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PRODUCT DESCRIPTION

The MAXON SMARTLINK® Intelligent Valve Actuator Assembly is a rugged, turnkey solution for industrial flow control applications that require a high degree of precision, repeatability, and commissioning flexibility in a small space.

In addition, SMARTLINK® provides easy, on-site customization of the valve flow characteristics. This feature makes it an ideal solution for parallel valve positioning systems in combustion control applications.

The SMARTLINK® assembly includes two components: 1) a Valve Actuator direct-coupled to a valve and, 2) a Control Interface unit between the Valve Actuator and the user’s process controller, PLC, or DCS.

The Valve Actuator is an industrial rated, factory-calibrated assembly that incorporates a heavy-duty, planetary gear-head with integrated, long-life position feedback. It also includes a stepper motor for continuous duty, high precision valve control. The Valve Actuator is powered by 24VDC through a four wire cable that also includes a digital position communications interface to ensure reliable operation in electrically noisy environments.

The Control Interface is a DIN rail-mounted electronic device that “links” the user’s process controller to the Valve Actuator. Several front panel-mounted switches and lights are provided for displaying alarms, simple valve configuration, and valve characterization. The Control Interface also provides a precision, 4-20mA position feedback signal, several relay driver outputs for indication of alarm and control status, and digital inputs for commanding the valve to its maximum and minimum positions. The unit is typically mounted in a control panel along with a MAXON or user-supplied 24VDC supply and output interface relays.

FEATURES AND BENEFITS

- SMARTLINK® actuator fits various bodies to meet all combustion flow control needs - butterfly, ball, linkage arm
- Easy customization of the valve flow characteristic for high precision flow control and repeatability
- Maximize efficiency and minimize emissions with direct coupled, factory calibrated valve and actuator assembly
- Rugged industrial design for reliable, long-life operation
- Reduced maintenance - no lubrication required
- Hazardous Location approved: ATEX and IEC Ex; Non-Incendive for Class I, Division 2; CSA, UL, FM, CE

APPLICATIONS

SMARTLINK® valve actuators are designed for precision control of industrial combustion systems, boiler combustion systems, and related heating process flows. The rugged industrial package adds value to many heating and manufacturing processes by providing highly accurate, characterizable flow control with enhanced, digital intelligence.

Typical applications include:

- Simple burner ratio controls
- Low NOx and low CO burner controls
- Control of combustion systems on processes sensitive to products of combustion
- Control of complex burners with staging or flue gas recirculation
- Precise control of process flows like feed water, atmosphere gases, and even product feeds
- Accurate flow control of metered processes and process heaters for liquids and gases

SMARTLINK® valve actuators have numerous types of applications in addition to those listed above. Contact your MAXON representative for additional application questions.

APPROVALS

<table>
<thead>
<tr>
<th>Approval agency</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory Mutual</td>
<td>Non-incendive for Class I Division 2, Groups A, B, C &amp; D Hazardous (Classified) Indoor and Outdoor (Type 4X for Valve Actuator only) Locations</td>
</tr>
<tr>
<td>UL (US and Canadian)</td>
<td>All actuator-related requirements in UL353 (Limit Controls)</td>
</tr>
<tr>
<td>CE</td>
<td>CE EMC Directive: Electromagnetic Immunity and Emissions (EN61000)</td>
</tr>
<tr>
<td></td>
<td>CE Low Voltage Directive: Electrical Safety (EN61010-1)</td>
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<tr>
<td>ATEX</td>
<td>ATEX approval: II3 G Ex nA nC IIC T4 Ta=40C to +70C; IP66 when components mounted in enclosure (valve actuator is II 3 G Ex nA nC IIC T4 Ta=40C to +70C; IP66 and II 3 D Ex I2D A22 T135C) and IEC Ex nA nC IIC T4 Ta=70C Gc, Ex IE IIIC T135C Dc</td>
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</tbody>
</table>
MODEL NUMBER

Butterfly valves

<table>
<thead>
<tr>
<th>Configured Item Number</th>
<th>Valve Body</th>
<th>Actuator</th>
<th>Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size</td>
<td>Connection</td>
<td>Seals</td>
</tr>
<tr>
<td>0100</td>
<td>0100 - 1&quot;</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>0125 - 1.25&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0150 - 1.5&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0200 - 2&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0250 - 2.5&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0300 - 3&quot;</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>0400 - 4&quot;</td>
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<td></td>
<td>0600 - 6&quot;</td>
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<tr>
<td></td>
<td>0800 - 8&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000 - 10&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1200 - 12&quot;</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>1400 - 14&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1600 - 16&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Size**
- 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**
- S - Standard

**Series**
- SLCV - SMARTLINK® 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 - 33.9 N.m
- X - Special
  - * Valve Body Only

**Software Version**
- 1C - Standard software
  - * Valve Body Only

**Language**
- A - English
- X - Special
  - * Valve Body Only

**Fluid**
- A - 158F/70C Max Air
- B - 350F/177C Max Air
- C - 400F/204C Max Air
- D - Butane Gas
- E - Coke Oven Gas
- F - Digester Gas
- G - Landfill Gas
- H - Manufactured Gas
- I - Natural Gas
- J - Oxygen
- K - Propane Gas
- L - Propane/Butane Blend Gas
- M - Refinery Gas
- N - Sour Natural Gas
- O - Town Gas
- X - Special

[1] The latest version is the default.

**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
Ball valves

<table>
<thead>
<tr>
<th>Configured Item Number</th>
<th>Valve Body</th>
<th>Actuator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Flow Capacity</td>
<td>Series</td>
</tr>
<tr>
<td>0100 7 SLBV</td>
<td>B E 2 1 - 1 - 1C A</td>
<td></td>
</tr>
</tbody>
</table>

Size
0050 - .5"
0075 - .75"
0100 - 1"
0125 - 1.25"
0150 - 1.5"
0200 - 2"

Flow Capacity
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
SLBV - SMARTLINK® Ball Valve

Body Connection
A - ANSI Flanged 150#
B - ANSI Threaded
X - Special [1]
* - Actuator Only

Body Seals & Packing
E - Teflon
X - Special [1]
* - Actuator Only

Body Material
2 - Carbon Steel
5 - Stainless Steel
X - Special [1]
* - Actuator Only

Body Internals
1 - Trim Package 1
X - Special [1]
* - Actuator Only

Torque Rating
1 - 33.9 N.m
X - Special
* - Valve Body Only

Software Version [2]
1C - Standard software
** - Valve Body Only

Language
A - English
X - Special
* - Valve Body Only

[1] Please see page 4 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
### ADDITIONAL BALL VALVE OPTIONS FOR SPECIAL CONFIGURATION

<table>
<thead>
<tr>
<th>Body Connection</th>
<th>Body Seals &amp; Packing</th>
<th>Body Material</th>
<th>Body Internals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat-Faced Flanged</td>
<td>Body Seals</td>
<td>Body Material</td>
<td>Stem &amp; Ball</td>
</tr>
<tr>
<td>Butt Weld</td>
<td>Graphite</td>
<td>Duplex</td>
<td>Duplex</td>
</tr>
<tr>
<td>Extended Butt Weld</td>
<td>Kel-F</td>
<td>400 SS</td>
<td>400 SS</td>
</tr>
<tr>
<td>Clamp Ends</td>
<td>Peek</td>
<td>Alloy 20</td>
<td>Alloy 20</td>
</tr>
<tr>
<td>Groove Ends</td>
<td>RPTFE</td>
<td>Monel</td>
<td>Monel</td>
</tr>
<tr>
<td>Socket Weld</td>
<td>Carbon-Filled RPTFE</td>
<td>Bronze</td>
<td>Bronze</td>
</tr>
<tr>
<td>Extended Socket Weld</td>
<td>UHMWPE</td>
<td>Hastelloy c</td>
<td>Hastelloy c</td>
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<tr>
<td>Tube Ends</td>
<td></td>
<td>CF8</td>
<td>CF8</td>
</tr>
<tr>
<td>300# RF Flanged</td>
<td>Packing</td>
<td>Titanium</td>
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<td>600# RF Flanged</td>
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<td>RPTFE</td>
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<td></td>
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<tr>
<td></td>
<td>Carbon-Filled RPTFE</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Thrust Washer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Graphite</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hostaflon</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kel-F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peek</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>RPTFE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carbon-Filled RPTFE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UHMWPE</td>
<td></td>
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</table>
Control actuator

<table>
<thead>
<tr>
<th>Configured Item Number</th>
<th>Actuator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Series</td>
</tr>
<tr>
<td>SL CA</td>
<td>-</td>
</tr>
</tbody>
</table>

**Series**
SL CA - SMARTLINK® 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 - 33.9 N.m
X - Special

**Software Version [1]**
1C - Standard software

**Language**
A - English
X - Special

[1] The latest version is the default

**CONTROL ACTUATOR ROTATION**

1) Clockwise rotation
2) Counter-clockwise rotation
## Spare actuator

<table>
<thead>
<tr>
<th>Configured Item Number</th>
<th>Actuator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Series</td>
</tr>
<tr>
<td>SL SA</td>
<td>-</td>
</tr>
</tbody>
</table>

**Series**  
SL SA - SMARTLINK® Spare Actuator

**Torque Rating**  
1 - 33.9 N.m  
X - Special

**Language**  
A - English  
X - Special

**Software Version [2]**  
1C - Standard software

**Rotation [1]**  
1 - Clockwise  
2 - Counter-clockwise

[1] The correct rotation must be specified.  
a. Butterfly Valves are always supplied in a counter-clockwise rotation.  
b. Ball Valves are always supplied in a counter-clockwise rotation.  
c. Control Actuators are customer-specific and rotation must be obtained from the actuator this spare is intended to replace.

## Control interface

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<tr>
<td>SL CI</td>
<td>1C</td>
<td>A</td>
<td>A</td>
<td>1</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>A</td>
<td>1</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>

**Series**
SL CI - SMARTLINK® Control Interface

**Software Version [1]**
1C - Standard software

**Language**
A - English
X - Special

**Enclosure**
0 - None
A - 20x16x8, NEMA 4, window
X - Special

**Alarm**
0 - None
1 - 24VDC relay
X - Special

**Control Enable**
0 - None
1 - 24VDC relay
X - Special

**Power Supply**
0 - None
A - 24VDC relay
X - Special
* - Included with enclosure

**High Position Limit**
0 - None
1 - 24VDC relay
X - Special

**DIN Rail Assembly**
0 - None
1 - Parts mounted, factory wired
2 - Parts mounted, not wired
X - Special
* - Included with enclosure

**Low Position Limit**
0 - None
1 - 24VDC relay
X - Special

**High Position Command**
0 - None
A - 120VAC
X - Special

**Manual Control**
0 - None
1 - 24VDC relay
X - Special

**Low Position Command**
0 - None
A - 120VAC
X - Special

[1] The latest version is the default
### SPECIFICATIONS

#### System specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position accuracy</td>
<td>0.1 degrees (measured on the valve actuator shaft)</td>
</tr>
<tr>
<td>Position command</td>
<td>4-20mA isolated input; 4.8V burden @ 20mA</td>
</tr>
<tr>
<td>Position feedback</td>
<td>4-20mA isolated input; 400 ohm max load</td>
</tr>
<tr>
<td>Power input</td>
<td>24VDC +/-5%, 25W (maximum)</td>
</tr>
<tr>
<td>Duty cycle</td>
<td>Continuous</td>
</tr>
<tr>
<td>Relay driver outputs</td>
<td>Open collector, 30 VDC &amp; 100mA max</td>
</tr>
<tr>
<td>Digital inputs</td>
<td>5-24 VDC @ 10mA (max)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-40°C to 70°C</td>
</tr>
<tr>
<td>Enclosure ratings</td>
<td>NEMA 1, IP20 (Control Interface and all DIN rail options)</td>
</tr>
<tr>
<td></td>
<td>NEMA 4, IP66 (All standard, MAXON enclosures with factory-wired Control Interface and rail-mounted options)</td>
</tr>
<tr>
<td></td>
<td>NEMA 4, IP66 (Valve actuator)</td>
</tr>
<tr>
<td>Output relays (optional)</td>
<td>Output contacts: 250 VAC/DC @ 6 amps DIN rail-mounted</td>
</tr>
<tr>
<td>Input relays (optional)</td>
<td>Input coil voltage: 120VAC (230VAC and 24VDC options available) DIN rail-mounted</td>
</tr>
<tr>
<td>Universal Power Supply (optional)</td>
<td>Power input: 115-230 VAC +/-10%, 50/60 Hz</td>
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<tr>
<td></td>
<td>Power output: 24VDC, 2.3 amps (max)</td>
</tr>
<tr>
<td>Travel Time</td>
<td>14 seconds (full open to close)</td>
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</table>
 Capacities - butterfly valves

**BUTTERFLY VALVES - 1" THROUGH 4"**

<table>
<thead>
<tr>
<th>Size</th>
<th>Minimum controllable Cv rating</th>
<th>Maximum Cv rating</th>
<th>Maximum inlet pressure (bar)</th>
<th>Maximum body pressure (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>0.50</td>
<td>27</td>
<td>6.21</td>
<td>6.21</td>
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<tr>
<td>1.25&quot;</td>
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<tr>
<td>1.5&quot;</td>
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<td>190</td>
<td>6.21</td>
<td>6.21</td>
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<td>2.5&quot;</td>
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<td>5.59</td>
<td>6.21</td>
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<td>3&quot;</td>
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<td>360</td>
<td>3.73</td>
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<tr>
<td>4&quot;</td>
<td>5.00</td>
<td>750</td>
<td>1.86</td>
<td>6.21</td>
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</table>

**Fluid**

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Gas code</th>
<th>Suggested material options</th>
<th>Maximum fluid temperature rating</th>
<th>Maximum ambient temperature rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>70°C Max Air</td>
<td>A</td>
<td>A, B 1, 2, 3, 5</td>
<td>70°C</td>
<td>70°C</td>
</tr>
<tr>
<td>Butane Gas</td>
<td>D</td>
<td>A, B 1, 2, 3, 5</td>
<td>70°C</td>
<td>70°C</td>
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<tr>
<td>Coke Oven Gas</td>
<td>E</td>
<td>B 1, 2, 5</td>
<td>70°C</td>
<td>70°C</td>
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<tr>
<td>Digester Gas</td>
<td>F</td>
<td>B 5</td>
<td>70°C</td>
<td>70°C</td>
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<td>B 5</td>
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<tr>
<td>Manufactured Gas</td>
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<td>B 5</td>
<td>70°C</td>
<td>70°C</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>I</td>
<td>A, B 1, 2, 3, 5</td>
<td>70°C</td>
<td>70°C</td>
</tr>
<tr>
<td>Oxygen</td>
<td>J</td>
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**Body seals**

