



# VAS 5581



Operating Instructions  
HV Measurement  
Adapter



  
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## 1.0 Safety Instructions

Safety Instruction Explanations



**DANGER!** Refers to an imminent danger. Not observing these risks can result in death or serious injuries.



**WARNING!** Refers to a potentially dangerous situation. Not observing these risks can result in death or serious injuries.



**CAUTION!** Refers to a potentially damaging situation. Not observing these risks can result in minor injuries and property damage.



**NOTE!** Refers to a risk of poor quality work results and the potential for damaging the equipment.

**IMPORTANT!** Refers to application tips and other particularly useful information. It is not intended as a signal phrase to designate a damaging or dangerous situation.

Particular attention is required when you see a symbol shown in the "Safety Instruction" section.



## General



The unit was manufactured in accordance with the state of the art and the recognized safety-technical regulations. However, risks continue to exist when the unit is operated inappropriately or misused, specifically for:

- death or bodily injury of the operator or others,
- the unit or other property of the operating entity,
- the efficient operation of the unit.

All personnel who are involved with commissioning, operating, maintaining and servicing the unit must

- have the appropriate qualifications,
- have fully read and accurately follow these operating instructions.

The operating manual must be stored at the operating location of the unit at all times. In addition to the operating manual, all generally applicable and local accident prevention and environmental protection regulations must be observed.

All safety and hazard labels on the unit

- must be legible
- must not be damaged
- must not be removed
- must not be concealed, taped over or painted over.

You can find the locations of the safety and hazard labels on the unit in the "General Information" section of the unit operating manual.

Malfunctions that compromise safety must be corrected before the unit is turned on. This involves your personal safety!

## Intended uses



The unit must only be used for the intended purposes. Any other uses are in violation of the intended uses. The manufacturer is not liable for any losses and deficient or defective work output resulting from such uses.

The intended uses also include

- having fully read and complying with the operating manual and all safety and hazard instructions
- observing inspection and maintenance schedules
- observing all instructions by the battery and vehicle manufacturer

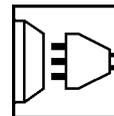
## Environmental conditions



Operating or storing the unit outside of the indicated areas is a violation of the intended uses. The manufacturer is not liable for losses resulting from this.

Precise information about the approved environmental conditions can be found in the accompanying technical specification sheet.

## Power connection



Due to their power consumption, equipment with high power ratings can negatively influence the electrical power supply grid.

This can impact certain equipment types in the form of:

- connection restrictions
- requirements with respect to the maximum rated grid impedance\*)
- requirements with respect to minimum short-circuit rating\*)

\*) respectively at the interface to the public utility grid see technical specifications



#### Hazards due to grid and charging current



In this case, the operating entity or user of the unit must determine whether the unit may be connected, possibly by contacting the electrical power utility.

You are exposed to a host of hazards when working with the HV Measurement Adapter, such as

- electrical hazards from the grid and charging current
- hazardous electro-magnetic fields, which are a deadly hazard for persons with pacemakers

An electrical shock can be deadly. Any electrical shock is categorically a deadly hazard. In order to avoid electrical shocks during operation:

- do not touch live components inside or outside of the unit.
- never touch the battery plugs
- do not short-circuit the inspection or charging cable

All cables and lines must be rigid, undamaged, insulated and appropriately sized. Loose connections, burned, damaged, or undersized cables and lines must be immediately serviced by a certified facility.

#### Personal and personnel safety



Keep people, especially children, away from the unit and the workspace while the unit is in operation. If people are nevertheless in the proximity

- notify the persons about the hazards from the grid and charging current,
- provide appropriate safety gear.

When leaving the workspace, ensure that bodily injury and property damage cannot be sustained while you are away.

#### Safety steps during normal operations



Only operate units with a protective ground wire on a grid with protective ground wire and a power outlet with protective ground wire. If the unit is operated on a grid without protective ground or on a power outlet without protective ground this is considered to be grossly negligent. The manufacturer is not liable for losses resulting from this.

- only operate the unit in accordance with the protection type indicated on the rating plate,
- never operate the unit when it has been damaged,
- regularly have a certified electrician inspect the protective ground wire of the power and unit cable for function,
- before turning the equipment on, have a certified service facility repair not fully operational safety equipment and components that are not in proper working condition,
- never bridge or otherwise disable safety features,
- a freely accessible power outlet is needed while the unit is in use.

