



PKC1 系列 (Series)

智能型数位式功率调整器

Intelligent Digital Power Regulator

使用说明书

Operating Instruction

上海亚泰仪表有限公司

Shanghai Yatai Instrumentation CO., Ltd

非常感谢您采用亚泰 PKC1 系列智能型数位式功率调整器, 使用前务必详读本使用说明书以防止操作错误!
Thank you very much for choosing Yatai PKC1 series intelligent digital power regulator, Please read this operating instruction carefully before using it to avoid malfunction!

▶ 操作注意事项/Caution When Operating ◀

- 断电后方可清洗控制器/Before cleaning the controller, please ensure that the power is switch off
- 清除显示器上污渍请用软布或棉纸/Please remove stains on the display panel by using a soft cloth only
- 显示器易被划伤, 禁止用硬物擦拭或触及/No scrubbing or touching the display panel with any hard object, the display panel can be easily scratched
- 禁止用螺丝刀或书写笔等硬物操作面板按键, 否则会损坏或划伤按键/Do not press any button on the display panel using pointy objects such as ballpoint pen or screw driver, it can easily scratch the panel or damage buttons on the panel

一、产品确认/Product validation

PKC1 智能型数位式功率调整器是用先进的单片机技术设计而成的, 是新一代的用可控硅控制正弦波波形导通大小/多少从而达到控制交流电压输出大小的控制器, 并具有以下特点/PKC1 Intelligent Digital Power Regulator is using advanced single-chip design, it is the new generation regulator providing control solution for power-conversion application by using SCR to control the sine wave:

■ 产品信息

- 采用高级数字化单片机作为控制核心, 有丰富的参数设定、检测和完善的保护功能
Microcontroller is used as the key with parameter set-up, test and protect functions
- LED 数码管显示、键盘参数设置、操作方便
LED display and key configuration are easy to operate
- 10 位精度的 AD 转换、分辨率高、线性度好
10 bits AD conversion, high resolution with high linearity
- 12 位精度的 DA 输出、最小模拟量输出值可设定
12 bits DA output accuracy, the minimum value of the analog output can be set
- 输入、输出接口均采用隔离技术、安全及抗干扰能力强
Input and output port are both using secure, jam-proofing isolation technology
- 采用宽触发脉冲提高触发控制信号的可靠性
Wide trigger pulse to improve reliability of control signal
- 集成开环、恒压、限压、恒流、限流等可选择功能, 控温精度高、效果好
Integration of open-loop, constant pressure, limited pressure, constant current, limited current which can be selected, high precision of temperature control
- RS485 通讯接口、采用标准的 MODBUS 协议的 RTU 模式
RS485 communication port, support standard MODBUS protocol RTU mode

■ 功能信息/Functions

- | | |
|----------------------|---|
| ● 电源频率 50/60 Hz 自动侦测 | Power frequency 50/60 Hz auto-detect |
| ● 可选择过零或相位控制方式 | Zero cross control or phase angle control selectable |
| ● 可选择自动或手动输出 | Auto output or manual output selectable |
| ● 可选择多种输入方式 | Multi-input type optional |
| ● 可设定相位控制时起始输出电压 | Configurable starting output voltage of phase control |
| ● 可设定最小或最大输出量限制 | Configurable maximum and minimum output limit |
| ● 可设定缓冲启动或脉冲启动时间 | Configurable soft start or kick start time |
| ● 电压/电流反馈检测功能 | Voltage/Current feedback detection function |
| ● 部分功能可通过外部开关操作 | Some functions can operate through external switch |
| ● 多种自动诊断报警功能 | Multi automatic diagnostic alarm function |

■ 产品选型/Product types choosing

- PKC1 系列/PKC1 series —— 单相两线式/Single phase by two wires

型号 Model	PKC1-									
	2100	2150	2200	2250	2300	3100	3150	3200	3250	3300
工作电压 Operating voltage	AC220V					AC380V				
额定电流 Rated current	100A max.	150A max.	200A max.	250A max.	300A max.	100A max.	150A max.	200A max.	250A max.	300A max.
保险丝 Protection fuse	120A	200A	250A	315A	350A	120A	200A	250A	315A	350A
最低耐 Min. block voltage	AC1200V									
反馈类型选择 (Feedback type)	U: 电压反馈 U: Voltage Feedback					I: 电流反馈 I: Current Feedback				
通讯选择 (Communication type)	0: 无通讯 0: No communication					1: RS485 通讯 1: RS485 communication				
变送输出选择 (Output type)	0: 无变送输出 0: No transmitter output					1: 4~20mA 输出 1: 4~20mA output				

