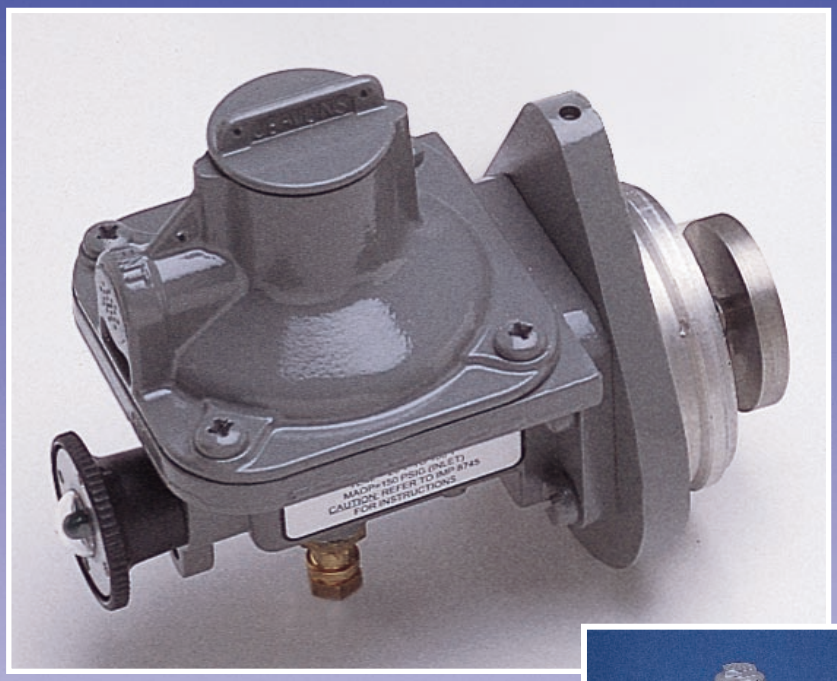
# USSA — Universal Safety Shutoff Assembly



AMERICAN METER COMPANY

# *USSA* *(Universal Safety Shutoff Assembly)*

## USSA Features

- If you currently use American Meter Company 1800, 2000 or 1800 PFM Series of Industrial Regulators (1-1/2" and 2" sizes), you now have a new way of providing reliable Overpressure and/or Underpressure protection functions.

- USSA models provide a reliable method of protecting downstream equipment from Overpressure Spikes (OPSO) – and also protection from Excess-Flow events (UPSO).

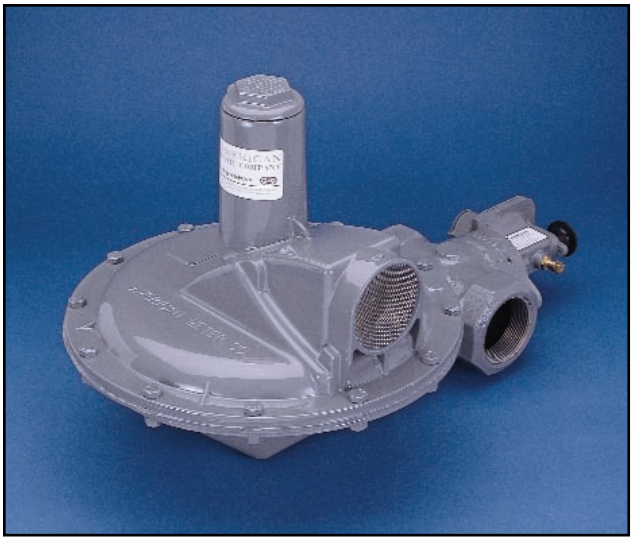
- USSAs can be ordered with all AMCO Industrial 1800/2000 and 1800PFM Series Regulators (PFM models are OPSO only). AMCO regulators currently using standard Overpressure Shutoff (OPSO) can use a USSA assembly as a direct bolt-on retrofit replacement.

- The USSA is a proven design—safety shutoff for AMCO Industrial Regulators, with an impressive multi-year operating record in Europe and North America. Every USSA uses molded diaphragms and two-stage linkages to assure low drag and high sensitivity for your application.

- All USSA models can be converted to all alternate pressure ranges simply by changing the pressure spring. (There are no high-pressure diaphragms or pressure-reducing rings to install.)

- USSA models can be converted from Overpressure Only (OPSO) to Underpressure Only (UPSO) to combined units (OPSO/UPSO) easily by changing parts above the diaphragm. (No disassembly of the main mechanism is required to change function.)

