

Utmost®

品质与艺术完美结合

艾坦姆流体控制技术（北京）有限公司
Utmost Flow Control Tech.(Beijing) Co.,Ltd



艾坦姆

U529系列智能定位器

Utmost U529 Series Smart Positioner



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概况 Profile

艾坦姆流体控制技术（北京）有限公司作为中国控制阀领域崛起的新星，已经走在了同行业的前列。在公司 UTM 系列高品质控制阀的基础上，通过多年调节阀的生产、制造和现场安装、调试经验，艾坦姆公司设计、研发团队与世界知名美国软件技术开发公司共同推出艾坦姆公司自己的定位器——U529 系列智能定位器。

As a new rising Star, Utmost Flow Control Tech.(Beijing) has been going in the forefront of the control valve industry. Now Utmost successfully developed our own smart positioner——U529 series smart positioner based on present high-quality control valve through years' experiences of manufacturing, installation and commissioning for control valves and positioners with a world famous American software technology development company.



做中国人自己的高端调节阀，艾坦姆 529 系列定位器采用先进的微处理及智能测控技术、基于 3/3 滑阀式喷嘴挡板和电磁阀技术，产品具备单双作用、Hart、远传、隔爆、防爆功能，中美联合开发，通过严酷工况验证，已经达到了良好的使用效果。

Made Chinese its own high-quality control valve, Utmost U529 series smart positioner adopt the newest advanced micro processing and intelligent measurement and control technology ,based on 3 / 3 slide nozzle baffle valve and solenoid valve technology, with single and double acting, Hart, remote transmission, flameproof, explosion-proof function,developed by China and the United States R&D team, verified under the harsh operation conditions, has achieved good performance.

技术原理:

Technology principle:

U529 系列智能定位器打破传统的压力平衡原理，采用世界前沿的电平衡（数字平衡）原理技术，将电控指令转化成气动定位增量实现阀位控制；利用数字式开、停、关的信号来驱动气动执行机构；阀位反馈信号直接通过高精度的位置传感器实现电 / 气转换功能。

U529 系列定位器基于定位器微处理器将接受的 DCS 输出的 4-20mA 的电流信号转换成电气输出信号，在线进行智能组态和参数设置，实现对阀门进行精确控制。

U529 series smart positioner adopt the world's leading edge of electric balance (digital balance) principle, the electronic control instruction into pneumatic positioning incremental valve position control, which break the traditional pressure balance principle; according the digital signal to open, stop, off to drive pneumatic actuator; valve position feedback signal directly through high precision position sensor to achieve power / gas conversion function.

U529 series positioner based on the microprocessor of the positioner to accept the DCS output of the 4-20mA signal into electrical output signal, online intelligent configuration and parameter settings, to achieve the valve precise control.

