

Thyristor Switches

Reversing Thyristor Switches



TSK 701 to TSK 744



These products are intended for industrial use and comply with the requirements of EC Directive 89/336/EEC. (Directive of the Council for Harmonisation of Legislation of the Member States Concerning Electromagnetic Compatibility, amended by RL 91/263/EEC, 92/31/EEC and 93/68/EEC of the Council).

Subject to technical changes without prior notice. For installation and commissioning, the applicable regulations and requirements must be observed. No warranty can be given.

Note:

This application makes reference to technical requirements to be particularly observed by the user.

Caution:

Information under this heading must be exactly observed to prevent danger to persons.

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Function

Application and features

Thyristor switches and reversing thyristor switches are connecting links between control and power circuits.

Thyristor switches are used as electronic relays for switching loads on single or three-phase a.c. systems.

Reversing thyristor switches are for switching three-phase reversing drives.

Via „clockwise“ and „anti-clockwise“ control commands, the sense of rotation of the three-phase voltage is varied at the device output, so that the motors can be operated both clockwise and anti-clockwise.

Description

The thyristor switches and reversing thyristor switches are compact devices designed for mounting on top-hat rails according to DIN EN 50022. All indicating and control elements are arranged at the front of the device.

Incorporated are fuses for the load circuit, which are accessible from the front.

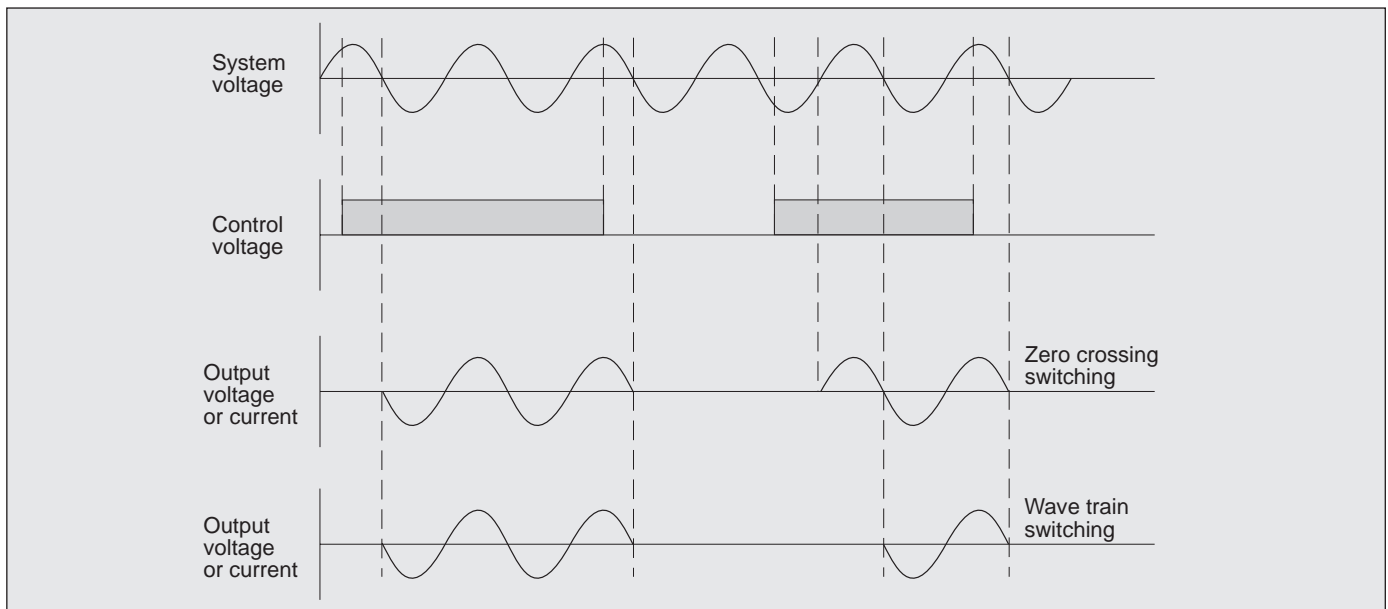
Connection of load takes place contactless and therefore wear-free at voltage zero, disconnection takes place at current zero, so that disturbances and current peaks are avoided.

Available for inductive loads are devices which employ wave train switching; switched are full sine waves which always begin with the same half-wave. Disconnection takes place at current zero of the reverse half-wave.

By employing wave train switching, inductive loads are subject to a normal remagnetising cycle on reconnection and can be switched without significant peak inrush currents.

In addition to switching output voltages, the reversing thyristor switches are suitable for a variety of other functions, depending on the device type, for example:

- Contactless and therefore wear-free electric motor braking after reversing or switching
- Motor temperature monitoring in conjunction with PTC thermocouples and signal output on exceeding critical values
- Protection against phase-to-phase short circuits as a result of minimum dead times when changing direction of rotation
- Mutual interlock of direction of rotation commands
- Inclusion of limit position signals in the control process
- Inhibiting of direction of rotation commands via external signal
- Separate input channels for manual and automatic mode, selectable via external signal
- Manual output control via simulation plugs for clockwise and anti-clockwise rotation
- Relay outputs for direction of rotation (clockwise, anti-clockwise), fault and limit position signals
- Provision of an auxiliary voltage for control inputs



Zero crossing and wave train switching

Thyristor switches

Type	TSK 701	TSK 702	TSK 703	TSK 721	TSK 722	TSK 723
Operating voltage	1 AC 24 V up to 400 V	3 AC 24 V up to 400 V	3 AC 24 V up to 400 V	1 AC 230 V	3 AC 400 V	3 AC 400 V
Switching functions						
• single-phase	x			x		
• two-phase		x			x	
• three-phase			x			x
Output continuous current per phase at 50°C	4,2 A	2,5 A	1,7 A	4,2 A	2,5 A	1,7 A
Control voltage	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Zero crossing switching	x	x	x			
Wave train switching				x	x	x
Housing width	45 mm	90 mm	90 mm	45 mm	90 mm	90 mm

Reversing thyristor switches

Type	TSK 742	TSK 743	TSK 744
Operating voltage	3 AC 400 V		
Switching function	400 V, 2 x two-phase (clockwise, anti-clockwise)		
Output continuous current per phase at 50°C	2,5 A		
Control voltage	24 V DC		
Wave train switching	x		
Zero crossing switching		x	x
Inputs for limit position signals			x
Manual or automatic mode			x
Clockwise, anti-clockwise simulation			x
Electric motor brake			x
Motor temperature monitoring			x
Additional relay outputs for signalling			
• Fault		x	
• Clockwise, anti-clockwise, fault			x
• Limit switch, motor limiting temperature			x
Housing width	90 mm	90 mm	135 mm

TSK 701 Thyristor switch



TSK 701 Thyristor switch

Function

The TSK 701 is controlled with a control voltage (24 V DC). The control input is electrically isolated from the system voltage.

The phase is switched, the neutral is looped through. Connection of load takes place at voltage zero, disconnection at current zero, so that disturbances and current peaks are avoided.

Connection and disconnection can take place at every zero crossing (zero crossing switching).

