# NPUH800

## Residual Overvoltage Relay
### (Neutral Displacement Relay)

NPUH800 provides the zero-sequence voltage monitoring of three-phase networks with isolated or high impedance earthed neutral. This multi-function relay supervises phase to phase and phase to earth faults and the good operating of the circuit breaker and its trip circuits.

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.



- Multifonction
- Measurement
- Recording / event log
- Disturbance recording
- Local MMI

## Protection function
- Maximum of zero sequence voltage with 2 thresholds [59N]

## Additional functions
- Latching of the output contacts [86]
- Trip circuit supervision of the breaker [74TC]

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## GENERAL CHARACTERISTICS

| | |
|---|---|
| **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** | |
| · VT nominal value | Un: 33 to 120 V |
| | input impedance > 80 kΩ |
| | 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 |
| · Frequency (50Hz or 60Hz) | measurement: 45 to 55 Hz or 55 to 65 Hz |
| **Digital inputs 4 or 8 according option** | |
| · 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 | < 10 Vdc range 19 to 70 V – < 33 Vdc range 85 to 255 V |
| · Level 1 | > 20 Vdc range 19 to 70 V – > 37 Vdc range 85 to 255 V |
| · Operating of the input by level 1 or 0 | programmable |
| · Burden | < 15 mA |
| **Output Relays 3* or 7 according option + 1 WD** | |
| · Relays A*, B*, E, F : <br> (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 $\varphi$ = 0.4: 1,250 VA |
| · Relays C*, D, G & WD: <br> (control, WD : Watchdog) <br> (C, D, G: programmable for CB Shunt <br> 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 $\phi$ = 0.4: 1 250 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 |
| **Max of zero sequence voltage [59N]** | |
| · Measurement method (according wiring) | calculated: 3 phase and neutral connection |
| | measured: with 1 neutral point VT or 3 VT with broken delta |
| | 2 to 80 % Un |
| · Setting of thresholds Vo> - Vo>> | 2% of Un |
| · Thresholds accuracy | 97% |
| · Reset percentage on the operating level | 60 ms including trip relay Vo ≥ 2 Vs |
| · Instantaneous operating time | 40 ms to 300 s |
| · Definite time delays | ± 2% or 20 ms |
| · Accuracy of the time delays | 3% from 3 to 240 V |
| · Accuracy of displayed measures | |
| **Trip circuit supervision of the breaker [74TC]** | |
| · Trip circuit supervision | requires four digital inputs (see application guide) |
| · Operating time (in faulty condition) | 500 ms fixed |
| **Latching of the output contacts [86]** | |
| · Latching of output  output relays | A, B, C and with option: D, E, F, G (programmable assignment) |
| · Reset | digital input, digital communication or local MMI |

## GENERAL CHARACTERISTICS

| | |
|---|---|
| **Digital inputs assignment** | |
| · By setting software | |
| · Setting table selection | set 1 – set 2 |
| · Disturbance recording order | |
| · Interlock o/o | |
| · Interlock c/o | |
| · Control mode | dedicated to remote control, local / remote |
| · Reset [86] function | acknowledgment of the selected output(s) |
| · Trip circuit supervision | [74TC] function |
| · CB trip external order | function [74TC] blocked if external trip order |
| · Input – output programmable functions | |
| **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 to the function, maximum of 14 characters | 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 and with option: D, E, F, G |
| **Load shedding – Load Restoration, remote control (communication option)** | |
| · Load shedding level | 1 to 6 |
| · Time delay before reclosing | 1 to 120 s, ± 2% |
| · Reclosing pulse | 100 to 500 ms (remote control) |
| · Output relays assigned | programmable by local MMI or by setting software |
| | A, B, C and with option: D, E, F, G |
| **Digital outputs assignment** | |
| · By local MMI or by setting software | |
| **Signalling LEDs assignment** | |
| · By setting software | |
| **Man Machine Interface** | |
| · Relay display | 2 lines of 16 characters |
| Language | French, English, Spanish, Italian |
| · Configuration and operating software | Windows® 2000, XP, Vista and 7 compatible |
| Language | French, English, Spanish, Italian |
| **MODBUS® Communication (option)** | |
| · Transmission | asynchronous series, 2 wires |
| · Interface | RS485 |
| · 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 speed | IEC / EN 60068-2-14: class Nb, -10 °C à +55 °C, 3 °C/min |
| **Storage** | |
| · Cold exposure | IEC / EN 60068-2-1: class Ad, -25 ° |
| · Dry heat exposure | IEC / EN 60068-2-2: class Bd, +70 °C |

# GENERAL CHARACTERISTICS

| | |
|---|---|
| **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) |
| | IEC / EN 60255-5: 500 Vdc - 1 s: > 100 MΩ |
| | IEC / EN 60255-5: rated insulation voltage: 250 V |
| · Insulation resistance | pollution degree : 2 |
| · Clearance and creepage distances | 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 |
| **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 falls | 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 connector | 173 x 106.3 x 250 mm (see drawing D37739) |
| · Weight | 3.6 kg |
| **Connection - codification** | |
| · See diagram S38026 | |