- All USSA models have a Green “Flag” Visual Flow Indicator that shows proper Regulator flow. When the OPSO or UPSO trips, the Green Flag is withdrawn into the USSA, showing that the unit needs to be reset.



**AMCO 1843B Regulator with USSA**

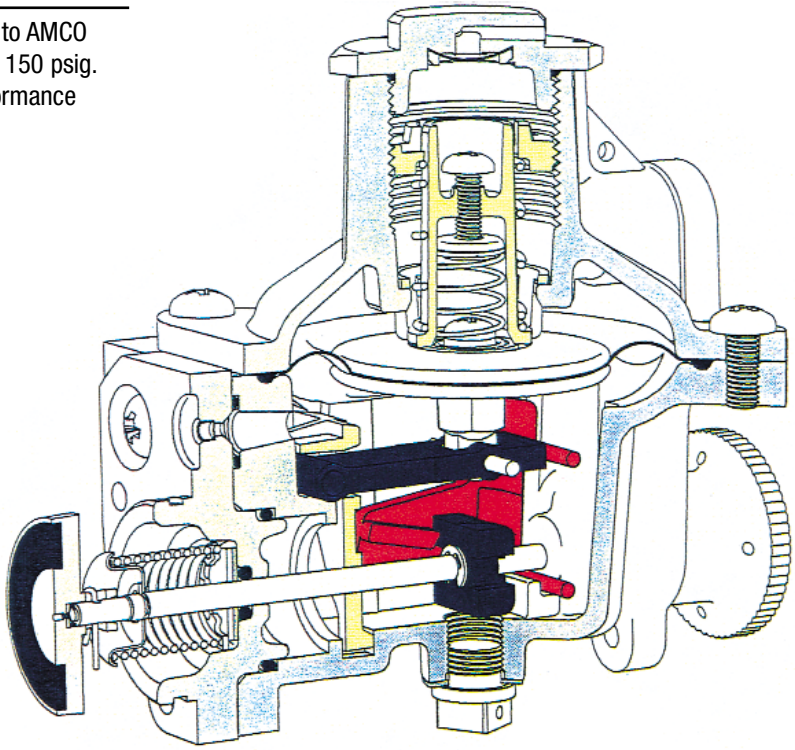
**AMCO 2083 Regulator with USSA**

**AMCO 1883 PFM Regulator with USSA**

# *USSA* *(Universal Safety Shutoff Assembly)*

## USSA Specifications

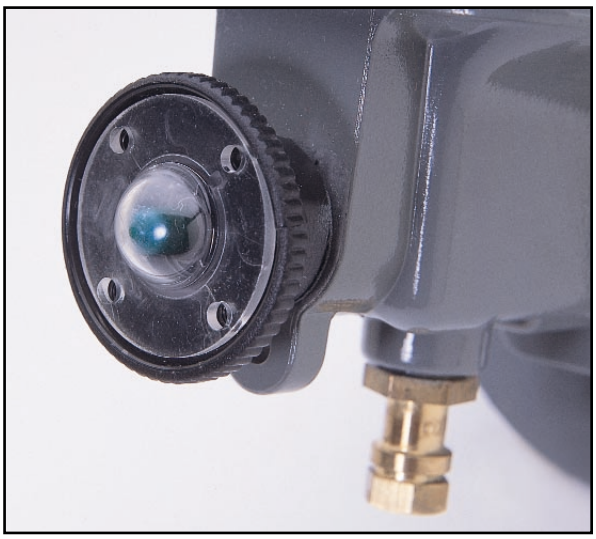
UnderPressure Shutoff Assemblies (USSAs) can be fitted to AMCO Industrial Regulators with inlet pressures from 1/2 psi to 150 psig. The USSA meets all applicable EN334 standards of performance with the following features:



- Diaphragm
  Molded Buna N with Sealing Ring
  Minimum burst pressure >100 psig
- Shutoff Pressures
  OPSO (7.5" w.c. to 35 psig)
  UPSO (3.0" w.c. to 60" w.c.)
- Repeatability
  OPSO (< 1% absolute pressure – " w.c. units)
  (< 1/2% absolute pressure – psig units)
  UPSO (< 2% absolute pressure – all units)
- Response Time
  Less than one second
- Service Life
  Type approval of 3000 on/shutoff/reset cycles
  USSA rated for 20-year average service life
- Temperature Range
  Operates at -20°F to +140°F
- Optional Equipment
  – Monitor adaptor plate for remote pressure sensing
  – Vent flow limitor (meets EN334 flow limit). Vent bugshield is standard equipment.
  – Optional switch closure for remote latch indication (available 10/02)

