

Design and Application Details

Principle of Operation

The SMARTLINK® MRV System synchronously positions 1, 2, 3, or 4 valves with 0.1-degree precision and repeatability. During ignition sequencing, SMARTLINK® works with the user's burner management system to drive the system to user-defined standby, purge, and light-off positions. After burner ignition, the user's process (or temperature) controller drives SMARTLINK® MRV with a 4-20 mA firing rate command.

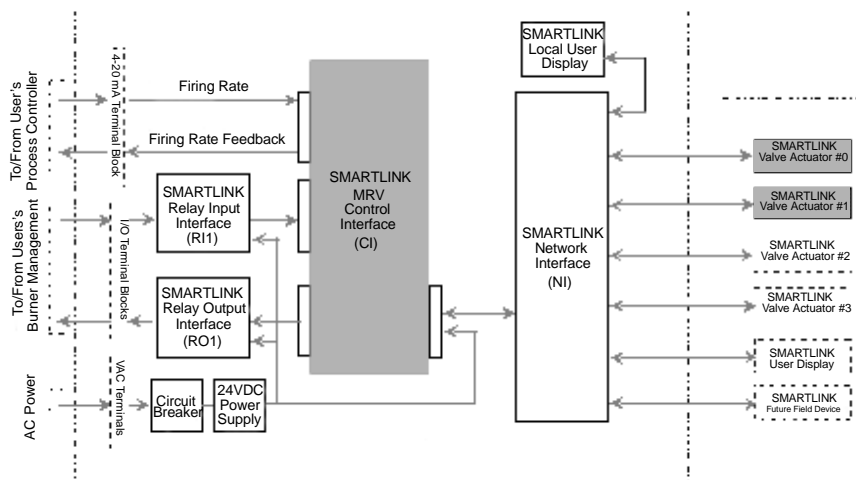
The Valve Actuators perform a high-speed control loop to achieve their position setpoints without overshoot. Valve positions are continuously transmitted digitally by the valve actuator over the communications network to the control interface for verification of proper valve position. The control interface also provides a 4-20 mA output signal that represents actual burner firing rate for process monitoring. This 4-20 mA output is also used to indicate the actual position of the valve selected during the commissioning process.

The Control Interface stores a 22 point, user-commissioned position profile for each valve and translates the firing rate command into synchronized, digital position commands that are sent to the Valve Actuators over a dedicated communications network.

The SMARTLINK® MRV Control Interface also includes a set of switches and indicators to allow the following functions:

- 1) Customize the position profile and commission each valve for precision burner tuning
- 2) Display the operating mode of the system and indicate alarm/fault codes
- 3) Display and change system operating parameters (such as loss of signal operation and valve speed)
- 4) Electronically lock the device to prevent tampering
- 5) Locally control burner firing rate in a manual mode

An optional User Display with a 4-line x 20-character LCD is available to easily commission the system locally or hundreds of feet away near the burner or field instrumentation. The User Display shows all alarm and fault conditions (as text messages), time stamps the last 6 shutdown events, performs system/valve maintenance functions, stores up to 5 system profiles, and restores the system profile if the Control Interface is replaced.



Notes:

1. Non-shaded blocks indicate optional MAXON-supplied equipment
2. Shaded blocks indicate SMARTLINK® MRV required components

Specifications of SMARTLINK® MRV

SMARTLINK® MRV System Specifications	
(For all Interface Panel configurations with factory-wired relay interface modules and power supply)	
Position Accuracy	0.1 degrees (measured on the valve actuator shaft)
Number of Valves	1, 2, 3, or 4
Valve Commissioning Profile	22 field-adjustable positions for each valve including individual standby, purge and light-off positions
Firing Rate Command	4-20 mA isolated input; 4.8V burden @ 20 mA
Firing Rate Feedback	0-20 mA isolated input; 400 ohm max load
Power	24 VDC universal power supply; provides 24 VDC output to all system components 24 VDC within components 1 valve system: 36 W max 2 valve system: 61 W max 3 valve system: 90 W max 4 valve system: 118 W max Optional power supply 120-230 VAC provides 24 VDC to system
Low to High Fire Modulation Speed	20, 40, or 60 seconds (user selectable)
Temperature Range (Ambient)	All components except user display: -40°F to 158°F
Enclosure Ratings	NEMA 4X, IP66 (valve actuator) NEMA 4X, IP66 (Optional MAXON-supplied enclosures with rail mounted components. See page 10-30.7-5 for individual components ratings)
Approvals	FM Class I, Division 2: Groups A,B,C,D,T4 (when provided with specialized NEMA 4X enclosures) UL (US & Canadian): Air Fuel Ratio System and Limit Controls (UL353), Class 2 Software (UL 1998) CE Gas Appliance Directive: Gas-Air Ratio Controller, Class C Software (prEN 12067-2, EN298) CE EMC Directive: Electromagnetic Immunity and Emissions (EN61000) CE Low Voltage Directive: Electrical Safety (EN61010-1)
Relay Outputs	Form A (N.O.), Dry Contacts Contact Ratings: 250VAC/DC @ 12 A
Relay Inputs	120VAC, 230VAC, or 24VDC solid-state

SMARTLINK® MRV Component Specifications	
Control Interface	
Power Input	24VDC, 0.1 A
Firing Rate Command	4-20 mA isolated input; 4.8V burden @ 20 mA
Spare Current Input	4-20 mA isolated input; 4.8V burden @ 20 mA
Firing Rate Feedback	4-20 mA isolated input: 40 Ohm max load
Relay Driver Outputs	Open collector, 30 VDC & 100 mA (max)
Digital Inputs	5-24VDC @ 10 mA (max)
Wiring Terminals	Keyed, plug-type screw terminals; Terminals accept 14-24 gauge wire
Enclosure	1" W x 4.65" H x 3.85" D DIN rail-mounted, NEMA 1, IP20
Relay Output Interface	
Electromechanical Output Relays (6)	Dry Contacts: Form A (normally-open) Max Contact Voltage: 250 VAC/DC Max Contact Current: 12 A (continuous)
Enclosure	1" W x 4.65" H x 3.85" D DIN rail-mounted, NEMA 1, IP20
Relay Input Interface	
Solid State Input Relays (6)	Input On-State Voltage: 120VAC, 230VAC or 24VDC depending on model Input on-State Current: 25 mA Input Off-State Leakage Current: 4 mA (max)
Enclosure	1" W x 4.65" H x 3.85" D DIN rail-mounted, NEMA 1, IP20
Network Interface	
Network Input Connection (1)	24VDC field device power & common Data communication (polarity insensitive)
Network Output Connections (7)	24VDC field device power & common Data communication (polarity insensitive)
Enclosure	1" W x 4.65" H x 3.85" D DIN rail-mounted, NEMA 1, IP20
User Display	
Power Input	24VDC, 0.13 A
Display	4 line x 20 character, back-lit, LCD display
Temperature Range (Ambient)	-20°F to 122°F
Enclosure	5.5" H x 4.25" W x 1.75" D DIN rail-mounted, NEMA 1, IP50
Universal Power Supply	
Power Input	120-230 VAC
Power Output	24VDC, 6 A (max)
Enclosure	5.0" H x 2.12" W x 5.0" D DIN rail-mounted, NEMA 1, IP20
Valve-Actuator Assembly	
Power Input	24VDC, 25W max
Torque	300 in-lbs (33.9 N.m)
Maximum Travel Time	14 seconds (open to close)
Enclosure (Actuator)	7.69" H x 4.4" W x 4.4" D, NEMA 4X, IP66

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Model Number Description

Butterfly Valves

The model number shown on the valve nameplate can accurately identify every MAXON SMARTLINK® MRV Butterfly Valve. The example below shows a typical SMARTLINK® MRV Butterfly Valve model number, along with the available choices for each item represented in the model number. The first three choices determine the valve's configured item number. The next eight characters in the model number identify valve body and actuator options.

Configured Item Number			Valve Body						Actuator			
Valve Size	Flow Capacity	Series		Body Connection	Body Seals	Body Material	Body Internals		Torque Rating	Software Version	Language	Valve Number
0100	S	SRCV	-	A	A	1	1	-	1	1D	A	0

Size

0000 - Actuator Only
0100 - 1"
0125 - 1.25"
0150 - 1.5"
0200 - 2"
0250 - 2.5"
0300 - 3"
0400 - 4"
0600 - 6"
0800 - 8"
1000 - 10"
1200 - 12"
1400 - 14"
1600 - 16"

Flow Capacity

0 - Actuator Only
S - Standard

Series

SRCV - SMARTLINK® MRV Butterfly Valve

Body Connection

A - ANSI Flange
M - "M" Style Flange
X - Special
* - Actuator Only

Body Seals

A - Buna-N
B - Viton
X - Special
* - Actuator Only

Body Material

1 - Cast Iron
2 - Carbon Steel
3 - Brass
5 - Stainless Steel
X - Special
* - Actuator Only

Body Internals

1 - Trim Package 1
2 - Trim Package 1, Oxy Clean
5 - Trim Package 2
6 - Trim Package 2, Oxy Clean
X - Special
* - Actuator Only

Torque Rating

1 - 300 in-lbs
X - Special
* - Valve Body Only

Software Version [1]

V1 - Version 1
1A - Version 1A
1B - Version 1B
1C - Version 1C
1D - Version 1D
XX - Special
** - Valve Body Only

Language

A - English
X - Special
* - Valve Body Only

Valve Number

0 - Valve 0
1 - Valve 1
2 - Valve 2
3 - Valve 3
4 - Spare Actuator

[1] The latest version is the default; proper version must be specified for replacement items

Trim Package Options and Typical Materials:

- 1 - 300 Series Stainless Steel stem, 300 Series Stainless Steel disc and Bronze bushings
- 2 - 300 Series Stainless Steel stem, 300 Series Stainless Steel disc and PEEK bushings

Valve Body Capacities

Butterfly Valves

Butterfly Valve Body Performance Table - 1" through 4"						
Size	Maximum Cv Rating	Minimum Controllable Cv rating	Maximum Inlet Pressure (psig)	Maximum Body Pressure (psig)	Maximum Fluid Temperature (see note 1)	
					Iron & Steel (°F)	Brass (°F)
1"	27	0.50	100	100	250	400
1.25"	70	0.60	100	100	250	400
1.5"	105	0.70	100	100	250	400
2"	190	1.30	100	100	250	400
2.5"	260	2.40	90	100	250	400
3"	360	3.00	60	100	250	400
4"	750	5.00	30	100	250	---

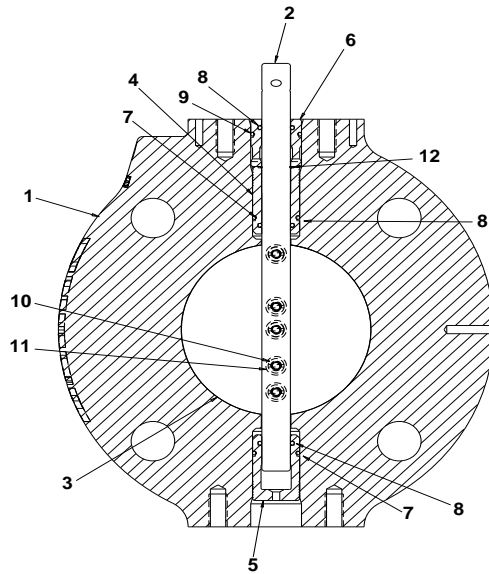
Note 1: Temperatures listed depict limitations of valve body components only. If fluid temperature is greater than 158°F, contact MAXON when applying SMARTLINK® Actuator to valve body assembly.

Butterfly Valve Body Performance Table - 6" through 16"					
Size	Maximum Cv Rating	Minimum Controllable Cv Rating	Maximum Inlet Pressure (psig)	Maximum Body Pressure (psig)	Maximum Fluid Temperature (°F) (see note 1)
6"	1425	12.5	5	100	250
8"	2500	22	5	100	250
10"	4500	35	5	100	250
12"	6400	50	5	100	250
14"	8800	67	5	100	250
16"	11700	88	5	100	250

Note 1: Temperatures listed depict limitations of valve body components only. If fluid temperature is greater than 158°F, contact MAXON when applying SMARTLINK® Actuator to valve body assembly.

