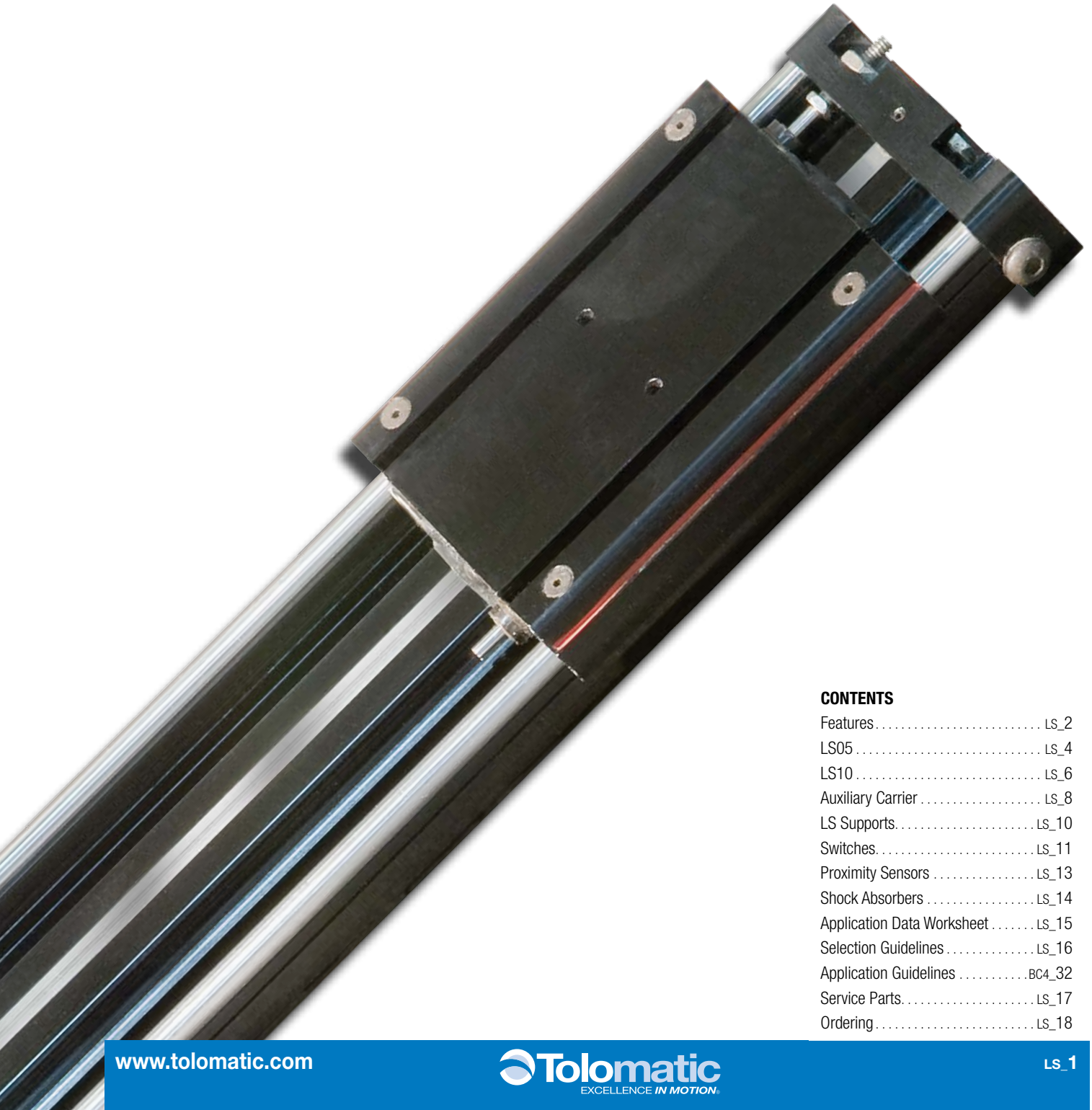
Tolomatic
EXCELLENCE IN MOTION®

LS LINEAR SLIDE RODLESS CYLINDER



CONTENTS

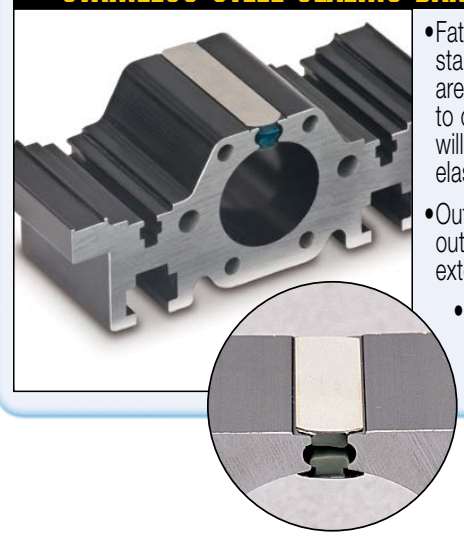
LS - LINEAR SLIDE

ENDURANCE TECHNOLOGY℠

Endurance Technology features are designed for maximum durability to provide extended service life.

Adapted from the popular BC2, the Linear Slide features 2 precision steel guide rods integrated with the extrusion to provide positive support of the load. This makes the Linear Slide more rugged and capable with greater load capacity and higher bending moments. Built-to-order in stroke lengths up to 72 inches.

STAINLESS STEEL SEALING BAND SYSTEM



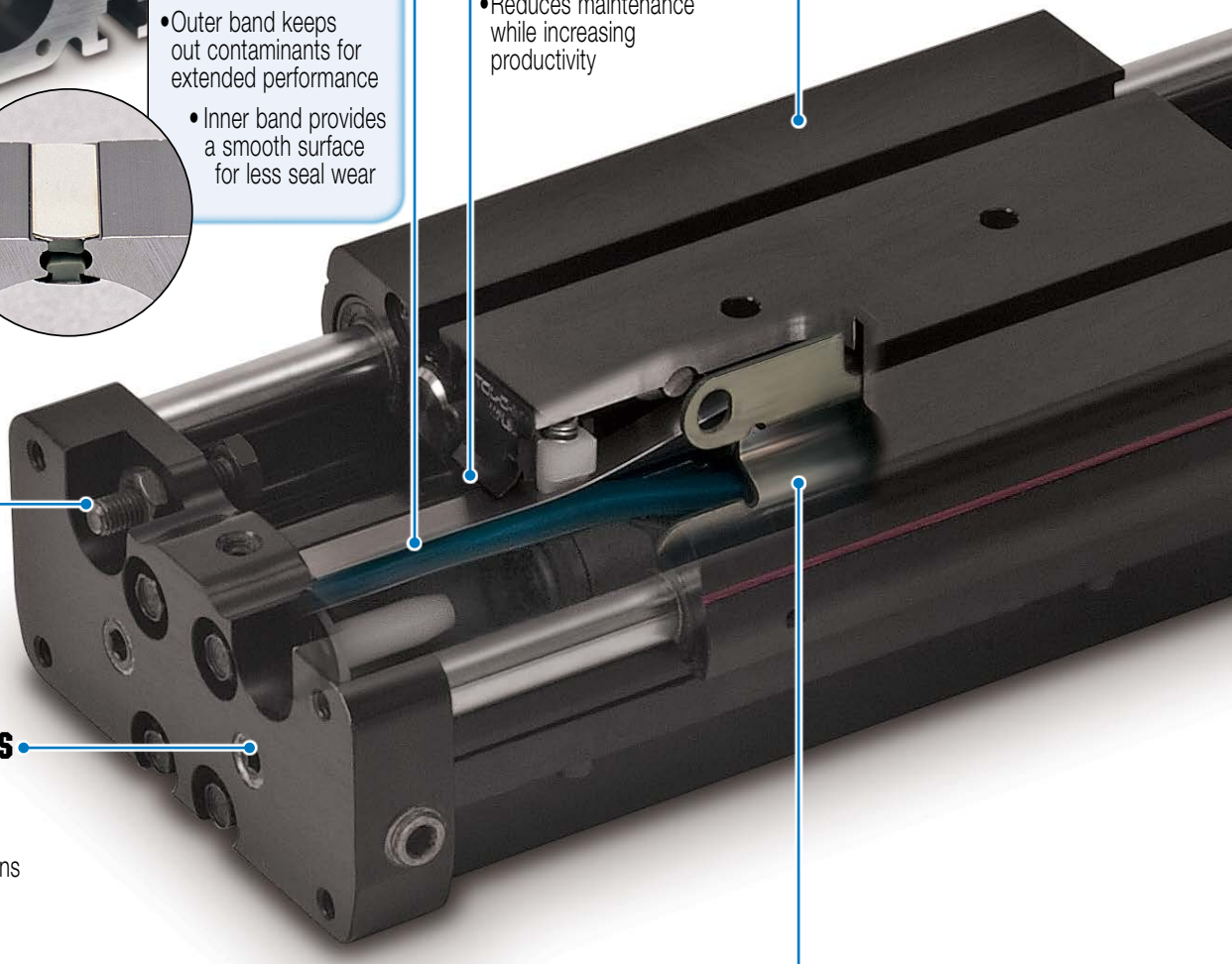
- Fatigue resistant stainless steel bands are specifically made to offer longer life and will not elongate like elastomers
- Outer band keeps out contaminants for extended performance
  - Inner band provides a smooth surface for less seal wear

FORMED END CAP WIPER SEAL

- Keeps contaminants from entering the sealing area
- Protects internal components
- Reduces maintenance while increasing productivity

LOW CARRIER HEIGHT

- Reduces overall actuator envelope
- Large mounting area for high load stability
- T-Slots for mounting flexibility



