NEMA Pressure Controls

	
Bulletin	**836**
Description	Style A – Pressure Controls (Internal Bellows) Style C – Pressure Controls (External Bellows)
Typical Applications	• Air Compressors • Compressed Air Monitor Systems • Liquid Level Control • Vacuum Transfer Systems • High Pressure Alert • Low Pressure Alert • Monitor Low and High Pressure
Operating Range	30 in. Hg vacuum to 900 psi
Max. Shaft Operating Speed	–
Enclosure Options	Open, Type 1, 4X, 4 & 13, 7 & 9 and 4 & 13
Differential	Independently adjustable
Repeat Accuracy	+/- 0.5%
Maximum Operating Limit	up to 1300 psi
Electrical Contacts	–
Electrical Ratings	–
Ambient Operating Temperature	-22…+150 °F (-30…+66 °C)
Ambient Storage Temperature	-22…+200 °F (-30…+93 °C)
Contact Ratings (Std.)	• Non-Inductive – 5 A, 240V / 3 A, 600V • Control Circuit – AC-125 VA, 24…600V DC-57.5 VA, 115…230V
Accessories/Modifications	Pulsation Snubbers, Specialty Contacts, Pilot Light Indicators, Quick Connects
Certifications	• UL & CSA (Standard Application and Haz Loc) • CE (Standard Application)
Product Selection	**Page 13-4**

NEMA Ratings and Test Values for AC Control Circuit Contacts at 50 or 60 Hz

NEMA Contact Rating Designation	Thermal Continuous Test Current [A]	Maximum Current [A]								VA	
		120V		240V		480V		600V			
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	10	60	6.00	30	3.00	15	1.50	12	1.20	7200	720
B600	5	30	3.00	15	1.50	7.50	0.75	6	0.60	3600	360
B150	5	30	3.00	—	—	—	—	—	—	3600	360

NEMA Pressure and Temperature Controls

		
Bulletin	**836T**	**837**
Features	• Independently adjustable trip and reset settings • Heavy-duty bellows or piston-style actuator • High reliability, snap-action silver contacts • On-machine style enclosure with removable access cover	• Independently adjustable trip and reset settings • Heavy-duty bellows-type actuator • High reliability, snap-action silver contacts • Direct immersion or remote bulb and capillary sensing elements
Operating Range	30 in. Hg vacuum to 5000 psi	-60…+570 °F (-51.1…298.9 °C)
Differential	Independently adjustable	Independently adjustable
Repeat Accuracy	• Bellows (+/-1%) • Piston without seal (+/-3%) • Piston with seal (+/-5%)	+/- 2 °F (+/- 16.7 °C)
Maximum Operating Limit	up to 15 000 psi	up to 600 °F (315.6 °C)
Actuator Type	• Style T – Bellows and Piston types available	• Style A/H/V – Bellows
Enclosure Options	Type 1/4/13, 7 & 9 and 4 & 13	Open, Type 1, 4 & 13, 7 & 9 and 4 & 13
Ambient Operating Temperature	-22…+150 °F (-30…+66 °C)	-22…+150 °F (-30…+66 °C)
Ambient Storage Temperature	-22…+200 °F (-30…+93 °C)	-22…+200 °F (-30…+93 °C)
Contact Ratings (Std.)	• 2 Circuit – NEMA A600 • 4 Circuit – NEMA B150	• Non-Inductive – 5 A, 240V / 3 A, 600V • Control Circuit – AC-125 VA, 24…600V DC-57.5 VA, 115…230V
Accessories/ Modifications	Pulsation Snubbers, Pilot Light Indicators, Quick Connects	Custom Capillary Lengths & Materials, Pilot Light Indicators, Quick Connects
Certifications	• UL & CSA (Standard Application and Haz Loc) • CE (Standard Application)	• UL & CSA (Standard Application and Haz Loc) • CE (Standard Application)
Product Selection	**Page 13-34**	**Page 13-48**

Bulletin 803 Rotating Cam Limit Switches — Renewal Parts



Bulletin 803 Style F

Contact Blocks

The following are the contact blocks offered for the Bulletin 803 Style A, B, and F.

Contact Blocks for Style A, B, and F	
Description	Cat. No.
Style A Contact Block	WX110280
Style B Contact Block	WX265557
Style F Contact Block	WX286260

Cam Kits

The following are the cam kits offered for the Bulletin 803 Style P.

Cams for Style P			
	Adjustable Degrees of Dwell		Cam Kit❄
Cam Code Designator	N.C. Contact Opens	N.O. Contact Remains Closed	Cat. No.
3	27…33°	327…333°	803-NK33
4	33…39°	321…327°	803-NK34
5	38…49°	311…322°	803-NK35
6	48…69°	291…312°	803-NK36
7	68…109°	251…292°	803-NK37
8	108…189°	171…252°	803-NK38
9	148…269°	91…212°	803-NK39
0	188…349°	11…172°	803-NK40

❄ Kit includes two cam and mounting hardware for one circuit.



Bulletin 836 — Pressure Controls, General Industrial

- Operating ranges from 30 in. Hg vacuum…900 psi
- Independently adjustable range and differential
- Copper alloy and stainless steel bellows
- 7/16-20 S.A.E. and 1/4 in. N.P.T. connections
- Variety of contact blocks available
- Open Type, Type 1, Type 4&13, Type 4X and Type 7&9 and 4&13 combination enclosures

Standards Compliance

UL 508
UL 698 (Haz. Loc.)
UL 1604 (Haz. Loc.)
CSA 22.2 No. 14
NEMA ICS-2
IEC 529/IP2X

