

## Datasheet



### BEL-TS

# Thyristor switches H2@400 to 480 V

Fast capacitors switching  
in Low-voltage grids



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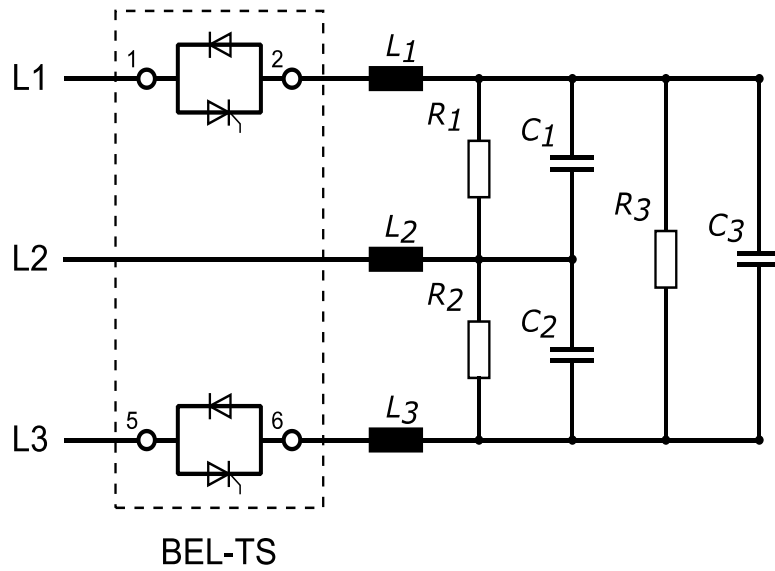
## 1. Revision History

Date	Name	Revision	Comment
05.12.17	ChP	1.0	Initial datasheet release
06.12.17	ChP	2.0	Update of technical data
18.01.18	ChP	3.0	Add kind of module type to technical data, connection scheme changed, mechanical drawings updated, note about discharging updated
30.08.18	SMi	4.0	Adaption to the current product portfolio
04.04.19	SMi	4.1	New revision numbering, revised connection schematic, temperature dependent rated current and reactive power added, inductive/capacitive assignment, layout changes, composition of the product name
08.05.19	SMi	4.2	50 kVAr thyristor switches revised, assignments of the 100 kVAr (400 V) thyristor switch adapted to $V_{RRM}$ , $V_{DRM} = 1800$ V



