NPM800

Asynchronous Motors Protection

NPM800 protects MV and high power LV motors. This multi-function relay supervises motor current during all its operating modes: starting, normal operation and reacceleration. The good operating of the circuit breaker and its trip circuits are also supervised.

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

- 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 (communication option)

GENERAL CHARACTERISTICS

Auxiliary Supply	
• Auxiliary suplly 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	
• Phases CT	In 1 or 5 A burden at In < 0.2 VA Continuous rating 3 In, short duration withstand 100 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 5P20
• 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 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 • Level 1	< 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
• 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 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 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
Thermal start authorisation [5]	
• Thermal start authorisation	40 to 100% 0 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	50 to 100 % 0 thermal, class 5

GENERAL CHARACTERISTICS

Too long start [48] and locked rotor [51LR]	
• Operating range	1 to 10 I_{ref}
• Threasholds 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 20 s
• Accuracy of the time delays [51LR]	± 5%
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> - Io>>	0.03 to 2.4 In_0 / CT - 0.6 to 48 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 delays	± 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 four 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 1,000 ms, step of 10 ms
Latching of the output contacts [86]	
• Manual reset for outwput relays	A, B, C and with option: D, E, F, G (programmable assignment)
• Reset	digital input, digital communication or local MMI

GENERAL CHARACTERISTICS

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 with option: D, E, F, G
Counters	
• Cumulative breaking current	maximum 64.10^6 kA^2 (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 65,535 hours
• Working time of the motor since its commissioning	0 to 65,535 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 (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

GENERAL CHARACTERISTICS

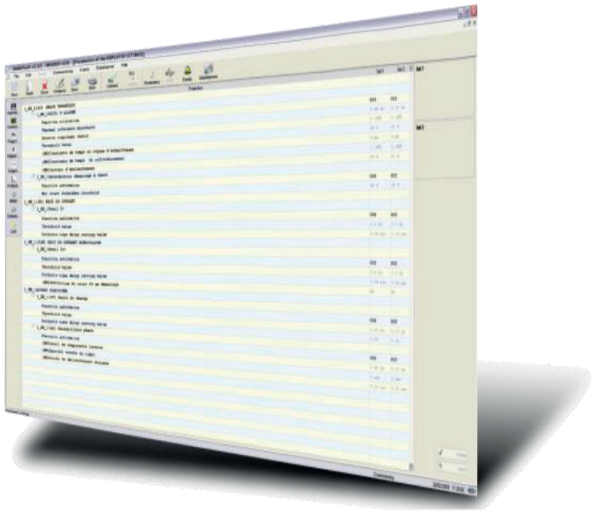
Climatic withstand in operation	
• Cold exposure	IEC / EN 60068-2-1: class Ad, -10 °C
• Dry heat exposure	IEC / EN 60068-2-2: class Bd, +55 °C
• Damp heat exposure	IEC / EN 60068-2-3: class Ca, 93 % HR, 40 °C, 56 days
• Temperature variation with specified speed	IEC / EN 60068-2-14: class Nb, -10 °C à +55 °C, 3 °C/min
Storage	
• Cold exposure	IEC / EN 60068-2-1: class Ad, -25 °C
• Dry heat exposure	IEC / EN 60068-2-2: class Bd, +70 °C
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 fall	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)

