OTT HydroMet

KIPP & ZONEN
an OTT HydroMet brand

CVF4 Ventilation Unit

Operational manual

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Subject to technical change.

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1 Scope of supply

The following items are included with delivery:

- Ventilation unit:
  - Base plate with ventilator, heater and connector
  - Replaceable filter plus cover
  - Top cover
- (Optional) 8-wire cable with connector or 8 pins connector only for customer cable
- Fixing kit with screws, washers and Allen key
- Instruction sheet
- Pack of 5 spare ventilation fan inlet filters

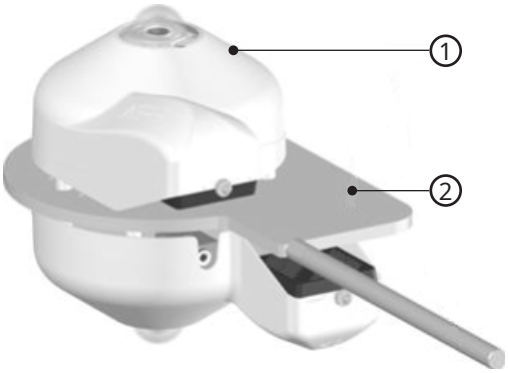
2 Order numbers and variant code

2.1 Product variants

Variant	Order number
CVF4 Ventilation Unit, without plug and without cable	0378910-000

2.2 Accessories and spare parts

Item	Order number
Spare filters pack of 5 fan inlet filters	2682047
CMF4 - Albedometer mount	0362703
CMB1 Mounting bracket	0369701
CVF4 adapter	0346700

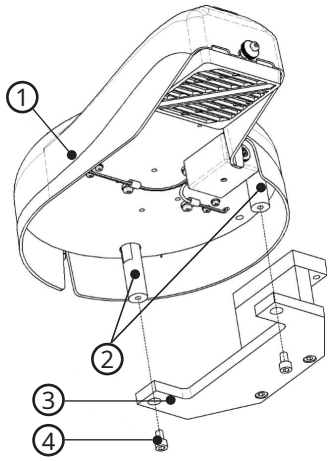


CMF4 albedometer mount

1 CVF4

2 CMF4 albedometer mount

CMB1 mounting bracket



CVF4 adapter

1	CVF4	3	CVF4 adapter
2	Mounting feet	4	Mounting screws

3 About this manual

3.1 Other applicable documents

The following documents contain further information on installation, maintenance and calibration:

- Radiometer instruction sheet
- Operating Manual Data Logger
- Operating Manual SCADA system

3.2 General signs and symbols

The signs and symbols used in the operational manual have the following meaning:

Practical tip

i This symbol indicates important and useful information.

Action

✓ Prerequisite that must be met before performing an action.

▸ Step 1

⇨ Intermediate result of an action

▸ Step 2

⇨ Result of a completed action

List

- List item, 1st level
  - List item, 2nd level

3.3 Explanation of warnings

To avoid personal injury and material damage, you must observe the safety information and warnings in the operating manual. The warnings use the following danger levels:

WARNING

WARNING

This indicates a potentially hazardous situation. If the hazardous situation is not avoided, it may result in death or serious injuries.

CAUTION

CAUTION

This indicates a potentially hazardous situation. If the hazardous situation is not avoided, it may result in moderately serious or minor injuries.

NOTICE

NOTE

This indicates a situation from which damage may arise. If the situation is not avoided, products may be damaged.

4 General safety instructions

4.1 Intended use

The ventilation unit is used to ventilate solar radiation sensors to increase the maintenance interval and accuracy of the measured data, and keep the mounted radiometer window or dome clean from dew, precipitation and pollution. Further, the device reduces the zero offset of the sensor.

The device can be mounted to a mast or wall with the CMF4 mounting fixture and CMB1 mounting bracket. Also, the device can be mounted on the 2AP and SOLYS2 sun trackers and the CM121C shadow ring.

4.2 Potential misuse

Any use of the product that does not comply with the intended use, be this intentional or negligent, is forbidden by the manufacturer.

- Use the product only as described in the operational manual.

