

# Rectifier Module & Monitoring Unit CAN Communication Reference Guide

## 30KW DC Module

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## 1.0 CAN protocol specification

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
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# 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: Lower part 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
Group Address	Message Type	Command Type	Reserved		Command Data			

Group Address (0x01~0x09)	SetData - 0	Vout, - 0	0					
BroadCast - 0	SetDataResponse-1	Iout_slow, - 1						
	ReadData - 2	VoutReference, - 2						
	ReadDataResponse-3	IoutLimit, - 3						
		ShutDownDCDC, - 4						
		ModuleStatus, - 8						
		Vab, - 20						
		Vbc, - 21						
		Vca, - 22						
		Iout_fast, - 48						
		GroupAddress, - 89						
		HiMode_LoMode_Selection - 95						
		HiMode_LoMode_Status - 96						

### 1.2.1 Byte 0

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

1, Group Address

Group address range is 0x01~0x09, and 0x00 broadcasts to all groups;

2, Message Type

Message Type	Description
0x00	Set data
0x01	Set data response
0x02	Read data
0x03	Read data response

## 1.2.2 Byte 1 data

Command Type.

Command Type	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
8	Module status flag	R	N
20	Line voltage AB	R	N
21	Line voltage BC	R	N
22	Line voltage CA	R	N
89	Group address	R/W	Y
95	HiMode_LoMode_Selection	W	Y
96	HiMode_LoMode_Status	R	N

## 1.2.3 Bytes 2~3

Byte 2 and Byte 3 are reserved for future use and should be filled with 0.

## 1.2.4 Bytes 4-7

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

Byte 1 (Command Type) and Byte4~Byte7 ( Command Data ) are defined:

Command Type	Command Data description
0	Module output voltage,such as 543.321V = 543321mV, it is filled with an integer 543321
1	Module output current,such as 13.321A = 13321mA, it is filled with an integer 13321

2	Module output reference voltage, such as 543.321V = 543321mV, it is filled with an integer 543321
3	Module output current limit, such as 13.321A = 13321mA, it is filled with an integer 13321
4	Turn on/off power module (0 turn on, 1 turn off)
8	Module status flag
95	Set module high or low voltage mode 1: 1000V 2: 500V (Note: Only can be set successfully when the module is shut down)
96	Read module high or low voltage mode status 1: 1000V 2: 500V

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	Reserved	Reserved
Bit4	Reserved	Reserved
Bit5	Reserved	Reserved
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	Reserved	Reserved

Bit11	Reserved	Reserved	Reserved
Bit12	Over temperature protection	Over temperature (Ambient temperature)	1: abnormal 0: normal
Bit13	Reserved	Reserved	Reserved
Bit14	Over temperature protection	PFC over temperature protection 1	1: abnormal 0: normal
Bit15		PFC over-temperature protection 2	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	Reserved	Reserved	Reserved
Bit20	Module failure	PFC failure	1: abnormal 0: normal
Bit21		DCDC failure	1: abnormal 0: normal
Bit22	Reserved	Reserved	Reserved
Bit23	Reserved	Reserved	Reserved
Bit24	Reserved	Reserved	Reserved
Bit25	Module status	Module turn on/off	1: off 0: on
Bit26	Reserved	Reserved	Reserved
Bit27	Reserved	Reserved	Reserved
Bit28	Reserved	Reserved	Reserved
Bit29	Reserved	Reserved	Reserved
Bit30	Reserved	Reserved	Reserved
Bit31	Module failure	Bleeder Not Working	1: abnormal 0: normal



## 2.0 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 CAN frame 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	Monitor Address	Module Address	Production Date	Serial Number Lower Part
1	1	0x00	0x00	0x00

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	0x00	0x00	0x00	0x07	0x41	0x9E
						0x7419E		

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

If the power module receives the broadcast set command, it will execute the command but will not send back a 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 is shown below(The CAN ID 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	Monitor Address	Module Address	Production Date	Serial Number Lower Part
1	1	0x01	0x00	0x00

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	0x00	0x00	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 is as follows:

28:25	24:21	20:14	13:9	8:0
Protocol	Monitor Address	Module Address	Production Date	Serial Number Lower Part
1	1	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	0x00	0x00	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 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	0x00	0x00	0x00

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	0x00	0x00	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 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	0x01	0x00	0x00

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	0x00	0x00	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	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	0x03	0x00	0x00	0x00	0x00	0x29	0x04
					0x2904			

## 2.5 Read the output voltage of all modules

An example of a CAN frame 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	0x00	0x00	0x00

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	0x00	0x00	0x00	0x00	0x00	0x00

