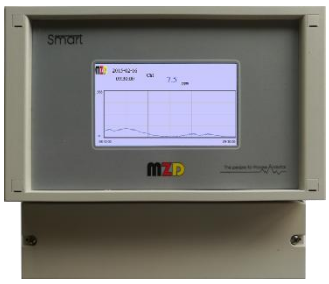
SMART-MT Moisture Analyzer

Overview

Electrolysis principle for trace moisture measurement in gas was successfully tested and applied to trace moisture measurement by Keide in 1959. This method provides a continuous industrial measurement solution for trace moisture in non-alkaline gases, which can continuously, online and real-time monitor the trace moisture in various industrial processes.



Principle

The sensor are plated with parallel platinum layers or wound parallel platinum wires, the platinum wires are coated with a hydrated phosphorus pentoxide film. When the gas passes through the electrolytic cell, all of the water is absorbed and generates phosphoric acid. At the same time, the DC voltage between the platinum wires causes the phosphoric acid to produce an electrolytic reaction to decompose oxygen, hydrogen and phosphorus pentoxide. When the absorption and electrolysis reach a balance, the water entering the electrolytic cell is all absorbed by the phosphorus pentoxide film and then electrolyzed completely. According to Faraday's law of electrolysis and the gas law, the absolute value of moisture in a gas sample can be directly measured according to the electrolysis current.

Application

- Chemicals (Especially for technologies with aggressive gases , PVC / Chlor-Alkali / Fluorine / Polysilicon / Silicone)
- Oil and gas
- Energy/Power Plant
- Air Separation Unit
- Microelectronics (OLED/capacitor/HID)
- Lithium battery
- University and research
- Glove Boxes

Trace Moisture Analyzer

Sensor features

Zirconia ceramic or glass material is optional. The movable construction of electrolytic cell is easy to disassemble and do maintenance.

Installation

▲Corrosive gas: PVDF electrolytic cell, Non-corrosive gas: PVDF or SS stainless steel electrolytic cell

▲The sample gas pressure can reach 3Bar (PVDF) /10Bar (SS)

▲Stable sample gas flow rate 20Nl/h or 100Nl/h

▲Three-way valve and four-way valve operation, convenient for sensor maintenance and recoating

▲Slight positive pressure protection of compressed air in the sampling unit

▲Filter can be used for unclean gases

▲Electric heating regulator can be used for liquid chlorine evaporation

▲Vacuum pump can be used for the vacuum sample gas

▲The sample gas outlet is recommended to be discharged into the exhaust gas treatment equipment

Some application case

▲Trace moisture measurement in chlorine at the inlet of the chlorine compressor for protection.

▲Trace moisture measurement in chlorine at the outlet and the final outlet of the chlorine compressor for protection.

▲Monitor the leakage of the precooler to protect the chlorine compressor.

▲Monitor the accuracy of the dew point analyzer at the outlet of the freezer.

SMART-MT Moisture 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 points

❖ **Powerful self-diagnosis function**

Built-in flow monitoring

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

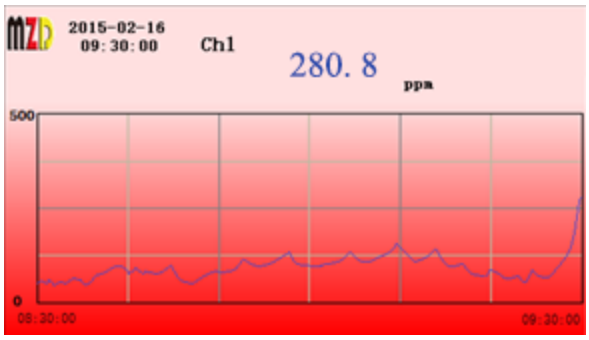
Optional: Timer control (automatic cleaning) function