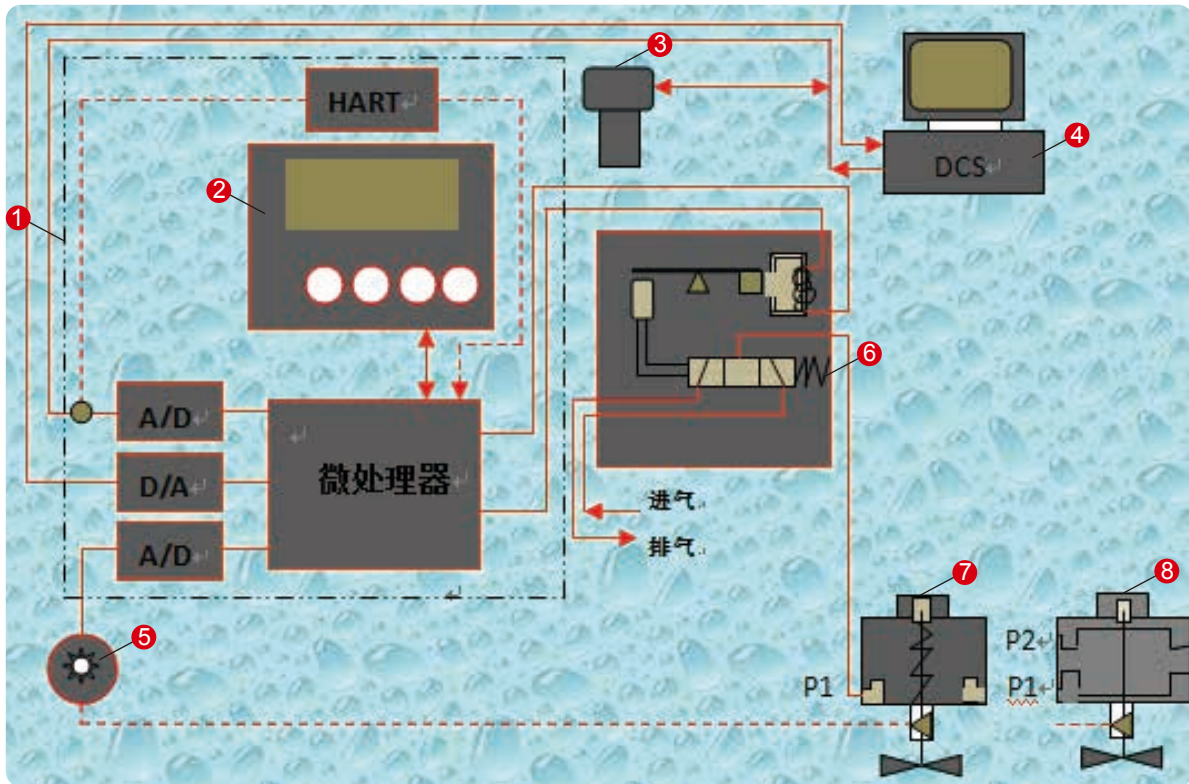
定位器 CPU 接受 4~20 mA 的设定信号与阀位传感器反馈的实际阀位值进行比较，并根据检测到的偏差的大小和方向输出一个电控指令（PWM 数字方式）传送给喷嘴挡板的 I/P 控制单元，以此达到对执行机构进气量的调节，也就是说控制阀将控制指令转换为气动唯一增量。

艾坦姆 U529 系列电气定位器 Utmost U529 Smart Positioner

By accept 4~20 mA setting signal the positioner CPU can compare the valve position sensor feedback actual valve position value and to the size and direction of the detection of the output of an electric control instruction (PWM digital mode) transfer to the nozzle baffle I/P control unit, to achieve the actuator air flow adjustment, which means the control valve is controlled by the change of gas flow as the only incremental.

当实际阀位与设定值偏差较大时（高速区），定位器输出一个连续信号；如果偏差不大（低速区），定位器将输出脉冲信号；当偏差很小时（自适应或可调死区内），则没有信号输出，此时实际阀门位置达到设定值，执行机构处于平衡状态，即一定量的设定电流对应一定的阀门位置。

The positioned will output a continuous signal while the actual valve position and the setting value with large deviation (the high speed area), locator output a continuous signal; if the deviation is not so large (low speed area), meanwhile the positioner will output pulse signal; when the deviation is very small (adaptive or adjustable dead time), there will be no signal output, at this time the actual valve position reach to set the value, the actuator stay in balance, that is, a certain amount of current corresponding to a fixed valve position.



- | | | | |
|-----------------|------------|----------------|-----------|
| ① 带微处理器和输入电路的主板 | ③ HART手操器 | ⑤ 非接触阀位传感器 | ⑦ 单作用执行机构 |
| ② 带LCD和键盘的主板 | ④ DCS上位计算机 | ⑥ 喷嘴挡板3/3滑阀I/P | ⑧ 双作用执行机构 |

U529 系列智能定位器通过创新技术有效解决了喷嘴挡板和压电阀的技术弊端和难题，产品技术达到世界先进水平！

- | | |
|--|----------------------------------|
| 1. Motherboard with microprocessor and input circuit | 5.Contactless position sensor |
| 2. Motherboard with LCD and keyboard | 6.Nozzle baffle I/P control unit |
| 3. Hart hand-operator | 7. Single acting actuator |
| 4.DCS Computer | 8. Double acting actuator |

