

## POWER and VOLTAGE RELAY

NPW800 performs the measurement of the apparent (S), active (P) and reactive (Q) power of 3 or 4 wire electrical networks. The monitoring of the energy flow direction is completed by the management of power factor, tangent  $\phi$  and by the supervision of network voltage and frequency.

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.



Multifunction  
Measurement  
Recording / event log  
Disturbance recording  
Local MMI

# NPW800

ICE Group



TECHNIREL

### Protection functions

- Maximum of active power with 2 thresholds\* **[32P]**
- Minimum of active power with 2 thresholds\* **[37P]**
- Max of reactive power with 2 thresholds\* **[32Q]**
- Min of reactive power with 2 thresholds\* **[37Q]**
- Overvoltage with 3 thresholds **[59]**
- Undervoltage with 3 thresholds **[27]**
- Overfrequency with 4 thresholds **[81O]**
- Underfrequency with 4 thresholds **[81U]**
- Max of zero sequence voltage with 2 thresholds **[59N]**

### Additional functions

- Management of the network power factor with 2 thresholds\* **[55]**
- Management of the network tangent  $\phi$  with 2 thresholds\* **[Q/P]**
- Max of Active  $\Sigma P$  and reactive  $\Sigma Q$  integrated power with 2 thresholds\*
- Latching of the output contacts **[86]**
- Trip circuit supervision of the breaker **[74TC]**
- Breaker failure **[BF]**
- Load shedding – Load Restoration, remote control (communication option)

\*operating mode: user configurable see characteristics

# CHARACTERISTICS NPW800

## 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

- Phase current inputs

In: 1 or 5A  
burden at  $I_n < 0.2 \text{ VA}$   
continuous rating 3  $I_n$ , short duration withstand 100  $I_n / 1 \text{ s}$   
CT setting: primary value from 1 A to 10 kA  
measurement from 0.01 to 18  $I_n$   
display of primary current from 0 to 65 kA  
5VA 5P10

- Recommended CTs
- Phase voltage inputs

Un: 33 to 120 V  
input impedance  $> 80 \text{ K}\Omega$   
continuous rating 240 V, short duration withstand 275V - 1 min  
measurement from 1 to 240 V  
VT setting: primary value from 220 V to 250 kV  
measurement: 45-55 Hz or 55-65 Hz

- Frequency (50Hz or 60Hz)

## Digital Inputs (8)

- Polarizing voltage

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

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

## Outputs Relays (7 + 1 WD)

- Relays A, B, E, F :  
(signalling, Shunt Opening Release)

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  $L/R = 40 \text{ ms}$ : 50W  
breaking capacity AC with  $\cos \phi = 0.4$  : 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  $L/R = 40 \text{ ms}$ : 50W  
breaking capacity AC with  $\cos \phi = 0.4$ : 1250 VA  
adjustable from 100 to 500 ms  
by the setting software  
capital letters or digits

- Relays C, D, G et WD :  
(control, WD : Watchdog)  
(C, D, G: programmable for CB Shunt  
Opening Release or Under Voltage  
Release)
- Relays pulse, except WD
- Assignment of name to the output  
maximum of 16 characters

## Power functions [32P] [32Q] [37P] [37Q] [55] – $\text{tg } \phi$ [Q/P] – $\Sigma P$ and $\Sigma Q$

- Measurement method
- Operation of P-Q thresholds [32P] [32Q] [37P] [37Q]
- $P>$  -  $P>>$  and  $P<$  -  $P<<$  operating range
- $Q>$  -  $Q>>$  and  $Q<$  -  $Q<<$  operating range
- P-Q thresholds accuracy
- Reset percentage on the operating level
- Operation of PF thresholds [55]
- $PF<$  -  $PF<<$  operating range
- Reset percentage on the operating level
- Operation of  $\text{tg } \phi$  thresholds [Q/P]
- $\text{tg } \phi>$  -  $\text{tg } \phi>>$  operating range
- Reset percentage on the operating level
- Maximum of integrated power  
 $\Sigma P>$  and  $\Sigma Q>$   
Integrated period
- $\Sigma P>$  and  $\Sigma Q>$  thresholds
- $\Sigma P>$  and  $\Sigma Q>$  thresholds accuracy
- Reset percentage on the operating level
- Instantaneous operating time
- Definite time delay
- Accuracy of the time delays
- Operating curves [32P] [32Q] [37P] [37Q]
- Curves accuracy and type
- Accuracy of displayed measures

