ALC736

HYBRID ENERGY LIGHTING TOWER CONTROLLER

COMMUNICATION PROTOCOL
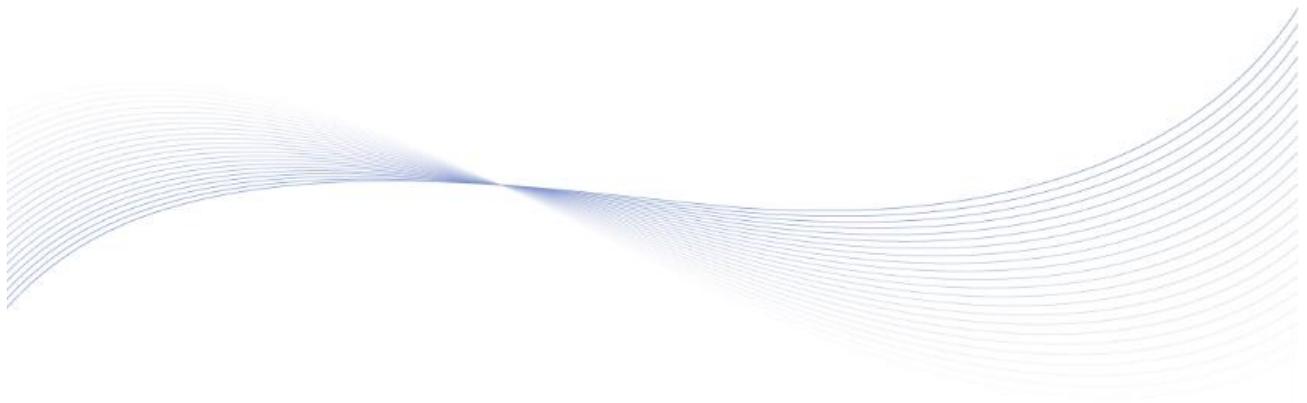
SmartGen

SmartGen **Registered trademark**

No. 28 Xuemei Street, Zhengzhou, Henan, China

Tel: +86-371-67988888/67981888/67992951

　　+86-371-67981000 (overseas)

Fax: +86-371-67992952

Web: www.smartgen.com.cn/
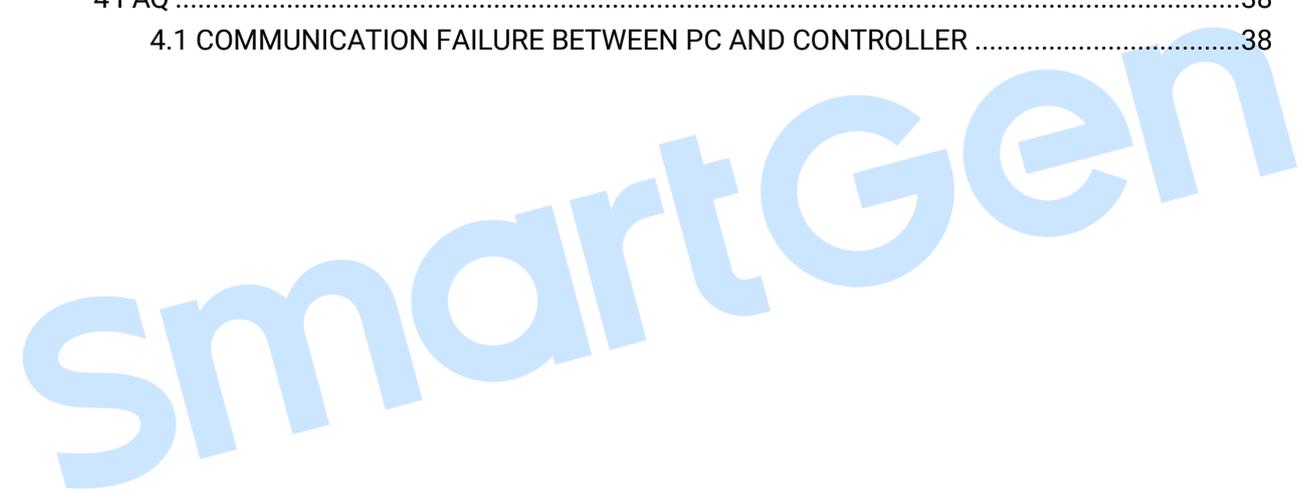
　　www.smartgen.cn/

Email: sales@smartgen.cn

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Table 1 Software Version

Date	Version	Content
2024-07-27	V1.0	Original release.

CONTENTS

1 DESCRIPTION

This protocol describes the command format for reading and writing via the controller's USB port, as well as the definition of internal messages and data to facilitate third-party development and use.

The ALC736 controller has one USB port, and works as a slave module. It supports the Modbus-RTU protocol but does not support other protocols, such as Modbus-ASCII.

Function code supported: 03H, 05H. Function code 03H is used for reading controller's alarms, status and various kinds of electric parameters; Function code 05H is used for sending remote commands.

2 WIRING DIAGRAM
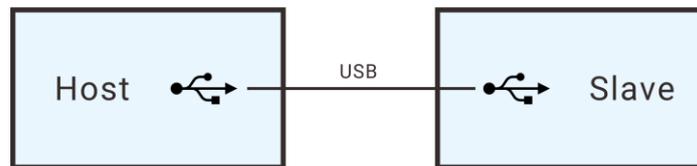
Fig. 1 Single Device Communication Wiring Diagram

NOTE: This diagram illustrates the communication connection between the computer host and the controller. The PC side uses a TYPE-A (2.0) port, while the controller uses a TYPE-C port.

3 ADDRESS AND DATA OF CONTROLLER INTERNAL REGISTERS

3.1 FUNCTION CODE 03H MAPPING ALARM AND STATUS OF DATA FIELD

Table 2 Alarm and Status of Data Field

Address	Items	Description
0.0	Common Alarm	1 as active
0.1	Common Warning	1 as active
0.2	Common Shutdown	1 as active
0.3	Common Light OFF Shutdown	1 as active
0.4	Common Light OFF Alarm	1 as active
0.5	Common Indication Alarm	1 as active
0.6	Reserved	/
0.7	Reserved	/
0.8	Reserved	/
0.9	Reserved	/
0.10	Reserved	/
0.11	Reserved	/
0.12	Reserved	/
0.13	System in Stop Mode	1 as active
0.14	System in Auto Mode	1 as active
0.15	System in Manual Mode	1 as active
1.0	Auto Lux Value + Scheduler Light ON Mode	1 as active

Address	Items	Description
1.1	Auto Scheduler Light ON Mode	1 as active
1.2	Auto SMS Light ON Mode	1 as active
1.3	Auto Sunset Light ON Mode	1 as active
1.4	Auto Remote Light ON Mode	1 as active
1.5	Auto Lux Value Light ON Mode	1 as active
1.6	Auto Lux Value + Sunset Light ON Mode	1 as active
1.7	Reserved	/
1.8	Reserved	/
1.9	Reserved	/
1.10	Reserved	/
1.11	Reserved	/
1.12	Reserved	/
1.13	Reserved	/
1.14	Reserved	/
1.15	Reserved	/
2.0	Reserved	/
2.1	Reserved	/
2.2	Reserved	/
2.3	Reserved	/
2.4	Reserved	/
2.5	Reserved	/
2.6	Reserved	/
2.7	Reserved	/
2.8	Reserved	/
2.9	Reserved	1 as active
2.10	High Temp. Warn IN	1 as active
2.11	Low Oil Pressure (OP) Warn IN	1 as active
2.12	Low Fuel Level (FL) Warn IN	1 as active
2.13	Low Coolant Level (CL) Warn IN	1 as active
2.14	Reserved	/
2.15	Reserved	/
3.0	Sensor 1 Open Warning	1 as active
3.1	Sensor 1 High Warning	1 as active
3.2	Sensor 1 Low Warning	1 as active
3.3	Sensor 2 Open Warning	1 as active
3.4	Sensor 2 High Warning	1 as active
3.5	Sensor 2 Low Warning	1 as active
3.6	Sensor 3 Open Warning	1 as active
3.7	Sensor 3 High Warning	1 as active
3.8	Sensor 3 Low Warning	1 as active
3.9	Sensor 4 Open Warning	1 as active
3.10	Sensor 4 High Warning	1 as active
3.11	Sensor 4 Low Warning	1 as active
3.12	Aux. Input 1 Warning	1 as active

