









Limit and Enclosed Switches

Miniature Switch Selection Guide

	Standard duty	Miniature size	Plastic enclosed
	 SL1 Pg. A84	 914CE Pg. A87	 BF Pg. A93
PHYSICAL DESCRIPTION Package size (in.)	1.27H 1.7W .7L	2.1H .6W 1.6L	2.7H 1.2W 2.9L
Actuators	Roller plunger, cross roller plunger, plunger, roller lever, one-way roller lever, roller plunger w/seal boot.	Side rotary, plunger, roller plunger, adj. plunger, PB, wobble lever.	Pin plunger, roller levers, one way roller lever, wobble lever.
SPECIAL FEATURES	Space-saving size for machine miniaturization. Different contact types and actuation methods available.	Gang-mount capability. Factory wired cable. Connector options available.	Rugged plastic enclosure eliminates need for grounding. Large internal cavity for easy wiring. Pressure plate style wire clamps.
CHARACTERISTICS Electrical data (maximum available)	5A - 125; 250 VAC; 0.1A - 125 VAC; 0.1A - 30 VDC	5A - 125, 250 VAC	.1A to 11A 125 VAC
Circuitry	SPDT	SPDT	SPDT
Operating force	Plunger 1200 grams Lever 400 grams	Plunger 2.75 lbs.	Wobble stick 7 oz. max
Differential travel (max.)	.004 in. (plunger) .012 in. (lever)	.004 in.	—
ENVIRONMENT Temperature Range	Upper Lower 158° F (70° C) 14° F (-10° C) Low temperature versions available	200° F (93° C)* 10° F (-12° C)*	160° F (71° C) -25° F (-31° C)
Sealing†	NEMA 3, 4, 13; IP 67	NEMA 1, 3, 4*, 6*, 6P*, 12*, 13*	NEMA 1, 3, 4, 13
Housing Material † For NEMA definitions, see page E7.	Zinc with plastic terminal cover	Zinc * Most listings	Thermoplastic enclosure
AGENCY LISTING	UL/CSA listings available.	UL Recognized CSA Certified CE Certified	UL Recognized
TYPICAL APPLICATIONS	<ul style="list-style-type: none"> ● Robotics ● Light material handling ● Machine tools ● Low temperature applications down to -60°F 	<ul style="list-style-type: none"> ● Processing equipment ● Textile machinery ● Machine tools ● Robotics ● Packaging equipment ● Farm machinery ● Commercial laundry equipment ● Printing trades machinery ● Vehicles 	<ul style="list-style-type: none"> ● Overhead cranes and hoists ● Surface transportation equipment ● Special machinery ● Agricultural equipment ● Earth moving equipment

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General Purpose Switches Selection Guide

