

# 1600 Series Intelligent Electropneumatic Valve Positioner

- 1600 Position controller
- 1601 Process controller
- 1602 Position controller(Profibus-DP)

- Compact stainless steel design
- Electrical waterproof connectors
- LCD with backlight
- Easy to start-up
- Rich additional software functions



**1600 series intelligent electro-pneumatic valve positioner is designed for integral pneumatic control valve, particularly suitable for angle seat valves and diaphragm valves.**

**The product is easy to operate and has rich software functions.**

**It can easily be operated via the LCD and keypad.**

**The positioner adjusts the valve position quickly and accurately through detecting the position sensor signal.**

Technical data	
Material	PC、PA6-GF30、Stainless Steel、SI
Power supply	24V DC $\pm$ 10%
Set-point signal (1600/1601)	0/4-20mA or 0-5/10 V
Input resistance for set-point signal (1600/1601)	240 $\Omega$ at 0/4-20mA, 21K $\Omega$ at 0-5/10V
Control medium Dust concentration Particle density Pressure condensation point Oil concentration	neutral gases, air DIN ISO 8573-1 Solid particle size and density Class 3 Dew point Class 3 Oil content Class 3
Ambient temperature	0-60° C
Pneumatic connection	Plug-in hose connector G1/4(internal $\Phi$ 6mm)
Electrical connection	M12 3-pins B-coded(cable $\varnothing$ 4-6mm) M12 4-pins D-coded(cable $\varnothing$ 4-6mm) M12 5-pins A-coded(cable $\varnothing$ 4-6mm)
Supply pressure	3~7 bar, specific values depending on the actuator
Air flow rate	17 l/min(input pressure of 0.6Mpa) 58 l/min(input pressure of 0.6Mpa ,only single-acting)
Stroke control range	Line 5-50mm Angle 90°
Installation	As required, Preferably with actuator in upright position, Screw
Protection class	IP67
Power consumption	<5W

## Combinations

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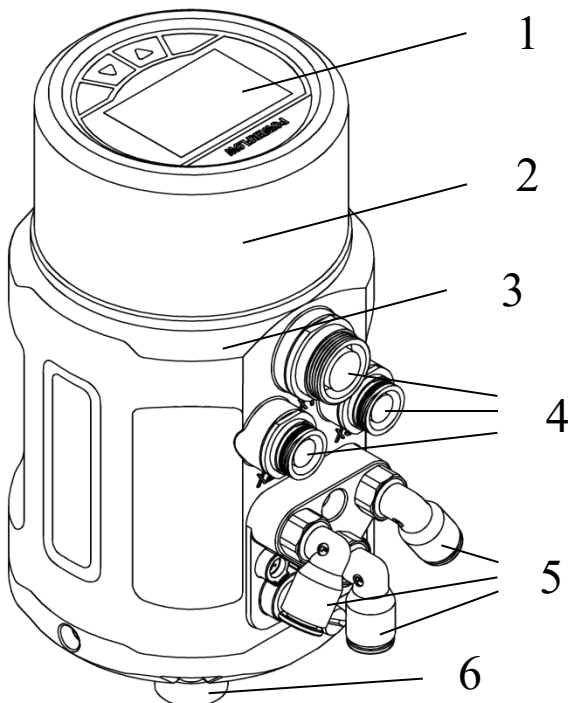
**Diaphragm control valve**



**Angle seat control valve**

## Structure

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1. **LCD and key panel**
2. **Stainless steel body casing**
3. **Main body casing**
4. **Electrical connection**
5. **Pneumatic connection**
6. **Actuator connection**

## Technical specifications

1600 Without process control function 1601 With process control function 1602 Without process control function (Profibus-DP)	Product series													
N No feedback signal Y 4-20mA feedback signal	Feedback signal													
S Single-acting D Double-acting	Actuator type													
S2 Line 5-25 mm S3 Line 25-50 mm S4 Angle 90°	Valve max stroke													
Q1 17 l/min Q2 58 l/min	Air flow rate													
T1 G1/4 T2 M16 * 1 T3 M22 * 1.5 T4 M26 * 1.5	Thread type													
S Safe F Freeze	Power off state for single-acting													
<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1600</td> <td>—</td> <td>N</td> <td>—</td> <td>S</td> <td>—</td> <td>S2</td> <td>—</td> <td>Q1</td> <td>—</td> <td>T1</td> <td>—</td> <td>S</td> </tr> </table>		1600	—	N	—	S	—	S2	—	Q1	—	T1	—	S
1600	—	N	—	S	—	S2	—	Q1	—	T1	—	S		