Address	Items	Description
3.13	Aux. Input 2 Warning	1 as active
3.14	Aux. Input 3 Warning	1 as active
3.15	Aux. Input 4 Warning	1 as active
4.0	Aux. Input 5 Warning	1 as active
4.1	Aux. Input 6 Warning	1 as active
4.2	Aux. Input 7 Warning	1 as active
4.3	Aux. Input 8 Warning	1 as active
4.4	Aux. Input 9 Warning	1 as active
4.5	Aux. Input 10 Warning	1 as active
4.6	Aux. Input 11 Warning	1 as active
4.7	Aux. Input 12 Warning	1 as active
4.8	Aux. Input 13 Warning	1 as active
4.9	Aux. Input 14 Warning	1 as active
4.10	Reserved	/
4.11	Reserved	/
4.12	Reserved	/
4.13	Reserved	/
4.14	Reserved	/
4.15	Reserved	/
5.0	PLC Function 1 Warning	1 as active
5.1	PLC Function 2 Warning	1 as active
5.2	PLC Function 3 Warning	1 as active
5.3	PLC Function 4 Warning	1 as active
5.4	PLC Function 5 Warning	1 as active
5.5	PLC Function 6 Warning	1 as active
5.6	PLC Function 7 Warning	1 as active
5.7	PLC Function 8 Warning	1 as active
5.8	PLC Function 9 Warning	1 as active
5.9	PLC Function 10 Warning	1 as active
5.10	PLC Function 11 Warning	1 as active
5.11	PLC Function 12 Warning	1 as active
5.12	PLC Function 13 Warning	1 as active
5.13	PLC Function 14 Warning	1 as active
5.14	PLC Function 15 Warning	1 as active
5.15	PLC Function 16 Warning	1 as active
6.0	PLC Function 17 Warning	1 as active
6.1	PLC Function 18 Warning	1 as active
6.2	PLC Function 19 Warning	1 as active
6.3	PLC Function 20 Warning	1 as active
6.4	Reserved	/
6.5	Reserved	/
6.6	Reserved	/
6.7	Reserved	/
6.8	Reserved	/

Address	Items	Description
6.9	Reserved	/
6.10	Reserved	/
6.11	DPF Regen. Inhibit	1 as active
6.12	DPF Regen. Request	1 as active
6.13	High Exhaust Temp.	1 as active
6.14	Driver Alarm Indicator	1 as active
6.15	Reserved	/
7.0	Reserved	/
7.1	Reserved	/
7.2	Start Warning	1 as active
7.3	Reserved	/
7.4	Reserved	/
7.5	Reserved	/
7.6	Reserved	/
7.7	Reserved	/
7.8	Reserved	/
7.9	Reserved	/
7.10	Over Power Warning	1 as active
7.11	Reverse Power Warning	1 as active
7.12	AC Overcurrent Warning	1 as active
7.13	Reserved	/
7.14	Reserved	/
7.15	Reserved	/
8.0	Reserved	/
8.1	Reserved	/
8.2	AC Voltage Imbalance Warning	1 as active
8.3	Reserved	/
8.4	AC Overfrequency Warning	1 as active
8.5	AC Underfrequency Warning	1 as active
8.6	AC Overvoltage Warning	1 as active
8.7	AC Undervoltage Warning	1 as active
8.8	Reserved	/
8.9	Overspeed Warning	1 as active
8.10	Underspeed Warning	1 as active
8.11	Speed Signal Loss Warning	1 as active
8.12	DC Overvoltage Warning	1 as active
8.13	DC Undervoltage Warning	1 as active
8.14	DC Overcurrent Warning	1 as active
8.15	Reserved	/
9.0	Batteries SOC High Warning	1 as active
9.1	Reserved	/
9.2	Reserved	/
9.3	Reserved	/
9.4	Power Supply Undervoltage Warning	1 as active

Address	Items	Description
9.5	Power Supply Overvoltage Warning	1 as active
9.6	ECU Comm. Failure Warning	1 as active
9.7	ECU Warning	1 as active
9.8	Reserved	/
9.9	Tilt Angle Over Limit Warning IN	1 as active
9.10	Reserved	/
9.11	Starting Battery Undervoltage Start Warning	1 as active
9.12	Reserved	/
9.13	BMS Comm. Failure Warning	1 as active
9.14	Batteries SOC Low Start Warning	1 as active
9.15	PV Comm. Failure Warning	1 as active
10.0	Reserved	/
10.1	GSM Comm. Failure Warning	1 as active
10.2	ECU High Coolant Temp. Warning	1 as active
10.3	ECU Low OP Warning	1 as active
10.4	High Enclosure Temp. Warning	1 as active
10.5	Sensor 4 Error Warning	1 as active
10.6	Reserved	/
10.7	Charging Failure Warning	1 as active
10.8	Stop Failure Warning	1 as active
10.9	External Charge Failure Warning	1 as active
10.10	Low FL Light-/Lumen- Warning	1 as active
10.11	Light Fault Warning	1 as active
10.12	Reserved	/
10.13	Batteries SOC Low Light-/Lumen- Warning	1 as active
10.14	Reserved	/
10.15	Reserved	/
11	Reserved	/
12	Reserved	/
13	Reserved	/
14	Reserved	/
15	Reserved	/
16	Reserved	/
17	Reserved	/
18.0	Sensor 1 Open Light OFF Alarm	1 as active
18.1	Sensor 1 High Light OFF Alarm	1 as active
18.2	Sensor 1 Low Light OFF Alarm	1 as active
18.3	Sensor 2 Open Light OFF Alarm	1 as active
18.4	Sensor 2 High Light OFF Alarm	1 as active
18.5	Sensor 2 Low Light OFF Alarm	1 as active
18.6	Sensor 3 Open Light OFF Alarm	1 as active
18.7	Sensor 3 High Light OFF Alarm	1 as active
18.8	Sensor 3 Low Light OFF Alarm	1 as active
18.9	Sensor 4 Open Light OFF Alarm	1 as active

Address	Items	Description
18.10	Sensor 4 High Light OFF Alarm	1 as active
18.11	Sensor 4 Low Light OFF Alarm	1 as active
18.12	Aux. Input 1 Light OFF Alarm	1 as active
18.13	Aux. Input 2 Light OFF Alarm	1 as active
18.14	Aux. Input 3 Light OFF Alarm	1 as active
18.15	Aux. Input 4 Light OFF Alarm	1 as active
19.0	Aux. Input 5 Light OFF Alarm	1 as active
19.1	Aux. Input 6 Light OFF Alarm	1 as active
19.2	Aux. Input 7 Light OFF Alarm	1 as active
19.3	Aux. Input 8 Light OFF Alarm	1 as active
19.4	Aux. Input 9 Light OFF Alarm	1 as active
19.5	Aux. Input 10 Light OFF Alarm	1 as active
19.6	Aux. Input 11 Light OFF Alarm	1 as active
19.7	Aux. Input 12 Light OFF Alarm	1 as active
19.8	Aux. Input 13 Light OFF Alarm	1 as active
19.9	Aux. Input 14 Light OFF Alarm	1 as active
19.10	Reserved	/
19.11	Reserved	/
19.12	Reserved	/
19.13	Reserved	/
19.14	Reserved	/
19.15	Reserved	/
20.0	PLC Function 1 Light OFF Alarm	1 as active
20.1	PLC Function 2 Light OFF Alarm	1 as active
20.2	PLC Function 3 Light OFF Alarm	1 as active
20.3	PLC Function 4 Light OFF Alarm	1 as active
20.4	PLC Function 5 Light OFF Alarm	1 as active
20.5	PLC Function 6 Light OFF Alarm	1 as active
20.6	PLC Function 7 Light OFF Alarm	1 as active
20.7	PLC Function 8 Light OFF Alarm	1 as active
20.8	PLC Function 9 Light OFF Alarm	1 as active
20.9	PLC Function 10 Light OFF Alarm	1 as active
20.10	PLC Function 11 Light OFF Alarm	1 as active
20.11	PLC Function 12 Light OFF Alarm	1 as active
20.12	PLC Function 13 Light OFF Alarm	1 as active
20.13	PLC Function 14 Light OFF Alarm	1 as active
20.14	PLC Function 15 Light OFF Alarm	1 as active
20.15	PLC Function 16 Light OFF Alarm	1 as active
21.0	PLC Function 17 Light OFF Alarm	1 as active
21.1	PLC Function 18 Light OFF Alarm	1 as active
21.2	PLC Function 19 Light OFF Alarm	1 as active
21.3	PLC Function 20 Light OFF Alarm	1 as active
21.4	Reserved	/
21.5	Reserved	/

Address	Items	Description
21.6	Reserved	/
21.7	Reserved	/
21.8	Reserved	/
21.9	Reserved	/
21.10	Reserved	/
21.11	Reserved	/
21.12	Reserved	/
21.13	Reserved	/
21.14	Reserved	/
21.15	Reserved	/
22.0	Reserved	/
22.1	Reserved	/
22.2	Reserved	/
22.3	Reserved	/
22.4	Reserved	/
22.5	Reserved	/
22.6	Reserved	/
22.7	Reserved	/
22.8	Reserved	/
22.9	Reserved	/
22.10	Over Power Light OFF Alarm	1 as active
22.11	Reverse Power Light OFF Alarm	1 as active
22.12	AC Overcurrent Light OFF Alarm	1 as active
22.13	Reserved	/
22.14	Reserved	/
22.15	Reserved	/
23.0	Reserved	/
23.1	Reserved	/
23.2	Voltage Imbalance Light OFF Alarm	1 as active
23.3	Reserved	/
23.4	AC Overfrequency Light OFF Alarm	1 as active
23.5	AC Underfrequency Light OFF Alarm	1 as active
23.6	AC Overvoltage Light OFF Alarm	1 as active
23.7	AC Undervoltage Light OFF Alarm	1 as active
23.8	Reserved	/
23.9	Overspeed Light OFF Alarm	1 as active
23.10	Underspeed Light OFF Alarm	1 as active
23.11	Speed Signal Loss Light OFF Alarm	1 as active
23.12	DC Overvoltage Light OFF Alarm	1 as active
23.13	DC Undervoltage Light OFF Alarm	1 as active
23.14	DC Overcurrent Light OFF Alarm	1 as active
23.15	Reserved	/
24.0	Reserved	/
24.1	Reserved	/

