

Rectifier module and monitoring unit CAN communication reference guide

Document version: 36.2

Release date: 2025 - 8 - 18

Preface

About this manual

This document describes in details about the CAN communication protocol between the Rectifier module and the Monitoring Unit.

Change log

Document version	Release date	Modification
01	2015 - 11 - 12	The first official release.
02	2016 - 07 - 06	Second official release.
35	2021 - 12 - 21	Based on 33 version, add 104 and 114 on Command Type
36	2022 - 08 - 02	Based on 35 version, add Command Type 62
36.1	2025 - 01 - 22	Based on 36 version, add some commands
36.2	2025-08-18	Add silent mode commands

Table of Contents

1 CAN protocol specification 4

1.1 Identifier field	4
1.2 Data Field	5
1.2.1 Byte0	6
1.2.2 Byte 1 data	6
1.2.3 Bytes 2~3	7
1.2.4 Bytes 4-7	8
1.2.5 Description for MessageType being the format of 'AllSetData' or 'AllSetDataResponse'	9
2.1 Set the output reference voltage of all modules	12
2.2 Set the output reference voltage of module 1 (the address of module 1 is 0x01)	13
2.3 Set the Current Limit of All Modules	14
2.4 Set current limit of module 1 (the address of the module 1 is 0x01)	15
2.5 Read the output voltage of all modules	15
2.6 Read the output voltage of module 1 (the address of the module 1 is 0x01)	16
2.7 Read the Output Current of All Modules	17
2.8 Read the output current of the module 1 (the address of the module 1 is 0x01)	18
2.9 Power on all modules	19
2.10 Power on module 1 (the address of the module 1 is 0x01)	19
2.11 Shutdown All Modules	20
2.12 Shutdown module 1 (the address of the module 1 is 0x01)	20
2.13 Read Status Flags of All Modules	21
2.14 Read status flags of module 1 (the address of the module 1 is 0x01)	22
2.15 Set low or high voltage mode of module 1 (the address of the module 1 is 0x01)	23
2.16 Read low or high voltage mode status of module 1 (the address of the module 1 is 0x01)	23
2.17 Read serial number of module 1 (the address of the module 1 is 0x01)	24
2.18 Power on or shut down module 1 by AllSetData command(the address of the module 1 is 0x01).	24
2.19 Set the group address of module 1 (set the module 1 group address is 0x02)	24
2.20 Set the silent mode 1 of module 1(the address of the module 1 is 0x01)	26
2.21 check the silent mode setting of module 1(assume the address of module is 0x01)	27

1 CAN protocol specification

About this chapter

The company's rectifier module supports CAN (Controller Area Network) protocol, this protocol uses CAN 2.0B version, extended frame, 29 identifier bits, the baud rate is 125kbps, units of all voltages are mV and all currents are mA.

The CAN protocol message format is as follows:

Identifier field: 29 Bits	Data Field: 8 Bytes
---------------------------	---------------------

1.1 Identifier field

The identifier field is defined as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	Monitor address	Module Address	Production date	SerialNumberLower Part
0x01	Monitor - (0x01~0x0F) Broadcast - 0	Module - (0x01~0x7F) Broadcast - 0	1~31 (Optional)	0 (optional)

Protocol: protocol type number (4 bits)

0x01: Indicates the communication protocol number between the rectifier module and the monitoring unit

Monitor Address: monitor address (4 bits)

Bits 21~24 are used to indicate the address of the monitoring unit on the bus. The address is set to be 0x01~0x0F, and the default is 0x01.

0x00: broadcast to all Monitoring units;

Module Address: Rectifier Module Address (7 bits)

Bit 14 to bit 20 are the address of the rectifier module. The address is set to be 0x01-0x7F.

0x00: broadcast to all power modules;

Production Date: production date (5 bits)

It is the production date (01-31) of the power module. It is optional for the monitoring unit and can be filled with 0.

