NPG800R - NPG800RE

RETROFITTING
Digital generator protection

NPG800R (R3 case) is dedicated to the refurbishment of CEE series 7000 relays providing the protection of generators connected on three-phase networks and driven by any type of prime mover: steam, hydraulic or gas turbine, diesel or gas engines. The various protection functions and measurement possibilities are suitable for hundreds kVA to tens MVA generator groups.

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.

NPG800R - EDPARw

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

Protection functions

- Minimum of impedance with 2 thresholds **[21]**
- Overfluxing with 2 thresholds **[24]**
- Undervoltage with 2 thresholds **[27]**
- Maximum **[32P*]** reverse **[32RP]** and minimum **[37P]** of active power
- Maximum with 2 thresholds **[32Q*]** and minimum **[37Q]** of reactive power
- Field failure with 2 thresholds **[40]**
- Negative phase sequence overcurrent with 2 thresholds **[46]**
- Thermal overload with 2 thresholds **[49]**
- Overcurrent with 3 thresholds **[51-1] [51-2] [50]** with voltage control unit **[51-1V] [51-2V] [50V]**
- Max of zero sequence voltage with 2 thresholds **[59N]**
- Overvoltage with 2 thresholds **[59]**
- Max of zero sequence current with 2 thresholds **[64]**
- Overfrequency with 2 thresholds **[810]**
- Underfrequency with 2 thresholds **[81U]**

* operating mode of power, import or export, configurable

Additional functions

- Latching of the output contacts **[86]**
- Trip circuit supervision of the breaker **[74TC]**
- Breaker failure **[BF]**
- Load shedding – Load Restoration, remote control

OUR TRADEMARKS
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Protection & Control
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Our energy at your service

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	
• Phase current inputs	In 1 or 5 A burden at In < 0.2 VA continuous rating 3 In, short duration withstand 80 In / 1s CT setting: primary value from 1 A to 10 kA measurement from 0.01 to 18 In display of primary current from 0 to 65 kA
• Recommended CTs	5VA 5P10
• Earth current inputs	In_0 1 or 5 A burden at In_0 < 0.5 VA continuous rating 1 In_0, short duration withstand 40 In_0 / 1s measurement from 0.005 to 2.4 In_0 display of primary current from 0 to 6.5 kA
• Earth current input from Ring CT 100/1	adjustment from 0.1 to 48 A primary
• Phase voltage inputs	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: 45-55 Hz or 55-65 Hz
Digital inputs (8)	
• 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
Outputs relays (7 + 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 and WD: (control, WD: Watchdog) (C, D, G: programmable for CB Shunt Opening Release or Under Voltage Release)	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 ms: 50W breaking capacity AC with cos φ = 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
Minimum of impedance function [21]	
• Trip authorization threshold IZ>	10 to 40 % In
• Operating range Z< - Z<<	10 to 200 % Zn
• Thresholds accuracy	± 5% or 3% of Zn
• Reset percentage on the operating level	105%
• Instantaneous operating time	60 ms including trip relay
• Definite time delays	40 ms to 300 s
• Accuracy of the time delays	± 2% or 20 ms
• Accuracy of displayed measures	3% of Zn
Overfluxing function [24]	
• Operating range (U/F)> - (U/F)>>	80 to 200 % Un/Fn
• Measurement range	45-55 Hz or 55-65 Hz
• Thresholds accuracy	± 1.5% of Un/Fn
• Reset percentage on the operating level	95%
• Definite time delay	200 ms to 10 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% of Un/Fn

