HMC6

POWER MANAGEMENT CONTROLLER

COMMUNICATION PROTOCOL

SMARTGEN (ZHENGZHOU) TECHNOLOGY CO., LTD.

Chinese trademark

English trademark

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Table 1 - Software Version

Date	Version	Note
2017-06-16	V1.0	Original release.
2018-03-31	V2.0	Add some data address.
2020-05-20	V2.1	Add user-defined mapping data field, some warning and data addresses.
2020-06-12	V2.2	Add some shaft data.
2021-08-13	V2.3	Add 05 function code address.

CONTENT

1. INTRODUCTION

This protocol describes read and write command format of PC serial port and the definition of internal information data for the third-party to develop and use.

MODBUS communication protocol allows the module to transfer information and data effectively with PLC, RTU, SCADA system of international brands (such as, Schneider, Siemens, and Modicon), and DCS or third-party monitoring system compatible with MODBUS. The monitoring system can be set up if only adding central communication master software (such as Kingview, Intouch, FIX, Synal) basing on PC (or IPC).

2. MODBUS BASIC RULES

— All RS232 communication loops should follow the master-slave mode. If so, data can be transferred between a master (e.g. PC) and 32 slaves.

— The master will initialize all messages sent from RS232 communication loops of the device.

— No communication can start from slaves.

— In RS232 communication loop, all communication should be transmitted in "information frame".

— If received information frame contains unknown command, no response will be given.

3. DATA FRAME FORMAT

Communication is asynchronously transferred, using byte (data frame) as unit., every transmitted data frame is 11-bit serial data stream between master and slave.

Table 2 - Data Frame Format

Item	Description
Baud rate	9600
Start bit	1-bit
Data bit	8-bit
Parity bit	No parity
Stop bit	2-bit

4. COMMUNICATION PROTOCOL

4.1 ILLUSTRATION

When communication command is sent to the slave, corresponding slave receives the communication command, then removes address code, and read the information. If no mistakes, it will execute commands, and send the result back to the master. Response information includes address code, function code, data and error check code (CRC). If an error occurs in receipt of the command, it will send no information.

4.2 INFORMATION FRAME FORMAT

Table 3 - Information Frame Format

Initiating Structure	Address Code	Function Code	Data Field	CRC	End Structure
Delay (equivalent to 4 bytes)	1 byte 8-bit	1 byte 8-bit	N bytes N*8-bit	2 bytes 16-bit	Delay (equivalent to 4 bytes)

4.3 ADDRESS CODE

Address code is the first data frame (8-bit) in each transmitted information frame (from 0-255). Single device address range is 1-247; this byte shows that the slave defined by users will receive the information sent by the master. Each slave has a unique address code, and responses begin with the address code. A master addresses a slave by placing the slave address in the address field of the message. When the slave sends its response, it places its own address in this address field of the response to let the master know which slave is responding.

4.4 FUNCTION CODE

4.4.1 ILLUSTRATION

This is the second byte of each transmission. ModBus communication protocol defined function code as 1-255 (01H-0FFH). HMC6 controller uses part of it. Master sends the request and the slave executes actions according to the function code. If the function code sent by slave is same as that sent by master, it means the response is active. But if the function code MSB is 1 (function code range>127), it means there is no response or response has error.

The following table shows the specific signification and operation of function code.

Table 4 - ModBus Partial Function Codes

Function Code	Definition	Operation
03H	Read Registers	Read one or multiple registers data
05H	Place Single Coil	Place single coil

4.4.2 03H READ REGISTERS

With function code 03H command, the master can read the numerical registers inside the device (numerical registers contains various analogs and parameter setting values). Input register values of function code 03H mapping data field are 16 bits (2 bytes). So, from the device reads registers values are 2 bytes. Maximum number of readable registers is 125 each time.

The slave received command format is slave address, function code, data field and the CRC code. The data of data field is in double bytes with every two bytes for a group, and high byte is in advance.

4.4.3 05H PLACE SINGLE COIL

With this command master can store single coil data to bit registers (e.g. ATS transfer control). Slave also can respond information to the master with this command.

4.5 DATA FIELD

4.5.1 ILLUSTRATION

Data field varies with different function codes.

4.5.2 CORRESPONDING DATA FIELD FORMAT TO FUNCTION CODE 03H

Table 5 - Master Request

Data Sequence	Data Signification	Byte Count
1	Starting address	2
2	Read registers	2

Table 6 - Slave Response

Data Sequence	Data Signification	Byte Count
1	Loopback byte count	1
2	N - register data	N*2

4.5.3 CORRESPONDING DATA FIELD FORMAT TO FUNCTION CODE 05H

Table 7 - Master Request

Data Sequence	Data Signification	Byte Count
1	Coil address	2
2	Forced single coil	2

Table 8 - Slave Response

Data Sequence	Data Signification	Byte Count
1	Coil address	2
2	Single coil value	2

4.6 ERROR CHECK CODE (CRC)

The Error Check Code allows master or slave to detect whether the received information has errors. Sometimes, the transmission information occurs imperceptible changes due to electronic noise and other interference, the CRC code ensures that the error information does not work, thus increasing the system's safety and efficiency. CRC adapts CRC-16 method of calibration.

When the CRC is appended to the message, the low-order byte is appended first, followed by the high-order byte.

⚠NOTE: All information frame formats are same: address code, function code, data field and CRC code.

The CRC field is two bytes, containing a 16-bit binary value. The CRC code is calculated by the transmitting device, which appends the CRC to the message. The receiving device recalculates a CRC during receipt of the message, and compares the calculated value to the actual value that received in the CRC field. If the two values are not equal, an error will result.

The CRC is started by first preloading a 16-bit register to all 1's. Then a process begins of applying successive 8-bit message to the current contents of the register. Only the eight bits of data in each character are used for generating the CRC. Start and stop bits do not apply to the CRC.

During generation of the CRC, each 8-bit character is exclusive OR with the register contents. Then the result is shifted in the direction of the least significant bit (LSB), with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB was 1, the register is then exclusive OR with a preset, fixed value. If the LSB was 0, no exclusive OR takes place.

This process is repeated until eight shifts have been performed. After the last (eighth) shift, the next 8-bit byte is exclusive OR with the register's current value, and the process repeats for eight more shifts as described above. The final contents of the register, after all the bytes of the message have been applied, is the CRC value.

CRC-16 CALCULATION PROCEDURE

1) Load a 16-bit register with FFFF hex;
2) Exclusive OR the first 8-bit message with the low-order byte of the CRC register, putting the result in the CRC register;
3) Shift the CRC register one bit to the right (toward the LSB), zero-filling the MSB. Extract and examine the LSB;
4) (If the LSB was 0): Repeat Step 3 (another shift);
5) (If the LSB was 1): Exclusive OR the CRC register with the A001 hex;
6) Repeat Steps 3 and 4 until 8 shifts have been performed. When this is done, a complete 8-bit data will have been processed;
7) Repeat Steps 2 through 5 for the next data processing;
8) The final contents of the CRC register are the CRC value. Least Significant Byte first. When the 16-bit CRC (two 8-bit bytes) is transmitted in the message, the low-order byte will be transmitted first, followed by the high-order byte.

⚠**NOTE: The calculating of CRC code starts from <slave address> and except for all bytes of <CRC code>.**

4.7 EXAMPLES OF INFORMATION FRAME FORMAT

4.7.1 FUNCTION CODE 03H

Take 03H as an example, slave address is 01 and starting address is 3 points of 0026H.

Table 9 - Point Data Address

Address	Data (Hex)
0026	0014
0027	0014
0028	0005

Table 10 - Master Request

Request	Bytes	Example (Hex)	
Slave address	1	01	Send to slave 01
Function code	1	03	Read point registers
Starting address	0	00 26	Starting address is 0026
Count number	2	00 03	Read 3 points (total 6 bytes)
CRC code	2	E4 00	CRC code which calculated by PC

Table 11 - Slave Response

Response	Bytes	Example (Hex)	
Slave address	1	01	Respond slave address 01
Function code	1	03	Read point registers
Read count	1	06	3 points (total 6 bytes)
Point 1 data	2	00 14	The content of address 0026
Point 2 data	2	00 14	The content of address 0027
Point 3 data	2	00 05	The content of address 0028
CRC code	2	91 71	CRC code which calculated by slave.

4.7.2 FUNCTION CODE 05H

Slave address is 01 and starting address is 1 coil of 0002H. Place 0002 unit as 1.

Table 12 - Coil Data Address

Address	Data (Hex)
0000	0
0001	0
0002	0

⚠**NOTE: Forced coil of FF00 hex is 1 and 000H is 0. Other values are illegal and will not affect the coil status.**

Table 13 - Master Request

Request	Bytes	Example (Hex)	
Slave address	1	01	Send slave address 01
Function code	1	05	Forced coil
Starting address	2	00 02	Starting address is 0002
Data	2	FF 00	Set coil as 1
CRC code	2	2D FA	CRC code which calculated by PC.

Table 14 - Slave Response

Slave Response	Bytes	Example (Hex)	
Slave address	1	01	Respond slave address 01
Function code	1	05	Forced coil
Starting address	2	00 02	Starting address is 0002
Data	2	FF 00	Set coil as 1
CRC code	2	2D FA	CRC code which calculated by slave.

4.8 ERROR HANDLING

When device detects other errors except the CRC code, the slave must send information to the master. The function code MSB is 1, which means the response function code by slave should add 128 based on the function code. The following codes show that unexpected errors have occurred.

CRC error received from the master will be ignored by the device.

Table 15 - Error Code Format of Slave Response (CRC excluded):

Item	Byte
Address code	1 byte
Function code	1 byte (MSB is 1)
Error code	1 byte
CRC code	2 bytes

Error code:

01 illegal function code

The function code received in the query is not an allowable action for the slave.

02 illegal data address

The data address received in the query is not an allowable address for the slave.

03 illegal data value

A value contained in the query data field is not an allowable value for the slave.

