MEGMEET 1U Low Voltage Module

(24V/48V/72V)

CAN Communication Protocol

Prepared by	Zhang Lu	Date	2022-08-15
Reviewed by	Wang Zhiyong	Date	2022-08-15
Approved by	Liu Xiaogang	Date	2022-08-15

SHENZHEN MEGMEET ELECTRICAL TECHNOLOGY CO., LTD

Version	Date	Change and Reason	Author
V1.0	2018-4-23	First release	Niu Peng
V1.1	2018-9-20	1. Modify the barcode address to 0x222~0x226; 2. 0x24D increases hardware overvoltage point sampling; 3. 0x233 is modified to the PFC software process version; 4. 0x234 is modified to the DCDC software process version; 5. 0x266, 0x267 increase the input voltage calibration slope and intercept.	Zhang Lu
V2.0	2022-8-15	1. Add address mode settings; 2. Add address related instructions;	Zhang Lu

Table of Contents

1 Range of applications

This protocol is mainly applicable to 1U series rectifier and photovoltaic (wind energy) input power modules.

- 48V voltage level: MR483000SHG, MR483000SG, MR483000HG, MR483000MG, MR483000EG, MR482000HG, MR4830N, MR484000SG, MS483000HG, MS483000SG, etc；
- 24V voltage level：MR242000MG, etc；
- 72V voltage level：MR723000MG, etc；

2 CAN Protocol Specifications

About this chapter

Megmeet's rectifier module supports CAN (Controller Area Network) communication protocol, and the controller module controls, configures, and queries the rectifier module through the CAN bus.

The extended frame format CAN2.0B of CAN bus is adopted , namely “Can Specification2.0 Part B”.

All data items are sent with high byte first, followed by low byte.

Communication baud rate is 125kbps .

The CAN2.0B frame format is as follows:

Start of the frame	**Arbitration domain**					**Control domain**		**Data domain**	**Check code**	**End of the frame**
SOF	ID	SRR	IDE	ID	RTR	Reserved	Data length	Data	CRC	EOF
/	11 bits	/	/	18 bits	/	/	/	8 bytes	/	/

Controllable parts used by actual users:

ID domain：29 bits	**Data domain：8 bytes**
The frame identifier	Data

2.1 ID domain

ID domain packet format is defined as follows：

ID domain																												
28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Protocol number（6 bits）						Secondary Node address（7 bits）							Command ID & Message ID（8 bits）								M/S	Reserved bit, must be filled with 1						CNT

Note

Protocol number（6 bits）

0x21： Indicates the communication protocol number between the rectifier module and the monitor.

0x22：Indicates the communication protocol number between rectifier modules.

Secondary Node address（7 bits）

It is used to define the slave node address associated with this frame during frame transfer. When the master node sends, this address is the destination slave node address; when the slave node sends, this address is the slave node's own address.

0x00： Represents the broadcast address, indicating that all slave nodes under the same protocol number must receive and process this frame.

Command ID & Message ID（8 bits）

Information used to identify a communication frame.

0x80：Control command ID.

0x81：Configuration command ID.

0x82： Query command ID.

0x40：Query all real-time data.

0x50：Query the inherent information of the module.

M/S（1 bit）

It is used to identify the source of the communication frame.

0x0: Represent sending from the node

0x1: Represent sending from the main node

CNT（1 bit）

It is used to identify whether there is subsequent frame data.

0x0：Indicates the last part of the data.

0x1：Indicates the last part of the data.

If the packet only needs to be delivered in one frame, then CNT=0x0.

2.2 Data domain

The format of the data field message is defined as follows:

Data domain		
Error type	Signal ID	Signal content

Data domain							
4 bits	12 bits	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7

2.2.1 Error type

Table 1-1 Error type

Error type（4 bits）	**Note**
0x0	No errors, normal response
0x1	Parameter error
0x2	Invalid command
0x3	Address recognition is being performed
0x4	Electronic tags are not written
0x5	Electronic label reading hardware failure
0x6	Rectifier module loading interrupted
0x7	The rectifier module is self-regulating
0x8	Cabinet address conflict

