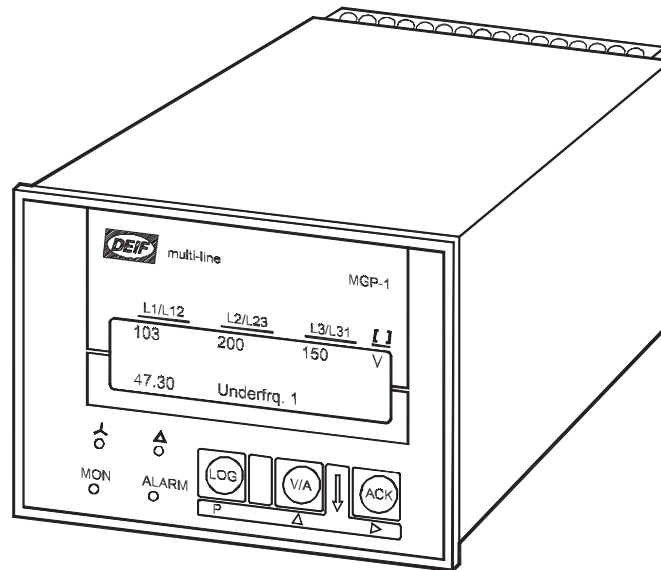


Additional electrical relay protection system



The Turbec T100 CHP microturbine can be fitted with an electrical relay protection system (DEIF type MGP-1). The system is additional and is not required for the running of the T100. The DEIF MGP-1 need only be installed if local legislation or standards require this type of safety system.

The DEIF MGP-1 protects against:

- Overvoltage
- Undervoltage
- Overfrequency
- Underfrequency
- Loss of grid

The DEIF MGP-1 protection unit is a microprocessor-based control unit. The unit contains all necessary functions and measuring circuits to protect the grid.

The DEIF MGP-1 is a flexible and menu-programmed unit, that enables the user to easily adapt the unit to the T100 CHP microturbine. The unit carries out cyclical self-tests, displaying errors, messages, on a LCD.

Time controlled protection systems

The protections in the DEIF MGP-1 are time controlled. The protection systems automatically disconnect the power feed to the grid if a time limit is exceeded after a measured breach of the voltage or frequency limits. The minimum reaction time of the MGP-1 is 30 milliseconds. With the DEIF MGP-1, it is possible to measure two different levels of protection with separate time relays. For example:

$U < 80\% = 2 \text{ seconds}$

$U < 70\% = 0.1 \text{ second}$

That is to say that a short drop in voltage is acceptable but if the voltage is too low the T100 needs to be disconnected as quickly as possible.

Voltage and frequency protection

The same time control protection mechanisms are used for both voltage and frequency protection. The protection mechanism has two limits of under and over voltage/frequency protection with a matching trip time set-up.

Password

The settings for both voltage and frequency deviation can be protected by a password if local legislation or standards call for this.

Loss of grid

The DEIF MGP-1 has two detection methods for loss of grid. These are vector jump and df/dt detection. The trip limits and the trip time can be set via the panel on the MGP-1. The vector jump can be set to any value between 30 and 90 degrees if only one phase is monitored or 8 to 90 degrees if the jump is on all three phases. The trip value for the df/dt monitoring can be set to values between 1.0 and 9.9 Hz/second. Lower values, are not to recommend. In many distribution grids, this is normal variation that not only occurs during loss of grid.

Notice

The DEIF MGP-1 is an option for the T100 CHP microturbine. All necessary protections are already included within the T100 microturbine electronics. However, if local legislation and standards require a relay protection system, the T100 is prepared for simple installation of this optional equipment.

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