Reference Guide | Maintenance and Troubleshooting
Vaisala Mobile Detector MD30

MD30 Maintenance

Table 1   MD30 Maintenance

Task	Frequency
Check error messages	–
Clean surface state sensor window	As needed
Clean surface temperature sensor	Annually
Replace air temperature and humidity sensor filter	Annually

Cleaning Surface State Sensor Window

- Cloth
- Glass cleaner
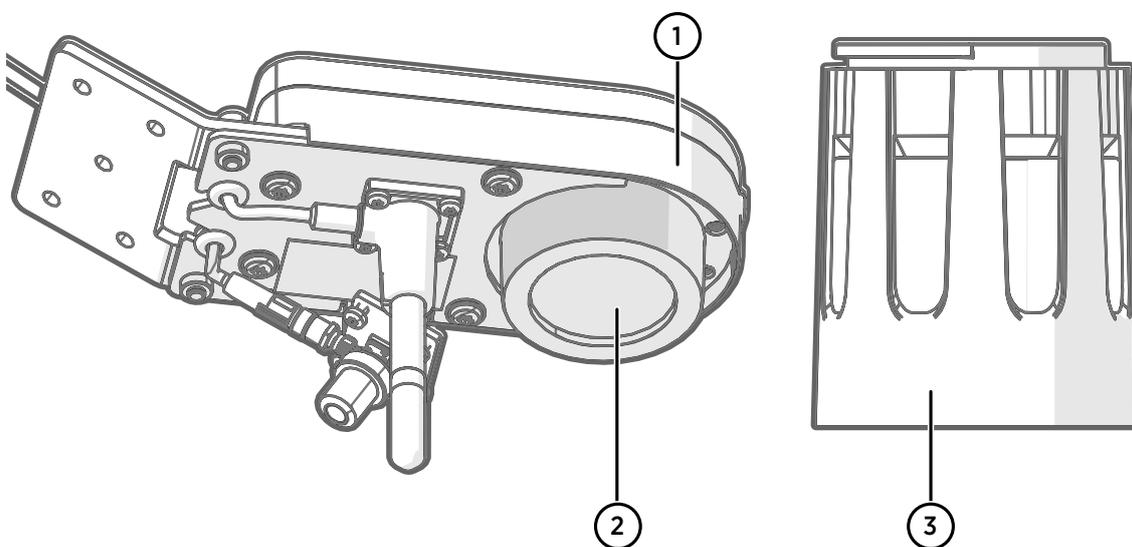
1   Surface state sensor
2   Window
3   Hood

Clean the window daily before use. For cleaning, the mobile sensor can remain mounted on the vehicle.

Check the surface state sensor before use and after car wash, and clean if necessary. Check the surface state sensor more often if the conditions require it. When cleaning, remove possible dirt, ice, and snow.

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▶ 1.   Remove the hood by turning it counterclockwise.
  2.   Apply glass cleaner on the window of the surface state sensor. Clean with a soft, lint-free cloth.
  3.   Clean the hood.
  4.   Attach the hood to the body by turning the hood clockwise.
       Make sure that the markings in the hood and sensor body are aligned.
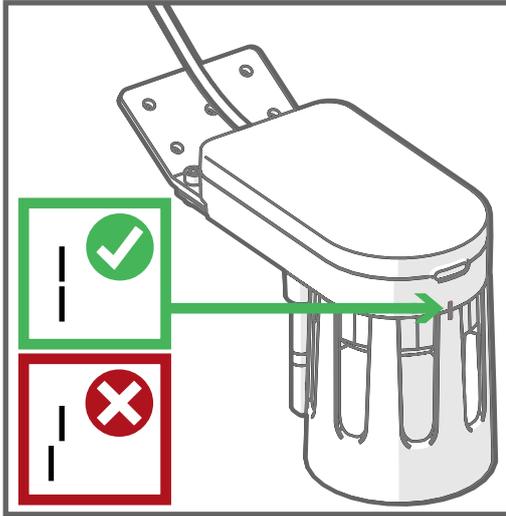
Cleaning Surface Temperature Sensor

- Cotton swab
- Compressed air or air pump
- Glass cleaner
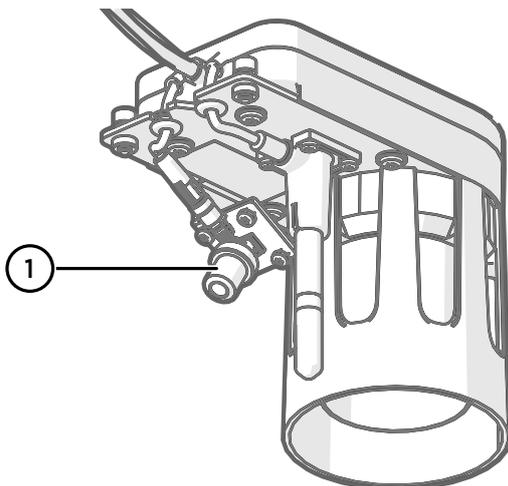
1   Surface temperature sensor

Clean the surface temperature sensor annually, or more often if conditions require it.

