

# GENERATION & NETWORK

## Network Check Synchronizing Relay

# NPSC800

NPSC800-1 performs check of synchronism between two power supplies. It is usually used to authorize the closing order of a paralleling circuit breaker. NPSC800-2 allows in addition the operating of live (or dead) line and live (or dead) bus. It also allows, with a dedicated output relay, the reconnection of two bus sections fed by the same supply.

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 by the RS232 port, or remotely using the RS485 port. Reading, measurement and recording are all available locally or remotely.



Multifunction  
Measurement  
Recording / event log  
Disturbance recording  
Local MMI

### Common functions for NPSC800-1 and NPSC800-2

- Synchro- check [25]

### Specific functions for NPSC800-2

- Dead Line – Dead Bus (**DLDB**)
- Dead Line – Live Bus (**DLLB**)
- Live Line – Dead Bus (**LLDB**)
- **Reconnection** of two bus section from the same source

# CHARACTERISTICS NPSC800

## Auxiliary Supply

- Auxiliary supply ranges
- Typical burden
- Memory backup

19 to 70 – 85 to 255 / Vdc or Vac 50 or 60 Hz  
6 W (CC), 6 VA (CA)  
72 hours

## Analogue Inputs

- Phase voltage inputs

Un: 55 to 120 V  
input impedance > 80 K $\Omega$   
continuous rating 240 V, short duration withstand 275V - 1 min  
measurement from 3 to 240 V  
VT setting: primary value from 220 V to 250 kV  
measurement: 45-55 Hz or 55-65 Hz  
measurement: 30 to 70 Hz (*from V1.50*)

- Frequency (50Hz or 60Hz)

## Digital Inputs (4 for NPSC800-1, 8 for NPSC800-2)

- Polarizing voltage

20 to 70 Vdc, range 19 to 70 V  
37 to 140 Vdc, range 85 to 255 V  
< 10Vdc range 19 to 70 V – < 33Vdc range 85 to 255 V  
> 20Vdc range 19 to 70 V – > 37Vdc range 85 to 255 V  
< 15 mA

- Level 0
- Level 1
- Burden

## Relay Outputs (3\* for NPSC800-1 + 1 WD, 7 for NPSC800-2 + 1 WD)

- Relays A\*, B\*, E, F

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: 50 W  
breaking capacity AC with cos  $\phi$  = 0.4: 1250 VA  
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: 50 W  
breaking capacity AC with cos  $\phi$  = 0.4: 1250 VA

- Relays C\*, WD, D, G

## Characteristics of the function [25]

- Blocking of the output relay C
- Threshold U line mini for authorisation [25]
- Threshold accuracy
- Setting of voltage difference:  $\Delta U$
- Voltage difference accuracy
- Setting of angular difference:  $\Delta \phi$
- Angular difference accuracy
- Setting of frequency difference:  $\Delta F$
- Frequency difference accuracy
- Setting of rate of frequency change:  $\Delta F/dt$
- Rate of frequency change accuracy
- Time lag before authorisation
- Accuracy of the time delays
- Accuracy of displayed measures

possible by digital input (output relay use for paralleling authorisation)  
50 to 100 % Un

2% of Un  
thresholds +/- : 1% to 15% Un, with step of 1% Un  
 $\pm 5\%$  of the set value  
thresholds +/- : 1° to 20°, with step of 1°  
 $\pm 2\%$   
thresholds +/- : 0.01 to 1.5 Hz, with step of 0.01 Hz  
 $\pm 5\%$  of the set value  
thresholds +/- : 0.01 to 0.2 Hz/s, with step of 0.01 Hz/s  
 $\pm 2\%$   
0 ms to 300 s  
 $\pm 2\%$  or 20 ms  
3% from 3 to 240 V

## Characteristics of line and bus functions\*\*: DLDB - DLLB – LLDB

- Activation of functions
- Information function activated
- Operating mode
- Threshold U> Live Line
- Threshold U< Dead Line
- Threshold U> Live Bus
- Threshold U< Dead Bus
- Thresholds accuracy
- Time lag before authorisation
- Accuracy of the time delays

by setting software and dedicated DI (non exclusive mode)  
HMI, dedicated DO, communication and setting software with PC  
paralleling authorisation by the output relay C  
5 to 120 % Un  
5 to 120 % Un  
5 to 120 % Un  
5 to 120 % Un  
2% of Un  
0 ms to 300 s (3 settings: DLDB, DLLB and LLDB)  
 $\pm 2\%$  or 20 ms

## Characteristics of the reconnection function\*\*

- Active only in synchronous mode
- Activation of the function
- Setting of  $\Delta U$  and  $\Delta \phi$
- Information function activated
- Setting of voltage difference:  $\pm \Delta U$
- Time delay for controlling the reconnection conditions
- Hold time of the output relay G

concomitance of Line and Bus frequencies  
by setting software and dedicated DI  
common settings with function [25]  
HMI, dedicated DO, communication and setting software with PC  
1% to 15% Un, step of 1% Un  
40 ms to 300 s

- Accuracy of the time delays

100 ms to 500 ms (output relay dedicated to the reconnection function)  
 $\pm 2\%$  or 20 ms

\*\* **only NPSC800-2**

# CHARACTERISTICS NPSC800

## Phase shift

- Line voltage / bus voltage

## Digital inputs assignment

- Input 1
- Input 2
- Input 3
  
- Input 4
- Input 5 (NPSC800-2 only)
- Input 6 (NPSC800-2 only)
- Input 7 (NPSC800-2 only)
- Input 8 (NPSC800-2 only)

