Honeywell

MICRO SWITCH™ Hazardous Area Switches

LSX Series

Datasheet

MICRO SWITCH™ LSX Series Hazardous Area Limit Switches

MICRO SWITCH™ LSX hazardous area switches are designed for use in adverse environments. They are approved for use in hazardous locations and NEMA classified atmospheres because their rugged housings have integral flame paths. These flame paths force internal expanding gases to cool below external atmosphere ignition temperatures before they leave the housing. The LSX also features tracking interchangeability with MICRO SWITCH™ BX Series Hazardous Area switches. An optional mounting plate provides the same tracking and mounting as the standard HDLS Series (heavy-duty limit switch).

The majority of HDLS operating heads and circuitry options are available for the LSX Series. The rotary actuated LSX series products are designed for use with levers that have non-sparking actuators due to the potentially hazardous environment. The other styles of LSX Series switches which are the plunger actuated and wobble actuated products incorporate an integral non-sparking actuator.

What makes our switches better?

- Industry-leading breadth of product
- Weather sealed to NEMA 1, 3, 4, 6, 13
  Explosion proof to NEMA 7 (Class 1, Division 1 & 2, Groups B, C, D), NEMA 9 (Class 2, Division 1 & 2, Groups E, F, G)
- Extensive variety of actuation heads and multiple non-sparking actuators
- All metal drive train that offers consistent operating characteristics through a broad temperature range. Also lasts longer (without need for frequent adjustment) than drive trains with plastic parts

SAFE • RELIABLE
EXPLOSION PROOF • WEATHER SEALED

Features and Benefits

DESIGN FLEXIBILITY

MICRO SWITCH™ LSX limit switches' field adjustability (CW-CCW operation, rotatable operating head) assists in matching the switch to the application. Available with momentary, maintained, sequential, or center neutral action.

All-metal drive train for consistent operation

UNIQUE DESIGN FEATURES

The head design is keyed for more **secure head-to-body retention** with the head indexable in any one of four positions 90° apart. Captive mounting screws in the heads help prevent the loss of screws during replacement or repositioning of the head. Self-lifting pressure plate terminals **save wiring time**.

Industry-leading breadth of products

WITHSTANDS MANY CAUSTIC ENVIRONMENTS

A die-cast zinc head and aluminum body make the LSX suitable for indoor and outdoor applications. A **diaphragm seal** between the head and body is designed to provide an extra measure of protection. Switches remain functional when exposed to many severe environments and caustic chemicals.

OPTIONAL SEALS

Standard seals are suitable for most applications, but **optional fluorocarbon or fluorosilicone seals** are available for many harsh chemical, high or low temperature environments.

DESIGNED TO CONTROL LOW-VOLTAGE DC APPLICATIONS

Hazardous area switches are available with a choice of **silver or gold-plated contacts** to handle a variety of electrical load requirements from low energy to power-duty control.

Potential Applications

GRAIN ELEVATORS

Monitors plugged grain conveyors, slide gate position, diverter valves, and leg positions

CONTROL VALVES AND ACTUATORS

Senses the “on” or “off” position of the valve

ON-SHORE DRILLING

Detects end of travel positions for extend and retract operations of drilling equipment

