



- power in control



INSTALLATION AND COMMISSIONING INSTRUCTIONS



Digital Voltage Controller, DVC 310

- Mounting
- Terminals and wiring
- Commissioning, using the EasyReg software



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1. Introduction

1.1 About the Installation and commissioning instructions

1.1.1 General purpose

These are the **Installation and commissioning instructions** for DEIF's Digital Voltage Controller, DVC 310. The general purpose is to provide information for the correct installation and commissioning of DVC 310.

 **Read this manual before installing or commissioning the DVC 310. Failure to do this could result in human injury or damage to the equipment.**

1.1.2 Intended users

The instructions are mainly intended for the people responsible for installing and commissioning the digital AVR.

1.1.3 Revision information

The letter at the end of the document number on the front page indicates the revision number of this document.

The latest version of this document can be downloaded at www.deif.com. If you click on the revision letter to the right of the document name, the revision history is displayed.

1.1.4 Software version

This document is based on the following software versions:

Software type	Software version
DVC 310 firmware	120
EasyReg for DEIF	

1.1.5 Getting technical support

You can read about service and support options on the DEIF website, www.deif.com. You can also find contact details on the DEIF website.

You have the following options if you need technical support for your controller:

- Technical documentation: All the product technical documentation is available on the DEIF website.
- Training: You can ask for training.
- Support: You can call or email DEIF. DEIF offers 24-hour support. There may also be a local DEIF subsidiary.
- Service: DEIF engineers can help with design, commissioning, operating and optimisation.

1.2 Warnings, safety and legal information

1.2.1 Warnings and notes

A number of warnings and notes are included in this document. These are highlighted, to separate them from the general text.



Warnings indicate potentially dangerous situations. If the guidelines are not followed, these situations could result in death, personal injury or damaged equipment.



Notes provide general, helpful information.

1.2.2 Safety issues

Installing and operating the unit may require work with dangerous currents and voltages. The installation must only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.



Hazardous live currents and voltages. Do not touch any terminals, especially the AC measurement inputs. Touching the terminals could lead to injury or death.

1.2.3 Factory settings

The DVC 310 is delivered pre-programmed from the factory with a set of factory settings. These are based on average values and are therefore not necessarily correct for your alternator. All DVC 310 parameters must be checked before running the installation.

1.2.4 Electrostatic discharge awareness

Protect the DVC 310 terminals from static discharge during installation. You must also protect the terminals if you need to remove the AVR.

These precautions are no longer necessary once the controller is correctly installed and connected, as required by the designer's wiring diagram.

1.2.5 Legal information

DEIF takes no responsibility for the installation or operation of the plant. Contact the alternator company if you have any doubt about installing or operating the plant.



The controller must not be opened by unauthorised personnel. If opened, the warranty is void.

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2. Installation, mounting and wiring

2.1 Installation

The DVC 310 is delivered in a sturdy carton to prevent shipping damage.

When you receive a system, check the part number against that of the requisition and packaging list for agreement. Inspect for damage, and if there is evidence of such, immediately file a claim with the carrier and notify the DEIF regional sales office, your sales representative or a sales representative at DEIF's head office in Skive, Denmark.

If the unit is not installed immediately, store it in the original shipping package in a moisture and dust free environment.

