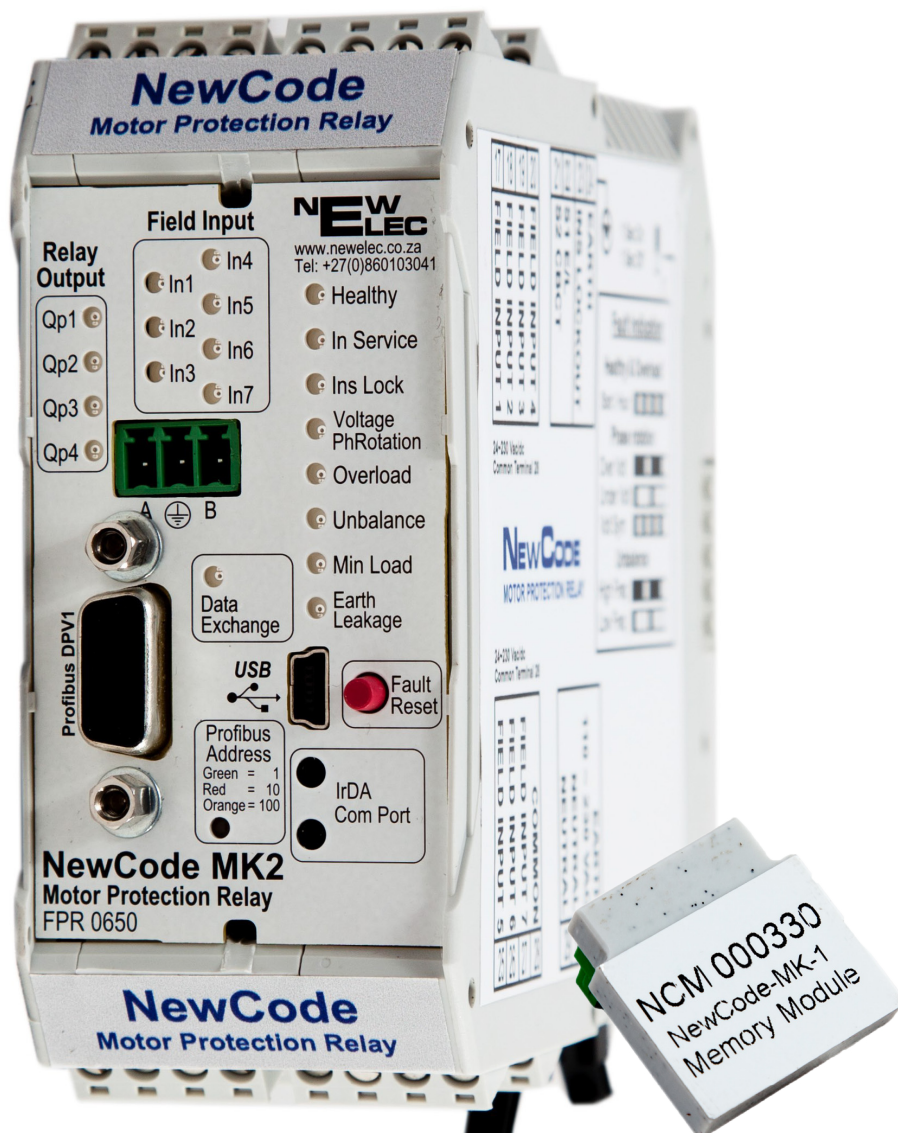


NEW ELEC

MOTOR PROTECTION & CONTROL TECHNOLOGY

NewCode

Comprehensive Motor Protection and Control Relay

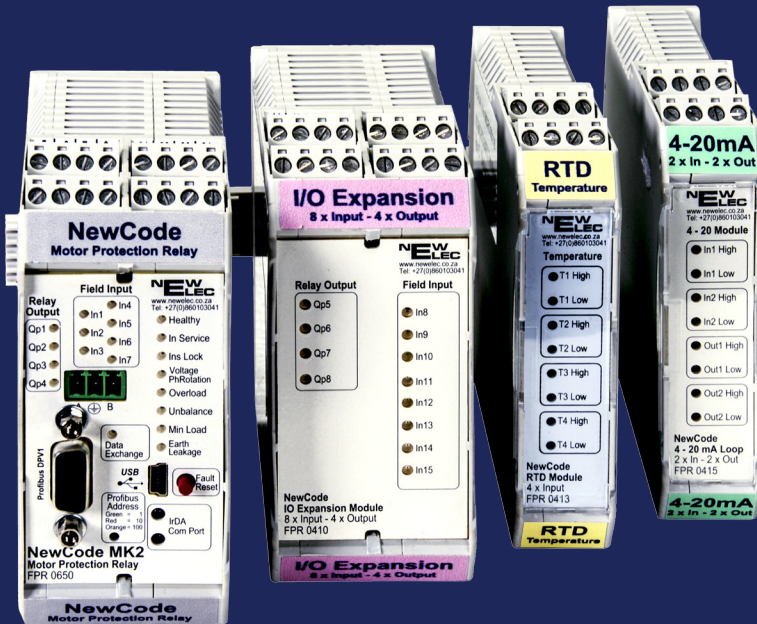


A South African Company to be Proud of

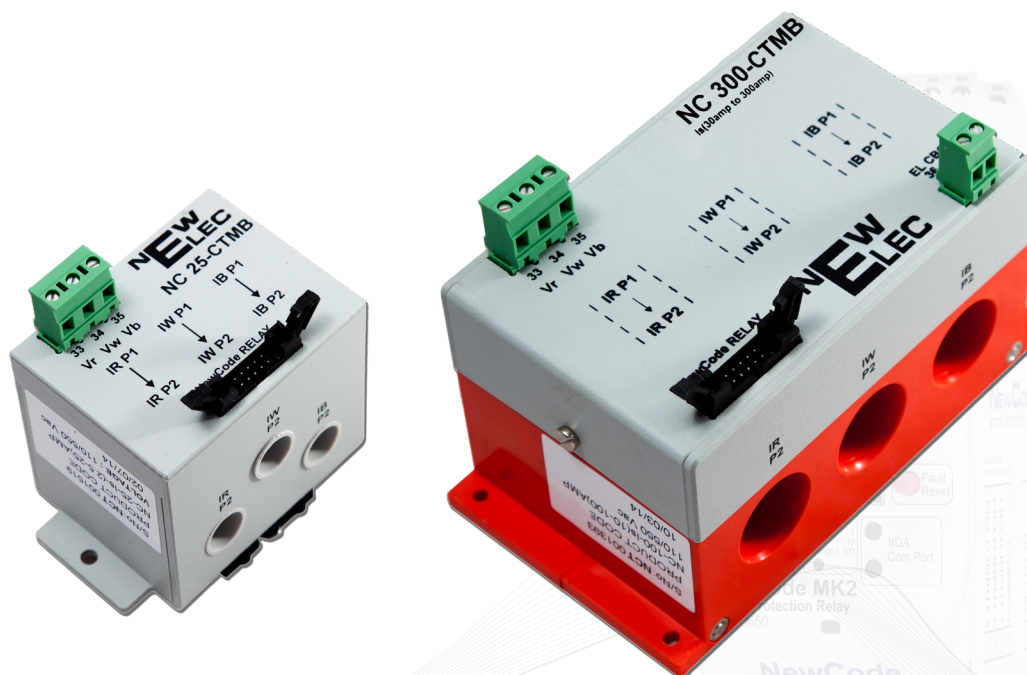


INTERGRATED STARTER CONTROL

- ✓ 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 can be Din Rail or Chassis mounted. To expand the current range beyond 300 Amps, external CT's with 1 Amp or 5 Amps secondary current can be used.

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.

A South African Company to be Proud of

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

Profibus 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

Unbalance / Single Phasing Setting

Level Setting : 5 – 50% I_e (M.F.L.)
Trip Delay : 1 to 10 seconds

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 : $\pm 2\%$
Linearity : $\pm 2\%$
Repeatability : $\pm 1\%$
Detection Level : $\pm 2\%$
Calibration : Amps

4X Output Relays

: 5 Amps 220 V AC
Configuration : Form C (Common, NC / NO)
: Fully configurable

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 – 300 Amps
Dynamic range : 0% to 1000%

Voltage Range

: 110 V, 380 V, 400 V,
525 V, 550 V, 680 V,
950 V, 1100 V, 3 K 3 V /
110 V, 6 K 6 V / 110 V,
11 KV / 110 V

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

ISO 9001:2008 : Quality management

CISPR 22:1-15 : Radiated emissions

CISPR 22:1-15 : Conducted emissions (Power Leads)

IEC 61000-4-2 : Electrostatic discharge immunity test

IEC 61000-4-3 : Radiated, radio-frequency,
electromagnetic field immunity test

IEC 61000-4-4 : Electrical fast transient / burst

IEC 61000-4-5 : Surge immunity test

IEC 61000-4-6 : Immunity to conducted disturbances,
induced by radio-frequency fields

