

SanRex

LEADING THE NEW POWER ELECTRONICS ▶▶

适用于开放型现场总线网络

DeviceNet™ CC-Link

功率调整器

Supports open field network
Electric Power Regulator

CALPOTE

UF

高功能型
High-performance type
series

SPU

通用型
General-purpose type
series



适应网络的高功能单元

功率调整器

本公司的可控硅式功率调整器，由于其操作性和可靠性高，在各方面都得到了广泛的利用。本公司一直以来开发、制造作为功率控制核心的半导体、硅元件。长期以来提供高可靠的功率调整器，承蒙惠顾。根据多年来的成果开发了高功能型“UF系列”，在主电路部采用本公司制造的可控硅模块（绝缘型），实现了小型轻量化。提高了在控制盘上安装多个单元时的安装密度。控制电路部采用数字控制方式。搭载了丰富多彩的保护功能和可选功能，实现了大幅度的性能提高。不仅如此，还推出提高了控制性能的通用型SPU系列。

High performance unit with network function Electric Power Regulator

Our thyristor type power regulator is reliable and easy to operate, making it widely popular across many industries. We have been developing and manufacturing semiconductors and thyristors, core elements of power control, for many years and with constant reliability, allowing us to deliver high quality power regulators.

The "UF series", fruit of many years of experience, is equipped with our thyristor module (Isolation type) in the main circuit to make it light and compact. It increases accordingly the mounting density and fits a large number of units on the control panel. The control circuit uses digital control. Various protective functions and options are available to achieve great performance. The lineup also includes the general-purpose SPU series.



特点 Features

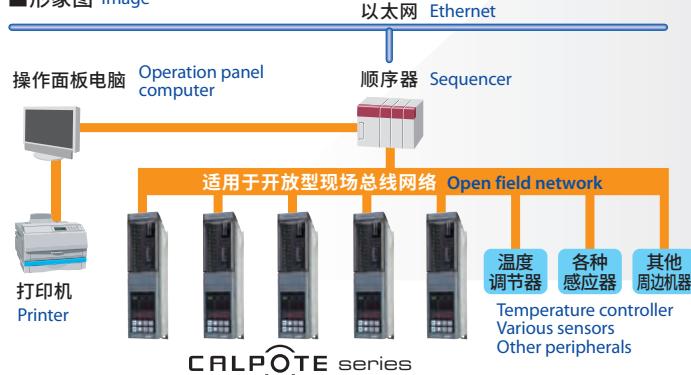
- 强化印刷电路板涂层标准，以提高耐环境性。
- 可以在周围温度为50°C的情况下以100%输出使用。
- 配备限流功能和负载断开(负载释放)异常为标准设备。
- 所有配件均可在交货后安装。
- 我们可以制造各种特殊规格的产品。
 - 变压器负载响应周期控制(仅适用于UF1)。
 - 旧型号(UE1)的更换用附件制作等。
- 适用于开放型现场总线网络 DeviceNet™ CC-Link

本公司产品在业界率先搭载了CC-Link等开放网络通信。
通过该功能，可以与电脑、PLC等控制设备相互连接，也容易与厂家匹配。
通过RS232C等专用通信，不需要麻烦的程序开发和专用基板。
(无法对应部分机型。)

- Reinforced printed circuit board coating, improved environmental resistance.
- Can be used with 100% output up to an ambient temperature of 50 °C.
- Equipped with current limit function and load open (load release) anomaly signal as standard.
- All options can be installed after delivery.
- We offer various customizations.
 - Transformer load-aware cycle control (UF1 only).
 - Attachment fitting for old model replacement (UE1).
- Supports open field network DeviceNet™ CC-Link

Our products are the first in the industry to incorporate open network communications such as CC-Link. You can enable interconnection with control devices such as PCs and PLCs, and easily match the equipment with mechanical systems. No need to develop complex programs or special boards, just connect via communication protocols such as RS232C. (Some models are not compatible.)

