

Thank you for purchasing HGW series SCR power regulator. This manual mainly explains some precautions during installation and wiring. Before operation, please read this manual to fully understand the use of this product. Please keep this instruction manual so that you can refer to it at any time.

01

**1. Appearance and product features**

**Product features:**

- Full-function, full intelligent SCR power regulator, normal phase, constant current and constant voltage, constant power, zero position, phase + zero control direct switching.
- More than ten input methods, directly with software through the keyboard settings.
- Intelligent protection function, phase loss, overtemperature, overcurrent alarm and other protection.
- The output linearity is high, and the percentage is precisely controlled by the microcontroller.
- The output and input are displayed in real time, and the working status of the regulator can be observed at any time.

**appearance:**



**2. Use safety, warnings and precautions**

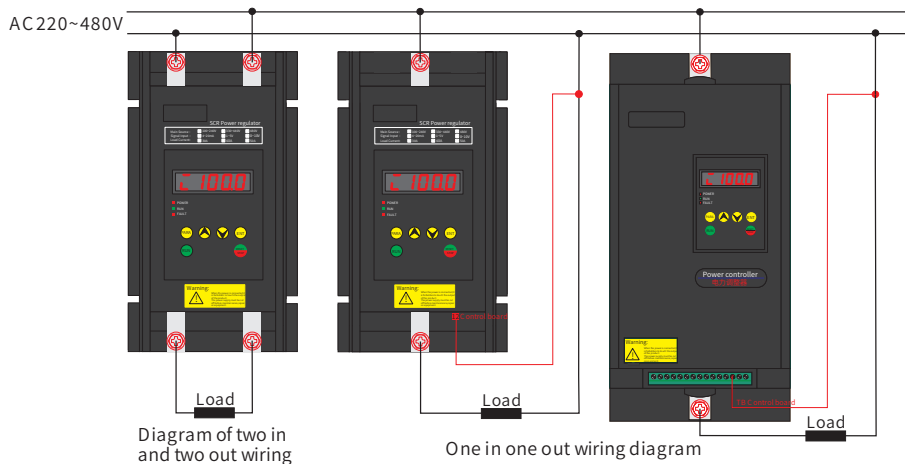
 Dangerous

1. Main circuit: Power line- Air circuit breaker- Contactor-Load.
2. All connecting nuts must be locking, to avoid arcing burned connector.
3. Air Switch: Can cut off the power, to protect the equipment and personal safety in the repair and maintenance.
4. Contactor: Can cut off power supply automatically to protect the equipment and avoid accidents, when the power regulator fails.

 Admation

1. Power regulator will produce internal heat during operation. Please install it vertically and both sides of the gap to be set aside to avoid the rapid aging and damage of power module caused by adverse thermal.
2. Air flow vents is required to control cabinet. Please follow the principle of hot air from bottom to top to install exhaust vents or install convection fan. Cabinet air-conditioning cooling can be considered if conditions allow.
3. Do not install it in high-temperature environments and poorly ventilated situations, otherwise use it less than 70% of rated capacity.
4. Avoid installing It in a steam or acid, alkali, corrosive gases and so on situations.
5. Humidity: 90% RH or less. (No condensation)
6. Ambient temperature: 0°C~+40°C.

**3. Main circuit power wiring**

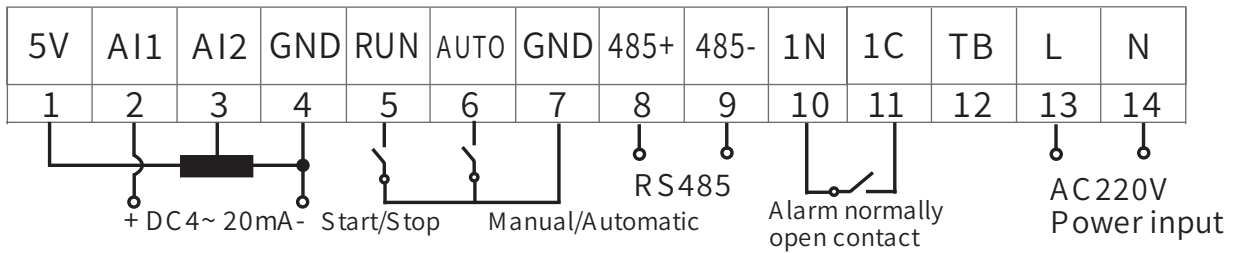


**4. Description of panel functionality**



Name	Function Description
LED Nixie tube	Current status value display/parameter value display/parameter setting value display
POWER Light	Red, power LED
RUN Light	Green, this light is on when the power regulator is operating
FAULT Light	Red, this light lights up when an exception occurs
PARA keystroke	Go to the parameter setting menu
▲ keystroke	The parameter is switched back, and the data is increased by the key
▼ keystroke	Parameters are switched forward, and data is reduced
ENT keystroke	Initial window switchover, failover, data modification confirmation
RUN keystroke	Keyboard launch
RESET STOP keystroke	The keyboard stops

