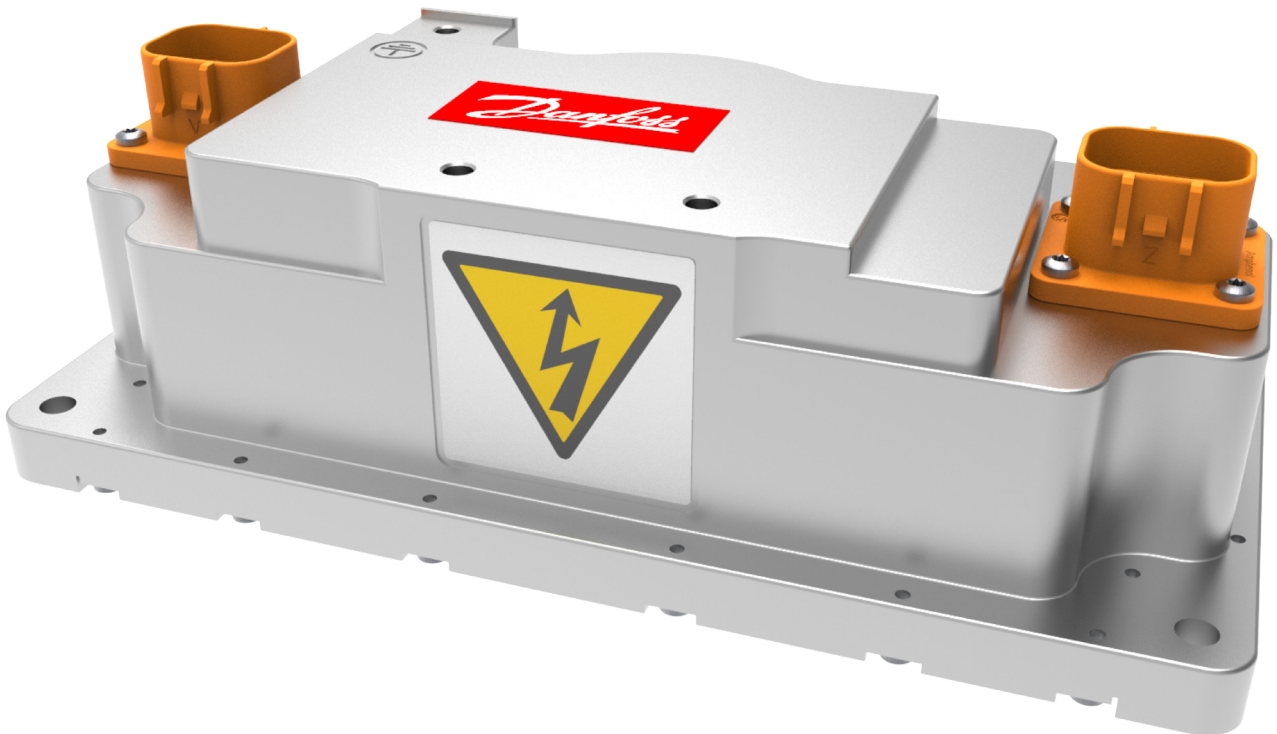


User Guide

EMI filter for liquid cooled onboard charger ED3

EC-BDF1200-63





Revision history

Table of revisions

Date	Changed	Rev
October 2024	First edition	0101

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General information

Intended use of the user guide

This user guide contains the installation, operation and maintenance instructions for the EC-BDF1200-63 EMI filter for liquid cooled onboard charger ED3.

This user guide contains instructions necessary to safely and properly handle, install and maintain the electric device. They should be brought to the attention of anyone who installs or maintains the electric device or associated equipment.

All of the safety warnings and instructions in this user guide must be followed to prevent injury to personnel or damage to property. Only qualified and authorized personnel, familiar with health and safety requirements and national legislation, shall be permitted to handle, install and maintain the device.

This user guide must be kept for future reference during installation, operation and maintenance.

This user guide uses illustrations as examples only. Illustrations in this user guide may not necessarily reflect all system features.

Product naming convention

In this user guide, the EC-BDF1200-63 EMI filter is referred to as the electric device.

The following naming convention is used to refer to electric device type code and options:

- EC-BDF1200-63

Part of the name	Explanation
EC	Electric Converter
BDF1200	Product name part 1
63	Product name part 2

Conformity according to standards

The electric device has been designed in accordance with the essential parts of the following directives and to meet the requirements of the standards:

Applicable directives and standards

Directives / Standards	Explanation
Low Voltage Directive 2014/35/EU	The low voltage directive (LVD) (2014/35/EU) ensures that electrical equipment within certain voltage limits provides a high level of protection for European citizens, and benefits fully from the single market. It has been applicable since 20 April 2016.
IEC 60664-1	Pollution degree class 2 Overvoltage category II
EN 61851-21-1:2017	Electric vehicle conductive charging system - Part 21-1 Electric vehicle onboard charger EMC requirements for conductive connection to AC/DC supply.
EN 61851-1:2019	Electric vehicle conductive charging system - Part 1: General requirements.

Warranty

Danfoss offers warranty against defects in workmanship and materials for its products for a period of twelve (12) months from commissioning or eighteen months (18) from delivery (Incoterms-EXW), whichever occurs first.