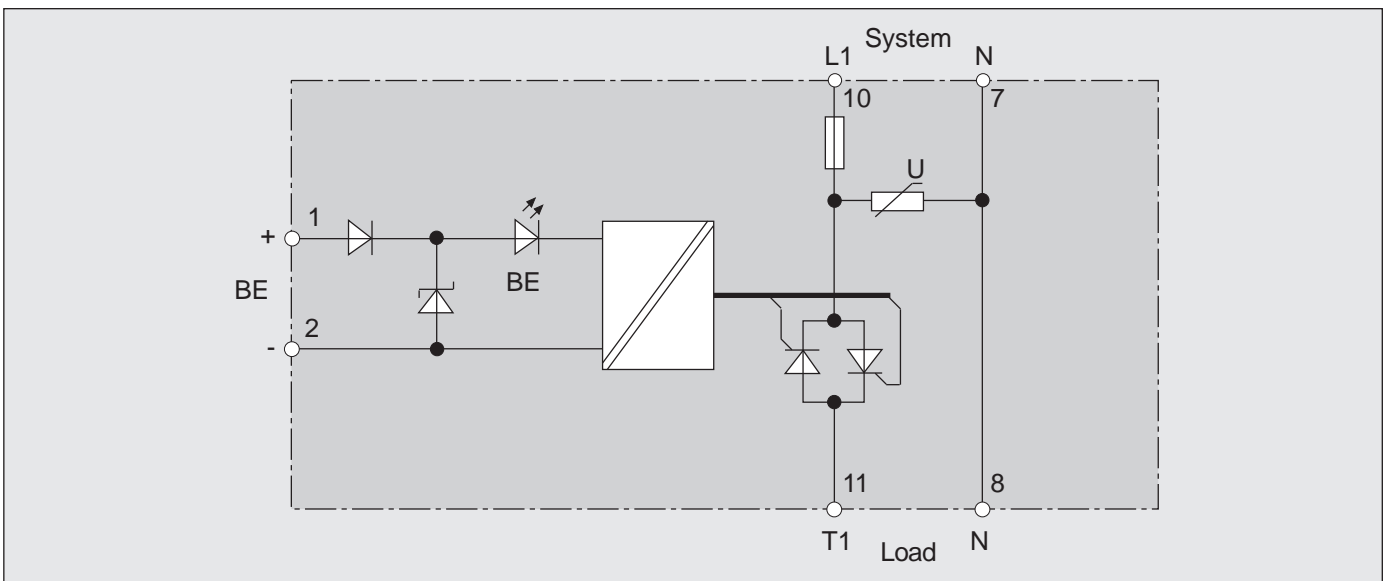
Note:

In the case of inductive loads, high peak inrush currents can occur as a result of unfavourable premagnetisation. This is avoided with the TSK 721 thyristor switch through the switching of entire wave trains.

Incorporated is a fuse for the load circuit, which is accessible from the front. The „BE“ LED display lights when control voltage is applied.

Application

The TSK 701 thyristor switch is an electronic relay for switching loads on a single-phase a.c. system, e.g.. heating, lighting and motors in industrial applications.



Block diagram

Power section

Supply voltage	1 AC 24 V to 400 V
Output voltage	
0-Signal	0 V
1-Signal	As for supply voltage
Rated current	4,2 A
at 45°C or 50% duty cycle	5 A
Minimum load current	0,1 A
Fuse	T 5 A
Back-up fuse	Max. 25 A

Control section

Input signal	+ 24 V DC
0-Signal	- 15 V to + 5 V DC
1-Signal	+ 15 V to + 35 V DC
Input current	About 10 mA at 24 V
Delay	≤ 10 ms

Ambient conditions

Operating temperature range	- 10 °C to + 50 °C
Transport temperature range	- 25 °C to + 70 °C
Storage temperature range	- 25 °C to + 55 °C
Relative air humidity	≤ 75% yearly mean Moisture condensation inadmissible during operation

Electromagnetic compatibility

Emitted interference	DIN EN 50081-1 (3 / 94)
Interference immunity	EN 50082-2 (3 / 95)

Safety parameters

Caution:

The device is not electrically isolated when switched off!

Insulation coordination

DIN VDE 0110	
Control section/power section	Overvoltage category II Pollution severity 2 (corresponds to protective separation through double insulation according to DIN VDE 0160)

Phase/Phase in
Power section

Overvoltage category III
Pollution severity 2

Test voltage

Control section/Power section	2.5 kVrms
Input/output	2.5 kVrms

Mechanical data

Housing type	DIN housing
Dimensions	45 mm x 78 mm x 110 mm Dimension drawing, see page 25
Fixing	Standard mounting rail DIN EN 50022, 35 mm wide
Mounting position	Any, however not suspended
Protection class	IP 40 housing IP 20 connections
Shock-hazard protection DIN VDE 0106, part 100	Safe from finger touch
Max. wire range	1 x 2.5 mm ² solid 2 x 1.5 mm ² solid 2 x 1.5 mm ² flexible with end splice DIN 46228
Oscillation strength	According to DIN IEC 68, part 2-6
Weight	About 270 g

Ordering data

TSK-701 Thyristor switch	
Order number	31 - 99 - 201

TSK 702 Thyristor switch



TSK 702 Thyristor switch

Function

The TSK 702 is controlled with a control voltage (24 V DC). The control input is electrically isolated from the system voltage.

Two of the three phases are switched. The third phase is looped through. For loads without multiple-earthed neutral point, no current flows through the load in a disconnected condition.

Connection of load takes place at voltage zero, disconnection at current zero, so that disturbances and current peaks are avoided.

Connection and disconnection can take place at every zero crossing (zero crossing switching).

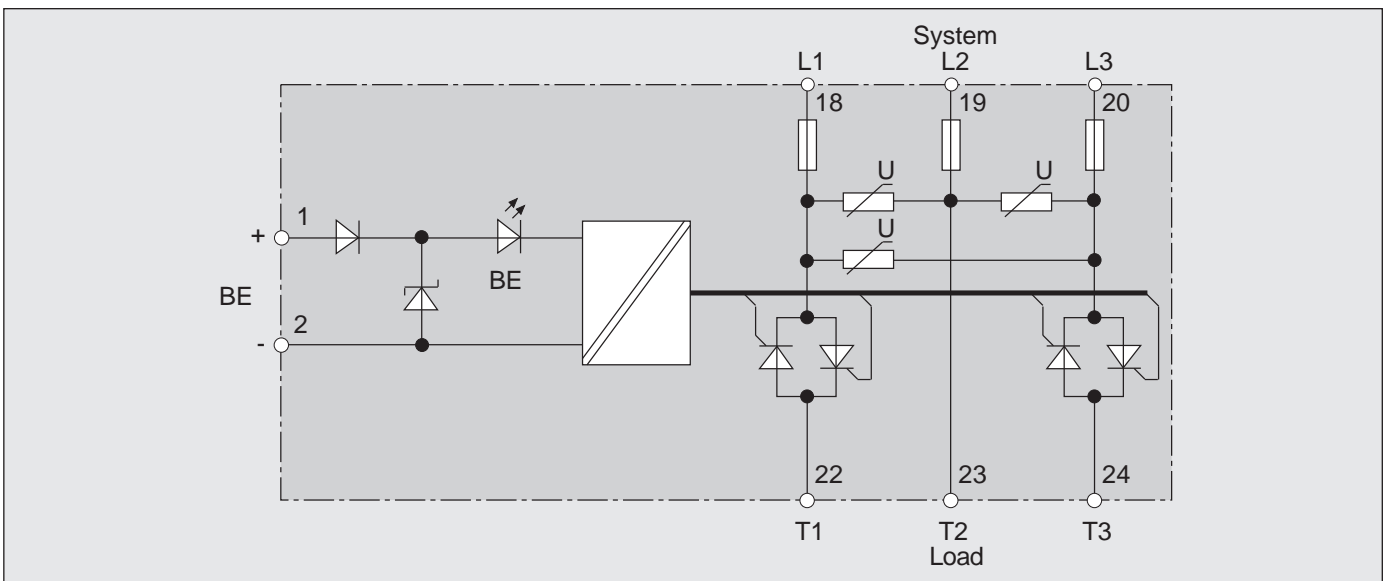
Note:

In the case of inductive loads, high peak inrush currents can occur as a result of unfavourable premagnetisation. This is avoided with the TSK 722 thyristor switch through the switching of entire wave trains.

Integrated in the device is a fuse for the load circuit, which is accessible from the front. The „BE“ LED-display lights when control voltage is applied.

Application

The TSK 702 thyristor switch is an electronic relay for switching loads on a three-phase system, e.g. heating, lighting and motors in industrial applications.



