Project：C388-V2.0 Inflate device
Date：Sep.23rd 2023

Catalogue

一、 Scenario 1 State

（1）The user needs to sit on the occupancy sensor.

（2）When the occupancy sensor operation is detected, the device inflation operation is initiated

（3）After the occupy sensor is working，PSI is default to 1.8。Let's start with the odd side （1、3、5、7）inflate，After inflation reaches 1.8 PSI，The valve holds this pressure value for 0.5 minutes by default，after 0.5 minutes，odd edge（2、4、6、8）start passive air transfer，transfer default 10 seconds。After 10 seconds of transmission, the PSI value is detected. If the PSI value is 0 at this time, the same charging and deflating action is carried out on the even edges (2,4,6,8) according to the above default values

（4）If the occupy sensor works, the device repeats the alternating pressure cycle. Otherwise, the device does not repeat the alternating pressure cycle

二、 Scenario 2 State

（1）The user needs to sit on the occupancy sensor.

（2） app need send command，like（SP:2.5E SK:0.5E ST:0.5E）these three command send to MCU。Please see the instructions in this article.

（3）For details about the operation of the device after the command is sent, refer to points (3) and (4) of Scenario 1，At this time, each parameter value is not the default value, but the value set by the mobile App

三、 Occupy sensor State

（1）Regardless of whether the working mode is Scenario 1 or Scenario 2, the occupied sensor must be enabled; otherwise, the device cannot be started

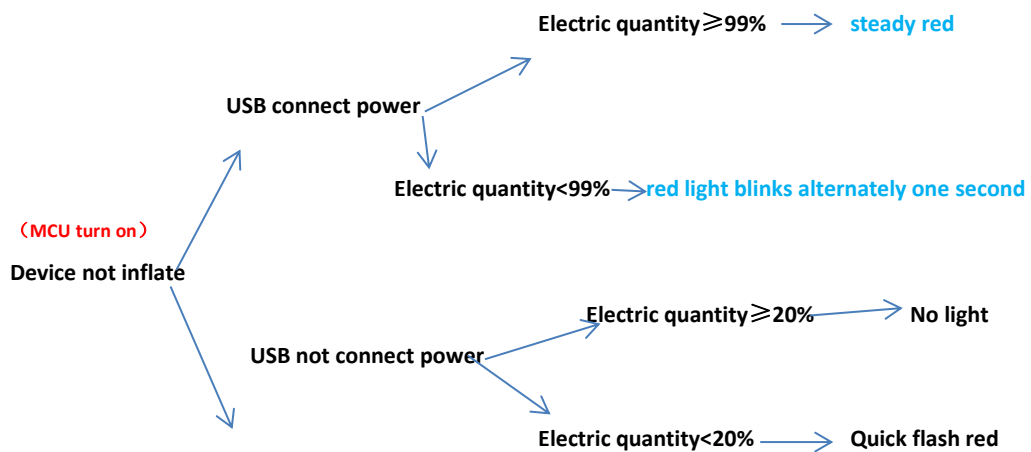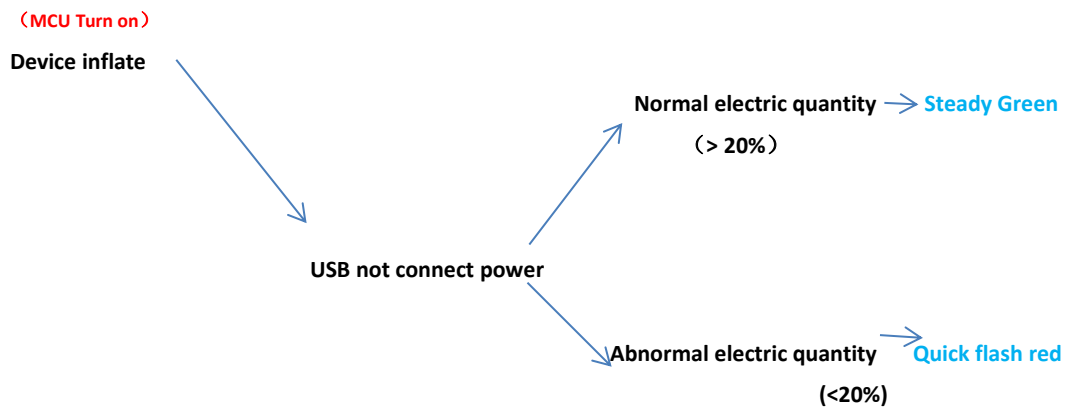（2）When the equipment is inflating, if the user gets up midway, the equipment inflating operation stops.

