

HPM18V Capacitance Diaphragm Gauge



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Overview

HPM18V is a Capacitance Diaphragm Gauge, also called capacitive film gauge (CDG). This product uses a ceramic capacitive sensor as a sensitive element and uses a vacuum connection to directly measure pressure. Its analog output signals such as 0-5 or 0-10 VDC are proportional to the measured pressure and are not affected by the type and composition of the process gas. Ceramics have the characteristics of high elasticity, wear resistance, corrosion resistance, and fast heat dissipation, which makes the vacuum gauge have very good thermal stability and extremely low temperature drift.

The HPM18V capacitive vacuum gauge has high measurement accuracy, excellent overvoltage resistance and excellent long-term stability. Its corrosion-resistant ceramic sensor is temperature compensated, has a wide operating temperature range, and has good zero-point stability. The vacuum gauge is compact in overall size, easy to use and reliable, and is suitable for accurate measurement of medium and low vacuum of complex gas components..

Application

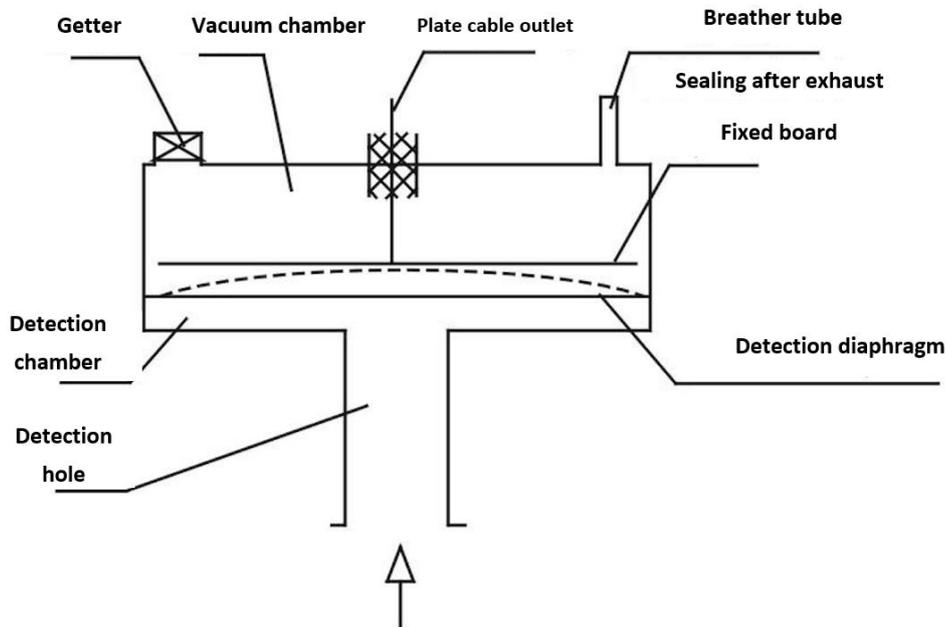
- Vacuum application
- Laboratory and research and development
- Semiconductor industry
- Vacuum packaging
- Plasma etching process equipment

Features

- Capacitor film principle
- High precision and good stability
- Has excellent anti-overload capability
- Detection is not affected by gas type and composition
- Fast response and small hysteresis
- Direct pressure measurement, the analog output signal is proportional to the measured pressure

- Support various pressure interfaces KF, CF, VCR, etc. in the vacuum industry

Measuring Principle



Capacitive vacuum gauge, also called capacitive film vacuum gauge, works based on the principle of capacitance change and consists of a detection part and a conversion circuit.

The picture above is a schematic diagram of the detection part. The detection part has two chambers, the vacuum chamber and the detection chamber. The vacuum chamber is a fully sealed structure. After passing the leak detection by the helium mass spectrometer leak detector, it is exhausted for a long time, and finally the exhaust pipe is sealed to maintain a long-term high vacuum. The fixed electrode plate is located in the vacuum chamber, and is led out of the vacuum chamber by the electrode lead wire. The detection diaphragm is placed between the high vacuum chamber and the detection chamber of the low vacuum system to be tested. The detection diaphragm is a movable plate, which forms a flat capacitor with the fixed plate. The measured low vacuum pressure enters the detection chamber through the detection hole, and the detection diaphragm deflects, changing its distance from the fixed plate, and the capacitance value also changes accordingly. Different low vacuum pressures determine different capacitance values.