GENERAL CHARACTERISTICS

Undervoltage function [27]	
• Operating mode	function « Or » or « And » programmable
• Measurement method	phase-neutral voltages or phase-phase voltages, according to wiring
• Undervoltage operating range U< - U<<	20 to 120 % Un
• Thresholds accuracy	2% Un
• Reset percentage on the operating level	103%
• Blocking of the thresholds	10% of Un, programmable: in or out of service
• Definite time delay	40 ms to 300 s
• Accuracy of the time delays	± 2% to 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
Power functions [32P] [32RP] [37P] [32Q] [37Q]	
• Measurement method	3I-2U or 3I-3V, according to wiring and programming
• Operation of the [32P] threshold and the two [32Q thresholds	3 programmable modes for the power-flow: export / import / export and import
• Operating range RP>, P> and P<	1 to 120 % of Sn
• Operating range Q>, Q>> and Q<	1 to 120 % of Sn
• P-Q thresholds accuracy	0.5% of Sn, Blocking of the thresholds [37P] and [37Q] 0.5% of Sn
• Reset percentage on the operating level	95% for RP>, P> and Q>, 105% for P< and Q<
• Instantaneous operating time	60 ms including trip relay
• Definite time delay	40 ms to 300 s
• Accuracy of the time delays	± 2% or 20 ms
• Operating curves	IEC 60255-3, RI, ANSI IEEE
• Curves accuracy	class 5 - Time Multiplier Setting: 0.03 to 3 s – RI: 0.01 to 20 s
• Accuracy of displayed measures	1% of Sn
Field failure function [40]	
• Setting of the circle offset X2	8 to 40 % Zn
• Setting of the circle diameter X1	50 to 500 % Zn
• Thresholds accuracy	± 5% or 3% of Zn
• Reset percentage on the operating level	95%
• Blocking threshold	U<16% of Un or I< 8% of In
• Instantaneous operating time	60 ms including trip relay
• Definite time delay	40 ms to 300 s
• Accuracy of the time delays	± 2% or 20 ms
• Accuracy of displayed measures	3% of Zn
Negative phase sequence overcurrent function [46]	
• Negative sequence threshold I2> - I2>>	3 to 50% In
• Thresholds accuracy	± 5%
• Reset percentage on the operating level	95%
• Inverse time curve	4 to 80 s (for Ineg = 100% Ineg/In)
• Min trip time	0.1 to 10 s
• Curves accuracy	class 5, type: see application guide
• Definite time delay	40 ms to 300 s
• Accuracy of the time delays	± 2% or 20 ms
• Instantaneous operating time	60 ms including trip relay
• Accuracy of displayed measures	3%
Thermal overload function [49]	
• Tripping curves	IEC 60255-8
• Heating-time constant C_{TE}	4 to 400 min
• Cooling time constant	1 to 6.0 C_{TE}, in step of 0.1
• Negative sequence factor	0 to 9
• Thermal trip threshold I_b	40 to 130 % In
• Thermal alarm threshold	80 to 100 % θ thermal
• Thresholds accuracy	class 5
Overcurrent function [51-1] [51-2] [50] [51-1V] [51-2V] [50V]	
• Operating range I> - I>> - I>>>	0.3 to 10 In
• Thresholds accuracy	1% between 0.5 and 4 In - 3% from 0.3 to 0.5 In and from 4 to 10 In
• Reset percentage on the operating level	95%
• Instantaneous operating time	60 ms including trip for I ≥ 2 Is
• Definite time delay	40 ms to 300 s: [51-1] I> - [51-2] I>> - [50] I>>>
• Accuracy of the time delays	± 2% or 20 ms
• Curves [51-1] I> - [51-2] I>>	IEC 60255-3, ANSI IEEE
• Curves accuracy and type	class 5 - Time Multiplier Setting: 0.03 to 3s (type: see last page)
• Operating principle [51V] – [50V]	assignment to [50] [51] thresholds of a criterion of voltage user configurable: in or out of order