#### EMC device classifications



##### Equipment of emission class A:

- is only intended for use in industrial zones
- can cause cable-borne and radiating malfunctions in other zones.

##### Equipment of emission class B:

- meet the emission requirements for residential and industrial zones. This also applies to residential zones where the energy supply originates from the public low-voltage grid.

EMC device classification as per the rating plate or the technical specifications.



#### EMC features



In special circumstances, the intended application may be impacted in spite of adhering to the standardized emission threshold values (e.g. when sensitive equipment is located near the equipment or when the unit is located in the proximity of radio or television receivers). In such cases, the operating entity is required to take appropriate steps to correct the malfunction.

#### Maintenance and repair



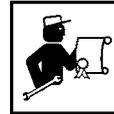
Under normal conditions, the unit requires only a minimum of care and maintenance. However, it is essential that several issues are observed to maintain the operational status over a period of several years.

- check the power plug and power cable for damage before each use
- clean the unit with a soft, dry cloth when the housing surface is soiled

Repair and service work must only be performed by an authorized service facility. Use only original spare and wear parts (this also applies to standard components). Components sourced from third parties may not be designed and manufactured in accordance with safety requirements.

Do not install other devices in the equipment or make modifications to the equipment without the manufacturer's approval.

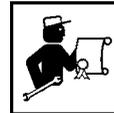
#### Product warranty and liability



The product warranty period for the unit is 2 years from the date of the invoice. However, the manufacturer will not honor the product warranty if the damage was caused by one or several of the following:

- use of the equipment in violation of its intended uses
- improper installation and operation
- operating the equipment with defective safety equipment
- non-compliance with the instructions in the operating manual
- unauthorized modifications of the equipment
- catastrophic events due to foreign objects and force majeure

#### Safety-technical inspection



The manufacturer recommends having a safety-technical inspection performed on the equipment at least every 12 months.

We recommend a safety-technical inspection by a certified electrician

- after modifications
- after installing other components or modifications
- after repairs, service and maintenance
- at least every 12 months.

Conduct the safety-technical inspection in compliance with the applicable national and international standards and directives.

You can obtain more detailed information about the safety-technical inspection from your electrical testing center, which will provide you with the required documentation upon request.



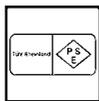
## Safety labeling



Devices with the CE marking meet the basic requirements of the low-voltage and electro-magnetic compatibility directive.



Devices marked with this TÜV test seal meet the requirements of the applicable standards for Canada and the USA.



Devices marked with this TÜV test seal meet the requirements of the applicable standards for Japan.



Devices marked with this TÜV seal and the markings indicated on the rating plate meet the requirements of the applicable standards for Australia.

## Disposal



Do not discard this device in the household waste! As per the European Directive 2002/96/EC for waste electrical and electronic devices and its implementation into national law, discarded electrical devices must be separated and recycled in an environmentally compatible manner. Ensure that your used equipment is returned to your dealer or obtain information about a local, authorized collection and disposal system. Ignoring this EU directive can have a potentially negative impact on the environment and your health.

## Copyright



The copyright to this operating manual remains with the manufacturer. The text and figures correspond to the technical status at the time of printing. Modifications made without notice. The content of the operating manual establishes no claims of any kind by the buyer. We appreciate suggestions for improvement and for any errors in the operating manual.

## 1.1 Instructions for the manual

### State of the art

This HV Measurement Adapter corresponds to the current state of the art. Proper and safety-conscious operation is required to operate the device safely.

### Read the operating manual

Carefully read the operating manual before using the HV Measurement Adapter. The operating manual must be observed at all times.

### Action

All actions required to correctly operate the unit are described in the operating manual and in the referenced documents.

Any other practices not explicitly approved by the manufacturer may not be employed.

The intended protection may be impaired if the unit is not used as per the operating manual.

### General instructions

Inspections, assembly and repair work may only be performed by personnel trained by the manufacturer. When malfunctions occur, only those malfunctions may be corrected in-house that have been marked for the corresponding maintenance processes in the manufacturer's training documentation.

