Part No.: **6441-629F**

SERIES ESK/ESL DESIGN 5 SLIDE INFORMATION MANUAL

ORDERING DATA

TYPE
Electromechanical

SERIES
K - Short Body
L - Long Body

SIZE
2
3
4
5
6

TRAVEL (MAX.)

Size	SK mm	SL mm
2	300	300
3	300	450
4	450	600
5	450	600
6	550	700

50 mm minimum travel in 50 mm increments

OPTIONS
H4 - Cylinder replacement only
H11 - Without cylinder option
G30 - Proximity switch ready with shock pads on extension and retraction
J3 - Transitional fit dowel holes (in both tool plate and housing)
J8 - Precision fit dowel holes (in both tool plate and housing)
Q1 - Corrosion resistant guide shafts (both ends unplated)

MOTOR MOUNT CODE
Wxxxx - Open Architecture p/n code
W0000 - Blank Motor Mount
Blank - No motor mount

E S K C 5 2 x 300 - R150 - G30 - QF11 - Wxxxx

PRODUCT
Slide

BUSHING
B - Ball Bushing, available only on Ball Screw sizes 4, 5 & 6.
C - TC Bushing, available only with Lead Screw.

DESIGN NO.
5 - Metric

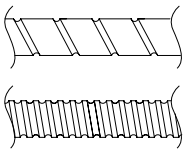
SCREW CONFIGURATION

	Size		Lead mm	Size		Lead mm
BALL SCREW	4	RB005	5	LEAD SCREW 2	RL150	1.50
	4	RB010	10	2	RL004	4
	5	RB010	10	3	RL150	1.50
	5	RB016	16	3	RL003	3
	6	RB010	10	4	RL003	3
	6	RB020	20	4	RL006	6
				5	RL004	4
				5	RL008	8
				6	RL004	4
				6	RL008	8

MOTOR CONFIGURATION
QF11 - Foldback with 1:1 ratio
QF21 - Foldback with 2:1 ratio, Not available on sizes 20 and 25
QL11 - Inline with 1:1 ratio
Blank - No Motor Mount

SCREW CONFIGURATION

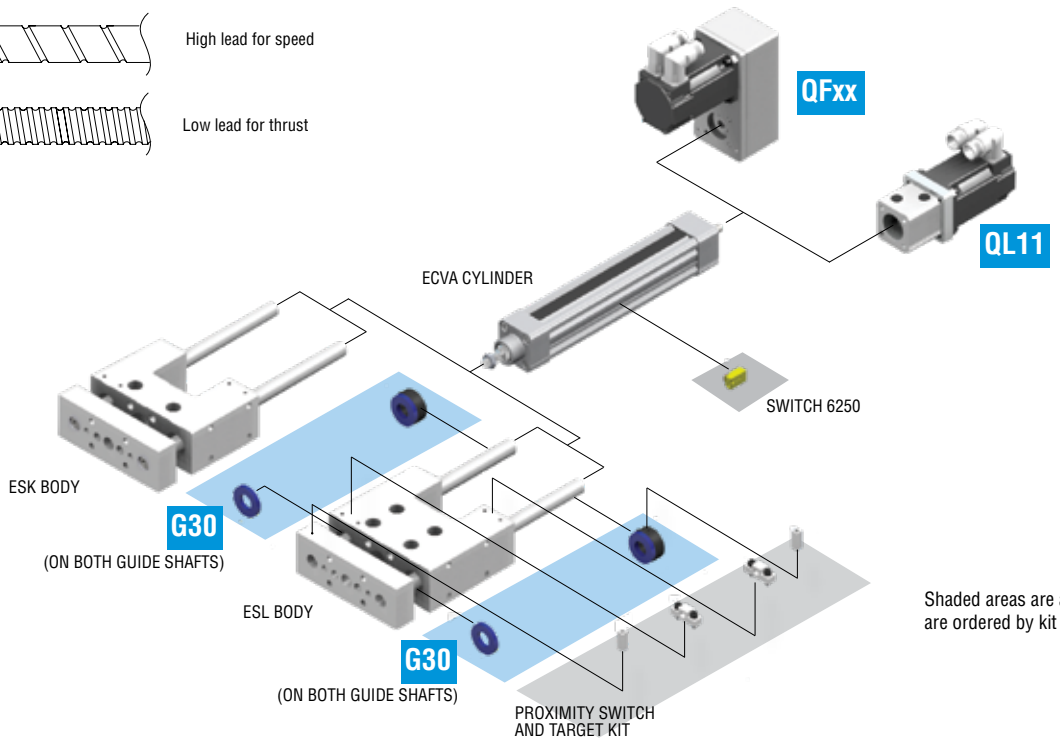
The ball (RBxxx) and lead (RLxxx) screw drive systems of the Series ESK/ESL are available in two lead choices. This provides flexibility when matching velocity and load requirements to the application. Refer to product specifications and sizing software for performance parameters.



High lead for speed

Low lead for thrust

MOUNTING OPTIONS & ACCESSORIES



Shaded areas are accessories and are ordered by kit or part numbers.

SERIES ESK/ESL DESIGN 5 SLIDE INFORMATION MANUAL

ENGINEERING DATA: BALL SCREW -RB

SPECIFICATIONS	BALL SCREW SERIES ESK/ESL
REPEATABILITY[1]	±0.010 mm [±0.0004 in]
MAXIMUM BACKLASH[2]	0.18 mm [0.007 in]
RATED LIFE[4]	Refer to Life vs. Thrust Chart in product catalog
FULL TRAVEL TOLERANCE[7]	+3.5/-0.0 mm [+0.138/-0.000 in]
DUTY CYCLE	100%
OPERATING TEMPERATURE	4 - 65°C [40 - 150°F]
LUBRICATION INTERVAL[3]	Horizontal: 2500 km [100 million in], Vertical: 1500 km [60 million in]