**5. Description of the control terminal function**

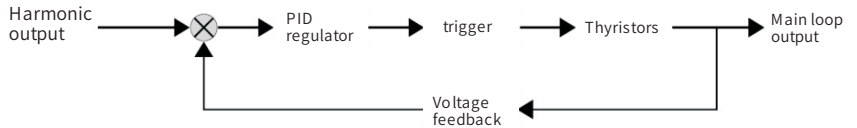
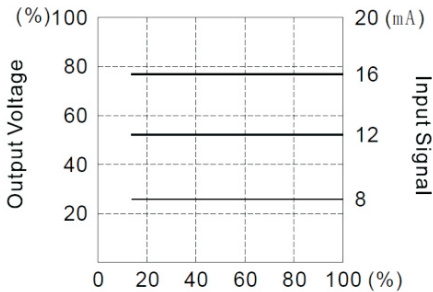


serial number	symbol	Function description
1	5V	Reference Supply +5V: A given reference for use by an external potentiometer
2	AI1	Analog input port 1: DC 0~20mA/DC 4~20mA (input impedance 200Ω), and 4-terminal GND to form an input loop
3	AI2	Analog input port 2: potentiometer input (middle tap) / DC 0~10V (input impedance ≥200KΩ), and GND form an input loop
4	GND	Signal common ground: a analog signal negative terminal, switching signal common terminal
5	RUN	Start/stop control terminal: R UN and 7-terminal GND form a start/stop control, when the two terminals are closed, the regulator works, and vice versa
6	AUTO	Analog input port selection: AUTO and 7-terminal GND, closed selection analog input port 1; Open Select Input Port 2
7	GND	Signal common ground: a analog signal negative terminal, switching signal common terminal
8	485+	Rs485 communication port
9	485-	
10	1N	Alarm relay output: normally open contact, load capacity AC 240V/3A, DC 24V/5A
11	1C	
12	TB	Synchronization signal input: if 2 in 2 out, the factory has been connected internally, no need to wire, if 1 in 1 out, to connect another power supply.
13	L	Control board power supply: AC 220V ±15%
14	N	

**6. Control mode function description**

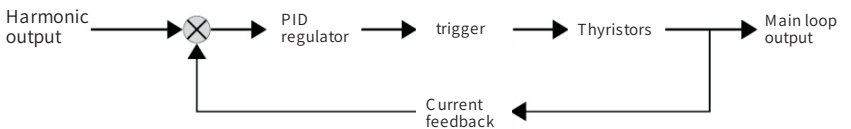
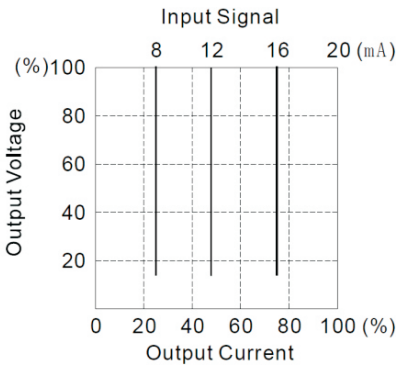
**Constant voltage control mode:**

- Control mode setting: **F-18** parameter = 0
- A control method that keeps the voltage output value constant at the given value of the voltage. When the grid voltage fluctuates or the load impedance changes, the regulator is regularized by PID Make adjustments. Suitable for inductive, resistive and capacitive loads.
- Constant voltage output characteristic diagram
- Constant voltage logic control block diagram