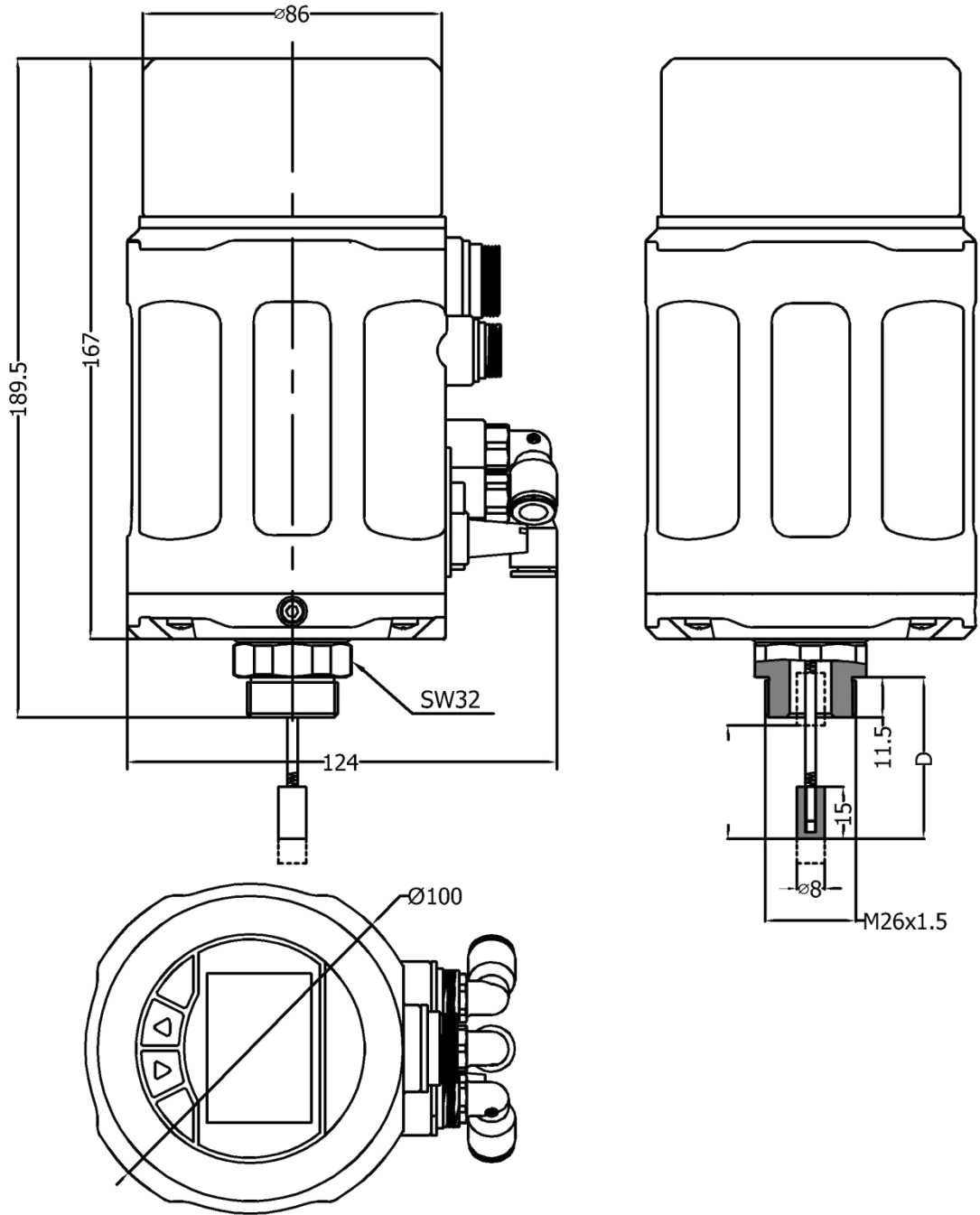
Remark:

In the **air flow rate** option, code Q1 is suggested to match the actuator of 40-100 mm internal gas chamber diameter, code Q2 is suggested to match the actuator of 125-160 mm internal gas chamber diameter. Code **Q2** is only used for **single-acting actuator**, and only in **Freeze** state when power-off. The air flow rates for code Q1 and Q2 are under the condition of 0.6Mpa input pressure.

In the **valve max stroke** option, AT actuator range for code S4 is AT50~AT125. For other actuator models, please consult our company. It is no need to select the **thread type** option for code S4.

**Power off state for single-acting** option is **Safe** by default. 1602 type is without 4-20mA feedback signal.

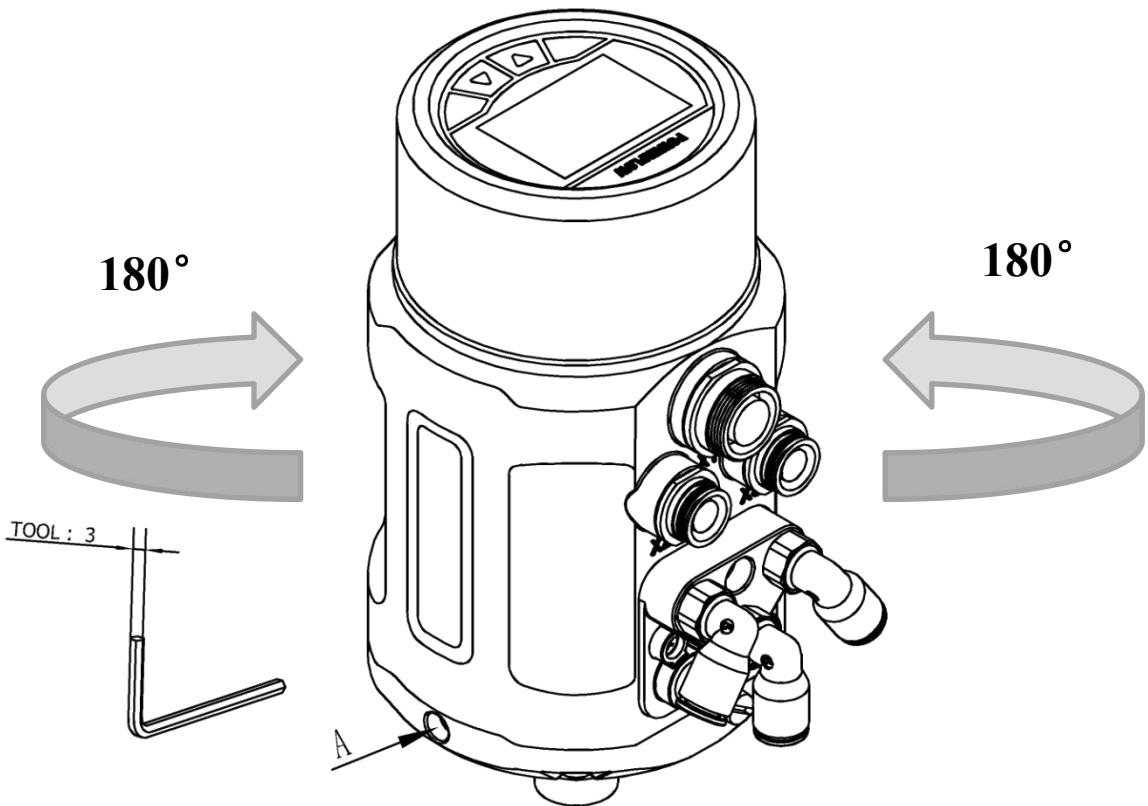
# Dimensions



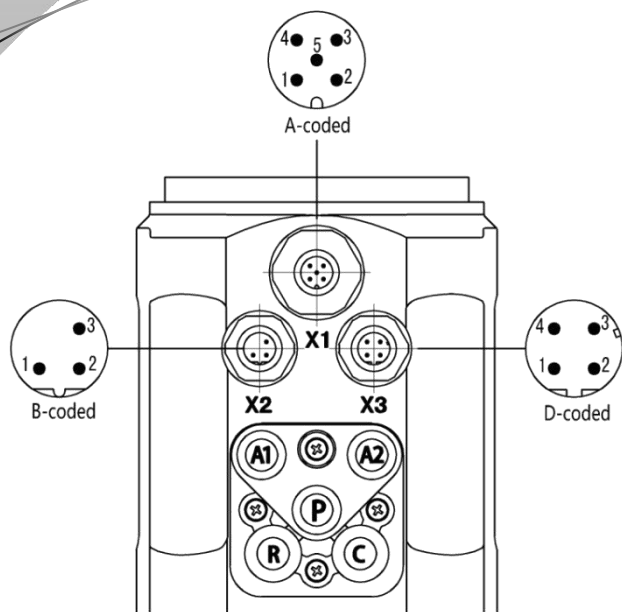
## Interface angle adjustment

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The angel can be adjusted between the positioner and the valve.If need to adjust the interface angle,relaxing the hexagon screw in place A first.Then adjusting the angle clockwise or counter-clockwise in 180° range. After adjusting the angle, locking the angle by the hexagon screw.



