NPU800

Voltage and Frequency Relay

NPU800 provides the voltage and frequency monitoring of electrical networks. This multi-function relay supervises phase to phase and phase to earth faults, positive, negative and zero sequence voltage and the good operating of the circuit breaker and its trip circuit. With its numerous under and over voltage and frequency thresholds, NPU800 is intended for network supervision, load management and load-shedding.

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 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 **[810]**
- Underfrequency with 4 thresholds **[81U]**

Additional functions

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

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
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 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 : (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: 1,250 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: 1,ww250 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 U< - U<< - U<<< - U<<<<	5 à 120 % Un
• 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 *Note: the functions [27] and [27P] cannot be used simultaneously*	5% from 3 to 240 V
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

GENERAL CHARACTERISTICS

Positive sequence voltage drops [27P]	
• Measurement method	positive voltage calculated with 3 phase connection mode
• Setting of thresholds Ud<- Ud<< - Ud<<<	5 to 120 % Un
• 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
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 and factory programmable (consult us)
• 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 [810] [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

GENERAL CHARACTERISTICS

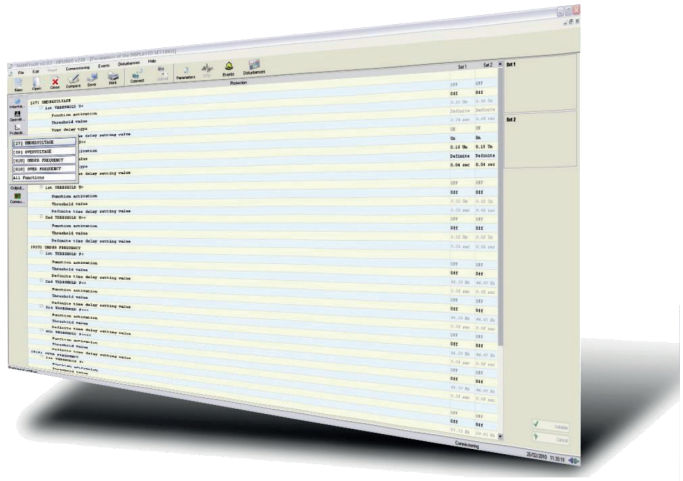
Latching of the output contacts [86]	
• Manual reset of output relays	A, B, C and with option: D, E, F, G (programmable assignment)
• Reset	digital input, digital communication or local MMI
Digital inputs assignment	
• By setting software	
• Setting table selection	set 1 – set 2
• Disturbance recording 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	
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 °CDry heat
• Dry heat exposure	IEC / EN 60068-2-2: class Bd, +70 °C

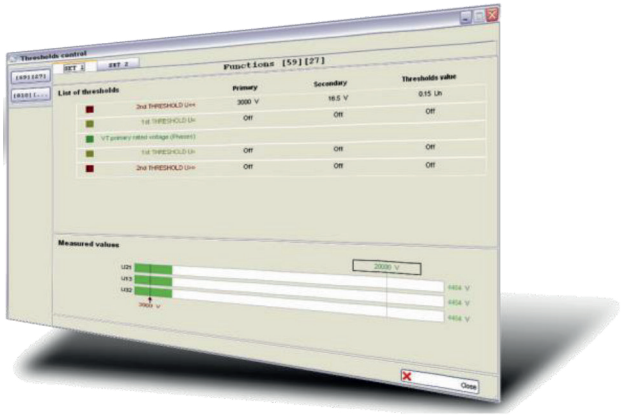
GENERAL CHARACTERISTICS

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)
• Insulation resistance	IEC / EN 60255-5: 500 Vdc - 1 s: > 100 MΩ
• Clearance 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
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 S38025	
Case	
• H, W, D without connector	173 x 106,3 x 250 mm (see drawing D37739)
• Weight	3.6 kg
Connection - codification	
• See diagram S38025	

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

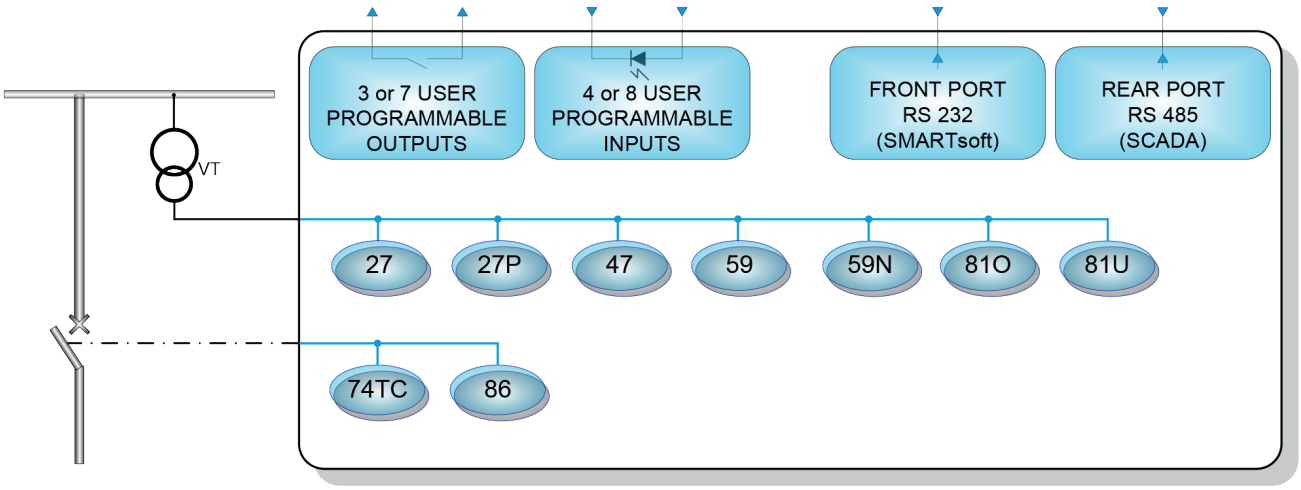
- 2 ranges of auxiliary supply
- Storage of the lack and the restoration of the auxiliary voltage (time stamped events)
- Configuration and parameter setting by local MMI or off-line / on-line PC
- Measurement of electrical quantities:
  Display expressed in primary values
  Instantaneous, integrated 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

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



Protection & Control ice
INDUSTRIELLE DE CONTRÔLE ET D'ÉQUIPEMENT - 11 rue Marcel Sembat F-94146 Alfortville cedex
+33 (0)1 41 79 76 00 www.icelec.com contact@icelec.com -
• ISO 19443 : 2018 • ISO 9001 : 2015 • ISO 14001 : 2015 certified •