**Constant current control mode:**

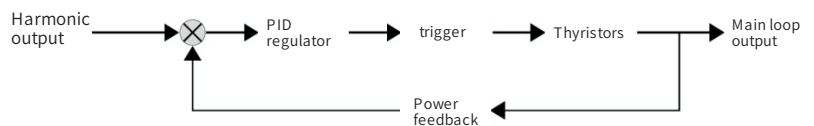
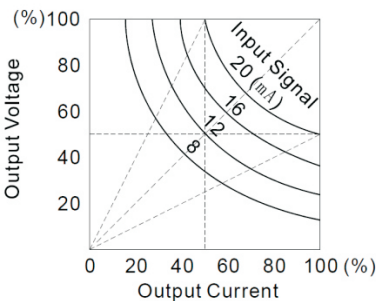
- Control mode setting: **F18** parameter = 1
- A control method that keeps the current output value constant at a given current value. When the grid voltage fluctuates or the load impedance changes, the regulator is regularized by PID Make adjustments. Suitable for inductive, resistive and capacitive loads.
- Constant current output characteristic diagram
- Constant current logic control block diagram



Description of panel functionality

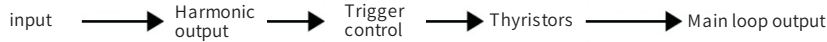
**Constant power control mode:**

- Control mode setting: **F-18** parameter = 2
- A control method that keeps the power output value constant on the given value of the power. When the grid voltage fluctuates or the load impedance changes, the regulator is regularized by PID Make adjustments. Suitable for inductive, resistive and capacitive loads.
- Constant power output characteristic diagram
- Constant power logic control block diagram



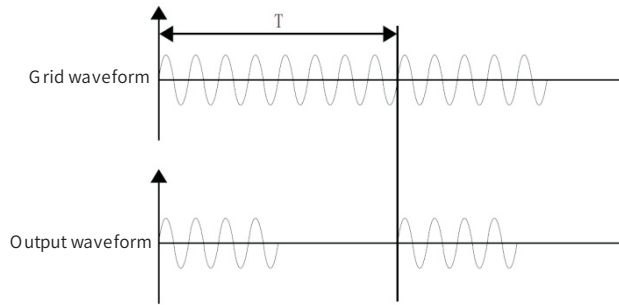
**Open-loop control mode**

- Control mode setting: [F-18] parameter = 3
- Control method to directly control thyristor opening with input value. When the grid voltage fluctuates or the load impedance changes, the voltage or current does not Can be kept constant. Suitable for inductive, resistive and capacitive loads.
- Open-loop logic control block diagram



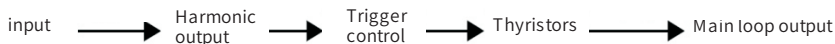
**Zero-crossing power control mode**

- Control mode setting: [F-18] parameter = 4
- There is no control method for harmonic pollution on the grid. The input value determines the number of cycles the thyristor turns on in 100 cycles, suitable for pure resistive loads.
- Schematic diagram of the zero-crossing power control output waveform for a given 50%



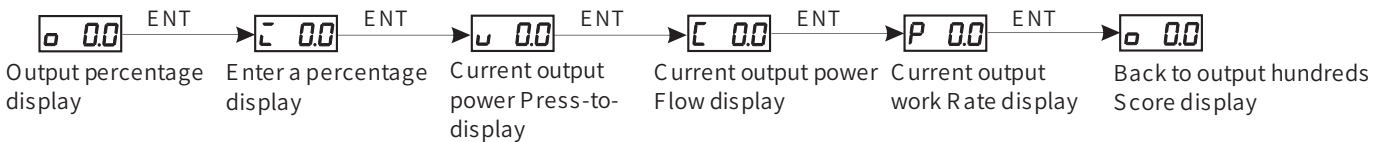
**Phase shift + zero control mode**

- Control mode setting: [F-18] parameter = 5
- No impact on the power grid and can effectively suppress the control method of harmonic pollution on the power grid. The input value determines the number of cycles the thyristor turns on in 100 cycles (Phase shift mode is used at the initial stage of activation). Suitable for inductive and resistive loads.
- Phase shift + zero logic control block diagram



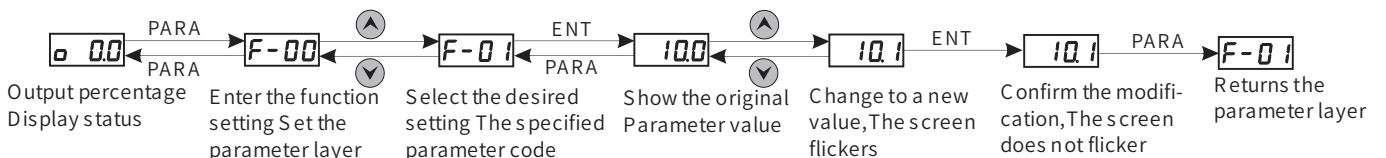
**7. Parameter description**

**Displays the parameter layer**



**Feature setting parameter layer**

- Parameter modification instructions ( change F-01 parameters from 10.0 to 10.1, other parameter modification steps are similar)



