

天武测控（江苏）有限公司

ToYoTop Measure and Control (Jiangsu) Co., Ltd

www.toyotop.net

TOYOTOP



天武测控（江苏）有限公司

ToYoTop Measure and Control (Jiangsu) Co.,Ltd

ToYoTop Measurement and Control (Jiangsu) Co., Ltd., as a technology-based innovative enterprise, has been dedicated to the research, production, and sales of high-precision gas mass flow meters (MFMs) and gas mass flow controllers (MFCs) with the mission of "improving gas flow measurement technology" since the establishment of Suzhou Keyite Technology R&D Center in 2012. After seven years of dedicated research and development, the company has successfully launched its first TP150 series product, laying the technological foundation for the industry. In 2021, Tianwu Measurement and Control established a modern industrial base integrating research and development, manufacturing, and sales in Taizhou National High tech Industrial Development Zone, marking the company's official entry into a new journey of large-scale and international development.

The technology of ToYoTop Measurement and Control originates from the dual wheel drive mode of "independent innovation+collaborative research and development": on the one hand, through years of technological accumulation, we have independently developed a series of products such as TPS, TP150, TP400, TP1000, IGS, etc., which have made breakthroughs in core technology fields such as high-precision gas flow measurement, full field adaptation, and industrial reliability; On the other hand, as a national confidential unit, we deeply integrate industry university research resources and carry out strategic cooperation with research institutions such as the Military Industry Research Institute, the Chinese Academy of Sciences, Xi'an University of Technology, and Harbin Institute of Technology. Through undertaking national level research projects and jointly building research and development platforms, we transform cutting-edge academic achievements into engineering solutions applicable to high-end fields such as semiconductors, new energy, biomedicine, aerospace, and national defense and military industry, achieving a technological closed loop from basic research to industrial applications.

部分产品图

Partial product images



前沿科技 引领行业标准

Leading edge technology leads industry standards

1. Core technology, independently controllable

ToYoTop flowmeter adopts independently developed thermal sensing technology, combined with exclusive optimization algorithms and EP precision technology, to ensure that measurement errors are controlled at the leading level in the industry. The product has ultra-low drift and low-temperature drift characteristics, and can maintain excellent stability and accuracy even under extreme working conditions.

2. Full field coverage, precise adaptation

Wide range: Supports precise control from small flow SCCM level to industrial high flow SLM level, suitable for various media such as inert gases, corrosive gases, and special industrial gases. Military grade reliability: Using precision ceramic technology and aerospace grade materials, the equipment undergoes rigorous environmental testing to ensure long-term stable operation under harsh conditions such as high pressure, high corrosion, and high dust.

3. Intelligent manufacturing, quality assurance

The company strictly implements the ISO 9001/14001 quality management system, from core component processing to complete machine assembly, using automated precision manufacturing and He quality inspection system throughout the process to ensure that every product meets the semicon quality standards.

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行业赋能 全球合作

Industry empowers global cooperation

1. High end market applications: Tianwu flow meters have been widely used in industries such as semiconductor manufacturing, new energy, biomedicine, military aerospace, environmental testing, and petrochemicals.

2. Global Service System

24X7 technical support, quick response to customer needs

Customized solutions, in-depth customer production sites, providing precise and adaptable flow control solutions, international cooperation network, global logistics rapid deployment

荣誉见证 实力彰显

Honor witnesses the display of strength

Tianwu Measurement and Control's outstanding performance has won recognition from multiple industry authorities:

- Calibration and Certification by the Institute of Metrology and Testing Technology of Aviation Industry Group
- Zhongding International Certification (ISO 9001 Quality Management System Certification)
- Core member unit of Jiangsu Instrument and Meter Society

The company adheres to innovation driven development and has obtained over 10 national patents (including 2 invention patents), with more than 10 core technology patents currently under application



展望未来：引领全球流量计量新篇章

Looking ahead to the future: leading a new chapter in global traffic measurement

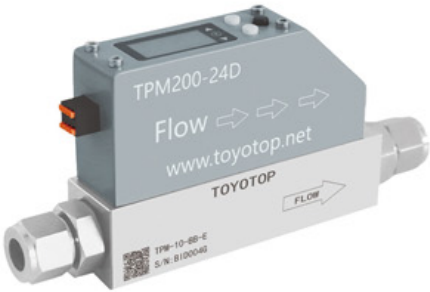
ToYoTop Measurement and Control adheres to the core values of "integrity-based, innovation driven, pursuit of excellence, and win-win future", with the vision of "empowering every demand and achieving possibilities with precision", continuously promoting the innovation of gas quality flow control technology.

We sincerely invite global partners to join hands and explore the infinite possibilities of industrial intelligence together!

气体质量流量计 Mass Flow Meter

TPM Series

- The TPM Series of Mass Flow Meter is suitable for detecting various gas flow rates
- Can quickly and accurately detect gas flow rate
- Measurement is not affected by pressure or temperature
- Analog quantity Modbus-RTU、EtherCAT、ProfiNET、Relay output optional
- Low zero drift, low-temperature drift, and automatic zero calibration
- Thermal gas mass flow meter (MFM) uses capillary sensors to obtain high-precision gas flow rate
- Can set coefficients, measure multiple gases, and read instantaneous flow rate and cumulative flow rate



型号 Model

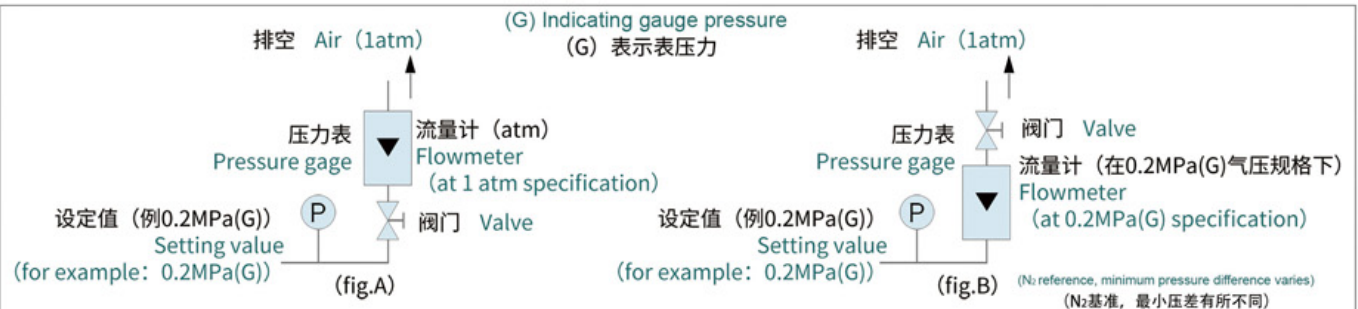
量程范围 Range range	信号类型 Signal type	供电电压 Power supply voltage	管路接头 Pipeline connector	安装方式 Installation method	密封材料 Sealing material	气体介质 Gas medium
TPM -	-	-	-	-	-	-
1	2	3	4	5	6	7

选择项目编号、填写到 □ 内完成选型。Complete the selection based on the project number filled in □.

项目编号 Project number		*主要参数 Main parameter	
1	20ML	0~20ML	Body material
	100ML	0~100ML	Sealing element
	500ML	0~500ML	Flow accuracy
	1000ML	0~1000ML	Linear
	5000ML	0~5000ML	repeatability
	10L	0~10L	Response time
	20L	0~20L	Measuring range
	50L	0~50L	Pressure resistance
	100L	0~100L	Leakage rate
	200L	0~200L	Signal type
2	RS	RS-485(Modbus-RTU)	Ambient Temperature
	ET	EtherCAT	Valve type
	5V	In/out 0-5 VDC	Warm-up time
	10V	In/out 0-10 VDC	Protection grade
	20A	In/out 4-20mA	
	PN	ProfiNET	
	PB	ProfiBUS	
3	15D	±15V	
	24D	DC24V	
	SK	DCSK6, SK1/4", SK8, SK3/8", SK10, SK12, SK1/2", SK14 (SK: Double card set)	
	VCR	VCR1/4" (Default)	
	KN	KN6, KN8, KN10, KN12 (KN: quick screw for PU hose)	
	KC	KC6, KC8, KC10, KN12 (KC: quick plug for PU hose)	
	T	Horizontal installation (default)	
	HV	Vertical installation (up and down)	
	HA	Vertical Installation (Bottom In Up)	
	L	Side mounting (left in right out)	
4	J	Side mounting (right in left out)	
	X	Any direction (no installation direction)	
	MS	Metal seal	
	RS	Rubber seal	
	N2	N2 (default), other fill	
	Enumerate	TPM-5000ML-RS-24D-SK6-T-RS-N2	

*1: The flow accuracy, linearity, repeatability, zero temperature drift, range temperature drift, and response time are the guaranteed values for the calibration gas (N₂) under our company's testing conditions.
 *2: The accuracy guarantee temperature is 23 ± 2C.
 *3: The response time is the time required for the flow output signal to reach and stabilize within the set value ± 2% F.S. during the rising response. (Note: The response time ensures a temperature of 23 ± 2C)

最小压差参考 Minimum pressure difference reference

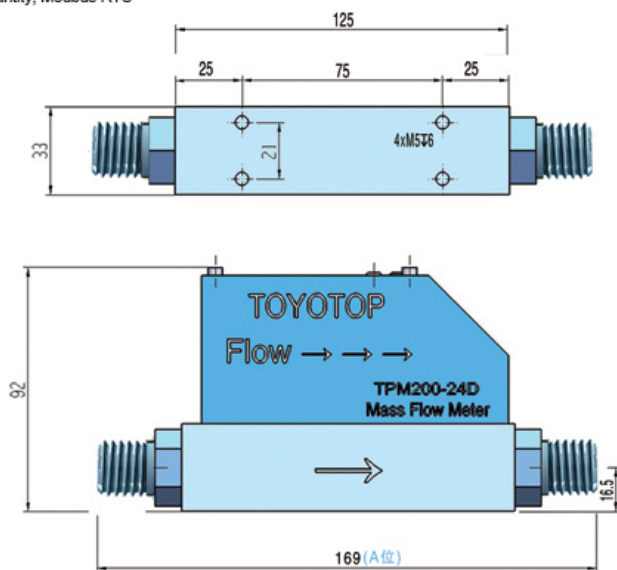


系列 series	最大流量 Maximum flow rate	通常管径 Typical pipe diameter
TPM	0~500ML/min	≥ Φ4
TPM	500~5000ML/min	≥ Φ6
TPM	5~50L/min	≥ Φ8
TPM	50~100L/min	≥ Φ10
TPM	100~200L/min	≥ Φ12

尺寸图 Dimensional drawing

TPM 外形及安装尺寸

TPM analog quantity, Modbus RTU



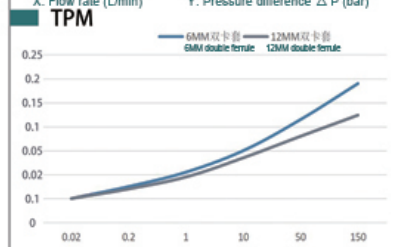
产品系列 Product series	接头类型 Type of connector	双卡套 Double ferrule						快插 Quickly plug in			
		Φ3/Φ1/8	Φ6/Φ1/4	Φ8	Φ3/8	Φ10	Φ12/Φ1/2	Φ14	Φ6	Φ8	Φ10
TPM	A位尺寸(单位: mm)	169	169	169	169	169	169	169	185	185	185

注: 特殊接头根据实际情况 Note: Special joints may vary depending on the actual situation

压差-流量 Differential pressure flow rate

TPM系列: 最大流量由量程、压差、管径尺寸决定。

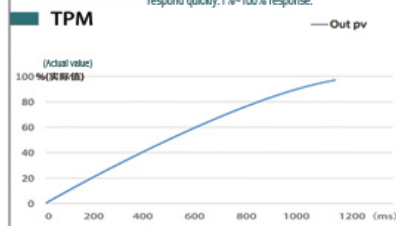
TPM series: maximum flow rate is determined by range, pressure difference, and pipe diameter size determination.

