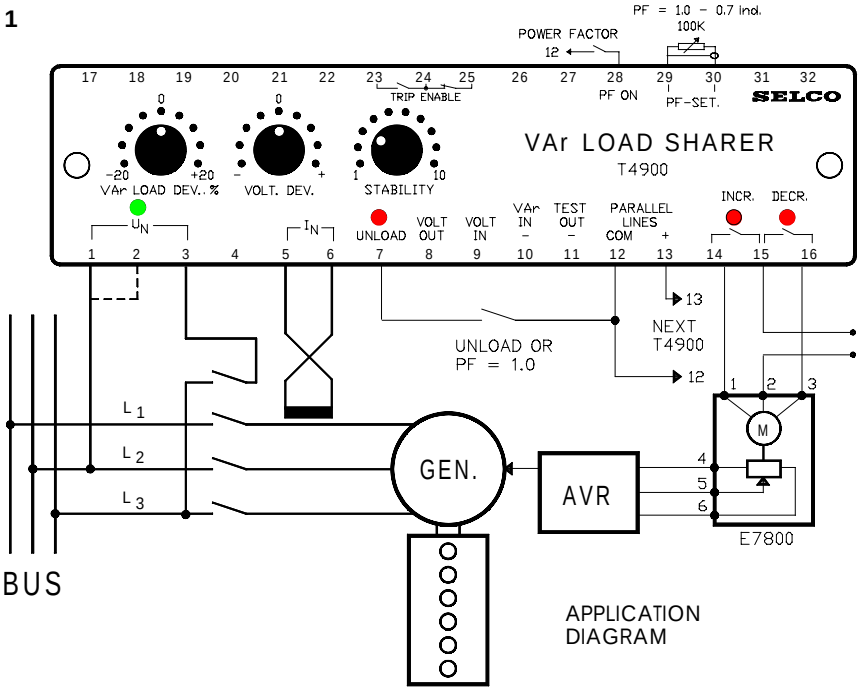
SELCO USA, INC.
VAr Load Sharer T4900

- ★ Cost effective and high reliable compact design with small dimensions H x W x D = 70 x 150 x 115mm
- ★ Available for all system voltages up to 660V
- ★ Communicating with other VAr load sharing units over only 2 wires
- ★ Unloading and tripping facility
- ★ 50 hours burn-in before final test
- ★ Visual indication of supply voltage, increase, decrease and unload signals
- ★ Operates in ambient temperature from -20°C to +70°C.
- ★ Noise and radio interference immunity according to EN50081-1, EN50082-1, EN50081-2 and EN50082-2
- ★ Flame retardant enclosure
- ★ DIN rail mounting
- ★ Output contact rating:
  AC: 380V, 2A, 250VA,
  DC: 110V, 2A, 100W.

Application

The VAr-load sharer T4900 provides automatic VAr-load sharing and system voltage control for parallel running generators. The VAr-load and voltage is measured on each generator and compared with the other generators and corrected via a motorized potentiometer SELCO E7800 until balance is obtained.
The AVR (Automatic Voltage Regulator) must have droop (voltage reduction with increasing reactive load) for the motorized potentiometer operation.
It is possible, with an external contact, between terminals 12 and 28, to change the function to power factor (cos j) control for parallel operation with the grid and the setting is determined by an external variable resistor, across terminals 29 and 30.

Fig 1



Function

The input to the unit is the voltage and the current from which the reactive power and voltage is measured. Contact signals for increase and decrease with proportional pulses are obtained as output.
This output controls the setting of the motorized potentiometer and regulates the reactive load and the voltage with optimal speed and stability.
An unloading facility is available which, when activated, will reduce the generator reactive power to zero or the power factor to 1,0.

Common reference

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

Supply voltage / current

The supply voltage from L_2 and L_3 is connected to terminals 1 and 3 or 2 and 3, depending on the system voltage, through a normally open auxiliary contact on circuit breaker.

The measuring current from L_1 is connected to terminals 5 and 6, with 5 relating to generator. See application diagram (Fig 1).
It is essential to observe correct relationship between current and voltage connections, to ensure correct reactive power measurement. This can be checked on terminals 11 (Test out) and 12.
With current input of 5.0A or 1.0A on terminals 5 and 6, and supply voltage on terminals 1 and 3 or 2 and 3, -2,0V should be measured between terminals 11 and 12.