形象图 Image



1. 作为可选功能，通过将通信单元连接到各单元，最多可在同一电缆上连接63台单元。
As an option, it is possible to connect up to 63 units on the same communication unit instead of individual connections.

2. 可通过电脑设置输出电压、电流、功率监控及信号。
The signals and monitoring of the output voltage, current and power can be set from a PC.



高功能型
High-performance type

CALPOTE
UF-1
series

●单相用 UF1 / 25~1200A
Single-phase type: UF 1 / 25~1200A

适用于开放型现场总线网络
Supports open field network



高功能型
High-performance type

CALPOTE
UF-3
series

●三相用 UF3 / 25~1200A
Three-phase type: UF 3 / 25~1200A

适用于开放型现场总线网络
Supports open field network



通用型
General-purpose type

SPU
series

●单相用 / 20~100A
Single-phase type: 20~100A

型号 Model

UF □ - □ 025 □ □

UF series

相数 Type of phases

- 1: 单相控制 1: Single-phase control
3: 三相控制 3: Three-phase control

公称电压 Nominal voltage

- 0: 三相 (200V系/400V系共用)
2: 单相 (100V系/200V系)
4: 单相 (400V系)
- 0: Three-phase type (Common for 100V, 200V and 400V power)
2: Single-phase type (100V and 200V power)
4: Single-phase type (400V power)

F: 有保险丝 F: With fuse

无: 无保险丝 None: Without fuse

只表示三相 Three-phase type only indicated

K: 6臂 K: 6-arm
(感应负载时推荐6臂)
(6-arm type recommended for induction load)

无: 3臂 None: 3-arm
(不需表示单相)
(No marking for single-phase type)

单元额定电流 Unit's rated current

标准规格 Standard specifications

输入规格 Input spec.	相数 Type of phases	单相, 三相 Single-phase, three-phase	控制方式 Control system	相位控制, 周期控制(连续式, 间欠式) 变压器负载支持循环控制(特殊支持仅适用于UF1)。 Phase control Cycle control (continuous, intermittent) Transformer load-supported cycle control (specific to UF1 only).
	电压 Voltage	100V系 (100/110/120V±10%) 100V power 200V系 (200/220/254V±10%) 200V power 400V系 (380/400/440/460/480V±10%) 400V power ※控制电源 AC200/220V Control power ※与主电路同相位连接。 Synchronized with the main circuit		(1) ON/OFF信号 比设定温度低的时候, 变成ON的接点 ON/OFF signal: Contact made when temperature drops below setting (2) 电流信号 DC4~20mA (单元输入电阻250Ω) Current signal: DC 4-20mA (Unit input resistance: 250Ω) (3) 电压信号 DC1~5V, DC0~5V (单元输入电阻13KΩ) Voltage signal: DC 1-5V, DC0-5V (Unit input resistance: 13KΩ) (4) 其他电流信号及电压(需要信号变换器) Other current and voltage signals (signal converter required)
	频率 Frequency	50/60Hz ±5%		软起动/下降方式 0~300秒 (标准0.5秒, 通过表示面板可任意设定) Soft start/down system 0-300 sec. (Standard 0.5 sec., Random setting on display panel)
输出规格 Output spec.	电流 Current	25/35/50/75A(自然冷却) (self cooled) 100/150/250/350/450A(风冷) (air-cooled) 600/800/1200A(准标准/风冷) (not standard/air-cooled)	限制电流 Current limit	可设定额定电流的50~110% (只限位相控制) (标准110%, 通过表示面板可任意设定) Presettable 50-110% of rated current (phase control only) (Standard 110%, Random setting on display panel)
使用环境 Operating environment	周围温度 Ambient temperature	动作: -10~50°C* 保存: -20~70°C Operation Storage	输出特性 Output characteristics	直线特性±3% F.S (通过输出10~90%) Linear characteristics ±3% F.S (at 10-90% output) 下点设定: 设定最低输出电压 Minimum setting: Minimum output voltage setting 斜率设定: 设定最大输出电力 Gradient setting: Maximum output voltage setting
绝缘耐力 Dielectric strength	绝缘强度 Withstand voltage	AC2000V/min (100, 200V系) (100/200V power) AC2500V/min (400V系) (400V power)	保护 Protection	(1) 过电流保护 (3) 过热保护 Overcurrent protection (额定100A单元以上) (2) 短路保护 Overheat protection Short-circuit protection (100A and higher rated units)
	绝缘电阻 Insulation resistance	20MΩ以上 (DC500V megger) Over 20MΩ (with DC500V megger)	附属品 (每本体1台) Accessories (per unit)	可变电阻器 (1KΩ) × 1个, 旋钮 × 1个 Variable resistor (1KΩ) knob

