Electric Linear Solutions

phd PLUS®

Electric Automation Solutions

Series ESG Electric Linear Slide

Series ESK/ESL Electric Linear Slide

Series ECP Electric IP69K Cylinder

USDA Certified Options Available

Series ECV Electric Cylinder

Series ESFX Electric Linear Actuator Slide

Your Motor, Your Way

ISO 9001 REGISTERED

Quality Management System Certified

PHDPLUS05

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Easy 3 Step Actuator and Motor Sizing

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

1 ONLINE SIZING:
Go to sizing.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 choose the brand of motor and controls.

3 MOTOR CONFIGURATION:
Go to application assistance after motor verification, a W-code is assigned for ordering.

PHD Plus Your Motor, Your Way, a simple 3-step process, allows users to employ PHD's proven technology operated by the motor and controls of their choice. This saves time and money by eliminating the need to learn or place into service a new motor and controls platform. If you prefer a complete package, PHD and your local distributor can provide motors and controls to fit your application needs.

See page 17 for details.

Series ECP Electric IP69K Cylinders

Series ECP Electric Cylinders are available in either ball screw or lead screw (polymer nut) versions, providing a wide range of high thrust or high speed capabilities. There are three models available.

Common Features

- Completely sealed to IP69K
- 3 sizes per model
- Travels up to 750 mm
- Inline or Foldback motor configurations
- *Your Motor, Your Way*

1 The Base Model

- Designed for applications in high pressure and high temperature washdown environments
- 300 grade stainless steel body and rod with aluminum head and motor mount
- *Your Motor, Your Way*

2 USDA Certified for Product Splash Zone (-Y8 Option)

- Designed for food processing industry splash zone and caustic washdown applications
- All external surfaces are 300 grade stainless steel
- USDA certified for splash zone environments in all orientations
- Limited *Your Motor, Your Way* with USDA certification*

3 USDA Certified for Product Contact Zone (-Y91 Option)

- Designed for food processing industry product contact zones requiring caustic washdown
- All external surfaces are 300 grade stainless steel
- USDA certified for product contact and over product
- Includes external rod wiper and sanitary tray for over product applications
- Limited *Your Motor, Your Way* with USDA certification*

**USDA Certification from PHD requires an -M Motor Code option with the -Y8 and -Y91 models. See page 17 for details.*

Series ECV Cylinder

The Series ECV Cylinder is an electromechanical rod style actuator with an ISO/VDMA mounting interface. The Series ECV is available in ball screw and lead screw (polymer nut) versions. The ball screw version is available in three sizes with a choice of high speed or high thrust variants, in travels up to 1000 mm. The lead screw version is available in five sizes with a choice of high speed or high thrust variants, in travels up to 750 mm. A large choice of cylinder mounting accessories is available to simplify machine design.

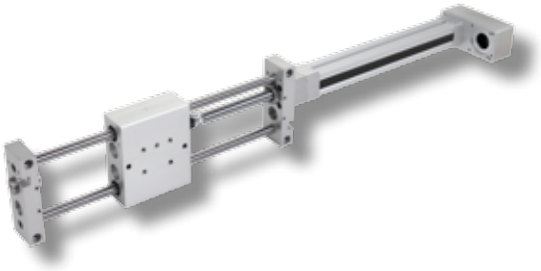
The Series ECVA provides a non-rotating rod design, whereas the lower cost Series ECVR has a rotating rod for applications where rod rotation is prevented by the attached load or tooling. These actuators feature *Your Motor, Your Way* - a configurable system that allows the customer to easily power the unit with the motor and controls of their choice. Motors are mountable in an inline or foldback configuration.

Series ESK/ESL Slide

The Series ESK/ESL Slide is an electromechanical cantilever style actuator featuring precision ground guide shafts and ball or TC bushings for smooth, accurate linear motion. The Series ESK/ESL is available in ball screw and lead screw versions. The ball screw version is available in three sizes, and the lead screw is available in five sizes, with choice of high speed and high thrust variants for each size.

These actuators also feature *Your Motor, Your Way* - a configurable system that allows the customer to easily power the unit with the motor and controls of their choice. Motors are mountable in an inline or foldback configuration.

Series ESG Slide



The Series ESG Slide is an electromechanical gantry style actuator with precision ground guide shafts and ball or TC bushings for smooth, accurate linear motion. The Series ESG is available in ball screw and lead screw versions. The ball screw version is available in three sizes, and the lead screw version is available in five sizes, with choice of high speed and high thrust variants for each size.

