NewCode Motor Protection & Control Relay
NewElec designs and manufactures a wide range of superior electronic motor protection relays for both local and International markets. NewElec's goal, for the past 38 years, has been to exceed the expectations of every client by OFFERING quality products, outstanding customer service and greater value, thus optimizing system functionality and improved operational efficiency.

As experts in motor protection, NewElec is involved in every stage of the client's selection of the required protection relay offering ongoing functional and technical support. Our R&D division is continually designing the most up to date motor protection products to meet customer requirements.

NewElec's electronic motor protection relays can be found in refineries, mining, steel, petrochemical, pulp and paper, sugar mills, agriculture and material handling industries to name a few, both locally and internationally. The NewElec product range includes software programmable LV motor protection relays for process control applications, protection relays for LV and MV motors, relays for pump motor protection, as well as earth leakage protection relays.

NewElec is continually expanding and has recently installed a manufacturing division for its relay housings. This ensures that the final product meets NewElec's precise requirements.

With headquarters in Pretoria West, Gauteng, South Africa, NewElec was established in May 1978 and is accredited with ISO 9002.
Innovative solutions from South Africa’s Leading Motor Protection Specialists

Output Relays Status X 4 off
Digital Input Status X 7 off
User friendly latched fault diagnostic LED s
Fault acknowledgement / Reset
USB port
Infrared data acquisition port
Communications port with multi protocol support
• Plus ….  
• Expansion I/O comprising 8 Inputs and 4 Outputs  
• Expansion 4 channel RTD Module PTC 100 OR PT 100  
• Expansion Module 4 to 20 mA [2 IN / 2 OUT]  
• Relay Configuration MemoryCard
Management Features

• Apparent Power and Real Power Measurement
• Statistical Data
• Last 40 Faults Record
• Last 1440 Events Record
• 3 Phase Recorder
• Training Simulator
Apparent Power and Real Power Measurement

The relay distinguishes between real & apparent power consumption

Use this information and management skills to assess

Revision of motor sizes
Improve power factor
Reduce electricity bills
Create a greener footprint
Statistical data

Essential Statistical Data ensures that information retrieved from the relay can be used for maintenance purposes before failure of the drive. The Drive ID and Description ensure the information pertains to the correct drive. Various selectable Communication protocols mean that automation of the plant via PLC and SCADA systems is seamless.
Last 40 Faults Record

The Last 40 Faults Record is Date and Time stamped with the fault description, Running Hours of the drive, Current Maximum, Voltage Minimum and Breaker Clearance Time.

This information can be uploaded and stored for viewing in MS Excel later or data capture into a SAP system.

Particularly helpful for maintenance planning on a plant.
1440 Event Records

The Event Records are Date and Time stamped with the event description, Running Hours of the drive, Current Maximum, Voltage Minimum and Breaker Clearance Time.

Downloaded and viewed in MS Excel, the event records will show setting changes, stops and starts of the drive, alarm conditions and trips.
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3 Phase Recorder

The 3 Phase Recorder allows the user to record the motor currents, voltages, thermal capacity and power factor. The motor performance can be monitored and analysed in real time.

Particularly useful when tripping occurs for no obvious reason. The recorder alleviates to some degree the need for sophisticated equipment to be carried round the plant.
Training Simulator

The Training Simulator is a tool that can be used to simulate running conditions. This allows the user to determine what the relay will do to protect the motor. Training of employees is essential for familiarisation and understanding of the protection equipment.
Benefits of the Management Features

- Lower energy costs can be achieved
- A better green footprint is obtainable
- Preventative maintenance is possible
- More Efficient Production is achievable
Protection Features

- Over Current (Overload) Detection
- Underload (Minimum load) Detection
- Unbalanced Phase Current Detection
- Single Phase (Phase Loss) Detection
- Run Stall Detection
- Vectorial Stall Detection
- Starts per Hour Control
- Short Circuit Detection
- Voltage Symmetry Detection
- Over Voltage Detection
- Under Voltage Detection
- High or Low Frequency Detection
- Voltage Phase Rotation Detection
- Insulation Failure Detection
- Earth Leakage Detection
- Earth Fault Detection
Over Current (Overload) Detection

