

Limit and Enclosed Switches

Explosion-Proof Switches

SUNSTAR自动化 <http://www.sensor-ic.com/> TEL:0755-83376549 FAX:0755-83376182 E-MAIL:szss20@163.com

MICRO SWITCH explosion-proof switches contain and cool the escaping hot gases that otherwise could cause an explosion outside the switch. Most of them are UL-CSA listed. Appropriate file reference numbers and copies of the card file are available from your local Branch Office or MICRO SWITCH, Freeport, Illinois.

Switches described on the following pages, except as noted below, are UL listed as follows:

NEMA TYPE 7, CLASS I FLAMMABLE GASES OR VAPORS

Type 7 enclosures are for use indoors in locations classified as Class I, Groups B, C, or D by the National Electrical Code.

Group B — (only switches so noted in the order guides include this listing). Atmospheres containing hydrogen or manufactured gas.

Group C — atmospheres containing diethyl ether, ethylene, or cyclopropane.

Group D — Atmospheres containing gasoline, hexane, butane, naptha, propane, acetone, toluene, or isoprene.

DIVISION 1

Locations in which hazardous agents are present under normal operating conditions.

DIVISION 2

Locations in which hazardous agents may be present only in case of accidental rupture or breakdown.

All MICRO SWITCH listings covered in Division 1 are also covered in the same groups in Division 2.

NEMA TYPE 9, CLASS II COMBUSTIBLE DUSTS

Type 9 enclosures are for use in indoor locations classified as Class II, Groups E, F or G, as defined in the National Electrical Code.

Group E — Atmospheres containing metal dust.

Group F — Atmospheres containing carbon black, coal dust or coke dust.

Group G — Atmospheres containing flour, starch, or grain dust.



LSX switches are for use either indoors or outdoors in hazardous atmospheres as they are a completely sealed explosion-proof device. Mounting hole location and tracking is same as the long established MICRO SWITCH ML-E1 explosion-proof switch.

An optional mounting plate provides the same tracking and mounting as the standard HDLS. The majority of HDLS operating heads and circuitry options are available on the LSX.

Standard HDLS levers are used, but because of explosion-proof requirements, only nylon rollers or other non-sparking material can be selected. Plunger and cat whisker types listed in the LSX order guide are of non-sparking material.

SEALS

Application proven HDLS head seals are retained to seal the top of the LSX. The circular cover on the front is easily unscrewed to expose the switching elements for wiring or replacement. A screwdriver or bar used on the wrenching lugs extending from the front of the cover allows easy removal or tightening. An O-ring seal is located between the housing and cover.

The LSX withstands pressure of an internal explosion and cools the exploding gases below the kindling temperature of the explosive atmosphere. Flame paths are provided by the cover-housing threads and an extended plunger between the switch cavity and head.

FEATURES

- Sealing - applicable portions of NEMA 1, 3, 4, 6, 7, 9, and 13.
- Tracking interchangeability with MICRO SWITCH ML-E1 and HDLS.
- Variety of heads and non-sparking actuators.
- Field adjustability matches switch to application.
- Momentary, maintained, random sequence, or center neutral action.
- 10 amps continuous carry electrical rating.
- Choice of silver or gold contacts.
- ½ or ¾ inch conduit opening.
- UL Listed, file #E61730
- CSA Certified, file #LR57327
- Internal grounding screw.

NEMA standards: 1, 3, 4, 6, 7, 9 and 13. UL listed and CSA certified: Class I, Div. 1, Groups B, C and D. Class II, Div. 1, Groups E, F and G.

Limit/Enclosed

Limit and Enclosed Switches

LSX Series

Weather-Sealed Explosion-Proof Switches

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HOW TO ORDER

The order guide shows the option codes which are added to the LSX prefix to specify the operating head, body and circuitry, assembly modifications (if desired) and actuator type.