Block diagram

Power section

Supply voltage	3 AC 24 V to 400 V
Output voltage with 0-Signal	Two phases switched 0 V
Output voltage with 1-Signal	As for supply voltage
Rated current	2.5 A
at 50 % duty cycle	5 A
Minimum load current	0.1 A
Fuses	T 3.15 A
Back-up fuse	Max. 25 A

Control section

Input signal	+ 24 V DC
0-Signal	- 15 V to + 5 V DC
1-Signal	+ 15 V to + 35 V DC
Input current	About 10 mA at 24 V
Delay	≤ 10 ms

Ambient conditions

Operating temperature range	- 10 °C to + 50 °C
Transport temperature range	- 25 °C to + 70 °C
Storage temperature range	- 25 °C to + 55 °C
Relative air humidity	≤ 75 % yearly mean Moisture condensation inadmissible during operation

Electromagnetic compatibility

Emitted interference	DIN EN 50081-1 (3/94)
Interference immunity	EN 50082-2 (3/95)

Safety parameters

Caution:

The device is not electrically isolated when switched off

Insulation coordination

DIN VDE 0110

Control section/Power section

Overvoltage category II
Pollution severity 2
(corresponds to protective separation through double insulation according to DIN VDE 0160)

Phase/Phase in Power section

Overvoltage category III
Pollution severity 2

Test voltage

Control section/Power section

2.5 kVrms

Input/output

2.5 kVrms

Mechanical data

Housing type

DIN housing

Dimensions

90 mm x 78 mm x 110 mm
Dimension drawing, see page 25

Fixing

Standard mounting rail
DIN EN 50022, 35 mm wide

Mounting position

Any, however not suspended

Protection class

IP 40 housing

IP 20 connections

Shock-hazard protection

DIN VDE 0106, part 100

Safe from finger touch

Max. wire range

1 x 2.5 mm² solid
2 x 1.5 mm² solid
2 x 1.5 mm² flexible
with end splice DIN 46228

Oscillation strength

According to DIN IEC 68, part 2-6

Weight

About 480 g

Ordering data

TSK 702 Thyristor switch	
Order number	31 - 99 - 202

TSK 703 Thyristor switch



TSK 703 Thyristor switch

Function

The TSK 703 is controlled with a control voltage (24 V DC). The control input is electrically isolated from the system voltage. All three phases are switched.

Connection of load takes place at voltage zero, disconnection at current zero, so that disturbances and current peaks are avoided.

Connection and disconnection can take place at every zero crossing (zero crossing switching).

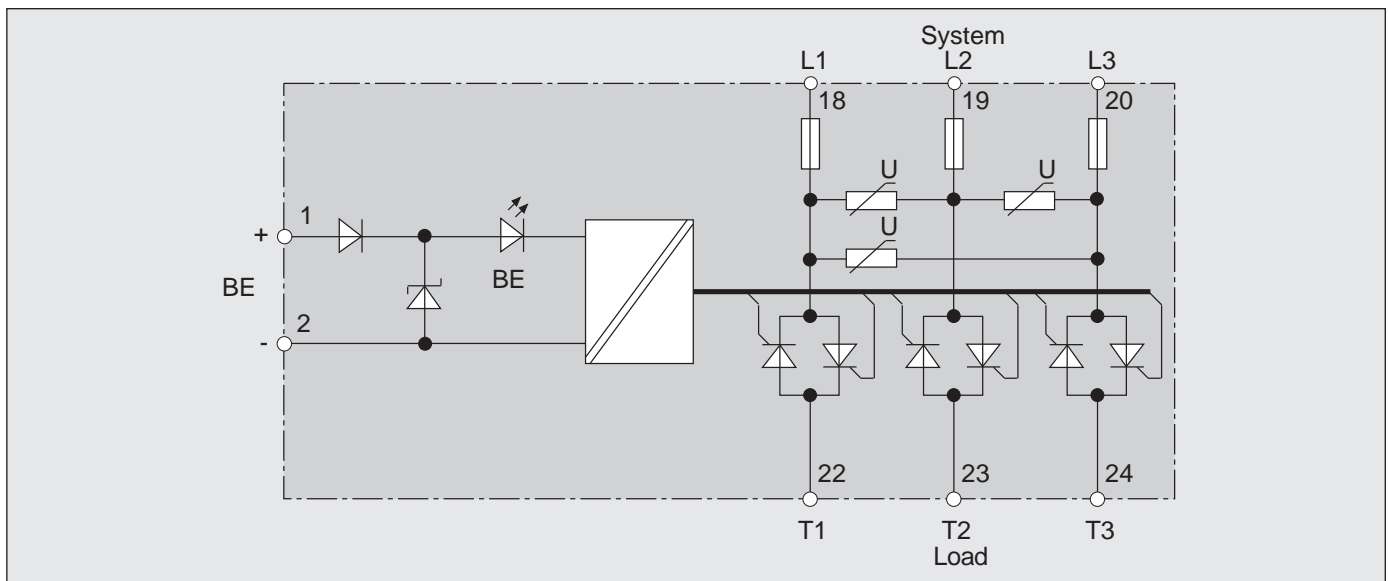
Note:

In the case of inductive loads, high peak inrush currents can occur as a result of unfavourable premagnetisation. This is avoided with the TSK 723 through the switching of entire wave trains.

Incorporated are fuses for the load circuit, which are accessible from the front. The „BE“ LED display lights when control voltage is applied.

Application

The TSK 703 thyristor switch is an electronic relay for switching loads on a three-phase system, e.g. heating, lighting and motors in industrial applications.



Block diagram

Power section

Supply voltage	3 AC 24 V to 400 V
Output voltage with 0-Signal	Three phases switched 0 V
Output voltage with 1-Signal	As for supply voltage
Rated current	1.7 A
at 50 % duty cycle	2.5 A
Minimum load current	0.1 A
Fuses	T 3.15 A
Back-up fuse	Max. 25 A

Control section

Input signal	+ 24 V DC
0-Signal	- 15 V to + 5 V DC
1-Signal	+ 15 V to + 35 V DC
Input current	About 10 mA at 24 V
Delay	≤ 10 ms

Ambient conditions

Operating temperature range	- 10 °C to + 50 °C
Transport temperature range	- 25 °C to + 70 °C
Storage temperature range	- 25 °C to + 55 °C
Relative air humidity	≤ 75 % yearly mean Moisture condensation during operation inadmissible

Electromagnetic compatibility

Emitted interference	DIN EN 50081-1 (3 / 94)
Interference immunity	EN 50082-2 (3 / 95)

Safety parameters

Caution:

The device is not electrically isolated when switched off!

Insulation coordination

DIN VDE 0110	Overvoltage category II
Control section/Power section	Pollution severity 2 (corresponds to protective separation through double insulation according to DIN VDE 0160)

Phase/Phase in Power section

Overvoltage category III
Pollution severity 2

Test voltage

Control section/Power section 2.5 kVrms

Input/output

2.5 kVrms

Mechanical data

Housing type	DIN housing
Dimensions	90 mm x 78 mm x 110 mm Dimension drawing, see page 25
Fixing	Mounting on standard mounting rail DIN EN 50022, 35 mm wide
Mounting position	Any, however not suspended
Protection class	IP 40 housing IP 20 connections
Shock-hazard protection	Safe from finger touch
Max. wire range	1 x 2.5 mm ² solid 2 x 1.5 mm ² solid 2 x 1.5 mm ² flexible with end splice DIN 46228
Oscillation strength	According to DIN IEC 68, part 2-6
Weight	About 520 g

Ordering data

TSK 703 Thyristor switch	
Order number	31 - 99 - 203

TSK 721 Thyristor switch



TSK 721 Thyristor switch

Function

The TSK 721 is controlled with a control voltage (24 V DC). The control input is electrically isolated from the system voltage.

The phase is switched, the neutral is looped through.

Connection of load takes place in full sine waves, which always begin with the same half-wave. The output voltage is disconnected at current zero of the reverse half-wave (wave train switching), so that disturbances and current peaks are avoided.