GENERAL CHARACTERISTICS

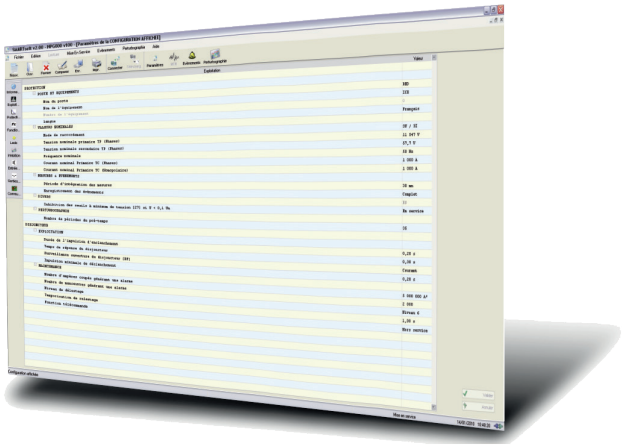
Overvoltage function [59]	
• Operating mode	function « Or » or « And » programmable
• Measurement method	phase-neutral or phase-phase voltages, according to wiring
• Overvoltage operating range U> - U>>	40 to 150 % Un
• Thresholds accuracy	2% Un
• Reset percentage on the operating level	97%
• Definite time delay	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
Maximum of zero sequence voltage [59N]	
• Measurement of Vr (accord. Wiring)	calculated or measured (VT in neutral point or broken delta VTs)
• Operating range 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
• Definite time delay	40 ms to 300 s
• Accuracy of the time delays	± 2% or 20 ms
• Accuracy of displayed measures	3% from 3 to 240 V
Maximum of zero sequence current [64]	
• Operating range Io> - Io>>	0.03 to 2.4 In_0 / CT – 0.6 to 48 A / ring
• Thresholds accuracy	1% typical, 2% max from 0.05 to 0.4 In_0 / CT 3% typ., 5% max from 0.03 to 0.05 In_0 and 0.4 to 2.4 In_0 / CT 5% from 0.6 to 48 A / ring
• Reset percentage on the operating level	97%
• Instantaneous operating time	60 ms including trip relay for I ≥ 2 Is
• Definite time delay	40 ms to 300 s
• Curves	IEC 60255-3, ANSI IEEE
• Curves accuracy	class 5 - Time Multiplier Setting: 0.03 to 3 s
Frequency functions [810] [81U]	
• Operating range F> - F>>	50.05 – 54.00 Hz / 60.05 – 64.00 Hz
• Operating range 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: [810] F> - F>> - [81U] F< - F<<
• Accuracy of the time delays	± 2% or 20 ms
• Accuracy of displayed measures	0.1 Hz
Trip circuit supervision and breaker failure [74TC] [BF]	
• Trip circuit supervision [74TC]	requires one or two digital inputs (see application guide)
• Operating time (in faulty condition)	500 ms fixed for [74TC] function
• Fixed operating range [BF]	>0.5 % of In / >0.5% of In or >1% of Un
• Breaker failure time delay	60 to 1,000 ms
Latching of the output contacts [86]	
• Manual reset for output relays	A, B, C, D, E, F, G (assignment programmable)
• Reset	digital input, digital communication or local MMI
Digital inputs assignment	
• By setting software	set 1 – set 2
• Setting table selection	
• Disturbance recording order	dedicated to remote control, switching device position
• Interlock o/o	dedicated to remote control, switching device position
• Interlock c/o	dedicated to remote control, local / remote
• Control mode	acknowledgment of the selected output(s)
• Reset [86] function	[74TC] function
• Trip circuit supervision	function [74TC] blocked if external trip order
• CB trip external order	(except thermal function)
• Blocking of the protection functions	(when time delay cancelled, function acts instantaneously,
• Blocking of the time delays	except [49] function)
• Input-Output Programmable functions	

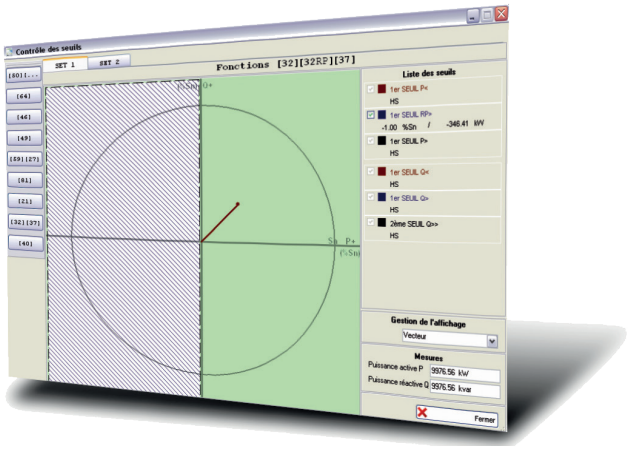
GENERAL CHARACTERISTICS

User programmable functions (digital inputs – digital outputs)	
• Status of the function	in or out of service, by local MMI or by setting software
• Tripping mode or report	report: for time stamping and event recorder
• Operating and release time delays	tripping mode: 10 ms to 300 s
• Assignment of name to the function/maximum of 14 characters	by setting software
• Assignment of one or more output relays (alarm or trip)	by local MMI or by setting software A, B, C, 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
• Output relays assignment	by local MMI or by setting software A, B, C, D, E, F, G
Digital outputs assignment	
• By local MMI or by setting software	
Signalling LEDs assignment	
• By setting software	
Counters	
• Energy	E. Active +, E. Active -, E. Reactive +, E. Reactive -
• Cumulative breaking current	maximum 64.10^6 kA^2 (phase 1,2 and 3)
• Operation number circuit breaker	0 to 10,000
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
Presentation	
• Height	4U
• Width	case R3
• Brackets 19" rack mounting	see drawing 9954 (7000 series rack definition table)
Case (see drawing D40037)	
• **EDPAR**	
H, W, D (case & base)	172 x 125 x 222 mm
H, W (front face dimensions)	217 x 140 mm
• **SDPAR**	
H, W, D (case & base)	172 x 125 x 227 mm
H, W (front face dimensions)	172 x 125 mm
• Weight	4.5 kg
Connection - codification	
• NPG800R	See diagram S39961
• Ring CT	See diagram 142941