Reactive power and Voltage balance
Two normally open contacts with LED indication, on terminals 14, 15 and 16 are for increase and decrease of motorized potentiometer. This output controls the setting and regulates reactive load through the voltage adjustment with optimum speed and stability.
For communicating reactive power and voltage balance between paralleled generators all terminals 12 are interconnected and all terminals 13 are interconnected.

Unload
Connecting terminal 7 (unload) and terminal 12, will reduce the reactive power on the generator to zero, and maintain zero reactive power. If the unit is in power factor control, the power factor will be adjusted to 1,0.

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

VAr in
On terminals 10 (VAr in) and 12 a negative voltage –1,0V from volt free VAr-converter can be connected to substitute the external reactive power measuring circuit in lieu of C.T. to terminals 5 and 6 are needed. Most standard measurement signals can be adapted with external resistors
0 - 10V: Series resistor 820 kohm.
0 - 5mA: Parallel resistor 200 ohm.

Power factor control
A contact between 28 and 12 will change the function from VAr-load sharer to power factor controller. A variable resistor between 29 and 30 of 100 kohm determines the power factor from 1,0 to 0,7 inductive. Zero ohm gives power factor 1,0. A contact between 7 and 12 will regulate the power factor to 1,0 independent of the selected power factor on terminals 29 - 30, such that when the power factor is at 1,0 the volt free contacts on terminals 23 - 24 – 25 (trip enable) will operate.

Adjustments

VAr-load deviation ±20% is used for fine adjustments of VAr-load balance or for adapting input signals from generators of different sizes.
Voltage deviation voltage adjustment is possible approximately ±12% and it determines the generator voltage.

Stability is used to avoid fluctuations in regulation 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 25 and 125% and the dead zone (in balance – no pulsing) is adjustable between 1 and 10%.

Trouble shooting

If VAr-load balance is not obtainable and the reactive power is only increasing or decreasing continuously, one of the input signals is in opposition such as wrong polarity or interchanged wires.
Checks can be made as follows:

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

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

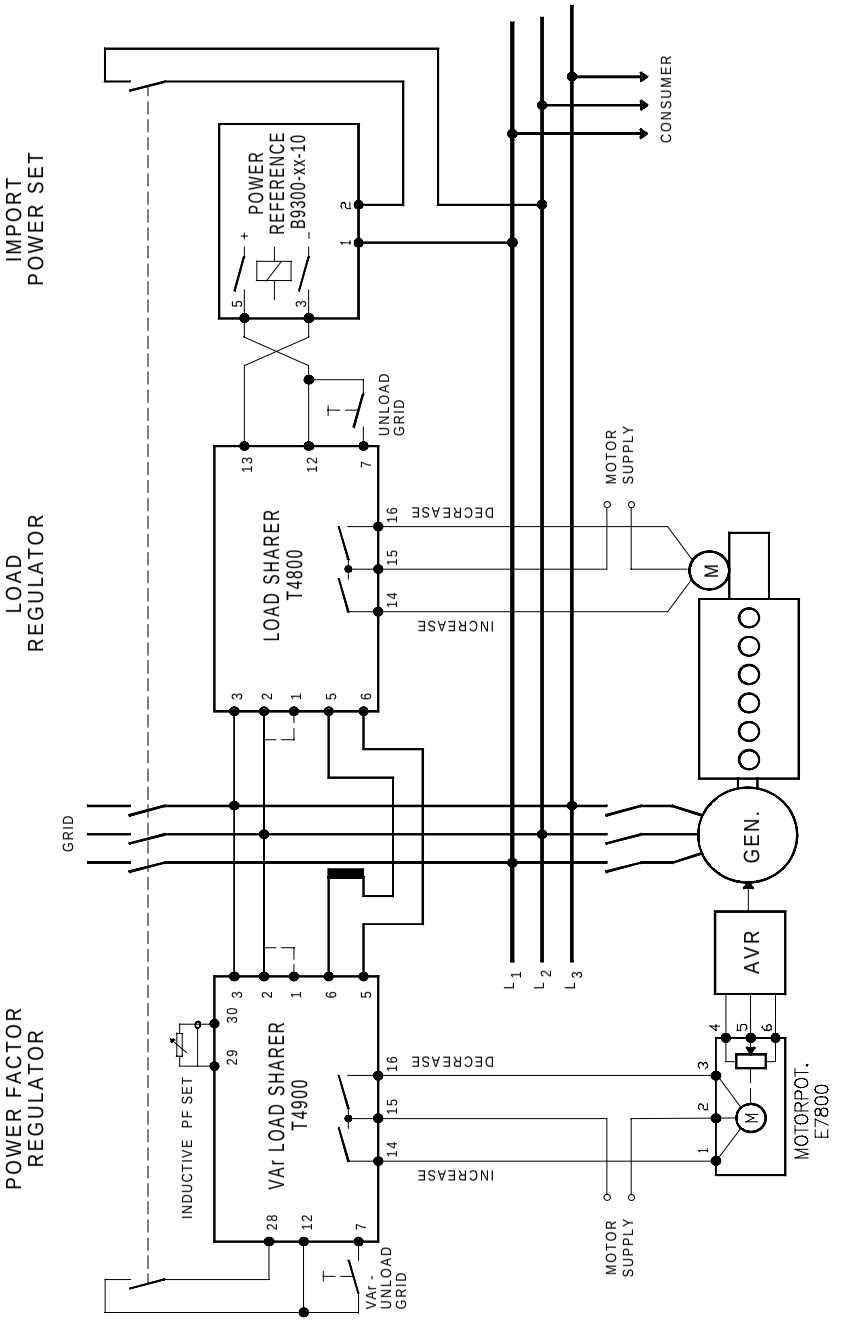
1. Load deviation should be on zero for identical generators and installations. Small differences can be corrected here.
2. If the deviation from other generators is approximately twice the reactive power, it is likely that the current on 5 and 6 has incorrect phaserelationship to voltage connected to 1, 2 or 3.

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

Fig 2

Co-Production Application Diagram

Single generator with constant grid load and power factor regulation



Specifications

Voltage	: Max. 660V
	: Range: 70-110%
	: Burden: 4VA
	: Frequency: 35 - 70Hz
Current	: Continuously: 2 x I_N
	: Burden: 0,4VA
Operating Temp.	: -20 +70°C
Proportional band	: ±25 - 125% load
Dead band zone	: ±1 - 10% load
Contact rating	: AC = 380V, 2A, 250VA
	: DC = 110V, 2A, 100W
Enclosure material	: Polycarbonate
	: Flame retardant
Weight	: 0,7kg
Dimensions	: 70 x 150 x 115mm
	: (H x W x D)
EMC	: CE according to EN50081-1, EN50082-1, EN50081-2, EN50082-2
Burn-in	: 50 hours before final test
Installation	: 35 DIN rail or two 4mm (3/16") screws.

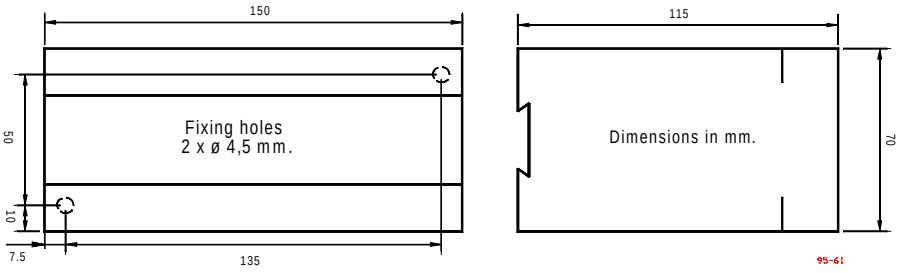
Type Selection Table

Standard types: I_N =5A

Type	Terminals 1-3	Terminals 2-3	I_N	Function
T4900-00	440V	380V	5A	
T4900-02	240V	220V	5A	
T4900-04	480V	415V	5A	
T4900-06	110V	100V	5A	
T4900-08	110V	100V	1A	
T4900-10	440V	380V	1A	

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

Fig 3



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