GENERATION & NETWORK
Power and Voltage Relay

NPW800

Protection & Control ice

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 φ 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

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 φ with 2 thresholds* **[Q/P]**
- Max of Active **ΣP** and reactive **ΣQ** 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	19 to 70 – 85 to 255 / Vdc or Vac 50 or 60 Hz
• Typical burden	6 W (DC), 6 VA (AC)
• Memory backup	72 hours

Analogue Inputs

• Phase current inputs	In: 1 or 5A burden at In < 0.2 VA continuous rating 3 In, short duration withstand 100 In / 1 s CT setting: primary value from 1 A to 10 kA measurement from 0.01 to 18 In display of primary current from 0 to 65 kA
• Recommended CTs	5VA 5P10
• Phase voltage inputs	Un: 33 to 120 V input impedance > 80 KΩ 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
• Frequency (50Hz or 60Hz)	measurement: 45-55 Hz or 55-65 Hz

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
• Level 0	< 10Vdc range 19 to 70 V – < 33Vdc range 85 to 255 V
• Level 1	> 20Vdc range 19 to 70 V – > 37Vdc range 85 to 255 V
• Operating of the input by level 1 or 0	programmable
• Burden	< 15 mA

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 ms: 50W breaking capacity AC with cos φ = 0.4 : 1250 VA
• Relays C, D, G & WD : (control, WD : Watchdog) (C, D, G: programmable for CB Shunt Opening Release or Under Voltage Release)	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
• Relays pulse, except WD	adjustable from 100 to 500 ms
• Assignment of name to the output maximum of 16 characters	by the setting software capital letters or digits

Power functions [32P] [32Q] [37P] [37Q] [55] – tg φ [Q/P] – ΣP and ΣQ

• Measurement method	2 wattmeter or 3 wattmeter as an alternative
• Operation of P-Q thresholds [32P] [32Q] [37P] [37Q]	3 programmable modes for the power flow: export / import / export and import
• P> - P>> and P< - P<< operating range	1 to 120 % of Sn
• Q> - Q>> and Q< - Q<< operating range	1 to 120 % of Sn
• P-Q thresholds accuracy	0.5% of Sn, Blocking of the [37] thresholds 0.5% of Sn
• Reset percentage on the operating level	95% for P> and Q>, 105% for P< and Q<
• Operation of PF thresholds [55]	3 programmable modes: lead / lag / lead-lag
• PF< - PF<< operating range	0.1 to 0.99
• Reset percentage on the operating level	PF< - PF<<: adjustable from 0.1 to 0.99
• Operation of tg φ thresholds [Q/P]	6° < φ < 84.28°
• tg φ> - tg φ>> operating range	0.1 to 9.99
• Reset percentage on the operating level	tg φ> - tg φ>>: adjustable from 0.1 to 9.99
• Maximum of integrated power ΣP> and ΣQ> Integrated period	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)
• ΣP> and ΣQ> thresholds	1 to 120 % of Sn
• ΣP> and ΣQ> thresholds accuracy	0.5% of Sn
• Reset percentage on the operating level	ΣP> and ΣQ>: 95%
• Instantaneous operating time	60 ms including trip relay
• Definite time delay	40 ms to 300 s : [32P] [32Q] [37P] [55] tg φ [Q/P] ΣP ΣQ
• Accuracy of the time delays	± 2% or 20 ms
• Operating curves [32P] [32Q] [37P] [37Q]	according to IEC 60255-3, ANSI IEEE and configurable (consult us)
• Curves accuracy and type	class 5 – Time Multiplier Setting: 0.03 to 3 s, type : see Functionalities
• Accuracy of displayed measures	3% of Sn

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Phase voltage functions [59] [27]

• Operating mode	function « Or » or « And » programmable
• Measurement method	phase to phase voltage for the 2 wattmeter method phase to neutral voltage for the 3 wattmeter method
• Overvoltage operating range [59]	40 to 200 % Un
• Thresholds accuracy	2% from 40% to 150% Un – 3% over 150% Un
• Reset percentage on the operating level	97%
• Undervoltage operating range [27]	5 to 120 % Un
• Thresholds accuracy	2%
• Reset percentage on the operating level	103%
• Blocking of the [27] thresholds	10% of Un, programmable: in or out of service
• Definite time delay	40 ms to 300 s
• Accuracy of the time delays	± 2% or 20 ms
• Operating curves	according to IEC 60255-3, ANSI IEEE
• Curves accuracy and type	class 5 – Time Multiplier Setting: 0.03 to 3 s, type : see Functionalities
• Instantaneous operating time	60 ms including trip relay
• Accuracy of displayed measures	3% from 3 to 240 V

Zero sequence voltage functions [59N]

