

# Gas Electro-mechanical Valves



- Electrically actuated valves with powerful closing spring provide closure in less than 1 second for reliable, long-life operation
- Factory Mutual, CSA, UL and CE approved; Canadian registration obtained on all valve bodies
- Hazardous Locations valves approved for Non-incendive Class I, Division 2 areas
- Full assessment to IEC 61508 as SIL 3 capable
- Visual position indication provided
- Cast iron, carbon steel, low temperature carbon steel and stainless steel body assemblies with internal trim options to handle general purpose or corrosive gases; oxygen compatibility available
- Ambient and gas temperature ranges of -29°C to 60°C
- Application flexibility provided with 3/4" (DN20) through 6" (DN150) line sizes & line pressures up to 8.62 bar
- Unique bonnet design eliminates packing adjustments, reducing maintenance and minimizing drag on closing
- MAXON electro-mechanical gas valves meet Fluid Control Institute (FCI) 70-2 control valve standard for Class VI seat leakage
- Field rotatable top assemblies in 90° increments to fit specific application requirements
- Actuator assemblies available with manual reset or automatic reset operators
- Normally-closed and normally-open versions available
- Overtravel position switches for open and closed position

## Operating concepts

### Automatic reset valves

#### Current model designation (former model designation)

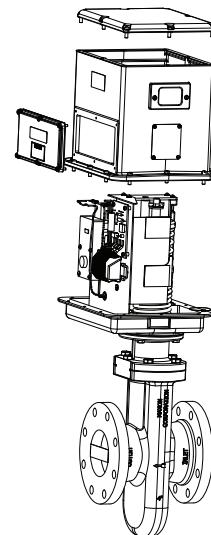
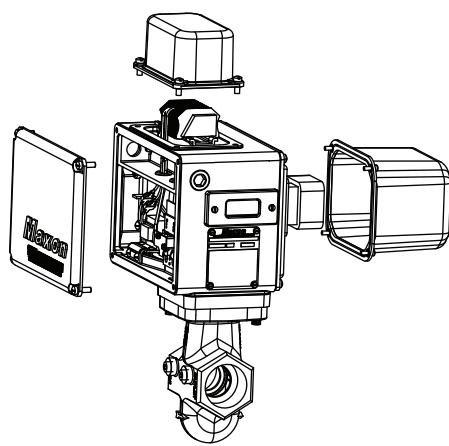
Standard & CP construction

SMA11 (5000), CMA11 (5000 CP)

SMA21 (STO-A), CMA21 (STO-A-CP)

High capacity construction

HMA11 (7000)

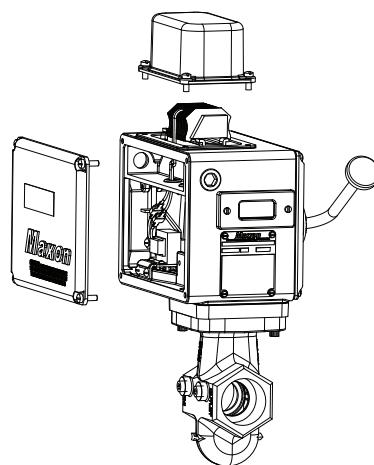


### Manual reset valves

#### Current model designation (former model designation)

Standard & CP construction only

SMM11 (808), CMM11 (808 CP), SMM21 (STO-M)



- All valves are designed to return to normal position instantly with any interruption in the electric power supplied through your safety circuit.
- (Motorized) automatic reset actuators are used where remote access or unmanned applications are needed.
- Manual reset actuators require operating personnel to be physically present to actuate the valve from its at rest position.

## Switch assemblies

- Provides positive valve position - open or closed
- Complies with "proof of closure" requirements
- Easily integrates with an analog control system, DCS or PLC
- Hermetically sealed (HS) switches included for Non-incendive valves

## Body and trim selections

Cast iron, carbon steel, low temperature carbon steel and stainless steel body assemblies feature metal-to-metal seating that meets FCI 70-2 control valve standard for Class VI seat leakage. Internal trim options are available for general purpose and corrosive gases. Oxygen compatible trims are also available. Valve body assemblies are offered in normally-closed shut-off and normally-open vent versions.

Valve bodies are available in threaded, flanged, and socket-welded connections. Bodies are currently available in 3/4" (DN20) through 6" (DN150) sizes. Body design utilizes a straight-through flow path, which minimizes the pressure drop through the body.



Normally-closed shut-off valves utilize power to open. Removal of electrical signal allows instantaneous release of the holding mechanism, allowing the powerful closing spring to close the valve in less than one second.

**Series SMA11, SMM11, SMA12, SMM12, CMA11, CMM11, CMA12, CMM12, HMA11**  
(formerly Series 5000, 808, 5000 NI, 808 NI, 5000 CP, 808 CP, 5000-NI-CP, 808-NI-CP, 7000)



Normally-open vent valves utilize power to close. Removal of electrical signal allows instantaneous release of the holding mechanism, allowing the valve to open in less than one second.

**Series SMA21, SMM21, SMA22, SMM22, CMA21, CMA22, CMM22**  
(formerly Series STO-A, STO-M, STO-A-NI, STO-M-NI, STO-A-CP, STO-A-NI-CP, STO-M-NI-CP)



## Agency approvals and certifications

	General Purpose Valves SMA11, SMM11, CMA11, CMM11, SMA21, SMM21, CMA21, HMA11		Non-incendive/Non-sparking Valves SMA12, SMM12, SMA22, CMA22, CMA12, CMM12, SMM22, CMM22	
	Standards	Markings	Standards	Markings
FM approvals	FM 7400		FM 7400 FM 3611 FM 3600 FM 3810	Class I, Div. 2, Groups ABCD Class II, Div. 2, Groups FG Class III, Div. 2 Temp Code T4 (AC) T3 (DC, sizes 3/4" - 1-1/2") T3C (DC, sizes 2"-6")
FM approvals - IEC Ex Certification	Not applicable		IEC 60079-0 IEC 60079-15	Ex nA nC IIC T4A (AC), T3 (DC), Ta=60°C Gc Ex tc IIIC T135°C Dc IP65 FMG 11.0032X
UL approvals	UL 429	 (Normally open valves)	Not applicable	Not applicable
		 (Normally closed valves)		
CSA International	CSA 6.5		CSA 6.5 CSA 22.2 No. 213	Class I, Div. 2, Groups ABCD Class II, Div. 2, Groups FG Class III, Div. 2 Temp Code T4 (AC) T3 (DC, sizes 3/4" - 1-1/2") T3C (DC, sizes 2"-6")
European approvals [1]	EN 161 EN 13774	CL/KL: A, GR 2 EC PIN: C87BQ83	Not applicable	Not applicable
IEC approvals	IEC 61508	None	IEC 61508	None
KTL approvals	None	None	Not applicable	12-KB4BO-0057
				 12-KB4BO-0057

[1] Product certified to meet the following (SMA11, CMA11, SMM11, CMM11, SMA21, CMA21, SMM21 only):

Gas Appliance Directive (90/396/EEC)

Low Voltage Directive (73/23/EEC)

EMC Directive (2004/108/EC)

## 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.

	UL (UL 429)	CSA (CSA 6.5)	FM (FM 7400)	European (EN161)
Automatic Series MA11, MA12	100,000	100,000	20,000	<= 1" 200,000 <= 3" 100,000 <= 6" 50,000
Manual Series MM11, MM12	6,000	20,000	20,000	No special requirements
Vent valves Series MA21, MA22, MM21, MM22	6,000	No special requirements	No special requirements	No special requirements

## Valve model number description

Every MAXON gas electro-mechanical valve can be accurately identified by the model number shown on the valve nameplate. The example below shows a typical gas electro-mechanical valve model number, along with the available choices for each item represented in the model number.

Configured item number					Valve body				Actuator							
Valve size	Flow capacity	Valve type	Normal position	Area classification	Body connection	Body seals & bumper material	Body material	Internal trim package	Solenoid OR circuit board voltage	Motor voltage OR handle side plate	Motor timing (automatic valves only)	Switch options	Enclosure rating	Instruction language		
300	C	MA	1	1	-	A	A	1	1	-	B	B	2	0	A	0

### Valve size

- 075 - 3/4" (DN20)
- 100 - 1" (DN25)
- 125 - 1-1/4" (DN32)
- 150 - 1-1/2" (DN40)
- 200 - 2" (DN50)
- 250 - 2-1/2" (DN65)
- 300 - 3" (DN80)
- 400 - 4" (DN100)
- 600 - 6" (DN150)

### Flow capacity

- S - Standard
- C - CP body construction
- H - High capacity

### Valve reset type

- MA - MAXON automatic (motorized) valve
- MM - MAXON manual valve

### Normal position

- 1 - Normally closed shut-off valve
- 2 - Normally open vent valve

### Area classification

- 1 - General purpose
- 2 - Non-incendive, Class I, II and III  
Division 2
- 4 - Valve body only (400 & 600 high capacity valves only)
- 1 - Trim package 1
- 2 - Trim package 2
- 4 - Trim package 2, oxy clean [1]

### Body connection

- A - ANSI (NPT) threaded
- B - ANSI flanged (PN20)
- C - ISO 7/1 threaded
- D - DIN PN16 flanged
- E - Socket welded nipple
- F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)
- H - EN1092-1 PN16 flanged (ISO 7005-1 PN16)

### Body seals & bumper material

- A - Buna o-rings/Buna bumper
- B - Viton o-rings/Buna bumper
- C - Viton o-rings/Viton bumper [1]
- D - Ethylene Propylene o-rings/Ethylene Propylene bumper [1]
- E - Omnimflex o-rings/Buna bumper
- F - Omnimflex o-rings/Viton bumper [1]

### Body material

- 1 - Cast iron
- 2 - Carbon steel
- 5 - Stainless steel
- 6 - Low temp carbon steel

### Internal trim package

- 1 - Trim package 1
- 2 - Trim package 2
- 4 - Trim package 2, oxy clean [1]

### Solenoid OR circuit board voltage

- A - 115VAC 50 Hz
- B - 115VAC 60 Hz
- C - 230VAC 50 Hz
- D - 230VAC 60 Hz
- E - 208VAC 50 Hz
- F - 24VDC
- G - 120VDC

### Motor voltage

- A - 115VAC 50 Hz
- B - 115VAC 60 Hz
- C - 230VAC 50 Hz
- D - 230VAC 60 Hz
- E - 24VDC

### OR Handle side plate

- A - Standard handle
- B - Tandem main
- C - Tandem blocking
- D - Tandem overhead
- E - Wheel and chain

### Motor timing

- 1 - 2.5 second
- 2 - 6 second
- 3 - 12 second
- \* - N/A with manual valves

### Switch options

<b>Automatic valves</b>	<b>Manual valves</b>
0 - VOS1/none	0 - None
1 - VOS1/VCS1	1 - VOS1/VCS1
2 - VOS2/VCS2	2 - VOS2/VCS2
3 - VOS2/VCS1	3 - VOS2/VCS1
4 - VOS1HC/VCS1HC	

### Enclosure rating

- A - NEMA 4
- B - NEMA 4X

### Instruction language

- 0 - English

[1] -18°C minimum ambient temperature limit

## Valve model cross reference

MAXON valve model numbers have changed to intelligent coded model numbers for easy identification and specification. Valves manufactured prior to October 1, 2008 will contain an older model number system which can be easily cross referenced with the chart below.

