Pressure Switches Designed to UL or FM Requirements for Combustion Service

Features:

- Set point repeatability, ±1% of operating range.
- UL Listed in the gas and oil equipment list.
- FM Approved as “pressure supervisory switches.”
- Externally visible pressure setting scales.
- External adjusting nuts.
- Choice of fixed or full-range adjustable deadbands.
- Choice of single or two-stage units.
- Mounts in any position.
- Rugged and vibration resistant.
- Separate electrical, pressure and adjusting chambers.
- Mix and match switch and transducer components for increased stock flexibility or to change pressure ranges in field.
- Withstands high surge pressures.

General Description:

ASCO S-Series combustion switches consist of a switch unit and a transducer unit. They can be ordered separately for customer stocking and/or field assembly or as a complete factory-assembled unit.

Switch

S-Series combustion switch units incorporate the unique ASCO TRI-POINT alternating fulcrum balance plate to control the operation of one or more electrical snap-action swtiches. The electrical snap-action switch together with the adjusting mechanism is a fully-tested, self-contained subassembly.

Transducer

Transducer unit incorporates a diaphragm/piston type pressure sensor, and is also a fully-tested, self-contained subassembly.

Operation

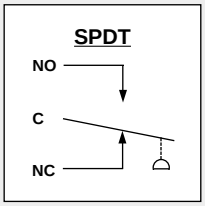
When pressure is applied to the transducer it is converted into movement of the piston. This piston movement is then used to control the operation of the electrical snap-action switch in the switch unit.

Options (See pages 34-35)

Dimensions (See page 15)

Standard Electrical Ratings

SA, SD and SE Series ①
5 Amp Res., 125, 250 VAC
1/8 HP, 125 VAC
1/4 HP, 250 VAC
1/2 Amp Res., 125 VDC
1/4 Amp Res., 250 VDC



SB and SC Series
5 Amp Res., 125, 250 VAC
1/4 HP, 125 VAC
1/2 HP, 250 VAC
.4 Amp Res., 125, VDC

UL®

FM APPROVED

① SD and SE Series not FM Approved.

Standard Temperature Ratings

Ambient: -4°F (-20°C) to 140°F (60°C)
Fluid: For Buna “N” or Neoprene Diaphragm
-4°F (-20°C) to 180°F (82°C)
For Viton Diaphragm
-4°F (-20°C) to 250°F (121°C)
For 316 SS Diaphragm
-50°F (-45°C) to 300°F (149°C)

UL Requirements

Underwriters' Laboratories, Inc.'s Standard UL 353 defines construction and performance requirements for limit controls.

Switch

S-Series combustion switch units when mated to the pressure transducers described below form pressure switches in accordance with UL requirements.

Transducers

Fuel Gas – UL requires a pressure transducer with a secondary chamber. This chamber allows the gas to be vented to a safe location in the event of primary sensing element rupture. The "double chamber" with vent pressure transducers meet this requirement.

Fuel Oil – UL requirements for fuel oil applications waive the double chamber requirement, providing the sensing element is made of Type 316 or 321 SS. S-Series type 316 SS pressure transducers are designed to meet this requirement.

General Service – Pressure transducers for water, steam and air service may be of the single chamber design.

Enclosures

ASCO TRI-POINT S-Series switches are available in three standard enclosures. All of these enclosed units are made in accordance with NEMA and UL standards.

General Purpose – Type 1. These enclosures are designed for indoor use to protect personnel from accidental contact with the equipment. S-Series general purpose switch units consist of a copper-free* aluminum die-cast body with a formed copper-free* aluminum cover; two 3/4" conduit hubs with one plug are provided.

Watertight – Type 4. Watertight and dust-tight enclosures are intended for use indoors and outdoors to protect the enclosed equipment against splashing or falling water, windblown dust and water, hose directed water, and severe external condensation. S-Series watertight switch units have a copper-free* aluminum die-cast body and a formed copper-free* aluminum cover with Buna "N" gaskets; two 3/4" conduit hubs with one plug are provided.

Explosion-Proof – Types 7 and 9. Type 7 enclosures are intended for use in locations defined by the National Electrical Code as Class I. Type 9 enclosures are intended for Class II locations.

Class I locations are those in which flammable gases are or may be present in the air in sufficient quantities to produce explosive or ignitable mixtures. Class I locations are classified by group letter, which defines particular atmospheres. Division 1 locations are areas where the hazardous concentration exists continuously, intermittently or periodically under normal operating conditions. Division 2 locations are those where the hazardous vapors are present only in case of accidental rupture or breakdown of equipment.

ASCO TRI-POINT explosion-proof enclosures with letter B, C or D in the fifth position are listed for Class I, Groups B, C, and D, Division 1. They are also suitable for the less stringent Division 2 environment.

Class II locations are those which are hazardous because of the presence of combustible dust. All ASCO TRI-POINT explosion-proof enclosures are listed for Groups E, F, and G locations.

The switch body and cover are die-cast copper-free* aluminum with a Buna "N" gasket. Two 3/4" conduit hubs with one plug are provided.

FM Requirements

Fuel Gas and Fuel Oil – FM requires that fuel gas and fuel oil pressure supervisory switches shall have a visible external means of determining switch position. No specific constructions are required for the pressure transducer. Switch units with visual position indication (suffix "V") in conjunction with single chamber pressure transducers will meet these requirements.

General Service – Standard switch units with an adjusting nut cover, when mated to single chamber transducers, meet FM requirements for general applications such as "airflow interlocking switches".

Enclosures

General Purpose – Designed to Type 1 specifications for indoor applications. Die casting is copper-free* aluminum; covers are polycarbonate. Two 3/4" conduit hubs with one plug are provided.

Watertight – Designed to Types 4 specifications for indoor/outdoor use. Die casting is copper-free* aluminum. Cover are polycarbonate and gaskets are neoprene. Two 3/4" conduit hubs with one plug are provided.

* Less than 0.6% copper.

How to Select and Order

ASCO S-Series switches consist of two components, the switch unit and the transducer unit.

How to Select

1. Select the adjustable operating range based on desired actuation pressure.
2. Check that proof pressure is sufficient.
3. Read across and select the desired S-Series switch unit with the proper enclosure.
4. Continue across and select a matching transducer unit compatible with the fluid.

How to Order

Factory assembled – Simply order the switch and transducer unit by catalog number joined by a slash (/), e.g., SA30D/TA31A11.

Field assembled – Simply order the switch and transducer units separately by individual catalog number, e.g., one SA30D and one TA31A11.

***Options* –** Add appropriate suffix for desired option (see pages 34-35).

Important Note: The third digit of each of the catalog numbers must be identical, e.g., SA 3 0D and TA 3 1A11.

Select S-Series pressure switch

SA Switch Unit

Single-Stage Adjustable Deadband units allow independent adjustment of the set and reset points over the full operating range of the switch. The minimum difference between set and reset points is the deadband listed below; the maximum difference is the full range of the switch .

UL General Purpose

SB, SD or SE Switch Unit

SB Switch Unit: Single-Stage Fixed Deadband units have an adjustable set point and a non-adjustable automatic reset point.

SD Switch Unit: Manual reset on decreasing pressure units operate automatically on increasing pressure and must be reset manually on decreasing pressure. (To order, change second digit to letter “D”, e.g., S B 30D becomes S D 30D).

SE Switch Unit: Manual reset on increasing pressure units operate automatically on decreasing pressure and must be reset manually on increasing pressure. (To order, change second digit to letter “E”, e.g., S B 30D becomes S E 30D).

SA, SB, SC, SD and SE unit below

SC Switch Unit

Two-Stage Fixed Deadband units consist of two separate snap-action switches, each with an independently adjustable set point and non-adjustable reset point. The difference between the set and reset points of each switch is the deadband listed below; the minimum difference between the set points of the two switches is the separation.

FM General Purpose

Select transducer unit below

UL Listed

FM Approved

Standard connection is 1/4” NPT

Transducer Unit

These **guage pressure type transducers** provide for one pressure connection in the bottom of the transducer. They are diaphragm/piston type transducers using an elastomer in contact with the fluid, backed by a piston cylinder. UL requires a double chamber transducer for fuel gas service and single chamber 316 SS transducer for fuel oil service.

Specifications		Adjustable Deadband				Fixed Deadband or Manual Reset ②					Two-Stage Fixed Deadband					Transducer Units			
Adjustable Operating Range (psig)	Proof Pressure (psig)	Adjustable Deadband Maximum Full Scale Minimum At Mid-Range (psig) ①	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.	Fixed Deadband At Mid-Range (psig.) ①	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.		Fixed Deadband At Mid-Range (psig) ①	Separation Maximum Full Scale Minimum At Mid-Range (psig) ①	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.	Aluminum & Buna “N” Catalog No.	Brass & Buna “N” Catalog No.	All 316 SS ③ Catalog No.	316 SS & Viton ④ Catalog No.
UL Listed																***Fuel Gas***		***Fuel Oil***	
0 - 27” W.C.	15	2.0” W.C.	SA30D	SA31D	SA32D	1.2” W.C.	SB30D	SB31D	SB32D		1.7” W.C.	2.7” W.C.	SC30D	SC31D	SC32D	TA31A11	---	---	---
0 - 65” W.C.	15	2.5” W.C.	SA20D	SA21D	SA22D	1.4” W.C.	SB20D	SB21D	SB22D		2.0” W.C.	6.5” W.C.	SC20D	SC21D	SC22D	TA21A11	---	---	---
15 - 140” W.C.	25	6.0” W.C.	SA20D	SA21D	SA22D	3.0” W.C.	SB20D	SB21D	SB22D		4.0” W.C.	14.0” W.C.	SC20D	SC21D	SC22D	TB21A11	---	---	---
15 - 250” W.C.	25	10.0” W.C.	SA10D	SA11D	SA12D	6.0” W.C.	SB10D	SB11D	SB12D		7.0” W.C.	25.0” W.C.	SC10D	SC11D	SC12D	TB11A11	---	---	---
25 - 400” W.C.	25	15.0” W.C.	SA10D	SA11D	SA12D	8.0” W.C.	SB10D	SB11D	SB12D		13.0” W.C.	40.0” W.C.	SC10D	SC11D	SC12D	TC11A11	---	---	---
0.8 - 9.0	150	1.4	SA40D	SA41D	SA42D	0.9	SB40D	SB41D	SB42D		1.5	1.6	SC40D	SC41D	SC42D	---	---	TE40A44	---
1.0 - 18	150	4.6	SA30D	SA31D	SA32D	0.6	SB30D	SB31D	SB32D		1.0	1.8	SC30D	SC31D	SC32D	---	---	TE30A44	---
1.5 - 30	200	4.0	SA30D	SA31D	SA32D	1.5	SB30D	SB31D	SB32D		2.0	3.0	SC30D	SC31D	SC32D	---	TF32A21	---	---
1.5 - 36	150	3.3	SA20D	SA21D	SA22D	1.4	SB20D	SB21D	SB22D		2.0	3.6	SC20D	SC21D	SC22D	---	---	TE20A44	---
2.0 - 60	150	5.4	SA10D	SA11D	SA12D	2.3	SB10D	SB11D	SB12D		3.5	6.0	SC10D	SC11D	SC12D	---	---	TE10A44	---
2.0 - 60	200	5.0	SA20D	SA21D	SA22D	2.0	SB20D	SB21D	SB22D		3.0	6.0	SC20D	SC21D	SC22D	---	TF22A21	---	---
3.0 - 100	200	9.0	SA10D	SA11D	SA12D	3.7	SB10D	SB11D	SB12D		5.0	10.0	SC10D	SC11D	SC12D	---	TF12A21	TF10A44	---
FM Approved																***Fuel Gas and Fuel Oil***			
2 - 12” W.C.	25	1.5” W.C.	SA40DV	SA41DV	---	1.0” W.C.	SB40DV	SB41DV	---		1.4” W.C.	2.4” W.C.	SC40DV	SC41DV	---	TA40A11F	---	---	TA40A32F
2 - 27” W.C.	25	2.0” W.C.	SA30DV	SA31DV	---	1.2” W.C.	SB30DV	SB31DV	---		1.7” W.C.	2.7” W.C.	SC30DV	SC31DV	---	TA30A11F	---	---	TA30A32F
2 - 65” W.C.	25	2.5” W.C.	SA20DV	SA21DV	---	1.4” W.C.	SB20DV	SB21DV	---		2.0” W.C.	6.5” W.C.	SC20DV	SC21DV	---	TA20A11F	---	---	TA20A32F
15 - 140” W.C.	40	6.0” W.C.	SA20DV	SA21DV	---	3.0” W.C.	SB20DV	SB21DV	---		4.0” W.C.	14.0” W.C.	SC20DV	SC21DV	---	TB20A11	---	---	TB20A32
15 - 250” W.C.	40	10.0” W.C.	SA10DV	SA11DV	---	6.0” W.C.	SB10DV	SB11DV	---		7.0” W.C.	25.0” W.C.	SC10DV	SC11DV	---	TB10A11	---	---	TB10A32
25 - 400” W.C.	40	1 5.0” W.C.	SA10DV	SA11DV	---	8.0” W.C.	SB10DV	SB11DV	---		13.0” W.C.	40.0” W.C.	SC10DV	SC11DV	---	TC10A11	---	---	TC10A32
0.4 - 4.5	100	0.4	SA40DV	SA41DV	---	0.3	SB40DV	SB41DV	---		0.5	0.7	SC40DV	SC41DV	---	TD40A11	TD40A21	---	TD40A42
0.8 - 9.0	100	0.6	SA30DV	SA31DV	---	0.3	SB30DV	SB31DV	---		0.5	0.9	SC30DV	SC31DV	---	TD30A11	TD30A21	---	TD30A42
1.0 - 18	100	1.1	SA20DV	SA21DV	---	0.4	SB20DV	SB21DV	---		0.5	1.8	SC20DV	SC21DV	---	TD20A11	TD20A21	---	TD20A42
1.5 - 36	150	2.2	SA20DV	SA21DV	---	0.9	SB20DV	SB21DV	---		1.2	3.6	SC20DV	SC21DV	---	TE20A11	TE20A21	---	TE20A42
2.0 - 60	150	3.6	SA10DV	SA11DV	---	1.5	SB10DV	SB11DV	---		2.1	6.0	SC10DV	SC11DV	---	TE10A11	TE10A21	---	TE10A42
3.0 - 100	200	6.0	SA10DV	SA11DV	---	2.5	SB10DV	SB11DV	---		3.5	10.0	SC10DV	SC11DV	---	TF10A11	TF10A21	---	TF10A42

① Values shown are nominal. ② Manual reset units not available for FM.

