

ASCO[®]

Nuclear Catalog

Nuclear Products Qualified to IEEE Specifications

Solenoid Valves

Check Valves

Pressure & Temperature Switches

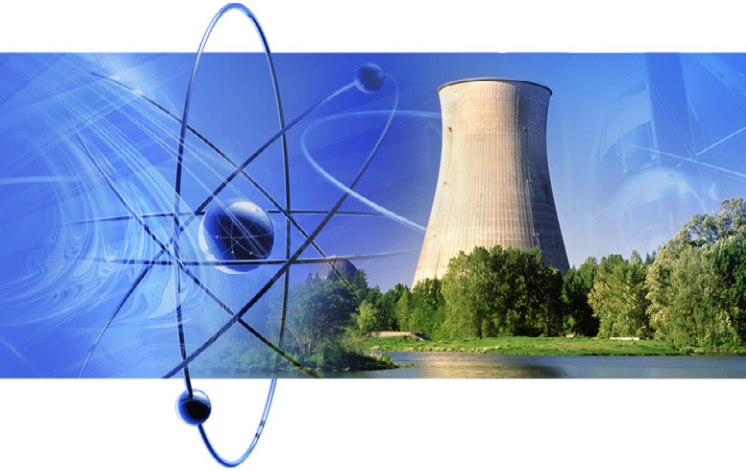
Hydramotor[®] Actuators



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ASCO, the pioneer and leader in the design and development of solenoid operated valves for the nuclear industry, offers a complete line of nuclear qualified products. Our engineering experience and stringent quality standards make every ASCO valve a high quality engineered product. ASCO nuclear products are 100% inspected and functionally tested prior to shipment in order to insure that they meet the rigorous demands and high expectations of the nuclear industry.

This catalog contains specifications for nuclear qualified 2, 3, and 4-way solenoid valves, nuclear qualified hydramotors as well as pressure and temperature switches and check valves.

ASCO nuclear qualified valves are used primarily as pilot valves for handling oil-free instrument air and inert gas in nuclear power plants. These valves are designed to meet the most stringent environmental conditions encountered in nuclear power generation applications and meet or exceed the following IEEE Standards.

- IEEE-323
- IEEE-344
- IEEE-382

ASCO nuclear 2-way valves and check valves are qualified for mild environmental applications as defined in IEEE-323-1983. The qualification program consisted of a series of four sequential aging simulation phases (thermal, wear, radiation, and vibration) followed by seismic DBE and SSE.

ASCO nuclear qualified pressure and temperature switches for Class IE service are based on the operating principle of ASCO's Industrial (S-Series) TRI-POINT® line, which meets or exceeds the following IEEE Standards:

- IEEE-323
- IEEE-344

The NH90 Hydramotor Series of Linear Actuators is qualified as Class IE, safety related equipment for nuclear power generating stations in accordance with IEEE Standards.

- IEEE-323
- IEEE-382
- IEEE-627

ASCO assures adherence to these standards by maintaining an extensive in-house testing program that is supplemented by independent outside testing facilities.

Qualification consists of subjecting each solenoid valve, pressure or temperature switch to the following tests as required by the previously noted IEEE specifications.

- A. Thermal aging
- B. Wear aging
- C. Pressurization aging
- D. Radiation aging
- E. Vibration aging
- F. Seismic event simulation
- G. Radiation event simulation
- H. LOCA/MSLB/HELB environmental simulation

All Valves Are Designed With The Following Special Features:

1. Type N Construction (NS Series), Class H (NP Series) coil insulation.
2. Elastomers (gaskets, o-rings, discs): all materials designed to meet high radiation and high temperature degradation effects.
3. Specially designed solenoid enclosures to withstand Loss-of-Coolant-Accident (LOCA) environment.
4. Designed to meet seismic loading.

All Pressure And Temperature Switches Are Supplied With The Following Special Features:

1. Elastomers (gaskets, o-rings) and all materials designed to meet high radiation and high temperature.
2. Elimination of radiation and temperature-affected materials.
3. Designed to meet seismic loading

ASCO 2, 3, and 4-way Nuclear Power (NP) and 3-way Nuclear Service (NS) solenoid valves are widely used for pilot control of diaphragm and cylinder actuated valves (and other applications) used in nuclear power plants.

Selection of the proper valve for a specific application is of paramount importance. This engineering information section describes principles of operation, types of solenoid valves, and types of solenoid enclosures, and materials to assist you in the proper selection of a valve.

I. Principles of Operation

A solenoid valve is a combination of two basic functional units: (1) a solenoid, consisting of a coil and a magnetic plunger (or core); and (2) a valve body containing an orifice in which a disc is positioned to stop or allow flow. The valve is opened or closed by movement of the magnetic plunger (or core), which is drawn into the solenoid when the coil is energized.

ASCO solenoid valves feature a packless construction. The solenoid is mounted directly on the valve and the core assembly is enclosed in a sealed tube inside the solenoid coil. This construction provides a compact, leak-tight assembly, without the need of a stuffing box or sliding stem seal.

Direct-Acting Solenoid Valves

Series NP8210, NP8262, NP8263, NS8300, NP8300, NS8314, NP8314, NS8320, NP8320, NP8342

For (oil free) Instrument Air 1/8", 1/4", 3/8", & 1/2" ANPT



General Description

ASCO NS/NP Series direct-acting solenoid valves operate from zero psi (no minimum pressure is required for the valve to operate), to the individual valve's maximum rated pressure. This broad family of qualified valves is available in brass or stainless steel.

Applications

ASCO direct-acting qualified valves, because of the wide range of sizes, construction materials, and pressures, are suited to the many applications found in nuclear power plants. Some uses include pilot operators for control valves, pressurizing and venting cylinders, and actuators, or for selection and diversion of instrument air.

NS/NP Comparison

Each ASCO direct-acting NS valve directly replaces a corresponding NP valve, with the same body type/material, pipe size, and orifice, as long as voltage, wattage, and Cv flow factors are also the same. ASCO does not manufacture a 2-way or 4-way NS Series valve.

NS/NP Performance Features

The ASCO NS Series nuclear qualified valves include construction, material, and qualification improvements that typically increase the service (qualified) life of the comparable NP valve by a factor of two to three times depending on the application.

Specific improvements include:

Elastomers: The standard ethylene propylene and optional FKM fluoroelastomer have been replaced with a patent pending proprietary elastomer that ASCO identifies as Gamma +. This elastomer offers improved radiation resistance and longer thermal life over the standard elastomers in NP valves due to its increased resistance to high temperatures. In addition, Gamma + replaces both NP elastomer constructions (ethylene propylene and FKM fluoroelastomer.)

Coils: ASCO NS Series valves are manufactured with a continuous-duty, Type N construction, fully encapsulated epoxy coil offering improved resistance to moisture and radiation and a longer thermal life. ASCO NP valves will be supplied with continuous-duty non-molded varnish-impregnated Class H coils.

Coil Leads: NS coil leads are 18-gauge multi-strand concentrically wound tinned copper wire with moisture-resistant insulation of polyether-etherketone (PEEK) that has a total diameter of approximately 1/16". NP valves have a multi-strand 18-gauge wire with silicone insulation covered with fiber glass (an approximate 1/8" total diameter).

NS Qualification: IEEE-323-1983, IEEE-344-1987, IEEE-382-1985, and IEEE-627-1980.

NP Qualification: IEEE-323-1974, IEEE-344-1975, IEEE-382-1972, or 1980 (depending on qualification report), and IEEE-627-1980 (if included in qualification report).

Specifications for Direct Acting Valves

Operation:

Two 2-way direct acting types are available:

Normally Closed: closed when de-energized and open when energized.

Normally Open: open when de-energized and closed when energized.

Three 3-way types are available:

Normally Closed: applies pressure when solenoid is energized; exhausts pressure when solenoid is de-energized.

Normally Open: applies pressure when solenoid is de-energized; exhausts pressure when solenoid is energized.

Universal: for normally closed or normally open operations.

A four-way direct acting design is available in single or dual solenoid models.

Solenoid Enclosures:

Two types are available:

(a) Watertight (Type 4 and 6) (not available on NS8314 and NP8314 Series valves) or NP8300 (DC) and NS8300 (DC)

(b) Explosionproof/raintight (Type 3, 7C, 7D, and 9)

Electrical:

Standard Voltages:

AC, 60Hz – 24, 48, 120, and 240 volts

AC, 50Hz – 110 and 120 volts

DC (battery voltages) - 12, 24, 48, 125, and 250 volts

Coil:

Continuous-Duty Type N construction (NS Series) and Class H (NP Series)

Standard Conduit Connection:

3/4" NPT (3 and 4-way), 1/2" NPT (2-way)

Ambient Temperature:

Normal Range, 32°F to 140° F (0° to 60°C)

Pilot Operated Valves

**Series NP8210, NS8316, NS8321, NP8316,
NP8321, NP8344**

For Oil-Free Instrument Air 1/4", 3/8", 1/2", 3/4", & 1" ANPT



General Description

ASCO NS/NP Series internal pilot operated solenoid valves have a pilot and bleed orifice that enables these valves to use line pressure to assist the valve in operating. When the solenoid is de-energized, the pilot orifice is closed and full line pressure is applied to the piston or diaphragm through the bleed orifice, providing seating force for tight closure. When the solenoid is energized, the core opens the pilot orifice, relieving pressure from the piston or diaphragm via the outlet side of the valve. The line pressure opens the valve by moving the piston or diaphragm off the main orifice.

Applications

These qualified valves are suited for high flow or moderate flow, quick-exhaust applications in nuclear power plants. The larger Cv flow factors allow a greater volume of air to flow through the valves to control actuators and cylinders at a much faster rate than ASCO's direct-acting valves.

Important: A minimum operating pressure differential is required for all pilot operated valves. Three-way valves will vent to zero psi.

NS/NP Comparison

Each ASCO internal pilot operated 3-way NS valve directly replaces a corresponding existing NP8316 and NP8321 Series valve with the same body type/material, pipe size, and orifice, as long as voltage, wattage, and Cv flow factors are also the same. ASCO does not manufacture a 2-way or 4-way NS Series valve.

NS/NP Performance Features

The ASCO NS Series nuclear qualified valves include construction, material, and qualification improvements that typically will increase the service (qualified) life of the comparable NP valve by a factor of two to three times, depending on the application.

Specific improvements include:

Elastomers: The standard ethylene propylene and optional FKM fluoroelastomer have been replaced with a patent-pending proprietary elastomer that ASCO identifies as Gamma +. This elastomer offers improved radiation resistance and longer thermal life over the standard elastomers in NP valves, due to its increased resistance to high temperatures. In addition, Gamma + replaces both NP elastomer constructions (ethylene propylene and FKM fluoroelastomer)

Coils: ASCO NS Series valves are manufactured with a continuous-duty, fully encapsulated epoxy coil offering improved resistance to moisture and radiation and a longer thermal life. ASCO NP valves will be supplied with continuous-duty non-molded varnish-impregnated Class H coils.

Coil leads: NS coil leads are 18-gauge, multi-strand, concentrically wound, tinned copper wire with moisture-resistant insulation of polyether-etherketone (PEEK) that has a total diameter of approximately 1/16". NP valves have a multi-strand, 18-gauge wire with silicone insulation covered with fiberglass (an approximate 1/8" total diameter).

NS Qualification: IEEE-323-1983, IEEE-344-1987, IEEE-382-1985, and IEEE-627-1980.

NP Qualification: IEEE-323-1974, IEEE-344-1975, IEEE-382-1972, or 1980 (depending on qualification report), and IEEE-627-1980 (if included in qualification report).

NS 2-Way Qualification: IEEE-323-1983, IEEE-344-1986, IEEE-382-1980, and IEEE-387-1984, and IEEE-627-1980

Specifications for Pilot Operated Valves

Operation:

Two 2-way Internal Piloted Operated types are available:

Normally Closed: closed when de-energized and open when energized.

Normally Open: open when de-energized and closed when energized.

Two 3-way types are available:

Normally Closed: applies pressure when solenoid is energized; exhausts pressure when solenoid is de-energized.

Normally Open: applies pressure when solenoid is de-energized; exhausts when solenoid is energized.

A 4-way design is available in single or dual solenoid modes

Solenoid Enclosures:

Two types available:

- a. Watertight (Type 4 and 6)
- b. Explosionproof/raintight (Type 3, 7C, 7D, and 9)

Mounting:

Can be mounted in any position without affecting operation.

Electrical:

Standard Voltages:

AC, 60 Hz-24, 48, 120, and 240 volts

AC, 50 Hz-110, and 220 volts

DC (battery voltages): 12, 24, 48, 125, and 250 volts

Coil:

Continuous Duty Type N construction (NS Series) and Class H (NP Series)

Standard Conduit Connection:

3/4" NPT (3 and 4-way), 1/2" NPT (2-way)

Ambient Temperatures:

Normal Range, 32°F to 140°F (0°C to 60°C)

II. Types of Solenoid Valves

Two-Way Solenoid Valves

Two-way valves have one inlet and one outlet pipe connection. They are used to allow or shut off air flow, and are available in either normally closed and normally open - direct acting or normally closed and normally open internal piloted operated.

The NP8210, NP8262, and NP8263 direct acting models and the NP8210 internal piloted operated model have two modes of operation: normally closed and normally open.

Three-Way Solenoid Valves

Three-way solenoid valves have three pipe connections: pressure, cylinder, and exhaust, and two orifices (one orifice is always open and one is always closed). These valves are commonly used to apply pressure to or exhaust pressure from a diaphragm valve or single acting cylinder. Direct acting 3-way valves may also be used to select or divert flow.

The 8316 and 8321 models have two modes of operation: normally open and normally closed.

The 8314, 8320, and 8300 series feature the three modes of operation: normally open, normally closed, and universal operation.

Normally Closed Construction

When the valve is de-energized, the pressure port is closed and the exhaust port is connected to the cylinder port. When the valve is energized, the pressure port is connected to the cylinder port and the exhaust port is closed.

Normally Open Construction

When the valve is de-energized, the pressure port is connected to the cylinder port and the exhaust port is closed. When the valve is energized, the pressure port is closed and the cylinder port is connected to the exhaust port.

Universal Construction

Allows the valve to be connected in either the normally closed or normally open position. This construction is available for 8300, 8314, and 8320 series valves only.

Four-Way Solenoid Valves

Four-way solenoid valves are generally used to operate double-acting cylinders. These valves have four pipe connections: one pressure, two cylinder, and one exhaust. Four-way valves are available only in the NP Series.

III. Solenoid Enclosure

Two-Way Valves

RedHat II solenoid enclosures are of one-piece molded epoxy construction, with an integral 1/2" NPT conduit hub. This epoxy encapsulation serves as the enclosure. The magnetic frame is molded into the coil.

RedHat II solenoids are offered as Type 1 General Purpose or Type 7 (A, B, C, and D) Explosionproof.

Type 1 – Solenoids are green and come equipped with three 18" long leads (the green lead is a ground wire). Also available as options are 1/4" spade connectors, screw terminals, and DIN-type terminals meeting ISO 4400 and DIN Standard 43650.

Type 7 – Solenoids are black and are available only in the leaded construction.

All RedHat II solenoids also meet the requirements for Types 2 Dripproof, 3 and 3S Raintight, and 4 and 4X Watertight-Corrosion Resistant.

Three and Four-Way Valves

Valves in this category are supplied with either watertight or combination explosionproof/raintight solenoid enclosures to withstand the environmental conditions of a Loss of Coolant Accident and Main Steam Line Break. Solenoid enclosures are electroless nickel plated, deep-drawn steel equipped with a 3/4" NPT threaded conduit hub standard, or 1/2" NPT conduit hub available as an option.

The solenoid enclosure forms a magnetic path; therefore, removal will affect valve operation.

Two types of solenoid enclosures are available to satisfy the following (formerly NEMA) classifications:

Watertight – Types 3, 3S, 4, 4X, 6, and 12.

Explosionproof/raintight – (Type 3, 7C, 7D, and 9).

ASCO qualification, has not included simulation of any submergence or explosive atmosphere conditions.

Connections to the solenoid should be such that any accumulated moisture or LOCA spray will not run into the enclosure. The following methods of connecting the solenoid, utilized during qualification of the valves, can be used:

- Running wiring* through conduit to a vented electrical junction box located in the same area as the valve

- Connecting a downward directed elbow to the conduit connection
- Connecting a potted street elbow and potted nipple to the conduit connection. Use approved potting compound only.

**Wiring must comply with all applicable electrical codes.*

Special valve model numbers with CSA approved solenoids are available. For additional information and model numbers contact ASCO.

IV. Solenoid Construction

Internal parts in contact with the fluid are made of non-magnetic 300 and magnetic 400 Series stainless steel. In AC constructions only, the shading coil is normally copper. No shading coil is used in DC valves.

The core tube is made of 305 stainless steel and formed by deep drawing, eliminating silver brazed, or welded joints otherwise necessary.

Main Body

Valve bodies can be made from one of two materials: brass or stainless steel. See individual valve descriptions for specific material.

V. NP Nuclear Valve Construction

Elastomers

NP Series valves are available with FKM fluoroelastomer or ethylene propylene depending upon the user's needs.

Coils

NP valves listed in this catalog are equipped with continuous duty non-molded varnish-impregnated coils.

Valves can be energized continuously without danger of overheating or failure. Coils are provided with two coil leads, which can be connected to any controlling device. For three-phase power systems, the two leads can be connected to any two of the three phases.

Coils (2-Way Valves)

Two-way NP Valves are equipped with coils which can be energized continuously without danger of over heating or failure. Standard coils have 18" leads which can be connected to any controlling device. Longer leads are available. For three phase power systems, the two leads can be connected to any two of the three phases.

VI. NS Nuclear Valve Construction

Elastomers

NS Series valves are manufactured with a special compound developed by ASCO for nuclear applications, which in comparison to NP valves, offer improved radiation resistance and longer thermal life due to increased resistance to high temperatures.

Coils (except RedHat II, one piece solenoids)

NS Series coils are of a fully encapsulated epoxy construction, which offers improved resistance to moisture. This allows the user greater flexibility in installing the valves. They also provide improved radiation resistance and longer thermal life due to increased resistance to high temperatures.

VII. Selection Considerations

Cv

Cv values in this catalog were obtained by testing valves using nominal parts and with strokes that were set to their lowest setting. These values should be used only as a guide in making your valve selection.

Cv values cannot be used to accurately predict exact shift times since the shifting speed of the solenoid valve and variations in piping configurations are not always accurately reflected in such calculations. Cv values generally are considered to indicate the approximate rather than the exact flow capabilities.

Response Time

Response time from fully closed to fully open, or vice versa, depends on the valve size and operating mode, electrical service, media, temperature, inlet pressure, and pressure drop.

Maximum Operating Pressure Differential (M.O.P.D.)

The maximum operating pressure differential is the maximum differential pressure between the inlet and the outlet sides of the valve against which the solenoid can safely operate the valve. This pressure may be much less than the safe working pressure.

Minimum Operating Pressure Differential

The minimum, operating pressure differential is the lowest operating pressure differential required for dependable operation. For 2, 3, and 4-way pilot valves, the minimum operating pressure must be maintained at the inlet port throughout the operating cycle to insure complete transfer from one position to the other.

NOTE: Direct-acting valves do not require a minimum pressure and can operate to 0 psi.

Safe Working Pressure

Safe working pressure is the line or system pressure to which the valve may be subjected without being damaged. The proof pressure for any ASCO nuclear valve is five times the safe working pressure.

Minimum Ambient Temperature Limitations

The nominal limitation of 32° F (0° C) is advisable for any valve. The actual minimum ambient temperature permissible can be greatly affected by both application and valve construction.

Maximum Ambient Temperature

Valves are qualified to meet accident and non-accident temperature conditions typical of nuclear plant service. For specific details, consult ASCO.

Seismic Capabilities

Valves are seismically qualified to meet IEEE-344- "IEEE recommended practices for seismic qualification of Class 1E Equipment for nuclear power generating stations." For specific details, consult ASCO.

Coil Operating Voltage Ranges

Power Consumption

Power consumption of solenoid valves may be determined from the rating listed. For valves on AC service, the watt rating, the volt-ampere "inrush", and the volt-ampere "holding" are given. The volt-amp (VA) "inrush" is the high momentary surge of current that occurs at the moment an AC solenoid is energized.

The volt-amp (VA) "holding" is the continuous rating after the initial "inrush". The current rating for the "inrush" and "holding" may be determined by dividing the voltage into the volt-amp rating.

$$\frac{\text{AMPS}}{(\text{INRUSH})} = \frac{\text{volt-amp "inrush" }}{\text{voltage}}$$

$$\frac{\text{AMPS}}{(\text{HOLDING})} = \frac{\text{volt-amp "holding" }}{\text{voltage}}$$

Valves supplied for DC service have no "inrush" current. The amp rating can be determined by dividing the voltage into the DC watt rating.

$$\text{AMPS} = \frac{\text{watts (DC)}}{\text{voltage}}$$

Most ASCO valves, depending upon construction, will operate at 15% under nominal voltage and maximum operating pressure differential, and are capable of operating for short periods at 10% over nominal voltage.

For battery charging circuits where wider voltage ranges are typically encountered, the voltage range is equivalent to 12% over and 28% under the nominal, voltage at 140°F (60°C) ambient temperature. For a nominal voltage of 125 VDC, the voltage range is 90-140 VDC.

VIII. Air Quality (Instrument Air)

The following are recommendations for the quality of the instrument air used in ASCO nuclear valves.

- Dew Point - The dew point at line pressure must be at least 18°F (8°C) below the minimum temperature to which any portion of the instrument air system can be exposed. In no case should the dew point at line pressure exceed 35°F (2°C)
- Particle Size - The maximum particle size in the airstreams being applied to the ASCO valve shall not exceed 50 microns
- Hydrocarbon Content - The maximum total oil or hydro-carbon content exclusive of non-condensables shall not exceed 1ppm w/w or v/v
- Contaminants - The instrument air shall be free of all corrosive contaminants and hazardous gases, flammable or toxic, that may be drawn into the instrument air system

IMPORTANT NOTICE:

When using ASCO pilot operated 2, 3, and 4-way valves, the pressure and exhaust lines must be kept fully open and the minimum operating pressure differential, as listed in this catalog, must be maintained to insure proper operation of the valve. Do not install flow controls (speed or metering devices) or any type of restrictive device in either the pressure "P" (inlet) or exhaust "E" (outlet) ports of the valve. Restricting either of these ports may cause valve malfunction. ASCO valves are designed for use on full size piping. Use of tubing in place of piping may be considered a restriction. For example nominal 1/2" schedule 40 pipe has a .622" internal diameter, while 1/2" tubing (.035" wall thickness) has a .430" internal diameter. Using 1/2"-.035" wall tubing in place of 1/2" schedule 40 pipe will reduce (restrict) flow to the valve by at least 30% (at minimum) and depending on the number and type of fittings, length of tubing, and the amount of bends, additional restriction to air flow may occur.

WARNING

Improper selection or use of products and related items in catalog can cause death, serious injury, or property damage.

This document and other information from ASCO Valve, Inc., its subsidiaries and authorized distributors provide product options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product in the current product catalog. Due to the variety of operating conditions and applications for these products, the user, through analysis and testing, is solely responsible for making the final selection of the products and assuring that all performance, safety, and warning requirements of the application are met.

The product described herein, including but without limitation, product features, specifications, and options are subject to change by ASCO Valve, Inc. and its subsidiaries at any time without notice.

Qualification

IEEE-323-1983, IEEE-344-1986, IEEE-382-1980,
IEEE-387-1984, and IEEE-627-1980

ASCO Qualification Report: AQR-68061

Installation

Valves must be mounted with solenoid vertical and upright.

Important: 5 psi minimum operating pressure differential is required on some pilot operated models.

Valve Parts in Contact with Media

Body: Brass

Disc: FKM fluoroelastomer

Springs: 302 Stainless Steel

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 Ph Stainless Steel

Shading Coil (AC models): Copper

Diaphragms: FKM fluoroelastomer on Nylon (Nomex® fabric)

Static Seals: FKM fluoroelastomer

Nomex is registered trademark of DuPont Co.

Nominal Ambient Temperature

122°F (50°C) maximum

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
F	-	6.1	16	40
F	-	10.1	25	70
F	-	16.1	35	180
H	24.6	-	-	-
H	26.6	-	-	-

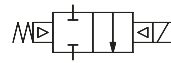
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof/Watertight Solenoid Enclosure
120/60 VAC	238210-032-D	238214-032-D
120/60 VAC	238610-032-D	238614-032-D
120/60 VAC	272610-032-D	272614-032-D
125 VDC	238910-335-D	238914-335-D
125 VDC	222184-016-D	222184-016-D

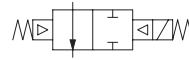
* For optional 72" (6') coil leads replace "D" with "K", i.e. -001K.

Note: Additional coil model numbers for non-standard voltages are also available. Contact ASCO.