2 wattmeter or 3 wattmeter as an alternative  
3 programmable modes for the power flow:  
export / import / export and import  
1 to 120 % of  $S_n$   
1 to 120 % of  $S_n$   
0.5% of  $S_n$ , Blocking of the [37] thresholds 0.5% of  $S_n$   
95% for  $P>$  and  $Q>$ , 105% for  $P<$  and  $Q<$   
3 programmable modes: lead / lag / lead-lag  
0.1 to 0.99  
 $PF<$  -  $PF<<$ : adjustable from 0.1 to 0.99  
 $6^\circ < \phi < 84.28^\circ$   
0.1 to 9.99  
 $\text{tg } \phi>$  -  $\text{tg } \phi>>$ : adjustable from 0.1 to 9.99  
3 programmable modes for the power flow:  
export / import / export and import  
5 to 60 min, step of 1 min (common value for the integrated  
measures)  
1 to 120 % of  $S_n$   
0.5% of  $S_n$   
 $\Sigma P>$  and  $\Sigma Q>$ : 95%  
60 ms including trip relay  
40 ms to 300 s : [32P] [32Q] [37P] [55]  $\text{tg } \phi$  [Q/P]  $\Sigma P$   $\Sigma Q$   
 $\pm 2\%$  or 20 ms  
according to IEC 60255-4, ANSI IEEE and configurable  
(consult us)  
class 5 – Time Multiplier Setting: 0.03 to 3 s, type : see  
Functionalities  
3% of  $S_n$

# CHARACTERISTICS NPW800

## Phase voltage functions [59] [27]

- Operating mode
- Measurement method
- Overvoltage operating range [59]
- Thresholds accuracy
- Reset percentage on the operating level
- Undervoltage operating range [27]
- Thresholds accuracy
- Reset percentage on the operating level
- Blocking of the [27] thresholds
- Definite time delay
- Accuracy of the time delays
- Operating curves
- Curves accuracy and type
- Instantaneous operating time
- Accuracy of displayed measures

function « Or » or « And » programmable  
phase to phase voltage for the 2 wattmeter method  
phase to neutral voltage for the 3 wattmeter method  
40 to 200 % Un  
2% from 40% to 150% Un – 3% over 150% Un  
97%  
5 to 120 % Un  
2%  
103%  
10% of Un, programmable: in or out of service  
40 ms to 300 s  
± 2% or 20 ms  
according to IEC 60255-4, ANSI IEEE  
class 5 – Time Multiplier Setting: 0.03 to 3 s, type : see  
Functionalities  
60 ms including trip relay  
3% from 3 to 240 V

## Zero sequence voltage functions [59N]

- Measurement method
- Operating range
- Thresholds accuracy
- Reset percentage on the operating level
- Instantaneous operating time
- Definite time delay
- Accuracy of the time delays
- Accuracy of displayed measures

zero sequence voltage calculated  
2 to 80 % Un (3W) or Un/√3 (2W)  
2% of Un  
97%  
60 ms including trip relay  
40 ms to 300 s  
± 2% or 20 ms  
3% from 3 to 240 V

## Frequency functions [81O] [81U]

- Operating range
- Thresholds accuracy
- Reset percentage on the operating level
- Blocked for voltage
- Instantaneous operating time
- Definite time delay
- Accuracy of the time delays
- Accuracy of displayed measures

46 – 49.95 Hz / 50.05 – 54 Hz or 56 – 59.95 Hz / 60.05 – 64 Hz  
± 0.1 Hz  
0.2 Hz  
<10% of Un  
80 ms typical including trip relay, 150 ms maximum  
80 ms to 10 s  
± 2% or 20 ms  
0.1 Hz

## Trip circuit supervision and breaker failure [74TC] [BF]

- Trip circuit supervision [74TC]
- Operating time (in faulty condition)
- Fixed operating range [BF]
- Breaker failure time delay

requires one or two digital inputs (see application guide)  
500 ms fixed for [74TC] function  
>0.5 % of In / >0.5% of In or >1% of Un  
60 to 1000 ms

## Latching of the output contacts [86]

- Manual reset for output relays
- Reset

A, B, C, D, E, F, G (assignment programmable)  
digital input, digital communication or local MMI

## Digital inputs assignment

- By the setting software
- Settings table selection
- Disturbance record
- Interlock o/o
- Interlock c/o
- Control mode
- Reset [86] function
- Trip circuit supervision
- CB external trip order
- Blocking of the protection functions
- Blocking of the time delays
- Programmable function

set 1 – set 2

dedicated to remote control, switching device position  
dedicated to remote control, switching device position  
dedicated to remote control, local / remote  
acknowledgment of the selected output(s)  
[74TC] function  
function [74TC] blocked if external trip order

(time delay cancel, function acts instantaneously)