A - Buna-N

B - Viton

**Body material**

1 - Cast iron

2 - Carbon steel

3 - Brass

5 - Stainless steel

**Body internals**

1 - Trim package 1

2 - Trim package 1, oxy clean

5 - Trim package 2

6 - Trim package 2, oxy clean
## BUTTERFLY VALVES - 6” THROUGH 16”

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<th>Size</th>
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<th>Maximum Cv rating</th>
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**Body seals**
- A - Buna-N
- B - Viton

**Body material**
- 1 - Cast iron

**Body internals**
- 1 - Trim package 1

**Gasket material**
- FIBR - Hi temp fiber
- NEOP - Neoprene
## Capacities - ball valves

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

## Butterfly valves

**BUTTERFLY VALVE BODY ASSEMBLY - ALL SIZES**

<table>
<thead>
<tr>
<th>Item number</th>
<th>Description</th>
<th>Material specifications</th>
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<tbody>
<tr>
<td>1</td>
<td>Valve body sub-assembly</td>
<td>See page 2</td>
</tr>
<tr>
<td>2</td>
<td>Locating spring pin</td>
<td>Zinc plated carbon steel</td>
</tr>
<tr>
<td>3</td>
<td>Adapter bracket</td>
<td>ASTM B179 T6 aluminum</td>
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<td>4 [1]</td>
<td>Socket head cap screw</td>
<td>Zinc plated carbon steel</td>
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<td>Coupling</td>
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<td>Locking collar</td>
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<td>Spring pin</td>
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<td>303 stainless steel</td>
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<td>Hard stop screw</td>
<td>18-8 stainless steel</td>
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<td>Hard stop nut</td>
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<td>11 [1]</td>
<td>Cover plate</td>
<td>Aluminum</td>
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[1] These items used only on sizes 1" through 4"
BUTTERFLY VALVE BODY SUB-ASSEMBLY - SIZES 1” THROUGH 4”

**Body Materials**

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**Body Seals**

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<td>O-Ring</td>
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<td>O-Ring</td>
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**Trim Package Materials**

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<td>303 Stainless Steel, ASTM A157 Gr. G3000</td>
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<td>Butterfly Disc</td>
<td>304 Stainless Steel (1.4301), ASTM A240 Type 304 UNS No. S30400</td>
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<td>Bronze ASTM B271, B505 and B584 UNS No. C93200</td>
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<td>5</td>
<td>Bottom Bushing</td>
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<td>10</td>
<td>Screw</td>
<td>18-8 Stainless Steel</td>
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<td>11</td>
<td>Washer</td>
<td>304 Stainless Steel (1.4301)</td>
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<td>Retaining Ring</td>
<td>316 Stainless Steel</td>
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BUTTERFLY VALVE BODY SUB-ASSEMBLY - SIZES 6” THROUGH 16”

**Body Materials**

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<td>Valve Body</td>
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**Body Seals**

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<th>Description</th>
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<td>O-Ring</td>
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<td>O-Ring</td>
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**Trim Package Materials**

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<td>Carbon Steel SAE 1060-1090 UNS No. G10600-G10900</td>
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Ball valves

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<th>Description</th>
<th>Material specification</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Valve Body Sub-assembly</td>
<td>Based on selection on page 3</td>
</tr>
<tr>
<td>2</td>
<td>Bracket</td>
<td>6063-T6 Aluminum Alloy UNS A96063</td>
</tr>
<tr>
<td>3</td>
<td>Button Head Screw</td>
<td>18-8 (type 303) Stainless Steel</td>
</tr>
<tr>
<td>4</td>
<td>Coupling Collar</td>
<td>Zinc Plated Alloy Steel</td>
</tr>
<tr>
<td>5</td>
<td>Coupling</td>
<td>303 Stainless Steel ASTM A582 UNS No. S30300</td>
</tr>
<tr>
<td>6</td>
<td>Hard Stop Pin</td>
<td>420 Stainless Steel</td>
</tr>
</tbody>
</table>
# DIMENSIONS AND WEIGHTS

**Butterfly valves**

<table>
<thead>
<tr>
<th>Flange Dimension “A” (in mm)</th>
<th>Flange Dimension “A” (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron Threaded</td>
<td>72.9</td>
</tr>
<tr>
<td>Steel Threaded</td>
<td>80</td>
</tr>
<tr>
<td>Steel Socket Welded</td>
<td>72</td>
</tr>
<tr>
<td>Stainless Steel Threaded</td>
<td>80</td>
</tr>
<tr>
<td>Stainless Steel Socket Welded</td>
<td>72</td>
</tr>
<tr>
<td>Brass Threaded</td>
<td>71</td>
</tr>
</tbody>
</table>

Approximate weight: 10 kg; w/flanges 11.8 kg

<table>
<thead>
<tr>
<th>Dimensions in mm unless stated otherwise</th>
<th>1&quot; SMARTLINK® Butterfly Valve</th>
<th>1.25&quot; SMARTLINK® Butterfly Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1.0</td>
<td>102</td>
<td>51</td>
</tr>
<tr>
<td>1.25</td>
<td>102</td>
<td>51</td>
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</tbody>
</table>

[1] M8 - 1.25 tap, 0.62 deep, 2 holes
1.5" SMARTLINK® Butterfly Valve

Approximate weight: 12.7 kg; w/flanges 15.4 kg

2" SMARTLINK® Butterfly Valve

Approximate weight: 14 kg; w/flanges 17.7 kg

<table>
<thead>
<tr>
<th>Flange Dimension “A” (in mm)</th>
<th>Flange Dimension “A” (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron Threaded 83</td>
<td>Iron Threaded 87</td>
</tr>
<tr>
<td>Steel Threaded 82</td>
<td>Steel Threaded 90.4</td>
</tr>
<tr>
<td>Stainless Steel Threaded 82</td>
<td>Stainless Steel Threaded 90.4</td>
</tr>
<tr>
<td>Brass Threaded 80</td>
<td>Brass Threaded 94.5</td>
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</tbody>
</table>

Dimension in mm unless stated otherwise

<table>
<thead>
<tr>
<th>Size</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J Ø</th>
<th>K Ø</th>
<th>L Ø</th>
<th>M Ø</th>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R [1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5&quot;</td>
<td>101</td>
<td>50.8</td>
<td>259</td>
<td>88.9</td>
<td>81.3</td>
<td>322.6</td>
<td>0.5</td>
<td>112</td>
<td>15.7</td>
<td>127</td>
<td>99</td>
<td>43.2</td>
<td>71.1</td>
<td>45°</td>
<td>33.3</td>
<td>25.4</td>
<td>15.7</td>
</tr>
<tr>
<td>2&quot;</td>
<td>101.6</td>
<td>50.8</td>
<td>259</td>
<td>88.9</td>
<td>86.4</td>
<td>322.6</td>
<td>0.5</td>
<td>112</td>
<td>19</td>
<td>152.4</td>
<td>122</td>
<td>55.9</td>
<td>76.2</td>
<td>45°</td>
<td>42.9</td>
<td>25.4</td>
<td>15.7</td>
</tr>
</tbody>
</table>

[1] M8 - 1.25 tap, 0.62 deep, 2 holes
2.5" SMARTLINK® Butterfly Valve

3" SMARTLINK® Butterfly Valve

Approximate weight: 17.7 kg; w/flanges 26.3 kg
Approximate weight: 20 kg; w/flanges 28 kg

<table>
<thead>
<tr>
<th>Flange Dimension “A” (in mm)</th>
<th>Flange Dimension “A” (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>Threaded</td>
</tr>
<tr>
<td>Steel</td>
<td>Threaded</td>
</tr>
<tr>
<td></td>
<td>Socket Welded</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>Threaded</td>
</tr>
<tr>
<td></td>
<td>Socket Welded</td>
</tr>
<tr>
<td>Brass</td>
<td>Threaded</td>
</tr>
</tbody>
</table>

Dimensions in mm unless stated otherwise

<table>
<thead>
<tr>
<th>Size</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H NPT</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
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</thead>
<tbody>
<tr>
<td>2.5&quot;</td>
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<td>50.8</td>
<td>259</td>
<td>101.6</td>
<td>106.7</td>
<td>335.3</td>
<td>0.5</td>
<td>111.8</td>
<td>19.1</td>
<td>190.5</td>
<td>139.7</td>
<td>66</td>
<td>96.5</td>
<td>45°</td>
<td>46</td>
<td>25.4</td>
<td>15.7</td>
</tr>
<tr>
<td>3&quot;</td>
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<td>50.8</td>
<td>259</td>
<td>101.6</td>
<td>106.7</td>
<td>335.3</td>
<td>0.5</td>
<td>111.8</td>
<td>19.1</td>
<td>190.5</td>
<td>152.4</td>
<td>83.8</td>
<td>96.5</td>
<td>45°</td>
<td>46</td>
<td>25.4</td>
<td>15.7</td>
</tr>
</tbody>
</table>

[1] M8 - 1.25 tap, 0.62 deep, 2 holes
4" SMARTLINK® Butterfly Valve

6" SMARTLINK® Butterfly Valve

Flange Dimension “A” (in mm)

<table>
<thead>
<tr>
<th>Material</th>
<th>Threaded</th>
<th>104.9</th>
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</thead>
<tbody>
<tr>
<td>Iron</td>
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</tr>
<tr>
<td>Steel</td>
<td>103.1</td>
<td></td>
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<tr>
<td>Stainless Steel</td>
<td>103.1</td>
<td></td>
</tr>
</tbody>
</table>

Approximate weight: 22.2 kg; w/flanges 32.2 kg

Approximate weight: 24.9 kg; w/flanges 32.2 kg

Dimensions in mm unless stated otherwise

<table>
<thead>
<tr>
<th>Size</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
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<tbody>
<tr>
<td>4”</td>
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<td>50.8</td>
<td>259</td>
<td>116.8</td>
<td>134.6</td>
<td>350.5</td>
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<td>19.1</td>
<td>228.6</td>
<td>190.5</td>
<td>109.2</td>
<td>124.5</td>
<td>22.5”</td>
<td>52.3</td>
<td>25.4</td>
<td>15.7</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>6”</td>
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<td>259</td>
<td>149.8</td>
<td>150</td>
<td>383.5</td>
<td>0.5</td>
<td>111.8</td>
<td>19.1</td>
<td>226.1</td>
<td>196.9</td>
<td>154.9</td>
<td>154.9</td>
<td>60”</td>
<td>25.4</td>
<td>76.2</td>
<td>11.1</td>
<td>38.1</td>
<td>109.2</td>
</tr>
</tbody>
</table>

[1] Add 64 mm for high temperature (>70°C) configuration

[1] 1/2-13 UNC, 6 holes
[2] For 4” Valve: M6-1.25 tap, 0.62 deep, 2 holes. For 6” Valve: 1/2-13 UNC, 4 holes
8” SMARTLINK® Butterfly Valve

10” SMARTLINK® Butterfly Valve

[1] Add 64 mm for high temperature (>70°C) configuration

Note: Flanges are shipped loose.

Approximate weight: 27.7 kg; w/flanges 41.3 kg

Approximate weight: 29.9 kg; w/flanges 63 kg

### Dimensions in mm unless stated otherwise

<table>
<thead>
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<tbody>
<tr>
<td>8”</td>
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<td>259</td>
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<td>188</td>
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<td>411.5</td>
<td>0.5</td>
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<td>260.4</td>
<td>27.9</td>
<td>193</td>
<td>[1]</td>
<td>203.2</td>
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<td>60°</td>
<td>25.4</td>
<td>11.1</td>
<td>76.2</td>
<td>---</td>
</tr>
<tr>
<td>10”</td>
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<td>233.7</td>
<td>193</td>
<td>63.5</td>
<td>165</td>
<td>467.4</td>
<td>0.5</td>
<td>111.8</td>
<td>360.7</td>
<td>91.4</td>
<td>213.4</td>
<td>[2]</td>
<td>254</td>
<td>406.4</td>
<td>---</td>
<td>25.4</td>
<td>11.1</td>
<td>76.2</td>
<td>330</td>
</tr>
</tbody>
</table>

[1] 1/2-13 UNC, 6 holes
[2] 1.0 diameter, 12 holes
[3] 0.438 deep, 4 holes
**12" SMARTLINK® Butterfly Valve**

[Add 64 mm for high temperature (>70°C) configuration]

Note: Flanges are shipped loose.
Approximate weight: 34.9 kg; w/flanges 89.4 kg

---

**14" SMARTLINK® Butterfly Valve**

[Add 64 mm for high temperature (>70°C) configuration]

Note: Flanges are shipped loose.
Approximate weight: 49.4 kg; w/flanges 120.7 kg

---

Dimensions in mm unless stated otherwise

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</tr>
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<tbody>
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<td>259</td>
<td>259</td>
<td>221</td>
<td>76.2</td>
<td>193</td>
<td>492.8</td>
<td>0.5</td>
<td>111.8</td>
<td>431.8</td>
<td>116.8</td>
<td>241.3</td>
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<td>304.8</td>
<td>482.6</td>
<td>25.4</td>
<td>11.1</td>
<td>76.2</td>
<td>406.4</td>
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<tr>
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<td>50.8</td>
<td>259</td>
<td>289.6</td>
<td>243.8</td>
<td>76.2</td>
<td>193</td>
<td>523.2</td>
<td>0.5</td>
<td>111.8</td>
<td>477.5</td>
<td>147.3</td>
<td>266.7</td>
<td>27.9</td>
<td>335.3</td>
<td>533.4</td>
<td>25.4</td>
<td>11.1</td>
<td>76.2</td>
<td>442</td>
</tr>
</tbody>
</table>

[1] 0.438 deep, 4 holes
16" SMARTLINK® Butterfly Valve

[1] Add 64 mm for high temperature (>70°C) configuration

Note: Flanges are shipped loose.

