Maxon Oil Electro-mechanical Valves

INSTRUCTION MANUAL

1/2" Series 8730 position "TO"

1" Series 4760 position “L”

Please read the operating and mounting instructions before using the equipment. Install the equipment in compliance with the prevailing regulations.

Bedrijfs- en montagehandleiding voor gebruik goed lezen! Apparaat moet volgens de geldende voorschriften worden geïnstalleerd.

Lire les instructions de montage et de service avant utilisation! L’appareil doit imperativement être installé selon les règlementations en vigueur.

Betriebs- und Montageanleitung vor Gebrauch lesen! Gerät muß nach den geltenden Vorschriften installiert werden.

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).

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Fax: 765.286.8394

EUROPEAN SALES OFFICE – IMPORTER
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Luchthavenlaan 16-18
1800 Vilvoorde, Belgium

Tel: 32.2.255.09.09

Fax: 32.2.251.82.41

32M-95002-04

⚠ WARNING

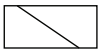
The installation, operation and maintenance instructions contain important information that must be read and followed by anyone operating or servicing this product. Do not operate or service this equipment unless the instructions have been read. IMPROPER INSTALLATION OR USE OF THIS PRODUCT COULD RESULT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

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.

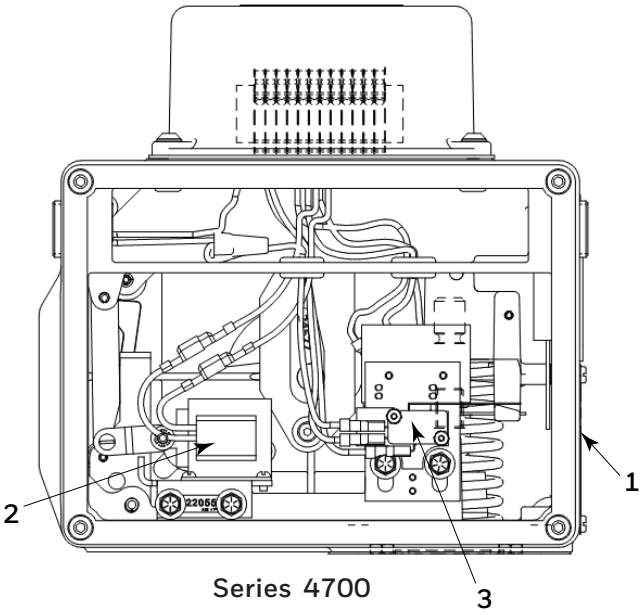
To determine suggested spare parts, identify series designation and serial number from the valve's nameplate. Refer to the illustration and legend below to identify suggested spare parts.

To order, specify:

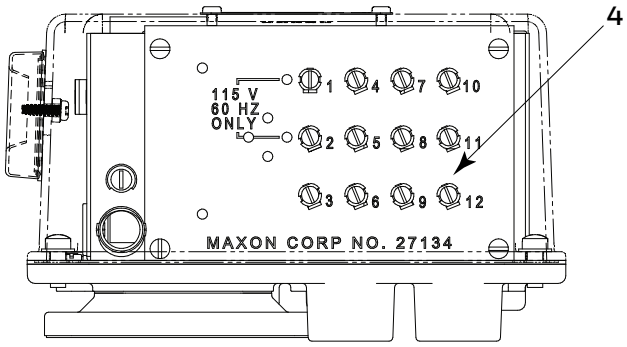
1. **Quantity**
2. **Assembly part number** (if available)
3. **Description**
4. **Electrical specification**
5. **Full nameplate information** (from existing valve)

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)

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.

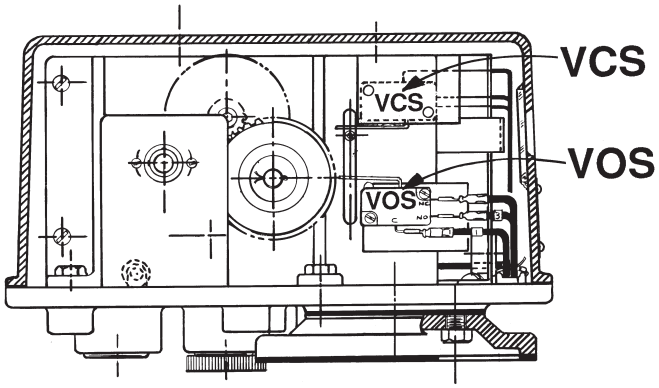
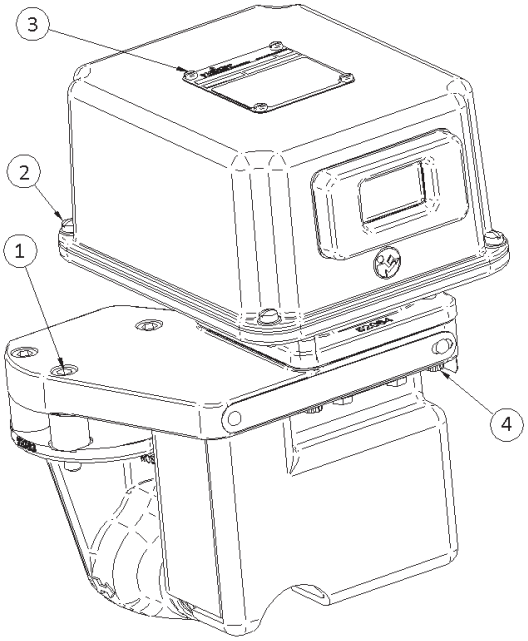


Fig. 1.



