Power system Protection relay NA-3.1

1.0 FEATURES

The power system protection relay NA-3.1 meets the required protective functions for the parallel operation of generators in the public low-voltage grid:

- Voltage increase protection U >>
- Voltage increase protection U > (10 min average)
- Voltage decrease protection U <<
- Voltage decrease protection U <
- Frequency increase protection f >
- Frequency increase protection f <
- Vector surge

in a compact, 107.6 mm wide unit.

The device disconnects the generating plant over the subsequent section switch from the mains if the measured values exceed the set limits.

A bus connection allows the extension of the functional scope by attachable additional modules

2.0 DESCRIPTION

The NA-3.1 was developed with regard to the VDE-AR-N 4105 and the DIN V VDE V 0126-1-1.

2.1 Voltage monitoring

The device calculates the RMS value of the AC voltage after filtering the measured voltage.

When exceeding or falling below the limits set for U<<, U<, U> or U>> the associated output relays switch off after expiration tripping delay

The switch back time for voltage monitoring is 30 sec. in accordance with the VDE AR-N 4105. This time may be parameterized in the range from 0.1 to 600 sec.

2.2 Frequency monitoring

The frequency measurement is performed according to the principle of period measurement. This allows fast reaction when exceeding or falling below the limits set.

When exceeding the limit for set f> or falling below the limit set for f< the associated output relays switch off after expiration tripping delay

The switch back time for frequency monitoring is 30 sec. in accordance with the

VDE AR-N 4105. This time may be parameterized in the range from 0.1 to 600 sec.

2.3 Vector shift monitoring

The vector shift monitoring is programmable in the range of 0.2 ... 4 Hz / sec. The switch back time is 30 seconds. This time may be parameterized in the range from 0.1 to 600 sec.

2.4 Self monitoring

If the device detects a fault the alarm relay will be switched off. In addition, a watchdog function monitors the microprocessor of the unit.

2.5 Commissioning

After commissioning, the device begins to measure the network parameters.

The error messages associated output relays are de-energized (failure LED lights up), the fault relay is energized and the LED operating lights up.

If the the network parameters are within the given limits, the output relays are energized and the fault indicator LED goes off after switch back time has elapsed.

The device can be disabled via the Disable input. The Disable signal must be present for longer than 1s to disable the device.

2.6 Parameterization

The device can be configured via the front panel buttons and LCD display or via the serial interface and standard terminal program.

This allows to adapt the device to customer-specific requirements.

In the device are several parameter sets stored by factory, which can be accessed directly.

2.7 Interface connection

Via the interface, the device can be extended in functionality by additional modules.

2.8 Error memory

The last 10 error messages are stored with a relative time stamp

3.0 Technische Daten

Housing
: Plastic polycarbonate light grey/ black
according to VDE 0100 and VBG 4
flammability class UL 94: V0 according to DIN 43880

Mounting
: on C-rail according to DIN

Dimension
: L 89,7 mm x W 107,6 mm x H 62,2 mm

Protection
: Housing IP 20
Terminals IP 20

Housing cover
: Transparent, lead sealable

Ambient temperature
: -10... + 55 ° C

Auxiliary voltage A1, A2
: 85-265 V AC
Isolation Voltage: 4000V AC

Consumption
: max. 3 VA

Measuring
: Voltage
  3 x 400 VAC (Best.Nr.:430.333.400)
  3 x 100 VAC (Best.Nr.:430.333.100)
  Measuring range: 20%...130% $U_{Nominal}$
  True RMS measurement (TRMS)
  Resolution 1V, Accuracy 1% v.E.
  frequency
  Measuring range: 40…70 Hz,
  Resolution: 0,05 Hz
  Accuracy: 0,1 Hz

Digital inputs
: 1. Disable, delay time 1sec
2. Y1 contact monitoring, tie breaker 1
3. Y2 contact monitoring, tie breaker 2

  All inputs galvanically isolated by optocouplers.
  Input range 6 ... 30V DC

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Data interface	: Serial 1 Wire, galvanically isolated by optocouplers. 9600 Baud, 8 Bit, No Parity, 1 Stop-Bit interface auf - RS232 (IF-1) - RS485 (IF-3) available separately.

Parameterization,
Measuring range and
tripping delay

: voltage decrease protection U<<
$0,2...1,0$ U_N, t_v 50 msec...180 sec.

voltage decrease protection U<
$0,5...1,0$ U_N, t_v 50 msec...180 s

voltage increase protection U>>
$1,0...1,3$ U_N, t_v 50 msec...180 s

voltage increase protection U>
$1,0...1,3$ U_N, t_v 50 msec...180 s
Average time t_i> 1 min...30 min

Frequency decrease protection f<
$40...60$ Hz, t_v 50 msec…180 s

Frequency increase protection f>
$45...70$ Hz, t_v 50 msec…180 s

Vector surge df/dt
$0,2...4$ Hz s^{-1}

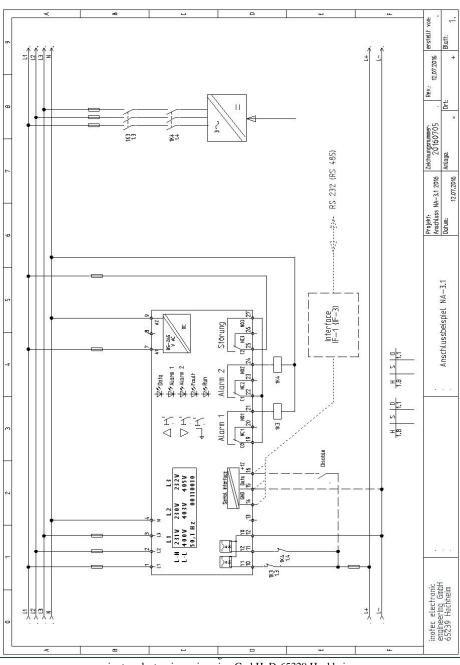Outputs

: 1 SPDT relay, tie switch 1
1 SPDT relay, tie switch 2,
1 SPDT relay, fault
All contact of the relays are closed contact

Maximum load	AC1	: 1250 VA
	AC15 (230V AC)	: 250 VA
Test voltage	coil / contact	: 6000 V AC

RS 232 (RS 485)

Interface
IF−1 (IF−3)

Störung

Alarm 2

Alarm 1

Data
Alarm 1
Alarm 2
Fault
Run

Serial Interface

Disable

	L1	L2	L3
L − N	231V	230V	232V
L − L	400V	403V	405V
	50,1 Hz		00110010

1K3
1.3

1K4
1.4

Anschlussbeispiel NA−3.1