■ 共同规格/Specification

控制方式 Control method	Zero cross control or phase angle control selectable
输出控制 Output control	Auto output or manual output selectable
输入方式 Input method	4~20mA/0~20mA/1~5V/0~5V/2~10V/0~10V or VR-10KΩ selectable
输入阻抗 Input impedance	4~20mA/0~20mA: >240Ω
	1~5V/0~5V/VR-10KΩ: >2MΩ
	2~10V/0~10V: >1.3MΩ
输入解析度 Input resolution	0.5%
输出范围 Output range	0~100%
输出下限 Output lower limit	0~100% (L.000~L.100) settable
输出上限 Output upper limit	0~199% (H.000~H.199) settable
调节分辨 Resolution adjustment	Phase angle control: 0.36°/0.12°
	Zero cross control: 20ms
触发信号 Trigger signal	Wide pulse trigger
缓冲启动 Soft start	1~199s (t.001~t.199) settable
风扇电源 Fan power source	230VAC、50/60Hz、13/12W
使用环境 Operating temp	86~106kPa、0~50℃、45~85%RH
外壳材质 Housing material	Ferrous metal

■ 适用范围信息/Scope of application

- 本产品可与连续 PID 输出的温度控制仪表配合使用，达到高精度温度控制功能，也可使用手动功能单独用于高精度的电压、电流控制等
This product can be used together with temperature controllers with Continuous PID output in order to achieve high accuracy of temperature control. It can also be used alone manually to achieve accurate voltage and current control
- 本产品适用于控制定阻性负载、变阻性负载、电感性负载、变压器负载及电容性负载
This product is suitable for controlling fixed resistive load、variable resistive load、inductive load、transformer load and capacitive load
- 本产品可广泛应用于塑料、玻璃、陶瓷、冶金、热处理、化工、电炉、窑炉等高精度温度控制，是传统的 ZK-1、NZK-1 可控硅调压器的更新换代产品

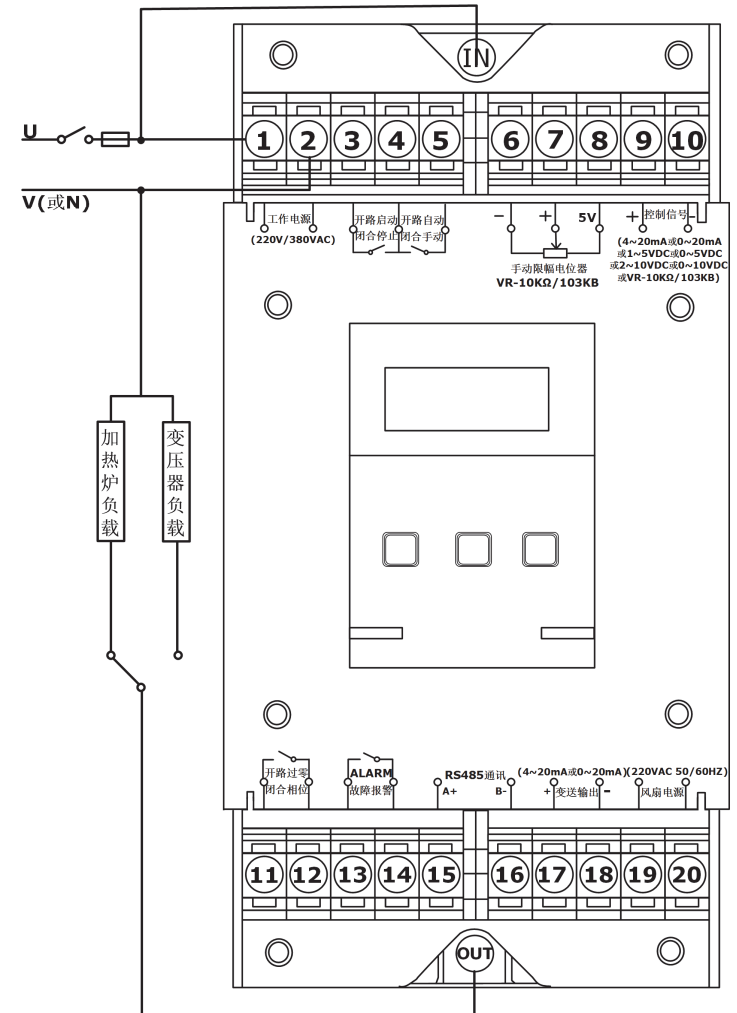
This product can be used widely in high accuracy temperature control of plastic、glass、ceramic、metallurgy、heat treatment、chemical engineering、electric stove and kilns etc, it is the new generation regulator replacement for the traditional ZK-1、NZK-1 SCR regulators

