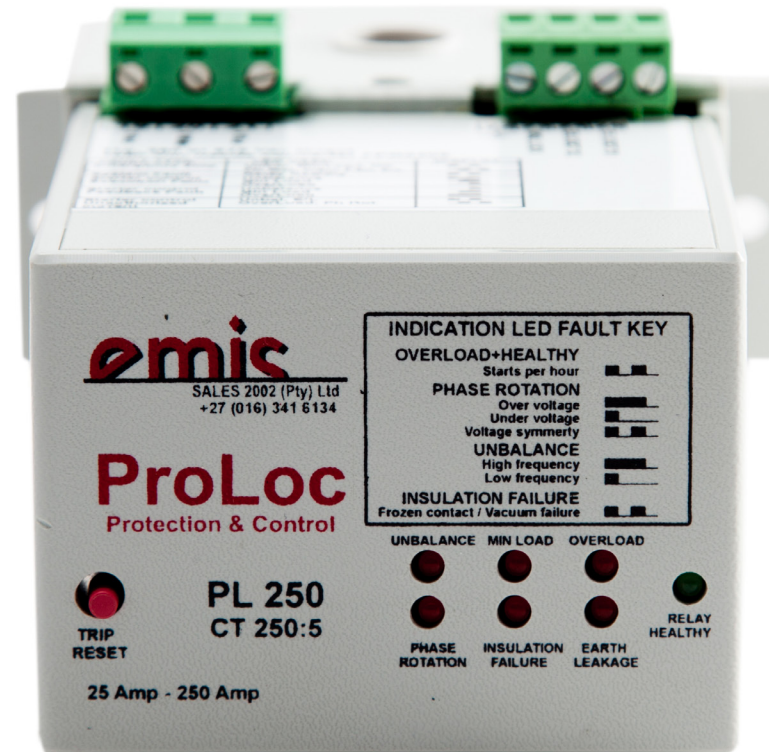




MOTOR PROTECTION & CONTROL TECHNOLOGY

# Emis ProLoc 2 Relay...



*A South African Company to be Proud of*



Physical Address: 298 Soutter Street, Pretoria West  
Tel: 083 454 6949, +27 12 327 1729 Fax: +27 (0)12 327 1733 Toll Assist: 0860 10 30 41  
[www.newelec.co.za](http://www.newelec.co.za) [sales@newelec.co.za](mailto:sales@newelec.co.za)



MOTOR PROTECTION & CONTROL TECHNOLOGY



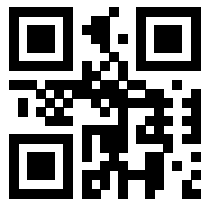
+27 12 327 1729  
Toll Assist: 0860 10 30 41



[www.newelec.co.za](http://www.newelec.co.za)



GPS Coordinates:  
-25.752984, 28.162957



*Innovative solutions from South Africa's Leading Motor Protection Specialists*

## About NewElec

*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.*

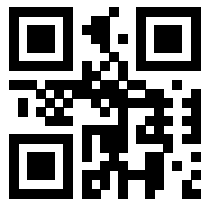
*NewElec's electronic motor protection relays can be found in refineries, mining, steel, petrochemical, pulp and paper, sugar mills, agriculture and material handling industries to name a few, both locally and internationally. The NewElec product range includes software programmable LV motor protection 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.*

*A South African Company to be Proud of*

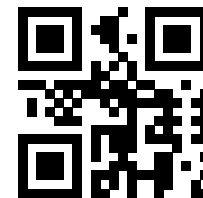




## Management Features

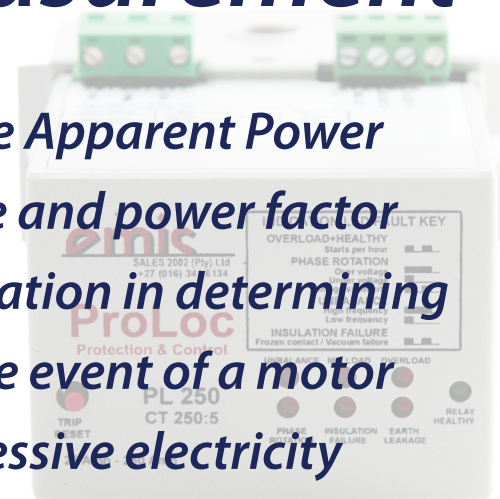
- *Apparent Power and Real Power Measurement*
- *Statistical Data*
- *Last 50 Faults Record*
- *Last 1764 Events Record*
- *3 Phase Recorder*
- *Training / Modelling Simulator*
- *Management Features*
- *Management Feature Benefits*



