



# 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

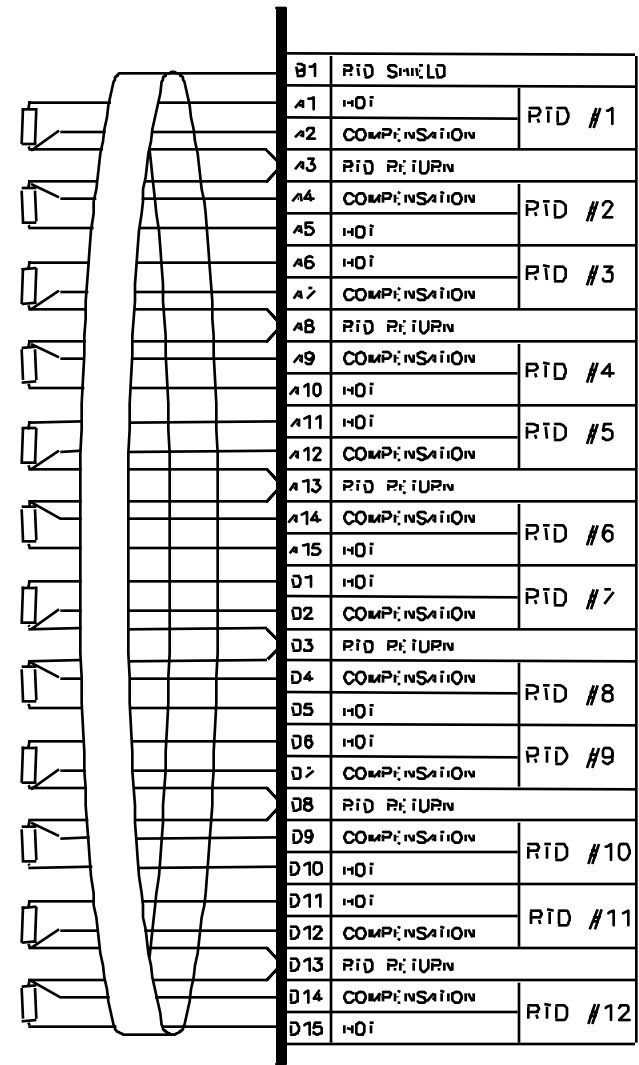


Digital Generation Protection

# 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

## RTD wiring



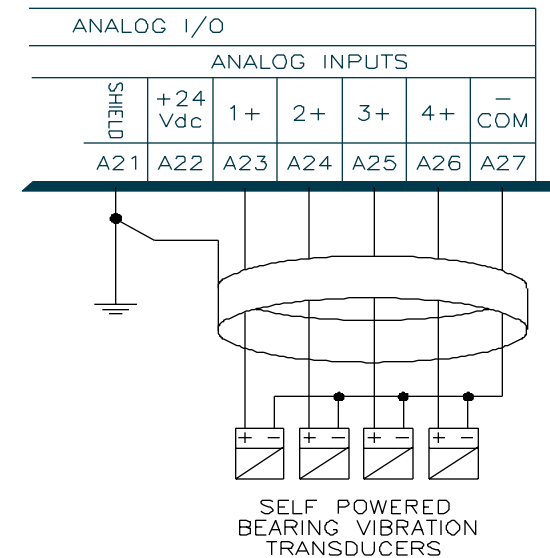
SR489 Relay





# 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





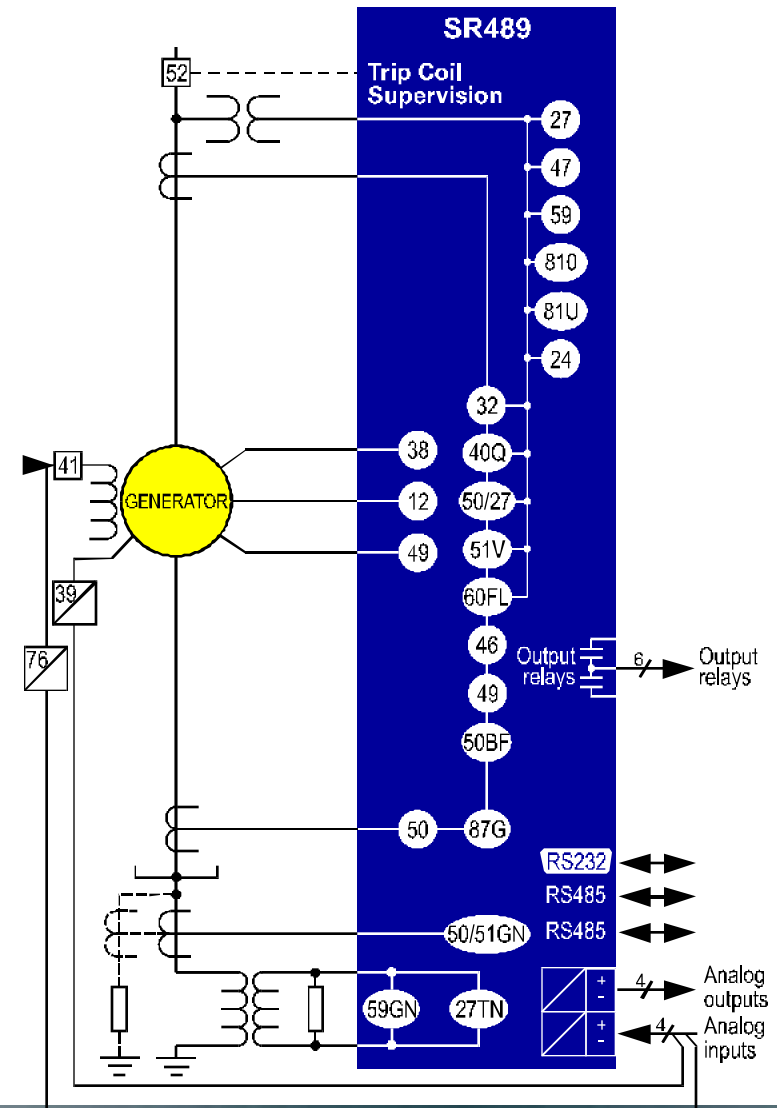
# Outputs

- 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



500793E4.CDR

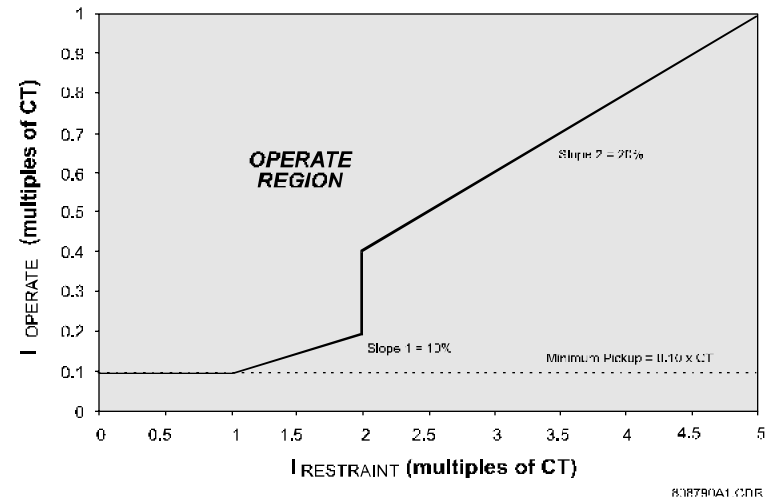