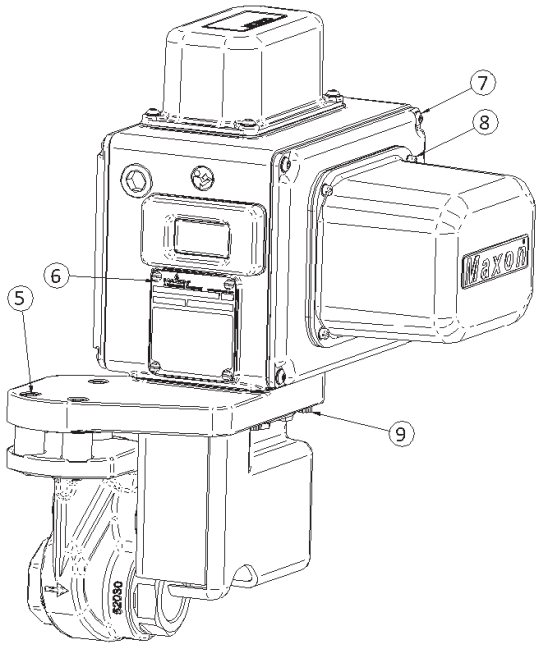


Table 11. Torque Specifications

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

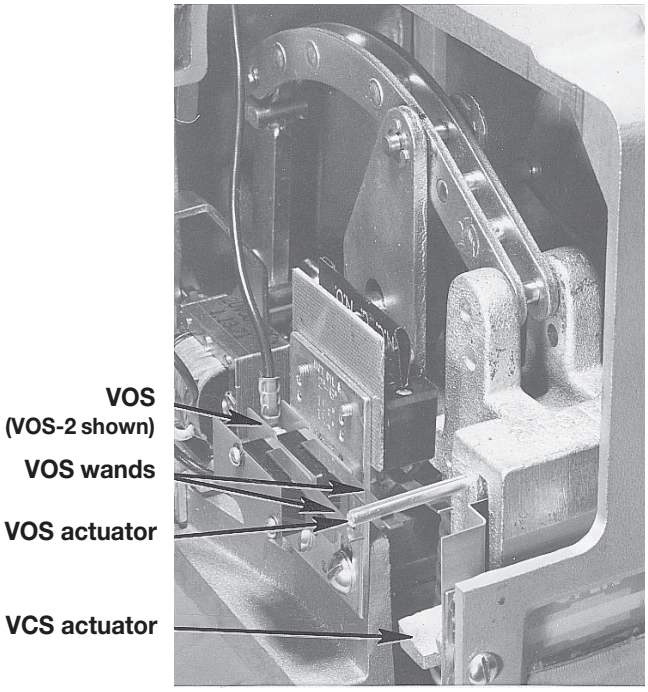
AUXILIARY SIGNAL SWITCHES 4700(NI) & 33479 SERIES

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.

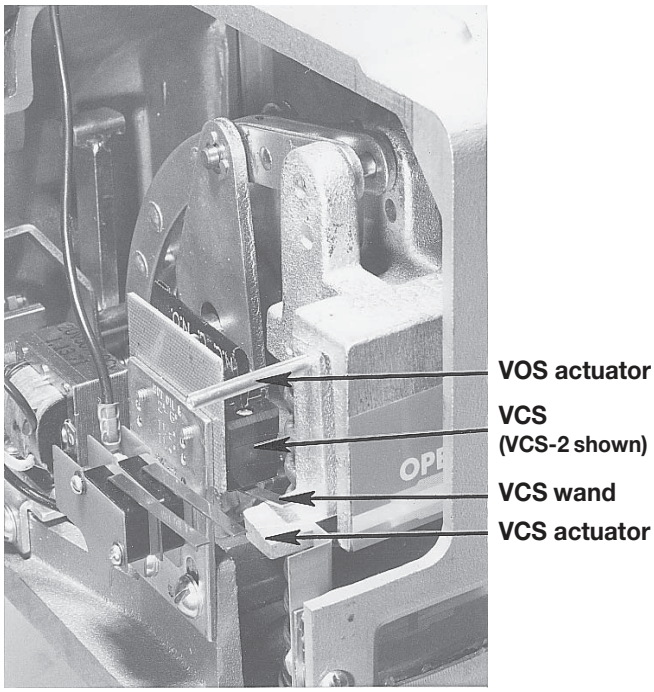
Auxiliary signal switches indicate when valve is open or closed and are normally connected electrically into your control panel lights or warning device circuit(s).

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

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 4.
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**

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

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 Technical Document Maintenance of MAXON Shut-Off Valves 10-35.1. at www.docuthek.com)

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 Technical Document Functional Testing of MAXON Shut-off Valves 10-35.2 at www.docuthek.com. 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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