In order for the warranty to be valid, the customer must follow the requirements of this and all related documents, especially those set out in the product installation and maintenance documents, as well as the applicable standards and regulations in force in each country.

General information

Defects arising from the improper or negligent use, operation, and/or installation of the equipment, non-execution of regular preventive maintenance, as well as defects resulting from external factors or equipment and components not supplied/recommended by Danfoss, will not be covered by the warranty.

The warranty will not apply if the customer at its own discretion makes repairs and/or modifications to the equipment without prior written consent from Danfoss.

Terms and abbreviations

Following symbols, terms and abbreviations may exist in this user guide.

Term/ Abbreviation	Explanation
AC	Alternating current
DC	Direct current
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
GND	Ground in electrical connections
HV	High voltage
IMD	Insulation measurement device
I/O	Input / Output
LV	Low voltage
MCB	Miniature circuit breaker
RCD	Residual current device

Symbol	Variable	Unit
U_{DC}	DC link voltage	V
U_{ac}	AC output voltage	V
I_n	Rated current	A_{rms}
P_n	Rated power	kW
$f_{in/out}$	Input / Output frequency	Hz
f_{switch}	Switching frequency	kHz
I_{peak}	Overcurrent limit	A
Q_c	Rated coolant liquid flow	l/min
T_c	Rated coolant liquid input temperature	°C
T_{amb}	Rated ambient temperature	°C
R	Resistance	Ω

Responsibility of the manufacturer

Danfoss is responsible for the safety, reliability and performance of the electric device only if:

- Handling, mounting, installation, operation and maintenance are carried out by qualified and authorized service personnel.
- The installation of the system complies with the requirements of the appropriate regulations.
- The electric device is used in accordance with the instructions in this user guide.
- The electric device is installed, maintained and serviced in accordance with the instructions in this user guide.

Safety information

General safety statement

The electric device is intended for use as a component for work machines, vehicle and commercial installations. The end product containing the electric device must conform with all related regulations.

The use of the electric device is prohibited in hazardous areas unless it is expressly designed for such use.

The electric device is intended for installation, use and maintenance by qualified personnel, familiar with health and safety requirements and national legislation. Ignoring these instructions may invalidate all applicable warranties.

These instructions must be followed to ensure safe and proper installation, operation and maintenance of the electric device. They should be brought to the attention of anyone who installs, operates or maintains the electric device or associated equipment.

High voltage and rotating parts can cause serious or fatal injuries. For the electric device covered by this user guide, it is important to observe safety precautions to protect personnel from possible injury.

Safety message signal words

Safety message signal words indicate the severity of a potential hazard.

DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. CAUTION may also alert against unsafe practices

NOTICE Indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Safety symbols

The following safety and information related symbols may exist in this user guide and on the electric device.

	Danger This symbol is identified by a yellow background, red octagonal band and a black STOP text. It indicates a hazardous situation that causes severe injury or death. Action indicated by this symbol may not be executed.
	General warning This symbol is identified by a yellow background, black triangular band, and a black exclamation point symbol. It indicates a general potentially hazardous situation.
	Electric shock warning The symbol is identified by a yellow background, black triangular band, and a black arrowhead symbol. It indicates dangerous electrical voltage that could cause an electric shock to a person.
	Burn warning The symbol is identified by a yellow background, black triangular band, and a black wavy lines- symbol. It indicates a hot device that could cause burns to a person. The symbol also indicates that the device should be placed and installed so that contact with its potentially hot surface is not possible.

Safety information

	Magnet warning The symbol is identified by a yellow background, black triangular band, and a black magnet symbol. It indicates strong magnetic field that could cause harm to a person or property.
	Poison warning The symbol is identified by a yellow background, black triangular band, and a skull and crossbones symbol. It indicates a poisonous substance that could kill or cause an injury to a person.
	Electric shock warning - Read the instructions in the user guide.
	General Information.
	Read the instructions in the manual.

Personal protective equipment

Personal protective equipment shall be used when necessary during handling, installation and maintenance of the electric device to avoid injury.

	Use eye protective equipment like safety goggles or mask when you work with the electric device. Permanent damage to the eye could be caused by splashing fluids or other substances.
	Use hearing protective equipment when you work on the electric device. Hearing injuries can be caused by too loud noise (noise in excess of 85 dBA).
	Use head protective equipment like helmet when you lift the electric device! Head injuries can be caused by object impact.
	Use cut resistant gloves when you handle and maintain the electric device. There is a risk of cut injuries.
	Use protective footwear when you lift or move the electric device! Foot injuries could be caused if lifting system or lifting brackets fail.

Safety information

Safety features

Electromagnetic compatibility (EMC)

	When interfacing other equipment, connect only equipment that are specified as part of the system and that are compatible.
	Magnetic and electromagnetic fields generated near the current-carrying conductors and permanent magnets in electric machines represent a health danger to persons with heart pacemakers, metal implants and hearing aids. Persons with a heart pacemaker, metal implants or hearing aids must consult a doctor before they enter the following areas: • areas in which electric equipment and parts are operated • areas in which electric equipment with permanent magnets are stored, mounted, operated or repaired If necessary, perform a special electromagnetic compatibility (EMC) test on the installation.