- Note: 1. When the display is in the parameter setting window, if no operation is performed for 15 seconds, it will automatically return to the basic display state. At this point, it has been modified instead Parameters that are not saved will not be valid. 2. When the regulator alarms, press the ENT key to reset the fault.

**Parameter description**

- F-00 through F-04 are read-only parameters that display basic information about the normal operation of the regulator.

F-00	The effective output percentage is displayed	range	0.0~100.0%	Factory value	—	attribute	read only
F-01	Valid input percentages are displayed	range	0.0~100.0%	Factory value	—	attribute	read only
F-02	The current output voltage value is displayed	range	The magnitude of the voltage actually detected	Factory value	—	attribute	read only
F-03	The current output current value is displayed	range	The magnitude of the actual sensed current	Factory value	—	attribute	read only
F-04	The current output power value is displayed	range	The amount of power actually detected	Factory value	—	attribute	read only

- F-05 to F-22 set parameters for functions, and can change functional parameters to achieve the desired function of the adjuster.

F-05	Start-stop state	range	0:Stop;1:Start	Factory value	0	attribute	Can be read and written
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The start and stop of the regulator can be controlled by communication, and the starting and stopping status of the regulator can be determined. For example: parameter code F-09 in the function menu. When set to 1, when the F-05 is assigned to 1 through communication, the adjuster is in the starting state; if the assignment is 0, the regulator is stopped.

F-06	Number given signal input percentage	range	0.0~100.0%	Factory value	—	attribute	Can be read and written
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The adjuster's internal keypad or communication method is given digitally to control the adjuster output. Note: This function window will not save the written data after the power is lost.

F-07	Given the signal type selection	range	0: digital; 1: Analog	Factory value	1	attribute	Can be read and written
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The adjuster is valid for the setting of a given signal type. For example, when you set the parameter code F-07 in the function menu to 0 and then set the parameter code F-08 to 1. The effective given signal of the regulator is given for the communication digital, and the internal keyboard and analog of the regulator are given invalid.

F-08	Number given type selection	range	0: keyboard or communication; 1: Communication	Factory value	0	attribute	Can be read and written
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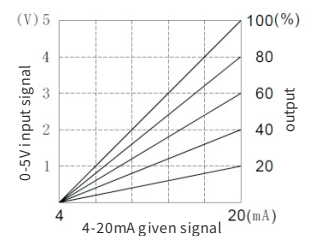
The regulator effectively digitizes the given signal source setting. When set to 0, the keyboard and communication are valid; when set to 1, communication is given to the keyboard to be valid. The given is invalid.

F-09	Start-stop control mode	range	0:Externalswitch; 1:Communication	Factory value	0	attribute	Can be read and written
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Selection of effective start and stop control mode of the adjuster. For example, when the parameter code F-09 in the function menu is set to 0, the start and stop of the adjuster is opened externally. Off signal control, that is, RUN and GND short circuit start, open circuit stop, in this state by communication stop regulator is invalid.

F-10	Current analog input type selection	range	0:0~20mA; 1:4~20mA; 2:4~20mA and 0~5V dual signal integrated control	Factory value	1	attribute	Can be read and written
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Adjuster effective analog setting for a given source type. Note: If selected. When 4~20mA and 0~5V dual signal integrated control, the regulator input can be formed 4~20mA automatic input, potentiometer limiting, control output as shown in figure:



F-11	Slow start time setting	range	0~120seconds	Factory value	2	attribute	Can be read and written
F-12	Slow off-time setting	range	0~120seconds	Factory value	2	attribute	Can be read and written
F-13	Output Cap set percentage	range	0~100%	Factory value	100	attribute	Can be read and written
F-14	Lower output set percentage	range	0~100%	Factory value	0	attribute	Can be read and written
F-15	Scale factor	range	0~200	Factory value	80	attribute	Can be read and written

The proportional gain of the PID regulator, the proportional gain multiplied by the error to obtain the correction value. Increasing this parameter increases the damping of the system and accelerates the dynamic response of the system Speed, for a certain load, this parameter is too large to cause system instability, and the optimal setting is the maximum possible value for the system to start entering instability.