## Electrical connections



### X2 (1601)

Pin	Description	Signal type
1	Transmitter input +	+24 V
2	Transmitter signal output	4-20 mA
3	Transmitter GND	GND

### X3 (1600/1601)

Pin	Description	Signal type
1	Power supply +	+24 V
2	Power supply GND	GND
3	Set signal input +	0/4 – 20 mA or 0 – 5/10 V
4	Set signal input GND	GND

### X3 (1602)

Pin	Description	Signal type
1	Power supply +	+24 V
2	Power supply GND	GND
3	/	/
4	/	/

### X1 (1600/1601)

Pin	Description	Signal type
1	Analogue signal output +	0/4 – 20 mA
2	Binary signal output 1	0/24 V
3	Binary signal output 2	0/24 V
4	Binary signal input +	0-3V = "0" , 15-30V = "1"
5	Signal common GND	GND

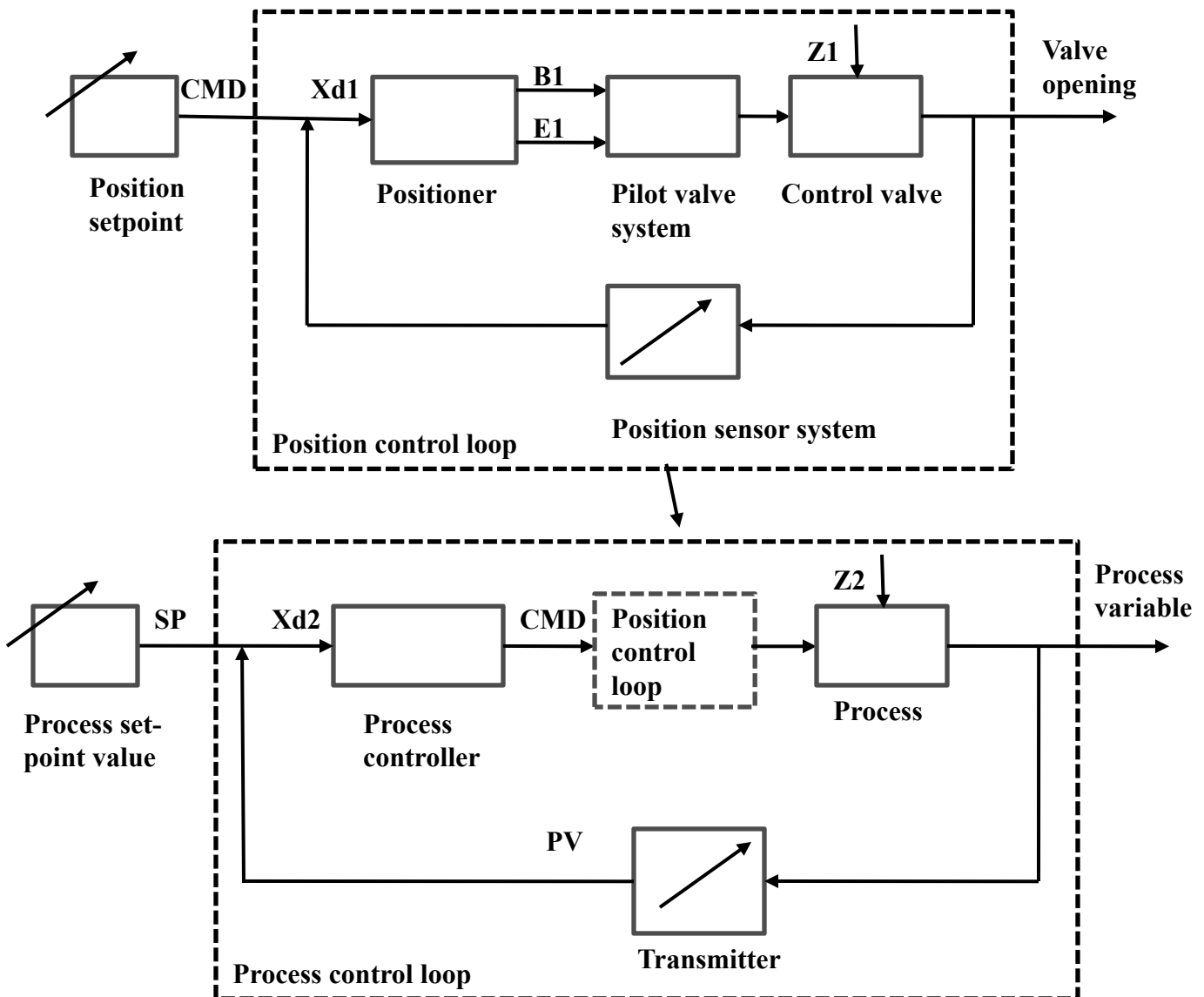
### X1 (1602)

Pin	Description
1	Bus power supply +5 V
2	<b>B</b> Inverting driver output/receiver input
3	<b>A</b> Noninverting driver output/receiver input
4	<b>DE</b> Driver enable status output
5	Bus GND

# Pneumatic connections

<b>P</b>	Air supply enter(built-in filter, filter size 5 $\mu\text{m}$ )
<b>R</b>	Air exhaust
<b>C</b>	Check valve
<b>A1</b>	Pilot air outlet 1
<b>A2</b>	Pilot air outlet 2

