NPU800R
NPU800RE

NPU800R (R2 case) and NPU800RE (R3 case) are dedicated to the refurbishment of 700 and 7000 series (R2 and R3 cases) of CEE relays providing the supervision of the voltage and the frequency of electrical networks. These numerical and multi-function relays supervise the phase to phase or phase to earth faults, the positive sequence and negative sequence voltages, and the good operation of the circuit breaker and its trip circuit. Their voltage and frequency minimum and maximum thresholds intend them as to the simple operations of network supervision than the load management and load-sheddings.

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**). A blank cover R1, provide in option, can improve mechanical installation (replacement of CEE case R3 by a NPU800R).

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

NPU800RE / NPU800R - EDPAR

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

Protection functions
- Undervoltage with 4 thresholds **[27]**
- Positive sequence voltage drops with 3 thresholds **[27P]**
- Max of negative sequence voltage with 2 thresholds **[47]**
- Overvoltage with 2 thresholds **[59]**
- Max of zero sequence voltage with 2 thresholds **[59N]**
- Overfrequency with 4 thresholds **[81O]**
- Underfrequency with 4 thresholds **[81U]**

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

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Protection & Control

CHARACTERISTICS NPU800R – NPU800RE

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

Connection modes
- 1, 2 or 3 phase to neutral voltages
- 1, 2 or 3 phase to phase voltages
- Zero sequence voltage measured if connection mode 1 or 2 voltage(s)

Analogue inputs
- VT nominal value 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 to 55 Hz or 55 to 65 Hz

Digital inputs (4 for NPU800R ; 8 for NPU800RE)
- 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

Output Relays (3* for NPU800R + 1 WD ; 7 for NPU800RE + 1 WD)
- Relays A*, B*, E, F: double contact NO, permanent current 8 A
  (signalling, Shunt Opening Release) 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: changeover contact, permanent current 10 A
  (control, WD: Watchdog) closing capacity 15 A / 4 s
  (C, D, G: programmable for CB Shunt short circuit current withstand 250 A / 30 ms
  Opening Release or Under Voltage breaking capacity DC with L/R = 40 ms: 50W
  Release) 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 by the setting software
- maximum of 16 characters capital letters or digits

Undervoltage [27]
- Operating mode function « Or » or « And » programmable
- Measurement method phase to neutral or phase to phase, according to wiring
- Setting of thresholds 5 à 120 % Un
  U< - U<< - U<<< - U<<<<
- Reset percentage on the operating level 103%
- Thresholds accuracy 2%
- Definite time delays 40 ms to 300 s
- Tripping curves CEI 60255-4, ANSI IEEE
- Accuracy and type of curves class 5 - Time Multiplier Setting: 0,03 à 3 s, type see
  Functionalities
- Instantaneous operating time 60 ms including trip relay
- Blocking of the thresholds 10% Un, programmable: in or out of service (If the blocking is
  activated, the minimum setting of the thresholds is 20% Un)
- Display accuracy 5% from 3 to 240 V
- *Note: the functions [27] and [27P] cannot be used simultaneously*

Positive sequence voltage drops [27P]
- Measurement method positive voltage calculated with 3 phase connection mode
- Setting of thresholds 5 to 120 % Un
  Ud<- Ud<< - Ud<<<
- Reset percentage on the operating level 103%
- Definite time delay 40 ms to 300 s
- Time delays accuracy ± 2% or 20 ms
- Instantaneous operating time 60 ms including trip relay
- Blocking of the thresholds 10% Un, programmable: in or out of service (If the blocking is
  activated, the minimum setting of the thresholds is 20% Un)
- Display accuracy 5% from 3 to 240 V
- *Note: the functions [27] and [27P] cannot be used simultaneously*

CHARACTERISTICS NPU800R – NPU800RE

Max of negative sequence voltage [47]
- Measurement method   negative voltage calculated with 3 phase connection mode
- Setting of thresholds U_{neg}> - U_{neg}>>   3 to 30 % Un
- Thresholds accuracy   5% Un
- Reset percentage on the operating level   94%
- Definite time delays   40 ms to 300 s
- Time delays accuracy   ± 2% or 20 ms
- Instantaneous operating time   60 ms including trip for U ≥ 2 Us
- Accuracy of displayed measures   3% from 3 to 240 V

Overvoltage function [59]
- Operating mode   function « Or » or « And » programmable
- Measurement method   phase-neutral voltages or phase-phase voltages, according to wiring
- Setting of thresholds U> - U>>   40 to 200 % Un
- Reset percentage on the operating level   97%
- Thresholds accuracy   2% from 40% to 150% Un – 3% above 150% Un
- Definite time delays   40 ms to 300 s
- Accuracy of the time delays   ± 2% or 20 ms
- Operating curves   IEC 60255-3, ANSI IEEE
- Curves accuracy   class 5 - Time Multiplier Setting: 0.03 to 3 s
- Instantaneous operating time   60 ms including trip relay
- Accuracy of displayed measures   3% from 3 to 240 V

