Honeywell

MAXON

Maxon Oil Electro-mechanical Valves

TECHNICAL CATALOG

1/2" Series 8730 position "TO"

1" Series 4760 position “L”

- **Electrically actuated valves** shut off oil (or other liquid) lines reliably, in less than 1 second.
- **Application flexibility provided** with 3/8" through 1.25” diameter line sizes, Cv flow factors up to 45, and line pressures up to 550 PSIG.
- **Handles flowing fluid temperatures:**
  - Swinging gate bodies from -20°F (-28°C) to 550°F (+288°C)
  - Any ambient temperature from -20°F (-28°C) to +140°F (+60°C)
- **All Actuator enclosures meet IP65 and NEMA** 1, 3, 3S, 4, and 12, Option available for NEMA 4X.
- **Minimize line pressure drops** with straight-through flow swinging gate valve bodies
- **Positive visual indication of valve body position** is provided by large two-color open/shut indicator.
- **Installation piping convenience obtained** from field rotatable top assemblies.
- **Valve bodies meet ANSI standards**, Connection options for ANSI and ISO threads and flanges.
- **Micro-lapped seating** wears in, not out.
- **UL, CSA, and FM approvals** for General Purpose applications.
- **"NI" valves are FM approved for hazardous locations**: Class I, Division 2, Groups A,B,C and D; Class II, Division 2, Groups F and G; Class III, Division 2; Temp Code T4 (AC) or T3C (DC).
- **"Hazardous Location" Approvals** include FM, CSA, IECEx, CCC and KC.

FEATURES AND BENEFITS

Valves with electro-mechanical actuators

Normally closed shut-off valves are used in burner system fuel supply lines on industrial boilers, furnaces, ovens, kilns, and other heating processes. All valves are designed to shut-off fuel flow, in less than one (1) second, with any interruption in the electric power supplied through your safety circuit.

These valves are also used for the **motorized** opening or closing of pipe lines carrying gases and liquids commonly used in industrial processes. Normally closed valves cannot be opened until the interlocking safety control circuit is proven and resulting electrical power is supplied to the shut-off valve.

Motorized automatic valve actuators are used where remote access or unmanned applications are needed.

NOTE: Valve motors and solenoids are protected against thermal overload. If the normal valve duty cycle is repeatedly exceeded, the thermal cutout will trip, and the motor and/or solenoid must be allowed to cool before the thermal protection will automatically reset.

VALVE BODY DESIGN DETAILS

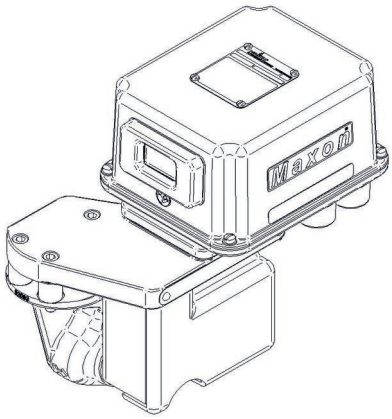
Seat **Disc**

Valve Body Assembly

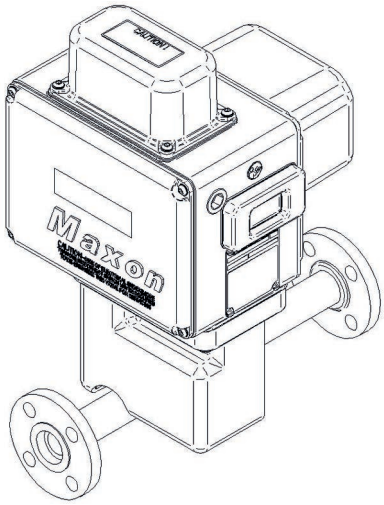
Swinging gate valves are frequently used in normally closed oil service, and for some non-combustible gas applications. The carefully machined and micro lapped sealing surfaces promote a positive shutoff, which meets the FCI 70.2 Class VI standard. Frequent cycling of the valve shears accumulated dirt or residue from the disc/ seat interface to provide consistent and reliable sealing. The hard faced and lapped seat nut is threaded into the onepiece valve body. The free-floating, hard faced lapped,, spring loaded circular disc slides across the seat. Line pressure also assists in sealing the disc to the downstream seat.

Frequent use and cycling actually helps to keep your valve clean. Since the free-floating disc is swinging across the circular seat nut on the arc created by the disc carrier, the disc rotates slightly on every cycle. This provides fresh, clean surfaces for sealing.

Maxon valves have special service trim options available to meet your particular fluid service requirements. Contact your Maxon representative for details.



1/2" 8760 Threaded



1" 4760 w/ Class 150 Flanges

AGENCY APPROVALS AND CERTIFICATIONS

Table 1. Approvals and Certifications.

	General Purpose Valves		Non-Incendive/Non-Sparking Valves	
	4730, 4760 8730, 8760		4730NI, 4760NI	
	Standards	**Markings**	**Standards**	**Markings**
FM Approvals	FM 7400	FM APPROVED FM 7400	FM 7400 FM 3600 FM 3611 FM 3810	Class I, Div 2, Groups ABCD Class II, Div 2, Groups FG Class III, Div 2 T4 (AC) = 60°C T3C Ta = 60°C FM APPROVED FM 7400 FM 3600 FM 3611 FM 3810
UL	UL 429	UL	Not Applicable	Not Applicable
CSA	CSA 6.5 CSA 22.2 No. 139	161061 C/I	CSA 22.2 No. 0 CSA 22.2 No. 0.4 CSA 22.2 No. 25 CSA 22.2 No. 94 CSA 22.2 No. 142 CSA 22.2 No. 213	Class I, Div 2, Groups ABCD Class II, Div 2, Groups FG Class III T4 (AC) = 60°C T3C (DC) = 60°C
IEC Approvals	Not Applicable	Not Applicable	IEC 60079-0 IEC 60079-15 IEC 60079-31	Ex nA nC IIC T4 (AC), T3 (DC), Gc Ex tc IIIC T135°C Dc -29°C < Ta < 60°C IP65 IECEx FMG 11.0032X
KTL Approvals	Not Applicable	Not Applicable	Announcement No. 2010-36 of Ministry of Employment and Labor	4700NI 16-KA4BO-0567X
Chinese Approvals	Not Applicable	Not Applicable	GB/T 3836.1, GB/T 3836.8, GB/T 3836.3, GB/T 3836.31	Ex ec nC IIC T4(AC), T3(DC) Gc, Ex tc IIIC T135°C Dc IP65

Valve cycle requirements

This is based on the standards that MAXON valves are approved to and the corresponding minimum number of cycles to be completed without failure as shown in the chart below.

Table 2. Minimum number of cycles.