EMC stands for Electromagnetic compatibility. It is the ability of electric equipment to operate without problems within an electromagnetic environment. Likewise, the equipment must not disturb or interfere with any other product or system within its locality. This is a legal requirement for all equipment taken into service within the European Economic Area (EEA).

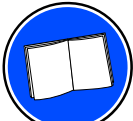
Our products are designed with high standards of EMC in mind. Connect the power lines and groundings along the instructions in this user guide to achieve the required level of EMI protection.

It is the responsibility of the installer to make sure that the equipment or system into which the product is incorporated complies with the EMC legislation of the country of use. Within the European Union, equipment into which this product is incorporated must comply with the EMC Directive 2014/30/EU.

Installation safety

	Only trained and qualified personnel familiar with the relevant safety requirements can install the electric device. If the electric device is installed incorrectly it may lead to safety hazard.
	Make sure of correct grounding connections. Do not run the electric device without correctly attached protective earth conductor. The grounding cable must be sufficient to carry the maximum supply fault current which is normally limited by the fuses or Miniature Circuit Breaker (MCB). Suitably rated fuses or MCB should be fitted in the mains supply of the electric device, by the local legislation and recommendations.
	Use only correct (type and rating) protective fuses with the high voltage AC-system.
	Do not activate the automatic fault reset function on any system, where this may cause a potentially dangerous situation. Reason for every fault situation should be determined before resetting the fault.

Safety information

	Make sure that the supply voltage corresponds to the specification of the electric device.
	Do not attempt to repair the electric device. In the case of suspected fault or malfunction, contact Danfoss or Danfoss authorized service center for further assistance.
	Electric device must not be opened. Any attempt causes loss of warranty.
	Within the European Union, all machinery in which this product is used must comply with Directive 98/37/EC, Safety of Machinery. In particular, the machine manufacturer is responsible for providing a main switch and ensuring the electrical equipment complies with EN60204-1.
    	Use correct personal protective equipment when you are near the electric device.
	Read the instructions in this user guide before you start to install the electric device.

Safety information

Operation safety

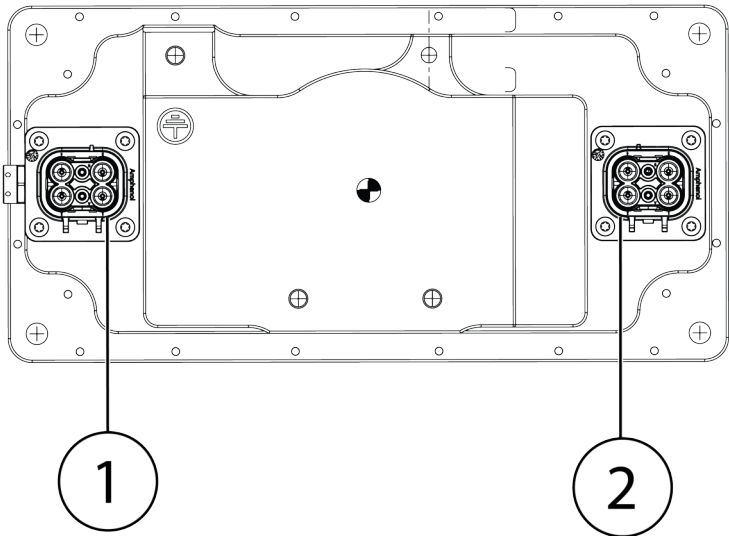
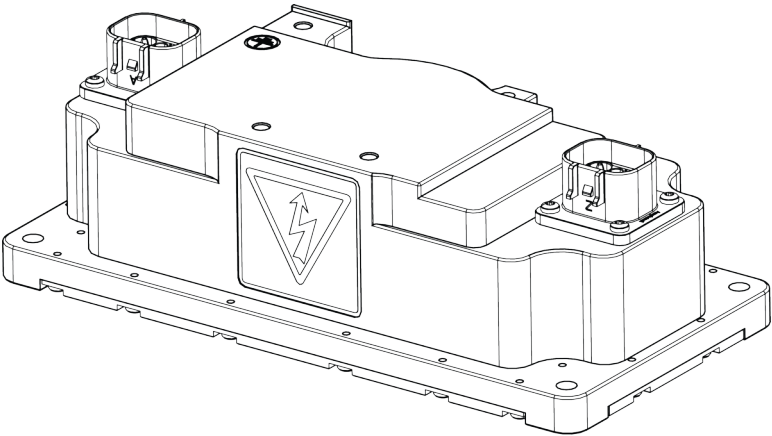
	Maximum operation temperature must not be exceeded to avoid permanent damage to the electrical device.
	The requirements of this user guide and other related instructions and standards must be followed.
	Do not touch the electric device during operation. The surface of the electric device can be hot.
	This electric device is intended for professional use as a part of complete equipment or system. The electric device uses high voltages and currents, and it has large amounts of stored electrical energy. Close attention is required to system design and electrical installation to avoid hazards in either normal operation or in the event of equipment malfunction.
	The electric device can only be used in the applications it is intended for. The rated nominal values and operational conditions are shown in the rating plate.

Product overview

The advantages and features of the electric device:

- Extremely compact design – 63 A.
- Enclosure with high degree of protection from ingress (IP6K9K) – sealed from moisture and dust.
- Ambient temperature -40°C...+70°C.
- Robust design withstanding high levels of mechanical vibrations and shocks.
- Passive cooling.

