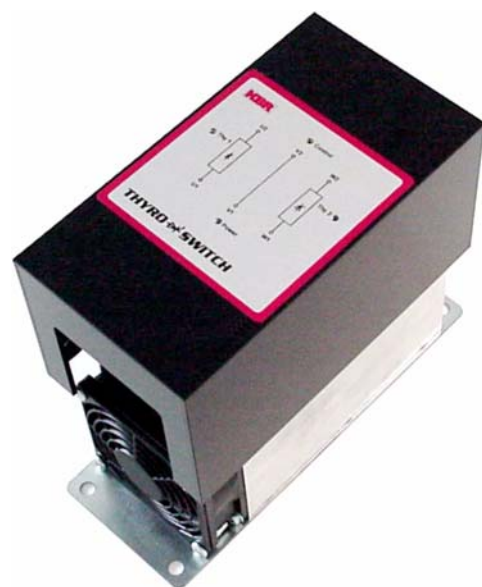


thyro switch

Thyristor switch for
reactive current compensation



Operating Instructions
Technical Parameters

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1 Intended Use

The thyro \neq switch is a power electronics component for connecting capacitive loads to the power network. The device is intended exclusively for installation in switchgear and controlgear. Only reactor-protect compensation stages (up to 14%) can be switched. That means: You must not switch non-reactor-protected compensation stages. First and foremost, symmetrical three-phase current compensation is intended as the application, but it is also possible to switch two separate alternating current compensation stages simultaneously.

Technical Data

Input:

- Control input 10-30V DC max. 30mA
180-260V AC; 50/60Hz max. 20mA
- Fuse protection max. 6A

Supply circuit:

- Auxiliary voltage 230V AC \pm 10% 50/60Hz max. 18VA
- Fuse protection other devices on request
max. 6A

Load circuit:

- Supply voltage U_N 400/500V 50/60Hz Type-specific (see table on page 9)
- Load current 70/90/115A Type-specific (see table on page 9)
- Power dissipation 70A Type approximately 2,2W per A
90/115A-Type approximately 2,1W per A

Application area:

- Creepage distance from control input to main circuit: >10,5mm for SELV-voltage circuits
- Rated voltage $U_N \pm 10\%$
- Harmonic voltage DIN EN 61000-2-4 class 3; THD max. 10%

Switch-on delay:

Control input: - DC: 0 ... max. 20ms

- AC: 10 ... max. 30ms

Switch-off time >5s

Re-make to me:

Control input: - DC: 0 ... max. 33ms

- AC: 10 ... max. 43ms

Electrical safety:

Standards and amendments

- Class of protection I
- Distance EN61010:2001 pollution degree II CAT III
- Degree of protection IP10

Environmental conditions:

- Standards and amendments DIN EN 60721-3-3/A2
(3K5+3Z11)
EC 721-3-3 (3K5+3Z11)
- Operating temperature -5°C... +55°C => Please observe restricted performance depending on the ambient temperature (see page 8)
- Humidity; non-condensing 5%...95%
- Storage temperature -25°C... +70°C

Mounting:

- Mountin position Vertical or horizontal
min. 50mm to the ventilator and
min.150mm to gate cooler
- Cooling distances 220 x 105 x 188mm (H x W x D)
220 x 105 x 198mm (type 115A)

Housing:

220 x 105 x 188mm (H x W x D)
220 x 105 x 198mm (type 115A)
approximately 2900g
approximately 3600g (type 115A)

Weight:


2 Safety Notes


Due to the design with forced cooling, that is with the use of a fan, unimpeded air intake must in particular be guaranteed. The cooling openings must not be covered up. The distances specified from neighboring components must be observed. For nominal load, there is an increase in temperature between fresh air and exhaust air of max. 30°C for type 70A and of 35°C for type 100A. Temperature sensitive components such as cable ducts should be protected by cowls.


For nominal load, there is an increase in temperature between fresh air and exhaust air of:


- max. 52°C for type 115A,
- max. 40°C for type 90A and
- max. 35°C for type 70A.

Temperature sensitive components such as cable ducts have to be protected accordingly.


The thyro  switch may only be operated with a series-connected power disconnecting device.


The thyro  switch cannot function alone as a component and must be project-planned for use with a compensation unit.

For detuned units, it is absolutely essential that the thyro  switch 3P is connected upstream to the inductor and capacitor.