Valve Body Assembly Specifications

1" through 4" Butterfly Valves



Body Materials

Item No.	Description	Material Code			
		1	2	3	5
1	Valve Body	Cast Iron ASTM A159 Gr. 3000	Carbon Steel ASTM A216 Gr. WCB	Brass ASTM B62 UNS No. C83600	Stainless Steel ASTM A351 Gr. CF8M

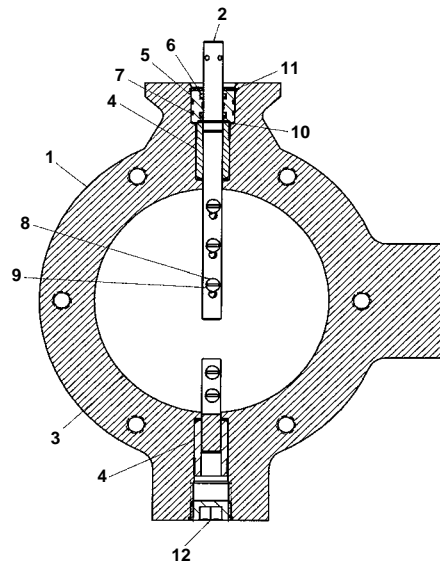
Body Seals

Item No.	Description	Material
7	O-Ring	Standard material options are Buna-N and Viton
8	O-Ring	
9	O-Ring	

Trim Package Materials

Item No.	Description	Internal Trim Package	
		1	2
2	Valve Stem	303 Stainless Steel, ASTM A157 Gr. G3000	
3	Butterfly Disc	304 Stainless Steel (1.4301), ASTM A240 Type 304 UNS No. S30400	
4	Top Bushing	Bronze ASTM B271, B505 and B584 UNS No. C93200	PEEK
5	Bottom Bushing		
6	Top Shim Bushing		
10	Screw	18-8 Stainless Steel	
11	Washer	304 Stainless Steel (1.4301)	
12	Retaining Ring	316 Stainless Steel	

6" through 16" Butterfly Valves



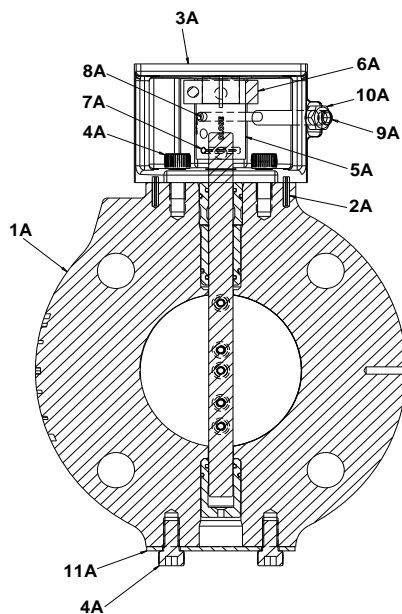
Body Materials		
Item No.	Description	Material Code
		1
1	Valve Body	Cast Iron ASTM A159 Gr. 3000

Body Seals		
Item No.	Description	Material
6	O-Ring	Standard material option is Buna-N
7	O-Ring	

Trim Package Materials			
Item No.	Description	Internal Trim Package	
		1	
Valve Size		6" & 8"	10" through 16"
2	Valve Stem	316 Stainless Steel, ASTM A276	
3	Butterfly Disc	304 Stainless Steel (1.4301) ASTM A167 UNS No. S30400	Carbon Steel ASTM A108 UNS No. G10180
4	Top & Bottom Bushing	Bronze ASTM B271, B505 and B584 UNS No. C93200	
5	Shim Bushing		
8	Screw	304 Stainless Steel (1.4301)	Zinc Plated Carbon Steel
9	Washer	316 Stainless Steel	Zinc Plated Carbon Steel
10	Retaining Ring	Carbon Steel SAE 1060-1090 UNS No. G10600-G10900	
11	Retaining Ring		
12	Pipe Plug	Alloy Steel, ASTM A322 UNS G40370	

Assembly Specifications

Butterfly Valves



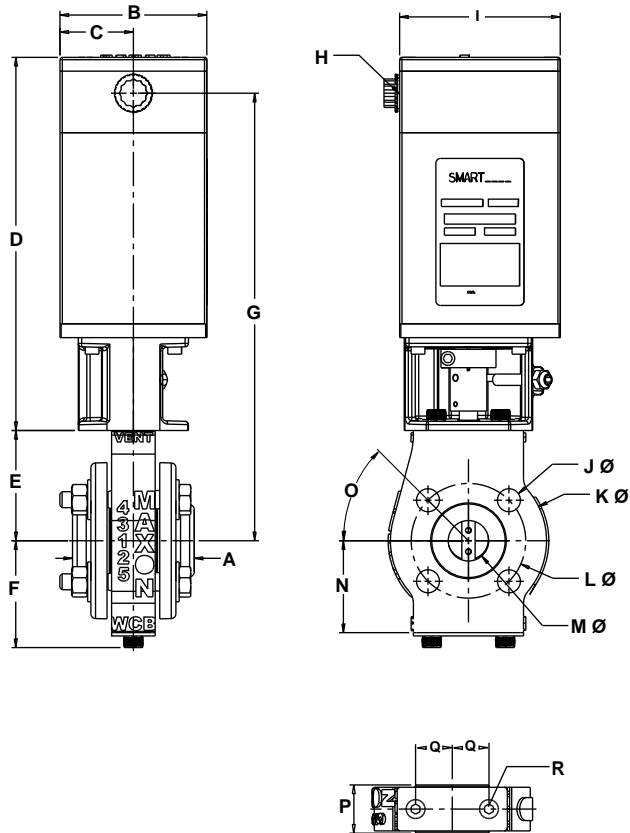
SMARTLINK® Valve Body Assembly Material Specifications

Item No.	Description	SMARTLINK® Component Material Specifications
1A	Valve Body Sub-assembly	Assembly per pages 10-30.7-10 and -11
2A	Locating Spring Pin	Zinc Plated Carbon Steel
3A	Adapter Bracket	ASTM B179 T6 Aluminum
4A*	Socket Head Cap Screw	Zinc Plated Carbon Steel
5A	Coupling	ASTM A582 Type 303 Stainless Steel
6A	Locking Collar	18-8 Type 303 Stainless Steel
7A	Spring Pin	Zinc Plated Carbon Steel
8A	Dowel Pin	303 Stainless Steel
9A	Hard Stop Screw	18-8 Stainless Steel
10A	Hard Stop Nut	Stainless Steel
11A*	Cover Plate	Aluminum

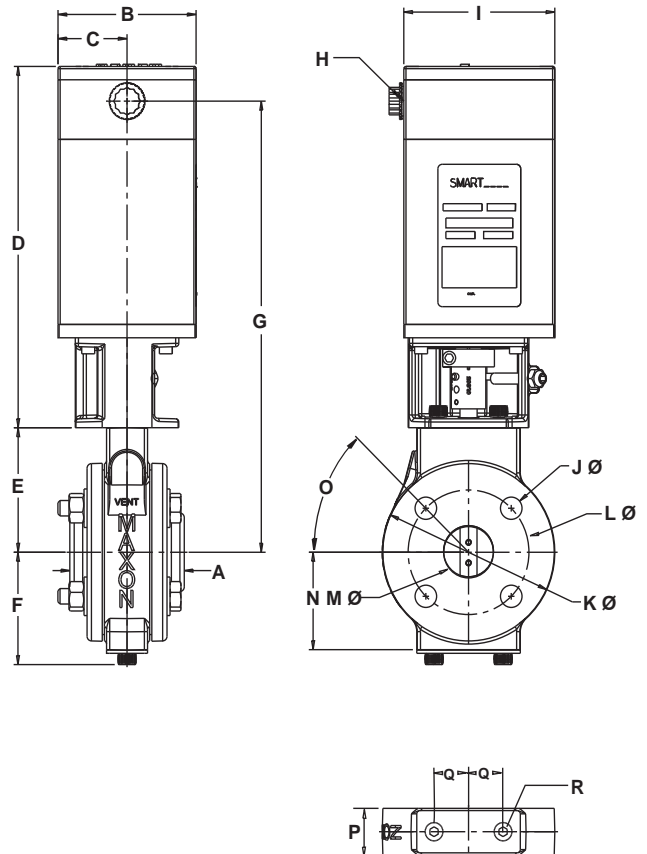
*These items used only on sizes 1" through 4"

Dimensions

1" SMARTLINK® Butterfly Valve



1.25" SMARTLINK® Butterfly Valve



Flange Dimension "A" (in inches)		
Iron	Threaded	2.87
	Socket Welded	2.84
Steel	Threaded	3.15
	Socket Welded	2.84
Brass	Threaded	2.81
	Solder Cup	3.51

Approximate weight: 22 lbs; w/flanges 26 lbs

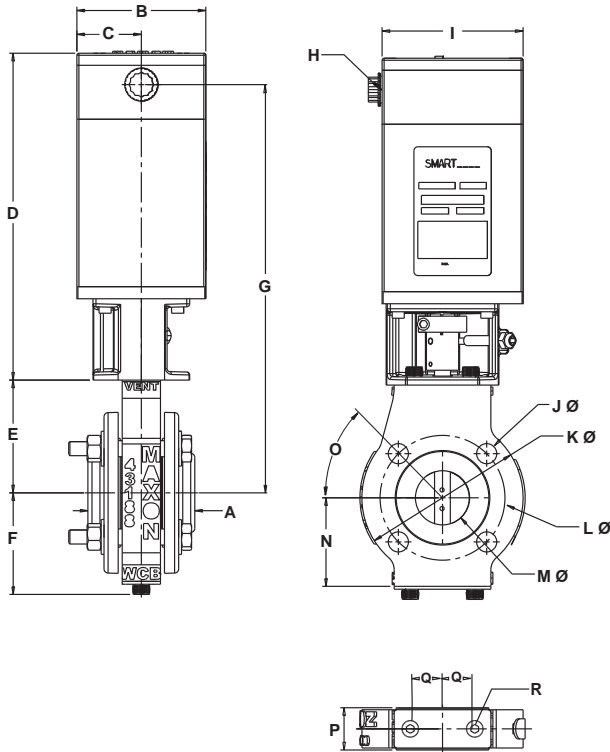
Flange Dimension "A" (in inches)		
Iron	Threaded	3.05
	Socket Welded	3.05
Steel	Threaded	3.12
	Socket Welded	3.05
Brass	Threaded	3.05
	Solder Cup	3.63

Approximate weight: 25 lbs; w/flanges 29 lbs

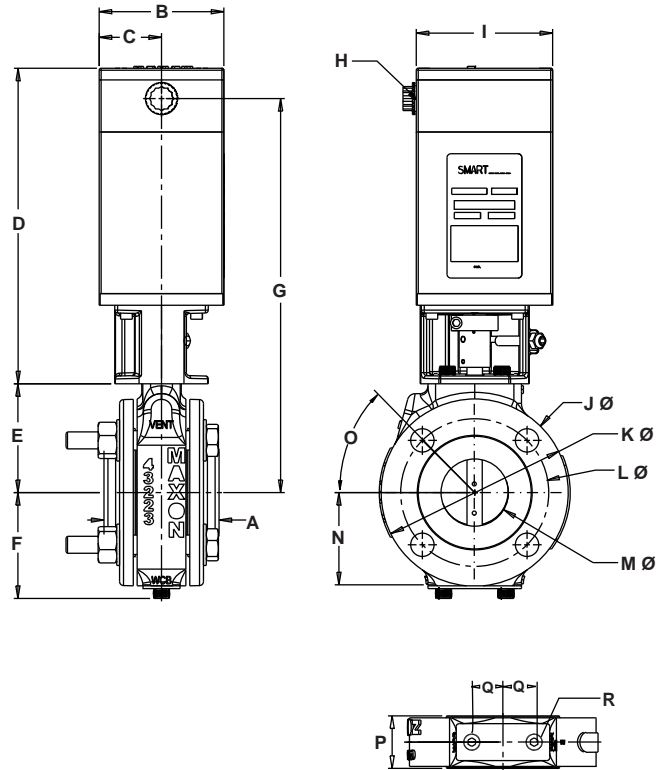
Dimensions in inches unless stated otherwise																	
Size	B	C	D	E	F	G	H NPT	I	J Ø	K Ø	L Ø	M Ø	N	O	P	Q	R [1]
1.0	4.0	2.0	10.2	3.0	2.9	12.2	0.5	4.4	0.62	4.2	3.1	1.1	2.5	45°	1.31	1	0.62
1.25	4.0	2.0	10.2	3.5	3.2	12.7	0.5	4.4	0.62	5.0	3.5	1.4	2.7	45°	1.31	1	0.62

[1] M8 - 1.25 tap, 0.62 deep, 2 holes

1.5" SMARTLINK® Butterfly Valve



2" SMARTLINK® Butterfly Valve



Flange Dimension "A" (in inches)		
Iron	Threaded	3.27
	Socket Welded	3.24
Steel	Threaded	3.23
	Socket Welded	3.24
Brass	Threaded	3.15
	Solder Cup	3.88

Approximate weight: 28 lbs; w/flanges 34 lbs

Flange Dimension "A" (in inches)		
Iron	Threaded	3.43
	Socket Welded	3.51
Steel	Threaded	3.56
	Socket Welded	3.51
Brass	Threaded	3.72
	Solder Cup	4.62