STROKE ADJUSTMENT

- End of stroke
- Integrated into design

3-PORTED HEADS

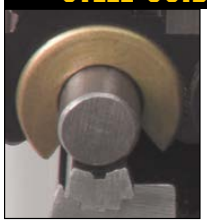
- Single End Porting
- Standard feature
- Simplifies air connections

FORMED STEEL PISTON BRACKET

- Provides maximum strength at major stress points
- Heat treated carbon steel withstands the toughest dynamic forces
- Strongest bracket design in the industry assures long life with less maintenance

TOLOMATIC…THE RODLESS CYLINDER LEADER

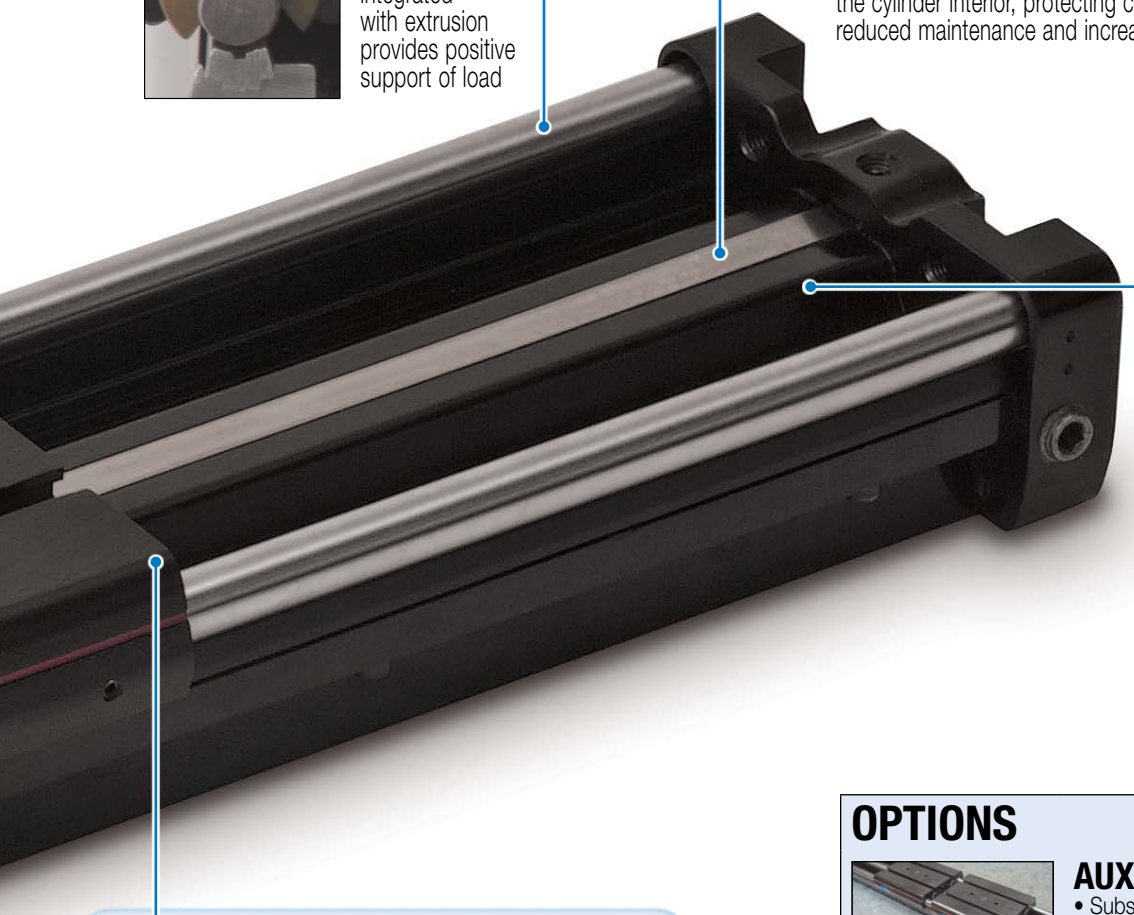
STEEL GUIDE RODS



- Two precision ground steel guide rods integrated with extrusion provides positive support of load

RETAINED DUST BAND

- Retained dust band keeps contaminants from entering the cylinder interior, protecting components for reduced maintenance and increased uptime



RIGID BLACK-ANODIZED EXTRUDED ALUMINUM TUBE

- Stronger, stiffer tube retains tolerance specs when chamber is pressurized
- Keeps sealing band in place for maximized air efficiency
- Tube supports are minimized
- Solid structural support provides durability and long life performance

LOAD-BEARING CARRIER DESIGN

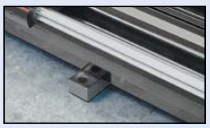
- Load and piston are independent - piston floats, resulting in less friction and longer seal life
- Bearings offer consistently low friction and long wear; 1/2" bore features composite bearings, 1" bore features precision linear ball bearings

NOTE: Boxed letters indicate ordering codes

OPTIONS

AUXILIARY CARRIER [D][W] [D][O]

- Substantially higher load capacity
- Substantially higher bending moment capacity



SUPPORTS [M][P]

- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

T-NUTS

- Used for intermediate support, combine with Tube Supports or mount directly to surface

SHOCK ABSORBERS [S][L] [S][H]

- Smooth deceleration
- Allows increased operating speed
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Higher equipment productivity
- Integrated to carrier design

SWITCHES

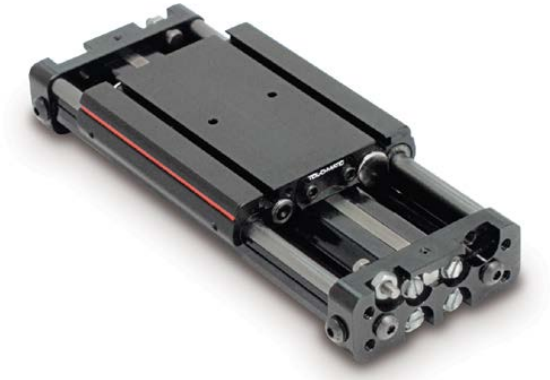
- Available in Proximity, Reed, Hall-effect and Triac
- 15ft. cable with flying leads; available with quick-disconnect couplers

5 DAYS BUILT-TO-ORDER

LS05 Linear Slide Rodless Cylinder

PERFORMANCE

LS05



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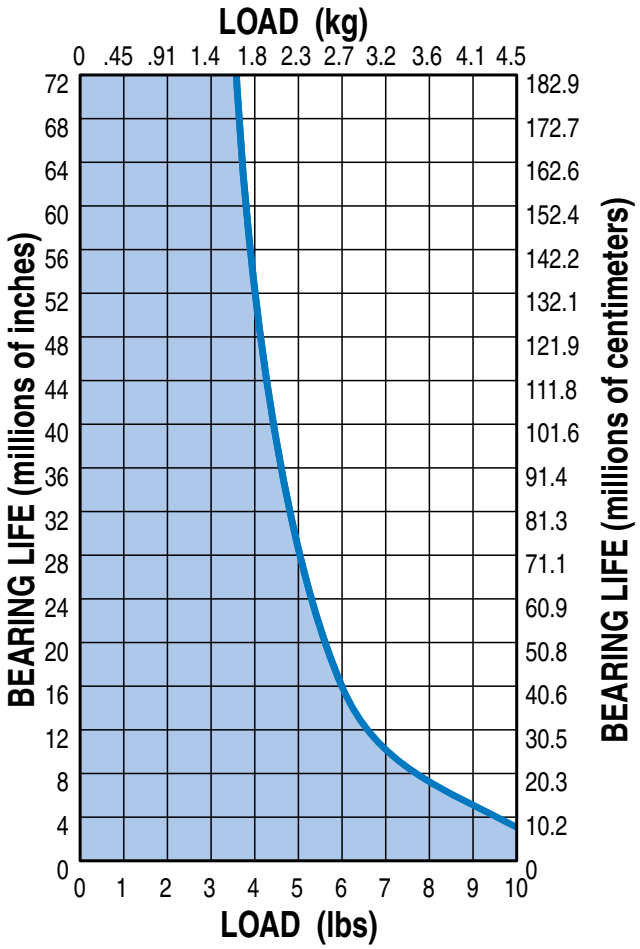
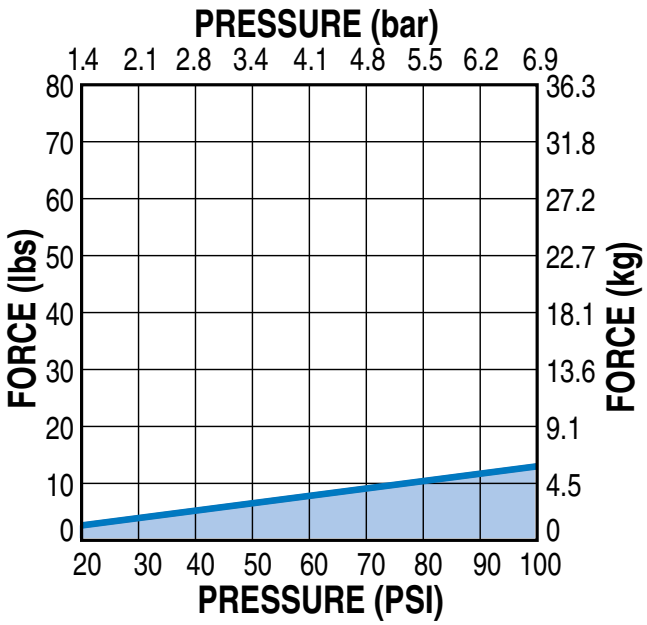
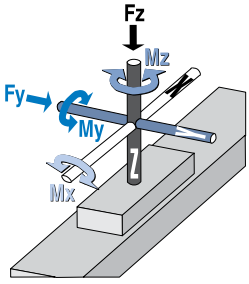
BEARING LIFE vs LOAD



