**Thermal gas mass flow meter**

**Installation manual**

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**One、Overview**

The thermal gas mass flow meter is designed based on the principle of thermal diffusion, which uses the constant temperature difference method to accurately measure the gas. The utility model has the advantages of small volume, high digitization degree, convenient installation and accurate measurement.

The sensor part consists of two reference grade platinum resistance temperature sensors. When the instrument is working, one sensor continuously measures the medium temperature T1; the other sensor self-heats to the medium temperature T2, which is used to sense the fluid flow rate, called the speed. sensor. The temperature ΔT=T2-T1, T2>T1, when there is fluid flowing, the gas molecules collide with the sensor and take away the heat of T2, so that the temperature of T2 is lowered. To keep ΔT unchanged, it is necessary to increase T2. The supply current, the faster the gas flow rate, the more heat is removed, and the gas flow rate and the added heat have a fixed function relationship. This is the principle of constant temperature difference.



…………..（1）

Among them — Fluid specific gravity（related to density）

**V** — Flow rate

**K —** Balance factor

**Q** — Heating amount（related to specific heat and structure）

**ΔT** — Temperature difference

Since the temperature of the sensor is always automatically higher than the medium temperature by about 30℃, the thermal gas flow meter does not require temperature compensation in principle.

Thermal gas mass flow meter for medium temperature range is **-40-450℃**。

1. Fluid specific gravity and density

****

………..（2）

among them

— Dielectric density under working conditions（kg/m3）

**ρn —**  Medium density under standard conditions（101.325 Kpa、20℃） （kg/m3）

**P —** Working condition pressure （kPa） **T —** Working temperature（℃）

It can be seen from equations (1) and (2) that the relationship between flow rate and operating pressure, gas density, and operating temperature has been determined.

The constant temperature differential heat mass flow meter is not only affected by temperature, but also is not affected by pressure. The thermal gas mass flow meter is a true direct mass flow meter, and the user does not have to correct the pressure and temperature.

**Two、Features：**

* Thermal gas mass flow meters have the following technical advantages:
* The real mass flow meter does not require temperature and pressure compensation for gas flow measurement, and the measurement is convenient and accurate. A mass flow rate of the gas or a standard volume flow can be obtained.
*  Wide range ratio, can measure gas flow rate up to 120Nm / s down to 0.1Nm / s, can be used for gas leak detection.
* The seismic performance is good and the service life is long. The sensor has no moving parts and pressure sensing parts and is immune to the influence of vibration on the measurement accuracy.
*  Easy to install and maintain. Non-stop production installation and maintenance can be achieved where field conditions permit. (requires special customization)
*  Digital design. The overall digital circuit measurement, accurate measurement and convenient maintenance.
*  RS-485 communication enables factory automation and integration.
*  Oxygen, nitrogen, hydrogen, chlorine and multi-component gas measurements.
*  blast furnace gas, coke oven gas measurement.
* Gas flow measurement of natural gas, liquefied gas, flare gas, etc.
* Primary and secondary air flow measurements of blast furnaces in the power plant.
* Flow measurement of downhole ventilation or exhaust system in Yanzhou Mine.
*  Flue gas measurement.
* Compressed air measurement.

**Three、Technical performance**

|  |  |  |
| --- | --- | --- |
| performance | Technical Parameters | |
| structure type | Plug-in | Pipeline |
| Measuring medium | Common steady-state gases (unstable media such as acetylene and boron trichloride are not measurable) | |
| Pipe diameter range | DN65～4000mm | DN15～2000mm |
| Flow rate range | 0.1～120Nm/s | |
| Accuracy | ±1～2.5% | |
| Operating temperature | sensor：-40～+450℃ converter：-20～+45℃ | |
| Working pressure | Medium pressure≤4.0MPa(≥4.0MPa Agreement supply) | Medium pressure≤1.6MPa(≥4.0MPa Agreement supply) |
| Power supply | **(DC 24V )>=18W** | |
| Responding speed | 1s | |
| Output signal | 4-20mA(Optical isolation，Maximum load500ohm）、RS-485(Lightning protection） | |
| Call the police | 1-2 normally open contacts、24V/0.5A | |
| Type of supply | Integrated structure | |
| Pipe material | Carbon steel, stainless steel, plastic, etc. | |
| Live display | Four-line LCD display | |
| Display content | Mass flow rate, standard volume flow rate, cumulative flow rate, standard flow rate, etc. | |
| Protection level | IP65、IP67、IP68 | |
| Sensor material | stainless steel | Stainless steel, carbon steel |