• Measurement method	zero sequence voltage calculated
• Operating range	2 to 80 % Un (3W) or Un/√3 (2W)
• Thresholds accuracy	2% of Un
• Reset percentage on the operating level	97%
• Instantaneous operating time	60 ms including trip relay
• Definite time delay	40 ms to 300 s
• Accuracy of the time delays	± 2% or 20 ms
• Accuracy of displayed measures	3% from 3 to 240 V

Frequency functions [81O] [81U]

• Operating range	46 – 49.95 Hz / 50.05 – 54 Hz or 56 – 59.95 Hz / 60.05 – 64 Hz
• Thresholds accuracy	± 0.1 Hz
• Reset percentage on the operating level	0.2 Hz
• Blocked for voltage	<10% of Un
• Instantaneous operating time	80 ms typical including trip relay, 150 ms maximum
• Definite time delay	80 ms to 10 s
• Accuracy of the time delays	± 2% or 20 ms
• Accuracy of displayed measures	0.1 Hz

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

• Trip circuit supervision [74TC]	requires one or two digital inputs (see application guide)
• Operating time (in faulty condition)	500 ms fixed for [74TC] function
• Fixed operating range [BF]	>0.5 % of In / >0.5% of In or >1% of Un
• Breaker failure time delay	60 to 1000 ms

Latching of the output contacts [86]

• Manual reset for output relays	A, B, C, D, E, F, G (assignment programmable)
• Reset	digital input, digital communication or local MMI

Digital inputs assignment

• By the setting software	
• Settings table selection	set 1 – set 2
• Disturbance record	
• Interlock o/o	dedicated to remote control, switching device position
• Interlock c/o	dedicated to remote control, switching device position
• Control mode	dedicated to remote control, local / remote
• Reset [86] function	acknowledgment of the selected output(s)
• Trip circuit supervision	[74TC] function
• CB external trip order	function [74TC] blocked if external trip order
• Blocking of the protection functions	
• Blocking of the time delays	(time delay cancel, function acts instantaneously)
• Programmable function	

User programmable functions (digital inputs – digital outputs)

• Status of the function	in or out of service, by local MMI or by the setting software
• Tripping mode or report	report : for time stamping and event recorder
• Operating and release time delays	tripping mode: 40 ms to 300 s
• Assignment of name, maximum of 14 characters to the function	by the setting software
• Assignment of one or more output relays (alarm or trip)	by local MMI or by the setting software A, B, C, D, E, F, G

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

• Load shedding level	1 to 6
• Time delay before reclosing	1 a 120 s, ± 2%
• 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 –
• Cumulative breaking current	maximum 64.10^6 kA² (phase 1,2 and 3)
• Operation number circuit breaker	0 to 10 000

Man Machine Interface

• Relay display Language	2 lines of 16 characters French, English, Spanish, Italian
• Configuration and operating software Language	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_{rms} – 1 min differential mode for Digital Output 1 kV_{rms} – 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

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Immunity – Radiated disturbances

• Immunity to RF radiated fields	IEC / EN 60255-22-3 / IEC / EN 61000-4-3 : class III, 10 V/m
• Electrostatic discharges	IEC / EN 60255-22-2 / IEC / EN 61000-4-2: class III, 8 kV air / 6 kV contact
• Power frequency magnetic field immunity test	IEC / EN 61000-4-8: class IV, 30 A/m continuous, 300 A/m 1 to 3 s

Mechanical robustness - energised

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

Mechanical robustness - not energised

• Vibrations	IEC / EN 60255-21-1: class 1 - 1g
• Shocks	IEC / EN 60255-21-2: class 1 - 15g / 11 ms
• Bumps	IEC / EN 60255-21-2: class 1 - 10g / 16 ms
• Free fall	IEC / EN 60068-2-32: class 1 - 250 mm

Electromagnetic compatibility (EMC)

• Radiated field emissivity	EN 55022: class A
• Conducted disturbance emissivity	EN 55022: class A

Presentation

• Height	4U
• Width	¼ 19"
• Brackets 19” rack mounting	option (see drawing D37739)

Case

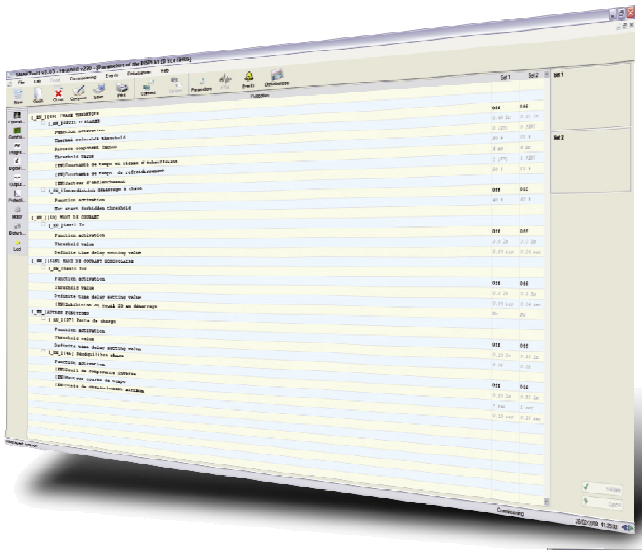
• H, W, D without short-circuiting devices	173 x 106.3 x 250 mm (see drawing D37739)
• H, W, D with short-circuiting devices	173 x 106.3 x 305 mm (see drawing D37739)
• Weight	3.6 kg

