

**BETTIS®**

# WellGuard™ PWG-IO Pneumatic Piston Actuator With Internal Override

Actuation for  
API 6A and 6D  
through conduit  
gate valves.

For shut down  
(reverse acting)  
or blow down  
(direct acting)  
applications.

  
**EMERSON™**  
Process Management

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## The Company

Bettis has been providing quality valve actuation and control for more than 40 years, establishing itself as a pioneer and innovator in this industry, with products specifically engineered to your application. Today, as part of Emerson Process Management, we are the world's leading independent manufacturer of pneumatic and hydraulic valve actuators. Bettis products are used in almost every facet of the energy industry – oil and gas production, pipeline and processing. Our facility near Houston, Texas has more than 145,000 square feet of manufacturing capacity. We also operate modern manufacturing facilities in Edmonton, Canada; Mansfield, Ohio; and Esbjerg, Denmark. We have been awarded the ISO 9001 designation indicating full compliance with worldwide standards for quality and documentation.

## General Description

The WellGuard™ PWG-IO Piston range of pneumatic Control Fluid Powered linear actuators with internal manual overrides from Bettis Canada Ltd. is designed to be used in conjunction with Bettis valve bonnets to provide open and close control for major brands of API 6A through conduit reverse acting gate valves fitted to oil and gas wellheads and production flow lines. These actuators can also be used with API 6D and ANSI B16.34 valves where the bonnets are built to the Bettis design.

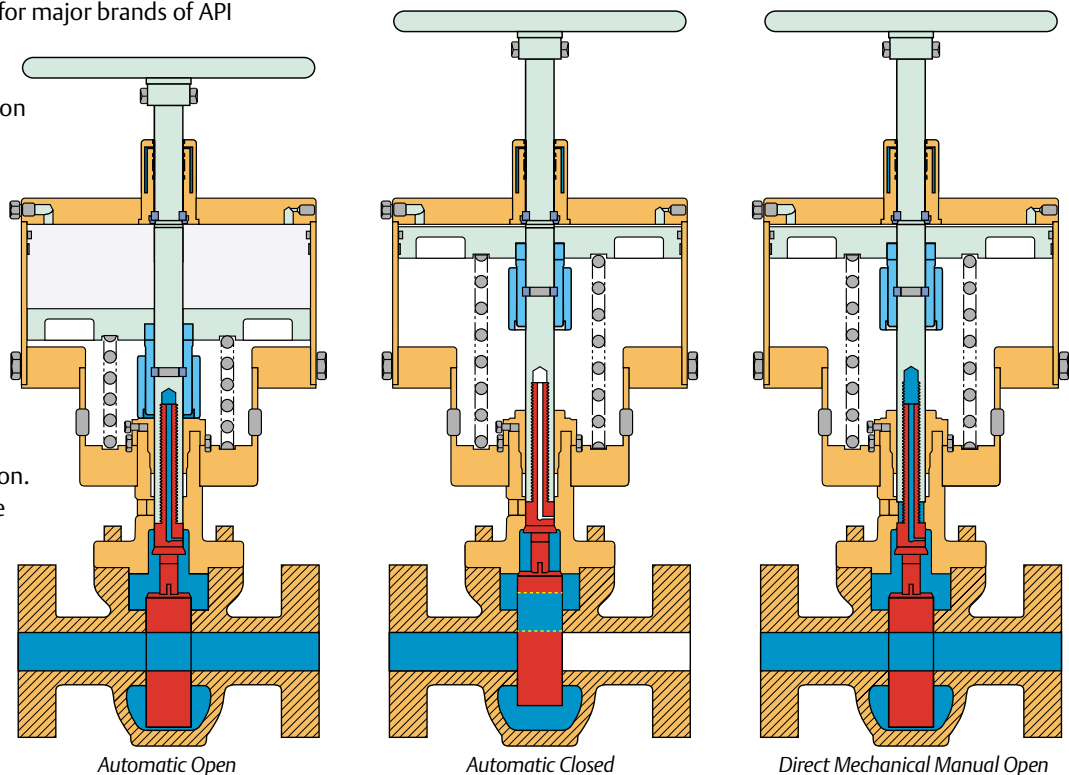
Suitable for onshore locations and ideal for use in H<sub>2</sub>S and CO<sub>2</sub> applications, the Bettis PWG-IO range of piston actuators provides a simple and reliable valve automation solution. These actuators will be available in 10" and 14" diameters, suitable for valve sizes 1-13/16" thru 2-9/16".

## Operating Principle

Valve actuation is achieved by applying a low pressure (maximum 250 psig) pneumatic control pressure to a piston in a closed housing thereby exerting a force which compresses a spring and extends a valve stem. This action is designed to open a reverse acting gate valve (or close a directing acting gate valve).