Main components



1	AC-In connector
2	AC-Out connector

Product overview

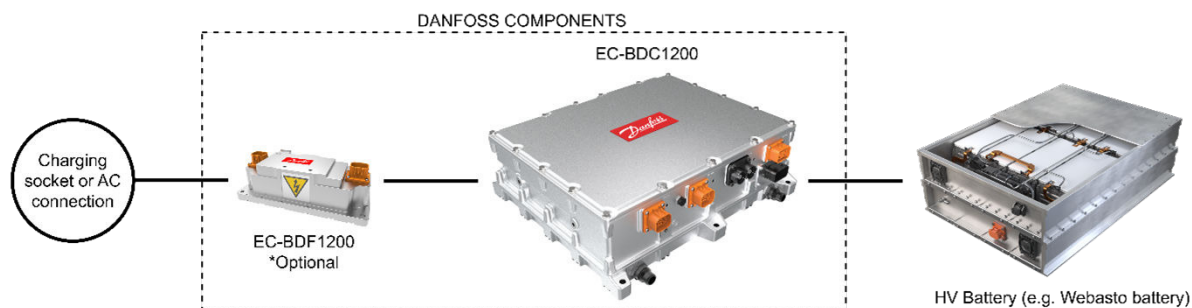
Intended use of the electric device

	The electric device is intended only for professional use. Installation, operation and maintenance of the electric device is permitted only for trained personnel and professionals.
	The electric device is intended for installation as a part of complete power generation equipment or system.
	Safety guaranteed only when used with EC-BDC1200.

Typical applications for the electric device:

- System component designed to be combined with EC-BDC1200 onboard charger

Application example



Prohibited use of the electric device

It is prohibited to use, handle, maintain and store the electric device in the following ways (including but not limited to):

- Using the electric device for other purposes than defined in the user guide.
- Disregarding the obligation to comply with the user guide, safety signs and rating plate of the electrical device.
- Using the electric device, making adjustments and maintenance without first reading the user guide.
- Exceeding the designed limits during the operation.
- Using non-original service parts of wrong material causing corrosion problems and mechanical failures in time.
- Operating and performing maintenance on the electric device without appropriate personal protective equipment.
- Using the electric device for supporting other structures or indirect movements.
- Causing any kind of impact forces to the electric device (for example hitting or hammering or dropping objects).
- Operating the electric device with electric connections other than defined in the user guide.
- Operating the electric device with power cables routed against the instructions.
- Lifting the electric device with additional load attached.
- Using the electric device in potentially explosive environment.

Product overview

- Allowing dirt or liquid to enter into the electric device.
- Using cables that can not withstand the maximum current values of the electric device.
- Using damaged electric device or damaged connectors.
- Storing the electric device contrary to the guidelines presented in this user guide, for example, outdoors in wet or dusty conditions.
- Storing the electric device without proper support that prevents overturning and falling.

System introduction

Cooling

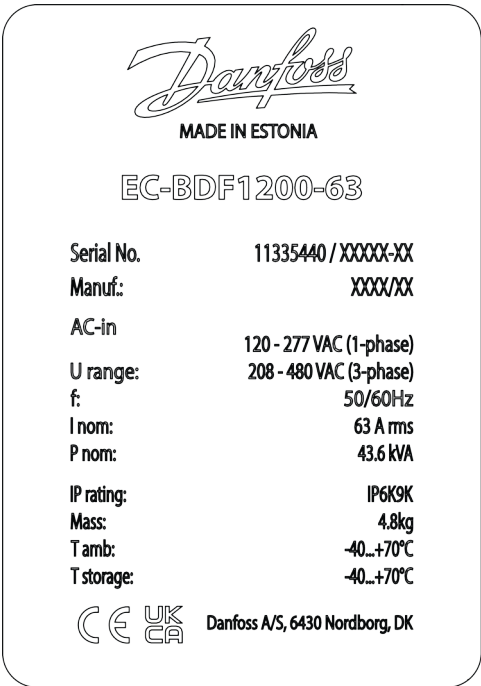
The electric device is passive air cooled and designed to be operated in ambient temperatures from -40°C to +70°C.

See detailed information and specifications from the product data sheet. Rated values can be found from the rating plate.

Rating plate

Each electric device has a rating plate (also called product label) which can be found on top of the electric device. The rating plate contains device rating and identification details. The figure below shows an example of a rating plate. For exact information, see the product-specific data sheet at <https://www.danfoss.com/> or the rating plate on the electric device.

Rating plate example



Rating plate fields

Field	Explanation	Unit
1	Electric device product family	
Serial No.	Serial number	

Product overview

Rating plate fields (continued)

Manuf.	Manufacturing year	
U range	Voltage range	V _{DC} or V _{AC}
f	Frequency	Hz
I nom	Nominal current	A
P nom	Nominal power	kVA
IP rating	Enclosure class according to IEC60034-5	
Mass	Total weight of the electric device	kg
T _{amb}	Ambient temperature limits	°C
T _{storage}	Storage temperature limits	°C

Tightening torques

For correct and safe operation, it is essential to use specified tightening torques for the electric device screws. Tightening torques (screw preloads) used in the electric device are shown in the Table below.