Serial Number Lower Part: Lowerpart of serial number (9 bits)

It is the lower part of the product serial number of the power module. It is optional for the monitoring unit and can be filled with 0.

1.2 Data Field

The data field format is defined as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
GroupAddress	MessageType	CommandType	Reserved		CommandData			
GroupAddress	SetData - 0	Vout, - 0	0					
(0x01~0x09)	SetDataResponse-1	Iout_slow, - 1						
BroadCast - 0	ReadData -2	VoutReference, -2						
	ReadDataResponse-3	IoutLimit, -3						
	ReadSerialNumberResponse-4	ShutDownDCDC,-4						
	AllSetData-11	ReadSN, -5						
	AllSetDataResponse-12	ModuleStatus, -8						
		Vab, -20						
		Vbc, -21						
		Vca, -22						
		VfanReference, -26						
		Tin -30						
		Tpfc -31						
		Tdc2 -34						
		Tdc3 -35						
		Iout_fastest, -47						

		Iout_fast, -48 FanSilentLevel, -62 GroupAddress, -89 HiMode_LoMode _Selection - 95 HiMode_LoMode_St atus - 96 Vout_fast, -98 TrueHiLo_Status, - 101 CurrentCapability, - 104 CurrentAndCapabilit y - 114		
--	--	---	--	--

1.2.1 Byte0

The byte0 consists of two parts, the higher 4 bits are group address and the lower 4 bits are message type;

1, GroupAddress

Group address range is 0x01~0x0F, and 0x00 broadcasts to all groups;

2, MessageType

MessageType	Description
0x00	Set data
0x01	Set data response
0x02	Read data
0x03	Read data response
0x04	Read serial number response

1.2.2 Byte 1 data

CommandType.

CommandType	Description	Read data/write data	Eeprom storage
0	Module output voltage	R	N
1	Module output current	R	N
2	Module output reference voltage	R/W	N
3	Module output current limit	R/W	N
4	Turn on/off power module	W	N
5	Read serial number of power module	R	Y
8	Module status flag	R	N
20	Line voltage AB	R	N
21	Line voltage BC	R	N
22	Line voltage CA	R	N
30	Inlet Temperature	R	N
62	FanSilentLevel	R/W	N
89	Group address	R/W	Y
95	HiMode_LoMode_Selection	W	Y
96	HiMode_LoMode_Status	R	N
104	Module Output Current Capability	R	N
114	Module Output Current and Output Current Capability	R	N

1.2.3 Bytes 2~3

If reading power module serial number response, Byte 2 and Byte 3 are higher 16 bits of serial number, definition is shown below.

Bit Number	Definition	Remark
9:0	ModuleType	AC/DC power module type code of UUGreenPower
15:10	DefaultOutputVoltage	Default output voltage type code of UUGreenPower

Byte 2 and Byte 3 remain used in other directives.

1.2.4 Bytes 4-7

Byte 4~ Byte 7 are the command data, a 32 bits integer;

Byte 1 (CommandType) and Byte4~Byte7 (CommandData) are defined:

CommandType	CommandData description
0	Read the module module's output voltage, such as 543.321V = 543321mV, which is filled with an integer 543321
1	Read the module output current, such as 13.321A = 13321mA, which is filled with an integer 13321
2	Set up or read the module's output reference voltage, such as 543.321V = 543321mV, which is filled with an integer 543321
3	Set up or read module's output current limit, such as 13.321A = 13321mA, which is filled with an integer 13321
4	Start up/shut down the power module; 0: start up; 1: shut down
5	Read lower 32 bits of power module serial number
8	Read the module's status flag
20	Read the AC input line voltage Vab, mV
21	Read the AC input line voltage Vbc, mV
22	Read the AC input line voltage Vca, mV
26	Read the module's fan voltage, eg.10000 means 10V