4.3 Personnel qualification

The equipment described in this manual must be installed, operated, maintained and repaired by qualified personnel only.

- Obtain training from OTT HydroMet if necessary.

4.4 Operator obligations

The installer is responsible for observing the safety regulations. Unqualified personnel working on the product can cause risks that could lead to serious injury.

- Have all activities carried out by qualified personnel.
- Ensure that everybody who works on or with the product has read and understood the operational manual.
- Ensure that safety information is observed.
- File the operational manual together with the documentation of the entire system and ensure that it is accessible at all times.
- The operational manual is part of the product, forward the operational manual together with the product.

4.5 Personnel obligations

To avoid equipment damage and injury when handling the product, personnel are obliged to the following:

- Read the operational manual carefully before using the product for the first time.
- Pay attention to all safety information and warnings.
- If you do not understand the information and procedure explanations in this manual, stop the action and contact the service provider for assistance.
- Wear the necessary personal protective equipment.

4.6 Correct handling

If the product is not installed, used and maintained correctly, there is a risk of injury. The manufacturer does not accept any liability for personal injury or material damage resulting from incorrect handling.

- Install and operate the product under the technical conditions described in the operational manual.
- Do not change or convert the product in any way.
- Do not perform any repairs yourself.

- Get OTT HydroMet to examine and repair any defects.
- Ensure that the product is correctly disposed of. Do not dispose of it in household waste.

4.7 Certification

CE (EU)
The device complies with the essential requirements of EMC Directive 2014/30/EU.

FCC (US)
FCC Part 15, Class "B" Limits

The device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- The equipment may not cause harmful interference.
- The equipment must accept any interference received, including interference that may cause undesired operation.

IC (CN)
Canadian Radio Interference-Causing Equipment Regulation, ICES-003, Class B

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

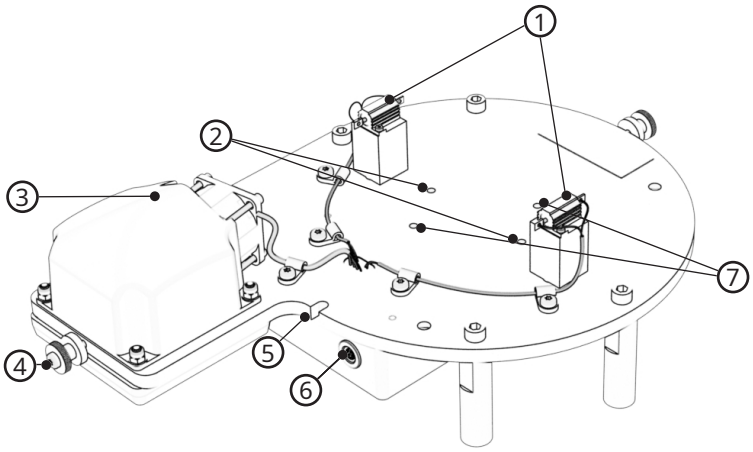
Canada ICES-003 (B) / NMB-003 (B)

5 Product description

5.1 Design and function

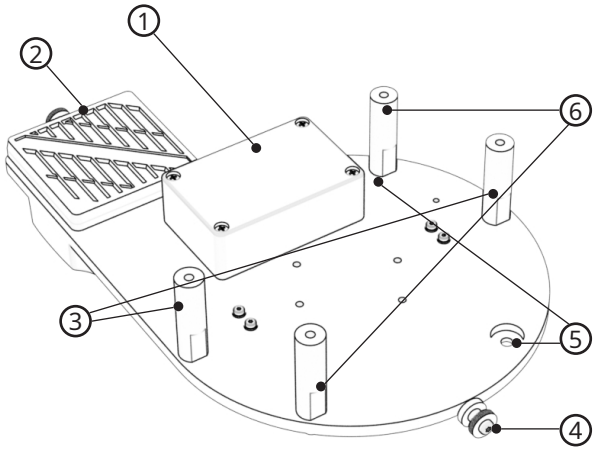
The ventilation unit is used for radiometers and is meant to run continuously. The built-in heater keeps the air just above ambient temperature. Either the heater is switched on permanently for cold regions or by a data logger or clock for a shorter period to remove dew in the morning (from 2 hours before to one hour after sunrise).