Compact	Standard/versatile	Compact - Double Conduit	High current capacity	Compact LS
 <p>E6/V6 Pg. A96</p>	 <p>OP Pg. A108</p>	 <p>BZG/BZH Pg. A102</p>	 <p>BAF1 Pg. A105</p>	 <p>LS Pg. A70</p>
<p>2.7H 1.0W 3.0L</p> <p>Plunger, roller lever, rod, manual button, roller plunger, one-way roller lever, wobble lever.</p>	<p>2.6H 3.2W 3.7L</p> <p>Plunger, roller lever, paddle lever.</p>	<p>2.9H 1.0W 3.4L</p> <p>Plunger, roller lever, rod lever.</p>	<p>3.2H 1.3W 4.0L</p> <p>Plunger, roller lever, flexible rod, manual button, roller plunger, one way roller lever.</p>	<p>3.7H 2.3W 1.6L</p> <p>Side rotary, plunger, roller plunger, wobble lever.</p>
<p>Momentary or maintained contact. Sealed or unsealed actuators. Internal grounding screw. Side or bottom mounting.</p>	<p>Mounts from four sides. Captive cover screws. Internal grounding screw.</p>	<p>Optional: 2 conduit openings, neon pilot light, side or bottom mount. Internal grounding screw.</p>	<p>Right or lefthand actuators. Momentary or maint. contacts. Internal grounding screw.</p>	<p>Small size of compact version. Years of field-proven performance.</p>
<p>15A - 125, 250, 480 VAC</p> <p>SPDT DPDT</p> <p>(Sealed plunger) 9-24 oz.</p> <p>.002 in.</p>	<p>20A-125, 250, 480 VAC</p> <p>SPDT DPDT 2 CKT DB</p> <p>(Rotary) .5-2.5 lbs.</p> <p>.007 in.</p>	<p>15A-125, 250, 480 VAC</p> <p>SPDT</p> <p>(Sealed plunger) 9-24 oz.</p> <p>.002 in.</p>	<p>20A-125, 250, 480 VAC</p> <p>SPDT DPDT</p> <p>(Plunger) 2.5 lbs. max.</p> <p>.010 in.</p>	<p>10A-120, 240, 480 VAC</p> <p>2 CKT DB</p> <p>(Standard size rotary) 4.5 in. lbs. (Low force types available)</p> <p>12°</p>
<p>160° F (71° C) -25° F (-32° C)</p> <p>NEMA 1, 3, 4*, 12*, 13*</p> <p>Zinc * Some listings</p>	<p>160° F (71° C) -25° F (-32° C)</p> <p>NEMA 1, 3*, 4*, 13*</p> <p>Al or Iron * Except Q-plunger</p>	<p>160° F (71° C) -25° F (-32° C)</p> <p>NEMA 1, 3*, 4*, 13*</p> <p>Al * Except Q-plunger</p>	<p>160° F (71° C) -25° F (-32° C)</p> <p>NEMA 1, 3*, 4*, 13*</p> <p>Al * Except BAF1-2RQ9</p>	<p>160° F (71° C) -20° F (-29° C)</p> <p>NEMA 1, 3, 4, 6, 13</p> <p>Al and Zinc</p>
<p>UL Recognized CSA Certified</p>	<p>UL Recognized CSA Certified</p>	<p>UL Recognized</p>	<p>UL Recognized CSA Certified</p>	<p>UL Recognized CSA Certified CE Certified</p>
<ul style="list-style-type: none"> ● Packaging equipment ● Special machinery ● Textile machinery ● Conveyors ● Construction machinery and equipment ● Printing trades machinery ● Overhead cranes and hoists 	<ul style="list-style-type: none"> ● Control valves and actuators ● Material handling ● Conveyors 	<ul style="list-style-type: none"> ● Packaging machinery ● Conveyors ● Materials handling ● Food processing ● Machine tools 	<ul style="list-style-type: none"> ● Packaging equipment ● Special machinery ● Farm machinery ● Conveyors ● Overhead cranes and hoists 	<ul style="list-style-type: none"> ● Machine tools ● Conveyors ● Material handling ● Metal fabrication equipment ● Lift trucks

Limit/Enclosed



Limit and Enclosed Switches

Heavy Duty Switch Selection Guide

	Global Limit Switch DIN	Miniature Global Limit Switch	Heavy Duty LS
	<p>GLA/B Pg. A11</p>	<p>GLC/D GLE Pg. A18</p>	<p>HDLS Pg. A30</p>
PHYSICAL DESCRIPTION Package size (in.)	4.05 (102,9)H 1.65 (42)W 1.64 (41,6)L	3.03 (77)H 1.201 (30,5)W 1.132 (28,75)L	SPDT DPDT 4.2H 4.7H 2.4W 2.4W 1.6L 1.9L
Actuators	Side rotary, plunger, roller plunger, roller arm, wobble levers.	Side rotary, plunger, roller plunger, roller arm, wobble levers.	Side and top rotary, plunger, adj. plunger, roller plunger, wobble lever.
SPECIAL FEATURES	Designed to newest IEC standard for worldwide acceptance.	Designed to newest IEC standard for worldwide acceptance. GLE 3 cable entry.	All-metal drive train. Integral grounding screw. Interchangeable mounting of all switch types. Identical cam tracking for single and double-pole models.
CHARACTERISTICS Electrical data (maximum available)	IEC 947-5-1 I _{th} 10A U _i 660 VAC/VDC	IEC 947-5-1 I _{th} 10A U _i 660 VAC/VDC	60A make. 6A break — 120 VAC; 10A continuous — 120, 240, 480, 600 VAC.
Circuitry	2 CKT DB 4 CKT DB 2 CKT BBM 2 CKT MBB 2 CKT Bifurcated	2 CKT DB 4 CKT DB 2 CKT BBM 2 CKT MBB 2 CKT Bifurcated	SPDT, DB DPDT, DB SPDT maintained DPDT maintained Center neutral Solid State, digital output.
Operating force	Side rotary 9.7 N Plunger 16 N	Side rotary 2.5 N Plunger 12N	(Standard side rotary) 4 in. lbs. (Low force types available)
Differential travel (max.)	12°	11.5°	SPDT: 5° DPDT: 7°
ENVIRONMENT Temperature range	Upper Lower 85°C -25°C	85°C -25°C	250°F (121°C) 10°F (-12°C) -40° See pg. A42 Refer to page A40 for temperatures.
Sealing†	IP 67, NEMA 4	IP 67, NEMA 4	NEMA 1, 3, 4, 4X, 6, 13. UL Enclosure Types 1, 3, 4, 4X, 6, 6P, 13.
Housing material † For NEMA definitions, see page A114.	Metal	Metal, thermoplastic	Zinc
AGENCY LISTING	EN50041 UL, CSA and CE	EN50047 UL, CSA and CE	UL Listed CSA Certified CE Certified
TYPICAL APPLICATIONS	<ul style="list-style-type: none"> • Machine tool • Material handling • Packaging machinery • Textile machinery • Construction machinery and equipment • PLC Interface 	<ul style="list-style-type: none"> • Machine tool • Material handling • Packaging machinery • Textile machinery • Construction machinery and equipment • PLC Interface 	<ul style="list-style-type: none"> • Machine tool • Material handling • Packaging • Presses • Pulp and paper • Welding • PLC Interface

