

PMA Relay – The Revolution Series

We are delivering real cost benefits



- You pay only for what you need with Relay Modularity
- All in one solution – Solid State Relay, Controller & Fuse Protection
- No tools needed to program the unit, all configuration via the front keypad
- Designed for field-bus system



WEST Control Solutions – Consolidated expertise

PMA: More than 80 years of automation engineering experience

Four internationally successful companies – PMA, WEST, CAL and Partlow – have combined their expertise under the “WEST Control Solutions” banner. As a premium brand, PMA Prozeß- und Maschinen- Automation GmbH represents more than 80 years of instrumentation and automation engineering experience. The core competence of the company is industrial automation engineering.

As a competent partner, WEST Control Solutions offers individual hardware and software solutions which are perfectly matched to each process and application area – from simple and powerful to flexible and multi-functional configurations.

The offering also includes customer-specific controller solutions along with engineering support for special processes or the complete automation of plants and machinery.

Modern software tools and a full range of controllers designed for an extremely wide variety of tasks set new standards in application flexibility and guarantee an optimum price/performance ratio. This product strategy makes WEST Control Solutions one of the market leaders for digital temperature controllers.

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Why choose PMA-Relay?

We designed a superior product



With the market place becoming more competitive we had a choice to make. Design a product a little cheaper but possibly not as good, or design a new innovative product where its added value is clear for all to see. We chose the latter, in line with our long-term philosophy.

No compromise

- Heatsink and thyristor junctions generously sized to guarantee a long life for the thyristor unit.
- Units working at low junction thyristor temperature with 20% margin on max temperature.
- Strong connection design between the block terminal and thyristor semiconductor connection allows for generous sizing.
- All the copper connections treated against oxidation.
- Rugged construction for electronic and plastic parts.
- Protection against over voltage.

Have a closer look

Open a PMA thyristor unit and any of our competitors, you will discover the difference and see why we can offer a longer life warranty (see below tab.)

Estimated Powercycles of AL wire bonded dies

	dT	Tj max \°C 100°C	110°C	120°C	130°C	140°C
Tj start \°C	80°C	248.000				
	70°C	320.200	110.000			
	60°C	464.000	145.500	51.100		
	50°C	782.000	216.000	69.100	24.800	
	40°C	1.600.000	372.000	105.000	34.100	12.500
SSR	30°C	4.800.000	793.000	184.000	52.500	17.500
Single Cycle	20°C	25.400.000	2.400.000	400.000	94.000	27.500
			12.800.000	1.200.000	209.000	50.000
				6.700.000	645.000	112.000
					3.600.000	353.000
						2.000.000

PMA

PMA

COMPETITORS

PMA predicted life working in Single Cycle.

PMA predicted life with SSR Input and ZC Firing.

Predicted life of majority of competitors working at 130°C with SSR Input and ZC firing.

Save space = Save money

An innovative process solution that will dramatically save wiring & labour time

With a reduction of 50% space, it's easy to save hundreds off the cabinet price.

Left Side (Traditional)

Mounted on the baseplate are a Fuse & Fuseholder, 40A Solid State Relay and a Current Transformer.

Right Side (Innovative)

Mounted on the same baseplate are two Relay 40A units, each having the same components as the traditional unit. This simple example demonstrates a 50% saving of panel space.



The new Relay S family can be put together with little technical knowledge.

- SSR Solid State Relay with Zero Crossing.
- SSR Solid State Relay + Fuse & Fuse Holder.
- SSR Solid State Relay + Fuse & Fuse Holder + Current Transformer.
- Different versions with or without heatsink.
- Single and three phase thyristor units.

The new Relay M = Relay S + Drive M

The addition of Drive M transforms a simple unit into a sophisticated unit capable of the following additional features.

- Universal inputs accepting all standard signals.
- Universal firing including Zero Crossing, Burst Firing.
- Single Cycle, Delayed Triggering and Phase Angle.
- Universal Feed Back (Voltage, Current and Power).
- RS485 Communication.

OPTIONS

- Heater Break Alarm for partial or total load failure.
- Thyristor short circuit failure.

Key benefits include:

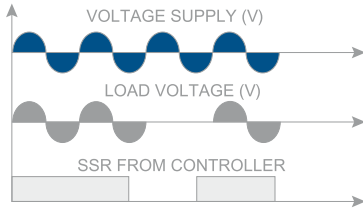
- Space reduction of 50%, labour reduction of 1 hour per control zone, high reliability.
- If one zone fails a non-technical user can substitute a second within minutes.



Glossary

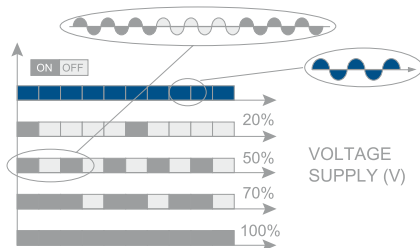
Zero Crossing ZC

ZC firing mode is used with the logic output from a temperature controller and so the thyristor operates like a contactor. The cycle time is performed by the temperature controller. Zero Crossing minimizes interferences as the thyristor unit switches ON-OFF at zero voltage.



Burst Firing BF

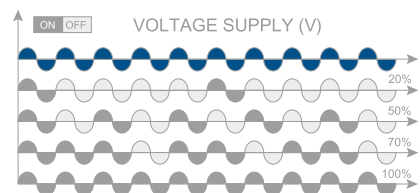
This firing is performed digitally within the thyristor unit at zero volts, producing no EMC interference. Analogue input is necessary for BF and the number of complete cycles must be specified for 50% power demand. This value can be between 1 and 255 complete cycles, determining the speed of firing. When 1 is specified, the firing mode becomes Single Cycle (SC).



Soft Start + Burst Firing now available as an option.

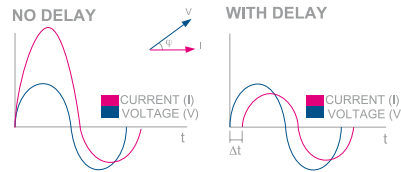
Single Cycle SC

SC is the fastest zero crossing switching method. At 50% input signal, one cycle is ON and one cycle is OFF. At 75%, 3 cycles are ON and one cycle is OFF. If power demand is 76% the unit performs the same as for 75% but every time the unit switches ON the microprocessor divides $76/75$ and memorises the ratio. When the sum is one the unit delivers one cycle more to the load. With this firing it is necessary to have analogue input.



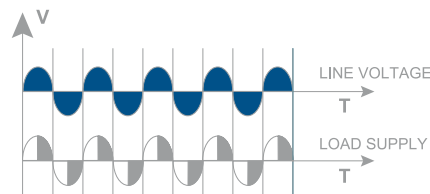
Delayed Triggering DT

Used to switch the primary coil of transformers when coupled with normal resistive loads (not cold resistance) on the secondary, DT prevents the inrush current when zero voltage (ON-OFF) is used to switch the primary. The thyristor unit switches OFF when the load voltage is negative and switches ON only when positive with a pre-set delay for the first half cycle.



Phase Angle PA

PA controls the power to the load by allowing the thyristor to conduct for part of the AC supply cycle only. The more power required, the more the conduction angle is advanced until virtually the whole cycle is conducting for 100% power. The load power can be adjusted from 0 to 100% as a function of the analogue input signal, normally determined by a temperature controller or potentiometer, PA is normally used with inductive loads.



Feedback/Control Mode

Supply voltage fluctuations changes the power to the load. To overcome this effect the voltage supplied to the load is measured and compared with the power demand from the controller. The error signal is used to automatically hold the power at the value requested.

Three types of control mode are available:

- Voltage Control Mode, where the input signal is proportional to the voltage output (voltage f/b).
- Current Control Mode, where the input signal is proportional to the current output (current f/b). Power Control Mode, where the input signal is proportional to the power output (power f/b).
- As an option it is possible to transfer control mode from voltage to power via a simple digital command.

What our Customers want?

They want a positive experience with our total solution, not just a cheap price!

Knowledgeable Sales Team

We have a team of sales engineers focused on core business products only. An expert at no cost, not an engineer with a big catalogue and little product knowledge, will welcome customers. Easy access to engineers when you need a special performance project.

Fast Service

Excellent pre sales and after sales service including engineering support.

Easy to do business with us

Fast reaction to your enquiry, short lead times, timely production of order acknowledgement, invoices etc. Catalogues & manuals of all our products plus configuration software, available free of charge from our web-site. Our people are always welcoming to our customers.

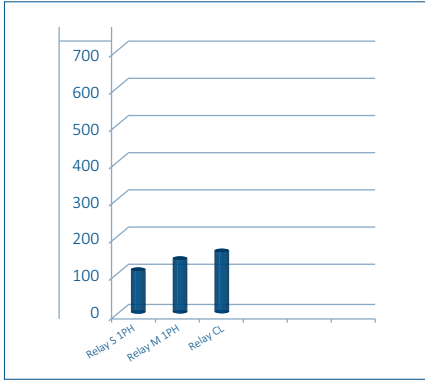
Digital Documentation on www.west-cs.com

- Bulletins
- Manuals
- Applications
- Help desk

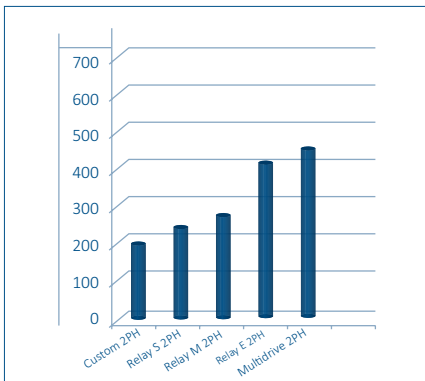


Guide to product selection

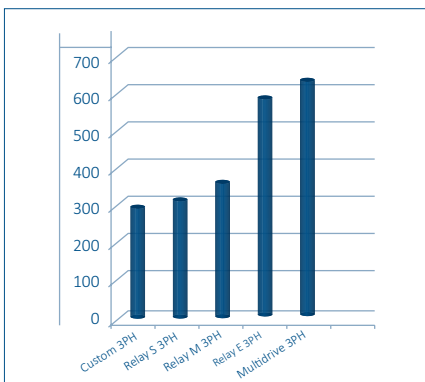
For more details on Thyristor Unit go to page 10 - 11



MODEL	INPUT	FIRING	CURRENT LIMIT	COMMUNICATION	CONTROL MODE	MAX VOLTAGE	MAX CURRENT	MAIN OPTION
RELAY S 1PH	SSR ANALOG	0-CROSSING BURST-FIRING	NO	NO	NO	600V	700A	HB ALARM ANALOG
RELAY M 1PH	SSR ANALOG RS485	0-CROSSING BURST-FIRING PHASE ANGLE	NO	YES	V,I,VxI	600V	700A	HB ALARM ANALOG Std
RELAY CL	SSR ANALOG RS485	0-CROSSING BURST-FIRING PHASE ANGLE	YES	YES	V,I,VxI	600V	700A	HB ALARM ANALOG Std



MODEL	INPUT	FIRING	CURRENT LIMIT	COMMUNICATION	CONTROL MODE	MAX VOLTAGE	MAX CURRENT	MAIN OPTION
CUSTOM 2PH	SSR ANALOG	0-CROSSING BURST-FIRING	NO	NO	NO	690V	2400A	HB ALARM ANALOG
RELAY S 2PH	SSR ANALOG	0-CROSSING BURST-FIRING	NO	NO	NO	600V	700A	HB ALARM ANALOG
RELAY M 2PH	SSR ANALOG RS485	0-CROSSING BURST-FIRING	NO	YES	V,I,VxI	600V	700A	HB ALARM ANALOG Std
RELAY E 2PH MULTIDRIVE 2PH	SSR ANALOG RS485	0-CROSSING BURST-FIRING DELAYED TRIGGERING	NO	YES	V,I,VxI	600V 690V	700A 2400A	HB ALARM ANALOG Std



MODEL	INPUT	FIRING	CURRENT LIMIT	COMMUNICATION	CONTROL MODE	MAX VOLTAGE	MAX CURRENT	MAIN OPTION
CUSTOM 3PH	SSR ANALOG	0-CROSSING BURST-FIRING	NO	NO	NO	690V	2400A	HB ALARM ANALOG
RELAY S 3PH	SSR ANALOG	0-CROSSING BURST-FIRING	NO	NO	NO	600V	500A	HB ALARM ANALOG
RELAY M 3PH	SSR ANALOG RS485	0-CROSSING BURST-FIRING	NO	YES	V,I,VxI	600V	500A	HB ALARM ANALOG Std
RELAY E 3PH MULTIDRIVE 2PH	SSR ANALOG RS485	0-CROSSING BURST-FIRING PHASE ANGLE DELAYED TRIGGERING	YES	YES	V,I,VxI	600V 690V	700A 2400A	HB ALARM ANALOG Std

Relay Family from 30 to 2400A



Universal Firing
Possibility to configure all the possible firing
Phase Angle
Soft Start + Phase Angle
Zero Crossing
Burst Firing, Single Cycle


Construction
Aluminium
Treated copper bars
Easy access to circuit board, fuse and thyristor just opening the frontal door

Universal Input
Analog Inputs
Potentiometer
Communication via different FieldBus

Universal Control Mode
Voltage Feedback
Current Feedback
Square Current and Power Feedback

Programming / Tuning Facility
Friendly to be done:
RS485 Communication port
Frontal Key Pad
Reading of Current, Voltage, Power and all parameter