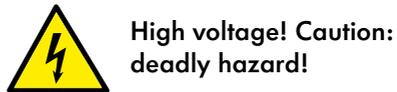


### 1.2 Pictograph legend

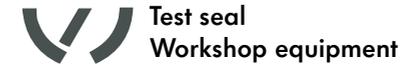
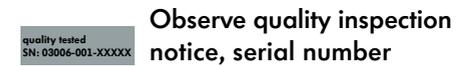
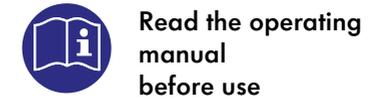
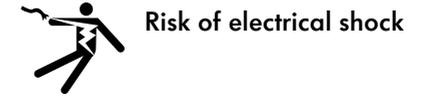
Comply with all instructions and safety regulations

This operating manual contains several sections with internationally referenced warning labels, hazard warnings and general instruction markings.

The individual icons are explained as follows.



### 1.3 Labeling on the HV Measurement Adapters





## 2.1 Safety Instructions

The VAS 5581 Measurement Adapter is exclusively intended for diagnostics on high-voltage batteries. The tool may only be used for those purposes that do not represent a risk for people and machinery. The VAS 5581 Measurement Adapter may only be used as described in the operating manual! Any modifications on the VAS 5581 HV Measurement Adapter or other uses are made at the operating entity's risk.

Ensure that the VAS 5581 HV Measurement Adapter is in proper working order and that all functions are available for safe operation.

Observe the accident prevention regulations applicable in the respective countries.



Wear personal protective gear!

Never throw or drop the VAS 5581 Measurement Adapter. Never allow the VAS 5581 Measurement Adapter to be employed for unintended uses or by untrained personnel!

Ensure that the VAS 5581 HV Measurement Adapter is employed in a working environment that has no heat sources (max. 40°C / 77°F), and is free of corrosive fluids, oil and grease.

The VAS 5581 Measurement Adapter must never be used in explosive environments.



Ensure that the VAS 5581 Measurement Adapter is placed on a non-slip surface and that the equipment cannot be damaged. Only use tools and accessories that are not worn or exhibit other forms of damage. Damaged tools or accessories can result in serious injuries!

## 2.2 Maintenance and repair

The manufacturer is not liable for losses that are the result of faulty repairs or the use of foreign spare parts.

The product warranty is null and void as a result of inappropriate uses of the measurement adapter that result in damage to the equipment.



When in doubt, always contact a certified service provider or akkuteam directly. You can find the corresponding contact address in this manual.

Any components that have been visibly damaged must be replaced. Damaged components can result in serious injuries!

Inspect contacts and connections for damage.

Maintenance and repair work may only be performed by authorized and trained personnel after having been instructed by akkuteam.



Contact us at our service address for further information about service work and training:

akkuteam Energietechnik GmbH  
Theodor-Heuss-Straße 4  
D-37412 Herzberg am Harz  
vas-service@akkuteam.de



