

**PNEUMATIC POSITIONERS
PP981**

DESCRIPTION

The ADCATROL PP 981 positioner requires an input signal of 0,2÷1bar (3÷15psi) for proportional control actuator. The positioner compares the output signal from a controller with the position feedback, and varies a pneumatic output signal to the actuator accordingly. The actuator position is therefore guaranteed for any controller output signal and the effects of varying differential pressure.

MAIN FEATURES

- Independent adjustment of stroke range and zero.
- Adjustable amplification and damping.
- Split range up to 4-fold possible.
- Supply pressure up to 6 bar (90 psig).
- Low vibration effect in all directions.
- Mounting according to IEC 534, part 6 (NAMUR).
- Rotation adapter for angles up to 120 °.
- Ambient temperature -40 ... 80 °C (-40 ... 176 °F).
- Travel 8 to 100 mm (0.3 to 4 in).
- Angular range 30 ° to 120 °.
- Modular system of additional equipment
 - Electrical limit switches
 - Electrical position transmitter
 - Booster
 - Connection manifold
- Protection class IP54 (IP65 on request).
- Certificate No. 90/20226 (E2) Lloyd's Register of shipping for use on vessels.
- Base device: II 2 G c IIB/IIC T4/T6 according to Atex.
- When with electrical options:
II 2 G EEx ib/ia IIB/IIC T4/T6 according to Atex.



OPTIONS: Inductive limit switch, two wire system.
Inductive Limit Switch, three-wire system.
Limit switch assembly with Micro-switch.
Connection manifold with gauges.
Electrical position transmitter 4-20 mA.

AVAIL.
MODELS: PP981.

PNEUMATIC CONNECTIONS: Female G 1/8" ISO 228.

INSTALLATION: Any position.

TECHNICAL DATA

Input

Signal range 0.2 ... 1 bar (3 ... 15 psig)
 or split range down to $\square\Delta w$ 0.2 bar (3 psi)
 Stroke range 8 ... 100 mm (0.3 ... 4 in)
 Angular range
 linear 30° ... 120°
 equal percentage 90°; from 70° linear

Output

Output to actuator 0 ... 100 % supply air pressure

Supply

Supply air pressure 1.4 ... 6 bar (20 ... 90 psig)
 Supply air. free of oil, dust, water
 according to IEC 654-2

Ambient conditions

Ambient temperature -40 ... 80 °C (-40 ... 176 °F)
 Relative humidity up to 100 %
 Operating conditions
 as per IEC 654-1 The device can be operated
 at a class D2 location
 Transport and storage
 temperature -50 ... 80 °C (-58 ... 176 °F)
 Protection class IP 54 (IP 65 on request)

Materials

Base plate Aluminium (Alloy No. 230)
 finished with DD-varnish grey blue
 Cover. impact resistant polyester black or grey blue
 All moving parts of feedback system 1.4305 / 1.4571
 Mounting bracket 1.4301

Weight

single acting
 without gauges. approx. 0.7 kg (1.5 lbs)
 with gauges approx. 0.8 kg (1.8 lbs)
 double acting approx. 0.9 kg (2.0 lbs)
 attachment kit
 for diaphragm actuators approx. 0.3 kg (0.6 lbs)
 for rotary actuators approx. 0.5 kg (1.1 lbs)

Data measured according to VDI/DE 2177

1) Data based on following parameters:
 stroke 30 mm, feedback lever, effective length 117.5, max. amplification,
 supply air pressure 3 bar

2) measured at air supply 1.4 bar and 50 % of signal range

Response characteristic¹⁾

Amplification adjustable
 Sensitivity < 0.1 % F.S.
 Non-linearity (terminal based adjustment) < 1.0 % F.S.
 Hysteresis < 0.3 % F.S.
 Supply air dependency. < 0.2 % / 0.1 bar (1.5 psi)
 Temperature effect. < 0.3 % / 10 K