	CSA (CSA 6.5)	FM (FM 7400)	UL (UL 429)
Automatic Models	100.000	20.000	100.000

VALVE MODEL NUMBER DESCRIPTION

Table 3. Valve Model Number Description

Configured Model			Valve Body			Actuator								
Valve Size	Valve Type		Body Connection	Body Trim		Solenoid Voltage	Clutch Voltage	Motor Voltage	Motor Timing	VOS Switch	VCS Switch	Enclosure Rating	Terminal Block	Instruction Language
0050	8700	-	A	1B	-	0	B	B	7	2	2	A	0	0

Valve Size

0038 -- 3/8” (DN 10)
0050 -- 1/2” (DN 15)
0075 -- 3/4" (DN20)
0100 -- 1" (DN25)
0125 -- 1-1/4" (DN32)

Valve Type

8700 -- Motor/Clutch Actuator
4700(NI) -- Motor/Solenoid Actuator
33479 -- High Temp Fluid 4700

Body Connection

A -- ANSI Threaded
C -- ISO Threaded
E -- Nippled
F -- Nippled w/150# Flanges
G -- Nippled w/300# Flanges
I -- Nippled w/600# Flanges

Body and Trim Material Options

1B -- Iron Body with 420 SS Seat & DI Disc
1D -- Iron Body with Hardfaced Seat & Disc
2D -- Steel Body with Hardfaced Seat & Disc
2H -- HC Steel Body with Hardfaced Seat & Disc
2P -- 2D with PEEK backed Disc for lower actuation friction

Solenoid Voltage

0 -- None
A -- 115V 50HZ
B -- 115V 60HZ
C -- 230V 50HZ
D -- 230V 60HZ
E -- 208V 50HZ
F -- 24VDC
G -- 120VDC

Clutch Voltage

0 -- None
B -- 115V 60Hz

Motor Voltage

A -- 115V 50Hz
B -- 115V 60Hz
G -- 230V 50Hz
H -- 230V 60Hz

Motor Timing

6 -- 6 Sec (7 Sec on 50Hz)

VOS Switch

1 -- VOS-1 Switch
2 -- VOS-2 Switch

VCS Switch

0 -- No Switch Ordered
1 -- VCS-1 Switch
2 -- VCS-2 Switch

Enclosure Rating

A -- NEMA 4
B -- NEMA 4X

Terminal Block

00 -- None
12 -- 12 Terminal Connections
14 -- 14 Terminal Connections

Instruction Language

0 -- English
6 -- Chinese

VALVE BODY CAPACITIES/SPECIFICATIONS

Table 4. Valve bodies.

Body Material	End Connections	Pipe Size (in inches)	C_v Factor
Gray Iron	Threaded	.375 & .5	3.4
		.75	9.6
			20
		1	12
			20
		1.25	17
			45
Cast Steel	Threaded & Flanged	.5	3.4
		.75	9.6
		1	12
		1.25	17
			45

Each complete valve assembly must include one of these valve bodies, regardless of ultimate series designation.

Flows through the valve body and resulting pressure drops may be estimated by inserting your specific conditions into the following formula and using C_v flow factors given for each valve body.

Gases: $$Q = (1360) \times (C_v) \times \left(\sqrt{\frac{(P_1+P_2)}{G\,T_f}}\right) \times \left(\sqrt{\frac{(P_1-P_2)}{2}}\right)$$

Liquids: $$V = (C_v) \times \left(\sqrt{\frac{(P_1-P_2)}{G_f}}\right)$$

Where:

ρ ρ G=Gas specific gravity (air = 1.0)

G_f = Specific gravity @ flowing temperature °F

P_1 = Inlet pressure PSIA (14.7 psi + psi gauge)

P_2 = Outlet pressure PSIA (14.7 psi + psi gauge)

Q = Cubic feet per hour @ 14.7 PSIA and 60°F

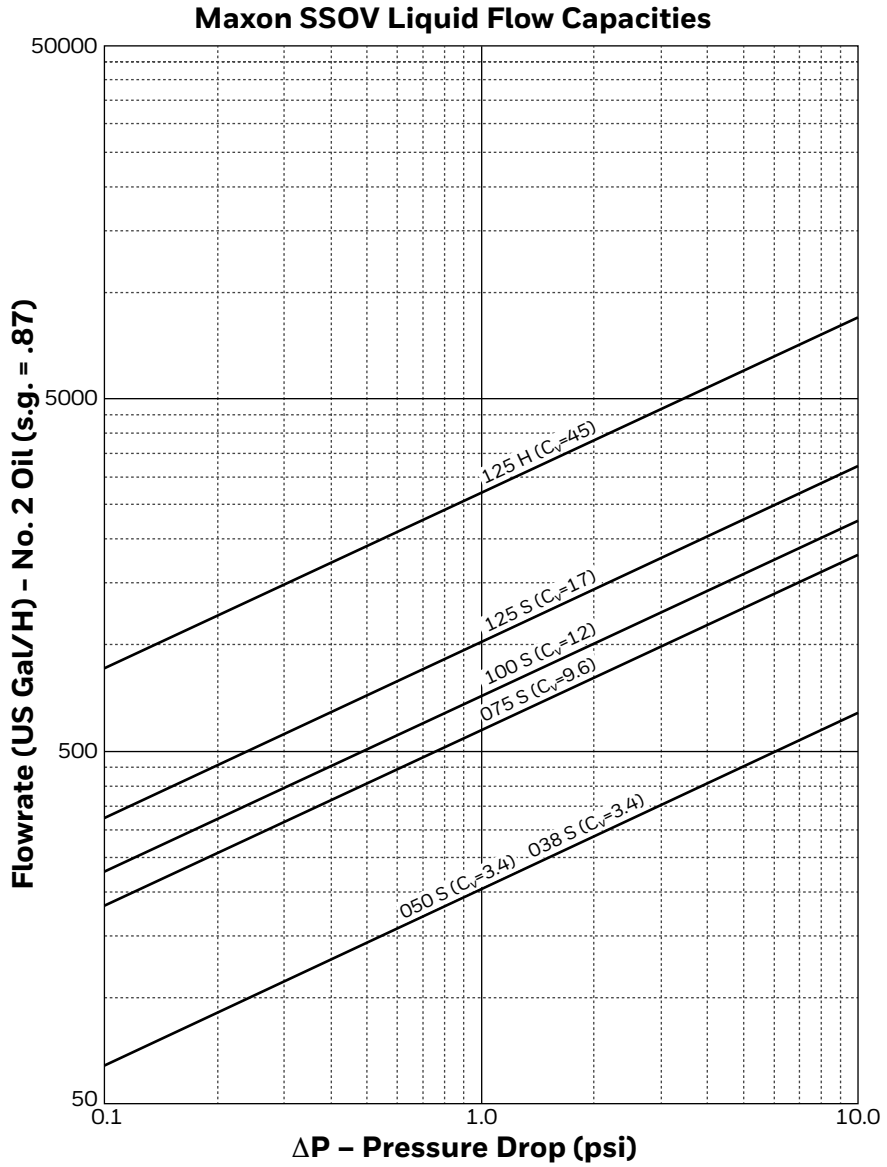
T_f = Flowing temperature absolute (460° + °F)

V = Flow in U.S. gallons/minute of water

VALVE BODY CAPACITIES WITH #2 OIL

To select a valve for your application, use either C_v factor calculations, or this graph showing approximate pressure drop at various flows of #2 oil.

Typically, pressure drop for fuel flows should not exceed 10% of inlet pressure.



For preheated #5 or #6 oil, multiply the required flow rate in GPH by the factor given in the table at right, then select a valve based upon that equivalent flow of #2 oil and the allowable drop.

