

Industrial Network Communication and Application Based on S7 - 400

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Abstract—The industrial network communication and application based on advanced automation process control system are used for industrial network communication to realize the configuration among PLC, HMI touch screen, communication module, interface module, DP / PA Link and DP / PA coupler, and a set of analog sorting system and a set of temperature measurement system are designed.

Keywords—S7-400; advanced automated process control system; industrial networking

I. INTRODUCTION

The more reliable s7 - 400 can better solve the problem of industrial automation control. In addition, with the widespread application of many high-tech technologies in daily life, various kinds of electromagnetic interference in urban air are becoming more and more serious [1-2]. In order to ensure the reliability and stability of traffic control, it is necessary to select plc that can work normally under the bad environment of electromagnetic interference. This paper mainly uses Wincc step 7 for system configuration and function realization, and uses Siemens plc s7 - 400 to design a set of analog sorting system and a set of temperature measurement system [3-4]. Complete the following functions: Press the start button to start the system. There are three kinds of materials: white plastic block, black plastic block and silver metal block. Inductance sensor detects metal block[5]; The optical fiber sensor 1 detects a white plastic block; The optical fiber sensor 2 detects a black mass. After that, the metal block is pushed into the chute 1 by the cylinder 1; The white block is pushed into the chute 2 by the air cylinder 2; The black block is pushed into the chute 3 by the cylinder 3. and counted separately by a counter. Press the stop button to stop the system after the last material enters the material bin. Press the reset button to reset the counter.

II. HARDWARE CONFIGURATION AND NETWORK ESTABLISHMENT

Configuration hardware is an important function of step 7 software, and it is to set and modify the parameters of plc hardware module. The configuration hardware includes two parts, namely, configuration hardware module and setting parameters. Figure 1 is a diagram of hardware configuration and network establishment of the system.

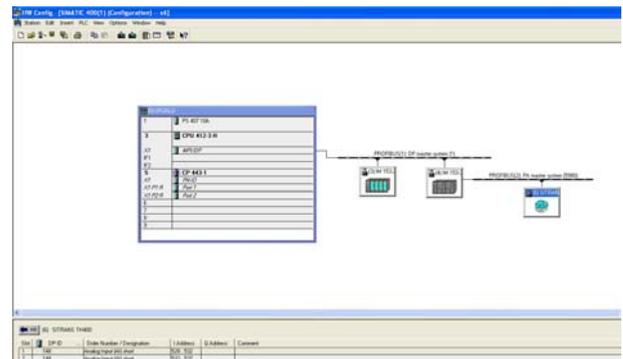


FIGURE I. HARDWARE DOWNLOAD

III. PROGRAMMING AND DEBUGGING

A. Main Program Sensor Detection

Figures 2 and 3 are partial programs, where figure 2 is a cylinder start program.

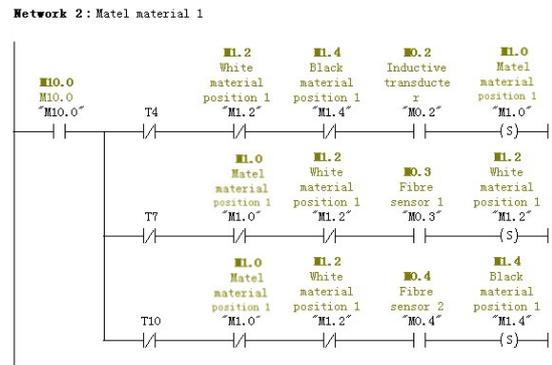


FIGURE II. SENSOR DETECTION PROCEDURE

B. Main Program Cylinder Start

Figure 3 shows the main program cylinder startup program.