Address	Items	Description
24.2	Reserved	/
24.3	Reserved	/
24.4	Power Supply Undervoltage Light OFF Alarm	1 as active
24.5	Power Supply Overvoltage Light OFF Alarm	1 as active
24.6	ECU Comm. Failure Light OFF Alarm	1 as active
24.7	ECU Light OFF Alarm	1 as active
24.8	Reserved	/
24.9	Reserved	/
24.10	Reserved	/
24.11	Reserved	/
24.12	Reserved	/
24.13	BMS Comm. Failure Light OFF Alarm	1 as active
24.14	Reserved	/
24.15	PV Comm. Failure Light OFF Alarm	1 as active
25.0	Reserved	/
25.1	GSM Comm. Failure Light OFF Alarm	1 as active
25.2	ECU High Coolant Temp. Light OFF Alarm	1 as active
25.3	ECU Low OP Light OFF Alarm	1 as active
25.4	Reserved	/
25.5	Reserved	/
25.6	Reserved	/
25.7	Charging Failure Light OFF Alarm	1 as active
25.8	Reserved	/
25.9	Reserved	/
25.10	Reserved	/
25.11	Light Fault Light OFF Alarm	1 as active
25.12	Reserved	/
25.13	Reserved	/
25.14	Reserved	/
25.15	Reserved	/
26	Reserved	/
27	Reserved	/
28	Reserved	/
29	Reserved	/
30	Reserved	/
31	Reserved	/
32	Reserved	/
33.0	Sensor 1 Open Light OFF Shutdown	1 as active
33.1	Sensor 1 High Light OFF Shutdown	1 as active
33.2	Sensor 1 Low Light OFF Shutdown	1 as active
33.3	Sensor 2 Open Light OFF Shutdown	1 as active
33.4	Sensor 2 High Light OFF Shutdown	1 as active
33.5	Sensor 2 Low Light OFF Shutdown	1 as active
33.6	Sensor 3 Open Light OFF Shutdown	1 as active

Address	Items	Description
33.7	Sensor 3 High Light OFF Shutdown	1 as active
33.8	Sensor 3 Low Light OFF Shutdown	1 as active
33.9	Sensor 4 Open Light OFF Shutdown	1 as active
33.10	Sensor 4 High Light OFF Shutdown	1 as active
33.11	Sensor 4 Low Light OFF Shutdown	1 as active
33.12	Aux. Input 1 Light OFF Shutdown	1 as active
33.13	Aux. Input 2 Light OFF Shutdown	1 as active
33.14	Aux. Input 3 Light OFF Shutdown	1 as active
33.15	Aux. Input 4 Light OFF Shutdown	1 as active
34.0	Aux. Input 5 Light OFF Shutdown	1 as active
34.1	Aux. Input 6 Light OFF Shutdown	1 as active
34.2	Aux. Input 7 Light OFF Shutdown	1 as active
34.3	Aux. Input 8 Light OFF Shutdown	1 as active
34.4	Aux. Input 9 Light OFF Shutdown	1 as active
34.5	Aux. Input 10 Light OFF Shutdown	1 as active
34.6	Aux. Input 11 Light OFF Shutdown	1 as active
34.7	Aux. Input 12 Light OFF Shutdown	1 as active
34.8	Aux. Input 13 Light OFF Shutdown	1 as active
34.9	Aux. Input 14 Light OFF Shutdown	1 as active
34.10	Reserved	/
34.11	Reserved	/
34.12	Reserved	/
34.13	Reserved	/
34.14	Reserved	/
34.15	Reserved	/
35.0	PLC Function 1 Light OFF Shutdown	1 as active
35.1	PLC Function 2 Light OFF Shutdown	1 as active
35.2	PLC Function 3 Light OFF Shutdown	1 as active
35.3	PLC Function 4 Light OFF Shutdown	1 as active
35.4	PLC Function 5 Light OFF Shutdown	1 as active
35.5	PLC Function 6 Light OFF Shutdown	1 as active
35.6	PLC Function 7 Light OFF Shutdown	1 as active
35.7	PLC Function 8 Light OFF Shutdown	1 as active
35.8	PLC Function 9 Light OFF Shutdown	1 as active
35.9	PLC Function 10 Light OFF Shutdown	1 as active
35.10	PLC Function 11 Light OFF Shutdown	1 as active
35.11	PLC Function 12 Light OFF Shutdown	1 as active
35.12	PLC Function 13 Light OFF Shutdown	1 as active
35.13	PLC Function 14 Light OFF Shutdown	1 as active
35.14	PLC Function 15 Light OFF Shutdown	1 as active
35.15	PLC Function 16 Light OFF Shutdown	1 as active
36.0	PLC Function 17 Light OFF Shutdown	1 as active
36.1	PLC Function 18 Light OFF Shutdown	1 as active
36.2	PLC Function 19 Light OFF Shutdown	1 as active

Address	Items	Description
36.3	PLC Function 20 Light OFF Shutdown	1 as active
36.4	Reserved	/
36.5	Reserved	/
36.6	Reserved	/
36.7	Reserved	/
36.8	Reserved	/
36.9	Reserved	/
36.10	Reserved	/
36.11	Reserved	/
36.12	Reserved	/
36.13	Reserved	/
36.14	Reserved	/
36.15	Reserved	/
37.0	Reserved	/
37.1	Reserved	/
37.2	Reserved	/
37.3	Reserved	/
37.4	Reserved	/
37.5	Reserved	/
37.6	Reserved	/
37.7	Reserved	/
37.8	Reserved	/
37.9	Reserved	/
37.10	Over Power Light OFF Shutdown	1 as active
37.11	Reverse Power Light OFF Shutdown	1 as active
37.12	AC Overcurrent Light OFF Shutdown	1 as active
37.13	Reserved	/
37.14	Reserved	/
37.15	Reserved	/
38.0	Reserved	/
38.1	Reserved	/
38.2	Voltage Imbalance Light OFF Shutdown	1 as active
38.3	Reserved	/
38.4	AC Overfrequency Light OFF Shutdown	1 as active
38.5	AC Underfrequency Light OFF Shutdown	1 as active
38.6	AC Overvoltage Light OFF Shutdown	1 as active
38.7	AC Undervoltage Light OFF Shutdown	1 as active
38.8	Reserved	/
38.9	Overspeed Light OFF Shutdown	1 as active
38.10	Underspeed Light OFF Shutdown	1 as active
38.11	Speed Signal Loss Light OFF Shutdown	1 as active
38.12	DC Overvoltage Light OFF Shutdown	1 as active
38.13	DC Undervoltage Light OFF Shutdown	1 as active
38.14	DC Overcurrent Light OFF Shutdown	1 as active

Address	Items	Description
38.15	Reserved	/
39.0	Reserved	/
39.1	Reserved	/
39.2	Reserved	/
39.3	Reserved	/
39.4	Power Supply Undervoltage Light OFF Shutdown	1 as active
39.5	Power Supply Overvoltage Light OFF Shutdown	1 as active
39.6	ECU Comm. Failure Light OFF Shutdown	1 as active
39.7	ECU Light OFF Shutdown	1 as active
39.8	Reserved	/
39.9	Reserved	/
39.10	Reserved	/
39.11	Reserved	/
39.12	Reserved	/
39.13	BMS Comm. Failure Light OFF Shutdown	1 as active
39.14	Reserved	/
39.15	PV Comm. Failure Light OFF Shutdown	1 as active
40.0	Reserved	/
40.1	GSM Comm. Failure Light OFF Shutdown	1 as active
40.2	ECU High Coolant Temp. Light OFF Shutdown	1 as active
40.3	ECU Low OP Light OFF Shutdown	1 as active
40.4	Reserved	/
40.5	Reserved	/
40.6	Reserved	/
40.7	Charging Failure Light OFF Shutdown	1 as active
40.8	Reserved	/
40.9	Reserved	/
40.10	Reserved	/
40.11	Light Fault Light OFF Shutdown	1 as active
40.12	Reserved	/
40.13	Reserved	/
40.14	Reserved	/
40.15	Reserved	/
41	Reserved	/
42	Reserved	/
43	Reserved	/
44	Reserved	/
45	Reserved	/
46	Reserved	/
47.0	Emergency Stop Alarm	1 as active
47.1	Reserved	1 as active
47.2	Reserved	1 as active
47.3	Reserved	1 as active
47.4	Reserved	1 as active

