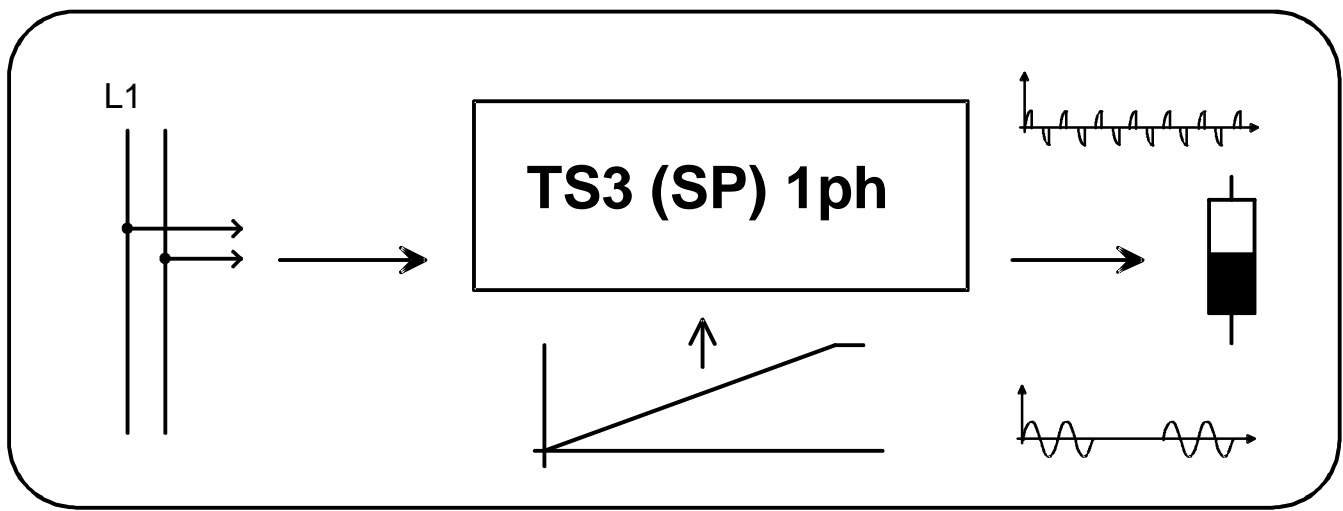


Power Thyristor TS3 (SP) 1ph

Installation Guide



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1. General Descriptions

Thyristors are more and more used where increased resistive and inductive loads have to be controlled. By means of the modular and compact construction as well as the control by a continuous action control signal, these Power Thyristors are becoming a perfect actuator for industrial power control.

The power unit of the Thyristor is made of two anti-parallel connected Thyristors, the insulated heat sink and the control electronics.

Explanation of types:

TS3 1ph A.C. Regulator with phase angle control for single-phase systems

TS3 SP 1ph A.C. Regulator with oscillation package single-phase systems

Construction:

The Thyristors correspond to the VDE 0558 Part 1 and VDE 0160 Table 4.

The Thyristor TS3 (SP) 1ph is integrated in a plastic housing (ABS). The main component of the Thyristor consist of the

Power unit with heat sink and the Thyristor wiring as well as of the
Control unit with starter and control electronics.

2. Installation: Thyristor TS3 (SP) 1ph

A sufficient cooling (e.g. forced-air cooling) is of paramount importance. Temperature is not allowed to exceed 50°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 on-site 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 100mm.

Wiring:

Power supply (L1, N (L2)) must be produced via a fail-safe circuit breaker with the common backups.

The wiring for the power supply and the control unit must be done in separate channels or protection tube.

During the electrical installation procedure, the general VDE-regulations (VDE 0100, VDE 0113, VDE 160) must be observed, accordingly.

3. Set-up of Thyristor

First of all, all electrical connections should be set-up, according to the attached circuit diagrams: L1, N (L2), T1, T2.

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.

General Information:

Thyristor TS3 for phase angle control is designed for the control of resistive and inductive loads. As a standard the control is made via the analog signal (0...10V or 0...20mA). The phase angle control respectively the on and off timing relation of the oscillation package control (pulse group operation) is continuously corrected by the control electronics, in order to reach a sufficient proportionality between the Power Thyristor control and the output (T1, T2, T3).