- **Curve class settings**: 3 seconds to 40 seconds
- **IEC 60255-8 specification**
- **Motor full load setting (MLC)**: 10% to 100%
- **Reset**: Manual or three automatic resets per hour (when selected)
- **Reset threshold setting**: Adjustable from 10% to 80% Thermal Capacity or Dynamic Threshold
- **Dynamic Threshold Adjustment** determined over 10 last restarts
Under Current (Underload) Detection

- **Trip level adjustment:** 10% to 100%
- **Selection:** Current level or power factor %
- **Trip delay time:** 1 to 10 seconds
- **Start up delay:** 1 to 200 seconds (To facilitate pump priming)
- **Reset time:** Manual or 10 seconds to 6 hours (9 steps)
- **Feature selectable**
Unbalanced Phase Current Detection

- **Trip level adjustment**: 0 to 50%
- **Trip delay time**: 1 to 10 seconds
- **Reset**: Manual
- **Feature selectable**

Single Phase (Phase Loss) Detection

- **Trip delay time**: 1 second fixed
- **Feature selectable**
- **Reset**: Manual
Run-Stall Detection

- **Stall current trip level adjustment:** 110% to 300%
- **Stall trip delay time:** 0 to 120 seconds adjustable
- **Feature selectable**
- **Reset:** Manual
Vectorial Stall Detection

Vectorial Stall is detected during the start up procedure of the motor. A motor normally starts up with a bad power factor and gradually improves it as full speed is approached. If no power factor improvement is detected for longer then 33% of the curve class time the motor is tripped to prevent thermal and mechanical damage.

- **Trip:** Static or decreasing power factor
- **Trip delay:** 33% of curve class setting.
- **Reset:** Manual
- **Feature selectable**
Starts per Hour Control

- Starts setting: 1 to 60 starts per hour adjustable
- Consecutive starts: 1 to 3 starts per interval adjustable
- Reset: Automatic
- Feature selectable

Short Circuit Detection

- Articulated detection: If (ILOAD > 950% and Power factor < 85%) or (ILOAD > 300% and Power factor > 85%)
- Trip delay time: 1 second fixed
- Reset: Manual
- Feature selectable
Voltage Symmetry Detection

- Trip delay time: 10 seconds fixed
- Trip level adjustment: 70% to 99%
- Reset: Manual
- Feature selectable

Over Voltage Detection

- Trip delay time: 10 seconds fixed
- Trip level: Adjustable 1% - 15% Default 10%
- Reset: Manual
- Feature selectable
Under Voltage Detection

- **Trip delay time:** 10 seconds fixed
- **Trip level:** Adjustable 1% - 15% Default 10%
- **Feature selectable**
- **Reset:** Manual

High or Low Frequency Detection

- **Trip delay time:** 10 seconds fixed
- **Trip level:** Factory settings (45Hz to 55Hz)
- **Reset:** Manual
- **Feature selectable**
Voltage Phase Rotation Detection

- **Trip delay time:** 0.5 seconds.
- **Auto reset once fault is fixed**
- **Feature selectable (forward, reverse, none)**
Insulation Failure Detection

- Detection: Only in static state (motor not running)
- Trip delay time: 1 second fixed
- Trip level: Resistance < 20 kOhm (fixed)
- Reset: Manual
- Feature selectable
Earth Leakage Detection ($I_{EL} < 2A$)

- Selection between Instantaneous Definite Time or Inverse Define Minimum Time.
- Instantaneous Definite Time ($0.1 \text{ sec.} \leq t \leq 1 \text{ sec.}$), (0.05 sec. steps)
- Inverse Define Minimum Time (Std. Inv. TMS = 0.1)
- Harmonic filtering (suitable for VSD’s and soft starters)
- Trip level: Adjustable
- Reset: Manual
- Feature selectable
Earth Fault Detection \( (I_{EL} < 2A) \)

