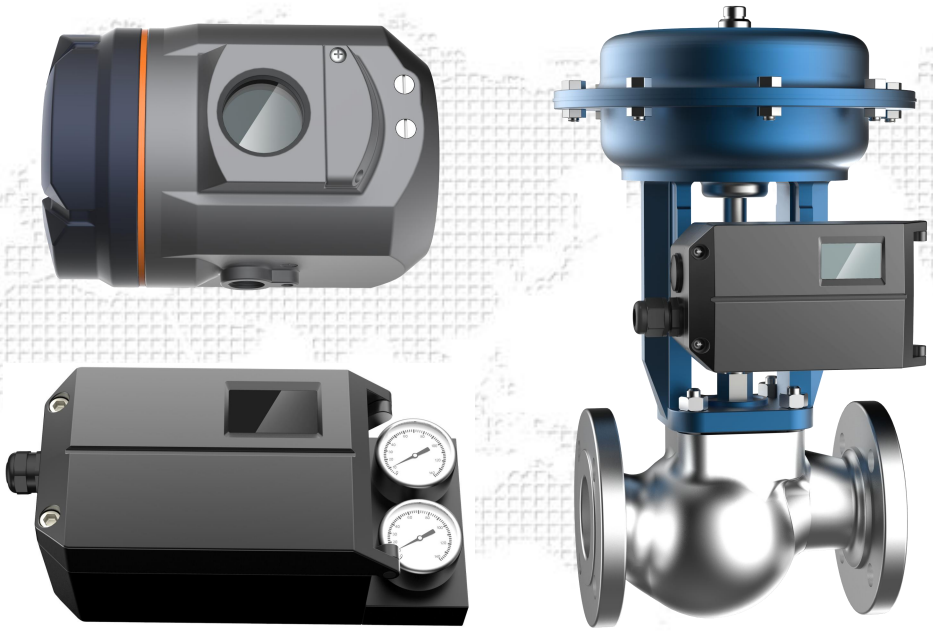
IP6000系列定位器

IP6000 Series Intelligent Valve Positioner Brief Introduction



POWERFLOW

Expertise in flow control

IP6000 intelligent valve positioner is mounted on pneumatic actuators. It's used to control air intake and exhaust of the pneumatic actuators to drive the valve position to the set point by calculating both data from 4-20mA DC signal and feedback position.

1 Technical Description

Ex d linear type

Ex ia linear type

- **Enclosure material**
  Aluminum
- **Pressure gauge block material**
  Aluminum, anodized
- **Input signal**
  Input resistance: 120Ω
  Limit voltage: 28V
- **Output signal**
  Feedback type: 2-wire 4~20mA signal,
  internal resistance 120Ω
- **Digital communication protocol**
  HART 7
- **Minimum operating current**
  3.8mA
- **Steady state air consumption**
  ≤ 0.4 L/min

1 Technical Description

Stroke range
Default linear type: 10~100mm
Default rotary type: 30~100°
Separate type: 5~25mm
Optional mounting bracket: Hard connection or soft connection
Note: The stroke range of remote type is the same as that of default type

Pneumatic data
Auxiliary power (air supply):
compressed air, carbon dioxide, nitrogen, inert gas, clean natural gas
Air quality meets ISO 8573-1 standard
Pressure range: 1.4~7bar(20.3~101.5psi)
Solid particle size and density: Grade 3
Pressure dew point: Class 3 (minimum 20K (36° F) lower than the ambient temperature)
Oil content: Class 3

Flow rate
Intake:
2 bar 4.8 Nm³/h
4 bar 8.0 Nm³/h
6 bar 11.2 Nm³/h
Exhaust (fail-safe):
2 bar 5.9 Nm³/h
4 bar 9.8 Nm³/h
6 bar 13.7 Nm³/h
Exhaust (fail-freeze):
2 bar 6.6 Nm³/h
4 bar 11.1 Nm³/h
6 bar 15.6 Nm³/h
The value of the flameproof type (IP6000d) is reduced by about 20%

Electrical connection
NPT1/2
M20×1.5

Pneumatical connection
NPT1/4
G1/4

Protection class
IP66

Vibration resistance
0.15mm，10Hz-60Hz，20 cycle/axis
20m/s2，60Hz-500Hz，20 cycle/axis
Recommended range for control valve
≤ 20 m/s2，no resonance peak

Basic error & Hysteresis error
Basic error: ≤ 1%
Hysteresis error: ≤ 1%

Ambient temperature
Normal version for non-explosion-proof:
-20℃ ~ +80℃
Optional version for non-explosion-proof:
-40℃ ~ +80℃
Normal version for explosion-proof:
-20℃ ~ +80℃(T4)，-20℃ ~ +40℃(T6)
Optional version for explosion-proof:
-40℃ ~ +80℃(T4)，-40℃ ~ +40℃(T6)
Ex d default type: -20 ℃ ~ +60 ℃
Ex d low temperature type : -40 ℃ ~ +60 ℃

Ex ia type

1 Technical Description

- **Explosion-proof grade and applicable zone**

  Intrinsically safe: Ex ia IIC T4/T6 Ga
  Apply to Zone 0,Zone 1,Zone 2
  Flameproof: Ex d IIC T6 Gb
  Apply to Zone 1，Zone 2

Ex d type

Intrinsically safe type electrical parameters

Circuit name	Max input voltage Ui(v)	Max input current Ii(mA)	Max input power Pi（W)	Max internal equivalent parameters	
				CI(nF)	LI(mH)
4~20mA Input	28	93	0.66	≈ 0	≈ 0
4~20mA Output	28	93	0.66	≈ 0	≈ 0

Summary of electromagnetic compatibility results

Object	Description	Standard	Test level	Result
Ex ia type	Electrostatic discharge immunity	GB/T 17626.2	±4kV 触点 ±8Kv 空气	Pass
Ex ia type	Radio frequency electromagnetic field radiation immunity	GB/T 17626.3	3V/m，80%AM （1kHz），80MHz~1000MHz	Pass
Ex ia type	Power frequency magnetic field immunity	GB/T 17626.8	50Hz，100A/m	Pass
Ex ia type	Electrical fast transient pulse group immunity	GB/T 17626.4	±1.0 kV	Pass
Ex d type	Radio frequency electromagnetic field radiation immunity	GB/T 17626.3	10V/m，80%AM （1kHz），80MHz~1000MHz	Pass

- **Rated conditions-height**

  2000m above sea level.
  At locations above 2000m above sea level, please use a suitable power supply.