Certifications

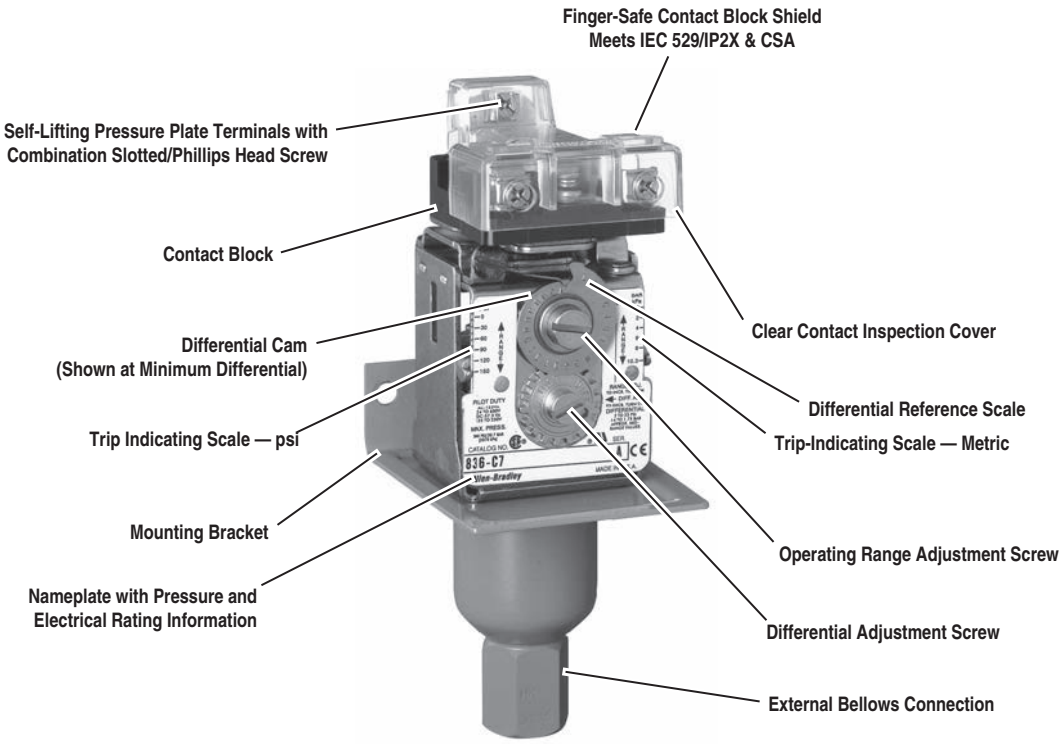
(For file and guide numbers, see the table below)

Table of Contents

Product Overview ..... this page
Technical Data 13-6
Product Selection 13-10
Modifications 13-14
Accessories 13-15
Factory Options 13-17
Refrigeration Controls 13-18
Approximate Dimensions 13-21

File and Guide Numbers

	UL		CSA	
	File Number	Guide Number	File Number	Class
Bulletin 836	E14842	NKPZ	LR1234	3211-03
	E53048 (Haz. Loc.)	NOWT	LR11924 (Haz. Loc.)	3218-05
	Hazardous Location Enclosure not CE compliant. All other enclosed devices are CE compliant			



Description

Bulletin 836 Pressure Controls are designed for general industrial use to control and detect pressure. Allen-Bradley Bulletin 836 Pressure Controls can be used in pneumatic and hydraulic systems. Pressure controls use copper alloy or stainless steel bellows. The design and high-quality components provide long life operation with air, water, oil, non-corrosive liquids, vapors, gases, and some corrosive liquids and gases.

Pressure controls feature snap-action precision switches equipped with silver contacts. The straight in-line and relatively friction-free construction provides accurate and consistent operation regardless of the angle at which the controls are mounted. Pressure controls are designed for easy adjustment of both trip and reset pressures.

Allen-Bradley Bulletin 836 Pressure Controls are used in many types of industries and applications. They can be used to control pneumatic systems, maintaining preset pressures between two values. Pressure controls can be used to detect overpressures of gases or liquids to protect machines, processes, and personnel. They can also be used to detect low pressures to protect equipment from loss of coolants and lubrication.

Bulletin 836 Pressure Controls are offered in a variety of styles to meet a wide range of applications. The devices are available in Type 1, 4 & 13, 4X, 7 & 9, and 4 & 13 combined and open type without enclosure for panel mounting. Pressure controls have a wide variety of contact modifications to meet most control circuit requirements. The controls have adjustable pressure ranges from 30 in. Hg vacuum…900 psi with corresponding differentials. Accessories and modifications are available to tailor the device to meet most application requirements.

Style A — Small Size, Internal Copper Alloy Bellows



Style A

- Independently adjustable range and differential
- 7/16-20 SAE flare for 1/4 in. copper tubing connection
- Adjustable operating range — 30 in. Hg vacuum…375 psi
- Maximum line pressure — up to 750 psi
- Occasional surge pressure — up to 850 psi

Style C — Wider Ranges, External Bellows



Style C

- Independently adjustable range and differential
- 1/4 in N.P.T. female pipe connection
- 3/8 in N.P.T. female pipe connection (836-C1 and 836-C1A only)

Copper Alloy Bellows

- Adjustable operating range — 30 in. Hg vacuum…900 psi
- Maximum line pressure — up to 1300 psi
- Occasional surge pressure — up to 1600 psi

Type 316 Stainless Steel Bellows

- Adjustable operating range — 30 in. Hg vacuum…375 psi
- Maximum line pressure — up to 650 psi
- Occasional surge pressure — up to 650 psi

Refrigeration Controls - See page 13-19



Style H

- High-pressure refrigeration controls

Style L

- Low-pressure refrigeration controls

Style P

- High-pressure definite purpose controls

Technical Terms

Adjustable operating range — Total span within which the contacts can be adjusted to trip and reset.

Trip setting — Higher pressure setting at which value the contacts transfer from their normal state to a changed state.

Reset setting — Lower pressure setting at which value the contacts return to their normal state.

Adjustable differential — Difference between the trip and reset values.

Minimum differential — When the differential is set to the lowest pressure difference between trip and reset.

Maximum differential — When the differential is set to the widest pressure difference between trip and reset.

