NewCode
Comprehensive Motor Protection and Control Relay

A South African Company to be Proud of
INTEGRATED STARTER CONTROL

- DOL Fwd/Rev
- Star Delta Fwd/Rev
- Dahlander Fwd/Rev
- Pole Changing Fwd/Rev
- Soft Starter Fwd/Rev
- OCB DOL/Pulsed Trip Repeat

TYPICAL PROTECTION APPLICATION
About

The NewCode Relay is an ISO 9001:2008 compliant, three-phase motor protection relay, designed and manufactured in South Africa. It is a micro-controller based precision instrument for three-phase induction motor protection with advanced control logic features as well as multiple motor starter control circuit configurations. The relay is designed for the low voltage motor protection market. The current transformers, including the core balance current transformers are external. Certain models cater for combined current and core balance current transformers, maximum flexibility is maintained by allowing separate C.B.C.T’s with interposing current transformers with a software selectable, 1 to 10 amp secondary winding, Class 1, 5VA.

Protection Features:
- Thermal Overload
- Locked Rotor
- Running Stall – Jam
- Vectorial Stall - Start Stall
- Unbalanced Current
- Single Phasing
- Minimum Load – Underload - Dry Run
- Earth Leakage
- Earth Fault
- Short-circuit
- Starts per Hour Limitation
- Overvoltage – Undervoltage
- Phase Rotation
- Over Frequency – Under Frequency
- Main-Circuit Insulation Failure Lock-Out

Management Features:
- Power Factor Measurement
- Power Consumption Measurement
- Statistical Data
- 1400 Event Records with time and date stamp
- 35 Last Fault Records with time and date stamp

Configurable Automation Features:
- Timers
- Real Time Clock (24 Hour)
- Starter Controller Logic
- Logic Function Blocks
- 7 Field Inputs
- Motor Parameter Calculator
- 4 Programmable Outputs
- 3 Phase Recorder
- On-board Simulator for Training / Commissioning
- Multiple Communication Protocols

The NewCode relay is fully configurable with the aid of frontend software or a man machine interface unit (MMI). Event records can also be downloaded with the aid of the laptop for further analysis. All the settings can be password protected. The relay has an onboard database where time and date stamped records are kept. Two types of records are kept namely fault records (35 last faults) and event records (1400 events). In the case of event records, the user has limited access rights (read only).

The front-end also has a data recorder and a spectrum analyser which could be used to analyse motor performance and supplied power quality respectively. The spectrum analyser can detect harmonics up to the 9th harmonic on any of the three phase currents.

The relay detects earth leakage currents with the aid of the external core balance current transformer and is configurable to operate in inverse definite minimum time (IDMT) or instantaneous definite time (IDT) mode. A unique feature is added to the relay in the form of simulation. This function could be used for personnel training or relay functionality testing.
## Technical Specifications

**Auxiliary Power Supply**
- Voltage requirements: 110 - 230 V AC/DC
- Power requirements: 2.5 Watt

**Operating Environment**
- Temperature: -20°C - 65°C
- Relative humidity: < 85%

**Communication Protocols**
- Profinet DPV-1, Modbus, CanBus

**Input Converter**
- Class: Class 1
- Rating: 0.1 VA
- Frequency Response: 40 to 66 Hz

**Overload Trip Delay Curves**
- Class 3 – 40 to IEC 60255-8 Specification

**Underload Detection**
- Range: 10 to 100% of Max Load Setting
- Trip Delay: 1 to 10 seconds
- Priming Time Available: 1 to 200 seconds
- Power Factor Setting: 0.1 to 1 on Minimum Load Setting

**Auto Reset Limiter**
- Auto Reset limited to only 3 times per hour

**Maximum Load Current Setting**
- Level Setting Accuracy: ± 2%
- Linearity: ± 2%
- Repeatability: ± 1%
- Detection Level: ± 2%
- Calibration: Amps

**4X Output Relays**
- Level Setting Accuracy: ± 2%
- Linearit: ± 2%
- Repeatability: ± 1%
- Detection Level: ± 2%
- Calibration: Amps