NORMALLY CLOSED

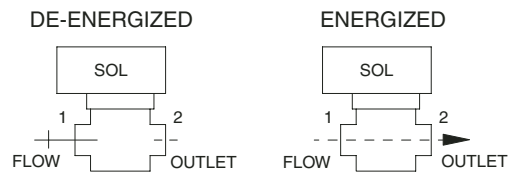


NORMALLY OPEN

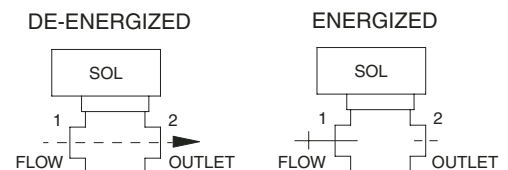


Flow Diagrams

NORMALLY CLOSED



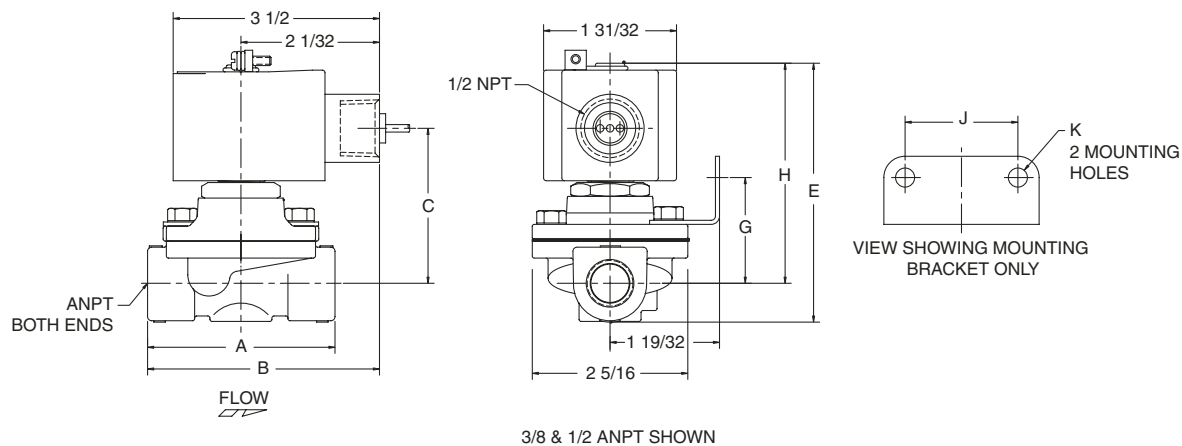
NORMALLY OPEN



Specifications (NP8210 Brass Body)

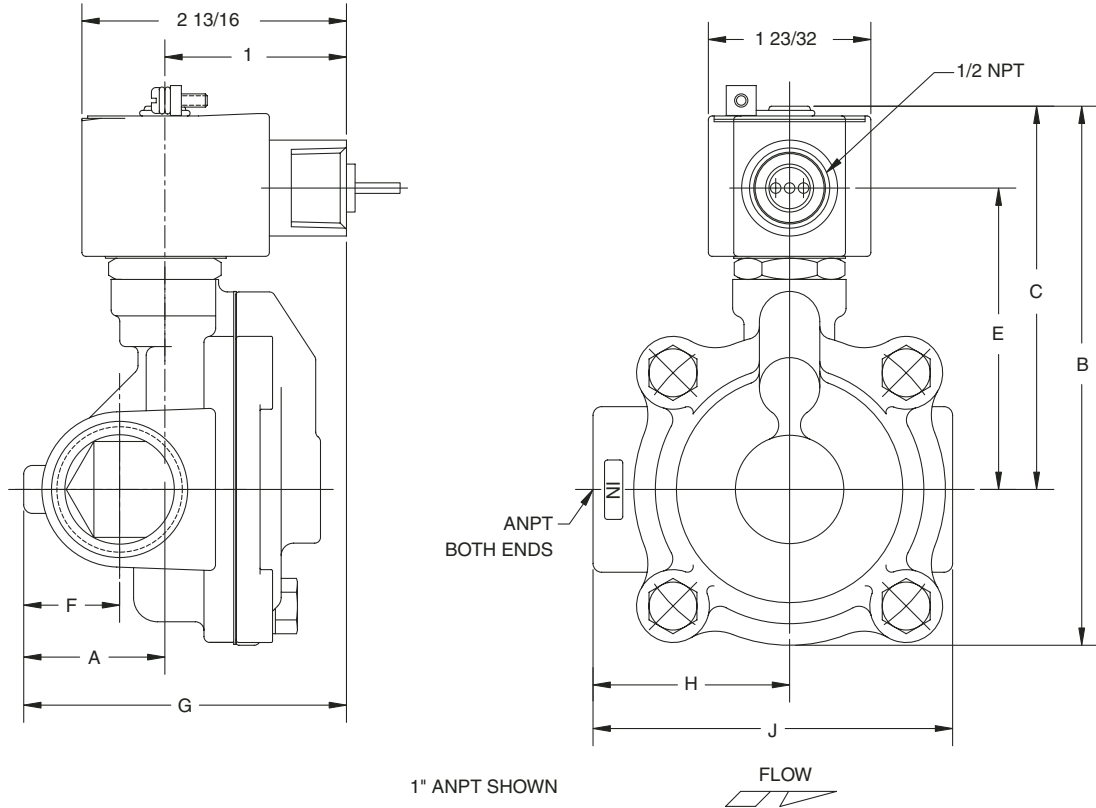
Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential (psi)		Minimum Operating Pressure	Safe Working Pressure (psi)	Cv Flow Factor	Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
		AC	DC						AC	DC
Normally Closed Operation										
3/8	5/8	150	40	0	600	3	NP8210G093	NPEF8210G093	10.1	24.6
1/2	5/8	150	40	0	600	4	NP8210G094	NPEF8210G094	10.1	24.6
3/4	3/4	150	40	0	600	5	NP8210G095	NPEF8210G095	10.1	24.6
1	1	150	125	5	600	13	NP8210G004	NPEF8210G004	6.1	24.6
1 1/4	1 1/8	150	125	5	600	15	NP8210G008	NPEF8210G008	6.1	24.6
1 1/2	1 1/4	150	125	5	600	22.5	NP8210G022	NPEF8210G022	6.1	24.6
Normally Open Operation										
3/8	5/8	150	125	0	300	3	NP8210G033	NPEF8210G033	10.1	24.6
1/2	5/8	150	125	0	300	4	NP8210G034	NPEF8210G034	10.1	24.6
3/4	3/4	150	125	0	300	5.5	NP8210G035	NPEF8210G035	10.1	24.6
1	1	150	-	5	300	13	NP8210D014	NPEF8210G014	16.1	-
1 1/4	1 1/8	150	-	5	300	15	NP8210D018	NPEF8210G018	16.1	-
1 1/2	1 1/4	150	-	5	300	22.5	NP8210D032	NPEF8210G032	16.1	-
1	1	-	125	5	300	13	NP8210G014	NPEF8210G014	-	26.6
1 1/4	1 1/8	-	125	5	300	15	NP8210G018	NPEF8210G018	-	26.6
1 1/2	1 1/4	-	125	5	300	22.5	NP8210G032	NPEF8210G032	-	26.6

NP8210 - Dimensions



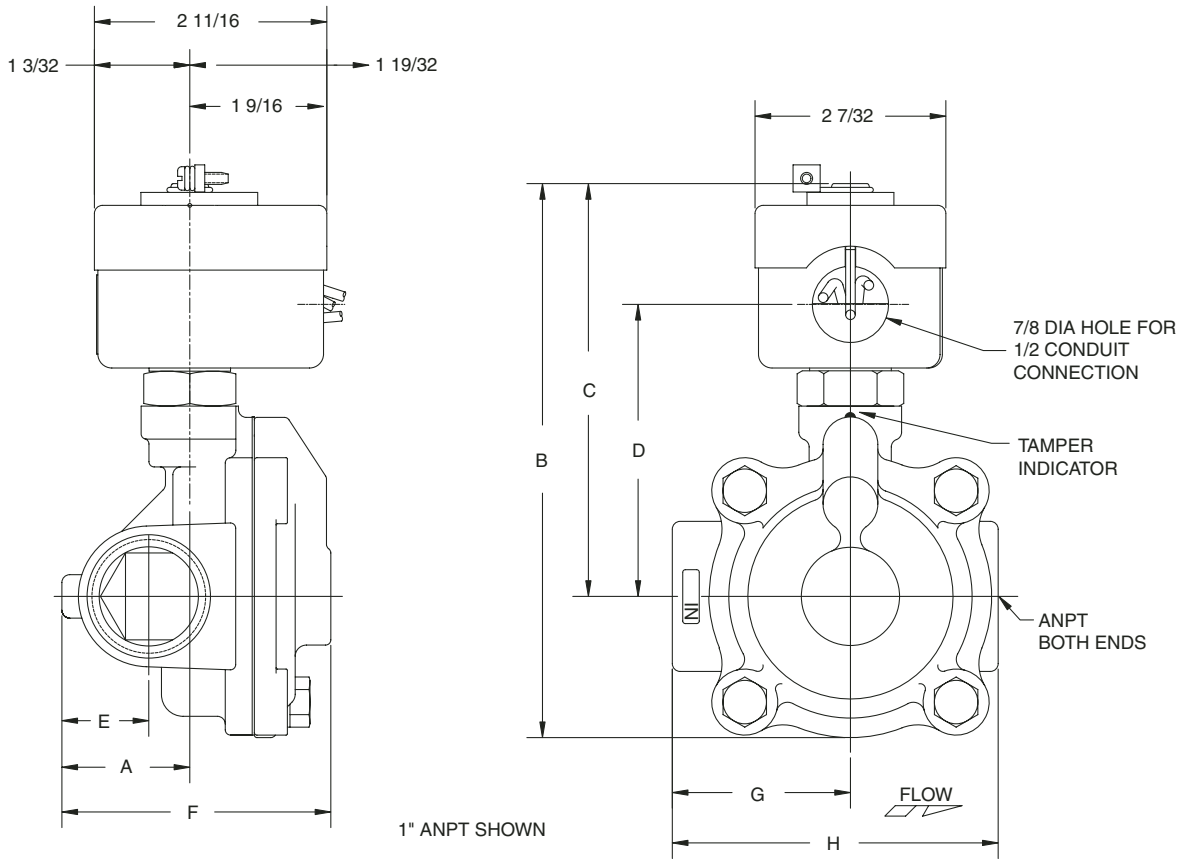
NP Catalog Numbers	ANPT	A	B	C	E	G	H	J	K
NP8210G093 NPEF8210G093	3/8	2 3/4	3 7/16	2 5/16	3 13/16	1 9/16	3 1/4	1 23/32	9/32
NP8210G094 NPEF8210G094	1/2	2 3/4	3 7/16	2 5/16	3 13/16	1 9/16	3 1/4	1 23/32	9/32
NP8210G095 NPEF8210G095	3/4	2 13/16	3 15/32	2 15/32	4 3/32	1 23/32	3 13/32	1 23/32	9/32
NP8210G033 NPEF8210G033	3/8	2 3/4	3 7/16	2 21/32	4 5/16	1 9/16	3 3/4	1 23/32	9/32
NP8210G034 NPEF8210G034	1/2	2 3/4	3 7/16	2 21/32	4 5/16	1 9/16	3 3/4	1 23/32	9/32
NP8210G035 NPEF8210G035	3/4	2 13/16	3 15/32	2 13/16	4 5/8	1 23/32	3 29/32	1 23/32	9/32

NP8210 - Dimensions



NP Catalog Numbers	ANPT	A	B	C	E	F	G	H	J
NP8210G004 NPEF8210G004	1	1 15/32	5 21/32	4 1/32	3 5/32	1	3 3/8	2 1/16	3 3/4
NP8210G008 NPEF8210G008	1 1/4	1 11/16	5 21/32	4 1/32	3 5/32	1 3/16	3 9/16	2 1/32	3 21/32
NP8210G022 NPEF8210G022	1 1/2	2 1/32	6 1/8	4 3/16	3 5/16	1 5/16	3 15/16	2 3/16	4 3/8
NP8210G014 NPEF8210G014	1	1 15/32	6 3/8	4 3/4	3 19/32	1	3 3/32	2 1/16	3 3/8
NP8210G018 NPEF8210G018	1 1/4	1 11/16	6 3/8	4 3/4	3 19/32	1 3/16	3 17/32	2 1/32	3 21/32
NP8210G032 NPEF8210G032	1 1/2	2 1/32	6 7/8	4 15/16	3 3/4	1 5/16	3 15/16	2 3/16	4 3/8

NP8210 - Dimensions



NP Catalog Numbers	ANPT	A	B	C	D	E	F	G	H
NP8210D014	1"	1 9/32	6 3/8	4 3/4	3 1/4	13/16	2 15/16	2 1/16	3 3/4
NP8210D018	1 1/4	1 1/2				1	3 3/8	2 1/32	3 21/32
NP8210D032	1 1/2	1 13/16	6 7/8	4 15/16	3 3/8	1 3/32	3 3/4	2 1/16	1 3/6

Qualification

IEEE-323-1983, IEEE-344-1986, IEEE-382-1980,
IEEE 387-1984, and IEEE-627-1980

ASCO Qualification Report: AQR-68061

Installation

Valves must be mounted with solenoid vertical and upright.

Valve Parts in Contact with Media

Body: Brass

Disc: FKM fluoroelastomer

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 Ph Stainless Steel

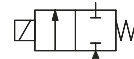
Shading Coil (AC models): Copper

Static Seals: FKM fluoroelastomer

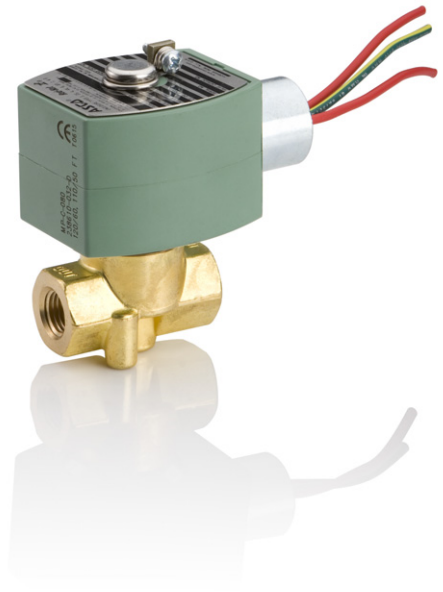
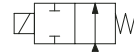
Nominal Ambient Temperature

32 - 150°F (0-66°C)

NORMALLY CLOSED



NORMALLY OPEN



Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
F	-	6.1	16	40
F	-	10.1	25	70
H	20.6	-	-	-
H	24.6	-	-	-

Replacement Coil Kits

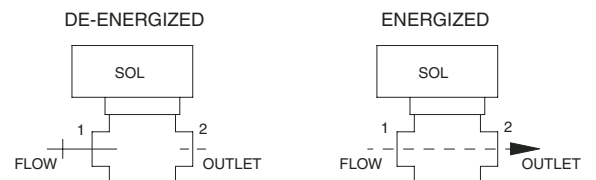
Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof/Watertight Solenoid Enclosure
120/60 VAC	238210-032-D	238214-032-D
120/60 VAC	238610-032-D	238614-032-D
125 VDC	238510-335-D	238514-335-D
125 VDC	238910-335-D	238914-335-D

* For optional 72" (6') coil leads replace "D" with "K", i.e. -001K.

Note: Additional coil model numbers for non-standard voltages are also available. Contact ASCO.

Flow Diagrams

NORMALLY CLOSED



NP8262 NP8263 VALVES

2-Way Solenoid
For Oil-Free Instrument Air or Nitrogen
1/4", 3/8" ANPT



Specifications (NP8262)

Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)		Minimum Operating Pressure	Safe Working Pressure (psi)	Cv Flow Factor	Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
		AC	DC						AC	DC
Normally Closed Operation										
1/4	1/8	300	75	0	600	0.35	NP8262G232	NPEF8262G232	10.1	24.6
1/4	5/32	180	40	0	600	0.50	NP8262G202	NPEF8262G202	10.1	24.6
1/4	7/32	90	25	0	600	0.72	NP8262G208	NPEF8262G208	10.1	24.6
1/4	9/32	60	18	0	600	0.88	NP8262G210	NPEF8262G210	10.1	24.6
Normally Open Operation										
1/4	3/64	750	500	0	600	.06	NP8262G260	NPEF8262G260	10.1	24.6
1/4	3/32	300	200	0	600	.17	NP8262G261	NPEF8262G261	10.1	24.6
1/4	1/8	130	80	0	600	.35	NP8262G262	NPEF8262G262	10.1	24.6
1/4	5/32	85	45	0	600	.49	NP8262G263	NPEF8262G263	10.1	24.6
1/4	7/32	45	25	0	600	.83	NP8262G264	NPEF8262G264	10.1	24.6
1/4	9/32	30	15	0	600	.96	NP8262G265	NPEF8262G265	10.1	24.6

Specifications (NP8263)

Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)		Minimum Operating Pressure	Safe Working Pressure (psi)	Cv Flow Factor	Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
		AC	DC						AC	DC
Normally Closed Operation										
3/8	1/8	160	65	0	600	0.35	NP8263G002	NPEF8263G002	6.1	20.6
3/8	5/32	100	35	0	600	0.52	NP8263G200	NPEF8263G200	10.1	24.6
3/8	7/32	100	25	0	600	0.72	NP8263G206	NPEF8263G206	-	24.6

NP8262 - Dimensions

Dimensions:

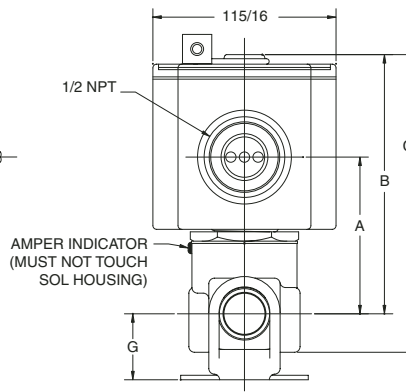
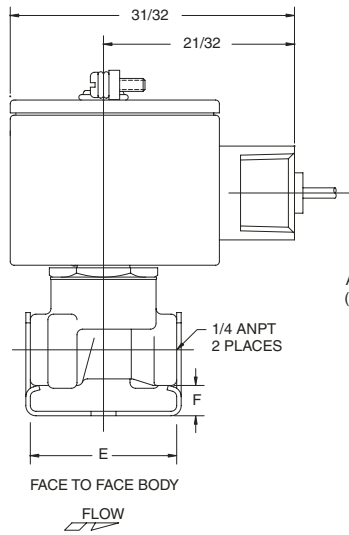
- Top left: 3 1/32, 2 1/32
- Top middle: 1 15/16
- Top right: 7/8, ø9/32, 11/16, 7/8, 19/32, R1/8 4 PLACES
- Bottom middle: 1/2 NPT, A, B, C, 2
- Bottom right: ø5/32 DRILL, 5/16 DEEP FOR 5/32 THREAD CUTTING SCREW, 2 HOLES FOR MOUNTING, 2 1/32
- Bottom left: E, F, G, FLOW

BOTTOM VIEW OF MOUNTING BRACKET

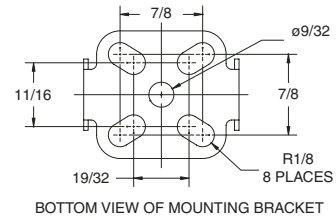
OPTIONAL BODY MOUNTING CONFIGURATION

NP Catalog Numbers	A	B	C	E	F	G
NP8262G232	1 13/16	2 23/32	3 5/32	1 1/4	13/32	13/16
NPEF8262G232						

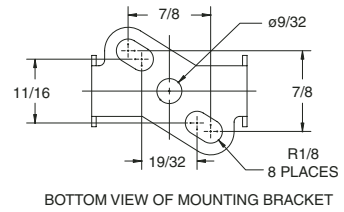
NP8262 - Dimensions



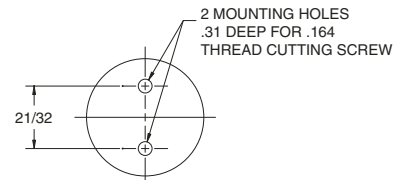
CATALOG NUMBER NP8262G263 SHOWN



FOR CATALOG NUMBERS
NP8262G263, NP8262G264, & NP8262G265



FOR CATALOG NUMBERS
NP8262G260, NP8262G261, & NP8262G262



OPTIONAL BODY MOUNTING CONFIGURATION
CATALOG NUMBERS NP8262G260,
NP8262G261 & NP8262G262 ONLY.

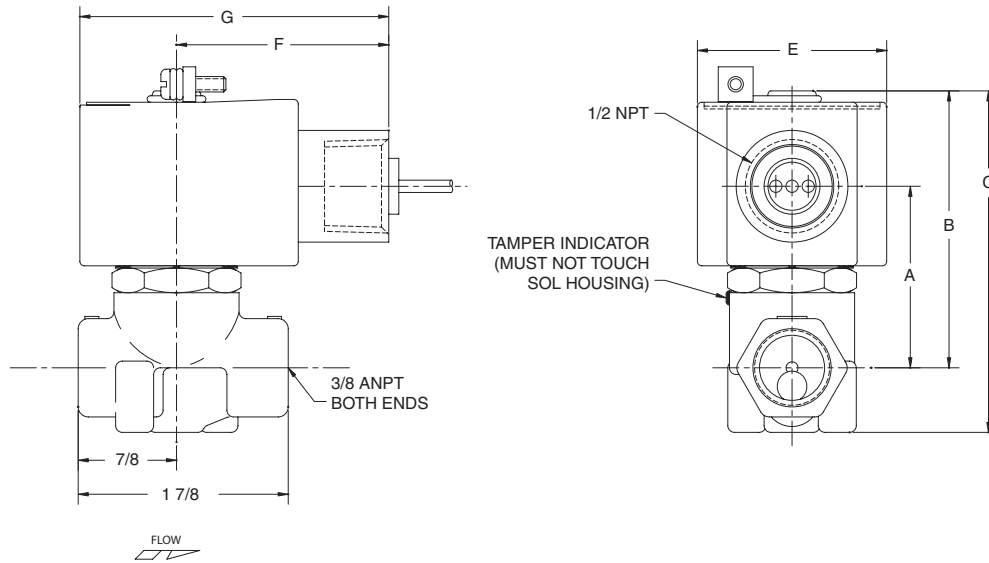
NP Catalog Numbers	A	B	C	E	F	G
NP8262G260	1 21/32	2 25/32	3 3/16	1 1/4	15/32	7/8
NPEF8262G260						
NP8262G261						
NPEF8262G261						
NP8262G262						
NPEF8262G262						
NP8262G263	1 21/32	2 3/4	3 5/32	1 9/16	5/16	11/16
NPEF8262G263						
NP8262G264						
NPEF8262G264						
NP8262G265						
NPEF8262G265						
NP8262G202	1 25/32	2 23/32	3 3/32	1 9/16	5/16	11/16
NPEF8262G202						
NP8262G208						
NPEF8262G208						
NP8262G210						
NPEF8262G210						

**NP8262
NP8263
VALVES**

2-Way Solenoid
For Oil-Free Instrument Air or Nitrogen
1/4", 3/8" NPT



NP8263 - Dimensions



NP Catalog Numbers	A	B	C	E	F	G
NP8263G002	1 5/8	2 15/32	3 1/16	1 11/16	1 29/32	2 25/32
NPEF8263G002						
NP8263G200	1 11/16	2 5/8	3 7/32	1 15/16	2 1/32	3 1/32
NPEF8263G200						
NP8263G206						
NPEF8263G206						

Qualification

IEEE-323-1983, IEEE-344-1986, IEEE-382-1980,
IEEE 387-1985, and IEEE-627-1980

ASCO Qualification Report: AQR-68061

Installation

Valves may be mounted in any position.

Valve Parts in Contact with Media

Body: Brass

Seals and Disc: FKM fluoroelastomer

Springs: 302 Stainless Steel

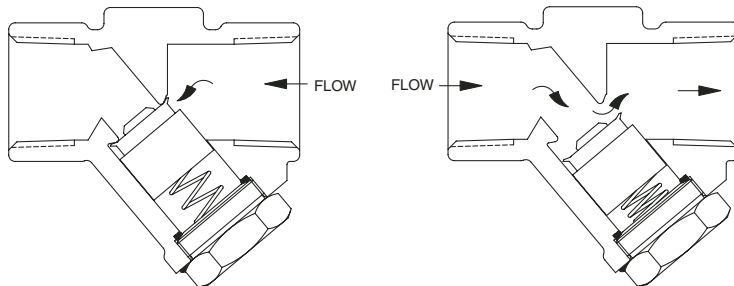
Disc Holder: Brass



Nominal Ambient Temperature

122°F (50°C) maximum

Flow Diagrams



Specifications (NPV012 Check Valves)

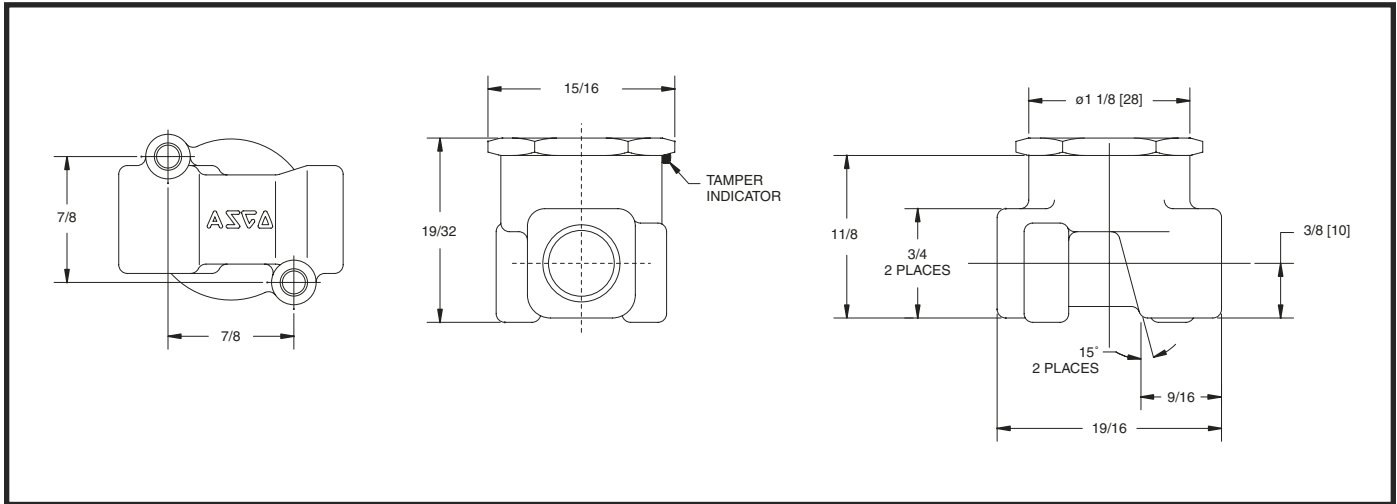
Pipe Size (in.)	Orifice Size (in.)	Cv Flow Factor	Opening Pressure (psi)	Maximum Operating Pressure Differential (psi) Air	Catalog Number
FORGED BRASS BODY, with FKM fluoroelastomer Disc					
1/4	9/32	0.7	1	150	NPV012001
3/8	3/8	1.2	1	150	NPV012002
1/2	7/16	2.5	1	150	NPV012003
3/4	1/2	3.6	1	150	NPV012004

NPV012 CHECK VALVES

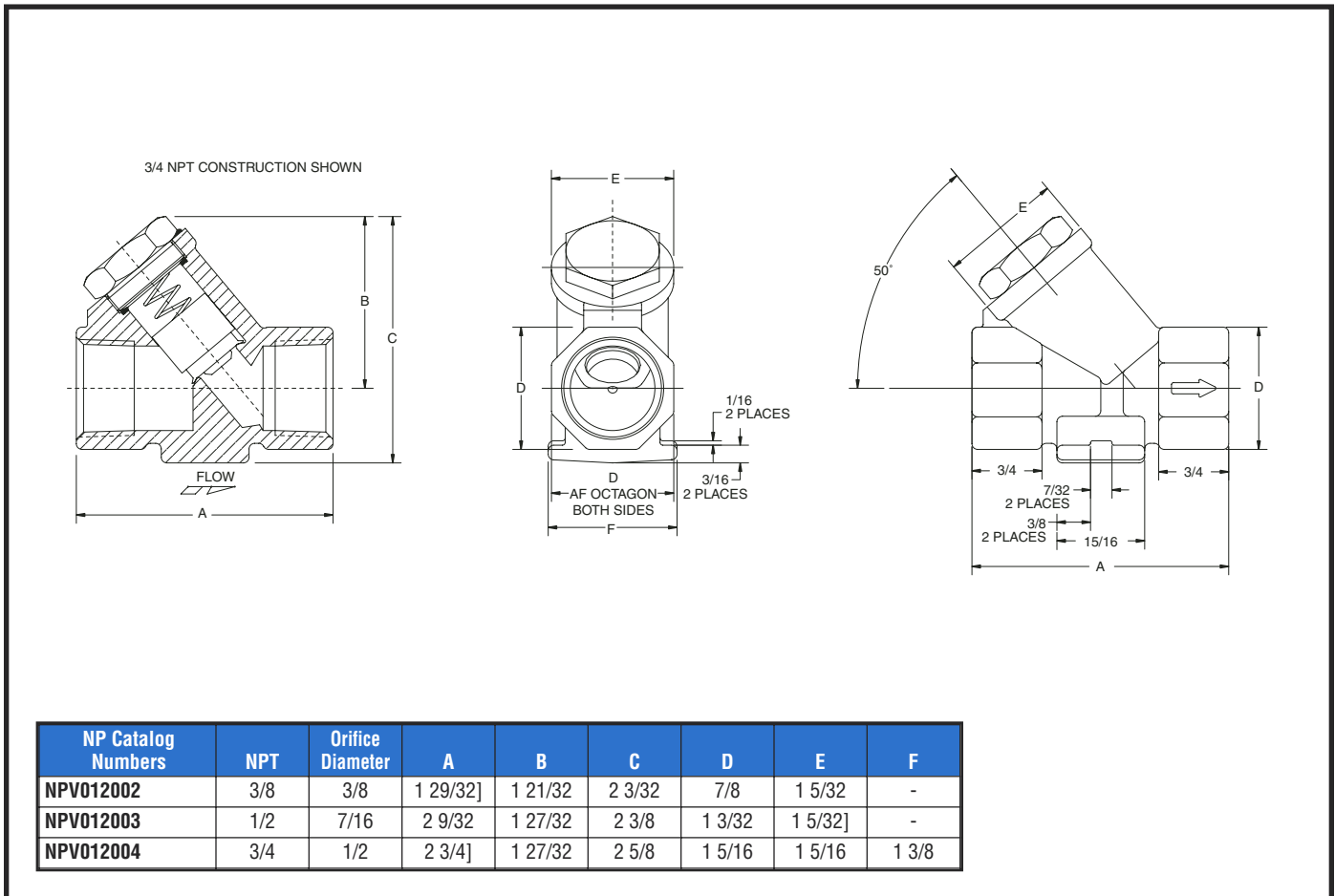
For Oil-Free Instrument Air
1/4", 3/8", 1/2", and 3/4" ANPT



NPV012001 - Dimensions, 1/4" NPT



NPV012 - Dimensions



Qualification

IEEE-323-1974, IEEE-344-1975, IEEE-382-1980
(Revision of 382-1972), and IEEE-627-1980
ASCO Qualification Specification: AQS-21680/Rev.C
ASCO Qualification Report: AQR-67368/Rev.1
IEEE-323-1974, IEEE-344-1975, and IEEE-382-1972
ASCO Qualification Specification: AQS-21678, Rev.B
ASCO Qualification Report: AQS-21678/TR. Rev.A

Installation

Valves must be mounted with solenoid vertical and upright.

