

ICPDAS I-7000 Series Modules Applied in an Alert System for IPE Equipment AA Flammable Gas

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Based on the alert system for IPE equipment AA flammable gas, this application story gives a detailed analysis of the architecture and application features of the [I-7000 series](#).

The flammability alert system described is typically used for the field monitoring and measurement necessary at 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 ICP DAS modules ensure 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 requiring monitoring and measurement in this system include flammable and toxic gases such as methane, ethane, CO, hydrogen, etc. According to the regulations for industrial fields, there are 57 locations that require monitoring. The densities of the flammable gases are converted into electrical signals by means of appropriate sensors and then transferred to the [I-7017](#) modules, which convert these analog signals into digital ones and communicate with the central computer that is connected to [I-7520](#) modules via a RS485 bus. The system architecture diagram is shown in Figure 1:

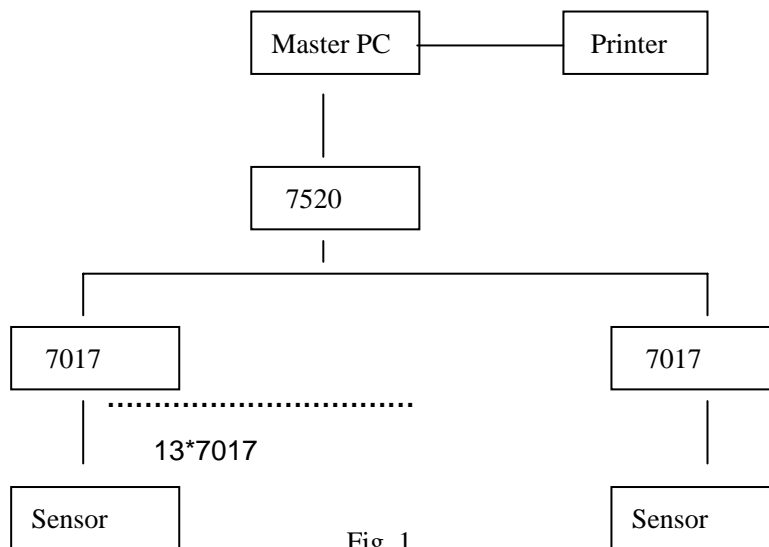


Fig. 1

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

2. Hardware Description

At 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% and a zero-drift of 0.03 of the full scale. The internal architecture is shown in Fig 2.

The voltage insulation for the isolated input channels has a rating of up to 3000VDC. The signals are acquired via embedded micro-controllers and then saved onto the E2PROM then communicated to the master PC via RS485. 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 mechanisms to transfer electrical data, and represents a significant improvement in the area of anti-interference performance. Without repeaters, the transmission distance can span up to 1.2 Km at a rate of 9600 bps.

3. Software Configuration

The central computer uses [I-7520](#) modules to convert RS-232 signals into RS-485 ones and communicate with the [I-7017](#) modules at the monitoring points. The data is acquired via automatic polling. The address is designated using the 7000 utility. When the baud rate is set at 19.2K, the

polling interval can be limited to within 500ms. This interval meets the time requirement for this kind of system. We use the industrial configuration software for central information processing, which helps us to create the project diagram and analysis reports. Figure 2 is a runtime screenshot from the KingView software's display.

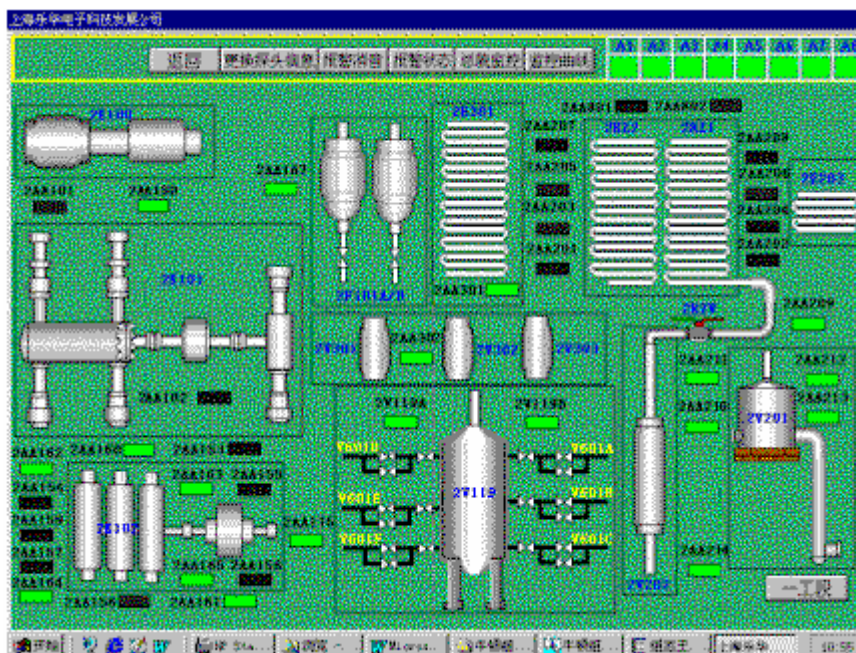


Fig. 2

4. Conclusion

This monitor system, which is built up of [I-7000](#) series modules, has been put into operation in the 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 the application of these devices within this industry.