

Functions

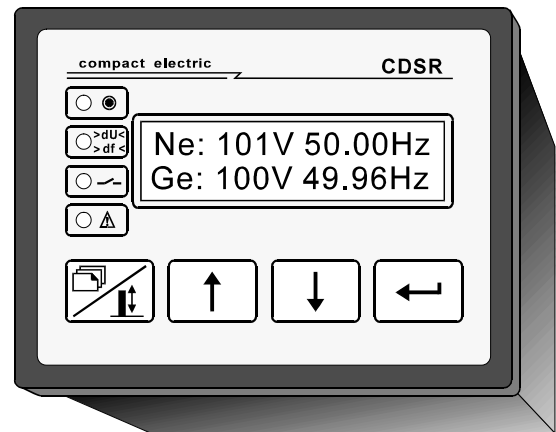
- Synchronous monitoring of two networks and release signal for the section switch
- Zero voltage monitoring of the bus bars
- Blackstart mode (connection release to a grid without voltage) with automatic direction identification

Measuring voltage: 400 VAC and 100 / 110VAC, a linked voltage per grid.

Frequency range: 45 – 65Hz, optional: 14 – 20Hz

Supply DC/AC (24 - 220VDC, 100 - 230VAC)

Housing Standard housing 96 x 72 mm for Control panel installation or rail installation



Description

The Synchro-Check Relay CDSR-21 is used to acquire the synchronization condition of two grids and deliver – under specified synchronization conditions – a release signal for the connection of the grids. The signal will be issued in parallel to the output relays K1 and K2, and each relay can be defined in such a way to determine whether the output should be static (as a status signal) or a pulse. The Synchro-Check function can be blocked externally through the control input Input B1.

The relay includes a zero voltage monitoring with separate message for both grids. The limit of the zero voltage range can be adjusted.

The CDSR-21 has two operating modes (Synchro-Check and blackstart), which can be selected through the external control input B2.

Mode 1: Synchro-Check

The synchronization status of both grids will be determined by using a micro-controller through the comparison of the voltage, frequency and phase position of two corresponding linked phases. The following conditions will be monitored:

- The voltages and frequencies of both the grids must be within set minimum and maximum values.
- The voltage and frequency difference of both grids must be within the set limit values.
- The phase differences at the time of the closing of the circuit breaker contacts must be lower than the set limit value.

The release signal will be issued after an adjustable delay time (0..10s) if these synchronization conditions are reached. In case of a time related change of the phase difference, the exact output time of the micro-controller's signal will be calculated under consideration of the circuit breaker closing time (derivative time) and a possible frequency difference (slip).

Mode 2: Blackstart

As a second operating mode, the relay includes the blackstart to connect a voltage carrying grid to a grid without voltage. Using an appropriate parameterizing, it is possible to specify the blackstart direction or to set up an automatic direction identification. The release signal for the connection will be issued if the following conditions are fulfilled:

- The residual voltage of the grid without voltage must be within the set "Zero voltage range".
- The voltage and the frequency of the voltage carrying grid must be within the set minimum and maximum values for a blackstart.
- The device must have been released through the control input B1 (contact B1-M closed), the blackstart mode must have been released through the parameterizing and must be activated through the external input B2 (contact B2-M closed).
- An (adjustable) delay time is adhered to before the above conditions have been reached and until the issue of the release signal. The conditions must be fulfilled during the entire delay time.

The release signal can be issued as a pulse or condition signal and for the latter case, adherence to the set pulse lengths is provided as a minimum length of the signal.

Display and control field

The following operating states will be displayed through LEDs (LED sequence from top to bottom):

- LED1: Operating voltage display
- LED2: Signaling of the current synchronization status through flashing of the static display
- LED3: Signaling the output of the release signal on K1 and K2
- LED4: Signaling external blockage at input B1 or equipment failure.

Digital SYNCHRO-CHECK RELAY

CDSR-21

As a default, the display shows the current measured values of both grids and the left button can be used to switch between 3 variants:

- a) 1st Line: Ne: Mains voltage and frequency
2nd Line: Ge: Generator voltage and frequency
- b) 1st Line: Ne: Mains voltage and frequency
2nd Line: ΔG: Difference voltage and difference frequency between generator and grid
- c) 1st Line: Information text "Phase difference"
2nd Line: ΔP: Phase difference in [degree]

The device is parameterized through a menu selection system. A language selection between German and English exists for the menu texts. The parameter settings can be secured against unauthorized change through a three digit code.