X: 流量 (L/min) Y: 压差ΔP (bar)
X: Flow rate (L/min) Y: Pressure difference ΔP (bar)

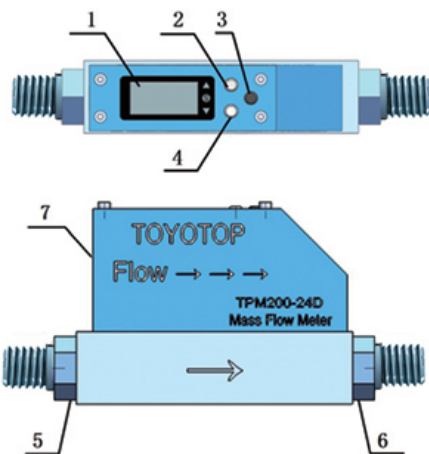
响应性 Responsiveness

TPM系列: 具有优越的稳定性, 整个区间能快速响应。

1%~100%响应 TPM series: With superior stability, the entire region can respond quickly. 1%~100% response.



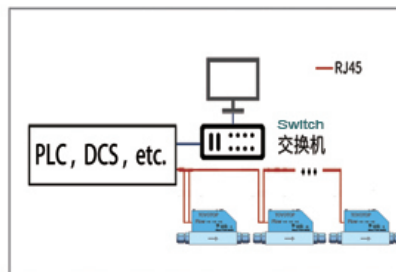
部件名称 Component Name



引脚 Pin	信号描述 Signal Description
1	主显示 Main Display
2	向上键 (白色按钮1) Up button (white button 1)
3	设置键 (黑色按钮) Set button (black button)
4	向下键 (白色按钮2) Down arrow (white button 2)
5	进气接口 Air intake interface
6	出气接口 Air outlet interface
7	接线端子 Wiring terminals

EtherCAT 组态 / ProfiNET

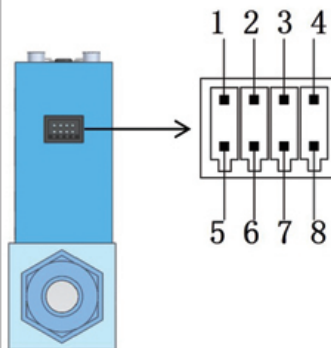
Configuration/ProfiNET



Modbus-RTU组态

Modbus RTU configuration

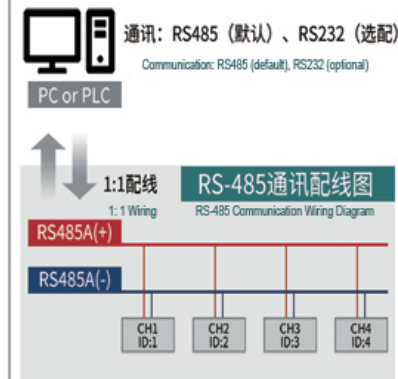
端子定义图 Terminal Definition Diagram



端子NO. Terminal No.	定义 Definition
1	0VDC(电源负) 0VDC (negative power supply)
2	RS485 (B-) RS485(B-)
3	RS485 (A+) RS485(A+)
4	24VDC(电源正) 24VDC (positive power supply)
5	输出 4-20mA Output 4-20mA
6	输出 0-5V Output 0-5V
7	信号公共端 Scom Signal common end Scom
8	信号公共端 Scom Signal common end Scom

注: 针数2、3、5、6、7针脚可以根据用户需求定制功能。上图为默认定义

Note: The number of pins 2, 3, 5, 6, and 7 can be customized according to user needs. The above image is the default definition



气体质量流量控制器 Mass Flow Controller

IGS 系列 NEW

- The IGS series thermal gas mass flow controller is suitable for controlling various gas flow rates
- Can quickly and accurately control the flow rate (0.02-10L) of gas
- Measurement is not affected by pressure or temperature
- Analog, Modbus RTU, EtherCAT, ProfiNET optional
- Low zero drift, low temperature drift, automatic zero calibration
- A thermal gas mass flow controller (MFC) uses capillary sensors to obtain high-precision gas flow rates. Through PI/MCU precision calculation and control of high-precision linear proportional valve action, the output gas volume is controlled according to the target. Fast, stable, and reliable response to values



型号 Model

IGS	量程范围 Range range	信号类型 Signal type	供电电压 Power supply voltage	进出口压差 Pressure difference between inlet and outlet	安装方式 Installation method	密封件类型 Sealing material	气体介质 Gas medium
	1	2	3	4	5	6	7

根据项目编号填写到 □ 内完成选型。Complete the selection based on the project number filled in □.

项目编号 Project number

1	0.02L	Maximum flow rate (L/min) (based on N ₂)	0~0.02
	0.05L		0~0.05
	0.1L		0~0.1
	0.15L		0~0.15
	1L		0~0.1
	2L		0~2
	3L		0~3
	5L		0~5
	8L		0~8
	10L		0~10
2	RS		RS-485 (Modbus-RTU)
	ET		EtherCAT
	5V		In/out 0-5 VDC
	10V		In/out 0-10 VDC
	20A		In/out 4-20mA
	PN		ProfiNET
	PB		ProfiBUS

3	15D		±15VDC
	24D		24VDC
4	DP		Default 3Bar (can specify working pressure difference of 0.2~5Bar)
5	T		Horizontal installation (default)
	HV		Vertical installation (top and bottom out)
	HA		Vertical installation (bottom in and top out)
	L		Side mounted (left in, right out)
	J		Side mounted (right in, left out)
	X		Any direction (without distinguishing installation direction)
6	W		W—Seal
	C		C—Seal
7	N ₂		N ₂ (default), other filled in
*	particularizing		IGS-5L-RS-24D-DP3-T-W-N ₂

*主要参数 Main parameter

Body material	316L
Sealing element	Manufacturers select based on gas selection
Flow accuracy	± 1.0% S.P. (>30% F.S.), ± 0.3% F.S. (≤30% F.S.)
Linear	±0.5% F.S.
repeatability	±0.2% F.S.
Response time	≤ 3 seconds (software adjustable)
Control range	2%~100%
Pressure resistance	3mpa (default), 15Mpa
Leakage rate	≤1×10 ⁻¹² Pa.m ³ /sec (He)
Signal type	Analog/digital quantity (software adjustable)
Ambient Temperature	5°C~55°C
Valve type	Normally closed
Warm-up time	≤ 3 minutes (optimal for ≥ 3 minutes)
Protection grade	IP40 (non explosion proof)

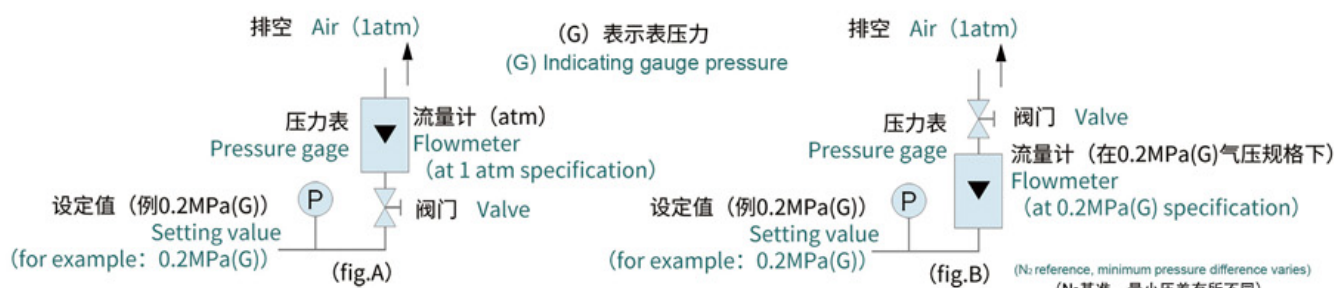
*1: The flow accuracy, linearity, repeatability, zero temperature drift, range temperature drift, and response time are the guaranteed values for the calibration gas (N₂) under our company's testing conditions.

*2: The precision guarantee temperature is 23 ± 2 °C.

*3: The response time is the time required for the flow output signal to reach and stabilize within the set value ± 2% F.S. during the rising response. (Note: The response time ensures a temperature of 23 ± 2 °C.)

*4: Due to different product specifications, the working pressure difference may also vary.

最小压差参考 Minimum pressure difference reference

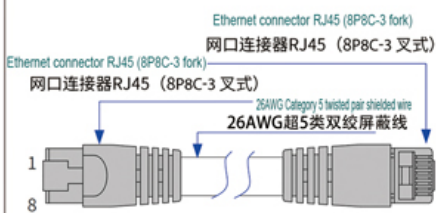
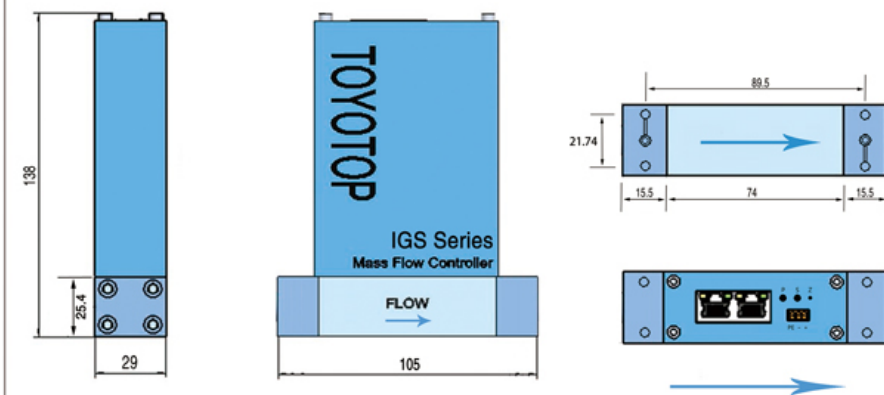


系列 Series	最大流量 Maximum flow rate	建议最小压差 Minimum pressure difference	最佳可控压差范围 Controllable pressure difference range
IGS	0~0.02L/min	0.2bar	0.2~5bar
IGS	0.02~0.1L/min	0.5bar	0.5~5bar
IGS	0.1~1L/min	1bar	1~5bar
IGS	1~5L/min	1bar	1~5bar
IGS	5~10L/min	1bar	1~5bar

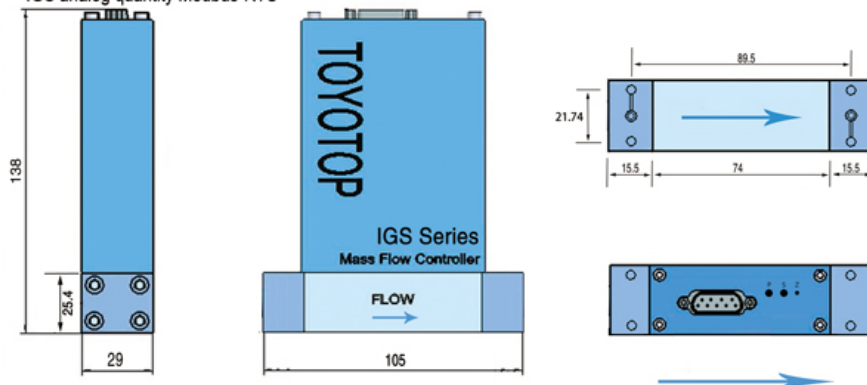
尺寸图 Dimensional drawing

压差曲线 Pressure difference curve

IGS EtherCAT / ProfiNET



引脚 Pin	信号 Signal	信号方向 Signal direction	信号描述 Signal Description
1	TD+	Output	Data transmission+
2	TD-	Output	Data transmission-
3	TD+	Input	Data reception+
4	--	--	Not used
5	--	--	Not used
6	RD-	Input	Data reception-
7	--	--	Not used
8	--	--	Not used

IGS 模拟量 Modbus-RTU
IGS analog quantity Modbus-RTU

端子定义图

Terminal Definition Diagram

D-sub 9 pin (male body)
D-sub 9 pin (公头-本体)

黑 棕 红 橙 黄
1 2 3 4 5 6
Black Brown Red Orange Yellow
6 7 8 9 10
Green Blue Purple Grey

D-sub 9 pin (mother cable)
D-sub 9 pin (母头-线缆)

黄 橙 红 棕 黑
5 4 3 2 1 0
Yellow Orange Red Brown Black
9 8 7 6 5 4
Grey Purple Blue Green

端子No. Terminal No.	电缆颜色 Cable color	定义 Definition
1	黑 Black	正电源 (+15V / +24V) Power+ (+15V / +24V)
2	棕 Brown	大地 PE
3	红 Red	负电源 (-15V) Power- (-15V)
4	橙 Orange	通讯信号 (B-) RS485 (B-)
5	黄 Yellow	通讯信号 (A+) RS485 (A+)
6	绿 Green	电源地 Power GND
7	蓝 Blue	信号地 Signal GND
8	紫 Purple	输入信号 Signal in
9	灰 Grey	输出信号 Signal out

注: DB9线缆的流量控制器和流量计、模拟量信号类型根据选型决定。

Note: The flow controller, flow meter, and analog signal type of DB9 cable are determined based on the selection.

