

# NPW800R

## RETROFITTING

## Power and Voltage Protection Relay



NPW800R (R3 case) is dedicated to the refurbishment of CEE WTG 7000 relays (R3 case) providing the measurement of apparent (S), active (P) and reactive (Q) powers of electrical networks. The monitoring of the energy flow direction of this numerical and multi-function relay is completed by the management of power factor, of tangent  $\varphi$  and by the supervision of network voltage and frequency.

NP800R 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.

Two mountings are available, Flush Rear Connection (**EDPAR**) or Projecting Rear Connection (**SDPAR**).

Setting, reading, measurement and recording are all available locally or remotely.



NPW800R - EDPAR

- Minimises retrofitting man-hours
- Maximises preservation of existing installation
- Simplifies and reduces re-commissioning time
- Minimises retrofitting costs

### 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 [810]
- 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  $\varphi$  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

\*operating mode: user configurable see characteristics

#### OUR TRADEMARKS



## GENERAL CHARACTERISTICS

<b>Auxiliary Supply</b> <ul style="list-style-type: none"> <li>Auxiliary supply ranges</li> <li>Typical burden</li> <li>Memory backup</li> </ul>	19 to 70 – 85 to 255 / Vdc or Vac 50 or 60 Hz 6 W (DC), 6 VA (AC) 72 hours
<b>Analogue inputs</b> <ul style="list-style-type: none"> <li>Phase current inputs</li> </ul>	In: 1 or 5A burden at $I_n < 0.2 \text{ VA}$ continuous rating $3 I_n$ , short duration withstand $80 I_n / 1 \text{ s}$ 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"> <li>Recommended CTs</li> </ul>	5VA 5P10
<ul style="list-style-type: none"> <li>Phase voltage inputs</li> </ul>	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"> <li>Frequency (50Hz or 60Hz)</li> </ul>	measurement: 45-55 Hz or 55-65 Hz
<b>Digital inputs (8)</b> <ul style="list-style-type: none"> <li>Polarizing voltage</li> <li>Level 0</li> <li>Level 1</li> <li>Operating of the input by level 1 or 0</li> <li>Burden</li> </ul>	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 $< 15 \text{ mA}$
<b>Outputs Relays (7 + 1 WD)</b> <ul style="list-style-type: none"> <li>Relays A, B, E, F : (signalling, Shunt Opening Release)</li> </ul>	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"> <li>Relays C, D, G &amp; WD: (control, WD : Watchdog) (C, D, G: programmable for CB Shunt Opening Release or Under Voltage Release)</li> </ul>	changeover contact, permanent current 10 A closing capacity 15 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"> <li>Relays pulse, except WD</li> </ul>	adjustable from 100 to 500 ms
<ul style="list-style-type: none"> <li>Assignment of name to the output maximum of 16 characters</li> </ul>	by the setting software capital letters or digits
<b>Power functions [32P] [32Q] [37P] [37Q] [55] – <math>\text{tg } \varphi</math> [Q/P] – <math>\Sigma P</math> and <math>\Sigma Q</math></b> <ul style="list-style-type: none"> <li>Measurement method</li> <li>Operation of P-Q thresholds [32P] [32Q] [37P] [37Q]</li> <li><math>P&gt;</math> - <math>P&gt;&gt;</math> and <math>P&lt;</math> - <math>P&lt;&lt;</math> operating range</li> <li><math>Q&gt;</math> - <math>Q&gt;&gt;</math> and <math>Q&lt;</math> - <math>Q&lt;&lt;</math> operating range</li> <li>P-Q thresholds accuracy</li> <li>Reset percentage on the operating level</li> <li>Operation of PF thresholds [55]</li> <li><math>\text{PF}&lt;</math> - <math>\text{PF}&lt;&lt;</math> operating range</li> <li>Reset percentage on the operating level</li> <li>Operation of <math>\text{tg } \varphi</math> thresholds [Q/P]</li> <li><math>\text{tg } \varphi&gt;</math> - <math>\text{tg } \varphi&gt;&gt;</math> operating range</li> <li>Reset percentage on the operating level</li> </ul>	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

