

Thermal Conductivity Analyzer

Overview

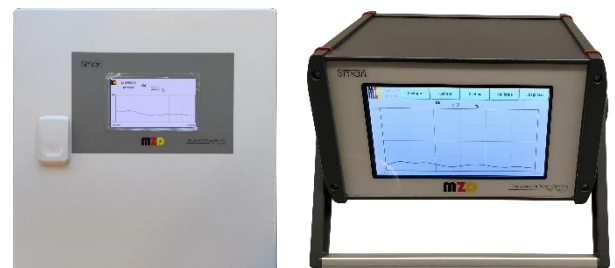
Thermal conductivity gas analyzer is an effective method to measure one of two components in a gas mixture (the thermal conductivities differ a lot). Mainly used to measure the content of hydrogen (H₂), carbon dioxide (CO₂), argon (Ar), etc.

Principle

The sensor chip consists of a silicon frame with a silicon-nitride membrane. In the center is a heater and a thermopile. The center of the membrane is heated using a heater resistor. The resulting temperature increase is measured by the thermopile. This temperature rise depends on the effective thermal resistance between the membrane center and the ambient gases. The chip measures the thermal conductance between the ambient and the membrane center, which is influenced by the thermal conductivity of the measured gas.

Application

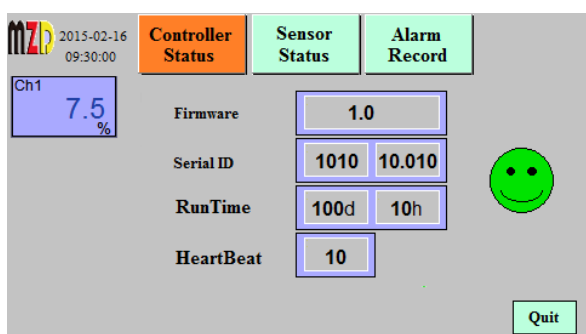
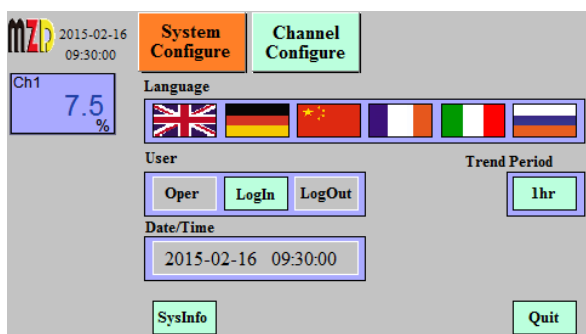
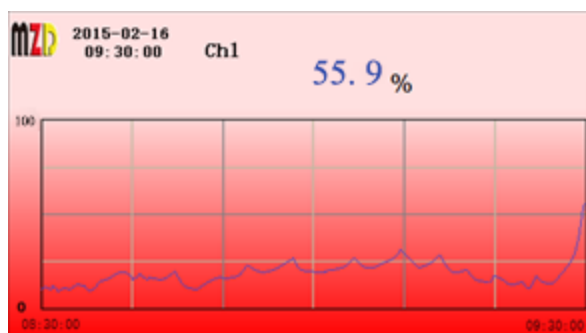
- Measurement of hydrogen (H₂) content in synthesis gas of ammonia plant
- Purity measurement of hydrogen (H₂) in hydrogenation unit
- Measurement of oxygen (O₂) in pure hydrogen (H₂) and hydrogen (H₂) in pure oxygen (O₂) in the process of producing hydrogen by electrolysis of water and oxygen
- Hydrogen (H₂) content measurement in hydrocarbon gas
- Monitoring of hydrogen (H₂) and carbon dioxide (CO₂) content in hydrogen-cooled generator sets
- Measurement of hydrogen (H₂) in chlorine (Cl₂) in the chlorine production process
- Measurement of chlorine (Cl₂) in the chlorine production process
- Measurement of carbon dioxide (CO₂) content in flue gas of furnace combustion
- Argon (Ar) content measurement in air separation plant
- Monitoring in the production of pure gases, such as helium (He) in nitrogen (N₂) and argon (Ar) in oxygen (O₂)
- Sulfur dioxide (SO₂) content measurement in the production process of sulfuric acid and phosphate fertilizer



Features

- ❖ **Condensation and dust protection Optional**
The sintered stainless steel with µm-sized holes is used to protect the sensor. The PTFE hydrophobic membrane is used to protect the sensor, allowing gas molecules to pass through while preventing liquid water from penetrating.
- ❖ **Multiple gas measurement modes Optional**
The analyzer has 3 built-in binary mixed gas measurement modes and calibration curve.
- ❖ **High corrosion resistance Optional**
Sensor is made from Al₂O₃, glass and SiO₂ coated Pt filaments, and Gas connections in PTFE, PFA
- ❖ **High temperature Optional**
Sensor is be used at higher temperatures up to 180°C
- ❖ **Integrated Infrared/Ultraviolet Measurement Optional**
For multicomponent gases (>2 species), optional Infrared/Ultraviolet (NDIR / NDUV) sensor isolates specific molecular spectra to eliminate cross-interference for independent measurement.