Valve Parts in Contact with Media

- Core Tube: 305 Stainless Steel
- Core and Plugnut: 430F Stainless Steel
- Springs: 302 Stainless Steel and 17-7 Ph Stainless Steel
- Shading Coil (AC models): Copper
- Body: Brass or 304 Stainless Steel, see specification table
- Disc: 303 Stainless Steel (valve with metal seats), machined brass (valve with resilient seals)
- Seats: Nickel/PTFE plated phosphor bronze (metal), ethylene propylene (resilient), FKM fluoroelastomer (optional)
- Gaskets: Ethylene propylene or FKM fluoroelastomer (optional)
- No aluminum parts

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
H	35.1	20	41.5	195

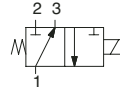
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	258288-001D	258287-001D
125 VDC	-	258286-001D
240/60 VAC	258288-002D	258287-002D
250 VAC	-	258286-002D

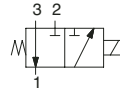
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K.
For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

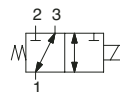
NORMALLY CLOSED (PRESSURE AT 2)



NORMALLY OPEN (PRESSURE AT 3)



UNIVERSAL (PRESSURE AT 2 OR 3 ONLY)

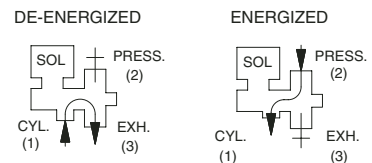


Optional Features (see pages 64-65 for details)

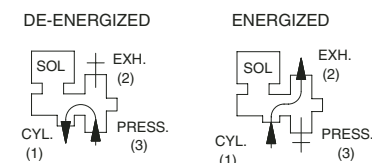
- 1/2" NPT threaded conduit hub
- Longer than standard lead lengths
- Screw terminal coils (AC watertight solenoid or DC explosion proof only)
- Elastomers: FKM fluoroelastomer (suffix V)

Flow Diagrams

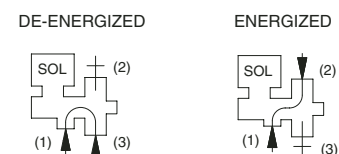
NORMALLY CLOSED
(Suffix "F")



NORMALLY OPEN
(Suffix "G")



UNIVERSAL
(Suffix "U")



Specifications (NP8300 Valve Series)

Normally Closed Operation												
Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)	Safe Working Pressure (psi)	Cv Resilient Seat ①		Cv Metallic Seat		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Body Material	Watt Rating	
				2 to 1	1 to 3	2 to 1	1 to 3				AC	DC
AC Construction (model numbers listed have metal seats)												
1/8	3/16	200	600	0.31	0.18	0.39	0.34	NP8300181EF	NPEF8300181EF	Brass	20	-
1/4	3/16	200	600	0.31	0.18	0.39	0.34	NP8300141EF	NPEF8300141EF	Brass	20	-
1/4	1/4	150	600	0.45	0.28	0.48	0.39	NP8300142EF	NPEF8300142EF	Brass	20	-
3/8	3/16	200	600	0.31	0.18	0.39	0.34	NP8300381EF	NPEF8300381EF	Brass	20	-
3/8	1/4	150	600	0.45	0.28	0.48	0.39	NP8300382EF	NPEF8300382EF	Brass	20	-
3/8	5/16	100	600	0.59	0.38	0.77	0.66	NP8300383EF	NPEF8300383EF	Brass	20	-
1/2	5/16	100	600	0.59	0.38	0.77	0.66	NP8300123EF	NPEF8300123EF	Brass	20	-
3/8	3/16	200	1500	-	-	0.39	0.34	NP8300384EF	NPEF8300384EF	Stainless Steel	20	-
3/8	1/4	150	1500	-	-	0.48	0.39	NP8300385EF	NPEF8300385EF	Stainless Steel	20	-
3/8	5/16	100	1500	-	-	0.77	0.66	NP8300386EF	NPEF8300386EF	Stainless Steel	20	-
1/2	5/16	100	1500	-	-	0.77	0.66	NP8300243EF	NPEF8300243EF	Stainless Steel	20	-
DC Construction (model numbers listed have metal seats)												
1/8	3/16	200	600	0.25	0.18	0.31	0.21	-	NPEF8300181EF	Brass	-	35.1
1/4	3/16	200	600	0.25	0.18	0.31	0.21	-	NPEF8300141EF	Brass	-	35.1
1/4	1/4	150	600	0.37	0.20	0.36	0.26	-	NPEF8300142EF	Brass	-	35.1
3/8	3/16	200	600	0.25	0.18	0.31	0.21	-	NPEF8300381EF	Brass	-	35.1
3/8	1/4	150	600	0.37	0.20	0.36	0.26	-	NPEF8300382EF	Brass	-	35.1
3/8	5/16	125	600	0.58	0.35	0.76	0.66	-	NPEF8300383EF	Brass	-	35.1
1/2	5/16	125	600	0.58	0.35	0.76	0.66	-	NPEF8300123EF	Brass	-	35.1
3/8	3/16	200	1500	-	-	0.31	0.21	-	NPEF8300384EF	Stainless Steel	-	35.1
3/8	1/4	150	1500	-	-	0.36	0.26	-	NPEF8300385EF	Stainless Steel	-	35.1
3/8	5/16	125	1500	-	-	0.76	0.66	-	NPEF8300386EF	Stainless Steel	-	35.1
1/2	5/16	125	1500	-	-	0.76	0.66	-	NPEF8300243EF	Stainless Steel	-	35.1

① For resilient seat models add an "R" suffix in the valve model number. (Only available in brass body valves). For ethylene elastomers place the "R" after the "E" but before the form of flow designation: F. (example "NP8300 181ERF"); and for a FKM fluoroelastomer construction valve place the "R" before the "V" suffix, (example "NP8300 181RVF"). For FKM fluoroelastomer constructions substitute "V" for "E" in catalog number.



3-Way Solenoid
For Oil-Free Instrument Air
1/8", 1/4", 3/8", and 1/2" ANPT

**NP8300
VALVES**

Specifications (NP8300 Valve Series)

Normally Open Operation												
Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)	Safe Working Pressure (psi)	Cv Resilient Seat ①		Cv Metallic Seat		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Body Material	Watt Rating	
				3 to 1	1 to 2	3 to 1	1 to 2				AC	DC
AC Construction (model numbers listed have metal seats)												
1/8	3/16	200	600	0.14	0.27	0.34	0.39	NP8300181EG	NPEF8300181EG	Brass	20	-
1/4	3/16	200	600	0.14	0.27	0.34	0.39	NP8300141EG	NPEF8300141EG	Brass	20	-
1/4	1/4	150	600	0.18	0.47	0.39	0.48	NP8300142EG	NPEF8300142EG	Brass	20	-
3/8	3/16	200	600	0.14	0.27	0.34	0.39	NP8300381EG	NPEF8300381EG	Brass	20	-
3/8	1/4	150	600	0.18	0.47	0.39	0.48	NP8300382EG	NPEF8300382EG	Brass	20	-
3/8	5/16	100	600	0.51	0.61	0.66	0.77	NP8300383EG	NPEF8300383EG	Brass	20	-
1/2	5/16	100	600	0.51	0.61	0.66	0.77	NP8300123EG	NPEF8300123EG	Brass	20	-
3/8	3/16	200	1500	-	-	0.34	0.39	NP8300384EG	NPEF8300384EG	Stainless Steel	20	-
3/8	1/4	150	1500	-	-	0.39	0.48	NP8300385EG	NPEF8300385EG	Stainless Steel	20	-
3/8	5/16	100	1500	-	-	0.66	0.77	NP8300386EG	NPEF8300386EG	Stainless Steel	20	-
1/2	5/16	100	1500	-	-	0.66	0.77	NP8300243EG	NPEF8300243EG	Stainless Steel	20	-
DC Construction (model numbers listed have metal seats)												
1/8	3/16	200	600	0.15	0.28	0.21	0.31	-	NPEF8300181EG	Brass	-	35.1
1/4	3/16	200	600	0.15	0.28	0.21	0.31	-	NPEF8300141EG	Brass	-	35.1
1/4	1/4	150	600	0.20	0.41	0.26	0.36	-	NPEF8300142EG	Brass	-	35.1
3/8	3/16	200	600	0.15	0.28	0.21	0.31	-	NPEF8300381EG	Brass	-	35.1
3/8	1/4	150	600	0.20	0.41	0.26	0.36	-	NPEF8300382EG	Brass	-	35.1
3/8	5/16	125	600	0.35	0.59	0.66	0.76	-	NPEF8300383EG	Brass	-	35.1
1/2	5/16	125	600	0.35	0.59	0.66	0.76	-	NPEF8300123EG	Brass	-	35.1
3/8	3/16	200	1500	-	-	0.21	0.31	-	NPEF8300384EG	Stainless Steel	-	35.1
3/8	1/4	150	1500	-	-	0.26	0.36	-	NPEF8300385EG	Stainless Steel	-	35.1
3/8	5/16	125	1500	-	-	0.66	0.76	-	NPEF8300386EG	Stainless Steel	-	35.1
1/2	5/16	125	1500	-	-	0.66	0.76	-	NPEF8300243EG	Stainless Steel	-	35.1

① For resilient seat models add an "R" suffix in the valve model number. (Only available in brass body valves). For ethylene elastomers place the "R" after the "E" but before the form of flow designation: G. (example "NP8300 181ERG"); and for a FKM fluoroelastomer construction valve place the "R" before the "V" suffix, (example "NP8300 181RVG"). For FKM fluoroelastomer Constructions substitute "V" for "E" in catalog number.

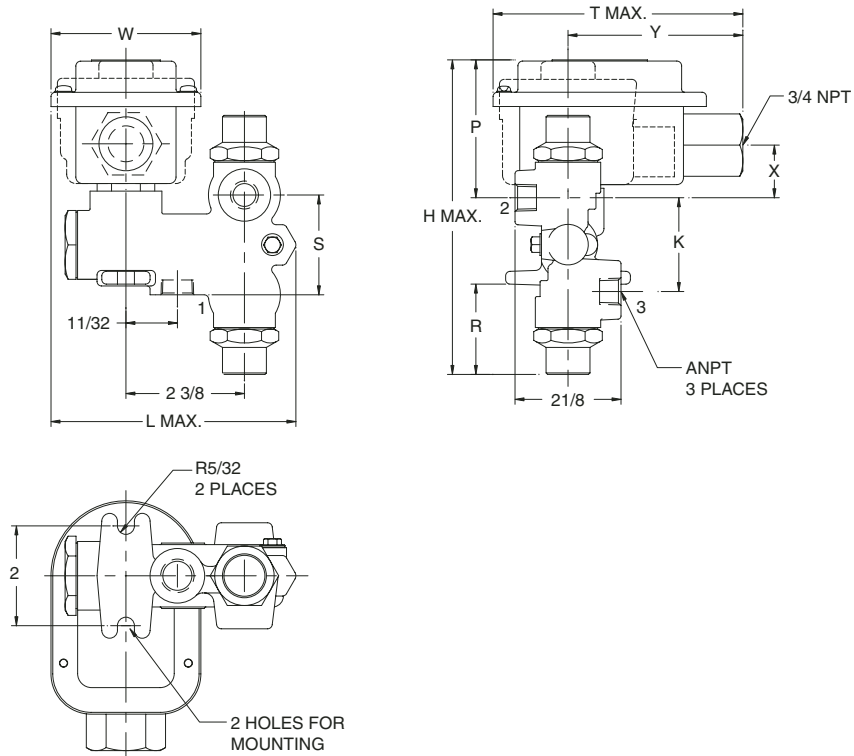
Specifications (NP8300 Brass Body)

Universal Operation												
Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)	Safe Working Pressure (psi)	Cv Resilient Seat ①		Cv Metallic Seat		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Body Material	Watt Rating	
				1 to 2	3 to 1	1 to 2	3 to 1				AC	DC
AC Construction (model numbers listed have metal seats)												
1/8	3/16	100	600	0.30	0.22	0.39	0.34	NP8300181EU	NPEF8300181EU	Brass	20	-
1/4	3/16	100	600	0.30	0.22	0.39	0.34	NP8300141EU	NPEF8300141EU	Brass	20	-
1/4	1/4	75	600	0.47	0.31	0.48	0.39	NP8300142EU	NPEF8300142EU	Brass	20	-
3/8	3/16	100	600	0.30	0.22	0.39	0.34	NP8300381EU	NPEF8300381EU	Brass	20	-
3/8	1/4	75	600	0.47	0.31	0.48	0.39	NP8300382EU	NPEF8300382EU	Brass	20	-
3/8	5/16	50	600	0.58	0.38	0.77	0.66	NP8300383EU	NPEF8300383EU	Brass	20	-
1/2	5/16	50	600	0.58	0.38	0.77	0.66	NP8300123EU	NPEF8300123EU	Brass	20	-
3/8	3/16	100	1500	-	-	0.39	0.34	NP8300384EU	NPEF8300384EU	Stainless Steel	20	-
3/8	1/4	75	1500	-	-	0.48	0.39	NP8300385EU	NPEF8300385EU	Stainless Steel	20	-
3/8	5/16	50	1500	-	-	0.77	0.66	NP8300386EU	NPEF8300386EU	Stainless Steel	20	-
1/2	5/16	50	1500	-	-	0.77	0.66	NP8300243EU	NPEF8300243EU	Stainless Steel	20	-
DC Construction (model numbers listed have metal seats)												
1/8	3/16	100	600	0.22	0.15	0.31	0.21	-	NPEF8300181EU	Brass	-	35.1
1/4	3/16	100	600	0.22	0.15	0.31	0.21	-	NPEF8300141EU	Brass	-	35.1
1/4	1/4	75	600	0.39	0.27	0.36	0.26	-	NPEF8300142EU	Brass	-	35.1
3/8	3/16	100	600	0.22	0.15	0.31	0.21	-	NPEF8300381EU	Brass	-	35.1
3/8	1/4	75	600	0.39	0.27	0.36	0.26	-	NPEF8300382EU	Brass	-	35.1
3/8	5/16	60	600	0.61	0.48	0.76	0.66	-	NPEF8300383EU	Brass	-	35.1
1/2	5/16	60	600	0.61	0.48	0.76	0.66	-	NPEF8300123EU	Brass	-	35.1
3/8	3/16	100	1500	-	-	0.31	0.21	-	NPEF8300384EU	Stainless Steel	-	35.1
3/8	1/4	75	1500	-	-	0.36	0.26	-	NPEF8300385EU	Stainless Steel	-	35.1
3/8	5/16	60	1500	-	-	0.76	0.66	-	NPEF8300386EU	Stainless Steel	-	35.1
1/2	5/16	60	1500	-	-	0.76	0.66	-	NPEF8300243EU	Stainless Steel	-	35.1

① For resilient seat models add an "R" suffix in the valve model number. (Only available in brass body valves). For ethylene elastomers place the "R" after the "E" but before the form of flow designation: U. (example "NP8300 181ERU"); and for a FKM fluoroelastomer construction valve place the "R" before the "V" suffix, (example "NP8300 181RVU"). For FKM fluoroelastomer constructions substitute "V" for "E" in catalog number.

NP8300 - Dimensions

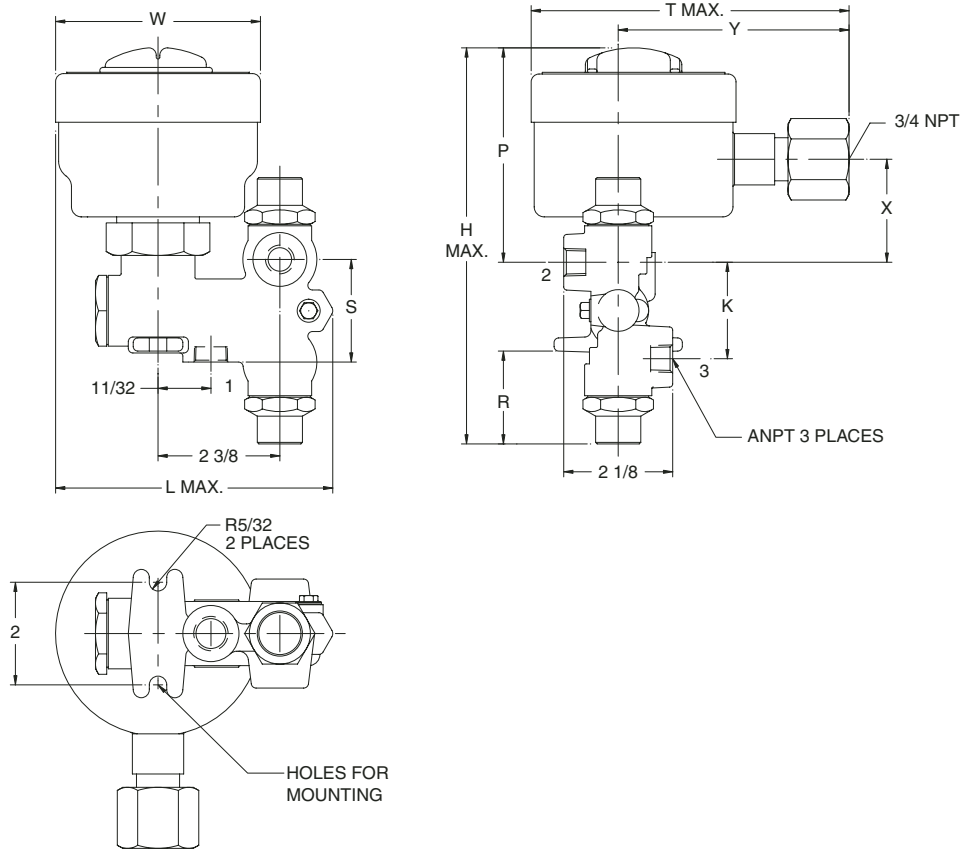
AC Construction



AC Construction											
NP Catalog Numbers	Mounting Hole Dia.	H	K	L	P	R	S	T	W	X	Y
NP8300181E NP8300141E NP8300142E NP8300381E NP8300382E	11/32	5 5/16	1 7/16	5	2 13/16	1 1/16	1 19/32	5 1/16	3	1 1/16	3 15/32
NP8300383E NP8300123E		6 5/16	1 7/8	5	2 11/16	1 7/8	2	5 1/16	3	1	3 15/32
NPEF8300181E NPEF8300141E NPEF8300142E NPEF8300381E NPEF8300382E	11/32	5 1/4	1 7/16	4 7/8	2 11/16	1 1/16	1 19/32	4 5/16	2 3/4	15/16	3 9/16
NPEF8300383E NPEF8300123E		6 1/4	1 7/8	4 7/8	2 19/32	1 7/8	2	4 5/16	2 3/4	27/32	3 9/16
NP8300384E NP8300385E NP8300386E NP8300243E	3/8	6 5/16	1 7/8	5	2 11/16	1 27/32	2	5 1/16	3	1	3 15/32
NPEF8300384E NPEF8300385E NPEF8300386E NPEF8300243E	3/8	6 1/4	1 7/8	4 7/8	2 19/32	1 27/32	2	4 15/16	2 3/4	27/32	3 9/16

NP8300 - Dimensions

DC Construction



DC Construction											
NP Catalog Numbers	Mounting Hole Dia.	H	K	L	P	R	S	T	W	X	Y
NPEF8300181E NPEF8300141E NPEF8300142E NPEF8300381E NPEF8300382E	11/32	6 3/4	1 7/16	5 1/2	4 3/16	1 1/4	1 19/32	6 1/4	4	1 29/32	4 1/2
NPEF8300383E NPEF8300123E	7 3/4	7 3/4	1 7/8	5 1/2	4 3/32	2 1/32	2	6 1/4	4	1 15/16	4 1/2
NPEF8300384E NPEF8300385E NPEF8300386E NPEF8300243E	3/8	7 3/4	1 7/8	5 1/2	4 1/8	1 27/32	2	6 1/4	4	1 15/16	4 1/2

Qualification

IEEE-323-1983, IEEE-344-1987, and IEEE-382-1985

ASCO Qualification Specification:
AQS-21691

ASCO Qualification Report:
AQR-21691

Installation

Valves must be mounted with solenoid vertical and upright.

Valve Parts in Contact with Media

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 PH Stainless Steel

Shading Coil (AC models): Copper

Body: Brass or 304 Stainless Steel, see specification table

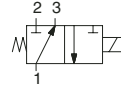
Disc: 303 Stainless Steel (valve with metal seats),
machined brass (valve with resilient seats)

Seats: Nickel/PTFE plated phosphor bronze (metal)
Gamma + (resilient)

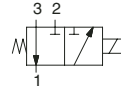
Gaskets: Gamma +

No aluminum parts

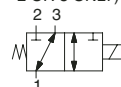
NORMALLY CLOSED
(PRESSURE AT 2)



NORMALLY OPEN
(PRESSURE AT 3)



UNIVERSAL
(PRESSURE AT 2 OR 3 ONLY)



Optional Features (see pages 64-65 for details)

1/2" NPT threaded conduit hub

Longer than standard lead lengths

Screw terminal coils (AC watertight or DC explosionproof solenoid only)

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
N	35.1	20	41.5	195

Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	278288-001-D	278287-001D
125 VDC	-	278286-001D
240/60 VAC	278288-002-D	278287-002D
250 VAC	-	278286-002D

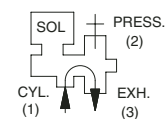
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K.
For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

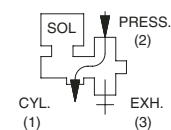
Flow Diagrams

NORMALLY CLOSED
(Suffix "F")

DE-ENERGIZED

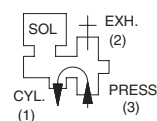


ENERGIZED

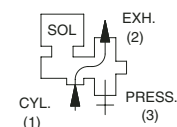


NORMALLY OPEN
(Suffix "G")

DE-ENERGIZED

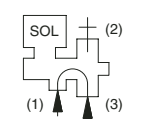


ENERGIZED

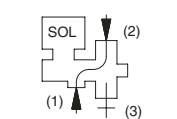


UNIVERSAL
(Suffix "U")

DE-ENERGIZED



ENERGIZED



Specifications (NS8300 Series Valves)

Normally Closed Operation												
Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)	Safe Working Pressure (psi)	Cv Resilient Seat ①		Cv Metallic Seat		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Body Material	Watt Rating	
				2 to 1	1 to 3	2 to 1	1 to 3				AC	DC
AC Construction (model numbers listed have metal seats)												
1/8	3/16	200	600	0.31	0.18	0.39	0.34	NS8300181F	NSEF8300181F	Brass	20	-
1/4	3/16	200	600	0.31	0.18	0.39	0.34	NS8300141F	NSEF8300141F	Brass	20	-
1/4	1/4	150	600	0.45	0.28	0.48	0.39	NS8300142F	NSEF8300142F	Brass	20	-
3/8	3/16	200	600	0.31	0.18	0.39	0.34	NS8300381F	NSEF8300381F	Brass	20	-
3/8	1/4	150	600	0.45	0.28	0.48	0.39	NS8300382F	NSEF8300382F	Brass	20	-
3/8	5/16	100	600	0.59	0.38	0.77	0.66	NS8300383F	NSEF8300383F	Brass	20	-
1/2	5/16	100	600	0.59	0.38	0.77	0.66	NS8300123F	NSEF8300123F	Brass	20	-
3/8	3/16	200	1500	-	-	0.39	0.34	NS8300384F	NSEF8300384F	Stainless Steel	20	-
3/8	1/4	150	1500	-	-	0.48	0.39	NS8300385F	NSEF8300385F	Stainless Steel	20	-
3/8	5/16	100	1500	-	-	0.77	0.66	NS8300386F	NSEF8300386F	Stainless Steel	20	-
1/2	5/16	100	1500	-	-	0.77	0.66	NS8300243F	NSEF8300243F	Stainless Steel	20	-
DC Construction (model numbers listed have metal seats)												
1/8	3/16	200	600	0.25	0.18	0.31	0.21	-	NSEF8300181F	Brass	-	35.1
1/4	3/16	200	600	0.25	0.18	0.31	0.21	-	NSEF8300141F	Brass	-	35.1
1/4	1/4	150	600	0.37	0.20	0.36	0.26	-	NSEF8300142F	Brass	-	35.1
3/8	3/16	200	600	0.25	0.18	0.31	0.21	-	NSEF8300381F	Brass	-	35.1
3/8	1/4	150	600	0.37	0.20	0.36	0.26	-	NSEF8300382F	Brass	-	35.1
3/8	5/16	125	600	0.58	0.35	0.76	0.66	-	NSEF8300383F	Brass	-	35.1
1/2	5/16	125	600	0.58	0.35	0.76	0.66	-	NSEF8300123F	Brass	-	35.1
3/8	3/16	200	1500	-	-	0.31	0.21	-	NSEF8300384F	Stainless Steel	-	35.1
3/8	1/4	150	1500	-	-	0.36	0.26	-	NSEF8300385F	Stainless Steel	-	35.1
3/8	5/16	125	1500	-	-	0.76	0.66	-	NSEF8300386F	Stainless Steel	-	35.1
1/2	5/16	125	1500	-	-	0.76	0.66	-	NSEF8300243F	Stainless Steel	-	35.1

① For resilient seat models add an "R" suffix before the last letter in the valve model number, i.e. NS8300181F becomes NS8300181RF.
Only available in brass body valves.



Specifications (NS8300 Series Valves)

Normally Open Operation												
Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)	Safe Working Pressure (psi)	Cv Resilient Seat ①		Cv Metallic Seat		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Body Material	Watt Rating	
				3 to 1	1 to 2	3 to 1	1 to 2				AC	DC
AC Construction (model numbers listed have metal seats)												
1/8	3/16	200	600	0.14	0.27	0.34	0.39	NS8300181G	NSEF8300181G	Brass	20	-
1/4	3/16	200	600	0.14	0.27	0.34	0.39	NS8300141G	NSEF8300141G	Brass	20	-
1/4	1/4	150	600	0.18	0.47	0.39	0.48	NS8300142G	NSEF8300142G	Brass	20	-
3/8	3/16	200	600	0.14	0.27	0.34	0.39	NS8300381G	NSEF8300381G	Brass	20	-
3/8	1/4	150	600	0.18	0.47	0.39	0.48	NS8300382G	NSEF8300382G	Brass	20	-
3/8	5/16	100	600	0.51	0.61	0.66	0.77	NS8300383G	NSEF8300383G	Brass	20	-
1/2	5/16	100	600	0.51	0.61	0.66	0.77	NS8300123G	NSEF8300123G	Brass	20	-
3/8	3/16	200	1500	-	-	0.34	0.39	NS8300384G	NSEF8300384G	Stainless Steel	20	-
3/8	1/4	150	1500	-	-	0.39	0.48	NS8300385G	NSEF8300385G	Stainless Steel	20	-
3/8	5/16	100	1500	-	-	0.66	0.77	NS8300386G	NSEF8300386G	Stainless Steel	20	-
1/2	5/16	100	1500	-	-	0.66	0.77	NS8300243G	NSEF8300243G	Stainless Steel	20	-
DC Construction (model numbers listed have metal seats)												
1/8	3/16	200	600	0.15	0.28	0.21	0.31	-	NSEF8300181G	Brass	-	35.1
1/4	3/16	200	600	0.15	0.28	0.21	0.31	-	NSEF8300141G	Brass	-	35.1
1/4	1/4	150	600	0.20	0.41	0.26	0.36	-	NSEF8300142G	Brass	-	35.1
3/8	3/16	200	600	0.15	0.28	0.21	0.31	-	NSEF8300381G	Brass	-	35.1
3/8	1/4	150	600	0.20	0.41	0.26	0.36	-	NSEF8300382G	Brass	-	35.1
3/8	5/16	125	600	0.35	0.59	0.66	0.76	-	NSEF8300383G	Brass	-	35.1
1/2	5/16	125	600	0.35	0.59	0.66	0.76	-	NSEF8300123G	Brass	-	35.1
3/8	3/16	200	1500	-	-	0.21	0.31	-	NSEF8300384G	Stainless Steel	-	35.1
3/8	1/4	150	1500	-	-	0.26	0.36	-	NSEF8300385G	Stainless Steel	-	35.1
3/8	5/16	125	1500	-	-	0.66	0.76	-	NSEF8300386G	Stainless Steel	-	35.1
1/2	5/16	125	1500	-	-	0.66	0.76	-	NSEF8300243G	Stainless Steel	-	35.1

① For resilient seat models add an "R" suffix before the last letter in the valve model number, i.e. NS8300181G becomes NS8300181RG. Only available in brass body valves.