四、 Silicone Button State

（1）When the device is powered off, click 1 second to enter the inflate state. When device inflate ,click 1 second to stop inflate .

<center>2</center>

五、 Indicator light state

USB connect power ⟶ Steady green

（**MCU Turn on**）
Device inflate

USB not connect power

Normal electric quantity → Steady Green
（＞**20%**）

Abnormal electric quantity Quick flash red
(<20%)

Electric quantity≥99% → steady red

USB connect power

Electric quantity<99% → red light blinks alternately one second

（**MCU turn on**）
Device not inflate

USB not connect power

Electric quantity≥20% → No light

Electric quantity<20% → Quick flash red

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六、**app command send**

(1) Query battery level information（B）

App needs to send command B: to query the current battery level information of the device, the corresponding hexadecimal number of this comman 0x42, 0x3a When the MCU receives this command, it will return the current power data value, for example, the app will receive data like 72, which represents that the current battery power is 72%.

(2) Queries the current PSI value of the device (P)

App needs to send command p: to query the current PSI information of the device, the corresponding hexadecimal number of this instruction is 0x70, 0x3a 。The MCU will return the current PSI value when it receives this command, e.g. the App will receive data like 1.2, which represents the current PSI value of 1.2

(3) Query the PSI value set by the device operation (SP)

App needs to send command P: to query the PSI value information set by the device operation, the corresponding hexadecimal number of this instruction is 0x50, 0x3a
When the MCU receives this command, it will return the current PSI data value, e.g., the App will receive data such as 1.8, which represents the current PSI value set to 1.8

(4) Check the air pressure holding time set for equipment operation (ST)

App needs to send command T: to query the hold time set by the device operation, the corresponding hexadecimal number of this instruction is 0x54, 0x3a
When the MCU receives this command, it will return the hold time data value, for example, the App will receive data such as 30, which represents the current air pressure hold time is set to 30 seconds

(5) Inquire about the passive air transfer time of the equipment (SK)

App needs to send command K: to query the passive air transfer time set by the device operation, the corresponding hexadecimal number of this instruction is 0x4B, 0x3a When the MCU receives this command, it will return the corresponding time data value, e.g., the App will receive data such as 10, which represents that the current passive air transmission time is set to 10 seconds

(6) Check Occupancy Times (O)

App needs to send command O: to query the occupancy time when the device is running, the corresponding hexadecimal number of this instruction is 0x4F, 0x3a
The MCU will return the occupancy time data value after receiving this instruction, for example, the App will receive data like 1024, which represents the current occupancy time of 1024 seconds

(7) Check non-occupancy time (U)

App needs to send command   U: to query the unoccupied time when the device is running, the corresponding hexadecimal number of this instruction is 0x55, 0x3a When the MCU receives this command, it will return the non-occupancy time data value, for example, the app will receive data like 68, which represents the current non-occupancy time of 68 seconds

(8) Query Occupancy Sensor Status (L)

App needs to send command L: to query the status of the seat sensor when the device is running, the corresponding hexadecimal number of this instruction is 0x4C, 0x3a When the MCU receives this command, it will return the occupancy sensor status data value, such as the App will receive data such as 1, which means the current occupancy sensor is working, such as the App will receive data such as 0, which means the current occupancy sensor is not working.

(9) Query RTC

App needs to send command R:RTC to query the current running time of MCU, the corresponding hexadecimal number of this instruction is 0x52, 0x3a,0x52,0x54, 0x43 Before the App sends a command, please check whether the command to be sent corresponds to the hexadecimal number provided. When MCU receives this instruction, it will return the current running time data, such as time:23:07:25-14:14:53 to the app.