**Four、Pipe and plug-in structure dimensions**

**4.1 Flange mounting size**  Unit：mm

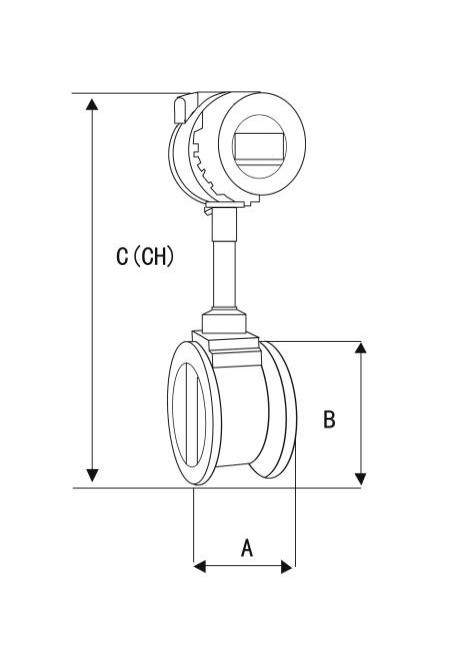


Figure 1 Figure 2

GB/T9119-2000 PN1.6Mpa(16bar) Flat, protruding panel flat welded steel pipe flange

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Nominal diameter | Flange outer diameter | Center hole diameter | Screw hole | Thread specification | Flange thickness | Instrument installation length |
| DN | D | K | n\*L |  | C | L |
| 15 | 95 | 65 | 4\*14 | M12 | 12 | 160 |
| 20 | 105 | 75 | 4\*14 | M12 | 14 | 160 |
| 25 | 115 | 85 | 4\*14 | M12 | 14 | 160 |
| 32 | 140 | 100 | 4\*18 | M16 | 16 | 160 |
| 40 | 150 | 110 | 4\*18 | M16 | 16 | 180 |
| 50 | 165 | 125 | 4\*18 | M16 | 18 | 180 |
| 65 | 185 | 145 | 4\*18 | M16 | 20 | 180 |
| 80 | 200 | 160 | 8\*18 | M16 | 20 | 180 |
| 100 | 220 | 180 | 8\*18 | M16 | 20 | 200 |
| 125 | 250 | 210 | 8\*18 | M16 | 20 | 200 |
| 150 | 285 | 240 | 8\*22 | M20 | 22 | 200 |
| 200 | 340 | 295 | 12\*22 | M20 | 22 | 200 |
| 250 | 405 | 355 | 12\*26 | M24 | 24 | 200 |
| 300 | 460 | 410 | 12\*26 | M24 | 24 | 200 |

**4.2 Card mounted mounting**

**size** Unit：mm

|  |  |  |  |
| --- | --- | --- | --- |
| Caliber  DN | B | C (CH) | A |
| 15-25 | 55 | 390(455) | 70 |
| 32 | 55 | 390(455) | 70 |
| 40 | 80 | 385(440) | 85 |
| 50 | 90 | 390(450) | 85 |
| 65 | 105 | 400(470) | 85 |
| 80 | 120 | 420(480) | 85 |
| 100 | 140 | 440(500) | 85 |
| 125 | 165 | 465(530) | 90 |
| 150 | 194 | 490(560) | 100 |
| 200 | 248 | 545(610) | 102 |
| 250 | 300 | 595(650) | 115 |
| 300 | 350 | 645(710) | 130 |

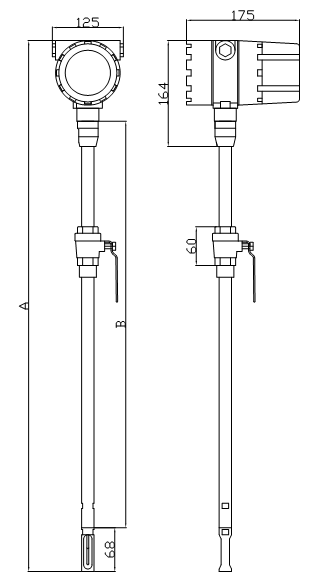
Figure 3

（1）For DN15 ~ DN80 can be used pipe thread connection.