Tightening torques

Connection	Torque
Grounding point	24 Nm +/-4 Nm, M8
Mounting points	24 Nm +/-4 Nm, M8

Transportation and storage

Transportation

	Do not apply any excess weight on the electric device during transportation.
	See the weight of the electric device from the product Data sheet.

The electric device is shipped in first class condition. Products are inspected and packed correctly to prevent damage from ordinary handling during the transportation. Transportation conditions must be in accordance with the product specification and shocks of any kind must be avoided.

Plug and seal the cabling and cooling connections for transportation.

Receiving and unpacking

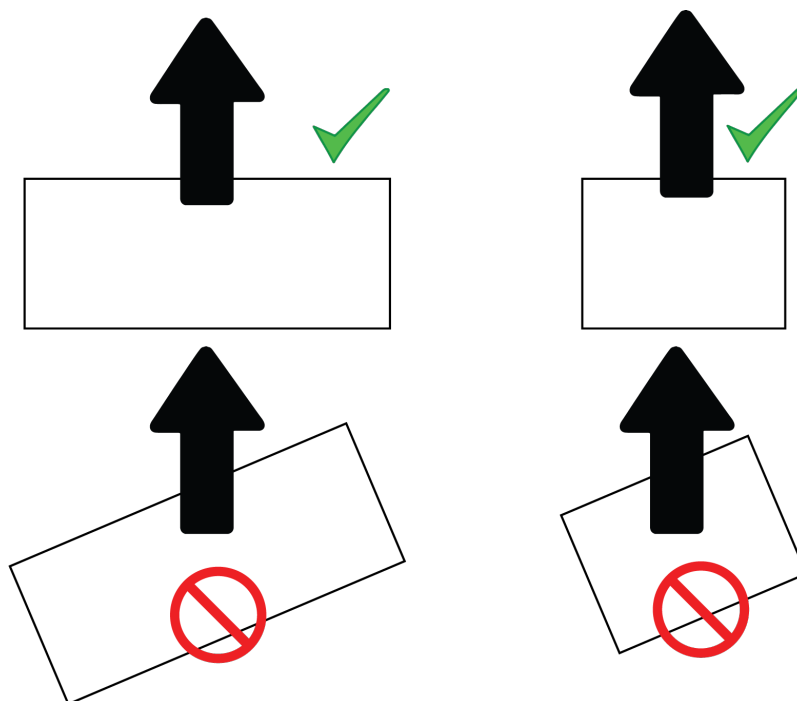
Inspect the electric device and the package immediately upon arrival. Ensure that the rating plate data in the cover letter complies with the purchase order. All external damage in the package or in the electric device must be photographed and reported to Danfoss immediately.

Lifting

	Do not apply any excess weight on the electric device when lifting it.
	See the rating plate and data sheets for weight information.
	Do not go under a lifted load.
	The weight of the electric device is under 25 kg, so lifting it by hand is possible in most cases. If it is necessary to lift the electric device with a lifting device, install two lifting eyes in the threaded installation holes and lift from them. Obey the local legislation and recommendations.

Transportation and storage

Correct lifting and incorrect lifting



Handling



When turning or lifting the electric device, lift it in the air in order to prevent damage to the frame or other parts of the electric device.

Although the electric device is designed to operate in harsh and demanding environment, any misuse or improper handling of the electric device is prohibited to avoid malfunctions later.

Storage



Do not apply any excess weight on the electric device during storage.

Always store the electric device indoors. The storage temperature should preferably be above -20°C and the relative humidity less than 60 %. Storage conditions must be dry and dust free.

Make sure that the cabling and cooling connections are plugged and sealed before storage.

The electric device must not be subjected to any external vibrations during storage to avoid possible hidden structural damages.

Installation

Required tools

	Risk of electric shock during electrical installations. Use insulated tools.
	Measure voltage before working on the device.

To install the electric device, the following tools are required:

- Torque wrench for correct range.
- Socket wrench kit with different metric sizes.
- Wire cutters.

For more detailed information, see appropriate sections in this user guide and product data sheets at <https://www.danfoss.com>.

Insulation resistance test

Measure the insulation resistance of the electric device before and after the installation of the electric device.

The reference value 10 MΩ has to be exceeded at reference ambient temperature +25°C (measured with 500 V_{DC} / 1 min insulation resistance test). Contact Danfoss Editron service if the reference value is not exceeded.

Measuring the insulation resistance

	Insulation resistance testers generate lethal voltages. Only qualified personnel should perform insulation resistance measurements.
	Do not touch the electric device during the test and make sure you discharge the electric device afterwards.

The insulation resistance should be measured between break out boxes and the filter enclosure (in order to avoid damage to the connector pins).

High voltage circuit to enclosure

The following table lists test conditions and pass criteria for the EMI filter.