2.2 Mounting

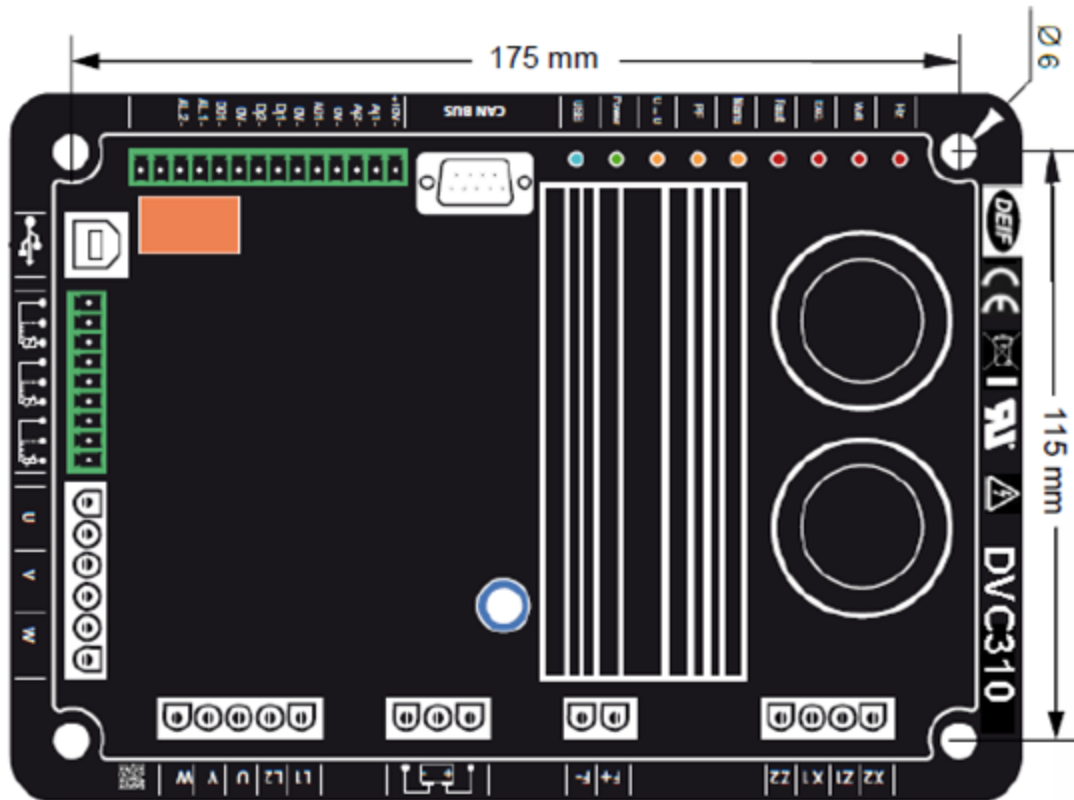
2.2.1 Mounting the DVC 310

The DVC 310 is normally located in the generator terminal box. It is designed for mounting behind the panel. Mounting hardware consists of four thread-forming screws, Ø 6 mm, that pass through the plastic shell of the DVC 310 and go into the terminal box of the alternator.

The recommended torque range for the steel mounting screws is 4.07 to 4.52 newton metres (36 to 40 inch-pounds).

The unit must be mounted where the ambient temperature does not exceed the range (-40 to +65) °C.

