

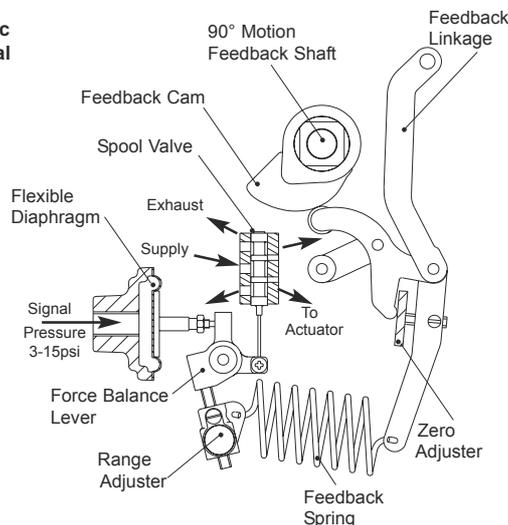


Operation

The AP Positioner is designed to drive a rotary or linear actuator to a position set by a 3-15 psi (0.2 to 1.0 bar) signal and hold it there until the signal changes. When a signal pressure is applied to the diaphragm it moves the force balance lever clockwise against the tension of the feedback spring. This moves the spool valve, supplying air pressure to one side of the actuator while exhausting trapped air from the other side. The feedback shaft follows the movement of the actuator and turns the cam counter clockwise, pushing the cam follower and increasing the tension on the feedback spring until it balances the forces on the diaphragm and moves the spool valve to its hold position.

The input signal and desired position is determined by the cam profile. A cam giving 0-90° output movement linearly proportional to a 3-15 psi (0.2-1.0 bar) signal is standard, and almost any desired characteristic can be supplied to order; if it cannot be found in the list of existing options contact Kinetrol.

Schematic Functional Diagram



The AP positioner moves an actuator to a position set by a 3-15psi control signal and holds it there. Its features are:

- **Fast, smooth, accurate response**
- **Simple, all-mechanical function for unbeatable reliability**
- **Three flow options to optimise control on all actuator sizes**
- **Universal application**
The unit can be mounted in any orientation on to any quarter-turn or linear application
- **Easy set up**
Quick calibration and reversal of rotational sense (clockwise and counter clockwise) without special tools or parts change
- **ATEX CAT 1 / IECEx approved versions available**
- **Easily retrofitted integral module options include:**
 - Two wire 4-20mA angle retransmit (inside the same case)
 - Mechanical or inductive limit switches (general or hazardous areas)
 - 4-20mA I/P convertors (general or hazardous areas)
 - Clear Cone visual position indicator (general or hazardous areas)
 - DIN plug option for retransmit connection
 - Low (-40°C) and high (100°C) temperature versions available
 - Fail hold options available
 - Choice of mount options - see opposite
- **Weatherproof, compact and robust metal housing**
- **Vibration and shock resistant to 4G**
- **Built in ports for signal air supply and gauge connections**
- **ATEX CAT 2 Exd switch option available**



The AP positioner can be directly mounted on standard Kinetrol models 05, 07, 08, 09, 10, 12, 14 and 15 actuators, both double acting and spring return, giving an assembly with no external plumbing, wiring or mechanical connections and the best in direct backlash free control. Mount kits are available for models 16, 18, 20 and 30.

Alternatively, discrete versions mount on any actuator using VDI/VDE 3845 NAMUR drive, or Kinetrol male square with mounting brackets. Neat adaptations for linear cylinders are also available - consult Kinetrol for details.

Specification

Air Supply	instrument quality (dry, clean, oil free) 3.5 to 7 bar, (50 psi to 100 psi) standard. Consult Kinetrol for low pressure application
Signal	3-15psi (0.2-1.0 bar) standard. Consult Kinetrol for split range, 6-30 psi etc.
Control Response	0-90° linear output standard. Consult Kinetrol for other characteristic cam options
Sensitivity	better than 0.7% of span*
Hysteresis	better than 0.7% of span*
Deviation from linearity	less than 1% of span*
Flowrates @ 5.5 bar	AP: 3.3 scfm (93nl/min) MP: 10.0 scfm (283nl/min) HP: 27.0 scfm (764nl/min)
Operating Temperature Range	-20° to +80°C Standard -20° to +100°C High Temp -40° to +80°C Low Temp
Weight	2.8 kg/6.2 lb
Materials	<ul style="list-style-type: none"> case and cover - zinc alloy spool and liner - stainless steel diaphragm: <ul style="list-style-type: none"> - reinforced polyurethane (standard) - fluorocarbon rubber (high temp) - silicone rubber (low temp) feedback spring - steel
Dimensions	see page 54
Finish	epoxy stove enamel
Enclosure Rating	IP54
Output Torque	same as double acting or spring return actuator. When controlling fast movement of inertia loads consult Kinetrol

* These refer to the combination of Kinetrol actuator with AP positioner - not just the positioner performance

