The Multilin™ 469 Motor Protection System, a member of the SR family of relays, provides protection, control, simplified configuration and advanced communications in a cost effective industry leading draw-out construction. Designed for medium voltage motors, the 469 delivers advanced protection with customizable overload curves and single CT differential protection for added flexibility. The 469 also provides simplified configuration using the Motor Settings Auto-Configurator, providing a quick and easy set-up of motor parameters. Coupled with advanced protection and diagnostics, the 469 provides users the flexibility of multiple communication protocols allowing integration into new and existing control networks.

Key Benefits

- Comprehensive motor protection plus voltage dependant overload curves, torque metering and protection, broken rotor bar protection
- Most advanced thermal model - Including multiple RTD inputs for stator thermal protection
- Minimize replacement time - Draw-out construction
- Complete asset monitoring - Temperature, Analog I/O, full metering including demand & energy
- Improve uptime of auxiliary equipment - Through I/O monitoring
- Reduce troubleshooting time and maintenance costs - Event reports, waveform capture, data logger
- Built in simulation functions simplify testing and commissioning
- Cost Effective Access to information - Through standard RS232 & RS485 serial ports, and optional Ethernet and DeviceNet Ports
- Field upgradable firmware and settings
- Optional Conformal coating for exposure to chemically corrosive or humid environments

Applications

- Protection and Management of three phase medium and large horsepower motors and driven equipment, including high inertia, two speed and reduced-voltage start motors

Protection and Control

- Thermal model biased with RTD and negative sequence current feedback
- Start supervision and inhibit
- Mechanical jam
- Voltage compensated acceleration
- Undervoltage, overvoltage
- Underfrequency
- Stator differential protection
- Thermal overload
- Overtemperature protection
- Phase and ground overcurrent
- Current unbalance
- Power elements
- Torque protection
- Dual overload curves for 2 speed motors
- Reduced voltage starting control

Communications

- Multiple Ports - 10baseT Ethernet, RS485, RS232, RS422, DeviceNet
- Multiple Protocols - Modbus RTU, Modbus TCP/IP, DeviceNet

Monitoring & Metering

- A, V, W, var, VA, PF, Hz, Wh, varh, demand
- Torque, temperature (12 RTDs)
- Event recorder
- Oscillography & Data Logger (trending)
- Statistical information & learned motor data

EnerVista Software

- State of the art software for configuration and commissioning Multilin products
- Document and software archiving toolset to ensure reference material and device utilities are up-to-date
- EnerVista™ Integrator providing easy integration of data in the 469 into new or existing monitoring and control systems
### Technical Specifications

**Protection**

**Phase Short Circuit**
- **Pickup Level:** 2 to 20 x CT primary in steps of 0.1 of any one phase
- **Time Delay:** 0 to 100 ms in steps of 10
- **Pickup Accuracy:** as per Phase Current Inputs
- **Timing Accuracy:** ±5 ms

**Reduced Voltage Start**
- **Transition Level:** 25 to 100% FLA in steps of 1
- **Transition Time:** 0 to 50 s in steps of 1
- **Transition Control:** Current, Timer, Current and Timer

**Overload/Dwell Protection/Thermal Model**
- **Overload Curves:** ±5 Standard Overload Curves, Custom Curve, Voltage Dependent, Custom Current for high inertia, starting (all curves time out against average phase current)
- **Curve Biasing:** 
  - Phase Unbalance
  - Hot/Cold Curve
  - Stator RTD
  - Running Cool Rate
  - Line Voltage

**Mechanical JAM**
- **Pickup Level:** 1.01 to 3.00 x FLA in steps of 0.01 of any one phase, blocked on start 1 to 30 s in steps of 1
- **Time Delay:**
- **Pickup Accuracy:** as per Phase Current Inputs
- **Timing Accuracy:** ±0.5 or ±0.5% of total time
- **Elements:** Trip and Alarm

**Undercurrent**
- **Pickup Level:** 0.01 to 0.99 x CT Trip 0.01 to 0.95 x CT Alarm in steps of 0.01 of any one phase
- **Time Delay:** 1 to 60 s in steps of 1
- **Block From Start:** 0 to 15000 s in steps of 1
- **Pickup Accuracy:** as per Phase Current Inputs
- **Timing Accuracy:** ±0.5 or ±0.5% of total time
- **Elements:**

**Current Unbalance**
- **Unbalance:** ±1 / ±10 / ±100 + FLA
- **Range:** 0 to 100% U/B in steps of 1
- **Pickup Level:** 1 to 60 s in steps of 1
- **Time Delay:** 1 to 60 s in steps of 1
- **Pickup Accuracy:** as per Phase Current Inputs
- **Timing Accuracy:** ±0.5 or ±0.5% of total time
- **Elements:** Trip and Alarm

**Phase Differential**
- **Pickup Level:** 0.01 to 1.0 x CT primary in steps of 0.01 of any one phase
- **Time Delay:** 0 to 1000 ms in steps of 10
- **Pickup Accuracy:** as per Phase Differential Current Inputs
- **Timing Accuracy:** ±50 ms
- **Elements:**