The valve is returned to its fail position upon venting the piston pressure. The actuator ensures that a fail position is achieved through the use of valve body pressure acting on the valve stem diameter assisted by coiled springs. The springs provide rapid and reliable valve shutdown when there is little or no valve body or flow-line pressure available. When manually operated, the actuator functions as a manual valve and will remain open until manually closed.

The Bettis PWG-IO actuator can be supplied to API 6A SDV and BDV to meet the quality assurance and test requirements of API 6A and Q1. The standard actuator can be supplied to meet the NACE MR0175-2000 requirements (optional).



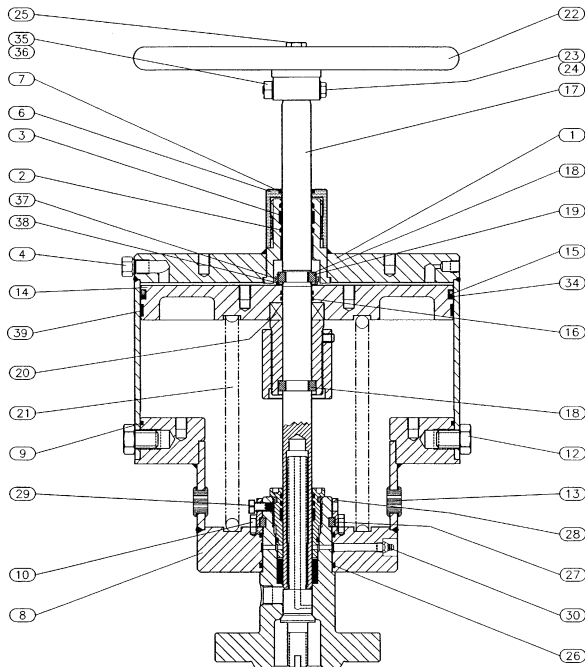
## Features and Benefits

The simple and reliable design of the PWG-IO provides a range of features when actuated pneumatically:

- **Sour Service** – Compatible with both sweet and sour (NACE MR0175-2000) control fluids.
- **Visual Indication** – The shaft of the actuator extends through the top of the housing, with dual stem seals to provide local visual indication of valve position.
- **Maintenance** – The simple and reliable design allows quick and simple maintenance without the need of any specialized tools.
- **Reliability** – Springs provide reliable and quick shutdown assistance when flowline pressure is low or not available.
- **Compliance** – Certified for API 6A PR-1 applications. Valve/actuator packages can be supplied for PSL-1 to 3 applications.
- **Protection** – Integral, tamper resistant relief valve protects actuator from over-pressurization.

- Suitable for operation over a wide temperature range:  
**Actuator** -20°F (-29°C) to +150°F (+65°C),  
**Bonnet** -20°F (-29°C) to +250°F (+121°C), (for most sizes).
- **Internal Override** – Comes complete with internal manual override.

*When manually opened, the PWG-IO operates like a manual valve and must be manually closed. When operated manually, there is no visual position indication.*



Notes: (Y) Recommended spare parts  
 (N) Not shown  
 Housing Capscrews (12) shown 15° from true orientation  
 Spring Spirol Pins (11) shown 45° from true orientation  
 Shown in closed position  
 Bonnet parts shown but not listed

ITEM	DESCRIPTION	MATERIAL	QTY	NOTE
1	CYLINDER	A350-LF2/A106-B/XYLAN	1	
2	O-RING, HUB	NITRILE	2	(Y)
3	GUIDE (PART #505-031)	DELTRIN	1	(Y)
4	OVERPRESSURE PROTECTION DEVICE	BRASS	1	
5	WARNING LABEL, RELIEF	VINYL	1	(N, Y)
6	THREAD PROTECTOR	DELTRIN	1	
7	WIPER	URETHANE	1	(Y)
8	LOWER HOUSING	A106-B/A36/XYLAN	1	
9	O-RING, FLANGE	NITRILE	1	(Y)
10	SPIROL COIL PIN, RETAINER	SS 302	2	
12	MODIFIED CAPSCREW	SS 304	12	
13	VENT GROMMET	EPDM	2	(Y)
14	PISTON	A516-70/XYLAN	1	
15	O-RING, PISTON	NITRILE	1	(Y)
16	O-RING, UPPER STEM	NITRILE	2	(Y)
17	UPPER STEM	17-4PH	1	
18	SPLIT RING, STEM	17-4PH/NITRIDE	2	
19	RETAINER RING, SPLIT RING	SS 302	1	
20	THRUST BEARING	STEEL	1	(Y)
21	SPRING	5160/XYLAN	1	
22	HANDWHEEL	D.I.	1	
23	CAPSCREW, SHEAR	HXHC SS 304	1	
24	FLATWASHER, SHEAR	WSHS SS 304	1	
25	CAPSCREW, HANDWHEEL	HXHC SS 304	1	
26	O-RING, MOUNTING PLATE	NITRILE	2	(Y)
27	SPLIT RING, RETAINER	17-4PH	1	
28	RETAINER, SPLIT RING	17-4PH	1	
29	RETAINER CAPSCREW	HXHC SS 304	1	
30	VENT/LUBE FITTING	SS 304	1	
31	WARNING LABEL, SPRING	VINYL	1	(N, Y)
32	NAMEPLATE (PART #700-100)	SS 304	1	(N)
33	NAMEPLATE DRIVE SCREW (PART #700-99)	SS 301	4	(N)
34	BACK UP RING, PISTON	NITRILE	1	
35	NUT, CAPSCREW	SS 304	1	
36	LOCK WASHER, NUT	SS 304	1	
37	RETAINER, SPLIT RING	A564	1	
38	FLAT WASHER	BRASS	1	
39	GUIDE PISTON	DELTRIN	1	