PIPELINES

Monitors pig position and resulting pipeline health

PETROCHEMICAL AND CHEMICAL PLANTS

Monitors the position of control valves, doors, and gates

WATER TREATMENT PLANTS

Detects control valve position

PAINT BOOTHS

Door interlocks for sliding or hinged gates or doors

HAZARDOUS WASTE HANDLING

Often used as a valve position monitor

MICRO SWITCH™ Hazardous Area Limit Switches

Figure 1. MICRO SWITCH™ LSX SERIES FEATURES AND OPTIONS

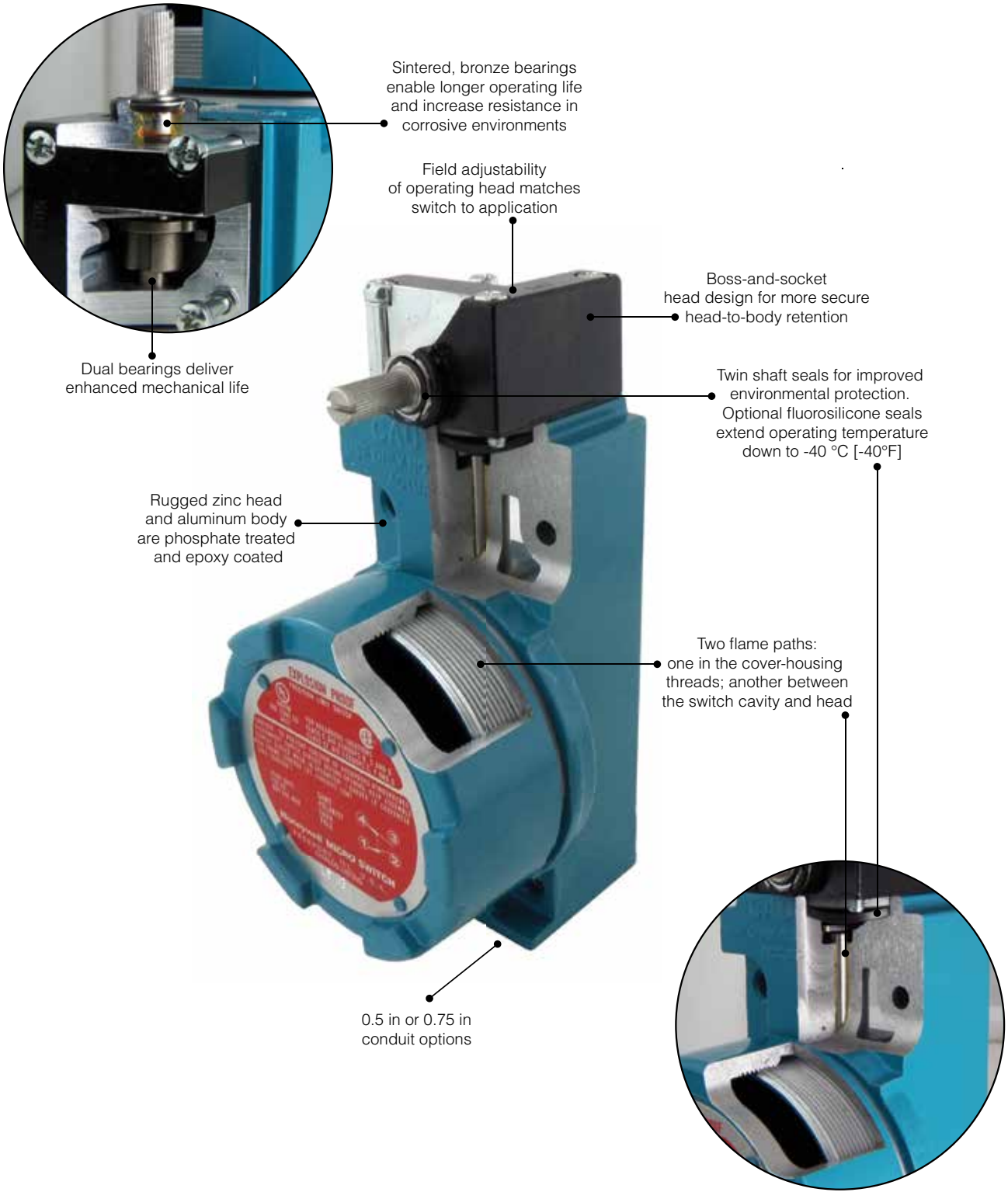


Figure 2. MICRO SWITCH™ LSX SERIES NOMENCLATURE

LSX Series Hazardous Area Switch

Head Style	
A	Side rotary; momentary
B	Top rotary; momentary
C	Top plunger, plain
D	Top plunger, roller
E	Side plunger plain; momentary
F	Side plunger roller; momentary
H	Side rotary, momentary; low PT, low torque
J	Wobble stick
K	Whisker
L	Side rotary; sequential
M	Side rotary; central neutral
N	Side rotary; maintained
P	Side rotary, momentary; low PT and DT
R	Side rotary, momentary; low torque
U	Side rotary, low pre-travel
V	Top plunger, adjustable
W	Side plunger, adjustable