Limit and Enclosed Switches





Harsh Duty Switch Selection Guide

	Harsh duty epoxy filled HDLS	Corrosion resistant HDLS
	 <p style="text-align: center;">HDLS Pg. A44</p>	 <p style="text-align: center;">HDLS Pg. A47</p>
PHYSICAL DESCRIPTION Package size (in.)	SPDT 4.2H DPDT 4.7H 2.4W 1.6L 1.9L	4.2H 2.4W 1.9L
Actuators	Side and top rotary, plunger, adj. plunger, roller plunger, wobble lever.	Side and top rotary, plunger, adj. plunger, roller plunger, wobble lever.
SPECIAL FEATURES	All non plug-in HDLS features. Switch cavity epoxy filled. All fluorocarbon seals. Exceeds NEMA 6P. Preleaded or connector.	All corrosion resistant type 316 stainless steel construction. All non plug-in HDLS features. All fluorocarbon seals.
CHARACTERISTICS Electrical data (maximum available)	60A make. 6A break — 120 VAC; 10A continuous — 120, 240, 480, 600 VAC.	60A make. 6A break — 120 VAC; 10A continuous — 120, 240, 480, 600 VAC.
Circuitry	SPDT, DB DPDT, DB	SPDT, DB DPDT, DB
Operating force	(Standard side rotary) 4 in. lbs. (Low force types available)	(Standard side rotary) 4 in. lbs. (Low force types available)
Differential travel (max.)	SPDT: 5° DPDT: 7°	SPDT: 5° DPDT: 7°
ENVIRONMENT Temperature range	Upper 250°F (121°C) Lower 10°F (-12°C) -40° See pg. A42 Refer to page A42 for temperatures.	250°F (121°C) 10°F (-12°C)
Sealing†	NEMA 1, 3, 4, 4X, 6, 6P, 13. UL Enclosure Types 1, 3, 4, 4X, 6, 6P, 13.	NEMA 1, 3, 4, 4X, 6, 6P, 13. UL Enclosure Types 1, 3, 4, 6, 6P, 13.
Housing material	Zinc	Stainless Steel
† For NEMA definitions, see page E7.		
AGENCY LISTING	UL Listed CSA Certified CE Certified	UL Listed CSA Certified
TYPICAL APPLICATIONS	<ul style="list-style-type: none"> • Food processing machines and conveying equipment subject to daily washdown. • Automotive machine tools and conveyors subject to various coolants and cutting fluids. 	<ul style="list-style-type: none"> • Shipboards and dockside • Power generating plants • Caustic waste handling • Mining • Undersea transit systems • Corrosive valve locations

Limit/Enclosed

Limit and Enclosed Switches


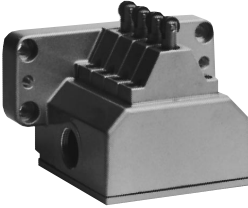

Explosion Proof Switch Selection Guide

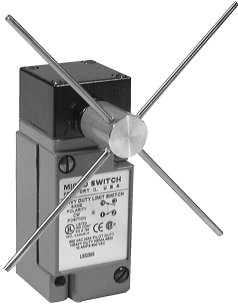
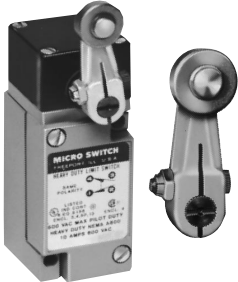

