

Instruction Manual

CVF4 Ventilation Unit

Valid for part number 0378910-xxx serial number CVF4193800 and above

V2007-01

1. Important user information

Dear customer, thank you for purchasing a Kipp & Zonen instrument. It is essential that you read this manual completely for a full understanding of the proper and safe installation, use, maintenance and operation of your new CVF4 Ventilation Unit.

We understand that no instruction manual is perfect, so should you have any comments regarding this manual we will be pleased to receive them at:

Kipp & Zonen B.V.
Delftechpark 36, 2628 XH Delft, - or
P.O. Box 507, 2600 AM Delft,
The Netherlands
+31 15 2755 210
support@kippzonen.com
www.kippzonen.com

Warranty and liability

Kipp & Zonen guarantees that the product delivered has been thoroughly tested to ensure that it meets its published specifications. The warranty included in the conditions of delivery is valid only if the product has been installed and used according to the instructions supplied by Kipp & Zonen.

Kipp & Zonen shall in no event be liable for incidental or consequential damages, including without limitation, lost profits, loss of income, loss of business opportunities, loss of use and other related exposures, however incurred, rising from the faulty and incorrect use of the product.

Modifications made by the user may affect the instrument performance, void the warranty, or effect the validity of the CE declaration or other approvals and compliances to applicable International Standards.

Copyright © 2019 Kipp & Zonen B.V.

All rights are reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, without authorisation by Kipp & Zonen.

Kipp & Zonen reserves the right to make changes to this manual, brochures, specifications and other product documentation without prior notice.

Manual document number: V2007-01

Publication date: July 2020

Table of contents

1.	Important user information	2
2.	Introduction	4
2.1.	Safety precautions	4
2.2.	Waste disposal.....	5
2.3.	Customer support	5
3.	CVF4 main components	6
3.1.	CVF4 top side	6
3.2.	CVF4 bottom side	6
4.	Installation	7
4.1.	Individual components	7
4.2.	Tools required	7
4.3.	Preparation.....	7
4.4.	Installation procedure.....	8
4.5.	Electrical connections.....	10
5.	Accessories	11
5.1.	Spare filters	11
5.2.	CMF4 Mounting Fixture	11
5.3.	CMB1 Mounting Bracket.....	11
5.4.	Adapter for use of the CVF4 in the CM121C shadow ring	12
6.	Maintenance.....	14
7.	Technical specifications	15
7.1.	Optical and electrical	15
7.2.	Dimensions and weight.....	15
8.	Trouble shooting.....	16
9.	Customer support	16



Using this table

Click on any item in the table of contents to be taken directly to the relevant page.

Click on the bottom of any page to be taken back to the table of contents.

2. Introduction

This manual will show you how to install, use and maintain the CVF4 Ventilation Unit. The CVF4 is meant for ventilating solar radiation sensors with the purpose to keep the mounted radiometer window or dome clean from dew, precipitation and pollution. It can be used outdoors under all-weather conditions. The CVF4 has a built in heater to keep the air just above ambient temperature.

Reading this entire manual is recommended for a full understanding of this product..



The triangle with exclamation mark is intended to alert the user to the presence of important installation, operating and maintenance instructions in the literature accompanying the instrument.



This electrical equipment should only be serviced by authorized personnel, meaning people who have been trained and designated as “authorized” by their employers.



Useful information for the user

Both the World Meteorological Organisation (WMO) and the Baseline Surface Radiation Network (BSRN) guidelines advise using a ventilator to optimise the performance of radiometers in general.

The use of the CVF4 will:

- Increase the maintenance interval.
- Increase the accuracy of the measured data (cleaner dome / window)
- Reduce the zero offset of the radiometer.

The CVF4 is meant for all CM, CMP, SMP, CG, CGR and CUV radiometers. However with the CMP3 and SMP3 and CGR3 the ventilation effect will be less due to the larger opening around the dome. The CVF4 is meant to run continuously. The heater can either be switched on permanently for cold regions or be switched by a data logger or clock to remove dew in the morning and be switched off afterwards. In that case the heater is operated from a 2 hours before sunrise to an hour after sunrise. This saves power in situations where power is limited such as PV operated sites.