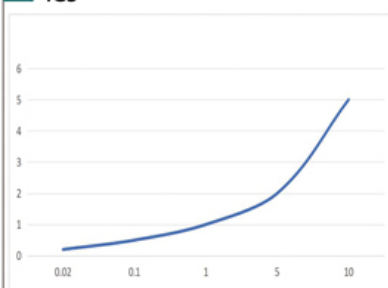
IGS系列: 最大流量 10 L (N₂)

由量程、压差决定。

IGS series: The maximum flow rate of 10L (N₂) is determined by the range, pressure difference.

X: 流量 (L/min) Y: 压差 ΔP (bar)
X: Flow rate (L/min) Y: Pressure difference ΔP (bar)

IGS

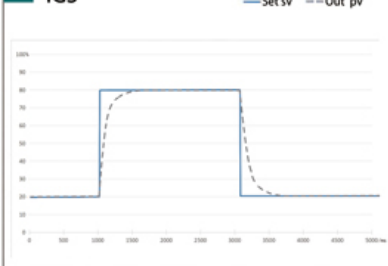


响应性 Responsiveness

IGS系列: 具有优越的稳定性, 不仅能快速响应, 还可以精确控制。

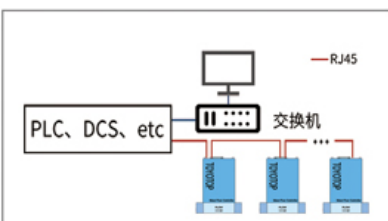
5%~100%响应 IGS series: With superior stability, not only can respond quickly and control accurately 5%~100% response

IGS

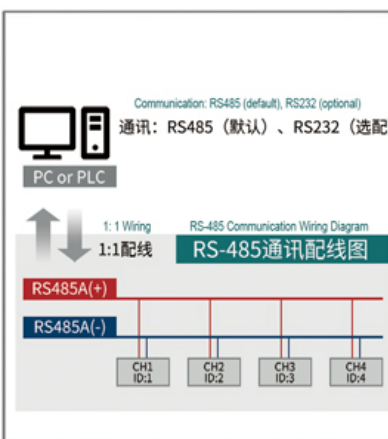


EtherCAT 组态 / ProfiNET

Configuration/ProfiNET



Modbus-RTU组态 Configuration



气体质量流量控制器 Mass Flow Controller

TPS Series NEW

- The TPS Series thermal Mass Flow Controller is suitable for various gas flow controls
- Can quickly and accurately control the flow rate (5-5000ML) of gas
- Measurement is not affected by pressure or temperature
- Analog quantity, Modbus RTU, EtherCAT, ProfiNET optional
- Low zero drift, low-temperature drift, and automatic zero calibration
- The thermal gas mass flow controller (MFC) uses capillary sensors to obtain high-precision gas flow rate, and through I/MCU precision calculation, controls the action of high-precision linear proportional valves, so that the output gas volume responds quickly, stably, and reliably according to the target value



型号 Model

量程范围 Range range	信号类型 Signal type	供电电压 Power supply voltage	管路接头 Pipeline connector	进出口压差 Pressure difference between inlet and outlet	安装方式 Installation method	密封材料 Sealing material	气体介质 Gas medium
TPS -							
1	2	3	4	5	6	7	8

根据项目编号填写到 □ 内完成选型。Complete the selection based on the project number filled in □.

项目编号 Project number

1	20ML	0~20
	50ML	0~50
	100ML	0~100
	200ML	0~200
	500ML	0~500
	1000ML	0~1000
	2000ML	0~2000
	3000ML	0~3000
	4000ML	0~4000
2	5000ML	0~5000
	RS	RS-485(Modbus-RTU)
	ET	EtherCAT
	5V	In/out 0-5 VDC
	10V	In/out 0-10 VDC
	20A	In/out 4-20mA
	PN	ProfiNET

3	15D	±15VDC
	24D	24VDC
4	SK	SK3, SK1/8", SK6, SK1/4" (SK: double card sleeve)
	VCR	VCR1/4" (default)
	KN	KN4, KN6 (KN: quick twist for FPU hoses)
	KC	KC4, KC6 (KC: quick plug for PU hoses)
5	DP	Default 2Bar (can specify working pressure difference between 0.2~5Bar)
6	T	Horizontal installation (default)
	HV	Vertical installation (top and bottom out)
	HA	Vertical installation (bottom in and top out)
	L	Side mounted (left in, right out)
7	J	Side mounted (right in, left out)
	MS	Metal seal
	RS	Rubber seal
8	N ₂	N ₂ (default), other filled in
*	particularizing	TPS-5000ML-PN-24D-SK3-DP2-HV-MS-N ₂

*主要参数

Body material	316L
Sealing element	Manufacturers select based on gas selection
Flow accuracy	± 1.0%F.S. (>30%F.S.), ±0.3%F.S. (≤30%F.S.)
Linear	±0.5%F.S.
repeatability	±0.2%F.S.
Response time	≤ 3 seconds (software adjustable)
Control range	2%~100%
Pressure resistance	3mpa (default), 15Mpa
Leakage rate	≤1×10 ⁻¹² Pa.m ³ /sec (He)
Signal type	Analog/digital quantity (software adjustable)
Ambient Temperature	5℃~55℃
Valve type	Normally closed
Warm-up time	≤ 3 minutes (optimal for ≥ 3 minutes)
Protection grade	IP40 (non explosion proof)

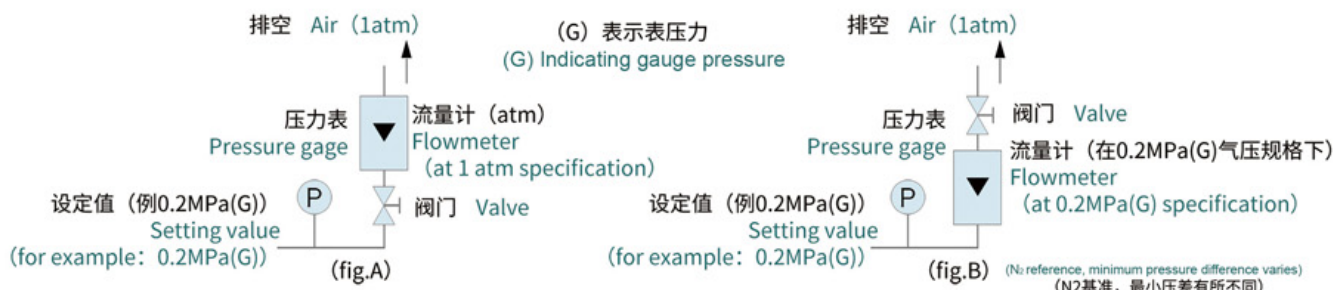
*1: The flow accuracy, linearity, repeatability, zero temperature drift, range temperature drift, and response time are the guaranteed values for the calibration gas (N₂) under our company's testing conditions.

*2: The precision guarantee temperature is 23 ± 2 °C.

*3: The response time is the time required for the flow output signal to reach and stabilize within the set value ± 2% F.S. during the rising response. (Note: The response time ensures a temperature of 23 ± 2 °C)

*4: Due to different product specifications, the working pressure difference may also vary.

最小压差参考 Minimum pressure difference reference

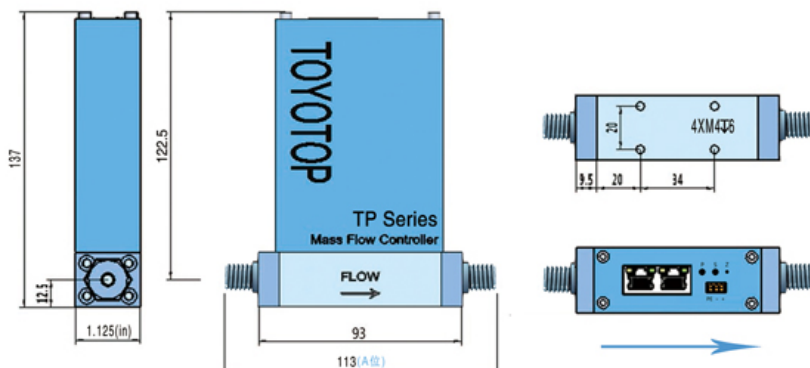


系列 Series	最大流量 Maximum flow rate	最小压差 Minimum pressure difference	可控压差范围 Controllable pressure difference range
TPS	0~20ML/min	0.2bar	0.2~5bar
TPS	20~100ML/min	0.5bar	0.5~5bar
TPS	100~500ML/min	1bar	1~5bar
TPS	500~1000ML/min	1bar	1~5bar
TPS	1000~5000ML/min	1bar	1~5bar

尺寸图 Dimensional drawing

TPS 外形及安装尺寸

TPS appearance and installation dimensions

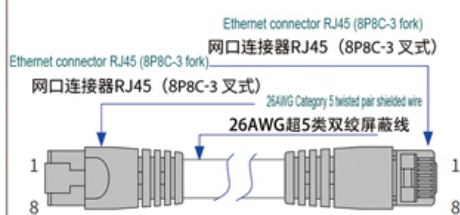


注：此处具体尺寸根据接头规格，例图为Φ6双卡套接头

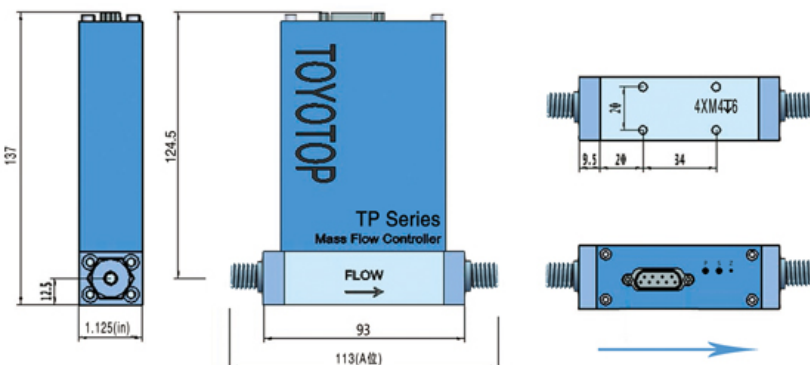
Note: The specific dimensions here are based on the joint specifications. For example, the figure shows Φ6 double card sleeve joint

产品系列 Product series	接头类型 Type of connector	双卡套 Double female		快拧 Quick twist		VCR
		Φ 3/ Φ 1/8	Φ 6/ Φ 1/4	Φ 6	Φ 8	
TPS	A位尺寸(单位: mm) A-size (unit: mm)	113	113	115	125	124

注：特殊接头根据实际情况 Note: Special joints may vary depending on the actual situation



引脚 Pin	信号 Signal	信号方向 Signal direction	信号描述 Signal Description
1	TD+	Output	Data transmission+
2	TD-	Output	Data transmission-
3	TD+	Input	Data reception+
4	--	--	Not used
5	--	--	Not used
6	RD-	Input	Data reception-
7	--	--	Not used
8	--	--	Not used

TPS 模拟量 / Modbus-RTU
TPS analog quantity/Modbus RTU

注：此处具体尺寸根据接头规格，例图为Φ6双卡套接头

端子定义图

Terminal Definition Diagram

D-sub9 pin (male body)
D-sub 9 pin (公头-本体)

黑 棕 红 橙 黄
1 2 3 4 5 6
Black Brown Red Orange Yellow
6 7 8 9 10
Green Blue Purple Grey

D-sub9 pin (mother cable)
D-sub 9 pin (母头-线缆)

黄 橙 红 棕 黑
5 4 3 2 1 0
Yellow Orange Red Brown Black
9 8 7 6 5 4
Grey Purple Blue Green

端子No. Terminal No.	电缆颜色 Cable color	定义 Definition
1	黑 Black	正电源 (+15V / +24V) Power+ (+15V / +24V)
2	棕 Brown	大地 PE
3	红 Red	负电源 (-15V) Power- (-15V)
4	橙 Orange	通讯信号 (B-) RS485 (B-)
5	黄 Yellow	通讯信号 (A+) RS485 (A+)
6	绿 Green	电源地 Power GND
7	蓝 Blue	信号地 Signal GND
8	紫 Purple	输入信号 Signal in
9	灰 Grey	输出信号 Signal out

注：DB9线缆的流量控制器和流量计、模拟量信号类型根据选型决定。

Note: The flow controller, flow meter, and analog signal type of DB9 cable are determined based on the selection.