5. ATTACHMENT: ADDRESS AND DATA

5.1 FUNCTION CODE 03H MAPPING DATA FIELD

Table 16 - Function Code 03H Mapping Data Field

Address	Item	Description	Bytes
0000	Common Alarm	1 for active (LSB)	1bit
	Common Warning Alarm	1 for active	1bit
	Common Trip and Stop Alarm	1 for active	1bit
	Common Trip Alarm	1 for active	1bit
	Common Block Alarm	1 for active	1bit
	Common Warning Response Bit	1 for active	1bit
	Common Trip and Stop Response Bit	1 for active	1bit
	Common Trip Response Bit	1 for active	1bit
	Common Block Response Bit	1 for active	1bit
	System in Auto Mode	1 for active	1bit
	System in Semi-Auto Mode	1 for active	1bit
	System in Manual Mode	1 for active	1bit
	Common Alarm Response Bit	1 for active	1bit
	Light Load Mode	1 for active	1bit
	Fixed Power Mode	1 for active	1bit
	Safe Mode	1 for active	1bit
0001	Inhibit Start Input	1 for active	1bit
	Override Mode	1 for active	1bit
	Common Safety Trip and Stop	1 for active	1bit
	Common Safety Trip	1 for active	1bit
	Common Safety Trip and Stop Response	1 for active	1bit
	Common Safety Trip Response	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0002	Busbar Overvolt 1 Trip and Stop	1 for active	1bit
	Busbar Overvolt 2 Trip and Stop	1 for active	1bit
	Busbar Overvolt 3 Trip and Stop	1 for active	1bit
	Busbar Undervolt 1 Trip and Stop	1 for active	1bit
	Busbar Undervolt 2 Trip and Stop	1 for active	1bit
	Busbar Undervolt 3 Trip and Stop	1 for active	1bit

Address	Item	Description	Bytes
	Busbar Overfrequency 1 Trip and Stop	1 for active	1bit
	Busbar Overfrequency 2 Trip and Stop	1 for active	1bit
	Busbar Overfrequency 3 Trip and Stop	1 for active	1bit
	Busbar Underfrequency 1 Trip and Stop	1 for active	1bit
	Busbar Underfrequency 2 Trip and Stop	1 for active	1bit
	Busbar Underfrequency 3 Trip and Stop	1 for active	1bit
	Gen. Overvolt 1 Trip and Stop	1 for active	1bit
	Gen. Overvolt 2 Trip and Stop	1 for active	1bit
	Gen. Undervolt 1 Trip and Stop	1 for active	1bit
	Gen. Undervolt 2 Trip and Stop	1 for active	1bit
0003	Gen. Undervolt 3 Trip and Stop	1 for active	1bit
	Gen. Overfrequency 1 Trip and Stop	1 for active	1bit
	Gen. Overfrequency 2 Trip and Stop	1 for active	1bit
	Gen. Overfrequency 3 Trip and Stop	1 for active	1bit
	Gen. Underfrequency 1 Trip and Stop	1 for active	1bit
	Gen. Underfrequency 2 Trip and Stop	1 for active	1bit
	Gen. Underfrequency 3 Trip and Stop	1 for active	1bit
	Overcurrent 1 Trip and Stop	1 for active	1bit
	Overcurrent 2 Trip and Stop	1 for active	1bit
	Overcurrent 3 Trip and Stop	1 for active	1bit
	Overcurrent 4 Trip and Stop	1 for active	1bit
	Gen. ROCOF	1 for active	1bit
	Rapid Overcurrent 2 Trip and Stop	1 for active	1bit
	Reverse Power 1 Trip and Stop	1 for active	1bit
	Reverse Power 2 Trip and Stop	1 for active	1bit
	Overpower 1 Trip and Stop	1 for active	1bit
0004	Overpower 2 Trip and Stop	1 for active	1bit
	Reverse Phase Sequence Trip and Stop	1 for active	1bit
	Fail to Close Trip and Stop	1 for active	1bit
	Fail to Open Trip and Stop	1 for active	1bit
	Fail to Sync Trip and Stop	1 for active	1bit
	Zero Sequence Current Trip and Stop	1 for active	1bit
	Unbalanced Current Trip and Stop	1 for active	1bit
	MSC Too Few Sets Trip and Stop	1 for active	1bit
	Loss of Excitation Alarm Shutdown	1 for active	1bit
	Input 1 Trip and Stop	1 for active	1bit
	Input 2 Trip and Stop	1 for active	1bit
	Input 3 Trip and Stop	1 for active	1bit
	Input 4 Trip and Stop	1 for active	1bit
	Input 5 Trip and Stop	1 for active	1bit
	Input 6 Trip and Stop	1 for active	1bit
	Input 7 Trip and Stop	1 for active	1bit
0005	Input 8 Trip and Stop	1 for active	1bit

Address	Item	Description	Bytes
	Input 9 Trip and Stop	1 for active	1bit
	Busbar ROCOF	1 for active	1bit
	Busbar Vector Shift	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0006	Exp. Input Module1 Input 1 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 2 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 3 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 4 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 5 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 6 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 7 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 8 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 9 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 10 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 11 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 12 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 13 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 14 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 15 Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 16 Trip and Stop	1 for active	1bit
0007	Exp. Input Module2 Input 1 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 2 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 3 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 4 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 5 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 6 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 7 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 8 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 9 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 10 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 11 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 12 Trip and Stop	1 for active	1bit

Address	Item	Description	Bytes
	Exp. Input Module2 Input 13 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 14 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 15 Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 16 Trip and Stop	1 for active	1bit
0008	Exp. Input Module 1 Comm. Fail Trip and Stop	1 for active	1bit
	Exp. Input Module 2 Comm. Fail Trip and Stop	1 for active	1bit
	Exp. Output Module 1 Comm. Fail Trip and Stop	1 for active	1bit
	Exp. Output Module 2 Comm. Fail Trip and Stop	1 for active	1bit
	Exp. Display Module 1 Comm. Fail Trip and Stop	1 for active	1bit
	Exp. Display Module 2 Comm. Fail Trip and Stop	1 for active	1bit
	Loss of Phase Trip and Stop	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Fault	1 for active	1bit
	MSC Too Few Sets Trip and Stop	1 for active	1bit
	External Short Circuit Trip and Stop	1 for active	1bit
	Emergency Trip and Stop	1 for active	1bit
	Reserved	1 for active	1bit
0009	PLC FLAG 1 Trip and Stop	1 for active	1bit
	PLC FLAG 2 Trip and Stop	1 for active	1bit
	PLC FLAG 3 Trip and Stop	1 for active	1bit
	PLC FLAG 4 Trip and Stop	1 for active	1bit
	PLC FLAG 5 Trip and Stop	1 for active	1bit
	PLC FLAG 6 Trip and Stop	1 for active	1bit
	PLC FLAG 7 Trip and Stop	1 for active	1bit
	PLC FLAG 8 Trip and Stop	1 for active	1bit
	PLC FLAG 9 Trip and Stop	1 for active	1bit
	PLC FLAG 10 Trip and Stop	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0010	Busbar Overvolt 1 Trip	1 for active	1bit
	Busbar Overvolt 2 Trip	1 for active	1bit
	Busbar Overvolt 3 Trip	1 for active	1bit
	Busbar Undervolt 1 Trip	1 for active	1bit
	Busbar Undervolt 2 Trip	1 for active	1bit
	Busbar Undervolt 3 Trip	1 for active	1bit
	Busbar Overfrequency 1 Trip	1 for active	1bit

Address	Item	Description	Bytes
	Busbar Overfrequency 2 Trip	1 for active	1bit
	Busbar Overfrequency 3 Trip	1 for active	1bit
	Busbar Underfrequency 1 Trip	1 for active	1bit
	Busbar Underfrequency 2 Trip	1 for active	1bit
	Busbar Underfrequency 3 Trip	1 for active	1bit
	Gen. Overvolt 1 Trip	1 for active	1bit
	Gen. Overvolt 2 Trip	1 for active	1bit
	Gen. Undervolt 1 Trip	1 for active	1bit
	Gen. Undervolt 2 Trip	1 for active	1bit
0011	Gen. Undervolt 3 Trip	1 for active	
	Gen. Overfrequency 1 Trip	1 for active	1bit
	Gen. Overfrequency 2 Trip	1 for active	1bit
	Gen. Overfrequency 3 Trip	1 for active	1bit
	Gen Underfrequency 1 Trip	1 for active	1bit
	Gen Underfrequency 2 Trip	1 for active	1bit
	Gen Underfrequency 3 Trip	1 for active	1bit
	Overcurrent 1 Trip	1 for active	1bit
	Overcurrent 2 Trip	1 for active	1bit
	Overcurrent 3 Trip	1 for active	1bit
	Overcurrent 4 Trip	1 for active	1bit
	Gen. ROCOF	1 for active	1bit
	Rapid Overcurrent 2 Trip	1 for active	1bit
	Reverse Power 1 Trip	1 for active	1bit
	Reverse Power 2 Trip	1 for active	1bit
	Over Power 1 Trip	1 for active	1bit
0012	Over Power 2 Trip	1 for active	1bit
	Reverse Phase Sequence Trip	1 for active	1bit
	Fail to Close Trip	1 for active	1bit
	Fail to Open Trip	1 for active	1bit
	Fail to Sync Trip	1 for active	1bit
	Zero Sequence Current Trip	1 for active	1bit
	Unbalanced Current Trip	1 for active	1bit
	MSC ID Error Trip	1 for active	1bit
	Loss of Excitation Trip	1 for active	1bit
	Input 1 Trip	1 for active	1bit
	Input 2 Trip	1 for active	1bit
	Input 3 Trip	1 for active	1bit
	Input4 Trip	1 for active	1bit
	Input 5 Trip	1 for active	1bit
	Input 6 Trip	1 for active	1bit
	Input 7 Trip	1 for active	1bit
0013	Input 8 Trip	1 for active	1bit
	Input 9 Trip	1 for active	1bit