This manual, together with the instruction sheet, gives information related to installation, maintenance, product specifications and troubleshooting of the CVF4.

If any questions should remain, please feel free to contact your Kipp & Zonen dealer or e-mail:

info@kippzonen.com .

For information about other Kipp & Zonen products or to check for any update of this manual, go to

www.kippzonen.com .

2.1. Safety precautions

Many hazards are associated with installing and maintaining instruments on towers or elevated structures. It is advised to use qualified personnel for installation and maintenance. The client is responsible for following the local safety regulations.

The use of appropriate equipment and safety practices is mandatory. Check your company's safety procedure and protective equipment prior to performing any work.) If the CVF4 is mounted at a high position, special care must be taken to secure both the person installing it and the instrument from falling during installation.

2.2. Waste disposal



The pictogram showing a waste bin with a cross means that the product is subject to European Union regulations covering segregated waste disposal. This applies both to the product itself and to any accessories marked with the same symbol. Disposal of any such item as unsorted domestic waste is not allowed.

2.3. Customer support

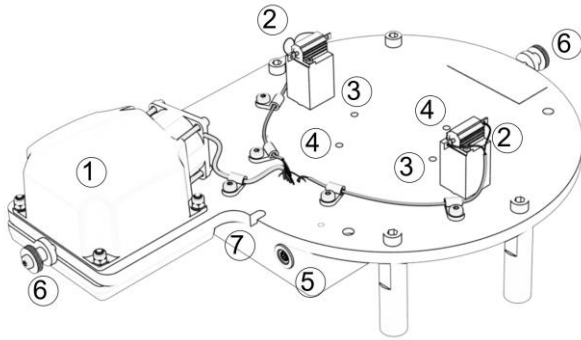
In case you need support, please contact:

Kipp & Zonen B.V.
Delftechpark 36, 2628 XH Delft, or
P.O. Box 507, 2600 AM Delft,
The Netherlands
Tel. +31 15 2755 210
support@kipzonen.com
www.kipzonen.com

3. CVF4 main components

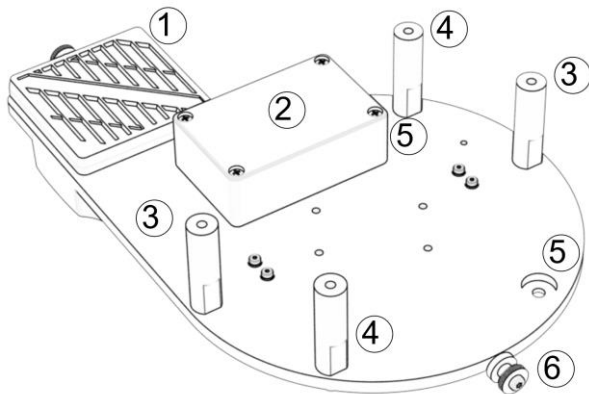
In this section the main CVF4 components are described.

3.1. CVF4 top side



1. Air duct and fan
2. Heating elements
3. Mounting holes CMP3, SMP3 and CGR3
4. Mounting holes all other instruments
5. Connector
6. Cover nuts
7. Slit for radiometer cable

3.2. CVF4 bottom side



1. Filter cover
2. Connector box
3. Mounting feet for SOLYS2 / Feet for stabilisation
4. Feet for stabilisation / Mounting feet for 2AP
5. Mounting holes for mounting feet on CM121C shadow ring adapter
6. Cover nut

4. Installation

The following section describes the CVF4 unit and the installation.