These actuators also feature *Your Motor, Your Way* - a configurable system that allows the customer to easily power the unit with the motor and controls of their choice. Motors are mountable in an inline or foldback configuration.

Series ESFX Slide

The Series ESFX Slide is an electromechanical base slide designed with a highly rigid aluminum frame. The frame provides superior support and strength that can be combined to create a Cartesian robot system. Heavy duty versions provide additional bearing support for high load and offset applications.

These actuators also feature *Your Motor, Your Way* - a configurable system that allows the customer to easily power the unit with the motor and controls of their choice.

ELECTRIC LINEAR SOLUTIONS

Electric Automation Solutions

The data shown is presented as a quick reference tool for determining which slide may fit your requirements. Refer to engineering data pages for more information. It is recommended to use the PHD online sizing app to easily and confidently determine which slide is best suited for your requirements.

SERIES	SCREW VERSION	SIZE	LEAD mm	TRAVEL MAX mm	MAX THRUST (SEE NOTE) lb	MAX THRUST (SEE NOTE) N	MAX SPEED (SEE NOTE) in/sec	MAX SPEED (SEE NOTE) mm/sec
ECP CYLINDERS **page 6** 	Lead - RL	32	3	500	180	800	2.4	60
			6		90	400	4.8	120
		40	4	500	360	1600	160	80
			8		180	800	80	160
		50	4	600	562	2500	160	80
			8		281	1250	6.3	160
	Ball - RB	32	5	750	306	1360	19.6	500
			10		153	680	39.3	1000
		40	10	750	546	2430	39.3	1000
			16		342	1520	63	1600
		50	10	750	991	4410	39.3	1000
			20		564	2510	78.7	2000
ECV CYLINDERS **page 26** 	Lead - RL	20	1.5	400	67.5	300	0.6	15
			4		33.7	150	3.15	80
		25	1.5	400	112	500	1.2	30
			3		56	250	2.4	60
		32	3	500	180	800	2.4	60
			6		90	400	4.8	120
		40	4	600	360	1600	3.15	80
			8		180	800	6.3	160
		50	4	750	562	2500	3.15	80
			8		281	1250	6.3	160
	Ball - RB	32	5	1000	306	1360	19.6	500
			10		153	680	39.3	1000
		40	10	1000	546	2430	39.3	1000
			16		342	1520	63	1600
SEE NEXT PAGE FOR ELECTRIC SLIDES		50	10	1000	991	4410	39.3	1000
			20		564	2510	78.7	2000

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

ELECTRIC LINEAR SOLUTIONS

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The data shown is presented as a quick reference tool for determining which slide may fit your requirements. Refer to engineering data pages for more information. It is recommended to use the PHD online sizing app to easily and confidently determine which slide is best suited for your requirements.