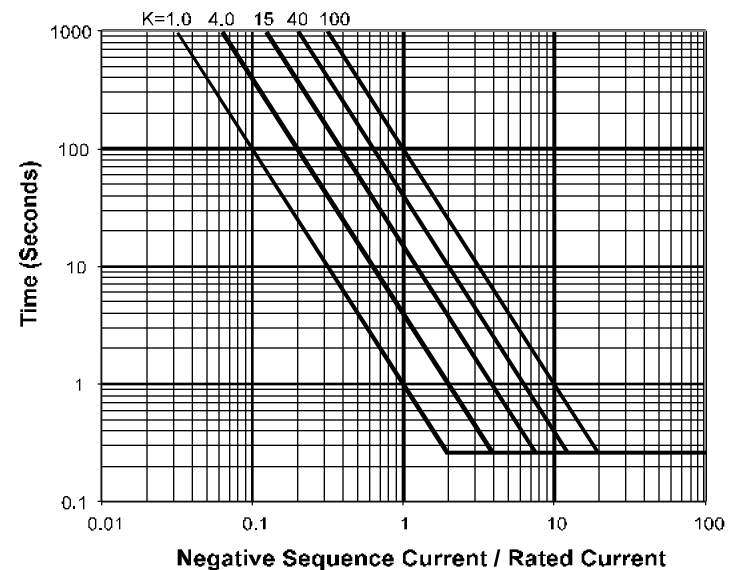
# Protection

- **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**

87G



46

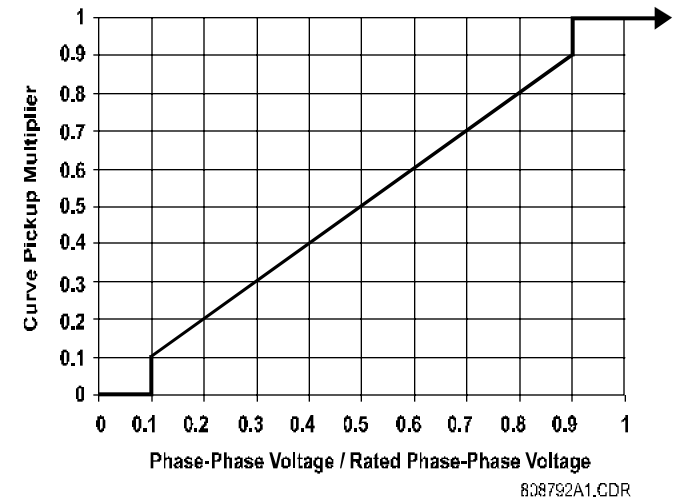




# Protection

- **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**

51V





## **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

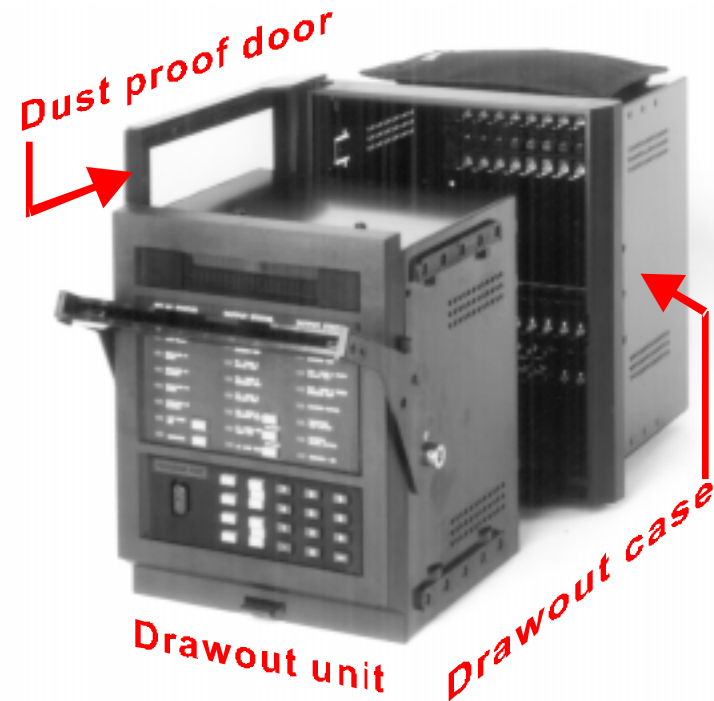
- RTD temperatures
- Speed RPM (tach. input)
- 4 analog inputs
- Learned parameters
  - Max. RTDs
  - Min./Max. analog inputs