Approximate weight: 60.8 kg; w/flanges 155.6 kg

Dimensions in mm unless stated otherwise

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<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
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<td>50.8</td>
<td>259</td>
<td>309.9</td>
<td>266.7</td>
<td>76.2</td>
<td>205.7</td>
<td>543.6</td>
<td>0.5</td>
<td>111.8</td>
<td>538.5</td>
<td>167.6</td>
<td>289.6</td>
<td>28.4</td>
<td>381</td>
<td>596.9</td>
<td>25.4</td>
<td>11.1</td>
<td>76.2</td>
<td>492.8</td>
</tr>
</tbody>
</table>

[1] 0.438 deep, 4 holes
Ball valves

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

Approximate weight: 5.4 kg

Approximate weight: 6.4 kg

<table>
<thead>
<tr>
<th>Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
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</thead>
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<td>249</td>
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<td>50.8</td>
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<td>73.7</td>
<td>88.9</td>
<td>60.5</td>
<td>15.7</td>
<td>45°</td>
<td>53.8</td>
<td>108</td>
</tr>
</tbody>
</table>

Dimensions in mm unless stated otherwise
1) Temporary shipping plug  
2) 1/2" NPT threads  
3) Inlet end  
4) 3/4" NPT

**0.75" SMARTLINK® Ball Valve - Threaded**

Approximate weight: 5.89 kg

**0.75" SMARTLINK® Ball Valve - Flanged**

Approximate weight: 7.25 kg

<table>
<thead>
<tr>
<th>Dimensions in mm unless stated otherwise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>0.75&quot;</td>
</tr>
</tbody>
</table>
1) Temporary shipping plug
2) 1/2” NPT threads
3) Inlet end
4) 1/2” NPT

1” SMARTLINK® Ball Valve - Threaded
Approximate weight: 6.8 kg

1” SMARTLINK® Ball Valve - Flanged
Approximate weight: 8.16 kg

| Dimensions in mm unless stated otherwise |
|-----------------|--------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|-------|
| Size  | A     | B     | C     | D     | E     | F     | G      | H oct. | I     | J     | K     | L     | M     | N     | O     | P     | Q     | R     |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1”    | 101.6 | 50.8  | 283   | 256.8 | 111.3 | 48    | 66     | 43.2   | 31.8  | 63.5  | 49.5  | 99.1  | 107.9 | 79.2  | 15.7  | 45°   | 63.5  | 127   |

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

1.25" SMARTLINK® Ball Valve - Threaded

Approximate weight: 7.5 kg

1.25" SMARTLINK® Ball Valve - Flanged

Approximate weight: 9.8 kg

Dimensions in mm unless stated otherwise

<table>
<thead>
<tr>
<th>Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N oct.</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
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<tbody>
<tr>
<td>1.25&quot;</td>
<td>101.6</td>
<td>50.8</td>
<td>281</td>
<td>255</td>
<td>111</td>
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<td>89</td>
<td>16</td>
<td>117</td>
<td>45°</td>
<td>70</td>
<td>140</td>
</tr>
</tbody>
</table>
1) Temporary shipping plug
2) 1/2" NPT threads
3) Inlet end
4) 1-1/2" NPT
5) 150# ANSI flange

Approximate weight: 8.6 kg

Approximate weight: 11.8 kg

Dimensions in mm unless stated otherwise

<table>
<thead>
<tr>
<th>Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N oct.</th>
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<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
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<tbody>
<tr>
<td>1.5</td>
<td>101.6</td>
<td>50.8</td>
<td>287</td>
<td>261</td>
<td>111</td>
<td>48</td>
<td>85</td>
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<td>86</td>
<td>60</td>
<td>119</td>
<td>58</td>
<td>99</td>
<td>16</td>
<td>127</td>
<td>45°</td>
<td>83</td>
<td>165</td>
</tr>
</tbody>
</table>
1) Temporary shipping plug
2) 1/2" NPT threads
3) Inlet end
4) 2" NPT
5) 150# ANSI flange

Approximate weight: 10 kg

Approximate weight: 14 kg

### Dimensions in mm unless stated otherwise

| Size | A   | B   | C   | D   | E   | F   | G   | H   | I   | J   | K   | L   | M   | N   | Ø   | Ø   | Ø   | Ø   | Oct. | Ø   | Ø   | Ø   | R   | S   | T   |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2"   | 101.6 | 50.8 | 293 | 266 | 111 | 48  | 95  | 49  | 49  | 48  | 97  | 70  | 140 | 71  | 121 | 19  | 152 | 45° | 89  | 178 |
Control actuator

1) .5 dia. w/1/8” key
2) Temporary shipping plug
3) 1/2” NPT threads
4) 4 x 4.1
5) 4 x 3/8-16 UNC

Approximate weight: 6.8 kg

Dimensions in mm unless stated otherwise

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>LØ</th>
<th>M</th>
<th>N</th>
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Dimensions in mm unless stated otherwise

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<td>19.1</td>
<td>25.4</td>
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</table>
Control interface

DIN rail assembly

(MAXIMUM OPTIONS SHOWN)

1) Terminal blocks
2) DIN rail end stop (5)
3) 4.0 amp circuit breaker
4) 120VAC relays (optional) 2 max.
5) 24VDC relay (optional) 5 max.
6) Control interface
7) TS 35X15 high rise slotted DIN rail
8) 24VDC power
9) Actuator network
10) 4 to 20 mA I/O
11) 24VDC 2.3A power supply (optional)
12) Relay output contacts
13) Relay input contacts
14) 120VAC power

Dimensions in mm unless stated otherwise

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
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<td>B</td>
<td>C</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Dimensions in mm unless stated otherwise

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<thead>
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<th></th>
<th></th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>2.3</td>
</tr>
</tbody>
</table>
Interface panel

(MAXIMUM OPTIONS SHOWN)

1) Mounting lug

Dimensions in mm unless stated otherwise

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Weight (kg)</th>
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</thead>
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<td>184</td>
<td>584</td>
<td>546</td>
<td>508</td>
<td>32</td>
<td>18</td>
</tr>
</tbody>
</table>
INSTALLATION INSTRUCTIONS

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 réglementations en vigueur.

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

Mechanical installation

REQUIRED COMPONENTS
The minimum SMARTLINK® system requires 1 Control Interface and 1 Valve Actuator assembly.

The SMARTLINK® Control Interface shall be mounted within a tool-secured enclosure which meets the requirements of EN 60079-0 and EN-60079-15 and is capable of accepting the applicable wiring methods specified in EN 60079-14. Where installed in outdoor and potentially wet locations, the enclosure shall, at a minimum, meet the requirements of IP54. Where installed in locations providing adequate protection against the entry of solid foreign objects or water capable of impairing safety, the enclosure shall, at a minimum, meet the requirements of IP4X.

OPTIONAL COMPONENTS
DIN rail-mounted interface relays, 24VDC supply, terminal block assembly, a pre-wired DIN rail assembly and a NEMA 4 enclosed panel are all options available from MAXON.

Mechanical installation of the SMARTLINK® Intelligent Valve and Actuator Assembly requires the following:

• Mount the SMARTLINK® Control Interface along with any optional interface relays on a DIN rail within an appropriate electrical enclosure or cabinet, and
• Install the SMARTLINK® Valve Actuator assembly in any orientation within the pipe train.

Electrical installation

SYSTEM WIRING REQUIREMENTS
The system block diagram below indicates the sources and destinations of the electrical wiring required by the SMARTLINK® Control Interface and Actuator assembly.

SYSTEM BLOCK DIAGRAM
The basic electrical installation requires the following wiring:

- **Low voltage 4-20mA signal wiring** from the user’s process controller to the SMARTLINK® Control Interface. Wiring of the 4-20mA position feedback signal is optional and may not be needed for specific applications.

- **Communications wiring** between the SMARTLINK® Control Interface and Valve Actuator.

- **Low-voltage supply wiring** between a 24VDC supply and the SMARTLINK® Control Interface. A pre-wired MAXON DIN Rail Assembly can be supplied that includes this wiring.

- **Low voltage DC relay coil wiring** from the SMARTLINK® Control Interface to output interface relays. All interface relays are optional. A pre-wired MAXON DIN Rail Assembly can be supplied that includes this wiring to the relays.

- **120/230 VAC input relay wiring** from the user’s process controller to the optional input relays. This wiring is not required if input interface relays are not used by the application. A pre-wired MAXON DIN rail assembly can be supplied that includes the relays and the wiring.

- **Low voltage DC relay contact input wiring** from the input relay contacts to the Control Interface.

- **120/230 VAC output relay wiring** from the output interface relay contacts to the user’s process control equipment. This wiring is not required if output interface relays are not required.

- **20/230 VAC supply wiring** between a user’s fused power source and the 24VDC power supply.

Electrical wiring should be performed in accordance with all local and NEC 1 codes. See Reference Table 1 (page 46) and Table 2 (page 47) for summaries of all of the input/output terminals for the Control Interface and Valve Actuator. Reference Table 3 (page 47) summarizes the maximum wiring length, type, and size for all terminations.

**Typical wiring diagram** of a SMARTLINK® Valve Actuator Assembly is shown on page 34.

If the Control Interface is shipped as part of the MAXON pre-wired DIN rail assembly, the electrical installation is simplified because the 24VDC power supply and interface relays are provided and wired to the Control Interface. The electrical installation for the pre-wired DIN rail assembly requires the following:

- **Low voltage 4-20mA signal wiring** from the user’s process controller to the SMARTLINK™ DIN rail assembly. Wiring of the 4-20mA position feedback signal is optional.

- **Communications wiring** between the SMARTLINK™ Control Interface and Valve Actuator.

- **120/230 VAC input relay wiring** from the user’s process controller to the optional input relays. This wiring is not required if input interface relays are not used by the application.

- **120/230 VAC output relay wiring** from the output interface relay contacts to the user’s process control equipment. This wiring is not required if output interface relays are not required.

- **20/230 VAC supply wiring** between a user’s fused power source and the 24VDC power supply.

All electrical wiring should be performed in accordance with all local and NEC 1 codes. Reference Table 4 (page 48) summarizes all of the input/output terminals for the DIN rail assembly and Reference Table 5 (page 49) summarizes the maximum wiring length, type, and size for all DIN rail assembly terminations.
Note 1: Recommended wire color code for SMARTLINK®

<table>
<thead>
<tr>
<th>Component terminal designation</th>
<th>Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>F24 / +24</td>
<td>Maxon #59829 (not to exceed 100 ft)</td>
</tr>
<tr>
<td>FCOM / GND</td>
<td>white / orange</td>
</tr>
<tr>
<td>DA</td>
<td>orange</td>
</tr>
<tr>
<td>DB</td>
<td>white / blue</td>
</tr>
<tr>
<td></td>
<td>blue</td>
</tr>
</tbody>
</table>

Note 2: This wiring schematic represents electrical connections in a typical product application. Please refer to the schematic of the specific application for troubleshooting.
OPERATING INSTRUCTIONS

Instructions provided by the company or individual responsible for the manufacture and/or overall installation of a complete system incorporating MAXON products take precedence over the installation and operating instructions provided by MAXON. If any of the instructions provided by MAXON are in conflict with local codes or regulations, please contact MAXON before initial start-up of equipment.

Read the instruction manual carefully before initiating the start-up and adjustment procedure. Verify that all of the equipment associated with and necessary to the safe operation of the system have been installed correctly, that all pre-commissioning checks have been carried out successfully and that all safety-related aspects of the installation are properly addressed.

The installer should perform the following commissioning steps for the SMARTLINK® Control Interface and Actuator Assembly:

- Wiring checkout prior to applying power
- Operational checkout after applying power
- System configuration if required by the application
- Valve characterization if required by the application

Control interface

- **MAN Light** - Unit in Manual Positioning Mode when lit.
- **RUN Light** - Unit in Run Mode when lit; Unit in Position Setup Mode when RUN or MAN lights are both blinking.
- **ALM Light** - Alarm exists when lit; Unit is locked if blinking.
- **0 - 9 Lights** - Indicates valve position index when unit is in Manual or Position Setup Mode; Also indicates command number selected by rotary CMD SEL switch, configuration settings, alarm codes and lock passcodes.
- **ENTER Switch** - Momentary pushbutton for command entry and saving configuration or valve position changes.
- **MODE Switch** - 3 positions: (1) RUN (down) places unit in Run Mode which positions valve by 4-20mA input, (2) Command Entry (middle) for selecting user command with rotary switch, and (3) CMD abc (up, with momentary action) for command set selection.
- **ADJUST Switch** - 3 positions: (1) STANDBY (down) for emergency valve movement to its standby position when unit is not in Run Mode, (2) ADJ (middle) enables valve movement in tenth degree steps when using the INC/DEC switch in Manual and Position Setup Mode, and (3) INDEX enables valve positioning moves to the 19 position indexes when using the INC/DEC switch in Manual Mode.
- **INC/DEC Switch** - 3 positions: INC and DEC (up & down, with momentary action) for valve opening and closing in Manual or Position Setup Mode; also used for changing configuration settings. Middle position has no function.
- **Command Set Lights** - Identifies which command set (a, b, or c) is currently selected (when blinking) or active (when not blinking).
- **CMD SEL (Rotary) Switch** - Selects command number, 0 thru 7.
Wiring checkout
Before applying power to the SMARTLINK® Control Interface and SMARTLINK® Valve Actuator Assembly, perform the following wiring checkout:

1. Verify that 120 VAC is not connected directly to SMARTLINK® Control Interface and Valve Actuator Assembly. Both devices are powered by a 24VDC supply. All output interface relay wiring from the Control Interface is connected to 24VDC relay coils.
2. Verify the proper wire type and maximum wire length requirements are satisfied for all connections.
3. Verify color code connections are correct on the 24V/Data Connector of both the Control Interface and Valve Actuator Assembly.
4. Measure the resistance between earth ground at the user’s panel enclosing the Control Interface and each of the four signals wired to the Valve Actuator: F24 (Field +24VDC), FCOM (Field Common), DA (Data-A), and DB (Data-B). The resistance should indicate an open circuit (i.e., a resistance value greater than 106 Ohms). If an open circuit is not measured, damage or incorrect wiring of the control network cable exists and must be corrected.
5. Verify proper termination of shields for the 4-20mA cables and the control cable between the Control Interface and Valve Actuator Assembly.
6. If MAXON SMARTLINK® Interface Relays are not provided with the Control Interface, verify that all required relays have a coil rating less than 30VDC and 100mA. The output interface relay coils are connected to the Control Interface, RO1 through RO5 terminals of the Relay Output driver connector.

Refer to SMARTLINK® Reference Tables 1 through 5 (page 46 through page 49) for all termination definitions and wiring/shielding requirements.