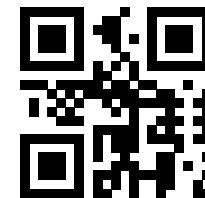


## Apparent Power and Real Power Measurement

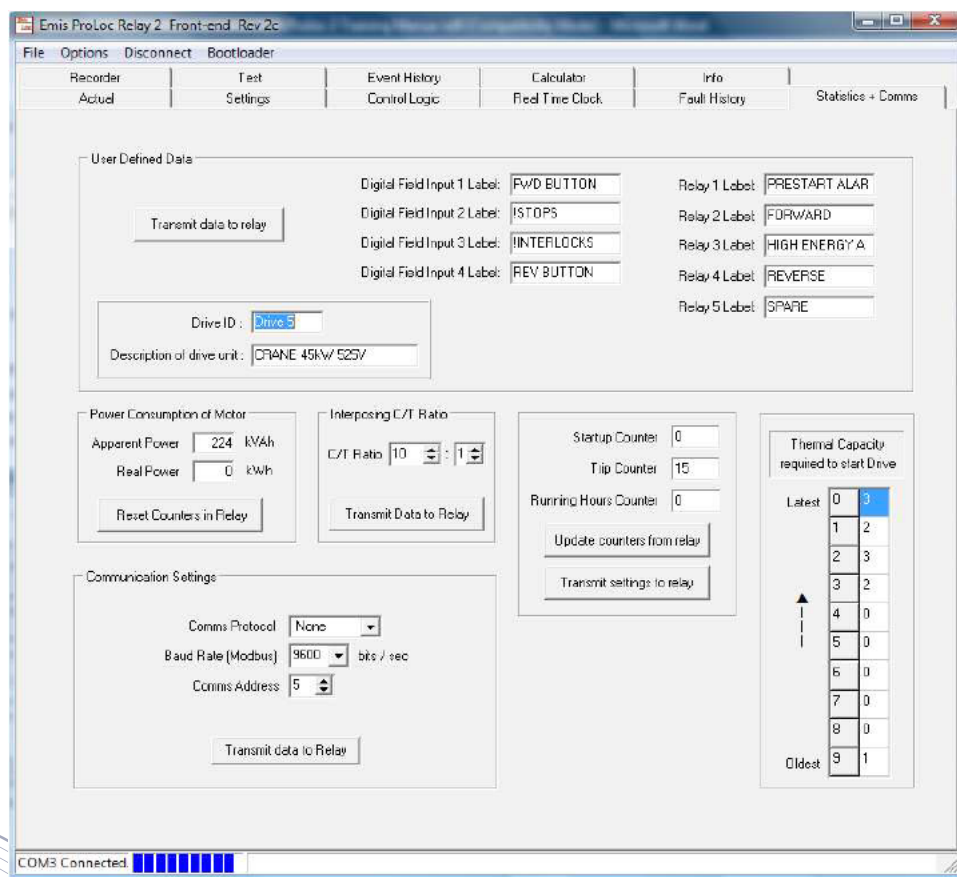
*The ProLoc 2 Relay measures the Real Power (KWatt.h) as well as the Apparent Power (KVA.h) of the motor. This is derived from line voltage, phase voltage and power factor (where applicable). This provides the clients with the necessary information in determining whether or not the motor is the correct size for the application. In the event of a motor being over-sized for the application, a poor power factor and excessive electricity consumption result in high energy costs and a poor green footprint. With the information provided by the relay, steps can be taken in order to improve the power factor. A smaller motor can also be considered for the application, should it be feasible to replace. Increasing energy costs and the push towards a greener footprint make this feature a valuable asset in any plant.*







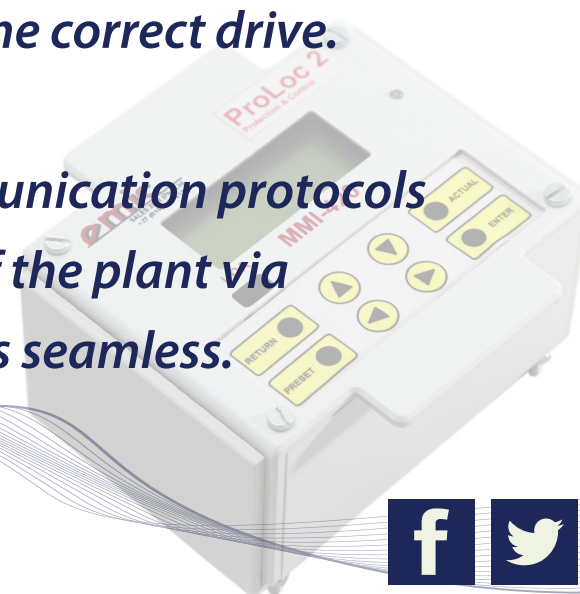
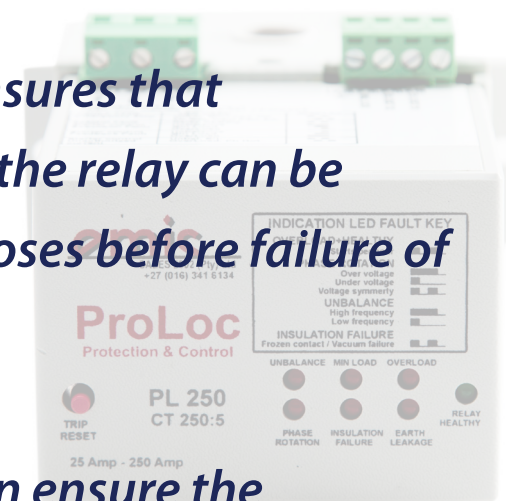
## Statistical data

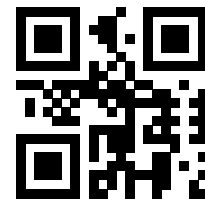


*Essential Statistical Data ensures that information retrieved from the relay can be used for maintenance purposes before failure of the drive.*

*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 50 Faults Record

Emis ProLoc Relay 2 Front-end Rev 2b

File Options Disconnect Bootloader

Recorder Actual Test Settings Event History Control Logic Calculator Real Time Clock Info Fault History Statistics + Comm