Maximum occasional surge pressure — Maximum surge pressure that can be applied to the actuator. Surges or transients can occur during startup and shutdown of a machine or system. Expressed in milliseconds, complex electronic instrumentation is required to measure the varying amplitude, frequency, and duration of this wave form. Extreme surges that occur approximately eight times in a 24-hour period are negligible.

Maximum line pressure — Maximum sustained pressure that can be applied to the bellows without permanent damage. The control should not be cycled at this pressure.

Positive pressure — Any pressure more than 0 psi. See Figure 2.

- **Trip setting —** Increasing pressure setting when contacts change state.
- **Reset setting —** Decreasing pressure setting when contacts return to their normal state.

Vacuum (negative pressure) — Any pressure less than 0 psi, inches of Hg vacuum. See Figure 2.

- **Trip setting —** Decreasing vacuum setting when contacts change state.
- **Reset setting —** Increasing vacuum setting when contacts return to their normal state.

psi — Pounds per square inch. Devices listed are in gauge pressure units which use atmospheric pressure as a reference. Atmospheric pressure at sea level is approximately 14.7 psi or 30 in. Hg.

Operating range adjustment acrew — This screw is used to adjust the trip setting by varying the force of the main spring.

Differential adjustment screw — This screw is used to adjust reset setting by varying the force of the differential blade spring.

Pressure media — There are many types of pressure media that are controlled. Examples include air, water, hydraulic fluids and other types of gases and liquids. The type of media and maximum system pressure will determine the type of actuator used for the pressure control application. See page 13-9.

Pressure connection — Common types of pressure connections used in control systems are 1/4 in. and 3/8 in. female pipe threads, and 7/16 in. — 20 SAE copper tubing.

Contact configuration — There are many types of contact configurations available. Bulletin 836 Style A and C pressure controls offer a wide variety of contact configurations for both automatic operation and manual reset. See page 13-14.

Figure 1
Graphics to illustrate technical terms

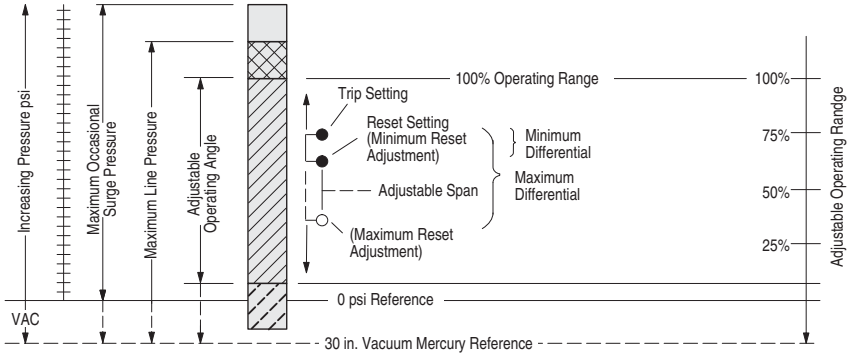
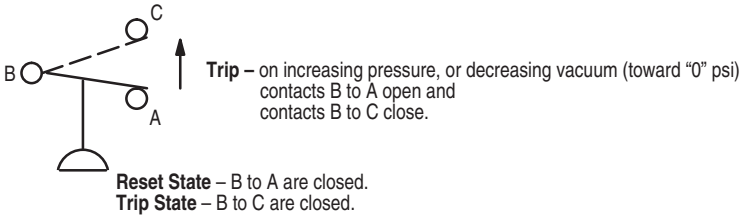


Figure 2
Positive pressure or vacuum



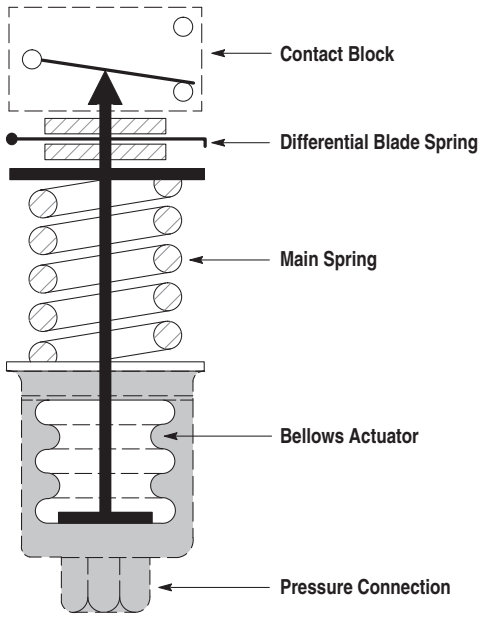
Theory of Operation

Bulletin 836 Pressure Controls are designed to open or close electrical circuits in response to changes in pneumatic (air or gas) or hydraulic (water or oil) pressure. Figure 3 is a simplified drawing of a pressure control.

The system pressure is connected to the control at the pressure connection. The system pressure is applied directly to the bellows. As pressure rises, the bellows exerts force on the main spring. When the threshold force of the main spring is overcome, it transfers the motion to the contact block, causing the contacts to actuate — this is referred to as the trip setting. As pressure decreases, the main spring will retract, causing the secondary differential blade spring to activate and return the contacts to their normal state — this is referred to as reset setting.

Varying the force of the main spring (by turning the operating range adjustment screw) determines where the contacts will trip. Varying the force of the secondary differential blade spring (by turning the differential adjustment screw) determines where the contacts will reset.

Figure 3
Basic mechanical structure



Applications for Control

Pressure controls can be used to either control or monitor a machine or process. Figure 4 shows a typical control application. Here, pressure is controlled within predetermined high and low values. Figure 5 shows a typical monitoring application. Here, pressure is monitored between a high and low value, signaling when a preset limit has been exceeded.