**3.0 Keyboard assignments**

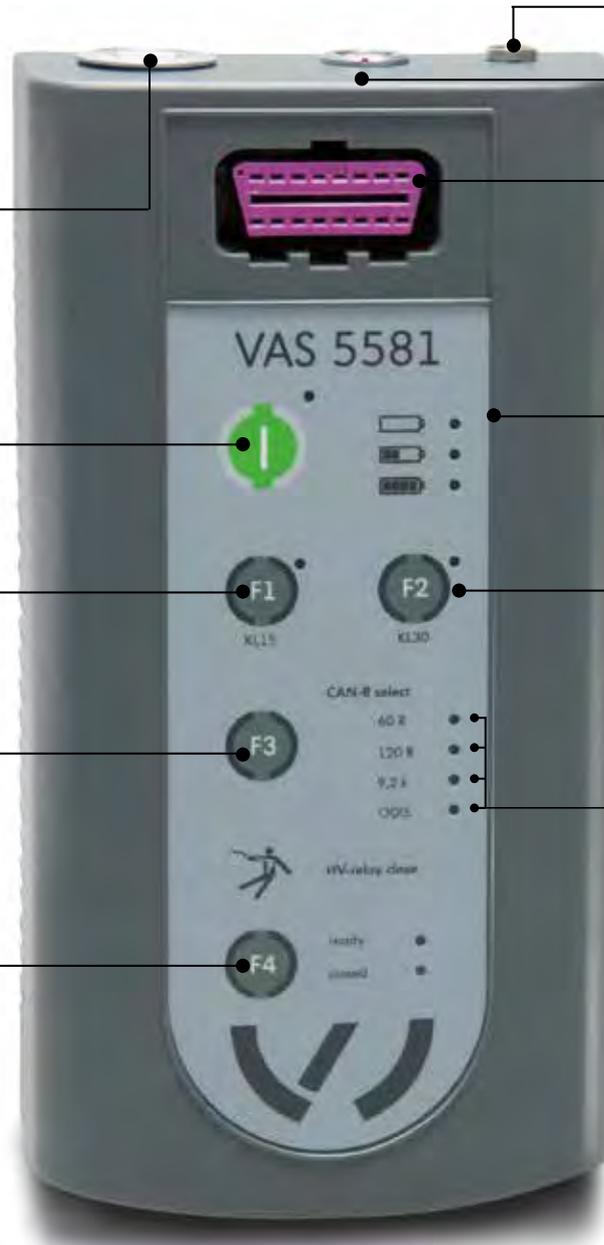
USB 2.0 port

On/Off switch

**F1**  
 adds terminal 15.  
 When the LED is lit, the associated terminal carries voltage (12 Volts).

**F3**  
 CAN-R select key.  
 Selects the impedance when pressed repeatedly

**F4**  
 activates and deactivates "close connection" function



Power supply plug

OBD plug

BMS connection cable

**Battery indicator**

- "Battery empty", less than 30 %.
- "Battery half full", less than 60 %
- "Battery full", 100 %

**F2**  
 adds terminal 30. When the LED is lit, the associated terminal carries voltage (12 Volts).

**Selected impedance value**



Power supply plug

USB 2.0 port

BMS connection cable



#### 4.1 Function

The VAS 5581 high-voltage measurement adapter is a tool to diagnose a high-voltage battery that has not been integrated into the vehicle on-board power grid. The work instructions of the trouble-shooting procedures published by the respective vehicle brands of the Volkswagen Group must be observed for this purpose.

#### 4.2 Equipment concept

The measurement adapter can be operated with the power supply but also independently with the installed battery (accessory, not included in the supplied contents). To do so, verify the supplied content to determine whether the device-specific battery is included. The use of an installed rechargeable battery increases operational reliability.

The device can be updated and can be adapted for future applications by means of firmware updates..

#### 4.3 Safety



**WARNING!** Inappropriate operation can result in serious bodily injury and property damage. Only perform the described functions after having read and understood the following documents:

- operating manual
- all operating manuals for the system components, specifically the safety instructions

#### 4.4 Intended uses

The measurement adapter is only intended for diagnostics as per the descriptions in the trouble-shooting procedure. Any other uses are in violation of the intended uses. The manufacturer is not liable for losses resulting from this. The intended uses also include

- observing all instructions in the operating manual
- regularly inspecting the power cable

#### 4.5 Power connection

The rating plate with the power supply rating is located on the housing. The device is only designed for this voltage supply. The unit must therefore only be operated with the included power supply and power cable.

#### 4.6 Startup

Remove the unit from the carrying case and check the unit for any damage. The unit works with the installed battery (accessory, not included in the supplied contents) but also without the battery - but in this case only when the power supply is connected to a power outlet.

Only use a device-specific original battery!  
The original battery VAS 5581/10 is available as an accessory (Part No. A 000606, ASE-No. 109 051 00 000).

The battery is installed by loosening the 4 screws on the bottom of the VAS 5581 HV Measurement Adapter and opening the battery compartment by lifting the device bottom. Insert the battery and connect the battery plug with the connector terminal that protrudes from the intermediate unit bottom.



Close the unit back up with all previously removed screws and check the proper seat of the unit bottom.

Insert the charger plug of the power supply into the charging plug on the measurement adapter and plug the power supply into a matching power outlet. Country-specific power cables can be used as an alternative on the power supply, provided these are equipped with a Type C6 power plug.



When the power supply is connected to the measurement adapter, the charging manager of the internal battery is in charge operation mode. This is indicated by a flashing of the green status LED with the battery symbol "full battery" and happens regardless of whether or not a battery is installed.

Start the measurement adapter with the green On button. The green LED next to the On switch confirms when the unit is operational. The battery status indicator indicates the charging status of the installed battery.



When no battery is installed in the measurement adapter, all 3 battery LEDs light up for 15 seconds and then go dark after the measurement adapter was started.