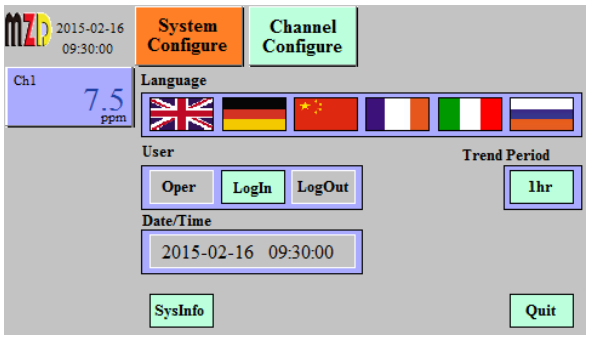
Optional: analog PID control function

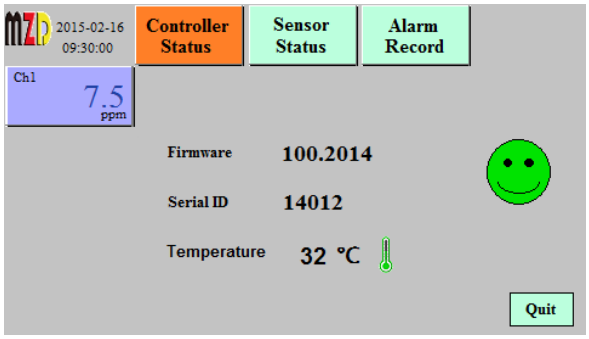
Optional: PWM control function

❖ **Flexible fieldbus communication functions for IOT4.0**

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







Continuous Measurement of Trace Moisture in Gases

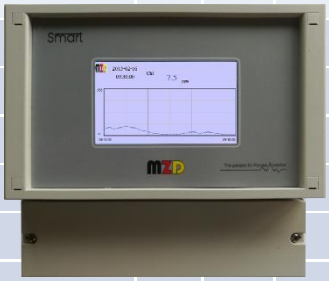
Trace Moisture Analyzer

Parameters

Sensor Material	Glass pillar with platinum wires or Platinum coated ceramic pillar			
Measuring Cell Material	PVDF or Stainless Steel			
Display	4.3" or 7" industrial color touch screen			
Language	Multi-Language (English, German, Chinese, French, Italian, Russian or Customized)			
Range	0~10ppm up to 500ppm(max.2500ppm)			
Sensitivity	50ppb			
Accuracy	0.4ppm or 5% of measuring value(0~2,000ppm) 0.4ppm or 2% of measuring value(0~500ppm) 10% of measuring value(0~20,000ppb)			
Lowest detection limit	50ppb			
Response Time	Less than 1 s			
Action time T90 (up)	Less than 5 s			
Action time T90 (down)	Less than 15 min			
Diagnosis function	Flow monitoring, Sensor and controller self-diagnosis, Heartbeat monitoring			
Event Logger	Internal Flash, up to 6,000 alarm records			
Analog Output(Galvanic)	4~20mA, maximum load 500Ω			
Relay Output(Galvanic)	Relay (2A, 230V AC freely set alarm), System alarm			
Control function	Optional Timer controller, PID analog controller, PWM controller			
Calibration	Expert calibration function, Multi-point calibration function up to 9 points			
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 ~ 60℃			
Storage and transport temperature	-25 ~ 70℃			
Gas Flow	20Nl/h or 100Nl/h			
Max Static Pressure	3Bar (PVDF) or 10Bar (Stainless Steel)			
Sample gas temperature	5~65℃			
Process Connection	1/4"NPT thread or KF40 flange			
Diameter of connecting pipe	6mm			
Leakage Level	< $5x10^{-8}$ mbar x l / s^{-1}			
Wire Connections	5Pin			
Sensor Cable	3 ~ 150 meters			
Explosion-proof	Sensor Intrinsic Safety Ex ia optional, Exd IICT4 Controller optional			
Wall-mounted	4.3" touchscreen	ABS, Gray RAL7045	213*185*84mm	IP65
	1.8" color LCD	Aluminum, Gray	200*200*135 mm	IP65, Exd IICT4
Laboratory Desktop	7" touchscreen	Aluminum, Black	250*144*184mm	IP40
Portable	7" touchscreen	ABS, Yellow	420*325*180mm	IP67
19" Rack(1~6Channels)	7" touchscreen	Aluminum, natural-coloured	483*133*238mm	IP40

SMART-MT Moisture Analyzer

Model

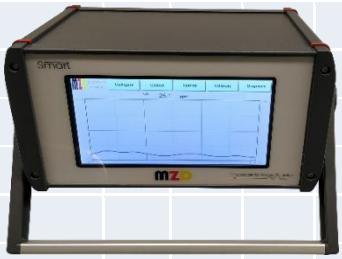
	MT	—Moisture Analyzer						
		Display and Operation						
		50	—4.3-inch industrial color resistive touchscreen					
			Number of Channels					
			—	—1 Channel				
			2	—2 Channels				
				Measuring Range (User-Configurable)				
				—	—0~10~500~2000ppm, resolution up to 1ppb			
					Flow Monitoring			
					—	—Without Flow Monitoring		
					FA	—Flow Monitoring with Low-Flow Alarm		
						Power Supply		
						D	—19–28 V DC power supply	
						**A**	—80–264 V AC, 50/60 Hz power supply	
							Communication	
							—	—RS485 bus communication (MODBUS RTU)
							1	—HART bus communication
							2	—Profibus-PA bus communication
							3	—Profibus-DP bus communication
							4	—Foundation Fieldbus bus communication
SMART-	**MT**	**50**	**X**	**X**	**X**	**X**	**X**	

	Flow Cell with Sensor						
	BP	—PVDF Flow Cell					
	BV	—Stainless Steel Flow Cell					
		Sensor Material					
		G	—Glass Pillar with Platinum Wire				
		K	— Platinum coated ceramic pillar				
			Flow Rate				
			20	—20Nl/h Flow Rate			
			100	—100Nl/h Flow Rate			
				Electrical Connection			
				—	M12 Electrical Connector		
					Sensor Cable		
					—	—Standard Sensor Cable (3 m) with M12 Connector	
					n	—Customized sensor cable	

						Explosion Protection Option	
						—	—Standard Version without Ex ia/ib Certification
						Ex	— Ex ia/ib Certification
ATM-	**X**	**X**	**X**	**—**	**X**	**X**	

