

Installation and safety instructions

DC Converter – DVC, DVCH, DR series

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1. Instruction


The following installation and safety instructions have to be observed before commissioning a DC Converter of the DVC, DVCH and DR series (described as device or DC/DC converter in the following).

The user (also referred to as system integrator) is provided with important information to detect existing danger potentials and to minimize the risk of personal or material damages.

This document does not make any claim to completeness and considers the risks known to the manufacturer.







The operation of the device may only be carried out by qualified and instructed personnel.

The DC/DC converters should be seen as system components. The responsibility for the application of the DC/DC converter in the application including the risk analysis is subject to the system integrator. Additionally, the model specific data sheets must always be observed.

 This instruction should always be kept easily accessible.

2. Symbols

The used safety and warning symbols have the following meaning:

| DEVICE LABEL | DEVICE AND DOCUMENTATION LABEL |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
|  Read the operation manual |  Information |
|  Warning of electrical voltage |  Note |
|  Warning of hot surface |  General warning signal |


3. Intended Use

The intended use results from the listed standards in the data sheet.

Additional certifications might be necessary (e.g. E1 approval). Contact Deutronic Elektronik GmbH for specific applications.


The device may only be installed and operated by qualified and instructed personnel.

A DC/DC converter converts DC voltage applied at the input into DC voltage with higher, lower or inverted voltage level. The conversion is carried out by a periodically working electronic switch and one or more energy storages devices. The DC/DC converters by Deutronic Elektronik GmbH are equipped with internal EMC filters to guarantee EMC conformity according to basic industry standards. Nevertheless, additional measures may be necessary during the installation, considering also the field of application and ambient conditions, to ensure EMC conformity with the applicable product standards.

 For the respective application, it is essential to consider whether a galvanic isolation is required between the input and output circuits.

The DC/DC converter must be selected accordingly.


4. Warranty

 Deutronic Elektronik GmbH wants to point out that all warranty claims expire, if:

- the device was opened and/or the seal is damaged.
- the device was changed mechanically or electrically.
- the device was operated under non-intended use
- prohibitions and instructions of this manual were violated.
- accessories not approved by Deutronic Elektronik GmbH were used

5. Unpacking

5.1 Control before the first commissioning

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- Check the delivery immediately after receipt for completeness and transport damages such as mechanical damages to the device housing, cables or accessories.
 - If there is damage to the device, this needs to be reported to the transport company immediately.
 - If there are damages to the device, to cables or accessory parts detected or suspected, do not proceed with the installation and commissioning under any circumstances.
 - In this case, label the device as defective.
 - After a hard hit or fall damage, the device should not be used anymore.

5.2 Disposal of the packaging material

- ! • Keep used packaging material for a possible reuse.
- If this is not possible, ensure an appropriate and environmentally friendly disposal of the packaging material while considering the current environment protection guidelines.

5.3 Storage

- i • Incorrect or improper storage may result in damage to the device.
- ! • Protect the device during storage against pollution, humidity and extreme temperatures.
- After long storage times, check the proper function of the device before use.

6. Installation




6.1 Requirements for the installation place

- ! • The device may only be operated in the environmental conditions specified in the data sheet.
- The operation of the device may only take place on a mechanical, stable, level and not burnable surface. .
- Make sure that there is sufficient cooling according to the application, see chapter 6.3.
- ! • It has to be ensured that no metallic items can fall between the input terminals, the output terminals of the converter and lines connected to them. There is danger of short circuit and fire.
- The device may not be operated in close proximity of aggressive vapors, in explosion-endangered areas or in proximity of ignition sources.

6.2 Operating situation

- i • The operation of the device is only allowed in the operating situations described in the data sheet.
- The user assumes the sole responsibility for the professional execution and safety of the installation.
- Installation sets that are suitable for the installation and approved by Deutronic can be found under **www.deutronic.com**.
- ! • Only use installation sets approved by Deutronic.
- The device is to be screwed to the mounting surface at all designated points.
- Include valid standard works, such as VDI 2230 for the calculation of bolted connections.
- ! • It is prohibited to make mechanical changes to the device, such as drilling holes, for the mounting of additional installation points.
- Each change to the device may lead to life-threatening operating situations or fire.




6.3 Cooling

-  • The cooling concept of the device is exclusively based on heat dissipation via contact cooling between the device and installation surface.
- The system integrator bears the sole responsibility for a professional installation in the end application and the control of sufficient heat dissipation from the device to the installation surface.
- To check the temperature development of the device, a reference measurement point is defined in the data sheet.
- An excess of the maximum permissible temperature can lead to a power reduction of the device or even to a protective shut-down.
- The use of low amounts of heat-conducting paste is recommended.
-  • A permanently good thermal connection must be ensured between the contact cooling surface of the device and the installation surface.
- Avoid material with high thermal resistance such as stickers, varnish layers, pollutions between the contact cooling surface and installation surface.
- Consider the maximum power loss of the device at the operating points when dimensioning the cooling concept.
-  • The possible thermally induced operating states (power reduction, protective shutdown) must be considered for the overall system.
- DVC(H)x3 with communication interface determine the internal temperature of the device at a specified measuring point, which is not accessible from the outside. This temperature point refers to the temperature thresholds for warnings and error states, which can be evaluated via CAN.



