CRH Series Mod-Bus Single Phase Voltage Regulator

Product Description

CRH Series is an intelligent bus control single phase voltage regulator module with RS 485 bus control, and adopts Modbus RTU Communication Protocol. This module can real-time detect the load current, and then transfer the message to the host computer through the RS485 bus control. This product is stablized voltage control output, when the SCR or load anomaly happens, it can ouput alarm signal. Its rated current is 25A, 40A, 60A or 80A.

- RS 485 Bus Control
- Modbus RTU Communication Protocol
- Dielectric Strength: 3000Vrms
- LED Indicator
- Real-time Current Detection
- Stablized Voltage Output
- Anomoly Alert Function

Ordering Information

CRH	380	D	40	-C	S	W	(XXX)	-B
CRH Series	Load Voltage 380:176~440VAC	Auxiliary Power Supply D:15~32VDC	Load Current 25:25A 40:40A 60:60A 80:80A	Function C:Current Detection	Function S:Stablized Voltage	Control type W: 0-10VDC / 4-20mA / RS 485	Customer Code	Heat Sink B: KHS-90J IF24DC: KHS-I93-B24

Technical Specification

Input Circuit(Ta=25°C)		
Auxiliary Power Supply Voltage Range		15-32VDC
Auxiliary Power Supply Current		100mA max.@24VDC
Input Control	Analog	0-10VDC
	Bus	RS 485 (2 Connections)
Module Output Switching Port Level	High Level	15-32VDC
	Low Level	0-5VDC
Module Output Switching Port Current		5mA max.@24VDC
Alert Interface Rated Current		50mA max.

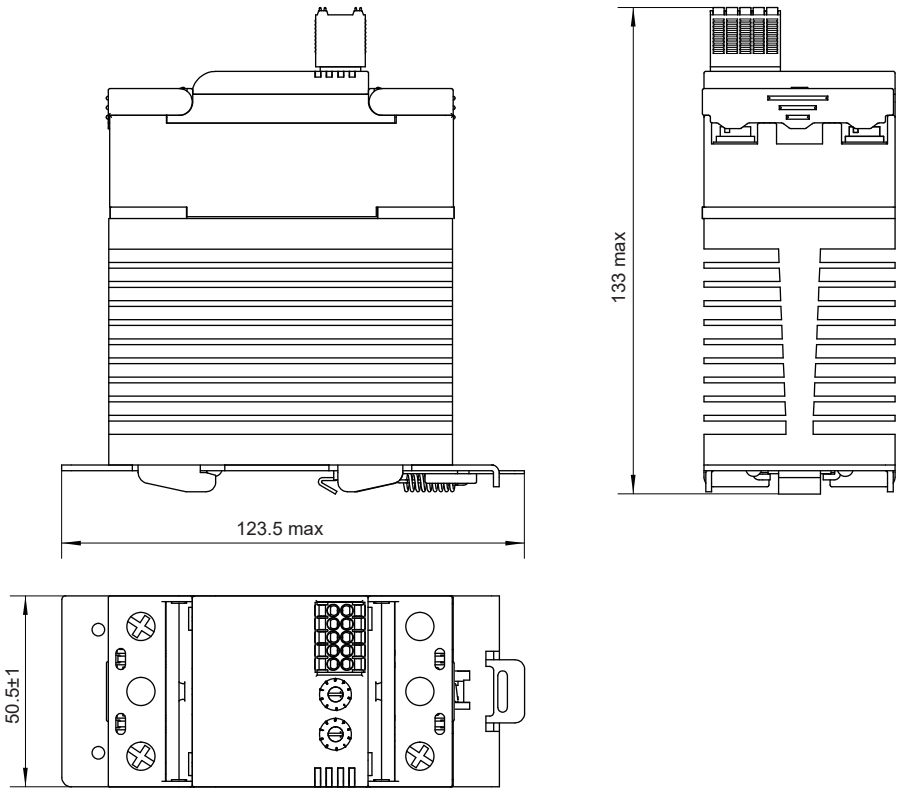
Output Circuit(Ta=25℃)		
Load Voltage Range		176-440VAC
Load Current	25A	0.1-25A
	40A	0.1-40A
	60A	0.1-60A
	80A	0.1-80A
Maximum Surge Current (@10ms)	25A	250A
	40A	400A
	60A	600A
	80A	800A

