# LCR Series Positioners

Light Capacity Rodless Miniature Linear Positioners MANUAL NO. 102-4109-01 REV D EFFECTIVE : July 11, 2014 SUPERCEDES : January 28, 2014







# Important User Information

#### WARNING

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### LCR22/LCR30 SERIES PRODUCT MANUAL



### LCR22/LC30 Series Product Manual

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### LCR22/LCR30 SERIES PRODUCT MANUAL



#### **REVISON NOTES**

- REV 1 INITIAL RELEASE 5-15-11
- REV 2 Rebranded drive as P2 3/2013
- REV 3 Fixed some missed Ion references, added CE warnings 1/29/14
- REV 4 Wrap update, LCR changes 7/14/14





# **Chapter 1 - Introduction**

### **Product Description**

#### LCR Positioner

Thank you for your interest in the Light Capacity Rodless (LCR) series miniature actuators. The LCR is designed for maximum flexibility to deliver the most value for the customer. The LCR is ideal for Maldiplate, Titer tray, and slide automation, as well as any light weight payload. The "off the shelf" product will significantly reduce design, procurement, inspection, and handling time; in turn bringing your product to market faster. The following user guide will direct you in any needed maintenance items and basic features of the LCR series. If you have any questions or challenges please call our factory support team at 800-245-6903.

### Unpacking

# A Unpacking

Carefully remove the positioner from the shipping container and inspect the unit for any evidence of shipping damage. Report any damage immediately to your local authorized distributor. Please save the shipping container for damage inspection or future transportation.

Incorrect handling of the positioner may adversely affect the performance of the unit in its application. Standard handling and lifting practices should be employed, product may be heavy. Please observe the following guidelines for handling and mounting of your new positioner.

- DO NOT allow the positioner to drop onto the mounting surface. Dropping the positioner can generate impact loads that may result in flat spots on bearing surfaces or misalignment of drive components.
- DO NOT drill holes into the positioner. Drilling holes into the positioner can generate particles and machining forces that may effect the operation of the positioner. Parker will drill holes if necessary; contact your local authorized distributor.
- DO NOT subject the unit to impact loads such as hammering, riveting, etc. Impacts loads generated by hammering or riveting may result in flat spots on bearing surfaces or misalignment of drive components.
- DO NOT lift the positioner by cables or cable management system. Lifting positioner by cables or cable management system may effect electrical connections and/or cable management assembly. The unit should be lifted by the base structure only.
- DO NOT expose positioner to mist, spray or submersion in liquids.
- DO NOT disassemble positioner. Unauthorized adjustments may alter the positioner's specifications and void the product warranty.





### **Return Information**

#### <u>Returns</u>

All returns must reference a "Return Material Authorization" (RMA) number. Please call your local authorized distributor or Parker Customer Service Department at 800-245-6903 to obtain a "RMA" number.

### **Repair Information**

#### Out-of-Warranty Repair

Our Customer Service Department repairs Out-of-Warranty products. All returns must reference a "RMA" number. Please call your local authorized distributor or Parker Customer Service Department at 800-245-6903 to obtain a "RMA" number. You will be notified of any cost prior to making the repair.

### Warnings and Precautions

#### Hot Surfaces

DO NOT touch rotary motor coils located on the MX45S after high duty operation. Motor temperature may approach 60°C. The unit itself may become warm or hot to the touch.



#### **Electrical Shock**

DO NOT take apart or touch any internal components of the positioner while unit is plugged into an electrical outlet. SHUT OFF power before replacing components to avoid electrical shock.



#### Pinch Points

Unit may have a pinch point because the top extends over the base of the table. Proper care should be exercised.



#### Vertical Operation

Depending upon your load and screw selection the carriage and load may 'backdrive' in power loss situations potentially causing product damage or personal injury.



#### **General Safety**

Sometimes positioners move without warning, keep all personnel away from dynamic travel range of positioner.



#### Strain Relieve Electrical Components

All electrical components (such as motor, encoders and limit/home switches) must be strain relieved. Failure to strain relieve electrical wires or cables may result in component failure and/or possible personal injury.



#### High Magnetic Field

Unit may be HAZARDOUS to people with Pace Makers or any other 'magnetically-sensitive' medical devices. Unit may have an effect on 'magnetically-sensitive' applications.



#### Moving Cables

If the LCR cables are to be moving, the use of high flex cabling to insure long life is recommended.





### **Specification Conditions**

#### **Specifications Are Temperature Dependent**

Catalog specifications are obtained and measured at 20 Degrees C. Specifications at any other temperature may deviate from catalog specifications. Minimum to maximum continuous operating temperature range (with NO guarantee of any specification except motion) of a standard unit before failure is 5 - 40 degrees C.

#### Specifications Are Mounting Surface Dependent

Catalog specifications are obtained and measured when the positioner is fully supported, bolted down, and is mounted to a work surface that has a maximum flatness error of:

0.001mm/300mm (0.00004"/ft)

Table will operate with work surface of 0.100mm/300mm flatness or worse, but performance specifications will be significantly effected.

#### **Specifications Are Point of Measurement Dependent**

Catalog specifications and specifications in this manual are measured from the center of the carriage, 38 mm above the carriage surface. All measurements taken at any other location may deviate from these values.

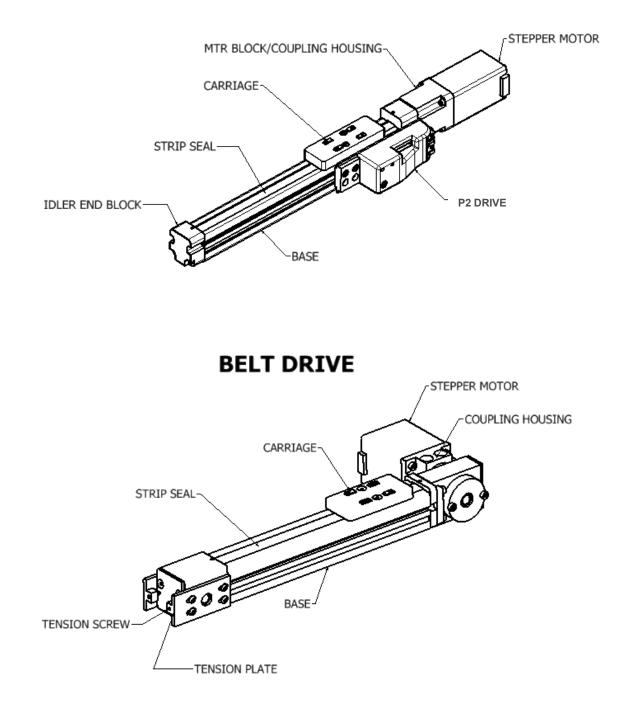
#### Specifications Are Load Mounting Dependent

Catalog specifications are obtained and measured when the customer load is fixed to the carriage mounting surface(s) and has a flatness of equal to or less than 0.0025mm (0.0001"). The table will operate with customer load surface greater than 0.0025mm (0.0001") flatness, but performance specifications will be significantly effected.





