

Thank you for purchasing DSPR Series digital display power regulator. This manual mainly is to explain some precautions during installation and wiring. Before the operation, Please read this manual first in order to fully understand the use of this product. Please keep this manual for your reference at any time.

## ONE PRODUCT CHARACTERISTICS

- The high power thyristor unit is driven by an advanced 32-bit control chip to realize stepless regulation of voltage and current.
- The control circuit board adopts imported chip, high quality radiator and multi-channel detection to ensure quality.
- Standard constant voltage constant current function output fine, to achieve high precision field heating requirements.
- Constant current function to meet the silicon carbon rod, silicon molybdenum rod, molybdenum wire, transformer and other high-end load occasions.
- It has the modes of phase shift voltage regulation, power regulation and power change over zero.
- Isolated RS485 modbus RTU communication is standard for remote monitoring and control.
- Double row digital tube display, high temperature, cold and wet, suitable for harsh industrial occasions.
- The input and output interfaces are protected by isolation and have strong disturbance resistance.
- Exquisite appearance, small size to save the installation space in the cabinet.
- Used in industrial furnace, drying equipment, glass, heat treatment, chemical industry and other industries.

## TWO USE SAFETY, WARNINGS AND PRECAUTIONS



### SECURE

1. Read the safety precautions carefully before use. The precautions expressed here are important for safety and must be implemented.
2. If this product is used on the equipment that causes personnel injury and major property damage, double protection or triple protection devices must be set before use.
3. When SCR is not output, it is not completely isolated, and it is recommended that a shunt switch (NFB) must be installed.
4. In the equipment maintenance, to isolate the main power supply, such as only the operation of SCR off is not enough, because its output is still live, there will be a risk of electric shock.
5. It is recommended to use the alarm output function of the power regulator, when there is any abnormal, you can alarm the output at the first time.



### WARN correctly.

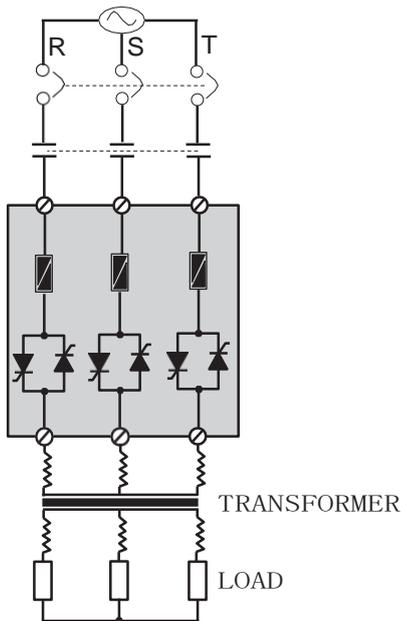
1. In order to maintain the long-term use of this product, please use the standard input voltage
2. Please do not disassemble, process, modify or repair this product at will, which may cause electric shock, fire and other risks.

**LOOK OUT**

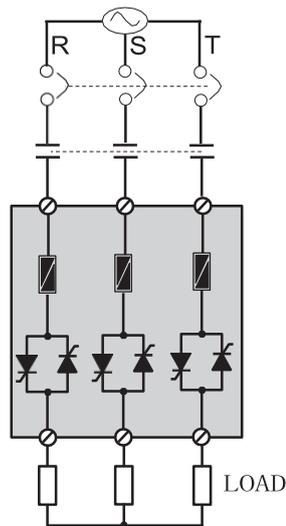
1. Please make sure that the product is not damaged during transportation before use.
2. The setting of the environment has a great impact on the performance and life of the product, so please avoid the following environment: high temperature air is not easy to circulate. Please avoid corrosive gases, harmful gases and other places (such occasions need to be effectively isolated with a control box or control room).
3. Drill holes in the upper part of the control box and install an exhaust fan.
4. Use ambient humidity: below 90%RH (no frost).
5. Operating cycle temperature :0℃~+40℃ MAX60℃(When the cycle temperature is between +40℃ ~+60℃, each increase of 1℃, the rated current must be attenuated by 1.2%).
6. The input and output connections must be tight. SCR is a high-current product, if the terminal is not fastened, it will cause arc welding phenomenon, and the current will increase several times. Causing parts to burn.
7. The heat sink is too hot. Do not touch the body.
8. The input and output terminals are in danger of electric shock. Please avoid direct contact with the conductor.
9. Do not connect unused terminals.
10. Follow the principle of gas heat when installing, please press the vertical installation direction.
11. If the load is not connected or the current is less than 0.6A, SCR cannot perform normal test (the load should be greater than 0.6A).