Figure 4
Typical control application

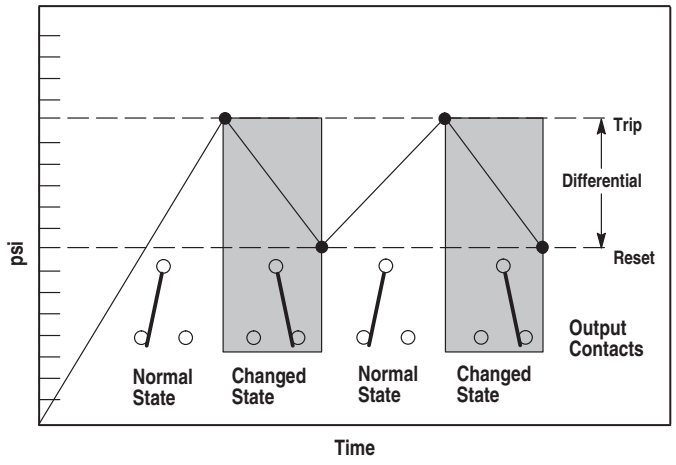
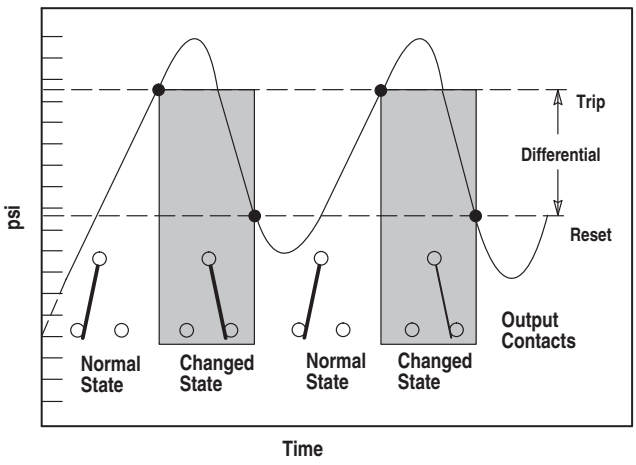


Figure 5
Typical monitoring application



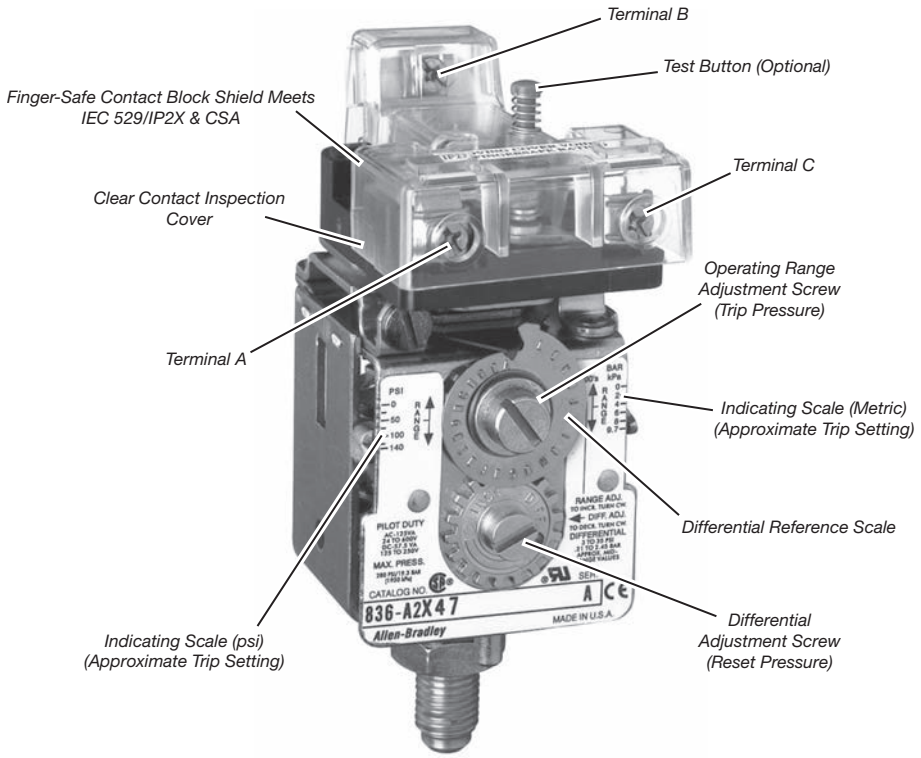
Control Settings

Allen-Bradley controls are designed for ease of setting to help minimize installation time. Standard controls shipped from the factory are set at the maximum operating range and minimum differential. By following this simple two-step process, the control can be set to the specific requirements for each application. See Figure 6.

Step 1 — Adjust trip setting
The trip setting is achieved by turning the operating range adjustment screw. Turn the range screw counterclockwise to lower the trip setting, or clockwise to raise the trip setting. The approximate trip setting is shown on the indicating scale.
Note: Turning the operating range adjustment screw will change both the trip and reset settings in virtually equal increments.

Step 2 — Adjust reset setting
The reset setting is achieved by turning the differential adjustment screw counterclockwise to increase the differential, or clockwise to decrease the differential.
Note: Adjusting the differential has little or no affect upon the trip setting.