Custom Family from 150 to 2400A



Rugged and reliable
easy to be customized with customer LOGO

Firing
Zero Crossing
Burst Firing

Front Key Pad to read:
Current
Voltage
Power and all parameter

Basic product
able to satisfy OEM needs and easy to be used

Application guide for Thyristor unit selection

APPLICATION GUIDE	LOAD TYPE	MODEL	CURRENT RANGE	N. OF UNITS	PHASE CTRL	
	Normal resistance infrared medium and long waveform	Relay SSR Relay S 1PH Custom 1PH	It depends on heat sink 30-700A 300-2400A	1 1 1	1 1 1	
	Quartz lamp infrared waveform	Relay M 1PH Relay CL	35-700A 35-700A	1 1	1 1	
		Molibdenum, Tungstenum, Superkanthal, Platinum,	Relay CL	35-700A	1	1
		Silicon carbide elements	Relay M 1PH Relay CL	35-700A 35-700A	1 1	1 1
	Transformers coupled with normal resistance	Relay M 1PH	35-700A	1	1	
	Transformers coupled with cold resistances (kanthal super)	Relay CL	35-700A	1	1	
	Normal Resistance	Relay S 2PH Relay M 2PH Multidrive 2PH	30-700A 30-700A 1000-2400	1 1	2 2	
			Relay S 3PH Relay M 3PH Custom 3PH	30-500A 30-500A 150-2400A	1 1 2-3	3 3 3
	PM3000E 3PH Multidrive 3PH Relay M 3PH		35-500A 35-2400A 30-500A	1 1	3 3	
			Molibdenum, Tungstenum Super Kantal Platinum, Quartz lamp infrared short waveform (1)	PM3000E 3PH Multidrive 3PH	35-500A 25-2400A	1 1
		Three phase transformer (1)	PM3000E 3PH Multidrive 3PH	25-500A 25-2400A	1 1	3 3
			Three phase normal load resistance with open delta connection	Relay S 3PH Relay M 3PH Custom 3PH	30-500A 30-500A 150-2400A	1 1 1
Relay CL		30-700A		3	3	
Cold resistance		PM3000E Multidrive 3PH		35-500A 35-2400A	1	3

CONTROL MODE: V = Voltage feedback V² = Square voltage feedback VxI = Power feedback I = Current feedback

SUGGESTED FIRING MODE FOR YOUR APPLICATIONS					OTHER FEATURES				SIZING		NOTE	
ZC	SC	BF	BF Simply	S+BF	DT	PA	CL	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 (SC) or Phase Angle (PA).	
•			•									
•			•									
	•	•				•	V ²					
								•	Vxl			
								•		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 (superkanthal). Infrared lamp short waveform can reach 8 time nominal current.
		•							V to Vxl	V	$\frac{P}{V}$	These resistances change value with temperature and age and value at the end of element life is 4 times the initial value. Constant power regulation is necessary with V to Vxl Transfer.
						•			Vxl	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 DT firing that will automatically switch ON-OFF when current value is at zero.
							•	•	I ²	V	$\frac{P}{V\cos\phi}$	Use Phase Angle + Current Limit
•			•						V	V	$\frac{P}{1.73V}$	Relay M 2PH is suitable to control resistive loads with delta or star connection without neutral.
		•							Vxl	V	$\frac{P}{1.73V}$	
•			•						Vxl	$\frac{V}{1.73}$	$\frac{P}{1.73V}$	Three phase load with star plus neutral connection must be controlled on the three phases.
		•										
•			•									
						•			V to Vxl	V	$\frac{P}{1.73V}$	On three phase silicon carbide elements Vxl 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. With Relay M use BF firing and Power Limit.
		•										
						•	•	I ²				
						•	•	I ²				
							•	•	I ²	V	$\frac{P}{1.73V\cos\phi}$	Three phase Multidrive and PM3000E are specially designed to drive three phase transformers coupled on secondary with normal or special resistive loads.
							•	•	I ²			
•			•						Vxl	V	$\frac{P}{3V}$	Open delta can be driven by three phase unit.
		•										
•			•									
						•	•	I ²	V	$\frac{P}{3V}$		

PMA-Relay feature comparison

	Description	Relay CL	Relay SSR	Relay S - 1PH	Relay S - 2PH	Relay S - 3PH
	CODE	RCL	SSR	RS1	RS2	RS3
LOAD TYPE	Max voltage 480V	●	●	●	●	●
	Max voltage 600V	●	●	●	●	●
	Max voltage 690V	● > 280A		● > 280A	● > 280A	● > 225A
	Single phase	●	●	●		
	3 phase load star no neutral or delta				●	●
	3 phase load star with neutral					●
INPUT TYPE	3 phase load open delta	●				●
	SSR 4:30VDC	●	●	●	●	●
	4:20 mA	●	0	0	0	0
	0:10 Vdc	●	0	0	0	0
	10K potentiometer	●				
	Communication command	●				
FIRING	Zero crossing		●	●	●	●
	Single cycle					
	Burst firing			0 (3)	0 (3)	0 (3)
	Soft start + burst firing					
	Phase angle	●				
	Soft start + phase angle	●				
CONTROL MODE	Delayed triggering + burst firing	●				
	Voltage	●				
	Square Current	●				
	Current	●				
	Voltage X current (power)	●				
	Voltage to power transfer	●				
OPTION	External control mode	●				
	Internal current limit	● (1)				
	Heater break + thyristor short circuit	0	0	0	0	0
	Integrated fixed fuses	● > 40A		● > 40A	● > 40A	● > 40A
	Fuse & fuse holder	=< 40A	=< 40A	=< 40A	=< 40A	=< 40A
	Flat wiring terminal		0 (2)	0 (2)	0 (2)	0 (2)
COMM.	RS485 with modbus protocol	●				
	Profibus DP, ethernet	0				
	Frontal key pad	●				
	PC programmable + USB\TTL conv.	●				
	Easy Download					
I/O	Analogue input/output (4)	1/1				
	Digital input/output	2/1				
CURRENT	CURRENT	SIZE	SIZE	SIZE	SIZE	SIZE
	30		SRO.SR1	SR3.SR6	SR4.SR7	SR5.SR8
	35	SR9		SR3.SR6	SR4.SR7	SR5.SR8
	40	SR9		SR3.SR6	SR4.SR7	SR5.SR8
	45					
	60	SR15		SR12	SR12	SR13
	75					
	90	SR15		SR12	SR12	SR13
	100					
	120	SR15		SR12	SR13	SR14
	125					
	150	SR15		SR12	SR13	SR14
	180	SR15		SR12	SR13	SR14
	200					
	210	SR15		SR12	SR13	SR14
	225					S13
	280	S9		S9	S10	
	300					S14
	350					S14
	400	S12		S12	S14	S14
	450				S14	S14
	500	S12		S12	S14	S14
	600	S12		S12	S14	
	700	S12		S12	S14	
850						
1000						
1300						
1600						
1800						
2000						
2200						
2400						

● Standard 0 Option (1) Phase Angle only (2) Flat wiring available as option ≤ 40A (3) 4-8-16 Cycles Simplified Burst Firing available with Analog Input only (4) Main Analog Input not included

Relay M - 1PH	Relay M - 2PH	Relay M - 3PH	PM3000E-2PH	PM3000E-3PH	Multidrive 1PH	Multidrive 2PH	Multidrive 3PH
RM1	RM2	RM3	RE2	RE3	M1	M2	M3
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
● ≥ 400A	● ≥ 400A	● >250A			●	●	●
●		●	●	●		●	●
		●		●			●
		●		●			●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●					●		
●	●	●	●	●	●	●	●
●					●		●
●					●		●
●					●		●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
○	○	○	●	●	●	●	●
● > 40A	● > 40A	● > 40A	●	●	●	●	●
● =< 40A	● =< 40A	● =< 40A					
●	●	●	●	●	●	●	●
○	○	○	○	○	○	○	○
●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●
○/1	○/1	○/1	○/1	1/1	2/4	2/4	2/4
2/1	2/1	2/1	4/3	4/3	6/4	6/4	6/4
SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE
SR9	SR10	SR11	S9	S9		S13	S13
SR9	SR10	SR11	S9	S9		S13	S13
SR15	SR16	SR16	S9	S9		S13	S13
SR15	SR16	SR16	S9	S11		S13	S13
SR15	SR16	SR17	S9	S11		S13	S13
SR15	SR16	SR17	S9	S11		S13	S13
SR15	SR16	SR17	S9				
SR15	SR16	SR17	S9				
SR15	SR16	S13		S13		S13	S13
S9	S10		S14			S14	
		S14		S14			S14
		S14	S14	S14		S14	S14
S12	S14	S14	S14	S14		S14	S14
	S14	S14	S14	S14		S14	S14
S12	S14	S14	S14	S14		S14	S14
S12	S14		S14			S14	S14
S12	S14		S14			S14	S14
					S14	S14	S15
					SR18	SR19	SR20
					SR18	SR19	SR20
					SR21	SR22	SR23
					SR21	SR22	SR23
					SR21	SR22	SR23
					SR21	SR22	SR23
					SR21	SR22	SR23

For PM 3000 and Custom Family see pages 38-39

Size and dimensions of PMA-Relay family



SR0 H 97 x W 36 x D 32 - 0,12kg.



SR1 H 97 x W 36 x D 92 - 0,29kg.



SR2 H 121 x W 36 x D 87 - 0,27kg.



SR3 H 121 x W 36 x D 125 - 0,44kg.



SR4 H 121 x W 72 x D 125 - 0,88kg.



SR5 H 121 x W 108 x D 125 - 1,32kg.



SR6 H 121 x W 36 x D 185 - 0,61kg.



SR7 H 121 x W 72 x D 185 - 1,22kg.



SR8 H 121 x W 108 x D 185 - 1,83kg.



SR9 H 121 x W 72 x D 185 - 1,15kg.



SR10 H 121 x W 108 x D 185 - 1,76kg.



SR11 H 121 x W 144 x D 185 - 2,4kg.



SR12 H 269 x W 93 x D 170 - 3,4kg.



SR13 H 269 x W 186 x D 170 - 6,8kg.



SR14 H 269 x W 279 x D 170 - 10,2kg.



SR15 H 273 x W 93 x D 170 - 3,6kg.



SR16 H 273 x W 186 x D 170 - 7kg.



SR17 H 273 x W 279 x D 170 - 10,6kg.



S9 H 350 x W 116 x D 244 - 5,1kg



S10 H 350 x W 240 x D 244 - 11kg.



S11 H 440 x W 137x D 270 - 10,5kg.



S12 H 520 x W 137 x D 270 - 15kg.



S13/S14 H 440/520 x W 262 x D 270 - 18kg.



S15 H 520 x W 400 x D 270 - 43kg.



SR18 H 550 x W 329 x D 347 - 27kg.



SR19 H 550 x W 523 x D 347 - 49kg.



SR20 H 550 x W 717 x D 347 - 72kg.



SR21 H 640 x W 329 x D 347 - 32/40kg.

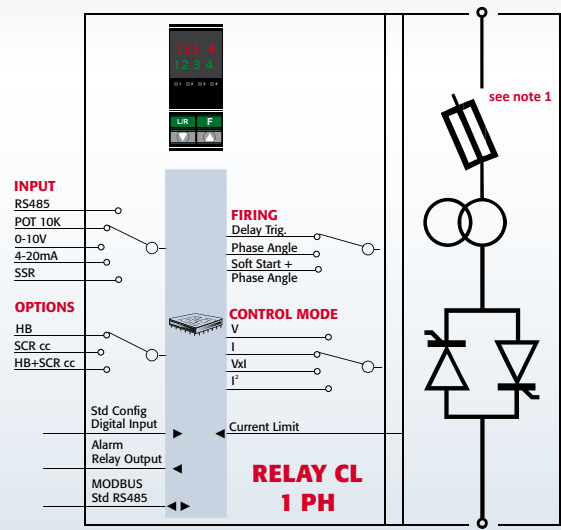


SR22 H 640 x W 523 x D 347 - 59/75kg.



SR23 H 640 x W 717 x D 347 - 86/110kg.

Relay CL 1PH



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistance, infrared long, short and medium waveform, Silicon Carbide, cold resistance coupled with transformer
- **Inputs:** 0-10V dc, 4-20mA, 10kpot, SSR, RS485
- **Firing mode:** Burst Firing, Single Cycle, Soft Start + Phase Angle, Delayed Triggering
- **Operating temperature:** 0 to 40°C without derating
- **Control mode:** Voltage, VxI Power and current I and I²
- **RS485 port:** RTU Modbus Protocol
- **Comply with EMC**
- **Data sheet:** More details on "Relay CL" bulletin

Option

- **Heater break alarm**
- **Configuration software code:** CCA cable + converter + configuration software

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	R	C	L	-	-	-	-	-	-	-	-	-	-	-	-	-
CURRENT				4	5	6					11					
description				code		note					code					Note
35A				0	3	5					O					
40A				0	4	0					U					
60A				0	6	0					W					
90A				0	9	0					Q					
120A				1	2	0					I					
150A				1	5	0										
180A				1	8	0										
210A				2	1	0										
280A				2	8	0										
400A				4	0	0										
500A				5	0	0										
600A				6	0	0										
700A				7	0	0										
CONTROL MODE																
description																
Open Loop																
Voltage Feed Back V																
Power Feed Back VxI																
Voltage Square V2																
Current Feed Back I																
FUSES & OPTION																
description																
For Units =< 40A Fuse + Fuse Holder + CT Standard																
Fuse + Fuse Holder + CT + HB with screw Terminal																
For Units > 40A Fixed Fuse + CT																
Fixed Fuse + CT + HB																
FAN VOLTAGE																
description																
No Fan < 120A																
No Fan 110V > 90A																
No Fan 220V > 90A Std Version																
APPROVALS																
description																
CE EMC For European Market																
MANUAL																
description																
None																
Italian																
English																
German																
French																
VERSION																
description																
Std with fuse + fuse holder up to 40A																
Second fuse normally used with phase to phase																4
Second fuse with an additional safety electromechanical relay to open in alarm conditions																4

Note (1) Fuse & fuse holder are included as Std. up to 40A. Fixed fuses for all other rating.
Note (2) After 16th digit, write current and voltage of load inside brackets Ex (190A-400V)
Note (3) Load voltage must be included in Selected Auxiliary Voltage Range.
Note (4) This option is possible with unit up to 40A. Dimension equal Relay M 2PH of same rating.