## Signal flow diagram



## Additional software functions

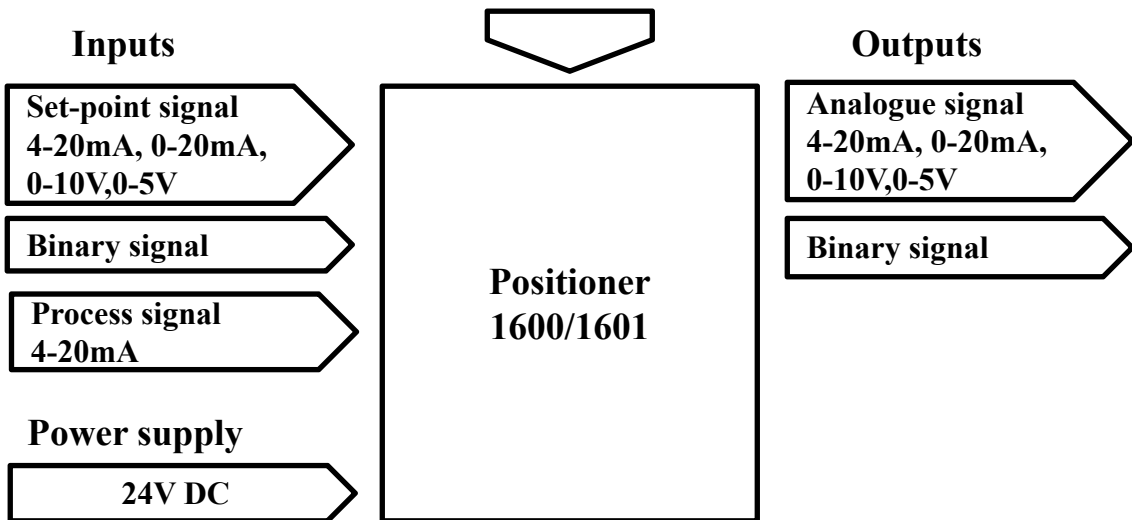
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- Selection of the transfer characteristic between set-point value and stroke.
- Sealing function for position controller.
- Effective sense of direction between input signal and set-point value.
- Limit of the mechanical stroke range.
- Setting for control parameters.
- Safety position setting for the position controller.
- Configuration of signal level fault detection.
- Activating of the binary input.
- Configuration of the outputs.
- Calibrating the control parameters.
- Setting for manual control rate.
- Code protection.

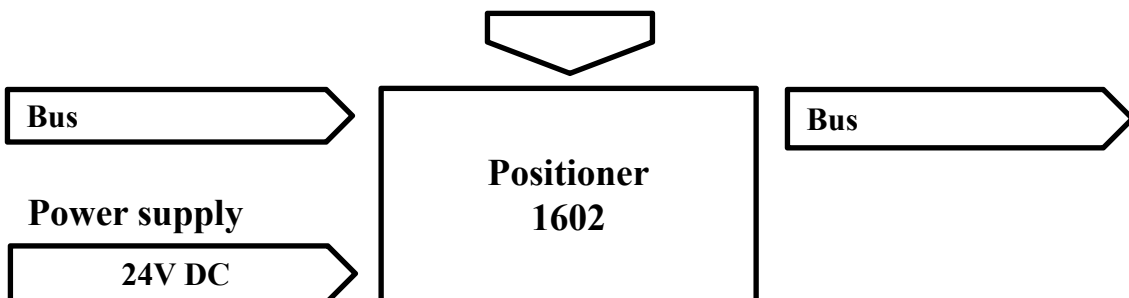
## Schematic diagram

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### Operation through keypad



### Operation through keypad


























## Function comparison for all types

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FUNCTION	1600	1601	1602	1500
Explosion-proof	√	√	×	×
Process control	×	√	×	×
4-20mA signal input	√	√	×	√
4-20mA signal output	○	○	×	○
Autotune	√	√	√	√
Valve position manual adjustment	√	√	√	√
Sealing function	√	√	√	√
Dead band setting	√	√	√	√
4-20mA input signal error detection	√	√	×	√
Factory setting	√	√	√	√
Characteristic curve setting	√	√	√	×
Direction of set-point value	√	×	√	×
Valve stroke range limiting	√	√	√	×
Safety position setting	√	√	×	×
Binary signal input/output	√	√	×	×
Input signal calibration	√	√	×	×
Speed setting of manual adjustment	√	√	√	×
Code protection	√	√	√	×

√	YES
×	NO
○	optional

# Valve match

	Intelligent valve positioner 1600 series	Intelligent valve positioner 1500 series	Intelligent valve positioner IP4000 series
Diaphragm valve 2800 series			
T type angle seat valve (3rd party company)			
Pneumatic sleeve valve (3rd party company)			
Pneumatic butterfly valve with rotary actuator (3rd party company)			
Pneumatic ball valve with rotary actuator (3rd party company)			
Angle seat Valve 2710 series			N/A
Divert seat valve (3rd party company)			N/A
Pneumatic butterfly valve with linear actuator (3rd party company)			N/A

# 1600系列智能电气阀门定位器

1600 位置控制器

1601 过程控制器

1602 位置控制器(Profibus-DP)

- 不锈钢外壳设计
- 电气防水接头
- 带背光液晶显示屏
- 快速简易启动
- 丰富的附加功能



1600系列智能电气阀门定位器是专为一体式气动调节阀所设计的，特别适用于角座阀和隔膜阀产品。

该产品操作简便，软件功能丰富，可轻松通过液晶屏和按键面板进行操作。

定位器可通过检测位移传感器信号，对阀位进行快速精确调节。

## 技术参数

材料	聚碳酸脂 (PC) 硅橡胶(SI) 聚酰胺(PA6-GF30) 不锈钢(304)
电源	直流 24V ± 10%
信号输入 (1600/1601)	0/4 to 20mA 或 0 to 5/10 V
设定信号输入阻抗 (1600/1601)	0/4-20mA信号时 240Ω 0-5/10V信号时 21KΩ
压缩空气要求 颗粒度要求 颗粒密度要求 凝点要求 油脂浓度要求	固体颗粒大小和密度 3级 露点 3级 含油量 3级
环境温度	0-60° C
气动接头	1/4英寸插入式软管接头(内径Φ 6mm)
电气快速接头	M12 三针 B标准(电缆直径ø 4-6mm) M12 四针 D标准(电缆直径ø 4-6mm) M12 五针 A标准(电缆直径ø 4-6mm)
气源压力	3-7 bar, 具体值视执行机构而定
气体输出流量	17 l/min(输入压力为0.6Mpa) 58 l/min(输入压力为0.6Mpa, 仅单作用)
阀门行程控制范围	直行程 5-50 mm 角行程 90°
安装方式	倾向于安装在执行器顶端, 通过螺纹和 执行器连接
防护等级	IP67
功耗	<5W