THEORETICAL FORCE vs PRESSURE



SPECIFICATIONS



LS05 BENDING MOMENTS AND LOAD

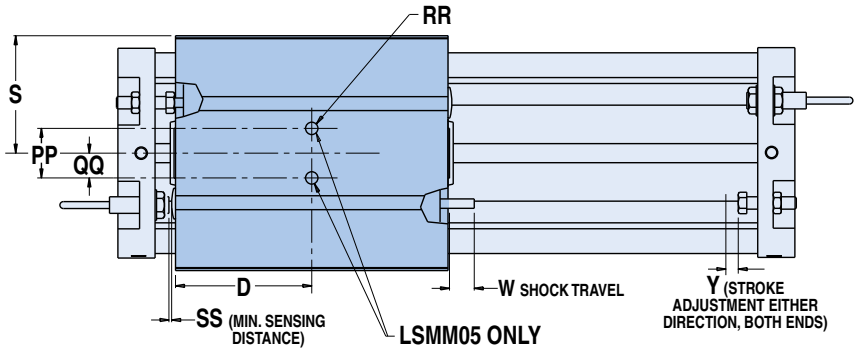
	BORE SIZE	MAX. BENDING MOMENT			MAX. LOAD
		My	Mx	Mz	Fz
U.S.	0.50 in	4.0 in-lbs	8.0 in-lbs	6.0 in-lbs	10.0 lbs
Metric	12 mm	0.45 N-m	0.90 N-m	0.68 N-m	4.5 kg

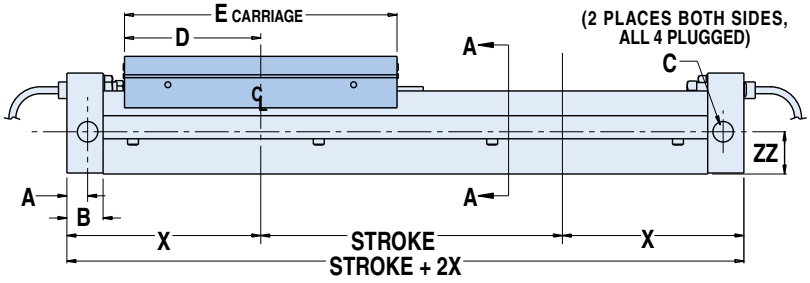
LS05 Linear Slide Rodless Cylinder

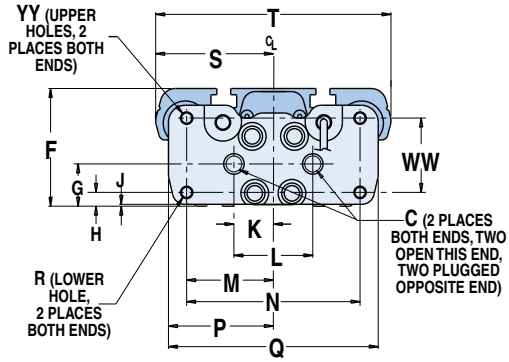
DIMENSIONS

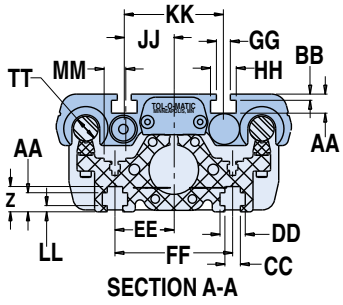
3D CAD available at www.tolomatic.com

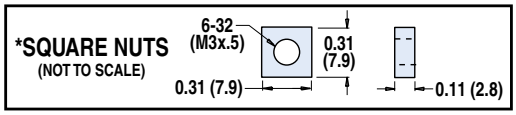
Always use configurated CAD solid model to determine critical dimensions











*NOTE: Four square nuts are provided with each linear slide for base mounting. Additionally 2 square nuts are provided for 30" of stroke and 2 for every 20" of stroke thereafter.

	U.S.	Metric
A	0.32	8.1
B	0.50	12.7
C	#10-32 PORTS	M5 x 0.8
D	1.82	46.1
E	3.63	92.2
F	1.31	33.3
G	0.43	10.8
H	0.24	6.0
J	0.02	0.5
K	0.88	22.23
L	1.75	44.45
M	1.13	28.58
N	2.25	57.15
P	1.39	35.5
Q	2.78	70.6
R	#10-24 x .38 DP	M5 x 0.8 x 10 DP
S	1.50	38.1
T	3.00	76.2
W	0.18	4.6
X	2.69	62.9
Y	0.13	3.2
Z	0.34	8.59
AA	0.19	4.88
BB	0.06	1.57
CC	0.16	3.96
DD	0.33	8.43
EE	0.81	20.62
FF	1.63	41.28
GG	0.16	3.96
HH	0.33	8.43
JJ	0.94	23.83
KK	1.88	47.63
LL	0.13	3.18
MM	0.28	7.14
PP	1.00	25.4
QQ	0.50	12.7
RR	.13 x .09 DP	3.18 x2.4 DP
SS	0.04	1
TT	.25 Nominal	6.35 Nominal
WW	0.50	12.7
YY	#10-24 x .21 DP	M5 x 0.8 x 5 DP
ZZ	0.47	11.8
	INCHES	MILLIMETERS

SPECIFICATIONS

	BORE SIZE	WEIGHT		MAX. STROKE LENGTH*	MAX. PRESSURE	TEMPERATURE RANGE	END-OF-STROKE POSITIONING ACCURACY	STROKE ADJUSTMENT
		BASE	PER UNIT OF STOKE					
U.S.	0.50 in	1.2 lbs	0.15 lbs/in	72 in	100 PSI	20° to 140° F	±0.0005 in	±0.12 in per end
Metric	12 mm	0.54 kg	0.068 kg/mm	1829 mm	6.895 bar	-7° to 60° C	0.0127 mm	±3.05 mm per end

***For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic**

LS10 Linear Slide Rodless Cylinder

PERFORMANCE

LS10

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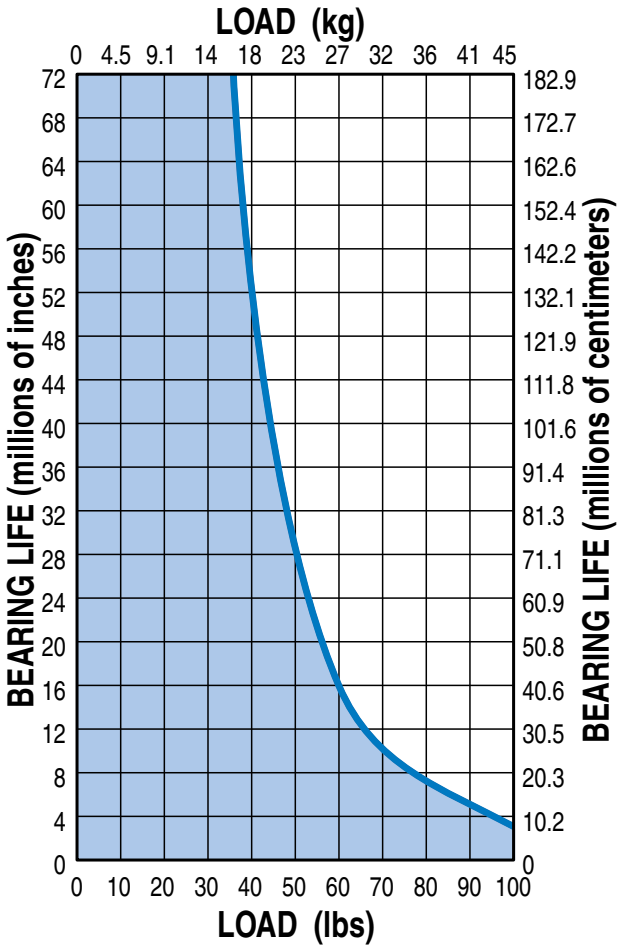
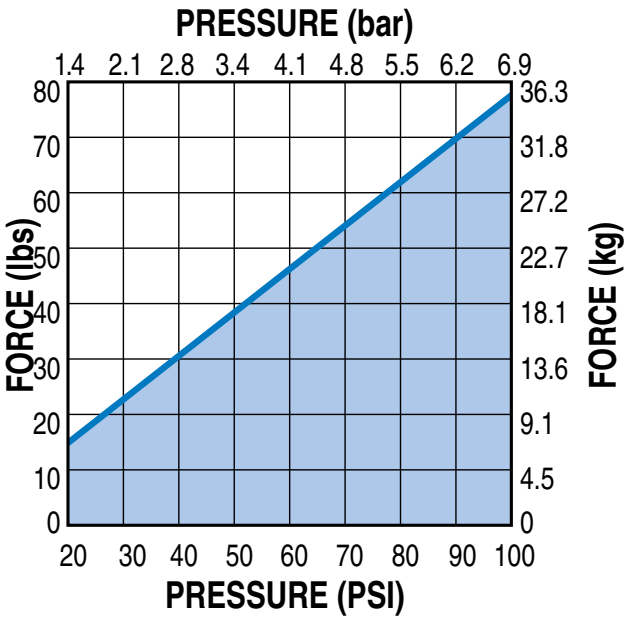
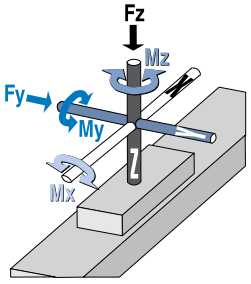
BEARING LIFE vs LOAD