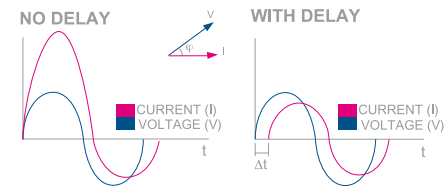
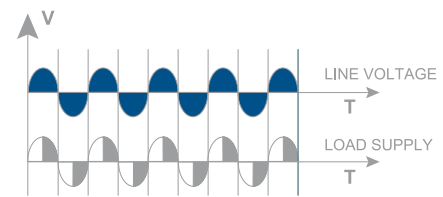
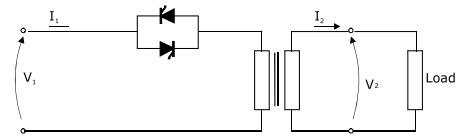
Thyristor Unit connected with Transformers

Relay CL has been specifically designed to drive transformers and has all the drive capability & techniques required, configurable from the front panel display.

Close examination of the transformer application needs to be made as the typical inrush current, when switched on. This over-current will have the result of fuse or thyristor failure.

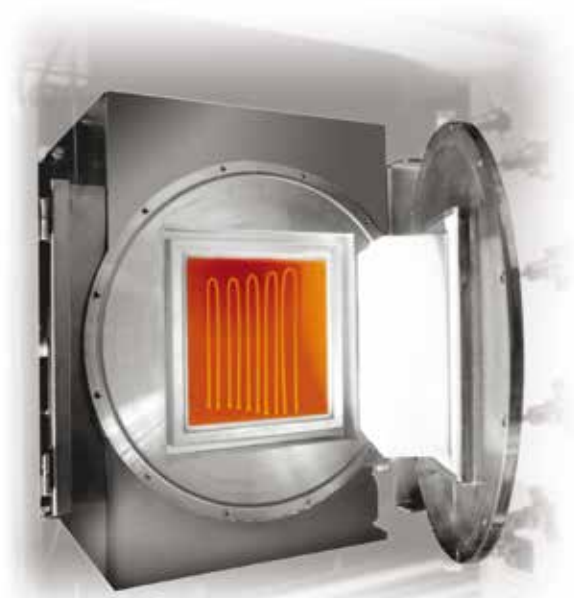
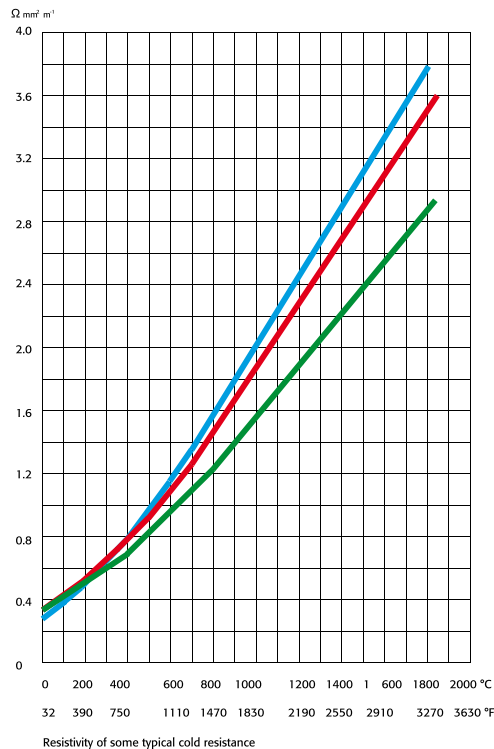
To avoid this peak current two techniques can be used:

- Phase angle firing with soft start and current limit. This type of firing can be used with all types of loads.
- Normal resistance.
- Cold resistance (Example: Kanthal Super elements)
- Transformer coupled with normal or cold resistance.
- Burst firing using the Delay Triggering (DT) technique. To avoid magnetic circuit saturation, the thyristor unit will switch OFF when the load voltage is negative and switch ON again when positive. The unit also has an adjustable delay on voltage zero crossing. In this way it is possible to switch ON when current is zero. This Firing technique can only be used with normal resistance, where its resistive value remains constant with temperature variations.



The BIG advantage with Relay CL

Buy one unit and you remove all application risks, selecting Phase Angle or Delayed Triggering as required via frontal Key Pad.



Relay SSR



SIZE SRO



Technical Specification

- **Dimensions:** SRO, SR1, (see page14-15)
- **Load type:** Normal resistance, infrared long and medium waveform
- **Inputs:** SSR
- **Firing mode:** Zero Crossing
- **Operating temperature:** See graph on right page
- **Comply with EMC**
- **Data sheet:** More details on "Relay SSR" Bulletin

Option

Total load failure without latching
 All options below are available with fuse + fuse holder only
 Current Transformer
 Current Transformer + HB (heater break)
 Current Transformer + HB (heater break) + flat wiring system

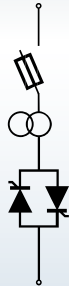
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
CODE	S	S	R	-	-	-	-	-	-	-	-	-	-	-	-	-	
CURRENT				4	5	6											
description				code			note										
62A				0	6	2											
74A				0	7	4											
90A				0	9	0											
MAX VOLTAGE				7													
description				code			note										
480V				4													
600V				6													
VOLTAGE SUPPLY AUX.				8													
description				code			note										
Without HB no auxiliary voltage supply				0													
With HB 12:24V ac-dc opt. Available only with fuse + fuse holder				4			1										
INPUT				9													
description				code			note										
SSR				S													
FIRING				10													
description				code			note										
ZC Zero Crossing				Z													
Random				R													
CONTROL MODE				11													
description				code			note										
Open Loop				0													
FUSES & OPTION							12										
description							code										Note
No Fuse							0										
Fuse + Fuse Holder							F										
Fuse + Fuse Holder + CT							Y										
Fuse + Fuse Holder + CT + HB							H										2
Fuse + Fuse Holder + CT + HB + Flat Cable							X										2
Total Load Failure							N										
FAN VOLTAGE							13										
description							code										Note
No Fan							0										
APPROVALS							14										
description							code										Note
CE EMC For European Market							0										
MANUAL							15										
description							code										Note
None							0										
Italian							1										
English							2										
German							3										
French							4										
VERSION							16										
description							code										Note
Std version							1										

Note (1) Auxiliary voltage supply used only with HB option **Note (2)** Option available only with fuse + fuse holder

Relay SSR Analog



SIZE SR1



Technical Specification

- **Dimensions:** SR1 (see page14-15)
- **Load type:** Normal resistance, infrared long and medium waveform
- **Inputs:** 0:10V; 4-20mA - SSR
- **Firing mode:** Zero Crossing
- **Operating temperature:** See graph on right page
- **Comply with EMC**
- **Data sheet:** More details on "Relay SSR Analog" Bulletin

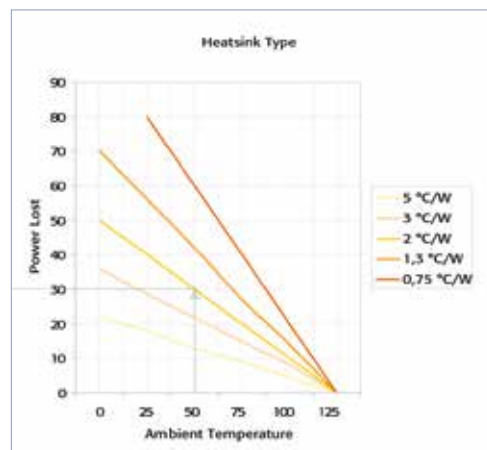
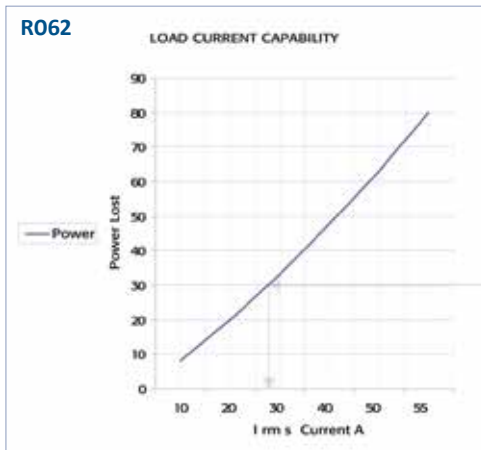
Option

All options below are available with fuse + fuse holder only
 Current Transformer
 Current Transformer + HB (heater break)
 Current Transformer + HB (heater break) + flat wiring system

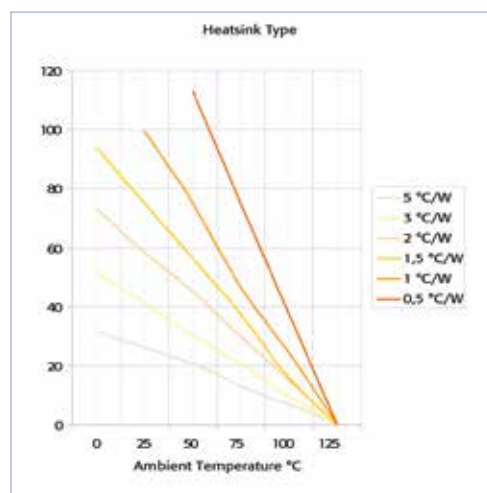
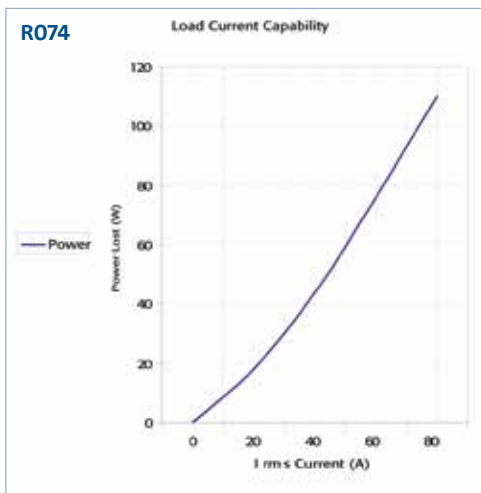
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
CODE (Note3)	S	S	R	-	-	-	-	-	-	-	-	-	-	-	-	-	
CURRENT				4	5	6											
description				code			note										
62A				0	6	2											
74A				0	7	4											
90A				0	9	0											
MAX VOLTAGE				7													
description				code			note										
480V				4													
600V				6													
VOLTAGE SUPPLY AUX.				8													
description				code			note										
12:24V ac-dc				4													
INPUT				9													
description				code			note										
0:10V Analog Input				V			2										
4:20 mA Analog Input				A			2										
FIRING				10													
description				code			note										
Burst Firing 4 Cycles on at 50% Power Demand				4													
Burst Firing 8 Cycles on at 50% Power Demand				8													
Burst Firing 16 Cycles on at 50% Power Demand				6													
CONTROL MODE							11										
description							code										note
Open Loop							0										
FUSES & OPTION							12										
description							code										Note
Fuse + Fuse Holder							F										
Fuse + Fuse Holder + CT							Y										
Fuse + Fuse Holder + CT + HB							H										2
Fuse + Fuse Holder + CT + HB + Flat Cable							X										2
FAN VOLTAGE							13										
description							code										Note
No Fan							0										
APPROVALS							14										
description							code										Note
CE EMC For European Market							0										
MANUAL							15										
description							code										Note
None							0										
Italian							1										
English							2										
German							3										
French							4										
VERSION							16										
description							code										Note
Std version							1										

Note (2) Option available only with fuse + fuse holder
Note (3) All the Relay Analog version have fuse + fuse holder

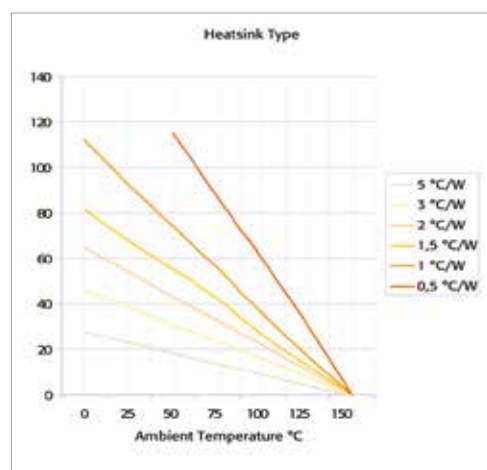
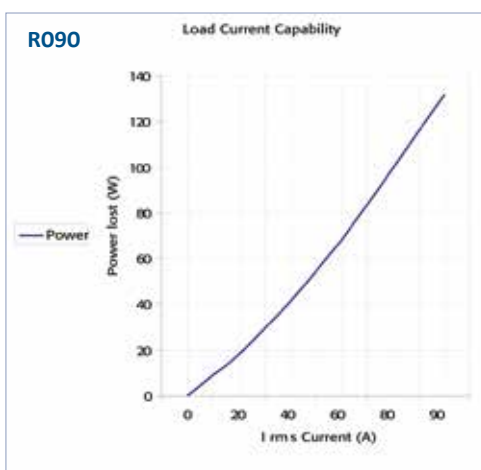
Current sizing for Relay SSR/SSR Analog



R062 MODULE Power Dissipation versus on state Current and ambient Temperature



R074 MODULE Power Dissipation versus on state Current and ambient Temperature



R090 MODULE Power Dissipation versus on state Current and ambient Temperature

Relay SX



SIZE SR2 - 230V / 480V

Specification

- This unit is available in three version as is drawing below
- Each unit includes Fuse and Fuse Holder, thyristor and heat sink with its own Firing circuit
- Zero Crossing Firing
- Insulated input
- LED for On Off Status indication
- LED for fuse failure indication
- Plug in connection for auxiliary and power terminations
- Small dimensions Width: 36 Depth: 86 Height:121
- Din rail mounting or screw mounting
- Can be used in applications with many zones and low power as thermoforming, blow Moulding and Hot Runners

