

GE Energy

Masoneilan* 8012/8013 Series Electro-pneumatic Transducers

fact sheet

Excellent Dynamic Response and Positioning Accuracy

Accurate, Simple, Rugged

The primary function of a valve positioner is to ensure that the control valve plug position is always proportional to the value of the controller output signal, regardless of packing box friction, diaphragm actuator hysteresis, or out-of-balance forces on the valve plug. The controller output signal may be pneumatic or electric, depending on the type of positioner.

GE's Masoneilan 8012 and 8013 Series cam positioner is a force-balance electro-pneumatic device which, by directly comparing valve position with a controlled DC output signal, provides excellent dynamic response and positioning accuracy. One multi-lobe cam provides field-changeable linear- or percentage-control characteristics without additional parts.



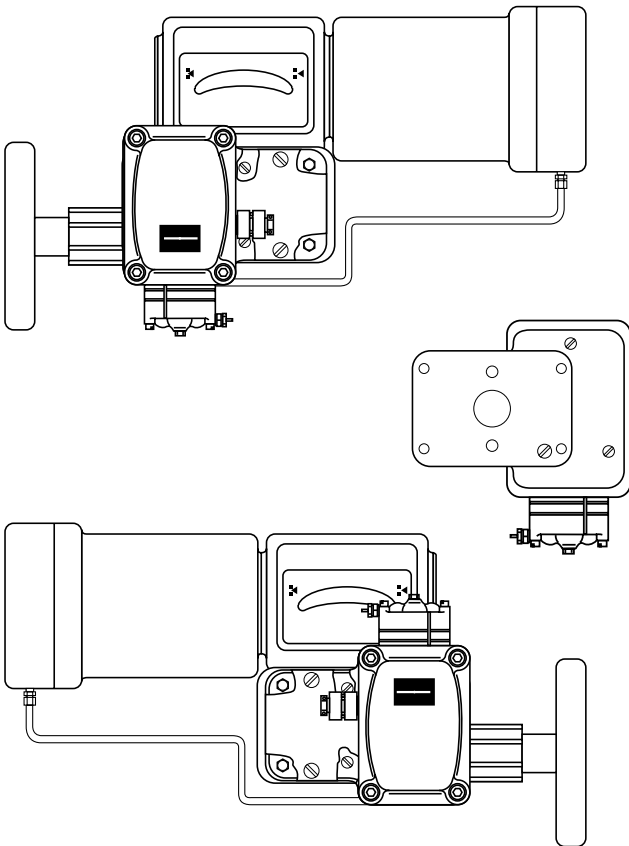
8012/8013 Series Electro-pneumatic Transducers

Operation

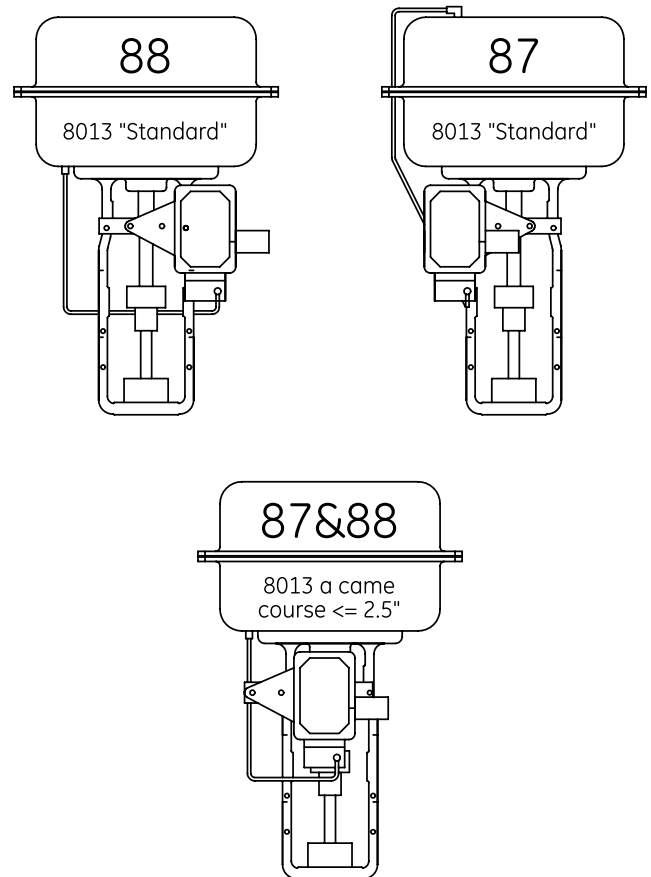
The 8013 Series electro-pneumatic cam positioner is able:

- To change the valve action (increase in electrical signal opens or closes the valve)
- To change control characteristics (linear or equal-percentage)
- To operate each of two control valves (split-range)

The 8013 Series positioner is available for either direct action (increase in electrical signal increases output pressure) or reverse action (increase in electrical signal decreases output pressure). In addition, the positioner provides an accurate means of split-ranging controller output signal for sequential operation of two control valves by a single controller.