③ 316 SS transducers increase deadband by 50%. ④ Transducers ending in 32 have 303 SS process connections, not 316 SS.

H-Series, P-Series and S-Series Snap-Action Switch Options

Optional snap-action switches to meet specific electrical loads or application conditions are available on most ASCO TRI-POINT switch units. Generally, the construction of a switch unit with optional snap-action switches contains other specific parts and may be ordered only as a factory-built unit. To specify a particular optional construction, add the appropriate suffix to the switch unit catalog number, e.g., SA10D with optional gold contact snap-action switch (suffix "P") would become SA10D P.

Description	Electrical Rating	Catalog Suffix	Deadband Variation From Listing
DC Rating 1 Amp Double Break	5 Amp, 125, 250 VAC 1/4 HP, 125 VAC 1/2 HP, 250 VAC 1 Amp, 125 VDC 1/2 Amp, 250 VDC	G	SA: +50% SB, SC, PA: +100% H: +200% PB: +400%
DC Rating 10 Amps, SPDT	10 Amp, 125 VAC, VDC 1/8 HP, 125 VAC, VDC	M	SA: +50% SB, SC, PA: +100% H: +120% PB: +400%
Double-pole Double-throw (Two SPDT Switches with Common Lever)	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	K	SA, SB, SD, SE, PB: +50%
Gold Contact Dry Circuit SPDT	1 Amp, 28 VAC 1 Amp, 28 VDC 25 Amp Res, 28 VDC	P	SA, SB, SC, PA: +25% H: +50% PB, PC: +100%
Hermetically Sealed SPDT	10 Amp Ind, 28 VDC 5 Amp Motor, 28 VDC 3 Amp Lamp, 28 VDC 1 Amp, 125 VAC	H	SA, PA: +100% H: +200% PB: +600%
High Ambient 250°F SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	F	SA, SB, SC: +25%
High Power 1 HP SPDT	20 Amp, 125, 250 VAC 1 HP, 125 VAC 2 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	W	SA: +50% SB, SC: +100% PB: +400%
Moisture Resistant Sealed Switch SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	J	SA: None SB, SC, PA: +25% PB, H: +50%
Tight Fixed Deadband SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC	T	SB, SC: -50%

P-Series Switch Options

Panel Mount – Open frame P-Series compact switch units are available for panel mounting with the switch unit inside and the transducer outside. The panel separates the fluid sensing portion from the electromechanical portion. Five holes for bolts and operating stem must be drilled or punched through the panel. Three constructions are available: add the suffix listed below to the switch unit catalog number for the desired thickness.

Panel Thickness	Suffix
10 Ga (.135±.005)	10
14 Ga (.075±.005)	11
16 Ga (.060±.005)	12

S-Series Switch Options

Industrial Adjusting Nut Covers – Available in clear plastic or metal to prevent tampering with set point adjusting nuts.
Clear plastic cover: To order, add suffix "1" to the switch unit catalog number, or order separately as SP01.
Metal cover: To order, add suffix "2" to the switch unit catalog number, or order separately as SP02.

JIC Construction – A switch unit having the electrical and adjusting nut covers attached to the switch body by a chain. Also designed to Type 13 specifications. To order, add suffix "3" to the switch unit catalog number, or order separately as SP03.

Terminal Block – Applicable to switch units with one single-poledouble-throw switch. The terminal strip is prewired to the snap-action switch. To order, add suffix "4" to the switch unit catalog number, or order separately as SP04.

Factory Sealed – Explosion-proof units may be ordered with a factory seal separating the electrical chamber from the conduit hubs and 24" long #14 AWG 105°C. rated lead wires. To order, change the fourth digit of the switch unit catalog number from "2" to "3", e.g., SA12D becomes SA13D.

Pressure Transducer Options

Special Wetted Materials – The following diaphragms may be substituted on transducer body materials of aluminum, brass, polyester and stainless steel. To order, substitute the material code below in the seventh digit of the transducer catalog number, e.g., a TF10A1[1] with optional viton diaphragm becomes a TF10A1[2].

Diaphragm	Material Code	Temperature Range
Buna "N"	1	-4°F (-20°C) to 180°F (82°C)
Ethylene Propylene	6	-4°F (-20°C) to 250°F (121°C)
Neoprene	3	-4°F (-20°C) to 180°F (82°C)
Fluorosilicone	7	-40°F (-40°C) to 250°F (121°C)
Viton	2	-4°F (-20°C) to 250°F (121°C)

Oxygen Cleaning – Pressure transducers for oxygen service should be specially cleaned. They are degreased and blacklight inspected, then assembled in a clean area and tested with oil-free air or nitrogen. Use metal body transducer with viton or neoprene diaphragm and add suffix "H" to transducer catalog number, e.g., TA40A13 becomes TA40A13[H].

Pressure Snubbers – A pressure snubber (1/4" NPTF by 1/4" NPTM) installed in the transducer pressure connection will dampen the pressure spikes to a value which will not cause damage. It consists of a body with a porous metal disc of stainless steel through which the fluid passes. To order, select a snubber compatible with the fluid. Available by seperate catalog number only (see table below).

Fluid	Brass Catalog No.	303 SS Catalog No.
Air, Non-Hazardous Gases	TP04G2	TP04G3
Water, Light Oil (under 225 SSU)	TP04E2	TP04E3
Oil (Heavy, (over 225 SSU)	TP04D2	TP04D3
Pressure Rating (psig)	2000	5000

Process Connection – A female process connection (1/4" NPT) is standard on all pressure transducers. A 1/2" NPT is available as an option on *gauge* pressure transducers. To order, add suffix "B" to transducer catalog number, e.g., RF10A21 becomes RF10A21[B].
Note: Not available on nylon transducers.

P-Series and S-Series Temperature Transducer Options

Armored Capillaries – Double braided copper armor is standard for copper capillary units. Stainless steel spiral interlocked armor is available for stainless steel capillary units. Add suffix "C" to transducer catalog number.

Thermal Well

Thermal Well① – Use with direct or remote sensors for protecting sensing bulb. This allows removal of bulb while maintaining a pressure-tight vessel. Available in 1/2" NPT or 3/4" NPT process connection in brass or 316 SS. Dimensions are in accordance with SAMA Std. RC17-9. Standard "U" dimension (insertion length) is 2-1/2" for direct mount and 6' capillary units and is 4-1/2" for 12' capillary units.

Material	Pressure Rating (psig)	"U" Dimensions (Inches)	Process Connection	
			1/2" NPT	3/4" NPT
			Catalog No.	Catalog No.
Brass	1000	2-1/2	QP03	QP04
		4-1/2	QP13	QP14
		7-1/2	QP23	QP24
		10-1/2	QP33	QP34
316 SS	6000	2-1/2	QP07	QP08
		4-1/2	QP17	QP18
		7-1/2	QP27	QP28
		10-1/2	QP37	QP38

① Jam nuts provided with thermal wells.

Longer Capillaries – Standard copper and stainless steel capillary units can be furnished in 12' lengths. To order, add suffix "D" to transducer catalog number.
Consult ASCO for longer length capillaries.

Capillary Length (Feet)	Transducer Suffix	Bulb Length (Inches)	"U" Dimension Required (Inches)
6	---	3-1/2	2-1/2
12	D	5-1/2	4-1/2
13 - 20	E	5-1/2	4-1/2
21 - 50	F	8-1/2	7-1/2
51 - 80	G	11-1/2	10-1/2

Union Connector – For use with remote units for mounting of bulb in fluid being controlled. Available in 1/2" NPT and 3/4" NPT process connections in brass or 316 SS.

Material	Pressure Rating (psig)	Process Connection	
		1/2" NPT	3/4" NPT
		Catalog No.	Catalog No.
Brass	500	QP01	QP02
316 SS	1500	QP05	---

Definitions

Accuracy – The maximum deviation from the set point under specified operating condition (ambient temperature, barometric pressure, etc.).

Adjustable Deadband – Refers to the capability of a pressure or temperature switch to allow the deadband to be adjusted over a given range. Certain ASCO TRI-POINT switches have an adjustable deadband which can be adjusted over the total operating range of the switch.

Adjustable Operating Range – The pressure or temperature range of the switch within which the set point may be adjusted.

Differential Pressure – The difference between two pressures. A differential pressure switch senses two pressure sources and can be adjusted to actuate on a desired difference between them.

Guage Pressure – The actual reading of a typical pressure guage and is the difference between the pressure within a vessel and the atmospheric pressure surrounding it. It is normally measured in pounds per square inch (psig).

Manual Reset – The switch is a semi-automatic device which operates automatically with a signal change in one direction but must be manually reset once the signal returns to its original position.

Proof Pressure – A pressure which a device can be subjected to for extended periods of time without changes in its operating characteristics.

Rated Overrange Temperature – A temperature which a device can be subjected to for extended periods of time without changes in its operating characteristics.

Repeatability – The closeness of agreement among a number of consecutive measurements of the output for the same value of input under the same operating conditions approaching from the same direction. Repeatability is normally specified as a percentage of the upper limit of the operating range.

> Example: Operating range 5-100 psig with ±1% repeatability; equals ±1% of 100 psig or ±1 psig.

Reset Point – After a pressure or temperature switch has reached its set point and operated the electrical switch, it must return to a point called the reset point before the electrical switch can return to its original position.

Set Point – The pressure reading at which the electrical switch element changes contact position (it can be specified either increasing or decreasing).

Switch Unit – ASCO uses the term “switch unit” to describe the electromechanical portion of a pressure or temperature switch. This is used in conjunction with a transducer unit to form a complete pressure or temperature switch.

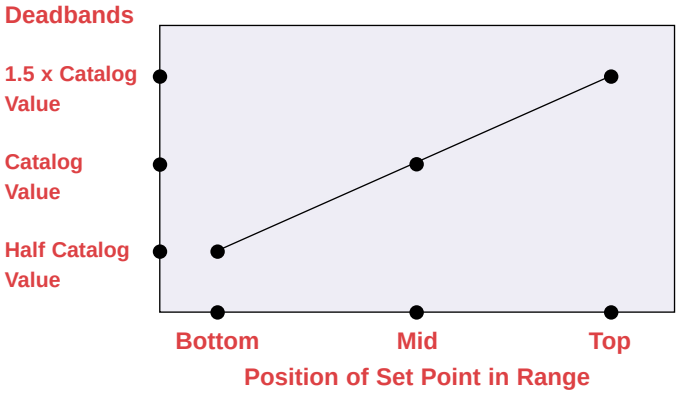
Transducer Unit – ASCO uses the term “transducer unit” to describe that portion of a pressure or temperature switch to which a pressure or temperature is applied which converts the input signal to another form of energy to operate the switch unit.

Two-Stage (Dual) – ASCO uses the term “two stage” to describe a pressure or temperature switch which is equivalent to two pressure or temperature switches which are independently adjustable. This switch is equivalent to two fixed deadband switches.

Deadbands – The deadband is the difference between the set point and reset point readings. Deadbands are listed in the specification tables at nominal values. They are representative of the deadbands of the units at the middle of the range.

The deadband values for the full range adjustable deadband switches and limited adjustable deadband switches indicate the values through which the deadband may be adjusted.

Generally, as the set point is adjusted through the operating range, the deadband will vary. Normally, it will become narrower as the set point is towards the bottom of the range, and will become wider when the set point is towards the top of the range. The graph shown below indicates representative trends of this type of deadband variation.



Temperature switch deadbands are a result of the characteristics of the vapor pressure curve as well as other factors. Normally, this results in a deadband which is narrower in the top third of the range than in the bottom third of the range. The values published are nominal and representative of mid-range set points.

Fluid Compatibility Guide

These recommendations are to be used as a guide only, as service life of material is dependent on temperature, concentrations, or catalysts that may be added and other conditions which are beyond our control.
Consult ASCO for specific service applications.

Note: Items in black circles are standard catalog units.
All others available on factory order.
P - Indicates preferred construction. **S** - Indicates satisfactory construction.

Transducer Material Code of Two Digits represents process connection material and diaphragm material, respectively; these are the sixth and seventh positions of the pressure transducer catalog number.

