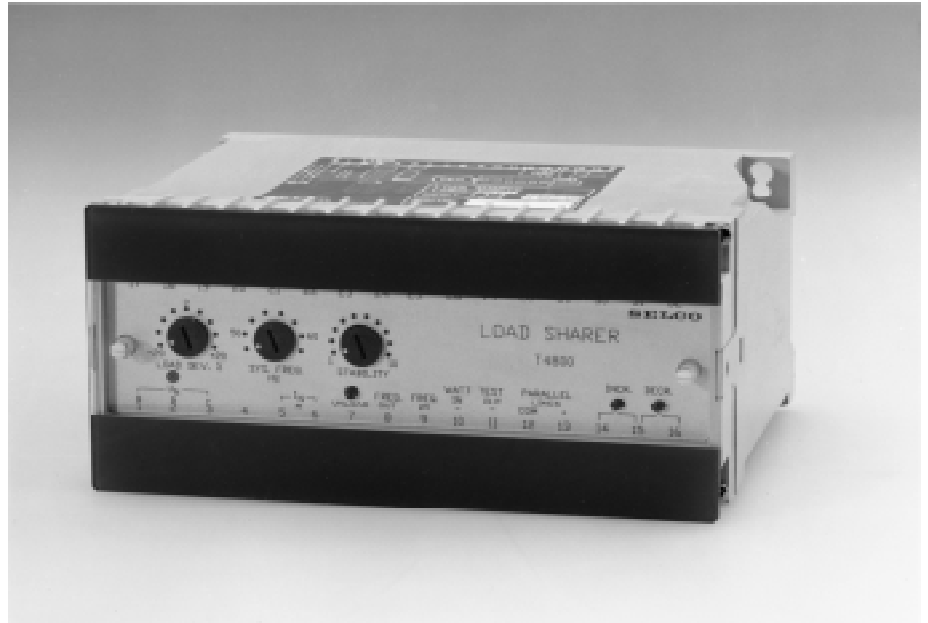


T4895-81 E

- ★ Cost effective and high reliable compact design with small dimensions H x W x D = 70 x 150 x 115
- ★ Available for all system voltages up to 660V
- ★ Communicating with other load sharing units over only 2 wires
- ★ Unloading facility
- ★ Built in reverse power relay and unloaded trip
- ★ 50 hours burnin before final test
- ★ Visual indication of voltage, increase, decrease and unload signals
- ★ Operates in ambient temperature from -20°C to +70°C.
- ★ Noise and radio interference immunity according to IEC 255.
- ★ Flame retardant enclosure
- ★ DIN rail mounting
- ★ Output contact rating: AC: 380V, 2A, 250VA, DC: 110V, 2A, 100W.



Application

The T4800 provides automatic load sharing and system frequency control for parallel running

generators. The load on each generator is compared with the load of the other generators and corrected until balance is obtained. Load sharing is necessary after synchronization for returning to load balance and to obtain long term stability of load and frequency.

The speed governor must have droop (frequency reduction with load) to obtain fast load balance with load changes.