- **Rated conditions-installation position**

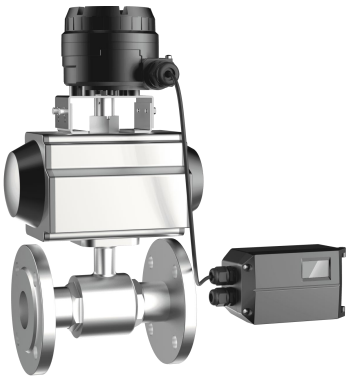
  Anywhere. In a humid environment, the pneumatic connector and exhaust port are not facing upwards, please install correctly

● Position feedback module

For position feedback DC output, 2-wire connection	
Current output	Terminals OUT1 and OUT2
Output rated signal range	4~20mA, short-circuit proof
Dynamic Range	3.8~20.5mA
External load R_B[kΩ]	≤ (U_{Aux}[v]-12v)I [mA]
Transmission error	≤0.5%
Temperature effect	≤0.1%/10K (≤0.1%/18°F)
Resolution	≤0.1%
Effective internal capacitance	C_i=Approximately 0
Effective internal inductance	L_i=Approximately 0

Ex d rotary type

Ex ia default rotary type



Ex ia remote rotary type

Ex d separate type

Ex ia separate type

2 Advantages & applications

Advantages

- Simple mounting and one-key automatic commissioning
- Mature and reliable piezo module, imported from Germany
- Simple operation and configuration of the device using 4 buttons and LCD local display
- Numerous functions can be activated(e.g. characteristic curves and limits)
- Negligible air consumption in stationary operation
- Tight closing function
- Fail-freeze function (Optional according to product selection chart)
- One device variant for linear and rotary actuators
- Excellent shock resistance
- External remote sensor as option for extreme ambient conditions
- On-site calibration of 4-20mA input signal can be performed

Applications

IP6000 positioner application industry：

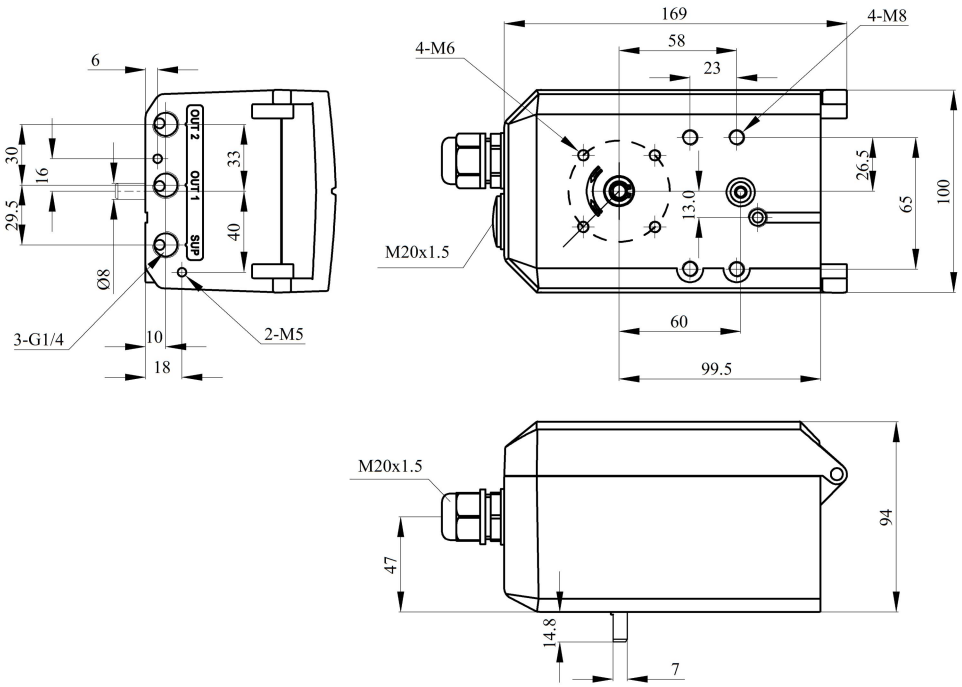
- Refining/Petrochemical/Nuclear Power/Power Plant
- Paper and glass/water and wastewater industry
- Food & beverage, pharmaceutical industry
- Marine Industry