Air consumption

supply air pressure
 air consumption
 single acting
 1.4 bar (20 psig). 200 l_n/h (7.1 scfh)
 3.0 bar (45 psig). 400 l_n/h (12.4 scfh)
 6.0 bar (90 psig). 600 l_n/h (21.2 scfh)
 double acting
 1.4 bar (20 psig). 350 l_n/h (10.6 scfh)
 3.0 bar (45 psig). 550 l_n/h (17.7 scfh)
 6.0 bar (90 psig). 750 l_n/h (33.5 scfh)

Air output

Load effect 2) -3 % for delivery flow
 2 350 l_n/h (83 scfh)
 +3 % for exhausted flow
 1 900 l_n/h (67 scfh)

CAPACITY AT MAXIMUM DEVIATION				
AIR PRESSURE SUPPLY (bar)	1,4	2	4	6
Without booster (L _n /h)	2700	3500	5500	7500
With booster LEXG-FN/GN (L _n /h)	18000	24000	40000	55000
With booster LEXG-HN (L _n /h)	38000	48000	80000	110000

Gauges

Indicating range
 Input. 0 ... 1.6 bar (0 ... 23 psig)
 Output 0 ... 10 bar (0 ... 150 psig)
 Error limit class 1.6

ADDITIONAL EQUIPMENT

Inductive Limit Switch, two-wire system

Input Stroke / angle from actuator via positioner feedback lever

Output 2 inductive proximity sensors acc. to DIN 19 234 resp. NAMUR for connection to a switching amplifier with an intrinsically safe control circuit ^{1) 2) 3)}

Current consumption

Vane clear. > 3 mA

Vane interposed < 1 mA

for control circuit with the following electrical values

Supply voltage DC 8 V, R_i approx. 1 kOhms

Residual ripple < 5 %

Permissible line resistance < 100 Ohms

Response characteristic ⁶⁾

Gain continuously adjustable from 1:1 to approx. 7:1

Switching differential < 1 %

Switching point repeatability. < 0.2 %

Explosion protection ^{7) 8)}

Type of protection II 2 G EEx ib/ia IIB/IIC T4/T6

Certificate of conformity PTB 02 ATEX 2153

For operation in certified intrinsically safe circuits with the following maximum values:

U_{max} 16 V

I_{max} 25 mA

P_{max} 64 mW

Internal inductance 100 µH

Internal capacitance 30 nF

Ambient temperature

Temperature class T6 -40 ... 65 °C (-4 ... 149 °F)

T1 to T5 -40 ... 80 °C (-4 ... 176 °F)

1) For the standard version, one switching amplifier is required
For the security version a fail-safe switching amplifier for each inductive proximity sensor is required

2) Operating mode min. (= low) / max. (= high) selectable by adjustment of switch vanes

3) Operating mode normally closed circuit / normally open circuit selectable at switch amplifier output

4) Contact closed within the positive range

5) Contact open within the positive range

6) For feedback lever effective length of 117.5 mm, stroke 30 mm and maximum gain

7) National installation regulations must be observed

8) For retrofitting the product must be tested by a qualified inspector as a special version in accordance with ExeV.

Inductive Limit Switch, three-wire system

Input Stroke / angle from actuator via positioner feedback lever

Output 2 inductive proximity sensors, three-wire system, LED indication, contact, pnp ^{2) 4)}

Supply voltage U_S DC 10 ... 30 V

Residual ripple ± 10 %, U_S = 30 V

Switching frequency 2 kHz

Constant current 100 mA

Response characteristic ⁶⁾

Gain continuously adjustable from 1:1 to approx. 7:1

Switching differential < 1 %

Switching point

repeatability. < 0.2 %

Limit Switch Assembly with Micro-switches

Input Stroke / angle from actuator via positioner feedback lever

Output 2 micro switches ^{2) 5)}

Connected load, alternating current

Switching capacity. max. 250 VA

Switching voltage max. 250 V

Switching current with ohmic resistance max. 5 A

inductive resistance max. 2 A

Bulb, metal filament max. 0.5 A

CONNECTED LOAD, DIRECT CURRENT		
Switching voltage, max.	Ohmic load	Inductive load
V	A	A
30	5	3
50	1	1