SPECIFICATIONS				SIZE					
				4		5		6	
MECHANICS	MAXIMUM TRAVEL	ESK	mm [in]	450 [17.72]		450 [17.72]		550 [21.65]	
		ESL		600 [23.62]		600 [23.62]		700 [27.65]	
	DRIVE MECHANISM			Ball Screw					
	SCREW DIAMETER		mm	12		16		20	
	SCREW CONFIGURATION			-RB005	-RB010	-RB010	-RB016	-RB010	-RB020
	SCREW LEAD		mm/rev	5	10	10	16	10	20
	GUIDE SHAFT DIAMETER		mm	16		20		25	
	GUIDE SHAFT BEARING TYPE			Ball Bushing					
SPEED[4]	MAXIMUM SPEED		mm/sec [in/sec]	500 [19.6]	1000 [39.3]	1000 [39.3]	1600 [63.0]	1000 [39.3]	2000 [78.7]
	MAXIMUM RPM		rev/min	6000					
	MAXIMUM ACCELERATION	-QL11	m/sec^2 [in/sec^2]	19.6 [772]					
		-QFx1	m/sec^2 [in/sec^2]	9.8 [386]					
THRUST[4]	MAXIMUM THRUST		N [lbf]	1360 [306]	680 [153]	2430 [546]	1520 [342]	4410 [991]	2510 [564]
TORQUE	PERMISSIBLE DRIVE TORQUE[6]	-QL11	Nm [in-lb]	1.2 [10.62]		4.3 [38.06]		7.8 [69.03]	
		-QFx1	Nm [in-lb]	0.84 [7.43]		3 [26.55]		5.46 [48.32]	
	NO-LOAD TORQUE		Nm [in-lb]	0.15 [1.33]		0.40 [3.54]		0.60 [5.31]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})	ESK	kg [lb]	3.55 [7.83]		5.34 [11.77]		9.50 [20.93]	
		ESL		4.20 [9.26]		6.38 [14.07]		11.68 [25.76]	
	TOTAL LENGTH ADDER (W_{LT})		kg/mm [lb/in]	0.0073 [0.41]		0.0105 [0.59]		0.0145 [0.81]	
	MOVING @ ZERO STROKE (W_{OM})	ESK	kg [lb]	1.28 [2.83]		2.25 [4.97]		4.15 [9.16]	
		ESL		1.44 [3.17]		2.54 [5.61]		4.74 [10.45]	
	MOVING LENGTH ADDER (W_{LM})		kg/mm [lb/in]	0.0039 [0.216]		0.0059 [0.333]		0.0097 [0.544]	
INERTIA	ACTUATOR @ ZERO STROKE (J_O)		kg-m^2 [lb-in^2]	3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		4.84×10^{-5} [0.165]	
	LENGTH ADDER (J_L)		kg-m^2/mm [lb-in^2/in]	9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		7.95×10^{-8} [0.0069]	
	MOVING WEIGHT ADDER (J_M)		kg-m^2/kg [lb-in^2/lb]	6.21×10^{-7} [9.63×10^{-4}]	2.48×10^{-6} [3.85×10^{-3}]	2.48×10^{-6} [3.85×10^{-3}]	6.36×10^{-6} [9.86×10^{-3}]	2.48×10^{-6} [3.85×10^{-3}]	9.93×10^{-6} [1.54×10^{-2}]
	MOTOR CONFIGURATION (J_Q)	-QF11	kg-m^2 [lb-in^2]	1.40×10^{-5} [0.048]		4.71×10^{-5} [0.161]		4.65×10^{-5} [0.159]	
		-QF21		2.75×10^{-5} [0.094]		8.28×10^{-5} [0.283]		1.91×10^{-4} [0.654]	
		-QL11		3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		4.04×10^{-5} [0.138]	

NOTES:
1) UNIDIRECTIONAL
2) AXIAL FREE PLAY WHEN DRIVE SHAFT LOCKED
3) REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
4) REFER TO PERFORMANCE CHARTS IN PRODUCT CATALOG
5) 2500 km [100 MILLION in] LIFE
6) CORRESPONDS TO MAXIMUM THRUST
7) FOR HOMING AND INCREASED APPLICATION FLEXIBILITY, INCLUDE EXTRA TRAVEL WHEN NECESSARY
8) ALL DIMENSIONS ARE FOR REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED. REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES.

WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT [reference pages in product catalog]
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

FOR -Qx11: $INERTIA_{Reflected} = J_O + (J_L \times TRAVEL) + (J_M \times TOTAL\ MOVING\ WEIGHT) + J_Q$
FOR -QF21: $INERTIA_{Reflected} = [J_O + (J_L \times TRAVEL) + (J_M \times TOTAL\ MOVING\ WEIGHT)] / 4 + J_Q$

SERIES ESK/ESL DESIGN 5 SLIDE INFORMATION MANUAL

ENGINEERING DATA - LEAD SCREW -RL

SPECIFICATIONS	LEAD SCREW SERIES ESK/ESL
REPEATABILITY[1]	±0.5 mm [±0.020 in] (typical)
REVERSING BACKLASH[2]	0.20 mm [0.008 in]
RATED LIFE	Refer to Online Sizing
FULL TRAVEL TOLERANCE	+3.5/-0.0 mm [+0.138/-0.000 in]
MAXIMUM DUTY CYCLE	35%
OPERATING TEMPERATURE	4 - 65°C [40 - 150°F]
LUBRICATION INTERVAL[3]	Horizontal: 500 km [20 million in], Vertical: 250 km [10 million in]

