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 2 silicon-nitride membrane2. Each membrane has a micromechanical heating element at its center, and the chip uses a heating resistor to control heating of the center of the membrane to about 40°C above ambient temperature. The resulting temperature increase of the center is measured by the thermopile.

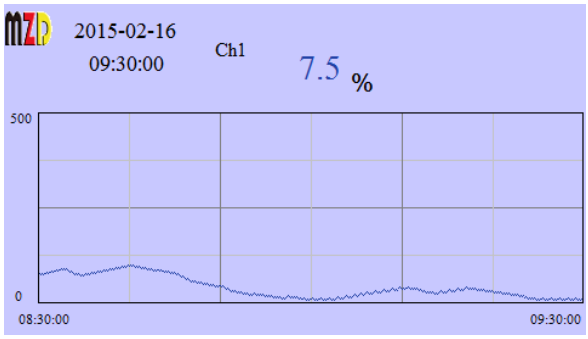
Application

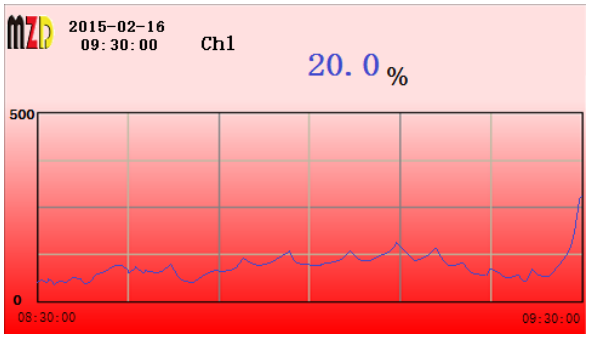
- Measurement of hydrogen (H2) content in synthesis gas of ammonia plant
- Purity measurement of hydrogen (H2) in hydrogenation unit
- Measurement of oxygen (O2) in pure hydrogen (H2) and hydrogen (H2) in pure oxygen (O2) in the process of producing hydrogen by electrolysis of water and oxygen
- Hydrogen (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

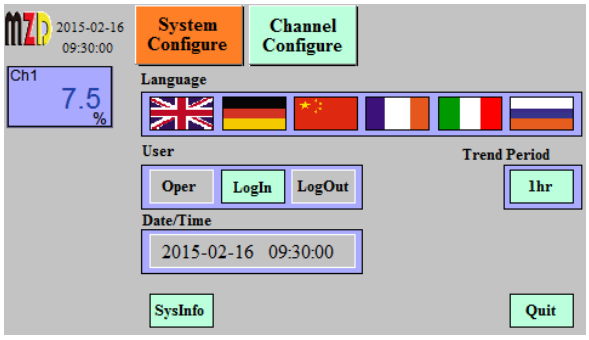
Features

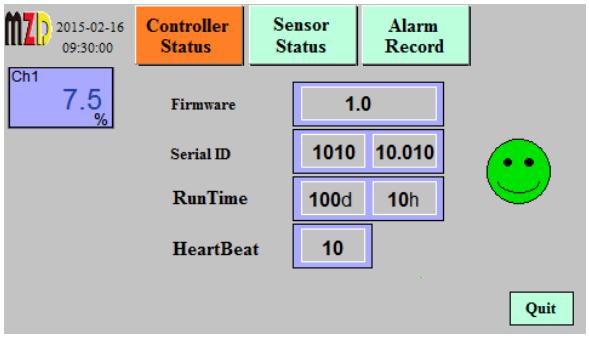
- **Corrosion protection**
  Sensor surface is coated with Polymer layer(4μm) which will not affect the excellent measurement performance of the sensor unit.
- **Condensation and dust protection**
  The sintered glass with μm-sized holes is used to protect the sensor so that gas molecules can pass through, but liquid water molecules are not permeable.
- **Multiple gas measurement modes**
  The analyzer has 16 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

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, safe 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.