IP6000 positioner application form：

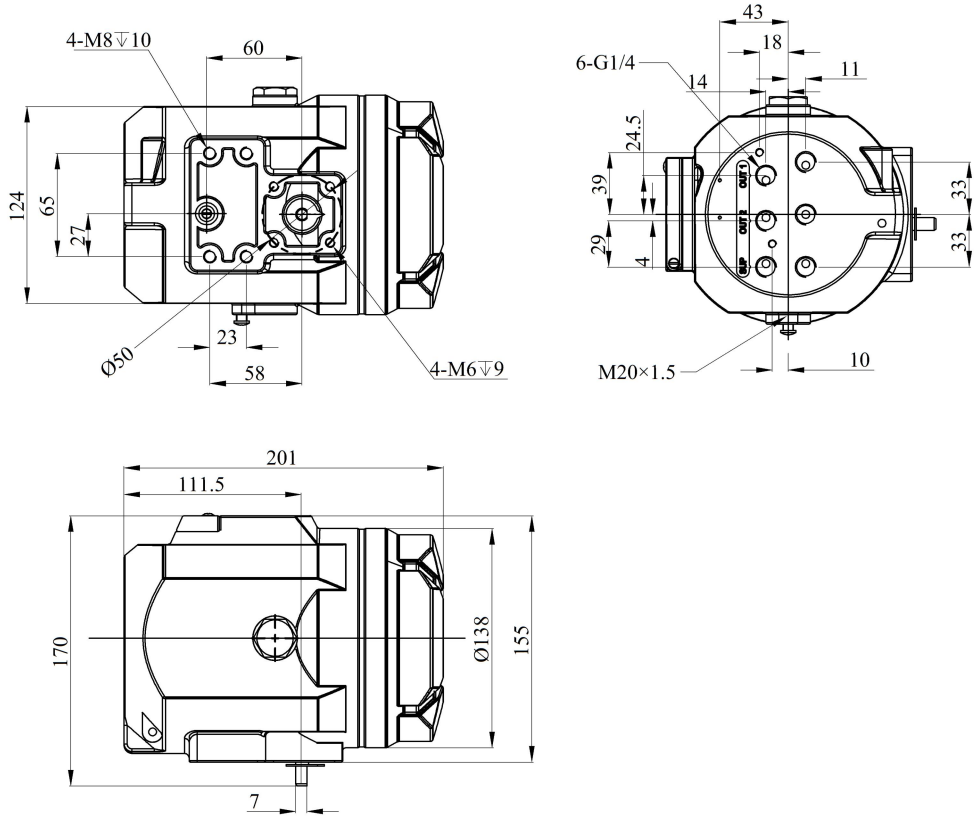
- For single/double acting actuators: aluminum enclosure and flameproof aluminum enclosure
- Used in non-hazardous locations
- Types used in hazardous locations: Intrinsically safe explosion-proof type "Ex ia"
  Flameproof type "Ex d", aluminum flameproof enclosure