Address	Items	Description
47.5	Reserved	1 as active
47.6	Reserved	1 as active
47.7	High Temp. Shut IN	1 as active
47.8	Low OP Shut IN	1 as active
47.9	Low Level Shut IN	1 as active
47.10	Reserved	/
47.11	Reserved	/
47.12	Reserved	/
47.13	Reserved	/
47.14	Reserved	/
47.15	Reserved	/
48.0	Sensor 1 Open Shutdown	1 as active
48.1	Sensor 1 High Shutdown	1 as active
48.2	Sensor 1 Low Shutdown	1 as active
48.3	Sensor 2 Open Shutdown	1 as active
48.4	Sensor 2 High Shutdown	1 as active
48.5	1Sensor 2 Low Shutdown	1 as active
48.6	Sensor 3 Open Shutdown	1 as active
48.7	Sensor 3 High Shutdown	1 as active
48.8	Sensor 3 Low Shutdown	1 as active
48.9	Sensor 4 Open Shutdown	1 as active
48.10	Sensor 4 High Shutdown	1 as active
48.11	Sensor 4 Low Shutdown	1 as active
48.12	Aux. Input 1 Shutdown	1 as active
48.13	Aux. Input 2 Shutdown	1 as active
48.14	Aux. Input 3 Shutdown	1 as active
48.15	Aux. Input 4 Shutdown	1 as active
49.0	Aux. Input 5 Shutdown	1 as active
49.1	Aux. Input 6 Shutdown	1 as active
49.2	Aux. Input 7 Shutdown	1 as active
49.3	Aux. Input 8 Shutdown	1 as active
49.4	Aux. Input 9 Shutdown	1 as active
49.5	Aux. Input 10 Shutdown	1 as active
49.6	Aux. Input 11 Shutdown	1 as active
49.7	Aux. Input 12 Shutdown	1 as active
49.8	Aux. Input 13 Shutdown	1 as active
49.9	Aux. Input 14 Shutdown	1 as active
49.10	Reserved	/
49.11	Reserved	/
49.12	Reserved	/
49.13	Reserved	/
49.14	Reserved	/
49.15	Reserved	/
50.0	PLC Function 1 Shutdown	1 as active

Address	Items	Description
50.1	PLC Function 2 Shutdown	1 as active
50.2	PLC Function 3 Shutdown	1 as active
50.3	PLC Function 4 Shutdown	1 as active
50.4	PLC Function 5 Shutdown	1 as active
50.5	PLC Function 6 Shutdown	1 as active
50.6	PLC Function 7 Shutdown	1 as active
50.7	PLC Function 8 Shutdown	1 as active
50.8	PLC Function 9 Shutdown	1 as active
50.9	PLC Function 10 Shutdown	1 as active
50.10	PLC Function 11 Shutdown	1 as active
50.11	PLC Function 12 Shutdown	1 as active
50.12	PLC Function 13 Shutdown	1 as active
50.13	PLC Function 14 Shutdown	1 as active
50.14	PLC Function 15 Shutdown	1 as active
50.15	PLC Function 16 Shutdown	1 as active
51.0	PLC Function 17 Shutdown	1 as active
51.1	PLC Function 18 Shutdown	1 as active
51.2	PLC Function 19 Shutdown	1 as active
51.3	PLC Function 20 Shutdown	1 as active
51.4	Reserved	/
51.5	Reserved	/
51.6	Reserved	/
51.7	Reserved	/
51.8	Reserved	/
51.9	Reserved	/
51.10	Reserved	/
51.11	Reserved	/
51.12	Reserved	/
51.13	Reserved	/
51.14	Reserved	/
51.15	Low CL Shut IN	1 as active
52.0	OP Sensor Open Shut IN	1 as active
52.1	Temp. Sensor Open Shut IN	1 as active
52.2	Reserved	/
52.3	Reserved	/
52.4	Reserved	/
52.5	Reserved	/
52.6	Reserved	/
52.7	Reserved	/
52.8	Reserved	/
52.9	Reserved	/
52.10	Over Power Shutdown	1 as active
52.11	Reverse Power Shutdown	1 as active
52.12	AC Overcurrent Shutdown	1 as active

Address	Items	Description
52.13	Reserved	/
52.14	Reserved	/
52.15	Reserved	/
53.0	Reserved	/
53.1	Reserved	/
53.2	Voltage Imbalance Shutdown	1 as active
53.3	Reserved	/
53.4	AC Overfrequency Shutdown	1 as active
53.5	AC Underfrequency Shutdown	1 as active
53.6	AC Overvoltage Shutdown	1 as active
53.7	AC Undervoltage Shutdown	1 as active
53.8	Reserved	/
53.9	Overspeed Shutdown	1 as active
53.10	Underspeed Shutdown	1 as active
53.11	Speed Signal Loss Shutdown	1 as active
53.12	DC Overvoltage Shutdown	1 as active
53.13	DC Undervoltage Shutdown	1 as active
53.14	DC Overcurrent Shutdown	1 as active
53.15	Reserved	/
54.0	Batteries SOC High Shutdown	1 as active
54.1	Reserved	/
54.2	Reserved	/
54.3	Reserved	/
54.4	Power Supply Undervoltage Shutdown	1 as active
54.5	Power Supply Overvoltage Shutdown	1 as active
54.6	ECU Comm. Failure Shutdown	1 as active
54.7	ECU Shutdown	1 as active
54.8	Crank Failure Shutdown	1 as active
54.9	Reserved	/
54.10	Reserved	/
54.11	Reserved	/
54.12	Reserved	/
54.13	BMS Comm. Failure Shutdown	1 as active
54.14	Reserved	/
54.15	PV Comm. Failure Shutdown	1 as active
55.0	Reserved	/
55.1	GSM Comm. Failure Shutdown	1 as active
55.2	ECU High Coolant Temp. Shutdown	1 as active
55.3	ECU Low OP Shutdown	1 as active
55.4	Reserved	/
55.5	Reserved	/
55.6	Reserved	/
55.7	Charging Failure Shutdown	1 as active
55.8	Reserved	/

Address	Items	Description
55.9	Reserved	/
55.10	Reserved	/
55.11	Light Fault Shutdown	1 as active
55.12	Charging Timeout Shutdown	1 as active
55.13	Reserved	/
55.14	Reserved	/
55.15	Reserved	/
56	Reserved	/
57	Reserved	/
58	Reserved	/
59	Reserved	/
60	Reserved	/
61	Reserved	/
62	Reserved	/
63.0	Sensor 1 Open Indication Alarm	1 as active
63.1	Sensor 1 High Indication Alarm	1 as active
63.2	Sensor 1 Low Indication Alarm	1 as active
63.3	Sensor 2 Open Indication Alarm	1 as active
63.4	Sensor 2 High Indication Alarm	1 as active
63.5	Sensor 2 Low Indication Alarm	1 as active
63.6	Sensor 3 Open Indication Alarm	1 as active
63.7	Sensor 3 High Indication Alarm	1 as active
63.8	Sensor 3 Low Indication Alarm	1 as active
63.9	Sensor 4 Open Indication Alarm	1 as active
63.10	Sensor 4 High Indication Alarm	1 as active
63.11	Sensor 4 Low Indication Alarm	1 as active
63.12	Aux. Input 1 Indication Alarm	1 as active
63.13	Aux. Input 2 Indication Alarm	1 as active
63.14	Aux. Input 3 Indication Alarm	1 as active
63.15	Aux. Input 4 Indication Alarm	1 as active
64.0	Aux. Input 5 Indication Alarm	1 as active
64.1	Aux. Input 6 Indication Alarm	1 as active
64.2	Aux. Input 7 Indication Alarm	1 as active
64.3	Aux. Input 8 Indication Alarm	1 as active
64.4	Aux. Input 9 Indication Alarm	1 as active
64.5	Aux. Input 10 Indication Alarm	1 as active
64.6	Aux. Input 11 Indication Alarm	1 as active
64.7	Aux. Input 12 Indication Alarm	1 as active
64.8	Aux. Input 13 Indication Alarm	1 as active
64.9	Aux. Input 14 Indication Alarm	1 as active
64.10	Reserved	/
64.11	Reserved	/
64.12	Reserved	/
64.13	Reserved	/

Address	Items	Description
64.14	Reserved	/
64.15	Reserved	/
65.0	PLC Function 1 Indication Alarm	1 as active
65.1	PLC Function 2 Indication Alarm	1 as active
65.2	PLC Function 3 Indication Alarm	1 as active
65.3	PLC Function 4 Indication Alarm	1 as active
65.4	PLC Function 5 Indication Alarm	1 as active
65.5	PLC Function 6 Indication Alarm	1 as active
65.6	PLC Function 7 Indication Alarm	1 as active
65.7	PLC Function 8 Indication Alarm	1 as active
65.8	PLC Function 9 Indication Alarm	1 as active
65.9	PLC Function 10 Indication Alarm	1 as active
65.10	PLC Function 11 Indication Alarm	1 as active
65.11	PLC Function 12 Indication Alarm	1 as active
65.12	PLC Function 13 Indication Alarm	1 as active
65.13	PLC Function 14 Indication Alarm	1 as active
65.14	PLC Function 15 Indication Alarm	1 as active
65.15	PLC Function 16 Indication Alarm	1 as active
66.0	PLC Function 17 Indication Alarm	1 as active
66.1	PLC Function 18 Indication Alarm	1 as active
66.2	PLC Function 19 Indication Alarm	1 as active
66.3	PLC Function 20 Indication Alarm	1 as active
66.4	Reserved	/
66.5	Reserved	/
66.6	Reserved	/
66.7	Reserved	/
66.8	Reserved	/
66.9	Reserved	/
66.10	Reserved	/
66.11	Reserved	/
66.12	Reserved	/
66.13	Reserved	/
66.14	Reserved	/
66.15	Reserved	/
67.0	Reserved	/
67.1	Reserved	/
67.2	Reserved	/
67.3	Reserved	/
67.4	Reserved	/
67.5	Reserved	/
67.6	Reserved	/
67.7	Reserved	/
67.8	Reserved	/
67.9	Reserved	/