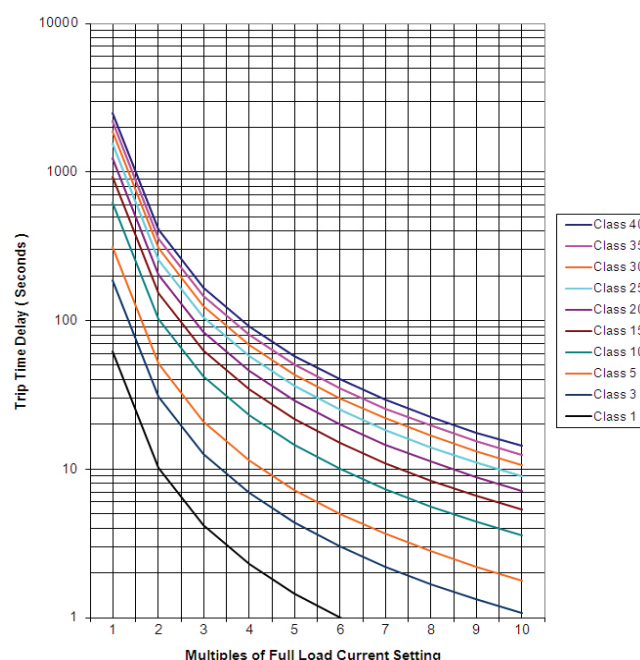
IEC 61000-4-11 : Voltage dips

IEC 61000-3-2 : Harmonic current emissions

IEC 61000-3-3: Voltage changes, voltage fluctuations
and flicker

Thermal Curves

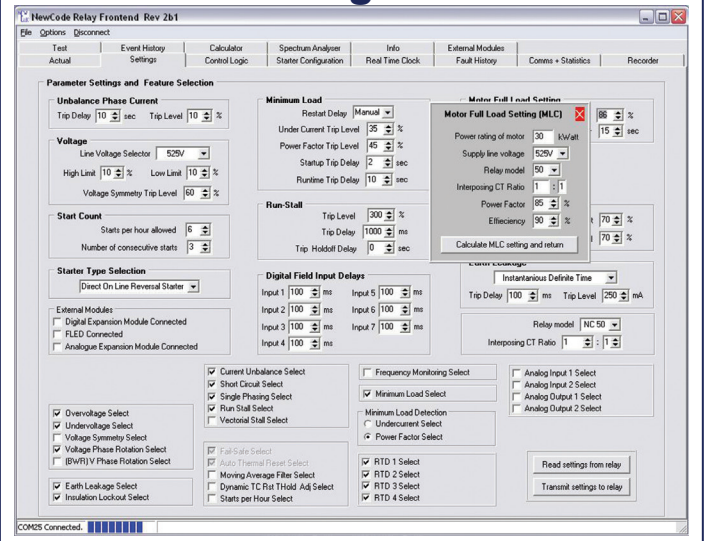
NewCode Thermal Trip Curve



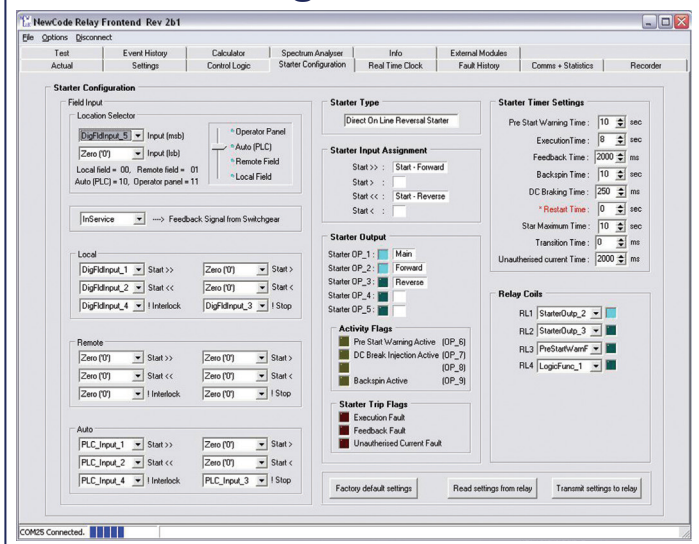
Frontend Actual Readings



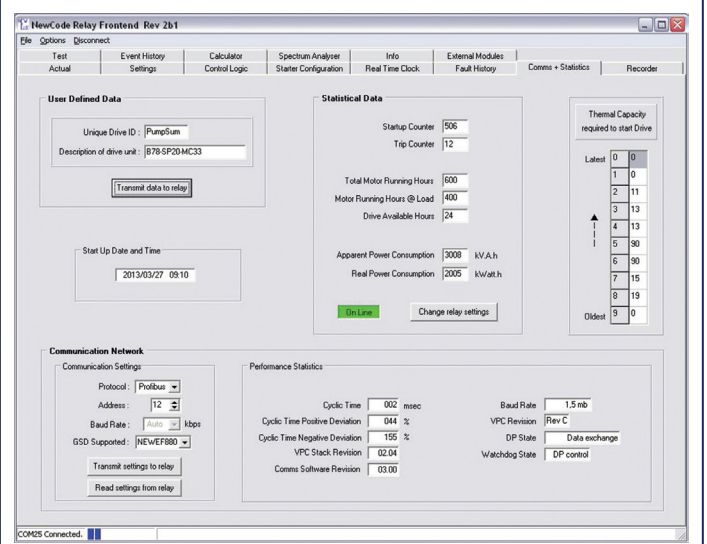
Frontend Settings



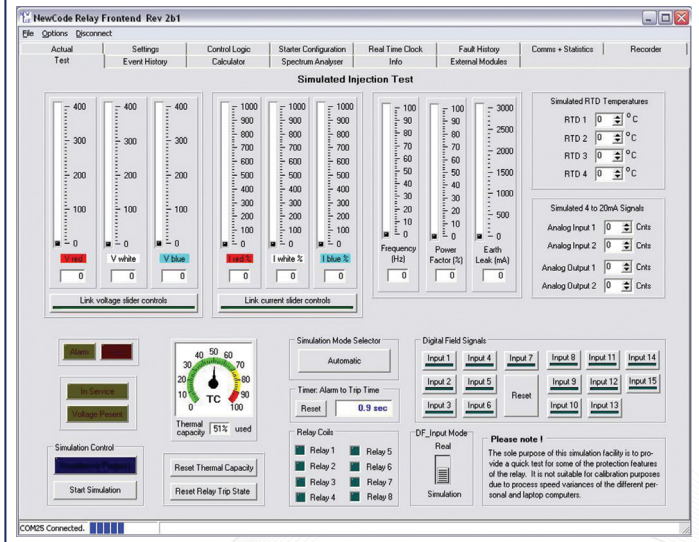
Starter Configuration



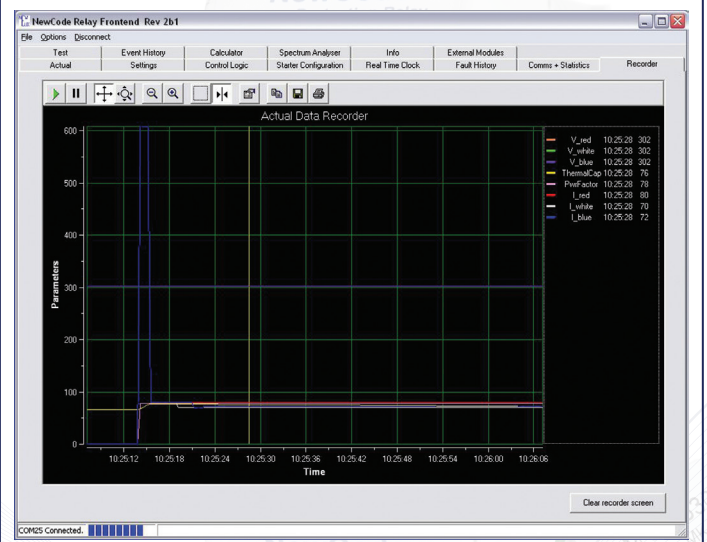
Statistical Screen



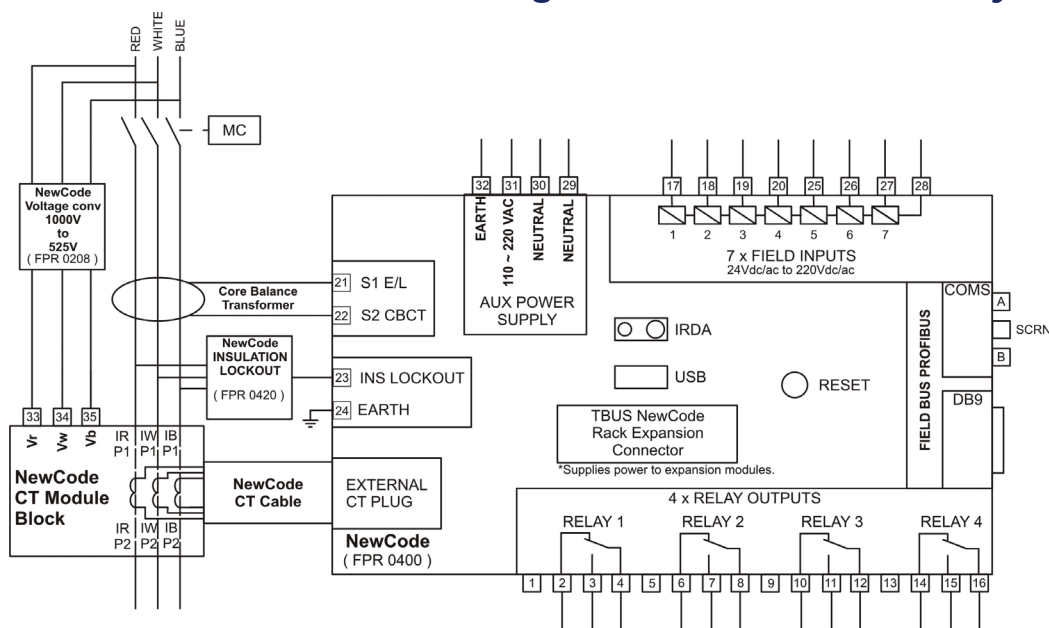
Test Screen



Actual Data Recorder



Electrical Connection Diagram for NewCode Relay