Operational checkout
Apply power to the SMARTLINK® Control Interface and SMARTLINK® Valve Actuator Assembly and perform the following operational checkout:

1. Verify the Control Interface Alarm light is off and the Run light is on after powering up the system. If the alarm light is on, see page 43 to determine the cause of the alarm and corrective actions.
2. Place the user's process controller into manual mode or temporarily replace the 4-20mA position command with a simulated 4-20mA current loop. With the Control Interface command switch in the “RUN” position, move the position command signal slowly from 4mA to 20mA and verify valve movement. The position of the valve can be visually observed by the “OPEN” or “CLOSED” markings on the machined coupling that connects the actuator to the valve shaft. If the application requires the 4-20mA position feedback signal, measure this feedback current loop while changing the position command and verify that the two currents (input vs. output) are approximately equal after pausing at several intermediate positions.
3. If the process controller cannot be placed in manual mode or if a simulated command signal cannot be produced, the SMARTLINK® assembly can be placed in a local manual mode. (Refer to Command A-0 and the general command entry instructions on page 37). Once the system is in manual mode, drive the valve to its full open and closed positions using the INC/DEC switch on the Control Interface.
4. If installed, verify operation of each output interface relay by measuring the presence and disappearance of voltage on the relay’s contact. If a DIN Rail Assembly is supplied with the Control Interface, the terminals for each relay contact are shown in Reference Table 6 on page 50. The Control Interface relay driver output terminals are also provided in Reference Table 6 to assist in testing of interface relays when not supplied and pre-wired by MAXON.

Do not remove power from an air valve actuator when both 1) the valve is open more than 30 degrees, and 2) the blower is running. Prior to power loss, ensure that the valve position is less than 30 degrees open, and/or that the blower has stopped. Failure to observe these precautions can result in permanent damage to the valve actuator.
User commands

There are 3 SMARTLINK® command sets (a, b, and c) as listed below. Entry requirements for each command (if applicable) are listed at right. Detailed descriptions of the following user commands are shown in Reference Tables 8 through 10 (page 52 through page 57).

Command Set "A"

A-0........ Enter Manual Positioning Mode ................. Position command <= 4 mA
A-1........ Display Alarm Codes
A-2........ Enter Valve Position Setup Mode ............... Position command = 4 to 20 mA
A-3........ Reserved for future use
A-4........ Reserved for future use
A-5........ Set Max Position and Min/Max Ramp ......... Position command = 20 mA
A-6........ Set Min Position and Min/Max Ramp .......... Position command = 4 mA
A-7........ Unlock Valve Configuration .................... Unit must be “locked”

Command Set "B"

B-0........ Select Loss of Signal Position
B-1........ Reserved for future use
B-2........ Select Standby Position
B-3........ Select Deadband
B-4........ Set High Limit Position Threshold ............. Unit in Manual Mode
B-5........ Set Low Limit Position Threshold.............. Unit in Manual Mode
B-6........ Set Auto Ramp Adjust On/Off
B-7........ Reserved for future use

Command Set "C"

C-0 ....... Check Valve CalibrationFor MAXON-trained technician only
C-1 ....... Calibrate Valve ...................................... For MAXON-trained technician only
C-2 ....... Enable Valve Calibration / Check ................. For MAXON-trained technician only
C-3 ....... Reset Factory Default Settings ................. Unit in Position Setup Mode
C-4 ....... Enter New Lock Combination .................... Unit “unlocked” to modify
C-5 ....... Select Lock Enable / Disable .................... Unit “unlocked” to modify
C-6 ....... Save Profile as Backup
C-7 ....... Restore Backup Profile ......................... Unit in Position Setup Mode

GENERAL COMMAND ENTRY INSTRUCTIONS:

1. A user command can be performed only when the following conditions are all satisfied:
   a) MODE switch is not in the RUN position,
   b) one of the green command set lights (a, b, c) is blinking,
   c) ADJUST switch is not in the STANDBY position, and
   d) unit is “unlocked”. (Condition ‘d’ is not required for Command A-7, Unlock Valve Configuration and Command A-1, Display Alarm Codes.)
   e) For some commands, the unit must be in a specific mode or have the correct 4-20 mA command signal (see command entry requirements listed above or in Reference Tables 8 through 10 on page 52 through page 57).

2. If the a, b, or c command set light is not blinking, momentarily push the MODE switch in the CMD abc position (up) or, change the position of the rotary CMD SEL switch. This will start the command set light blinking and permit a command to be entered.

3. Select the desired command set by momentarily pushing the MODE switch upward to the CMD abc position. Subsequent CMD abc switch entries will change the command set selection as indicated by the green command set (a, b, c) lights.

4. Select the desired command number by changing the position of the rotary CMD SEL switch. When one of the command set lights is blinking, the command number selected is indicated by the corresponding numbered (0-9) light being lit.

5. After the command set and number are selected, press the ENTER button. If all of the numbered lights flash momentarily after the ENTER button is pushed, a command entry error has occurred and the command was not executed. If an entry error occurs, check if the unit is locked (i.e. alarm light blinking) or the ADJUST switch is in the STANDBY position. If neither condition exists, check the specific entry requirements of the command.
SYSTEM CONFIGURATION

There are 8 SMARTLINK® configuration settings that can be changed through execution of the commands below, using the switches and lights on the Control Interface. Detailed explanations of each setting appear in Reference Table 7: SMARTLINK™ System Configuration Summary on page 51.

<table>
<thead>
<tr>
<th>Command Name</th>
<th>Command Number</th>
<th>Factory Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select LOS Position</td>
<td>B-0</td>
<td>No position change</td>
</tr>
<tr>
<td>Select Standby Position</td>
<td>B-2</td>
<td>Position Index 0</td>
</tr>
<tr>
<td>Select Control Deadband</td>
<td>B-3</td>
<td>0.06% Deadband</td>
</tr>
<tr>
<td>Set High Limit Position Threshold</td>
<td>B-4</td>
<td>80.0 degrees</td>
</tr>
<tr>
<td>Set Low Limit Position Threshold</td>
<td>B-5</td>
<td>0.0 degrees</td>
</tr>
<tr>
<td>Set Auto Ramp Adjust On/Off</td>
<td>B-6</td>
<td>Auto Ramp ON</td>
</tr>
<tr>
<td>Enter New Lock Combination</td>
<td>C-4</td>
<td>Passcode: 0, 0, 0, 0</td>
</tr>
<tr>
<td>Select Lock Enable/Disable</td>
<td>C-5</td>
<td>Lock Disable</td>
</tr>
</tbody>
</table>

Review the factory default settings before changing any of the system configuration settings; in many applications, modification of the default settings is not necessary. If a setting does need to be changed, follow the procedure outlined below.

1. Select and enter the required system configuration command.
2. After the command is entered, one of the numbered (0-9) lights will be on, indicating the current configuration setting. (For example: If the lock configuration is set to #0, Lock Disable, the 0 light will be solidly lit after Command C-5, Lock Enable/Disable, is entered successfully.)
3. Select the desired configuration setting by using the INC/DEC switch. As the INC/DEC switch is momentarily pushed up or down, the selected setting changes as indicated by turning on the corresponding numbered light (0-9).
4. Push the ENTER button after the desired configuration setting is selected. The numbered light that is lit to indicate the selected configuration will momentarily turn off indicating the command is complete and the configuration setting is saved.
5. To confirm the correct setting is saved, re-enter the command and verify the new setting by the numbered light (0-9) indication.
Valve characterization

Valve characterization is necessary for changing the relationship between valve position and the 4-20mA position command. This process permits field adjustment of the “installed” valve characteristic without mechanically adjusting the valve or external linkages.

The SMARTLINK® is pre-set to a linear slope, but can be customized using either the 10 Point Characterization procedure or the 19 Point Characterization procedure.

10 POINT CHARACTERIZATION

SMARTLINK® is shipped with the configuration setting to easily adjust valve positions at 10 of the 19 position indexes and automatically set the positions at the other 9 (intermediate) indexes.

1. Place the process controller that commands SMARTLINK® in manual mode and connect a 4-digit current meter on the 4-20mA position output. Execute Command B-6 and verify the Auto Ramp function is set to #1, Auto Ramp ON. If not set correctly, refer to page 38 or Reference Table 7 on page 51.
2. Execute Command A-2, Enter Position Setup Mode. In this mode, both the yellow and green run lights will be flashing. The position command signal determines which of the 19 position indexes can be modified as shown by the blinking numbered lights. Move the process controller's output to either 0% (Index #0) or 100% (Index #9) to begin characterization.
3. With the ADJUST switch in the middle (ADJ) position, push the INC/DEC switch up or down to change the valve position. Each push of the INC/DEC switch moves the valve 0.1 degrees. If the switch is held in the up or down position for more than 3 seconds, the valve will move in 0.5-degree steps up to a total travel of 8 degrees from the stored valve position. (All the numbered lights will momentarily flash when this 8-degree limit is reached.) After moving the valve to the desired position, press the ENTER button to save the position setting. Record the valve position feedback in mA or %.
4. Move the controller's output to the % or mA setting in the commissioning table (shown on page 40) for each consecutive whole digit index and repeat the adjustment procedure in Step 3. With the auto ramp function ON, adjustment at only the 10 whole digit indexes is necessary because positions at the intermediate indexes (0.5, 1.5, etc.) are automatically set to a value halfway between the positions of the whole number indexes (0, 1, 2, etc).
5. Execute Command C-6 to save the profile as a backup. Move the MODE switch to the RUN position and put the user's process controller in AUTO.

19 POINT CHARACTERIZATION

There are applications that require precision adjustment throughout the actuator’s control range. For these applications, adjustment of all 19 positions is necessary using the procedure below.

1. Place the process controller that commands SMARTLINK® in manual mode and connect a 4-digit current meter on the 4-20mA position output. Execute Command B-6 and set the auto ramp function to setting #0, Auto Ramp OFF. (Refer to page 38 or the Reference Table 7 on page 51 for changing configuration settings.)
2. Execute Command A-2, Enter Position Setup Mode. In this mode, both the yellow and green run lights will be flashing. The position command signal determines which of the 19 position indexes can be modified as shown by the blinking numbered lights. Move the process controller's output to either 0% (Index #0) or 100% (Index #9) to begin characterization.
3. With the ADJUST switch in the middle (ADJ) position, push the INC/DEC switch up or down to change the valve position. Each push of the INC/DEC switch moves the valve 0.1 degrees. If the switch is held in the up or down position for more than 3 seconds, the valve will move in 0.5-degree steps up to a total travel of 8 degrees from the stored valve position. (All the numbered lights will momentarily flash when this 8-degree limit is reached.) After moving the valve to the desired position, press the ENTER button to save the position setting. Record the valve position feedback in mA or %.
4. Move the controller's output to the next % or mA setting in the commissioning table (shown on page 40) and repeat the adjustment procedure in Step 3 for all 19 position indexes. With the auto ramp function OFF, the positions of adjacent indexes are not automatically ramped. Therefore, all 19 position indexes should be visited during this procedure and adjusted if necessary.
5. Execute Command C-6 to save the profile as a backup. Move the MODE switch to the RUN position and put the user's process controller in AUTO.

If an unsafe operating condition is observed while characterizing the SMARTLINK® in a parallel positioning combustion application, follow the instructions below:

1. When SMARTLINK® is in the Position Setup Mode for valve characterization, the ADJUST switch can be pushed to the STANDBY position (down). This action will immediately move the valve to the Standby position, overriding the 4-20mA position command.
2. The factory default Standby position is the valve position at Index #0, the minimum position in the profile. While the ADJUST switch is in this position, no commands can be executed. The Standby position function is inhibited when the MODE switch is in the RUN position (down).
**MAXON SMARTLINK® commissioning table**

**(SHOULD BE COMPLETED AT TIME OF INSTALLATION)**

Serial No. / Install Date: ______________________________

<table>
<thead>
<tr>
<th>Position index</th>
<th>Interface output (light #’s)</th>
<th>Position command (%)</th>
<th>Position command (mA)</th>
<th>Custom position (% or mA)</th>
<th>Factory default (degs)</th>
<th>Field readings (°Wc, 02%, etc.)</th>
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</thead>
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<td>0</td>
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<td>4.000</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>0, 1</td>
<td>05.56%</td>
<td>4.889</td>
<td>4.4</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>11.11%</td>
<td>5.778</td>
<td>8.9</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>1, 2</td>
<td>16.67%</td>
<td>6.667</td>
<td>13.3</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>22.22%</td>
<td>7.556</td>
<td>17.8</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>2, 3</td>
<td>27.78%</td>
<td>8.444</td>
<td>22.2</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>33.33%</td>
<td>9.333</td>
<td>26.7</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td>3, 4</td>
<td>38.89%</td>
<td>10.222</td>
<td>31.1</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>44.44%</td>
<td>11.111</td>
<td>35.6</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>4, 5</td>
<td>50.00%</td>
<td>12.000</td>
<td>40.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>55.56%</td>
<td>12.889</td>
<td>44.4</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>5, 6</td>
<td>61.11%</td>
<td>13.778</td>
<td>48.9</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>66.67%</td>
<td>14.667</td>
<td>53.3</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>6, 7</td>
<td>72.22%</td>
<td>15.556</td>
<td>57.8</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>77.78%</td>
<td>16.444</td>
<td>62.2</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>7.5</td>
<td>7, 8</td>
<td>83.33%</td>
<td>17.333</td>
<td>66.7</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>88.89%</td>
<td>18.222</td>
<td>71.1</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>8.5</td>
<td>8, 9</td>
<td>94.44%</td>
<td>19.111</td>
<td>75.6</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>100.00%</td>
<td>20.000</td>
<td>80.0</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Configuration command name (&amp; number)</th>
<th>Factory default (&amp; configuration setting number)</th>
<th>Field configuration setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Loss of Signal (LOS) Position (B-0)</td>
<td>No Position Change (#4)</td>
<td></td>
</tr>
<tr>
<td>Select Standby Position (B-2)</td>
<td>Position Index 0 (#0)</td>
<td></td>
</tr>
<tr>
<td>Select Control Deadband (B-3)</td>
<td>0.06% Deadband (#2)</td>
<td></td>
</tr>
<tr>
<td>Set High Limit Position Threshold (B-4)</td>
<td>80.0 degrees (N/A)</td>
<td></td>
</tr>
<tr>
<td>Set Low Limit Position Threshold (B-5)</td>
<td>0.0 degrees (N/A)</td>
<td></td>
</tr>
<tr>
<td>Set Auto Ramp Adjust ON/OFF (B-6)</td>
<td>Auto Ramp ON (#1)</td>
<td></td>
</tr>
<tr>
<td>Enter New Lock Passcode (C-4)</td>
<td>Passcode: 0, 0, 0, 0 (N/A)</td>
<td></td>
</tr>
<tr>
<td>Select Lock Enable/Disable (C-5)</td>
<td>Lock Disable (#0)</td>
<td></td>
</tr>
</tbody>
</table>
Unit locking and passcode entry

The SMARTLINK® Control Interface is shipped with the lock function disabled and a factory default 4-digit passcode or “combination” of 0,0,0,0. To lock the unit for the first time and change the default passcode, the lock function must first be enabled (Command C-5) and the default passcode entered (Command A-7) as described in the first two procedures below. After the lock function is enabled and the unit is “unlocked”, a new passcode can be entered using Command C-4 as described in the procedure below. If you forget the passcode, call MAXON for the “master” passcode.

