



- Unit absorbs transient energy generated when a generator not fully offloaded is switched off
- Protects generator windings against "killer" switch-off transients
- Prevents generator windings insulation puncture or breakdown
- For use on generators in marine and offshore installations

Specifications

Supply Voltage:	
TSU172	200-240VAC
TSU173	380-440VAC
TSU176	660-690VAC
Energy Absorption:	
TSU172	160Joules / phase
TSU173	320Joules / phase
TSU176	450Joules / phase
Clamping Voltage:	
TSU172	330V (1mA) , 620V (100mA)
TSU173	640V (1mA) , 1200V (100mA)
TSU176	950V (1mA) , 1790V (100mA)
Temperature:	-10 to +50°C
Connections:	Terminal block, three phase protective earth, 6sqmm max.
Dimensions:	
TSU172 & TSU173	H = 225 mm (incl. terminals) W = 125 mm (incl. mounting flanges) D = 108 mm (incl. mounting flanges)
TSU176	H = 225 mm (incl. terminals) W = 160 mm (incl. mounting flanges) D = 108 mm (incl. mounting flanges)
Weight:	
TSU172 & TSU173	1,2kg
TSU176	1,7kg

Caution

This Transient Suppression Unit is **NOT** an OVER-VOLTAGE protection unit, and sustained exposure to over-voltage (due to AVR fault etc.) may blow units external 20A fuses. A blown fuse will demobilise TSU17x, and must be replaced/reset immediately.

Preferably install a triple-pole electro magnetic fuse with auxiliary contact which can be used as OVERVOLTAGEALARM.

Description

TSU17x is designed for use on generators in marine and offshore installations. It is a cost saving and a re-assuring measure to fit this transient protection unit directly on each generator in both old and new installations.

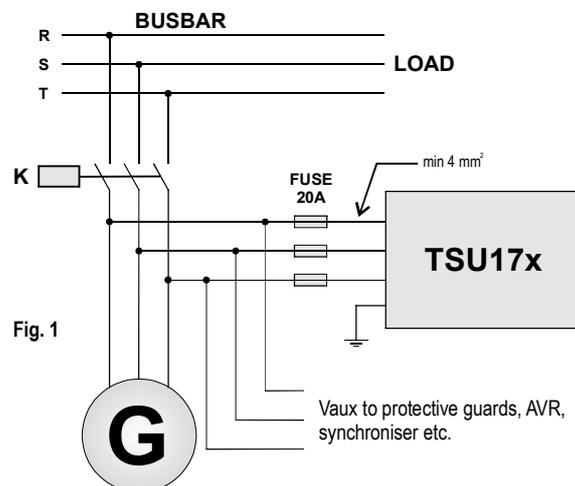
The TSU17x range of Transient Suppression Units provides active transient protection of generator windings and electronic units connected directly to the generator, where the system impedance is too high to provide inherent transient suppression.

Operation of a **loaded** generator breaker (K) will under certain conditions cause the stored energy in the generator to superimpose large transient voltage or spikes on the generator voltage.

The arc voltage will be superimposed on the terminals of any adjacent instrumentation and may well cause damage to it.

The TSU17x incorporates three high power transient suppressers that absorb the transient energy and in doing so limits the voltage level.

Three discharge resistors are also included. The components are mounted in a ventilated sheet steel enclosure (fig.1) suitable for back of panel vertical mounting, with electrical connections to a terminal block at the bottom of the unit.



General

- 1- It is a statistical fact that "killer" transients on the generator bus, caused by opening a **loaded** generator breaker, may accelerate generator winding insulation puncture and cause breakdown and damage to electronic equipment connected directly to the generator bus.
- 2- Megacon has undertaken a wide research program into the reasons for such failure. The concluding report quantifies the measured level of transient energy and voltage exposure, and specifies measures to eliminate the brutal electrical forces, which may harm operational safety of a generator system.

Voltage transients on a 440V generator bus may worst case **exceed 300kV peak**, with high-energy leading edge frequency components **exceeding 1GHz** (fig.2).

- 3- Electronic equipment which receives auxiliary, measuring or feedback voltage supply **directly** from a generator bus (synchroniser, voltage regulator (AVR), protective guards etc), may be exposed to very high voltage transients when the generator is disconnected from the main busbar.

Disconnection of a load-free generator is the ideal situation, as with zero load no dangerous transients are induced in the generator windings. Megacon Power Management Systems take note of this, and open the generator circuit breaker only after the generator is fully unloaded.

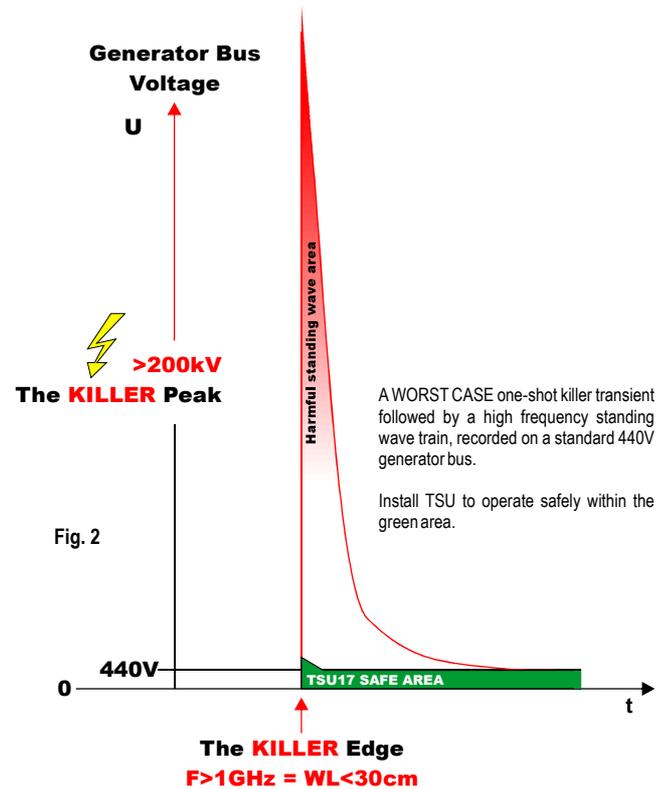
Opening a loaded generator breaker while the generator is running in motoring (reverse power) mode will NOT generate transients on the generator bus.

- 4- If the generator circuit breaker is opened whilst the generator is loaded, very high voltage transients may then be induced in the generator winding. It is typical that electronic equipment in ships installations often is damaged during classification society's overload tests, but later operates problem free for many, many years under normal cyclic running conditions.

Correspondingly, it appears that life expectancy can be attributed to individual engineers working methods. One engineer may instantly disconnect a generator under load, while other correctly offload the generator before disconnection.

- 5- Megacon has developed the robust transient protection unit TSU17x, which effectively limits to safe levels the prejudicial voltage transients generated during un controlled disconnection of the generator breaker while under load (e.g. due to control failure, overcurrent or short circuit release, etc.)

Type TSU17x is suitable for 10.000A non-repetitive transient currents for each phase (maximum 8/20-microsecond duration) with 450 Joules energy absorption.



Generator Switch-off transients, the forgotten safety factor

Generator disconnection transients may often be the unknown cause of winding insulation puncture and sudden breakdown of generator circuitry (AVR, synchroniser, guards etc).

A Megacon TSU17x Transient Suppression Unit connected to the generator bus neutralises the immense electrical surges induced when a LOADED generator breaker is opened.



The MEGACON policy is one of continuous improvement, consequently equipment supplied may vary in detail from this publication.

ORDERING EXAMPLE:
Type: TSU172
Input Voltage: 200-240V

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Range