Diagram of control connection 4x3,5A

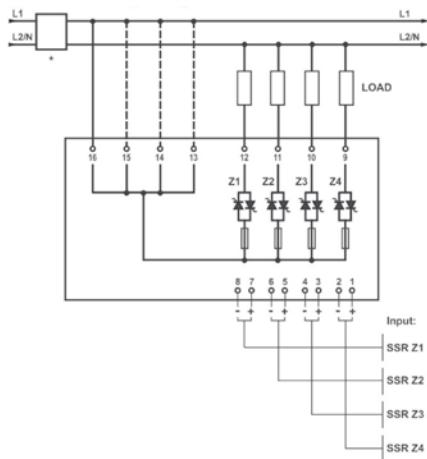


Diagram of control connection 3x4,5A

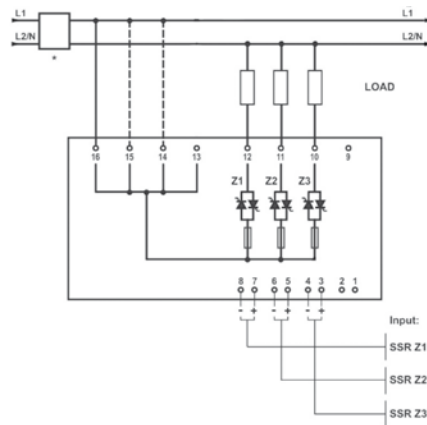
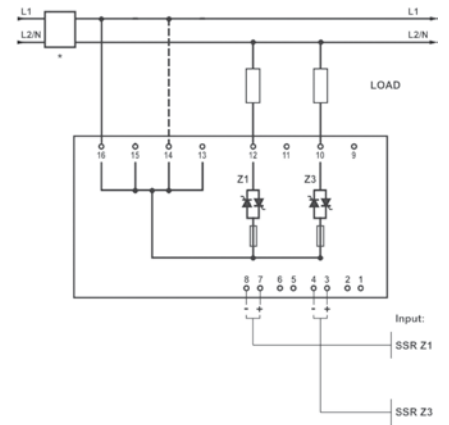


Diagram of control connection 2x7A



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CODE	R	S	X	-	-	-	-	-	-	-	-	-	-	-	-	-
NUMBER OF ZONES X CURRENT RATING				4	5	6										
description				code		note										
4 zones 3,5A each				4	0	3										
3 zones 4,5A each				3	0	4										
2 zones 7A each				2	0	7										
MAX VOLTAGE				7												
description				code		note										
230 V				2												
480 V				4		2										
VOLTAGE SUPPLY AUX.				8												
description				code		note										
No auxiliary voltage with 230V				0												
12-24V ac-dc with 480V				4												
INPUT				9												
description				code		note										
SSR				S												
FIRING				10												
description				code		note										
Zero Crossing				Z												
Random (used with Relay-PC)				R												
CONTROL MODE				11												
description				code		note										
Open Loop				0												
FUSES & OPTION												12				
description												code		Note		
Fuse + Fuse Holder												F				
Total Load Faillure with Latching												L		1		
FAN VOLTAGE												13				
description												code		Note		
No Fan Voltage												0				
APPROVALS												14				
description												code		Note		
CE EMC For European Market												0				
MANUAL												15				
description												code		Note		
None												0				
Italian												1				
English												2				
German												3				
French												4				
VERSION												16				
description												code		Note		
Version 1												1				

Note (1) This option is available only on 480V version

Note (2) The 480V version have dimension W=48 H=121 D=86

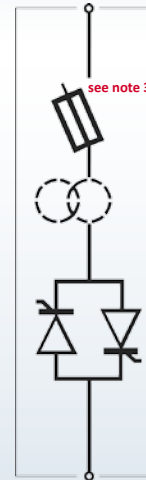
Relay S 1PH



SIZE SR6



SIZE S12



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistance, infrared long and medium waveform
- **Inputs:** SSR Standard, 0:10V, 4:20mA and Heater Break alarm are options
- **Firing mode:** Zero Crossing, Burst Firing available with analogue input only
- **Operating temperature:** 0 to 40°C without derating
- **Comply with EMC**
- **Data sheet:** More details on “Relay S 1PH” bulletin

Option

- Analog input: 4/20 mA or 0/10V
- Heater Break Alarm + Current Transformer
- Current Transformer only mounted inside

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																			
CODE	R	S	1	-	-	-	-	-	-	-	-	-	-	-	-	-																			
CURRENT				4	5	6				10																									
description				code	code	note				code	code	Note																							
30A				0	3	0				Z		6																							
35A				0	3	5				4		4																							
40A				0	4	0				8		4																							
60A				0	6	0				6		4																							
90A				0	9	0																													
120A				1	2	0																													
150A				1	5	0																													
180A				1	8	0																													
210A				2	1	0																													
280A				2	8	0																													
400A				4	0	0																													
500A				5	0	0																													
600A				6	0	0																													
700A				7	0	0																													
MAX VOLTAGE							7																												
description							code	code	note																										
480V							4																												
600V							6																												
690V							7	7																											
VOLTAGE SUPPLY AUX.										8																									
description										code	code	note																							
No Aux. Voltage without HB and/or Analog Input up to 210A included										0																									
With HB and/or Analog Input on all unit =<210A Aux Volt 12:24V ac-dc										4																									
For all Units > 210A with whichever options and inputs																																			
90:130V										1	5																								
170:265V										2	5																								
230:345V										3	5																								
300:530V										5	5																								
510:690V										6	5																								
600:760V										7	5																								
INPUT													9																						
description													code	code	note																				
SSR													S																						
0:10V dc													V																						
4:20mA													A																						
FIRING																10																			
description																code	Note																		
ZC Zero Crossing																Z	6																		
Burst Firing 4 Cycles On at 50% Power Demand																4	4																		
Burst Firing 8 Cycles On at 50% Power Demand																8	4																		
Burst Firing 16 Cycles On at 50% Power Demand																6	4																		
CONTROL MODE																			11																
description																			code	Note															
Open Loop																			0																
FUSES & OPTION																						12													
description																						code	Note												
No Fuse for all Units =< 40A																						0													
Fuse + Fuse Holder																						F													
Fuse + Fuse Holder + CT																						Y													
Fuse + Fuse Holder + CT + HB																						H													
Fuse + Fuse Holder + CT + HB with flat cable connection																						X													
Fixed Fuses Std for all Units > 40A																						F	3												
Fixed Fuses Std + CT																						Y													
Fixed Fuses Std + CT + HB																						H													
FAN VOLTAGE																									13										
description																									code	Note									
No Fan < 120A																									0										
Fan 110V > 90A																									1										
Fan 220V > 90A Std Version																									2										
APPROVALS																												14							
description																												code	Note						
CE EMC For European Market																												0							
MANUAL																															15				
description																															code	Note			
None																															0				
Italian																															1				
English																															2				
German																															3				
French																															4				
VERSION																															16				
description																																		code	Note
Std unit with one fuse only																																		1	
Units with 2 Fuses + fuse Holder =< 40A																																		2	1
Units with 2 Fuses + fuse Holder + safety relay + fuse =< 40A																																		3	2

Note (1) If you need one Relay S 1PH with 2 Fuse & Fuse Holder. For dimensions see Relay S 2PH. This solution can be used up to 40A max.

Note (2) If you need one Relay S 1PH with 2 Fuse & Fuse Holder + safety relay. For dimensions see Relay S 2PH. This solution can be used up to 40A max.

Note (3) Fixed Fuses over 40A

Note (4) Available only with Analog input

Note (5) Load voltage must be included in Selected Auxiliary Voltage Range for units >210A

Note (6) With 690V the firing is random

Note (7) Available on unit >280A

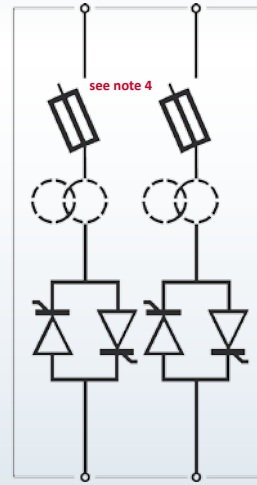
Relay S 2PH



SIZE SR7



SIZE S14



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistance, infrared long and medium waveform
- **Inputs:** SSR Standard, 0:10V, 4:20mA and Heather Break alarm are options
- **Firing mode:** Zero Crossing, Burst Firing available with analogue input only
- **Operating temperature:** 0 to 40°C without derating
- **Comply with EMC**
- **Data sheet:** More details on "Relay S 2PH" bulletin

Option

- Analog input: 4/20 mA or 0/10V
- Current Transformer only mounted inside
- Current Transformer+ HB Alarm

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
CODE	R	S	2	-	-	-	-	-	-	-	-	-	-	-	-	-	
CURRENT				4	5	6											
description				code		note											
30A				0	3	0											
35A				0	3	5											
40A				0	4	0											
60A				0	6	0											
90A				0	9	0											
120A				1	2	0											
150A				1	5	0											
180A				1	8	0											
210A				2	1	0											
280A				2	8	0											
400A				4	0	0											
450A				4	5	0											
500A				5	0	0											
600A				6	0	0											
700A				7	0	0											
MAX VOLTAGE					7												
description					code	note											
480V					4												
600V					6												
690V					7	5											
VOLTAGE SUPPLY AUX.					8												
description					code	note											
No Aux. Voltage without HB and/or Analog Input up to 210A included					0												
With HB and/or Analog Input on all unit =<210A Aux Volt 12:24V ac-dc					4												
For all Units > 210A with whichever options and inputs																	
90:130V					1	3											
170:265V					2	3											
230:345V					3	3											
300:530V					5	3											
510:690V					6	3											
600:760V					7	3											
INPUT					9												
description					code	note											
SSR					S												
0:10V dc					V												
4:20mA					A												
FIRING										10							
description										code	Note						
ZC Zero Crossing										Z							
Burst Firing 4 Cycles On at 50% Power Demand										4	2						
Burst Firing 8 Cycles On at 50% Power Demand										8	2						
Burst Firing 16 Cycles On at 50% Power Demand										6	2						
CONTROL MODE											11						
description											code	Note					
Open Loop											0						
FUSES & OPTION												12					
description												code	Note				
No Fuse for all Units =< 40A												0					
Fuse + Fuse Holder												F					
Fuse + Fuse Holder + CT												Y					
Fuse + Fuse Holder + CT + HB with Terminals												H					
Fuse + Fuse Holder + CT + HB with Flat Cable Connection												X					
Fixed Fuses Std for all Units > 40A												F	4				
Fixed Fuses Std + CT												Y					
Fixed Fuses Std + CT + HB												H					
FAN VOLTAGE													13				
description													code	Note			
Fan < 90A													0				
Fan 110V => 90A													1				
Fan 220V => 90A Std Version													2				
APPROVALS														14			
description														code	Note		
CE EMC For European Market														0			
MANUAL															15		
description															code	Note	
None															0		
Italian															1		
English															2		
German															3		
French															4		
VERSION																16	
description																code	Note
Std unit with 2 fuses + fuses Holder =< 40A																1	
Std Units with 2 fixed fuses > 40A																2	
Units with 3 fuses + fuses Holder =< 40A																3	1

- Note (1)** If you need one Relay S 2PH with 3 Fuse & Fuse Holder For dimensions see Relay S 3PH. This solution can be used up to 40A max.
- Note (2)** Available with Analog input only
- Note (3)** Load voltage must be included in Selected Auxiliary Voltage Range for unit > 210A
- Note (4)** Fixed Fuses over 40A
- Note (5)** Available on unit >280A

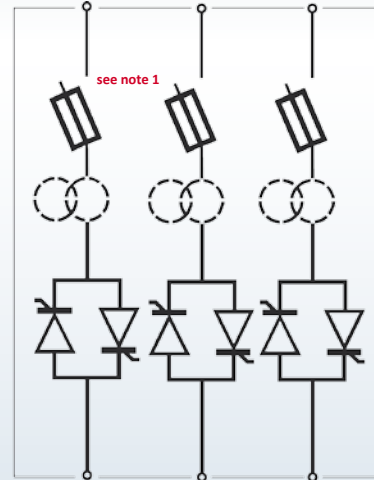
Relay S 3PH



SIZE SR8



SIZE S13



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistance, infrared long and medium waveform
- **Inputs:** SSR Standard, 0:10V, 4:20mA and Heater Break alarm are options
- **Firing mode:** Zero Crossing, Burst Firing available with analogue input only
- **Operating temperature:** 0 to 40°C without derating
- **Comply with EMC**
- **Data sheet:** More details on "Relay S 3PH" bulletin

Option

- Analog input: 4/20 mA or 0/10V
- Heater Break Alarm + Current Transformer
- Current Transformer+ HB Alarm

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
	R	S	3	-	-	-	-	-	-	-	-	-	-	-	-	-	
CURRENT				4	5	6											
description				code		note											
30A				0	3	0											
35A				0	3	5											
40A				0	4	0											
60A				0	6	0											
90A				0	9	0											
120A				1	2	0											
150A				1	5	0											
180A				1	8	0											
210A				2	1	0											
225A				2	2	5											
300A				3	0	0											
350A				3	5	0											
400A				4	0	0											
450A				4	5	0											
500A				5	0	0											
MAX VOLTAGE							7										
description				code		note											
480V				4													
600V				6													
690V				7		5											
VOLTAGE SUPPLY AUX.							8										
description				code		note											
No Aux. Voltage without HB and/or Analog Input up to 210A included				0													
With HB and/or Analog Input on all unit =<210A Aux Volt 12:24V ac-dc				4													
For all Units > 210A with whichever options and inputs 90:130V																	
90:130V				1		4											
170:265V				2		4											
230:345V				3		4											
300:530V				5		4											
510:690V				6		4											
600:760V				7		4											
INPUT							9										
description				code		note											
SSR				S													
0:10V dc				V													
4:20mA				A													
FIRING										10							
description										code		note					
ZC Zero Crossing										Z							
Burst Firing 4 Cycles On at 50% Power Demand										4		2					
Burst Firing 8 Cycles On at 50% Power Demand										8		2					
Burst Firing 16 Cycles On at 50% Power Demand										6		2					
CONTROL MODE										11							
description										code		note					
Open Loop										0							
FUSES & OPTION										12							
description										code		note					
No Fuse for all Units =< 40A										0							
Fuse + Fuse Holder										F							
Fuse + Fuse Holder + CT										Y							
Fuse + Fuse Holder + CT + HB with terminals										H							
Fuse + Fuse Holder + CT + HB + Flat cable connection										X		3					
Fixed Fuses Std for all Units > 40A										F		1					
Fixed Fuses Std + CT										Y							
Fixed Fuses Std + CT + HB										H							
FAN VOLTAGE										13							
description										code		note					
No Fan < 90A										0							
Fan 110V => > 90A										1							
Fan 220V => > 90A Std Version										2							
APPROVALS										14							
description										code		note					
CE EMC For European Market										0							
MANUAL										15							
description										code		note					
None										0							
Italian										1							
English										2							
German										3							
French										4							
VERSION										16							
description										code		note					
Std Version										1							

