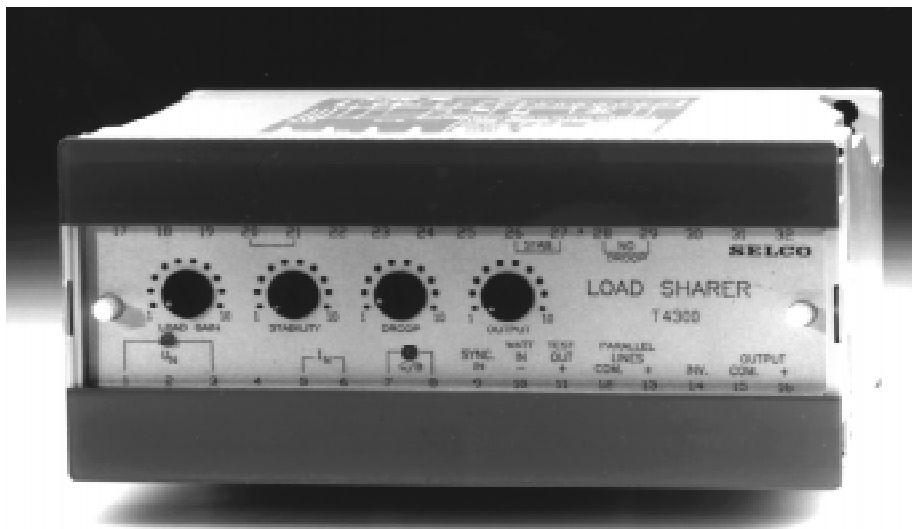


T4395-72 E

- ★ Cost effective and highly reliable compact design with small dimensions (HxWxD) 70 x 150 x 115 mm
- ★ Available for all system voltages up to 660V
- ★ Adaptable to all major speed governor systems
- ★ Communicating with other load sharing units over only 2 wires
- ★ Unloading facility
- ★ Optional reverse power relay and unloaded trip
- ★ 50 hours burn-in before final test
- ★ Visual indication of voltage and generator Circuit Breaker
- ★ Operates in ambient temperature from -20°C to +70°C / -4°F to 158°F
- ★ Noise and radio interference immunity according to IEC255
- ★ Flame retardant enclosure
- ★ DIN rail mounting

Application

The T4300 provides automatic isochronous load sharing for parallel running generators in connection with all types of



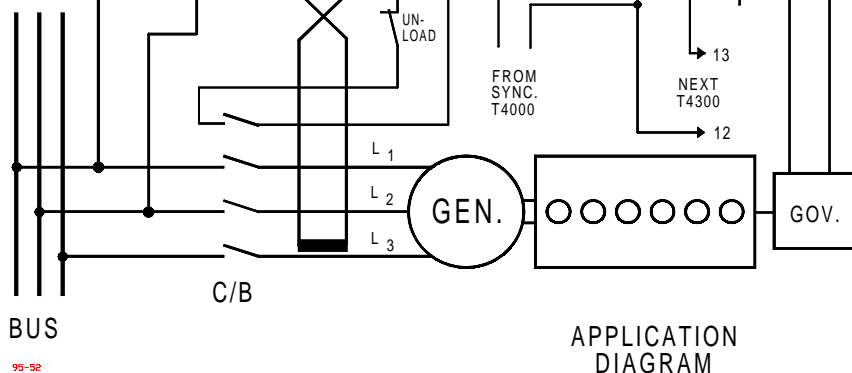
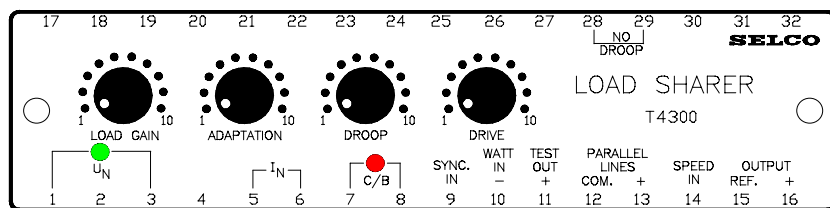
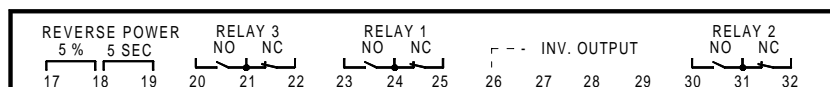
electric governors. The load on each generator is compared with the load of the other generators and corrected until balance is obtained. An unloading facility is available and when used, the load on the generator is reduced and maintained on a low value. Optional functions such as unload trip and reverse power trip are available.