Address	Item	Description	Bytes
	Busbar ROCOF	1 for active	1bit
	Busbar Vector Shift	1 for active	1bit
	NEL 1 Trip	1 for active	1bit
	NEL 2 Trip	1 for active	1bit
	NEL 3 Trip	1 for active	1bit
	PLC FLAG 1 Trip	1 for active	1bit
	PLC FLAG 2 Trip	1 for active	1bit
	PLC FLAG 3 Trip	1 for active	1bit
	PLC FLAG 4 Trip	1 for active	1bit
	PLC FLAG 5 Trip	1 for active	1bit
	PLC FLAG 6 Trip	1 for active	1bit
	PLC FLAG 7 Trip	1 for active	1bit
	PLC FLAG 8 Trip	1 for active	1bit
	PLC FLAG 9 Trip	1 for active	1bit
0014	Exp. Input Module1 Input 1 Trip	1 for active	1bit
	Exp. Input Module1 Input 2 Trip	1 for active	1bit
	Exp. Input Module1 Input 3 Trip	1 for active	1bit
	Exp. Input Module1 Input 4 Trip	1 for active	1bit
	Exp. Input Module1 Input 5 Trip	1 for active	1bit
	Exp. Input Module1 Input 6 Trip	1 for active	1bit
	Exp. Input Module1 Input 7 Trip	1 for active	1bit
	Exp. Input Module1 Input 8 Trip	1 for active	1bit
	Exp. Input Module1 Input 9 Trip	1 for active	1bit
	Exp. Input Module1 Input 10 Trip	1 for active	1bit
	Exp. Input Module1 Input 11 Trip	1 for active	1bit
	Exp. Input Module1 Input 12 Trip	1 for active	1bit
	Exp. Input Module1 Input 13 Trip	1 for active	1bit
	Exp. Input Module1 Input 14 Trip	1 for active	1bit
	Exp. Input Module1 Input 15 Trip	1 for active	1bit
	Exp. Input Module1 Input 16 Trip	1 for active	1bit
0015	Exp. Input Module2 Input 1 Trip	1 for active	1bit
	Exp. Input Module2 Input 2 Trip	1 for active	1bit
	Exp. Input Module2 Input 3 Trip	1 for active	1bit
	Exp. Input Module2 Input 4 Trip	1 for active	1bit
	Exp. Input Module2 Input 5 Trip	1 for active	1bit
	Exp. Input Module2 Input 6 Trip	1 for active	1bit
	Exp. Input Module2 Input 7 Trip	1 for active	1bit
	Exp. Input Module2 Input 8 Trip	1 for active	1bit
	Exp. Input Module2 Input 9 Trip	1 for active	1bit
	Exp. Input Module2 Input 10 Trip	1 for active	1bit
	Exp. Input Module2 Input 11 Trip	1 for active	1bit
	Exp. Input Module2 Input 12 Trip	1 for active	1bit
	Exp. Input Module2 Input 13 Trip	1 for active	1bit

Address	Item	Description	Bytes
	Exp. Input Module2 Input 14 Trip	1 for active	1bit
	Exp. Input Module2 Input 15 Trip	1 for active	1bit
	Exp. Input Module2 Input 16 Trip	1 for active	1bit
0016	Exp. Input Module 1 Comm. Fail Trip	1 for active	1bit
	Exp. Input Module 2 Comm. Fail Trip	1 for active	1bit
	Exp. Output Module 1 Comm. Fail Trip	1 for active	1bit
	Exp. Output Module 2 Comm. Fail Trip	1 for active	1bit
	Exp. Display Module 1 Comm. Fail Trip	1 for active	1bit
	Exp. Display Module 2 Comm. Fail Trip	1 for active	1bit
	Loss of Phase Trip	1 for active	1bit
	PLC FLAG 10 Trip	1 for active	1bit
	Main Switch Abnormal Trip	1 for active	1bit
	Main Switch External Open	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Fault	1 for active	1bit
	MSC Too Few Sets Trip	1 for active	1bit
	External Short Circuit Trip	1 for active	1bit
	Emergency Trip	1 for active	1bit
	Reserved	1 for active	1bit
0017	Busbar Overvolt 1 Warning	1 for active	1bit
	Busbar Overvolt 2 Warning	1 for active	1bit
	Busbar Overvolt 3 Warning	1 for active	1bit
	Busbar Undervolt 1 Warning	1 for active	1bit
	Busbar Undervolt 2 Warning	1 for active	1bit
	Busbar Undervolt 3 Warning	1 for active	1bit
	Busbar Overfrequency 1 Warning	1 for active	1bit
	Busbar Overfrequency 2 Warning	1 for active	1bit
	Busbar Overfrequency 3 Warning	1 for active	1bit
	Busbar Underfrequency 1 Warning	1 for active	1bit
	Busbar Underfrequency 2 Warning	1 for active	1bit
	Busbar Underfrequency 3 Warning	1 for active	1bit
	Gen. Overvolt 1 Warning	1 for active	1bit
	Gen. Overvolt 2 Warning	1 for active	1bit
	Gen. Undervolt 1 Warning	1 for active	1bit
	Gen. Undervolt 2 Warning	1 for active	1bit
0018	Gen. Undervolt 3 Warning	1 for active	1bit
	Gen. Overfrequency 1 Warning	1 for active	1bit
	Gen. Overfrequency 2 Warning	1 for active	1bit
	Gen. Overfrequency 3 Warning	1 for active	1bit
	Gen. Underfrequency 1 Warning	1 for active	1bit
	Gen. Underfrequency 2 Warning	1 for active	1bit
	Gen. Underfrequency 3 Warning	1 for active	1bit
	Overcurrent 1 Warning	1 for active	1bit

Address	Item	Description	Bytes
	Overcurrent 2 Warning	1 for active	1bit
	Overcurrent 3 Warning	1 for active	1bit
	Overcurrent 4 Warning	1 for active	1bit
	Gen. ROCOF	1 for active	1bit
	Rapid Overcurrent 2 Warning	1 for active	1bit
	Reverse Power 1 Warning	1 for active	1bit
	Reverse Power 2 Warning	1 for active	1bit
	Over Power 1 Warning	1 for active	1bit
0019	Over Power 2 Warning	1 for active	1bit
	Reverse Phase Sequence Warning	1 for active	1bit
	Fail to Close Warning	1 for active	1bit
	Fail to Open Warning	1 for active	1bit
	Fail to Sync Warning	1 for active	1bit
	Zero Sequence Current Warning	1 for active	1bit
	Unbalanced Current Warning	1 for active	1bit
	MSC ID Error Warning	1 for active	1bit
	Loss of Excitation Warning	1 for active	1bit
	Input 1 Warning	1 for active	1bit
	Input 2 Warning	1 for active	1bit
	Input 3 Warning	1 for active	1bit
	Input 4 Warning	1 for active	1bit
	Input 5 Warning	1 for active	1bit
	Input 6 Warning	1 for active	1bit
	Input 7 Warning	1 for active	1bit
0020	Input 8 Warning	1 for active	1bit
	Input 9 Warning	1 for active	1bit
	Input 10 Warning	1 for active	1bit
	Input 11 Warning	1 for active	1bit
	NEL 1 Trip	1 for active	1bit
	NEL 2 Trip	1 for active	1bit
	NEL 3 Trip	1 for active	1bit
	Unbalanced Distribution of Active Power	1 for active	1bit
	Unbalanced Distribution of Reactive Power	1 for active	1bit
	Busbar Breakdown Feedback Fault	1 for active	1bit
	Engine Fault	1 for active	1bit
	SG and DG Parallel Over Limit	1 for active	1bit
	Insuffcient SG Capacity	1 for active	1bit
	Insuffcient DG Capacity	1 for active	1bit
	SG and DG Grid Connection Time out	1 for active	1bit
	SG Solenoid Valve Fault	1 for active	1bit
0021	Exp. Input Module1 Input 1 Warning	1 for active	1bit
	Exp. Input Module1 Input 2 Warning	1 for active	1bit
	Exp. Input Module1 Input 3 Warning		

Address	Item	Description	Bytes
	Exp. Input Module1 Input 4 Warning	1 for active	1bit
	Exp. Input Module1 Input 5 Warning	1 for active	1bit
	Exp. Input Module1 Input 6 Warning	1 for active	1bit
	Exp. Input Module1 Input 7 Warning	1 for active	1bit
	Exp. Input Module1 Input 8 Warning	1 for active	1bit
	Exp. Input Module1 Input 9 Warning	1 for active	1bit
	Exp. Input Module1 Input 10 Warning	1 for active	1bit
	Exp. Input Module1 Input 11 Warning	1 for active	1bit
	Exp. Input Module1 Input 12 Warning	1 for active	1bit
	Exp. Input Module1 Input 13 Warning	1 for active	1bit
	Exp. Input Module1 Input 14 Warning	1 for active	1bit
	Exp. Input Module1 Input 15 Warning	1 for active	1bit
	Exp. Input Module1 Input 16 Warning	1 for active	1bit
0022	Exp. Input Module2 Input 1 Warning	1 for active	1bit
	Exp. Input Module2 Input 2 Warning	1 for active	1bit
	Exp. Input Module2 Input 3 Warning	1 for active	1bit
	Exp. Input Module2 Input 4 Warning	1 for active	1bit
	Exp. Input Module2 Input 5 Warning	1 for active	1bit
	Exp. Input Module2 Input 6 Warning	1 for active	1bit
	Exp. Input Module2 Input 7 Warning	1 for active	1bit
	Exp. Input Module2 Input 8 Warning	1 for active	1bit
	Exp. Input Module2 Input 9 Warning	1 for active	1bit
	Exp. Input Module2 Input 10 Warning	1 for active	1bit
	Exp. Input Module2 Input 11 Warning	1 for active	1bit
	Exp. Input Module2 Input 12 Warning	1 for active	1bit
	Exp. Input Module2 Input 13 Warning	1 for active	1bit
	Exp. Input Module2 Input 14 Warning	1 for active	1bit
	Exp. Input Module2 Input 15 Warning	1 for active	1bit
	Exp. Input Module2 Input 16 Warning	1 for active	1bit
0023	Exp. Input Module 1 Comm. Fail Warning	1 for active	1bit
	Exp. Input Module 2 Comm. Fail Warning	1 for active	1bit
	Exp. Output Module 1 Comm. Fail Warning	1 for active	1bit
	Exp. Output Module 2 Comm. Fail Warning	1 for active	1bit
	Exp. Display Module 1 Comm. Fail Warning	1 for active	1bit
	Exp. Display Module 2 Comm. Fail Warning	1 for active	1bit
	Loss of Phase Warning	1 for active	1bit
	Power Overvolt Warning	1 for active	1bit
	Power Undervolt Warning	1 for active	1bit
	Frequency Error Warning	1 for active	1bit
	No Running Feedback Fault Warning	1 for active	1bit
	Fail to Stop	1 for active	1bit
	MSC Too Few Sets Warning	1 for active	1bit
	Unload Fail Warning	1 for active	1bit