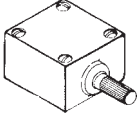
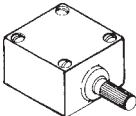
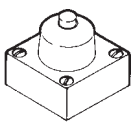
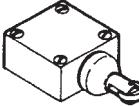
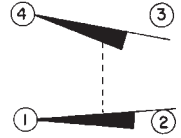
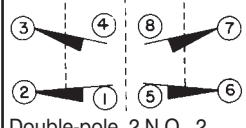
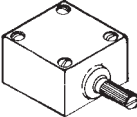
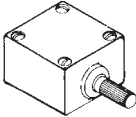
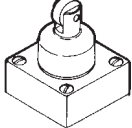
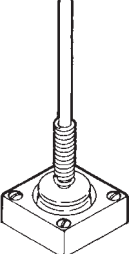
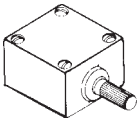
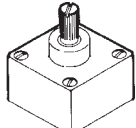
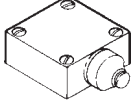
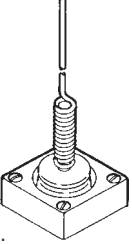
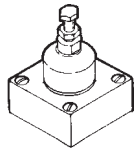
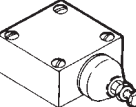
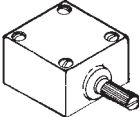
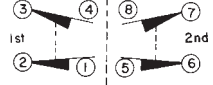
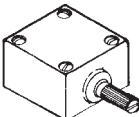
The example given below is LSXA3K-1A. This is an explosion-proof LSX switch with the standard side rotary momentary-action head (A), single-pole circuitry and ½ in. conduit opening (3K). Since no modification codes are listed, it is adjusted for both clockwise (CW) and counterclockwise (CCW)

operation, with the actuator shaft facing the front (label side) of the switch. The actuator (-1A) is in a 1.5 in. lever with a .75 in. nylon roller on the open side. There are list price adders for double-pole circuitry and the actuators. (Levers may also be ordered separately by specifying the LSX listings shown in the actuator code description.)

ORDER GUIDE

LSX standard weather-sealed explosion-proof switch.

Typical Catalog Listing: **LSX**

Head Code				Body and Contacts Circuitry Code	
A*  Side rotary. Momentary.	H  Side rotary. Low differential travel and low torque. Momentary.	C  Top plunger. Momentary.	F*  Side roller plunger. Momentary.	3K Silver 3E Gold plated MOMENTARY  Single-pole, 1 N.O., 1 N.C., ½ in. conduit.† 4K ¾ in. conduit†	4L Silver 4S Gold plated MOMENTARY  Double-pole, 2 N.O., 2 N.C., ¾ in. conduit.† 7L Silver ½ in. conduit† 7S Gold plated 3N SPNC Direct Acting
P  Side rotary. Low differential travel. Momentary.	N*  Side rotary. Maintained contact.	D  Top roller plunger. Momentary.	J  Wobble stick. Momentary.		
R*  Side rotary. Low torque. Momentary.	B*  Top rotary. Momentary.	E*  Side plunger. Momentary.	K  Cat whisker. Momentary.		
V  Adjustable top plunger. Momentary.	W*  Adjustable side plunger. Momentary.				
				L  Side rotary. Sequence operation.	4M Silver 4T Gold plated SEQUENCE  Sequential. Pole 1 operates before Pole 2 (CW, CCW or both). ¾ in. conduit.† 7T Gold plated ½ in. conduit.
				M  Side rotary. Center neutral.	

* Available with a Single Pole N.C. Direct Acting contact. Electrical Rating D. To order, use 3N for body and circuitry code.

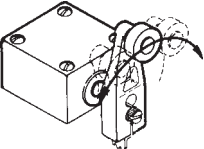
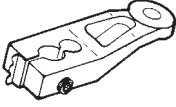
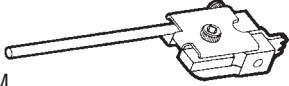
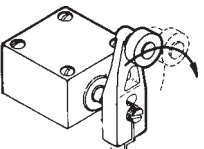
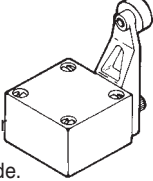
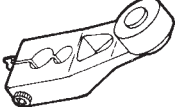
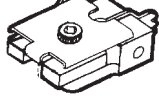
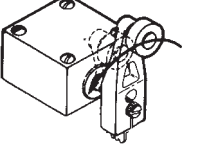
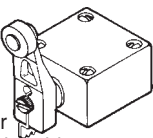
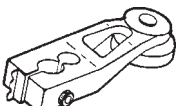
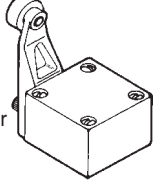
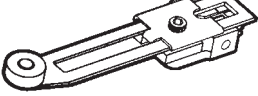
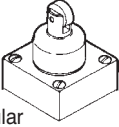
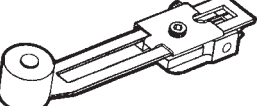
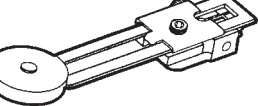
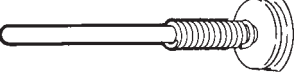
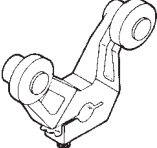
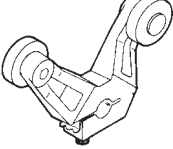
ELECTRICAL RATINGS
Same as HDLS, see page A34.