- 请参照上述定制信息确认送达产品是否和您选定的型号和功能完全一致/

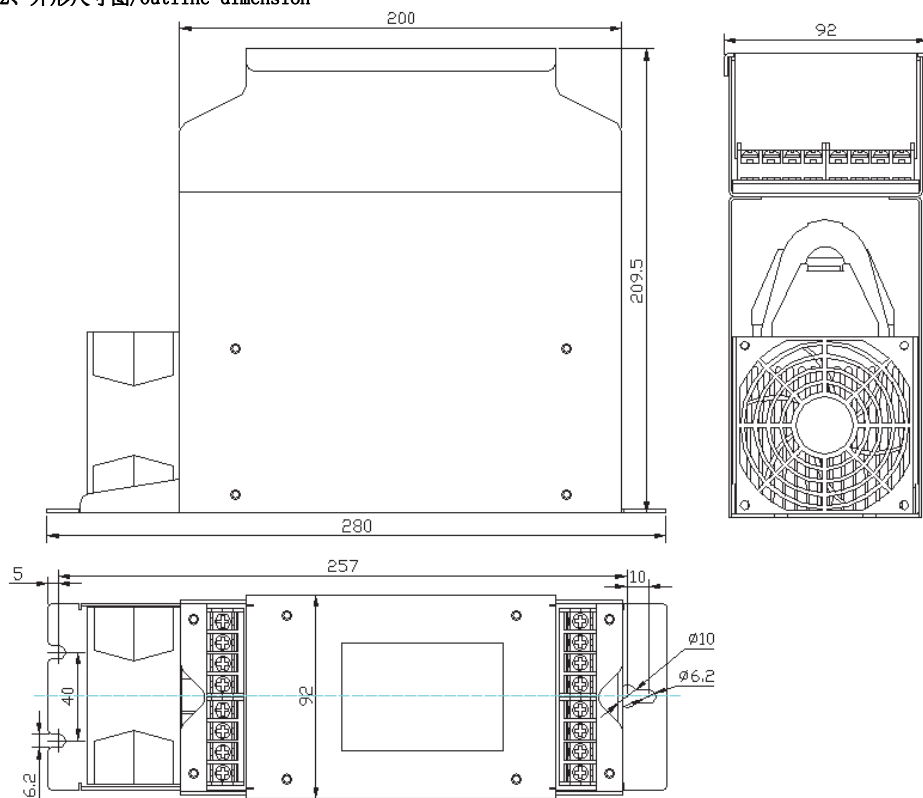
Please check carefully with the information provided above to confirm the product delivered to you is the same model and function you order

二、接线图和外形尺寸图/Connection diagram and outline dimension

1、接线图/Connection diagram










2、外形尺寸图/Outline dimension

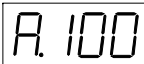




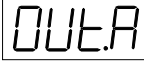

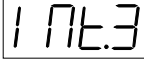









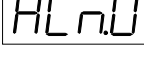



三、菜单设定/Menu setting

1、手动输出设定/Setting of manual output

手动输出状态/Manual Output	说明/Description
	1、在手动输出状态中，按  或  键 1 秒可改变手动输出量/On the manual output status, Press  or  key one second to change the manual output volume 2、按  键完成手动输出量设定/Press  to finish setting

2、功能设定/Function setting

状态/Status	显示代码/Display code	说明/Description
运转状态 Running Status		1、A:自动输出量/Auto output volume 2、M:手动输出量/Manual output volume
Press  &  key for 3 sec		
锁住设定 Setting of lock		1、Lck.0:全锁定/All lock 2、Lck.1:仅参数可设定/Only data settable 3、Lck.2:可设定/Unlock
Press  key ↓		
输出选择 Output		1、Out.A:自动输出量/Auto output volume 2、Out.M:手动输出量/Manual output volume
Press  key ↓		
输入选择 Input		1、Int.0: 4~20mA 2、Int.1: 0~20mA 3、Int.2: 1~5V 4、Int.3: 0~5V 5、Int.4: 2~10V 6、Int.5: 0~10V 7、Int.6: 10KΩ 可变电位器/10KΩ Variable resistance
Press  key ↓		
模拟量输出最小值选择 Minimum value of the analog output		模拟量输出最小值/ Minimum value of analog output 1、Oan.0:0mA 2、Oan.4:4mA
Press  key ↓		
有无反馈选择 Feedback		1、Mod.n:无反馈/No feedback 2、Mod.F:有反馈/Have feedback
Press  key ↓		
控制方式选择 Control Method		1、Con.0:过零控制/Zero cross control 2、Con.1:相位控制/Phase control 3、Con.2:外部过零/相位开关控制 External Zero/Phase control switch
Press  key ↓		
启动方式选择 Start Method		1、Str.0:缓冲启动/Soft start 2、Str.1:脉冲启动/Kick start
Press  key ↓		
报警输出状态选择 Alarm Output Status		1、Alm.0:报警输出常开/Alarm output normal open(NO) 2、Alm.1:报警输出常闭/Alarm output normal close(NC)
Press  key		