2.2.2 Signal ID

Table 1-2 Signal ID

Signal ID	Signal description	Type of data	Note	Default value	Write/Read （W/R）	EEPROM storage
0x001	Characteristic word of rectifier module	III	Refer to the characteristic word of the rectifier module for details.		R	
0x005	Software and hardware version numbers	VII/VII/VII	Refer to software and hardware version numbers for details.		R	
0x006	Hardware address	VII	Refer to hardware address for details		R	
0x100	DC output voltage setting value	I	48V Voltage regulation range （41.5V~58.5V）	53.5V	W/R	
0x101	Default output voltage	I	48V Voltage regulation range （48V~58V）	53.5V	W/R	YES
0x102	DC output Voltage overvoltage protection point	I	48V Setting range （58.5V~60.5V）	60.5V	W/R	YES
0x103	DC output current limit setting value	I	（0~1.22）Rated current	1.22	W/R	
0x104	Default current limiting point	I	（0~1.22）Rated current	1.22	W/R	YES
0x10C	WALK-IN time	II	Unit：s（8s~200s） 0 represents Forbid	0Forbid	W/R	YES
0x10E	Total running time	II	Unit：Hour	0	W/R	YES
0x132	Module switch control	V	0：Power on 1：Power off	0：Power	W	

	(all shutdown)			on		
0x133	Module overvoltage lockout reset control	V	0：Forbid 1：Reset	0：Forbid	W	
0x135	Module communication green light flashing control	V	0：Forbid 1：Flicker	0：Forbid	W	
0x13A	The module performs address assignment control	V	0：Forbid 1：Going on	0：Forbid	W	
0x140	Indicator light control	A：V	Refer to control indicators for details	0：Auto（Do not control）	W	
0x142	Shield Alarm	III	Refer to shield Alarm		W	
0x143	When the communication with the monitor is interrupted, block the yellow light alarm	V	0：No shield 1：Shield	0：No Shield	W	YES
0x170	Input power	I	W		R	
0x171	Input frequency	I	Hz		R	
0x172	Input Current	I	A		R	
0x173	DC output power	I	W		R	
0x175	DC output voltage measurement	I	V		R	
0x176	Output actual current limit point	I	A		R	
0x177	Output actual	I	W		R	

	power limit point					
0x178	Single-phase module input voltage	I	V		R	
0x180	Air inlet ambient temperature	I	℃		R	
0x182	Output current display value	I	A		R	
0x183	Current alarm / status	IV	Refer to current alarm / status for details		R	
0x184	output external voltage	I	V		R	
0x188	Module rated current	VII	A The reported value is the actual rated current value × 100 . For example , the value reported by the 100A module is 100×100=10000		R	

0x21D	Node address mode switch (Only supports 48V module)	V	0: Hardware address mode 1: Slot identification mode 2: Software address mode		W/R	YES
0x222	Barcode version number	II			W/R	YES
0x223	Barcode content 1	II			W/R	YES
0x224	Barcode content 2	II			W/R	YES
0x225	Barcode content 3	II			W/R	YES
0x226	Barcode content 4	II			W/R	YES

0x22B	Fan duty cycle feedback	I	%		R	
0x22D	Rectifier module output current limiting point set value	I	（0~1.22）Rated current		W/R	
0x22E	PV module output current limiting point set value	I	（0~1.22）Rated current		W/R	
0x22F	Rectifier module output voltage set value	I	48V Voltage regulation range （41.5V~58.5V）		W/R	
0x230	PV module output voltage set value	I	48V Voltage regulation range （41.5V~58.5V）		W/R	
0x236	PFC alarm word	III	Module manufacturer analysis		R	
0x237	PFC fault word	III	Module manufacturer analysis		R	
0x238	PFC statue word	III	Module manufacturer analysis		R	
0x239	DCDC alarm word	III	Module manufacturer analysis		R	
0x23A	DCDC fault word	III	Module manufacturer analysis		R	
0x23B	DCDC status word	III	Module manufacturer analysis		R	

0x24E	Default auto-boot settings	V	0xAAAA: Automatic start 0x5555: No automatic startup		W	YES
0x270	PV voltage setting	II	Unit：V （120V~340V） 0 indicates Forbid	0：PV voltage does not set	W/R	
0x271	Reserved					
0x272	Reserved					
0x273	MPPT single scan command	V	1 means enable scan 0 means disable scan	0：Forbid Scan	W/R	
0x274	MPPT scan cycle	II	Unit：s （180s~1800s） 0 indicates Forbid	0：Forbid Cycle scan	W/R	YES
0x275	Wind energy voltage setting	II	Unit：V （120V~380V） 0 indicates Forbid	0：Wind energy voltage is not set	W/R	
0x276	Wind energy voltage range operating point upper limit	II	Unit：V （200V~380V） 0 indicates Forbid	0：Forbid interval mode	W/R	
0x277	Wind energy voltage range operating point lower limit	II	Unit：V （200V~380V） 0 indicate Forbid	0：Forbid interval mode	W/R	

