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, Q, 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 fault/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

Dimensions and Weight

- 4U (177mm) height,
  2/3 x 19" (297mm) width,
  163mm depth
- 3.5kg (standard model)

Ordering code

GRE160 — [ ][0][ ] A — [ ][ ] — [ ][ ]

Type :	
Transformer protection	GRE160
Model (analog input) :	
2 x 3I	1
2 x 3I + 2 x Ie	2
2 x 3I + 1 x V	3
2 x 3I + 2 x Ie + 1 x V	4
2 x 3I + 2 x Ie + 4 x V	5
Model (Input and Output) :	
6xBIs, 4xBOs + Fail	0
12xBIs, 10xBOs + Fail	1
18xBIs, 16xBOs + Fail	2
Rating :	
CT: 1/5A, f: 50/60Hz, 110/250Vdc/110/240Vac	1
CT: 1/5A, f: 50/60Hz, 48/110Vdc	2
CT: 1/5A, f: 50/60Hz, 24/48Vdc	A
Standard and language :	
IEC (English)	0
ANSI (English)	1
Communication :	
RS485 x 1 (Modbus/ IEC 60870-5-103)	10
RS485 x 1 (Modbus/DNP3)	11
For others, see (*)	

(*)
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
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

TOSHIBA

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TOSHIBA

Leading Innovation

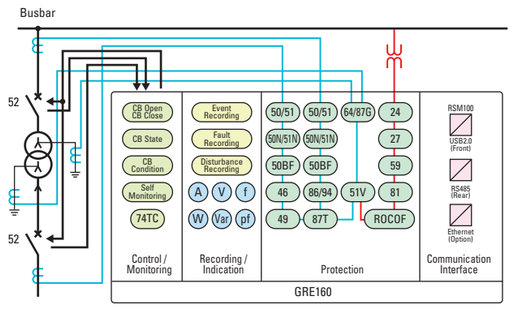
GRE160

Transformer Protection

GRE-Series – GRE160

Multi-Function Transformer Protection

GRE160 is a fully numerical multi-function transformer protection device designed for two-winding transformer 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 two-winding transformer
- Current differential protection and comprehensive backup protection including overcurrent and earth fault protection, restricted earth fault protection, overexcitation protection etc.
- Feeder manager device with 2 x 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
  - Current differential (87T)
  - Inrush restraint (2f and 5f)
  - Overexcitation (24) – option
  - Undervoltage (27) – option
  - NPS-OC (46)
  - Thermal Overload (49)
  - Phase Fault O/C (50/51P)
  - Earth Fault O/C (50/51N)
  - Voltage restricted OCI (51V) – option
  - Circuit Breaker Fail (50BF)
  - Phase O/V (59) – Option
  - Restricted Earth Fault (64 & 87G) – option
  - Over/Under Frequency (81U/O) – option
  - Frequency rate of change (df/dt) – option
  - Lockout and trip relay (86/94)
- Control
  - Local/Remote Control
- Monitoring
  - Trip circuit supervision (74TC)
  - Self supervision
  - CB State Monitoring
  - Trip Counter Alarm
  - ΣI^y Alarm
  - CB Operate Time Alarm
- 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)