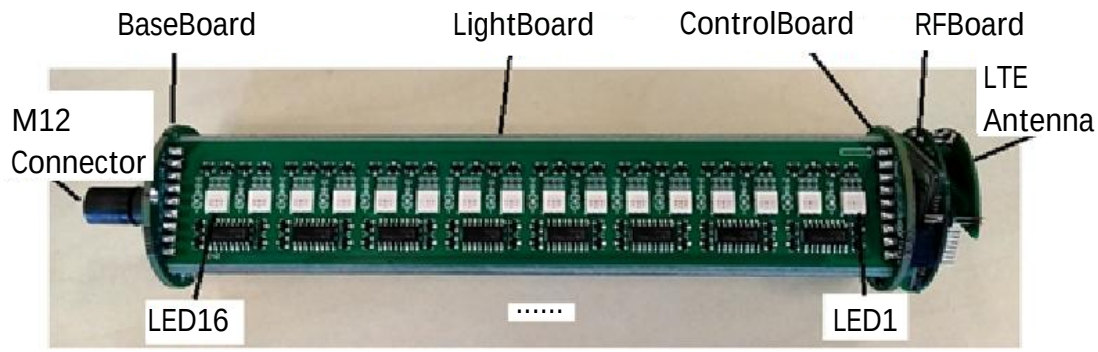
EIoT-LS SERIES

---- IO-Link Signal Light System Manual

CONTENTS

1 Basic Hardware Components of the Equipment



The entire column light assembly consists of five circuit boards:

Base Board: Equipped with an M12 connector, it introduces power supply (24V, GND) and machine status signals. It includes four digital input (DI) signal lines, one analog input (AI) signal line, and one mode selection line (MODE).

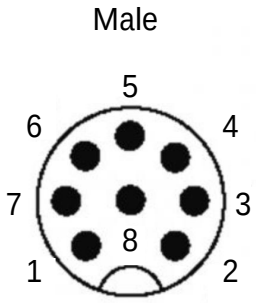
Light Boards: Three identical circuit boards. Each board contains 16 sets of four-color LED light clusters. The base board is numbered LED16 at one end and LED1 at the other, with sequential numbering from LED15 to LED2 in between. The real-time illumination status of each LED array is determined by the device's captured real-time machine status (M12) and built-in lighting rules.

Main Control Board: Features an MCU, model stm32L452.

RF Board: Houses LTE and BLE modules.

LTE Antenna: RF antenna.

2 M12 Interface Specifications



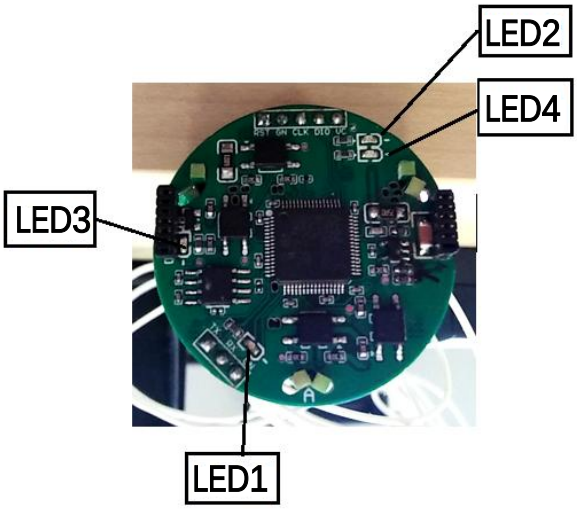
Pin	Function
1	24 VDC
2	0 VDC
3	DI 1
4	DI 2
5	DI 3

6	DI 4
7	AI 1
8	Mode Selection (0-Digital Only, 1-Digital Plus Analog)

3 Quick Start Guide for the Equipment

3.1 Equipment Indicator Lights

The main control board of the column light equipment features four LED indicator lights, positioned as shown in the diagram, with the following functions:



LED1: Thread Indicator. Device operation is divided into upgrade threads and service threads. LED1 flashes when running in an upgrade thread; LED1 remains solid when running in a service thread.

LED2: Power Indicator. LED2 remains solid when the M12 is connected to an external power source and the device hardware is functioning normally.