Address	Items	Description
67.10	Over Power Indication Alarm	1 as active
67.11	Reverse Power Indication Alarm	1 as active
67.12	AC Overcurrent Indication Alarm	1 as active
67.13	Reserved	/
67.14	Reserved	/
67.15	Reserved	/
68.0	Reserved	/
68.1	Reserved	/
68.2	Voltage Imbalance Indication Alarm	1 as active
68.3	Reserved	/
68.4	AC Overfrequency Indication Alarm	1 as active
68.5	AC Underfrequency Indication Alarm	1 as active
68.6	AC Overvoltage Indication Alarm	1 as active
68.7	AC Undervoltage Indication Alarm	1 as active
68.8	Reserved	/
68.9	Overspeed Indication Alarm	1 as active
68.10	Underspeed Indication Alarm	1 as active
68.11	Speed Signal Loss Indication Alarm	1 as active
68.12	DC Overvoltage Indication Alarm	1 as active
68.13	DC Undervoltage Indication Alarm	1 as active
68.14	DC Overcurrent Indication Alarm	1 as active
68.15	Reserved	/
69.0	Reserved	/
69.1	Reserved	/
69.2	Reserved	/
69.3	Reserved	/
69.4	Power Supply Undervoltage Indication Alarm	1 as active
69.5	Power Supply Overvoltage Indication Alarm	1 as active
69.6	ECU Comm. Failure Indication Alarm	1 as active
69.7	ECU Indication Alarm	1 as active
69.8	Reserved	/
69.9	Reserved	/
69.10	Reserved	/
69.11	Reserved	/
69.12	Reserved	/
69.13	BMS Comm. Failure Indication Alarm	1 as active
69.14	Reserved	/
69.15	PV Comm. Failure Indication Alarm	1 as active
70.0	Reserved	/
70.1	GSM Comm. Failure Indication Alarm	1 as active
70.2	ECU High Coolant Temp. Indication Alarm	1 as active
70.3	ECU Low OP Indication Alarm	1 as active
70.4	Reserved	/
70.5	Reserved	/

Address	Items	Description
70.6	Reserved	/
70.7	Charging Failure Indication Alarm	1 as active
70.8	Reserved	/
70.9	Reserved	/
70.10	Reserved	/
70.11	Light Fault Indication Alarm	1 as active
70.12	Reserved	/
70.13	Reserved	/
70.14	Reserved	/
70.15	Reserved	/
71	Reserved	/
72	Reserved	/
73	Reserved	/
74	Reserved	/
75	Reserved	/
76	Reserved	/
77	Reserved	/
78	Reserved	/
79	Reserved	/
80	Reserved	/
81	Reserved	/
82	Reserved	/
83.0	Emergency Stop Input Status	1 as active
83.1	Aux. Input 1 Status	1 as active
83.2	Aux. Input 2 Status	1 as active
83.3	Aux. Input 3 Status	1 as active
83.4	Aux. Input 4 Status	1 as active
83.5	Aux. Input 5 Status	1 as active
83.6	Aux. Input 6 Status	1 as active
83.7	Aux. Input 7 Status	1 as active
83.8	Aux. Input 8 Status	1 as active
83.9	Aux. Input 9 Status	1 as active
83.10	Aux. Input 10 Status	1 as active
83.11	Aux. Input 11 Status	1 as active
83.12	Aux. Input 12 Status	1 as active
83.13	Aux. Input 13 Status	1 as active
83.14	Aux. Input 14 Status	1 as active
83.15	Reserved	/
84.0	Aux. Input 1 Active	1 as active
84.1	Aux. Input 2 Active	1 as active
84.2	Aux. Input 3 Active	1 as active
84.3	Aux. Input 4 Active	1 as active
84.4	Aux. Input 5 Active	1 as active
84.5	Aux. Input 6 Active	1 as active

Address	Items	Description
84.6	Aux. Input 7 Active	1 as active
84.7	Aux. Input 8 Active	1 as active
84.8	Aux. Input 9 Active	1 as active
84.9	Aux. Input 10 Active	1 as active
84.10	Aux. Input 11 Active	1 as active
84.11	Aux. Input 12 Active	1 as active
84.12	Aux. Input 13 Active	1 as active
84.13	Aux. Input 14 Active	1 as active
84.14	Reserved	/
84.15	Reserved	/
85.0	1# Light IN Active	1 as active
85.1	2# Light IN Active	1 as active
85.2	3# Light IN Active	1 as active
85.3	4# Light IN Active	1 as active
85.4	5# Light IN Active	1 as active
85.5	6# Light IN Active	1 as active
85.6	Reserved	/
85.7	Reserved	/
85.8	Reserved	/
85.9	Reserved	/
85.10	Reserved	/
85.11	Reserved	/
85.12	Reserved	/
85.13	Reserved	/
85.14	Reserved	/
85.15	Reserved	/
86.0	1# Light OUT Status	1 as active
86.1	2# Light OUT Status	1 as active
86.2	3# Light OUT Status	1 as active
86.3	4# Light OUT Status	1 as active
86.4	5# Light OUT Status	1 as active
86.5	6# Light OUT Status	1 as active
86.6	Mast Up Status	1 as active
86.7	Mast Down Status	1 as active
86.8	Lights Left Status	1 as active
86.9	Lights Right Status	1 as active
86.10	Lights Up Status	1 as active
86.11	Lights Down Status	1 as active
86.12	Reserved	/
86.13	Reserved	/
86.14	Reserved	/
86.15	Reserved	/
87.0	Fuel Relay Output Status	1 as active
87.1	Crank Relay Output Status	1 as active

Address	Items	Description
87.2	Charger D+ Output Status	1 as active
87.3	LCD Heating Status	1 as active
87.4	Aux. Output 1 Status	1 as active
87.5	Aux. Output 2 Status	1 as active
87.6	Aux. Output 3 Status	1 as active
87.7	Aux. Output 4 Status	1 as active
87.8	Aux. Output 5 Status	1 as active
87.9	Aux. Output 6 Status	1 as active
87.10	Aux. Output 7 Status	1 as active
87.11	Aux. Output 8 Status	1 as active
87.12	Aux. Output 9 Status	1 as active
87.13	Aux. Output 10 Status	1 as active
87.14	Flex. Output 11 Status	1 as active
87.15	Reserved	/
88.0	Mains Normal	1 as active
88.1	Mains Abnormal	1 as active
88.2	Mains Blackout	1 as active
88.3	Gen. Abnormal	1 as active
88.4	Gen. Normal	1 as active
88.5	PV Normal	1 as active
88.6	PV Abnormal	1 as active
88.7	Batteries Normal	1 as active
88.8	Batteries Abnormal	1 as active
88.9	Mains Active	1 as active
88.10	Reserved	/
88.11	Reserved	/
88.12	Reserved	/
88.13	Reserved	/
88.14	Reserved	/
88.15	Reserved	/
89.0	LED 1 Status (Linked to AUTO key)	1 as active
89.1	LED 2 Status (Linked to Manual key)	1 as active
89.2	LED 3 Status (Linked to STOP key)	1 as active
89.3	LED 4 Status (Linked to battery icon)	1 as active
89.4	LED 5 Status (Linked to diesel genset icon)	1 as active
89.5	LED 6 Status (Linked to lights icon)	1 as active
89.6	LED 7 Status (Linked to status lamp 1)	1 as active
89.7	LED 8 Status (Linked to status lamp 2)	1 as active
89.8	Reserved	/
89.9	Reserved	/
89.10	Reserved	/
89.11	Reserved	/
89.12	Reserved	/
89.13	Reserved	/

Address	Items	Description
89.14	Reserved	/
89.15	Reserved	/
90.0	Up Key Status	1 as active
90.1	Down Key Status	1 as active
90.2	Return Key Status	1 as active
90.3	Set Key Status	1 as active
90.4	Auto Key Status	1 as active
90.5	Start Key Status	1 as active
90.6	Manual Key Status	1 as active
90.7	Stop Key Status	1 as active
90.8	Light ON Key Status	1 as active
90.9	Light OFF Key Status	1 as active
90.10	Lock Status	1 as active
90.11	Reserved	/
90.12	Reserved	/
90.13	Reserved	/
90.14	Reserved	/
90.15	Reserved	/

EXAMPLE:

If "Up Key Status" and "Down Key Status" need to be read, check the table above and find their addresses are 90.0 and 90.1, so it needs to read one data address.

Table 3 Master (PC) Request Frame

Slave Address	Function Code	Start Address (90)		Request Data Length (1)		CRC 16	
		MSB	LSB	MSB	LSB	LSB	MSB
01	03	00	5A	00	01	A4	19

The slave response is as following:

Table 4 Slave (Controller) Response Frame

Slave Address	Function Code	Data Length (Bytes)	Data		CRC 16	
			Data of Address 90 MSB	Data of Address 90 LSB	LSB	MSB
01	03	02	00	03	F8	45

Table 5 Data Analysis

Address	Data Received (Hexadecimal)	Convert to Binary	Data Signification
90	0003H	0000 0000 0000 0011	The Bit0 of data is 1, which means the "Up Key Status" is active; The Bit1 of data is 1, which means the "Down Key Status" is active.