8013 Series cam positioner mounted on Camflex II (similar on Minitork II and 31000 Series)

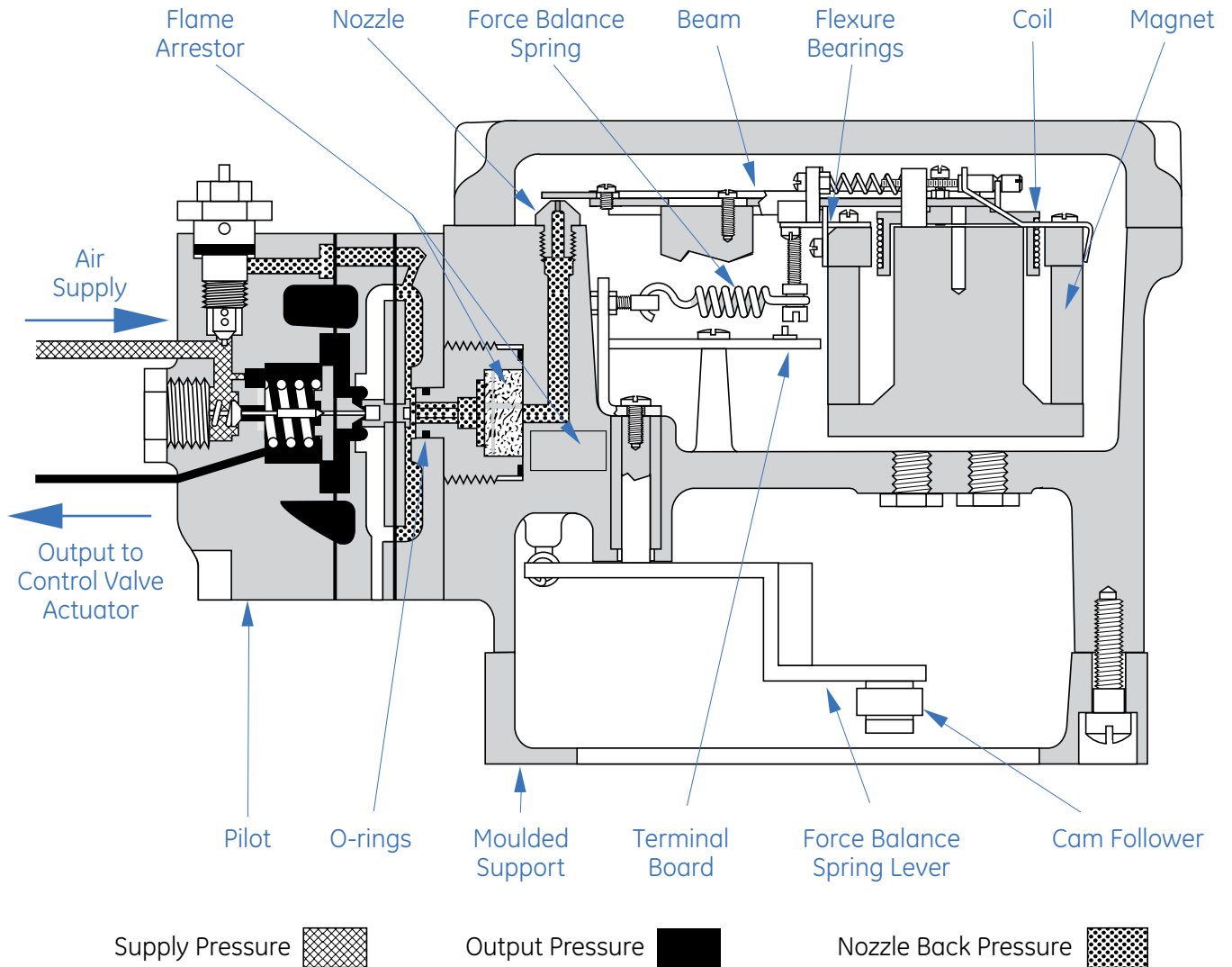


8013 Series positioner mounted on 87/88 multi-spring actuator

Description

Sectional View of Positioner

The installation in hazardous area locations must be in accordance with applicable safety standards



Housing: The cast aluminum case is mounted at the front of the device by means of a mounting plate and a molded support.