Process Connection: 6th Position

1 Aluminum
2 Brass
3 303 S.S.
4 316 S.S.
7 Nylon/Brass

Diaphragm: 7th Position

1 Buna "N"
2 Viton
3 Neoprene
4 316 S.S.
6 Ethylene Propylene
7 Fluorosilicone

Material Code		11	12	13	16	17	21	22	23	26	27	31	32	33	36	37	42	44	71
Ranges Available	Vacuum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	Inches of Water	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	P.S.I.G. ⑤ to	400	400	400	400	400	3500	3500	3500	3500	3500	8000	8000	8000	8000	8000	8000	400	200
Acetic Acid														S	S			P	
Acetylene		P	S		S							S	S		S		S	S	
Air		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Ammonia																		P	
Argon-Welding ①		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Benzene-Benzol			P					S					S				S	S	
Butane		P	S				S	S				S	S				S	S	
Carbon Tetrachloride													P				P	S	
Cellulube			P		S			S		S			S		S		S	S	
Coke Oven Gas													P				P	S	
Ethyl Alcohol (denatured)		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Ethylene Glycol		P	S	S	S		S	S	S	S		S	S	S	S		S	S	
Freon Refrigerants																		P	
Freon Solvents ("MF", "TF", "BF")							P	S				S	S				S	S	
Fuel Oils and Diesel ④		P	S				S	S				S	S				S	S	
Gasoline																		P	
Gas, Inert		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Gas (natural and manufactured) ④		P	S	S		S	S	S	S		S	S	S	S		S	S	S	
Helium		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Hydrogen		P	S	S	S		S	S	S	S		S	S	S	S		S	S	
Jet Fuel (JP1 to JP6)			P			S		S			S		S			S	S	S	
Kerosene		P	S				S	S				S	S					S	
Methyl Alcohol (Methanol)		P		S	S	S	S		S	S	S	S		S	S	S	S	S	
Naphtha		P	S				S	S				S	S				S	S	
Nitrogen		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Oils (coolant, hydraulic, lubricating and motor)		P	S				S	S				S	S				S	S	P
Oxygen, Gaseous ②			S	P		S		S	S		S		S	S		S	S	S	
Potassium Sulfate		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Propane Gas and Liquid		P	S	S			S	S	S			S	S	S			S	S	
"Pydraul" ("Monsanto")			P			S		S			S		S			S	S	S	
Steam ③							P	S		S	S	S	S		S	S	S	S	
Steam Condensate							P	S		S	S	S	S		S	S	S	S	P
Stoddard Solvent		P	S				S	S				S	S				S	S	
Toluene (Tolulo)			P					S					S				S	S	
Vacuum		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S		
Vegetable Oil		P	S	S		S						S	S	S		S	S	S	
Vinegar													S		S	S	S	P	
Water, Fresh, Boiler Feed							P	S		S	S	S	S		S	S	S	S	P
Water (Distilled, Deionized, Demineralized)												P	S	S	S	S	S	S	
Water, Sea																		S	

Notes: ① For high purity applications use stainless steel transducers. ② Oxygen service requires special cleaning, specify suffix "H". ③ For steam service a condensate loop (pigtail) is required. ④ For pressure transducers for combustion service see pages 20-23. ⑤ Material availability refers to standard gauge pressure constructions only.

Switches for Pressure to 8000 psig, Vacuum, Differential, or Level Control with General Purpose, Watertight or Explosion-Proof Enclosures

Features:

- Set point repeatability, ±1% of operating range.
- All wiring terminals, adjustments and visual scales are accessible from the front of the switch.
- Choice of general purpose, watertight or explosion-proof enclosures.
- Choice of fixed or full-range adjustable deadband.
- Choice of single or two-stage units.
- Manual reset units available.
- Mounts in any position.
- Rugged and vibration resistant.
- Visual adjustment scales in psi and bars.
- External adjusting nuts.
- Separate electrical, pressure and adjusting chambers.
- Wide selection of transducer wetted materials suitable for air, water, oil or corrosive fluids.
- Mix and match switch and transducer components for increased stock flexibility or to change pressure ranges in field.

General Description:

ASCO S-Series pressure switches consist of a switch unit and a transducer unit. They can be ordered separately for customer stocking and/or field assembly or as a complete factory-assembled unit.

Switch

S-Series pressure switch units incorporate the unique ASCO TRI-POINT alternating fulcrum balance plate to control the operation of one or more electrical snap-action swtiches. The electrical snap-action switch together with the adjusting mechanism is a fully-tested, self-contained subassembly.

Transducer

Transducer unit incorporates a diaphragm/piston type pressure sensor, and is also a fully-tested, self-contained subassembly.

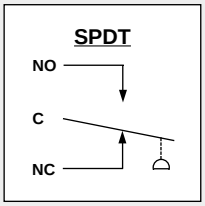
Operation

When pressure is applied to the transducer it is converted into movement of the piston. This piston movement is then used to control the operation of the electrical snap-action switch in the switch unit.

Standard Electrical Ratings

SA, SB, SC, SD and SE Series

15 Amp Res., 125 VAC
10 Amp Res., 250 VAC
1/8 HP, 125 VAC
1/4 HP, 250 VAC
1/2 Amp Res., 125 VDC
1/4 Amp Res., 250 VDC



Standard Temperature Ratings

Ambient: -4°F (-20°C) to 140°F (60°C)
Fluid: For Buna "N" or Neoprene Diaphragm
-4°F (-20°C) to 180°F (82°C)
For Viton Diaphragm
-4°F (-20°C) to 250°F (121°C)
For 316 SS Diaphragm
-50°F (-45°C) to 300°F (149°C)

Options (See pages 34-35)

Enclosures

ASCO TRI-POINT S-Series switches are available in three standard enclosures. All of these enclosed units are made in accordance with NEMA and UL standards.

General Purpose – Type 1. These enclosures are designed for indoor use to protect personnel from accidental contact with the equipment. S-Series general purpose switch units consist of a copper-free* aluminum die-cast body with a formed copper-free* aluminum cover; two 3/4" conduit hubs with one plug are provided.

Watertight – Type 4. Watertight and dust-tight enclosures are intended for use indoors and outdoors to protect the enclosed equipment against splashing or falling water, windblown dust and water, hose directed water, and severe external condensation. S-Series watertight switch units have a copper-free* aluminum die-cast body and a formed copper-free* aluminum cover with Buna "N" gaskets; two 3/4" conduit hubs with one plug are provided.

Explosion-Proof – Types 7 and 9. Type 7 enclosures are intended for use in locations defined by the National Electrical Code as Class I. Type 9 enclosures are intended for Class II locations.

Class I locations are those in which flammable gases are or may be present in the air in sufficient quantities to produce explosive or ignitable mixtures. Class I locations are classified by group letter, which defines particular atmospheres. Division 1 locations are areas where the hazardous concentration exists continuously, intermittently or periodically under normal operating conditions. Division 2 locations are those where the hazardous vapors are present only in case of accidental rupture or breakdown of equipment.

ASCO TRI-POINT explosion-proof enclosures with letter B, C or D in the fifth position are listed for Class I, Groups B, C, and D, Division 1. They are also suitable for the less stringent Division 2 environment.

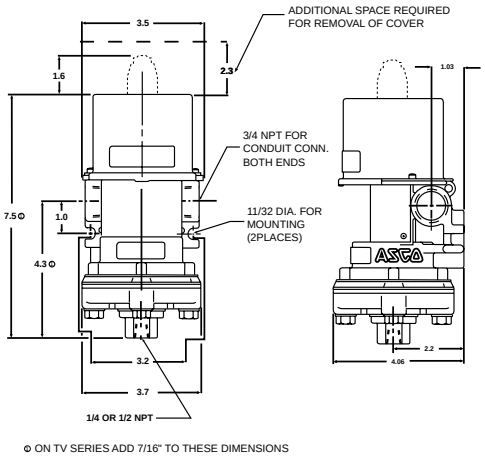
Class II locations are those which are hazardous because of the presence of combustible dust. All ASCO TRI-POINT explosion-proof enclosures are listed for Groups E, F, and G locations.

The switch body and cover are die-cast copper-free* aluminum with a Buna "N" gasket. Two 3/4" conduit hubs with one plug are provided.

Dimensions (inches)

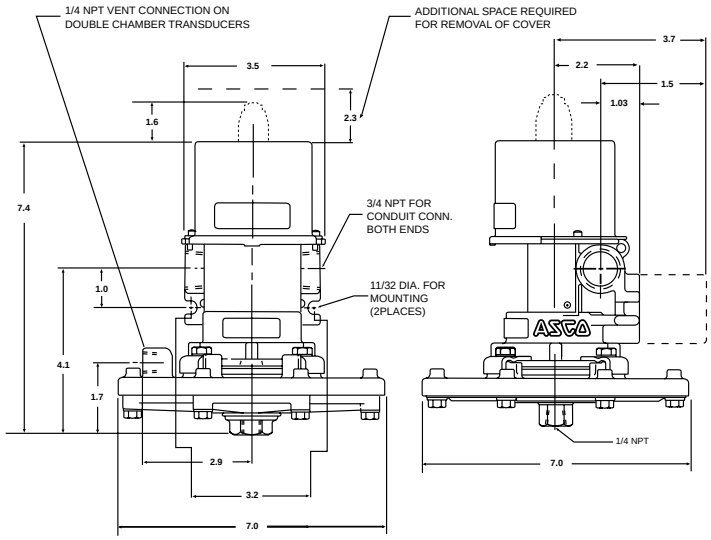
S-Series Pressure

With Types TD - TV Transducers



⊙ ON TV SERIES ADD 7/16" TO THESE DIMENSIONS

With Types TA - TC Transducers



* Less than 0.6% copper.

How to Select and Order

ASCO S-Series switches consist of two components, the switch unit and the transducer unit.

How to Select

1. Select the adjustable operating range based on desired actuation pressure.
2. Check that proof pressure is sufficient.
3. Read across and select the desired S-Series switch unit with the proper enclosure.
4. Continue across and select a matching transducer unit compatible with the fluid.

How to Order

Factory assembled – Simply order the switch and transducer unit by catalog number joined by a slash (/), e.g., SA40D/TA40A11.

Field assembled – Simply order the switch and transducer units separately by individual catalog number, e.g., one SA40D and one TA40A11.

***Options* –** Add appropriate suffix for desired option (see pages 34-35).

***Important Note*:** The third digit of each of the catalog numbers must be identical, e.g., SA 4 0D and TA 4 0A11.

Select S-Series pressure switch SA, SB, SC, SD and SE unit below

SA Switch Unit

Single-Stage Adjustable Deadband units allow independent adjustment of the set and reset points over the full operating range of the switch. The minimum difference between set and reset points is the deadband listed below; the maximum difference is the full range of the switch .

General Purpose

SB, SD or SE Switch Unit

SB Switch Unit: Single-Stage Fixed Deadband units have an adjustable set point and a non-adjustable automatic reset point.
SD Switch Unit: Manual reset on decreasing pressure units operate automatically on increasing pressure and must be reset manually on decreasing pressure.
(To order, change second digit to letter “D”, e.g., S B 40D becomes S D 40D).
SE Switch Unit: Manual reset on increasing pressure units operate automatically on decreasing pressure and must be reset manually on increasing pressure.
(To order, change second digit to letter “E”, e.g., S B 40D becomes S E 40D).

SC Switch Unit

Two-Stage Fixed Deadband units consist of two separate snap-action switches, each with an independently adjustable set point and non-adjustable reset point. The difference between the set and reset points of each switch is the deadband listed below; the minimum difference between the set points of the two switches is the separation.

Explosion Proof

Select transducer unit below

Series TA-TC

Series TD-TQ

Standard connection is 1/4” NPT; (Optional 1/2” NPT add suffix “B” to catalog numbers TD thru TQ)

Transducer Unit

These **guage pressure type transducers** provide for one pressure connection in the bottom of the transducer. They are diaphragm/piston type transducers using an elastomer in contact with the fluid, backed by a piston cylinder. This allows high sensitivity for low pressures and strength for high pressures.