## 2. Wiring Diagram

### 2.1 Capacitive Compensation



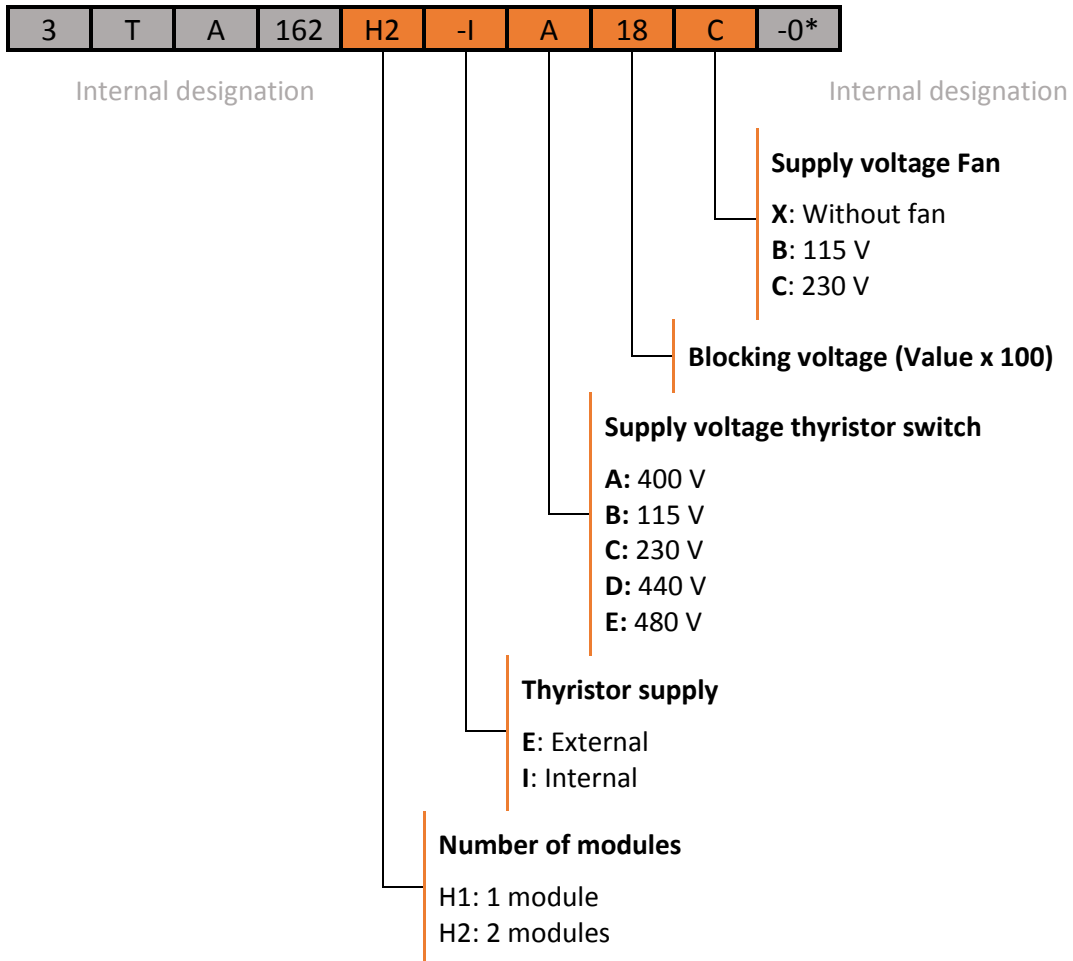
**External components:**

- $L_1, L_2, L_3$ : Chokes (detuning)
- $R_1, R_2, R_3$ : Discharge resistors
- $C_1, C_2, C_3$ : Capacitors (compensation)



### 3. Product Name Composition

The names of the Beluk thyristor switches are composed according to the following principle.





## 4. Technical Data

### 4.1 25 kVAr capacitive, 400 V

Type	<b>3TA042H2-**18X-0*</b>	
Nominal power	at 45 °C at 25 °C	25 kVAr (capacitive) 32 kVAr (capacitive)
Nominal voltage		400 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	36 A 47 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		3600 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		1800 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 200 mm x 156 mm x 217 mm
Weight		Approx. 5.1 kg
Power losses at nominal current		77 W
Cooling		Natural convection
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



#### 4.2 25 kVAr capacitive, 440 V

Type	<b>3TA072H2-**22X-0*</b>	
Nominal power	at 45 °C at 25 °C	25 kVAr (capacitive) 32 kVAr (capacitive)
Nominal voltage		440 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	33 A 43 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		10500 A <sup>2</sup> s
$V_{RRM}$ , $V_{DRM}$		2200 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 200 mm x 156 mm x 217 mm
Weight		Approx. 5.1 kg
Power losses at nominal current		61 W
Cooling		Natural convection
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



### 4.3 25 kVAr capacitive, 480 V

Type	<b>3TA072H2-**22X-0*</b>	
Nominal power	at 45 °C at 25 °C	25 kVAr (capacitive) 32 kVAr (capacitive)
Nominal voltage		480 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	30 A 39 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		10500 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		2200 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 200 mm x 156 mm x 217 mm
Weight		Approx. 5.1 kg
Power losses at nominal current		55 W
Cooling		Natural convection
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)





**4.4 50 kVAr capacitive, 400 V**

Type	<b>3TA092H2-**18X-0*</b>	
Nominal power	at 45 °C at 25 °C	50 kVAr (capacitive) 65 kVAr (capacitive)
Nominal voltage		400 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	72 A 94 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		15000 A <sup>2</sup> s
$V_{RRM}$ , $V_{DRM}$		1800 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 200 mm x 156 mm x 217 mm
Weight		Approx. 5.1 kg
Power losses at nominal current		154 W
Cooling		Natural convection
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



**4.5 50 kVAr capacitive, 440 V**

Type	<b>3TA072H2-**22X-0*</b>	
Nominal power	at 45 °C at 25 °C	50 kVAr (capacitive) 65 kVAr (capacitive)
Nominal voltage		440 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	66 A 86 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		10500 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		2200 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 200 mm x 156 mm x 217 mm
Weight		Approx. 5.1 kg
Power losses at nominal current		137 W
Cooling		Natural convection
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



**4.6 50 kVAr capacitive, 480 V**

Type	<b>3TA072H2-**22X-0*</b>	
Nominal power	at 45 °C at 25 °C	50 kVAr (capacitive) 65 kVAr (capacitive)
Nominal voltage		480 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	60 A 78 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		10500 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		2200 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 200 mm x 156 mm x 217 mm
Weight		Approx. 5.1 kg
Power losses at nominal current		123 W
Cooling		Natural convection
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