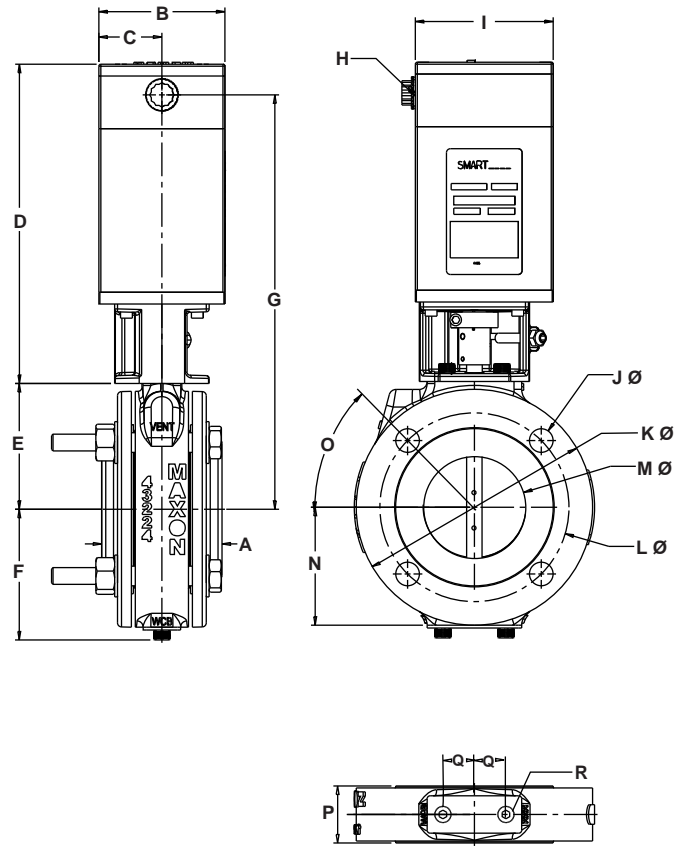
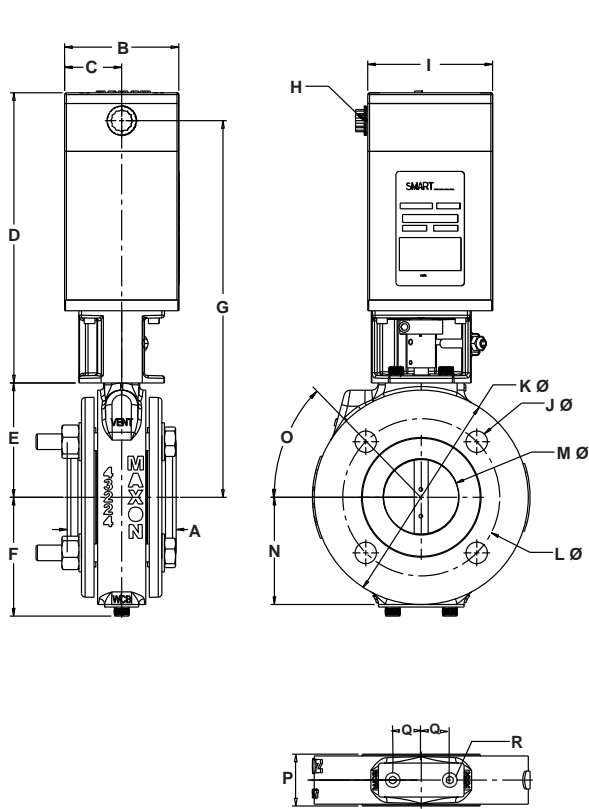
Approximate weight: 31 lbs; w/flanges 39 lbs

Dimension in inches unless stated otherwise																	
Size	B	C	D	E	F	G	H NPT	I	J Ø	K Ø	L Ø	M Ø	N	O	P	Q	R [1]
1.5"	4.0	2.0	10.2	3.5	3.2	12.7	0.5	4.4	0.62	5.0	3.9	1.7	2.8	45°	1.31	1	0.62
2"	4.0	2.0	10.2	3.5	3.4	12.7	0.5	4.4	0.75	6.0	4.8	2.2	3.0	45°	1.69	1	0.62

[1] M8 - 1.25 tap, 0.62 deep, 2 holes

2.5" SMARTLINK® Butterfly Valve

3" SMARTLINK® Butterfly Valve



Flange Dimension "A" (in inches)		
Iron	Threaded	3.72
	Socket Welded	3.79
Steel	Threaded	3.67
	Socket Welded	3.79
Brass	Threaded	3.80
	Solder Cup	5.27

Approximate weight: 39 lbs; w/flanges 58 lbs

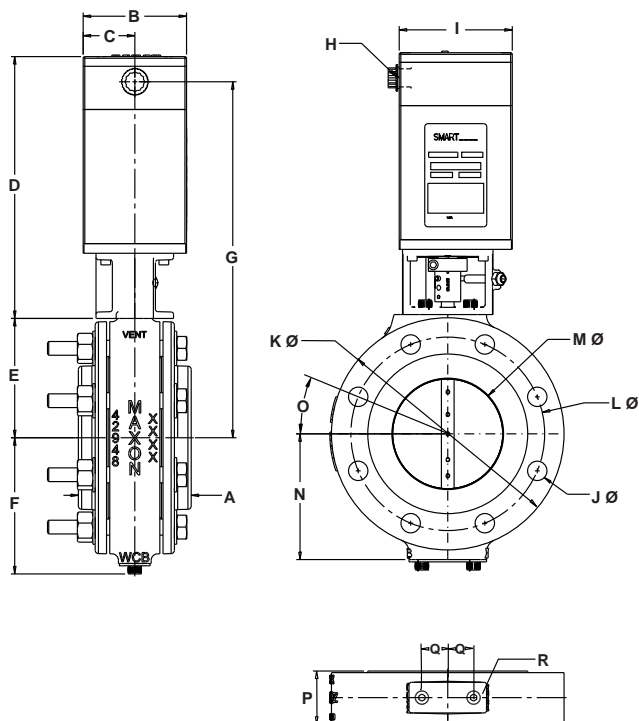
Flange Dimension "A" (in inches)		
Iron	Threaded	3.83
	Socket Welded	4.03
Steel	Threaded	4.13
	Socket Welded	4.03
Brass	Threaded	4.02
	Solder Cup	5.09

Approximate weight: 44 lbs; w/flanges 62 lbs

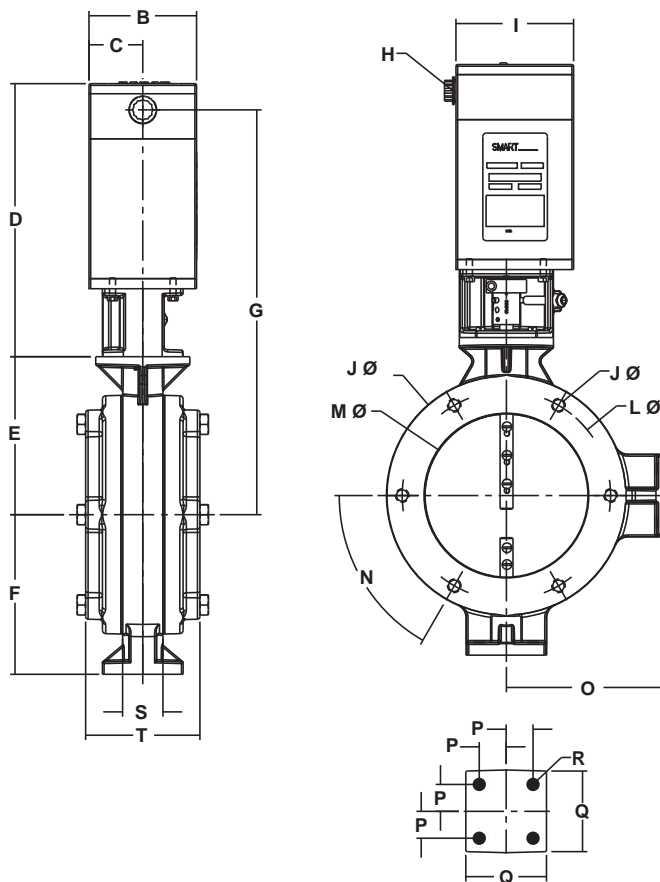
Dimensions in inches unless stated otherwise																	
Size	B	C	D	E	F	G	H NPT	I	J Ø	K Ø	L Ø	M Ø	N	O	P	Q	R [1]
2.5"	4.0	2.0	10.2	4.0	4.2	13.2	0.5	4.4	0.75	7.5	5.5	2.6	3.8	45°	1.81	1	0.62
3"	4.0	2.0	10.2	4.0	4.2	13.2	0.5	4.4	0.75	7.5	6.0	3.3	3.8	45°	1.81	1	0.62

[1] M8 - 1.25 tap, 0.62 deep, 2 holes

4" SMARTLINK® Butterfly Valve



6" SMARTLINK® Butterfly Valve



Flange Dimension "A" (in inches)		
Iron	Threaded	4.13
	Socket Welded	4.06
Steel	Threaded	4.06
	Socket Welded	4.06

Approximate weight: 49 lbs; w/flanges 71 lbs

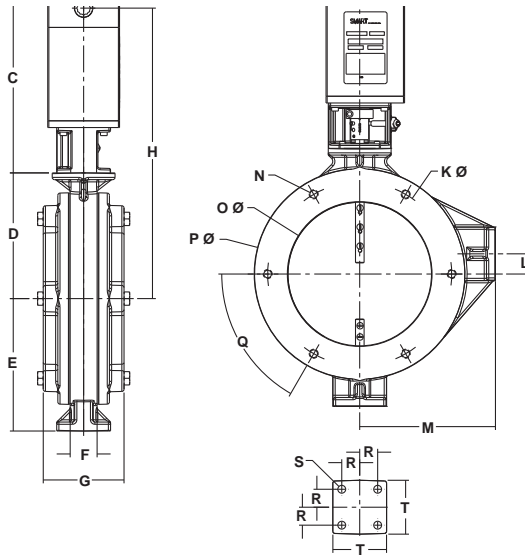
Approximate weight: 55 lbs; w/flanges 71 lbs

Dimensions in inches unless stated otherwise																			
Size	B	C	D	E	F	G	H NPT	I	J	K Ø	L Ø	M Ø	N Ø	O	P	Q	R [2]	S	T
4"	4.0	2.0	10.2	4.6	5.3	13.8	0.5	4.4	0.75	9.0	7.5	4.3	4.9	22.5°	2.06	1	0.62	---	---
6"	4.0	2.0	10.2	5.9	5.9	15.1	0.5	4.4	[1]	8.9	7.75	6.1	6.1	60°	1.0	3.0	0.438	1.5	4.3

[1] 1/2-13 UNC, 6 holes

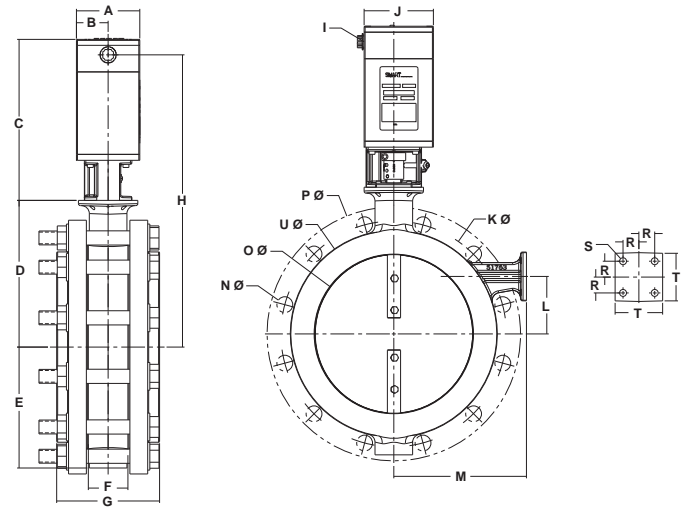
[2] For 4" Valve: M8-1.25 tap, 0.62 deep, 2 holes. For 6" Valve: 1/2-13 UNC, 6 holes

8" SMARTLINK® Butterfly Valve



Approximate weight: 61 lbs; w/flanges 91 lbs

10" SMARTLINK® Butterfly Valve

**Note: Flanges are shipped loose**

Approximate weight: 66 lbs; w/flanges 139 lbs

Dimensions in inches unless stated otherwise

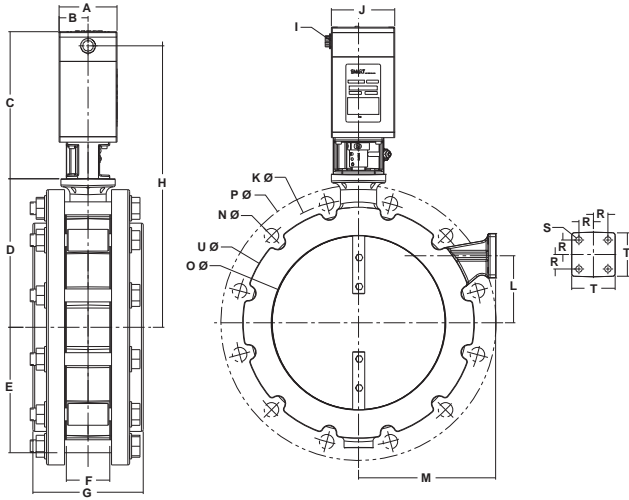
Size	A	B	C	D	E	F	G	H	I NPT	J	K Ø	L	M	N	O Ø	P Ø	Q	R	S [3]	T	U Ø
8"	4.0	2.0	10.2	7.0	7.4	1.5	4.4	16.2	0.5	4.4	10.25	1.1	7.6	[1]	8.0	11.8	60°	1.0	0.438	3.0	---
10"	4.0	2.0	10.2	9.2	7.6	2.5	6.5	18.4	0.5	4.4	14.2	3.6	8.4	[2]	10.0	16.0	---	1.0	0.438	3.0	13