## User programmable functions (digital inputs – digital outputs)

- Status of the function
- Tripping mode or report
- Operating and release time delays
- Assignment of name, maximum of 14 characters to the function
- Assignment of one or more output relays (alarm or trip)

in or out of service, by local MMI or by the setting software  
report : for time stamping and event recorder  
tripping mode: 0 ms to 300 s  
by the setting software

by local MMI or by the setting software  
A, B, C, D, E, F, G

# CHARACTERISTICS NPW800

## Load shedding – Load Restoration, remote control (communication option)

- Load shedding level 1 to 6
- Time delay before reclosing 1 a 120 s, ± 2% or 20 ms
- Reclosing pulse 100 to 500 ms (remote control)
- Output relays assigned programmable by local MMI or by the setting software A, B, C, D, E, F, G

## Digital output assignment

- By local MMI or by the setting software

## Signalling LEDs assignment

- By the setting software

## Counters

- Energy E. Active +, E. Active -, E. Reactive +, E. Reactive -

## Setting software

- Display French, English, Spanish, Italian
- Configuration and operating software Windows® 2000, XP, Vista and 7 compatible  
French, English, Spanish, Italian

## MODBUS® Communication (option)

- Transmission asynchronous series, 2 wires
- Interface RS 485
- Transmission speed 300 to 115 200 bauds

## Disturbance recording

- Number of recordings 4
- Total duration 52 periods per recording
- Pre fault time adjustable from 0 to 52 cycles

## Climatic withstand in operation

- Cold exposure IEC / EN 60068-2-1: class Ad, -10 °C
- Dry heat exposure IEC / EN 60068-2-2: class Bd, +55 °C
- Damp heat exposure IEC / EN 60068-2-3: class Ca, 93 % HR, 40 °C, 56 days
- Temperature variation with specified variation rate IEC / EN 60068-2-14: class Nb, -10 °C to +55 °C, 3 °C/min

## Storage

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

## Electrical safety

- Ground bond test current IEC / EN 61010-1: 30 A
- Impulse voltage withstand 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
- Dielectric withstand (50Hz or 60Hz) 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)
- Insulation resistance IEC / EN 60255-5: 500 Vdc - 1 s : > 100 MΩ
- Clearances and creepage distances 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 IEC / EN 61000-4-6: class III, 10 V
- Fast transients IEC / EN 60255-22-4 / IEC / EN 61000-4-4: class IV
- Oscillatory waves disturbance IEC / EN 60255-22-1: class III, 2.5 kV CM, 1 kV DM  
except RS485, class II, 1 kV CM
- Surge immunity IEC / EN 61000-4-5: class III
- Supply interruptions IEC / EN 60255-11: 100% 20 ms

# CHARACTERISTICS NPW800

## 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
- Display

4U  
¼ 19"  
option (see drawing D37739)  
2 lines of 16 characters

## Case

- H, W, D without short-circuiting devices
- H, W, D with short-circuiting devices
- Weight

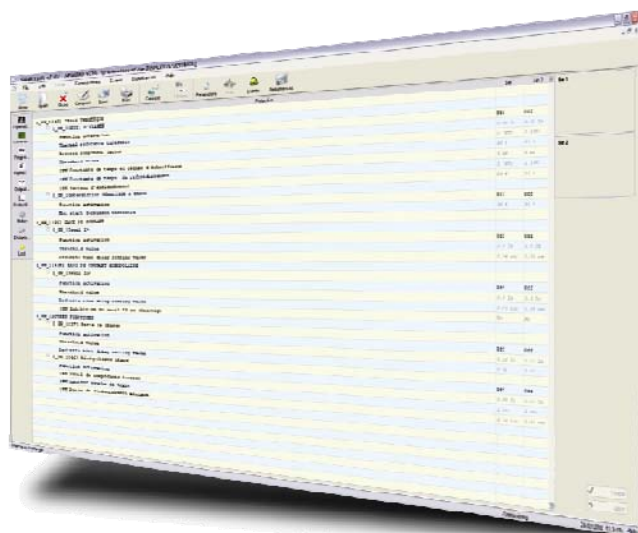
173 x 106.3 x 250 mm (see drawing D37739)  
173 x 106.3 x 305 mm (see drawing D37739)  
3.6 kg