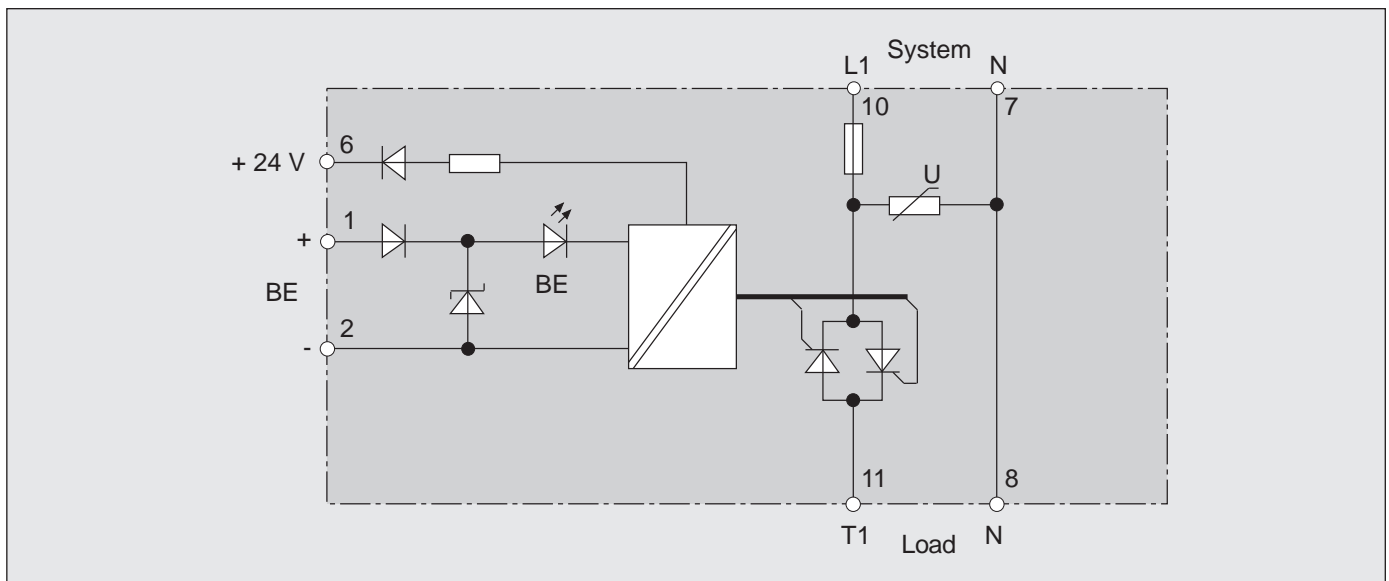
By employing wave train switching, inductive loads are subject to a normal remagnetising cycle and can be switched without significant peak inrush currents.

The auxiliary voltage supplied by the TSK 721 is only intended for use as a control voltage at terminal 1.

Incorporated is a fuse for the load circuit, which is accessible from the front. The „BE“ LED display lights when control voltage is applied.

Application

The TSK 721 thyristor switch is an electronic relay for switching inductive loads on a single-phase a.c. system in industrial applications.



Block diagram

Power section

Supply voltage	1 AC 230 V
Permissible tolerance	- 10 % to + 10 %
Output voltage	
0-Signal	0 V
1-Signal	As for supply voltage
Rated current	4.2 A
at 45 °C or	
50 % duty cycle	5 A
Minimum load current	0.1 A
Fuse	
T 5 A	
Back-up fuse	Max. 25 A

Control section

Input signal	+ 24 V DC
0-Signal	- 15 V to + 5 V DC
1-Signal	+ 15 V to + 35 V DC
Input current	≤ 5 mA at 24 V
Delay	
≤20 ms	
Auxiliary voltage for signal input	+ 24 V DC
Load	≤ 5 mA

Ambient conditions

Operating temperature range	- 10 °C to + 50 °C
Transport temperature range	- 25 °C to + 70 °C
Storage temperature range	- 25 °C to + 55 °C
Relative air humidity	≤ 75 % yearly mean
	Moisture condensation inadmissible during operation

Electromagnetic compatibility

Emitted interference	DIN EN 50081-1 (3 / 94)
Interference immunity	EN 50082-2 (3 / 95)

Safety parameters

Caution:

The device is not electrically isolated when switched off!!

Insulation coordination

DIN VDE 0110

Control section/Power section

Overvoltage category II
Pollution severity 2
(corresponds to protective separation through double insulation according to DIN VDE 0160)

Phase/Phase in Power section

Overvoltage category III
Pollution severity 2

Phase/Phase in Power section

Overvoltage category III
Pollution severity 2

Test voltage

Control section/Power section

2.5 kV/rms

Input/output

2.5 kV/rms

Mechanical data

Housing type

DIN housing

Dimensions

45 mm x 78 mm x 110 mm
Dimension drawing, see page 25

Fixing

Standard mounting rail
DIN EN 50022, 35 mm wide

Mounting position

Any, however not suspended

Protection class

IP 40 housing

IP 20 connections

Shock-hazard protection

DIN VDE 0106, part 100

Safe from finger touch

Max., wire range

1 x 2.5 mm² solid
2 x 1.5 mm² solid
2 x 1.5 mm² flexible
with end splice DIN 46228

Oscillation strength

According to DIN IEC 68,
part 2-6

Weight

About 350 g

Ordering data

TSK 721 Thyristor switch

Order number

31 - 99 - 221

TSK 722 Thyristor switch



TSK 722 Thyristor switch

Function

The TSK 722 is controlled with a control voltage (24 V DC). The control input is electrically isolated from the system voltage.

Two of the phases are switched. The third phase is looped through. For loads without multiple-earthed neutral point, no current flows through the load in a disconnected condition.

Connection of load takes place in full sine waves, which always begin with the same half-wave. The output voltage is disconnected at current zero of the reverse half-wave (wave train switching), so that disturbances and current peaks are avoided.

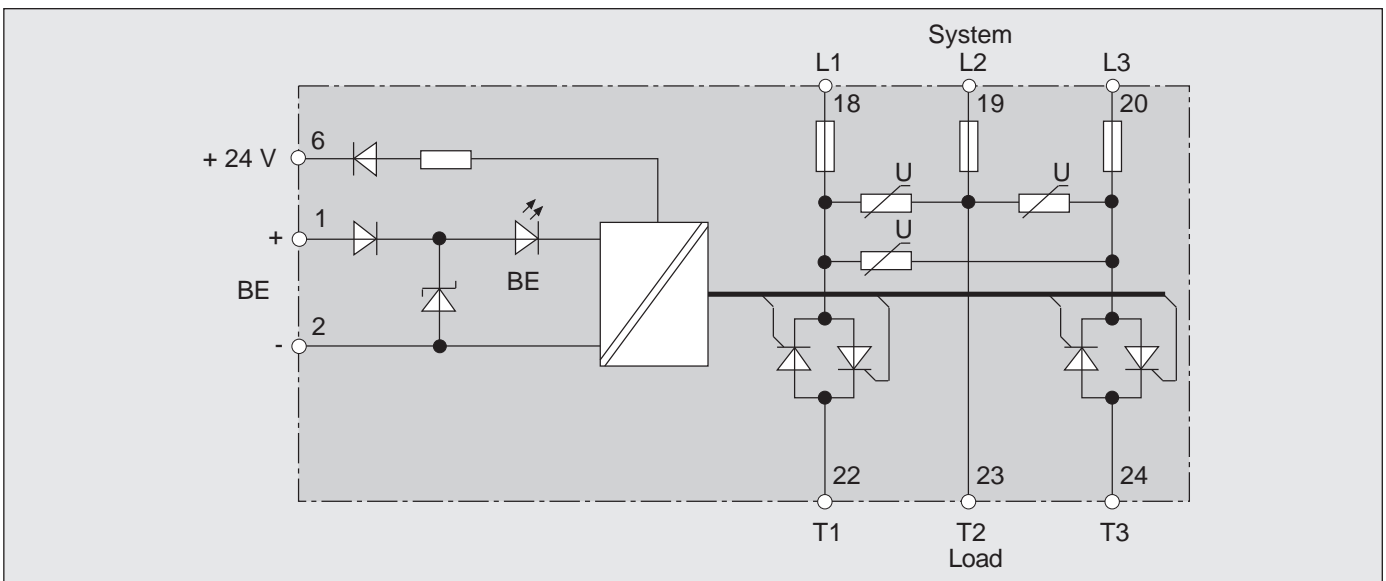
By employing wave train switching, inductive loads are subject to a normal remagnetising cycle and can be switched without significant peak inrush currents.

The auxiliary voltage supplied by the TSK 722 is only intended for use as a control voltage at terminal 1.

Incorporated is a fuse for the load circuit, which is accessible from the front. The „BE“ LED display lights when control voltage is applied.

Application

The TSK 722 thyristor switch is an electronic relay for switching inductive loads on a three-phase system in industrial applications.