### SCREW DRIVE

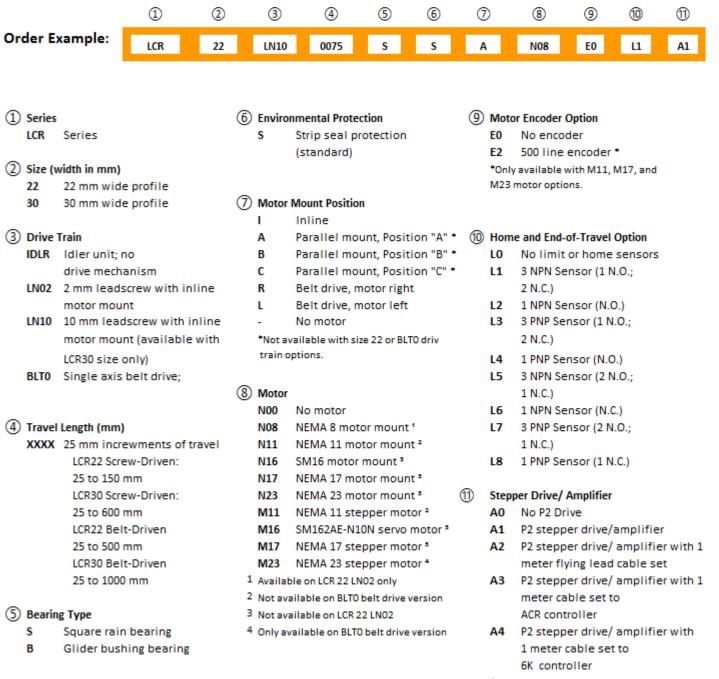






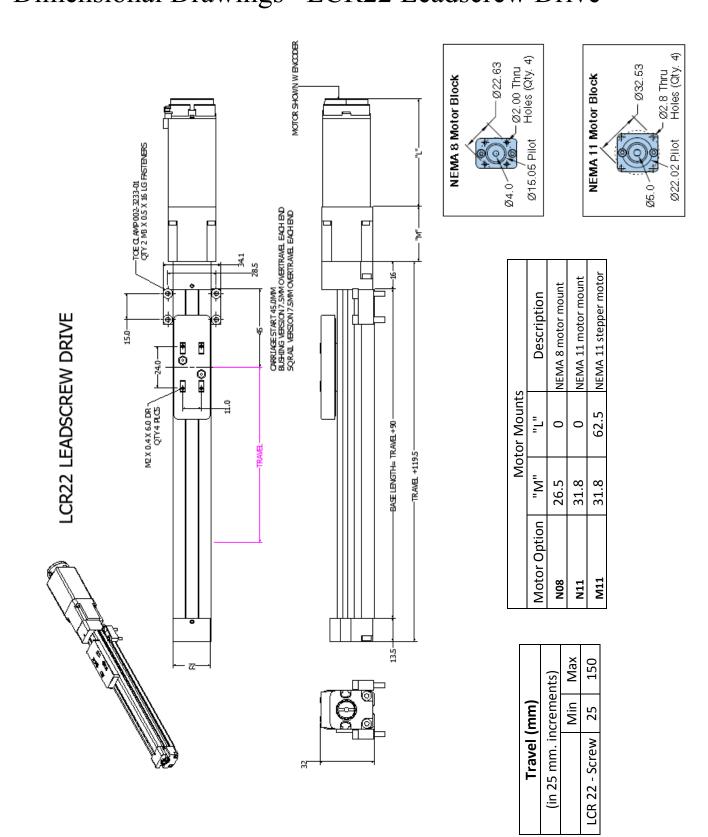
# **Chapter 2 - LCR Specifications**

LCR-How to Order



\*For longer cable needs, please order the A1 option and order cables separately

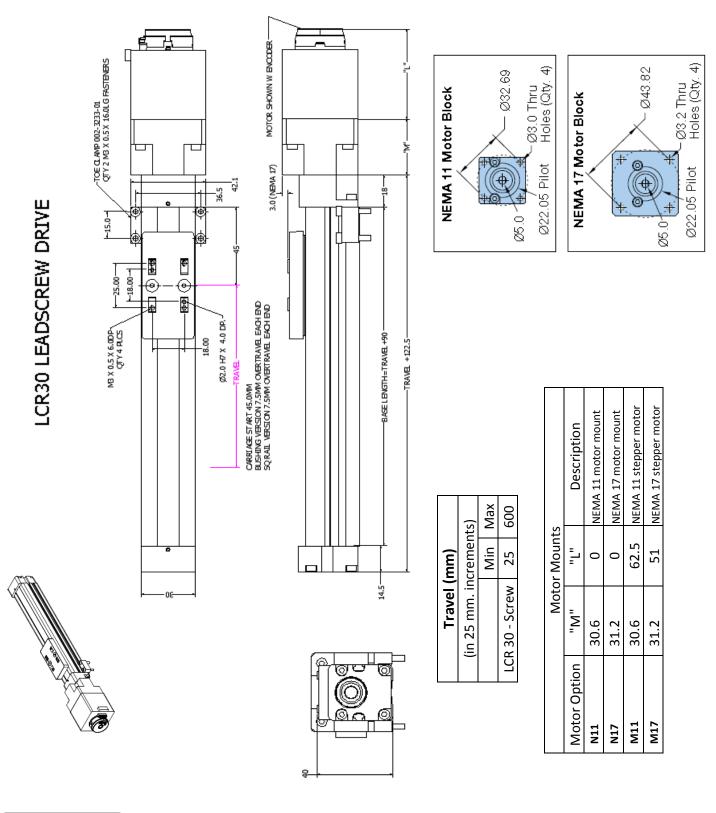








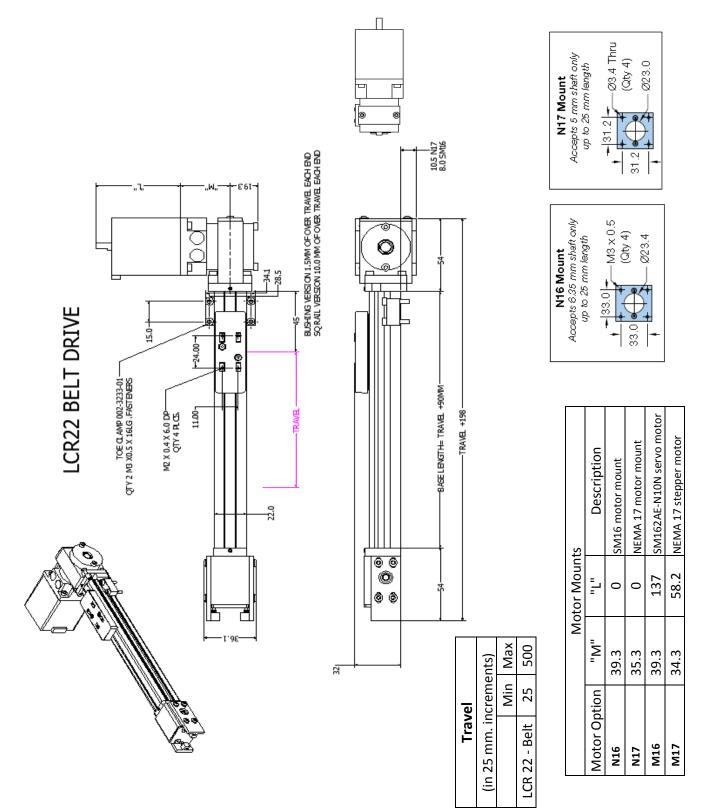
# Dimensional Drawings-LCR30 Leadscrew Drive