THEORETICAL FORCE vs PRESSURE



SPECIFICATIONS



LS10 BENDING MOMENTS AND LOAD

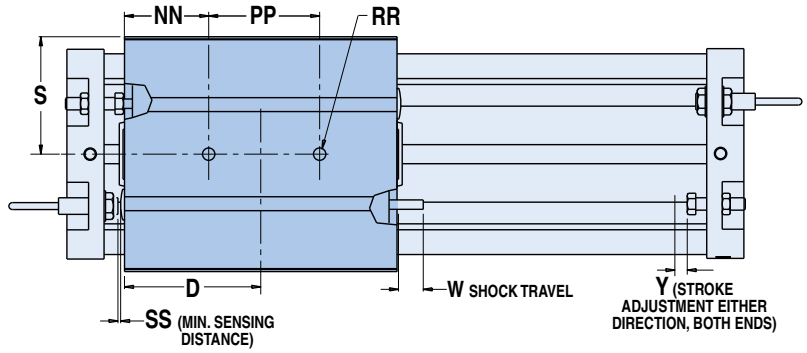
	BORE SIZE	MAX. BENDING MOMENT			MAX. LOAD
		My	Mx	Mz	Fz
U.S.	1.00 in	80 in-lbs	80 in-lbs	125 in-lbs	100 lbs
Metric	25 mm	9.0 N-m	9.0 N-m	14.0 N-m	45.4 kg

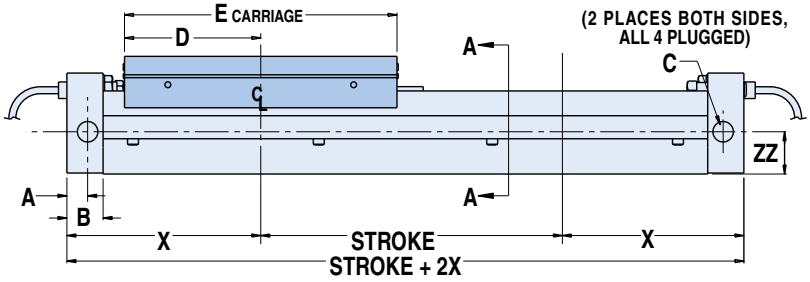
LS10 Linear Slide Rodless Cylinder

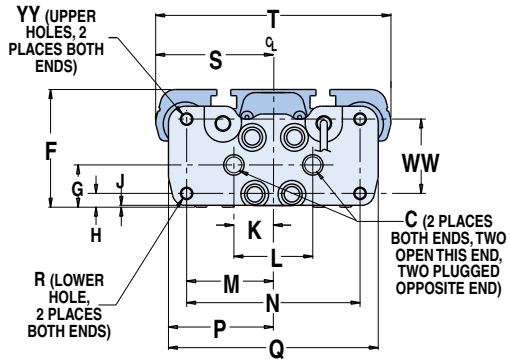
DIMENSIONS

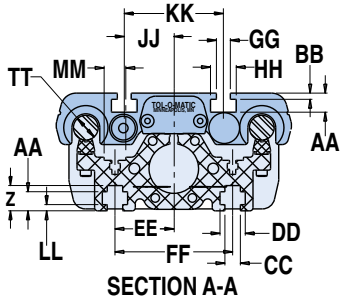
3D CAD available at www.tolomatic.com

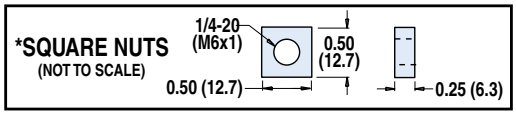
Always use configurated CAD solid model to determine critical dimensions











*NOTE: Four square nuts are provided with each linear slide for base mounting. Additionally 2 square nuts are provided for 30" of stroke and 2 for every 20" of stroke thereafter.

	U.S.	Metric
A	0.42	10.7
B	0.73	18.5
C	1/8 NPT PORT	G 1/8-28 Parallel
D	2.75	69.9
E	5.50	139.7
F	2.38	60.5
G	0.86	21.7
H	0.28	7.1
J	0.04	1.0
K	0.80	20.3
L	1.59	40.4
M	1.75	44.5
N	3.50	88.9
P	2.13	54.1
Q	4.25	107.9
R	1/4-20 x .50 DP	M6 x 1.0 x 12 DP
S	2.38	60.5
T	4.75	120.7
W	0.43	10.9
X	3.89	98.8
Y	0.25	6.4
Z	0.51	12.9
AA	0.39	9.8
BB	0.10	2.5
CC	0.31	7.9
DD	0.51	13.0
EE	1.19	30.2
FF	2.38	60.3
GG	0.28	7.1
HH	0.52	13.2
JJ	1.00	25.4
KK	2.00	50.8
LL	0.13	3.2
MM	0.44	11.1
NN	1.75	44.5
PP	2.00	50.8
RR	.25 x .20 DP	6.35 x 5.1 DP
SS	0.04	1.0
TT	.472 Nominal	12.0 Nominal
WW	1.50	38.1
YY	1/4-20 x .38 DP	M6 x 1.0 x 9 DP
	INCHES	MILLIMETERS

SPECIFICATIONS

	BORE SIZE	WEIGHT		MAX. STROKE LENGTH*	MAX. PRESSURE	TEMPERATURE RANGE	END-OF-STROKE POSITIONING ACCURACY	STROKE ADJUSTMENT
		BASE	PER UNIT OF STOKE					
U.S.	1.00 in	5.2 lbs	0.4 lbs/in	72 in	100 PSI	20° to 140° F	±0.0005 in	±0.25 in per end
Metric	25 mm	2.36 kg	0.181 kg/mm	1829 mm	6.895 bar	-7° to 60° C	0.0127 mm	±6.35 mm per end

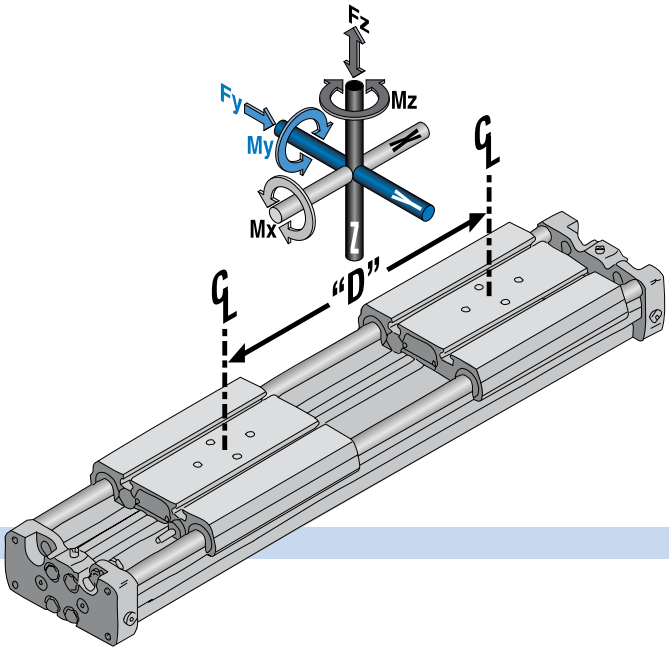
***For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic**

LS Auxiliary Carrier - All Sizes

PERFORMANCE

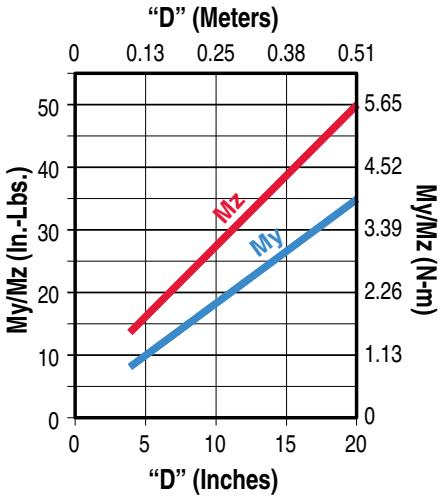
The auxiliary carrier option substantially increases load carrying and bending moments capacity over the standard single carrier models. As a general rule, the auxiliary carrier option is highly recommended in vertical applications (My) if the distance from the carrier mounting surface to the load center of gravity (CG) exceeds the overall length of the carrier. Auxiliary carriers can be ordered with (DW) or without (DO) an internal piston. (Auxiliary carriers without a piston have no cushion on the cylinder end closest to the auxiliary carrier.)

NOTE: breakaway pressure will increase when using auxiliary carrier.

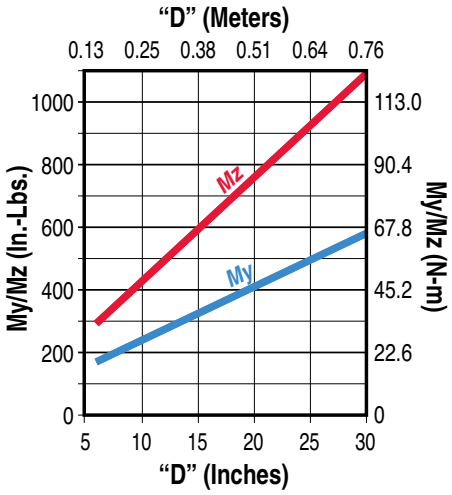


BENDING MOMENTS

LS05 AUXILIARY CARRIER LOAD vs DISTANCE



LS10 AUXILIARY CARRIER LOAD vs DISTANCE



Rates were calculated with the following assumptions:
1.) Coupling between carriers is rigid. **2.)** Load is equally distributed between carriers.
3.) Coupling device applies no misalignment loads to carriers.