Maximum Vibration Tolerance 4G, 100Hz

I/P Converter Options see page 19

Travel Times

Maximum velocity (no load) at 80psi 5.5 bar

Model	05	07	08	09	10	12	12*
Deg/Sec	180	90	53	45	33	25	32

Model	14	14*	15	15*	16*	18*	20*
Deg/Sec	10.6	13.8	6.0	7.5	22.5	11.3	5.6

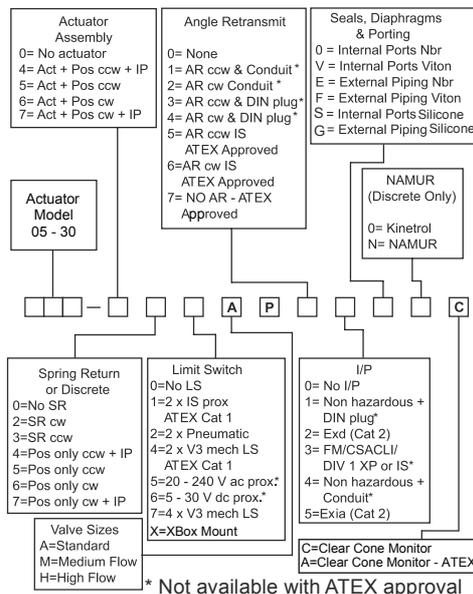
*Externally piped

Cam Options

Giving typical control characteristics. Contact Kinetrol for details of other options or see TD112.

Input Control		Electrical Signal	Output Movement	Characteristic	Cam No.
Air Signal					
3-15 psi 0.2-1.0 bar	4-20mA	0-90°	Linear	5-1A	
3-9psi 0.2-0.6 bar	4-12mA	0-90°	Linear	5-2A	
6-12 psi 0.4-0.8 bar	8-16mA	0-90°	Linear	5-3A	
9-15psi 0.6-1.0 bar	12-20mA	0-90°	Linear	5-4A	
3-15 psi 0.2-1.0 bar	4-20mA	0-60°	Linear	5-5A	
3-15 psi 0.2-1.0 bar	4-20mA	0-45°	Linear	5-6A	
3-15 psi 0.2-1.0 bar	4-20mA	0-90°	Proportional Flow	5-7A	
3-9 psi 0.2-0.6 bar	4-12mA	0-90°	Proportional Flow	5-8A	
9-15 psi 0.6-1.0 bar	12-20mA	0-90°	Proportional Flow	5-22A	
3-12 psi 0.2-0.8 bar	4-16mA	0-90°	Linear	5-13A	
9-15 psi 0.6-1.0 bar	12-20mA	0-60°	Linear	5-14A	

Ordering Codes



* Not available with ATEX approval

*A Valve is supplied with all sizes up to and inc' 09
*M Valve is supplied with 10-15
*H Valve is supplied with sizes 16-30

UNLESS SPECIFICALLY REQUESTED OTHERWISE Recommended spring unit for model 14 actuator is 4900 type. This should be coded 12□49AP or 13□49AP instead of the usual 12□AP or 13□AP. The same applies to other specially coded spring assemblies.

For more information see KF-391





The optional Kinetrol I/P Controller is mounted in place of the standard diaphragm housing on the side of the positioner case. The positioner can still be mounted in any orientation and gives an angular output position which is proportional to the input current control signal between 4-20mA.

The 4-20mA signal is converted to an air pressure by a coil and magnet and flapper valve arrangement. This air pressure controls the positioner in the normal way.

Zero and range adjustment is done within the positioner in the same way as with a standard pneumatic positioner. No adjustment is necessary within the I/P Controller. The cover is removed only to connect the two wires - this is not necessary with the DIN plug option.

I/P Controller - Hazardous Area

Kinetrol offers various optional I/P converters which are explosion proof or intrinsically safe certified for use in ATEX Zones 1 & 2 or NEC and CSA CLASS I DIVISION 1. They are mounted directly onto Kinetrol AP positioners with integral air supply.

ATEX certificated as follows:

Explosion proof

Ex II 2G Ex d IIB+H2 T6 Ta= -40°C to 75°C

Ex II 2D Ex td A21 IP65 T85°C Ta= -40°C to 75°C

Intrinsically safe

Ex II IG Ex ia IIC T4 Ta= -55°C to 85°C

For FM Approved version - contact Kinetrol



Specification - Safe Area

Electrical Control Signal	4-20mA
Coil Impedance	20 ohms typical
Cable Entry	16mm conduit or gland (mini DIN plug, IP 65 with Pg9 cable gland, 6-8mm dia optional)
Air Supply	80 psi/5.5 bar nominal
Air Entry	G ¹ / ₈ (fitted with 6mm pipe dia. push in connector)
Weight	1.2 kg
Dimensions	see page 54
Linearity	1.5%*
Hysteresis	less than 1%*
Sensitivity/Deadband	less than 1%*
Supply Pressure Influence	0.2% per psi between 80 and 60 psi
Quiescent Air Consumption	3.5 l/min free air max
Working Temperature Range	-20°C to 80°C

Instrument quality dry, clean air obligatory (Class 6.4.4 ISO8573.2001)

* These refer to the combination of Kinetrol actuator with I/P controller - not just the positioner performance

Specification - Hazardous Area

Electrical Control Signal	4-20mA
Input Resistance	260 ohms at 24°C
Cable Entry	Exd - M20 x 1.5 conduit entry FM/CSA - 1/2 NPT conduit entry
Air Supply	50-100 psi/3.5 to 7 bar
Air Entry	Exd (AP & MP) G ¹ / ₄ (1/4 NPT) (HP) G ³ / ₈ (3/8 NPT)
Working Temperature	-40°C to 75°C for Exd -55°C to 85°C for Exia

Instrument quality dry, clean air obligatory (Class 3.4.4 ISO 8573.1)