

☆Preface☆

Thank you very much for choosing S5000 series UV curing power supply produced by Shenzhen UWET Electric Technology Co, Ltd. The power supply integrates modern power electronics technologies such as vector control algorithm and IGBT inverter technology. The product has the characteristics of high excitation voltage, stability and reliability, precise control, small size, light weight, etc.

This manual is S5000 series power supply manual, it will provide you with detailed power supply installation, Wiring, functional parameters, daily maintenance, fault diagnosis and troubleshooting and other related rules and precautions.

In order to use the S5000 series power supply correctly, give full play to the excellent performance of the product and ensure the safety of users and equipment, please read this manual carefully before using the product. Improper use may cause abnormal operation of the product, failure, shortened service life, equipment damage, personal injury and other accidents!

This manual is sent as an electronic file, please keep it properly for future use in maintenance and repair of the product. Due to the continuous improvement and upgrading of products, the information provided by the company is subject to change without prior notice.

S5000 Series Digital Power Supply User Manual

Version V1.2

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Chapter 1 Production Introduction

1.1 Introduction

S5000 series power supply is a high-tech product developed for UV curing applications, controlled by a high-performance MCU control core, high-precision vector control algorithm to ensure the stability of the output, to create excellent application equipment for customers. Products are widely used in photocatalytic experiments, photoaging experiments and other fields.

1.2 Function

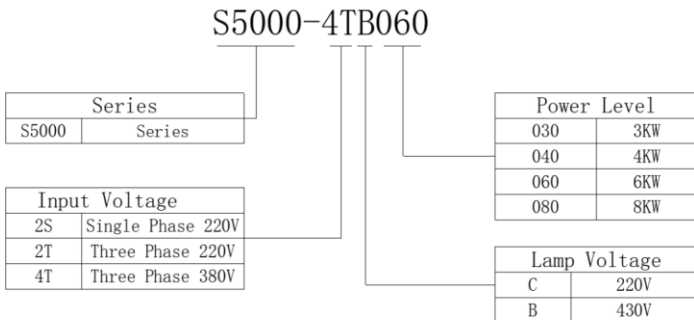
- 1) Flexible control methods: operation panel control, external terminal control, and RS485 communication control are optional.
- 2) Various power setting methods: panel setting, analog setting or communication setting are optional.
- 3) High excitation voltage and automatic retry: The built-in booster circuit can boost the instantaneous output voltage to above 5000V (pp), automatically retry triggers when the light is off, and alarm when the predetermined number or time is reached.
- 4) Automatic matching lamp: as long as the rated power of the lamp is set correctly, the power supply will automatically compensate the rated tube pressure error of the lamp.
- 5) Lamp temperature control: It can output temperature control signal for cooling the lamp, and has the function of delay cooling after the lamp is turned off.
- 6) Status monitoring: The machine comes with a digital tube interface to display the working status of the machine and the lamp in real time.
- 7) Configurable relay output function: the relay function can be set to fault alarm,

startup completion, etc.

8) The standard operation panel is easy to use: start-stop control, power setting, status monitoring, parameter modification, etc.

9) Optional external LCD liquid crystal control box: the operation screen can be set in Chinese and English, which is more convenient to use and debug.

1.3 Description of power supply model (label)

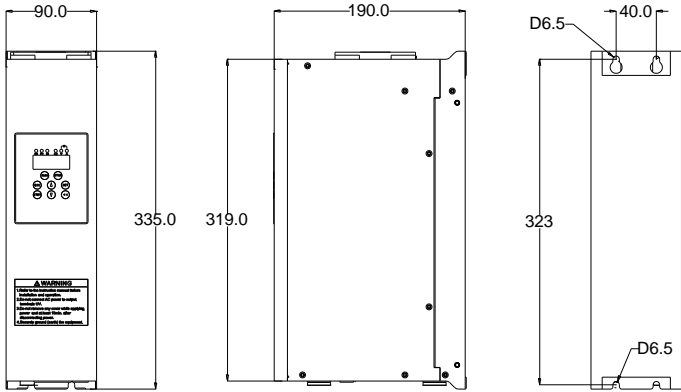


1.4 Product technical indicators and specifications

Input	Rated Voltage, Frequency	According To Specific Model
	Voltage Allowed Range of Change	-5%~+10%
Output	Voltage	According To Specific Model
	Current	According To Specific Model
	Frequency	1KHz

Control mode		Constant Power Control	
Control Feature	Power Setting Resolution		1%
	Current Limit		4.0a--- the maximum allowed by the machine
	Voltage Limit		Less than lamp rated voltage*110%
	Power Limit		According to specific model
Typical Function	Standby Function		When the device is intermittent, set the standby power consumption for energy-saving
	Working Time Record		Lamp use time record, communication reading
	Rs485 Communication		Standard configuration rs485 communication interface, run, stop command and machine status reading
	Running Function		External dry contact to control machine start and stop
	Failure Analysis		It has the functions of fault record query and fault cause analysis
Display	Operation	Run State	Optional monitoring of output voltage, output current, set power, output power, etc.
	Screen	Parameter Setting	Relevant parameter values can be set according to actual requirements
Protection/alarm function			Overvoltage, undervoltage, overheating, short circuit, phase failure, etc.
Environment	Ambient Temperature		-10°C to +45°C (not frozen)
	Ambient Humidity		Below 90% (not frozen)
	Surroundings		Indoor (no direct sunlight, no corrosion, no flammable gas, no oil mist, dust, etc.)
	Altitude		Below 1000m
Structure	Degree of Protection		IP52
	Cooling method		Forced air cooling