30	Read the module's inlet temperature, m°C
47	Read the module's output current (fastest), mA
48	Read the module's output current (fast), mA
62	Set the module's silent level. 0: normal , 1: silent mode 1, 2:silent mode 2
89	Set up or read the module's group address
95	Set up the module's high or low voltage mode; 1: 1000V ; 2: 500V (Note: It only can be set up successfully when the module is shut down)
96	Read module high or low voltage mode status 1: 1000V 2: 500V
98	Read the module's output voltage (fast), mV
101	Read the Real-time status of HiMode or LoMode; 1: 1000V; 2: 500V
104	Read the maximum output current that the module can supply at present, mA
114	Read the module's output current and output current capability at present; the higher 16 bits represent the module's output current in units of 0.1 ampere, eg.123 means 12.3A; and the lower 16 bits represent the module's output current capability, also in units of 0.1 ampere, eg.425 means 42.5A

The module status flag is defined as follows: (See the definition of the module status flag in the appendix)

Bits	Status type		Description
Bit0	AC input failure	AC over voltage	1: abnormal 0: normal
Bit1		AC undervoltage	1: abnormal 0: normal
Bit2	Module protection	Disconnects from AC (AC overvoltage shutdown)	1: abnormal 0: normal
Bit3	PFC Bus over voltage	PFC Bus over voltage	1: abnormal 0: normal
Bit4	PFC Bus under voltage	PFC Bus under voltage	1: abnormal 0: normal

Bit5	PFC Bus unbalance	PFC Bus unbalance	1: abnormal 0: normal
Bit6	DC output overvoltage	DC output overvoltage	1: abnormal 0: normal
Bit7	Module protection	DC over voltage shutdown	1: abnormal 0: normal
Bit8	DC output undervoltage	DC output undervoltage	1: abnormal 0: normal
Bit9	Fan failure	Fan stops operating	1: abnormal 0: normal
Bit10	Manual	Manual mode selection	1: manual mode 0: automatic mode (default)
Bit11	Fan driven circuit damaged	Fan driven circuit damaged	1: abnormal 0: normal
Bit12	Over temperature protection	Over temperature (Ambient temperature)	1: abnormal 0: normal
Bit13	Low ambient temperature	Low ambient temperature	1: abnormal 0: normal
Bit14	Over temperature protection	PFC over temperature protection 1	1: abnormal 0: normal
Bit15		Output relay failure	1: abnormal 0: normal
Bit16		DC over-temperature protection 1	1: abnormal 0: normal
Bit17		DC over-temperature protection 2	1: abnormal 0: normal
Bit18	Module failure	Communication failure between PFC and DCDC	1: abnormal 0: normal
Bit19	DcdcNotGetPfcOK	DCDC not get PFC OK signal	1: true (PFC is off) 0: false (PFC is on)
Bit20	Module failure	PFC failure	1: abnormal 0: normal
Bit21		DCDC failure	1: abnormal 0: normal

Bit22	PoDeratedByAC	Derated by AC voltage	1: derated 0: underated
Bit23	PoDeratedByT	Derated by temperature	1: derated 0: underated
Bit24	PfcNotRun	PFC on/off state	1: PFC off 0: PFC on
Bit25	DcdcNotRun	Module on/off state	1: off 0: on
Bit26	Output mode	Output loop status	3: Reserved 2: Current loop 1: Reserved 0: Voltage loop
Bit27			
Bit28	DC output voltage unbalance	DC output voltage unbalance	1: abnormal 0: normal
Bit29	Get same SN	Get same SN among modules	1: abnormal 0: normal
Bit30	ShortCircuitShut-Down	Output short-circuit shutdown	1: abnormal 0: normal
Bit31	Module failure	BleederNotWork	1: abnormal 0: normal

The lower 32bit of Module serial number are defined as below:

Bits	Definition	Description
12:0	ModuleNumber	Module number for the day
17:13	ProductionDay	Pruduction date (1~31)
21:18	ProductionMonth	Production month (1~12)
28:22	ProductionYear	Production year (0~127, 0 represents 2000Year)
31: 29	ProductionLocation	Production location (0: Shenzhen)