The thyro  switch may only be deployed in the context of its intended use. Even when used only as intended, a defect cannot be ruled out. In this case the currents and voltages in the load circuit could be affected. In case of an error, the following cases are possible: Current interruption, half-wave operation or constant energy flow. Correct design of protective devices must therefore be ensured during project planning.

Incorrect operation or wrong connections could lead to destruction of the device or the load.


The thyro  switch may only be connected with insulated crimping cable lugs.

Work such as assembly, maintenance and servicing may only be performed by skilled electricians. As soon as the thyro  switch is connected to the power supply system, the capacitive load is charged to network peak voltage. In addition a phase is connected directly to the load. This means that the load is under voltage, even when switched off, and remains connected to the power supply. When working on the load, disconnection from the network must be made under all circumstances. ***Danger to life!***

Even after disconnection from the network, a residual charge remains in the capacitive load. Before working on the equipment, it must be checked that the capacitors are isolated from the supply. The discharge time of the capacitors must be taken into account.

Note: Power capacitors must be equipped with permanently connected discharge devices and be discharged within five minutes to a residual charge of 50µC at most, or to a voltage of 60V. If this has a disturbing effect on the function of the electrical equipment, a warning sign must be put up in a clearly visible position stating that the discharge time is longer than five minutes. If it is possible to come into contact with the voltage of the capacitors, with the correct use of connectors, and these connectors can be pulled off without the use of tools, the discharge must be complete within one minute (See EN 50178, Section 5.2.5).

For the design of the discharge equipment it must be remembered that capacitors when switched off are charged to a direct voltage at the level of the network peak voltage.

The parallel operation of facilities with conventional protective relaying and semiconductor technology is only possible for reactor-protected equipment. Otherwise the thyro  switch could be destroyed by the effects of charge transfer.

3 Areas of Application

The thyro \rightarrow switch is intended in particular for facilities with frequent and rapidly changing reactive power loads. The advantages of the thyro \rightarrow switch compared to conventional technology are:


- High switching speed
- Switching behavior with low system pollution
- Switching with no wearing parts
- Long working life through practically unlimited frequency of operations

Areas of application:

- Crane equipment
- Lifts
- Welding equipment
- Molding
- Wind turbines


The power switch can be operated in conjunction with VAr controllers, memory-programmable controls, computer systems and process control units.

4 Installation

The thyro  switch can be installed horizontally or vertically. The integrated fan controls the air flow, so that nearly all the warm air produced is emitted in one direction. At maximum load, a temperature increase of max. 30°C for type 70A and of 35°C for type 100A can be expected. If temperature sensitive components are used, such as cable ducts, it is possible that cowls must be provided.