Figure 6
Trip and reset adjustment

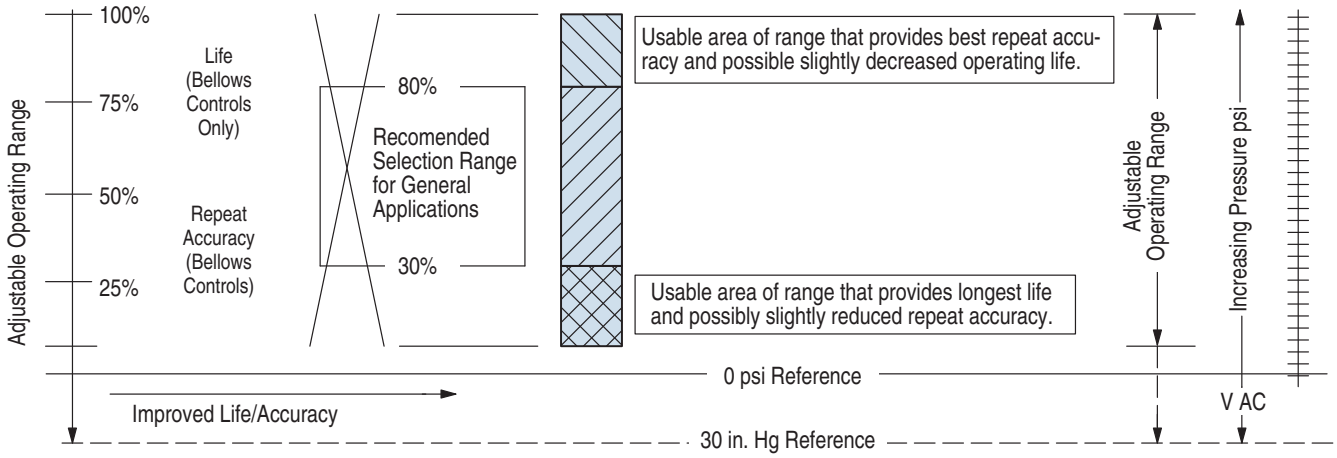


Repeat Accuracy and Mechanical Life

The design and construction of Bulletin 836 Styles A and C controls provide a typical repeat accuracy of + 0.5% or better. Repeat accuracy is based on percent of maximum range, evaluated from test data and calculated using the formula per ICS 2-225 standards.

Repeat accuracy and mechanical life of bellows type controls is graphically illustrated in Figure 7. For general applications, controls selected where the contacts operate between 30…80% of the operating range and where the maximum line and surge pressures do not exceed the specified values will provide excellent life and repeat accuracy. For more specific applications, it is important to note that the controls are designed to operate **below** or **above** these values. However, there may be a small trade-off between the factors of repeat accuracy and mechanical life.

Figure 7
Repeat accuracy versus mechanical life graph



Ordering Bulletin 836 Pressure Controls

When ordering Bulletin 836 Pressure Controls, consider the following:

- Device style
- Adjustable operating range
- Adjustable differential
- Maximum line pressure
- Occasional surge pressure
- Pressure media
- Enclosure type
- Pressure connection

How to Order

Step 1: Basic Device
Select a catalog number for the basic device.
See Product Selection.

Step 2: Modifications
If required, add the appropriate modification suffix code(s) to the catalog number of the basic device.
See Modifications.

Step 3: Accessories
If required, select appropriate accessories.
See Ordering Accessories.

Step 4: Factory Options
Factory-set pressure controls.
See Factory Options.

Catalog Number Explanation

Note: Catalog numbers must not include blank spaces.

836 –	A	1	A	X9
	a	*b*	*c*	*d*

a

Style of Device	
Code	Description
A	Internal Bellows
C	External Bellows

b

Pressure Specifications
See "Pressure Specifications" on pages 13-11…13-13

c

Enclosure Type	
Code	Description
A	Type 1
E	Type 7 & 9 and 4 & 13 Combined Metallic (Aluminum)
J	Type 4 & 13 Metallic (Aluminum)
S	Type 4X Non-Metallic
None	Without Enclosure

d

Modification	
Code	Description
X_	Add suffix codes in descending order whenever possible (see page 13-14)

Conversion Factors

Conversion Factors (Rounded)
psi x 703.1 = mm/H_2O
psi x 27.68 = in. H_2O
psi x 51.71 = mm/Hg
psi x 2.036 = in. Hg
psi x 0.0703 = kg/cm^2
psi x 0.0689 = bar
psi x 68.95 = mbar
psi x 6895 = Pa
psi x 6.895 = kPa
Note: psi — pounds per square inch (gauge) H_2O at 39.2 °F/Hg at 32 °F



Style C External Bellows — Copper Alloy, Type 4 & 13



Style C External Bellows — Copper Alloy, Type 1 With Pilot Light Option

Style C External Bellows — Copper Alloy Bellows∗ With 1/4 in. N.P.T. Female Pipe Connection

Standard pressure controls shipped from the factory are set at the maximum operating range and minimum differential.

Pressure Specifications				Enclosure Type		
Adjustable Operating Range [in. Hg Vacuum…psi]❄	Adjustable Differential [psi] (Approximate Mid-Range Values)	Maximum psi		Open Type (Without Enclosure)	Type 1	Type 4 & 13
		Line Pressure	Occasional Surge Pressure‡	Cat. No.	Cat. No.	Cat. No.
12 in. Vacuum…8➢	0.2…2.5§	25	30	836-C1	**836-C1A**	—
30 in. Vacuum…10	0.4…6§	65	75	**836-C2**	**836-C2A**	**836-C2J**
0.8…30	0.4…6	80	80	**836-C3**	**836-C3A**	**836-C3J**
30 in. Vacuum…45	1…12§	175	190	**836-C4**	**836-C4A**	**836-C4J**
2…80	1…12	190	210	**836-C5**	**836-C5A**	**836-C5J**
30 in. Vacuum…100	2…25§	300	375	**836-C6**	**836-C6A**	**836-C6J**
4…150	2…25	300	375	**836-C7**	**836-C7A**	**836-C7J**
6…250	4…45	500	650	**836-C8**	**836-C8A**	**836-C8J**
35…375	6…80	900	1200	**836-C9**	**836-C9A**	**836-C9J**
50…500	12…115	1300	1600	**836-C10**	**836-C10A**	836-C10J
50…650	16…115	1300	1600	**836-C11**	**836-C11A**	836-C11J
200…900	25…115	1300	1600	**836-C12**	**836-C12A**	836-C12J

Style C External Bellows — Copper Alloy Bellows∗ With 1/4 in. N.P.T. Female Pipe Connection

Standard pressure controls shipped from the factory are set at the maximum operating range and minimum differential.