1.5 Installation Size



Graphic 1-1, S5000A Installation Dimension

Chapter 2 Wiring

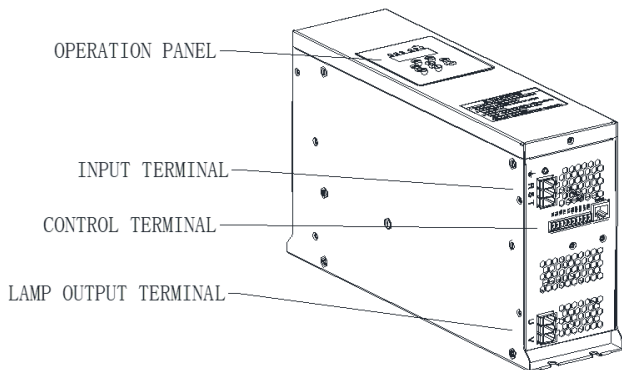
2.1 Precautions for Wiring

- 1) Make sure that a circuit breaker is connected between the power supply and the power supply to avoid accident expansion when the power fails.
- 2) In order to reduce electromagnetic interference, please connect surge absorbers to the coils of electromagnetic contactors, relays and other devices in the circuit around the power supply.
- 3) For the wiring of analog signals, please use shielded wires over 0.3 mm². The shielding layer is connected to the ground terminal of the power supply (keep the shielding layer grounded at one end), and the wiring length is less than 30 m.
- 4) The wiring of the relay input and output circuits should use twisted wires or shielded wires above 0.75 mm².
- 5) The wiring of the main circuit must conform to the power level of the power supply.

Recommended electrical specifications, as shown in the table below:

Power Level	Input Voltage (v)	Input Current (a)	Wire Gauge (main circuit) (mm ²)	Air Circuit Breaker (a)	Electromagnetic Contactor (a)
2kw	400	3.3	2.5	16	12
6kw	400	9.9	4	25	25
8kw	400	13.2	4 or 6	30	30

2.2 Main Circuit Terminal Wiring



Graphic 2-1, S5000 Terminal Position

Chart 2-1 Main Circuit Terminal Function Description

Terminal Symbol	Terminal Name	Instruction
R、S、T	Input	Three Phase AC Power Supply
U、V	High Voltage output	Connect Lamp
E	Earth	Connect Earth Line

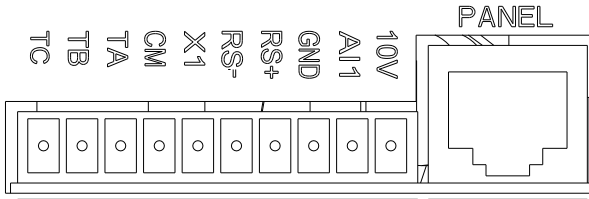
ATTENTION

Do the wiring work ten minutes after the indicator light on the panel goes out.

Please confirm that you have safely grounded the digital power supply to prevent electric shock.

Do not install power factor correctors and surge voltage absorbers at the output end.

2.3 Control board terminal wiring

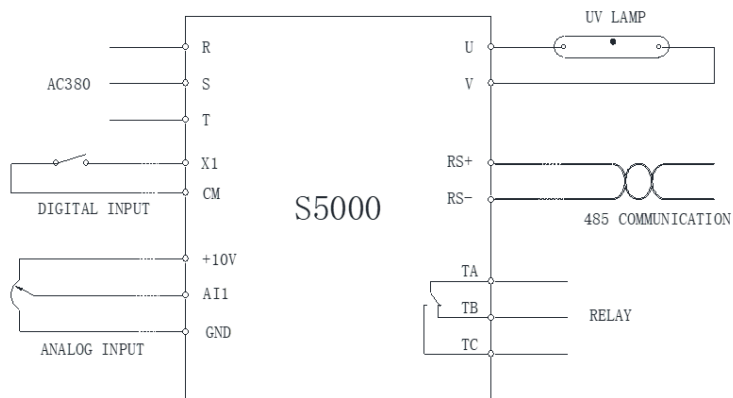


Graphic 2-2, terminal

Chart 2-2 Power Control Board Terminal Function Description

Terminal Type	Terminal Symbol	Terminal Function	Note
Analog Input	10V,AI1,GND	Analog input, generally used for power given	0-10V input
485 Communication	RS-,RS+	R485 communication interface	Connect to touch screen, plc
Terminal Input	X1,CM	Digital terminal input, generally used to start	X1 and CM short circuit
Relay Output	TA,TB,TC	Configurable output function, generally used for alarm	TA, TC normally open, TA, TB normally closed
Control Box Interface	PANEL	For external control box	

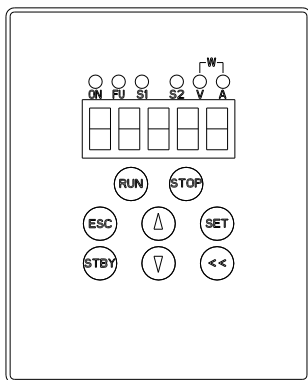
2.4 Basic Wiring Diagram of Power Supply



Graphic 2-3, Basic Wiring Diagram

Chapter 3 Power Supply Operation

3.1 Basic Functions of the Operation Panel



Graphic 3-1, Schematic Diagram of the Operation Panel

The operation panel is composed of 5 digital tubes, 6 indicator lights and 8 buttons. Users can control the power supply start and stop, power setting, parameter setting, status monitoring, fault query, etc. through the operation panel.

Refer to the following two tables for the functions of each indicator light and key.