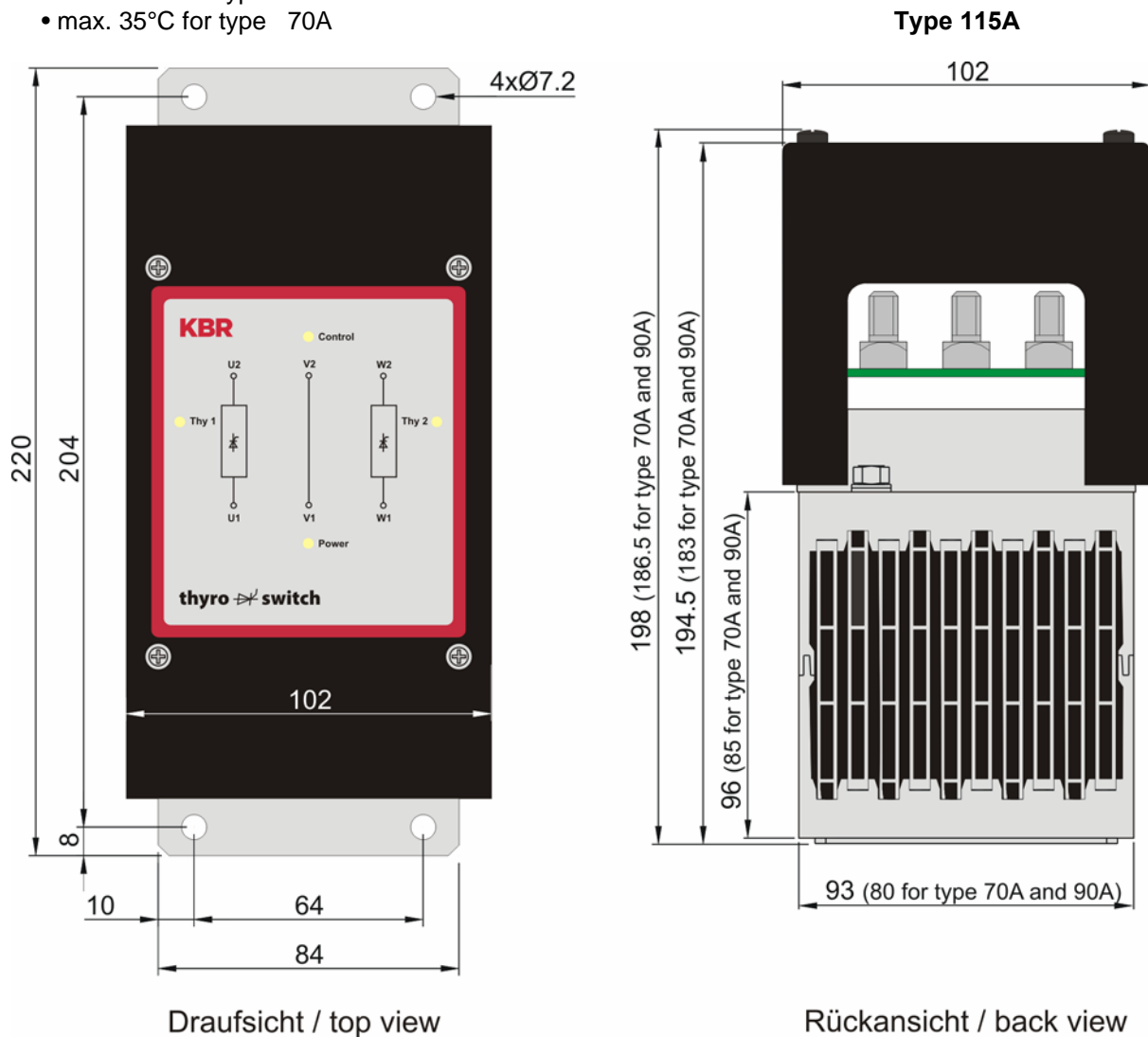
Temperature sensitive components installed in the vicinity have to be protected accordingly. The safe distances specified must be observed.

- Fan side: >50mm
- Heat sink outlet: >150mm

With vertical installation it must be ensured that warm air is always emitted upwards. When installing several thyro  switch on top of one another, cowls should be used.

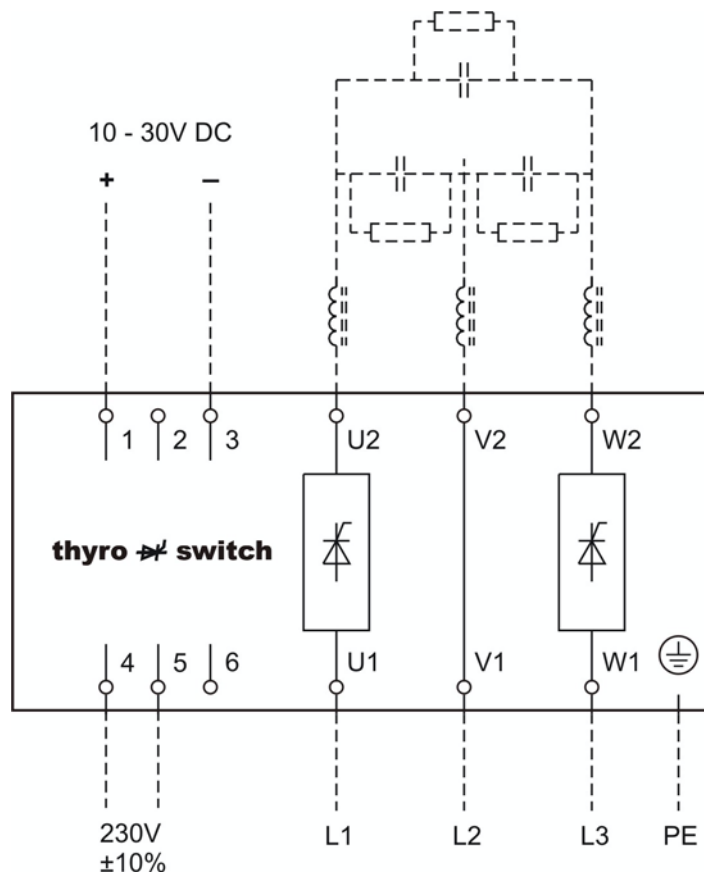
For nominal load, there is an increase in temperature between fresh air and exhaust air of:

- max. 52°C for type 115A
- max. 40°C for type 90A
- max. 35°C for type 70A

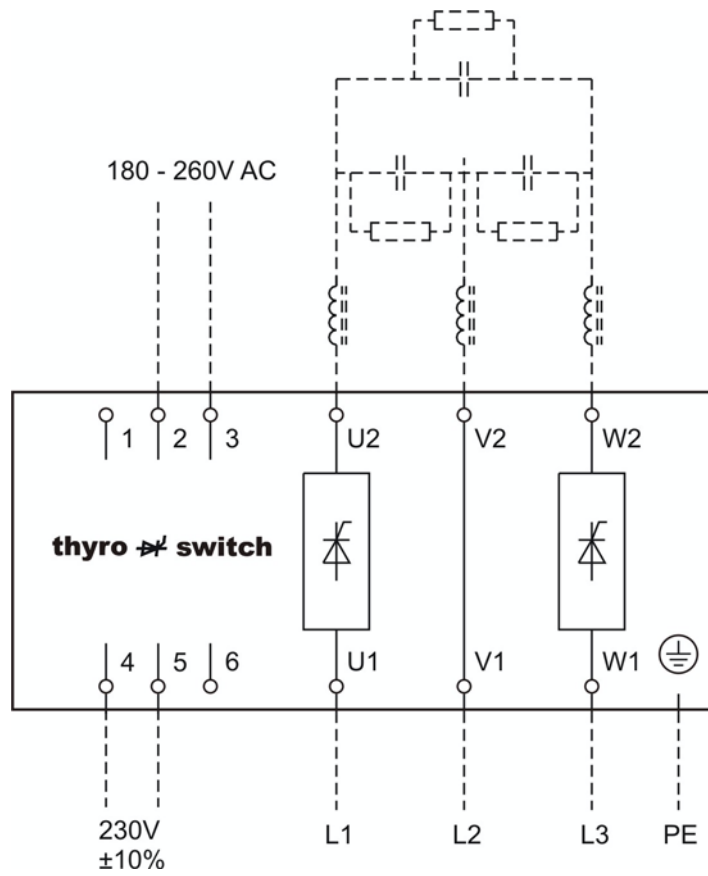


5 Connection


DC gating:




AC gating:



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For the connection of the load current with **insulated** crimping cable lugs with 8mm rings, terminal studs are envisaged that must be tightened with a torque of 5.5 - 6Nm. The cable lugs must be exactly vertical to the conducting plate. When laying leads, you should ensure that the connection leads are not heated up directly by the exhaust from the heat sinks. As load fuses, fuse units for the protection of semiconductors must be used. Project planning of their size must be made according to the connected capacitive load. You must ensure that the equipment grounding conductor is connected correctly. The equipment grounding conductor connection in the form of an M6 hexagon bolt is located on the heat sink beneath the connections for the capacitor and is labeled with the PE conductor sign .


For reactor-protected equipment it is absolutely essential that the thyro  switch is connected in series before inductor and capacitor.


Terminal 1(+) and 3(-): For gating with 10-30V DC, terminal 1 must be connected to plus and terminal 3 to minus.
(see design: DC gating on page 6)

Terminal 2 and 3: For gating with 180-260V AC 50/60Hz, terminals 2 and 3 must be used.
(see design: AC gating on page 6)

Terminal 4 and 5: The supply voltage 207-253V AC or 100-130V AC with 50 or 60Hz is connected to terminals 4 and 5.
(see design: DC gating and AC gating on page 6)