Table 5. Factors for preheated #5 and #6 oil

Oil Grade	#5		#6				
°F @ Inlet	125	160	120	140	180	210	220
Factor	1.43	1.11	2.86	2.00	1.25	1.11	1.05

For example: To size for 5 PSIG drop with a 3500 GPH flow of #6 oil preheated to 140°F, the multiplier is 2. Equivalent flow of #2 oil is then 3500 x 2, or 7000 GPH. Chart shows that a 5 PSIG drop will require use of a valve body having a C_v factor of at least 45.

SELECTION DATA

Swinging gate valves

Table 6. Series Designation

Body Material	Gray Iron		Cast Steel	
Top Assembly Function	Sanctioned Service [1]	Special Service (Non-sanctioned) [2]	Sanctioned Service [1]	Special Service (Non-sanctioned) [2]
General Purpose	4730; 8730	4790; 8790	4730-S 4760; 8760	4790-S; 8790-S 33479
Hazardous Location	4730NI	n/a	4760NI	n/a

[1] Sanctioned valves are sold for fuel oils and may carry one or more sanctions (UL, FM, CSA). They are IRI approvable for liquified petroleum gases, #1 and #2 fuel oils, kerosene, JP-4 and preheated #4, #5 and #6 oils with maximum viscosity of 5000 SSU.

[2] Non-sanctioned valves do not carry blanket approval/listings, and the pressure limits shown apply only for selected special service applications. An analysis of your fluid will determine the actual rating, trim, and specifics for your application.

Features:

- **Normally closed**
- **Electrically actuated**
- **Swinging gate body**
- **For shut-off service**
- **For liquid and noncombustible gas service**

Temperature Limits

All of these valves can handle **fluid temperatures** from -20°F (-28°C) to +250°F (+121°C). The Series 33479 valves are designed to handle higher fluid temperatures up to +450°F (+232°C) and even up to +550°F (+288°C) with addition (at extra charge) of special stem seals.

Ambient temperature limits vary. Any valve on this page using DC voltage and all Series 8700 valves can handle ambient temperatures from -20°F (-28°C) to +125°F (+52°C). The other valves on this page handle ambient temperatures from -20°F (-28°C) to +140°F (+60°C).

Operation

All of these electro-mechanical valves require a constant supply of electrical energy to their holding solenoids inside the top assembly actuators. Once the solenoid is energized the valve will automatically open. Any interruption of the electrical power to the valves causes an immediate trip of the valve to its normally closed position.

Table 7. Available Sizes and Pressure Ratings

Pipe Size (inches)	Body C_V Flow Factor	Maximum Inlet Pressure (PSIG)				
		Gray Iron Bodies		Cast Steel Bodies		
		Fuel Oils	Special Service	Fuel Oils	Liquid Propane	Special Service
.375 [1]	3.4	300	300	---	---	---
.5 [1]				550	300	550
.75 [1]	9.6					
1	12	250	250	250	250	250
1.25	17					
1.25 HC	45	---	---	125	---	125

[1] Available in 8730, 8760 & 8790

SWINGING GATE BODY/TRIM SPECIFICATIONS

Trim Specification of Maxon Swinging Gate Shut-Off Valves is two-part. The first digit before the hyphen is a number (2) identifying body material as shown in Table 8 below. The second digit after the hyphen identifies a trim utilizing the materials indicated in Table 9 below.

Standard sanctioned valves incorporating a *cast iron body* will normally be identified by trim 1-B or 1-D. Sanctioned valves with *steel body* will normally be trim 2-D.

Non-sanctioned services or unusual applications may require upgrading of internal trim. Contact Maxon with specific fuel analysis for price and availability.

The drawings shown on the following page carry item numbers matching those in Table 9. This information is furnished for identification only, not for ordering parts.

⚠ WARNING

Do not attempt field repair of Maxon valve body or electro-mechanical top actuator. Any field alterations void all warranties.

Table 8. Body Specifications

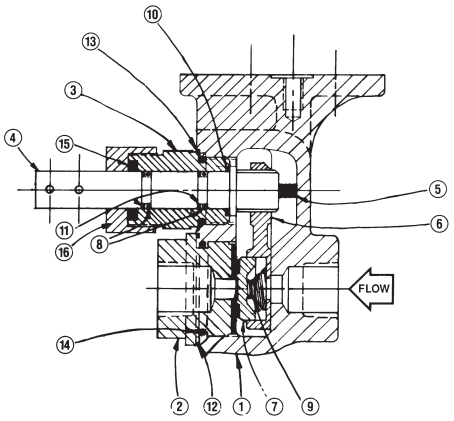
Body Description	Body 1-	Body 2-
Material	Cast Iron, G3000	Cast Steel
ASTM Spec	A126 Class B	A216-WCB

Table 9. Internal Trim Material Specifications.

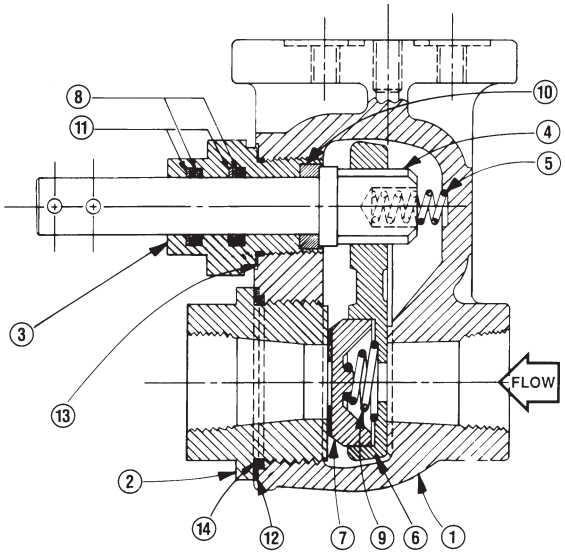
Item No.	Part Description	for .375" & .75" valves		For 1" & 1.25" valves		
		Trim: -D	Trim: -P	Trim: -B	Trim: -D	Trim: -P
2	Hex Nut or Renewable Seat	Hard-Faced Steel	Hard-Faced Steel	Cast Iron with #420 Stainless Steel Seat Ring	Hard-Faced Steel	Hard-Faced Steel
3	Stem Bushing	Zinc-Plated Steel	Zinc-Plated Steel	Zinc-Plated Steel	Zinc-Plated Steel	Zinc-Plated Steel
4	Stem	#416 Stainless Steel	#416 Stainless Steel	#416 Stainless Steel	#416 Stainless Steel	#416 Stainless Steel
5	Stem Spring	#302 Stainless Steel	#302 Stainless Steel	#302 Stainless Steel	#302 Stainless Steel	#302 Stainless Steel
6	Disc Carrier	Steel	Steel w/PEEK Insert	Steel	Steel	Steel w/PEEK Insert
7	Disc	Hard-Faced Steel	Hard-Faced Steel	Nodular Iron	Hard-Faced Steel	Hard-Faced Steel
8	Stem O-Rings	Viton	Viton	Viton	Viton	Viton
9	Disc Spring	#302 Stainless Steel	#302 Stainless Steel	#302 Stainless Steel	#302 Stainless Steel	#302 Stainless Steel
10	Inner Stem Thrust Ring	Teflon	Teflon	Teflon	Teflon	Teflon
11	Back-up O-Rings	Teflon	Teflon	Teflon	Teflon	Teflon
12	Body Gaskets	Soft Iron	Soft Iron	Soft Iron	Soft Iron	Soft Iron
13	Stem Bushing Gasket	Soft Iron	Soft Iron	Soft Iron	Soft Iron	Soft Iron
14	Body O-Ring	Viton	Viton	Viton	Viton	Viton
15	Stem Packing Ring	Grafoil	Grafoil	---	---	---
16	Packing Nut	Zinc-Plated Steel	Zinc-Plated Steel	---	---	---
17	Outlet Flange	---	---	---	---	---

