Data sheet

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Digital Voltage Controller

DVC 550

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1. Product description

2. Technical specifications

3. Legal information

1. Product description

1.1 Application

The DVC 550 is a digital automatic voltage regulator, which monitors and regulates the alternator output with rated field current up to 7 A. It is designed for alternators with SHUNT, AREP (auxiliary winding) or PMG (permanent magnet) excitation types. The DVC adjusts the excitation current in the exciter field according to the desired alternator output.

The DVC 550 includes several protections and functions to keep the alternator running in full safe operation.

There are five configurable regulation modes:

1. Voltage
2. Field current (manual mode)
3. Generator power factor
4. Generator kVAr
5. Grid power factor

Regulation features:

- Voltage equalisation
- Droop management
- Soft start
- Load Acceptance Module (L.A.M.) function to assist during heavy load application events
- Negative field forcing

The utility software, DEIF EasyReg Advanced, provides a visual interface to configure values and parameters. You can also configure the DVC 550 directly through the USB port. Power is supplied to the DVC 550 from the USB connection. The DVC 550 also features an event log and data logger option.

Integration with DEIF's AGC-4 (or AGC 150)

You can use the DVC 550 with an AGC-4 controller to perform digital regulation. The AGC-4 can control all of the features and receive fault information directly with the CAN bus communication in a similar way to an Engine Control Unit (ECU).

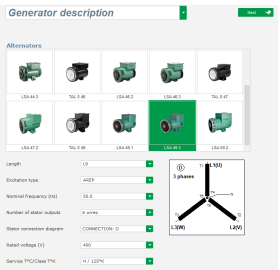
1.2 Operation range

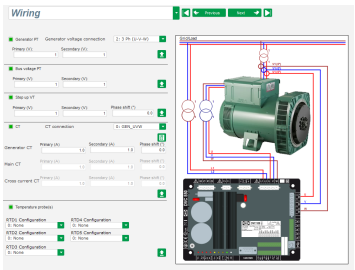
The DVC 550 can operate on a wide range of existing alternators from the market. The excitation current can be 7 A, and the DVC 550 should be fed with maximum 277 V AC from the auxiliary winding, from PMG or from shunt.