- Note (1)** Fixed Fuses over 40A
- Note (2)** Available with Analog input only
- Note (3)** Available up to 40A only flat Cable Connection
- Note (4)** Load Voltage must be included in selected Auxiliary Voltage Range for unit > 210A
- Note (5)** Available on unit => 225A

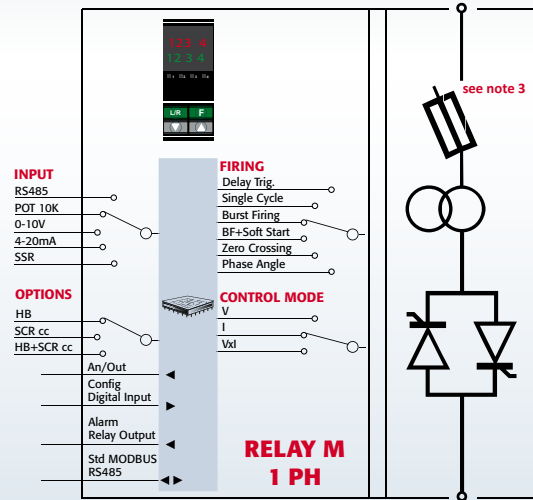
Relay M 1PH



SIZE SR9



SIZE S12



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistance, infrared short long and medium waveform, Silicon Carbide
- **Inputs:** 0:10V dc, 4:20mA, 10kpot, SSR, RS485
- **Firing mode:** Zero Crossing, Burst Firing, Single Cycle, Soft Start + Phase Angle, Delayed Triggering
- **Operating temperature:** 0 to 40°C without derating
- **Control mode:** Voltage, Vxl Power, I and I2
- **RS485 port:** RTU Modbus Protocol
- **Comply with EMC**
- **Data sheet:** More details on "Relay M 1PH" bulletin

Option

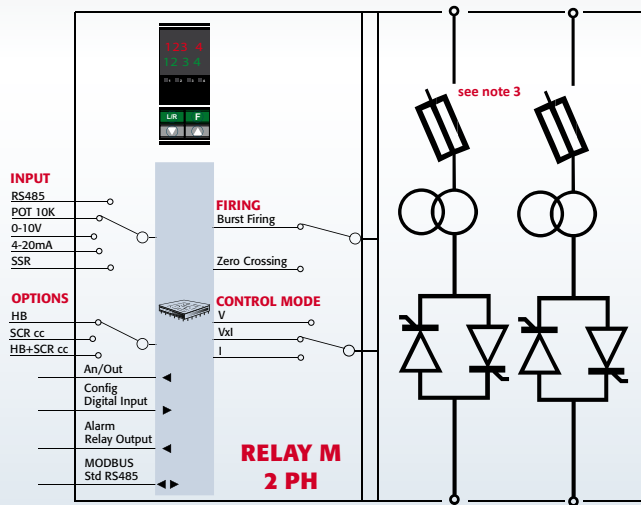
HB + CT : Current transformer plus HB Alarm Configuration software + CCA (cable + converter)

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note 5	
R	M	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CURRENT				4	5	6					11							
description				code		note					code							Note
35A				0	3	5					O							
40A				0	4	0					U							
60A				0	6	0					W							
90A				0	9	0					I							
120A				1	2	0					T							
150A				1	5	0												
180A				1	8	0												
210A				2	1	0												
280A				2	8	0												
400A				4	0	0												
500A				5	0	0												
600A				6	0	0												
700A				7	0	0												
CONTROL MODE																		
description											code							Note
Open Loop											O							
Voltage Feed Back											U							
Power Feed Back											W							
Current Feed Back											I							
Voltage to Power Feed Back Transfer											T							
FUSES & OPTION																		
description											code							Note
For Units =< 40A Fuse + Fuse Holder + CT											Y							
Fuse + Fuse Holder + CT + HB with Terminal											H							
For Units > 40A Fixed Fuse Std + CT											Y							3
Fixed Fuse Std + CT + HB											H							
Control Mode Retransmission 4:20mA											A							
Control Mode Retransmission 0:10mV											V							
FAN VOLTAGE																		
description											code							Note
No Fan < 120A											0							
Fan 110V > 90A											1							
Fan 220V > 90A Std Version											2							
APPROVALS																		
description											code							Note
CE EMC For European Market											0							
MANUAL																		
description											code							Note
None											0							
Italian											1							
English											2							
German											3							
French											4							
VERSION																		
description											code							Note
Std unit with 1 fuse											1							
Unit with 2 fuses + Fuse Holder =< 40A											2							1
Unit with 2 fuses + Fuse Holder + Safety Relay =< 40A											3							2
Unit with 2 fuses + Fuse Holder + Safety Relay =< 40A											3							2
Note (1)	If you need one Relay M 1PH with 2 Fuse & Fuse Holder. For dimensions see Relay M 2PH. This solution can be used up to 40A max.																	
Note (2)	If you need one Relay M 1PH with 2 Fuse & Fuse Holder + safety relay. For dimensions see Relay M 2PH. This solution can be used up to 40A max.																	
Note (3)	Fixed Fuse over 40A																	
Note (4)	Available on units => 400A																	
Note (5)	After 16th digit write current and voltage of load inside brackets Ex (190A-400V)																	
Note (6)	Load voltage must be included in Selected Auxiliary Voltage Range.																	

Relay M 2PH



SIZE S14



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistance, infrared long and medium waveform, Silicon Carbide
- **Inputs:** 0-10V dc, 4-20mA, 10kpot, SSR, RS485
- **Firing mode:** Zero Crossing, Burst Firing
- **Operating temperature:** 0 to 40°C without derating
- **Control mode:** V Voltage, Vxl Power
- **RS485 port:** RTU Modbus Protocol Std.
- **Comply with EMC**
- **Data sheet:** More details on "Relay M 2PH" bulletin

Option

- **HB + CT :** Current transformer plus HB Alarm
- **Control Mode Retransmission**
- **Configuration software code:** CCA (cable + converter + configuration software)
- **Profibus DP, Modbus TCP** from 60A to 700A

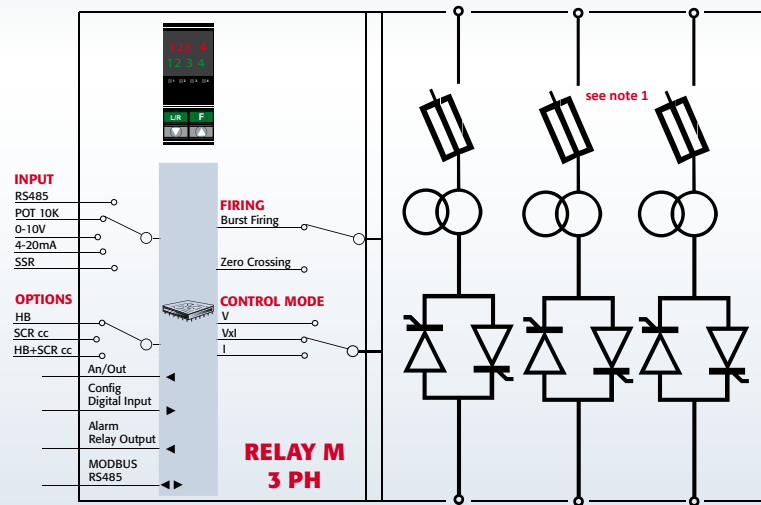
CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	R	M	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CURRENT				4	5	6					11					Note 4
description				code		note					code					Note
30A				0	3	0					O					
35A				0	3	5					U					
40A				0	4	0					W					
60A				0	6	0					I					
90A				0	9	0										
120A				1	2	0										
150A				1	5	0										
180A				1	8	0										
210A				2	1	0										
280A				2	8	0										
400A				4	0	0										
450A				4	5	0										
500A				5	0	0										
600A				6	0	0										
700A				7	0	0										
CONTROL MODE																
description																
Open Loop											O					
Voltage Feed Back V											U					
Power Feed Back Vxl											W					
Current Feed Back I											I					
FUSES & OPTION																
description																
For Units =< 40A Fuse & Fuse Holder + CT											Y					1
Fuse & Fuse Holder + CT + HB with Terminal											H					
Fuse & Fuse Holder + CT + HB with Flat Cable											X					
For Units => 40A Fixed Fuse Std + CT											Y					3
Fixed Fuse Std + CT + HB											H					
Control Mode Retransmission 4:20mA											A					
Control Mode Retransmission 0:10mV											V					
FAN VOLTAGE																
description																
No Fan < 120A											0					
Fan 110V > 90A											1					
Fan 220V > 90A Std Version											2					
APPROVALS																
description																
CE EMC For European Market											0					
MANUAL																
description																
None											0					
Italian											1					
English											2					
German											3					
French											4					
VERSION																
description																
Std unit with 2 fuses + Fuse Holder =< 40A											1					1
Std Unit > 40A with 2 Fixed Fuses											2					
Unit with 3 fuses & Fuse Holder =< 40A											3					1
INPUT																
description																
SSR											S					
0:10V dc											V					
4:20V mA											A					
10KPot											K					
SRS458											R					
FIRING																
description																
Zero Crossing ZC											Z					
Burst Firing BF											B					

- Note (1)** If you need one Relay M 2PH with 3 Fuse & Fuse Holder For dimensions see Relay M 3PH. This solution can be used up to 40A max
- Note (2)** Available on units => 400A
- Note (3)** Fixed Fuses over 40A
- Note (4)** After 16th digit write current and voltage of load inside brackets Ex (190A-400V)
- Note (5)** Load voltage must be included in Selected Auxiliary Voltage Range

Relay M 3PH



SIZE S13



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistive, infrared long and medium waveform, Silicon Carbide
- **Inputs:** 0-10V dc, 4-20mA, 10kpot, SSR, RS485
- **Firing mode:** Zero Crossing, Burst Firing
- **Operating temperature:** 0 to 40°C without derating
- **Control mode:** Voltage, Vxl Power I and I₂
- **RS485 port:** RTU Modbus Protocol Std.
- **Comply with EMC**
- **Data sheet:** More details on "Relay M 3PH" bulletin

Option

- **HB + CT :** Current transformer plus HB Alarm
- **Control Mode Retransmission**
- **Configuration software code:** CCA (cable + converter + configuration software)
- **Profibus DP, Modbus TCP** for unit > 300A

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note 2
	R	M	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CURRENT				4	5	6											
description				code	code	code											
30A				0	3	0											
35A				0	3	5											
40A				0	4	0											
60A				0	6	0											
90A				0	9	0											
120A				1	2	0											
150A				1	5	0											
180A				1	8	0											
210A				2	1	0											
225A				2	2	5											
300A				3	0	0											
350A				3	5	0											
400A				4	0	0											
450A				4	5	0											
500A				5	0	0											
MAX VOLTAGE				7													
description				code	note												
480 V				4													
600 V				6													
690V Available on Units => 225A				7													
VOLTAGE SUPPLY AUX.				8													
description				code	note												
90:130V				1	3												
170:265V				2	3												
230:345V				3	3												
300:530V				5	3												
510:690V				6	3												
600:760V				7	3												
INPUT				9													
description				code	note												
SSR				S													
0:10V dc				V													
4:20V mA				A													
10KPot				K													
RS485				R													
FIRING				10													
description				code	note												
Zero Crossing ZC				Z													
Burst Firing BF				B													
CONTROL MODE				11													
description				code	Note												
Open Loop				O													
Voltage Feed Back V				U													
Power Feed Back Vxl				W													
Current Feed Back I				I													
FUSES & OPTION				12													
description				code	Note												
For Units =< 40A Fuse & Fuse Holder + CT				Y													
Fuse & Fuse Holder + CT + HB with Terminal				H													
Fuse & Fuse Holder + CT + HB with Flat Cable				X													
For Units => 40A Fixed Fuse Std + CT				Y	1												
Fixed Fuse Std + CT + HB				H													
Control Mode Retransmission 4:20mA				A													
Control Mode Retransmission 0:10mV				V													
FAN VOLTAGE				13													
description				code	Note												
No Fan < 120A				0													
Fan 110V => 90A				1													
Fan 220V => 90A Std Version				2													
APPROVALS				14													
description				code	Note												
CE EMC For European Market				0													
MANUAL				15													
description				code	Note												
None				0													
Italian				1													
English				2													
German				3													
French				4													
VERSION				16													
description				code	Note												
Version Std with 3 fuses				1													

Note (1) Fixed Fuses over 40A

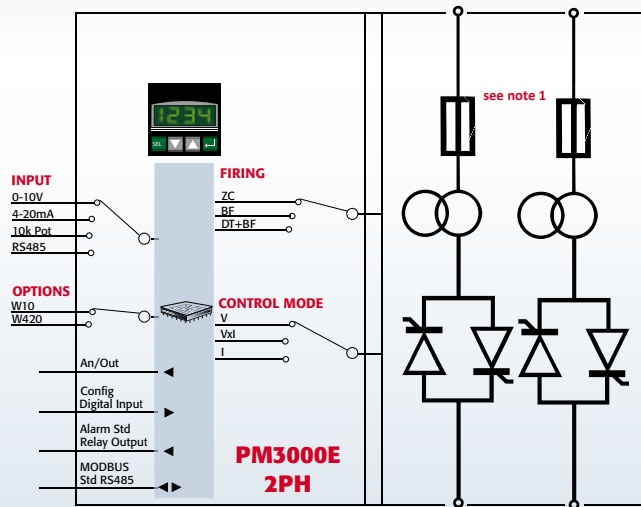
Note (2) After 16th digit write current and voltage of load inside brackets Ex (190A-400V)

Note (3) Load voltage must be included in Selected Auxiliary Voltage Range.