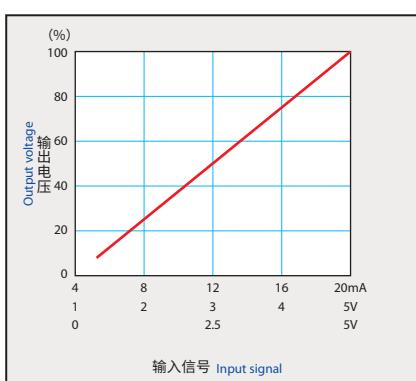
*1200A单元 ... -10~40°C 1200A unit ... -10~40°C

控制, 保护功能 Control and protection functions

■ 标准输出入特性

本单元的标准输出入特性如下图所示。
(相位控制, 周期控制)

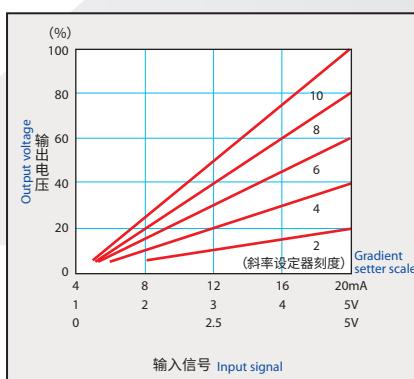
Standard input/ output characteristics
Standard input/ output characteristics are shown below.
(Phase control, Cycle control)



■ 斜率输出特性

通过安装斜率设定器(可变电阻器),
可任意设定可变最大输出电压。

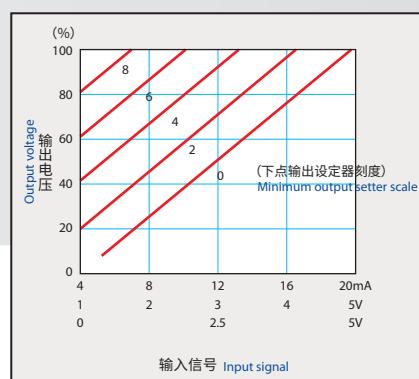
Gradient output characteristics
Maximum output voltage can be set by adding a gradient setter.
(variable resistor)