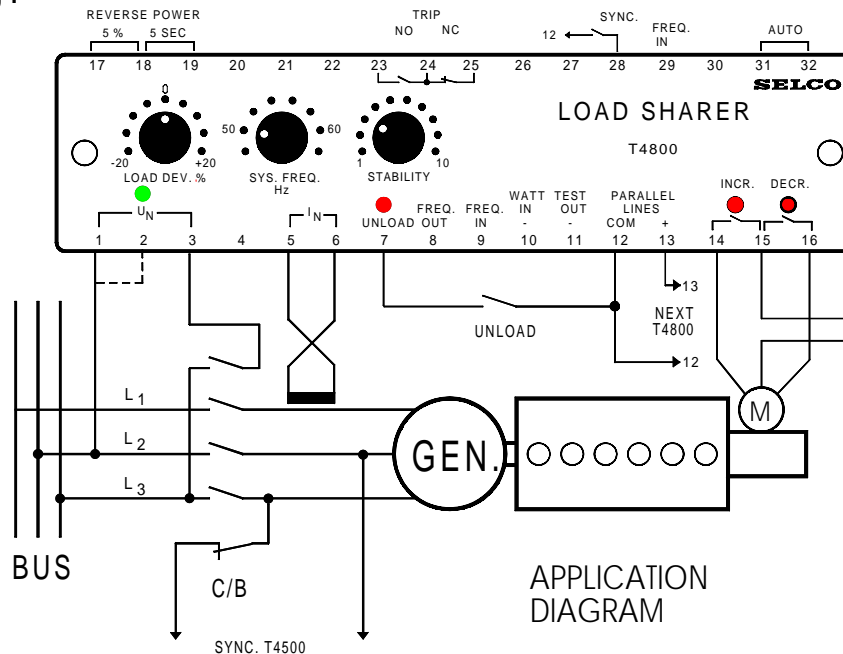
Function

The input to the unit is the voltage and the current from which power and frequency are measured. Contact signals for increase and decrease with proportional pulses are obtained as output. This output controls the electric speed setting motor on the governor and regulates the load and the frequency with optimal speed and stability. An unloading facility is available which, when activated, will reduce the generator power to zero.

Supply voltage / current

The supply voltage from L1 and L2 is connected to terminal 1 and 3 or 2 and 3 (depending on the system voltage) via a NO circuit breaker aux. contact. The measuring current from L3 is connected to 5 and 6 with 5 referring to the generator (see application diagram). The current is measured in the phase that is not supplying the unit. Observe that the phase sequence is correct. This relation between the connections of voltage and current must be correct because of the power measuring circuit in T4800, and it can be checked on terminal 11 (test out) where an input of nomi-

Fig 1



nal current (1,0A or 5,0A) and PF = 1,0 gives -2,0V for correct connection.

Common reference

Terminal 12 is common reference for all terminals 7 to 13 and 28 to 29.

Power and frequency balance

Two NO contacts on terminals 14, 15 and 16 for increase and decrease with LED indication controls the speed setting motor. For communicating power and frequency balance between paralleled generators all terminals 12 are interconnected and all terminals 13 are interconnected.

Unload

Connecting 7 (unload) and 12 will reduce the power on the generator to zero load, and maintain zero load.

Frequency out

Connecting 8 (frequency out) to 12 will disable frequency control and is used when running parallel with the grid where the frequency is already determined.

Frequency in / sync. control

An external voltage injected between 9 and 12 can control the frequency. The same signal can be connected between 29 and 12.

The synchronizing control on terminal 28 will switch this signal on and disable the internal frequency control.

This can be used for synchronizing parallel running generators.

Terminals 28 on all units are interconnected and with a contact between 28 and 12, the external frequency signal from synchronizer T4500 on terminal 29 will be active and all internal frequency controls are disabled. (see Fig 3)

Watt in

On terminal 10 (watt in) a negative voltage -1,0V from volt free watt converter can be connected to substitute the internal power measuring circuit and no connections on terminals 5 and 6 are needed. Most standard measuring signals can be adapted with external resistors.

0-10V: series resistor 820 kohm.
0-5 mA: parallel resistor 200 ohm.

Reverse power trip / unload trip

The reverse power trip operates at 10% with a delay of 10 sec. It can be reduced to 5% by bridging 17 and 18, and 5 sec. by bridging 18 and 19. A resistor of 510 kohm between 17 and 18 gives 7,5% and a resistor between 18 and 19 of 2,7 mohm gives 7,5 sec.

If the generator is unloading (contact between 7 and 12) a trip signal is obtained when the load passes below +5% load.

Both tripping signals are available on the same volt free switch over contact. NO-contact on 23 and 24 and NC-contact on 24 and 25.

The reverse power trip signal is continues, and the unload trip signal has a duration of 0.5 sec.

Auto mode

Terminals 31 and 32 must be bridged for automatic load sharing function. If only reverse power protection is wanted disconnect 31 and 32.

Adjustments

Load deviation $\pm 20\%$ is used for fine adjustments of load balance or for adapting input signals from generators of different sizes.

System frequency adjustment is possible on 50 and 60 Hz and it determines the generator frequency.

Stability is used to avoid fluctuations in load and must be adjusted as low as possible because a high setting gives a slow regulation.

With this setting the proportional band (pulsing band) is adjustable between 50 and 250% and the dead zone (in balance - no pulsing) is adjustable between 2 and 10%.

