

NPIHD800

Earth Fault Overcurrent Relay with or without Directional criteria



NPIHD800 provides the earth fault overcurrent protection for medium and high voltage electrical networks. This multi-function and directional relay supervises phase to earth short-circuits 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 functions

- Earth fault with 2 thresholds [51N] [50N]
- Earth directional [67N]
- Load reclosing function
- Logical selectivity

Additional functions

- Latching of the output contacts [86]
- Trip circuit supervision of the breaker [74TC]
- Breaker failure [50N_BF]
- Load shedding – Load Restoration, remote control (communication option)

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"> • Earth current CT 	I_{n0} 1 or 5 A measurement from 0.005 to $2.4 I_{n0}$ burden at $I_{n0} < 0.5$ VA continuous rating $1 I_{n0}$, short duration withstand $40 I_{n0} / 1s$ CT setting: primary value from 1 A to 10 kA display of primary current from 0 to 6.5 kA
<ul style="list-style-type: none"> • Recommended CTs 	5VA 5P20
<ul style="list-style-type: none"> • Earth current from Ring CT 100/1 or Ring CT 1500/1 and BA800 	measurement from 0.1 to 48 A primary
<ul style="list-style-type: none"> • VT nominal value 	U_n : 33 to 120 V input impedance > 80 k Ω 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
<ul style="list-style-type: none"> • Frequency (50Hz or 60Hz) 	measurement: 45 to 55 Hz or 55 to 65 Hz
Digital inputs 4 or 8 according option <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 Vdc range 19 to 70 V – < 33 Vdc range 85 to 255 V > 20 Vdc range 19 to 70 V – > 37 Vdc range 85 to 255 V programmable < 15 mA
Output Relays 3* or 7 according option + 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 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 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
Earth fault function [51N] [50N] <ul style="list-style-type: none"> • Operating range $I_{o>}$ - $I_{o>>}$ • Thresholds accuracy • Reset percentage on the operating level • Instantaneous operating time • Definite time delay • Accuracy of the time delays • Curves [51N] $I_{o>}$ • Curves accuracy and type 	0.03 to $2.4 I_{n0} / CT$ - 0.6 to 48 A / ring CT 1% typical, 2% max from 0.05 to $0.4 I_{n0} / CT$ 3% typ., 5% max from 0.03 to $0.05 I_{n0}$ and 0.4 to $2.4 I_{n0} / CT$ 5% from 0.6 to 48 A / ring CT 95% 60 ms including trip for $I \geq 2 I_s$ 40 ms to 300 s: [51N] $I_{o>}$ [50N] $I_{o>>}$ $\pm 2\%$ or 20 ms IEC 60255-3, ANSI IEEE and factory programmable (consult us) class 5 - Time Multiplier Setting: 0.03 to 3 s, type: see functionalities

GENERAL CHARACTERISTICS

Earth directional function [67N] <ul style="list-style-type: none"> • Operating principle • Measurement of residual voltage V_r • Polarization threshold • Operating mode according to the polarization voltage • Angle measurement V_p/I_0 • Setting of characteristic angle α • Inhibition of the function 	assignment of a directional criteria to the functions [50N] [51N] measured or calculated, to be defined at the order 3% to 20% U_n , step of 1 %, accuracy ± 5 % or 1 V programmable: blocking or permission (tripping by functions [50N] [51N]) -180° to $+180^\circ$, accuracy $\pm 5^\circ$ -180° to $+180^\circ$, step of 1° , accuracy $\pm 5^\circ$ programmable: yes or no ; by digital input or by the communication
Load reclosing function <ul style="list-style-type: none"> • Application • Operating principle • Ratio « K » of reclosing time • Accuracy • Reclosing time 	threshold adjustment [50N] [51N] function activation by digital input 50 à 200% ± 5 % 40 ms to 300s, $\pm 2\%$ or 20 ms
Latching of the output contacts [86] <ul style="list-style-type: none"> • Latching of output relays • Reset 	A, B, C and with option: D, E, F, G (programmable assignment) digital input, digital communication or local MMI
Trip circuit supervision and breaker failure [74TC] [50N_BF] <ul style="list-style-type: none"> • Trip circuit supervision [74TC] • Operating time (in faulty condition) • Failure threshold [50N_BF] • Breaker failure time delay 	requires four digital inputs (see application guide) 500 ms fixed for [74TC] function 0.5% to 3% I_{n0} , step of 0.1 I_{n0} 60 to 1,000 ms, step of 10 ms
Logical selectivity <ul style="list-style-type: none"> • Application on a radial network • Operating principle • Additional time delay [51N] • Additional time delay [50N] • Operating mode of digital inputs 	number of relays too important to allow the use of time co-ordination additional time added to the functions [50N] [51N] 60 ms to 120s, $\pm 2\%$ or 20 ms 60 ms to 3s, $\pm 2\%$ or 20 ms negative or positive true-data mode
Digital inputs assignment <ul style="list-style-type: none"> • By setting software • Setting table selection • Disturbance recording order • Logical selectivity • Interlock o/o • Interlock c/o • Control mode • Closing mode • Reset [86] function • Trip circuit supervision • CB trip external order • Input – output programmable functions 	set 1 – set 2 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 to the function, maximum of 14 characters • 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 and with option: D, E, F, G
Counters <ul style="list-style-type: none"> • Operation number of circuit breaker 	0 to 10,000