## USSA Materials

| Component | Material |
|---|---|
| Body and Top Cover | Die-Cast Aluminum |
| Diaphragm | Molded Buna N Rubber |
| Seat Disc Insert and O-Rings | Buna N Rubber |
| Latch Mechanisms | Acetal |
| Spindle and Seat Disc | Stainless Steel |



## Flow Indicator

All USSA models have a clear cover on the reset knob which shows a green dot to indicate (normal) flow. In the event of an overpressure (or underpressure) USSA trip, the green dot disappears from the clear cover, indicating the need to reset the USSA.

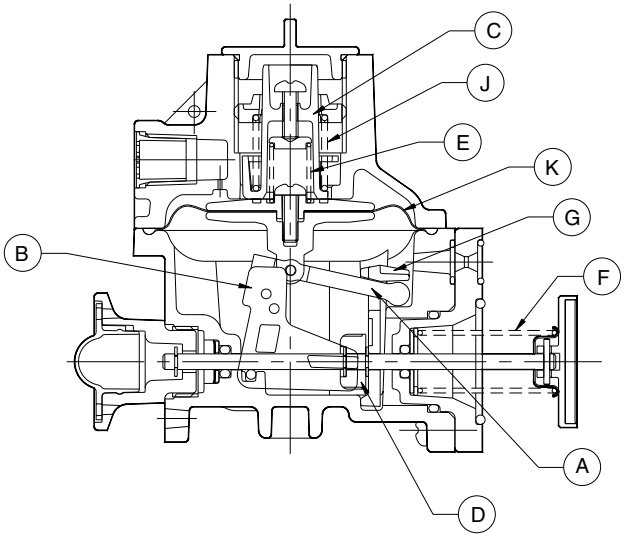
# *USSA* *(Universal Safety Shutoff Assembly)*

## How It Works

A USSA is fitted to an AMCO 1800/2000/1800 PFM Industrial Regulator on the inlet side of the valve head. The USSA senses downstream regulator pressure through a brass sensing tube (standard models) or is piped to a remote sensing port (monitor versions). In the event of an Overpressure or Underpressure occurrence, there is excess motion of the diaphragm, which causes the USSA mechanism to trip. Shutoff occurs when the spring-loaded seat disc is released to seal off the inlet side of the main regulator orifice.

## Overpressure Shutoff

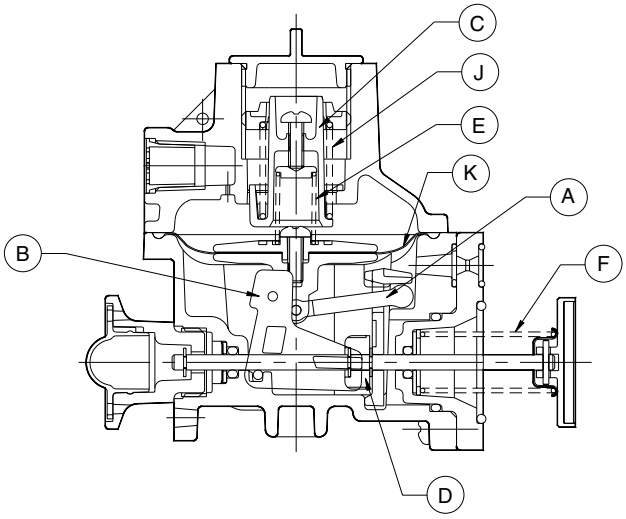
The USSA diaphragm (K) is held down by the force of the pressure spring (J). When pressure under the diaphragm builds, the diaphragm lifts and pulls the lever (A) upward across the latch (B). When pressure reaches the USSA set pressure, the lever (A) is pulled off of the latch (B), allowing the normal closing force of the spring-loaded seat disc (F) to detach the latch (B) from the trip-off bushing (D), thereby allowing the seat disc (F) to close off inlet-regulator flow.




**Overpressure Shutoff Activated**

## Underpressure Shutoff

Normal inlet pressure compresses the underpressure spring (E) and holds the USSA diaphragm (K) in its normal position. When excess flow lowers downstream pressure, underpressure spring (E) forces the USSA diaphragm (K) downward, which pulls the USSA lever (A) downward. Sufficient drop in pressure allows the lever (A) to move the latch (B) downward, which allows the natural closing force of the spring-loaded seat disc (F) to detach the latch (B) from the trip-off bushing (D), thereby allowing the seat disc (F) to close off inlet-regulator flow.