[1] 1/2-13 UNC, 6 holes

[2] 1.0 diameter, 12 holes

[3] 0.438 deep, 4 holes

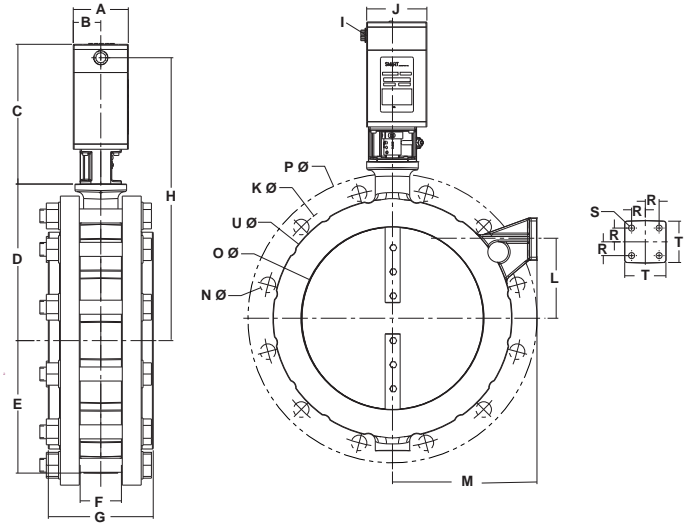
12" SMARTLINK® Butterfly Valve



Note: Flanges are shipped loose.

Approximate weight: 77 lbs; w/flanges 197 lbs

14" SMARTLINK® Butterfly Valve



Note: Flanges are shipped loose.

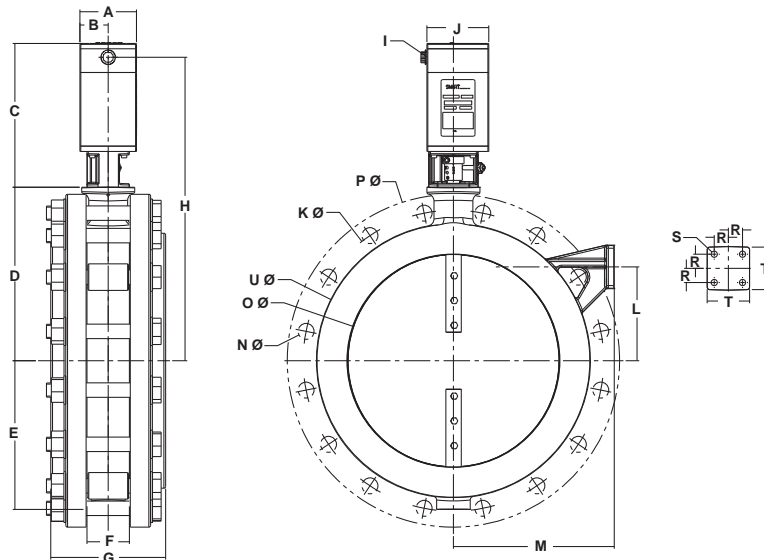
Approximate weight: 109 lbs; w/flanges 266 lbs

Dimensions in inches unless stated otherwise

Size	A	B	C	D	E	F	G	H	I NPT	J	K Ø	L	M	N Ø	O Ø	P Ø	R	S [1]	T	U Ø
12"	4.0	2.0	10.2	10.2	8.7	3.0	7.6	19.4	0.5	4.4	17.0	4.6	9.5	1.0	12.0	19.0	1.0	0.438	3.0	16.0
14"	4.0	2.0	10.2	11.4	9.6	3.0	7.6	20.6	0.5	4.4	18.8	5.8	10.5	1.1	13.2	21.0	1.0	0.438	3.0	17.4

[1] 0.438 deep, 4 holes

16" SMARTLINK® Butterfly Valve



Note: Flanges are shipped loose.

Approximate weight: 134 lbs; w/flanges 343 lbs

Dimensions in inches unless stated otherwise																				
Size	A	B	C	D	E	F	G	H	I NPT	J	K Ø	L	M	N Ø	O Ø	P Ø	R	S [1]	T	U Ø
16"	4.0	2.0	10.2	12.2	10.5	3.0	8.1	21.4	0.5	4.4	21.2	6.6	11.4	1.12	15.0	23.5	1.0	0.438	3.0	19.4

[1] 0.438 deep, 4 holes

Model Number Description

Ball Valves

The model number shown on the valve nameplate can accurately identify every MAXON SMARTLINK® MRV Ball Valve. The example below shows a typical SMARTLINK® MRV Ball Valve model number, along with the available choices for each item represented in the model number. The first three choices determine the valve's configured item number. The next eight characters in the model number identify valve body and actuator options.

Configured Item Number			Valve Body						Actuator			
Valve Size	Flow Capacity	Series		Body Connection	Body Seals & Packing	Body Material	Body Internals		Torque Rating	Software Version	Language	Valve Number
0100	7	SRBV	-	B	E	2	1	-	1	1D	A	0

Size

0000 - Actuator Only
0050 - .5"
0075 - .75"
0100 - 1"
0125 - 1.25"
0150 - 1.5"
0200 - 2"

Flow Capacity

0 - Actuator Only
1 - 1/32" Slot
2 - 1/16" Slot
3 - 1/8" Slot
4 - 3/16" Slot
5 - 1/4" Slot
6 - 30° V
7 - 60° V
8 - 90° V
9 - Round Port

Series

SRBV - SMARTLINK® MRV Ball Valve

Body Connection

A - ANSI Flanged 150#
B - ANSI Threaded
X - Special (see note 1)
* - Actuator Only

Body Seals & Packing

E - Teflon
X - Special (see note 1)
* - Actuator Only

Body Material

2 - Carbon Steel
5 - Stainless Steel
X - Special (see note 1)
* - Actuator Only

Body Internals

1 - Trim Package 1
X - Special (see note 1)
* - Actuator Only

Torque Rating

1 - 300 in-lbs
X - Special
* - Valve Body Only

Software Version

1C - Version 1C
1D - Version 1D
XX - Special
** - Valve Body Only

Language

A - English
X - Special
* - Valve Body Only

Valve Number

0 - Valve 0
1 - Valve 1
2 - Valve 2
3 - Valve 3
4 - Spare Actuator

Note 1: Please see page 10-30.7-22 for all available ball valve options. These will require a special configuration.

Trim Package Options and Typical Materials:

1 - 300 Series Stainless Steel Ball, 300 Series Stainless Steel Stem and Teflon Seat Rings

Valve Body Capacities

Ball Valves

Flow Coefficient - Cv vs. % open											
Size	Insert	0.0%	11.1%	22.2%*	33.3%	44.4%	55.6%	66.7%	77.8%	88.9%	100%
0.5"	1/32" Slot	0.00	0.00	0.03	0.07	0.12	0.16	0.20	0.24	0.28	0.32
	1/16" Slot	0.00	0.01	0.07	0.20	0.33	0.46	0.60	0.73	0.86	1.00
	1/8" Slot	0.00	0.01	0.10	0.36	0.61	0.86	1.10	1.40	1.60	1.80
	30°V	0.00	0.01	0.11	0.24	0.36	0.56	0.84	1.10	1.60	2.10
	60°V	0.00	0.01	0.12	0.33	0.60	0.84	1.40	2.00	3.10	4.40
	Round Port	0.00	0.15	0.29	0.46	0.70	1.10	1.80	2.60	4.30	6.40
0.75"	1/16" Slot	0.00	0.01	0.06	0.24	0.40	0.56	0.73	0.90	1.00	1.20
	1/8" Slot	0.00	0.01	0.14	0.39	0.65	0.90	1.20	1.40	1.70	1.90
	30°V	0.00	0.01	0.11	0.24	0.41	0.67	1.00	1.40	1.90	2.60
	60°V	0.00	0.01	0.13	0.36	0.55	1.00	1.50	2.30	3.60	5.00
	Round Port	0.00	0.21	0.43	0.70	1.10	1.60	2.60	4.00	6.40	9.60
1"	1/16" Slot	0.00	0.03	0.10	0.40	0.67	0.94	1.20	1.50	1.70	1.90
	3/16" Slot	0.00	0.03	0.22	0.82	1.40	1.90	2.50	3.10	3.50	4.00
	30°V	0.00	0.03	0.21	0.56	1.00	1.60	2.40	3.40	4.60	6.20
	60°V	0.00	0.03	0.30	0.78	1.20	2.30	3.60	5.30	8.30	11.60
	90°V	0.00	0.03	0.48	1.20	2.30	3.50	5.40	7.70	10.80	12.10
	Round Port	0.00	0.58	1.20	1.90	2.80	4.30	7.00	10.50	17.00	26.00
1.25"	3/16" Slot	0.00	0.05	0.38	1.40	2.40	3.40	4.40	5.40	6.20	6.90
	30°V	0.00	0.05	0.39	1.00	1.80	2.90	4.40	6.40	8.60	11.40
	60°V	0.00	0.06	0.48	1.30	2.00	3.70	5.80	8.50	13.40	18.70
	90°V	0.00	0.06	0.78	2.00	3.70	5.70	8.80	12.50	17.50	19.70
	Round Port	0.00	0.91	1.80	3.00	4.40	6.70	10.90	16.40	26.60	40.60
1.5"	3/16" Slot	0.00	0.05	0.47	1.80	3.00	4.20	5.40	6.80	7.70	8.60
	30°V	0.00	0.05	0.41	1.20	2.10	3.50	5.20	7.60	10.30	13.70
	60°V	0.00	0.06	0.57	1.70	3.00	5.60	9.10	13.20	19.80	28.40
	90°V	0.00	0.06	1.00	2.80	4.50	8.10	13.40	19.70	30.90	47.10
	Round Port	0.00	1.50	3.00	4.80	7.20	11.00	18.00	27.00	44.00	65.50
2"	1/4" Slot	0.00	0.05	0.75	2.90	4.80	6.80	8.70	10.80	12.30	13.80
	30°V	0.00	0.05	0.55	1.70	3.40	5.70	8.30	12.10	16.60	22.20
	60°V	0.00	0.06	0.70	2.60	4.90	9.30	15.50	22.20	32.10	47.20
	90°V	0.00	0.06	0.88	3.30	6.10	11.70	19.40	27.50	40.10	59.00
	Round Port	0.00	2.20	4.30	7.00	10.50	16.20	26.40	39.60	64.00	96.00

*Select valves for minimum controllable Cv at 22°. Errors may become substantial below this point.

