

# Electrak<sup>®</sup> LL – Technical Features



## Standard Features

- Long life expectancy
- High duty cycle
- Constant speed regardless of the load
- Designed and tested to meet the toughest environmental demands
- 24 Vdc versions complies to railway standards EN 50155, EN 60077 and EN 45545 \*
- Onboard electronics eliminate the need for standalone controls
- Suitable for pneumatic and hydraulic-to-electric application conversions

\* Electrak LL (24 Vdc version only) complies to the railway standards EN 50155, EN 60077 and EN 45545.

## General Specifications

Screw type	ball
Nut type	load lock ball nut
Manual override	yes
Anti-rotation	yes
Controlled braking	yes <sup>(1)</sup>
Static load holding brake	yes
Safety features	Electrak monitoring package: current monitoring voltage monitoring temperature monitoring internal end-of-stroke limit switches
Electrical connections <sup>(2)</sup>	cable(s) with flying leads
Compliances <sup>(3)</sup>	CE, UKCA, RoHS, EN 50155, EN 60077, EN 45545

(1) The actuator is stopped in a controlled manner using a preset deceleration rate.

(2) There are two cables. The cable(s) enters the actuator via a connector. The replacement of an actuator can be completed by unplugging the old actuator and plugging in the new one.

(3) Only the 24 Vdc versions complies to EN 50155, EN 60077 and EN 45545.

## Optional Mechanical Features

- Variety of front and rear adapters
- Alternative adapter orientation

## Optional Electronic Control Features

- CANopen<sup>®</sup> CAN bus
- SAE J1939 CAN bus
- Low-level switching
- Programmable limit switches
- End-of-stroke limit switch inputs
- Absolute position output

## Control Option Combinations

LEX	Electrak Monitoring Package + low-level signal motor switching + external end-off-stroke limit switch inputs
LXX	Electrak Monitoring Package + low-level signal motor switching
LXP	Electrak Monitoring Package + low-level signal motor switching + absolute position feedback output
CNO	SAE J1939 CAN bus + speed control
COO	CANopen CAN bus + speed control

## Accessories

Mechanical	Rod end front adapter
Electrical	External slot-mounted limit switches

# Electrak LL – Technical Specifications

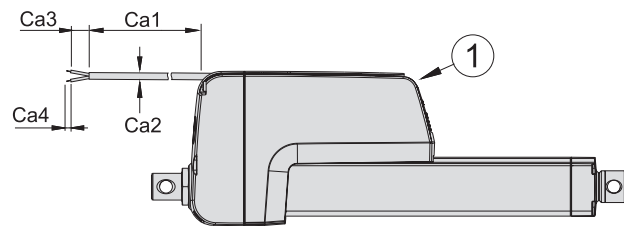
Mechanical Specifications		
Max. static load <sup>(1)</sup>	[kN (lbs)]	
LLxx-B020		5 (1124)
LLxx-B040		10 (2248)
LLxx-B060		15 (3372)
Max. dynamic load (Fx)	[kN (lbs)]	
LLxx-B020		2 (450)
LLxx-B040		4 (899)
LLxx-B060		6 (1349)
Speed <sup>(2)</sup>	[mm/s (in/s)]	
LLxx-B020		54 (2.13)
LLxx-B040		30 (1.18)
LLxx-B060		15 (0.59)
Min. ordering stroke (S) length	[mm]	100
Max. ordering stroke (S) length	[mm]	450
Ordering stroke length increments	[mm]	50
Operating temperature limits	[°C (F)]	-40 – 85 (-40 – 185)
Full load duty cycle @ 25 °C (77 °F)	[%]	35
End play, maximum	[mm (in)]	1.2 (0.047)
Restraining torque	[Nm (lbs)]	0
Protection class - static		IP66 / IP69K
Protection class - dynamic		IP66
Salt spray resistance	[h]	500

- 1) Max. static load at fully retracted stroke
- 2) Speeds are constant regardless of the load unless using the speed control feature in bus controlled units
- 3) Do not use PWM voltage for speed control to avoid damaging the onboard electronics
- 4) Control option LEX not available with 48 Vdc input voltage

Weight [kg]							
Ordering Stroke (S) [mm]							
100	150	200	250	300	350	400	450
6.8	7.2	7.5	7.9	8.2	8.6	8.9	9.3