3.2 FUNCTION CODE 03H MAPPING PARAMETERS OF DATA FIELD

Table 6 Parameters of Data Field

Address	Items	Range	Ratio	Unit	Description	Remarks
100	Reserved	/	/	/		
101	Reserved	/	/	/		
102	Gen. Uab	(0-30000)	0.1	V	16-bit Unsigned	
103	Gen. Ubc	(0-30000)	0.1	V	16-bit Unsigned	
104	Gen. Uca	(0-30000)	0.1	V	16-bit Unsigned	
105	Gen. Ua	(0-30000)	0.1	V	16-bit Unsigned	
106	Gen. Ub	(0-30000)	0.1	V	16-bit Unsigned	
107	Gen. Uc	(0-30000)	0.1	V	16-bit Unsigned	
108	Gen. Ua Phase	(0~360.0)	1	°	16-bit Signed	
109	Gen. Ub Phase	(0~360.0)	1	°	16-bit Signed	
110	Gen. Uc Phase	(0~360.0)	1	°	16-bit Signed	
111	Gen. Frequency	(0~100.00)	0.01	Hz	16-bit Unsigned	
112	Unbalanced Voltage	(0~100.0)	0.1	V	16-bit Signed	
113	Phase A Current	(0-6000.0)	0.1	A	16-bit Signed	
114	Phase B Current	(0-6000.0)	0.1	A	16-bit Signed	
115	Phase C Current	(0-6000.0)	0.1	A	16-bit Signed	
116	Neutral Wire Current (Zero sequence current, Ground wire current)	(0-6000.0)	0.1	A	16-bit Signed	
117 118	Phase A Active Power	(-6000-6000)	0.1	kW	32-bit Signed	
119 120	Phase B Active Power	(-6000-6000)	0.1	kW	32-bit Signed	
121 122	Phase C Active Power	(-6000-6000)	0.1	kW	32-bit Signed	
123 124	Total Active Power	(-6000-6000)	0.1	kW	32-bit Signed	
125 126	Phase A Reactive Power	(-6000-6000)	0.1	kvar	32-bit Signed	
127 128	Phase B Reactive Power	(-6000-6000)	0.1	kvar	32-bit Signed	
129 130	Phase C Reactive Power	(-6000-6000)	0.1	kvar	32-bit Signed	
131 132	Total Reactive Power	(-6000-6000)	0.1	kvar	32-bit Signed	
133 134	Phase A Apparent Power	(-6000-6000)	0.1	kVA	32-bit Signed	
135 136	Phase B Apparent Power	(-6000-6000)	0.1	kVA	32-bit Signed	

Address	Items	Range	Ratio	Unit	Description	Remarks
137	Phase C Apparent Power	(-6000-6000)	0.1	kVA	32-bit Signed	
138						
139	Total Apparent Power	(-6000-6000)	0.1	kVA	32-bit Signed	
140						
141	Phase A Power Factor	(-1.000-1.000)	0.01	/	16-bit Unsigned	
142	Phase B Power Factor	(-1.000-1.000)	0.01	/	16-bit Unsigned	
143	Phase C Power Factor	(-1.000-1.000)	0.01	/	16-bit Unsigned	
144	Average Power Factor	(-1.000-1.000)	0.01	/	16-bit Unsigned	
145	DC Voltage	(0-32767)	0.1	V	16-bit Signed	
146	DC Current	(0-32767)	0.1	A	16-bit Signed	
147	DC Power	(0-32767)	0.1	kW	16-bit Signed	
148	Aux. Sensor 1 Resistance Value	(0-65535)	0.1	Ω	16-bit Unsigned	
149	Aux. Sensor 1 Process Value	(-32767-32767)	1	/	16-bit Signed	
150	Aux. Sensor 2 Resistance Value	(0-65535)	0.1	Ω	16-bit Unsigned	
151	Aux. Sensor 2 Process Value	(-32767-32767)	1	/	16-bit Signed	
152	Aux. Sensor 3 Resistance Value	(0-65535)	0.1	Ω	16-bit Unsigned	
153	Aux. Sensor 3 Process Value	(-32767-32767)	1	/	16-bit Signed	
154	Aux. Sensor Type	(0-2)	/	/	16-bit Unsigned	0: Resistance Type 1: Current Type 2: Voltage Type
155	Aux. Sensor 4 Value	(0-65535)	0.1 0.01 0.01	Ω/ A/ V	16-bit Unsigned	
156	Aux. Sensor 4 Process Value	(-32767-32767)	1	/	16-bit Signed	
157	DC Sampling Voltage	(0-750)	0.1	V	16-bit Unsigned	
158	DC Sampling Current	(400-2000)	0.01	mA	16-bit Unsigned	
159	Battery Voltage	(0-600)	0.1	V	16-bit Unsigned	
160	Charger D+ Voltage	(0-600)	0.1	V	16-bit Unsigned	
161	Engine Speed	(0-65535)	1	r/min	16-bit Unsigned	
162	Reserved	/	/	/		

Address	Items	Range	Ratio	Unit	Description	Remarks
163	Coolant Temp. (ECU)	(-40-300)	1	°C		
164	Oil Pressure (ECU)	(0-1000)	1	kPa		
165	Reserved	/	/	/		
166	Coolant Level	(0-100)	1	%	16-bit Unsigned	
167	Oil Temp.	(-273-300)	1	°C	16-bit Signed	
168	Coolant Pressure	(0-1000)	1	kPa	16-bit Unsigned	
169	Fuel Pressure	(0-1000)	1	kPa	16-bit Unsigned	
170	Fuel Temp.	(-40-300)	1	°C	16-bit Signed	
171	Air Inlet Temp.	(-40-300)	1	°C	16-bit Signed	
172	Exhaust Outlet Temp.	(-100-300)	1	°C	16-bit Signed	
173	Fuel Consumption	(0-1000)	1	L/h	16-bit Unsigned	
174	Total Fuel Consumption	(0-99999999)	1	L	16-bit Unsigned	
175					16-bit Unsigned	
176	Turbo Pressure	(0-1000)	1	kPa	16-bit Unsigned	
177	Adblue Level	(0-100)	1	%	16-bit Unsigned	
178	Ambient Pressure	(0-1000)	1	kPa	16-bit Unsigned	
179	ECU Temp.	(-100-300)	1	°C	16-bit Signed	
180	DPF Lamp	/	/	/	16-bit Unsigned	0: Off 1: Always on 4: Flashing
181	Reserved	/	/	/		
182	Reserved	/	/	/		
183	DPF Regen. Inhibit Lamp Status	/	/	/	16-bit Unsigned	0: Off 1: Always on
184	High Exhaust Temp. Alarm Lamp Status	/	/	/	16-bit Unsigned	0: Off 1: Always on
185	Driver Alarm Lamp Status	/	/	/		0: Off 1: Always on 4: Flashing
186	Genset Status	/	/	/	16-bit Unsigned	Genset Status
187	Genset Status Delay	(0-3600)	1	s	16-bit Unsigned	
188	Remote Start Status	/	/	/	16-bit Unsigned	0: None 1: Start Delay 2: Starting 3: Stop Delay
189	Remote Start Delay	(0-3600)	1	s	16-bit Unsigned	
190	Mains Status	/	/	/	16-bit Unsigned	0: Mains Available 1: Mains Normal Delay 2: Mains Normal 3: Mains

Address	Items	Range	Ratio	Unit	Description	Remarks
						Abnormal Delay 4: Mains Abnormal 5: Blackout
191	Mains Delay	(0-3600)	1	s	16-bit Unsigned	
192	Total Running Hours MSB	(0-65535)	1	h	16-bit Unsigned	
193	Total Running Hours LSB				16-bit Unsigned	
194	Total Running Minutes	(0-59)	1	min	16-bit Unsigned	
195	Total Running Seconds	(0-59)	1	s	16-bit Unsigned	
196	Total Start Times	(0-65535)	1	/	16-bit Unsigned	
197					16-bit Unsigned	
198	Current Running Hours	(0-65535)	1	h	16-bit Unsigned	
199	Current Running Minutes	(0-59)	1	min	16-bit Unsigned	
200	Current Running Seconds	(0-59)	1	s	16-bit Unsigned	
201	1# Light Total Running Hours MSB	(0-65535)	1	h	16-bit Unsigned	
202	1# Light Total Running Hours LSB		1	h	16-bit Unsigned	
203	1# Light Total Running Minutes	(0-59)	1	min	16-bit Unsigned	
204	1# Light Total Running Seconds	(0-59)	1	s	16-bit Unsigned	
205	Reserved	/	/	/		
206						
207	1# Light Current Running Hours	(0-65535)	1	h	16-bit Unsigned	
208	1# Light Current Running Minutes	(0-59)	1	min	16-bit Unsigned	
209	1# Light Current Running Seconds	(0-59)	1	s	16-bit Unsigned	
210	2# Light Total Running Hours MSB	(0-65535)	1	h	16-bit Unsigned	
211	2# Light Total Running Hours LSB		1	h	16-bit Unsigned	
212	2# Light Total Running Minutes	(0-59)	1	min	16-bit Unsigned	
213	2# Light Total	(0-59)		s	16-bit Unsigned	