Block diagram

Power section

Supply voltage	3 AC 400 V
Permissible tolerance	- 10% to + 10%
Output voltage	Two phases switched
0-Signal	0 V
1-Signal	As for voltage supply
Rated current	2.5 A
at 50 % duty cycle	5 A
Minimum load current	0.1 A
Fuses	T 3.15 A
Back-up fuse	Max. 25 A

Control section

Input signal	+ 24 V DC
0-Signal	- 15 V to + 5 V DC
1-Signal	+ 15 V to + 35 V DC
Input current	≤ 5 mA at 24 V
Delay	≤ 20 ms
Auxiliary voltage for signal input Load	+ 24 V DC ≤ 5 mA

Ambient conditions

Operating temperature range	- 10 °C to +50 °C
Transport temperature range	- 25 °C to +70 °C
Storage temperature range	- 25 °C to +55 °C
Relative air humidity	≤ 75 % yearly mean Moisture condensation inadmissible during operation

Electromagnetic compatibility

Emitted interference	DIN EN 50081-1 (3/94)
Interference immunity	EN 50082-2 (3/95)

Safety parameters

Caution:

The device is not electrically isolated when switched off!

Insulation coordination

DIN VDE 0110

Control section/Power section

Overtoltage category II
Pollution severity 2
(corresponds to protective separation through double insulation according to DIN VDE 0160)

Phase/Phase in Power section

Overtoltage category III
Pollution severity 2

Test voltage

Control section/Power section

2.5 kVrms

Input/output

2.5 kVrms

Mechanical data

Housing type

DIN housing

Dimensions

90 mm x 78 mm x 110 mm
Dimension drawing, see page 25

Fixing

Standard mounting rail
DIN EN 50022, 35 mm wide

Mounting position

Any, however not suspended

Protection class

IP 40 housing

IP 20 connections

Shock-hazard protection
DIN VDE 0106, part 100

Safe from finger touch

Max. wire range

1 x 2.5 mm² solid
2 x 1.5 mm² solid
2 x 1.5 mm² flexible
with end splice DIN 46228

Oscillation strength

According to DIN IEC 68,
part 2-6

Weight

About 560 g

Ordering data

TSK 722 Thyristor switch

Order number

31 - 99 - 222

TSK 723 Thyristor switch



TSK 723 Thyristor switch

Function

The TSK 723 is controlled with a control voltage (24 V DC). The control input is electrically isolated from the system voltage.

All three phases are switched.

Connection of load takes place in full sine waves, which always begin with the same half-wave. The output voltage is disconnected at current zero of the reverse half-wave (wave train switching), so that disturbances and current peaks are avoided.

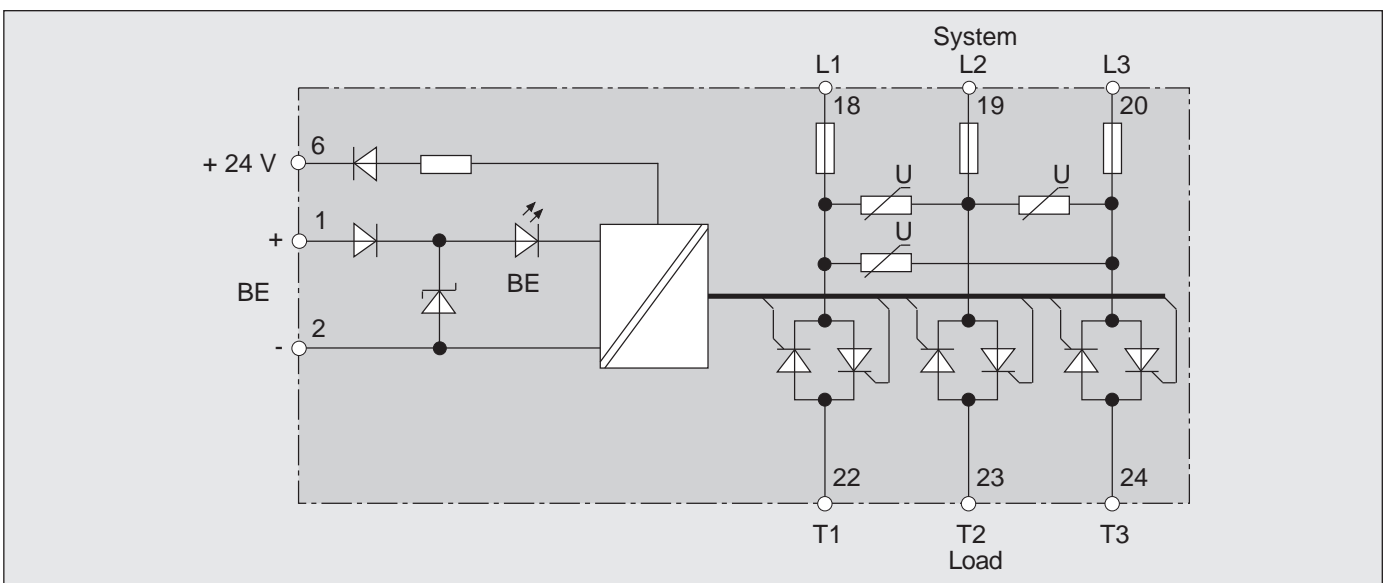
By employed wave train switching, inductive loads are subject to a normal remagnetising cycle and can be switched without significant peak inrush currents.

The auxiliary voltage supplied by the TSK 723 is only intended for use as a control voltage at terminal 1.

Incorporated are fuses for the load circuit, which are accessible from the front. The „BE“ LED display lights when control voltage is applied.

Application

The TSK 723 thyristor switch is an electronic relay for switching inductive loads on a three-phase system in industrial applications.



Block diagram

Power section

Supply voltage	3 AC 400 V
Permissible tolerance	- 10 % to + 10 %
Output voltage	
0-Signal	0 V
1-Signal	As for supply voltage
Rated current	1.7 A
at 50 % duty cycle	2.5 A
Minimum load current	0.1 A
Fuses	T 3.15 A
Back-up fuse	Max. 25 A

Control section

Input signal	+ 24 V DC
0-Signal	- 15 V to + 5 V DC
1-Signal	+ 15 V to + 35 V DC
Input current	≤ 5 mA at 24 V
Delay	≤ 20 ms
Auxiliary voltage for signal input Load	+ 24 V DC ≤ 5 mA

Ambient conditions

Operating temperature range	- 10 °C to + 50 °C
Transport temperature range	- 25 °C to + 70 °C
Storage temperature range	- 25 °C to + 55 °C
Relative air humidity	≤ 75 % yearly mean Moisture condensation inadmissible during operation

Electromagnetic compatibility

Emitted interference	DIN EN 50081-1 (3/94)
Interference immunity	EN 50082-2 (3/95)

Safety parameters

Caution:

The device is not electrically isolated when switched off!

Insulation coordination

DIN VDE 0110	Overvoltage category II
Control section/Power section	Pollution severity 2 (corresponds to protective separation through double insulation according to DIN VDE 0160)

Phase/Phase in Power section	Overvoltage category III Pollution severity 2
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Test voltage	
Control section/Power section	2.5kVrms
Input/output	2.5kVrms

Mechanical data

Housing type	DIN housing
Dimensions	90 mm x 78 mm x 110 mm Dimension drawing, see page 25

Fixing	Standard mounting rail DIN EN 50022, 35 mm wide
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Mounting position	Any, however not suspended
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Protection class	IP 40 housing IP 20 connections
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Shock-hazard protection	
DIN VDE 0106, part 100	Safe from finger touch

Max. wire range	1 x 2.5 mm ² solid 2 x 1.5 mm ² solid 2 x 1.5 mm ² flexible with end splice DIN 46228
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Oscillation strength	According to DIN IEC 68, part 2-6
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Weight	About 600 g
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Ordering data

TSK 723 Thyristor switch	
Order number	31 - 99 - 223

TSK 742 Reversing thyristor switch



TSK 742 Reversing thyristor switch

Function

When control voltage (24 V DC) is applied, two phases of the three-phase system are applied to the device output. The third phase is looped through. The direction of rotation is determined by the control signals „clockwise“ RL and „anti-clockwise“ LL, which are internally mutually interlocked.

Starting of the motor takes place in full sine waves, which always begin with the same half-wave. The output voltage is disconnected at current zero of the reverse half-wave (wave train switching), so that disturbances and current peaks are avoided.