Conversion Factors:  
 Millimeter to inch: 1 mm = 0.03937 in  
 Kilogram to pound: 1 kg = 2.204623 lbs

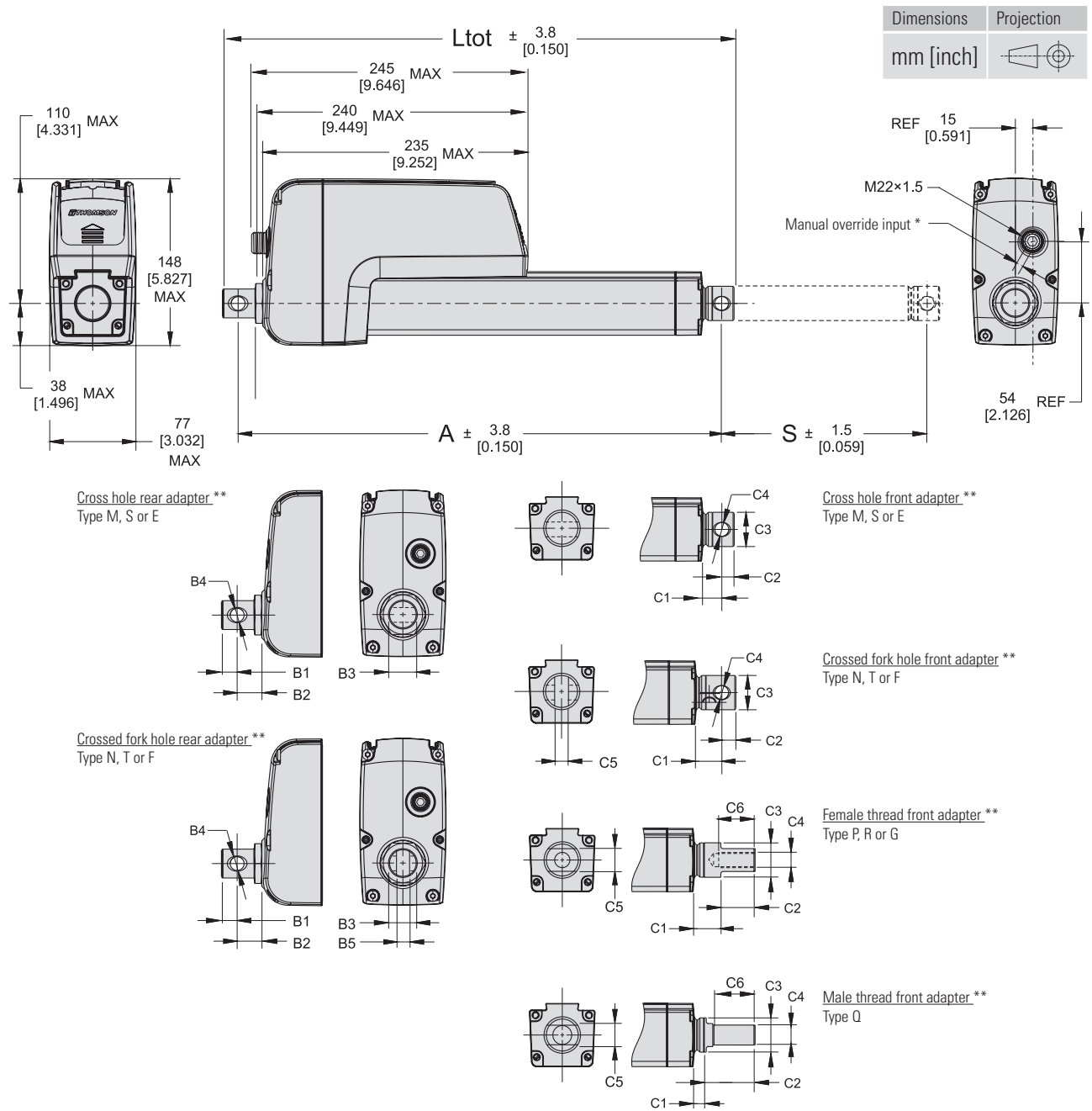
Electrical Specifications		
Available input voltages <sup>(3)(4)</sup>	[Vdc]	24, 48
Input voltage tolerance	[Vdc]	
LL24 (24 Vdc input voltage)		16.8 - 32.0
LL48 (48 Vdc input voltage)		36.0 - 60.0
Current draw @ no load/max. load	[A]	
LL24-B020(40)		2/10.50
LL24-B060		2/8.50
LL48-B020(40)		1/5.25
LL48-B060		1/4.25
Motor cable leads cross section	[mm <sup>2</sup> (AWG)]	2 (14)
Signal cable leads cross section	[mm <sup>2</sup> (AWG)]	0.5 (20)
Standard cable length (Ca1)	[m (in)]	0.3 (11.8)
Cable diameter (Ca2)	[mm (in)]	
motor cable		7.3 (0.29)
signal cable		6.6 (0.26)
Flying lead length (Ca3)	[mm (in)]	74 (2.9)
Stripped lead length (Ca4)	[mm (in)]	6 (0.25)