Update faults from relay Save fault records on disk Clear fault history in relay

Gip	Status	Date	Time	Fault Description	Run Hrs	I <sub>max</sub> %	V <sub>min</sub>	Brk Ct	DF Inp
1	Sim	2013/02/04	10h21	Undervoltage	0	100	110	0ms	1000
2	Sim	2013/02/04	10h19	Overvoltage	0	68	380	0ms	1000
3	Sim	2013/02/04	08h18	Emergency Stop	0	0	0	0ms	0000
4	Sim	2013/02/01	15h43	Overvoltage	0	68	295	0ms	1000
5	Sim	2013/02/01	15h47	Unauthorised Current	0	68	295	0ms	1000
6	Sim	2013/02/01	15h47	Unauthorised Current	0	68	295	0ms	1000
7	Sim	2013/02/01	15h47	Unauthorised Current	0	68	295	0ms	1000
8	Act	2013/02/01	15h45	Emergency Stop	2	0	0	0ms	0000
9	Act	2013/02/01	15h44	Emergency Stop	0	8	0	0ms	0000
10	Act	2013/02/01	15h30	Emergency Stop	0	0	10	0ms	0001
11	Act	2013/02/01	15h25	Emergency Stop	0	0	0	100ms	0000
12	Act	2013/02/01	11h20	Emergency Stop	0	8	0	0ms	0010
13	Act	2002/02/01	11h20	Emergency Stop	0	8	0	0ms	0110
14	Act	2013/01/01	11h20	Emergency Stop	0	0	0	0ms	0110
15	Act	2013/02/01	17h19	Emergency Stop	0	0	0	0ms	0110
16	Act	2013/02/01	02h15	Emergency Stop	0	0	0	0ms	0110
17	Act	2013/02/01	10h01	Execution Fault	0	0	0	0ms	0110
18	Act	2013/02/01	10h33	Unauthorised Current	0	0	0	0ms	1110
19	Act	2013/02/01	10h33	Unauthorised Current	0	0	0	0ms	1110
20	Act	2013/02/01	10h33	Frozen Contact	0	0	0	0ms	1110
21	Act	2013/02/01	10h32	Unauthorised Current	512	0	0	0ms	1010
22	Act	2013/02/01	10h32	Execution Fault	2	0	0	0ms	0110
23	Act	2013/02/01	09h58	Unauthorised Current	0	8	0	0ms	1110
24	Act	2013/02/01	09h58	Feedback Fault	0	0	5	0ms	0110
25	Act	2013/02/01	09h55	Execution Fault	0	0	0	50ms	0110
26	Act	2013/02/01	09h54	Unauthorised Current	0	0	0	0ms	0010
27	Act	2002/02/01	09h54	Unauthorised Current	0	0	0	0ms	0000
28	Act	2002/02/01	09h54	Unauthorised Current	0	0	0	0ms	0000

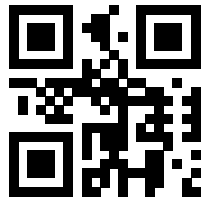
COMB Connected

*The Last 50 Faults Record is Date and Time stamped with the fault description, Running Hours of the drive, Current Maximum, Voltage Minimum, Breaker Clearance Time and Digital Field Inputs.*

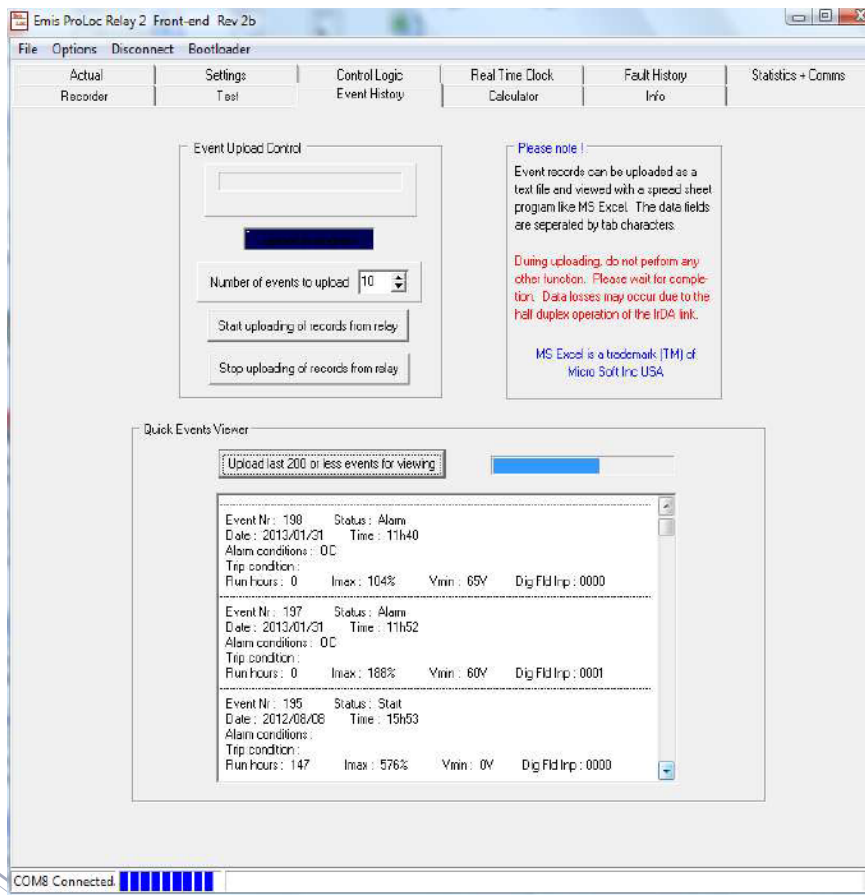
*This information can be uploaded and stored for viewing in MS Excel later or data capture into a SAP system.*

