

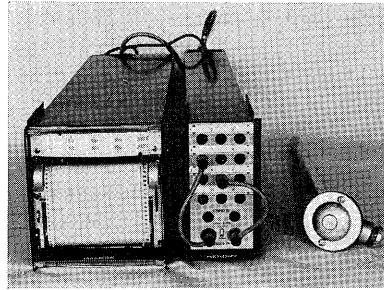
INTRINSICALLY SAFE EXPLOSION-PROOF INDUSTRIAL INSTRUMENTS

With development of the chemical industry and other industries concerned with explosive gases, demands for explosion-proof equipment have increased, necessitating less expensive and safer explosion-proof devices. To satisfy these demands, intrinsically safe explosion-proof device was developed. Fuji Electric formed an executive committee on intrinsically safe explosion-proof devices in May, 1966 and continued research in this field. The results of these studies, a series of temperature indicators, alarms, and controls are introduced here.

In intrinsically safe explosion-proof devices, the sparks produced by electrical equipment will not ignite explosive gases.

The sparks mentioned above are those produced during normal operation, short circuiting, or ground connection during accidents or wire cuts during power input. Since any spark will not ignite an explosive gas, the device need not be placed in very strong casing or kept away from persons other than the operator responsible. The device is therefore inexpensive and maintenance or inspection is easy.

Since performance of the intrinsically safe explosion-proof device is largely effected by conditions of the internal circuit, individual approval is necessary for any specification changes (ex.,



measuring rate). (The intrinsically safe explosion-proof devices, unlike other explosion-proof devices, must be approved by the public authorities.)

As a rule, it would be better if all equipment were approved after installation, but this is impossible in practice. It is therefore approved on the basis of the limited usage conditions shown in *Table 1*.

Characteristics

1. Standard-type temperature measuring units can be used.
2. The equipment is applicable to almost all combustible gas vapor including explosion grade-3 explosive gases such as acetylene and hydrogen.
3. It is not necessary to use explosion-proof construction in the circuit of the connecting line if it satisfies the wiring specifications for low energy circuits given in the electrical equipment standards.

Table 1 List of Intrinsically Safe Explosion-Proof Industrial Instruments

| | Nomenclature | Detector | Scale Range | Gas | Application Conditions |
|---|---|------------------|---------------|-----------------------------------|---|
| 1 | S-series moving coil type indicator S-EIMB/JR-EXSi | CA thermo-couple | 0~300°C | Hydrogen Ethylene Acetylene | 1. Install the indicator and thermocouple in safe locations. 2. The line is less than 0.5 mH and 0.025 μ F. |
| 2 | S-series moving coil type indicator S-EIMB/B-EXSi | Thermistor | 0~50°C | Same as above | 1. Install the indicator in safe locations. 2. The line is less than 0.5 mH and 0.05 μ F. |
| 3 | S-series cross coil type indicator S-EIXMP/R-EXSi | Pt. 100 Ω | 0~100°C | Hydrogen Ethylene | 1. Install the indicator in safe locations. 2. The line is less than 0.5 mH and 0.025 μ F |
| 4 | S-series cross coil type contactless meter relay S-EIXMP/HL-EXSi | Same as above | 0~50°C | Hydrogen Ethylene Acetylene | 1. Install the indicator in safe locations. 2. The line is less than 0.5 mH and 0.05 μ F. |
| 5 | S-series self-balancing indicator S-EIWS-EXSi | Same as above | 0~100°C | Same as above | Same as above. |
| 6 | K-series self-balancing recorder K-ERS-615-EXSi | IC thermo-couple | 0~200°C | Same as above | 1. Install the recorder in safe locations. 2. The line is unlimited. |
| 7 | S-series trend recorder, S-series input selector SV-ETRS-2-EXSi, SV-SS-EXSi | Same as above | Same as above | Same as above | 1. Install the recorder and input selector in safe locations. 2. The line is unlimited. |
| 8 | S-series Ipsopneu controller, S-series TELEPERM setter S-ECPII-N-LPID-542-EXSi, S-ESTM-EXSi | Pt. 100 Ω | 0~50°C | Same as above | 1. Install the controller and TELEPERM setter in safe locations. 2. The line is less than 0.5 mH and 0.05 μ F. |