SR489
Generator Management Relay

Economical protection, metering, and monitoring functions for small and medium sized generators.
• Product Highlights
• Inputs / Outputs
• Generator Protection
• Power Metering
• Diagnostics
• Communications/ 489PC
• Simulation
• Order Code
• Comprehensive generator protection
• Synchronous and Induction generators at 25, 50 and 60 Hz
• 12 Samples/cycle
• Percent Differential Protection
• Product Upgrades via Diskette/CD/Internet
• Stator and Bearing RTD Monitoring and Modeling
Inputs/RTDs

- 12 RTDs, field programmable type
- Independent trip and alarm settings
- Trip voting
- Feedback to thermal model
- Programmable RTD name
- Open sensor detection
- Short or Low Temp Detection
Digital Inputs

- 9 digital inputs
- 2 pre-defined
  - Setpoint Access
  - Breaker Status (52/a or 52/b)
- 7 assignable
  - Remote Reset
  - Test Input
  - Thermal Reset
  - Dual Setpoints
  - Sequential Trip
  - Field Breaker Discrepancy
  - Tachometer (one closure/revolution)
  - General & Programmable
Analog Inputs

- 4 analog inputs
- Settings of 4-20, 0-20 or 0-1mA
- Assignable name
- Min., max., & units
- Block from start
- Under or over thresholds
- Trip or alarm
- Delay
Outputs

• 6 output relays
  – Form C
  – 10A/30-250 Vac or dc, 30A for 0.2 sec.
• 4 programmable analog outputs
  – 4-20 or 0-1 mA (as ordered)
  – 29 programmable parameters
• 2 RS485 ports
• 1 front panel RS232 port
• 22 front panel status indicators
• 40 character vacuum florescent display and keypad
  – Up to 20 selectable scrolling display messages
  – User defined text messages
Protection

- Machine Fault Protection
- Stator Ground Protection
- Stator Thermal Protection
- Bearing Protection
- Excitation Protection
- Generator Fault backup
- Differential
- Stator/Bearing/Other
- Ambient RTD
Protection

- 87G - Phase differential
  - Dual Slope
- 64 - 100% Stator ground
  - 95% Fundamental O/V
  - 15% Third Harmonic U/V
- 50/51N - Ground overcurrent
- 32 - Anti-motoring
- 40Q - Loss of excitation
- 46 - Negative sequence OC
- Inadvertent energization
- Breaker failure detection
- Trip coil monitor
Protection

- 50S - Instantaneous OC (startup)
- 51 - Phase overcurrent
  - Voltage Restraint Choice (System Backup)
- 24 - Overexcitation, Volts/Hz
- 27 - Undervoltage (Curve Choice)
- 59 - Overvoltage (Curve Choice)
- 47 - Voltage phase reversal
- 81U - Underfrequency (2 units)
- 81O - Overfrequency (2 Units)
- Bearing overtemperature, vibration
- Overspeed
- VT Fuse Failure
- Programmable Time Current Curves
Metering & Monitoring

- Phase amps
- Neutral amps
- Differential amps
- Negative sequence current
- % load
- % unbalance
- Voltage (VLN, VLL)
- MW, Mvar, MVA
- MWh, + Mvarh, - Mvarh
- PF
- Frequency
- Demand (A, MW, Mvar, MVA and peak demand)
  - Alarm levels for A, MW, Mvar, MVA demand
Metering & Monitoring

- RTD temperatures
- Speed RPM (tach. input)
- 4 analog inputs
- Learned parameters
  - Max. RTDs
  - Min./Max. analog inputs
Maintenance & Diagnostics

- **Statistical data on:**
  - Number of trips
  - Type of trips
  - Number of starts
  - Number of breaker operations
  - Number of running hours
  - Last 40 events recorded (time and date stamped)

- **Last trip data & pre-trip data**

- **Trip & alarm pickups**

- **Digital input status**

- **Waveform capturing - 16 cycles**

- **Self-test diagnostics with Alarm Contact**
Simulation Mode

- Allows testing without external test equipment
- Suspends all A/D operations
- Pre-fault setup
- Fault setup
- Test output relays
- Test analog input
Communications/489PC

- **3 serial ports**
  - RS232 (front)
  - Two RS485 (back)

- **Modbus RTU protocol**

- **489PC**
  - Future upgrades - Flash Memory
  - Setpoint programming
  - Metering values
  - Oscillography
  - Event Recorder
  - Simulation mode for testing/training
  - Help - instruction manual
  - File - Open, Save, Send to Relay
## Order Code

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>1 Amp CT Inputs</td>
</tr>
<tr>
<td>P5</td>
<td>5 Amp CT Inputs</td>
</tr>
<tr>
<td>LO</td>
<td>20-60Vdc, 20-48Vac Control Pwr</td>
</tr>
<tr>
<td>HI</td>
<td>90-300Vdc, 70-265Vac Control Pwr</td>
</tr>
<tr>
<td>A1</td>
<td>0-1 mA Analog Outputs</td>
</tr>
<tr>
<td>A20</td>
<td>4-20 mA Analog Outputs</td>
</tr>
</tbody>
</table>