### THREE MAIN CIRCUIT POWER DISTRIBUTION

TRANSFORMER  
PRIMARY CONTROL



PURE RESISTIVE LOAD



NFB → Power can be cut off for maintenance or Avoid electric shock during maintenance.

MC → Can cut off the power supply to the load, Failure or temperature of power regulator Degree above setting too much when cut Cut off the power supply to avoid high temperature burnThe device may have an accident.

SCR → Adjust according to the control signal size Output current to achieve temperature control effect A result.

LOAD → Depending on the control mode, negative Load can be resistive load, feel Sexual load, rheostatic load, e.g Such as transformers, silicon carbon rods, silicon Molybdenum rod, etc.The load can be connected to the neutral line.

## FOUR PANEL FUNCTION DESCRIPTION



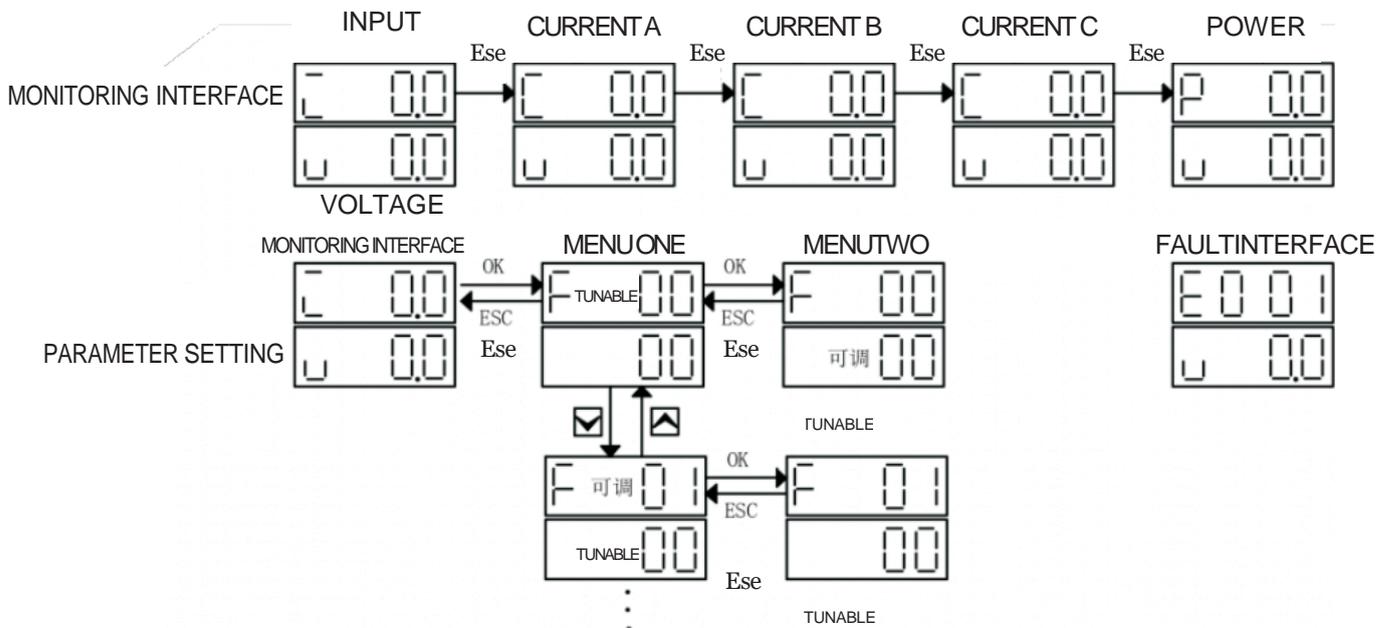
NAME	FUNCTION DESCRIPTION
Top row of digital tubes	Display input percentage, current A, current B, current C, power; Parameter sequence number
Bottom row nixie tube	Fixed display current output voltage
RUN Pilot lamp	Green, this light is on when the power regulator is working
FAULT Pilot lamp	Red, when the power regulator abnormal alarm, this light
COM Pilot lamp	Yellow: When the communication is online, the light is on
OK KEY	Tap to enter the parameter setting menu, modify the parameters, and tap to save
▲ KEY	Switch back parameter/Add data key
▼ KEY	Parameter forward switch/Data reduction key
Ese KEY	Click to switch display input, current, power; Parameter setting screen Tap to return
RUN KEY	Keyboard start
STOP KEY	Keyboard stops and resets if it fails