**Fault Indication**
- Operation: Latch LED on Trip, record on event and fault records
- Clear LED on Resetting

**Running Stall Protection**
- Detection Level: 110 to 300% of Max Load
- Trip Delay Adjustable: 0.100 - 1 second

**Three phase current measurement**
- Range: 1 – 400 Amps
- Dynamic range: 0% to 100%
- Range selection: manual or automatic selection at power up
- Earth Leakage Range: 30 mA to 3 Amps
- Trip Time: Inverse Definite Minimum Time (IDMT) and Instantaneous Definite Time (IDT)
- Real Time Clock
  - 24hr clock (year, month, day, hours and minutes)
  - Battery back-up (5 days)
  - Time & date stamping (fault and event records)
  - Insulation Resistance
  - Measurement range: 1 to 99 kOhm
  - Resolution: 1 kOhm
  - Power Factor Range: 0 to 100% (phase angle 0 to 90°)

### Standards compliance and certifications

<table>
<thead>
<tr>
<th>ISO 9001:2008</th>
<th>Quality management</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISPR 22:1-15</td>
<td>Radiated emissions</td>
</tr>
<tr>
<td>CISPR 22:1-15</td>
<td>Conducted emissions (Power Leads)</td>
</tr>
<tr>
<td>IEC 61000-4-2</td>
<td>Electrostatic discharge immunity test</td>
</tr>
<tr>
<td>IEC 61000-4-3</td>
<td>Radiated, radio-frequency,</td>
</tr>
<tr>
<td></td>
<td>electromagnetic field immunity test</td>
</tr>
<tr>
<td>IEC 61000-4-4</td>
<td>Electrical fast transient / burst</td>
</tr>
<tr>
<td>IEC 61000-4-5</td>
<td>Surge immunity test</td>
</tr>
<tr>
<td>IEC 61000-4-6</td>
<td>Immunity to conducted disturbances,</td>
</tr>
<tr>
<td></td>
<td>induced by radio-frequency fields</td>
</tr>
<tr>
<td>IEC 61000-4-11</td>
<td>Voltage dips</td>
</tr>
<tr>
<td>IEC 61000-3-2</td>
<td>Harmonic current emissions</td>
</tr>
<tr>
<td>IEC 61000-3-3</td>
<td>Voltage changes, voltage fluctuations</td>
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<tr>
<td></td>
<td>and flicker</td>
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</tbody>
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### Thermal Curves

Thermal Curves graph showing trip time delay in seconds for different current settings.
Frontend Actual Readings

Frontend Settings

Starter Configuration

Statistical Screen

Test Screen

Actual Data Recorder
Electrical Connection Diagram for NewCode Relay

Connection Diagram for Expanded I/O Module

* Powered from NewCode relay.
NewCode Current module dimensions for 100 and 300 Amps

NewCode Current module dimensions for 5, 10, 25 and 50 Amps
WHY WAIT TO AUTOMATE?

THE QUESTION
Are you waiting to replace your MCC to automate?
You can automate your existing MCC...

...with minimal wiring changes
- Use existing maintenance staff for changes
- Improve safety by adding a separate MMI/PLC
- Check status of all starters on MCC from safe location within substation
- Start/Stop drive from a safe location in substation

No need to open panel door to measure
- Status of interlock, supply voltage or current - all from MMI display
- Setup NewCode protection relay with through door IrDA communications

This is all done with your existing:
- Switchgear and control gear inventory
- Staff - while training and upskilling in use of PLC and MMI technology
- Maintenance budget with improved plant availability
THE SOLUTION

*NewElec is willing to assist your maintenance staff on site, every step of the way.*

- From your existing MCC schematic diagrams, identify the different starter components
- Suggest modifications while consulting with your electrical maintenance staff
- Finalisation of circuit connections to provide PLC Control/SCADA interface
- Assist maintenance staff in replacing existing protection relay with intelligent NewCode Motor Protection Relay of your choice

THE RESULT

- Existing plant control with optional automated control which can now be linked to Local control HMI or Centralised control SCADA
- Improved personnel safety
- No need to open MCC cubicle during fault finding
- Comprehensive protection, earth leakage as well as frozen contactor
- IRDA through door communication NewCode configuration
- NewCode memory module retains relay configuration settings
- Standard HMI/PLC module extracts customized shift reports
- Direct link to engineering /foreman/production supervisor/desktop
- Maintenance staff directly involved in commissioning
- Maintenance staff able to take ownership and continue with production optimization
Accessories

**External Memory Module (Part number: FPR0407)**

The external, pluggable memory module stores the relay setting, logic function settings and starter configurations. The memory module is updated by the relay each time any of these settings are changed via the front-end software or door mounted MMI. The module is intended to aid field maintenance personnel in the setup of a replacement relay should a relay need to be changed.

