DVC 350

Digital voltage controller

Installation instructions

4189341290C

DEIF Improve Tomorrow

1. About the installation instructions

1.1 Intended users

This document gives information on how to mount and wire up the DVC 350 in a default configuration. If changes are made from the default configuration, make sure to include the changes in the system documentation.

The installation instructions are intended for the person who mount and wire up the DVC 350.

1.2 Notation and symbols

Symbols for hazard statements

DANGER!

This shows dangerous situations.

If the guidelines are not followed, these situations will result in death, serious personal injury, and equipment damage or destruction.

WARNING

This shows potentially dangerous situations.

If the guidelines are not followed, these situations could result in death, serious personal injury, and equipment damage or destruction.

CAUTION

This shows low level risk situation.

If the guidelines are not followed, these situations could result in minor or moderate injury.

NOTICE

This shows an important notice

Make sure to read this information.

Symbols for general notes

NOTE This shows general information.

More information
This shows where you can find more information.

Example

This shows an example.

How to ...
This shows a link to a video for help and guidance.

1.3 Warnings and safety

General safety guidelines

The DVC 350 can contain unprotected live parts, and hot surfaces, during operation. Removal of protection devices, faulty installation or incorrect use can cause serious risk to personnel and equipment.

Only experience, qualified personnel can do work related to transportation, installation, commissioning and maintenance (see IEC 364, CENELEC HD 384 or DIN VDE 0100, as well as national specifications for installation and accident prevention).

Safety guidelines during installation

- Installation of DVC 350 must comply with the supplied documentation.
- The controller must not be damaged or modified in any way.
- Do not touch the electronic components or any live parts. The controller contains parts which are sensitive to electrostatic stress.

Safety guidelines during electrical connection

- The instructions given in this manual must be followed in all cases.
- Adherence to the limits given in the EMC legislation is the responsibility of the manufacturer of the installation or the machine.
- Any work on a powered DVC 350 must comply to national rules.
- The AC and DC AVR power supplies, which are used to create the field current, should be protected by fast-blow fuses or circuit-breakers.

For EU applications: Instrument transformers shall provide basic insulation according to the requirements of IEC 61869-1, " Instrument transformers – Part 1: General requirements " and IEC 61869-2, " Additional requirements for current transformers"

For US applications: Instrument transformers shall provide basic insulation according to the requirements of IEEE C57.13, "Requirements for Instrument Transformers," and IEEE C57.13.2, "Conformance Test Procedure for Instrument Transformers."

1.4 Legal information

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.

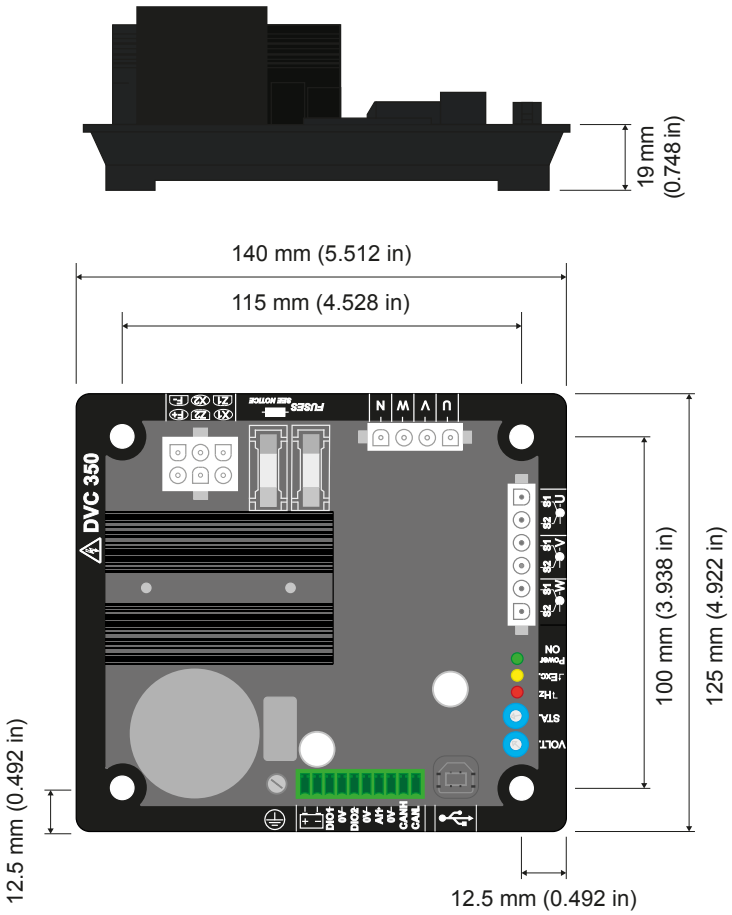
Third party equipment

DEIF takes no responsibility for the installation or operation of any third party equipment, including the **genset**.

