DGEN/2, 2T, 2S, 2TS

ROTATING MACHINE PROTECTION – TWO-BRANCH SYSTEM

(*With or without a synchronizer and/or with or without a step-up transformer*)

PRESENTATION

MICROENER offers a range of protection relays for rotating machines under the **DGEN** family (formerly **DTRV/G**). The **DGEN/2** and **DGEN/2T** relays are specifically designed for the protection of alternators and block-mounted alternators, respectively.
The **DGEN/2S** and **DGEN/2TS** relays provide the same functionalities as the **DGEN/2** and **DGEN/2T** models, with the addition of a synchronizer function for machine-grid coupling. They are all part of the **PROTECTA range**.
Thanks to the modular architecture of this range, the modules are assembled and configured according to user requirements. The **EUROCAP** software then enables function selection and customization. This configuration tool is available on our website (**www.microener.com**) and offers a user-friendly and flexible application for **protection, control, and measurement functions**. This makes the relays fully customizable solutions, both as **protection devices and as synchronizers**.

Rack 19"3u (84TE)

Rack 9,5"3u (42TE)

GENERAL CHARACTERISTICS

The main features of the **PROTECTA** relay range are as follows :

- Native IEC 61850 compatibility, compliant with Edition 2
- Scalable hardware to adapt to various applications
- The base configuration can be customized according to user specifications using the powerful EUROCAP tool
- Flexible protection and control functionalities to meet specific customer requirements
- Advanced HMI features via a color touchscreen display and an integrated web server
- Extended measurement, control, and monitoring functions
- Configurable graphical user interface, allowing single-line diagram display with status indication and control of switching devices, as well as real-time measurement values
- Multiple protection setting groups (adaptive protection)
- High-capacity disturbance recorder (DRE) and event recorder, with data stored in non-volatile memory
- DRE supports up to 32 analog signal channels and 64 digital signal channels
- Event recorder can store more than 10,000 events
- Multiple mounting options: Rack-mounted, flush-mounted, semi-flush-mounted, surface-mounted, surface-mounted on a panel, flush-mounted with protective cover (IP54)
- Wide range of communication protocols:
- Ethernet communication port: IEC 61850, IEC 60870-5-104, DNP3.0-TCP, Modbus-TCP
- Serial communication port: DNP3.0, IEC 60870-5-101/103, MODBUS, SPA
- The PROTECTA range can handle multiple communication protocols simultaneously
- Integrated self-monitoring to detect internal hardware or software faults
- Multiple time synchronization options: NTP server, minute pulse, master protocol, IRIG-B000, or IRIG-B12X
- Large rack sizes available: 84TE or 42TE (height: 3U)

CHARACTERISTICS OF DGEN RELAYS

The relays in the **PROTECTA** range are uniquely designed with **Software Functional Blocks (SFBs)**. These SFBs allow for easy assembly during production to achieve the desired protection relay functionalities. The corresponding **electronic boards** are assembled based on the required SFBs for protection.
This modular approach—combining **SFBs and hardware components**—ensures **high reliability** for both the embedded firmware and electronic components, as they are standardized across all devices and therefore deployed on a large scale.

Each **DGEN relay** is equipped with at least **twenty-three SFBs**, enabling the implementation of various protection functions, including:

- Current-based protection: Phase overcurrent, differential protection (for alternators or motors, with or without block-mounted configuration), and stator ground fault detection
- Voltage and frequency protection
- Power-based protection: Wattmetric, thermal overload, and phase imbalance detection
- Excitation monitoring, loss of synchronism, and rotor ground fault detection
- Synchronization function (Synchrocheck) for models DGEN/2S and DGEN/2TS

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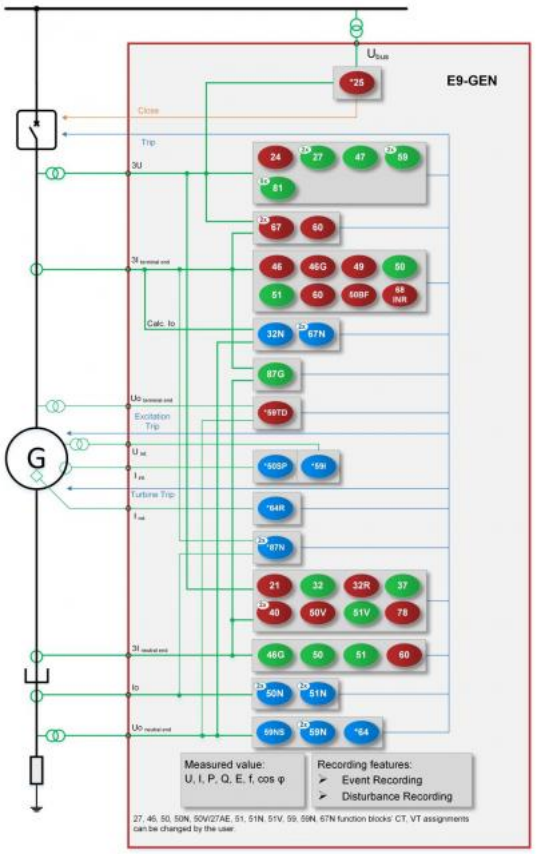
FUNCTIONALITIES AND BASIC OVERVIEW