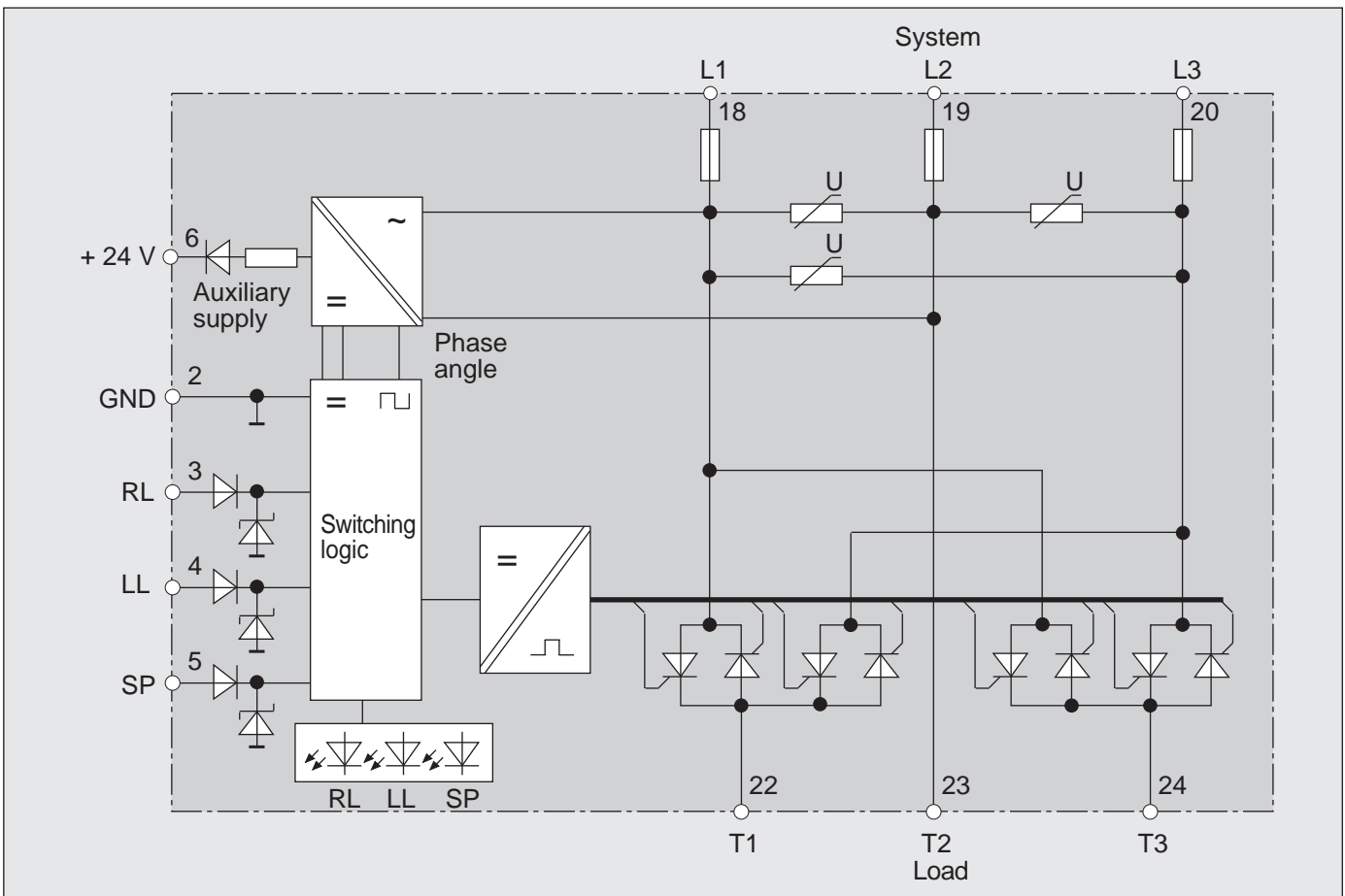
By employed wave train switching, inductive loads are subject to a normal remagnetising cycle on reconnection and can be switched without significant peak inrush currents.

By applying a blocking signal SP (e.g. of limit switches), the output voltage can also be blocked with an input signal applied. The auxiliary voltage supplied by the device is only intended for use as a control voltage at terminals 3, 4 or 5.

Incorporated are fuses for the load circuit, which are accessible from the front. The direction or rotation and application of the blocking signals are indicated by LED displays.

Application

The TSK 742 reversing thyristor switch is preferably used for directional switching of three-phase motors in industrial applications.



Block diagram

Power section

Supply voltage	3 AC 400 V
Permissible tolerance	- 10% to + 10%
Output voltage	Clockwise, anti-clockwise
0-Signal	0 V
1-Signal	As for supply voltage
Rated current	2.5 A
at 50 % duty cycle	5 A
Minimum load current	0.1 A
Fuses	T 3.15 A
Back-up fuse	Max. 25 A

Control section

Inputs	RL, LL, SP: + 24 V DC
0-Signal	- 15 V to + 5 V DC
1-Signal	+ 15 V to + 35 V DC
Input current	≤ 5 mA at 24 V
Delay	≤ 20 ms
Auxiliary voltage for signal inputs	+ 24 V DC
Load	≤ 5 mA

Ambient conditions

Operating temperature range	- 10 °C to + 50 °C
Transport temperature range	- 25 °C to + 70 °C
Storage temperature range	- 25 °C to + 55 °C
Relative air humidity	≤ 75% yearly mean Moisture condensation is inadmissible during operation

Electromagnetic compatibility

Emitted interference	DIN EN 50081-1 (3/94)
Interference immunity	EN 50082-2 (3/95)

Safety parameters

Caution:

The device is not electrically isolated when switched off!

Insulation coordination

DIN VDE 0110

Control section/Power section

Overvoltage category II
Pollution severity 2
(corresponds to protective separation through double insulation according to DIN VDE 0160)

Phase/Phase in Power section

Overvoltage category III
Pollution severity 2

Test voltage

Control section/Power section

Input/output

2.5 kV/rms

2.5 kV/rms

Mechanical data

Housing type

DIN housing

Dimensions

90 mm x 78 mm x 110 mm
Dimension drawing, see page 25

Fixing

Standard mounting rail
DIN EN 50022, 35 mm wide

Mounting position

Any, however not suspended

Protection class

IP 40 house

IP 20 connections

Shock-hazard protection

DIN VDE 0106, part 100

Safe from finger touch

Max. wire range

1 x 2.5 mm² solid
2 x 1.5 mm² solid
2 x 1.5 mm² flexible
with end splice DIN 46228

Oscillation strength

According to DIN IEC 68,
part 2-6

Weight

About 680 g

Ordering data

TSK 742 Reversing thyristor switch

Order number

31 - 99 - 242

TSK 743 Reversing thyristor switch



TSK 743 Reversing thyristor switch

Function

When control voltage (24 V DC) is applied, two phases of the three-phase system are applied to the device output. The third phase is looped through. The direction of rotation is determined by the control signals „clockwise“ RL and „anti-clockwise“ LL, which are internally mutually interlocked. Connection of the motor takes place at voltage zero, disconnection at current zero, so that disturbances and current peaks are avoided.

Connection and disconnection can take place at every zero crossing (zero crossing switching).