Ball Valves

Additional Ball Valve Options for Special Configuration

Body Connection

Flat-Faced Flanged
Butt Weld
Extended Butt Weld
Clamp Ends
Groove Ends
Socket Weld
Extended Socket Weld
Tube Ends
300# RF Flanged
600# RF Flanged

Body Seals & Packing

Body Seals

Graphite
Kel-F
Peek
RPTFE
Carbon-Filled RPTFE
UHMWPE
Viton

Packing

Graphite
RPTFE
Carbon-Filled RPTFE

Thrust Washer

Graphite
Hostafion
Kel-F
Peek
RPTFE
Carbon-Filled RPTFE
UHMWPE

Body Material

Duplex
400 SS
Alloy 20
Monel
Bronze
Hastelloy c
CF8
Titanium

Body Internals

Stem & Ball

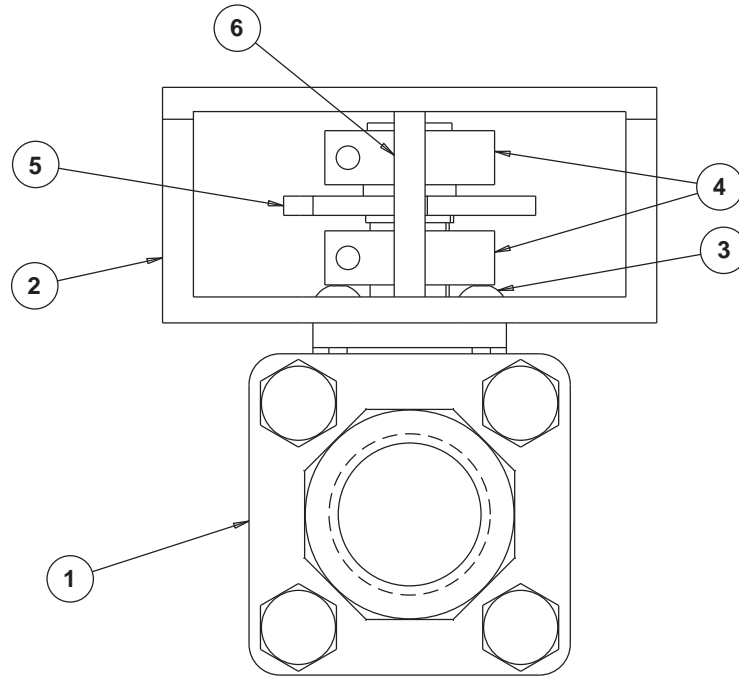
Duplex
400 SS
Alloy 20
Monel
Bronze
Hastelloy c
CF8
Titanium

Seat Rings

PFA
Delrin
Hostafion
Kel-F
Peek
RPTFE
Carbon-Filled RPTFE

Assembly Specifications

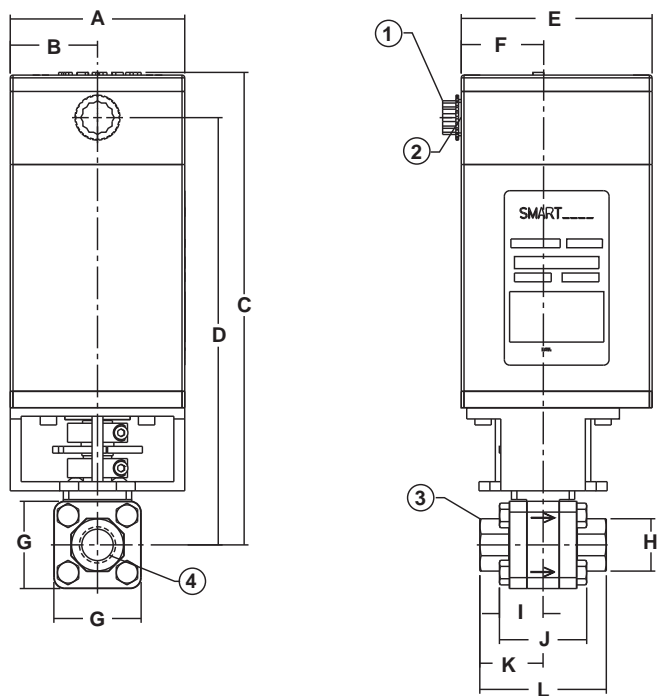
Ball Valves



Item Number	Description	Component Material Specifications
1	Valve Body Sub-assembly	Based on selection on page 10-30.7.20
2	Bracket	6063-T6 Aluminum Alloy UNS A96063
3	Button Head Screw	18-8 (type 303) Stainless Steel
4	Coupling Collar	18-8 (type 303) Stainless Steel
5	Coupling	303 Stainless Steel ASTM A582 UNS No. S30300
6	Hard Stop Pin	420 Stainless Steel

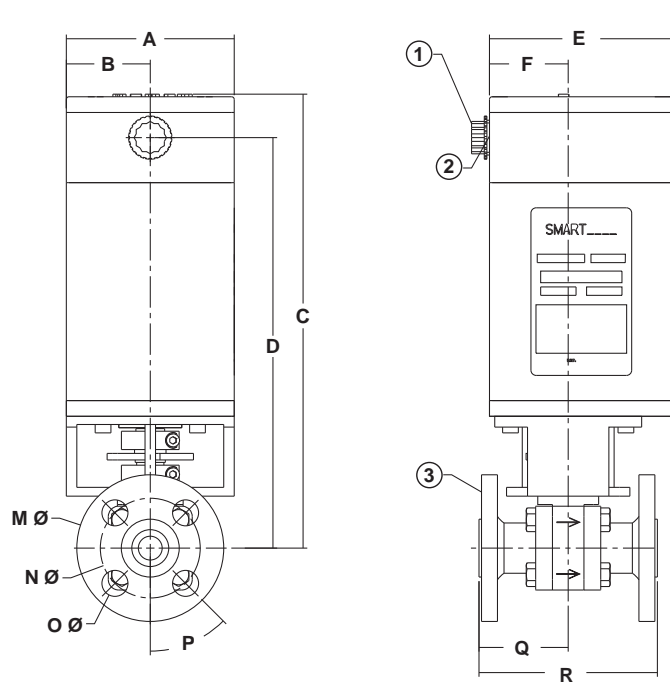
Dimensions

0.5" SMARTLINK® Ball Valve - Threaded



Approximate weight: 12 lbs.

0.5" SMARTLINK® Ball Valve - Flanged



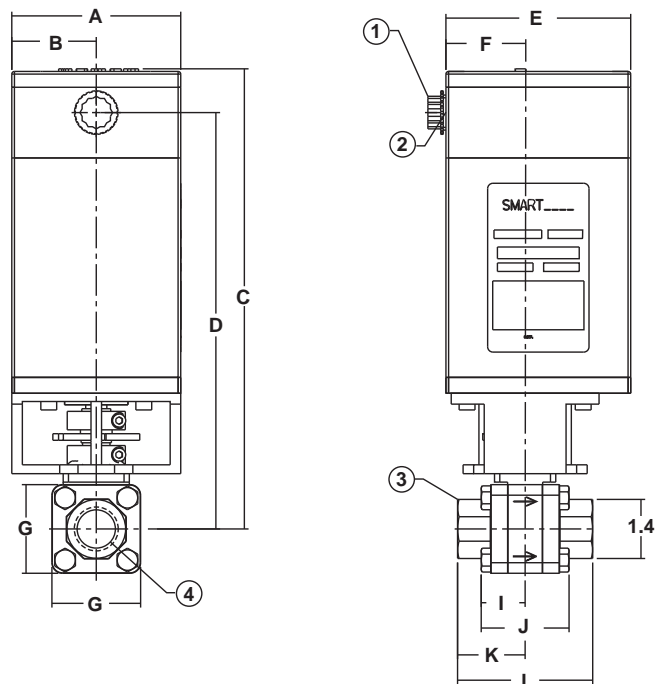
Approximate weight: 14 lbs.

Dimensions in inches unless stated otherwise

Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
0.5"	4.0	2.0	10.83	9.8	4.38	1.89	2.0	1.2 oct.	1.0	2.0	1.45	2.9	3.5	2.38	0.62	45°	2.12	4.25

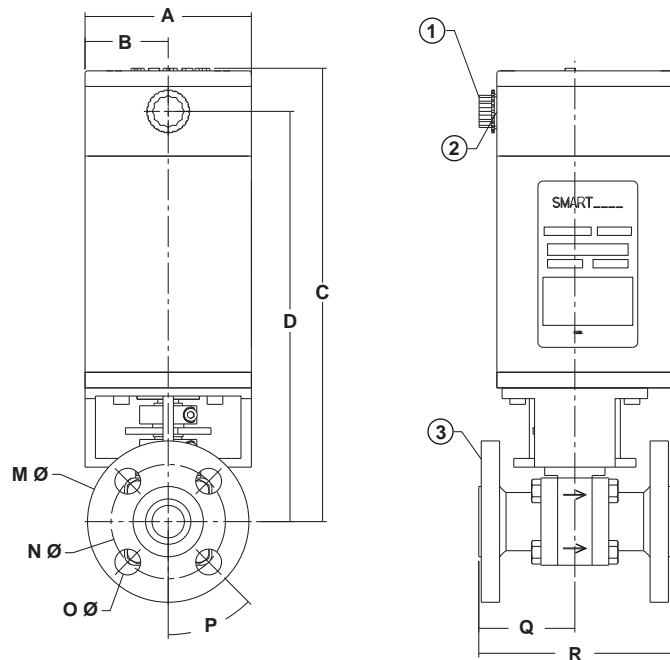
Number	Description
1	Temporary shipping plug
2	1/2" NPT threads
3	Inlet end
4	1/2" NPT

0.75" SMARTLINK® Ball Valve - Threaded



Approximate weight: 13 lbs.

0.75" SMARTLINK® Ball Valve - Flanged



Approximate weight: 16 lbs.

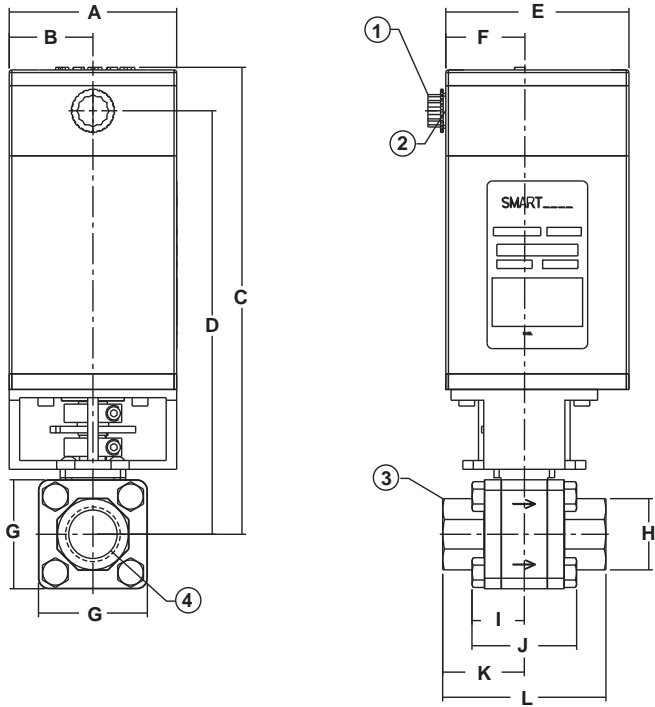
Dimensions in inches unless stated otherwise

Size	A	B	C	D	E	F	G	H oct.	I	J	K	L	M Ø	N Ø	O Ø	P	Q	R
0.75"	4.0	2.0	10.9	9.87	4.38	1.89	2.1	1.4	1.04	2.08	1.6	3.2	3.88	2.75	0.62	45°	2.31	4.62

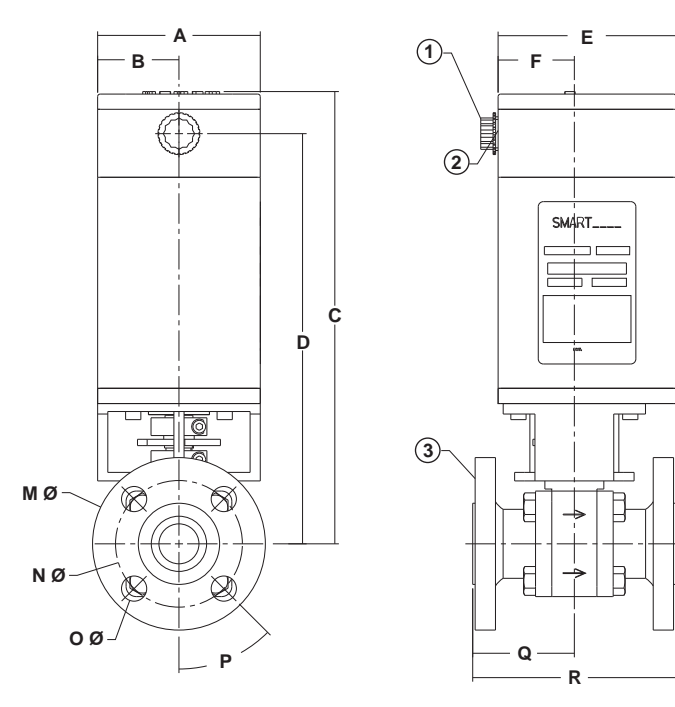
Number	Description
1	Temporary shipping plug
2	1/2" NPT threads
3	Inlet end
4	3/4" NPT

1" SMARTLINK® Ball Valve - Threaded

1" SMARTLINK® Ball Valve - Flanged



Approximate weight: 15 lbs.



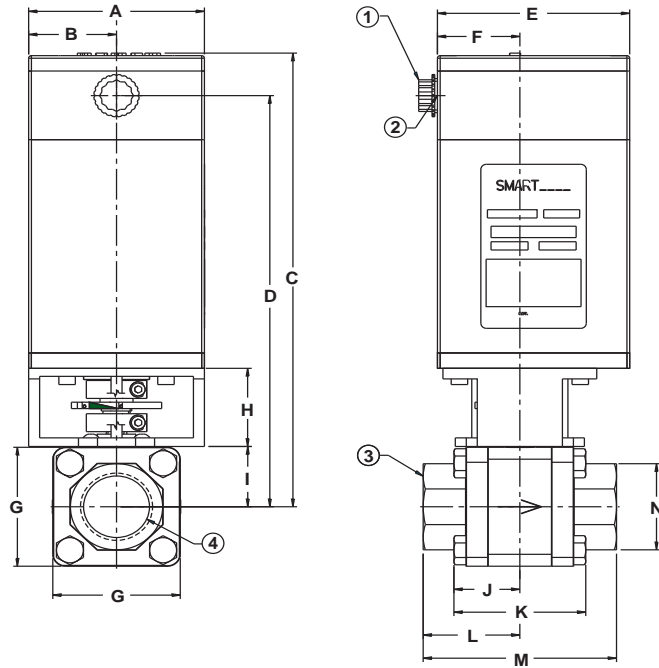
Approximate weight: 18 lbs.