## FIVE MENU OPERATION

Ese key switch display parameters: input percentage, output voltage, output current, power.

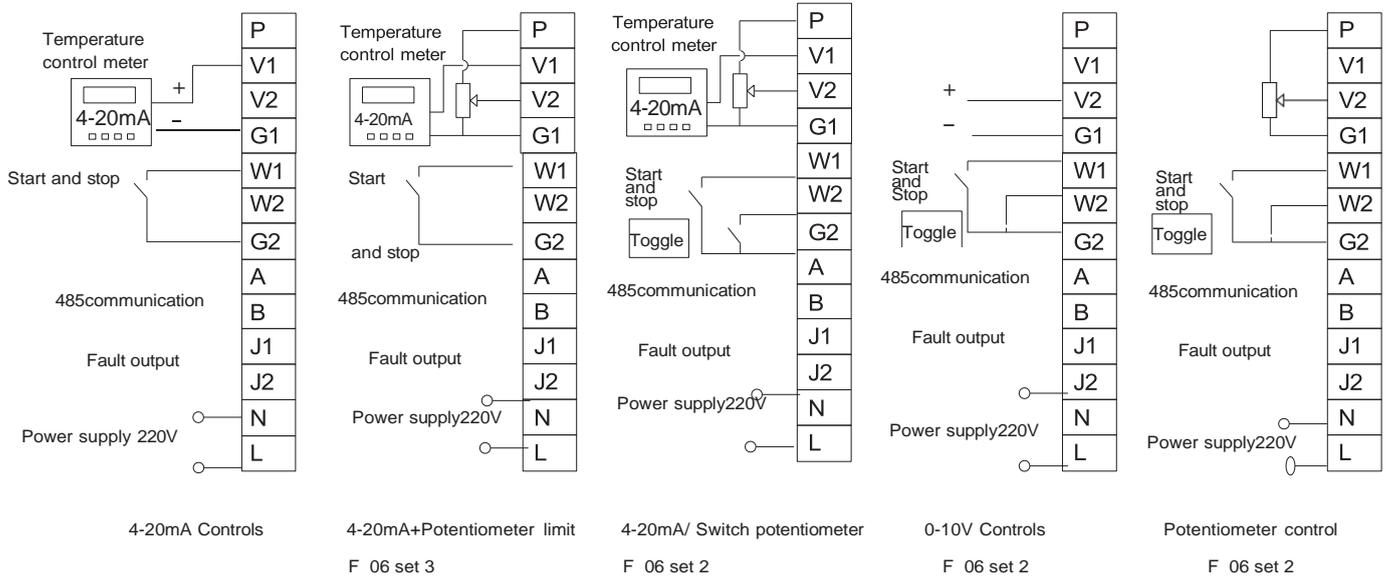
OK key to enter the menu, menu parameters (F00--F28), through the up and down keys to change the content, press OK to save, press Ese to return the upper-level parameters.

RUN is keyboard startup; STOP is to stop the keyboard (default terminal start and stop); The Ese key is pressed to reset in case of failure.