<b>Normally-closed (shut-off) valves</b> <b>General purpose, NEMA 4 or 4X</b>	
<b>Model number (prior to October 1, 2008)</b>	<b>New model designation</b>
808	SMM11
808 CP	CMM11
5000	SMA11
5000 CP	CMA11
7000	HMA11

<b>Normally-open (vent) valves</b> <b>General purpose, NEMA 4 or 4X</b>	
<b>Model number (prior to October 1, 2008)</b>	<b>New model designation</b>
STO-M	SMM21
STO-A	SMA21
STO-A-CP	CMA21

<b>Normally-closed (shut-off) valves</b> <b>Hazardous area classification</b>	
<b>Model number (prior to October 1, 2008)</b>	<b>New model designation</b>
808 NI	SMM12
808 NI CP	CMM12
5000 NI	SMA12
5000 NI CP	CMA12

<b>Normally-open (vent) valves</b> <b>Hazardous area classification</b>	
<b>Model number (prior to October 1, 2008)</b>	<b>New model designation</b>
STO-M-NI	SMM22
STO-M-NI-CP	CMM22
STO-A-NI	SMA22
STO-A-NI-CP	CMA22

## Valve body assembly options &amp; specifications

Normally-closed shut-off valves										
Nominal pipe size	Flow capacity	Body connections available	Body material	Trim package options	Cv rating	MOPD rating (mbar)	Special service MOPD rating (mbar) [1]			
3/4" (DN20)	S	A, C	1, cast iron	1, 2, 4	19	8618	2068			
1" (DN25)	S	A, C	1, cast iron	1, 2, 4	20	8618	2068			
		A, C, E, F	2, 6, carbon steel	2, 4						
			5, stainless steel							
1-1/4" (DN32)	S	A, C	1, cast iron	1, 2, 4	45	6895	2068			
1-1/2" (DN40)	S	A, C	1, cast iron	1, 2, 4	53	4826	1379			
		A, C, E, F	2, 6, carbon steel	2, 4						
			5, stainless steel							
2" (DN50)	S	A, B, C, D, H	1, cast iron	1, 2, 4	86	4826	1034			
		A, C, E, F	2, 6, carbon steel	2, 4						
			5, stainless steel							
2-1/2" (DN65)	S	A, B, C, D	1, cast iron	1	127	2758	689			
	CP	A, B, C, D	1, cast iron	1, 2, 4	304	3447	1034			
			2, 6, carbon steel	2, 4						
		B, D, H	5, stainless steel							
3" (DN80)	S	A, C	1, cast iron	1	173	2068	345			
	CP	A, B, C, D, H	1, cast iron	1, 2, 4	423	2758	689			
			2, 6, carbon steel	2, 4						
		B, D, H	5, stainless steel							
4" (DN100)	CP	B, D, H	1, cast iron	1, 2, 4	490	2758	689			
			2, 6, carbon steel	2, 4						
			5, stainless steel							
	HC	B, D, H	1, cast iron	1, 2, 4	719	4137	689			
			2, carbon steel	2, 4						
		B, D, H	5, stainless steel							
6" (DN150)	S	B, D, H	1, cast iron	1, 2, 4	869	1379	Not available			
			2, carbon steel	2, 4						
			5, stainless steel							
	HC	B, D, H	1, cast iron	1, 2, 4	1172	3447	689			
			2, carbon steel	2, 4						
		B, D, H	5, stainless steel							

[1] Special service fuels (see page 10-30.1-12): Valve maximum operating pressure differential (MOPD) to be reduced

**Body connections:**

- A - NPT
- B - ANSI flanged (ISO 7005 PN20)
- C - ISO 7-1 threaded
- D - DIN PN16 flanged
- E - Socket welded nipple
- F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)
- H - EN1092-1 PN16 (ISO 7005-1 PN16)

**Body material:**

- 1 - Cast iron
- 2 - Carbon steel
- 5 - Stainless steel
- 6 - Low temp carbon steel

**Trim package options and typical material:**

- 1 - 400 series stainless steel seat, hardened ductile iron disc, PEEK follower ring
- 2 - 316SS seat, 316SS disc, PEEK follower ring
- 4 - Oxy clean, trim 2

**Body seals and bumper:**

- Buna o-rings/Buna bumper
- Viton o-rings/Buna bumper
- Viton o-rings/Viton bumper
- Ethylene Propylene o-rings/Ethylene Propylene bumper
- Omnimflex o-rings/Buna bumper
- Omnimflex o-rings/Viton bumper

Refer to valve body assembly gas compatibility for proper elastomer selection.

Normally-open vent valves										
Nominal pipe size	Flow capacity	Body connections available	Body material	Trim package options	Cv rating	MOPD rating (mbar)	Special service MOPD rating (mbar) [1]			
3/4" (DN20)	S	A, C	1, cast iron	1, 2, 4	19	8618	2068			
1" (DN25)	S	A, C	1, cast iron	1, 2, 4	20	8618	2068			
		A, C, E, F	2, 6, carbon steel	2, 4						
			5, stainless steel							
1-1/2" (DN40)	S	A, C	1, cast iron	1, 2, 4	53	4826	1379			
		A, C, E, F	2, 6, carbon steel	2, 4						
			5, stainless steel							
2" (DN50)	S	A, B, C, D, H	1, cast iron	1, 2, 4	86	4826	1034			
		A, C, E, F	2, 6, carbon steel	2, 4						
			5, stainless steel							
2-1/2" (DN65)	CP	A, B, C, D	1, cast iron	1, 2, 4	304	3447	1034			
		B, D, H	2, 6, carbon steel	2, 4						
			5, stainless steel							
3" (DN80)	CP	A, B, C, D, H	1, cast iron	1, 2, 4	423	2758	689			
		B, D, H	2, 6, carbon steel	2, 4						
			5, stainless steel							
4" (DN100)	CP	B, D, H	1, cast iron	1, 2, 4	490	2758	689			
			2, 6, carbon steel	2, 4						
			5, stainless steel							

[1] Special service fuels (see page 10-30.1-12): Valve maximum operating pressure differential (MOPD) to be reduced

**Body connections:**

- A - NPT
- B - ANSI flanged (ISO 7005 PN20)
- C - ISO 7-1 threaded
- D - DIN PN16 flanged
- E - Socket welded nipple
- F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)
- H - EN1092-1 PN16 (ISO 7005-1 PN16)

**Body material:**

- 1 - Cast iron
- 2 - Carbon steel
- 5 - Stainless steel
- 6 - Low temp carbon steel

**Trim package options and typical material:**

- 1 - 400 series stainless steel seat, hardened ductile iron disc, PEEK follower ring
- 2 - 316SS seat, 316SS disc, PEEK follower ring
- 4 - Oxy clean, trim 2

**Body seals and bumper:**

- Buna o-rings/Buna bumper
- Viton o-rings/Buna bumper
- Viton o-rings/Viton bumper
- Ethylene Propylene o-rings/Ethylene Propylene bumper
- Omnimflex o-rings/Buna bumper
- Omnimflex o-rings/Viton bumper

Refer to valve body assembly gas compatibility for proper elastomer selection.

## Valve actuator options

Automatic reset valves							
Nominal pipe size	Flow capacity	Normal position	Area classification	Solenoid OR circuit board voltage	Motor voltage	Motor timing	Switch options
3/4" (DN20)	S	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
1" (DN25)	S	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
1-1/4" (DN32)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
1-1/2" (DN40)	S	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1,2 1,2	0, 1, 2, 3, 4 0, 1, 2, 3
2" (DN50)	S	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
2-1/2" (DN65)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
3" (DN80)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
2-1/2" (DN65)	C	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	2 2	0, 1, 2, 3, 4 0, 1, 2, 3
3" (DN80)	C	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	2 2	0, 1, 2, 3, 4 0, 1, 2, 3
4" (DN100)	C	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	2 2	0, 1, 2, 3, 4 0, 1, 2, 3
4" (DN100)	H	1	1	A, B, C, D, G	A, B, C, D	3	0, 1, 2, 3
6" (DN150)	H	1	1	A, B, C, D, G	A, B, C, D	3	0, 1, 2, 3