Ex ia remote linear type

3 Mechanical Dimensions

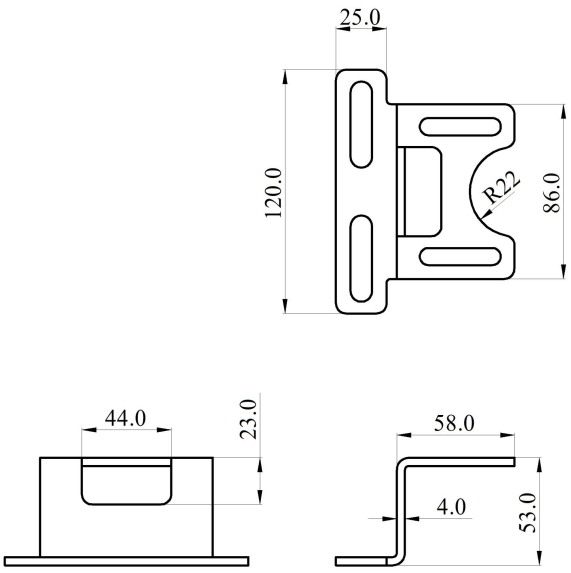


Ex ia type mechanical dimensions

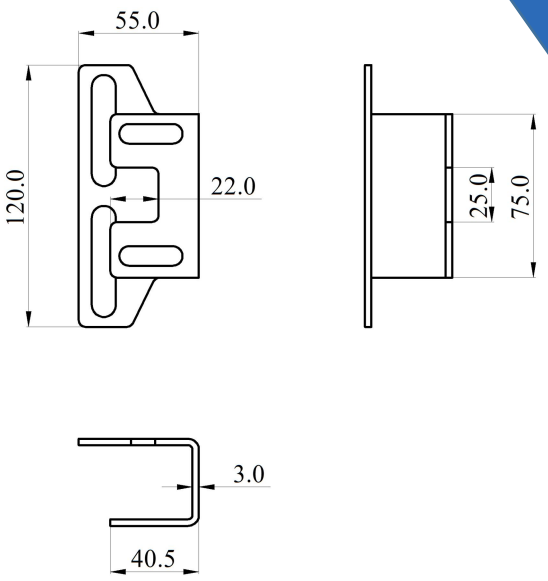


Ex d type mechanical dimensions

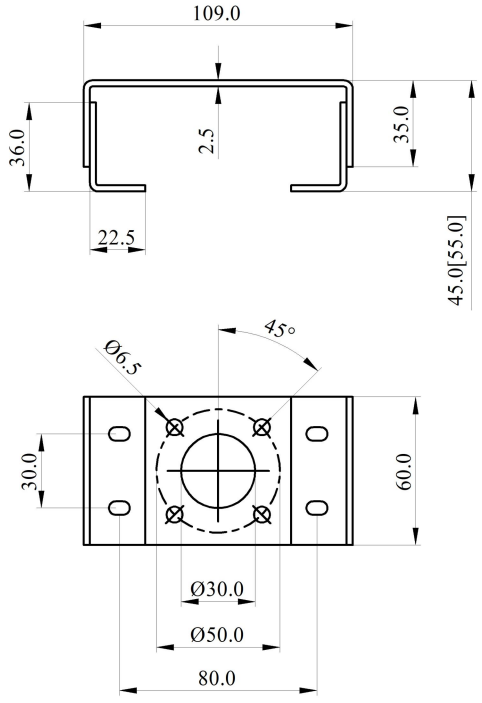
3 Mechanical Dimensions



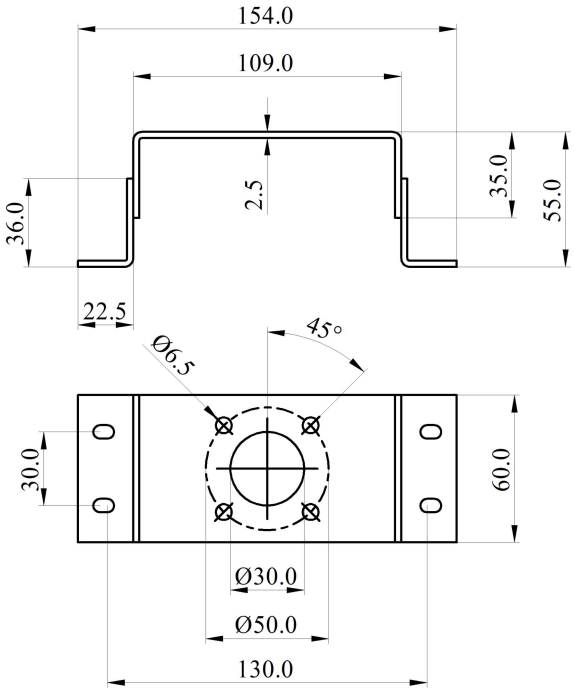
Linear mounting bracket



Remote type linear mounting bracket

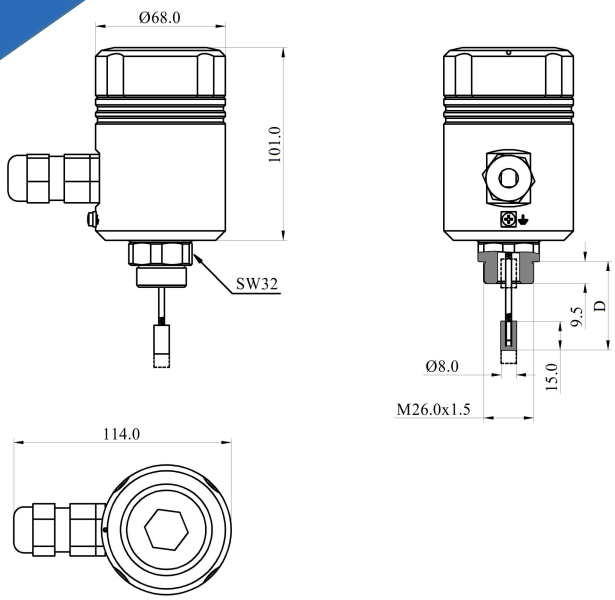


Rotary mounting bracket (Form 1)

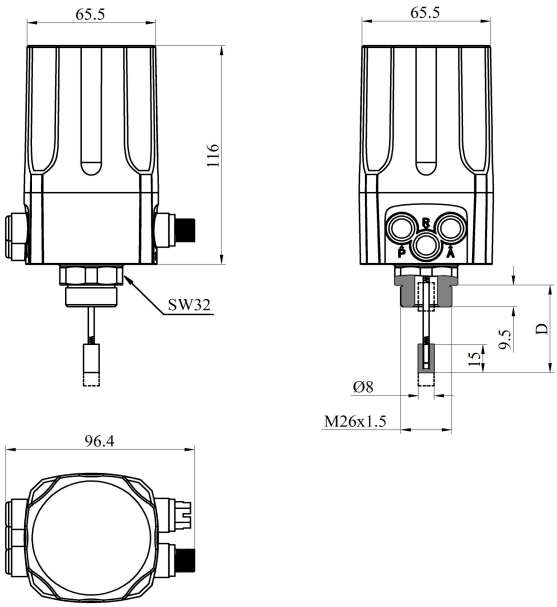


Rotary mounting bracket (Form 2)