压差曲线 Pressure difference curve

TPS系列：最大流量 5000ML (N₂)

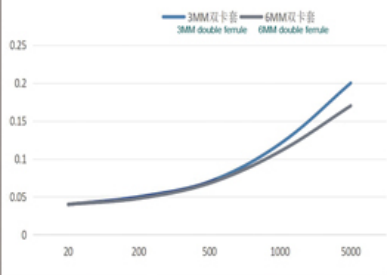
由量程、压差及接口尺寸决定。

TPSeries: The maximum flow rate of 5000ML (N₂) is determined by the range, pressure difference, and interface size

X: 流量 (ML/min) Y: 压差ΔP (bar)

X: Flow rate (L/min) Y: Pressure difference ΔP (bar)

TPS

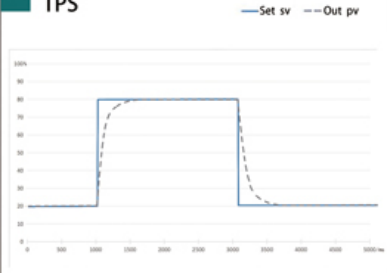


响应性 Responsiveness

TPS系列：具有优越的稳定性，不仅能快速响应，还可以精确控制。

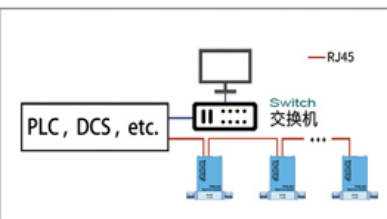
5%~100%响应 TPS series: With superior stability, not only can respond quickly and control accurately 5%-100% response

TPS

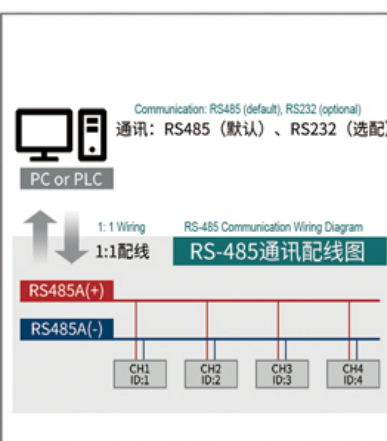


EtherCAT 组态 / ProfiNET

Configuration/ProfiNET



Modbus-RTU组态 Configuration



TP50 Series NEW

- The TP50 Series thermal Mass Flow Controller is suitable for various gas flow controls
- Can quickly and accurately control the flow rate (5-50L) of gas
- Measurement is not affected by pressure or temperature
- Analog quantity, Modbus RTU, EtherCAT, ProfiNET optional
- Low zero drift, low-temperature drift, and automatic zero calibration
- The thermal gas mass flow controller (MFC) uses capillary sensors to obtain high-precision gas flow rate, and through I/MCU precision calculation, controls the action of high-precision linear proportional valves, so that the output gas volume responds quickly, stably, and reliably according to the target value



型号 Model

量程范围 Range range	信号类型 Signal type	供电电压 Power supply voltage	管路接头 Pipeline connector	进出口压差 Pressure difference between inlet and outlet	安装方式 Installation method	密封材料 Sealing material	气体介质 Gas medium
TP50 -							
1	2	3	4	5	6	7	8

根据项目编号填写到 □ 内完成选型。Complete the selection based on the project number filled in □.

项目编号 Project number

1	5L	0~5
	10L	0~10
	15L	0~15
	20L	0~20
	25L	0~25
	30L	0~30
	35L	0~35
	40L	0~40
	45L	0~45
	50L	0~50
Maximum flow rate (L/min) (based on N ₂)		
2	RS	RS-485(Modbus-RTU)
	ET	EtherCAT
	5V	In/out 0-5 VDC
	10V	In/out 0-10 VDC
	20A	In/out 4-20mA
	PN	ProfiNET
	PB	ProfiBUS

3	15D	±15VDC
	24D	24VDC
4	SK	SK3, SK1/8", SK6, SK1/4" (SK: double card sleeve)
	VCR	VCR1/4" (default)
	KN	KN4, KN6 (KN: quick twist for FPU hoses)
	KC	KC4, KC6 (KC: quick plug for PU hoses)
5	DP	Default 3Bar (can specify working pressure difference between 0.2~5Bar)
6	T	Horizontal installation (default)
	HV	Vertical installation (top and bottom out)
	HA	Vertical installation (bottom in and top out)
	L	Side mounted (left in, right out)
	J	Side mounted (right in, left out)
7	X	Any direction (without distinguishing installation direction)
	MS	Metal seal
	RS	Rubber seal
8	N ₂	N ₂ (default), other filled in
*	particularizing	TP50-5L-RS-24D-SK6-DP3-T-MS-N ₂

*主要参数 Main parameter

Body material	316L
Sealing element	Manufacturers select based on gas selection
Flow accuracy	± 1.0% S.P. (>30% F.S.), ± 0.3% F.S. (≤30% F.S.)
Linear repeatability	±0.5% F.S., ±0.2% F.S.
Response time	≤ 3 seconds (software adjustable)
Control range	2%~100%
Pressure resistance	3mpa (default), 15Mpa
Leakage rate	≤1×10 ⁻¹² Pa.m ³ /sec (He)
Signal type	Analog/digital quantity (software adjustable)
Ambient Temperature	5°C~55°C
Valve type	Normally closed
Warm-up time	≤ 3 minutes (optimal for ≥ 3 minutes)
Protection grade	IP40 (non explosion proof)

*1: The flow accuracy, linearity, repeatability, zero temperature drift, range temperature drift, and response time are the guaranteed values for the calibration gas (N₂) under our company's testing conditions.

*2: The precision guarantee temperature is 23 ± 2 °C.

*3: The response time is the time required for the flow output signal to reach and stabilize within the set value ± 2% F.S. during the rising response. (Note: The response time ensures a temperature of 23 ± 2 °C)

*4: Due to different product specifications, the working pressure difference may also vary.

最小压差参考 Minimum pressure difference reference

排空 Air (1atm)

(G) 表示表压力
(G) Indicating gauge pressure

流量 (atm)
Flowmeter
(at 1 atm specification)

设定值 (例0.2MPa(G))
Setting value
(for example: 0.2MPa(G))

(fig.A)

排空 Air (1atm)

流量 (在0.2MPa(G)气压规格下)
Flowmeter
(at 0.2MPa(G) specification)

设定值 (例0.2MPa(G))
Setting value
(for example: 0.2MPa(G))

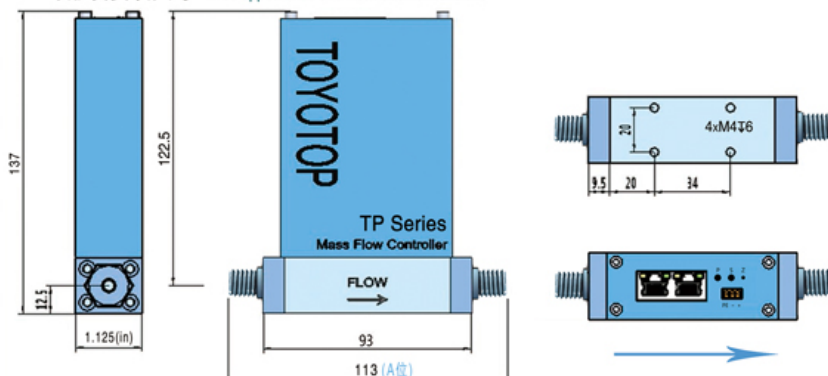
(fig.B)

(N₂ reference, minimum pressure difference varies)
(N₂基准, 最小压差有所不同)

系列 Series	最大流量 Maximum flow rate	最小压差 Minimum pressure difference	可控压差范围 Controllable pressure difference range
TP50	0~10L/min	0.5bar	0.5~5bar
TP50	10~20L/min	1bar	1~5bar
TP50	20~30L/min	1bar	1~5bar
TP50	30~40L/min	1bar	1~5bar
TP50	40~50L/min	1bar	1~5bar

尺寸图 Dimensional drawing

TP50 外形及安装尺寸 TP50 appearance and installation dimensions

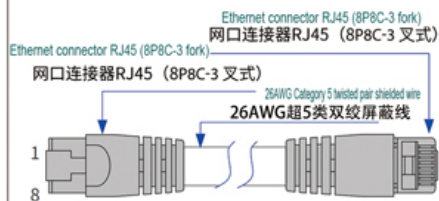


注：此处具体尺寸根据接头规格，例图为Φ6双卡套接头。

Note: The specific dimensions here are based on the joint specifications. For example, the figure shows a double card sleeve joint in Φ6.

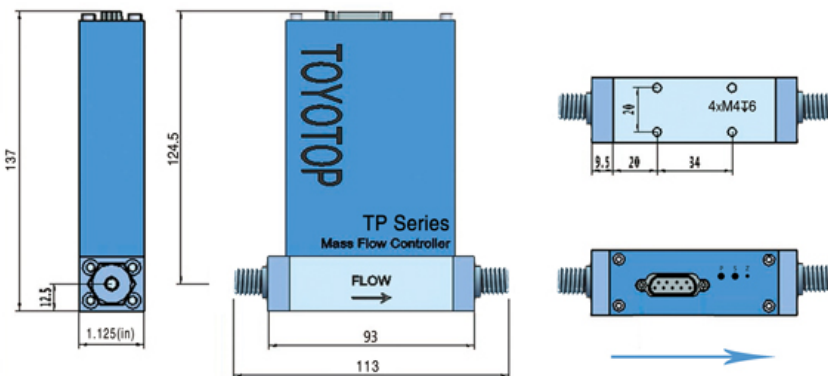
产品系列 Product series	接头类型 Type of connector	双卡套 Double female	快拧 Quick twist	VCR
TP50	A位尺寸(单位: mm) A-size (unit: mm)	Φ3/Φ1/8 Φ6/Φ1/4	Φ6 Φ8	VCR1/4"

注：特殊接头根据实际情况 Note: Special joints may vary depending on the actual situation



引脚 Pin	信号 Signal	信号方向 Signal direction	信号描述 Signal Description
1	TD+	Output	Data transmission+
2	TD-	Output	Data transmission-
3	TD+	Input	Data reception+
4	--	--	Not used
5	--	--	Not used
6	RD-	Input	Data reception-
7	--	--	Not used
8	--	--	Not used

TP50 模拟量 Modbus-RTU TP50 analog Modbus RTU



注：此处具体尺寸根据接头规格，例图为Φ6双卡套接头。

NOTE: THE SPECIFIC DIMENSIONS HERE ARE BASED ON THE JOINT SPECIFICATIONS. FOR EXAMPLE, THE FIGURE SHOWS A DOUBLE CARD SLEEVE JOINT IN FIGURE 6.

端子定义图

Terminal Definition Diagram

D-sub9 pin (male body)
D-sub 9 pin (公头-本体)

黑 棕 红 橙 黄
1 2 3 4 5 6 7 8 9
Black Brown Red Orange Yellow
6 7 8 9 0 1 2 3 4 5
Green Blue Purple Grey

D-sub9 pin (mother cable)
D-sub 9 pin (母头-线缆)

黄 橙 红 棕 黑
5 4 3 2 1 0 9 8 7 6 5
Yellow Orange Red Brown Black
9 8 7 6 5 4 3 2 1 0
Grey Purple Blue Green

端子No. Terminal No.	电缆颜色 Cable color	定义 Definition
1	黑 Black	正电源 (+15V / +24V) Power+ (+15V / +24V)
2	棕 Brown	大地 PE
3	红 Red	负电源 (-15V) Power- (-15V)
4	橙 Orange	通讯信号 (B-) RS485 (B-)
5	黄 Yellow	通讯信号 (A+) RS485 (A+)
6	绿 Green	电源地(0 V) Power GND(0 V)
7	蓝 Blue	信号地 Signal GND
8	紫 Purple	输入信号 Signal in
9	灰 Grey	输出信号 Signal out

注：DB9线缆的流量控制器和流量计、模拟量信号类型根据选型决定。

Note: The flow controller, flow meter, and analog signal type of DB9 cable are determined based on the selection.