Specifications		Adjustable Deadband				Fixed Deadband or Manual Reset				Two-Stage Fixed Deadband					Transducer Units			
		Adjustable Deadband Maximum Full Scale									Separation Maximum Full Scale				Air, Oil or Gas	Water, Air Oil or Gas	Corrosive Fluids	
Adjustable Operating Range (psig)	Proof Pressure (psig)	Minimum At Mid-Range (psig) ①	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.	Fixed Deadband At Mid-Range (psig) ①	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.	Fixed Deadband At Mid-Range (psig) ①	Minimum At Mid-Range (psig) ①	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.	Aluminum & Buna “N” Catalog No.	Brass & Buna “N” Catalog No.	All 316 SS ② Catalog No.	316 SS & Viton ③ Catalog No.
0 - 12” W.C.	25	1.5” W.C.	SA40D	SA41D	SA42D	1.0” W.C.	SB40D	SB41D	SB42D	1.2” W.C.	2.4” W.C.	SC40D	SC41D	SC42D	TA40A11	---	---	TA40A32
0 - 27” W.C.	25	2.0” W.C.	SA30D	SA31D	SA32D	1.2” W.C.	SB30D	SB31D	SB32D	1.4” W.C.	2.7” W.C.	SC30D	SC31D	SC32D	TA30A11	---	---	TA30A32
0 - 65” W.C.	25	2.5” W.C.	SA20D	SA21D	SA22D	1.4” W.C.	SB20D	SB21D	SB22D	1.6” W.C.	6.5” W.C.	SC20D	SC21D	SC22D	TA20A11	---	---	TA20A32
15 - 140” W.C.	40	6” W.C.	SA20D	SA21D	SA22D	3” W.C.	SB20D	SB21D	SB22D	4.0” W.C.	14” W.C.	SC20D	SC21D	SC22D	TB20A11	---	---	TB20A32
15 - 250” W.C.	40	10” W.C.	SA10D	SA11D	SA12D	6” W.C.	SB10D	SB11D	SB12D	7.0” W.C.	25” W.C.	SC10D	SC11D	SC12D	TB10A11	---	---	TB10A32
25 - 400” W.C.	40	15” W.C.	SA10D	SA11D	SA12D	8” W.C.	SB10D	SB11D	SB12D	13.0” W.C.	40” W.C.	SC10D	SC11D	SC12D	TC10A11	---	---	TC10A32
0.4 - 4.5	100	0.4	SA40D	SA41D	SA42D	0.3	SB40D	SB41D	SB42D	0.4	0.7	SC40D	SC41D	SC42D	TD40A11	TD40A21	---	TD40A42
0.7 - 9.0	100	0.6	SA30D	SA31D	SA32D	0.3	SB30D	SB31D	SB32D	0.4	0.9	SC30D	SC31D	SC32D	TD30A11	TD30A21	---	TD30A42
0.8 - 9.0	150	1.4	SA40D	SA41D	SA42D	0.8	SB40D	SB41D	SB42D	1.0	1.6	SC40D	SC41D	SC42D	---	---	TE40A44	---
1.0 - 18	100	1.1	SA20D	SA21D	SA22D	0.4	SB20D	SB21D	SB22D	0.6	1.8	SC20D	SC21D	SC22D	TD20A11	TD20A21	---	TD20A42
1.0 - 18	150	1.6	SA30D	SA31D	SA32D	1.0	SB30D	SB31D	SB32D	1.2	1.8	SC30D	SC31D	SC32D	---	---	TE30A44	---
1.5 - 36	150	2.2	SA20D	SA21D	SA22D	0.9	SB20D	SB21D	SB22D	1.4	3.6	SC20D	SC21D	SC22D	TE20A11	TE20A21	TE20A44	TE20A42
2 - 60	150	3.6	SA10D	SA11D	SA12D	1.5	SB10D	SB11D	SB12D	2.2	6	SC10D	SC11D	SC12D	TE10A11	TE10A21	TE10A44	TE10A42
5 - 60	3000	6.0	SA30D	SA31D	SA32D	4.0	SB30D	SB31D	SB32D	5.5	8	SC30D	SC31D	SC32D	---	---	---	TG33A42
3 - 100	200	6.0	SA10D	SA11D	SA12D	2.5	SB10D	SB11D	SB12D	3.5	10	SC10D	SC11D	SC12D	TF10A11	TF10A21	TF10A44	TF10A42
5 - 120	3000	10	SA20D	SA21D	SA22D	5.0	SB20D	SB21D	SB22D	7.0	12	SC20D	SC21D	SC22D	---	---	---	TG23A42
5 - 200	3000	14	SA10D	SA11D	SA12D	6.0	SB10D	SB11D	SB12D	8.5	20	SC10D	SC11D	SC12D	---	---	---	TG13A42
6 - 200	400	12	SA10D	SA11D	SA12D	5.0	SB10D	SB11D	SB12D	7.0	20	SC10D	SC11D	SC12D	TG10A11	TG10A21	TG10A44	TG10A42
13 - 300	600	18	SA10D	SA11D	SA12D	8	SB10D	SB11D	SB12D	10	30	SC10D	SC11D	SC12D	TH10A11	TH10A21	TH10A44	TH10A42
15 - 400	600	24	SA10D	SA11D	SA12D	10	SB10D	SB11D	SB12D	14	40	SC10D	SC11D	SC12D	TJ10A11	TJ10A21	TJ10A44	TJ10A42
30 - 600	900	36	SA10D	SA11D	SA12D	15	SB10D	SB11D	SB12D	20	60	SC10D	SC11D	SC12D	---	TK10A21	---	TK10A42
50 - 1000	1500	75	SA10D	SA11D	SA12D	30	SB10D	SB11D	SB12D	40	100	SC10D	SC11D	SC12D	---	TL10A21	---	TL10A42
75 - 1500	2300	115	SA10D	SA11D	SA12D	45	SB10D	SB11D	SB12D	60	150	SC10D	SC11D	SC12D	---	TM10A21	---	TM10A42
200 - 3500	5000	225	SA10D	SA11D	SA12D	125	SB10D	SB11D	SB12D	150	350	SC10D	SC11D	SC12D	---	TN10B21	---	TN10B42
500 - 8000	9000	450	SA10D	SA11D	SA12D	275	SB10D	SB11D	SB12D	300	800	SC10D	SC11D	SC12D	---	---	---	TQ10B42

All switch units above are in stock for immediate delivery.

All switch units and transducer units above are in stock for immediate delivery.

① Values shown are nominal.

② 316 SS transducers increase deadband by 50%. ③ Transducers ending in 32 have 303 SS process connections, not 316 SS.

H-Series, P-Series and S-Series Snap-Action Switch Options

Optional snap-action switches to meet specific electrical loads or application conditions are available on most ASCO TRI-POINT switch units. Generally, the construction of a switch unit with optional snap-action switches contains other specific parts and may be ordered only as a factory-built unit. To specify a particular optional construction, add the appropriate suffix to the switch unit catalog number, e.g., SA10D with optional gold contact snap-action switch (suffix "P") would become SA10D P.

Description	Electrical Rating	Catalog Suffix	Deadband Variation From Listing
DC Rating 1 Amp Double Break	5 Amp, 125, 250 VAC 1/4 HP, 125 VAC 1/2 HP, 250 VAC 1 Amp, 125 VDC 1/2 Amp, 250 VDC	G	SA: +50% SB, SC, PA: +100% H: +200% PB: +400%
DC Rating 10 Amps, SPDT	10 Amp, 125 VAC, VDC 1/8 HP, 125 VAC, VDC	M	SA: +50% SB, SC, PA: +100% H: +120% PB: +400%
Double-pole Double-throw (Two SPDT Switches with Common Lever)	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	K	SA, SB, SD, SE, PB: +50%
Gold Contact Dry Circuit SPDT	1 Amp, 28 VAC 1 Amp, 28 VDC 25 Amp Res, 28 VDC	P	SA, SB, SC, PA: +25% H: +50% PB, PC: +100%
Hermetically Sealed SPDT	10 Amp Ind, 28 VDC 5 Amp Motor, 28 VDC 3 Amp Lamp, 28 VDC 1 Amp, 125 VAC	H	SA, PA: +100% H: +200% PB: +600%
High Ambient 250°F SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	F	SA, SB, SC: +25%
High Power 1 HP SPDT	20 Amp, 125, 250 VAC 1 HP, 125 VAC 2 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	W	SA: +50% SB, SC: +100% PB: +400%
Moisture Resistant Sealed Switch SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	J	SA: None SB, SC, PA: +25% PB, H: +50%
Tight Fixed Deadband SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC	T	SB, SC: -50%

P-Series Switch Options

Panel Mount – Open frame P-Series compact switch units are available for panel mounting with the switch unit inside and the transducer outside. The panel separates the fluid sensing portion from the electromechanical portion. Five holes for bolts and operating stem must be drilled or punched through the panel. Three constructions are available: add the suffix listed below to the switch unit catalog number for the desired thickness.

Panel Thickness	Suffix
10 Ga (.135±.005)	10
14 Ga (.075±.005)	11
16 Ga (.060±.005)	12

S-Series Switch Options

Industrial Adjusting Nut Covers – Available in clear plastic or metal to prevent tampering with set point adjusting nuts.
Clear plastic cover: To order, add suffix "1" to the switch unit catalog number, or order separately as SP01.
Metal cover: To order, add suffix "2" to the switch unit catalog number, or order separately as SP02.

JIC Construction – A switch unit having the electrical and adjusting nut covers attached to the switch body by a chain. Also designed to Type 13 specifications. To order, add suffix "3" to the switch unit catalog number, or order separately as SP03.

Terminal Block – Applicable to switch units with one single-poledouble-throw switch. The terminal strip is prewired to the snap-action switch. To order, add suffix "4" to the switch unit catalog number, or order separately as SP04.

Factory Sealed – Explosion-proof units may be ordered with a factory seal separating the electrical chamber from the conduit hubs and 24" long #14 AWG 105°C. rated lead wires. To order, change the fourth digit of the switch unit catalog number from "2" to "3", e.g., SA12D becomes SA13D.

Pressure Transducer Options

Special Wetted Materials – The following diaphragms may be substituted on transducer body materials of aluminum, brass, polyester and stainless steel. To order, substitute the material code below in the seventh digit of the transducer catalog number, e.g., a TF10A1[1] with optional viton diaphragm becomes a TF10A1[2].

Diaphragm	Material Code	Temperature Range
Buna "N"	1	-4°F (-20°C) to 180°F (82°C)
Ethylene Propylene	6	-4°F (-20°C) to 250°F (121°C)
Neoprene	3	-4°F (-20°C) to 180°F (82°C)
Fluorosilicone	7	-40°F (-40°C) to 250°F (121°C)
Viton	2	-4°F (-20°C) to 250°F (121°C)

Oxygen Cleaning – Pressure transducers for oxygen service should be specially cleaned. They are degreased and blacklight inspected, then assembled in a clean area and tested with oil-free air or nitrogen. Use metal body transducer with viton or neoprene diaphragm and add suffix "H" to transducer catalog number, e.g., TA40A13 becomes TA40A13[H].

Pressure Snubbers – A pressure snubber (1/4" NPTF by 1/4" NPTM) installed in the transducer pressure connection will dampen the pressure spikes to a value which will not cause damage. It consists of a body with a porous metal disc of stainless steel through which the fluid passes. To order, select a snubber compatible with the fluid. Available by seperate catalog number only (see table below).

Fluid	Brass Catalog No.	303 SS Catalog No.
Air, Non-Hazardous Gases	TP04G2	TP04G3
Water, Light Oil (under 225 SSU)	TP04E2	TP04E3
Oil (Heavy, (over 225 SSU)	TP04D2	TP04D3
Pressure Rating (psig)	2000	5000

Process Connection – A female process connection (1/4" NPT) is standard on all pressure transducers. A 1/2" NPT is available as an option on *gauge* pressure transducers. To order, add suffix "B" to transducer catalog number, e.g., RF10A21 becomes RF10A21[B].
Note: Not available on nylon transducers.

P-Series and S-Series Temperature Transducer Options

Armored Capillaries – Double braided copper armor is standard for copper capillary units. Stainless steel spiral interlocked armor is available for stainless steel capillary units. Add suffix "C" to transducer catalog number.

Thermal Well

Thermal Well① – Use with direct or remote sensors for protecting sensing bulb. This allows removal of bulb while maintaining a pressure-tight vessel. Available in 1/2" NPT or 3/4" NPT process connection in brass or 316 SS. Dimensions are in accordance with SAMA Std. RC17-9. Standard "U" dimension (insertion length) is 2-1/2" for direct mount and 6' capillary units and is 4-1/2" for 12' capillary units.

Material	Pressure Rating (psig)	"U" Dimensions (Inches)	Process Connection	
			1/2" NPT	3/4" NPT
			Catalog No.	Catalog No.
Brass	1000	2-1/2	QP03	QP04
		4-1/2	QP13	QP14
		7-1/2	QP23	QP24
		10-1/2	QP33	QP34
316 SS	6000	2-1/2	QP07	QP08
		4-1/2	QP17	QP18
		7-1/2	QP27	QP28
		10-1/2	QP37	QP38

① Jam nuts provided with thermal wells.

Longer Capillaries – Standard copper and stainless steel capillary units can be furnished in 12' lengths. To order, add suffix "D" to transducer catalog number.
Consult ASCO for longer length capillaries.

Capillary Length (Feet)	Transducer Suffix	Bulb Length (Inches)	"U" Dimension Required (Inches)
6	---	3-1/2	2-1/2
12	D	5-1/2	4-1/2
13 - 20	E	5-1/2	4-1/2
21 - 50	F	8-1/2	7-1/2
51 - 80	G	11-1/2	10-1/2

Union Connector – For use with remote units for mounting of bulb in fluid being controlled. Available in 1/2" NPT and 3/4" NPT process connections in brass or 316 SS.

Material	Pressure Rating (psig)	Process Connection	
		1/2" NPT	3/4" NPT
		Catalog No.	Catalog No.
Brass	500	QP01	QP02
316 SS	1500	QP05	---

Definitions

Accuracy – The maximum deviation from the set point under specified operating condition (ambient temperature, barometric pressure, etc.).

Adjustable Deadband – Refers to the capability of a pressure or temperature switch to allow the deadband to be adjusted over a given range. Certain ASCO TRI-POINT switches have an adjustable deadband which can be adjusted over the total operating range of the switch.

Adjustable Operating Range – The pressure or temperature range of the switch within which the set point may be adjusted.

Differential Pressure – The difference between two pressures. A differential pressure switch senses two pressure sources and can be adjusted to actuate on a desired difference between them.

Guage Pressure – The actual reading of a typical pressure guage and is the difference between the pressure within a vessel and the atmospheric pressure surrounding it. It is normally measured in pounds per square inch (psig).

Manual Reset – The switch is a semi-automatic device which operates automatically with a signal change in one direction but must be manually reset once the signal returns to its original position.

Proof Pressure – A pressure which a device can be subjected to for extended periods of time without changes in its operating characteristics.

Rated Overrange Temperature – A temperature which a device can be subjected to for extended periods of time without changes in its operating characteristics.

Repeatability – The closeness of agreement among a number of consecutive measurements of the output for the same value of input under the same operating conditions approaching from the same direction. Repeatability is normally specified as a percentage of the upper limit of the operating range.

> Example: Operating range 5-100 psig with ±1% repeatability; equals ±1% of 100 psig or ±1 psig.