F-16	Integration coefficient	range	0~200	Factory value	2	attribute	Can be read and written
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The integral gain of the PID regulator, which is multiplied by the error to obtain the correction value. This correction value ensures that the system is error-free, and increasing this parameter increases the system exposure The rate of recovery after a disturbance, if the parameters are too large, the system tends to oscillate rather than recover quickly.

F-17	Differential coefficients	range	0~200	Factory value	0	attribute	Can be read and written
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The differential gain of the PID regulator, the differential gain multiplied by the error to obtain the correction value, has a damping effect. Optimal performance is the best combination of PID's three parameters Obtained.

F-18	Control mode	range	0:constant voltage;1:constant current;2:Constant power;3:Openloop;4:Zero crossing and adjusting thework;5:Phase shift+work adjustment	Factory value	0	attribute	Can be read and written
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0: Constant voltage control. Constant output voltage, the error between the given value and the output voltage feedback value is adjusted according to the PID adjustment law, so that the output voltage tends to or Equal to the given value.

1: Constant current control. Constant output current, which is kept constant by load current feedback.

2: Constant power control. Through the detection of voltage and current, the power signal is obtained by multiplying the two, which is used as the power feedback of the load and made by power feedback The output power remains constant.

3: Open loop control. The control signal comes from the ramp output, and the ramp output directly controls the thyristor trigger angle, and the ramp output is 100% corresponding to the thyristor's full conduction. In open-loop control, the given relationship with the output voltage is nonlinear.

4: Zero crossing power control The control signal is derived from the ramp output, and a corresponding proportion of pure zero-crossing cycles are continuously output within the period T according to its size.

5: Phase shift + zero crossing power control The input value determines the number of cycles that the thyristor turns on in 100 cycles, and the phase shift method is used for 10 cycles before opening.

After the phase shift, a pure zero-crossing method is adopted.

F-19	Load rated voltage setting	range	110~440V	Factory value	380	attribute	Can be read and written
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In constant voltage control mode, the maximum voltage allowed by the regulator to output.

F-20	Feedback signal correction	range	0~100%	Factory value	100	attribute	Can be read and written
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The feedback acquisition values corresponding to the different settings of 0, 1 and 2 in the window code F-18 in the function menu are corrected.

F-21	Output voltage display correction	range	50~150%	Factory value	100	attribute	Can be read and written
F-22	Output current display correction	range	50~150%	Factory value	100	attribute	Can be read and written

• F-23 to F-29 are protection function parameters, which can be changed to make the adjuster achieve the required protection function.

F-23	Latest failure query	range	—	Factory value	0	attribute	Can be read and written
F-24	Overcurrent protection allows	range	0:prohibited;1: Allowed	Factory value	1	attribute	Can be read and written
F-25	Overcurrent protection threshold	range	50~200%	Factory value	120	attribute	Can be read and written
F-26	Power failure protection allows	range	0:prohibited;1:Allowed	Factory value	1	attribute	Can be read and written
F-27	Load break protection allows	range	0:prohibited; 1:Allowed	Factory value	0	attribute	Can be read and written
F-28	Load break protection threshold	range	1~70%	Factory value	70	attribute	Can be read and written

Set the load disconnect protection threshold current. This value is a percentage of the rated current. Note: Load break protection threshold current calculation formula: Enter percentage(F-01) × rated current x percentage of breakage protection threshold (F-28) = threshold current.

F-29	Thyristor overheating protection allows	range	0:prohibited; 1:Allowed	Factory value	1	attribute	Can be read and written
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• F-30 to F-32 are communication setting parameters, according to the specific communication protocol. The power regulator supports MODBUS communication protocol and supports 4 functions in 3, 4, 6, 16. The parameter value is a 16-bit unsigned register and is not supported Decimal point, if you want to write 56.7, you need to adjust it to the integer 567 before writing. The parameter address is the parameter number, such as writing the slow start time, as long as it is written Write data to parameter address 11.