# SIX

# CONTROL TERMINAL CONNECTION



SERIAL NUMBER	SYMBOL	FUNCTION DESCRIPTION
1	P	10VDC Potentiometer power supply。
2	V1	Current analog input port :4-20MA(impedance 150Ω), and the terminal G1 form a loop.
3	V2	Voltage analog input port :0-5V/1-5V/0-10V/ comprehensive limit, and the terminal G1 form a loop.
4	G1	Signal common ground: analog signal negative.
5	W1	External start and stop terminals, connect to the G2 terminal, disconnect and stop.
6	W2	Analog input port selected. Analog port V2 is valid when it is connected to G2 terminal, and analog port V1 is valid when it is disconnected from G2 terminal.
7	G2	Signal common ground: analog signal negative terminal, switching signal common terminal.
8	A	RS485 communication port +
9	B	RS485 communication port -
10	J1	Output relay: default fault output, can be set to run output by parameter.
11	J2	Output capacity :AC250V 3A
12	N	Auxiliary power supply :AC220V(± 15%) 50/60Hz Pmax=30W
12	L	

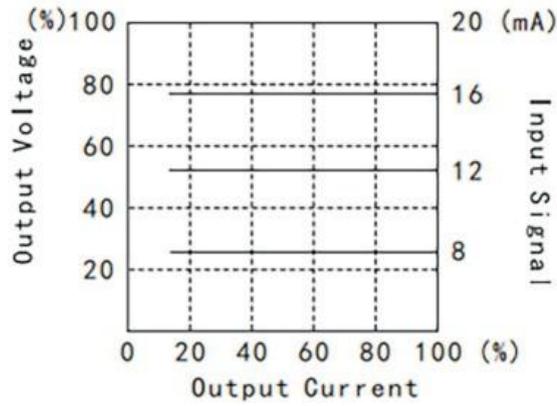
# SEVEN

# FEATURE

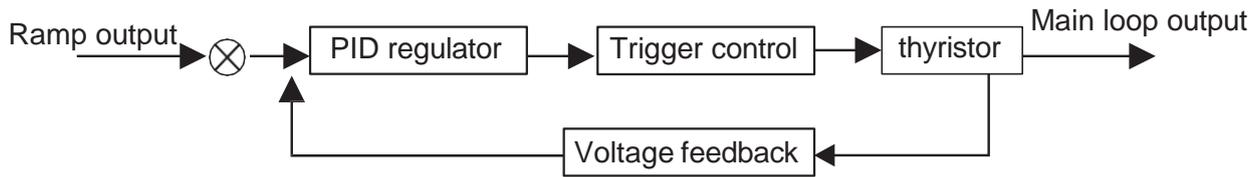
## ① Constant voltage control

- Control mode setting: F01=1
- A control method that keeps the voltage output constant at a given voltage value. When the grid voltage fluctuates or the load impedance changes, The regulator is adjusted by PID rule. Suitable for inductive, resistive and capacitive loads.