5.2 Product overview



CVF4, top view

1	Heating elements	5	Slit for radiometer cable
2	Mounting holes CMP3 and SMP3	6	Connector
3	Air duct and fan	7	Mounting holes for all other instruments
4	Cover nuts		



CVF4, bottom view

1	Connector box	4	Cover nut
2	Filter cover	5	Mounting holes for mounting feet on CM121C shadow ring adapter
3	Mounting feet for SOLYS2 / feet for stabilization	6	Mounting feet for SOLYS GD / feet for stabilization

6 Transport, storage, and unpacking

6.1 Unpacking

- Carefully remove the product from the packaging.
- Check that the delivery is complete and undamaged.
- If you find any damage or if the delivery is incomplete, then immediately contact your supplier or manufacturer.
- Keep the original packaging for any further transportation.

6.2 Storage

- Store within specified temperature ranges.
- Store in dry area.
- Store in original box where possible.

7 Installation

7.1 Mechanical installation

7.1.1 Required tools and aids

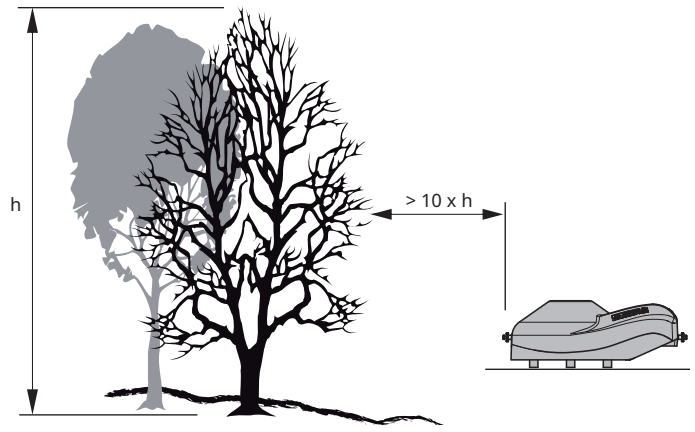
The following tools and aids are required:

- Allen key
- Screw driver

7.1.2 Installation location

When selecting the installation location, ensure there are no obstructions to the field of vision above the device's sensor element. If this is not possible, the location of the device must be chosen to ensure that obstacles do not rise by more than 5 degrees above the azimuth range between sunrise after the shortest night and sunset on the longest day.

The 5 degrees correspond to a minimum distance from the device to the obstacle of 10 times the height of the obstacle:



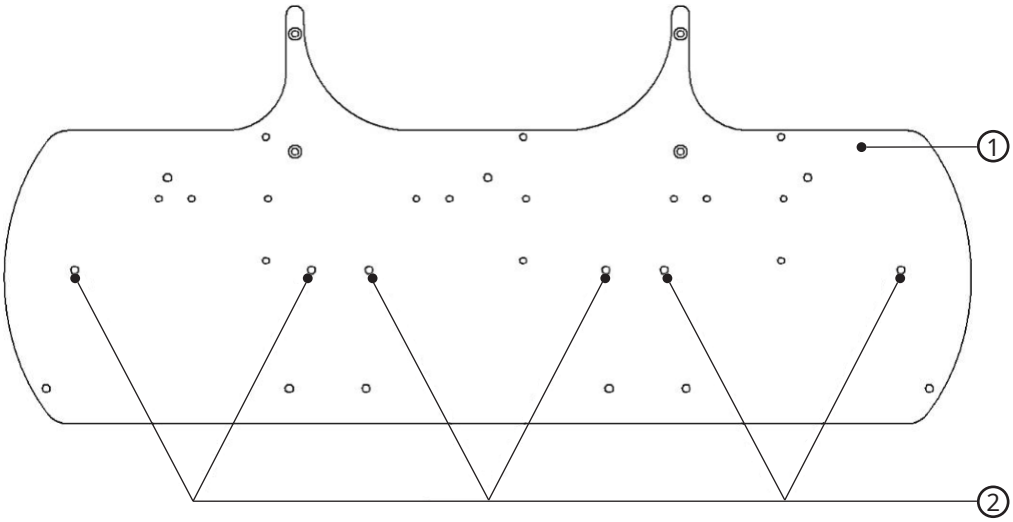
Minimum distance from device to obstacle

7.1.3 Installing device

First the CVF4 is screwed flat on its mounting plate. In case the CVF4 is mounted on a solar tracker, the tracker has to be leveled first.