（2）Only the maximum rated pressure data of 1.6Mpa is given in the table, and it can be customized above the rated pressure.

（3）The integral full tube can be flanged, threaded and snap-fit.

**4.3 Plug-in mounting size** Unit：mm

Figure 4

1. The integral plug-in type should be inserted into the axis of the pipe to be tested, so the length of the measuring rod depends on the diameter of the measuring pipe. It should be stated when ordering.
2. If it cannot be inserted into the pipe axis, the factory will provide the calibration factor to complete the accurate measurement.

**Five、Option**

1. **The flow range**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Thermal gas mass flow meter range table** | | | | |
| caliber | Base range (air)（Nm3/h） | Extended range (air)（Nm3/h） | Oxygen base range（Nm3/h） | Combustible gas range（Nm3/h） |
| 10 | 0.5-28 | 0.03-30 | 0.5-14 | 0.5-5 |
| 15 | 0.5-65 | 0.07-65 | 0.5-32 | 0.5-10 |
| 20 | 0.5-100 | 0.12-110 | 0.5-55 | 0.5-20 |
| 25 | 0.5-175 | 0.18-180 | 0.5-89 | 0.5-28 |
| 32 | 0.5-290 | 0.3-290 | 0.5-144 | 0.5-45 |
| 40 | 0.5-450 | 0.5-450 | 0.5-226 | 0.5-70 |
| 50 | 1-600 | 0.5-700 | 0.7-352 | 0.7-110 |
| 65 | 1.5-1000 | 1-1200 | 1.2-600 | 1.2-185 |
| 80 | 2-1500 | 1.5-1800 | 2-900 | 2-280 |
| 100 | 3-2300 | 3-2800 | 3-1420 | 3-470 |
| 125 | 4.5-3500 | 4-4400 | 4.5-2210 | 4.5-700 |
| 150 | 6.5-5200 | 6-6300 | 6.5-3200 | 6.5-940 |
| 200 | 12-9000 | 12-11500 | 12-5650 | 12-1880 |
| 250 | 18-14500 | 18-17500 | 18-8830 | 18-2820 |
| 300 | 25-21000 | 25-25000 | 25-12720 | 25-4060 |
| 350 | 35-28000 | 35-34500 | 35-17000 | 35-5600 |
| 400 | 45-36500 | 45-45000 | 45-22600 | 45-7200 |
| 450 | 60-46500 | 60-57000 | 60-29000 | 60-9200 |
| 500 | 70-57000 | 70-70000 | 70-35300 | 70-11280 |
| 600 | 100-81000 | 100-101000 | 100-50600 | 100-16300 |
| 700 | 140-110000 | 140-138000 | 140-69000 | 140-22100 |
| 800 | 180-150000 | 180-180000 | 180-90000 | 180-29000 |
| 900 | 230-185000 | 230-230000 | 230-115000 | 230-36500 |
| 1000 | 290-230000 | 290-280000 | 290-140000 | 290-45500 |
| 2000 | 1150-900000 | 1150-1130000 | 1150-560000 | 1150-185000 |

Note：

1）Determination of the upper and lower limits of the range：

**A** Determination of the lower limit: Since the lower limit of the thermal gas mass flow meter can measure extremely low flow rates, such as 0.1 Nm/s, it is not necessary to consider the lower limit in the selection.

**B**  Determination of the upper limit: Generally, the choice is higher, and there should be more than 20%. Because the actual flow is easy to estimate the error.

**C** Mixing gas range: For mixed gas, the user should give the molar ratio of the standard and the mixed gas (the percentage of each component to the total flow), and then the range is determined by the manufacturer. It is usually calibrated with air and then multiplied by a conversion factor.