Address	Item	Description	Bytes
	HMC6000 Communication Fail	1 for active	1bit
	Reserved	1 for active	1bit
0024	PLC FLAG 1 Warning	Reserved	2 bytes
	PLC FLAG 2 Warning	1 for active	1bit
	PLC FLAG 3 Warning	1 for active	1bit
	PLC FLAG 4 Warning	1 for active	1bit
	PLC FLAG 5 Warning	1 for active	1bit
	PLC FLAG 6 Warning	1 for active	1bit
	PLC FLAG 7 Warning	1 for active	1bit
	PLC FLAG 8 Warning	1 for active	1bit
	PLC FLAG 9 Warning	1 for active	1bit
	PLC FLAG 10 Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	HMP300 Communication Fail	1 for active	1bit
	Insufficient Generation Capacity	1 for active	1bit
0025	Busbar Overvolt 1 Block	1 for active	1bit
	Busbar Overvolt 2 Block	1 for active	1bit
	Busbar Overvolt 3 Block	1 for active	1bit
	Busbar Undervolt 1 Block	1 for active	1bit
	Busbar Undervolt 2 Block	1 for active	1bit
	Busbar Undervolt 3 Block	1 for active	1bit
	Busbar Overfrequency 1 Block	1 for active	1bit
	Busbar Overfrequency 2 Block	1 for active	1bit
	Busbar Overfrequency 3 Block	1 for active	1bit
	Busbar Underfrequency 1 Block	1 for active	1bit
	Busbar Underfrequency 2 Block	1 for active	1bit
	Busbar Underfrequency 3 Block	1 for active	1bit
	Gen. Overvolt 1 Block	1 for active	1bit
	Gen. Overvolt 2 Block	1 for active	1bit
	Gen. Undervolt 1 Block	1 for active	1bit
	Gen. Undervolt 2 Block	1 for active	1bit
0026	Gen. Undervolt 3 Block	1 for active	1bit
	Gen. Overfrequency 1 Block	1 for active	1bit
	Gen. Overfrequency 2 Block	1 for active	1bit
	Gen. Overfrequency 3 Block	1 for active	1bit
	Gen. Underfrequency 1 Block	1 for active	1bit
	Gen. Underfrequency 2 Block	1 for active	1bit
	Gen. Underfrequency 3 Block	1 for active	1bit
	Overcurrent 1 Block	1 for active	1bit
	Overcurrent 2 Block	1 for active	1bit

Address	Item	Description	Bytes
	Overcurrent 3 Block	1 for active	1bit
	Overcurrent 4 Block	1 for active	1bit
	Gen. ROCOF	1 for active	1bit
	Rapid Overcurrent 2 Block	1 for active	1bit
	Reverse Power 1 Block	1 for active	1bit
	Reverse Power 2 Block	1 for active	1bit
	Over Power 1 Block	1 for active	1bit
0027	Over Power 2 Block	1 for active	1bit
	Reverse Phase Sequence Block	1 for active	1bit
	Fail to Close Block	1 for active	1bit
	Fail to Open Block	1 for active	1bit
	Fail to Sync Block	1 for active	1bit
	Zero Sequence Current Block	1 for active	1bit
	Unbalanced Current Block	1 for active	1bit
	MSC ID Error Block	1 for active	1bit
	Loss of Excitation Block	1 for active	1bit
	Input 1 Block	1 for active	1bit
	Input 2 Block	1 for active	1bit
	Input 3 Block	1 for active	1bit
	Input 4 Block	1 for active	1bit
	Input 5 Block	1 for active	1bit
	Input 6 Block	1 for active	1bit
	Input 7 Block	1 for active	1bit
0028	Input 8 Block	1 for active	1bit
	Input 9 Block	1 for active	1bit
	Input 10 Block	1 for active	1bit
	Input 11 Block	1 for active	1bit
	Busbar ROCOF	1 for active	1bit
	Busbar Vector Shift	1 for active	1bit
	Fail to Start Block	1 for active	1bit
	Busbar Input Fault Block	1 for active	1bit
	Frequency/Voltage Fault Block	1 for active	1bit
	PLC FALG 1 Block	1 for active	1bit
	PLC FALG 2 Block	1 for active	1bit
	PLC FALG 3 Block	1 for active	1bit
	PLC FALG 4 Block	1 for active	1bit
	PLC FALG 5 Block	1 for active	1bit
	PLC FALG 6 Block	1 for active	1bit
	PLC FALG 7 Block	1 for active	1bit
0029	Exp. Input Module1 Input 1 Block	1 for active	1bit
	Exp. Input Module1 Input 2 Block	1 for active	1bit
	Exp. Input Module1 Input 3 Block	1 for active	1bit
	Exp. Input Module1 Input 4 Block	1 for active	1bit

Address	Item	Description	Bytes
	Exp. Input Module1 Input 5 Block	1 for active	1bit
	Exp. Input Module1 Input 6 Block	1 for active	1bit
	Exp. Input Module1 Input 7 Block	1 for active	1bit
	Exp. Input Module1 Input 8 Block	1 for active	1bit
	Exp. Input Module1 Input 9 Block	1 for active	1bit
	Exp. Input Module1 Input 10 Block	1 for active	1bit
	Exp. Input Module1 Input 11 Block	1 for active	1bit
	Exp. Input Module1 Input 12 Block	1 for active	1bit
	Exp. Input Module1 Input 13 Block	1 for active	1bit
	Exp. Input Module1 Input 14 Block	1 for active	1bit
	Exp. Input Module1 Input 15 Block	1 for active	1bit
	Exp. Input Module1 Input 16 Block	1 for active	1bit
0030	Exp. Input Module2 Input 1 Block	1 for active	1bit
	Exp. Input Module2 Input 2 Block	1 for active	1bit
	Exp. Input Module2 Input 3 Block	1 for active	1bit
	Exp. Input Module2 Input 4 Block	1 for active	1bit
	Exp. Input Module2 Input 5 Block	1 for active	1bit
	Exp. Input Module2 Input 6 Block	1 for active	1bit
	Exp. Input Module2 Input 7 Block	1 for active	1bit
	Exp. Input Module2 Input 8 Block	1 for active	1bit
	Exp. Input Module2 Input 9 Block	1 for active	1bit
	Exp. Input Module2 Input 10 Block	1 for active	1bit
	Exp. Input Module2 Input 11 Block	1 for active	1bit
	Exp. Input Module2 Input 12 Block	1 for active	1bit
	Exp. Input Module2 Input 13 Block	1 for active	1bit
	Exp. Input Module2 Input 14 Block	1 for active	1bit
	Exp. Input Module2 Input 15 Block	1 for active	1bit
	Exp. Input Module2 Input 16 Block	1 for active	1bit
0031	Exp. Input Module 1 Comm. Fail Block	1 for active	1bit
	Exp. Input Module 2 Comm. Fail Block	1 for active	1bit
	Exp. Output Module 1 Comm. Fail Block	1 for active	1bit
	Exp. Output Module 2 Comm. Fail Block	1 for active	1bit
	Exp. Display Module 1 Comm. Fail Block	1 for active	1bit
	Exp. Display Module 2 Comm. Fail Block	1 for active	1bit
	Loss of Phase Block	1 for active	1bit
	Engine Fault Input Block	1 for active	1bit
	PLC FALG 8 Block	1 for active	1bit
	PLC FALG 9 Block	1 for active	1bit
	PLC FALG 10 Block	1 for active	1bit
	Reserved	1 for active	1bit
	MSC Too Few Sets Block	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit

Address	Item	Description	Bytes
	Reserved	1 for active	1bit
0032	PLC FALG 1 Indication		
	PLC FALG 2 Indication	1 for active	1bit
	PLC FALG 3 Indication	1 for active	1bit
	PLC FALG 4 Indication	1 for active	1bit
	PLC FALG 5 Indication	1 for active	1bit
	PLC FALG 6 Indication	1 for active	1bit
	PLC FALG 7 Indication	1 for active	1bit
	PLC FALG 8 Indication	1 for active	1bit
	PLC FALG 9 Indication	1 for active	1bit
	PLC FALG 10 Indication	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0033	Reserved	1 for active	1bit
	Input 1 Indication	1 for active	1bit
	Input 2 Indication	1 for active	1bit
	Input 3 Indication	1 for active	1bit
	Input 4 Indication	1 for active	1bit
	Input 5 Indication	1 for active	1bit
	Input 6 Indication	1 for active	1bit
	Input 7 Indication	1 for active	1bit
	Input 8 Indication	1 for active	1bit
	Input 9 Indication	1 for active	1bit
	Input 10 Indication	1 for active	1bit
	Input 11 Indication	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0034	Exp. Input Module1 Input 1 Indication	1 for active	1bit
	Exp. Input Module1 Input 2 Indication	1 for active	1bit
	Exp. Input Module1 Input 3 Indication	1 for active	1bit
	Exp. Input Module1 Input 4 Indication	1 for active	1bit
	Exp. Input Module1 Input 5 Indication	1 for active	1bit
	Exp. Input Module1 Input 6 Indication	1 for active	1bit
	Exp. Input Module1 Input 7 Indication	1 for active	1bit
	Exp. Input Module1 Input 8 Indication	1 for active	1bit
	Exp. Input Module1 Input 9 Indication	1 for active	1bit
	Exp. Input Module1 Input 10 Indication	1 for active	1bit