ENABLING THE “LOCK” CONFIGURATION SETTING (COMMAND C-5):
1. If the alarm light is blinking, the lock function is already enabled and the unit is in a “locked” state. Before changing the passcode, the unit must be unlocked by entering the current passcode (Command A-7) using the procedure below.
2. If the alarm light is not blinking, select and enter Command C-5, Lock Enable/Disable.
3. After the command is entered, one of the numbered (0-9) lights will be on, indicating the current configuration setting. If the #1 light is on, the lock function is already enabled and the procedure below can be performed to change the passcode. If the #0 light is on, the lock function is disabled.
4. To select the #1 setting (Lock Enable), momentarily push the INC/DEC switch in the up position. The #1 light will now be on, indicating the new setting is selected.
5. Push the ENTER button. The #1 light will turn off indicating the command is complete and the configuration setting is saved. The unit is now locked and the alarm light will be blinking.
6. To change the current passcode, perform the next two procedures (Command A-7 & C-4).

ENTERING THE CURRENT “LOCK” PASSCODE (COMMAND A-7):
1. Select and enter Command A-7, Unlock Valve Configuration.
2. After the command is entered, the INC/DEC switch is used to select the first passcode digit. The digit selected is indicated by a numbered light (0-9).
3. Once the first digit of the passcode is selected, push the ENTER button once. The numbered light should momentarily turn off indicating the entry was accepted.
4. Repeat steps 2 and 3 for the 2nd, 3rd, and 4th passcode digits. If the passcode was entered incorrectly, all the numbered lights will momentarily flash after entry of the 4th and final passcode digit. If the passcode was correct, the alarm light will stop flashing and will be turned off completely if no other alarms exist.
5. To change the current passcode, perform the procedure (Command C-4) below.

ENTERING A NEW “LOCK” PASSCODE (COMMAND C-4):
1. To enter a new lock passcode, the lock function must be enabled (Command C-5) and the current passcode must be entered (i.e. the unit must be “unlocked” using Command A-7). See the two previous procedures if these command entry requirements have not been satisfied.
2. Select and enter Command C-4, Enter New Lock Combination.
3. After the command is entered, the INC/DEC switch is used to select the first new passcode digit. The digit selected is indicated by a numbered light (0-9).
4. Once the first new digit of the passcode is selected, push the ENTER button once. The numbered light should momentarily turn off indicating the entry was accepted. Write down the new digit for later use.
5. Repeat steps 3 and 4 for the 2nd, 3rd, and 4th passcode digits, remembering to write down each passcode digit as it is entered.
6. Verify the new passcode by re-locking the unit (MODE switch to the RUN position and then back to the middle, Command Entry position), and entering the new passcode using Command A-7 as described in the procedure above.
Manual operation
Command A-0, Enter Manual Positioning Mode, is used to override the 4-20 mA position command input. (This command should not be used when the valve is in an operating process that requires continuous positioning based on the 4-20 mA input signal.)

ENTERING MANUAL POSITIONING MODE (COMMAND A-0):
1. To enter the Manual Positioning Mode, the position command input signal must be first driven to 4mA or less.
2. Select and enter Command A-0, Enter Manual Positioning Mode. If the numbered lights flash momentarily after entering Command A-0: a) the position command may not be less than 4 mA, b) the adjustment mode switch may be in the STANDBY position, or c) unit may be “locked” to prevent tampering.
3. After entering the command, the yellow manual (MAN) light will be on and RO5 (Relay Output driver #5) will energize the Manual Control relay (if installed). The INC/DEC switch can be used to move the valve open or closed. If the adjustment mode switch is in the INDEX position, the INC/DEC switch is used to move between the 19 position “indexes”. If the adjustment mode switch is in the ADJ position, pushing the INC/DEC switch up or down changes the valve position in 1.0 degree steps. If the INC/DEC switch is held in the up or down position, the position is continuously adjusted until the maximum or minimum position is reached. When the max or min position setpoint is reached, all the numbered lights will momentarily flash. This command should not be executed when the valve is part of an operating process that requires continuous, closed-loop valve positioning.
4. To return control back to the 4-20 mA position command input, move the MODE switch to the RUN position (down).

High and low valve position limits
The high and low limits are automatically set when the user adjusts the maximum (Index #19) and minimum (Index #0) valve position settings. If different high and low limits are required (other than the default or automatically set limits), Command B-4 and Command B-5 can be executed using the procedure below.

Command B-4 is a configuration command that is used to adjust the high limit position threshold. Relay driver Output #3, RO3 will energize the optional High Position Limit relay when the valve position is equal to or greater than the stored high limit position threshold. The high limit threshold has a factory default of 80.0 degrees and is automatically set to 1.0 degree less than the maximum valve position when modified using Command A-2, Enter Position Setup Mode, or A-5, Set Max Position & Min/Max Ramp. If the factory default or automatic 1.0 degree offset is acceptable, execution of Command B-4 is not necessary.

Command B-5 is a configuration command that is used to adjust the low limit position threshold. Relay driver Output #4, RO4 will energize the optional Low Position Limit relay when the valve position is less than or equal to the stored low limit position threshold. The low limit threshold has a factory default of 0.0 degrees and is automatically set to 1.0 degree above the minimum valve position when modified using Command A-2, Enter Position Setup Mode, or A-6, Set Min Position & Min/Max Ramp. If the factory default or automatic 1.0 degree offset is acceptable, execution of Command B-5 is not necessary.

MANUALLY ADJUSTING THE HIGH OR LOW LIMIT POSITION THRESHOLD (COMMAND B-4 OR B-5):
1. Before entering Command B-4 (or B-5), the unit must be in the Manual Positioning Mode (Execute Command A-0, as described on page 42 or in Reference Table 8 on page 52).
2. With the unit in Manual Positioning Mode (as indicated by the yellow, MAN light on) and the ADJUST switch in the “ADJ” middle position, select and enter Command B-4 (or B-5). After command entry, the valve will be driven to the high (or low) limit position.
3. To change the valve position in +/- 1.0 degree steps, momentarily push the INC/DEC switch up or down. If the INC/DEC switch is held in the up or down position, the valve position setpoint is continuously changed in +/- 1.0 degree steps.
4. After moving the valve to the desired high (or low) limit position, push the ENTER button to save the new setting. When the ENTER button is pressed, the numbered light(s) and command set “b” light will momentarily turn off, indicating the new value has been stored.
5. To return control back to the 4-20mA position command input, move the MODE switch to the RUN position (down). The unit is now in RUN mode.
**Alarm codes**

If the alarm light of the Control Interface is on or flashing, view the alarm condition by executing Command A-1, Display Alarm Codes. After command entry, the INC/DEC switch is used to scroll through the alarm codes. The cause of the alarm can be determined by observing the numbered lights turned on and matching the light pattern to a table entry below.

<table>
<thead>
<tr>
<th>Alarm Code (Lights ON)</th>
<th>Alarm Name</th>
<th>Alarm Description, Possible Cause and Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator Alarm Light # Pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0, 1</td>
<td>Position Overshoot</td>
<td>Actuator detected problem with position control. If alarm persists, replace valve actuator.</td>
</tr>
<tr>
<td>0, 2</td>
<td>Position Breakaway</td>
<td>Actuator detected problem holding commanded position. Check valve’s operating differential pressure and compare with specification. If alarm persists and measured pressure does not exceed valve rating, replace actuator.</td>
</tr>
<tr>
<td>0, 1, 2</td>
<td>Sticky Valve</td>
<td>Actuator could not position to within 0.1 degree. Check if there is debris in the valve inhibiting movement and command the valve open and close. If alarm persists and no debris is found, replace actuator.</td>
</tr>
<tr>
<td>0, 3</td>
<td>Stuck Valve</td>
<td>Actuator could not position to within 0.1 degree. Re-power the actuator. Check if there is debris in the valve inhibiting movement and command the valve open and close. If alarm persists and no debris is found, replace actuator.</td>
</tr>
<tr>
<td>0, 1, 3</td>
<td>Temperature</td>
<td>Actuator senses out-of-specification ambient temperature. Check temperature of actuator’s enclosure and remove heat source or promote circulation if too hot. If actuator ambient temperature is within specification, replace valve actuator.</td>
</tr>
<tr>
<td>0, 2, 3</td>
<td>Calibration</td>
<td>Actuator is not calibrated. Contact MAXON.</td>
</tr>
<tr>
<td>0, 1, 2, 3</td>
<td>DC Supply Voltage</td>
<td>Actuator senses improper +24VDC supply. Check for heavily loaded power supply, a failed supply, or cable length out-of-specification.</td>
</tr>
<tr>
<td>0, 4</td>
<td>Reset</td>
<td>Actuator detected a reset condition due to improper software execution, high electrical noise, improper shielding, or electronics failure. If alarm persists after checking for noise source and proper shielding, replace actuator.</td>
</tr>
<tr>
<td>0, 1, 4</td>
<td>Hardware</td>
<td>Actuator detected hardware failure. If alarm persists after re-powering actuator, replace actuator.</td>
</tr>
<tr>
<td>Control Interface Alarm Light # Pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1, 2</td>
<td>Communication</td>
<td>Control Interface/Valve Actuator communication timeout occurred. Check for an intermittent control cable (4-wire cable and shield) connection. Replace Control Interface or Valve Actuator if control cable connections are sound.</td>
</tr>
<tr>
<td>1, 3</td>
<td>Memory</td>
<td>Control Interface detected data corruption. Reset factory defaults and re-commission valve actuator. If alarm persists, replace Control Interface.</td>
</tr>
<tr>
<td>1, 2, 3</td>
<td>Lock</td>
<td>Control Interface is “locked” and user has moved command switch from the RUN position to the Command Entry (middle) position. A flashing alarm light also indicates this condition. Move command switch to the RUN position or unlock the unit by entering Command A-7 followed by the 4-digit passcode.</td>
</tr>
<tr>
<td>1, 4</td>
<td>Reset</td>
<td>Control Interface detected a reset condition due to improper software execution, high electrical noise, improper shielding, or electronics failure. If alarm persists after checking for noise source and proper shielding, replace Control Interface.</td>
</tr>
</tbody>
</table>

**NOTES:**

1. If the alarm light is not on or flashing, no alarm conditions exist.
2. If the alarm light is on or flashing, view the alarm code by executing Command A-1, Display Alarms. After command entry, the INC/DEC switch is used to scroll through the alarm codes. The cause of the alarm can be determined by observing the numbered lights turned on and matching the pattern to a table entry above.
MAINTENANCE INSTRUCTIONS

SAFETY REQUIREMENTS
Regular inspection, testing and recalibration of combustion equipment according to the installation manual is an integral part of its safety. Inspection activities and frequencies shall be carried out as specified in the installation manual.

Actuator replacement
The SMARTLINK® valve actuator assembly is factory-calibrated to ensure 0.1 degree positioning accuracy. Therefore, the following actuator replacement procedures should be performed by MAXON personnel or maintenance personnel trained specifically by MAXON.

ACTUATOR REMOVAL:
1. Disable the process controller connected to the SMARTLINK® and turn off power. Remove the actuator access cover using a 4 mm Allen wrench and verify the green power light is OFF.
2. Record the wire color code sequence and then disconnect the four wires and shield from the terminal block. Disconnect any conduit fittings.
3. Loosen the clamp collar screws with a 3/16” Allen wrench.
4. Remove the four M6x1x18 mm screws connecting the actuator to the adapter with a 5 mm Allen wrench.
5. Remove the actuator by holding the actuator housing and pulling the actuator away from the valve.

ACTUATOR REINSTALLATION:
1. Inspect the actuator coupling. Identify the type of key required based on the photos below.
2. Verify the clamp collar is loose and position the screw head on the left when looking at the clamp collar at the top.
3. Place the actuator shaft with key into the clamp collar. Slide the keyed shaft into the coupling key slot, then rotate the actuator housing so the alignment pin mates with the pin hole in the valve adapter. The parts are a clearance fit but should slip together with little force. Apply pressure until the actuator is flat against the adapter. Do not apply an excessive force. If the sub-assemblies do not mate together, recheck that the clamp is loose and the key is pressed to the bottom of the key slot.
4. Verify that the valve will close completely. With the valve closed, the coupling hard-stop pin should be centered and touching the hard-stop set screw for butterfly valves. For ball valves, the coupling should hit on the two vertical hard-stop pins in the bracket.
5. With valve in the fully closed position, assemble the actuator to the valve adapter with four M6x1x18 mm fasteners using Loctite 242. Use a torque wrench with a 5 mm Allen bit to apply 2 N.m of torque in an alternating diagonal tightening sequence.
6. With the valve in the fully closed position, verify that the clamp collar is seated flush against the coupling shoulder. Tighten the stainless steel clamp collar with a torque wrench and 3/16” Allen bit to 19 N.m.
7. Make the necessary water-tight electrical conduit connection. Re-connect the four wires to the terminal strip per the original color code sequence. Re-connect the shield wire to the terminal strip, keeping it less than 25 mm in length.
8. Apply power to the SMARTLINK® system. Verify the green power light is ON.
9. Reinstall the access cover and torque the four fasteners to 2 N.m using a 4mm Allen wrench.
10. Place the Control Interface in manual mode by executing Command A-0. Then execute Command C-2 (Enable Valve Calibration/Check) which places the actuator in a command mode for calibration. When the command is entered, if all the lights flash on the Control Interface, the command was not executed. When the command is properly executed, the green diagnostic (DIAG) light in the actuator terminal block compartment will be on and the unit will no longer respond to 4-20 mA position commands.