	BORE SIZE		"D" MINIMUM *		MAX. BENDING MOMENT						MAX. LOAD	
					My**		Mx		Mz**		Fz	
	in	mm	in	mm	in-lbs	N-m	in-lbs	N-m	in-lbs	N-m	lbs	kg
05	0.50	12	3.63	92.2	9.51	1.07	16.00	1.81	14.27	1.61	20	9.08
10	1.00	25	5.75	146.1	177.80	20.09	160.00	18.08	277.80	31.30	200	90.8

* "D" is distance between carriers
** Loads calculated are at minimum "D", for substantially higher My and Mz loads increase "D" and refer to graph above

LS Auxiliary Carrier - All Sizes

AUXILIARY CARRIER

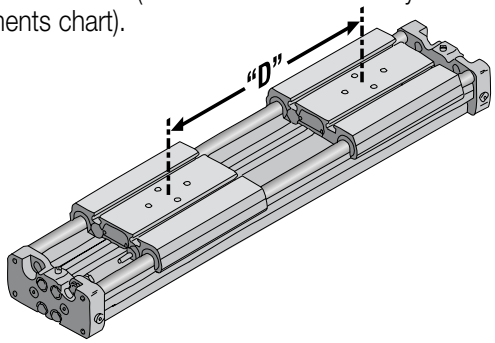
ORDER CODES

DO
(Auxiliary Carrier without piston)

DW
(Auxiliary Carrier with piston)

ORDERING INFORMATION

When ordering, determine the minimum distance required between carriers (dimension "D" in Auxiliary Carrier Bending Moments chart).



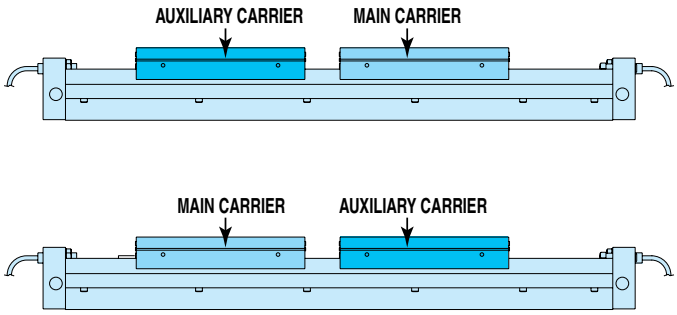
Determine your working stroke and your "D" dimension, then enter these into your configuration string. (Example: LS10SK30.00DW8.00RT2) The configurator will calculate the overall length of the actuator. Refer to page LS_18 for complete LS ordering information.

ASSEMBLY INFORMATION

IMPORTANT INFORMATION REGARDING AUXILIARY CARRIER PLACEMENT

When an LS is ordered without shock absorbers, the auxiliary carrier is always placed to the left (while facing the switch mounted or open port side) of the main carrier.

When an LS is ordered with shock absorbers, the auxiliary carrier is always placed to the right (while facing the switch mounted or open port side) of the main carrier.



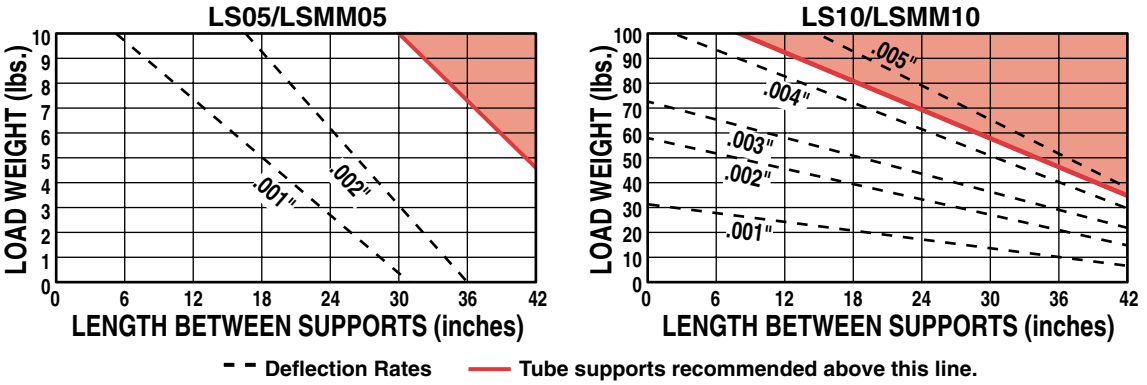
LS Supports - All Sizes

3D CAD available at www.tolomatic.com

Always use configurated CAD solid model to determine critical dimensions

PERFORMANCE

DISTANCE BETWEEN SUPPORTS



– – Deflection Rates —— Tube supports recommended above this line.

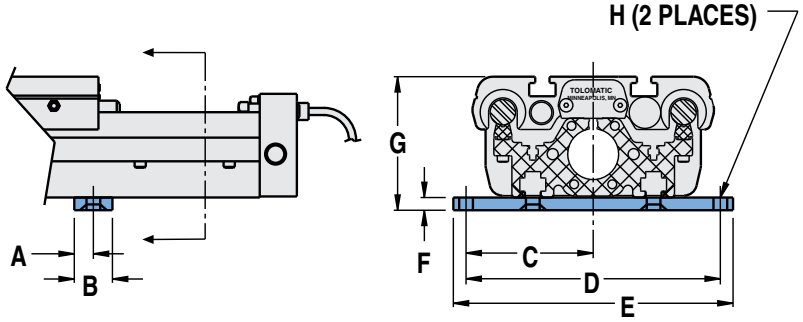
MP SUPPORTS

Base mounting linear slides may be accomplished by fastening directly to "T" slot nuts provided in the base of the slide (shown at right) or by using the MP mounting plates.

SQUARE NUTS

*NOTE: Four square nuts are provided with each linear slide for base mounting. Additionally 2 square nuts are provided for 30" of stroke and 2 for every 20" of stroke thereafter.

DIMENSIONS



	BORE SIZE	A	B	C	D	E	F	G	H Ø
05	0.50	0.38	0.75	1.60	3.30	3.60	0.25	1.60	0.156
10	1.00	0.38	0.75	2.50	5.00	5.50	0.25	2.63	0.270

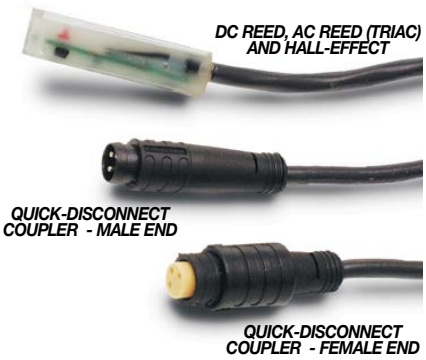
Dimensions in inches

	BORE SIZE	A	B	C	D	E	F	G	H Ø
05	12	9.7	19.1	41.4	82.6	92.2	6.4	39.6	3.96
10	25	9.7	19.1	63.5	127.0	139.7	6.4	66.8	6.86

Dimensions in millimeters

LS Switches - All Sizes

SWITCHES



There are 10 sensing choices: DC reed, form A (open) or form C (open or closed); AC reed (Triac, open); Hall-effect, sourcing, PNP (open); Hall-effect, sinking, NPN (open); each with either flying leads or QD (quick disconnect). Commonly used to send analog signals to PLC (programmable logic controllers), TLL, CMOS circuit or other controller device. These switches are activated by the actuator's magnet.

Switches contain reverse polarity protection. QD cables are shielded; shield should be terminated at flying lead end.

If necessary to remove factory installed switches, be sure to reinstall on the same of side of actuator with scored face of switch toward internal magnet.

SPECIFICATIONS

		REED DC				REED AC		HALL-EFFECT DC			
ORDER CODE		RT	RM	BT	BM	CT	CM	TT	TM	KT	KM
LEAD		5m	QD*	5m	QD*	5m	QD*	5m	QD*	5m	QD*
CABLE SHIELDING		Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†
SWITCHING LOGIC		"A" Normally Open		"C" Normally Open or Closed		Triac Normally Open		PNP (Sourcing) Normally Open		NPN (Sinking) Normally Open	
MECHANICAL CONTACTS		Single-Pole Single-Throw		Single-Pole Double-Throw		Single-Pole Single-Throw		NO, These Are Solid State Components			
COIL DIRECT		Yes		Yes		Yes		—			
POWER LED		None		None		None		None		None	
SIGNAL LED		Red						Red		Red	
OPERATING VOLTAGE		200 Vdc max.		120 Vdc max.		120 Vac max.		5 - 25 Vdc			
OUTPUT RATING		—				—		25 Vdc, 200mA dc			
OPERATING TIME		0.6 msec max. (including bounce)		0.7 msec max. (including bounce)		—		< 10 micro sec.			
OPERATING TEMPERATURE		-40°F [-40°C] to 158°F [70°C]						0°F [-18°C] to 150°F [66°C]			
RELEASE TIME		1.0 msec. max.				—		—			
ON TRIP POINT		—				—		150 Gauss maximum			
OFF TRIP POINT		—				—		40 Gauss minimum			
****POWER RATING (WATTS)**		10.0 §		3.0 §§		10.0		5.0			
VOLTAGE DROP		2.6 V typical at 100 mA		NA		—		—			
RESISTANCE		0.1 Ω Initial (Max.)				—		—			
CURRENT CONSUMPTION		—				1 Amp at 86°F [30°C]	0.5 Amp at 140°F [60°C]	200 mA at 25 Vdc			
FREQUENCY		—				47 - 63 Hz		—			
CABLE MIN. BEND RADIUS	**STATIC**	0.630" *[16mm]*									
	DYNAMIC	Not Recommended									

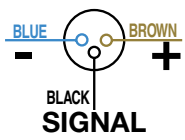
CAUTION: DO NOT OVER TIGHTEN SWITCH HARDWARE WHEN INSTALLING!