The drawing shows the cables exiting the cable slots at the end of the actuator housing, which is the shipping position. The user can adjust the exit point to be anywhere between the connector (1) in the front of the housing and the end of the cable slots.



# Electrak® LL – Dimensions



\* Manual override input. The input hole is covered with a plastic plug. When removed, a 6 mm female hexagon key can be inserted and used as a crank.  
 \*\* All adapters shown in the standard orientation.

### Ordering Stroke, Retracted Length and Total Length Relationships [mm (in)]

Ordering Stroke (S)	Retracted Length (A)	Total Length (Ltot),
100 - 450 (3.937 - 17.716)	$S + 182 (7.165) + B2 + C1$	$A + B1 + C2$

### Rear Adapter Dimensions [mm (in)]

	Adapter Type			
	M, S	E	N, T	F
B1	13.4 (0.53)			
B2	21.6 (0.85)			
B3	25.4 (1.0)			
B4	12.2 E9 (0.48)	12.8 (0.506)	12.2 E9 (0.48)	12.8 (0.506)
B5	-	-	8.2 (0.323)	

### Front Adapter Dimensions [mm (in)]

	Adapter Type						
	M, S	E	N, T	F	P, R	G	Q
C1	24.0 (0.945)	27.0 (1.063)		24.9 (0.980)		13.2 (0.519)	
C2	10.9 (0.429)	12.9 (0.508)		30 (1.18)		42 (1.654)	
C3	34.93 (1.375)						
C4	12.2 E9 (0.48)	12.8 (0.506)	12.2 E9 (0.48)	12.8 (0.506)	M12 × 1.75	1/2-20 NF-2B	M16 × 2
C5	-	-	8.2 (0.323)		19 (0.748)		
C6	-	-	-	-	35 (1.38)		