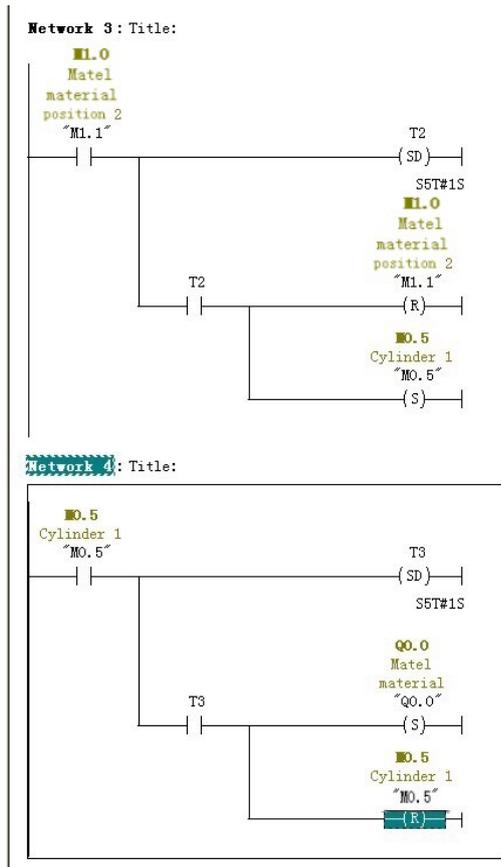


FIGURE III. CYLINDER START PROCEDURE

IV. MONITOR SCREEN DESIGN

A. Establish a Connection

First of all, it is necessary to establish the contact between touch screen and plc, click on the link, find out the input of touch screen address and plc address, and select Ethernet connection for the network.

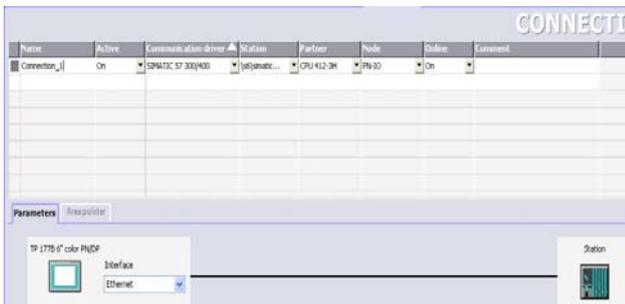


FIGURE IV. ESTABLISHING A SCREEN CONNECTION

B. Establish Variables

In order for plc and touch screen to be connected, the same variables must be established.

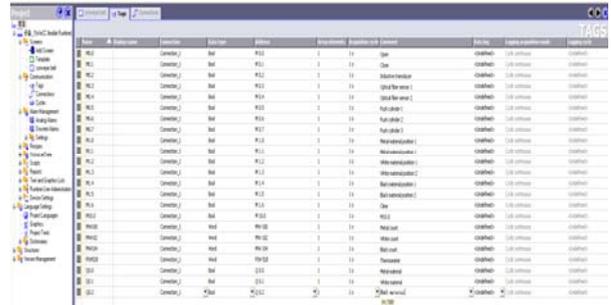


FIGURE V. TOUCH SCREEN I/O SETTINGS

V. SCREEN DESIGN

A. Sorting Station and Thermometer Screen

Figure 6 shows the screen of the sorting station. metal materials, white non-metal materials and black non-metal materials can be sorted through the start button of the touch screen.

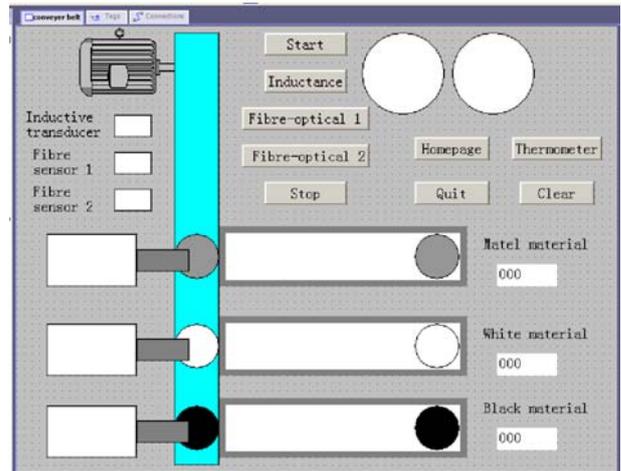


FIGURE VI. SORTING STATION SCREEN

Figure 7 shows the temperature acquisition interface of the thermometer. Through network data communication, the temperature acquisition of the load temperature measuring instrument can be displayed through the touch screen.

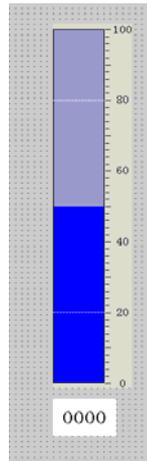


FIGURE VII. THERMOMETER SCREEN

VI. CONCLUSION

Using industrial network communication and application based on s7 - 400 to carry out industrial network communication, a set of analog sorting system and a set of temperature measurement system can be designed better.

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