<p><b>Power functions [32P] [32Q] [37P] [37Q] [55] – tg φ [Q/P] – ΣP and ΣQ</b></p> <ul style="list-style-type: none"> <li>• Maximum of integrated power ΣP&gt; and ΣQ&gt;</li> <li>• Integrated period</li> <li>• ΣP&gt; and ΣQ&gt; thresholds</li> <li>• ΣP&gt; and ΣQ&gt; thresholds accuracy</li> <li>• Reset percentage on the operating level</li> <li>• Instantaneous operating time</li> <li>• Definite time delay</li> <li>• Accuracy of the time delays</li> <li>• Operating curves [32P] [32Q] [37P] [37Q]</li> <li>• Curves accuracy and type</li> <li>• Accuracy of displayed measures</li> </ul>	<p>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&gt; and ΣQ&gt;: 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 class 5 – Time Multiplier Setting: 0.03 to 3 s, type : see Functionalities 3% of Sn</p>
<p><b>Phase voltage functions [59] [27]</b></p> <ul style="list-style-type: none"> <li>• Operating mode</li> <li>• Measurement method</li> <li>• Overvoltage operating range [59]</li> <li>• Thresholds accuracy</li> <li>• Reset percentage on the operating level</li> <li>• Undervoltage operating range [27]</li> <li>• Thresholds accuracy</li> <li>• Reset percentage on the operating level</li> <li>• Blocking of the [27] thresholds</li> <li>• Definite time delay</li> <li>• Accuracy of the time delays</li> <li>• Operating curves</li> <li>• Curves accuracy and type</li> <li>• Instantaneous operating time</li> <li>• Accuracy of displayed measures</li> </ul>	<p>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</p>
<p><b>Zero sequence voltage functions [59N]</b></p> <ul style="list-style-type: none"> <li>• Measurement method</li> <li>• Operating range</li> <li>• Thresholds accuracy</li> <li>• Reset percentage on the operating level</li> <li>• Instantaneous operating time</li> <li>• Definite time delay</li> <li>• Accuracy of the time delays</li> <li>• Accuracy of displayed measures</li> </ul>	<p>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</p>
<p><b>Frequency functions [810] [81U]</b></p> <ul style="list-style-type: none"> <li>• Operating range</li> <li>• Thresholds accuracy</li> <li>• Reset percentage on the operating level</li> <li>• Blocked for voltage</li> <li>• Instantaneous operating time</li> <li>• Definite time delay</li> <li>• Accuracy of the time delays</li> <li>• Accuracy of displayed measures</li> </ul>	<p>46 – 49.95 Hz / 50.05 – 54 Hz or 56 – 59.95 Hz / 60.05 – 64 Hz ± 0.1 Hz 0.2 Hz &lt;10% of Un 80 ms typical including trip relay, 150 ms maximum 80 ms to 10 s ± 2% or 20 ms 0.1 Hz</p>