PM 3000E 2PH



SIZE S9



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistance, three phase transformer, coupled with normal resistance
- **Inputs:** 0-10V dc, 4-20mA, 10k Pot, SR485
- **Firing mode:** Zero Crossing, Burst Firing, DT+BF (not with cold resistance)
- **Operating temperature:** 0° to 40°C without derating
- **Control mode:** V Voltage, VxI Power, Open Loop
- **RS485 port:** RTU Modbus Protocol
- **Comply with EMC**
- **Data sheet:** More details on “PM 3000E 2PH” bulletin

Option

- No options, all included
- Configuration software code: CCA (cable + converter + configuration software)
- Profibus DP, Modbus TCP for unit > 280A

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note 2
	R	E	2	-	-	-	-	-	-	-	-	-	-	-	-	-	
CURRENT				4	5	6											
description				code		note											
35A				0	3	5											
45A				0	4	5											
75A				0	7	5											
100A				1	0	0											
125A				1	2	5											
150A				1	5	0											
200A				2	0	0											
280A				2	8	0											
400A				4	0	0											
450A				4	5	0											
500A				5	0	0											
600A				6	0	0											
700A				7	0	0											
MAX VOLTAGE				7													
description				code		note											
480V				4													
600V				6													
VOLTAGE SUPPLY AUX.				8													
description				code		note											
110V				1													
230V				2													
INPUT				9													
description				code		note											
SSR 3:30V dc				S													
0:10V dc				V													
4:20V mA				A													
10kPot				K													
RS485				R													
FIRING				10													
description				code		note											
Zero Crossing ZC				Z													
Burst Firing BF				B													
Delayed Triggering + Burst Firing DT + BF				D		3											
CONTROL MODE				11													
description				code		Note											
Open Loop				O													
Voltage Feed Back V				U													
Power Feed Back VxI				W													
Current Feed Back I				I													
OPTION				12													
description				code		Note											
Control Mode Retransmission 4:20mA				A													
Control Mode Retransmission 0:10mV				V													
FAN VOLTAGE				13													
description				code		Note											
Fan Voltage equal to Aux. Voltage				3													
APPROVALS				14													
description				code		Note											
CE EMC For European Market				0													
cUL For American Market				L													
MANUAL				15													
description				code		Note											
None				0													
Italian				1													
English				2													
German				3													
French				4													
VERSION				16													
description				code		Note											
Resistive Load/Delta Connection				1													
Resistive Load/Star Connection				2													
Transformer Load/Delta Connection				3													
Transformer Load/Star Connection				4													

Note (1) Internal Fixed Fuses.

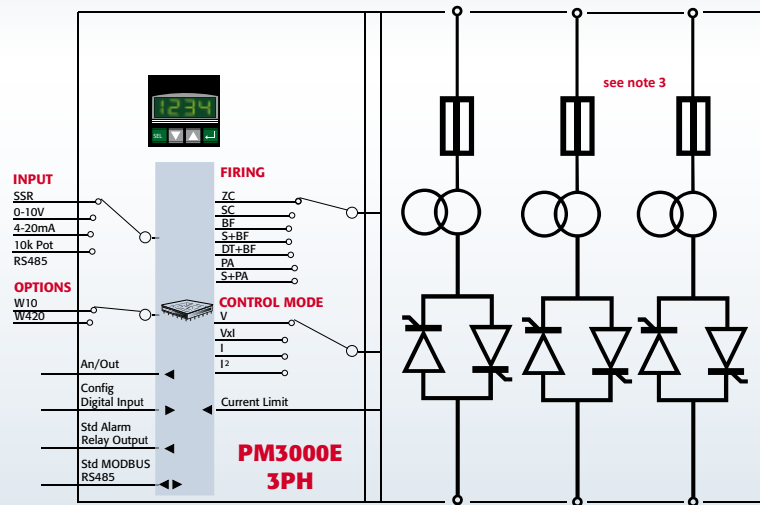
Note (2) After 16th digit write current and voltage of load inside brackets Ex (190A-400V). Required if units are to be tuned to load.

Note (3) DT + BF can be used to drive transformers coupled with normal resistance.

PM 3000E 3PH



SIZE S13



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistance, three phase transformer coupled with normal or cold resistance
- **Inputs:** None, SSR, 0-10V, 4-20mA, 10kpot, RS485 communication
- **Firing mode:** Zero Crossing, Single Cycle, Burst Firing, Soft Start + Burst Firing, Delayed Triggering + Burst Firing, Phase Angle, Soft Start + Phase Angle
- **Operating temperature:** 0° to 40°C without derating
- **Control mode:** V, Vxl, I
- **RS485 RTU port. Modbus Protocol**
- **Comply with EMC and cUL**
- **Data sheet:** More details on "PM 3000E 3PH" bulletin

Option

No options, all included
Configuration software code: CCA (cable + converter + configuration software)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note 1
CODE	R	E	3	-	-	-	-	-	-	-	-	-	-	-	-	-	
CURRENT				4	5	6											
description				code		note											
35A				0	3	5											
45A				0	4	5											
75A				0	7	5											
100A				1	0	0											
125A				1	2	5											
150A				1	5	0											
225A				2	2	5											
300A				3	0	0											
350A				3	5	0											
400A				4	0	0											
450A				4	5	0											
500A				5	0	0											
MAX VOLTAGE							7										
description							code										
480V							4										
600V							6										
VOLTAGE SUPPLY AUX.								8									
description								code									
110V								1									
230V								2									
INPUT									9								
description									code								
SSR 3:30V dc									S								
0:10V dc									V								
4:20V mA									A								
10KPot									K								
RS485									R								
FIRING										10							
description										code							
Zero Crossing ZC										Z							
Single Cycles SC										C							
Burst Firing BF										B							
Soft Start + Burst Firing S + BF										J							
Delayed Triggering + Burst Firing DT + BF										D						2	
Phase Angle PA										P							
Soft Start + Phase Angle S + PA										E							
CONTROL MODE											11						
description											code						Note
Open Loop											O						
Voltage Feedback V											U						
Power Feedback Vxl											W						
Current Feedback I											I						
Square I Feedback											Q						
OPTION												12					
description												code					Note
Control Mode Retransmission 4:20mA												A					
Control Mode Retransmission 0:10mV												V					
FAN VOLTAGE													13				
description													code				Note
Fan Voltage equal to Aux. Voltage													3				
APPROVALS														14			
description														code			Note
CE EMC For European Market														0			
cUL For American Market														L			
MANUAL															15		
description															code		Note
None															0		
Italian															1		
English															2		
German															3		
French															4		
VERSION																16	
description																code	Note
Resistive Load/Delta Connection																1	
Resistive Load/Star Connection																2	
Resistive Load/Star Connection + Neutral																7	
Transformer Load/Delta Connection																3	
Transformer Load/Star Connection																4	
Transformer Load/Star Connection + Neutral																5	
Resistive Load/Open Delta																6	

Note (1) After 16th digit write current + voltage of load inside brackets Ex (190A-400V). Required if units are to be tuned to load.

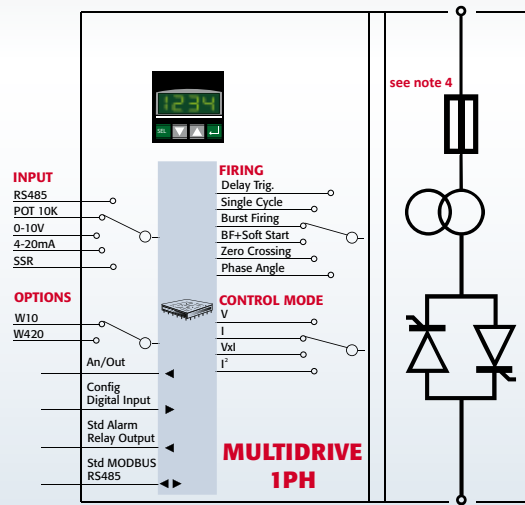
Note (2) DT + BF can be used to drive transformers coupled with normal resistance.

Note (3) Internal Fixed Fuses.

Multidrive 1PH



SIZE SR18



Technical Specification

- **Dimensions:** See size and dimensions at page 14-15
- **Load type:** Normal resistance, one phase transformer coupled with normal or cold resistance
- **Inputs:** 0-10V, 4-20mA, 10kpot, RS485 communication, SSR
- **Firing mode:** Burst Firing, Soft Start + Burst Firing, Delayed Triggering + Burst Firing, Phase Angle, Soft Start + Phase Angle
- **Operating temperature:** 0° to 40°C without derating
- **Control mode:** Voltage, Current Power, External signal, Current square
- **RS485 port:** RTU Modbus Protocol Std. for other Fieldbus see option
- **Comply with EMC**
- **Data sheet:** More details on "Multidrive 1PH" bulletin

Option

No options, all included
 Configuration software code: CCA (cable + converter + configuration software)
 Profibus DP, ProfiNet and Modbus TCP

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note 1	
	M	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
CURRENT			3	4	5	6												
description			code			note												
850A			0	8	5	0												
1000A			1	0	0	0												
1300A			1	3	0	0												
1600A			1	6	0	0												
1800A			1	8	0	0												
2000A			2	0	0	0												
2200A			2	2	0	0												
2400A			2	4	0	0										2		
MAX VOLTAGE							7											
description							code		note									
480V								4										
600V								6										
690V								7										
VOLTAGE SUPPLY AUX.								8										
description								code		note								
110V									1									
230V									2									
INPUT									9									
description									code		note							
SSR 3:30V dc										S								
0:10V dc										V								
4:20 mA										A								
10KPot										K								
RS485										R								
FIRING																		
description										code		note						
Burst Firing BF											B							
Soft Start + Burst Firing S + BF											J							
Delayed Triggering + Burst Firing DT + BF											D							
Phase Angle PA											P							
Soft Start + Phase Angle S + PA											E							
CONTROL MODE																		
description																		
Open Loop																		
Voltage Feed Back V																		
Power Feed Back Vxl																		
Current Feed Back I																		
External Feed Back I																		
OPTION																		
description																		
4:20mA Retransmission																		
0:10V Retransmission																		
FAN VOLTAGE																		
description																		
Fan Voltage equal to Aux. Voltage																		
APPROVALS																		
description																		
CE EMC For European Market																		
MANUAL																		
description																		
None																		
Italian																		
English																		
German																		
French																		
VERSION																		
description																		
Resistive Load																		
Transformer																		

Note (1) After 16th digit write current and voltage of load inside brackets Ex (190A-400V). This is to receive the Thyristor unit already tuned from PMA.

Note (2) Rating not available at 690V

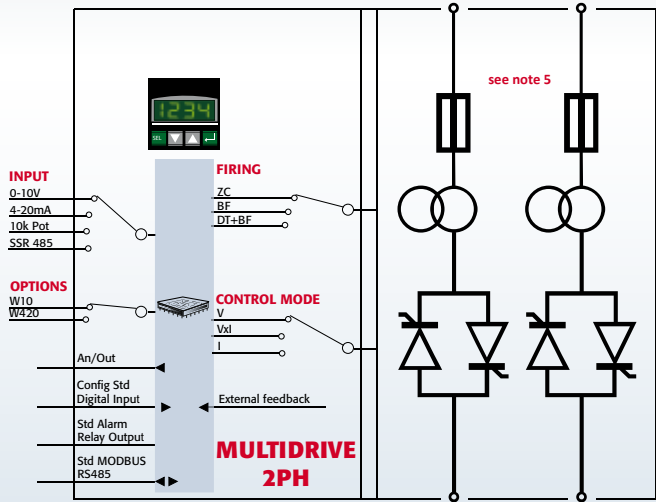
Note (3) In total are available 4 Analog Output. One dedicated to Control Mode and the other 3 dedicated to Current, Voltage etc.

Note (4) Internal Fixed Fuses.

Multidrive 2PH



SIZE SR19



Technical Specification

- Dimensions:** See size and dimensions at page 14-15
- Load type:** Normal resistance, three phase transformer coupled with normal resistance
- Inputs:** 0-10V, 4-20mA, 10kpot, RS485 communication, SSR
- Firing mode:** Zero Crossing, Burst Firing, Delayed Triggering + Burst Firing (not with cold resistance)
- Operating temperature:** 0° to 40°C without derating
- Control mode:** V Voltage, VxI Power and Current
- RS485 RTU port. Modbus Protocol Std.** for other Fieldbus see option
- Comply with EMC and cUL up to 700A**
- Data sheet:** More details on "Multidrive 2PH" bulletin

Option

- No options, all included
- Configuration software code: CCA (cable + converter + configuration software)
- Profibus DP, ProfiNet and Modbus TCP

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Note 1				
CURRENT	M	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
FIRING																					
description																10					
description																code	note				
35A																0	0	3	5		
45A																0	0	4	5		
75A																0	0	7	5		
100A																0	1	0	0		
125A																0	1	2	5		
150A																0	1	5	0		
225A																0	2	2	5		
280A																0	2	8	0		
400A																0	4	0	0		
450A																0	4	5	0		
500A																0	5	0	0		
600A																0	6	0	0		
700A																0	7	0	0		
850A																0	8	5	0		
1000A																1	0	0	0		
1300A																1	3	0	0		
1600A																1	6	0	0		
1800A																1	8	0	0		
2000A																2	0	0	0		
2200A																2	2	0	0		
2400A																2	4	0	0		2
MAX VOLTAGE																					
description																7					
description																code	note				
480V																4					
600V																6					
690V																7					
VOLTAGE SUPPLY AUX.																					
description																8					
description																code	note				
110V																1					
230V																2					
INPUT																					
description																9					
description																code	note				
SSR 3:30V dc																S					
0:10V																V					
4:20 mA																A					
10KPot																K					
RS485																R					
CONTROL MODE																					
description																11					
description																code	Note				
Open Loop																O					
Voltage Feed Back V																U					
Power Feed Back VxI																W					
Current Feed Back I																I					
OPTION																					
description																12					
description																code	Note				
4:20mA Retransmission Load Current and Control Mode																A	3				
0:10V Retransmission Load Current and Control Mode																V	3				
FAN VOLTAGE																					
description																13					
description																code	Note				
Fan Voltage equal to Aux. Voltage																3					
APPROVALS																					
description																14					
description																code	Note				
CE EMC For European Market																O					
cUL For American Market up to 700A																L	4				
MANUAL																					
description																15					
description																code	Note				
None																0					
Italian																1					
English																2					
German																3					
French																4					
VERSION																					
description																16					
description																code	Note				
Resistive Load/Delta Connection																1					
Resistive Load/Star Connection																2					
Transformer Load/Delta Connection																3					
Transformer Load/Star Connection																4					

Note (1) After 16th digit write current and voltage of load inside brackets Ex. (190A-400V). this is to receive the Thyristor unit already tuned from PMA.

