RETROFITTING
Motor Protection Relay

NPM800R
NPM800RE

NPM800R (R2 case) and NPM800RE (R3 case) are dedicated to the refurbishment of 7000 series (R2 and R3 cases) of CEE relays providing the protection of medium voltage and high power motor for low voltage. These numerical and multi-function relays analyze the currents absorbed by the motor during the starting, reacceleration and normal operation phases.

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.

NPM800RE / NPM800R - EDPAR

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

Protection functions

- Thermal start authorisation **[5]**
- Thermal overload **[49]**
- Too long start **[48]**
- Locked rotor **[51LR]**
- Phase to phase short-circuit **[50]**
- Limitation of number of starts **[66]**
- Unbalance, Reversal and Loss of Phase **[46]**
- Earth fault **[51N]**
- Minimum of Load - Unpriming **[37I]**

Additional functions

- Latching of the output contacts **[86]**
- Trip circuit supervision of the breaker **[74TC]**
- Breaker failure **[50BF] [50N_BF]**
- Load shedding by external input and high speed restarting
- Load shedding – Load Restoration, remote control

Protection & Control
ice

CHARACTERISTICS NPM800R – NPM800RE

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 CT	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 0.05 to 24 In display of primary current from 0 to 65 kA
• Earth current CT	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
• Recommended CTs	5VA 5P15
• Earth current from Ring CT 100/1 or Ring CT 1500/1 and BA800	measurement from 0.1 to 48 A primary
• Frequency (50Hz or 60Hz)	measurement: 45 to 55 Hz or 55 to 65 Hz

Digital inputs (4 for NPM800R ; 8 for NPM800RE)

• 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 NPM800R + 1 WD ; 7 for NPM800RE + 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: 1250 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 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: 1250 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

Thermal start authorisation [5]

• Thermal start authorisation	40 to 100% θ thermal, class 5

Thermal overload [49]

• Tripping curves	IEC 60255-8
• Heating-time constant C_{TE}	4 to 180 min, class 5
• Cooling time constant	1 to 6.0 C_{TE}, in step of 0.1
• Negative sequence factor	0 to 9
• Factor of start F_D	50 to 100% C_{TE}
• Thermal trip threshold I_{ref}	40 to 130 % In, class 5
• Thermal alarm threshold	80 to 100 % θ thermal, class 5

Too long start [48] and locked rotor [51LR]

• Operating range	1 to 10 I_{ref}
• Thresholds accuracy	± 5%
• Too long start time delay [48]	2 to 200 s
• Accuracy of the time delays [48]	± 5%
• Locked rotor time delay [51LR]	0.2 to 10 s
• Accuracy of the time delays [51LR]	± 5%

CHARACTERISTICS NPM800R- NPM800RE

Phase to phase short-circuit [50]

• Operating range I>>	3 à 12 In
• Phase threshold accuracy	3%
• Reset percentage on the operating level	95%
• Instantaneous operating time	60 ms including trip relay for I ≥ 2 Is
• Definite time delay	40 ms to 3 s
• Accuracy of the time delay	± 2% or 20 ms

Limitation of number of starts [66]

• Number of authorized starts	from 1 to 4
• Reference period	15 to 60 min
• Blocking period	15 to 60 min
• Accuracy of the time delays	± 5%

Unbalance, Reversal and Loss of Phase [46]

• Operating range I2>	20 to 80% In, accuracy ± 5%
• Inverse curves	1 to 10 s (for Ineg = 100% Ineg/In), accuracy ± 5%
• Reset percentage on the operating level	94 %, accuracy ± 1%

Earth fault [51N]

• Operating range Io>	0.03 to 0.4 In_0 / CT - 0.6 to 8 A / ring CT
• 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 CT
• Reset percentage on the operating level	95%
• Instantaneous operating time	60 ms including trip for I ≥ 2 Is
• Definite time delay	40 ms to 3 s
• Accuracy of the time delay	± 5% or 20 ms
• Blocking during starting period	programmable: active / inactive

Minimum of Load - Unpriming [37I]

• Operating range I<	0.1 to 2.4 In, accuracy ± 5%
• Operating time delay	0.05 to 120 s
• Accuracy of the time delay	± 5% or 20 ms
• Reset percentage on the operating level	106 %, accuracy ± 1%

Trip circuit supervision and breaker failure [74TC] [50BF] [50N_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
• Failure threshold [50BF]	5% to 30 % In, step of 1 In
• Failure threshold [50N_BF]	0.5% to 3% In_0, step of 0.1 In_0
• Breaker failure time delay	60 to 1000 ms, step of 10 ms

Latching of the output contacts [86]

• Manual reset for 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	
• Logical selectivity	
• Interlock o/o	
• Interlock c/o	
• Control mode	dedicated to remote control, local / remote
• Load shedding	
• 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 according to version D, E, F, G

CHARACTERISTICS NPM800R – NPM800RE

Counters

• Cumulative breaking current	maximum 64.10^6 kA² (phase 1 and 3)
• Operation number of circuit breaker	0 à 10 000
• Working time of the motor since its last energizing	0 minute to 65535 hours
• Working time of the motor since its commissioning	0 to 65535 hours

Load shedding by external input and high speed restarting

• Load shedding time delay	60 ms to 120 s, accuracy ± 5%
• Reacceleration during a time corresponding to a starting [48]	If the external order disappears before the end of the time delay

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 version 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 NPM800R-NPM800RE

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)