Beam and flexure bearings: Beryllium copper flexure bearings provide friction-free fulcrum points for the beam.

Pilot: High-capacity type for fast stroking speeds. The metering tube for the nozzle air supply is equipped with a clean-out plunger.

Cam: Only one cam can be provided, depending on the selected lobe, equal-percentage or linear (and linear split-range) control characteristics. Linkage and associated backlash problems are essentially eliminated by mounting the cam directly to the end of the plug shaft (rotary valves) or the actuator stem (reciprocating valves).

Electrical circuit: The 8013 Series electro-pneumatic positioner can be supplied or easily adapted to accommodate the DC output signals of nearly all the electric controllers presently available. The coil is impregnated with an insulating material.

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Any variation in the output signal of an electro-pneumatic controller causes the coil to produce a force on the beam, moving the flapper to cover or uncover the nozzle.

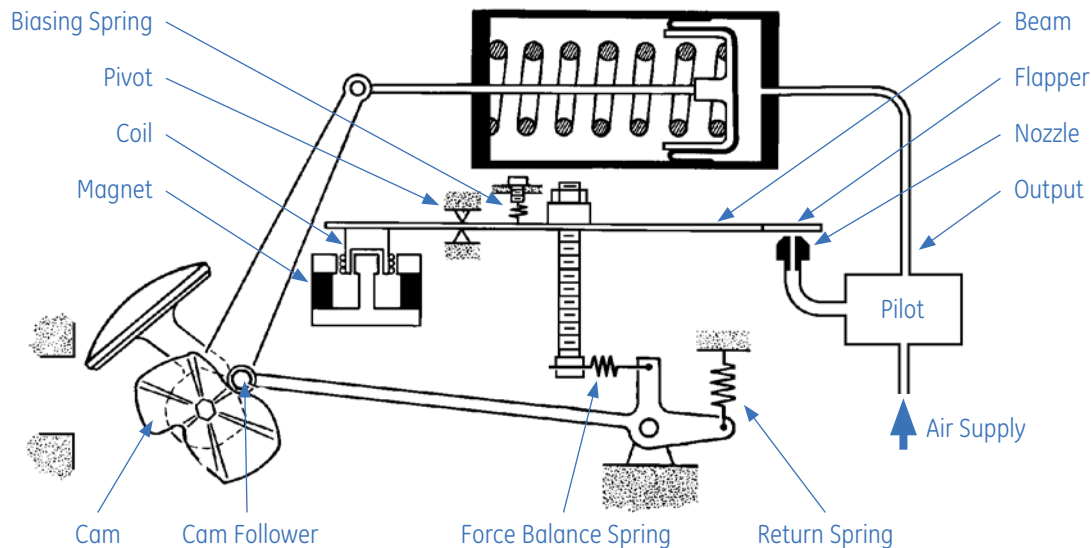
The modification in nozzle back pressure causes, through the pilot, a variation of output pressure to the control valve actuator. An increase in electrical signal increases output pressure in direct action and decreases output pressure in reverse action.

The resultant plug motion is transmitted through the positioner lever to the force-balance spring, extending or

compressing the spring until the force exerted by it on the beam balances the opposing force of the coil.

The system is then in equilibrium, and positioner output is stabilized at the necessary level to maintain the desired valve plug position. When the forces on the beam are in equilibrium, there is theoretically no flow of air into or out from the pilot.

Actually, a small bleed is provided between supply and output to increase pilot responsiveness when at equilibrium.



Operation on Camflex II (similar on Minitork II and 31000 Series)

Hazardous Environment Approvals

ATEX Approvals (94/9/EC Directive)

Explosion-proof:

- II 2 G/D EEx d IIB + H2
- T6 (Tamb. = -20°C to +68°C)
- T5 (Tamb. = -20°C to +80°C)
- IP 65 T100 (Ta +80°C)

Intrinsic safety:

- II 1 G/D EEx ia IIC
- T6 (Tamb. = -55°C to +40°C)
- T4 (Tamb. = -55°C to +80°C)
- IP 65 T125 (Ta +80°C)

FM Approvals (Factory Mutual)

Explosion-proof:

Class I, Div 1, Groups B, C and D

Dust ignition-proof:

Class II, Div 1, Groups E, F and G

Suitable for Class III, Div 1

Nema 4X

General Data

Performance Characteristics

Air supply:

1.4 to 5.2 bar (20 to 75 psi) depending on the valve size and actuator action.