1.2.5 Description for MessageType being AllSetData and AllSetDataResponse

When message type is AllSetData、AllSetDataResponse, the log format of Data Field is defined as

below:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
GroupAddress	MessageType	OnOff_and_HiLoMode	IoutLimit		Vbattery		VoutReference	
GroupAddress (0x01~0x0F) BroadCast - 0	AllSetData-11 AllSetDataResponse-12		Output current limit point (Unit: 0.1A)		Battery voltage (Unit : 0.1V)		Output voltage reference (Unit: 0.1V)	

And the definition of Byte1 is like this:

7:6	5:2	1:0
HiLoModeSelection	reserved	OnOff
NoSelection - 0 HiMode - 2 LoMode - 3 (When you select LoMode or HiMode, if the module is not running on the right mode, The Module will shutdown automatically and configure to the right mode you need, then restart.)	0	TurnOn- 0 ShutDown(DC,not PFC) - 1 TurnOn(DC, PFC)-2 ShutDown(DC,PFC) -3

2 Examples of frequently used commands

2.1 Set the output reference voltage of all modules

The output reference voltage of all the power modules is set to 475.55V, and the example of CAN ID is shown below.(The CAN ID is 0x02200000, and the data field is 0x10 0x02 0x00 0x00 0x00 0x07 0x41 0x9E)

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart

1	1 (optional)	0x00	optional	optional
---	--------------	------	----------	----------

The example of CAN frame data fields is shown below.

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x02	optional	optional	0x00	0x07	0x41	0x9E
					0x7419E			

Note: Since the voltage unit is mV, 475.55V is converted to 475550 mV and converted to hexadecimal 0x7419E

The power module will execute this broadcast command directly after receiving it, without sending any information in response.

2.2 Set the output reference voltage of module 1 (the address of module 1 is 0x01).

The output reference voltage of the module 1 is set to 475.55V, and the CAN frame ID is shown below

(The CANID is 0x02204000, and the data field is 0x10 0x02 0x00 0x00 0x00 0x07 0x41 0x9E):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

The example of data fields is shown below:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x02	optional	optional	0x00	0x07	0x41	0x9E
					0x7419E			

The power module receives a point-to-point command and responds to the command. An example of a CAN frame ID is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	Serial number information	Serial number information

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x01	0x02	optional	optional	0x00	0x07	0x41	0x9E
					0x7419E			

2.3 Set the Current Limit of All Modules

The current limit of all the power modules is set to 10.5A, and the CAN frame ID is shown below

(The CAN ID is 0x02200000, and the data field is 0x10 0x03 0x00 0x00 0x00 0x00 0x29 0x04):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x00	optional	optional

The example of data fields is shown below:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x03	optional	optional	0x00	0x00	0x29	0x04
					0x2904			

Note: Because the current unit is mA, 10.5A is converted to 10500 mA and converted to hexadecimal 0x2904

If the power module receives the broadcast set command, it will execute the command but will not send back a response.

2.4 Set current limit of module 1 (the address of the module 1 is 0x01)

The current limit of module 1 is set to 10.5A, and the CAN frame ID is shown below

(The CAN ID is 0x02204000, and the data field is 0x10 0x03 0x00 0x00 0x00 0x00 0x29 0x04)

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x03	optional	optional	0x00	0x00	0x29	0x04
					0x2904			

The power module receives a point-to-point command and responds to the command. An example of a CAN frame is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	Serial number information	Serial number information

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x01	0x03	optional	optional	0x00	0x00	0x29	0x04
					0x2904			

2.5 Read the output voltage of all modules

An example of a CAN frame ID is as follows

(The CAN ID is 0x02200000, and the data field is 0x12 0x00 0x00 0x00 0x00 0x00 0x00 0x00):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1(optional)	0x00	optional	optional

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x02	0x00	optional	optional	optional	optional	optional	optional

