

# T3500 Frequency Deviation Relay

- Protection of generators from frequency deviation on the grid
- Visual indication of power, ready, pick-up and relay tripping
- Accepts high supply voltage variations: 60 - 110%
- Cost effective and highly reliable compact design
- 50 hours burn-in before final test
- Operating temperature range: -20°C to +70°C
- Flame retardant enclosure
- DIN rail or screw mounting

## Application

When generators are operating in parallel with the grid (utility) it is important to detect that the grid supply is present. With the grid connected the system frequency is very stable, but if there is an interruption of the grid, a frequency deviation will occur and this will be detected by the T3500.

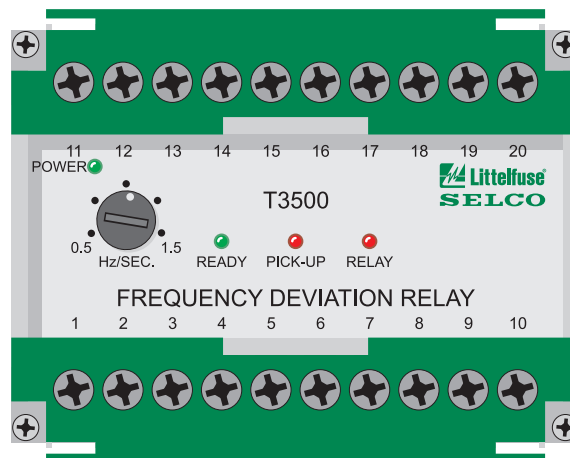
Thus the T3500 provides a good protection to a generator, operating in parallel with the grid, as the frequency deviations can damage the generator as well as the switchgear.

## Function

The relay is a  $\Delta$  frequency /  $\Delta$  time relay. The working principle of the unit can be understood as a flywheel. This means that the unit will adjust itself to the frequency of the connected grid.

Slow changes in the grid frequency will not cause the unit to trip, as the flywheel will only adjust itself to the new frequency. However a rapid change in the frequency of 0.5 - 1.5 Hz/sec., which is adjustable on the front, will cause the relay to trip.

When the supply voltage is connected the output relay is energized and a delay of 4 sec. is introduced in order to allow for the measuring circuit to adjust. The "ready" LED will indicate and if the input frequency deviates above the setting in either direction, the "pick-up" LED will indicate, and provided the frequency deviation continues for more than 100 msec., the output relay will de-energize and this will be indicated on the "relay" LED.



The 100 msec. delay can be omitted by bridging terminals 19 and 20 or it can be reduced to 50 msec. by inserting a resistor of 620 k $\Omega$  between terminals 19 and 20.

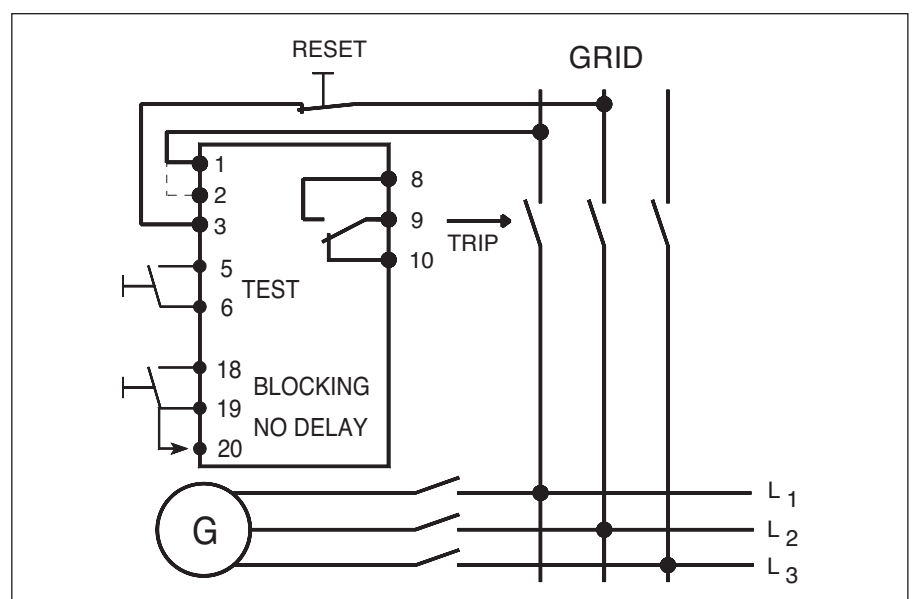
The output relay can not be energized again until the unit has been reset by disconnecting the supply or by using the blocking input by connecting terminals 18 and 19.

As long as the blocking input is present, the unit will not make any measurement. This function can be used to make the unit inactive when the circuit breaker is open and the generator thus not operating in parallel with the grid.

The blocking signal can be a signal from the circuit breaker auxiliary contact, present when the breaker is open. The "ready" LED will be off as long as the blocking signal is present.

When the blocking signal is cancelled a delay of 4 sec. is again introduced. After the delay the "ready" LED will come on light, indicating that the unit is again ready to make measurements.

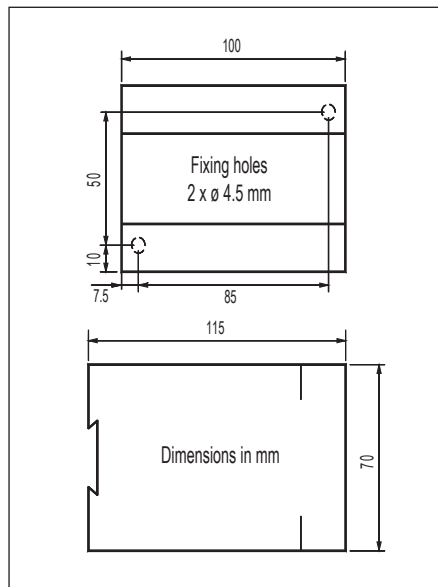
Interconnecting terminals 5 and 6 will perform a test of the unit by introducing a phase shift. The phase shift should cause the relay to trip.



Connection Diagram. Output relay normally energized. Relay shown de-energized.

# Specifications

## T3500 Frequency Deviation Relay



Dimensions.

<b>Deviation adjustment</b>	0.5 - 1.5 Hz/sec.
<b>Max. voltage</b>	660V
<b>Voltage range</b>	60 - 110 %
<b>Consumption</b>	4VA at $U_N$
<b>Frequency range</b>	45 - 65Hz
<b>Output relay</b>	Normally energized
<b>Contact ratings</b>	AC: 380V, 2A, 250VA DC: 150V, 2A, 100W
<b>Operating temperature</b>	-20°C to +70°C
<b>EMC</b>	CE according to EN50081-1, EN50082-1, EN50081-2, EN50082-2
<b>Approvals</b>	Certified by major marine classification societies
<b>Burn-in</b>	50 hours before final test
<b>Enclosure material</b>	Polycarbonate. Flame retardant
<b>Weight</b>	0.5kg
<b>Dimensions</b>	70 x 100 x 115mm (H x W x D)
<b>Installation</b>	35mm DIN rail or 4mm (3/16") screws

The specifications are subject to change without notice.

### SELCO Worldwide



### Type Selection Table

Type	Terminals		Function
	1-3	2-3	
T3500.0010	230V		
T3500.0020	450V	400V	
T3500.0030	480V	415V	
T3500.0040	110V	100V	
T3500.0050	110V	100V	Adjustment 0.5 - 5 Hz/sec.

Other combinations and voltages are available on request.

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