

# RAILWAY

## Power Swing Detection for Network (AC)

The emergence of new locomotive engines revealed disturbances of the electrical feeding to the railway network. These disturbances are noticed in traffic areas or locomotive engines parking involving their concentration. Recording in real highlight reveals an obvious place phenomena of pumping. Just as it appeared, it may disappear spontaneously.

DPR800, power swing detector, is dedicated to railway AC network. It analyzes the evolution of the substation current and voltage and detects any pulsation characteristic of a power swing.

As well as the usual protection functions, NP800 relays provide monitoring, measurement and recording of the electrical quantities of the network. The relays can be set locally, using either the keypad and display or the RS232 port, or remotely using the RS485 port. Setting, reading, measurement and recording are all available locally or remotely.



# DPR800



Multifonction  
Measurement  
Recording / event log  
Disturbance recording  
Local MMI

### Protection functions

- Power Swing Detection [S.D.]



CEE Relays Ltd

# CHARACTERISTICS DPR800

## Auxiliary Supply

- Auxiliary supply ranges
- Typical burden
- Memory backup

19 to 70 – 85 to 255 / Vdc or Vac 50 or 60 Hz  
6 W (DC), 6 VA (AC)  
72 hours

## Analogue inputs

- CT

In<sub>0</sub> 1 or 5 A  
CT setting: primary value from 50 A to 10 kA  
burden at In<sub>0</sub> < 0.5 VA  
continuous rating 1 In<sub>0</sub>, short duration withstand 40 In<sub>0</sub> / 1s  
measurement from 0.005 to 2.4 In<sub>0</sub>  
display of primary current from 0 to 6.5 kA  
5VA 5P10  
measurement: 45 to 55 Hz or 55 to 65 Hz

- Recommended CTs
- Frequency (50Hz or 60Hz)

## Digital inputs (4)

- Polarizing voltage
- Level 0
- Level 1
- Operating of the input by level 1 or 0
- Burden

20 to 70 Vdc for 19 to 70 V auxiliary supply range  
37 to 140 Vdc for 85 to 255 V auxiliary supply range  
< 10Vdc range 19 to 70 V – < 33Vdc range 85 to 255 V  
> 20Vdc range 19 to 70 V – > 37Vdc range 85 to 255 V  
programmable  
< 15 mA

## Output Relays (3 + 1 WD)

- Relays A, B  
(signalling)
- Relays C, & WD:  
(control, WD: Watchdog)  
(C : programmable for CB Shunt  
Opening Release or UVR)

double contact NO, permanent current 8 A  
closing capacity 12 A / 4 s  
short circuit current withstand 100 A / 30 ms  
breaking capacity DC with L/R = 40 ms: 50W  
breaking capacity AC with cos φ = 0.4: 1250 VA  
changeover contact, permanent current 16 A  
closing capacity 25 A / 4 s  
short circuit current withstand 250 A / 30 ms  
breaking capacity DC with L/R = 40 ms: 50W  
breaking capacity AC with cos φ = 0.4: 1250 VA

## Power Swing Detection [S.D.]

- Beat number
- Time-delay monitoring beat
- Time-delay monitoring first beat
- Current drop (depth)
- Minimum number of decrease
- Minimum number of increase
- Time-delay for tripping
- Gap between decrease / increase
- Reset percentage on the operating level
- Accuracy
- Instantaneous operating time

1 to 100  
1 to 100 s  
50 to 500 ms  
5 to 90% Imax  
5 to 15  
3 to 15  
100 to 10000 ms  
1 to 5%  
95%  
2%  
60 ms

## Digital inputs assignment

- Input 1
- Input 2
- Input 3
- Input 4

not used  
disturbance trip  
not used  
not used

## Digital output assignment

- Relay A
- Relay B
- Relay C

alarm trip  
alarm for 1<sup>st</sup> beat detection  
trip

## Signalling LEDs assignment

- By settings software

## Man Machine Interface

- Relay display  
Language
- Configuration and operating software  
Language

2 lines of 16 characters  
French, English  
Windows® 2000, XP, Vista and 7 compatible  
French, English

## MODBUS® Communication

- Transmission
- Interface
- Transmission speed

asynchronous series, 2 wires  
RS 485  
300 to 115 200 bauds

## Disturbance recording

- Number of recordings
- Total duration
- Pre fault time

4  
26 seconds  
adjustable from 1 to 25 seconds

# CHARACTERISTICS DPR800

## Climatic withstand in operation

- Cold exposure
- Dry heat exposure
- Damp heat exposure
- Temperature variation with specified speed

IEC / EN 60068-2-1: class Ad, -10 °C  
IEC / EN 60068-2-2: class Bd, +55 °C  
IEC / EN 60068-2-3: class Ca, 93 % HR, 40 °C, 56 days  
IEC / EN 60068-2-14: class Nb, -10 °C to +55 °C, 3 °C/min

## Storage

- Cold exposure
- Dry heat exposure

IEC / EN 60068-2-1: class Ad, -25 °C  
IEC / EN 60068-2-2: class Bd, +70 °C

## Electrical safety

- Ground bond test current
- Impulse voltage withstand
- Dielectric withstand (50Hz or 60Hz)
- Insulation resistance
- Clearance and creepage distances