** **WARNING**: Do not exceed power rating (Watt = Voltage X Amperage). Permanent damage to sensor will occur.

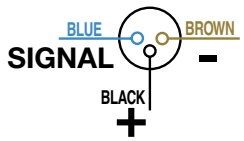
*QD = Quick Disconnect; Male coupler is located 6" [152mm} from sensor,
Female coupler to flying lead (part #2503-1025) distance is 197" [5m] also see Cable Shielding specification above

REPLACEMENT OF QD SWITCHES MANUFACTURED BEFORE JULY 1, 1997: It will be necessary to replace or rewire the female end coupler.

CURRENT
Quick disconnect Wiring



OLD
Quick disconnect Wiring



Reed Switch Life Expectancy: Up to 200,000,000 cycles (depending on load current, duty cycle and environmental conditions)

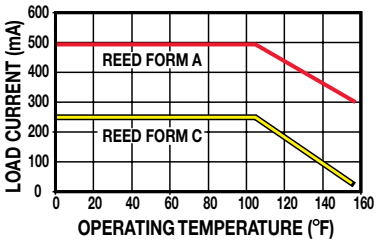
†Shielded from the female quick disconnect coupler to the flying leads. Shield should be terminated at flying lead end.

§ Maximum current 500mA (not to exceed 10VA) Refer to Temperature vs. Current graph and Voltage Derating graph

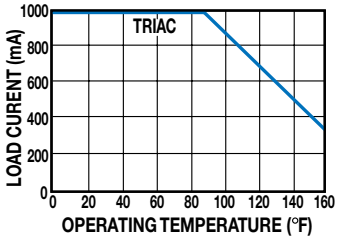
§§ Maximum current 250mA (not to exceed 3VA) Refer to Temperature vs. Current graph and Voltage Derating graph

PERFORMANCE

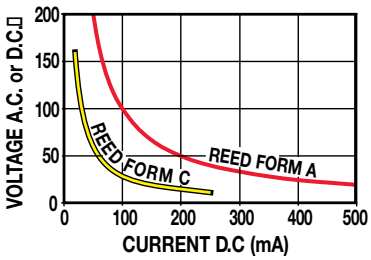
TEMP. vs CURRENT, DC REED



TEMP. vs CURRENT, AC REED

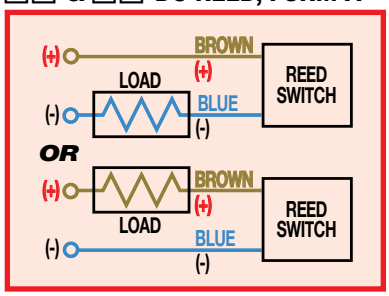


VOLTAGE DERATING, DC REED

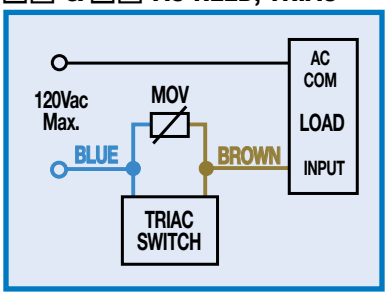


WIRING DIAGRAMS

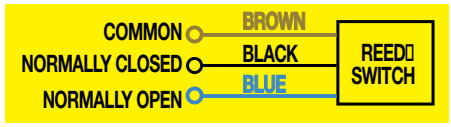
RT & RM DC REED, FORM A



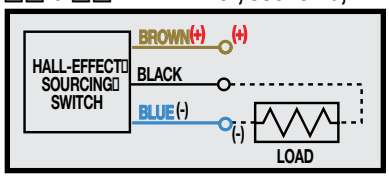
CT & CM AC REED, TRIAC



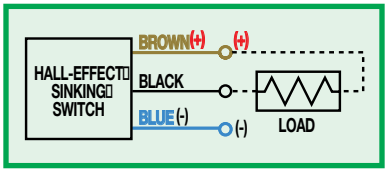
BT & BM DC REED, FORM C



TT & TM HALL-EFFECT, SOURCING, PNP



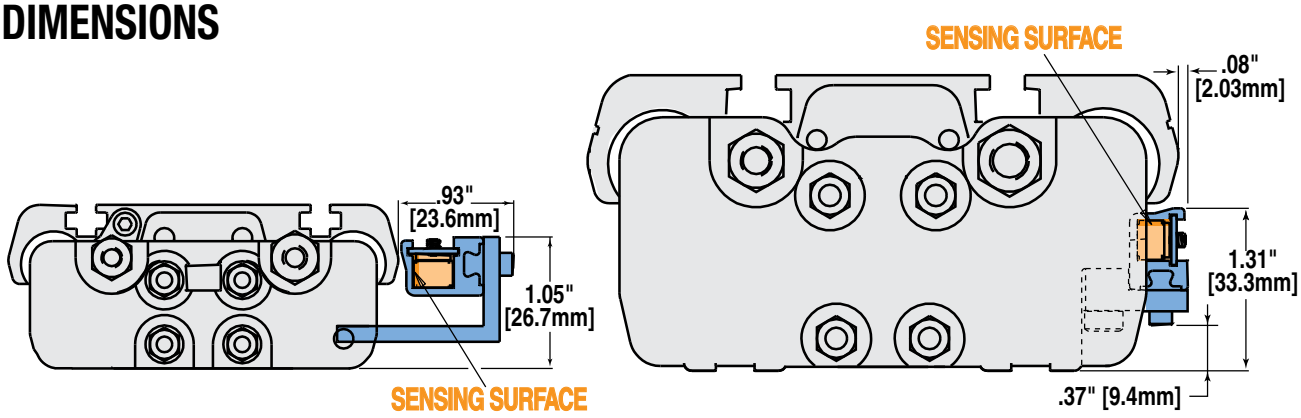
KT & KM HALL-EFFECT, SINKING, NPN



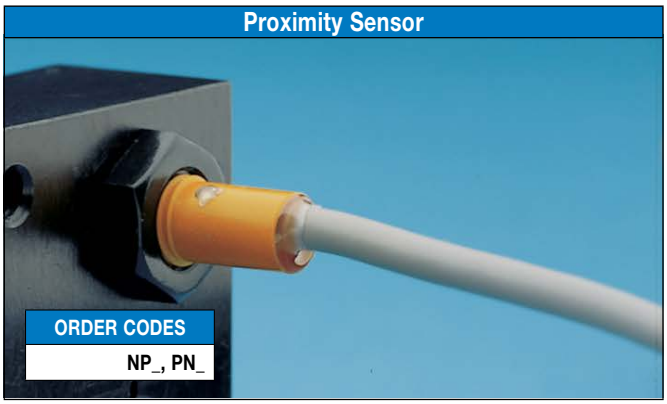
INSTALLATION INFORMATION

THE NOTCHED FACE OF THE SWITCH INDICATES THE SENSING SURFACE AND MUST FACE TOWARD THE MAGNET.

DIMENSIONS



LS Proximity Sensors - All Sizes



This L.E.D. device senses end-of-stroke with one of two normally open inductive d.c. proximity sensors. NPN supplies a sinking signal; PNP supplies a sourcing signal to a device such as a programmable logic controller.

Ambient Temp.: -13° to 158° F., (-25° to 70° C.)

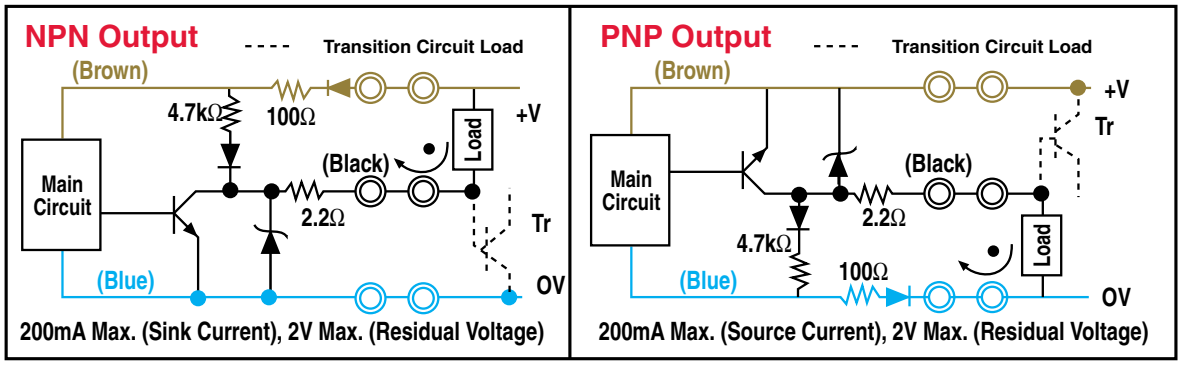
NEMA Encl. Rating: 1, 3, 4, 6, 12, 13

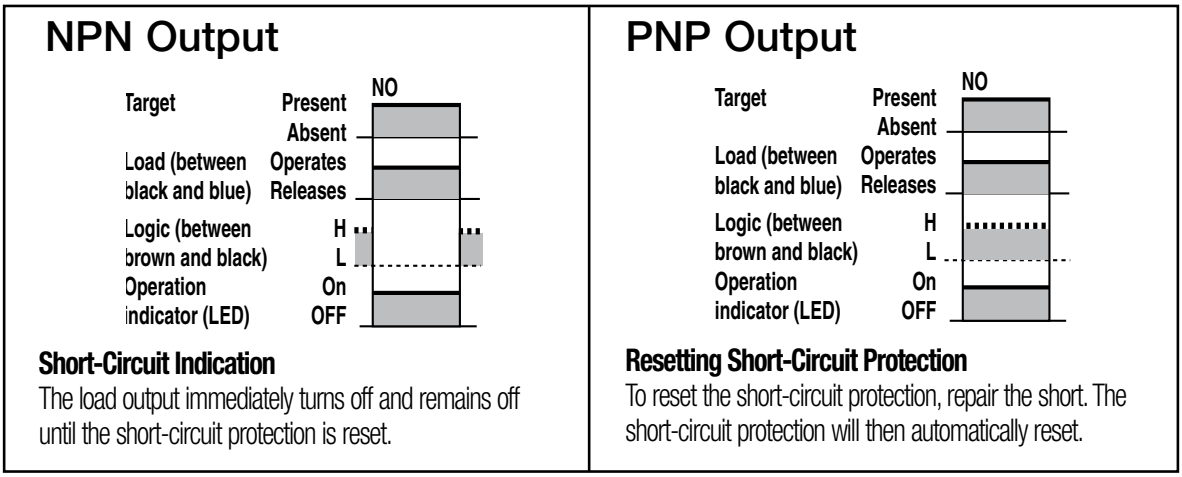
Lead Length: 6.56 feet (2.0m)