**Underpressure Shutoff Activated**

# *USSA* *(Universal Safety Shutoff Assembly)*

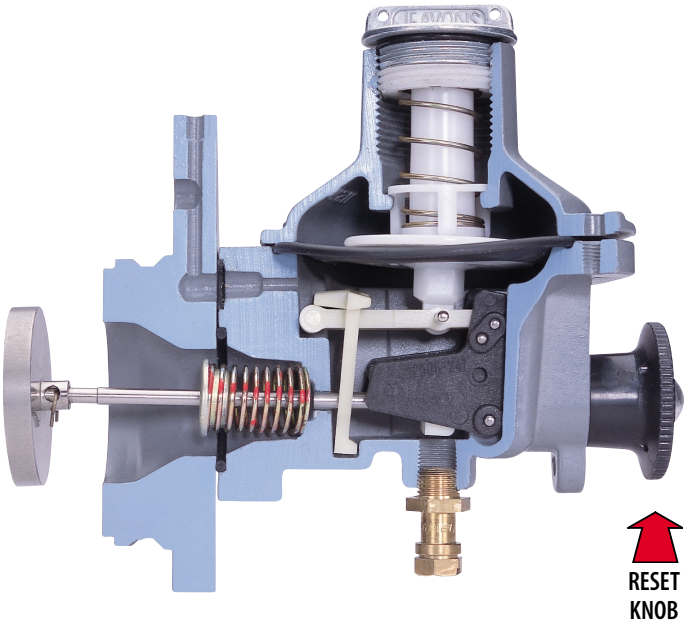
## How To Reset The USSA

***When the green dot on the USSA reset knob is not visible, the USSA needs to be reset. Please note:***

- All USSA models latch in the “No Flow” position when tripped. USSA will not allow regulator gas flow until manually reset.
- USSA OPSO (only) models can be reset with normal downstream pressure present – or with no downstream pressure.
- USSA models with UPSO require that the set pressure of the UPSO unit be present downstream before the unit will latch.

## To Reset:

- Determine and correct the cause(s) of the downstream overpressure/underpressure. Check the main regulator and all associated equipment, including the bypass, for proper function.
- Reset the USSA by unscrewing the reset knob and slowly pulling it away from the main regulator. The reset mechanism has a built-in “starter orifice” to allow a small flow downstream and ease resetting. Allow up to one minute for this starter orifice to equalize pressures before pulling the knob fully out (until a latching “click” is heard).
- When the USSA clicks in place, push the reset knob inward and screw it clockwise.
- Confirm that the green indicator dot is visible in the reset knob clear cover. If the green dot cannot be seen, check to see if the downstream pressures are in the correct range (to allow reset) and repeat the rest procedure.

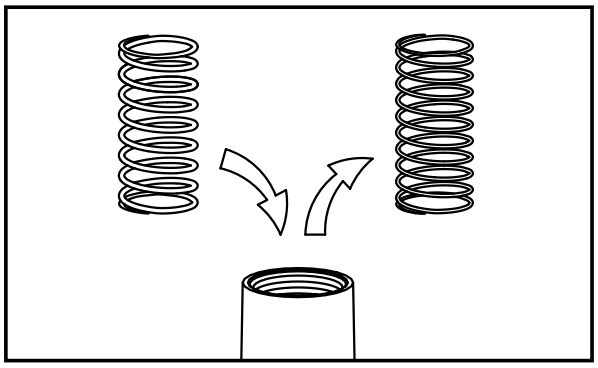



**USSA Cross-Section View**

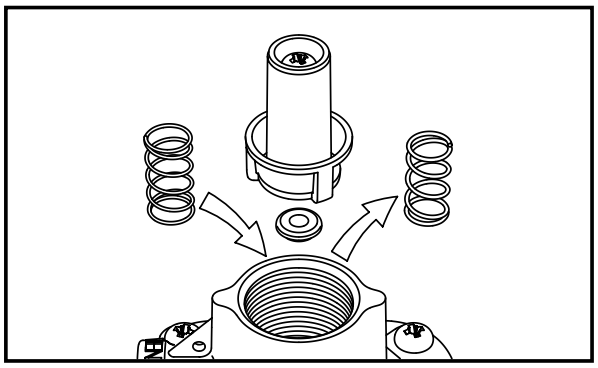
## USSA Range Springs

All USSA models can be converted to all alternate pressure ranges simply by changing the pressure spring. There are no high-pressure diaphragms or pressure-reducing rings to install.