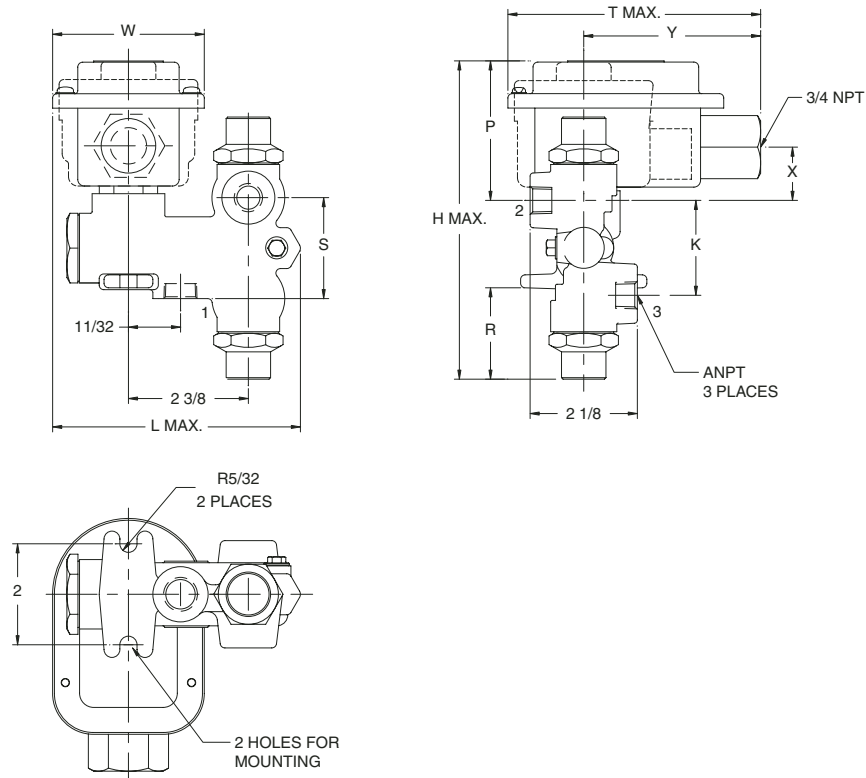
Specifications (NS8300 Series Valves)

Universal Operation													
Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)	Safe Working Pressure (psi)	Cv Resilient Seat ①		Cv Metallic Seat		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Body Material	Watt Rating		
				1 to 2	3 to 1	1 to 2	3 to 1				AC	DC	
AC Construction (model numbers listed have metal seats)													
1/8	3/16	100	600	0.30	0.22	0.39	0.34	NS8300181U	NSEF8300181U	Brass	20	-	
1/4	3/16	100	600	0.30	0.22	0.39	0.34	NS8300141U	NSEF8300141U	Brass	20	-	
1/4	1/4	75	600	0.47	0.31	0.48	0.39	NS8300142U	NSEF8300142U	Brass	20	-	
3/8	3/16	100	600	0.30	0.22	0.39	0.34	NS8300381U	NSEF8300381U	Brass	20	-	
3/8	1/4	75	600	0.47	0.31	0.48	0.39	NS8300382U	NSEF8300382U	Brass	20	-	
3/8	5/16	50	600	0.58	0.38	0.77	0.66	NS8300383U	NSEF8300383U	Brass	20	-	
1/2	5/16	50	600	0.58	0.38	0.77	0.66	NS8300123U	NSEF8300123U	Brass	20	-	
3/8	3/16	100	1500	-	-	0.39	0.34	NS8300384U	NSEF8300384U	Stainless Steel	20	-	
3/8	1/4	75	1500	-	-	0.48	0.39	NS8300385U	NSEF8300385U	Stainless Steel	20	-	
3/8	5/16	50	1500	-	-	0.77	0.66	NS8300386U	NSEF8300386U	Stainless Steel	20	-	
1/2	5/16	50	1500	-	-	0.77	0.66	NS8300243U	NSEF8300243U	Stainless Steel	20	-	
DC Construction (model numbers listed have metal seats)													
1/8	3/16	100	600	0.22	0.15	0.31	0.21	-	NSEF8300181U	Brass	-	35.1	
1/4	3/16	100	600	0.22	0.15	0.31	0.21	-	NSEF8300141U	Brass	-	35.1	
1/4	1/4	75	600	0.39	0.27	0.36	0.26	-	NSEF8300142U	Brass	-	35.1	
3/8	3/16	100	600	0.22	0.15	0.31	0.21	-	NSEF8300381U	Brass	-	35.1	
3/8	1/4	75	600	0.39	0.27	0.36	0.26	-	NSEF8300382U	Brass	-	35.1	
3/8	5/16	60	600	0.61	0.48	0.76	0.66	-	NSEF8300383U	Brass	-	35.1	
1/2	5/16	60	600	0.61	0.48	0.76	0.66	-	NSEF8300123U	Brass	-	35.1	
3/8	3/16	100	1500	-	-	0.31	0.21	-	NSEF8300384U	Stainless Steel	-	35.1	
3/8	1/4	75	1500	-	-	0.36	0.26	-	NSEF8300385U	Stainless Steel	-	35.1	
3/8	5/16	60	1500	-	-	0.76	0.66	-	NSEF8300386U	Stainless Steel	-	35.1	
1/2	5/16	60	1500	-	-	0.76	0.66	-	NSEF8300243U	Stainless Steel	-	35.1	

① For resilient seat models add an "R" suffix before the last letter in the valve model number, i.e. NS8300181U becomes NS8300181RU.
Only available in brass body valves.

NS8300 - Dimensions

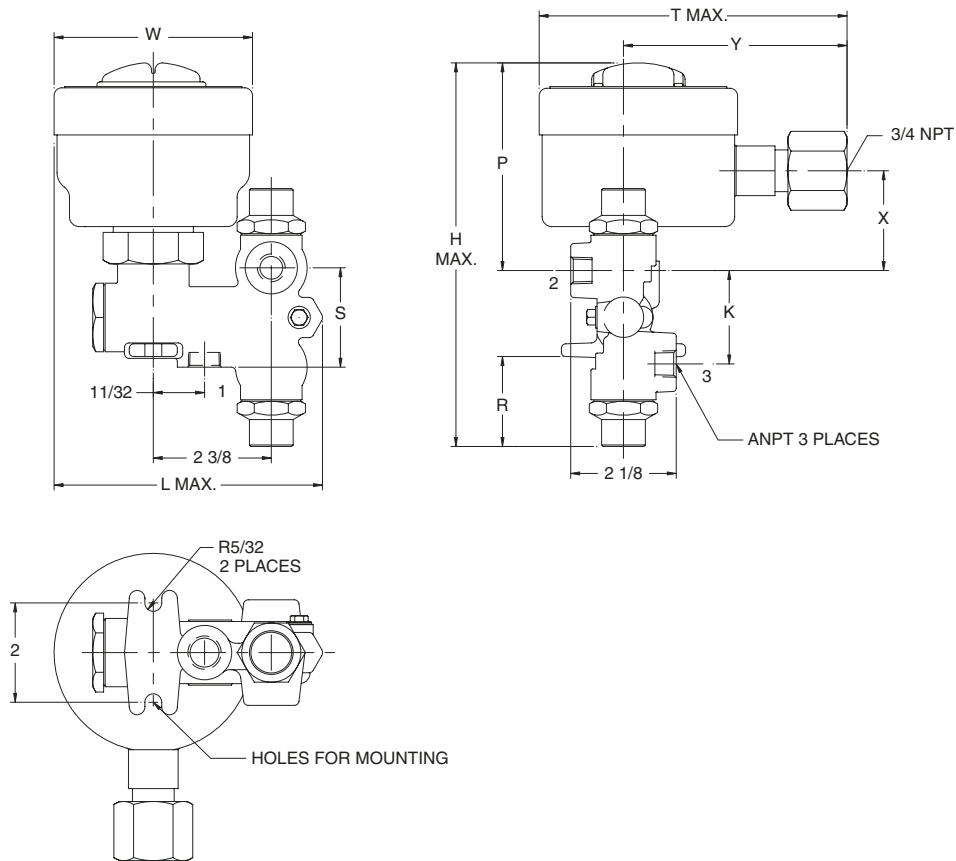
AC Construction



AC Construction											
NP Catalog Numbers	Mounting Hole Dia	H	K	L	P	R	S	T	W	X	Y
NS8300181 NS8300141 NS8300142 NS8300381 NS8300382	11/32	5 5/16	1 7/16	5	2 13/16	1 1/16	1 19/32	5 1/16	3	1 1/16	3 15/32
NS8300383 NS8300123		6 5/16	1 7/8	5	2 11/16	1 7/8	2	5 1/16	3	1	3 15/32
NSEF8300181 NSEF8300141 NSEF8300142 NSEF8300381 NSEF8300382	11/32	5 1/4	1 7/16	4 7/8	2 11/16	1 1/16	1 19/32	5 1/16	2 29/32	15/16	3 9/16
NSEF8300383 NSEF8300123		6 1/4	1 7/8	4 31/32	2 19/32	1 7/8	2	5 1/16	2 29/32	27/32	3 9/16
NS8300384 NS8300385 NS8300386 NS8300243	3/8	6 5/16	1 7/8	5	2 11/16	1 27/32	2	5 1/16	3	1	3 15/32
NSEF8300384 NSEF8300385 NSEF8300386 NSEF8300243	3/8	6 1/4	1 7/8	4 7/8	2 21/32	1 27/32	2	4 13/32	2 29/32	7/8	2 29/32

NS8300 - Dimensions

DC Construction



DC Construction

NP Catalog Numbers	Mounting Hole Dia	H	K	L	P	R	S	T	W	X	Y
NSEF8300181 NSEF8300141 NSEF8300142 NSEF8300381 NSEF8300382	11/32	6 3/4	1 7/16	5 1/2	4 3/16	1 1/4	1 19/32	6 1/4	4	1 29/32	4 1/2
NSEF8300383 NSEF8300123		7 3/4	1 7/8	5 1/2	4 3/32	2 1/32	2	6 1/4	4	1 15/16	4 1/2
NSEF8300384 NSEF8300385 NSEF8300386 NSEF8300243	3/8	7 3/4	1 7/8	5 1/2	4 1/8	1 27/32	2	6 1/4	4	1 15/16	4 1/2

Qualifications

IEEE-323-1974, IEEE-344-1975, IEEE-382-1980
(Revision of 382-1972), and IEEE-627-1980

ASCO Qualification Specification:
AQS-21680/Rev.C

ASCO Qualification Report:
AQR-67368/Rev.1

Installation

Valves may be mounted in any position.

Valve Parts in Contact with Media

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 PH Stainless Steel

Shading Coil (AC models): Copper

Seats: All metal or combination metal and ethylene propylene

Elastomers: Ethylene propylene or FKM fluoroelastomer (optional)

Body: Brass

No aluminum parts

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
H	17.4	11	23	45

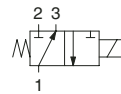
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	-	258285-001D
125 VDC	-	258284-001D
240/60 VAC	-	258285-002D
250 VAC	-	258284-002D

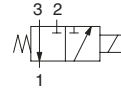
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K.
For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

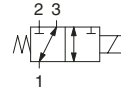
NORMALLY CLOSED



NORMALLY OPEN



UNIVERSAL



Optional Features (see pages 64-65 for details.)

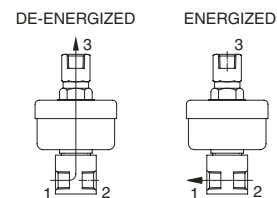
1/2" NPT threaded conduit hub

Longer than standard lead lengths

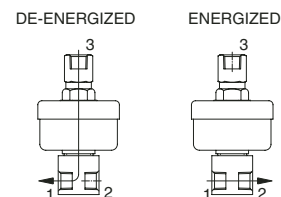
Elastomers: FKM fluoroelastomer (suffix V)

Flow Diagrams

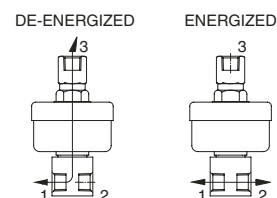
NORMALLY CLOSED
PRESSURE AT 2



NORMALLY OPEN
PRESSURE AT 3



UNIVERSAL
PRESSURE AT 2 OR 3 ONLY



NP8314 VALVES

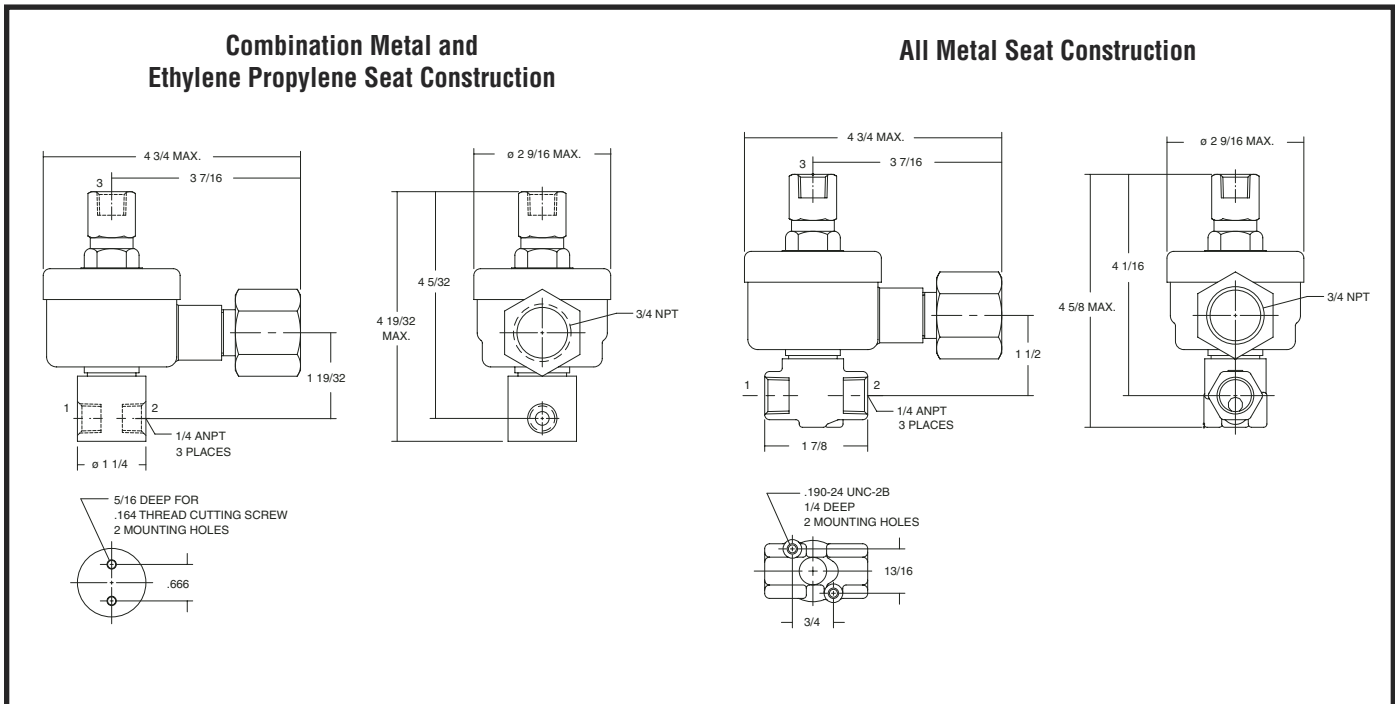
3-Way Solenoid
For Oil-Free Instrument Air
1/4" ANPT



Specifications (NP8314)

Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)		Safe Working Pressure (psi)	Cv Flow Factor		Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
		AC	DC		Pressure to Cylinder	Cylinder to Exhaust		AC	DC
COMBINATION METAL AND ETHYLENE PROPYLENE SEAT									
Universal Operation									
1/4	3/64	160	70	750	0.04	0.05	NP8314C13E	11	17.4
1/4	3/32	80	35	750	0.12	0.11	NP8314C14E	11	17.4
Normally Closed Operation									
1/4	3/64	175	120	750	0.04	0.05	NP8314C28E	11	17.4
1/4	3/32	125	60	750	0.12	0.11	NP8314C29E	11	17.4
Normally Open Operation									
1/4	3/64	175	175	750	0.04	0.05	NP8314C61E	11	17.4
1/4	3/32	175	70	750	0.14	0.13	NP8314C62E	11	17.4
ALL METAL SEAT CONSTRUCTION									
Universal Operation									
1/4	3/64	160	70	750	0.04	0.05	NP8314C13EL	11	17.4
1/4	3/32	80	35	750	0.12	0.11	NP8314C14EL	11	17.4
Normally Closed Operation									
1/4	3/64	175	120	750	0.04	0.05	NP8314C28EL	11	17.4
1/4	3/32	125	60	750	0.12	0.11	NP8314C29EL	11	17.4
Normally Open Operation									
1/4	3/64	175	175	750	0.04	0.05	NP8314C61EL	11	17.4
1/4	3/32	175	70	750	0.13	0.10	NP8314C62EL	11	17.4

NP8314 - Dimensions



Qualification

IEEE-323-1983, IEEE-344-1987, and IEEE-382-1985

ASCO Qualification Specification:
AQS-21691

ASCO Qualification Report:
AQR-21691

Installation

Valves may be mounted in any position.

Valve Parts in Contact with Media

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 PH Stainless Steel

Shading Coil (AC models): Copper

Body: Brass

Seats: All metal or combination metal and Gamma +

Gaskets: Gamma +

No aluminum parts

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
N	17.4	11	21	42

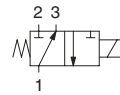
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	-	278285-001D
125 VDC	-	278284-001D
240/60 VAC	-	278285-002D
250 VAC	-	278284-002D

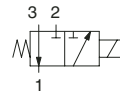
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K. For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

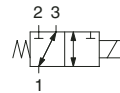
NORMALLY CLOSED



NORMALLY OPEN



UNIVERSAL



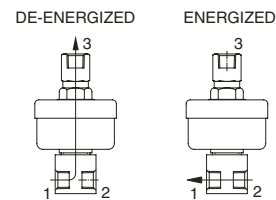
Optional Features (see pages 64-65 for details)

1/2" NPT threaded conduit hub

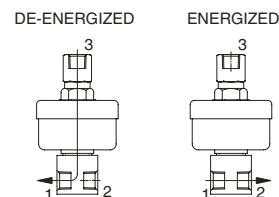
Longer than standard lead lengths

Flow Diagrams

NORMALLY CLOSED
PRESSURE AT 2

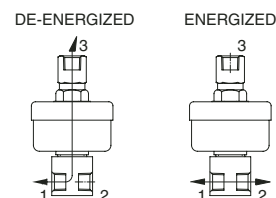


NORMALLY OPEN
PRESSURE AT 3



UNIVERSAL

PRESSURE AT 2 OR 3 ONLY



NS8314 VALVES

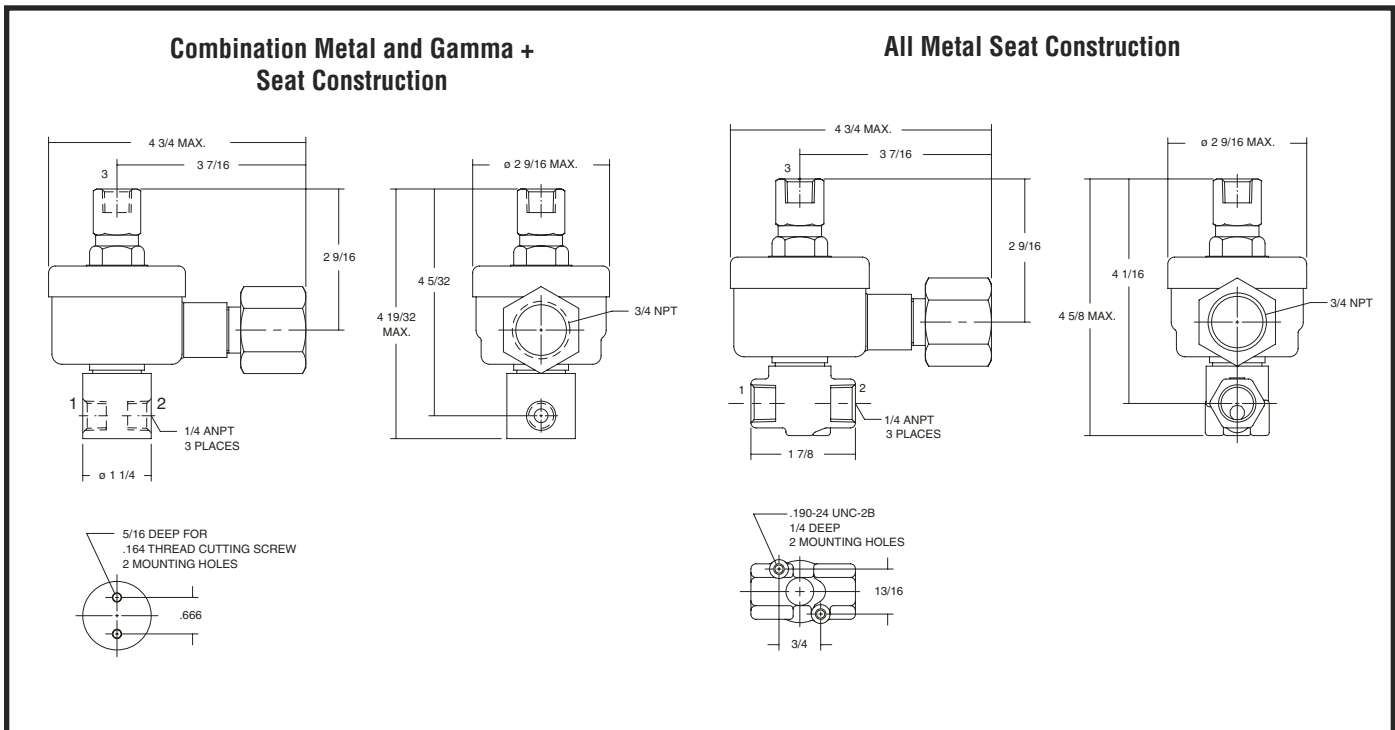
3-Way Solenoid
For Oil-Free Instrument Air
1/4" ANPT



Specifications (NS8314)

Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)		Safe Working Pressure (psi)	Cv Flow Factor		Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
		AC	DC		Pressure to Cylinder	Cylinder to Exhaust		AC	DC
COMBINATION METAL AND GAMMA + Universal Operation									
1/4	3/64	160	70	750	0.04	0.05	NSEF831413	11	17.4
1/4	3/32	80	35	750	0.12	0.11	NSEF831414	11	17.4
Normally Closed Operation									
1/4	3/64	175	120	750	0.04	0.05	NSEF831428	11	17.4
1/4	3/32	125	60	750	0.12	0.11	NSEF831429	11	17.4
Normally Open Operation									
1/4	3/64	175	175	750	0.04	0.05	NSEF831461	11	17.4
1/4	3/32	175	70	750	0.14	0.13	NSEF831462	11	17.4
ALL METAL SEAT CONSTRUCTION Universal Operation									
1/4	3/64	160	70	750	0.04	0.05	NSEF831413L	11	17.4
1/4	3/32	80	35	750	0.12	0.11	NSEF831414L	11	17.4
Normally Closed Operation									
1/4	3/64	175	120	750	0.04	0.05	NSEF831428L	11	17.4
1/4	3/32	125	60	750	0.12	0.11	NSEF831429L	11	17.4
Normally Open Operation									
1/4	3/64	175	175	750	0.04	0.05	NSEF831461L	11	17.4
1/4	3/32	175	70	750	0.13	0.10	NSEF831462L	11	17.4

NS8314 - Dimensions



Qualification

All NP8316 Series valves with ethylene propylene elastomers only:
IEEE-323-1974, IEEE-344-1975, IEEE-382-1980 (Revision of 382-1972),
and IEEE-627-1980

ASCO Qualification Specification: AQS-21680/Rev. C
ASCO Qualification Report: AQR-67368/Rev. 1

All NP8316 Series valves with ethylene propylene or
FKM fluoroelastomers:

IEEE-323-1974, IEEE-344-1975, and IEEE-382-1972
ASCO Qualification Specification: AQS-21678, Rev. B
ASCO Qualification Report: AQS-21678, TR. Rev. A

Important

A 10 psi minimum operating pressure differential is required.
Valve vents to zero psi.

Installation

Can be mounted in any position without affecting operation.

Valve Parts in Contact with Media

Body: Brass

Diaphragm: Ethylene propylene or FKM fluoroelastomer (optional)

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 PH Stainless Steel

Shading Coil (AC models): Copper

Pilot Seat Cartridge: Brass

Disc Holder: Stainless Steel

Seals and Discs: Ethylene propylene or FKM fluoroelastomer (optional)

No aluminum parts

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
H	17.4	10.5	23	45

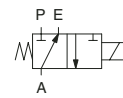
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	258280-010D	258283-001D
125 VDC	258278-001D	258282-001D
240/60 VAC	258280-002D	258283-002D
250 VAC	258278-002D	258282-002D

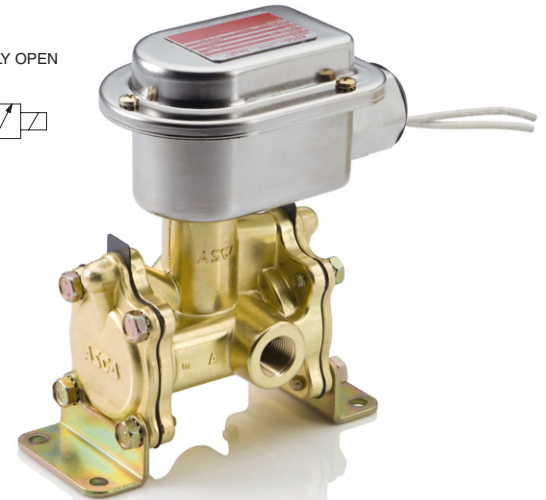
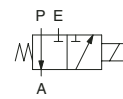
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K.
For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages
are also available. Contact ASCO.