1.3 Setup and configuration

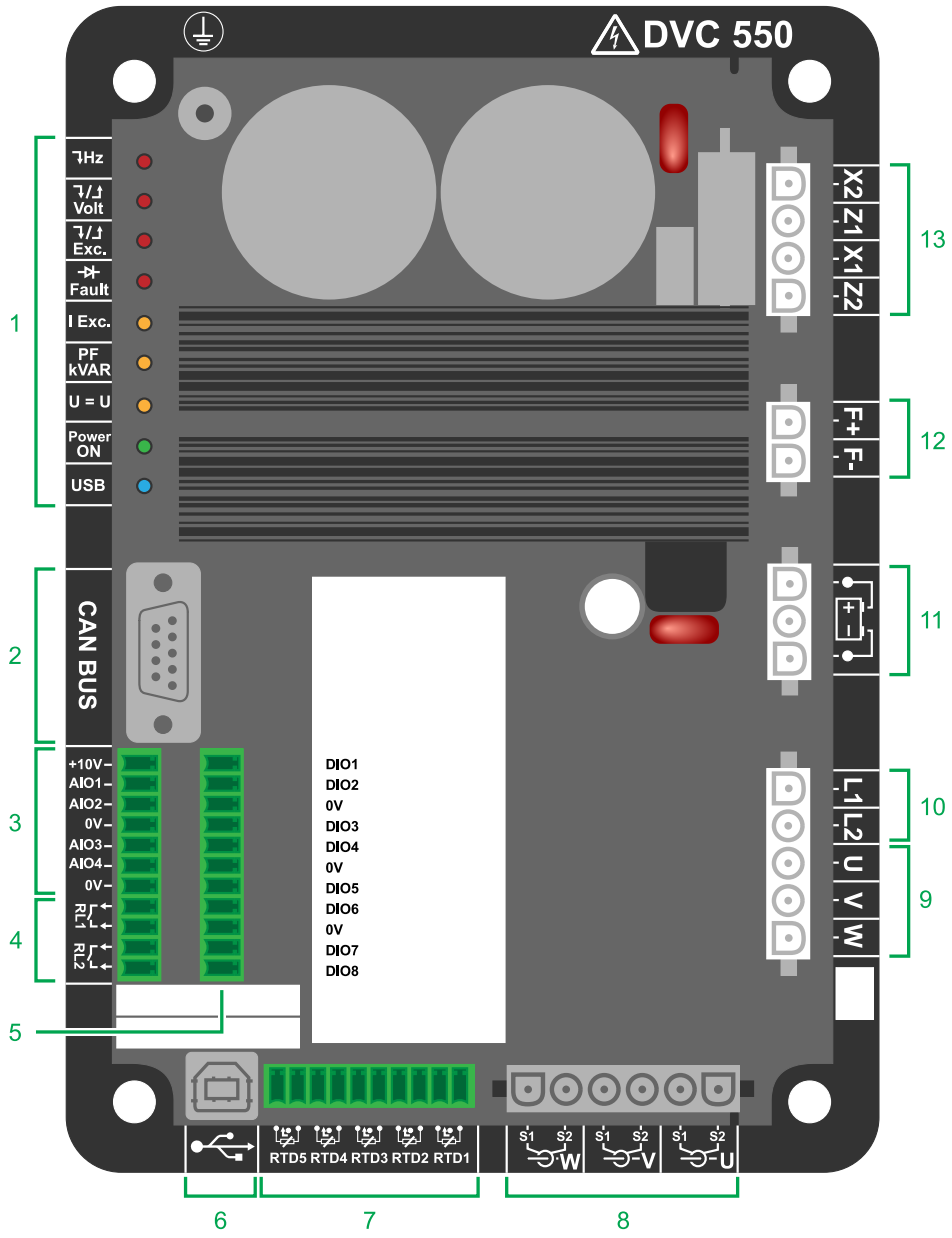
Setup is easily done via the PC utility software, DEIF EasyReg Advanced.

The utility software offers additional features such as monitoring during commissioning, and saving and downloading of settings.





1.4 Terminal description



1. LED indication
2. CAN J1939 port
3. Analogue inputs / outputs
4. Relay outputs
5. Digital inputs / outputs
6. USB port
7. Temperature sensors
   - PTC
   - Pt100
8. Current transformer
   - **U**: Used for paralleling and measurement
   - **V** and **W**: Used for measurement only.
9. Voltage sensing
   - Alternator:
   - 1-phase = **V** and **W**
   - 3-phase = **U**, **V**, and **W**
10. Voltage sensing
    - **Mains**: **L1** and **L2**
11. DC supply
    - **DC +** and **DC -**
12. Excitation output:
    - **F +** = **E +** field winding
    - **F -** = **E -** fielding winding
13. Field excitation supply
    - **AREP**: X1, Z1, X2, Z2
    - **PMG**: X2, X1, Z2
    - **SHUNT**: X1, X2

1.5 Software and hardware versions

The information in this document corresponds to the following software and hardware versions.

Table 1.1 Supported versions

Item	Notes	Version
AGC-4	Supported product	4.75.x or later
DVC 550		Hardware: Rev. A Firmware: 1.1
DEIF EasyReg Advanced	Utility software	1.0.6.x