Connection - codification

- See diagram S39292

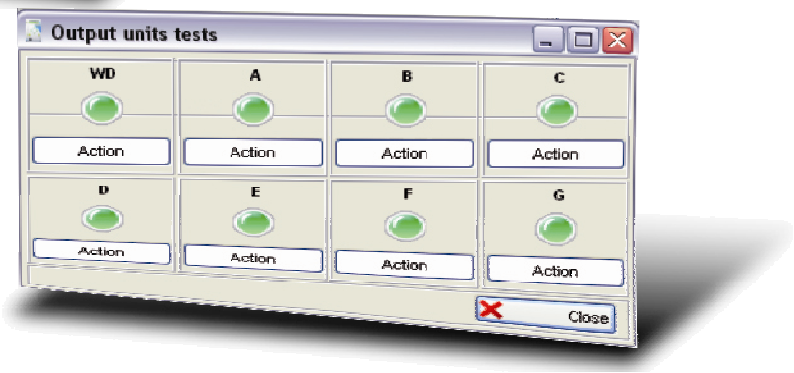
SMARTsoft

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



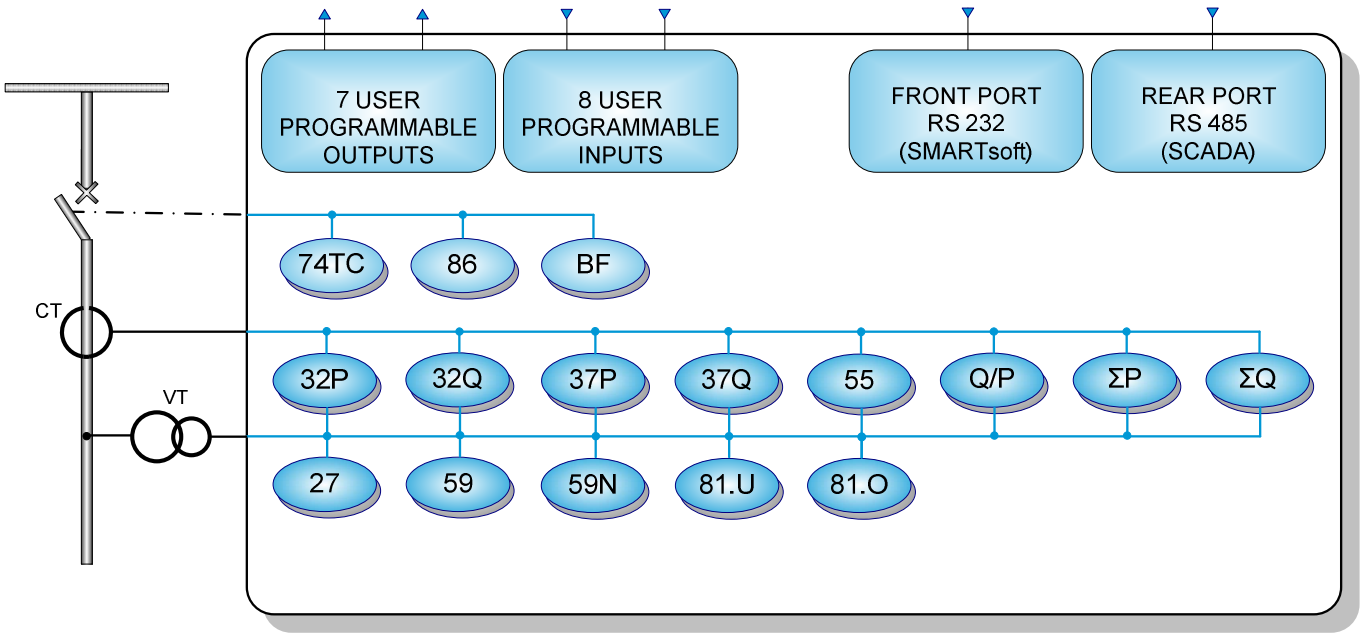
Functionalities

- 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, Cosφ
  Instantaneous value of tangent φ
- Instantaneous alarm threshold
- Definite time tripping
- Dependent time tripping according to inverse/very inverse/extremely inverse IEC 60255-3 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 internals 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



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