*Particularly helpful for maintenance planning on a plant.*





## 1764 Event Records

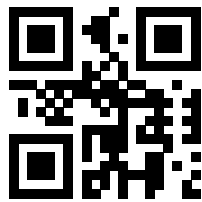


*The Event Records are Date and Time stamped with the event description, Running Hours of the drive, Current Maximum, Voltage Minimum and Breaker Clearance Time.*

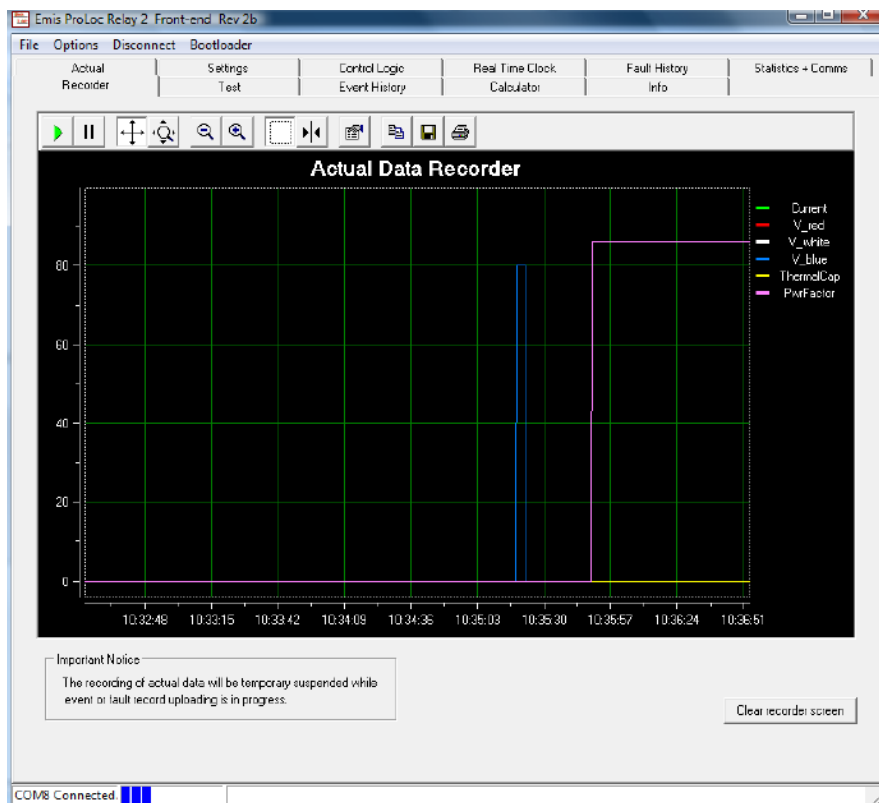
*Downloaded and viewed in MS Excel, the event records will show setting changes, stops and starts of the drive, alarm conditions and trips.*





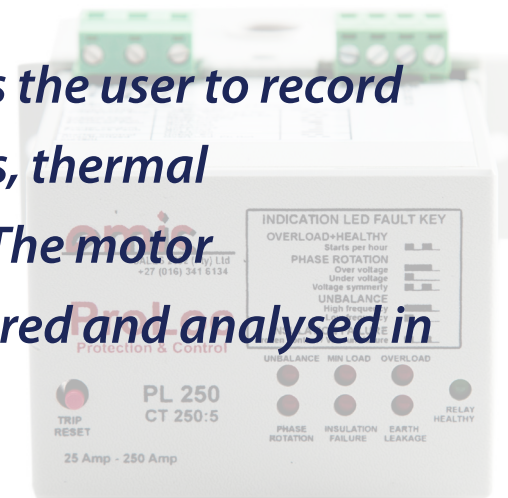


## 3 Phase Recorder

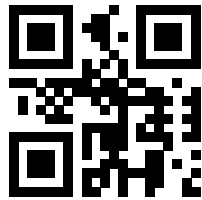


*The 3 Phase Recorder allows the user to record the motor currents, voltages, thermal capacity and power factor. The motor performance can be monitored and analysed in real time.*