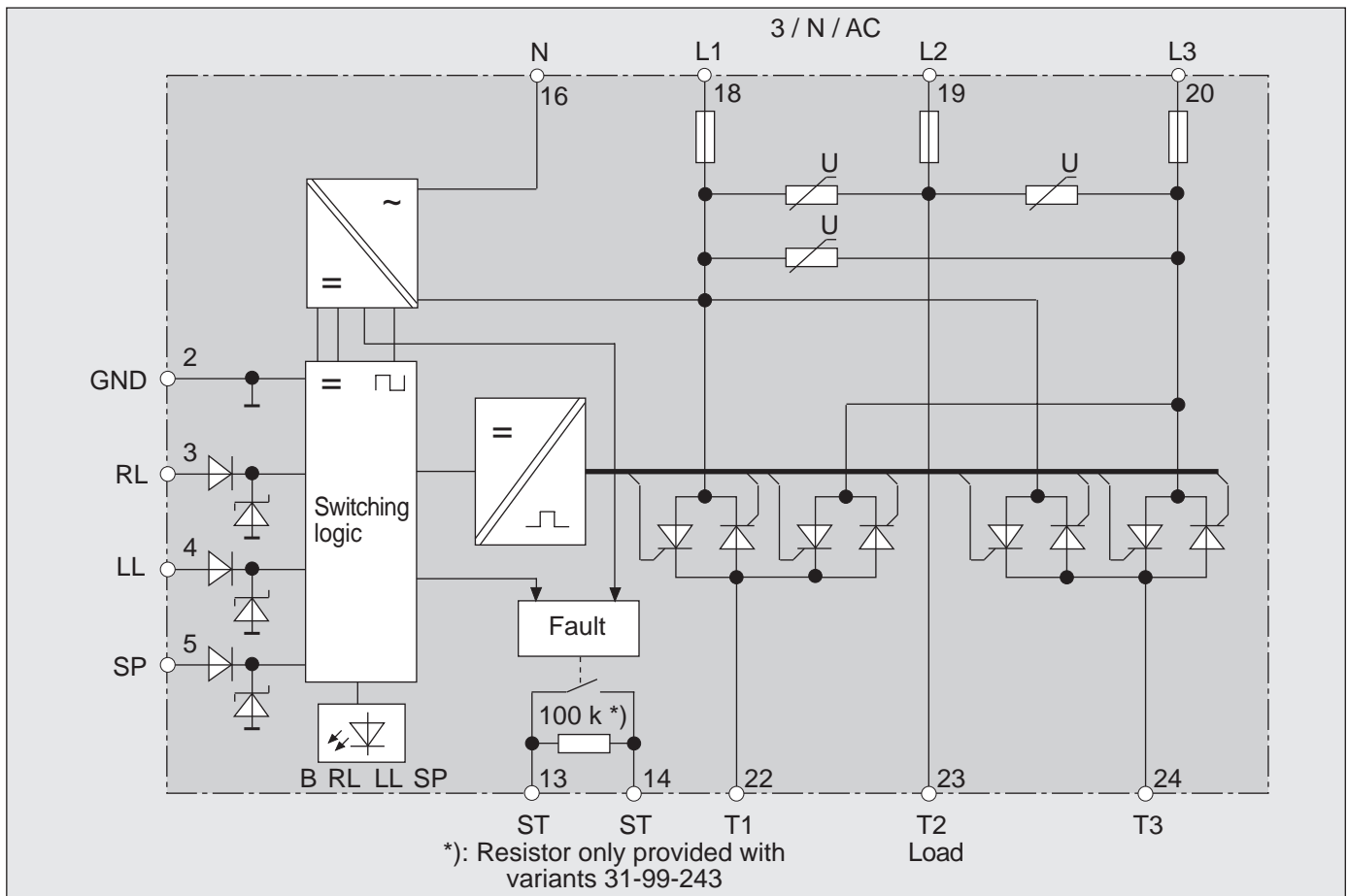
By applying a blocking signal SP (e.g. of limit switches), the output voltage can also be blocked with an input signal applied.

In the event of a voltage failure of more than 3 seconds, the relay contact ST closes.

Incorporated are fuses for the load circuit, which are accessible from the front. Operational readiness, the direction of rotation and application of the blocking signal are indicated by LED displays.

Application

The TSK 743 reverse thyristor switch is preferably used for directional switching of three-phase motors in industrial applications.



Block diagram

Power section

Supply voltage	3/N AC 400 V
Permissible tolerance	- 10 % to + 10 %
Output voltage	Clockwise, anti-clockwise
0-Signal	0 V
1-Signal	As for supply voltage
Rated current	2.5 A
at 50 % duty cycle	5 A
Minimum load current	0,1 A
Fuses	T 3.15 A
Back-up fuse	Max. 25 A

Control section

Inputs	RL, LL, SP: + 24 V DC
0-Signal	- 15 V to + 5 V DC
1-Signal	+ 15 V to + 35 V DC
Input current	≤ 5 mA to 24 V
Delay	≤ 20 ms
Interval between direction of rotations	≤ 0,5 s
Alarm contact ST	Closed in the event of voltage failure > 3 s Variant 31-99-243 bridged with resistor 100 kΩ
Max. switching voltage	DC: 60 V, AC: 100 V
Max. switched current	1 A

Ambient conditions

Operating temperature range	- 10 °C to + 50 °C
Transport temperature range	- 25 °C to + 70 °C
Storage temperature range	- 25 °C to + 55 °C
Relative air humidity	≤ 75 % yearly mean Moisture condensation inadmissible during operation

Electromagnetic compatibility

Emitted interference	DIN EN 50081-1 (3/94)
Interference immunity	EN 50082-2 (3/95)

Safety parameters

Caution:

The device is not electrically isolated when switched off!

Insulation coordination	
DIN VDE 0110	
Control section/Power section separation	Overvoltage category II Pollution severity 2 (correspondence to protective through double insulation according to
	DIN VDE 0160)
Phase/Phase in Power section	Overvoltage category III Pollution severity 2
Test voltage	
Control section/Power section Input/output	2,5 kVrms 2,5 kVrms

Mechanical data

Housing type	DIN housing
Dimensions	90 mm x 78 mm x 110 mm Dimension drawing, see page 25
Fixing	Standard mounting rail DIN EN 50022, 35 mm wide
Mounting position	Any, however not suspended
Protection class	IP 40 housing IP 20 connections
Shock-hazard protection	
DIN VDE 0106, part 100	Safe from finger touch
Max. wire range	1 x 2.5 mm ² solid 2 x 1.5 mm ² solid 2 x 1.5 mm ² flexible with end splice DIN 46228
Oscillation strength	According to DIN IEC 68, part 2-6
Weight	About 720 g

