Autonics

POWER CONTROLLER **SPC SERIES**

INSTRUCTION MANUAL



Thank you for choosing our Autonics product. Please read the following safety considerations before use.

Safety Considerations

XPlease observe all safety considerations for safe and proper product operation to avoid hazards.

st symbol represents caution due to special circumstances in which hazards may occur.

▲ Warning Failure to follow these instructions may result in serious injury or death.

▲ Caution Failure to follow these instructions may result in personal injury or product damage.

⚠ Warning

- 1. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
- Failure to follow this instruction may result in personal injury, economic loss or fire.

 2. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present. Failure to follow this instruction may result in explosion or fire.

 3. Install on the device panel, and ground to the F.G. terminal separately.
- Failure to follow this instruction may result in fire or electric shock
- 4. Do not connect, repair, or inspect the unit while connected to a power source.
- Failure to follow this instruction may result in fire or electric shock.
- 5. Check 'Connections' before wiring.
 Failure to follow this instruction may result in fire.
- 6. Do not disassemble or modify the unit.

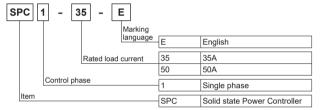
Failure to follow this instruction may result in fire or electric shock.

⚠ Caution

- Use the unit within the rated specifications.
- Failure to follow this instruction may result in fire or product damage.

 2. Use dry cloth to clean the unit, and do not use water or organic solvent.
- Failure to follow this instruction may result in fire or electric shock.
- Keep the product away from metal chip, dust, and wire residue which flow into the unit.
 Failure to follow this instruction may result in fire or product damage.
- 4. Since leakage current still flows right after turning off the power or in the output OFF Failure to follow this instruction may result in electric shock

Ordering Information



Specifications

Model		SPC1-35-E	SPC1-50-E	
Power supply		220VAC□ 50/60Hz		
Allowable voltage range		90 to 110% of rated voltage		
Operating fluctuation	frequency	±1Hz		
Rated load current		35A (Single phase)	50A (Single phase)	
Control power		220VAC□		
Control range		Phase control: 0 to 98%, Cycle control: 0 to 100%		
Applied load		Resistance load (Min. load: over 5% of rated current)		
Cooling method		Natural air cooling		
Control circuit		Micom control type		
Control input		1-5VDC□		
		DC4-20mA (250Ω)		
		ON/OFF (External contact or 24VDC)		
		External adjuster (1kΩ)		
		Output limit input (Front OUT ADJ. adjuster)		
Control method	By selection switch	Phase control ^{x1}		
		Cycle control (Zero Cross turn-on) - period 0.5, 2.0, 10sec ^{⊗1}		
		ON/OFF control (Zero Cross turn-on)		
Starting type		SOFT START (0 to 50 sec variable)		
Indicator		Output indicator (OUT): red LED		
Insulation resistance		Over 100MΩ (at 500VDC megger)		
Dielectric strength		2000VAC 50/60Hz for 1 minute		
Noise immunity		±2kV the square wave noise (pulse width:1μs) by the noise simulator		
Vibration	Mechanical	0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 1 hour		
	Malfunction	0.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 min		
Shock	Mechanical	300m/s² (approx. 30G) in each X, Y, Z direction for 3 times		
	Malfunction	100m/s² (approx. 10G) in each X, Y, Z direction for 3 times		
Environ- ment	Ambient temperature	0 to 50°C, storage: -25 to 65°C		
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH		
Wire specification		AWG16 to 8	AWG8 to 6	
Unit weig	ht	Approx. 1kg		

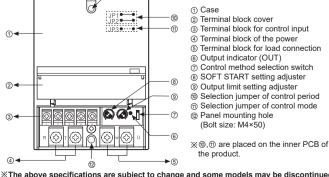
※1. Refer to '■ Operation and Function.

XEnvironment resistance is rated at no freezing or condensation.

Factory Default

•		
Control method	Phase control	
Control mode	Phase equal division type according to control input	
Cycle control period	0.5 sec (JP1, JP2 short)	
SOFT START setting	0 sec	
OUT ADJ. setting	100%	

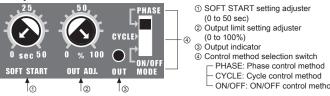
Unit Description



XThe above specifications are subject to change and some models may be discontinued without notice.