*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.*



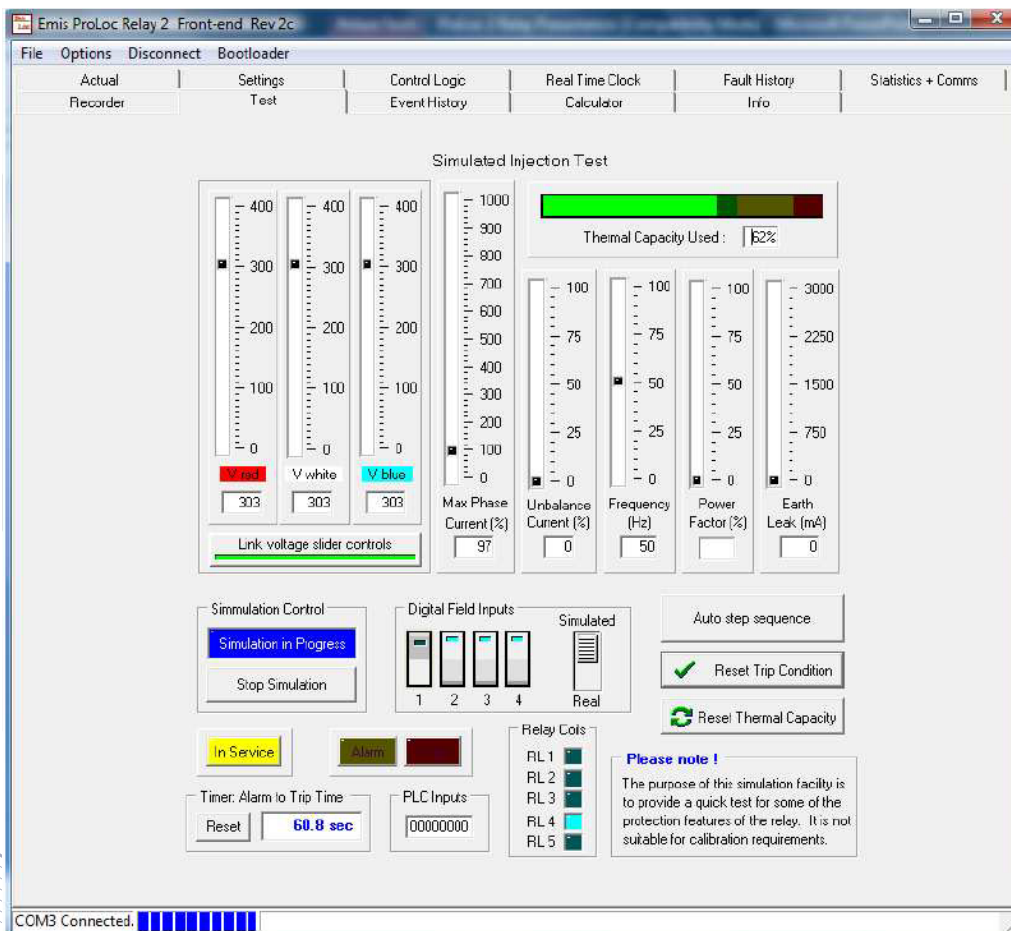


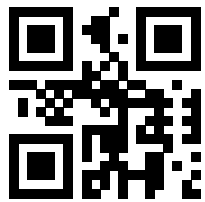


## Training Simulator

*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.*

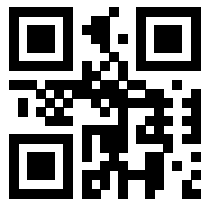




## *Benefits of the Management Features*

- Lower energy costs can be achieved*
- A better green footprint is obtainable*
- Preventative maintenance is possible*
- More Efficient Production is achievable*
- Safer equipment with Insulation Lockout*



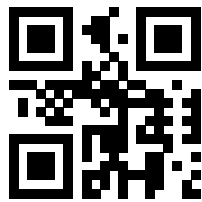


## Protection Features

- **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**
- **Frozen contact / Vacuum loss < 1M Ohm across open contactor on any phase**



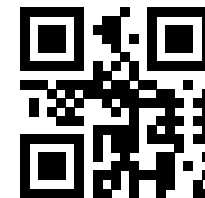




## Over Current (Overload) Detection

- **Curve class settings: 3 seconds to 40 seconds**
- **IEC 60255-8 specification**
- **Motor full load setting (MLC): 2% to 100%**
- **Reset: Manual or three automatic resets per hour (when selected)**
- **Reset threshold settable: Between 0% to 80% Thermal Capacity**
- **or Dynamic Threshold**
- **Adjustment determined over last 10 starts.**

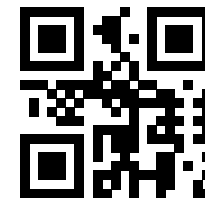




## Under Current (Underload) Detection

- *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*

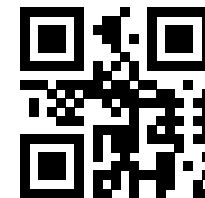


## Single Phase (Phase Loss) Detection

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







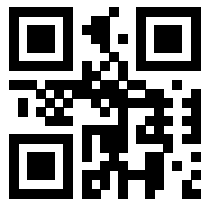
## Run-Stall Detection

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

## 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*



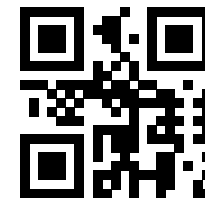


## Vectorial Stall Detection

*Vectorial Stall is detected during the start up procedure of the motor. A motor normally starts up with a bad power factor which gradually improves 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.*

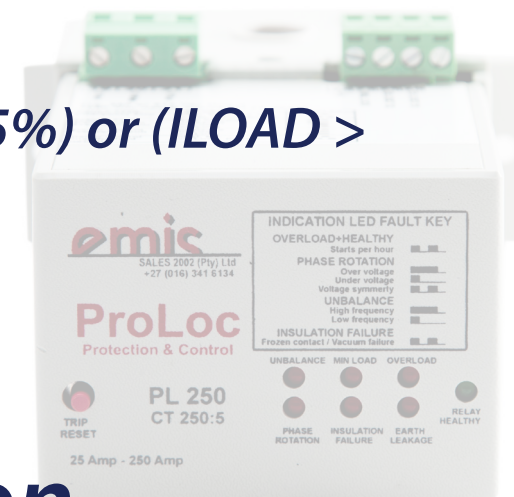
- *Trip: Static or decreasing power factor*
- *Trip delay: 33% of curve class setting.*
- *Reset: Manual*
- *Feature selectable*





## 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**

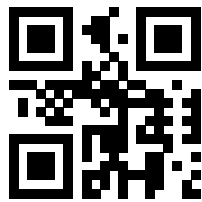


## Voltage Symmetry Detection

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







## Over Voltage Detection

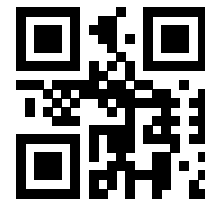
- *Trip delay time: 10 seconds fixed*
- *Trip level: Adjustable 1% - 15% Default 10%*
- *Reset: Manual*
- *Feature selectable*