**Flow capacity**

S - Standard  
C - CP body construction  
H - High capacity

**Normal position**

1 - Normally-closed shut-off valve  
2 - Normally-open vent valve

**Area classification**

1 - General purpose  
2 - Non-incendive, Class I, II and III, Division 2

**Solenoid OR circuit board voltage**

A - 115VAC 50 Hz  
B - 115VAC 60 Hz  
C - 230VAC 50 Hz  
D - 230VAC 60 Hz  
E - 208VAC 50 Hz  
F - 24VDC  
G - 120VDC

**Motor voltage**

A - 115VAC 50 Hz  
B - 115VAC 60 Hz  
C - 230VAC 50 Hz  
D - 230VAC 60 Hz  
E - 24VDC

**Motor timing**

1 - 2.5 second  
2 - 6 second  
3 - 12 second

**Switch options**

0 - VOS1/None  
1 - VOS1/VCS1  
2 - VOS2/VCS2  
3 - VOS2/VCS1  
4 - VOS1HC/VCS1HC

Manual reset valves						
Nominal pipe size	Flow capacity	Normal position	Area classification	Solenoid voltage	Handle side plate options	Switch options
3/4" (DN20)	S	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
		2	1	A, B, C, D, E, F, G	A, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, E	0, 1, 2, 3
1" (DN25)	S	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
		2	1	A, B, C, D, E, F, G	A, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, E	0, 1, 2, 3
1-1/4" (DN32)	S	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
1-1/2" (DN40)	S	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
		2	1	A, B, C, D, E, F, G	A, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, E	0, 1, 2, 3
2" (DN50)	S	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
		2	1	A, B, C, D, E, F, G	A, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, E	0, 1, 2, 3
2-1/2" (DN65)	S	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
3" (DN80)	S	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
2-1/2" (DN65)	C	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
		2	2	A, B, C, D, F, G	A, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, E	0, 1, 2, 3
3" (DN80)	C	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
		2	2	A, B, C, D, F, G	A, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, E	0, 1, 2, 3
4" (DN100)	C	1	1	A, B, C, D, E, F, G	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, B, C, D, E	0, 1, 2, 3
		2	2	A, B, C, D, F, G	A, E	0, 1, 2, 3
			2	A, B, C, D, F, G	A, E	0, 1, 2, 3
6" (DN150)	S	1	1	A, B, C, D, E	A, B, C, D, E	0, 1, 2, 3
			2	A, B, C, D	A, B, C, D, E	0, 1

**Flow capacity**

S - Standard  
C - CP body construction  
H - High capacity

**Normal position**

1 - Normally-closed shut-off valve  
2 - Normally-open vent valve

**Area classification**

1 - General purpose  
2 - Non-incendive, Class I, II and III, Division 2

**Solenoid voltage**

A - 115VAC 50 Hz  
B - 115VAC 60 Hz  
C - 230VAC 50 Hz  
D - 230VAC 60 Hz  
E - 208VAC 50 Hz  
F - 24VDC  
G - 120VDC

**Handle side plate options**

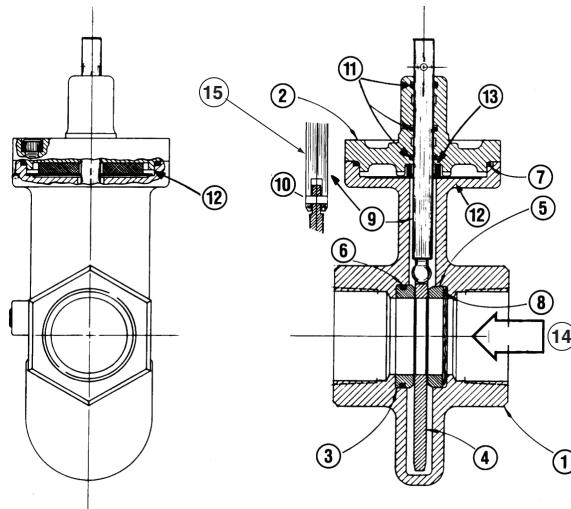
A - Standard handle  
B - Tandem main  
C - Tandem blocking  
D - Tandem overhead  
E - Wheel and chain

**Switch options**

0 - None  
1 - VOS1/VCS1  
2 - VOS2/VCS2  
3 - VOS2/VCS1

## Valve body assembly specifications

- 1) Body
- 2) Bonnet
- 3) Seat
- 4) Disc
- 5) Follower ring
- 6) Seat o-ring
- 7) Body o-ring
- 8) Wavy spring
- 9) Stem
- 10) Spring pin
- 11) Stem o-ring
- 12) Striker plate
- 13) Bumper
- 14) Flow direction
- 15) Typical stem/disc connection used with smaller sized valves



Threaded CP body design shown

Body and bonnet materials					
Item number	Description	Material code			
		1	2	5	6
1	Body	Cast iron	Carbon steel	Stainless steel	Low temp carbon steel
2	Bonnet	ASTM A126, Class B	ASTM A216, Gr. WCB	ASTM A351 Gr. CF8M	ASTM A352 Gr. LCB

Body seals and bumper material		
Item number	Description	Material
6	Seat o-ring	Buna o-rings/Buna bumper
7	Body o-ring	Viton o-rings/Buna bumper
11	Stem o-ring	Viton o-rings/Viton bumper
13	Bumper	Ethylene Propylene o-rings/Ethylene Propylene bumper
		Omniflex o-rings/Buna bumper
		Omniflex o-rings/Viton bumper

Trim package materials			
Item number	Description	Internal trim package	
		1	2
3	Seat	400 series stainless steel	316 stainless steel
4	Disc	Hardened ductile iron	316 stainless steel
5	Follower ring	PEEK	PEEK
8	Wavy spring	300 series stainless steel	
9	Stem	17-4 PH stainless steel	
10	Spring pin (when required)	Carbon steel	400 series stainless steel
12	Striker plate		17-7 PH stainless steel

## Valve body assembly - gas compatibility

Gas	Gas code	Suggested material options			MOPD rating	Agency approvals and certifications			
		Body seals & bumper	Body & bonnet	Trim package [7]		FM	CSA [3]	CE [4]	UL [3]
Air	AIR	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X X
Ammonia	AMM	A, D, E	1, 2, 5, 6	1, 2	Std.	X	X		X
Butane gas	BUT	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X	X	X X
Coke oven gas	COKE	C, F	1, 2, 5, 6	2	[5]	X	X		X
Delco	DEL	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X X
Digester [1]	DIG	Analysis required	5	2	[5]	X	X		X
Endothermic AGA	ENDO	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X X
Exothermic gas	EXO	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X X
Hydrogen gas	HYD	A, B, C, E, F	1, 2, 5, 6	1, 2	[2]	X	X		X
Manufactured [1]	MFGD	Analysis required	5	2	Std.	X	X		X
Natural gas	NAT	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X	X	X X
Nitrogen	NIT	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X X
No. 1 fuel oil [6]	NO1OIL	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X X
No. 2 fuel oil [6]	NO2OIL	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X X
Oxygen high	OXYH	C, D, F	2, 5, 6	4	8.62 barg max	X	X		X
Oxygen low	OXYL	C, D, F	1, 2, 5, 6	4	2.07 barg max	X	X		X
Propane	PROP	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X	X	X X
Refinery [1]	REF	Analysis required	5	2	[5]	X	X		X
Sour natural [1]	SOUR	Analysis required	5	2	[5]	X	X		X
Town gas [1]	TOWN	Analysis required	5	2	Std.	X	X	X	X
Land fill gas [1]	LAND	Analysis required	5	2	[5]	X	X		X

[1] Other body and trim packages may be acceptable pending fuel analysis. For pricing inquiries, Viton or Omniflex o-rings should be used. Contact MAXON for details.

[2] Valve maximum operating pressure differential (MOPD) to be reduced by 25% from standard ratings.

[3] ISO connections are not recognized by CSA or UL standards

[4] SMA11, CMA11, SMM11, CMM11, SMA21, CMA21, SMM21 Series electro-mechanical valves meet the essential requirements of the Low Voltage (73/23/EEC), EMC (2004/108/EC) and Gas Appliance - GAD (90/396/EEC) Directives. The Gas Appliance Directive only covers the use of commercially available fuels (natural gas, butane, town gas and LPG). MD stands for Machinery Directive (98/37/EC).

[5] Special service fuels: Valve maximum operating pressure differential (MOPD) to be reduced from standard ratings

[6] All electro-mechanical valves except HMA11 Series are approved for use with No. 1 and No. 2 fuel oils, however, valve cycling must be limited to 5 times or less per day. Swinging gate style valves are preferable for liquid service. Contact MAXON before ordering Gas Electro-mechanical Valves for fuel oil service.

[7] Trim Package 1 is only allowed with body and bonnet 1.

**Body seals & bumper:**

A - Buna o-rings/Buna bumper

B - Viton o-rings/Buna bumper

C - Viton o-rings/Viton bumper

D - Ethylene propylene o-rings/Ethylene propylene bumper

E - Omniflex o-rings/Buna bumper

F - Omniflex o-rings/Viton bumper

**Body & bonnet:**

1 - Cast iron

2 - Carbon steel

5 - Stainless steel

6 - Low temp carbon steel

**Trim package:**

1 - Trim package 1

2 - Trim package 2

4 - Trim package 2, oxy clean

## Electrical data

### General

MAXON shut-off valves are electrically actuated from a power source. Standard assemblies include an internal holding solenoid or clutch and printed circuit board.

Position switch wiring diagrams (reproduced below) are part of each valve assembly, summarizing electrical data and wiring for a valve equipped with terminal block and a full complement of optional switches.

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

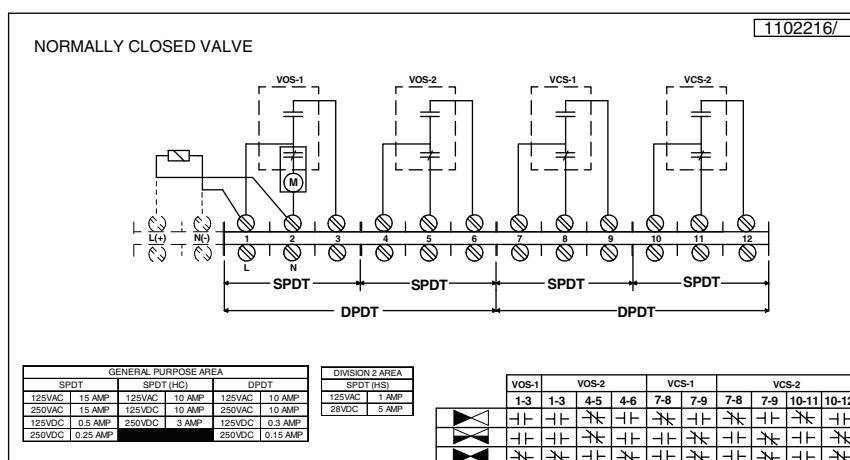
Valve position switches are offered in SPDT (single pole/double throw). Recommended packages include one open switch and one closed switch (VOS1/VCS1). Additional auxiliary switches are designated by VOS2/VCS2.