SWINGING GATE BODY/TRIM SPECIFICATIONS

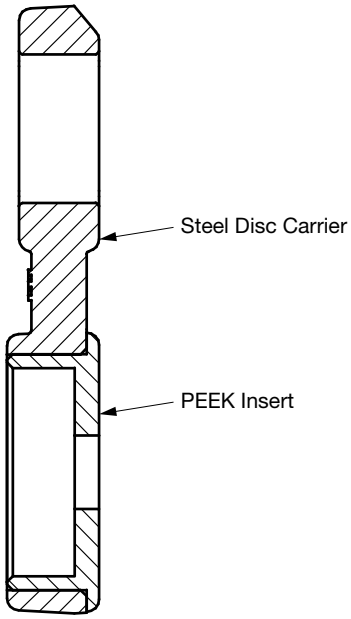
Typical construction of .375" through .75" screwed body valves



Typical construction of 1" through 1.25" screwed body valves



2-P trim disc carrier (Item No. 6)



COMPONENT IDENTIFICATION

General Maintenance and Spare Parts

All safety devices should be tested at least monthly* and more often if deemed advisable. Periodic testing for tightness motorized shut-off valve closure is equally essential.

***per NFPA 86-Appendix B-4 (1995)**

These Maxon valves are designed for long troublefree service. Only items shown as suggested spare parts are considered field replaceable.

WARNING

Do not attempt field repair of valve body, top assembly or motor drive unit. Any alterations void all warranties.

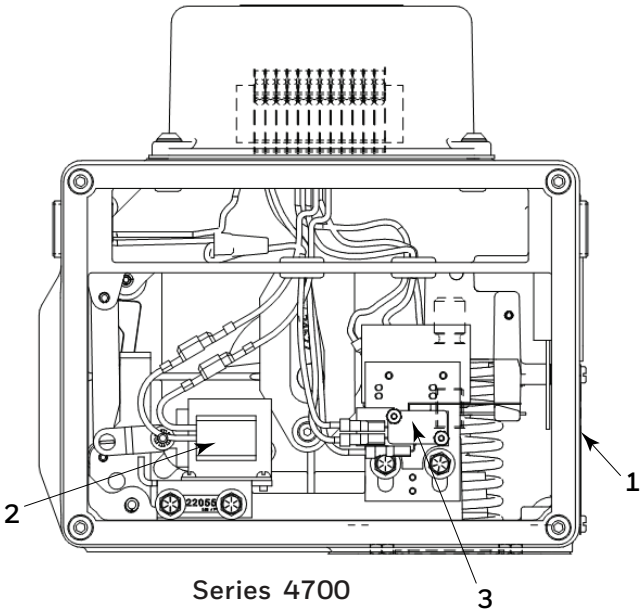
To determine suggested spare parts, identify series designation and serial number from the valve's nameplate. Refer to the illustration and legend below to identify suggested spare parts.

To order, specify:

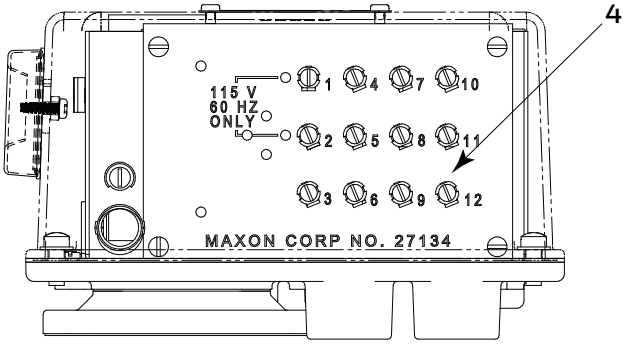
1. **Quantity**
2. **Assembly part number** (if available)
3. **Description**
4. **Electrical specification**
5. **Full nameplate information** (from existing valve)

Automatic Reset

Note: *Drawings are illustrative only. Actual valves may vary slightly.*



Series 4700



Series 8700

Legend:

① – Nameplate
② – Solenoid
③ – VOS motor limit/signal switch for normally closed valve; VCS for normally open valve
④ – Printed Circuit Board (PCB)

ELECTRICAL DATA

for normally closed valves

General

All Maxon shut-off valves are electrically actuated from a power source, normally through the flame safeguard and/or safety control circuits.

Standard valve assemblies include an internal holding solenoid or printed circuit board for 115 volt 60 hertz AC power. (Other electrical current options are available upon request.)

Series 4730(NI), and 4760(NI) valves have the internal solenoid. Series 8700 valves incorporate the printed circuit board.

The solenoid (or the printed circuit board) is energized whenever the valve is powered. The motor operator on automatic reset versions is powered only during the opening stroke.

Switch wiring diagrams (reproduced on the next page) are part of each valve assembly, summarizing electrical data and wiring for a valve equipped with terminal block and a full complement of optional signal switches.

Diagrams show valve in its normally closed (at rest) position. The indicated internal wiring is present only when the appropriate auxiliary switches are specified. Automatic reset valves always include a VOS-1 SPDT valve open motor limit switch.

Good practice *normally* dictates that auxiliary switches in valves used for safety shut-off functions should be used for signal duty **only**, not to operate additional safety devices.

Signal switch designations:

VCS (Valve Closed Switch) is actuated at the end of the closing stroke. VCS-1 is SPDT; VCS-2 is DPDT.

VOS (Valve Open Switch) is actuated at the end of the opening stroke. VOS-1 is SPDT; VOS-2 is DPDT.

Switch amp ratings are shown on the schematic wiring diagrams. DO NOT EXCEED rated amperage or total load shown.