Circuitry and Conduit Connection	
3E	1NO/1NC, gold contacts, 1/2-14NPT
3K	1NO/1NC, 1/2-14NPT
3N	SPNC direct acting, 1/2-14NPT
4K	1NO/1NC, 3/4-14NPT
4L	2NO/2NC, 3/4-14NPT
4M	2NO/2NC, 3/4-14NPT, sequential operation
4N	2NO/2NC, 3/4-14NPT, center neutral
4S	2NO/2NC, gold contacts, 3/4-14NPT
4T	2NO/2NC, gold contacts, 3/4-14NPT, sequential operation
4U	2NO/2NC, gold contacts, 3/4-14NPT, center neutral
7L	2NO/2NC, 1/2-14NPT
7M	2NO/2NC, 1/2-14NPT, sequential operation
7N	2NO/2NC, 1/2-14NPT, center neutral
7S	2NO/2NC, gold contacts, 1/2-14NPT
7T	2NO/2NC, gold contacts,1/2-14NPT, sequential operation
7U	2NO/2NC, gold contacts,1/2-14NPT, center neutral

Modification Code	
1	CW rotation
2	CCW rotation
3	Head assembled with actuator to right side
4	Head assembled with actuator to left side
5	Head assembled with actuator toward mounting surface
6	Roller perpendicular to mounting surface
8	Roller on side plunger in vertical position

Actuator Options**	
1	Fixed roller, 1.5 in radius
1A	Fixed 0.75 in x 0.25 in nylon roller, 1.5 in radius
1C	Fixed 0.75 in x 0.25 in nylon roller, 1.5 in radius
2	Adjustable, rollerless
2A	Adjustable, 0.75 in x 0.25 in nylon roller
2C	Adjustable, 0.75 in x 0.25 in nylon roller
2J	Adjustable, 1.0 in x 0.5 in nylon roller
2K	Adjustable, 0.5 in x 0.25 in nylon roller
3E	Yoke, 0.75 in x 0.25 in nylon roller
3M	Yoke, 0.75 in x 0.25 in nylon roller
3S	Yoke, 0.75 in x 0.25 in nylon roller, same side
4	Hub only
4M	Hub rod, aluminum
5	Offset, rollerless
5A	Offset, 0.75 in x 0.25 in nylon roller
5C	Offset, 0.75 in x 0.25 in nylon roller
7A	Plastic wobble stick
8A	Whisker, 5.5 in
9A	Fixed, 0.75 in x 0.25 in nylon roller, open, 1.33 in radius
9C	Fixed, 0.75 in x 0.25 in nylon roller, closed, 1.33 in radius

** Levers can be ordered separately.
See Levers for Side Rotary Actuated Switches table

Not all combinations available. Please contact Honeywell for assistance.

To order high temperature versions, insert the additional letters **Y** and **C** in the appropriate places in the standard catalog listing, as shown below:

LSXA3K	standard, side-rotary plug-in switch
LSXYAC3K	completely FC-sealed version of LSXA3K

To order low temperature versions, insert the additional letters **Y** and **B** in the appropriate places in the standard catalog listing, as shown below:

LSXA3K	standard, side-rotary plug-in switch
LSXYAB3K	low-temperature version of LSXA3K

For more details, please see page 8.

MICRO SWITCH™ Hazardous Area Limit Switches

Table 1. Specifications

Characteristic	Parameter
Product type	MICRO SWITCH™ hazardous area limit switches
Actuators	side pin plunger side rotary top pin plunger - adjustable wobble - cat whisker side pin plunger - adjustable side rotary maintained top roller plunger wobble - plastic rod side roller plunger top pin plunger top rotary
Circuitry	1NC 1NO SPDT snap action, double break 2NC 2NO DPDT snap action, double break 2NC 2NO DPDT snap action, double break, sequential 2NC 2NO DPDT snap action, double break, center neutral
Electrical	10 A thermal single and double pole: AC15 A600, AC15 B600; DC13 R300 (see table on page 8)
Housing material	zinc head, aluminum body
Termination types	0.5 in - 14 NPT conduit 0.75 in - 14 NPT conduit
Housing type	LSX non-plug-in
Agency approvals and standards	UL, CSA
Sealing	NEMA 1, 3, 4, 6, 13
Hazardous area designations	NEMA 7 (Class 1, Division 1 & 2, Groups B, C, D), NEMA 9 (Class 2, Division 1 & 2, Groups E, F, G)
Operating temperature*	standard: -12 °C to 121 °C [10 °F to 250 °F] optional: -40 °C to 121 °C [-40 °F to 250 °F]
UNSPSC code	39122213
UNSPSC commodity	39122213 Limit Switch

* Reference operating head styles on page 9 and 10 for exceptions.