■ 下点输出特性

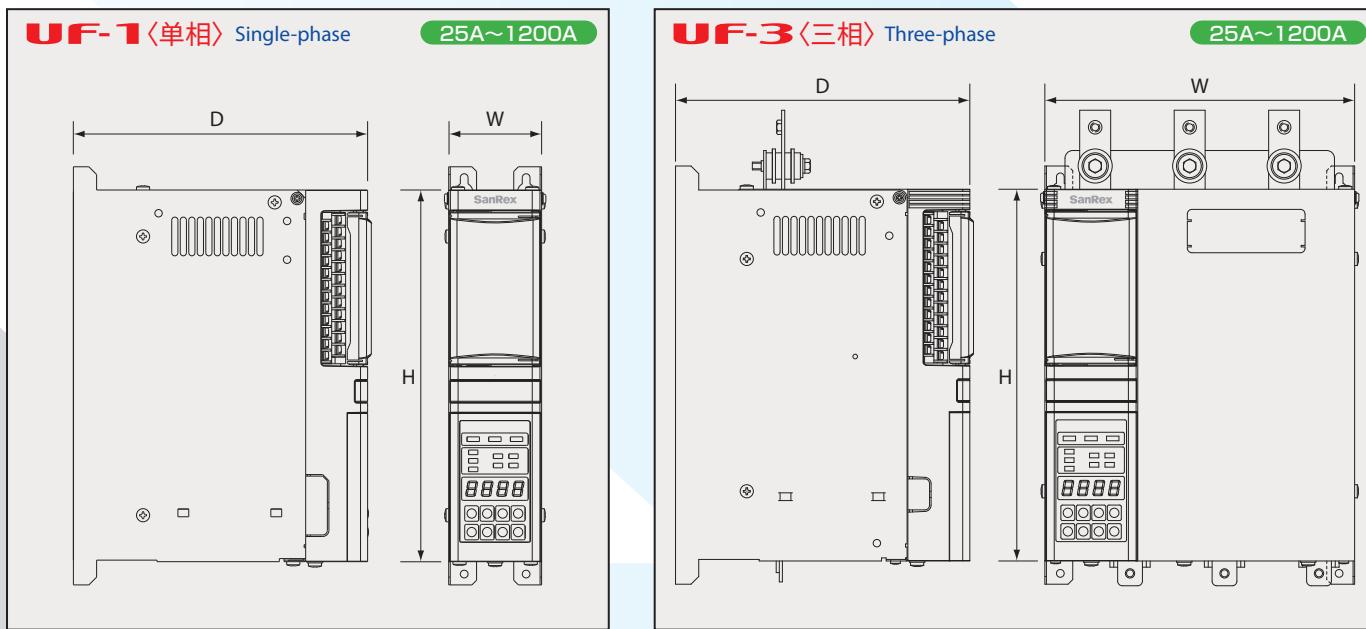
通过安装下点输出设定器(可变电阻器),
可任意设定可变最小输出电压。

Minimum output characteristics
Minimum output voltage can be set by adding a minimum output setter.
(variable resistor)



UF-1/UF-3

尺寸, 重量, 发热量 Dimensions, weight and calorific power



UF-1<单相> Single-phase

额定及尺寸, 内部发热量 Ratings, dimensions and internal calorific power

型号 Model	额定电流 (A) Rated current	冷却方式 Cooling system	外形尺寸 (mm) Outer dimensions			重量 (kg) Mass	发热量 (W) Calorific power
			W	H	D		
UF1- 025	25	自然冷却 Self cooled	60	240	190	3	43
UF1- 035	35		60	240	190	3	57
UF1- 050	50		60	240	190	3	77
UF1- 075	75		60	240	230	3.5	113
UF1- 100	100		60	240	230	4	164
UF1- 150	150		118	240	230	5	224
UF1- 250	250		118	350	260	8	349
UF1- 350	350		118	425	260	12	395
UF1- 450	450		118	425	260	12	512
UF1- 600	600 (订单生产) made-to-order		260	366	309	23	695
UF1- 800	800 (订单生产) made-to-order	风冷 Air-cooled	400	366	359	31	982
UF1- 1200	1200 (订单生产) made-to-order		420	553	365	56	1578

※1 ⇒ 2: 100V用, 200V用, 4: 400V用

2: For 100V, 200V, 4: For 400V

※2 ⇒ F: 有保险丝 无: 无保险丝 (因400V是标准装备所以用F表示)

F: Fuse fitted, None: No fuse (400V power type standard equipped with fuse. All marked with "F")