Thermal Conductivity Analyzer



Features

❖ Quick and convenient

The navigation menu contains 6 languages, which can be operated easily.

❖ Process safety

4.3" or 7" large size color LCD touch screen, convenient and safe touch operation and debugging

Large size screen with red flashing alarm, clearly visible from long distances and in dark areas

Alarm immediately, save the process

❖ Alarm event record

Real-time data curve display

Record function for up to 6,000 alarms

❖ Expert calibration function

Multi-point calibration function up to 9 point

❖ Powerful self-diagnosis function

Built-in heartbeat monitoring function and watchdog

Monitor the status of analyzer and sensors, and promptly remind customers to take necessary maintenance

High-standard hardware and software security and password protection

❖ Powerful control function

High(low) limit control function

Optional: Timer control(automatic cleaning) function

Optional: analog PID control function

Optional: PWM control function

❖ Flexible fieldbus communication functions for IOT4.0

Optional fieldbus MODBUS, HART, Foundation Fieldbus FF, PROFIBUS PA, PROFIBUS DP, etc.



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Measurement components and ranges

Measuring Gas	Carrier Gas	Basis Range	Smallest Range	Smallest Suppressed Zero Range
Hydrogen (H ₂)	Nitrogen (N ₂) or Air	0% – 100%	0% – 0.5%	99.5% – 100%
Oxygen (O ₂)	Nitrogen (N ₂)	0% – 100%	0% – 15%	85% – 100%
Helium (He)	Nitrogen (N ₂) or Air	0% – 100%	0% – 0.8%	97% – 100%
Carbon dioxide (CO ₂)	Nitrogen (N ₂) or Air	0% – 100%	0% – 3%	96% – 100%
Nitrogen (N ₂)	Argon (Ar)	0% – 100%	0% – 3%	97% – 100%
Oxygen (O ₂)	Argon (Ar)	0% – 100%	0% – 2%	97% – 100%
Hydrogen (H ₂)	Argon (Ar)	0% – 100%	0% – 0.4%	99% – 100%
Helium (He)	Argon (Ar)	0% – 100%	0% – 0.5%	98% – 100%
Carbon dioxide (CO ₂)	Argon (Ar)	0% – 60%	0% – 10%	—
Argon (Ar)	Carbon dioxide (CO ₂)	40% – 100%	—	80% – 100%
Methane (CH ₄)	Nitrogen (N ₂) or Air	0% – 100%	0% – 2%	96% – 100%
Methane (CH ₄)	Argon (Ar)	0% – 100%	0% – 1.5%	97% – 100%
Argon (Ar)	Oxygen (O ₂)	0% – 100%	0% – 3%	96% – 100%
Nitrogen (N ₂)	Hydrogen (H ₂)	0% – 100%	0% – 0.5%	99.5% – 100%
Oxygen (O ₂)	Carbon dioxide (CO ₂)	0% – 100%	0% – 3%	96% – 100%
Hydrogen (H ₂)	Helium (He)	20% – 100%	20% – 40%	85% – 100%
Hydrogen (H ₂)	Methane (CH ₄)	0% – 100%	0% – 0.5%	98% – 100%
Hydrogen (H ₂)	Carbon dioxide (CO ₂)	0% – 100%	0% – 0.5%	98% – 100%
Sulfur hexafluoride (SF ₆)	Nitrogen (N ₂) or Air	0% – 100%	0% – 2%	96% – 100%
Nitrogen dioxide (NO ₂)	Nitrogen (N ₂) or Air	0% – 100%	0% – 5%	96% – 100%
Hydrogen (H ₂)	Oxygen (O ₂)	0% – 100%	0% – 0.8%	97% – 100%
Argon (Ar)	Xenon (Xe)	0% – 100%	0% – 3%	99% – 100%
Neon (Ne)	Argon (Ar)	0% – 100%	0% – 1.5%	99% – 100%
Krypton (Kr)	Argon (Ar)	0% – 100%	0% – 2%	96% – 100%
Extinguishing gas (R125)	Nitrogen (N ₂) or Air	0% – 100%	0% – 5%	98% – 100%
Deuterium (D ₂)	Nitrogen (N ₂) or Air	0% – 100%	0% – 0.7%	96% – 100%
Deuterium (D ₂)	Helium (He)	0% – 100%	0% – 5%	70% – 100%