**D** Explosion-proof product upper limit: 1) the maximum flow rate is preferably less than 17m/s.

2）Standard state flow: flow at a temperature of 20 ° C and a pressure of 101.325 KPa.

3）The unit of instantaneous flow rate can be Nm3/h, Nm3/min, L/h, L/min, t/h, t/min, kg/h and kg/min.

**4）Conversion of working condition flow and standard condition flow:**



Q Standard condition：Standard state flow（Nm3/h）

Q Working condition：Working condition flow（m3/h）

T：Working medium temperature（℃）

P：Working medium pressure (gauge pressure KPa)

1. **Flow rate calculation formula**



V: medium standard flow rate (Nm/S) Q: standard state flow (Nm3/h) D: measuring pipe diameter (mm)

**Six、Installation**

**6.1 Cable installation method**

**Terminal block description and wiring method:**

485 Output I-

Lower alarm limit

4-20mA Output N

Upper limit of alarm B

DC24V输出

通道1

24V+ 24- I+ I- A B +UP- +LP-

Figure 5

**6.2 Field instrument installation**

OE_DC2IQ9_BMFVFIG@_J]K1If the instrument is installed outdoors, the instrument sun shield should be added to avoid sun and rain.

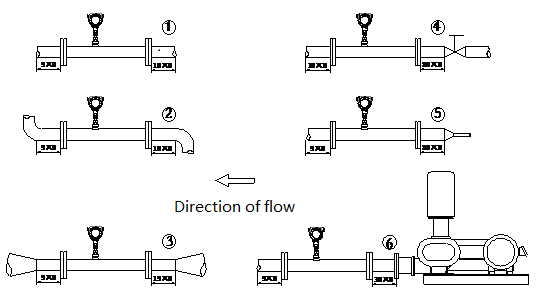
禁止标志Do not install in places subject to strong vibration.

Do not expose to an environment containing a large amount of corrosive gases.禁止标志

禁止标志Do not share the power supply with equipment that pollutes the power supply such as inverters or welders. If necessary, install a clean power supply for the converter.

**6.2.1 Installation location and requirements for piping**

(1) When installing the instrument, keep away from elbows, obstacles, reducers, and valves to ensure a stable flow field. On the other side, a long upper straight pipe is required. The front straight pipe length is greater than 10D, and the rear straight pipe length is long. More than 5D. The following figure shows the length of the straight pipe required for several situations that are often encountered in the field:



Straight pipe section before and after installation

Figure 6



（2）When the site can not meet the requirements of the straight pipe section, the gas rectifier can be connected in series to greatly reduce the requirements for the straight pipe section.。

**Seven、Debugging and running**

**7.1、Main interface under working status (as shown below)**

**Status Bar**

**TMF**

**Zero voltage**

**O K SAVE UP LP V:0.0000V**

**Instant** **0 .00** **Nm3/h**

0001

**0 0 0 0 0 0 0 0. Nm3**

**FlowV 0.0000 Nm/s**

**Instantaneous flow**

**Cumulative traffic**

**flow rate**

SET

**Operation key**

**Figure 8**

**Prompt line：**

（1）When the meter is working normally and power is on, it will perform self-test. When the self-test is normal, it will prompt OK，SAVE；

（2）Instrument alarm channel prompt，UP indicates the upper limit alarm，LP indicates the lower limit alarm。

（3）The instrument performs parameter setting by pressing the button. Generally, some parameters are set manually by using the button during installation.。The meter has three buttons, from left to right is   。Usually is shift key， is add key， is confirm save and change button, confirm and shift button under password menu,Under the password menuis the confirmation and shift button。

**7.2、Parameter settings**

**7.2.1 Main page display**

**O K SAVE UP LP V:0.0000V**

**Instant** **0 .00** **Nm3/h**

0001

**0 0 0 0 0 0 0 0. Nm3**

**FlowV 0.0000 Nm/s**

Under this interface，press（Shift） button to enter the setup menu;

\

**7.2.2 Parameter setting main interface**

Press(Shift Select Menu)key

In the main interface, pressto enter the main menu interface. You can use theshift keys to select the corresponding menu item and pressto enter.