Pressure Specifications				Enclosure Type	
Adjustable Operating Range [in. Hg Vacuum…psi]❄	Adjustable Differential [psi] (Approximate Mid-Range Values)	Maximum psi		Type 4X	Type 7 & 9 and 4 & 13♣
		Line Pressure	Occasional Surge Pressure‡	Cat. No.	Cat. No.
12 in. Vacuum…8➢	0.2…2.5§	25	30	—	—
30 in. Vacuum…10	0.4…6§	65	75	836-C2S	836-C2E
0.8…30	0.4…6	80	80	836-C3S	836-C3E
30 in. Vacuum…45	1…12§	175	190	836-C4S	836-C4E
2…80	1…12	190	210	836-C5S	836-C5E
30 in. Vacuum…100	2…25§	300	375	836-C6S	836-C6E
4…150	2…25	300	375	836-C7S	**836-C7E**
6…250	4…45	500	650	836-C8S	**836-C8E**
35…375	6…80	900	1200	836-C9S	836-C9E
50…500	12…115	1300	1600	836-C10S	836-C10E
50…650	16…115	1300	1600	836-C11S	836-C11E
200…900	25…115	1300	1600	836-C12S	836-C12E

∗ Copper alloy bellows may be used on water or air, and other liquids or gases not corrosive to this alloy.

❄ For applications where settings approach 0 psi, select a control that has an adjustable range that goes into vacuum.

‡ Transients (pulses) can occur in a system prior to reaching a steady-state condition. Surge pressures within published values generated during startup or shutdown of a machine or system, not exceeding eight times in a 24-hour period, are negligible.

§ To determine differential in. Hg vacuum, multiply value in table by 2.036 (or approximately 2).

♣ The combined Type 7 & 9 and 4 & 13 Hazardous Gas and Dust service enclosure is supplied with special gasket and O-ring seal to diminish/exclude moisture, fluids, and dust from entering the enclosure. Enclosures rated 7 & 9 only are not designed to restrict moisture from entering the enclosure, which is common to outdoor service. Enclosure is rated for the following environments:
CLASS I Groups C,D
CLASS II Groups E,F,G
CLASS III

➢ With 3/8 in. N.P.S.F. female pipe connection.



Style C External Bellows —
Type 4X Glass Reinforced Polyester Enclosure



Style C External Bellows —
Stainless Steel, Type 7 & 9 and 4 & 13 Combined

Style C External Bellows — Type 316 Stainless Steel Bellows∗ With 1/4 in. N.P.T. Female Pipe Connection

Standard pressure controls shipped from the factory are set at the maximum operating range and minimum differential.

Pressure Specifications				Enclosure Type				
Adjustable Operating Range [in. Hg Vacuum…psi]❄	Adjustable Differential [psi] (Approximate Mid-Range Values)	Maximum psi		Open Type (Without Enclosure)	Type 1	Type 4 & 13	Type 4X	Type 7 & 9 and 4 & 13♣
		Line Pressure	Occasional Surge Pressure‡	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
30 in. Vacuum…10	0.4…6§	65	65	836-C60	836-C60A	836-C60J	836-C60S	836-C60E
0.8…30	0.4…6	65	65	836-C61	836-C61A	836-C61J	836-C61S	836-C61E
30 in. Vacuum…100	2…25§	270	270	836-C62	836-C62A	836-C62J	836-C62S	836-C62E
4…150	2…25	270	270	836-C63	**836-C63A**	836-C63J	836-C63S	836-C63E
6…250	4…45	450	450	836-C64	836-C64A	836-C64J	836-C64S	836-C64E
35…375	8…80	650	650	836-C65	836-C65A	836-C65J	836-C65S	836-C65E

∗ Type 316 stainless steel bellows are available for more corrosive liquids or gases.

❄ For applications where settings approach 0 psi, select a control that has an adjustable range that goes into vacuum.

‡ Transients (pulses) can occur in a system prior to reaching a steady-state condition. Surge pressures within published values generated during startup or shutdown of a machine or system, not exceeding eight times in a 24-hour period, are negligible.

§ To determine differential in. Hg vacuum, multiply value in table by 2.036 (or approximately 2).

♣ The combined Type 7 & 9 and 4 & 13 Hazardous Gas and Dust service enclosure is supplied with special gasket and O-ring seal to diminish/exclude moisture, fluids, and dust from entering the enclosure. Enclosures rated 7 & 9 only are not designed to restrict moisture from entering the enclosure, which is common to outdoor service. Enclosure is rated for the following environments:
CLASS I Groups C,D
CLASS II Groups E,F,G
CLASS III

Ordering Modifications

Modifications are ordered by adding the appropriate modification suffix code to the catalog number of the basic device. Add suffix codes to the catalog number in descending order (highest number first).

Modifications

Contact Blocks — Trip pressure-indicating scales are supplied on controls with standard contact block.

Description	Rating	Symbol	Suffix Code	
Automatic Operation				
Standard Contact Block — Single-pole, double-throw, snap-action. Supplied when a contact block suffix is not added to the catalog number.	Control Circuit Rating: See Specifications on page 13-9		—	
Single-pole double-throw — slow-acting contact with no snap action. Contacts close on rise and close on fall with an open circuit between contact closures.	Control Circuit Rating: AC-125VA, 24…250V		∗❄	X171
Single-pole single-throw, normally open — closes on rise.	0.5 Hp, 115V AC 1 HP, 230V AC Control Circuit Rating: AC-125 VA, 24…110V AC-345 VA, 110…600V DC-57.5 VA, 110…250V		∗❄	X221
Single-pole single-throw, normally closed — opens on rise.			∗❄	X231
Single-pole single-throw, normally open — closes on rise.	1 Hp, 115V AC 1.5 Hp, 230V AC Control Circuit Rating: AC-600 VA, 110…600V DC-57.5 VA, 110…250V		∗❄	X321
Single-pole single-throw, normally closed — opens on rise.			∗❄	X331
External Manual Reset (Not available in Type 4X Enclosures)‡§				
Single-pole single-throw, normally open — contacts open at a predetermined setting on fall and remain open until system is restored to normal run conditions, at which time contacts can be manually reset.	Non-inductive: 5 A, 240V 3 A, 600V Control Circuit Rating: AC-125 VA, 24…600V DC-57.5 VA, 115…230V		∗‡§♣	X140
Single-pole single-throw, normally closed — contacts open on rise and remain open until system is restored to normal run conditions, at which time contacts can be manually reset.			∗‡§♣	X150
Single-pole double-throw, one contact normally closed — contact opens on rise and remains open until system is restored to normal run conditions, at which time contact can be manually reset. A second contact closes when the first contact opens.			∗‡§♣	X15A

∗ Contact blocks not available for field conversion or replacement.