Note (2) Rating not available at 690V

Note (3) In total are available 4 Analog output. One dedicated to control mode and the other 3 for current on phases 1-2-3

Note (4) cUL Approval up to 700A included.

Note (5) Internal Fixed Fuses.

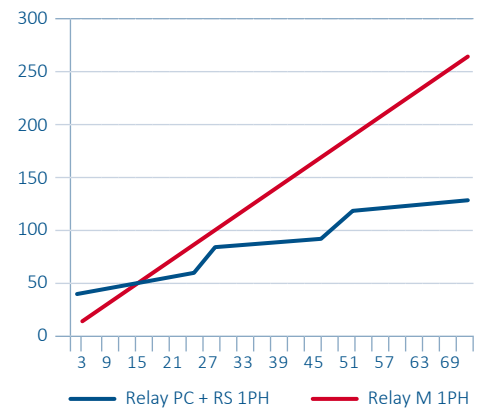
Why to use Relay PC

BENEFITS:

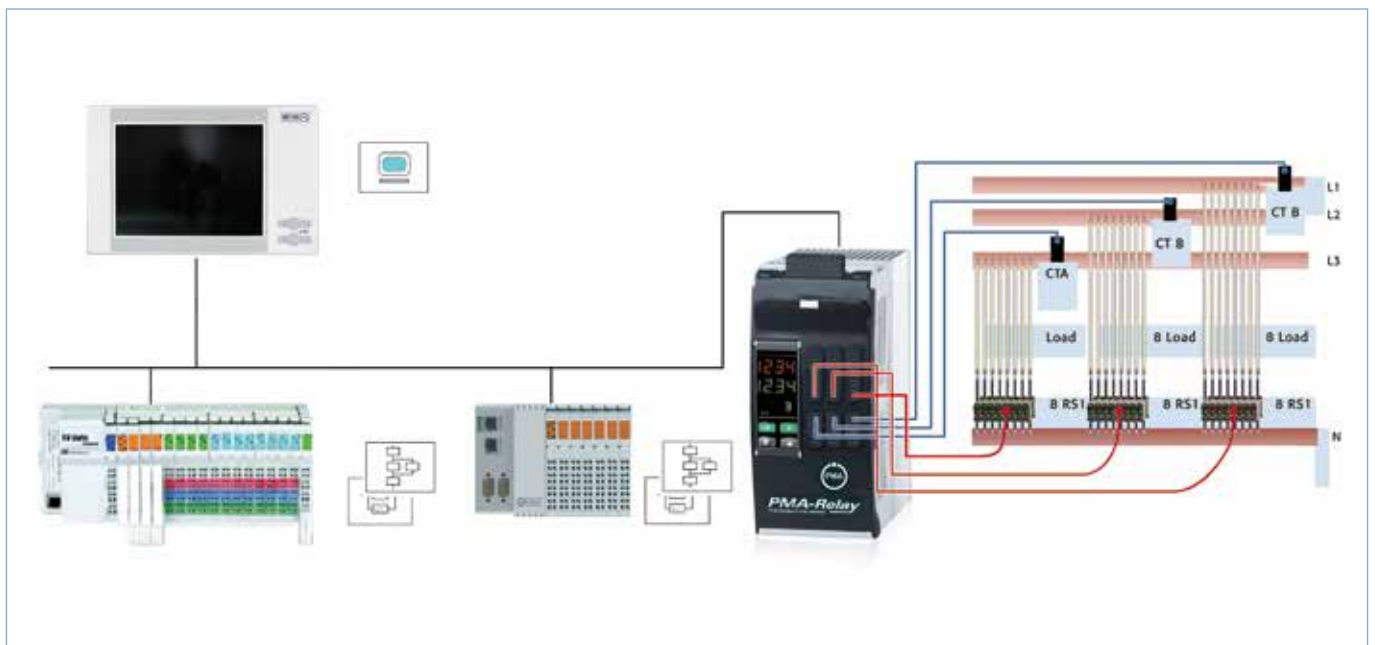
- Reduce the cost of your energy bill.
- Reduce the size of your cable and remove the flickering on lights.
- Improve the power factor close to 1.
- Reduction of harmonics on main supply.
- Reduce the electrodynamic forces between coils of transformer on main supply increasing its life.

Transform a simple solid state relay in advanced thyristor unit adding these features:

- Communication RS485.
 - Heater break Alarm for partial or total load failure.
 - Power scaling for each zone.
 - Power Load Management.
 - Intelligent unit with communication cost more than Relay PC + solid state Relay.
- In addition you have the Power Load Management free of charge.



Easy for responsible of software to manage the communication. These is because he has to write software from PLC or Multiloop Controller to one device like Relay PC that provide itself to communicate up to 24 solid state Relay. In addition you save the cost of output module.



Relay PC

Revolution in power control

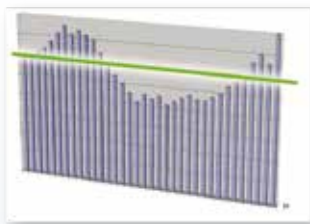
Relay PC was designed specifically to manage multizone systems. This powerful unit, with its unique algorithm, will minimize your energy costs by controlling synchronization and power limit.

Benefits include:

- Elimination of power overshoot (see graph below).
- Power factor close to one due to zero crossing firing.
- Relay PC keeps your instantaneous power within the limit of your electricity supply contract.
- Prevents increases in energy supply tariffs imposed by your electricity supplier.
- Quick return on your investment.

This powerful unit with high performance micro can drive simple thyristor unit like Relay S with zero crossing firing. By using the PC, simple thyristor units can be used reducing the overall financial investment.

- Simultaneous fast full wave control of:
 - 8-16-24 Relay S 1PH single phase units
 - 8 Relay S 2PH/3PH for 3 phase loads
- Each loop's process information is managed in independent mode with:
 - Calculation of instant current and RMS Current
 - Power calculation of load resistance with Heater Break Alarm
 - Modbus Master, Modbus slave, Profibus DP, Modbus/TCP and other fieldbus available

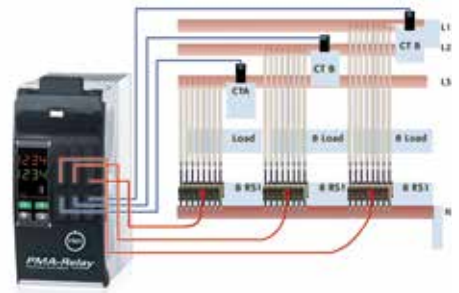


Easy to start Relay PC

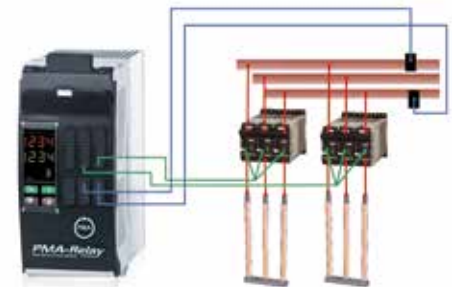
Only few parameter are requested to start with Relay PC:

- Set the operative current of the heater zone.
- Set the Total Power Limit.
- Set the Power of each zone.

The Relay PC strategy is easy to implement. Do the same operation with a competitor's load management system and the operator must learn up to 15 pages of the manual and understand up to five models of synchronization.



Application with 8, 16 or 24 single phase loads



Application with 8 three phase loads

Synchronization

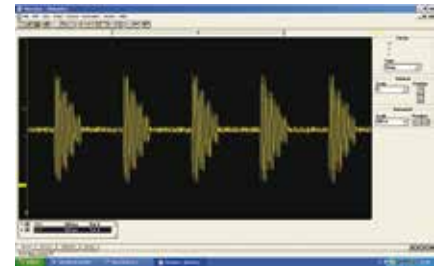
On all controlled zones, the Live Predictive Synchronization is automatic resulting in superior performance:

- Total current is equal to a sinusoidal wave form.
- Power factor > 0,9
- Instantaneous current close to average value.
- Cancellation of harmonics.
- Power saving by harmonic reduction.
- Flickering effect removed.

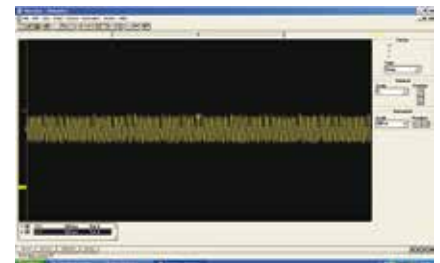
Synchronization selection is available for normal resistive loads or short infrared.

Smart Power limitation

- Smart power limitation works together with synchronization.
 - If this function is enabled, Relay PC makes a live calculation of power at each period and generates the output values for the next period.
- If the calculated power is below the power limit value, the previous values remain with each channel using full power.
- If the power is above the power limit value, the setpoint of each channel is reduced proportionally to restrict power overshoot.
 - This function significantly reduces disturbances on the main network compared to a full power system, preventing any increase in energy tariffs imposed by the electricity supplier.
- This function can be activated/deactivated and the limit value changed at any time.



Without power control optimisation



With power control optimisation

General Rules to size a Relay PC System

Each Relay PC Suitable to drive 1 Phase Loads can have up to 24 Channels
RPC08 : Can drive up to 8 Relay S 1PH with Random Firing
RPC16 : Can drive up to 16 Relay S 1PH with Random Firing
RPC24 : Can drive up to 24 Relay S 1PH with Random Firing
The zero crossing is performed inside Relay PC
Each Relay PC Suitable to drive 3 Phase Loads controlled on 2 Phases have 16 Channels
RPC28 : Can drive up to 16 Relay S 1PH with Zero Crossing Firing
We use 2 Off Relay S 1PH for each 3 Phase Load so in total we control 8 three phase loads
Each Relay PC Suitable to drive 3 Phase Loads controlled on 3 Phases have 24 Channels
RPC38 : Can drive up to 24 Relay S 1PH with Zero Crossing Firing
We use 3 Off Relay S 1PH for each 3 Phase Load so in total we control 8 three phase loads
For each Relay PC it's necessary
1 Off Auxiliary Voltage Transformer Ex. Between L1 and L2
This is necessary to synchronize Relay PC with the loads wired below same voltage
For each 8 Channels of one Relay PC it's necessary one Current Transformer
The Current Transformer must have a primary with current > Totale power connected L1 and L2 /Voltage L1 and L2
For RPC-28 are necessary 3 Off Current Sensor on incoming L1 ; L2 ; L3
The Current Transformer must have a primary with current > Totale power connected on L1 ; L2 and L3 (Voltage Supply x 1,73)
For RPC-38 are necessary 3 Off Current Sensor on incoming L1 ; L2 ; L3
The Current Transformer must have a primary with current > Totale power connected on L1 ; L2 and L3 (Voltage Supply x 1,73)

Power Control Coding

Model Relay PC

	Code
Channel	RCP
8 Channels for 8 Off 1Phase Units max	.08
16 Channels for 16 Off 1Phase Units max	16
24 Channels for 24 Off 1 Phase Unit max	24
16 Channels for 8 Off 3 Phase Loads controlled on 2 Phase	28
24 Channels for 8 Off 3 Phase Units controlled on 3 Phase	38
Current Sensor fore Relay PC	
For current sensor see Tab below „Current Sensor for Relay PC“	0
Communication	
N°1 Port Ethernet Modbus TCP Internal Aux Voltage	1
N°1 ModBus Slave Port	2
N°1 ModBus Master Port + N°1 Modbus Slave	3
N°1 Profibus DP Port Aux Voltage 24 v DC	4
N°1 Ethernet Port, ProfiNET Protocol 24 v DC	5
N°2 Ethernet Port, TCP Protocol for Client-Server	6
N°2 Ethernet Port, Multi Protocol Port (Ethernet IP, ETHER CAT, TCP, Profinet) 24 v DC	7
Primary/Secondary Auxiliary Voltage Transformer	
Transformer 90 :130V / 24 v	2
Transformer 170:265V / 24 v	3
Transformer 230:245V / 24 v	4
Transformer 300:530V / 24 v	5
Transformer 510:690V / 24 v	6
Transformer 600:760V / 24 v	7
Firing	
Half Cycle at 50% power demand for 1 Phase Loads	1
One Cycle at 50% power demand for 3 Phase Loads	2
Feed Back (Control Mode)	
No Feed Back	1
Power	2
Approvals	
CE EMC 1	1
Manual	
None	0
Italian	1
English	2
German	3
French	4
Version	
Version 1	1

Additional Units to be ordered with Relay PC

	Note	Code
Current Sensor fore Relay PC	1-2-3	CS
Current 50/0,05	1-2-3	0
Current 100/0,05	1-2-3	1
Current 150/0,05	1-2-3	2
Current 200/0,05	1-2-3	3
Current 250/0,05	1-2-3	4
Current 400/0,05	1-2-3	5
Current 800/0,05	1-2-3	6
Current 1000/0,05	1-2-3	7
Current 1500/0,05	1-2-3	8
Current 2000/0,05	1-2-3	9

Note (1) Use 1 Off Current Sensor for each 8 Channels on Relay PC Example: System with 24 zone 1 phase.

To be able to equilibrate the current on phase L1, L2 and L3 it's necessary to connect 8 zone on each phase coupled with one Relay PC synchronized on same voltage supply. In total we need: 3 Off Relay PC 08 + 3 Off Current sensor + 24 Off Relay S 1PH with Random Firing.