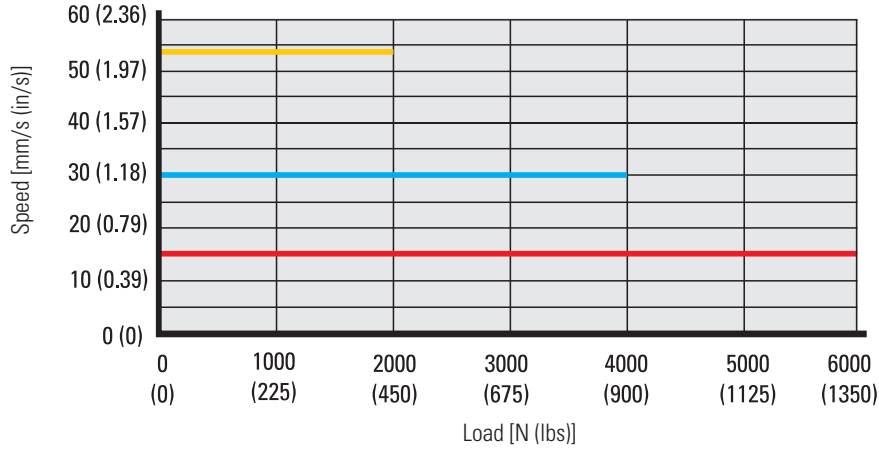


# Electrak® LL – Performance Diagrams

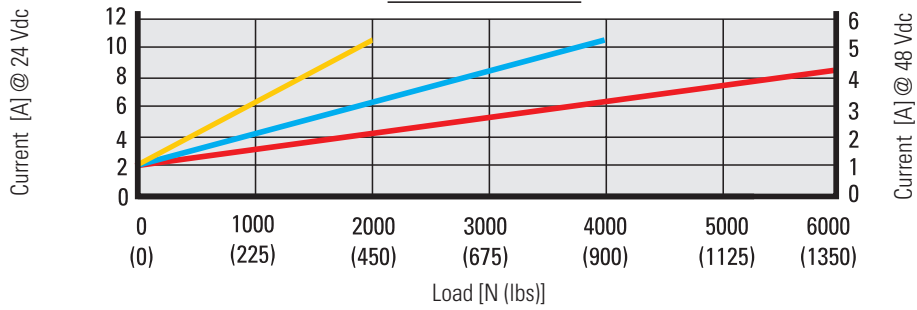
Screw Type and Dynamic Load Capacity

■ ball screw, 2 kN (450 lbs)   
 ■ ball screw, 4 kN (899 lbs)   
 ■ ball screw, 6 kN (1348 lbs)

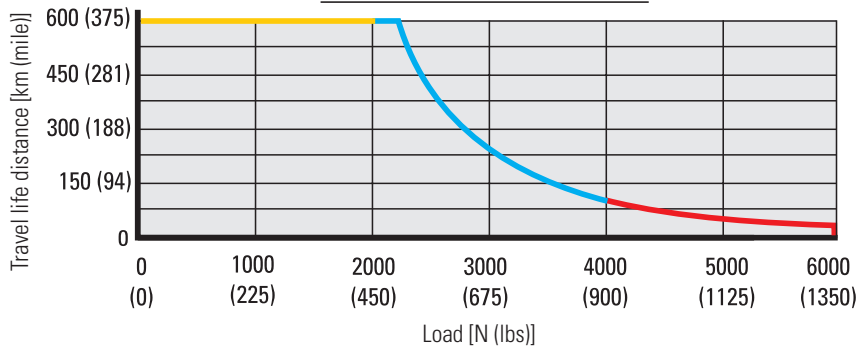
Load vs. Speed



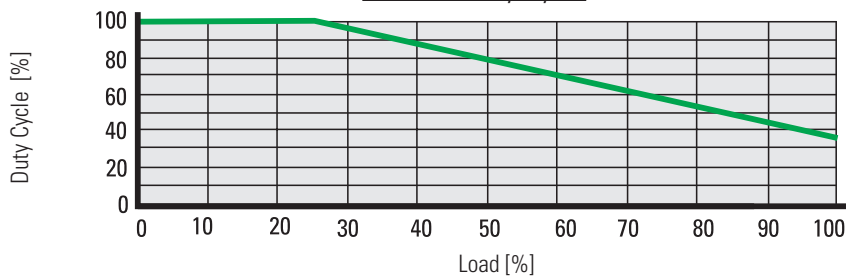
Load vs. Current <sup>(1)</sup>



Load vs. Travel Life Distance <sup>(2)</sup>



Load vs. Duty Cycle <sup>(1)(3)</sup>



1) Curves were generated at an ambient temperature of 25°C (77°F).  
 2) The exact travel life also depends on temperature and other environmental factors. Contact customer support for more information.  
 3) Load in percent of the max permissible load for the screw type and dynamic load capacity in question.