The power modules receive a broadcast read voltage command, respectively, send back information. An example of a CAN frame is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0xXX (address)	Serial number information	Serial number information

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x03	0x00	optional	optional				
Get the voltage of the module								

2.6 Read the output voltage of module 1 (the address of the module 1 is 0x01)

An example of a CAN frame ID is as follows (The CAN ID is 0x02204000, and the data field is 0x12 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x02	0x00	optional	optional	optional	optional	optional	optional

After the power module receives this command, send back information. An example of a CAN frame is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1(optional)	0x01	Serial number information	Serial number information

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x03	0x00	optional	optional				
the voltage of the module								

2.7 Read the Output Current of All Modules

An example of a CAN frame ID is as follows(The CAN ID is 0x02200000,and the data field is 0x12 0x01 0x00 0x00 0x00 0x00 0x00 0x00):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x00	optional	optional

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x02	0x01	optional	optional	optional	optional	optional	optional

The power modules receive a broadcast read current command, respectively, send back information. An example of a CAN frame is as follows:

28:25	24:21	20:14	13:9	8:0
-------	-------	-------	------	-----

Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1(optional)	0xXX (address)	Serial number information	Serial number information

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x03	0x01	optional	optional				
					the current of the module			

2.8 Read the output current of the module 1 (the address of the module 1 is 0x01)

An example of CAN communication frame ID field is as follows:(The CAN ID is 0x02204000,and the data field is 0x12 0x01 0x00 0x00 0x00 0x00 0x00 0x00 0x00):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x02	0x01	optional	optional	optional	optional	optional	optional

After the power module receives this command, send back information. An example of a CAN frame is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	Serial number information	Serial number information

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0

0x01	0x03	0x01	optional	optional				
					get the current current value of the module			

2.9 Power on all modules

Monitor and send broadcast message to start up all modules. The example of CAN communication frame ID field is as follows:(The CAN ID is 0x02200000, and the data field is 0x10 0x04 0x00 0x00 0x00 0x00 0x00 0x00 0x00):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x00	optional	optional

The example of Data fields is shown below

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x04	optional	optional	0x00	0x00	0x00	0x00
					0x00			

The rectifier module receives the broadcast command and does not make data response.

2.10 Power on module 1 (the address of the module 1 is 0x01)

An example of CAN communication frame ID field is as follows:(The CAN ID is 0x02204000,and the data field is 0x10 0x04 0x00 0x00 0x00 0x00 0x00 0x00 0x00):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x04	optional	optional	0x00	0x00	0x00	0x00

					0x00
--	--	--	--	--	------

The returned message of rectifier module and the example of CAN communication frame ID field are as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	Serial number information	Serial number information

Examples of data fields are as follows:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x01	0x04	optional	optional	0x00	0x00	0x00
							0x00

2.11 Shutdown All Modules

Monitor and send broadcast message to start up all modules. The example of CAN communication frame ID field is as follows:(The CAN ID is 0x02200000, and the data field is 0x10 0x04 0x00 0x00 0x00 0x00 0x00 0x01):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x00	optional	optional

Examples of data fields are as follows:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x04	optional	optional	0x00	0x00	0x01
							0x01

The rectifier module receives the broadcast command and does not make data response.

2.12 Shutdown module 1 (the address of the module 1 is 0x01)

An example of CAN communication frame ID field is as follows:(The CAN ID is 0x02204000, and the data field is 0x10 0x04 0x00 0x00 0x00 0x00 0x00 0x01):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart

1	1 (optional)	0x01	optional	optional
---	--------------	------	----------	----------

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x04	optional	optional	0x00	0x00	0x00	0x01
					0x01			

The returned message of rectifier module and the example of CAN communication frame ID field are as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	Serial number information	Serial number information

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x01	0x04	optional	optional	0x00	0x00	0x00	0x01
					0x01			

2.13 Read Status Flags of All Modules

An example of CAN communication frame ID field is as follows:(The CAN ID is 0x02200000, and the data field is 0x12 0x08 0x00 0x00 0x00 0x00 0x00 0x00 0x00):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x00	optional	optional