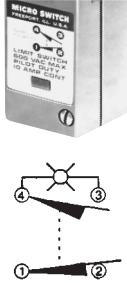
	Standard explosion proof	Sealed explosion proof	Explosion proof LS	Momentary explosion proof cable pull
	 <p>EX Pg. A121</p>	 <p>CX Pg. A127</p>	 <p>LSX Pg. A113</p>	 <p>CLSX Pg. A119</p>
PHYSICAL DESCRIPTION Package size (in.)	2.6H 3.2W 3.7L	4.0H 6.6W 4.0L	5.8H 2.4W 3.0L	5.6H 2.9W 3.0L
Actuators	Plunger, roller and one-way roller lever, rod and roller rod lever, and manual paddle.	Plunger, rotary forms.	Same as HDLS.	Cable
SPECIAL FEATURES	Single or double conduit connection. Mounts from four sides. Interchangeable with OP. Internal grounding screw.	Sealed for outdoor use. Adjustable P.T., O.T. and operating mode. Mounts from front or four sides. Salt and water resistant marine version.	Sealed and explosion-proof interchangeable with HDLS (w/adaptor plate) and ML-E1.	Explosion proof. Covers cable spans up to 200 ft.
CHARACTERISTICS Electrical data (maximum available)	20A-125, 250, 480 VAC	20A-125, 250, 480 VAC	10A-120, 240, 480, 600 VAC	$I_{in} = 10A$ $U_i = 660 VAC/660 VDC$
Circuitry	SPDT DPDT 2 CKT DB	SPDT DPDT	SPDT DPDT	1NC Direct Acting 1NO - 1NC Direct Acting 1NO - 1NC Snap Action
Operating force	(Rotary) .5-2.5 lbs.	(Rotary) 11.1 in. lbs.	(Side rotary) 4 in. lbs.	—
Differential travel (max.)	.007-.109 in.	5-25°	SPDT: 5° DPDT: 7°	—
ENVIRONMENT Upper Temperature range Lower	160°F (71°C) -40°F (-40°C)	185°F (85°C) -13°F (-25°C)	250°F (121°C) 10°F (-12°C)	158°F (70°C) 30°F (-1°C)
Sealing†	NEMA 1, 7, 9.	NEMA 1, 3, 4, 4X, 7, 9, 13	NEMA 1, 3, 4, 6, 7, 9, 13	NEMA 1, 3, 4, 7, 9, 13
Housing material † For NEMA definitions, see page E7.	Al	Al or Bronze	Al and Zinc	Al and Zinc
AGENCY LISTING	UL Listed CSA Certified	UL Listed CSA Certified	UL Listed CSA Certified	UL Listed CSA Certified
TYPICAL APPLICATIONS	<ul style="list-style-type: none"> Control valves and actuators Grain handling Conveyors Material handling 	<ul style="list-style-type: none"> Control valves and actuators Petroleum plants Chemical plants Waste treatment Hazardous waste handling 	<ul style="list-style-type: none"> Control valves and actuators Petroleum plants Chemical plants Waste treatment Hazardous waste handling Power generating Paint booths 	For signaling applications: <ul style="list-style-type: none"> Petroleum Plants Chemical Plants Mining Conveyors

Limit and Enclosed Switches

Special Purpose Switch Selection Guide

Limit/Enclosed

	Impact resistance	Multiplunger	Sealed/Analog output
	 <p>LN Pg. A111</p>	 <p>LD Pg. A82</p>	 <p>Linear CX Pg. A128</p>
SPECIAL FEATURES	High impact resistance. Factory wired leads. Plunger, roller lever. 15A - 125, 250, 480 VAC Zinc housing	Can replace several individual switches. Numerous conduit arrangements available. Roller plunger, chisel plunger. 0.1A - 125 VAC; 10A - 125, 250, 480 VAC; 0.1A - 30 VDC; 0.5A - 125 VDC; 0.25A - 250 VDC	Sealed for outdoor use. Adjustable P.T., O.T. and operating mode. Mounts from front or four sides. Salt water resistant marine version. 4-20 mA, 12.5 to 40 VDC, Analog output
TYPICAL APPLICATIONS	<ul style="list-style-type: none"> High shock and vibration applications. 	<ul style="list-style-type: none"> Machine tools Transfer lines 	<ul style="list-style-type: none"> Valve position sensing Flow control