	MT	—Moisture Analyzer						
		Display and Operation						
		50	—4.3-inch industrial color resistive touchscreen					
			Enclosure and Protection Rating					
			A1	—Laboratory Desktop/Portable (Without Li-battery),IP40 Rating, Gray black, Aluminum				
			A2	—Portable (Without Li-battery),IP65 Rating, Yellow, PP box				
				Measuring Range (User-Configurable)				
				—	—0~10~500~2000ppm, resolution up to 1ppb			
					Flow Monitoring			
					—	—Flow monitoring (Rotameter)		
					FC2	—Flow monitoring and controller, Aluminum		
					FC3	—Flow monitoring and controller, Stainless steel		
						Sensor Type		
							—Platinum coated ceramic pillar, Stainless steel	
SMART-	**MT**	**50**	**X**	**X**	**X**	**X**	**X**	

SMART-MT Moisture Analyzer

	MT	—Moisture Analyzer								
		Display and Operation								
		70	—7-inch industrial color capacitive touchscreen							
			Enclosure and Protection Rating							
			R	—19" rack type, IP40, Aluminum						
			A	—Laboratory Desktop, IP40 Rating, Gray black, Aluminum						
				Number of Channels						
				—	—1 Channel					
				2	—2 Channels					
					Measuring Range (User-Configurable)					
					—	—0~10~500~2000ppm, resolution up to 1ppb				
						Flow Monitoring				
						—	—Without Flow Monitoring			
						FA	—Flow Monitoring with Low-Flow Alarm			
						FR	—Flow monitoring with rotameter			
						FM	—Flow monitoring with MFM			
						FC2	—Flow monitoring and controller with MFC, Aluminum			
						FC3	—Flow monitoring and controller with MFC, Stainless steel			
							Power Supply			
							D	—19–28 V DC power supply		
							A	—80–264 V AC, 50/60 Hz power supply		
								Communication		
								—	—RS485 bus communication (MODBUS RTU)	
								1	—HART bus communication	
								2	—Profibus-PA bus communication	
								3	—Profibus-DP bus communication	
								4	—Foundation Fieldbus bus communication	
								5	—Ethernet (MODBUS TCP) communication	
									Sensor Type and Process Connection	
									—	—Platinum coated ceramic pillar, Stainless steel
									S	—Split version, sensor not included
SMART-	**MT**	**70**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	

Continuous Measurement of Trace Moisture in Gases

Trace Moisture Analyzer

Overview

Trace moisture analyzer is cost-effective and suitable for stable and continuous measurement of trace moisture of most gases.

Application

- Microelectronics (OLED/capacitor/HID)
- Lithium battery
- University and research
- Glove Boxes
- Metal heat treatment/welding
- Chemicals/Pharmaceuticals
- Air Separation Unit

Sensor Material	Platinum coated ceramic pillar
Display	1.8" color LCD, 160*128Pixel, English Menu, Status LED (NAMUR NE107)
Operation	Magnetic button
Range	0~10ppm up to 500ppm (max.2500ppm, free setting) Or -100 ~ -20℃ (Dew point)
Accuracy	2% of measuring value or 0.4ppm (0~500ppm range) 10% of measuring value (0~1ppm range)
Sensitivity	50ppb
Lowest detection limit	50ppb
Response Time	Less than 1s
Action time T90 (up)	Less than 5s
Action time T90 (down)	Less than 30 min
Diagnosis function	Self-diagnosis, heart beat monitoring
Analog Output	4~20mA，Maximum load 500 ohms
Relay Output	2 Relays (2A, 230V AC/DC freely set alarm), 1 Relay (System alarm)
Communication	RS485 MODBUS RTU Slave
Power	19 ~ 28V DC,0.5A
Ambient Temperature	5 ~ 65℃
Process Pressure (Max.)	10Bar
Gas Flow	20Nl/h (Recommend)
Process connection	NPT1/2” screw or KF40 flange
Housing Material	Aluminum alloy, Stainless steel
Size	Φ110*240*107 mm
Weight	1.5Kg
Explosion-proof	Ex d IICT4 optional (200*200*135 mm, 3.5Kg)

SMART-MT Moisture Analyzer

Model

	MT	—Moisture Analyzer				
		Display and Operation				
		20	—1.8-inch industrial color display, magnetic-button operation, English menu			
			Measuring Range (User-Configurable)			
			—	—0~10~500ppm, resolution up to 1ppb		
				Sensor Type and Process Connection		
				—	—Split version, Stainless Steel Flow Cell, Platinum coated ceramic pillar	
				1	—Platinum coated ceramic pillar, Stainless steel, G1/2" Screw	
				2	—Platinum coated ceramic pillar, Stainless steel, KF40 vacuum flange	
					Enclosure and Protection Rating	
					—	—Standard Enclosure, IP65, Aluminum
					Ex	—Explosion-Proof Enclosure, Ex d IIC, IP66, Wall-Mounted
SMART-	**MT**	**20**	**—**	**X**	**X**	

Note:

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