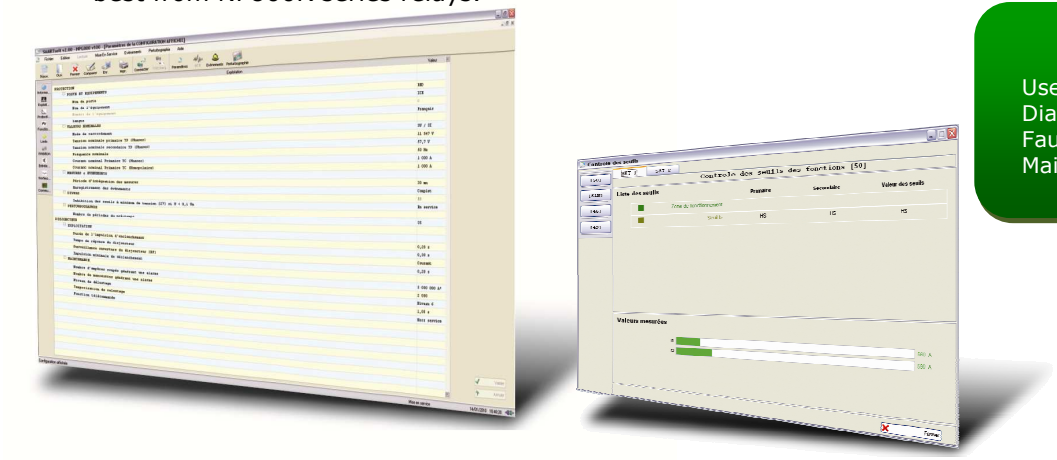
• **EDPAR**	
H, W, D (case & base)	NPM800R : 172 x 83 x 222 mm NPM800RE : 172 x 125 x 222 mm
H, W (front face dimension)	NPM800R : 217 x 98 mm NPM800RE : 217 x 140 mm
• **SDPAR**	
H, W, D (case & base)	NPM800R : 172 x 83 x 227 mm NPM800RE : 172 x 125 x 227 mm
H, W (front face dimension)	NPM800R : 172 x 83 mm NPM800RE : 172 x 125 mm
Weight	NPM800R : 3.5 kg NPM800RE : 4.5 kg

Connection - codification

• NPM800R	see diagram S39966
• NPM800RE	see diagram S39971
• Ring CT	see diagram 142941
• BA800	see diagram 38766

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

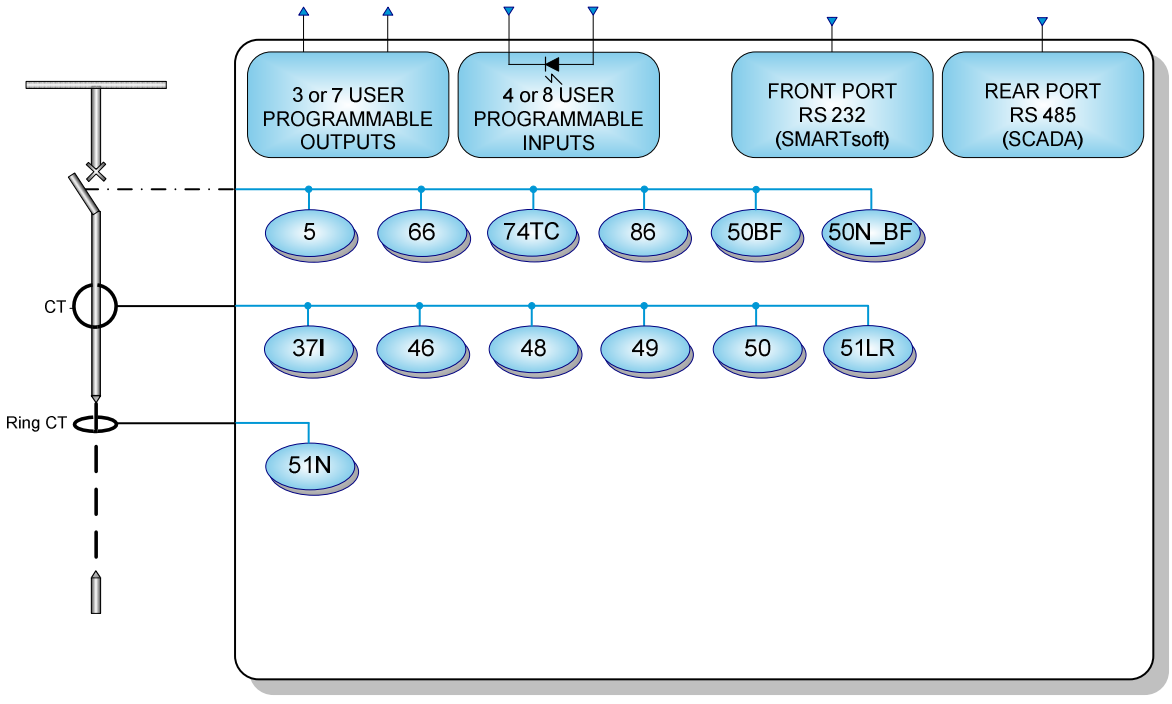
Functionalities

- 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 and earth currents
- 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
- Logical selectivity on the three phase thresholds and the two earth thresholds
- Thermal image according to IEC 60255-8:
- Cable (by phase) and transformer (3 phase)
- 2 setting groups, locally or remotely selectable
- CB Monitoring: interlocks discrepancy, local or remote control of closing / tripping
- Circuit breaker maintenance:
- counters of operation number and cut-off ampers² per phase, alarm and threshold
- Monitoring of breaker failure by checking the disappearance of 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 internals 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 initiated 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, phase rotation and direction of the currents

Related Equipement

- BA800 for ring CT 1500/1

Functional diagram



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