3、参数设定/Data setting

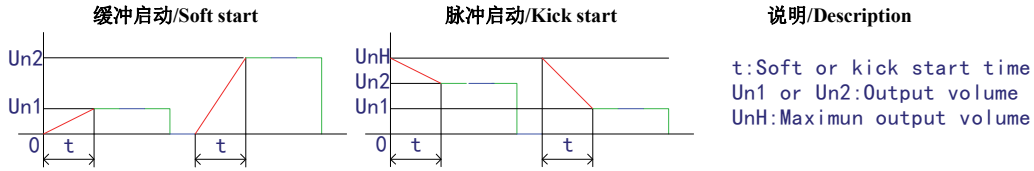
状态/Status	显示代码/Display code	说明/Description
运转状态 Running status Press SET Key 3 sec ↓	A.100	1、A:自动输出量/Auto output volume 2、M:手动输出量/Manual output volume
最小输出量设定 Setting of minimum output Press SET Key ↓	L.000	1、范围/Range:0~100 2、最小输出量设定/Minimum output volume setting
最大输出量设定 Setting of maximum output Press SET Key ↓	H.100	1、范围/Range:0~199 2、最大输出量设定/Maximum output volume setting
反馈超限报警值设定 Feedback overflow alarm setting Press SET Key ↓	0.380	1、范围/Range:0~1.5 倍的额定电压/电流值 /times the rated voltage/current 2、反馈超限报警值设定/Feedback overflow alarm setting
可控硅小输出切除 TRIACS small output resection Press SET Key ↓	d.005	1、范围/Range:0~50 2、可控硅小输出切除/TRIACS small output Resection 3、适用控制方式:相位控制 Applicable control method:phase control
缓冲/脉冲软启动时间设定 Setting of soft/kick start time Press SET Key ↓	t.010	1、范围/Range:1~199 2、缓冲启动时间/Time of soft start 或/或 脉冲启动时间/Time of kick start
输入偏差修正 Setting of Input offset Press SET Key ↓	F.000	1、范围/Range:-99~99 2、输入偏差修正/Setting of Input offset
通讯地址设定 Communication Address Setting Press SET Key ↓	A.001	1、范围/Range:0~254 2、通讯地址设定/Communication address settings
通讯波特率设定 Baud Rate Setting Press SET Key	b.960	1、范围/Range:600/1200/2400/4800/9600/14400/19200/28800/57600 (由于显示器数据区域位数限制, 只显示高三位/Due to limitation of screen, only highest three letters will be displayed) 2、通讯波特率设定/Baud rate setting