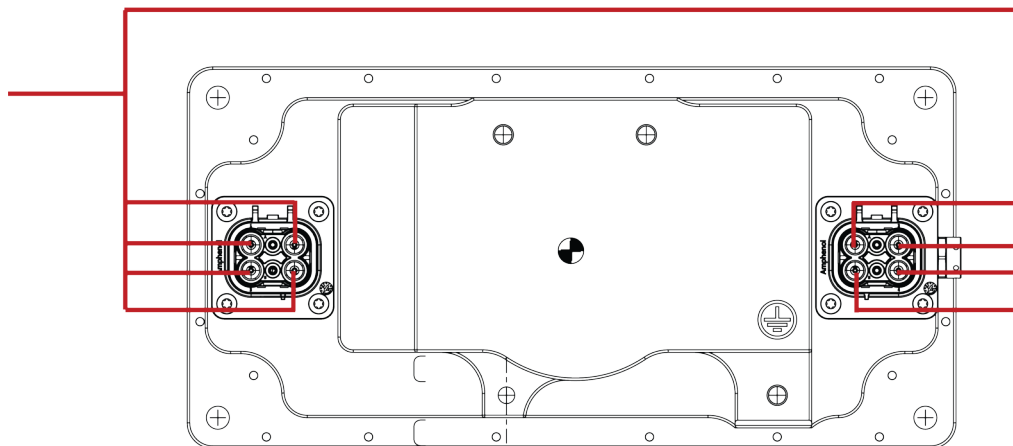
Test voltage	Test duration	Pass criteria
500 V _{DC}	60 s	> 50 MΩ

Measurement procedure:

Installation

1. Connect L1, L2, L3 and N of the grid side and L1, L2, L3 and N of the ED3 side together.
2. Connect the measurement devices ground cable to the filter enclosure.
3. Connect the measurement probe to the high voltage circuit.
4. Measure the insulation resistance and mark down the result.

High voltage circuit measurement



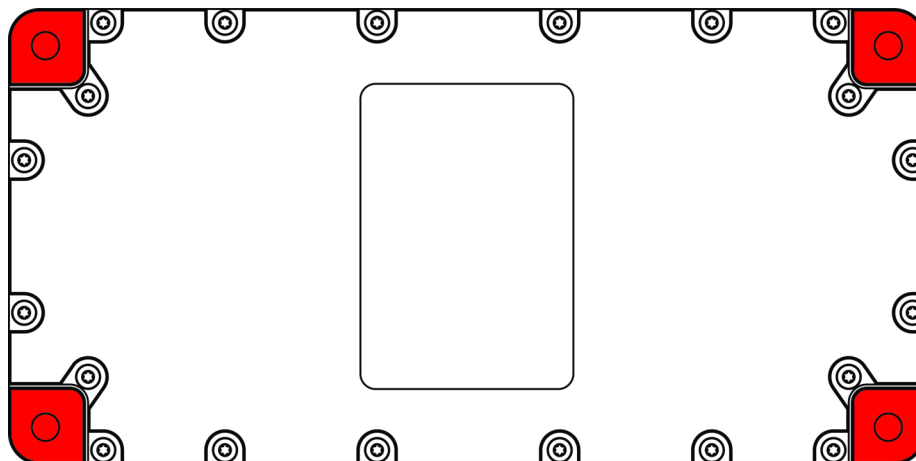
Mechanical installation

Allowed mounting position

	Do not place the electric device on the ground without proper mounting or protective structure.
	The electric device must be mounted in a way that no other object or structure, which can cause compression, pull, torsion, rotation etc., touches the enclosure of the electric device. In addition, the electric device should not be used to support any other structure of the system.

- The electric device must be mounted on a flat, heat- and flame-resistant mounting place (for example on a bracket).

Location of the mounting points



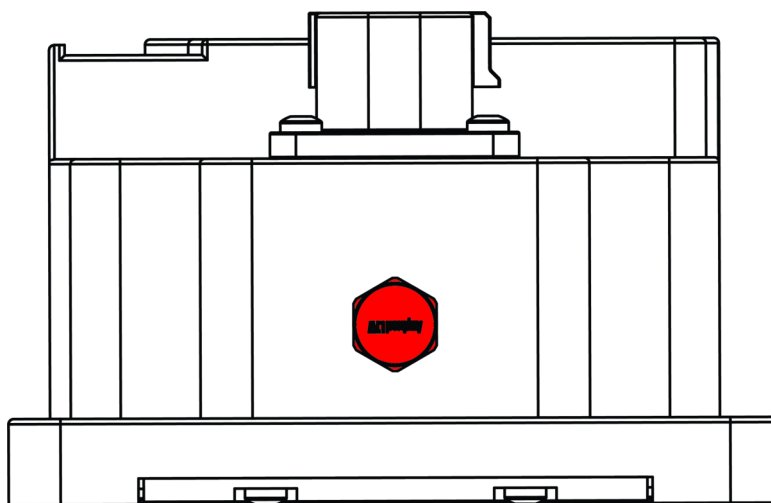
Installation

Breather plug

The purpose of breather plugs is to equalize the pressure between the inside of the device enclosure and the surrounding environment. Do not remove the breather plug(s) under any circumstances.

Make sure that the breather plug is clean and the selected installation place and mounting direction do not allow water, dust or dirt to block it.

Location of the breather plug(s)



Installation procedure



Heavy electric device. Handle with care. Handle the electric device correctly when you install it to the correct mounting position. See Chapter [Handling](#) on page 16.

