

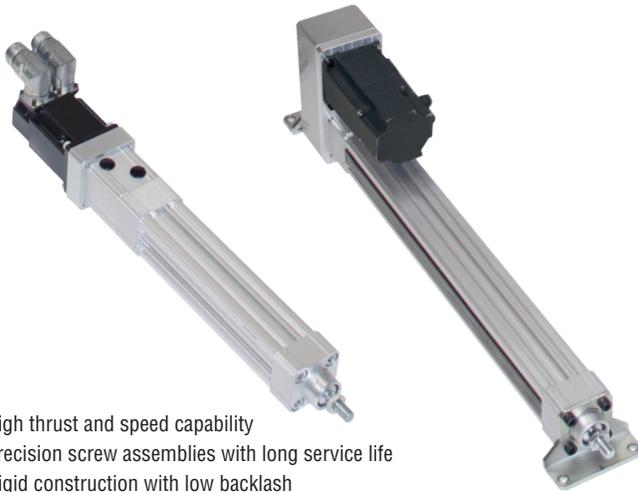
Electric Actuators

- The industry's most versatile, powerful, and dynamic electric actuators
- Superior speeds, thrust, and payloads while delivering extreme accuracy
- "Your Motor, Your Way" to employ the motor and controls of your choice

**Your Motor
Your Way**



SERIES ECV CYLINDER page 4



- High thrust and speed capability
- Precision screw assemblies with long service life
- Rigid construction with low backlash

DRIVE MODE	SIZE	LEAD		TRAVEL MAX		MAX THRUST*		MAX SPEED*	
		mm	mm	mm	mm	lb	N	in/sec	mm/sec
Lead - RL	20	1.5	4	400	400	67.5	300	1.2	30
		4				33.7	150	3.15	80
	25	1.5	3	400	400	112	500	1.2	30
		3				56	250	2.4	60
	32	3	6	500	500	180	800	2.4	60
6			90			400	4.8	120	
40	4	8	600	600	360	1600	3.15	80	
	8				180	800	6.3	160	
50	4	8	750	750	562	2500	3.15	80	
	8				281	1250	6.3	160	
Ball - RB	32	5	1000	1000	306	1360	19.6	500	
		10				153	680	39.3	1000
	40	10	1000	1000	546	2430	39.3	1000	
		16				342	1520	63	1600
50	10	1000	1000	991	4410	39.3	1000		
	20				564	2510	78.7	2000	

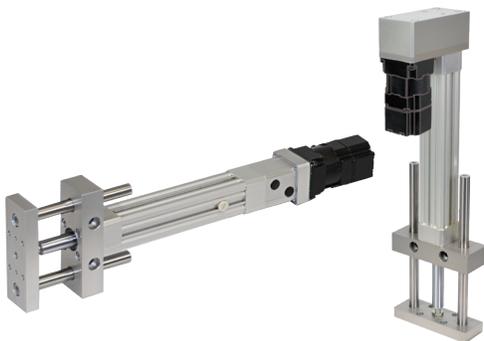
SERIES ECP ELECTRIC IP69K CYLINDERS page 24



- IP69K ingress protection
- 300 grade stainless steel versions (-Y8 and -Y91) for caustic washdown environments with USDA certifications for splash zone and product contact zones. See page 24 for details.
- High thrust or speed capability

DRIVE MODE	SIZE	LEAD		TRAVEL MAX		MAX THRUST*		MAX SPEED*	
		mm	mm	mm	mm	lb	N	in/sec	mm/sec
Lead - RL	32	3	6	500	500	180	800	2.4	60
		6				90	400	4.8	120
	40	4	8	600	600	360	1600	160	80
8			180			800	80	160	
50	4	8	750	750	562	2500	160	80	
	8				281	1250	6.3	160	
Ball - RB	32	5	750	750	306	1360	19.6	500	
		10				153	680	39.3	1000
	40	10	750	750	546	2430	39.3	1000	
		16				342	1520	63	1600
50	10	750	750	991	4410	39.3	1000		
	20				564	2510	78.7	2000	

SERIES ESCV VERTICAL THRUSTER SLIDE page 42



- Design based on the proven PHD Series SCV Slide
- High thrust and speed capability
- Precision screw assemblies with long service life
- Rigid construction with low backlash

DRIVE MODE	SIZE	LEAD		TRAVEL MAX	MAX THRUST*		MAX SPEED*		MAX MOMENT* PITCH/YAW		MAX LOAD HORIZONTAL*	
		mm	mm		mm	mm	mm	mm	mm	mm	mm	mm
Lead - RL	2	1.5	4	150	67.5	300	1.20	30	14.6	1.6	8.5	3.9
		4			33.7	150	3.15	80				
	3	1.5	3	150	112.0	500	1.20	30	29	3.3	12	5.4
		3			56.0	250	2.40	60				
	4	3	6	200	180.0	800	2.40	60	73	8.2	13	5.9
		6			90.0	400	4.80	120				
5	4	8	200	360.0	1600	3.15	80	178	20	28	13	
	8			180.0	800	6.30	160					
6	4	8	250	562.0	2500	3.15	80	372	42	51	23	
	8			281.0	1250	6.30	160					
Ball - RB	4	5	200	306.0	1360	19.60	500	73	8.2	13	5.9	
		10			153.0	680	39.30	1000				
	5	10	200	546.0	2430	39.30	1000	178	20	28	13	
		16			342.0	1520	63.00	1600				
6	10	250	991.0	4410	39.30	1000	372	42	51	23		
	20			564.0	2510	78.70	2000					

*Refer to performance charts in engineering section of catalog and online sizing for specific performance limitations of a configured actuator.

SELECTION GUIDE: Electric Solutions

SERIES ESK/ESL THRUSTER SLIDE page 52



- Design based on the proven PHD Series SK/SL Slide
- High thrust and speed capability
- Precision screw assemblies with long service life

DRIVE MODE	SIZE	LEAD mm	TRAVEL MAX mm	MAX THRUST*		MAX SPEED*		MAX MOMENT PITCH/YAW/ROLL		MAX PAYLOAD*	
				lb	N	in/sec	mm/	in-lb	Nm	lb	kg
Lead - RL	2	1.5	300	67.5	300	1.2	30	42	4.7	43	19.3
				33.7	150	3.15	80				
	3	1.5	450	112	500	1.2	30	69	7.8	63	28.5
				56	250	2.4	60				
	4	3	600	180	800	2.4	60	118	13	90	40.8
				90	400	4.8	120				
5	4	800	360	1600	3.15	80	153	17	225	102	
			180	800	6.3	160					
6	4	700	562	2500	3.15	80	225	25	357	162.2	
			281	1250	6.3	160					
Ball - RB	4	5	600	306	1360	19.6	500	118	13	90	40.8
				153	680	39.3	1000				
	5	10	600	546	2430	39.3	1000	153	17	225	102
				342	1520	63	1600				
	6	10	700	991	4410	39.3	1000	225	25	357	162.2
				564	2510	78.7	2000				

SERIES ESU LINEAR ACTUATOR page 70



- High capacity rail bearing provides superior moment and load capability
- Self-lubricating linear guides provide maintenance-free operation

DRIVE MODE	SIZE	LEAD mm	TRAVEL MAX mm	MAX THRUST*		MAX SPEED*		MAX MOMENT*				MAX PAYLOAD*	
				lb	N	in/sec	mm/sec	PITCH/YAW		ROLL		lb	N
Belt- RT	55	160	5500	326.0	1450	197.0	5000	3363	380	381	43	1103	4903
				586.0	2610			6328	715	832	94	1720	7648
				1222.0	5440			12975	1466	1469	166	2567	11410
Ball - RB	55	10	1000	547	2430	39.3	1000	3363	380	381	43	1103	4903
				342	1520	63	1600						
	56	10		992	4410	39.3	1000	6328	715	832	94	1720	7648
				565	2510	78.7	2000						
	58	10		2297	10210	39.3	1000	12975	1466	1469	166	2567	11410
32	1233	5478.0	126	3200									

SERIES EGRR HEAVY DUTY PARALLEL GRIPPER page 88



- Superior moment and load capability
- Self-lubricating linear guides for low maintenance

MODEL NUMBER	TOTAL JAW TRAVEL TRAVEL TOLERANCE		GRIPPER WEIGHT				GRIP FORCE	
	+4.8	+0.189	WITHOUT MOTOR SPEED REDUCER		WITH MOTOR SPEED REDUCER			
	+2.1	+0.084	kg	lb	kg	lb	N	lb
EGRR12-x-63 x 150	150	5.906	12.8	28.2	14.9	32.8	3,561	809
EGRR12-x-63 x 200	200	7.874	15.3	33.7	17.4	38.3		
EGRR12-x-63 x 250	250	9.843	18.2	40.1	20.3	44.7		
EGRR12-x-63 x 300	300	11.811	20.5	45.1	22.5	49.7		
EGRR12-x-63 x 350	350	13.78	22.7	50.1	24.8	54.7		

*Refer to performance charts in engineering section of catalog and online sizing for specific performance limitations of a configured actuator.

Easy 3 Step Actuator and Motor Sizing

Using PHD's 3 step process, you can specify the actuator configured for your particular motor brand.

Your Motor Your Way

1 ONLINE SIZING:
Go to size.phdinc.com and input your requirements. Suitable actuator and motor performance requirements are provided. Contact PHD Application Support for additional assistance.

2 SELECT A MOTOR:
You select the motor from your preferred supplier for the application based on motor parameters from step 1.

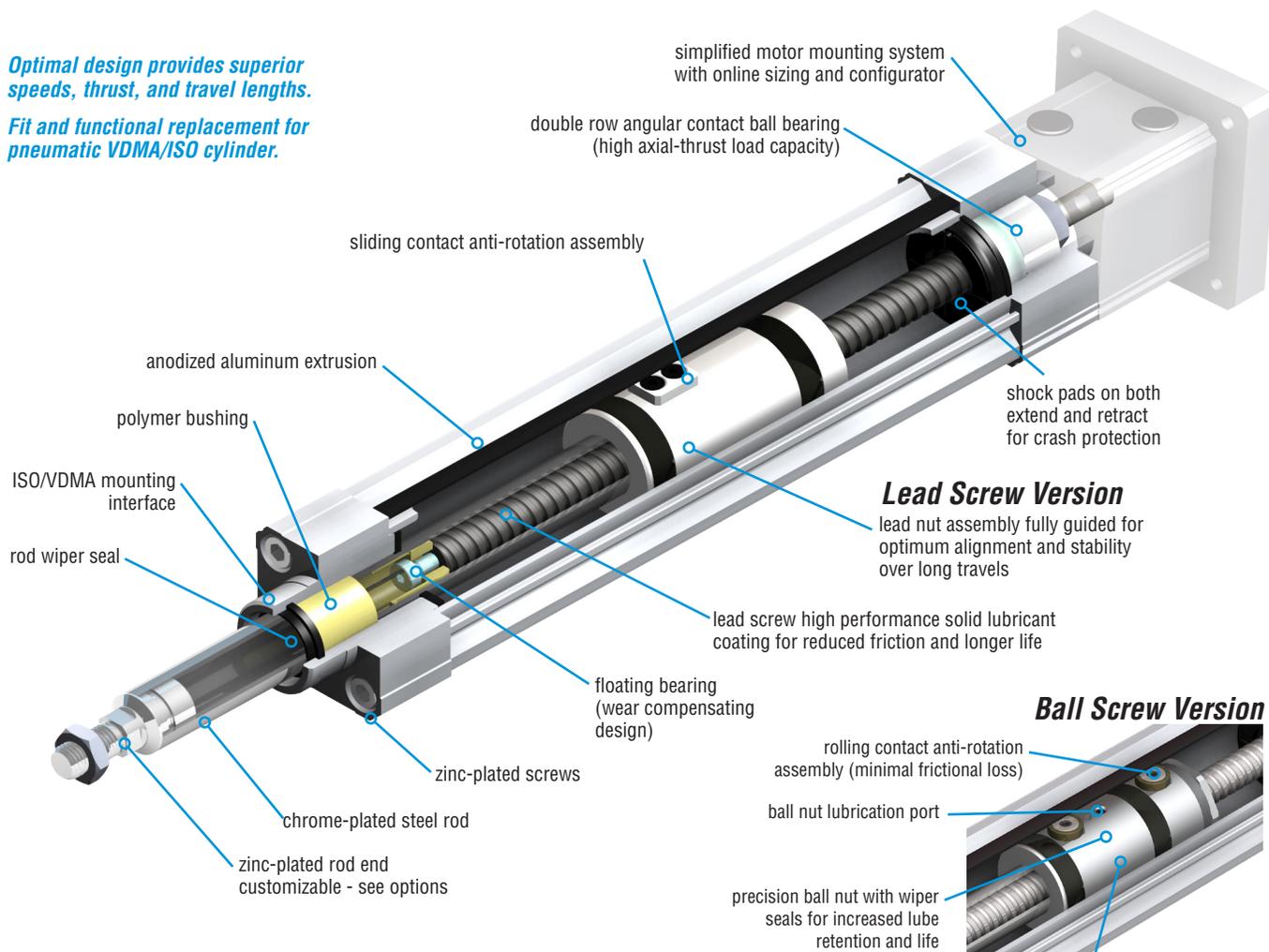
3 MOTOR CONFIGURATION:
Using PHD's CAD Configurator, a complete part number can be generated with a motor mount code specific to your actuator and motor combination.

See details in each product section.

SERIES ECV CYLINDER

Optimal design provides superior speeds, thrust, and travel lengths.

Fit and functional replacement for pneumatic VDMA/ISO cylinder.



Your Motor Your Way

Major Benefits

- High thrust and speed capability
- Precision screw assemblies with long service life
- Rigid construction with low backlash
- High degree of repeatability
- Travel lengths up to 1000 mm available
- IP50 ingress protection
- ISO/VDMA mounting interface for easy interchange
- Non-rotating rod or rotating rod versions
- Inline and foldback motor mounting flexibility
- **Your Motor, Your Way** allowing motor and controls flexibility at no additional cost
- Large choice of options/accessories
- Switch ready is standard

Choice of Inline or Foldback Motor Mounting



Foldback available in 1:1 or 2:1 drive for tailored performance.



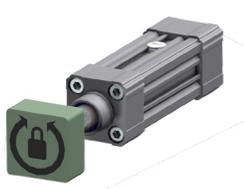
ORDERING DATA: Series ECV Cylinder

TYPE Electromechanical	SERIES VA - Non-rotating Rod VR - Rotating Rod ISO VDMA 6432 Drop-in replacement size 20 only, VDMA 24562 Drop-in replacement sizes 32-50.	SIZE 20 25 32 40 50	OPTIONS K_ - Extra rod extension in 1 mm increments. Length code is K100=100 mm, K050=50 mm T44 - Female rod end TEE - Male rod end with oversize thread. Not available on sizes 20 and 25. Blank - No Options	MOTOR MOUNT CODE Wxxxx - Open Architecture p/n code W0000 - Blank motor mount
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E C VA 5 20 x 400 - RL004 - T44 - QF11 - Wxxxx

PRODUCT Cylinder	DESIGN NO. 5 - Metric	TRAVEL (MAX.) RB (Ball) RL (Lead) Size mm mm 20 — 400 25 — 400 32 1000 500 40 1000 600 50 1000 750 50 mm minimum travel in 50 mm increments	SCREW CONFIGURATION	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
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BALL SCREW			LEAD SCREW		
Size	Type	Lead mm	Size	Type	Lead mm
32	RB005	5	20	RL150	1.50
32	RB010	10	20	RL004	4
40	RB010	10	25	RL150	1.50
40	RB016	16	25	RL003	3
50	RB010	10	32	RL003	3
50	RB020	20	32	RL006	6
			40	RL004	4
			40	RL008	8
			50	RL004	4
			50	RL008	8



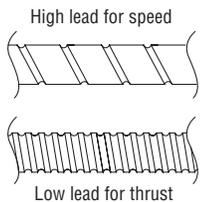
ROD ROTATION

Series VA requires no external guidance/coupling for cataloged performance.

Series VR requires the external payload to provide non-rotation to the system. This payload must be rigidly coupled to the rod to ensure axial motion. Any rotation will directly affect the performance of the system and result in lost motion.

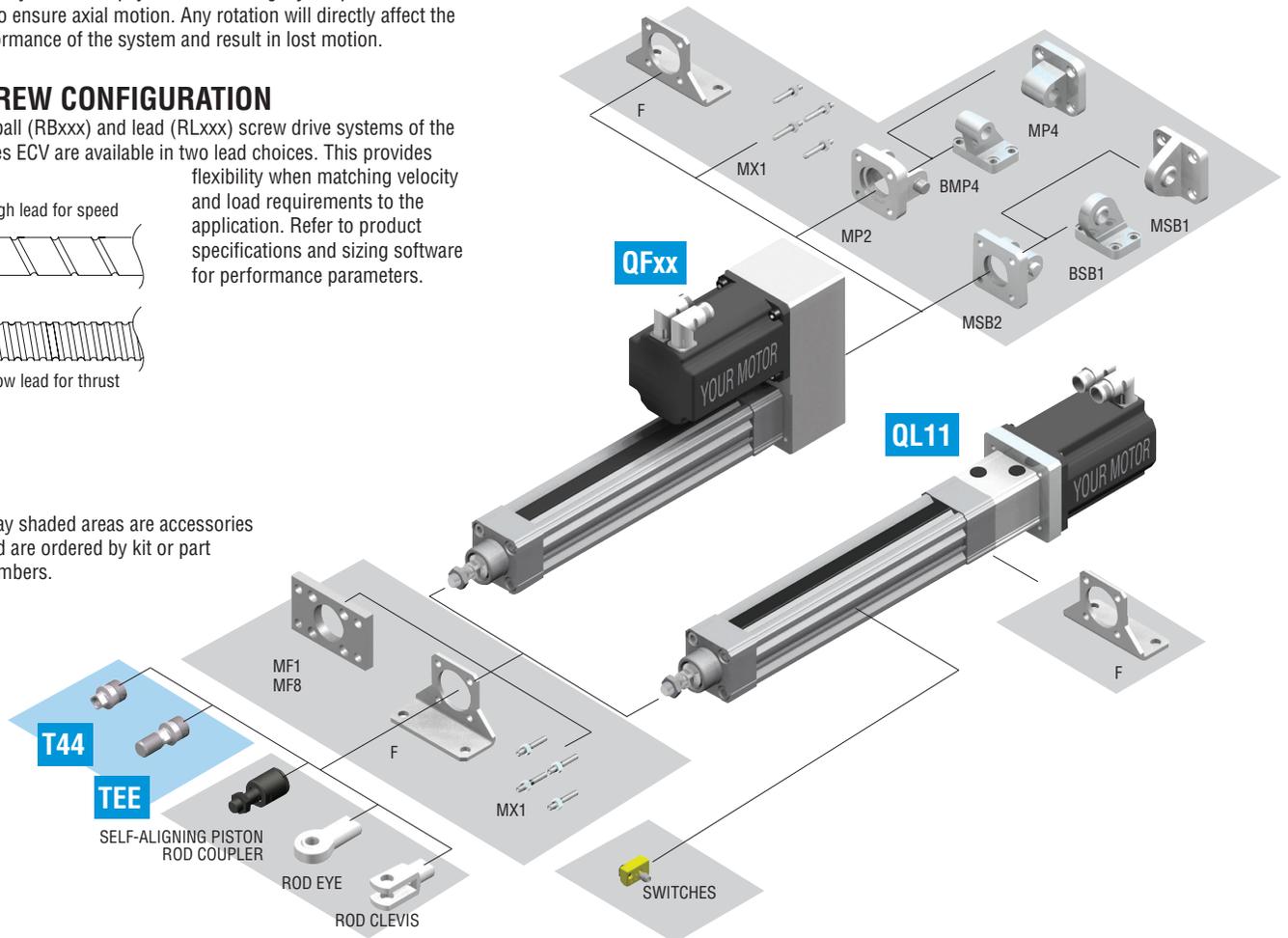
SCREW CONFIGURATION

The ball (RBxxx) and lead (RLxxx) screw drive systems of the Series ECV 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.



Gray shaded areas are accessories and are ordered by kit or part numbers.

MOUNTING OPTIONS & ACCESSORIES



ENGINEERING DATA: Series ECV Cylinder Ball Screw -RB

SPECIFICATIONS	BALL SCREW SERIES ECV ^A	BALL SCREW SERIES ECVR ^B
PISTON ROD	Non-Rotating	Rotating
REPEATABILITY ¹	±0.01 mm [±0.0004 in]	
MAXIMUM BACKLASH ²	0.025 mm [0.001 in]	
RATED LIFE	Refer to Life vs. Thrust Chart (page 8)	
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]	
ENCAPSULATION CLASS	IP50	

SPECIFICATIONS			SIZE					
			32		40		50	
MECHANICS	MAXIMUM TRAVEL	mm [in]	1000 [39.37]					
	DRIVE MECHANISM		Ball Screw					
	SCREW DIAMETER	mm	12	16		20		
SPEED ⁴	SCREW CONFIGURATION		-RB005	-RB010	-RB010	-RB016	-RB010	-RB020
	SCREW LEAD	mm	5	10	10	16	10	20
	MAXIMUM SPEED	mm/sec [in/sec]	500 [19.6]	1000 [39.3]	1000 [39.3]	1600 [63.0]	1000 [39.3]	2000 [78.7]
THRUST ⁵	MAXIMUM RPM	rev/min	6000					
	MAXIMUM ACCELERATION	-QL11	19.6 [772]					
		-QFx1	9.8 [386]					
TORQUE	MAXIMUM THRUST	N [lbf]	1360 [306]	680 [153]	2430 [546]	1520 [342]	4410 [991]	2510 [564]
	NOMINAL THRUST ⁵	N [lbf]	400 [90]	330 [74]	1270 [285]	975 [219]	1835 [413]	1515 [341]
	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]	
WEIGHT	NO-LOAD TORQUE	Nm [in-lb]	0.10 [0.89]		0.25 [2.21]		0.40 [3.54]	
	TOTAL @ ZERO STROKE (W _{OT})	kg [lb]	1.16 [2.55]		1.49 [3.29]		2.36 [5.20]	
	TOTAL LENGTH ADDER (W _{LT})	kg/mm [lb/in]	0.0034 [0.19]		0.0046 [0.26]		0.0071 [0.40]	
INERTIA	MOVING @ ZERO STROKE (W _{OM})	kg [lb]	0.30 [0.66]		0.52 [1.14]		0.98 [2.15]	
	MOVING LENGTH ADDER (W _{LM})	kg/mm [lb/in]	0.0010 [0.058]		0.0010 [0.058]		0.0020 [0.111]	
	ACTUATOR @ ZERO STROKE (J _o)	kg-m ² [lb-in ²]	3.00 x 10 ⁻⁶ [0.010]		1.50 x 10 ⁻⁵ [0.051]		4.84 x 10 ⁻⁵ [0.165]	
MOTOR CONFIGURATION (J _o)	LENGTH ADDER (J _L)	kg-m ² /mm [lb-in ² /in]	9.85 x 10 ⁻⁹ [0.0009]		2.90 x 10 ⁻⁸ [0.0025]		7.95 x 10 ⁻⁸ [0.0069]	
	MOVING WEIGHT ADDER (J _M)	kg-m ² /kg [lb-in ² /lb]	6.21 x 10 ⁻⁷	2.48 x 10 ⁻⁶	2.48 x 10 ⁻⁶	6.36 x 10 ⁻⁶	2.48 x 10 ⁻⁶	9.93 x 10 ⁻⁶
			[9.63 x 10 ⁻⁴]	[3.85 x 10 ⁻³]	[3.85 x 10 ⁻³]	[9.86 x 10 ⁻³]	[3.85 x 10 ⁻³]	[1.54 x 10 ⁻²]
	MOTOR CONFIGURATION (J _o)	-QF11	kg-m ² [lb-in ²]	1.40 x 10 ⁻⁵ [0.048]		4.71 x 10 ⁻⁵ [0.161]		4.65 x 10 ⁻⁵ [0.159]
-QF21			2.75 x 10 ⁻⁵ [0.094]		8.28 x 10 ⁻⁵ [0.283]		1.91 x 10 ⁻⁴ [0.654]	
-QL11			3.14 x 10 ⁻⁶ [0.011]		6.11 x 10 ⁻⁶ [0.021]		4.04 x 10 ⁻⁵ [0.138]	

NOTES:

- UNIDIRECTIONAL
- AXIAL FREE PLAY WHEN DRIVE SHAFT LOCKED
- REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
- REFER TO PERFORMANCE CHARTS ON PAGE 8
- 2500 km [100 MILLION INCHES] LIFE
- CORRESPONDS TO MAXIMUM THRUST
- FOR HOMING AND INCREASED APPLICATION FLEXIBILITY, INCLUDE EXTRA TRAVEL WHEN NECESSARY.
- SERIES VR REPEATABILITY AND BACKLASH A FUNCTION OF COUPLING RIGIDITY TO EXTERNAL NON-ROTATING LOAD
- 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 12 and 13]

TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

FOR -Qx11: INERTIA_{Reflected} = J_o + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT) + J_o

FOR -QF21: INERTIA_{Reflected} = [J_o + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_o

ENGINEERING DATA: Series ECV Cylinder Lead Screw -RL

SPECIFICATIONS	LEAD SCREW SERIES ECVA	LEAD SCREW SERIES ECVR
PISTON ROD	Non-Rotating	Rotating
REPEATABILITY ¹	±0.5 mm [±0.020 in]	
MAXIMUM BACKLASH ²	0.03 - 0.20 mm [0.001 - 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]	
ENCAPSULATION CLASS	IP50	

SPECIFICATIONS		SIZE																					
		20		25		32		40		50													
MECHANICS	MAXIMUM TRAVEL	mm [in]		400 [15.75]		400 [15.75]		500 [19.68]		600 [23.62]		750 [29.53]											
	SCREW DIAMETER	mm		8		10		12		16		20											
MECHANICS	SCREW CONFIGURATION			-RL150	-RL004	-RL150	-RL003	-RL003	-RL006	-RL004	-RL008	-RL004	-RL008										
	SCREW LEAD	mm		1.5		4		1.5		3		3		6		4		8		4		8	
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		1200		1200		1200		1200		1200		1200		1200		1200		1200	
THRUST	MAXIMUM ACCELERATION	mm/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]	
	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]										
		-QF1	Nm [in-lb]		0.5 [4.42]		0.7 [6.20]		0.84 [7.43]		3 [26.55]		5.46 [48.32]										
WEIGHT	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]											
	TOTAL @ ZERO STROKE (W _{OT})	kg [lb]		0.57 [1.26]		0.77 [1.70]		1.08 [2.39]		1.38 [3.05]		2.16 [4.77]											
WEIGHT	TOTAL LENGTH ADDER (W _{LT})	kg/mm [lb/in]		0.0015 [0.08]		0.002 [0.11]		0.0034 [0.19]		0.0046 [0.26]		0.0071 [0.40]											
	MOVING @ ZERO STROKE	kg [lb]		0.08 [0.18]		0.14 [0.30]		0.23 [0.50]		0.41 [0.90]		0.78 [1.72]											
WEIGHT	MOVING LENGTH ADDER	kg/mm [lb/in]		0.0004 [0.021]		0.0006 [0.034]		0.0010 [0.058]		0.001 [0.058]		0.002 [0.114]											
	ACTUATOR @ ZERO STROKE	kg-m ² [lb-in ²]		1.66 x 10 ⁻⁶ [0.006]		2.09 x 10 ⁻⁶ [0.007]		3.00 x 10 ⁻⁶ [0.010]		1.50 x 10 ⁻⁵ [0.051]		4.84 x 10 ⁻⁵ [0.165]											
INERTIA	LENGTH ADDER (J _L)	kg-m ² /mm [lb-in ² /in]		1.59 x 10 ⁻⁹ [0.00014]		4.94 x 10 ⁻⁹ [0.00043]		9.85 x 10 ⁻⁹ [0.0009]		2.90 x 10 ⁻⁸ [0.0025]		7.95 x 10 ⁻⁸ [0.0069]											
	MOVING WEIGHT ADDER (J _M)	kg-m ² /kg [lb-in ² /lb]		3.8 x 10 ⁻⁸ [5.89 x 10 ⁻⁵]		1.01 x 10 ⁻⁷ [1.57 x 10 ⁻⁴]		3.8 x 10 ⁻⁸ [5.89 x 10 ⁻⁵]		7.6 x 10 ⁻⁸ [1.18 x 10 ⁻⁴]		7.6 x 10 ⁻⁸ [1.18 x 10 ⁻⁴]		1.52 x 10 ⁻⁷ [2.36 x 10 ⁻⁴]		1.01 x 10 ⁻⁷ [1.57 x 10 ⁻⁴]		2.03 x 10 ⁻⁷ [3.14 x 10 ⁻⁴]		1.01 x 10 ⁻⁷ [1.57 x 10 ⁻⁴]		2.03 x 10 ⁻⁷ [3.14 x 10 ⁻⁴]	
INERTIA	MOTOR CONFIGURATION (J ₀)	-QF11	kg-m ² [lb-in ²]		2.69 x 10 ⁻⁵ [0.092]		2.69 x 10 ⁻⁵ [0.092]		1.40 x 10 ⁻⁵ [0.048]		4.71 x 10 ⁻⁵ [0.161]		4.65 x 10 ⁻⁵ [0.159]										
		-QF21			—		—		2.75 x 10 ⁻⁵ [0.094]		8.28 x 10 ⁻⁵ [0.283]		1.91 x 10 ⁻⁴ [0.654]										
		-QL11			1.89 x 10 ⁻⁶ [0.006]		1.89 x 10 ⁻⁶ [0.006]		3.14 x 10 ⁻⁶ [0.011]		6.11 x 10 ⁻⁶ [0.021]		4.04 x 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 CHARTS ON PAGE 9
- 5) CORRESPONDS TO MAXIMUM THRUST

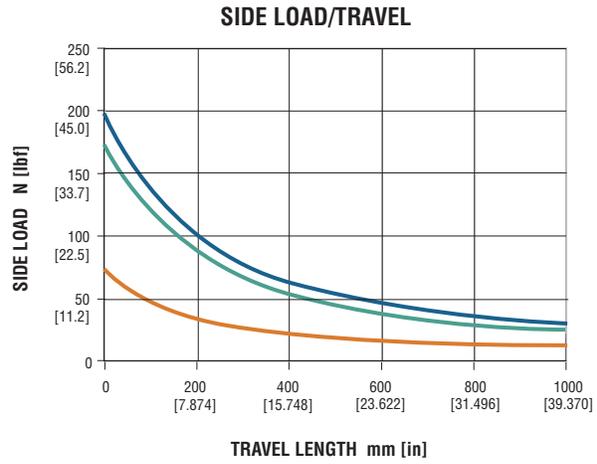
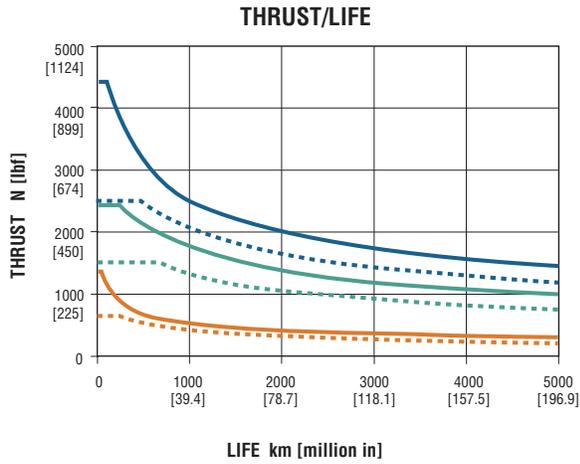
WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT [reference pages 12 and 13]

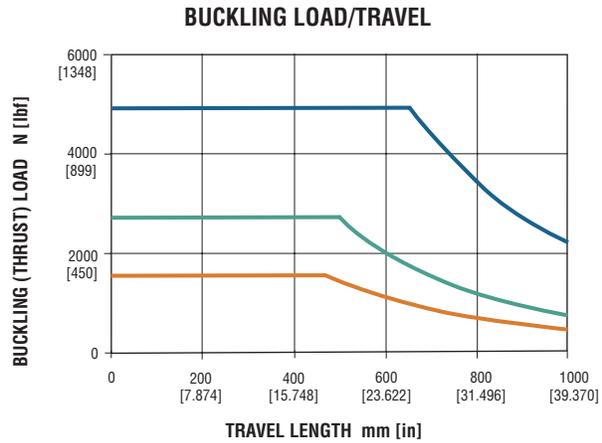
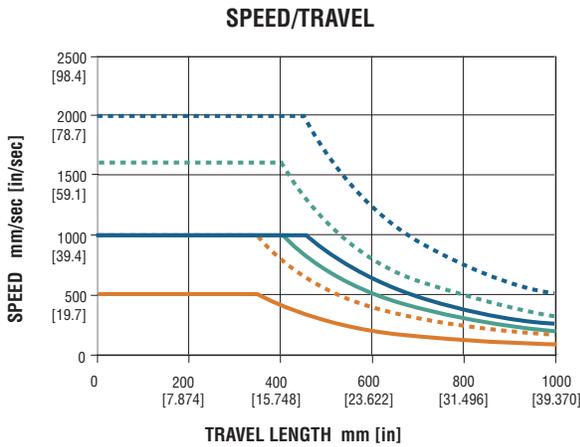
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

FOR -Qx11: INERTIA_{Reflected} = J₀ + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT) + J₀

FOR -QF21: INERTIA_{Reflected} = [J₀ + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J₀

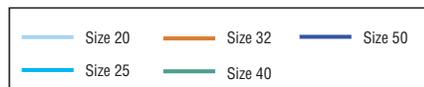
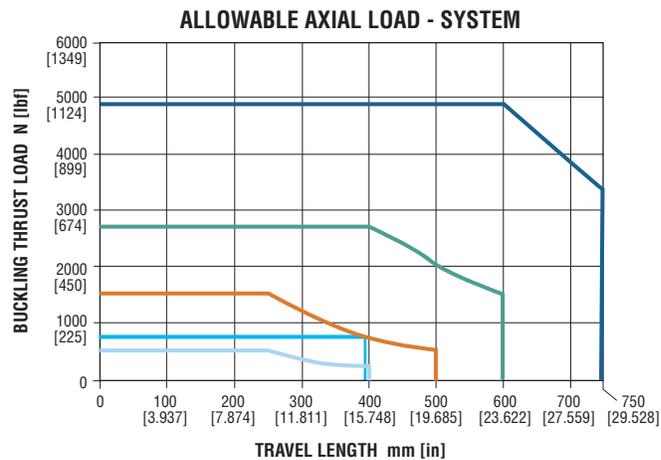
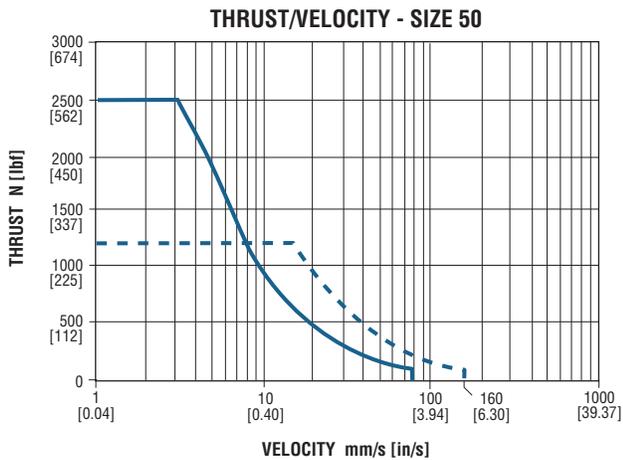
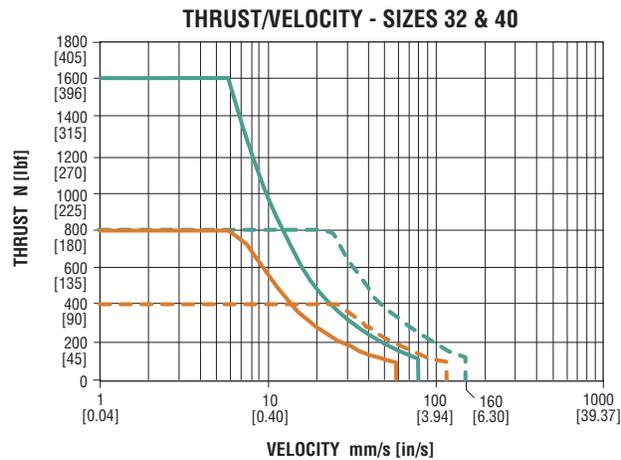
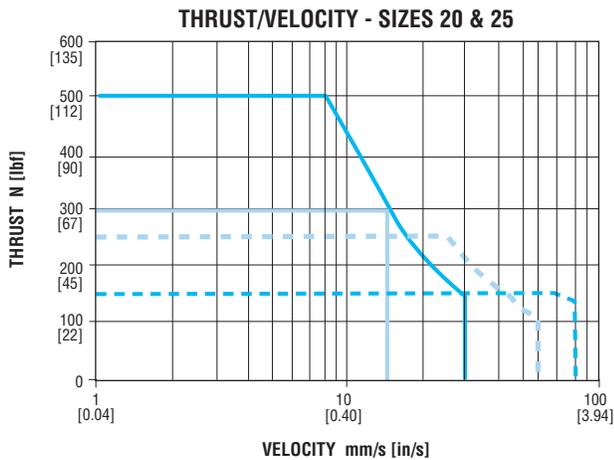


NOTE: THE MAXIMUM SPEED NOT TO EXCEED 200 mm/sec [7.87 in/sec]



This section contains information on the capabilities of the Ball Screw Series ECV. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer Service Department.

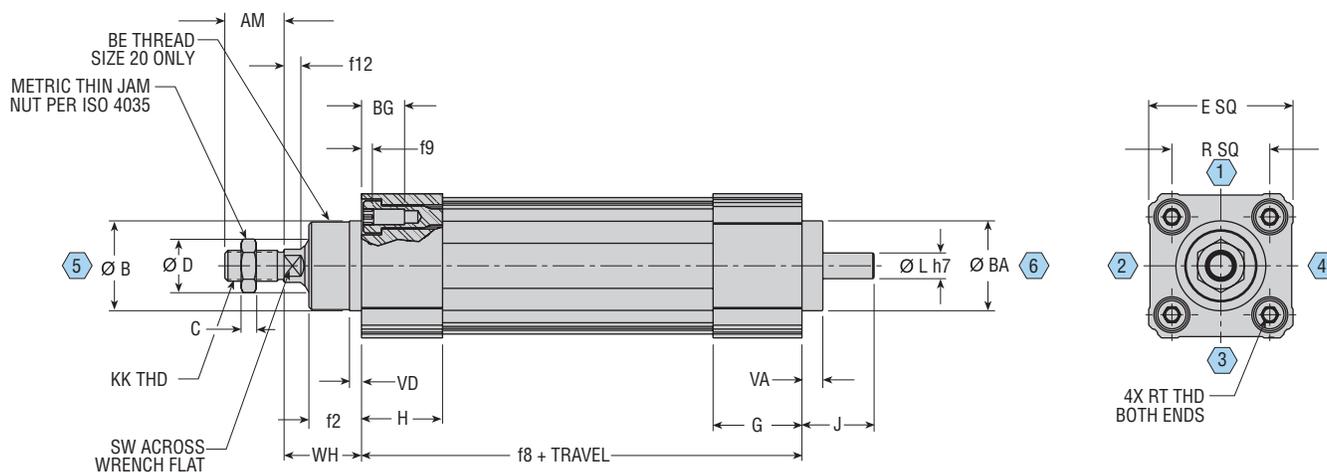
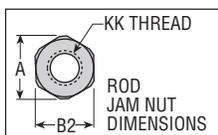
PERFORMANCE CHARTS: Series ECV Cylinder Lead Screw -RL



This section contains information on the capabilities of the Lead Screw Series ECV. It is not intended to be a comprehensive selection guide. To simplify the selection process, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer Service Department.

DIMENSIONS: Series ECV Cylinder

The Series ECV is available as a driver only or with inline or foldback **Your Motor, Your Way** configurations. These dimensions apply to the driver portion for all standard units.



SIZE	A MAX	AM	ØB	ØB2	ØBA	BE	BG MIN	C	ØD	E	f2	f8	f9	f12	G	H	J	KK	ØL	R	RT	SW	VA	VD	WH
20	15.0	19.0	21.9	13.0	22.9	M22 x 1.5	12.0	3.9	12.6	37.0	16.6	113.4	3.6	6.0	22.4	20.0	24.4	M8 x 1.25	5.0	26.0	M4 x .7	7.0	8.1	2.0	24.0
25	18.5	21.0	21.9	16.0	24.9	—	12.0	4.9	15.8	40.0	16.6	117.3	3.6	6.0	22.4	20.0	24.4	M10 x 1.25	5.0	27.0	M4 x .7	8.0	8.1	2.0	28.0
32	18.5	21.0	29.9	16.0	29.9	—	18.0	4.9	18.9	49.5	18.5	150.0	4.3	6.0	31.0	28.0	25.0	M10 x 1.25	6.0	32.5	M6 x 1	9.9	8.1	4.5	26.0
40	20.8	23.0	34.9	18.0	34.9	—	18.7	5.9	22.1	56.0	20.4	170.9	4.2	6.5	34.5	31.4	28.0	M12 x 1.25	10.0	38.0	M6 x 1	12.9	8.1	4.6	30.0
50	27.7	31.0	39.9	24.0	48.5	—	20.7	7.7	28.5	68.5	27.6	193.0	5.7	8.0	34.5	34.5	34.6	M16 x 1.5	12.0	46.5	M8 x 1.25	15.9	9.1	4.6	37.0

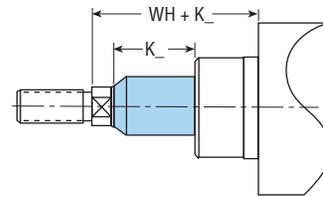
NOTES:

- 1) NUMBERS SHOWN IN ◊ INDICATE CYLINDER POSITIONS
- 2) DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

K EXTRA ROD EXTENSION

Extra rod extension can be achieved by specifying the option -K followed by the length code. Rod extension is available in 1 mm increments (250 mm max). Rod extension can impact load capacity, therefore rod extension and travel should not exceed 1000 mm.



Length Code	
Metric	
K5	5 mm extra rod extension
K15	15 mm extra rod extension

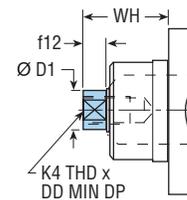
BORE mm	WH
20	24.0
25	28.0
32	26.0
40	30.0
50	37.0

NOTE: DIMENSIONS: mm

T44 FEMALE ROD END

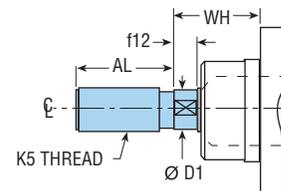
This option provides a female rod end in place of the standard male rod end. See catalog dimensional page for standard rod end. This rod end deviates from ISO 6431/VDMA 24562.

T44 FEMALE ROD END



TEE MALE OVERSIZE ROD END (Only available on sizes 32, 40 & 50)

TEE MALE OVERSIZE ROD END



LETTER DIM	SIZE				
	20	25	32	40	50
AL	—	—	21.0	23.0	31.0
D1	8.00	10.01	11.35	15.21	18.27
f12	6.0	6.0	6.0	6.5	8.0
K4	M5 x 0.8	M6 x 1.0	M8 x 1.25	M10 x 1.5	M12 x 1.75
K5	—	—	M12 x 1.25	M16 x 1.5	M20 x 1.5
DD min	10.5	12.5	14.0	17.0	19.0
WH	24.0	28.0	26.0	30.0	37.0

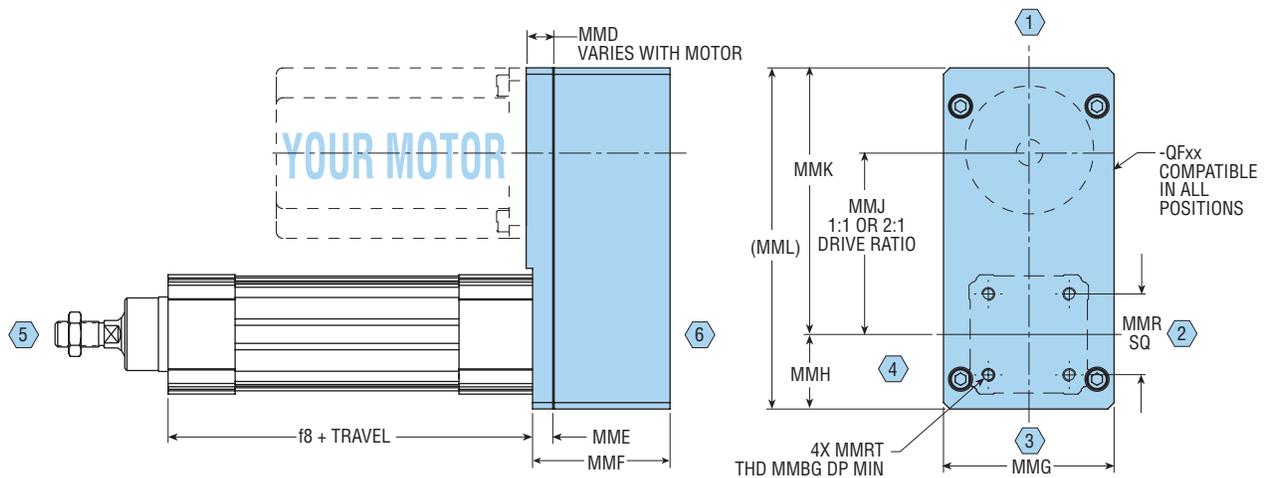
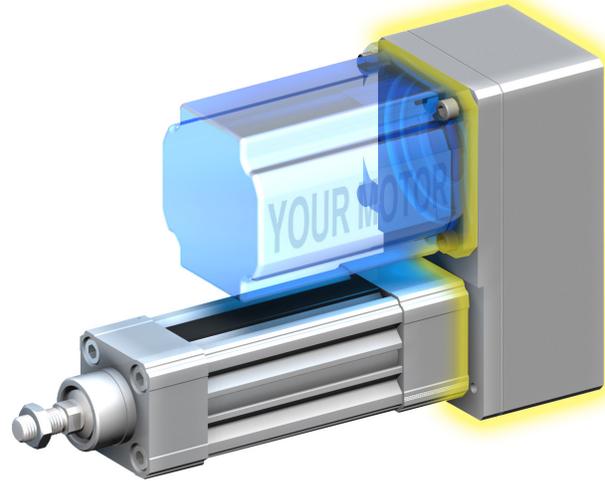
NOTE: DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

QF21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO (NOT AVAILABLE ON SIZES 20 AND 25)

Foldback motor mounting with the QF11 option provides a 1:1 drive ratio allowing similar performance to the inline motor mounting in a shorter overall length. The QF21 option provides a 2:1 drive ratio reduction for applications that require higher thrust. Foldback motor mounting also provides a VDMA 24562 compliant mounting pattern that allows the use of many standard cylinder mounting accessories. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 14.

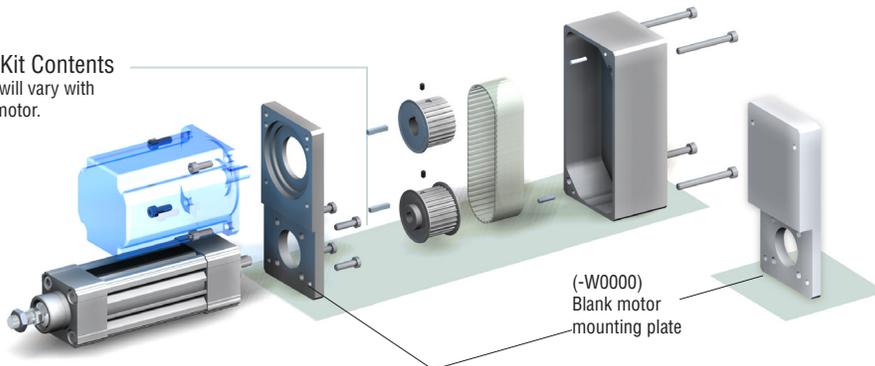


SIZE	f8	MMD MIN	MMD MAX	MME	MMF	MMG	MMH	MMJ 1:1	MMJ 2:1	MMK	MML	MMR	MMRT	MMBG	WEIGHT kg
20	113.4	6.1	22.5	9.5	55.5	58.0	24.0	67.5	—	96.5	120.5	26.0	M4 x .7	11.5	0.79
25	117.3	6.1	22.5	9.5	55.5	58.0	24.0	67.5	—	96.5	120.5	27.0	M4 x .7	11.5	0.79
32	150.0	9.5	31.5	9.5	55.5	63.0	31.0	72.5	70.5	104.0	135.0	32.5	M6 x 1	11.5	1.02
40	170.9	9.5	22.5	9.5	64.5	80.0	35.0	85.1	83.9	125.1	160.1	38.0	M6 x 1	11.5	1.70
50	193.0	9.5	22.5	9.5	68.0	86.0	44.0	102.5	111.4	154.4	198.4	46.5	M8 x 1.25	14.5	2.37

NOTES:

- YOUR MOTOR, YOUR WAY MOTOR MOUNT -QFxx IS PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO CYLINDER
- KITS INCLUDE DIRECTIONS AND ALL PARTS REQUIRED TO ASSEMBLE TO DRIVER BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
- WHEN (-W0000) IS SPECIFIED, PULLEY ID IS SUPPLIED WITH UNFINISHED ID Ø MMU AND MOTOR MOUNTING PLATE IS SUPPLIED WITHOUT MOTOR MOUNTING FEATURES
- DIMENSIONS: mm

Typical Kit Contents
Contents will vary with selected motor.

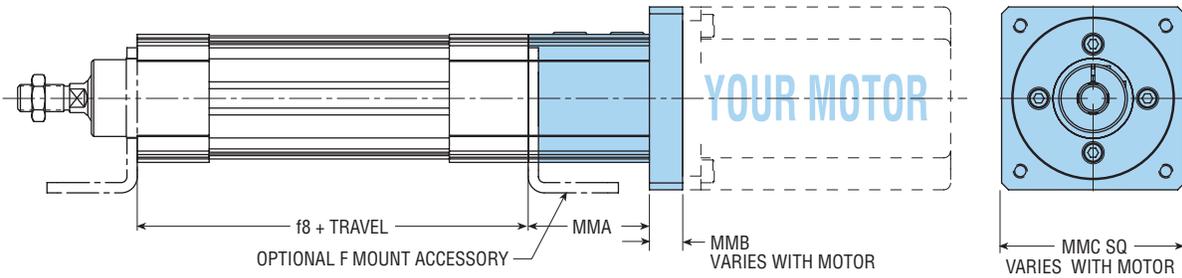
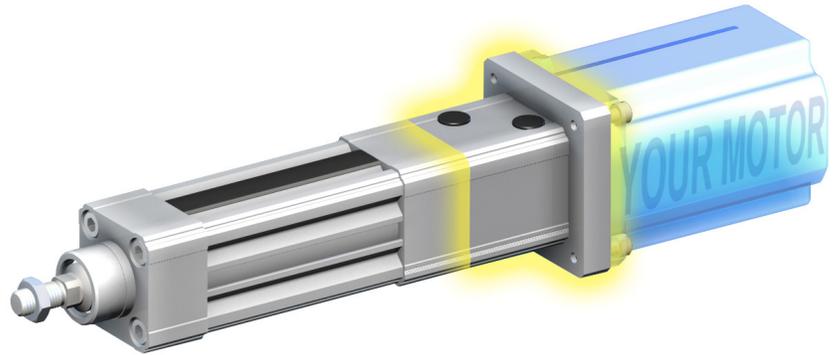


**Your Motor
Your Way**

All dimensions are reference only unless specifically tolerated.

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 14.