0x301	Customer information 1	II	The host computer converts to ASCII		W/R	YES

			code			
0x302	Customer information 2	II	The host computer converts to ASCII code		W/R	YES
0x303	Customer information 3	II	The host computer converts to ASCII code		W/R	YES
0x304	Customer information 4	II	The host computer converts to ASCII code		W/R	YES
0x305	Customer information 5	II	The host computer converts to ASCII code		W/R	YES
0x306	Customer information 6	II	The host computer converts to ASCII code		W/R	YES
0x307	Customer information 7	II	The host computer converts to ASCII code		W/R	YES
0x308	Customer information 8	II	The host computer converts to ASCII code		W/R	YES

2.2.3 Signal content

Data Type Description

The definition of the signal content format depends on the data type definitions in Table 1-3 .

Table 1-3 Data Type Description

Data Type	Note
I	4 bytes fixed point（IQ10：2^10）
II	4 bytes integer （IQ0：2^0）
III	4 bytes bitwise definition
IV	6 bytes bitwise definition
V	1 byte integer
VI	2 bytes fixed point number（IQ10：2^10）
VII	2 bytes integer（IQ0：2^0）

For a 4 -byte single signal, the sending method is as follows

Signal content					
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
0		4 byte variable			

For a single signal with a combination of 2 bytes and 4 bytes, the sending method is as follows:

Signal content					
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
2 byte variable		4 byte variable			

For a 1 -byte single signal, the sending method is as follows:

Signal content					
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
0	1 byte variable	0			

Characteristic word of rectifier module（Signal ID：0x001）

The rectifier module characteristic word is the characteristic quantity that characterizes the same type of module, including the power supply mode, AC phase number, AC voltage type, rated power, rated efficiency, output voltage type and hardware version, etc. All software versions are forward compatible; the module feature word is the basis for monitoring online loading to identify the same type of

modules; however, when the software version is incompatible due to hardware changes, the hardware version information in the feature word must be modified.

Signal content					
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
		Characteristic word of rectifier module			

Characteristic word of rectifier module																															
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Power supply		AC phases		Input voltage		Rated output current										Output voltage type			Efficiency Type				Hardware minor version				Hardware version				Reserve
00：Single power supply **01**：Dual power supply		**00**：Single-phase **01**：Three-phase		**00**：220V AC **01**：110V AC **11**：Support AC input / DC input / PV input		Digital quantity 1 means 0.5A 0~1023 means current 0~511.5A For example：50A（100 is 0x64）：00 0110 0100										**000**：48V **001**：24V **010**：60V **011**：48V/60V			**0000**：<90% **0001**：(90~91)% **0010**：(91~92)% **0011**：(92~93)% **0100**：(93~94)% **0101**：(94~95)% **0110**：(95~96)% **0111**：(96~97)% **1000**：(97~98)% **1001**：(98~99)% **1010**：>99%				The hardware minor version of each module needs to be defined on a case-by-case basis				**000~111 Indicates the 1st generation to the 7th generation products respectively**				2

Software and hardware version numbers（Signal ID：0x005）

Signal content					
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Hardware version number		Software version number 1（DC/DC）		software version number 2（PFC）	

Hardware Address（Signla ID：0x006）

The hardware address represents the position of the module in the system, and consists of Byte2 and Byte3 in the frame data, Byte2 represents its group address (each group of 8 modules), and Byte3 represents its slave address.

E.g:

1) If the read hardware address is 01 02, it indicates that the module is located in the second slot of the first group, indicating that the hardware address of the module is 2;
2) If the read hardware address is 0 2 02, it indicates that the module is located in the second slot of the second group, indicating that the hardware address of the module is 10 ;

Signal content					
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Hardware address					

Current Alarm / Status（Signal ID：0x183）

Signal content					
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Expansion definition of current alarm/status word of rectifier module		Definition of the current alarm/status of the rectifier module			