 **NOTE!** When no battery is installed in the battery compartment, the measurement adapter can only be operated with a connected power supply. The operational reliability is increased by installing a device-specific battery.

 **NOTE!** Only use device-specific batteries (VAS 5581/10)! (Part No. A 000606, ASE-No. 109 051 00 000).



#### 4.6.1 Installing the lithium-ion battery



#### NOTE!

Make sure that all devices and consumers are switched off or disconnected from the power supply before installation.

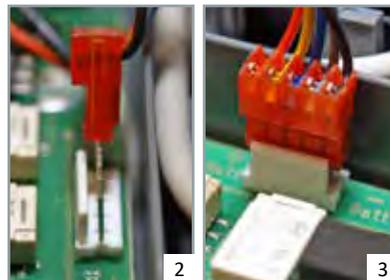
1. Unscrew and remove the rear cover of the VAS 5581.

2. Place the lithium-ion battery in the lower area intended for it. The cable connection should be on the right side. No further fixing in place is necessary.

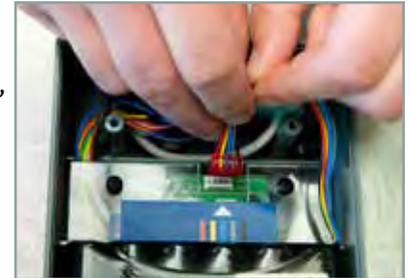
Before connecting the battery, ensure that the device is disconnected from the power supply and switched off.



3. Attach the plug to the circuit board of the device so that the white socket guide rail on the circuit board is able to engage the recess in the red battery plug as intended (refer to Figure 2 + 3).



Attaching the plug in a manner contrary to the instructions specified above may cause defects, or result in a short-circuit, as soon as the VAS 5581 is switched on.



4. When you are sure that you have connected the lithium-ion battery in accordance with the instructions, screw the rear cover of the VAS 5581 back on. Your HV diagnosis box is now ready for use.





#### 4.6.2 Battery status indicator and charging the battery

After switching on the VAS 5581 without a connected power supply, the charge status of the battery is indicated with 3 LEDs next to the battery symbols. Without an installed battery, the VAS 5581 can only be started with a power supply connected and plugged into a power outlet. When no battery is installed in the measurement adapter, all 3 battery LEDs light up for 15 seconds and then go dark after the measurement adapter was started.

The charging of the built-in battery will start automatically when the power supply is connected. The green flashing LED with the battery symbol "Full Battery" indicates the started charging process. Whenever the power supply is connected the charging mode will be started when a battery is installed even when the device is switched off. The regular charging time of a fully discharged battery is about 12 hours. Partial charges to maintain the currently required operability are possible at any time.

The 3 LEDs indicate the charging status when operating the measurement adapter without a power supply and with the battery installed. When the red, the yellow and the green LED with the "Full Battery" symbol is lit, the battery is at a charging status of 100 %. When only the red and the yellow LED with the "Half-Full Battery" symbol is lit, the battery is at a charging status of less than 60 %. When only the red LED with the "Empty Battery" symbol is lit, the battery is at a charging status of less than 30%.

The cells of the built-in battery need a balancing regularly. This equalization charge starts automatically when the power supply is connected. Other features of the device will not be affected. The balancing will not be signaled separately. It is indicated by the flashing LED "Full Battery", too. For an efficient balancing the power supply should stay connected to a VAS 5581 with built-in battery for at least 12 hours. At least every 10 complete discharges of the battery this special charge should take place during the usage of the VAS 5581.

To visualize the finished balancing while the power supply is connected the flashing LED will change into a permanent shine after 12 hours.

#### 4.7 Function description



**NOTE!** As a result of firmware updates, your device may have functions available that are not described in this operating manual, or vice-versa. Moreover, individual graphics may show operator controls that differ slightly from those on your device. The function of the operator controls is nevertheless the same.



**NOTE!** The close contactor function has the effect that KL30C is supplied with 12V from the BMS and that the pilot line is closed. You can find other framework conditions in the repair guidelines.



**WARNING!** Inappropriate operation can result in serious bodily injury and property damage. Only perform the described functions after having read and understood the following documents:

- this operating manual
- all operating manuals for the system components, specifically the safety instructions

Insert the diagnostics connector or the radio head (VCI, e.g. VAS 5054) into the diagnostics port on the VAS 5581. Connect the vehicle-specific adapter cable into the 10-pin port of the measurement adapter and connect the other end with the BMS on the HV battery.