**1.Common Functions**

**2.Common parameters**

**3.Common parameters**

**0000**

In the main menu of the main interface, pressto enter the common menu interface. Press to save and go to the next menu, pressto move the cursor position, and，to modify the parameters.

**Language**

**Chinese**

The default is Chinese display, you can switch English display.

Under the language menu, press to save and enter the caliber menu. Press to save and go to the next menu, pressto move the cursor position, andto modify the parameters.

**Caliber**

**Calibration 080**

**Actual 00080**

Under the caliber menu, pressto save and enter the unit menu. Press to save and go to the next menu, pressto move the cursor position, and，to modify the parameters.

**Unit**

**Nm3/h**

Under the unit menu, press to save and enter the communication address menu.press to save and go to the next menu, pressto move the cursor position, and，to modify the parameters.

**mailing address**

**01**

In the Communication Address menu, press to save and enter the flow coefficient menu.press to save and go to the next menu, pressto move the cursor position, and，to modify the parameters.The coefficient is proportional to the flow rate, which is the total coefficient.

**Flow Coefficient ρ/m3**

**01.000**

In the Flow Factor menu, pressto save and enter the full flow menu.press to save and go to the next menu, pressto move the cursor position, and，to modify the parameters

**Full flow**

**00001000.0000**

Under the Full Flow menu, pressto save and enter the Density menu.press to save and go to the next menu, pressto move the cursor position, and，to modify the parameters

**Density**

**Kg/m3**

**01.000**

Under the density setting menu, pressto save and enter the conversion factor menu.press to save and go to the next menu, pressto move the cursor position, and，to modify the parameters. Enter the corresponding conversion coefficient value for different media.

**Conversion coeffient**

**01.000**

Under the clear menu, pressto save and enter the password setting menu. Pressto save and go to the next menu, pressto move the cursor position, andto modify the parameters. This menu sets the password for the frequently used function setting menu. Pressunder this menu to return to the main page.

**Password**

**0000**

Under the lower cut menu, pressto save and enter the clear menu. Pressto clear the accumulated flow.

Under the zero voltage menu, pressto save and enter the lower cut menu.press to save and go to the next menu, pressto move the cursor position, and，to modify the parameters

This menu cuts off the value of the instantaneous flow.

Under the Conversion Factor menu, pressto save and enter the zero voltage menu.press to save and go to the next menu, pressto move the cursor position, and，to modify the parameters

This menu is set to 0 point voltage.

**Flow clear**

**clear**

**Lower cut**

**000.0**

**Zero voltage**

**0.0000**

**O K SAVE UP LP V:0.0000V**

**Instant** **0 .00** **Nm3/h**

0001

**0 0 0 0 0 0 0 0. Nm3**

**FlowV 0.0000 Nm/s**面。**/s**

In this interface, double-click to select the common parameter query.

**2.3 参数设置主界面**

**1.Common Functions**

**2.Common parameters**

**3.Common parameters**

**0000**

In this interface, press to enter the common parameter query menu.

Under the Query menu, press to save and re-enter the main page display. Press to calibrate the zero point. Zero calibration is to calibrate the piping in a closed, non-ventilated condition. The overflow flag is 1 when the flow rate exceeds 100000000. When this bit is greater than 10, it is automatically cleared. When the accumulated flow is cleared, this bit is also cleared. Press under this menu to return to the main page.

**Vol： 0.0000V**

**Overflow：0**

**O K SAVE UP LP V:0.0000V**

**Instant** **0 .00** **Nm3/h**

0001

**0 0 0 0 0 0 0 0. Nm3**

**FlowV 0.0000 Nm/s**

In this interface, press three times to select the calibration parameter settings.

In this interface, pressto enter the calibration parameter password input.