The current alarm / status of the rectifier module		
Bit0	Output overvoltage lockout alarm	Alarm：1
Bit1	Ambient temperature over temperature alarm	Alarm：1
Bit2	Module failure alarm	Alarm：1
Bit3	Module protection alarm	Alarm：1
Bit4	Fan failure alarm	Alarm：1
Bit5	Reserved	
Bit6	Reserved	
Bit7	Reserved	
Bit8	Low temperature shutdown alarm	Alarm：1
Bit9	Module shutdown status	Shutdown：1
Bit10	Reserved	
Bit11	Module WALK-IN function enable	Enable：1
Bit12	Internal over temperature alarm	Alarm：1
Bit13	Reserved	
Bit14	Output overvoltage protection alarm	Alarm：1
Bit15	Reserved	
Bit16	Module sequence start function enable	Enable：1
Bit17	Module input undervoltage alarm	Alarm：1
Bit18	Module AC imbalance alarm	Alarm：1
Bit19	Module AC Phase Loss Alarm	Alarm：1
Bit20	Serious uneven current alarm caused by the module not being able to carry the load	Alarm：1
Bit21	Reserved	
Bit22	Module input overvoltage alarm	Alarm：1
Bit23	Module PFC fault alarm	Alarm：1
Bit24	Module Unbalanced Current Alarm	Alarm：1
Bit25	Drop line alarm	Alarm：1
Bit26	Module internal communication abnormal alarm	Alarm：1
Bit27	Module output fuse break alarm	Alarm：1
Bit28	Reserved	

Bit29	Module input power failure alarm	Alarm：1
Bit30	Serious unbalanced bus voltage alarm	Alarm：1
Bit31	Cabinet address conflict alarm	Alarm：1

Expansion definition of the current Alarm/status word of the rectifier module		
Bit0	Module hardware address abnormal alarm	Alarm：1
Bit1	Module Input Common Mode Voltage Abnormal Alarm	Alarm：1
Bit2	Main relay coil short circuit alarm	Alarm：1
Bit3	Input reverse connection alarm	Alarm：1
Bit4~Bit1	Reserved	

Shield Alarm（Signal ID：0x142）

Signal content					
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Expansion definition of shield alarm		Shield alarm command definition			

Shield alarm command definition		
Bit0	Output overvoltage lockout alarm	1：Shield；0：Auto
Bit1	Ambient temperature over temperature	1：Shield；0：Auto
Bit2	Reserved	
Bit3	Reserved	
Bit4	Fan failure alarm	1：Shield；0：Auto
Bit5~Bit16	Reserved	
Bit17	Module input undervoltage alarm	1：Shield；0：Auto
Bit18	Module AC imbalance alarm	1：Shield；0：Auto
Bit19	Module AC Phase Loss Alarm	1：Shield；0：Auto
Bit20	Serious uneven current alarm caused by the module not being able to carry the	1：Shield；0：Auto
Bit21	Reserved	
Bit22	Module input overvoltage alarm	1：Shield；0：Auto
Bit23	Module PFC fault alarm	1：Shield；0：Auto
Bit24	Module unbalanced current alarm	1：Shield；0：Auto
Bit25	Drop line alarm	1：Shield；0：Auto
Bit26	Module internal communication abnormal alarm	1：Shield；0：Auto
Bit27	Module output fuse break alarm	1：Shield；0：Auto
Bit28	Reserved	
Bit29	Module input power failure alarm	1：Shield；0：Auto

Bit30	Serious unbalanced bus voltage alarm	1：Shield；0：Auto
Bit31	Cabinet address conflict alarm	1：Shield；0：Auto

Expansion definition of shield alarm command		
Bit0	Module hardware address abnormal alarm	1：Shield；0：Auto
Bit1	Module input common mode voltage abnormal alarm	1：Shield；0：Auto
Bit2	Main relay coil short circuit alarm	1：Shield；0：Auto
Bit3	Input reverse connection alarm	1：Shield；0：Auto
Bit4~Bit15	Reserved	

Control Indicator（Signal ID：0x140）

Signal content					
Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
0	Control light command	0			

Control light command							
Byte3							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Reserved		Control red light		Control yellow light		Control green light	
Reserved		00：Auto 01：Red light flashes slowly（0.5Hz） 10：Red light flashes quickly（4Hz） 11：The red light is always on		00：Auto 01：Yellow light flashes slowly（0.5Hz） 10：Yellow light flashes quickly（4Hz） 11：The yellow light is always on		00：Auto 01：Green light flashes slowly（0.5Hz） 10：Green light flashes quickly（4Hz） 11：Green light is always on	

3 Examples of common commands

3.1 Set the output voltage of all modules

The monitor sends out a broadcast message to set the output voltage of all rectifier modules to 53.5V .