Thermal Conductivity Analyzer

Parameters

Measuring principle	Thermal conductivity (TCD)			
Display	4.3" or 7" industrial color touch screen			
Language	Multi-Language (English, German, Chinese, French, Italian, Russian or Customized)			
Linearity	< 1% of range			
Repeatability	< 1% of range			
Warm up time	About 30min; 1h for small ranges			
Sensitivity	0.01%			
Response Time	Less than 1 s (depending on flow rate)			
T90-time	< 1sec at flow rate higher 60l/h			
Noise	< 1% of smallest range			
Drift at zero point per week	< 2% of smallest range, or < 200ppm per week and < 0.2% per year			
Flow rate	40l/h to 150l/h; 60l/h - 80l/h recommended			
Flow influence between 60l/h and 90l/h per 10l/h	< 1% of smallest range			
Measuring error with ambient temperature change per 10°K	< 1% of smallest range			
Max Static Pressure	10bar			
Fault with measurement gas change (Pabs > 800 hPa) per 10 hPa	< 1% of smallest range			
Analog Output (Galvanic)	4~20mA, maximum load 500Ω			
Relay Output (Galvanic)	Relay (2A, 230V AC freely set alarm), System alarm			
Diagnosis function	Flow monitoring, Sensor and analyzer self-diagnosis, Heartbeat monitoring			
Event Logger	Internal Flash, up to 6,000 alarm records			
Control function	Optional Timer control function, PID, PWM			
Calibration	Expert calibration function, Multi-point calibration function up to 9 point			
Communication	RS485 MODBUS RTU, HART, Foundation Fieldbus FF, PROFIBUS PA, PROFIBUS DP, MODBUS TCP/IP, etc			
Power	80~264V AC, 1A or 19~28V DC, 3A			
Electrical protection	EMI / RFI CEI-EN55011 – 05/99			
Ambient Temperature	-15 ~ 50°C			
Storage and transport temperature	-25 ~ 70°C			
Process Connection	6mm Pipe			
Wall-mounted	4.3" touchscreen	Steel, Gray	300*300*220mm	IP65
	1.8" color LCD	Aluminum, Gray	300*280*195 mm*	IP65, Exd IIC T4
Laboratory Desktop	7" touchscreen	Aluminum, Black	250*144*184mm	IP40
Portable	7" touchscreen	ABS, Yellow	420*325*180mm	IP67
19" Rack (1~6 Channels)	7" touchscreen	Aluminum, natural-coloured	483*133*238mm	IP40

Hydrogen Analyzer—Better solution for Green Hydrogen!

Overview

The thermal conductivity gas analyzer features built-in temperature and humidity measurement powered by **MZD VaporSense™ Technology**, delivering stable and continuous hydrogen (H₂) measurement in high-humidity green hydrogen electrolysis applications.

Application

- Water electrolysis to produce hydrogen
- Hydrogenation unit
- Hydrogen-cooled generator
- University and research
- Metal heat treatment/welding
- Chemicals/Pharmaceuticals



Parameters

Measuring principle	Thermal conductivity (TCD)
Display	1.8" industrial color LCD, 160*128Pixel
LED Light	Status LED Light(NAMUR NE107)
Linearity Error	< 1% F.S.
Repeatability	< 1% F.S.
Sensitivity	0.02% F.S.
T90-time	<1sec at flow rate higher 60l/h
Drift	<200ppm per week and < 0.2% per year
Power	19 ~ 28V DC Power
Analog Output	4~20mA
Relay Output	3 Relays, NO, 5A 250VAC/30VDC
Communication	RS485, MODBUS RTU
Electrical protection	EMI / RFI CEI-EN55011 – 05/99
Flow rate	30l/h to 120l/h; 60l/h -80l/h recommended
Max Static Pressure	10Bar
Temperature Range	-40 ~ 85°C
Humidity Range	0~95%RH (non-condensing)
Process Connection	G3/8 screw or 6mm tube
Ambient Temperature	-15 ~ 60°C
Housing Material	Aluminum and Stainless steel
Explosion-proof	Ex d IICt4 optional (300*280*195 mm, 14Kg)

Hydrogen Analyzer——Better solution for Green Hydrogen!

Note:

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