Chart 3-1, Indicator Light Function Table

Name	Function	Note
ON	Power running indicator light, flashes when activated, and is always on when preheating is completed	
FU	Fault indicator light, flashing when alarming, always on when faulting	
S1	Blinks when the power supply is activated	

	and waits, otherwise it goes out	
S2	The power supply flips when it receives the correct MODBUS data	Turn off after 0.5 seconds without communication
V	Unit indicator light, the unit of the current display value is V	When V and A are on together, the unit is W
A	Unit indicator light, the unit of the current display value is V	

Chart 3-2, Key Function Table

Name	Function
RUN	Run key, press it to start the power, it is valid when the start mode is controlled by the panel
STOP	Stop key, the power will stop after pressing it, and it will be valid when the start mode is controlled by the panel
SET	Set, OK, save keys for parameter setting
ESC	Exit key, exit the menu or enter the monitoring parameter group
△	"up", increase parameter
▽	"down", decrease parameter
STBY	Standby Mode
<<	Shift key, used to switch the bit to be modified when modifying parameters

3.2 How to Operate the Operation Panel

3.2.1 Status Monitoring Parameter Query

After the power supply is powered on, the digital tube displays "0" and flashes. After the internal preparation of the power supply is completed, it displays the current given power flashes. At this time, press the ESC key to enter the monitoring

parameter selection screen, displaying "d0-00" (the underline indicates that the bit is flashing), press the shift, up, and down keys to select the parameter to be viewed, and press the SET key to enter the parameter value screen.

Take the query of the current lamp usage time as an example to illustrate the query method of the status monitoring parameters.

The monitoring parameter code of the lamp usage time is D0-38, the key sequence and screen display are as follows.

100→ESC→d0-00→left shift button→d0-00→press up bottom 4 times→d0-40→press right shift button →d0-40→press down bottom twice→d0-38→SET→1.1 (The parameter value is subject to the actual)

Exit from the parameter value display screen to the initial screen, press the ESC key twice.

3.2.2 Parameter Modify Method

Press the SET key on the initial screen to enter the parameter group selection screen, press the up and down keys to switch parameter groups. Press the up and down keys and the shift key to select the parameter to be set. Press the SET key to display the parameter value, press the SET or the up and down key, the shift key enter the parameter editing screen, press SET to save after editing. Then press the ESC key three times to exit to the initial screen.

Take changing the X1 terminal as an example to illustrate the button method of parameter change.

100→SET→ FA→SET→FA-00→ press up key 6 times→FA-06→SET→0100→SET→0100→press up key→0101→SET→0101→ESC→FA-06→ESC→FA→ESC→100

3.2.3 Display of basic operating parameters

In the running state, the current output power screen is displayed by default. Press the shift key to switch between the output power, output voltage, output current, and power reference screens. By observing the unit indicator light, it can be known that the current display value is output power, voltage or current. When switching to the power given value screen, the displayed value flickers.

Chapter 4 Functional parameters and monitoring parameter table



Description of symbols in the function parameter table: “★” Indicates that the parameter cannot be changed during operation; “▲” Indicates that the parameter is not recommended to be modified in the running state; “◆” Can be modified during operation.

4.1 Function parameter table

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
F A Basic Parameter	FA.00	Lamp Rated Power	1.0-2.5	1	2.0	▲
	FA.01	Lamp Rated Voltage	10V-400V	1	250	▲
	FA.02	Digital Power Setting	FA.05-100%	1	100	◆
	FA.03	Lamp Preheating Current	5.0A-14.0	0.1	14.0	▲
	FA.04	Lamp Lower Limit Current	1.5A-5A	0.1	4.0	▲
	FA.05	Lamp Lower Limit Power Value	2%-100%	1	10	▲
	FA.06	Power Control Channel	0000: Power Start Mode 0: Start Operating Panel 1: X1 Terminal 2: RS485 Start 0000: Power Given Channel 0: Operation Panel Setting 1: AI1 Channel 2: Reserved 3: RS485 Setting, Communication Address 1001H, not saved when power off 4: Reserved 5: Reserved 6: Reserved 7: RS485 setting, communication address	0000	0100	★

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
FA Basic Parameter			1009H, save when power off 0000: Delayed Standby 0: off 1: open 2: Transfer to standby after power is paused 0000: standby signal channel 0: operation panel			
	FA.07	Reservation	Reservation	1	0	▲
	FA.08	Digital Output Setting	0000: Relay 0000: Reserved 0000: Reserved 0000: Reserved 0: lamp ventilation signal 1: Fault alarm signal 2: The system is ready to complete the signal 3: Lighting and preheating completion signal 4: output power arrival signal 5: Lamp voltage arrival signal 6: Lamp current arrival signal 7: Power warning signal 8: Power supply running signal 9: Extended function parameter FE.00 confirmed	0000	7201	★
	FA.09	Reservation	Reservation	0000	0000	
	FA.10	Function Switch Selection		0000: Detection of the Missing phase of electricity supply 0: open 1: close 0000: power supply temperature alarm 0: open 1: close 0000: power supply cooling fan control	0000	0000

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
FA Basic Parameter			0: Running Start 1: Power-on and start <u>0000</u> : Reservation			
	FA.11	Parameter initialization	1: Standard initialization 2: Clear the fault record	0	0	★
	FA.12	RS485 communication setting	<u>0000</u> : Baud Rate Selection 0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps <u>0000</u> : data format selection 0: No Check 1: odd check 2: Dual Check <u>0000</u> : communication protocol 0: MODBUS <u>0000</u> : communication failure handling 0: Keep the original state 1: stop	1	0003	★
	FA.13	RS485 communication Address.	0: Broadcasting 1-247: Slave address	1	1	★
	FA.14	CAN communication setting	Reservation		0	★
	FA.15	CAN communication setting	Reservation		0	★
	FA.16	Long-term allowable current of lamp	1.0A-13.0A	0.1	13.0	◆
	FA.17	Panel lock	Panel lock 0: open 1: lock	1	0	◆