**Ground instantaneous**
- **Pickup Level:** 0.1 to 1.0 x CT primary in steps of 0.01 of any one phase
- **Time Delay:** 0 to 1000 ms in steps of 10
- **Pickup Accuracy:** as per Ground Current Input
- **Timing Accuracy:** ±50 ms
- **Elements:** Trip and Alarm

**Acceleration Timer**
- **Pickup:** Transition of no phase current to overload pickup
- **Dropout:** When current falls below overload pickup
- **Time Delay:** 1.0 to 250.0 s in steps of 1
- **Timing Accuracy:** ±100 ms or ±0.5% of total time
- **Elements:** Trip

**Restart Block**
- **Starts/Hours:** 1 to 5 in steps of 1
- **Time between Starts:** 1 to 1000 min.
- **Timing Accuracy:** ±0.5 or ±0.5% of total time
- **Elements:** Block

**Under Voltage**
- **Pickup Level:** Motor Starting: 0.60 to 0.99 x Rated in steps of 0.01
- **Time Delay:** 0 to 60 s in steps of 0.1
- **Pickup Accuracy:** as per Voltage Inputs
- **Timing Accuracy:** ±100 ms or ±0.5% of total time
- **Elements:** Trip and Alarm

**DIGITAL INPUTS**

**Remote Switch**
- **Configurable:** Assignable to Digital Inputs 1 to 4
- **Timing Accuracy:** ±100 ms max
- **Elements:** Trip and Alarm

**Speed Switch**
- **Configurable:** Assignable to Digital Inputs 1 to 4
- **Time Delay:** 1.0 to 250.0 s in steps of 0.1
- **Timing Accuracy:** 100 ms max
- **Elements:** Trip

**Load Shed**
- **Configurable:** Assignable to Digital Inputs 1 to 4
- **Timing Accuracy:** ±100 ms max
- **Elements:** Trip

**Pressure Switch**
- **Configurable:** Assignable to Digital Inputs 1 to 4
- **Time Delay:** 0 to 60 s in steps of 1
- **Starts/Hour:** 0 to 5000 s in steps of 1
- **Pickup Accuracy:** as per Phase Current Inputs
- **Timing Accuracy:** ±0.5 or ±0.5% of total time
- **Elements:** Trip and Alarm

**Shunt Switch**
- **Configurable:** Assignable to Digital Inputs 1 to 4
- **Time Delay:** 0.1 to 1.0 x 5000 s in steps of 1
- **Timing Accuracy:** ±100 ms or ±0.5% of total time
- **Elements:** Trip and Alarm

**Vibration Switch**
- **Configurable:** Assignable to Digital Inputs 1 to 4
- **Time Delay:** 0.1 to 1.0 x 5000 s in steps of 1
- **Timing Accuracy:** ±100 ms or ±0.5% of total time
- **Elements:** Trip and Alarm

**Digital Counter**
- **Configurable:** Assignable to Digital Inputs 1 to 4
- **Count Frequency:** < 100 ms or ±0.5% of total time
- **Elements:** Trip and Alarm

**Tachometer**
- **Configurable:** Assignable to Digital Inputs 1 to 4
- **RPM Range:** 0 to 2000 RPM
- **Pulse Duty Cycle:**
- **Elements:** Trip and Alarm

**General Purpose**
- **Configurable:** Assignable Digital Inputs 1 to 4
- **Time Delay:** 0 to 5000 s in steps of 1
- **Timing Accuracy:** ±100 ms or ±0.5% of total time
- **Elements:** Trip and Alarm

**Voltage Inputs**
- **VT Ratio:** 1.0 to 150.0 in steps of 0.01
- **VT Secondary:** 20 - 120 Hz
- **Nominal Frequency:** 50 - 60 Hz
- **Burden:** ±0.5% of full scale
- **Accuracy:** ±0.5% of full scale
- **Max. Connections:** ±10% or ±0.5% of full scale
- **Elements:**

**Current Input**
- **Isolation:** < 100 Ms
- **Applicable Voltage:** 9 opto-isolated inputs
- **External Switch:** dry contact < 400 mA, or open collector NPN transistor from sensor; 6 mA sinking from internal 4 K sensor; 6 mA sinking from internal 4 K
- **Potential:** ±5 V

**RTD Inputs**
- **3 wire RTD Types:**
  - Platinum (DN 43160), 100 Ohm Nickel, 120 Ohm Copper

**RTD Sensing**
- **Current:** 5 mA
- **Isolation:** 36 Vpk (isolated with analog inputs and outputs)
- **Range:** +50 to +250°C
- **Accuracy:** ±0.5% of full scale
- **Limit Resistance:** Max per lead for Pt and Ni type Max per lead for Cu type
- **No Sensor:** < ±0.5°C
- **Short/Load Alarm:** < -50°C

**Trip Coil Supervision**
- **Applicable Voltage:** 20 to 300 V DC / V AC
- **Trickle Current:** 2 to 5 mA

**Analogue Current Inputs**
- **Current Inputs:**
  - 0 to 1 mA, 0 to 20 mA, 4 to 20 mA (setpoint)
  - Input Impedance: 2 KΩ ±10%
- **Conversion Resistance:** 0 to 25 mΩ
- **Accuracy:** ±1% of full scale
- **Type:** passive

**Analogue Input Summary**
- **Conversion:** 24 V DC at 100 mA maximum
- **Response Time:** 0 to 100 ms

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Please refer to Multih 469 Motor Protection System Instruction Manual for complete technical specifications.