**1.Common Functions**

**2.Common parameters**

**3.Calibration parameter**

**0000**

**Appendix 1 Troubleshooting**



**Appendix 2 Table of Density and Relative Air Conversion Coefficient of General Gases**

At present, the laboratory cannot calibrate the mass flow according to the gas actually used by the user, and usually performs calibration according to the flow rate of the actual use gas of the user into the flow of the air. When the user is in use, the direct output shows the mass flow or volume flow of the actual gas used.

The conversion of different gases is carried out by means of a conversion factor, and the conversion coefficient of a single component gas can be checked. As shown in the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0** | Air | **0.24** | **1.2048** | **1.0000** |
| **1** | Argon Ar | **0.125** | **1.6605** | **1.4066** |
| **2** | Arsenic AsH3 | **0.1168** | **3.478** | **0.6690** |
| **3** | Boron tribromide BBr3 | **0.0647** | **11.18** | **0.3758** |
| **4** | Boron trichloride BCl3 | **0.1217** | **5.227** | **0.4274** |
| **5** | Boron trifluoride BF3 | **0.1779** | **3.025** | **0.4384** |
| **6** | Borane B2H6 | **0.502** | **1.235** | **0.5050** |
| **7** | Carbon tetrachloride CCl4 | **0.1297** | **6.86** | **0.3052** |
| **8** | Carbon tetrafluoride CF4 | **0.1659** | **3.9636** | **0.4255** |
| **9** | Methane CH4 | **0.5318** | **0.715** | **0.7147** |
| **10** | Acetylene C2H2 | **0.4049** | **1.162** | **0.5775** |
| **11** | Ethylene C2H4 | **0.3658** | **1.251** | **0.5944** |
| **12** | Ethane C2H6 | **0.4241** | **1.342** | **0.4781** |
| **13** | Propyne C3H4 | **0.3633** | **1.787** | **0.4185** |
| **14** | Propylene C3H6 | **0.3659** | **1.877** | **0.3956** |
| **15** | Propane C3H8 | **0.399** | **1.967** | **0.3459** |
| **16** | Butyne C4H6 | **0.3515** | **2.413** | **0.3201** |
| **17** | Butene C4H8 | **0.3723** | **2.503** | **0.2923** |
| **18** | Butane C4H10 | **0.413** | **2.593** | **0.2535** |
| **19** | Pentane C5H12 | **0.3916** | **3.219** | **0.2157** |
| **20** | Methanol CH3OH | **0.3277** | **1.43** | **0.5805** |
| **21** | Ethanol C2H6O | **0.3398** | **2.055** | **0.3897** |
| **22** | Trichloroethane C3H3Cl3 | **0.1654** | **5.95** | **0.2763** |
| **23** | Carbon monoxide CO | **0.2488** | **1.25** | **0.9940** |
| **24** | Carbon dioxide CO2 | **0.2017** | **1.964** | **0.7326** |
| **25** | Cyanide gas C2N2 | **0.2608** | **2.322** | **0.4493** |
| **26** | Chlorine Cl2 | **0.1145** | **3.163.** | **0.8529** |
| **27** | Helium D2 | **1.7325** | **0.1798** | **0.9921** |
| **28** | Fluorine gas F2 | **0.197** | **1.695** | **0.9255** |
| **29** | Neodymium tetrachloride GeCl4 | **0.1072** | **9.565** | **0.2654** |
| **30** | Decane GeH4 | **0.1405** | **3.418** | **0.5656** |
| **31** | Hydrogen H2 | **3.4224** | **0.0899** | **1.0040** |
| **32** | Hydrogen bromide HBr | **0.0861** | **3.61** | **0.9940** |