VCS (valve closed switch) is actuated at the end of the closing stroke. VOS (valve open switch) is actuated at the end of the opening stroke.

Switch amperage ratings are shown on the schematic wiring diagrams below. DO NOT EXCEED rated amperage or total load shown. Diagrams show valve with a full complement of switches. For normally-closed valves, the wiring diagram illustrates the switch contact positions with the valve closed. For normally-open valves, the wiring diagram illustrates the switch contact position with the valve open.

Figure 1: Normally-closed shut-off valves

Standard and CP  
valves



High capacity  
valves  
(4" & 6" sizes only)

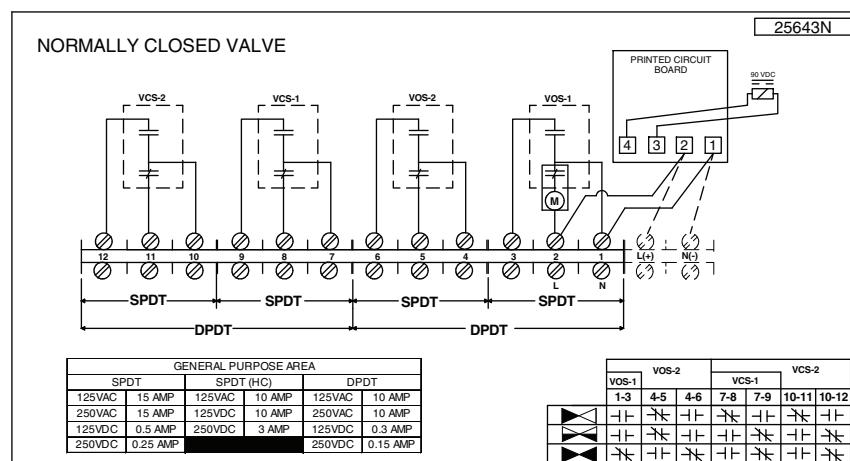
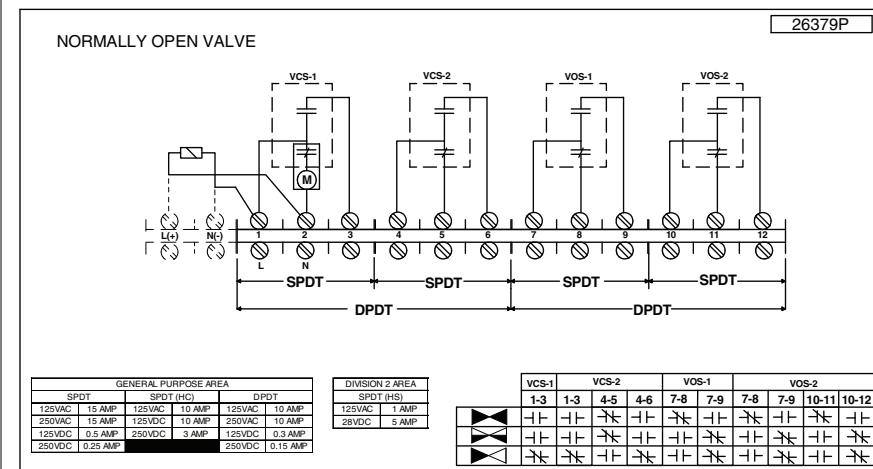


Figure 2: Normally-open valves

Standard and CP valves



## Available voltages and electrical data - General Purpose areas

All MAXON valves are electrically actuated from a power source through the flame safeguard and/or safety control circuits. Standard valve assemblies include an internal holding solenoid on standard flow and CP body constructions, or a printed circuit board on high capacity valves. The solenoid (or printed circuit board) is energized whenever the valve is powered. The motor operator on automatic reset valves is powered only during the opening stroke for normally-closed valves, or the closing stroke for normally-open versions.

### Standard flow and CP body constructions

Solenoids					
3/4" - 1-1/2" standard flow		2" - 3" standard flow		2-1/2"CP - 4"CP & 6" standard flow	
Voltage	Power	Voltage	Power	Voltage	Power
115VAC, 50 Hz	23VA	115VAC, 50 Hz	23VA	115VAC, 50 Hz	40VA
115VAC, 60 Hz	23VA	115VAC, 60 Hz	23VA	115VAC, 60 Hz	40VA
230VAC, 50 Hz	23VA	230VAC, 50 Hz	23VA	230VAC, 50 Hz	40VA
230VAC, 60 Hz	23VA	230VAC, 60 Hz	23VA	230VAC, 60 Hz	40VA
208VAC, 50 Hz	23VA	208VAC, 50 Hz	23VA	208VAC, 50 Hz	40VA
24VDC	14W	24VDC	24W	24VDC	24W
120VDC	14W	120VDC	34W	120VDC	34W

Motor operators	
Voltage	Power
115VAC, 50 Hz	322VA
115VAC, 60 Hz	196VA
230VAC, 50 Hz	322VA
230VAC, 60 Hz	198VA
24VDC	60W

### To determine valve OPENING power: (or CLOSING power for normally-open versions)

#### Automatic reset valves

- Total power is the sum of the motor and solenoid power ratings for the appropriate voltage/frequency in the tables above.
- If supply voltages are different, then the circuits must be segregated.

#### Manual reset valves

- Total power consists of only the solenoid power rating.

### To determine valve HOLDING power:

- Holding power consists of the solenoid power rating for the appropriate voltage/frequency.

## 4" and 6" high capacity valves

Printed circuit boards	
Voltage	Power
115VAC, 50 Hz	13VA
115VAC, 60 Hz	13VA
230VAC, 50 Hz	25VA
230VAC, 60 Hz	25VA
120VDC	14W

Motor operators	
Voltage	Power
115VAC, 50 Hz	667VA
115VAC, 60 Hz	391VA
230VAC, 50 Hz	667VA
230VAC, 60 Hz	391VA

**To determine valve OPENING power:**

- Total power is the sum of the motor and printed circuit board power ratings for the appropriate voltage/frequency in the tables shown.
- If supply voltages are different, then the circuits must be segregated.

**To determine valve HOLDING power:**

- Holding power consists of the printed circuit board power rating for the appropriate voltage/frequency.

## Available voltages and electrical data - Non-incendive areas

All MAXON valves are electrically actuated from a power source through the flame safeguard and/or safety control circuits. Standard valve assemblies include an internal holding solenoid on standard flow and CP body constructions, or a printed circuit board on high capacity valves. The solenoid (or printed circuit board) is energized whenever the valve is powered. The motor operator on automatic reset valves is powered only during the opening stroke for normally-closed valves, or the closing stroke for normally-open versions.

### Standard flow and CP body constructions

Solenoids					
3/4" - 1-1/2" standard flow		2" - 3" standard flow		2-1/2"CP - 4"CP & 6" standard flow	
Voltage	Power	Voltage	Power	Voltage	Power
115VAC, 50 Hz	23VA	115VAC, 50 Hz	23VA	115VAC, 50 Hz	34VA
115VAC, 60 Hz	16VA	115VAC, 60 Hz	16VA	115VAC, 60 Hz	26VA
230VAC, 50 Hz	23VA	230VAC, 50 Hz	23VA	230VAC, 50 Hz	34VA
230VAC, 60 Hz	16VA	230VAC, 60 Hz	16VA	230VAC, 60 Hz	26VA
24VDC	18W	24VDC	24W	24VDC	24W
120VDC	26W	120VDC	34W	120VDC	34W

Motor operators	
Voltage	Power
115VAC, 50 Hz	322VA
115VAC, 60 Hz	196VA
230VAC, 50 Hz	322VA
230VAC, 60 Hz	198VA

### To determine valve OPENING power: (or CLOSING power for normally-open versions)

#### Automatic reset valves

- Total power is the sum of the motor and solenoid power ratings for the appropriate voltage/frequency in the tables above.
- If supply voltages are different, then the circuits must be segregated.

#### Manual reset valves

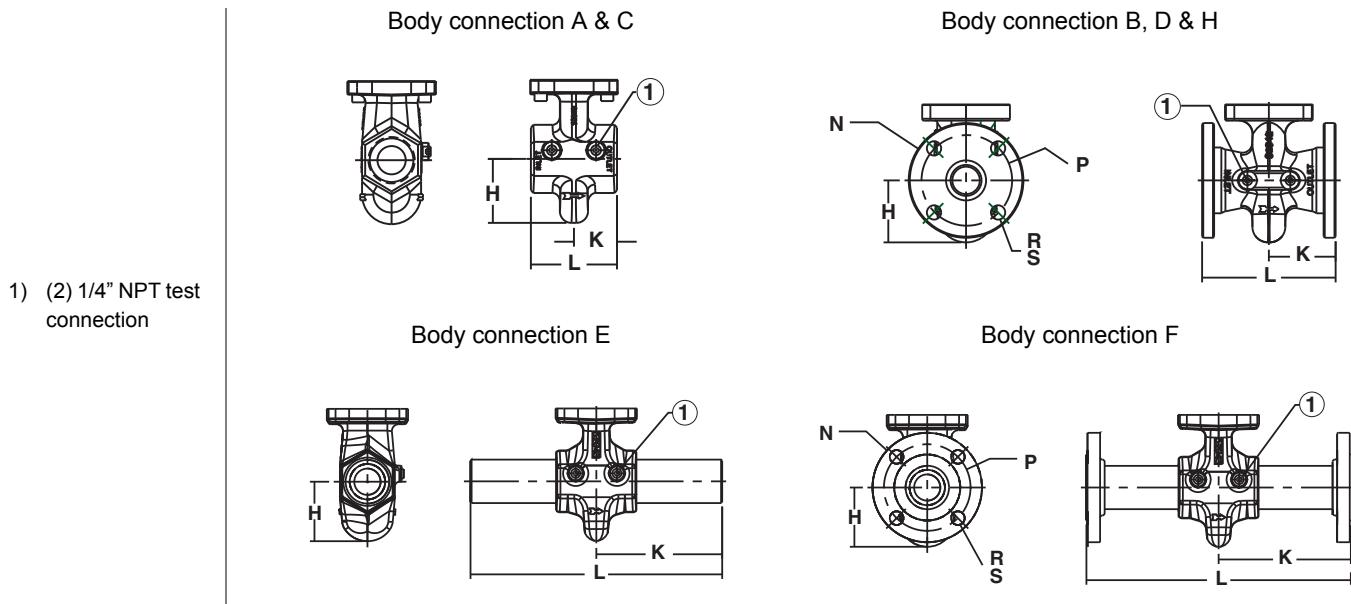
- Total power consists of only the solenoid power rating.