LSX Series

MICRO SWITCH™ LSX SERIES ELECTRICAL RATINGS: 10 A CONTINUOUS CARRY ac VOLTS; PILOT DUTY: AC15, A600

Electrical Rating	Circuitry	Vac	Amps at 0.35 Power Factor Make	Amps at 0.35 Power Factor Break
AC15, A600	SPDT DPDT	120	60	6
		240	30	3
		480	15	1.5
		600	12	1.2

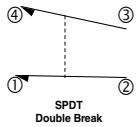
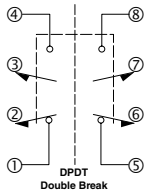
MICRO SWITCH™ LSX SERIES ELECTRICAL RATINGS: dc VOLTS; PILOT DUTY: DC13, R300

Electrical Rating	Circuitry	Vdc	Make & Break Amps Inductive	Make & Break Amps Resistive
DC13, R300	SPDT DPDT	120	0.25	0.8
		240	0.15	0.4

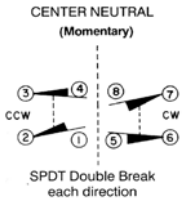
MICRO SWITCH™ LSX limit switches are capable of the following low voltage dc loads

Circuitry	Vdc	Amps Inductive	Amps Resistive
SPDT, DPDT	24	10	10

SWITCH CONTACT STYLES, DOUBLE BREAK

SPDT (1NC/1NO)	DPDT (2NC/2NO)
	

Center Neutral (SPDT each direction)
Pole 1 operates CCW; Pole 2 operates CW



NOTE: Same polarity each pole

TEMPERATURE LIMITS

	Standard LSX				Low Temperature LSX (Fluorosilicone Sealed): Y_B				High Temperature LSX (Fluorocarbon Sealed)*: Y_C		
	Low Limit		High Limit		Low Limit		High Limit		Low Limit		High Limit
	-12 °C [10 °F]	-1 °C [30 °F]	93 °C [200 °F]	121 °C [250 °F]	-40 °C [-40°F]	-29 °C [-20 °F]	93 °C [200 °F]	121 °C [250 °F]	-12 °C [10 °F]	-1 °C [30 °F]	121 °C [250 °F]
LSXA - Side Rotary Momentary	•			•	•			•	•		•
LSXB - Top Rotary		•		•		•		•		•	•
LSXC - Top Plain Plunger	•		•		•		•		•		•
LSXD - Top Roller Plunger	•		•		•		•		•		•
LSXE - Side Plain Plunger	•		•		•		•		•		•
LSXF - Side Roller Plunger	•		•		•		•		•		•
LSXH - Side Rotary, Low Diff, Low Torque		•		•		•		•		•	•
LSXJ - Wobble Stick	•		•		•			•	•		•
LSXK - Cat Whisker	•		•			•		•	•		•
LSXL - Side Rotary, Sequence	•			•	•			•	•		•
LSXM - Side Rotary, Center Neutral		•		•	•			•		•	•
LSXN - Side Rotary, Maintained		•		•		•		•		•	•
LSXP - Side Rotary, Low Diff	•			•	•			•	•		•
LSXR - Side Rotary, Low Torque		•		•		•		•		•	•
LSXU - Side Rotary, 5º Low Pretravel	•			•							•
LSXV - Top Adjustable Plunger	•		•		•		•		•		•
LSXW - Side Adjustable Plunger	•		•		•		•		•		•

* For LSX application wherein the upper temperature limit is normally above 93 °C [200 °F], extended switch life can be obtained by using completely fluorocarbon-sealed switches rather than standard LSX.

MICRO SWITCH™ Hazardous Area Limit Switches

SPECIAL OPTIONS

HIGH TEMPERATURE/CHEMICAL RESISTANT SWITCHES

Completely fluorocarbon (FC)-sealed switches have a full FC body gasket covering the switch cavity. Rotary types have an extra FC seal on the operating shaft, while plunger versions have FC boot seals. They are designed for use in applications where the environment includes fire-resistant synthetic fluids. In addition, the FC-sealed switches may be used with such industrial fluids as Cellulube, Fyrquell, Houghto-Safe, Pydraul, and other special cutting and hydraulic fluids. The additional FC seals also promote extended operating life for rotary-actuated LSX switches in applications where the temperatures are normally -12 °C to 121 °C [10 °F to 250 °F].