Output Circuit(Ta=25℃)		
Maximum I²t	25A	312A²S
	40A	1250A²S
	60A	1800A²S
	80A	3200A²S
Transient Overvoltage		1200Vpk
Maximum Off-State Leakage Current (@220VAC)		5mA

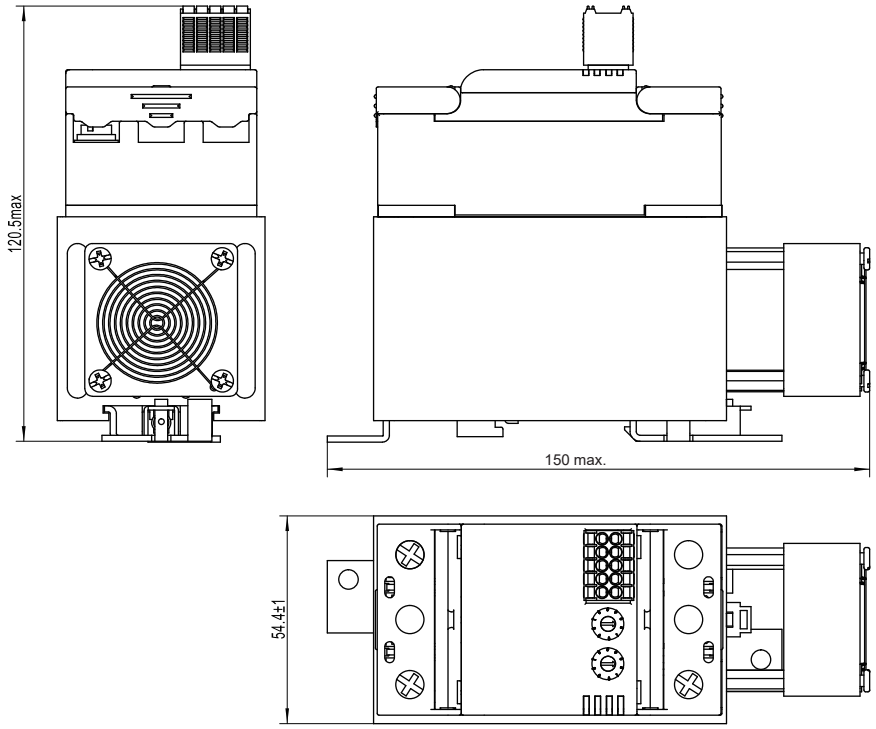
General Information(Ta=25℃)	
Slave Station Address Range	1 ~ 99
Max. Station Nodes	99
Data Bit Rate	9600, 19200, 38400, 57600, 115200
Communication Protocol	Modbus RTU
Dielectric Strength	3000Vrms
Insulation Resistance (@500VDC)	1000MΩ
Ambient Operating Temperature Range	-30°C ~ +70°C
Ambient Storage Temperature Range	-30°C ~ +100°C