- Constant voltage output characteristic diagram

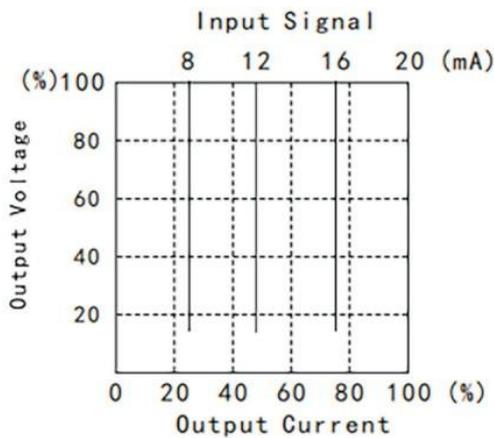


- Constant voltage logic control block diagram

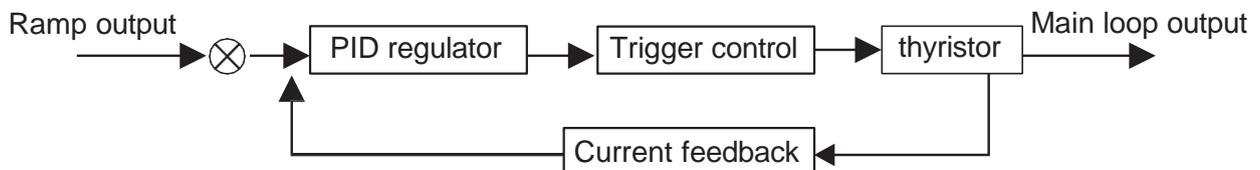


## ② Constant current control

- Control mode setting: F01=2
- A control method that keeps the current output constant at a given current value. When the grid voltage fluctuates or the load impedance changes, The regulator is adjusted by PID rule. Suitable for inductive, resistive and capacitive loads.
- Constant current output characteristic diagram

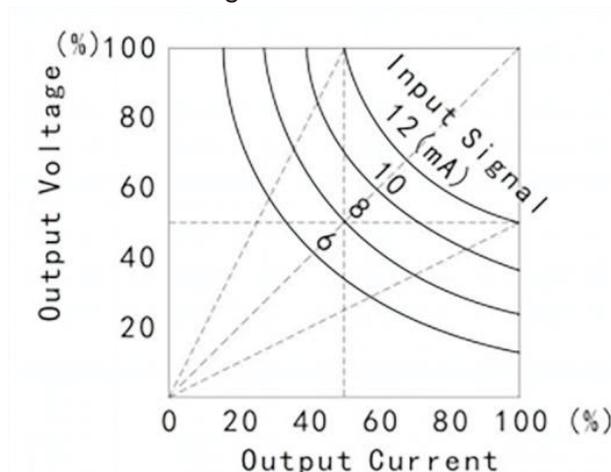


- Constant current logic control block diagram

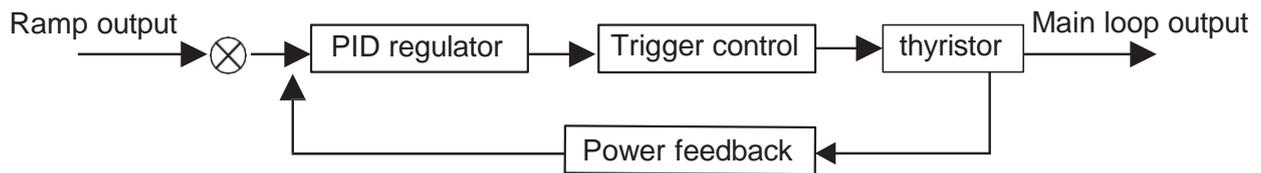


### ③ Constant power control

- Control mode setting: F01=3
- A control method that keeps the power output constant at a given power value. When the grid voltage fluctuates or loads occur When the impedance changes, the regulator adjusts with PID rule. Suitable for inductive, resistive and capacitive loads.
- Constant power output characteristic diagram

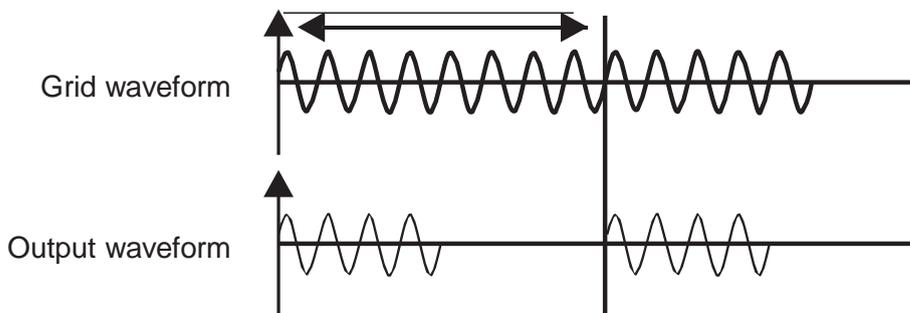


- Constant power logic control block diagram



### ④ Power adjustment through zero

- Control mode setting: F01=4
- There is no harmonic pollution control method for the power grid. The number of cycles opened in 100 cycles is determined by the input value, which is suitable for resistive load and inductive load.
- Zero control output waveform (given 50%)