	SPECIFICATIONS			SIZE									
				2		3		4		5		6	
MECHANICS	MAXIMUM TRAVEL	ESK	mm [in]	300 [11.81]		300 [11.81]		450 [17.72]		450 [17.72]		550 [21.65]	
		ESL		300 [11.81]		400 [15.75]		500 [19.69]		600 [23.62]		700 [27.65]	
	SCREW DIAMETER		mm	8		10		12		16		20	
	SCREW CONFIGURATION			-RL150	-RL004	-RL150	-RL003	-RL003	-RL006	-RL004	-RL008	-RL004	-RL008
	SCREW LEAD		mm/rev	1.5	4	1.5	3	3	6	4	8	4	8
	GUIDE SHAFT DIAMETER		mm	10		12		16		20		25	
	GUIDE SHAFT BEARING TYPE			Composite Bushing									
SPEED[4]	MAXIMUM SPEED		mm/sec [in/sec]	30 [1.2]	80 [3.15]	30 [1.20]	60 [2.40]	60 [2.40]	120 [4.80]	80 [3.15]	160 [6.3]	80 [3.15]	160 [6.3]
	MAXIMUM RPM		rev/min	1200									
	MAXIMUM ACCELERATION		m/sec^2 [in/sec^2]	0.3 [11.81]	1.0 [39.37]	0.3 [11.81]	1.0 [39.37]	0.3 [11.81]	1.0 [39.37]	0.5 [19.69]	1.0 [39.37]	0.5 [19.69]	1.0 [39.37]
THRUST[4]	MAXIMUM THRUST		N [lbf]	300 [67.5]	150 [33.7]	500 [112]	250 [56]	800 [180]	400 [90]	1600 [360]	800 [180]	2500 [562]	1250 [281]
TORQUE	PERMISSIBLE DRIVE TORQUE[5]	-QL11	Nm [in-lb]	0.5 [4.42]		0.7 [6.20]		1.2 [10.62]		4.3 [38.06]		7.8 [69.03]	
		-QFx1	Nm [in-lb]					0.84 [7.43]		3 [26.55]		5.46 [48.32]	
	NO-LOAD TORQUE		Nm [in-lb]	0.09 [0.80]		0.12 [1.00]		0.10 [0.89]		0.25 [2.21]		0.40 [3.54]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})	ESK	kg [lb]	1.84 [4.06]		2.33 [5.13]		3.55 [7.83]		5.23 [11.53]		9.50 [20.93]	
		ESL		2.24 [4.94]		2.90 [6.39]		4.20 [9.26]		6.27 [13.83]		11.68 [25.76]	
	TOTAL LENGTH ADDER (W_{LT})		kg/mm [lb/in]	0.003 [0.17]		0.004 [0.20]		0.0073 [0.41]		0.0105 [0.59]		0.0145 [0.81]	
	MOVING @ ZERO STROKE (W_{OM})	ESK	kg [lb]	0.65 [1.43]		0.85 [1.88]		1.28 [2.83]		2.15 [4.73]		4.15 [9.16]	
		ESL		0.72 [1.58]		0.97 [2.14]		1.44 [3.17]		2.43 [5.36]		4.74 [10.45]	
	MOVING LENGTH ADDER (W_{LM})		kg/mm [lb/in]	0.002 [0.092]		0.002 [0.140]		0.0039 [0.216]		0.006 [0.333]		0.0097 [0.544]	
INERTIA	ACTUATOR @ ZERO STROKE (J_O)		$kg\text{-}m^2$ [$lb\text{-}in^2$]	1.66×10^{-6} [0.006]		2.09×10^{-6} [0.007]		3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		4.84×10^{-5} [0.165]	
	LENGTH ADDER (J_L)		$kg\text{-}m^2/mm$ [$lb\text{-}in^2/in$]	1.59×10^{-9} [0.00014]		4.94×10^{-9} [0.00043]		9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		7.95×10^{-8} [0.0069]	
	MOVING WEIGHT ADDER (J_M)		$kg\text{-}m^2/kg$	3.8×10^{-8}	1.01×10^{-7}	3.8×10^{-8}	7.6×10^{-8}	7.6×10^{-8}	1.52×10^{-7}	1.01×10^{-7}	2.03×10^{-7}	1.01×10^{-7}	2.03×10^{-7}
			$[lb\text{-}in^2/lb]$	[5.89 x 10^{-5}]	[1.57 x 1 0^{-4}]	[5.89 x 10^{-5}]	[1.18 x 10^{-4}]	[1.18 x 10^{-4}]	[2.36 x 10^{-4}]	[1.57 x 10^{-4}]	[3.14 x 10^{-4}]	[1.57 x 10^{-4}]	[3.14 x 10^{-4}]
	MOTOR CONFIGURATION (J_Q)	-QF11	$kg\text{-}m^2$ [$lb\text{-}in^2$]	2.69×10^{-5} [0.092]		2.69×10^{-5} [0.092]		1.40×10^{-5} [0.048]		4.71×10^{-5} [0.161]		4.65×10^{-5} [0.159]	
		-QF21		—		—		2.75×10^{-5} [0.094]		8.28×10^{-5} [0.283]		1.91×10^{-4} [0.654]	
		-QL11		1.89×10^{-6} [0.006]		1.89×10^{-6} [0.006]		3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		4.04×10^{-5} [0.138]	

NOTES:
1) UNIDIRECTIONAL
2) VALUES CORRESPOND TO INITIAL(AS SUPPLIED NEW) CONDITION. BACKLASH MAY INCREASE OVER TIME
3) REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
4) REFER TO PERFORMANCE CHART IN PRODUCT CATALOG
5) CORRESPONDS TO MAXIMUM THRUST

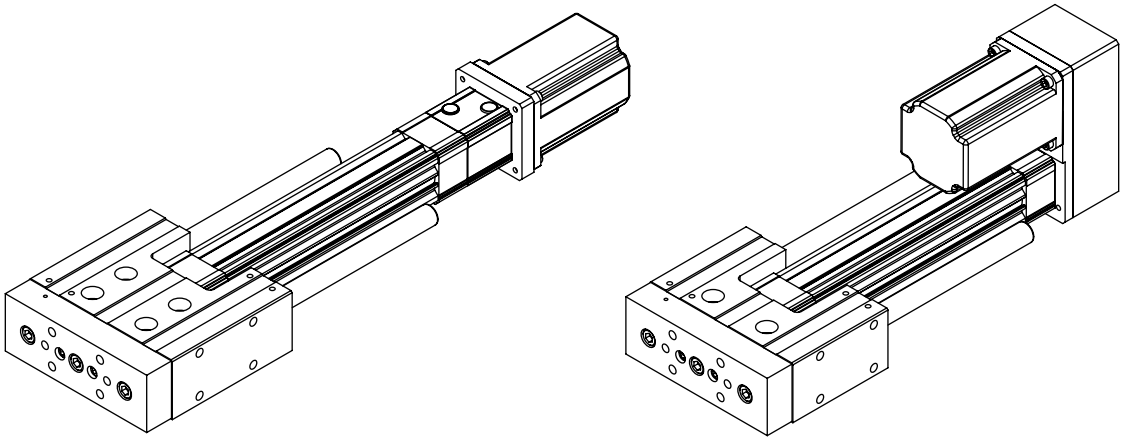
WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT [reference pages in product catalog]
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