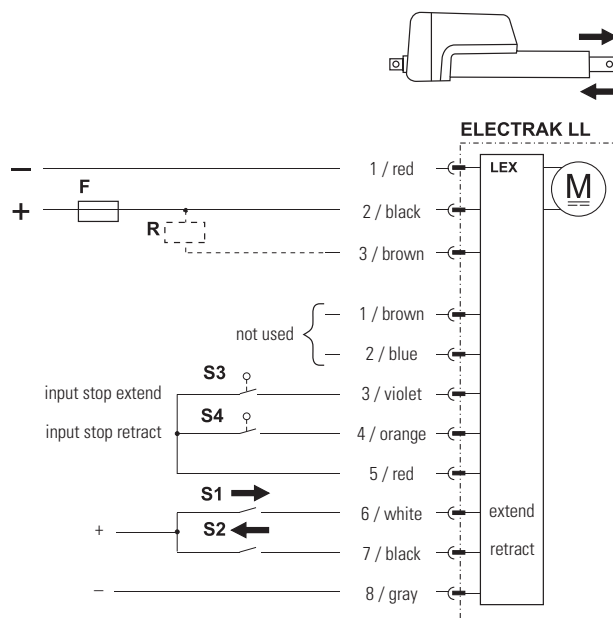
# Electrak LL – Ordering Key

Ordering Key								
1	2	3	4	5	6	7	8	9
<b>LL24</b>	<b>B040-</b>	<b>0200</b>	<b>LEX</b>	<b>A</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>D</b>
<p><b>1. Model and input voltage</b>            LL24 = Electrak LL, 24 Vdc            LL48 = Electrak LL, 48 Vdc</p> <p><b>2. Screw type, dynamic load capacity</b>            B020- = ball screw, 2 kN (450 lbs)            B040- = ball screw, 4 kN (899 lbs)            B060- = ball screw, 6 kN (1348 lbs)</p> <p><b>3. Ordering stroke length <sup>(1)</sup></b>            0100 = 100 mm            0150 = 150 mm            0200 = 200 mm            0250 = 250 mm            0300 = 300 mm            0350 = 350 mm            0400 = 400 mm            0450 = 450 mm</p> <p><b>4. Control option</b>            LEX = Electrak Monitoring Package + low-level signal motor switching + external end-off-stroke limit switch inputs <sup>(2)</sup>            LXX = Electrak Monitoring Package + low-level signal motor switching <sup>(3)</sup>            LXP = LXX + absolute position feedback output <sup>(3)</sup>            CNO = SAE J1939 CAN bus + speed control <sup>(3)</sup>            COO = CANopen CAN bus + speed control <sup>(3)</sup></p> <p><b>5. Harness option</b>            A = 0.3 m long cables with flying leads (number coded leads)            1 = 0.3 m long halogen-free cables with flying leads (color coded leads)            2 = 1.5 m long halogen-free cables with flying leads (color coded leads)            3 = 5.0 m long halogen-free cables with flying leads (color coded leads)</p>					<p><b>6. Rear adapter option</b>            M = cross hole for 12 mm pin            E = cross hole for 0.5 inch pin            N = forked cross hole for 12 mm pin            F = forked cross hole for 0.5 inch pin            S = stainless cross hole for 12 mm pin            T = stainless forked cross hole for 12 mm pin</p> <p><b>7. Front adapter option</b>            M = cross hole for 12 mm pin            E = cross hole for 0.5 inch pin            N = forked cross hole for 12 mm pin            F = forked cross hole for 0.5 inch pin            P = metric female thread M12 × 1.75            G = inch female thread 1/2-20 UNF-2B            S = stainless cross hole for 12 mm pin            Q = stainless metric male thread M16 × 2            R = stainless metric female thread M16 × 2            T = stainless forked cross hole for 12 mm pin</p> <p><b>8. Adapter orientation</b>            S = standard            M = 90° turned</p> <p><b>9. Connector option</b>            D = flying leads</p> <p>(1) Other stroke lengths available upon request. Please contact customer support.            (2) Only available with 24 Vdc input voltage.            (3) Available for both 24 and 48 Vdc input voltages.</p>			

# Electrak® LL – Electrical Connections

## Control Option LEX

Available input voltages	[Vdc]	24
Input voltage tolerance	[Vdc]	16.8 - 32.0
Extend / retract input voltage	[Vdc]	9 - 64
Extend / retract input current	[mA]	0.35 - 2.75