Preparations

- Make sure that the chosen installation place fulfills the environmental requirements specified for the electric device.
- Protect the electric device against corrosive gases, liquids, conductive contaminants (such as condensation, carbon dust, and metallic particles) and sprays or splashing water from all directions.
- Protect the electric device from excess humidity, salt and chemicals with suitable additional enclosure.
- The mounting place and mounting interfaces should be sufficient to carry the weight of the electric device.
- Make sure that the electric device has sufficient mounting and operating clearances for maintenance work.
- Measure the insulation resistance of the electric device before and after the installation of the electric device. For more information, see [Insulation resistance test](#) on page 17.
- Installation procedure may vary from that shown in this user guide. All steps must be included in the procedure, although the order of the steps can be different.

Installation procedure

1. Prepare the installation place and make sure that it meets the requirements for the product.
2. Lift and support the electrical device for the mounting. Refer to Chapter [Lifting](#) on page 15.
3. Install all appropriate mounting screws, do not tighten the screws until they are aligned and pre-installed. See the tightening torques from Chapter [Tightening torques](#) on page 14.

Installation

4. Make sure that the devices and machines you will connect to the electric device have no voltage.
5. Make the grounding of the frame of the electric device by direct contact between it and the metal bracket and / or from the protective earth contacts. The grounding contacts must be paint-free. See Chapter [Grounding](#) on page 20.

Electrical installation

Electrical connections

	Before you start the electrical installation, make sure that the frame of the electric device is grounded correctly. Refer to Chapter Grounding on page 20.
	Before you start the electrical installation, make sure that the environment is dry and free from conductive dust particles.
	Minimum cable temperature withstand is +100°C.

Grounding

	Make sure that the electric device is correctly grounded. Do not operate the electric device without correctly attached protective earth conductor. Obey the installation instructions and the guidelines for component selection given in this user guide.
	The grounding cable must be able to carry the maximum supply fault current which normally will be limited by the fuses or the Miniature Circuit Breaker (MCB). Put correctly rated fuses or MCB in the mains supply of the electrical device: obey the local legislation and recommendations.
	Obey the installation instructions and the guidelines for component selection given in this user guide.
	Make sure that the safety grounding is correct. Refer to Chapter Mechanical installation.

Generic grounding guidelines

- Connect the ground terminal of each electric device individually to the site grounding bus bar.
- The grounding connections cannot loop from one electric device to another electric device, or to any other piece of equipment, or from any other piece of equipment.
- Ground impedance must be compliant with local industrial safety regulations.

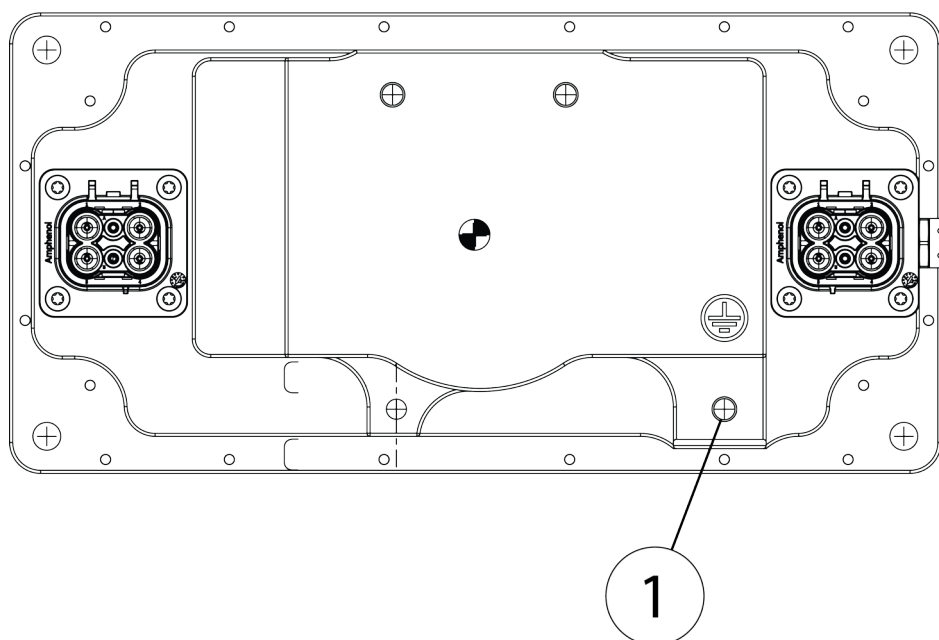
Installation

- The protective ground of the unit must be connected to the system ground. Ground impedance must meet with the requirements of national and local industrial safety regulations and electrical requirements. The condition of the grounding connections must be checked periodically.
- Make sure that all grounding surfaces are clean and remove paint from the contact areas.
- For detailed information, see appropriate Chapters in this user guide.

Main frame

The best grounding is achieved when the main frame of each electric device is directly connected to the ground. If this is not possible, the electric device must be grounded at least from one of the safety grounding points with an appropriate grounding cable. For good functional grounding use wide flat grounding braid. Round grounding wires are adequate for safety grounding but it does not provide very good functional grounding because of its higher impedance at high frequencies. The grounding points are marked to the electric device.

Grounding point(s)



Grounding connection: M8 hole. Note that the grounding cable connects to the grounding point from the side. Refer to *Main dimension drawing* for more details.