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
F A Basic Parameter	FA.18	Lamp Control Selection	0000: Lamp excitation mode selection 0: Mode 1 1: Mode 2 2: Mode 3 3: Mode 4 0000: Lamp preheating protection function 0: off 1: open 0000: : Maximum lamp warm-up time 0: 3min 1: 5min 2: 7min 3: 10min 4: 12min 5: 15min 6: 17min 7: 20min 8: FE.24 setting	1	1000	▲
	FA.19	Light box temperature control	0000: PID type of lamp exhaust 0: Output Power Closed Loop 1.Lamp box temperature closed loop 2.Lamp voltage closed loop 0000: lamp box temperature detection channel 0: AI1 1: Reservation 2: RS485 0000: : Given channel of lamp box temperature 0: AI1 1: Reservation 2: Operation panel settings 3: RS485 0000: : reservation	0000	0230	▲

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
F A 基本 参数	FA.20	Light intensity control	000: Light intensity feedback channel 0: AI1 1: reservation 2: RS485 000: Light intensity given channel 0: Operation panel setting 1: AI1 2: reservation 3: RS485	00	0032	▲
	FA.21	Light box temperature digital given	30-500℃	1	70	◆
	FA.22	Light intensity number given	10-5000mW	1	5000	◆
	FA.23	Reservation	Reservation			
	FA.24	Delay time of standby	1-3000s	1	10	▲
	FA.25	Delay time of Lamp exhaust	1-15min	1	3	▲
	FA.26	Voltage arrival	100-1000V	1	120	▲
	FA.27	Power arrival	0.5-5.0KW	0.1	1.8	▲
	FA.28	Current arrival	1.0-20.0A	0.1	3.0	▲
	FA.29	Lamp igniting time	1-5	1		▲
F B Basic Parameter	FB.00	Lamp exhaust lower limit (%)	0-100%	1	0	◆
	FB.01	Reservation	Reservation			
	FB.02	Reservation	Reservation			
	FB.03	Reservation	Reservation			
	FB.04	Reservation	Reservation			
	FB.05	Reservation	Reservation			
	FB.06	Reservation	Reservation			
	FB.07	Reservation	Reservation			
	FB.08	AI corresponding light intensity value	100-5000mW	1	5000	▲
	FB.09	AI corresponding temperature value	100-500℃	1	150	▲

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
F B Basic	FB.10	Lightbox temperature alarm value	10.0-300.0	0.1	80.0	▲
	FB.11	Light box temperature control value P	1-1000	0.1	1.0	▲
	FB.12	Light box temperature control value I	1-1000	0.1	1.0	▲
	FB.13	Light intensity control value P	1-1000	0.1	1.0	▲
	FB.14	Light intensity control value I	1-1000	0.1	1.0	▲
	FB.15	Reservation	Reservation			
	FB.16	Reservation	Reservation			
	FB.17	Lamp exhaust 0V corresponding value	0-FB.18	1	60	◆
	FB.18	Lamp exhaust 10V Corresponding value	0-100%	1	95	◆
	FB.19	Low Voltage Protection and Bus Protection	0000: Low Grid Voltage Protection selection 0: Close 1: Open 0000: bus voltage anomaly detection 0: Close 1: Open	1	00	◆
	FB.20	Reservation	Reservation			
FB.21	Reservation	Reservation				

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
Parameter	FB.22	Lamp timing and delayed power-off	0000: Enabled lamp timing function 0: Close 1: Open 0000: Lamp life arrival 0: No Action 1: Alarm and Continue Operation 2: Alarm for next startup 0000: Delayed power-off mode 0: Trip unit self-powered off and manually powered on, and the light-off signal is triggered. 0000: Delayed power-off trigger switch type 0: Normal Closed type, Disconnect output and self-locking, Closed Trigger Power Off 1: Normal open type, closing output self-locking, disconnect triggers power off	0	0001	◆
	FB.23	Lamp availability time	0.1-6000.0 H	0.1	1000.0	◆

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
	FB.24	Delay the power-off time	0-120 Min If this parameter is less than the exhaust delay time, the shutdown power-off delay is calculated by the exhaust delay time, and after the exhaust is completed, output power-off signal; recommending to set this value slightly longer than the exhaust delay time to prevent the blower from being powered off before the blower is completely stopped.	1	15	◆
	FB.25	Advanced fault function	0000: External Fault Input Function 0: invalid 1: X1 0000: Reservation 0000: Reservation 0000: External fault input type 0: Normal Open Fault Input 1: Normal Closed Fault Input	1	0000	◆
	FB.26	Reservation	Reservation			
	FB.27	Factory password	00000-65535	1	0	◆
	FB.28	Proxy password	00000-65535	1	0	◆
	FB.29	Allowed running time	1-65535H	1	0	◆
FE Extended Parameters	FE.00	Digital Terminal Expansion Function Selection	0000: Relay Extension Function Selection + 0000: Reservation 0000: Reservation 0000: Reservation 0: no function 1: Delay power off function 2: Shutter control 3: Communication Control	1	0000	◆
	FE.01	Reservation	Reservation			
	FE.02	Reservation	Reservation			

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
FE Extended Parameters	FE.03	Reservation	Reservation			
	FE.04	Reservation	Reservation			
	FE.05	RS power given, holding register	FA.05-100%	1	100%	◆
	FE.06	Reservation	Reservation			
	FE.07	Reservation	Reservation			
	FE.08	AI1 input range	1-10V	0.1	10.0	◆
	FE.09	Reservation	Reservation			
	FE.10	Reservation	Reservation			
	FE.11	Reservation	Reservation			
	FE.12	Enabled Operating State	0-1	1	0	◆
	FE.13	Running state lower limit power	FA.05-100%	1	60	◆
	FE.14	Enabled operation setting function	0000: Enabled operation Terminal Selection 0: Invalid function 1:X1 0000: Type of enabled operation terminal 0: normal open type 1: normal closed type	1	00	◆
	FE.15	X terminal filtering time	10-6000ms	1	100	◆
	FE.16	off value of voltage arrival	10-FA.01	1	50	◆
	FE.17	enabled voltage arrival exhaust	0-1	1	0	◆
	FE.18	Reservation	Reservation			
	FE.19	Reservation	Reservation			
	FE.20	Reservation	Reservation			
	FE.21	Reservation	Reservation			
	FE.22	Reservation	Reservation			
	FE.23	Reservation	Reservation			
	FE.24	Lamp warm-up timeout	0-1200S	1	180	◆
	FE.25	Grid voltage quasi-factor	80-120%	1	100	◆
	FE.26	Grid voltage bias	80-120%	1	100	◆
	FE.27	Bus voltage detection value	100-500	1	300	◆