2. Technical specifications

2.1 Electrical specifications

Electrical specifications	Notes
AC supply input	PMG, AREP, SHUNT Range: 50 to 277 V AC
Excitation	Rated field current (continuous): 7 A at 70 °C / 8 A at 55 °C Field forcing current (10s max): 15 A at 70 °C Recommended field resistance: > 4 Ω
Voltage input impedance	**Alternator - U V W:** • 1.885 MΩ phase/ground • 682.8 kΩ phase/phase **Mains - L1 L2:** • 3.96 MΩ phase/ground • 2.64 MΩ phase/phase
Auxiliary DC power supply	Nominal voltage: 12 V DC or 24 V DC (operating range: 8 to 35 V DC) Consumption: < 1 A
Frequency range	30 to 400 Hz
Generator voltage measurement	3-phase, 2-phase Range: 0 to 530 V AC Consumption: < 2 VA
Grid voltage measurement	2-phase Range: 0 to 530 V AC Consumption: < 2 VA
Generator current measurement	1 or 3-phase Secondary range: 1 or 5 A Consumption: < 2 VA
Protection response time	Delay set to min.: Short circuit: <400 ms Loss of voltage reference: <400 ms Over-voltage: <400 ms Over-excitation: <400 ms High temperature: <400 ms Speed drop: <400 ms Diode fault: <400 ms Stator current unbalance: <400 ms Stator current limitation: <400 ms
Protection functions	Under-voltage (ANSI 27) Open diode and diode short-circuited failures Over-voltage (ANSI 59) Under-frequency (ANSI 81L) Over-frequency (ANSI 81H) Active reverse power (ANSI 32P) Reactive reverse power (ANSI 32Q) Synchro check (ANSI 25)
AC voltage regulation accuracy	+/- 0.25 %
Accuracy class	AC voltage: Class 0.5 Frequency: Class 0.2 AC current: Class 2.5

Electrical specifications	Notes
	Field excitation current: Class 5 Pt100 inputs: Class 2 Analogue inputs: Class 1

2.2 Inputs and outputs

Specification	Notes
8 programmable digital inputs and outputs	Output specification: 150 mA - 30 VDC
4 programmable analogue inputs and outputs	4-20 mA / + 10 V / 0-10V / potentiometer (1 kΩ)
2 relay outputs	125 V AC, 1 A 30 V DC, 3 A
5 temperature sensors	Type Pt100/PTC Programmable threshold