Outline Dimensions

Unit：mm

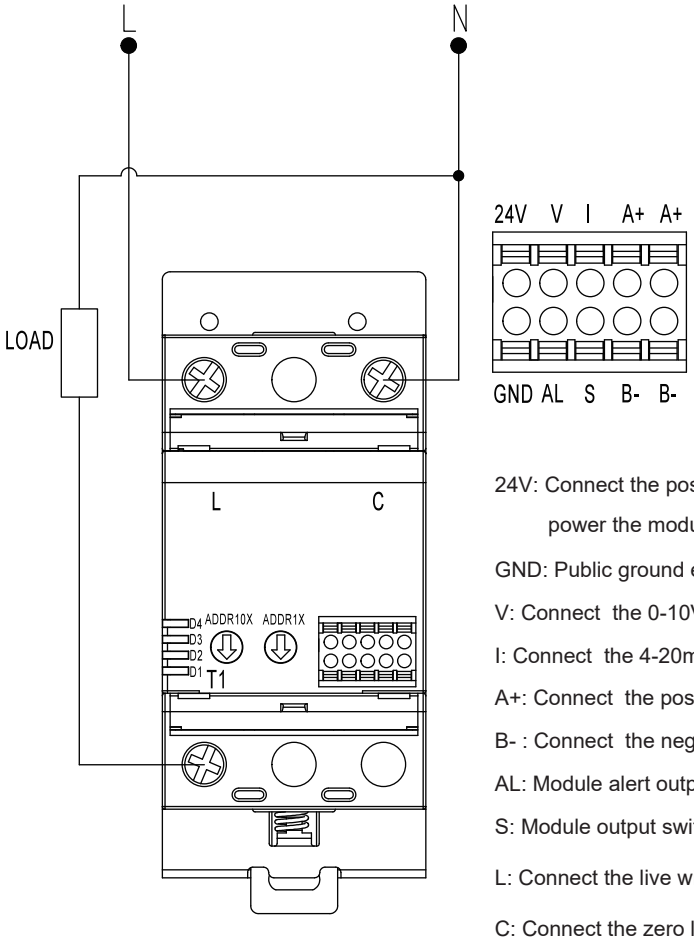


25A / 40A



60A / 80A

Wiring Diagram



24V: Connect the positive end of the 24VDC supply power to power the module.

GND: Public ground end

V: Connect the 0-10VDC analog;

I: Connect the 4-20mA analog;

A+: Connect the positive end of RS 485.

B- : Connect the negative end of RS 485.

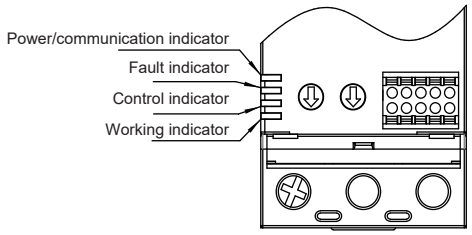
AL: Module alert output port

S: Module output switching port

L: Connect the live wire of the load power supply

C: Connect the zero line when the load power supply is 220VAC, and connect another live line when the load power supply is 380VAC.

Wiring Diagram



Power/communication indicator:
LED lights up when there is an auxiliary power supply, and will be brighter when the module is communicating.

Fault indicator: LED lights up when anomaly happens.

Control indicator: LED lights up when the product is turned on.

Working indicator: LED flashes every 1.5s when the module is operating normal.

Interface function description

1. Anolog control
V control voltage range is 0-10VDC, so the output voltage is 0-100%.
I control voltage range is 4-20mA, so the output voltage is 0-100%.

2. Alert output
When the module is operating normal, the alert output is on high resistance state to the floor. But when any channel of the module has following question, the alert output to the floor will turn on.
A) SCR channel through: no control signal, but there has current in the loop.
B) SCR disconnection: having control signal, but there has not current in the loop.
C) Load connection break.
D) No load supply power.

3. Module output switching port
Used to switch the output state of module:
When the port level switches from low voltage (voltage less than 5VDC) to high voltage (voltage greater than 15VDC), the module enters the welding state and outputs three welding voltages in sequence: welding voltage 1 (maintenance time 1), welding voltage 2 (maintenance time 2), welding voltage 3 (maintenance time 3), and then re-enters the standby state.

