



GPM500

Generator Protection Module



**SAM
Electronics**

an  communications company

GPM500

Generator Protection Module

The microprocessor based Generator Protection System GPM500 performs the protection and control of medium and low voltage generators and networks. The GPM500 can be operated as stand alone or in combination with other GPM500 communicating via data bus. Generally each application (e.g. generator, coupling circuit breaker, etc.) requires an own GPM500 for the protection.

The GPM500 is mainly intended for the protection and control of the following listed applications:

- Diesel generators
- Shaft generators
- Emergency generators
- Coupling circuit breakers
- Transfer line circuit breakers
- Transformers
- Motors
- Shore connections
- Filters
- HR grounding

Typically the GPM500 is fitted inside the associated panel of the switchboard. The modular design allows the extension of functions and of in- and outputs in an easy way. Via connection plugs the modules can be directly interconnected. The installation of the modules can be easily done via snap-on rails.

Besides the below listed protection and control functions of the GPM500 data transfer with external monitoring and control systems is possible via an interface (Modbus, CANopen) and with the Internet (Modbus/ TCP). The authorisation for remote access/modification of parameters can be restricted.

For operation, setting of parameters and control of the GPM500 a separate tableau with touch screen display is used (BAT500). Several graphical

symbols on the main picture and all relevant data such as current, voltage, load etc. allow general survey of the status of e.g. the generator and the respective generator circuit breaker. Control and modification (password protected) of parameters can be done on protection function based pages (e.g. one page for overcurrent protection with all relevant parameters). An alarm list will appear automatically in case of failure.

An integrated PLC allows the programming of additional protection and control functions. The programming of the PLC can be done with functional blocks according to IEC 1131 on a PC in an easy and user-friendly way. Via the touch screen display BAT500 the online visualisation of PLC process functions and variables is possible.

Protection Functions

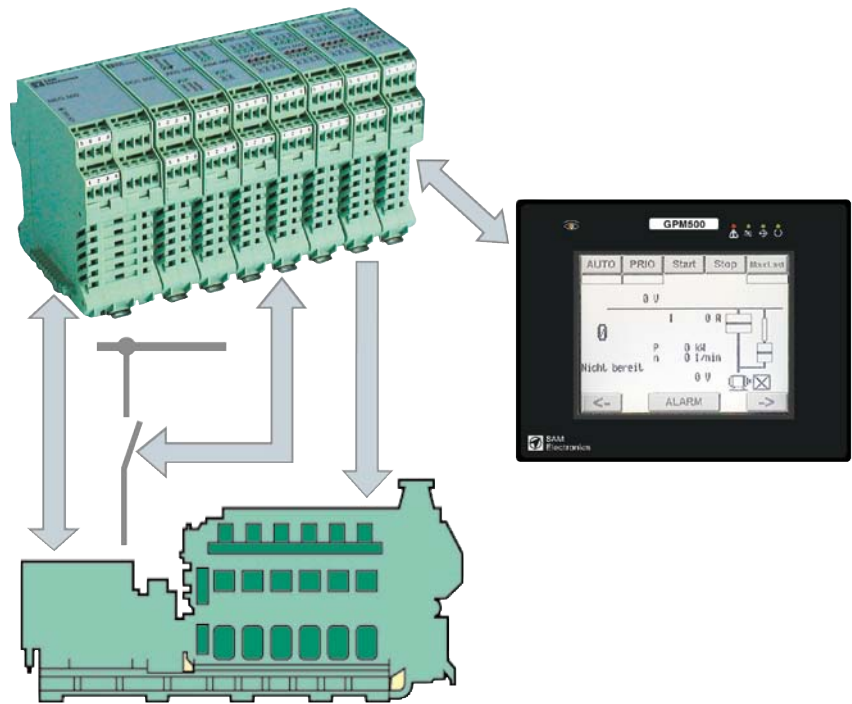
- Instantaneous overcurrent protection (short circuit)
 - (ANSI Code No. 50)
- Thermal overload (overcurrent)
 - (ANSI Code No. 49)
- Reverse power
 - (ANSI Code No. 32)
- Under-/ Overvoltage
 - (ANSI Code No. 27 / 59)
- Under-/ Overfrequency
 - (ANSI Code No. 81L / 81H)
- Phase balance (asymmetry) current protection
 - (ANSI Code No. 46)
- Monitoring of excitation
 - (ANSI Code No. 24 & 40)
- Circuit breaker failure
 - (ANSI Code No. 50BF)
- Undercurrent monitoring (underload)
 - (ANSI Code No. 37)
- Synchronising
 - (ANSI Code No. 25)
- Phase failure
 - (ANSI Code No. 47)
- Stator protection
- Load shedding (switch off of unimportant consumers)
- Voltage backup for undervoltage coil
- Protection against earthfault (optional)
 - (ANSI Code No. 50G)
- Differential protection (optional)
 - (ANSI Code No. 87G/M/N/T)
- Neutral voltage displacement (optional)
 - (ANSI Code No. 59N/64)