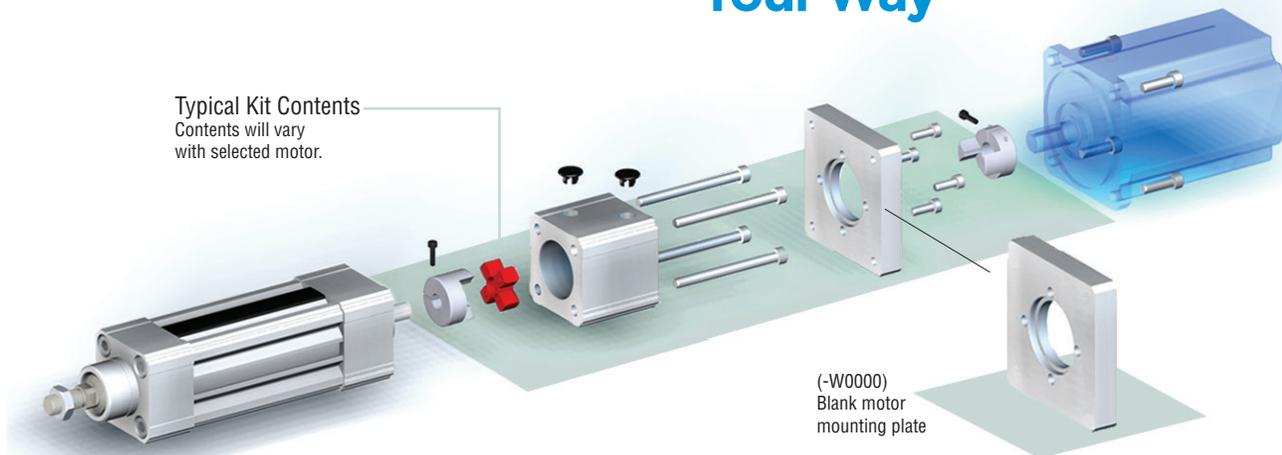


SIZE	f8	MMA	MMA WITH F MOUNT	MMB MAX	MMB MIN	MMC		WEIGHT kg
						STANDARD	OVERSIZE	
20	113.4	43.6	46.6	25.4	8.5	49.0	60.0	.25
25	117.3	43.6	46.6	25.4	8.5	49.0	60.0	.25
32	150.0	49.5	54.0	25.4	8.5	60.0	70.0	0.45
40	170.9	53.0	57.5	35.6	8.5	70.0	88.0	0.65
50	193.0	82.1	86.6	35.6	8.5	88.0	110.0	1.36

NOTES:

- 1) YOUR MOTOR, YOUR WAY MOTOR MOUNT -QL11 IS PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO CYLINDER
- 2) KITS INCLUDE DIRECTIONS AND ALL PARTS REQUIRED TO ASSEMBLE TO DRIVER BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
- 3) WHEN (-W0000) IS SPECIFIED, COUPLER ID IS SUPPLIED WITH UNFINISHED ID Ø MMT AND MOTOR MOUNTING PLATE IS SUPPLIED AT MMC "OVERSIZE" AND WITHOUT MOTOR MOUNTING FEATURES
- 4) DIMENSIONS: mm

Your Motor Your Way



All dimensions are reference only unless specifically tolerated.

Wxxxx MOTOR MOUNT CODE

Your Motor, Your Way customizable motor mounting is generated by PHD's extensive motor database at www.config.phdinc.com. Users 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 mount code.

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

Your Motor Your Way

Select your compatible motor of choice from the pre-populated motor database!

The screenshot shows the PHD Sizing software interface. The top navigation bar includes the PHD logo, 'Sizing Home', 'File', 'Rebecca Hutchins', and 'Help'. The main interface is divided into four steps: 1. Settings (Enter app settings), 2. Motion Profile (Enter app motion), 3. Selection (Pick your electric actuator), and 4. Summary (View details, get CAD & report). The current step is 'Step 1 - Enter App Settings'. It features several input fields: 'Actuator Type' with options for Cylinder, Cantilever Slide, Saddle Slide, and Gripper (selected); 'Unit Series' with 'EGRR' selected and a 'ON' toggle; 'Sizing Type' with instructions to enter application settings and motor parameters; 'Input Units' with 'Imperial' selected; and 'App Inputs' with fields for Tooling Length (K) (From Face) set to 250.00 mm, Total Tooling Weight (W) set to 10.00 kg, and Load set to 10.00 kg. A 'Next' button is visible at the bottom right.

Step 1 - Online Actuator Sizing - size.phdinc.com

- Input your application data.
- The sizing software will tell you which actuator and motor performance parameters are needed for your application.

Step 2 - Motor Selection

- Based on the performance requirements determined by online sizing, select an appropriate motor from your preferred motor manufacturer.

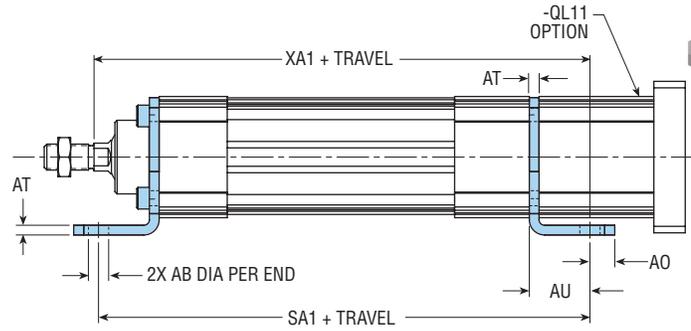
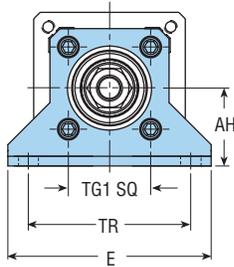
Step 3 - CAD Configurator - config.phdinc.com

- Select your motor from the drop down menus or request a new motor if the preferred motor is not on the list.
- The generated motor mount code for the compatible motor will complete the ordering data necessary to download 3D CAD model or order the actuator tailored to your specific application.

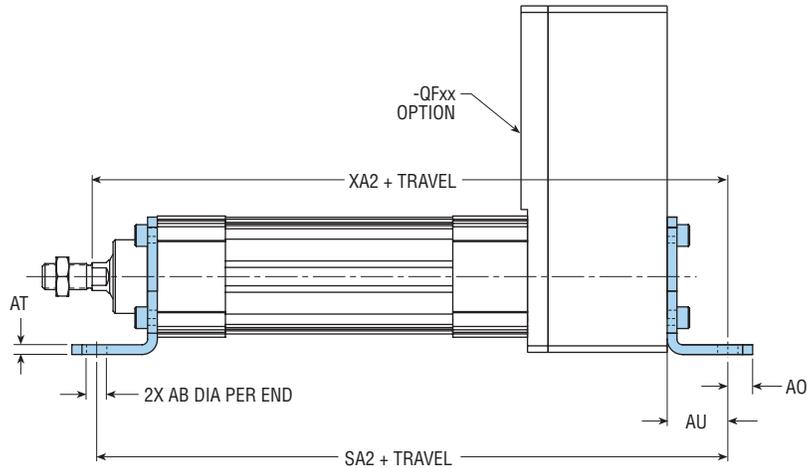
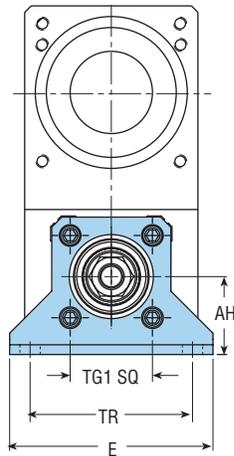
F BASE MOUNTING KIT

NOTE: BASE MOUNTING KIT BRACKET ADDS TO OVERALL LENGTH

INLINE



FOLDBACK



LETTER DIM	SIZE				
	20	25	32	40	5
AB	6.86	6.86	6.86	9.37	9.37
TG1	26.0	27.0	32.5	38.0	46.5
E MAX	65.3	68.48	80.4	94.6	109.0
TR	50.8	54.0	65.5	75.0	87.5
AO MAX	8.13	8.13	8.4	11.5	11.4
AU	19.99	19.99	24.0	28.0	32.0
AH	24.99	24.99	32.0	36.0	45.0
AT	3.05	3.05	4.5	4.5	5.5
SA1	153.34	157.25	198.0	226.9	257.0
SA2	208.84	212.75	253.5	291.4	325.0
XA1	159.44	164.44	200.0	228.9	262.0
XA2	214.93	219.94	255.5	293.4	330.0
KIT NO.	85971-01-01	85972-01-01	83217-01-01	83217-02-01	83217-03-01

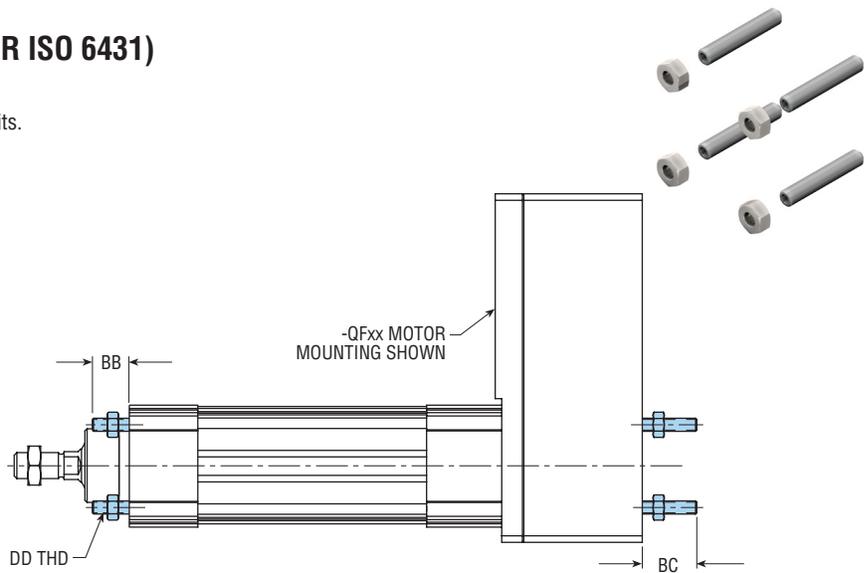
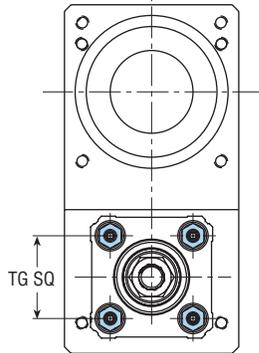
NOTES:

- 1) KIT INCLUDES BRACKET AND CYLINDER MOUNTING HARDWARE FOR ONE END ONLY
- 2) DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

MX1 FASTENER MOUNTING KIT (PER ISO 6431)

Fastener mounting kit can be used on the rod end of all units. This kit can also be used on the motor end of -QFxx units.



SIZE	BB MIN	BC	DD	TG	KIT NO.
20	13.0	18.9	M4 x 0.7	26.0	85961-01-01
25	13.0	18.9	M4 x 0.7	27.0	85961-01-01
32	17.0	25.0	M6 x 1.0	32.5	83213-01-01
40	17.0	25.0	M6 x 1.0	38.0	83213-01-01
50	23.0	31.4	M8 x 1.25	46.5	83213-02-01

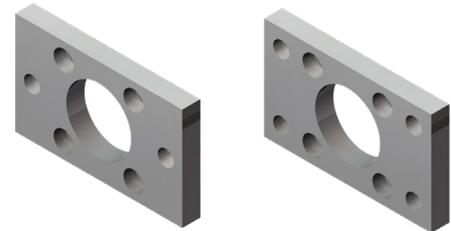
NOTES:

- 1) KIT INCLUDES STUD AND NUTS FOR ONE END ONLY
- 2) ROD END MOUNTING (BB) COMPLIES WITH ISO 6431, REAR MOUNTING (BC) DOES NOT
- 3) REQUIRES -QFxx FOR REAR MOUNTING
- 4) DIMENSIONS: mm

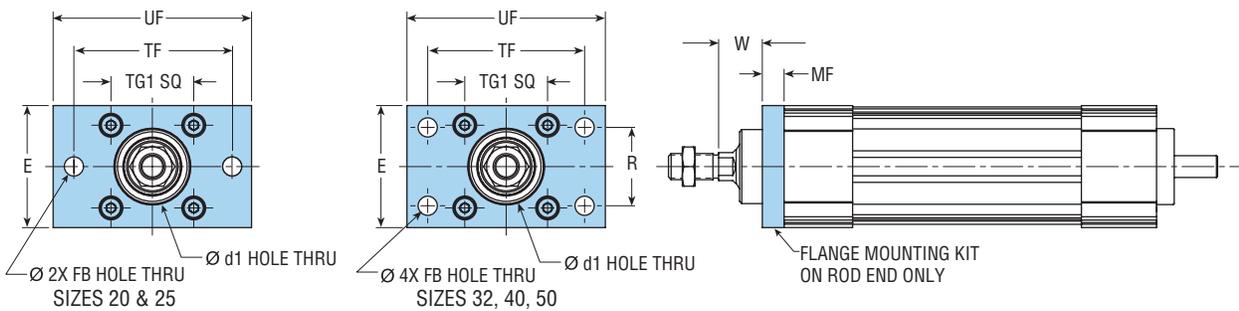
MF8 FLANGE MOUNTING KIT (MF8 PER ISO 6432) (SIZES 20 & 25)

SIZES 20 & 25

SIZES 32, 40, 50



MF1 FLANGE MOUNTING KIT (PER VDMA 24562) (SIZES 32, 40 & 50)



SIZE	LETTER DIMENSION/TOLERANCE									
	d1/H11	FB/H13	TG1	E MAX	R/JS14	MF	TF/JS14	UF MAX	W	KIT NO.
20	22.0	M6 x 1.0	26.0	40.0	—	5.0	50.0	70.0	19.0	85552-01-01
25	22.0	M6 x 1.0	27.0	40.0	—	5.0	50.0	70.0	23.0	85552-01-01
32	30.1	6.7	32.5	50.0	32.0	10.0	64.0	86.0	16.0	83219-01-01
40	35.0	8.8	38.0	58.0	36.0	10.0	72.0	96.0	20.0	83219-02-01
50	40.1	8.8	46.5	70.0	45.0	12.0	90.0	115.0	25.0	83219-03-01

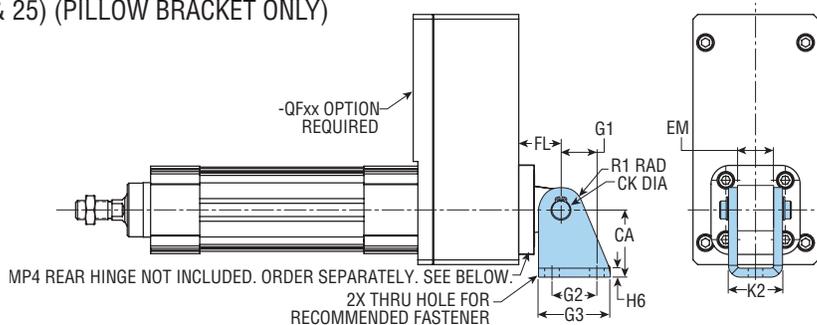
NOTES:

- 1) KIT INCLUDES CYLINDER MOUNTING HARDWARE FOR ROD END ONLY
- 2) DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

REAR MALE HINGE MOUNTING BRACKET KIT

(SIZES 20 & 25) (PILLOW BRACKET ONLY)



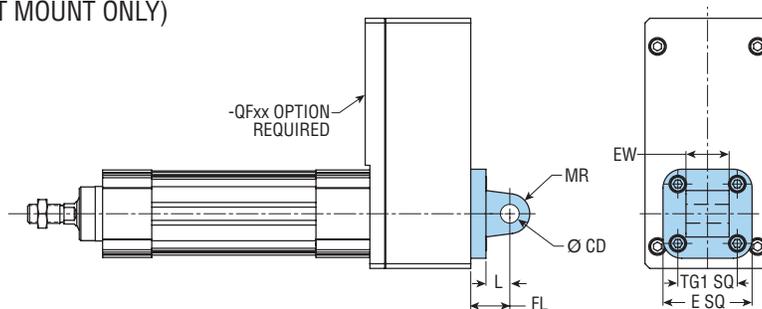
SIZE	LETTER DIMENSION/TOLERANCE											FASTENER	KIT NO.
	CA	CK	EM	FL	G1	G2	G3	H6	K2	R1	R1 RAD CK DIA		
20	30.0	8.0	16.1	21.7	16.0	20.0	32.0	4.0	24.1	10.0		M6	65778-01-2
25	30.0	8.0	16.1	21.7	16.0	20.0	32.0	4.0	24.1	10.0		M6	65778-01-2

NOTES:

- 1) KIT INCLUDES CYLINDER MOUNTING HARDWARE
- 2) DIMENSIONS: mm

MP4 REAR MALE HINGE MOUNTING KIT (PER VDMA 24562)

(PIVOT MOUNT ONLY)



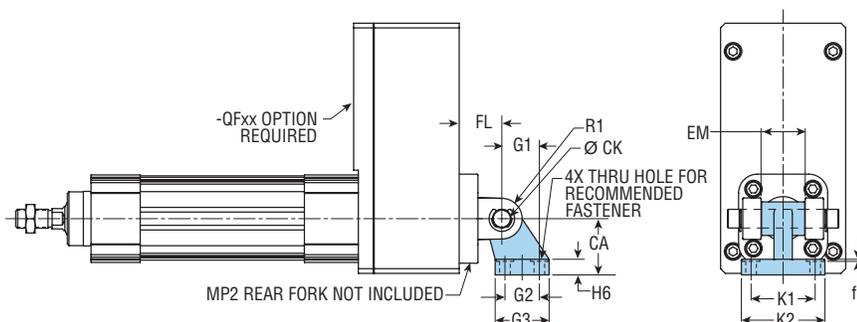
SIZE	LETTER DIMENSION/TOLERANCE								KIT NO.
	E MAX	EW MAX	TG1	FL (±0.2mm)	L MIN	CD/H9	MR MAX	MR	
20	40.5	16.0	26.4	21.7	12.0	8.0	10.0	85973-01-01	
25	40.5	16.0	26.4	21.7	12.0	8.0	10.0	85973-01-01	
32	50.0	26.0	32.5	22.0	12.2	10.0	11.0	83218-01-01	
40	58.0	28.0	38.0	25.0	15.3	12.0	13.0	83218-02-01	

NOTES:

- 1) KIT INCLUDES CYLINDER MOUNTING HARDWARE
- 2) REAR MALE HINGE IS COMPATIBLE WITH MP2 MOUNTING AND MP2 PIVOT PIN
- 3) REQUIRES -QFxx OPTION
- 4) DIMENSIONS: mm

BMP4 PILLOW BLOCK MOUNTING KIT (PER CETOP 107 P)

(SIZES 32, 40 & 50)



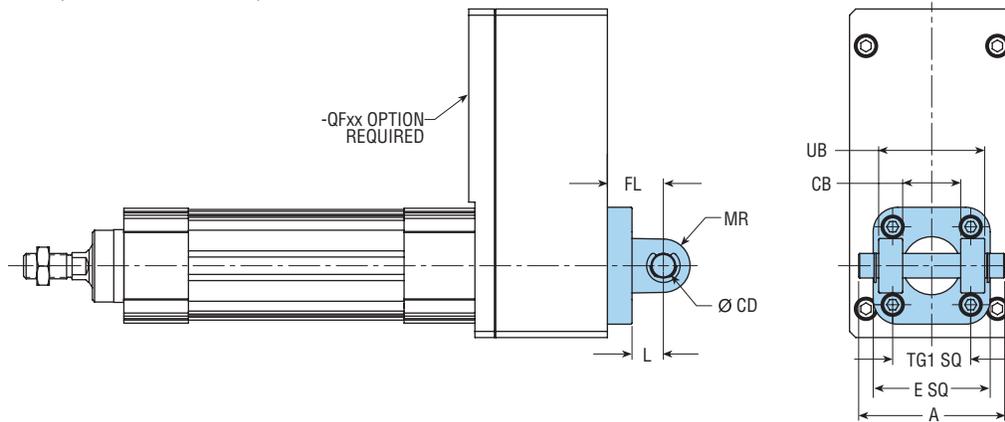
SIZE	LETTER DIMENSION/TOLERANCE													FASTENER	KIT NO.
	CK/H9	K1/JS14	K2 MAX	G1/JS14	f5 MAX	G2	EM MAX	G3 MAX	CA/JS15	H6	R1 MAX	FL	f5		
32	10.0	38.0	51.0	21.0	1.6	18.0	25.8	31.0	32.0	8.0	10.0	22.0	M6	62818-001-00	
40	12.0	41.0	54.0	24.0	1.6	22.0	27.8	35.0	36.0	10.0	11.0	25.0	M6	62818-002-00	
50	12.0	50.0	65.0	33.0	1.6	30.0	31.8	45.0	45.0	12.0	13.0	27.0	M8	62818-003-00	

NOTES:

- 1) KIT DOES NOT INCLUDE MOUNTING FASTENERS OR PIVOT PIN
- 2) BMP4 PILLOW BLOCK IS COMPATIBLE WITH MP2 REAR FORK
- 3) REQUIRES -QFxx OPTION
- 4) MOUNTING IS FUNCTIONAL IN INDICATED ORIENTATION ONLY
- 5) DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

MP2 REAR FORK MOUNTING KIT (PER VDMA 24562) (SIZES 32, 40 & 50)

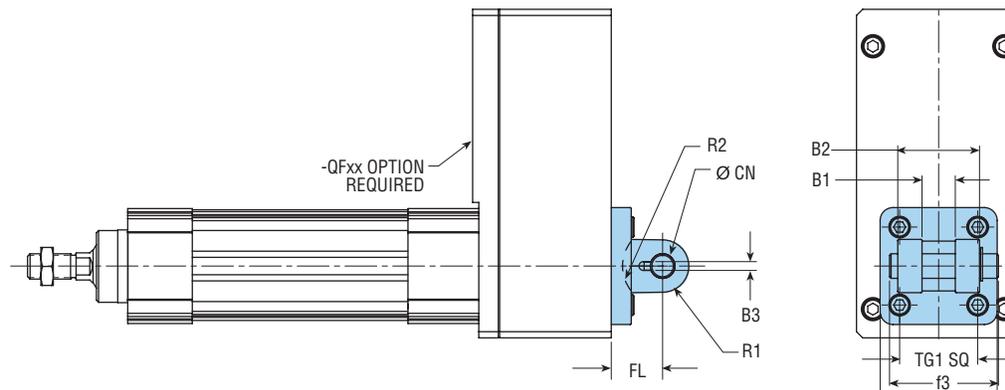


SIZE	LETTER DIMENSION/TOLERANCE									
	A MAX	E MAX	UB/h14	CB/H14	TG1	FL (±0.2 mm)	L MIN	CD/H9	MR MAX	KIT NO.
32	65.0	50.0	44.7	26.3	32.5	22.0	12.2	10.0	11.0	83214-01-01
40	72.0	58.0	51.6	28.3	38.0	25.0	15.0	12.0	13.0	83214-02-01
50	80.0	70.0	59.6	32.3	46.5	27.0	15.3	12.0	13.0	83214-03-01

NOTES:

- 1) KIT INCLUDES CYLINDER MOUNTING HARDWARE, PIVOT PIN AND PIVOT PIN RETAINER CLIPS
- 2) MP2 REAR FORK MOUNTING IS COMPATIBLE WITH MP4 MALE HINGE AND BMP4 PILLOW BLOCK
- 3) REQUIRES -QFxx OPTION
- 4) DIMENSIONS: mm

MSB2 REAR FORK MOUNTING FOR SPHERICAL BEARING KIT (PER VDMA 24562) (SIZES 32, 40 & 50)



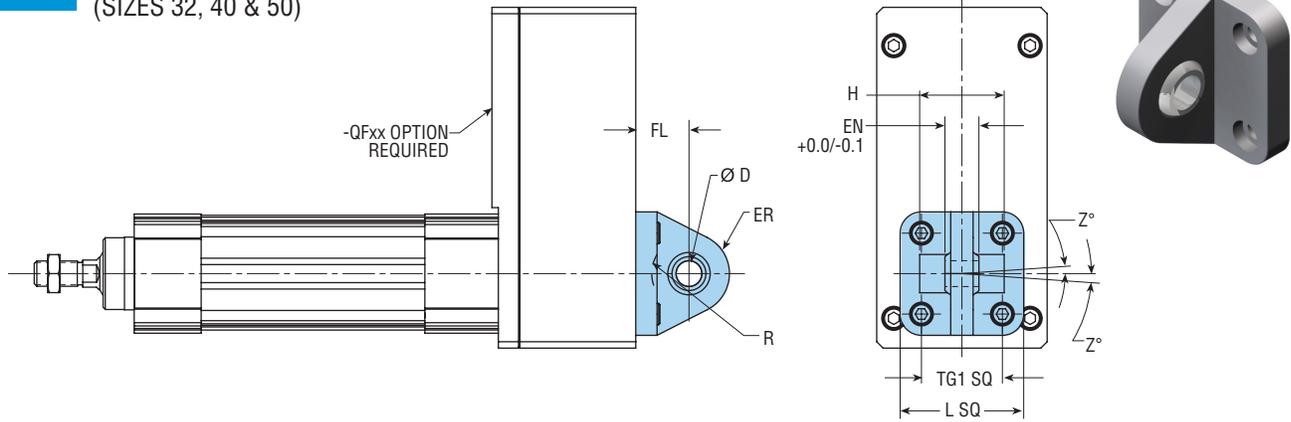
SIZE	LETTER DIMENSION/TOLERANCE										
	E MAX	B2/d12	B1/H14	TG1	B3 (±0.2 mm)	R2 MIN	f3	FL (±0.2 mm)	CN/F7	R1 MAX	KIT NO.
32	50.0	33.8	14.2	32.5	3.3	16.5	46.0	22.0	10.0	11.0	83215-01-01
40	58.0	39.8	16.2	38.0	4.3	19.5	53.0	25.0	12.0	13.0	83215-02-01
50	70.0	44.8	21.3	46.5	4.3	21.5	58.0	27.0	16.0	13.0	83215-03-01

NOTES:

- 1) KIT INCLUDES CYLINDER MOUNTING HARDWARE AND PIVOT PIN
- 2) MSB2 REAR FORK IS COMPATIBLE WITH BSB1 PILLOW BLOCK, MSB1 REAR MALE HINGE WITH SPHERICAL BEARING AND ROD EYE
- 3) REQUIRES -QFxx OPTION
- 4) DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

MSB1 REAR MALE HINGE MOUNTING FOR SPHERICAL BEARING KIT (SIZES 32, 40 & 50)

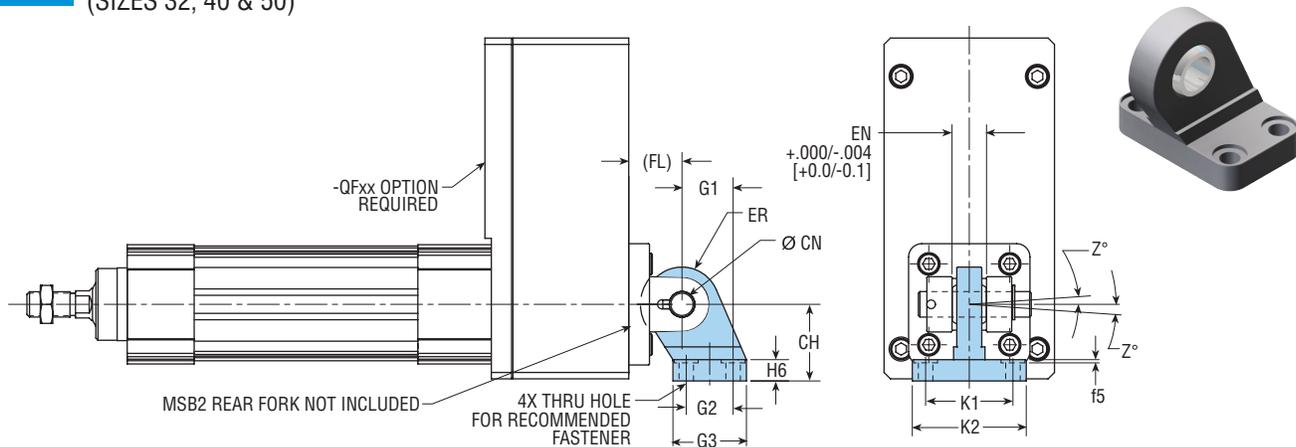


SIZE	LETTER DIMENSION/TOLERANCE									
	TG1	FL (±0.2 mm)	D/H7	EN	ER MAX	L MAX	Z	H	R	KIT NO.
32	32.5	22.0	10.0	13.9	16.0	50.0	4°	—	—	83216-01-01
40	38.0	25.0	12.0	16.0	19.0	58.0	4°	—	—	83216-02-01
50	46.5	27.0	16.0	21.0	21.0	70.0	4°	51.0	19.0	83216-03-01

NOTES:

- 1) KIT INCLUDES CYLINDER MOUNTING HARDWARE
- 2) MSB1 REAR MALE IS COMPATIBLE WITH MSB2 REAR FORK FOR SPHERICAL BEARING
- 3) REQUIRES -QFxx OPTION
- 4) DIMENSIONS: mm

BSB1 PILLOW BLOCK MOUNTING SPHERICAL BEARING KIT (PER VDMA 24562) (SIZES 32, 40 & 50)



SIZE	LETTER DIMENSION/TOLERANCE														
	CN/H7	K1/JS14	K2 MAX	G1/JS14	f5 MAX	G2/JS14	EN	G3 MAX	CH/JS15	H6	ER MAX	FL	Z	FASTENER	KIT NO.
32	10.0	38.0	51.0	21.0	1.6	18.0	13.9	31.0	32.0	10.0	16.0	22.0	4°	M6	62822-001-00
40	12.0	41.0	54.0	24.0	1.6	22.0	16.0	35.0	36.0	10.0	18.0	25.0	4°	M6	62822-002-00
50	16.0	50.0	65.0	33.0	1.6	30.0	21.0	45.0	45.0	12.0	21.0	27.0	4°	M8	62822-003-00

NOTES:

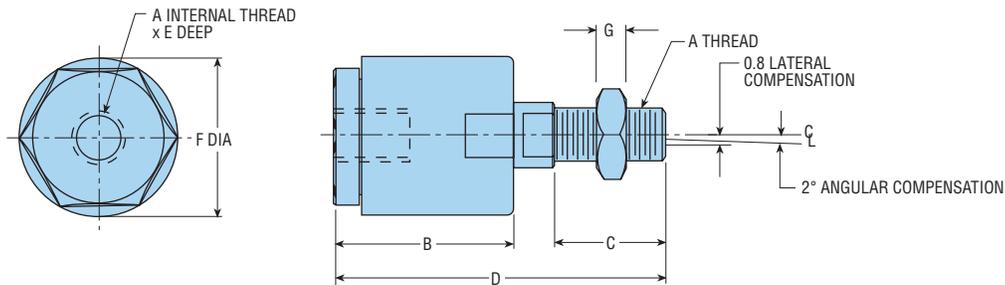
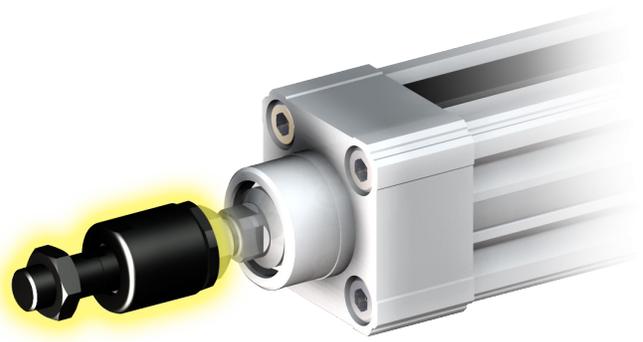
- 1) KIT INCLUDES PILLOW BLOCK ONLY
- 2) BSB1 PILLOW BLOCK IS COMPATIBLE WITH MSB2 REAR FORK FOR SPHERICAL BEARING
- 3) REQUIRES -QFxx OPTION
- 4) MOUNTING IS FUNCTIONAL IN INDICATED ORIENTATION ONLY
- 5) DIMENSIONS: mm

All dimensions are reference only unless specifically toleranced.

SELF-ALIGNING PISTON ROD COUPLERS - METRIC (NOT FOR USE WITH SERIES VR)

Major Benefits

- Rod Couplers eliminate expensive precision machining for mounting fixed or rigid cylinder on guide or slide applications.
- Cylinder efficiency is increased by eliminating friction caused by misalignment. Couplers compensate for 2° angular error and 0.8 mm [1/32"] lateral misalignment on push and pull travel.
- Couplers provide greater reliability and reduce cylinder and component wear, simplifying alignment problems in the field.
- Rod Couplers are manufactured from high tensile and hardened steel components.

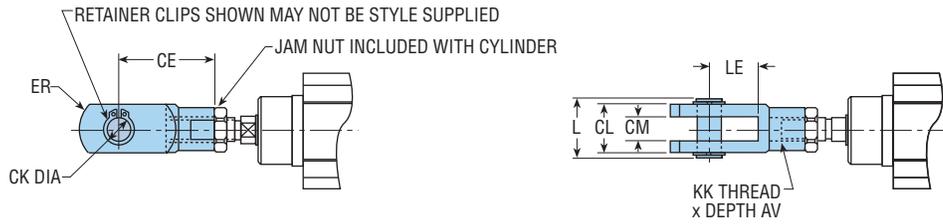


SIZE	LETTER DIMENSION/TOLERANCE							PART NO.	CORROSION RESISTANT
	A	B MIN	C MIN	D MIN	E	F	G		
20	M8 x 1.25	25.4	15.9	47.6	12.7	22.2	5.0	83275-02	51842-02
25	M10 x 1.25	25.4	15.9	47.6	12.7	22.2	5.0	83275-03	51842-03
32	M10 x 1.25	25.4	15.9	47.6	12.7	22.2	5.0	83275-03	51842-03
40	M12 x 1.25	28.6	16.5	55.5	12.7	25.4	6.0	83275-04	51842-04
50	M16 x 1.5	44.5	28.5	84.1	20.6	39.7	8.0	83275-05	51842-05

NOTE: DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

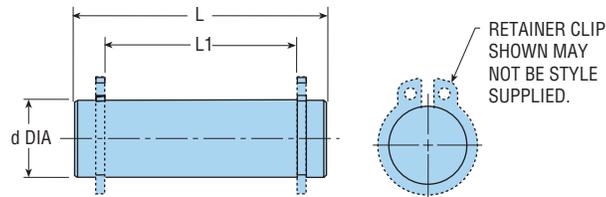
ROD CLEVIS MOUNTING KIT FOR METRIC ROD ENDS (PER DIN 8140)



SIZE	LETTER DIMENSION/TOLERANCE									KIT NO.
	AV MIN	CE	CK/H9	CL MAX	CM MIN	ER MAX	KK	L	LE MIN	
20	16.0	32.0	8.02	16.0	8.0	13.0	M8 x 1.25	21.0	16.5	85578-01-01
25	20.0	40.0	10.0	20.0	10.0	16.0	M10 x 1.25	25.0	20.5	83221-01-01
32	20.0	40.0	10.0	20.0	10.0	16.0	M10 x 1.25	25.0	20.5	83221-01-01
40	22.0	48.0	12.0	24.0	12.0	19.0	M12 x 1.25	30.0	24.5	83221-02-01
50	28.0	64.0	16.0	32.0	16.0	25.0	M16 x 1.5	39.0	32.5	83221-03-01

- NOTES:**
 1) KIT INCLUDES CLEVIS, PIVOT PIN, AND RETAINER RINGS
 2) DIMENSIONS: mm

ROD CLEVIS PIVOT PIN KIT

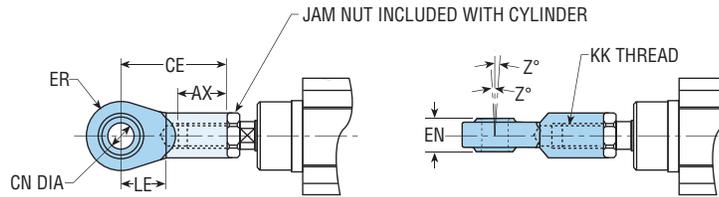


SIZE	d	L	L1	KIT NO.
20	8.0	21.0	—	65777-001-01
25	10.0	25.0	20.1	63463-01-2
32	10.0	25.0	20.1	63463-01-2
40	12.0	30.0	24.1	63463-02-2
50	16.0	39.0	32.1	63463-03-2

NOTE: DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

ROD EYE MOUNTING WITH SPHERICAL BEARING KIT

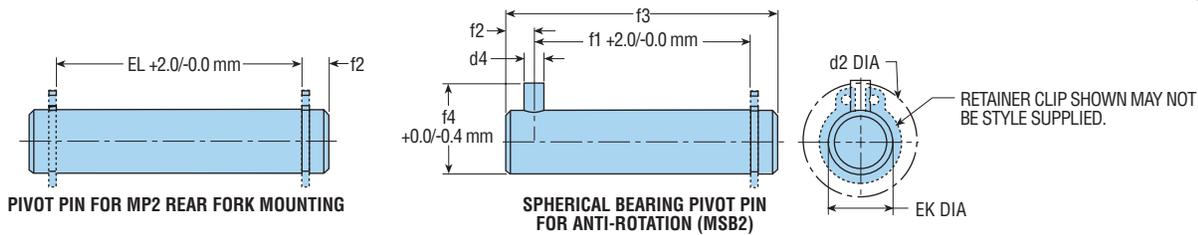


NOTES:

- 1) KIT COMPATIBLE WITH MSB2 REAR FORK FOR SPHERICAL BEARING
- 2) DIMENSIONS: mm

SIZE	LETTER DIMENSION/TOLERANCE								KIT NO.
	AX MIN	CE	CN/H9	EN/h12	ER MAX	KK	LE MIN	Z	
20	16.0	36.0	8.0	11.9	12.0	M8 x 1.25	13.0	4°	85576-01-01
25	20.0	43.0	10.0	13.9	14.0	M10 x 1.25	15.0	4°	83220-01-01
32	20.0	43.0	10.0	13.9	14.0	M10 x 1.25	15.0	4°	83220-01-01
40	22.0	50.0	12.0	15.9	16.0	M12 x 1.25	17.0	4°	83220-02-01
50	28.0	64.0	16.0	20.9	21.0	M16 x 1.5	23.0	4°	83220-03-01

PIVOT PIN KIT



MP2 PIVOT PIN

SIZE	LETTER DIMENSION/TOLERANCE				KIT NO.
	d2 MAX	EK/e8	EL	f2	
20	—	—	—	—	—
25	—	—	—	—	—
32	23.0	10.0	47.0	8.5	52490-01-2
40	25.0	12.0	54.0	8.5	52490-02-2
50	25.0	12.0	62.0	8.5	52490-03-2

NOTE: DIMENSIONS: mm

MSB2 PIVOT PIN

SIZE	LETTER DIMENSION/TOLERANCE							KIT NO.
	d2 MAX	d4/H12	EK/h9	f1	f2 MAX	f3 MAX	f4	
20	—	—	8.0	24.0	—	32.0	—	52491-07-2
25	—	—	8.0	24.0	—	32.0	—	52491-07-2
32	23.0	3.0	10.0	32.5	4.5	46.0	13.8	52491-01-2
40	25.0	4.0	12.0	38.1	6.0	53.0	15.8	52491-02-2
50	25.0	4.0	16.0	43.1	6.0	58.0	19.8	52491-03-2

NOTE: DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

6250 SOLID STATE SWITCHES

Series ECV comes standard with a magnet band for use with PHD miniature Reed and Solid State Switches listed below. These switches mount easily to the cylinder using any of the three "T" slots provided in the body.



SERIES 6250 SOLID STATE SWITCHES

PART NO.	DESCRIPTION	COLOR
62505-1-02	NPN (Sink) DC Solid State, 2 m cable	Brown
62506-1-02	PNP (Source) DC Solid State, 2 m cable	Tan
62515-1	NPN (Sink) DC Solid State, Quick Connect	Brown
62516-1	PNP (Source) DC Solid State, Quick Connect	Tan

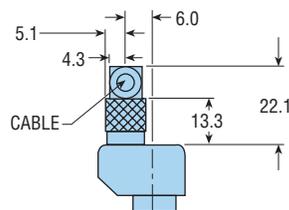
SERIES 6250 REED SWITCHES

PART NO.	DESCRIPTION	COLOR
62507-1-02	AC/DC Reed, 2 m cable	Silver
62517-1	AC/DC Reed, Quick Connect	Silver

CORDSETS WITH QUICK CONNECT

PART NO.	DESCRIPTION
61397-02	2 meter/3 wire
61397-05	5 meter/3 wire

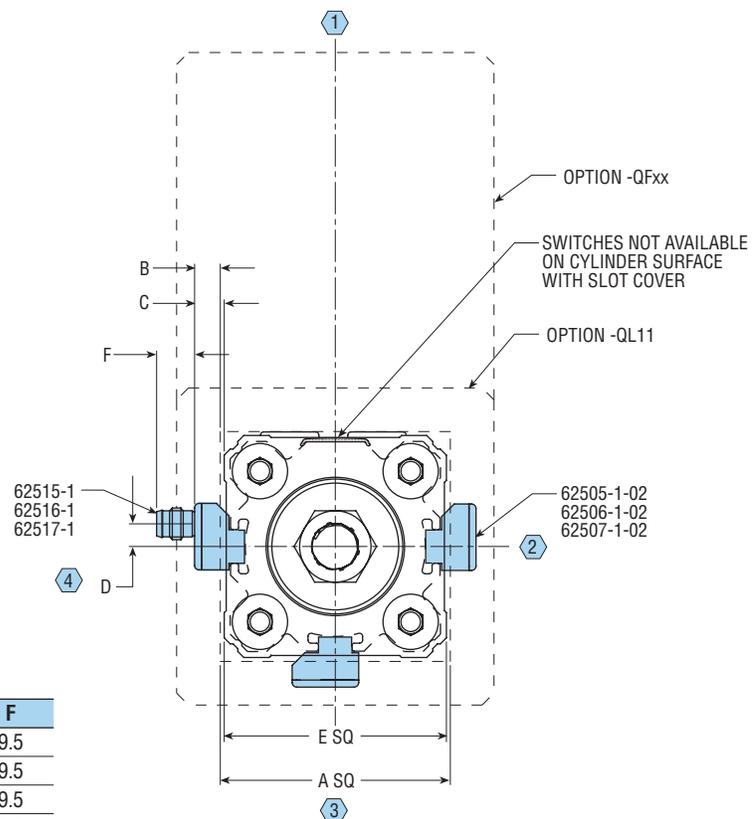
62515-1, 62516-1 & 62517-1 Connector Detail



SIZE	A*	B	C	D	E	F
20	34.0	8.7	7.2	6.0	37.0	9.5
25	34.0	11.2	8.2	6.0	40.0	9.5
32	50.0	7.0	7.5	6.0	49.5	9.5
40	58.0	5.0	6.5	6.0	56.0	9.5
50	70.0	6.0	7.0	6.0	68.5	9.5

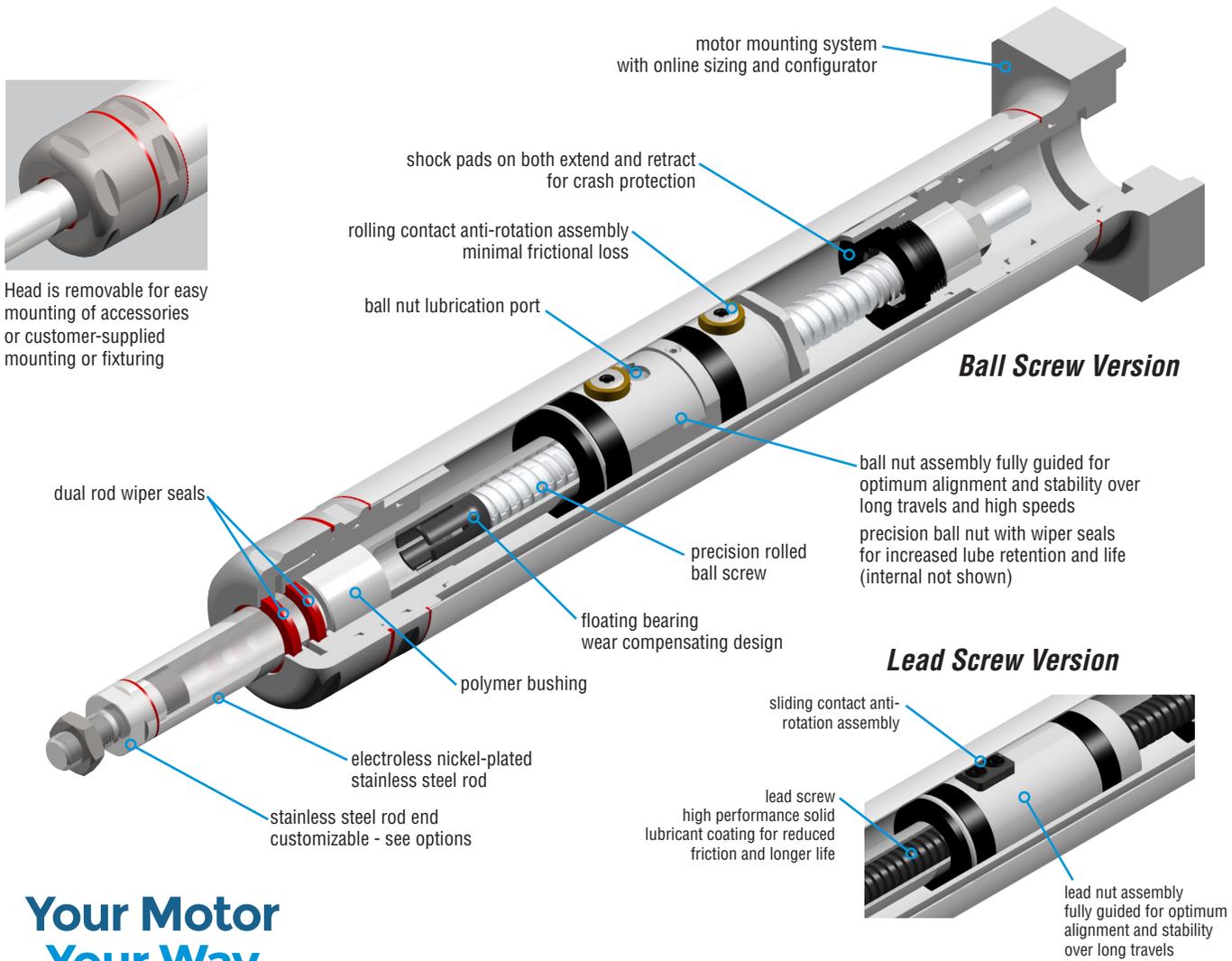
NOTES:

- *ISO/VDMA MAX SQUARE SIZE
- DIMENSIONS F & D APPLY TO SWITCHES 62515-1, 62516-1 & 62517-1 ONLY
- DIMENSIONS: mm



All dimensions are reference only unless specifically tolerated.

SERIES ECP ELECTRIC IP69K CYLINDER



Head is removable for easy mounting of accessories or customer-supplied mounting or fixturing

Your Motor Your Way

Major Benefits

- IP69K ingress protection
- 300 grade stainless steel versions (-Y8 and -Y91) for caustic washdown environments USDA certifications for splash zone and product contact zones when using motor with IP69K rating
- High thrust or speed capability
- Precision screw assemblies with long service life
- Rigid construction with low backlash
- High degree of repeatability
- Non-rotating rod or rotating rod versions
- Inline and foldback motor mounting flexibility
- **Your Motor, Your Way** allows motor and controls flexibility at no additional cost
- Large choice of options/accessories

Choice of Inline or Foldback Motor Mounting

Foldback available in 1:1 or 2:1 drive for tailored performance.



ORDERING DATA: Series ECP Electric IP69K Cylinder

TYPE
Electromechanical

SERIES
PA - Protected to IP69K
Non-Rotating Rod
PR - Protected to IP69K
Rotating Rod

SIZE
32
40
50

OPTIONS
K_ - Extra rod extension in 1mm increments. Length code is K100=100mm, K050=50 mm
T44 - Female rod end, stainless steel applications
TEE - Oversized, threaded, male rod end, stainless steel
Y8 - Stainless steel external construction compatible with caustic washdown. USDA Certified for Product Splash Zone
Y91 - Stainless steel external construction compatible with caustic washdown. USDA Certified for Product Contact Zone

MOTOR MOUNT CODE
Wxxxx - Open Architecture p/n code

E C PA 5 32 x 500 - RB010 - T44 - QF21 - Wxxxx

PRODUCT
Cylinder

DESIGN NO.
5 - Metric

TRAVEL (MAX.)

	RB (Ball)	RL (Lead)
Size	mm	mm
32	750	500
40	750	600
50	750	750

50 mm minimum stroke in 50 mm increments

SCREW CONFIGURATION

	Size	Type	Lead mm		Size	Type	Lead mm
BALL SCREW	32	RB005	5	LEAD SCREW	32	RL003	3
	32	RB010	10		32	RL006	6
	40	RB010	10		40	RL004	4
	40	RB016	16		40	RL008	8
	50	RB010	10		50	RL004	4
50	RB020	20	50	RL008	8		

MOTOR CONFIGURATION
QF11 - Foldback with 1:1 ratio
QF21 - Foldback with 2:1 ratio
QL11 - Inline with 1:1 ratio



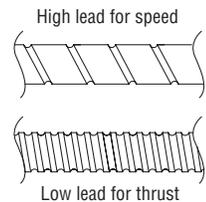
ROD ROTATION

Series ECPA requires no external guidance/coupling for cataloged performance.

Series ECPR requires external guidance to provide non-rotation to the system. This must be rigidly coupled to the rod to ensure axial motion. Any rotation will directly affect the performance of the system and result in lost motion.

SCREW CONFIGURATION

The ball (RBxxx) and lead (RLxxx) screw drive systems of the Series ECP 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.



Gray shaded areas are accessories and are ordered by kit or part numbers.

MOUNTING OPTIONS & ACCESSORIES

QFxx **QL11**

BASE MODEL

Accessories shown: F, S, MX1, MP4, BMP4, MP2, MSB1, BSB1, MSB2, MF1, T44, TEE, ROD EYE, ROD CLEVIS.