### To determine valve HOLDING power:

- Holding power consists of the solenoid power rating for the appropriate voltage/frequency.

## Dimensions and weights

### Valve bodies: 3/4" (DN20) to 3" (DN80)



1) (2) 1/4" NPT test connection

Valve size	Flow capacity	Body Connection	Body/bonnet material	Approximate dimensions (in mm)							Approximate weight (in kg)								
				H	K	L	N Ø	P Ø	R Ø	S # of holes	Body assembly	Actuator assembly	Total weight						
3/4" (DN20)	S	A, C	Cast iron	51	48	96	N/A			6.8	3.6	5	8.6						
1" (DN25)	S	A, C	Cast iron				N/A												
		A, C	Carbon steel & stainless steel				N/A			4	3.6	9	8.6						
		E					N/A												
		F					N/A			5									
1-1/4" (DN32)	S	A, C	Cast iron	61	51	102	N/A			4	6.8	5	11.8						
1-1/2" (DN40)	S	A, C	Cast iron				N/A												
		A, C	Carbon steel & stainless steel				N/A			5	4	9	9						
		E					N/A												
		F					N/A			6									
2" (DN50)	S	A, C	Cast iron	84	56	112	N/A			4	7	6	13						
		B					152 122 19												
		D, H					165 124 18												
		A, C	Carbon steel & stainless steel		89	178	N/A			4	12	18	18						
		E					N/A												
		F					N/A			4	15								
2-1/2" (DN65)	S	A, C	Cast iron		74	63	127	N/A			8.6	14.6	14.6						
		B						178 140 19			4	13.5							
		D, H						185 145 18											
3" (DN80)	S	A, C	Cast iron	76	66	132	N/A			4	9	13.5	19.5						

#### Flow capacity:

S - Standard  
C - CP body construction  
H - High capacity

#### Body connection:

A - NPT  
B - ANSI flanged (ISO 7005 PN20)  
C - ISO 7-1 threaded

D - DIN PN16 flanged

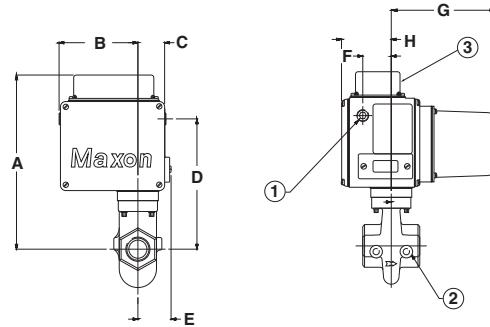
E - Socket welded nipple

F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)

H - EN 1092-1 PN16 (ISO 7005-1 PN16)

## Valve actuators: 3/4" through 1-1/2" valves

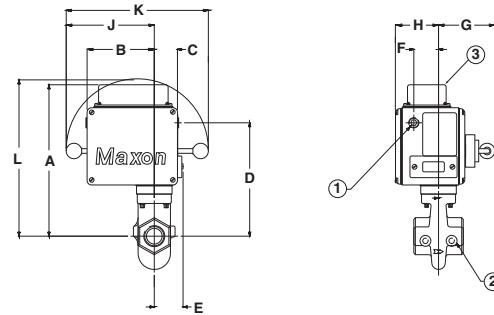
Automatic reset type (SMA11, SMA21, SMA12, SMA22)  
(formerly 5000, STO-A, 5000 NI, STO-A-NI)



- 1) (2) 3/4" NPT conduit connection
- 2) (2) 1/4" NPT test connection
- 3) Terminal block cover

NOTE: 70 mm needed for terminal block cover removal

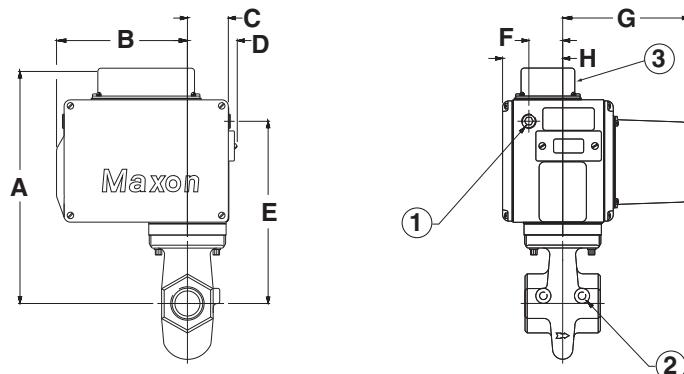
Manual reset type (SMM11, SMM21, SMM12, SMM22)  
(formerly 808, STO-M, 808 NI, STO-M-NI)



Valve size	Flow capacity	Valve type	Approximate dimensions (in mm)										
			A	B	C	D	E	F	G	H	J	K	L
3/4" (DN20)	S	MM11, MM21	311			206			114	89	181	292	294
		MM12, MM22								139			
		MA11, MA21							186	89			
		MA12, MA22								139			
1" (DN25)	S	MM11, MM21	311		47	206		58	51	89	181	292	294
		MM12, MM22								139			
		MA11, MA21							186	89			
		MA12, MA22								139			
1-1/4" (DN32)	S	MM11	325		140	220		58	51	89	181	292	308
		MM12								139			
		MA11							186	89			
		MA12								139			
1-1/2" (DN40)	S	MM11, MM21	338		232			114	181	89	292	320	
		MM12, MM22								139			
		MA11, MA21						186	181	89			
		MA12, MA22								139			

## Valve actuators: 2" through 3" valves

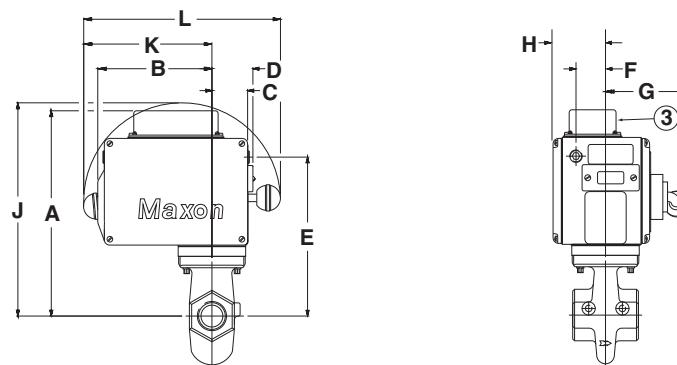
Automatic reset type (SMA11, SMA21, SMA12, SMA22)  
(formerly 5000, STO-A, 5000 NI, STO-A-NI)



- 1) (2) 3/4" NPT conduit connection
- 2) (2) 1/4" NPT test connection
- 3) Terminal block cover

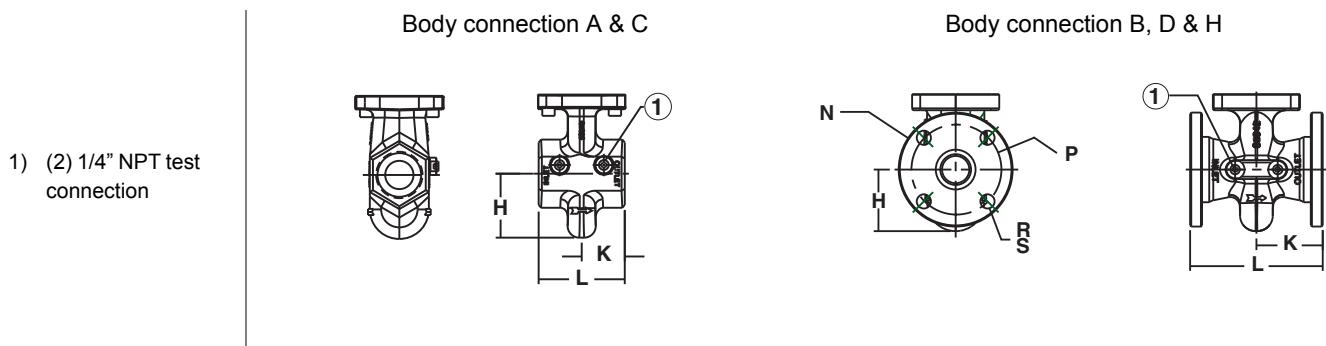
NOTE: 70 mm needed for terminal block removal

Manual reset type SMM11, SMM21, SMM12, SMM22)  
(formerly 808, STO-M, 808 NI, STO-M-NI)



Valve size	Flow capacity	Valve type	Approximate dimensions (in mm)										
			A	B	C	D	E	F	G	H	J	K	L
2" (DN50)	S	MM11, MM21	375			269		50	143	89	365	217	333
		MM12, MM22							191	137			
		MA11, MA21							143	89	362	217	333
		MA12, MA22							191	137			
2-1/2" (DN65)	S	MM11	371	193	60	74	266	50	143	89	362	217	333
		MM12							191	137			
		MA11							143	89	368	217	333
		MA12							191	137			
3" (DN80)	S	MM11	377			272		50	143	89	368	217	333
		MM12							191	137			
		MA11							143	89	368	217	333
		MA12							191	137			

