Longer's RS485 Protocol for BQ50-1J

1. Data Format: 1start + 8data + 1even parity + 1stop, 1200bps.

This defines the data format: 1 start bit, 8 data bits, one even parity bit, and one stop bit at 1200 bits per second.

2. Command Format: flag+ addr + len + pdu + fcs.

flag: E9H is the start **flag** of a command string. Every command string is preceded with the start of E9H.

- In one command string, there is no other E9H except start **flag** E9H. When transmitting, E8H is replaced by E8H 00H, and E9H is replaced by E8H 01H except start **flag**. When receiving, E8H 00H is replaced by E8H, and E8H 01H is replaced by E9H.

addr: Pump address (i.e. Pump I.D.#.), take up 1 byte.

- The pump address can be set from 1 to 30. 31(1F) is broadcast address.

- In a command string from the control computer, if the **addr** is pump address, the corresponding pump will execute the command and respond. And if the **addr** is broadcast address, all the pumps execute the same command, and pumps don't respond.

len: Length of **pdu**, take up 1 byte.

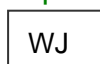**Fcs**: XOR of **addr**, **len**, **pdu**, take up 1 byte.

3. Pdu Format: application layer code format

3.1. Write Running Parameter

Control computer command string:

WJ	Rotate speed (2 bytes)	State1 (1byte)	State2 (1 byte)

Pump response:

WJ

- In a command string from the control computer, the **addr** can be pump address (1-30) and broadcast address (31). When the **addr** is pump address, the corresponding pump will execute the command and respond. When the **addr** is broadcast address, all the pumps execute the same command, and pumps don't respond.

3.2. Read Running Parameter

Control computer command string:

RJ

Pump response:

RJ	Rotate speed (2 bytes)	State1 (1byte)	State2 (1 byte)

- In a command string from the control computer, if the **addr** is one pump's address (1-30), the corresponding pump will respond.

3.3. Write Pump Address

Control computer command string:

WID	New pump I.D. #. (1byte)

Pump response:

WID

- In a command string from the control computer, the **addr** can be pump address (1-30) and broadcast address (31).
- Pump address can be set one by one with broadcast address.

3.4. Read Pump Address

Control computer command string:

RID

Pump response:

RID

- In a command string from the control computer, if the **addr** is one pump's address (1-30), the corresponding pump will respond.

APPENDIX

1. The command characters in the **pdu** are characters from the standard ASCII character set.

Command character	W	R	J	I	D
ASCII	57H	52H	4AH	49H	44H

2. The most significant byte is transmitted first and the least significant byte finally when transmitting rotate speed. The max speed is 50.0 rpm, i.e. 01F4 in hex.

3. State1: state byte 1.

    Bit 0 – start / stop bit, 1 to start the pump, 0 to stop the pump.

    Bit 1 – prime bit, 1 to prime the pump at the max speed 50 rpm.
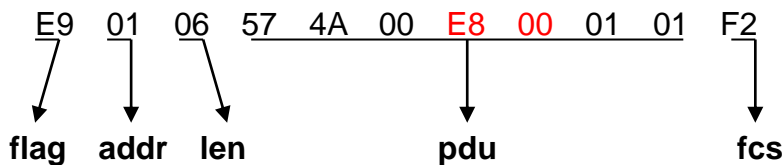
4. State2: state byte 2.

    Bit 0 – cw / ccw bit, 1 to run cw, 0 to run ccw.

5. Default **addr** : default pump address (i.e. Pump I.D.#.): 1.

6. Examples

    a. Write Running Parameter

   Control computer's command string:

   E9   01   06   57   4A   00   E8   00   01   01   F2

   flag   addr   len   pdu   fcs

   - The above command string from control computer will set running parameter of pump 1 as follows: run cw at 23.2 rpm.

   - When transmitting a command string, E8H is replaced by E8H 00H.

   Pump response:

   E9   01   02   57   4A   1E

7. DB-15 External Control Interface

     Pin 2 - RS485 B

     Pin 3 - RS485 A