Parameter Group	Function Code	Description	Setting Range and Description	Min Unit	Factory Set up	Change Limit
	FE.28	Ready to complete signal type	0-1	1	0	◆
	FE.29	Reservation	Reservation			
	FE.30	Lighting failure retry times	0-5	1	0	◆
	FE.31	retry wait time	60-300S	1	120	◆
	FE.32	Reservation	Reservation			
	FE.33	while lighting, detect voltage value	400-600V	1	500	◆
	FE.34	while lighting, detect frequency value	3.0-30.0KHZ	0.1	8.0	◆
	FE.35	Reservation	Reservation			
	FE.36	Reservation	Reservation			
	FE.37	Power Mode Options	0-2	1	0	◆
	FE.38	Power Mode Parameters	40-99	1	60	◆
	FE.39	Grid undervoltage value	340-380V	1	360	◆
F F Extended Control Box Parameters	FF.00	Language	0: Simplified Chinese 1: English	1	0	◆
	FF.01	Backlight properties	0: Delay shutdown when no operation 1: Always-on 2: Always-on during operation, delay the off during shutdown	1	0	◆
	FF.02	Screen extinguishing Time when no operation	0-300S	1	60	◆
	FF.03	Reservation	Reservation			
	FF.04	Reservation	Reservation			
	FF.05	Permission level	0-1	1	0	◆
	FF.06	Top level display switching page number	0-5	1	4	◆
	FF.07	System message	Read only			
FF.08	Display contrast	14-34	1	24	◆	

4.2 Status Monitoring Parameter Table

Monitoring	Content	Unit	Communication address	Note
D0-00	Current output power of UV Power Supply	kw	D000(H)	10 times quantized Communication

D0-01	Current output current	A	D001(H)	10 times quantized Communication
D0-02	Current output voltage	V	D002(H)	
D0-03	Max. Temp. Of Module	°C	D003(H)	10 times quantized Communication
D0-04	Status of Power Supply		D004(H)	
D0-05	Current fault code		D005(H)	
D0-06	Current warning code		D006(H)	
D0-07	Current input grid voltage	V	D007(H)	
D0-08	Given power value	kW	D008(H)	10 times quantized Communication
D0-09	DC bus voltage	V	D009(H)	
D0-10	Current light intensity feedback	mW	D00A(H)	
D0-11	Current lightbox temperature value	°C	D00B(H)	10 times quantized Communication
D0-12	Power supply running time	H	D00C(H)	
D0-13	Power encryption run time	H	D00D(H)	
D0-14	RS485 communication status		D00E(H)	
D0-15	Light intensity target value	mW	D00F(H)	
D0-16	Lightbox temperature target value	°C	D010(H)	10 times quantized Communication
D0-17	Module temperature 1	°C	D011(H)	10 times quantized
D0-18	Module temperature 2	°C	D012(H)	10 times quantized
D0-19	Transformer temperature	°C	D013(H)	10 times quantized
D0-20	AI1 analog value	V	D014(H)	10 times quantized
D0-21	Reservation		D015(H)	10 times quantized
D0-22	X1 terminal status		D016(H)	
D0-23	Relay output status		D017(H)	
D0-24	Last fault record		D018(H)	
D0-25	Last two fault records		D019(H)	
D0-26	Last three fault records		D01A(H)	
D0-27	Last four fault records		D01B(H)	
D0-28	Last five fault records		D01C(H)	
D0-29	Program Version		D01D(H)	
D0-30	Reservation		D01E(H)	
D0-31	Reservation		D01F(H)	

D0-32	IO status indication (BIT)		D020(H)	
D0-33	Device using time	H	D021(H)	
D0-34	Output Voltage	W	D022(H)	
D0-35	Rated Power(W)	W	D023(H)	
D0-36	Retention constant 0		D024(H)	
D0-37	Reservation		D025(H)	
D0-38	Lamp running time	H	D026(H)	10 times quantized
D0-39	Lamp available remaining time	H	D027(H)	10 times quantized

Chapter 5 Communication Protocol

This machine adopts the standard MODBUS protocol and supports two function codes: 03(H) to read multiple holding registers and 06(H) to write to a single register. The physical layer adopts the standard RS485 bus. The communication definition of GF series machines is compatible with other series machines of our company. The original control program can be used directly. When reading the D0 monitoring parameter group, some parameter addresses have been adjusted. Please use "4.2 State Monitoring Parameter Table" shall prevail.

5.1 Protocol Specification

Application layer protocol: MODBUS-RTU.

Physical layer: RS485

Special regulations: In this application, additional constraints are imposed on the start conditions of data frames: the start interval of each data frame is greater than 3.5 byte transmission cycles (standard), but the minimum interval time must not be less than 0.5ms.

5.2 Data Format

ADU							
Address	Function Code	Data 1	Data n	CRC Low	CRC High
PDU							

Data structure: MODBUS-RTU standard format

The address and function code each occupy one byte, the High of 16-bit data is at the front, and the Low at the back.

Maximum capacity of per data frame.

256 bytes (ADU) containing the address and CRC verification code.