Table 10. Volt Ampere (VA) Ratings: Automatic Reset

Valve		AC Operation (115 VAC, 60 Hz)		DC Operation (24 VDC)	
Size	**Series**	**Opening**	**Holding**	**Opening**	**Holding**
1" - 1.25"	4730(NI), 4760(NI), 4790 (-S)	220 [1]	22	222	24
1" - 1.25"	33479	220 [1]	22	222	24
.375" – .75"	8730, 8760, 8790 (-S)	143	5	---	---

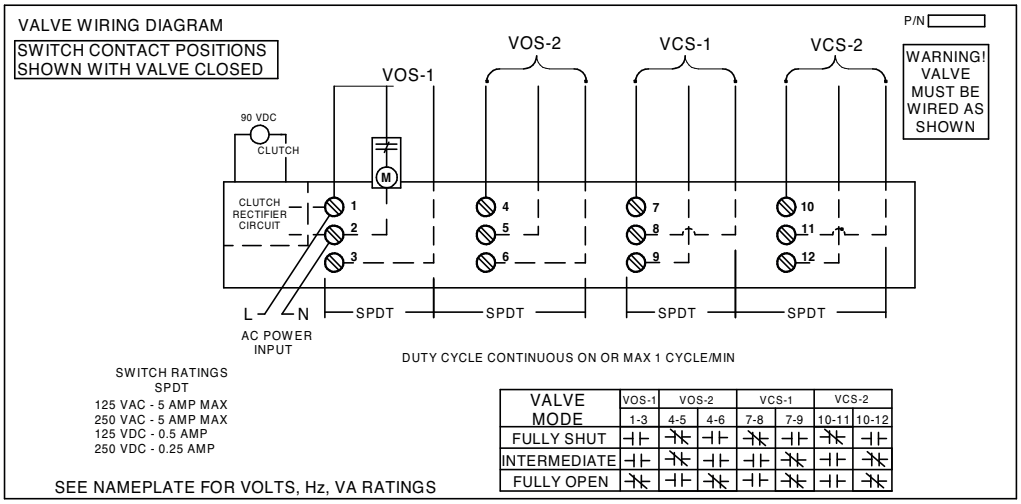
[1] 220 VA shown is for 60 hertz; if 50 hertz power, VA rating is 342

NOTE: The VA rating shown in the DC column is based on an AC motor, DC solenoid.

ELECTRICAL DATA

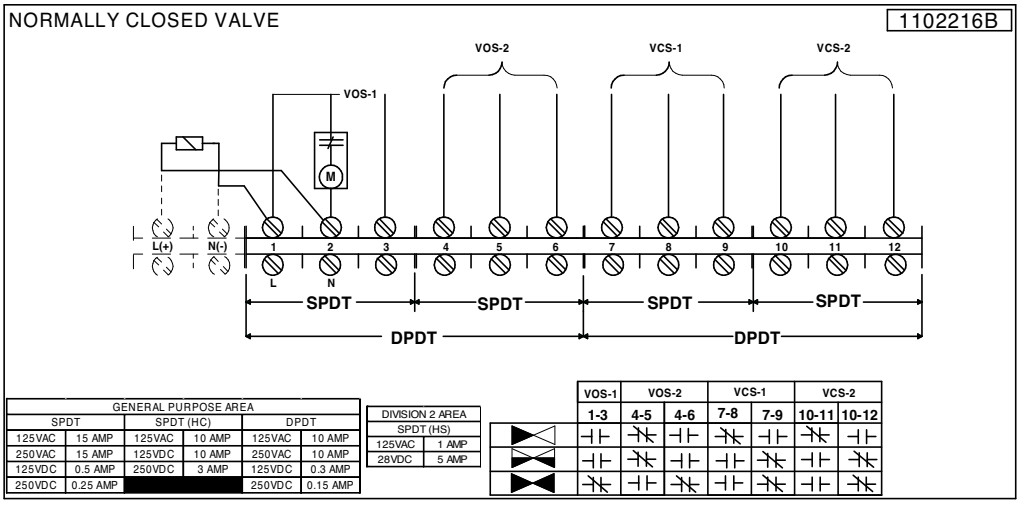
for normally closed valves

.375" through .75"
Series 8730, 8760, and 8790 (-S)



VALVE MODE	VOS-1	VOS-2		VCS-1		VCS-2	
	1-3	4-5	4-6	7-8	7-9	10-11	10-12
FULLY SHUT	⊣⊢	⊼	⊣⊢	⊼	⊣⊢	⊼	⊣⊢
INTERMEDIATE	⊣⊢	⊼	⊣⊢	⊣⊢	⊼	⊣⊢	⊼
FULLY OPEN	⊼	⊣⊢	⊼	⊣⊢	⊼	⊣⊢	⊼

1" through 1.25"
Series 4730(NI), 4760(NI), 4790, 33479



GENERAL PURPOSE AREA					
SPDT		SPDT (HC)		DPDT	
125VAC	15 AMP	125VAC	10 AMP	125VAC	10 AMP
250VAC	15 AMP	125VDC	10 AMP	250VAC	10 AMP
125VDC	0.5 AMP	250VDC	3 AMP	125VDC	0.3 AMP
250VDC	0.25 AMP			250VDC	0.15 AMP

DIVISION 2 AREA	
SPDT (HS)	
125VAC	1 AMP
28VDC	5 AMP

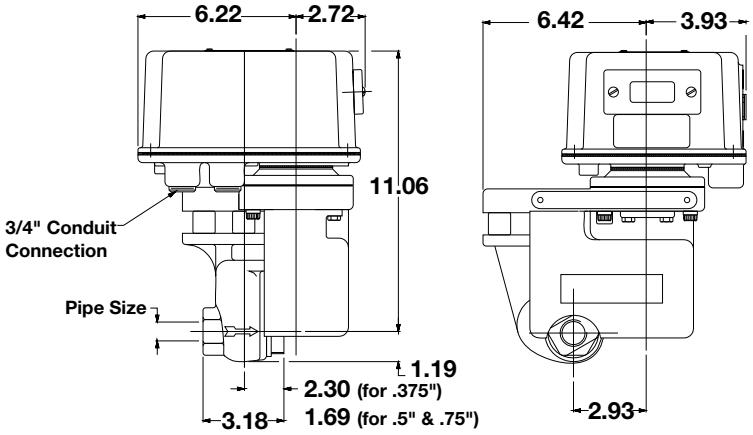
	VOS-1	VOS-2		VCS-1		VCS-2	
	1-3	4-5	4-6	7-8	7-9	10-11	10-12
	⊣⊢	⊼	⊣⊢	⊼	⊣⊢	⊼	⊣⊢
	⊣⊢	⊼	⊣⊢	⊣⊢	⊼	⊣⊢	⊼
	⊼	⊣⊢	⊼	⊣⊢	⊼	⊣⊢	⊼

DIMENSIONS (IN INCHES)

8700

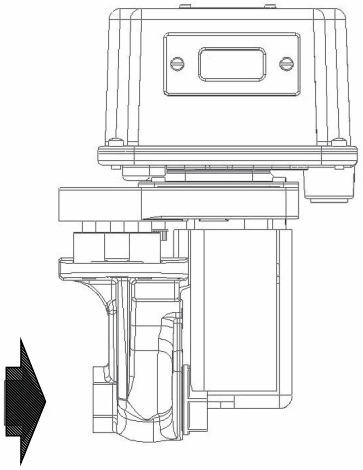
.375" through 1.25" valves with swinging gate bodies

Series 8730, 8760, 8790 & 8790-S (.375", .5" & .75")

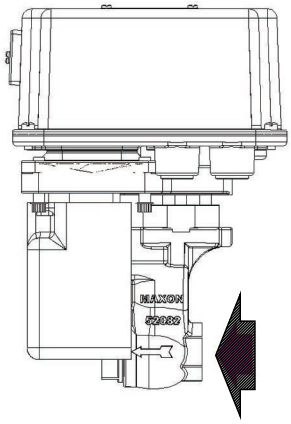


NOTE: *Series 8700 valves are* available in top assembly positions "R" and "TO" only.