Thermal Conductivity Analyzer

Measurement components and ranges

Measuring Gas	Carrier Gas	Basis Range	Smallest Range	Smallest Suppressed Zero Range
Hydrogen (H2)	Nitrogen (N2) or Air	0% – 100%	0% – 0.5%	98% – 100%
Oxygen (O2)	Nitrogen (N2)	0% – 100%	0% – 15%	85% – 100%
Helium (He)	Nitrogen (N2) or Air	0% – 100%	0% – 0.8%	97% – 100%
Carbon dioxide (CO2)	Nitrogen (N2) or Air	0% – 100%	0% – 3%	96% – 100%
Nitrogen (N2)	Argon (Ar)	0% – 100%	0% – 3%	97% – 100%
Oxygen (O2)	Argon (Ar)	0% – 100%	0% – 2%	97% – 100%
Hydrogen (H2)	Argon (Ar)	0% – 100%	0% – 0.4%	99% – 100%
Helium (He)	Argon (Ar)	0% – 100%	0% – 0.5%	98% – 100%
Carbon dioxide (CO2)	Argon (Ar)	0% – 60%	0% – 10%	—
Argon (Ar)	Carbon dioxide (CO2)	40% – 100%	—	80% – 100%
Methane (CH4)	Nitrogen (N2) or Air	0% – 100%	0% – 2%	96% – 100%
Methane (CH4)	Argon (Ar)	0% – 100%	0% – 1.5%	97% – 100%
Argon (Ar)	Oxygen (O2)	0% – 100%	0% – 3%	96% – 100%
Nitrogen (N2)	Hydrogen (H2)	0% – 100%	0% – 2%	99.5% – 100%
Oxygen (O2)	Carbon dioxide (CO2)	0% – 100%	0% – 3%	96% – 100%
Hydrogen (H2)	Helium (He)	20% – 100%	20% – 40%	85% – 100%
Hydrogen (H2)	Methane (CH4)	0% – 100%	0% – 0.5%	98% – 100%
Hydrogen (H2)	Carbon dioxide (CO2)	0% – 100%	0% – 0.5%	98% – 100%
Sulfur hexafluoride (SF6)	Nitrogen (N2) or Air	0% – 100%	0% – 2%	96% – 100%
Nitrogen dioxide (NO2)	Nitrogen (N2) or Air	0% – 100%	0% – 5%	96% – 100%
Hydrogen (H2)	Oxygen (O2)	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 (N2) or Air	0% – 100%	0% – 5%	98% – 100%
Deuterium (D2)	Nitrogen (N2) or Air	0% – 100%	0% – 0.7%	96% – 100%
Deuterium (D2)	Helium (He)	0% – 100%	0% – 5%	70% – 100%

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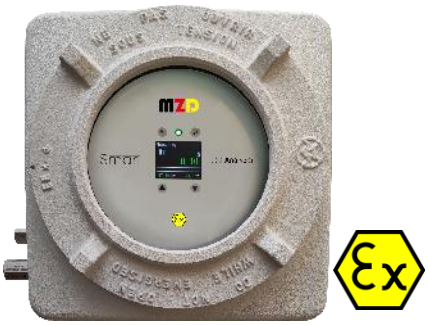
Parameters

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		
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		
Gas pressure	Max. 2MPa (20bar)		
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℃		
Storage and transport temperature	-25 ~ 70℃		
Process Connection	6mm Pipe		
Wall-mounted(1~2Channels)	ABS,Gray RAL7045	213x185x84mm	IP65
	Aluminum,Gray	230x200x157mm	IP65, Exd IICT4
Laboratory Desktop(1~2Channels)	Aluminum,Black	250x144x184mm	IP40
Portable(1~2Channels)	ABS,Yellow	420x325x180mm	IP67
19" Rack(1~6Channels)	Aluminu,natural-coloured	483x133x238mm	IP40

Hydrogen Analyzer——Better solution for Green Hydrogen!

Overview

Thermal conductivity gas transmitter (analyzer) has ***built-in temperature and humidity measurement and compensation***, is cost-effective and suitable for stable and continuous measurement of the content of hydrogen (H2).



Application

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

Parameters

Measuring principle	Thermal conductivity (TCD)
Display	1.8" industrial color LCD, 160*128Pixel
LED Light	Status LED Light(NAMUR NE107)
Linearity	< 1% F.S.
Repeatability	< 1% F.S.
Sensitivity	0.02% F.S.
T90-time	<1sec at flow rate higher 60l/h
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	40l/h to 150l/h; 60l/h -80l/h recommended
Process Pressure(Max.)	10Bar
Temperature Range	-40 ~ 85℃
Humidity Range	0~95%RH (non-condensing)
Process Connection	G3/8 screw or 6mm tube
Ambient Temperature	-15 ~ 60℃
Housing Material	Aluminum and Stainless steel
Explosion-proof	Exd IICT4 Controller optional

Hydrogen Analyzer——Better solution for Green Hydrogen!

Note:

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