Address	Item	Description	Bytes
	Exp. Input Module1 Input 11 Indication	1 for active	1bit
	Exp. Input Module1 Input 12 Indication	1 for active	1bit
	Exp. Input Module1 Input 13 Indication	1 for active	1bit
	Exp. Input Module1 Input 14 Indication	1 for active	1bit
	Exp. Input Module1 Input 15 Indication	1 for active	1bit
	Exp. Input Module1 Input 16 Indication	1 for active	1bit
0035	Exp. Input Module2 Input 1 Indication	1 for active	1bit
	Exp. Input Module2 Input 2 Indication	1 for active	1bit
	Exp. Input Module2 Input 3 Indication	1 for active	1bit
	Exp. Input Module2 Input 4 Indication	1 for active	1bit
	Exp. Input Module2 Input 5 Indication	1 for active	1bit
	Exp. Input Module2 Input 6 Indication	1 for active	1bit
	Exp. Input Module2 Input 7 Indication	1 for active	1bit
	Exp. Input Module2 Input 8 Indication	1 for active	1bit
	Exp. Input Module2 Input 9 Indication	1 for active	1bit
	Exp. Input Module2 Input 10 Indication	1 for active	1bit
	Exp. Input Module2 Input 11 Indication	1 for active	1bit
	Exp. Input Module2 Input 12 Indication	1 for active	1bit
	Exp. Input Module2 Input 13 Indication	1 for active	1bit
	Exp. Input Module2 Input 14 Indication	1 for active	1bit
	Exp. Input Module2 Input 15 Indication	1 for active	1bit
	Exp. Input Module2 Input 16 Indication	1 for active	1bit
0036	Reserved	1 for active	1bit
	Close Input Status	1 for active	1bit
	Input 9 Status	1 for active	1bit
	Manual Mode Input Status	1 for active	1bit
	Engine Fault Input Status/Standby Input Status (when T54 engine standby input is enabled)	1 for active	1bit
	Input 1 Status	1 for active	1bit
	Input 2 Status	1 for active	1bit
	Input 3 Status	1 for active	1bit
	Input 4 Status	1 for active	1bit
	Input 5 Status	1 for active	1bit
	Input 6 Status	1 for active	1bit
	Input 7 Status	1 for active	1bit
	Input 8 Status	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0037	Exp. Input Module1 Input 1 Status	1 for active	1bit
	Exp. Input Module1 Input 2 Status	1 for active	1bit
	Exp. Input Module1 Input 3 Status	1 for active	1bit
	Exp. Input Module1 Input 4 Status	1 for active	1bit

Address	Item	Description	Bytes
	Exp. Input Module1 Input 5 Status	1 for active	1bit
	Exp. Input Module1 Input 6 Status	1 for active	1bit
	Exp. Input Module1 Input 7 Status	1 for active	1bit
	Exp. Input Module1 Input 8 Status	1 for active	1bit
	Exp. Input Module1 Input 9 Status	1 for active	1bit
	Exp. Input Module1 Input 10 Status	1 for active	1bit
	Exp. Input Module1 Input 11 Status	1 for active	1bit
	Exp. Input Module1 Input 12 Status	1 for active	1bit
	Exp. Input Module1 Input 13 Status	1 for active	1bit
	Exp. Input Module1 Input 14 Status	1 for active	1bit
	Exp. Input Module1 Input 15 Status	1 for active	1bit
	Exp. Input Module1 Input 16 Status	1 for active	1bit
0038	Exp. Input Module2 Input 1 Status	1 for active	1bit
	Exp. Input Module2 Input 2 Status	1 for active	1bit
	Exp. Input Module2 Input 3 Status	1 for active	1bit
	Exp. Input Module2 Input 4 Status	1 for active	1bit
	Exp. Input Module2 Input 5 Status	1 for active	1bit
	Exp. Input Module2 Input 6 Status	1 for active	1bit
	Exp. Input Module2 Input 7 Status	1 for active	1bit
	Exp. Input Module2 Input 8 Status	1 for active	1bit
	Exp. Input Module2 Input 9 Status	1 for active	1bit
	Exp. Input Module2 Input 10 Status	1 for active	1bit
	Exp. Input Module2 Input 11 Status	1 for active	1bit
	Exp. Input Module2 Input 12 Status	1 for active	1bit
	Exp. Input Module2 Input 13 Status	1 for active	1bit
	Exp. Input Module2 Input 14 Status	1 for active	1bit
	Exp. Input Module2 Input 15 Status	1 for active	1bit
	Exp. Input Module2 Input 16 Status	1 for active	1bit
0039	Output 1 Status	1 for active	1bit
	Output 2 Status	1 for active	1bit
	Output 3 Status	1 for active	1bit
	Output 4 Status	1 for active	1bit
	Output 5 Status	1 for active	1bit
	Output 6 Status	1 for active	1bit
	Output 7 Status	1 for active	1bit
	Output 8 Status	1 for active	1bit
	Output 9 Status	1 for active	1bit
	Output 10 Status	1 for active	1bit
	Output 11 Status	1 for active	1bit
	Output 12 Status	1 for active	1bit
	Output 13 Status	1 for active	1bit
	Output 14 Status	1 for active	1bit
	Output 15 Status	1 for active	1bit

Address	Item	Description	Bytes
	Reserved	1 for active	1bit
0040	Exp. Output Module1 Output 1 Status	1 for active	1bit
	Exp. Output Module1 Output 2 Status	1 for active	1bit
	Exp. Output Module1 Output 3 Status	1 for active	1bit
	Exp. Output Module1 Output 4 Status	1 for active	1bit
	Exp. Output Module1 Output 5 Status	1 for active	1bit
	Exp. Output Module1 Output 6 Status	1 for active	1bit
	Exp. Output Module1 Output 7 Status	1 for active	1bit
	Exp. Output Module1 Output 8 Status	1 for active	1bit
	Exp. Output Module1 Output 9 Status	1 for active	1bit
	Exp. Output Module1 Output 10 Status	1 for active	1bit
	Exp. Output Module1 Output 11 Status	1 for active	1bit
	Exp. Output Module1 Output 12 Status	1 for active	1bit
	Exp. Output Module1 Output 13 Status	1 for active	1bit
	Exp. Output Module1 Output 14 Status	1 for active	1bit
	Exp. Output Module1 Output 15 Status	1 for active	1bit
	Exp. Output Module1 Output 16 Status	1 for active	1bit
0041	Exp. Output Module2 Output 1 Status	1 for active	1bit
	Exp. Output Module2 Output 2 Status	1 for active	1bit
	Exp. Output Module2 Output 3 Status	1 for active	1bit
	Exp. Output Module2 Output 4 Status	1 for active	1bit
	Exp. Output Module2 Output 5 Status	1 for active	1bit
	Exp. Output Module2 Output 6 Status	1 for active	1bit
	Exp. Output Module2 Output 7 Status	1 for active	1bit
	Exp. Output Module2 Output 8 Status	1 for active	1bit
	Exp. Output Module2 Output 9 Status	1 for active	1bit
	Exp. Output Module2 Output 10 Status	1 for active	1bit
	Exp. Output Module2 Output 11 Status	1 for active	1bit
	Exp. Output Module2 Output 12 Status	1 for active	1bit
	Exp. Output Module2 Output 13 Status	1 for active	1bit
	Exp. Output Module2 Output 14 Status	1 for active	1bit
	Exp. Output Module2 Output 15 Status	1 for active	1bit
	Exp. Output Module2 Output 16 Status	1 for active	1bit
0042	Exp. LA16 Module1 LED1 Status	1 for active	1bit
	Exp. LA16 Module1 LED2 Status	1 for active	1bit
	Exp. LA16 Module1 LED3 Status	1 for active	1bit
	Exp. LA16 Module1 LED4 Status	1 for active	1bit
	Exp. LA16 Module1 LED5 Status	1 for active	1bit
	Exp. LA16 Module1 LED6 Status	1 for active	1bit
	Exp. LA16 Module1 LED7 Status	1 for active	1bit
	Exp. LA16 Module1 LED8 Status	1 for active	1bit
	Exp. LA16 Module1 LED9 Status	1 for active	1bit
	Exp. LA16 Module1 LED10 Status	1 for active	1bit

Address	Item	Description	Bytes
	Exp. LA16 Module1 LED11 Status	1 for active	1bit
	Exp. LA16 Module1 LED12 Status	1 for active	1bit
	Exp. LA16 Module1 LED13 Status	1 for active	1bit
	Exp. LA16 Module1 LED14 Status	1 for active	1bit
	Exp. LA16 Module1 LED15 Status	1 for active	1bit
	Exp. LA16 Module1 LED16 Status	1 for active	1bit
0043	Exp. LA16 Module2 LED1 Status	1 for active	1bit
	Exp. LA16 Module2 LED2 Status	1 for active	1bit
	Exp. LA16 Module2 LED3 Status	1 for active	1bit
	Exp. LA16 Module2 LED4 Status	1 for active	1bit
	Exp. LA16 Module2 LED5 Status	1 for active	1bit
	Exp. LA16 Module2 LED6 Status	1 for active	1bit
	Exp. LA16 Module2 LED7 Status	1 for active	1bit
	Exp. LA16 Module2 LED8 Status	1 for active	1bit
	Exp. LA16 Module2 LED9 Status	1 for active	1bit
	Exp. LA16 Module2 LED10 Status	1 for active	1bit
	Exp. LA16 Module2 LED11 Status	1 for active	1bit
	Exp. LA16 Module2 LED12 Status	1 for active	1bit
	Exp. LA16 Module2 LED13 Status	1 for active	1bit
	Exp. LA16 Module2 LED14 Status	1 for active	1bit
	Exp. LA16 Module2 LED15 Status	1 for active	1bit
	Exp. LA16 Module2 LED16 Status	1 for active	1bit
0044	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Gen. Normal	1 for active	1bit
	Load Indication	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Highest Priority	1 for active	1bit
	Remote Control Mode	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0045	Reserved	2 bytes	
0046	Input 1 Active	1 for active	1bit
	Input 2 Active	1 for active	1bit
	Input 3 Active	1 for active	1bit
	Input 4 Active	1 for active	1bit