IEC / EN 61010-1: 30 A  
IEC / EN 60255-5: 5 kV MC, 5 kV MD (waveform: 1.2/50µs)  
except Digital Output, 1 kV differential mode  
except RS485, 3 kV common mode  
IEC / EN 60255-5: common mode 2 kV<sub>rms</sub> – 1 min  
differential mode for Digital Output 1 kV<sub>rms</sub> – 1 min  
(contact open)  
IEC / EN 60255-5: 500 Vdc - 1 s: > 100 MΩ  
IEC / EN 60255-5: rated insulation voltage: 250 V  
pollution degree: 2  
overvoltage category: III

## Enclosure safety

- Degree of protection provided by enclosures (IP code)

IEC / EN 60529: IP51, with front face

## Immunity – Conducted disturbances

- Immunity to RF conducted disturbances
- Fast transients
- Oscillatory waves disturbance

IEC / EN 61000-4-6: class III, 10 V  
IEC / EN 60255-22-4 / IEC / EN 61000-4-4: class IV  
IEC / EN 60255-22-1: class III, 2.5 kV CM, 1 kV DM  
except RS485, class II, 1 kV CM

- Surge immunity
- Supply interruptions

IEC / EN 61000-4-5: class III  
IEC / EN 60255-11: 100% 20 ms

## Immunity – Radiated disturbances

- Immunity to RF radiated fields
- Electrostatic discharges
- Power frequency magnetic field immunity test

IEC / EN 60255-22-3 /  
IEC / EN 61000-4-3: class III, 10 V/m  
IEC / EN 60255-22-2 /  
IEC / EN 61000-4-2: class III, 8 kV air / 6 kV contact  
IEC / EN 61000-4-8: class IV, 30 A/m continuous, 300 A/m 1 to 3 s

## Mechanical robustness - energised

- Vibrations
- Shocks

IEC / EN 60255-21-1: class 1 - 0.5g  
IEC / EN 60255-21-2: class 1 - 5g / 11 ms

## Mechanical robustness - not energised

- Vibrations
- Shocks
- Bumps
- Free fall

IEC / EN 60255-21-1: class 1 - 1g  
IEC / EN 60255-21-2: class 1 - 15g / 11 ms  
IEC / EN 60255-21-2: class 1 - 10g / 16 ms  
IEC / EN 60068-2-32: class 1 - 250 mm

## Electromagnetic compatibility (EMC)

- Radiated field emissivity
- Conducted disturbance emissivity

EN 55022: class A  
EN 55022: class A

## Presentation

- Height
- Width
- Brackets 19" rack mounting

4U  
¼ 19"  
option (see drawing D37739)

## Case

- H, W, D without short-circuiting device
- Weight

173 x 106.3 x 250 mm (see drawing D37739)  
3.6 kg

## Raccordement - codification

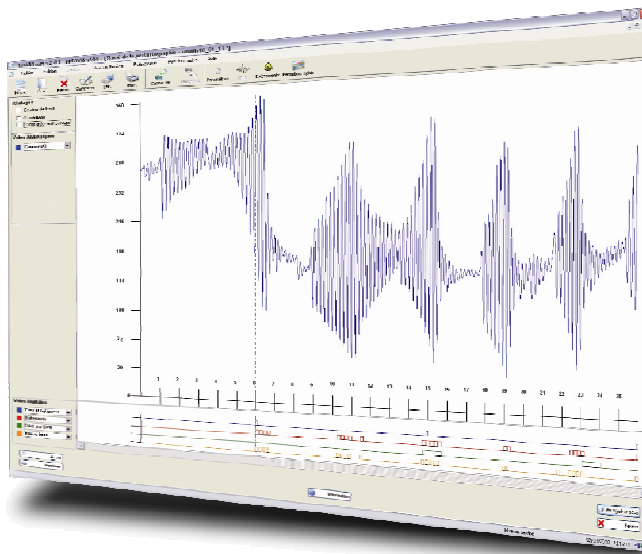
- See diagram S38016

## SMARTsoft

SMARTsoft, integrated software for the Industry, Railway and Transmission ranges, helps the User get the best from NP800 series relays.

## Functionalities

- 2 ranges of auxiliary supply
- Configuration and parameter setting by local MMI or off-line / on-line PC
- Measurement of electrical quantities:  
Display expressed in primary values  
Instantaneous values of current phase  
Frequency
- Instantaneous alarm threshold
- Setting software compatible with  
Windows® 2000, XP, Vista and 7
- User interface with access to all protection functions
- Time stamping of internal events with  
10ms resolution
- Time stamping of digital inputs with 10ms resolution
- Event recording: 60 locally recorded events, 50 saved in case of loss of auxiliary supply
- Recording of logical states of digital I/O, of measures, of faulty phase, of current.
- Local / remote events acknowledgment
- Disturbance recording according to Comtrade® format: storage of 4 recordings of 26 seconds
- Disturbance recording forced by digital input, setting software or communication channel
- Remote setting, remote reading of measurements, counters, alarms and parameters settings
- Remote reading of disturbance recording and event log
- Self-diagnosis: Memories, output relays, A/D converters, auxiliary supply, cycles of execution of software, hardware failure
- Test of wiring by activation of each output relay



## Functional diagram