Air consumption and output:

Supply	bar	1.4	2.4	5.2
	psi	20	35	75
Maximum consumption (steady state)	st.m3/h	0.40	0.55	0.85
	Scfm	0.24	0.33	0.51
Maximum air output (steady state)	st.m3/h	4.5	8.0	18
	Scfm	2.7	4.8	10.8

Supply pressure influence:

0.3 to 0.7 percent of output pressure for 100 mbar supply pressure change (0.2 to 0.5 percent per psi) depending on supply pressure.

Air connections:

1/4" NPT

Ambient temperature operating range:

- Standard instrument: -20°C to +80°C (-5°F to +175°F)
- Low temperature instrument: -50°C to +60°C (-60°F to +140°F)

Note: refer also to the marking of the apparatus.

Performance data:

The performance of a complete valve (i.e. the valve and its packing, actuator, positioner, and accessories) depends upon the specific performance of each component. The performance data given below, in average value in percentage of the input span, concerns Camflex* II, Minitork* II, and 87/88 multi-spring actuators equipped with a standard 8013 positioner.

- Hysteresis at mid stroke: 0.8 percent max
- Sensitivity: 0.3 percent max

Electromagnetic compatibility:

Compliance with 2004/108/EC Directive

Weight:

3.5 kg (7.5 lbs)

Electrical Characteristics

Typical circuit resistance is 216 ohm for an input D.C. signal of 4 to 20 mA.

The circuit is available for most current signals such as:

Input D.C. signal	Positioner input resistance	
	ohms	
mA	8013 model	8012 model
1-5	2753	NA
4-20	216	173
10-50	105	104
Other signals	On request	

Note: for intrinsically safe apparatus, 4-20 mA & 216/273 ohms only.

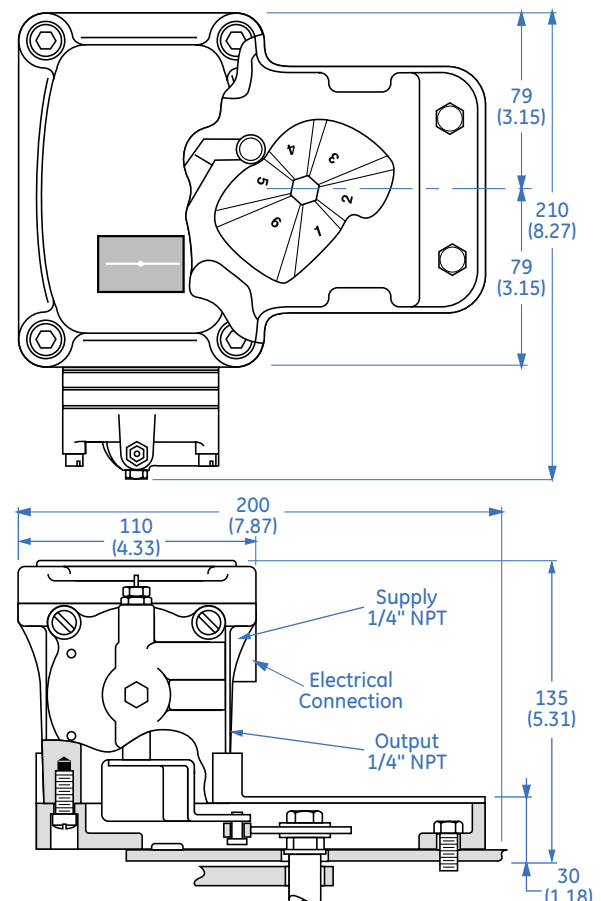
Zero adjustment:

Vernier screw.

Span adjustment:

Tension adjustment on force balance spring.