OPERATING CHARACTERISTICS
See next page.

TEMPERATURE RATINGS
Same as HDLS, see page A56.

ENVIRONMENTAL SEAL PERFORMANCE
Same as HDLS, see page A56.

LOW TEMPERATURE and HIGH TEMPERATURE SEALED
See next page.

		1A	
Actuation Direction Modification Code (No additional cost.)	Head/Actuator Orientation Modification Code (No additional cost.)	Actuator Code	
No Code.  CW and CCW. (Head types A, B, H, L, P, R.)	No Code. Side rotary heads assembled with actuator shaft facing front. Roller on top roller plungers assembled parallel to mounting surface.	1 LSZ51 lever (no roller). 	4M LSZ54M aluminum rod actuator. 
1  CW operation. (Optional with head types A, B, H, L, P, R.)	3 Head assembled with actuator shaft to right side. (Optional with head types A, E, F, H, L, M, N, P, R.) 	1A LSZ51A lever with .75 in. nylon roller on front side. 	4 LSZ54 hub for rod actuator. 
2  CCW operation. (Optional with head types A, B, H, L, P, R.)	4 Head assembled with actuator shaft to left side. (Optional with head types A, E, F, H, L, M, N, P, R.) 	1C LSZ51C lever with nylon roller on back side. 	5 LSZ55 offset lever (no roller). 
	5 Head assembled with actuator shaft to back of switch. (Optional with head types A, E, F, H, L, M, N, P, R.) 	2C LSZ52C adjustable lever (1.5-3.5 in.) with .75 in. nylon roller. 	5A LSZ55A offset lever with .75 in. nylon roller on back side. 
	6 Roller on top roller plungers assembled perpendicular to mounting surface. (Optional with head type D.) 	2J LSZ52J adjustable lever (1.5-3.5 in.) with 1 in. nylon roller. 	5C LSZ55C offset lever with .75 in. nylon roller on front side. 
	8 Roller on side plunger is assembled in vertical position.	2K LSZ52K adjustable lever (1.5-3.5 in.) with 1.5 in. nylon roller. 	7A  Wobble stick actuator. (Use with head type J only.)
		3S LSZ53S yoke lever with .75 in. nylon rollers (same side). 	8A  Cat whisker actuator. (Use with head type K only.)
		3E LSZ53E yoke lever with .75 in. nylon roller (one ea. side). 	1.5 in. long levers, except where noted.

Limit/Enclosed

OPERATING CHARACTERISTICS

Rotary actuated switches

	Side Rotary												Top Rotary Momentary			
	Momentary								Maintained		Sequence				Center Neutral	
	LSXA Standard		LSXP Low Diff. Travel		LSXR Low Torque		LSXH Low Diff. Low Torque		LSXN		LSXL (Double Pole Only)		LSXM (Double Pole Only)		LSXB	
Pretravel max.	15°		9°		15°		9°		65°		1st step 15° 2nd step 10° additional		18°		25°	
Overtravel min.	60°		66°		60°		66°		20°		48°		57°		100°	
Differential Travel max.	SPDT 5°	DPDT 7°	SPDT 3°	DPDT 4°	SPDT 5°	DPDT 7°	SPDT 3°	DPDT 4°	SPDT 30°	DPDT 35°	5°		10°		SPDT 10°	DPDT 12°
Operating Torque max.	0,45 Nm 4 in. lbs.		0,45 Nm 4 in. lbs.		0,19 1.7 in. lbs.		0,19 Nm 1.7 in. lbs.		0,45 Nm 4 in. lbs.		0,45 Nm 4 in. lbs.		0,45 Nm 4 in. lbs.		0,28 Nm 2.5 in. lbs.	
Operating Temp. Range	10 to 250°F −12 to 121°C				30 to 250°F −1 to 121°C				10 to 250°F −12 to 121°C				30 to 250°F −1 to 121°C			