## 组合方式

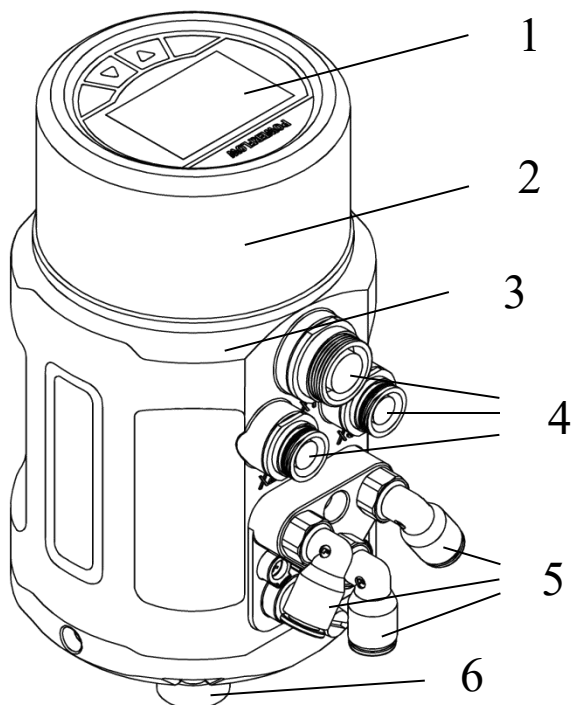


隔膜式调节阀



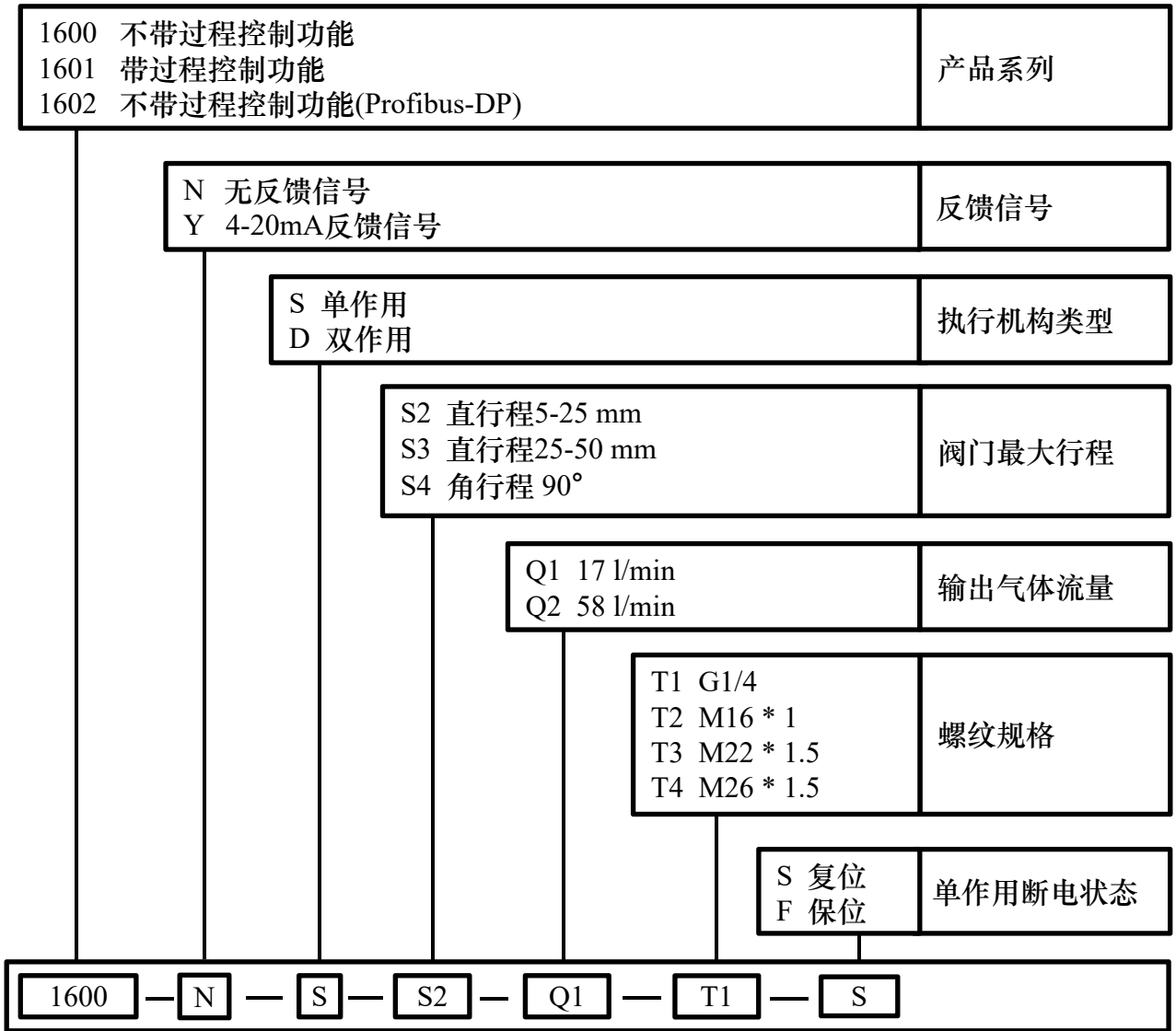
角座式调节阀

## 产品结构



1. 液晶屏和按键面板
2. 不锈钢外壳
3. 主壳体
4. 电气接口
5. 气动接口
6. 执行器连接件

# 技术规格



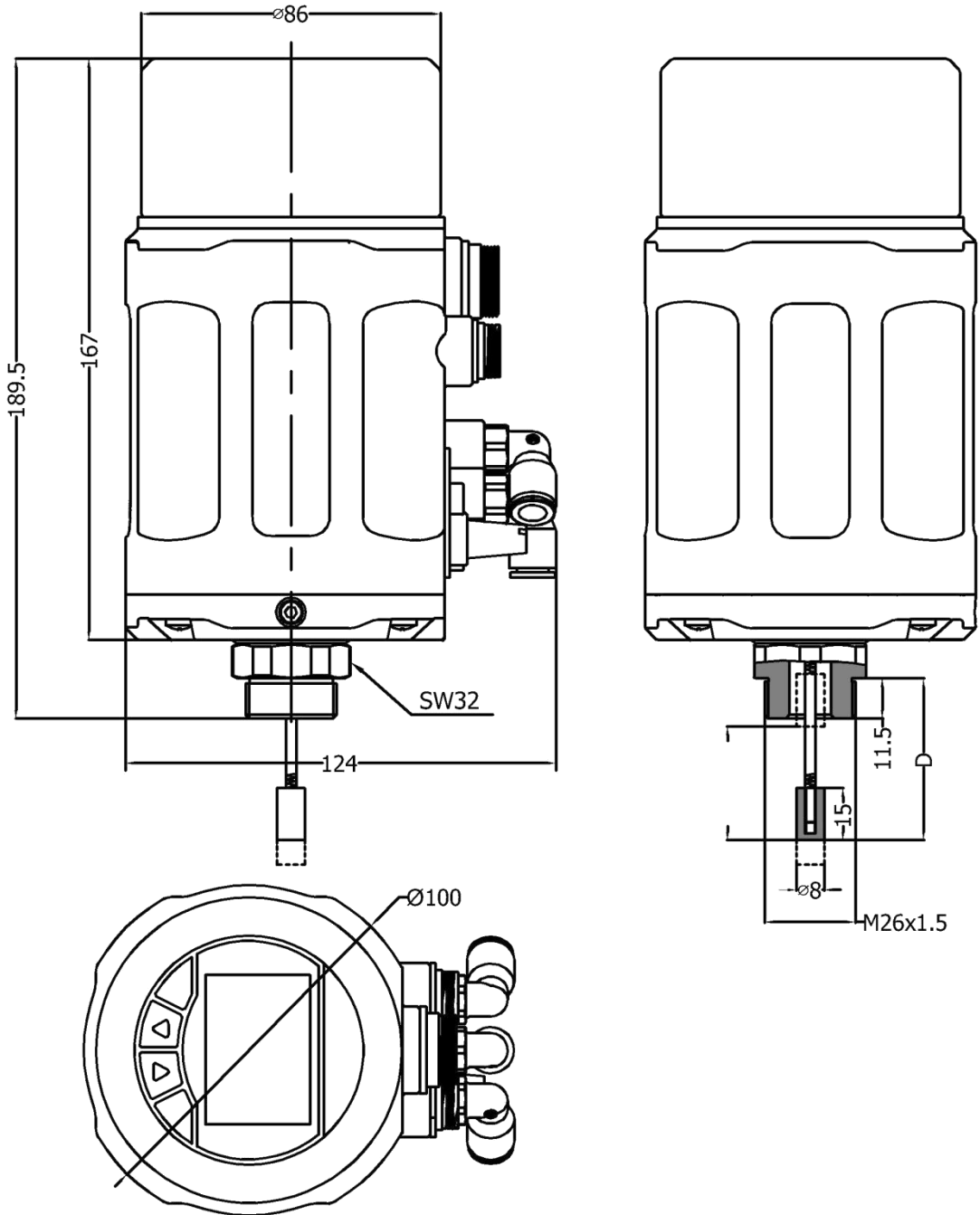
备注:

输出气体流量选项中，代码Q1建议匹配气室内径40-100 mm 的执行器，代码Q2建议匹配气室内径 125-160 mm的执行器。代码Q2仅适用于单作用执行器，且断电时只支持保位状态。代码Q1,Q2标注的气体流量均为输入压力在0.6Mpa下的气体流量。