Address	Items	Range	Ratio	Unit	Description	Remarks
	Running Seconds					
214	Reserved	/	/	/		
215						
216	2# Light Current Running Hours	(0-65535)	1	h	16-bit Unsigned	
217	2# Light Current Running Minutes	(0-59)	1	min	16-bit Unsigned	
218	2# Light Current Running Seconds	(0-59)	1	s	16-bit Unsigned	
219	3# Light Total Running Hours MSB	(0-65535)	1	h	16-bit Unsigned	
220	3# Light Total Running Hours LSB		1	h	16-bit Unsigned	
221	3# Light Total Running Minutes	(0-59)	1	min	16-bit Unsigned	
222	3# Light Total Running Seconds	(0-59)	1	s	16-bit Unsigned	
223	Reserved	/	/	/		
224						
225	3# Light Current Running Hours	(0-65535)	1	h	16-bit Unsigned	
226	3# Light Current Running Minutes	(0-59)	1	min	16-bit Unsigned	
227	3# Light Current Running Seconds	(0-59)	1	s	16-bit Unsigned	
228	4# Light Total Running Hours MSB	(0-65535)	1	h	16-bit Unsigned	
229	4# Light Total Running Hours LSB		1	h	16-bit Unsigned	
230	4# Light Total Running Minutes	(0-59)	1	min	16-bit Unsigned	
231	4# Light Total Running Seconds	(0-59)	1	s	16-bit Unsigned	
232	Reserved	/	/	/		
233						
234	4# Light Current Running Hours	(0-65535)	1	h	16-bit Unsigned	
235	4# Light Current Running Minutes	(0-59)	1	min	16-bit Unsigned	
236	4# Light Current Running Seconds	(0-59)	1	s	16-bit Unsigned	
237	5# Light Total Running Hours MSB	(0-65535)	1	h	16-bit Unsigned	
238	5# Light Total		1	h	16-bit Unsigned	

Address	Items	Range	Ratio	Unit	Description	Remarks
	Running Hours LSB					
239	5# Light Total Running Minutes	(0-59)	1	min	16-bit Unsigned	
240	5# Light Total Running Seconds	(0-59)	1	s	16-bit Unsigned	
241	Reserved	/	/	/		
242						
243	5# Light Current Running Hours	(0-65535)	1	h	16-bit Unsigned	
244	5# Light Current Running Minutes	(0-59)	1	min	16-bit Unsigned	
245	5# Light Current Running Seconds	(0-59)	1	s	16-bit Unsigned	
246	6# Light Total Running Hours MSB	(0-65535)	1	h	16-bit Unsigned	
247	6# Light Total Running Hours LSB		1	h	16-bit Unsigned	
248	6# Light Total Running Minutes	(0-59)	1	min	16-bit Unsigned	
249	6# Light Total Running Seconds	(0-59)	1	s	16-bit Unsigned	
250	Reserved	/	/	/		
251						
252	6# Light Current Running Hours	(0-65535)	1	h	16-bit Unsigned	
253	6# Light Current Running Minutes	(0-59)	1	min	16-bit Unsigned	
254	6# Light Current Running Seconds	(0-59)	1	s	16-bit Unsigned	
255	Controller Software Version	(0-65535)	0.1	/	16-bit Unsigned	
256	Controller Hardware Version	(0-65535)	0.1	/	16-bit Unsigned	
257	Release Year	(0-99)	1	/	16-bit Unsigned	
258	Release Month	(1-12)	1	/	16-bit Unsigned	
259	Released Day	(1-31)	1	/	16-bit Unsigned	
260	Controller Date: Year	(0-99)	1	/	16-bit Unsigned	
261	Controller Date: Month	(1-12)	1	/	16-bit Unsigned	
262	Controller Date: Day	(1-31)	1	/	16-bit Unsigned	
263	Controller Date: Week	(0-6)	1	/	16-bit Unsigned	
264	Controller Time:	(0-23)	1	h	16-bit Unsigned	

Address	Items	Range	Ratio	Unit	Description	Remarks
	Hour					
265	Controller Time: Minute	(0-59)	1	min	16-bit Unsigned	
266	Controller Time: Second	(0-59)	1	s	16-bit Unsigned	
267	Lighting Tower Status	/	/	/	16-bit Unsigned	0: Stand Still 1: Mast Up 2: Mast Up Interval 3: Mast Down 4: Mast Down Interval 5: Lights Left 6: Lights Right 7: Lights Up 8: Lights Down
268	Reserved	/	/	/		
269	Illuminance	(0-2000)	1	Lx	16-bit Unsigned	
270	Light Luminance	(0-100)	1	%	16-bit Unsigned	
271	Batteries Total Voltage	(0-30000)	0.01	V	16-bit Unsigned	
272	Batteries Current	(-32767-32767)	0.01	A	16-bit Signed	
273	Batteries Power	(-32767-32767)	0.01	W	16-bit Signed	
274	Batteries SOC	(0-100)	1	%	16-bit Unsigned	
275	Batteries SOH	(0-100)	1	%		
276	Batteries Status	/	/	/	16-bit Unsigned	BMS Status
277	Charge/Discharge Cycles	(0-65535)	1	/	16-bit Unsigned	
278	PV Array Status	/	/	/	16-bit Unsigned	PV Array Status
279	PV Charging Status	/	/	/	16-bit Unsigned	PV Charging Status
280	PV Loading Status	/	/	/	16-bit Unsigned	PV Load Status
281	Array Voltage 1	(0-65535)	0.01	V	16-bit Unsigned	
282	Array Current 1	(0-65535)	0.01	A	16-bit Unsigned	
283 284	Gen. Power 1	(0-4294967295)	0.01	W	32-bit Unsigned	
285	Reserved	/	/	/		
286	Reserved	/	/	/		
287	Reserved	/	/	/		
288	Reserved	/	/	/		
289	Load Voltage	(0-65535)	0.01	V	16-bit Unsigned	
290	Load Current	(0-65535)	0.01	A	16-bit Unsigned	
291 292	Load Power	(0-4294967295)	0.01	W	32-bit Unsigned	

Address	Items	Range	Ratio	Unit	Description	Remarks
293	PV Daily Total Generation	(0-4294967295)	0.01	kWh	32-bit Unsigned	
294						
295	PV Monthly Total Generation	(0-4294967295)	0.01	kWh	32-bit Unsigned	
296						
297	PV Annual Total Generation	(0-4294967295)	0.01	kWh	32-bit Unsigned	
298						
299	PV Total Generation	(0-4294967295)	0.01	kWh	32-bit Unsigned	
300						
301	LCD Heating Percentage	(0-100)	1	%	16-bit Unsigned	
302	LCD Temp.	(-40-80)	1	°C	16-bit Signed	
303	MCU Temp.	(-400-800)	0.1	°C	16-bit Signed	
304	MCUID_H1	/	1	/	16-bit Unsigned	
305		/	1	/	16-bit Unsigned	
306	MCUID_H2	/	1	/	16-bit Unsigned	
307		/	1	/	16-bit Unsigned	
308	MCUID_L	/	1	/	16-bit Unsigned	
309		/	1	/	16-bit Unsigned	
310	simIMEI	/	1	/	16-bit Unsigned	
311		/	1	/	16-bit Unsigned	
312		/	1	/	16-bit Unsigned	
313		/	1	/	16-bit Unsigned	
314	Longitude	(-180000000-180000000)	0.000001	°	16-bit Signed	
315					16-bit Signed	
316	Latitude	(-90000000-90000000)	0.000001	°	16-bit Signed	
317					16-bit Signed	
318	Altitude	(-999.9-999.9)	0.1	m	16-bit Signed	
319					16-bit Signed	
320	GSM Signal Strength	(0-100)	1	/	16-bit Unsigned	
321	GPS Satellite Quantity	(0-100)	1	/	16-bit Unsigned	
322	Light ON Status	/	/	/	16-bit Unsigned	0: All Lights are off 1: Lights are being turned on 2: Lights are being turned off 3: All Lights are on
323	Light ON/OFF Status Delay	(0-3600)	1	s	16-bit Unsigned	
324	Current ON/OFF Light No.	(0-6)	1	/	16-bit Unsigned	