## 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

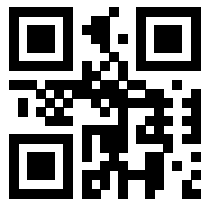
- *Trip delay time: 10 seconds fixed*
- *Trip level: Factory settings (45Hz to 55Hz)*
- *Reset: Manual*
- *Feature selectable*



## Voltage Phase Rotation Detection

- *0,5 sec delay time*
- *Auto reset once fault is fixed*
- *Feature selectable*
- *Phase Rotation RWB standard Selectable BRW*



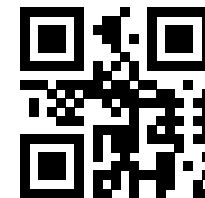


## Insulation Failure Detection

- *Detection: Only in static state (motor not running)*
- *Trip delay time: 1 second fixed*
- *Trip level: Resistance < 20 kOhm (fixed)*
- *Reset: Manual*
- *Feature selectable*



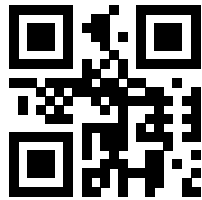




## *Earth Leakage Detection ( $I_{EL} < 2A$ )*

- *Selection between Instantaneous Definite Time or IDMT*
- *Instantaneous Definite Minimum Time ( $100\text{ ms} \geq t \geq 1000\text{ ms}$ ),*
- *Inverse Define Minimum Time ( SI Curve , TMS 0,1 on selected Threshold )*
- *Harmonic filtering notch 30 Hz – 70 Hz(suitable for VSD's and soft starters)*
- *Trip level: Adjustable ( 0.030 A to 1 Amp )*
- *Reset: Manual*
- *Feature selectable*

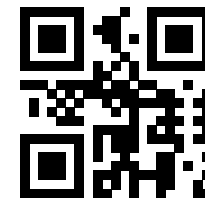




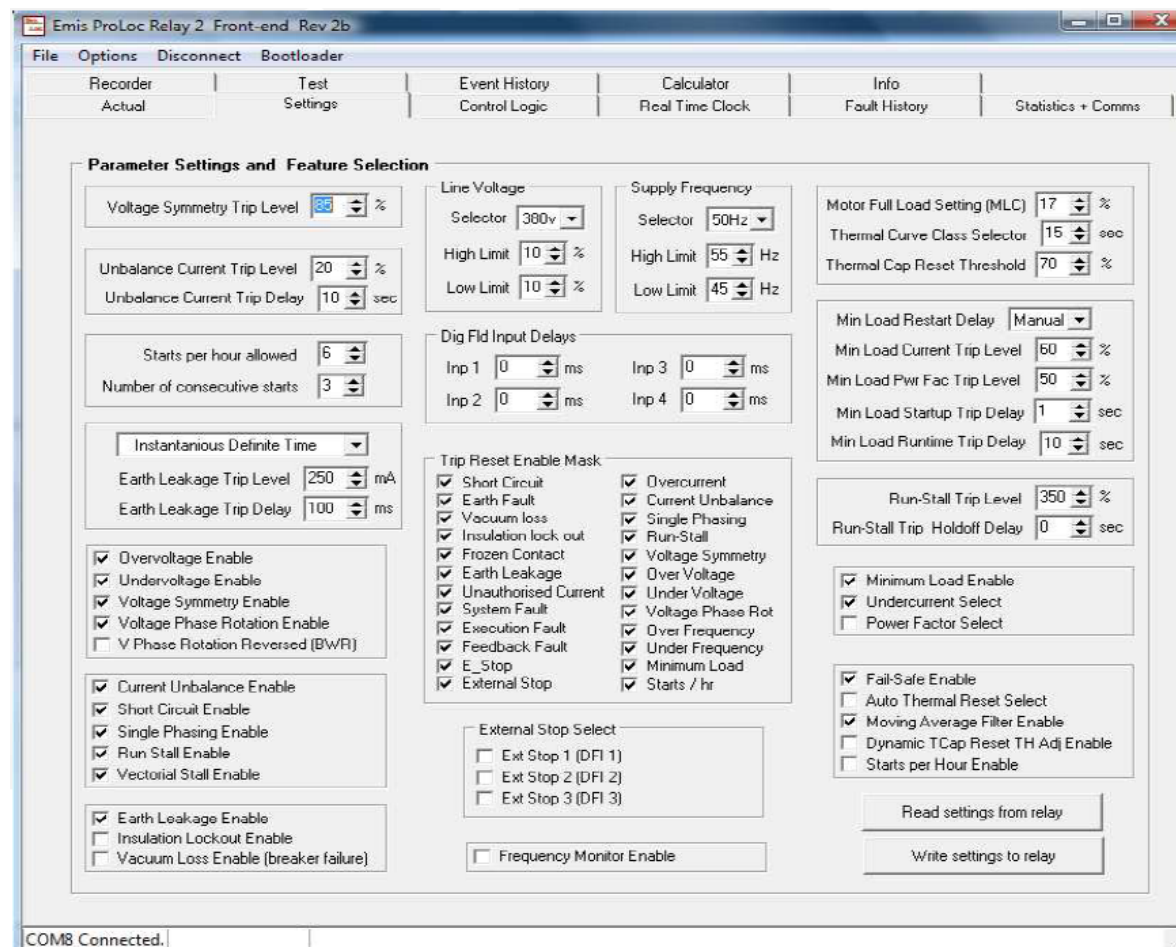
## *Earth Fault Detection ( $I_{EL} < 2A$ )*