U529 系列智能定位器特点 U529 Smart positioner Features

- 单、双作用;
Single/Double acting;
- 采用滑阀式喷嘴挡板结合 IP 模块结构, 大大增强了其对仪表气源适应性和抗污能力 (水份、粉尘、油污);
Greatly enhanced the instrument air adaptability and anti fouling ability(water, dust and oil), with Nozzle baffle I/P structure;
- 可随意设定阀门流量特性 (线性、快开、等百分比), 方便阀门控制;
Valve flow characteristics can be free setting (linear, quick opening, equal percentage,) and easy to control;
- LCD 液晶显示屏, 定位器配备内置调试按按键, 安全、可靠、实用;
Safe, reliable, practical with equipped with a built-in LCD screen and integrated debugging button;
- 快速自诊定 (2-3 分钟内可完成定位器全行程自诊定);
Fast self-diagnosis (2-3 minutes to complete the whole stroke);
- 内部模块化集成阀位变送器、限位开关等电气模块;
Valve position transmitter, limit switches and other internal electrical module can be integrated;
- Hart 通信模块, 方便用户进行远程校验和阀门诊断;
Easily remote for valve checking and diagnosis with Hart communication module;
- 智能控制算法, 调节精度高, 可实现 0.1% 精度的阀位智能控制;
High adjustment precision, can realize the accuracy of 0.1% intelligent valve control with intelligent control algorithm;
- 定位可实现三断保位、和三断复位的功能;
Three valve termination and three fault reset function can be achived;
- 低功耗 (I/P 低功耗、定位器低耗气量 :25L/h);
Low power consumption (25L/h I/P low power consumption, low air consumption: locator);
- 数据备份和存储功能, 有效解决定位器在线更换、调试的难题;
Data backup and storage functions, effectively solve the problem of online replacement, debugging;
- 符合 IEC534(NAMUR)
Meet IEC534 (NAMUR);