Reset Point – After a pressure or temperature switch has reached its set point and operated the electrical switch, it must return to a point called the reset point before the electrical switch can return to its original position.

Set Point – The pressure reading at which the electrical switch element changes contact position (it can be specified either increasing or decreasing).

Switch Unit – ASCO uses the term “switch unit” to describe the electromechanical portion of a pressure or temperature switch. This is used in conjunction with a transducer unit to form a complete pressure or temperature switch.

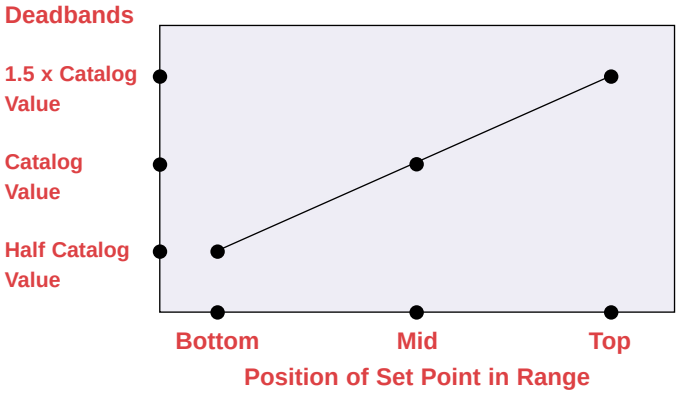
Transducer Unit – ASCO uses the term “transducer unit” to describe that portion of a pressure or temperature switch to which a pressure or temperature is applied which converts the input signal to another form of energy to operate the switch unit.

Two-Stage (Dual) – ASCO uses the term “two stage” to describe a pressure or temperature switch which is equivalent to two pressure or temperature switches which are independently adjustable. This switch is equivalent to two fixed deadband switches.

Deadbands – The deadband is the difference between the set point and reset point readings. Deadbands are listed in the specification tables at nominal values. They are representative of the deadbands of the units at the middle of the range.

The deadband values for the full range adjustable deadband switches and limited adjustable deadband switches indicate the values through which the deadband may be adjusted.

Generally, as the set point is adjusted through the operating range, the deadband will vary. Normally, it will become narrower as the set point is towards the bottom of the range, and will become wider when the set point is towards the top of the range. The graph shown below indicates representative trends of this type of deadband variation.



Temperature switch deadbands are a result of the characteristics of the vapor pressure curve as well as other factors. Normally, this results in a deadband which is narrower in the top third of the range than in the bottom third of the range. The values published are nominal and representative of mid-range set points.

Fluid Compatibility Guide

These recommendations are to be used as a guide only, as service life of material is dependent on temperature, concentrations, or catalysts that may be added and other conditions which are beyond our control.
Consult ASCO for specific service applications.

Note: Items in black circles are standard catalog units.
All others available on factory order.
P - Indicates preferred construction. **S** - Indicates satisfactory construction.

Transducer Material Code of Two Digits represents process connection material and diaphragm material, respectively; these are the sixth and seventh positions of the pressure transducer catalog number.

Process Connection: 6th Position

1 Aluminum
2 Brass
3 303 S.S.
4 316 S.S.
7 Nylon/Brass

Diaphragm: 7th Position

1 Buna "N"
2 Viton
3 Neoprene
4 316 S.S.
6 Ethylene Propylene
7 Fluorosilicone

Material Code		11	12	13	16	17	21	22	23	26	27	31	32	33	36	37	42	44	71
Ranges Available	Vacuum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	Inches of Water	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	P.S.I.G. ⑤ to	400	400	400	400	400	3500	3500	3500	3500	3500	8000	8000	8000	8000	8000	8000	400	200
Acetic Acid														S	S			P	
Acetylene		P	S		S							S	S		S		S	S	
Air		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Ammonia																		P	
Argon-Welding ①		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Benzene-Benzol			P					S					S				S	S	
Butane		P	S				S	S				S	S				S	S	
Carbon Tetrachloride													P				P	S	
Cellulube			P		S			S		S			S		S		S	S	
Coke Oven Gas													P				P	S	
Ethyl Alcohol (denatured)		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Ethylene Glycol		P	S	S	S		S	S	S	S		S	S	S	S		S	S	
Freon Refrigerants																		P	
Freon Solvents ("MF", "TF", "BF")							P	S				S	S				S	S	
Fuel Oils and Diesel ④		P	S				S	S				S	S				S	S	
Gasoline																		P	
Gas, Inert		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Gas (natural and manufactured) ④		P	S	S		S	S	S	S		S	S	S	S		S	S	S	
Helium		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Hydrogen		P	S	S	S		S	S	S	S		S	S	S	S		S	S	
Jet Fuel (JP1 to JP6)			P			S		S			S		S			S	S	S	
Kerosene		P	S				S	S				S	S					S	
Methyl Alcohol (Methanol)		P		S	S	S	S		S	S	S	S		S	S	S	S	S	
Naphtha		P	S				S	S				S	S				S	S	
Nitrogen		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Oils (coolant, hydraulic, lubricating and motor)		P	S				S	S				S	S				S	S	P
Oxygen, Gaseous ②			S	P		S		S	S		S		S	S		S	S	S	
Potassium Sulfate		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Propane Gas and Liquid		P	S	S			S	S	S			S	S	S			S	S	
"Pydraul" ("Monsanto")			P			S		S			S		S			S	S	S	
Steam ③							P	S		S	S	S	S		S	S	S	S	
Steam Condensate							P	S		S	S	S	S		S	S	S	S	P
Stoddard Solvent		P	S				S	S				S	S				S	S	
Toluene (Tolulo)			P					S					S				S	S	
Vacuum		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S		
Vegetable Oil		P	S	S		S						S	S	S		S	S	S	
Vinegar													S		S	S	S	P	
Water, Fresh, Boiler Feed							P	S		S	S	S	S		S	S	S	S	P
Water (Distilled, Deionized, Demineralized)												P	S	S	S	S	S	S	
Water, Sea																		S	

Notes: ① For high purity applications use stainless steel transducers. ② Oxygen service requires special cleaning, specify suffix "H". ③ For steam service a condensate loop (pigtail) is required. ④ For pressure transducers for combustion service see pages 20-23. ⑤ Material availability refers to standard gauge pressure constructions only.

Switches for -30 through 640°F with Adjustable Set Points, Fixed or Adjustable Deadband and General Purpose, Watertight or Explosion-Proof Enclosures

Features:

- Set point repeatability, ±1°F (1/2°C).
- All wiring terminals, adjustments and visual scales are accessible from the front of the switch.
- Choice of general purpose, watertight or explosion-proof enclosures.
- Choice of fixed or full-range adjustable deadband.
- Choice of single or two-stage units.
- Manual reset units available.
- Mounts in any position.
- Rugged and vibration resistant.
- Visual adjustment scales in °F and °C.
- External adjusting nuts.
- Separate temperature, electrical and adjusting chambers.
- Direct mount (local) or capillary and bulb (remote) sensors.
- Temperature transducers available with copper or 316 stainless steel wetted material.
- Withstands high overrange temperatures.
- Mix and match switch and transducer components for increased stock flexibility or to change pressure ranges in field.

General Description:

ASCO S-Series temperature switches consist of a switch unit and a transducer unit. They can be ordered separately for customer stocking and/or field assembly or as a complete factory-assembled unit.

Switch

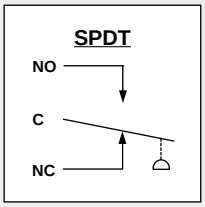
S-Series temperature switch units incorporate the unique ASCO TRI-POINT alternating fulcrum balance plate to control the operation of one or more electrical snap-action swtiches. The electrical snap-action switch together with the adjusting mechanism is a fully-tested, self-contained subassembly.

Transducer

The temperature transducer unit uses a vapor pressure principle where the internal pressure within the unit is generated by the vapor pressure of a chemical within a sealed system. Temperature transducers are available in two constructions, a direct mount or capillary and bulb construction. The direct mount unit includes a 1/2" NPT connection for direct mounting to the process. The capillary and bulb construction allows remote mounting from the process. The transducer unit (like the switch unit) is a fully-tested, self-contained subassembly.

Standard Electrical Ratings

SA, SB, SC, SD and SE Series
15 Amp Res., 125 VAC
10 Amp Res., 250 VAC
1/8 HP, 125 VAC
1/4 HP, 250 VAC
1/2 Amp Res., 125 VDC
1/4 Amp Res., 250 VDC



Standard Temperature Ratings

Ambient: -4°F (-20°C) to 140°F (60°C)
Fluid: See specification table on page 32 for rated overrange temperature.

Operation

Temperature sensed by the bulb creates an internal pressure within the transducer. This pressure is then converted into movement of the piston. This piston movement is then used to control the operation of the electrical snap-action switch in the switch unit.

Options (See pages 34-35)

Enclosures

ASCO TRI-POINT S-Series switches are available in three standard enclosures. All of these enclosed units are made in accordance with NEMA and UL standards.

General Purpose – Type 1. These enclosures are designed for indoor use to protect personnel from accidental contact with the equipment. S-Series general purpose switch units consist of a copper-free* aluminum die-cast body with a formed copper-free* aluminum cover; two 3/4” conduit hubs with one plug are provided.

Watertight – Type 4. Watertight and dust-tight enclosures are intended for use indoors and outdoors to protect the enclosed equipment against splashing or falling water, windblown dust and water, hose directed water, and severe external condensation. S-Series watertight switch units have a copper-free* aluminum die-cast body and a formed copper-free* aluminum cover with Buna “N” gaskets; two 3/4” conduit hubs with one plug are provided.

Explosion-Proof – Types 7 and 9. Type 7 enclosures are intended for use in locations defined by the National Electrical Code as Class I. Type 9 enclosures are intended for Class II locations.

Class I locations are those in which flammable gases are or may be present in the air in sufficient quantities to produce explosive or ignitable mixtures. Class I locations are classified by group letter, which defines particular atmospheres. Division 1 locations are areas where the hazardous concentration exists continuously, intermittently or periodically under normal operating conditions. Division 2 locations are those where the hazardous vapors are present only in case of accidental rupture or breakdown of equipment.

ASCO TRI-POINT explosion-proof enclosures with letter B, C or D in the fifth position are listed for Class I, Groups B, C, and D, Division 1. They are also suitable for the less stringent Division 2 environment.

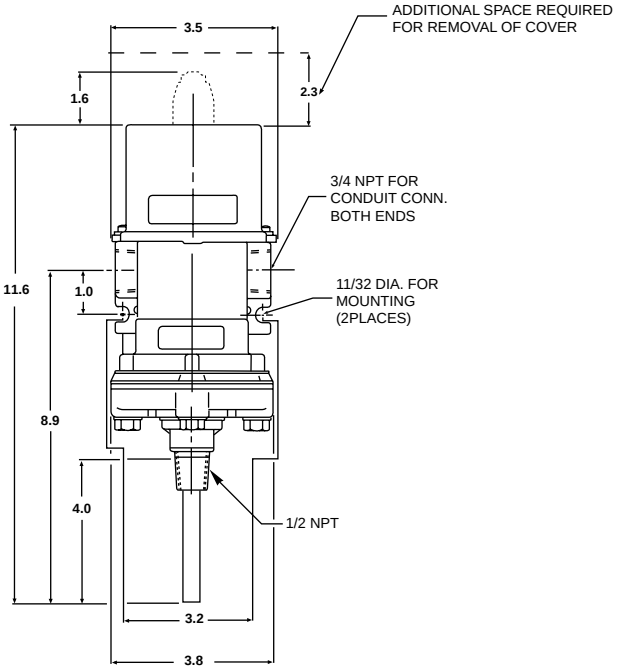
Class II locations are those which are hazardous because of the presence of combustible dust. All ASCO TRI-POINT explosion-proof enclosures are listed for Groups E, F, and G locations.

The switch body and cover are die-cast copper-free* aluminum with a Buna “N” gasket. Two 3/4” conduit hubs with one plug are provided.

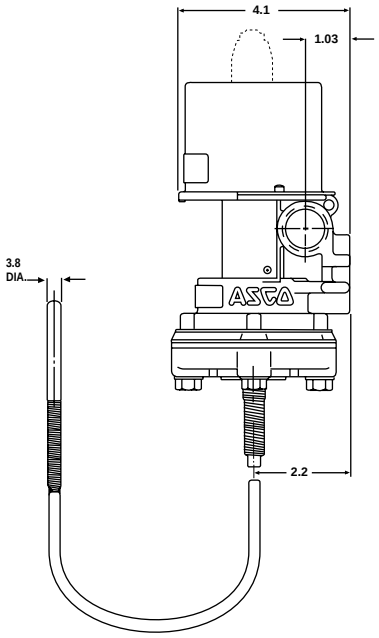
Dimensions (inches)

S-SeriesTemperature

With Direct Mount Transducer



With Capillary and Bulb Transducer



* Less than 0.6% copper.

How to Select and Order

ASCO S-Series switches consist of two components, the switch unit and the transducer unit.

How to Select

1. Select the adjustable operating range based on desired actuation temperature.
2. Check that rated overrange temperature is sufficient.
3. Read across and select the desired S-Series switch unit with the proper enclosure.
4. Continue across and select a matching transducer unit compatible with the fluid.

How to Order

Factory assembled – Simply order the switch and transducer unit by catalog number joined by a slash (/), e.g., SA10D/QA10A1.

Field assembled – Simply order the switch and transducer units separately by individual catalog number, e.g., one SA10D and one QA10A1.