Address	Item	Description	Bytes
	Input 5 Active	1 for active	1bit
	Input 6 Active	1 for active	1bit
	Input 7 Active	1 for active	1bit
	Input 8 Active	1 for active	1bit
	Input 9 Active	1 for active	1bit
	Input 10 Active	1 for active	1bit
	Input 11 Active	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0047	Exp. Input Module1 Input 1 Active	1 for active	1bit
	Exp. Input Module1 Input 2 Active	1 for active	1bit
	Exp. Input Module1 Input 3 Active	1 for active	1bit
	Exp. Input Module1 Input 4 Active	1 for active	1bit
	Exp. Input Module1 Input 5 Active	1 for active	1bit
	Exp. Input Module1 Input 6 Active	1 for active	1bit
	Exp. Input Module1 Input 7 Active	1 for active	1bit
	Exp. Input Module1 Input 8 Active	1 for active	1bit
	Exp. Input Module1 Input 9 Active	1 for active	1bit
	Exp. Input Module1 Input 10 Active	1 for active	1bit
	Exp. Input Module1 Input 11 Active	1 for active	1bit
	Exp. Input Module1 Input 12 Active	1 for active	1bit
	Exp. Input Module1 Input 13 Active	1 for active	1bit
	Exp. Input Module1 Input 14 Active	1 for active	1bit
	Exp. Input Module1 Input 15 Active	1 for active	1bit
	Exp. Input Module1 Input 16 Active	1 for active	1bit
0048	Exp. Input Module2 Input 1 Active	1 for active	1bit
	Exp. Input Module2 Input 2 Active	1 for active	1bit
	Exp. Input Module2 Input 3 Active	1 for active	1bit
	Exp. Input Module2 Input 4 Active	1 for active	1bit
	Exp. Input Module2 Input 5 Active	1 for active	1bit
	Exp. Input Module2 Input 6 Active	1 for active	1bit
	Exp. Input Module2 Input 7 Active	1 for active	1bit
	Exp. Input Module2 Input 8 Active	1 for active	1bit
	Exp. Input Module2 Input 9 Active	1 for active	1bit
	Exp. Input Module2 Input 10 Active	1 for active	1bit
	Exp. Input Module2 Input 11 Active	1 for active	1bit
	Exp. Input Module2 Input 12 Active	1 for active	1bit
	Exp. Input Module2 Input 13 Active	1 for active	1bit
	Exp. Input Module2 Input 14 Active	1 for active	1bit
	Exp. Input Module2 Input 15 Active	1 for active	1bit

Address	Item	Description	Bytes
	Exp. Input Module2 Input 16 Active	1 for active	1bit
0049	Busbar Overvolt 1 Safety Trip and Stop	1 for active	1bit
	Busbar Overvolt 2 Safety Trip and Stop	1 for active	1bit
	Busbar Overvolt 3 Safety Trip and Stop	1 for active	1bit
	Busbar Undervolt 1 Safety Trip and Stop	1 for active	1bit
	Busbar Undervolt 2 Safety Trip and Stop	1 for active	1bit
	Busbar Undervolt 3 Safety Trip and Stop	1 for active	1bit
	Busbar Overfrequency 1 Safety Trip and Stop	1 for active	1bit
	Busbar Overfrequency 2 Safety Trip and Stop	1 for active	1bit
	Busbar Overfrequency 3 Safety Trip and Stop	1 for active	1bit
	Busbar Underfrequency 1 Safety Trip and Stop	1 for active	1bit
	Busbar Underfrequency 2 Safety Trip and Stop	1 for active	1bit
	Busbar Underfrequency 3 Safety Trip and Stop	1 for active	1bit
	Gen. Overvolt 1 Safety Trip and Stop	1 for active	1bit
	Gen. Overvolt 2 Safety Trip and Stop	1 for active	1bit
	Gen. Undervolt 1 Safety Trip and Stop	1 for active	1bit
	Gen. Undervolt 2 Safety Trip and Stop	1 for active	1bit
0050	Gen. Undervolt 3 Safety Trip and Stop	1 for active	1bit
	Gen. Overfrequency 1 Safety Trip and Stop	1 for active	1bit
	Gen. Overfrequency 2 Safety Trip and Stop	1 for active	1bit
	Gen. Overfrequency 3 Safety Trip and Stop	1 for active	1bit
	Gen. Underfrequency 1 Safety Trip and Stop	1 for active	1bit
	Gen. Underfrequency 2 Safety Trip and Stop	1 for active	1bit
	Gen. Underfrequency 3 Safety Trip and Stop	1 for active	1bit
	Overcurrent 1 Safety Trip and Stop	1 for active	1bit
	Overcurrent 2 Safety Trip and Stop	1 for active	1bit
	Overcurrent 3 Safety Trip and Stop	1 for active	1bit
	Overcurrent 4 Safety Trip and Stop	1 for active	1bit
	Gen. ROCOF	1 for active	1bit
	Rapid Overcurrent 2 Safety Trip and Stop	1 for active	1bit
	Reverse Power 1 Safety Trip and Stop	1 for active	1bit
	Reverse Power 2 Safety Trip and Stop	1 for active	1bit
	Over Power 1 Safety Trip and Stop	1 for active	1bit
0051	Over Power 2 Safety Trip and Stop	1 for active	1bit
	Reverse Phase Sequence Safety Trip and Stop	1 for active	1bit
	Fail to Close Safety Trip and Stop	1 for active	1bit
	Fail to Open Safety Trip and Stop	1 for active	1bit
	Fail to Sync Safety Trip and Stop	1 for active	1bit
	Zero Sequence Current Safety Trip and Stop	1 for active	1bit
	Unbalanced Current Safety Trip and Stop	1 for active	1bit
	MSC Too Few Sets Safety Trip and Stop	1 for active	1bit
	Loss of Excitation Alarm Shutdown	1 for active	1bit
	Input 1 Safety Trip and Stop	1 for active	1bit

Address	Item	Description	Bytes
	Input 2 Safety Trip and Stop	1 for active	1bit
	Input 3 Safety Trip and Stop	1 for active	1bit
	Input 4 Safety Trip and Stop	1 for active	1bit
	Input 5 Safety Trip and Stop	1 for active	1bit
	Input 6 Safety Trip and Stop	1 for active	1bit
	Input 7 Safety Trip and Stop	1 for active	1bit
0052	Input 8 Safety Trip and Stop	1 for active	1bit
	Input 9 Safety Trip and Stop	1 for active	1bit
	Busbar ROCOF	1 for active	1bit
	Busbar Vector Shift	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0053	Exp. Input Module1 Input 1 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 2 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 3 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 4 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 5 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 6 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 7 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 8 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 9 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 10 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 11 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 12 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 13 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 14 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 15 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module1 Input 16 Safety Trip and Stop	1 for active	1bit
0054	Exp. Input Module2 Input 1 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 2 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 3 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 4 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 5 Safety Trip and Stop	1 for active	1bit

Address	Item	Description	Bytes
	Exp. Input Module2 Input 6 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 7 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 8 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 9 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 10 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 11 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 12 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 13 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 14 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 15 Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Input 16 Safety Trip and Stop	1 for active	1bit
0055	Exp. Input Module1 Comm. Fail Safety Trip and Stop	1 for active	1bit
	Exp. Input Module2 Comm. Fail Safety Trip and Stop	1 for active	1bit
	Exp. Output Module1 Comm. Fail Safety Trip and Stop	1 for active	1bit
	Exp. Output Module2 Comm. Fail Safety Trip and Stop	1 for active	1bit
	Exp. Display Module 1 Comm. Fail Safety Trip and Stop	1 for active	1bit
	Exp. Display Module 2 Comm. Fail Safety Trip and Stop	1 for active	1bit
	Loss of Phase Safety Trip and Stop	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Fault	1 for active	1bit
	MSC Too Few Sets Safety Trip and Stop	1 for active	1bit
	External Short Circuit Safety Trip and Stop	1 for active	1bit
	Emergency Safety Trip and Stop	1 for active	1bit
	Reserved	1 for active	1bit
0056	PLC FLAG 1 Safety Trip and Stop	1 for active	1bit
	PLC FLAG 2 Safety Trip and Stop	1 for active	1bit
	PLC FLAG 3 Safety Trip and Stop	1 for active	1bit
	PLC FLAG 4 Safety Trip and Stop	1 for active	1bit
	PLC FLAG 5 Safety Trip and Stop	1 for active	1bit
	PLC FLAG 6 Safety Trip and Stop	1 for active	1bit
	PLC FLAG 7 Safety Trip and Stop	1 for active	1bit
	PLC FLAG 8 Safety Trip and Stop	1 for active	1bit
	PLC FLAG 9 Safety Trip and Stop	1 for active	1bit
	PLC FLAG 10 Safety Trip and Stop	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit

Address	Item	Description	Bytes
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0057	Busbar Overvolt 1 Safety Trip	1 for active	1bit
	Busbar Overvolt 2 Safety Trip	1 for active	1bit
	Busbar Overvolt 3 Safety Trip	1 for active	1bit
	Busbar Undervolt 1 Safety Trip	1 for active	1bit
	Busbar Undervolt 2 Safety Trip	1 for active	1bit
	Busbar Undervolt 3 Safety Trip	1 for active	1bit
	Busbar Overfrequency 1 Safety Trip	1 for active	1bit
	Busbar Overfrequency 2 Safety Trip	1 for active	1bit
	Busbar Overfrequency 3 Safety Trip	1 for active	1bit
	Busbar Underfrequency 1 Safety Trip	1 for active	1bit
	Busbar Underfrequency 2 Safety Trip	1 for active	1bit
	Busbar Underfrequency 3 Safety Trip	1 for active	1bit
	Gen. Overvolt 1 Safety Trip	1 for active	1bit
	Gen. Overvolt 2 Safety Trip	1 for active	1bit
	Gen. Undervolt 1 Safety Trip	1 for active	1bit
	Gen. Undervolt 2 Safety Trip	1 for active	1bit
0058	Gen. Undervolt 3 Safety Trip		
	Gen. Overfrequency 1 Safety Trip	1 for active	1bit
	Gen. Overfrequency 2 Safety Trip	1 for active	1bit
	Gen. Overfrequency 3 Safety Trip	1 for active	1bit
	Gen. Underfrequency 1 Safety Trip	1 for active	1bit
	Gen. Underfrequency 2 Safety Trip	1 for active	1bit
	Gen. Underfrequency 3 Safety Trip	1 for active	1bit
	Overcurrent 1 Safety Trip	1 for active	1bit
	Overcurrent 2 Safety Trip	1 for active	1bit
	Overcurrent 3 Safety Trip	1 for active	1bit
	Overcurrent 4 Safety Trip	1 for active	1bit
	Gen. Frenquency Change	1 for active	1bit
	Rapid Overcurrent 2 Safety Trip	1 for active	1bit
	Reverse Power 1 Safety Trip	1 for active	1bit
	Reverse Power 2 Safety Trip	1 for active	1bit
	Over Power 1 Safety Trip	1 for active	1bit
0059	Over Power 2 Safety Trip	1 for active	1bit
	Reverse Phase Sequence Safety Trip	1 for active	1bit
	Fail to Close Safety Trip	1 for active	1bit
	Fail to Open Safety Trip	1 for active	1bit
	Fail to Sync Safety Trip	1 for active	1bit
	Zero Sequence Safety Trip	1 for active	1bit
	Unbalanced Current Safety Trip	1 for active	1bit

Address	Item	Description	Bytes
	MSC ID Error Safety Trip	1 for active	1bit
	Loss of Excitation Safety Trip	1 for active	1bit
	Input 1 Safety Trip	1 for active	1bit
	Input 2 Safety Trip	1 for active	1bit
	Input 3 Safety Trip	1 for active	1bit
	Input 4 Safety Trip	1 for active	1bit
	Input 5 Safety Trip	1 for active	1bit
	Input 6 Safety Trip	1 for active	1bit
	Input 7 Safety Trip	1 for active	1bit
0060	Input 8 Safety Trip	1 for active	1bit
	Input 9 Safety Trip	1 for active	1bit
	Busbar ROCOF	1 for active	1bit
	Busbar Vector Shift	1 for active	1bit
	NEL 1 Trip	1 for active	1bit
	NEL 2 Trip	1 for active	1bit
	NEL 3 Trip	1 for active	1bit
	PLC FLAG 1 Safety Trip	1 for active	1bit
	PLC FLAG 2 Safety Trip	1 for active	1bit
	PLC FLAG 3 Safety Trip	1 for active	1bit
	PLC FLAG 4 Safety Trip	1 for active	1bit
	PLC FLAG 5 Safety Trip	1 for active	1bit
	PLC FLAG 6 Safety Trip	1 for active	1bit
	PLC FLAG 7 Safety Trip	1 for active	1bit
	PLC FLAG 8 Safety Trip	1 for active	1bit
	PLC FLAG 9 Safety Trip	1 for active	1bit
0061	Exp. Input Module1 Input 1 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 2 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 3 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 4 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 5 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 6 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 7 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 8 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 9 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 10 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 11 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 12 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 13 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 14 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 15 Safety Trip	1 for active	1bit
	Exp. Input Module1 Input 16 Safety Trip	1 for active	1bit
0062	Exp. Input Module2 Input 1 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 2 Safety Trip	1 for active	1bit

Address	Item	Description	Bytes
	Exp. Input Module2 Input 3 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 4 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 5 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 6 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 7 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 8 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 9 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 10 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 11 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 12 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 13 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 14 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 15 Safety Trip	1 for active	1bit
	Exp. Input Module2 Input 16 Safety Trip	1 for active	1bit
0063	Exp. Input 1 Comm. Fail Safety Trip	1 for active	1bit
	Exp. Input 2 Comm. Fail Safety Trip	1 for active	1bit
	Exp. Output 1 Comm. Fail Safety Trip	1 for active	1bit
	Exp. Output 2 Comm. Fail Safety Trip	1 for active	1bit
	Exp. Display Module 1 Comm. Fail Safety Trip	1 for active	1bit
	Exp. Display Module 2 Comm. Fail Safety Trip	1 for active	1bit
	Loss of Phase Safety Trip	1 for active	1bit
	PLC FLAG 10 Safety Trip	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Fault	1 for active	1bit
	MSC Too Few Sets Safety Trip	1 for active	1bit
	External Short Circuit Safety Trip	1 for active	1bit
	Emergency Safety Trip	1 for active	1bit
	Reserved	1 for active	1bit
0064	Busbar UAB	Signed	2Bytes
0065	Busbar UBC	Signed	2Bytes
0066	Busbar UCA	Signed	2Bytes
0067	Busbar UA	Signed	2Bytes
0068	Busbar UB	Signed	2Bytes
0069	Busbar UC	Signed	2Bytes
0070	Busbar UA Phase	Signed (*10)	2Bytes
0071	Busbar UB Phase	Signed (*10)	2Bytes
0072	Busbar UC Phase	Signed (*10)	2Bytes
0073	Busbar Frequency	Signed (*100)	2Bytes
0074	Reserved	Signed	2Bytes
0075	Reserved	Signed	2Bytes
0076	Busbar ROCOF	Signed (*100)	2Bytes

Address	Item	Description	Bytes
0077	Busbar Phase Change Value	Signed (*100)	2Bytes
0078	Reserved	Signed	2Bytes
0079	Reserved	Signed	2Bytes
0080	Reserved	Signed	2Bytes
0081	Reserved	Signed	2Bytes
0082	Adjust Frequency Input Voltage	Signed (*100)	2Bytes
0083	Adjust Voltage Input Voltage	Signed (*100)	2Bytes
0084	Gen. UAB	Signed	2Bytes
0085	Gen. UBC	Signed	2Bytes
0086	Gen. UCA	Signed	2Bytes
0087	Gen. UA	Signed	2Bytes
0088	Gen. UB	Signed	2Bytes
0089	Gen. UC	Signed	2Bytes
0090	Gen. UA Phase	Signed (*10)	2Bytes
0091	Gen. UB Phase	Signed (*10)	2Bytes
0092	Gen. UC Phase	Signed (*10)	2Bytes
0093	Gen. Frequency	Signed (*100)	2Bytes
0094	Reserved		2Bytes
0095	Reserved		2Bytes
0096	Voltage Difference	Signed	2Bytes
0097	Frequency Difference	Signed (*100)	2Bytes
0098	Phase Difference	Signed (*10)	2Bytes
0099	Current Gen Active Power PCT	Signed (*10)	2Bytes
0100	Target Gen Active Power PCT	Signed (*10)	2Bytes
0101	Current Gen Reactive Power PCT	Signed (*10)	2Bytes
0102	Target Gen Reactive Power PCT	Signed (*10)	2Bytes
0103	GOV Output PCT	Signed (*10)	2Bytes
0104	AVR Output PCT	Signed (*10)	2Bytes
0105	Reserved		2Bytes
0106	A Phase Current	Signed (*10)	2Bytes
0107	B Phase Current	Signed (*10)	2Bytes
0108	C Phase Current	Signed (*10)	2Bytes
0109	Reserved		2Bytes
0110	Phase of A Phase Current	Signed(*10)	2Bytes
0111	Phase of B Phase Current	Signed(*10)	2Bytes
0112	Phase of C Phase Current	Signed(*10)	2Bytes
0113	Reserved		2Bytes
0114 0115	A Phase Active Power	Signed(*10)	4Bytes
0116 0117	B Phase Active Power	Signed(*10)	4Bytes
0118 0119	C Phase Active Power	Signed(*10)	4Bytes

Address	Item	Description	Bytes
0120 0121	Total Active Power	Signed(*10)	4Bytes
0122 0123	A Phase Reactive Power	Signed(*10)	4Bytes
0124 0125	B Phase Reactive Power	Signed(*10)	4Bytes
0126 0127	C Phase Reactive Power	Signed(*10)	4Bytes
0128 0129	Total Reactive Power	Signed(*10)	4Bytes
0130 0131	A Phase Apparent Power	Signed(*10)	4Bytes
0132 0133	B Phase Apparent Power	Signed(*10)	4Bytes
0134 0135	C Phase Apparent Power	Signed(*10)	4Bytes
0136 0137	Total Apparent Power	Signed(*10)	4Bytes
0138	A Phase Power Factor	Signed(*100)	2Bytes
0139	B Phase Power Factor	Signed(*100)	2Bytes
0140	C Phase Power Factor	Signed(*100)	2Bytes
0141	Average Power Factor	Signed(*100)	2Bytes
0142	Unbalanced Current PCT	Signed	2Bytes
0143	Reserved		2Bytes
0144	Unbalanced Current	Signed (*10)	2Bytes
0145	Reserved		
0146	Battery Voltage	Signed (*10)	2Bytes
0147	System Status	Details please to see System Status Table	2Bytes
0148	Delay		2Bytes
0149	ATS Status	Details please to see ATS Status Table	2Bytes
0150	Delay		2Bytes
0151	Start Status	Details please to see Start Status Table	2Bytes
0152	Start Delay		2Bytes
0153	Reserved		2Bytes
0154	Reserved		2Bytes
0155	Reserved		2Bytes
0156 0157	Total Running Hours	Unsigned	4Bytes
0158	Reserved		2Bytes
0159	Total Start Times	Unsigned	2Bytes
0160	Total Kwh	Signed (*10)	4Bytes