Nm = Newton meters

Plunger actuated switches

	Momentary			
	LSXC Top Plunger	LSXD Top Roller Plunger	LSXE Side Plunger	LSXF Side Roller Plunger
Pretravel max.	1,78mm .070 in.	1,78mm .070 in.	2,54mm .100 in.	2,54mm .100 in.
Differential Travel max.	SPDT 0,38mm .015 in. DPDT 0,51mm .020 in.	SPDT 0,38mm .015 in. DPDT 0,51mm .020 in.	1,14mm .045 in.	1,14mm .045 in.
Overtravel min.	4,83mm .190 in.	4,83mm .190 in.	4,83mm .190 in.	4,83mm .190 in.
Operating Force max.	17,8 N 4 lbs.	17,8 N 4 lbs.	26,7 N 6 lbs.	26,7 N 6 lbs.
Operating Point	58,5 ± 0,76mm 2.305 ± .030 in.	68,6 ± 1mm 2.700 ± .040 in.	33,0 ± 0,76mm 1.300 ± .030 in.	44,1 ± 1mm 1.735 ± .040 in.
Operating Temperature Range	-12 to 93°C 10 to 200°F			

Wobble Actuated Switches

	Momentary	
	LSXJ Delrin Rod	LSXK Cat Whisker (Wire)
Pretravel max.	Radius approx. 25,4mm 1.0 in.	50,8mm 2.0 in.
Operating Force max.	2,78 N 10 oz.	1,39 N 5.0 oz.
Operating Temperature Range	-12 to 93°C 10 to 200°F	

N = Newtons

COMPLETELY FLUOROCARBON-SEALED AND LOW TEMPERATURE SWITCHES

Completely fluorocarbon-sealed and low temperature construction LSX switches are available. See page A42 for a full description of both of these options.

How to order
For **fluorocarbon-sealed** switches, insert the additional letters Y and C in the appropriate places in the standard catalog listing; for **low temperature** versions insert the additional letters Y and B. Examples follow:

LSXA3K—standard side rotary switch
LSXYAC3K—completely fluorocarbon-sealed version of the LSXA3K
LSXA3K—standard side rotary switch
LSXYAB3K—low temperature version of the LSXA3K

REPLACEMENT PARTS

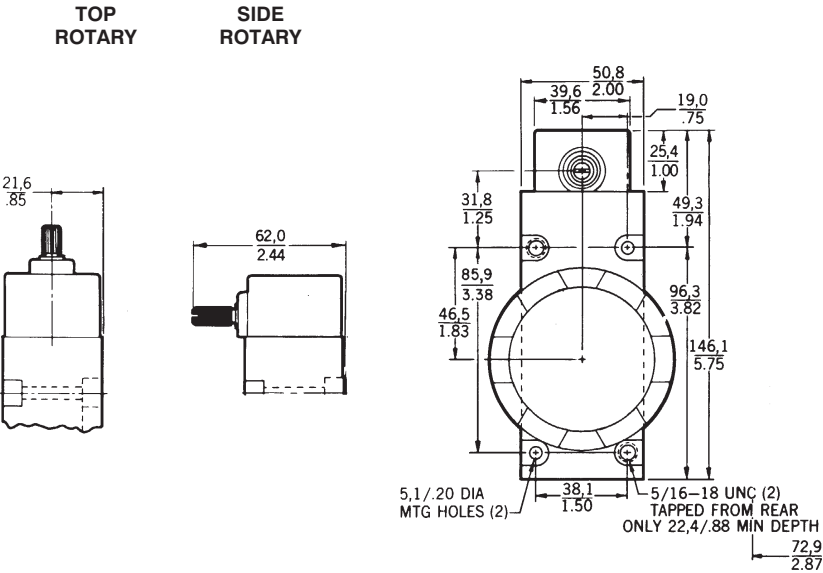
Operating Heads

Switch Type	Catalog Listing Operating Head Only
LSXA	LSZ1A
LSXB	LSZ1B
LSXC	LSXZ1C
LSXD	LSXZ1D
LSXE	LSXZ1E
LSXF	LSXZ1F
LSXH	LSZ1H
LSXJ	LSZ1JGA
LSXK	LSXZ1KHA
LSXL	LSZ1L
LSXM	LSZ1M
LSXN	LSZ1N
LSXP	LSZ1P
LSXR	LSZ1R