- Harmonic filtering (suitable for VSD’s and soft starters)
- Trip delay time: 1 second fixed
- Trip level: 2A fixed
- Reset: Manual
- Feature selectable
Setting up the Protection Features
Features and Control

- Input Voltages (110V to 550V)
- Power Dissipation Measurement
- Communication Protocols
- Field Inputs
- Programmable Outputs
- Timers
- Real Time Clock
- Spectrum Analyzer

- Calculators
- Free Frontend Software
- Logic Function Blocks
- Starter Logic
- Power Factor Measurement
Input Voltages

Direct measurement

- 110V
- 380V
- 400V
- 525V
- 550V

With converter

- 680V
- 950V
- 1100V

With PT (transformer)

- 3300V / 110V
- 6600V / 110V
- 11000V / 110V
Power Factor Measurement

- Is the relationship between real power and apparent power
  \[ \text{Power factor } \% = \left( \frac{(V \times I \times \cos \phi)}{(V \times I)} \right) \times 100\% \]
  \[ \text{Power factor } = \cos \phi \]
- Range: 0 to 100% (leading / lagging)

Power Dissipation Measurement

- Type: Apparent power (kVA) and Real power (kWatt)
- Derived from line voltage, phase voltage and power factor (where applicable)
Communication Protocols

- Profibus DPV-1
- ModBus
- CANbus
- DeviceNet [Under development]

Field Inputs and Programmable Outputs

- 7 Inputs
- 24 to 240V AC or DC
- LED Indication for High Inputs
- 4 Fully Programmable Output Relays
- Selectable dedicated fast trip output relay 1
- Single set of potential free switch-over contacts
Logic Function Blocks

- **Direct On Line Starter**
- **Star – Delta Starter**
- **Dahlander Starter**
- **Pole Changing Starter**
- **Soft Starter**
- **OCB Direct On Line Starter**

- **Direct On Line Reversal Starter**
- **Star – Delta Reversal Starter**
- **Dahlander Reversal Starter**
- **Pole Changing Reversal Starter**
- **Reverse Soft Starter**

- Adjustable maximum star / delta time: 1 to 100 sec
- Adjustable forward / reverse spin back time: 1 to 100 sec
- DC Breaking time up to 3000ms
- Selectable control sites: Local, remote or automatic (PLC control)
Control Logic Functions
Starter Set-up
Control Logic

- All configurable inputs have 73 possibilities which include alarm flags, trip flags, timer outputs, function block outputs, RTC output, starter outputs, digital field inputs, PLC inputs etc.

Logic Function Blocks

- Number of logic function blocks: 6
- Three fully configurable inputs per logic function block
- Sum of product or product of sums operation
Timers

- Timer A and Timer B
- Time setting: 0 to 50 minutes
- Start input: Configurable
- Reset / Inhibit input: Configurable

Real Time Clock (24 Hour)

- Start / Stop time: Hours and minutes configurable
- 24 hour clock (Year, month, date, hours and minutes)
- Battery backup (5 days with 1 Farad super capacitor)
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Spectrum Analyzer
Motor Protection Related Calculators
Frontend Software: Actual Values
Advantages of using NewElec relays

- Local design and Manufacture
- 1 Year warranty on all our products (Including after repair)
- Relays can be repaired at 50% of their list price
- Local support backed up by our excellent customer service
- Ongoing new product development
- 30 years of Local and International experience
Approvals

- Profibus Certification
- ISO 9001 Accreditation since November 2001
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We provide a 1 year renewable guarantee

We repair products out of guarantee for 50% of their list price and renew the guarantee

Local support
Applications particularly well suited for use in conjunction with the NewElec range of electronic motor protection relays.