4. RS 485 A+ & B-
Used for 485 communication, write or read the corresponding control values.

5. Address set
Set the address encoder to the corresponding location. Each time the address is reset, the module needs power off and then restarts with 24VDC before switching new address. When the address is set 99, the communication parameter of module is fixed to 9600 8BIT parity check 1 stop bit

Register Description

CRH has input and holding registers, their definition and address shown as below:

Address	Definition	Unit	Value Range	Whether to save when power is off
Input Register				
0	Alert register	-		No
1	current register	0.1A		No
3	Power half cycle time register	μs		No
Holding Register				
50	standby voltage register	-	0-1000	Yes
51	welding voltage 1 register	-	0-1000	Yes
52	welding voltage 2 register	-	0-1000	Yes
53	welding voltage 3 register	-	0-1000	Yes
58	Welding maintenance time 1 register	ms	0-60000	Yes
59	Welding maintenance time 2 register	ms	0-60000	Yes
60	Welding maintenance time 3 register	ms	0-60000	Yes
61	Communication anomaly turn off register	s	0-100	Yes
62	Communication parameters setting register	-	-	Yes
63	Standby on/off control register	-	0-1	No
64	Soft start setting register	-	0-60	Yes
65	Load voltage setting register	-	220	Yes
66	Output switching register	-	0-1	No
67	Output mode register	-	0-3	Yes
68	Channel 1 over-current setting register	0.1A	0-200	Yes
71	Alarm shielding register	-	0-3	Yes
74	Control signal gain setting register	-	0-1000	Yes

Definition and instruction of input register:

1)Output alert register REG_ALARM（Address: 0）
Data format: 16 bits unsigned integer
This is output alert register.When the module is operating normal, the register is 0 with corresponding location is 1. But when the module has following question, we judge the channel is abnormal with corresponding location is 1.
A)SCR channel through: no control signal, but there has current in the loop.
B)SCR disconnection: having control signal, but there has not current in the loop.
C)Load connection break.

Definition of output alert register:

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
-	-	-	-	Over current	-	Module Anomaly	Load supply power anomaly

2)Current register REG_CURR（Address: 1）
Data format: 16 bits unsigned integer
This register stores the current in the load loop, its unit is 0.1A.

3) Power half cycle time register REG_CYCLE（Address: 3）
Data format: 16 bits unsigned integer
This register stores the power half cycle time of load, its unit is μs.

Register Description

Definition and instruction of holding register:

1)Standby voltage register（Address: 50）
Data format: 16 bits unsigned integer
This register used to set the output voltage during standby, its value range is 0-1000.

2)Welding voltage register（Address: 51~53）
Data format: 16 bits unsigned integer
This register used to set the output voltage during welding, its value range is 0-1000.

3)Welding time register（Address: 58~60）
Data format: 16 bits unsigned integer
This register used to set the maintenance time for 3 welding phases,its unit is ms and the value range is 0-60000.

4)Communication anomaly turn off register REG_OFF（Address: 61）
Data format: 16 bits unsigned integer
This register used to set the turn-off output time automatically when the communication is cut off, it unit is s . The value of the register range from 0 to 100, with o indicating that the function is turned off and the default value is 0. The rest valves indicate that the output will be turned off when the module doesn't receive the communication information with the local address within the time.
Example: when the register value is 8, then the output will be turned off if the module doesn't receive the communication information with the local address within 8s.

5)Communication parameters setting register REG_TX（Address: 62）
Data format: 16 bits unsigned integer
This register used to set the communication parameters, the default value is 300, the value definition shown as below:

Register value	Baud rate	Data bit	Check bit	Stop bit
300	9600	8 Bit data bits	No check	2 stop bits
301	19200	8 Bit data bits	No check	2 stop bits
302	38400	8 Bit data bits	No check	2 stop bits
303	57600	8 Bit data bits	No check	2 stop bits
304	115200	8 Bit data bits	No check	2 stop bits
310	9600	8 Bit data bits	even parity check	1 stop bit
311	19200	8 Bit data bits	even parity check	1 stop bit
312	38400	8 Bit data bits	even parity check	1 stop bit
313	57600	8 Bit data bits	even parity check	1 stop bit
314	115200	8 Bit data bits	even parity check	1 stop bit
320	9600	8 Bit data bits	odd parity check	1 stop bit
321	19200	8 Bit data bits	odd parity check	1 stop bit
322	38400	8 Bit data bits	odd parity check	1 stop bit
323	57600	8 Bit data bits	odd parity check	1 stop bit
324	115200	8 Bit data bits	odd parity check	1 stop bit

Note: After writing the new value to this register, the auxiliary power supply 24VDC needs to be powered on again before switching to the new communication parameters.