S Stainless steel available for sanitary applications

SPECIFICATIONS	BALL SCREW SERIES ECPA	BALL SCREW SERIES ECPR ⁸
PISTON ROD	Non-Rotating	Rotating
REPEATABILITY ¹	±0.01 mm [±0.0004 in]	
MAXIMUM BACKLASH ²	0.025 mm [0.001 in]	
RATED LIFE	Refer to Life vs. Thrust Chart (page 28)	
FULL TRAVEL TOLERANCE ⁷	+3.5/-0.0 mm [+0.138/-0.000 in]	
DUTY CYCLE	75%	
OPERATING TEMPERATURE	4 - 65°C [40 - 150°F]	
LUBRICATION INTERVAL ³	Horizontal: 2500 km [100 million in], Vertical: 1500 km [60 million in]	
ENCAPSULATION CLASS	IP69K	

SPECIFICATIONS			SIZE					
			32		40		50	
MECHANICS	MAXIMUM TRAVEL		750 [29.53]					
	DRIVE MECHANISM		Ball Screw					
	SCREW DIAMETER		12		16		20	
MECHANICS	SCREW CONFIGURATION		-RB005	-RB010	-RB010	-RB016	-RB010	-RB020
	SCREW LEAD		5	10	10	16	10	20
SPEED ⁴	MAXIMUM SPEED		500 [19.6]	1000 [39.3]	1000 [39.3]	1600 [63.0]	1000 [39.3]	2000 [78.7]
	MAXIMUM RPM		6000					
	MAXIMUM ACCELERATION	-QL11	m/sec ² [in/sec ²]	19.6 [772]				
-QF11		m/sec ² [in/sec ²]	9.8 [386]					
THRUST ⁴	MAXIMUM THRUST		1360 [306]	680 [153]	2430 [546]	1520 [342]	4410 [991]	2510 [564]
	NOMINAL THRUST ⁵		400 [90]	330 [74]	1270 [285]	975 [219]	1835 [413]	1515 [341]
TORQUE	PERMISSIBLE DRIVE TORQUE ⁶	-QL11	1.2 [10.62]		4.3 [38.06]		7.8 [69.03]	
		-QF11	0.84 [7.43]		3 [26.55]		5.46 [48.32]	
	NO-LOAD TORQUE		0.10 [0.89]		0.25 [2.21]		0.40 [3.54]	
WEIGHT	TOTAL @ ZERO STROKE (W _{OT})		Refer to DIMENSIONS pages					
	TOTAL LENGTH ADDER (W _{LT})		Refer to DIMENSIONS pages					
	MOVING @ ZERO STROKE (W _{OM}) BASE & -Y8		0.33 [0.73]	0.54 [1.19]		1.01 [2.23]		
	MOVING @ ZERO STROKE (W _{OM}) -Y91		0.36 [0.81]	0.59 [1.31]		1.08 [2.38]		
MOVING LENGTH ADDER (W _{LM})		0.0007 [0.037]	0.0010 [0.058]		0.0018 [0.102]			
INERTIA	ACTUATOR @ ZERO STROKE (J _o)		3.00 x 10 ⁻⁶ [0.010]		1.50 x 10 ⁻⁵ [0.051]		4.84 x 10 ⁻⁵ [0.165]	
	LENGTH ADDER (J _L)		9.85 x 10 ⁻⁹ [0.0009]		2.90 x 10 ⁻⁸ [0.0025]		7.95 x 10 ⁻⁸ [0.0069]	
	MOVING WEIGHT ADDER (J _M)		6.21 x 10 ⁻⁷ [9.63 x 10 ⁻⁴]	2.48 x 10 ⁻⁶ [3.85 x 10 ⁻³]	2.48 x 10 ⁻⁶ [3.85 x 10 ⁻³]	6.36 x 10 ⁻⁶ [9.86 x 10 ⁻³]	2.48 x 10 ⁻⁶ [3.85 x 10 ⁻³]	9.93 x 10 ⁻⁶ [1.54 x 10 ⁻²]
	MOTOR CONFIGURATION (J _o)	-QF11	1.40 x 10 ⁻⁵ [0.048]		4.71 x 10 ⁻⁵ [0.161]		4.65 x 10 ⁻⁵ [0.159]	
		-QF21	2.75 x 10 ⁻⁵ [0.094]		8.28 x 10 ⁻⁵ [0.283]		1.91 x 10 ⁻⁴ [0.654]	
-QL11		3.14 x 10 ⁻⁶ [0.011]		6.11 x 10 ⁻⁶ [0.021]		4.04 x 10 ⁻⁵ [0.138]		

NOTES:

- UNIDIRECTIONAL
- AXIAL FREE PLAY WHEN DRIVE SHAFT LOCKED
- REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
- REFER TO PERFORMANCE CHARTS ON PAGE 28
- 2500 km [100 MILLION INCHES] LIFE
- CORRESPONDS TO MAXIMUM THRUST
- FOR HOMING AND INCREASED APPLICATION FLEXIBILITY, INCLUDE EXTRA TRAVEL WHEN NECESSARY
- SERIES ECPR REPEATABILITY AND BACKLASH A FUNCTION OF COUPLING RIGIDITY TO EXTERNAL NON-ROTATING LOAD
- 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 30 to 31]

TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

FOR -Qx11: INERTIA_{Reflected} = J_o + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT) + J_o

FOR -QF21: INERTIA_{Reflected} = [J_o + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_o

ENGINEERING DATA: Series ECP Electric IP69K Cylinder Lead Screw -RL

SPECIFICATIONS	LEAD SCREW SERIES ECPA	LEAD SCREW SERIES ECPR
PISTON ROD	Non-Rotating	Rotating
REPEATABILITY ¹	±0.5 mm [±0.020 in]	
MAXIMUM BACKLASH ²	0.03 - 0.20 mm [0.001 - 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]	
ENCAPSULATION CLASS	IP69K	

SPECIFICATIONS			SIZE					
			32		40		50	
MECHANICS	MAXIMUM TRAVEL	mm [in]	500 [19.68]		600 [23.62]		750 [29.53]	
	SCREW DIAMETER	mm	12		16		20	
	SCREW CONFIGURATION		-RL003	-RL006	-RL004	-RL008	-RL004	-RL008
	SCREW LEAD	mm	3	6	4	8	4	8
SPEED ⁴	MAXIMUM SPEED	mm/sec [in/sec]	60 [2.40]	120 [4.80]	80 [3.15]	160 [6.3]	80 [3.15]	160 [6.3]
	MAXIMUM RPM	rev/min	1200		1200		1200	
	MAXIMUM ACCELERATION	m/sec ² [in/sec ²]	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	MAXIMUM THRUST	N [lbf]	800 [180]	400 [90]	1600 [360]	800 [180]	2500 [562]	1250 [281]
TORQUE	PERMISSIBLE DRIVE TORQUE ⁵	-QL11	1.2 [10.62]		4.3 [38.06]		7.8 [69.03]	
		-QFx1	0.84 [7.43]		3 [26.55]		5.46 [48.32]	
	NO-LOAD TORQUE	Nm [in-lb]	0.10 [0.89]		0.25 [2.21]		0.40 [3.54]	
WEIGHT	TOTAL @ ZERO STROKE (W _{OT})		Refer to DIMENSIONS pages					
	TOTAL LENGTH ADDER (W _{LT})		Refer to DIMENSIONS pages					
	MOVING @ ZERO STROKE (W _{OM}) BASE & -Y8	kg [lb]	0.26 [0.57]		0.43 [0.95]		0.82 [1.80]	
	MOVING @ ZERO STROKE (W _{OM}) - Y91	kg [lb]	0.29 [0.64]		0.48 [1.07]		0.89 [1.95]	
	MOVING LENGTH ADDER (W _{LM})	kg/mm [lb/in]	0.0006 [0.034]		0.0010 [0.058]		0.0019 [0.105]	
INERTIA	ACTUATOR @ ZERO STROKE (J _o)	kg-m ² [lb-in ²]	3.00 x 10 ⁻⁶ [0.010]		1.50 x 10 ⁻⁵ [0.051]		4.84 x 10 ⁻⁵ [0.165]	
	LENGTH ADDER (J _L)	kg-m ² /mm [lb-in ² /in]	9.85 x 10 ⁻⁹ [0.0009]		2.90 x 10 ⁻⁸ [0.0025]		7.95 x 10 ⁻⁸ [0.0069]	
	MOVING WEIGHT ADDER (J _M)	kg-m ² /kg [lb-in ² /lb]	7.6 x 10 ⁻⁸	1.52 x 10 ⁻⁷	1.01 x 10 ⁻⁷	2.03 x 10 ⁻⁷	1.01 x 10 ⁻⁷	2.03 x 10 ⁻⁷
			[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 _o)	-QF11	kg-m ² [lb-in ²]	1.40 x 10 ⁻⁵ [0.048]		4.71 x 10 ⁻⁵ [0.161]		4.65 x 10 ⁻⁵ [0.159]
-QF21		2.75 x 10 ⁻⁵ [0.094]		8.28 x 10 ⁻⁵ [0.283]		1.91 x 10 ⁻⁴ [0.654]		
-QL11		3.14 x 10 ⁻⁶ [0.011]		6.11 x 10 ⁻⁶ [0.021]		4.04 x 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 CHARTS ON PAGE 29
- 5) CORRESPONDS TO MAXIMUM THRUST

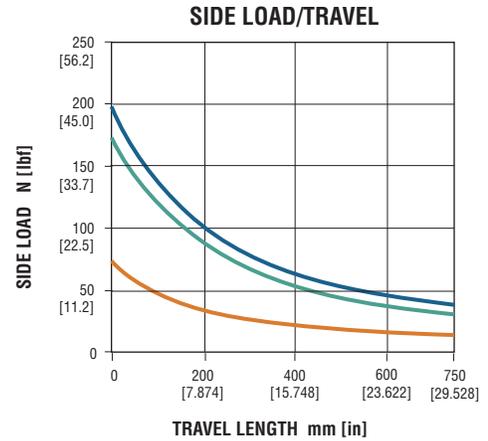
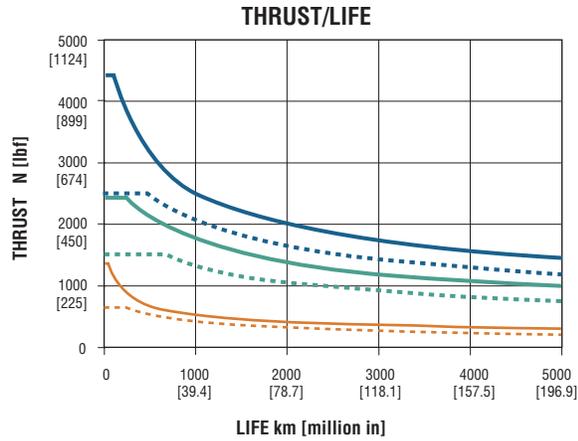
WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = W_{OT} + (W_{LT} X TRAVEL) + MOTOR MOUNT WEIGHT [reference pages 30 to 31]

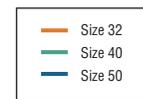
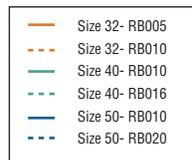
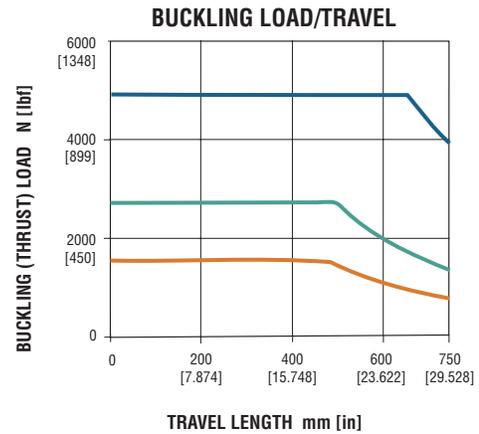
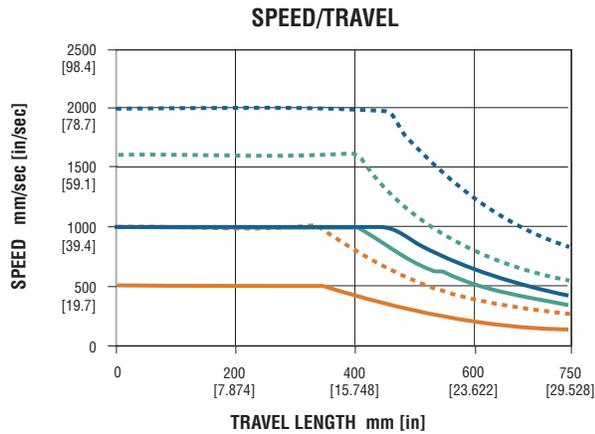
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} X TRAVEL) + EXTERNAL PAYLOAD

FOR -Qx11: INERTIA_{Reflected} = J_o + (J_L X TRAVEL) + (J_M X TOTAL MOVING WEIGHT) + J_o

FOR -QF21: INERTIA_{Reflected} = [J_o + (J_L X TRAVEL) + (J_M X TOTAL MOVING WEIGHT)] / 4 + J_o

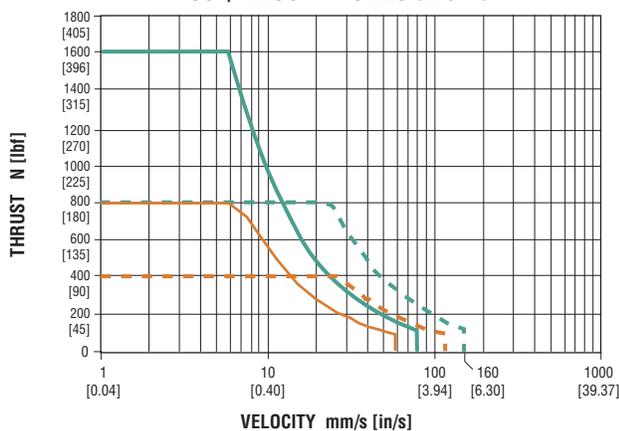


NOTE: THE MAXIMUM SPEED NOT TO EXCEED 200 mm/sec [7.87 in/sec]

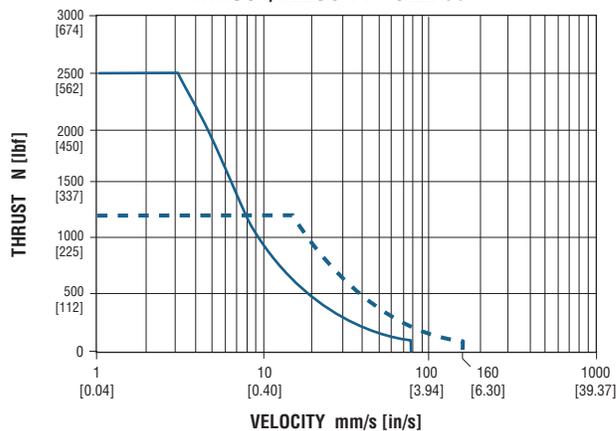


This section contains information on the capabilities of the Series ECP Ball Screw version. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer Service Department.

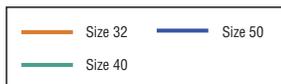
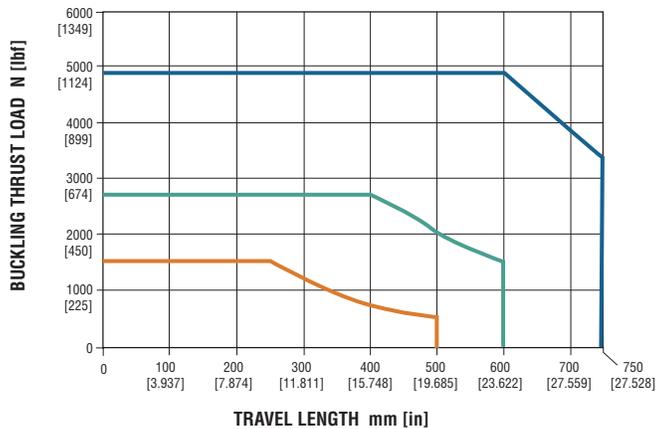
THRUST/VELOCITY - SIZES 32 & 40



THRUST/VELOCITY - SIZE 50



ALLOWABLE AXIAL LOAD - SYSTEM

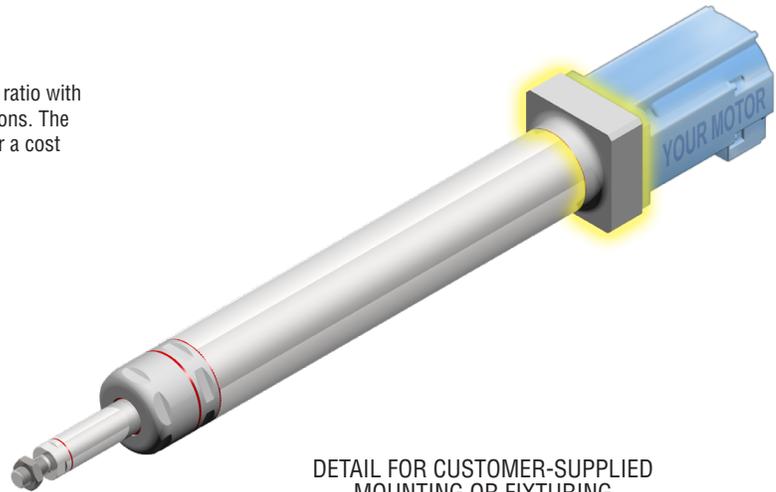


This section contains information on the capabilities of the Series ECP Lead Screw version. It is not intended to be a comprehensive selection guide. To simplify the selection process, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer Service Department.

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

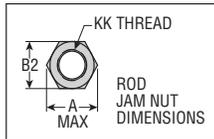
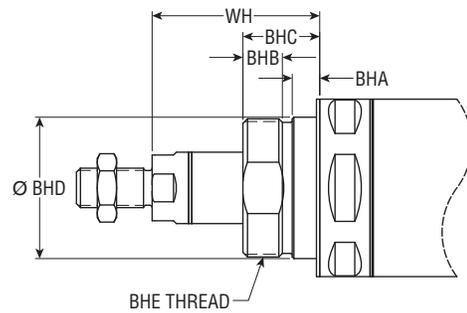
Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time.

Base unit head and motor mounts are anodized aluminum.

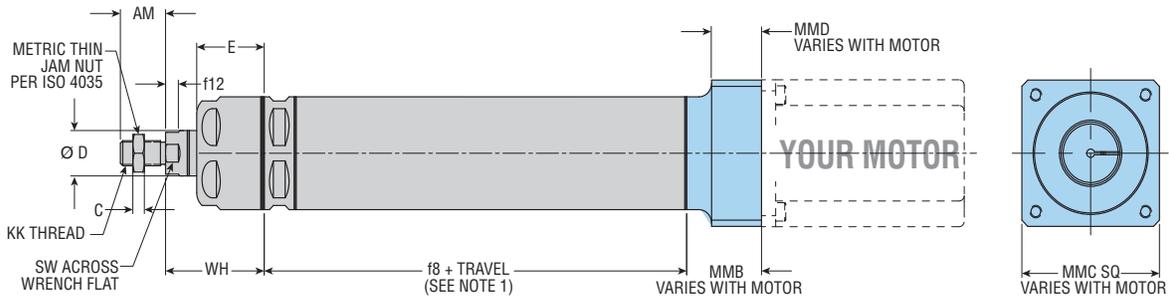


Removal of head on both inline and foldback units allow for customer-supplied mounting or fixturing. An extra seal is included for sealing of unit to mounting or fixturing. Refer to detail.

DETAIL FOR CUSTOMER-SUPPLIED MOUNTING OR FIXTURING



SIZE	BHA	BHB	BHC	Ø BHD	BHE	WH
32	7.5	12.0	22.5	35.3	M35 x	48.5
40	7.5	12.0	22.5	43.0	M42 x	50.1
50	8.5	12.0	23.5	53.0	M52 x	54.7



SIZE	A MAX	AM	B2	C MAX	Ø D	E	f8	f12	KK	MMB MIN	MMC		MMD MIN	SW	WH	WEIGHT ⁴			
											STD.	OVERSIZE				@ ZERO TRAVEL (kg)		TRAVEL ADDER (kg/mm)	
																-RB	-RL	-RB	-RL
32	18.9	21.0	16.0	5.0	18.5	33.5	195.4	6.0	M10 x 1.25	22.5	60.0	70.0	9.8	17.0	48.5	1.59	1.52	0.0031	0.0031
40	21.1	23.0	18.0	6.0	21.7	33.5	215.8	6.5	M12 x 1.25	22.5	70.0	88.0	9.8	20.0	50.1	2.07	1.96	0.0041	0.0041
50	26.8	31.0	24.0	8.0	28.1	34.5	264.2	8.0	M16 x 1.5	22.5	88.0	110.0	9.8	26.0	54.7	3.28	3.08	0.0062	0.0062

NOTES:

- 1) DIMENSION f8 IS TO MOUNTING SURFACE
- 2) DIMENSIONS: mm
- 3) FOR VARIABLE DIMENSIONS REFER TO ONLINE CAD CONFIGURATOR
- 4) UNIT WEIGHTS SHOWN ABOVE ARE FOR BASE ECP WITH ALUMINUM HEAD AND MOTOR MOUNT. SEE OPTION PAGES FOR ECP WITH -Y8 OR -Y91 FOR WEIGHTS WITH STAINLESS STEEL

All dimensions are reference only unless specifically tolerated.

DIMENSIONS: Series ECP Electric IP69K Cylinder, Base

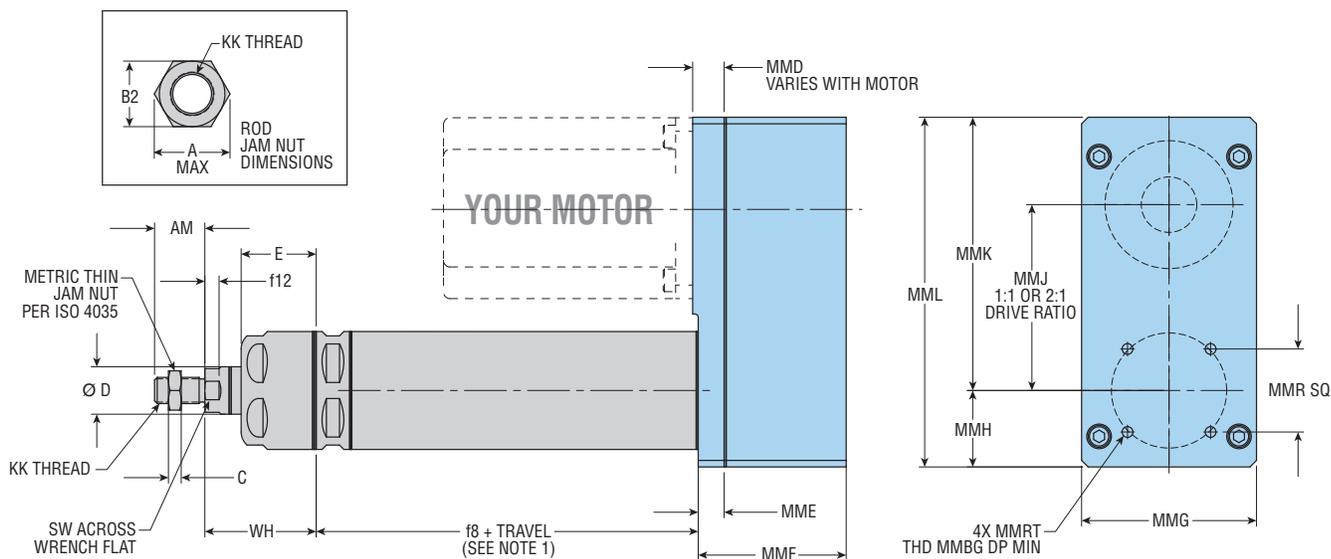
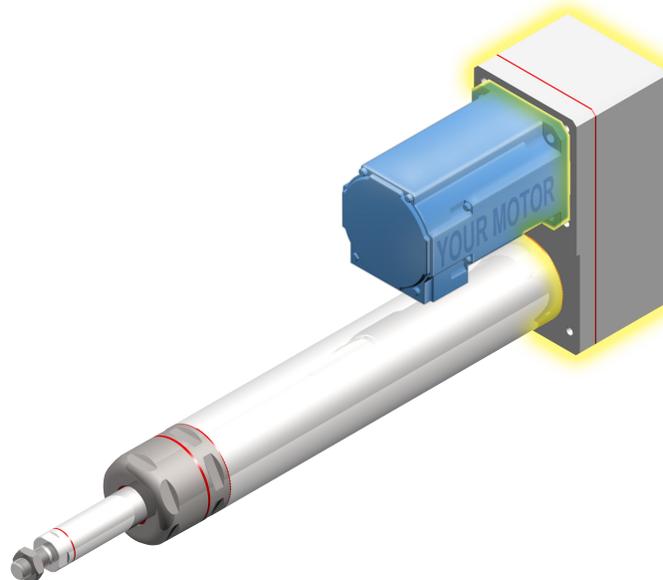
QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

QF21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO

Foldback motor mounting with the QF11 option provides a 1:1 drive ratio allowing similar performance to the inline motor mounting in a shorter overall length. The QF21 option provides a 2:1 drive ratio reduction for applications that require higher thrust. Foldback motor mounting also provides a VDMA 24562 compliant mounting pattern that allows the use of many standard cylinder mounting accessories.

Base unit head and motor mounts are anodized aluminum.

Removal of head on both inline and foldback units allow for customer-supplied mounting or fixturing. An extra seal is included for sealing of unit to mounting or fixturing. Refer to detail on page 30.



SIZE	A MAX	AM	B2	C MAX	ØD	E	f8	f12	KK	MMD		MME	MMF	MMG	MMH	MMJ 1:1	MMJ 2:1	MMK
										MIN	MAX							
32	18.9	21.0	16.0	5.0	18.5	33.5	158.7	6.0	M10 x 1.25	9.5	31.5	12.7	58.7	63.0	31.0	72.5	70.5	104.0
40	21.1	23.0	18.0	6.0	21.7	33.5	175.6	6.5	M12 x 1.25	9.5	22.5	12.7	67.7	80.0	35.0	85.1	83.9	125.1
50	26.8	31.0	24.0	8.0	28.1	34.5	194.9	8.0	M16 x 1.5	9.5	22.5	12.7	71.2	86.0	44.0	102.5	111.4	154.4

SIZE	MML	MMR	MMRT	MMBG	SW	WH	WEIGHT ⁴			
							@ ZERO TRAVEL (kg)		TRAVEL ADDER (kg/mm)	
							-RB	-RL	-RB	-RL
32	135.0	32.5	M6x1	11.5	17.0	48.5	2.20	2.13	0.0031	0.0031
40	160.1	38.0	M6x1	11.5	20.0	50.1	3.15	3.04	0.0041	0.0041
50	198.4	46.5	M8x1.25	14.5	26.0	54.7	4.60	4.41	0.0062	0.0062

NOTES:

- 1) DIMENSION f8 IS TO MOUNTING SURFACE
- 2) DIMENSIONS: mm
- 3) FOR VARIABLE DIMENSIONS REFER TO ONLINE CAD CONFIGURATOR
- 4) UNIT WEIGHTS SHOWN ABOVE ARE FOR BASE ECP WITH ALUMINUM HEAD AND MOTOR MOUNT. SEE OPTION PAGES FOR ECP WITH -Y8 OR -Y91 FOR WEIGHTS WITH STAINLESS STEEL

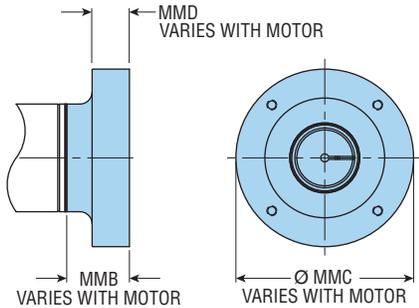
All dimensions are reference only unless specifically toleranced.

Y8 USDA CERTIFIED FOR PRODUCT SPLASH ZONE

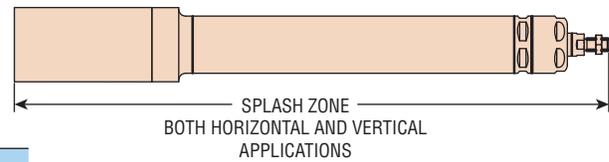
This option provides the Series ECP Cylinders with a 300 grade stainless steel head and motor mount suitable for food and dairy industry splash zone applications requiring clean-in-place (CIP) caustic washdown. USDA certification requires motor with IP69K rating.



INLINE



DIMENSIONS NOT SHOWN ARE SAME AS INLINE BASE UNIT

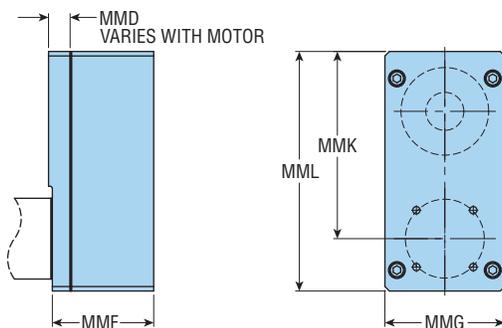


SIZE	MMB MIN	MMC MIN	MMD MIN	WEIGHT			
				@ ZERO TRAVEL (kg)		TRAVEL ADDER (kg/mm)	
				-RB	-RL	-RB	-RL
32	22.5	79.0	9.8	2.2	2.13	0.0031	0.0031
40	22.5	89.0	9.8	2.77	2.67	0.0041	0.0041
50	22.5	113.0	9.8	4.32	4.12	0.0062	0.0062

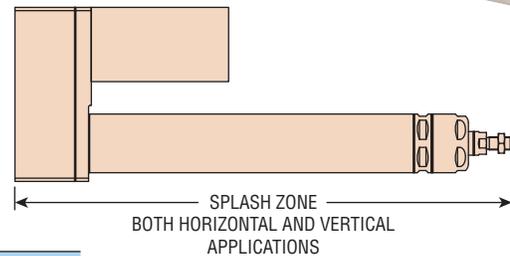
NOTES:

- 1) DIMENSIONS: mm
- 2) FOR VARIABLE DIMENSIONS REFER TO ONLINE CAD CONFIGURATOR

FOLDBACK



DIMENSIONS NOT SHOWN ARE SAME AS FOLDBACK BASE UNIT



SIZE	MMD		MMF	MMG	MMK	MML	WEIGHT			
	MIN	MAX					@ ZERO TRAVEL		TRAVEL ADDER (kg/	
	-RB	-RL					-RB	-RL		
32	10.5	31.5	56.7	79.0	112.0	143.0	5.48	5.40	0.0031	0.0031
40	10.2	22.5	71.2	89.0	129.6	164.6	8.11	8.00	0.0041	0.0041
50	12.5	22.5	71.2	113.0	167.9	211.9	13.43	13.23	0.0062	0.0062

NOTES :

- 1) DIMENSIONS: mm
- 2) FOR VARIABLE DIMENSIONS REFER TO ONLINE CAD CONFIGURATOR

All dimensions are reference only unless specifically tolerated.

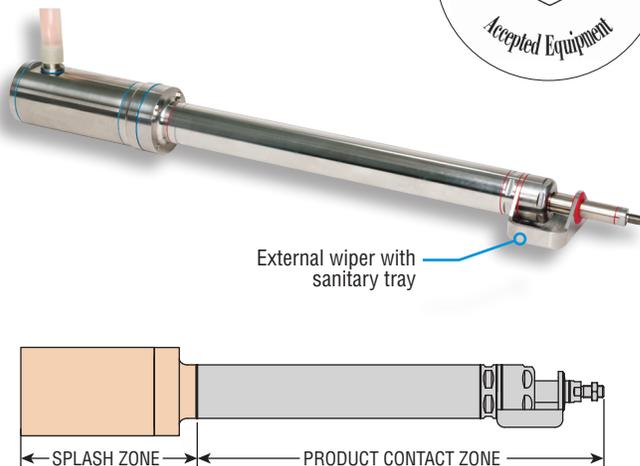
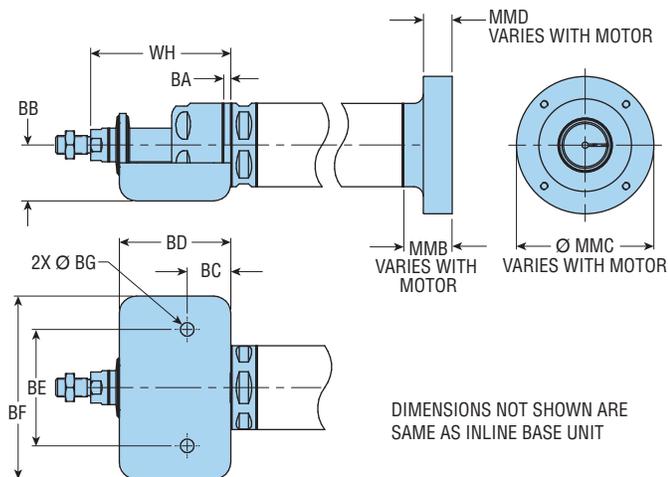
Y91 USDA CERTIFIED FOR PRODUCT CONTACT ZONE

This option provides the Series ECP Cylinders with a 300 grade stainless steel head and motor mount suitable for food and dairy industry splash and product contact zone applications requiring clean-in-place (CIP) caustic washdown. See diagrams for zones clarification.

USDA certification requires motor with IP69K rating.



INLINE

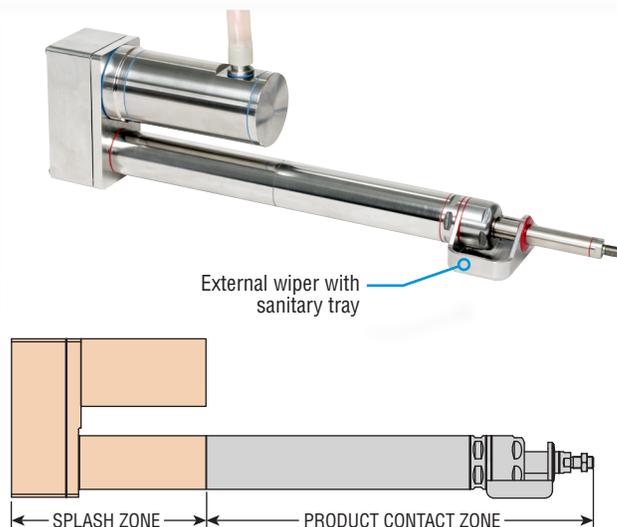
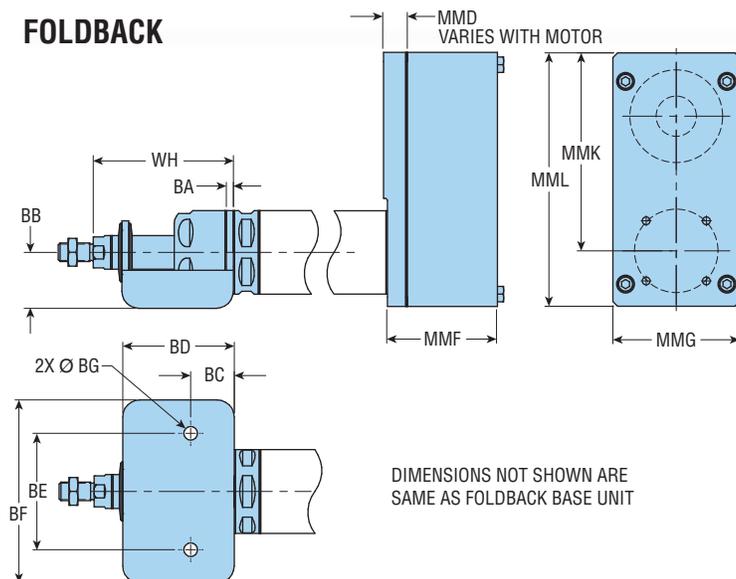


SIZE	BA	BB	BC	BD	BE	BF	Ø BG	MMB MIN	MMC MIN	MMD MIN	WH ²	WEIGHT			
												@ ZERO TRAVEL (kg)		TRAVEL ADDER (kg/mm)	
												-RB	-RL	-RB	-RL
32	4.7	32.0	24.0	71.8	65.5	10.45	6.8	22.5	79.0	9.8	88.5	2.72	2.65	0.0031	0.0031
40	4.7	36.0	28.0	71.8	75.0	118.0	8.8	22.5	89.0	9.8	90.1	3.38	3.28	0.0041	0.0041
50	6.4	45.0	32.0	73.8	87.5	132.5	8.8	22.5	113.0	9.8	94.7	5.20	5.00	0.0062	0.0062

NOTES:

- 1) DIMENSIONS: mm
- 2) WHEN Y91 OPTION IS SELECTED, ADDITIONAL LENGTH IS ADDED TO ROD
- 3) FOR VARIABLE DIMENSIONS REFER TO ONLINE CAD CONFIGURATOR

FOLDBACK



SIZE	BA	BB	BC	BD	BE	BF	Ø BG	MMD		MMF	MMG	MMK	MML	WH ²	WEIGHT			
								MIN	MAX						@ ZERO TRAVEL (kg)		TRAVEL ADDER (kg/mm)	
								-RB	-RL						-RB	-RL		
32	4.7	32.0	24.0	71.8	65.5	10.45	6.8	10.5	31.5	56.7	79.0	112.0	143.0	88.5	6.00	5.92	0.0031	0.0031
40	4.7	36.0	28.0	71.8	75.0	118.0	8.8	10.2	22.5	71.2	89.0	129.6	164.6	90.1	8.72	8.61	0.0041	0.0041
50	6.4	45.0	32.0	73.8	87.5	132.5	8.8	12.5	22.5	71.2	113.0	167.9	211.9	94.7	14.31	14.11	0.0062	0.0062

NOTES:

- 1) DIMENSIONS: mm
- 2) WHEN Y91 OPTION IS SELECTED, ADDITIONAL LENGTH IS ADDED TO ROD
- 3) FOR VARIABLE DIMENSIONS REFER TO ONLINE CAD CONFIGURATOR

All dimensions are reference only unless specifically tolerated.

K EXTRA ROD EXTENSION

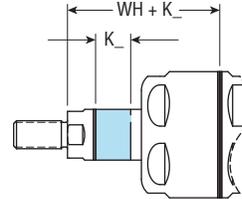
Extra rod extension can be achieved by specifying the option -K followed by the length code. Rod extension is available in 1 mm increments (250 mm max). Rod extension can impact load capacity, therefore rod extension and travel should not exceed 750 mm.

SIZE	WH	
	BASE & -Y8	-Y91
32	48.5	88.5
40	50.1	90.1
50	54.7	94.7

NOTE: DIMENSIONS: mm

Length Code

Metric
 K5 = 5 mm extra rod extension
 K15 = 15 mm extra rod extension

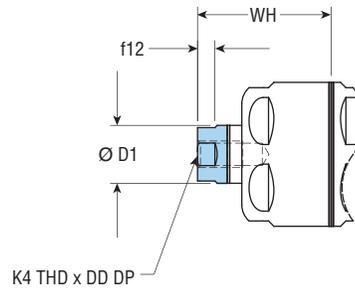


T44 FEMALE ROD END

This option provides a female rod end in place of the standard male rod end and is made of 300 grade stainless steel. See catalog dimensional page for standard rod end.

SIZE	D1	DD MIN	f12	K4	WH	
					BASE & -Y8	-Y91
32	18.5	14.0	6.0	M8 x 1.25	48.5	88.5
40	21.7	17.0	6.5	M10 x 1.5	50.1	90.1
50	28.1	19.0	8.0	M12 x 1.75	54.7	94.7

NOTE: DIMENSIONS: mm

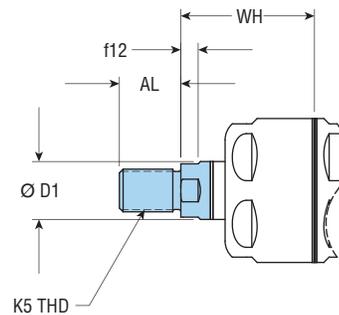


TEE MALE OVERSIZE ROD END

This option provides a male oversized rod end made of 300 grade stainless steel in place of the standard male rod end. See catalog dimensional page for standard rod end.

SIZE	AL	D1	f12	K5	WH	
					BASE & -Y8	-Y91
32	21.0	18.5	6.0	M12 x 1.25	48.5	88.5
40	23.0	21.7	6.5	M16 x 1.5	50.1	90.1
50	31.0	28.1	8.0	M20 x 1.5	54.7	94.7

NOTE: DIMENSIONS: mm



All dimensions are reference only unless specifically toleranced.

Wxxxx MOTOR MOUNT CODE

Your Motor, Your Way customizable motor mounting is generated by PHD's extensive motor database at www.config.phdinc.com. Users 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 mount code.

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

Your Motor Your Way

Select your compatible motor of choice from the pre-populated motor database!

The screenshot shows the PHD Sizing software interface. The top navigation bar includes the PHD logo, 'Sizing', and user information. The main content area is divided into four steps: 1. Settings (highlighted), 2. Motion Profile, 3. Selection, and 4. Summary. Under 'Step 1 - Enter App Settings', there are sections for 'Actuator Type' (Cylinder, Cantilever Slide, Saddle Slide, Gripper), 'Sizing Type' (Application and Gripper performance), 'Input Units' (Imperial, Metric), and 'Grip Type'. The 'App Inputs' section includes 'Tooling Length (K) (From Face):' set to 250.00 mm, 'Total Tooling Weight (W):' set to 10.00 kg, and 'Load:' set to 10.00 kg. A 'Next' button is visible at the bottom right.

Step 1 - Online Actuator Sizing - size.phdinc.com

- Input your application data.
- The sizing software will tell you which actuator and motor performance parameters are needed for your application.

Step 2 - Motor Selection

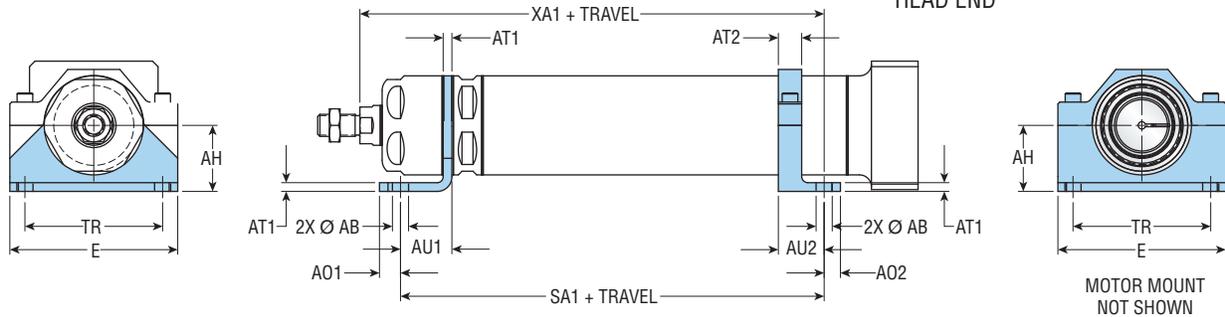
- Based on the performance requirements determined by online sizing, select an appropriate motor from your preferred motor manufacturer.

Step 3 - CAD Configurator - config.phdinc.com

- Select your motor from the drop down menus or request a new motor if the preferred motor is not on the list.
- The generated motor mount code for the compatible motor will complete the ordering data necessary to download 3D CAD model or order the actuator tailored to your specific application.

F BASE MOUNTING KIT

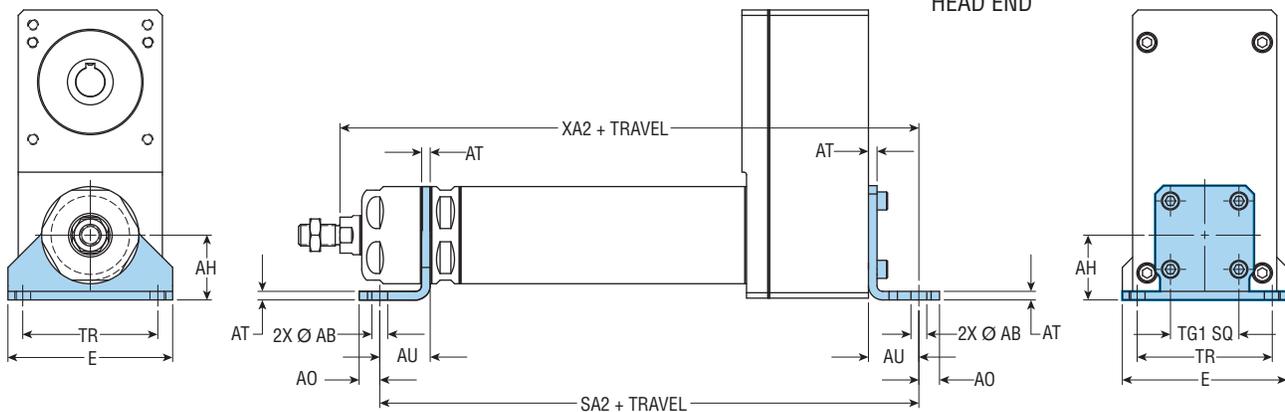
NOTE: HEAD END BASE MOUNTING KIT BRACKET ADDS TO OVERALL LENGTH.



SIZE	AB	AH	A01	A02	AT1	AT2	AU1	AU2	E	SA1 MAX	TR	XA1 MAX	KIT NO. HEAD END ⁴	SANITARY KIT NO. HEAD END ³	KIT NO. CAP END ⁴	SANITARY KIT NO. CAP END
32	6.8	32.0	8.4	6.8	4.7	12.7	24.0	22.9	79.6	212.6	65.5	237.1	86216-01-02	86216-01-02	86474-01-01	86474-01-02
40	8.8	36.0	11.5	8.9	4.7	12.7	28.0	24.9	91.4	234.9	75.0	257.0	86216-02-02	86216-02-02	86474-02-01	86474-02-02
50	8.8	45.0	11.4	8.9	6.4	12.7	32.0	24.9	108.2	287.3	87.5	310.0	86216-03-02	86216-03-02	86474-03-01	86474-03-02

NOTES:

- 1) DIMENSIONS: mm
- 2) HEAD END BASE MOUNTING KIT NOT COMPATIBLE WITH -Y91 OPTION
- 3) SANITARY KIT INCLUDES ONLY STAINLESS STEEL COMPONENTS
- 4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS



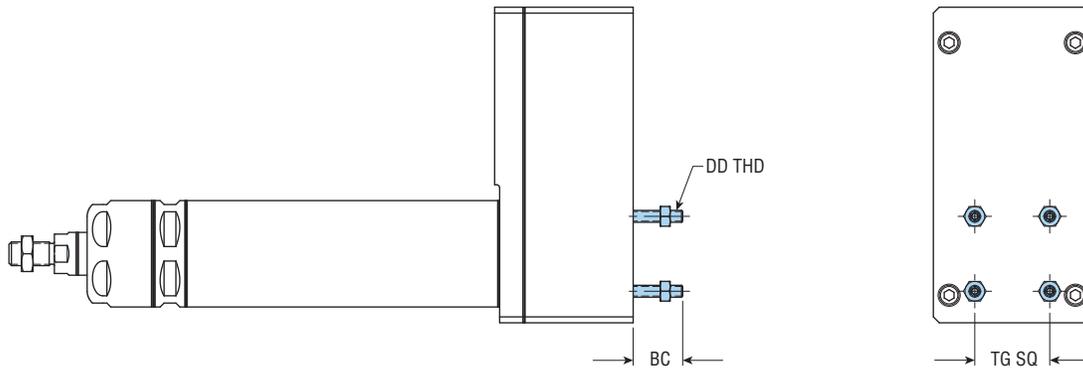
SIZE	AB	AH	A0	AT	AU	E	SA2	TG1	TR	XA2	KIT NO. HEAD END ⁴	SANITARY KIT NO. HEAD END ³	KIT NO. CAP END ⁴	SANITARY KIT NO. CAP END
32	6.8	32.0	8.4	4.7	24.0	79.6	265.4	32.5	65.5	289.9	86216-01-02	86216-01-02	86474-01-04	86474-01-04
40	8.8	36.0	11.5	4.7	28.0	91.4	299.3	38.0	75.0	321.4	86216-02-02	86216-02-02	86474-02-04	86474-02-04
50	8.8	45.0	11.4	6.4	32.0	108.2	330.1	46.5	87.5	352.8	86216-03-02	86216-03-02	86474-03-04	86474-03-04

NOTES:

- 1) DIMENSIONS: mm
- 2) HEAD END BASE MOUNTING KIT NOT COMPATIBLE WITH -Y91 OPTION
- 3) SANITARY KIT INCLUDES ONLY STAINLESS STEEL COMPONENTS
- 4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically tolerated.

MX1 FASTENER MOUNTING KIT (PER ISO 6431)

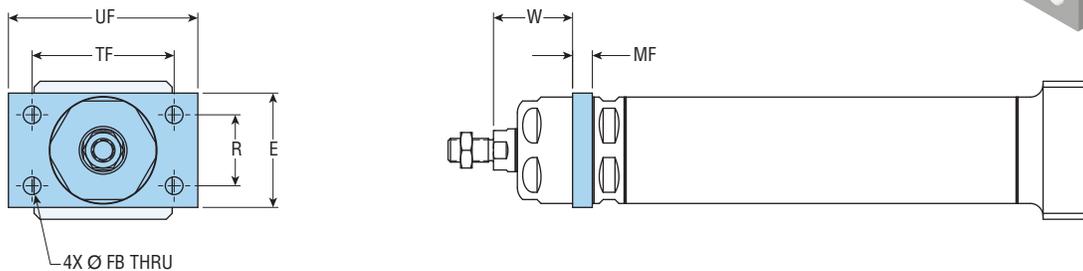
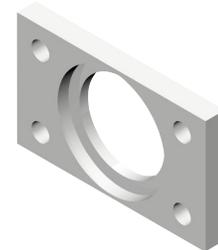


SIZE	BC	DD	TG	KIT NO. ³	SANITARY KIT NO. ²
32	25.0	M6 x 1	32.5	86217-01-01	86217-01-02
40	25.0	M6 x 1	38.0	86217-01-01	86217-01-02
50	31.4	M8 x 1.25	46.5	86217-02-01	86217-02-02

NOTES:

- 1) DIMENSIONS: mm
- 2) SANITARY KIT INCLUDES ONLY STAINLESS STEEL COMPONENTS
- 3) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

MF1 FLANGE MOUNTING KIT (PER VDMA 24562)



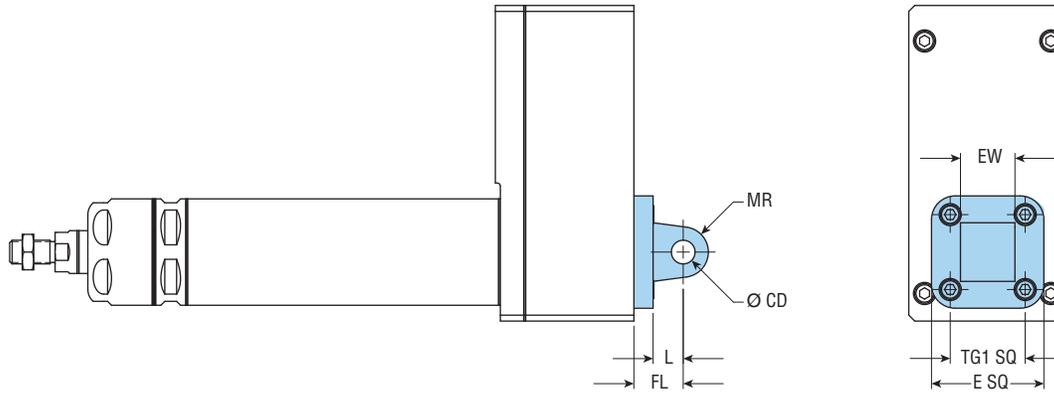
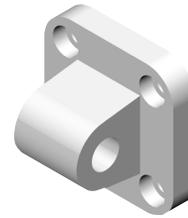
SIZE	E MAX	FB H13	MF	R JS14	TF JS14	UF MAX	W	KIT NO. ⁵	SANITARY KIT NO. ⁴
32	50.8	7.0	10.0	32.0	64.0	86.8	38.5	86215-01-01	86215-01-02
40	58.8	9.0	10.0	36.0	72.0	96.8	40.1	86215-02-01	86215-02-02
50	70.8	9.0	10.0	45.0	90.0	115.8	44.7	86215-03-01	86215-03-02

NOTES:

- 1) DIMENSIONS: mm
- 2) KIT INCLUDES FLANGE ONLY
- 3) FLANGE MOUNTING KIT NOT COMPATIBLE WITH -Y91 OPTION
- 4) SANITARY KIT INCLUDES ONLY STAINLESS STEEL COMPONENTS
- 5) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically tolerated.

MP4 REAR MALE HINGE MOUNTING KIT (PER VDMA 24562) (PIVOT MOUNT ONLY)

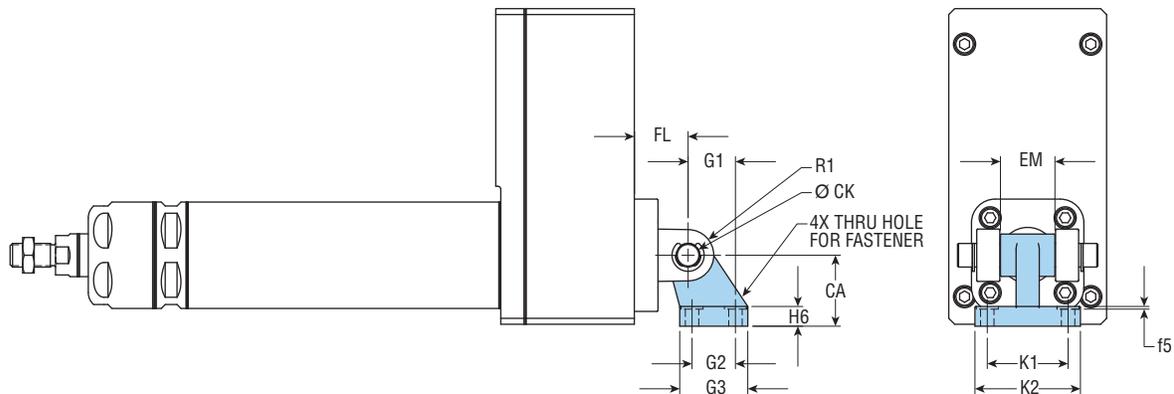


SIZE	CD	E	EW	FL	L	MR	TG1	KIT NO.
32	10.0	53.0	25.8	22.0	12.0	11.0	32.5	86219-01-01
40	12.0	61.5	27.8	25.0	15.0	13.0	38.0	86219-02-01
50	12.0	73.0	31.8	27.0	15.0	13.0	46.5	86219-03-01

NOTES:

- 1) DIMENSIONS: mm
- 2) KIT INCLUDES MOUNTING HARDWARE
- 3) MP4 REAR MALE HINGE MOUNTING IS COMPATIBLE WITH MP2 REAR FORK AND MP2 PIVOT PIN
- 4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

BMP4 PILLOW BLOCK MOUNTING KIT (PER CETOP 107 P)



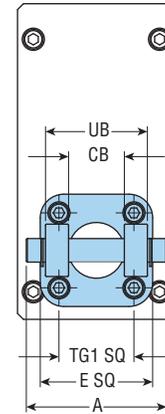
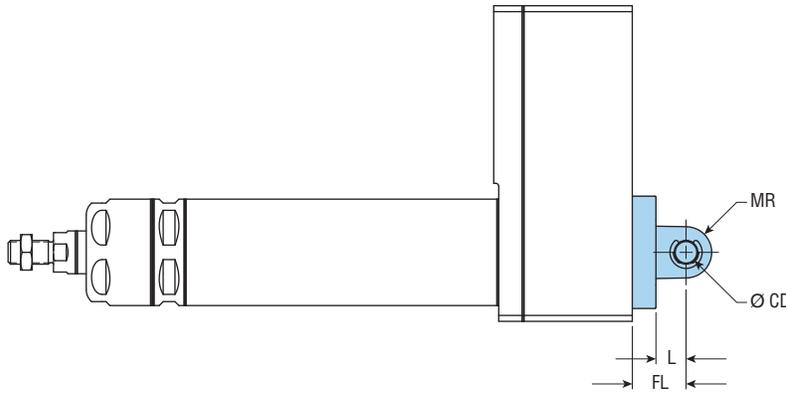
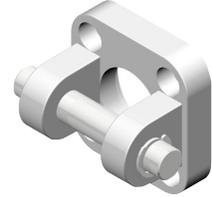
SIZE	CA JS15	CK H9	EM MAX	f5 MAX	FL	G1 JS14	G2	G3 MAX	H6	K1 JS14	K2 MAX	R1 MAX	FASTENER	KIT NO.
32	32.0	10.0	25.8	1.9	22.0	21.0	18.0	31.0	8.0	38.0	51.0	10.0	M6	62818-001-00
40	36.0	12.0	27.8	1.9	25.0	24.0	22.0	35.0	10.0	41.0	54.0	11.0	M6	62818-002-00
50	45.0	12.0	31.8	1.9	27.0	33.0	30.0	45.0	12.0	50.0	65.0	13.0	M8	62818-003-00

NOTES:

- 1) DIMENSIONS: mm
- 2) KIT INCLUDES MOUNTING HARDWARE
- 3) BMP4 PILLOW BLOCK IS COMPATIBLE WITH MP2 REAR FORK
- 4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically tolerated.