NewCode CT Module Block

NC-300-CBCT [30 to 300 Amps / 550 Vac / EL CBCT] (FPR 0401)
 NC-100-CBCT [10 to 100 Amps / 550 Vac / EL CBCT] (FPR 0402)
 NC-001-CBCT [0.1 to 1 Amps / 550 Vac] (FPR 0403)
 NC-005-CBCT [0.5 to 5 Amps / 550 Vac] (FPR 0404)
 NC-025-CBCT [2.5 to 25 Amps / 550 Vac] (FPR 0405)
 NC-050-CBCT [5 to 50 Amps / 550 Vac] (FPR 0406)

NewCode CT Cable

NC-CT-CAB-1000-1m (FPR 0408)
 NC-CT-CAB-1000-500mm (FPR 0409)
 NC-CT-CAB-1000-300mm (FPR 0410)
 NC-CT-CAB-1000-100mm (FPR 0411)

Core Balance Transformer

100mm Inside Diameter (BTX 0010)

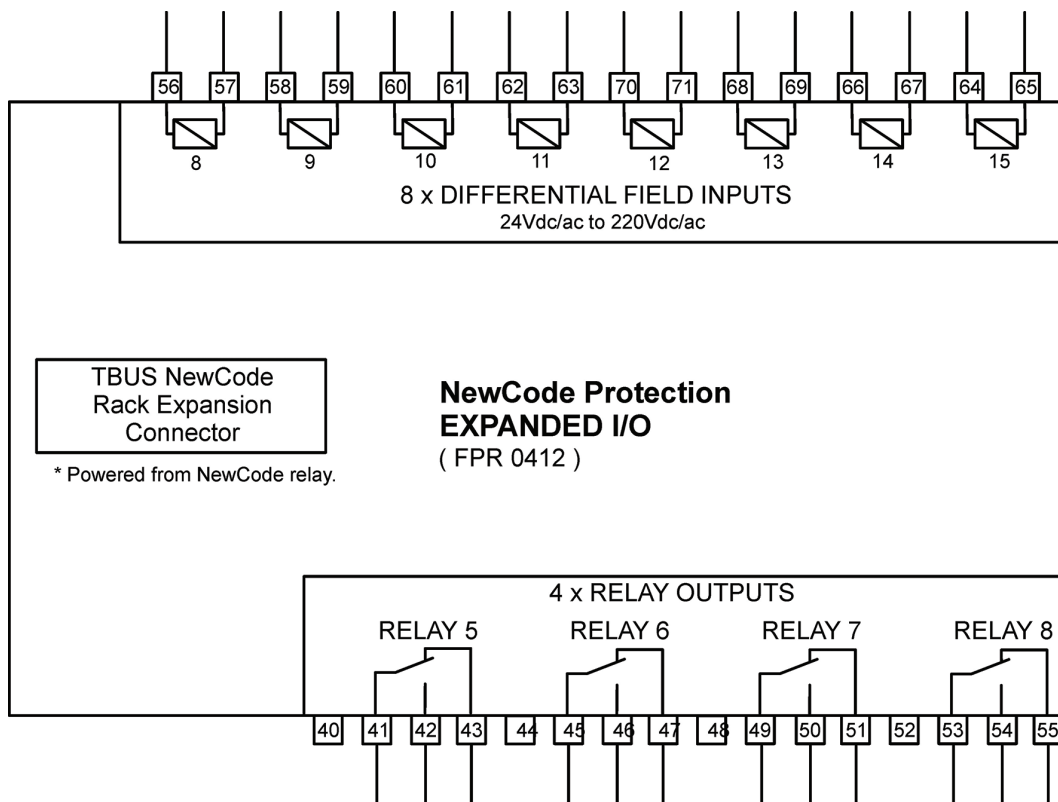
NewCode Backup Memory Module (FPR 0407)