Response characteristic ⁶⁾

Gain continuously adjustable from 1:1 to approx. 7:1

Switching differential < 2.5 %

Switching point

repeatability. < 0.2 %

Electrical Position Transmitter

Input Stroke / angle from actuator via positioner feedback lever

Sensor resistive precision conductive plastic element

Stroke range 15 ... 80 mm (0.6 ... 3.15 in)
 < 15 mm (0.6 in) on request

Angular range 60 ... 120 °

Output Two-wire system

Signal range 4 ... 20 mA

Permitted load. $R_{B \max} = \frac{U_s - 12V}{0.02A}$

(U_s = Supply voltage)

Power supply

Supply voltage DC 12 ... 36 V

Permitted ripple < 10 % p.p.

Supply voltage dependency < 0.2 %

Response characteristic¹⁾

Non-linearity with terminal based setting. < 1.0 % F.S.

Hysteresis < 0.5 % F.S.

External resistance dependency < 0.2 % / $\square \Delta R_{B \max}$

Temperature effect < 0.3 % / 10 K

Explosion protection^{2) 3)}

Type of protection II 2 G EEx ib/ia IIB/IIC T4/T6

Certificate of conformity PTB 02 ATEX 2153

For operation in certified intrinsically safe circuits with the following maximum values:

U_{\max} T4: 30 V; T6: 22 V

I_{\max} T4: 130 mA ; T6: 66 mA

P_{\max} T4: 0,9 W ; T6: 0,5 W

Internal inductance 9 μ H

Internal capacitance to earth 10 nF or 6 nF differential

Ambient temperature

Temperature class T6 -40 ... 40 °C (-40 ... 104 °F)

T5 -40 ... 55 °C (-40 ... 131 °F)

T4 -40 ... 80 °C (-40 ... 176 °F)

1) For feedback lever effective length of 117.5 mm (4.63 in) and stroke 30 mm (1.28 in)

2) National installation regulations must be observed

3) For retrofitting, the product must be tested by a qualified inspector as a special version in accordance with ElexV

4) Except manifold with gauges

5) Without explosion protection

6) -40 ... 80 °C (-40 ... 176 °F) for the fail-safe version of inductive limit switch

Common Data⁴⁾

Ambient conditions

Ambient temperature^{5) 6)} . . -25 ... 80 °C (-13 ... 176 °F)

-40 ... 80 °C (-40 ... 176 °F)

Relative humidity up to 100 %

Operating conditions as per IEC 654-1 The device can be operated at a class D2 location

Transport and storage

Temperature. -40. 80 °C (-40.....176 °F)

Protection class IP 54 (IP 65 on request)

Electrical connection

Line entry 1 or 2 cable glands M20x1.5 (others with Adapter AD-...)

Cable diameter. 6 to 12 mm (0.24 to 0.47 in)

Screw terminals Screw terminals for wires up to 2.5 mm² (AWG 14)

Materials

Base plate Galvanized steel

Control vane. Aluminium

Setting mechanism Fibre glass-reinforced polyamide

Electromagnetic compatibility EMC

Operating conditions. industrial environment

Immunity according to

- NAMUR recommendation NE21 fulfilled

- EN 61 326 fulfilled

- EN 61 000-6-2 fulfilled

Emission according to

- EN 55 011,

Group 1, Class A fulfilled

- EN 61 000-6-2 fulfilled

CE marking

Electromagnetic compatibility 89/336/EWG

Low voltage regulations . . w/o Ex: 73/23/EWG fulfilled

(with Ex: not applicable)

Safety

as per DIN EN 61010-1 (DIN IEC 61010-1)

(VDE 0411 part 1). safety class III

over voltage category 1

internal fuses none

external fuses. Limitation of power supplies

for fire protection has to be observed due to EN 61010-1

9.3. ff