

Design and Simulation of Instrument Panel for Pure Electric Vehicle

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Abstract—This design is based on the traditional automobile dashboard, aiming at the development and design of the instrument panel of the pure electric vehicle training platform. As pure electric vehicles, dashboard and traditional dashboard not only have the same parts, but also different parts, This design analyzes the functions and characteristics of the traditional and pure electric vehicles respectively, combined with the training of teaching and practical working principle, to design and simulation of training platform.

Keywords— Pure Electric Vehicles; Training Platform; The Dashboard

I. FOREWORD

In recent years, electric vehicles boom continues to heat up, whether in use or maintenance, the electric car is different from the traditional car, so the school undertakes the task for training the relevant professionals. If the classroom is only the use of theoretical knowledge for teaching, is not feasible, is an armchair strategist. It is under these circumstances, the development of pure electric vehicle teaching equipment is of great significance.

II. ANALYSIS AND POSITIONING

As pure electric vehicles, compared to traditional cars, it does not have an engine, replaced by a power battery, at the same time, the pure electric vehicle not have the traditional engine water temperature sensor, oil pressure gauge and so on, so the display of the dashboard has changed accordingly. The design is based on pure electric vehicle training equipment for the development of the dashboard, a comprehensive simulation of pure electric vehicles in the actual operation of the display state, the image and intuitive, so that students understand more fully.

III. INSTRUMENT PANEL DESIGN

A. Introduction to MCGS









MCGS configuration software is the whole Chinese industrial control configuration software, mainly used to complete the field data collection and monitoring, front-end data processing and control, MCGS embedded version of the configuration software interface is simple and flexible, rich multimedia picture, and has a strong Network function, support a variety of hardware devices. So the design uses MCGS embedded version of the configuration software to complete the design.

B. Display contents of instrument

Since pure electric vehicles have changed in structure compared to conventional cars, the display on their dashboard is bound to change, retain the partial display of the original traditional car, the left and right turn lights, fog lights, headlight headlamp, etc^[1-2], also increased motor overheating,

charging connection indicator lamp, charging reminder lamp, power battery cutting, running ready indicator lamp, etc^[2-4]. Dashboard to increase the display as shown in Table 1.

TABLE I PURE ELECTRIC CAR DASHBOARD ADDED SIGN

Appellation	Identification	Function
Running preparation indicator lamp		When it receives a signal from the vehicle controller, the light is on, indicating that the vehicle can travel. If there is a fault, the lamp not bright.
System fault lamp		Light up when power system failure or communication failure occurs.
Battery charging fault lamp		When the battery is charging or the battery voltage is low, the lights are lit and signal provided by the vehicle controller.
Charging reminder lamp		When the electricity is too low, the indicator light is lit, remind to recharge.
Power battery fault alarm lamp		When the signal from the vehicle controller is received, the alarm light is on, indicating a possible failure of the power battery.
Motor overheat indicator lamp		When the motor temperature is too high, the indicator light to receive the vehicle controller signal will light up, this time, should stop and cooling.
Power battery cut off indicator lamp		The indicator lamp is on, indicates that the power accumulator can not provide the power source, and the battery power has been cut off.
Charging connection indicator lamp		When the indicator light is on, indicate the charging line connection.

The signs in table 1 are unique to pure electric vehicles, table 1 described the functions of each flag, there are national standards for the colors and design of each display sign, in which red represents danger, important reminder, yellow represents warning, fault, green, blue or white represents instructions or confirms the enable.

C. Graphical interface design

Open the MCGS embedded version of the configuration software, click the file, in the drop-down menu, select the new project, select the corresponding touch screen model, taking into account the requirements of teaching, the design uses the TPC1061Ti, the resolution is 1024 X 600, 10.2, "TFT LCD screen", "ARM CPU", the main frequency is 600MHz, 128M, DDR2128M, NAND, Flash. According to the previous research to determine the display of the instrument, the use of software to provide various types of components

for the design of the screen, while the display elements in the screen for attribute design, dashboard design shown in Figure1.



Figure 1 Dashboard Design Interface

D. Analog simulation

After the graphical interface design and various variables are added,click on the run policy window, design the corresponding policy block, taking into account the versatility of the program, in this design, a loop strategy is designed to control the display of each variablecorresponding flag. After the running strategy is written, click on the device window and add the device inside, the parent device uses the universal

serial parent device, sub equipment selection is Modicon ModbusRTU.Because it is not in practice collect signals of all kinds of signs, therefore, the use of Modbus slave software, acquire the analog and digital quantities, so as to achieve the effect of simulation.

IV. SUMMARY

In this design, the dashboard display interface design and simulation, achieved the desired effect, all kinds of signs and colors of the dashboard are according to the national standard, in addition,taking into account the most important part of this design is to practice teaching,therefore, the dashboard display icon in addition to the national standard requirements, also some common parameters of the display, to meet the requirements. The design of the screen clear, rational layout, display icon specification, for teaching and training is of great significance.

REFERENCES

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