Blind keyway
Requires 1/8” x 1/8” square key
Open keyway
Requires 1/8” x 3/16” rectangular key
11. Execute Command C-1 (Calibrate Valve) which closes the valve until the hard-stop is found, establishes a new home (or 0 degree) position, and moves the valve through all 800 positions. The command takes 2 or 3 minutes to execute during which half of the numbered lights on the Control Interface flash on and off. When the command is finished, the Control Interface will flash all of the numbered lights ON if the command was not successful. If the calibration failed, repeat the command a second time.

12. Execute Command C-0 to check the new calibration. This command takes less than 90 seconds and will flash half of the numbered lights during execution. At the end of command execution, if all the number lights on the Control Interface flash ON and then OFF, the calibration test failed. Re-mount the valve to the assembly as described above and repeat the calibration procedure. If the calibration test passed, cycle power to the actuator and check for a calibration alarm. (The actuator’s green diagnostic light should now be flashing and the alarm light on the Control Interface should be off.)

13. Re-enable the process controller commanding SMARTLINK®.
**SMARTLINK® REFERENCE TABLES**

**Table 1: SMARTLINK® Control Interface Input / Output Terminal Description**

<table>
<thead>
<tr>
<th>Terminal Name (Abbreviation)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>24V / Data Connector</strong></td>
<td></td>
</tr>
<tr>
<td>Field 24VDC Power (F24)</td>
<td>Output: Valve actuator +24VDC power; 25 Watts peak, 12 Watts average</td>
</tr>
<tr>
<td>Field Common (FCOM)</td>
<td>Output: Valve actuator +24VDC common</td>
</tr>
<tr>
<td>Data A (DA)</td>
<td>Input / Output: Communications network data ‘A’ signal</td>
</tr>
<tr>
<td>Data B (DB)</td>
<td>Input / Output: Communications network data ‘B’ signal</td>
</tr>
<tr>
<td>Supply 24VDC (S24)</td>
<td>Input: Power supply +24VDC; 25 Watts peak, 12 Watts average</td>
</tr>
<tr>
<td>Supply Common (SCOM)</td>
<td>Input: Power supply common</td>
</tr>
<tr>
<td><strong>4-20mA Connector</strong></td>
<td></td>
</tr>
<tr>
<td>4-20mA In A + (INA+)</td>
<td>Input: 4-20mA valve position command, current into + and out of - terminal; 4mA = minimum position; 20mA = maximum position</td>
</tr>
<tr>
<td>4-20mA In A - (INA-)</td>
<td></td>
</tr>
<tr>
<td>4-20mA In B + (INB+)</td>
<td>Reserved for future use</td>
</tr>
<tr>
<td>4-20mA In B – (INB-)</td>
<td></td>
</tr>
<tr>
<td>4-20mA Out + (OUT+)</td>
<td>Output: 4-20mA valve position feedback, current out of + and into – terminal; 4mA = 0.0 degrees; 20mA = 80.0 degrees; valve position = ([\text{current (mA)} - 4.0\text{mA}] / 16.0\text{mA} \times 80.0) degrees (for non-characterized valve actuator)</td>
</tr>
<tr>
<td>4-20mA Out - (OUT-)</td>
<td></td>
</tr>
<tr>
<td><strong>Relay Input Connector</strong></td>
<td>The following relay inputs are solid-state and require 5 to 24VDC and 2mA (max) to turn “ON”. Note #1: The input voltages applied to RI1 through RI6 must all be referenced to the RCOM terminal of the Control Interface.</td>
</tr>
<tr>
<td>Relay In 1 (RI1)</td>
<td>Input: The ON state of Relay Input #1 drives the valve actuator to its maximum characterized position, i.e. index #9. The 4-20mA position command signal is ignored when this input is ON. This input function is not supported in Software Version #1.</td>
</tr>
<tr>
<td>Relay In 2 (RI2)</td>
<td>Input: The ON state of Relay Input #2 drives the valve actuator to its minimum characterized position, i.e. index #0. The 4-20mA position command signal and RI1 are ignored when this input is ON. This input function is not supported in Software Version #1.</td>
</tr>
<tr>
<td>Relay In 3 (RI3)</td>
<td>Input: Reserved for future use</td>
</tr>
<tr>
<td>Relay In 4 (RI4)</td>
<td>Input: Reserved for future use</td>
</tr>
<tr>
<td>Relay In 5 (RI5)</td>
<td>Input: Reserved for future use</td>
</tr>
<tr>
<td>Relay In 6 (RI6)</td>
<td>Input: Reserved for future use</td>
</tr>
<tr>
<td><strong>Relay Output Connector</strong></td>
<td></td>
</tr>
<tr>
<td>Relay Out 1 (RO1)</td>
<td>Output: Alarm relay driver output; External interface relay coil voltage is connected to Supply Common (SCOM) through RO1, an open collector transistor output, if one or more of the following alarm conditions exist: valve communications, memory fault, valve actuator alarm, or tamper alarm.</td>
</tr>
<tr>
<td>Relay Out 2 (RO2)</td>
<td>Output: Control Enable relay driver output; External interface relay coil voltage is connected to Supply Common (SCOM) through RO2, an open collector transistor output, if one or more of the following alarm conditions exist: valve communications, memory fault, or stuck valve alarm.</td>
</tr>
<tr>
<td>Relay Out 3 (RO3)</td>
<td>Output: High Position Limit relay driver output; External interface relay coil voltage is connected to Supply Common (SCOM) through RO3, an open collector transistor output, if valve position &gt;= high limit position.</td>
</tr>
<tr>
<td>Relay Out 4 (RO4)</td>
<td>Output: Low Position Limit relay driver output; External interface relay coil voltage is connected to Supply Common (SCOM) through RO3, an open collector transistor output, if valve position &lt;= low position limit position.</td>
</tr>
<tr>
<td>Relay Out 5 (RO5)</td>
<td>Output: Manual Control relay driver output; External interface relay coil voltage is connected to Supply Common (SCOM) through RO3, an open collector transistor output, if control interface is in manual control mode.</td>
</tr>
<tr>
<td>Relay Common (RCOM)</td>
<td>Output and Input Relay Common</td>
</tr>
</tbody>
</table>
### Table 2: SMARTLINK® Valve Actuator Input / Output Terminal Description

<table>
<thead>
<tr>
<th>Terminal Name (Abbreviation)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>24V / Data Connector</strong></td>
<td></td>
</tr>
<tr>
<td>Field 24VDC Power (+24)</td>
<td>Input: Valve actuator +24VDC power; 25 Watts peak, 12 Watts average</td>
</tr>
<tr>
<td>Field Common (GND)</td>
<td>Input: Valve actuator +24VDC common</td>
</tr>
<tr>
<td>Data A (DA)</td>
<td>Input / Output: Communications network data 'A' signal</td>
</tr>
<tr>
<td>Data B (DB)</td>
<td>Input / Output: Communications network data 'B' signal</td>
</tr>
<tr>
<td>Shield (SHD)</td>
<td>Field device shield</td>
</tr>
</tbody>
</table>

### Table 3: SMARTLINK® Control Interface Wiring Specifications

<table>
<thead>
<tr>
<th>Terminal Name (Abbreviation)</th>
<th>Wiring Specification (Maximum Length, Type, Min/Max Size, and special requirements)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>24V / Data Connector</strong></td>
<td></td>
</tr>
<tr>
<td>Field 24VDC Power (F24)</td>
<td>100 feet maximum length; MAXON P/N 59829, Connect-Air International P/N W22P-1005, or equivalent; EIA Level 4 cable, 2 twisted pair with shield, 22 AWG; Suggested wiring color code convention: Orange/White (F24), Orange (FCOM), Blue (DA), Blue/White (DB); Requires shield wire termination at both ends. Shield should be connected to earth ground as it enters the enclosure for the Control Interface with a maximum length of 2 inches.</td>
</tr>
<tr>
<td>Field Common (FCOM)</td>
<td>300 feet maximum length; Belden P/N 3086A; 2 twisted pair with shield; 16 AWG - power pair, 20 AWG - data pair; Suggested wiring color code convention: Brown (F24), Blue (FCOM), White (DA), Black (DB); Requires shield wire termination on both ends. Shield should be connected to earth ground as it enters the enclosure for the Control Interface with a maximum length of 2 inches.</td>
</tr>
<tr>
<td>Data A (DA)</td>
<td></td>
</tr>
<tr>
<td>Data B (DB)</td>
<td></td>
</tr>
<tr>
<td>Supply 24VDC (S24)</td>
<td>No length limitations other than voltage drop considerations versus wire size constraints; +24VDC;1A/25 Watt maximum; 14 to 22 AWG</td>
</tr>
<tr>
<td>Supply Common (SCOM)</td>
<td></td>
</tr>
<tr>
<td><strong>4-20mA Connector</strong></td>
<td></td>
</tr>
<tr>
<td>4-20mA In A + (INA+)</td>
<td>1000 feet maximum length; Belden 9535, 2-conductor, 100% shield coverage, 300V 80C (UL 2464, CSA PCC FT 4) or equivalent; Inputs (INA+/− &amp; INB+/−) Requires shield wire termination at Control Interface end. Shield should be connected to earth ground as it enters the enclosure for the Control Interface with a maximum length of 2 inches. Output (OUT+/−) shield should be terminated at user's controller end.</td>
</tr>
<tr>
<td>4-20mA In A - (INA-)</td>
<td></td>
</tr>
<tr>
<td>4-20mA In B + (INB+)</td>
<td></td>
</tr>
<tr>
<td>4-20mA In B − (INB-)</td>
<td></td>
</tr>
<tr>
<td>4-20mA Out + (OUT+)</td>
<td></td>
</tr>
<tr>
<td>4-20mA Out - (OUT-)</td>
<td></td>
</tr>
<tr>
<td><strong>Relay Input Connector</strong></td>
<td>No length limitations; 14 to 22 AWG; Follow local codes for wire type</td>
</tr>
<tr>
<td>Relay In 1 (RI1)</td>
<td></td>
</tr>
<tr>
<td>Relay In 2 (RI2)</td>
<td></td>
</tr>
<tr>
<td>Relay In 3 (RI3)</td>
<td></td>
</tr>
<tr>
<td>Relay In 4 (RI4)</td>
<td></td>
</tr>
<tr>
<td>Relay In 5 (RI5)</td>
<td></td>
</tr>
<tr>
<td>Relay In 6 (RI6)</td>
<td></td>
</tr>
<tr>
<td><strong>Relay Output Connector</strong></td>
<td>No length limitations; 30 VDC max &amp; 100 mA max; 14 to 22 AWG; Follow local codes for wire type</td>
</tr>
<tr>
<td>Relay Out 1 (RO1)</td>
<td></td>
</tr>
<tr>
<td>Relay Out 2 (RO2)</td>
<td></td>
</tr>
<tr>
<td>Relay Out 3 (RO3)</td>
<td></td>
</tr>
<tr>
<td>Relay Out 4 (RO4)</td>
<td></td>
</tr>
<tr>
<td>Relay Out 5 (RO5)</td>
<td></td>
</tr>
<tr>
<td>Relay Common (RCOM)</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4: SMARTLINK® DIN Rail Assembly Input / Output Terminal Description

<table>
<thead>
<tr>
<th>Terminal Designator: Name (Abbreviation)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Supply VAC Terminals</strong></td>
<td>Provided only if optional DC supply is provided</td>
</tr>
<tr>
<td>Line Voltage (L1)</td>
<td>120 to 230 VAC power source, 50-60Hz</td>
</tr>
<tr>
<td>Neutral (L2)</td>
<td>Neutral</td>
</tr>
<tr>
<td>Ground (GND)</td>
<td>Earth Ground</td>
</tr>
</tbody>
</table>

#### Relay Output Terminal Block
- **Alarm (AL)**
  - **Alarm Return (ALR)**: Output: Alarm relay contact, Normally open, 6A, 250VAC/DC max; Contacts closes if one or more of the following alarms exist: valve communications, memory fault, valve actuator alarm, or tamper alarm.
- **Control Enable (CE)**
  - **Control Enable Return (CER)**: Output: Control Enable relay contact; Normally open, 6A, 250VAC/DC max; Contact closes if one or more of the following alarm conditions exist: valve communications, memory fault, or stuck valve alarm.
- **High Position Limit (HPL)**
  - **High Position Limit Return (HPLR)**: Output: High Position relay contact; Normally open, 6A, 250VAC/DC max; Contact closes if valve position >= high limit position.
- **Low Position Limit (LPL)**
  - **Low Position Limit Return (LPLR)**: Output: Low Position Limit relay contact; Normally open, 6A, 250VAC/DC max; Contact closes if valve position <= low position limit position.
- **Manual Control (MC)**
  - **Manual Control Return (MCR)**: Output: Manual Control relay contact; Normally open, 6A, 250VAC/DC max; Contact closes if Control Interface is in manual control mode.

#### Relay Input Terminal Block
- **Command Common (CCOM)**: Common for all relay input command signals listed below and must be wired to ground reference of all input command signals below. End-user must make this connection for proper operation of input commands; For input relays with VAC-rated coils, this terminal is typically connected to L2.
- **High Position Command (HPC)**: Input: High Position Command drives the valve actuator to its maximum characterized position, i.e. index #9. The 4-20mA position command signal is ignored when this input is energized. The HPC input function is not supported in Software Version #1.
- **Low Position Command (LPC)**: Input: Low Position Command drives the valve actuator to its minimum characterized position, i.e. index #0. The 4-20mA position command signal and the HPC relay input are ignored when this input is energized. The LPC input function is not supported in Software Version #1.