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 (with V1 or U12 connected)
- Setting of thresholds Vo> - Vo>>   2 to 80 % Un
- Thresholds accuracy   2% of Un
- Reset percentage on the operating level   97%
- Instantaneous operating time   60 ms including trip relay Vo ≥ 2 Vs
- Definite time delays   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]
- Setting of the 4 thresholds F< ... F<<<<   50.05 – 54.00 Hz / 60.05 – 64.00 Hz
- Setting of the 4 thresholds F< ... F<<<<   46.00 – 49.95 Hz / 56.00 – 59.95 Hz
- Thresholds accuracy   ± 0.1 Hz
- Reset value on the operating level   0.2 Hz
- Voltage inhibition threshold   10% of Un
- Instantaneous operating time   80 ms typical including trip relay, 150 ms maximum
- Adjustment of time delays   80 ms to 10 s
- Accuracy of the time delays   ± 2% or 20 ms
- Accuracy of displayed measures   0.1 Hz

Trip circuit supervision of the breaker [74TC]
- Trip circuit supervision   requires one or two digital inputs (see application guide)
- Operating time (in faulty condition)   500 ms fixed

Latching of the output contacts [86]
- Latching of output relays   A, B, C and according to version D, E, F, G (programmable assignment)
- Reset   digital input, digital communication or local MMI

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

CHARACTERISTICS NPU800R – NPU800RE

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 according to D, E, F, G

Load shedding – Load Restoration, remote control

- 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 according to 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 — 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

CHARACTERISTICS NPU800R – NPU800RE

Presentation
- Height   4U
- Width   case R2 or R3 according to version
- Brackets 19" rack mounting   see diagram 9954 (7000 series rack definition table)

Case (see drawing D40037)
- **EDPAR**
  - H, W, D (case & base)   NPU800R : 172 x 83 x 222 mm
                                                 NPU800RE : 172 x 125 x 222 mm
  - H, W (front face dimension)   NPU800R : 217 x 98 mm
                                                 NPU800RE : 217 x 140 mm

- **SDPAR**
  - H, W, D (case & base)   NPU800R : 172 x 83 x 227 mm
                                                 NPU800RE : 172 x 125 x 227 mm
  - H, W (front face dimension)   NPU800R : 172 x 83 mm
                                                 NPU800RE : 172 x 125 mm
- Weight   NPU800R : 3.5 kg
                                                 NPU800RE : 4.5 kg

Connection - codification
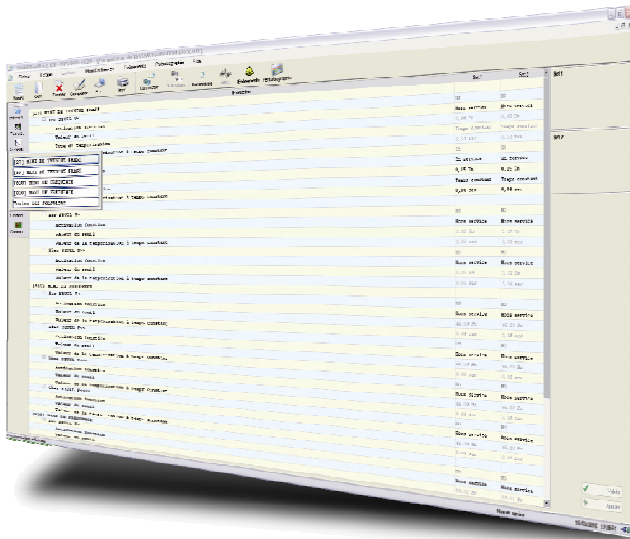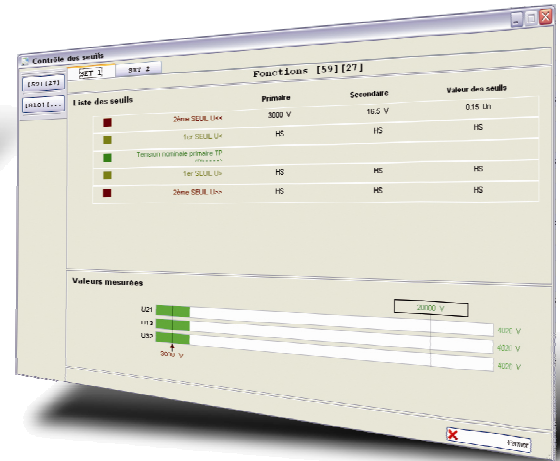- NPU800R   see diagram S39968
- NPU800RE   see diagram S39973

SMARTsoft
SMARTsoft, integrated software for the Industry, Railway and Transmission ranges, helps the User get the best from NP800R 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 (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
  Instantaneous, integrated and maximum values of phase to neutral voltages V or phase to phase voltages U
  Positive and negative sequence voltage (according wiring)
  Frequency
  Residual voltage and maximum value
- Instantaneous voltage alarm threshold
- Instantaneous frequency alarm threshold
- Definite time tripping for undervoltage and overvoltage thresholds
- Definite time tripping for undervoltage and overvoltage thresholds inverse/very inverse/extremely inverse time according to IEC inverse/very inverse/extremely inverse time according to ANSI /IEEE
- Definite time tripping for positive sequence voltage drop thresholds
- Tripping on frequency thresholds: programmable definite time
- 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 faulty phase (phase to neutral voltages only), 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
- Test of wiring, phase order

Functional diagram