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x02	0x08	optional	optional	optional	optional	optional	optional

After receiving the broadcast read module status flag bit, the rectifier module sends back information respectively. An example of CAN communication frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
-------	-------	-------	------	-----

Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0xXX (address)	Serial number information	Serial number information

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x03	0x08	optional	optional				
Get the current status of the module								

2.14 Read status flags of module 1 (the address of the module 1 is 0x01)

An example of CAN communication frame ID field is as follows:(The CAN ID is 0x02204000, and the data field is 0x12 0x08 0x00 0x00 0x00 0x00 0x00 0x00 0x00):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x02	0x08	optional	optional	optional	optional	optional	optional

After the power module receives this command, send back information. An example of a CAN frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	Serial number information	Serial number information

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0

0x01	0x03	0x08	optional	optional				
					Get the current status of the module			

2.15 Set low or high voltage mode of module 1 (the address of the module 1 is 0x01)

The example of CAN communication frame ID field is as follows: if it is set to 1000V mode, the data field data is 0x01. (The CAN ID is 0x02204000, and the data field is 0x10 0x5F 0x00 0x00 0x00 0x00 0x00 0x01):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x5F	optional	optional	0x00	0x00	0x00	0x01
					0x01			

2.16 Read low or high voltage mode status of module 1 (the address of the module 1 is 0x01)

An example of CAN communication frame ID field is as follows: (The CAN ID is 0x02204000, and the data field is 0x12 0x60 0x00 0x00 0x00 0x00 0x00 0x00):

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x02	0x60	optional	optional	optional	optional	optional	optional

After the power module receives this command, it will send back information. An example of a CAN frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	Serial number information	Serial number information

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x03	0x60	optional	optional				
					Get the low or high voltage mode status of the module			

2.17 Set the group address of module 1 (set the module 1 group address is 0x01).

An example of CAN communication frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x05	optional	optional	optional	optional	optional	optional

After receiving the command to read the module serial number, the rectifier module sends back the information. An example of CAN communication frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	Serial number information	Serial number information

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0

0x01	0x04	(reserved)						
			Get module serial number					

2.18 Allsetdata switching on/off module 1 (set the address of module 1 as 0x01)

Monitor and set Allsetdata of rectifier module 1 to power on, Commandtype is 0 (on DC), and corresponding parameters: output current limiting point is 10.5a, battery voltage is 470.5v, output voltage is 475.5v. The example of CAN communication frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDay	SerialNumberLowPart
1	1 (optional)	0x01	optional	optional

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x0B	0x00	0x00	0x69	0x12	0x61	0x12	0x93
			0x0069		0x1261		0x1293	

Note: Since the current unit is 0.1A, 10.5a should be multiplied by 10 to convert to 105, the hexadecimal number to 0x0069, and the voltage unit is 0.1V, so 470.5v should be multiplied by 10 to convert to 4705, the hexadecimal number to 0x1261, 475.5v should be multiplied by 10 to convert to 4755, and the hexadecimal number to 0x1293.

The rectifier module sends back the message, and the example of CAN communication frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDay	SerialNumberLowPart
1	1 (optional)	0x01	Serial number	Serial number

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x0C	0x00	0x00	0x69	0x12	0x61	0x12	0x93
			0x0069		0x1261		0x1293	

2.19 Set the group address of module 1 (set the address of module 1 as 0x02)

The monitor set the group address of rectifier module 1 as 0x02, and the example of CAN communication frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDay	SerialNumberLowPart
1	1 (optional)	0x01	optional	optional

Examples of data fields are as follows:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0
optional	0x00	0x59	optional	optional	0x00	0x00	0x00
					0x00000002		

The rectifier module receives the point-to-point setting command and makes data response. An example of CAN communication frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDay	SerialNumberLowPart
1	1 (optional)	0x01	Serial number	Serial number

Examples of data fields are as follows:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0
0x02	0x01	0x59	optional	optional	0x00	0x00	0x00
					0x00000002		

2.20 Set the silent mode 1 of module 1 (the address of the module 1 is 0x01)

The example of CAN communication frame ID field is as follows: if it is set to noise priority, the data field is 0x01.