▶ 1.   Remove the surface temperature sensor from the body.

2. Apply glass cleaner on the surface temperature sensor. Insert a cotton swab in the thread and turn it clockwise. Remove the cotton swab by turning it counterclockwise in the thread. If required, use compressed air or an air pump.
3. Attach the surface temperature sensor to the body.

Replacing Air Temperature and Humidity Sensor Filter

• Screwdriver Torx 10
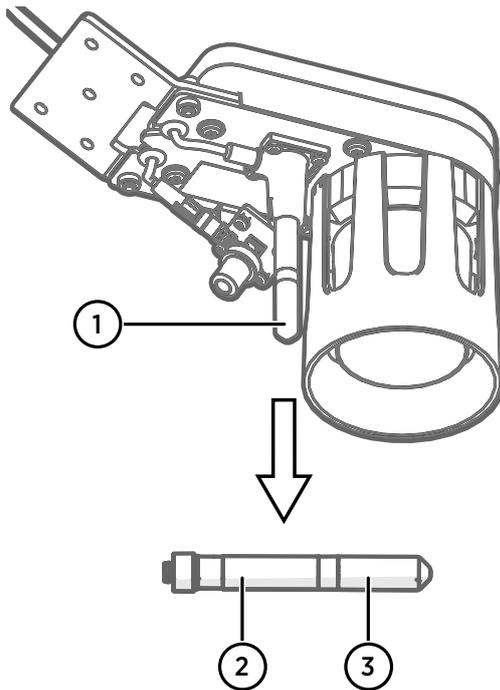
1 Air temperature and humidity sensor
2 Probe body
3 Filter

Replace the filter when it is damaged or dirty.

The replacement filter comes with an O ring, but do not use it.

▶ 1. Carefully remove the filter from the probe. Holding the filter by its collar, rotate the filter counter-clockwise, then pull it out.

⚠ **CAUTION!** Do not touch the sensor heads.

2. Without delay, install the new filter carefully on the air temperature and humidity sensor. Rotate the filter clockwise, making sure the filter sits straight and meets the threads properly.

MD30 Troubleshooting

Table 2   Mobile Sensor Status LED

LED	Status
Orange	Powered up
Green (steady)	Start-up ongoing
Green (blinking)	Operational
Red	System is in error state and cannot be used

Table 3   Troubleshooting

Problem	Probable Cause	Actions
Installation and Setup		
Phone is not showing data.	Device pairing was not successful or the system is not getting power.	Check that the car charge adapter and car phone charger are connected and the mobile sensor and mobile phone are powered. If the Bluetooth module LED is still red, redo the pairing.
Installation was verified and mobile sensor adapted to road surface types, but mobile sensor still gives inaccurate readings.	Road was not completely dry when road type adaptation was performed.	Carry out the road type adaptation again. See *Vaisala Mobile Detector MD30 Setup Guide*.
	Road surface type in the area of operation differs significantly from the road surface type in the location where adaptation was performed.	
	Plate was not clean and dry during plate calibration.	Carry out the plate adjustment. See *Vaisala Mobile Detector MD30 Setup Guide*.
	Plate was not positioned correctly during plate calibration.	
Calibration gets stuck or does not succeed.	There is an active error.	Check **Unit status** and **Error status** information in RoadAI, and act on any open errors.
Dry road not available.	–	Give the values manually or use the factory settings until you can do road type adaptation on dry road.
Operation		
System is in error state (mobile sensor LED is red).	Several possible causes.	Restart the mobile sensor. If the error persists, see the following table for more troubleshooting information.
Phone is not showing data.	System is not getting power.	Check that car charge adapter and car phone charger are connected and mobile sensor and mobile phone are powered.

Problem	Probable Cause	Actions
Phone does not upload data to network.	Phone battery level is <85 %.	Connect phone to charger.
	No network connection.	Change location.
Phone SD card is empty.	Data has been uploaded to the server.	–

Check the error message for information about the error and follow the relevant instructions.