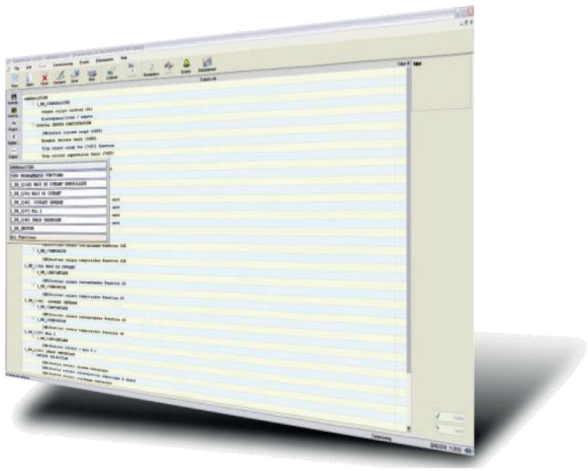
GENERAL CHARACTERISTICS

Case	
• H, W, D without short-circuiting device	173 x 106.3 x 250 mm (see drawing D37739)
• H, W, D with short-circuiting devices	173 x 106.3 x 305 mm (see drawing D37739)
• Weight	3.6 kg
Connection - codification	
• See diagram S38024	
• 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 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 and earth currents I1, I3 and Io
  Current of the last starting
  Time of the last starting
  Max of starting current
  Time of starting
  Negative sequence current value
  Thermal state value
  Frequency value
  Number of authorized starts
- 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 ampers^2 per phase, alarm and threshold

- Motor maintenance:
- Counter of the working time of the motor since its last energizing
- Counter of the working time of the motor since its commissioning
- 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
- Blocking during starting period of the earth fault threshold
- 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 ofsoftware, hardware failure
- Test of wiring, phase rotation and direction of the currents
- LED « Start authorized (or forbidden) » by
- assignment of function

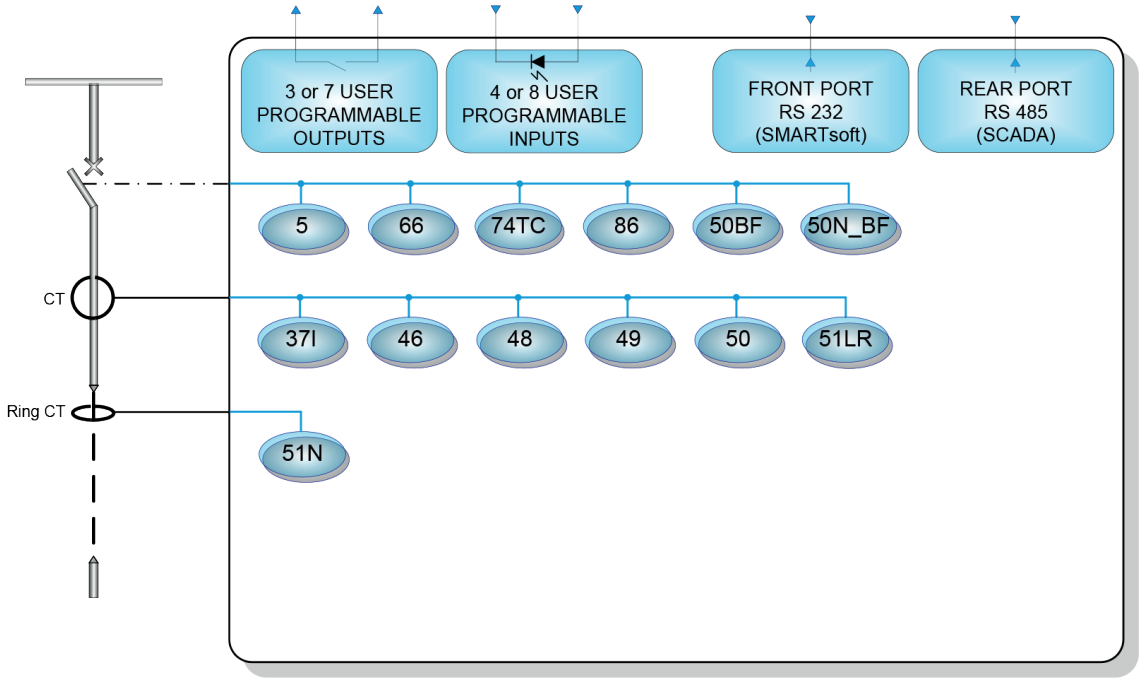
Options

- Communication by Modbus® or IEC 60870-5-103 protocol
- 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



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