Copyright

2. Mounting the equipment

2.1 Dimensions



2.2 Mounting

DANGER!

Hazardous live currents and voltages

Risk of electrical shock

Installation must only be carried out by authorised personnel who understand the risks involved in working with electrical equipment.

Prerequisites

- Find a mounting location and drill the mounting holes, max. 5.8 mm (0.23 in).
- Make sure that there is enough space around the heat sink for sufficient cooling. If the space is limited, a ventilation system or cooling system can be installed.
- Protect the terminals from static discharge during installation.

Procedure

1. Place the DVC 350 on the mounting location.
2. Tighten the M5 mounting screws to 2.5 N·m (22 lb-in) of torque.

3. Wiring

3.1 Wiring precautions

- Use the terminal blocks supplied with DVC 350.
- Cables must not be longer than 100 m.
- Use shielded cables, if DVC 350 is installed outside the terminal box (to comply with IEC standards).
- The total resistance of the exciter loop (out and back) must not exceed 5 % of the exciter resistance, regardless of the cable length.

Table 3.1 Approximate resistance for copper cables at 20°C

Cross-section (mm^2)	Resistance (mΩ/m)
1.5	13.3
2.5	7.98
4	4.95
6	3.3
10	1.91

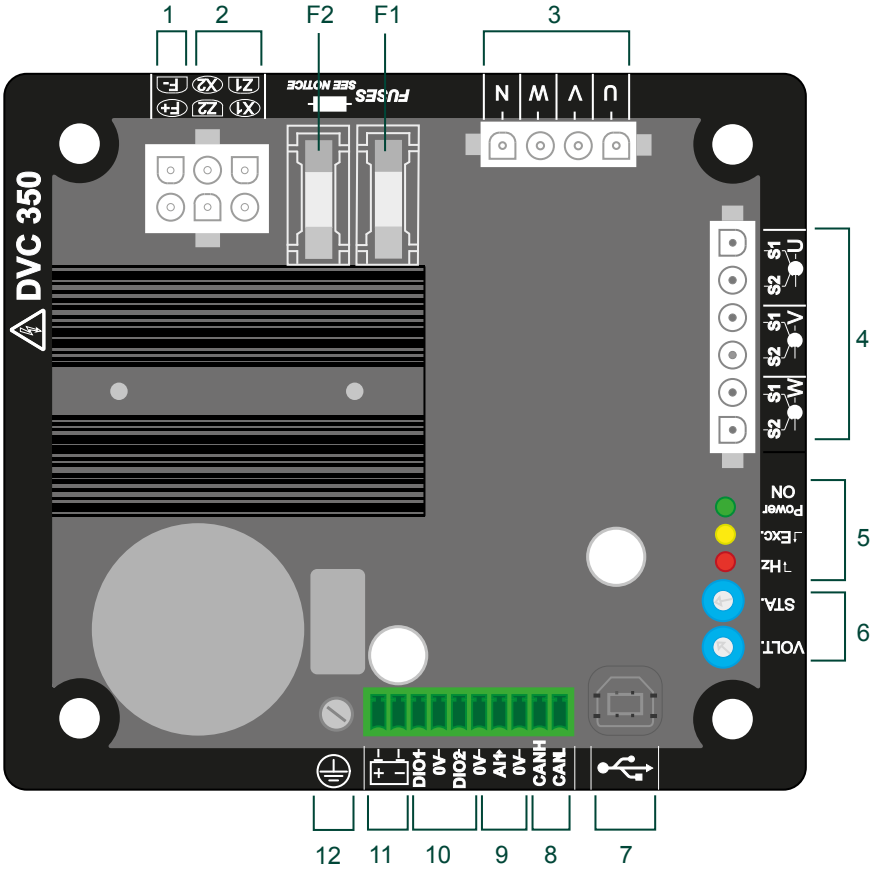
Example: Calculation of required cable cross-section