MP2 REAR FORK MOUNTING KIT (PER VDMA 24562)

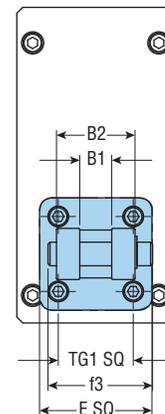
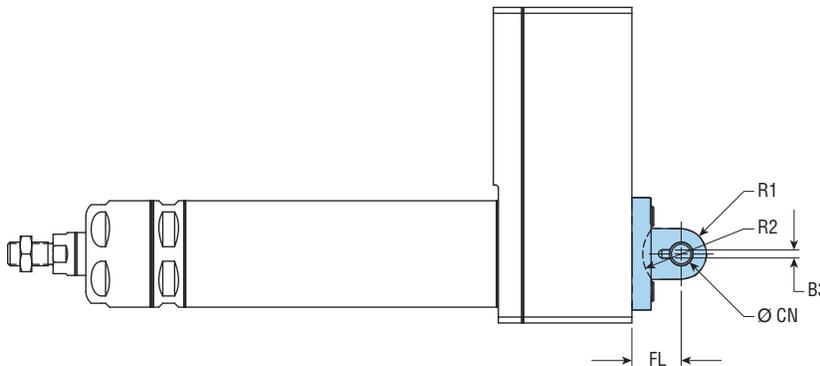
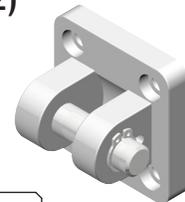


SIZE	A MAX	CB H14	CD H9	E MAX	FL (± 0.2)	L MIN	MR MAX	TG1	UB h14	KIT NO.
32	67.0	26.0	10.0	53.0	22.0	12.0	11.0	32.5	45.0	86218-01-01
40	74.3	28.0	12.0	61.5	25.0	15.0	13.0	38.0	52.0	86218-02-01
50	82.3	32.0	12.0	73.0	27.0	15.0	13.0	46.5	60.0	86218-03-01

NOTES:

- 1) DIMENSIONS: mm
- 2) KIT INCLUDES MOUNTING HARDWARE, PIVOT PIN AND PIVOT PIN RETAINER CLIPS
- 3) MP2 REAR FORK MOUNTING IS COMPATIBLE WITH MP4 REAR MALE HINGE AND BMP4 PILLOW BLOCK
- 4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

MSB2 REAR FORK MOUNTING FOR SPHERICAL BEARING KIT (PER VDMA 24562)



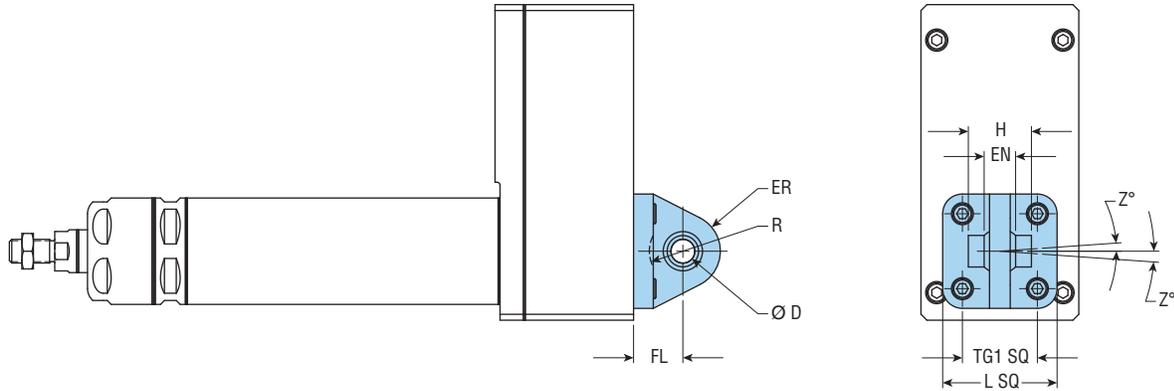
SIZE	B1 H14	B2 d12	B3 (± 0.2)	CN F7	E MAX	f3	FL (± 0.2)	R1 MAX	R2 MIN	TG1	KIT NO.
32	14.0	34.0	3.3	10.0	53.0	46.0	22.0	11.0	16.0	32.5	86476-01-01
40	16.0	40.0	4.3	12.0	61.5	53.0	25.0	13.0	19.0	38.0	86476-02-01
50	21.0	45.0	4.3	16.0	73.0	58.0	27.0	13.0	21.0	46.5	86476-03-01

NOTES:

- 1) DIMENSIONS: mm
- 2) KIT INCLUDES MOUNTING HARDWARE AND PIVOT PIN
- 3) MSB2 REAR FORK MOUNTING IS COMPATIBLE WITH BSB1 PILLOW BLOCK, MSB1 REAR MALE HINGE AND ROD EYE
- 4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically tolerated.

MSB1 REAR MALE HINGE MOUNTING FOR SPHERICAL BEARING KIT

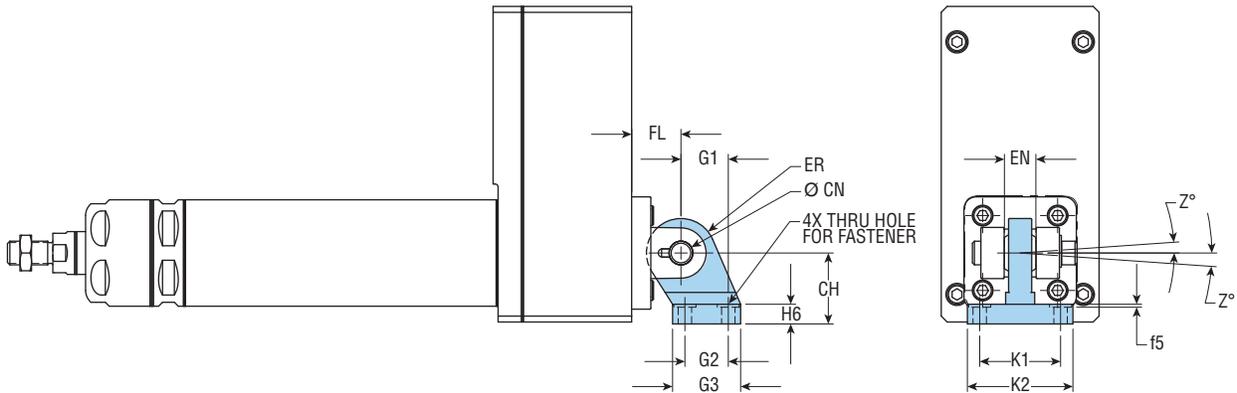


SIZE	D H7	EN (+0.0/-0.1)	ER MAX	FL (± 0.2)	H	L MAX	R	TG1	Z	KIT NO.
32	10.0	14.0	16.0	22.0	—	53.0	—	32.5	4°	86477-01-01
40	12.0	16.0	17.5	25.0	—	61.5	—	38.0	4°	86477-02-01

NOTES:

- 1) DIMENSIONS: mm
- 2) KIT INCLUDES MOUNTING HARDWARE
- 3) MSB1 REAR MALE HINGE MOUNTING IS COMPATIBLE WITH MSB2 REAR FORK
- 4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

BSB1 PILLOW BLOCK MOUNTING SPHERICAL BEARING KIT (PER VDMA 24562)



SIZE	CH JS15	CN H7	EN (+0.0/-0.1)	ER MAX	F5 MAX	FL	G1 JS14	G2 JS14	G3 MAX	H6	K1 JS14	K2 MAX	Z	FASTENER	KIT NO.
32	32.0	10.0	14.0	16.0	1.9	22.0	21.0	18.0	31.0	10.0	38.0	51.5	4°	M6	62822-001-00
40	36.0	12.0	16.0	18.0	1.9	25.0	24.0	22.0	35.0	10.0	41.0	54.5	4°	M6	62822-002-00
50	45.0	16.0	21.0	21.0	1.9	27.0	33.0	30.0	45.0	12.0	50.0	65.5	4°	M8	62822-003-00

NOTES:

- 1) DIMENSIONS: mm
- 2) KIT INCLUDES PILLOW BLOCK ONLY
- 3) BSB1 PILLOW BLOCK MOUNTING IS COMPATIBLE WITH MSB2 REAR FORK (NOT INCLUDED)
- 4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS
- 5) MOUNTING IS FUNCTIONAL ONLY AS SHOWN

All dimensions are reference only unless specifically tolerated.

ROD CLEVIS MOUNTING KIT FOR METRIC ROD ENDS (PER DIN 8140)

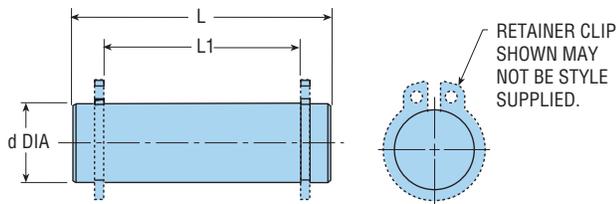


SIZE	AV MIN	CE	CK H9	CL MAX	CM MIN	ER MAX	KK	L	LE MIN	KIT NO.
32	20.0	40.0	10.0	20.3	10.0	16.0	M10 x 1.25	25.0	20.0	86479-01-01
40	22.0	48.0	12.0	24.3	12.0	19.0	M12 x 1.25	30.0	24.0	86479-02-01

NOTES:

- 1) DIMENSIONS: mm
- 2) KIT INCLUDES PIVOT PIN AND PIVOT PIN RETAINER CLIPS
- 3) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

ROD CLEVIS PIVOT PIN KIT



SIZE	d	L	L1	KIT NO.
32	10.0	25.0	20.1	63463-01-2
40	12.0	30.0	24.1	63463-02-2

NOTES:

- 1) DIMENSIONS: mm
- 2) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

ROD EYE MOUNTING WITH SPHERICAL BEARING KIT

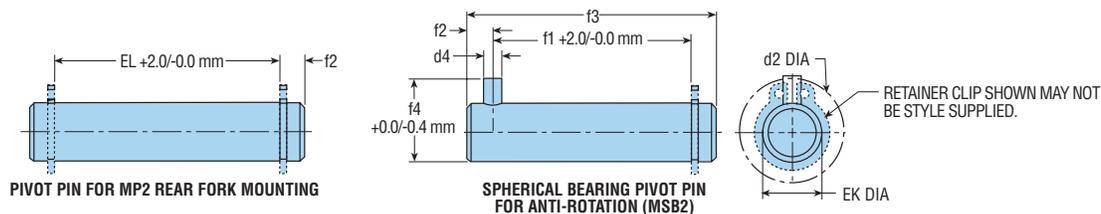


SIZE	AX MIN	CE	CN H9	EN h12	ER MAX	KK	LE MIN	Z	KIT NO.
32	20.0	43.0	10.0	14.0	14.0	M10 x 1.25	15.0	4°	86481-01-01
40	22.0	50.0	12.0	16.0	16.0	M12 x 1.25	17.0	4°	86481-02-01
50	28.0	64.0	16.0	21.0	21.0	M16 x 1.5	23.0	4°	86481-03-01

NOTES:

- 1) DIMENSIONS: mm
- 2) ROD EYE MOUNTING IS COMPATIBLE WITH MSB2 REAR FORK
- 3) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

PIVOT PIN KIT



PIVOT PIN FOR MP2 REAR FORK MOUNTING

SPHERICAL BEARING PIVOT PIN FOR ANTI-ROTATION (MSB2)

MP2 PIVOT PIN

SIZE	d2 MAX	EK/e8	EL	f2	KIT NO.
32	23.0	10.0	46.0	8.5	52490-01-2
40	25.0	12.0	53.0	8.5	52490-02-2
50	25.0	12.0	61.0	8.5	52490-03-2

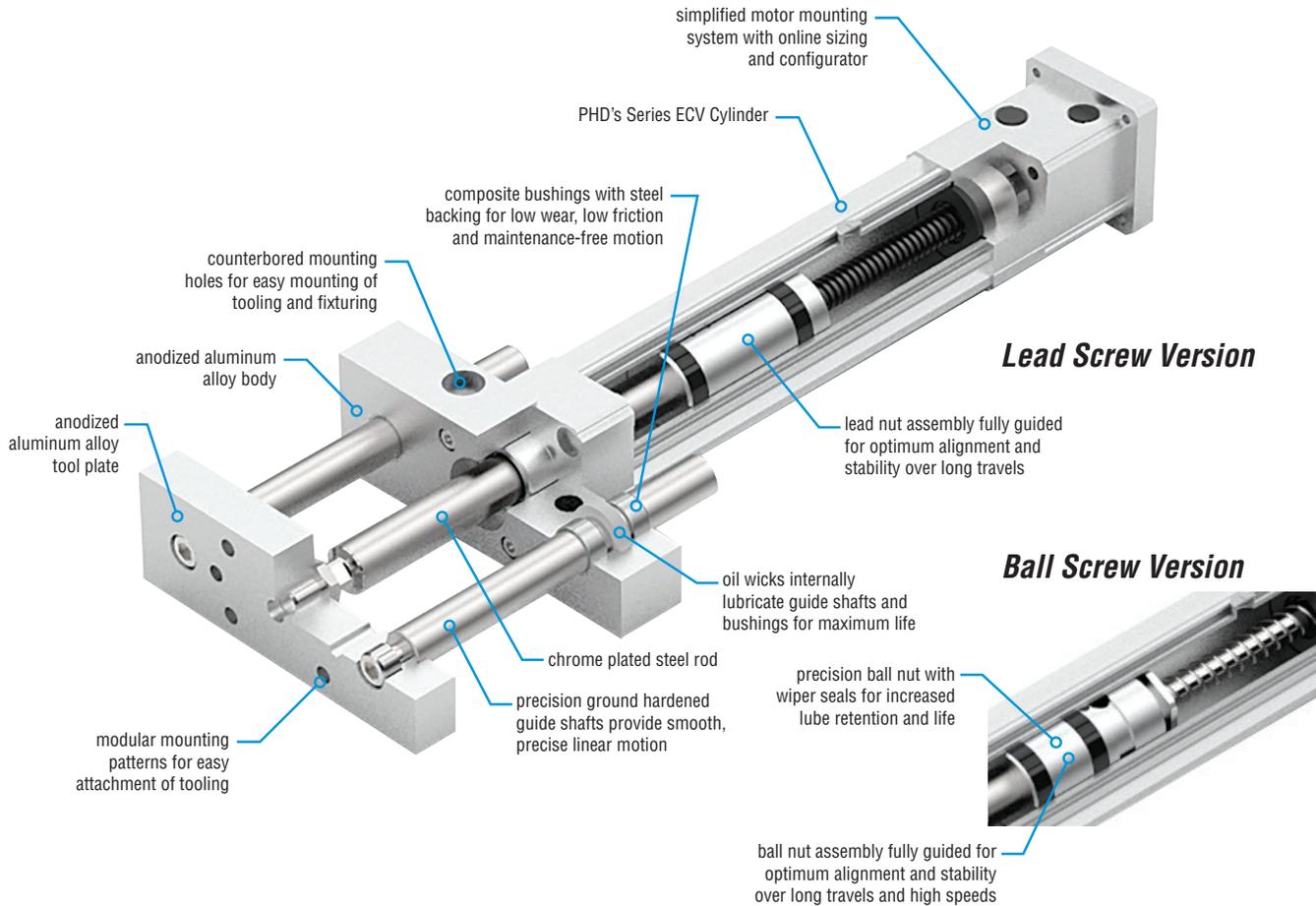
MSB2 PIVOT PIN

SIZE	d2 MAX	d4/H12	EK/h9	f1	f2 MAX	f3 MAX	f4	KIT NO.
32	23.0	3.0	10.0	32.5	4.5	46.0	14.0	52491-01-2
40	25.0	4.0	12.0	38.0	6.0	53.0	16.0	52491-02-2
50	25.0	4.0	16.0	43.0	6.0	58.0	20.0	52491-03-2

- NOTES: 1) DIMENSIONS: mm 2) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically tolerated.

SERIES ESCV VERTICAL ELECTRIC THRUSTER SLIDE



Your Motor Your Way

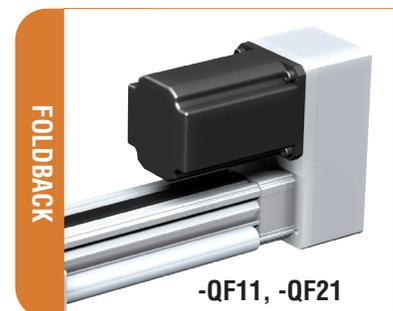
Major Benefits

- Electrically driven thruster slide based on the proven PHD Series SCV Slide
- High thrust and speed capability
- Precision screw assemblies with long service life
- Rigid construction with low backlash
- High degree of repeatability
- IP50 ingress protection
- Ideal for non-rotating applications
- Inline and foldback motor mounting flexibility
- **Your Motor, Your Way** allows motor and controls flexibility at no additional cost
- Switch ready standard

Choice of Inline or Foldback Motor Mounting



Foldback available in 1:1 or 2:1 drive for tailored performance.



ORDERING DATA: Series ESCV Vertical Electric Thruster Slide

TYPE
Electromechanical

CYLINDER
C - Series ECV Compatible

SIZE
2
3
4
5
6

TRAVEL (MAX.)

Size	Ball mm	Lead mm
2	—	150
3	—	150
4	200	200
5	200	200
6	250	250

50 mm minimum travel in 50 mm increments

TYPE

AE - Shock pads on extend
AR - Shock pads on retract
Q1 - Corrosion resistant guide shafts
H1 - Slide section only
H4 - Cylinder replacement only

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

MOTOR MOUNT CODE

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

E S C V 7 4 x 150 - 25 - RB010 - AE - SAPK2 - QF11 - Wxxxx

PRODUCT
Slide

TYPE
V - Standard Light Duty Slide Bushing

DESIGN NO.
7 - Metric

TOOL PLATE EXTENSION

Additional distance between tool plate and bearing body in 25 mm increments. Leave blank if additional extension is not required.

SCREW CONFIGURATION

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

SWITCH BUNDLE (OPTIONAL)

SAPK2

SWITCH CIRCUITRY

B - AC/DC Reed
N - NPN DC Solid State
P - PNP DC Solid State

QUANTITY

1 - 1 Switch
2 - 2 Switches
3 - 3 Switches
4 - 4 Switches
5 - 5 Switches
6 - 6 Switches
7 - 7 Switches
8 - 8 Switches
9 - 9 Switches

CABLE TYPE

K - Quick Connect
2 - 2 Meter Length Cable

NOTE: If switch option is ordered, switch(es) are included, but not installed. Cordsets for Quick Connect are ordered separately.

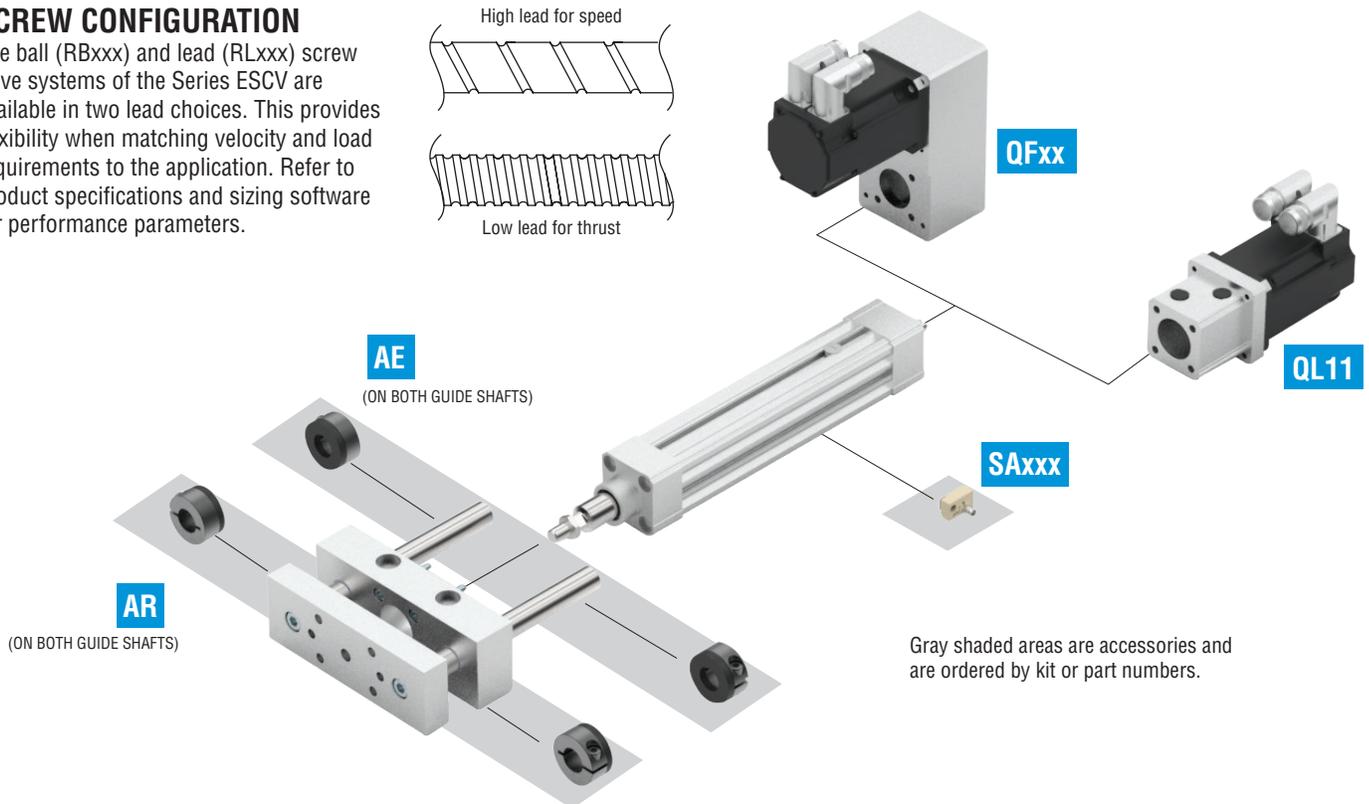
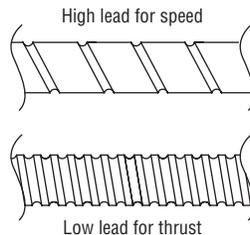
CORDSETS WITH QUICK CONNECT

PART NO.	CABLE LENGTH
61397-02	2 meter, 3 wire
61397-05	5 meter, 3 wire

NOTE: This cordset is used for both 3-wire and 2-wire applications. When used in 2-wire applications, refer to the schematic and disregard the black wire.

SCREW CONFIGURATION

The ball (RBxxx) and lead (RLxxx) screw drive systems of the Series ESCV 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.



Gray shaded areas are accessories and are ordered by kit or part numbers.

SPECIFICATIONS	BALL SCREW SERIES ESCV
REPEATABILITY ¹	±0.010 mm [±0.0004 in]
MAXIMUM BACKLASH ²	0.025 mm [0.001 in]
RATED LIFE	Refer to Life vs. Thrust Chart (page 46)
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		mm [in]		200 [7.87]		200 [7.87]		250 [9.84]	
	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				Composite with Steel Backing 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 ⁵	MAXIMUM THRUST		N [lbf]		1360 [306]	680 [153]	2430 [546]	1520 [342]	4410 [991]	2510 [564]
	NOMINAL THRUST ⁵		N [lbf]		400 [90]	330 [74]	1270 [285]	975 [219]	1835 [413]	1515 [341]
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 (WOT)		kg [lb]		2.21 [4.88]		3.26 [7.20]		5.75 [12.67]	
	TOTAL LENGTH ADDER (WLT)		kg/mm [lb/in]		0.0066 [0.28]		0.0096 [0.53]		0.0148 [0.83]	
	MOVING @ ZERO STROKE (WOM)		kg [lb]		0.80 [1.76]		1.40 [3.09]		2.69 [5.94]	
	MOVING LENGTH ADDER (WLM)		kg/mm [lb/in]		0.0042 [0.24]		0.0060 [0.33]		0.0097 [0.54]	
INERTIA	ACTUATOR @ ZERO STROKE (JO)		kg-m ² [lb-in ²]		3.00 x 10 ⁻⁶ [0.010]		1.50 x 10 ⁻⁵ [0.051]		4.84 x 10 ⁻⁵ [0.165]	
	LENGTH ADDER (JL)		kg-m ² /mm [lb-in ² /in]		9.85 x 10 ⁻⁹ [0.0009]		2.90 x 10 ⁻⁸ [0.0025]		7.95 x 10 ⁻⁸ [0.0069]	
	MOVING WEIGHT ADDER (JM)		kg-m ² /kg [lb-in ² /lb]		6.21 x 10 ⁻⁷ [9.63 x 10 ⁻⁴]	2.48 x 10 ⁻⁶ [3.85 x 10 ⁻³]	2.48 x 10 ⁻⁶ [3.85 x 10 ⁻³]	6.36 x 10 ⁻⁶ [9.86 x 10 ⁻³]	2.48 x 10 ⁻⁶ [3.85 x 10 ⁻³]	9.93 x 10 ⁻⁶ [1.54 x 10 ⁻²]
	MOTOR CONFIGURATION (JQ)	-QF11	kg-m ² [lb-in ²]		1.40 x 10 ⁻⁵ [0.048]		4.71 x 10 ⁻⁵ [0.161]		4.65 x 10 ⁻⁵ [0.159]	
		-QF21	kg-m ² [lb-in ²]		2.75 x 10 ⁻⁵ [0.094]		8.28 x 10 ⁻⁵ [0.283]		1.91 x 10 ⁻⁴ [0.654]	
	-QL11	kg-m ² [lb-in ²]		3.14 x 10 ⁻⁶ [0.011]		6.11 x 10 ⁻⁶ [0.021]		4.04 x 10 ⁻⁵ [0.138]		

NOTES:

- UNIDIRECTIONAL
- AXIAL FREE PLAY WHEN DRIVE SHAFT LOCKED
- REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
- REFER TO PERFORMANCE CHARTS ON PAGE 46
- 2500 km [100 MILLION in] LIFE
- CORRESPONDS TO MAXIMUM THRUST
- FOR HOMING AND INCREASED APPLICATION FLEXIBILITY, INCLUDE EXTRA TRAVEL WHEN NECESSARY
- ALL DIMENSIONS ARE FOR REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED. REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES.

WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = $W_{OT} + (W_{LT} \times \text{TRAVEL}) + \text{MOTOR MOUNT WEIGHT}$ [reference pages 48-49]

TOTAL MOVING WEIGHT = $W_{OM} + (W_{LM} \times \text{TRAVEL}) + \text{EXTERNAL PAYLOAD}$

FOR -Qx11: $\text{INERTIA}_{\text{Reflected}} = J_0 + (J_L \times \text{TRAVEL}) + (J_M \times \text{TOTAL MOVING WEIGHT}) + J_0$

FOR -QF21: $\text{INERTIA}_{\text{Reflected}} = [J_0 + (J_L \times \text{TRAVEL}) + (J_M \times \text{TOTAL MOVING WEIGHT})] / 4 + J_0$

ENGINEERING DATA: Series ESCV Vertical Electric Thruster Slide -RL

SPECIFICATIONS	LEAD SCREW SERIES ESCV
REPEATABILITY ¹	±0.5 mm [±0.020 in]
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	mm [in]	150 [5.91]		150 [5.91]		200 [7.87]		200 [7.87]		250 [9.84]	
	DRIVE MECHANISM		Lead Screw									
	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 with Steel Backing 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 [6.30]	80 [3.15]	160 [6.30]
	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 [112.0]	250 [56.0]	800 [180.0]	400 [90.0]	1600 [360.0]	800 [180.0]	2500 [562.0]	1250 [281.0]
	PERMISSIBLE DRIVE TORQUE ⁵	-QL11	0.5 [4.42]		0.7 [6.20]		1.2 [10.62]		4.3 [38.06]		7.8 [69.03]	
-QF21		0.84 [7.43]		3 [26.55]		5.46 [48.32]						
TORQUE	NO-LOAD TORQUE	Nm [in-lb]	0.09 [0.80]		0.12 [1.00]		0.15 [1.33]		0.40 [3.54]		0.60 [5.31]	
	TOTAL @ ZERO STROKE (W _{OT})	kg [lb]	1.09 [2.41]		1.52 [3.35]		2.14 [4.72]		3.16 [6.96]		5.55 [12.24]	
WEIGHT	TOTAL LENGTH ADDER (W _{LT})	kg/mm [lb/in]	0.0028 [0.15]		0.0038 [0.21]		0.0066 [0.37]		0.0095 [0.53]		0.0148 [0.83]	
	MOVING @ ZERO STROKE (W _{OM})	kg [lb]	0.30 [0.67]		0.45 [1.00]		0.73 [1.61]		1.30 [2.86]		2.50 [5.52]	
	MOVING LENGTH ADDER (W _{LM})	kg/mm [lb/in]	0.0018 [0.09]		0.0027 [0.14]		0.0041 [0.24]		0.0059 [0.33]		0.0095 [0.54]	
INERTIA	ACTUATOR @ ZERO STROKE (J _o)	kg-m ² [lb-in ²]	1.66 x 10 ⁻⁶ [0.006]		2.09 x 10 ⁻⁶ [0.007]		3.00 x 10 ⁻⁶ [0.010]		1.50 x 10 ⁻⁵ [0.051]		4.84 x 10 ⁻⁵ [0.165]	
	LENGTH ADDER (J _L)	kg-m ² /mm [lb-in ² /in]	1.59 x 10 ⁻⁹ [0.00014]		4.94 x 10 ⁻⁹ [0.0043]		9.85 x 10 ⁻⁹ [0.0009]		2.90 x 10 ⁻⁸ [0.0025]		7.95 x 10 ⁻⁸ [0.0069]	
	MOVING WEIGHT ADDER (J _M)	kg-m ² /kg [lb-in ² /lb]	3.80 x 10 ⁻⁸ [5.89 x 10 ⁻⁵]	1.01 x 10 ⁻⁷ [1.57 x 10 ⁻⁴]	3.80 x 10 ⁻⁸ [5.89 x 10 ⁻⁵]	7.60 x 10 ⁻⁸ [1.18 x 10 ⁻⁴]	7.60 x 10 ⁻⁸ [1.18 x 10 ⁻⁴]	1.52 x 10 ⁻⁷ [2.36 x 10 ⁻⁴]	1.01 x 10 ⁻⁷ [1.57 x 10 ⁻⁴]	2.03 x 10 ⁻⁷ [3.14 x 10 ⁻⁴]	1.01 x 10 ⁻⁷ [1.57 x 10 ⁻⁴]	2.03 x 10 ⁻⁷ [3.14 x 10 ⁻⁴]
	MOTOR CONFIGURATION (J _o)	kg-m ² [lb-in ²]	2.69 x 10 ⁻⁵ [0.092]		2.69 x 10 ⁻⁵ [0.092]		1.40 x 10 ⁻⁵ [0.048]		4.71 x 10 ⁻⁵ [0.161]		4.65 x 10 ⁻⁵ [0.159]	
	-QF11	—		—		2.75 x 10 ⁻⁵ [0.094]		8.28 x 10 ⁻⁵ [0.283]		1.91 x 10 ⁻⁴ [0.654]		
	-QL11	1.89 x 10 ⁻⁶ [0.006]		1.89 x 10 ⁻⁶ [0.006]		3.14 x 10 ⁻⁶ [0.011]		6.11 x 10 ⁻⁶ [0.021]		4.04 x 10 ⁻⁵ [0.138]		

NOTES:

- UNIDIRECTIONAL
- VALUES CORRESPOND TO INITIAL (AS SUPPLIED NEW) CONDITION. DUE TO FRICTIONAL WEAR, BACKLASH MAY INCREASE OVER TIME.
- REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
- REFER TO PERFORMANCE CHARTS ON PAGE 46
- CORRESPONDS TO MAXIMUM THRUST

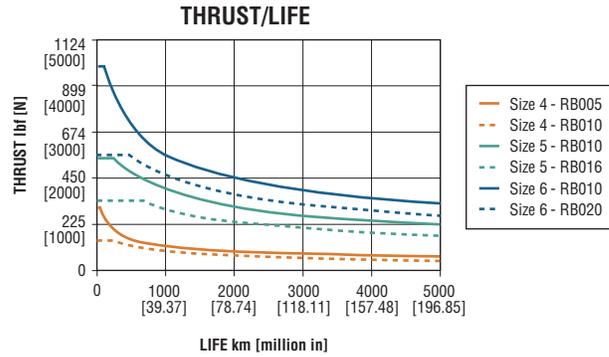
WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT [reference pages 48-49]
 TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

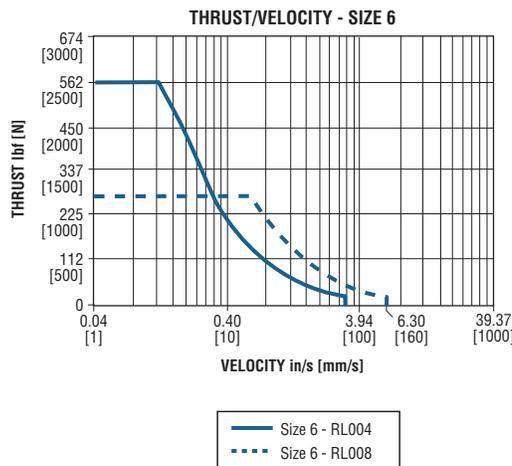
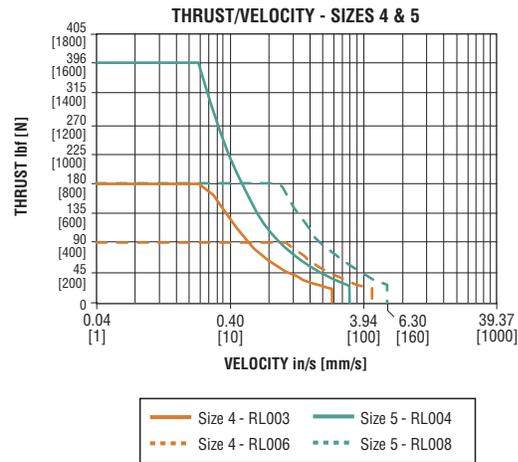
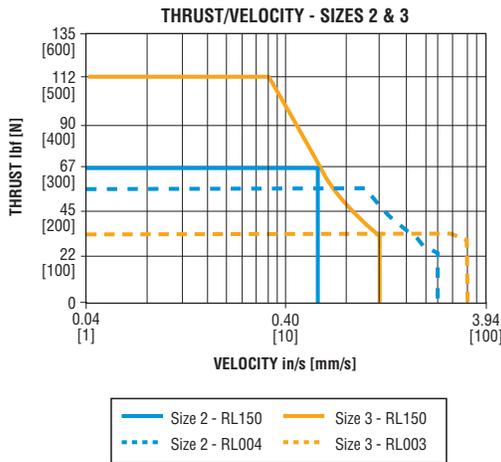
FOR -Qx11: INERTIA_{Reflected} = J_o + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT) + J_o

FOR -QF21: INERTIA_{Reflected} = [J_o + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_o

BALL SCREW - RB

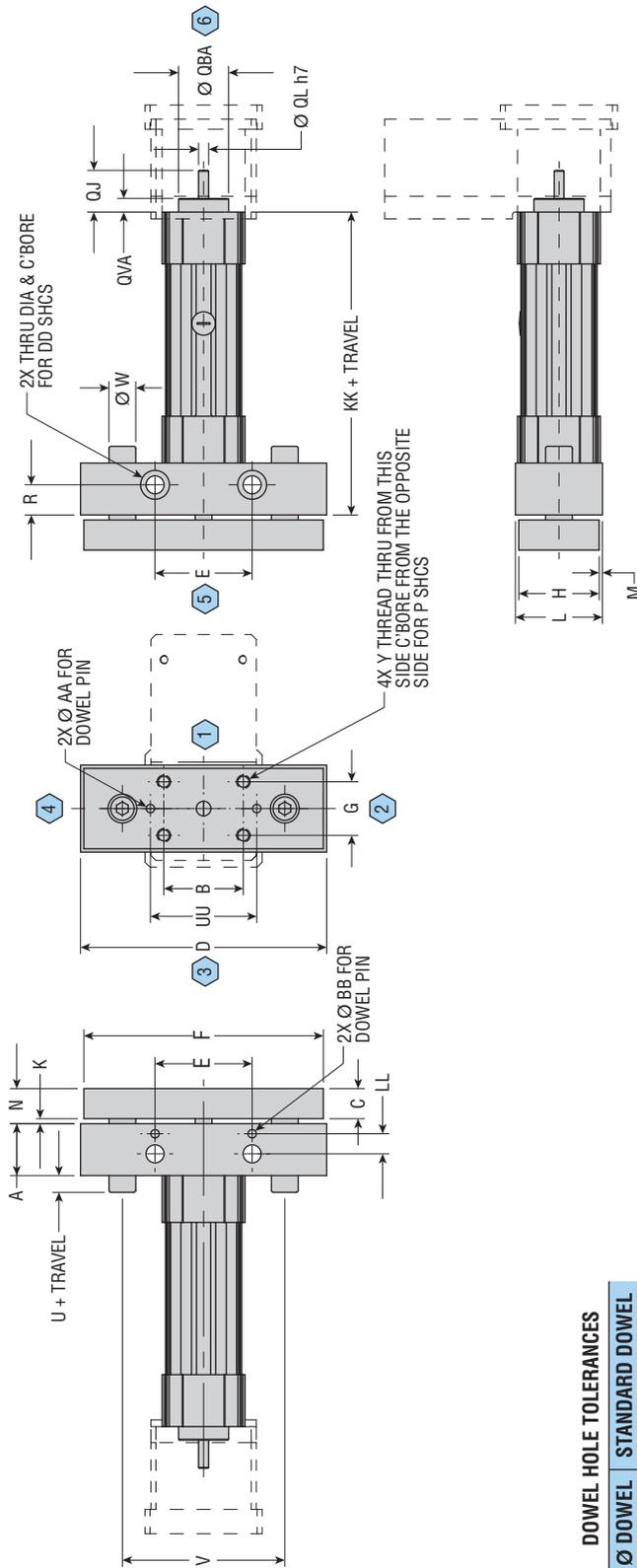


LEAD SCREW - RL



This section contains information on the capabilities of the Ball and Lead Screw Series ESCV. It is not intended to be a comprehensive selection guide. To simplify the selection process, or for deflection values, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer Service Department.

DIMENSIONS: Series ESCV Vertical Electric Thruster Slide



DOWEL HOLE TOLERANCES

Ø DOWEL HOLE	STANDARD TOLERANCE
5	+0.032 / +0.006
8	+0.029 / +0.004

SIZE	BORE Ø	A	B	C	D	E	F	G	H	K	L	M	N	P	R	U	V	W	Y	AA	BB	DD	KK	LL	UU	QBA	QJ	QL	QVA
2	20	28.0	38.5	16.0	112.0	50.0	108.0	23.0	36.0	2.5	40.0	2.0	18.5	M4	16.0	10.0	76.0	10.0	M5 x 0.8	5.0	5.0	M6	141.4	9.0	49.0	22.9	24.4	5.0	8.1
3	25	33.0	50.0	17.0	121.5	47.5	117.5	30.0	41.0	2.5	45.0	2.0	19.5	M4	18.0	10.0	81.0	12.0	M6 x 1	5.0	5.0	M8	151.3	9.5	50.0	24.9	24.4	6.0	8.1
4	32	31.0	47.5	18.0	147.0	58.0	143.0	32.0	48.0	3.0	52.0	2.0	21.0	M6	18.0	10.0	97.0	16.0	M8 x 1.25	5.0	5.0	M10	181.0	12.0	47.5	29.9	25.0	6.0	8.1
5	40	36.0	58.0	23.0	176.0	65.0	172.0	36.0	58.0	3.0	62.0	2.0	26.0	M8	23.0	10.0	117.0	20.0	M10 x 1.5	8.0	8.0	M12	206.9	16.0	75.0	34.9	28.0	10.0	8.1
6	50	45.0	65.0	31.0	217.5	80.0	213.5	45.0	69.0	3.0	73.0	2.0	34.0	M10	27.0	10.0	143.0	25.0	M12 x 1.75	8.0	8.0	M12	238.0	18.0	90.0	48.5	34.6	12.0	9.1

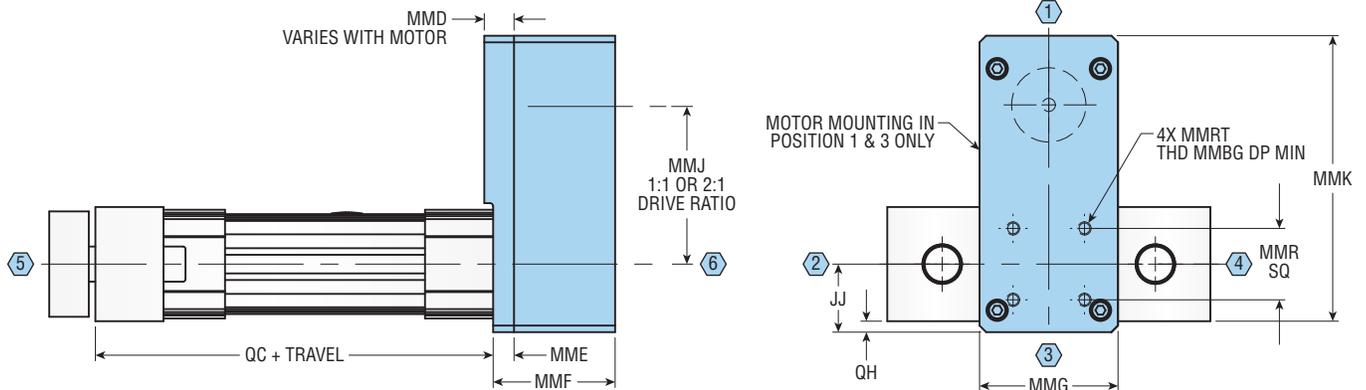
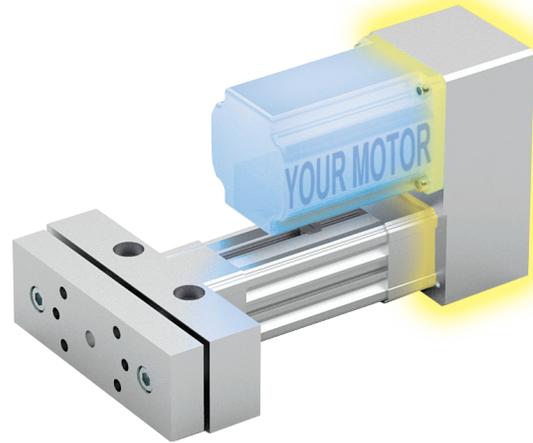
DIMENSIONS: mm
NUMBERS SHOWN IN ◻ INDICATE SLIDE POSITIONS

All dimensions are reference only unless specifically tolerated.

QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

QF21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO (Not available on sizes 2 and 3)

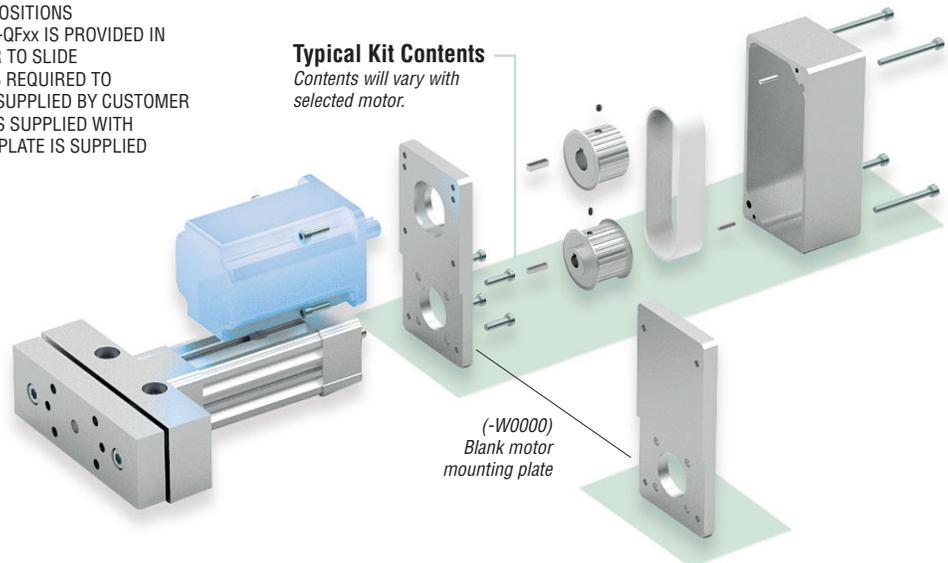
Foldback motor mounting with the QF11 option provides a 1:1 drive ratio allowing similar performance to the inline motor mounting in a shorter overall length. The QF21 option provides a 2:1 drive ratio reduction for applications that require higher thrust. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 50.



SIZE	BORE Ø	JJ	MMD MIN	MMD MAX	MME	MMF	MMG	MMJ (1:1)	MMJ (2:1)	MMK	MMR	MMBG	MMRT	QC	QH	WEIGHT (kg)
2	20	24.0	6.1	22.5	9.5	55.5	58.0	67.5	—	116.5	26.0	11.5	M4 x 0.7	141.4	4.0	0.79
3	25	24.0	6.1	22.5	9.5	55.5	58.0	67.5	—	119.0	27.0	11.5	M4 x 0.7	151.3	1.5	0.79
4	32	31.0	9.5	31.5	9.5	55.5	63.0	72.5	70.5	130.0	32.5	11.5	M6 x 1	181	5.0	1.02
5	40	35.0	9.5	22.5	9.5	64.5	80.0	85.1	83.9	156.1	38.0	11.5	M6 x 1	206.9	4.0	1.70
6	50	44.0	9.5	22.5	9.5	68.0	86.0	102.5	111.4	190.9	46.5	14.5	M8 x 1.25	238	7.5	2.37

NOTES:

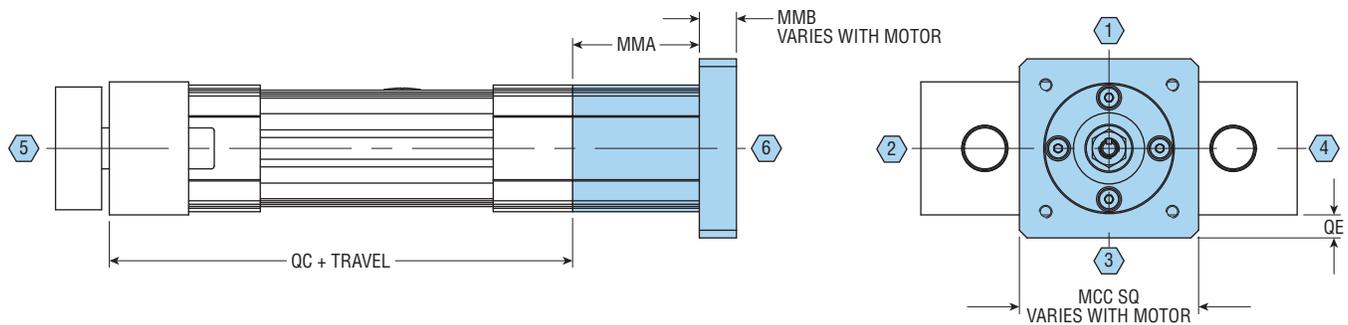
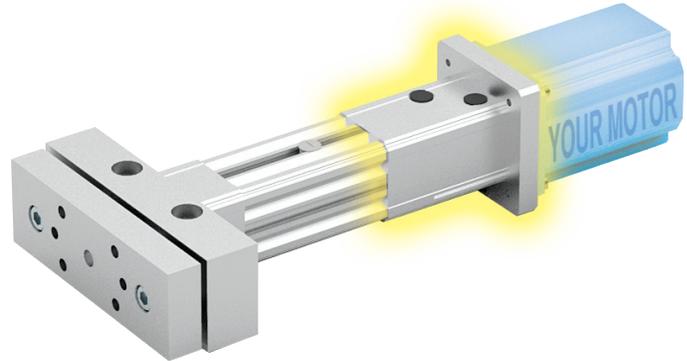
- 1) DIMENSIONS: mm
- 2) NUMBERS SHOWN IN ◻ INDICATE SLIDE POSITIONS
- 3) YOUR MOTOR, YOUR WAY MOTOR MOUNT -QFxx IS PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO SLIDE
- 4) KITS INCLUDE DIRECTIONS AND ALL PARTS REQUIRED TO ASSEMBLE SLIDE BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
- 5) WHEN (-W0000) IS SPECIFIED, PULLEY ID Ø AND MOTOR MOUNTING PLATE IS SUPPLIED WITHOUT MOTOR MOUNTING FEATURES



All dimensions are reference only unless specifically tolerated.

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 50.



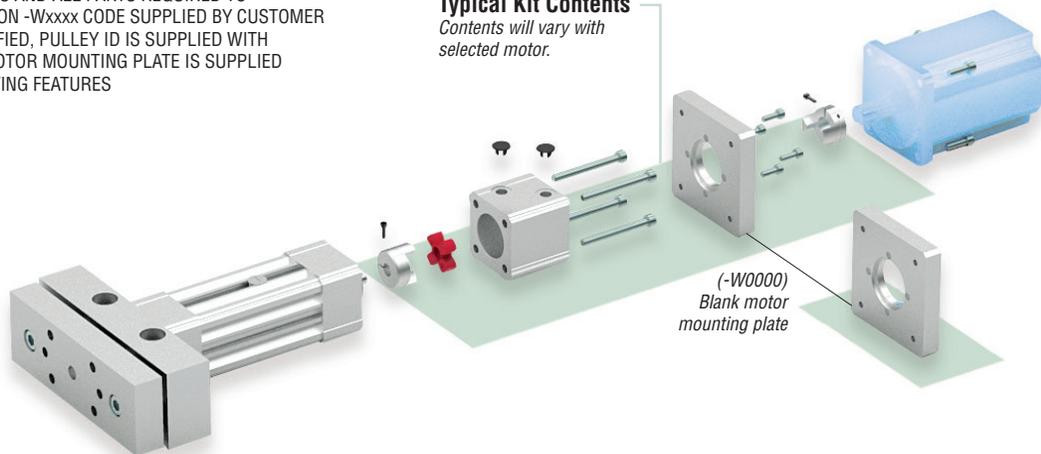
SIZE	BORE Ø	MMA	MMB MIN	MMB MAX	MMC STANDARD	MMC OVERSIZE	QC	QE STANDARD	QE OVERSIZE	WEIGHT (kg)
2	20	43.6	8.5	25.4	49.0	60.0	141.4	4.5	10.0	0.25
3	25	43.6	8.5	25.4	49.0	60.0	151.3	2.0	7.5	0.25
4	32	49.5	8.5	25.4	60.0	70.0	181.0	4.0	9.0	0.45
5	40	53.0	8.5	35.6	70.0	88.0	206.9	4.0	13.0	0.65
6	50	82.1	8.5	35.6	88.0	110.0	238.0	7.5	18.5	1.36

NOTES:

- 1) DIMENSIONS: mm
- 2) NUMBERS SHOWN IN ◻ INDICATE SLIDE POSITIONS
- 3) YOUR MOTOR, YOUR WAY MOTOR MOUNT -QL11 IS PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO SLIDE
- 4) KITS INCLUDE DIRECTIONS AND ALL PARTS REQUIRED TO ASSEMBLE SLIDE BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
- 5) WHEN (-W0000) IS SPECIFIED, PULLEY ID IS SUPPLIED WITH UNFINISHED ID Ø AND MOTOR MOUNTING PLATE IS SUPPLIED WITHOUT MOTOR MOUNTING FEATURES

Typical Kit Contents

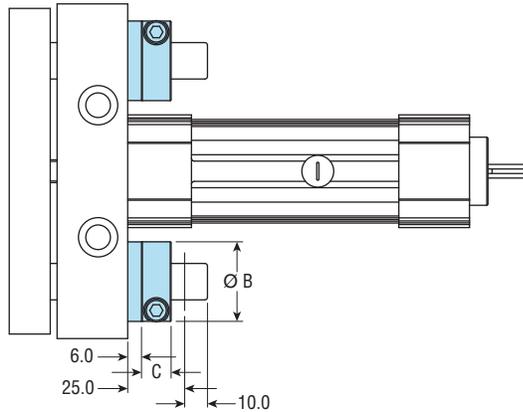
Contents will vary with selected motor.



All dimensions are reference only unless specifically tolerated.