## Thrust Characteristics

ACTUATOR MODEL	INITIAL NET THRUST OUTPUT EQUATION (LB)	PRESSURE (PSIG)	INITIAL NET THRUST OUTPUT (Lb)
P1 X 10 X 3 X 3 GVO-PWG-IO	80 P-600	75	5,400
		100	7,400
		125	9,400
		150	11,400
		250	19,400
P1 X 14 X 3 X 3 GVO-PWG-IO	140 P-600	75	9,900
		100	13,400
		125	16,900
		150	20,400
		250	34,400

## Actuator Specifications

	STANDARD SERVICE		OPTIONAL
<b>Max. Control Pressure</b>	250 PSIG	17.24 BARG	
<b>Production Test Pressure</b>	375 PSIG	25.81 BARG	
<b>Operating Temp. Range</b>	-20° TO +150°F	-29° TO +65°C	
<b>Actuator Model</b>	<b>Weight (Lb)</b>	<b>Weight (Kg)</b>	
P1 X 10 X 3 X 3 GVO-PWG-IO	175	80	
P1 X 14 X 3 X 3 GVO-PWG-IO	250	114	
<b>API 6A Monogramable</b>	<b>Control Fluid Powered, PR 1</b>		NACE

## Dimensions

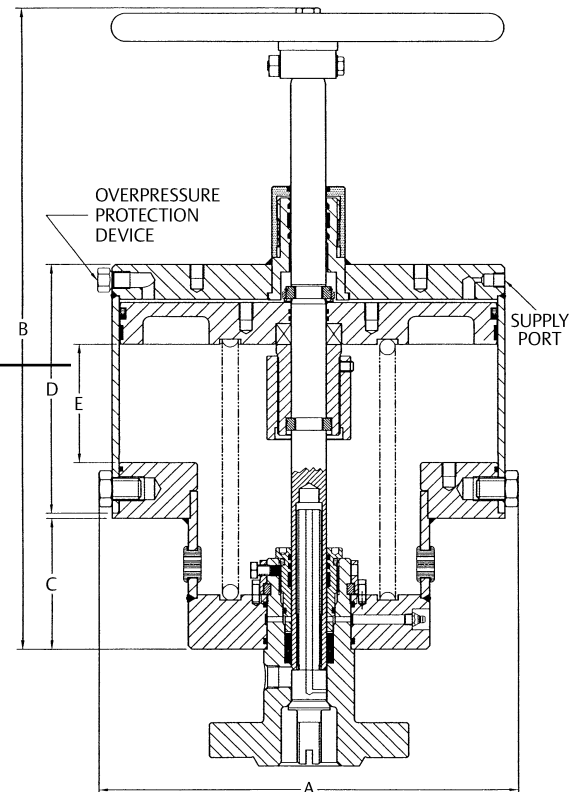
ACTUATOR MODEL	MAXIMUM STROKE	DIMENSION					WEIGHT (LB)
		A	B	C	D	E	
P1 X 10 X 3 X 3 PWG-IO	3.88	11.7	23.0	4.7	9.0	4.2	175
P1 X 14 X 3 X 3 PWG-IO	3.88	15.0	23.0	4.7	9.0	4.2	250

Dimensions in inches.

Supply Port Thread: 1/4 NPT

Relief Valve Port Thread: 5/8 NF-LH

Note: Weight is typical and does not include bonnet or line valve.