Max. Sensing Distance (LS05): .059" (1.5mm)

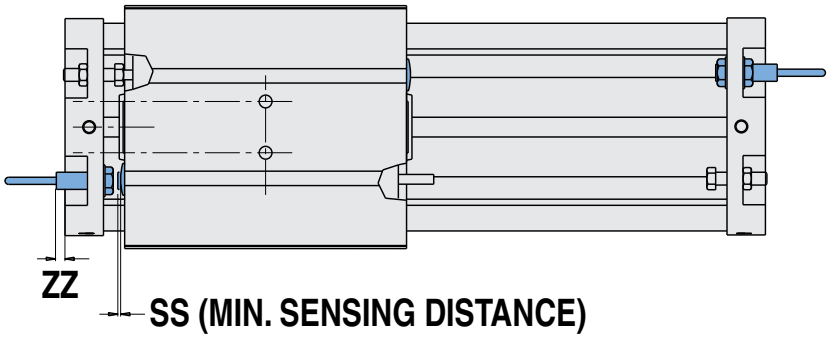
Max. Sensing Distance (LS10): .039" (1.0mm)

Wiring Diagrams





DIMENSIONS



SIZE	BORE		SS		ZZ	
	in	*mm*	in	*mm*	in	*mm*
05	0.50	*12.7*	0.04	*1.02*	0.46	*11.68*
10	1.00	*25.4*	0.04	*1.02*	0.40	*10.16*

LS Shock Absorbers - All Sizes

3D CAD available at www.tolomatic.com

Always use configurated CAD solid model to determine critical dimensions

SHOCK ABSORBERS

ORDER CODE

SH_ or SL_
(_ = Number ordered)

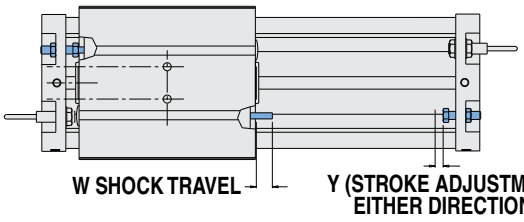
Rodless cylinders with standard internal cushion offer an effective method of decelerating loads. However, all Tolomatic rodless cylinders are capable of carrying heavier loads at higher velocities than the cylinder cushion can absorb. Optional shock absorbers can be used to increase the cylinder's life and broaden the application range for the cylinder model you have chosen.

Typical shock absorber life varies between 1-2 million cycles (depending on environment). Appropriate preventative maintenance should be considered in high cyclic applications.

NOTE: Actuators ordered without selecting a shock absorber MUST have external stops. The LS does NOT have internal bumpers or cushions.

CAUTION: In applications which result in a load bending moment at deceleration, care should be taken to decelerate the load rather than the carrier of the band cylinder.

DIMENSIONS



SIZE	BORE	W	Y
05	0.375	0.18	0.13
10	0.625	0.43	0.25

Dimensions in inches

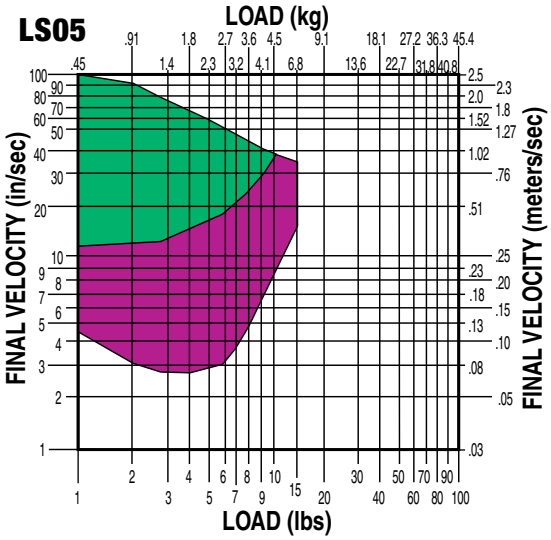
SIZE	BORE	W	Y
05	12	4.6	3.2
10	25	10.9	6.4

Dimensions in millimeters

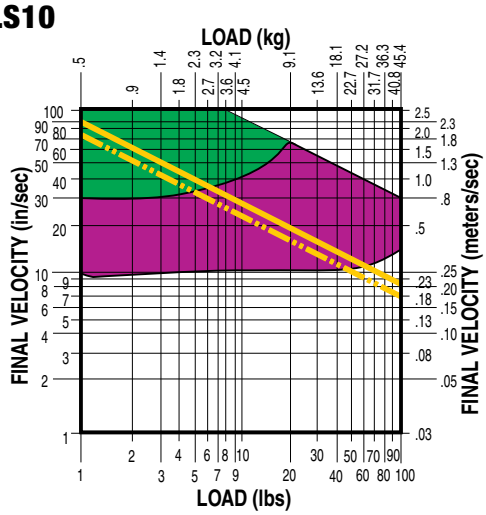
PERFORMANCE

VELOCITY vs LOAD

LS05



LS10

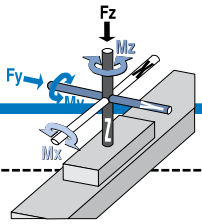


LIGHT DUTY (Light load/High velocity)

HEAVY DUTY (Heavy load/Low velocity)

Tolomatic EXCELLENCE IN MOTION

Application Data Worksheet



STROKE LENGTH _____
☐ inch (SK) (U.S. Standard) ☐ millimeters (Metric)

AVAILABLE AIR PRESSURE _____
☐ PSI (U.S. Standard) ☐ bar (Metric)

REQUIRED THRUST FORCE _____
☐ lbf (U.S. Standard) ☐ N (Metric)

LOAD _____
☐ lb (U.S. Standard) ☐ kg (Metric)

LOAD CENTER OF GRAVITY DISTANCE TO CARRIER CENTER
d_x _____
d_y _____
d_z _____
☐ inch (U.S. Standard) ☐ millimeters (Metric)

FORCES APPLIED TO CARRIER
F_z _____
F_y _____
☐ lbf (U.S. Standard) ☐ N (Metric)

BENDING MOMENTS APPLIED TO CARRIER
M_x _____
M_y _____
M_z _____
☐ in-lbs (U.S. Standard) ☐ N-m (Metric)

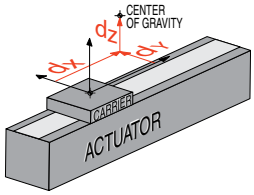
FINAL VELOCITY _____
☐ in/sec (U.S. Standard) ☐ mm/sec (Metric)

MOVE TIME sec. _____

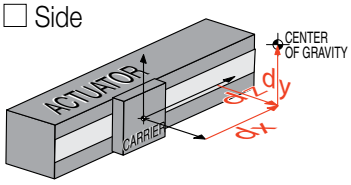
NO. OF CYCLES _____
☐ per minute ☐ per hour

ORIENTATION

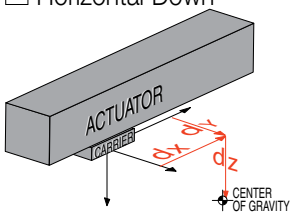
☐ Horizontal



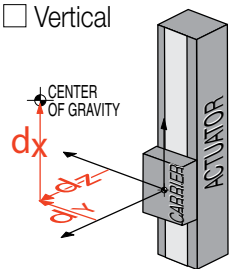
☐ Side



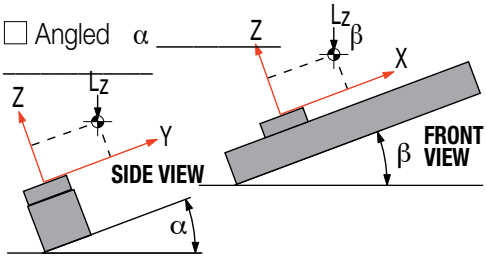
☐ Horizontal Down



☐ Vertical



☐ Angled α _____



OTHER ISSUES:
(i.e. Environment, Temperature, Contamination, etc.)
_____
_____
_____
_____

Contact information:
_____
_____
_____
_____

STOP Fax (1-763-478-8080) or call Tolomatic (1-800-328-2174) with the above information. We will provide any assistance needed to determine the proper actuator.

Rodless Cylinder Selection Guidelines - BC2, BC3, BC4, LS - All Sizes

PROVIDING LOAD GUIDANCE AND SUPPORT

The process of selecting a load bearing actuator for a given application can be complex. It is highly recommended that you contact Tolomatic or a Tolomatic Distributor for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

1 COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Band Cylinder or Linear Slide model for an application, compile the following information:

- Available pressure (PSI)
- Weight of load (lbs or kg)
- Orientation of load (lbs or kgs)
- Velocity of load (in/sec or mm/sec)
- Stroke length (in or mm)

HINT: Use Tolomatic sizing and selection software, download at: tolomatic.com

2 SELECT CYLINDER SIZE

- Consult the Theoretical Force vs. Pressure charts.
- Cross-reference the load force (or load weight if force is not known) and the available operating pressure. If the intersection falls below the diagonal line, and if moments do not exceed maximum values listed for that model (see Step 3), the actuator will accommodate the application.