4、设定说明/Setting description

参数代码/Data code	选项/Option	说明/Description
输出选择 OUT.A/M	M: 纯手动 Manual	面板 <input type="checkbox"/> 和 <input type="checkbox"/> 键调节, H.100 参数值作为最大输出量值, 输入偏差修正功能无效 /Use <input type="checkbox"/> 和 <input type="checkbox"/> to adjust, H.100 as the maximum output volume, Input correction function is disabled
	A: 外部自动 / 手动开关 / External Auto/Manual Switch	开路: 自动状态中的自动功能(控制信号与手动限幅电位器同时作用), 手动限幅电位器值作为最大输出量值, 输入偏差修正功能有效/Open Loop: Automatic function in automatic mode(control signal and manual potentiometer both in use), manual potentiometer value is set as maximum output value, input correction function is enabled 闭合: 自动状态中的手动功能(仅手动限幅电位器作用), H.100 参数值作为最大输出量值, 输入偏差修正功能有效/Closed-Loop: Manual function in automatic mode(only manual potentiometer is in use), H.100 parameter as the maximum output volume, input correction function is enabled
有无反馈选择 MOD.n/F	n: 过零控制, 无反馈之说 /Zero Control, No Feedback	反馈超限报警值设定功能无效/Feedback overflow alarm setting is disabled
	n/F: 相位控制可以设置成有、无反馈 /Phase control with、without feedback	n: 无反馈——反馈超限报警值设定功能无效/No feedback——Feedback overflow alarm setting is disabled F: 带反馈——反馈超限报警值设定功能有效/With feedback——Feedback overflow alarm setting is enabled
控制方式选择 CON. 0/1/2	0: 过零控制 /Zero control	过零控制不考虑有无反馈, 将设定的百分比值用于显示/Ignore feedback in zero control, display setting value in percentage
	1: 相位控制 /Phase control	无反馈时将实际输出的导通角占全部导通角 180° 的百分比值用于显示/When no feedback, the conduction angle of the actual output over 180 is displayed in percentage 有反馈时将反馈检测到的实际电压/电流值用于显示/When with feedback, display actual voltage/current
	2: 外部过零 / 相位开关 / External Zero/Phase Switch	开路: 过零控制——变周期调功方式/Open-Loop: Zero Control——Period of variation control method 闭合: 相位控制——移相控制方式/Closed-Loop: Phase Control——Phase shift Control Method
启动方式选择 STR. 0/1	0: 缓冲软启动 /Soft start	过零/相位控制都从零输出慢慢在 T 时间内增大到满度值输出/Zero/Phase Control starts from 0 to maximum value within period T
	1: 脉冲软启动 /Kick start	过零/相位控制都从满度值输出慢慢在 T 时间内减小到零输出/Zero/Phase Control descends to 0 from maximum value within period T
	相位控制具有缓停功能: 关闭时在 10s 后完全关断/Phase control have slow stop function: complete cut power 10s after shutdown 过零控制无缓停功能: 关闭时直接关断/Zero control no have slow stop function: directly off after shutdown	
报警输出状态选择 ALM. 0/1	停止输出 / Stop output	报警动作时 10s 后完全关断停止输出/Complete stop output 10s after alarm
	解除警报 / Reset alarm	故障解决后需重新上电方能进入待机状态或工作状态/Cycle power to enter standby or operation mode after fault is cleared
	保险丝损坏、散热器过热、反馈超限等情况下报警输出功能有效/Alarm is still working even fuse is damaged, radiator is overheated、feedback is overflow	

四、菜单参数详解/Menu parameter details

1、启动方式说明/Start mode description



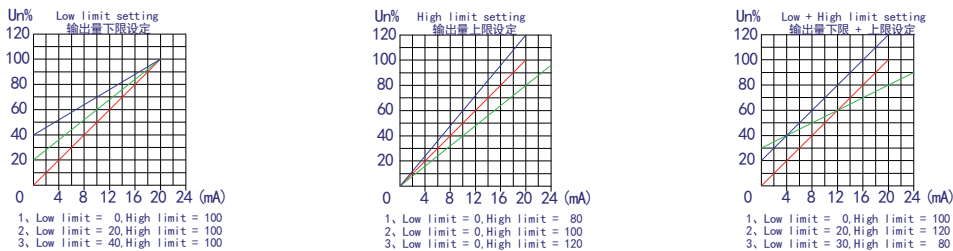
2、控制方式说明/Illustration of control method

控制方法/Control method	相位控制/Phase angle control	零点控制/Zero cross control	
输出量 /Output volume	10%		
	25%		
	50%		
	75%		
特性/Feature	1、适用于控制电感性或变阻性负载 例如：红外线加热器、变压器负载、纯金属或碳硅发热体/Suited to control the inductive load or The variable resistance load For example:IR、Pure metal heater、Silicone carbonate heater or Transformer 2、功率因素小于 1/The power factor $\cos\theta < 1$ 3、较高谐波干扰/Higher harmonic noise	1、适用于控制定阻性负载或电容性负载 例如：合金类发热体或电容器负载/Suited to control the constant resistance load or The capacity load For example:Alloy heater or Capacitor 2、功率因素等于 1/The power factor $\cos\theta = 1$ 3、较低谐波干扰/Lower harmonic noise	

说明/Description

- ① 一些如碳硅棒等特殊负载应用：低温时负载阻抗很小，加热升温，温度超过 700~800℃后阻抗增大；如果刚开始时用过零控制调功方式则对电源冲击会很大，也会使碳硅棒使用寿命大大缩短，所以开始阶段使用相位控制移相调压方式，加热升温，温度达到一定值后转换为过零控制调功方式，使电源功率因素提高，减小调压所带来的谐波干扰/Special load such as carbon silicon rods application: when temperature is low load resistance is small, with temperature raises over 700-800 degrees, the load resistance will increase, the lifecycle of carbon silicon rods will be reduced significantly, so during start-up stage please use phase control voltage adjustment until temperature reaches certain level then switch to zero control in order to improve power factor, reduce harmonic interference from surge
- ② 用相位控制移相调压方式给变阻性负载加热时推荐使用带恒流方式的电流反馈机型，控制效果最佳/Use phase swift control method to heating the variable resistive load, the constant current feedback type is recommended in order to achieve best results