压差曲线 Pressure difference curve

TP50系列：最大流量 50 L (N₂)

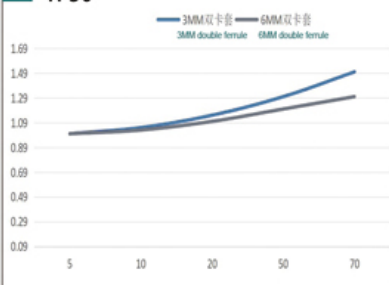
由量程、压差及接口尺寸决定。

TP50 series: The maximum flow rate of 50L (N₂) is determined by the range, pressure difference, and interface size.

X: 流量 (L/min) Y: 压差ΔP (bar)

X: Flow rate (L/min) Y: Pressure difference ΔP (bar)

TP50

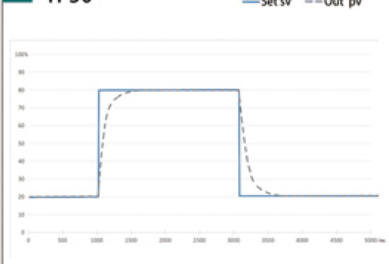


响应性 Responsiveness

TP50系列：具有优越的稳定性，不仅能快速响应，还可以精确控制。

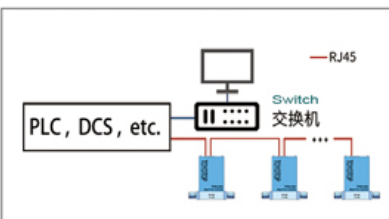
5%~100%响应 TP50 series: With superior stability, not only can it respond quickly and control accurately 5%~100% response

TP50

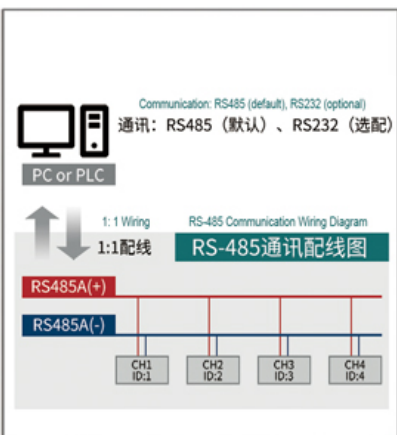


EtherCAT 组态 / ProfiNET

Configuration/ProfiNET



Modbus-RTU组态 Configuration



气体质量流量控制器 Mass Flow Controller

TP150 Series NEW



- The TP150 Series thermal Mass Flow Controller is suitable for various gas flow controls
- Can quickly and accurately control the flow rate (10-150L) of gas
- Measurement is not affected by pressure or temperature
- Analog quantity, Modbus RTU, EtherCAT, ProfiNET optional
- Low zero drift, low-temperature drift, and automatic zero calibration
- The thermal gas mass flow controller (MFC) uses capillary sensors to obtain high-precision gas flow rate, and through I/MCU precision calculation, controls the action of high-precision linear proportional valves, so that the output gas volume responds quickly, stably, and reliably according to the target value

型号 Model

量程范围 Range range	信号类型 Signal type	供电电压 Power supply voltage	管路接头 Pipeline connector	进出口压差 Pressure difference between inlet and outlet	安装方式 Installation method	密封材料 Sealing material	气体介质 Gas medium
TP150 -							
1	2	3	4	5	6	7	8

根据项目编号填写到 □ 内完成选型。Complete the selection based on the project number filled in □.

项目编号 Project number

1	10L	Maximum flow rate (L/min) (based on N ₂)	0~10
	20L		0~20
	30L		0~30
	40L		0~40
	50L		0~50
	60L		0~60
	80L		0~80
	100L		0~100
	120L		0~120
	150L		0~150
2	RS	RS-485(Modbus-RTU)	
	ET	EtherCAT	
	5V	In/out 0-5 VDC	
	10V	In/out 0-10 VDC	
	20A	In/out 4-20mA	
	PN	ProfiNET	
	PB	Profibus	

3	15D	±15VDC	
	24D	24VDC	
4	SK	SK8, SK10, SK12, SK1/2" (SK: double card sleeve)	
	VCR	VCR1/4" (default)	
	KN	KN8, KN10, KN12 (KN: quick twist for FPU hoses)	
	KC	KC8, KC10, KC12 (KC: quick plug for PU hoses)	
5	DP	Default 3Bar (can specify working pressure difference between 0.2~5Bar)	
6	T	Horizontal installation (default)	
	HV	Vertical installation (top and bottom out)	
	HA	Vertical installation (bottom in and top out)	
	L	Side mounted (left in, right out)	
	J	Side mounted (right in, left out)	
7	X	Any direction (without distinguishing installation direction)	
	MS	Metal seal	
8	RS	Rubber seal	
	N ₂	N ₂ (default), other filled in	
*	particularizing	TP150-100L-RS-24D-SK12-DP3-T-RS-N ₂	

*主要参数 Main parameter

Body material	316L
Sealing element	Manufacturers select based on gas selection
Flow accuracy	± 1.0% S.P. (>30% F.S.), ± 0.3% F.S. (≤30% F.S.)
Linear	± 0.5% F.S.
repeatability	± 0.2% F.S.
Response time	≤ 3 seconds (software adjustable)
Control range	2%~100%
Pressure resistance	3mpa (default), 15Mpa
Leakage rate	≤ 1×10 ⁻¹² Pa.m ³ /sec (He)
Signal type	Analog/digital quantity (software adjustable)
Ambient Temperature	5℃~55℃
Valve type	Normally closed
Warm-up time	≤ 3 minutes (optimal for ≥ 3 minutes)
Protection grade	IP40 (non explosion proof)

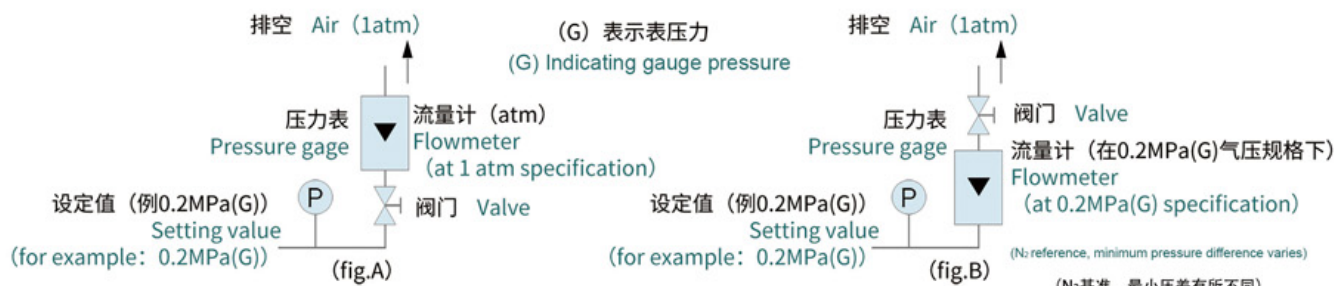
*1: The flow accuracy, linearity, repeatability, zero temperature drift, range temperature drift, and response time are the guaranteed values for the calibration gas (N₂) under our company's testing conditions.

*2: The precision guarantee temperature is 23 ± 2 °C.

*3: The response time is the time required for the flow output signal to reach and stabilize within the set value ± 2% F.S. during the rising response. (Note: The response time ensures a temperature of 23 ± 2 °C)

*4: Due to different product specifications, the working pressure difference may also vary.

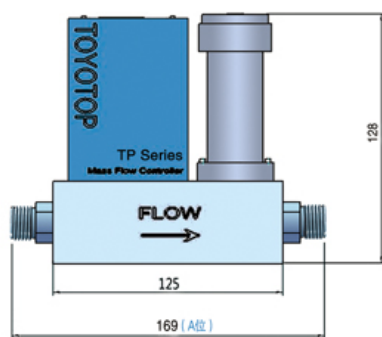
最小压差参考 Minimum pressure difference reference



系列 Series	最大流量 Maximum flow rate	最小压差 Minimum pressure difference	可控压差范围 Controllable pressure difference range
TP150	0~50L/min	0.5bar	0.5~2bar
TP150	50~60L/min	1bar	1~3bar
TP150	60~70L/min	1bar	1~3bar
TP150	80~100L/min	1.5bar	1.5~3bar
TP150	100~150L/min	2bar	2~4bar

尺寸图 Dimensional drawing

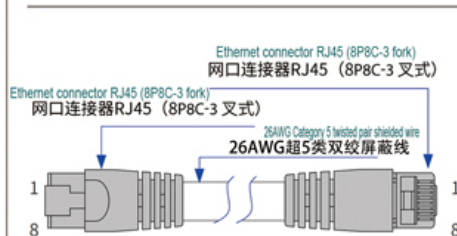
TP150 EtherCAT / ProfiNET



注：此处具体尺寸根据接头规格
Note: The specific dimensions here depend on the joint specifications

产品系列 Product series	接头类型 Type of connector	双卡套 Double female							快插 Quickly plug in			快拧 Quick twist
		Φ3/Φ1/8	Φ6/Φ1/4	Φ8	Φ3/8	Φ10	Φ12/Φ1/2	Φ14	Φ6	Φ8	Φ10	Φ6
TP150	A位尺寸(单位: mm)	169	169	169	169	169	169	169	185	185	185	195

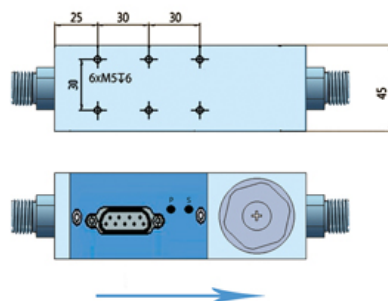
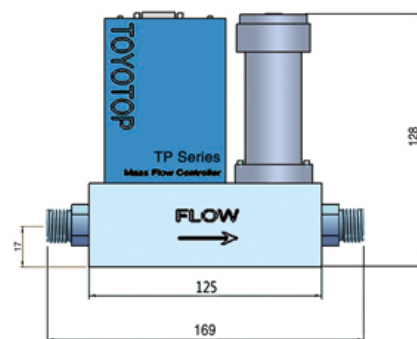
注：特殊接头根据实际情况 Note: Special joints may vary depending on the actual situation



引脚 Pin	信号 Signal	信号方向 Signal direction	信号描述 Signal Description
1	TD+	Output	Data transmission+
2	TD-	Output	Data transmission-
3	TD+	Input	Data reception+
4	--	--	Not used
5	--	--	Not used
6	RD-	Input	Data reception-
7	--	--	Not used
8	--	--	Not used

TP150 模拟量 Modbus-RTU

TP150 analog Modbus RTU



端子定义图

Terminal Definition Diagram

D-sub 9 pin (male body)
D-sub 9 pin (公头-本体)

黑 棕 红 橙 黄
1 2 3 4 5 6 7 8 9
Black Brown Red Orange Yellow
6 7 8 9 0 1 2 3 4 5
Green Blue Purple Grey

D-sub 9 pin (mother cable)
D-sub 9 pin (母头-线缆)

黄 橙 红 棕 黑
5 4 3 2 1 0 1 2 3 4 5
Yellow Orange Red Brown Black
9 8 7 6 5 4 3 2 1 0
Grey Purple Blue Green

端子No. Terminal No.	电缆颜色 Cable color	定义 Definition	
1	黑 Black	正电源 (+15V / +24V)	Power+ (+15V / +24V)
2	棕 Brown	大地	PE
3	红 Red	负电源 (-15V)	Power- (-15V)
4	橙 Orange	通讯信号 (B-)	RS485 (B-)
5	黄 Yellow	通讯信号 (A+)	RS485 (A+)
6	绿 Green	电源地	Power GND
7	蓝 Blue	信号地	Signal GND
8	紫 Purple	输入信号	Signal in
9	灰 Grey	输出信号	Signal out

注：DB9线缆的流量控制器和流量计、模拟量信号类型根据选型决定。

Note: The flow controller, flow meter, and analog signal type of DB9 cable are determined based on the selection.