4. Terminal Connections

Clamps:	Functions:	Switch status:	Description of function:
1 - 2	Start	closed opened	Soft start is activated Ready for operation
3	U _{reference}	10V	To be used upon adjustment of potentiometer
4	U _{control-Input}	0...10V, 0...20mA, 2,5...10kΩ	Input for voltage and current signals or potentiometer adjustment (sliding contact)
5	Earth		To be used upon current, voltage or potentiometer adjustment
6 - 7	Interference relay output	Cl. 6,7 closed	Upon interference status
8 - 9	Supply voltage (optional, not necessary)	230V/50 - 60Hz	For internal voltage supply (optional, not necessary)
L1 -L2	Power supply	110V - 500V AC	Rating voltage
T1 - T2	Load connector		Load (heating resistance, motor, ...)

Control by voltage signal 0...10V:

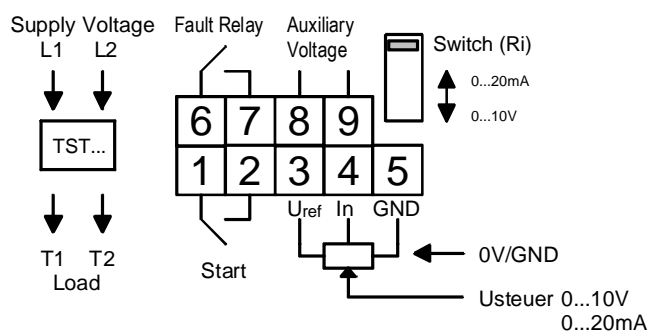
Switch (Ri) set to „0...10V" (Ri>50kΩ)
Clamp: 4 Signal input
 5 Ground

Control by current signal 0...20mA:

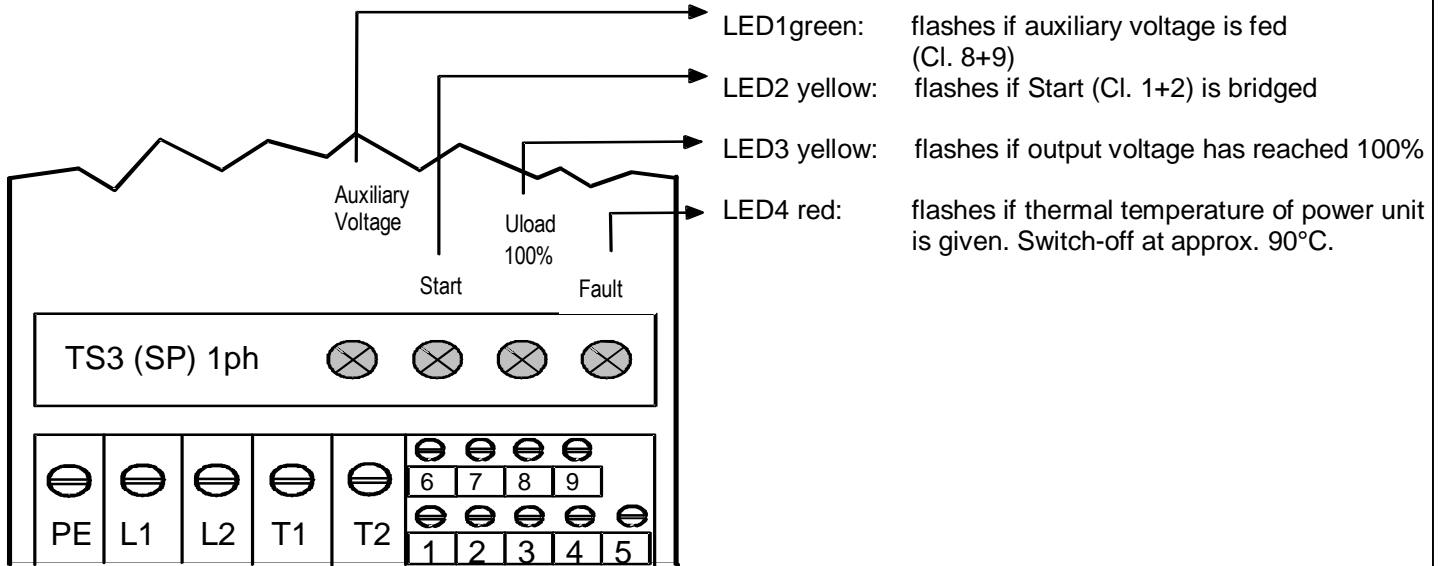
Switch (Ri) set to „0...20mA"
Clamp: 4 Signal input
 5 Ground

Control by potentiometer 2,5...10kΩ:

Switch (Ri) set to „0...10V" (Ri>50kΩ)
Clamp: 3 Reference voltage 10V (supply voltage for potentiometer)
 4 Sliding contact
 5 Ground



5. Description of LED`s:

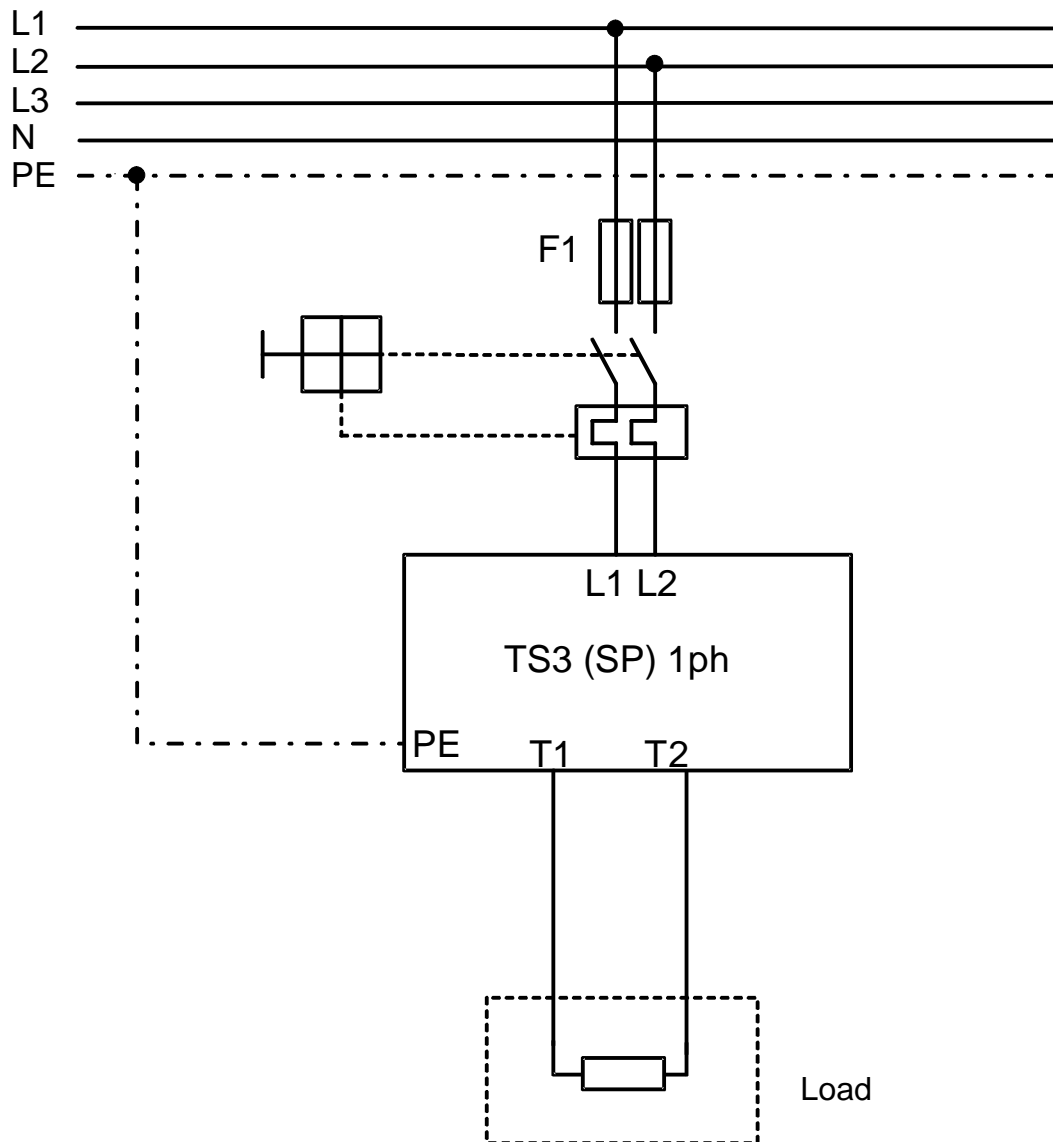


Diagnosis Diagram

Pos.	LED1	LED2	LED3	LED4	Funktionszustand	Fault-Relay Output (same time as LED 4)
1	green	*	*	*	Auxiliary voltage (Cl. 8+9) is fed; device ready for operation	
2	green	yellow	*	*	Device ready for operation; Start is activated (Cl. 1+2 bridged)	
3	green	yellow	yellow	*	Device ready for operation; Start is activated; ULoad is 100%	
4	green	*	*	red	Device ready for operation; An interference occurred	Cl. 6+7 closed
5	green	yellow	*	red	Device ready for operation; Start is activated; An interference occurred	Cl. 6+7 closed