| Range in. w.c. | psig | Color | AMCO Part Number |
|---|---|---|---|
| ***Springs, Overpressure (OPSO)*** | | | |
| 7.5" w.c. to 24" w.c. | 0.27 – 0.87 psig | Black | 70017P123 |
| 20" w.c. to 32" w.c. | 0.72 – 1.16 psig | Orange | 70017P124 |
| 24" w.c. to 44" w.c. | 0.87 – 1.60 psig | Red | 70017P125 |
| 40" w.c. to 84" w.c. | 1.5 – 3 psig | Dark Green | 70017P126 |
| | 3 – 5 psig | Yellow | 70017P127 |
| | 4 – 7 psig | White | 70017P128 |
| | 7.8 – 14.5 psig | Dark Blue/Black | 70017P129 |
| | 14.5 – 29 psig | Dark Blue/Orange | 70017P130 |
| | 29 – 58 psig | Dark Blue/Red | 70017P131 |
| | 14 – 35 psig | Dark Blue/Green | 70017P132 |
| | | | |
| ***Springs, Underpressure (UPSO)*** | | | |
| 3" w.c. to 6" w.c. | 0.11 – 0.22 psig | Light Blue | 70017P133 |
| 6" w.c. to 24" w.c. | 0.22 – 0.87 psig | Brown | 70017P134 |
| 24" w.c. to 60" w.c. | 0.87 – 2.17 psig | Purple | 70017P135 |



**USSA—OPSO Spring Replacement**



**USSA—UPSO Spring Replacement**

## A Complete Family of Gas Measurement, Pressure Regulation, and Filtering Systems

### Diaphragm Meters

American Meter's compact, light-weight, aluminum-case meters are designed to provide positive displacement accuracy for industrial or commercial loads. See bulletin SB 3510 for more information.

### Rotary Meter With Continuous Mechanical Temperature Compensator

The new CMTC RPM® Series gas meter provides flowing-gas volume registration continuously and mechanically corrected to the standard base temperature (60°F). See bulletin SB 5520 for more information.

### 1800/2000 Series Industrial Regulators

1800/2000 Regulators are designed to give years of accurate regulation service with minimal maintenance. Models are available for all Class 125 service. See bulletin SB 8540.2 for more information.

### 1800 PFM Series

1800 PFM industrial regulators are designed for applications requiring medium-to-high capacity, extremely precise outlet-pressure control, and fast response to changing loads. See Bulletin SB 8551 for more information.

### Filters

Filtration down to 10 microns. Protects meter and regulator stations from dirt and pipe scale damage. See bulletin SB 12521 for more information.

## How to Order the AMCO USSA – Universal Safety Shutoff Assembly

**Please contact your AMCO representative with:**

**MODEL TYPE**
- **USSA Overpressure only (OPSO)**
- **USSA Over and Underpressure (OPSO/UPSO)**
- **USSA Underpressure only (UPSO)**

**APPLICATION**
**OEM – mounted on AMCO Industrial Regulator**
**Specify:**
- **Main Regulator Model (refer to SB 8540.2)**
- **Main Regulator Outlet (Set) Pressure**
- **OPSO Set Pressure (should be >IPSI above Regulator Set)**
- **UPSO Set Pressure (should be >3" w.c. below Regulator Set)**
- **Special Requirements**
  **Monitor Version (Remote Sensing)**
  **Optional Switch Closure**

**Stand-Alone or Replacement USSA (no Main Regulator)**
**Specify:**
- **OPSO Set Pressure (should be >IPSI above Regulator Set)**
- **UPSO Set Pressure (should be >3" w.c. below Regulator Set)**
- **Special Requirements**
  **Monitor Version (Remote Sensing)**
  **Optional Switch Closure (available 10/02)**


AMERICAN METER COMPANY
*Measurement Engineers Since 1836*
Yesterday…Today…Tomorrow
300 Welsh Road, Building One
Horsham, PA 19044-2234
Phone: 215/830-1800
Fax 215/830-1890
www.americanmeter.com

CANADIAN METER
275 Industrial Road
Cambridge, Ontario
Canada N3H 4R7
Phone: 519/650-1900
Fax 519/650-1917
www.canadianmeter.com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