	360° Maintained	High capacity HDLS	Low Torque HDLS	Indicator Light HDLS
	 <p>LSQ300 Pg. A35</p>	 <p>LSQ Pg. A43</p>	 <p>LSS/LST Pg. A42</p>	 <p>(N.C. Lamp Available, Pg. A34 Assembly Modification #7) See HDLS Order Guides</p>
SPECIAL FEATURES	Fixed and adjustable spoke lever available.	High DC current ratings. 20 amp rating at 120 VAC (single pole). Plug in or non-plug in. Positive retention lever arm.	LSS1H gravity return side rotary limit switches have no return spring mechanism. The weight of the actuating lever must provide the force to restore it to the free position. 5 in. oz. max. LST1H extra low torque side rotary limit switches have a low force return spring and a maximum operating torque of 12 in. oz.	24 volt LED and 120 or 240 volt neon indicator versions available. High efficiency bi-polar LED is not polarity sensitive. Draws less than 1.5mA. Parallel lamp wiring does not require a 3rd wire! Allows upgrading to plug-in lighted version without rewiring base receptacle.
TYPICAL APPLICATIONS	<ul style="list-style-type: none"> Turnstile counting Random direction counting 	<ul style="list-style-type: none"> Power generating stations Presses and other machinery that create extreme shock/vibration High current capacity applications 	<ul style="list-style-type: none"> Monitoring feeder roll take up Fill level sensing 360° rotation with no overtravel stop 	<ul style="list-style-type: none"> Applications with high downtime cost, requiring fast troubleshooting


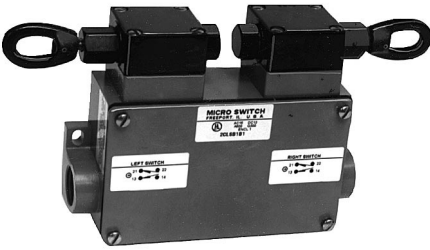
COMPLETELY FLUOROCARBON-SEALED SWITCHES Pg. A42
Completely fluorocarbon (FC)-sealed switches have a full FC body gasket covering the switch cavity. Rotary types have an extra FC seal on the operating shaft, while plunger versions have FC boot seals.

They are for use in applications where the environment includes fire-resistant synthetic fluids. In addition to most all fluids, FC-sealed switches may be used with such industrial fluids as Cellulube, Fyrquell, Houghto-Safe, Pydraul, and other special cutting and hydraulic oils.

LOW TEMPERATURE SWITCHES Pg. A42
All forms of HDLS limit switches are also available in low temperature construction with fluorosilicone diaphragm, shaft seals, and external boot seal (where applicable) plus a low temperature lubricant.

Limit and Enclosed Switches

Momentary Cable Pull Switch Selection Guide

	Momentary cable pull LS single head	Momentary cable pull LS duplex head
	 <p style="text-align: center;">CLS Pg. A65</p>	 <p style="text-align: center;">2CLS Pg. A65</p>
PHYSICAL DESCRIPTION Package size (in.)	4.0H 1.8W 1.6L	4.8H 1.8W 5.9L
Actuators	Cable	Cable
SPECIAL FEATURES	Covers cable span up to 200 ft. Four conduit thread sizes available.	Covers cable spans up to 400 ft. Optional corner installation. Four conduit thread sizes available.
CHARACTERISTICS Electrical data (maximum available) Circuitry	I_{in} 10A U, 660 VAC/660 VDC 1NO 1NC Direct Acting 1NO 1NC Snap Acting	I_{in} 10A U, 660 VAC/660 VDC (Primary) 1NO 1NC Direct Acting (Auxiliary) 1NO 1NC Direct Acting 2NO 2NC Snap Action* 1NO 1NC (SDS)* *For monitoring only.
ENVIRONMENT Temperature range Sealing† Housing material † For NEMA definitions, see page E7.	Upper Lower 158°F (70°C) 30°F (-1°C) IP 67, NEMA 1, 3, 4, 13 Metal	158°F (70°C) 30°F (-1°C) IP 67, NEMA 1, 3, 4, 13 Metal
AGENCY LISTING	UL Listed CSA Certified CE Certified	UL Listed CSA Certified CE Certified
TYPICAL APPLICATIONS	For signaling applications <ul style="list-style-type: none"> ● Conveyors ● Packaging machinery ● Assembly lines ● Process equipment ● Transfer lines 	For signaling applications <ul style="list-style-type: none"> ● Conveyors ● Packaging machinery ● Assembly lines ● Process equipment ● Transfer lines