FOR -Qx11: $INERTIA_{Reflected} = J_O + (J_L \times TRAVEL) + (J_M \times TOTAL\ MOVING\ WEIGHT) + J_Q$
FOR -QF21: $INERTIA_{Reflected} = [J_O + (J_L \times TRAVEL) + (J_M \times TOTAL\ MOVING\ WEIGHT)] / 4 + J_Q$

SERIES ESK/ESL DESIGN 5 SLIDE INFORMATION MANUAL

MOUNTING INFORMATION



START-UP PROCEDURE

- The ESK/ESL Slide should be securely mounted before powering up the electric motor.
- Care should be taken to provide adequate space for the slide tool plate to extend.
- Make sure that the electric motor and the motor mount kit (inline or fold-back) are securely mounted to the cylinder and fastened with the recommended tightening torques.
- The cylinder rod of the ECV is a non-rotating element. When tightening or loosening the threaded joint, use the flats on the rod end to prevent torque transmission into the rod.

OPERATING CONDITIONS

- DO NOT use the slide in shock or impact load applications (Example: End of travel impact against a fixed stop).
- The slide comes with a self aligning rod coupler between the cylinder rod and tool plate. This rod coupler prevents internal friction caused by misalignment, provides greater reliability by reducing component wear and simplifying alignment problems.
- The maximum input torque and speed should not exceed the values specified in the engineering data on pages 2 and 3.
- The slide is designed for use in a clean industrial environment and designed to prevent solid particles from entering the slide.
- Do not use the slide in a wash-down environment. Please consult PHD if your application requires wash-down.

MAINTENANCE

- The ESK/ESL Slide is not field repairable.

Re-lubricate nut and screw using recommended grease at the following intervals

Screw Type	Lubricant	Orientation	
		Horizontal	Vertical
-RBxxx (Ball Screw)	Castrol Longtime PD2 (NLGI Class 2)	100 M in [2500 km]	60 M in [1500 km]
-RLxxx (Lead Screw)	NYE Rheolube 368 AX-1	20 M in [500 km]	10 M in [250 km]

- After each lubrication interval, inspect shaft couplings, timing belt and screw assembly for excessive backlash. Replace coupling spider or timing belt as necessary.

MAINTENANCE - RELUBRICATING BALL SCREW ASSEMBLY

ECVA-RB

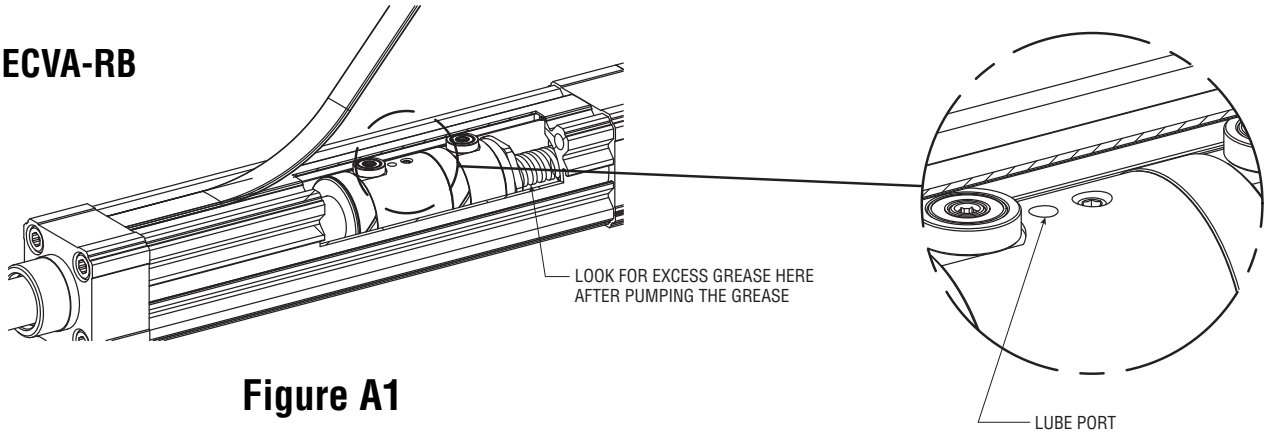


Figure A1

ECVR-RB

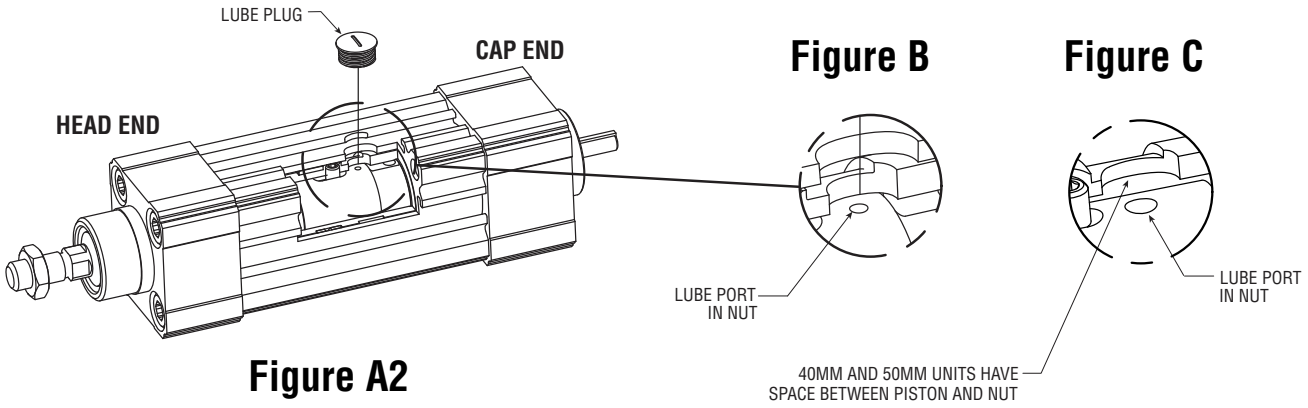


Figure A2

RECOMMENDED GREASE: CASTROL LONGTIME PD 2 (NLGI CLASS2)