LED3: BLE Indicator. LED3 illuminates when the BLE module is enabled.

LED4: LTE indicator. Remains lit when the device is powered on and hardware is functioning normally.

3.2 Device Communication Methods

The column light device connects to IOTHUB 2.0 via LTE, allowing users to query real-time machine status (M12) through IOTHUB 2.0. It connects to a mobile app via BLE, enabling users to check real-time lighting status through the app.

Upon each power-up, the BLE module activates. Users configure the LTE connection's IP and port via BLE. After successful LTE connection, users can control the BLE module's on/off state via LTE.

3.3 LTE Communication

Pole light devices communicate with IOTHUB2.0 via LTE using the MQTT+JSON protocol.

Devices report device information (e.g., model) and real-time status (e.g., operational condition) to IOTHUB2.0.

IOTHUB2.0 issues commands to devices for BLE switching and over-the-air updates.

For detailed communication protocols between the pillar light equipment and IOTHUB 2.0, refer to the technical documentation titled “LTE Protocol (IOTHUB 2.0) - Smartlight20200.”

3.4 BLE Communication

The column light device communicates with the mobile app via BLE. The mobile app acts as the master to initiate communication, while the column light device responds as the slave. The BLE module's enable status is controlled by IOTHUB.

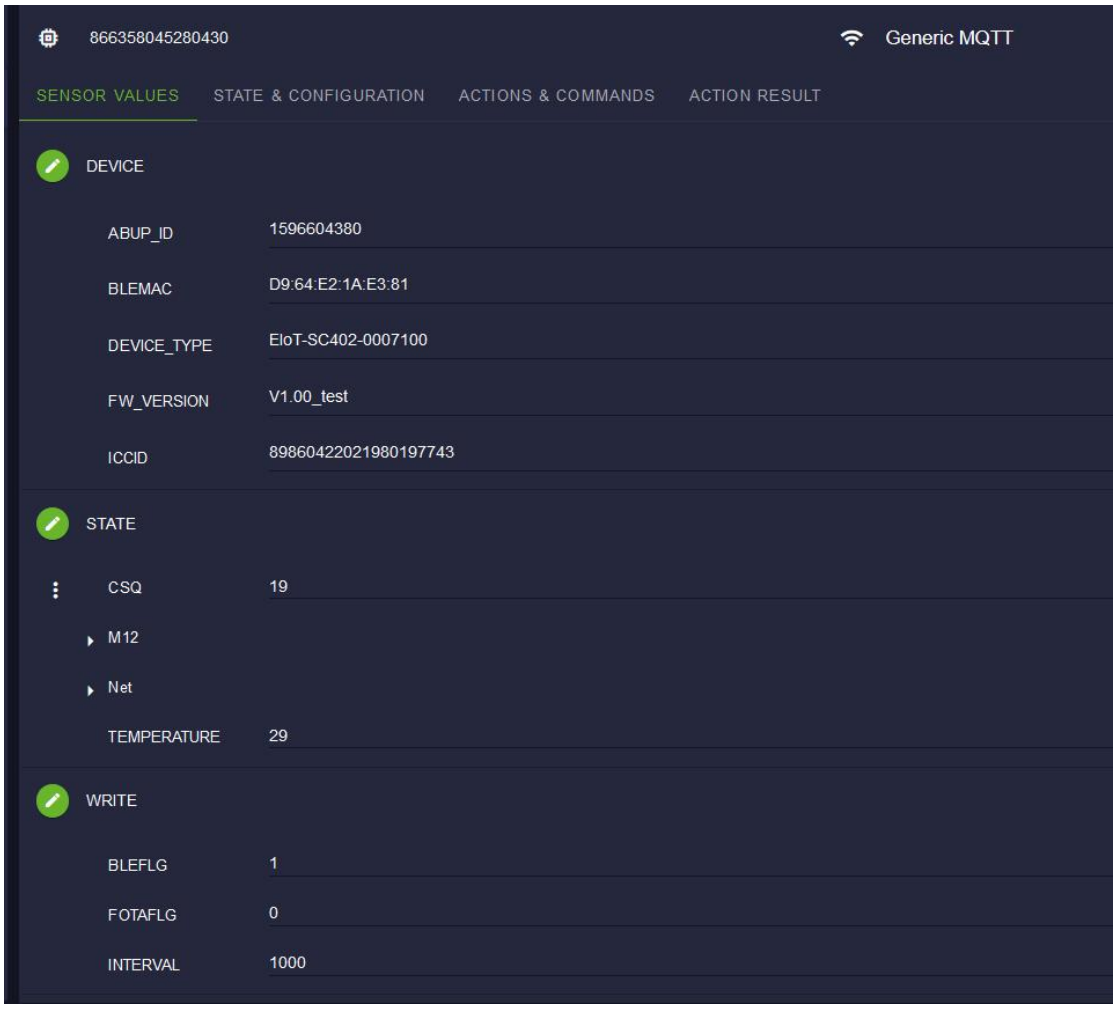
Users can use the mobile app to check real-time lighting status, modify default lighting rules, force the device to execute specified lighting states, issue exit commands, and access other functions.

