

Application hints Analogue Power Controller SPC 1 AD

Control Mode Selection

The diagram shows three control modes: Current Loop, Potentiometer control, and Voltage control. Each mode is represented by a switch symbol and a corresponding terminal block. The Current Loop mode has terminals for 0-20, 20-0, 4-20, and 20-4 mA. The Potentiometer control mode has terminals for 10-0 kΩ, 0-10 kΩ, 10-0 V, and 0-10 V. The Voltage control mode has terminals for 10-0 V and 0-10 V.

Selection of control signal
The type of control signal, Current, Voltage or Potentiometer, can be selected on the rotary switch.

Protection
The control inputs are protected against overload. If the current exceeds 25 mA the loop will be switched Off and the LED's will indicate failure. The input will not be damaged if the 24 V supply by mistake is connected to the signal input. Control input terminals are marked with + and - correct polarity must be observed. The control input is floating.

Isolation Voltage:
Line to Control: 2.5kV AC
Isolation Voltage:
Supply to Control: 500V AC

Power

The graph shows a linear relationship between the control signal and power. The y-axis is labeled 'Power' and the x-axis is labeled 'Control'. A green shaded area represents the power range from 0 to 100%.

Control Signal	Power
0	0
20	100

Current Loop

Control Signal	Power
0	0
20	100

Voltage

Control Signal	Power
0	0
10	100

Potentiometer

Control Signal	Power
0	0
10	100

Function Mode Selection

Phase Angle

The diagram shows a sine wave with a phase angle shift. The x-axis is labeled 'Control' and the y-axis is labeled 'Linea Power or Voltage'. A green shaded area represents the power range from 0 to 100%.

Burst Firing

Time cycle from 0.4 sec. to 60 sec.

The diagram shows a burst of sine waves. The x-axis is labeled 'Time' and the y-axis is labeled 'Power'. A green shaded area represents the power range from 0 to 100%.

Phase Angle: Phase angle Control is used for Control of infrared lamps or heaters in IR heating applications
Two different operation modes can be selected.
Lin. Voltage: The load voltage varies linearly with the control signal
Lin. Power: The power delivered to the load varies linearly with the control signal.

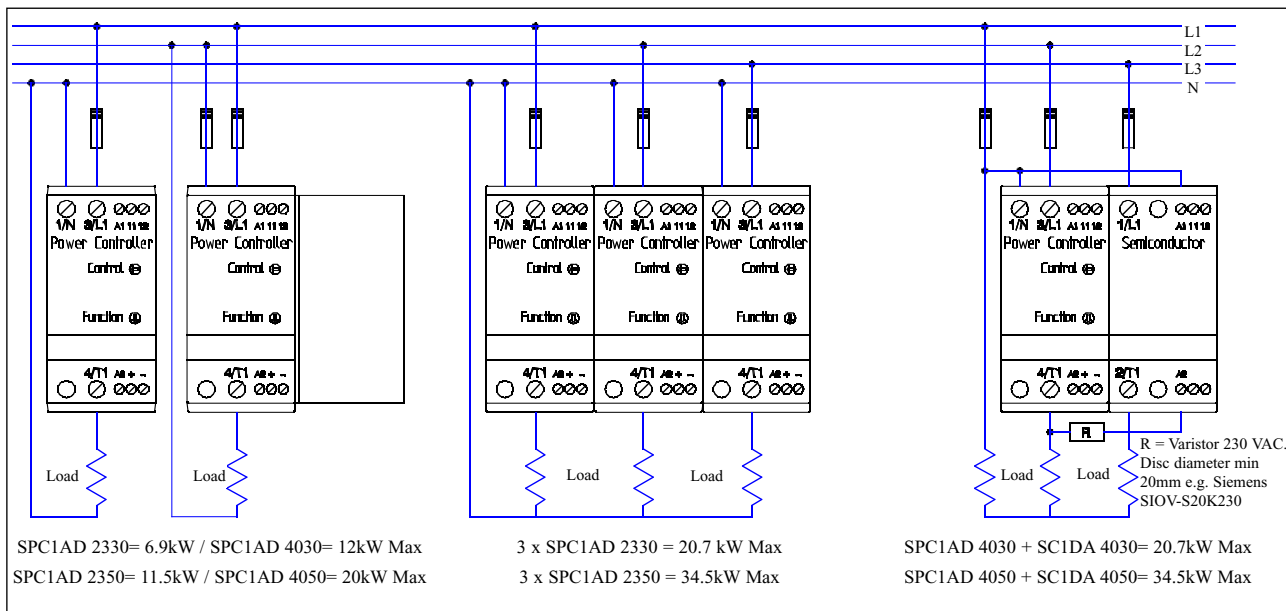
Burst Firing
In Burst Firing mode full sine waves are supplied to the load. Consequently DC magnetising of the supply transformer is avoided. The number of sine waves varies linearly with the control signal. Adjustable cycle times from 400 ms to 60 sec.