2.3 Communication

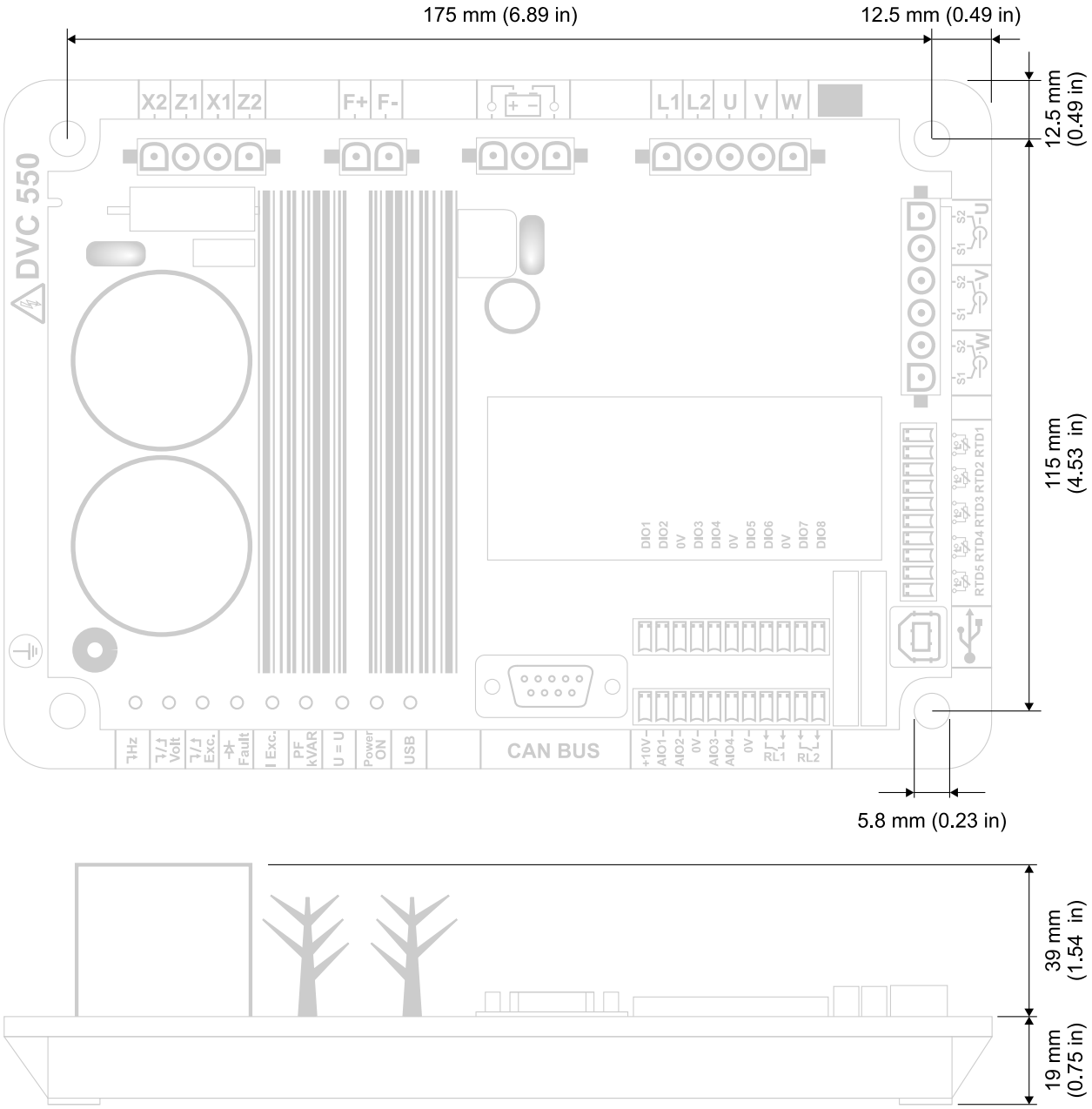
Communication	Notes
Software configuration	*DEIF EasyReg Advanced* utility software
USB port	Self powered USB-B type (standard USB A to B cable)
CAN J1939	Interface to DEIF equipment

2.4 Environmental conditions

Specification	Notes
Ambient temperature	-40 °C to +70 °C
Operating and storage humidity	95 % RH, IEC 60068-2-30, test Db
Protective level	Terminals: IP 20 To IEC / EN 60529
Flammability	All plastic materials are self-extinguishing, according to UL94 (V1)
Mounting	Mounted in a cabinet or in a terminal box without excessive vibration.
Vibration	3 to 25 Hz 3.5 mm 25 to 100 Hz 4.4 g
Shock	50 g, 11 ms, half sine - I60068-2-27, test Ea Tested with three impacts in each direction in all three axes, in total 18 impacts per test.
Altitude	0 - 2000 meter

2.5 Dimensions and weight

Figure 2.1 DVC 550 dimensions



Dimensions and weight	Notes
Dimensions	Length overall: 200 mm (7.87 in) Width: 127.5 mm (5.02 in) Depth: 58 mm (2.28 in)
Weight	0.89 kg (1.96 lbs)

2.6 Approvals and standards

Approvals
CE, UL
BV

Standards	Notes
EMC	IEC 61000-6-2 IEC 61000-6-4 IACS UR E10 power distr. zone
Safety (insulation intensity)	To IEC 61010-1 Installation category (over-voltage category) III, 300 V, pollution degree 2.
Humidity	IEC 60068-1 and test in accordance with IEC 60068-2-14
Dry heat	IEC 60068-2-2
Damp heat	IEC 60028-2-30
Cold	IEC 60068-2-1
Protective level	Terminals: IP 20 To IEC / EN 60529

3. Legal information

3.1 Disclaimer

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