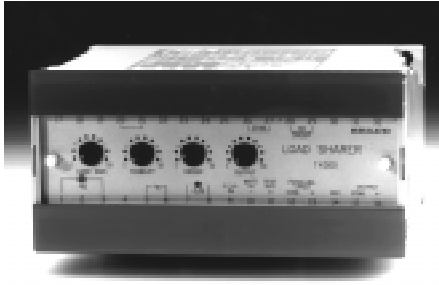
Function

The input to the unit is the voltage and the current from which power is measured. This is compared with the power on the other generators and calculated into a control signal that is connected to the electric speed governor for regulating the load with optimal speed and stability. The supply voltage from L1 and L2 is connected to terminal 1 and 3 or 2 and 3 depending on system voltage. The measuring current from L3 is connected to 5 and 6 with 5 referring to the generator (see application diagram).

Current input must be taken from the same phase on all generators and 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 T4300, and it can be checked on terminal 11 (test out) where an input of nominal current (1A or 5A) and PF=1.0 gives +6.0V for correct connection. Terminal 12 is common reference for all terminals. For communicating

OPTIONAL FUNCTIONS





power balance between paralleled generators all terminals 12 is interconnected and all terminals 13 is interconnected. Connecting 7 and 8 with an aux. contact from the generator C/B will activate T4300 for load sharing and disconnecting 7 or 8 with the generator on load will reduce and maintain the power on the generator to a low value. 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 input on terminals 5 and 6 are needed. Most standard measuring signals can be adapted with external resistors.

0-10V: series resistor 510 kohm.
0-5mA: parallel resistor 200 ohm.
Between terminals 9 and 12 the SELCO synchronizer T4000 or any other manufacture of synchronizer can be connected. This input is not effected by the output adjustment. Output to the electric speed governor is taken from terminals 15 and 16 with 15 as reference. If inverse signal is needed use terminals 26 and 15, do not changing wires 15 and 16. Terminal 28 and 29 must be bridged for isochronous load sharing and with no connection the droop control is active. External speed control is available from a variable voltage input of $\pm 4V$ on 14 compared to 15

Adjustments

Load gain is used for fine adjustments of load balance for adapting generators of different sizes. For generators of same size setting is 1 on all load sharers and the load increases with higher setting. Adaptation or stability control is used to adapt the load sharer to the input resistance of the governor by means of a variable resistor in the output 16. This control gives 0 Ohm output at setting 1 and this setting is for governors with low impedance input. The setting must be the same on all load shares.

If droop control is preferred to isochronous load sharing, disconnect parallel lines (12 and 13) and open the bridge between 28 and 29. Droop setting 1 is zero droop and it is increasing with higher setting. Drive or output setting is intended for adjusting the size of the output signal to the governor. Output increases with setting. Too much output can result in instability, and if this is the situation, turn anti clockwise until stability is restored.

Options

Models are available with built-in reverse power trip and unloaded trip. The reverse power trip operates at 10% with a delay of 10 sec. but it can be reduced to 5% by bridging 17 and 18, and to 5 sec. by bridging 18 and 19. A resistor of 510 kohm between 17 and 18 gives 7.5% and a resistor of 2.7 Mohm between 18 and 19 gives 7.5 sec. If the generator is unloaded (7 or 8 disconnected) a trip signal is obtained with a duration of 0.5 sec. 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.