Bluetooth communication with the column light device can be established via Bluetooth tools according to the specified protocol. For details on the communication protocol, refer to the technical documentation titled “MCU Bluetooth Protocol - SmartLight20200825.”

4 Management Platform Operation Guide

Management Platform Operation Guide

Users can manage pole light devices through the IOTHUB 2.0 platform. Within the IOTHUB 2.0 platform, the interface for a single pole light devic eis shown below. Only content under the “WRITE” section can be pushed to and parsed/executed by the pole light device.



4.1 DEVICE: Device Information

"ICCID":"89860422021980197743", //LTE SIM card ICCID

'BLEMAC':"D9:64:E2:1A:E3:81", //BLE module MAC address

"ABUP_ID":"1596604380", //ABUP project ID

'FW_VERSION':"V1.00_test", //Software version

"DEVICE_TYPE":"EIoT-SC402-0007100" //Device model

4.2 STATE：Real-time Equipment Status

"M12": //Machine Status

{

"DI":9, //Value formed by 4 digital inputs D0-D3

"AI":0, //Analog data current range value; partition rules see Note ①

"MODE":1 //Machine mode: 0-Digital read-only; 1-Digital + Analog

},

"TEMPERATURE":32, //Column light temperature (℃)

"CSQ":20, //LTE signal strength

"Net": //Network status (not saved after power loss)

{

"ConnectCnt":1, //(per power-up) Device network connection count

"StateCnt":0, //(per power-up) Device data upload count

"WriteCnt":0 //(per power-up) Remote data transmission count

}

Note ①: Analog current partitioning rules

Current < 2mA, reading = 0;

2mA ≤ Current < 5mA, reading = 1;

5mA ≤ Current < 6mA, reading = 2;

6mA ≤ Current < 7mA, reading = 3;

7mA ≤ Current < 8mA, reading = 4;

8mA ≤ Current < 9mA, reading = 5;

9mA ≤ Current < 10mA, reading = 6;

10mA ≤ current < 11mA, reading = 7;

11mA ≤ current < 12mA, reading = 8;

12mA ≤ current < 13mA, reading = 9;

13mA ≤ current < 14mA, reading = 10;

14mA ≤ current < 15mA, reading = 11;

15mA ≤ current < 16mA, reading = 12;

16mA ≤current＜17mA，Reading=13；

17mA≤current＜18mA，Reading=14；

18mA≤current＜19mA，Reading=15；

19mA≤current＜20mA，Reading=16；

20mA≤current＜22mA，Reading=17；

current≥22mA，Reading=18。

4.3 WRITE：Server Data Description

Note: Only this field can be pushed and parsed/executed by the column light device

“FOTAFLG”:0, // Over-the-air upgrade flag, ‘1’: upgrade; “0”: no upgrade

“INTERVAL”:1000, // Column light auto-reporting interval, in ms. Note 2

“BLEFLG”:0 //BLE module power toggle, “1”: On; “0”: Off

//BLE module turns on when pole light powers up, then controlled by IOTHUB

Note 2:

Pole lights actively report when machine status changes. When machine status remains unchanged, they report at the “INTERVAL” specified time interval. “INTERVAL” range: 1–2,000,000 seconds.