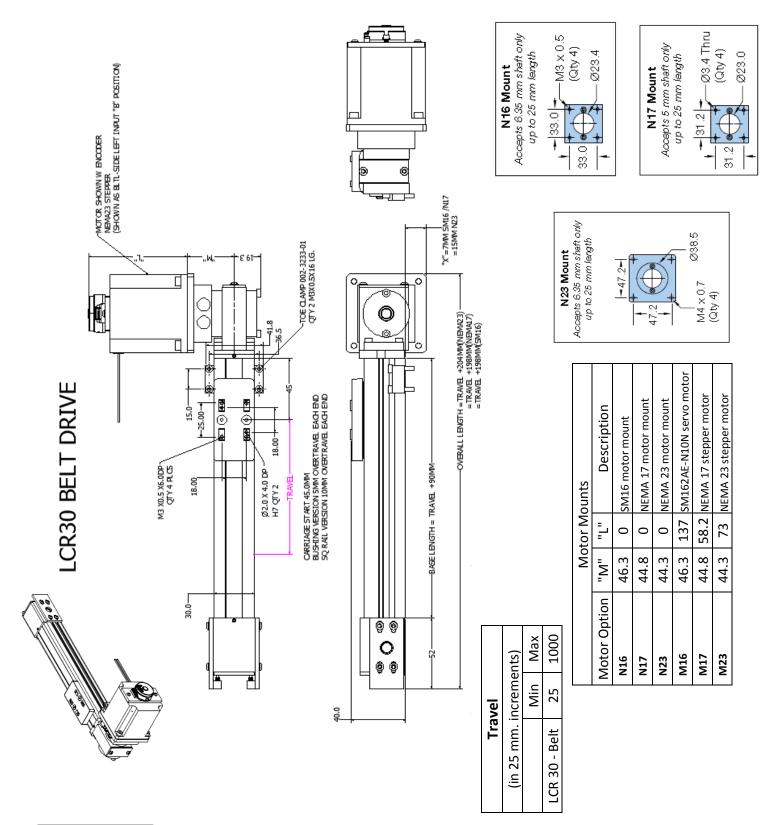
### Dimensional Drawing-LCR22 Belt Drive







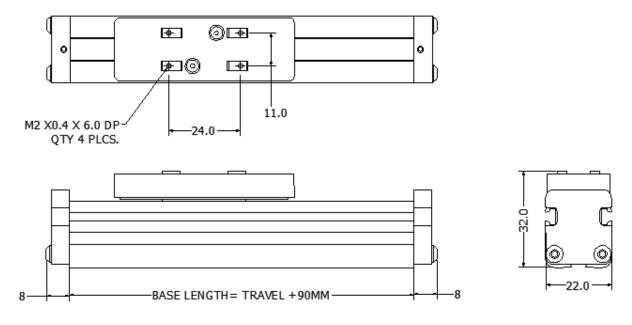
## Dimensional Drawings– LCR30 Belt Drive



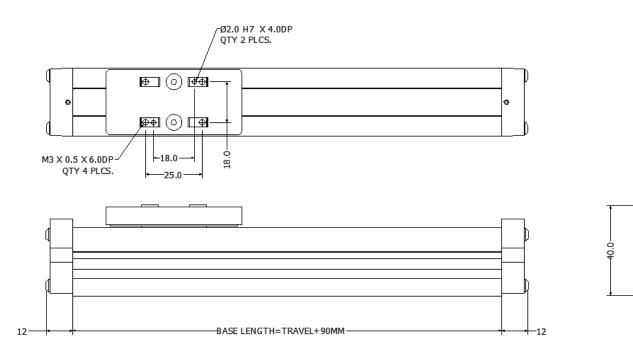




LCR22 IDLER UNIT ( SQ RAIL ONLY)



### LCR30 IDLER UNIT ( SQ RAIL ONLY)





0

0

0

(**Q** 

-30.0



# Performance Specifications– LCR Screw Driven

Specification	Units	LCR22		LCR	30
Grade		S (Square Rail)	B (Bushing)	S (Square Rail)	B (Bushing)
Bidirectional Repeatability	mm	± 0.1	± 0.2	± 0.1	± 0.2
Duty Cycle	%	100	100	100	100
Max Acceleration	m/s <sup>2</sup>	20	20	20	20
Normal Load	Ν	45	25	90	45
Moment Load *					
Roll	Nm	0.9	0.1	2.6	0.3
Yaw	INITI	2	0.3	6.5	0.8
Pitch		2.5	0.8	8.2	1.5
Max Axial Load	Ν	25	25	70	70
Screw Efficiency					
2.0 mm Lead	%	50	50	50	50
10.0 mm Lead		-	-	70	70
Breakaway Torque	Nm	0.02	0.03	0.03 (2mm lead) 0.05(10mm lead)	0.04 (2mm lead) 0.09(10mm lead)
Screw Diameter	mm	3.3	3.3	6.4	6.4
Coefficient of Friction		0.02	0.10	0.02	0.10
Carriage Weight	Ν	0.2	0.2	0.5	0.5
Base Moment of Inertia					
Ixx	$mm^4$	10,332	10,332	39,778	36,162
lyy		11,808	11,808	46,273	42,066

• Moment loading : Moment ratings are reduced ,when multiple moments/forces are applied , see page 26.

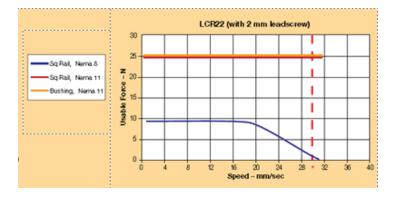
Positioner Weight- Screw Driven LCR	Nema 11	Nema 17
LCR22		
Unit Weight (Basic Unit with 0 travel)- Kgf(lbs)	0.394 (0.867)	NA
Weight of Additional Travel Length- Kgf/mm (lbs/mm)	0.001 (0.002)	NA
LCR30		
Unit Weight (Basic Unit with 0 travel)- Kgf(lbs)	0.660 (1.452)	0.759 (1.670)
Weight of Additional Travel Length- Kgf/mm (lbs/mm)	0.002 (0.004)	0.002 (0.004)

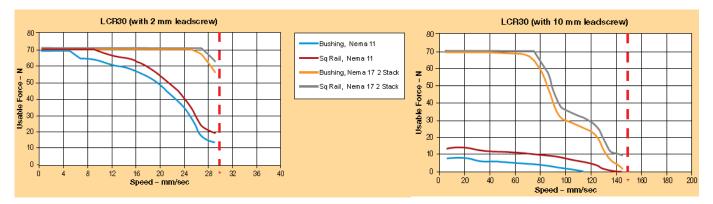




### LCR Screw-Driven Specifications

### Linear Speed Versus Thrust Graphs





\*Maximum speed with Parker P2 stepper drive at 24 VDC. To achieve faster speeds, motor must be connected to a drive with active damping, electronic viscosity or other advanced anti-resonance zone features.

#### **Performance Graph Notes:**

To simplify application, the different aspects of positioner performance including motor torque, motor speed, screw efficiency, friction, safety margin, etc. have been consolidated into these speed versus thrust graphs. To make a selection first use the X axis scale of the different graphs to identify a screw lead that will deliver the desired peak velocity. Next, using the specific screw lead graph, identify the motor with enough torque to deliver the needed thrust to lift or accelerate the load.