Line and Load Wiring hints

Single Phase 230 / 400 V AC
Phase Angle and Burst Firing applications
230 and 400 V Heaters

Three Phase with Neutral
Phase Angle and Burst Firing applications

Three Phase without Neutral Economy
With single pole contactor SC1DA4030 as slave.
Only Burst Firing applications.

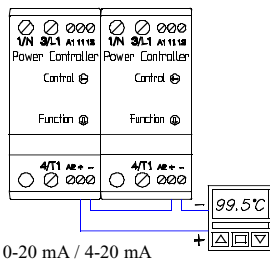


Specifications are subject to change without notice

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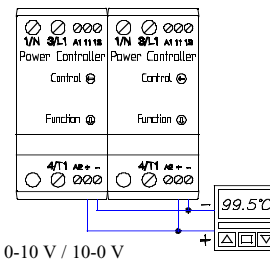
Current Loop:

0-20 mA or 4-20 mA. Controller inputs must be connected in series



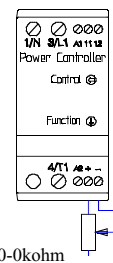
Voltage Control :

Controller inputs must be connected in parallel



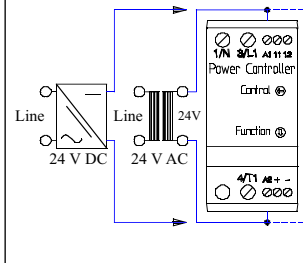
Potentiometer Control :

10 kohm linear potentiometer



Control Supply :

Controller supply must be connected in parallel



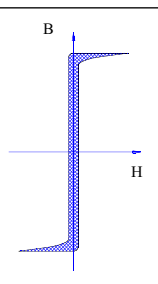
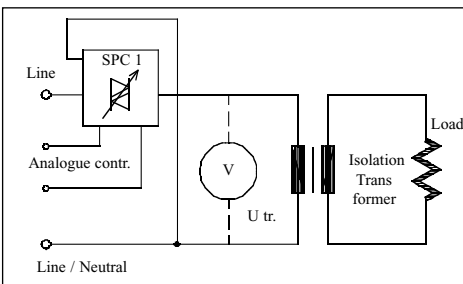
Transformer Applications Hints

Transformer Loads

SPC1 load driving capability includes transformer applications which means that low voltage loads can be controlled via an isolation transformer without any surge or DC magnetising of the transformer

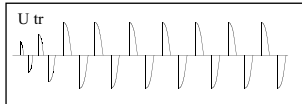
Switching Transformers

The problem in transformer switching is the magnetic circuit. When the transformer is switched Off, (H=0) the field (B) remains on a high level due to the high remanence of modern transformer core material. At initial turn-On where the remanence is unknown the SPC1 will soft-start to avoid the high current surge and at repetitive turn-on the switch-off polarity is "remembered" so next turn-on will be in the opposite polarity, thereby eliminating the high current surge normally seen in transformer applications. DC magnetising is eliminated by operating in full cycle mode only



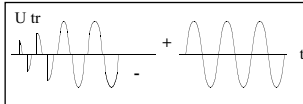
Phase Angle Mode :

A initial turn On SPC 1 will soft-start the transformer to the voltage level set by the analogue input.