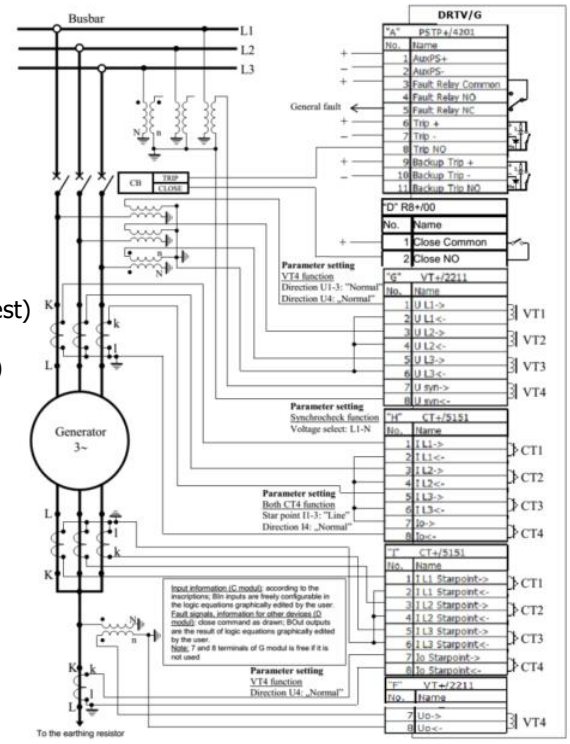
DGEN protection relays are suitable for both **alternators and synchronous motors** of **medium to high power**. They come to standard with:

- A voltage measurement unit with four inputs
- Two three-phase + ground current measurement units



The **DGEN/2** or **DGEN/2T** (ver. E9) and **DGEN/2S** or **DGEN/2TS** (ver. E10) alternator protection relays from the **PROTECTA** range perform, among others, the following functions:

- Impedance minimum protection (21)
- Overexcitation protection (24)
- Synchronizer (25) {DGEN/2S or 2TS models}
- Undervoltage protection (27)
- Zero sequence power directional protection (32N)
- Directional of power protection (32)
- Minimum directional power protection (37)
- Loss of excitation protection (40)
- Negative sequence current protection (46)
- Negative sequence voltage protection (47)
- Thermal image protection (49)
- Circuit breaker failure protection (50BF)
- Overcurrent protection (50/51, 50/51N)
- Incorrect coupling detection (50V/27AE)
- Voltage-controlled overcurrent protection (51V)
- Overvoltage protection (59)
- Zero-sequence overvoltage protection (59N)
- Zero-sequence voltage detection at startup (59NS)
- 100% stator ground fault protection (59TD) {optional}
- CT supervision and dead-line detection (60) {depending on relay model}
- Unbalanced current detection (60)
- Rotor ground fault protection (64R) {optional}
- Phase directional protection (67)
- Zero-sequence directional protection (67N)
- Inrush current detection (68)
- Trip circuit supervision (74)
- Loss of synchronism protection (78)
- Under/Over-frequency protection (81u/81o)
- Rate of Change of Frequency (RoCoF) protection (81Rocof)
- Lockout relay function (86)
- Rotating machine differential protection (87G/T) {depending on relay model}
- Switchgear position management
- Event logging
- Oscillographic recording of voltage (U) and current (I)
- Communication protocol: MODBUS TCP/IP (other protocols available on request)



The **standard versions** of these relays are housed in a 19" half-rack, 3U (42TE) format and come equipped with:

- 1 three-phase + ground voltage measurement unit
- 2 three-phase + ground current measurement units
- 1 logic input card with 12 digital inputs
- 1 digital output card with 8 relay outputs
- 1 front-panel Ethernet port (RJ45) for configuration
- 1 Ethernet port (RJ45) for remote relay operation
- 16 programmable multifunction LED indicators
- 1 embedded Web Server configuration software
- 1 3.5" touchscreen display for operation and remote control
- 1 wide-range power supply card
- 2 high-capacity trip relays (NO)
- 1 watchdog relay

With the addition of an optional card, the **DGEN/2** relays are provided in a **19" 3U rack format (84TE).** See the document related to the **PROTECTA** range.

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