

# The CAN Communication Protocol

## 1. Communication Specification

### 1.1. The principles of data link layer

The rate of bus communication: 250 KBPS. The provisions of the data link layer the main reference CAN2.0 B and SAEJ1939 rules. Use CAN extend the frame and redefined, 29 identifier for 29 identifier allocation table below:

| IDENTIFIER 11BITS |    |    |    |    |                |    |    |    |    |    | SRR | IDE |
|-------------------|----|----|----|----|----------------|----|----|----|----|----|-----|-----|
| PRIORITY          |    |    | R  | DP | PDU FORMAT(PF) |    |    |    |    |    | SRR | IDE |
| 3                 | 2  | 1  | 1  | 1  | 8              | 7  | 6  | 5  | 4  | 3  |     |     |
| 28                | 27 | 26 | 25 | 24 | 23             | 22 | 21 | 20 | 19 | 18 |     |     |

| IDENTIFIER EXTENSION 18BITS |    |                  |    |    |    |    |    |   |   |   |                    |   |   |   |   |   |   |
|-----------------------------|----|------------------|----|----|----|----|----|---|---|---|--------------------|---|---|---|---|---|---|
| PF                          |    | PDU SPECIFIC(PS) |    |    |    |    |    |   |   |   | SOURCE ADDRESS(SA) |   |   |   |   |   |   |
| 2                           | 1  | 8                | 7  | 6  | 5  | 4  | 3  | 2 | 1 | 8 | 7                  | 6 | 5 | 4 | 3 | 2 | 1 |
| 17                          | 16 | 15               | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6                  | 5 | 4 | 3 | 2 | 1 | 0 |

Among them, the priority for three, can have eight priority, R general fixed to 0, DP is fixed to 0, 8 bits of PF is the code of a message, eight of the PS for target location or set of extensions, eight of the SA for sending the source address of this message.

- 1) Access networks of every node has a name and address, name of the node function is used to identify and address the arbitration, and address used for data communication node.
- 2) Each node has at least one kind of function, there may be multiple nodes have the same function, can also be a node has multiple functions.
- 3) Way for multibyte data, using the small end, such as 4660 = 0 x1234, first send 0 x34, second send 0x12.

### 1.2. The table of CAN network addresses

| The names of nodes        | SOURCE ADDRESS(SA) |
|---------------------------|--------------------|
| Car charger               | 0x64               |
| Battery management system | 0x36               |

### 1.3. Tormats of data

| Data        | Resolution | Ranges                              | Offset | Bytes |
|-------------|------------|-------------------------------------|--------|-------|
| Volume      | 0.1V/bit   | 0-5000 (0—500v)                     | 0      | 2BYTE |
| Current     | 0.1A/bit   | 3 2 0 0 - 4 0 0 0 ( - 4 0 0 — 400A) | -3200  | 2BYTE |
| Temperature | 1°C/bit    | 0-190 (-40—150°C)                   | -40    | 1BYTE |

## 2. Protocol message

### 2.1. BMS state (charge), information (charger)

| ID         |     | P                                                                                                 | PGN |                                                                                                                                                                                                                                                      |        |               | SA | Period |
|------------|-----|---------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|----|--------|
| 0x18E54024 |     | 6                                                                                                 | R   | DP                                                                                                                                                                                                                                                   | PF     | PS            | 36 | 500ms  |
|            |     |                                                                                                   | 0   | 0                                                                                                                                                                                                                                                    | 229    | 64            |    |        |
| DATA       |     |                                                                                                   |     |                                                                                                                                                                                                                                                      |        |               |    |        |
| Location   |     | Name                                                                                              |     | Resolution                                                                                                                                                                                                                                           | Offset | Ranges        |    |        |
| BYTE       | BIT |                                                                                                   |     |                                                                                                                                                                                                                                                      |        |               |    |        |
| BYTE1      | 7-2 | Reserved                                                                                          |     | Set 1                                                                                                                                                                                                                                                |        |               |    |        |
|            | 1-0 | Charger control                                                                                   |     | Bit 1 Bit 0<br>0 0 start charging<br><br>0 1 stop charging                                                                                                                                                                                           |        |               |    |        |
| BYTE2      | 7-0 | Highest voltage of charging<br>Uc=[UcH (Byte3 )<br>*256+UcL (Byte2 )<br>]*0.1                     |     | 0.1V/bit                                                                                                                                                                                                                                             | 0      | 0—500V        |    |        |
| BYTE3      | 7-0 |                                                                                                   |     |                                                                                                                                                                                                                                                      |        |               |    |        |
| BYTE4      | 7-0 | Maximum current of charging<br>Ic = - 3 2 0 0 +<br>[IcH (Byte 5 )<br>*256+IcL (Byte 4 ) ]<br>*0.1 |     | 0.1A/bit                                                                                                                                                                                                                                             | -3200  | -400—<br>400A |    |        |
| BYTE5      | 7-0 |                                                                                                   |     |                                                                                                                                                                                                                                                      |        |               |    |        |
| BYTE6      | 7-0 | Charger-LEDDIS                                                                                    |     | 0x00 R-<br>0x01 R<br>0x02 Y-<br>0x03 Y<br>0x04 G-<br>0x05 G<br>0x06-0xFF R-G-<br><br>Note:<br>1."-" represents led that does not light for 0.5s, a color word represents that the LED of this color lights for 0.2s.<br>2. R --red G —green Y—yellow |        |               |    |        |
| BYTE7      | 7-0 | Reserved                                                                                          |     | Set 0xFF                                                                                                                                                                                                                                             |        |               |    |        |
| BYTE8      | 7-0 | Reserved                                                                                          |     | Set 0xFF                                                                                                                                                                                                                                             |        |               |    |        |