XBe sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

Operation and Function



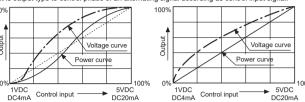
1. Control method selection ON/OFF control Cycle control Control method Phase control (Zero Cross turn-on) (Zero Cross turn-on) PHASE ┌ PHASE CYCLE CYCLE CYCLE ON/OFF ON/OFF ON/OFF

When selecting cycle control method, the cycle has been set as 0.5 sec. It can be changed to 2 sec, 10 sec by selection.

*The control method setting cannot be changed while it is operating.
Turn OFF the power at first then change the setting and supply the power again.

1) Phase control

It is output type to control phase of an alternating signal according as control input signal.



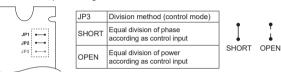
(Fig. 1) Equal division type of phase according as control input

This is analog type to output control angle with dividing equally according as control input signal. It shows power characteristic as (Fig. 1) and it might occur over power or lack power at point middle of control input. (Fig. 2) Equal division type of power according as control input

It divides control angle non-equally according as control input signal then make power curve linearization, so it becomes possible to output the power, which is proportioned

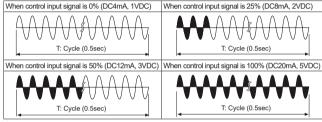
SHORT OPEN

※To change control mode, please change the JP3 of the PCB as below



2) Cycle control (fixed cycle) - Zero cross turn on

It controls the power, which is applied into the load to repeat ON/OFF cycle like below picture with constant proportion according to control input signal. It is easy to control the load and there is no ON/OFF noise because it turns ON and OFF at the zero point of AC. Usually it is used in a place or electric furnace which is not easily effected by external noise.

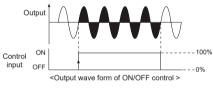


*To change control cycle, please change JP1 and JP2 of PCB as below



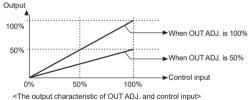
3) ON/OFF control - Zero cross turn on

This function is when control input is ON, output is 100%. When it is OFF, output is 0%. It is the same function as SSR (Solid State Relay). (It always turns ON/OFF at zero point of AC.) **XOUT ADJ.** and SOFT START functions are not available in ON/OFF control method



2. OUT ADJ. (Output limit) (0 to 100%)

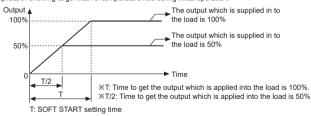
This function will be [Control input(%) × output limit set(%) = Output] and it controls the power supplied into the load. Although control input is 100% (5V or 20mA), the output is the 50% which is proportioned with OUT ADJ. When not using OUT ADJ. function, please make set value 100%



*This function must not be used in ON/OFF control method.

3. SOFT START (0 to 50sec)

This function protects the load in cases that the set temperature is high, such as controlling the load (platinum. molybdenum, tungsten, infrared lamp, etc.) in which inrush current flows when power is supplied, or showing large width of temperature rise during initial operation.



SOFT START set time (T) is the required time that output reaches to 100%, and it is differentiated by OUT ADJ, set value. For example, SOFT START is set as 10sec and OUT ADJ, is set as 70%, it takes 7 sec to reach goal output.

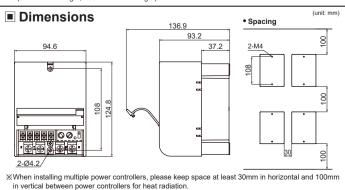
[Set time (T) × OUT ADJ, set value (%)=10sec × 0.7 = 7sec]

If increasing the OUT ADJ. before output reaches to goal output, it delays as much as the value, multiply of increased value (%) and SOFT START set time.