7. Installation and preparation for the operation

7.1 Connection




Device connection

-  • The type plate includes the valid connection dates.
-  • The maximum output current and maximum output power of the connected users may not exceed the nominal values of the DC/DC converter.
- Only use accessory parts approved by Deutronic Elektronik GmbH.
- Tighten the connection clamps according to the torque specifications in the data sheet and secure them against loosening.
-  • Before starting the installation and maintenance works, separate the system from all energy sources. Secure against reconnection and ensure that no voltage is present. There is danger of electric shock.
- Do not wear any jewelry or metallic items during commissioning and maintenance works. There is danger of severe burns because of short circuits.
- No single wires or braids may stick out. Braids must always be completely in the clamps. There is danger of short circuits and burns.
- Loose fit of DC input and DC output connections may lead to spark formation or overheating. There is danger of burns.



Protection

-  Generally, the device does not have an input or output protection.
- The primary and secondary side protection of the DC/DC converter in the respective application is the responsibility of the system integrator.
-  Depending on the model, a fuse must be installed according to the data sheet.

Reverse polarity protection



-  Generally, the device does not have an integrated electrical reverse polarity protection.
- Devices with connector connection technology may have mechanical reverse polarity protection on the device side.
-  When connecting the device, observe the correct polarity of the connection cables.
-  Input and output may not be connected in reverse polarity. Danger of irreparable damages and fire.

Inrush current limitation



-  Generally, the device does not have an integrated inrush current limitation.
-  If required, intend an external inrush current limitation. The calculation of an external inrush current limitation mainly depends on the input capacity of the device and the impedance of the used connection cables.

7.2 Cable routing


Cable routing

-  All cables connected to the device must not contact the device housing to avoid damages caused by hot surfaces.
- Lay the cables as freely as possible for a better cooling, however, pay attention to a sufficient fixation.
- Replace damaged cables and lines immediately. The device has to be decommissioned and protected against being switched on again.
- Use empty conduits and feedthroughs if cables need to be led through sheet metals or other sharp-edged parts to avoid mechanic damages.
- Lay all cables so that no damage or mechanical stress occurs. Never bend cables sharply.
- Only use copper cables for the connections of the device.
-  If cables are damaged, danger of fire as well as electrical shock exists. Thermal overheating of the cable isolation may be caused by:
 - Hot surfaces of the device
 - Winding or bundling of input and/or output cables
 - Joint routing of the input and output cables of the DC/DC converter.



Cable dimensioning

-  • Observe the relevant norms for the cable dimensioning such as VDE 0298-4:2013-06.
- Select the nominal cross section of each conductor so that its current load is not smaller than the maximum permanent current that flows through the conductor under normal conditions. Additionally, consider possible overcurrent and transients.
- The limit temperatures of insulating covers and sleeves may not be exceeded.
- Consider the resistance against environmental influences and the expected mechanical load in the respective application.
-  • If cables are damaged, danger of fire as well as electrical shock exists. Thermal overheating of the cable isolation may be caused by:
 - Hot surfaces of the device
 - Winding or bundling of input and/or output cables
 - Joint routing of the input and output cables of the DC/DC converter.



EMC – approved cable routing

-  • Due to electromagnetic compatibility (EMC), input and output cables have to be laid with as much distance to each other as possible. Ideally, cables are routed away from the device on the opposite sides of the housing without the cables touching the device housing.
- The DC/DC converter is intended as a component for the installation into a system. The conformity certificates for the system have to be rendered by the system integrator.
- The output cables of the DC/DC converter need to be laid to the user as closely and parallel as possible due to electromagnetic compatibility.
- Interface cables (if existing) may only be connected to the device in a shielded version with a shield at both ends.
- Interface cables must be laid separately from the input and output cables of the device.


7.3 Communication interface

-  • The device internal interfaces are galvanically separated from the input and output of the DC/DC converter.
-  • Use interface cables with a shielding at both ends.

8. General operation instructions

-  The device may not be used by children or persons with limited physical, sensory or mental abilities or with missing experience or knowledge.
- Store the device out of the reach of children or persons with limited physical, sensory or mental abilities or with missing experience or knowledge.
- When unplugging the device, always pull the plug and not the cable.
- Before connecting the DC output cables to the device, check the sockets and plug for possible pollutions. Only if the device is separated from the supply network, remove pollutions with a dry cloth.
- Check all plugs and cables for moisture before connection. Never connect the device to the supply with wet hands.
- Separate the device from the supply, if it is not in use anymore.
- Do not touch both connection clamps of the DC output simultaneously if the device is in operation.
- Control the tight fit of the plug connections before each switch on.
-  During the operation, the device with its connected cables may disturb active electrical implants (such as pacemakers) and, thus, endanger persons.
- Smoking and open fire is forbidden during operation.
- Switch off the supply voltage in case of malfunctions or damages immediately.

9. Cleaning

-  Cleaning may only be carried out in a voltage free condition and only with a slightly damp cloth without addition of chemicals.

10. Contact data

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