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

Examples of data fields are as follows:

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x00	0x3e	optional	optional	0x00	0x00	0x01

					0x01
--	--	--	--	--	------

2.21 Read silent mode 1 of module 1 (the address of the module 1 is 0x01)

To check the current silent mode setting of module 1, (assume the module is 0x01), CAN ID fields are as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	optional	optional

Data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x02	0x3e	optional	optional	0x00	0x00	0x00	0x00

After the power module receives this command, it will reply its status. An example of a CAN frame ID field is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1 (optional)	0x01	Serial number information	Serial number information

Examples of data fields are as follows:

Byte0		Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
7:4	3:0	7:0	7:0	7:0	7:0	7:0	7:0	7:0
0x01	0x03	0x3e	optional	optional				
					silent mode status of power module(00/01-for 40kW module; 00/01/02 for 30kW module)			

3 Appendix

The module status flags are specifically defined as follows:

```
struct MODULE_STATUS_BITS {  
    Uint16 AcOV:1;                // 0  AC input overvoltage  
    Uint16 AcUV:1;                // 1  AC input undervoltage  
    Uint16 AcOVDisconnected:1;    // 2  AC input overvoltage shutdown (disconnect)  
    Uint16 PfcOV:1;               // 3  PFC Bus Over voltage  
    Uint16 PfcUV:1;               // 4  PFC Bus Under voltage  
    Uint16 PfcUnbalance:1;        // 5  PFC Bus Unbalance  
    Uint16 DcOV:1;                // 6  DC output overvoltage  
    Uint16 DcOVShutDown:1;        // 7  DC output overvoltage shutdown  
    Uint16 DcUV:1;                // 8  DC output undervoltage  
    Uint16 FanNotRun:1;           // 9  fan failure  
    Uint16 Manual:1;              // 10 Manual mode selection  
    Uint16 FanDriverFail:1;       // 11 Fan driver Fail  
    Uint16 AmbientOT:1;           // 12 Ambient temperature over temperature protection  
    Uint16 AmbientUT:1;           // 13 Ambient temperature under temperature protection  
    Uint16 Pfc1_OT:1;             // 14 PFC over temperature protection 1  
    Uint16 OutputRelayFault:1;    // 15 Ouput Relay Fault  
    Uint16 Dcdc1_OT:1;            // 16 DC over temperature protection 1  
    Uint16 Dcdc2_OT:1;            // 17 DC over-temperature protection 2  
    Uint16 SciIsNotOK:1;          // 18 Communication failure between PFC and DCDC  
    Uint16 DcdcNotGetPfcOK:1;     // 19 DCDC not get PFC OK signal  
    Uint16 PfcFail:1;             // 20 PFC failure  
    Uint16 DcdcFail:1;            // 21 DCDC failure
```

```
    Uint16 PoDeratedByAC:1;           // 22  Derated by AC voltage
    Uint16 PoDeratedByT:1;           // 23  Derated by temperature
    Uint16 PfcNotRun:1;              // 24  PFC on/off state
    Uint16 DcdcNotRun:1;             // 25  Module on/off
    Uint16 Output mode:2;            // 26:27  Output loop status
    Uint16 DcVoltageUnbalance:1;     // 28  DC ouput Voltage Unbalance
    Uint16 GetSameSN:1;              // 29  Modules with the same serial number were found
    Uint16 ShortCircuitShutDown:1;   // 30  Output short-circuit shutdown
    Uint16 BleederNotWork:1;         // 31  Bleeder Not Work
};

union MODULE_STATUS_REG {
    Uint32      all;
    struct MODULE_STATUS_BITS bit;
};
```