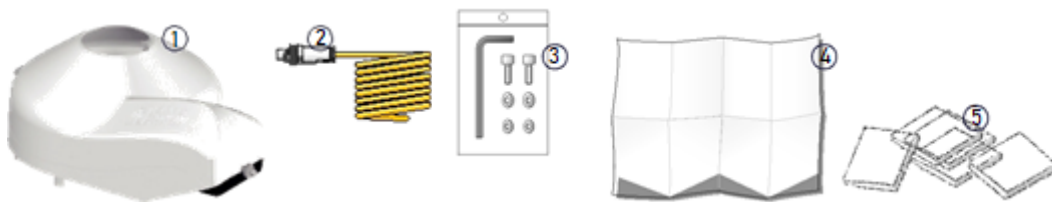
4.1. Individual components

The CVF4 consists of:

1. Base plate with ventilator, heater and connector
2. Replaceable filter plus cover
3. Top cover

Included with the product are:

1. Ventilation Unit
2. (Optional) 8-wire cable with connector or 8 pins connector only for customer cable
3. Fixing kit with screws, washers and Allen key
4. Instruction sheet
5. Pack of 5 spare ventilation fan inlet filters



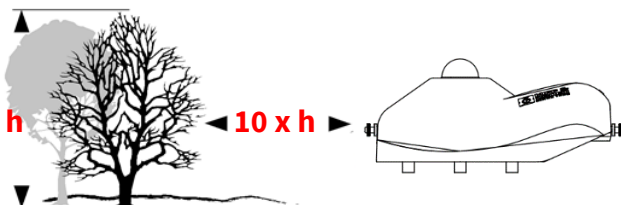
For optional accessories see chapter 3.

4.2. Tools required

If the CVF4 is mounted with the supplied screws only the supplied Allen key is required. Make sure there is space to fasten the screw under the bottom of the plate. To fasten the radiometers other Allen keys or screwdrivers may be necessary.

4.3. Preparation

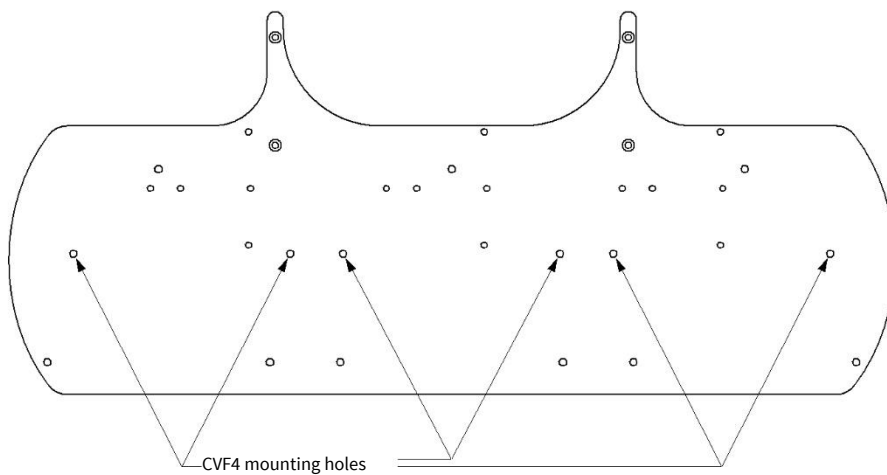
Like for any radiometer with 360° field of view, make sure there are **no obstructions** that are higher than **ten times** their distance when selecting a location for the CVF4.



