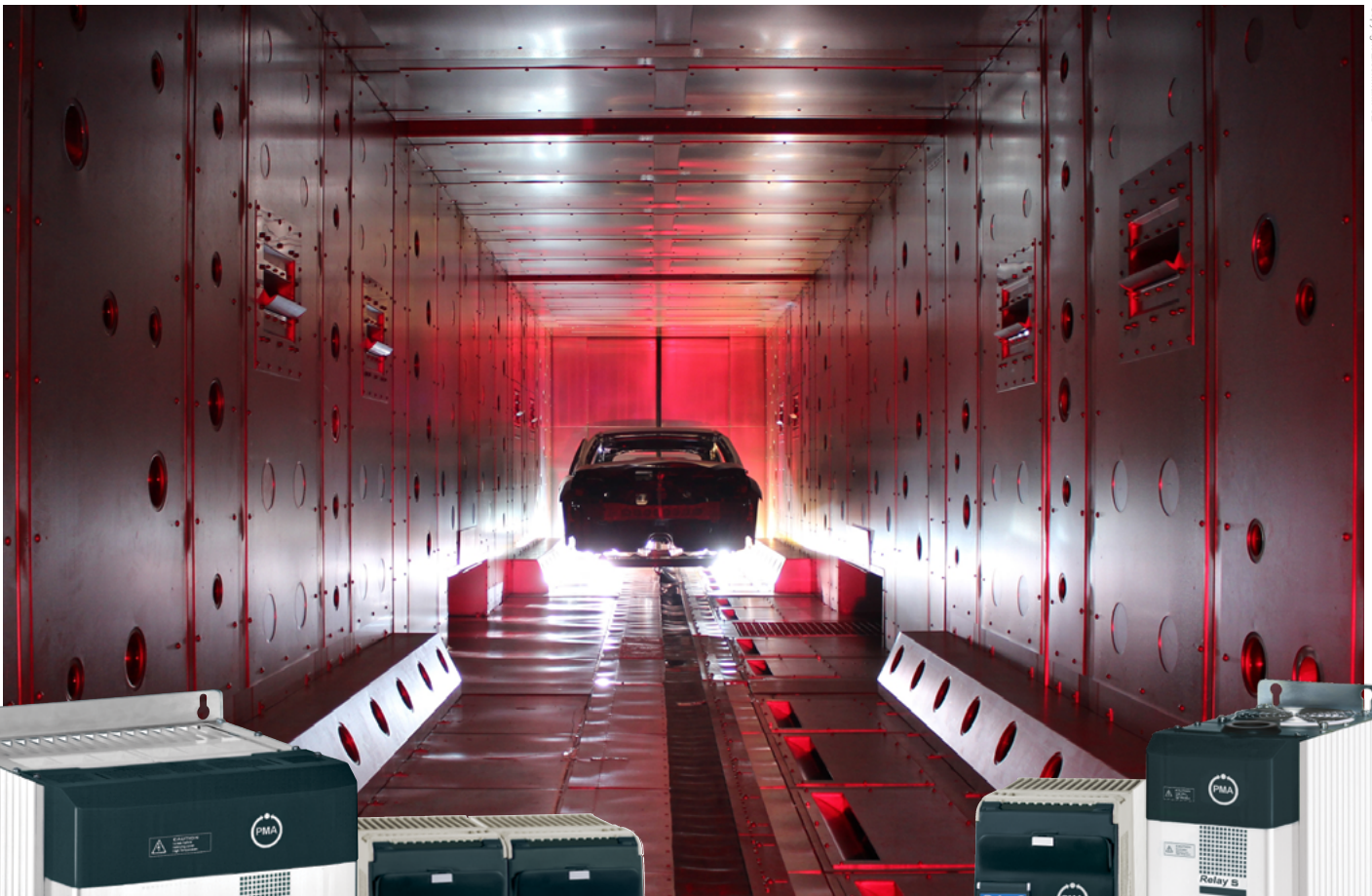


Thyristor Power Controllers Relay S and Relay C

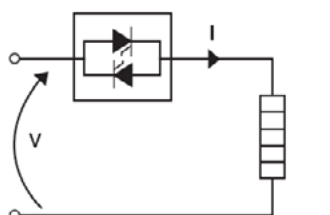
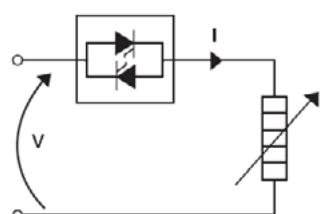
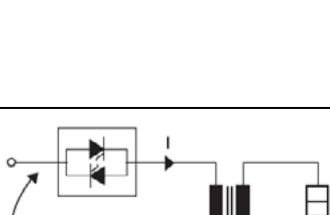
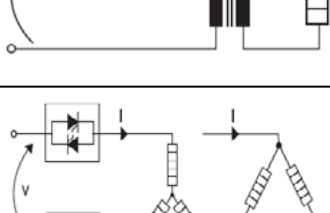
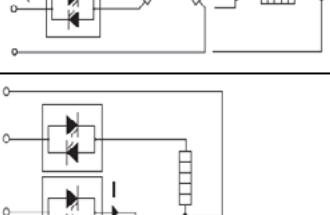
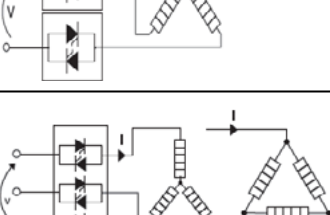
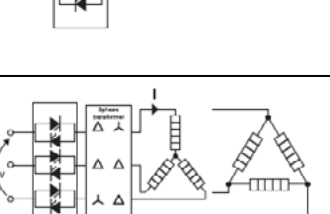
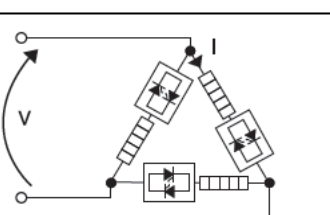

Applications and Product Comparison



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Application Overview Thyristor Power Controller

Application	Load Type	Model	No. of Units	Phase Control	Suggested Operating Mode		
					Zero Crossing	Half Cycle	Single Cycle
	Normal resistance infrared medium and long waveform	Relay S 1PH	1	1	•		
		Relay C 1PH	1	1	•		
	Quartz lamp infrared short waveform	Relay C 1PH	1	1		•	•
		Molibdenum, Tungstenum, Kanthal® super, Platinum	Relay C 1PH	1	1		
Silicon carbide elements		Relay S 1PH	1	1			
	Transformers coupled with normal resistance	Relay C 1PH	1	1			
	Transformers coupled with cold resistances (Kanthal® super)	Relay C 1PH	1	1			
	Normal Resistance	Relay S 2PH	1	2	•		
		Relay C 2PH	1	2			
	Normal Resistance	Relay S 3PH	1	3	•		
		Relay C 3PH	1	3			
	Silicon carbide elements	Relay C 3PH	1	3			
	Molibdenum, Tungstenum, Kantal® Super, Platinum, Quartz lamp infrared short waveform	Relay C 3 PH	1	3			
	Three phase transformer	Relay C 3PH	1	3			
	Three phase normal load resistance with open delta connection	Relay S 3PH	1	3	•		
		Relay C 1PH	3	3			
	Cold resistance	Relay C 1PH	3	3			

			Other Features		Sizing		Note
Burst Firing	Delay Triggering	Phase Angle	Current Limit	Control	V	I	