## Valve bodies: 2-1/2" CP (DN65), 3" CP (DN80), 4" CP (DN100) and 6" (DN150)



Valve size	Flow capacity	Body connection	Body/bonnet material	Approximate dimensions (in mm)							Approximate weight (in kg)					
				H	K	L	N Ø	P Ø	R Ø	S #of holes	Body assembly	Actuator assembly	Total weight			
2-1/2" (DN65)	C	A, C	Cast iron	109	63	127	N/A				9	7	16			
		B					178	140	19	4	14		21			
		D					185	145	18		14		21			
		H					185	145	18	8	14		21			
		B	Carbon steel & stainless steel				178	140	19	4	15		22			
		D					185	145	18		15		22			
		H					185	145	18	8	14		21			
	3" (DN80)	A, C	Cast iron	129	71	140	N/A				11	7	18			
		B					190	152	19	4	21		28			
		D, H					201	160	18	8	21		28			
		B	Carbon steel & stainless steel				190	152	19	4	21		28			
		D, H					201	160	18	8	21		28			
4" (DN100)	C	B	Cast iron	140	114	229	229	190	19	8	29	7	36			
		D, H					221	180	18		29		36			
		B	Carbon steel & stainless steel				229	190	19		29		36			
		D, H					221	180	18		29		36			
6" (DN150)	S	B	Cast iron	190	133	267	279	241	22	8	52	7	59			
		D, H					284	239	22		52		59			
		B	Carbon steel & stainless steel				279	241	22		52		59			
		D, H					284	239	22		52		59			

**Flow capacity:**

S - Standard  
C - CP body construction  
H - High capacity

**Body connection:**

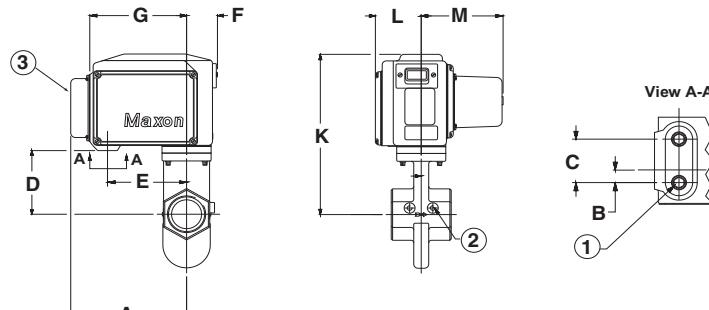
A - NPT  
B - ANSI flanged (ISO 7005 PN20)  
C - ISO 7-1 threaded  
D - DIN PN16 flanged  
E - Socket welded nipple  
F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)  
H - EN1092-1 PN16 (ISO 7005-1 PN16)

## Valve actuators: 2-1/2" CP through 4" CP and 6" valves

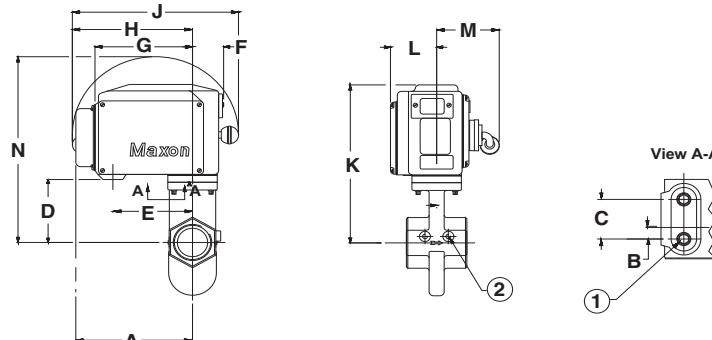
Automatic reset type (CMA11, CMA21, CMA12, CMA22)  
(formerly 5000 CP, STO-A-CP, 5000 NI-CP, STO-A-NI-CP)

- 1) (2) 3/4" NPT conduit connection
- 2) (2) 1/4" NPT test connection
- 3) Terminal block cover

NOTE: 70 mm needed  
for terminal block cover  
removal



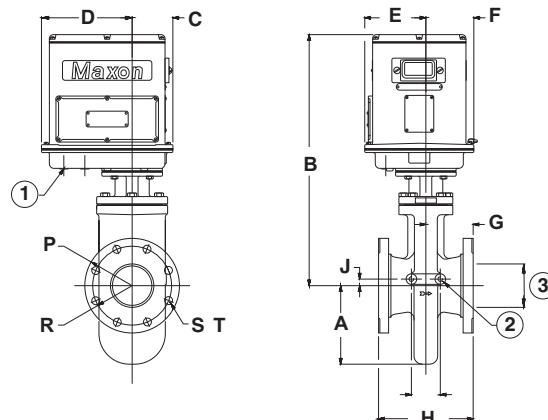
Manual reset type (CMM11, CMM12, CMM22, SMM11, SMM12)  
(formerly 808 CP, 808-NI-CP, STO-M-NI-CP, 808, 808 NI)



Valve size	Flow capacity	Valve type	Approximate dimensions (in mm)												
			A	B	C	D	E	F	G	H	J	K	L	M	N
2-1/2" (DN65)	C	MM11	297	22	76	155	184	72	225	278	384	370	107	160	370
		MM12, MM22								156					
		MA11, MA21								107	191				
		MA12, MA22								156					
3" (DN80)	C	MM11	297	22	76	155	184	72	225	278	384	388	107	160	456
		MM12, MM22								156					
		MA11, MA21								107	191				
		MA12, MA22								156					
4" (DN100)	C	MM11	297	22	76	155	184	72	225	278	384	388	107	160	456
		MM12, MM22								156					
		MA11, MA21								107	191				
		MA12, MA22								156					
6" (DN150)	S	MM11	297	22	76	155	184	72	225	278	384	527	107	160	595
		MM12								156					

## Valve bodies and actuators: 4" &amp; 6" high capacity valves

- 1) (2) 3/4" NPT conduit connection
- 2) (2) 1/4" NPT test connection
- 3) Pipe size

HMA11 versions only  
(formerly 7000)

Valve size	Flow capacity	Valve type	Approximate dimensions (in mm)					
			A	B	C	D	E	F
4" (DN100)	H	MA11	186	606	98	219	106	116
6" (DN150)	H	MA11	213	635			147	

Valve size	Body connection	Body/bonnet material	Approximate dimensions (in mm)							Approximate weight (in kg)		
			G	H	J	P Ø	R Ø	S Ø	T # of holes	Body assembly	Actuator assembly	Total weight
4" (DN100)	B	Cast iron	114	229	16	229	190	19	8	43	20	63
	D, H					221	180	18		43		63
	B	Carbon steel & stainless steel	133	267	16	229	190	19		43	20	63
	D, H					221	180	18		43		63
6" (DN150)	B	Cast iron	133	267	16	279	241	22	8	53	20	73
	D, H					284	239	22		53		73
	B	Carbon steel & stainless steel	133	267	16	279	241	22		57	20	77
	D, H					284	239	22		57		77

**Flow capacity:**

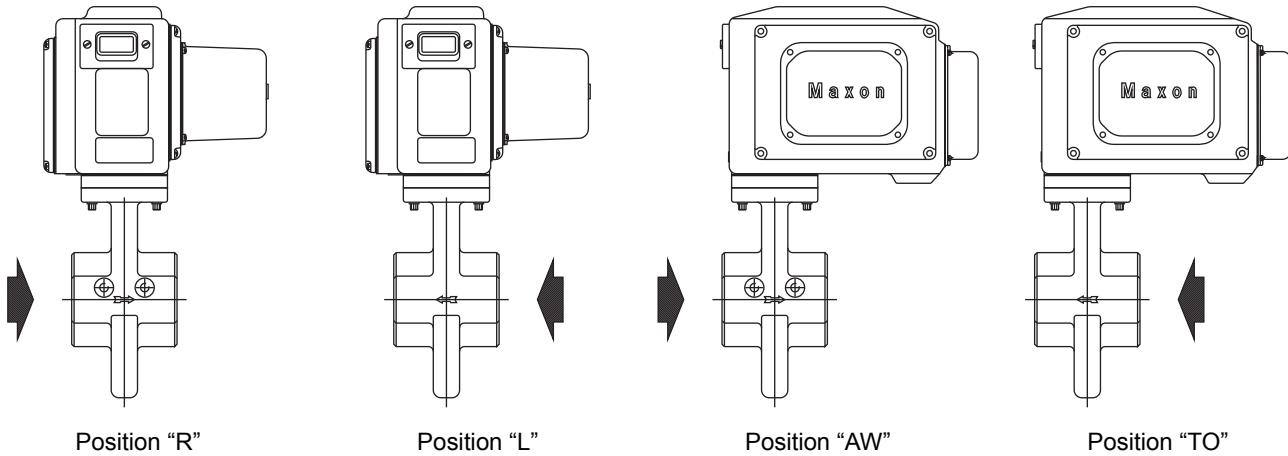
S - Standard  
C - CP body construction  
H - High capacity

**Body connection:**

A - NPT  
B - ANSI flanged (ISO 7005 PN20)  
C - ISO 7-1 threaded  
D - DIN PN16 flanged  
E - Socket welded nipple  
F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)  
H - EN1092-1 PN16 (ISO 7005-1 PN16)

## Available top assembly positions

The valve top assembly can be positioned on the body in four different orientations. See sketches below to determine the designation of the required orientation for your application.



Position "R"

Position "L"

Position "AW"

Position "TO"

## Tandem arrangements

(for simultaneous opening of main and blocking valves)

### General

Wherever insurance underwriters or other regulatory groups require the use of a double-valve or "block-and-bleed" system, but manual operation is preferred to the use of automatic reset valves, operation can be simplified by adding a tandem arrangement to a pair of MAXON manual reset shut-off valves.

A linkage overtravel spring in the tandem arrangement latches the blocking valve just before the main valve is latched, assuring latching of both valves.

If it is necessary to locate a tandem valve above arms reach, an overhead wheel and chain assembly may be added which includes a loop of chain accessible to operating personnel.

### To order

Valves are to be specified in the usual manner and must be in top assembly position TO or AW.

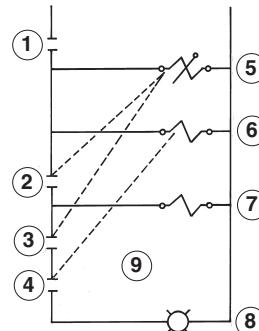
VOS and VCS switches must be included on the main valve and a VOS switch on the blocking valve to permit electrical connection as shown in the wiring schematic illustrated below.