For a 10 Ω exciter, the maximum cable resistance is 2 × 0.25 Ω = 0.5 Ω.
The required cross-section as a function of the distance between the AVR and the alternator is:

Distance (m)	Cross-section (mm^2)
30	2.5
50	4
75	6
100	10

3.2 Wiring the terminal connections

3.2.1 Terminals



1. Excitation:
   - **F⁻**
   - **F⁺**
2. Power supply:
   - **AREP:** X1, X2, Z1, Z2
   - **PMG:** X1, X2, Z2
   - **SHUNT:** X1, X2
3. Alternator voltage sensing
4. Alternator current measurements (parallel operation CT)
5. LED indication
6. Potentiometers:
   - **STA.:** PID global gain or reactive droop compensation
   - **VOLT.:** Voltage
7. USB port
8. CAN port
9. Analogue input
10. 2 digital inputs or outputs
11. DC auxiliary supply
12. Ground

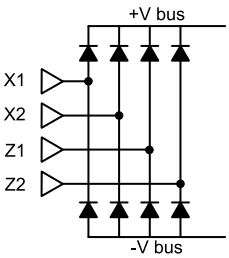
Fuses

F1:	• Standard application: 10 A/250 V • UL applications: 8 A/ 250 V
F2:	• Standard application: 10 A/250 V • UL applications: 10 A/ 250 V

3.2.2 AC power supply

The DVC 350 does not have black start functionality, therefore DC auxiliary power supply is mandatory.

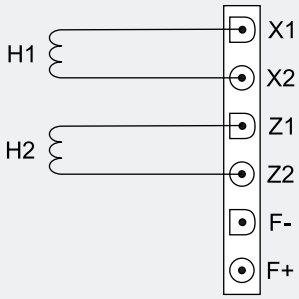
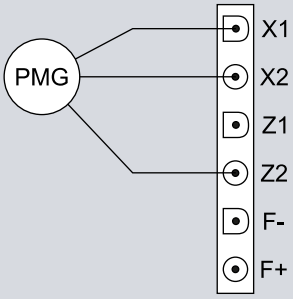
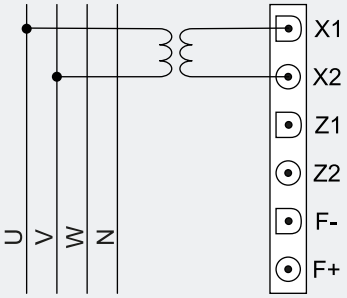
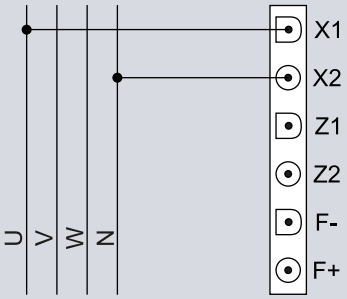
The AC power supply terminals are connected to a rectifier circuit.



You can connect the AC power supply terminals to the alternator terminals (SHUNT), permanent magnet generator (PMG), auxiliary winding excitation principle (AREP) or external power supply.

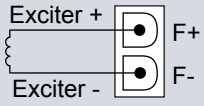
The maximum allowed voltage between each of the connection point (X1, X2, Z1, Z2) is 300 V AC. For US applications you must use fuses from listed Class CC Fuse (25 A max.) or listed inverse time circuit breaker (20 A max.) to protect the power supply input.

Table 3.2 Wiring examples

Connection	Electrical schematic
AREP	
PMG	
2-phase SHUNT with power voltage transformer	
Phase-to-neutral SHUNT (low voltage)	