**Insulation Lock-out Module (Part number: FPR0216)**

The insulation resistance of the motor is measured while in a static (not in service) condition. If the resistance drops below 20 kilo ohms, the relay will trip and prevent a start-up.

**Expanded I/O Module (Part number: FPR0412)**

This is an expansion module with 4 programmable output relays and 8 digital inputs (all with LED status indication). The unit connects to the relay via a T-Bus connector and derives power from the relay's own power supply.

**RTD Temperature Module (Part number: FPR0413)**

This is an expansion module with 4 RTD inputs which can accept a NTC, PTC, PT100 or PT1000 input. The unit connects to the relay via the T-Bus connector and derives power from the relay's own power supply.

**4-20 mA Module (Part number: FPR0415)**

This is an expansion module with 2 input loops and 2 output loops for 4-20 mA signals. Running amps or thermal capacity, or any analog signal, can be sent out though the output loops. Similarly, any analog input can be sent to the NewCode relay for control purposes.

### Ordering information

<table>
<thead>
<tr>
<th>NewCode Motor Protection Relay</th>
<th>Product Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>NewCode MK2 with Profibus</td>
<td>FPR0650</td>
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<tr>
<td>NewCode MK2 with Modbus</td>
<td>FPR0651</td>
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<tr>
<td>Current Module:</td>
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<tr>
<td>NC-300-CBCT-110/550 (30-300 Amp 110-550 Volt Converter)</td>
<td>FPR0401</td>
</tr>
<tr>
<td>NC-100-CBCT-110/550 (10-100 Amp 110-550 Volt Converter)</td>
<td>FPR0402</td>
</tr>
<tr>
<td>NC-01-110/550 (0.1-1 Amp 110-550 Volt Converter)</td>
<td>FPR0403</td>
</tr>
<tr>
<td>NC-05-110/550 (0.5-5 Amp 110-550 Volt Converter)</td>
<td>FPR0404</td>
</tr>
<tr>
<td>NC-25-110/550 (0.25-25 Amp 110-550 Volt Converter)</td>
<td>FPR0405</td>
</tr>
<tr>
<td>NC-50-110/550 (5-50 Amp 110-550 Volt Converter)</td>
<td>FPR0406</td>
</tr>
<tr>
<td>NC-Core Balance CT-43MM</td>
<td>BTX0004</td>
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<tr>
<td>NC-Core Balance CT-60MM</td>
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</tr>
<tr>
<td>NC-Core Balance CT-100MM</td>
<td>BTX0002</td>
</tr>
<tr>
<td>NC-Core Balance CT-150MM</td>
<td>BTX0003</td>
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<tr>
<td>NC-Core Balance CT-190MM</td>
<td>BTX0005</td>
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<tr>
<td>NC-MM-I2C-TBUS (External Settings Memory Model)</td>
<td>FPR0407</td>
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<tr>
<td>NC-CT-CAB-1000-1m (Current Converter to NC Conn Cable)</td>
<td>FPR0408</td>
</tr>
<tr>
<td>NC-CT-CAB-1000-500mm (Current Converter to NC Conn Cable)</td>
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<tr>
<td>NC-CT-CAB-1000-300mm (Current Converter to NC Conn Cable)</td>
<td>FPR0410</td>
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<tr>
<td>NC-CT-CAB-1000-100mm (Current Converter to NC Conn Cable)</td>
<td>FPR0411</td>
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<tr>
<td>NC-Expanded-I/O (4 outputs relays and 8 differential inputs)</td>
<td>FPR0412</td>
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<tr>
<td>NC-RTD-04 RTD/PTC Temp Module (PTC, NTC, PT100, PT1000) Selectable</td>
<td>FPR0413</td>
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<tr>
<td>NC-Insulation Lockout Module (400 – 1100 Volt direct connection)</td>
<td>FPR0216</td>
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<tr>
<td>NC-4.20mA-Module (2x 4-20 mA In loops, 2x 4-20 Out loops)</td>
<td>FPR0415</td>
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<tr>
<td>NC-Volt-Converter (1100 Volt to 525 Volt)</td>
<td>FPR0208</td>
</tr>
<tr>
<td>NC-MM - 420 Door Relay</td>
<td>FPR0414</td>
</tr>
<tr>
<td>T-Bus MMI Connector</td>
<td>FPR0422</td>
</tr>
</tbody>
</table>
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