# 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

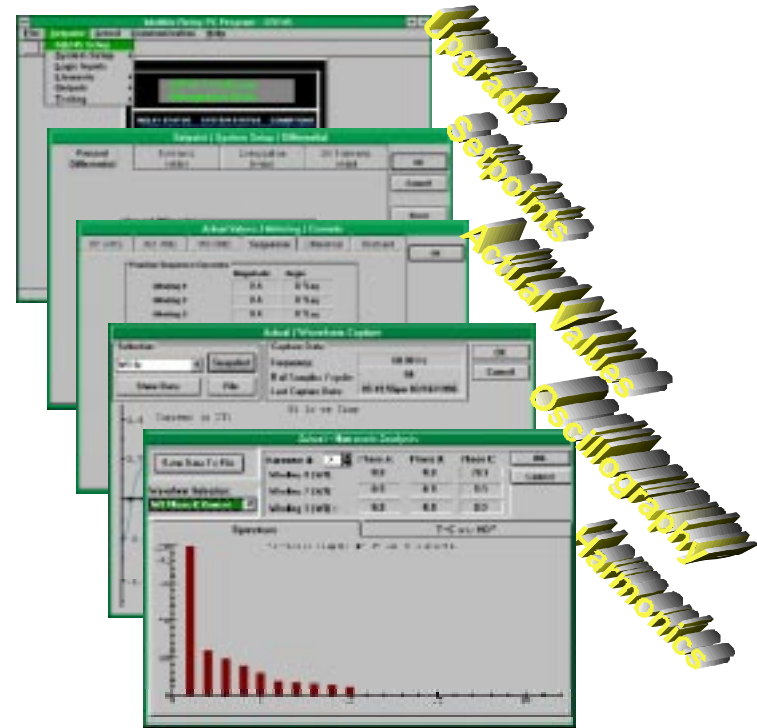
- Allows testing without external test equipment
- Suspends all A/D operations
- Pre-fault setup
- Fault setup
- Test output relays
- Test analog input





# 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

SR489	*	*	*	Base Unit
P1				1 Amp CT Inputs
P5				5 Amp CT Inputs
LO				20-60Vdc, 20-48Vac Control Pwr
HI				90-300Vdc, 70-265Vac Control Pwr
A1				0-1 mA Analog Outputs
A20				4-20 mA Analog Outputs