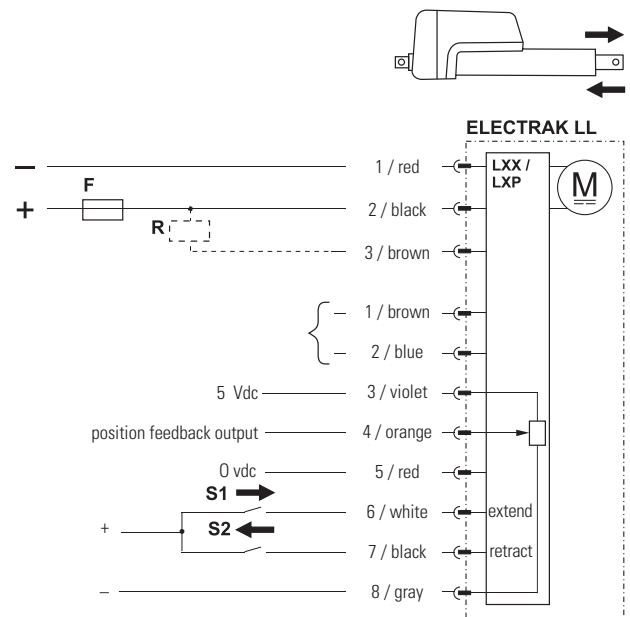


- + / - Positive / negative voltage
- F Fuse
- R Brake resistor
- S1 Switch extend
- S2 Switch retract
- S3 Limit switch stop extend
- S4 Limit switch stop retract

The actuator movement is controlled by connecting a positive voltage to the extend or retract input, and a negative to the common input on lead 8 / gray. There are also external limit switch inputs that stop the actuator from extending or retracting when activated. If you want to detect the position of the extension tube, we recommend using a Thomson reed sensor (part number 840-9132) that mounts directly to the extension tube sensor grooves.

## Control Option LXX / LXP

Available input voltages	[Vdc]	24, 48
Input voltage tolerance	[Vdc]	16.8 - 32.0 LL24 (24 Vdc input voltage) LL48 (48 Vdc input voltage)
Extend / retract input voltage	[Vdc]	9 - 64
Extend / retract input current	[mA]	0.35 - 2.75
Position feedback output voltage	[Vdc]	0.5 - 4.5
Position feedback linearity	[%]	± 0.25
Position feedback resolution	[mm/V]	ordering stroke length (S) [mm] / 4

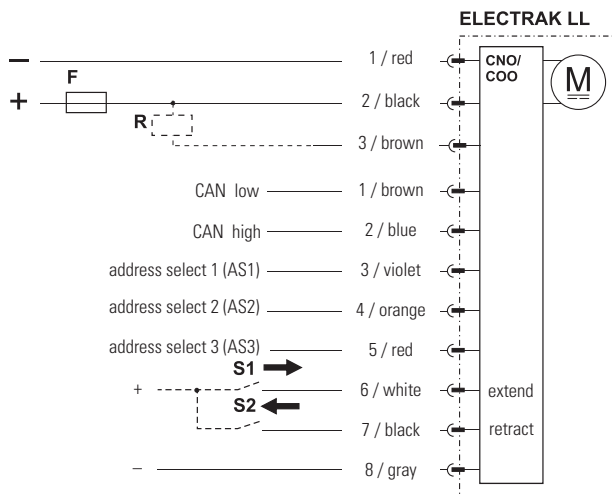
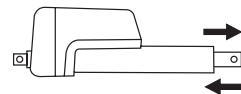


- + / - Positive / negative voltage
- F Fuse
- R Brake resistor
- S1 Switch extend
- S2 Switch retract

On control options LXX and LXP, the actuator movement is controlled by connecting the input voltage positive to the extend or retract input, and the negative to the common input on lead 8 / gray. On the LXP option, there is also an absolute position feedback output.

Control Option Type CNO / COO		
Available input voltages	[Vdc]	24, 48
Input voltage tolerance LL24 (24 Vdc input voltage) LL48 (48 Vdc input voltage)	[Vdc]	16.8 - 32.0 36.0 - 60.0
Extend / retract input voltage	[Vdc]	9 - 64
Extend / retract input current	[mA]	0.35 - 2.75
CAN bus command data includes:		
<ul style="list-style-type: none"> <li>• position</li> <li>• speed</li> <li>• current</li> </ul>		
CAN bus feedback data includes:		
<ul style="list-style-type: none"> <li>• position</li> <li>• speed</li> <li>• current</li> <li>• other diagnostic information</li> </ul>		

Control option CNO includes a SAE J1939 CAN bus control interface, and COO includes a CANopen® control interface that controls and monitors the actuator. Movement commands are sent via CAN messages on the CAN low and CAN high inputs. Address inputs AS1, AS2 and AS3J can be used as a binary coded decimal (BCD) adder to change the default address of the actuator. This option can be used when multiple CAN bus actuators are located on a single bus. The actuator can be manually forced to move by connecting a positive voltage to the extend or retract input, and a negative to the common input. When these manual control inputs are used, CAN bus control messages are ignored, but the unit will still provide CAN bus feedback messages. When the inputs are left floating, CAN bus functionality for control messages is restored. When using the address inputs and/or the manual extend and retract switches, the common input on lead 8 / gray must be connected to negative.