Address	Item	Description	Bytes
0161			
0162 0163	Total kvarh	Signed (*10)	4Bytes
0164 0165	Total kVAh	Signed (*10)	4Bytes
0166 0167	Total NkWh	Signed (*10)	4Bytes
0168 0169	Multi-sets Total Reactive Power	Signed (*10)	4Bytes
0170 0171	Multi-sets Total Active Power	Signed (*10)	4Bytes
0172	Controller Model	Unsigned	2Bytes
0173	Controller Software Version	Unsigned (*10)	2Bytes
0174	Controller Hardware Version	Unsigned (*10)	2Bytes
0175	Release Time (Year)	Only save the last two digits of the year	2Bytes
0176	Release Time (Month)	Unsigned	2Bytes
0177	Release Time (Day)	Unsigned	2Bytes
0178	Reserved	Reserved	2Bytes
0179	Reserved	Reserved	2Bytes
0180	Controller Time: Year	Only save the last two digits of the year	2Bytes
0181	Controller Time: Month	Signed	2Bytes
0182	Controller Time: Day	Signed	2Bytes
0183	Controller Time: Week	Signed	2Bytes
0184	Controller Time: Hour	Signed	2Bytes
0185	Controller Time: Minute	Signed	2Bytes
0186	Controller Time: Second	Signed	2Bytes
0187	Module MSC ID	Unsigned	2Bytes
0188	Module Priority Level	Unsigned	2Bytes
0189	Total Module Number	Unsigned	2Bytes
0190	Close Set Number	Unsigned	2Bytes
0191	Reserved	Unsigned	2Bytes
0192	Busbar Module Number	Unsigned	2Bytes
0193	Reserved	Unsigned	2Bytes
0194	Genset Residual Power	Signed	2Bytes
0195	Reserved	Reserved	2Bytes
0196	Genset Request Power	Reserved	2Bytes
0197	Reserved	Reserved	2Bytes
0198 0199	Buabar Residual Power	Signed (*10)	4Bytes
0200 0201	Buabar Request Power	Signed (*10)	4Bytes

Address	Item	Description	Bytes
0202	Buabar Total Power	Signed (*10)	4Bytes
0203			
0204	Normal Genset Number	Reserved	2Bytes
0205	MSC Start Number	Reserved	2Bytes
0206	Active Power Unbalanced Percentage	Signed (*10)	2Bytes
0207	Reactive Power Unbalanced Percentage	Signed (*10)	2Bytes
0208	HMP300 Active Power Percentage (HC Feedback Active Power Percentage)	Signed (*10)	2Bytes
0209	HMP300 Reactive Power Percentage	Signed (*10)	2Bytes
0210	HMP300 Rated Active Power	Unsigned	2Bytes
0211	HMP300 Rated Reactive Power	Unsigned	2Bytes
0212	Reserved	Reserved	2Bytes
0213	DG Total Reactive Power	Signed (*10)	4Bytes
0214			
0215	DG Total Active Power	Signed (*10)	4Bytes
0216			
0217	DG Total Apparent Power	Signed (*10)	4Bytes
0218			
0219	DG Total Residual Active Power	Signed (*10)	4Bytes
0220			
0221	DG Total Residual Reactive Power	Signed (*10)	4Bytes
0222			
0223	Reserved	Reserved	2Bytes
0224	Reserved	Reserved	2Bytes
0225	Reserved	Reserved	2Bytes
0226	Reserved	Reserved	2Bytes
0227	SG Total Number	UnSigned	2Bytes
0228	Genset Max Output Percentage	Signed (*10)	2Bytes
0229	Reserved		
0230 -0249	Reserved		

5.2 FUNCTION CODE 03H MAPPING USER-DEFINED DATA FIELD

Table 17 - Function Code 03H Mapping User-defined Data Field

Address	Item	Description	Bytes
3500	User-defined		2Bytes
3501	User-defined		2Bytes
3502	User-defined		2Bytes
3503	User-defined		2Bytes
3504	User-defined		2Bytes
3505	User-defined		2Bytes
3506	User-defined		2Bytes
3507	User-defined		2Bytes

Address	Item	Description	Bytes
3508	User-defined		2Bytes
3509	User-defined		2Bytes
3510	User-defined		2Bytes
3511	User-defined		2Bytes
3512	User-defined		2Bytes
3513	User-defined		2Bytes
3514	User-defined		2Bytes
3515	User-defined		2Bytes
3516	User-defined		2Bytes
3517	User-defined		2Bytes
3518	User-defined		2Bytes
3519	User-defined		2Bytes
3520	User-defined		2Bytes
3521	User-defined		2Bytes
3522-3749	User-defined		2Bytes

In order to facilitate the remote monitoring of users and reduce the pressure of the system communication bus, a user-defined data area with address 3500-3749 was established. The user-defined data address was configured by the upper computer, and users could read the user-defined data sequence through address 3500-3749.

5.3 FUNCTION CODE 05H MAPPING DATA FIELD

Table 18 - Function Code 05H Mapping Data Field

Address	Item	Description
0000	Remote Start Key	1 for active
0001	Remote Stop Key	1 for active
0002	Reserved	
0003	Remote Auto Key	1 for active
0004	Remote Semi-auto Key	1 for active
0005	Remote Gen Close Key	1 for active
0006	Remote Gen Open Key	1 for active
0007	Remote UP Key	1 for active
0008	Remote Down Key	1 for active
0009	Reserved	1 for active
0010	Reserved	1 for active
0011	Remote Confirm/Page Key	1 for active
0012	Remote 1st Priority Key	1 for active
0013	Remote Alarm Response	1 for active
0014	Remote Alarm Reset	1 for active
0015	Reserved	1 for active
0016	Reserved	1 for active
0017	Remote Alarm Mute	1 for active
0018	Reserved	1 for active

Address	Item	Description
0019	Reserved	1 for active
0020	Remote Output Port 1 Output	1 for active, 0 for deactivated
0021	Remote Output Port 2 Output	1 for active, 0 for deactivated
0022	Remote Output Port 3 Output	1 for active, 0 for deactivated
0023	Remote Output Port 4 Output	1 for active, 0 for deactivated
0024	Remote Output Port 5 Output	1 for active, 0 for deactivated
0025	Remote Output Port 6 Output	1 for active, 0 for deactivated
0026	Remote Output Port 7 Output	1 for active, 0 for deactivated
0027	Remote Output Port 8 Output	1 for active, 0 for deactivated
0028	Remote Output Port 9 Output	1 for active, 0 for deactivated
0029	Reserved	1 for active
0030-0050	Reserved	1 for active
0051	Remote DOUT16-1 Output Port 1 Output	1 for active
0052	Remote DOUT16-1 Output Port 2 Output	1 for active
0053	Remote DOUT16-1 Output Port 3 Output	1 for active
0054	Remote DOUT16-1 Output Port 4 Output	1 for active
0055	Remote DOUT16-1 Output Port 5 Output	1 for active, 0 for deactivated
0056	Remote DOUT16-1 Output Port 6 Output	1 for active, 0 for deactivated
0057	Remote DOUT16-1 Output Port 7 Output	1 for active, 0 for deactivated
0058	Remote DOUT16-1 Output Port 8 Output	1 for active, 0 for deactivated
0059	Remote DOUT16-1 Output Port 9 Output	1 for active, 0 for deactivated
0060	Remote DOUT16-1 Output Port 10 Output	1 for active, 0 for deactivated
0061	Remote DOUT16-1 Output Port 11 Output	1 for active, 0 for deactivated
0062	Remote DOUT16-1 Output Port 12 Output	1 for active, 0 for deactivated
0063	Remote DOUT16-1 Output Port 13 Output	1 for active, 0 for deactivated
0064	Remote DOUT16-1 Output Port 14 Output	1 for active, 0 for deactivated
0065	Remote DOUT16-1 Output Port 15 Output	1 for active, 0 for deactivated
0066	Remote DOUT16-1 Output Port 16 Output	1 for active, 0 for deactivated
0067-0070	Reserved	Reserved
0071	Remote DOUT16-2 Output Port 1 Output	1 for active, 0 for deactivated
0072	Remote DOUT16-2 Output Port 2 Output	1 for active, 0 for deactivated
0073	Remote DOUT16-2 Output Port 3 Output	1 for active, 0 for deactivated
0074	Remote DOUT16-2 Output Port 4 Output	1 for active, 0 for deactivated
0075	Remote DOUT16-2 Output Port 5 Output	1 for active, 0 for deactivated
0076	Remote DOUT16-2 Output Port 6 Output	1 for active, 0 for deactivated
0077	Remote DOUT16-2 Output Port 7 Output	1 for active, 0 for deactivated
0078	Remote DOUT16-2 Output Port 8 Output	1 for active, 0 for deactivated
0079	Remote DOUT16-2 Output Port 9 Output	1 for active, 0 for deactivated
0080	Remote DOUT16-2 Output Port 10 Output	1 for active, 0 for deactivated
0081	Remote DOUT16-2 Output Port 11 Output	1 for active, 0 for deactivated

Address	Item	Description
0082	Remote DOUT16-2 Output Port 12 Output	1 for active, 0 for deactivated
0083	Remote DOUT16-2 Output Port 13 Output	1 for active, 0 for deactivated
0084	Remote DOUT16-2 Output Port 14 Output	1 for active, 0 for deactivated
0085	Remote DOUT16-2 Output Port 15 Output	1 for active, 0 for deactivated
0086	Remote DOUT16-2 Output Port 16 Output	1 for active, 0 for deactivated

5.4 PROTOCOL APPENDIX

Table 19 - ATS Status Table

No.	Content	Scope	Description
0	Gen. Synchronizing		Delay value is not displayed in this status
1	Gen. Close Delay		
2	Wait for Gen. Close Input		Delay value is not displayed in this status
3	Gen. Closed		Delay value is not displayed in this status
4	Gen. Unloading		Delay value is not displayed in this status
5	Gen. Open Delay		
6	Wait for Gen. Open Input		Delay value is not displayed in this status
7	Gen. Opened		Delay value is not displayed in this status

Table 20 - System Status Table

No.	Content	Scope	Description
0	Standby		Delay value is not displayed in this status
1	Start Output		
2	Wait for Start		
3	Load Stability		
4	Wait for Load		Delay value is not displayed in this status
5	Transient Fault		
6	Unit Running		Delay value is not displayed in this status
7	High Speed Cooling		
8	Stop Output		
9	Wait for Stop		
10	Stop Failure		Delay value is not displayed in this status

Table 21 - Start Status Table

No.	Content	Scope	Description
0	None		Delay value is not displayed in this status
1	Start Delay		
2	Stop Delay		
3	Wait Genset Ready		Delay value is not displayed in this status

_____