Available Top Assembly Positions for Series 8700



"R"



"TO"

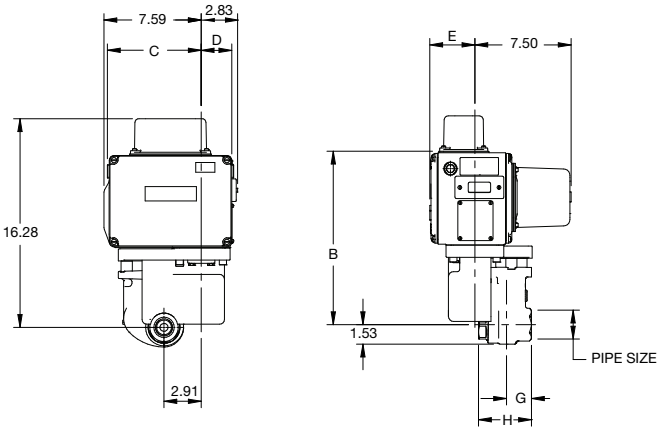
NOTE: 4" needed for cover removal.

DIMENSIONS (IN INCHES)

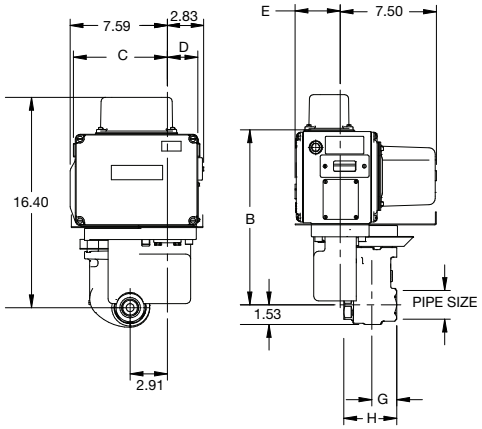
4700, 33479

1" & 1.25" valves with swinging gate bodies

1"& 1.25" Series 4700(NI)

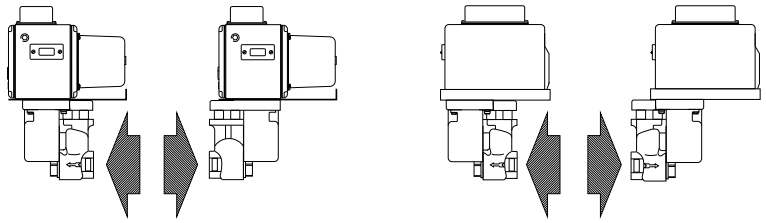


1" & 1.25" Series 33479



Available Top Assembly Positions

NOTE: *3" needed for terminal block cover removal.*



Valve Size	Valve Series	B	C	D	E	G	H
1”	4730(NI), 4760(NI), 4790, & 33479	13.53	7.59	2.38	3.5	1.94	4.12
1.25”							4.19

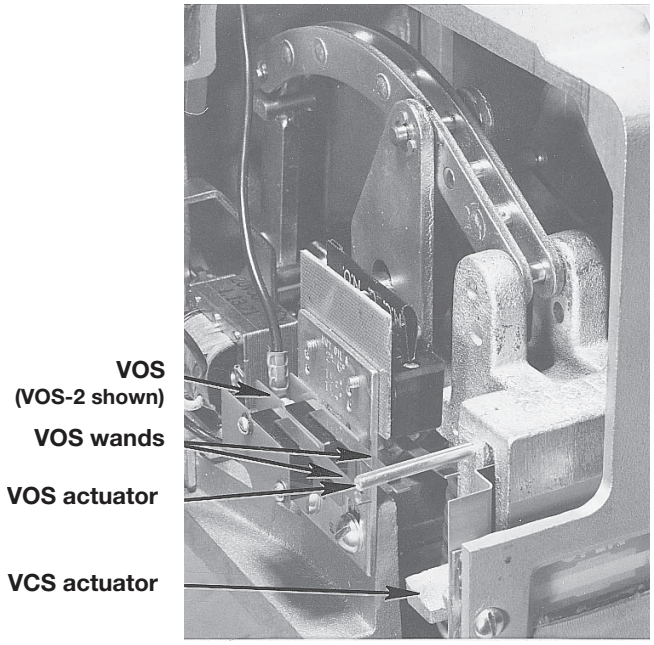
AUXILIARY SIGNAL SWITCHES 4700(NI) & 33479 SERIES

All Maxon valves may be equipped with internally-mounted signal switch(es) to provide a “proof-of-open” or “proof-of-closure” valve position indication.

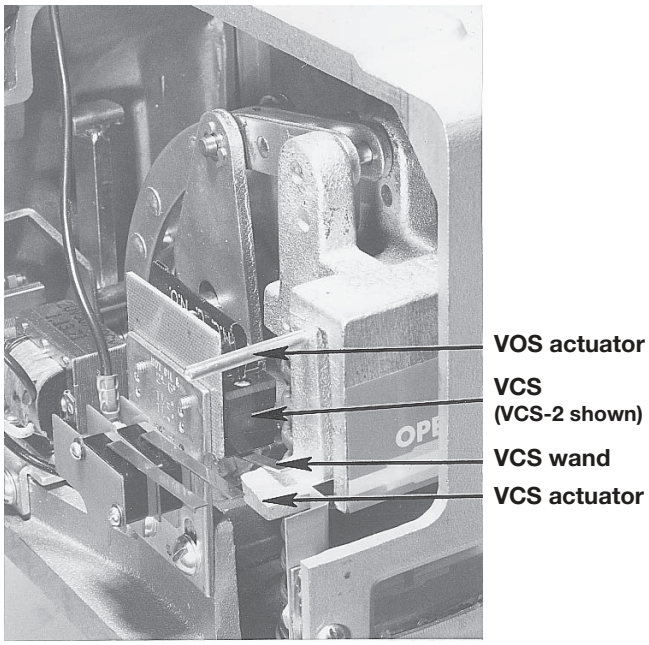
Auxiliary signal switches indicate when valve is open or closed and are normally connected electrically into your control panel lights or warning device circuit(s).

VCS (Valve Closed Switch) is actuated when valve is fully shut. It is the upper, inverted snap-switch mounted on rear of switch bracket. VCS-1 is an SPDT (single-pole, double-throw) switch. VCS-2 is a DPDT (double-pole, double-throw) switch. All contacts are available for external circuitry.

VOS (Valve Open Switch) is actuated when valve reaches full-open. It is the lower snap-switch mounted on front of switch bracket. VOS-1 is an SPDT switch. On automatic reset valves, its normally closed contact serves as a motor limit switch and is not available for external circuitry VOS-2 is DPDT, used in lieu of VOS-1 for additional contacts.



Valve Open



Valve Shut

AUXILIARY SIGNAL SWITCHES 8700 SERIES

All Maxon proof-of-open and proof-of-closure signal switches work in a similar manner; but due to different styles and types of top assembly housings, the switches appear in slightly different positions in the various types of valves. Illustrated at right are representative top housings for .375" – .75" Series 8700 (Fig. 1) valves. Switch locations are noted on sketch.