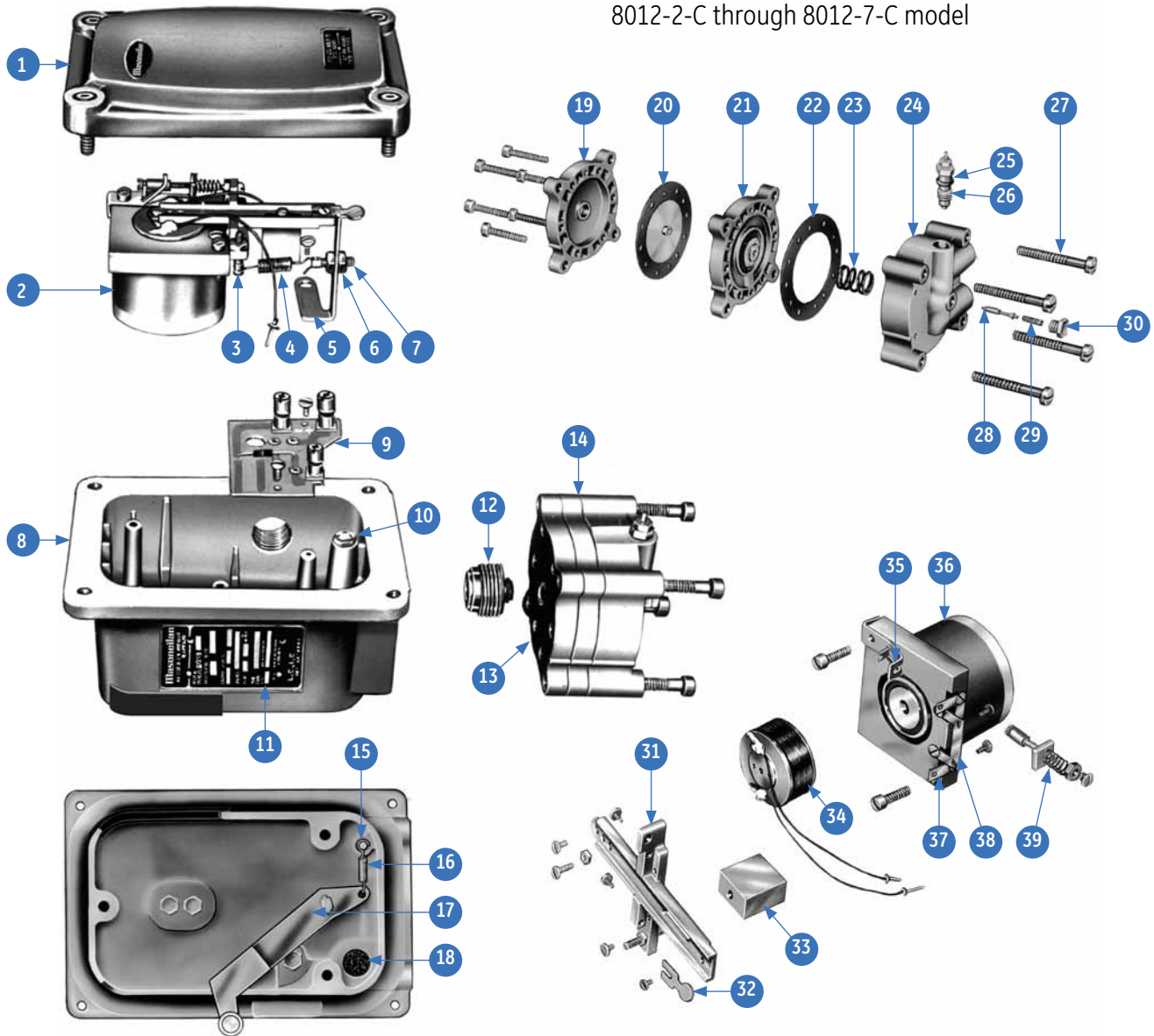
Dimensions in mm (inches)



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Construction and Part Reference

8012-2-C through 8012-7-C model



1	Cover	14	Relay	27	Mounting screw (relay)
2	Magnet S/A	15	Groove pin	28	Relay plug
3	Adjusting screw	16	Spring (stroke adj.)	29	Spring
4	Spring (force balance)	17	Sleeve bearing	30	Holding screw
5	Spring lever	18	Flame arrestor	31	Beam
6	Locking nut	19	Cap	32	Flapper
7	Adjusting screw	20	Diaphragm S/A	33	Weight
8	Case	21	Bellofram plate S/A	34	Coil S/A
9	Terminal board S/A	22	Gasket	35	Spring bracket
10	Nozzle	23	Spring	36	Magnet S/A
11	Serial plate	24	Relay body	37	Flexure bearing
12	Adapter (flame arrestor)	25	O-ring	38	Flexure bearing
13	Gasket	26	Metering tube S/A	39	Biasing spring