The capacitance signal formed by the detection part is sent to the circuit conversion part. The circuit conversion part converts the capacitance signal through transformation, sorting, amplification and conversion, and finally outputs a standard

voltage or current signal. This standard electrical signal is derived from the capacitive signal and is proportional to the vacuum pressure.

Technical Parameters

Measuring Range									
Absolute (kPa)	Rated pressure	0.2	0.5	1	2	5	10	20	100
	Overload	200	200	200	200	400	400	600	1000
Absolute (Torr)	Rated pressure	2	5	10	20	50	100	200	1000
	Overload	2000	2000	2000	2000	4000	4000	6000	10000
Absolute (mbar)	Rated pressure	2	5	10	20	50	100	200	1000
	Overload	2000	2000	2000	2000	4000	4000	6000	10000
Note: For other measuring ranges, please contact us.									

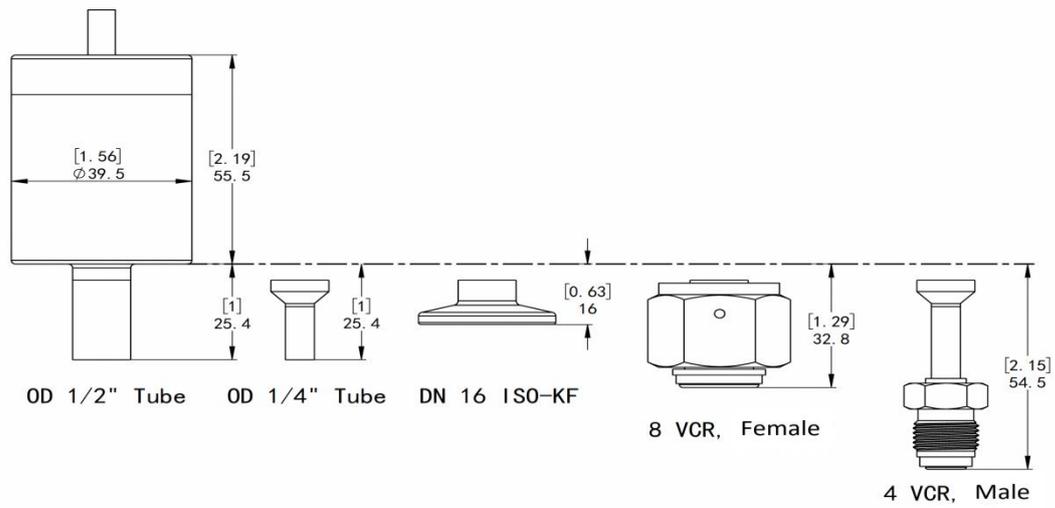
Measuring Medium	
Type	Various gases compatible with contact materials
Output Signal/Power Supply	
Standard	4~20mA / $V_S=10\sim30 V_{DC}$
Standard	0 ~ 5VDC / $V_S=8.5\sim30 V_{DC}$
Standard	0 ~ 10VDC / $V_S=12\sim30 V_{DC}$
Standard	RS485 / $V_S=10\sim30 V_{DC}$
Performance	
Accuracy	±0.1%FS (20kPa,100kPa) ±0.25%FS (2kPa,5kPa,10kPa) ±0.5%FS (500Pa,1kPa) ±1.5%FS (200Pa)
Long-term stability	±0.50%FS/year, ≤1kPa ±0.25%FS/year, >1kPa
*Accuracy complies with IEC 60770 (non-linearity, hysteresis, repeatability)	
Environment Conditions	
Temperature range	Working temperature: -30 ~ 85°C Ambient temperature: -30 ~ 85°C Storage temperature: -30 ~ 85°C
Protection grade	IP65

Temperature Drift	
Compensation temperature	-20 ~ 80°C
Temperature drift of zero point	±1.5%FS (Within compensation temperature)
Temperature drift of full scale	±1.5%FS (Within compensation temperature)
Electrical Protection	
Short circuit protection	Permanent
Reverse polarity protection	No damage, circuit does not work
Electromagnetic compatibility	According to EN 61326
Mechanical stability	
Vibration	20g(20~5000Hz)
Impact resistance	50g(11ms)
Insulation	
Insulation resistance	>200MΩ @500VDC
Dielectric strength	<2mA @ 500VAC 1min