UF-3<三相> Three-phase

额定及尺寸, 内部发热量 Ratings, dimensions and internal calorific power

型号 Model	额定电流 (A) Rated current	冷却方式 Cooling system	外形尺寸 (mm) Outer dimensions			重量 (kg) Mass	发热量 (W) Calorific power
			W	H	D		
UF3 - 0025	25	自然冷却 Self cooled	200	240	190	6	87
UF3 - 0035	35		200	240	190	6	114
UF3 - 0050	50		200	240	190	6	174
UF3 - 0075	75		200	240	230	7	252
UF3 - 0100	100		230	240	230	10	312
UF3 - 0150	150		230	350	260	13	522
UF3 - 0250	250		360	350	260	19	936
UF3 - 0350	350		360	425	260	28	1140
UF3 - 0450	450		360	425	260	28	1560
UF3 - 0600KF	600 (订单生产) made-to-order		500	660	410	70	2000
UF3 - 0800KF	800 (订单生产) made-to-order	风冷 Air-cooled	560	705	425	99	2700
UF3 - 01200KF	1200 (订单生产) made-to-order		740	875	420	150	3924

※1 ⇒ K: 25~450A是6臂时表示 (600~1200A是8臂时表示)

K: 25~450A indicated for 6-arm type (600~1200A for 6-arm type only)

(注: 三相通用于100V系, 200V系, 400V系)

(Note: Three-phase type: Common for 100V, 200V and 400V)

选项 Option

■ 表示面板 (UF-DP) Display panel



1. 电路电压, 电流, 功率的各值用4位数字表示。
(由于变换面板的种类表示功能将有所变更)
Circuit voltage, current and power are displayed in 4 digits each.
(Display function depending on the type of conversion board)
2. 通过面板的开关可以控制运行或停止。
(但是以外部控制用端子传来的信号为优先执行)
The unit can be started and stopped with the switch on the panel.
(Note: Signal from the external control terminal is given priority.)
3. 斜率设定或下点设定的信号可以通过数值确认的同时也可通过面板的操作键进行设定。
Gradient setting and minimum setting signals can be numerically checked and the settings can be made with the operation key on the panel.
4. 通过UF本体或延长电缆(另购)可安装在控制盘上。
Display panel can be mounted on the UF main unit, or the external control panel with an extension cable (option).
5. 可任意设定软起动的时间。
Soft-start time can be set within the specified range.
6. 可任意设定加热器的断线测定量。
The heater breakdown detection level can be set within the specified range.

■ 变换面板 (UF-TB) Conversion board

1. 可适应, 定电压控制, 定电流控制, 定电力控制。(根据控制方法, 需要外部CT / PT。)

The board is designed for constant-voltage control, constant-current control and constant-power control.
(Depending on the control method, external CT / PT is required.)

2. 内设加热器断线测定电路的, 在加热器的并列运行时可将其一根断线检测出来。

Open wire (single line) can be detected during the parallel heater run for the unit with the heater breakdown detection circuit.

3. 根据变换面板的种类, 可进行功能的组合。

The functions can be combined depending on the models of conversion boards.

变换面板型号 Model of conversion board

■ 单相 Single-phase

变换面板型号 Model of conversion board	定电压控制 (CV) Constant-voltage control	定电流控制 (CC) Constant-current control	定电力控制 (CW) Constant-power control	加热器 断线测定 Heater breakdown detection
UF-TB1V	○			
UF-TB1A		○		
*UF-TB3	○	○	○	
UF-TB3U	○	○	○	○
*UF-TB3H	○	○	○ (1%)	
*UF-TB3HU	○	○	○ (1%)	○
UF-TB4			○	
*UF-TB4H			○ (1%)	

* 订单生产 Made-to-order

■ 三相 Three-phase

变换面板型号 Model of conversion board	测定相数 Type of phases detected	定电压控制 (CV) Constant-voltage control	定电流控制 (CC) Constant-current control	定电力控制 (CW) Constant-power control	加热器 断线测定 Heater breakdown detection
UF-TB21A	2-phase		○		
UF-TB33	3-phase	○	○	○	
UF-TB33U	3-phase	○	○	○	○

用途 Applications

■ 定电流电路 Constant-current circuit

1. 纯金类(钼, 白金)或硅化钼系(Super kanthal, molidit等)加热器控制。

For control of pure metal (molybdenum, platinum) or molybdenum silicate (Super Kanthal, Molidit, etc.) heaters.