6)Standby on/off control register REG_ST_ON_OFF（Address: 63）
Data format: 16 bits unsigned integer
This register is used to control the turn on/off of the output.
If the register value is 1, turn on the output; If the register value is 0, turn off the output.

Register Description

7)Soft start setting register（Address: 64）
Data format: 16 bits unsigned integer
This register used to control the slope of soft start (standby control only), the value range is 0-60 and the default value is 0. When the value is 0, the soft start is turned off. When this value is n, the output control rises at a rate of 8/(n×50ms).

8)Load voltage setting register（Address: 65）
Data format: 16 bits unsigned integer
This register default value is 220, when the load voltage is 380VAC, it is set to 380.

9)Output switching register（Address: 66）
Data format: 16 bits unsigned integer
This register used to switch the output voltage. When the register value changes from 0 to 1, the module output switches from standby state to welding sate.

10)Output mode register (address: 67)
Data format: 16 bit unsigned integer
This register is used to switch output modes, with a value range of 0-3 and a default value of 0. The corre sponding pattern of register values is as follows:

Register value	Mode
0	Stable power ratio
1	power ratio
2	Stable voltage ratio
3	voltage ratio

11)Over-current setting register（Address: 68）
Data format: 16 bits unsigned integer
This register used to set the max. Value of the output current. When the load current is over this value, the product will output alarm signal and keep the alert in the corresponding position 1. Once the register is set to 0, the alert function will be closed.

12) Alarm shielding register (address: 71)
Data format: 16 bit unsigned integer
This register is used to mask the alarm function, with a value range of 0-3 and a default value of 0. The definitions of each bit in the register are as follows:

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
-	-	-	-	-	-	Module Anomaly	Load supply power anomaly

When it is necessary to block a certain abnormal alarm function, the corresponding position is 1.
For example, when BIT1 is set to 1, module anomalies will be blocked.

13) Control signal gain setting register (address: 74)
Data format: 16 bit unsigned integer
The input control signal value is: current set gain value x input control signal value/100. If the control value is set to 500 and the gain is set to 200, the output power is 100%; When the gain is set to 50, the output power is 25%. The default value for this register is set to 100, which means the gain is 1.00.

Output Control Mode

Mode 1: Adopt voltage analog port control

Apply the corresponding voltage value(0~10VDC) to the control terminal(V) as required, then the module outputs corresponding voltage.

Mode 2: Adopt current analog port control

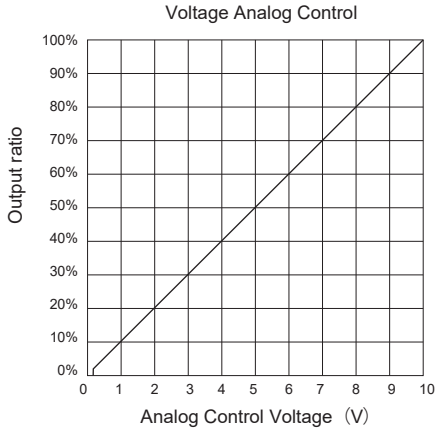
Apply the corresponding current value(4~20mA) to the control terminal(I) as required, then the module outputs corresponding current.