压差曲线 Pressure difference curve

TP150系列：最大流量 150 L (N₂)

由量程、压差及接口尺寸决定。

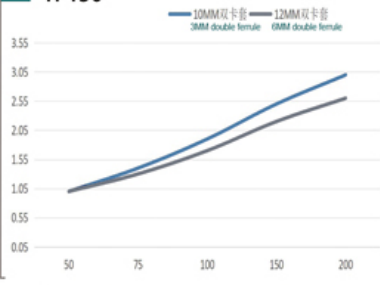
TP150 series: The maximum flow rate of 150L (N₂) is determined by the range, pressure difference, and interface size

X: 流量 (L/min) Y: 压差ΔP (bar)

X: Flow rate (L/min)

Y: Pressure difference ΔP (bar)

TP150

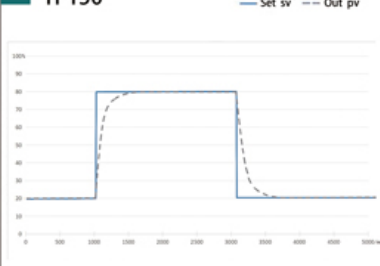


响应性 Responsiveness

TP150系列：具有优越的稳定性，不仅能快速响应，还可以精确控制。

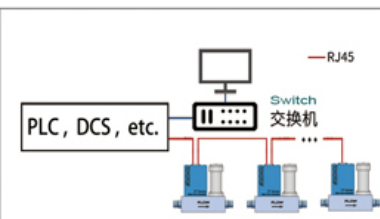
5%~100%响应 TP150 series: With superior stability, not only can respond quickly and control accurately 5%~100% response

TP150

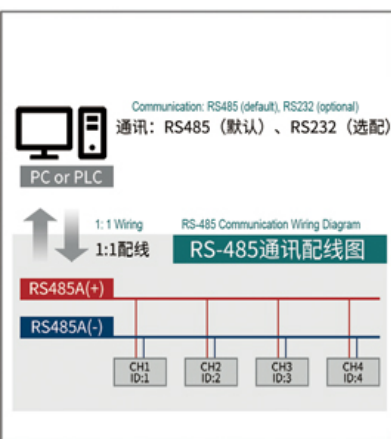


EtherCAT 组态 / ProfiNET

Configuration/ProfiNET



Modbus-RTU组态 Configuration



气体质量流量控制器 Mass Flow Controller

TP200 Series NEW

- The TP series thermal gas mass flow controller is suitable for controlling various gas flow rates
- Can quickly and accurately control the flow rate (10-200L) of gas
- Measurement is not affected by pressure or temperature
- Analog, Modbus RTU, EtherCAT, ProfiNET optional
- Low zero drift, low temperature drift, automatic zero calibration
- A thermal gas mass flow controller (MFC) uses capillary sensors to obtain high-precision gas flow rates, Through PI/MCU precision calculation and control of high-precision linear proportional valve action, the output gas volume is controlled according to the target Fast, stable, and reliable response to values



型号 Model

量程范围 Range range	信号类型 Signal type	供电电压 Power supply voltage	管路接头 Pipeline connector	进出口压差 Pressure difference between inlet and outlet	安装方式 Installation method	密封材料 Sealing material	气体介质 Gas medium
TP200 -							
1	2	3	4	5	6	7	8

根据项目编号填写到 □ 内完成选型。 Complete the selection based on the project number filled in □.

项目编号 Project number

1	20L	0~20
	40L	0~40
	60L	0~60
	80L	0~80
	100L	0~100
	120L	0~120
	140L	0~140
	160L	0~160
	180L	0~180
	200L	0~200
2	RS	RS-485(Modbus-RTU)
	ET	EtherCAT
	5V	In/out 0-5 VDC
	10V	In/out 0-10 VDC
	20A	In/out 4-20mA
	PN	ProfiNET
	PB	ProfiBUS

3	15D	±15VDC
	24D	24VDC
4	SK	SK10, SK12, SK1/2", SK14 (SK: double card sleeve)
	VCR	VCR3/8", VCR1/2" (default)
	KN	KN10, KN12, KN14 (KN: quick twist for FPU hoses)
	KC	KC10, KC12, KC14 (KC: quick plug for PU hoses)
5	DP	Default 3Bar (can specify working pressure difference between 0.2~5Bar)
6	T	Horizontal installation (default)
	HV	Vertical installation (top and bottom out)
	HA	Vertical installation (bottom in and top out)
	L	Side mounted (left in, right out)
	J	Side mounted (right in, left out)
7	X	Any direction (without distinguishing installation direction)
	MS	Metal seal
	RS	Rubber seal
8	N ₂	N ₂ (default), other filled in
*	particularizing	TP200-200L-RS-24D-SK12-DP3-T-RS-N ₂

*主要参数 Main parameter

Body material	316L
Sealing element	Manufacturers select based on gas selection
Flow accuracy	± 1.0% S.P. (>30% F.S.), ± 0.3% F.S. (≤30% F.S.)
Linear	± 0.5% F.S.
repeatability	± 0.2% F.S.
Response time	≤ 3 seconds (software adjustable)
Control range	2%~100%
Pressure resistance	3mpa (default), 15Mpa
Leakage rate	≤ 1×10 ⁻¹² Pa.m ³ /sec (He)
Signal type	Analog/digital quantity (software adjustable)
Ambient Temperature	5°C ~ 55°C
Valve type	Normally closed
Warm-up time	≤ 3 minutes (optimal for ≥ 3 minutes)
Protection grade	IP40 (non explosion proof)

*1: The flow accuracy, linearity, repeatability, zero temperature drift, range temperature drift, and response time are the guaranteed values for the calibration gas (N₂) under our company's testing conditions.

*2: The precision guarantee temperature is 23 ± 2 °C.

*3: The response time is the time required for the flow output signal to reach and stabilize within the set value ± 2% F.S. during the rising response. (Note: The response time ensures a temperature of 23 ± 2 °C)

*4: Due to different product specifications, the working pressure difference may also vary.

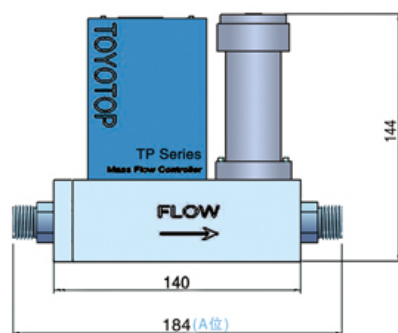
最小压差参考 Minimum pressure difference reference



系列 Series	最大流量 Maximum flow rate	建议最小压差 Minimum pressure difference	最佳可控压差范围 Controllable pressure difference range
TP200	0~50L/min	0.5bar	0.5~2bar
TP200	50~60L/min	1bar	1~3bar
TP200	60~100L/min	1bar	1~3bar
TP200	100~150L/min	1.5bar	1.5~3bar
TP200	150~200L/min	2bar	2~5bar

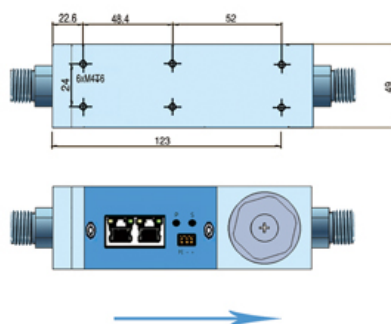
尺寸图 Dimensional drawing

TP200 EtherCAT / ProfiNET



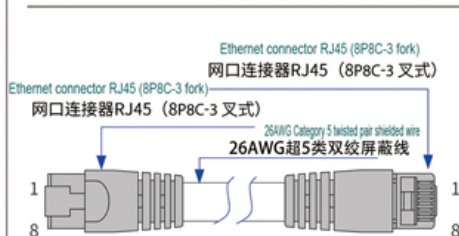
注：此处具体尺寸根据接头规格，例图为Φ10双卡套接头

Note: The specific dimensions here are based on the joint specifications. For example, the figure shows Φ10 double card sleeve joint



产品系列 Product series	接头类型 Type of connector	双卡套 Double female					快插 Quickly plug in			
		φ 8	φ 3/8	φ 10	φ 12/φ 1/2	φ 14	φ 8	φ 10	φ 12	φ 14
TP200	接口尺寸(单位: mm) A-size (unit: mm)	184	184	184	184	184	200	200	200	200

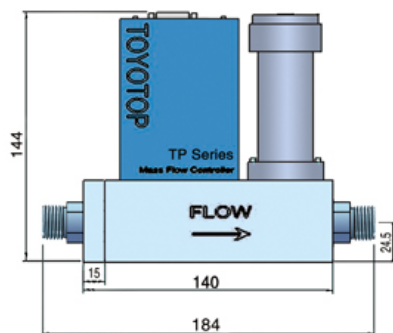
注：特殊接头根据实际情况 Note: Special joints may vary depending on the actual situation



引脚 Pin	信号 Signal	信号方向 Signal direction	信号描述 Signal Description
1	TD+	Output	Data transmission+
2	TD-	Output	Data transmission-
3	TD+	Input	Data reception+
4	--	--	Not used
5	--	--	Not used
6	RD-	Input	Data reception-
7	--	--	Not used
8	--	--	Not used

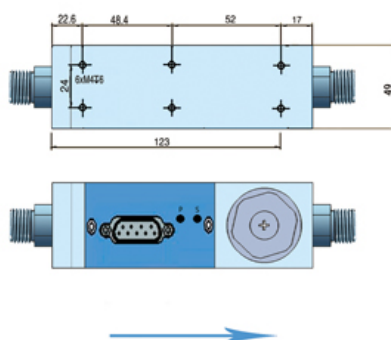
TP200 模拟量 Modbus-RTU

TP400 analog quantity Modbus-RTU



注：此处具体尺寸根据接头规格，例图为Φ10双卡套接头

Note: The specific dimensions here are based on the joint specifications. For example, the figure shows a 10 double card sleeve joint



端子定义图

Terminal Definition Diagram

D-sub9 pin (male body)
D-sub 9 pin (公头-本体)

黑 棕 红 橙 黄
1 2 3 4 5 6 7 8 9
Black Brown Red Orange Yellow
6 7 8 9 0 1 2 3 4 5 6 7 8 9
Green Blue Purple Grey

D-sub9 pin (mother cable)
D-sub 9 pin (母头-线缆)

黄 橙 红 棕 黑
5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0
Yellow Orange Red Brown Black
9 8 7 6 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0
Grey Purple Blue Green

端子No. Terminal No.	电缆颜色 Cable color	定义 Definition
1	黑 Black	正电源 (+15V / +24V) Power+ (+15V / +24V)
2	棕 Brown	大地 PE
3	红 Red	负电源 (-15V) Power- (-15V)
4	橙 Orange	通讯信号 (B-) RS485 (B-)
5	黄 Yellow	通讯信号 (A+) RS485 (A+)
6	绿 Green	电源地 Power GND
7	蓝 Blue	信号地 Signal GND
8	紫 Purple	输入信号 Signal in
9	灰 Grey	输出信号 Signal out

注：DB9线缆的流量控制器和流量计、模拟量信号类型根据选型决定。

Note: The flow controller, flow meter, and analog signal type of DB9 cable are determined based on the selection.

压差曲线 Pressure difference curve

TP200系列：最大流量 200L (N₂)

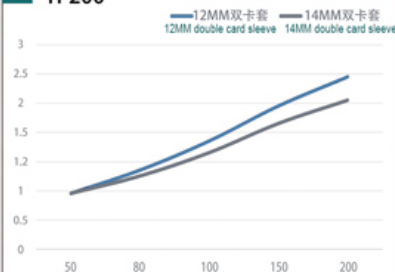
由量程、压差及接口尺寸决定。

TP400 series: The maximum flow rate of 400L (N₂) is determined by the range, pressure difference, and interface size

X: 流量 (L/min) Y: 压差ΔP (bar)

X: Flow rate (L/min) Y: Pressure difference ΔP (bar)

TP200



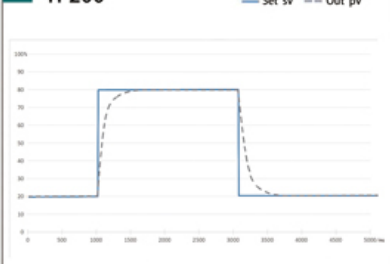
响应性 Responsiveness

TP200系列：具有优越的稳定性，不仅能快速响应，还可以精确控制。

TP400 series: With superior stability, not only can respond quickly and control accurately 5%~100% response

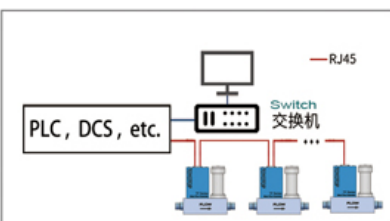
5%~100%响应

TP200

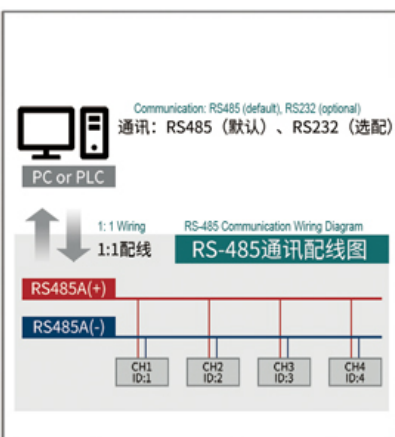


EtherCAT 组态 / ProfiNET

Configuration/ProfiNET



Modbus-RTU组态 Configuration



气体质量流量控制器 Mass Flow Controller

TP400 Series NEW



- The TP series thermal gas mass flow controller is suitable for controlling various gas flow rates
- Can quickly and accurately control the flow rate (40-400L) of gas
- Measurement is not affected by pressure or temperature
- Analog, Modbus RTU, EtherCAT, ProfiNET optional
- Low zero drift, low temperature drift, automatic zero calibration
- A thermal gas mass flow controller (MFC) uses capillary sensors to obtain high-precision gas flow rates, Through PI/MCU precision calculation and control of high-precision linear proportional valve action, the output gas volume is controlled according to the target Fast, stable, and reliable response to values

型号 Model

量范围 Range range	信号类型 Signal type	供电电压 Power supply voltage	管路接头 Pipeline connector	进出口压差 Pressure difference between inlet and outlet	安装方式 Installation method	密封材料 Sealing material	气体介质 Gas medium
TP400 -							
1	2	3	4	5	6	7	8

根据项目编号填写到 □ 内完成选型。 Complete the selection based on the project number filled in □.