NORMALLY CLOSED



NORMALLY OPEN



Optional Features (see pages 64-65 for details)

1/2" NPT threaded conduit hub

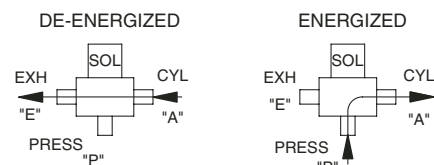
Longer than standard lead lengths

Screw terminal coils (watertight solenoid only)

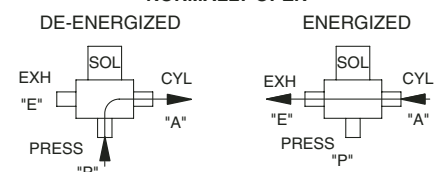
Elastomers: FKM fluoroelastomer (suffix V)

Flow Diagrams

NORMALLY CLOSED



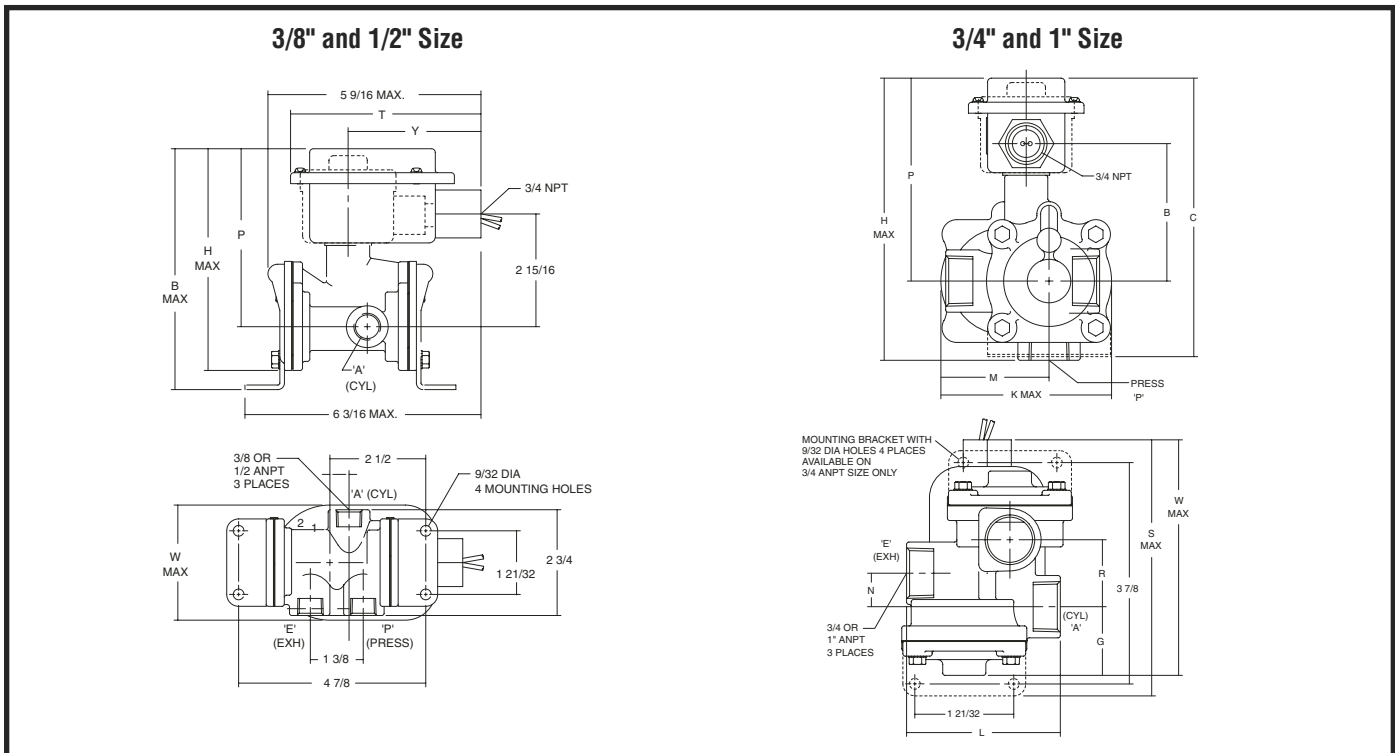
NORMALLY OPEN



Specifications (NP8316 Series)

Pipe Size (in.)	Orifice Size (in.)	Minimum Operating Pressure Differential Air (psi)	Maximum Operating Pressure Differential Air (psi)		Safe Working Pressure (psi)	Cv Flow Factor		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
			AC	DC		Pressure to Cylinder	Cylinder to Exhaust			AC	DC
Normally Closed Operation, Forged Brass Bodies											
3/8	5/8	10	175	175	250	2.20	3.30	NP8316A54E	NP8316A55E	10.5	17.4
1/2	5/8	10	175	175	250	3.30	3.60	NP8316A64E	NP8316A65E	10.5	17.4
3/4	11/16	10	175	175	250	4.70	4.20	NP8316B74E	NP8316B75E	10.5	17.4
1	1	10	175	175	250	13.40	11.40	NP8316E34E	NP8316E35E	10.5	17.4
Normally Open Operation, Forged Brass bodies											
3/8	5/8	10	175	175	250	2.20	3.10	NP8316A56E	NP8316A57E	10.5	17.4
1/2	5/8	10	175	175	250	3.30	3.60	NP8316A66E	NP8316A67E	10.5	17.4
3/4	11/16	10	175	175	250	4.70	4.60	NP8316B76E	NP8316B77E	10.5	17.4
1	1	10	175	175	250	13.00	11.60	NP8316E36E	NP8316E37E	10.5	17.4

NP8316 - Dimensions



NP Catalog Numbers	Solenoid Enclosure	Pipe Size	B	H	P	T	W	Y
NP8316A54E NP8316A56E	WP	3/8	6 5/16	5 7/8	4 11/16	5 1/16	3 1/6	3 15/32
NP8316A55E NP8316A57E	EP	3/8	6 3/16	5 11/16	4 1/2	4 11/16	2 3/4	3 7/16
NP8316A64E NP8316A66E	WP	1/2	6 5/16	5 7/8	4 11/16	5 1/16	3 1/16	3 15/32
NP8316A65E NP8316A67E	EP	1/2	6 3/16	5 11/16	4 1/2	4 11/16	2 3/4	3 7/16

NP Catalog Numbers	Solenoid Enclosure	Pipe Size	B	C	G	H	K	L	M	N	P	R	S	W
NP8316B74E NP8316B76E	WP	3/4	3 5/16	6 11/16	1 7/16	6 3/4	3 3/8	3 3/8	2 5/32	17/32	5 1/16	1/2	5 3/4	5 1/8
NP8316B75E NP8316B77E	EP	3/4	3 5/16	6 1/2	1 7/16	6 9/16	3 3/8	3 3/8	2 5/32	17/32	4 7/8	1/2	5 3/4	5 1/8
NP8316E34E NP8316E36E	WP	1	3 5/8	7 7/16	1 7/8	7 7/16	4 1/2	4 1/16	3 5/32	7/8	5 5/16	1 3/4	-	6 1/4
NP8316E35E NP8316E37E	EP	1	3 1/2	7 1/4	1 7/8	7 3/16	4 1/2	4 1/16	3 5/32	7/8	5	1 3/4	-	6 1/4

Qualification

IEEE-323-1983, IEEE-344-1987, and IEEE-382-1985

ASCO Qualification Specification:
AQS-21691

ASCO Qualification Report:
AQR -21691

Important

A 10 psi minimum operating pressure differential is required.
Valve vents to zero psi.

Installation

Can be mounted in any position without affecting operation.

Valve Parts in Contact with Media

Seals and Discs: Gamma +

Diaphragm: Gamma +

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 PH Stainless Steel

Shading Coil (AC models): Copper

Pilot Seat Cartridge: Brass

Disc Holder: Stainless steel

No aluminum parts

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
N	17.4	10.5	23	45

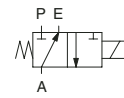
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	278280-001D	278283-001D
125 VDC	278278-001D	278282-001D
240/60 VAC	278280-002D	278283-002D
250 VAC	278278-002D	278282-002D

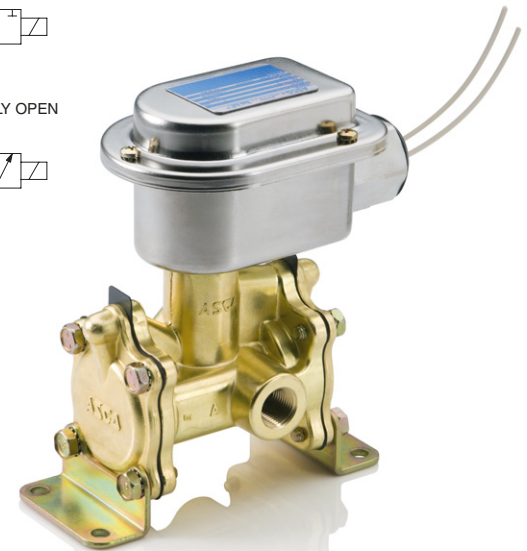
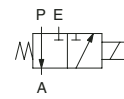
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K.
For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

NORMALLY CLOSED



NORMALLY OPEN



Optional Features (see pages 64-65 for details)

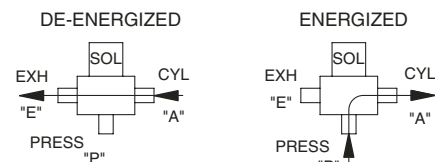
1/2" NPT threaded conduit hub

Screw terminal coils (watertight solenoid only)

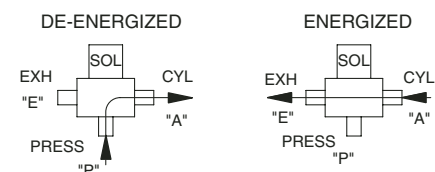
Longer than standard lead lengths

Flow Diagrams

NORMALLY CLOSED



NORMALLY OPEN

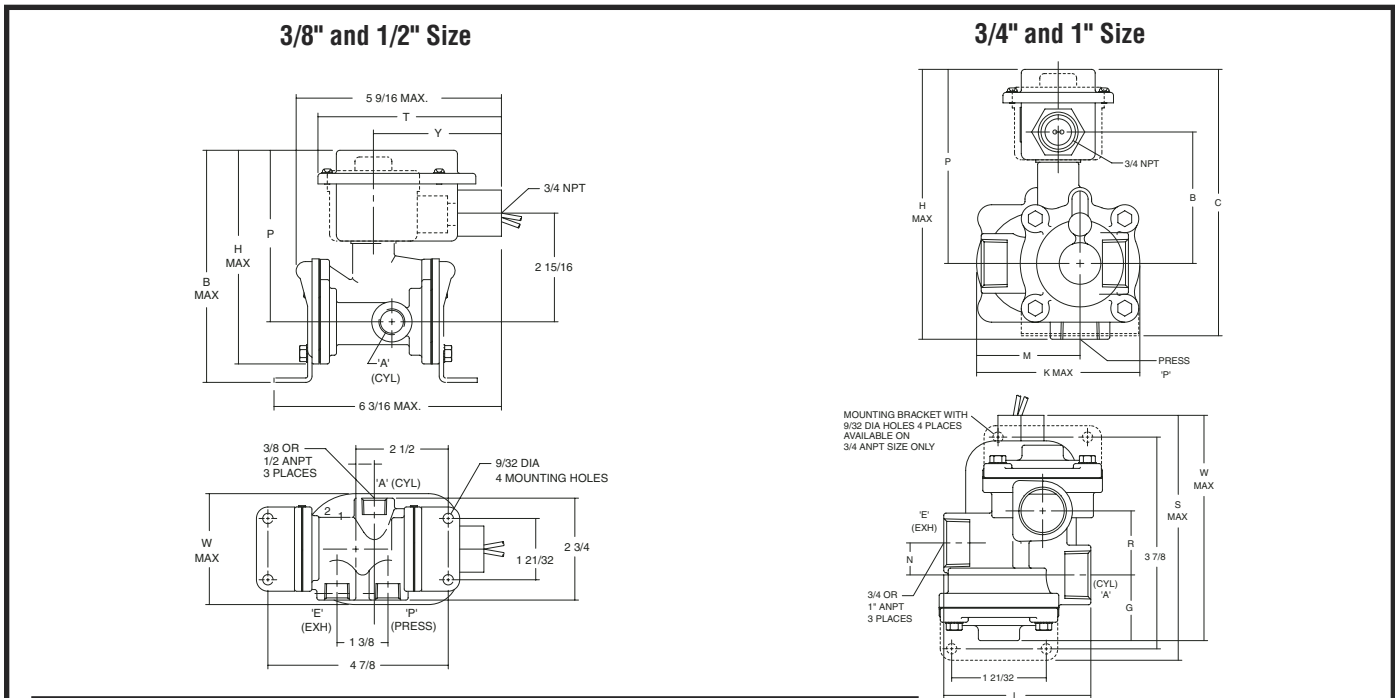


Specifications (NS8316 Series)

Pipe Size (in.)	Orifice Size (in.)	Minimum† Operating Pressure Differential Air (psi)	Maximum Operating Pressure Differential Air (psi)		Safe Working Pressure (psi)	Cv Flow Factor		Watertight Solenoid Enclosure Catalog Number	Watt Rating	
			AC	DC		Pressure to Cylinder	Cylinder to Exhaust		AC	DC
Normally Closed Operation, Forged Brass Bodies										
3/8	5/8	10	175	175	250	1.98	2.72	NS831654	10.5	17.4
1/2	5/8	10	175	175	250	2.99	3.27	NS831664	10.5	17.4
3/4	11/16	10	175	175	250	4.17	4.20	NS831674	10.5	17.4
1	1	10	175	175	250	14.42	11.75	NS831634	10.5	17.4
Normally Open Operation, Forged Brass bodies										
3/8	5/8	10	175	175	250	2.03	2.79	NS831656	10.5	17.4
1/2	5/8	10	175	175	250	3.17	3.40	NS831666	10.5	17.4
3/4	11/16	10	175	175	250	4.19	4.27	NS831676	10.5	17.4
1	1	10	175	175	250	14.17	11.60	NS831636	10.5	17.4

NOTE: ASCO NS valves do not have a separate model number listing for Type 3, 7C, 7D, and 9 Explosionproof/raintight solenoid enclosure. To order an NS valve model number with this enclosure, add the prefix "EF" after the "NS" prefix in the valve model number. For example, a Watertight NS831654 valve in an Explosionproof/raintight construction would become an "NSEF831654".
 † Depending upon application, reduced levels of qualification or increase in minimum operating pressure may be required.
 Refer to ASCO qualification report AQR-21691 for explanation of limitations.

NS8316 - Dimensions



NS Catalog Numbers	Solenoid Enclosure	Pipe Size	B	H	P	T	W	Y
NS831654, NS831656	WP	3/8	6 5/16	5 7/8	4 11/16	5 1/16	3 1/6	3 15/32
NSEF831654, NSEF831656	EP	3/8	6 3/16	5 11/16	4 1/2	4 11/16	2 3/4	3 7/16
NS831664, NS831666	WP	1/2	6 5/16	5 7/8	4 11/16	5 1/16	3 1/16	3 15/32
NSEF831664, NSEF831666	EP	1/2	6 3/16	5 11/16	4 1/2	4 11/16	2 3/4	3 7/16

NS Catalog Numbers	Solenoid Enclosure	Pipe Size	B	C	G	H	K	L	M	N	P	R	S	W
NS831674, NS831676	WP	3/4	3 5/16	6 11/16	1 7/16	6 3/4	3 3/8	3 3/8	2 5/32	17/32	5 1/16	1/2	5 3/4	5 1/8
NSEF831674, NSEF831676	EP	3/4	3 5/16	6 1/2	1 7/16	6 9/16	3 3/8	3 3/8	2 5/32	17/32	4 7/8	1/2	5 3/4	5 1/8
NS831634, NS831636	WP	1	3 5/8	7 7/16	1 7/8	7 7/16	4 1/2	4 1/16	3 5/32	7/8	5 5/16	1 3/4	-	6 1/4
NSEF831634, NSEF831636	EP	1	3 1/2	7 1/4	1 7/8	7 3/16	4 1/2	4 1/16	3 5/32	7/8	5	1 3/4	-	6 1/4

Qualification

IEEE-323-1974, IEEE-344-1975, IEEE-382-1980
(Revision of 382-1972), and IEEE-627-1980

ASCO Qualification Specification:

AQS-21680/Rev. C

ASCO Qualification Report:

AQR-67368/Rev. 1

IEEE-323-1974, IEEE-344-1975, and IEEE-382-1972

ASCO Qualification Specification:

AQS-21678, Rev. B

ASCO Qualification Report:

AQS-21678/TR. Rev. A

Installation

Can be mounted in any position without affecting operation.

Valve Parts in Contact with Media

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 PH Stainless Steel

Shading Coil (AC models): Copper

Body: Brass or 303 Stainless Steel, see specification table

Seals and Discs: Ethylene propylene or FKM fluoroelastomer (optional)

Disc Holder: Stainless Steel

Core Guide: (AC) Brass

No aluminum parts

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
H	17.4	10.5	23	45

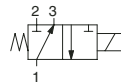
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	258280-001D	258283-001D
125 VDC	258278-001D	258282-001D
240/60 VAC	258280-002D	258283-002D
250 VAC	258278-002D	258282-002D

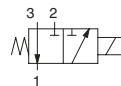
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K.
For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO

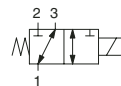
NORMALLY CLOSED
(PRESSURE AT 2)



NORMALLY OPEN
(PRESSURE AT 3)



UNIVERSAL
(PRESSURE AT 2 OR 3 ONLY)



Optional Features (see pages 64-65 for details)

1/2" NPT threaded conduit hub

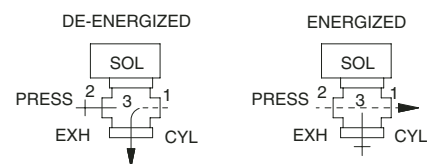
Longer than standard lead lengths

Screw terminal coils (watertight solenoid only)

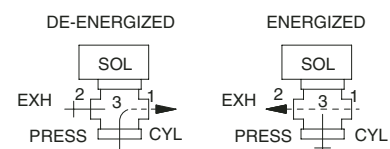
Elastomers: FKM fluoroelastomer (suffix V)

Flow Diagrams

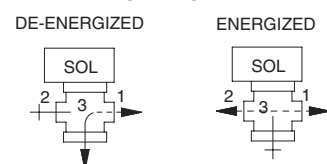
NORMALLY CLOSED



NORMALLY OPEN



UNIVERSAL



Specifications (NP8320 Brass)

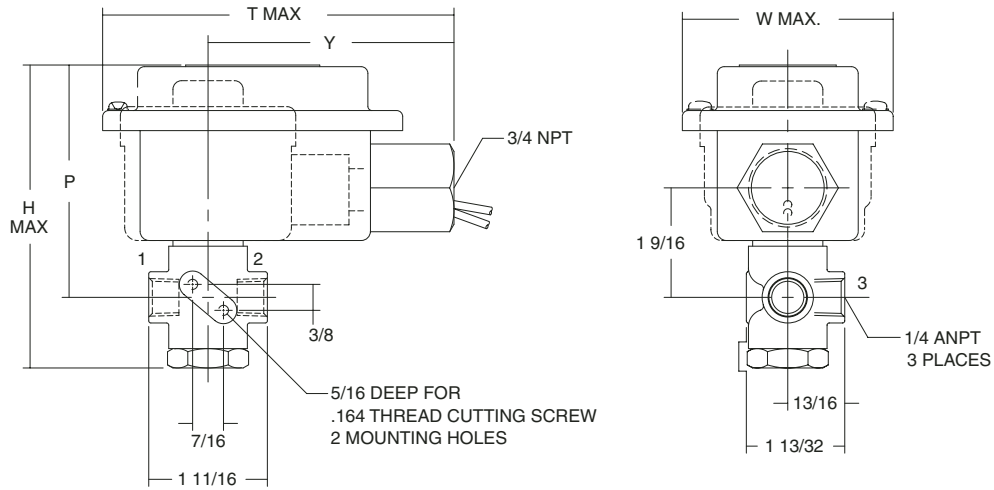
Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)		Safe Working Pressure (psi)	Cv Flow Factor		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
		AC	DC		Pressure to Cylinder	Cylinder to Exhaust			AC	DC
Universal Operation (For Normally Closed or Normally Open Operation, Pressure Can Be Applied at 2 or 3 only)										
1/4	1/16	125	75	300	0.07	0.08	NP8320A172E	NP8320A173E	10.5	17.4
1/4	3/32	75	60	300	0.10	0.10	NP8320A174E	NP8320A175E	10.5	17.4
1/4	1/8	35	25	300	0.17	0.20	NP8320A176E	NP8320A177E	10.5	17.4
1/4	11/64	20	12	300	0.31	0.28	NP8320A178E	NP8320A179E	10.5	17.4
Normally Closed Operation (Pressure at 2)										
1/4	1/16	175	160	300	0.07	0.09	NP8320A182E	NP8320A183E	10.5	17.4
1/4	3/32	150	115	300	0.10	0.15	NP8320A184E	NP8320A185E	10.5	17.4
1/4	1/8	85	60	300	0.18	0.29	NP8320A186E	NP8320A187E	10.5	17.4
1/4	11/64	45	25	300	0.27	0.41	NP8320A188E	NP8320A189E	10.5	17.4
Normally Open Operation (Pressure at 3)										
1/4	1/16	175	135	300	0.07	0.08	NP8320A192E	NP8320A193E	10.5	17.4
1/4	3/32	140	100	300	0.13	0.10	NP8320A194E	NP8320A195E	10.5	17.4
1/4	1/8	70	55	300	0.23	0.20	NP8320A196E	NP8320A197E	10.5	17.4
1/4	11/64	40	30	300	0.31	0.28	NP8320A198E	NP8320A199E	10.5	17.4

Specifications (NP8320 Stainless Steel)

Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)		Safe Working Pressure (psi)	Cv Flow Factor		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
		AC	DC		Pressure to Cylinder	Cylinder to Exhaust			AC	DC
Universal Operation (For Normally Closed or Normally Open Operation, Pressure Can Be Applied at 2 or 3 only)										
1/4	1/16	100	65	300	0.07	0.08	NP832057E	NP832058E	10.5	17.4
1/4	3/32	40	40	300	0.10	0.10	NP832059E	NP832060E	10.5	17.4
1/4	1/8	30	20	300	0.17	0.20	NP832061E	NP832062E	10.5	17.4
Normally Closed Operation (Pressure at 2)										
1/4	1/16	125	125	300	0.07	0.09	NP832063E	NP832064E	10.5	17.4
1/4	3/32	110	65	300	0.13	0.13	NP832093E	NP832094E	10.5	17.4
1/4	1/8	40	40	300	0.19	0.20	NP832065E	NP832066E	10.5	17.4
Normally Open Operation (Pressure at 3)										
1/4	1/16	125	125	300	0.07	0.09	NP832067E	NP832068E	10.5	17.4
1/4	3/32	110	65	300	0.10	0.13	NP832095E	NP832096E	10.5	17.4
1/4	1/8	40	40	300	0.17	0.20	NP832069E	NP832070E	10.5	17.4

NP8320 - Dimensions

Brass Body

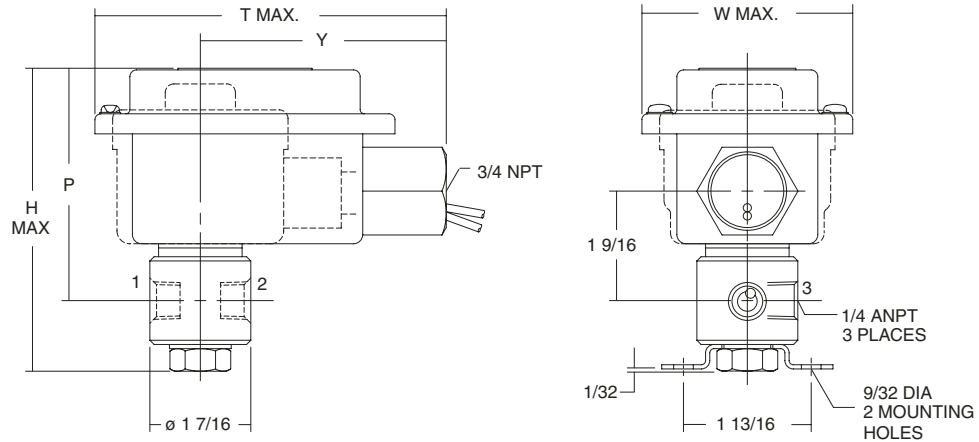


Brass Body

NP Catalog Numbers			Solenoid Enclosure	P	H	T	W	Y
NP8320A172E	NP8320A182E	NP8320A192E	WP	3 5/16	4 3/8	5 1/16	3 1/16	3 1/2
NP8320A174E	NP8320A184E	NP8320A194E						
NP8320A176E	NP8320A186E	NP8320A196E						
NP8320A178E	NP8320A188E	NP8320A198E						
NP8320A173E	NP8320A183E	NP8320A193E	EP	3 1/16	4 1/8	4 7/8	2 9/16	3 7/16
NP8320A175E	NP8320A185E	NP8320A195E						
NP8320A177E	NP8320A187E	NP8320A197E						
NP8320A179E	NP8320A189E	NP8320A199E						

NP8320 - Dimensions

Stainless Steel Body



Stainless Steel Body			Solenoid Enclosure	P	H	T	W	Y
NP Catalog Numbers								
NP832057E	NP832063E	NP832069E	WP	3 5/16	4 5/16	5 1/16	3 1/16	3 1/2
NP832059E	NP832065E	NP832093E						
NP832061E	NP832067E	NP832095E						
NP832058E	NP832064E	NP832070E	EP	3 1/16	4 1/16	4 7/8	2 9/16	3 7/16
NP832060E	NP832066E	NP832094E						
NP832062E	NP832068E	NP832096E						

Qualification

IEEE-323-1983, IEEE-344-1987, and IEEE-382-1985

ASCO Qualification Specification:
AQS-21691

ASCO Qualification Report:
AQR-21691

Installation

Can be mounted in any position without affecting operation.

Valve Parts in Contact with Media

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 PH Stainless Steel

Shading Coil (AC models): Copper

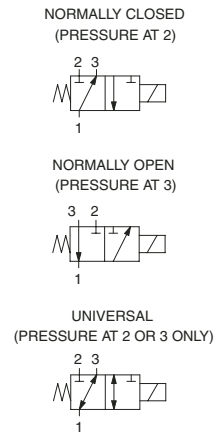
Body: Brass or 303 Stainless Steel, see specification table

Seals and Discs: Gamma +

Disc Holder: Stainless Steel

Core Guide: (AC models) Brass

No aluminum parts



Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
N	17.4	10.5	23	45

Optional Features (see pages 64-65 for details.)

1/2" NPT threaded conduit hub

Longer than standard lead lengths

Screw terminal coils

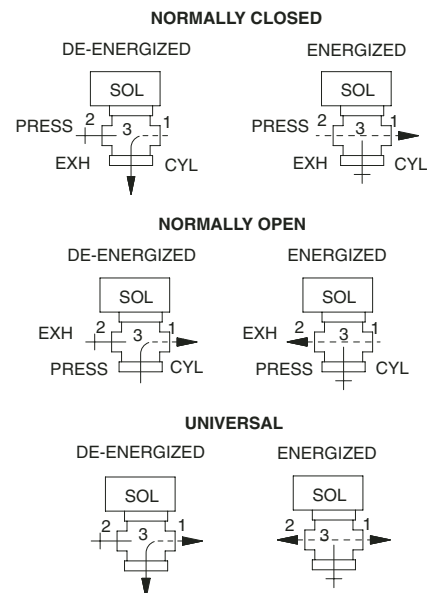
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	278280-001D	278283-001D
125 VDC	278278-001D	278282-001D
240/60 VAC	278280-002D	278283-002D
250 VAC	278278-002D	278282-002D

* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K. For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

Flow Diagrams



Specifications (NS8320 Brass)

Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)		Safe Working Pressure (psi)	Cv Flow Factor		Watertight Solenoid Enclosure Catalog Number	Watt Rating	
		AC	DC		Pressure to Cylinder	Cylinder to Exhaust		AC	DC
Universal Operation (For Normally Closed or Normally Open Operation, Pressure Can Be Applied at 2 or 3 only)									
1/4	1/16	125	75	300	0.07	0.08	NS8320172	10.5	17.4
1/4	3/32	75	60	300	0.10	0.10	NS8320174	10.5	17.4
1/4	1/8	35	25	300	0.17	0.20	NS8320176	10.5	17.4
1/4	11/64	20	12	300	0.31	0.28	NS8320178	10.5	17.4
Normally Closed Operation (Pressure at 2)									
1/4	1/16	175	160	300	0.07	0.09	NS8320182	10.5	17.4
1/4	3/32	150	115	300	0.10	0.15	NS8320184	10.5	17.4
1/4	1/8	85	60	300	0.18	0.29	NS8320186	10.5	17.4
1/4	11/64	45	25	300	0.27	0.41	NS8320188	10.5	17.4
Normally Open Operation (Pressure at 3)									
1/4	1/16	175	135	300	0.07	0.08	NS8320192	10.5	17.4
1/4	3/32	140	100	300	0.13	0.10	NS8320194	10.5	17.4
1/4	1/8	70	55	300	0.23	0.20	NS8320196	10.5	17.4
1/4	11/64	40	30	300	0.31	0.28	NS8320198	10.5	17.4

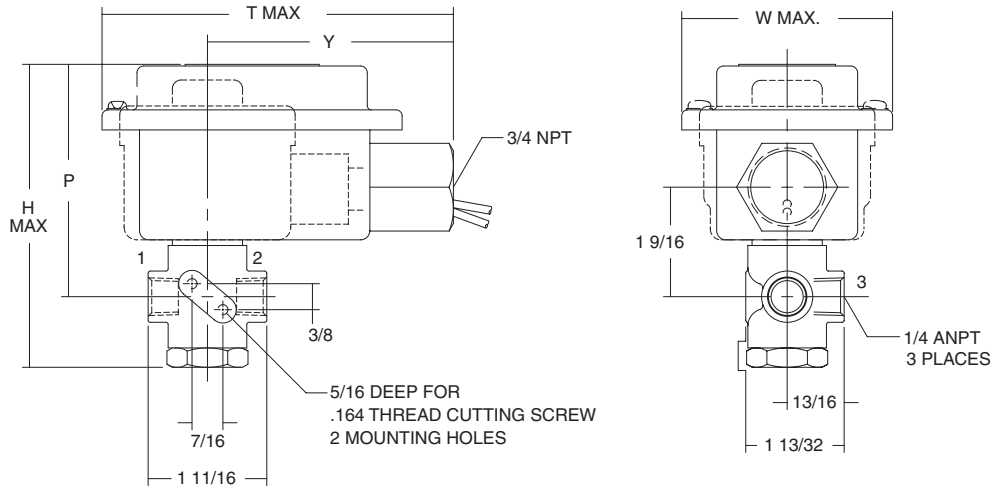
Specifications (NS8320 Stainless Steel Body)

Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential Air (psi)		Safe Working Pressure (psi)	Cv Flow Factor		Watertight Solenoid Enclosure Catalog Number	Watt Rating	
		AC	DC		Pressure to Cylinder	Cylinder to Exhaust		AC	DC
Universal Operation (For Normally Closed or Normally Open Operation, Pressure Can Be Applied at 2 or 3 only)									
1/4	1/16	100	65	300	0.07	0.08	NS832057	10.5	17.4
1/4	3/32	40	40	300	0.10	0.10	NS832059	10.5	17.4
1/4	1/8	30	20	300	0.17	0.20	NS832061	10.5	17.4
Normally Closed Operation (Pressure at 2)									
1/4	1/16	125	125	300	0.07	0.09	NS832063	10.5	17.4
1/4	3/32	110	65	300	0.13	0.13	NS832093	10.5	17.4
1/4	1/8	40	40	300	0.19	0.20	NS832065	10.5	17.4
Normally Open Operation (Pressure at 3)									
1/4	1/16	125	125	300	0.07	0.09	NS832067	10.5	17.4
1/4	3/32	110	65	300	0.10	0.13	NS832095	10.5	17.4
1/4	1/8	40	40	300	0.17	0.20	NS832069	10.5	17.4

NOTE: ASCO NS valves do not have a separate model number listing for type 3, 7C, 7D, and 9 Explosionproof/raintight solenoid enclosure. To order an NS valve with this enclosure add the prefix "EF" after the "NS" prefix in the valve model number. For example a Watertight NS8320172 valve in an explosionproof/raintight construction would become an "NSEF8320172".