❄ Minimum specified differential value approximately doubles.

‡ **Manual reset devices cannot be supplied with an adjustable differential. Inherent differential is approximately three times the differential of the corresponding adjustable differential control.**

§ Available only for replacement of complete open type control in an existing Type 1 or 4 & 13 enclosure. Replacement in a Type 7 & 9 enclosure is not available because it would void UL and CSA.

♣ Type 7 & 9 enclosures for manual reset devices are not also rated Type 4 & 13.

Note: NEMA does not rate contacts to switch low voltage and current. Bulletin 836 Styles A and C Pressure Controls are supplied with silver contacts. The devices are designed to deliver high force snap action to the contacts. This provides exceptional contact fidelity at 24V DC I/O card current level entry when the control is protected in a suitable enclosure for the surrounding environment.

Modification	Description	Suffix Code
Oxygen/Nitrous Oxide Service	Bellows and fittings are specially prepared for oxygen and nitrous oxide service. The devices are tested with pure oxygen, bellows are plugged for protection from contamination, and a tag warning against contamination is applied.	X2
Tamper-Resistant Adjustment	Range and differential adjustment screws are designed so that after a setting has been applied to the control, the adjustment screws can be broken off with a pliers. **Note:** The "break-off" adjustment screw(s) will not be broken off unless a factory setting is given and the order specifies "Break-off Adjustment Screw(s)". **See paragraph entitled "Factory-Set Temperature Controls" on page 13-17.**	X4
Neon Pilot Light, 120V AC	A high intensity neon pilot light is available for 120V AC, 60 Hz applications and can be wired for ON or OFF operation. The current rating is 1.0 m A.∗	X9
Red LED Pilot Light, 24V DC	A high intensity LED 24V DC pilot light is available to meet the requirements of the automotive, machine tool builders and other industries. The current rating is 22 mA and can be wired for ON or OFF operation.∗	X15
Green LED Pilot Light, 24V DC	A high intensity LED 24V DC pilot light is available to meet the requirements of the automotive, machine tool builders and other industries. The current rating is 22 mA and can be wired for ON or OFF operation.∗	X18

∗ Not available on combined Type 7 & 9 and 4 & 13, Type 4X, and manual reset devices.

Ordering Accessories

Accessories are ordered as separate catalog numbers. Select the required accessories from the tables below.

Accessories

Pipe Adapter

Description	Cat. No.
1/4 in. male pipe adapter with copper seating washer for Style A only.	**836-N1**

Contact Block Replacement Kit

Description	Cat. No.
Kit consists of a standard contact block and instructions.	**836-N2**

Finger Safe Contact Block Cover

Description	Cat. No.
Clear contact block cover provides IP2X Finger-Safe protection.	41162-908-01

Hardware Kits for Mounting Open Type Controls in Special Enclosures

Description	Type	Material	Cat. No.
Hardware kits for mounting open type controls in special enclosures allow ease of connecting pressure lines to the enclosure. For use with Type 1 and Type 4 & 13 enclosures with wall thickness up to 0.25 in. (6.35 mm).	**Style A Controls**		
	Open type controls	Plated steel	836-N5
	Style C Controls		
	Open type controls	Brass	836-N8
		Stainless steel	836-N10

Angle Mounting Brackets

Description	Bracket Type	Cat. No.
For mounting one or two open type Bulletin 836 Style A Pressure Controls or Bulletin 837 Temperature Controls on an enclosure mounting plate.	Single bracket	836-N11
	Dual mounting bracket	836-N12

Steam and/or Corrosive Media Applications — Isolation Traps

Description	Type	Cat. No.
An isolation trap is available for high-temperature media applications from 150…600 °F or corrosive applications compatible with Type 316 stainless steel tubing and fittings. The isolation coil is inserted between the bellows of the pressure control and the elevated temperature line of the system. The isolation trap will fill with condensed water or can be filled with water or suitable fluid when installed. A silicone buffer fluid is available in a convenient dispenser. Copper alloy lower and higher pressure range bellows can be applied to many applications using the isolation trap. The silicone buffer fluid is used to isolate many corrosive substances from coming in contact with the bellows. The isolation trap is rated at 3000 psi working pressure. Not available for piston-type controls.	Isolation trap with two 1/4 in. male pipe fittings	836-N25
	Isolation trap with one 1/4 in. male and one 1/4 in. female pipe fitting	836-N26
	2 oz. of buffer fluid to fill bellows and tubing	**836-N27**



Isolation Trap and Silicone Buffer Fluid

Ordering Accessories

Accessories are ordered as separate catalog numbers. Select the required accessories from the tables below.