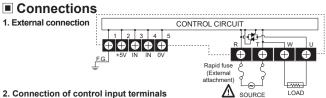
When not using SOFT START function, set value 0. **XThis function must not be used in ON/OFF control method.**

4. OUT display

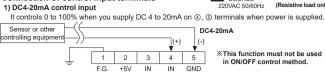
This is LED lamp to display the status of output and will be getting brighter according as output. (0%: Min. LED light, 100%: Max. LED light)

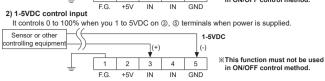


Connections



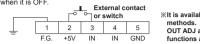
2. Connection of control input terminals





3) ON/OFF external contact control input

It controls 100% if you connect external contact or switch to ②, ③ terminal when it is ON, it controls 0% when it is OFF.



methods.
OUT ADJ and SOFT START functions are not available in ON/OFF control method.

4) External adjuster control input

After power is applied, connecting the external adjuster 1kΩ to ②, ③ and ④ terminals and turning adjuster control from 0% to 100%. In another way, connecting to the ② and ③ terminals and turning OUT ADJ control from 0% to 100%. <Refer to 'E.g. 2)' of '■Applications'.> It is available to control as OUT ADJ, adjuster for the above 1), 2), 3) and set at 100% when it is



5) External 24VDC control input

It can be used with external 24VDC voltage as below. It is available to control of ON/OFF, outputs 100% for applying 24VDC and 0% for applying 0VDC.

24VDC +++-XIt is available for all control **OUT ADJ and SOFT START** ON/OFF control method.

Max. 7.0mm

Max. 12mr

XTighten the terminal screw with the below tightening torque nals of size specified below Signal input Output and power terminal type control input) <Round> Tightening torque 0.6 to 1.2N·m 1.5 to 2.2N·m Output and pow Min. 5mm Min. 3.5mm

Applications

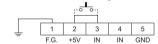
E.g. 1) When controlling by limiting the power at ON/OFF in phase control and cycle control method. For example, if it needs to control 80% output when it is ON, 24% output when it is OFF, please keep below.



• When the External contact signal is OFF: 30% (adjuster input) ×80%(OUT ADJ.) = 80%
• When the External contact signal is OFF: 30% (adjuster input) ×80%(OUT ADJ.) = 24%

E.g. 2) This is how to control 0 to 100% without external adjuster in phase control and cycle control

It is possible to control 0 to 100% with turning OUT ADJ. in state of connecting terminal 2 and

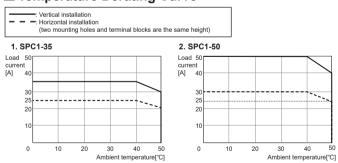


Control Input Specification and Function

• Please see <Connection of control input terminals> and above function Control method ON/OFF control Phase control Cycle control Input and function DC4-20mA 1-5VDC External contact Control input specification External contact, 24VDC or 24VDC External adjuster OUT ADJ Function SOFT START **OUT** display

Temperature Derating Curve

OUT display



Remove of Case

After disconnecting all power sources supplied to the product, remove the case, Push the Joint part (4 points) on the right and left side of the case with the flat head screwdriver, and disassemble the case



Cautions during Use

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents. 2. Use the product, after 3 sec of supplying power.

3. Before use, set the mode and function according to the specification

Especially, be cautious that the product does not operate when OUT ADJ. is set to 0%. Since mode/parameter can not be changed during operation, set the mode and function after turning off the power.

To ensure the reliability of the product, install the product on the panel or metal surface vertically to the ground.

5. Install the unit in the well ventilated place

6. While supplying power to the load or right after turning off the power of the load, do not touch the body and heat sink. Failure to follow this instruction may result in a burn due to the high temperature.

7. Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.

8. Do not wire to terminals which are not used

9. The rapid fuse must be connected between R terminal and the power source.

10. Do not use near the equipment which generates strong magnetic force or high frequency

11. This unit may be used in the following environments ①Indoors (in the environment condition rated in 'Specifications') ②Altitude max. 2,000m ③Pollution degree 2

(4) Installation category III 18, Bansong-ro 513 beon-gil, Haeundae-gu, Busan, South Korea, 48002 www.autonics.com | +82-51-519-3232 | sales@autonics.com

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