ID domain of the CAN communication frame is as follows:

ID domain																													
28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Protocol number（6 bits）						Secondary Node address （ 7 bits）							Command ID & Message ID （ 8 bits）								M/S	Reserved bit, must be filled with 1						CNT
1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
0x21						0x00							0x80								0x1	0x3F						0x0
Protocol number						Indicates a broadcast command							Indicates a control command								Indicates issued by monitoring	Reserved bit, must be filled with 1						Indicates that there are no subsequent frames

The CAN communication frame data field is as follows:

Data Domain							
Byte0		**Byte1**	**Byte2**	**Byte3**	**Byte4**	**Byte5**	**Byte6**	**Byte7**
4 bits	4 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits
error type	Signal ID		Data content					
0x0	0x100		0x0000		0x0000D600			
0x01		0x00	0x00	0x00	0x00	0x00	0xD6	0x00
No errors , data is normal.	Indicates the ID of the signal that sets the DC output voltage		No data, fill with 0		Set DC output voltage value, scaled for IQ10			

The rectifier module receives the broadcast setting command and does not respond with data.

3.2 Setting the output voltage of Module 1

Monitor and set the output voltage of rectifier module 1 to 53.5V .

ID field of the CAN communication frame is as follows:

ID domain																														
28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
Protocol number（6 bits）						Secondary Node address （ 7 bits）							Command ID & Message ID （ 8 bits）									M/S	Reserved bit, must be filled with 1						CNT		
1	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0		
0x21						0x01							0x80									0x1	0x3F						0x0		
Protocol number						Software address of module 1							Indicates control commands									Indicates that issued by module 1	Reserved bit, must be filled with 1						Indicates that there are no subsequent frames		

The CAN communication frame data field is as follows:：

Data domain							
Byte0		**Byte1**	**Byte2**	**Byte3**	**Byte4**	**Byte5**	**Byte6**	**Byte7**
4 bits	4 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits
Error type	Signal ID		Data content					
0x0	0x100		0x0000		0x0000D600			
0x01		0x00	0x00	0x00	0x00	0x00	0xD6	0x00
No error, and the data is normal.	ID of the signal that sets the output voltage		No data, fill with 0		Set output voltage value, scaled for IQ10			

After the rectifier module receives the point-to-point setting command, it responds with data.

ID domain of the CAN communication frame is as follows:

ID domain																														
28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
Protocol number（6 bits）						Secondary Node address （ 7 bits）							Command ID & Message ID （ 8 bits）									M/S	Reserved bit, must be filled with 1						CNT		
1	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0		

0x21	0x01	0x80	0x0	0x3F	0x0
Protocol number	Software address of module 1	Indicates control commands	Indicates that issued by module 1	Reserved bit, must be filled with 1	Indicates that there are no subsequent frames

The CAN communication frame data field is as follows:

Data Domain							
Byte0		**Byte1**	**Byte2**	**Byte3**	**Byte4**	**Byte5**	**Byte6**	**Byte7**
4 bits	4 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits
Error type	Signal ID		Data content					
0x0	0x100		0x0000		0x0000D600			
0x01		0x00	0x00	0x00	0x00	0x00	0xD6	0x00
No error, and the data is normal.	ID of the signal that sets the output voltage		No data, fill with 0		Set output voltage value, scaled for IQ10			

3.3 Query the inherent information of module 1

The controller queries the inherent information of the rectifier module 1 through the 0x50 batch command.

ID domain of the CAN communication frame is as follows:

ID domain																												
28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Protocol number（6 bits）						Secondary Node address （ 7 bits）							Command ID & Message ID （ 8 bits）								M/S	Reserved bit, must be filled with 1						CNT
1	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	1	1	1	1	1	1	1	0/1
0x21						0x01							0x50								0x1	0x3F						0x0/0x1
Protocol number						Software address of module 1							0x50 Batch command to query the inherent information of the module								Indicates issued by controller	Reserved bit, must be filled with 1						Indicate whether there are subsequent frames

The CAN communication frame data field is as follows:

Data Domain								
Byte0		**Byte1**	**Byte2**	**Byte3**	**Byte4**	**Byte5**	**Byte6**	**Byte7**
4 bits	4 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits
Error type	Signal ID		Data content					
0x0	0x001		0x0000		0x00000000			
0x0	0x005		0x0000		0x00000000			
0x0	0x006		0x0000		0x00000000			
0x00		0x01	0x00	0x00	0x00	0x00	0x00	0x00
0x00		0x05	0x00	0x00	0x00	0x00	0x00	0x00
0x00		0x06	0x00	0x00	0x00	0x00	0x00	0x00
No error, and the data is normal.	Indicates the characteristic word of the rectifier module Indicates the software and hardware version number Indicates the module hardware address		No data, fill with 0		No data, fill with 0			

After receiving the point-to-point setting command, rectifier module 1 responds.

ID domain of the CAN communication frame is as follows:

ID domain																													
28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Protocol number（6 bits）						Secondary Node address （ 7 bits）							Command ID & Message ID （ 8 bits）								M/S	Reserved bit, must be filled with 1						CNT
1	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	1	1	1	1	1	1	0/1
0x21						0x01							0x50								0x0	0x3F						0x0/0x1
Protocol number						Software address of module 1							0x50 Batch command to query the inherent information of the module								Indicates that issued by module 1	Reserved bit, must be filled with 1						Indicate whether there are subsequent frames

The CAN communication frame data field is as follows:

Data Domain								
Byte No.	**Byte0**		**Byte1**	**Byte2**	**Byte3**	**Byte4**	**Byte5**	**Byte6**	**Byte7**
Number of digits	4 bits	4 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits	8 bits
Data Domain definition	Error type	Signal ID		Data content					
Characteristic word of rectifier module	0x0	0x001		0x00	0x00	0x40	0x68	0x0E	0x27
software and hardware version number	0x0	0x005		0x01	0x00	0x02	0x02	0x02	0x02
Module hardware address	0x0	0x006		0x01	0x02	0x00	0x00	0x00	0x00
Note	No error , data normal	Associated Signal ID		Define the specific data of the reply according to the protocol					

3.4 Query all real-time data of module 1

The monitoring unit queries all real-time data of the rectifier module 1 through the 0x40 batch command.

rectifier module 1 receives the 0x40 command, it sends the following information upward in sequence:

Signal ID	Single-phase module signal description
0x010E	total running time
0x0170	input power
0x0171	input frequency
0x0172	Input Current
0x0173	DC output power
0x0174	/
0x0175	DC output voltage measurement
0x0176	Output actual current limit point

0x0178	Single-phase module input voltage
0x0179	/
0x017A	/
0x017B	/
0x0180	Air inlet ambient temperature
0x0182	Output current display value
0x0183	Current alarm / status

4 Recommended Communication Strategies

Communication related features

1. The controller monitors all online rectifier modules. The setting command of the module can be sent by broadcast, and can also be sent to the specified module according to the needs; for the query command of the module, the controller can send the command to a single module cyclically in sequence.

3. The rectifier module has a software address (generated by internal sorting among the rectifier modules) and a hardware address (some modules do not have). The software address always starts from 1 and is continuous. For example, there is only one module in the system, then no matter which slot it is inserted in, its software address is always 1, and the monitoring can always use address 0x01 to communicate with it; for example, there are four modules in the system, then Regardless of the slot where the four modules are located, their software addresses are always 0x01, 0x02, 0x03, 0x04, and monitoring can always use 0x01~0x04 to establish communication with the four modules respectively. It is recommended that the partner monitor manage the module through the software address, and the hardware address is only used to display the module slot number.

4. In the scenario where only the software address is used, you can control the green light of the queried module to flash on the module information query page through the command 0x0135 to indicate which module is currently queried.

5. The communication between the rectifier module and the controller is interrupted for more than 1 minute, the output of the rectifier module will be restored to the default value to ensure the power supply capacity. The restored default value includes: the output voltage of the module will be restored to the default voltage (if the user has not set the default voltage, the default value will be 53.5V); the current limiting point of the module is restored to the default current limiting point (if the default current limiting point has not been set by the user, the default is the maximum current limiting point); the module that is monitored for shutdown and hibernation will be restarted, with limited consideration of the power supply capacity .

6. When the module is newly inserted into the system, or the module is powered on again, or the module is not powered off and plugged in, the software address of the module will be rearranged; after the module address is rearranged, the software address of the module can be guaranteed to be continuous; however, due to the change of the number of modules , the original software address may be changed. When the controller powers on or the controller is the newly inserted system, the user can also start the address rearrangement of the module through the CAN communication command 0x013A to ensure the continuity of the module address.