Ordering data

TSK 743 Reversing thyristor switch

Order number	31 - 99 - 2 _ _
Alarm contact protective circuit	
None	45
100 kΩ	43

TSK 744 Reversing thyristor switch



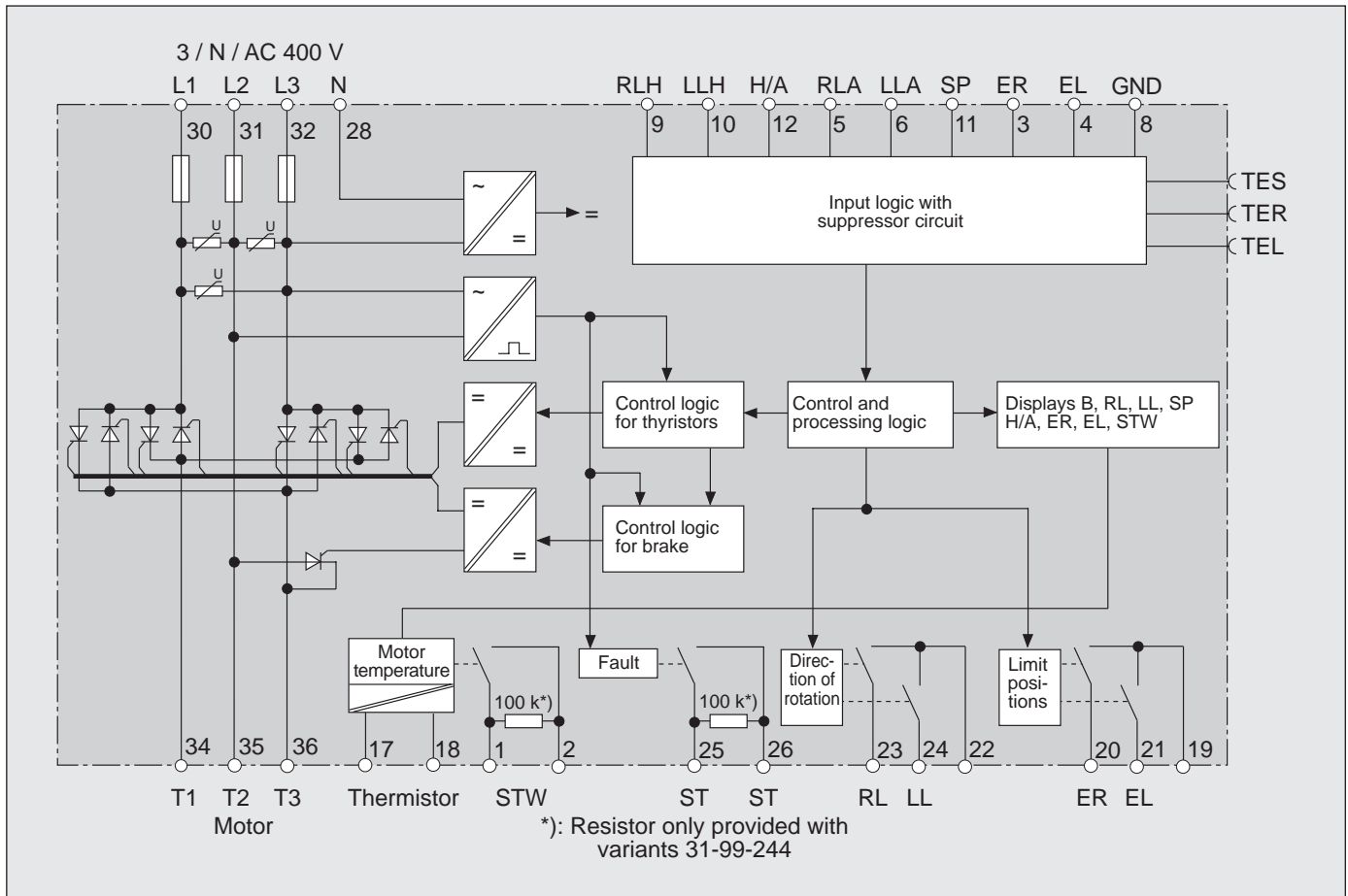
Thyristorwendeswitcher TSK 744

Application

The TSK 744 reversing thyristor switch is preferably used for directional switching and braking of three-phase motors in industrial applications.

Function

- Alternate connection of phases at zero crossing
- Control signals „clockwise“ RL and „anti-clockwise“ LL (internally mutually interlocked) determine the direction of rotation
- Avoidance of disturbances and peak currents through zero crossing switching
- DC brake with variable braking time t_{br} and braking torque M_{br}
- Two selectable channels (manual and automatic) for input signals
- Limit position signals ER, EL block the respective direction of rotation. The blocking signal SP blocks all input signals.
- Simulation in test mode:
 - Control of direction of rotation with plug TER or TEL
 - Insert plug TES; all inputs except limit positions are blocked
- Motor temperature monitoring by means of thermistor or switching sensor
 - LED display and relay signal STW in the event of excessive motor temperature
- Blocking intervals for the prevention of short-circuits between operation and braking, rapid switching between the directions of rotation and after braking.
- Incorporated are fuses for the load circuit, accessible from the front.
- Alarm ST in the event of voltage failure lasting more than three seconds.



Block diagram

Power section

Supply voltage	3/N AC 400 V
Permissible tolerance	- 10 % to + 10 %
Output voltage	Clockwise, anti-clockwise
0-Signal	0V
1-Signal	As for supply voltage
Rated current	2.5 A
at 50 % duty cycle	5 A
Minimum load current	0.1 A
Fuses	T 3.15 A
Back-up fuse	Max. 25 A

Control section

Inputs	
Clockwise automatic mode	RLA
Clockwise manual mode	RLH
Anti-clockwise automatic mode	LLA
Anti-clockwise manual mode	LLH
Limit position right	ER
Limit position left	EL
Manual/Automatic	M/A
Blocking signal	SP
Rated signal voltage	+ 24 V DC
0-Signal	- 15 V to + 5 V DC
1-Signal	+ 15 V to + 35 V DC
Input current	≤ 5 mA at 24 V
Input delay	≤ 20 ms
Changeover delay	About 0,5 s
Braking delay	≤ 50 ms
Alarm relay outputs	
Alarm ST	Closed in the event of voltage failure > 3 s
Alarm „Motor temperature too high“ STW	Thermistor-resistor
Closed	2.5 kΩ to 3.6 kΩ
Open	1.5 kΩ to 2.3 kΩ
Max. switching voltage	DC: 60 V, AC: 100 V
Max. switched current	1 A
	Relay contacts for variant 31-99-244 bridged with resistors 100 kΩ

Relay outputs, direction of rotation and limit positions	
Max. switching voltage	DC: 60 V, AC: 100 V
Max. switched current	1 A

Setting ranges	
Braking time	0 to 10 s
Braking voltage	0 to 170 V DC

Ambient conditions

Operating temperature range	- 10 °C to + 50 °C
Transport temperature range	- 25 °C to + 70 °C
Storage temperature range	- 25 °C to + 55 °C
Relative air humidity	≤ 75 % yearly mean
	Moisture condensation in admissible during operation

Electromagnetic compatibility

Emitted interference	DIN EN 50081-1 (3/94)
Interference immunity	EN 50082-2 (3/95)

Safety parameters

Caution:

The device is not electrically isolated when switched off!

Insulation coordination	
DIN VDE 0110	
Control section/Power section	Overvoltage category II
	Pollution severity 2
	(corresponds to protective separation through double insulation according to DIN VDE 0160)
Phase/Phase in Power section	Overvoltage category III
	Pollution severity 2
Test voltage	
Control section/Power section	2.5 kVrms
Input/output	2.5 kVrms

Technical data TSK 744

Mechanical data

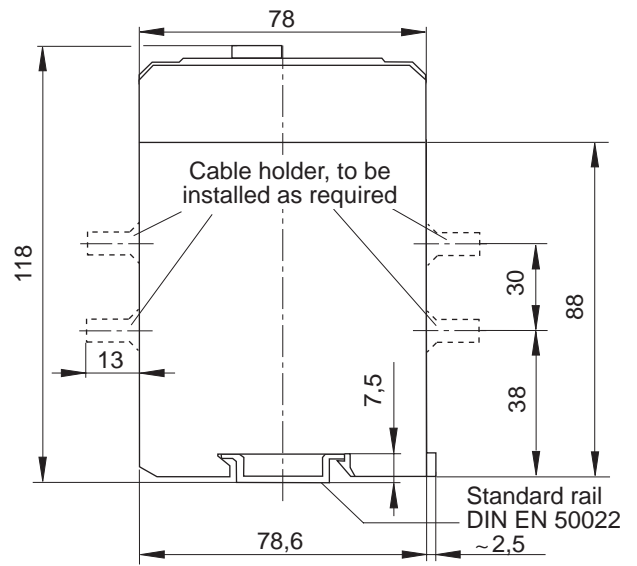
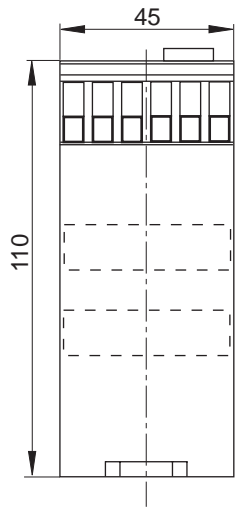
Housing type	DIN housing
Dimensions	135 mm x 78 mm x 110 mm Dimension drawing, see page 25
Fixing	Standard mounting rail DIN EN 50022, 35 mm wide
Mounting position	Any, however not suspended
Protection class	IP 40 housing IP 20 connections
Shock-hazard protection DIN VDE 0106, part 100	Safe from finger touch
Max. wire range	1 x 2.5 mm ² solid 2 x 1.5 mm ² solid 2 x 1.5 mm ² flexible with end splice DIN 46228
Oscillation strength	According to DIN IEC 68, part 2-6
Weight	About 1100 g

Radio interference occurs during motor braking which must be suppressed by means of suitable filters for more than five braking operations per minute.

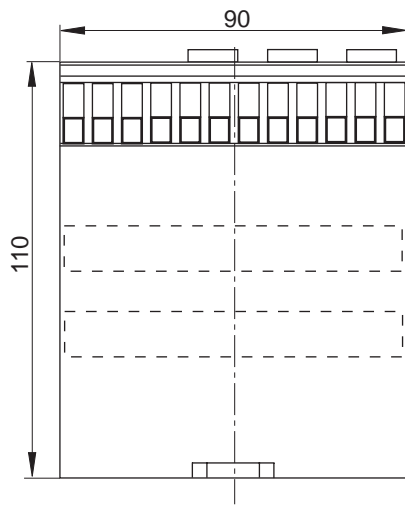
Ordering data TSK 744 Reversing thyristor switch

Order number	31 - 99 - 2
Alarm contact protective circuit	
None	46
100 k Ω	44

Type:
TSK 701
TSK 721



Type:
TSK 702
TSK 703
TSK 722
TSK 723
TSK 742
TSK 743



Type:
TSK 744