Dimensions in inches unless stated otherwise

Size	A	B	C	D	E	F	G	H oct.	I	J	K	L	M Ø	N Ø	O Ø	P	Q	R
1"	4.0	2.0	11.14	10.11	4.38	1.89	2.6	1.7	1.25	2.5	1.95	3.9	4.25	3.12	0.62	45°	2.5	5.0

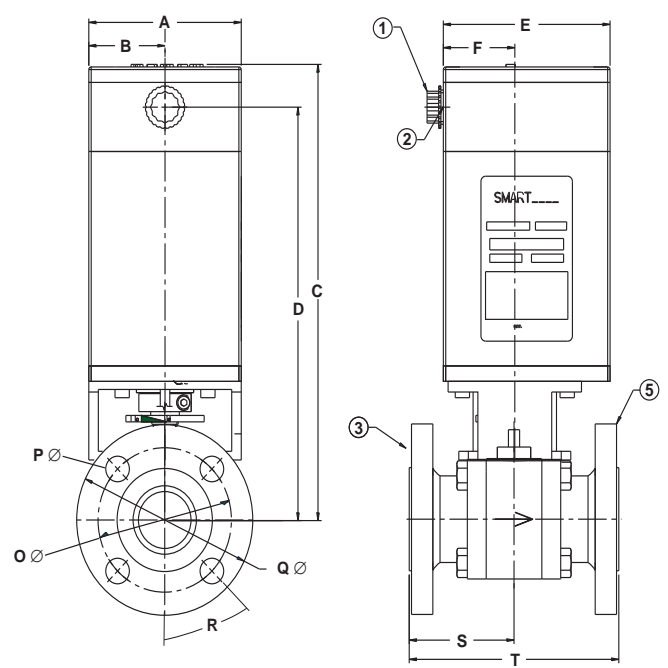
Number	Description
1	Temporary shipping plug
2	1/2" NPT threads
3	Inlet end
4	1/2" NPT

1.25" SMARTLINK® Ball Valve - Threaded



Approximate weight: 16.5 lbs.

1.25" SMARTLINK® Ball Valve - Flanged

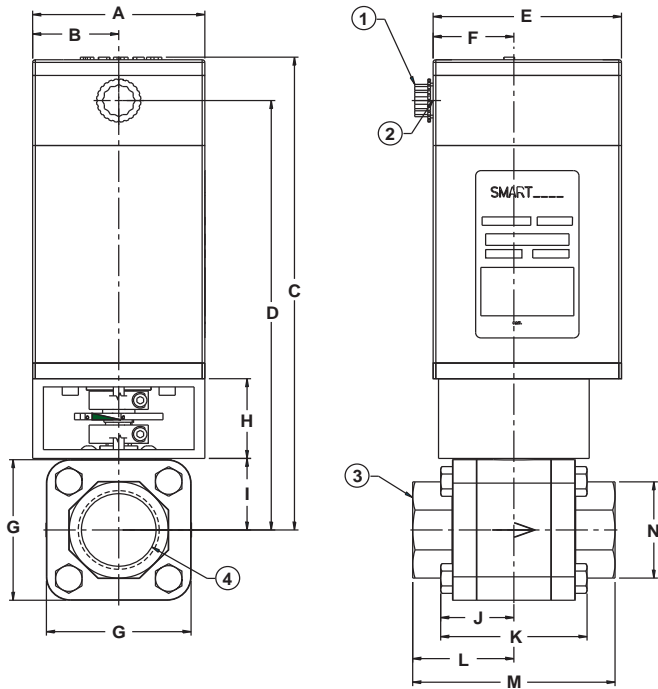


Approximate weight: 21.5 lbs.

Dimensions in inches unless stated otherwise																				
Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N oct.	O Ø	P Ø	Q Ø	R	S	T
1.25"	4.0	2.0	11.06	10.03	4.38	1.88	2.9	1.91	1.47	1.5	3.0	2.2	4.4	2.1	3.5	.62	4.62	45°	2.75	5.5

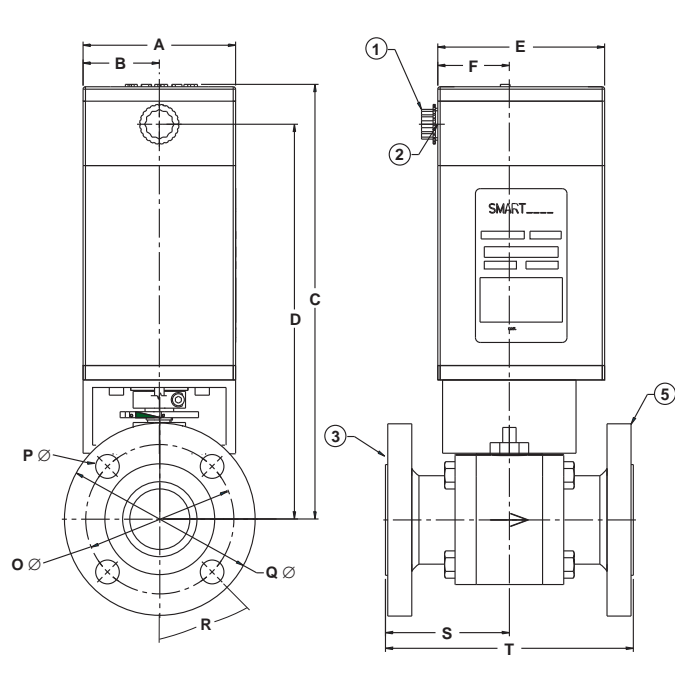
Number	Description
1	Temporary shipping plug
2	1/2" NPT threads
3	Inlet end
4	1-1/4" NPT
5	150# ANSI flange

1.5" SMARTLINK® Ball Valve - Threaded



Approximate weight: 19 lbs.

1.5" SMARTLINK® Ball Valve - Flanged



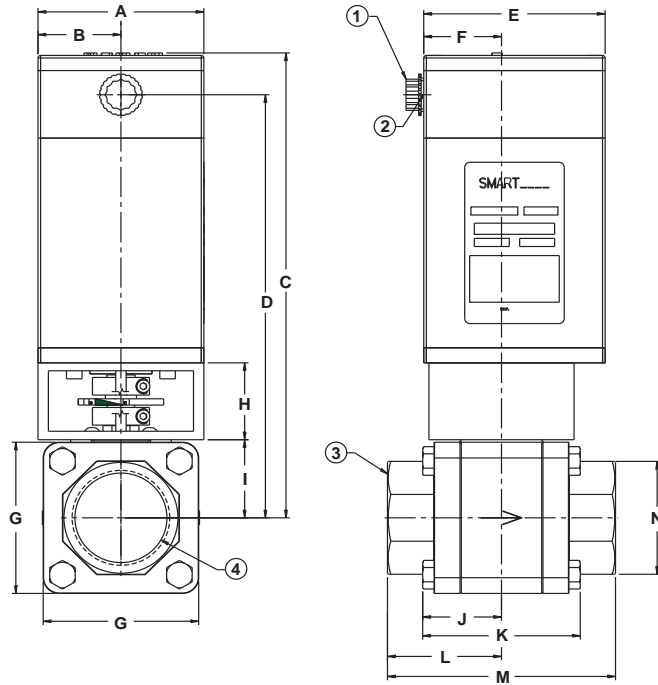
Approximate weight: 26 lbs.

Dimensions in inches unless stated otherwise

Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N oct.	O Ø	P Ø	Q Ø	R	S	T
1.5"	4.0	2.0	11.3	10.27	4.38	1.88	3.36	1.91	1.71	1.7	3.4	2.35	4.7	2.3	3.88	.62	5.0	45°	3.25	6.5

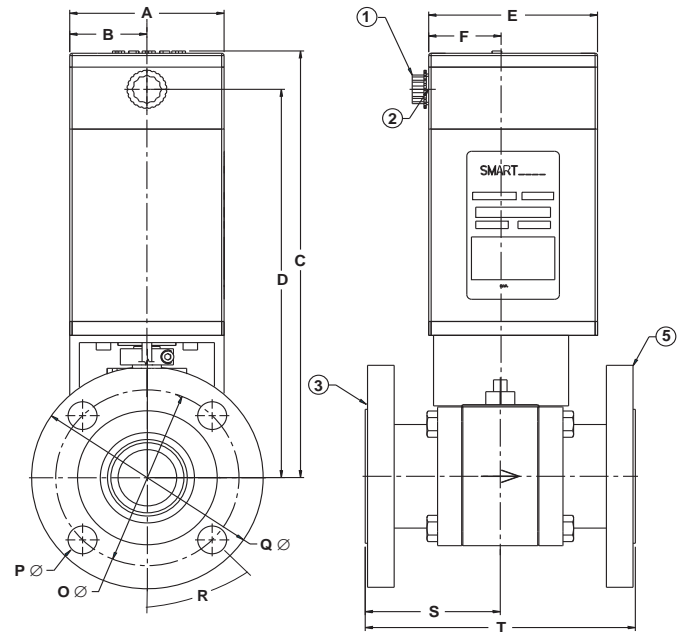
Number	Description
1	Temporary shipping plug
2	1/2" NPT threads
3	Inlet end
4	1-1/2" NPT
5	150# ANSI flange

2" SMARTLINK® Ball Valve - Threaded



Approximate weight: 22 lbs.

2" SMARTLINK® Ball Valve - Flanged



Approximate weight: 31 lbs.

Dimensions in inches unless stated otherwise

Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N oct.	O Ø	P Ø	Q Ø	R	S	T
2"	4.0	2.0	11.53	10.49	4.38	1.88	3.75	1.91	1.94	1.90	3.80	2.75	5.5	2.8	4.75	.75	6.0	45°	3.5	7.0

Number	Description
1	Temporary shipping plug
2	1/2" NPT threads
3	Inlet end
4	2" NPT
5	150# ANSI flange

Model Number Description

Control Actuator

The model number shown on the actuator nameplate can accurately identify every MAXON SMARTLINK® MRV Control Actuator. The example below shows a typical SMARTLINK® MRV Control Actuator model number, along with the available choices for each item represented in the model number. The first choice determines the actuator's configured item number. The next six choices in the model number identify the connection and actuator options.

Configured Item Number										
Series		Connection		Torque Rating	Software Version	Language		Valve Number		Rotation
SR CA	-	K1	-	1	1D	A	-	0	-	2

Series

SR CA - SMARTLINK® MRV Control Actuator

Connection

K1 - 1/2" Keyed Output Shaft
L1 - Linkage Arm
S1 - 1/2" Square Output Shaft
S2 - 3/4" Square Output Shaft

Torque Rating

1 - 300 in-lbs
X - Special

Software Version

1D - Version 1D
XX - Special

Language

A - English
X - Special

Valve Number

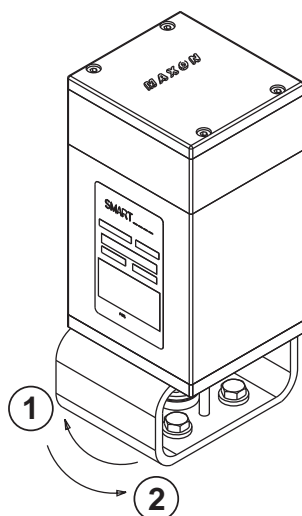
0 - Valve 0
1 - Valve 1
2 - Valve 2
3 - Valve 3