技术参数 Technical Data

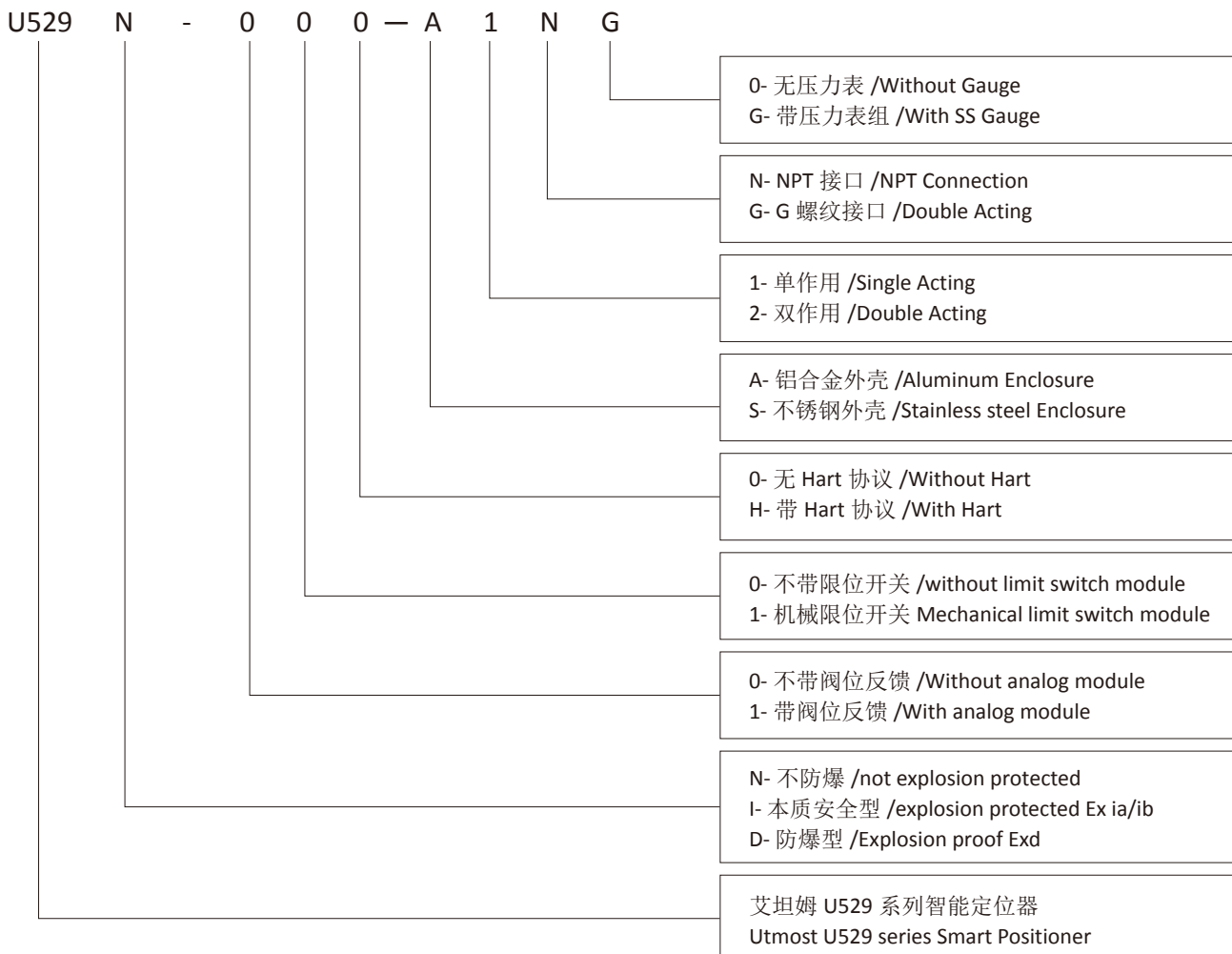
项目 /Item	U529N/I	U529D
防爆等级 /Explosion-proof	Without Ex protection or explosion protection "ia"	Explosion Protection
输入信号 /Input Signal	4-20 mA	
供气压力 /Inlet air pressure	0.14~0.6Mpa(G)	
行程 /Stroke	Linear: 10~150mm	
	Angle :0~120°	
控制精度 /Control Accuracy	± 0.2% F.S.	
滞后性 /Hysteresis	± 0.2% F.S.	
重复性 / Repeatability	± 0.2% F.S.	
阻抗 / Impedance	最大 /Max. 460Ω/20 mA(DC)	
输出特性 /Output characteristic	线性、开关、等百分比和用户自定义 /Linear , ON/OFF, Equal percentage or User defined	
耗气量 /Air Consumption	稳定耗气量 /Stable gas consumption 25L/h	
接口尺寸 Connections	气动 /Pneumatic 1/4NPT or G1/4	
	电气 /Electrical 1/2NPT	
环境温度 /Ambient temperature	-40~80 ℃	
外壳材质 /Housing Material	压铸铝或不锈钢 /Aluminum or Stainless steel	
重量 (基本型) /Weight, basic device	About 2.0Kg	About 3.6 Kg

