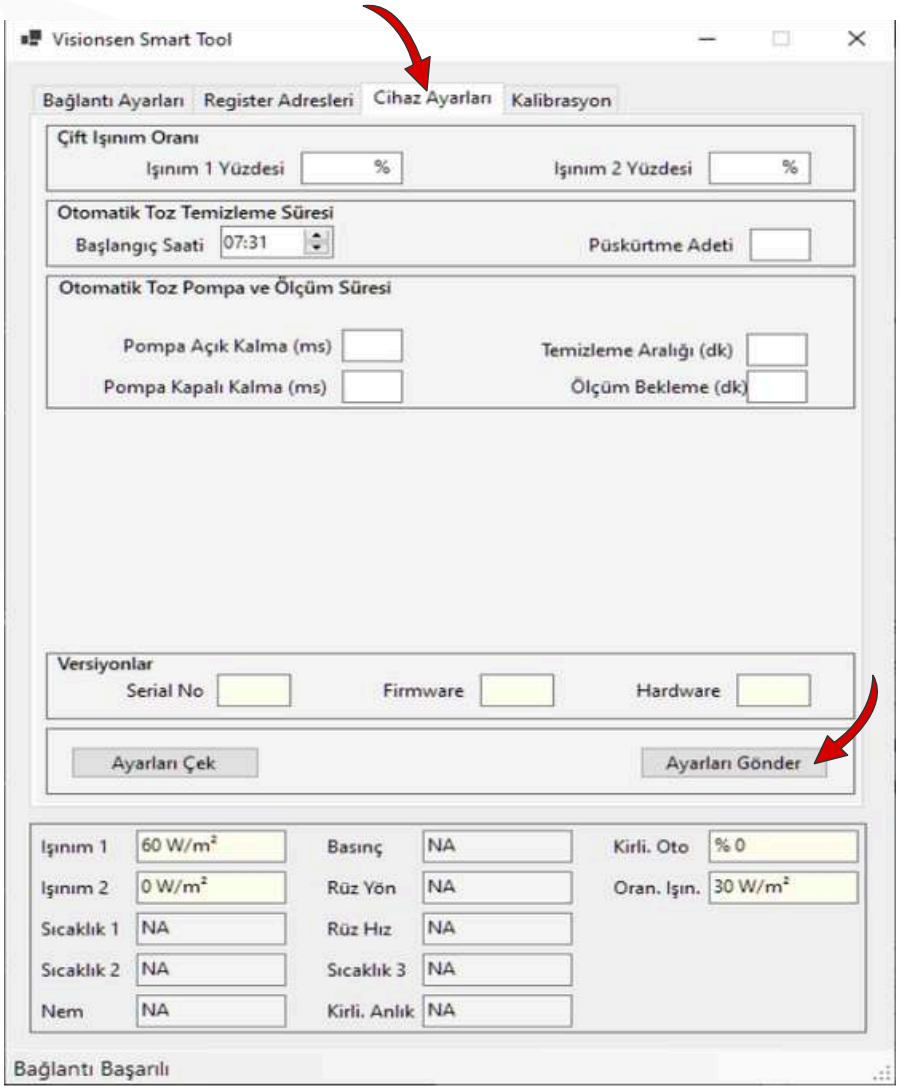
Attention : ***Atanan register başka bir sensöre tanımlı olması durumunda hata oluşacaktır. Değişiklik yapılmadan önce atanan registerin boş olduğundan emin olunuz.***

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10 COMMUNICATION

10.3 Device Settings

For PERC Irradiance Sensors with dual-direction irradiance measurement models, after entering the proportional values for each orientation, you must press the “Send Settings” button to obtain the effective (proportional) irradiance value. After establishing the device connection, you can also view the device serial number, firmware and hardware information, as well as real-time values.



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10 COMMUNICATION

10.4 Modbus® Table and Configuration Settings

Communication parameters:

Baud Rate : 9600

Parity : None

Data Bits : 1

Stop Bits : 1

Adress : 1

If you are using the software on-site, ensure that it is pre-installed on the laptop.

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

Adress		Type	Gain	Unit	Description
Hex	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	Panel Backside Temperatur
0x14	20	uint16	10	m/s	Wind Speed
0x15	21	uint16	10	0-359°	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

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11 MODELS

11.1 Kompakt Hava Gözlem İstasyonu Modelleri

Model	CWS-101	CWS-102	CWS-103	CWS-104	CWS-105	CWS-106	CWS-107
Angled Irradiance			+	+	+		
Dual-Angle Irradiance						+	+
Wind Speed	+			+			+
Wind Direction		+			+		
Atmospheric Pressure	+	+	+	+	+	+	+
Relative Humidity	+	+	+	+	+	+	+
Ambient Temperature	+	+	+	+	+	+	+
Panel Backside Temperature			+	+	+	+	+
Manual Dust							
Automatic Dust							

Model	CWS-108	CWS-109	CWS-110	CWS-111	CWS-112	CWS-113	CWS-114
Angled Irradiance				+	+	+	+
Dual-Angle Irradiance	+						
Wind Speed		+		+	+		
Wind Direction	+	+				+	+
Atmospheric Pressure	+		+	+	+	+	+
Relative Humidity	+		+	+	+	+	+
Ambient Temperature	+		+	+	+	+	+
Panel Backside Tempera	+			+	+	+	+
Manual Dust					+		+
Automatic Dust				+		+	

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11 MODELS

11.2 Options

CWS-101: Optionally, 2 under-panel temperature sensors (MTS-P) and 1 wind direction sensor (WDS-P) can be connected.

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

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

CWS-104: Optionally, 2 under-panel temperature sensors (MTS-P) and 1 wind direction sensor (WDS-P) can be connected.

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

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

CWS-107: Optionally, 2 under-panel temperature sensors (MTS-P) and 1 wind direction sensor (WDS-P) can be connected.

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