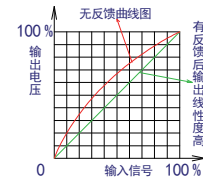
3、输出量限制设定/Output limit Setting



注意/Note:

- ① Un: 输出量/Output volume
- ② 设定范围/Setting range: 下限设定/Lower limit = 0~100%，上限设定/Upper limit = 0~199%
- ③ 输出量下限 + 上限设定适用于高辐射热加热器，如：红外线加热器/Lower + upper limit setting is suited to control the radial heating heater, such as: IR lamp

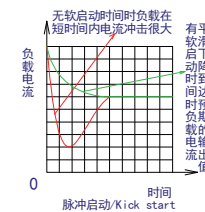
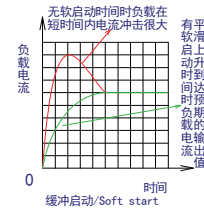
4、有无反馈说明/Have no feedback description



说明/Description

输入信号及输出电压对应关系在有反馈和无反馈两种模式时的两条对比曲线，有反馈与无反馈的区别是调整了输入信号与输出电压之间的线性化关系，使得对应关系为 1:1，大大增加了控制精度/Comparing the relationship between input singinal and output vltage with without feedback mode, the curve with feedback adjusts linear ratio to 1:1 between input signal and output voltage, precision of control is largely improved

5、软启动时间说明/Soft start time description




说明/Description

时间及负载电流对应关系在有软启动时间和无软启动时间两种模式时的两条对比曲线，无软启动时间时负载在短时间内电流冲击很大，而有软启动时间时负载电流平滑上升/下降到达预期的输出值，能有效降低冲击电流，起到保护负载及可控硅的效果/Comparing the relationship between time and load current with without soft start, there is large current during start up without soft start,Soft start could control load current increase and decrease more smoothly to protect load and controllable silicon

五、故障排除/Trouble shooting

报警/Alarm	说明/Description	检查/Checking
FBEr	保险丝烧毁/Fuse break	请检查保险丝是否烧毁/Please check power supply
OHEr	散热器过热超过 80℃/Over heat 80℃	请改善散热条件/Please improve cooling condition
FOEr	反馈超限/Feedback Overflow	请检查负载是否短路/Please check short of load circuit

六、安全注意事项/Safety notice

 <p>警告 Warning</p>	<p>潜在危险，如果操作失当可能导致死亡或严重伤害 Potentially hazardous situation, if mishandling, may result in death or serious injury</p>
<p>1、请确认「输入方式」与本控制器「输入选择」是否相符？接线是否正确？否则可能导致本控制器失控 Please confirm the input type and connection method with this controller, if not, it may result in malfunction</p> <p>2、带电运行中，请勿触碰本控制器任何接线端子以避免触电 Please do not touch any terminal of this controller while power supply is supplied, if do, it may result in electronic shock</p> <p>3、更换保险丝前，请务必关闭电源系统以避免触电 「Power supply system」 must be shut down before replace the fuse, if not, it may result in electronic shock</p> <p>4、负载电流请勿超过额定电流，以避免保险丝或本控制器烧毁 Please rated the load current within the specified value, if not, it may result to burn up this controller or fuse</p> <p>5、请务必锁紧端子螺丝，扭力需超过 100kg-cm, 否则可能导致本控制器或保险丝烧毁 Please tighten the screw terminal over 100kg-cm, if not, it may result to burn up this controller or fuse</p> <p>6、本控制器烧毁后可能是短路或失控状态，请加装独立警报系统以确保安全，否则可能造成严重意外事故 If this controller is burned up, it may be in short circuit condition or malfunction, please settle an independent alarm system to ensure safety protection, if not, it may result in a serious accident</p> <p>7、必须由具有专业资格的人员才能更换零件，严禁将线头或金属物遗留在控制器内，否则有引发爆炸和发生火灾的危险 Component must be replaced by professional staff, any metal or thread is strictly prohibited in the controller to avoid fire hazard.</p>	