Backup for NewCode relay settings and control logic configuration.

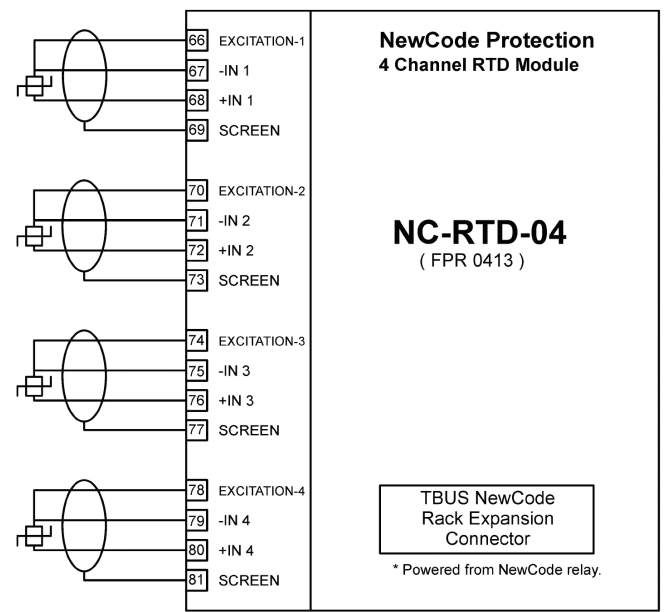
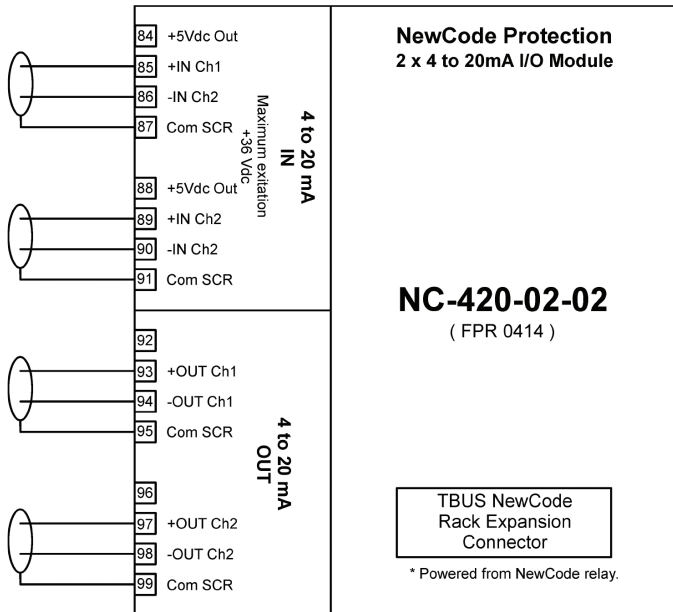
TBUS NewCode Rack Expansion Connector

* Powered from NewCode relay.

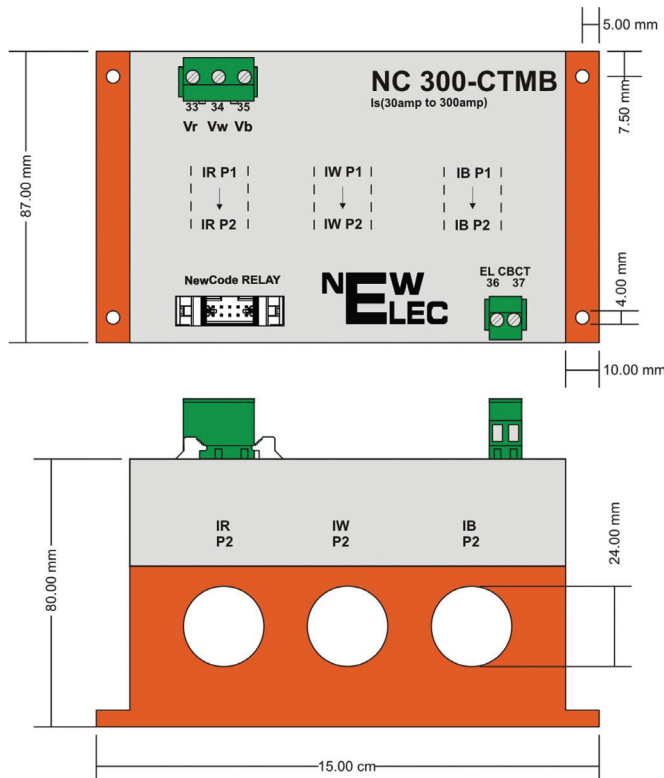
Connection Diagram for Expanded I/O Module