•					V	$\frac{P}{V}$	For general resistance applications with low variations in temperature and age. For low inertia loads use Single Cycle or Phase Angle. For Infrared Short it's also available Half Cycle that is a very fast Firing
•							
		•		V^2			
		•	•	I^2	V	$\frac{P}{V}$	These resistances change with temperature but have low variations with age. Starting current with cold elements can be 16 times nominal current (Kanthal® super). Infrared lamp short waveform can reach 8 time nominal current.
•				$\frac{V}{V \times I}$			
	•	•	•	$V \times I$	V	$\frac{P}{V \cos \phi}$	Transformers and inductors have inrush current on start up. Phase Angle plus Soft Start and current limit are required. To switch the transformer ON-OFF, use Delay Triggering that will automatically switch ON-OFF when current value is at zero.
		•	•	I^2			
•				$V \times I$	V	$\frac{P}{1.73V}$	Relay S, and Relay C-2PH are suitable to control resistive loads with delta or star connection without neutral.
•							
•				$V \times I$	V 1.73	$\frac{P}{1.73V}$	Three phase load with star plus neutral connection must be controlled on the three phases.
•							
		•	•	I^2	V	$\frac{P}{1.73V}$	On three phase silicon carbide elements $V \times I$ feedback is suggested to have a constant power control. This is necessary to compensate resistance change with temperature and age. Resistance value at the end of element life is 4 times the original value.
•		•	•	I^2			
		•	•	I^2	V	$\frac{P}{1.73V \cos \phi}$	Three phase Relay C units are specially designed to drive three phase transformers coupled on secondary with normal or special resistive loads.
•				I^2	V	$\frac{P}{3V}$	Open delta can be driven by three phase unit.
		•	•				
		•	•				

