

NPW800

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 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

OUR TRADEMARKS



GENERAL CHARACTERISTICS

Auxiliary Supply <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Recommended CTs 	5VA 5P10
<ul style="list-style-type: none"> • Phase voltage inputs 	Un: 33 to 120 V input impedance $> 80 \text{ K}\Omega$ continuous rating 240 V, short duration withstand 275 V - 1 min measurement from 1 to 240 V VT setting: primary value from 220 V to 250 kV
<ul style="list-style-type: none"> • Frequency (50Hz or 60Hz) 	measurement: 45-55 Hz or 55-65 Hz
Digital inputs (8) <ul style="list-style-type: none"> • 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 $< 10 \text{ Vdc}$ 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 $< 15 \text{ mA}$
Outputs Relays (7 + 1 WD) <ul style="list-style-type: none"> • 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 $\cos \varphi = 0.4$: 1,250 VA
<ul style="list-style-type: none"> • Relays C, D, G et 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 $L/R = 40 \text{ ms}$: 50W breaking capacity AC with $\cos \varphi = 0.4$: 1,250 VA
<ul style="list-style-type: none"> • Relays pulse, except WD 	adjustable from 100 to 500 ms
<ul style="list-style-type: none"> • 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] – $\text{tg } \varphi$ [Q/P] – ΣP and ΣQ <ul style="list-style-type: none"> • 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] • $\text{PF}<$ - $\text{PF}<<$ operating range • Reset percentage on the operating level • Operation of $\text{tg } \varphi$ thresholds [Q/P] • $\text{tg } \varphi>$ - $\text{tg } \varphi>>$ operating range • Reset percentage on the operating level 	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 $\text{PF}<$ - $\text{PF}<<$: adjustable from 0.1 to 0.99 $6^\circ < \varphi < 84.28^\circ$ 0.1 to 9.99 $\text{tg } \varphi>$ - $\text{tg } \varphi>>$: adjustable from 0.1 to 9.99

GENERAL CHARACTERISTICS

Power functions [32P] [32Q] [37P] [37Q] [55] – tg φ [Q/P] – ΣP and ΣQ <ul style="list-style-type: none"> Maximum of integrated power ΣP> and ΣQ> Integrated period ΣP> and ΣQ> thresholds ΣP> and ΣQ> 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 	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 Sn 0.5% of Sn ΣP> and ΣQ>: 95% 60 ms including trip relay 40 ms to 300 s : [32P] [32Q] [37P] [55] tg φ [Q/P] ΣP ΣQ ± 2% or 20 ms according to IEC 60255-3, ANSI IEEE and configurable (consult us) class 5 – Time Multiplier Setting: 0.03 to 3 s, type : see Functionalities 3% of Sn
Phase voltage functions [59] [27] <ul style="list-style-type: none"> 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 60255-3, 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] <ul style="list-style-type: none"> 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 [810] [81U] <ul style="list-style-type: none"> 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
Latching of the output contacts [86] <ul style="list-style-type: none"> Manual reset for output relays Reset 	A, B, C, D, E, F, G (programmable assignment) digital input, digital communication or local MMI

GENERAL CHARACTERISTICS

Trip circuit supervision and breaker failure [74TC] [BF] <ul style="list-style-type: none"> • 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 I_n / $>0.5\%$ of I_n or $>1\%$ of U_n 60 to 1,000 ms
Digital inputs assignment <ul style="list-style-type: none"> • 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 • 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
User programmable functions (digital inputs – digital outputs) <ul style="list-style-type: none"> • 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: 40 ms to 300 s by the setting software by local MMI or by the setting software A, B, C, D, E, F, G
Load shedding – Load Restoration, remote control (communication option) <ul style="list-style-type: none"> • Load shedding level • Time delay before reclosing • Reclosing pulse • Output relays assigned 	1 to 6 1 to 120 s, $\pm 2\%$ 100 to 500 ms (remote control) programmable by local MMI or by setting software A, B, C, D, E, F, G
Digital output assignment <ul style="list-style-type: none"> • By local MMI or by setting software 	
Signalling LEDs assignment <ul style="list-style-type: none"> • By setting software 	
Counters <ul style="list-style-type: none"> • Energy • Cumulative breaking current • Operation number circuit breaker 	E. Active +, E. Active -, E. Reactive +, E. Reactive - maximum 64.10^6 kA ² (phase 1,2 and 3) 0 to 10,000
Man Machine Interface <ul style="list-style-type: none"> • Relay display Language • Configuration and operating software Language 	2 lines of 16 characters French, English, Spanish, Italian Windows® 2000, XP, Vista and 7 compatible French, English, Spanish, Italian
MODBUS® Communication (option) <ul style="list-style-type: none"> • Transmission • Interface • Transmission speed 	asynchronous series, 2 wires RS485 300 to 115,200 bauds

GENERAL CHARACTERISTICS

Disturbance recording <ul style="list-style-type: none"> • Number of recordings • Total duration • Pre fault time 	4 52 periods per recording adjustable from 0 to 52 cycles
Climatic withstand in operation <ul style="list-style-type: none"> • Cold exposure • Dry heat exposure • Damp heat exposure • Temperature variation with specified variation rate 	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 à +55 °C, 3 °C/min
Storage <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 _{rms} - 1 min differential mode for Digital Output 1 kV _{rms} - 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 <ul style="list-style-type: none"> • Degree of protection provided by enclosures (IP code) 	IEC / EN 60529: IP51, with front face
Immunity – Conducted disturbances <ul style="list-style-type: none"> • Immunity to RF conducted disturbances • Fast transients • Oscillatory waves disturbance • Surge immunity • Supply interruptions 	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 IEC / EN 61000-4-5: class III IEC / EN 60255-11: 100% 20 ms
Immunity – Radiated disturbances <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Vibrations • Shocks • Bumps • Free falls 	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) <ul style="list-style-type: none"> • Radiated field emissivity • Conducted disturbance emissivity 	EN 55022: class A EN 55022: class A

GENERAL CHARACTERISTICS

Presentation <ul style="list-style-type: none"> • Height • Width • Brackets 19" rack mounting 	4U 1/4 19" option (see drawing D37739)
Case <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • See diagram S39292 	

SMARTsoft

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



- 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
 - Power factor, Cos φ
 - 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 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® RS485
- Communication by Modbus® RS485 with redundancy
- 2 dependent time, configurable and downloadable curves (consult us)

FUNCTIONAL DIAGRAM