阀门最大行程选项中代码S4适用的AT执行器范围是AT50~AT125。其他型号请咨询我司。如果选择代码S4，则螺纹规格选项不需要选择。

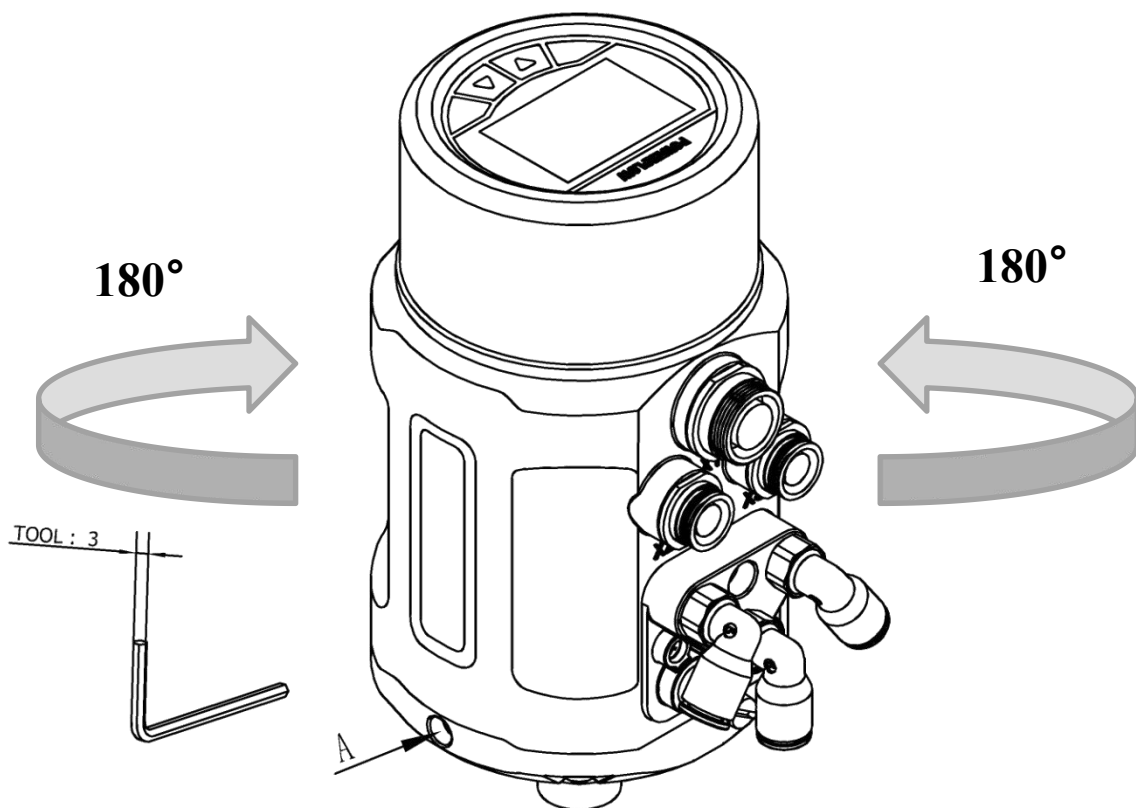
单作用断电状态默认为复位。1602不支持4-20mA反馈信号。

# 机械尺寸

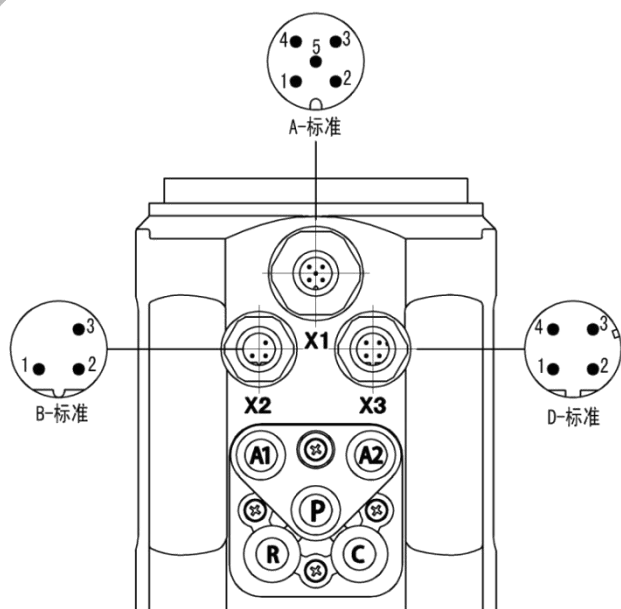


## 操作界面角度调整

将定位器与阀门连接之后，定位器可与阀门之间做角度调整。若需要调整定位器操作界面角度，松开A处的内六角紧定螺钉后，顺时针或逆时针180°范围内调整到需要的角度，再拧紧紧定螺钉。



# 电气接口



## X2 (1601)

端子号	描述	信号类型
1	变送器输入 +	+24 V
2	变送器信号输出	4-20 mA
3	变送器 GND	GND

## X3 (1600/1601)

端子号	描述	信号类型