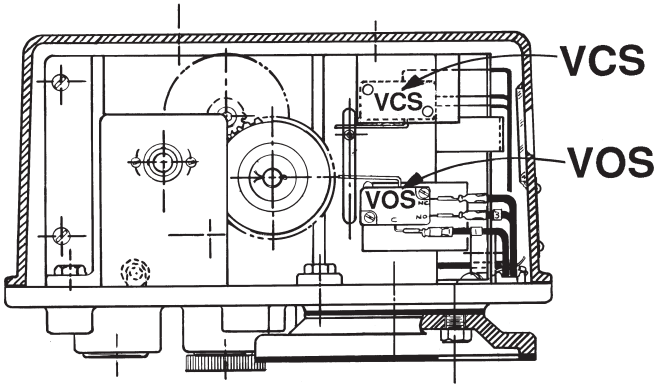
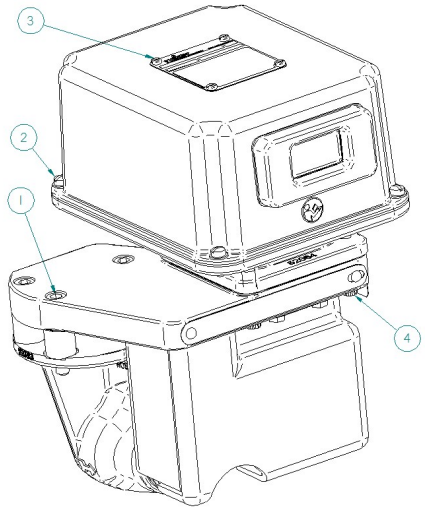


Fig. 1.



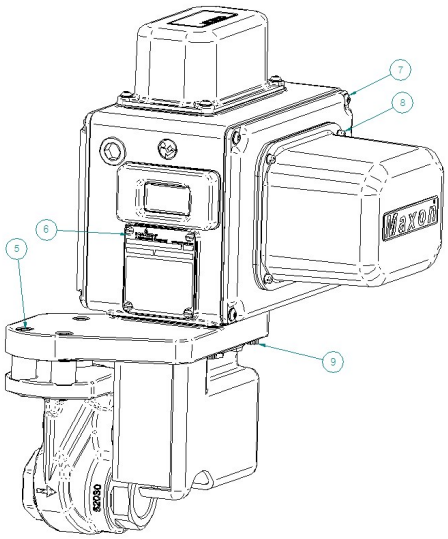


Table 11. Torque Specifications

Valve Type	Item Number	Description	Torque
8700	1	Adaptor Base Mounting Screws - 3/8"-16 x 2" UNC	239 in-lbs
	2	Cover Mounting Screws - 1/4"-20 x .625" UNC	71 in-lbs
	3	Nameplate Mounting Screws - #8-32 x .25"	10 in-lbs
	4	Actuator Adaptor Screws - 3/8"-16 x 1.5"	239 in-lbs
4700/33479	5	Adaptor Base Mounting Screws - 3/8"-16 x 2" UNC	239 in-lbs
	6	Nameplate Mounting Screws - #8-32 x .25"	10 in-lbs
	7	Cover Mounting Screws - 1/4"-20 x .625" UNC	71 in-lbs
	8	Motor Cover Mounting Screws - #10-24 x .5"	42 in-lbs
	9	Actuator Adaptor Screws - 3/8"-16 x 1.5"	239 in-lbs

MANUFACTURER AND IMPORTER ADDRESSES

Below are the addresses and contact information for the Honeywell – Maxon manufacturing location and European sales office. The European sales office serves as the importer and EU manufacturer's representative under the EU New Legislative Framework (NLF).

MUNCIE, INDIANA, USA – MANUFACTURER

201 East 18th Street
Muncie, IN 47307-0068

Tel: 765.284.3304

Fax: 765.286.8394

EUROPEAN SALES OFFICE – IMPORTER

BELGIUM
Maxon International BVBA
Luchthavenlaan 16-18
1800 Vilvoorde, Belgium

Tel: 32.2.255.09.09

Fax: 32.2.251.82.41

⚠ WARNING

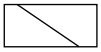
The installation, operation and maintenance instructions contain important information that must be read and followed by anyone operating or servicing this product. Do not operate or service this equipment unless the instructions have been read. IMPROPER INSTALLATION OR USE OF THIS PRODUCT COULD RESULT IN BODILY INJURY OR DEATH.

Description

MAXON electro-mechanical valves are electrically actuated fuel shut-off valves. The valves are designed for a fast acting return to Normally-closed and normally-open options are available. The normally-closed versions will shut off flow when de-energized and pass flow when energized. The normally-open versions will shut off flow when energized and pass flow when de-energized. Electro-mechanical valves are also offered in configurations that meet hazardous locations.

Nameplate and abbreviations

Consult the nameplate of your valve. This lists the maximum operating pressure, temperature limitations, voltage requirements and service conditions of your specific valve. Do not exceed nameplate ratings.

Abbreviation or symbol	Description
M.O.P.	Maximum operating pressure
OPENING	Valve opening time (for automatic valves only). Units shown in seconds.
	Solenoid/clutch voltage and frequency
	Motor voltage and frequency
T_{AMB}	Ambient temperature range
T_F	Fluid temperature range
SHUT	Visual indication that valve is shut
OPEN	Visual indication that valve is open
SPDT (HS)	Single pole double throw hermetically-sealed switch(es)
SPDT	Single pole double throw switch(es)
SPDT (HC)	Single pole double throw high capacity switch(es) (used when DC motors are ordered)
DPDT	Double pole double throw switch(es)
GENERAL PURPOSE AREA	Designates components used in general purpose areas
DIVISION 2 AREA	Designates components used in Division 2 hazardous locations areas
	Valve is shut
	Valve is partially open
	Valve is full open
VOS-1/2	Valve open switch(es)
VCS-1/2	Valve closed switch(es); proof of closure