## Digital output assignment

- Relay A
- Relay B
- Relay C
- Relay D (NPSC800-2 only)
- Relay E (NPSC800-2 only)
- Relay F (NPSC800-2 only)
- Relay G (NPSC800-2 only)

## Signalling LEDs assignment

- LED 1
- LED 2
- LED 3
- LED 4

## Man Machine Interface

- Relay display Language
- Configuration and operating software Language

## MODBUS® Communication (option)

- Transmission
- Interface
- Transmission speed

## Disturbance recording

- Number of recordings
- Total duration
- Pre fault time

## Climatic withstand in operation

- Cold exposure
- Dry heat exposure
- Damp heat exposure
- Temperature variation with specified variation rate

## Storage

- Cold exposure
- Dry heat exposure

## Electrical safety

- Ground bond test current
- Impulse voltage withstand
  
- Dielectric withstand: 50Hz
  
- Insulation resistance
- Clearances and creepage distances

0 to 360°, step of 1°

### (see application guide)

activation set 2  
inhibition of the function [25]  
paralleling order (management of disturbance recording and events)  
contact o/o of the Circuit Breaker (management of events)  
enable mode DL-DB  
enable mode DL-LB  
enable mode LL-DB  
enable mode reconnection

### (see application guide)

set 2 activated  
function [25] inhibited  
paralleling authorisation (permanent order if conditions are valid)  
mode DL-DB selected  
mode DL-LB selected  
mode LL-DB selected  
reconnection order

info  $\Delta U$  OK  
info  $\Delta \varphi$  OK  
info  $\Delta F$  OK  
paralleling authorised

2 lines of 16 characters  
French, English, Spanish, Italian  
Windows® 2000, XP, Vista and 7 compatible  
French, English, Spanish, Italian

asynchronous series, 2 wires  
RS 485  
300 to 115 200 bauds

4  
170 cycles per recording (12 samples / cycle)  
adjustable from 0 to 170 cycles

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

IEC / EN 60068-2-1: class Ad, -25 °C  
IEC / EN 60068-2-2: class Bd, +70 °C

IEC / EN 61010-1: 30 A  
IEC / EN 60255-5: 5 kV MC, 5 kV MD  
except outputs TOR, 1 kV MD  
except RS485, 3 kV MC  
IEC / EN 60255-5: common mode 2 kV<sub>rms</sub> – 1 min  
Differential outputs mode TOR 1 kV<sub>rms</sub> – 1 min  
(open contact type)  
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

# CHARACTERISTICS NPSC800

## Enclosure safety

- Degrees of protection provided by enclosures (IP code)

IEC / EN 60529: IP51, with front face

## Immunity – Conducted disturbances

- Immunity to RF conducted disturbances
- Fast transients
- Oscillatory waves disturbance 1 MHz

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 MC, 1 kV MD except RS485, class II, 1 kV MC

IEC / EN 61000-4-5: class III

IEC / EN 60255-11: 100% 20 ms

- Surge immunity
- Supply interruptions

## Immunity – Radiated disturbances

- Immunity to RF radiated fields

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 permanent, 300 A/m 1 to 3 s

- Electrostatic discharges

- Power frequency magnetic field immunity test

## Mechanical robustness - energised

- Vibrations
- Shocks

IEC / EN 60255-21-1: class 1, 0.5 Gn

IEC / EN 60255-21-2: class 1, 5 Gn / 11 ms

## Mechanical robustness - not energised

- Vibrations
- Shocks
- Bumps
- Free falls

IEC / EN 60255-21-1: class 1, 1 Gn

IEC / EN 60255-21-2: class 1, 15 Gn / 11 ms

IEC / EN 60255-21-2: class 1, 10 Gn / 16 ms

IEC / EN 60068-2-32: class 1, 250 mm

## Electromagnetic compatibility (EMC)

- Radiated field emissivity
- Conducted disturbance emissivity

EN 55022: class A

EN 55022: class A

## Presentation

- Height
- Width
- Brackets 19" rack mounting

4U

¼ 19"

option (see drawing D37739)

## Case

- H, W, D without connectors
- Net weight

173 x 106.3 x 250 mm (see drawing D37739)

3.6 kg

## Connection - codification

- NPSC800-1
- NPSC800-2

see diagram S38893

see diagram S39609



## Functionalities

- 2 ranges of auxiliary supply
- Storage of lack and the restoration of the auxiliary voltage (events recorded)
- Configuration and parameter setting by off-line / on-line PC
- Reading and recording of configuration by PC
- Measurement of electrical quantities:
  - Phase voltages  $U_L$ ,  $U_B$
  - Frequency  $F_L$ ,  $F_B$
  - Voltage difference  $\Delta U$  ( $U_L - U_B$ )
  - Angular difference  $\Delta \phi$
  - Frequency difference  $\Delta F$  ( $F_L - F_B$ )
  - Acceleration ( $\text{Hz} / \text{s}$ )
- Display expressed in primary values
- 2 setting groups, remotely selectable by a digital input
- Setting software compatible with Windows® 2000, XP, Vista and 7
- User interface with access to all functions
- Commissioning facilitated, the inhibition of the output relay of the [25] function allow the validation of the wiring.
- 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 the auxiliary supply
- Local / remote events acknowledgment
- Disturbance recording according to Comtrade® format: storage of 4 recordings of 170 periods. Wiring of the paralleling order requested, except for reconnection function
- Remote setting, remote reading of measurements, alarms and parameters settings
- Remote reading of disturbance recording and events log
- Self-diagnosis: Memories, output relays, A/D converters, auxiliary supply, cycles of execution of the software, hardware anomaly

## Options

- Communication by Modbus® RS 485
- Communication by Modbus® RS 485 with redundancy (NPSC800-2 only)

## Functional diagram