项目编号 Project number

1	40L	0~40
	50L	0~50
	80L	0~80
	100L	0~100
	150L	0~150
	200L	0~200
	250L	0~250
	300L	0~300
	350L	0~350
	400L	0~400
2	RS	RS-485 (Modbus-RTU)
	ET	EtherCAT
	5V	In/out 0-5 VDC
	10V	In/out 0-10 VDC
	20A	In/out 4-20mA
	PN	ProfiNET
	PB	ProfiBUS

3	15D	±15VDC
	24D	24VDC
4	SK	SK10, SK12, SK1/2", SK14 (SK: double card sleeve)
	VCR	VCR3/8", VCR1/2" (default)
	KN	KN10, KN12, KN14 (KN: quick twist for FPU hoses)
	KC	KC10, KC12, KC14 (KC: quick plug for PU hoses)
5	DP	Default 3Bar (can specify working pressure difference between 0.2-5Bar)
6	T	Horizontal installation (default)
	HV	Vertical installation (top and bottom out)
	HA	Vertical installation (bottom in and top out)
	L	Side mounted (left in, right out)
	J	Side mounted (right in, left out)
7	X	Any direction (without distinguishing installation direction)
	MS	Metal seal
	RS	Rubber seal
8	N2	N2 (default), other filled in
*	particularizing	TP400-300L-RS-24D-SK12-DP3-T-RS-N2

*主要参数 Main parameter

Body material	316L
Sealing element	Manufacturers select based on gas selection
Flow accuracy	± 1.0% S.P. (>30% F.S.), ± 0.3% F.S. (≤30% F.S.)
Linear	± 0.5% F.S.
repeatability	± 0.2% F.S.
Response time	≤ 3 seconds (software adjustable)
Control range	2%~100%
Pressure resistance	3mpa (default), 15Mpa
Leakage rate	≤ 1×10 ⁻¹² Pa.m ³ /sec (He)
Signal type	Analog/digital quantity (software adjustable)
Ambient Temperature	5℃~55℃
Valve type	Normally closed
Warm-up time	≤ 3 minutes (optimal for ≥ 3 minutes)
Protection grade	IP40 (non explosion proof)

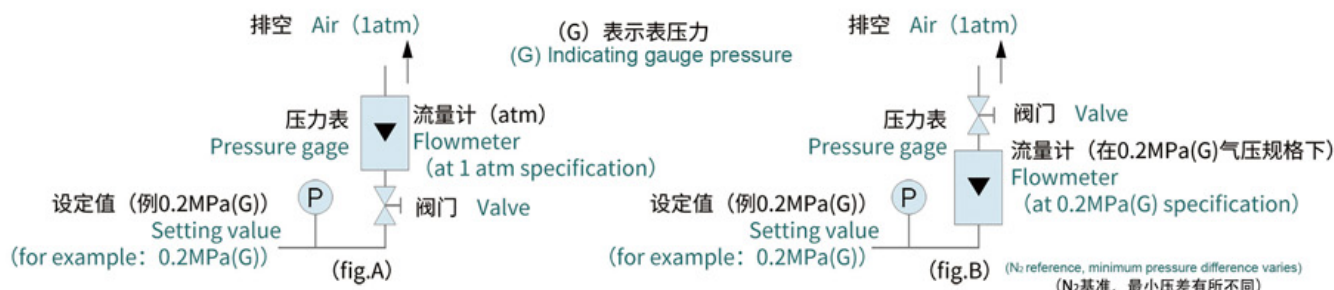
*1: The flow accuracy, linearity, repeatability, zero temperature drift, range temperature drift, and response time are the guaranteed values for the calibration gas (N₂) under our company's testing conditions.

*2: The precision guarantee temperature is 23 ± 2 °C.

*3: The response time is the time required for the flow output signal to reach and stabilize within the set value ± 2% F.S. during the rising response. (Note: The response time ensures a temperature of 23 ± 2 °C)

*4: Due to different product specifications, the working pressure difference may also vary.

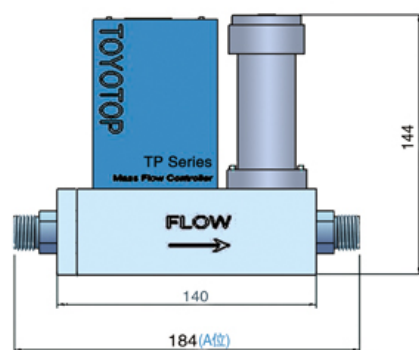
最小压差参考 Minimum pressure difference reference



系列 Series	最大流量 Maximum flow rate	建议最小压差 Minimum pressure difference	最佳可控压差范围 Controllable pressure difference range
TP400	0~40L/min	0.5bar	0.5~2bar
TP400	40~100L/min	1bar	1~3bar
TP400	100~150L/min	1bar	1~3bar
TP400	150~250L/min	1.5bar	1.5~3bar
TP400	250~400L/min	2bar	2~5bar

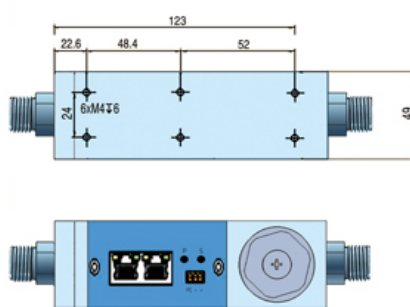
尺寸图 Dimensional drawing

TP400 EtherCAT / ProfiNET



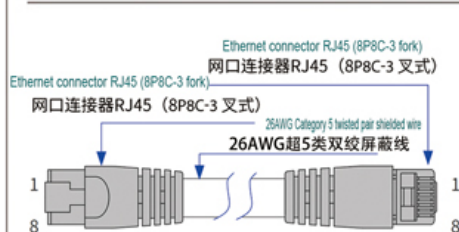
注：此处具体尺寸根据接头规格，例图为Φ12双卡套接头

Note: The specific dimensions here are based on the joint specifications. For example, the figure shows Φ12 double card sleeve joint



产品系列 Product series	接头类型 Type of connector	双卡套 Double female					快插 Quickly plug in			
		Φ8	Φ3/8	Φ10	Φ12/Φ1/2	Φ14	Φ8	Φ10	Φ12	Φ14
TP400	A位尺寸(单位: mm) A-size (unit: mm)	184	184	184	184	184	200	200	200	200

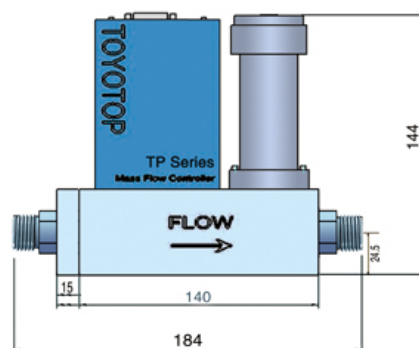
注：特殊接头根据实际情况 Note: Special joints may vary depending on the actual situation



引脚 Pin	信号 Signal	信号方向 Signal direction	信号描述 Signal Description
1	TD+	Output	Data transmission+
2	TD-	Output	Data transmission-
3	TD+	Input	Data reception+
4	--	--	Not used
5	--	--	Not used
6	RD-	Input	Data reception-
7	--	--	Not used
8	--	--	Not used

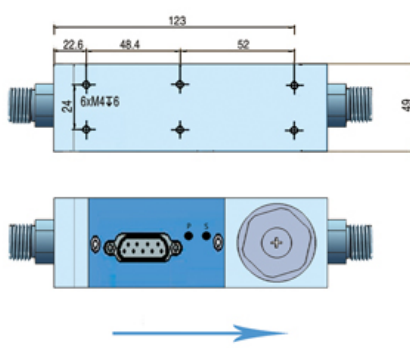
TP400 模拟量 Modbus-RTU

TP400 analog quantity Modbus-RTU



注：此处具体尺寸根据接头规格，例图为Φ12双卡套接头

Note: The specific dimensions here are based on the joint specifications. For example, the figure shows Φ12 double card sleeve joint



端子定义图

Terminal Definition Diagram

D-sub9 pin (male body)
D-sub 9 pin (公头-本体)



D-sub9 pin (mother cable)
D-sub 9 pin (母头-线缆)



端子No. Terminal No.	电缆颜色 Cable color	定义 Definition	
1	黑 Black	正电源 (+15V / +24V)	Power+ (+15V / +24V)
2	棕 Brown	大地	PE
3	红 Red	负电源 (-15V)	Power- (-15V)
4	橙 Orange	通讯信号 (B-)	RS485 (B-)
5	黄 Yellow	通讯信号 (A+)	RS485 (A+)
6	绿 Green	电源地	Power GND
7	蓝 Blue	信号地	Signal GND
8	紫 Purple	输入信号	Signal in
9	灰 Grey	输出信号	Signal out

注：DB9线缆的流量控制器和流量计、模拟量信号类型根据选型决定。

Note: The flow controller, flow meter, and analog signal type of DB9 cable are determined based on the selection.

压差曲线 Pressure difference curve

TP400系列：最大流量 400L (N₂)

由量程、压差及接口尺寸决定。

TP400 series: The maximum flow rate of 400L (N₂) is determined

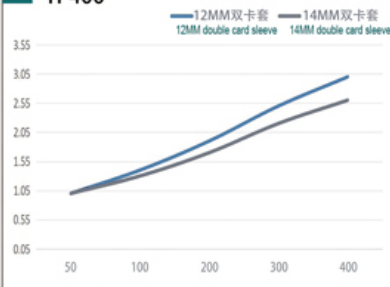
by the range, pressure difference, and interface size

X: 流量 (L/min) Y: 压差ΔP (bar)

X: Flow rate (L/min)

Y: Pressure difference ΔP (bar)

TP400

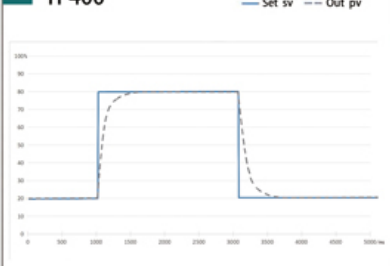


响应性 Responsiveness

TP400系列：具有优越的稳定性，不仅能快速响应，还可以精确控制。

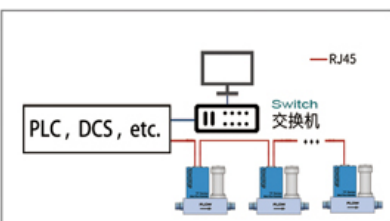
5%~100%响应 TP400 series: With superior stability, not only can respond quickly and control accurately 5%~100% response

TP400

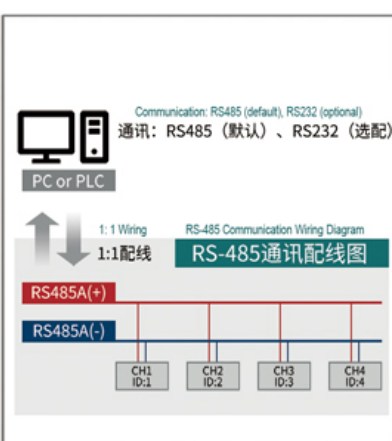


EtherCAT 组态 / ProfiNET

Configuration/ProfiNET



Modbus-RTU组态 Configuration



气体质量流量控制器 Mass Flow Controller

TP1000 Series NEW

- The TP1000 Series thermal Mass Flow Controller is suitable for various gas flow controls
- Can quickly and accurately control the flow rate (5-100L) of gas
- Measurement is not affected by pressure or temperature
- Analog quantity, Modbus RTU, EtherCAT, ProfiNET optional
- Low zero drift, low-temperature drift, and automatic zero calibration
- The thermal gas mass flow controller (MFC) uses capillary sensors to obtain high-precision gas flow rate, and through I/MCU precision calculation, controls the action of high-precision linear proportional valves, so that the output gas volume responds quickly, stably, and reliably according to the target value



型号 Model

量程范围 Range range	信号类型 Signal type	供电电压 Power supply voltage	管路接头 Pipeline connector	进出口压差 Pressure difference between inlet and outlet	安装方式 Installation method	密封材料 Sealing material	气体介质 Gas medium
TP1000 -							
1	2	3	4	5	6	7	8

根据项目编号填写到 □ 内完成选型。Complete the selection based on the project number filled in □.