## Valve Bonnet Specifications

VALVE BONNET ASSEMBLY				
<b>Operating Temp. Range</b>	-20° TO +250°F	-29° TO +121°C		
<b>Bonnet Size and Pressure Rating</b>	<b>Bonnet Weight (Lb)</b>	<b>Bonnet Weight (Kg)</b>	<b>Temp. Class</b>	<b>API Trim Class</b>
1-13/16, 10,000	TBA	TBA	P thru V	AA, BB, CC, DD, EE, FF
1-13/16, 15,000	TBA	TBA	P thru V	AA, BB, CC, DD, EE, FF
2-1/16, 2,000 – 5,000	TBA	TBA	P thru V	AA, BB, CC, DD, EE, FF
2-1/16, 10,000	TBA	TBA	P thru V	AA, BB, CC, DD, EE, FF
2-9/16, 2,000 – 5,000	TBA	TBA	P thru V	AA, BB, CC, DD, EE, FF
2-9/16, 10,000	TBA	TBA	P thru V	AA, BB, CC, DD, EE, FF
<b>Bonnet in Conformance with API 6A</b>		<b>PSL 1, 2, or 3</b>		<b>PR 1</b>

## Service Conditions Reference Guide

MATERIAL CLASS	CLASSIFICATION, APPLICATION
AA	General Service, non-corrosive
BB	General Service, slightly corrosive
CC	General Service, moderate to high corrosive
DD	Sour Service, non-corrosive
EE	Sour Service, slightly corrosive
FF	Sour Service, moderate to high corrosive
HH	Very corrosive

TEMP. CLASS	MINIMUM AMBIENT TEMP.	MAXIMUM PROCESS TEMP.
K	-75°F (-60°C)	+180°F (+82°C)
L	-50°F (-46°C)	+180°F (+82°C)
P	-20°F (-29°C)	+180°F (+82°C)
R	+70°F (+21°C)	+70°F (+21°C)
S	0°F (-18°C)	+150°F (+66°C)
T	0°F (-18°C)	+180°F (+82°C)
U	0°F (-18°C)	+250°F (+121°C)
V	+35°F (+2°C)	+250°F (+121°C)
X	0°F (-18°C)	+350°F (+177°C)

## API Certification Number 6A-0397

Bettis Canada is authorized to use the official API monogram on Actuators and Bonnets for Surface Safety Valves manufactured and assembled under API Specification 6A for Valve and Wellhead equipment.

ISO 9001



Cert. Num. 93-13  
**Bettis Canada Ltd.**  
 Edmonton, Alberta



API 6A Specification

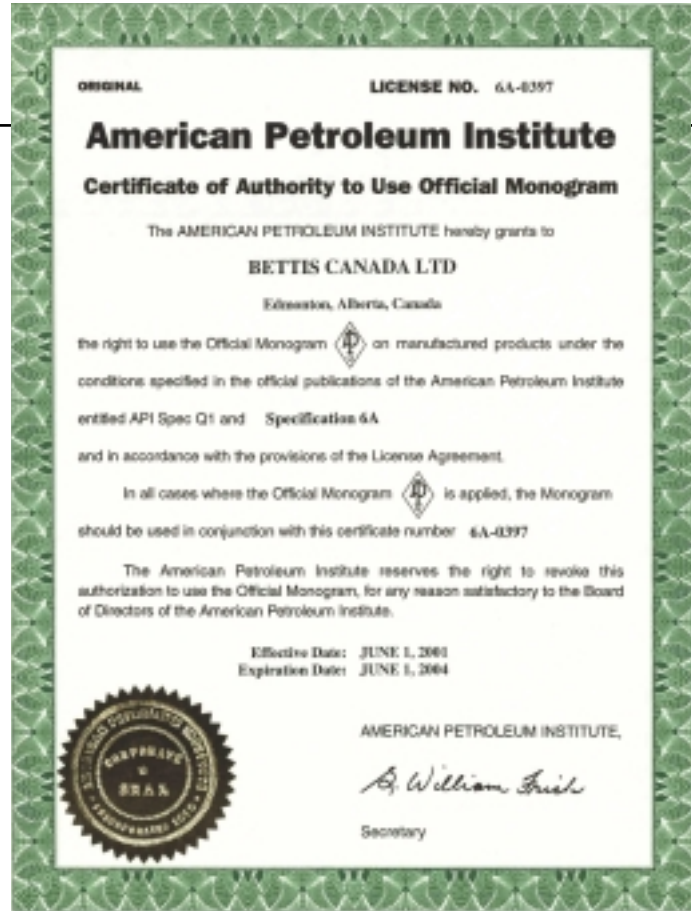
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**Important:** Due to Emerson's continuing commitment to engineered product advancement, data presented herein is subject to change.

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