1. Remove the SLOT COVER or LUBE PLUG from the cylinder (Figure A1).
   • ROTATING (ECVR) UNITS: Fully retract the cylinder and rotate rod clockwise until the LUBE PORT in the piston is accessible. This step may require disengagement of the motor brake or attached load.
2. Using grease gun, pump the recommended grease into the LUBE PORT in the BALL NUT (Figure B). Be sure to lubricate the indicated LUBE PORT in the BALL NUT, not extraneous geometry in piston (Figure C).
3. Pump the grease until it fully fills the piston assembly.
4. Cycle the cylinder at low speeds or by hand keeping any contaminant from entering the tube, then repeat step 3.
5. Reinstall the SLOT COVER or LUBE PLUG.

MAINTENANCE - RELUBRICATING LEAD SCREW ASSEMBLY

ECVA-RL

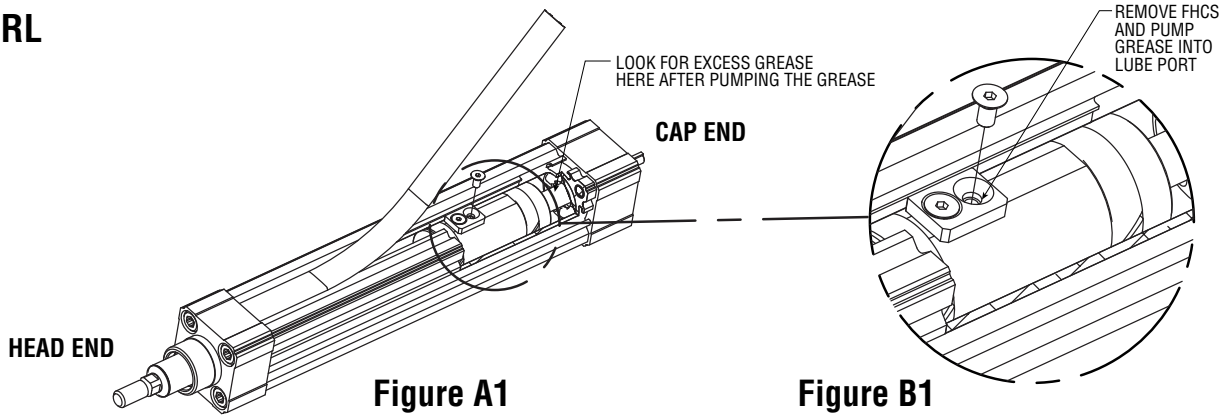


Figure A1 Figure B1

ECVR-RL

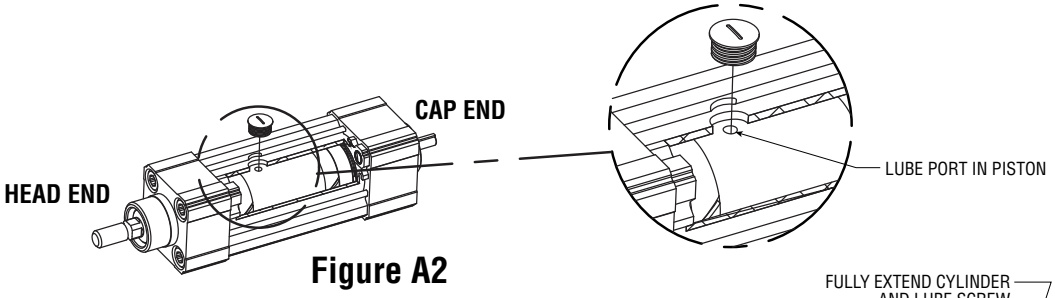


Figure A2

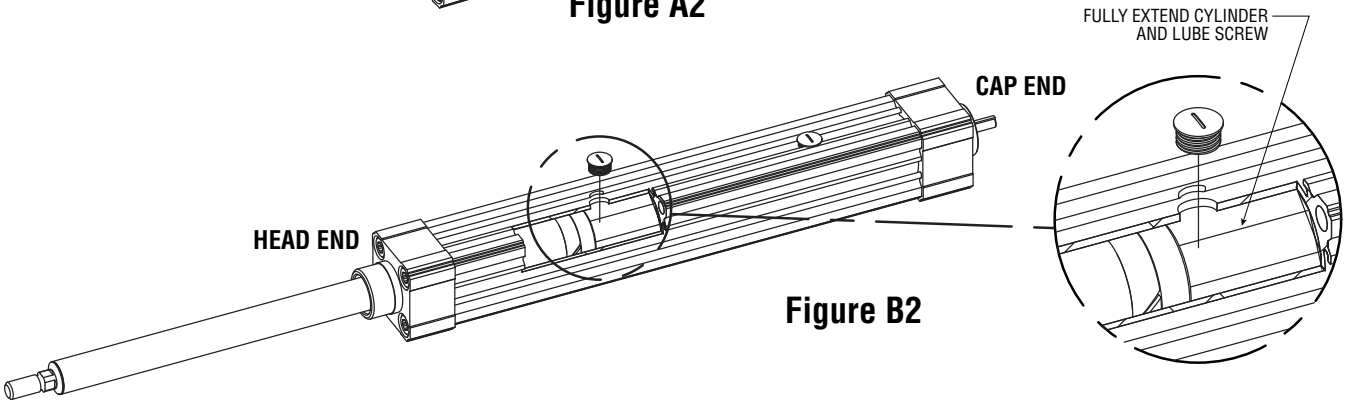


Figure B2

RECOMMENDED GREASE: NYE RHEOLUBE 368 AX-1

1. Remove the SLOT COVER or the LUBE PLUG from the cylinder (Figure A1).
   • NON-ROTATING (ECVA) UNITS: Fully retract the cylinder and remove the CAP END FHCS in the anti-rotation key. (FIGURE A1)
2. ROTATING (ECVR) UNITS: Fully retract the cylinder and rotate the rod clockwise until the LUBE PORT in piston is accessible. (FIGURE A2) This step may require disengagement of the motor brake or attached load.
3. Using grease gun, pump the recommended grease into LUBE PORT in the PISTON (Figure A2). Be sure to lubricate the indicated LUBE PORT in the PISTON.
4. Pump the grease until it fully fills the piston assembly.
5. For Lead Screw units with 200mm of travel or more, fully extend the cylinder and lube the screw as shown in (FIGURE B2).
6. Cycle the cylinder at low speeds or by hand keeping any contaminant from entering the tube, then repeat step 3.
7. Reinstall the SLOT COVER or LUBE PLUG.

OPTIONS

H4 CYLINDER REPLACEMENT ONLY (WITHOUT SLIDE)

This option provides complete cylinder replacement motor mounting and is included/excluded based on ordering specifications. If motor mounting is desired, full unit description is required.

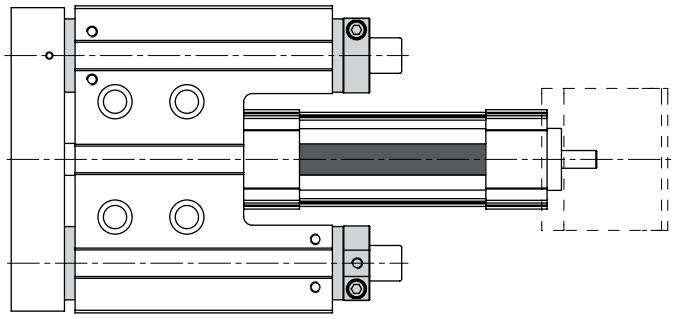