Trouble shooting

If load balance is not obtainable and the power is only increasing or decreasing continuously, one of the signals are opposite such as wrong polarity or interchanged wires. Is this the situation, check the following:

1. The polarity of the power measuring signal on test out - (11). This must be negative and if not, the phase sequence is false and a change of connections 1,2 and 3 or 5 and 6 are necessary.
2. Increase and decrease are obtained as indicated on the front.
3. Parallel lines 12 and 13 are not interchanged.

Is there a balance point but is the load balance incorrect, check the following:

1. Load deviation shall be on zero for identical generators and installations. Small differences can be corrected here.
2. Is the deviation from other generators approximately two times the power, it is likely that the current on 5 and 6 is measured wrong in one of the phases connected to 1, 2 or 3. Check the voltage on test out - (11) to be -2V for nominal current input (1A or 5A) and PF = 1,0. Current measurement in wrong phase gives 1,0V. If the current in terminals 5 and 6 is 2,0A (In = 5A) and PF = 0,8 then the voltage for correct connection is:

$$-2 \times \frac{2}{5} \times 0,8 = -0,64V.$$

Is there a correct balance point, but is the load fluctuating up and down, turn stability clockwise but not more than necessary to obtain stability.

T4895-81 E

Fig 2

Application Diagram Synchronization and Load Sharing with T4500 and T4800

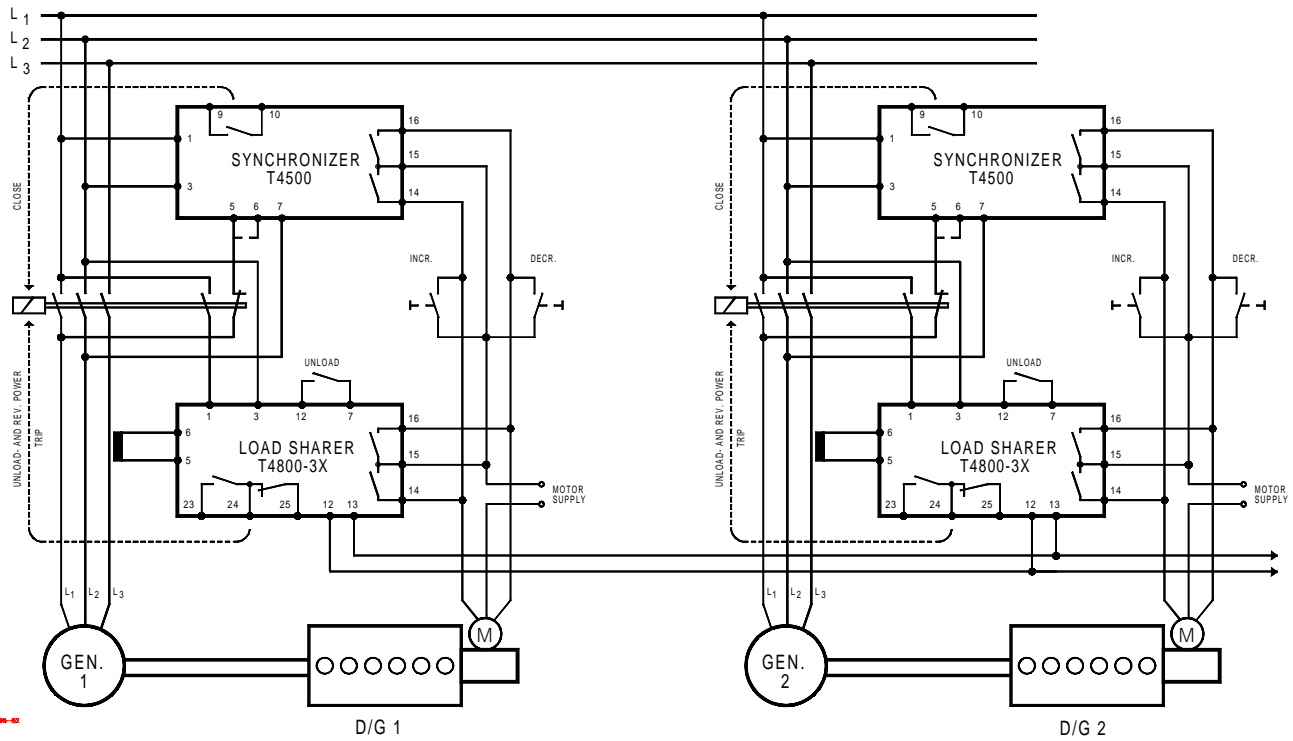
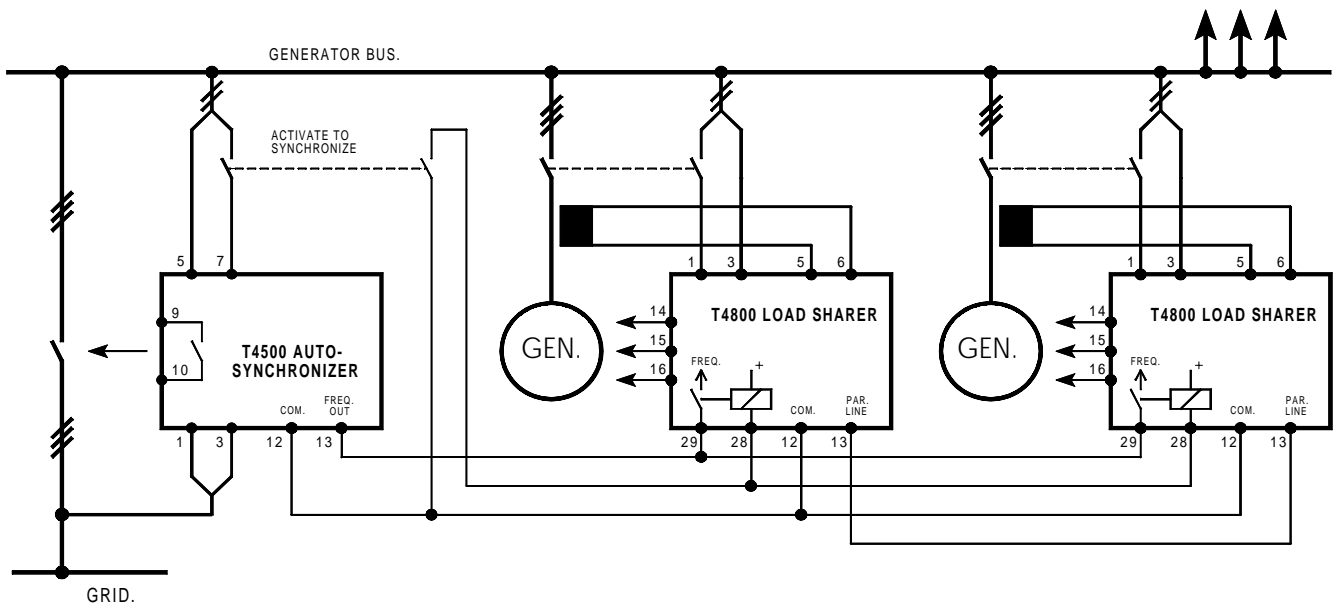