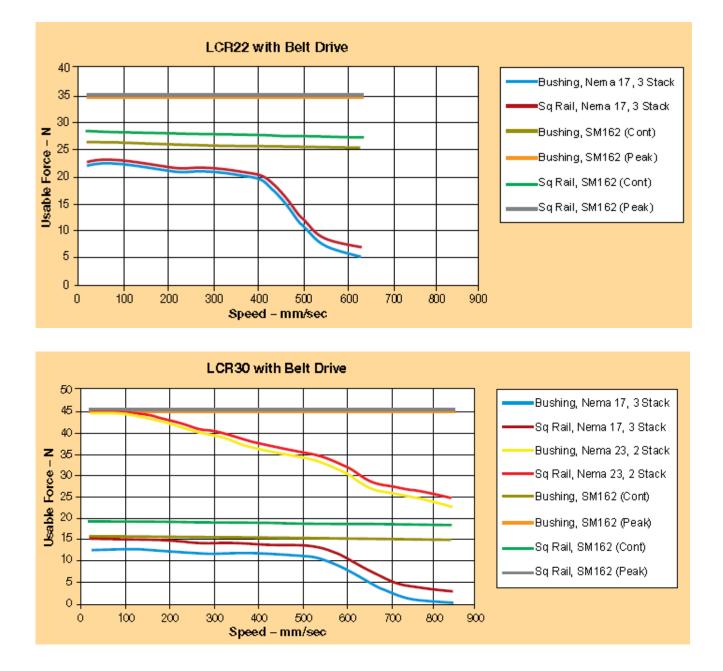
# Performance Specifications- LCR Belt Driven

Specification	Units	LCR22		LCR	30
Grade		S (Square Rail)	B (Bushing)	S (Square Rail)	B (Bushing)
Bidirectional Repeatability	mm	± 0.5	± 0.5	± 0.5	± 0.5
Duty Cycle	%	100	100	100	100
Max Acceleration	m/s <sup>2</sup>	20	20	20	20
Max. Linear Speed	mm/s	675	675	825	825
Normal Load	Ν	45.0	25.0	90.0	45.0
Moment Load*					
Roll	Nm	0.9	0.1	2.6	0.3
Yaw		2.0	0.3	6.5	0.8
Pitch		2.5	0.8	8.2	1.5
Max Axial Load	Ν	25	25	45	45
Linear Travel/Rev	mm	44.0	44.0	58.0	58.0
Breakaway Torque	Nm	0.075	0.075	0.085	0.085
Coefficient of Friction		0.02	0.10	0.02	0.10
Carriage Weight	Ν	0.2	0.2	0.5	0.5
Base Moment of Inertia					
lxx	$mm^4$	11,365	10,332	39,778	36,162
lyy		12,989	11,808	46,273	42,066

\* Moment loading : Moment ratings are reduced ,when multiple moments/forces are applied , see page 26.

Positioner Weight- Belt Driven LCR	Nema 17	Nema 23
LCR22		
Unit Weight (Basic Unit with 0 travel)- Kgf(lbs)	0.635 (1.397)	0.712( 1.566)
Weight of Additional Travel Length- Kgf/mm (lbs/mm)	0.025 (0.055)	0.025 (0.055)
LCR30		
Unit Weight (Basic Unit with 0 travel)- Kgf(lbs)	1.121 (2.466)	1.198 (2.636)
Weight of Additional Travel Length- Kgf/mm (lbs/mm)	0.035 (0.077)	0.035 (0.077)





#### **Performance Graph Notes:**

To simplify application, the different aspects of positioner performance including motor torque, motor speed, efficiency, friction, safety margin, etc. have been consolidated into these speed versus thrust graphs. To make a selection first use the X axis scale of the different graphs to identify a screw lead that will deliver the desired peak velocity. Next, using the specific screw lead graph, identify the motor with enough torque to deliver the needed thrust to lift or accelerate the load.





# Chapter 3– Component Specifications

### LCR Motor Information

LCR Motor Specifications		M11 Screw	M17 Screw	M17 Belt	M23 Belt	M16E1
		P/N 003-4457-08	P/N 003-4457-10	P/N 003-4457-12	P/N 003-4653-01	P/N SM162AE-F10N
Rated Torque	mN-M	100	360	440	990	330/990(PEAK)
Rated Current (rms)	Amps/Phase	0.67	1.67	1.67	2.33	2.6(Peak of Sine)
Max Current (peak)	Amps/Phase	0.94	2.36	2.36	3.29	7.8(Peak of Sine)
Rated Resistance	Ohms/Phase	8.6	8.6	1.6	0.88	6.5
Rated Inductance	mH	6.7	3.2	3.2	2.7	1.39
Rotor Inertia	g-cm <sup>2</sup>	18	61	68	275	180
# Phases		2	2	2	2	4 pole
Step Angle	Degrees	1.8	1.8	1.8	1.8	na

#### Stepper Motor Wire Color Code

P/N	Placement	Motor	A+	A-	B+	В-	STEPPE	R MOTOR CONNECTOR
			Red	Blue	Green	Black	PIN#	FUNCTION
M11 Screw	LCR22/30 Screw Drive	NEMA11	Red	Yellow	Grey	Green	111.1	
M17 Screw	LCR30 Screw Drive	NEMA17	Red	Blue	Green	Black	1	A+
M17 Belt	LCR22/30 Belt Drive	NEMA17	Red	Blue	Green	Black	2	A-
M23 Belt	LCR30 Belt Drive	NEMA23	Black	Red	White	Green	3	<b>B</b> +
							4	B-

	Stepper Motor Switching Sequence							
CCW	A+	A-	B+	В-				
Step 1	+	-	+	-				
Step 2	+	-	-	+				
Step 3	-	+	-	+				
Step 4 - + + -								
Note: Viewe	d from Front	Shaft End						

#### Servo Motor Connector Pin Outs

M16 POWER CONNECTOR						
PIN#	COLOR	FUNCTION				
1	RED/YELLOW	PHASE A				
2	WHITE/YELLOW	PHASE B				
3	BLACK/YELLOW	PHASE C				
4	GREEN/YELLOW	GROUND				

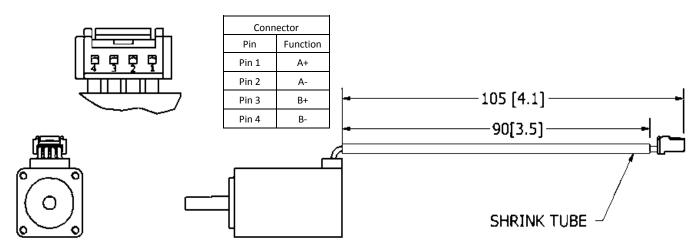
M16 Connection Feedback Code					
Wire Color	Function				
Red	Vcc				
Black & Red/ Blue	Ground				
Yellow/ Brown	CH A +				
White/ Yellow	CH A -				
Brown	CH B +				
White	CH B -				
Green	Index +				
Yellow	Index -				
Gray/ Brown	Brake				
White/ Gray	Brake				
Pink/ Brown	Temp +				
White/ Pink	Temp -				
Blue	Hall Ground				
Violet	Hall +5V				
White/ Green	Hall 1				
Brown/ Green	Hall 2				
Gray/ Pink	Hall 3				



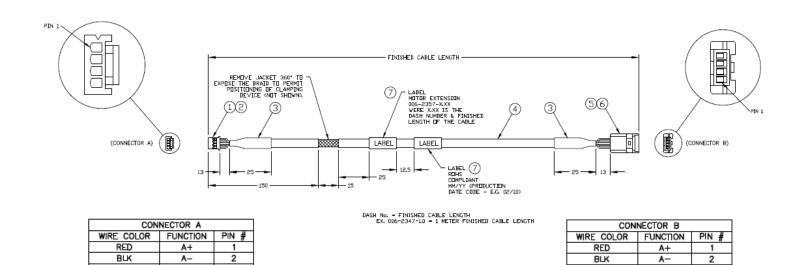


### Motor Information

Motor Cable Connector Pin Out



006-2357-(1.0/3.0) Stepper Motor Power Extension Cable





WHT

GRN

B+

в-

3

4

B+

в-

WHT

GRN

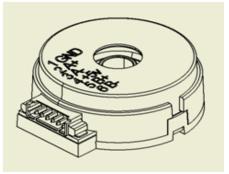
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4



# LCR Stepper Motor Encoder

Part #	Counts/REV	Bore
003-4590-01	400	4mm
003-4590-02	400	5mm
003-4590-03	500	4mm
003-4590-04	500	5mm
003-4590-05	400	6.35mm
003-4590-06	500	6.35mm



	Encoder Cable Pin Out			
Pin	Color Function			
1	White	Ground		
2	Green	А		
3	Yellow	A-		
4	Brown	+5 VDC		
5	Blue	В		
6	Red	B-		

Part #	Stepper Motor Encoder Cable		
006-2398-1.0	Encoder Cable 6 Pin Differential Flying Leads 1m		
006-2398-3.0	Encoder Cable 6 Pin Differential Flying Leads 3m		

\* note wire colors pink & grey not used.