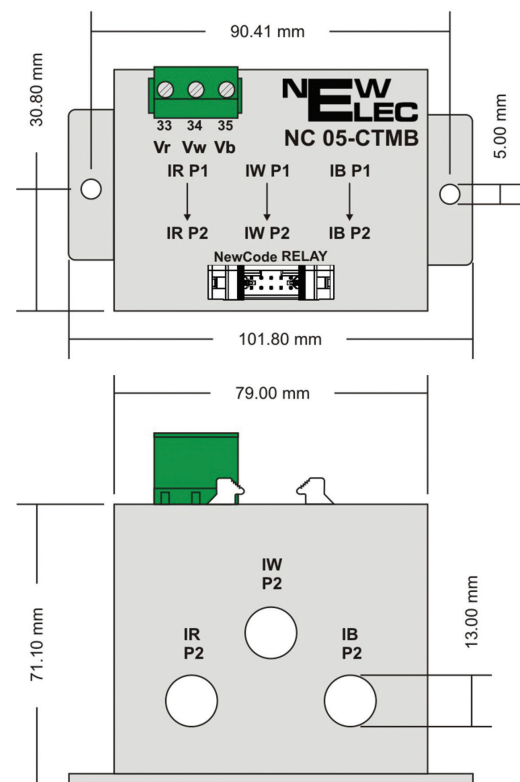
Electrical Connection Diagrams for 4-20 mA and RTD Modules



NewCode Current module dimensions for 100 and 300 Amps



NewCode Current module dimensions for 5, 10, 25 and 50 Amps



The diagram illustrates the NewCode memory module, which is a DIN rail mountable device. It is divided into four main functional sections, each with a specific color-coded header:

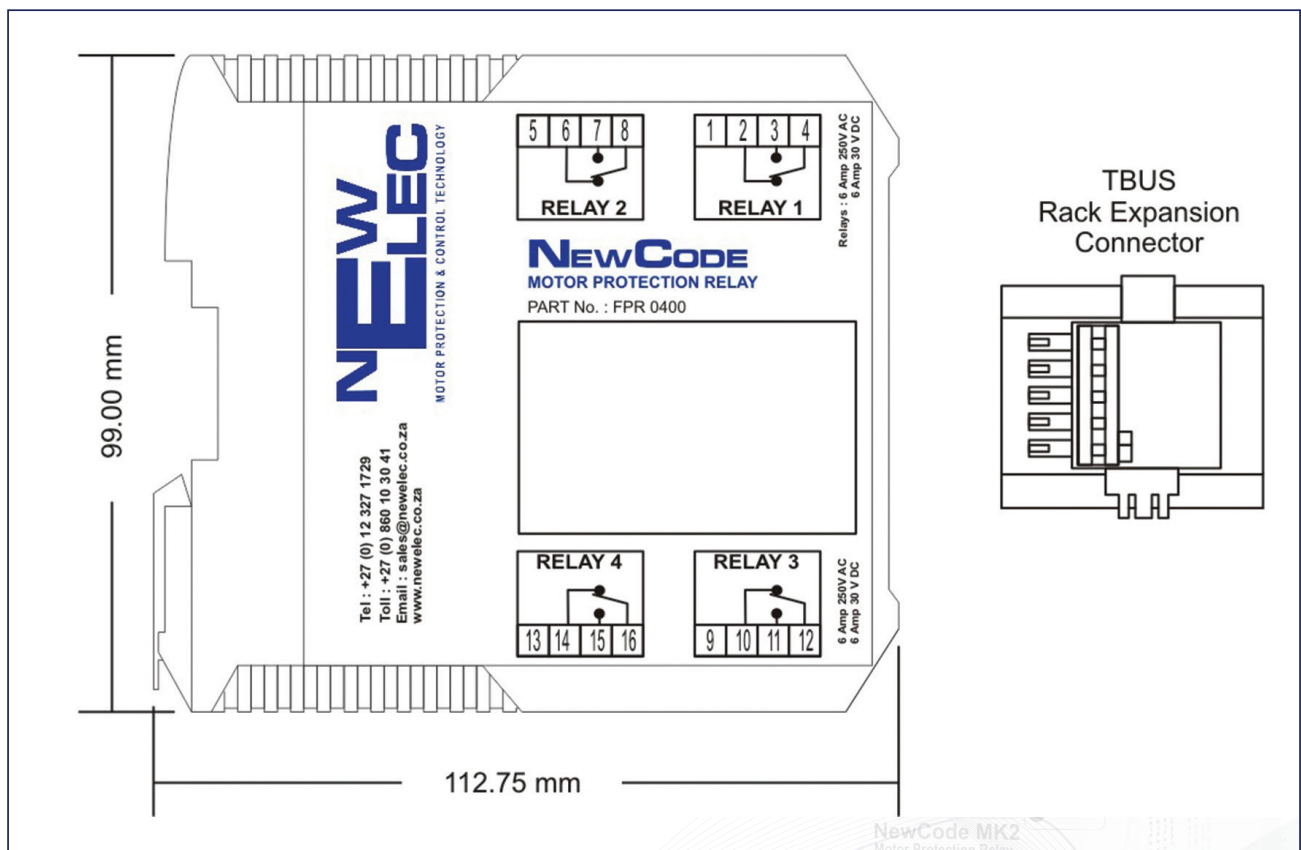
- Section 1 (Grey Header): NewCode Motor Protection Relay**
 - Relay Output:** Qp1, Qp2, Qp3, Qp4
 - Field Input:** In1, In2, In3, In4, In5, In6, In7
 - NEWLEC Logo:** www.newelec.co.za, Tel: +27(0)860103041
 - Features:** Healthy, In Service, Ins Lock, Voltage PhRotation, Overload, Unbalance, Min Load, Earth Leakage, Data Exchange, USB, Profibus Address (Green = 1, Red = 10, Orange = 100), IrDA Com Port, Fault Reset.
 - Model:** NewCode Motor Protection Relay FPR 0400
- Section 2 (Pink Header): I/O Expansion**
 - Relay Output:** Qp5, Qp6, Qp7, Qp8
 - Field Input:** In8, In9, In10, In11, In12, In13, In14, In15
 - NEWLEC Logo:** www.newelec.co.za, Tel: +27(0)860103041
 - Model:** NewCode IO Expansion Module 8 x Input - 4 x Output FPR 0410
- Section 3 (Green Header): 4-20mA**
 - Relay Output:** Out1 High, Out1 Low, Out2 High, Out2 Low
 - Field Input:** In1 High, In1 Low, In2 High, In2 Low
 - NEWLEC Logo:** www.newelec.co.za, Tel: +27(0)860103041
 - Model:** NewCode 4 - 20 mA Loop 2 x In - 2 x Out FPR 0414
- Section 4 (Yellow Header): RTD Temperature**
 - Relay Output:** T1 High, T1 Low, T2 High, T2 Low, T3 High, T3 Low, T4 High, T4 Low
 - Field Input:** (None listed)
 - NEWLEC Logo:** www.newelec.co.za, Tel: +27(0)860103041
 - Model:** NewCode RTD Module 4 x Input FPR 0413