- *Harmonic filtering (suitable for VSD's and soft starters)*
- *Trip delay time: 1 second fixed*
- *Trip level: 2A fixed*
- *Reset: Manual*
- *Feature selectable*

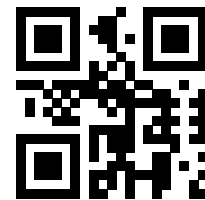




## Setting up the Protection Features



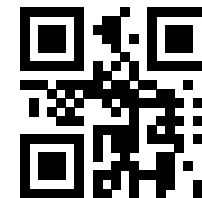




## Features and Control

- **Main Circuit 3 Phase Voltage (110V to 550 V direct; 1100 V with convertor)**
- **Power Dissipation Measurement**
- **Communication: ProfiBus / Modbus**
- **Programmable Field I/O (4 in / 5 out)**
- **Timers, E stop reporter, Unauthorized Current, Execution Fault**
- **Real Time Clock**
- **Calculators**
- **Free Frontend Software**
- **Logic Function Blocks / 6**
- **Power Factor Measurement**
- **Features and Control**
- **Starter Control (DOL, Fwd-Rev, Protection relay)**





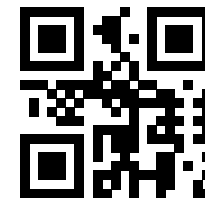
## Input Voltages

- Auto
- 110V
- 400V
- 525V
- 680 V
- 950 V
- 1100V

## Communication Protocols

- Profibus DPV-0





## Power Factor Measurement

- *Is the relationship between real power and apparent power Power factor % =  $((V \times I \times \cos\phi) / (V \times I)) \times 100\%$  Power factor =  $\cos\phi$*
- *Range: 0 to 100% (leading / lagging)*

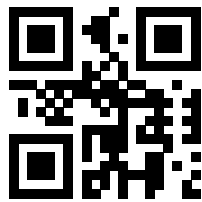


## Power Dissipation Measurement

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







## Control Logic

- *Starter Control for DOL, Forward – Reverse and Protection Relay. All configurable inputs have 60 possibilities which include alarm flags, trip flags, timer outputs, function block outputs and RTC output.*

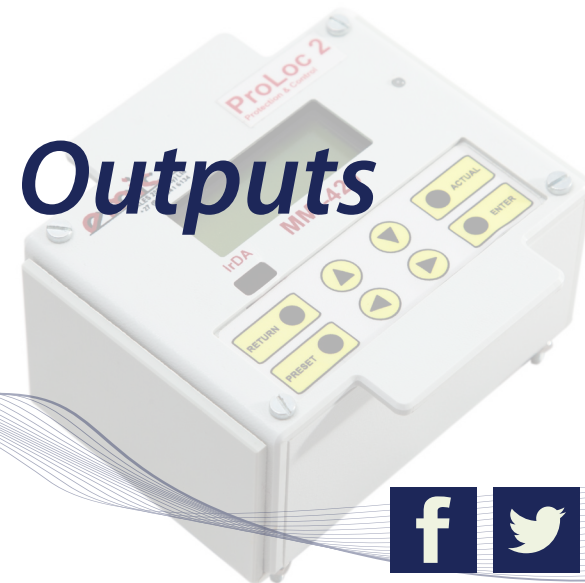
## Logic Function Blocks

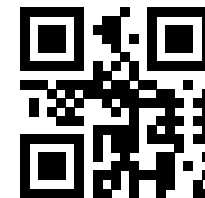
- *Amount of function blocks: 6*
- *Three fully configurable inputs per logic function block*
- *Sum of product or product of sums operation*



## Field Inputs and Programmable Outputs

- *1 Fully Programmable Output Relay*
- *Single set of potential free switch-over contacts*
- *Set of contacts for Remote Reset*





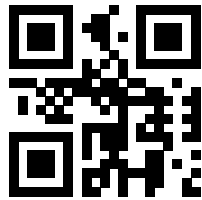
## Timers

- *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)*





## Calculators

Emis ProLoc Relay 2 Front-end Rev 2b

File Options Disconnect Bootloader

Actual Recorder Settings Test Control Logic Event History Real Time Clock Calculator Fault History Info Statistics + Comm

### Thermal Calculator

#### Cooling Time Calculation

Initial thermal capacity used:  %  
Thermal cap. reset threshold:  %  
Thermal time constant:  sec  
Forced cooling: ☒  
Calculate cooling time  sec

#### Trip Time Calculation

Motor load current:  %  
Thermal curve class:  sec  
Thermal capacity used:  %  
Calculate trip time  sec

#### Current Calculator (Delta Connection)

Full load power rating: ☐ kWatt  
Line voltage:  Volt  
Power factor:  %  
Efficiency:  %  
Calculate current  A

#### Earth Leakage IDMT Calculator

Actual leak current:  mA  
Lock current trip setting:  mA  
Time multiplier:   
Calculate trip time  sec

#### Full Load Motor Setting Calculator

Line Current:  A  
Relay Model:   
Interposing CT Ratio:  :   
Calculate MLC  %

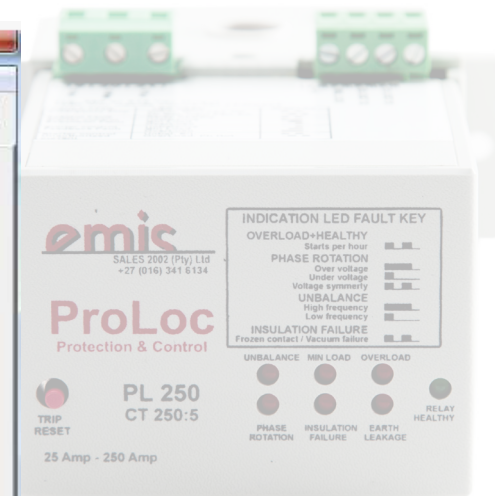
#### Thermal Curve Class Calculator

Max current @ lock rotor:  %  
Max time @ lock rotor:  sec  
Calculate curve class  sec