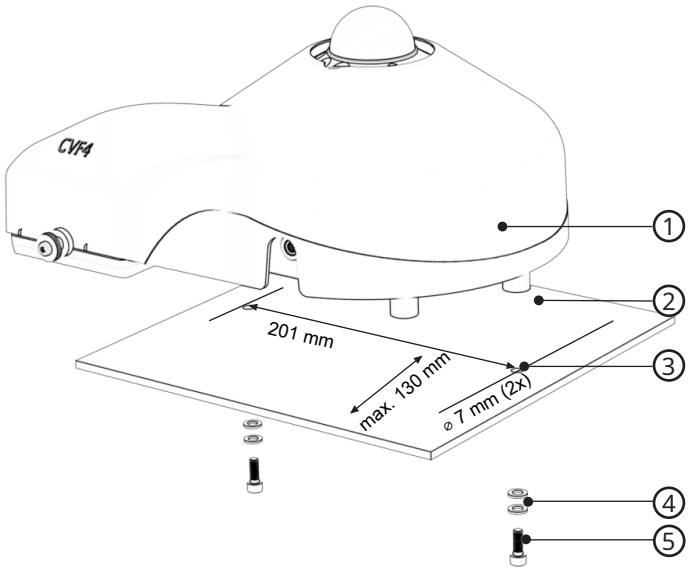
On the sun trackers the CVF4 is positioned with the fan sticking out over the edge of the plate. This ensures the air inlet is never blocked.

The same implies when using a different mounting plate: the CVF4 must be positioned with the fan sticking out.

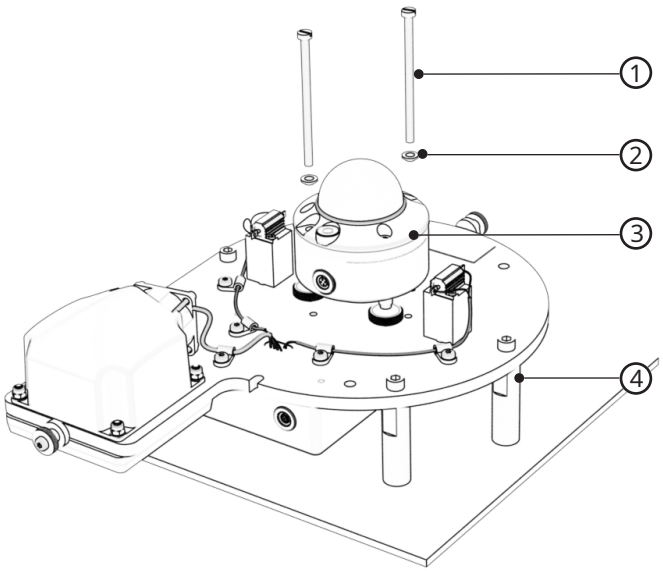


Mounting holes for the CVF4 on the sun tracker

1	SOLYS2 top mounting plate	2	CVF4 mounting holes



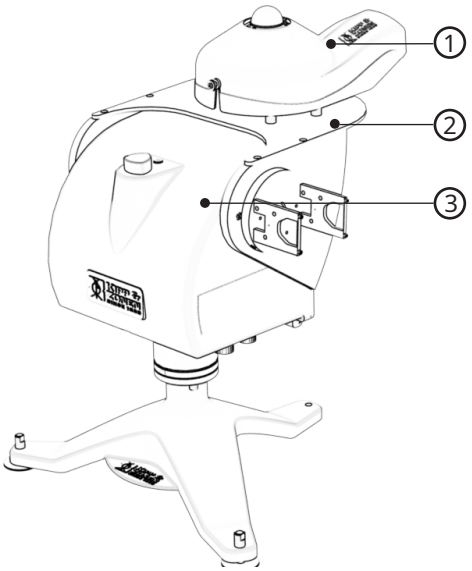
1	Ventilation unit	4	Washers
2	Mounting plate (4 - 8 cm thick)	5	Screw
3	Mounting hole		