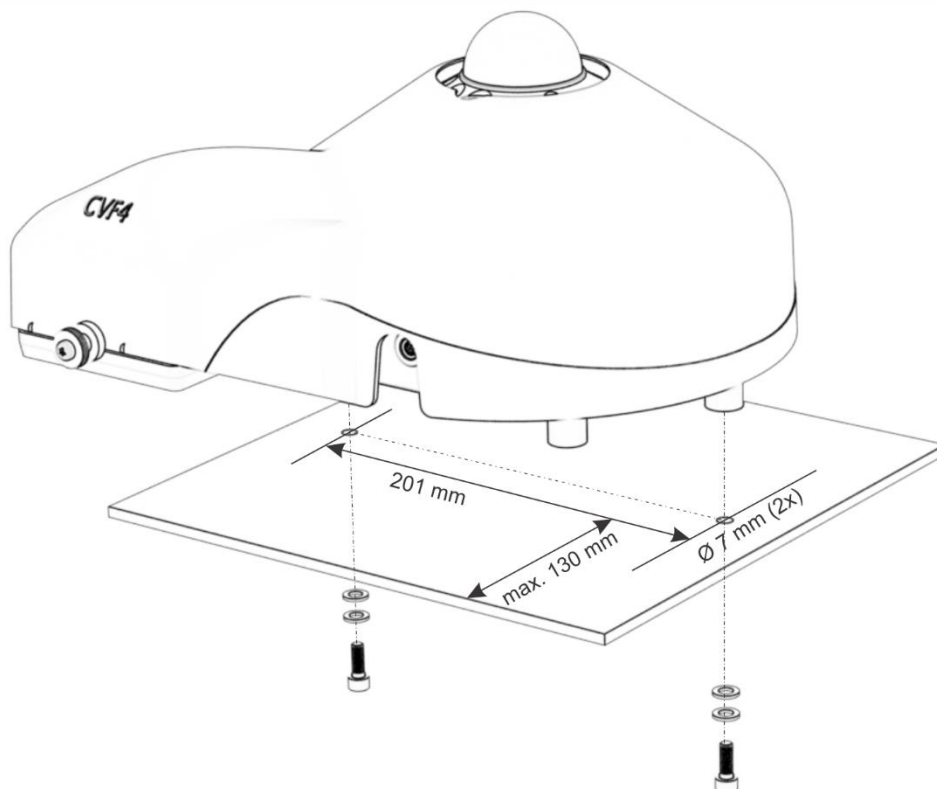
4.4. Installation procedure

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 levelled first.

On our sun trackers the CVF4 is positioned such that the fan sticks out over the edge of the plate. This ensures the air inlet is never blocked (see picture of the CVF4 on the SOLYS2 Sun Tracker on the next page). The locations of the CVF4 mounting holes on the SOLYS2 top mounting plate are shown below.

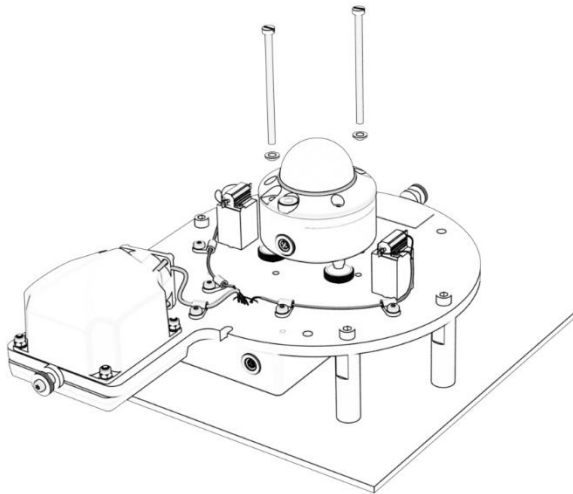


When using your own mounting plate, make sure the CVF4 is mounted in the same way with the fan sticking out. The CVF4 mounting holes size and distances are indicated in the drawing below.



The CVF4 is mounted with the supplied 4 washers and 2 screws through mounting plates from 4 to 8 mm thick. The other 2 feet are for stability but do not need screws.

Then the radiometer is mounted in the CVF4 and levelled with its own levelling feet. Afterwards the radiometer mounting screws and shoulder washers are fitted (not secured yet).