2.2.2 Dimensions

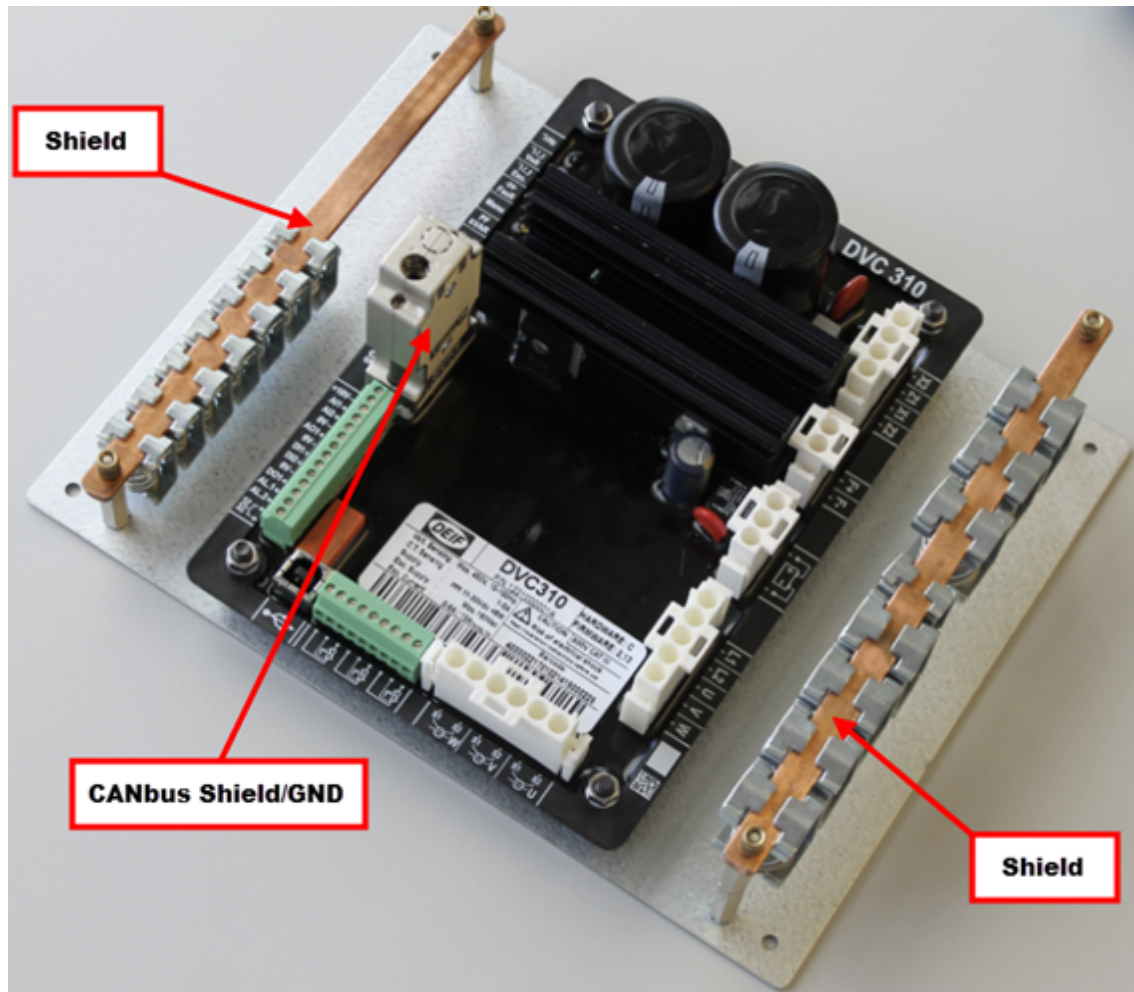


2.2.3 Installation for CE compliance

In order for the DVC 310 to be CE (European Community) compliant, the end-user should follow a few recommendations concerning mounting of the unit.

The DVC 310 can be mounted in the terminal box of the alternator (metal enclosure) or directly into the control switchboard.

Wiring connected to every used terminal must be shielded. See the picture below for an example.



In this example, the DVC 310 is for mounting in the back of a switchboard. The DVC 310 is mounted on a galvanic plate, after which the galvanic plate is to be mounted in the back of a switchboard. Two holders are mounted on the galvanic plate to hold the copper bars. These two copper bars are for the shield of every cable into to the DVC 310. On the two copper bars, clips are used to ensure proper contact between the copper bar and the shield from the cables. All the cables going to/from the DVC 310 must be shielded. The CAN bus cable will also need a shield, but this shield will also have to be mounted in the included CAN bus connector.

The DVC 310 does not have to be mounted on a galvanic plate to be inside a switchboard. It can also be mounted directly into the back of the switchboard.

To ensure proper connection between the copper bars and the galvanic plate it is required to use a toothed lock washer into the galvanic plate.

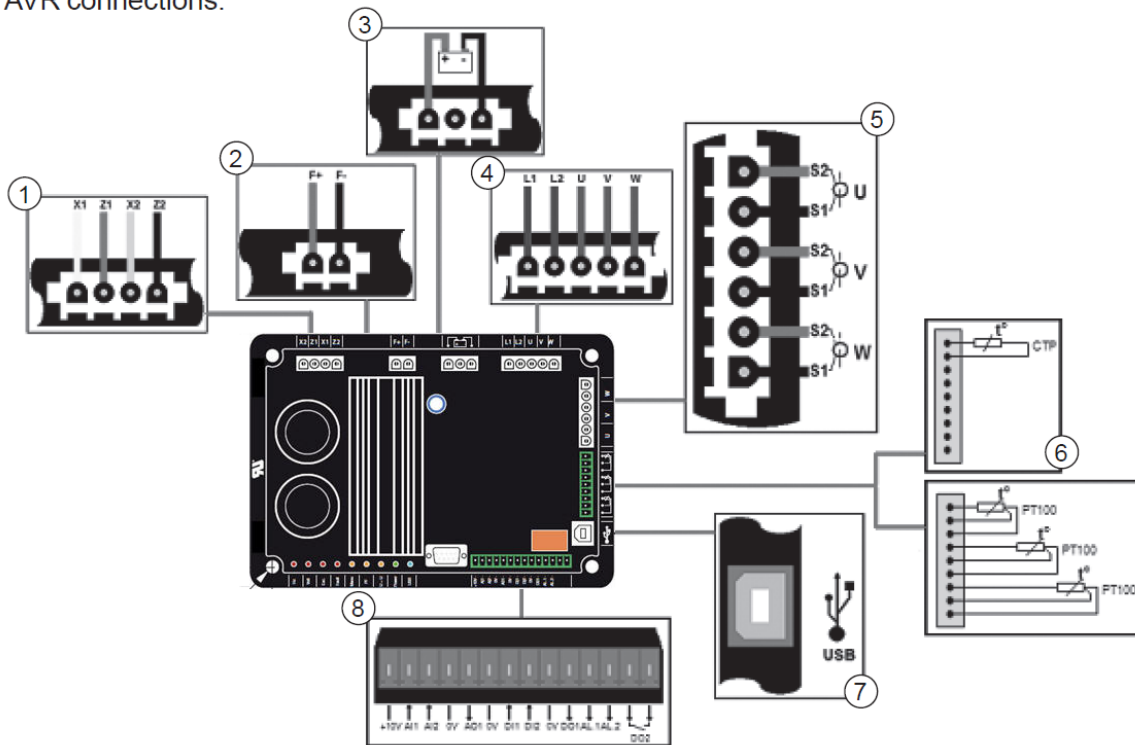
The shield from the copper bars should be directly terminated to ground, if the switchboard is not.