***Options* –** Add appropriate suffix for desired option (see pages 34-35).

***Important Note*:** The third digit of each of the catalog numbers must be identical, e.g., SA 1 0D and QA 1 0A1.

Select S-Series temperature switch

SA Switch Unit

Single-Stage Adjustable Deadband units allow independent adjustment of the set and reset points over the full operating range of the switch. The minimum difference between set and reset points is the deadband listed below; the maximum difference is the full range of the switch .

General Purpose

SB, SD or SE Switch Unit

SB Switch Unit: Single-Stage Fixed Deadband units have an adjustable set point and a non-adjustable automatic reset point.
SD Switch Unit: Manual reset on decreasing temperature units operate automatically on increasing temperature and must be reset manually on decreasing temperature. (To order, change second digit to letter "D", e.g., S B 40D becomes S D 40D).
SE Switch Unit: Manual reset on increasing temperature units operate automatically on decreasing temperature and must be reset manually on increasing temperature. (To order, change second digit to letter "E", e.g., S B 40D becomes S E 40D).

Specifications				Adjustable Deadband				Fixed Deadband or Manual Reset			
Adjustable Operating Range (°F)	Rated Overrange Temperature (°F)			Adjustable Deadband Maximum Full Scale Minimum At Mid-Range (°F) ①	General Purpose	Watertight Enclosure	Explosion-Proof	Fixed Deadband At Mid-Range (°F) ①	General Purpose	Watertight Enclosure	Explosion-Proof
	Direct Mount	Capillary			Catalog No.	Catalog No.	Catalog No.		Catalog No.	Catalog No.	Catalog No.
		Copper	SS								
-30 - 60	250	250	250	8	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
0 - 90	260	300	300	8	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
50 - 160	260	350	350	8	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
100 - 220	260	450	450	8	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
160 - 260	260	500	500	9	SA10D	SA11D	SA12D	3	SB10D	SB11D	SB12D
225 - 340	---	550	600	12	SA10D	SA11D	SA12D	6	SB10D	SB11D	SB12D
300 - 450	---	550	700	12	SA10D	SA11D	SA12D	6	SB10D	SB11D	SB12D
350 - 510	---	550	800	18	SA10D	SA11D	SA12D	7	SB10D	SB11D	SB12D
425 - 640	---	550	890	32	SA10D	SA11D	SA12D	20	SB10D	SB11D	SB12D

All switch units above are in stock for immediate delivery.

°C = (°F -32) x 5/9

① Values shown are nominal.

SA, SB, SC, SD or SE unit below

SC Switch Unit

Two-Stage Fixed Deadband units consist of two separate snap-action switches, each with an independently adjustable set point and non-adjustable reset point. The difference between the set and reset points of each switch is the deadband listed below; the minimum difference between the set points of the two switches is the separation.

Explosion Proof

Select transducer unit below

Direct Mount
1/2" NPT

Capillary
and Bulb

Transducer Unit

The **temperature transducer** works on the vapor principle where the internal pressure within the system is generated by the vapor pressure of a chemical within a sealed system. The temperature sensed by the bulb is related uniquely to an internal pressure within the system. The pressure acts on a diaphragm/piston to create the force output from the transducer into the switch unit. Temperature transducers are available in two constructions. The direct mount (local) unit includes a 1/2" NPT connection for direct application to the process. The capillary and bulb-type construction allows for remote mounting from the process.

Two-Stage Fixed Deadband

Fixed Deadband At Mid-Range (°F) ①	Separation: Maximum Full Scale / Minimum At Mid-Range (°F) ①	General Purpose Catalog No.	Watertight Enclosure Catalog No.	Explosion-Proof Catalog No.
4	8	SC10D	SC11D	SC12D
4	8	SC10D	SC11D	SC12D
4	8	SC10D	SC11D	SC12D
4	8	SC10D	SC11D	SC12D
4	9	SC10D	SC11D	SC12D
8	12	SC10D	SC11D	SC12D
8	12	SC10D	SC11D	SC12D
10	18	SC10D	SC11D	SC12D
27	32	SC10D	SC11D	SC12D

Transducer Units

Direct Mount		6' Capillary and Bulb		12' Capillary and Bulb	
Copper Catalog No.	316 SS Catalog No.	Copper (Armored Capillary) Catalog No.	316 SS (Plain Capillary) Catalog No.	Copper (Armored Capillary) Catalog No.	316 SS & (Plain Capillary) Catalog No.
QB10A1	QB10A4	QB11A1	QB11A4	QB11A1D	QB11A4D
QD10A1	QD10A4	QD11A1	QD11A4	QD11A1D	QD11A4D
QF10A1	QF10A4	QF11A1	QF11A4	QF11A1D	QF11A4D
QJ10A1	QJ10A4	QJ11A1	QJ11A4	QJ11A1D	QJ11A4D
QL10A1	QL10A4	QL11A1	QL11A4	QL11A1D	QL11A4D
---	---	QN11A1	QN11A4	QN11A1D	QN11A4D
---	---	QT11A1	QT11A4	QT11A1D	QT11A4D
---	---	QU11A1	QU11A4	QU11A1D	QU11A4D
---	---	---	QW11A4	---	QW11A4D

All switch units and transducer units above are in stock for immediate delivery.

H-Series, P-Series and S-Series Snap-Action Switch Options

Optional snap-action switches to meet specific electrical loads or application conditions are available on most ASCO TRI-POINT switch units. Generally, the construction of a switch unit with optional snap-action switches contains other specific parts and may be ordered only as a factory-built unit. To specify a particular optional construction, add the appropriate suffix to the switch unit catalog number, e.g., SA10D with optional gold contact snap-action switch (suffix "P") would become SA10D P.

Description	Electrical Rating	Catalog Suffix	Deadband Variation From Listing
DC Rating 1 Amp Double Break	5 Amp, 125, 250 VAC 1/4 HP, 125 VAC 1/2 HP, 250 VAC 1 Amp, 125 VDC 1/2 Amp, 250 VDC	G	SA: +50% SB, SC, PA: +100% H: +200% PB: +400%
DC Rating 10 Amps, SPDT	10 Amp, 125 VAC, VDC 1/8 HP, 125 VAC, VDC	M	SA: +50% SB, SC, PA: +100% H: +120% PB: +400%
Double-pole Double-throw (Two SPDT Switches with Common Lever)	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	K	SA, SB, SD, SE, PB: +50%
Gold Contact Dry Circuit SPDT	1 Amp, 28 VAC 1 Amp, 28 VDC 25 Amp Res, 28 VDC	P	SA, SB, SC, PA: +25% H: +50% PB, PC: +100%
Hermetically Sealed SPDT	10 Amp Ind, 28 VDC 5 Amp Motor, 28 VDC 3 Amp Lamp, 28 VDC 1 Amp, 125 VAC	H	SA, PA: +100% H: +200% PB: +600%
High Ambient 250°F SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	F	SA, SB, SC: +25%
High Power 1 HP SPDT	20 Amp, 125, 250 VAC 1 HP, 125 VAC 2 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	W	SA: +50% SB, SC: +100% PB: +400%
Moisture Resistant Sealed Switch SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	J	SA: None SB, SC, PA: +25% PB, H: +50%
Tight Fixed Deadband SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC	T	SB, SC: -50%

P-Series Switch Options

Panel Mount – Open frame P-Series compact switch units are available for panel mounting with the switch unit inside and the transducer outside. The panel separates the fluid sensing portion from the electromechanical portion. Five holes for bolts and operating stem must be drilled or punched through the panel. Three constructions are available: add the suffix listed below to the switch unit catalog number for the desired thickness.

Panel Thickness	Suffix
10 Ga (.135±.005)	10
14 Ga (.075±.005)	11
16 Ga (.060±.005)	12

S-Series Switch Options

Industrial Adjusting Nut Covers – Available in clear plastic or metal to prevent tampering with set point adjusting nuts.
Clear plastic cover: To order, add suffix "1" to the switch unit catalog number, or order separately as SP01.
Metal cover: To order, add suffix "2" to the switch unit catalog number, or order separately as SP02.

JIC Construction – A switch unit having the electrical and adjusting nut covers attached to the switch body by a chain. Also designed to Type 13 specifications. To order, add suffix "3" to the switch unit catalog number, or order separately as SP03.

Terminal Block – Applicable to switch units with one single-poledouble-throw switch. The terminal strip is prewired to the snap-action switch. To order, add suffix "4" to the switch unit catalog number, or order separately as SP04.

Factory Sealed – Explosion-proof units may be ordered with a factory seal separating the electrical chamber from the conduit hubs and 24" long #14 AWG 105°C. rated lead wires. To order, change the fourth digit of the switch unit catalog number from "2" to "3", e.g., SA12D becomes SA13D.

Pressure Transducer Options

Special Wetted Materials – The following diaphragms may be substituted on transducer body materials of aluminum, brass, polyester and stainless steel. To order, substitute the material code below in the seventh digit of the transducer catalog number, e.g., a TF10A1[1] with optional viton diaphragm becomes a TF10A1[2].

Diaphragm	Material Code	Temperature Range
Buna "N"	1	-4°F (-20°C) to 180°F (82°C)
Ethylene Propylene	6	-4°F (-20°C) to 250°F (121°C)
Neoprene	3	-4°F (-20°C) to 180°F (82°C)
Fluorosilicone	7	-40°F (-40°C) to 250°F (121°C)
Viton	2	-4°F (-20°C) to 250°F (121°C)

Oxygen Cleaning – Pressure transducers for oxygen service should be specially cleaned. They are degreased and blacklight inspected, then assembled in a clean area and tested with oil-free air or nitrogen. Use metal body transducer with viton or neoprene diaphragm and add suffix "H" to transducer catalog number, e.g., TA40A13 becomes TA40A13[H].

Pressure Snubbers – A pressure snubber (1/4" NPTF by 1/4" NPTM) installed in the transducer pressure connection will dampen the pressure spikes to a value which will not cause damage. It consists of a body with a porous metal disc of stainless steel through which the fluid passes. To order, select a snubber compatible with the fluid. Available by seperate catalog number only (see table below).

Fluid	Brass Catalog No.	303 SS Catalog No.
Air, Non-Hazardous Gases	TP04G2	TP04G3
Water, Light Oil (under 225 SSU)	TP04E2	TP04E3
Oil (Heavy, (over 225 SSU)	TP04D2	TP04D3
Pressure Rating (psig)	2000	5000

Process Connection – A female process connection (1/4" NPT) is standard on all pressure transducers. A 1/2" NPT is available as an option on *gauge* pressure transducers. To order, add suffix "B" to transducer catalog number, e.g., RF10A21 becomes RF10A21[B].
Note: Not available on nylon transducers.

P-Series and S-Series Temperature Transducer Options

Armored Capillaries – Double braided copper armor is standard for copper capillary units. Stainless steel spiral interlocked armor is available for stainless steel capillary units. Add suffix "C" to transducer catalog number.

Thermal Well

Thermal Well① – Use with direct or remote sensors for protecting sensing bulb. This allows removal of bulb while maintaining a pressure-tight vessel. Available in 1/2" NPT or 3/4" NPT process connection in brass or 316 SS. Dimensions are in accordance with SAMA Std. RC17-9. Standard "U" dimension (insertion length) is 2-1/2" for direct mount and 6' capillary units and is 4-1/2" for 12' capillary units.

Material	Pressure Rating (psig)	"U" Dimensions (Inches)	Process Connection	
			1/2" NPT	3/4" NPT
			Catalog No.	Catalog No.
Brass	1000	2-1/2	QP03	QP04
		4-1/2	QP13	QP14
		7-1/2	QP23	QP24
		10-1/2	QP33	QP34
316 SS	6000	2-1/2	QP07	QP08
		4-1/2	QP17	QP18
		7-1/2	QP27	QP28
		10-1/2	QP37	QP38

① Jam nuts provided with thermal wells.

Longer Capillaries – Standard copper and stainless steel capillary units can be furnished in 12' lengths. To order, add suffix "D" to transducer catalog number.
Consult ASCO for longer length capillaries.

Capillary Length (Feet)	Transducer Suffix	Bulb Length (Inches)	"U" Dimension Required (Inches)
6	---	3-1/2	2-1/2
12	D	5-1/2	4-1/2
13 - 20	E	5-1/2	4-1/2
21 - 50	F	8-1/2	7-1/2
51 - 80	G	11-1/2	10-1/2

Union Connector – For use with remote units for mounting of bulb in fluid being controlled. Available in 1/2" NPT and 3/4" NPT process connections in brass or 316 SS.

Material	Pressure Rating (psig)	Process Connection	
		1/2" NPT	3/4" NPT
		Catalog No.	Catalog No.
Brass	500	QP01	QP02
316 SS	1500	QP05	---

Switches for Pressure to 8000 psig, Vacuum, or Differential with General Purpose, Watertight or Explosion-Proof Enclosures

Features:

- Set point repeatability, ±1% of operating range.
- All wiring terminals, adjustments and visual scales are accessible from the front of the switch.
- Choice of general purpose, watertight or explosion-proof enclosures.
- Choice of fixed or full-range adjustable deadband.
- Choice of single or two-stage units.
- Manual reset units available.
- Mounts in any position.
- Rugged and vibration resistant.
- Visual adjustment scales in psi and bars.
- External adjusting nuts.
- Separate electrical, pressure and adjusting chambers.
- Wide selection of transducer wetted materials suitable for air, water, oil or corrosive fluids.
- Mix and match switch and transducer components for increased stock flexibility or to change pressure ranges in field.