The adapter cable specified for use is described in the repair guidelines or in the guided fault finding. Employing an incorrect adapter cable may damage the vehicle. The VAS 5581/1 adapter cable is included in the contents supplied together with the VAS 5581.



After being prompted by the guided trouble-shooting procedure, add terminal 15 and terminal 30 with the F1 and F2 keys. The switching status of the terminals is indicated by the green LEDs next to the keys. When the LED is lit, the associated terminal carries voltage (12 Volts). The electricity is connected to the BMS via the diagnostics port and via the adapter cable.

Select the CAN termination impedance indicated by the guided trouble-shooting procedure by repeatedly pressing the CAN-R select (F3) key. The respectively selected impedance value is indicated by the yellow LED on the selection row. The measurement adapter is now ready for communication. Now follow the instructions from the guided trouble-shooting procedure.

When prompted by the guided trouble-shooting procedure to perform the "Close Connection" function, press and hold the F4 key on the measurement adapter for 5 seconds until the blinking "ready" status LED lights up steadily. Now press the F4 key once again within an additional 5 seconds, therefore triggering the "Close Connection" function. This activates the "Close Connection" function. This supplies terminal 30C with on-board power and the pilot line is closed. The "Closed" LED now also lights up as a confirmation and the power supply to terminal 30C drops off.

Pressing the F4 key once again resets the function and the connection is reopened. This causes the function LEDs to go dark.

The device is shut down by pressing the green On button once.

#### 4.8 Firmware update



**NOTE!** When a firmware update is made available for download, the download contains separate operating instructions for installing the update.

The firmware status of the measurement adapter can be updated.

In order to upload an update revision of the firmware/software, connect the VAS 5581 to a Windows PC via its USB port. Each new firmware revision comes with its own detailed instructions.

The firmware revision is published by the sales organization or can be obtained as a download from [akkuteam.de](http://akkuteam.de).

#### 4.9 Supplied content

- 1 VAS 5581 Measurement Adapter
- 1 VAS 5581-1 Adapter cable
- 1 Power supply - 18 Volt 4.75 A (90-240 VAC 50/60 Hz)
- 1 Power cable - EU
- 1 Operating manual
- 1 Carrying case



## 5.0 Product Warranty

The HV Measurement Adapter from akkuteam comes with a product warranty of 24 months against materials or manufacturing defects.

The product warranty begins on the shipping date as confirmed on the invoice or the shipping ticket.

The product warranty is valid for the user/buyer, provided the measurement adapter was purchased from an authorized dealer and that it was used as intended.

The product warranty is null and void if the measurement adapter was used for other purposes that are in violation of the intended uses.

The warranty expires when the measurement adapter was not used in accordance with the operating manual.

In case of a defect, akkuteam will at its own discretion repair or replace only the defective components.

**Service Address:**  
akkuteam Energietechnik GmbH  
Theodor-Heuss-Straße 4  
D-37412 Herzberg am Harz  
vas-service@akkuteam.de

## 6.0 Cleaning and decontamination

The measurement adapter should only be cleaned with a soft and dry cloth.

## 7.0 Technical specifications

### Electrical specifications

#### Input

Input voltage	18 - 20 V DC
Input current	4.0 - 8.0 A max.
EMC Emission class	B
Test seal	CE

### Electrical specifications Output

Nominal output voltage	12 V DC
Output current	3.0 A max.

### Battery specifications

Lithium-Ion battery	14.80 V 6750 mAh
with protective circuit	99.9 Wh

Use only batteries from the VAS 5581 Series!  
(Part No. A 000606, ASE-No. 109 051 00 000).

### Technical specifications

Cooling	Convection
Dimensions l x w x h	234 x 123 x 60 mm
Weight (without cable and battery)	0.562 kg
Weight (with battery)	1.120 kg



**Environmental conditions**

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Operating temperature	0 °C - +40 °C
Storage temperature	-40 °C - +65 °C
Climate class	B
Protection class	IP20

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**Standards**

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IEC 60950-1, UL 60950-1, C22.2 No. 60950-1,  
EN 61000-6-3:2007+A1:2011, EN61000-6-2:2005, ICES-003  
Issue05 incl. FCC part 15

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