## GENERAL CHARACTERISTICS

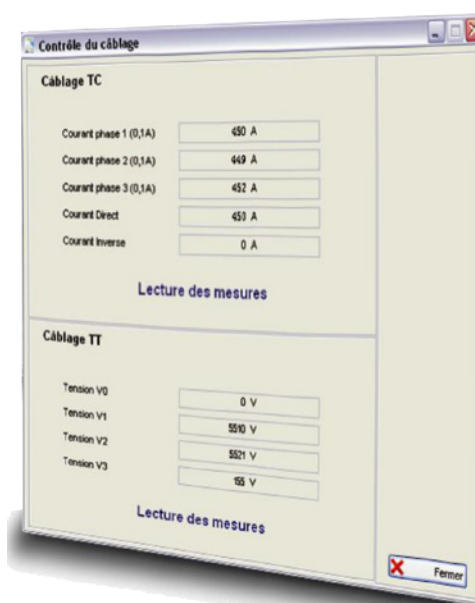
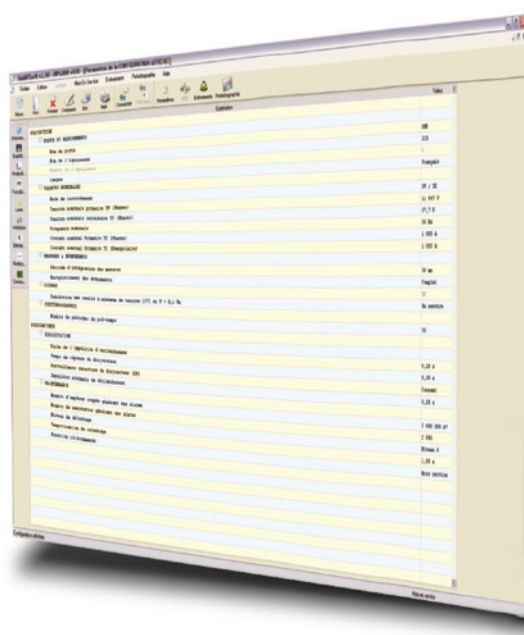
<b>Trip circuit supervision and breaker failure [74TC] [BF]</b> <ul style="list-style-type: none"> <li>• Trip circuit supervision [74TC]</li> <li>• Operating time (in faulty condition)</li> <li>• Fixed operating range [BF]</li> <li>• Breaker failure time delay</li> </ul>	<p>requires one or two digital inputs (see application guide)</p> <p>500 ms fixed for [74TC] function</p> <p>&gt;0.5 % of <math>I_n</math> / &gt;0.5% of <math>I_n</math> or &gt;1% of <math>U_n</math></p> <p>60 to 1,000 ms</p>
<b>Latching of the output contacts [86]</b> <ul style="list-style-type: none"> <li>• Manual reset for output relays</li> <li>• Reset</li> </ul>	<p>A, B, C, D, E, F, G (programmable assignment)</p> <p>digital input, digital communication or local MMI</p>
<b>Digital inputs assignment</b> <ul style="list-style-type: none"> <li>• By the setting software</li> <li>• Settings table selection</li> <li>• Disturbance record</li> <li>• Interlock o/o</li> <li>• Interlock c/o</li> <li>• Control mode</li> <li>• Reset [86] function</li> <li>• Trip circuit supervision</li> <li>• CB external trip order</li> <li>• Blocking of the protection functions</li> <li>• Programmable function</li> </ul>	<p>set 1 – set 2</p> <p>dedicated to remote control, switching device position</p> <p>dedicated to remote control, switching device position</p> <p>dedicated to remote control, local / remote</p> <p>acknowledgment of the selected output(s)</p> <p>[74TC] function</p> <p>function [74TC] blocked if external trip order</p>
<b>User programmable functions (digital inputs – digital outputs)</b> <ul style="list-style-type: none"> <li>• Status of the function</li> <li>• Tripping mode or report</li> <li>• Operating and release time delays</li> <li>• Assignment of name to the function, maximum of 14 characters</li> <li>• Assignment of one or more output relays (alarm or trip)</li> </ul>	<p>in or out of service, by local MMI or by the setting software</p> <p>report: for time stamping and event recorder</p> <p>tripping mode: 40 ms to 300 s</p> <p>by the setting software</p> <p>by local MMI or by the setting software</p> <p>A, B, C, D, E, F, G</p>
<b>Load shedding – Load Restoration, remote control (communication option)</b> <ul style="list-style-type: none"> <li>• Load shedding level</li> <li>• Time delay before reclosing</li> <li>• Reclosing pulse</li> <li>• Output relays assigned</li> </ul>	<p>1 to 6</p> <p>1 to 120 s, <math>\pm 2\%</math></p> <p>100 to 500 ms (remote control)</p> <p>programmable by local MMI or by setting software</p> <p>A, B, C, D, E, F, G</p>
<b>Digital outputs assignment</b> <ul style="list-style-type: none"> <li>• By local MMI or by setting software</li> </ul>	
<b>Signalling LEDs assignment</b> <ul style="list-style-type: none"> <li>• By setting software</li> </ul>	
<b>Counters</b> <ul style="list-style-type: none"> <li>• Energy</li> <li>• Cumulative breaking current</li> <li>• Operation number circuit breaker</li> </ul>	<p>E. Active +, E. Active -, E. Reactive +, E. Reactive -</p> <p>maximum <math>64 \cdot 10^6 \text{ kA}^2</math> (phase 1, 2 and 3)</p> <p>0 to 10,000</p>
<b>Man Machine Interface</b> <ul style="list-style-type: none"> <li>• Relay display</li> <li>• Language</li> <li>• Configuration and operating software</li> <li>• Language</li> </ul>	<p>2 lines of 16 characters</p> <p>French, English, Spanish, Italian</p> <p>Windows® 2000, XP, Vista and 7 compatible</p> <p>French, English, Spanish, Italian</p>
<b>MODBUS® Communication</b> <ul style="list-style-type: none"> <li>• Transmission</li> <li>• Interface</li> <li>• Transmission speed</li> </ul>	<p>asynchronous series, 2 wires</p> <p>RS485</p> <p>300 to 115,200 bauds</p>

## GENERAL CHARACTERISTICS

<b>Disturbance recording</b> <ul style="list-style-type: none"> <li>• Number of recordings</li> <li>• Total duration</li> <li>• Pre fault time</li> </ul>	4 52 periods per recording adjustable from 0 to 52 cycles
<b>Presentation</b> <ul style="list-style-type: none"> <li>• Height</li> <li>• Width</li> <li>• Brackets 19" rack mounting</li> </ul>	4U case R3 see diagram 9954 (7000 series rack definition table)
<b>Case (see drawing D40037)</b> <ul style="list-style-type: none"> <li>• EDPAR <ul style="list-style-type: none"> <li>H, W, D (case &amp; base)</li> <li>H, W (front face dimensions)</li> </ul> </li> <li>• SDPAR <ul style="list-style-type: none"> <li>H, W, D (case &amp; base)</li> <li>H, W (front face dimensions)</li> </ul> </li> <li>• Weight</li> </ul>	172 x 125 x 222 mm 217 x 140 mm  172 x 140 x 227 mm 172 x 140 mm 4.5 kg
<b>Connection - codification</b> <ul style="list-style-type: none"> <li>• NPW800R</li> </ul>	See diagram S39970

## Smartsoft

SMARTsoft, integrated software for the Industry, Railway and Transmission ranges, helps the User get the best from NP800R 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
  - Frequency
  - Power factor,  $\cos \varphi$
  - Instantaneous value of tangent  $\varphi$
- 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.

## FUNCTIONAL DIAGRAM

