Data transmission of gas detectors

In some specific places there are often gas emissions, such as petrochemical, coal, metallurgy, chemical, municipal gas, environmental monitoring and many other places. And some of these gases may be dangerous, such as flammable, explosive or contaminated, then you need to use the gas detector to detect them. Then the gas detector is generally how to transmit data?

- **Two-Wire 4-20mA**

Two-wire system, as the name suggests, the signal transmission and power supply of the instrument together with two wires to complete, these two wires are both the power line and the signal transmission line.

Advantage: only two wires, compared with three-wire and four-wire system, in the wiring distance is very long, can reduce more than 1/3 of the wiring cost.

Disadvantage: The working current of the instrument can not be larger than 4mA, otherwise the two-wire system can not be used.

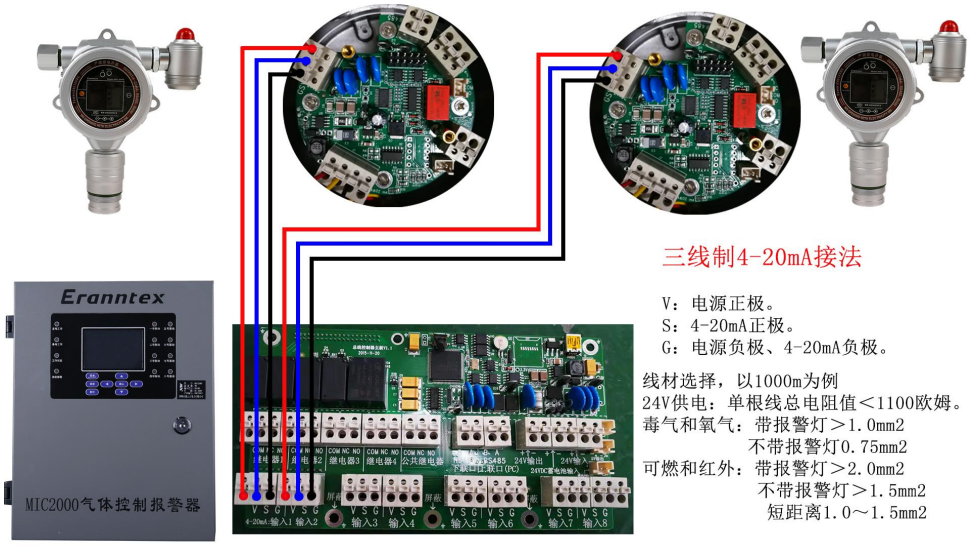
Therefore, the 2-wire 4-20mA system is only suitable for electrochemical instruments, but not for catalytic combustion, PID and infrared instruments.

- **Three-wire 4-20mA**

Three-wire system, as the name implies, the signal transmission of the instrument and the power supply of the instrument together with three wires to complete, the power supply negative and signal line negative share a common wire, the other two wires are the power supply positive and signal line positive.

Advantage: No communication protocol is required when connecting the instrument to the controller, which greatly facilitates the integration of instruments from different manufacturers into a control system without software debugging.

Shortcomings: the current signal in the transmission process, the wire diameter is too small will be lost, coupled with a variety of external interference signals, will cause the instrument measurement results and the controller to display results are not the same, for example, the actual measurement of the instrument is 13.25 ppm, the controller displays 13.15 ppm, at this time, you need to carry out the controller on the 4mA and 20mA calibration can be controlled in the error of 0.01ppm.



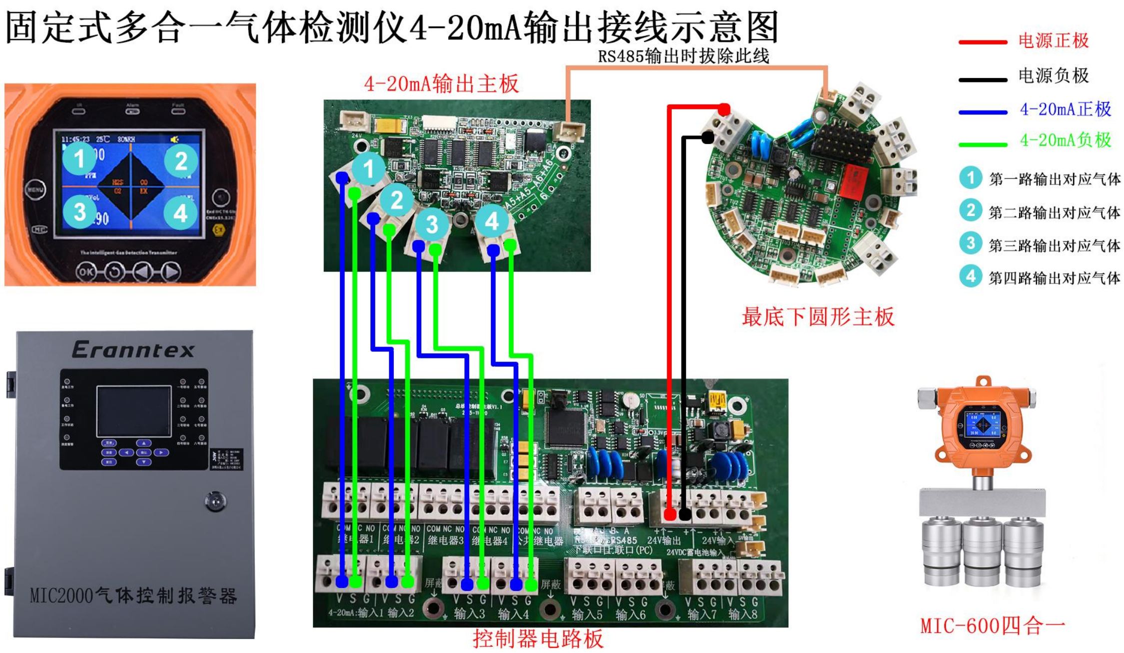
- **Four-wire 4-20mA**

Four-wire system, as the name implies, the signal transmission of the instrument and the power supply of the instrument together with four wires to complete, two power lines, two signal lines.

Advantage: Compared with the three-wire 4-20mA, the advantage is that the four-wire signal transmission is more stable, not subject to power ripple interference, because the power line and the signal line are completely separated.

Disadvantage: Four-wire 4-20mA wiring is more expensive than three-wire 4-20mA wiring.

Therefore, it is generally recommended to use 3-wire 4-20mA.



- **RS485**

Digital signal transmission method, must use 4 wires, two power lines, two signal lines.

Advantages: accurate transmission of measurement results without any transmission error, the use of buses to integrate instruments, one controller can be connected to 128 or 255 instruments, which can save a lot of wiring costs, the instrument can accept the controller instructions to be controlled remotely.

Shortcomings: Instrument integration requires communication protocols, different manufacturers of instruments with different communication protocols, there is a certain amount of software debugging workload, if the configuration of our controllers do not have this problem, or the user has the ability to analyze the signals themselves is not a problem.