（10）Update RTC

After the completion of the upgrade of the device default run 00 years 00 months 00 days 00 hours 00 minutes 00 seconds, need to be adjusted through the app, the app needs to send instructions as follows W:23:07:25:10:30:08 This instruction corresponds to the hexadecimal number 0x57,0x3a,0x32,0x33,0x3a,0x30,0x37, 0x3a, 0x32, 0x35, 0x3a, 0x31, 0x30, 0x3a, 0x, 0x33, 0x30, 0x3a, 0x30,0x38

This command means to change the current RTC time to July 25, 2023 at 10:30:08 AM **Please reflect all data digits as even numbers.**，For example, in July, a 0 should be added in front of the number 7 to change it to 07, and 8 seconds should be added in front of a 0 to change it to 08 seconds, because MCU needs to receive hexadecimal data, and the data bit format should be sent in the form of an even number.**Please send the data to MCU 1 second in advance of the setting time, and MCU will return OK command to App after receiving the command successfully.**

（11）Launch Scene 2

App needs to send three commands, there is no requirement for the order of commands to be sent, but the three commands must be sent, and the commands need to be sent completely without error, otherwise the MCU refuses to receive the command. These three commands, such as SP:1.8E SK:1.0E ST:0.5E Each of these three instructions corresponds to a hexadecimal number of **0x53**,0x50,0x3a,0x31,0x2e,0x38,**0x45** **0x53**,0x4b,0x3a,0x31,0x2e,0x30,**0x45** **0x53**,0x54,0x3a,0x30,0x2e,0x35,**0x45** Where the first hexadecimal data is the start code, the MCU will not start receiving the later data until it receives 0x53, and will not start to end receiving the data until it receives the end code 0x45, and all the data should be accurate, otherwise the data is invalid.

These three commands are explained as follows SP:1.8E The 1.8 in the data represents that the PSI is set to 1.8. 1.0 in the SK:1.0E data represents that the valve exhausts for 1x10=10 seconds, and then for example, the 2.5 in the data represents that the valve exhausts for 2.5x10=25 seconds. 0.5 in the ST:0.5E data represents that the PSI is maintained at the value hold time of 0.5x60=30 seconds, and then 1.0 represents maintaining that PSI value hold time of 1.0x60=60 seconds. The legitimacy of these data is limited to those provided in the previous development documents (0.5,1.0,1.5,1.8,2.0,2.5,2.8,3.0), and data not declared in the development documents are invalid. When setting the parameters, please fill in the data strictly according to the data provided in the development document.

Attention:

1, the parameters set by these three commands only support (0.5, 1.0, 1.5, 1.8, 2.0, 2.5, 2.8, 3.0), these data are provided by the development documents, the parameters set please enter according to these data, other data is invalid！！！！！！！！！！！！！！！！

2、Don't send each instruction at the same time, please send one instruction at an interval of 500 milliseconds.

（12）Low Power Mode (Shutdown Command)

App needs send command **w:SD** to MCU ,This instruction corresponds to the hexadecimal number 0x77,0x3a,0x53,0x44, the instruction must be sent in full, otherwise it can not enter the low-power mode The MCU will return the SD command to the App after receiving the command successfully.

（13）Query one month's data method（It takes about 15 minutes to complete the query and return the data to the app if the data is available for that month.）

The device records data every 1 hour and has a data storage capacity of 12 months. The order of data storage is Year, Month, Day, Hour, PSI, Occupancy Open Time, Occupancy Close Time, Valve Hold Time, Valve Close Time, and Battery Power Percentage, totaling 10 recorded data. There is no need to delete the data when it is full because the data for each time of each day of each month of the 12 months of the year has a uniquely determined address, and the data storage will store the data for each moment to the uniquely determined address. If last year's data is stored in a particular address area, it will be overwritten by this year's data. For example, if you start storing data at 1:00 on January 1, 2022, there are 10 members of the hourly data, which are stored in address 0, and the 10 members of the hourly data at 2:00 on January 1, 2022 are stored in address 1, and so on for each hourly data storage address. The 10 member data in these hours are stored in uniquely determined addresses until the next year's corresponding hourly hour is stored, and the data for the corresponding hour of the previous year is not cleared and overwritten.