Accessories

External Fixed Pulsation Snubbers

Description	Type	Cat. No.
Controls are supplied as standard with an internal pulsation snubber. However, a control properly selected and used within the adjustable range values yet having a short bellows life is a good indication of the presence of extreme surge pressures. External fixed pulsation snubbers are available to provide **additional** dampening when extreme pulsations or surges are present. Recommended if more than eight line surges occur in a 24 hr. time period.	Snubber for Style A Controls	836-N6
	Snubber for Style C Controls	**836-N7**

Selectable Element Pulsation Snubbers

Description	Type	Cat. No.
Controls are supplied as standard with an internal pulsation snubber. However, a control properly selected and used within the adjustable range values, yet having a short bellows life, is a good indication of the presence of extreme surge pressures. Selectable element pulsation snubbers are supplied with five different elements to provide a selectable balance between maximizing pressure control life and minimizing control response time. Pulsation snubbers are supplied with the mid-range element already mounted and four other color-coded porosity elements included in the package.	Snubber for Style C Controls	836-N40

Selectable Pulsation Snubber Porosity Elements

Description	Recommended Type of Service	Color Code	Porosity	Cat. No.
Package consists of five porosity elements and complete instructions. Elements are color-coded for easy identification. Elements are available in five different porosities for a wide range of applications.	Viscous fluids (over 500 SSU)*	None	Coarser	836-N43
	Medium type oils (225…500 SSU)*	Black		836-N44
	Water and light oils (30… 225 SSU)*	Brown		836-N45
	Low viscosity fluids (under 30 SSU)*	Green		836-N46
	Air and other gases	Red	Finer	836-N47
	One of each of the above	—	Assorted	836-N48

* SSU Saybolt Seconds Universal — units of viscosity measurement.
Note: Color code is located on end of element.

Pulsation Snubbers

Fixed Pulsation Snubbers
Male/Female Pipe Threads



Selectable Element Pulsation Snubbers
Male/Female Threads



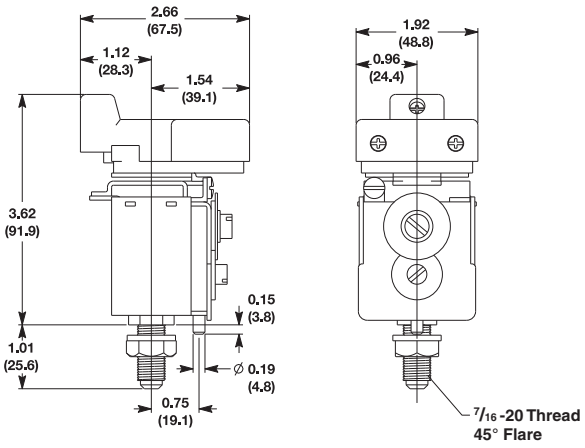
Porosity Elements



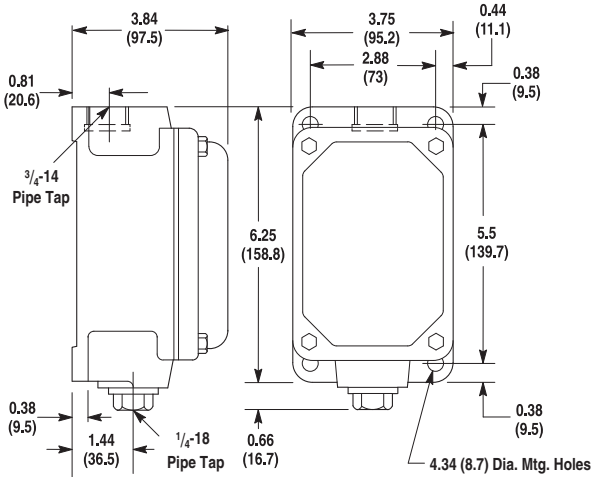
Approximate Dimensions and Shipping Weights

Dimensions in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

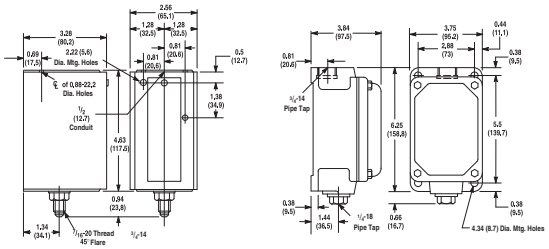
Style A



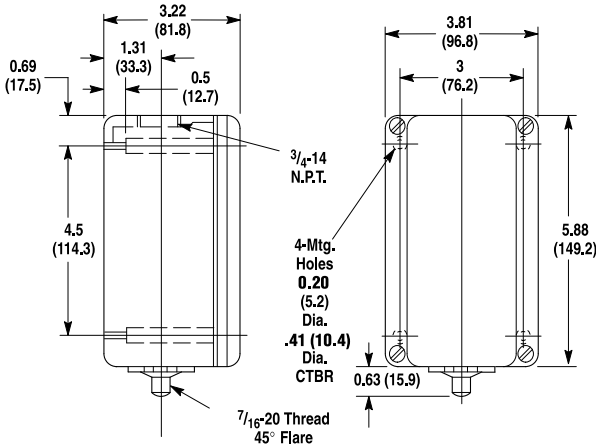
Open Type
Approximate Shipping Weight 1 lb. (0.45 kg)



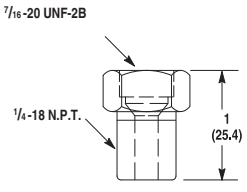
Type 7 & 9 and 4 & 13
Approximate Shipping Weight 9 lbs (4.1 kg)



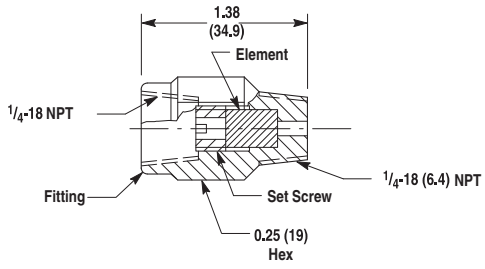
Type 1
Approximate Shipping Weight 2 lbs (0.91 kg)



Type 4 & 13
Approximate Shipping Weight 3 lbs (1.4 kg)



Cat. No. 836-N1
Approximate Shipping Weight 1/4 lb (0.1 kg)



Cat. No. 836-N40
Approximate Shipping Weight 1/4 lb (0.1 kg)