*no indication

6. Basic Circuit 1-phase



7. Overview of types

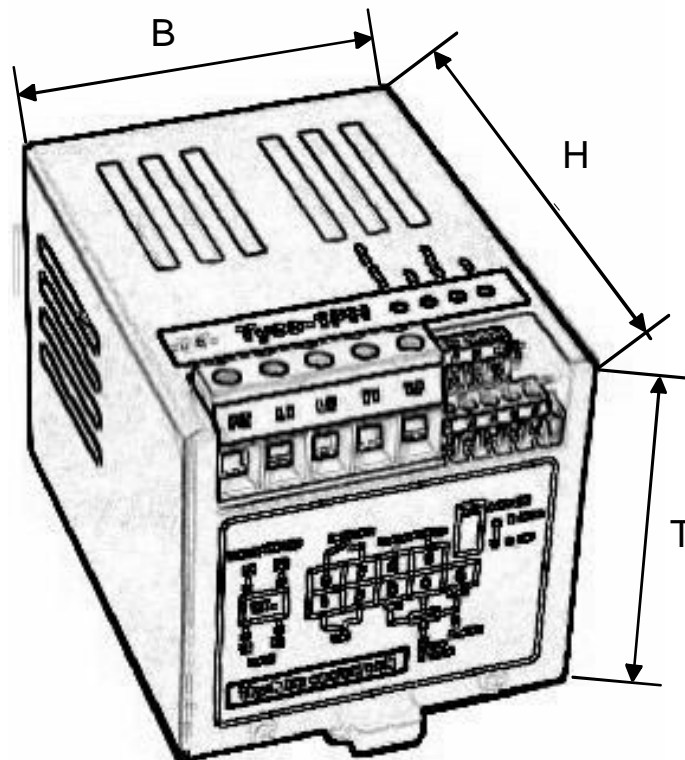
Type	Maximal Load current [A]	Recommended semi-conductor protection[A]	Power protection [A]	Recommended cross-section [mm ²]	Weight [kg]	Dimensions T x H x B [mm]
TS3 (SP) 1ph 15A	15	25	25	2,5	1,1	92x125x90
TS3 (SP) 1ph 25A	25	30	32	4	1,1	92x125x90
TS3 (SP) 1ph 35A	35	40	50	6	1,1	92x125x90
TS3 (SP) 1ph 50A	50	60	80	10	1,1	92x125x90

*Subject to errors and technical alterations

The maximum operation temperature amounts to 50°C.

The values mentioned are relating to a nominal operating voltage of 3x400V AC.

The values mentioned for the load are valid for an ambient temperature of 40°C and a mounting height of max. 1000m.



8. Technical Data

Type:	TS3 (SP) 1ph 15A	TS3 (SP) 1ph 25A	TS3 (SP) 1ph 35A	TS3 (SP) 1ph 50A
Power supply	230VAC			
Load current	15A	25A	35A	50A
Supply voltage	Internal production			
Frequency	45Hz – 65Hz, self-synchronisation			
Inputs	0...10V, 0...20mA, Potentiometer connection: 2,5....10kΩ Switchable input impedance: 500Ω, 50kΩ			
Protection function	Thermal temperature switch-off by indication of LED: „Fault“			
LED-Display	Auxiliary Voltage (Hilfsspannung), Start, 100% Uload, Fault (Störung)			
Outputs	Fault message: Clamps 6, 7 closed, Load: 2A, 230V AC, AC1			
Power connection	L1 and L2 Input voltage; T1 and T2 Output voltage			
Control	Phase angle control respect. Oscillation control package (SP)			
Dissipation	1,1W per Ampere			
Ambient temperature	Operation: 0 to 45°C Storage: -10 to 70°C			
Air humidity	5% to 95% relative humidity, non-condensing			
Environment	Dry non-conductive environment			
Max. mounting height	1000m over NN			
Weight	1,1kg	1,1kg	1,1kg	1,1kg
Protection	IP 40			
Dimensions	DxHxW = 92x125x90mm			
Mounting	on DIN-rail system (alternative mounting possibility with mounting plates)			
CE-sign	Accord. to European low-voltage directive 73/23/EEC and EMV directive 89/336 EWG for industrial applications			

*subjected to errors and technical alterations

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