## Connection - codification

- See diagram S39292

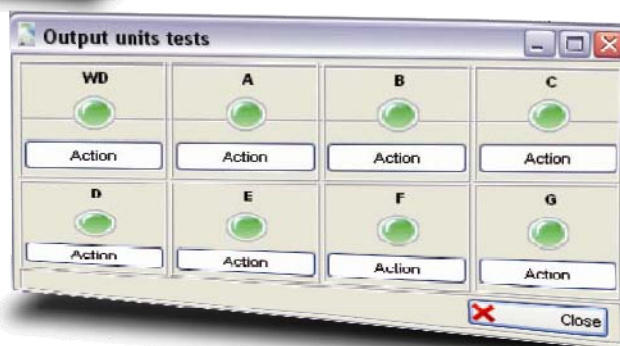
## SMARTsoft

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



SMARTsoft

User friendly  
Diagnosis  
Fault analysis  
Maintenance tools



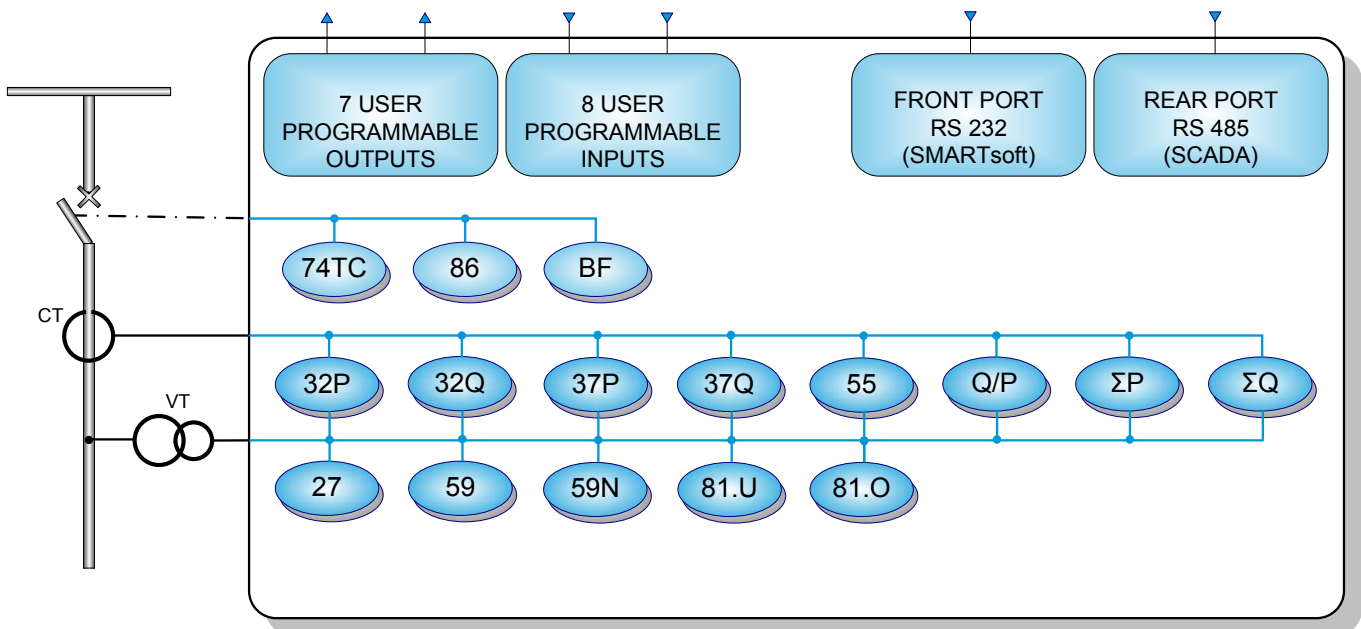
## Functionalities

- 2 ranges of auxiliary supply
- Storage of the lack and the restoration of the auxiliary voltage (events recorded)
- Configuration and parameter setting by local MMI or off-line / on-line PC
- Measurement of electrical quantities:  
Display expressed in primary values  
Instantaneous and integrated values of phase currents and S, P, Q power  
Values, according to the wiring, phase to phase or phase to neutral and the residual voltage  
Frequency  
Power factor,  $\text{Cos}\phi$   
Instantaneous value of tangent  $\phi$
- Instantaneous alarm threshold
- Definite time tripping
- Dependent time tripping according to inverse/very inverse/extremely inverse IEC 60255-4 curves
- Tripping according to RI inverse curve (electromechanical)
- Tripping according to moderately inverse/very inverse/extremely inverse ANSI /IEEE curves
- 2 setting groups, locally or remotely selectable by a digital input or by the communication channel
- Energy metering : storage values / hour
- CB Monitoring : interlocks discrepancy, local or remote control of closing / tripping
- Remote control by the communication channel: tripping or closing, load shedding with priority levels and load restoration
- 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: 250 locally recorded events, 200 saved in case of loss of auxiliary supply
- Local / remote events acknowledgment
- Disturbance recording according to Comtrade® format: storage of four 52 periods recordings
- Disturbance recording initiated by digital input, setting software or communication network
- 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 and failure
- Test of wiring, phase rotation and direction of the current

## Options

- Communication by Modbus® RS 485
- Communication by Modbus® RS 485 with redundancy
- 2 dependent time, configurable and downloadable curves (consult us)

## Functional diagram



Only documents supplied with our acknowledgment are to be considered as binding.