#### 4.7 75 kVAr capacitive, 400 V

Type	<b>3TA092H2-**18B-0*, 3TA092H2-**18C-0*</b>	
Nominal power	at 45 °C at 25 °C	75 kVAr (capacitive) 97 kVAr (capacitive)
Nominal voltage		400 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	108 A 140 A
$i^2t$ ( $T_{vj} = 125$ °C; 8.3 ... 10 ms)		15000 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		1800 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 250 mm x 156 mm x 217 mm
Weight		Approx. 5.6 kg
Power losses at nominal current		223 W
Cooling		Forced convection Fan supply voltage <b>B</b> = 115 V AC or <b>C</b> = 230 V AC, 50/60 Hz
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



**4.8 75 kVAr capacitive, 440 V**

Type	<b>3TA072H2-**22B-0*, 3TA072H2-**22C-0*</b>	
Nominal power	at 45 °C at 25 °C	75 kVAr (capacitive) 97 kVAr (capacitive)
Nominal voltage		440 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	98 A 127 A
$i^2t$ ( $T_{vj} = 125$ °C; 8.3 ... 10 ms)		10500 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		2200 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 250 mm x 156 mm x 217 mm
Weight		Approx. 5.6 kg
Power losses at nominal current		228 W
Cooling		Forced convection Fan supply voltage <b>B</b> = 115 V AC or <b>C</b> = 230 V AC, 50/60 Hz
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



**4.9 75 kVAr capacitive, 480 V**

Type	<b>3TA072H2-**22B-0*, 3TA072H2-**22C-0*</b>	
Nominal power	at 45 °C at 25 °C	75 kVAr (capacitive) 97 kVAr (capacitive)
Nominal voltage		480 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	90 A 117 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		10500 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		2200 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 250 mm x 156 mm x 217 mm
Weight		Approx. 5.6 kg
Power losses at nominal current		204 W
Cooling		Forced convection Fan supply voltage <b>B</b> = 115 V AC or <b>C</b> = 230 V AC, 50/60 Hz
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



#### 4.10 100 kVAr capacitive, 400 V

Type	<b>3TA162H2-**18B-0*, 3TA162H2-**18C-0*</b>	
Nominal power	at 45 °C at 25 °C	100 kVAr (capacitive) 130 kVAr (capacitive)
Nominal voltage		400 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	144 A 187 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		125000 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		1800 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 250 mm x 156 mm x 217 mm
Weight		Approx. 5.6 kg
Power losses at nominal current		284 W
Cooling		Forced convection Fan supply voltage <b>B</b> = 115 V AC or <b>C</b> = 230 V AC, 50/60 Hz
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



#### 4.11 100 kVAr capacitive, 440 V

Type	<b>3TA162H2-**22B-0*, 3TA162H2-**22C-0*</b>	
Nominal power	at 45 °C at 25 °C	100 kVAr (capacitive) 130 kVAr (capacitive)
Nominal voltage		440 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	131 A 170 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		115000 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		2200 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 250 mm x 156 mm x 217 mm
Weight		Approx. 5.6 kg
Power losses at nominal current		253 W
Cooling		Forced convection Fan supply voltage <b>B</b> = 115 V AC or <b>C</b> = 230 V AC, 50/60 Hz
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)





#### 4.12 100 kVAr capacitive, 480 V

Type	<b>3TA162H2-**22B-0*, 3TA162H2-**22C-0*</b>	
Nominal power	at 45 °C at 25 °C	100 kVAr (capacitive) 130 kVAr (capacitive)
Nominal voltage		480 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	120 A 156 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		115000 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		2200 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 250 mm x 156 mm x 217 mm
Weight		Approx. 5.6 kg
Power losses at nominal current		228 W
Cooling		Forced convection Fan supply voltage <b>B</b> = 115 V AC or <b>C</b> = 230 V AC, 50/60 Hz
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