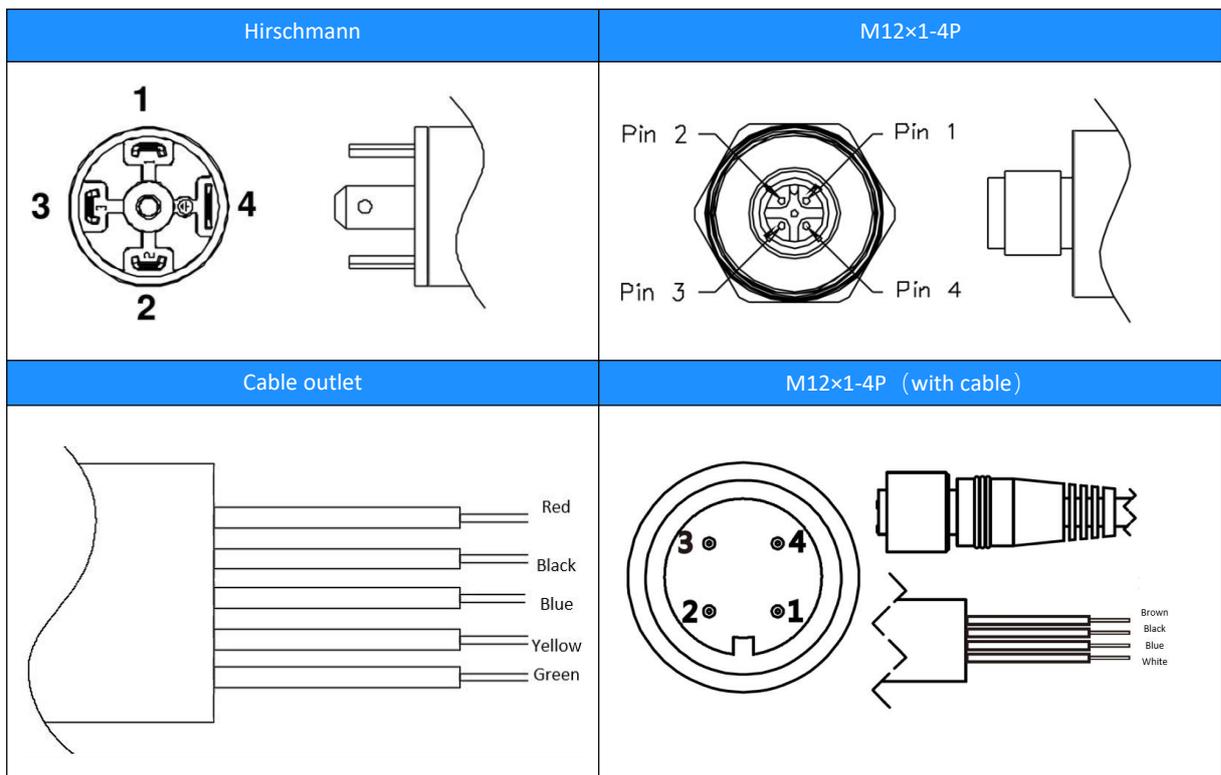
Structure Material

Ordering Code	Part	Materials
S4	Pressure port	SS304
S6		SS316L
PE		PEEK
M6	Sensor	Ceramic Al ₂ O ₃ 99.9%
FK	O-Ring	FKM Fluoro rubber
NB		NBR Nitrile