Installation

1. A filter or strainer of 40 mesh (0.6 mm maximum) or greater is recommended in the fuel piping to protect the downstream safety shut-off valves.
2. Properly support and pipe the valve in the direction of the flow arrow on the valve body. Valve seats are directional. Sealing will be maintained at full rated pressures in one direction only. Sealing will be provided in reverse flow only at reduced pressures.
3. Mount valve so that open/shut window indicator will be visible to your operating personnel. The open/shut window indicator should never face downward. The valve side plates should be located in a vertical plane for best performance. Valves are usually installed in horizontal piping; however, other orientations are acceptable, subject to the above limitations. The top assemblies of all MAXON valves are field rotatable to allow installations involving conflicts with these mounting restrictions.
4. Wire the valve in accordance with all applicable local and national codes and standards. In U.S. and Canada, wiring must conform to the NEC ANSI/NFPA 70 and/or CSA C22.1, Part 1.
   - Supply voltages must agree with valve's nameplate voltage within -15%/+10% for proper operation. For electrical wiring schematic, see instructions or sample affixed inside valve terminal block cover.
   - Grounding is achieved with a grounding screw, which is located in the top assembly.
   - Customer connections are provided via terminal blocks located in the top assembly.
   - Main power wiring (120 VAC or 240 VAC) must be segregated from lower voltage 24 VDC signal wiring, when both are required.
   - To eliminate any potential for gas to enter the electrical wiring system, install a conduit seal fitting at the actuator conduit hub.
5. Maintain integrity of the electro-mechanical actuator enclosures by using the appropriate electrical connectors for the (2) 3/4" NPT conduit threaded connections.
6. All access cover plate screws should be tightened using a torque wrench in an alternate cross-corner tightening pattern to the values shown in "Torque Specifications" on page 16.
7. Verify proper installation and operation by electrically actuating the valve for 10-15 cycles prior to the first introduction of gas.
8. **WARNING - Explosion hazard**
   - **Do not connect or disconnect this equipment unless power has been removed or the area is known to be non-hazardous.**
   - **Substitution of components may impair suitability for Class I, Division 2 (applies to 4700NI valves only).**
9. This equipment is suitable for installation in Class I, Division 2 Groups B, C, D, and Class II Groups F and G, and Class III hazardous locations or non-hazardous locations (applies to 4700NI valves only).

Auxiliary features

- **Non-adjustable proof of closure switch(es) with valve seal over travel interlock**
- **Auxiliary switch for indication of full travel (open for normally-closed valves, closed for normally-open valves)**

Operating environment

- **Actuators rated for NEMA 4 or optional NEMA 4X**
- **Ambient and fluid temperature range of -20°F to +140°F for 1" & 1-1/4" valves**
- **Ambient and fluid temperature range of -20°F to +125°F for 3/8", 1/2" & 3/4" valves**
- **All valves for oxygen service or using Ethylene Propylene body seals are limited to a minimum ambient and fluid temperature of 0°F**

ACTUATOR ASSEMBLY ROTATION

WARNING

MAXON electro-mechanical valves should be ordered in a configuration compatible with planned piping. If valve orientation is not correct, the actuator assembly can be rotated in 90° increments around the valve body centerline axis using the procedure below.

1. Shut off all electrical power and close off upstream manual cock.
2. Remove terminal block cover plate and disconnect power lead wires. (Tag carefully for later re-assembly.)
3. Remove conduit and electrical leads.
4. Note physical position of any signal switch actuator wands on auxiliary signal switches.
5. Unscrew the two actuator bolts screwed up from the bottom to 1/4 inch. DO NOT completely remove. These bolts secure the valve body to the valve's top assembly housing.
6. Gently lift the top assembly (not more than 1/4" in height); just enough to break the seal between the valve body assembly and the rubber gasket adhering to the bottom of the top housing.

WARNING

Lifting too far may dislodge some small parts inside the top housing, requiring complex re-assembly and retesting by trained factory personnel.

7. Remove the two actuator bolts screwed up from the bottom (were partially unscrewed in step 5).
8. Carefully rotate top assembly to the desired position in a plane parallel to the top of the valve body casting. Rotate the top housing about 30° beyond this position, and then rotate it back. Reposition the top housing back down onto the valve body casting. This should align the open/shut indicator with its window and provide proper alignment of the internal mechanism.
9. Realign holes in valve body casting with the corresponding tapped holes in the bottom of the top assembly housing. Be sure the gasket is still in place between the body and top housing.
10. Reinsert the actuator bolts up from the bottom through the body and carefully engage threads of the top assembly. Tighten securely.
11. Reconnect conduit and electrical leads, then check that signal switch wands are properly positioned and that the open/shut indicator moves freely. Failure to correct any such misalignment can result in extensive damage to the internal mechanism of your valve.
12. Energize valve and cycle several times from closed to full open position. Also electrically trip the valve in a partially opened position to prove valve operates properly.
13. Replace and secure terminal block cover plate and place valve in service.

FIELD INSTALLATION OF VALVE POSITION SWITCH

General

- **Shut off fuel supply upstream of valve, then de-energize valve electrically.**
- **Remove terminal block and access cover to provide access, being careful not to damage gaskets.**
- **Compare with illustrations below to identify your valve type.**

Replacement switches

- **Note wand position and mounting hole location carefully, then remove 2 screws and lift existing switch.**
- **Install replacement switch in same mounting holes on bracket and verify correct wand position.**
- **Replace existing wiring one connection at a time, following original route and placement.**

Add switches

- **Check illustrations below. If your valve uses a switch mounting bracket as in Fig. 1 & 2, mount switches to bracket using the mounting holes appropriate for valve type and size. For high capacity valves, mount switches on the support stand.**
- **Position bracket so VCS wand just touches top of actuator, then move downward slightly, depressing wand until switch clicks, then tighten mounting screws to hold this position.**
- **Pin bracket by drilling 1/8" diameter holes 1/4" deep into bracket mounting pad through drive pin holes, then tap drive pin in until flush (not required for high capacity valves).**
- **Route wires to wiring compartment as shown, then complete wiring connections and clean out metal drilling chips from previous procedure.**
- **Cycle valve, checking switch actuation points carefully. (VCS actuates at top of stem stroke, VOS at bottom.) Simultaneously the valve body must be tested for switch continuity and seat leakage. Bend VOS switch wands slightly if necessary to insure valve is opening fully.**
- **Replace covers, then return valve to service.**

MAINTENANCE INSTRUCTIONS

MAXON electro-mechanical valves are endurance tested far in excess of the most stringent requirements of the various approval agencies. They are designed for long life even if frequently cycled, and to be as maintenance-free and trouble-free as possible. A valve operational test should be performed on an annual basis. If abnormal opening or closing is observed, the valve should be removed from service and your MAXON representative should be contacted. (See MAXON Technical Document 10-35.1.)

Valve leak test should be performed on an annual basis to assure continued safe and reliable operation. Every MAXON valve is operationally tested and meets the requirements of FCI 70-2 Class VI Seat Leakage when in good operable condition. Zero leakage may not be obtained in the field after it has been in service. For specific recommendations on leak test procedures, see MAXON Technical Document 10-35.2. Any valve that exceeds the allowable leakage, as set forth by your local codes or insurance requirements should be removed from service and your MAXON representative should be contacted.

Actuator assembly components require no field lubrication and should never be oiled.

Auxiliary switches, solenoids, motors, clutches or circuit boards may be replaced in the field.

⚠ WARNING

Do not attempt field repair of valve body or actuator. Any alterations void all warranties and can create potentially hazardous situations.

If foreign material or corrosive substances are present in the fuel line, it will be necessary to inspect the valve to make certain it is operating properly. If abnormal opening or closing is observed, the valve should be removed from service. Contact your MAXON representative for instructions.

Operator should be aware of and observe characteristic opening/closing action of the valve. Should operation ever become sluggish, remove valve from service and contact MAXON for recommendations.

Address inquiries to MAXON. Local worldwide offices may be located at www.maxoncorp.com. Include valve serial number and nameplate information.

For More Information

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschröder and Maxon. To learn more about our products, visit ThermalSolutions.honeywell.com or contact your Honeywell Sales Engineer.

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