If overhead wheel and chain assembly is also required, specify loop length to reach appropriate operating position. Extra chain (in one foot increments) may be specified.

Center line distance between valves must be within the ranges indicated in Table 1 and shown in sketch below and must be specified at the time of order.

- 1) Flame safeguard contact
- 2) VCS in main valve
- 3) VOS in main valve
- 4) VOS in blocking valve
- 5) Main valve (normally-closed)
- 6) Blocking valve (normally-closed)
- 7) Vent valve (normally-open)
- 8) Main fuel panel light
- 9) For illustration only (not a wiring diagram)

Wiring schematic



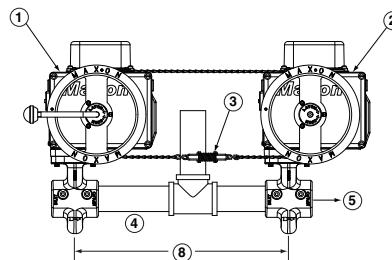
Main valve and blocking valve wired in parallel. VCS switch on main valve powers vent valve. VOS switches on main and blocking valves wired in series to signal light.

Table 1: Allowable valve spacing for tandem arrangement (in mm)

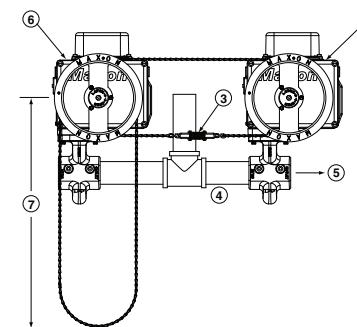
Valve size	Minimum C-C	Maximum C-C
3/4" - 1-1/2"	457	609
2" - 3"	508	686
4" & 6"	686	838

- 1) Tandem main valve
- 2) Tandem blocking valve
- 3) Tension spring
- 4) Piping by others
- 5) Flow
- 6) Tandem overhead valve
- 7) Specify loop length if overhead wheel & chain option
- 8) See Table 1 above

Tandem arrangement



Tandem arrangement with overhead wheel & chain



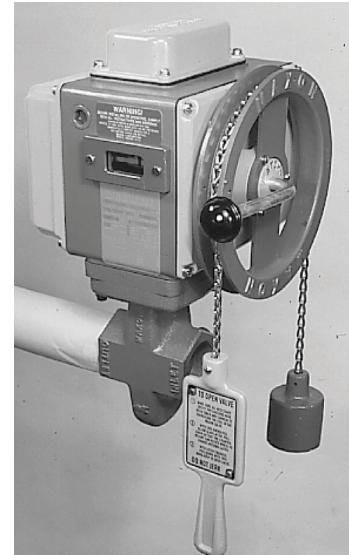
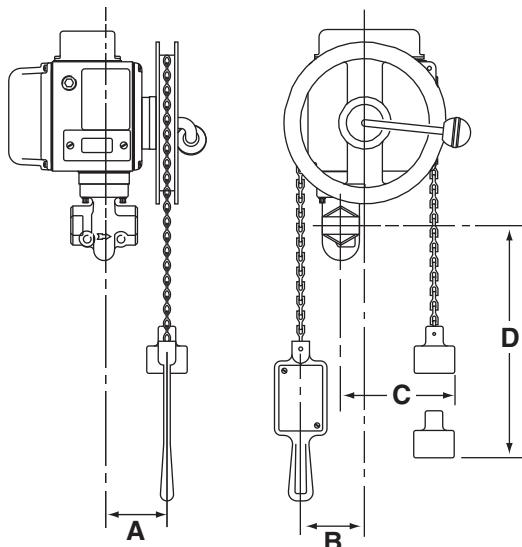
## Overhead wheel & chain assembly

Overhead wheel and chain assembly allows operation of a manual reset valve in an otherwise inaccessible overhead location. A wheel is mounted onto the handle of the valve. The attached chain is weighted on one end and has a paddle handgrip on the other.

Once the valve is electrically energized, pulling down on the paddle will open normally-closed versions or close normally-open versions.

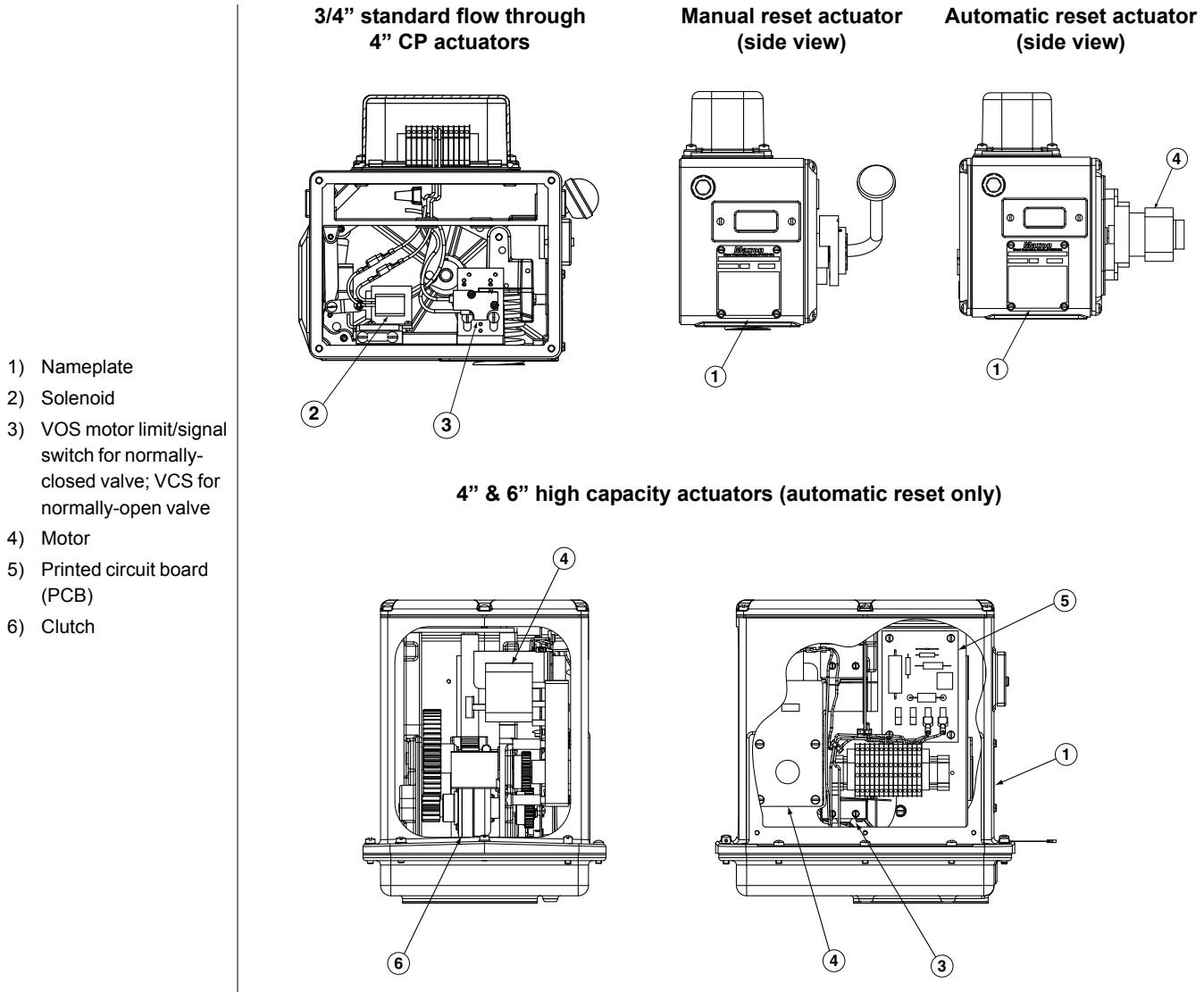
MAXON valve's free-handle design permits valve to trip to its rest position on any power interruption.

Wheel and chain assembly includes a length of chain to position the paddle handgrip slightly below pipe centerline. A standard length of 7 feet of chain is included with CP and larger valve sizes and 5 feet is included with all other valves. Extra chain (in one foot increments) may be specified to fit your specific location.



Dimensions (in mm)			
A	B	C	D
133 maximum	103	184	310 maximum

## Valve actuator spare part identification



- MAXON nameplates include a model designation, which can be used to easily identify the exact components for each valve configuration.
- Standard flow and CP flow valve spare parts include the solenoid, motor, and switches as shown above.
- High capacity valve spare parts include the clutch, motor and circuit board as shown above.



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.



**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 the at rest position upon removal of a control voltage signal. Motorized automatic and manual actuators are available depending on application needs. In addition, 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

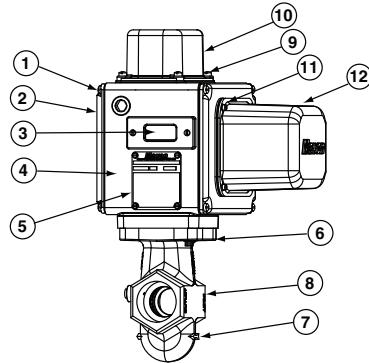
Consult the nameplate of your valve. This lists the maximum operating pressure, temperature limitations, voltage requirements and service conditions of your specific valve. Do not exceed nameplate ratings.