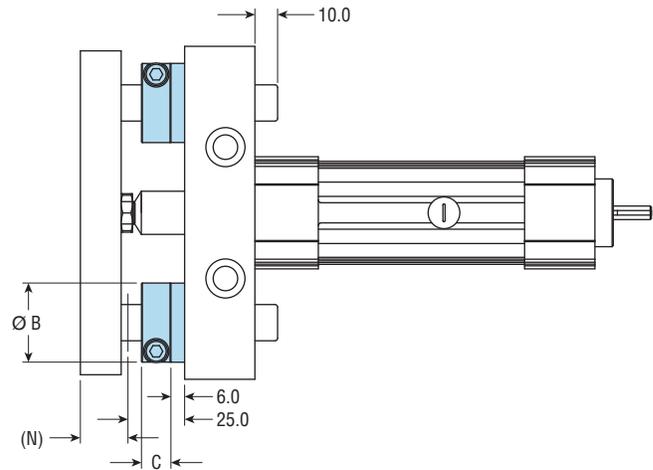
AE SHOCK PADS ON EXTENSION

This option provides urethane shock pads on extension for crash protection, eliminating metal-to-metal contact as the stop collars reach the slide body. This option is not intended for travel adjustment.



AR SHOCK PADS ON RETRACTION

This option provides urethane shock pads on retraction for crash protection, eliminating metal-to-metal contact as the stop collars reach the slide body. This option is not intended for travel adjustment.



SIZE	BORE Ø	Ø B	C	N
2	20	25.0	10.0	18.5
3	25	28.0	11.0	19.5
4	32	35.0	13.0	21.0
5	40	42.0	15.0	26.0
6	50	48.0	15.0	34.0

DIMENSIONS: mm

Wxxxx MOTOR MOUNT CODE *Your Motor Your Way*

Your Motor, Your Way customizable motor mounting is generated by PHD's extensive motor database at config.phdinc.com. Users 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 mount code.

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

H4 CYLINDER REPLACEMENT ONLY (WITHOUT SLIDE)

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

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.

H1 SLIDE REPLACEMENT ONLY (WITHOUT CYLINDER)

This option provides the slide mechanism only without cylinder or motor mounting. Included with option -H1 is all the hardware required for mounting standard PHD Series ECV Cylinders or pneumatic standard VDMA/ISO cylinders to the slide.

All dimensions are reference only unless specifically tolerated.

OPTIONS: Series ESCV Vertical Electric Thruster Slide

SA SWITCH BUNDLE INCLUDED

Switches are included, but not installed with this option. See option code to specify the switches to be included.

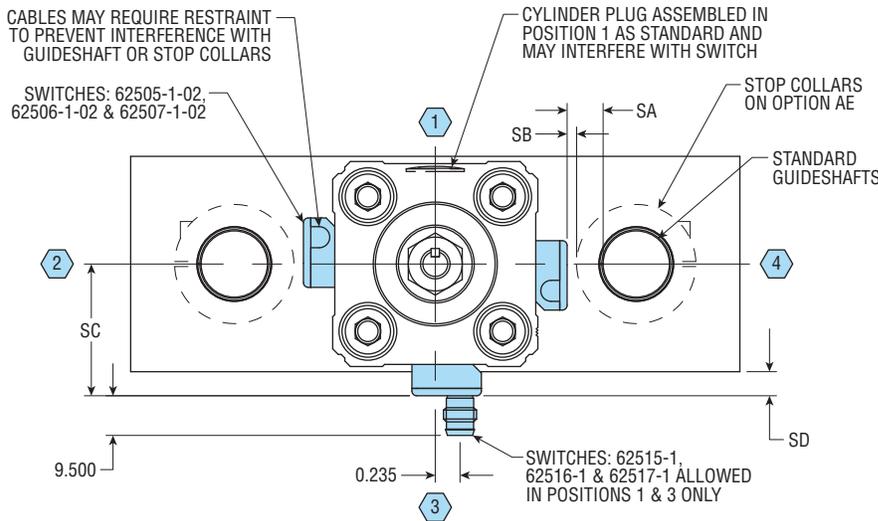
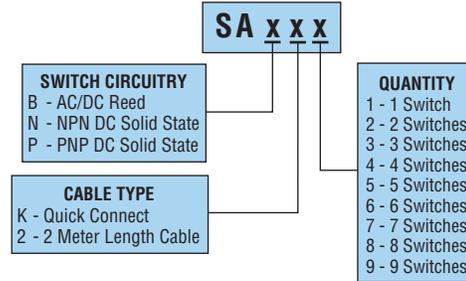
NOTE: Cordsets for Quick Connect are ordered separately.

CORDSETS WITH QUICK CONNECT

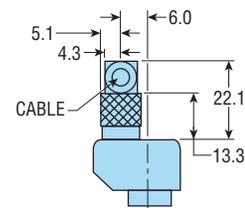
PART NO.	CABLE LENGTH
61397-02	2 meter, 3 wire
61397-05	5 meter, 3 wire

NOTE: This cordset is used for both 3-wire and 2-wire applications. When used in 2-wire applications, refer to the schematic and disregard the black wire.

SWITCH BUNDLE INCLUDED OPTIONS



62515-1, 62516-1 & 62517-1 Connector Detail



SIZE	BORE Ø	SA	SB	SC	SD
2*	20	—	—	25.7	5.7
3*	25	—	—	28.2	5.7
4	32	8.3	**	32.0	6.0
5	40	14.0	3.0	34.0	3.0
6	50	17.8	6.3	41.0	4.5

NOTES:

- DIMENSIONS: mm
 - NUMBERS SHOWN IN ○ INDICATE SLIDE POSITIONS
 - SWITCHES MAY NOT BE ABLE TO BE ADJUSTED WHEN ALIGNED WITH STOP COLLARS
- * SWITCHES ONLY WORK IN POSITIONS 1 AND 3
 ** STOP COLLARS WILL INTERFERE WITH SWITCHES MOUNTED IN POSITIONS 2 AND 4

REPLACEMENT SERIES 6250 REED SWITCHES

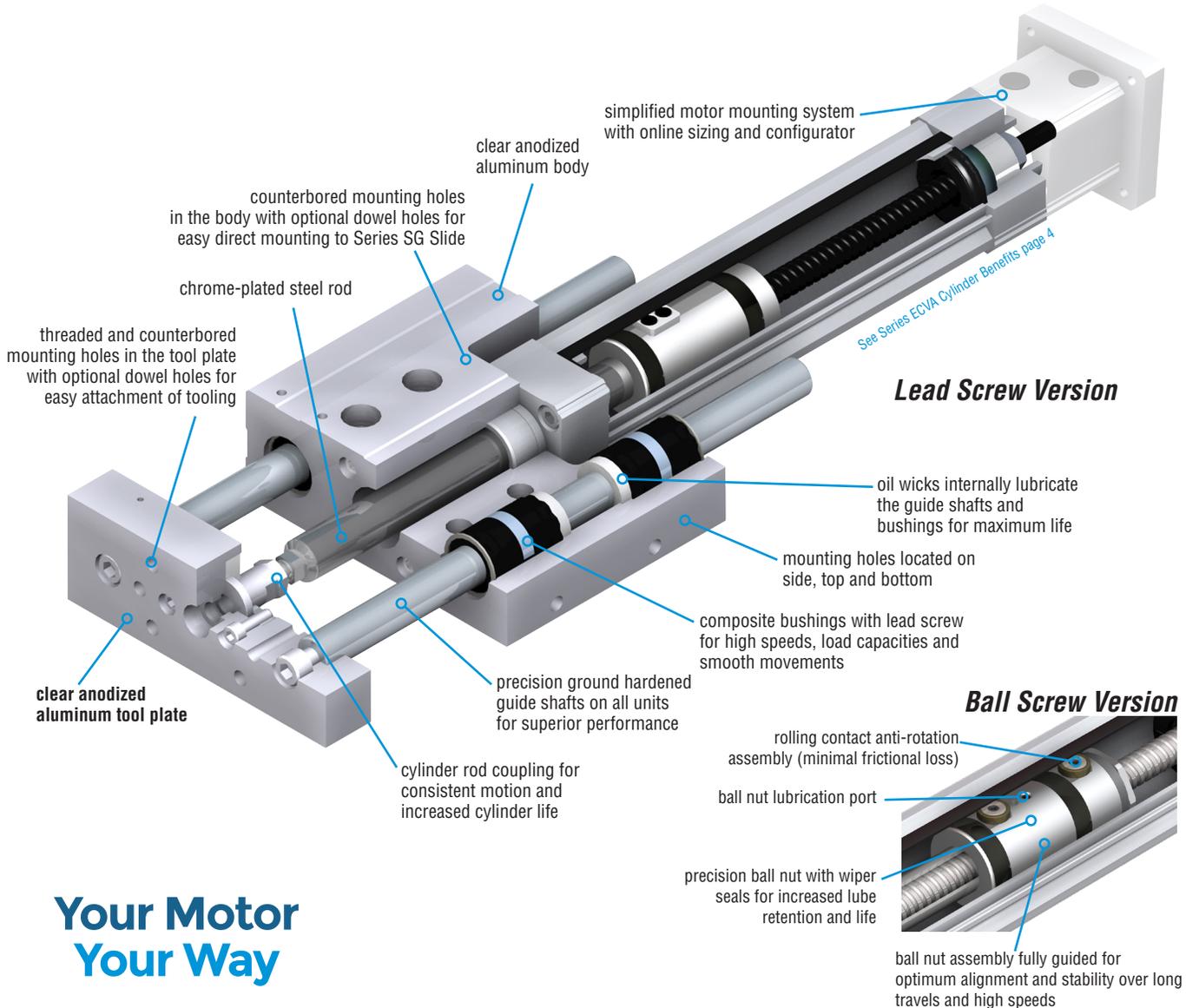
PART NO.	DESCRIPTION	COLOR
62507-1-02	AC/DC Reed, 2 Meter Cable (-SAB2x)	Silver
62517-1	AC/DC Reed, Quick Connect (-SABKx)	Silver

REPLACEMENT SERIES 6250 SOLID STATE SWITCHES

PART NO.	DESCRIPTION	COLOR
62505-1-02	NPN (Sink) DC Solid State, 2 Meter Cable (-SAN2x)	Brown
62506-1-02	PNP (Source) DC Solid State, 2 Meter Cable (-SAP2x)	Tan
62515-1	NPN (Sink) DC Solid State, Quick Connect (-SANKx)	Brown
62516-1	PNP (Source) DC Solid State, Quick Connect (-SAPKx)	Tan

All dimensions are reference only unless specifically tolerated.

SERIES ESK/ESL THRUSTER SLIDE



Your Motor Your Way

Major Benefits

- Electrically driven cantilever slide based on the proven PHD Series SK/SL Slide
- High thrust and speed capability
- Precision screw assemblies with long service life
- Rigid construction with low backlash
- High degree of repeatability 0.01 mm
- Travel lengths up to 700 mm
- IP50 ingress protection
- Available in two body configurations for specific load carrying capabilities and application flexibility
- Inline and foldback motor mounting flexibility
- **Your Motor, Your Way** allowing motor and controls flexibility at no additional cost
- Standard dowel pin holes with optional transitional and precision diameters
- Large choice of options/accessories
- Switch ready is standard

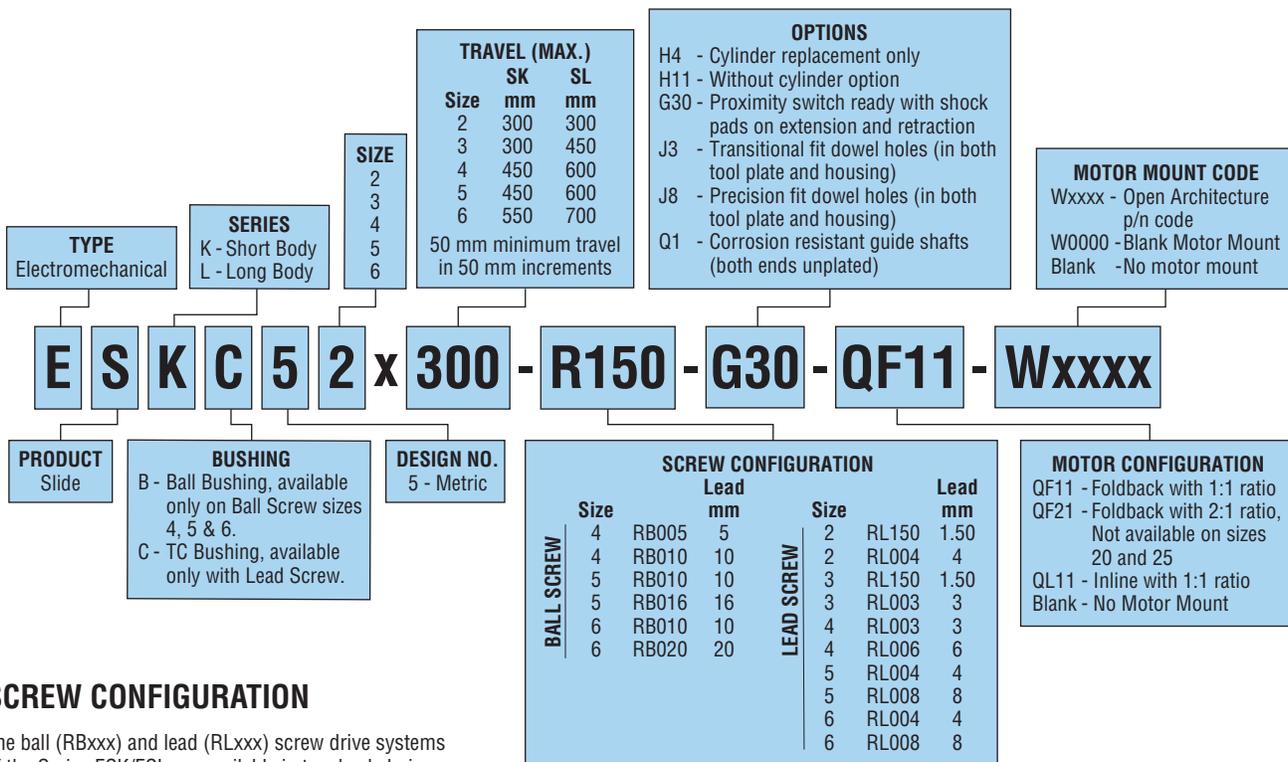
Choice of Inline or Foldback Motor Mounting



Foldback available in 1:1 or 2:1 drive for tailored performance.

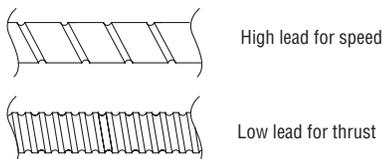


ORDERING DATA: Series ESK/ESL Thruster Slide

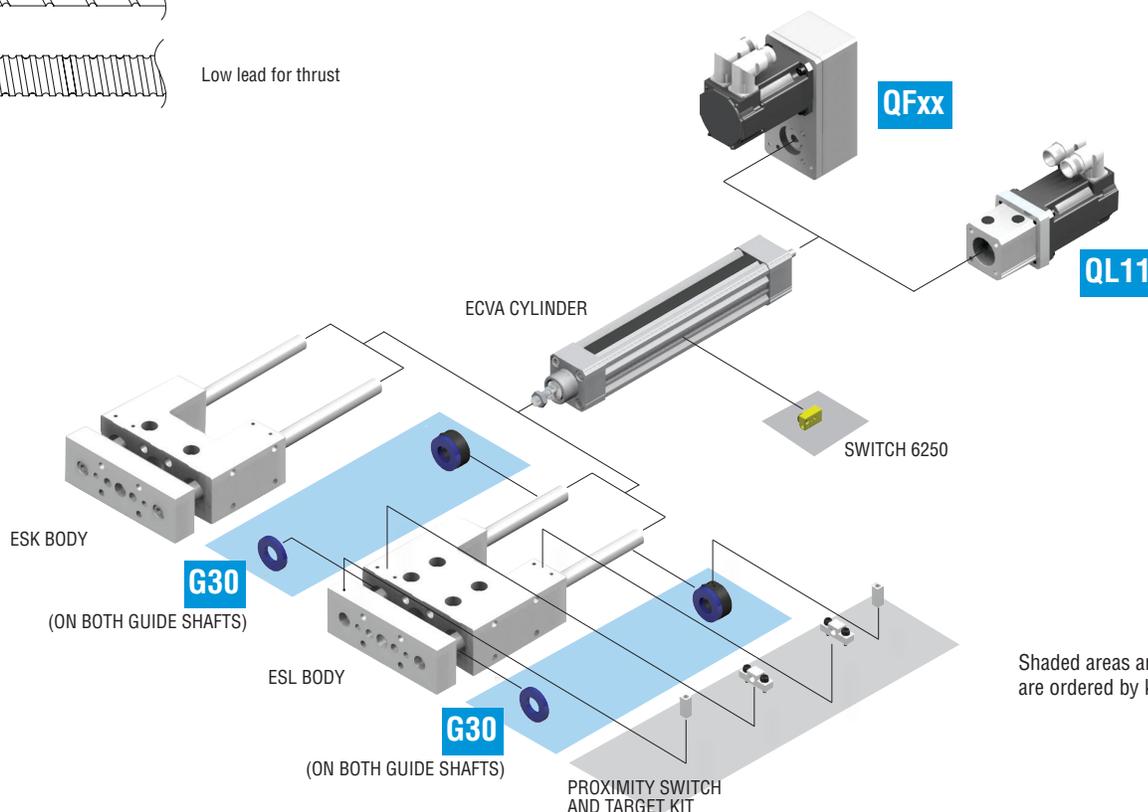


SCREW CONFIGURATION

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.



MOUNTING OPTIONS & ACCESSORIES



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

ENGINEERING DATA: Series ESK/ESL Thruster Slide -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	Refer to Life vs. Thrust Chart (page 56)
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	mm [in]		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]						
-QF1		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]		
	NOMINAL THRUST ⁵	N [lbf]		400 [90]	330 [74]	1270 [285]	975 [219]	1835 [413]	1515 [341]		
TORQUE	PERMISSIBLE DRIVE TORQUE ⁶	-QL11	Nm [in-lb]		1.2 [10.62]		4.3 [38.06]		7.8 [69.03]		
		-QF1	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	kg [lb]		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	kg [lb]		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 x 10 ⁻⁶ [0.010]		1.50 x 10 ⁻⁵ [0.051]		4.84 x 10 ⁻⁵ [0.165]			
	LENGTH ADDER (J _L)	kg-m ² /mm [lb-in ² /in]		9.85 x 10 ⁻⁹ [0.0009]		2.90 x 10 ⁻⁸ [0.0025]		7.95 x 10 ⁻⁸ [0.0069]			
	MOVING WEIGHT ADDER (J _M)	kg-m ² /kg [lb-in ² /lb]		6.21 x 10 ⁻⁷	2.48 x 10 ⁻⁶	2.48 x 10 ⁻⁶	6.36 x 10 ⁻⁶	2.48 x 10 ⁻⁶	9.93 x 10 ⁻⁶		
				[9.63 x 10 ⁻⁴]	[3.85 x 10 ⁻³]	[3.85 x 10 ⁻³]	[9.86 x 10 ⁻³]	[3.85 x 10 ⁻³]	[1.54 x 10 ⁻²]		
	MOTOR CONFIGURATION (J _o)	-QF11	kg-m ² [lb-in ²]		1.40 x 10 ⁻⁵ [0.048]		4.71 x 10 ⁻⁵ [0.161]		4.65 x 10 ⁻⁵ [0.159]		
	-QF21	kg-m ² [lb-in ²]		2.75 x 10 ⁻⁵ [0.094]		8.28 x 10 ⁻⁵ [0.283]		1.91 x 10 ⁻⁴ [0.654]			
	-QL11	kg-m ² [lb-in ²]		3.14 x 10 ⁻⁶ [0.011]		6.11 x 10 ⁻⁶ [0.021]		4.04 x 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 ON PAGE 56
- 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 64 and 65]

TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

FOR -Qx11: INERTIA_{Reflected} = J_o + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT) + J_o

FOR -QF21: INERTIA_{Reflected} = [J_o + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_o

ENGINEERING DATA: Series ESK/ESL Thruster Slide -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	mm [in]	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									
THRUST ⁴	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]
	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]
	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]
-QF11			Nm [in-lb]	0.5 [4.42]		0.7 [6.20]		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	kg [lb]	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	kg [lb]	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-m ² [lb-in ²]	1.66 x 10 ⁻⁶ [0.006]		2.09 x 10 ⁻⁶ [0.007]		3.00 x 10 ⁻⁶ [0.010]		1.50 x 10 ⁻⁵ [0.051]		4.84 x 10 ⁻⁵ [0.165]	
	LENGTH ADDER (J _L)		kg-m ² /mm [lb-in ² /in]	1.59 x 10 ⁻⁹ [0.00014]		4.94 x 10 ⁻⁹ [0.00043]		9.85 x 10 ⁻⁹ [0.0009]		2.90 x 10 ⁻⁸ [0.0025]		7.95 x 10 ⁻⁸ [0.0069]	
	MOVING WEIGHT ADDER (J _M)		kg-m ² /kg [lb-in ² /lb]	3.8 x 10 ⁻⁸	1.01 x 10 ⁻⁷	3.8 x 10 ⁻⁸	7.6 x 10 ⁻⁸	7.6 x 10 ⁻⁸	1.52 x 10 ⁻⁷	1.01 x 10 ⁻⁷	2.03 x 10 ⁻⁷	1.01 x 10 ⁻⁷	2.03 x 10 ⁻⁷
				[5.89 x 10 ⁻³]	[1.57 x 10 ⁻⁴]	[5.89 x 10 ⁻³]	[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 _o)	-QF11		kg-m ² [lb-in ²]	2.69 x 10 ⁻⁵ [0.092]		2.69 x 10 ⁻⁵ [0.092]		1.40 x 10 ⁻⁵ [0.048]		4.71 x 10 ⁻⁵ [0.161]		4.65 x 10 ⁻⁵ [0.159]
-QF21				—		—		2.75 x 10 ⁻⁵ [0.094]		8.28 x 10 ⁻⁵ [0.283]		1.91 x 10 ⁻⁴ [0.654]	
-QL11				1.89 x 10 ⁻⁶ [0.006]		1.89 x 10 ⁻⁶ [0.006]		3.14 x 10 ⁻⁶ [0.011]		6.11 x 10 ⁻⁶ [0.021]		4.04 x 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

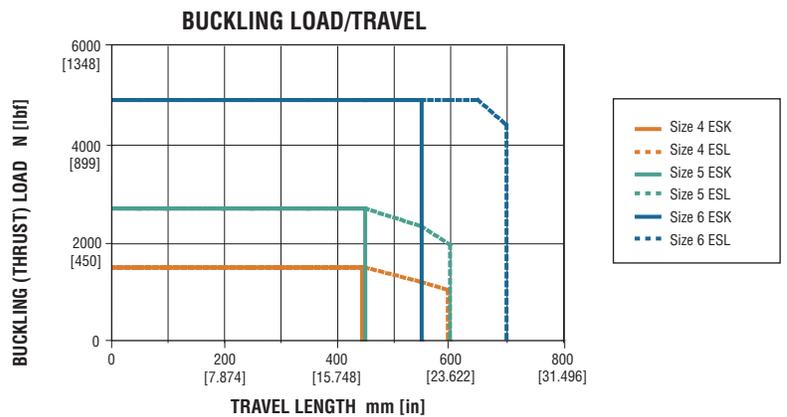
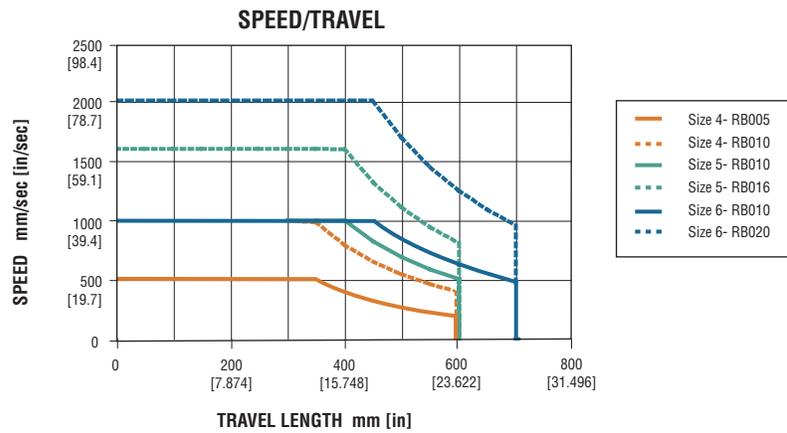
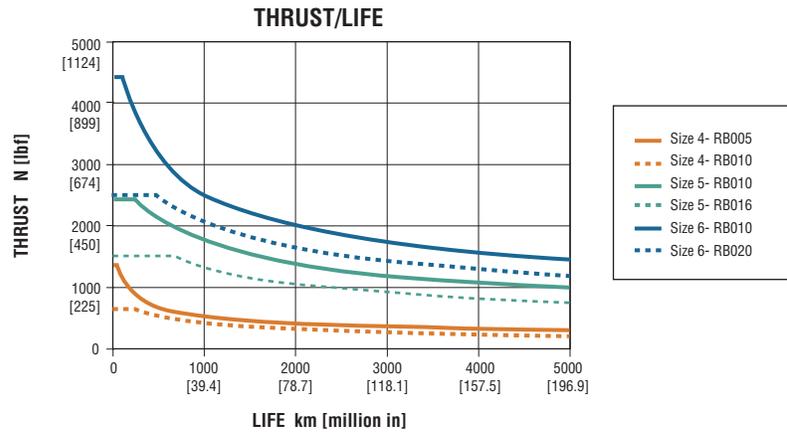
WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = W_{OT} + (W_{LT} X TRAVEL) + MOTOR MOUNT WEIGHT [reference pages 64 and 65]

TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} X TRAVEL) + EXTERNAL PAYLOAD

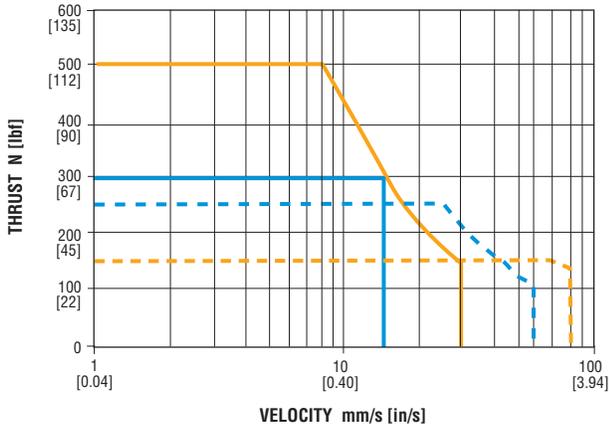
FOR -QX11: INERTIA_{Reflected} = J_o + (J_L X TRAVEL) + (J_M X TOTAL MOVING WEIGHT) + J_o

FOR -QF21: INERTIA_{Reflected} = [J_o + (J_L X TRAVEL) + (J_M X TOTAL MOVING WEIGHT)] / 4 + J_o

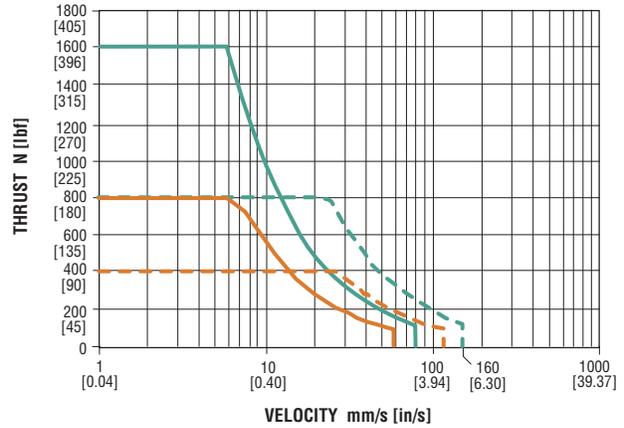


This section contains information on the capabilities of the Ball Screw Series ESK/ESL. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Inside Sales Department.

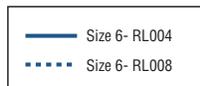
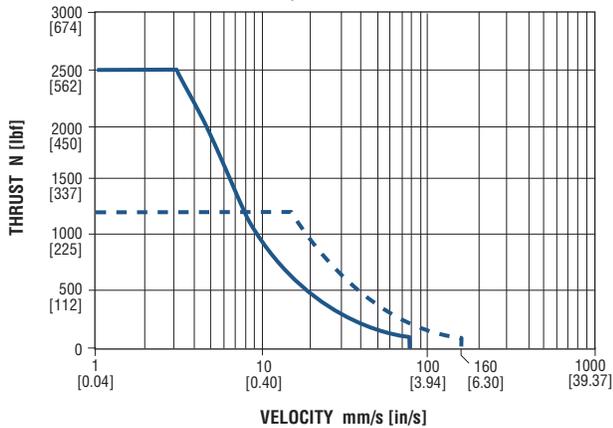
THRUST/VELOCITY - SIZES 2 & 3



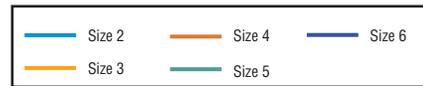
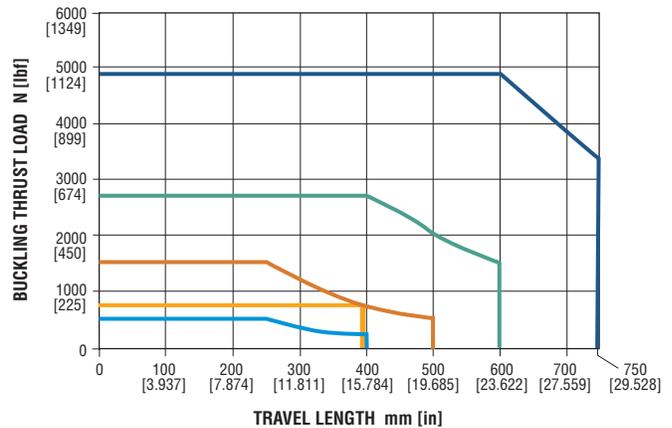
THRUST/VELOCITY - SIZES 4 & 5



THRUST/VELOCITY - SIZE 6



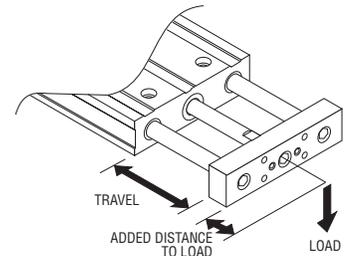
ALLOWABLE AXIAL LOAD - SYSTEM



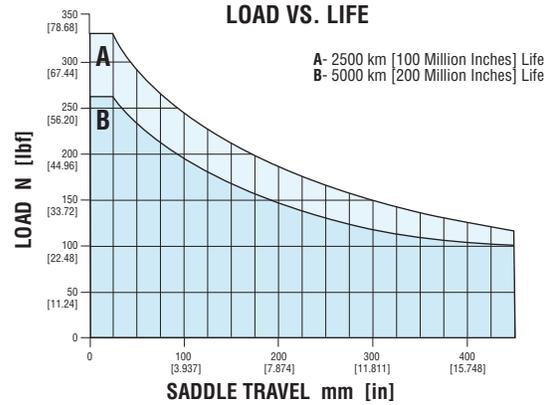
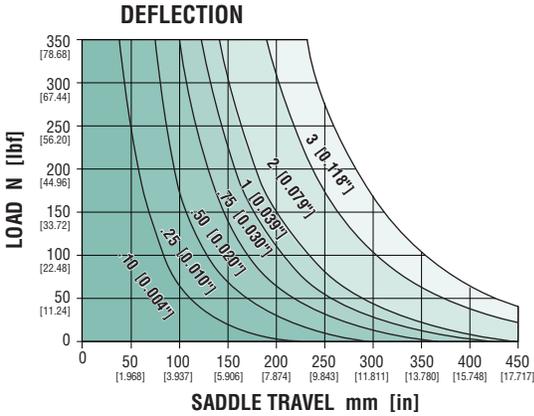
This section contains information on the capabilities of the Lead Screw Series ESK/ESL. It is not intended to be a comprehensive selection guide. To simplify the selection process, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Inside Sales Department.

PERFORMANCE CHARTS: Series ESK/ESL Thruster Slide -RB

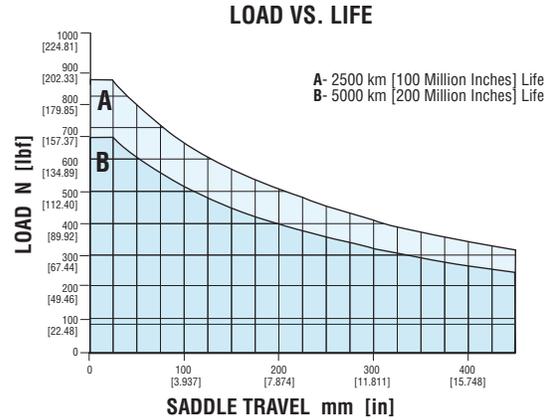
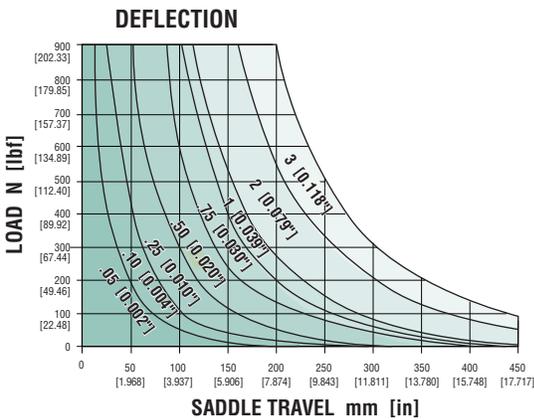
The deflection figures given in these charts are based on the effect of external loads. Shaft straightness and bearing alignment will affect the accuracy of the tool plate location. When the load is attached to the face of the tool plate, add the distance between load center of gravity and tool plate to the travel length and use the total as the travel length in the following charts.



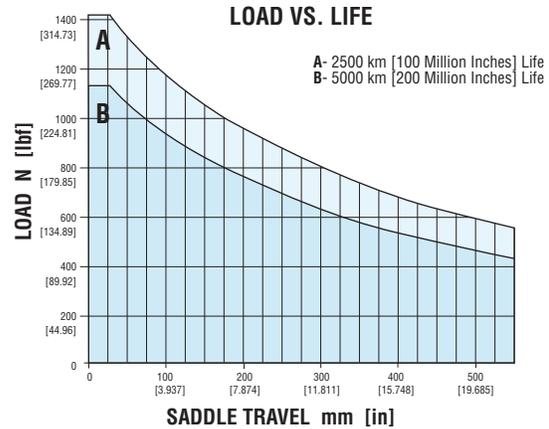
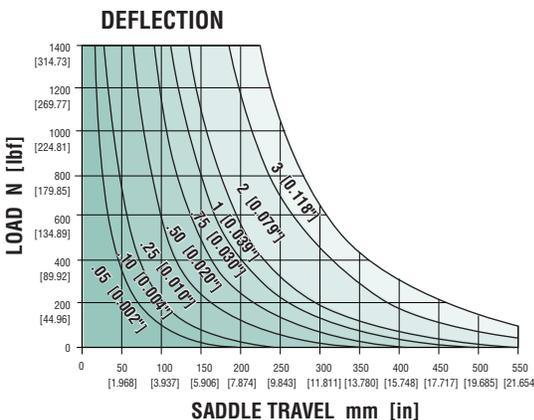
ESKB54



ESKB55

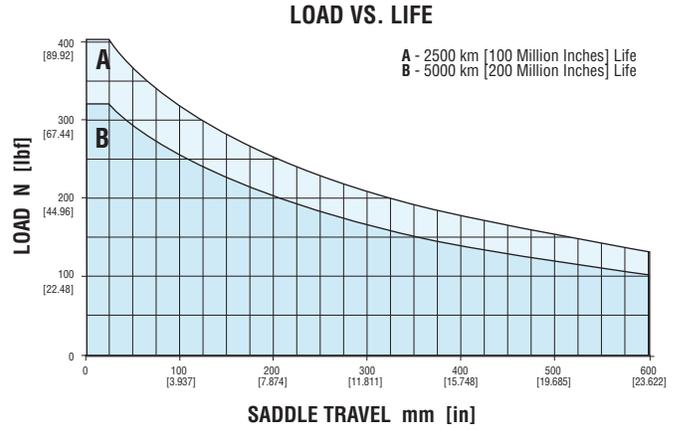
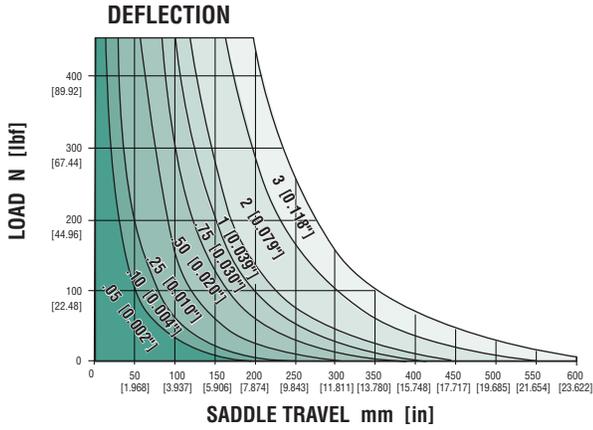


ESKB56

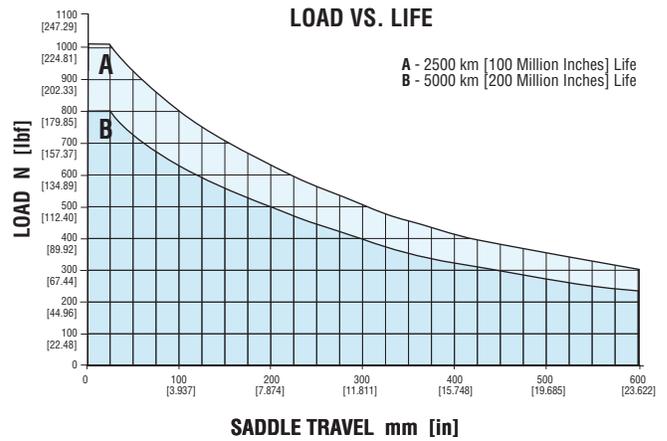
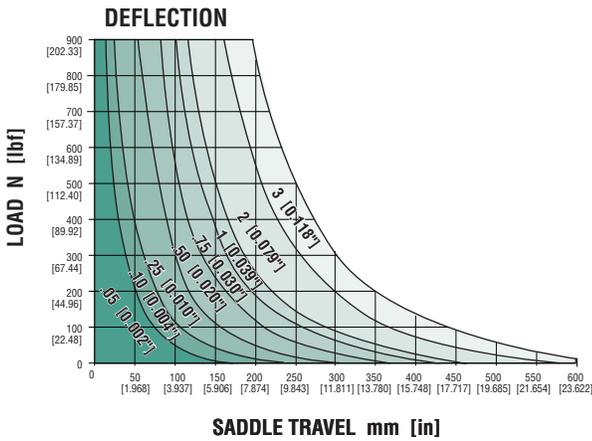


NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

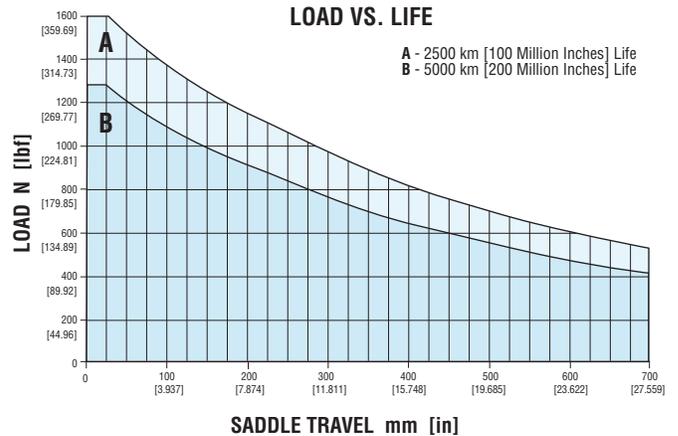
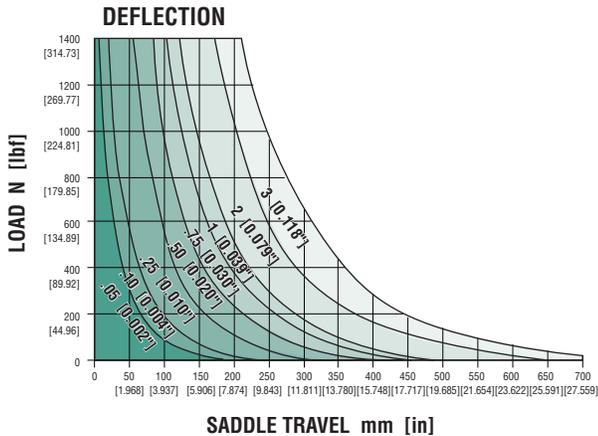
ESLB54



ESLB55



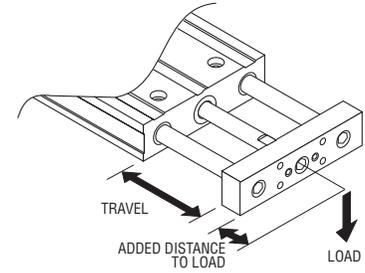
ESLB56



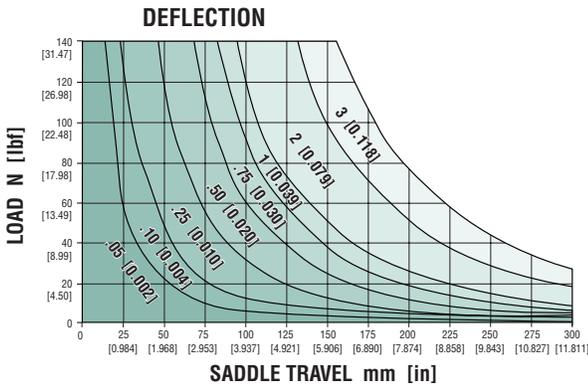
NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

PERFORMANCE CHARTS: Series ESK/ESL Thruster Slide -RL

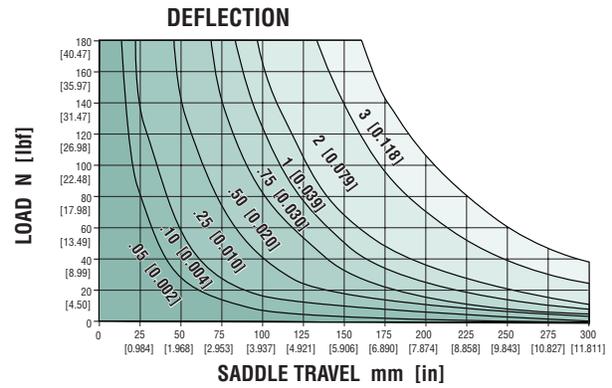
The deflection figures given in these charts are based on the effect of external loads. Shaft straightness and bearing alignment will affect the accuracy of the tool plate location. When the load is attached to the face of the tool plate, add the distance between load center of gravity and tool plate to the travel length and use the total as the travel length in the following charts.



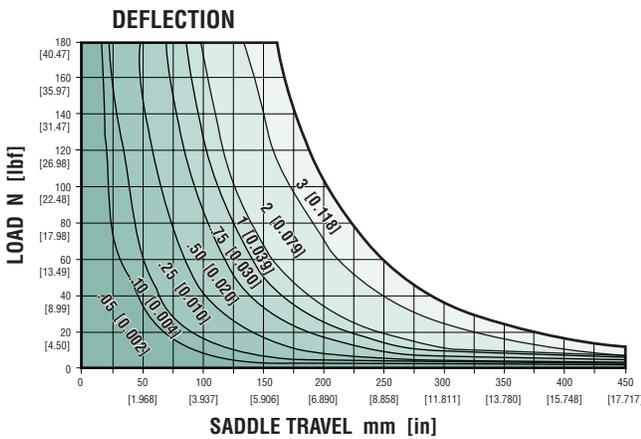
ESKC52



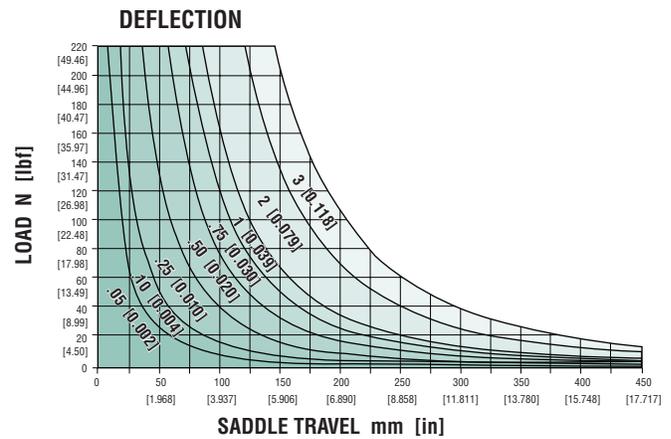
ESLC52



ESKC53

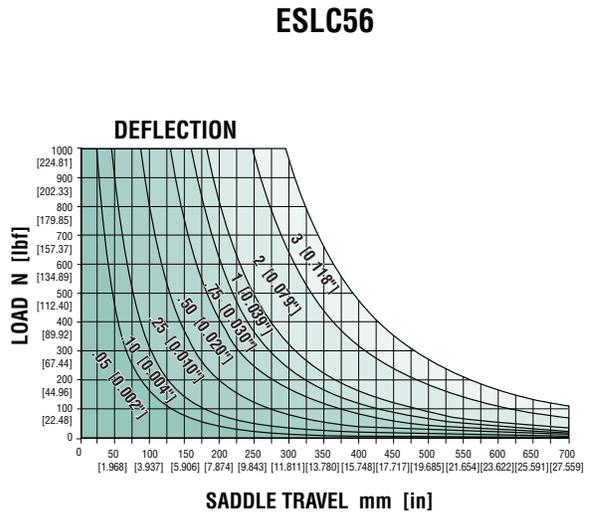
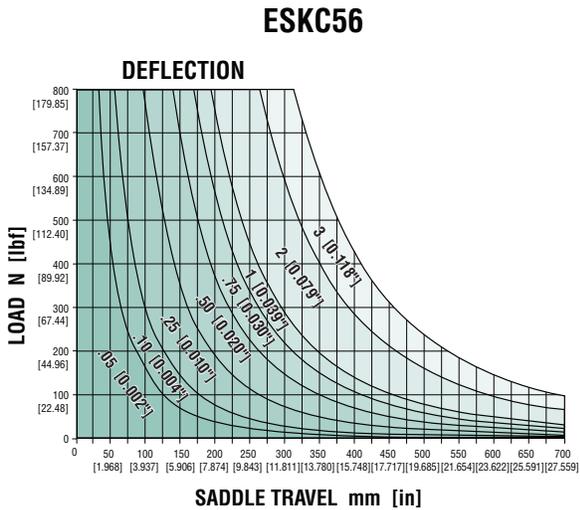
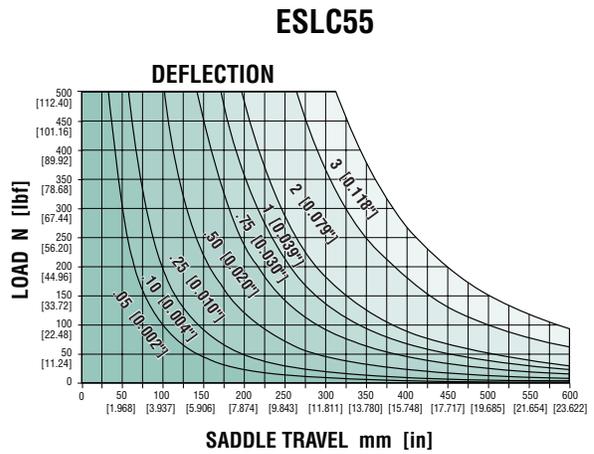
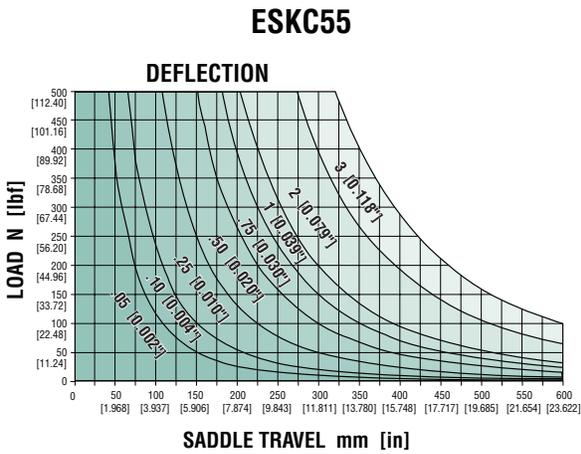
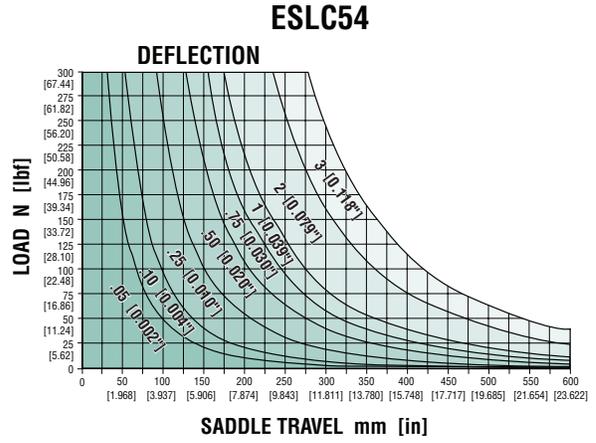
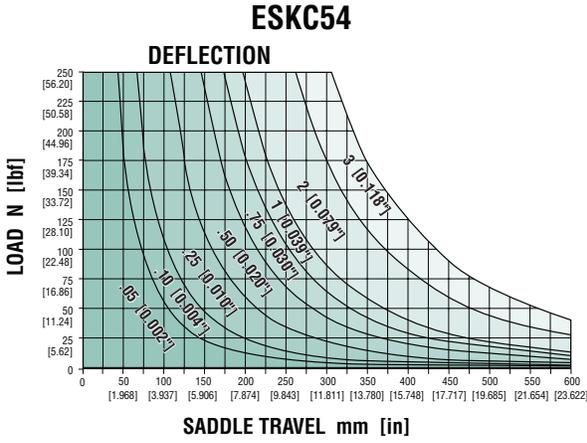


ESLC53



NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

PERFORMANCE CHARTS: Series ESK/ESL Thruster Slide -RL



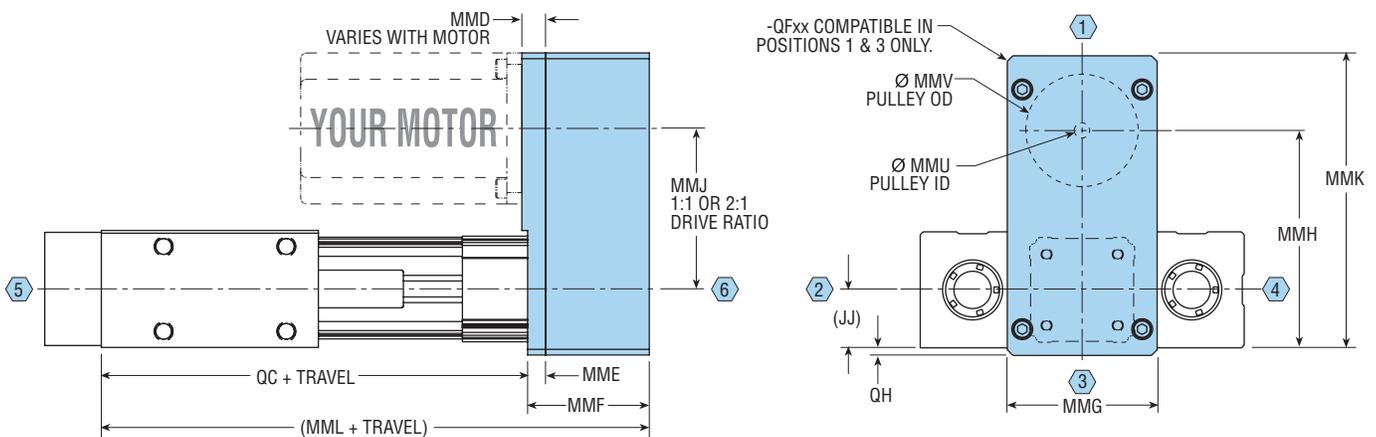
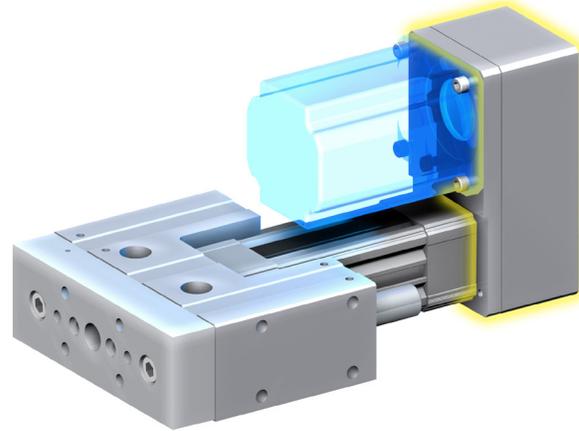
NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

QF21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO

(NOT AVAILABLE ON SIZES 2 AND 3)

Foldback motor mounting with the QF11 option provides a 1:1 drive ratio allowing similar performance to the inline motor mounting in a shorter overall length. The QF21 option provides a 2:1 drive ratio reduction for applications that require higher thrust. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 66.