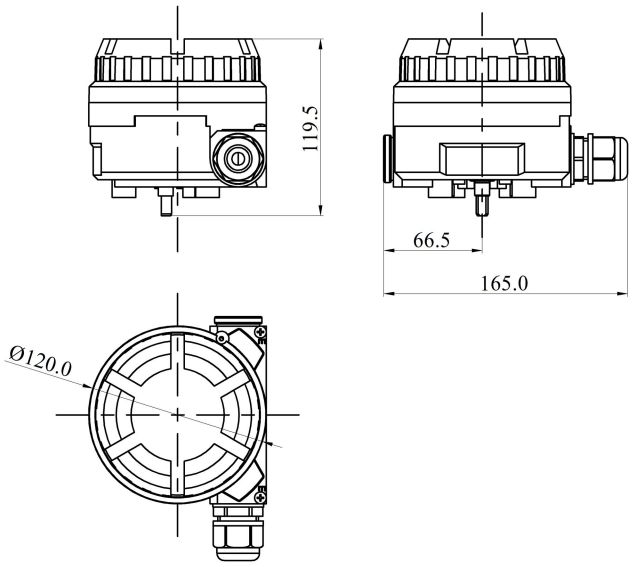
3 Mechanical Dimensions



Dimensions of Ex d separate type sensor

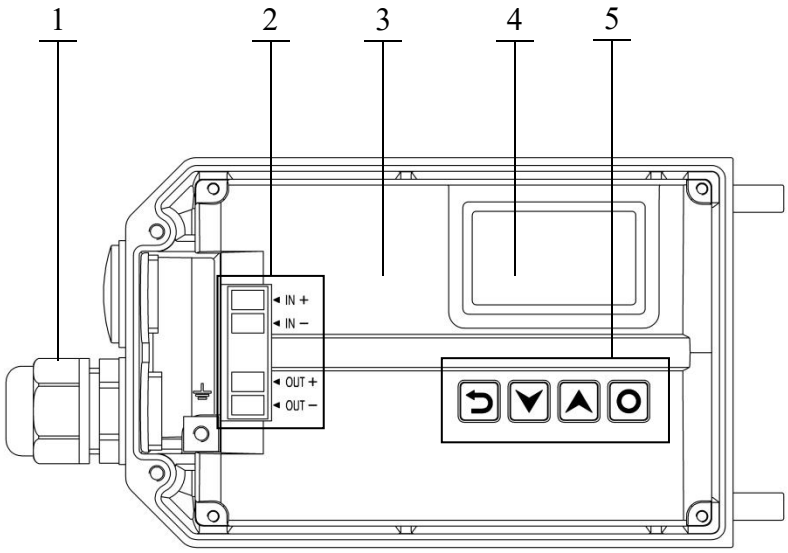


Dimensions of Ex ia separate type sensor



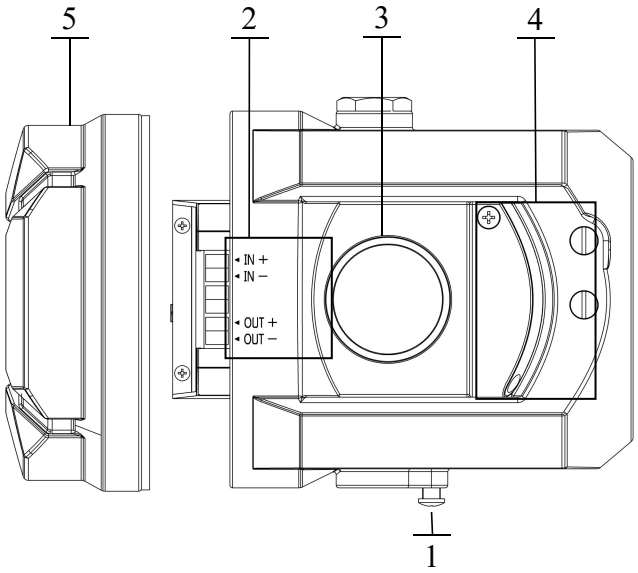
Dimensions of remote type sensor

4 Structure



1. Electrical cable access
2. Electrical wiring position
3. Shell
4. LCD screen
5. Buttons

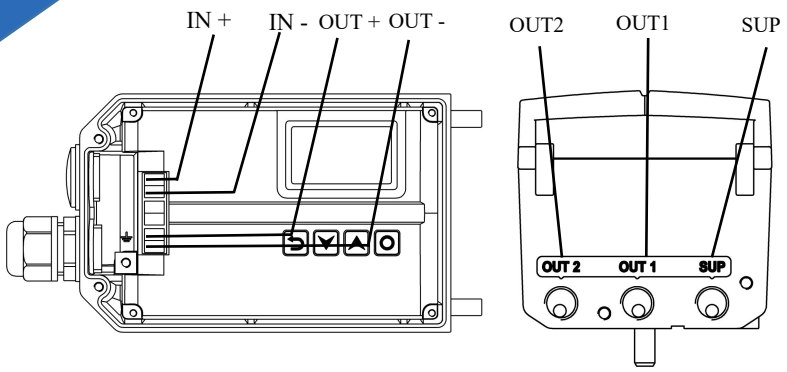
Ex ia positioner structure



1. Electrical cable access
2. Electrical wiring position
3. LCD screen
4. Buttons
5. End cover

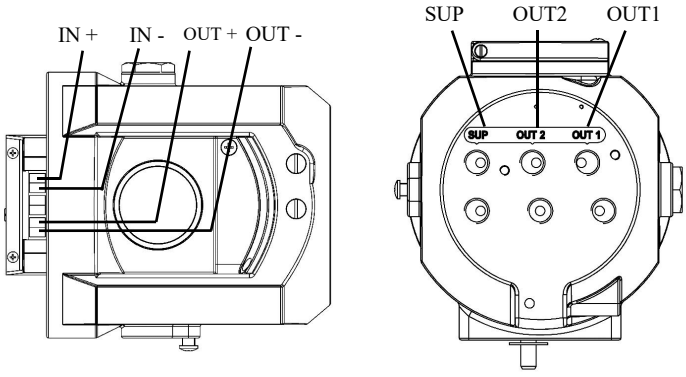
Ex d positioner structure

5 Electrical & pneumatic connections, wiring diagram



Ex ia type

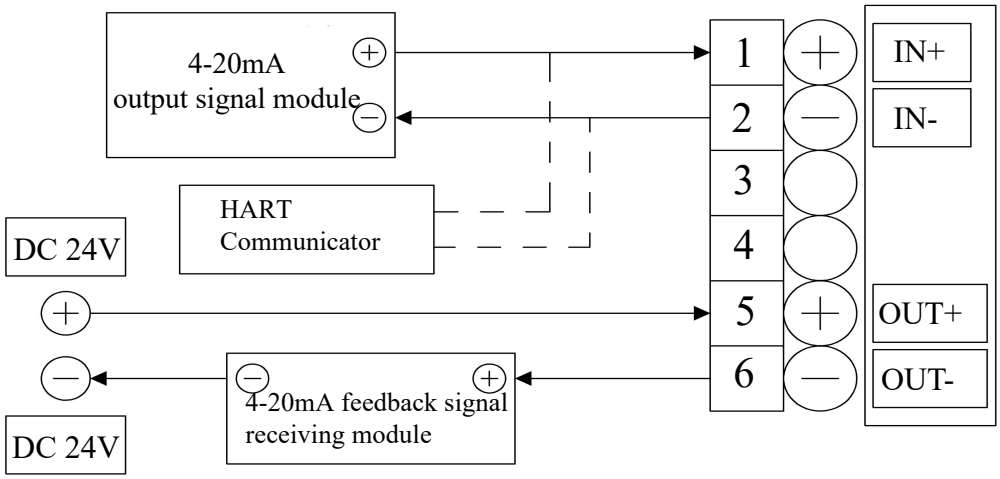
Pneumatical	Description
SUP	Air supply input
OUT1	Pilot air outlet 1
OUT2	Pilot air outlet 2