NOTES:
1) REQUIRES FULL UNIT DESCRIPTION FOR PROPER REPLACEMENT.
2) FOR CYLINDER REPLACEMENT PROCEDURE REFER TO PACKER NO. 6441-624.

H11 SLIDE REPLACEMENT ONLY (WITHOUT CYLINDER)

This option provides the slide mechanism only without cylinder or motor mounting. Included with option -H11 is all the hardware required for mounting standard PHD Series ECVA Cylinders or pneumatic standard VDMA/ISO cylinders to the slide. A self-aligning rod coupling is also provided, making it easy to attach the appropriate VDMA/ISO cylinder. (No extra rod extension required.)

G30 SHOCK PADS ON EXTENSION AND RETRACTION

Adjust one collar and tighten to proper torque (see chart below.) Then adjust the other collar so that both collars and pads make contact evenly.



COLLAR SCREW TORQUE SPECIFICATION

	ESK/ESL SIZES									
	SIZE 2		SIZE 3		SIZE 4		SIZE 5		SIZE 6	
TORQUE Nm [in-lb]	4.6	[40]	8.6	[75]	15.8	[140]	15.8	[140]	15.8	[140]

OPTIONS

Wxxxx MOTOR CODE

Your Motor, Your Way customizable motor mounting is generated by PHD's extensive motor database at www.config.phdinc.com. The user may select their compatible motor of choice from the pre-populated motor database. In the event the chosen motor is not in the database, they may enter necessary motor features to generate the PHD motor code.

The tailored motor mounting components are included with the specified driver and shipped in kit form.

Q1 CORROSION RESISTANT GUIDE SHAFTS

Extremely hard corrosion-resistant coating on the guide shafts for use in applications where moisture may corrode untreated hardened and ground shafts. End faces of the shafts remain uncoated. Consult PHD for fully coated shafts.

J3 TRANSITION FIT DOWEL HOLES

This option provides a compromise fit between clearance and interference. Transitional fits are used where accuracy of location is important, but a small amount of clearance or interference is permissible.

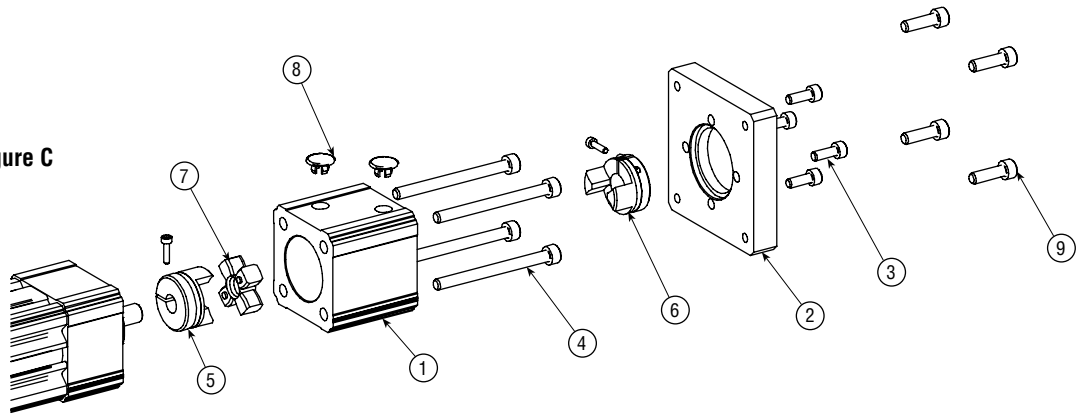
J8 PRECISION FIT DOWEL HOLES

This option provides an H7 tolerance precision fit with dowel pins. Precision fits are used where accuracy of location is of prime importance, and for parts requiring rigidity and alignment.