Structure Drawings



Electrical Connection

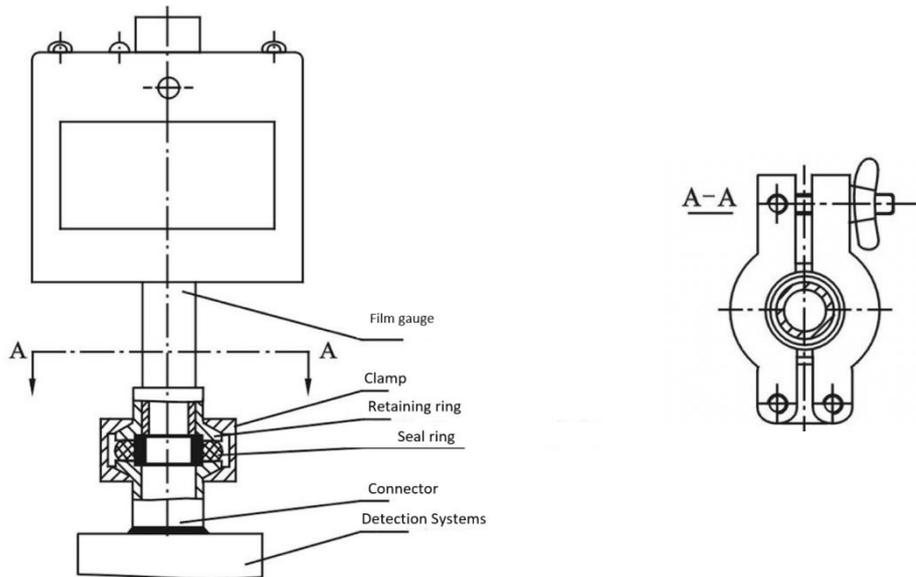


Two-wire 4 ~ 20mA current output				
	Power supply+ (+V)	Power supply- (0V/+OUT)	N/A	
Hirschmann	1	2	3, 4	
Cable outlet	Red	Black		
M12×1	1	2	3, 4	
M12×1 (with cable)	Brown	Black	Blue,white	
Three- wire 0~5V/10V voltage output				
	Power supply+ (+V)	Common Ground (GND)	Output (+OUT)	N/A
Hirschmann	1	2	3	4
Cable outlet	Red	Black	Blue	
M12×1	1	2	3	4
M12×1 (with cable)	Brown	Black	Blue	White
Four-wire Modbus-RTU/RS485				
	Power supply+ (+V)	Power supply- (0V/+OUT)	RS485A	RS485B
Hirschmann	1	2	3	4
Cable outlet	Red	Black	Yellow	Green
M12×1,4P	1	2	3	4
M12×1 (with cable)	Brown	Black	Blue	White

Installation Notes

ISO-KF interface installation diagram

When installing the capacitive film vacuum gauge, it is recommended to use the national standard GB4982-85 (equivalent to ISO 2861/1-74 or DIN 28403) KF vacuum quick connector. The user only needs to weld the joint to the system to be tested, and after confirming the seal through leak detection, install the retaining ring, O-ring and film gauge in sequence, then clamp it firmly with the clamp of the connector, and finally tighten the nut, and it is complete. Installation work. The installation is very convenient and the sealing is reliable.



Note:

1. The film gauge must be installed vertically upward as shown in the figure.
2. During the disassembly and assembly process, care should be taken to handle it with care and avoid collisions to avoid instrument errors. Otherwise, it needs to be recalibrated before it can be used.
3. The diaphragm gauge cannot be installed in a vibrating position. If it must be installed in a vibrating position, please use a vacuum hose to connect it to avoid vibration.
4. The film gauge can also be installed using CF type vacuum flange, VCR, etc. Please consult the sales engineer for details.

Ordering Guide

Item	Type						
HPM18V	HPM18V Capacitance Diaphragm Gauge						
	Pressure Range						
	(0~X)kPa	Torr or mbar					
		Item	Output				
		B1	4~20mA				
		B3	0-10V				
		B4	0-5V				
		Item	Process Port				
		VKF16	DN 16 ISO-KF				
		VCF16	DN 16 CF				
		VT4	0.5" outer tube				
		VT2	0.25" outer tube				
		VR8M	1/2 VCR Female, swivel joint.				
		VR4M	1/4 VCR Female, swivel joint.				
		VR4F	1/2 VCR male, swivel joint.				
		VP1	M20*1.5Male				
		Item	Electronic output				
		C1	DIN43650				
		C2	Cable out let				
		C5	M12*1				
		CD15	15 Pins, D-sub connector				
		Item	Sensor				
		M6	Ceramic Al2O3				
			Item	Housing material			
			S4	304			
			S6	316L			
			PE	PEEK			
			Item	Additional Function			
			A	Absolute(typical)			
		QF	Delivery inspection report				
			Other customized requirements				
HPM18V	(0~1)kPa	B1	VKF16	C2	M6	S6	A