General Description:

ASCO S-Series pressure switches consist of a switch unit and a transducer unit. They can be ordered separately for customer stocking and/or field assembly or as a complete factory-assembled unit.

Switch

S-Series pressure switch units incorporate the unique ASCO TRI-POINT alternating fulcrum balance plate to control the operation of one or more electrical snap-action swtiches. The electrical snap-action switch together with the adjusting mechanism is a fully-tested, self-contained subassembly.

Transducer

Transducer unit incorporates a diaphragm/piston type pressure sensor, and is also a fully-tested, self-contained subassembly.

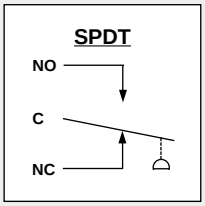
Operation

When pressure is applied to the transducer it is converted into movement of the piston. This piston movement is then used to control the operation of the electrical snap-action switch in the switch unit.

Standard Electrical Ratings

SA, SB, SC, SD and SE Series

15 Amp Res., 125 VAC
10 Amp Res., 250 VAC
1/8 HP, 125 VAC
1/4 HP, 250 VAC
1/2 Amp Res., 125 VDC
1/4 Amp Res., 250 VDC



Standard Temperature Ratings

Ambient: -4°F (-20°C) to 140°F (60°C)
Fluid: For Buna "N" or Neoprene Diaphragm
-4°F (-20°C) to 180°F (82°C)
For Viton Diaphragm
-4°F (-20°C) to 250°F (121°C)
For 316 SS Diaphragm
-50°F (-45°C) to 300°F (149°C)

Options (See pages 34-35)

Enclosures

ASCO TRI-POINT S-Series switches are available in three standard enclosures. All of these enclosed units are made in accordance with NEMA and UL standards.

General Purpose – Type 1. These enclosures are designed for indoor use to protect personnel from accidental contact with the equipment. S-Series general purpose switch units consist of a copper-free* aluminum die-cast body with a formed copper-free* aluminum cover; two 3/4" conduit hubs with one plug are provided.

Watertight – Type 4. Watertight and dust-tight enclosures are intended for use indoors and outdoors to protect the enclosed equipment against splashing or falling water, windblown dust and water, hose directed water, and severe external condensation. S-Series watertight switch units have a copper-free* aluminum die-cast body and a formed copper-free* aluminum cover with Buna "N" gaskets; two 3/4" conduit hubs with one plug are provided.

Explosion-Proof – Types 7 and 9. Type 7 enclosures are intended for use in locations defined by the National Electrical Code as Class I. Type 9 enclosures are intended for Class II locations.

Class I locations are those in which flammable gases are or may be present in the air in sufficient quantities to produce explosive or ignitable mixtures. Class I locations are classified by group letter, which defines particular atmospheres. Division 1 locations are areas where the hazardous concentration exists continuously, intermittently or periodically under normal operating conditions. Division 2 locations are those where the hazardous vapors are present only in case of accidental rupture or breakdown of equipment.

ASCO TRI-POINT explosion-proof enclosures with letter B, C or D in the fifth position are listed for Class I, Groups B, C, and D, Division 1. They are also suitable for the less stringent Division 2 environment.

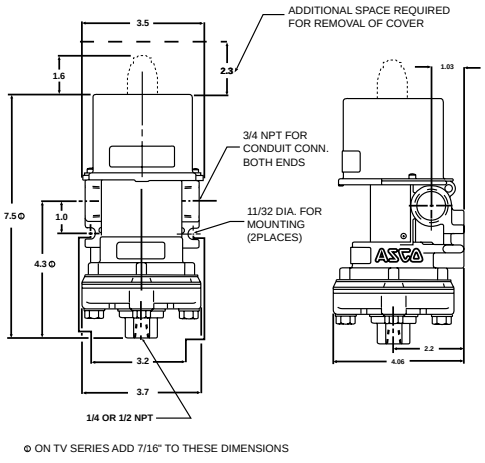
Class II locations are those which are hazardous because of the presence of combustible dust. All ASCO TRI-POINT explosion-proof enclosures are listed for Groups E, F, and G locations.

The switch body and cover are die-cast copper-free* aluminum with a Buna "N" gasket. Two 3/4" conduit hubs with one plug are provided.

Dimensions (inches)

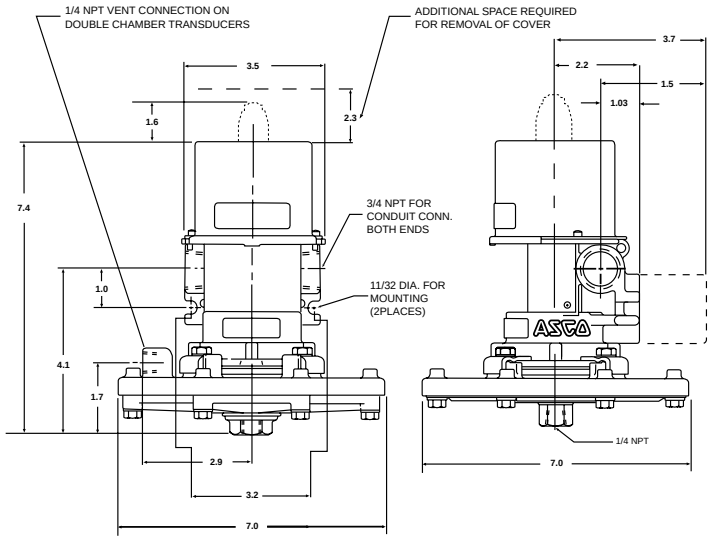
S-Series Pressure

With Types TD - TV Transducers



⊙ ON TV SERIES ADD 7/16" TO THESE DIMENSIONS

With Types TA - TC Transducers



* Less than 0.6% copper.

How to Select and Order

ASCO S-Series switches consist of two components, the switch unit and the transducer unit.

How to Select

1. Select the adjustable operating range based on desired actuation point.
2. Check that proof pressure is sufficient.
3. Read across and select the desired S-Series switch unit with the proper enclosure.
4. Continue across and select a matching transducer unit compatible with the fluid.

How to Order

Factory assembled – Simply order the switch and transducer unit by catalog number joined by a slash (/), e.g., SA30D/TA34A11.

Field assembled – Simply order the switch and transducer units separately by individual catalog number, e.g., one SA30D and one TA34A11.

***Options* –** Add appropriate suffix for desired option (see pages 34-35).

***Important Note*:** The third digit of each of the catalog numbers must be identical, e.g., SA 3 0D and TA 3 4A11.

Select S-Series pressure switch

SA Switch Unit

Single-Stage Adjustable Deadband units allow independent adjustment of the set and reset points over the full operating range of the switch. The minimum difference between set and reset points is the deadband listed below; the maximum difference is the full range of the switch .

General Purpose

SB, SD or SE Switch Unit

SB Switch Unit: Single-Stage Fixed Deadband units have an adjustable set point and a non-adjustable automatic reset point.

SD Switch Unit: Manual reset on decreasing pressure units operate automatically on increasing pressure and must be reset manually on decreasing pressure. (To order, change second digit to letter "D", e.g., S B 30D becomes S D 30D).

SE Switch Unit: Manual reset on increasing pressure units operate automatically on decreasing pressure and must be reset manually on increasing pressure. (To order, change second digit to letter "E", e.g., S B 30D becomes S E 30D).

SA, SB, SC, SD and SE unit below

SC Switch Unit

Two-Stage Fixed Deadband units consist of two separate snap-action switches, each with an independently adjustable set point and non-adjustable reset point. The difference between the set and reset points of each switch is the deadband listed below; the minimum difference between the set points of the two switches is the separation.

Explosion Proof

Select transducer unit below

The **vacuum transducer** has a spring which preloads the switch unit when no vacuum is applied. On application, the vacuum acts on a piston area to overcome the spring to operate the switch unit.

Vacuum Transducer

The **differential pressure transducer** has two pressure sources acting on the piston area in opposite directions. The force output is proportional to the difference between these pressures, allowing the differential pressure to be contolled by adjustment of the switch unit.

Differential Pressure Transducer

Specifications		Adjustable Deadband				Fixed Deadband or Manual Reset				Two-Stage Fixed Deadband					Transducer Units		
											Separation				Air or Gas	Water, Air Oil or Gas	Corrosive Fluids
Adjustable Operating Range (In W.C.)	Proof Pressure (psig)	Adjustable Deadband At Mid-Range (In W.C.) ① From/To	General Purpose Catalog No.	Watertight Catalog No.	Explosion-Proof Catalog No.	Fixed Deadband At Mid-Range (In W.C.) ①	General Purpose Catalog No.	Watertight Catalog No.	Explosion-Proof Catalog No.	Fixed Deadband At Mid-Range (In W.C.) ①	Maximum Full Scale Minimum At Mid-Range (In W.C.) ①	General Purpose Catalog No.	Watertight Catalog No.	Explosion-Proof Catalog No.	Aluminum & Buna "N" Catalog No.	Brass & Buna "N" Catalog No.	303 SS & Viton Catalog No.
Vacuum																	
0 - 30" Hg	50	2 - 28" Hg	SA30D	SA31D	SA32D	1.2" Hg	SB30D	SB31D	SB32D	1.7" Hg	3" Hg	SC30D	SC31D	SC32D	TV34A11	TV34A21	TV34A32
15 PSI - 30" Hg	50	3 - 57" Hg	SA20D	SA21D	SA22D	1.7" Hg	SB20D	SB21D	SB22D	2.0" Hg	8" Hg	SC20D	SC21D	SC22D	TV24A11	TV24A21	TV24A32
0 - 27	15	2 - 27	SA30D	SA31D	SA32D	1.2	SB30D	SB31D	SB32D	1.7	2.7	SC30D	SC31D	SC32D	TA31A11	---	---
0 - 65	15	3 - 65	SA20D	SA21D	SA22D	1.4	SB20D	SB21D	SB22D	2.0	6.5	SC20D	SC21D	SC22D	TA21A11	---	---
15 - 140	25	6 - 125	SA20D	SA21D	SA22D	3.0	SB20D	SB21D	SB22D	4.0	14.0	SC20D	SC21D	SC22D	TB21A11	---	---
15 - 250	25	10 - 235	SA10D	SA11D	SA12D	6.0	SB10D	SB11D	SB12D	7.0	25.0	SC10D	SC11D	SC12D	TB11A11	---	---
25 - 400	25	15 - 375	SA10D	SA11D	SA12D	8.0	SB10D	SB11D	SB12D	13.0	40.0	SC10D	SC11D	SC12D	TC11A11	---	---
Differential																	
0 - 12	15	2 - 12	SA40D	SA41D	SA42D	1.0	SB40D	SB41D	SB42D	1.4	2.4	SC40D	SC41D	SC42D	TA41A11	---	---
0 - 27	15	2 - 27	SA30D	SA31D	SA32D	1.2	SB30D	SB31D	SB32D	1.7	2.7	SC30D	SC31D	SC32D	TA31A11	---	---
0 - 65	15	3 - 65	SA20D	SA21D	SA22D	1.4	SB20D	SB21D	SB22D	2.0	6.5	SC20D	SC21D	SC22D	TA21A11	---	---
15 - 140	25	6 - 125	SA20D	SA21D	SA22D	3.0	SB20D	SB21D	SB22D	4.0	14.0	SC20D	SC21D	SC22D	TB21A11	---	---
15 - 250	25	10 - 235	SA10D	SA11D	SA12D	6.0	SB10D	SB11D	SB12D	7.0	25.0	SC10D	SC11D	SC12D	TB11A11	---	---
25 - 400	25	15 - 375	SA10D	SA11D	SA12D	8.0	SB10D	SB11D	SB12D	13.0	40.0	SC10D	SC11D	SC12D	TC11A11	---	---

All switch units above are in stock for immediate delivery.

All switch units and transducer units above are in stock for immediate delivery.

① Values shown are nominal.

H-Series, P-Series and S-Series Snap-Action Switch Options

Optional snap-action switches to meet specific electrical loads or application conditions are available on most ASCO TRI-POINT switch units. Generally, the construction of a switch unit with optional snap-action switches contains other specific parts and may be ordered only as a factory-built unit. To specify a particular optional construction, add the appropriate suffix to the switch unit catalog number, e.g., SA10D with optional gold contact snap-action switch (suffix "P") would become SA10D P.

Description	Electrical Rating	Catalog Suffix	Deadband Variation From Listing
DC Rating 1 Amp Double Break	5 Amp, 125, 250 VAC 1/4 HP, 125 VAC 1/2 HP, 250 VAC 1 Amp, 125 VDC 1/2 Amp, 250 VDC	G	SA: +50% SB, SC, PA: +100% H: +200% PB: +400%
DC Rating 10 Amps, SPDT	10 Amp, 125 VAC, VDC 1/8 HP, 125 VAC, VDC	M	SA: +50% SB, SC, PA: +100% H: +120% PB: +400%
Double-pole Double-throw (Two SPDT Switches with Common Lever)	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	K	SA, SB, SD, SE, PB: +50%
Gold Contact Dry Circuit SPDT	1 Amp, 28 VAC 1 Amp, 28 VDC 25 Amp Res, 28 VDC	P	SA, SB, SC, PA: +25% H: +50% PB, PC: +100%
Hermetically Sealed SPDT	10 Amp Ind, 28 VDC 5 Amp Motor, 28 VDC 3 Amp Lamp, 28 VDC 1 Amp, 125 VAC	H	SA, PA: +100% H: +200% PB: +600%
High Ambient 250°F SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	F	SA, SB, SC: +25%
High Power 1 HP SPDT	20 Amp, 125, 250 VAC 1 HP, 125 VAC 2 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	W	SA: +50% SB, SC: +100% PB: +400%
Moisture Resistant Sealed Switch SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC 1/4 Amp, 250 VDC	J	SA: None SB, SC, PA: +25% PB, H: +50%
Tight Fixed Deadband SPDT	5 Amp, 125, 250 VAC 1/8 HP, 125 VAC 1/4 HP, 250 VAC 1/2 Amp, 125 VDC	T	SB, SC: -50%

P-Series Switch Options

Panel Mount – Open frame P-Series compact switch units are available for panel mounting with the switch unit inside and the transducer outside. The panel separates the fluid sensing portion from the electromechanical portion. Five holes for bolts and operating stem must be drilled or punched through the panel. Three constructions are available: add the suffix listed below to the switch unit catalog number for the desired thickness.