Dimensions:

- Overall Width:** 143.16 mm
- Overall Height:** 99.00 mm
- Section Widths:** 45.00 mm (Section 1), 45.00 mm (Section 2), 22.50 mm (Section 3), 22.50 mm (Section 4)
- Module Thickness:** 13.00 mm

Additional Features:

- NewCode Memory Module:** Indicated by an arrow pointing to the green component on the right side of the module.



WHY WAIT TO AUTOMATE?

THE QUESTION

Are you waiting to replace your MCC to automate?

You can automate your existing MCC...

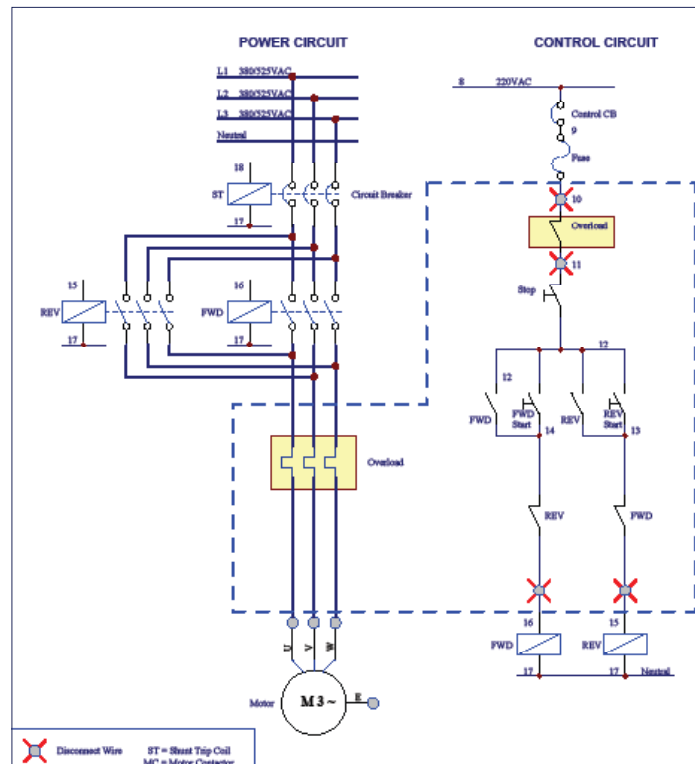
...with minimal wiring changes

- 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

Typical existing wiring diagram of FWD/REV starter



This is all done with your existing:

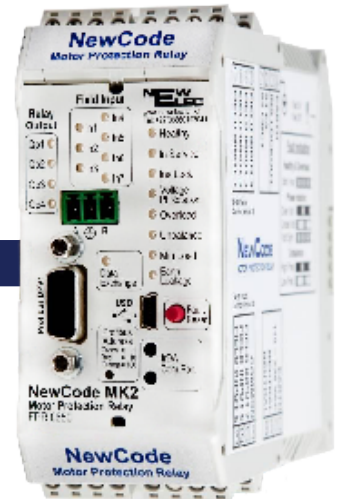
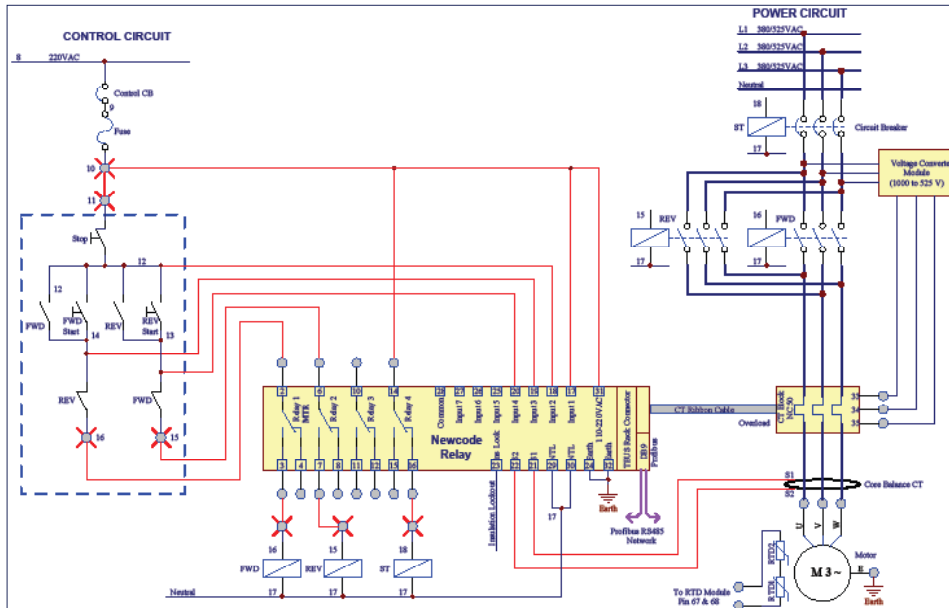
- Switchgear and control gear inventory
- Staff - while training and upskilling in use of PLC and MMI technology
- Maintenance budget with improved plant availability