Safety grounding points and protective earth conductor

	Touch current in the protective earth conductor exceeds 3,5 mA AC and 10 mA DC.
	The cross sectional area of the protective earth conductor must be at least equal to that of the incoming supply conductor.

Installation



The impedance between the device enclosure and the grounding point of the application must be less than 50 milliohms ($m\Omega$).

One of the safety groundings must be connected to an appropriate grounding point. Grounding points must comply with national and local industrial safety regulations and/or electrical codes.

Cabling and wiring

To make sure that the electric device functions correctly. Use appropriate cabling that is suitable for application and mating connectors. Refer to the manufacturer's website for instructions on assembly and use of high voltage connectors.

Operation

Operation conditions

The electric device should be used for its intended purpose only and within limits specified by the manufacturer, concerning:

- Loading.
- Cooling.
- Service interval.
- Ambient conditions such as temperature and moisture.

The electric device is designed for these conditions:

- Maximum altitude 3000 m above sea level.

If the operation limits are exceeded and the electric device is damaged, please contact local Danfoss representative.

Condition monitoring during operation

	Risk of permanent damage to the electric device. Use the electric device only if the technical guidelines and ambient conditions given in this user guide and in the data sheet are met.
	Risk of permanent damage to the electric device. If you notice deviations from the normal operation (for example: high temperatures or noise), stop the electric device. Find the reason for the deviation and refer to Chapter Troubleshooting on page 27 for more information.
	Safety of IT earthing systems should be guaranteed by use of suitable insulation monitoring device and safety of TN earthing system should be guaranteed by use of fuses and residual leakage detector.

Monitor the electric device regularly during operation to make sure of reliable operation, to foresee possible upcoming failures and to help to reach the designed lifetime of the product.

Maintenance

Regular maintenance

	Do not disassemble the electric device. You can do only procedures described in this user guide. For further information contact Danfoss representative.
	Only trained and qualified personnel that are familiar with the relevant safety requirements can do any maintenance to the electric device.
	Risk of electric shock if dismantling steps are continued before the electric device is discharged and a safe voltage level has been measured.
	Do not touch the electric device or continue to work with the electric device until it cools down.
	Do not attempt to tighten or release any screws, nuts or joints which are not shown in this user guide and that are not involved in the normal installation procedures.
    	Use correct personal protective equipment when you are near the electric device.

Maintenance

Maintenance intervals

Object		Check/Task	Weekly	Monthly	Yearly
General construction	Operation	Abnormal phenomenon, for example noise or heating. If clearly increased, contact Danfoss representative.	X		
	Mounting	Tightness of the screws. Tighten to proper value if necessary. Applies to screws that are presented in this user guide. See Chapter Tightening torques on page 14.			X
	Enclosure and connected parts	Check cleanliness. Clean if necessary. See Chapter Cleaning on page 25.		X	
Electrical system	Electrical connections	Check connections for damage and that they are correctly secured.			X
Cooling	Operation	Electric device does not heat abnormally.	X		
	Ventilation plug	Cleanliness. Clean if necessary. See Chapter Cleaning on page 25.		X	

The electric device does not require regular maintenance, nor does it have any parts that should be serviced or replaced by the customer.

Cooling system maintenance

Passive cooling of the electric device should be checked regularly. Check that the unit is clean and does not heat abnormally.

Cleaning

	Never open or remove the watertight breather plugs. Clean them only from the outside.
	Risk of electric shock if the electric device is cleaned against instructions allowing water to go in to the electric device.

Keep the electric device clean. For cleaning, use non-abrasive and non-corrosive cleaning products. Make sure that the detergent can be used for aluminum.

Dismounting and disposal of the electric device

	Risk of electric shock if dismounting steps are continued before the electric device is discharged and a safe voltage level has been measured.
	Do not touch the electric device or continue to work with the electric device until it cools down.
	Support the electric device during dismounting, handle it with care.
	Refer to Chapter Installation procedure on page 19 for additional information.

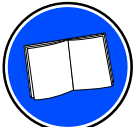
Dismounting procedure

1. Switch off the system.
2. Always measure that no voltage is present on the power terminals before you proceed.
3. Wait until the temperature of the electric device has decreased below +40°C.
4. Disconnect the power terminal cabling.
5. Disconnect grounding cables (protective earth).
6. Remove the mounting screws and dismount the electric device from the mounting base.
7. Plug all electrical connections for longer storage.
8. Lift the electric device off.

Disposal of the electric device

Dispose of the electric device and any of its parts by appropriate means in accordance with local laws and regulations.

Troubleshooting

	Do not try to repair the electric device. In the case of suspected fault or malfunction, contact Danfoss or authorized service center for further assistance.
	For the reason of general safety and correct operative actions, read the instructions carefully before you start any analysis or work with the electric device.
	Use correct personal protective equipment when you are near the electric device.

Some unexpected situations may occur while operating the electric device. Some of the possible causes and actions are given in table below. If an unexpected situation occurs, it should be corrected as soon as possible.

These instructions do not cover all details or variations in the equipment nor provide information for every possible condition to be met in connection with installation, operation or maintenance.

Troubleshooting

Fault description	Possible cause	Action
Electric device does not work correctly or the performance is poor.	Poor electrical contacts	Inspect and clean the electrical connections.

Aftersales

Service policy

The electric device has no need for regular maintenance or service parts.

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