#### 4-20mA Terminal Block
- **4-20mA In A + (INA+)**
  - **4-20mA In A - (INA-)**: Input: 4-20mA valve position command, current into + and out of - terminal; 4mA = minimum position; 20mA = maximum position
- **4-20mA In B + (INB+)**
  - **4-20mA In B – (INB-)**: Reserved for future use
- **4-20mA Out + (OUT+)**
  - **4-20mA Out - (OUT-)**: Output: 4-20mA valve position feedback, current out of + and into – terminal; 4mA = 0.0 degrees; 20mA = 80.0 degrees; valve position = [current (mA) – 4.0mA] / 16.0mA * 80 degs (for non-characterized valve actuator)

#### Network Terminal Block
- **Field 24VDC Power (F24)**: Output: Communications network +24VDC power
- **Field Common (FCOM)**: Output: Communications network common
- **Data A (DA)**: Input / Output: Communications network data ‘A’ signal
- **Data B (DB)**: Input / Output: Communications network data ‘B’ signal

#### 24VDC Terminal Block
- **Supply 24VDC Power (S24)**: Pre-wired only if optional DC supply is provided
  - **Supply Common (SCOM)**: 24VDC power source; 1A peak current
# Table 5: SMARTLINK® DIN Rail Assembly Wiring Specifications

<table>
<thead>
<tr>
<th>Terminal Designator: Name (Abbreviation)</th>
<th>Wiring Specification (Maximum Length, Type, Min/Max Size, and special requirements)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VAC Terminal Block</strong></td>
<td></td>
</tr>
<tr>
<td>Line Voltage (L1)</td>
<td>No length limitations; 14 to 22 AWG; Follow all local and NEC 1 wiring codes; Protective Earth should also be connected to the ground lug of the enclosure that houses the Control Interface.</td>
</tr>
<tr>
<td>Neutral (L2)</td>
<td></td>
</tr>
<tr>
<td>Ground (GND)</td>
<td></td>
</tr>
<tr>
<td><strong>Relay Output Terminal Block</strong></td>
<td></td>
</tr>
<tr>
<td>Alarm (AL)</td>
<td>No length limitations; 14 to 22 AWG; Follow all local and NEC 1 wiring codes.</td>
</tr>
<tr>
<td>Alarm Return (ALR)</td>
<td></td>
</tr>
<tr>
<td>Control Enable (CE)</td>
<td></td>
</tr>
<tr>
<td>Control Enable Return (CER)</td>
<td></td>
</tr>
<tr>
<td>High Position Limit (HPL)</td>
<td></td>
</tr>
<tr>
<td>High Position Limit Return (HPLR)</td>
<td></td>
</tr>
<tr>
<td>Low Position Limit (LPL)</td>
<td></td>
</tr>
<tr>
<td>Low Position Limit Return (LPLR)</td>
<td></td>
</tr>
<tr>
<td>Manual Control (MC)</td>
<td></td>
</tr>
<tr>
<td>Manual Control Return (MCR)</td>
<td></td>
</tr>
<tr>
<td><strong>Relay Input Terminal Block</strong></td>
<td></td>
</tr>
<tr>
<td>Command Common (CCOM)</td>
<td>No length limitations; 14 to 22 AWG; Follow local codes for wire type.</td>
</tr>
<tr>
<td>High Position Command (HPC)</td>
<td></td>
</tr>
<tr>
<td>Low Position Command (LPC)</td>
<td></td>
</tr>
<tr>
<td><strong>4-20mA Terminal Block</strong></td>
<td></td>
</tr>
<tr>
<td>4-20mA In A + (INA+)</td>
<td>1000 feet maximum length; Belden 9535, 2-conductor, 100% shield coverage, 300V 80C (UL 2464, CSA PCC FT 4) or equivalent; Inputs (INA+/ INB+) Requires shield wire termination at enclosure that houses the Control Interface end. Shield should be connected to the ground lug with a maximum length of 2 inches. Output (OUT+) shield should be terminated at user's controller end.</td>
</tr>
<tr>
<td>4-20mA In A - (INA-)</td>
<td></td>
</tr>
<tr>
<td>4-20mA In B + (INB+)</td>
<td></td>
</tr>
<tr>
<td>4-20mA In B - (INB-)</td>
<td></td>
</tr>
<tr>
<td>4-20mA Out + (OUT+)</td>
<td></td>
</tr>
<tr>
<td>4-20mA Out - (OUT-)</td>
<td></td>
</tr>
<tr>
<td><strong>Network Terminal Block</strong></td>
<td></td>
</tr>
<tr>
<td>Field 24VDC Power (F24)</td>
<td>100 feet maximum length; MAXON P/N 59829, Connect-Air International P/N W22P-1005, or equivalent; EIA Level 4 cable, 2 twisted pair with shield, 22 AWG; Suggested wiring color code convention: Orange/White (F24), Orange (FCOM), Blue (DA), Blue/White (DB); Requires shield wire termination at both ends. Shield should be connected to ground lug of enclosure that houses the Control Interface with a maximum length of 2 inches.</td>
</tr>
<tr>
<td>Field Common (FCOM)</td>
<td></td>
</tr>
<tr>
<td>Data A (DA)</td>
<td>300 feet maximum length; Belden P/N 3086A; 2 twisted pair with shield; 16 AWG – power pair, 20 AWG - data pair; Suggested wiring color code convention: Brown (F24), Blue (FCOM), White (DA), Black (DB); Requires shield wire termination on both ends. Shield should be connected to earth ground as it enters the enclosure for the Control Interface with a maximum length of 2 inches.</td>
</tr>
<tr>
<td>Data B (DB)</td>
<td></td>
</tr>
<tr>
<td><strong>24VDC Terminal Block</strong></td>
<td></td>
</tr>
<tr>
<td>Supply 24VDC Power (S24)</td>
<td>No wiring required if optional supply and pre-wiring are specified; If supply is not provided, no length limitations exist other than voltage drop considerations versus wire size constraints; 14 to 22 AWG; Follow all local and NEC 1 codes</td>
</tr>
<tr>
<td>Supply Common (SCOM)</td>
<td></td>
</tr>
</tbody>
</table>
Table 6: SMARTLINK® Interface Relay Checkout Procedures

<table>
<thead>
<tr>
<th>SMARTLINK® DIN-Rail Assembly Terminal Number: Name (Abbreviation)</th>
<th>SMARTLINK® Control Interface Relay Driver Terminal Name (Abbreviation)</th>
<th>Checkout Procedure to verify proper relay contact operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay Output Terminal Block</td>
<td>Relay Output Drivers</td>
<td></td>
</tr>
<tr>
<td>Alarm (AL)</td>
<td>Relay Out 1 (RO1)</td>
<td>Temporarily disconnect the Data A or B signal to the Valve Actuator. Within a few seconds, the Alarm relay (connected to the Control Interface RO1 terminal) should be energized.</td>
</tr>
<tr>
<td>Control Enable (CE)</td>
<td>Control Enable Return (CER)</td>
<td>Relay Out 2 (RO2)</td>
</tr>
<tr>
<td>High Position Limit (HPL)</td>
<td>High Position Limit Return (HPLR)</td>
<td>Relay Out 3 (RO3)</td>
</tr>
<tr>
<td>Low Position Limit (LPL)</td>
<td>Low Position Limit Return (LPLR)</td>
<td>Relay Out 4 (RO4)</td>
</tr>
<tr>
<td>Manual Control (MC)</td>
<td>Manual Control Return (MCR)</td>
<td>Relay Out 5 (RO5)</td>
</tr>
</tbody>
</table>

| Relay Input Terminal Block | |
| High Position Command (HPC) | Relay In 1 (RI1) | Energize HPC terminal and verify that valve moves to its maximum characterized position, index #9. (Input function not supported in Software Version #1.) |
| Low Position Command (LPC) | Relay In 2 (RI2) | Energize LPC terminal and verify that valve moves to its minimum characterized position, index #0. (Input function not supported in Software Version #1.) |
### Table 7: SMARTLINK® System Configuration Summary

System configuration of SMARTLINK® is accomplished through execution of the commands shown below, using the switches and lights on the Control Interface. Before performing any system configuration function, review the factory default settings. In many applications, modification of the default configuration is not necessary.

<table>
<thead>
<tr>
<th>Configuration Function (Command #)</th>
<th>Factory Default (Configuration #)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select LOS Position (B-0)</td>
<td>No position change (#4)</td>
<td>Desired valve position when a loss of signal (L.O.S.) event occurs. A loss of signal condition exists if the position command signal drops below 0.05 mA. Configuration setting #0, 1, 2, and 3 correspond to the positions defined at index #0, 3, 6, and 9, respectively. Setting #4 corresponds to no position change (i.e. actuator remains in last position before loss of signal).</td>
</tr>
<tr>
<td>Select Standby Position (B-2)</td>
<td>Position Index 0 (#0)</td>
<td>Desired valve position when adjustment mode switch is placed in the STANDBY position. (The STANDBY function is not active when the unit is in RUN mode.) Configuration setting #0, 1, 2, and 3 correspond to the positions defined at index #0, 3, 6, and 9, respectively.</td>
</tr>
<tr>
<td>Select Control Deadband (B-3)</td>
<td>0.06% Deadband (#2)</td>
<td>Control deadband placed around the position command input signal to eliminate unwanted actuator movement caused by electrical noise on the 4-20 mA position command. Configuration setting #0, 1, 2, 3, 4, and 5 correspond to a deadband of 0, 0.03, 0.06, 0.13, 0.16, and 0.19%, respectively.</td>
</tr>
<tr>
<td>Set High Limit Position Threshold (B-4)</td>
<td>80.0 degrees (N/A)</td>
<td>Relay driver Output #3 (RO3) will energize the High Position Limit relay when the valve position is &gt;= high position limit threshold. This value is automatically set to 1.0 degree less than the maximum valve position when modified using Commands A-2 or A-5.</td>
</tr>
<tr>
<td>Set Low Limit Position Threshold (B-5)</td>
<td>0.0 degrees (N/A)</td>
<td>Relay driver Output #4 (RO4) will energize the Low Position Limit relay when the valve position is &lt;= low position limit threshold. This value is automatically set to 1.0 degree above the minimum valve position when modified using Commands A-2 or A-6.</td>
</tr>
<tr>
<td>Set Auto Ramp Adjust On/Off (B-6)</td>
<td>Auto Ramp ON (#1)</td>
<td>The automatic ramp function is used during the Valve Position Setup Mode to create a linear position ramp between the position being adjusted and the two adjacent position indexes. This provides a position “smoothing” of the valve profile and simplifies valve characterization. Setting #0 is Auto Ramp OFF and setting #1 is ON.</td>
</tr>
<tr>
<td>Enter New Lock Combination (C-4)</td>
<td>Passcode: 0,0,0,0 (N/A)</td>
<td>4-digit electronic passcode to prevent tampering. The passcode is required to modify the configuration only if the lock is enabled. See Select Lock Enable/Disable configuration below.</td>
</tr>
<tr>
<td>Select Lock Enable / Disable (C-5)</td>
<td>Lock Disable (#0)</td>
<td>Enable / Disable selection of the electronic “lock” function. If enabled, the stored passcode must be entered to modify any configuration or valve profile data. Setting #0 and #1 correspond to Lock Disable and Lock Enable, respectively.</td>
</tr>
</tbody>
</table>

### CHANGING A SYSTEM CONFIGURATION SETTING:

1. Select and enter the required system configuration command.
2. After the command is entered, one of the numbered (0-9) lights will be on, indicating the current configuration setting. (For example: If the lock configuration is set to #0, Lock Disable, the 0 light will be solidly lit after Command C-5, Lock Enable/Disable, is entered successfully.)
3. Select the desired configuration setting by using the INC/DEC switch. As the INC/DEC switch is momentarily pushed up or down, the selected setting changes as indicated by turning on the corresponding numbered (0-9) light.
4. Push the ENTER button after the desired configuration setting is selected. The numbered light that is lit to indicate the selected configuration will momentarily turn off indicating the command is complete and the configuration setting is saved.
5. To confirm the correct setting is saved, re-enter the command and verify the new setting by the numbered (0-9) light indication.
### Table 8: SMARTLINK® User Commands - Command Set ‘A’

<table>
<thead>
<tr>
<th>SMARTLINK® Commands Number: Name</th>
<th>Description of command purpose and usage</th>
</tr>
</thead>
</table>
| **A-0: Enter Manual Positioning Mode** | Command A-0 is used to enter a Manual Positioning Mode that overrides the 4-20 mA, position command input. To execute Command A-0, the position command signal must first be driven to 4mA or less. If the numbered lights flash momentarily after entering Command A-0, - the position command may not be less than 4mA, - the adjustment mode switch may be in the STANDBY position, or - unit may be “locked” to prevent tampering.  

After entering Command A-0, the yellow manual light on the Control Interface will be on and RO5 (Relay Output driver #5) will energize the Manual Control relay (if installed). Once this command has been entered, the INC/DEC switch can be used to move the valve open or close. If the adjustment mode switch is in the INDEX position, the INC/DEC switch is used to move between the 19 electronic position “indexes”. (See Commissioning Sheet on page 40 for the factory default valve positions for each index).  

If the adjustment mode switch is in the ADJ position, pushing the INC/DEC switch up or down changes the valve position in 0.1 degree steps. If the INC/DEC switch is held in the up or down position, the position is continuously adjusted until the max/min position is reached. **This command should not be executed when the valve is part of an operating process that requires continuous, closed-loop valve positioning.** |
| **A-1: Display Alarm Codes** | After entering Command A-1, the INC/DEC switch is used to scroll through all current alarm conditions. If the red alarm (“ALM”) light on the Control Interface is on, one or more alarm condition exists. (See page 43 for Alarm Codes.) |
| **A-2: Enter Valve Position Setup Mode** | Command A-2 is used to enter the Valve Position Setup Mode for modifying the 19 position profile. To execute Command A-2, the position command signal must be 4 mA or greater. (If the numbered lights flash momentarily after entering A-0, the adjustment mode switch may be in the STANDBY position, or the unit may be “locked” to prevent tampering.)  

After entering Command A-2, both the yellow manual light and green run light will be flashing along with 1 or 2 of the numbered lights that are used to indicate the valve’s position index. The flashing lights indicate that one of the 19 position indexes can now be modified using the INC/DEC switch. (For example, if the #1 and #2 light are flashing, position index 1.5 can be adjusted.) The position command signal determines which of the 19 position indexes can be modified. With the adjustment mode switch in the ADJ position, pushing the INC/DEC switch up or down changes the valve position in +/-0.1 degree steps. If the INC/DEC switch is held in the up or down position for more than 3 seconds, the valve position is changed in 0.5 degree steps. After moving the valve to the desired position, the Enter button must be pressed to save the position setting. When the Enter button is pressed, the blinking position index lights (0-9) and command set light ‘a’ will momentarily turn off. See Commissioning Sheet on page 40 for a complete description of the valve characterization procedure.  