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

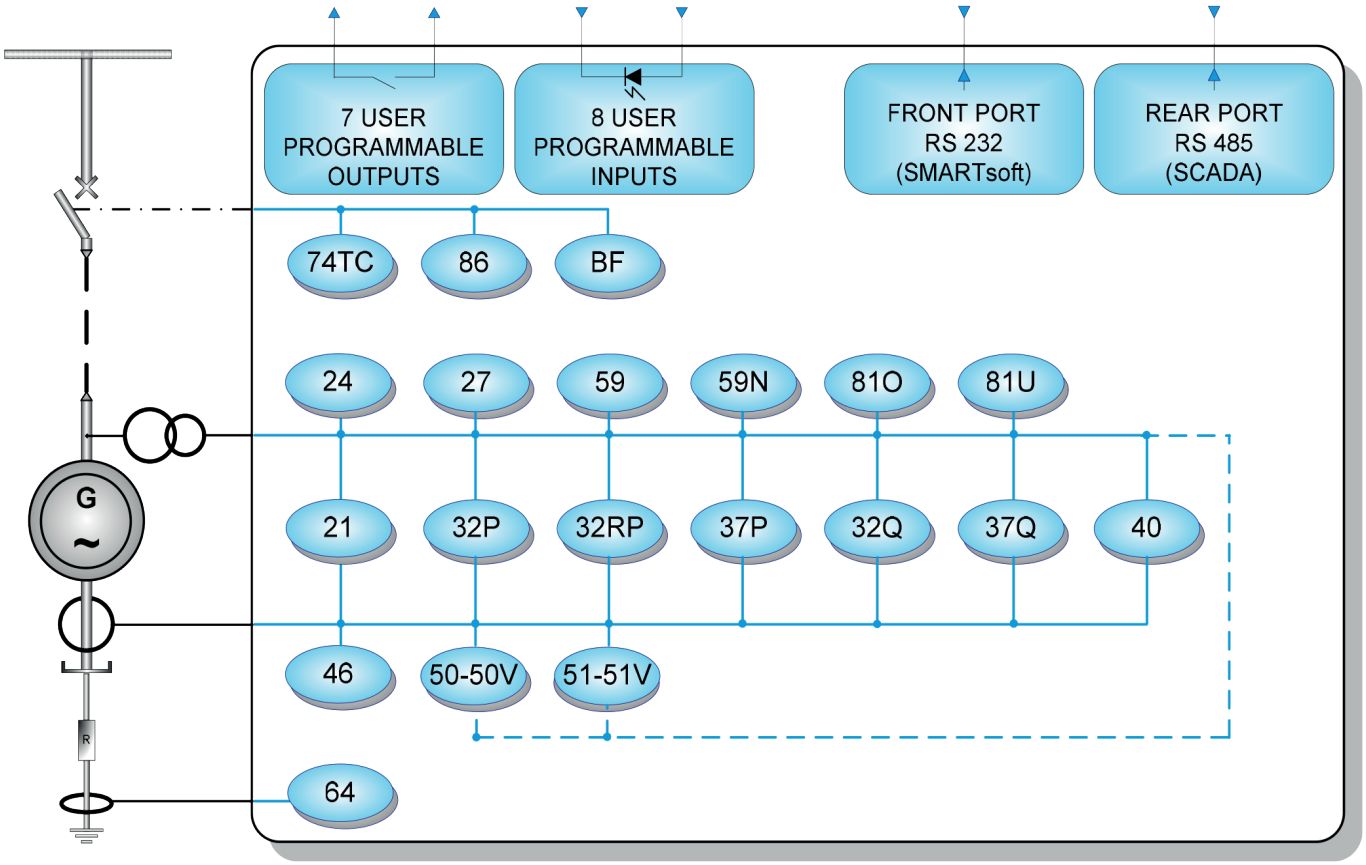
FUNCTIONALITIES

- 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 and integrated values of phase currents and S, P, Q powers
  - Values, according to the wiring: phase to phase or phase to neutral voltages- residual voltage-zero sequence current
  - Thermal image value
  - Impedance
  - Frequency
  - Power factor, Cos φ
- Instantaneous alarm threshold
- Definite time tripping
- Dependent time tripping according to inverse/ very inverse/extremely inverse IEC 60255-3 curves
- 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 of values / hour
- CB Monitoring : interlocks discrepancy, local or remote control of closing / 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 internals events with 10 ms resolution

FUNCTIONALITIES

- Time stamping of digital inputs with 10 ms resolution
- Event recording: 250 locally recorded events, 200 saved in case of loss of auxiliary supply
- Local / remote event acknowledgment
- Disturbance recording according to Comtrade® format: storage of 4 recordings of 52 periods
- 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 failure
- Test of wiring, phase rotation and direction of the currents

FUNCTIONAL DIAGRAM



The specifications and drawings given are subject to change and are not binding unless confirmed by our specialists.

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