MOTOR MOUNTS

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

Figure C



	DESCRIPTION	QTY	TORQUE in-lb [Nm]									
			SIZE 2		SIZE 3		SIZE 4		SIZE 5		SIZE 6	
1	Coupling Housing	1	-	-	-	-	-	-	-	-	-	-
2	Motor Mounting Plate	1	-	-	-	-	-	-	-	-	-	-
3	Brite Zinc Plate Metric Fasteners	4	26	[2.9]	26	[2.9]	50	[5.5]	50	[5.5]	50	[5.5]
4	Brite Zinc Plate Metric Fasteners	4	26	[2.9]	26	[2.9]	100	[11]	100	[11]	100	[11]
5	Coupling Hub	1	6	[0.72]	6	[0.72]	18	[2]	18	[2]	18	[2]
6	Coupling Hub	1	6	[0.72]	6	[0.72]	18	[2]	18	[2]	18	[2]
7	Coupling Spider	1	-	-	-	-	-	-	-	-	-	-
8	Hole Plug	2	-	-	-	-	-	-	-	-	-	-
9	Motor Screw	4	See note below									

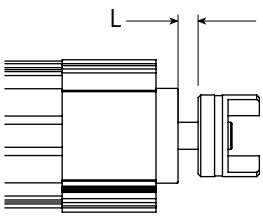
NOTE: The torque on these screws will depend on the screw sizes on your motor.

ASSEMBLY INSTRUCTIONS

(Please use Loctite 248 or equivalent on all fasteners)

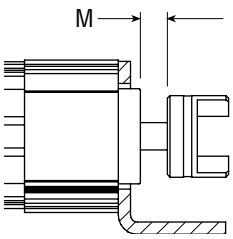
1. Mount the coupling hub half **5** on the ECV cylinder shaft. Dimensions in Figures D & E are factory suggestions and may not work in every combination. Ensure maximum coupling engagement on each shaft while retaining full spider engagement. Avoid axial loading either shaft.

Figure D



Standard Assembly		
ESG Size	Dimension L in [mm]	
2	0.118	[3]
3	0.118	[3]
4	0.197	[5]
5	0.295	[7.5]
6	0.178	[4.5]

Figure E



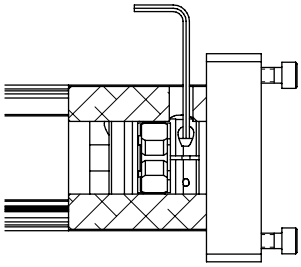
Assembly with "F" Type Mount		
ESG Size	Dimension M in [mm]	
2	0.197	[5]
3	0.197	[5]
4	0.276	[7]
5	0.374	[9.5]
6	0.256	[6.5]

(continued on next page)

MOTOR MOUNTS

2. Mount the spider **7** to the coupling hub **5**.
3. Mount the other coupling hub **6** on the spider **7**. Loosen the cap screw on coupling hub **6**.
4. Using the four cap screws **4**, fasten the housing **1** to the cylinder. If an "F" type foot mounting bracket option is being used, mount the bracket between the cylinder and the housing **1** as shown in Figure E. Align the cap screw on coupling hub **6** with the hole in the housing **1**.
5. Mount the motor mounting plate **2** to the housing using the four fasteners **3**, and tighten to the recommended torque.
6. Insert the motor carefully through the motor mounting plate **2** such that the motor shaft enters the hole in the coupling hub **6**. You may have to apply some force to fully insert the motor shaft in the coupling hub.
7. With the motor flush to the motor mounting plate, use the mounting screws **9** to fasten the motor to the mounting plate **2**.
8. To tighten the cap screw on coupling hub **6**, align the head of the cap screw with the hole in the housing **1** as shown in Figure F. If you have lost alignment, realign by either pushing or pulling the cylinder rod or by rotating the motor shaft. Tighten to the recommended torque.
9. Plug the two holes on the coupling housing using the plastic plugs **8**.

Figure F



MOTOR MOUNTS

QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

QF21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO

(NOT AVAILABLE ON SIZES 2 & 3)