To order, insert the additional letters **Y** and **C** in the appropriate places in the standard catalog listing, as shown below:

LSXA3K	standard, side-rotary plug-in switch
LSXYAC3K	completely FC-sealed version of LSXA3K

LOW TEMPERATURE SWITCHES

All forms of LSX limit switches are also available in low-temperature construction. Design features include fluorosilicone diaphragm, shaft seals, and external boot seal (where applicable).

To order, insert the additional letters **Y** and **B** in the appropriate places in the standard catalog listing, as shown below:

LSXA3K	standard, side-rotary plug-in switch
LSXYAB3K	low-temperature version of LSXA3K

MICRO SWITCH™ LSX SERIES OPERATING HEADS

SIDE ROTARY: Heads may be positioned in any one of four positions, 90° increments. All are momentary action except maintained head (LSXN Series).

LSXA - Standard: 60° minimum overtravel, 15° maximum pretravel, 5° (single pole) and 7° (double pole) maximum differential travel.

LSXR - Low operating torque: 60° minimum overtravel, 15° maximum pretravel, 0.19 Nm [1.7 in-lb] maximum operating torque.

LSXN - Maintained contact: Maintained on counterclockwise rotation and reset on clockwise rotation, and vice versa.

LSXP - Low differential: 68° minimum overtravel, 9° maximum pretravel, 3° (single pole) and 4° (double pole) maximum differential travel.

LSXH - Low torque, low differential travel: 68° minimum overtravel. Features low operating torque and narrow differential travel.

LSXL - Sequence action: 48° minimum overtravel. Delayed action between operation of two poles.

LSXM - Center neutral: 57° minimum overtravel. One pole operates on the clockwise rotation, and the other pole on the counterclockwise rotation.

LSXU - Low pretravel: 5° max. pretravel, 70° min. overtravel.

TOP ROTARY: Available levers provide greater versatility. Heads may be positioned in any one of four positions, 90° increments. All are momentary action.

LSXB: With 100° minimum overtravel. Various levers that fit side rotary shafts may be used on the top rotary shaft. Switch is suitable for use when increased overtravel is required.

LSX Series

MICRO SWITCH™ LSX SERIES OPERATING HEADS

TOP PLUNGERS: Available with 4,83 mm [0.19 in] minimum overtravel. Top pin plungers are offered in pin plunger, an adjustable plunger, and a roller plunger.

	**LSXC - Top pin plunger:** A copper alloy plunger for in-line actuating motion. Oil-tight seals on plunger and between the operating head and housing are designed to keep out coolant, dust, and chips. Momentary action.
	**LSXD - Top roller plunger:** A copper alloy roller plunger is adjustable to 90° angles to accept cam or slide operation from any of two directions. Boot seal on the plunger. Momentary action.
	**LSXV - Adjustable top pin plunger:** A copper alloy adjustable plunger is designed to simplify the application and decreases installation time. The operating points of the switch can be adjusted from 65,66 mm to 72,0 mm [2.585 in to 2.535 in]. Seals are the same as the pin plunger. Momentary action.

WOBBLE LEVER ACTUATING HEADS: Heads come with either a Delrin® plastic rod or a copper alloy cat whisker. Any movement of the lever (except pull) will actuate the switch.

	
LSXJ - Plastic rod: Recommended where possible scratching or marring by the actuator is to be avoided.	**LSXK - Cat whisker:** Copper alloy actuator designed for low operating force applications.

SIDE PLUNGERS: Made of non-sparking copper alloy. Available with 4,83 mm [0.19 in] minimum overtravel. Side plungers are offered in plain plunger, an adjustable pin plunger, and a roller plunger.

	**LSXE - Side pin plunger:** A copper alloy plunger for actuating motion inline with the plunger travel. Actuating head may be rotated in any of four positions, 90° apart. A boot seal on the plunger and a gasket seal between the head and housing is designed to keep out coolant, dust, and chips. Momentary action.
	**LSXF - Side roller plunger:** A copper alloy roller plunger fits close quarters under cams and slides. The head may be rotated in any of four positions, 90° apart. The roller can be turned vertical or horizontal to the switch. Boot seal on plunger. Momentary action.
	**LSXW - Adjustable side pin plunger:** Has the same features of the side plain plunger plus the means to adjust the operating points of the switch from 41 mm to 47,4 mm [1.615 in to 1.865 in]. Momentary action.