Fig 3

Application: Synchronizing two generators in load sharing to the grid with T4500



Specifications

Voltage	: Max. 660V : Range: 70-110% : Burden: 4VA : Frequency: 35 - 70 Hz
Current	: Continuously: 2 x I _N : Burden: 0,4VA
Operating Temp.	: -20 +70°C
Proportional band	: ±50 - 250% load : ±5 - 25% frequency
Dead zone	: ±2 - 10% load : ±0,2 - 1,0% frequency
Contact rating	: AC = 380V, 2A, 250VA : DC = 110V, 2A, 100W
Enclosure material	: Polycarbonate : Flame retardant
Weight	: 0,7 kg
Dimensions	: 70 x 150 x 115 mm : (H x W x D)
Burn-in	: 50 hours before final test
Installation	: 35 DIN rail or two 4 mm (3/16") screws.

Type Selection Table

Standard types: I_N =5A

Type	Terminals		I _N	Function
	1-3	2-3		
T4800-31	440V	380V	5A	Reverse power trip, unloaded trip, sync. control
T4800-33	240V	220V	5A	Reverse power trip, unloaded trip, sync. control
T4800-35	480V	415V	5A	Reverse power trip, unloaded trip, sync. control
T4800-41	100V	110V	1A	Reverse power trip, unloaded trip, sync. control
T4800-42	440V	380V	1A	Reverse power trip, unloaded trip, sync. control
T4800-45	127V	120V	5A	Reverse power trip, unloaded trip, sync. control
T4800-46	110V	100V	5A	Reverse power trip, unloaded trip, sync. control

Other supply voltages, nominal currents and combinations are available on request.

Fig 4