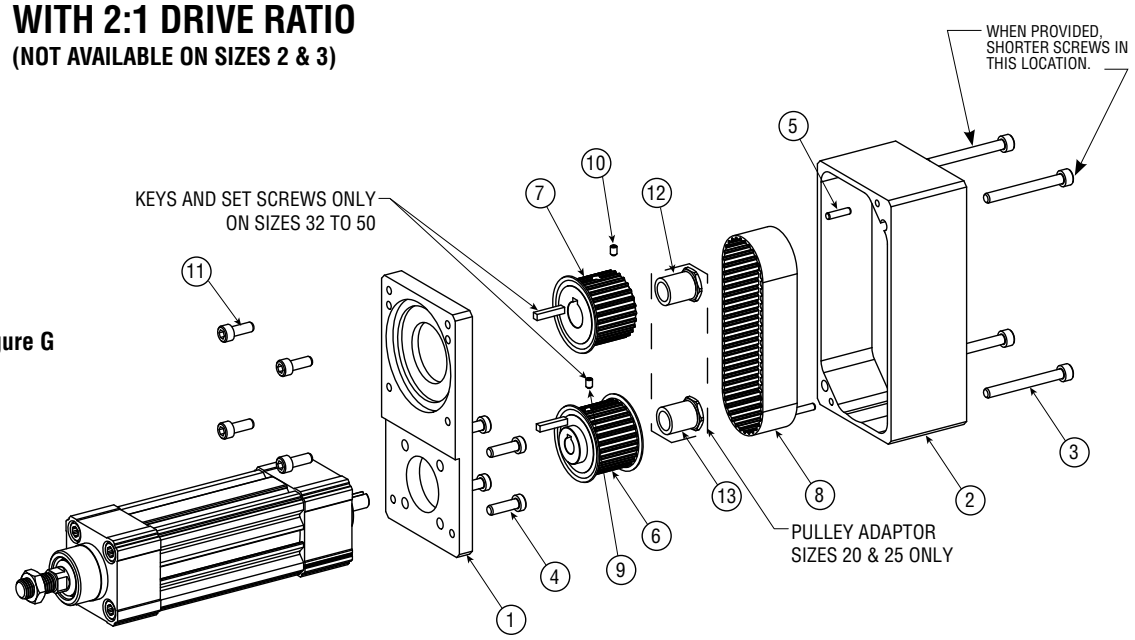


Figure G

	DESCRIPTION	QTY	TORQUE in-lb [Nm]									
			SIZE 2		SIZE 3		SIZE 4		SIZE 5		SIZE 6	
1	Motor Mounting Plate	1	-	-	-	-	-	-	-	-	-	-
2	Drive Cover	1	-	-	-	-	-	-	-	-	-	-
3	Brite Zinc Metric Fasteners	4	60	[7]	60	[7]	60	[7]	100	[11]	100	[11]
4	Brite Zinc DIN 7984 Metric Fastener	4	100	[11]	100	[11]	100	[11]	100	[11]	230	[26]
5	Metric Dowel Pin	2	-	-	-	-	-	-	-	-	-	-
6	Pulley	1	-	-	-	-	-	-	-	-	-	-
7	Pulley	1	-	-	-	-	-	-	-	-	-	-
8	Timing Belt	1	-	-	-	-	-	-	-	-	-	-
9	Metric Socket Set Screw	1	-	-	-	-	15	[1.5]	27	[3]	27	[3]
10	Metric Socket Set Screw	1	-	-	-	-	See note 1 below					
11	Motor Screw	4	-	-	-	-						
12	Motor Adaptor Pulley	1	See note 4				-					
13	Cylinder Adaptor Pulley	1	44	[5]	44	[5]	-					

NOTE:

1) The torque on these screws will depend on the screw sizes on your motor.
2) The key shown with the cylinder side pulley will be factory fitted on the cylinder shaft.
3) The key shown with the motor side pulley to be used from the customer's motor.
4) The torque on this adaptor will depend on the shaft size of the motor.
   Ø 5 mm shaft = 44 [5]
   Ø 6 mm to Ø 6.35 mm shaft = 70 [8]
   Ø 8 mm shaft = 130 [15]

(continued on next page)

MOTOR MOUNTS

ASSEMBLY INSTRUCTIONS

Use Loctite 248 or equivalent on all fasteners (excluding Pulley Adapters).

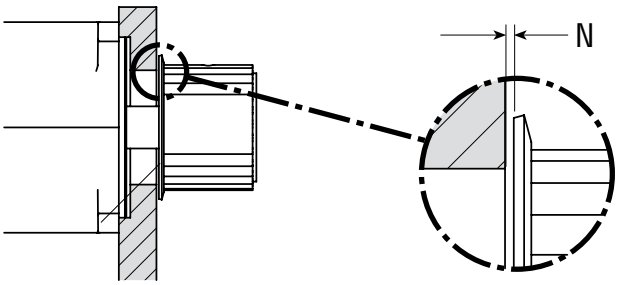
Torque to recommended values.

1. Attach Motor Mounting Plate **7** to actuator and secure with supplied Fasteners **4**.
2. Mount motor [not shown] to Motor plate using supplied Fasteners **11**.
3. Attach Pulleys **6** and **7** to motor and actuator shafts.

SIZES 2 & 3

a. Insert Pulley Adapter **12** into Pulley **7** and slide over motor shaft.
b. Maintain clearance between Pulley **7** and Motor Mounting Plate **1** as shown in Figure H.
c. Torque Pulley Adapter **7** to recommended value. Ensure pulley is protected while torqueing.
d. Place Timing Belt **8** around Pulley **6**.
e. Insert Pulley Adapter **13** into Pulley **6**.
f. Slide Pulley Adapter **13** on actuator shaft while also sliding Timing Belt **8** around Pulley **7** as shown in Figure I. Maintain clearance between Pulley **6** and Motor Mounting Plate **1** as shown Figure H.
g. Torque Pulley Adapter **7** to recommended value.

Figure H



ESK/ESL Size	Dimension N in [mm]	
2	0.041	[1.0]
3	0.053	[1.3]
4	0.067	[1.7]
5	0.047	[1.2]
6	0.057	[1.5]

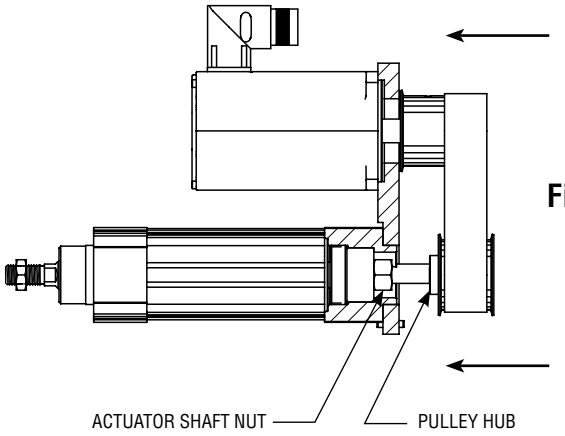


Figure I

MOTOR MOUNTS

ASSEMBLY INSTRUCTIONS

SIZES 4 - 6

a. Slide Pulley **7** over motor shaft while insuring proper placement of key in keyway or Set Screw(s) **10** over flat(s) on motor shaft.
b. Maintain clearance between Pulley **7** and Motor Mounting Plate **1** as shown in Figure H.
c. Torque Set Screw(s) **10** to recommended value. There may be multiple Set Screws **10** in Pulley **7**.
d. Rotate the actuator shaft so the key faces Pulley **7**.
e. Place Timing Belt **8** around Pulley **6**.
f. Slide Pulley **6** over actuator shaft while also sliding Timing Belt **8** around Pulley **7** as shown in Figure I. Ensure proper placement of key in keyway.
g. Maintain clearance between Pulley **6** and Motor Mounting Plate **1** as shown Figure H. The hub on Pulley **7** should contact the nut on the actuator shaft.
h. Torque Set Screw **9** to recommended value.

4. Verify Pulley **6** and Pulley **7** alignment as shown in Figure J. Adjust if necessary.
5. Assemble Dowel Pins **5** in Motor Mounting Plate **1**.
6. Place Drive Cover **2** on Motor Mounting Plate **1** and secure with Fasteners **3**.

NOTE: Drive Cover **2** must be in place for Timing Belt **8** to track properly.

Figure J