F-30	Mailing address	range	1~247	Factory value	123	attribute	Can be read and written
F-31	baud rate	range	0:2400;1:4800;2:9600;3:19200	Factory value	2	attribute	Can be read and written
F-32	data format	range	0:8N2;1:8E1;2:8O1	Factory value	1	attribute	Can be read and written

**8. Description of the exception code**

Symptom	The name of the fault	Fault causes and treatment schemes
ERR1	Internal system failure	Replace the control board
ERR2	Main power failure	1. Check the main circuit power supply; 2. Check the thyristor
ERR3	Load overcurrent fault	Excessive load or short circuit
ERR4	Load disconnect failure	1. Check the load disconnection threshold setting; 2. Check whether the load is broken
ERR5	Thyristor overheating failure	1. Whether the load current is too large; 2. Whether the heat dissipation fan and air duct are normal; 3. The ring temperature is too high
ERR6	Power supply frequency failure	Check the quality of the power supply grid

**9. Specification model table**

Model identification

HGW6——————

specification	code	Main power	code	current	code	current	code	current	code	current	code	Control mode setting	code	Other configurations	code
Single-phase	1	110~440V	4	30A	030	75A	075	150A	150	300A	300	Phase constant voltage current limiting	p	NONE	NONE
				40A	040	80A	080	175A	175	400A	400	Phase constant current	C	Power supply 2 in 2 out	2
				50A	050	90A	090	200A	200	450A	450	Phase constancy	CV	Other special configurations	X
				60A	060	100A	100	225A	225	500A	500	Zero crossing power adjustment	Z		
						125A	125	250A	250	600A	600				

Specification model table:

Specifications and models	current	Load Power (KW)		Appearance size(mm)			Fixed size(mm)		Weight KG	Screws and indentation torque		Cooling method
		220V	380V	long	wide	high	long	wide				
HGW6-1-4-030- P	30	5.2	9.1	200	113	160	130	105	2.0	M6	40kgfcm	Free cooling
HGW6-1-4-040- P	40	7.0	12.1	200	113	160	130	105	2.0	M6	40kgfcm	Free cooling
HGW6-1-4-030-PF	30	5.2	9.1	225	113	170	130	105	2.0	M6	40kgfcm	Forced air cooling
HGW6-1-4-040-PF	40	7.0	12.1	225	113	170	130	105	2.0	M6	40kgfcm	Forced air cooling
HGW6-1-4-050-P	50	8.8	15.2	225	113	170	130	105	2.3	M6	40kgfcm	Forced air cooling
HGW6-1-4-060-P	60	10.5	18.2	225	113	170	130	105	2.3	M6	40kgfcm	Forced air cooling
HGW6-1-4-075- P	75	13.2	22.8	225	113	170	130	105	2.3	M6	40kgfcm	Forced air cooling
HGW6-1-4-080- P	80	14.0	24.3	225	113	170	130	105	2.3	M6	40kgfcm	Forced air cooling
HGW6-1-4-090- P	90	15.8	27.3	225	113	170	130	105	2.3	M6	40kgfcm	Forced air cooling
HGW6-1-4-100- P	100	17.6	30.4	225	113	170	130	105	2.3	M6	40kgfcm	Forced air cooling
HGW6-1-4-125- P	125	22.0	38.0	270	113	170	160	105	3.2	M8	40kgfcm	Forced air cooling
HGW6-1-4-150-P	150	26.4	45.6	270	113	170	160	105	3.2	M8	40kgfcm	Forced air cooling
HGW6-1-4-175- P	175	30.5	53.2	270	113	170	160	105	3.2	M8	40kgfcm	Forced air cooling
HGW6-1-4-200- P	200	35.2	60.8	270	113	170	160	105	3.2	M8	40kgfcm	Forced air cooling
HGW6-1-4-225- P	225	39	65	335	164	213	316	104	12	M8	250kgfcm	Forced air cooling
HGW6-1-4-250- P	250	42	70	335	164	213	316	104	14	M8	250kgfcm	Forced air cooling
HGW6-1-4-300- P	300	52	86	335	164	213	316	104	16	M8	250kgfcm	Forced air cooling
HGW6-1-4-400- P	400	70	120	335	164	213	316	104	20	M8	250kgfcm	Forced air cooling
HGW6-1-4-450-P	450	79	135	435	263	248	416	160	25	M10	250kgfcm	Forced air cooling
HGW6-1-4-500-P	500	88	150	435	263	248	416	160	25	M10	250kgfcm	Forced air cooling
HGW6-1-4-600- P	600	100	180	435	263	248	416	160	25	M10	250kgfcm	Forced air cooling

\* The above specifications are for reference only, and the actual specifications are subject to the actual product.