Specifications	Min.	Тур.	Max.	Units	Notes
Supply Current	-	22	30	mA	
Supply Voltage	4.5	-	5.5	V	
High Level Output	2.4	3.4	-	V	I <sub>oh</sub> = -20mA
Low Level Output	-	0.2	0.4	V	I <sub>ol</sub> =20mA
Rise Time	-	500	-	ns	
Fall Time	-	100	-	ns	
Frequency Response	-	-	44 _	kHz	

Parameter	Тур.	Max.	Units
Symmetry Error	16	75	deg.
Quadrature Error	12	60	deg.

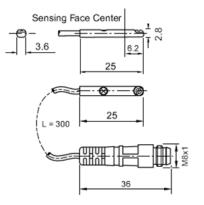




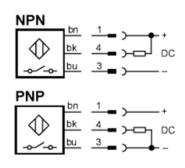
## Limit/Home Switch Information

Specifications	L3,L7,L8	L1,L5,L6	L3,L4,L7	L1,L2,L5
Parker EMN P/N	003-4475-02	003-4475-04	003-4475-06	003-4475-08
Switch Type	N.C.	N.C.	N.O.	N.O.
Logic	PNP	NPN	PNP	NPN
Туре	FINE	Elect		INFIN
Operating Voltage		10-30		
Voltage Drop		≤ 2.5		
Continuous Current		≤ 70		
Response Sensitivity		≤ 48 (	Gauss	
Switching Frequency		100	0 Hz	
Power Consumption		≤ 8 mA wit	thout load	
Ripple	10% of operating voltage			
Hysteresis	≤ 15 Gauss			
Repeatability	≤±0.1 mm			
EMC	EN 60 947-5-2			
Short-circuit protection	Yes			
Power-up Pulse suppression		N	0	
<b>Reverse Polarity Protection</b>		Ye	es	
Enclosure Rating		IP	67	
Shock and Vibration Stress		30g, 11ms, 10	)-55 Hz, 1mm	
Operating Temperature range	- 25°C to +75°C (-13°F to 167°F)			
Housing Material	PA 12			
Connector Cable	PUR 3 x 0.09 mm <sup>2</sup>			
Connector	PUR cable w/8mm connector			
Cabling*	0.3m with M8			

\* P/N 003-2918-01 5m flying lead extension cable is available



4	Pin	Wire	Function
	1	Brown	+VDC
(• <b>)</b> <sup>3</sup>	4	Black	NO
	3	Blue	- VDC







### LCR Motor Sizing Information : Screw Drives

LCR3	ο ΜΑΧΙΜΙ	JM SPEED M	M/SEC	
		MAXIMUM LINEAR SPEED M		
TRAVEL (MM)	MAX RPS	LEAD 2.0MM	LEAD 10.0 MM	
25	15	30	150	
50	15	30	150	
75	15	30	150	
100	15	30	150	
125	15	30	150	
150	15	30	150	
175	15	30	150	
200	15	30	150	
225	15	30	150	
250	15	30	150	
275	15	30	150	
300	15	30	150	
325	15	30	150	
350	15	30	150	
375	14	28	140	
400	12	24	120	
425	11	22	110	
450	10	20	100	
475	9	18	90	
500	9	18	90	
525	8	16	80	
550	7	14	70	
575	7	14	70	
600	6	12	60	



LCR22		INLINE
TRAVEL(MM)	LEAD(M)	INERTIA REFLECTED(KG-M^2)
25	0.002	1.249676E-07
50	0.002	1.272379E-07
75	0.002	1.295083E-07
100	0.002	1.317786E-07
125	0.002	1.340489E-07
150	0.002	1.363193E-07

LCR22 MAXIMUM SPEED MM/SEC				
		MAXIMUM LINEAR SPEED MM/S		
TRAVEL (MM)	MAX RPS	LEAD 2.0MM		
25	15	30		
50	15	30		
75	15	30		
100	15	30		
125	15	30		
150	15	30		

LCR30		INLINE
TRAVEL(MM)	LEAD(M)	INERTIA REFLECTED(KG-M^2)
25	0.002	4.117468E-07
50	0.002	4.428732E-07
75	0.002	4.739997E-07
100	0.002	5.051261E-07
125	0.002	5.362526E-07
150	0.002	5.673790E-07
175	0.002	5.985054E-07
200	0.002	6.296319E-07
225	0.002	6.607583E-07
250	0.002	6.918847E-07
275	0.002	7.230112E-07
300	0.002	7.541376E-07
325	0.002	7.852641E-07
350	0.002	8.163905E-07
375	0.002	8.475169E-07
400	0.002	8.786434E-07
425	0.002	9.097698E-07
450	0.002	9.408962E-07
475	0.002	9.720227E-07
500	0.002	1.003149E-06
525	0.002	1.034276E-06
550	0.002	1.065402E-06
575	0.002	1.096528E-06
600	0.002	1.127655E-06

LCR30		INLINE
TRAVEL(MM)	LEAD(M)	INERTIA REFLECTED(KG-M^2)
25	0.01	5.260371E-07
50	0.01	5.571635E-07
75	0.01	5.882900E-07
100	0.01	6.194164E-07
125	0.01	6.505429E-07
150	0.01	6.816693E-07
175	0.01	7.127957E-07
200	0.01	7.439222E-07
225	0.01	7.750486E-07
250	0.01	8.061750E-07
275	0.01	8.373015E-07
300	0.01	8.684279E-07
325	0.01	8.995543E-07
350	0.01	9.306808E-07
375	0.01	9.618072E-07
400	0.01	9.929337E-07
425	0.01	1.024060E-06
450	0.01	1.055187E-06
475	0.01	1.086313E-06
500	0.01	1.117439E-06
525	0.01	1.148566E-06
550	0.01	1.179692E-06
575	0.01	1.210819E-06
600	0.01	1.241945E-06





### LCR Motor Sizing information : Belt Drive Information

LCR22 BELT TRAVEL(MM)	PULLEY RADIUS	TOTAL INERTIA REFLECTED(KG-M^2)
25	0.0072	1.310099E-04
50	0.0072	1.310364E-04
75	0.0072	1.310628E-04
100	0.0072	1.310892E-04
125	0.0072	1.311157E-04
150	0.0072	1.311421E-04
175	0.0072	1.311686E-04
200	0.0072	1.311950E-04
225	0.0072	1.312214E-04
250	0.0072	1.312479E-04
275	0.0072	1.312743E-04
300	0.0072	1.313007E-04
325	0.0072	1.313272E-04
350	0.0072	1.313536E-04
375	0.0072	1.313801E-04
400	0.0072	1.314065E-04
425	0.0072	1.314329E-04
450	0.0072	1.314594E-04
475	0.0072	1.314858E-04
500	0.0072	1.315123E-04