Address	Items		Range	Ratio	Unit	Description	Remarks
325	Current Light ON Quantity		(0-6)	1	/	16-bit Unsigned	
326	Starting Battery Start Status		/	1	/	16-bit Unsigned	0: Standby 1: Start Delay 2: Starting 3: Charging 4: Trickle Charging 5: Stop Delay 6: Start Failure
327	Starting Battery Start Delay		(0-3600)	1	s	16-bit Unsigned	
328	Batteries SOC/Voltage Low Start Status		/	1	/	16-bit Unsigned	0: Standby 1: Start Delay 2: Starting 3: Charging 4: Trickle Charging 5: Stop Delay 6: Start Failure
329	Batteries SOC/Voltage Low Start Delay		(0-3600)	1	s	16-bit Unsigned	
330 331	Total Generation:		(0-99999999)	0.01	kWh	32-bit Unsigned	
332 333	Generation in Current Start		(0-99999999)	0.01	kWh	32-bit Unsigned	
334	DM1 Alarm Type		/	/	/	16-bit Unsigned	
335	DM1 Alarm Quantity		/	/	/	16-bit Unsigned	
336	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	
337	Alarm 1	FMI OC	(0-65535)	1	/	16-bit Unsigned	
338	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	
339	Alarm 2	FMI OC	(0-65535)	1	/	16-bit Unsigned	
340	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	
341	Alarm 3	FMI OC	(0-65535)	1	/	16-bit Unsigned	
342	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	
343	Alarm 4	FMI OC	(0-65535)	1	/	16-bit Unsigned	
344	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	
345	Alarm 5	FMI OC	(0-65535)	1	/	16-bit Unsigned	
346	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	
347	Alarm 6	FMI OC	(0-65535)	1	/	16-bit Unsigned	
348	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	
349	Alarm 7	FMI OC	(0-65535)	1	/	16-bit Unsigned	
350	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	

Address	Items		Range	Ratio	Unit	Description	Remarks
351	Alarm 8	FMI OC	(0-65535)	1	/	16-bit Unsigned	
352	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	
353	Alarm 9	FMI OC	(0-65535)	1	/	16-bit Unsigned	
354	DM1	SPN	(0-524287)	1	/	16-bit Unsigned	
355	Alarm 10	FMI OC	(0-65535)	1	/	16-bit Unsigned	
356	DM2 Alarm Type		/	/	/	/	
357	DM2 Alarm Quantity		/	/	/	/	
358	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
359	Alarm 1	FMI OC	(0-65535)	1	/	16-bit Unsigned	
360	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
361	Alarm 2	FMI OC	(0-65535)	1	/	16-bit Unsigned	
362	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
363	Alarm 3	FMI OC	(0-65535)	1	/	16-bit Unsigned	
364	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
365	Alarm 4	FMI OC	(0-65535)	1	/	16-bit Unsigned	
366	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
367	Alarm 5	FMI OC	(0-65535)	1	/	16-bit Unsigned	
368	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
369	Alarm 6	FMI OC	(0-65535)	1	/	16-bit Unsigned	
370	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
371	Alarm 7	FMI OC	(0-65535)	1	/	16-bit Unsigned	
372	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
373	Alarm 8	FMI OC	(0-65535)	1	/	16-bit Unsigned	
374	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
375	Alarm 9	FMI OC	(0-65535)	1	/	16-bit Unsigned	
376	DM2	SPN	(0-524287)	1	/	16-bit Unsigned	
377	Alarm 10	FMI OC	(0-65535)	1	/	16-bit Unsigned	

NOTE 1: Actual value = data received * ratio. Take the Frequency as the example: if the data received is 5000 (1388H), ratio is 0.01Hz, then the actual frequency value is 50.00Hz (5000*0.01Hz).

NOTE 2: If the data received is 32766, it means there is no normal data, and "###" will be shown;

NOTE 3: Definition of signed number: Take the data received "8000H" as the example, convert it to binary number "1000 0000 0000 0000b". The MSB is 1, which means it is negative. The number minus 1 will get its 1's complement, then inverting it will get the absolute value of the negative number. Finally convert the absolute value to decimal number -32768.

EXAMPLE:

If "Controller Software Version" and "Controller Hardware Version" need to be read, check the table above and find their addresses are 255 and 256, so it needs to read two bytes of data.

Assuming the slave address is 01, the master request command is as following:

Table 7 Master Request Command

Slave Address	Function Code	Start Address (255)		Request Data Length (2)		CRC 16	
		MSB	LSB	MSB	LSB	LSB	MSB
01	**03**	**00**	**FF**	**00**	**02**	**F4**	**3B**

The slave response command is as following:

Table 8 Slave Response Command

Slave Address	Function Code	Data Length (Bytes)	Data				CRC 16	
			Data of Address 255 MSB	Data of Address 255 LSB	Data of Address 256 MSB	Data of Address 256 LSB	LSB	MSB
01	**03**	**04**	**00**	**0A**	**00**	**0D**	**1B**	**F4**

Fill the data received into the address respectively, as shown in the table below.

Table 9 Data Analysis

Address	Data Received (Hex)	Software Version	Hardware Version
255	000AH	1.0	
256	000DH		1.3

3.3 FUNCTION CODE 05H MAPPING REMOTE COIL FIELD

Table 10 Remote Coil Field

Address	Items	Description
1	Remote Start Key	Active when it is 0xff00
2	Remote Stop Key	
3	Reserved	
4	Remote Auto Key	
5	Remote Manual Key	
6	Remote Up Key	
7	Remote Down Key	
8	Remote Confirm Key	
9	Remote Return Key	
10	Remote Light ON Key	
11	Remote Light OFF Key	
12	Remote Emergency Stop	
13	Remote Lock	
14	Reserved	
15	Remote Output 1	Active when the output is configured as remote output. Output when it is 0xff00, not output when it is 0.
16	Remote Output 2	
17	Remote Output 3	
18	Remote Output 4	
19	Remote Output 5	
20	Remote Output 6	
21	Remote Output 7	
22	Remote Output 8	
23	Remote Output 9	
24	Remote Output 10	
25	Remote Output 11	
26	Remote All Lights ON	Active when it is 0xff00

Address	Items	Description
27	Remote All Lights OFF	
28	Auto Scheduler Light ON Mode	
29	Auto SMS Light ON Mode	
30	Auto Sunset Light ON Mode	
31	Auto Remote Light ON Mode	
32	Auto Lux Value + Scheduler Light ON Mode	
33	Auto Lux Value + Sunset Light ON Mode	
34	Auto Lux Value Light ON Mode	
35	Auto Scheduler Light ON Mode	

NOTE: The remote command in the table above only needs to be sent once.

Example:

If the controller is required to be set as Auto Scheduler Light ON Mode remotely, check the table first and find its remote address is 27.

Assuming the slave address is 01, the master request command is as following:

Table 11 Master Request Command

Slave Address	Function Code	Remote Address (27)		Remote Data		CRC 16	
		MSB	LSB	MSB	LSB	LSB	MSB
01	05	00	1B	FF	00	FC	3D

The slave response command is as following:

Table 12 Slave Response Command

Slave Address	Function Code	Remote Address (27)		Remote Data		CRC 16	
		MSB	LSB	MSB	LSB	LSB	MSB
01	05	00	1B	FF	00	FC	3D

To check whether the remote command is successfully executed, you can send function code 03H to read the Auto Scheduler Light ON Mode status of address 1.1.

3.4 BMS STATUS

Table 13 BMS Status

No.	Status	Description
0	Status Abnormal	1 as active (low order)
1	Comm. Failure	1 as active
2	Over Voltage	1 as active
3	Under Voltage	1 as active
4	Over Discharge	1 as active
5	Fault	1 as active
6	Normal	1 as active

No.	Status	Description
7	Over Temp.	1 as active
8	Low Temp.	1 as active

3.5 PV ARRAY STATUS

Table 14 PV Array Status

No.	Status	Description
0	Status Abnormal	
1	Comm. Failure	
2	Input Over Current	
3	Anti-Reverse MOSFET Short Circuit	
4	Charging or Anti-Reverse MOSFET Open Circuit	
5	Charging MOSFET Short Circuit	
6	Input Voltage Normal	
7	No Input Power Connected	
8	Input Overvoltage	
9	Input Voltage Error	

3.6 PV LOAD STATUS

Table 15 PV Load Status

No.	Status	Description
0	Status Abnormal	
1	Comm. Failure	
2	Output Overvoltage	
3	Boost Overvoltage	
4	High Voltage Side Short Circuit	
5	Output Voltage Abnormal	
6	Unable to Stop Discharging	
7	Unable to Discharge	
8	Short Circuit (SC)	
9	Output Power Light Load	
10	Output Power Moderate	
11	Output Power Rated	
12	Output Power Overload	
13	Charge MOSFET Short Circuit	
14	Load Short Circuit	
15	Load Over Current	

3.7 PV CHARGING STATUS

Table 16 PV Charging Status

No.	Status	Description
0	Status Abnormal	
1	Comm. Failure	
2	No Charging	
3	Float Charging	
4	Boost Charging	
5	Equalization Charging	

3.8 GENSET STATUS

Table 17 Genset Status

No.	Content	Default (Range)	Description
0	Standby		No delay value is shown in the status
1	Preheat		
2	Fuel Output		No delay value is shown in the status
3	Crank		
4	Crank Rest		
5	Safety on Delay		
6	Start Idle		
7	High Speed Warming Up		
8	Wait for On-load		No delay value is shown in the status
9	Normal Running		No delay value is shown in the status
10	High Speed Cooling		
11	Stop Idle		
12	ETS		
13	Wait for Stop		
14	Stop Failure		No delay value is shown in the status

4 FAQ

4.1 COMMUNICATION FAILURE BETWEEN PC AND CONTROLLER

a)   Check the USB wiring connection.

b)   Check whether the controller is in Stop mode.

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