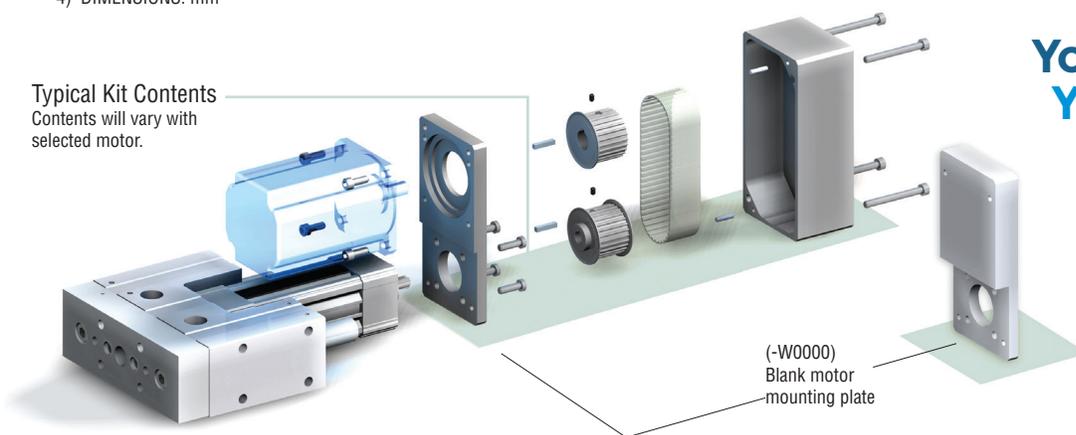
SIZE	QC (ESKCxx)	QC (ESLCxx)	(JJ)	QH	MMD MIN	MMD MAX	MME	MMF	MMG	MMH 1:1	MMH 2:1	MMJ 1:1	MMJ 2:1	MMK	MML (ESKBxx)	MML (ESLBxx)	WEIGHT kg
2	158.4	190.4	20.1	4	6.1	22.5	9.5	55.5	58	88.4	—	67.5	—	116.6	213.7	245.7	0.79
3	169.3	204.3	22.6	4	6.1	22.5	9.5	55.5	58	90.2	—	67.5	—	119.3	224.7	259.7	0.79
4	198	235	25	6	9.5	22.5	9.5	55.5	63	97.5	95.5	72.5	70.5	129	253.5	290.5	1.02
5	225.9	265.9	31	4	9.5	22.5	9.5	64.5	80	116.1	108	85.1	83.9	156.1	290.4	330.4	1.70

NOTES:

- 1) YOUR MOTOR, YOUR WAY MOTOR MOUNT -QFxx IS PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO SLIDE
- 2) KITS INCLUDE DIRECTIONS AND ALL PARTS REQUIRED TO ASSEMBLE SLIDE BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
- 3) WHEN (-W0000) IS SPECIFIED, PULLEY ID IS SUPPLIED WITH UNFINISHED ID Ø MMU AND MOTOR MOUNTING PLATE IS SUPPLIED WITHOUT MOTOR MOUNTING FEATURES
- 4) DIMENSIONS: mm

Typical Kit Contents

Contents will vary with selected motor.

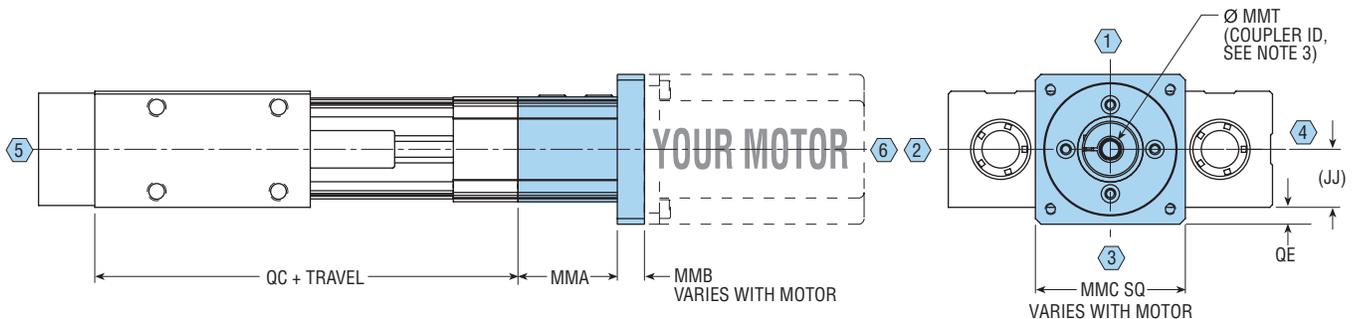
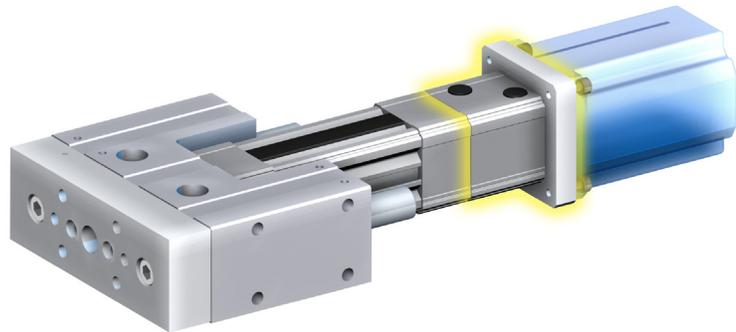


Your Motor
Your Way

All dimensions are reference only unless specifically tolerated.

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

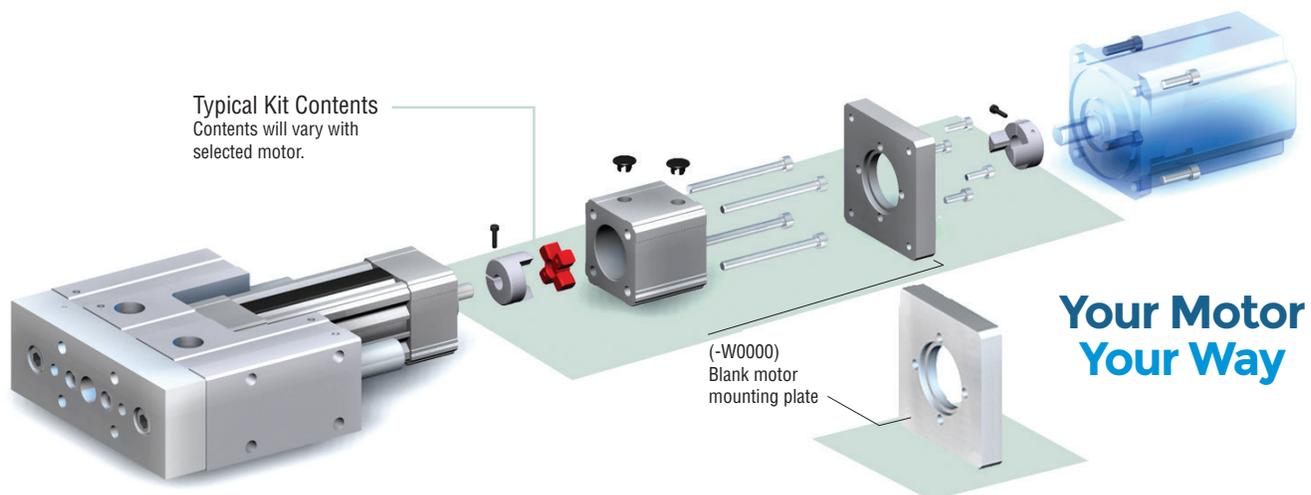
Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 66.



SIZE	QC (ESKCxx)	QC (ESLCxx)	(JJ)	QE		MMA	MMB MAX	MMB MIN	MMC		WEIGHT kg
				STANDARD	OVERSIZE				STANDARD	OVERSIZE	
2	158.4	190.4	20.1	4.4	9.9	43.6	25.4	8.5	49.0	60.0	0.25
3	169.3	204.3	22.6	1.9	7.4	43.6	25.4	8.5	49.0	60.0	0.25
4	198	235	25	5.0	10.0	49.5	25.4	8.5	60.0	70.0	0.45
5	225.9	265.9	31	4.0	13.0	53.0	35.6	8.5	70.0	88.0	0.65
6	259	309	36.5	7.5	18.5	82.1	35.6	8.5	88.0	110.0	1.36

NOTES:

- 1) YOUR MOTOR, YOUR WAY MOTOR MOUNT -QL11 IS PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO SLIDE
- 2) KITS INCLUDE DIRECTIONS AND ALL PARTS REQUIRED TO ASSEMBLE A SLIDE BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
- 3) WHEN (-W0000) IS SPECIFIED, COUPLER ID IS SUPPLIED WITH UNFINISHED ID Ø MMT AND MOTOR MOUNTING PLATE IS SUPPLIED AT MMC "OVERSIZE" AND WITHOUT MOTOR MOUNTING FEATURES
- 4) DIMENSIONS: mm



All dimensions are reference only unless specifically tolerated.

Wxxxx MOTOR MOUNT CODE

Your Motor, Your Way customizable motor mounting is generated by PHD's extensive motor database at config.phdinc.com. Users 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 mount code.

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

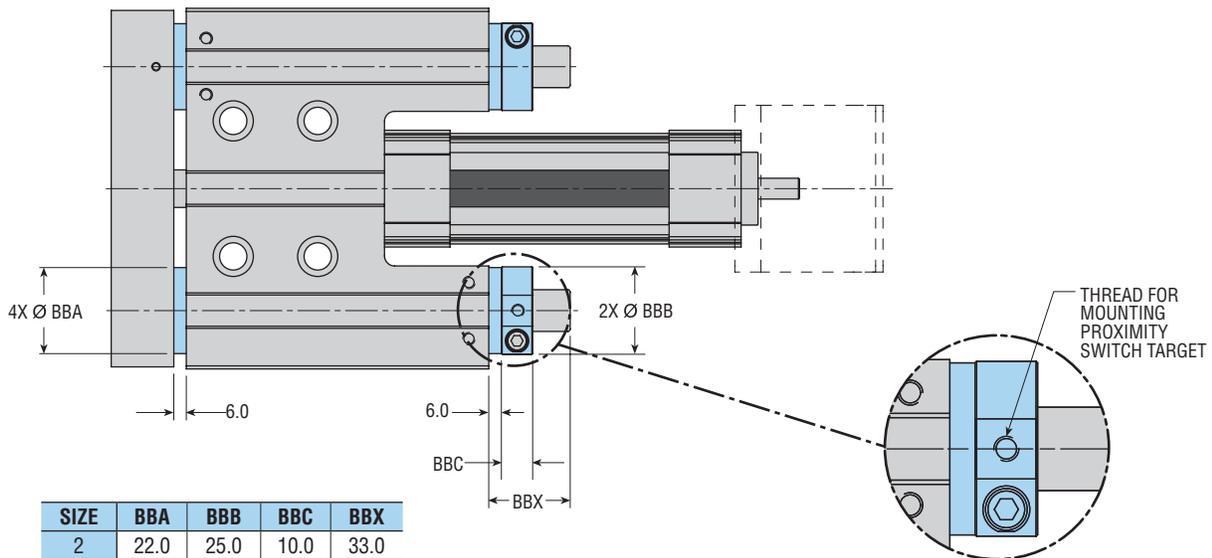
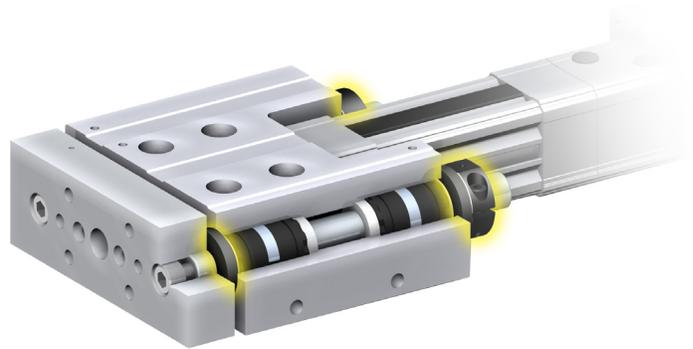
Your Motor Your Way

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.

G30 SHOCK PADS ON EXTENSION AND RETRACTION

This option provides urethane shock pads on retraction and extension for crash protection, eliminating metal-to-metal contact as the tool plate or stop collars reach the slide body. This option is not intended for travel adjustment. The G30 option also includes one collar that allows the addition of a proximity switch target. This option is required when proximity switches are desired on extend.



SIZE	BBA	BBB	BBC	BBX
2	22.0	25.0	10.0	33.0
3	28.5	28.0	11.0	39.0
4	35.0	35.0	13.0	39.0
5	41.0	42.0	15.0	39.0
6	47.5	48.0	15.0	45.0

NOTE: DIMENSIONS: mm

All dimensions are reference only unless specifically tolerated.

J3 TRANSITION FIT DOWEL HOLES

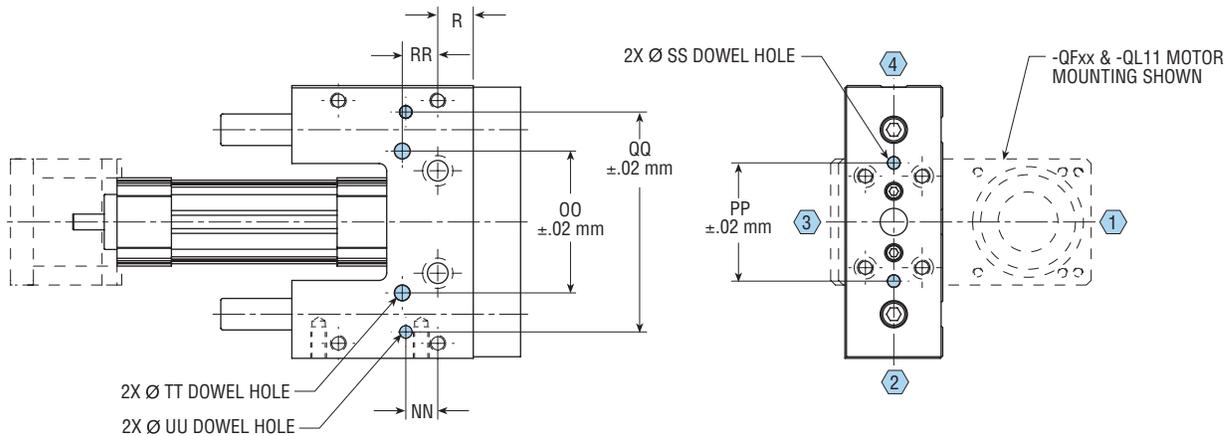
This option provides a compromise fit between clearance and interference. Transitional fits are used where accuracy of location is important, but a small amount of clearance or interference is permissible.



POSITION 3 SHOWN

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.



SIZE	R	NN	OO	PP	QQ	RR	SS	TT	UU
2	23	17.5	50	49	114	15	Ø 5 x 5 mm DP	Ø 5 x 5 mm DP	Ø 8 x 8 mm DP
3	15.6	19.5	64	50	100.5	16	Ø 5 x 5 mm DP	Ø 6 x 8 mm DP	Ø 8 x 8 mm DP
4	22	18	75	64	114	18	Ø 6 x 8 mm DP	Ø 8 x 8 mm DP	Ø 8 x 8 mm DP
5	22.5	20.24	90	75	139.5	22.5	Ø 8 x 8 mm DP	Ø 10 x 10 mm DP	Ø 8 x 8 mm DP
6	25.5	38	—	90	197	—	Ø 10 x 10 mm DP	—	Ø 10 x 10 mm DP

NOTE: DIMENSIONS: mm

Ø DOWEL HOLE	J3 OPTION TOLERANCE	J8 OPTION TOLERANCE
5	+0.038/-0.011	+0.012/-0.000
6	+0.038/-0.011	+0.012/-0.000
8	+0.041/-0.016	+0.015/-0.000
10	+0.041/-0.016	+0.015/-0.000

NOTE: DIMENSIONS: mm

H4 CYLINDER REPLACEMENT ONLY (WITHOUT SLIDE)

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

H11 SLIDE REPLACEMENT ONLY (WITHOUT CYLINDER)

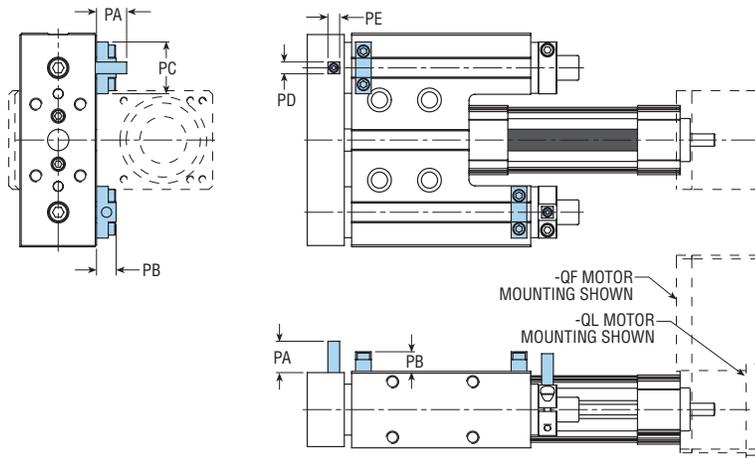
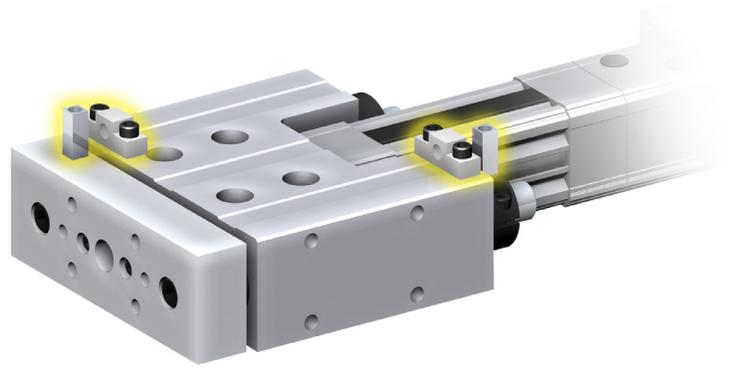
This option provides the slide mechanism only without cylinder or motor mounting. Included with option -H11 is all the hardware required for mounting standard PHD Series ECVA Cylinders or pneumatic standard VDMA/ISO cylinders to the slide. A self-aligning rod coupling is also provided, making it easy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

All dimensions are reference only unless specifically tolerated.

PROXIMITY SWITCH BRACKET & TARGET KITS

Each kit contains a bracket, target, and hardware for mounting one 8 mm or 12 mm threaded proximity switch on an ESK or ESL Slide. Switches must be ordered separately.

SIZE	STANDARD PLATING		CORROSION RESISTANT	
	8 mm	12 mm	8 mm	12 mm
2	56848-06	65561-02-1	58243-06	65561-02-2
3	56848-01	65561-02-1	58243-01	65561-02-2
4	56848-02	65561-03-1	58243-02	65561-03-2
5	56848-03	65561-03-1	58243-03	65561-03-2
6	56848-04	65561-04-1	58243-04	65561-04-2



8 mm PROXIMITY SWITCH MOUNTING

SIZE	PA	PB	PC	PD	PE
2	18.0	15.9	28.6	8.0	8.0
3	20.4	15.9	28.6	9.5	9.5
4	25.4	15.9	41.9	9.5	9.5
5	25.4	15.9	41.9	9.5	9.5
6	27.4	15.9	50.8	9.5	9.5

NOTE: DIMENSIONS: mm

12 mm PROXIMITY SWITCH MOUNTING

SIZE	PA	PB	PC	PD	PE
2	38.1	31.8	28.6	12.7	9.5
3	38.1	31.8	28.6	12.7	9.5
4	25.4	22.4	38.1	12.7	9.5
5	25.4	22.4	38.1	12.7	9.5
6	28.6	22.2	50.8	12.7	9.5

NOTE: DIMENSIONS: mm

INDUCTIVE PROXIMITY SWITCHES

Two models of inductive proximity switches are available for use with PHD Series ESK and ESL Slides (-G30 option required on extend).

PART NO.	DESCRIPTION
51422-005-02	8 mm Inductive Proximity Switch,
51422-006-02	8 mm Inductive Proximity Switch,
15561-001	12 mm Inductive Proximity Switch,
15561-002	12 mm Inductive Proximity Switch,
15561-003	12 mm Inductive Proximity Switch,



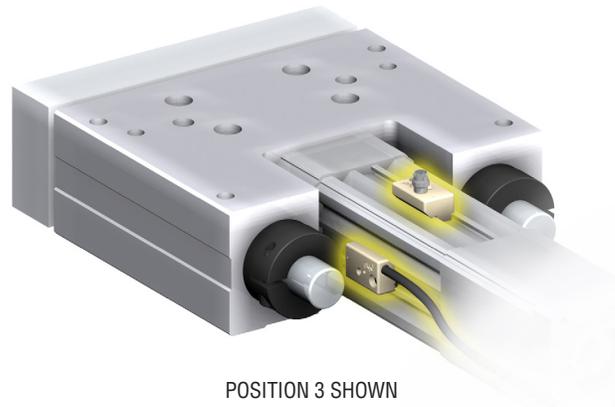
All dimensions are reference only unless specifically tolerated.

6250 SOLID STATE SWITCHES

Cylinder comes standard with a magnet band for use with PHD miniature Reed and Solid State Switches listed below. These switches mount easily to the cylinder using any of the three "T" slots provided in the body.

SERIES 6250 SOLID STATE SWITCHES

PART NO.	DESCRIPTION	COLOR
62505-1-02	NPN (Sink) DC Solid State, 2 m cable	Brown
62506-1-02	PNP (Source) DC Solid State, 2 m cable	Tan
62515-1	NPN (Sink) DC Solid State, Quick Connect	Brown
62516-1	PNP (Source) DC Solid State, Quick Connect	Tan



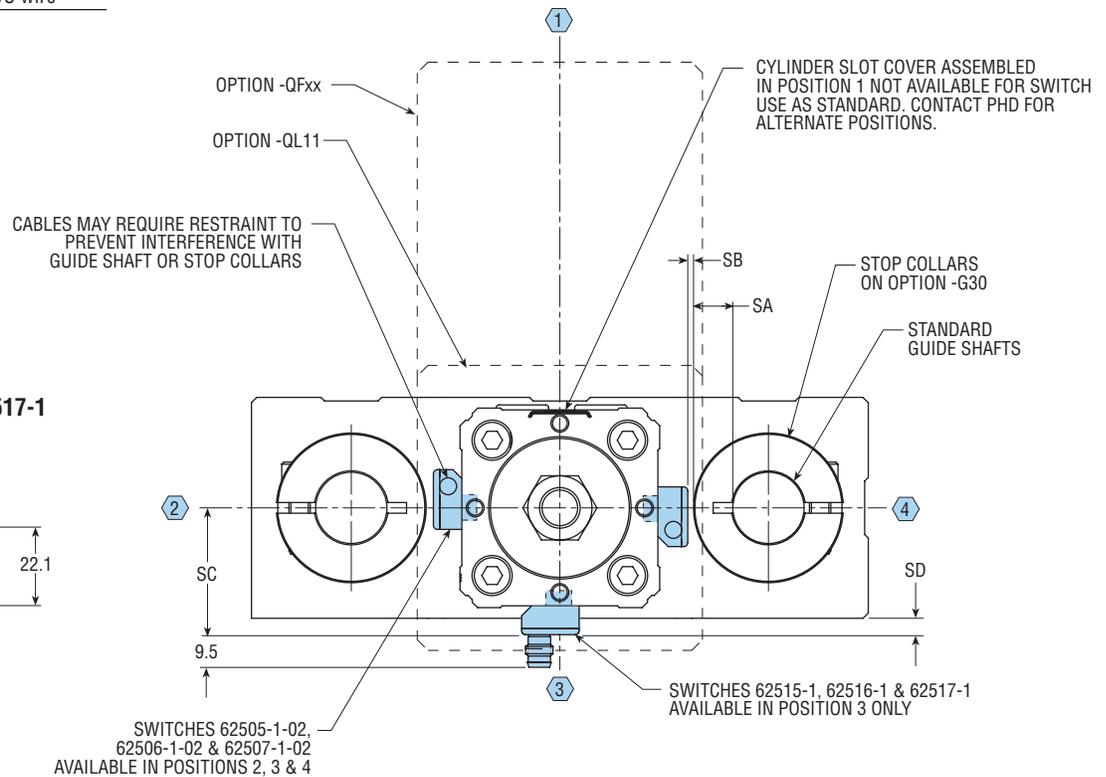
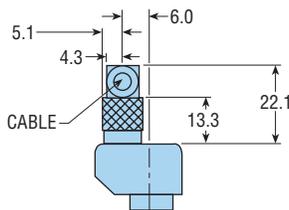
SERIES 6250 REED SWITCHES

PART NO.	DESCRIPTION	COLOR
62507-1-02	AC/DC Reed, 2 m cable	Silver
62517-1	AC/DC Reed, Quick Connect	Silver

CORDSETS WITH QUICK CONNECT

PART NO.	DESCRIPTION
61397-02	2 meter/3 wire
61397-05	5 meter/3 wire

62515-1, 62516-1 & 62517-1 Connector Detail

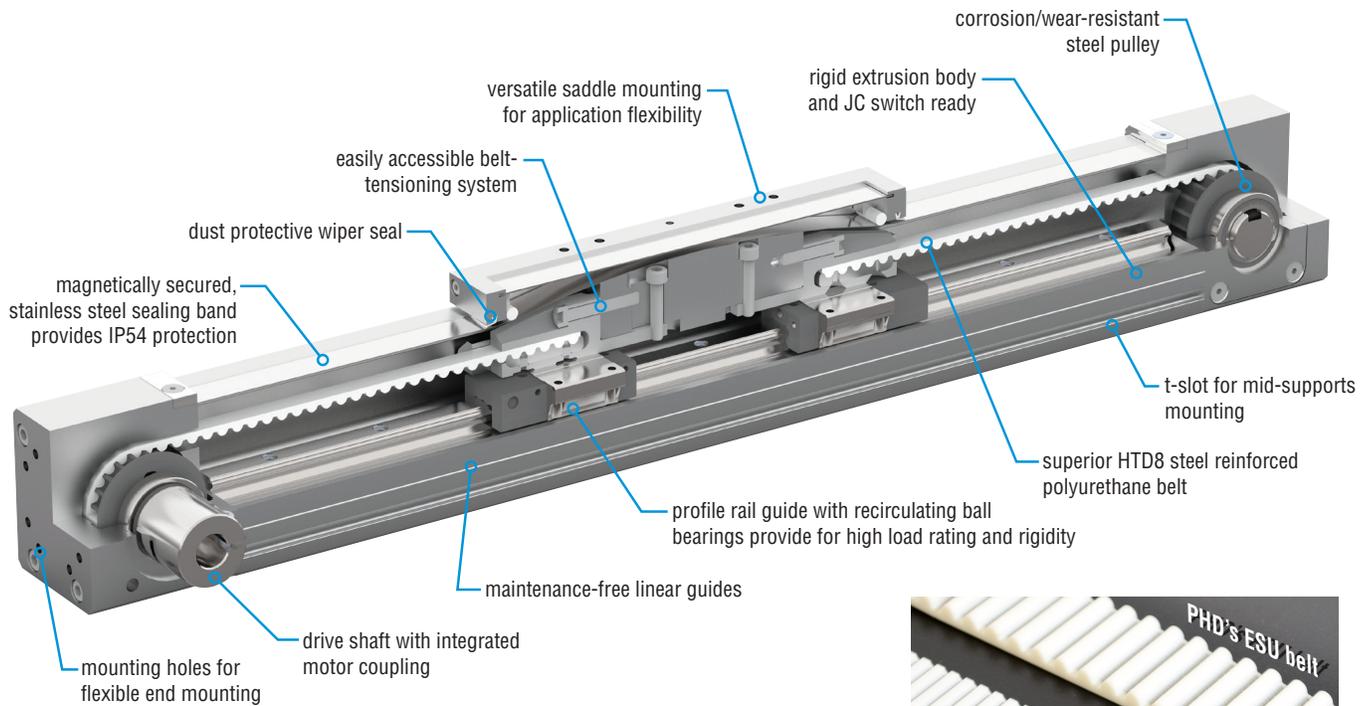


SIZE	SA	SB	SC	SD
2	—	—	25.4	5.3
3	—	—	27.9	5.3
4	9.1	—	31.5	6.5
5	13.0	1.3	35.6	4.6
6	18.5	6.4	40.4	4.1

NOTES:
 1) SWITCHES ONLY WORK IN POSITION 3
 2) DIMENSIONS: mm

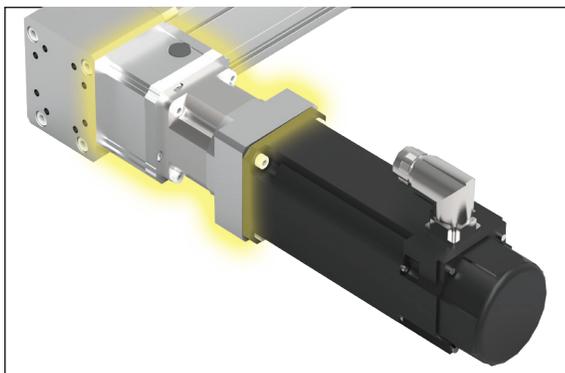
All dimensions are reference only unless specifically tolerated.

SERIES ESU BELT-DRIVEN LINEAR ACTUATOR -RT



-RT Belt-Driven Major Benefits

- Travel lengths up to 5500 mm
- Maximum speed 5000 mm/s, acceleration 50 m/s²
- Superior HTD8 steel reinforced polyurethane belt for uniform load distribution, precise tooth engagement, and improved performance
- Corrosion-resistant steel pulleys provide high structural strength and minimal wear
- Easy access belt tensioning system
- Integrated shaft coupling allows for a rigid connection and zero backlash

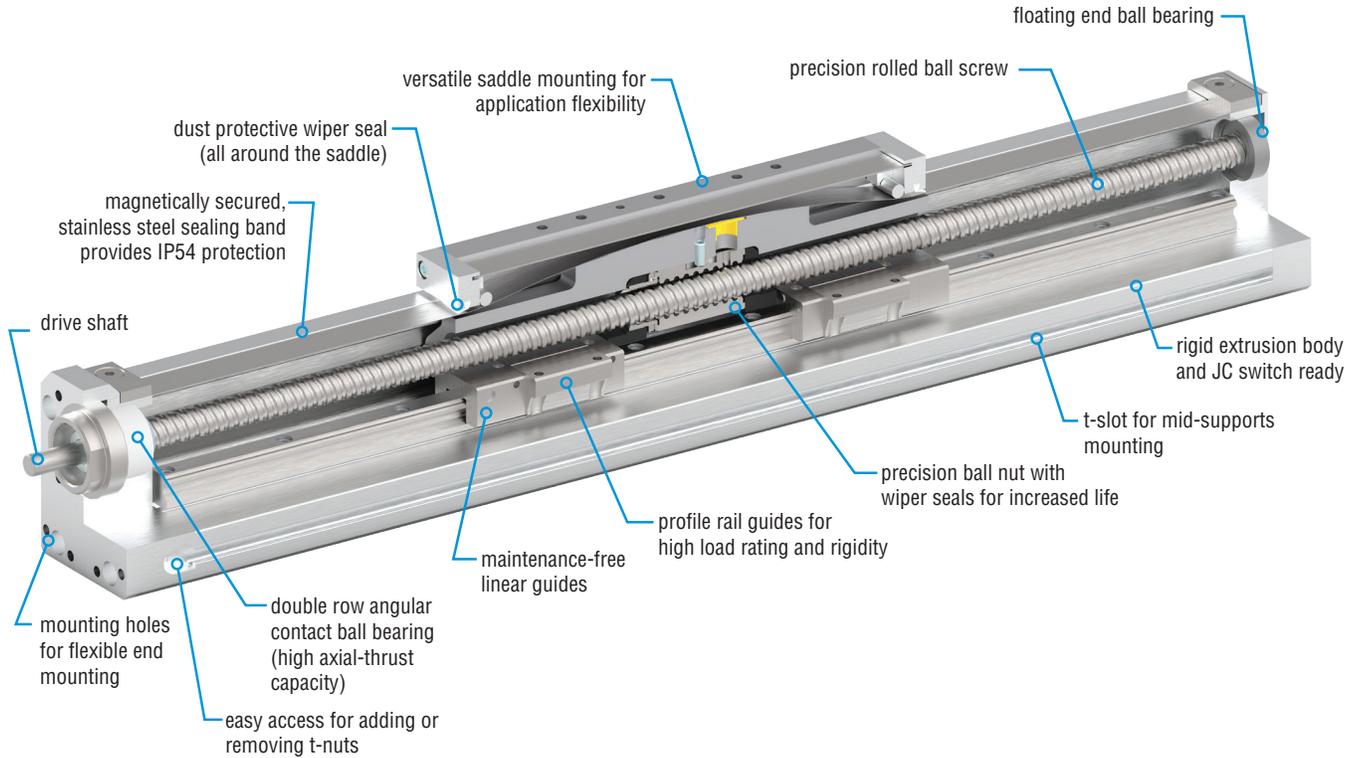


Gear Reducer Option (RW Code)

Common Major Benefits

- High capacity rail bearing provides superior moment and load capability
- Self-lubricating linear guides provide maintenance-free operation
- Rigid construction with low backlash
- High degree of repeatability
- Proven band seal technology provides IP54 ingress protection
- Switch ready as standard
- Mid-support(s) mounting for long travels and high payloads
- **Your Motor, Your Way** allows motor and controls flexibility at no additional cost

SERIES ESU BALL SCREW LINEAR ACTUATOR -RB



-RB Ball Screw Major Benefits

- Travel lengths up to 1000 mm
- Maximum speed 3200 mm/s, acceleration 20 m/s²
- Precision ball screw assemblies with long service life

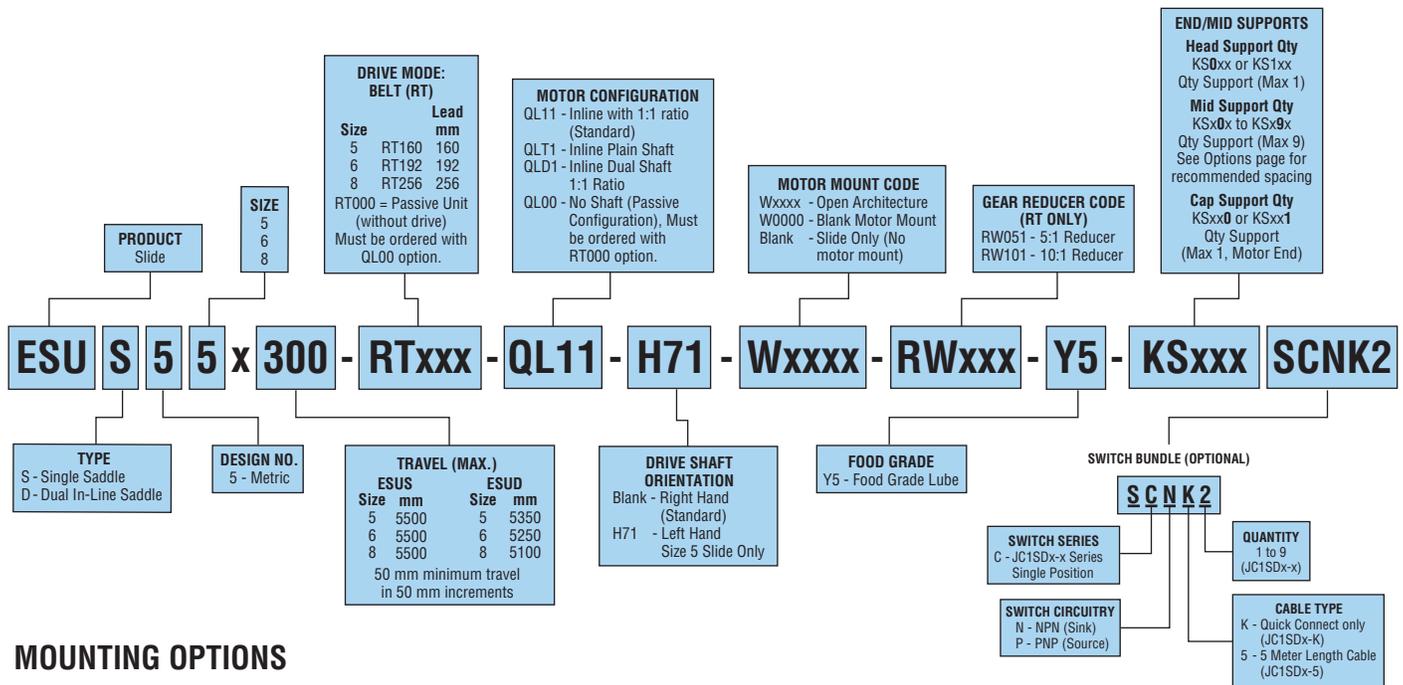
Your Motor Your Way



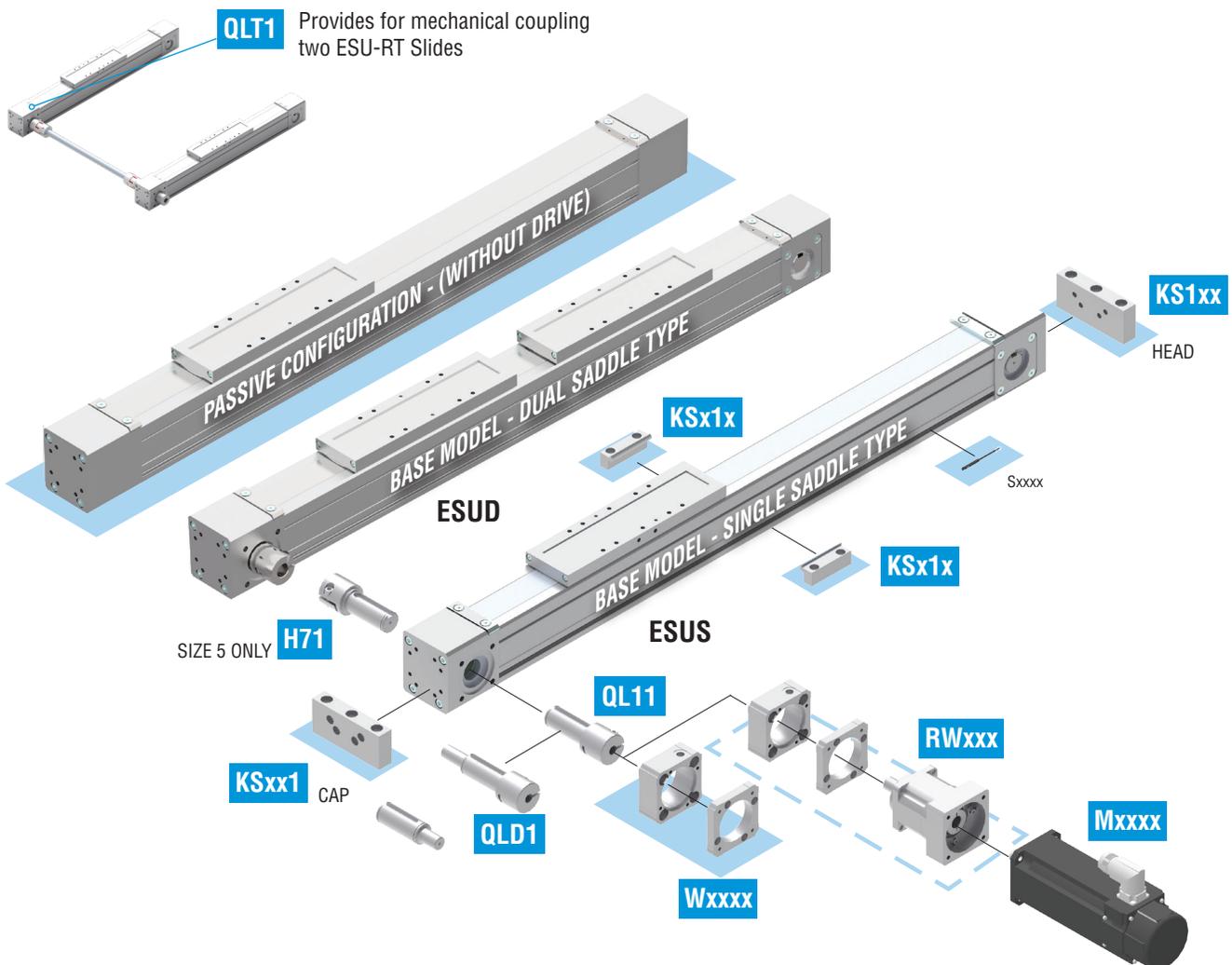
Dual Saddle Option

Doubles the load capacity and increases My (pitch) and Mz (yaw) moment capacities.

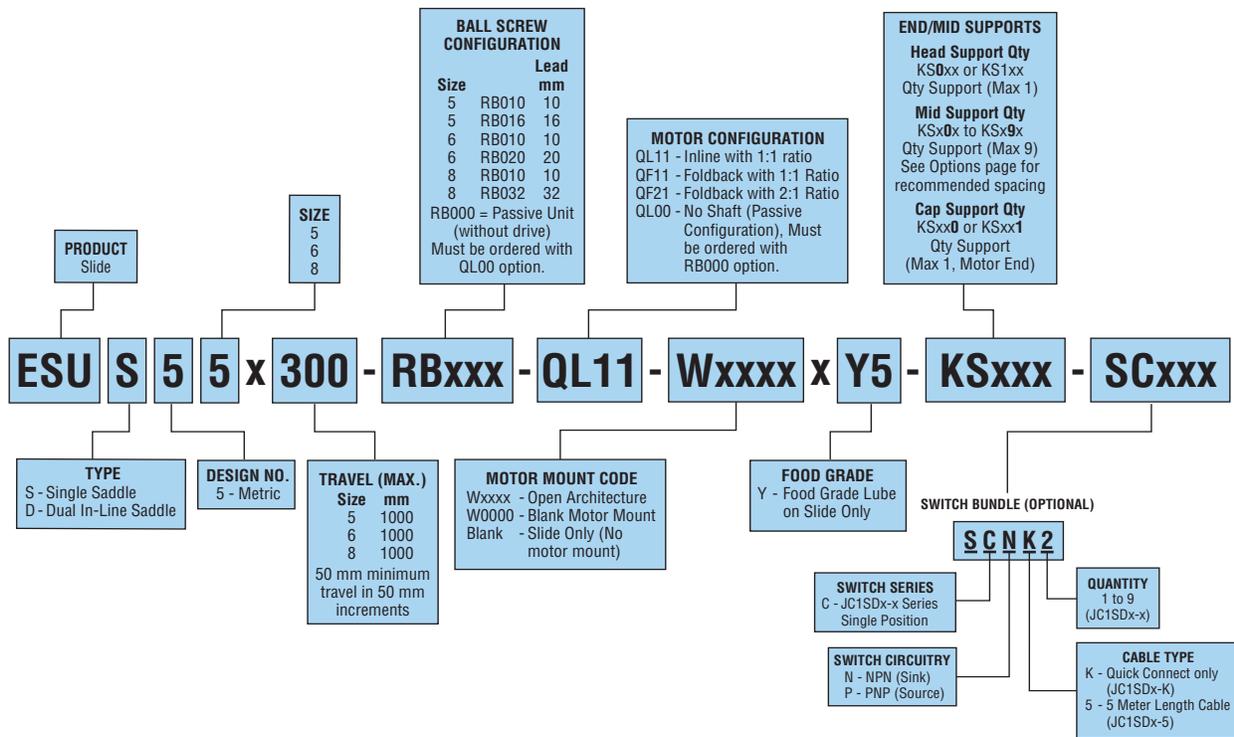
ORDERING DATA: Series ESU Belt-Driven Linear Actuator -RT



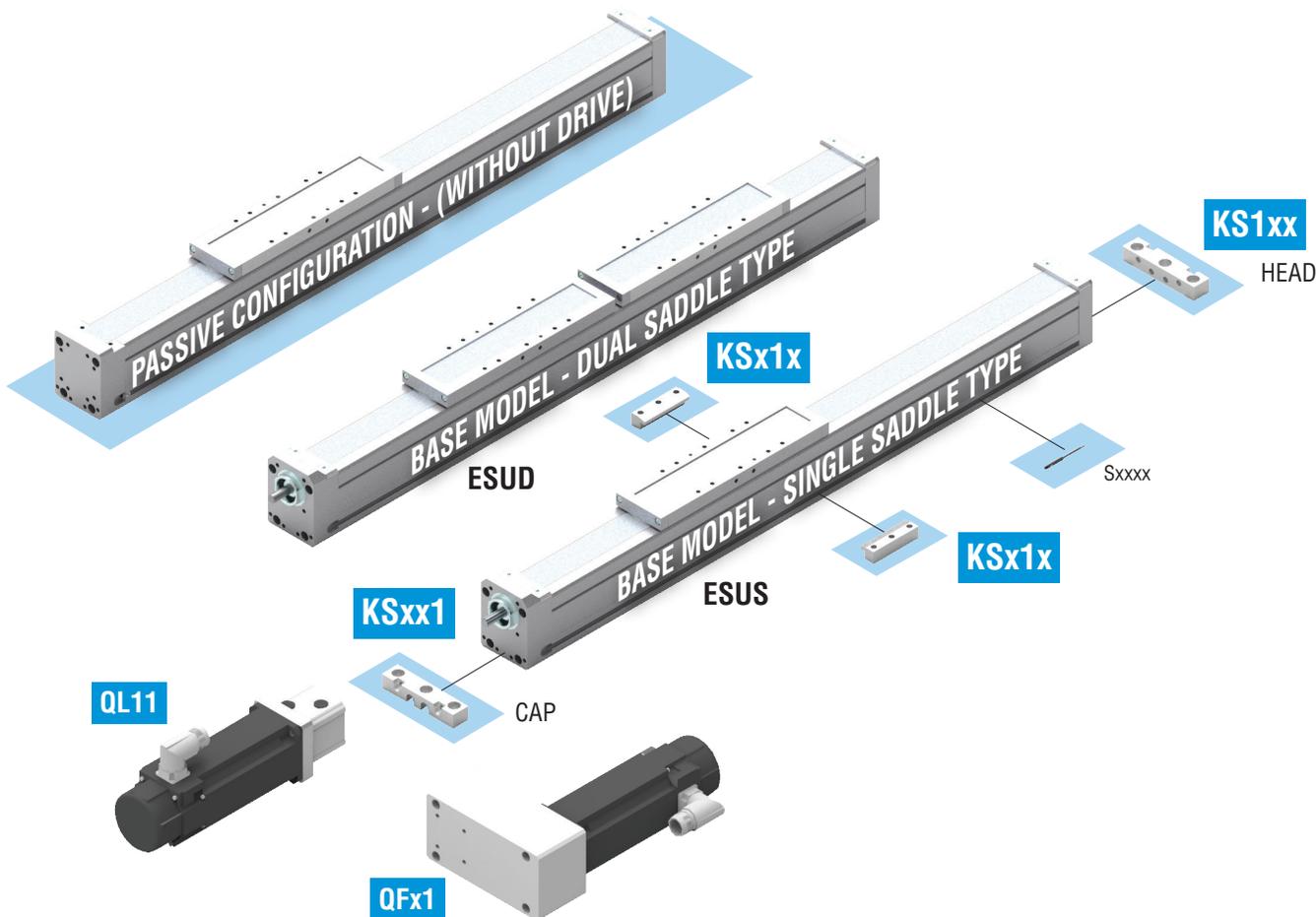
MOUNTING OPTIONS



ORDERING DATA: Series ESU Ball Screw Linear Actuator -RB



MOUNTING OPTIONS



SPECIFICATIONS	TIMING BELT SERIES ESU-RT
REPEATABILITY	±0.05 mm [±0.002 in]
TRAVEL TOLERANCE	+2.5/-0.0 mm [+0.100/-0.000 in]
DUTY CYCLE	100%
OPERATING TEMPERATURE	4 - 65°C [40 - 150°F]
LUBRICATION INTERVAL	Factory lubricated for life
ENCAPSULATION CLASS	IP54

SPECIFICATIONS				SIZE		
				5	6	8
MECHANICS	DRIVE MECHANISM			Timing Belt		
	GUIDE			Recirculating Ball- Linear Motion Guide & Rail System		
	ESUS MAX. TRAVEL ¹	mm [in]		5500 [216.53]		
	ESUD MAX. TRAVEL ¹	mm [in]		5350 [210.62]	5250 [206.69]	5100 [200.78]
	BELT			HTD8		
	PITCH (LINEAR TRAVEL PER REVOLUTION)	mm [in]		160 [6.3]	192 [7.56]	256 [10.08]
SPEED	PULLEY DIAMETER			50.93 [2.005]	61.12 [2.406]	81.5 [3.208]
	MAXIMUM SPEED	mm/s [in/sec]		5000 [197]		
	MAXIMUM ACCELERATION	m/s ² [ft/s ²]		50 [164.05]		
THRUST	MAXIMUM THRUST ²			1450 [326]	2610 [586]	5440 [1222]
TORQUE	MAX. PERMISSABLE DRIVE TORQUE ³			32 [283]	71 [628]	208 [1842]
	NO-LOAD TORQUE			1.5 [13.3]	2.4 [22]	3.6 [32]
WEIGHT	TOTAL @ ZERO STROKE (W _{OT})	STANDARD	kg [lb]	6.38 [14.08]	13.69 [30.21]	25.66 [56.74]
		DUAL SADDLE	kg [lb]	9.46 [20.87]	20.43 [45.09]	37.47 [82.92]
	TOTAL TRAVEL ADDER (W _{LT})			6.50E-03 [0.366]	1.04E-02 [0.582]	1.54E-02 [0.881]
	MOVING @ ZERO TRAVEL (W _{OM})	STANDARD	kg [lb]	1.81 [3.99]	4.35 [9.59]	7.48 [16.52]
		DUAL SADDLE	kg [lb]	3.03 [6.69]	7.29 [16.09]	12.16 [26.87]
	MOVING TRAVEL ADDER (W _{LM})			3.00E-04 [1.57E-02]	4.00E-04 [2.35E-02]	7.00E-04 [3.92E-02]
INERTIA	ACTUATOR @ ZERO STROKE (J _o)	STANDARD	kg-m ² [lb-in ²]	1.17E-03 [4.00]	4.06E-03 [13.90]	1.24E-02 [42.50]
		DUAL SADDLE	kg-m ² [lb-in ²]	1.97E-03 [6.70]	6.81E-03 [23.30]	2.02E-02 [69.10]
	TRAVEL ADDER (J _L)			1.82E-07 [1.58E-02]	3.92E-07 [3.40E-02]	1.16E-06 [1.01E-01]
	EXTERNAL PAYLOAD ADDER (J _m)			6.84E-04 [1.01]	9.34E-04 [1.45]	1.66E-03 [2.57]

NOTES:

- 1) STRONGLY RECOMMENDED: ORDERED TRAVEL = WORKING TRAVEL + SAFETY TRAVEL ON BOTH ENDS
- 2) REFER TO SPEED VS. THRUST CHART
- 3) REFER TO SPEED VS. TORQUE CHART

WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT
 TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

INERTIA_{Reflected} = J_o + (J_L x TRAVEL) + (J_m x TOTAL MOVING WEIGHT)

The max dynamic loads Fz and Fy and the moment Mx of a dual saddle Series ESU are doubled. The max dynamic moment of My and Mz depends on the distance between the saddles; the distance calculation follows the note 4 and 5 on pages 78 and 79 respectively.

DYNAMIC LOADS AND MOMENTS

f_c = Equivalent Load Factor

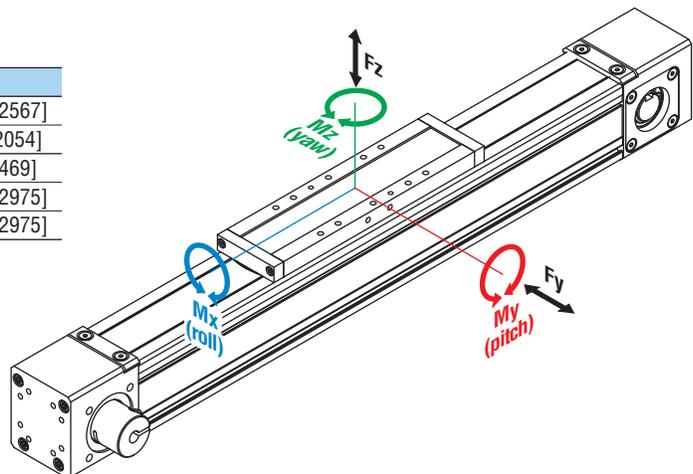
			5	6	8
Load (Max)	Fz	N [lb]	4903 [1103]	7648 [1720]	11410 [2567]
	Fy	N [lb]	3923 [883]	6120 [1377]	9129 [2054]
Bending Moments (Max)	Mx	Nm [in-lb]	43 [381]	94 [832]	166 [1469]
	My	Nm [in-lb]	380 [3363]	715 [6328]	1466 [12975]
	Mz	Nm [in-lb]	380 [3363]	715 [6328]	1466 [12975]

$$f_c = \frac{F_z}{F_z \max} + \frac{F_y}{F_y \max} + \frac{M_x}{M_x \max} + \frac{M_y}{M_y \max} + \frac{M_z}{M_z \max} \leq 1$$

NOTE: Max Loads and Moments correspond to 5000 km of actuator life when applied individually to single saddle slide.