2. 盐槽炉, 玻璃溶解火炉等直接加热方式的电气炉控制。

For control of direct-heating electric furnaces such as salt-bath furnace and glass melting furnace.

3. 根据直接通电退化线材或钢带等。

For annealing of wires and steel strips by direct energizing.

4. 通过对螺栓或钢材的直接通电进行淬火, 铸造用钢材的加热。

For quenching of bolts and steel materials by direct energizing and for heating of forging stocks.

5. 离子氮化用电源。

For power supply of ion nitriding.

■ 定电压电路 Constant-voltage circuit

对于控制中的电源电压变动, 感应变动, 控制防止输出电压的变动。

Control against output voltage fluctuations due to fluctuations of the input voltage and the load during the operation.

■ 定电力电路 Constant-power circuit

1. 碳化硅系加热器使用炉的自动控制。

For automatic control of silicon carbide heater furnace.

2. 碳素素材碳加热器的控制。

For control of carbon materials and carbon heaters.

3. 不能测定温度的控制系列温度控制。

For temperature control of control lines whose temperature not detectable.

安装可选产品时

When installing option items.

● 表示单元
Communication unit

● 表示面板
Display panel

■ 通信单元 Communication unit

通信单元型号 Model of communication unit	适应网络 Applicable network	最多连接台数 Maximum number of units for connections
UF-RS485	RS485	15 units
UF-DN	DeviceNet	63 units
UF-CL	CC-Link	42 units

SPU series

通用型

General-purpose type

型号 Model

SPU-2020

单相SPU系列
Single-phase SPU series单元额定电流
Unit's rated current2: 100V/200V兼用
Common for 100V and 200V power

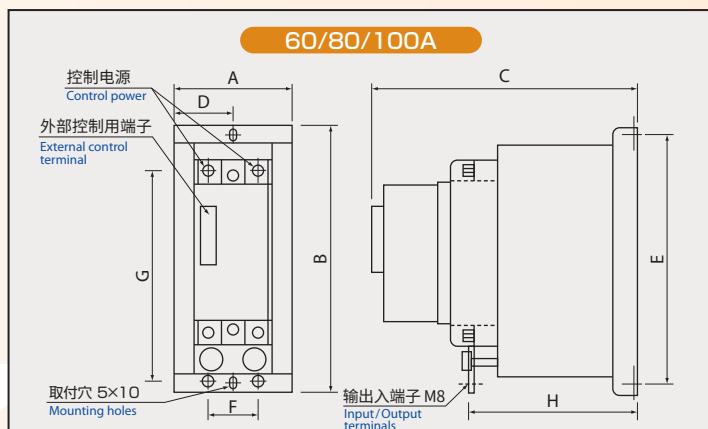
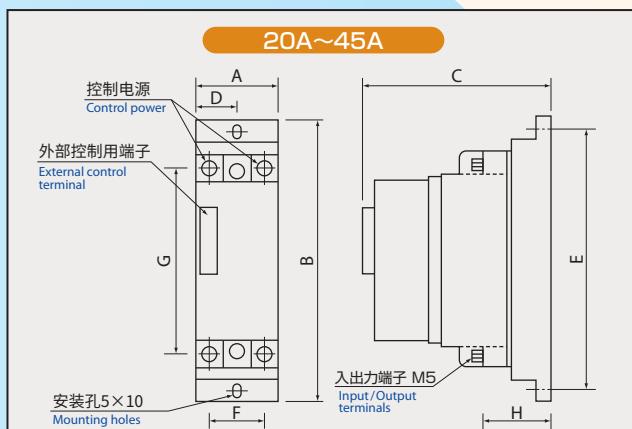
标准规格 Standard specifications