Panel Thickness	Suffix
10 Ga (.135±.005)	10
14 Ga (.075±.005)	11
16 Ga (.060±.005)	12

S-Series Switch Options

Industrial Adjusting Nut Covers – Available in clear plastic or metal to prevent tampering with set point adjusting nuts.
Clear plastic cover: To order, add suffix "1" to the switch unit catalog number, or order separately as SP01.
Metal cover: To order, add suffix "2" to the switch unit catalog number, or order separately as SP02.

JIC Construction – A switch unit having the electrical and adjusting nut covers attached to the switch body by a chain. Also designed to Type 13 specifications. To order, add suffix "3" to the switch unit catalog number, or order separately as SP03.

Terminal Block – Applicable to switch units with one single-poledouble-throw switch. The terminal strip is prewired to the snap-action switch. To order, add suffix "4" to the switch unit catalog number, or order separately as SP04.

Factory Sealed – Explosion-proof units may be ordered with a factory seal separating the electrical chamber from the conduit hubs and 24" long #14 AWG 105°C. rated lead wires. To order, change the fourth digit of the switch unit catalog number from "2" to "3", e.g., SA12D becomes SA13D.

Pressure Transducer Options

Special Wetted Materials – The following diaphragms may be substituted on transducer body materials of aluminum, brass, polyester and stainless steel. To order, substitute the material code below in the seventh digit of the transducer catalog number, e.g., a TF10A1[1] with optional viton diaphragm becomes a TF10A1[2].

Diaphragm	Material Code	Temperature Range
Buna "N"	1	-4°F (-20°C) to 180°F (82°C)
Ethylene Propylene	6	-4°F (-20°C) to 250°F (121°C)
Neoprene	3	-4°F (-20°C) to 180°F (82°C)
Fluorosilicone	7	-40°F (-40°C) to 250°F (121°C)
Viton	2	-4°F (-20°C) to 250°F (121°C)

Oxygen Cleaning – Pressure transducers for oxygen service should be specially cleaned. They are degreased and blacklight inspected, then assembled in a clean area and tested with oil-free air or nitrogen. Use metal body transducer with viton or neoprene diaphragm and add suffix "H" to transducer catalog number, e.g., TA40A13 becomes TA40A13[H].

Pressure Snubbers – A pressure snubber (1/4" NPTF by 1/4" NPTM) installed in the transducer pressure connection will dampen the pressure spikes to a value which will not cause damage. It consists of a body with a porous metal disc of stainless steel through which the fluid passes. To order, select a snubber compatible with the fluid. Available by seperate catalog number only (see table below).

Fluid	Brass Catalog No.	303 SS Catalog No.
Air, Non-Hazardous Gases	TP04G2	TP04G3
Water, Light Oil (under 225 SSU)	TP04E2	TP04E3
Oil (Heavy, (over 225 SSU)	TP04D2	TP04D3
Pressure Rating (psig)	2000	5000

Process Connection – A female process connection (1/4" NPT) is standard on all pressure transducers. A 1/2" NPT is available as an option on *gauge* pressure transducers. To order, add suffix "B" to transducer catalog number, e.g., RF10A21 becomes RF10A21[B].
Note: Not available on nylon transducers.

P-Series and S-Series Temperature Transducer Options

Armored Capillaries – Double braided copper armor is standard for copper capillary units. Stainless steel spiral interlocked armor is available for stainless steel capillary units. Add suffix "C" to transducer catalog number.

Thermal Well

Thermal Well① – Use with direct or remote sensors for protecting sensing bulb. This allows removal of bulb while maintaining a pressure-tight vessel. Available in 1/2" NPT or 3/4" NPT process connection in brass or 316 SS. Dimensions are in accordance with SAMA Std. RC17-9. Standard "U" dimension (insertion length) is 2-1/2" for direct mount and 6' capillary units and is 4-1/2" for 12' capillary units.

Material	Pressure Rating (psig)	"U" Dimensions (Inches)	Process Connection	
			1/2" NPT	3/4" NPT
			Catalog No.	Catalog No.
Brass	1000	2-1/2	QP03	QP04
		4-1/2	QP13	QP14
		7-1/2	QP23	QP24
		10-1/2	QP33	QP34
316 SS	6000	2-1/2	QP07	QP08
		4-1/2	QP17	QP18
		7-1/2	QP27	QP28
		10-1/2	QP37	QP38

① Jam nuts provided with thermal wells.

Longer Capillaries – Standard copper and stainless steel capillary units can be furnished in 12' lengths. To order, add suffix "D" to transducer catalog number.
Consult ASCO for longer length capillaries.

Capillary Length (Feet)	Transducer Suffix	Bulb Length (Inches)	"U" Dimension Required (Inches)
6	---	3-1/2	2-1/2
12	D	5-1/2	4-1/2
13 - 20	E	5-1/2	4-1/2
21 - 50	F	8-1/2	7-1/2
51 - 80	G	11-1/2	10-1/2

Union Connector – For use with remote units for mounting of bulb in fluid being controlled. Available in 1/2" NPT and 3/4" NPT process connections in brass or 316 SS.

Material	Pressure Rating (psig)	Process Connection	
		1/2" NPT	3/4" NPT
		Catalog No.	Catalog No.
Brass	500	QP01	QP02
316 SS	1500	QP05	---

Definitions

Accuracy – The maximum deviation from the set point under specified operating condition (ambient temperature, barometric pressure, etc.).

Adjustable Deadband – Refers to the capability of a pressure or temperature switch to allow the deadband to be adjusted over a given range. Certain ASCO TRI-POINT switches have an adjustable deadband which can be adjusted over the total operating range of the switch.

Adjustable Operating Range – The pressure or temperature range of the switch within which the set point may be adjusted.

Differential Pressure – The difference between two pressures. A differential pressure switch senses two pressure sources and can be adjusted to actuate on a desired difference between them.

Guage Pressure – The actual reading of a typical pressure guage and is the difference between the pressure within a vessel and the atmospheric pressure surrounding it. It is normally measured in pounds per square inch (psig).

Manual Reset – The switch is a semi-automatic device which operates automatically with a signal change in one direction but must be manually reset once the signal returns to its original position.

Proof Pressure – A pressure which a device can be subjected to for extended periods of time without changes in its operating characteristics.

Rated Overrange Temperature – A temperature which a device can be subjected to for extended periods of time without changes in its operating characteristics.

Repeatability – The closeness of agreement among a number of consecutive measurements of the output for the same value of input under the same operating conditions approaching from the same direction. Repeatability is normally specified as a percentage of the upper limit of the operating range.

> Example: Operating range 5-100 psig with ±1% repeatability; equals ±1% of 100 psig or ±1 psig.

Reset Point – After a pressure or temperature switch has reached its set point and operated the electrical switch, it must return to a point called the reset point before the electrical switch can return to its original position.

Set Point – The pressure reading at which the electrical switch element changes contact position (it can be specified either increasing or decreasing).

Switch Unit – ASCO uses the term “switch unit” to describe the electromechanical portion of a pressure or temperature switch. This is used in conjunction with a transducer unit to form a complete pressure or temperature switch.

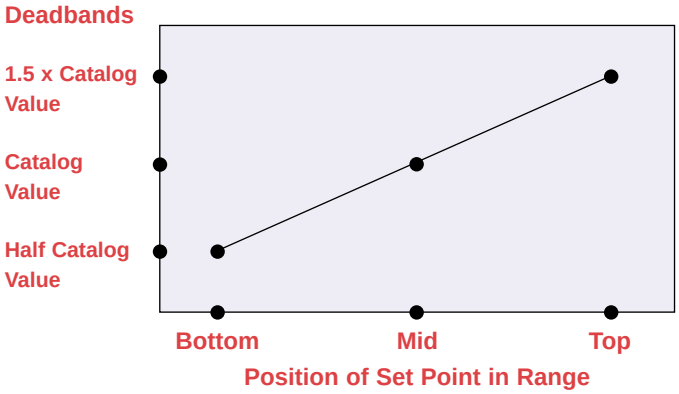
Transducer Unit – ASCO uses the term “transducer unit” to describe that portion of a pressure or temperature switch to which a pressure or temperature is applied which converts the input signal to another form of energy to operate the switch unit.

Two-Stage (Dual) – ASCO uses the term “two stage” to describe a pressure or temperature switch which is equivalent to two pressure or temperature switches which are independently adjustable. This switch is equivalent to two fixed deadband switches.

Deadbands – The deadband is the difference between the set point and reset point readings. Deadbands are listed in the specification tables at nominal values. They are representative of the deadbands of the units at the middle of the range.

The deadband values for the full range adjustable deadband switches and limited adjustable deadband switches indicate the values through which the deadband may be adjusted.

Generally, as the set point is adjusted through the operating range, the deadband will vary. Normally, it will become narrower as the set point is towards the bottom of the range, and will become wider when the set point is towards the top of the range. The graph shown below indicates representative trends of this type of deadband variation.



Temperature switch deadbands are a result of the characteristics of the vapor pressure curve as well as other factors. Normally, this results in a deadband which is narrower in the top third of the range than in the bottom third of the range. The values published are nominal and representative of mid-range set points.

Fluid Compatibility Guide

These recommendations are to be used as a guide only, as service life of material is dependent on temperature, concentrations, or catalysts that may be added and other conditions which are beyond our control.
Consult ASCO for specific service applications.

Note: Items in black circles are standard catalog units.
All others available on factory order.
P - Indicates preferred construction. **S** - Indicates satisfactory construction.

Transducer Material Code of Two Digits represents process connection material and diaphragm material, respectively; these are the sixth and seventh positions of the pressure transducer catalog number.

Process Connection: 6th Position

1 Aluminum
2 Brass
3 303 S.S.
4 316 S.S.
7 Nylon/Brass

Diaphragm: 7th Position

1 Buna "N"
2 Viton
3 Neoprene
4 316 S.S.
6 Ethylene Propylene
7 Fluorosilicone

Material Code		11	12	13	16	17	21	22	23	26	27	31	32	33	36	37	42	44	71
Ranges Available	Vacuum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	Inches of Water	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	P.S.I.G. ⑤ to	400	400	400	400	400	3500	3500	3500	3500	3500	8000	8000	8000	8000	8000	8000	400	200
Acetic Acid														S	S			P	
Acetylene		P	S		S							S	S		S		S	S	
Air		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Ammonia																		P	
Argon-Welding ①		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Benzene-Benzol			P					S					S				S	S	
Butane		P	S				S	S				S	S				S	S	
Carbon Tetrachloride													P				P	S	
Cellulube			P		S			S		S			S		S		S	S	
Coke Oven Gas													P				P	S	
Ethyl Alcohol (denatured)		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Ethylene Glycol		P	S	S	S		S	S	S	S		S	S	S	S		S	S	
Freon Refrigerants																		P	
Freon Solvents ("MF", "TF", "BF")							P	S				S	S				S	S	
Fuel Oils and Diesel ④		P	S				S	S				S	S				S	S	
Gasoline																		P	
Gas, Inert		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Gas (natural and manufactured) ④		P	S	S		S	S	S	S		S	S	S	S		S	S	S	
Helium		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Hydrogen		P	S	S	S		S	S	S	S		S	S	S	S		S	S	
Jet Fuel (JP1 to JP6)			P			S		S			S		S			S	S	S	
Kerosene		P	S				S	S				S	S					S	
Methyl Alcohol (Methanol)		P		S	S	S	S		S	S	S	S		S	S	S	S	S	
Naphtha		P	S				S	S				S	S				S	S	
Nitrogen		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P
Oils (coolant, hydraulic, lubricating and motor)		P	S				S	S				S	S				S	S	P
Oxygen, Gaseous ②			S	P		S		S	S		S		S	S		S	S	S	
Potassium Sulfate		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
Propane Gas and Liquid		P	S	S			S	S	S			S	S	S			S	S	
"Pydraul" ("Monsanto")			P			S		S			S		S			S	S	S	
Steam ③							P	S		S	S	S	S		S	S	S	S	
Steam Condensate							P	S		S	S	S	S		S	S	S	S	P
Stoddard Solvent		P	S				S	S				S	S				S	S	
Toluene (Tolulo)			P					S					S				S	S	
Vacuum		P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S		
Vegetable Oil		P	S	S		S						S	S	S		S	S	S	
Vinegar													S		S	S	S	P	
Water, Fresh, Boiler Feed							P	S		S	S	S	S		S	S	S	S	P
Water (Distilled, Deionized, Demineralized)												P	S	S	S	S	S	S	
Water, Sea																		S	

Notes: ① For high purity applications use stainless steel transducers. ② Oxygen service requires special cleaning, specify suffix "H". ③ For steam service a condensate loop (pigtail) is required. ④ For pressure transducers for combustion service see pages 20-23. ⑤ Material availability refers to standard gauge pressure constructions only.