Mx, My and Mz are total Moments (Static + Dynamic)

To make the selection process quick and simple, refer to PHD's sizing software.



SPECIFICATIONS	BALL SCREW SERIES ESU -RB
REPEATABILITY	±0.01 mm [±0.0004 in]
TRAVEL TOLERANCE	+2.5/-0.0 mm [+0.100/-0.000 in]
MAXIMUM BACKLASH	0.025 mm [0.001 in]
DUTY CYCLE	100%
OPERATING TEMPERATURE	4 - 65°C [40 - 150°F]
LUBRICATION INTERVAL	Rail bearing system - Factory lubricated for life
ENCAPSULATION CLASS	Ball Screw - Horizontal: 2500 km [100 mil. inches], Vertical: 1500 km [60 mil. inches] IP54

SPECIFICATIONS				SIZE						
				5		6		8		
MECHANICS	DRIVE MECHANISM			Ball Screw						
	GUIDE			Recirculating Ball - Linear Motion Guide & Rail System						
	MAX. TRAVEL ¹ mm [in]			1000 [39.37]						
	BALL SCREW DIAMETER mm			15		20		32		
	SCREW CONFIGURATION			-RB010	-RB016	-RB010	-RB020	-RB010	-RB032	
SPEED	PITCH (LINEAR TRAVEL PER REVOLUTION) mm [in]			10	16	10	20	10	32	
	MAXIMUM SPEED ² mm/s [in/sec]			1000 [39.3]	1600 [63.0]	1000 [39.3]	2000 [78.7]	1000 [39.3]	3200 [126.0]	
	MAXIMUM ACCELERATION			19.6 [772]						
THRUST	MAXIMUM THRUST ³ N [lbf]			2430 [547]	1520 [342]	4410 [992]	2510 [565]	10210 [2297]	5478 [1233]	
	MAXIMUM PERMISSABLE DRIVE TORQUE ⁴ Nm [in-lb]			4.3 [38.06]		7.8 [69.03]		16.3 [144.2]		31.0 [274.3]
TORQUE	NO-LOAD TORQUE Nm [in-lb]			0.40 [3.54]		0.55 [4.87]		1.50 [13.27]		
	TOTAL @ ZERO STROKE (W _{OT})			STANDARD						
WEIGHT	DUAL SADDLE kg [lb]			4.83 [10.67]	4.91 [10.84]	10.36 [22.87]	10.54 [23.27]	21.23 [46.86]	21.26 [46.94]	
	TOTAL TRAVEL ADDER (W _{LT}) kg/mm [lb/in]			0.008 [0.436]	0.008 [0.436]	0.012 [0.700]	0.012 [0.700]	0.022 [1.224]	0.022 [1.224]	
	MOVING @ ZERO TRAVEL (W _{OM})			STANDARD						
	DUAL SADDLE kg [lb]			1.53 [3.36]	1.61 [3.54]	3.28 [7.22]	3.46 [7.61]	6.00 [13.21]	6.03 [13.29]	
MOMENT OF INERTIA	ACTUATOR @ ZERO STROKE (J _o)			STANDARD						
	DUAL SADDLE kg-m ² [lb-in ²]			8.36E-06 [0.029]	8.94E-06 [0.031]	2.98E-05 [0.102]	2.94E-05 [0.101]	2.52E-04 [0.860]	2.82E-04 [0.964]	
	TRAVEL ADDER (J _L) kg-m ² /mm [lb-in ² /in]			2.64E-08 [2.29E-03]	2.95E-08 [2.56E-03]	8.00E-08 [6.94E-03]	7.81E-08 [6.78E-03]	5.49E-07 [4.77E-02]	6.50E-07 [5.65E-02]	
	EXTERNAL PAYLOAD ADDER kg-m ² /kg [lb-in ² /lb]			2.53E-06 [3.93E-03]	6.48E-06 [1.01E-02]	2.53E-06 [3.93E-03]	1.01E-05 [1.57E-02]	2.53E-06 [3.93E-03]	2.59E-05 [4.02E-02]	
	MOTOR CONFIGURATION			-QL11						
	DUAL SADDLE kg-m ² [lb-in ²]			6.11E-06 [0.021]	6.11E-06 [0.021]	4.04E-05 [0.138]	4.04E-05 [0.138]	1.71E-04 [0.583]	1.71E-04 [0.583]	
			-QF11							
			2.03E-04 [0.694]						2.03E-04 [0.694]	
			-QF21							
			3.59E-04 [1.227]						3.59E-04 [1.227]	

NOTES:

- STRONGLY RECOMMENDED:
ORDERED TRAVEL = WORKING TRAVEL + SAFETY TRAVEL ON BOTH ENDS
- REFER TO SPEED VS. TRAVEL CHART
- REFER TO THRUST VS. LIFE CHART
- REFER TO TORQUE VS. THRUST CHART

WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = W_{OT} + (W_{LT} X TRAVEL) + MOTOR MOUNT WEIGHT
 TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} X TRAVEL) + EXTERNAL PAYLOAD

FOR Qx11:

INERTIA_{Reflected} = J_o + (J_L X TRAVEL) + (J_M X TOTAL MOVING WEIGHT) + J_o

FOR -QF21:

INERTIA_{Reflected} = [J_o + (J_L X TRAVEL) + (J_M X TOTAL MOVING WEIGHT)] / 4 + J_o

DYNAMIC LOADS AND MOMENTS

f_c = Equivalent Load Factor

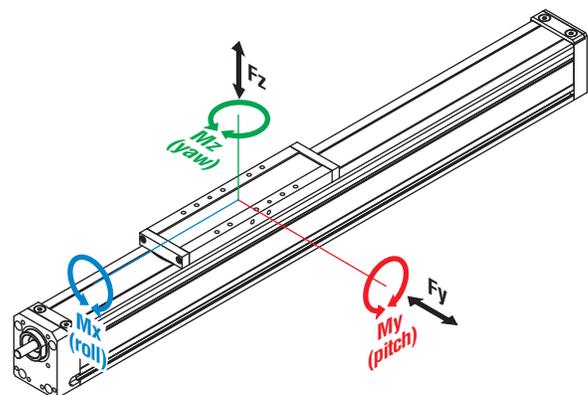
			5	6	8
Load (Max)	Fz	N [lb]	4903 [1103]	7648 [1720]	11410 [2567]
	Fy	N [lb]	3923 [883]	6120 [1377]	9129 [2054]
Bending Moments (Max)	Mx	Nm [in-lb]	43 [381]	94 [832]	166 [1469]
	My	Nm [in-lb]	380 [3363]	715 [6328]	1466 [12975]
	Mz	Nm [in-lb]	380 [3363]	715 [6328]	1466 [12975]

$$f_c = \frac{F_z}{F_z \max} + \frac{F_y}{F_y \max} + \frac{M_x}{M_x \max} + \frac{M_y}{M_y \max} + \frac{M_z}{M_z \max} \leq 1$$

NOTE: Max Loads and Moments correspond to 5000 km of actuator life when applied individually to single saddle slide.

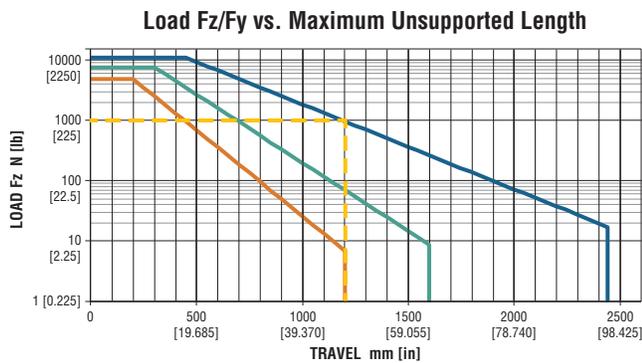
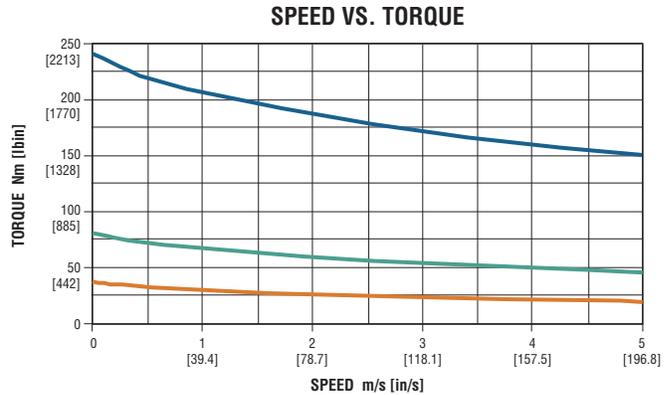
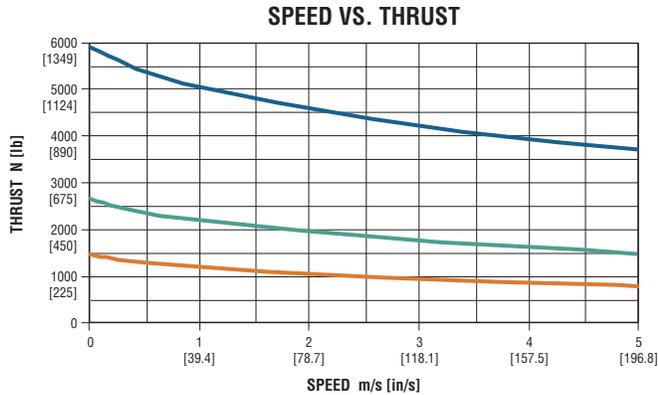
M_x, M_y and M_z are total Moments (Static + Dynamic)

To make the selection process quick and simple, refer to PHD's sizing software.

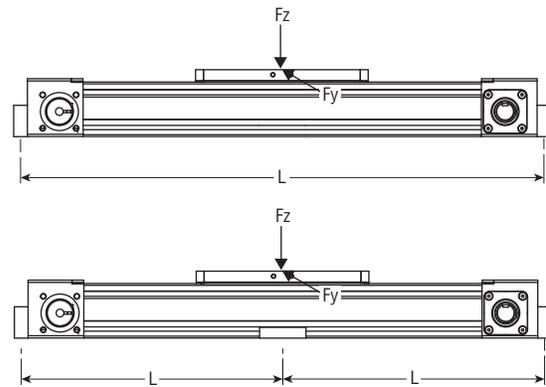


PERFORMANCE CHARTS: Series ESU Belt-Driven Linear Actuator -RT

This section contains information on the capabilities of the Series ESU -RT version. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Inside Sales Department.



Mid-Support Calculation illustrated by dashed yellow line in graph above.



MID-SUPPORT CALCULATION

Example (Application Requirements)

Actuator – ESUS size 58

Load Fz – 1000 N [225 lb]

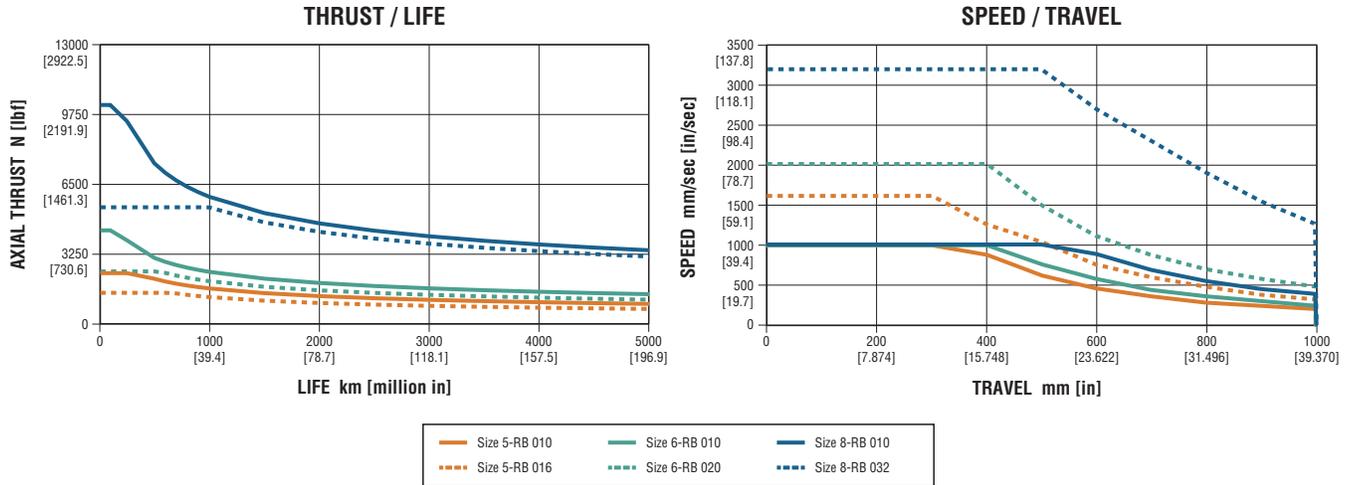
Travel – 3000 mm

Use Load Fz/Fy vs Maximum Unsupported Length graph

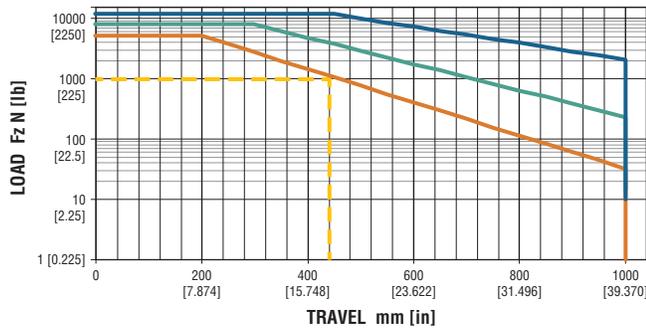
- 1) Find **Maximum Unsupported Length** from the above graph [1000 N = 1200 mm]
- 2) Calculate **Total Actuator Length** (refer to Dimensions page 78)
 $\text{Total Travel} + \text{Dimension A} = \text{Total Actuator Length}$
 $3000 + 628.1 = \mathbf{3628.1 \text{ mm}}$
- 3) Determine **number of required mid-supports**
 $(\text{Total Actuator Length} / \text{Maximum Unsupported Length}) - 1 = \text{Required mid-supports}$
 $(3628.1 \text{ mm} / 1200 \text{ mm}) - 1 = \mathbf{2 \text{ mid-supports}}$ (round up to next whole number)

PERFORMANCE CHARTS: Series ESU Ball Screw Linear Actuator -RB

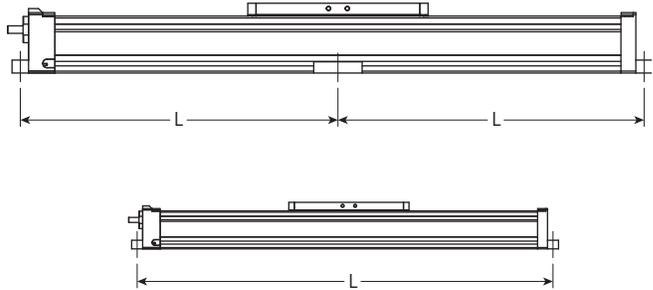
This section contains information on the capabilities of the Series ESU -RB version. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Inside Sales Department.



Load Fz/Fy vs. Maximum Unsupported Length



Mid-Support Calculation illustrated by dashed yellow line in graph above.



MID-SUPPORT CALCULATION

Example (Application Requirements)

Actuator – ESUS size 55

Load Fz – 1000 N [225 lb]

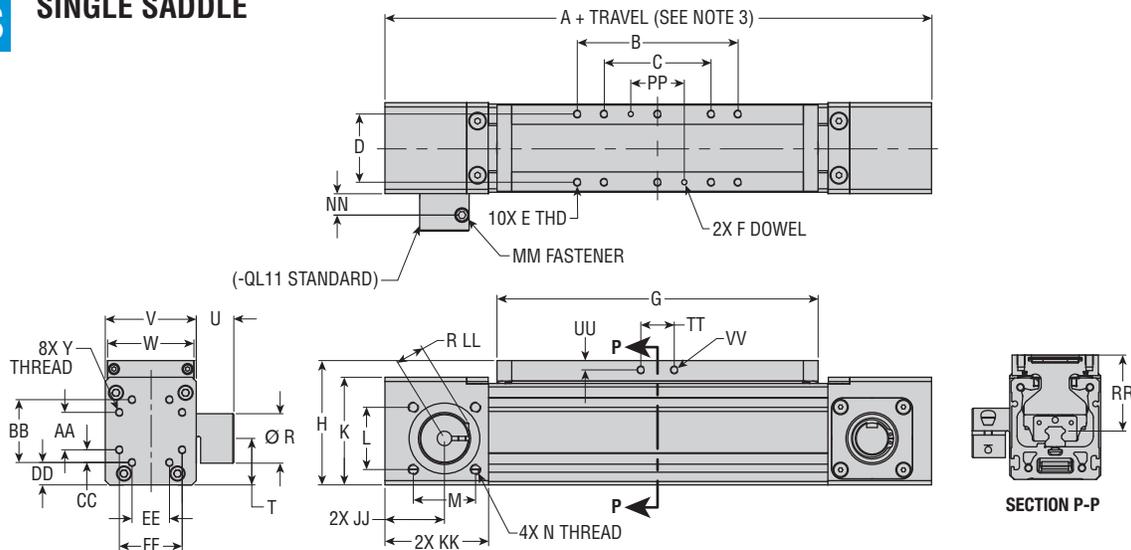
Travel – 1000 mm

Use Load Fz/Fy vs Maximum Unsupported Length graph

- 1) Find **Maximum Unsupported Length** from the above graph [1000 N = 440 mm]
- 2) Calculate **Total Actuator Length** (refer to Dimensions page 79)
 Total Travel + Dimension A = Total Actuator Length
 $1000 + 308.5 = 1308.5 \text{ mm}$
- 3) Determine **number of required mid-supports**
 (Total Actuator Length / Maximum Unsupported Length) - 1 = Required mid-supports
 (1308.5 mm / 440 mm) - 1 = **2 mid-supports** (round up to next whole number)

DIMENSIONS: Series ESU Belt-Driven Linear Actuator -RT

ESUS SINGLE SADDLE



SIZE	A	B	C	D	E	F	G	H	K	L	M	N	R	T	U	V	W
5	408.5	120.0	80.0	51.0	M6 x 1 x 8.5	4 x 4	240.0	93.0	80.5	46.5	46.5	M8 x 1.25 x 12	37.0	34.8	28.1	68.0	64.5
6	514.0	160.0	100.0	70.0	M6 x 1 x 10.2	5 x 5	287.0	115.0	100.2	46.5	46.5	M8 x 1.25 x 14	42.0	41.1	31.4	88.0	83.5
8	628.1	175.0	105.0	75.0	M8 x 1.25 x 12.7	6 x 6	373.0	149.0	131.2	66.0	78.5	M10 x 1.5 x 15	55.0	57.7	44.2	105.0	99.0

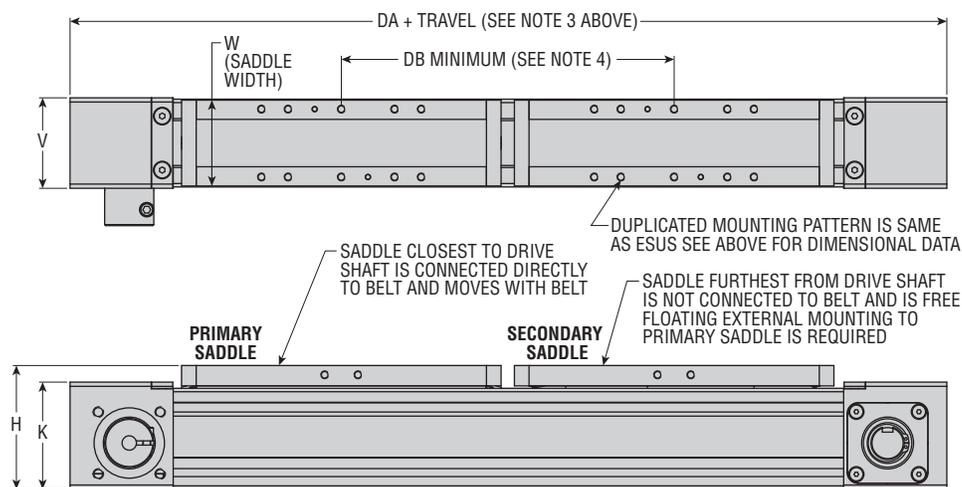
SIZE	Y	AA	BB	CC	DD	EE	FF	JJ	KK	LL	MM	NN	PP	RR	TT	UU	VV
5	M6 x 1 x 9	28.0	47.0	9.5	16.8	28.0	47.0	44.5	77.5	R 21.3	M6 x 1	16.1	40.0	56.8	25.0	7.0	M6 x 1 x 8
6	M8 x 1.25 x 12	40.0	64.0	12.0	18.1	40.0	64.0	55.0	105.0	R 24.2	M6 x 1	15.9	40.0	72.2	25.0	7.0	M6 x 1 x 8
8	M10 x 1.5 x 16	47.5	80.0	16.3	25.6	47.5	80.0	69.0	125.0	R 31.9	M8 x 1.25	25.8	50.0	91.0	25.0	7.0	M6 x 1 x 8

NOTES:

- 1) DIMENSIONS: mm
- 2) SADDLE(S) SHOWN IN MID POSITION
- 3) PHD RECOMMENDS ADDING 50 mm TO THE TOTAL WORKING TRAVEL FOR OVER-TRAVEL PROTECTION (25 mm PER END)

ESUD DUAL SADDLE

The max dynamic loads F_z and F_y and the moment M_x of a dual saddle Series ESU are doubled. The max dynamic moment of M_y and M_z depends on the distance between the saddles; the distance calculation follows the note 4.



NOTE:

- 4) MINIMUM SADDLE TO SADDLE DISTANCE SHOWN. IF ADDITIONAL DISTANCE BETWEEN SADDLES IS REQUIRED, ADD APPROPRIATE LENGTH TO TOTAL TRAVEL IN 50 mm INCREMENTS.

EXAMPLES:

SIZE 5 WITH 500 mm TRAVEL WITH STANDARD "DB" DISTANCE OF 250 mm
ESUD55 x 500 -RTxxx (NO ADDITIONAL STROKE ADDER NEEDED)

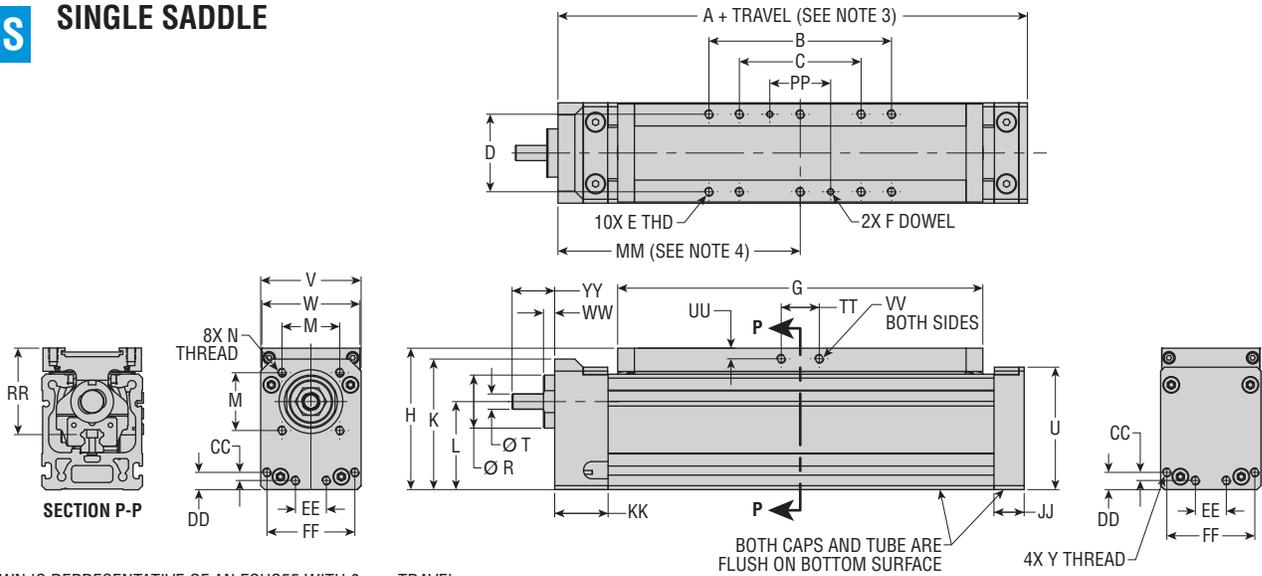
SIZE 5 WITH 500 mm TRAVEL WITH "DB" DISTANCE OF 350 mm
ESUD55 x 600 -RTxxx (WILL NEED ADDITIONAL 100 mm STROKE ADDER)
FOR AN END RESULT OF 500 mm TRAVEL

SIZE	DA	DB	H	K	V	W
5	658.5	250.0	93.0	80.5	68.0	64.5
6	814.0	300.0	115.0	100.2	88.0	83.5
8	1028.1	400.0	149.0	131.2	105.0	99.0

All dimensions are reference only unless specifically tolerated.

DIMENSIONS: Series ESU Ball Screw Linear Actuator -RB

ESUS SINGLE SADDLE



UNIT SHOWN IS REPRESENTATIVE OF AN ESUS55 WITH 0 mm TRAVEL

SIZE	A	B	C	D	E	F	G	H	K	L	M	N	ØR	ØT	U	V
5	308.5	120.0	80.0	51.0	M6 x 1 x 8.5	4 x 4	240.0	93.0	85.9	57.9	38.0	M6 x 1 x 18.7	34.9	10.0	80.5	66.0
6	414.0	160.0	100.0	70.0	M6 x 1 x 10.2	5 x 5	287.0	115.0	105.2	71.0	46.5	M8 x 1.25 x 22	48.5	12.0	100.2	86.0
8	528.1	175.0	105.0	75.0	M8 x 1.25 x 12.7	6 x 6	373.0	149.0	143.3	94.3	72.0	M10 x 1.5 x 15	61.9	22.0	131.2	103.0

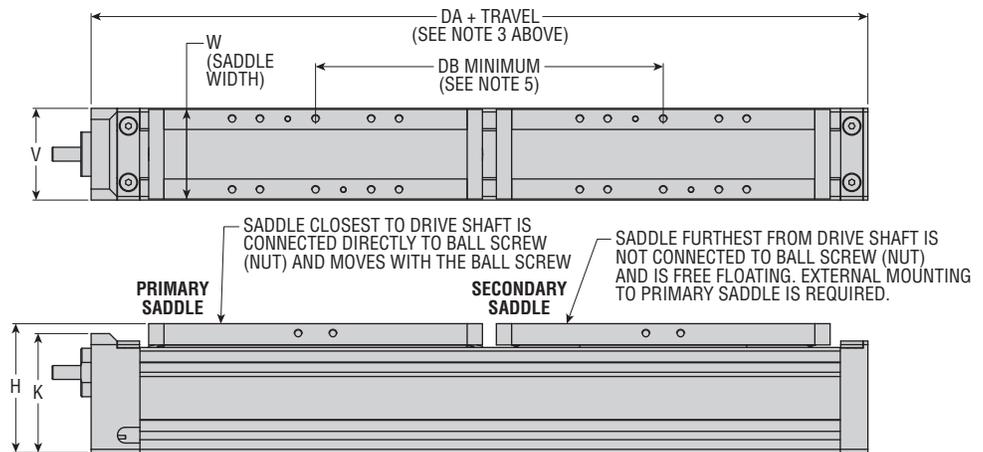
SIZE	W	Y	CC	DD	EE	FF	JJ	KK	MM	PP	RR	TT	UU	VV	WW	YY
5	64.5	M6 x 1 x 13	5.3	11.3	20.3	57.8	19.8	35.1	161.4	40.0	56.8	25.0	7.0	M6 x 1.0 x 8	7.4	28.0
6	83.5	M8 x 1.25 x 22	10.5	18.1	19.7	40.0	55.0	55.0	206.5	40.0	72.2	25.0	7.0	M6 x 1.0 x 8	6.8	34.6
8	99.0	M10 x 1.5 x 23	15.0	25.4	37.0	56.0	75.0	75.0	263.5	50.0	91.0	25.0	7.0	M6 x 1.0 x 8	11.0	56.2

NOTES:

- 1) DIMENSIONS: mm
- 2) SADDLES SHOWN IN MID POSITION
- 3) PHD RECOMMENDS ADDING 50 mm TO THE TOTAL WORKING TRAVEL FOR OVER-TRAVEL PROTECTION (25 mm PER END)
- 4) SADDLE IS FULLY RETRACTED TO MOTOR END.

ESUD DUAL SADDLE

The max dynamic loads Fz and Fy and the moment Mx of a dual saddle Series ESU are doubled. The max dynamic moment of My and Mz depends on the distance between the saddles; the distance calculation follows the note 5.



NOTE:

- 5) MINIMUM SADDLE TO SADDLE DISTANCE SHOWN. IF ADDITIONAL DISTANCE BETWEEN SADDLES IS REQUIRED, ADD APPROPRIATE LENGTH TO TOTAL TRAVEL IN 50 mm INCREMENTS.

REFER TO SINGLE SADDLE DIMENSIONS ABOVE FOR DATA NOT SHOWN

EXAMPLES:

SIZE 5 WITH 500 mm TRAVEL WITH STANDARD "DB" DISTANCE OF 250 mm
ESUD55 x 500 -RBxxx (NO ADDITIONAL STROKE ADDER NEEDED)

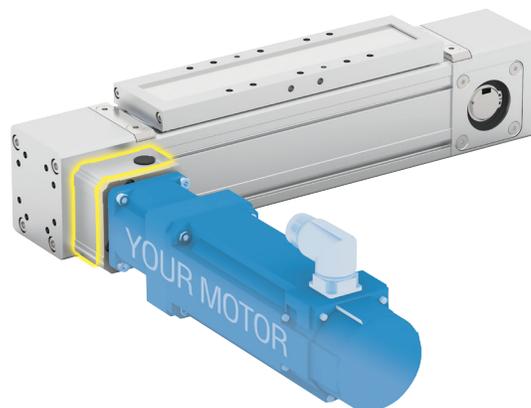
SIZE 5 WITH 500 mm TRAVEL WITH "DB" DISTANCE OF 350 mm
ESUD55 x 600 -RBxxx (WILL NEED ADDITIONAL 100 mm STROKE ADDER)
FOR AN END RESULT OF 500 mm TRAVEL

SIZE	H	K	V	W	DA	DB
5	93.0	85.9	66.0	64.5	558.5	250.0
6	115.0	105.2	86.0	83.5	714.0	300.0
8	149.0	143.3	103.0	99.0	928.1	400.0

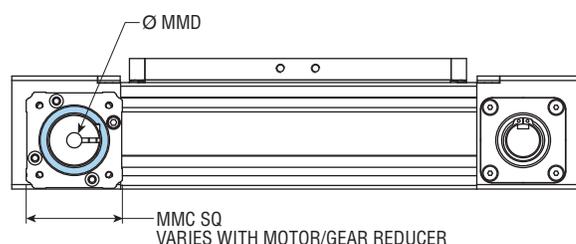
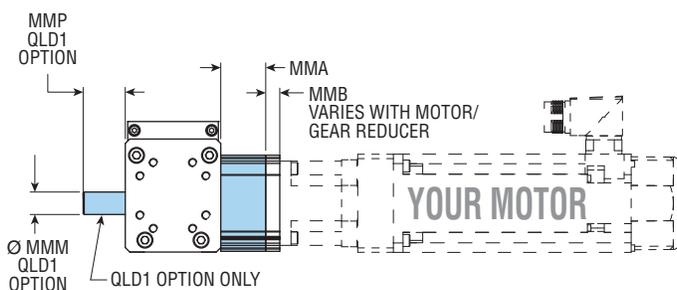
All dimensions are reference only unless specifically tolerated.

QL11 INLINE WITH 1:1 RATIO (STANDARD ON -RT)

Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall weight. The simple low inertia design of the inline motor/gearbox mounting allows for a cost-effective solution with minimal assembly time. If blank mounting is desired, use -W0000 mounting code for a blank plate intended for customer modification.



SINGLE SADDLE



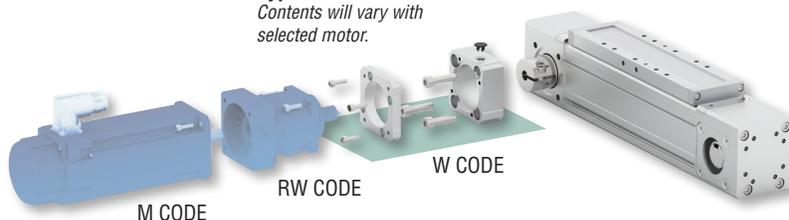
SIZE	-QL11 AND -QLD1						-QLD1 AND -QLT1	-QL11-W0000		
	MMA	MMB MAX	MMB MIN	MMC STANDARD	MMC OVERSIZE	WEIGHT kg	MMM	MMP	MMC	MMD
5	27.0	31.0	12.5	68.5	88.0	0.36	16.0	30.0	88.0	19.0
6	32.2	33.0	14.0	88.0	115.0	0.54	22.0	32.0	115.0	24.0
8	46.0	56.0	16.5	115.0	138.0	1.04	32.0	40.0	138.0	32.0

NOTES:

- 1) YOUR MOTOR, YOUR WAY MOTOR MOUNTS -QL11 & -QLD1 ARE PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO ACTUATOR
- 2) KIT INCLUDES ALL PARTS REQUIRED TO ASSEMBLE AN ACTUATOR BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
- 3) DIMENSIONS: mm

Typical Kit Contents

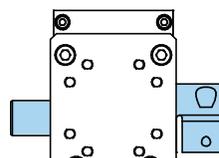
Contents will vary with selected motor.



All dimensions are reference only unless specifically tolerated.

QLD1 INLINE DUAL SHAFT 1:1 RATIO (-RT ONLY)

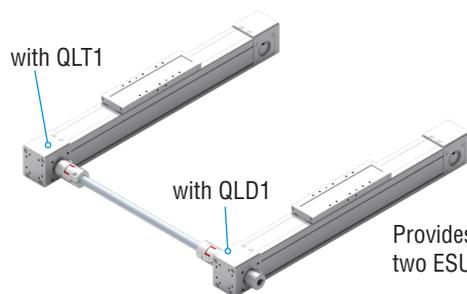
Inline dual shaft output motor mounting is a 1:1 drive ratio with a shaft extension thru opposite side of cap. The shaft extension allows for two axis mechanical synchronization from a single motor.



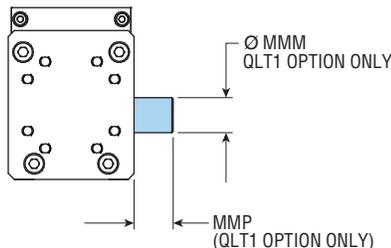
*Motor/gear mounts included but not shown

QLT1 INLINE PLAIN SHAFT (-RT ONLY)

The inline plain shaft option for mechanically coupling 2 ESU-RT actuators together, driven by a single motor. This option requires two ESU actuators. One with the QLD1 option and other with the QLT1 option. The shaft coupler is to be provided by customer. Consult PHD Application Engineering or your local distributor for suppliers.



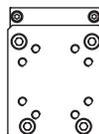
Provides for mechanical coupling two ESU-RT Slides



Refer to page 80 for the variable dimensions.

QL00 NO SHAFT (PASSIVE CONFIGURATION, AVAILABLE ON -RT AND -RB)

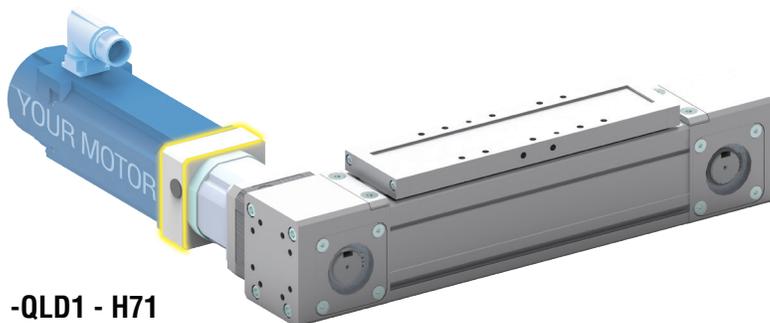
This option provides the ESU without drive. The option is a no shaft option and does not include a coupler housing or motor mount plate. Linear rail only.



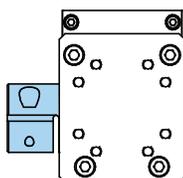
-QL00 IS A NO SHAFT OPTION AND DOES NOT INCLUDE A COUPLER HOUSING OR MOTOR MOUNTING PLATE USED IN CONJUNCTION WITH THE -RT000 OR -RB000 PASSIVE CONFIGURATION

H71 LEFT HAND DRIVE SHAFT ORIENTATION (-RT ONLY)

The inline motor mounting with the H71 option provides drive shaft/ motor orientation on the left side of the actuator, as shown.

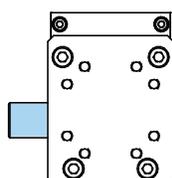


-QL11 - H71

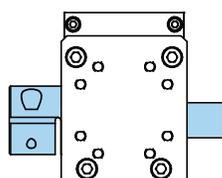


*Motor/gear mounts included but not shown

-QLT1 - H71



-QLD1 - H71

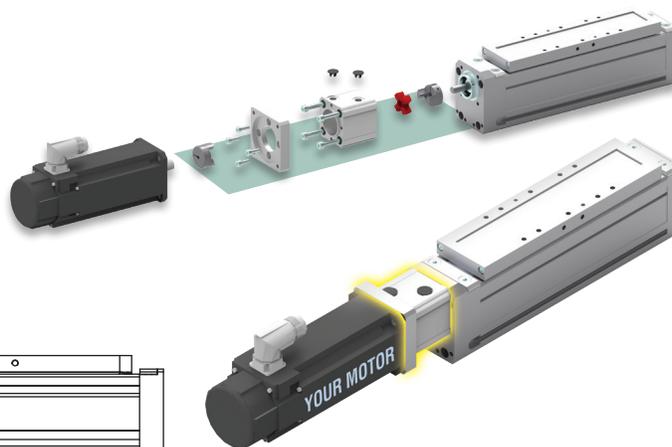
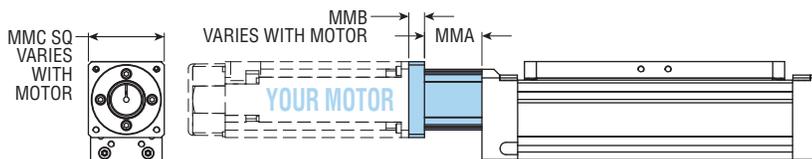


*Motor/gear mounts included but not shown

All dimensions are reference only unless specifically tolerated.

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO (-RB MODEL)

Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 83.



NOTES:

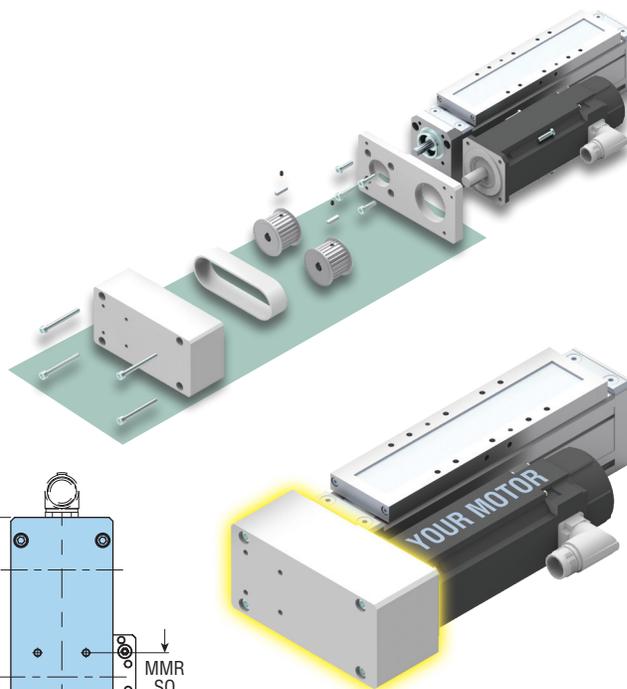
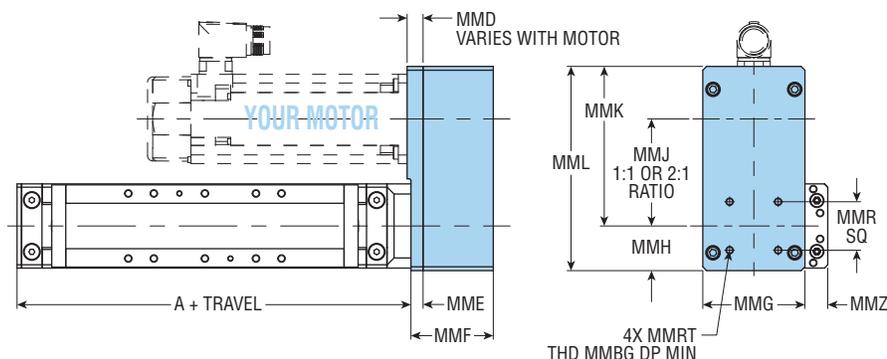
- 1) YOUR MOTOR, YOUR WAY MOTOR MOUNTS -QL11 IS PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO ACTUATOR
- 2) KITS INCLUDE DIRECTIONS AND ALL PARTS REQUIRED TO ASSEMBLE AN ACTUATOR BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
- 3) WHEN (-Wxxxx) IS SPECIFIED, COUPLER ID IS SUPPLIED WITH UNFINISHED ID Ø MMT AND MOTOR MOUNTING PLATE IS SUPPLIED AT MMC "OVERSIZE" AND WITHOUT MOTOR MOUNTING FEATURES
- 4) DIMENSIONS ARE mm

SIZE	MMA	MMB MAX	MMB MIN	MMC STANDARD	MMC OVERSIZE	WEIGHT kg
5	53.0	35.6	8.5	70.0	88.0	0.65
6	82.2	35.6	8.5	88.0	110.0	1.36
8	108.8	35.6	19.0	120.7	150.0	2.50

QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO (-RB ONLY)

QF21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO (-RB ONLY)

Foldback motor mounting with the QF11 option provides a 1:1 drive ratio allowing similar performance to the inline motor mounting in a shorter overall length. The QF21 option provides a 2:1 drive ratio reduction for applications that require higher thrust. Foldback motor mounting also provides a VDMA 24562 compliant mounting pattern that allows the use of many standard cylinder mounting accessories. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 83.



SIZE	A	MMD MIN	MMD MAX	MME	MMF	MMG	MMH	MMJ 1:1	MMJ 2:1	MMK	MML	MMR	MMRT	MMBG	MMZ	WEIGHT kg
5	308.5	9.5	22.5	9.5	64.5	80.0	35.0	85.1	83.9	125.1	160.1	38.0	M6 x 1	11.5	17.9	1.7
6	414.0	9.5	22.5	9.5	68.0	86.0	44.0	102.5	111.4	154.4	198.4	46.5	M8 x 1.25	14.5	28.0	2.37
8	528.1	15.0	25.4	15.0	86.0	122.0	61.0	140.3	158.2	223.1	284.1	72.0	M10 x 1.5	17	33.3	5.9

All dimensions are reference only unless specifically tolerated.

Wxxxx MOTOR MOUNT CODE

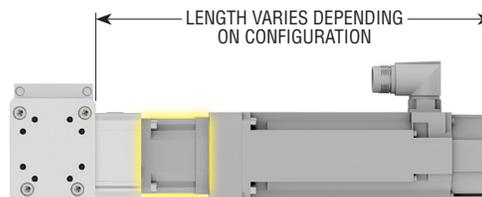
Your Motor, Your Way customizable motor mounting is generated by PHD's extensive motor database at www.config.phdinc.com. Users may select their compatible motor of choice from the pre-populated motor database. In the event the chosen motor is not in the database, they may enter necessary motor features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

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

RWxxx GEAR REDUCER (-RT ONLY)



A factory provided gear reducer is only available when a motor is configured from PHD. The available gear reducers and associated RWxxx codes can be selected using PHD's motor database at www.config.phdinc.com.



Y5 FOOD GRADE

Food grade lubricant replaces all standard lubricants.

NOTES:

- 1) SIZE DEPENDS ON MOTOR USED, SEE CAD CONFIGURATOR MODEL FOR ACTUAL SIZE
- 2) QL11 AND QLD1 ARE TYPICALLY ORDERED WITH Wxxxx OR Mxxxx+RWxxx

KSxxx END/MID SUPPORTS

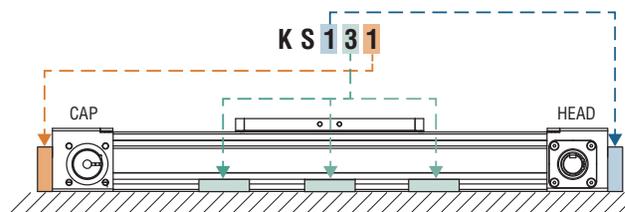
Mounting with optional supports using the integrated T-slot. Recommended number of mid-support mounts can be determined by finding the maximum distance between supports based on the load per your application. See Engineering Data page, Load Fz/Fy vs. Maximum Unsupported Length graph.

NOTE: PHD does not recommend only the use of mid supports for actuator mounting. Utilize end supports when applicable.

Mid supports include one set of brackets.

See dimensions on next page.

END/MID SUPPORT ORDERING EXAMPLE:



SUPPORT LOCATION	QUANTITY
Head - KS0xx or KS1xx	0 or 1
Mid - KSx0x to KSx9x	0 to 9
Cap - KSxx0 or KSxx1	0 or 1

KSx1x includes one set of brackets
KSx2x includes two sets of brackets, etc.

SUPPORT REPLACEMENT KITS

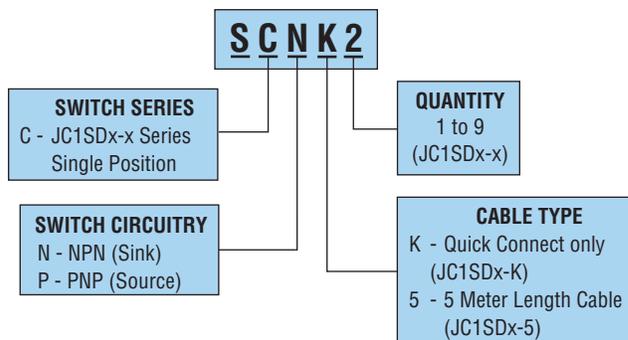
SUPPORT KITS	-RB SIZE			-RT SIZE		
	5	6	8	5	6	8
Head or Cap	90090-01	90090-02	90090-03	90036-01	90036-02	90036-03
Mid	90037-01	90037-02	90037-03	90037-01	90037-02	90037-03

Sxxxx

SWITCH BUNDLE

These options conveniently provide switches with additional hardware if required. Series JC1SDx-x single position switches are available as NPN or PNP. Connection method may also be specified along with quantity of switches, up to nine.

SWITCH BUNDLE (OPTIONAL)



SERIES JC1SDx-x SINGLE POSITION MAGNETIC SWITCH

This switch provides the ability to identify a single position of travel. Solid-state sensing technology provides a highly reliable switch. Elliptical housing allows for easy “drop-in” installation. Includes LED indicator for convenient means of positioning. Available with PNP or NPN output. Available with cable or 8 mm threaded Quick Connect.



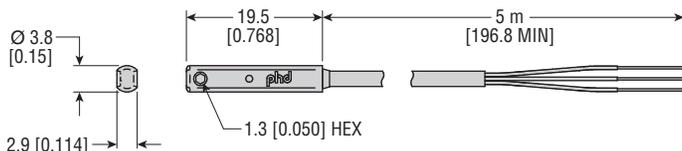
SERIES JC1SDx SINGLE POSITION SWITCHES

PART NO.	DESCRIPTION
JC1SDN-5	NPN (Sink) Solid State, 10-30 VDC, 5 m cable
JC1SDP-5	PNP (Source) Solid State, 10-30 VDC, 5 m cable
JC1SDN-K	NPN (Sink) Solid State, 10-30 VDC, Quick Connect
JC1SDP-K	PNP (Source) Solid State, 10-30 VDC, Quick Connect

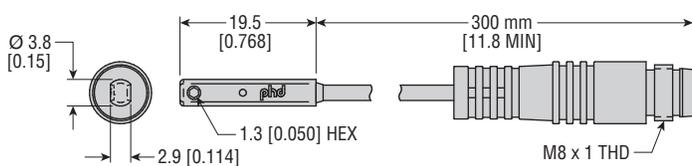
SERIES JC1SDx CORDSET

PART NO.	DESCRIPTION
63549-02	M8, 3 pin, Straight Female Connector, 2 m cable
63549-05	M8, 3 pin, Straight Female Connector, 5 m cable

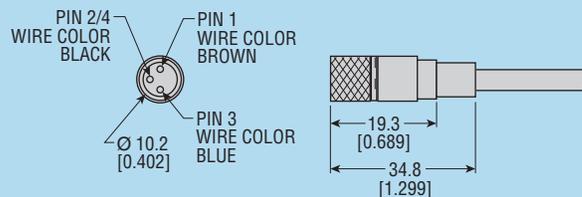
JC1SDx-5



JC1SDx-K (Quick Connect)



63549-xx CORDSET



PHD's Series ESU -RT Electric Belt-Driven Linear Actuators feature a robust, enclosed design with a high capacity rail bearing system which delivers exceptional moment and load capability. The ESU -RT linear actuator and other PHD electric and pneumatic actuators can be used in a variety of combinations that create a full range of motion for a variety of cartesian systems. Below are a few examples of how PHD electric components can be configured.

