

TS1 (3-phase)

Power thyristor

thermokon[®]
Sensortechnik GmbH

Datasheet

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Application

Power thyristors are used as actuators for industrial power controls (e.g. fans, pumps, lamps, heating registers, industrial furnaces). Their solid and compact construction ensures reliable control and high efficiency.

Types Available

TS1 3 ph 2 A	A.C. Regulator with phase angle control for three-phase systems (2 Ampere / max. 1,2 kW)
TS1 SP 3 ph 2 A	A.C. Regulator with oscillation package for three-phase systems (2 Ampere / max. 1,2 kW)
TS1 3 ph 4 A	A.C. Regulator with phase angle control for three-phase systems (4 Ampere / max. 2,5 kW)
TS1 SP 3 ph 4 A	A.C. Regulator with oscillation package for three-phase systems (4 Ampere / max. 2,5 kW)
TS1 3 ph 6 A	A.C. Regulator with phase angle control for three-phase systems (6 Ampere / max. 4 kW)
TS1 SP 3 ph 6 A	A.C. Regulator with oscillation package for three-phase systems (6 Ampere / max. 4 kW)
TS1 3 ph 8 A	A.C. Regulator with phase angle control for three-phase systems (8 Ampere / max. 5 kW)
TS1 SP 3 ph 8 A	A.C. Regulator with oscillation package for three-phase systems (8 Ampere / max. 5 kW)
TS1 3 ph 10 A	A.C. Regulator with phase angle control for three-phase systems (10 Ampere / max. 6,5 kW)
TS1 SP 3 ph 10 A	A.C. Regulator with oscillation package for three-phase systems (10 Ampere / max. 6,5 kW)

Security Advice – Caution



The installation and assembly of electrical equipment should only be performed by authorized personnel.

The product should only be used for the intended application. Unauthorised modifications are prohibited! The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or assets. Ensure all power is disconnected before installing. Do not connect to live/operating equipment.



CAUTION! Risk of electric shock due to live components within the enclosure, especially devices with mains voltage supply (usually between 90..265 V).

Please comply with

- Local laws, health & safety regulations, technical standards and regulations
- Condition of the device at the time of installation, to ensure safe installation
- This data sheet and installation manual

Notes on Disposal



As a component of a large-scale fixed installation, Thermokon products are intended to be used permanently as part of a building or a structure at a pre-defined and dedicated location, hence the Waste Electrical and Electronic Act (WEEE) is not applicable. However, most of the products may contain valuable materials that should be recycled and not disposed of as domestic waste. Please note the relevant regulations for local disposal.

Technical Data

Output switch contact		floating normally open contact for 250 V ~ / 3 A or 24 V = / 3 A power output for ohmic and inductive load
	TS1 3Ph 02	2 A, max. 1,2 kW
	TS1 3Ph 04	4 A, max. 2,5 kW
	TS1 3Ph 06	6 A, max. 4 kW
	TS1 3Ph 08	8 A, max. 5 kW
	TS1 3Ph 10	10 A, max. 6,5 kW
Power consumption	TS1 3Ph 02	typ. 7 W (400 V ~)
	TS1 3Ph 04	typ. 13 W (400 V ~)
	TS1 3Ph 06	typ. 19 W (400 V ~)
	TS1 3Ph 08	typ. 25 W (400 V ~)
	TS1 3Ph 10	typ. 31 W (400 V ~)
Inputs		control voltage 400 V ~ set point signal 0..10 V = or 0..20 mA (switchable with DIP-switch) potentiometer input 2,5..10 kΩ
Display		LED Mains: green LED U out 100%: green
Functions		phase-angle control (optional: oscillation package)
Enclosure		PA
Protection		IP40 according to EN 60529
Connection electrical		terminal block, max. 2,5 mm ²
Ambient condition		0..+45 °C
Weight	TS1 3Ph 02 04	500 g
	TS1 3Ph 06 08 10	600 g
Mounting		prepared for mounting on DIN rail TS35 (35x7,5 mm) according to EN 60715
Notes	TS1 3Ph 06 08 10	with heat sink