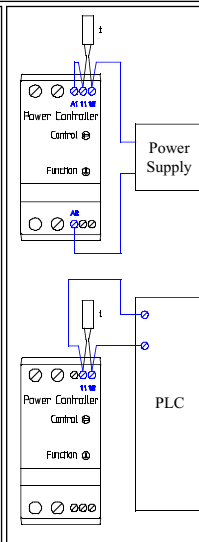
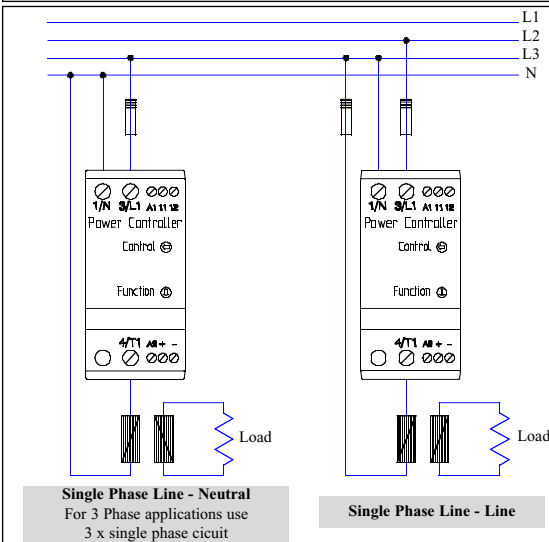


Burst Firing Mode :

A initial turn On SPC 1 will soft-start the transformer to full On mode. The controller will only allow full cycles to be supplied to the transformer hereby eliminating current surges and DC saturation of the transformer.



Transformer Applications Hints

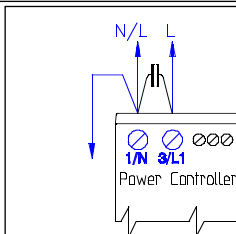


Application Examples

The thermostat is connected in series with the control supply of the controller. When the controller heatsink temperature exceeds 100°C the control supply is switched Off. When the controller heatsink has dropped to approx. 70°C the control supply is switched On again.

Application Examples

The thermostat is connected to a PLC or other form of controller for controlled shutdown in case of over temperature



EMC Specifications

SPC 1 is in conformity with IEC 60947-4-3 / EN 60947-4-3
AC Semiconductor Contactors for non motor loads

Burst Firing Control Mode:

No action necessary.

Phase Angle Control Mode: I<10A.

No action necessary.

Internal filter is sufficient.

Phase Angle Control Mode: I>10A.

Connect 1uF capacitor from N/L to L1 as shown above.

Utilisation Categories (IEC 947-4-3)

- AC - 51 Switching of resistive loads
- AC - 55a Switching of electric discharge lamp controls
- AC - 55b Switching of incandescent lamps
- AC - 56a Switching of transformers

Short-circuit Protection

Short-circuit protection by fuses.

Short-circuit protection is divided into 2 levels Type 1 / Type 2

Type 1: Short-circuit protects the installation

Type 2: Short-circuit protects the installation and the semiconductors inside the power controller

Short-circuit Protection by Fuses

Controller type SPC 1 AD

Type 1: SPC 1 AD XX30 protection max 50 A. gL/gG.
Type 1: SPC 1 AD XX50 protection max 50 A. gL/gG.

Type 2: SPC 1 AD XXXX protection max I²t of the fuse 1800 A²S
Type 2: SPC 1 AD XX50 protection max I²t of the fuse 1800 A²S

Recommended fuse :

	Ferraz	Siemens
SPC 1 AD XX30	660 RB 10-30	Sillized 5SD4 60A Max 500V
SPC 1 AD XX50	6.621 CP URGA	Sillized 5SD4 60A Max 500V
	22x58/50	

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