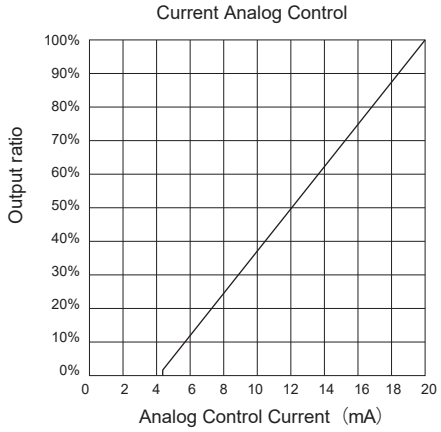
Mode 3: Adopt RS 485 control

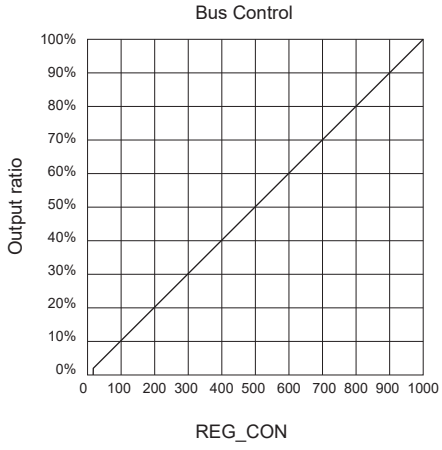
Sending the standby voltage, welding voltage 1,welding voltage 2, welding voltage 3, welding maintenance time 1, welding maintenance 2, welding maintenance 3 to the module through 485, and opening the corresponding channel (register address:63)(1), let the module enter in standby state at the moment. When welding required, apply a rising edge to the module output switching port (from low voltage to high voltage), then the module enter the welding state: output welding voltage 1, welding voltage 2 and welding voltage 3 in turn, it will return to standby state automatically when welding finished.

Note: (1) If welding is not required, just set the standby voltage (register address: 50) and standby switch register (register address: 63).

Output/Proportional Control Features

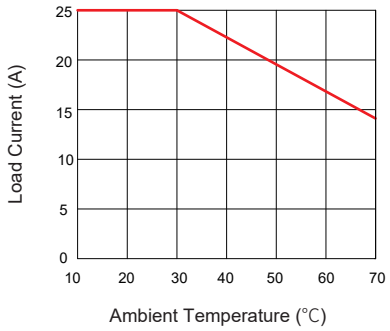




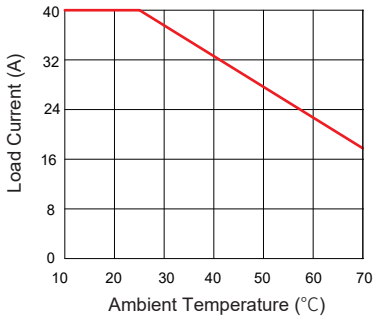


Thermal Derating Curve

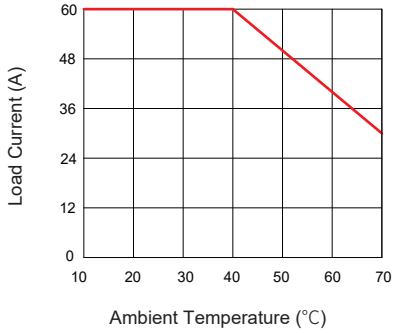
25A



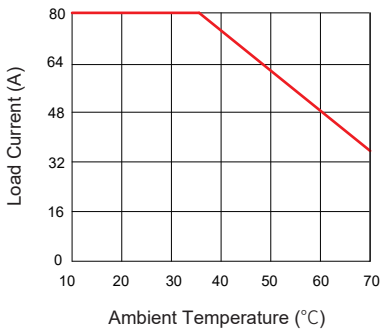
40A



60A



80A



General Notes

1.When connection wiring to SSR please ensure screws are torqued down properly.The recommended installation torque for the M4 terminal is (0.98~1.37) N·m.

2.When ambient temperature is above 25°C see thermal derating curve.

! Warnings

1. The base plate and sides of the relay will be hot during operaiton,please allow the relay to cool down before touching.
2. Disconnect all power before installing or using the relay.
3. Verify all connections areproper before turning on power.