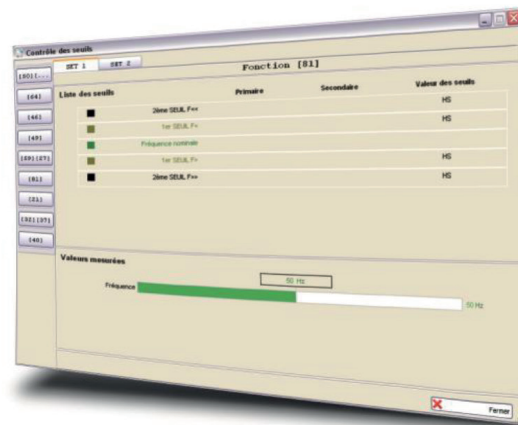
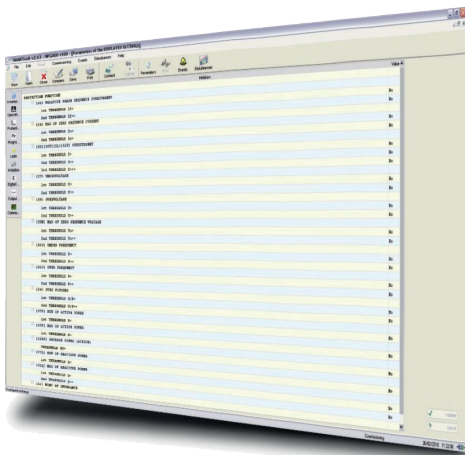
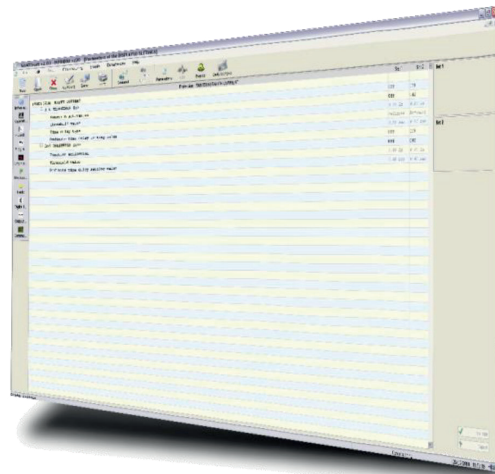
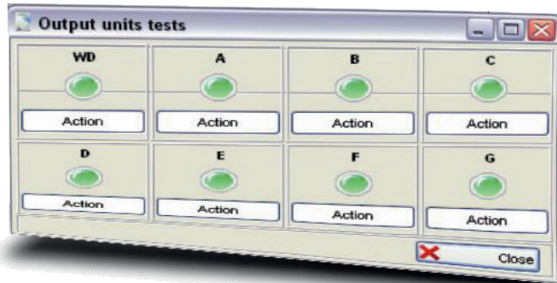
GENERAL CHARACTERISTICS

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 and with option: D, E, F, G
Digital outputs 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 	
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
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 speed 	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 60068-2-1: 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

GENERAL CHARACTERISTICS

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 fall 	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
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 device • 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 S38022 • Ring CT • BA800 	See diagram 142941 See diagram 38766

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 earth currents
Residual voltage value
- Instantaneous alarm threshold
- Definite time tripping
- Dependent time tripping according to inverse/very inverse/extremely inverse IEC 60255-3 curves
- Tripping according to RI curve (electromechanical)
- Tripping according to moderately inverse/very inverse/extremely inverse ANSI /IEEE curves
- 2 setting groups, locally or remotely selectable
- CB Monitoring: interlocks discrepancy, local or remote control of closing / tripping
- Circuit breaker maintenance: counter of operation number, over operation alarm

- Monitoring of breaker failure by checking the disappearance of earth current after opening
- 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 measurements and 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
- Closing function: adjustment of phase, earth, negative sequence current thresholds by external input
- Remote setting and reading of measurements, counters, alarms and parameter 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

Options

- Communication by Modbus® - (IEC 60870-5-103 protocol: consult us)
- Additional card with 4 assignable output relays and 4 assignable digital inputs
- 2 inverse time curves, programmable (in factory, consult us) and downloadable

Related equipment

- BA800 for ring CT 1500/1

FUNCTIONAL DIAGRAM