### ⑤ Open-loop control

- Control mode setting: F01=0
- The opening Angle of thyristor is controlled directly by the input value. When the grid voltage fluctuates or loads occur When the impedance changes, the voltage or current cannot be kept constant. Suitable for inductive, resistive and capacitive loads.
- Open loop logic control block diagram



## EIGHT MENU PARAMETER

ARGUMENT	INSTRUCTIONS	ACQUIESCE	REGISTER
F00	Slow rise time: 0-120 seconds	3	106
F01	Working mode: 0, phase shift 1, fixed voltage 2, fixed current 3, fixed electric power 4, zero crossing 5, frequency conversion zero crossing	1	105
F02	Load connection: 0, star point does not connect to zero (triangle) 1, star point to zero	0	107
F03	Number of cycles: zero cross range 10-500 Frequency conversion zero cross range 100-500	40	110
F04	Given minimum limit value: 0-100%	0	120
F05	Given maximum limit value: 0-100%	100	121
F06	Analog V2 channels: 0, 0-5V 1, 1-5V 2, 0-10V 3, comprehensive restrictions	2	102
F07	Given mode: 0, analog 1, communication 2, keyboard	0	103
F08	Slow descent time: 0-10 seconds	2	140
F10	Load break value: 0-80% the larger the more sensitive, 0 is off, the general setting is 15	0	142
F11	Overcurrent protection threshold: 110-150% (overcurrent = overcurrent threshold * load current Example :130%X100A=130A)	130	143
F12	Current imbalance protection: 10-100%(phase maximum current - average current)/ average current, the smaller the more sensitive, 100 for off	100	131
F13	Mailing address: 1-128	1	145
F14	Communication baud rate: 0,4800 1,9600 2,19200	1	146
F15	Communication check: 0 and 8 Data none Check 1 and 8 Data parity check 2 and 8 Data odd check	0	148
F16	Start-stop mode: 0, keyboard or communication 1, terminal	1	100
F17	Relay output mode: 0, fault output 1, operation output	0	149
F18	Load voltage: indicates the actual load voltage	380	160
F19	Load current: indicates the actual load current	-	161
F20	Analog input calibration factor: 50-150 %	100	162
F21	Output voltage calibration factor: 50-150%	100	165
F22	Output current calibration coefficient: 50-150%	100	166
F23	Restore parameters: Write 6 Power off and restart	0	
F26	Machine current	-	

## NINE COMMUNICATION

Supports RS485 modbus rtu format. Slave mode, command format 03 Multiple read commands within 20 bytes, 06 single write command; Data format 16 bits unsigned

For example, the host sends the message 010300000002C40B and receives the message 0103 04000100 02 2A 32  
Register addresses 0-13 in the following table are read-only and 16-18 are write

If using communication control, set F07 to 1 and write 0-1000 to register 17 (part of the programming address to add 1+17=18). Write data all the time, otherwise the communication interruption will automatically return to zero after more than 10 seconds.

ARGUMENT	READ AND WRITE VALUES ARE 16-BIT DECIMAL INTEGERS	RADIUS	PECULIARITY	ADDRESS
System state	0 Stopped /1 Running /128 faulty	0/1/128	Read	0
Percentage display	Enter the percentage, 1000 corresponds to the given 100.0%	0-1000	Read	1
Output voltage Uab	The measured output voltage (V) 3800 represents 380.0V	0-6600	Read	3
Output voltage Ubc	The measured output voltage (V) 3800 represents 380.0V	0-6600	Read	4
Output voltage Uca	The measured output voltage (V) 3800 represents 380.0V	0-6600	Read	5
Output current Ia	The measured output voltage (V) 1000 represents 100.0V	0-9999	Read	6
Output current Ib	The measured output voltage (V) 1000 represents 100.0V	0-9999	Read	7
Output current Ic	The measured output voltage (V) 1000 represents 100.0V	0-9999	Read	8
Output power P	Communication read 15 means 1.5KW, digital tube Display 1.5=1.5KW	0-10000	Read	9
Grid frequency	500 indicates 50.0HZ	0-650	Read	12
Fault code	1 lack of phase, 2 overheat, 3 overcurrent, 4 broken line, 5 electricity Table E001-E005 describes the flow imbalance	0-10	Read	13
Communication start stop	For communication start stop machine: write 2 start, write 5 stop	2-5	Read/write	16
Communication setting	Used to communicate a given value: 500 indicates a given 50.0%	0-1000	Read/write	17
Communication reset	Write 0 to reset the fault	0-1	Read/write	18

