

## MODEL3500 Series Hydrogen Sensor in Transformer Oil



### Thin-film Technology of Solid-state Palladium Alloy

The optimized doping ratios and process methods ensure excellent long-term stability and sensitivity



### Specific Coating Technology

Ensure that the sensor can work reliably in harsh environment including CO, H<sub>2</sub>, CH etc., even directly applied to hydrogen monitoring in transformer oil



### Hydrogen Online Monitoring under Different Background Gases

Meet the online monitoring of hydrogen with different background gases such as N<sub>2</sub>, inert gases etc.



### Adjusting Working Temperature Automatically

The working temperature can be adjusted automatically by the thin-film temperature sensor and heater integrated on the chip surface, no need external temperature and flow control devices.



The MODEL3500 series hydrogen sensor in transformer oil is based on palladium alloy thin-film hydrogen detection technology, and the sensor chip can be placed in the transformer oil directly without oil and gas separation. The technology has absolute hydrogen specificity and no cross-response to other combustible gases. The MODEL3500 series sensor chips use a palladium alloy thin-film resistor structure and adopt mature and stable palladium alloy material doping system, alloy film preparation processes, and key process technologies such as specific composite thin-film preparation techniques, which ensures that the MODEL3500 series sensors have better long-term stability, and the sensors are free from periodic maintenance, reducing the operating costs.

| MODEL3500 |                                  |                                          |                                |                                               |          |              |
|-----------|----------------------------------|------------------------------------------|--------------------------------|-----------------------------------------------|----------|--------------|
| Model     | Measuring Range(H <sub>2</sub> ) | Minimum Detection Limit(H <sub>2</sub> ) | Response Time(H <sub>2</sub> ) | Accuracy(H <sub>2</sub> )                     | Moisture | Oil Pressure |
| Model3500 | 0~10000ppm                       | 15ppm                                    | 10min (150ppm)                 | ±20% reading or ±20ppm (whichever is greater) | NA       | NA           |
| Model3503 | 0~10000ppm                       | 15ppm                                    | 10min (150ppm)                 | ±20% reading or ±20ppm (whichever is greater) | AVL      | NA           |
| Model3504 | 0~10000ppm                       | 15ppm                                    | 10min (150ppm)                 | ±20% reading or ±20ppm (whichever is greater) | AVL      | AVL          |

1. The sensor can only be used for hydrogen measurement in oil with concentration below 10000ppm. Exceeding this range may cause the sensor chip deviation or even failure.  
2. The response time is specific to certain hydrogen concentration. As the hydrogen concentration increases, the response rate accelerates and the response time shortens.  
3. The accuracy data test is completed under normal temperature conditions.

## Technical Parameters

### Main Performance Indicators

|                    |                                                  |                                                         |              |
|--------------------|--------------------------------------------------|---------------------------------------------------------|--------------|
| Dissolved Hydrogen | Measurement Range                                | 0~10000ppm                                              |              |
|                    | Measurement Accuracy                             | $\pm 20\%$ or $\pm 20\text{ppm}$ (whichever is greater) |              |
|                    | Repeatability                                    | $\pm 5\%$ or $\pm 10\text{ppm}$ (whichever is greater)  |              |
|                    | Minimum Detection Limit                          | 15ppm                                                   |              |
|                    | Oil Temperature                                  | $-40\sim 105^{\circ}\text{C}$                           |              |
|                    | Response Time( $t_{50}$ )                        | < 30min                                                 |              |
|                    | Sensor                                           | Pd alloy thin-film hydrogen sensor                      |              |
| Moisture           | Measurement Range                                | 0~100%RS                                                |              |
|                    | Measurement Accuracy<br>( $20^{\circ}\text{C}$ ) | 0~90%RS                                                 | $\pm 2\%$ RS |
|                    |                                                  | 90~100%RS                                               | $\pm 3\%$ RS |
|                    | Response Time( $t_{90}$ )                        | < 10min                                                 |              |
| Oil Temperature    | Measurement Range                                | $-40\sim 120^{\circ}\text{C}$                           |              |
|                    | Measurement Accuracy                             | $\pm 0.2^{\circ}\text{C}$                               |              |
| Oil Pressure       | Measurement Range                                | 0~1MPa                                                  |              |
|                    | Measurement Accuracy                             | $\pm 1\%$ F.S.                                          |              |
|                    | Resolution                                       | 0.1kPa                                                  |              |
|                    | Overload Capacity                                | 3MPa                                                    |              |

### Electrical Characteristics and Others

|                        |                                                            |
|------------------------|------------------------------------------------------------|
| Power Supply           | 24VDC $\pm 10\%$ , 0.5A (max)                              |
| Digital Output         | RS-485                                                     |
| Communication Protocol | Modbus_RTU                                                 |
| Ingress Protection     | IP67                                                       |
| Data Storage           | Data storage interval:30min, data retention period:5 years |
| Life Expectancy        | 10years                                                    |

# Outline Dimension

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