LCR30 BELT		TOTAL	
TRAVEL(MM)	PULLEY RADIUS	INERTIA REFLECTED(KG-M^2)	
25	0.0095	2.285894E-04	
50	0.0095	2.286262E-04	
75	0.0095	2.286722E-04	
100	0.0095	2.287182E-04	
125	0.0095	2.287643E-04	
150	0.0095	2.288103E-04	
175	0.0095	2.288563E-04	
200	0.0095	2.289024E-04	
225	0.0095	2.289484E-04	
250	0.0095	2.289944E-04	
275	0.0095	2.290404E-04	
300	0.0095	2.290865E-04	
325	0.0095	2.291325E-04	
350	0.0095	2.291785E-04	
375	0.0095	2.292245E-04	
400	0.0095	2.292706E-04	
425	0.0095	2.293166E-04	
450	0.0095	2.293626E-04	
475	0.0095	2.294087E-04	
500	0.0095	2.294087E-04 2.294547E-04	
525	0.0095	2.295099E-04	
550	0.0095	2.295467E-04	
575	0.0095	2.295928E-04	
600	0.0095	2.296388E-04	
625	0.0095	2.296848E-04	
650	0.0095	2.297308E-04	
675	0.0095	2.297769E-04	
700	0.0095	2.298229E-04	
725	0.0095	2.298689E-04	
750	0.0095	2.299150E-04	
775	0.0095	2.299610E-04	
800	0.0095	2.300070E-04	
825	0.0095	2.300530E-04	
850	0.0095	2.300991E-04	
875	0.0095	2.301451E-04	
900	0.0095	2.3014512-04	
925	0.0095	2.302372E-04	
950	0.0095	2.302372E-04	
975	0.0095	2.303292E-04	
1000	0.0095	2.303752E-04	



### LCR22/LCR30 SERIES PRODUCT MANUAL



# Chapter 4– Setup and Usage

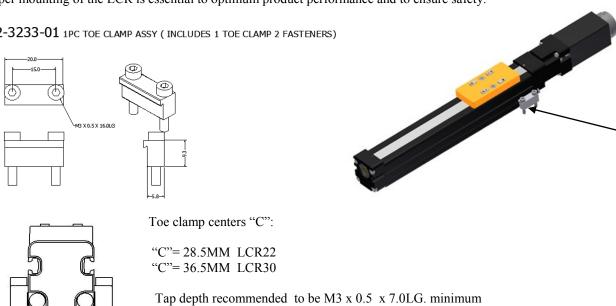
### **Base Mounting**

"C"

Securing the LCR22/LCR30 is done by toe clamp mounting

Proper mounting of the LCR is essential to optimum product performance and to ensure safety.

002-3233-01 1PC TOE CLAMP ASSY (INCLUDES 1 TOE CLAMP 2 FASTENERS)

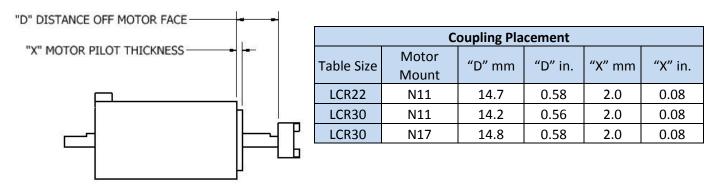


# Installation of coupling half onto Motor Shaft:

### (LCR 22/30 Screw Drive option only. See Chapter 5 for Belt Drive motor mounting.)

Screw driven actuators : To provide coupling engagement and avoid preloading motor bearing, the coupling half Must be accurately placed on motor shaft. See chart below.

Set screw of coupling should be aligned to flat on motor and torque to 0.5 N-m







### Payload Mounting-LCR22/30

Payload mounting to LCR using the M3 x0.5 (LCR30) M2.0 x 0.4 (LCR22) in the load plate. When fastening to load take precaution in using screws with no more than 5.5mm of thread engagement, as to not damage positioner.

The LCR30 contains 2.5 diameter H7 (slip fit) dowel holes for repeatable mounting to customer load plate if desired. See pages 10 thru 13 for detailed carriage specifications.





WARNING : To avoid damage to nut-carriage assembly Do not back drive (push by hand) the carriage. Carriage should be only moved by input to the drive shaft via motor or hand crank.

#### **Moment loading pre-cautions :**

The LCR positioners have rated individual moment and load ratings. When multiple moments are applied to carriage these rating must be reduced use the equation below as a guideline.

MOMENT LCR22 SQ RAIL/BUSHING		LCR30 SQ RAIL/BUSHING
Mroll (N-M)	0.9/0.1	2.6/0.3
Mpitch (N-M)	2.5/0.8	8.2/1.5
Myaw (N-M)	2.0/0.3	6.5/08

#### **Moment Factor:**

Take each existing moment/ corresponding maximum allowable moment = moment factor.

Sum all the moment factors and result must be less than 1.8 Example : LCR30 screw drive sq rail version with the following:

Mroll =0.5 N-m	= 0/2.6 (0.00)
Mpitch =2.5 N-m	= 2.5/8.2 (0.30)
Myaw =1.0 N-m	=1.0/6.5 (0.15)

SUM THE ABOVE=(0.00+0.30+0.15)=0.45 WHICH IS LESS THAN 1.8 Moment loading is acceptable.





# Limit/Home Switch Mounting/Adjustment

Travel limit sensors signal the motor to stop whenever the carriage is approaching end of travel. The home sensor provides a fixed reference point to which the carriage can be commanded to return repeatedly.

If equipped the LCR limit home switches are installed at factory but not set. To adjust the switches . Loosen the flat head screw by turning (CCW) and position the switch to desired location and then retighten.

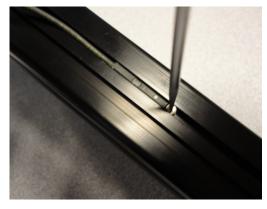
Insert the switch into t-slot ( screw head facing up and then rotate 90') and mount

The limit switches must be inserted into the top t-slot for the magnet in carriage to trigger.

The limit switches can be mounted to either side of unit

See page 22 for detailed switch specifications











# Chapter 5– Maintenance and Repair Lubrication

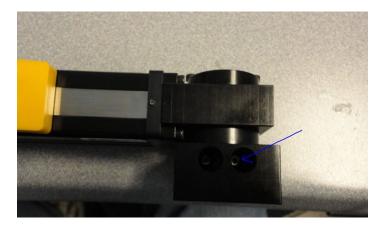
No lubrication is required in standard operating conditions.

# LCR BELT DRIVE INFORMATION:

### Mounting Motor to LCR22 belt drives

Mount motor to motor block by inserting the motor /motor shaft into input shaft of table. Secure motor with its mounting hardware to motor block. Tighten the clamp collar(003-2604-08) to secure to 1.9 N-m (16 in-lbs)







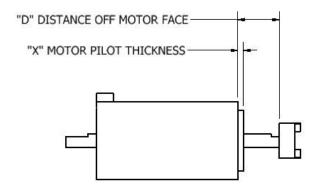
### LCR22/LCR30 SERIES PRODUCT MANUAL



### Mounting Motor to LCR30 belt drives

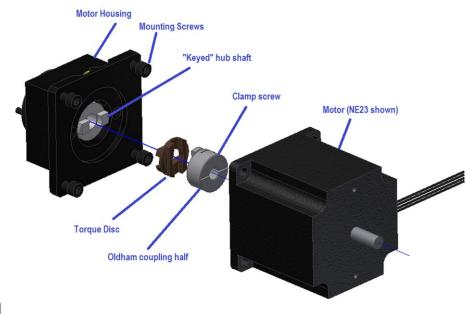
1. Mount Oldham coupling half onto motor shaft according to table below. Torque coupling bolt to 11.0 in-lbs (1.24 Nm).

