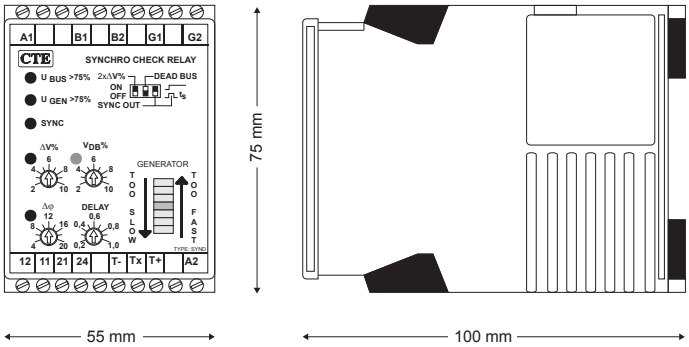


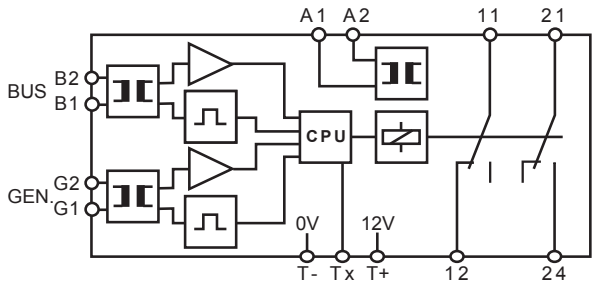
SYNCHRO CHECK RELAY

Type: SYND

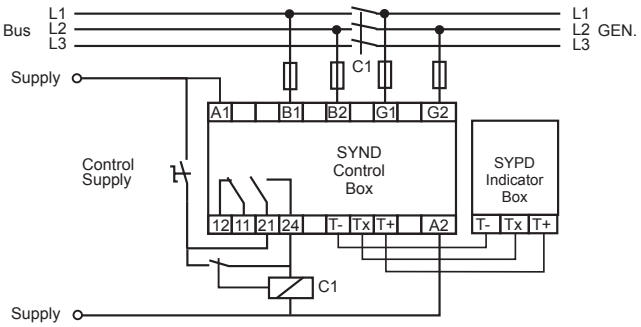
FEATURES

- **Multi function check relay**
- **Extremely compact**
- **Rail mounting for easy cabling on the baseplate**
- **Three wire interface to an optional panel indicator**
- **Microcontroller and SMD - technic for accurate and reliable function.**
- **LED indication of bus and generator status**

FUNCTION DIAGRAM



CONNECTION DIAGRAM



Description:
The synchro check relay type SYND is a multifunction unit that can be set to both constant or pulse output as well as to enable or disable synchronization to a “dead bus”. The unit is designed with a micro controller to monitor the bus and the generator voltage, as well as the phase differential between two grids.

The SYND ensure the right conditions before the connection of the generator to the bus, in order to avoid damage to the generator and malfunction or damage to the connected equipment.

The unit is specially designed for DIN rail mounting on the base of the control box for an easy connection to the two bus systems.

For a front panel indication of the function, the SYND can be connected through a simple three wire digital interface to the optional panel indicator type SYPD.

Operation:
Dead Bus OFF: When the voltage on the Mains Bus, L1 - L2, and the Generator Bus, L1 - L2, both are above 75% of the nominal value, the SYND will monitor the voltage difference $\Delta V\%$. As soon as ΔV is below the set limit, the SYND will start monitoring the phase difference $\Delta\varphi$. If the phase difference $\Delta\varphi$ is continuously below the set limit during the elapse of the set delay time t_d and the voltages still within the limits, the internal relay will pull in for 100 m sec. if pulse output is selected, or stay in as long as the conditions are within the limits for synchronisation.

Dead Bus ON: *Be careful when this function is selected. Personal injury can occur if the bus is disconnected for maintenance. Too the load of the generator can be excessive*. When the Mains Bus voltage is detected to be under the Dead Bus $V_{DB}\%$ set limit V the Mains Bus is defined to be dead and the internal relay will pull in if the Generator voltage is above 75% of nominal value. The relay will drop out or stay in according to the function setting on the SYPD as described above.