核心技术 Core technology

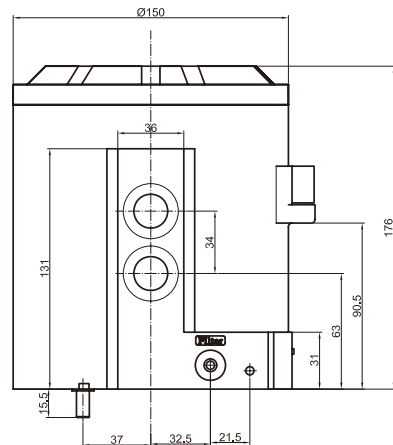
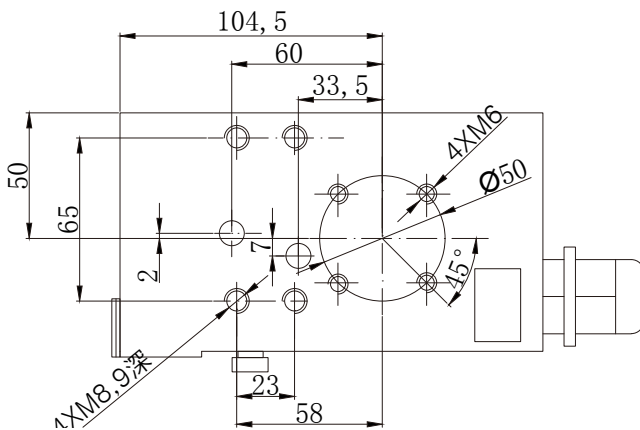
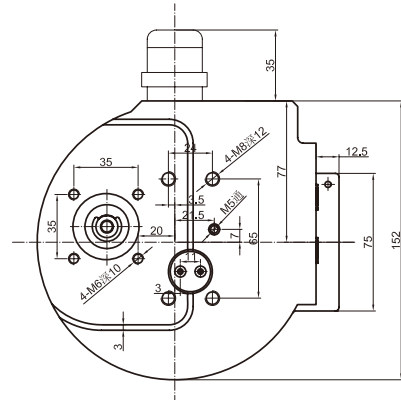
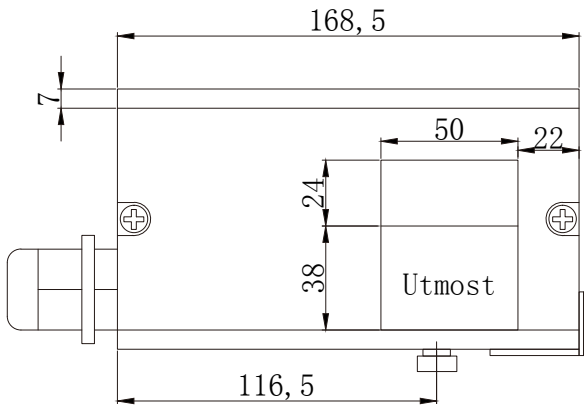
- 基于 PWM 驱动喷嘴挡板、3/3 滑阀 I/P 的设计及制造技术;
Design and manufacture technology based on PWM driver, and I/P with 3/3 nozzle flapper slide valve;
- 定位器控制参数快速自整定及自适应控制技术;
Positioner control parameters self-tuning and fast adaptive control technology;
- 定位器极低功耗可靠性设计技术;
Low power consumption reliability design technology;
- 定位器 EMI 抗干扰技术;
Anti interference technology of EMI;
- Hart 通信在智能阀门定位器应用技术;
Hart communication application of smart valve positioner

定位器编号:

Selection and Ordering data



外观尺寸
Dimensional drawings

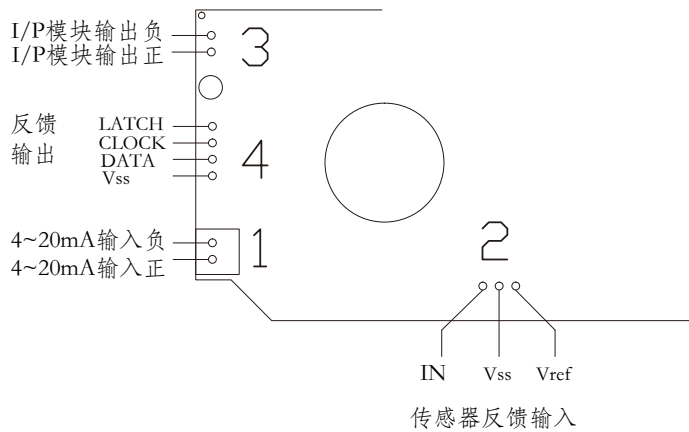


一体式无管路安装
Integrated installation without pipeline



U529 系列定位器控制面板视图
U529 series positioner control panel

接线图
Schematics



端子 1: 外部 4-20mA 信号源输入，外侧为正端；

Terminal 1: 4-20 mA current signal input, end for “+”connection

端子 2: 传感器反馈输入，IN— 电位器中心抽头、Vref— 电位器正端、Vss— 电位器负端（对应电位器右旋方向）；

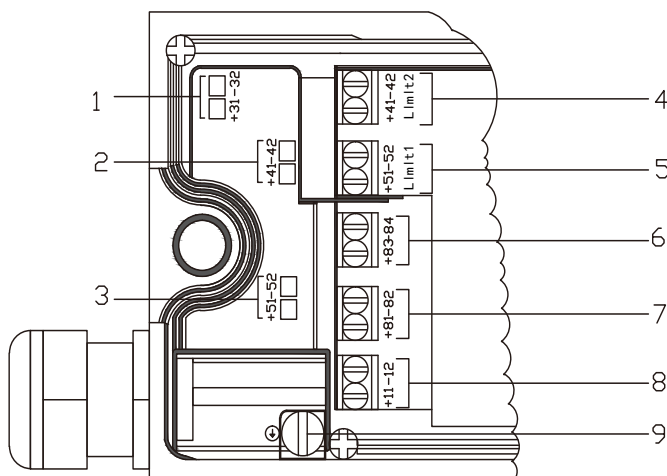
Terminal 2: sensor feedback input, IN – for center tap, Vref - Positive end, Vss - negative end (corresponding to the right direction of the potentiometer);

端子 3: I/P 驱动线圈，上下正反；

Terminal 3: I/P drive coil, Up for positive down for negative;

端子 4: 数字信号反馈输出，用于连接 4-20mA 电流反馈板。

Terminal 4: Digital signal feedback output for 4-20mA current feedback board connection.



1. 模拟位置反馈模块
Analog position feedback
2. 远传定位器模拟位置反馈模块或关闭模块的开关
Remote position feedback module or closed module
3. 远传定位器模拟位置反馈模块或关闭模块接线端
Remote position feedback module or closed module
4. 数字开位反馈 / 接近开关或 24V 微动开关
Open position feedback / Proximity switch or 24V micro switch
5. 数字关位反馈 / 接近开关或 24V 微动开关
Closed position feedback / Proximity switch or 24V micro switch
6. 数字输出 DO
Digital output DO
7. 数字输入 DI
Digital input DI
8. 4-20mA 输入信号
4-20mA input Signal
9. 接地螺丝
Crew of ground connection

工作参数 Operating parameter

信号范围 Signal range

最小信号 4 mA, 最大信号 20 mA (0...100%)
Min. Signal 4 mA, Max. 20 mA (0...100%)
可自由选择分程范围工作 /Freely choose scope
最小范围 /Min. Range 20% (3.2 mA),
推荐范围 / Recommended Range > 50% (8.0 mA)

作用方向 Acting Direction

正向 / Positive:
信号 /Signal 4...20 mA = position 0...100 %
反向 /Reverse:
信号 /Signal 20...4 mA = position 0...100 %

特性曲线 Characteristic curve

直线
等百分比 1:25 或 1:50 或 25:1 或 50:1, 或用户自定义
Linear, equal percentage 1:25 or 1:50 or 25:1 or 50:1 and freely configurable with 20 reference points.

行程限制 /Travel limit

定位器行程, 即直行程或旋转角度可以按需在满量程 100% 范围内减少, 注意最小值为 20%。
configurable between 0 ... 100% of total travel (min. range > 20%)

数字输入 /Digital input

控制电压 /Control voltage
24 V DC (12...30 V DC)
最大电流 /max. Current 4 mA

数字输出 (控制电路符合 DIN 19234/NAMUR)

Digital output (control circuit to DIN 19234 / NAMUR)
供电电压、Supply voltage 5...11 V DC

输出

范围 /Range 0...6 bar (0...90 psi)
气容 /Air capacity
气源压力 /supply pressure
1.4 bar (20 psi) 时 /at
5.0 kg/h = 3.9 Nm³/h = 2.3 scfm
气源压力为 /supply pressure
6 bar (90 psi) 时 /at
13 kg/h = 10 Nm³/h = 6.0 scfm

输出功能 Output Function

用于单作用或双作用执行机构 /for single/double acting actuator
如果断电, 空气从执行机构排出或执行机构被闭锁。
Power fails, instrument air discharged or locked in the actuator.
关断值 /closed value
0% 终端位置 /Terminal position = 0...45 %

100% 终端位置 Terminal position = 55...100 %

行程 Stroke

范围 /Range
25...120° (角行程执行机构 / Rotary actuator)
25...60° (直行程执行机构 /Linear actuator)