1	电源 +	+24 V
2	电源GND	GND
3	设定信号输入 +	0/4-20mA 或 0-5/10 V
4	设定信号输入GND	GND

## X3 (1602)

端子号	描述	信号类型
1	电源 +	+24 V
2	电源GND	GND
3	/	/
4	/	/

## X1 (1600/1601)

端子号	描述	信号类型
1	模拟信号输出 +	0/4-20mA
2	开关量信号输出通道1	0/24 V
3	开关量信号输出通道2	0/24 V
4	开关量信号输入 +	0-3V = "0" , 15-30V = "1"
5	信号公共 GND	GND

## X1 (1602)

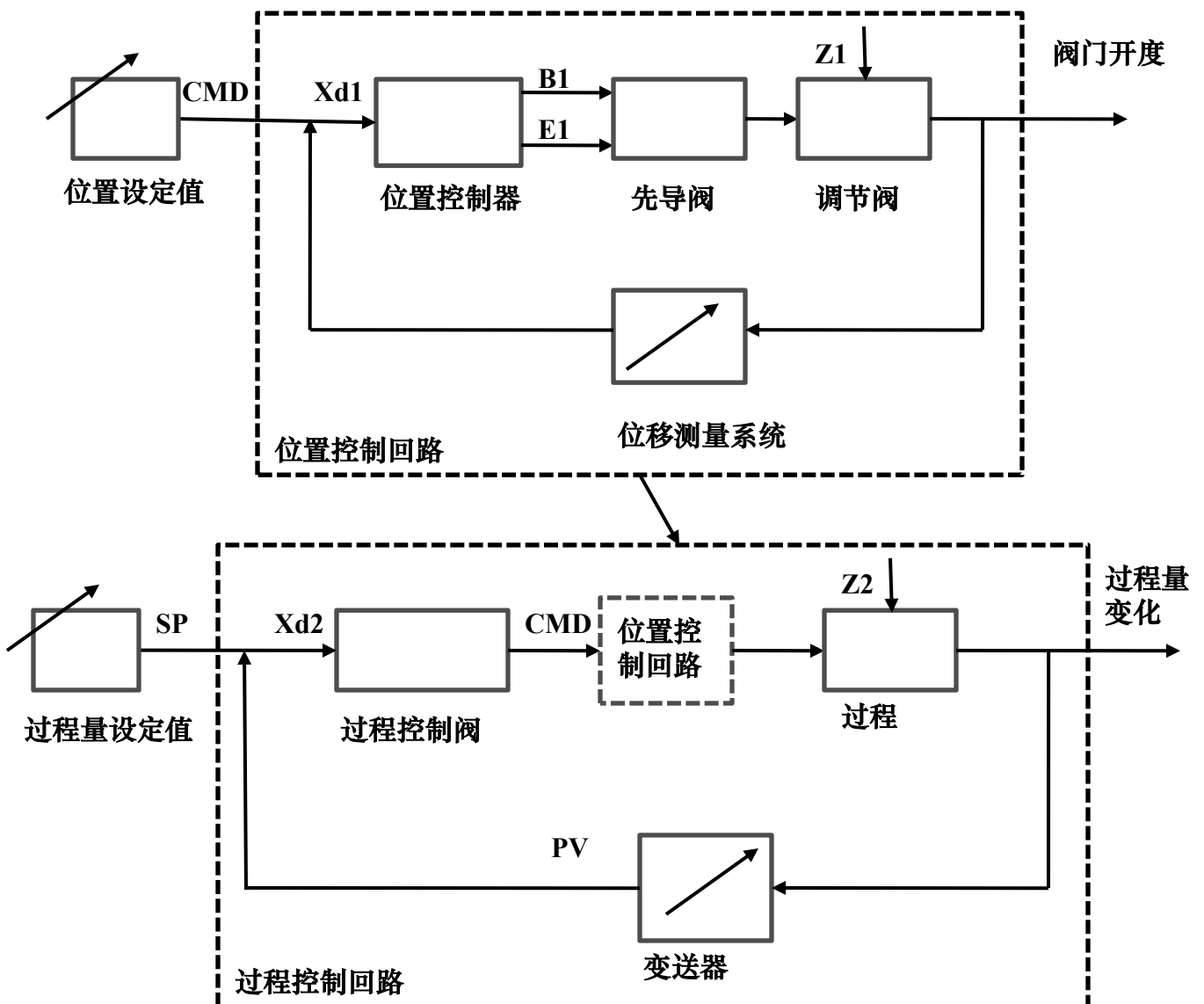
端子号	描述
1	总线电源+5V
2	B 反相驱动器输出/接收器输入
3	A 同相驱动器输出/接收器输入
4	DE 驱动器启用状态输出
5	总线GND



