Ancillary functions

- Metering functions:

Phase currents (Ia, Ib, Ic), Zero sequence current (In1, In2)

Sequence currents (I1, I2), Ratio of sequence currents (I2/I1)

Phase voltages (Va, Vb, Vc), Phase-to-phase voltage (Vab, Vbc, Vca), Residual voltage (Vn)

Symmetrical component voltages (V1, V2, V0)

Power (P, O, S), Power factor (PF)

Active power (W), Reactive power (VAR), Frequency (f)

Percentage of thermal capacity (THM%)

Maximum. phase currents and voltages

Maximum power

Maximum and minimum frequency

- Event Recording

Up to 200 most recent events time-tagged to 1ms resolution.

- Fault recording

Up to 4 most recent faults with phase-by-phase reports prior to and during fault conditions.

- Disturbance recording

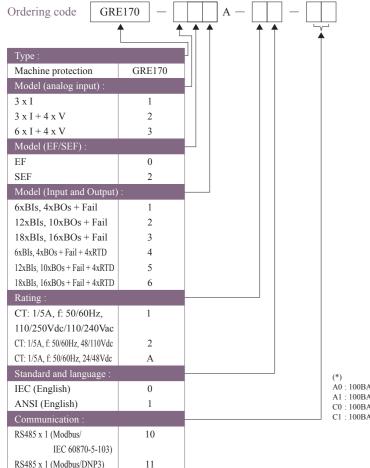
8 analog and 32 binary signal records.

Max. 5 records each of five seconds duration.

Communication

RS485: Modbus, DNP3 or IEC 60870-5-103

Ethernet (100Base-TX or 100Base-FX): Modbus, DNP3 or IEC 61850



(*) A0 : 100BASE-TX (Modbus/IEC 61850) x 1 port and RS485 (Modbus/IEC 60870-5-103) x 1 port A1 : 100BASE-TX (Modbus/IEC 61850/DNP3) x 1 port and RS485 (Modbus/DNP3) x 1 port

Dimensions and Weight

- 3.5kg (standard model)

2/3 x 19" (297mm) width.

- 4U (177mm) height,

163mm depth

A1: 100BASE-1X (Modbus/IEC 61850/DNP3) x 1 port and RS485 (Modbus/IEC 60870-5-103) x 1 port C0: 100BASE-FX (Modbus/IEC 61850) x 1 port and RS485 (Modbus/IEC 60870-5-103) x 1 port

C1 : 100BASE-FX (Modbus/IEC 61850/DNP3) x 1 port and RS485 (Modbus/DNP3) x 1 port

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For others, see (*)

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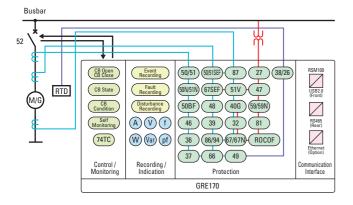
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TOSHIBA Leading Innovation >>> **GRE170 Machine Protection**

GRE-Series – GRE170

Multi-Function Machine Protection

GRE170 is a fully numerical multi-function machine protection device designed for medium and small capacity generator and motor protection applications, drawing upon proven technologies developed over more than 100 years, and providing a comprehensive range of protection and control functions.







Features

- Protection of generators and motors
- Basic machine protection and comprehensive backup protection including directional and non-directional overcurrent and earth fault protection, thermal overload and optional current differential protection and RTD input for temperature measurement.
- Feeder manager device with CB control function, 43R/L switch and comprehensive support functions
- Compact and cost-effective design
- Elementary, environmentally-friendly, easy to use and featuring enhanced product concepts

Functions

- Protection

Inrush restraint (2f & 5f)

Undervoltage (27) - option

Reverse power (32) - option

Undercurrent (37) Bearing and stator temperature (38/26) - option

Mechanical jam / load jam (39)

Loss of field protection (40G) - option

NPS-OC (46)

Phase sequence check - NOV (47) - option

Thermal Overload (49)

Phase Fault O/C (50/51P)

Earth Fault O/C (50/51N)

Sensitive earth fault protection SEF/SEFI - option

Voltage restricted OCI (51V) - option

Circuit Breaker Fail (50BF)

Phase O/V (59) - Option

Zero-phase sequence voltage protection (59N) - option

Restart inhibit protection (66)

Directional overcurrent protection (67) - option

Directional earthfault protection (67N) - option

Directional sensistive earthfault protection (67N) - option

Over/Under Frequency (81U/O) - option

Frequency rate of change (df/dt) - option

Current differential (87) - option

Lockout and trip relay (86/94)

- Control

Local/Remote Control Autoreclose and synch check (79/25)

- Monitoring

Motor start supervision

Trip circuit supervision (74TC)

Self supervision

CB State Monitoring Trip Counter Alarm

ΣI^y Alarm

CB Operate Time Alarm

RTD monitoring

- Communication

USB port

Remote communication (Modbus, DNP3, IEC 60870-5-103 and IEC 61850)

- Others

Two setting groups Menu-based HMI (16 x 8 characters) Configurable LED (8 fixed and 6 configurable) Programmable Logic Controller (PLC)