3.2.3 Exciter field

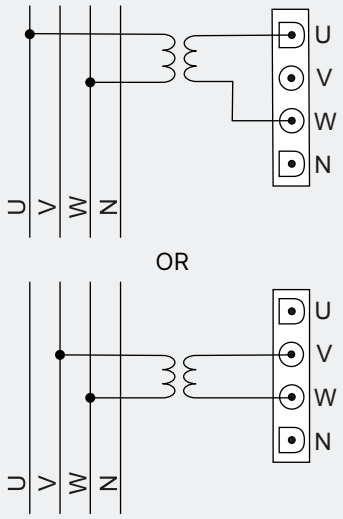
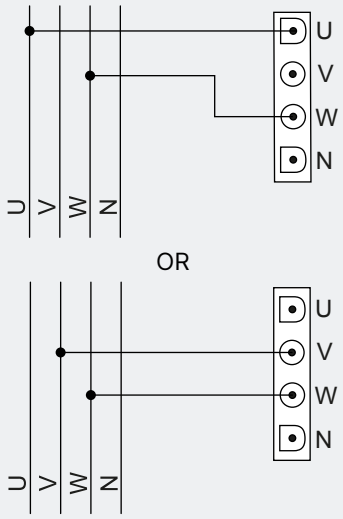
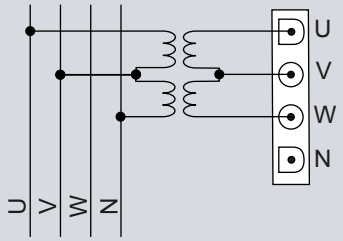
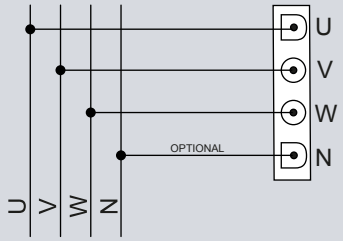
Table 3.3 Wiring example

Connection	Electrical schematic
Exciter	

3.2.4 Alternator voltage measurement

You must use voltage transformers if the alternator voltage measurement is higher than 480 V AC RMS phase-to-phase (530 V AC RMS maximum for 10 seconds or 277 V AC RMS between phase and neutral). The alternator voltage measurement connection must match the transformer mounting phase(s).

Table 3.4 Wiring examples

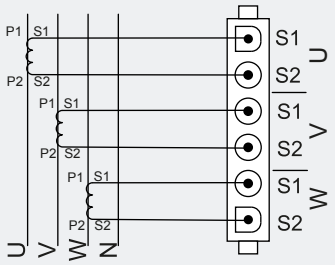
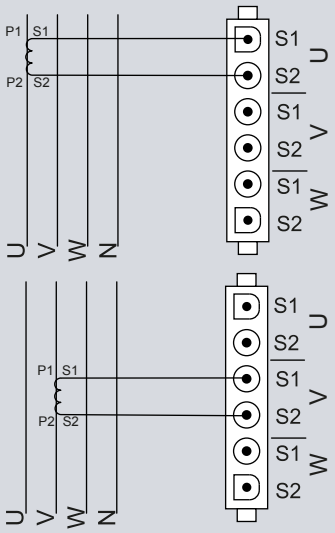
Connection	Electrical schematic	
Phase/Phase	 With PT	 Without PT
3-Phase	 With PT	 Without PT

More information
See **Glossary, Vector permutations** for example of vector permutations.

3.2.5 Alternator current measurement

Measure the alternator current on phase U or phase V.

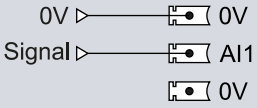
Table 3.5 Wiring examples

Connection	Electrical schematic
With one CT per phase	
With only one CT	

3.2.6 Analogue input

The analogue input is defined by its range and minimum and maximum limits.

Table 3.6 Wiring example

Connection	Electrical schematic
4 to 20 mA, 0 to 10 V, ±10 V, or ± 5 V	

The analogue input is non-isolated against other inputs and outputs.

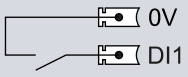
3.2.7 Digital input

Control the digital input with a volt-free contact. It is configured by a destination parameter and its activation mode.

The options for the activation mode are:

- Normally open (active low)
- Normally closed (active high)

Table 3.7 Wiring example

Connection	Electrical schematic
Digital input	

The digital input is non-isolated against other inputs and outputs.

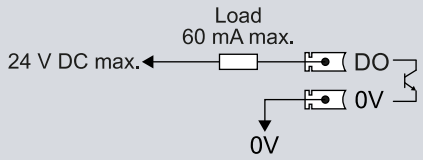
3.2.8 Digital outputs

The digital outputs are open collector transistor types that can withstand a maximum of 24 V DC and 60 mA. Digital outputs are configured by a source parameter and its activation mode.

The options for the activation mode are:

- Normally open (active low)
- Normally closed (active high)

Table 3.8 Wiring example

Connection	Electrical schematic
Digital output	

The digital outputs are non-isolated. Reversed polarity on the voltage can cause the output to break.