1	Radiometer mounting screws	3	Radiometer
2	Radiometer shoulder washers	4	Leveling feet

- Position the device on the mounting plate with the fan sticking out over the edge of the plate to ensure that the air inlet is never blocked.
- Make sure there is space under the bottom of the mounting plate to fasten the screws.
- Screw the device flat on the mounting plate into the corresponding mounting holes with the supplied 4 washers and 2 screws.
- Mount the radiometer in the CVF4 and level with leveling feet.
- Fit the radiometer mounting screws and shoulder washers.
- Secure the radiometer mounting screws.
- Connect the cables of the CVF4 and the radiometer.
- Put on the CVF4 cover horizontal and make sure there is equal space around the radiometer dome.
- Fasten the two cover nuts hand tight.

7.1.4 Mounting device on a solar tracker



1 Ventilation unit
2 Top mounting plate
3 Solar tracker

In case the CVF4 is mounted on a solar tracker, finish the alignment of the tracker first before securing the radiometer screws, because the tracker (and the radiometer) leveling might need re-adjustment.

- Secure the mounting screws.
- Connect the cables of the CVF4 and the radiometer: The radiometer cable goes (down) through the slit in the CVF4 base plate.
- Put on the CVF4 cover and make sure the cover is horizontal. (Check for equal space around the radiometer dome.)
- Fasten the two cover nuts hand tight.

7.2 Electrical installation

7.2.1 Electrical connections

⚠ WARNING

Electric shock due to incorrectly connected device!

If the device is not connected correctly, it may be permanently damaged and an electric shock may result.

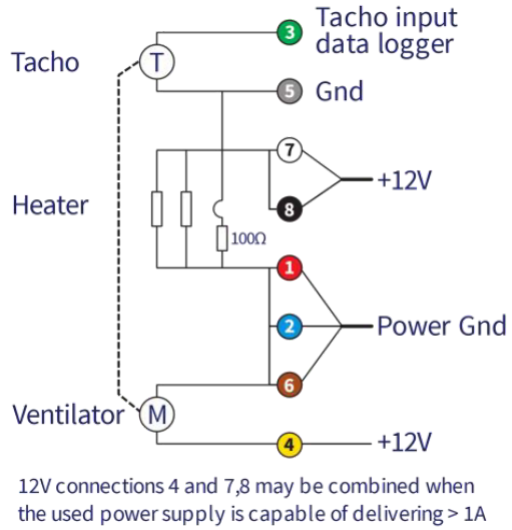
- Ensure that the device is connected correctly.
- Ensure that the cable shielding is connected to earth in the control cabinet.

Pin assignment for supply voltage

Number	Color	Assignment
1	Red	Power ground (Heater -)
2	Blue	Power ground (Heater -)
3	Green	Tacho input logger (Tacho +)

Number	Color	Assignment
4	Yellow	+12 V 0.52 A (Ventilator +)
5	Grey	Ground logger (Tacho -)
6	Brown	Power ground (Ventilator -)
7	White	+12 V 0.46 A (Heater +)
8	Black	+12 V 0.46 A (Heater +)

Supply voltage



Electrical connections of the CVF4

There is a connector on the side of the device. This serves to connect the supply voltage via the connection cable.

The ground is common for the ventilator and the heater (red, blue and brown wires). The CVF4 has an optional 8-wire cable to connect the supply voltage to the ventilator and the heater.

The tacho can be connected to a tacho input data logger.

- For detailed information about connecting and data logging, see the Operating Manual of the data logger.

> When the tacho output is logged with the radiometer data, the performance of the ventilator can be remotely checked.

The ventilator and tacho ground are connected via a 100 Ohm resistor.

7.2.2 Supply voltage

The supply voltage is 12 V DC ± 1 V DC.