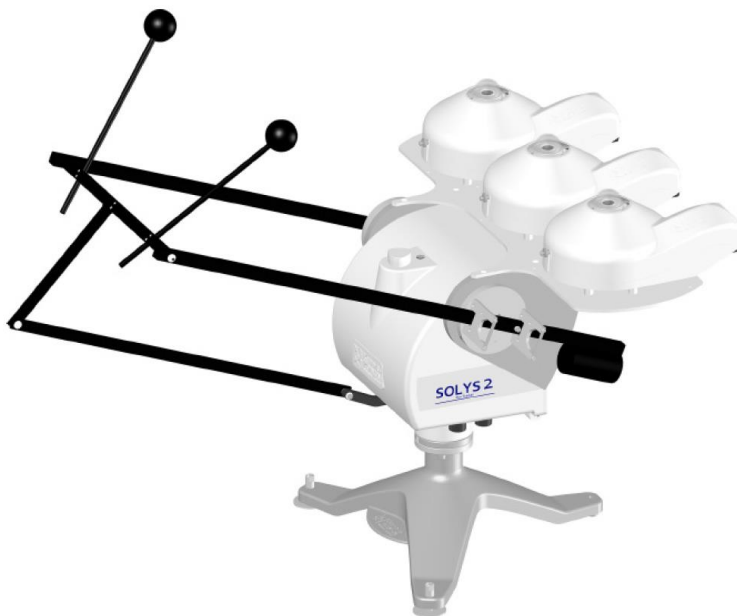


In case the CVF4 is mounted on a solar tracker, finish the alignment of the tracker first before securing the radiometer screws because tracker (and radiometer) levelling might need re-adjustment.

After all mounting screws have been secured the cables of the CVF4 and the radiometer can be connected. The radiometer cable goes (down) through the slit in the CVF4 base plate.

Finally the CVF4 cover can be put on and the two cover nuts can be fastened.

Make sure the cover is horizontal (check equal space around the radiometer dome) and the two cover nuts are fastened hand tight.



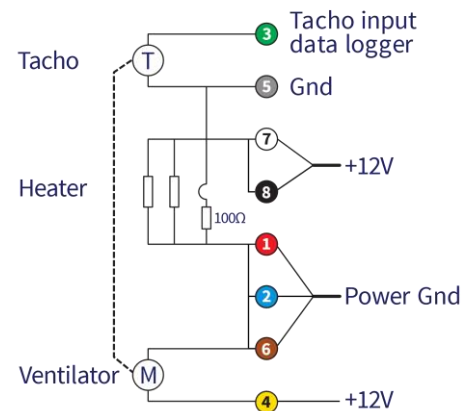
SOLYS2 with top mounting plate and 3 x CVF4



SOLYS2 with small top mounting plate with CVF4

4.5. Electrical connections

Compact Ventilation Unit Power Connection			
Nr	Wire	Function	Connect with
1	Red	Heater -	Power ground
2	Blue	Heater -	Power ground
7	White	Heater +	+12V 0.46A
8	Black	Heater +	
3	Green	Tacho +	Tacho input logger
5	Grey	Tacho -	Ground logger
4	Yellow	Ventilator +	+12V 0.52A
6	Brown	Ventilator -	Power ground
	Shield		Earth



12V connections 4 and 7,8 may be combined when the used power supply is capable of delivering > 1A

The ground is common for the ventilator and the heater (red, blue and brown). The CVF4 has an optional 8-wire Kipp & Zonen cable for connecting the 12 VDC to the ventilator and heater.

The tacho output provides a 5 Volt square wave signal. It can be connected to a data logger to (remotely) check proper operation of the CVF4. Ventilator and heater ground are separated but may be connected. Ventilator and tacho ground are connected via a 100 Ω resistor.

The nominal tacho output is 475 Hz ± 25%.

Changes often indicate pollution of the filter (significantly higher frequency), or mechanical problems with ventilator (zero or significantly lower frequency).

If sufficient power is available it is advised to use the heater in combination with the ventilator even in warm climates. The heater will prevent deposition of dew in the morning.

Plug in the instrument data cable, connected to the data logger or SCADA system as described in its own manual, in the instrument.

Plug the CVF4 power cable in the CVF4 socket.

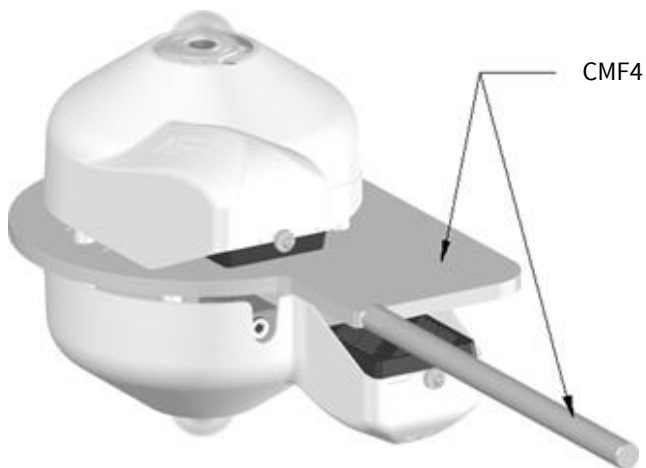
5. Accessories

5.1. Spare filters

Spare CVF4 filters are available under part number 2682047 from Kipp & Zonen or under EBM-Papst part number: FP80T from a local distributor of Pabst fans.