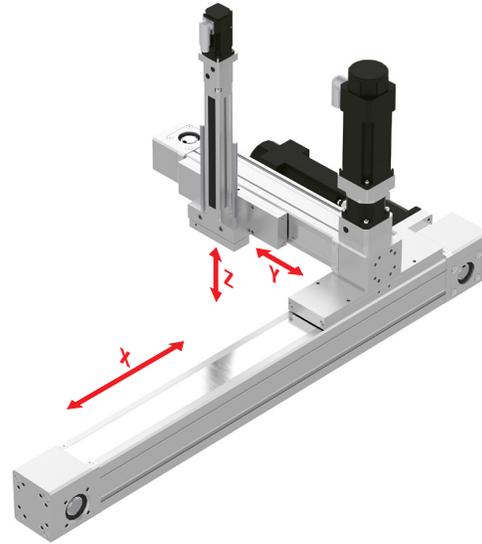
3-Axis Cartesian Robot, Permanent Arm Type

Z- Axis = ESCV Thruster Slide

Y- Axis = ESU -RT Linear Actuator

X- Axis = ESU -RT Linear Actuator

Advantages - Small footprint, high accuracy, high speed



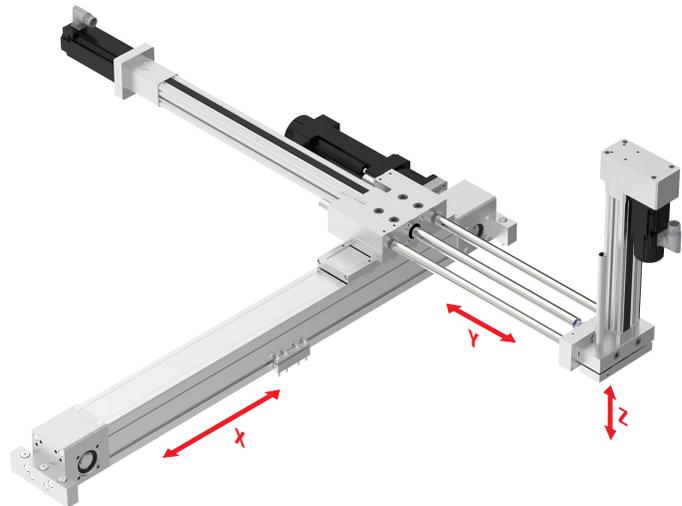
3-Axis Cartesian Robot, Retracting Arm Type

Z- Axis = ESCV Thruster Slide

Y- Axis = ESL Thruster Slide

X- Axis = ESU -RT Linear Actuator

Advantages - Small footprint, lower cost



4-Axis Cartesian Robot, Gantry Type

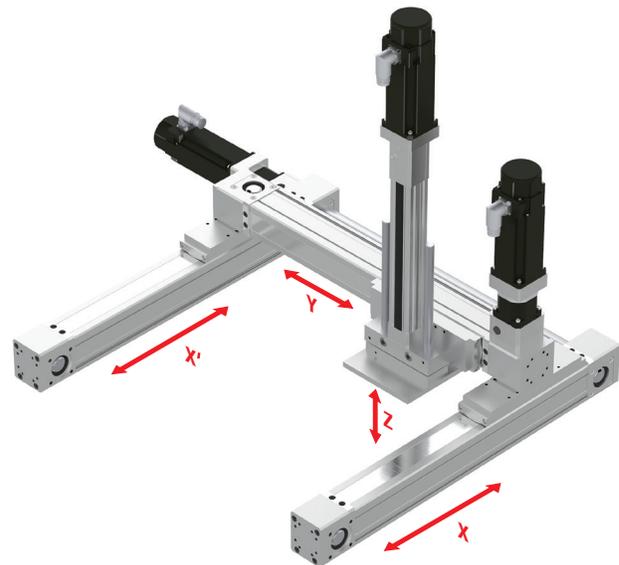
Z- Axis = ESCV Thruster Slide

Y- Axis = ESU -RT Linear Actuator

X- Axis = ESU -RT Linear Actuator

X- Axis = ESU -RT Linear Actuator

Advantages - Large working area, high payload, high speed

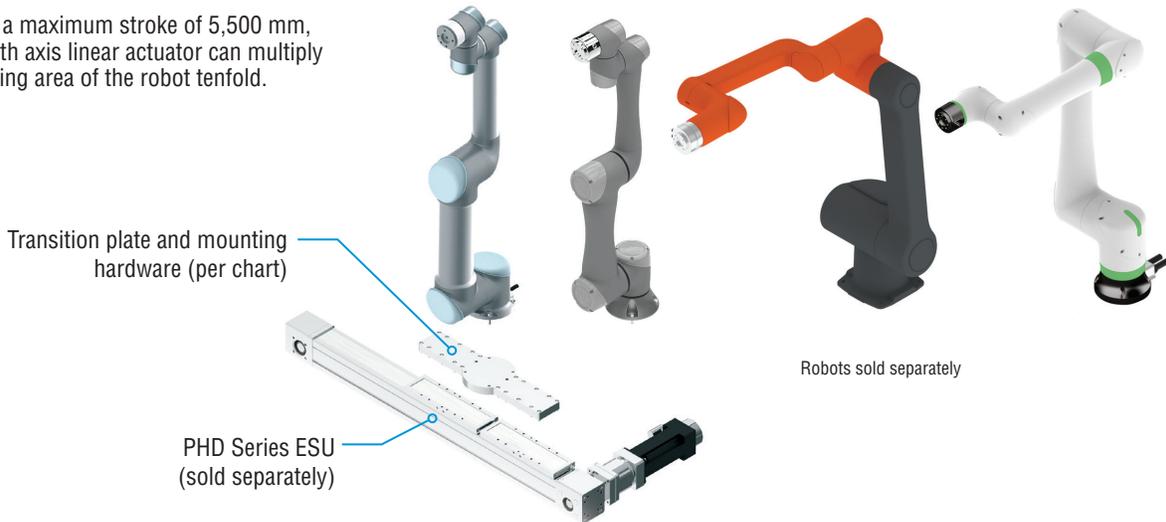


MODULAR 7th AXIS LINEAR ACTUATOR

BENEFITS

- Transition plates and hardware available for direct mounting between electric linear actuator and robot.
- Torque limiting features on servo-driven linear actuator can provide faults in case of collisions.*
- With a maximum stroke of 5,500 mm, the 7th axis linear actuator can multiply working area of the robot tenfold.

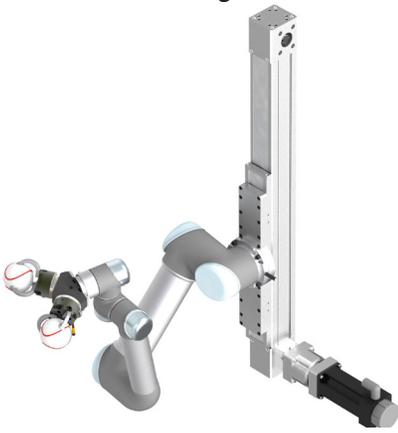
Modular 7th Axis Linear Actuator Is Compatible With A Variety Of Cobot Brands



	UNIVERSAL ROBOTS				TECHMAN ROBOTS				HANWHA ROBOTS			FANUC CRX	
	UR3	UR5	UR10	UR16	TM5 - 700	TM5 - 900	TM12	TM14	HCR-3	HCR-5	HCR-12	CRX-10i A	CRX-10i A/L
Max. Payload	3 kg	5 kg	10 kg	16 kg	6 kg	4 kg	12 kg	14 kg	3 kg	5 kg	12 kg	10 kg	
Reach	500 mm	850 mm	1300 mm	900 mm	700 mm	900 mm	1300 mm	1100 mm	630 mm	915 mm	1300 mm	1249 mm	1418 mm
Weight	11 kg	18.4 kg	28.9 kg	33.1 kg	22.1 kg	22.6 kg	33.3 kg	32.6 kg	13 kg	21 kg	53 kg	39 kg	
Recommended 7th Axis**	ESUS55	ESUD56	ESUD58		ESUD56		ESUD58		ESUD55	ESUD56	ESUD58	ESUD58	
Transition Plate	ML317526	ML317527	ML317528	ML317528	ML317814	ML317814	ML317818	ML317818	ML318421	ML318422	ML318423	ML318926	
Plate Weight	0.94 kg	3.08 kg	4.87 kg		3.38 kg		4.94 kg		0.9 kg	3.0 kg	4.6 kg	4.87 kg	

The robust design of the Series ESU Electric Belt-Driven Linear Actuator provides a superior guide system to support the robot in various orientations.

Vertical Mounting



Overhead Mounting



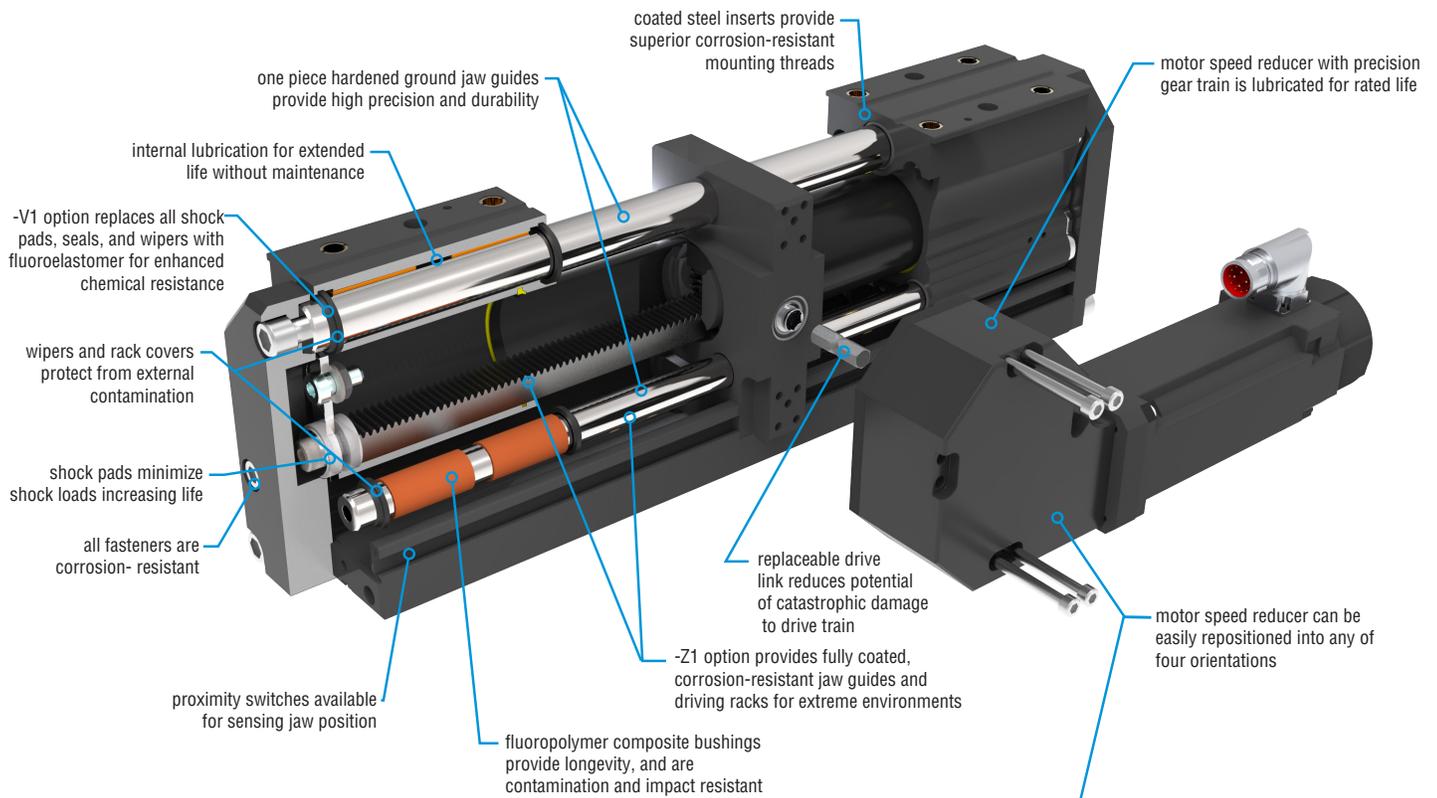
Wall Mounting



*Series ESU Electric Linear Actuators are not collaborative rated from PHD. Customer assumes the responsibility of risk assessment.

**Recommended linear actuator selected for maximum payload and reach of robot. Contact PHD Applications Engineering for other combinations.

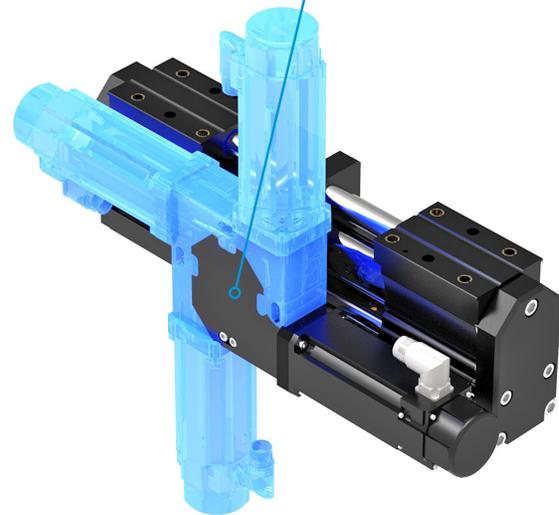
SERIES EGRR HEAVY DUTY PARALLEL GRIPPER



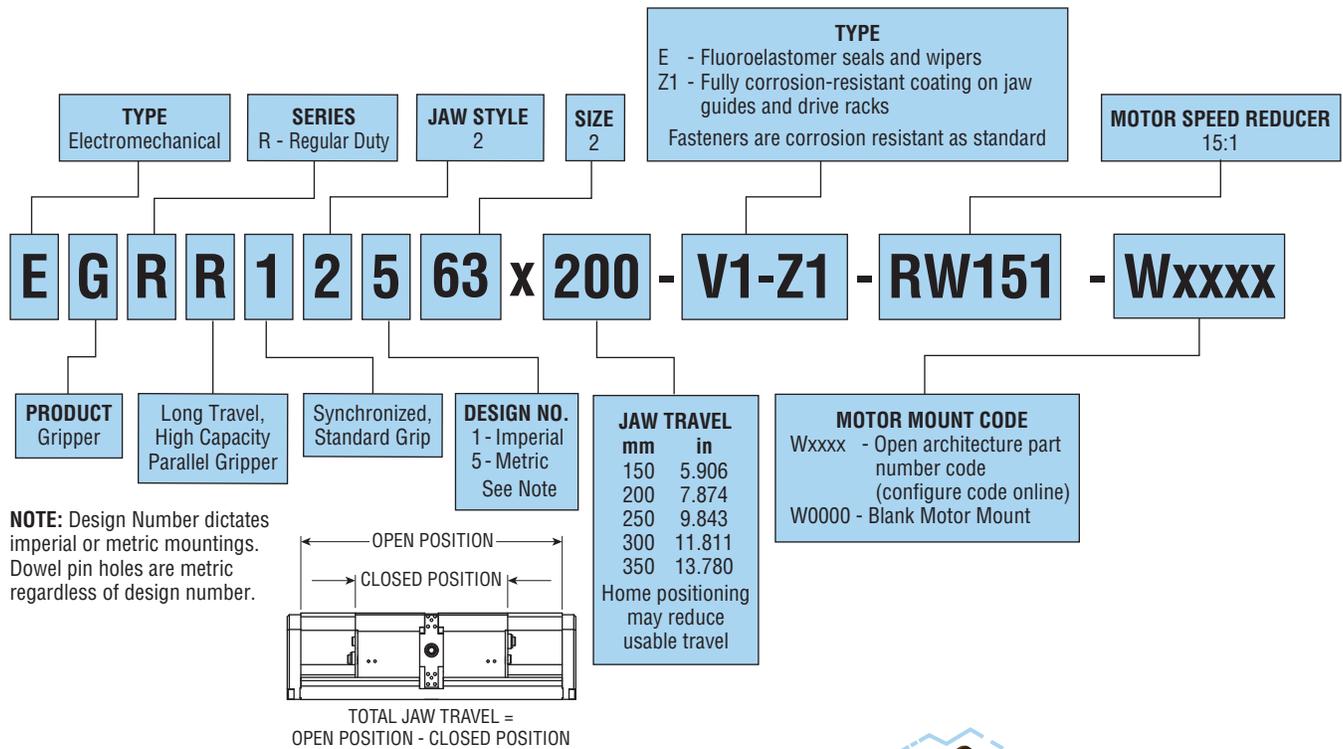
Your Motor Your Way

Major Benefits

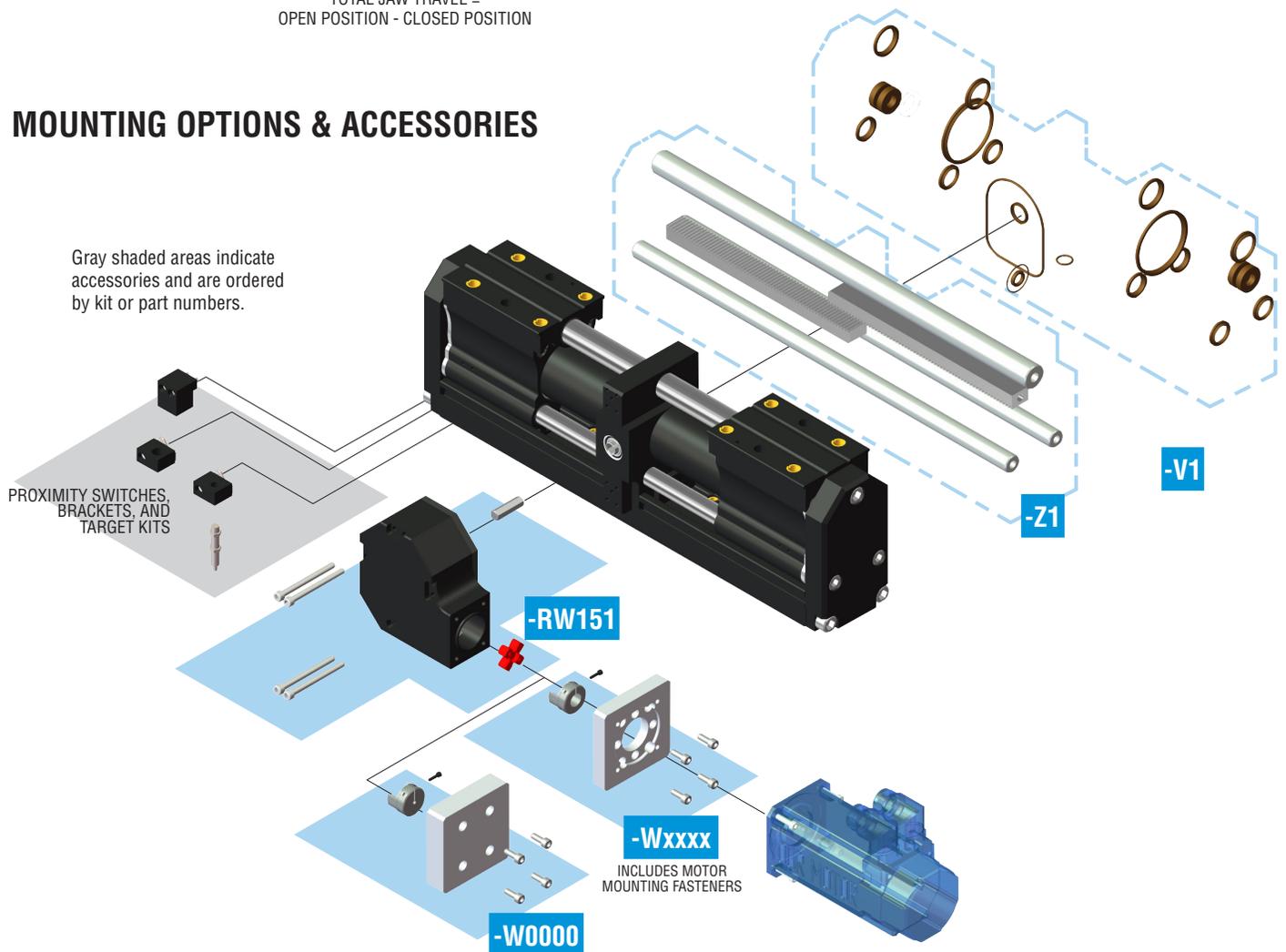
- Servo motor control provides acceleration, velocity, and position feedback.
- Compact design provides high grip force, large moment capacities, long jaw travel, and low overall weight for applications with limited space.
- Rugged construction withstands high impact and shock loads in demanding industrial environments.
- Three large diameter jaw guides spanning the length of the gripper provide stable jaw travel, long allowable tooling length, and high moment capacities.
- Robust rack and pinion jaw drive provides repeatable jaw positioning.
- **Your Motor, Your Way** allows motor and controls flexibility at no additional cost.



ORDERING DATA: Series EGRR Heavy Duty Gripper



MOUNTING OPTIONS & ACCESSORIES



ENGINEERING DATA: Series EGRR Heavy Duty Gripper

SPECIFICATIONS		SERIES EGRR	
INPUT TORQUE	Without Motor Speed Reducer	2.9 Nm min to 43.2 Nm max [26 in-lb min to 382 in-lb max]	
	With RW151 Motor Speed Reducer	0.3 Nm min to 3.8 Nm max [2.3 in-lb min to 34 in-lb max]	
INPUT RUNNING SPEED	Without Motor Speed Reducer	400 rpm max	
	With RW151 Motor Speed Reducer	6000 rpm max	
JAW GRIP SPEED*		50 mm/sec max [2 in/s max]	
OPERATING TEMPERATURE		-28° to +82° C [-20° to 180° F]	
RATED LIFE		5 million cycles minimum	
GRIP REPEATABILITY		Within 0.05 mm [.002 inch] of original centered position	
LUBRICATION		Factory lubricated for rated life	
MAINTENANCE		Field repairable (except reducer)	

* Jaw grip speed is speed which jaws contact gripped workpiece. Jaws may operate at faster speeds, but must decelerate to grip speed prior to grip.

MODEL NUMBER	TOTAL JAW TRAVEL TRAVEL TOLERANCE		GRIPPER WEIGHT						FULL TRAVERSE TIME FACTOR**	GRIP FORCE FACTOR GF*	
	+4.8 +2.1	+ 0.189 + 0.084	WITHOUT MOTOR SPEED REDUCER		WITH MOTOR SPEED REDUCER		WITH REDUCER & M1095 MOTOR			CF	METRIC
	mm	in	kg	lb	kg	lb	kg	lb			
EGRR12-x-63 x 150	150	5.906	12.8	28.2	14.9	32.8	18.3	40.2	1057	937	23.8
EGRR12-x-63 x 200	200	7.874	15.3	33.7	17.4	38.3	20.8	45.7	1410		
EGRR12-x-63 x 250	250	9.843	18.2	40.1	20.3	44.7	23.7	52.1	1762		
EGRR12-x-63 x 300	300	11.811	20.5	45.1	22.5	49.7	25.9	57.1	2115		
EGRR12-x-63 x 350	350	13.780	22.7	50.1	24.8	54.7	28.2	62.1	2467		

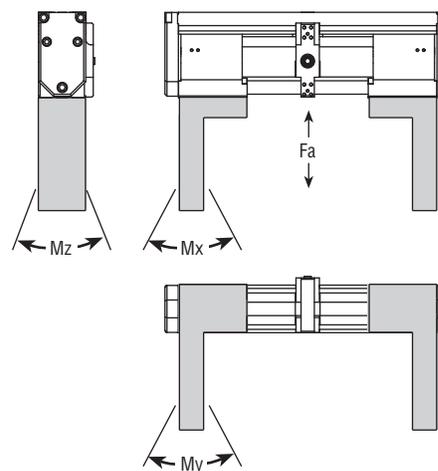
* Grip force varies with tooling length

**Time factors assume a total jaw acceleration and deceleration of 1G (0.5 G per jaw) to and from jaw running speed

MODEL NUMBER	JAW TRAVEL FACTOR JT				JAW TRAVEL DIRECTION TRAVEL DIRECTION WITH SPECIFIED INPUT SHAFT ROTATION			
	WITHOUT MOTOR SPEED REDUCER		WITH RW151 MOTOR SPEED REDUCER		WITHOUT MOTOR SPEED REDUCER		WITH RW151 MOTOR SPEED REDUCER	
	METRIC	IMPERIAL	METRIC	IMPERIAL	CW	CCW	CW	CCW
EGRR12-x-63 x 150	127.674	5.027	8.512	0.335	Open	Close	Close	Open
EGRR12-x-63 x 200								
EGRR12-x-63 x 250								
EGRR12-x-63 x 300								
EGRR12-x-63 x 350								

MAXIMUM ALLOWABLE FORCES AND MOMENTS

MODEL NUMBER	Fa		Mx		My		Mz	
	N	lb	Nm	in-lb	Nm	in-lb	Nm	in-lb
EGRR12-x-63 x 150	15570	3500	880	8000	715	6500	715	6500
EGRR12-x-63 x 200	15570	3500	990	9000	825	7500	825	7500
EGRR12-x-63 x 250	15570	3500	990	9000	825	7500	825	7500
EGRR12-x-63 x 300	15570	3500	990	9000	825	7500	825 <td 7500	
EGRR12-x-63 x 350	15570	3500	990	9000	825	7500	825	7500



Fa: Total for both jaws

Mx: Allowable moment per jaw, measured from jaw mounting surface

My: Allowable moment per jaw, measured from geometric center of jaw

Mz: Allowable moment per jaw, measured from jaw mounting surface

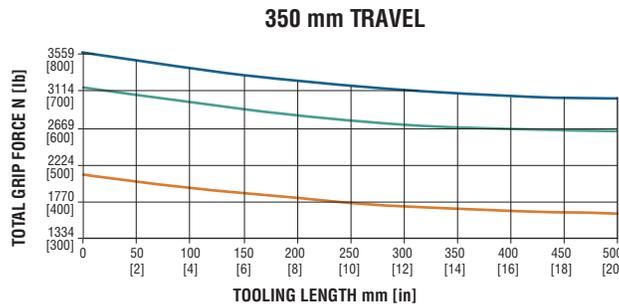
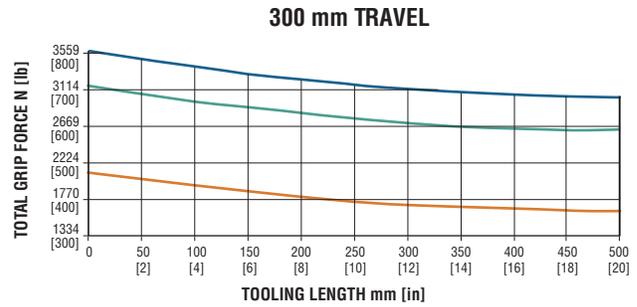
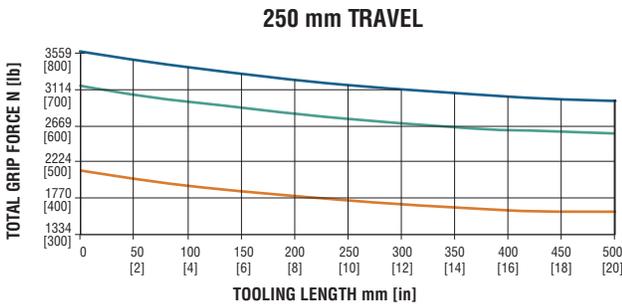
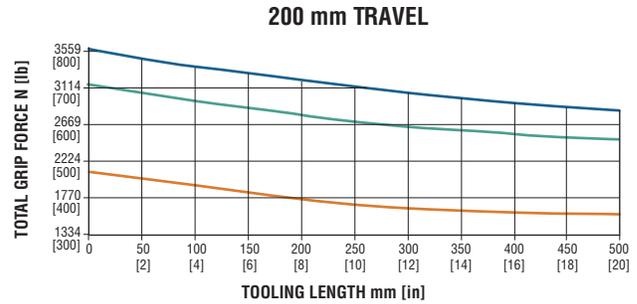
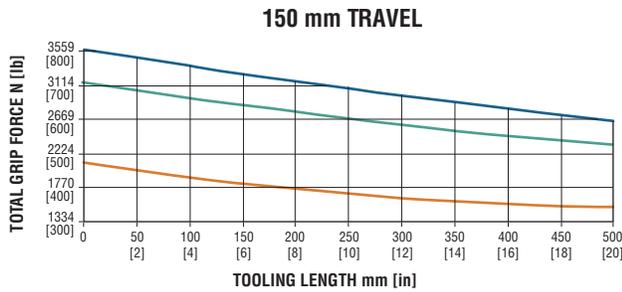
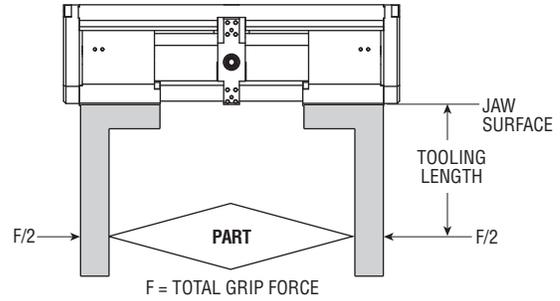
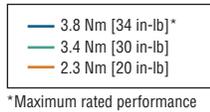
When calculating the value for Fa, include weight of tooling, part weight, acceleration, and external forces. When calculating values for Mx, My, and Mz, include the grip force per jaw, part weight, external forces, and acceleration as applicable.



MOMENT VALUES ASSUME THE USE OF ALL THREADED MOUNTING HOLES.

GRIP FORCE

Total gripping force relative to tooling length is shown below at the stated torque applied to the motor speed reducer input shaft. Grip force per jaw equals the total grip force divided by two. The graphs also indicate the maximum tooling length and maximum rated grip force for each gripper size.

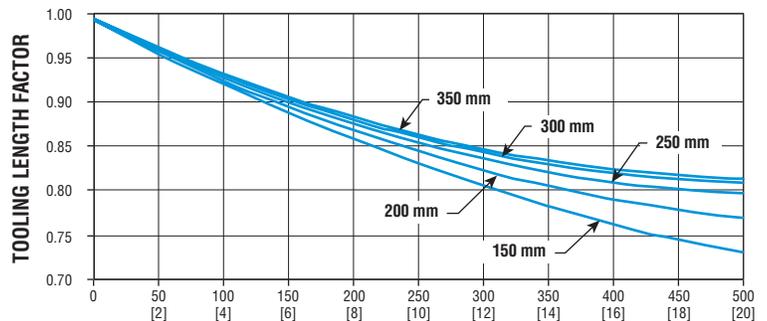


TOOLING LENGTH FACTOR

Jaw tooling should be designed so that the grip point is as close to the jaw surface as possible. As the grip point is moved away from the jaw surface, the applied moment causes jaw friction to increase, resulting in reduced effective grip force. The grip force factor (G_r) values given in the table are for zero tooling length (jaw surface).

The maximum load that grippers can handle will vary based on: size of the part being picked up, shape of the part, texture of the part, speed at which the part is transferred, shape of the fingers, etc. PHD recommends that the fingers of jaws be tooled or machined to conform to the shape of the part being gripped.

TOOLING LENGTH DERATING FACTOR



GRIP FORCE EQUATIONS:

METRIC: TOTAL GRIP FORCE (N) = (Torque [Nm] x G_F) x Tooling Length Factor

IMPERIAL: TOTAL GRIP FORCE (lb) = (Torque [in-lb] x G_F) x Tooling Length Factor

GRIP FORCE CALCULATION EXAMPLE:

Gripper: Series EGRR Size 63 x 200

Common Parameters:

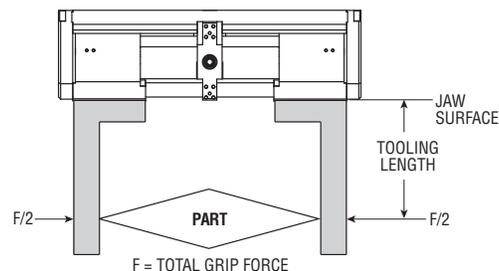
Input Torque = 3.4 Nm [30 in-lb]

Tooling Length = 254 mm [10 in]

1. Determine Grip Force Factor G_F = 937 [23.8] (from table on page 90)
2. Determine Tooling Length Factor = 0.84 [0.84] (from Tooling Length Factor graph on page 5)
3. Total Grip Force Calculations:

For Standard Unit: EGRR12-5-63 x 200 [EGRR12-1-63 x 200]

Total Grip Force = 3.4 Nm x 937 x 0.84 = 2676 N [30 in-lb x 23.8 x 0.84 = 600 lb]



FULL TRAVERSE TIME

Full traverse time is the shortest time possible for the jaws to completely traverse the total travel of the gripper. Use PHD Sizing Software to calculate the motion time for your specific motion profile. Full traverse time assumes that the jaws are accelerated at 1 G (0.5 G per jaw) up to the motor running speed, then travel at the motor running speed until decelerated at 1 G (0.5 G per jaw) to rest.

FULL TRAVERSE TIME EQUATION:

TIME (sec) = $[C_F \div \text{Running Speed (rpm)}] + [\text{Running Speed (rpm)} \div 69120]$

FULL TRAVERSE TIME CALCULATION EXAMPLE:

Gripper: Series EGRR Size 63 x 200

Common Parameters:

Motor Running Speed = 5500 rpm

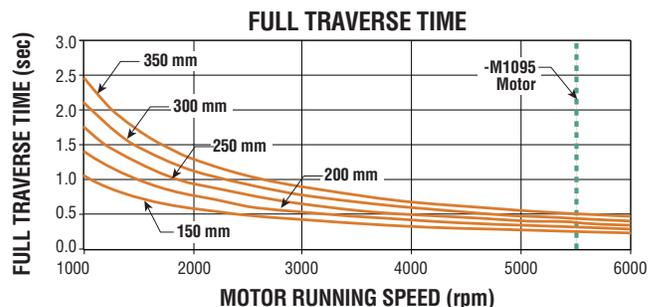
1. Determine Time Factors:

C_F = 1410 (from table on page 90)

2. Release Time Calculations:

For Standard Unit: EGRR12-5-63 x 200 [EGRR12-1-63 x 200]

Open or Close Time = $[1410 \div 5500 \text{ rpm}] + [5500 \text{ rpm} \div 69120] = 0.336 \text{ sec}$



JAW TRAVEL EQUATIONS:

The jaw travel equation relates the rotation of the gripper or motor speed reducer input shaft to the linear travel of the jaws.

METRIC: TOTAL JAW TRAVEL (mm) = Input Shaft Rotation (rev) x J_T

IMPERIAL: TOTAL JAW TRAVEL (in) = Input Shaft Rotation (rev) x J_T

JAW TRAVEL CALCULATION EXAMPLE:

Gripper: Series EGRR Size 63 x 200 -RW151 -W0000

Common Parameters:

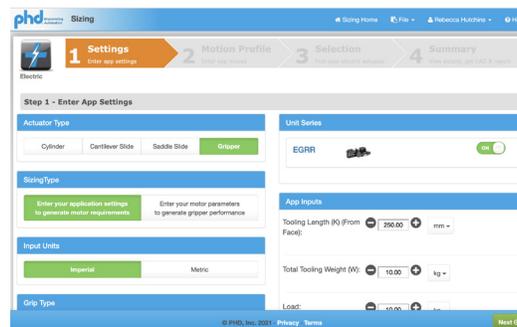
Motor Rotation = 2 rev

1. Determine Jaw Travel Factor J_T = 8.512 [0.335] (from table on page 90)

2. Jaw Travel Calculations:

For Standard Unit: EGRR12-5-63 x 200 -RW151 -W0000 [EGRR12-1-63 x 200 -RW151 -W0000]

Total Jaw Travel = 2 rev x 8.512 = 17.024 mm [2 rev x 0.335 = 0.670 in]

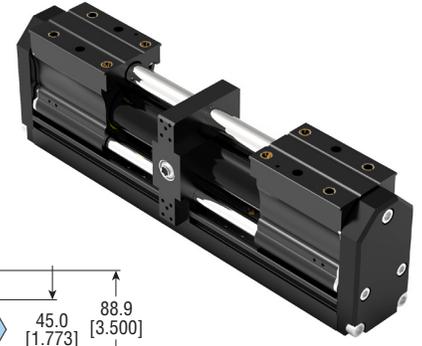
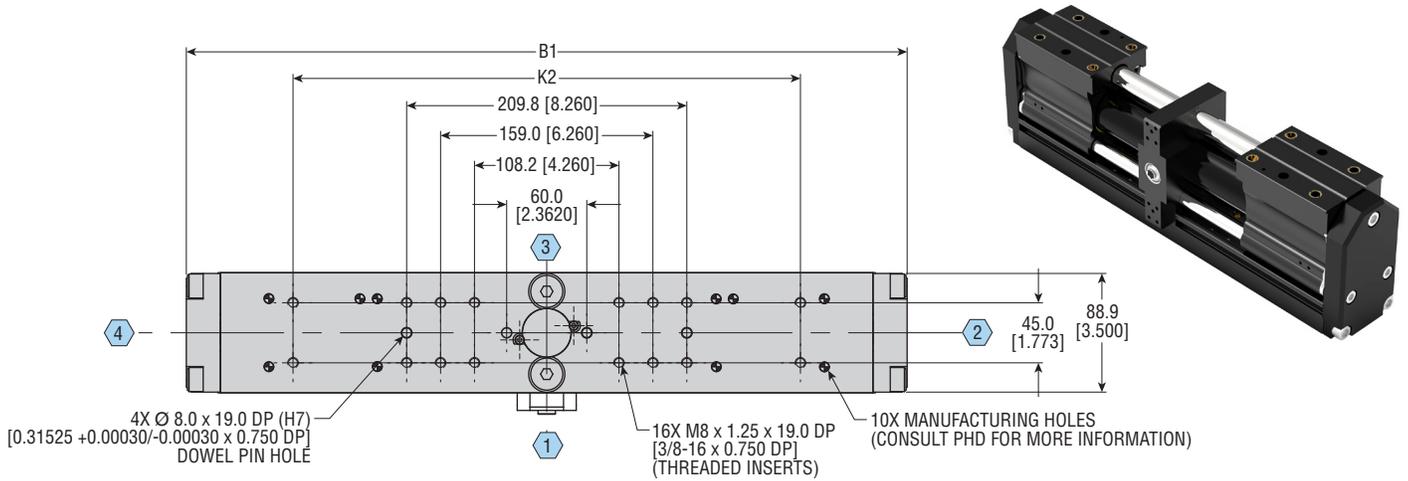


Series EGRR Sizing Software

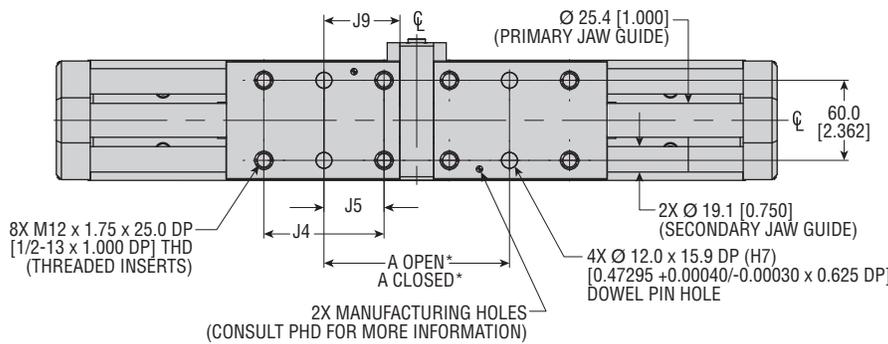
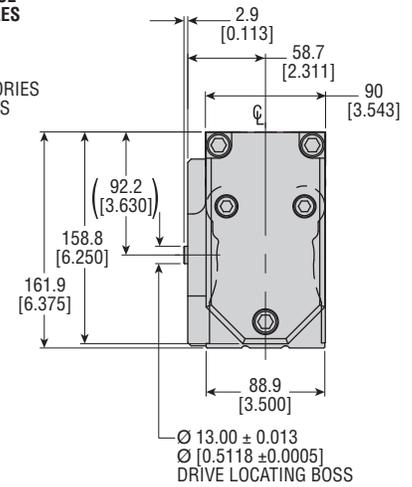
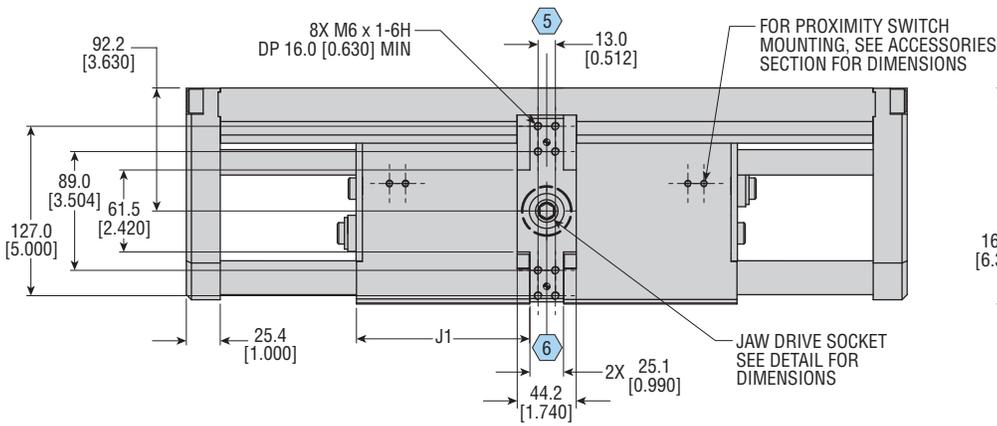
Engineering requirements, concept and detail design

size.phdinc.com

DIMENSIONS: Series EGRR Heavy Duty Gripper



! MOMENT CAPABILITY REQUIRES USE OF ALL THREADED MOUNTING HOLES



DRIVE SOCKET
10.03 MIN HEX x 19.0 DP [0.3949 MIN HEX x 0.750 DP]



DRIVE LOCATING BOSS USED TO LOCATE MATING DRIVE ELEMENTS TO GRIPPER
Ø 13.5 h8 [Ø 0.5310 ± 0.0005]

LETTER DIM	TOTAL JAW TRAVEL									
	150		200		250		300		350	
	mm	in	mm	in	mm	in	mm	in	mm	in
MIN. TRAVEL PER JAW	75.0	2.953	100.0	3.937	125.0	4.921	150.0	5.906	175.0	6.890
A CLOSED *	120.0	4.724	139.8	5.504	139.8	5.504	280.0	11.024	330.0	12.992
A OPEN *	270.0	10.630	339.8	13.379	389.8	15.347	580.0	22.835	680.0	26.772
B1	439.8	17.314	539.8	21.251	660.8	26.016	760.8	29.953	860.8	33.890
J1	105.1	4.136	130.0	5.120	165.6	6.518	190.6	7.504	215.6	8.487
J4	66.0	2.598	90.0	3.544	90.0	3.544	90.0	3.544	90.0	3.544
J5	33.0	1.299	45.0	1.772	45.0	1.772	45.0	1.772	45.0	1.772
J9	47.0	1.850	56.9	2.240	56.9	2.240	127.0	5.000	152.0	5.984
K2	320.0	12.598	380.0	14.960	380.0	14.960	590.0	23.228	590.0	23.228

NOTES:

- 1) DESIGNATED \varnothing IS CENTERLINE OF UNIT
- 2) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 3) IMPERIAL INFORMATION SHOWN IN [] OR SHOWN IN COLUMNS DESIGNATED IN
- 4) NUMBERS IN \square INDICATE POSITIONS
- 5) *A OPEN REFLECTS THE SMALLEST POSSIBLE OPEN DIMENSION
*A CLOSED REFLECTS THE LARGEST POSSIBLE CLOSED DIMENSION

All dimensions are reference only unless specifically toleranced.

Z1 CORROSION-RESISTANT

Corrosion-resistant coating on jaw guides and drive racks provides enhanced environmental protection.

V1 FLUORO-ELASTOMER SEALS

Fluoro-elastomer shock pads, seals, and wipers are available to achieve material compatibility with certain fluids. Material compatibility should be checked with the fluid manufacturer for proper application. This option includes Series GRR -V9 fluoro-elastomer seals and jaw guide wipers option.

RW151 MOTOR SPEED REDUCER

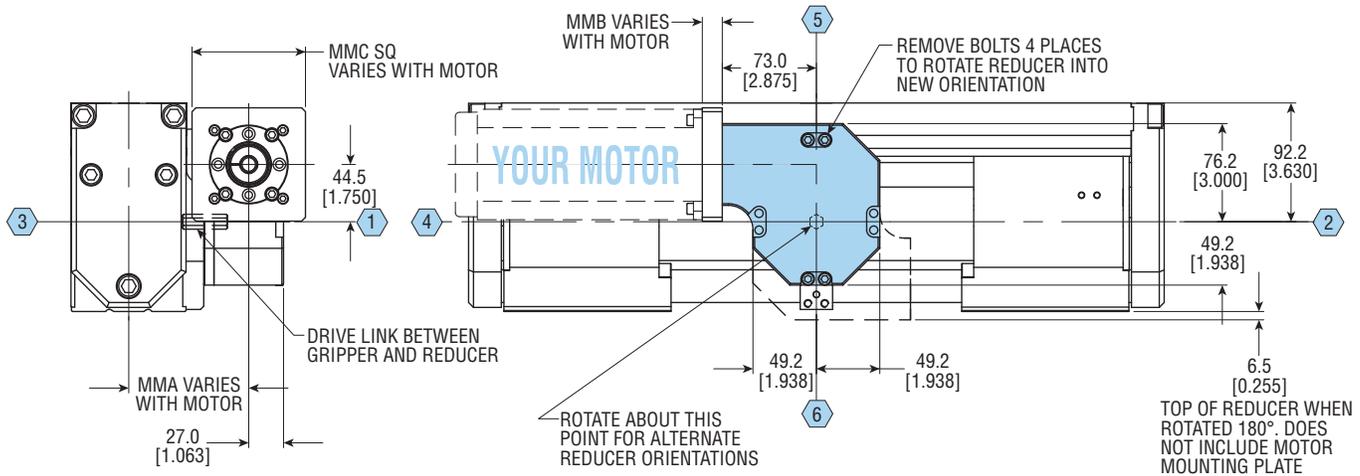
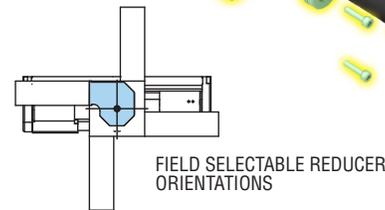
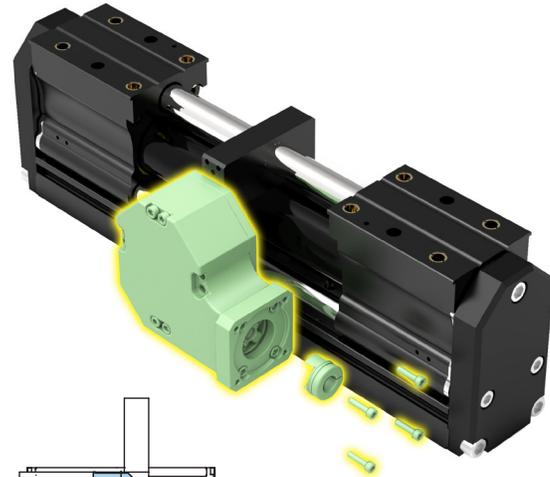
A 15:1 drive ratio motor speed reducer is installed onto the gripper. The reducer is factory lubricated for the rated life of the gripper. The motor speed reducer provides a convenient means of matching the output torque and shaft speed of many motors to the input requirements of the gripper.

The reducer must be ordered with a motor mounting code. See page 95 for details.

Motor mounting fasteners and motor coupling are supplied unassembled along with assembly instructions.

Use **-W0000** motor mount code to order a motor mount intended for customer modification. See page 95.

The reducer can be easily removed from the gripper for ease of motor installation and field rotated into one of four positions.



OPTION	MMA		MMB		MMC SQUARE							
	STANDARD	OVERSIZED	STANDARD	OVERSIZED	STANDARD	OVERSIZED						
	mm	in	mm	in	mm	in						
Wxxxx*	93.6	3.685	111.6	4.394	11.0 MIN	.433 MIN	11.0 MIN	.433 MIN	88.0	3.465	130	5.118
W0000	93.6	3.685	—	—	22.6	.890	—	—	88.0	3.465	—	—

NOTES:

- 1) ALL DIMENSIONS ARE SHOWN IN mm [in] AND ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 2) OPTION Wxxxx MUST BE ORDERED WITH OPTION RW151
- 3) REDUCER IS SUPPLIED PREASSEMBLED IN ORIENTATION SHOWN, CUSTOMER MAY ROTATE INTO PREFERRED ORIENTATION AFTER RECEIPT
- 4) WHEN (-W0000) IS SPECIFIED, COUPLER IS SUPPLIED WITH UNFINISHED SHAFT BORE AND MOTOR MOUNTING PLATE IS SUPPLIED WITH DIMENSIONS SHOWN WITHOUT MOTOR MOUNTING FASTENERS
- 5) * Wxxxx CONFIGURED ONLINE

All dimensions are reference only unless specifically toleranced.

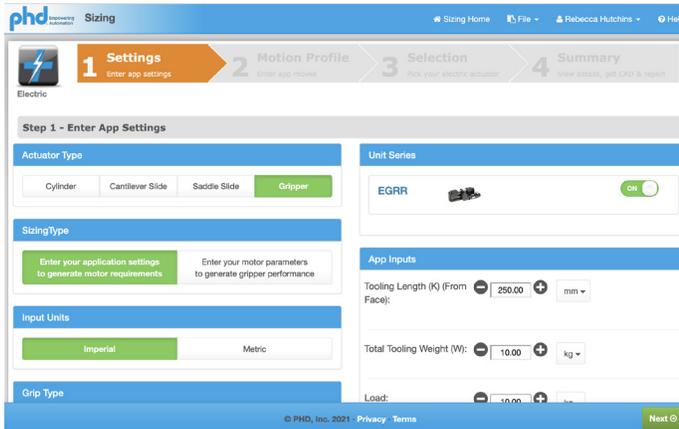
Wxxxx MOTOR MOUNT CODE

Your Motor, Your Way customizable motor mounting is generated by PHD's extensive motor database at www.config.phdinc.com. Users 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 mount code.

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

Your Motor Your Way

Select your compatible motor of choice from the pre-populated motor database!



Step 1 - Online Actuator Sizing - size.phdinc.com

- Input your application data.
- The sizing software will tell you which actuator and motor performance parameters are needed for your application.

Step 2 - Motor Selection

- Based on the performance requirements determined by online sizing, select an appropriate motor from your preferred motor manufacturer.

Step 3 - CAD Configurator - config.phdinc.com

- Select your motor from the drop down menus or request a new motor if the preferred motor is not on the list.
- The generated motor mount code for the compatible motor will complete the ordering data necessary to download 3D CAD model or order the actuator tailored to your specific application.

ACCESSORIES: Series EGRR Heavy Duty Gripper

DRIVE LINK

A single drive link couples the output of the motor speed reducer to the input socket of the gripper. The link is intended to mechanically fail reducing catastrophic damage to the gripper and motor speed reducer if maximum torque is exceeded.

DRIVE LINK KIT

PART NUMBER	DESCRIPTION
88157-0000	Used with Standard Motor Mounting Flange
88157-0018	Used with Oversize Motor Mounting Flange

Kit includes one drive link and installation instructions



PROXIMITY SWITCHES - EXTERNAL

This accessory provides for the external mounting of 8 or 12 mm threaded round metal sensing inductive proximity switches. Multiple switches may be mounted using multiple brackets. Proximity switches, targets, and mounting brackets are ordered separately. See the Switches and Sensors section of the main catalog for complete switch specifications.

NOTE: Target and bracket kits do not interchange with Series GRR Grippers Design 1 [5].



8 mm THREADED INDUCTIVE PROXIMITY SWITCHES

PART NUMBER	DESCRIPTION
51422-005-02	NPN (Sink), 2 meter cable
51422-006-02	PNP (Source), 2 meter cable



8 mm & 12 mm THREADED INDUCTIVE PROXIMITY SWITCH TARGET KIT

CORROSION-RESISTANT
74994-33

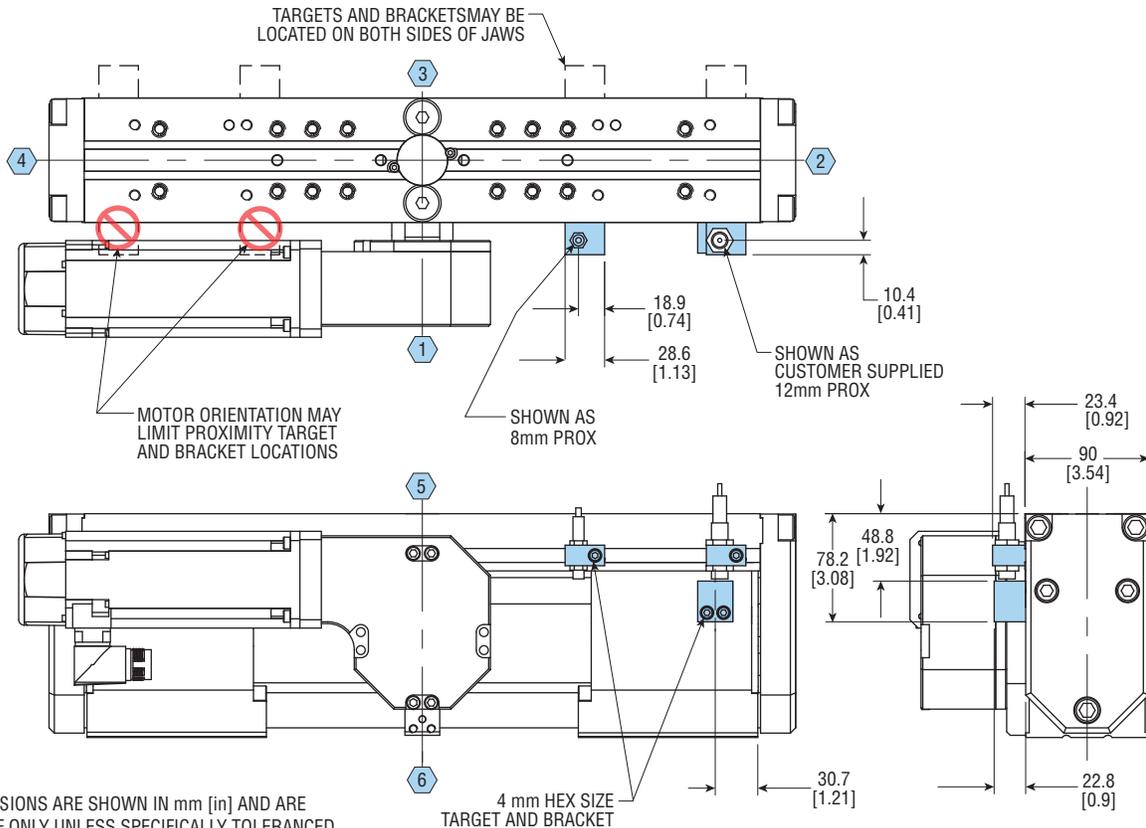
Kit includes 1 proximity switch target and 2 target mounting screws



THREADED INDUCTIVE PROXIMITY SWITCH MOUNTING BRACKET KITS

CORROSION-RESISTANT FOR 8 mm SWITCH	CORROSION-RESISTANT FOR 12 mm SWITCH
74992-33	74993-33

Kit includes 1 proximity switch mounting bracket, 1 mounting nut, and 1 mounting screw



NOTES:

- 1) ALL DIMENSIONS ARE SHOWN IN mm [in] AND ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 2) DESIGNATED ϕ IS CENTERLINE OF UNIT
- 3) NUMBERS IN \square INDICATE POSITIONS

All dimensions are reference only unless specifically toleranced.