

I-7000 Series Applied in the Alert System for IPE Equipment AA Flammable Gas

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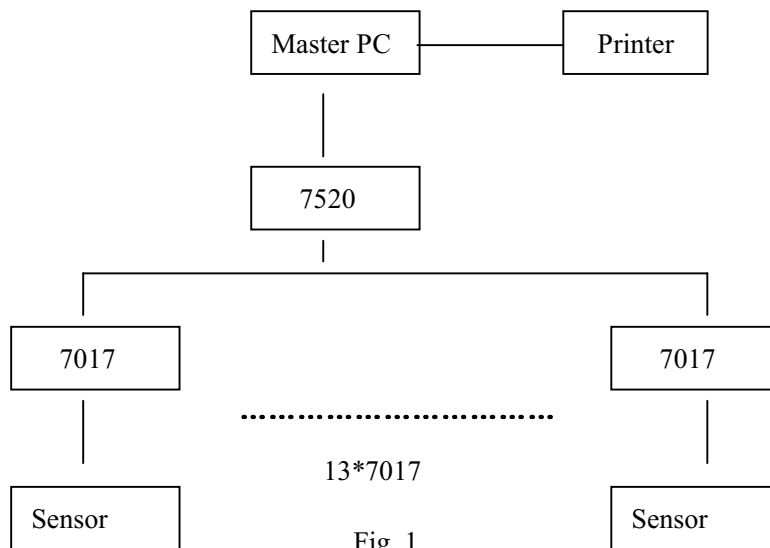
Abstract: Based on the alert system for IPE equipment AA flammable gas, this paper gives a detailed analysis to the architecture and application features of I7000 series.

Keywords: measurement and control, system, equipment

The flammability alert system is typically used in the field monitor and measurement in petrochemical plants to avoid serious accidents. Because the field environment is rather harsh with heavy electromagnetic interference, the requirements for reliability and stability for such measurement and control systems are very high. The dual-watchdog features of the ICPDAS modules ensure the security for such systems. The I-7000 configuration software provides full support for various features of the I-7000 modules beneficial to the system reliability and safety.

1. System Architecture

The front-end conditions that need to be monitored and measured in this system include flammable and toxic gases such as methane, ethane, CO, hydrogen etc. According to the regulations in industrial fields, there are 57 locations that need to be monitored. The density of the flammable gases are converted into electrical signals via appropriate sensors and transferred to the I-7017 modules, which convert these signals into digital ones and communicate with the central computer that has I-7520 modules via RS485 bus. The system architecture diagram is shown in Figure 1:



The central computer (the Master PC) uses industrial configuration software – I-7000 KingView - to automatically query data from different monitor locations, establish a visualized monitor interface of the industrial field, and create the alert information database.

2. Hardware Description

In the front end of the monitoring field, the fifty-seven analog signals are converted into digital signals via I-7017 modules, with a 16-bit resolution, a precision of 0.1%, a zero-drift of 0.03 of the full scale. The internal architecture is shown in Fig 2.

The insulating voltage of the isolated input channels can reach up to 3000VDC. The signals are acquired via embedded micro controller and then saved into the E2PROM and communicate with the master PC via RS485, and the data from all the monitoring points can be sent to the PC for analysis in real time.

RS-485 is a two-wire industrial field bus. Compared to the traditional RS-232, it uses differential transmission mechanism to transfer electrical levels, and has a significant improvement in the performance of anti-interference. Without repeater, the transmission distance can reach up to 1.2 KM at the speed of 9600 bps.

3. Software Configuration

The central computer uses I-7520 module to convert RS-232 signals into RS-485 and communicate with the I-7017 modules at the monitored points. The data is acquired via automatic polling. The address is designated using the utility 7000UILT of the I-7000 series. When the adopted baud rate is 19.2K, the polling interval can be limited within 500ms. This can meet the time requirement of this kind of systems.

We use the industrial configuration software for central information processing, which help us to create the project diagram and analysis reports. Figure 2 is the runtime screenshot of the KingView software.

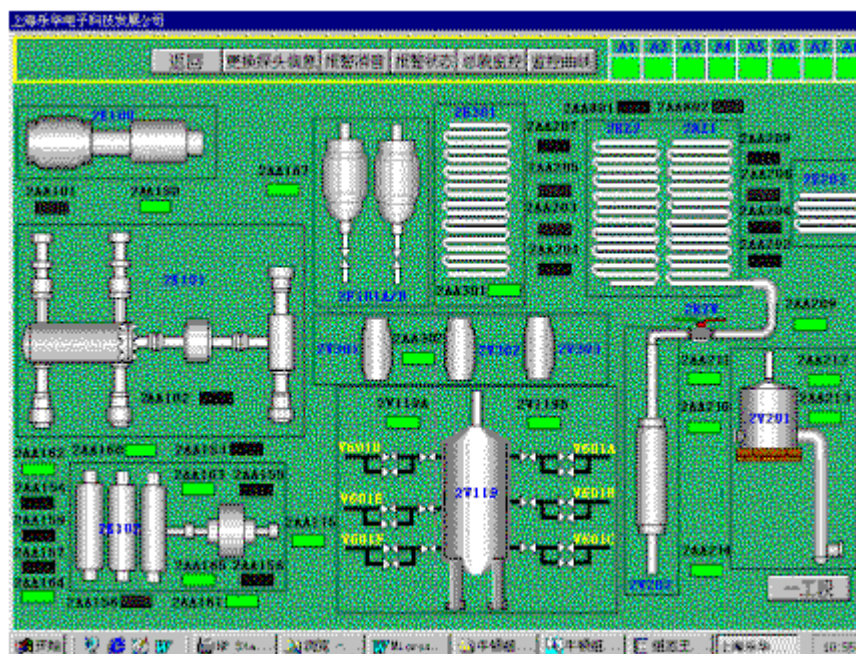


Fig. 2

4. Conclusion

This monitor system, which is built up using I-7000 series, has been put into operation in Shanghai Petrochemical Plant. The practical application of this system in the past half-year shows that it has a very reliable performance. Recently, we have also reached a long-term agreement with Wuxi Gelintong Company to further promote its application in this industry.