	相数 Type of phases	单相 Single-phase, three-phase
输入规格 Input spec.	电压 Voltage	100V系(100/110/200V ±10%) 100V power 200V系(200/220/254V ±10%) 200V power ※控制电源 AC200/220V Control power
	频率 Frequency	50/60Hz ±5%
输出规格 Output spec.	电流 Current	20/30/45/60/80/100A (自然冷却) (self cooled)
使用环境 Operating environment	周围环境 Ambient temperature	动作: -10~50°C* 保存: -20~70°C Operation Storage
	相对湿度 Relative humidity	30~90%
	工作环境 Atmosphere	无腐蚀性气体, 粉尘, 及振动 No corrosive gas, dust and vibrations

絶縁耐力 Dielectric strength	绝缘强度 Withstand voltage	AC2000V/1min
	绝缘电阻 Insulation resistance	20MΩ以上 (DC500V megger) Over 20MΩ (with DC500V megger)
控制方式 Control system	相位控制 Phase control	周期控制 Cycle control
控制输入 Control input	(1) 手动 Manual (2) 电流信号 DC4~20mA Current signal: DC 4-20mA	(3) 电压信号 DC1~5V Voltage signal: DC 1-5V
起动停止 方法 Start/Stop method	软起动/下降 1秒/10秒 DIP开关切换 Soft start/down 1 sec. / 10 sec. DIP switch	

* 可变电阻另售: 手动调整, 上限输出调整, 下限输出调整, 斜率设定
Volumes sold separately: Manual adjustment, upper-limit output adjustment, lower-limit output adjustment, gradient setting

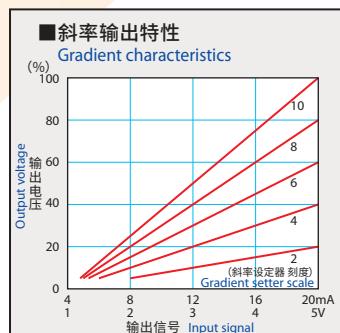
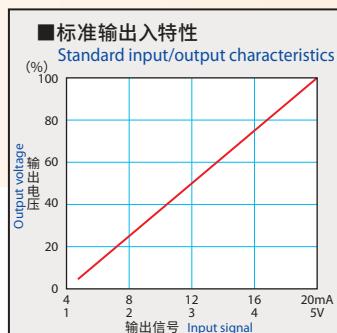
尺寸, 重量, 发热量 Dimensions, weight and calorific power



型号 Model	额定电流(A) Rated current	冷却形式 Cooling system	外形尺寸(mm) Outer dimensions							重量(kg) Mass	内部发热量(W) Calorific power
			A	B	C	D	E	F	G		
SPU-2020	20	自然冷却 Self cooled	52	180	110	26	164	31	104	52	0.7
SPU-2030			60	180	110	30	164	31	104	52	0.8
SPU-2045			60	180	171	30	164	31	104	113	1.6
SPU-2060			70	180	171	35	164	39	147	112	1.9
SPU-2080			98	190	156	49	174	39	147	98	1.9
SPU-2100			94	210	211	47	194	39	147	153	4.5