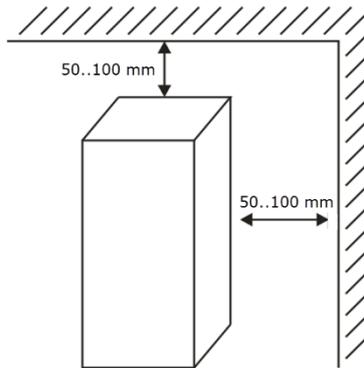
Mounting Advices

A sufficient cooling (e.g. forced air cooling) is of paramount importance. Temperature is not allowed to exceed 45 °C. The device has to be mounted on a vertical area, so that a sufficient air circulation is guaranteed. Moreover, the Thyristor has to be installed in dry rooms.

Further onsite conditions:

- Protection against dust and humidity
- Protection against aggressive atmosphere
- Free of vibrations

In order to avoid any interferences of the cooling, no further components should be installed around the Thyristor within a distance from 50 to 100 mm.

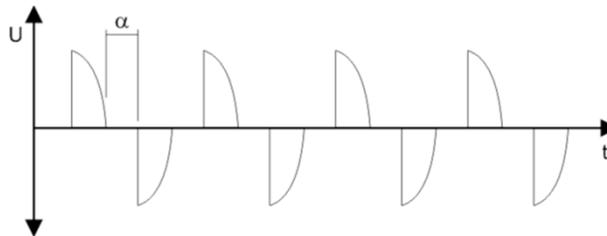


General Information

The power thyristors series TS1 are available with phase angle control or oscillation package.

Phase angle control:

The phase angle control can be used for almost any ohmic and inductive consumers and is the most common way to control the power consumption of a consumer. The consumer is connected to the supply network via the power thyristor. The thyristors are controlled in such a way, that the consumer is not supplied with the complete sinusoidal oscillation but only a part (depending on the steering angle α), whereas the voltage average value can be adjusted continuously.

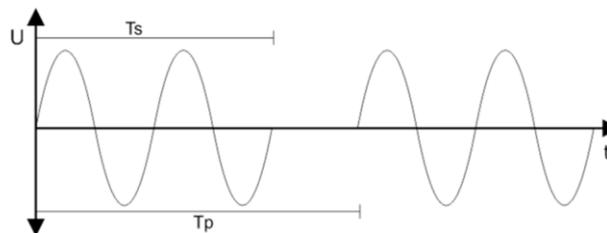


α = control angle

Oscillation control:

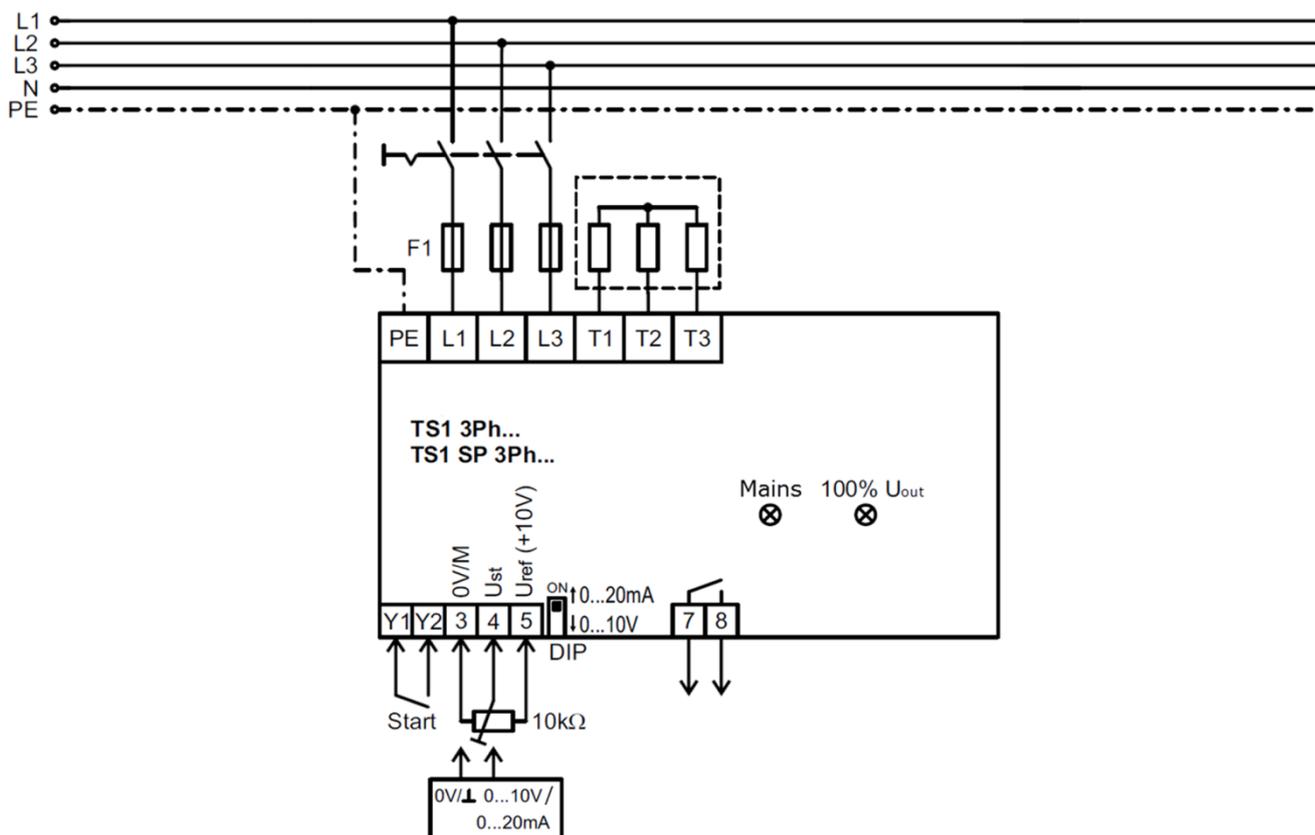
In principle, the oscillation control is used with inert consumers like for example heaters. Contrary to the phase angle control, complete sinusoidal waves are switched through to the consumer with the oscillation control.

The control of the average voltage value is made by switching through a certain number of oscillations (depending on the switch-on time T_s) within a certain time slot (clock cycle T_p).



T_s = turn-on time / T_p = pulse period time

Connection Plan



Clamp	Description
L1 L2 L3	400 AC / 50 Hz
T1 T2 T3	Load connection
Y1 Y2	Start / Activation resistor
3 4	Set point signal 0..10 V / 0..20 mA with 500 Ω
5	Reference voltage (10 V) for potentiometer control
7 8	Relay switching output: the relay is switched on if the output voltage reaches 100%.

LED	Description
Mains	Lights if power supply is connected.
100% U _{out}	Lights if output voltage has reached 100%.

Commissioning

First of all, all electrical connections should be setup, according to the attached circuit diagrams. According to the VDE regulations, the Thyristors must be connected to the supply net in that way, that they can be separated from the net by means of corresponding clearing instruments (e.g. main switch, contactor, protective power switch).

Cabling: The net and consumer lead wires as well as the control circuit must be lead in separate cables. In order to avoid any interferences, it is advisable to wire the electronic signal lines separated from the load leads and/or the contactor control circuit and to twist the coming and going wires of the signal line.

Protection: The net protection depends on the recommended respectively the used conductor cross section and must be made according to DIN 57100 Part 430/VDE 0100 Part 430/6.81.

EMC: According to the EMC-Norms power thyristors are belonging to assemblies, which do not have an intended purpose on their own. The devices present a functional unit of a complete system. The control electronics of the power thyristors is designed according to the valid EMV requirements. The builder of a plant/system has to fit the system with a suppressor (anti-interference) by means of suitable throttles and decoupling filters.

Dimensions (mm)