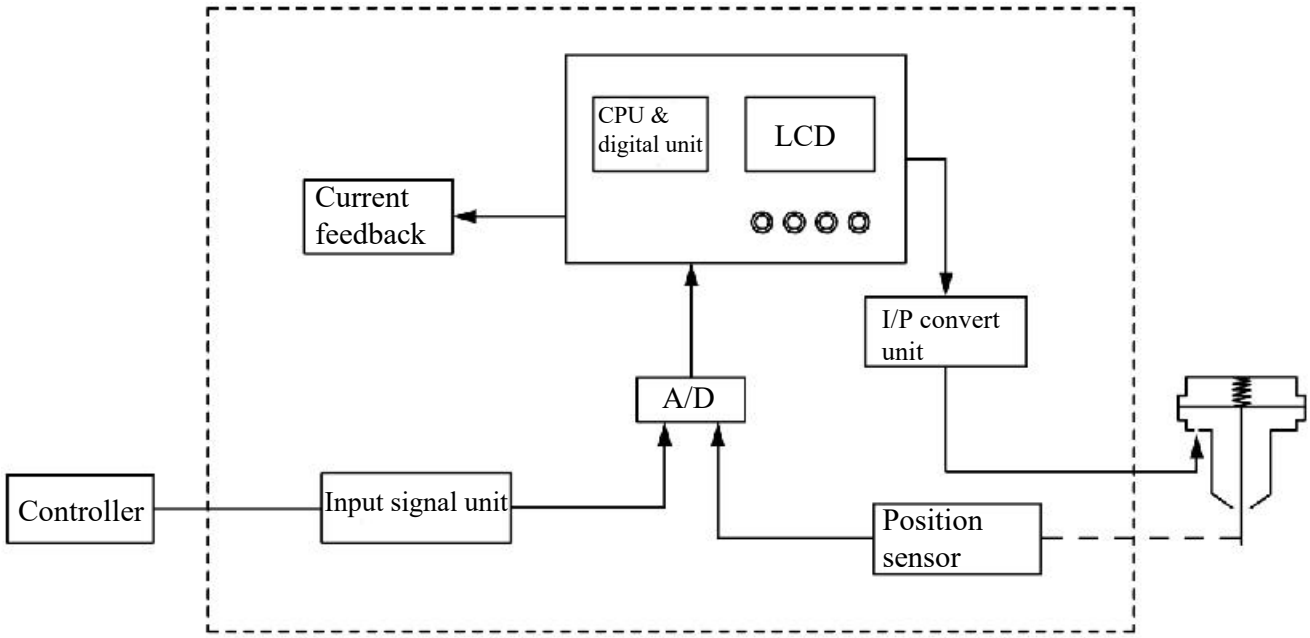
Ex d type

Electrical	Description
IN+	4-20 mA input signal +
IN-	4-20 mA input signal -
OUT+	Feedback signal module 18-30 V DC +
OUT-	Feedback signal module 4-20mA output

Wiring diagram



Principle Block Diagram



Additional Software Functions

- Calibrating the input signal.
- Calibrating the set-point signal.
- Tight closing function
- Stroke limit function
- Setting and selection of characteristic curves
- Selection of signal direction.
- Selection of stroke direction.
- Reset function

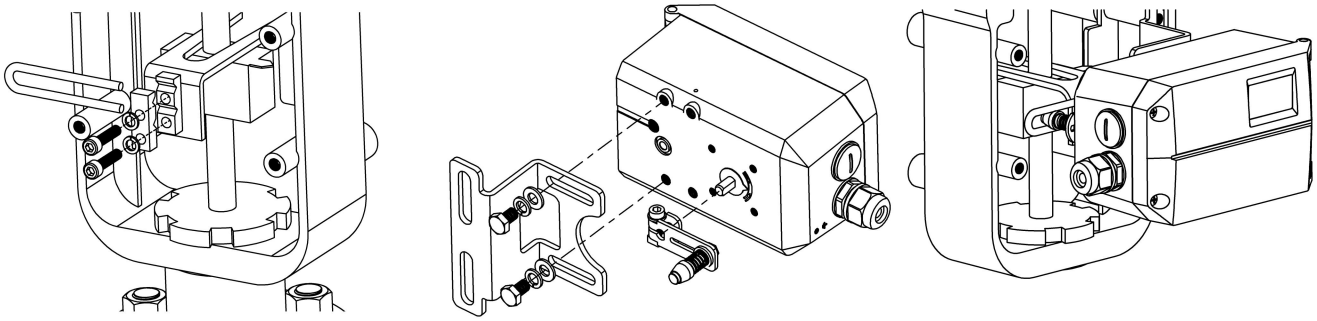
Advantages

The IP6000 series intelligent valve positioner uses a microprocessor and a new type of piezo valve to replace the nozzle and baffle pressure regulating system in the traditional positioner to realize the regulation and control of the output pressure. The control of the input signal of the valve opening and the feedback signal of the valve position is realized by CPU calculation processing. The piezo valve can release a short control pulse due to its small mass, thereby achieving high precision, and the piezo valve consumes air only when the valve is deviated and performing adjustment actions, so there is a low consumption.

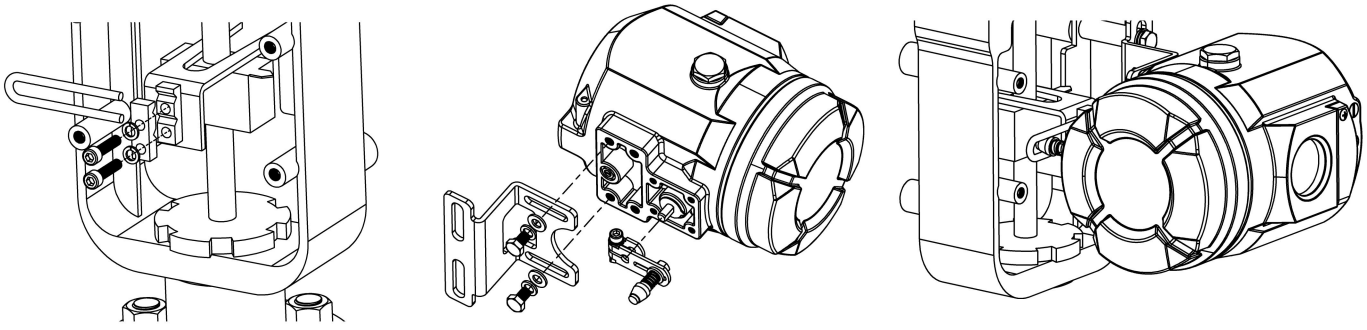
7 Mounting components

Linear actuator mounting components:

1. U-shaped rod*1
2. Clamping assembly*1
3. M6 hexagon socket screw*2
4. M6 spring washer*2
5. Feedback lever*1
6. M6 hexagon socket bolt*1
7. Linear mounting bracket*1
8. M8 hexagon head bolt*2
9. M8 spring washer*2
10. M8 flat washer*2