Note: To provide proper coupling engagement and avoid preloading the motor bearing, the coupling half must be accurately placed on the motor shaft.



Coupling Placement (LCR30 Belt Drive)					
Table Size	Motor Mount	"D" mm	"D" in.	"X" mm MAX	"X" in. MAX
LCR30	N16E0	3.98	0.157	3.6	0.142
LCR30	N17E0	2.38	0.094	2	0.079
LCR30	N23E0	1.88	0.074	1.5	0.059

- 2. Insert Plastic Torque Disc onto coupling.
- 3. Note: Orientation of Torque Disc "key way" and corresponding "key" on hub shaft inside LCR 30 housing. Rotate motor shaft to align both parts.
- 4. Insert motor with coupling and torque disc into LCR30 housing, making sure coupling "key" and "key way" are aligned.
- 5. Tighten motor mounting bolts to secure motor to mounting block





### LCR22/LCR30 SERIES PRODUCT MANUAL

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# LCR BELT DRIVE INFORMATION:

Replacing Belt :

One should remove the idler cover plate and drive end cover plate.



Remove strip seal per instruction page 32.

\*Extra care should be taken when coming into contact with strip seals as they are very sharp.

Remove the carriage load plate





Remove belt from Unit

Do not discard belt. One should use this belt as a guide to cutting the replacement belt to proper length. Cut new/replacement belt to match old belt. Put to side

Next go to idler end and **loosen** the 8 (4 each side) button head screws attaching the belt tension plates to allow the tension plate to slide, one will also have to back out the set screws in the end of plates to allow the tension plate to be pushed to a position that puts the plate and idler pulley closest to base extrusion. And then lightly tighten the 8 button heads so tension plates and pulley are fixed.







#### Replace belt

Run belt under drive pulley and into pocket of base. The use of screw driver /allen key can assiat into assuring the belt enters the pocket in base and does not raise up into main body extrusion. Push belt through extrusion and use same screw driver/allen key to assist in allowing belt to go under idler pulley and out the idler end.



Wrap the belt around the drive and idler pulleys and bring belt ends to carriage. Make sure the tension plates are fixed as stated on previous page( pushed toward the base extrusion.). Lay Belt teeth on carriage teeth as shown. Make sure to achieve at least 5 teeth engament of belt on each side and then place/mount top of carriage to clamp belt utilizing the Qty2 socket head fasteners..



LCR22 Bushing carriage employs clamping nuts and requires the belt be punched with 2.0mm hole.







#### BELT TENSION CONTINUED

Once the belt is clamped via the carriage top . Next is to tension the belt. Replace the cover plate on idler end



Remove the flat head set screws in the tension plates

Utilize belt tension fixture to provide uniform tension/pull force on tension plates/belt. P/N **005-3044-01** LCR 22 provides pull force of 80N and a belt tension of **40N** P/N **005-3044-02** LCR 30 provides pull force of 120N and a belt tension of **60N** 



Now tighten the qty button heads that secure the tension plates into position. Remove the belt tension fixture Re-insert the flat head set screws.





# Strip Seal Replacement

REPLACEMENT OF STRIP SEAL AS FOLLOWS:

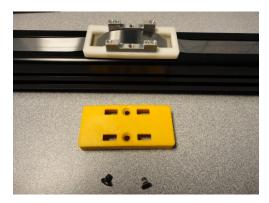
1. Remove the yellow load plate , QTY 2 M3 X 0.5 X 6.0 LG Socket flat heads w 2mm allen key.

2. Loosen the QTY 2 M2 X 0.4 X 6LG socket head set screws with 1.27mm alleny key

3. Remove and replace strip seal.

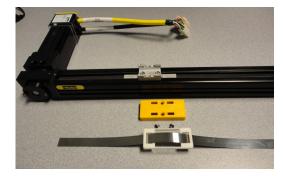
4. Reverse the steps above

\*Extra care should be taken when coming into contact with strip seals as they are very sharp.













### Accessories & Spare Parts

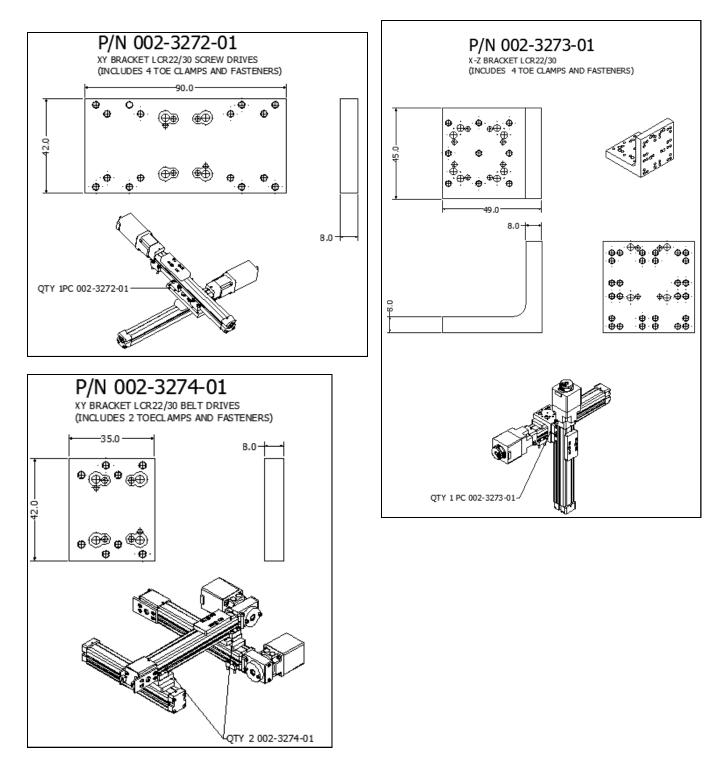
Part Number	Description		
003-4447-01	Strip seal LCR22 7mm wide (QTY = TABLE TRAVEL+98mm required)		
003-4447-02	Strip seal LCR30 12mm wide (QTY = TABLE TRAVEL+98mm required)		
003-4707-01	Belt LCR30-GT2-2mr-6mm wide (QTY= 2 x TABLE TRAVEL +287mm required)		
003-4707-02	Belt LCR30 GT2-2mr-9mm wide (QTY=2 x TABLE TRAVEL +298mm required)		
006-2360-08	Stepper motor with connector Nema 11 double stack (LCR22/LCR30-SCRW)		
006-2360-10	Stepper motor with connector Nema 17 double stack (LCR30-SCRW)		
006-2360-12	Stepper motor with connector Nema 17 triple stack (LCR22/30 –BLT)		
003-4653-01	Stepper motor with flying leads Nema 23 double stack (LCR30 – BLT)		
002-3233-01	Toe clamp Assy (includes 1pc Toe clamp and 2pc m3 x 16lg fasteners)		
002-3233-02	Toe clamp Assy (includes 2pc Toe clamp and 2pc m3 x 16lg fasteners)		
002-3233-04	Toe clamp Assy (includes 4pc Toe clamp and 2pc m3 x 16lg fasteners)		
002-3233-100	Toe clamp Assy (includes 100pc Toe clamp and 2pc m3 x 16lg fasteners)		
003-3560-01	LCR22/30 screw drive: Coupling torque disk		
003-3560-03	LCR22/30 screw drive: Coupling torque disk with thru hole		
003-3558-01	Coupling half motor side 5mm bore (nema11/17)		
003-3558-07	LCR22/30 screw drive: Coupling half motor side 6.35mm bore (nema23)		
003-3161-01	LCR30 Belt drive: Coupling torque disc		
003-3160-03	LCR30 Belt drive: Coupling half motor side 5mm bore (nema17)		
003-3160-01	LCR30 Belt drive: Coupling half motor side 6.35mm bore (nema23/sm16)		
003-2604-06	LCR22/30 Belt drive: Clamp collar motor input		
003-4475-02	LCR Switch PNP Normally Closed w 300mm cable length m8 connector type		
003-4475-04	LCR Switch npn Normally Closed w 300mm cable length m8 connector type		
003-4475-06	LCR Switch PNP Normally Open w 300mm cable length m8 connector type		
003-4475-08	LCR Switch PNP Normally Open w 300mm cable length m8 connector type		
003-2918-01	Extension cable LCR switch 5m flying leads		
002-3272-01	XY bracket assy LCR22/30 Screw drives		
002-3273-01	XZ bracket assy LCR22/30		
002-3274-01	XY bracket assy LCR22/30 Belt drives		
002-3283-01	Pack of 10pc M2.5 sq nuts		