七、安装调试





■ 安装注意事项/Caution when installing

- 控制器应在推荐的工作环境下使用
The installation and usage of the equipment should be done under the suggested working conditions
- 控制器应采用壁挂式竖直安装，有利于通风散热
The regulator should be installed vertically to ventilation and cooling.
- 严禁猛力撞击控制器
Do not expose the regulator to any vibration or shock directly
- 电源电压不要超过工作电压±10%范围
Power supply could not exceed 10% of the working voltage
- 模拟量输入值不要超过控制器的输入信号范围
Analog quantity input could not exceed the input signal range of the regulator
- 反馈输入电压值和电流值不要超过工作电压和额定电流范围
Input voltage feedback and current feedback should not exceed the working voltage and rated current
- 带通讯的控制器外部接线建议使用屏蔽线
Controller with communication capability should use shield line for external wiring

■ 系统接线及调试 /Wiring and debugging

- 仔细检查各接线是否正确，端子是否拧紧后再给控制器通电，调试时负载端不允许开路或空载，否则调试工作无法正常进行
Go through all the wiring and terminals before power up the regulator. During commissioning, zero load or short circuit is prohibited
- 为了调试工作顺利、可靠的进行，一般电压反馈控制的触发调压器、电流反馈控制的触发调压器等可先用小负载(1只200W灯泡或几百瓦的加热管等)进行通电调试，正常无误后再接入实际负载
In order to ensure commissioning is smoothly and reliable, trigger of voltage feedback control and current

feedback control should be adjusted to minimum load (200W bulb 1 or hundreds watts heating pipe), to ensure working properly before connect actual load

- 当调节面板  和  键、给控制器控制信号端输入正确的控制信号、旋转手动限幅电位器时输入信号逐渐增大或减小，负载上的电压应随输入信号变化而变化，负载上的电压调整范围为0~100%
When adjust  and  key on panel, input control signal from controller, or rotate the limiter of potentiometer input signal increases or decreases, load voltage should follow change of input signal, load voltage should be within 0~100%
- 负载上的电压变化应平滑、均匀、连续，不应出现突跳、抖动或变化趋势与输入信号不成线性关系等的现象
Change of load voltage should be smooth, continuous, sudden jump, shake or trend should be avoided to prevent non-linear behaviours
- 在控制器通电状态下显示器数据区域出现出错代码提示信息，用户在控制器未断电状态下检查完线路等情况确认无误后需给控制器重新上电方能进入待机状态或工作状态，如果无出错代码提示则可以正常工作输出，如果输出部分电压(流)后仍然出现出错代码提示信息则需要用户再次检查线路，重复如上操作
Error code and messages are displayed at data area of controller, users should recycle power to force controller into standby or operation mode after error is checked. If there is no more error message then normal operation shall be resumed. If error still occurs, please repeat the process

■ 可控硅小知识/SCR tips

- 断态、反向重复峰值电压：一般取负载电压有效值的三倍以上，例如：AC220V 供电的负载，可控硅的峰值电压应大于 AC800V；AC380V 供电的负载，可控硅的峰值电压应大于 AC1200V
Peak repetitive off state voltage and peak repetitive reverse voltage: Normally use a value more than three times of the effective value of the load voltage, for example: for load voltage with AC220V, SCR peak voltage should be more than AC800V; for load voltage with AC380V, SCR peak voltage should be more than AC1200V
- 门极触发电流：一般选择 60~150mA 之间，门极触发电流太小，容易引起可控硅误触发；门极触发电流太大，容易引起可控硅输出小电流时出现打不开现象
Gate trigger current: Normally choose between 60~150mA. If the gate trigger current is under the value, the SCR can be mis-triggered easily. If the gate trigger current is over the value, SCR output current can not be opened
- 门极触发电压：一般应小于 2V Gate trigger voltage: < 2V
- 通态峰值电压：通态峰值电压越小越好，通态峰值电压越小则发热量越低即可控硅损耗越小
Peak forward on-state voltage: the lower the peak forward on-state voltage value the better as lower value of the peak forward on-state voltage means less heat and less loss

八、不同类型负载的控制方法

■ 感性负载(变压器等)/Inductive Load (transformers etc)