Special functions

- Test program for the measurement of the circuit breaker closing time on site.
- Reliable data safety through checksum monitoring.
- Self monitoring: The output relay (K5) is closed in failure free operation and it opens in case of power failure, data error or failure.

Accessories (included):

- Fixing clips for panel mounting
- Adapter for DIN rail mounting

Technical specifications

For the order please provide **measured voltage** and frequency range.

Rated line voltage: a) 400 V AC
b) 100V/110V AC

Line frequency : 45 - 65 Hz

Power supply: AC : 100V -230V [70V - 300V]
(AC/DC wide range) DC : 24 V -220V [19V - 250V]

Power consumption : 3 VA

Ambient operating temp : -20 °C to +60 °C

LCD display contrast ... : - 5 °C to +50 °C

Output contact specifications:

Max. switching voltage : 250 V AC, 250 V DC

Max. switching current : 8 A / 250 V AC / 30 V DC
0.4 A / 230 V DC

Max. switching power ... : 2000 VA, 240 W

Electrical life.....: 10⁵ operations

Insulation:

Line inputs - power supply.. : 2.5 kV

Line inputs - output contacts: 4 kV

Safety standard:

Safety: EN 61010

EMC:

Noise emission: EN 50081-2 (Industry)

Noise immunity: EN 50082-2 (Industry)

Mechanical data:

Case DIN43700: 96 x 72 x 90 mm

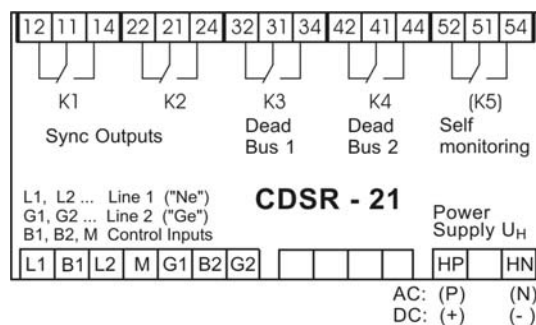
Panel cutout: 92 x 68 mm

Material: Noryl

Protection degree: Front IP50 / rear w. IP30

Rear connection terminals : 2.5 mm², pluggable

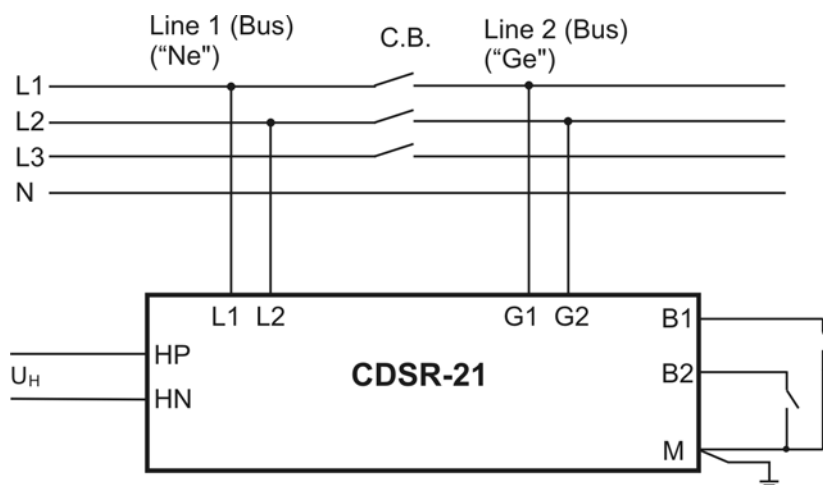
Subject to technical changes



CDSR-21 Terminal assignment

Operating parameters and set up ranges:

Value Setting	range	Resolution
Synchronization range: Max. voltage difference dU max. Diff	0 - 20 %Un	1V
Synchronization range: Max. frequency difference df max. Diff	0.01 - 0.5 Hz	0.01Hz
Synchronization range: Max. phase difference Phase-Diff	1 - 30°	1°
Synchronization range: Min. voltage U<	Un= 400V: [280V - 440V] Un=100/110V: [70V-110V]	1 V
Synchronization range: Max. voltage U>	Un= 400V: [360V - 530V] Un=100/110V: [90V-143V]	1 V
Synchronization range: Min. frequency f<	45-65 Hz (14-20Hz)	0.01 Hz
Synchronization range: Max. frequency f>	45-65 Hz (14-20Hz)	0.01 Hz
Synchronous release delay	0.0 - 10s	0.1 s
Synchronous release signal to K1:	static/pulse	0/1
Synchronous release signal to K2:	static/pulse	0/1
Synchronous release signal pulse duration (K1, K2)	60 - 2000 ms	10 ms
Blackstart mode: Block (=0) / Release with defined or automatic direction: G->N (=1), N->G (=2), auto (=3)	0, 1, 2, 3	-
Blackstart-range: Min. voltage U<	Un= 400V: [280V - 440V] Un=100/110V: [70V-110V]	1 V
Blackstart-range: Max. voltage U>	Un= 400V: [360V - 530V] Un=100/110V: [90V-143V]	1 V
Blackstart-range: Min. frequency f<	45 - 65 Hz (14 - 20Hz)	0.01 Hz
Blackstart-range: Min. frequency f<	45 - 65 Hz (14 - 20Hz)	0.01 Hz
Blackstart: Synchronous release delay	0 - 10 s	1s
Derivative time (closing time of the circuit breaker)	0 - 500 ms	10 ms
Dead bus max. voltage	3 - 60 %Un	1 V
Dead bus message delay	60 - 1000 ms	20ms
Combination lock (access code for settings changes)	000 - 999	-
Language selection German/English for menu texts	0/1	-



Control Inputs:

B1: Enable Input:
open = Sync Output disabled
closed = Sync Output enabled

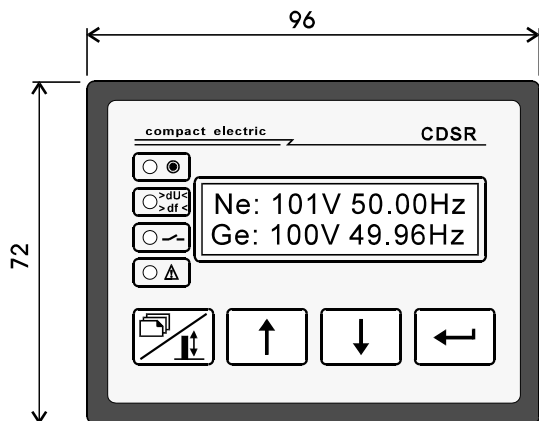
B2: Mode Switching Input
open = SYNCHRO-CHECK
closed = BLACKSTART

M: functional earthing

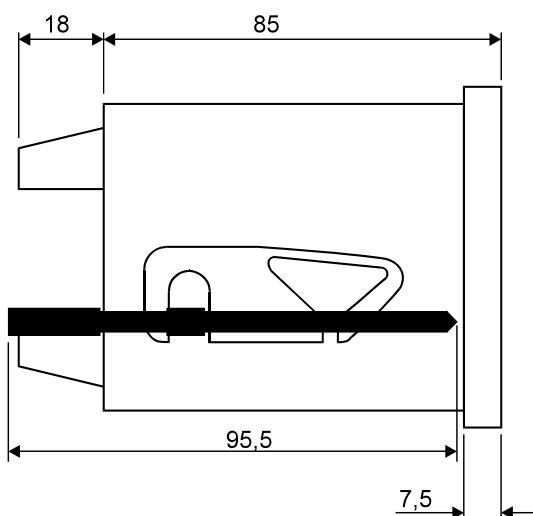
EMC- Wiring Note:

Wire length from terminals "B1", "B2" and "M" to corresponding switching contacts max. 3m.

CDSR-21 Wiring diagram

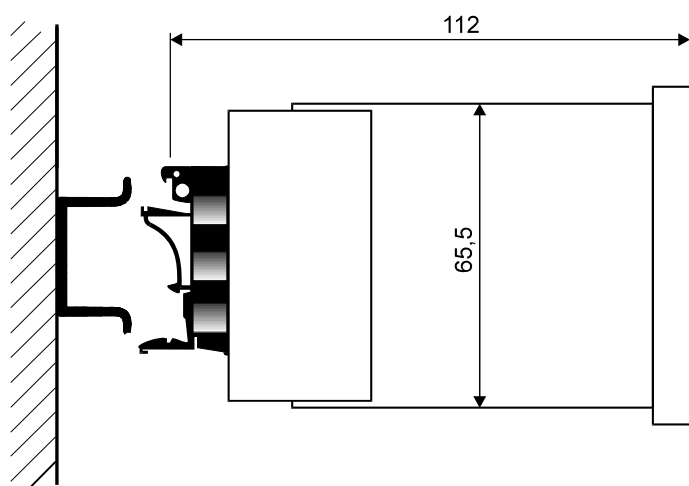


Mechanical dimensions



Panel mounting with
fixing clips

Panel-cutout:
92 x 68 mm (WxH)



DIN rail mounting

Installation width
with rail adapter 115 mm