## SMARTsoft

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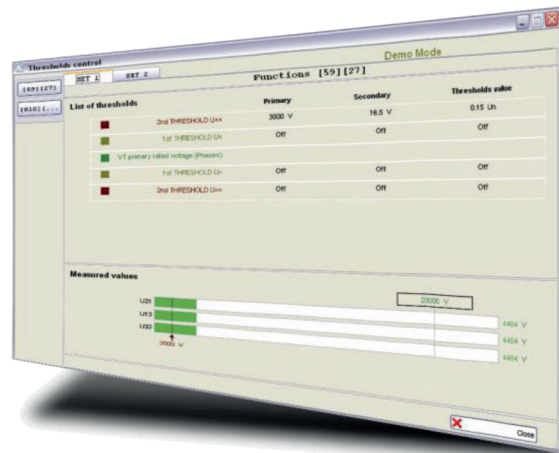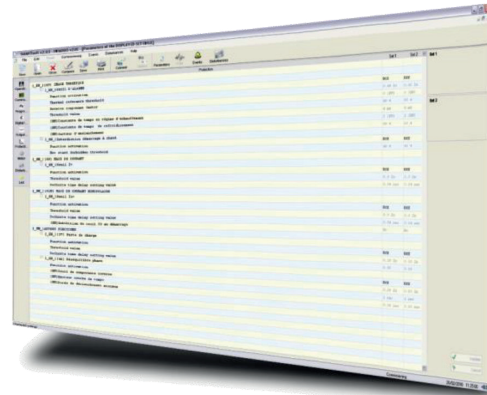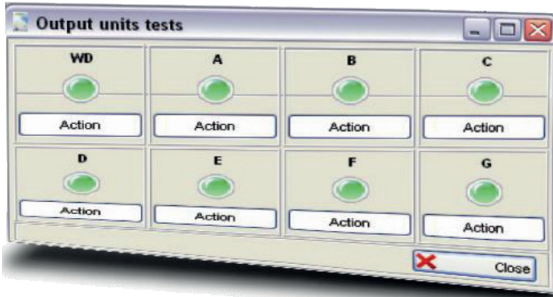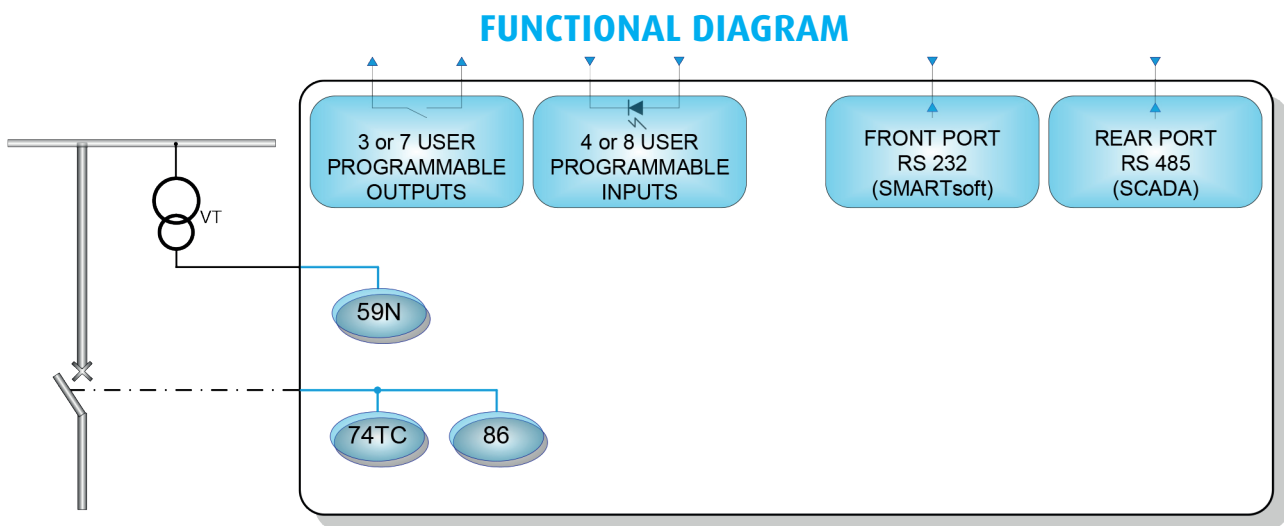


- · User friendly
- · Diagnosis
- · Fault analysis
- · Maintenance tools

# FUNCTIONALITIES

- 2 ranges of auxiliary supply
- Storage of the lack and the restoration of the auxiliary voltage (time stamped events)
- Configuration and parameter setting by local MMI or off-line / on-line PC
- Measurement of electrical quantities:
  Display expressed in primary values
  Residual voltage and maximum values
- Instantaneous alarm threshold
- Definite time tripping for thresholds
- 2 setting groups, locally or remotely selectable
- CB Monitoring: interlocks discrepancy, local or remote control of reclosing / tripping
- Remote control by 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
- Recording of logical states of digital I/O, of measures, of current setting group
- Local / remote events acknowledgment
- Disturbance recording according to Comtrade® format: storage of 4 recordings of 52 periods
- 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

### Options

- Communication by Modbus® - (IEC 60870-5-103 protocol: consult us)
- Additional card with 4 assignable output relays and 4 assignable digital inputs

# FUNCTIONAL DIAGRAM

GENERATION    TRANSMISSION    DISTRIBUTION    RAILWAY    INDUSTRY