8 Maintenance

8.1 Maintenance schedule

The frequency of cleaning is dependent upon the local weather and environmental conditions. Ideally, the cover of the device should be cleaned monthly.

The following maintenance intervals are recommended:

Interval	Activity	Performed by
Monthly	▸ Check the desiccant for the sensor in the drying cartridge. ▸ Replace the desiccant for the sensor when the colour changes from orange to clear (transparent).	Operator
6 months	▸ Clean the filter. If necessary, replace the filter.	Operator
Annually	▸ Check all electrical connections: Unscrew the plugs, clean the plugs if necessary and reconnect. ▸ Check all cables for damage. ▸ Check fastenings and basic supports. ▸ Clean the sun shield if dirty.	Operator
2 years	▸ Check sensitivity or have a recalibration performed.	OTT HydroMet
10 years	▸ Replace the desiccant in the sensor (SUV, C/SMP, S/CGR4).	OTT HydroMet

8.2 Replacing desiccant

The CMP10 pyranometer has an internal desiccant that needs replacement after 10 years. This is done with every factory re-calibration. The desiccant of the other CMP models can be replaced with the following steps:

- Unscrew the 2 mounting nuts from the top cover.
- Remove the top cover.
- For replacing of the desiccant: refer to the operating instructions of the corresponding radiometer.
- Place the top cover.
- Check that the cover is horizontal and make sure there is equal space around the radiometer dome.
- Fasten the mounting nuts hand tight.

9 Troubleshooting

9.1 Error elimination

Error	Possible cause	Corrective action
Device does not respond	Device does not work properly	▸ Check the power supply.
Ventilator does not work	Snow below the air intake or the filter is frozen	▸ Clean the filter and remove any obstruction.
Ventilator does not work	Electrical failure	▸ Check the fan impedance is ~ 30 Ohm
Heater does not work	Resistor is defective	▸ Measure the power resistors: Specifications should be 15 W and 50 / 39 Ohm

10 Repair

10.1 Customer support

- Have repairs carried out by OTT HydroMet service personnel.
- Only carry out repairs yourself, if you have first consulted OTT HydroMet.
- Contact your local representative: www.otthydromet.com/en/contact-us
- Include the following information:

– instrument model
– instrument serial number
– details of the fault or problem
– examples of data files
– readout device or data acquistion system
– interfaces and power supplies
– history of any previous repairs or modifications
– pictures of the installation
– overview of the local environment conditions

11 Notes on disposing of old devices

Member States of the European Union

In accordance with the German Electrical and Electronic Equipment Act (ElektroG; national implementation of EU Directive 2012/19/EU), OTT HydroMet takes back old devices in the Member States of the European Union and disposes of them in the proper manner. The devices that this concerns are labeled with the following symbol:

- For further information on the take-back procedure contact OTT HydroMet:

OTT HydroMet B.V.
Service & Technical Support
Delftechpark 36
2628 XH Delft
The Netherlands
phone: +31 15 2755 210
email: solar-info@otthydromet.com

All other countries

- Dispose of the product in the proper manner following decommissioning.
- Observe the country-specific regulations on disposing of electronic equipment.
- Do NOT dispose of the product in household waste.

12 Technical data

12.1 General technical data

Specification	Value
Heater voltage	12 V DC ± 1 V DC
Heater current	460 mA for the 7 W version
Heater power	5.5 W
Ventilator voltage	12 V DC ± 1 V DC
Ventilator current	520 mA ± 20 %
Ventilator power	6.3 W
Tacho output square wave signal	5 V
Nominal tacho output	475 Hz ± 25 %
Protection type	IP68
Max. cable length with 8-wire cable	25 m or 50 m
Operating temperature range	-40 to +70 °C
Increase of air temperature	0.25 K without heating 1 K at 6.8 W with heating
Zero o set A reduction	50 % reduction for CMPs
Cable resistance	0.16 Ω/m (2 x 0.08 Ω/m)
Voltage drop at maximum heating	0.08 V/m

12.2 Dimensions and weight

Specification	Value
Dimensions	210 x 178 x 126 mm
Weight	2000 g
Weight unpacked (without cable)	1600 g

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Contact Information