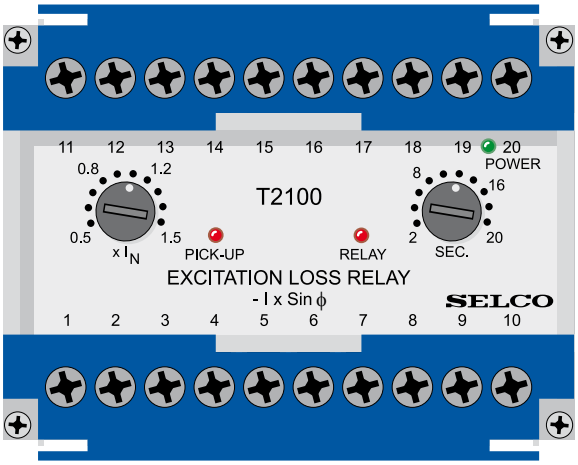
T2100 Excitation Loss Relay

- Protection of generators against loss of excitation
- Visual indication of power, pick-up and relay tripping
- High precision digital countdown timer for delayed output
- Direct Line-Line supply where neutral is not available
- Accepts high supply voltage variations: 50 - 110%
- Cost effective and highly reliable compact design
- 50 hours burn-in before final test
- Operating temperature range: -20°C to +70°C
- Certified by major marine classification societies
- Flame retardant enclosure
- DIN rail or screw mounting



Application

The T2100 Excitation Loss Relay protects against partial or complete excitation loss on the synchronous generator.

If a generator under parallel operation has a low excitation, a high inductive current is running into the generator. This current is detected and the faulty generator breaker is tripped, thus protecting the generator, and also avoiding overload on the remaining generators with a possible blackout of the system.

Together with the T2000 Reverse Power Relay, the T2500 Overcurrent and Short Circuit Relay and the T2700 Power Relay, the T2100 provides the optimal solution for complete generator protection, both in marine and land-based applications. The T2100 is type approved by major marine classification societies.

Function

The T2100 measures the voltage across phases L1 and L2 (or between L1 and neutral for L-N operation) and the current through a current transducer attached on phase L1.

The T2100 calculates I x sin Φ, representing the reactive power. If the reactive power becomes negative and exceeds the preset level (0.5 - 1.5 x I_N), the pick-up LED will indicate and the delay timer will be started.
After the preset time (2 - 20 sec.) has expired, the output relay and LED will be activated, provided that the negative reactive power level was exceeded for the entire delay time.

The output relay is a latching relay. The latching can be reset or disabled by bridging terminals 13 and 14.

Installation

Typical setting is 100% current level. However, it depends on the type of generator.

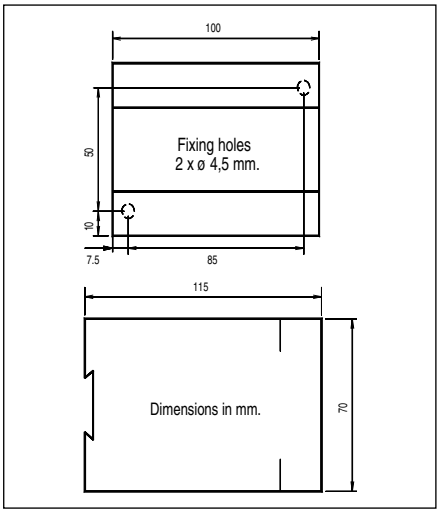
Example of setting:
Required trip level: 100%
Generator rating: 714A
Current transformer: 800/5A
Setting: 1 x 714/800 = 0.9 x I_N

It is important that the phase where the current is measured always is connected to terminals 1 or 2. See connection diagram.
For L- L operation terminal 3 is connected to the next phase in the phase sequence. For L- N operation terminal 3 is connected to neutral.
It is important that the phase sequence is correct and the current transformer side nearest the generator side is connected to terminal 5.

The LED based pick-up indication is ideal for testing. The T2100 can be tested by reducing the excitation on the generator, until the pick-up LED indicates exceeding the preset negative reactive power level.

Troubleshooting

1) If the relay operates on increased excitation of motor load, the wiring to terminals 5 and 6 are interchanged.
2) If the relay is not operating in any power direction and there is voltage on terminals 1 and 3 or terminals 2 and 3, check that current is floating in the current circuit terminals 5 and 6.
3) If the relay trips on different levels when the test is repeated, or operates in situations with high motor loads, check that the voltage and current inputs have the correct phase relationship and that the phase sequence is correct.
4) If the relay trips in situations with high motor loads, check (as in 3) that the voltage and current inputs have the correct phase relationship and that the phase sequence is correct.

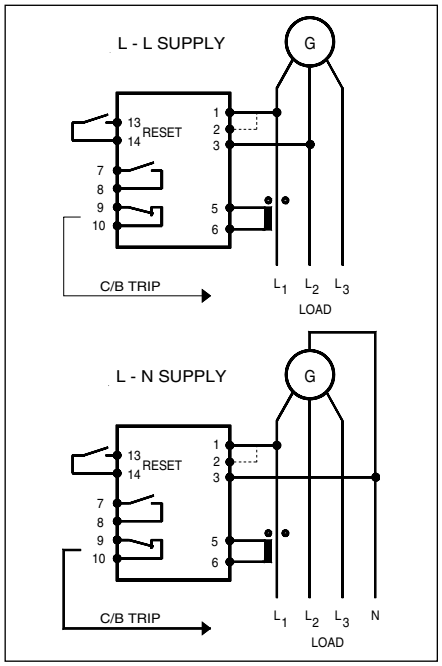


Dimensions.

SELCO

Specifications

T2100 Excitation Loss Relay



Connection diagram. Relay shown de-energized.

Trip level	0.5 - 1.5 x I_N
Delay	2 - 20 sec.
Max. voltage	660V
Voltage range	50 - 110%
Consumption	Voltage 5VA at U_N Current 0.3VA at I_N
Continuous current	2 x I_N
Frequency range	45 - 400Hz
Output relay	Normally de-energized, latching, resetable
Contact rating	AC: 400V, 5A, 1250VA DC: 150V, 5A, 120W
Overall accuracy	±5%
Repeatability	±1%
Operating temperature	-20°C to +70°C
Dielectric test	2500V, 50Hz
EMC	CE according to EN50081-1, EN50082-1, EN50081-2, EN50082-2
Approvals	Certified by major marine classification societies
Burn-in	50 hours before final test
Enclosure material	Polycarbonate. Flame retardant
Weight	0.5kg
Dimensions	70 x 100 x 115mm (H x W x D)
Installation	35mm DIN rail or 4mm (3/16") screws

The specifications are subject to change without notice.

Type Approvals and Certificates

The T2100 has been designed and tested for use in harsh environments. The T2100 carries the CE label and has been approved by the following marine classification societies:

Bureau Veritas
Romanian Register of Shipping
Russian Maritime Register of Shipping

Type Selection Table

Standard types: I_N = 5A

Type	Terminals 1-3	2-3	I_N	Supply	Function
T2100.0010	230V		5A	L-N	
T2100.0020	480V	415V	5A	L-L	
T2100.0030	450V	400V	5A	L-L	
T2100.0040	110V	100V	1A	L-L	
T2100.0050	110V	100V	5A	L-L	
T2100.0060	110V	100V	5A	L-L	Current 0.2 - 1.2 x I_N
T2100.0070	480V	415V	5A	L-L	Normally energized output, current 0.05 - 0.15 x I_N
T2100.0080	110V	100V	5A	L-L	24V DC aux. voltage supply, current 0.2 - 1.2 x I_N

Other combinations and voltages are available on request.

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