App needs send command like **C:ALL:7E** to MCU The hexadecimal number corresponding to this instruction is   0x43,0x3a,0x41,0x4c,0x4c,0x3a,0x37,0x45 This command means to query all the data available in the July record and give the data to the app.Parameters are only allowed to be entered（1,2,3,4,5,6,7,8,9,10,11,12）. Parameters must not be in the form of an even number of digits, except for the months of October, November, and December. For other months, please input the month parameter data directly, and it is forbidden to make up 0. When MCU receives the command successfully, it will return OK command to the app.

After receiving the complete command, the MCU first parses the data for the month of July to see if it exists, and if it does, the app will receive the

year:23   Note: 2023 Year

month:07   Nore: 07 monthy

day:25   Note: 25 day

hour:10   Note: a.m.(10-1)=9 hour

P:1.5   Note: The data P:1.5 indicates that the PSI value at that time was set at 1.5

occupy on:35   Note: Show the recorded time of occupancy,35 minutes

occupy off:25   Note: Shows the non-occupied time recorded at the time,25 minutes

valve on:30   Note :Show the time recorded for the valve to maintain pressure at that time,30 seconds

valve off:60   Note: Show the valve exhaust time recorded at that time,60 seconds

B:68   Note: The electricity level was 68%

Once the query is over, then the app will receive instructions such as F:102 , This command represents a total of 102 messages queried for that month's data

(14) Erase the whole flash (user should not operate, otherwise the machine will not work normally)

App needs to send the command f:erase to MCU, the corresponding hexadecimal number of the command is

0x66,0x3a,0x65,0x72,0x61,0x73, 0x65, this instruction can only be used once when the manufacturer factory upgrade program, do not operate at any time, otherwise it will lead to the loss of all data! Please wait for 1 minute...... the device does not work properly, after the operation, the app will receive the message Please wait for 1 minute!

Erase successful message will be sent to you. Otherwise, the app will receive a Prohibit operation Flash message.

七、 app command receive

(1) Turn on prompt command.（UP）

When the device is normal, the app will receive commands every 1 second UP

(2) Charge full command（FC）

When the battery is full the app will receive a command   FC

(3) Low battery alert（LBL）

App receives a command when the battery is too low LBL

(4) Successful data saving prompt（DSS）

When the data is saved successfully the app will receive the command DSS

(5) Inflation Abnormal Alert（ED、AG）

App receives instructions when an abnormality occurs during the inflation process ED or AG

The reasons for the abnormality are as follows

1、PSI value is detected to be abnormally high

2、Inflation time up to 90 seconds PSI value has not reached the set PSI value

3、The detected air pressure value is higher than the set PSI value when inflation starts.

Please check whether the air tube or pump is normal, whether the line is in good contact, whether the MCU is working normally.

(6) Gas Leakage Notification（GL）

A gas leak is indicated if a PSI value of <0.2 is detected during the time that the device maintains a hold of air pressure，App receive the command GL

(7) PSI error notification（LT）

The time that the equipment is maintained at a maintained air pressure If detect PSI<PSI-0.2 or PSI>PSI+0.2，Then the air pressure value error is large and the App will receive the command LT

Appendix

1、About RTC, in order to ensure that the database data storage is normal, please ensure that the button battery stable power supply, and from time to time to check the device RTC time, if the device running time is not normal, please adjust in time.（**It is recommended that when the mobile app is connected, the app automatically sends a time update command to the MCU for time calibration**）

2、Due to the electrical level jitter caused by the mechanical nature of the silicone key, it is recommended to press the silicone key for 1 second to inflate the start and stop

3、If the software has requirements for the inflation order of inflating odd and even sides, it can be adjusted by simply exchanging the control interfaces of the two valves.

4、Regarding the power level, when the power level is lower than 20%, the MCU operates normally, but the pumps and valves may not operate normally, at this time, if you start the device to inflate, the device will automatically terminate inflation within 20 seconds, and accompanied by a red light flashing rapidly, please recharge the device in time when the power level is lower than 20%

5.When the device is switched on and off, whether it is closed by App or closed by silicone button, please turn it on again after 5 seconds. Because of MCU in the closed equipment, need to store data, and refresh data, disconnect the power operations such as, need some time!!

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The device has been evaluated to meet general RF exposure requirement.

The device can be used in portable exposure condition without restriction.