Trouble Shooting

A. If load balance is not obtainable and the power goes to max. or reverse power, one of the signals are opposite such as wrong polarity or interchanged wires. If this is the situation, check the following :

1. The polarity of the power measuring signal on 11 (test out). This must be positive with the generator on load and if not, change the connections 1, 2 and 3 or 5 and 6.
2. Output from 15 and 16 must be connected to the governor control input. Terminal 16 is going positive for increased load, but if negative voltage for increased load is needed, use terminal 26.
3. Parallel lines connected to 12 and 13 between load sharers must not be interchanged.

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

1. Load gain shall be set on 1 for same size of generators.
2. The frequency of the generators before paralleling must be the same.
3. The output adjustment must have the same setting on all load sharers.
4. If the deviation from other generators is approx. two times, it is likely that the current on 5 and 6 is measured in one of the phases connected to 1, 2 or 3. The current must be measured in the phase that is not supplying the unit. Check the voltage on 11 (test out) to be +6V for nominal current input (1A or 5A) and PF=1.0. Current measurement in

T4395-72 E

wrong phases gives 3V.
 Example: If the current in terminals 5 and 6 is 2.0A (In=5A) and PF=0.8 then the voltage for correct connection is:

$$6 \times \frac{2}{5} \times 0.8 = +1.9V.$$

C. Is there a correct balance point but is the load fluctuating up and down, turn output anti clockwise on all load sharers until stability is obtained but not more than necessary.

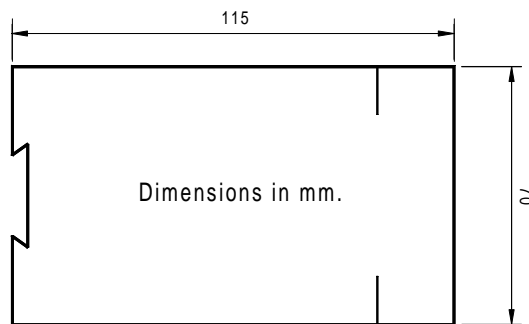
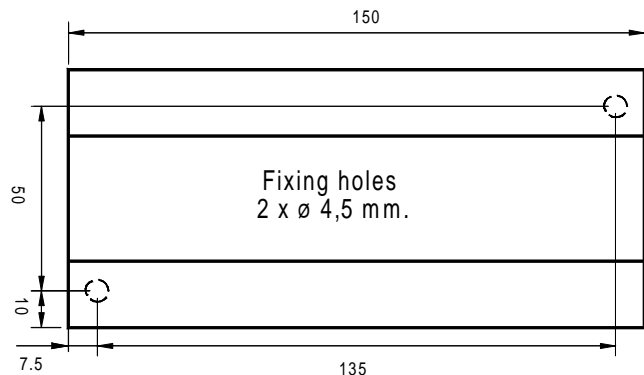
Type Description

Type	Terminal		
	1-3	2-3	
T4300-00	440V	380V	
T4300-02	240V	220V	
T4300-04	480V	415V	
T4300-06	110V	100V	
T4300-07	127V	120V	
T4300-30	440V	380V	with reverse power and unloaded trip on relay 1

Types with reverse power, unloaded trip and forward power with individual output contacts are available.
 Other supply voltages, nominal currents, and combinations are available on request.

Specifications

Voltage	: Max. 660V Range: 80-110% Burden 4VA Frequency: 35-70 Hz.
Current	: Continuously: 2 x In Burden: 0,4VA
Operating Temperature	: -20 to +70°C / -4 to 158°F
Output Voltage	: Max. ±6V
Enclosure Material	: Polycarbonate/ Flame retardant.
Weight	: 0,7 kg / 1.54Lb
Dimensions (H x W x D)	: 70 x 150 x 115 mm / 2.76 x 5.91 x 4.53"
Burn-in	: 50 hours before final test
Installation	: 35 DIN rail or two 4 mm (3/16") screws



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APPLICATION DIAGRAM SYNCHRONIZATION AND LOAD SHARING WITH T4000 AND T4300

OPTIONAL UNLOAD TRIP AND REV. POWER TRIP