### LCR22/LCR30 SERIES PRODUCT MANUAL



### Accessories :XYZ Bracketry







### **Compliance Documents**

### **RoHS Compliance Statement**

We hereby certify that the following item(s) produced by Parker Hannifin Corporation complies with the requirements of the EU Directive 2002/95/EC on the restriction of the use of certain hazardous substances in the electrical and electronic equipment (RoHS) and other national and international legislation similarly restricting the use of materials.

Substance	RoHS Threshold
Cadmium (Cd)	0.01% or 100ppm
Lead (Pb)	0.1% or 1000ppm
Mercury (Hg)	0.1% or 1000ppm
Hexavalent Chromium (Cr(VI))	0.1% or 1000ppm
Polybrominated biphenyls (PBB)	0.1% or 1000ppm
Polybrominated diphenyl ethers (PBDE)	0.1% or 1000ppm

# $\mathsf{C}\mathsf{E}_{\mathsf{D}\mathsf{E}\mathsf{C}\mathsf{L}\mathsf{A}\mathsf{R}\mathsf{A}\mathsf{T}\mathsf{I}\mathsf{O}\mathsf{N}}$

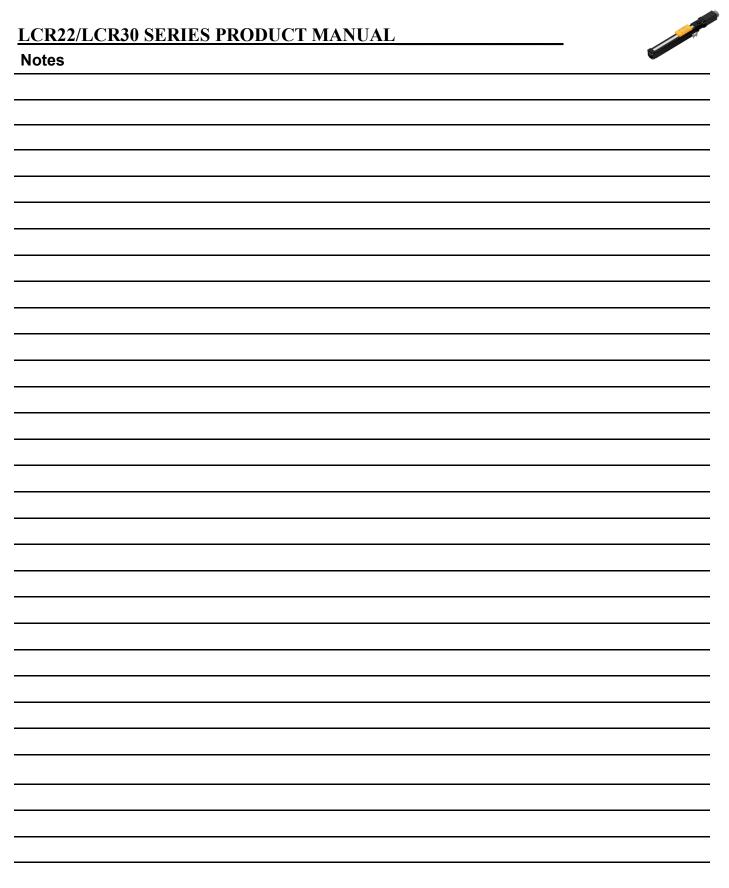
ACCORDING TO EC DIRECTIVE 2006/42/EC (ANNEX II, PART 1, SECTION B) FOR PARTLY COMPLETED MACHINERIES

	Safety of Machinery– basic concepts. Part 1: Fundamental terminology, methodology
EN 349	Safety of machinery - Minimum gaps to avoid crushing of parts of the human body
	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
EN/IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: general requirements



LCR22/LCR30	SERIES	PRODUCT	MANUAL

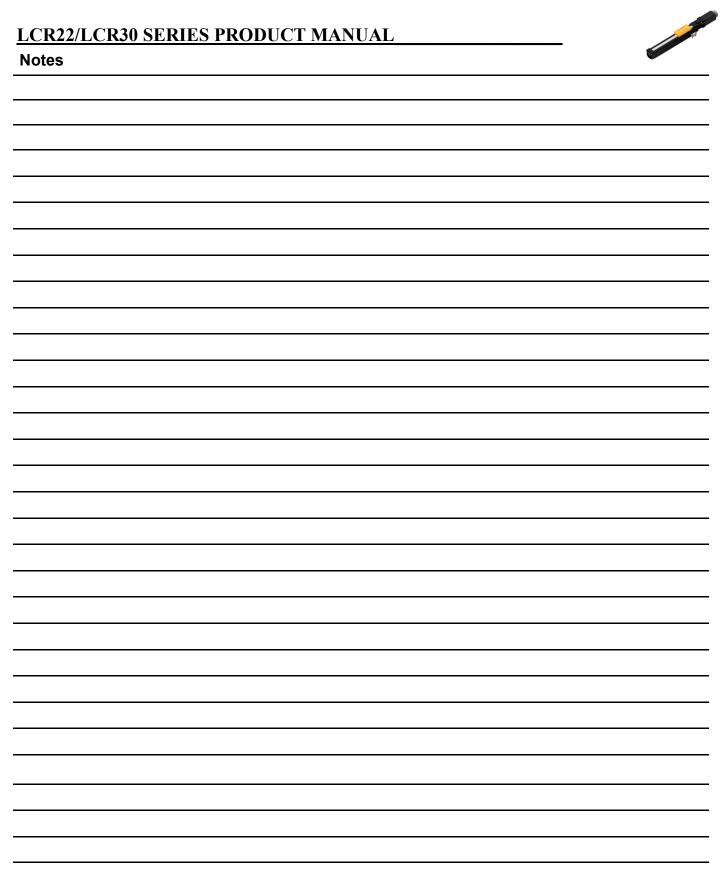
#### Notes





LCR22/LCR30	SERIES	<b>PRODUCT</b>	MANUAL

#### Notes







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