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	0xXX (address)	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	0x03	0x00	0x00	0x00				
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 is as follows(The CAN ID is 0x02204000,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	0x01	0x00	0x00

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

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	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	0x03	0x00	0x00	0x00				
					the voltage of the module			

## 2.7 Read the Output Current of All Modules

An example of a CAN frame 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	0x00	0x00	0x00

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	0x00	0x00	0x00	0x00	0x00	0x00

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	0xXX (address)	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	0x03	0x01	0x00	0x00				
					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 a CAN frame is as follows(The CAN ID is 0x02204000,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	0x01	0x00	0x00

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	0x00	0x00	0x00	0x00	0x00	0x00

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	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	0x03	0x01	0x00	0x00				
the current of the module								



## 2.9 Power on all modules

An example of a CAN frame is as follows(The CAN ID is 0x02200000,and the data field is 0x10 0x04 0x00 0x00 0x00 0x00 0x00 0x00 ):

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

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	0x00	0x00	0x00	0x00	0x00	0x00
					0x00			

The power module receives the broadcast set command, and it executes the command but does not send back a response.

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

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

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1	0x01	0x00	0x00

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	0x00	0x00	0x00	0x00	0x00	0x00
						0x00		

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	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	0x04	0x00	0x00	0x00	0x00	0x00	0x00
						0x00		

## 2.11 Shutdown All Modules

An example of a CAN frame 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	0x00	0x00	0x00

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	0x00	0x00	0x00	0x00	0x00	0x01
					0x01			

The power module receives the broadcast set command, and it executes the command but does not send back a response.

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

An example of a CAN frame 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	0x01	0x00	0x00

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	0x00	0x00	0x00	0x00	0x00	0x01
					0x01			

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	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	0x04	0x00	0x00	0x00	0x00	0x00	0x01
					0x01			

## 2.13 Read Status Flags of All Modules

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

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

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	0x00	0x00	0x00	0x00	0x00	0x00

The power modules receive a broadcast read 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	0xXX (address)	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	0x03	0x08	0x00	0x00				
the status flag of the module								

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

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

28:25	24:21	20:14	13:9	8:0
Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1	0x01	0x00	0x00

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	0x00	0x00	0x00	0x00	0x00	0x00

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	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	0x03	0x08	0x00	0x00				
the status flag of the module								

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

An example of a CAN frame is as follows,setting the module high voltage mode(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	0x01	0x00	0x00

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	0x00	0x00	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 a CAN frame is as follows, setting the module high voltage mode (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	0x01	0x00	0x00

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	0x00	0x00	0x00	0x00	0x00	0x00

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	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	0x03	0x60	0x00	0x00				
the low or high voltage status of the module								

## 2.17 Set the group address of module 1 (set the module 1 group address is 0x02).

The group address of the module 1 is set to 0x01, and the CAN frame is shown below (The CAN ID is 0x02204000, and the data field is 0x10 0x59 0x00 0x00 0x00 0x00 0x00 0x02):

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

Protocol	MonitorAddress	ModuleAddress	ProductionDate	SerialNumberLowerPart
1	1	0x01	0x00	0x00

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	0x59	0x00	0x00	0x00	0x00	0x00	0x02
						0x00000002		

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	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
0x02	0x01	0x59	0x00	0x00	0x00	0x00	0x00	0x02
						0x00000002		



## 3.0 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 Reserved_3:1;    // 3
    Uint16 Reserved_4:1;    // 4
    Uint16 Reserved_5:1;    // 5
    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 Reserved_10:1;   // 10
    Uint16 Reserved_11:1;   // 11
    Uint16 AmbientOT:1;     // 12 ambient temperature over temperature protection
    Uint16 Reserved_13:1;   // 13
    Uint16 Pfc1_OT:1;       // 14 PFC over temperature protection 1
    Uint16 Pfc2_OT:1;       // 15 PFC over temperature protection 2
    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 Reserved_19:1;   // 19
    Uint16 PfcFail:1;       // 20 PFC fault
    Uint16 DcdcFail:1;      // 21 DCDC failure
    Uint16 Reserved_22:1;   // 22
    Uint16 Reserved_23:1;   // 23
    Uint16 Reserved_24:1;   // 24
    Uint16 DcdcNotRun:1;    // 25 power on / off
    Uint16 Reserved_2627:2; // 26:27
    Uint16 Reserved_28:1;   // 28
    Uint16 Reserved_29:1;   // 29
    Uint16 Reserved_30:1;   // 30
    Uint16 BleederNotWork:1; // 31 Bleeder Not Work
};

```

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