项目编号 Project number

1	100L	Maximum flow rate (L/min) (based on N ₂)	0~100
	200L		0~200
	300L		0~300
	400L		0~400
	500L		0~500
	600L		0~600
	700L		0~700
	800L		0~800
	900L		0~900
	1000L		0~1000
2	RS		RS-485 (Modbus-RTU)
	ET		EtherCAT
	5V		In/out 0-5 VDC
	10V		In/out 0-10 VDC
	20A		In/out 4-20mA
	PN		ProfiNET
	PB		ProfiBUS

3	15D		±15VDC
	24D		24VDC
4	SK		SK10, SK12, SK1/2", SK14 (SK: double card sleeve)
	VCR		VCR3/8", VCR1/2" (default)
	KN		KN10, KN12, KN14 (KN: quick twist for FPU hoses)
	KC		KC10, KC12, KC14 (KC: quick plug for PU hoses)
5	DP		Default 3Bar (can specify working pressure difference between 0.2~5Bar)
6	T		Horizontal installation (default)
	HV		Vertical installation (top and bottom out)
	HA		Vertical installation (bottom in and top out)
	L		Side mounted (left in, right out)
	J		Side mounted (right in, left out)
7	X		Any direction (without distinguishing installation direction)
	MS		Metal seal
8	RS		Rubber seal
	N ₂		N ₂ (default), other filled in
*	pa		TP1000-500L-RS-24D-SK12-DP8-T-RS-N ₂

*主要参数 Main parameter

Body material	316L
Sealing element	Manufacturers select based on gas selection
Flow accuracy	± 1.0% S.P. (>30% F.S.), ± 0.3% F.S. (≤30% F.S.)
Linear	± 0.5% F.S.
repeatability	± 0.2% F.S.
Response time	≤ 3 seconds (software adjustable)
Control range	2%~100%
Pressure resistance	3mpa (default), 15Mpa
Leakage rate	≤ 1×10 ⁻¹² Pa.m ³ /sec (He)
Signal type	Analog/digital quantity (software adjustable)
Ambient Temperature	5℃~55℃
Valve type	Normally closed
Warm-up time	≤ 3 minutes (optimal for ≥ 3 minutes)
Protection grade	IP40 (non explosion proof)

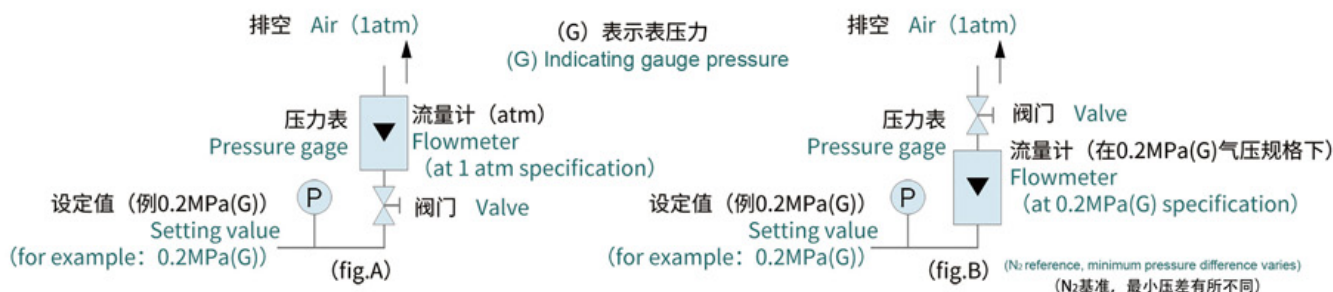
*1: The flow accuracy, linearity, repeatability, zero temperature drift, range temperature drift, and response time are the guaranteed values for the calibration gas (N₂) under our company's testing conditions.

*2: The precision guarantee temperature is 23 ± 2 °C.

*3: The response time is the time required for the flow output signal to reach and stabilize within the set value ± 2% F.S. during the rising response. (Note: The response time ensures a temperature of 23 ± 2 °C)

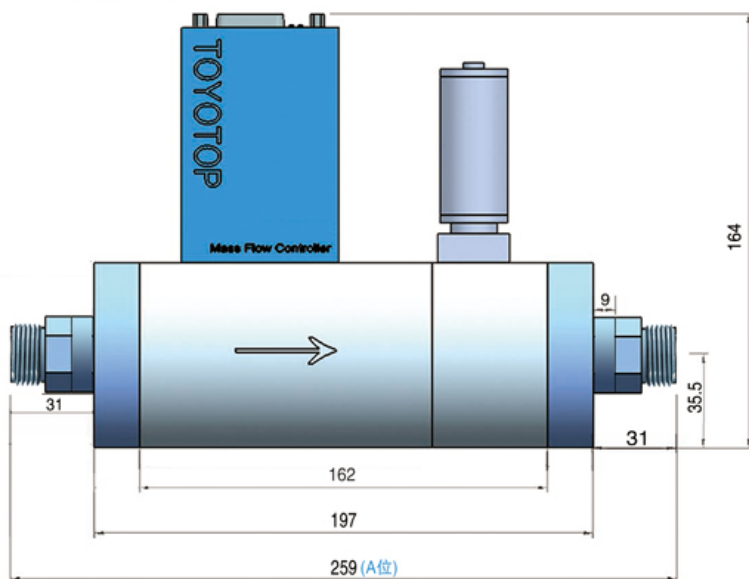
*4: Due to different product specifications, the working pressure difference may also vary.

最小压差参考



系列 Series	最大流量 Maximum flow rate	最小压差 Minimum pressure difference	可控压差范围 Controllable pressure difference range
TP1000	0~150L/min	2bar	2~6bar
TP1000	150~300L/min	2.5bar	2.5~6bar
TP1000	300~500L/min	3bar	3~8bar
TP1000	500~800L/min	3.5bar	3.5~9bar
TP1000	800~1000L/min	4bar	4~9bar

尺寸图 Dimensional drawing

TP1000 模拟量、MODBUS-RTU
TP1000 analog quantity, MODBUS-RTU

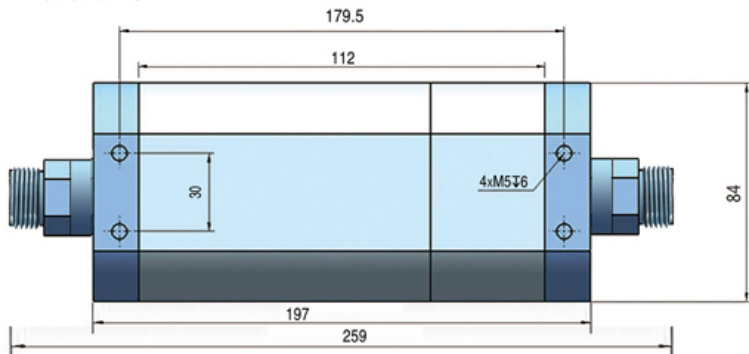
注：此处具体尺寸根据接头规格，例图为Φ12双卡套接头

Note: The specific dimensions here are based on the joint specifications. For example, the figure shows Φ12 double card sleeve joint

产品系列	接头类型	双卡套		快插	
		Φ 12/ Φ 1/2	Φ 14	Φ 12	Φ 14
TP1000	A位尺寸(单位: mm)	241	241	257	257

注：特殊接头根据实际情况

Note: Special joints may vary depending on the actual situation



注：此处具体尺寸根据接头规格，例图为Φ12双卡套接头

Note: The specific dimensions here are based on the joint specifications. For example, the figure shows a 12 double card sleeve joint

端子定义图

Terminal Definition Diagram

D-sub9 pin (male body)
D-sub 9 pin (公头-本体)

黑 棕 红 橙 黄
1 2 3 4 5
Black Brown Red Orange Yellow
6 7 8 9
Green Blue Purple Grey

D-sub9 pin (mother cable)
D-sub 9 pin (母头-线缆)

黄 橙 红 棕 黑
5 4 3 2 1
Yellow Orange Red Brown Black
9 8 7 6
Grey Purple Blue Green

端子No. Terminal No.	电缆颜色 Cable color	定义 Definition	
1	黑 Black	正电源 (+15V / +24V)	Power+ (+15V / +24V)
2	棕 Brown	大地	PE
3	红 Red	负电源 (-15V)	Power- (-15V)
4	橙 Orange	通讯信号 (B-)	RS485 (B-)
5	黄 Yellow	通讯信号 (A+)	RS485 (A+)
6	绿 Green	电源地	Power GND
7	蓝 Blue	信号地	Signal GND
8	紫 Purple	输入信号	Signal in
9	灰 Grey	输出信号	Signal out

注：DB9线缆的流量控制器和流量计、模拟量信号类型根据选型决定。

Note: The flow controller, flow meter, and analog signal type of DB9 cable are determined based on the selection.

压差曲线 Pressure difference curve

TP1000系列：最大流量 1000 L (N₂)

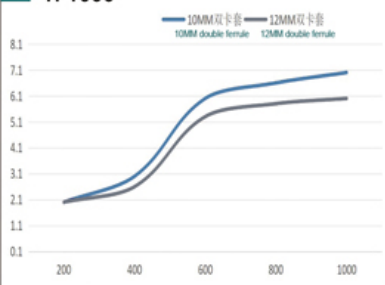
由量程、压差及接口尺寸决定。

TP1000 series: The maximum flow rate of 1000L (N₂) is determined by the range, pressure difference, and interface size

X: 流量 (L/min) Y: 压差ΔP (bar)

X: Flow rate (L/min) Y: Pressure difference ΔP (bar)

TP1000

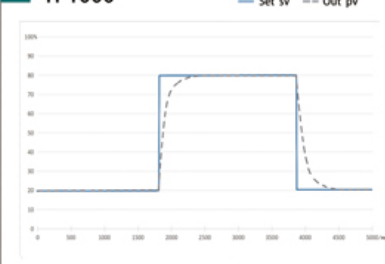


响应性 Responsiveness

TP1000系列：具有优越的稳定性，不仅能快速响应，还可以精确控制。

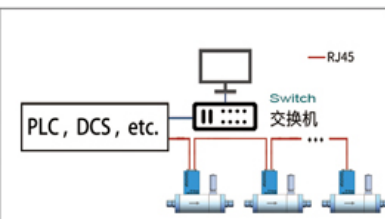
5%~100%响应 TP1000 series: With superior stability, not only can respond quickly and control accurately 5%~100% response

TP1000

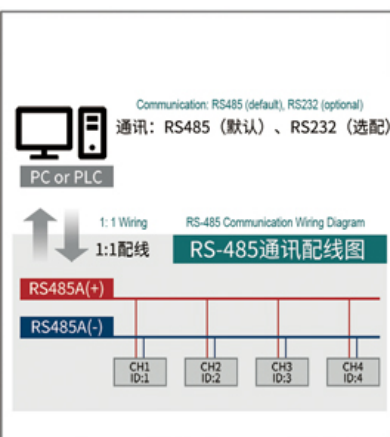


EtherCAT 组态 / ProfiNET

Configuration/ProfiNET



Modbus-RTU组态 Configuration





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（天武流量计公众号）
(TOYOTOP TIANWU FLOWMETER OFFICIAL ACCOUNT)