7. The rectifier module does not actively report the registration request or registration information, and the monitoring unit must obtain the module and quantity in the system through the 0x50 command.

8. The rectifier module does not actively report the alarm, and the alarm information is included in the 0x40 command, which is queried by the monitoring unit in real time.

8. Address Mode 0 : (hardware address mode)

1) The module communicates with the host computer using the software address ;

2) The communication between modules uses the hardware address ;

3) The address uploaded by the module to the monitoring is the hardware address ;

4) If the hardware address is conflicting or the module is not connected to the address board, it will not start and the yellow light (4Hz) will flash quickly.

9. Address mode 1 : (slot identification mode)

1) The module communicates with the host computer using the software address ;

2) The software address is used for communication between modules ;

3) The address uploaded by the module to the monitoring is the hardware address ;

4) The module can work normally if it is not connected to the address board, but the uploaded hardware address is 0.

10. Address Mode 2: (Software Address Mode)

1) The software address is used for the communication between the module and the upper monitor ;

2) The software address is used for communication between modules ;

3) If the module is not connected to the address board, it can start up and work normally. Monitor and query the hardware address of the module, and obtain the actual software address of the module.

Recommended Communication Strategies

Step 1

After the controller is powered on, firstly through the 0x013A command, each online module is notified to reassign addresses; inserting any module into the system will also cause the online modules to reassign addresses. A sign that the module is performing address assignment is that an error type in the data field indicates that the module is performing address recognition. When the monitoring recognizes that the module is in the process of address recognition, it must stop sending query commands. Address recognition is being performed

Step 2

After the module address is allocated (when the error type in the data field is not 3 , it means the process is over), the monitoring unit can broadcast the setting command to all online modules.

For the setting command issued by the controller broadcast, all modules do not respond with data. For the controller point-to-point setting command, the corresponding module will reply to the monitoring setting.

It is recommended that the following setting commands are broadcasted in each polling cycle: DC output current limit setting value, DC output voltage setting value. Additional command monitoring can be set up in the form of event triggers (eg set by the user).

Step 3

After sending the broadcast setting command, the controller can query the inherent information of each module according to the module software address in ascending order, and the query command is 0x50 .

There is a fixed interval between each command, the interval is 15ms~120ms , and the time for monitoring and waiting for a reply shall not be less than 120ms . When a rectifier module (such as the rectifier module with address 10) does not respond twice in a row, it is considered that the rectifier module does not exist, and continues to query the next module (such as the rectifier module with address 11) and also does not respond twice in a row , the query is stopped, and the number of rectifier modules can be determined to be 10 at the same time . After this process is over, the monitoring will no longer issue the 0x50 command.

Step 4

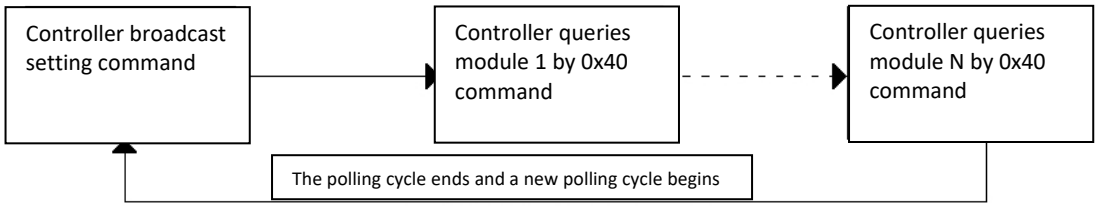
After obtaining the number of rectifier modules, the controller can query the real-time status information of each module according to the software address of the modules in ascending order, and the query command is 0x40 . This command is a polling command.

There is a fixed interval between each command, the interval is 30ms~140ms , and the monitoring waiting time for reply shall not be less than 140ms . If the monitoring responds correctly and completely within the interval time, the communication is normal; if the module N fails to respond correctly twice in a row, and it does so for two consecutive polling cycles, the controller generates a " controller and module N communication interruption alarm " .

Step 5

After the controller unit is powered on and the address of the rectifier module is reassigned each time, the controller will repeat the operations of steps 2 , 3 and 4 above.

The polling cycle for monitoring is as follows:



Step 6

Other settings and control commands of the controller are triggered by the parameter settings and control of the user interface.