Ex ia linear type

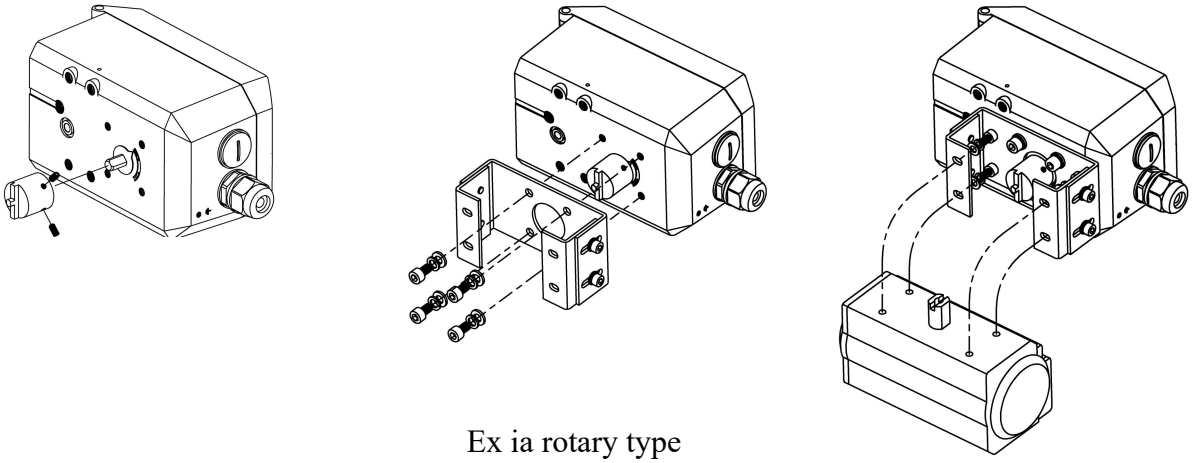


Ex d linear type

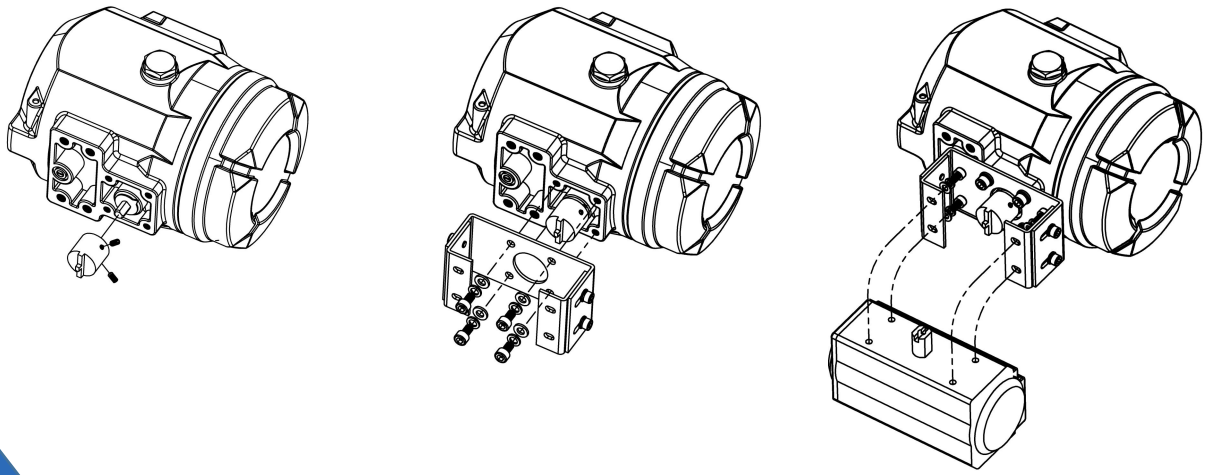
7 Mounting components

Linear actuator mounting components:

1. Adapter*1
2. Hexagon socket set screw*4
3. Rotary mounting bracket*1
4. M6 flat washer*4
5. M6 spring washer*4
6. M6 hexagon socket screw*4
7. M5 hexagon socket screw*4
8. M5 spring washer*4
9. M5 flat washer*4