5.2. CMF4 Mounting Fixture

Article number 0362703

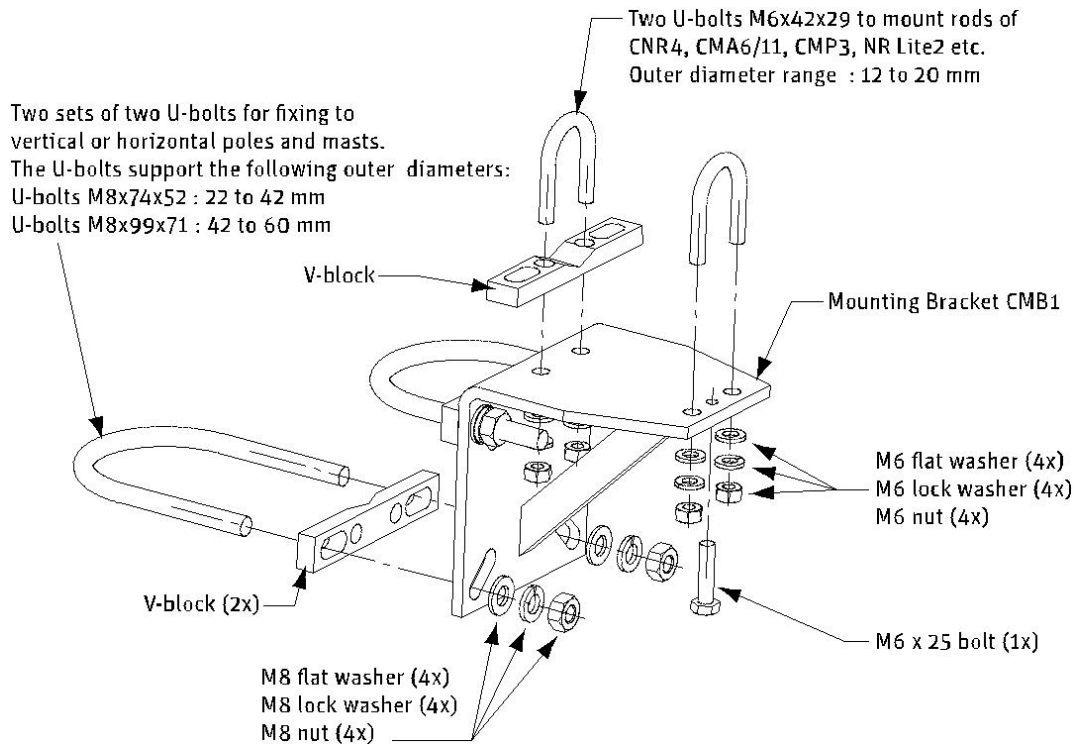


5.3. CMB1 Mounting Bracket

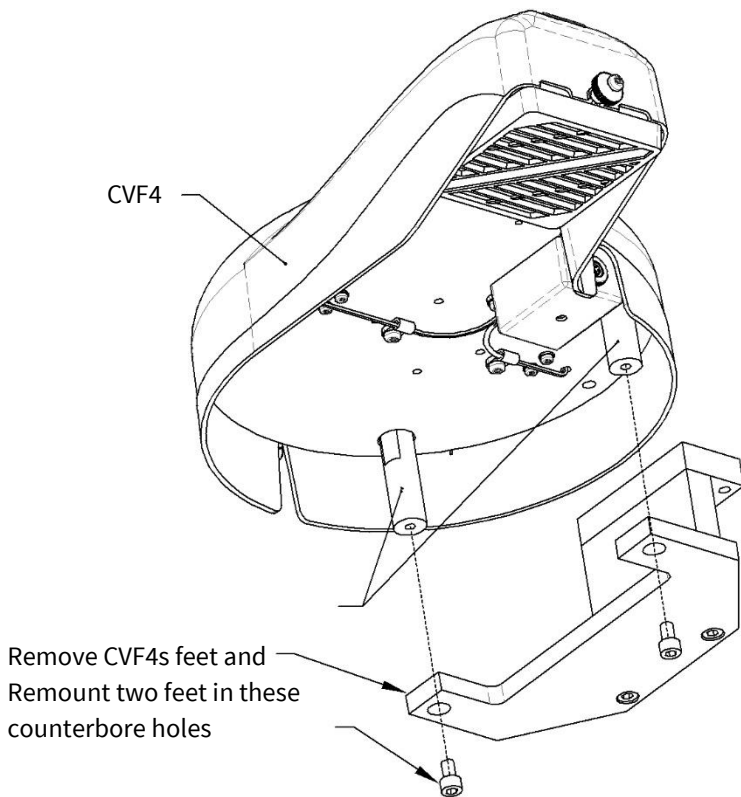
Article number 0369701



To mount the CMF4 to a mast or wall the CMB1 mounting bracket can be used.



5.4. Adapter for use of the CVF4 in the CM121C shadow ring



Relocation of 2 of the CVF4s mounting feet to fit it on the CM121C shadow ring



Fully installed CVM4s

The blue adapter part is included with the CM121C.

Note: CM121B (Article number 0346900) is not supplied with, nor aligned for the CVM4 adapter (Article number 0346700)
CM121C (Article number 0346901) is aligned for and supplied with the CVM4 adapter

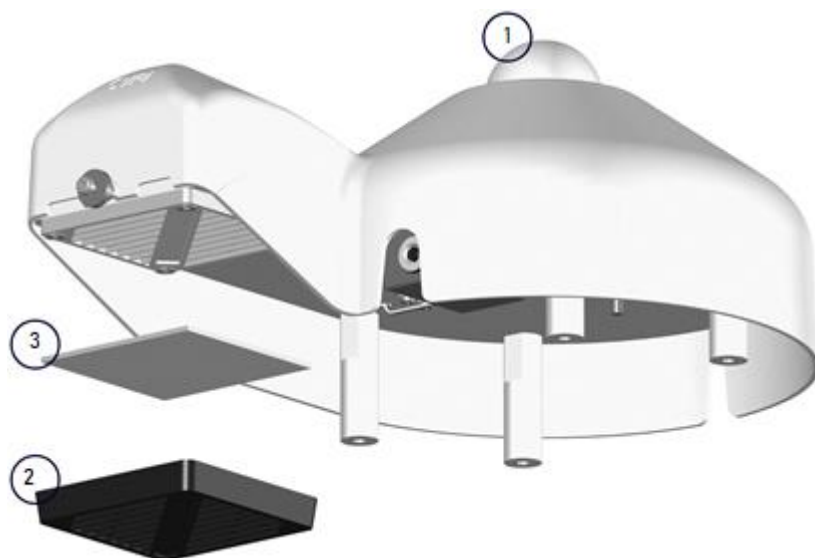
6. Maintenance

Regular inspection of the CVF4 is advised. Depending on the location (air pollution) this can be monthly or yearly. When on site for inspection of other instruments it is advised to check the CVF4 filter.

At the same time radiometer levelling and desiccant can be checked. For access to the desiccant the 2 mounting nuts have to be loosened and the top cover taken off.

When replacing the cover, make sure it is placed correctly. This can best be done by checking the opening around the radiometer, this should be evenly spaced.

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



1. Refer to radiometer instruction sheet for maintenance instructions.
2. Regularly inspect the fan inlet by unclipping the filter cover.
For optimal air flow, make sure the diagonal line on the filter cover is in line with the ventilator part (see above drawing).
The filter cover clicks back on the ventilator.
3. Clean or replace filter every 6 months or more often when required. (The interval strongly depends on the location and pollution of the air.) Discolouration or pollution of the plastic cover will not affect the proper operation of the radiometer. (the radiometer cannot 'see' the CVF4 cover).
Cleaning of the cover can be done with water and a brush or cloth.