## TEN FAULT DISPLAY CODE

REVEAL	BREAKDOWN	TROUBLESHOOTING
E001	Phase-out fault	Power grid phase loss, insurance fuse, poor power grid contact
E002	Overheat fault	The fan is damaged, dust accumulates in the air duct of the radiator, and the ambient temperature is high
E003	Overcurrent fault	The load is short-circuited, grounded, or aged
E004	Load break	The load is disconnected, the resistance becomes large, and the connection is virtual
E005	Current unbalance	The load is disconnected, the resistance becomes large, and the connection is virtual

## ELEVEN TYPE SELECTION

Code Section	Options	Description
<b>Series</b>	DSPR	Denki Seigyo Power Regulator
<b>Phase Type</b>	1	Single Phase (1Φ)
	3	Three Phase (3Φ)
<b>Current Rating</b>	100A	30A-600 A
<b>Control Mode</b>	Z	Zero fixed frequency wave (Zero-cross control)
	P	Open loop phase-shift control
	C	Constant current control
	V	Constant voltage control
	CV	Constant power control
<b>Display Option</b>	W	With display
	N	Without display
<b>Communication</b>	C	With communication (RS-485 Modbus RTU)
	N	Without communication

### ➤ Standard Configuration Table (100A Rating)

Model Code	Phase	Rated Current	Control Mode	Display	Communication
DSPR-1-100A-P-0-0	1Φ	100A	Phase shift (Open loop)	No	No
DSPR-1-100A-Z-W-0	1Φ	100A	Zero-cross	Yes	No
DSPR-3-100A-P-W-0	3Φ	100A	Phase shift (Open loop)	Yes	No
DSPR-3-100A-P-W-C	3Φ	100A	Phase shift (Open loop)	Yes	RS-485
DSPR-3-100A-C-W-C	3Φ	100A	Constant current	Yes	RS-485
DSPR-3-100A-V-W-C	3Φ	100A	Constant voltage	Yes	RS-485
DSPR-3-100A-CV-W-C	3Φ	100A	Constant power	Yes	RS-485

## TWELVE OVERALL DIMENSION

### DIMENSIONS (MM) Z1/22 IS THE MOUNTING DIMENSION OF THE HOUSING

MODEL NUMBER	LONG	WIDE	HIGH	LONG Z1	WIDE Z2	HOLE T3	WEIGHT
DSPR-3-30A	160	110	150	95	105	M6	1.8KG
DSPR-3-40A	200	110	150	95	105	M6	2.3KG
DSPR-3-50A	250	140	185	170	135	M6	3.5KG
DSPR-3-60A	250	140	185	170	135	M6	3.5KG
DSPR-3-75A	250	140	185	170	135	M6	3.9KG
DSPR-3-80A	250	140	185	170	135	M6	3.9KG
DSPR-3-90A	250	140	185	170	135	M6	3.9KG
DSPR-3-100A	250	140	185	170	135	M6	3.9KG
DSPR-3-125A	290	140	185	170	135	M6	5.1KG
DSPR-3-150A	340	140	185	170	135	M6	5.7KG
DSPR-3-175A	340	140	185	170	135	M6	5.7KG
DSPR-3-210A	400	245	232	380	160	M6	15KG
DSPR-3-260A	400	245	232	380	160	M6	15KG
DSPR-3-310A	435	263	290	416	160	M6	22KG
DSPR-3-360A	435	263	290	416	160	M6	22KG
DSPR-3-410A	435	263	290	416	160	M6	22KG
DSPR-3-460A	435	263	290	416	160	M6	23KG