控制, 保护功能 Control and protective functions

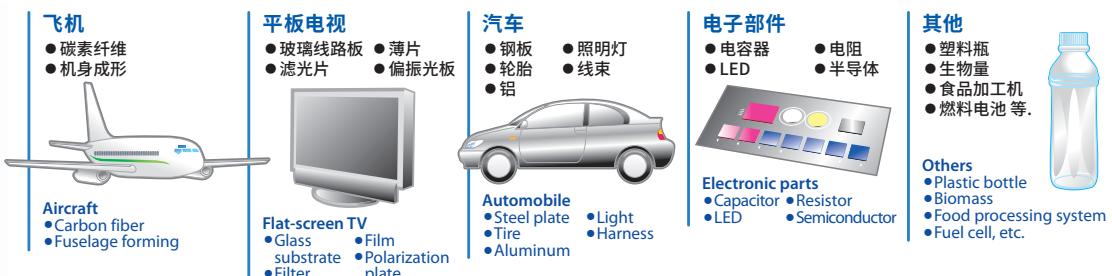
- 波形控制方式 … 相位控制, 周期控制 (间欠式, 连续式)
Waveform control system:
Phase control, cycle control (intermittent, continuous)
- 输出入特性 … 手动, 自动。本单元的标准输出入特性, 如右图所示。
(相位控制, 周期控制)
Standard input/output characteristics:
Manual, automatic. The unit has its standard input/output characteristics as shown at right. (Phase control, Cycle control)
- 斜率输出特性 … 通过接入斜率设定器 (可变电阻) 可任意变更设定最大输出电压。
Gradient output characteristics:
Maximum output voltage is freely presettable by adding a gradient setter (variable resistor).



贡献于社会的 UF·SPU系列

最适合高精度加热控制

UF·SPU series is widely used in many kinds of fields
Suitable for high-precision heating control



其他加热设备

Other heating machines



另外，本公司还制作加热器控制盘、直流加热用电源及感应加热用电源。

We design and manufacture heater control panel, DC heating and induction heating power supplies.



注意 Caution

为了正确、安全的使用电源，请事先认真阅读“使用说明书”。为了防止火灾、触电等事故的发生，请不要将其放置在水、湿气、水蒸气、灰尘、油烟等多的地方。

Read and understand the entire Operating Manual and your employer's safety practices before installing, or using the equipment. Do not install the equipment in an area where water, high humid, steam, dust or oil are located. It may cause damage to the equipment or result in a fire or electrical shock.

若用于如下用途，请咨询本公司。

- a. 用于人命直接相关的医疗器械、系统等
- b. 用于电车、电梯等可能导致人身伤害的运输系统
- c. 用于重要的社会性、公共性基础系统
- d. 相当于上述的装置和系统

用于与人身安全相关的、对维护公共功能有重大影响的装置和系统时，需要将系统多路复用化、设置紧急发电设备等，在运用、维护和管理方面需要采取特殊措施。

即使是因本公司产品导致的事故，包含对装置、连接设备、软件造成的异常和故障损害及其他二次损害在内的所有损害，本公司概不负责赔偿。

If the product is intended to be used for any of the following applications, consult us in advance.

- a. Use for medical devices, systems, etc. directly influence human lives
- b. Use for transportation systems such as electric trains, elevators, etc. that can lead to damage to human bodies
- c. Use for trunk systems that play important roles socially and publicly
- d. Devices and systems that are similar to any of the above

For devices and systems that are involved in the safety of people and have serious influence on the maintaining of public functions, special considerations are required to be given to their operation, maintenance, and management, such as multiplexing of systems, installation of power generation equipment for emergency use, and the like.

Even in the case of an accident caused by our product, we are not in a position to make compensation for any and all damages including damages related to abnormality and failure of devices, connected equipment, and software as well as other secondary and consequential damages.

- SanRex and CALPOTE are trademarks or registered trademarks of Sansha Electric Manufacturing Co., Ltd.
- DeviceNet is a trademark of ODVA, Inc.
- CC-Link is a trademark or a registered trademark of CC-Link Partner Association.
- Some of the products named in this catalog are trademarks or registered trademarks of their respective holders. None of these organizations are affiliated with Sansha Electric, nor do they sponsor or endorse Sansha Electric products.
- Please note that the parts such as fan or fuse needed to be replaced are chargeable when replacing. Also, keep accessory parts in a safe place.
- Please contact us if the equipment is used for any other applications not specified in this catalog.
- Specifications are subject to change without any notice.

株式会社 三社电机制作所

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