- + / - Positive / negative voltage
- R Brake resistor
- F Fuse
- S1 Switch extend (optional)
- S2 Switch retract (optional)
- AS1 Address selection switch for binary position 1
- AS2 Address selection switch for binary position 2
- AS3 Address selection switch for binary position 3

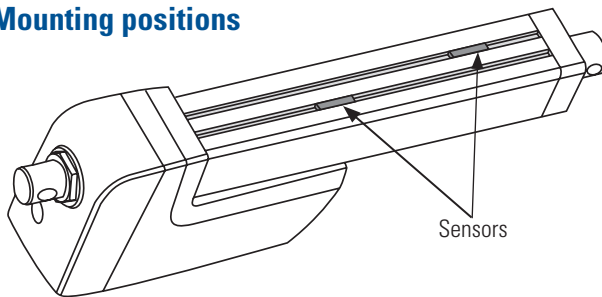


# Electrak® LL – Accessories

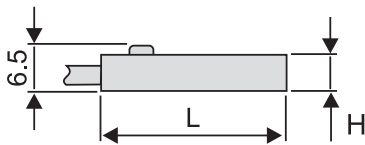
## Limit Switches for Cover Tube Mounting

Sensor type	solid state	reed switch
Contact type	normally open (N.O.)	
Output type	PNP	contact
Voltage [Vdc/Vac]	10 - 30 / -	5 -120 / 5 -120
Max. current [mA]	100	
Hysteresis [mm]	1.5	1.0
Operating temperature [°C]	- 20 to + 70	- 20 to + 70
Lead cross section [mm <sup>2</sup> ]	3 × 0.14	2 × 0.14
Length (L) [mm]	25.3	30.5
Height (H) [mm]	5.1	5.7
Protection class	IP69K	IP67
LED indicator	yes	
Connection	2 m cable with flying leads	
p/n	840-9131	840-9132

### Mounting positions

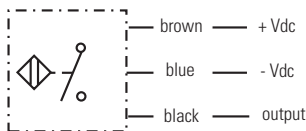


### Dimensions [mm]

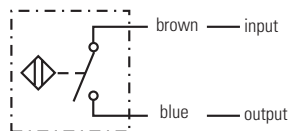


### Connection

Solid state



Reed switch

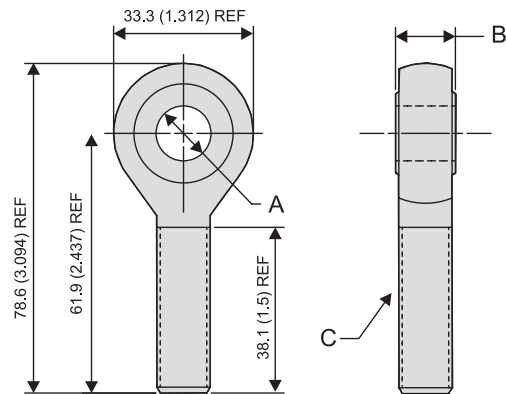


The limit switches are mounted in the cover tube slots and will be switched by a magnet mounted inside of the actuator on the extension tube.

## Rod End Front Adapter

Type	metric	inch
Material	Cadmium-plated steel	
Dimensions		
A	12.0 ± 0.1 mm	0.5 in
B	14.3 ± 0.1 mm	0.625 in
C	M12	1/2-20 UNF
p/n	756-9021	756-9007

### Dimensions [mm (in)]



The rod end front adapter comes in a metric or inch version. The metric adapter can be mounted to the front of the extension tube if the actuator is equipped with the metric female thread front adapter option (type P), while the inch adapter requires the inch female thread option (type G).

# Notes