Note (2) Example System with 6 three phase loads controlled on 2 Phase.1 Off Relay PC 28 + 3 Off Current sensor + 12 Off Relay S 1PH with Zero Crossing Firing. With Relay PC the Relay S 2PH has to be formed by 2 Off Relay S 1PH

Note (3) Example System with 6 three phase loads controlled on 3 Phase.1 Off Relay PC 38 + 3 Off Current sensor + 18 Off Relay S 1PH with Zero Crossing Firing. With Relay PC architecture the Relay S 3PH has to be formed by 3 Off Relay S 1PH

For more details see ask for Application Note on Relay PC

PM 3000 and Custom Family



This products range has been designed with these targets:

- Basic product able to satisfy OEM needs
- Basic Options like Analogue input and Heater Break Alarm
- Easy to be used rugged and very reliable
- Possibility to be customized with OEM logo
- Manuals available in neutral version without PMA Brand
- Plastic parts in light and dark grey for covers
- Competitive pricing where quantity are available

PM 3000 CE-EMC & cUL Approval

See full specification on web



S0 H 120 x W 30 x D 120



S1 H 120 x W 60 x D 120



S2 H 120 x W 92 x D 120



S3 H 120 x W 52 x D 120



S4 H 120 x W 117 x D 123



S6 H 138 x W 117 x D 123



S7 H 120 x W 117 x D 159



S8 H 138 x W 117 x D 159



S9 H 316 x W 116 x D 187



S10 H 350 x W 116 x D 220



S11 H 440 x W 137 x D 270



S12 H 520 x W 137 x D 270



S13 H 440 x W 262 x D 270



S14 H 520 x W 262 x D 270

Custom CE-EMC Approval

See full specification on web



S28 H 478 x W 260 x D 274



S29 H 478 x W 520 x D 274



S30 H 478 x W 390 x D 274



S31 H 550 x W 329 x D 320 - 27kg.



S32 H 550 x W 523 x D 320 - 49kg.



S33 H 550 x W 717 x D 320 - 72kg.



S34 H 640 x W 329 x D 320 - 32/40kg.



S35 H 640 x W 523 x D 320 - 59/75kg.



S36 H 640 x W 717 x D 320 - 86/110kg.

Custom 1PH



SIZE S28 - from 300A to 800A



SIZE S31 - from 1000A to 1300A | SIZE S34 - from 1600A to 2400A

Technical Specification

- **Dimensions:** See size and dimensions at page 38-39
- **Load type:** Normal resistance, infrared long and medium waveform
- **Semiconductor Fuses inside**
- **Inputs:** SSR Standard, 0:10V, 4:20mA and Heater Break alarm are options
- **Firing mode:** Zero Crossing, Burst Firing available with analogue input only
- **Operating temperature:** 0° to 40°C without derating
- **Comply with CE-EMC**
- **Data sheet:** More details on "Custom 1PH" bulletin

Option

- Analog Input
- HB + CT: Current Transformer plus HB Alarm

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16						
CODE	C	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
CURRENT			3	4	5	6																
description			code			note																
300A			0	3	0	0																
550A			0	5	5	0																
800A			0	8	0	0																
1000A			1	0	0	0																
1300A			1	3	0	0																
1600A			1	6	0	0																
1800A			1	8	0	0																
2000A			2	0	0	0																
2200A			2	2	0	0																
2400A			2	4	0	0										4						
MAX VOLTAGE							7															
description							code	note														
480V							4															
600V							6															
690V							7															
VOLTAGE SUPPLY AUX.							8															
description							code	note														
90:130V							1	1														
170:265V							2	1														
300:530V							5	1														
510:690V							6	1														
600:760V							7	1														
INPUT							9															
description							code	note														
SSR							S															
0:10V							V															
4:20 mA							A															
FIRING																10						
description																code						
Zero Crossing ZC																Z						
Burst Firing 4 Cycles on at 50% Power Demand																4						
Burst Firing 8 Cycles on at 50% Power Demand																8						
Burst Firing 16 Cycles on at 50% Power Demand																6						
CONTROL MODE																	11					
description																	code					
Open Loop																	0					
OPTION & FUSE																		12				
description																		code				
Fix Fuses Standard																		F				
Fix Fuses + CT																		Y				
Fix Fuses + CT + HB																		H				
FAN VOLTAGE																			13			
description																			code			
Fan 110V																			1			
Fan 220V Standard																			2			
APPROVALS																				14		
description																				code		
CE EMC																				0		
MANUAL																					15	
description																					code	
None																					0	
Italian																					1	
English																					2	
German																					3	
French																					4	
VERSION																						16
description																						code
Std with Fuse																						1

Note (1) Load voltage must be included in Selected Auxiliary Voltage Range.

Note (2) Available with Analog input only.

Note (3) With 690V the firing is random.

Note (4) Rating not available at 690V

Custom 2PH



SIZE S28 - from 150A to 300A



SIZE S29 - from 450A to 800A



SIZE S32 - from 1000A to 1300A | SIZE S35 - from 1600A to 2400A

Technical Specification

- **Dimensions:** See size and dimensions at page 38-39
- **Load type:** Normal resistance, infrared long and medium waveform
- **Semiconductor Fuses inside**
- **Inputs:** SSR Standard, 0:10V, 4:20mA and Heather Break alarm are options
- **Firing mode:** Zero Crossing, Burst Firing
- **Heather Break Alarm**
- **Operating temperature:** 0 to 40° C without derating
- **Comply with CE-EMC**
- **Data sheet:** More details on “Custom 2PH” bulletin

Option

- Analog Input
- HB + CT: Current Transformer plus HB Alarm

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16						
CURRENT	C	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
description																						
150A				0	1	5	0															
210A				0	2	1	0															
300A				0	3	0	0															
450A				0	4	5	0															
550A				0	5	5	0															
800A				0	8	0	0															
1000A				1	0	0	0															
1300A				1	3	0	0															
1600A				1	6	0	0															
1800A				1	8	0	0															
2000A				2	0	0	0															
2200A				2	2	0	0															
2400A				2	4	0	0									3						
MAX VOLTAGE							7															
description							code															
480V							4															
600V							6															
690V							7															
VOLTAGE SUPPLY AUX.								8														
description							code															
90:130V							1									1						
170:265V							2									1						
300:530V							5									1						
510:690V							6									1						
600:760V							7									1						
INPUT									9													
description							code															
SSR							S															
0:10V							V															
4:20 mA							A															
FIRING																10						
description																code						
Zero Crossing ZC																Z						
Burst Firing 4 Cycles on at 50% Power Demand																4						
Burst Firing 8 Cycles on at 50% Power Demand																8						
Burst Firing 16 Cycles on at 50% Power Demand																6						
CONTROL MODE																	11					
description																	code					
Open Loop																	0					
OPTION & FUSE																		12				
description																		code				
Fix Fuses Standard																		F				
Fix Fuses + CT																		Y				
Fix Fuses + CT + HB																		H				
FAN VOLTAGE																			13			
description																			code			
Fan 110V																			1			
Fan 220V Standard																			2			
APPROVALS																				14		
description																				code		
CE EMC																				0		
MANUAL																					15	
description																					code	
None																					0	
Italian																					1	
English																					2	
German																					3	
French																					4	
VERSION																						16
description																						code
Std with Fuse																						1

- Note (1)** Load voltage must be included in Selected Auxiliary Voltage Range.
- Note (2)** Available with Analog input only.
- Note (3)** Rating not available at 690V

Custom 3PH



SIZE S28 - 150A



SIZE S30 - from 300A to 800A



SIZE S33 - from 1000A to 1300A | SIZE S36 - from 1600A to 2400A

Technical Specification

- **Dimensions:** See size and dimensions at page 38-39
- **Load type:** Normal resistance, infrared long and medium waveform
- **Semiconductor Fuses inside**
- **Inputs:** SSR Standard, 0:10V, 4:20mA and Heater Break alarm are options
- **Firing mode:** Zero Crossing, Burst Firing
- **Operating temperature:** 0° to 40°C without derating
- **Comply with CE-EMC**
- **Data sheet:** More details on “Custom 3PH” bulletin

Option

- Analog Input
- HB + CT: Current Transformer plus HB Alarm

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
CODE	C	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CURRENT			3	4	5	6											
description			code			note											
150A			0	1	5	0											
300A			0	3	0	0											
550A			0	5	5	0											
800A			0	8	0	0											
1000A			1	0	0	0											
1300A			1	3	0	0											
1600A			1	6	0	0											
1800A			1	8	0	0											
2000A			2	0	0	0											
2200A			2	2	0	0											
2400A			2	4	0	0										3	
MAX VOLTAGE							7										
description							code										
480V							4										
600V							6										
690V							7										
VOLTAGE SUPPLY AUX.								8									
description								code									
90:130V								1								1	
170:265V								2								1	
300:530V								5								1	
510:690V								6								1	
600:760V								7								1	
INPUT									9								
description									code								
SSR									S								
0:10V dc									V								
4:20 mA									A								
FIRING																10	
description																code	
Zero Crossing ZC																Z	
Burst Firing 4 Cycles on at 50% Power Demand																4	
Burst Firing 8 Cycles on at 50% Power Demand																8	
Burst Firing 16 Cycles on at 50% Power Demand																6	
CONTROL MODE																	11
description																	code
Open Loop																	0
OPTION & FUSE																	12
description																	code
Fix Fuses Standard																	F
Fix Fuses + CT																	Y
Fix Fuses + CT + HB																	H
FAN VOLTAGE																	13
description																	code
No Fan 110V																	1
Fan 220V Standard																	2
APPROVALS																	14
description																	code
CE EMC																	0
MANUAL																	15
description																	code
None																	0
Italian																	1
English																	2
German																	3
French																	4
VERSION																	16
description																	code
Std with Fuse																	1

Note (1) Load voltage must be included in Selected Auxiliary Voltage Range .

Note (2) Available with Analog input only.

Note (3) Rating not available at 690V

Auxiliary Units



CD-RS

Compact and smart communication converter.

Input RS232 Output RS485 or 422

RS232 connection via a 9 pin connector on front of unit.

RS485 or 422 via screw terminals.

This converter can be used to interface a computer with PMA communicating Thyristor Units.

Code: CD-RS | For more informations see “CD-RS” bulletin



Field Bus Modules

Code: TU-RS485-PDP-BASIC used to convert RS485 Modbus to Profibus DP

For more informations see “TU-RS485-PDP-BASIC” bulletin

Code: TU-RS485-ETH used to convert RS485 Modbus to Ethernet Modbus TCP

For more informations see “TU-RS485-ETH” bulletin

Code: TU-RS485-PNT used to convert RS485 Modbus to ProfiNet

For more informations see “TU-RS485-PNT” bulletin



CD KP-Operator Interface

The CD-KP is designed to be connected with PM 3000E and Multidrive via RS485 communications.

The LED display will show Power, Voltage or Current values, all in engineering units.

Any one of these variables can be selected and retransmitted via an isolated output (4-20mA or 0-10V).

No need to open the cubicle door and stop the process, an RS485 connector on the front of the unit allows direct connection to a portable PC for easy configuration.

In addition the display unit allows simple diagnostics of fault conditions.

For more informations see “CD-KP” bulletin



Relay-KP2 Graphic Operator Terminals for Thyristor Units

This unit is based on a colour touch panel and can be used to be interfaced up to 6 Relay Thyristor units.

On front unit is possible to set or to read:

- Load Current in RMS value and Load Voltage
- Power delivered to the load and Power demand
- Digital input 1&2 Status
- SC = Short circuit on Thyristor
- HB = Partial or total load failure
- Local/Remot, Up/Down
- Trend of the selected variable Ex.Current Voltage for Relay M, Relay CL, PM 3000E, Multidrive
- Language selection

More details on manual

Configuration Software

PMA Configurator Software is free of charge

The thyristor unit leave the factory already configured but if is necessary to verify the configuration or to modify it is necessary to have the configurator plus the Cable Kit.

Code: CCA cable + converter

There is one page very friendly named „Test Unit“ from where without instruction is possible to communicate in intuitive mode. Just clicking on what you need.

With CD-RS converter (see above) it’s possible to communicate with the Thyristor unit without cable kit.

Code: CD-CONFIGURATOR



Cable Kit

The cable kit on left side is for universal use on PMA Thyristor unit including Relay and PM 3000 Family's Type of connector and USB cable as described on the Manual.

The components of the Kit are:

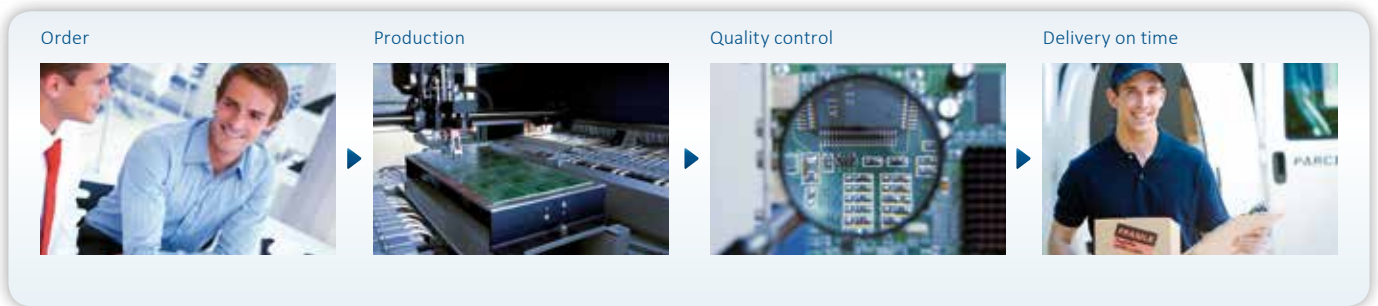
- 2 USB cable
- 1 USB/TTL converter
- 1 adapter with 4 poles
- 1 adapter with 9 pin connector

Code: CCA

You can depend on us

The satisfaction of our customers is our number one priority. For this reason, WEST Control Solutions relies on a recognised quality management method in the sectors of production, development and sales.

Furthermore, our ISO 9001 certification proves the adherence to international quality management standards. We are continuously working on optimising processes and increasing benefits for our customers. Profit from professional order processing, meticulous manufacturing, optimum quality control and the highest delivery reliability.



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Brochures and datasheets are available for the complete range of WEST Control Solutions products, contact your local sales office for more information or visit our website at: www.West-CS.com

BR-RE-2-EN-1310