In the Position Setup mode a maximum movement of 8 degrees from the stored position is permitted. When the 8 degree limit is reached all of the position index lights will momentarily flash on. If the adjustment mode switch is in the INDEX position, valve positioning is inhibited and is indicated by a momentary flash of the position index lights if an INC/DEC switch adjustment is attempted. Valve positioning is also inhibited if the position command signal is less than 0.05 mA and is indicated by turning off the position index lights. |
| **A-3: Reserved for future use** | N/A |
| **A-4: Reserved for future use** | N/A |
**Table 8: SMARTLINK® User Commands - Command Set ‘A’ (continued)**

<table>
<thead>
<tr>
<th>SMARTLINK® Commands Number:</th>
<th>Description of command purpose and usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Command Set ‘A’</strong></td>
<td></td>
</tr>
<tr>
<td>A-5: Set Max Position &amp; Min/Max Ramp</td>
<td>Command A-5 is used to enter the Valve Position Setup Mode for adjusting the maximum position (index #9) and setting a linear position ramp from the minimum to maximum stored positions. To execute Command A-5, the position command signal, must be 20.00mA, +/-0.15 mA. (If the numbered lights flash momentarily after command entry, the position command input is not 20mA or the adjustment mode switch is in the STANDBY position.) After entering the command, both the yellow manual light and green run light will be flashing along with a flashing #9 light. The valve’s maximum position can now be modified using the INC/DEC switch. If the adjustment mode switch is in the ADJ position, pushing the INC/DEC switch up or down changes the valve position in +/-0.1 degree steps. If the INC/DEC switch is held in the up or down position for more than 3 seconds, the valve position is changed in 0.5 degree steps. After moving the valve to the desired position, the Enter button must be pressed to save the position setting. When the Enter button is pressed, the #9 position index light and the command set light ‘a’ will momentarily turn off. In the Position Setup mode a maximum movement of 8 degrees from the stored position is permitted. When the 8 degree limit is reached all of the position index lights will momentarily flash on. If the adjustment mode switch is in the INDEX position, valve positioning is inhibited and is indicated by a momentary flash of the position index lights when an INC/DEC adjustment is attempted. After the command is entered, valve positioning is also inhibited if the command signal changes from 20.00 mA.</td>
</tr>
<tr>
<td>A-6: Set Min Position &amp; Min/Max Ramp</td>
<td>Command A-6 is used to enter the Valve Position Setup Mode for adjusting the minimum position (index #0) and setting a linear position ramp from the minimum to maximum positions. To enter Command A-6, the position command signal must be 4.00mA, +/-0.15 mA. Adjustment of the minimum position is performed identical to adjustment of the maximum position, Command A-5.</td>
</tr>
<tr>
<td>A-7: Unlock Valve Configuration</td>
<td>Command A-7 permits entry of a 4-digit passcode to “unlock” the system configuration and position profile for user modification. A flashing alarm light indicates a “locked” unit. If the alarm light is not flashing, the unit is already unlocked and the numbered lights will flash momentarily if command entry is attempted. After the command is entered, the INC/DEC command is used to select a passcode digit as indicated by the lights. Once selected, the Enter button should be pushed and the process repeated 3 more times. If the 4-digit pass-code is correct, the alarm light will stop flashing and be turned off if no other alarms exist. To re-lock the unit, move the command switch to the RUN position.</td>
</tr>
</tbody>
</table>
Table 9: SMARTLINK® User Commands - Command Set ‘B’

<table>
<thead>
<tr>
<th>SMARTLINK® Commands Number: Name</th>
<th>Description of command purpose and usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Command Set ‘B’</strong></td>
<td></td>
</tr>
<tr>
<td>B-0: Select Loss of Signal (LOS) Position</td>
<td>Command B-0 is a configuration command that permits selection of valve position when a loss of signal event occurs (below 0.05 mA). After B-0 is entered, the current configuration is shown by one of the numbered lights. Select an L.O.S. configuration, #0, 1, 2, 3, or 4, using the INC/DEC switch and push the Enter button after the desired configuration is indicated by the numbered lights. Configuration #0, 1, 2, and 3 correspond to the positions defined at index #0, 3, 6, and 9 (max), respectively. (See Commissioning Sheet on page 40 for the default valve position for each index). Configuration #4 corresponds to no position change (actuator remains in last position before loss of signal). The factory default configuration is #4.</td>
</tr>
<tr>
<td>B-1: Reserved for future use</td>
<td>N/A</td>
</tr>
<tr>
<td>B-2: Select Standby Position</td>
<td>Command B-2 is a configuration command that permits selection of the STANDBY valve position. After command entry, the current configuration is shown by one of the numbered lights. Select a standby position configuration, #0-3, using the INC/DEC switch and push the Enter button after the desired configuration is indicated by the numbered lights. Configuration #0, 1, 2, and 3 correspond to the positions defined at index #0, 3, 6, and 9 (max), respectively. (See Commissioning Sheet on page 40 for the default position for each index). The STANDBY position is useful if an emergency situation occurs during Valve Position Setup and the user wants the valve to immediately move to a “safe” position, regardless of the 4-20 mA position command. The valve moves to the STANDBY position when the adjustment mode switch is in the downward “STANDBY” position.</td>
</tr>
<tr>
<td>B-3: Select Deadband</td>
<td>Command B-3 is a configuration command that is used to select the deadband placed around the position command input signal. If the input signal contains spurious noise, hunting of the actuator may occur. It is recommended that the source of the noise is eliminated or the 4-20 mA cable type is verified as well as its shield and ground connections. If the noise cannot be eliminated, the deadband can be increased as a last resort. After Command B-3 is entered, the current configuration is shown by one of the numbered lights. Select a deadband configuration, #0-5, using the INC/DEC switch and push the Enter button after the desired configuration is indicated by the numbered lights. Configuration #0, 1, 2, 3, 4 and 5 correspond to a deadband of 0, 0.03, 0.06, 0.13, 0.16 and 0.19%, respectively. The factory default configuration is #2, 0.06%.</td>
</tr>
<tr>
<td>B-4: Set High Limit Position Threshold</td>
<td>Command B-4 is a configuration command that is used to adjust the high limit position threshold. Relay driver Output #3 (RO3) will energize the High Position Limit relay when the valve position is equal to or greater than the stored high limit position threshold. The factory default is 80.0 degrees and is automatically set to 1.0 degree less than the maximum valve position when modified using Commands A-2 or A-5. If the factory default or automatic 1.0 degree offset (from a user-selected maximum) is acceptable, this configuration is not necessary. To execute Command B-4, the valve system must be in the Manual Mode (See Command A-0). With the unit in Manual Mode and adjustment mode switch in the “ADJ” middle position, push the Enter button and the valve will be driven to the stored value. Then push the INC/DEC switch up or down to change the valve position in +/-1.0 degree steps. If the INC/DEC switch is held in the up or down position, the valve position is continuously changed in +/-1.0 degree steps. After moving the valve to the desired high limit position, the Enter button must be pressed to save the setting. When the Enter button is pressed, the position index and command set ‘b’ lights will momentarily turn off, indicating the new value has been stored.</td>
</tr>
</tbody>
</table>

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### Table 9: SMARTLINK® User Commands - Command Set ‘B’ (continued)

<table>
<thead>
<tr>
<th>SMARTLINK® Commands Number: Name</th>
<th>Description of command purpose and usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Command Set ‘B’</strong></td>
<td></td>
</tr>
</tbody>
</table>
| B-5: Set Low Limit Position Threshold | Command B-5 is a configuration command that is used to adjust the low limit position threshold. Relay driver Output #4 (RO4) will energize the Low Position Limit relay when the valve position is less than or equal to the stored low limit position threshold. The factory default is 0.00 degrees and is automatically set to 1.0 degree above the minimum valve position when modified using Commands A-2 or A-6. If the factory default or automatic 1.0 degree offset (from a user-selected minimum) is acceptable, this configuration is not necessary.  

To execute Command B-5, the valve system must be in the Manual Mode (See Command A-0). With the unit in Manual Mode and adjustment mode switch in the “ADJ” middle position, push the Enter button and the valve will be driven to the stored value. Then push the INC/DEC switch up or down to change the valve position in +/-1.0 degree steps. If the INC/DEC switch is held in the up or down position, the valve position is continuously changed in +/-1.0 degree steps. After moving the valve to the desired low limit position, the Enter button must be pressed to save the setting. When the Enter button is pressed, the position index and command set ‘b’ lights will momentarily turn off, indicating the new value has been stored. |
| B-6: Set Auto Ramp Adjust On/Off | Command B-6 is a configuration command that is used to set on or off the automatic ramp function. The factory default is Auto Ramp ON, configuration #1. Configuration #0 is Auto Ramp OFF.  

After command entry, the current configuration is shown by one of the numbered lights. Select Auto Ramp ON, #1, or Auto Ramp OFF, #0 using the INC/DEC switch and push the Enter button after the desired configuration is indicated by the numbered lights.  

The automatic ramp function is used during the valve Position Setup Mode to create a linear position ramp between the position being adjusted and the two adjacent position indexes. This provides a position “smoothing” of the valve profile and simplifies valve characterization because only 10 of the 19 position indexes (i.e. index 0, 1, 2, 3, ..., instead of 0, 0.5, 1.0, 1.5, etc.) require adjustment. For custom valve characterization that requires precision adjustment of each of the 19 position indexes, the Auto Ramp function should be OFF. |
| B-7: Reserved for future use | N/A |
Table 10: SMARTLINK® User Commands - Command Set ‘C’

<table>
<thead>
<tr>
<th>SMARTLINK® Commands Number: Name</th>
<th>Description of command purpose and usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Command Set ‘C’</strong></td>
<td></td>
</tr>
<tr>
<td>C-0: Check Valve Calibration</td>
<td>For use by Maxon-trained field personnel.</td>
</tr>
<tr>
<td>C-1: Calibrate Valve</td>
<td>For use by Maxon-trained field personnel.</td>
</tr>
<tr>
<td>C-2: Enable Valve Calibration / Check</td>
<td>For use by Maxon-trained field personnel.</td>
</tr>
<tr>
<td>C-3: Reset Factory Default Settings</td>
<td>Command C-3 is a configuration command that is used to reset all system configuration and valve position data with the exception of the backup position profile. To execute Command C-3, the valve system must first be in Position Setup Mode (See Command A-2). With the unit in Position Setup Mode and Command C-3 selected, push the Enter button. Light #3 and the command set ‘c’ light should momentarily turn off indicating the reset is complete.</td>
</tr>
<tr>
<td>C-4: Enter New Lock Combination</td>
<td>Command C-4 is a configuration command that is used to enter a new 4-digit electronic passcode to prevent tampering. To execute Command C-4, the electronic “lock” must be enabled and the unit must be in the “unlocked” state. (A locked unit is indicated by a flashing alarm light.) If all the numbered lights momentarily flash after command entry, the “lock” function is disabled or the unit is currently locked. See Command C-5 to enable the lock function or Command A-7 to unlock the unit. After the command is entered, the INC/DEC command is used to select a passcode digit as indicated by the numbered lights. After the first digit is selected, the Enter button should be pushed and the numbered light and command set light ‘c’ momentarily turn off. Repeat the previous digit entry process 3 more times for a total of 4 digits. After the 4th digit is entered, the number #4 light will turn on and the command set ‘c’ light will begin to flash, indicating that a new 4-digit passcode has been saved and the command is complete. If the 4-digit passcode is forgotten, call MAXON for assistance. The factory default 4-digit passcode is 0-0-0-0.</td>
</tr>
<tr>
<td>C-5: Select Lock Enable / Disable</td>
<td>Command C-5 is a configuration command that is used to enable or disable the electronic “lock” function. The factory default is configuration #0, Lock Disable. Configuration #1 is Lock Enable. To execute Command C-5, the unit must be in the unlocked state. (The alarm light will be flashing rapidly if the unit is locked. See Command A-7 to unlock the device.) After command entry, the current configuration is shown by one of the numbered lights. Select either configuration #0 or #1 using the INC/DEC switch and push the Enter button after the desired configuration is indicated by the numbered lights.</td>
</tr>
</tbody>
</table>
Table 10: SMARTLINK® User Commands - Command Set ‘C’ (continued)

<table>
<thead>
<tr>
<th>SMARTLINK® Commands Number: Name</th>
<th>Description of command purpose and usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Set ‘C’</td>
<td></td>
</tr>
<tr>
<td>C-6: Save Profile as Backup</td>
<td>Command C-6 is a configuration command that is used to save the currently stored valve position profile. This command is used in conjunction with C-7, Restore Backup Profile, to help ensure that a proven valve position profile can be restored without re-commissioning if a factory default reset is accidentally performed or incorrect position adjustments are made during the commissioning process. To execute Command C-6, the valve system must first be in Position Setup Mode (See Command A-2). With Command C-6 selected and the unit in Position Setup Mode, push the Enter button. Light #6 and the command set ‘c’ light should momentarily turn off, indicating the command has been executed.</td>
</tr>
<tr>
<td>C-7: Restore Backup Profile</td>
<td>Command C-7 is a configuration command that is used to restore a backup valve position profile as the current operating profile. This command is used in conjunction with C-6, Save Profile as Backup, to help ensure that a proven valve position profile can be restored without re-commissioning if a factory default reset is accidentally performed or incorrect position adjustments are made during the commissioning process. To execute Command C-6, the valve system must first be in Position Setup Mode (See Command A-2). With the unit in Position Setup Mode and Command C-7 selected, push the Enter button. Light #7 and the command set ‘c’ light should momentarily turn off, indicating the command has been executed.</td>
</tr>
</tbody>
</table>

GENERAL COMMAND ENTRY INSTRUCTIONS:

1. A user command can be performed only when the following conditions are all satisfied:
   a) MODE switch is not in the RUN position,
   b) one of the green command set light (a, b, c) is blinking,
   c) ADJUST switch is not in the STANDBY position, and
   d) unit is “unlocked”. (Condition ‘d’ is not required for Command A-7, Unlock Valve Configuration and Command A-1, Display Alarm Codes.)
   e) For some commands, the unit must be in a specific mode or have the correct 4-20 mA command signal (see command entry requirements listed on page 37 or in Reference Tables 8 through 10 on page 52 through page 57).

2. If the a, b, or c command set light is not blinking, momentarily push the MODE switch in the CMD abc position (up) or, change the position of the rotary CMD SEL switch. This will start the command set light blinking and permit a command to be entered.

3. Select the desired command set by momentarily pushing the MODE switch upward to the CMD abc position. Subsequent CMD abc switch entries will change the command set selection as indicated by the green command set (a, b, c) lights.

4. Select the desired command number by changing the position of the rotary CMD SEL switch. When one of the command set lights is blinking, the command number selected is indicated by the corresponding numbered (0-9) light being lit.

5. After the command set and number are selected, press the ENTER button. If all of the numbered lights flash momentarily after the ENTER button is pushed, a command entry error has occurred and the command was not executed. If an entry error occurs, check if the unit is locked (i.e. alarm light blinking) or the ADJUST switch is in the STANDBY position. If neither condition exists, check the specific entry requirements of the command.
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