Table 4   Error Messages

Bit [1]	Message	Probable Cause	Actions
0	Surface temperature sensor error	Cables may be loose, damaged, or disconnected.	Check the cables and connectors. If the problem persists, replace the mobile sensor.
1	Air temperature error		
2	Relative humidity error		
3	Reserved for future use	-	-
4	Laser status error	-	Restart the mobile sensor.
5	Laser heating error		
6	Excessive ambient light detected	Sunlight is reflected from road surface to mobile sensor.	Move the vehicle or reposition mobile sensor.
7	Receiver error	–	Restart the mobile sensor.
8	Signal level out of range, gain adjustment limit reached	–	Check the installation height and angle of the mobile sensor.
9	Received signals contain too much noise	–	Check that the mobile sensor is firmly attached to the vehicle.
10	Optical measurement data timeout	–	Restart the mobile sensor.
11	Low input voltage	Incorrect operating voltage.	Check the operating voltage.
12	High input voltage		
13	Flash failure status	-	Restart the mobile sensor.
14	Internal temperature too high	Mobile sensor overheated.	Disconnect the mobile sensor from power supply.
15	Reference status: `0` = OK `1` = Invalid or not set	–	Verify the installation with the reference plate and adapt the mobile sensor to road surface types.
16	Factory calibration status: `0` = OK `1` = Not calibrated	–	Return the mobile sensor to Vaisala.
17-31	Reserved for future use	–	–

1)   *Bit is shown in MD30 interface response data message, not in RoadAI.*

Table 5   Status Information

Bit [1]	Message	Value	Description
0	Not ready to measure	`0` = Ready `1` = Not ready	Bit `0` is set only when unit is started up. The flag is cleared when the unit has reached fully operational status for the first time. Measurement data may be invalid. If the condition persists, check error bits.
1	Reference setting ongoing	`0` = Not ongoing `1` = Ongoing	If reference setting does not start, check status information bits 10 ... 13 and error bits.
2	Laser temperature change in progress	`0` = Not ongoing `1` = Ongoing	Unit operational, but measurement data may be invalid. Wait for the laser temperature change to finish. If the condition persists, check error bits.
3	Reserved for future use	-	-
4	Window heating	`0` = OK `1` = Not working	If heating is not working, monitor window contamination.
5	Low input voltage detected	`0` = Voltage OK `1` = Voltage low	Unit operational, but check the input voltage.
6	High input voltage detected	`0` = Voltage OK `1` = Voltage high	
7	High internal temperature detected	`0` = Temperature OK `1` = Temperature high	First notification of unit getting too hot.
8	Temperature unit	`0` = °C `1` = °F	–
9	Layer thickness unit	`0` = mm `1` = inch	–
10	Reference setting interrupted due to laser temperature change	`0` = False `1` = True	Repeat the reference setting when laser temperature change has finished.
11	Reference setting interrupted due to hardware error, check parameter `0x56`	`0` = False `1` = True	Check error bits and parameter `0x56`, which contains the reason for the error.
12	Reference setting values are not updated due to poor signal quality	`0` = False `1` = True	Excessive variation in road surface type. Find more representative road surface.
13	Reference setting was interrupted by the client	`0` = False `1` = True	–

Bit [1]	Message	Value	Description
14	Signal levels low, uncertainty in surface layer thickness results	0 = False 1 = True	Unit operational, but measurement data may be invalid. Verify installation and clean window.
15 - 31	Reserved for future use	-	–

1) *Bit is shown in MD30 interface response data message, not in RoadAI.*

MD30 Spare Parts and Accessories

Table 6   MD30 Spare Parts and Accessories

Name	Order Code
Hood	MDHOOD
Air temperature and humidity sensor HMP113 for MD30	MD30HMPSP
Filters for air temperature and humidity sensor (5 pcs)	MD30HMPFILTERSET
Surface temperature sensor MT10	MT10SP
Mounting bracket	MDBRACKET
Sensor-to-power cable 8 m (26 ft)	MDCABLE8
Cable for HMP113 or MT10 installation to side of car 3 m (9 ft 10 in)	HMT120Z300
Electric joint compound	12475SP
Dry reference plate	MDPLATE
Splitter for car power outlet	260028
Mobile phone USB charger	256824
Mobile phone USB-C charging cable, 3-m (9-ft 8 in)	258180
Mobile phone holder	256791
Mobile phone (SIM not included)	– [1]
Memory card, 128 GB	256826
Polarization filter for phone camera	258143
Bluetooth media button	256825

1)   *Check model availability from Vaisala Sales.*

WARNING! Failure to comply with these precautions or with specific warnings elsewhere in these instructions violates safety standards of design, manufacture, and intended use of the product. Vaisala assumes no liability for the customer's failure to comply with these requirements.

WARNING! Do not substitute parts or modify the system, or install unsuitable parts in the system. Improper modification can damage the product or lead to malfunction.

WARNING! Follow local and state legislation and regulations on occupational safety.