

Ancillary functions

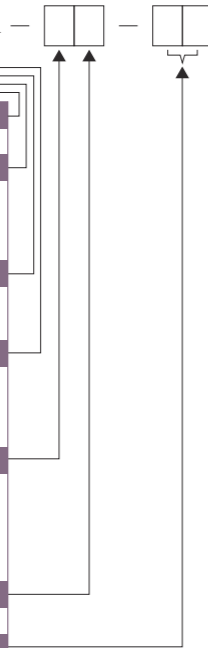
- Metering functions:
  - Phase currents (Ia, Ib, Ic), Zero sequence current (In1, In2)
  - Sequence currents (I1, I2), Ratio of sequence currents (I2/I1)
  - Phase voltages (Va, Vb, Vc), Phase-to-phase voltage (Vab, Vbc, Vca), Residual voltage (Vn)
  - Symmetrical component voltages (V1, V2, V0)
  - Power (P, Q, S), Power factor (PF)
  - 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 or IEC 60870-5-103

Dimensions and Weight

- 4U (177mm) height,
- 1/2 x 19" (223mm) width (for model 1x0, 1x1, 1x2, 2x0, 2x1 and 2x2),
- 2/3 x 19" (297mm) width (for model 3x0, 3x1 and 3x2)
- 163mm depth
- 2.5kg (for model 1x0, 1x1, 2x0 and 2x1)
- 3.0kg (for model 1x2 and 2x2)
- 3.4kg (for model 3x0 and 3x1)
- 4.0kg (for model 3x2)

Ordering code GRE170 - [ ] A - [ ] - [ ]

Type :	
Machine protection	GRE170
Model (analog input) :	
1 x three-phase CT	1
1 x three-phase CT + 4 x single-phase VT	2
2 x three-phase CT + 4 x single-phase VT	3
Model (EF/SEF) :	
EF	0
SEF	2
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
Communication :	
RS485 1 port (Modbus/ IEC 60870-5-103)	10



# TOSHIBA

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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

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| <ul style="list-style-type: none"> <li>- Protection                     <ul style="list-style-type: none"> <li>Inrush restraint (2f &amp; 5f)</li> <li>Undervoltage (27)</li> <li>Reverse power (32)</li> <li>Undercurrent (37)</li> <li>Mechanical jam / load jam (39)</li> <li>Loss of field protection (40G)</li> <li>NPS-OC (46)</li> <li>Phase sequence check – NOV (47)</li> <li>Start protection and locked rotor protection (48/50S/51L.R)</li> <li>Thermal Overload (49)</li> <li>Phase Fault O/C (50/51P)</li> <li>Earth Fault O/C (50/51N)</li> <li>Sensitive earth fault protection SEF/SEFI</li> <li>Voltage controlled/Restraint overcurrent (51V)</li> <li>Circuit Breaker Fail (50BF)</li> <li>Phase O/V (59)</li> <li>Zero-phase sequence voltage protection (59N)</li> <li>Restart inhibit protection (66)</li> <li>Directional overcurrent protection (67)</li> <li>Directional earthfault protection (67N)</li> <li>Directional sensitive earthfault protection (67N) Over/Under Frequency (81U/O)</li> <li>Frequency rate of change (df/dt)</li> <li>Current differential (87)</li> <li>Lockout and trip relay (86/94)</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>- Control                     <ul style="list-style-type: none"> <li>Local/Remote Control</li> </ul> </li> <li>- Monitoring                     <ul style="list-style-type: none"> <li>Motor start supervision</li> <li>Trip circuit supervision (74TC)</li> <li>Self supervision</li> <li>CB State Monitoring</li> <li>Trip Counter Alarm</li> <li><math>\Sigma I^2</math> Alarm</li> <li>CB Operate Time Alarm</li> </ul> </li> <li>- Communication                     <ul style="list-style-type: none"> <li>USB port</li> <li>Remote communication (Modbus and IEC 60870-5-103)</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>- Others                     <ul style="list-style-type: none"> <li>Two setting groups</li> <li>Menu-based HMI (16 x 8 characters)</li> <li>Configurable LED (8 fixed and 6 configurable)</li> <li>Programmable Logic Controller (PLC)</li> </ul> </li> </ul> |
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