Product Comparison - Relay Thyristor Power Controller

Description	 Relay S			 Relay C			
	Version:	1-phase	2-phase	3-phase	1-phase	2-phase	3-phase
Power range		30 ... 800A			30 ... 800A (up to 2100A on request)		
Load type	Max. voltage 480V	•	•	•	•	•	•
	Max. voltage 600V	•	•	•	•	•	•
	Max. voltage 690V (not available with cUL)	• ≥ 60A	• ≥ 60A	• ≥ 60A	• ≥ 60A	• ≥ 60A	• ≥ 60A
	Single phase	•			•		
	3-phase load, star (no neutral) or delta		•	•		•	•
	3-phase load, star with neutral			•			•
Power supply	3-phase load, open delta	• 3 x 1PH		•	• 3 x 1PH		
	With load voltage	•	•	•	•	•	•
	24V AC/DC	o ³	o ³	o ³			
Power supply fan	24 VDC				o (Backup communication)		
	230V AC	• ≥ 90A	• ≥ 60A	• ≥ 60A	• ≥ 90A	• ≥ 90A	• ≥ 90A
	115V AC	o ≥ 90A	o ≥ 60A	o ≥ 60A	o ≥ 90A	o ≥ 90A	o ≥ 90A
Input signal	24 VDC	o ≥ 90A	o ≥ 60A	o ≥ 60A	o ≥ 90A	o ≥ 90A	o ≥ 90A
	SSR 4 ... 30V	•	•	•	•	•	•
	4 ... 20 mA	o	o	o	•	•	•
	0 ... 10V	o	o	o	•	•	•
Operating mode	Potentiometer				•	•	•
	Zero cross switching / with soft start	•/ -	•/ -	•/ -	•/ •	•/ -	•/ •
	Single cycle operation / with soft start				•/ •		
	Burst-fire operation / with soft start	o ¹ -	o ¹ -	o ¹ -	•/ •	•/ -	•/ •
	Half-cycle operation / with soft start				•/ •		
	Phase angle operation / with soft start				•/ •		•/ • ⁴
Delayed triggering / with soft start				•/ •		• ⁴ -	

Product Comparison - Relay Thyristor Power Controller

Control/return	Voltage V				•	•	•
	V ²				•	•	•
	Current I				•	•	•
	I ²				•	•	•
	Power (V x I)				•	•	•
Options	Current limit				○		○
	Heater current and short circuit monitoring	○	○	○	○	○	○
	Fuse and fuse holder	○ ² ≤ 40A	○ ² ≤ 40A	○ ² ≤ 40A	• ≤ 40A	• ≤ 40A	• ≤ 40A
	Integrated fuse	• ≥ 60A	• ≥ 60A	• ≥ 60A	• ≤ 60A	• ≤ 60A	• ≤ 60A
	Data-logger function				○	○	○
Communications.	Energy meter				○	○	○
	OLED display with plain text and keypad				•	•	•
	Configuration PC software + Micro USB				•	•	•
	Modbus RTU				•	•	•
	Modbus RTU + ProfiBus DP				○	○	○
	Modbus RTU + Profinet				○	○	○
	Modbus RTU + Modbus TCP				○	○	○
Measuring output 0 ...10V/4 ...20mA				○	○	○	

• = Standard ○ = Option

1) 4, 8, 16 cycles on with analog input signal

2) Necessary with analog input signal

3) Necessary with analog input signal and/or heater current monitoring up to 210A

4) Only for versions ≥ 60A

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