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 <sub>AMB</sub>	Ambient temperature range
T <sub>F</sub>	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

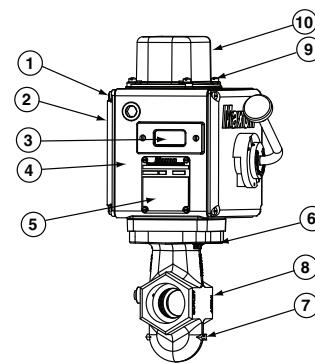
## Component identification

**Automatic (motorized) valve**  
**Current model designation**  
**(former model designation)**  
 SMA11 (5000), CMA11 (5000 CP),  
 SMA21 (STO-A), CMA21 (STO-A-CP)

- 1) Access cover screws
- 2) Access cover
- 3) Visual indication
- 4) Mainbase
- 5) Nameplate
- 6) Actuator bolts
- 7) Flow arrow
- 8) Valve body
- 9) Terminal block cover screws
- 10) Terminal block cover
- 11) Motor cover screws
- 12) Motor cover
- 13) Top cover plate screws
- 14) Top cover plate
- 15) Top housing
- 16) Top housing screws



**Manual valve**  
**Current model designation**  
**(former model designation)**  
 SMM11 (808), CMM11 (808 CP), SMM21 (STO-M)



**Automatic (motorized) valve - 4" & 6" high capacity**  
**Current model designation (former model designation)**  
 HMA11 (7000)

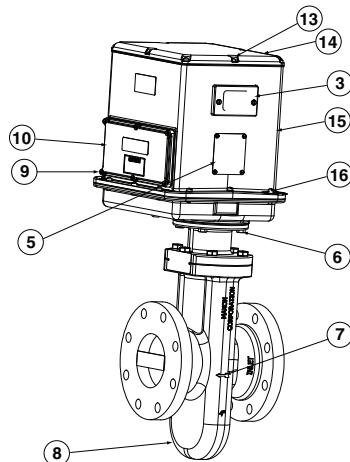


Table 1 - Torque specifications

Valve type	Item number	Description	Torque Nm
Standard and CP valves	1	Access cover screws 1/4-20	11
	6	Actuator bolts 5/16-18 (3/4" - 1-1/2" sizes)	47
	6	Actuator bolts 3/8-16 (2" - 6" sizes)	55
	9	Terminal block cover screws 1/4-20	6
	11	Motor cover screws #10-24	3.5
High capacity valves	9	Terminal block cover screws #10-24	3.5
	13	Top cover plate screws 1/4-20	11
	16	Top housing screws 1/4-20	11

## Installation

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1. A gas filter or strainer of 40 mesh (0.6 mm) or smaller is recommended in the fuel gas 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.
5. Maintain integrity of the electro-mechanical actuator enclosures by using the appropriate electrical connectors for the (2) 3/4" NPT conduit threaded connections. The electrical enclosure is NEMA 4 rated with an option for NEMA 4X.
6. All access cover plate screws should be tightened using an alternate cross-corner tightening pattern to the values shown in Table 1 on page 10-30.1-31.
7. Verify proper installation and operation by electrically actuating the valve for 10-15 cycles prior to the first introduction of gas.

## Auxiliary features

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- 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

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- Actuators rated for NEMA 4 or optional NEMA 4X
- Ambient and fluid temperature range of -28°C to 60°C for standard and CP flow constructions
- Ambient and fluid temperature range of -28°C to 52°C for high capacity flow constructions
- All valves for oxygen service or using Ethylene Propylene body seals are limited to a minimum ambient and fluid temperature of -18°C

## Actuator assembly rotation



**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 6 mm. 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 6 mm 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

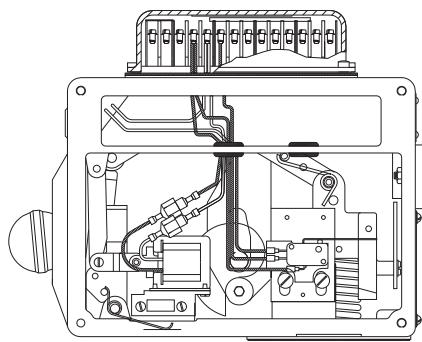
- Note wand position and mounting hole location carefully, then remove 2 screws and lift existing switch.
- Install replacement switch in same mounting holes on bracket and verify correct wand position.
- Replace existing wiring one connection at a time, following original route and placement.

### Add switches

NOTE: Instructions below are written for normally-closed valves. For normally-open valves, reverse switch nomenclature (VOS becomes VCS and vice versa).

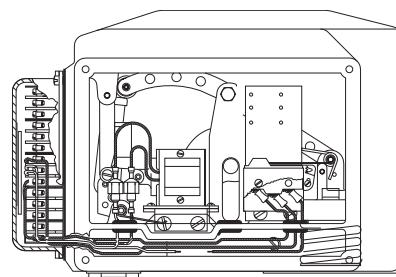
- Check illustrations below. If your valve uses a switch mounting bracket as in Fig. 1 & 2, mount switches to bracket using the mounting holes appropriate for valve type and size. For high capacity valves, mount switches on the support stand.
- Position bracket so VCS wand just touches top of actuator, then move downward slightly, depressing wand until switch clicks, then tighten mounting screws to hold this position.
- Pin bracket by drilling 3 mm diameter holes 6 mm 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.

Fig. 1  
Manual reset actuator  
3/4" - 3" standard flow



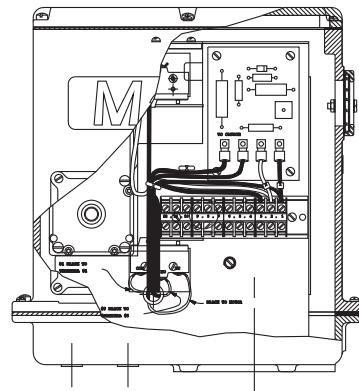
Reference mounting bracket A

Fig. 2  
Automatic reset actuator  
2-1/2" CP - 4" CP and 6" standard flow



Reference mounting bracket B

Fig. 3  
Automatic reset actuator  
4" & 6" high capacity



Switches mount on support stand

## Wand position (for normally-closed valves)

VOS switch wand should be actuated from above

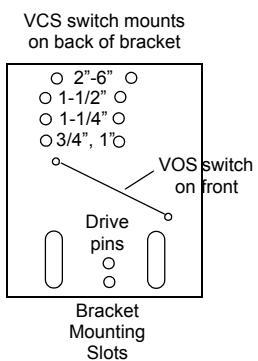


VCS switch wand should be actuated from below

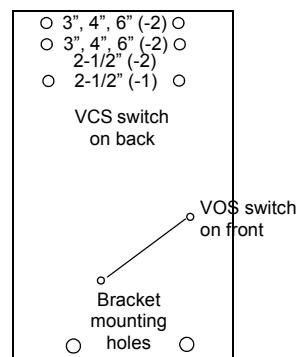


## Mounting brackets

## Mounting bracket A



## Mounting bracket B



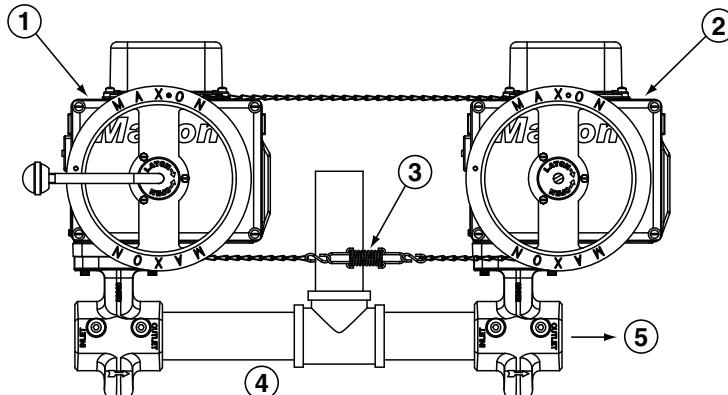
## Tandem arrangements

(for simultaneous opening of main and blocking valves)

### Installation instructions for tandem arrangements

1. Review and comply with all general valve installation instructions provided separately. (See sketch below.)
2. Mount both valves in fuel line with center to center spacing as originally specified, and blocking valve (without handle) downstream of main valve (with handle).
3. Check valve alignment to be certain that operating wheels lie in the same plane.
4. Remove tape from the wheel of the main valve and unwind the attached chain. Do not remove the screw holding chain to wheel; it has been factory positioned to assure correct alignment. Do not remove tension spring attached to one end of chain or the wooden block insert which preloads the spring.
5. Take free end of chain and loop it around the wheels of both main and blocking valve as shown in sketch below. Depending on the specific valve series and arrangement, tension spring may be located either above or below the wheel centerline.
6. Draw free end of chain and tension spring together so that as much slack as possible is eliminated, then insert the open eye of the spring "S" hook through the link in the chain that will most nearly maintain this position.
7. Crimp the "S" hook shut around the chain link, then cut and discard excess chain.
8. Remove spring preload wood block insert from the tension spring, and verify that the chain is drawn tight.
9. Rotate the operating handle of the main valve fully to latching position for your particular valve, then hold handle firmly in this position while performing the next few steps.
10. Rotate blocking valve wheel fully counter-clockwise until it strikes a stop (it will slide within the loop of chain).
11. Still holding main valve wheel in place, move blocking valve wheel approximately 6 mm to 12 mm back in the clockwise direction. Insert the #10-24 X 1/2" screw (furnished) through the chain link that lines up with the tapped hole on bottom of blocking valve wheel, then fasten securely.
12. Verify that the valves are wired in parallel as shown in wiring schematic on page 10-30.1-13.

1) Tandem main valve  
2) Tandem blocking valve  
3) Tension spring  
4) Piping by others  
5) Flow direction



**To add wheel & chain assembly to existing tandem valves**

1. Verify that both valves are in the same top assembly position (TO or AW). Rotate if necessary. (See top assembly rotation instructions on page 10-30.1-33.)
2. Bend handle of main valve outward about 25°.
3. Cut off handle of blocking valve at outer wheel face.
4. Remove hardware holding main valve wheel in place and mount new wheel and spacer to the existing wheel with new hardware provided.
5. Cut chain loop to the desired length and secure to both wheels.

## 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.



**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](http://www.maxoncorp.com). Include valve serial number and nameplate information.

## FITTING CERTIFICATE

We:

Maxon Corporation

Address:

201 E. 18th Street  
Muncie, IN 47302  
USA

Declare that all fittings produced at the above address within the following product group:

Maxon Series MA11, MM11, MA21 and MM21 Valves

Conform to all applicable provisions of the European Gas Appliance Directive.

Certification: Product Identification Number C87BQ83 applies

EC Surveillance: GL Industrial Services (Notified Body Number 0087)

This certificate issued by: Maxon Corporation

Name: Lora Davis

Title/Position: Product Engineering Manager

Date of issue: June 21, 2011