The display of a charger would not be controlled by CAN communication, when the charger is broken. And what the fault type is in the following table.

|   |                                                                                                                                                      |                             |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 1 | Charger over-temperature protection                                                                                                                  | R-G-Y- - - Y(1)             |
| 2 | Input fault protection                                                                                                                               | R-G-Y-Y- - - Y(2)           |
| 3 | Communication failure                                                                                                                                | R-G-Y-Y-Y- - - Y(3)         |
| 4 | Internal temperature sensor fault                                                                                                                    | R-G-Y-Y-Y-Y-Y- - - Y(6)     |
| 5 | Output voltage feedback fault                                                                                                                        | R-G-Y-Y-Y-Y-Y-Y- - - Y(7)   |
| 6 | Low temperature start delay<br>(When the internal temperature of charger is between -20 to -30 ° C, the charger will delay starting for 1~2 minutes) | R-G-Y-Y-Y-Y-Y-Y-Y- - - Y(8) |

Note:

1."-" represents led that does not light for 0.5s, a color word represents that the LED of this color lights for 0.2s.

2. R --red G --green Y--yellow

## 2.2. Charger status, information

| ID         |     | P                         | PGN                                                        |        |        |    | SA | Period |
|------------|-----|---------------------------|------------------------------------------------------------|--------|--------|----|----|--------|
| 0x18EB2440 |     | 6                         | R                                                          | DP     | PF     | PS | 64 | 500ms  |
|            |     |                           | 0                                                          | 0      | 235    | 36 |    |        |
| DATA       |     |                           |                                                            |        |        |    |    |        |
| Location   |     | Name                      | Resolution                                                 | Offset | Ranges |    |    |        |
| BYTE       | BIT |                           |                                                            |        |        |    |    |        |
| BYTE1      | 7-6 | High temperature protect  | Bit 7 Bit 6<br>0 0 Low temperature<br>0 1 High temperature |        |        |    |    |        |
|            | 5-4 | input voltage             | Bit 5 Bit 4<br>0 0 no error<br>0 1 error                   |        |        |    |    |        |
|            | 3-2 | hardware status           | Bit 3 Bit 2<br>0 0 no error<br>0 1 error                   |        |        |    |    |        |
|            | 1-0 | Communication status      | Bit 1 Bit 0<br>0 0 no error<br>0 1 error                   |        |        |    |    |        |
| BYTE2      | 7-4 | Reserved                  | Set 0                                                      |        |        |    |    |        |
|            | 3-2 | Battery connection states | Bit 3 Bit 2<br>0 0 Battery connection<br>0 1 NO Battery    |        |        |    |    |        |
|            | 1-0 | Start state               | Bit 1 Bit 0<br>0 0 charging<br>0 1 no charging             |        |        |    |    |        |
| BYTE3      | 7-0 | Output voltage of         |                                                            |        |        |    |    |        |

|       |     |                                                                      |          |       |                 |
|-------|-----|----------------------------------------------------------------------|----------|-------|-----------------|
| BYTE4 | 7-0 | charging<br>Ucc=[UccH (Byte4 )<br>*256+UccL (Byte3 ) ]<br>*0.1       | 0.1V/bit | 0     | 0—500V          |
| BYTE5 | 7-0 | Output current of<br>charging                                        | 0.1A/bit | -3200 | -400—<br>400A   |
| BYTE6 | 7-0 | Icc = - 3 2 0 0 +<br>[IccH (Byte 6 )<br>*256+IccL (Byte 5) ]<br>*0.1 |          |       |                 |
| BYTE7 | 7-0 | temperature of<br>Charger                                            | 1°C/bit  | -40°C | -40°C~150<br>°C |
| BYTE8 | 7-0 | Reserved                                                             | Set 0xFF |       |                 |

- 3、In order to facilitate the customers multiple charge r used together, increase the rectification scheme of ID address.

### To change the ID address

|          |             |                                    |
|----------|-------------|------------------------------------|
| ID       | 0X 1A5A5A5A |                                    |
| DATA     |             |                                    |
| Location | Name        | Example : 0x18E54024<br>0x18EB2440 |
| BYTE0    | Receive ID  | 0X18                               |
| BYTE1    |             | 0XE5                               |
| BYTE2    |             | 0X40                               |
| BYTE3    |             | 0X24                               |
| BYTE4    | Send ID     | 0X18                               |
| BYTE5    |             | 0XEB                               |
| BYTE6    |             | 0X24                               |
| BYTE7    |             | 0X40                               |

### To confirm the changes of ID information

|          |             |                                    |
|----------|-------------|------------------------------------|
| ID       | 0X 15A5A5A5 |                                    |
| DATA     |             |                                    |
| Location | Name        | Example : 0x18E54024<br>0x18EB2440 |
| BYTE0    | Receive ID  | 0X18                               |
| BYTE1    |             | 0XE5                               |
| BYTE2    |             | 0X40                               |
| BYTE3    |             | 0X24                               |

|       |                |             |
|-------|----------------|-------------|
| BYTE4 | <b>Send ID</b> | <b>0X18</b> |
| BYTE5 |                | <b>0XEB</b> |
| BYTE6 |                | <b>0X24</b> |
| BYTE7 |                | <b>0X40</b> |