THE SOLUTION

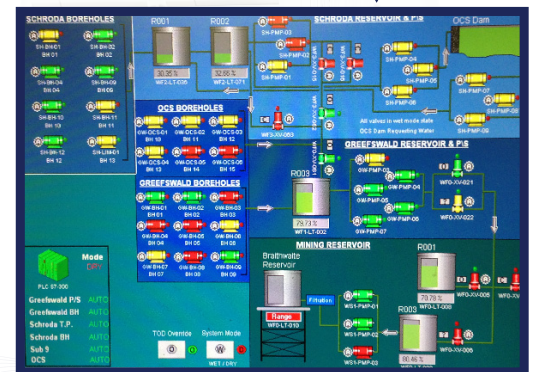
NewElec is willing to assist your maintenance staff on site, every step of the way.

- 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 Expansion Module (Part number: FPR0413)

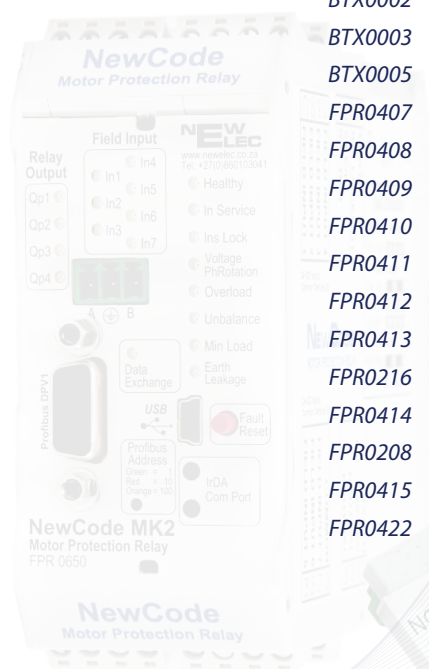
This is an expansion module with 4 RTD inputs which can accept a NTC, PTC, PT100 or PT1000 input. The unit connects to the relay via the T-Bus connector and derives power from the relay's own power supply.

4-20 mA Module (Part number: FPR0414)

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 through the output loops. Similarly, any analog input can be sent to the NewCode relay for control purposes.

Ordering information

Product Description	Product Code
NewCode MK2 with Profibus	FPR0650
NewCode MK2 with Modbus	FPR0651
Current Module:	
NC-300-CBCT-110/550 (30-300 Amp 110-550 Volt Converter)	FPR0401
NC-100-CBCT-110/550 (10-100 Amp 110-550 Volt Converter)	FPR0402
NC-01-110/550 (0.1-1 Amp 110-550 Volt Converter)	FPR0403
NC-05-110/550 (0.5-5 Amp 110-550 Volt Converter)	FPR0404
NC-25-110/550 (0.25-25 Amp 110-550 Volt Converter)	FPR0405
NC-50-110/550 (5-50 Amp 110-550 Volt Converter)	FPR0406
NC-Core Balance CT-43MM	BTX0004
NC-Core Balance CT-60MM	BTX0001
NC-Core Balance CT-100MM	BTX0002
NC-Core Balance CT-150MM	BTX0003
NC-Core Balance CT-190MM	BTX0005
NC-MM-I2C-TBUS (External Settings Memory Model)	FPR0407
NC-CT-CAB-1000-1m (Current Converter to NC Conn Cable)	FPR0408
NC-CT-CAB-1000-500mm (Current Converter to NC Conn Cable)	FPR0409
NC-CT-CAB-1000-300mm (Current Converter to NC Conn Cable)	FPR0410
NC-CT-CAB-1000-100mm (Current Converter to NC Conn Cable)	FPR0411
NC-Expanded-I/O (4 outputs relays and 8 differential inputs)	FPR0412
NC-RTD-04 RTD/PTC Temp Module (PTC, NTC, PT100, PT1000) Selectable	FPR0413
NC-Insulation Lockout Module (400 – 1100 Volt direct connection)	FPR0216
NC-4-20mA-Module (2x 4-20 mA In loops, 2x 4-20 Out loops)	FPR0414
NC-Volt-Converter (1100 Volt to 525 Volt)	FPR0208
NC- MMI	FPR0415
T-Bus MMI Connector	FPR0422



NEW ELEC

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sales@newelec.co.za

NewCode

Comprehensive Motor Protection and Control Relay