- 如果变压器设计的输出容量不足，则会造成当电流增加到一定程度时变压器铁芯会发生磁饱和现象，导致电流瞬间剧增、输出波形发生畸变、导致器件被损坏，解决方法：1、重新设计变压器，需增大变压器的输出功率；2、增加负载上最大电流限制功能
Shortage in the transformer design output capacity will result in the magnetic transformer core saturation phenomenon when the current reaches a certain level, an instant surge current, the output and waveform distortion will occur which lead to device damage, the solution: 1、re-design transformers, need to increase the output power; 2、increase the maximum load current limit
- 当变压器负载运行过程中断电瞬间后又上电，会造成上电时的通磁极性与断电时未退完的剩磁极性(上电时正在充磁和断电时正在退磁)发生“撞车”，产生危害性冲击电压、电流，所以电感性负载尤其是变压器负载，应采用上电软启动逐步充磁和缓停功能逐步退磁操作
When power lost occurs during operation, it will cause through magnetic polarity during power-up and power outage did not retire completely remanence polarity (when the power is off when the magnetization and demagnetization are) cause "crash". It will have impact on voltage, current, and inductive load,

transformer load should be used on electric soft-start gradually magnetization gentle stop function gradually demagnetization operation

- 变压器负载为感性负载，窄脉冲触发不可靠，脉宽可变直流触发技术能够提供负载电流到达晶闸管擎住电流所需的足够时间和能量，确保触发的可靠性

Transformer load is inductive load , short pulse trigger is unreliable , pulse width triggering technology provides variable DC load current reaches the thyristor Latching current which requires for sufficient time and energy to ensure the reliability of the trigger

- 变压器负载不能空载调试、工作运行
Zero load must be prohibited for commissioning and operation for inductive load

■ 变阻性负载(泛指冷、热状态电阻值变化大的负载)/Variable resistive load (refers to cold, hot state resistance change large load)

- 纯金属负载：硅钼、钼丝、钨、白金、石墨等负载冷态时电阻小，低温、中温段需限压、限流，随着温度变高，电阻随温度一起增大，在高温段时由于电阻较大需增加电压才能使负载工作在恒流状态，PKC1 功率调整器的电流限制功能和恒流功能是专门为这类负载设计的；此外，带多路 PID 调节的温度控制仪表也可根据温度变化来控制负载电流

Pure metal load : Silicon molybdenum, molybdenum wire , tungsten , platinum , graphite and other loads when cold resistance, low temperature, temperature segment need limited pressure , current limit , as the temperature increases, the resistance increases along with the temperature in the high temperature section. This is due to larger resistance can the need to increase the voltage in the constant-current load status , PKC1 power regulator and constant current limit function is designed specifically for the type of load; in addition , with multi-channel PID regulator temperature control instrumentation but also according to temperature changes to control the load current

- 硅碳棒负载：一般采用软启动时间>60s 或更长、采用电流限制功能，避开在 700℃ 附近时的负阻冲击电流(新棒更明显)

Silicon carbide load : Usually soft-start time > 60s or even longer , using current limit function , to avoid the negative impact of the current resistance near 700 °C, the (more effective for new rod)

■ 定阻性负载(泛指冷、热状态电阻值变化小的负载) / Fixed resistive load (refers to cold, heat a small change in the status of the resistance load)

- 定阻性负载可采用变周期调功方式，可以克服调压方式功率因素低、电网被污染的缺点，PKC1 功率调整器工作在过零控制变周期调功方式时负载电流以全正弦波为单位均匀分布，多台设备同时运行时，总动力电流相对均衡，解决了定周期调功方式工作时电流过度集中问题，改善了炉温均匀性，避免了电流表撞针，更重要的是提高了电源利用率和避免了电力设备增容，节电效果十分明显

Shift period for fixed resistive load adjustment method should be used , low voltage mode power factor , the disadvantage grid contaminated could be overcome, PKC1 power regulator operates in the chirped way power adjustment method of the zero crossing control with full load current sine wave units evenly distributed , multiple devices to run simultaneously , the total current is relatively balanced to solve the power adjustment when given cycle work as the excessive concentration of current problems and improve the temperature uniformity , avoiding meter striker , more importantly, to improve the power utilization rate and avoid power equipment capacity increase , energy-saving effect is very obvious

九、维护和保存/Service and maintenance

- 控制器自开票之日起十八个月内，因制造质量发生故障由本厂负责全面保修，因使用不当而造成损坏的则本厂酌情收取修理成本费，本厂控制器终身维修

This equipment is under warranty for 18 months since the day of purchase (the warranty only stands if the problem is caused by the malfunction due to manufacturing). Any repairment for damages caused by improper use of the equipment will be charged. The equipment is provided with lifetime maintenance and repair on cost

- 控制器应在包装齐全的情况下存放在干燥通风、无腐蚀性气体的场合
Please keep the controller in a dry place with air and NO corrosive gas

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如有改动，恕不另行通知！



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