行程限制 Stroke Limitation

最小和最大限制 Min./Max. Limitation
在总行程 0...100% 内任意组态 (最小范围 > 20%)
Min. stroke >20% with Arbitrary configuration

行程时间 /Travel time

范围 /Range: 0...200 s

气源

仪表气源 /Instrument air
无油、水和尘满足 DIN/ISO 8573-1 污染和油的含量达 3 级(纯度: 颗粒最大直径 5 μm, 颗粒密度最大 5 mg/m³, 含油: free of oil, water and dust to DIN/ISO8573-1. Pollution and oil content according to Class 3 (purity: max. particle size = 5 μm, max. particle density = 5 mg / m³; 10 K below operating temperature) 最大浓度 /Oil content: 1 mg/m³)

供气压力 Instrument Air Rang

1.4...6 bar (20...90 psi)
注意: 不要超过执行机构最大工作压力!
Note: No exceed the maximum working pressure of the actuator!
耗气量 /Air Consumption
< 0.03 kg/h / 0.015 scfm

环境适应性 /Environmental capabilities:

工作环境温度 /Operating temperature: - 40 ~ 80°C
存储、运输温度 / storage and transport: - 45 ~ 85°C
相对湿度 /Relative humidity:
< 75% 无冷凝现象
75% (annual average), non condensing

防爆等级 /Explosion protection:
工厂用本质安全型 /Intrinsically safe equipment EEx ia/ib II C T/4T5/T6
隔爆型产品 / Explosion proof equipment
EEx d II C T/4T5/T6

外壳材料 /Housing: 铝制 /Aluminum
电气连接 /Electrical Connection: 1/2" NPT
气动连接 /Pneumatic Connection: 1/4" NPT
重量 /Weight: 2Kg/4Kg
尺寸 /Size: 240mm(L) X 80mm(W) X 110mm(H)

同类产品性别对比
Performance comparison

指标性能	UTM	ABB	SAMSON	Azbil	比较说明
气动部件	数字式 I/P 转换器 气动 3/3 滑阀	模拟式 I/P 转换器 气动 3/3 滑阀	I/P 转化器 气动放大器	I/P 转化器 气动放大器	优于进口产品
I/P 驱动方式	数字式 (PWM)	模拟式 (电压)	模拟式 (电压)	模拟式 (电压)	优于进口产品
I/P 功耗	0.8mW	1.6mW	5mW	18mW	优于进口产品
抗震指标	2g	2g	1g	1g	达到进口产品
温度补偿	有补偿技术	有补偿技术	有补偿技术	无补偿技术	达到进口产品
气源压力	1.46 bar	1.46 bar	1.46 bar	1.47 bar	达到进口产品
空气质量	ISO8753-1 颗粒物 3 级含油小于 1g/m ³ 霾点低于: ok	ISO8753-1 颗粒物 3 级含油小于 1g/m ³ 霾点低于: ok	ISO8753-1 颗粒物 3 级含油小于 1g/m ³ 霾点低于: ok	ISO8753-1 颗粒物 4 级含油小于 3g/m ³ 霾点低于: 3g	达到进口产品
稳态耗气	0.056Nm ³ /h 与空气 压力无关	0.085Nm ³ /h 与空气 压力无关	0.11Nm ³ /h 与空气 压力无关	0.24Nm ³ /h (1.4 bar) 0.3Nm ³ /h (5 bar)	优于进口产品
控制精度	0.1%-0.3%	0.1%-0.3%	0.3%-0.5%	0.5%-1%	达到进口产品
自鉴定	“傻瓜式”一键鉴定	“多步菜单式”鉴定	“多步菜单式”鉴定	“拨动开关式”鉴定	优于进口产品
最底工作电流	3.4mA	3.4mA	3.5mA	3.8mA	达到进口产品
防爆标志	Exia IIC T6 木质安全防爆	Exia IIC T6 木质安全防爆	Exia IIC T6 木质安全防爆	Exia IIC T6 木质安全防爆	达到进口产品
隔爆标准	Exd IICT6	Exd IICT6	Exd IICT6	Exd IICT6	达到进口产品
备份功能	有	无	无	无	优于进口产品
售价	适中	高	高	高	高性价比