Rotation

1 - Clockwise
2 - Counter-clockwise

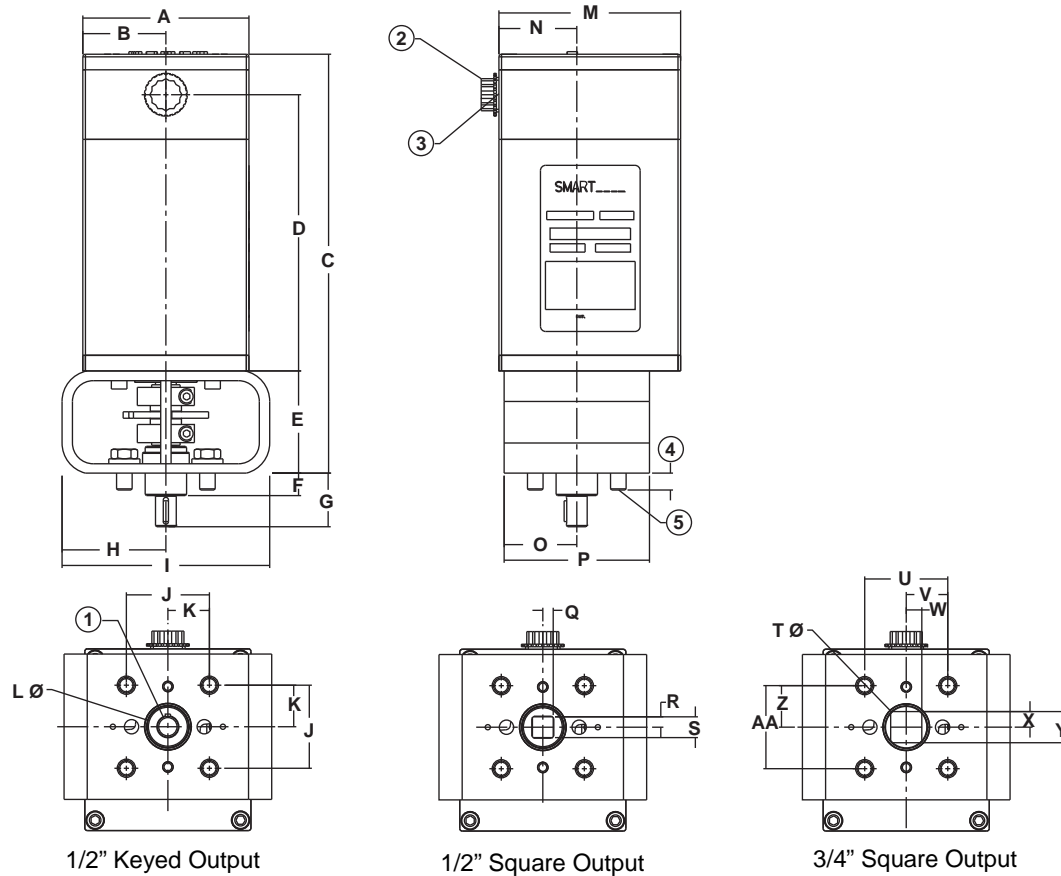
Control Actuator Rotation

- 1) Clockwise rotation
- 2) Counter-clockwise rotation



Dimensions

Control Actuator



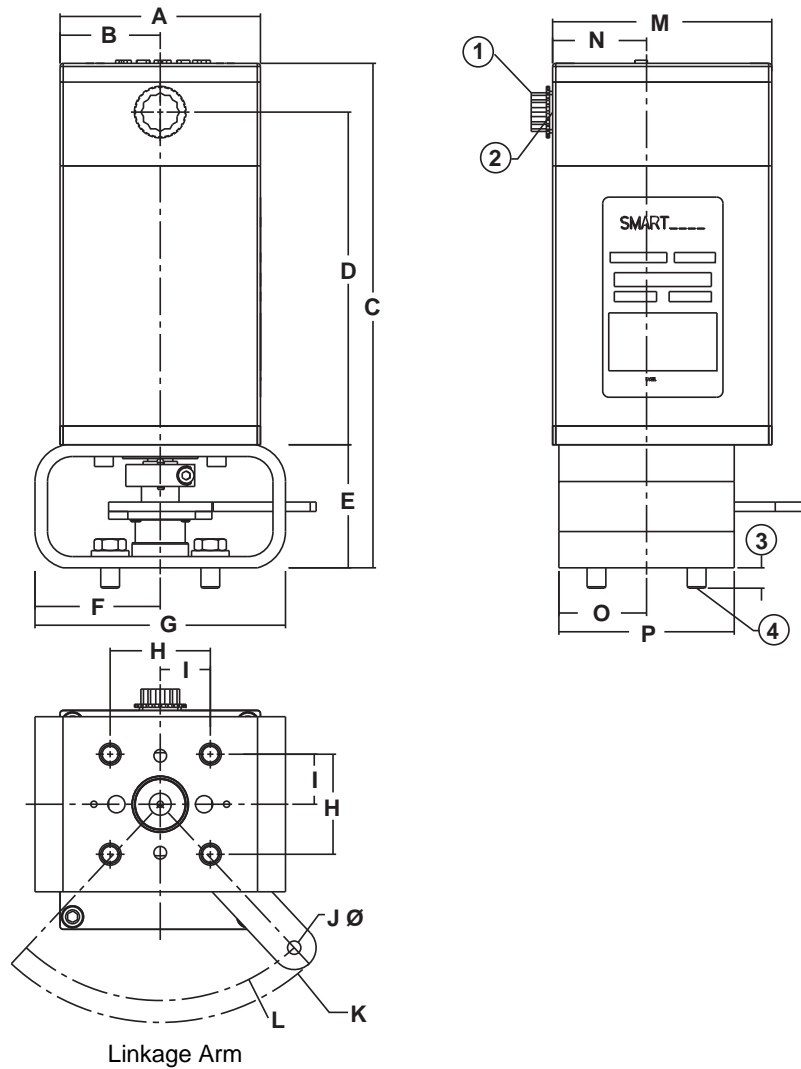
Approximate weight: 15 lbs

Dimensions in inches unless specified otherwise													
A	B	C	D	E	F	G	H	I	J	K	L Ø	M	N
4.0	2.0	10.08	6.65	2.46	0.54	1.29	2.5	5.0	2.0	1.0	1.0	4.38	1.88

Dimensions in inches unless specified otherwise													
O	P	Q	R	S	T Ø	U	V	W	X	Y	Z	AA	
1.75	3.5	0.25	0.25	0.5	1.0	2.0	1.0	0.375	0.375	0.75	1.0	2.0	

Number	Description
1	.5 dia. w/ 1/8" key
2	Temporary shipping plug
3	1/2" NPT threads
4	4 x 4.1
5	4X 3/8-16 UNC

Control Actuator



Approximate weight: 15 lbs

Dimensions in inches unless stated otherwise

A	B	C	D	E	F	G	H	I	J Ø	K rad.	L rad.	M	N	O	P
4.0	2.0	10.08	6.65	2.46	2.5	5.0	2.0	1.0	0.27	4.358	3.921	4.38	1.88	1.75	3.5

Number	Description
1	Temporary shipping plug
2	1/2" NPT threads
3	4X .41
4	4X 3/8-16 UNC

Model Number Description

Spare Actuator

The model number shown on the actuator nameplate can accurately identify every MAXON SMARTLINK® MRV Spare Actuator. The example below shows a typical SMARTLINK® MRV Spare Actuator model number, along with the available choices for each item represented in the model number. The first choice determines the actuator's configured item number. The next five choices in the model number identify the connection and actuator options.

Configured Item Number		Actuator						
Series		Torque Rating	Software Version	Language		Valve Number		Rotation
SR SA	-	1	1D	A	-	4	-	2

Series

SR SA - SMARTLINK® MRV Spare Actuator

Torque Rating

1 - 300 in-lbs
X - Special

Language

A - English
X - Special

Software Version

V1 - Version 1
1A - Version 1A
1B - Version 1B
1C - Version 1C
1D - Version 1D
XX - Special

Valve Number

0 - Valve 0
1 - Valve 1
2 - Valve 2
3 - Valve 3
4 - Spare Actuator

Rotation [1]

1 - Clockwise
2 - Counter-clockwise

[1] The correct rotation must be specified.

- Butterfly Valves are always supplied in a counter-clockwise rotation.
- Ball Valves are always supplied in a counter-clockwise rotation.
- Control Actuators are customer-specific and rotation must be obtained from the actuator this spare is intended to replace.

Model Number Description

Control Interface

The model number shown on the control interface nameplate can accurately identify every MAXON SMARTLINK® MRV Control Interface. The example below shows a typical SMARTLINK® MRV Control Interface model number, along with the available choices for each item represented in the model number. The first four characters determine the Control Interface's configured item number. The next 11 characters in the model number identify the assembly options.

Configured Item #	Assembly Options														
	Software Version	Language	Enclosure		User Display	Interface Panel/Plate	Power Supply		Network Interface	Relay Input Interface	Relay Output Interface	Rail Assemblies		Valve Count	
SR CI	1D	A	2	-	1	A	1	-	1	B	1	1		2	

Series

SR CI - SMARTLINK® MRV Control Interface

Software Version

V1 - Version 1
1A - Version 1A
1B - Version 1B
1C - Version 1C
1D - Version 1D
XX - Special

Language

A - English
X - Special

Enclosure

0 - None
1 - 24x20x8, NEMA 4/4X, Window
2 - 24x20x8, NEMA 4/4X, SS304 (1.4301), Window
3 - 24x20x8, NEMA 4/4X, SS316, Window
4 - 20x16x8, NEMA 4/4X, Window
5 - 20x16x8, NEMA 4/4X, SS304 (1.4301), Window
6 - 20x16x8, NEMA 4/4X, SS316, Window
7 - 20x16x8, NEMA 4/4X, No Window
8 - 20x16x8, NEMA 4/4X, SS304 (1.4301), No Window
9 - 20x16x8, NEMA 4/4X, SS316, No Window
X - Special

User Display [1]

0 - None
1 - Mounted Inside Enclosure
2 - Mounted Outside Enclosure
3 - Mounted Outside Enclosure w/dust cover

Interface Panel/Plate

0 - None
A - 24x20 Plate, prewired
B - 24x20 316SS Plate, prewired
C - 20x16 Plate, prewired
D - 20x16 316SS Plate, prewired
X - Special

Power Supply

0 - None
1 - 24VDC
X - Special
* - Included w/Interface Panel

Network Interface

0 - None
1 - Yes
* - Included w/Interface Panel

Relay Input Interface [2]

0 - None
A - 24 VDC
B - 120 VAC
C - 230 VAC

Relay Output Interface

0 - None
1 - Yes
* - Included w/Interface Panel

Rail Assemblies

0 - None
1 - Control Rail Assembly
2 - Control Rail and Terminal Block Assembly
* - Both included w/Interface Panel

Valve Count

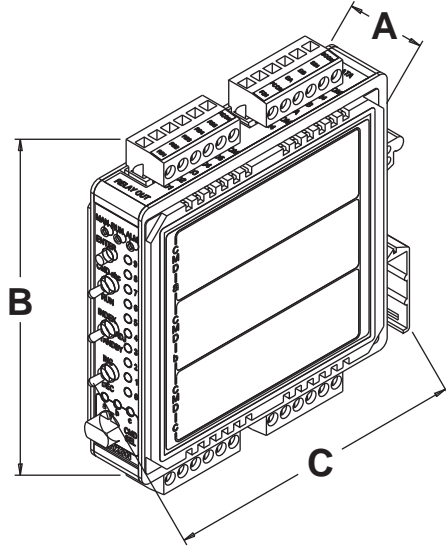
2 - Two Valve System
3 - Three Valve System
4 - Four Valve System

[1] Outside enclosure can only be chosen for a non-window enclosure

[2] One option must be chosen when an Interface Panel/Plate is specified

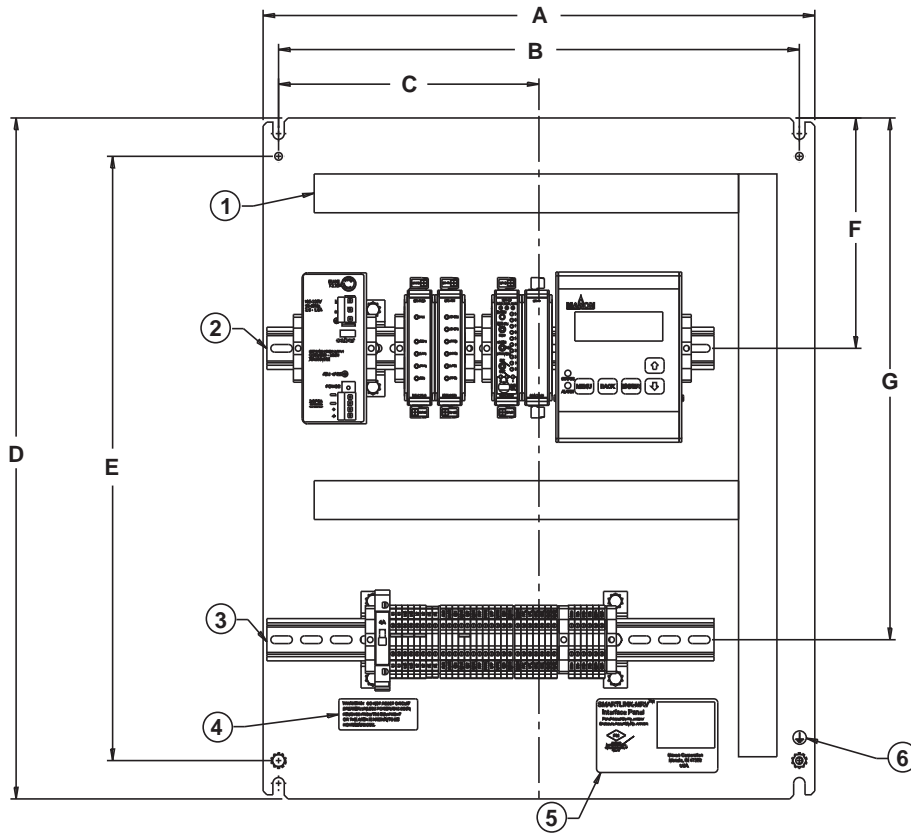
Dimensions

Control Interface



Dimensions in inches unless stated otherwise		
A	B	C
1.00	4.57	4.53

24 x 20" SMARTLINK® MRV Interface Panel (without enclosure)