  If the intersection is above the diagonal line, a larger cylinder bore size should be considered.

NOTE: Additional force may be required to obtain the necessary acceleration for vertical or horizontal loads.

3 DETERMINE NATURE OF LOAD AND THE EFFECT OF BENDING MOMENTS

If the cylinder will guide and support a load located directly over the center of carrier, bending moments will not be a factor in the cylinder selection.

NOTE: The maximum load "L" must not exceed the capacity limits of the cylinder selected.

- Bending Moments

  For off center or side loads, determine the distance from the center of mass of the load to the center of the carrier bracket. This measurement is needed to calculate the torque for bending moments. (Refer to Bending Moment chart for each model.)

  Should the resulting maximum bending moment exceed figures indicated on the chart, external guides, auxiliary carrier/s or a larger cylinder should be considered.

- Auxiliary Carrier Bending Moments

  The auxiliary carrier option (available on most models) increases load carrying capacity and bending moments. Auxiliary carriers can be ordered with or without an internal piston. (Auxiliary carriers without a piston have no internal cushion on the cylinder end closest to the auxiliary carrier.)

  IMPORTANT: When ordering, determine the working stroke, then the minimum distance required between carriers (dimension "D" in Auxiliary Carrier Bending Moments chart). When ordered, Tolomatic's configurator will calculate the overall length of the actuator.

NOTE: breakaway pressure will increase when using auxiliary carriers.

4 DETERMINE INTERNAL CUSHION CAPACITY

- Consult the Cushion Data chart for the model selected. The velocities listed on the cushion charts are final or cushion impact velocities. On applications where the internal cushions or bumpers are to be used, be sure the actual, final or impact velocity is known. If the velocity is not known, use of limit switches with valve deceleration circuits or shock absorbers should be considered. NOTE: The BC205 uses external bumpers in place of internal cushions, LS05 & LS10 do not have cushions or bumpers.
- Cross-reference the final velocity and weight of the load. If the intersection is below the diagonal lines, the internal cushions on the actuator may be used. If the point falls above the dashed diagonal line or if the velocity is not known, use deceleration circuits, external shock absorbers or select a larger cylinder with greater cushion capacity. On high-cyclic applications, use of external stops is strongly recommended.

5 DETERMINE TUBE SUPPORT REQUIREMENTS

- Consult the Tube Support chart for the model selected.
- Cross reference the load weight and maximum distance between supports.

6 CONSIDER OPTIONS

- Switches– dc Reed, Hall-effect or ac Triac

Band Cylinders and Linear Slides each have different standard features and options. Check the options section for the actuator you have selected.

- Shock Absorbers– if needed.
- Foot Mounting Kits
- Floating Mount Bracket – use when lack of parallelism occurs between the cylinder and an external guided and supported load.
- Single End Porting (BC3, BC4)
- Long Carrier (BC4)
- Proximity Sensors (LS)
- Dual 180° Carrier (BC3)

LS Service Parts Ordering - ALL Sizes

	Inch (U.S. Standard)		Metric	
SIZE	05	10	05	10
Support[1]	0605-9010	0610-9010	5605-9010	5610-9010
Inductive DC Proximity Sensors - 10-24 volts NPN NO Sink[2]	0605-1023	0610-1023	0605-1023	0610-1023
Inductive DC Proximity Sensors - 10-24 volts PNP NO Source[2]	0605-1024	0610-1024	0605-1024	0610-1024
Switch Rail and Rail Hardware (specify stroke)[3]	0605-9100SK_	0610-9100SK_	0605-9100SK_	0610-9100SK_
Shock Absorbers Field Retrofit Kit - Heavy Duty[4,5]	0605-9009	0610-9023	0605-9009	0610-9023
Shock Absorbers Field Retrofit Kit - Lite Duty[4,5]	0605-9008	0610-9022	0605-9008	0610-9022
T-Nuts (Each)	0605-1042	0610-1042	5605-1042	5610-1042
Configurated Repair Kit[6]	RKLS05NPSK_	RKLS10NPSK_	RKLS05TP(GP)SK_	RKLS10TP(GP)SK_
Configurated Repair Kit (Manufactured before May 1, 1998)[6]	RKLS05NPSK_	0610-9033SK_	RKLS05SK_	0610-9033SK_

	CONFIG. CODE ORDERING
	Mounting Hardware & FE conn. included
DESCRIPTION	CODE
Switch Kit, Reed, Form C, 5m	BT
Switch Kit, Reed, Form C, Male Conn.	BM
Switch Kit, Reed, Form A, 5m	RT
Switch Kit, Reed, Form A, Male Conn.	RM
Switch Kit, Triac, 5m	CT
Switch Kit, Triac, Male Conn.	CM
Switch Kit, Hall-effect, Sinking, 5m	KT
Switch Kit, Hall-effect, Sinking, Male Conn.	KM
Switch Kit, Hall-effect, Sourcing, 5m	TT
Switch Kit, Hall-effect, Sourcing, Male Conn.	TM

NOTE: When kit is ordered female connector & all mounting hardware is included

Switch Ordering NOTES:

To order field retrofit switch and hardware kits for all Tolomatic actuators: SW (Then the model and bore size, and type of switch required)
Example: SWLS10RT
(Hardware and Form A Reed switch with 5 meter lead for 1.0" bore LS linear slide)

Replacing an existing switch on an actuator manufactured BEFORE 7-1-1997
Order using CONFIGURATOR CODE in table above
Also order SWITCH RAIL and RAIL HARDWARE
If replacing a quick-disconnect switch on an actuator manufactured BEFORE 7-1-1997 it will also be necessary to replace or require the female-end coupler with the in-line splice
(see page LS_11)

Adding a switch to an actuator manufactured without switches
Order using CONFIGURATOR CODE in table above
Also order SWITCH RAIL and RAIL HARDWARE

Service Parts Ordering NOTES:

1 Support Kit contains one bracket and two screws

2 Proximity sensors for the LS05 have 5mm thread size; LS10 have 8mm thread size

3 When replacing an existing switch on an actuator manufactured BEFORE 7-1-1997 switch rail and hardware must be ordered stroke length is required. Order switch using Configurator Code in table at left.

4 Shock absorber kit includes one shock and mounting hardware

5 NOTE: Actuators ordered without selecting a shock absorber MUST have external stops. The LS does NOT have internal bumpers or cushions.

6 Repair Kit for LS contains external dust band, internal seal band, wipers, end caps and internal soft seals. Stroke length must be included after number or code.

NA = Not Available

LS Ordering - All Sizes

MODEL, BORE, STROKE | **OPTIONS**

LS 10 NP SK55.250 DW6.0 MP3 SH2 BM2

MODEL & MOUNTING

LS LS Linear Slide

BORE SIZE

05 0.50" *(12mm)*
10 1.00" *(25mm)*

MOUNTING & PORTS

NP US standard mounting & NPT ports
TP† Metric mounting with metric taper ports
GP† Metric mounting with metric parallel ports

† The metric version provides metric tapped holes for mounting of the load to the carrier and of the actuator to mounting surfaces & metric ports

STROKE LENGTH & MOUNTING TYPE

SK __.__ Stroke, enter desired stroke length in inches
SM† __.__ Stroke, enter desired stroke length in millimeters

NOTE: Actuator mounting threads and mounting fasteners will be either inch or metric; depending on how stroke length is indicated.

SK = inch mounting
SM = metric mounting

MAXIMUM STROKE

SIZE	...SK in	...SM *mm*
05	72	*1,829*
10	72	*1,829*

Not all codes listed are compatible with all options. Contact Tolomatic with any questions.

See page BC4_16 for application guidelines

AUXILIARY CARRIER (LS_8)

DW Auxiliary carrier With piston & "D" distance
DO Auxiliary carrier Without piston & "D" distance
_ _._ _ "D" Distance between carriers in inches (**SK**) or millimeters (**SM**)

MINIMUM "D" DISTANCE BETWEEN CARRIERS

	in	*mm*
05	5.07	*129*
10	5.17	*131*

***When ordering auxiliary carrier option, enter the distance required between carriers. The configurator will calculate the overall length of the actuator.**

SUPPORTS (LS_10)

MP_ Support & number required

*NOTE: Four square nuts are provided with each linear slide for base mounting. Additionally 2 square nuts are provided for 30" of stroke and 2 for every 20" of stroke thereafter.

SHOCK ABSORBERS (LS_14)

SH_ Shock, Heavy duty and number required
SL_ Shock, Light duty and number required

NOTE: Actuators ordered without selecting a shock absorber MUST have external stops. The LS does NOT have internal bumpers or cushions.

PROXIMITY SENSOR (LS_13)

NP_ Sinking type proximity sensor (NPN)
PN_ Sourcing type proximity sensor (PNP)

SWITCHES (LS_11)

(Quantity desired follows ordering code)

RM_ Reed Switch (Form A) with 5-meter lead/QD (Quick-disconnect)
RT_ Reed Switch (Form A) with 5-m lead
BM_ Reed Switch (Form C) with 5-meter lead/QD
BT_ Reed Switch (Form C) with 5-m lead
KM_ Hall-effect Sinking Switch with 5-meter lead/QD
KT_ Hall-effect Sinking Switch w/ 5-m lead
TM_ Hall-effect Sourcing Switch with 5-meter lead/QD
TT_ Hall-effect Sourcing Switch with 5-meter lead
CM_ TRIAC Switch with 5-meter lead/QD
CT_ TRIAC Switch with 5-meter lead
MDR Dual Magnet (Reed, Hall-effect, Triac)