5.3 Standard General Function Codes

In PDU data area, besides the function code occupying one byte, the number of bytes occupied by each data has general rules:

- 1.Number of registers: 2 bytes, counted in words (16 bits)
- 2.Number of bytes (number of queries or writes to registers): 1 byte, unit counted in bytes (8 bits)
- 3.Subfunction code: 2bytes
- 4.Abnormal Response: Exception Code 1 byte

PDU	
80H+ Function code	Exception code (01 ~ 08)

03 Read holding registers (multiple)

1) Query

Function Code	1 Byte	03H
Initial Address	2 Bytes	0 ~ FFH
No. Of Register N	2 Bytes	1 ~ 7DH (1 ~ 125)

2) Response

Function Code	1 Byte	03H
Bytes	1 Bytes	2*N (N is reading the No. of

		Register)
Value of Register	N*2 bytes	

N: Query the number of registers in the data

06 Writing to a single register

1) Query

Function code	1 Byte	06H
Register Address	2 Bytes	0 ~ 0FFFFH
Register Value	2 Bytes	0 ~ 0FFFFH

2) Response

Same as query data.

Exception code

When the system detects that the slave address of the communication is correct and the function code is correct, but the data does not meet the requirements of MODBUS-RTU, the error code with the error address of 8000 (H) will be replied.

Exception Code	
Code	Meaning
01	Illegal address
02	CRC Check Error
03	Illegal parameters
04	The command in the current state is invalid

05	Read parameters only, refuse to write
06	Write parameters only and refuse to read
07	No permission
08	Unknown error

5.4 Communication Parameter Address Definition Table

Register's Meaning	Register Address Space (Hexadecimal)	Reading and writing property	Parameter Description
Operating command	1000(H)	Writing	1: Start 2: Stop
Power reference	1001(H)	Reading & Writing	power reference, 0-100 integer indicates relative power rating
Forced Exhaust	1002(H)	Writing	Stop status is valid 1: Start 2: Stop
Reservation	1003(H)	Writing	
Timing Clearance	1004(H)	Writing	1: Current lamp timing, running time of lamp less than 1 hour is invalid
Temperature detection	1005(H)	Writing	Using for current LightBox Temperature Writing While PID exhaust Control
Target Temperature	1006(H)	Writing	Using for current target Temperature Writing While PID exhaust Control
Light Intensity Detection	1007(H)	Writing	Current Light Intensity Detection Value Writing While Light Intensity Closed-Loop Control
Light Intensity target	1008(H)	Writing	Current intensity target value writing while light intensity closed-loop

			control		
Power Given	1009(H)	Writing	Power reference, keeping power-off		
Terminal Control	4000(H)	Writing	Relay 1: pull-in 0 disconnected		
Power status	D004(H) 2000(H) 3000(H)	Reading	D004(H) return	2000(H) return	3000(H) Bitwise return
			1: running	1: Run (including	1: Stop
			2: Excitation	excitation)	2: Excitation
			3: stop	2: stop (including	4: Running
			4:malfunction	delay)	8: Malfunction
5: Delay	3: malfunction	16: delay			
Monitoring parameters	D000(H)-D027(H)	Reading	Corresponding state monitoring parameter table		
Fault information	D005(H), 5000H	Reading	Return 0 is no fault, other values are fault codes		

ATTENTION:

1.For details on the monitoring parameter address, please refer to "4.2 Status Monitoring Parameter Table";

2.The “power status” and “fault information” data shown in the above table have been integrated into the D0 monitoring parameter group. For the V3000 series machines, addresses of 2000 (H) and 5000 (H) are reserved. Users are advised to use the monitoring parameter group to read.

3.Fault information reading return value of 0 indicates no fault, and the fault returning code shown in the table of "6.3 Fault Phenomenon and Processing" when there is a fault.

5.5 Example

1.Start 1 # Digital Power Supply Operation

Host request:

Slave Address	Function Code	Register Start Address		Register Data		CRC Check	
		High	Low	High			High
01	06	10	00	00	01	06	10

Slave Reply: The digital power supply runs and returns the same data as the host request

2.Given power (0-100%) if rated power is 6KW and given power is 3KW, the given percentage is 50%.

Host request:

Slave Address	Function Code	Register Start Address		Register Data		CRC Check	
		High	Low	High			High
01	06	10	01	00	01	06	10

Slave Reply: The digital power supply runs and returns the same data as the host requests.

3.Read the Current Operation State of Digital Power Supply

Host request:

Slave Address	Function Code	Register Start Address		Register Data		CRC Check	
		High	Low	Low	Low	Low	High
01	03	D0	04	00	01	FD	0B

Slave Reply:

Slave Address	Function Code	read bytes	The first register data		CRC check	
			High	Low	Low	High
01	03	02	00	01	79	84

4. Monitor the current output power of the power supply

(read a single register value)

Host request:

Slave Address	Function Code	Register Start Address		Register Data		CRC Check	
		High	Low	High	Low	Low	High
01	03	d0	00	00	01	BC	CA

Slave Reply: (The power is 1.8KW and one decimal place is reserved)

Slave Address	Function Code	read bytes	The first register data		CRC check	
			High	Low	Low	High
01	03	02	00	12	38	49

5. Monitor the current output: power, voltage and current(Read multiple register values)

Host request example:

Slave Address	Function Code	Register Start Address		Number of Registers		CRC Check	
		High	Low	High	Low	Low	High
		01	03	d0	00	00	03

Slave Reply Example:(The data returned in the actual test is different from this example)

Slave Address	Function Code	read bytes	The first register data		The second register data		The Third register data		CRC Check	
			High	Low	High	Low	High	Low	Low	High
			01	03	06	00	12	00	C8	00

Chapter 6 Troubleshooting

This series of machines has rich fault alarm and alarm functions. Fault alarm means that the machine cannot continue to run when the equipment fails. After the alarm occurs, the output of the machine is blocked, the fault indicator light on the operation panel is on, and the fault code and fault description are displayed. The alarm means that the current working state of the machine is beyond the normal working range, reminding the user that the machine may be faulty. After the alarm occurs, the machine continues to run, the operation panel displays the alarm codes alternately, and the fault indicator light flashes. When the working status of the machine returns to the normal state, the alarm is automatically cancelled. Generally speaking, it is a normal phenomenon that the alarm occurs when the lamp is in the excitation stage or the short-term overcurrent accompanying the rapid switching from low power to full power.