同类产品性别对比
Performance comparison

Performance	UTM	ABB	SAMSON	Azbil	Comparative description
Pneumatic components	Digital I/P converter 3/3 Pneumatic valve	Analog I/P converter 3/3 Pneumatic valve	I/P converter Pneumatic amplifier	I/P converter Pneumatic amplifier	Better than imported brand
I/P Drive mode	Digital(PWM)	Analog(Voltage)	Analog(Voltage)	Analog(Voltage)	Better than imported brand
I/P Consumption	0.8mW	1.6mW	5mW	18mW	Better than imported brand
Seismic-Resistance	2g	2g	2g	1g	Meet the imported brands level
Temperature compensation	With	With	With	Without	Meet the imported brands level
Air pressure	1.4-6 bar	1.4-6 bar	1.4-6 bar	1.4-7 bar	Meet the imported brands level
Air quality	According to DIN/ISO 8573-1 Pollution and oil content according to Class 3 max.concentration = 1 mg / m ³ ; pressure dew point: 10 K below	According to DIN/ISO 8573-1 Pollution and oil content according to Class 3 max.concentration = 1 mg / m ³ ; pressure dew point: 10 K below	According to DIN/ISO 8573-1 Pollution and oil content according to Class 3 max.concentration = 1 mg / m ³ ; pressure dew point: 10 K below	According to DIN/ISO 8573-1 Pollution and oil content according to Class 3 max.concentration = 1 mg / m ³ ; pressure dew point: 10 K below	Meet the imported brands level
Air consumption	0.056Nm ³ /h	0.085Nm ³ /h	0.11Nm ³ /h	0.24Nm ³ /h (1.4 bar) 0.3Nm ³ /h (5 bar)	Better than imported brand
Precision	0.1%-0.3%	0.1%-0.3%	0.3%-0.5%	0.5%-1%	Meet the imported brands level
Self-diagnosis	One-step diagnosis	Multi-step diagnosis	Multi-step diagnosis	“Switch diagnosis”	Better than imported brand
Minimum Operating current	3.4mA	3.4mA	3.5mA	3.8mA	Meet the imported brands level
Explosion proof	Ex ia IICT6	Ex ia IICT6	Ex ia IICT6	Ex ia IICT6	Meet the imported brands level
	Ex d II CT6	Ex d II CT6	Ex d II CT6	Ex d II CT6	Meet the imported brands level
Backup function	With	Without	Without	Without	Better than imported brand
Prices	Middle	High	High	High	Better Cost Performance



品质与艺术完美结合

不仅仅是性能卓越的产品.....
艾坦姆还通过技术方案和综合的售后服务体系,
增强产品价值,为您的工厂提供全面支持!

More than just excellent products!
Utmost also supply technical solution and integrated after service
system to increase products value and fully support your factory!

声明:本样本所记载的数值为标准阀门理论值及测量值,数值规格
更新恕不另行通知。
Announcement: The data of this brochure comes from standard valve in
theory and measurement, data updates without notice.

艾坦姆流体控制技术(北京)有限公司 Utmost Flow Control Tech.(Beijing) Co.,Ltd

地址:北京市顺义区仁和开发区临河前街29号 邮编:101300
Add: No.29 of Renhe Qianjie, Renhe Industrial Park, Shunyi district, Beijing: 101300
电话/Tel: 010-80490446/ 80490441
传真/Fax: 010-61406990/6992
邮箱/Mail: sales@utmost-valve.com
网站/Web: www.utmost-valve.com

山东快速反应中心

Quick Response Center of Shandong
地址:山东省枣庄市滕州市腾飞东路1266号 邮编:277500
Add: No.1266 of Tengfei Road, Zaozhuang City, Tengzhou City, Shandong Province
电话/Tel: 0632-5656159
传真/Fax: 0632-5656159

大连快速反应中心

Quick Response Center of Dalian
地址:大连经济开发区红星海世界A区11号楼3公建
Add: No. 3 of 11 building Shijieguan of the Red Star A area, Economic Development Zone, Dalian
电话/Tel: 0411-87550166
传真/Fax: 0411-88175365