化系数表（续上表）：

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **33** | Hydrogen chloride HCl | **0.1911** | **1.627** | **0.9940** |
| **34** | Hydrogen fluoride HF | **0.3482** | **0.893** | **0.9940** |
| **35** | Hydrogen iodide HI | **0.0545** | **5.707** | **0.9930** |
| **36** | Hydrogen sulfide H2S | **0.2278** | **1.52** | **0.8390** |
| **37** | Helium He | **1.2418** | **0.1786** | **1.4066** |
| **38** | Helium Kr | **0..0593** | **3.739** | **1.4066** |
| **39** | Nitrogen N2 | **0.2486** | **1.25** | **0.9940** |
| **40** | Helium Ne | **0.2464** | **0.9** | **1.4066** |
| **41** | Ammonia NH3 | **0.5005** | **0.76** | **0.7147** |
| **42** | Nitric oxide | **0.2378** | **1.339** | **0.9702** |
| **43** | Nitrogen dioxide | **0.1923** | **2.052** | **0.7366** |
| **44** | Nitrous oxide | **0.2098** | **1.964** | **0.7048** |
| **45** | Oxygen O2 | **0.2196** | **1.427** | **0.9861** |
| **46** | Phosphorus trichloride PCl3 | **0.1247** | **6.127** | **0.3559** |
| **47** | Phosphine PH3 | **0.261** | **1.517** | **0.6869** |
| **48** | Phosphorus pentafluoride PF5 | **0.1611** | **5.62** | **0.3002** |
| **49** | Phosphorus oxychloride POCl3 | **0.1324** | **6.845** | **0.3002** |
| **50** | Silicon tetrachloride SiCl4 | **0.127** | **7.5847** | **0.2823** |
| **51** | Silicon tetrafluoride SiF4 | **0.1692** | **4.643** | **0.3817** |
| **52** | Silane SiH4 | **0.3189** | **1.433** | **0.5954** |
| **53** | Dichlorosilane SiH2Cl2 | **0.1472** | **4.506** | **0.4095** |
| **54** | Trichlorosilane SiHCl3 | **0.1332** | **6.043** | **0.3380** |
| **55** | Sulfur hexafluoride SF6 | **0.1588** | **6.516** | **0.2624** |
| **56** | Sulfur dioxide SO2 | **0.1489** | **2.858** | **0.6829** |
| **57** | Titanium tetrachloride TiCl4 | **0.1572** | **8.465** | **0.2048** |
| **58** | Tungsten hexafluoride WF6 | **0.0956** | **13.29** | **0.2137** |
| **59** | Helium Xe | **0.0379** | **5.858** | **1.4066** |

**Appendix3 Common gas range upper limit（Nm3/h）（the table below can be expanded）**



**Appendix 4 Thermal Mass Flowmeter Selection Table**

**Thermal gas mass flow meter selection table**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Spectrum | | | | | | | | | Description |
| TMF |  | | | | | | | | Thermal gas mass flow meter |
| Nominal diameter | ××× | 3 digits, see attached table | | | | | | | Nominal diameter |
| Connection method |  | F | Fully tubular only | | | | | | Flange connection |
| K | Fully tubular only | | | | | | Flange card type |
| J | Insert type only | | | | | | Simple insertion type |
| Q | Insert type only | | | | | | Ball valve insertion type |
| L | Fully tubular only | | | | | | Threaded type |
| G | Fully tubular only | | | | | | Clamp connection type |
| Pressure Level |  | | | A |  | | | | 1.6MPA |
| B |  | | | | 2.5MPA |
| C |  | | | | 4.0MPA |
| D |  | | | | 6.3MPA |
| E |  | | | | 其他 |
| proper temperature |  | | | | A |  | | | -40~200℃ |
| B |  | | | -40~450℃ |
| Explosion proof |  | | | | | P |  | | normal type |
| B |  | | Explosion-proof |
| output signal |  | | | | | | 1 |  | 4~20mA current output |
| 2 |  | RS-485 communication |
| Selection  Description | For example: TMF100FAAP1 full-tube type thermal gas mass flow meter, the diameter is DN100, flange type connection, nominal pressure 1.6MPa, maximum temperature 200 degrees, normal type, 4-20mA current signal output. | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| coding | 010 | 015 | 020 | 025 | 032 | 040 | 050 | 065 | 080 | 100 | 125 | 150 | 200 | 250 | 300 |
| Nominal diameter | 10 | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 | 250 | 300 |
| coding | 350 | 400 | 450 | 500 | 600 | 700 | 800 | 900 | A10 | A12 | A14 | A16 | A18 | A20 | A22 |
| Nominal diameter | 350 | 400 | 450 | 500 | 600 | 700 | 800 | 900 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | 2200 |