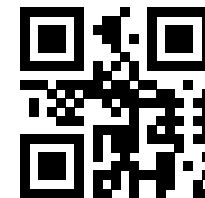
#### RMS Load Current Pattern Calculator

Stage 1: I Load  % Time  s  
Stage 2: I Load  % Time  s  
Stage 3: I Load  % Time  s  
Stage 4: I Load  % Time  s  
Note: See also Trip Time Calculator  
Calculate RMS Load Current  %

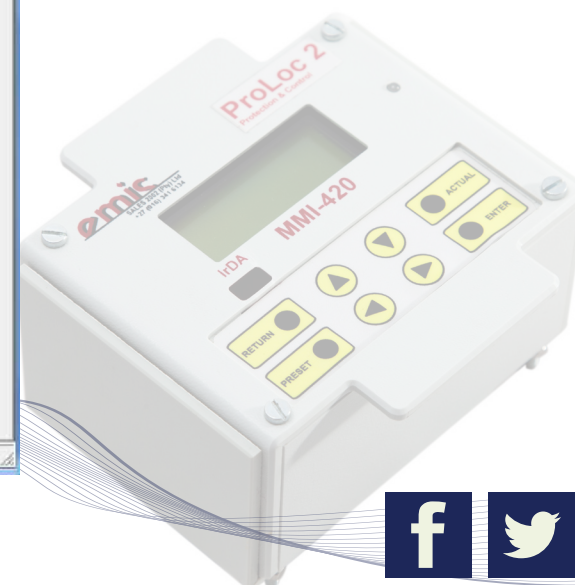
COM8 Connected. ■■■■

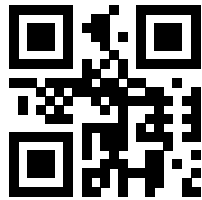






## Frontend Software: Actual Values

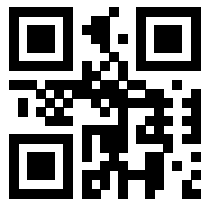




## Advantages of using the ProLoc 2 relays

- *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*



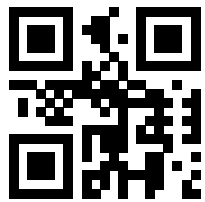


## Approvals

- *Profibus Certification*
- *ISO 9001 Accreditation since November 2001*
- *Eskom approval for our newest products*





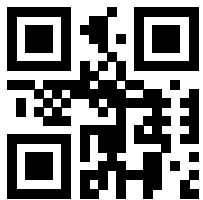


*We provide a 1 year renewable guarantee*

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

*Local support*



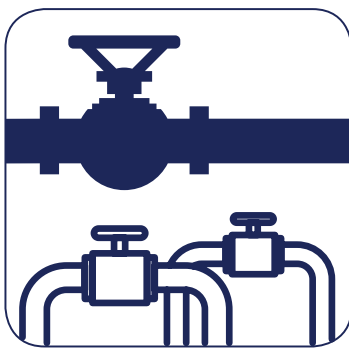


*Innovative solutions from South Africa's Leading Motor Protection Specialists*

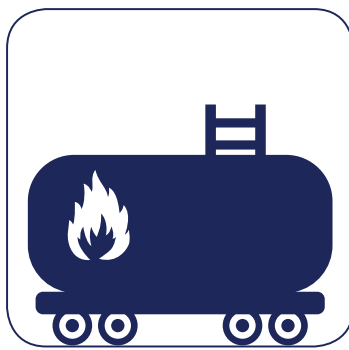
*Applications particularly well suited for use in conjunction with the NewElec range of electronic motor protection relays.*



*Mining*



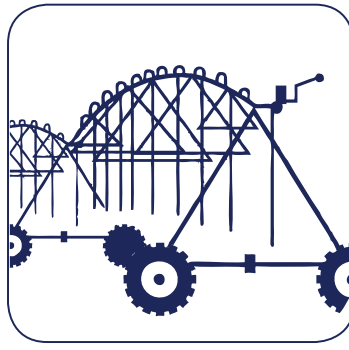
*Water Affairs*



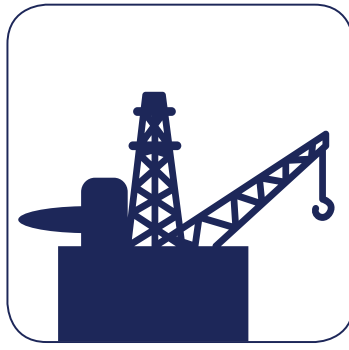
*Petro Chemical*



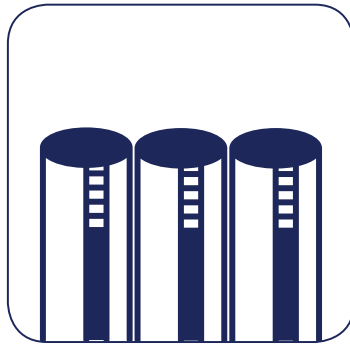
*Refineries*



*Agriculture*



*Material Handling*



*Mills*



*Cable Theft Detection*



*Pulp & Paper*