Thiim A/S
Transformervej 31
2860 Søborg - Denmark
Tel.: +45 4485 8000
Fax: +45 4485 8005
Web: www.thiim.com
Mail: thiim@thiim.com

SPECIFICATIONS

INPUT

Nominal voltage	Specify from 110 to 500 V
Max. input	Unom. x 1.5
Input resistance	2 kΩ x Unom.
Voltage range	50 % to 130 %
Frequency range	35 to 70 Hz
U_{BUS} low level	75 % fixed
$U_{GEN.}$ low level	75 % fixed
U_{BUS},$U_{GEN.}$ voltage differential	2 to 10 % / 4 to 20 % adjustable
U_{BUS},$U_{GEN.}$ phase angle differential	4 to 20 degrees adjustable
Delay	0,2 to 1 sec. adjustable

PERFORMANCE PARAMETERS

ELECTRICAL	
Supply dependence	< 0.01 % / % ΔU supply
Temp. dependence	< 0.02 % / °C

OUTPUT

Sync pulse delay	200 ms. to 1sec. adjustable
Sync pulse relay	1 x C/O
Contact rating	6 A, 250 VAC, 1500 W
Mechanical life	30 Million cycles
Sync pulse	100 ms. or constant
Output for SYPD indicator	B7 0 VDC B8 Digital output B9 12 VDC

SUPPLY

	AC voltage, Nominal ± 20 %
AC supply with transformer	24 V (19,2 to 28,8 V) 110 V (88 to 132 V) 230 V (184 to 276 V) 400 V (320 to 480 V) 440 V (352 to 528 V)
DC supply	DC Voltage, Nominal -20 % to +33 % 12V (From 9,6 to 16V) 24V (From 16 to 32V)
Frequency range	45 to 440 Hz (transformer)
Power consumption	4 VA, 3 W

GENERAL

Temperature range	- 25 °C to + 55 °C	
Humidity	Up to 90 % RH non-condensing	
Dielectric test voltage	Input to AC supply	3750 VAC
	Coil to relay contacts	3750 VAC
Weight	0.28 kg	

CE

	International Standards
EMC directive 89/336:	EN50081 - Emission
	EN50082 - Immunity
Low voltage directive 73/23:	EN60255 - Electrical Relays

TYPICAL SETTING

ΔV% setting — Set for max. differantial (U_{BUS} - U_{GEN}) voltage in % of U_{GEN}

C1 closing delay	25 mS	50 mS	100 mS	200 mS	400 mS
Δφ setting	± 15 deg.	± 15 deg.	± 10 deg.	± 7 deg.	± 5 deg.
DELAY setting	0.5 sec.	0.5 sec.	0.5 sec.	0.5 sec.	0.5 sec.
Min. time for 1 rotation 0-360 deg.	6 sec.	6 sec.	9 sec.	12.86 sec.	18 sec.
Max. frequency diff.	0.17 Hz	0.17 Hz	0.11 Hz	0.08 Hz	0.06 Hz
Max. sync error	16.5 deg.	18 deg.	14 deg.	12.6 deg.	13 deg.

Min. time for 1 rotation 0-360 deg. in sec. $= \frac{180}{\Delta\varphi \text{ setting}} \times \text{delay setting}$

Frequency diff. in Hz $= \frac{1}{\text{time for 1 rotation 0-360 deg.}}$

Max. sync error in deg. $= \Delta\varphi \text{ setting} + \left(\frac{\Delta\varphi \text{ setting} \times 2}{\text{DELAY setting}} \times \text{C1 closing delay} \right)$

ORDERING INFORMATION

EXAMPLE: SYND 400 2 B230 A A 5 C

TYPE
Syncho Check Relay — SYND

VOLTAGE BETWEEN PHASES
The first three figures of the voltage in Volt e.g. 400 V — 400

Followed by:
1 for V = 10.0 to 99.9 — 1
2 for V = 100 to 999 — 2

SUPPLY VOLTAGE

18-360 VDC and 20-240 VAC	E400
99-140 VAC	B110
198-264 VAC	B230
342-484 VAC	B400
374-506 VAC	B460

ADJUSTMENT
Trimpot A adjutable — A

HOUSING
Rail mounting.(internal transformer) — A

SIZE
55 mm. — 5

CODE END — C