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### Technical Specifications (continued)

#### ORDERING

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>469</td>
<td>Basic Unit</td>
</tr>
<tr>
<td>P1</td>
<td>1 A phase CT secondaries</td>
</tr>
<tr>
<td>P5</td>
<td>5 A phase CT secondaries</td>
</tr>
</tbody>
</table>

#### BODY RELAYS

- **Options:**
  - LO (H must be specified with order)
  - HI
  - LO: 20 to 60 V DC AC: 20 to 48 V AC at 48 to 62 Hz
  - HI: 90 to 300 V DC

- **Power:**
  - 45 VA (max), 25 VA typical

- **Operation:**
  - Proper operation time without supply voltage: 30 ms

#### COMMUNICATIONS

- **RS232 Port:**
  - 1: Front panel, non-isolated
  - 2: Isolated at 36 Vpk
- **RJ45 Ports:**
  - 6: Isolated at 36 Vpk
- **Baud Rates:**
  - 36 Vpk
- **Protocol:**
  - Modbus RTU / half duplex
- **Ethernet Port:**
  - 10BaseT, RJ45 Connector
  - Modbus RTU over TCP/IP

#### MONITORING

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Factor</td>
<td>0.01 lead or to 1.00</td>
<td>±1.5%</td>
</tr>
<tr>
<td>Pickup Level</td>
<td>0.99 to 0.05 in steps of 0.01</td>
<td>±0.5%</td>
</tr>
<tr>
<td>Time Delay</td>
<td>0 to 10.0 s in steps of 1</td>
<td>±2%</td>
</tr>
<tr>
<td>Block From Start</td>
<td>0 to 5000 s in steps of 1</td>
<td>±1%</td>
</tr>
<tr>
<td>Timing Accuracy</td>
<td>±100 ms or ±0.5% of total time</td>
<td>±2%</td>
</tr>
<tr>
<td>Elements</td>
<td>Trip and Alarm</td>
<td>±50 ms</td>
</tr>
</tbody>
</table>

#### OUTPUT RELAYS

- **Configuration:** 6 Electromechanical Form C
- **Contact Material:** silver alloy
- **Material:** 100% copper
- **Dimensions:** 2.50 x 0.50 x 0.25 inches
- **Operation:** 10 mA
- **Max ratings for 10000 operations**

#### POWER SUPPLY

- **Voltage:**
  - DC: 50 VDC
  - AC: 250 VAC
- **Breakdown Voltage:**
  - 70 VDC
  - 75 VAC
- **Input Current:***
  - 5 A
  - 250 VA

#### CONTROL POWER

- **Hi Range:**
  - DC: 20 to 60 V DC AC: 20 to 48 V AC at 48 to 62 Hz
  - 90 to 300 V DC
- **Hi Range:**
  - 70 to 265 V AC at 48 to 62 Hz
  - 45 VA (max), 25 VA typical
- **Contact Delay:**
  - 0.2 to 30.0 s in steps of 1
- **Pickup Level:**
  - ±1 to 25000 kW in steps of 1
- **Pickup Accuracy:**
  - ±0.5% of 3-PHASE REAL POWER

#### METERED REACTIVE POWER

- **Range:**
  - ±1% of 3-PHASE APPARENT POWER
- **Accuracy:**
  - ±1% of ±0.5% of total time
- **Elements:**
  - Trip and Alarm

#### METERED reactive ENERGY CONSUMPTION

- **Range:**
  - ±1% of ±0.5% of total time
- **Accuracy:**
  - ±1.5% of ±0.5% of total time
- **Elements:**
  - Trip and Alarm

#### METERED ELECTRIC ENERGY CONSUMPTION

- **Range:**
  - ±2% of ±0.5% of total time
- **Accuracy:**
  - ±0.5% of ±0.5% of total time
- **Elements:**
  - Trip and Alarm

#### METERED ELECTRIC ENERGY generation

- **Range:**
  - ±2% of ±0.5% of total time
- **Accuracy:**
  - ±0.5% of ±0.5% of total time
- **Elements:**
  - Trip and Alarm

#### METERED reactive ENERGY generation

- **Range:**
  - ±2% of ±0.5% of total time
- **Accuracy:**
  - ±0.5% of ±0.5% of total time
- **Elements:**
  - Trip and Alarm

#### METERED ELECTRIC energy generation

- **Range:**
  - ±2% of ±0.5% of total time
- **Accuracy:**
  - ±0.5% of ±0.5% of total time
- **Elements:**
  - Trip and Alarm

#### CERTIFICATION

- **ISO:** Manufactured under an ISO9001 registered system.
- **CE:** EN60255-5 / EN60255-27 / EN61010-1 / EN61010-2
- **cULus:** UL508 / UL1053 / C22.2-No 14
- **Safety:** UL508 / UL1053 / C22.2-No 14

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