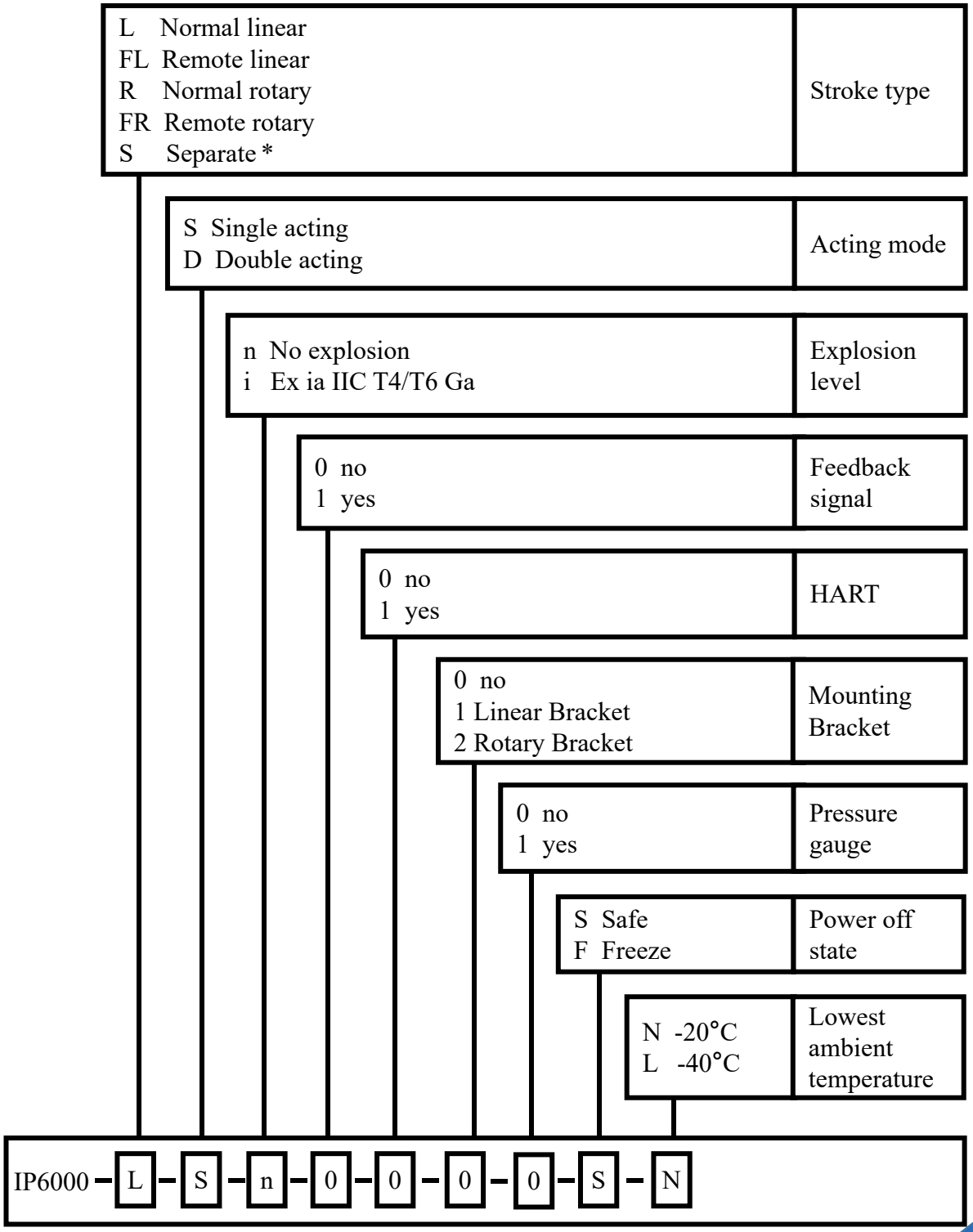


Ex ia rotary type



Ex d rotary type

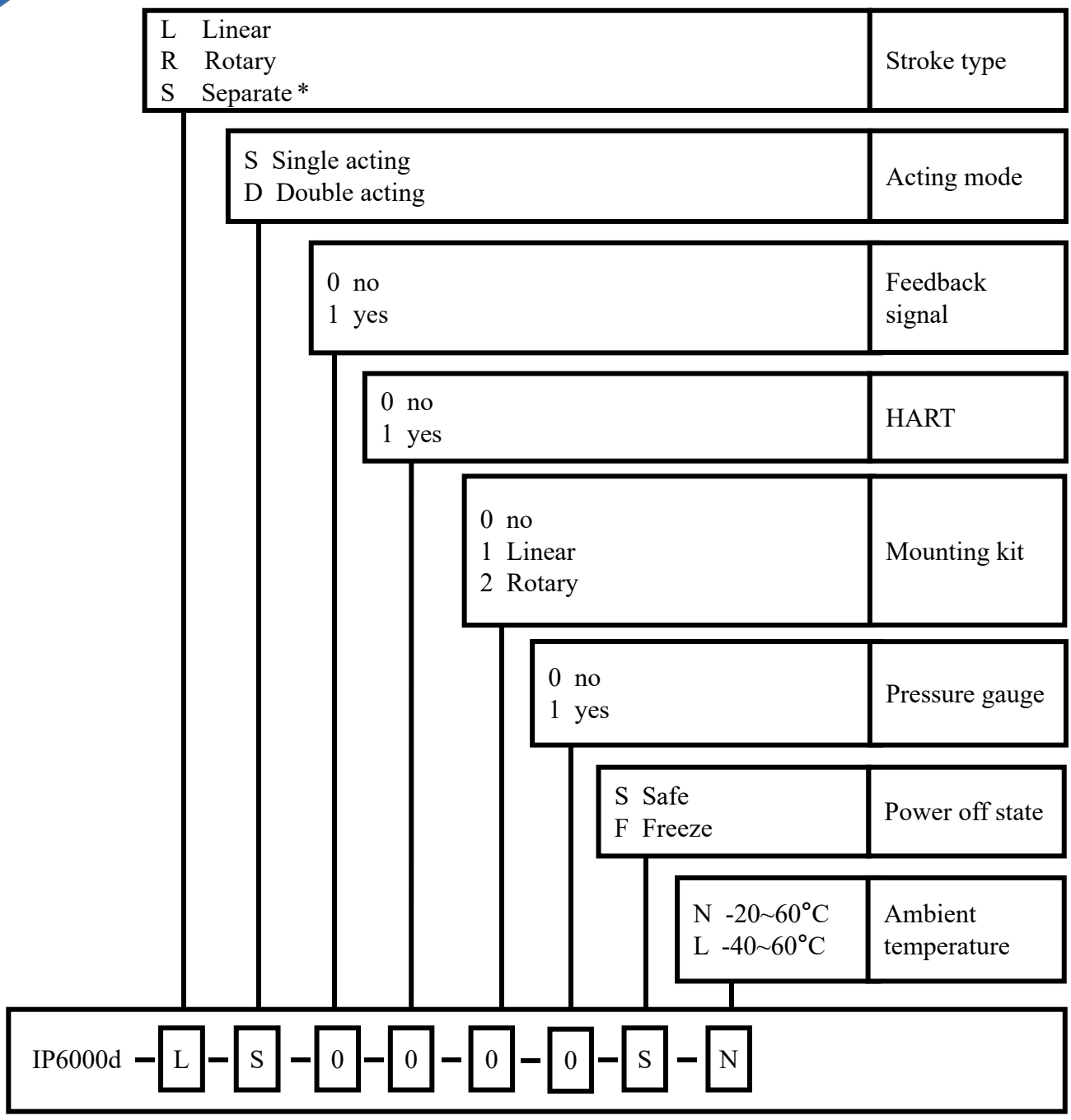
Technical specifications (Ex ia)



Remark:

In **Stroke type** options, the option **S** marked with * does not support **Lowest ambient temperature** option **L**.

Technical specifications (Ex d)



Remark:

In **Stroke type** options, the option **S** marked with * does not support **Lowest ambient temperature** option **L**.