**4.13 125 kVAr capacitive, 480 V**

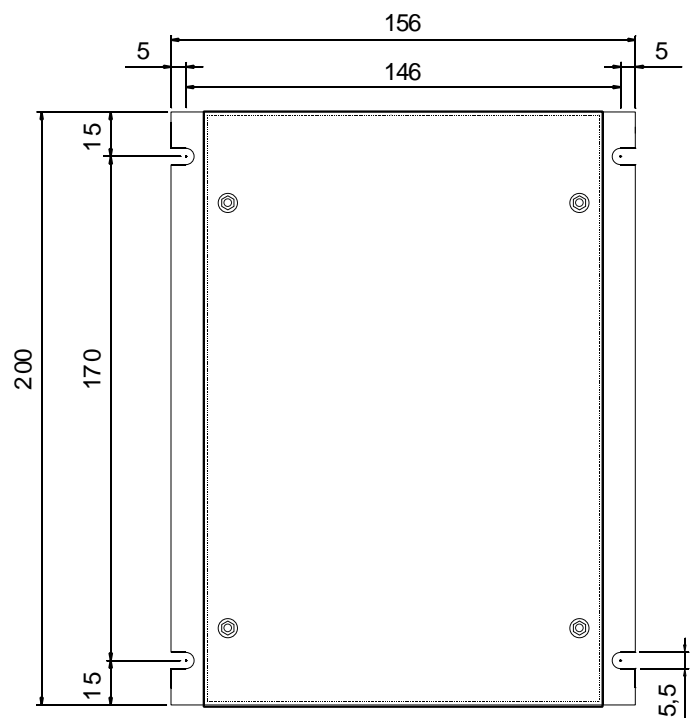
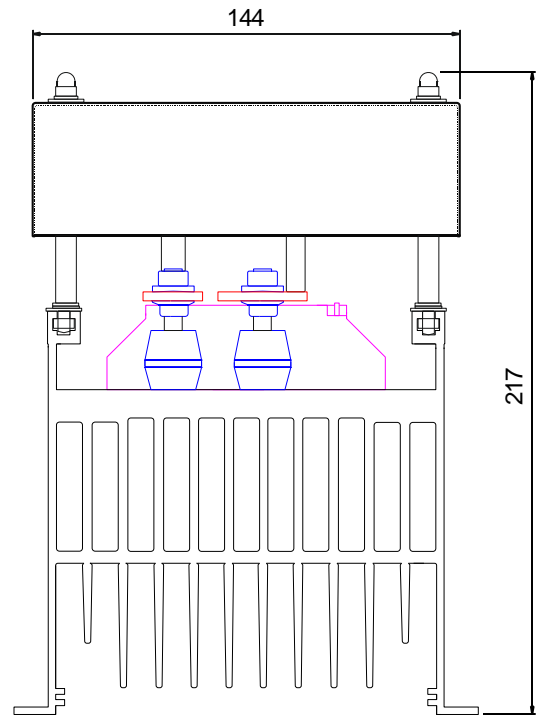
Type	<b>3TA162H2-**22B-0*, 3TA162H2-**22C-0*</b>	
Nominal power	at 45 °C at 25 °C	125 kVAr (capacitive) 162 kVAr (capacitive)
Nominal voltage		480 V (+/- 10 %)
Nominal current	at 45 °C at 25 °C	150 A 195 A
$i^2t$ ( $T_{vj} = 125\text{ °C}$ ; 8.3 ... 10 ms)		115000 A <sup>2</sup> s
$V_{RRM}, V_{DRM}$		2200 V
Modules		2 x Thyristor-Diode
Discharge capacitors		<b>CAUTION!</b> It's <b>not allowed</b> to use discharge reactors! Using <b>special discharging resistors</b> with thyristor switches is <b>mandatory!</b> Please contact your capacitor manufacturer!
Recovery time		Typically 1 period
Switched phases		2, half controlled
Supply voltage		From power circuit <b>(optional: external power supply)</b>
Max. consumption power supply		9 VA
Voltage trigger signal		8 – 30 V DC
Consumption trigger input		5 mA at 12 V DC 10 mA at 24 V DC
Over temperature protection		Integrated
Dimensions H x W x D		Approx. 250 mm x 156 mm x 217 mm
Weight		Approx. 5.6 kg
Power losses at nominal current		298 W
Cooling		Forced convection Fan supply voltage <b>B</b> = 115 V AC or <b>C</b> = 230 V AC, 50/60 Hz
Protection class		IP10
Humidity		10 % - 95 % (without moisture condensation)
Max. altitude		1000 m above sea level Operation at a higher altitude is possible with reduced power
Min. ambient temperature		-10 °C
Max. ambient temperature		+45 °C (operation with nominal power) +65 °C (operation with reduced power)



## 5. Dimensions

Without cooler:

- 3TA042H2-\*\*18X-0\*
- 3TA072H2-\*\*22X-0\*
- 3TA092H2-\*\*18X-0\*





**With cooler:**

- 3TA092H2-\*\*-18\*-0\*
- 3TA072H2-\*\*-22\*-0\*
- 3TA162H2-\*\*-22\*-0\*