The alarm fault code table is as follows:

Malfunction Code	Malfunction Description	Possible Causes	Solutions
1	Output Short	1.Output Short Circuit	1. Check lamp line.
	Circuit	2. Module failure	2.Seeking Manufacturer's Service
2	Fault of Temperature	1.Poor contact of temperature sensor signal line	1.Inspection of socket wiring
	Sensor	2.Temperature sensor damage	2.Seeking Manufacturer's Service
3	Current Detection	1. Current detector or circuit damage	Seeking Manufacturer's Service
	Fault	2. Auxiliary power fault	

Malfunction Code	Malfunction Description	Possible Causes	Solutions
4	Module Fault	1. Input phase missing	1.Check Input voltage
		2. Output Short Circuit	2.Check lamp line
		3. Machine Module Fault	3.Seeking Manufacturer's Service
5	Input Phase Missing	1.False disconnection of power input terminal	Inspect Input power supply
		2.Input electricity supply shortage	
6	Output Leakage	1.Lamp wire insulation damage	Part of model support
		2.Lamp damaged	Check lamps and cables
7	Excessive Temperature	1.Air-duct Blockage	1.Cleaning air-duct or improving ventilation conditions
		2.Ambient temperature is too high	2.Improving ventilation conditions and reducing carrier frequency
		3.cooling fan is broken	3.Replacement of Cooling Fan
8	Module Fault	1.Output Short Circuit	1.Check Lamp Line
		2.Module failure	2.Seeking Manufacturer's Service
9	Abnormal Start-Up	1. Lamp overheating	1.Whether the startup interval is too short or not?
		2.Lamp lead length disconnection	2.Lamp lead length disconnection
10	Drive Overload	1、 Input voltage is too low	1.Check the input voltage and increase the cable diameter
		2、 Lamp Voltage is too low	2.Change the lamp

Malfunction Code	Malfunction Description	Possible Causes	Solutions
		3、 Ambient Temperature is too high	3.Improve ventilation conditions and reduce carrier frequency
		4、 Cooling fan can not work	
11	Overvoltage Protection	1.Lamp overheating due to ventilation failure	1. Check exhaust
		2.Lamp lead length disconnection	2.Lamp lead length disconnection
		3. Rate lamp voltage setting is wrong	3、 Reset lamp voltage
12	Reservation		
13	Overcurrent Protection	1.Over-exhaust	1. Adjust the exhaust
		2. Abnormal lamp	2. Change the lamp
14	EEPROM Storage Error	Power supply running time arrives	Seeking Manufacturer's Service
15	Low Grid Voltage	That the grid voltage is lower than the set value of FE.39 lasts for 6 seconds.	Check grip voltage or FE.39 parameter
16	Shutter fault	Abnormal shutter switch	Check shutter's operation
17	Excessive temp. of lamp box	Poor heat dissipation of the lamp or malfunction of the temp. sensor	1.Increase the exhaust
			2.Reducing Operating Power
			3.Replacement of Temp. Sensor
18	External Input Faults	Fault input by X terminal	Check the corresponding fault output of equipment

Malfunction Code	Malfunction Description	Possible Causes	Solutions
19	Lamp Run time Reached	The lamp running time has reached the set lamp running time	Replace Lamp and Reset Lamp Run Time
20	Communication Timeout	communication does not respond,given the power or start-stop controlled by the communication	Check the communication line
21	Bus Voltage Anomaly	Self-check Anomaly	Power off for three minutes, Power on again. If the faulty code still exist, please seek manufacturer's service
22	Allowable Running Time arrival		Seeking Manufacturer's Service
23	Power- off trigger	Delayed power-off function triggered	Machine will be power-off
24	Preheating overtime, lamp voltage is too low.	Preheating is not completed within the prescribed time	1.Replacement of matched voltage lamp
			2.Extending lamp preheating time
			3.Seeking Manufacturer's Service

The fault warning code is represented by a byte, as shown in the following table

Binary Bits	BIT7-BIT4	BIT3	BIT2	BIT1	BIT0
Warning Function	Reservation	Arrival of allowable running time	Arrival of lamp running time	1: over current	The machine temperature is too high

Common warning code table:

Code	Meaning
01	01 The internal temperature of the machine is too high, the fan is damaged or the ambient temperature is too high.
02	Over-current, the current exceeds the long-term allowable current, and the excitation state warning 02 is generally normal.
03	01Warning、 02 Warning
04	Arrival of Lamp running time
05	04 Warning、 01 Warning
06	04 Warning、 02 Warning
07	04 Warning、 02 Warning、 01 Warning
08	Arrival of allowable running time, please contact the agent.

When the temperature of the machine module is over 70 degrees Celsius, the machine temperature is too high to take effect. At this time, the BIT0 of the warning code is 1, and when the temperature is below 69 degrees Celsius, the warning is canceled.

When the output current is greater than the long-term allowable current value defined by FA.16, the over-current warning occurs and warning code BIT1 is 1, the warning will be canceled when the output current is less than FA.16-0.2A.

That is, when the warning code is 01, the machine temperature is too high and the output current is too high when the code is 02. If the two warnings exist simultaneously, the warning code is 03.