The DVC 310 can also be mounted in the terminal box on an alternator. In this case it is also important to use shielded cables and make sure that all shield connections are terminated to ground.

2.3 Wiring and terminals

2.3.1 Wiring diagram

AVR connections:



The numbers in the diagram above indicate the following:

1 Power

AREP: Yellow wire on X2 - red wire on Z1 - green wire on X1 - black wire on Z2
PMG: X2, X1 and Z2
Shunt: X1 and X2

2 Field excitation

The field winding + to the terminal F+
The field winding - to the terminal F-

3 Battery

Ensure the polarity is correct when connecting

4 Voltage sensing

Mains voltage: L1 and L2
Alternator voltage - single-phase: V and W
Three-phase: U, V and W

5 Current transformer(s)

Placing in parallel and measurement: CT on U
Measurements: CTs on V and W

6 Temperature sensor

PTC: See Mounting above
Pt100: See Mounting above

7 USB port

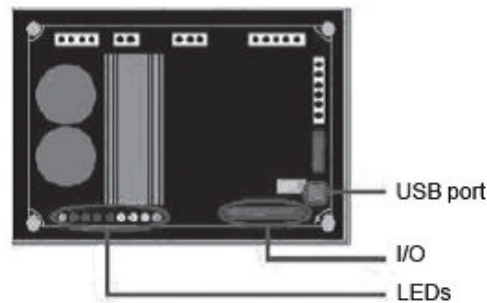
8 Digital I/O

3. Human Machine Interface

3.1 Human Machine Interface (HMI)

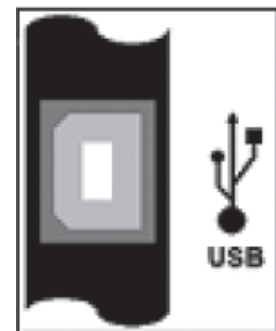
The DVC 310 Human Machine Interface (HMI) consists of three elements:

- The USB link
- The I/O
- The LEDs



3.1.1 Communication USB link

The EasyReg software and the DVC 310 communicate via a USB cable (Universal Serial Bus). The connection on the DVC 310 is the B type.



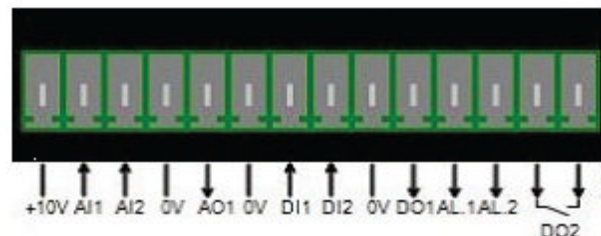
3.1.2 Analogue I/O

This part of the board allows the operator to use the inputs to make manual settings and the outputs to check certain data or to indicate whether certain AVR functions are working correctly or not. An external voltage (0 V to 10 V) is present, which can be used as a reference for an electronic device. The minimum analogue input setting is 0 % and the maximum is 100 %.

The different BIAS types are:

- from an external potentiometer (1 k Ω)
- 4 to 20 mA
- 0 to 10 V
- ± 10 V

The two analogue inputs can also be used to achieve digital functions + / -.




NB: Make sure that the voltage applied on analogue inputs does not exceed 10 V.

3.1.3 Digital I/O

I/O name	Type	Characteristics
DI1	Pull up input	To be connected to 0 V
DI2		
DO1	Opened collector	Max. current: 60 mA Voltage: 0 to 24 V
DO2	Dry contact	6 A, 30 V _{dc} /250 V _{ac} (on resistor)
AL1	Opened collector	Max. current: 60 mA Voltage: 0 to 24 V
AL2		

3.1.4 LEDs

Name	Colour	Meaning
Power ON	Green	The board is supplied with power
↓ Hz	Red	Speed drop
↑ / ↓ Volt	Red	Problem of over-voltage or under-voltage
↑ / ↓ Exc.	Red	Problem of over-excitation or under-excitation
 Fault	Red	Problem on the exciter field diode bridge
Manu	Yellow	Manual mode enabled
PF/KVAR	Yellow	Regulation of the power factor or reactive power enabled
U = U	Yellow	Alternator voltage = Mains voltage
USB	Blue	AVR connected to a PC