Numbering System

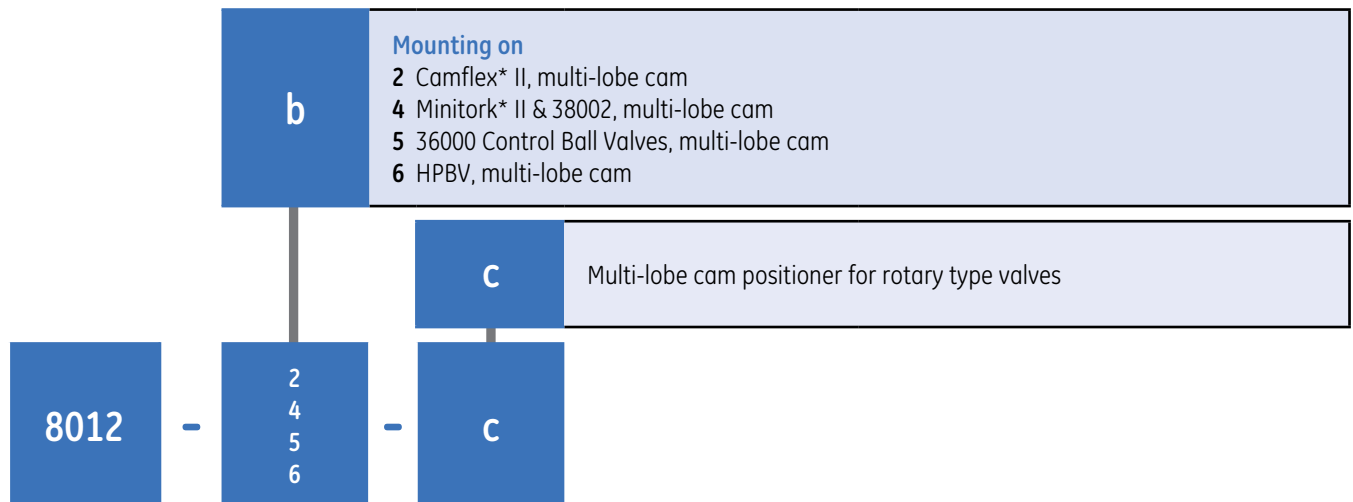
US design with FM approvals

Linear positioner for axial actuators:

Series Identification 8012

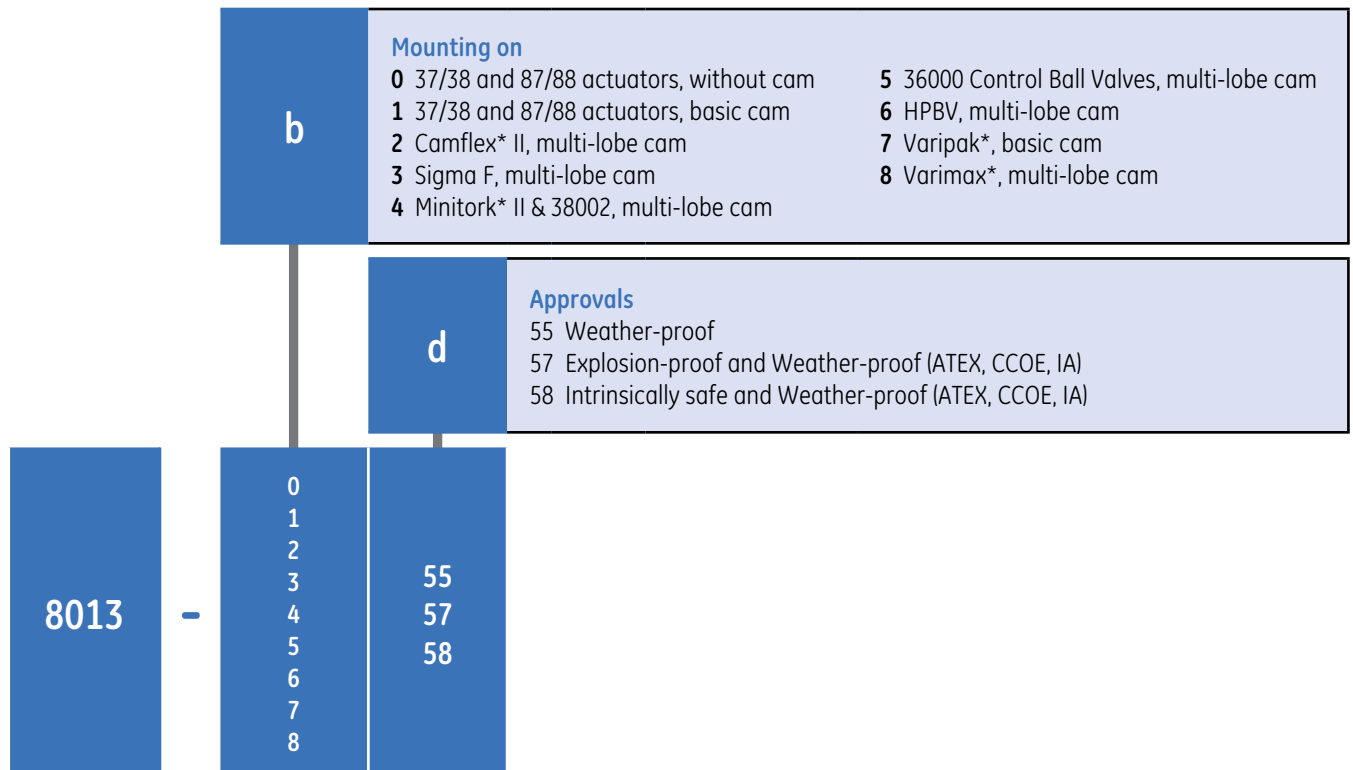
Multi-lobe cam positioner for rotary type valves:

Series Identification 8012-b-c



European design with ATEX, CCOE and IA approvals

Series Identification 8013-bd



DIRECT SALES OFFICE LOCATIONS

BELGIUM

Phone: +32-2-344-0970
Fax: +32-2-344-1123

BRAZIL

Phone: +55-11-2146-3600
Fax: +55-11-2146-3610

CHINA

Phone: +86-10-8486-4515
Fax: +86-10-8486-5305

FRANCE

Courbevoie
Phone: +33-1-4904-9000
Fax: +33-1-4904-9010

GERMANY

Ratingen
Phone: +49-2102-108-0
Fax: +49-2102-108-111

INDIA

Mumbai
Phone: +91-22-8354790
Fax: +91-22-8354791

New Delhi

Phone: +91-11-2-6164175
Fax: +91-11-5-1659635

ITALY

Phone: +39-081-7892-111
Fax: +39-081-7892-208

JAPAN

Chiba
Phone: +81-43-297-9222
Fax: +81-43-299-1115

KOREA

Phone: +82-2-2274-0748
Fax: +82-2-2274-0794

MALAYSIA

Phone: +60-3-2161-0322
Fax: +60-3-2163-6312

MEXICO

Phone: +52-5-310-9863
Fax: +52-5-310-5584

THE NETHERLANDS

Phone: +0031-15-3808666
Fax: +0031-18-1641438

RUSSIA

Veliky Novgorod
Phone: +7-8162-55-7898
Fax: +7-8162-55-7921

Moscow

Phone: +7 495-585-1276
Fax: +7 495-585-1279

SAUDI ARABIA

Phone: +966-3-341-0278
Fax: +966-3-341-7624

SINGAPORE

Phone: +65-6861-6100
Fax: +65-6861-7172

SOUTH AFRICA

Phone: +27-11-452-1550
Fax: +27-11-452-6542

SOUTH & CENTRAL

AMERICA AND THE CARIBBEAN
Phone: +55-12-2134-1201
Fax: +55-12-2134-1238

SPAIN

Phone: +34-93-652-6430
Fax: +34-93-652-6444

UNITED ARAB EMIRATES

Phone: +971-4-8991-777
Fax: +971-4-8991-778

UNITED KINGDOM

Wooburn Green
Phone: +44-1628-536300
Fax: +44-1628-536319

UNITED STATES

Massachusetts
Phone: +1-508-586-4600
Fax: +1-508-427-8971

Corpus Christi, Texas

Phone: +1-361-881-8182
Fax: +1-361-881-8246

Deer Park, Texas

Phone: +1-281-884-1000
Fax: +1-281-884-1010

Houston, Texas

Phone: +1-281-671-1640
Fax: +1-281-671-1735

California

Phone: +1-562-941-7610
Fax: +1-562-941-7810



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