# 气动接口

P	气源进入 (内置滤网, 过滤尺寸 $5\mu\text{m}$ )
R	排气
C	单向阀
A1	先导气口1
A2	先导气口2

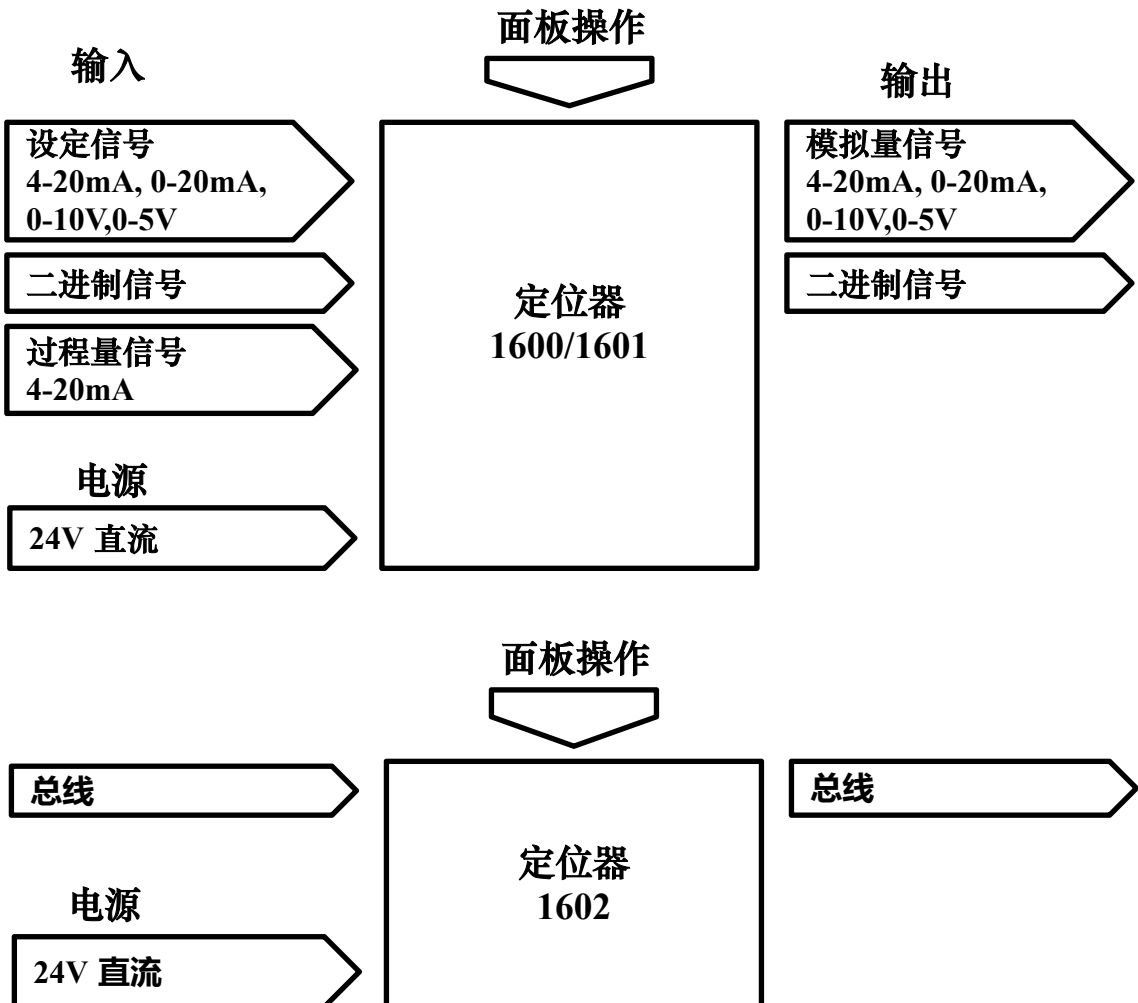
## 信号流程示意图



## 软件附加功能

- 阀门传输特性设置
- 安全位置的设置
- 紧闭功能设置
- 输入信号错误检测
- 输入信号和设定值间的作用方向设置
- 二进制输入信号功能激活
- 阀门行程限制
- 输出信号功能配置
- 密码保护功能
- 控制参数校正
- 控制参数的设置
- 手动控制速度设置
- 密码保护

## 原理图



## 各型号功能对比

功能	1600	1601	1602	1500
防爆	√	√	×	×
过程控制	×	√	×	×
4-20mA信号输入	√	√	×	√
4-20mA信号输出	○	○	×	○
自整定	√	√	√	√
手动调节阀位	√	√	√	√
紧闭功能	√	√	√	√
死区设置	√	√	√	√
4-20mA输入信号错误检测	√	√	×	√
恢复出厂设置	√	√	√	√
特性曲线设置	√	√	√	×
信号方向设置	√	×	√	×
行程限制	√	√	√	×
安全位置设置	√	√	×	×
开关量信号输入/输出	√	√	×	×
输入信号校正	√	√	×	×
手动调节速度设置	√	√	√	×
密码保护	√	√	√	×

√	有该功能
×	无该功能
○	可选

# 阀门匹配

	智能阀门定位器 1600系列	智能阀门定位器 1500系列	智能阀门定位器 IP4000系列
隔膜阀2800系列			
T型气动截止阀 (第三方)			
气动单座薄膜式调节阀 (第三方)			
角行程气动蝶阀 (第三方)			
角行程气动球阀 (第三方)			
调节式角座阀 2710系列			N/A
换向阀 (第三方)			N/A
直行程气动蝶阀 (第三方)			N/A