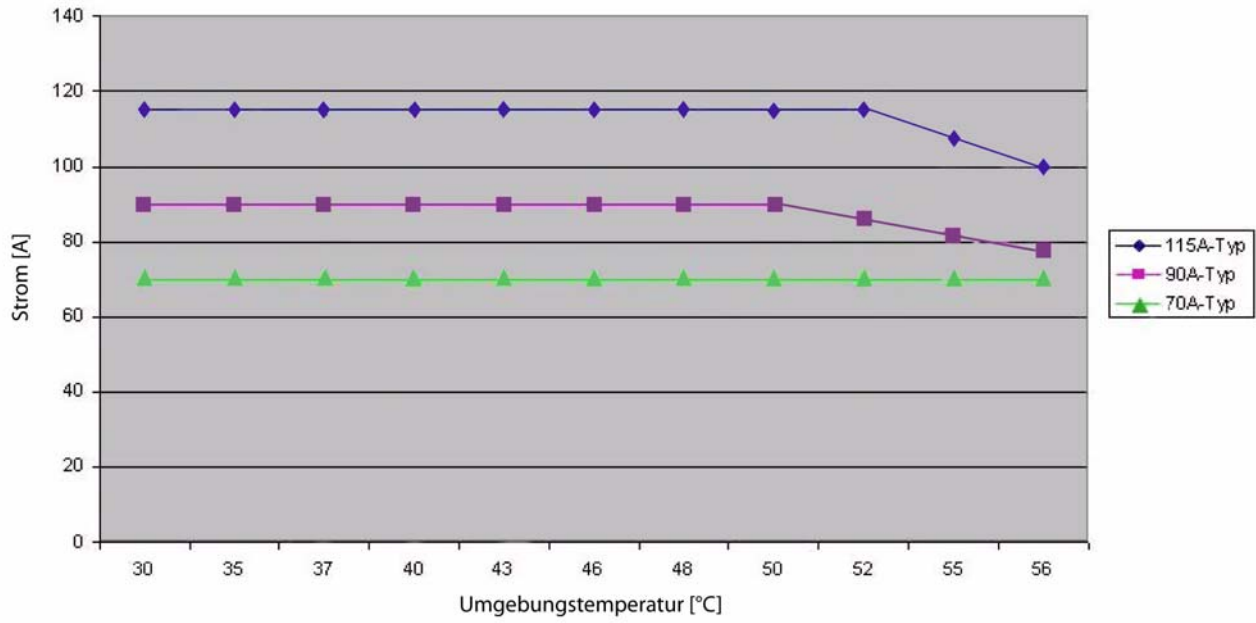
6 Commissioning

1. Check the correct connections of the thyro  switch
2. Attach plastic housing
3. Switch on supply voltage ("Power" LED lights up)
4. Possible test of gating by the controller ("Control" LED lights up and fan starts up)















Note: The operational current may only be released for the initial commissioning if no gating takes place, that is, the thyro  switch is switched off.

6. Connecting operational current
7. Release controller (for gating and correct function, "Power", "Control", "Thyr1" and "Thyr2" light up)

7 Power limitation depending on ambient temperature



8 Type Overview

<i>Type</i>	<i>Artikelnummer</i>	<i>Voltage</i>	<i>Frequency</i>	<i>Current</i>
thyro  switch 2ph-400-50-90	V108-10-0001	400V	50Hz	90A*
thyro  switch 2ph-400-60-90	V108-10-0002	400V	60Hz	90A
thyro  switch 2ph-400-50-115	V108-10-0003	400V	50Hz	115A*
thyro  switch 2ph-400-60-115	V108-10-0004	400V	60Hz	115A
thyro  switch 2ph-500-50-70	V108-10-0005	500V	50Hz	70A*
thyro  switch 2ph-500-60-70	V108-10-0006	500V	60Hz	70A
thyro  switch 2ph-120-50-90	V108-10-0007	120V	50Hz	90A
thyro  switch 2ph-120-60-90	V108-10-0008	120V	60Hz	90A
thyro  switch 2ph-120-50-115	V108-10-0009	120V	50Hz	115A
thyro  switch 2ph-120-60-115	V108-10-0010	120V	60Hz	115A
thyro  switch 2ph-240-50-90	V108-10-0011	240V	50Hz	90A
thyro  switch 2ph-240-60-90	V108-10-0012	240V	60Hz	90A
thyro  switch 2ph-240-50-115	V108-10-0013	240V	50Hz	115A
thyro  switch 2ph-240-60-115	V108-10-0014	240V	60Hz	115A

* Standard

Special voltages and currents on request.

9 Declaration of Conformity

ENGLISH CE DECLARATION OF CONFORMITY

We declare that we have sole responsibility that this product (see table) meets the regulations of Directives 73/23/EEC and 89/336/EEC* and complies with the following standards or reference documents:

EN 61010-1:2001; EN61010-1/B1:2002; EN 61010-1/B2:2004;
EN 61000-6-1:2002; EN 61000-6-2:2002; EN 61000-6-3:2002; EN 61000-6-4:2002