Common Alarm Solutions Are As Follows:

1. The machine reports 05 failure

Solution: Detect both of the following

- a. Whether the three-phase input voltage is normal
- b. Abnormal power failure

2. The machine reports 01 failure

Solution: If 01 is reported start instantaneously, the problem is that the output is short-circuited

3. The machine reports 09 failure

Solution: There are several scenarios for this situation

- a. First check whether the lamp is connected correctly;
- b. If the lamp is connected correctly, confirm whether the lamp has cooled down;

4. The machine reports 11 failure

Solution: If the machine has 11 alarms, there are two situations

- a. It is indicated that the lamp working voltage is higher than 1.1 times the rated voltage of lamp set in power supply, and it is necessary to increase the lamp rated voltage (FA.01)
- b. If the lamp goes out at the moment of standby, it should be that the lower limit current of the lamp is set too low to cause the lamp to extinguish, and the value in FA.04 should be appropriately increased

5. The lamp is lit, but the power cannot be adjusted

Solution: This situation first checks whether the given power is effectively delivered to the power supply (see the given power level); If the given power is normal, it is necessary to confirm whether the lamp exhaust is on or too large, if it is too large, it is necessary to reduce the exhaust air or turn on the exhaust after the lamp is lit.

Chapter 7 Maintenance and Care

Affected by many factors such as ambient temperature, humidity, dust, vibration and aging of power supply components, the power supply has hidden troubles. In order to ensure long-term and stable operation of the power supply, the power supply must be regularly maintained.

If the power supply is transported over long distances, check whether the components are intact and the screws are tight before using. During normal using, regularly clean the dust inside of the power supply and check if the screws are loose etc.

ATTENTION: The inspection must be carried out by a professional technician and the electricity of the power supply should be cut off.

7.1 Daily Inspection and Maintenance

Through daily inspection and maintenance, you can find all kinds of abnormal conditions in time, find out the cause of the abnormality in time, eliminate the hidden troubles early, ensure the normal operation of the equipment, and extend the service life of the power supply. Please refer to the table below for daily inspection and maintenance.

Chart of Inspection and Maintenance

Inspected Object	Inspection Cycle		Inspected contents	Discrimination standard
	Anytime	Regular		
Operating Environment	√		1.Temp., humidity 2.Dust, moisture 3.Gas	1.The power cover should be opened when the temp. is over 40 °C, the humidity is below 90%, no frost 2.No odor, no flammable, explosive gas
Cooling System		√	1.Installation environment 2.Fan of power supply	1.The installation environment is well ventilated and the air duct is non-blocking. 2.The fan runs normally without abnormal noise
Power Supply	√		1.Vibration, temperature rise 2.Noise 3.Wires and terminals	1.Smooth vibration, normal air outlet temperature 2.No abnormal noise, no odor 3.The fastening screws are not loose
Lamp	√		1. Vibration, temperature rise 2.Noise	1.Smooth operation and normal temperature 2.No abnormalities, uneven noise
Input and output parameters	√		1.Input voltage 2.Output current	1.The input voltage is within the specified range. 2.The output current is below the rated value

ATTENTION:

The power supply has been tested for electrical insulation before leaving the factory, and the user does not have to perform the high-voltage insulation testing.

If the power supply must be tested for insulation, all input and output terminals (R, S, T, U, V) must be connected reliably. It is strictly forbidden to test the insulation of a single terminal. Please use a 500V megger for testing.

The control loop can't be measured by megaohmmeter.

7.2 Inspection and Replacement of Consumable Parts

Some components in the electronic power supply will wear out or degrade during using. To ensure stable and reliable operation of the power supply, preventive maintenance of the power supply and replacement of parts if necessary.

7.2.1 Filter Capacitor

The pulsating current of the main circuit affects the performance of the aluminum electrolytic filter capacitor. The degree of influence is related to the ambient temperature and the operating conditions. The power supply used under normal conditions should be replaced with the electrolytic capacitor every 4 to 5 years.

When the electrolyte of the electrolytic capacitor leaks, the safety valve pops out or the capacitor body expands, it should be replaced immediately.

7.2.2 Cooling fan

The life of all cooling fans inside the electronic power supply is about 15,000 hours (that is, the power supply is used continuously for about two years). If the fan has abnormal sound or vibration, it should be replaced immediately.

7.3 Storage

After bought if the electronic power supply is temporarily not used or stored for a long time, the following items should be noted:

(1) The storage environment should meet the following table:

Environmental characteristics	Requirements	Remark
Ambient temp.	-20°C~60°C	Long-term storage temp. is not over 30°C, so as to avoid deterioration of capacitor characteristics, avoid condensation and freezing due to sudden temperature changes.
Relative humidity	20~90%	Plastic film sealing and desiccant can be used
Storage environment	No direct sunlight, no dust, no corrosive, flammable gas, no oil, steam, gas, dripping, vibration, less salt	

2) If the electronic power supply is not used for a long time, it should be powered once every half year to restore the characteristics of the filter capacitor and check other functions of the power supply. When power is on, the voltage should be gradually increased by an auto-transformer, and the power-on time should be over half an hour.

ATTENTION: If the power supply is not used for a long time, the internal filter capacitor characteristics will decrease.

7.4 Warranty

The company will provide repair services based on the following conditions:

(1) If the malfunction or damage occurs under normal use, the company provides free repair or replacement during the warranty period (within 18 months from the date of purchase). If it is over 18 months, reasonable repair fee will be charged.

(2) Even within the warranty period, certain maintenance cost should be charged for the failure caused by the following reasons:

- ① Failure caused by improper operation and not follow the operating manual or exceed the standard specifications.
- ② Failure caused by self-repair and modification without permission.
- ③ Failure due to poor storage.
- ④ Faults caused when power supply is used for abnormal functions.
- ⑤ Machine damage caused by fire, salt erosion, gas corrosion, earthquakes, storms, floods, lightning, voltage abnormalities or other force majeure.
- ⑥ Even if the warranty period is exceeded, the company also provides lifetime paid repair service.