Contact Blocks

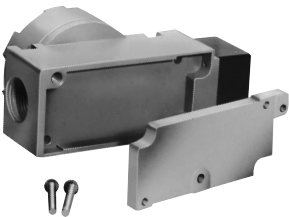
Circuitry	Contact Block
Single Pole	LSXZ3K
Double Pole	LSXZ3L
Sequence or Center Neutral	LSXZ3M

MOUNTING DIMENSIONS (For reference only)



Conduit Openings
(LSXA3, LSXB3, LSXH3, LSXN3,
LSXP3 and LSXR3 have ½-14 NPT.
LSXA4, LSXB4, LSXH4, LSXLR,
LSXM4, LSXN4, LSXP4, and LSXR4 have ¾-14 NPT.

ADAPTER PLATE



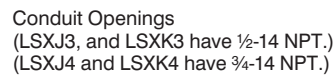
Catalog Listing **LSXZ4022** adapter plate enables the explosion-proof LSX to be mounted on existing HDLS mounting holes. The LSX has a recessed back into which the adapter plate fits and mounts, using two screws (furnished).

Limit/Enclosed

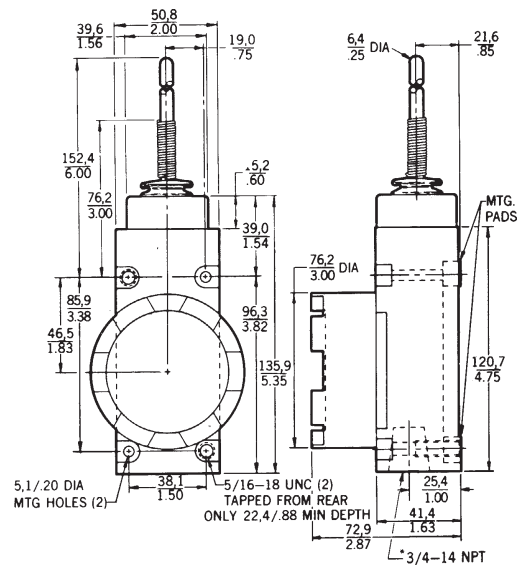
LSX Series

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TOP PLUNGER

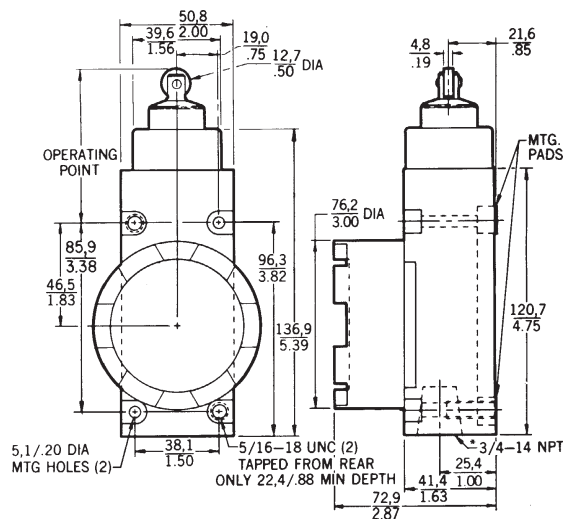


WOBBLE STICK



Conduit Openings
(LSXE3 and LSXF3 have 1/2-14 NPT.
LSXE4 and LSXF4 have 3/4-14 NPT).

TOP ROLLER PLUNGER



Conduit Openings
(LSXC3 and LSXD3 have 1/2-14 NPT.
LSXC4 and LSXD4 have 3/4-14 NPT).

Key: $\frac{0,0 = \text{mm}}{0.00 = \text{inches}}$

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