NS8320 - Dimensions

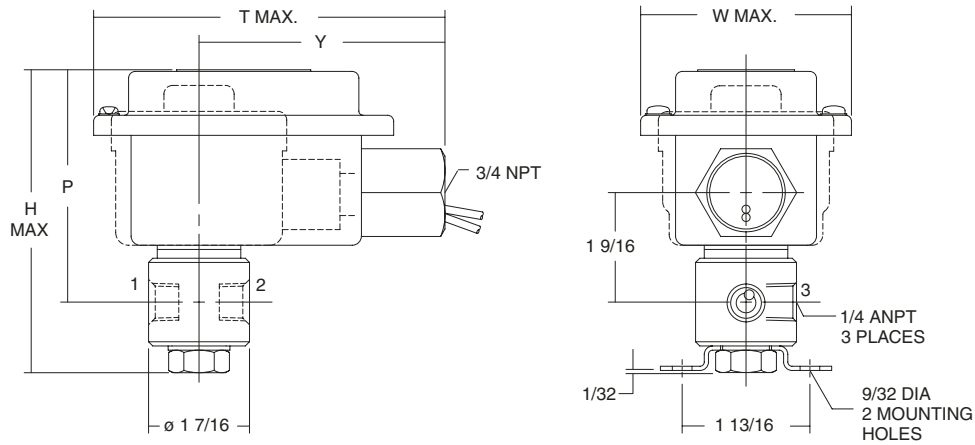
Brass Body



Brass Body							
NS Catalog Numbers		Solenoid Enclosure	P	H	T	W	Y
NS8320172	NS8320186	WP	3 5/16	4 3/8	5 1/16	3 1/16	3 1/2
NS8320174	NS8320188						
NS8320176	NS8320192						
NS8320178	NS8320194						
NS8320182	NS8320196						
NS8320184	NS8320198						
NSEF8320172	NSEF8320186	EP	3 1/8	4 3/16	4 1/16	2 9/16	3 7/16
NSEF8320174	NSEF8320188						
NSEF8320176	NSEF8320192						
NSEF8320178	NSEF8320194						
NSEF8320182	NSEF8320196						
NSEF8320184	NSEF8320198						

NS8320 - Dimensions

Stainless Steel Body



Stainless Steel Body						
NS Catalog Numbers	Solenoid Enclosure	P	H	T	W	Y
NS832057 NS832067 NS832059 NS832069 NS832061 NS832093 NS832063 NS832095 NS832065	WP	3 5/16	4 5/16	5 1/16	3 1/16	3 1/2
NSEF832057 NSEF832067 NSEF832059 NSEF832069 NSEF832061 NSEF832093 NSEF832063 NSEF832095 NSEF832065	EP	3 1/8	4 1/8	4 1/16	2 9/16	2 25/32

Qualification

IEEE-323-1974, IEEE-344-1975, and IEEE-382-1972

ASCO Qualification Specification:
AQS-21678, Rev. B

ASCO Qualification Report:
AQS-21678/TR. Rev. A

Important

15 psi minimum operating pressure differential is required.
Valve vents to zero psi.

Installation

Can be mounted in any position without affecting operation.

Valve Parts in Contact with Media

- Body: Brass
- Seals and Disc: Ethylene propylene, or FKM fluoroelastomer (optional)
- Core Tube: 305 Stainless Steel
- Core and Plugnut: 430F Stainless Steel
- Springs: 302 Stainless Steel and 17-7 PH Stainless Steel
- Shading Coil (AC models): Copper
- Pilot Seat Cartridge: Brass
- Disc Holder: Stainless Steel
- Piston: 303 Stainless Steel
- No Aluminum parts

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
H	17.4	10.5	23	45

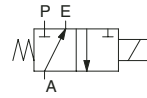
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	258280-001D	258283-001D
125 VDC	258278-001D	258282-001D
240/60 VAC	258280-002D	258283-002D
250 VAC	258278-002D	258282-002D

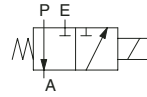
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K.
For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

NORMALLY CLOSED



NORMALLY OPEN

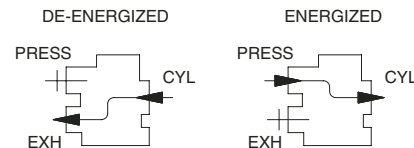


Optional Features (see pages 64-65 for details)

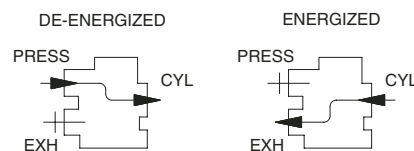
- 1/2" NPT threaded conduit hub
- Screw terminal coils (watertight solenoid only)
- FKM fluoroelastomer (suffix V)
- Longer than standard lead lengths

Flow Diagrams

NORMALLY CLOSED



NORMALLY OPEN



NP8321 VALVES

3-Way Solenoid
For Oil-Free Instrument Air
1/4" and 3/8" ANPT



Specifications (NP8321 Series)

Pipe Size (in.)	Orifice Size (in.)		Operating Pressure Differential Air Only (psi)			Safe Working Pressure (psi)	Cv Flow Factor		Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
	Pressure	Exhaust	Min.	AC	DC		Pressure to Cylinder	Cylinder to Exhaust			AC	DC
Normally Closed Operation												
1/4	9/32	11/32	15	150	150	200	.79	1.1	NP8321A1E	NP8321A5E	10.5	17.4
3/8	9/32	11/32	15	150	150	200	.79	1.1	NP8321A2E	NP8321A6E	10.5	17.4
Normally Open Operation												
1/4	9/32	11/32	15	150	150	200	.79	1.1	NP8321A3E	NP8321A7E	10.5	17.4
3/8	9/32	11/32	15	150	150	200	.79	1.1	NP8321A4E	NP8321A8E	10.5	17.4

NP8321 - Dimensions

NP Catalog Numbers	Solenoid Enclosure	H	P	T	W	Y
NP8321A1E NP8321A2E NP8321A3E NP8321A4E	WP	4 5/8	3 9/16	5 1/16	3 5/8	3 1/2
NP8321A5E NP8321A6E NP8321A7E NP8321A8E	EP	4 3/8	3 3/8	4 25/32	3 7/16	3 7/16

Qualification

IEEE-323-1983, IEEE-344-1987, and IEEE-382-1985

ASCO Qualification Specification:
AQS-21691

ASCO Qualification Report:
AQR-21691

Important

15 psi minimum operating pressure differential is required.
Valve vents to zero psi.

Installation

Can be mounted in any position without affecting operation.

Valve Parts in Contact with Media

Body: Brass

Seals and Disc: Gamma +

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7 PH Stainless Steel

Shading Coil (AC models): Copper

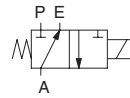
Pilot Seat Cartridge: Brass

Disc Holder: Stainless Steel

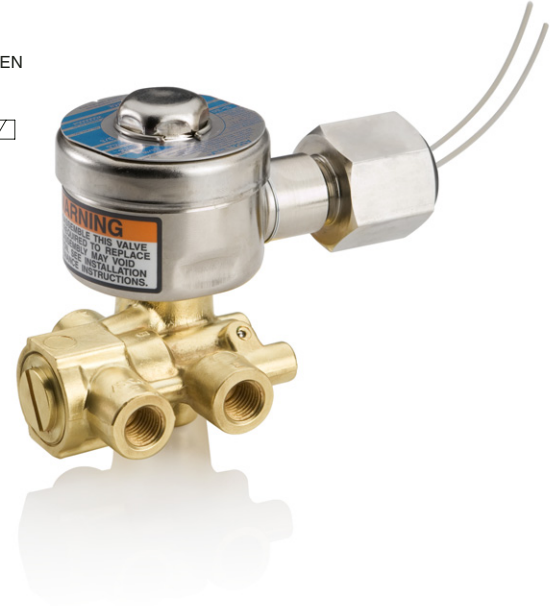
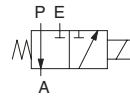
Piston: 303 Stainless Steel

No Aluminum parts

NORMALLY CLOSED



NORMALLY OPEN



Optional Features (see pages 64-65 for details)

Screw terminal coils (watertight solenoid only)

Longer than standard lead lengths

1/2" NPT Threaded conduit hub

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
N	17.4	10.5	23	45

Replacement Coil Kits

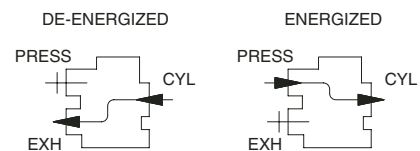
Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	278280-001D	278283-001D
125 VDC	278278-001D	278282-001D
240/60 VAC	278280-002D	278283-002D
250 VAC	278278-002D	278282-002D

* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K.
For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

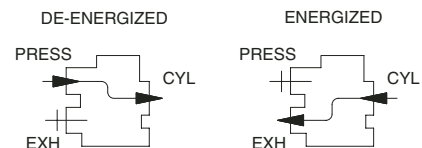
NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

Flow Diagrams

NORMALLY CLOSED



NORMALLY OPEN



Specifications (NS8321 Series)

Pipe Size (in.)	Orifice Size (in.)		Operating Pressure Differential Air Only (psi)			Safe Working Pressure (psi)	Cv Flow Factor		Watertight Solenoid Enclosure Catalog Number	Watt Rating	
	Pressure	Exhaust	Min. †	AC	DC		Pressure to Cylinder	Cylinder to Exhaust		AC	DC
Normally Closed Operation											
1/4	9/32	11/32	15	150	150	200	.79	1.1	NS83211	10.5	17.4
3/8	9/32	11/32	15	150	150	200	.79	1.1	NS83212	10.5	17.4
Normally Open Operation											
1/4	9/32	11/32	15	150	150	200	.79	1.1	NS83213	10.5	17.4
3/8	9/32	11/32	15	150	150	200	.79	1.1	NS83214	10.5	17.4

Note: ASCO NS valves no longer have a separate model number listing for Type 3, 7C, 7D, and 9 explosionproof/raintight solenoid enclosure. To order an NS valve model number with this enclosure, add the prefix "EF" after the "NS" prefix in the valve model number. For example a watertight NS83211 valve in an explosionproof construction will become an "NSEF83211". † Depending upon application, reduced levels of qualification or increase in minimum operating pressure may be required. Refer to ASCO qualification report AQR-21691 for explanation of limitations.

NS8321 - Dimensions

NS Catalog Numbers	Solenoid Enclosure	H	P	T	W	Y
NS83211 NS83212 NS83213 NS83214	WP	4 5/8	3 9/16	5 1/16	3 5/8	3 1/2
NSEF83211 NSEF83212 NSEF83213 NSEF83214	EP	4 3/8	3 3/8	4 25/32	3 7/16	3 7/16

General Description

Direct-acting 4-way solenoid valve designed to handle filtered instrument air (free of oil and petroleum) in nuclear power plant installations.

Important: No minimum operating pressure is required.

Qualification

IEEE-323-1974, IEEE-344-1975, IEEE-382-1980, and IEEE-627-1980

ASCO Qualification Specification: AQS-21681/Rev.C

ASCO Qualification Report: AQR-67484/Rev.0

Operation

Single Solenoid: Valve operates when energized and returns when de-energized.

Dual Solenoid: Valve operates when one solenoid is energized and returns when the other solenoid is energized. Solenoid may be energized momentarily (1/10 second) or energized continuously.

Caution: Do not energize both solenoids simultaneously.

Valve Parts in Contact with Fluid

Body: Brass

Seals: Ethylene propylene or FKM fluoroelastomer (suffix V, optional)

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel

Shading Coil (AC models): Copper

Sleeve: Brass

Seat: Nickel-plated brass

Discs: Polyphenylene sulfide

No aluminum parts

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
H	35.1	20	41.5	195

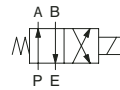
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	258288-001D	258287-001D
125 VDC	---	258286-001D
240/60 VAC	258288-002D	258287-002D
250 VAC	---	258286-002D

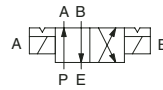
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K. For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

SINGLE SOLENOID



DUAL SOLENOID



Installation

Valves must be mounted with solenoid "A" in vertical and upright position.

Optional Features

(see pages 64-65 for details)

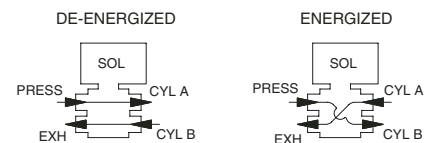
1/2" NPT threaded conduit hub

Screw terminal coils

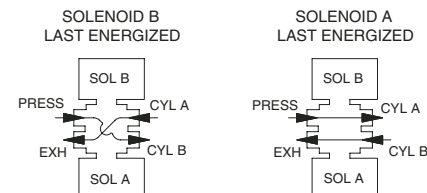
Longer than standard lead lengths

Flow Diagrams

SINGLE SOLENOID



DUAL SOLENOID



NP8342 VALVES

4-Way Solenoid

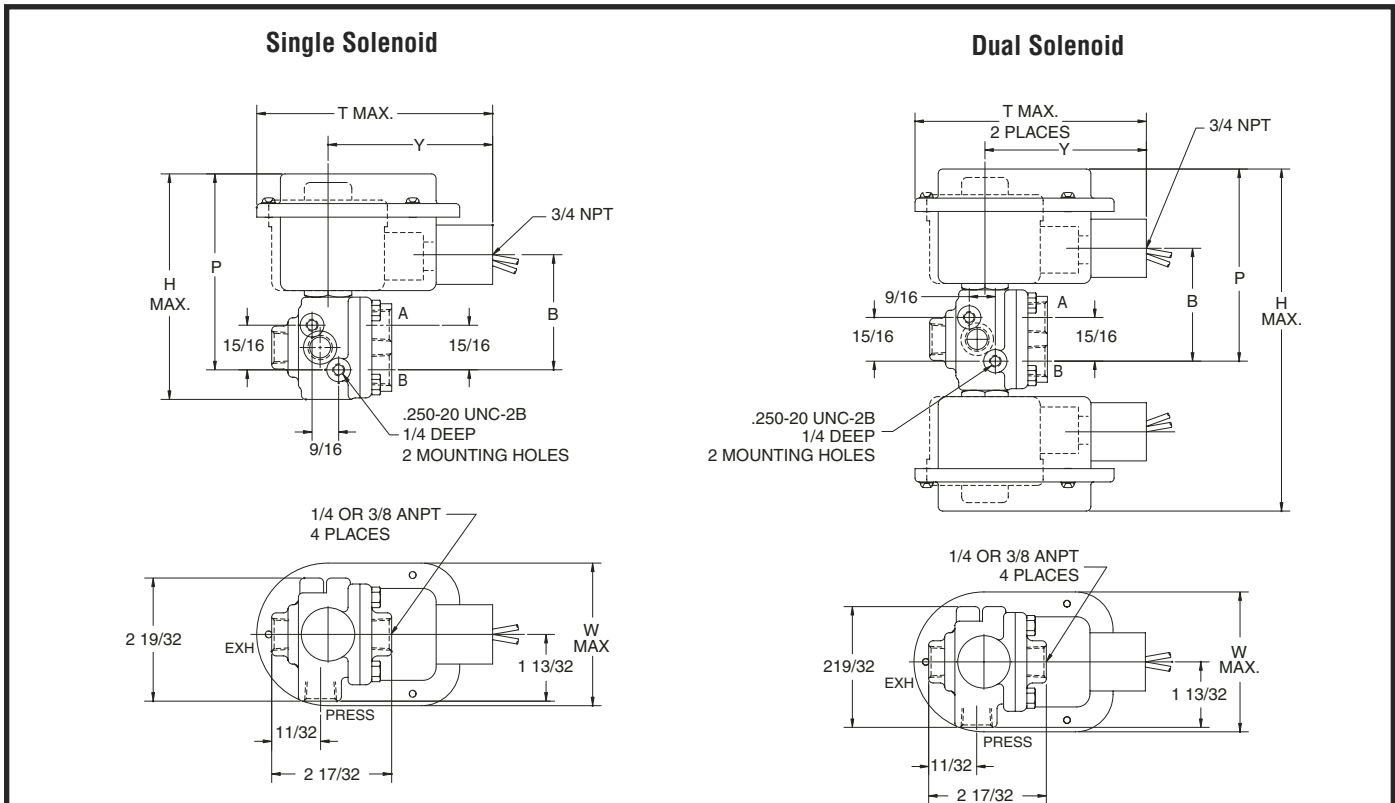
2-Position Single and Dual Solenoids
For Oil-Free Instrument Air
1/4" and 3/8" ANPT



Specifications (NP8342 Series)

Pipe Size (in.)	Orifice Size (in.)	Maximum Operating Pressure Differential (psi) Air Only		Safe Working Pressure (psi)	Cv Flow Factor				Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
					Pressure to Cylinder		Cylinder to Exhaust				AC	DC
		AC	DC		A	B	A	B				
Single Solenoid Construction												
1/4	3/16	125	50	300	0.83	0.79	0.78	0.79	NP8342B1E	NP8342B2E	20	35.1
3/8	3/16	125	50	300	0.78	0.77	0.75	0.74	NP8342B3E	NP8342B4E	20	35.1
Dual Solenoid Construction												
1/4	3/16	125	75	300	0.84	0.80	0.79	0.80	NP8342B20E	NP8342B21E	20	35.1
3/8	3/16	125	75	300	0.76	0.73	0.77	0.73	NP8342B22E	NP8342B23E	20	35.1

NP8342 - Dimensions



Single Solenoid							
NP Catalog Numbers	Solenoid Enclosure	B	H	P	T	W	Y
NP8342B1E NP8342B3E	WP	2 11/32	4 3/4	4 3/32	5 1/16	3 1/16	3 15/32
NP8342B2E NP8342B4E	EP AC	2 7/32	4 11/16	4 1/32	5	2 13/16	3 9/16
NP8342B2E NP8342B4E	EP DC	3 1/4	6 1/4	5 9/16	6 5/16	4 1/16	4 1/2

Dual Solenoid							
NP Catalog Numbers	Solenoid Enclosure	B	H	P	T	W	Y
NP8342B20E NP8342B22E	WP	2 11/32	7 5/16	4 3/32	5 1/16	3 1/16	3 15/32
NP8342B21E NP8342B23E	EP AC	2 7/32	7 1/8	4 1/32	5	2 13/16	3 9/16
NP8342B21E NP8342B23E	EP DC	3 1/4	10 3/16	5 9/16	6 5/16	4 1/16	4 1/2

General Description

Heavy-duty, two-position, 4-way valves with rugged forged brass bodies and discs providing tight seating.

The main valve discs are power driven in both directions by line pressure, no return springs.

Important: 10 psi minimum operating pressure differential is required. Valve will vent to zero psi.

Applications

Primarily used as pilot operators on larger control valves and to control cylinders and clutches.

Qualification

IEEE-323-1974, IEEE-344-1975, and IEEE-382-1972

ASCO Qualification Specification:
AQS-21678, Rev. B

ASCO Qualification Report:
AQS-21678/TR. Rev. A

Operations

Two types available:

Single Solenoid: The valve changes position when the solenoid is energized. The valve returns to its original position when de-energized.

Dual Solenoids: The valve changes position when one solenoid is energized. The valve will not return to normal position until opposite solenoid is energized. Solenoids may be energized momentarily or continuously. Minimum on time of coil for dual solenoid valves is 0.3 seconds.

Caution: Do not energize both solenoids simultaneously.

Installation

Can be mounted in any position without affecting operation.

Electrical Information

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			
	DC Watts	AC		
		Watts	Volt-Amp Holding	Volt-Amp Inrush
H	17.4	10.5	23	45

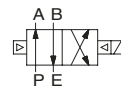
Replacement Coil Kits

Valve Voltage	Coil Kit Model Number with Standard 18" Coil Lead Length*	
	Watertight Solenoid Enclosure	Explosionproof Solenoid Enclosure
120/60 VAC	258280-001D	258283-001D
125 VDC	258278-001D	258282-001D
240/60 VAC	258280-002D	258283-002D
250 VAC	258278-002D	258282-002D

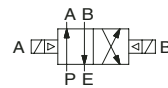
* For optional 72" (6') coil leads replace the suffix "D" with a "K", i.e. -001K.
For optional 240" (20') coil leads replace the suffix "D" with a "W", i.e. -001W.

NOTE: Additional coil kit model numbers for non-standard voltages are also available. Contact ASCO.

SINGLE SOLENOID



DUAL SOLENOID



Valve Parts in Contact with Media

Body: Brass

Seals: Ethylene propylene and optional FKM fluoroelastomer.*

Core Tube: 305 Stainless Steel

Core and Plugnut: 430F Stainless Steel

Springs: 302 Stainless Steel and 17-7PH Stainless Steel

Shading Coil (AC models): Copper

Pilot Seat Cartridge: Brass

No aluminum parts

FKM fluoroelastomer is only available in 1/4", 3/8", and 1/2" pipe size.

Optional Features

 (see pages 64-65 for details)

1/2" NPT threaded conduit hub

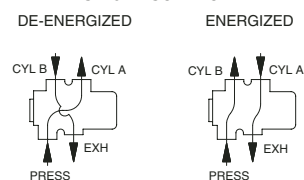
Screw terminal coils (watertight solenoid only)

FKM fluoroelastomer (suffix V)

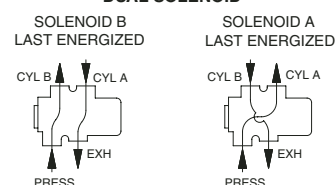
Longer than standard lead lengths

Flow Diagrams

SINGLE SOLENOID



DUAL SOLENOID



NP8344 VALVES

4-Way Solenoid

Pilot-Operated 2-Position Single and Dual Solenoids
For Oil-Free Instrument Air
1/4" to 1" ANPT

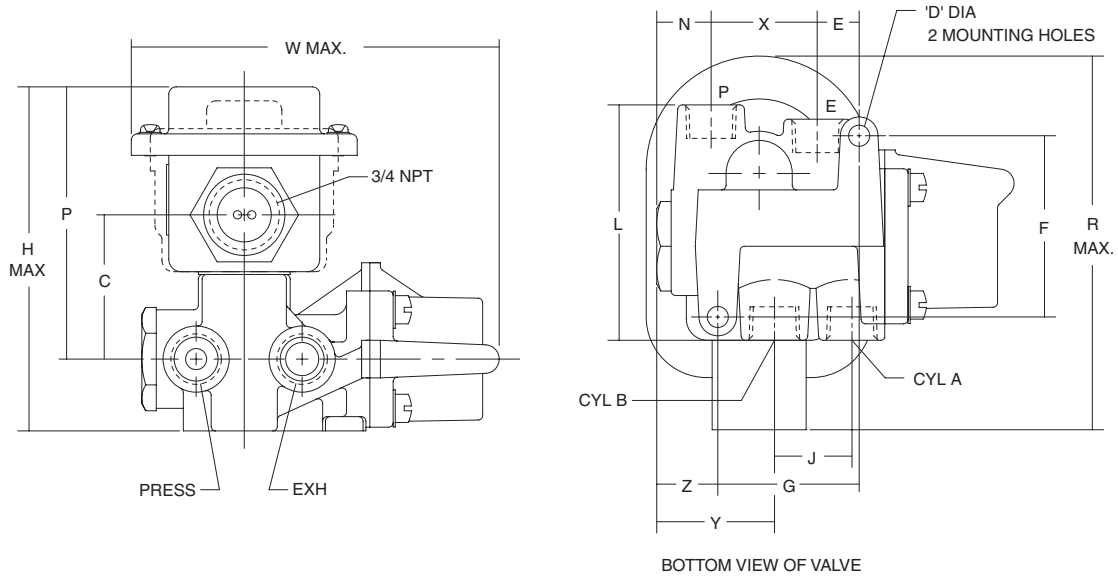


Specifications (NP8344)

Pipe Size (in.)	Orifice Size (in.)	Operating Pressure Differential Air Only (psi)			Safe Working Pressure (psi)	Cv Flow Factor				Watertight Solenoid Enclosure Catalog Number	Explosionproof Solenoid Enclosure Catalog Number	Watt Rating	
		Min.	Maximum			Pressure to Cylinder		Cylinder to Exhaust				AC	DC
			AC	DC		A	B	A	B				
Single Solenoid Construction													
1/4	1/4	10	125	125	450	.69	0.83	.87	.94	NP8344A70E	NP8344A71E	10.5	17.4
3/8	3/8	10	125	125	450	1.24	1.36	2.12	2.24	NP8344A72E	NP8344A73E	10.5	17.4
1/2	3/8	10	125	125	450	1.32	1.34	2.16	2.29	NP8344A74E	NP8344A75E	10.5	17.4
3/4	3/4	10	125	125	300	5.06	5.15	5.26	5.38	NP8344A76E	NP8344A77E	10.5	17.4
1	3/4	10	125	125	300	5.16	5.14	5.30	5.46	NP8344A78E	NP8344A79E	10.5	17.4
Dual Solenoid Construction													
1/4	1/4	10	350	125	450	.69	0.83	.87	.94	NP8344B46E	NP8344B58E	10.5	17.4
3/8	3/8	10	300	125	450	1.24	1.36	2.12	2.24	NP8344B50E	NP8344B62E	10.5	17.4
1/2	3/8	10	300	125	450	1.32	1.34	2.16	2.29	NP8344B52E	NP8344B64E	10.5	17.4
3/4	3/4	10	300	125	300	5.06	5.15	5.26	5.38	NP8344B54E	NP8344B66E	10.5	17.4
1	3/4	10	300	125	300	5.16	5.14	5.30	5.46	NP8344B56E	NP8344B68E	10.5	17.4