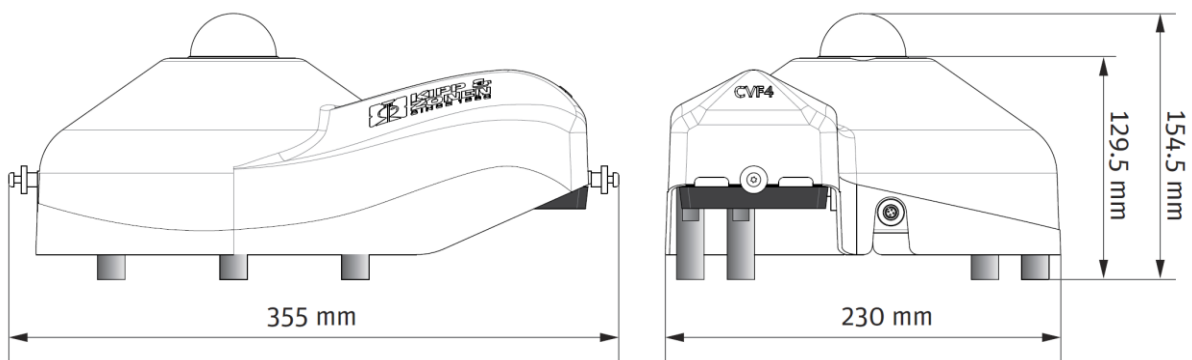
7. Technical specifications

7.1. Electrical

Specifications	
Heater voltage	12 ± 1 VDC
Heater current	460mA for the 7W version
Heater power	5.5W
Ventilator voltage	12 ± 1 VDC
Ventilator current	520mA ±20%
Ventilator power	6.3W
Tacho signal	5V and 475 Hz ±25%
Dimensions	210x178x126 mm
Weight packed	2 kg
Weight unpacked	1.6 kg
Ingression protection	IP68
Max cable length using Kipp & Zonen 8 wire cable	25 m
Temperature range	-40°C to +70°C
Increase of air temperature	0.25 K without heating 1 K at 6.8 W heating
Compliance with standards	ISO/TR 9901, BSRN operations manual
Zero offset A reduction	50% reduction for CMP's
Cable resistance	0.16 Ω/m (2 x 0.08 Ω/m)
Voltage drop at maximum heating	0.08 V/m
Intended instruments	CMP6, CMP10, CMP11, CMP21, CMP22 SMP6, SMP10, SMP11, SMP21, SMP22 CMP3, SMP3 and CGR3 with reduced specifications ISO/TR 9901, BSRN operations manual

Note: The performance specifications quoted are worst-case and/or maximum values

7.2. Dimensions and weight



Weight without cable: 1.6 kg

8. Trouble shooting

Malfunction	Cause	Check
Ventilator and heater do not work	Power failure	Check 12 VDC and/or mains voltage
Ventilator does not work	Mechanical obstruction Snow below air intake Frozen filter	Clean filter and/or remove obstruction
Ventilator does not work	Electrical failure	Check fan impedance ~30 Ω
Heater does not work	Resistor defective	Measure power resistors: Specifications: 15 Watt and 50 / 39 Ω

9. Customer support

If you require any support for your Kipp & Zonen product please contact your local representative in the first instance. The information can be found in the 'Contact' section of our website at www.kippzonen.com.

1. Alternatively, you can contact us directly at www.kippzonen.com/support
2. Please include the following information:
3. Instrument model
4. Instrument serial number
5. Details of the fault or problem
6. Examples of data files
7. Readout device or data acquisition system
8. Interfaces and power supplies
9. History of any previous repairs or modifications
10. Pictures of the installation
11. Overview of the local environment conditions

Kipp & Zonen guarantees that your information will not be shared with other organisations.



Kipp & Zonen B.V.

Delftechpark 36
2628 XH Delft
The Netherlands
+31 15 2755 210
info@kippzonen.com
www.kippzonen.com

Please visit our website for the contact details of our
worldwide network of sales offices, sales representatives and distributors.

Meteorology Division of