Power Management Functions

- Automatic synchronising
- Active load sharing
- Asymmetrical load sharing (e.g. for shaft generators)
- Frequency control
- „Topload“ function
- Blackout start

Options

- Load dependig diesel start / stop
- Load control of big consumer (e.g. Bowthruster)
- Expandable with Diesel Protection Module DPM500
- Data transfer to external monitoring and control systems
- Voltage control



GPM500

Technical Data

Mechanical Data

Mounting rail modules with 16 respectively 32 terminals (by 4 pole plug connectors with a code profile) and a 12 pole plug connection to the next modules. The 12 pole plug connection contains the internal CAN bus, the external CAN bus for the connection of the BAT500 and contacts for the control voltage supply. The SLE501 divides the internal bus into the ZK bus (on the left) and the analog bus (on the right). The ZK bus is used for communication purposes between the individual assemblies via CAN and is managed by the ZKG501. The analog bus serves to acquire analog values (currents and voltages) of TRV500 and DIF500 assemblies.

- Assemblies for mounting onto DIN EN mounting rails (top hat rails)
 - Dimensions (W x H x D):
 - 45 x 100 x 115 mm – (NEG510, SLE501, DIF500, USS500)
 - 22,5 x 100 x 115 mm – (NEG500, ZKG501, DIO500, DCC500, GOV500, TRV500x)

In the basic configuration (for LVgenerator application with check synchroniser/ without synchronising) the modules have following width:

- 157,5 mm – (NEG500, ZKG501, 2xDIO500, SLE501, TRV500)

- Touch panel for door mounting
 - Dimensions (W x H x D):
 - 187 x 147 x 70 mm
- Protection degree IP20 (front of touch panel IP65)
- Ambient temperature (during operation):
 - 0°C ... 55°C acc. various classification societies for mounting in switchboard panels

Electrical Data

- Required power supply DC 24 V (18-32 V) with a ripple < 5 % and/or a 3 phase power supply AC 19 V/ 40-72 Hz (redundant supply) e.g. generator voltage (via transformer)
- Direct measurement of voltages for rated voltages up to 450 V
- Direct measurement of currents for rated currents up to 1 A
- Load of relay outputs AC 230 V/4 A respectively DC 24 V/4 A (DIO500 only 24 V/4 A)
- Electronic analogue outputs ± 10 V, 0..20 mA or 4..20 mA
- Power consumption of the modules up to 48 W (BAT500: 14,4 W)

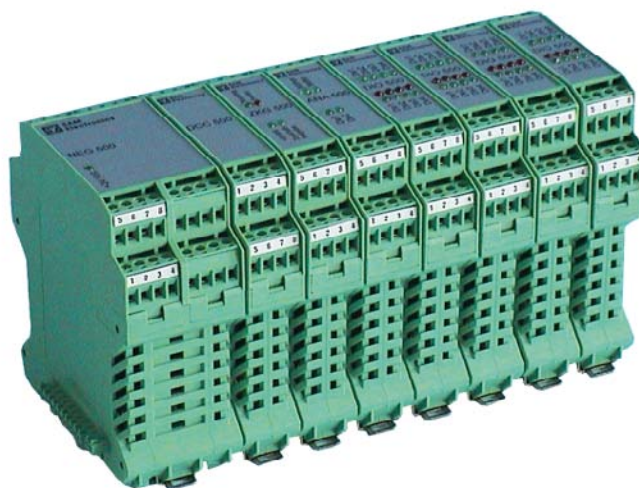
Interfaces

- 3 external CAN interfaces with up to 1 Mbit/s (support CANopen)
- RS485 interface with up to 56 kBit/s (SAM-protocol, Modbus: Master and Slave)

- RS232 interface for maintenance and software down-/upload. For remote maintenance and the software down-/upload an Ethernet coupler can be connected.

Software

- Parameters of protection functions can be modified via the touch screen display.
- Same basic software with all protection functions in all configurations/applications. The necessary protection functions and the respective basic picture on the BAT500 will be activated / deactivated by parameters according to the preselection of application (e.g. generator or transformer).
- User software: The programmable logic controller (PLC) of the ZKG500 can be graphically programmed on a PC (with function blocks) according IEC1131.



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