NP8344 - Dimensions

Single Solenoid Construction



Single Solenoid																	
Catalog Numbers	Sol. Encl.	Dia. D	C	E	F	G	H	J	L	N	P	R	W	X	Y	Z	Exh. Pipe Size
NP8344A70E	WP	9/32	1 31/32	9/16	2 13/32	1 7/8	4 11/16	1 1/32	3 1/8	7/8	3 11/16	5 1/16	4 15/16	1 13/32	1 9/16	13/16	3/8
NP8344A71E	EP	9/32	1 15/16	9/16	2 13/32	1 7/8	4 1/2	1 1/32	3 1/8	7/8	3 7/16	4 11/16	4 7/8	1 13/32	1 9/16	13/16	3/8
NP8344A72E NP8344A74E	WP	11/32	1 3/4	3/4	3 1/8	2 5/8	4 11/16	1 1/2	3 3/16	27/32	3 9/16	5 1/16	6 1/8	1 7/8	1 29/32	27/32	1/2
NP8344A73E NP8344A75E	EP	11/32	1 3/4	3/4	3 1/8	2 5/8	4 7/16	1 1/2	3 3/16	27/32	3 1/4	4 13/16	6 1/8	1 7/8	1 29/32	27/32	1/2
NP8344A76E NP8344A78E	WP	11/32	2 1/8	1 11/32	3 13/16	3 7/8	5 1/2	2 3/32	4 9/16	1 9/16	3 7/8	5 1/16	8 5/16	2 1/8	2 5/8	1 5/32	1
NP8344A77E NP8344A79E	EP	11/32	2 1/8	1 11/32	3 13/16	3 7/8	5 1/4	2 3/32	4 9/16	1 9/16	3 5/8	4 7/8	8 3/8	2 1/8	2 5/8	1 5/32	1

NP8344 VALVES

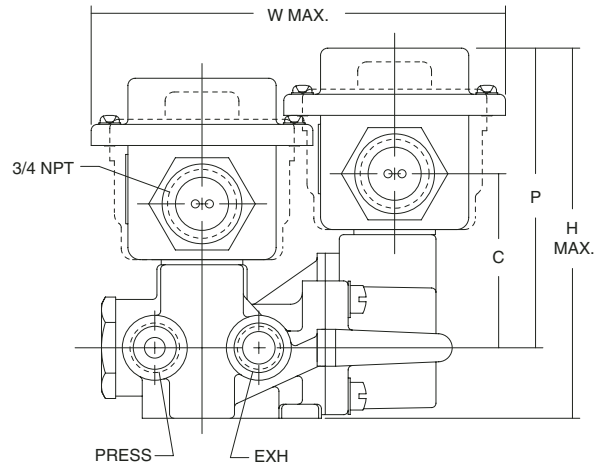
4-Way Solenoid

Pilot-Operated 2-Position Single and Dual Solenoids
For Oil-Free Instrument Air
1/4" to 1" ANPT



NP8344 - Dimensions

Dual Solenoid Construction



Dual Solenoid																	
Catalog Numbers	Sol. Encl.	Dia. D	C	E	F	G	H	J	L	N	P	R	W	X	Y	Z	Exh. Pipe Size
NP8344B46E	WP	9/32	2 3/8	9/16	2 13/32	1 7/8	5 1/8	1 1/32	3 1/8	23/32	4 1/8	5 31/32	5 11/16	1 13/32	1 9/16	13/16	3/8
NP8344B58E	EP	9/32	2 3/8	9/16	2 13/32	1 7/8	4 15/16	1 1/32	3 1/8	23/32	3 7/8	5 13/16	5 3/8	1 13/32	1 9/16	13/16	3/8
NP8344B50E NP8344B52E	WP	11/32	2 3/8	3/4	3 1/8	2 5/8	5 5/16	1 1/2	3 3/16	27/32	4 1/8	5 15/32	6 13/32	1 7/8	1 29/32	27/32	1/2
NP8344B62E NP8344B64E	EP	11/32	2 3/8	3/4	3 1/8	2 5/8	5 1/8	1 1/2	3 3/16	27/32	3 7/8	6 1/16	6 1/4	1 7/8	1 29/32	27/32	1/2
NP8344A54E NP8344B56E	WP	11/32	2 13/16	1 11/16	3 13/16	3 7/8	6 5/32	2 3/32	4 9/16	1 9/16	4 9/16	6 3/8	8 3/8	2 1/8	2 5/8	1 5/32	1
NP8344B66E NP8344B68E	EP	11/32	2 13/16	1 11/16	3 13/16	3 7/8	5 15/16	2 3/32	4 9/16	1 9/16	4 5/16	6 1/4	8 3/8	2 1/8	2 5/8	1 5/32	1

ASCO pressure and temperature radiation resistant construction switches are designed to be used outside the containment area of nuclear power plants to monitor pressure and temperature.

Selection of the proper pressure/temperature switch for a specific application is of paramount importance. This engineering information section describes principles of operation, types of switches, types of enclosures, and materials to assist in the proper selection.

I. Principles of Operation

The pressure/temperature switch will control electrical circuits in response to changes in pressure or temperature. The pressure transducers are generally of the diaphragm piston type pressure sensor. The exceptions are in the higher pressure ranges, which use a piston with an o-ring seal. The piston defines the area that the pressure is applied to, converting the pressure to a mechanical force.

The temperature transducer is also a diaphragm piston type pressure sensor converting pressure to a mechanical force. The internal pressure is the vapor pressure of a chemical in a contained volume that is in direct relation to the temperature.

The switch incorporates an adjustable spring force that opposes the transducer piston force. When the transducer force is greater than the spring force, the piston rod mechanism moves to operate an electrical snap switch. When the transducer force is less than the spring force the piston rod mechanism moves to restore the electrical snap switch to the normal position.

The switch units incorporate a unique ASCO TRI-POINT balance plate and operates on an alternating fulcrum principle. This converts a single motion/force of a transducer piston to a two-step motion controlling one or more electrical snap switches. The spring forces of the two-step motion are independent of each other.

II. Types of Switch Units

There are three types of switch units: adjustable deadband, fixed deadband, and two-stage fixed deadband.

The adjustable deadband (SA) model has one electrical snap switch with two separate independent adjusting nuts to set the trip point on increasing pressure/temperature signal and the reset trip point on decreasing pressure/temperature signal over the range of the switch.

The fixed deadband (SB) model has one electrical snap switch with one adjusting nut to set the trip point over the full range of the switch. The reset trip point is fixed relative to the set point and cannot be adjusted.

The two-stage (SC) model has two electrical snap switches with independent adjustment by two separate adjusting nuts. Each may set the trip point over the full range of the switch. The reset point of each electrical snap switch is fixed with respect to the set point for that switch.

III. Electrical Enclosure

All pressure/temperature switches in this catalog are supplied with either a watertight or combination explosion-proof/watertight electrical enclosure to withstand the environmental conditions of a Loss of Coolant Accident and Main Steam Line Break. Watertight models have a deep drawn aluminum cover secured by locking tabs and screws. Explosionproof/watertight models have a die cast aluminum cover that threads onto the body. Both enclosures have two 3/4" NPT conduit hubs for wiring.

Two types of electrical enclosures are available to satisfy the following (NEMA) classifications:

Watertight Types 3, 3S, 4

Explosionproof/Watertight Types 3, 3S, 4, 4x, 7, and 9.

ASCO's qualification has not included simulation of any outdoor or explosive atmosphere conditions.

Connections to the switch should be such that any accumulated moisture or LOCA spray will not run into the enclosure. During qualification testing, wiring was run through conduit to a vented electrical junction box located outside the test chamber. (Wiring must comply with all applicable electrical codes.)

IV. Transducer Construction

Pressure Internal parts in contact with the fluid are comprised of a pipe fitting (process connection) and elastomer or metallic diaphragm. The pipe fitting is available in aluminum, brass, stainless steel type 303 or 316 in both 1/4", and 1/2" NPT. Diaphragms are available in FKM fluoroelastomer, ethylene propylene, or 316 stainless steel.

Temperature Transducers are available with a direct mount or a remote-probe 316 stainless steel sensing bulb. The direct mount is a 4" long bulb with an integral 1/2" NPT connection for direct mounting to the process. The remote probe is a 3/8" OD probe at the end of a 6' to 80' stainless steel armored capillary.

V. Definitions & Terminology

Accuracy is the maximum deviation from the base set point under specified operating conditions. The value given by ASCO includes all the qualification life conditions. Accuracy is specified as a percent or the upper limit of the adjustable operating range.

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

Separation (on two stage unit) is the minimum difference between the two set points increasing or two set points decreasing that may be set.

Proof Pressure or **Rated Overrange Temperature** is the sensing maximum medium value that a device can be subjected to for an extended period of time without changes to its operating characteristics.

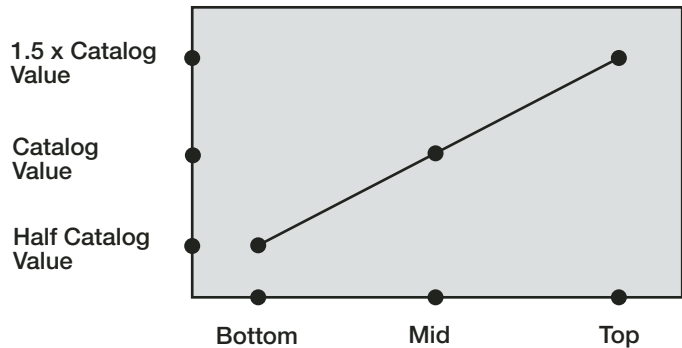
Adjustable Operating Range is the set point limits between which the instrument can be adjusted to operate.

Deadband is the difference between the set point and reset point readings either increasing or decreasing. The value in this catalog are nominal, representative of the deadbands of 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.

Deadbands



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 ranges than in the bottom third of the range. The values published are nominal and representative of midrange set points.

ASCO Pressure and Temperature Switches

IEEE qualified switches for pressures to 8000 psig, Vacuum, Differential or Level Control; Temperature Switches from 30° F through 510° F (-32° C through 265° C), with watertight or explosionproof enclosures



Photos (left to right):

Pressure Switches with watertight and explosionproof housing.

Temperature Switches (capillary and bulb), with watertight and explosionproof housing.

General Description

Pressure and temperature switches for Class 1E service are modified versions of the industrial ASCO TRI-POINT product line. Special features include radiation resistance and high-temperature construction. Class 1E switches are available only as factory assembled units consisting of a single switch and transducer assembly, factory set at operating points, and tested as a single unit before shipping from ASCO.

Applications

ASCO TRI-POINT pressure and temperature switches are available for safety-related (Class 1E) applications outside containment in nuclear power plants. They are also suitable for the less stringent balance-of-plant requirements.

Test Program

The Qualification Test Program consists of subjecting representative units to the following tests:

- **Thermal Aging** Short-term representation of an installed life
- **Radiation Aging** Exposure to gamma radiation
- **Wear Aging** Operating cycle testing at full electrical load
- **Vibration Endurance** Exposure to low-level multiaxial vibration simulating installed condition
- **Accident Simulation** Operating basis and design basis events—including both seismic shaker testing and high level radiation dosage
- **Environmental Simulation** Exposure to high temperature and humidity

Qualification

The ASCO Qualification Specification (AQS-21623) has been prepared in order to provide generic qualification of pressure and temperature switches. It is based on the suggestions and requirements of IEEE-323-1974-“IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations” and IEEE-344-1975-“IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations.”

The current ASCO qualification reports are:

- AQR-101083/Rev. 1 - Pressure switch
- AQR-020184/Rev. 1 - Temperature switch

Operation

Pressure Switches

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

Temperature Switches

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(es) in the switch unit. 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.

Features

- Set point repeatability of $\pm 3\%$ of operating range.
- Accuracy of $\pm 10\%$ of operating range for qualified life of the unit.
- Choice of watertight or explosionproof enclosures.
- Mounts in any position.
- Visual adjustment scales of pressure switches in psi and bars; of temperature switches in °F and °C.
- External adjusting nuts.
- Separate electrical, pressure, and adjusting chambers.
- Wide selection of pressure switch transducer wetted material suitable for air, water, oil, or corrosive fluids.
- 316 stainless steel temperature switch transducers available in direct-mount or armored capillary and bulb in standard 6 and 12 foot lengths, and optional lengths to 80 feet.

Switch/Transducer

ASCO qualified switch units incorporate the unique ASCO TRI-POINT alternating fulcrum balance plate to control the operation of one or more electrical snap-action switches. Pressure switch transducer units incorporate a diaphragm piston-type pressure sensor.

Temperature transducer units use a vapor pressure principle where the internal pressure within the unit is generated by the vapor pressure of a chemical within a sealed system. Switch and transducers (both pressure and temperature) are factory assembled and fully tested and supplied as a complete switch and transducer unit only.

Specifications

Type of Operation: Adjustable deadband, fixed deadband, and two-stage fixed deadband.

Pressure Switches: Vacuum to 30" Hg, pressure levels to 8000 psig.

Wetted Materials: FKM fluoroelastomer, ethylene propylene, aluminum, brass, and stainless steel.

Process Connection: 1/4" NPT, optional 1/2" NPT.

Temperature Switches: Temperature ranges -30°F to 510°F (-32°C to 265°C).

Process Connection: Direct-mount 316 stainless steel probe or remote-mount 316 stainless steel armored capillary.

Electrical Standard: 5 amp, 250 VAC switch;

Optional: 10 amp, 125 VDC switch,

Types of Enclosures: Watertight or Explosionproof/Watertight.

Standard Electrical Ratings

SA, SB, SC Series
 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

Optional High DC Rated Switches

(see optional features pages 64-65)
 10 Amp Res., 125 VAC or VDC
 1/8 Horsepower, 125 VAC or VDC

Environment of Service Conditions

Temp: 50°F to 104°F (10°C to 40°C)

Fluid: Pressure Switches-

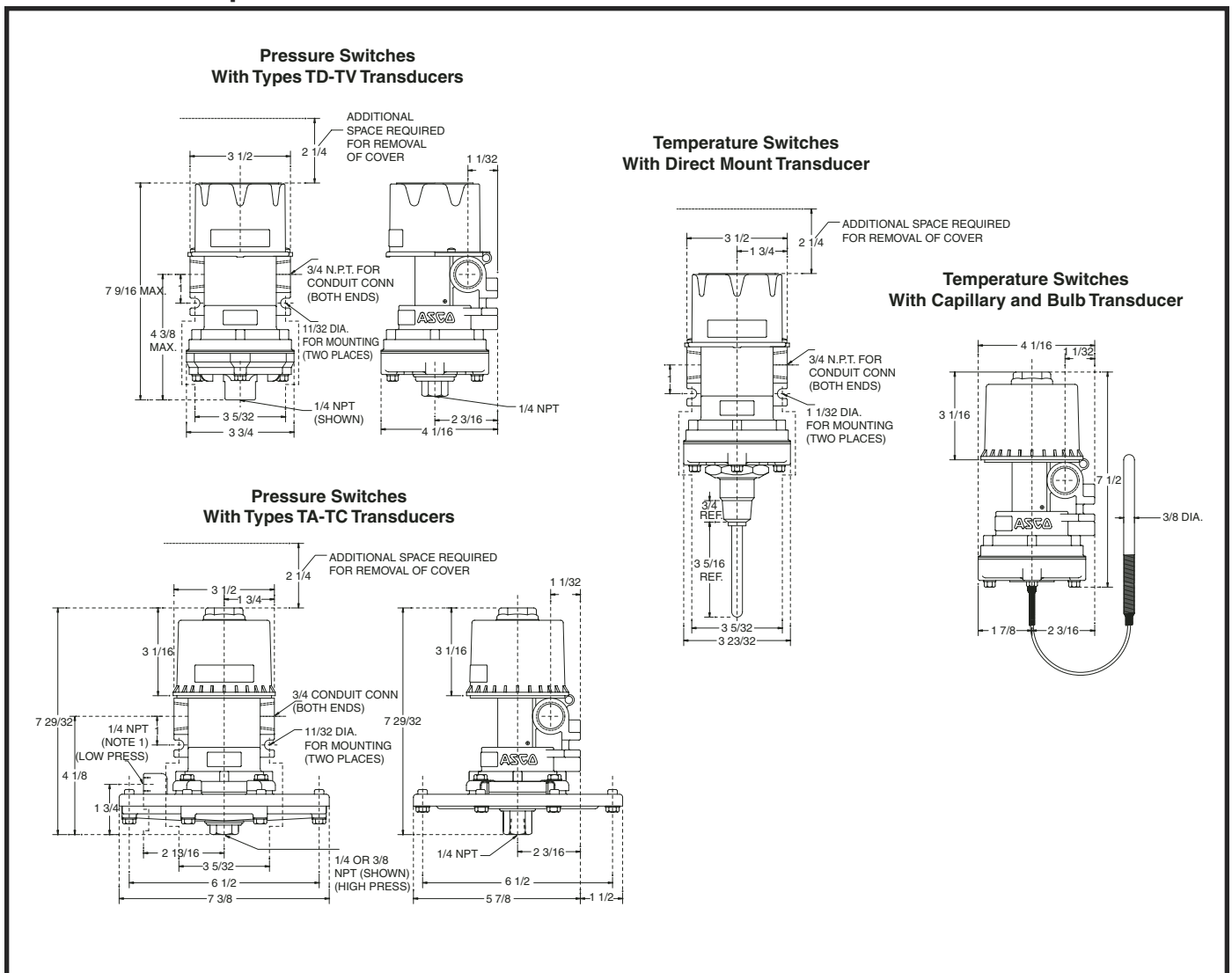
Ethylene propylene diaphragm:
 -4°F to 180°F (-20°C to 82°C)

FKM fluoroelastomer diaphragm:
 -4°F to 250°F (-20°C to 121°C)

316 Stainless Steel diaphragm:
 -50°F to 300°F (-45°C to 149°C)

Fluid: Temperature Switches - see specification table for rated overrange temperature.

Pressure and Temperature Switches - Dimensions



Pressure, Vacuum, and Differential Switches

Specifications			Adjustable Deadband			Fixed Deadband		
Adjustable Operating Range (psig)	Proof Pressure (psig)		Maximum Full Scale	Watertight Enclosure	Explosionproof Enclosure	Fixed Deadband At Mid-Range (psig)†	Watertight Enclosure	Explosionproof Enclosure
			Minimum At Mid-Range (psig)†	Catalog No.	Catalog No.		Catalog No.	Catalog No.
Regular Gauge Type								
0-27" W.C.	25		2.5" W.C.	SA31AR	SA32BR	1.5" W.C.	SB31AR	SB32BR
0-65" W.C.	25		3.2" W.C.	SA21AR	SA22BR	1.8" W.C.	SB21AR	SB22BR
15-140" W.C.	40		7.5" W.C.	SA21AR	SA22BR	3.8" W.C.	SB21AR	SB22BR
15-250" W.C.	40		13" W.C.	SA11AR	SA12BR	7.5" W.C.	SB11AR	SB12BR
25-400" W.C.	40		19" W.C.	SA11AR	SA12BR	10" W.C.	SB11AR	SB12BR
0.7-9.0	100		0.8	SA31AR	SA32BR	0.4	SB31AR	SB32BR
1.0-18	100		1.4	SA21AR	SA22BR	0.5	SB21AR	SB22BR
1.0-18	150		2.0	SA31AR	SA32BR	1.4	SB31AR	SB32BR
1.5-36	150		2.8	SA21AR	SA22BR	1.2	SB21AR	SB22BR
2-60	150		4.5	SA11AR	SA12BR	1.9	SB11AR	SB12BR
5-60	3000		7.5	SA31AR	SA32BR	5.0	SB31AR	SB32BR
3-100	200		7.5	SA11AR	SA12BR	3.2	SB11AR	SB12BR
5-120	3000		13	SA21AR	SA22BR	6.4	SB21AR	SB22BR
5-200	3000		18	SA11AR	SA12BR	7.5	SB11AR	SB12BR
6-200	400		15	SA11AR	SA12BR	6.4	SB11AR	SB12BR
13-300	600		23	SA11AR	SA12BR	10	SB11AR	SB12BR
15-400	600		30	SA11AR	SA12BR	13	SB11AR	SB12BR
30-600	900		45	SA11AR	SA12BR	19	SB11AR	SB12BR
50-1000	1500		94	SA11AR	SA12BR	38	SB11AR	SB12BR
75-1500	2300		144	SA11AR	SA12BR	58	SB11AR	SB12BR
200-3500	5000		282	SA11AR	SA12BR	158	SB11AR	SB12BR
500-8000	9000		564	SA11AR	SA12BR	344	SB11AR	SB12BR
Vacuum Switch Units								
0-30" H.G.	50		2.5" H.G.	SA31AR	SA32BR	1.5" H.G.	SB31AR	SB32BR
15 PSI-30" H.G.	50		3.8" H.G.	SA21AR	SA22BR	2.2" H.G.	SB21AR	SB22BR
0-27" W.C.	15		2.5" W.C.	SA31AR	SA32BR	1.5" W.C.	SB31AR	SB32BR
0-65" W.C.	15		3.8" W.C.	SA21AR	SA22BR	1.8" W.C.	SB21AR	SB22BR
15-140" W.C.	25		7.5" W.C.	SA21AR	SA22BR	3.8" W.C.	SB21AR	SB22BR
15-250" W.C.	25		13" W.C.	SA11AR	SA12BR	7.5" W.C.	SB11AR	SB12BR
25-400" W.C.	25		19" W.C.	SA11AR	SA12BR	10" W.C.	SB11AR	SB12BR
Differential Switch Units								
0-27" W.C.	15		2.5" W.C.	SA31AR	SA32BR	1.5" W.C.	SB31AR	SB32BR
0-65" W.C.	15		3.8" W.C.	SA21AR	SA22BR	1.8" W.C.	SB21AR	SB22BR
15-140" W.C.	25		7.5" W.C.	SA21AR	SA22BR	3.8" W.C.	SB21AR	SB22BR
15-250" W.C.	25		13" W.C.	SA11AR	SA12BR	7.5" W.C.	SB11AR	SB12BR
25-400" W.C.	25		19" W.C.	SA11AR	SA12BR	10" W.C.	SB11AR	SB12BR

Temperature Switches

Specifications			Adjustable Deadband			Fixed Deadband		
Adjustable Operating Range °F	Rated Overrange Temperature °F		Maximum Full Scale	Watertight Enclosure	Explosionproof Enclosure	Fixed Deadband At Mid-Range °F†	Watertight Enclosure	Explosionproof Enclosure
	Direct Mount	Stainless Steel	Minimum At Mid-Range °F†	Catalog No.	Catalog No.		Catalog No.	Catalog No.
-30 - 60	250	250	10	SA11AR	SA12BR	3.8	SB11AR	SB12BR
0 - 90	260	300	10	SA11AR	SA12BR	3.8	SB11AR	SB12BR
50 - 160	260	350	10	SA11AR	SA12BR	3.8	SB11AR	SB12BR
100 - 220	260	450	10	SA11AR	SA12BR	3.8	SB11AR	SB12BR
160 - 260	260	500	11.5	SA11AR	SA12BR	3.8	SB11AR	SB12BR
225 - 340	---	600	15	SA11AR	SA12BR	7.5	SB11AR	SB12BR
300 - 450	---	700	15	SA11AR	SA12BR	7.5	SB11AR	SB12BR
350 - 510	---	800	22.5	SA11AR	SA12BR	8.8	SB11AR	SB12BR

Note: *ASCO stainless steel & EPDM or stainless steel FKM fluoroelastomer transducers are only available in transducers construction listed in table. For other special transducers material contact ASCO. † Deadband values listed are nominal.



IEEE-Qualified For Nuclear Service

Two-Stage Fixed Deadband					Pressure, Vacuum, and Differential Transducers						
Fixed Deadband At Mid-Range (psig)†	Separation		Watertight Enclosure	Explosionproof Enclosure	Aluminum FKM Fluoroelastomer	Aluminum EPDM	Brass FKM Fluoroelastomer	Brass EPDM	316 (46) or 303 (36) SS EPDM*	All 316 SS**	316 (42) or 303 (32) SS FKM Fluoroelastomer*
	Maximum Full Scale	Minimum At Mid-Range (psig)									
1.8" W.C.	3.4" W.C.	SC31BR	SC32CR	TA30A12R	TA30A16R	---	---	TA30A36R	---	TA30A32R	
2.0" W.C.	8.2" W.C.	SC21BR	SC22CR	TA20A12R	TA20A16R	---	---	TA20A36R	---	TA20A32R	
5.0" W.C.	18" W.C.	SC21BR	SC22CR	TB20A12R	TB20A16R	---	---	TB20A36R	---	TB20A32R	
8.8" W.C.	32" W.C.	SC11BR	SC12CR	TB10A12R	TB10A16R	---	---	TB10A36R	---	TB10A32R	
17" W.C.	50" W.C.	SC11BR	SC12CR	TC10A12R	TC10A16R	---	---	TC10A36R	---	TC10A32R	
0.5	1.2	SC31BR	SC32CR	TD30A12R	TD30A16R	TD30A22R	TD30A26R	TD30A46R	---	TD30A42R	
0.8	2.4	SC21BR	SC22CR	TD20A12R	TD20A16R	TD20A22R	TD20A26R	TD20A46R	---	TD20A42R	
1.5	2.4	SC31BR	SC32CR	---	---	---	---	---	TE30A44R	---	
1.8	4.5	SC21BR	SC22CR	TE20A12R	TE20A16R	TE20A22R	TE20A26R	TE20A46R	TE20A44R	TE20A42R	
2.8	7.5	SC11BR	SC12CR	TE10A12R	TE10A16R	TE10A22R	TE10A26R	TE10A46R	TE10A44R	TE10A42R	
7.0	10	SC31BR	SC32CR	---	---	TG33A22R	TG33A26R	TG33A46R	---	TG33A42R	
4.4	13	SC11BR	SC12CR	TF10A12R	TF10A16R	TF10A22R	TF10A26R	TF10A46R	TF10A44R	TF10A42R	
8.8	15	SC21BR	SC22CR	---	---	TG23A22R	TG23A26R	TG23A46R	---	TG23A42R	
10.2	25	SC11BR	SC12CR	---	---	TG13A22R	TG13A26R	TG13A46R	---	TG13A42R	
9.0	25	SC11BR	SC12CR	TG10A12R	TG10A16R	TG10A22R	TG10A26R	TG10A46R	TG10A44R	TG10A42R	
12.5	38	SC11BR	SC12CR	TH10A12R	TH10A16R	TH10A22R	TH10A26R	TH10A46R	TH10A44R	TH10A42R	
17.5	50	SC11BR	SC12CR	TJ10A12R	TJ10A16R	TJ10A22R	TJ10A26R	TJ10A46R	TJ10A44R	TJ10A42R	
25	75	SC11BR	SC12CR	---	---	TK10A22R	TK10A26R	TK10A46R	---	TK10A42R	
50	125	SC11BR	SC12CR	---	---	TL10A22R	TL10A26R	TL10A46R	---	TL10A42R	
75	188	SC11BR	SC12CR	---	---	TM10A22R	TM10A26R	TM10A46R	---	TM10A42R	
188	438	SC11BR	SC12CR	---	---	TN10B22R	TN10B26R	TN10B46R	---	TN10B42R	
375	1000	SC11BR	SC12CR	---	---	TQ10B22R	TQ10B26R	TQ10B46R	---	TQ10B42R	
2.2" H.G.	3.4" H.G.	SC31BR	SC32CR	TV34A12R	TV34A16R	TV34A22R	TV34A26R	TV34A36R	---	TV34A32R	
2.5" H.G.	10" H.G.	SC21BR	SC22CR	TV24A12R	TV24A16R	TV24A22R	TV24A26R	TV24A36R	---	TV24A32R	
2.2" W.C.	3.4" W.C.	SC31BR	SC32CR	TA31A12R	TA31A16R	---	---	---	---	---	
2.5" W.C.	8.2" W.C.	SC21BR	SC22CR	TA21A12R	TA21A16R	---	---	---	---	---	
5.0" W.C.	18" W.C.	SC21BR	SC22CR	TB21A12R	TB21A16R	---	---	---	---	---	
8.8" W.C.	32" W.C.	SC11BR	SC12CR	TB11A12R	TB11A16R	---	---	---	---	---	
17" W.C.	50" W.C.	SC11BR	SC12CR	TC11A12R	TC11A16R	---	---	---	---	---	
2.2" W.C.	3.4" W.C.	SC31BR	SC32CR	TA31A12R	---	---	---	---	---	---	
2.5" W.C.	8.2" W.C.	SC21BR	SC22CR	TA21A12R	---	---	---	---	---	---	
5.0" W.C.	18" W.C.	SC21BR	SC22CR	TB21A12R	---	---	---	---	---	---	
8.8" W.C.	32" W.C.	SC11BR	SC12CR	TB11A12R	---	---	---	---	---	---	
17" W.C.	50" W.C.	SC11BR	SC12CR	TC11A12R	---	---	---	---	---	---	

Two-Stage Fixed Deadband					Temperature Transducers					
Fixed Deadband At Mid-Range °F†	Separation		Watertight Enclosure	Explosionproof Enclosure	Direct Mount 316 SS Catalog No.	316 SS Armored Capillary with 316 SS Bulb				
	Maximum Full Scale	Minimum At Mid-Range °F				The Exact Capillary Length Required Must Be Identified for the Model Numbers Listed Below				
			Catalog No.	Catalog No.		6' Capillary Catalog No.	12' Capillary Catalog No.	13-20' Capillary Catalog No.	21-50' Capillary Catalog No.	51-80' Capillary Catalog No.
5	10	SC11BR	SC12CR	QB10A4R	QB11A4CR	QB11A4CDR	QB11A4CER	QB11A4CFR	QB11A4CGR	
5	10	SC11BR	SC12CR	QD10A4R	QD11A4CR	QD11A4CDR	QD11A4CER	QD11A4CFR	QD11A4CGR	
5	10	SC11BR	SC12CR	QF10A4R	QF11A4CR	QF11A4CDR	QF11A4CER	QF11A4CFR	QF11A4CGR	
5	10	SC11BR	SC12CR	QJ10A4R	QJ11A4CR	QJ11A4CDR	QJ11A4CER	QJ11A4CFR	QJ11A4CGR	
5	11.5	SC11BR	SC12CR	QL10A4R	QL11A4CR	QL11A4CDR	QL11A4CER	QL11A4CFR	QL11A4CGR	
10	15	SC11BR	SC12CR	---	QN11A4CR	QN11A4CDR	QN11A4CER	QN11A4CFR	QN11A4CGR	
10	15	SC11BR	SC12CR	---	QT11A4CR	QT11A4CDR	QT11A4CER	QT11A4CFR	QT11A4CGR	
12.5	22.5	SC11BR	SC12CR	---	QU11A4CR	QU11A4CDR	QU11A4CER	QU11A4CFR	QU11A4CGR	

Optional Features NS/NP Valves and Pressure and Temperature Switches



To specify all optional features on ASCO NS and NP series valves, as well as ASCO Pressure and Temperature Switches, ASCO uses a letter code designator. Various letter/letter combinations, as identified below, when used with the appropriate valve catalog model number, will specify an applicable option to be incorporated in the selected ASCO valve.