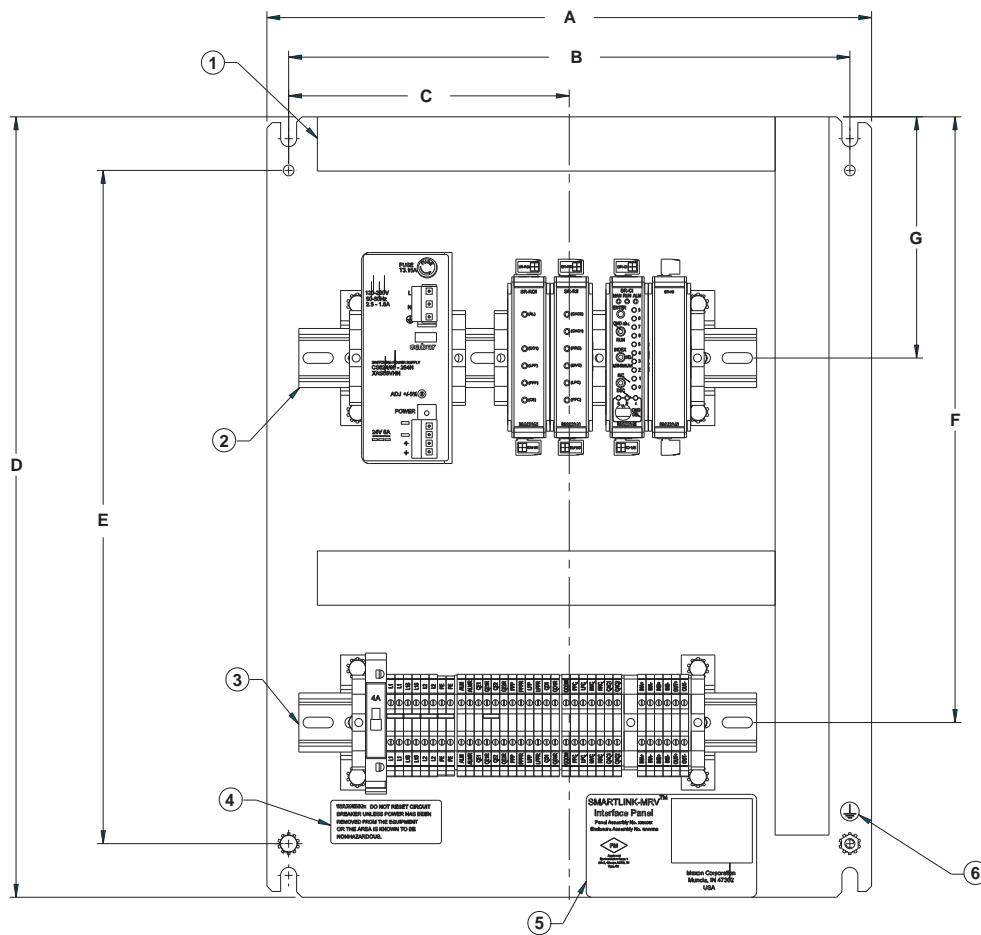
NOTE: Maximum options shown

Dimensions in inches unless stated otherwise						
A	B (1)	C	D	E (1)	F	G
18.2	17.18	8.59	2.20	19.7	7.51	17.01

[1] Mounting centers

Number	Description
1	1" wide x 2" high wire duct (typ.)
2	Control rail assembly
3	Terminal block rail assembly
4	Warning label
5	Interface panel label
6	Ground label

20 x 16" SMARTLINK® MRV Interface Panel (without enclosure)



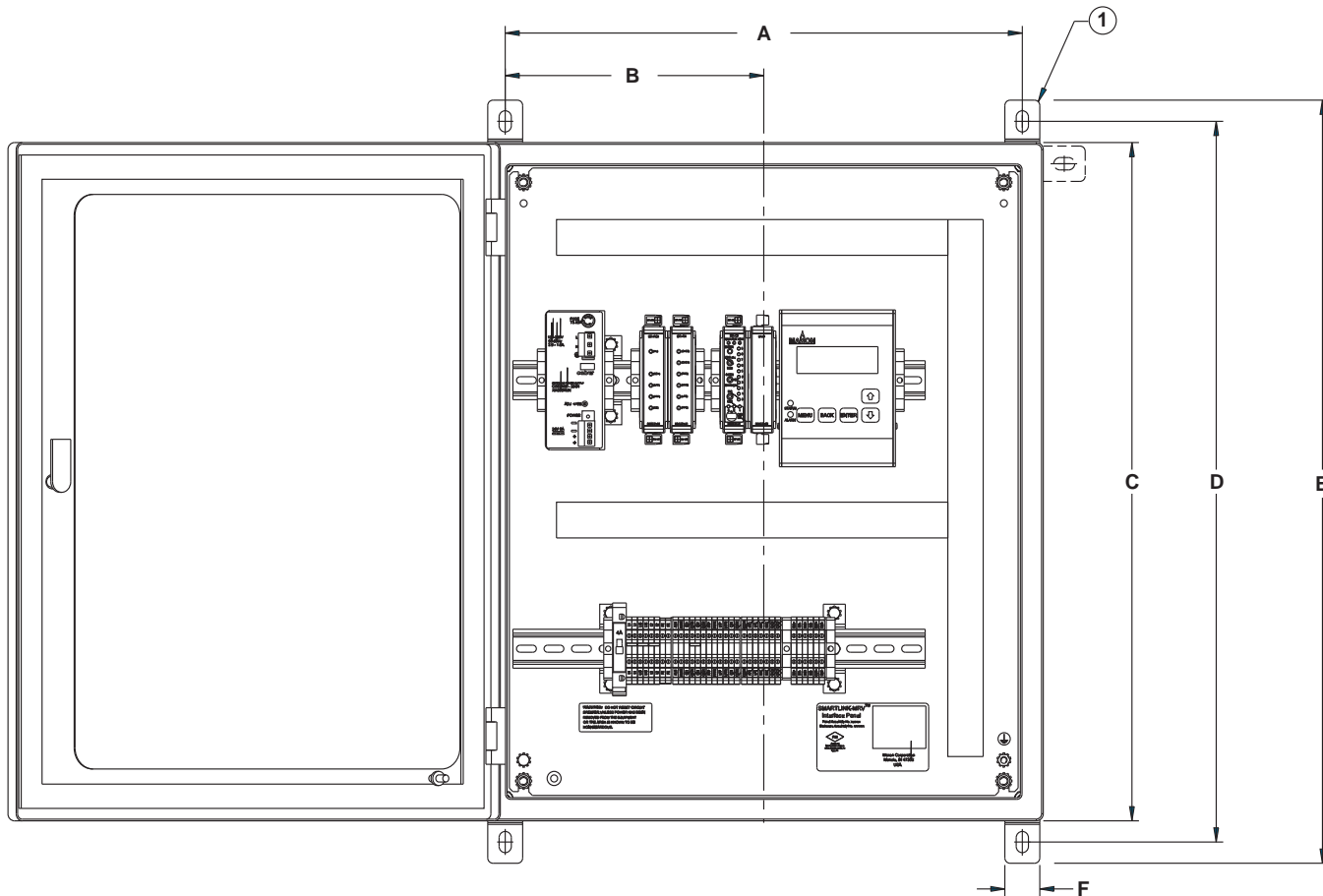
NOTE: Maximum options shown

Dimensions in inches unless specified otherwise						
A	B (1)	C	D	E (1)	F	G
14.2	13.18	6.59	18.2	15.7	14.12	5.62

[1] Mounting centers

Number	Description
1	1" wide x 2" high wire duct (typ.)
2	Control rail assembly
3	Terminal block rail assembly
4	Warning label
5	Interface panel label
6	Ground label

24 x 20" SMARTLINK® MRV Interface Panel (with enclosure)



NOTE: Maximum options shown

Dimensions in inches unless stated otherwise

A	B	C	D	E	F
18.5	9.25	24.0	25.5	27.0	1.25

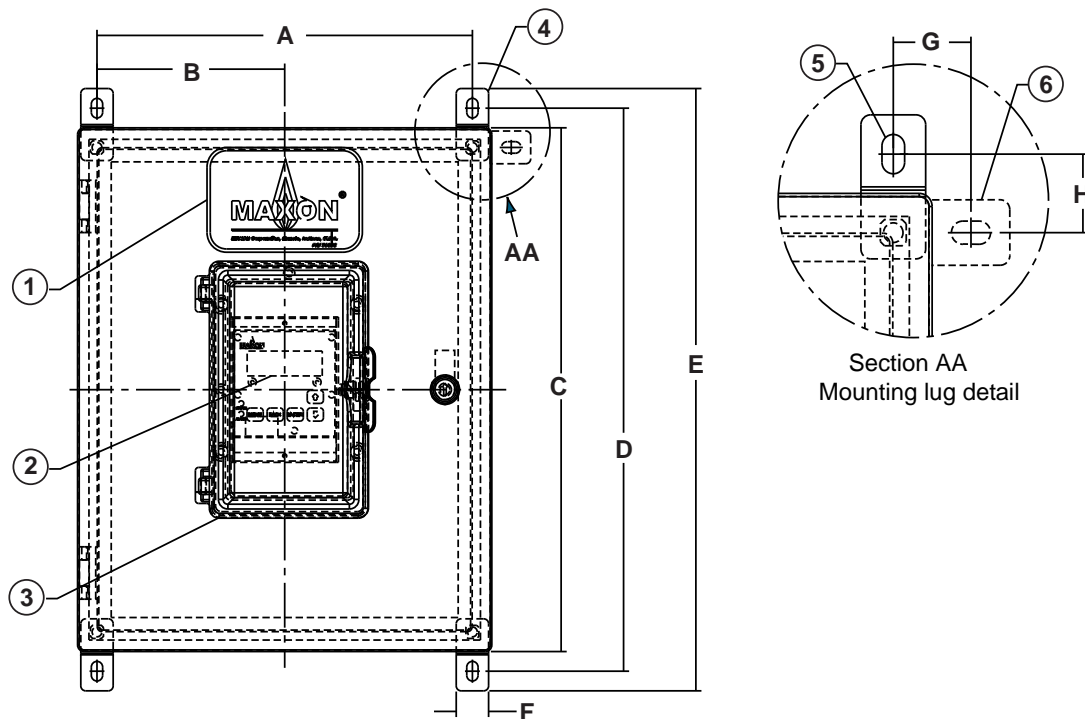
Number	Description
1	Mounting lug

Enclosure options

User display may be door mounted or mounted internally in the panel on a DIN rail. For door mounted selections, a dust cover is available and recommended for most installations. For internally mounted user displays, a window kit is available for monitoring. User display may also be mounted remotely from the interface panel to maintain enclosure ratings.

Note: Selection of door mounted components will alter the enclosure rating of panels. NEMA 4X / IP66 ratings cannot be maintained.

20 x 16" SMARTLINK® MRV Interface Panel (with enclosure)



NOTE: Maximum options shown

Dimensions in inches unless stated otherwise							
A	B	C	D	E	F	G	H
14.5	7.25	20.0	21.5	23.0	1.25	1.5	1.5

Number	Description
1	Logo label
2	User display (optional, door mounted only)
3	Dust cover (optional)
4	Mounting lug
5	.44 x .75 slot
6	Alternate position

Enclosure options

User display may be door mounted or mounted internally in the panel on a DIN rail. For door mounted selections, a dust cover is available and recommended for most installations. For internally mounted user displays, a window kit is available for monitoring. User display may also be mounted remotely from the interface panel to maintain enclosure ratings.

Note: Selection of door mounted components will alter the enclosure rating of panels. NEMA 4X / IP66 rating cannot be maintained.

Model Number Description

User Display

The model number shown on the user display nameplate can accurately identify every MAXON SMARTLINK® MRV User Display. The example below shows a typical SMARTLINK® MRV User Display model number, along with the available choices for each item represented in the model number. The first choice determines the user display's configured item number. The next two choices in the model number identify the user display options.

Configured Item Number		Options	
Series		Software Version	Language
SR UD	-	1D	A

Series

SR UD - SMARTLINK® MRV
User Display

Software Version

1D - Version 1D
XX - Special

Language

A - English
B - Dutch
C - French
D - German
X - Special