NS Valves

Standard NS valve model number samples	
NS8316A54	Standard NS Series valves are supplied with 18" long leads and watertight housing. The model number identifies individual valve specifications, i.e., pipe size, orifice, pressure ranges.
Optional feature NS valve model number	
Option Letters	Option Feature Description
NSEF831654	Explosionproof Housing (EF) - NS Series valve with an explosionproof and raintight housing (type 3, 7C, 7D, and 9).
NSL831654 or NSEFL831654	Longer Lead Length (L) - Valve supplied with either 6' (72"), 20' (240"), or 30' (360") long leads. (Customer must specify the optional lead length when ordering).
NSK831654 or NSEFK831654	Screw Terminal Coil (K) - Only available on valves with watertight solenoid housings or 35.1 watt rated DC voltage explosion proof valves.
NSX831654 10688 or NSEFX831654 10688	Special construction valves (X) - ASCO NS series valves can be supplied with a variety of options, including 1/2" NPT threaded conduit hubs (TPL 10688), blocked ports for two-way valve operation on direct acting valves, (TPL 13841), special DC voltages other than 125 or 250 VDC, (15273), etc. To facilitate these constructions ASCO denotes these options by adding an "X" in the valve model number. The customer must identify the special construction by description or ASCO "TPL" number. (Note: valves with an "X" will incorporate an "L" (longer leads) or "K" (screw terminals) option in the "X" model number if required in addition to the described "X" option).

NP Valves

Standard NP valve model number samples	
NP8316A54E or NP8300123EF	Standard NP Series valves are supplied with ethylene propylene elastomers and 18" long leads. The model number identifies individual valve specifications, i.e., pipe size, orifice, pressure ranges, solenoid housing types etc.
Optional feature NP valve model number	
Option Letter(s)	Option Feature Description
NPEF8300123EF	Explosionproof Housing (EF) - NS Series valve with an explosionproof and raintight housing (type 3, 7C, 7D, and 9).
NPL831654E	Longer Lead Length (L) - Valve supplied with either 6' (72"), 20' (240"), or 30' (360") long leads. (Customer must specify the optional lead length when ordering).
NP8316A54V	FKM Fluoroelastomer (V) - Supplied with FKM fluoroelastomer in place of ethylene propylene. (Housing gasket on watertight valve will always be ethylene propylene).
NPK8316A54E	Screw Terminal Coil (K) - Only available on valves with watertight solenoid housings or 35.1 watt rated DC voltage explosion proof valves.
NP8300/NPEF8300142ERF or NP8300/NPEF8300142RVF	Resilient Seats (R) - Available only on NP8300/NPEF8300 series valve with ethylene propylene or FKM fluoroelastomers. Resilient seats available with all options listed above.
NPX8316A54E 10688	Special construction valves (X) - ASCO NP series valves can be supplied with a variety of options, including 1/2" NPT threaded conduit hubs, (TPL 10688), blocked ports for two-way valve operation on direct acting valve, (TPL 13841), special DC voltages other than 125 or 250 VDC, (15273), etc. To facilitate these constructions ASCO denotes these options by adding an "X" in the valve model number. The customer must identify the special construction by description, by the ASCO serial number of a previously supplied valve, or ASCO "TPL" number found after the model number of the previously supplied ASCO valve. (Note: valves with an "X" will incorporate an "L" (longer leads) or "K" (screw terminals) option in the "X" model number if required in addition to the described "X" option).

Pressure and Temperature Switches

Standard Pressure/Temperature Switch model number samples	
SA11AR/TF10A42R	Standard ASCO pressure switch (SA11AR) identifies switch unit, and (TF10A32R) pressure transducer unit assembly. Model number denotes pressure ranges, deadband, etc.
SA11AR/QF10A4R	Standard ASCO temperature switch (SA11AR) identifies switch unit, and (QF10A4R) temperature transducer unit assembly. Model number denotes temperature ranges, deadband, etc.
Optional feature Pressure/Temperature Switch model number	
SA11AKR/TF10A42R or SA11AKR/QF10A4R	2 SPDT switches (K) - Pressure or temperature switches with two SPDT switches with a common lever (double-pole double-throw) in place of the standard single (SPDT) switch. <i>Note: Deadband must be increased by 50% when this option is utilized.</i> <i>Not available on two stage fixed deadband pressure or temperature switch units.</i>
SA11AMR/TF10A42R or SA11AMR/QF10A4R	Higher rated snap switch (M) - Pressure or temperature switches with higher rated snap switch, DC rated 10 Amp, 125 VAC/ VDC, 1/8 HP, 125 VAC/ VDC. <i>Note: Deadband must be increased by 100% when this option is utilized.</i>
SA11AKMR/TF10A42R or SA11AKMR/QF10A4R	2 SPDT higher rated snap switches (KM) - Pressure or temperature switches with SPDT switches with a common lever (double-pole double-throw) and two higher rated snap switches, DC rated 10 Amp, 125 VAC/VDC, 1/8 HP, 125 VAC/VDC. <i>Note: Deadband must be increased by 100% when this option is utilized.</i> <i>Not available on two stage fixed deadband pressure or temperature switch units.</i>
SA11AR/TF10A42BR or SA11AMR/TF10A42BR	1/2" NPT process connection (B) - Pressure switches with a 1/2" NPT process connection in place of the standard 1/4" NPT process connection. <i>Only available with pressure switch transducers having the prefix TD through TQ.</i>

General Description

The NH90 Hydramotor Series of Linear Actuators features a completely self-contained, hydraulic power system that has been integrally coupled to a hydraulic cylinder. The positive, firm positioning actuators are ideal for providing efficient and precise linear control of valves, dampers, louvers, and a wide variety of other equipment requiring an operating thrust of up to 1,500 lbs. (680 kg), 3,000 lbs (1,360kg), or 4,000 lbs. (1,800 kg).

Operating Ranges

Range (Stroke)	Thrust(lbs)
0-3.5 in. (89mm)	1,500 (680kg)
0-3.5 in. (89mm)	3,000 (680kg)
0-4.0 in. (102mm)	4,000 (1,800kg)

The NH90 Hydramotor Series of Linear Actuators is qualified as Class IE, safety related equipment for nuclear power generating stations in accordance with IEEE standards 323, 344, 382, and 627.

Features

- Self contained, intrinsically fail safe, sealed unit; no external pressure lines required
- Self lubrication and fewer moving parts mean less maintenance and longer service life
- Modular design speeds service and maintenance
- Infinite resolution and precise repeatability
- "Hard positioning" eliminates the effects of pipeline pressure surges
- Stem adapters and couplings available for a wide range of applications
- Continuous duty cycle
- Proportional or on-off operation

Principles of Operation

The NH90 Hydramotors are the result of over 50 years experience in designing, testing, manufacturing, marketing, and servicing electrohydraulically powered actuators.



Pull Type Shown

Units are available in both push or pull power stroke with a choice of either spring-return or lock-in-last position upon loss of power. The spring-return version offers the user "fail-safe" operation as the spring returns the actuator shaft to the de-energized position upon power interruption. The lock-in-last position version allows the user to control the return of the actuator shaft to the de-energized position after loss of supply power.

Considerable field experience has proven NH90 Hydramotors to be extremely reliable, and ensures minimum service requirements and a prolonged service life. The modular design uses few moving internal components and industry proven heat-resistant seals, which are immersed in oil for continuous lubrication.

An enamel finished die cast aluminum exterior housing and hard chrome plated steel output shaft have been selected to allow NH90 Hydramotors to be used in the most demanding, rugged, and hostile industrial environments.

To provide continuous peak output without overheating, the Hydramotor utilizes a rugged 100% duty cycle, single, or three phase electric motor. Single phase motors are of a permanent split capacitor run type. Hydramotors will operate in temperatures from -40°F (-40°C) to +200°F (+93°C).

Models with Continuous Modulation

The NH90 Series Modulating Actuators feature a unique “force-balance mechanism”, which controls their operation. Here’s how:

When a standard control signal input is supplied to the force motor coil. The coil applies a force to the balance beam. The force is directly proportional to the input signal.

This force on the balance beam is opposed by the actuator stem position feedback spring. Control is achieved as these two forces balance and reposition the flapper assembly and nozzle.

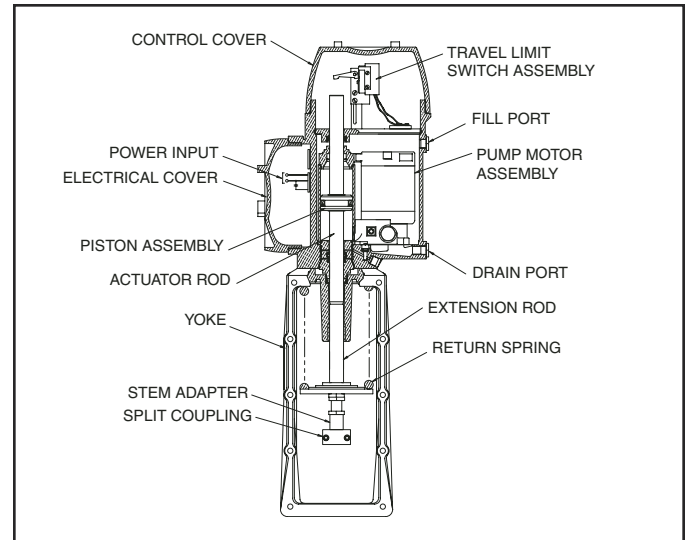
When the control signal input is increased, the force provided by the motor increases. As a result the flapper assembly is repositioned closer to the nozzle.

This repositioning increases the hydraulic pressure in the hydraulic amplifier, which in turn causes a diaphragm-activated lever to restrict fluid flow through the high pressure orifice at the inlet to the hydraulic amplifier.

Restricting the fluid flow at the inlet increases the hydraulic pressure of the oil supplied by the pumps. This also increases the oil pressure in the cylinder, thus forcing the piston to move the output stem.

When the force on the feedback spring equals that of the force motor, the hydraulic system stabilizes and the output stem remains in position.

An increase or decrease in the input signal produces a corresponding repositioning of the output stem.



NH90 Two-Position (ON-OFF) Models

When power is applied to the actuator’s electrical terminals, the solenoid valve closes. The pump applies hydraulic pressure to the piston. The piston pulls the output stem. When the stem reaches a pre-determined distance, the travel limit switch opens the pump motor circuit, causing the stem to stop.

The solenoid valve remains closed, holding the stem in position until the control circuit is broken. When the circuit is broken, the solenoid valve opens and the yoke-mounted spring returns the stem to its de-energized position.

What happens if the power fails?

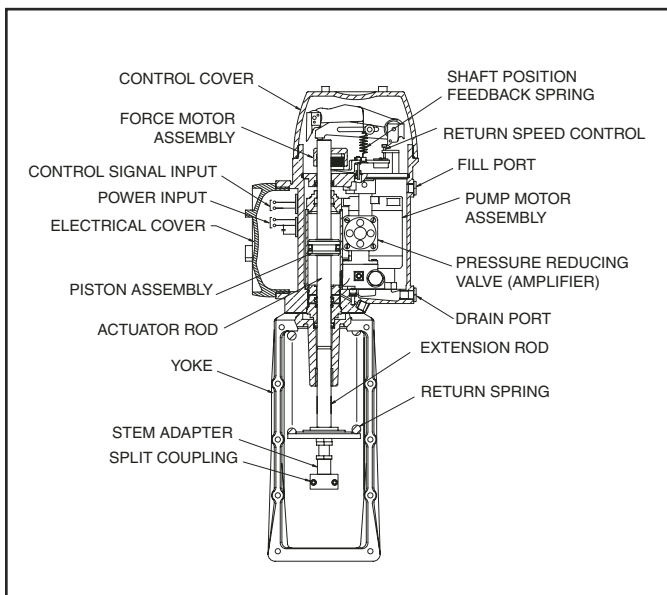
Models NH91, 92, 95, 96

(Modulating and ON-OFF Models with Direct or Reverse Action)

Power failure stops the hydraulic power unit. This causes the normally open solenoid valve to open. Then, the coiled spring returns the output stem to its de-energized position.

Net Stem Forces

A wide variety of net stem forces are available, ranging from 200 pounds to 4,000 pounds, depending on the choices of return springs.



Operating Modes

NH91 Proportional, Spring-Return, Pull-Type:

Shaft retracts on application of power; spring-return extends shaft on loss of power.

NH92 Proportional, Spring-Return, Push-Type:

Shaft extends on application of power; spring-return retracts shaft on loss of power.

NH93 Proportional, Lock-in-Last Position, Pull-Type:

Shaft retracts on application of power; lock-in-last position on power failure, spring-return when solenoid valve is energized. (Normally closed solenoid valve wired integrally to the motor circuit.)

NH94 Proportional, Lock-in-Position, Push-Type:

Shaft extends on application of power, lock-in-position on power failure: spring-return when solenoid valve is energized. (Normally closed solenoid valve wired integrally to the motor circuit.)

NH95 Two-Position, Spring-Return, Pull-Type:

Shaft retracts on application of power; spring-return on loss of power.

NH96 Two-Position, Spring-Return, Push-Type:

Shaft extends on application of power; spring-return on loss of power.

Exterior Construction

Electrical Housing: Cast aluminum UNS A13560 (AA-356-T6) with four 3/4" NPT Conduit Connections

Power Unit: Cast aluminum UNS A13560 (AA-356-T6)

Output Shaft: "Hard chrome plated hardened steel 1144 or 4140"

Yoke: Cast aluminum UNS A13560 (AA-356-T6)

Enclosure Ratings

Standard

NEMA 4- Meets watertight requirements

Optional

NEMA 4 & 7- Meets watertight and hazardous location requirements; Class I Division 1, Group C & D

Hydraulic Power Unit

Hydraulic Oil: Mobil SHC 824

Capacity: 3.26 quarts (3.08 liter)

Pump: Two Cylinder, positive displacement with integral check valve

Filter Capacity: 10 times pump capacity

Seals: FKM fluoroelastomer, and Polyurethane

Hydraulic System

Control Valve: Spring-return, normally-open valve

Lock-In-Last Position: normally-closed valve

Control Signal Output

A. 4-20 mA (400 Ohm) (4-12 mA & 12-20 mA split range)

B. 10-50 mA (100 Ohm)

Electric Motor

Type: Permanent Split capacitor run 2-Pole, Single Phase or Three Phase

Wiring Classifications: Class B 105°C (220°F)

Duty Cycle: 100 percent

Actuator Output

Force Output (gross) (for net force, consult selector chart or contact ASCO).

a. 1,500 lb. (680kg)

b. 3,000 lb. (1,360kg)

c. 4,000 lb. (1,800kg)

Maximum Stroke (adjustable)

a. 1,500 lb. (680kg) and 3,000 lb (1,360 kg) units 3.5" (89mm)

b. 4,000 lb. (1,800kg) units 4" (102mm)

Power Stroke Speed (hydraulic)

- a. 1,500lb (680kg) units – 0.376"/sec (9.5mm/sec)
- b. 3,000 lb. (1,360kg) units – 0.188"/sec (4.8 mm/sec)
- c. 4,000 lb. (1,800kg) units – 0.141"/sec (3.6 mm/sec)

Spring Return Speed (adjustable or modulating)

- a. 1,500 lb. (680kg) – 4 sec maximum
- b. 3,000 lb. (1,360kg) – 7 sec maximum
- c. 4,000 lb. (1,800kg) – 10 sec maximum

Crate Storage Environment

Short Term up to 3 months:

-40° F (-40° C) to +200° F (+93° C)

Long Term as specified per maintenance schedule

(up to 2 years): -20° F (-29° C) to +120° F (+49° C)

Operating Environment

Environment: Nuclear Power Station, outside containment area harsh environment

Temperature Range: -20° F (-29° C) to +150° F (+66°C)

Humidity Range: 0-100% R. H.

Mounting: Any position where the power housing is above the horizontal axis

Sub-Zero Ambient Start-Up: The Proportional Control Hydramotor must be energized for 30 minutes prior to application of control signal

Load Sensitivity: Within 0.1% of stroke per 100 lb (45.5kg)

How to order

To select the NH90 Series Hydramotor for your application, the operating conditions of the Process Control Device (PCD) must first be identified by determining the following parameters:

- Maximum stem forces at significant stem position
- Available power supply
- Control mode
- Closure mode whether push or pull
- Power failure mode whether opened, closed, or remaining in last position
- PCD interface dimensions, the operating environment, and the feedback instrumentation to be used.

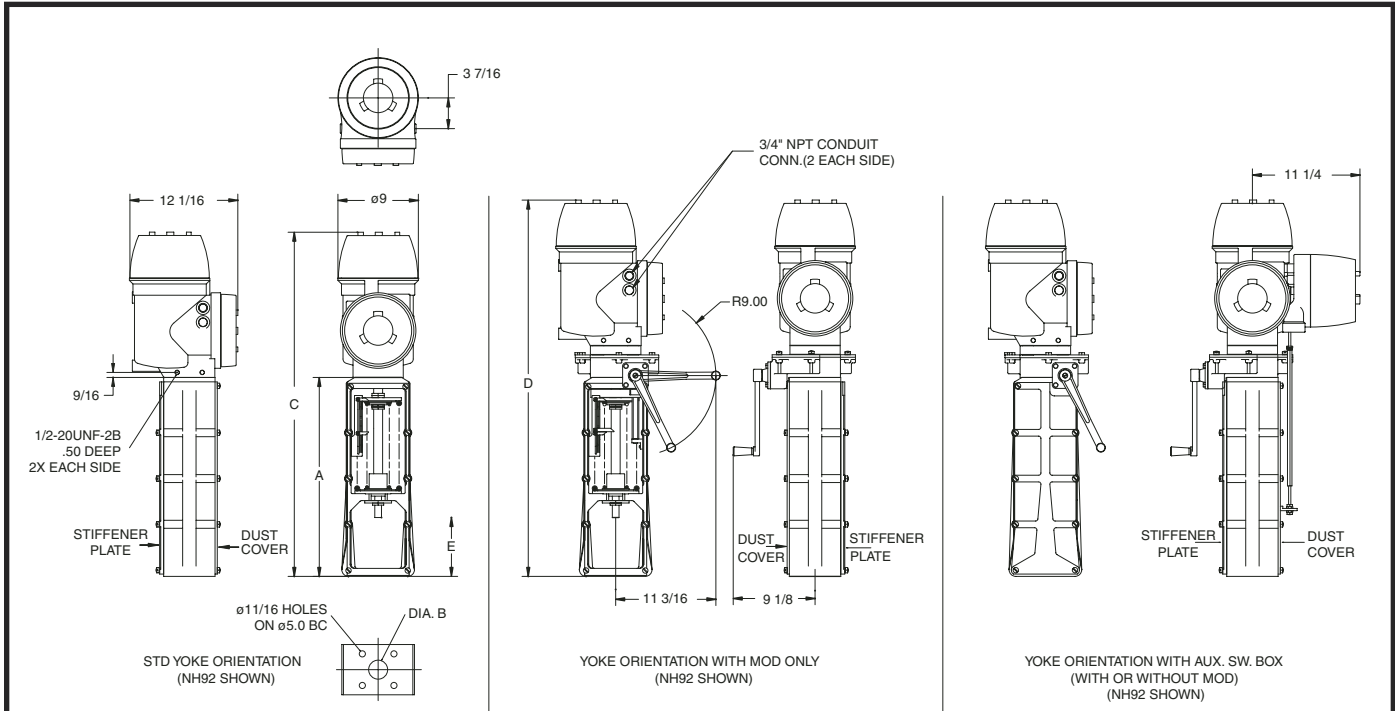
Contact ASCO for specific sizing and selection.

Shaft Adapter and Split Coupling

A shaft adapter and split coupling are normally required when installing a hydramotor on a linear-motion valve. These items are included in the catalog number and should be specified. Contact ASCO for assistance.

NH90 Series Hydramotor Actuators

Nominal Dimensions: Inches



NH91/93/95 - PULL TYPE Inches

Yoke Length	Bonnet Mounting Bore	Overall Height	Height With MOD	Stem Mid Position
A	DIA. B	C	D	E
20" (YOKE A)	2 1/8, 2 1/4 2 5/16, 2 3/8 2 1/2, 2 5/8	36-9/16	40-1/8	8.32
17 1/2" (YOKE C)	2 13/16, 3 3 1/4, 3 5/16 3 9/16, 4	34-1/16	37-5/8	5.82

NH92/94/96 - PUSH TYPE Inches

Yoke Length	Bonnet Mounting Bore	Overall Height	Height With MOD	Stem Mid Position
A	DIA. B	C	D	E
26 1/2" (YOKE L)	2 1/8, 2 1/4 2 5/16, 2 3/8 2 1/2, 2 5/8	43-1/16	46-5/8	8.31
22" (YOKE N)	2 13/16, 3 3 1/4, 3 5/16 3 9/16, 4	38-9/16	42-1/8	5.31

Actuator Ordering Tables

NH9 = Electrohydraulic Linear Actuator

Operating Mode

- 1 = Pull Type, Modulating, Failsafe
- 2 = Push Type, Modulating, Failsafe
- 3 = Pull Type, Modulating, Lock in Position on Power Failure
- 4 = Push Type, Modulating, Lock in Position on Power Failure
- 5 = Pull Type, Two-Position, Failsafe
- 6 = Push-Type, Two-Position (Spring Return)

Enclosure

- T = Watertight/Raintight
- U = Hazardous Location
- V = Watertight/Raintight with Manual Override
- W = Hazardous Location, with Manual Override

Power Unit

Gross Shaft Force	Input Signal
40 = 1,500 lbs	4-20 ma signal
41 = 1,500 lbs	10-50 ma signal
46 = 1,500 lbs	Intermittent Operation
60 = 3,000 lbs	4-20 ma signal
61 = 3,000 lbs	10-50 ma signal
66 = 3,000 lbs	Intermittent Operation
80 = 4,000 lbs	4-20 ma signal
81 = 4,000 lbs	10-50 ma signal
86 = 4,000 lbs	Intermittent Operation

Voltage

- 02 = 120V/60Hz single phase
- 04 = 240V/60Hz single phase
- 08 = 110V/50Hz single phase
- 09 = 220V/50Hz single phase
- 54 = 240V/50Hz single phase
- 69 = 240V/60Hz 3-phase
- 70 = 480V/60Hz 3-phase
- 71 = 380V/50Hz 3-phase
- 72 = 440V/50Hz 3-phase
- 73 = 460V/60Hz 3-phase

Options

- X0 = None
- E1 = 0-1,000 ohm Feedback Potentiometer
- E2 = 0-5,000 ohm Feedback Potentiometer
- F5 = Aux. Switchbox with 6 ea. DPDT Switches
- H2 = 1K Ohm F.B. Potentiometer + Aux. S.B. with 6 ea. DPDT Switches
- H6 = 1K Ohm F.B. Potentiometer + Aux. S.B. with 6 ea. SPDT Switches

Tagging

- R = FKM fluoroelastomer Construction without Tag
- P = FKM fluoroelastomer Construction with Tag

Yoke Length (Overall)

- A = 20" Yoke with 4 Bolt Mount on 5" BCD
- C = 17 1/2" Yoke with 4 Bolt Mount on 5" BCD
- L = 26 1/2" Yoke with 4 Bolt Mount on 5" BCD
- N = 22" Yoke with 4 Bolt Mount on 5" BCD
- X = No Yoke (consult factory)

Yoke Mount (Diameter)

- A = 2 1/4"
- D = 2 1/8"
- F = 2 3/8"
- G = 2 5/16"
- H = 2 5/8"
- J = 2 1/2"
- K = 2 13/16"
- L = 3"
- N = 3 1/4"
- P = 3 5/16"
- R = 3 9/16"
- V = 4"
- X = No Yoke

All yokes have four (4) bolt mount on 5" Bolt Circle

Protective Cover

- 3 = Stiffener Plate on Yoke (Standard)

External Return Spring

- 00 = No Spring (consult factory)
- 01 = #1 Spring (200 lb/in)
- 02 = #2 Spring (125 lb/in)
- 04 = #4 Spring (275 lb/in)
- 05 = #5 Spring (325 lb/in)
- 06 = #6 Spring (400 lb/in)

Stem Adapter

- BA = 1 5/16"
- BC = 1 9/16"
- BF = 2 1/16"
- BJ = 2 9/16"
- BM = 3 1/6"
- BQ = 3 9/16"
- BT = 4 1/16"
- BW = 4 9/16"
- XX = No Stem Adapter

Split Coupling*

- C74 = 5/16" 24 UNF
- E74 = 3/8" 24 UNF
- G70 = 7/16" 20 UNF
- J70 = 1/2" 20 UNF
- L12 = 9/16" 12 UNC
- L68 = 9/16" 18 UNF
- N11 = 5/8" 11 UNC
- N68 = 5/8" 18 UNF
- Q66 = 3/4" 16 UNF
- S66 = 7/8" 16 UNF
- T08 = 1" 8 UNC
- W62 = 1 1/2" 12 UNF
- X00 = No Coupling

Special Features

- X00 = No Special Features
- X04 = Hi-Rad Capacitor Option (Single on Modulating Actuator, Dual on 2 Position Actuator)
- X06 = Epoxy Paint
- X07 = 120 Volt Solenoid Dump Valve
- X11 = Hi-Rad Capacitor + Epoxy Paint (X04 + X06)
- X12 = Epoxy Paint + 120 VAC Dump Valve (X06 + X07)
- X16 = Dual Hi-Rad Capacitor on Modulating Units for Low Temp.

NH9

25-Digit Catalog Number

* Contact ASCO for additional variations.

www.ascovalve.com

**ASCO Nuclear Valve Stocking Distributor
& Hydramotor Service Facility**

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