SERIES	SCREW VERSION	SIZE	LEAD mm	TRAVEL MAX mm	MAX THRUST (SEE NOTE) lb	MAX THRUST (SEE NOTE) N	MAX SPEED (SEE NOTE) in/sec	MAX SPEED (SEE NOTE) mm/sec	MAX MOMENT PITCH in-lb	MAX MOMENT PITCH Nm	MAX MOMENT YAW in-lb	MAX MOMENT YAW Nm	MAX MOMENT ROLL in-lb	MAX MOMENT ROLL Nm	MAX PAYLOAD (SEE NOTE) lb	MAX PAYLOAD (SEE NOTE) kg
ESK / ESL SLIDES page 46	Lead - RL	2	1.5	300	67.5	300	0.6	150	42	4.7	42	4.7	42	4.7	43	19.3
			4		33.7	150	3.15	80								
		3	1.5	400	112	500	1.2	30	69	7.8	69	7.8	69	7.8	63	28.5
			3		56	250	2.4	60								
		4	3	500	180	800	2.4	60	118	13	118	13	118	13	90	40.8
			6		90	400	4.8	120								
		5	4	600	360	1600	3.15	80	153	17	153	17	153	17	225	102
			8		180	800	6.3	160								
		6	4	700	562	2500	3.15	80	225	25	225	25	225	25	357	162.2
			8		281	1250	6.3	160								
	Ball - RB	4	5	500	306	1360	19.6	500	118	13	118	13	118	13	90	40.8
			10		153	680	39.3	1000								
		5	10	600	546	2430	39.3	1000	153	17	153	17	153	17	225	102
			16		342	1520	63	1600								
		6	10	700	991	4410	39.3	1000	225	25	225	25	225	25	357	162.2
			20		564	2510	78.7	2000								
ESG SLIDES page 64	Lead - RL	2	1.5	400	67.5	300	0.6	15	84	9.5	84	9.5	84	9.5	56	25
			4		33.7	150	3.15	80								
		3	1.5	400	112	500	1.2	30	115	13	115	13	115	13	72	33
			3		56	250	2.4	60								
		4	3	500	180	800	2.4	60	355	40	355	40	355	40	186	84
			6		90	400	4.8	120								
		5	4	600	360	1600	3.15	80	713	81	713	81	713	81	340	154
			8		180	800	6.3	160								
		6	4	750	360	1600	3.15	80	1301	147	1301	147	1301	147	565	256
			8		180	800	6.3	160								
	Ball - RB	4	5	1000	306	1360	19.6	500	355	40	355	40	355	40	186	84
			10		153	680	39.3	1000								
		5	10	1000	546	2430	39.3	1000	713	81	713	81	713	81	340	154
			16		342	1520	63	1600								
		6	10	1000	546	2430	39.3	1000	1301	147	1301	147	1301	147	565	256
			16		342	1520	63	1600								
ESFX SLIDES page 78	Ball - RB	10	5	1050	216	961	11.8	300	1159	131	1159	131	1017	115	132	60
			10		267	1188	23.6	600								
			20		221	980	47.2	1200								
			30		361	1603	70.8	1800								
		H10	5	1050	216	961	11.8	300	3080	348	3080	348	1416	160	220	100
			10		267	1188	23.6	600								
			20		221	980	47.2	1200								
			30		361	1603	70.8	1800								
		14	5	1050	216	961	11.8	300	2062	233	2062	233	1805	204	220	100
			10		267	1188	23.6	600								
			20		221	980	47.2	1200								
			30		361	1603	70.8	1800								
		H14	5	1050	216	961	11.8	300	4885	552	4876	551	4292	485	264	120
			10		267	1188	23.6	600								
			20		221	980	47.2	1200								
			30		361	1603	70.8	1800								
		17	10	1250	567	2519	23.6	600	9151	1034	9133	1032	4876	908	330	150
			20		439	1953	47.2	1200								
			40		852	3787	110.2	2800								

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

SEE PREVIOUS PAGE FOR ELECTRIC CYLINDERS

SERIES ECP ELECTRIC IP69K CYLINDERS

Electric Automation Solutions

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

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

Ball Screw Version

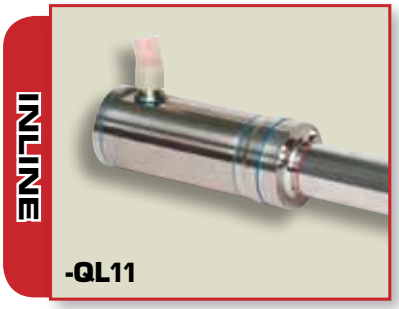
Lead Screw Version

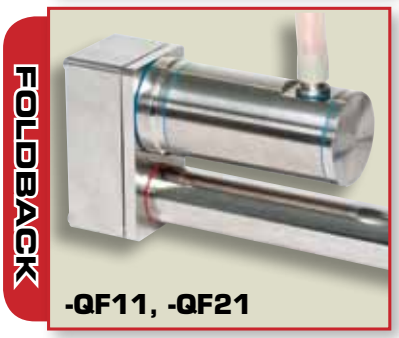
Major Benefits

- 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
- 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
- Complete solutions with motor installed by PHD using Kollmorgen motor

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

Example Ordering Data:

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

Electromechanical

Cylinder

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

Metric Design

Size

mm	in
32	1.26
40	1.58
50	1.97

Travel (Max.)

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

50 mm minimum stroke in 50 mm increments

Screw Configuration

	Size	Type XXxxx	Lead xxXXX mm
Ball Screw	32	RB005	5
	32	RB010	10
	40	RB010	10
	40	RB016	16
	50	RB010	10
	50	RB020	20
Lead Screw	32	RL003	3
	32	RL006	6
	40	RL004	4
	40	RL008	8
	50	RL004	4
	50	RL008	8

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 Configuration
QF11 - Foldback with 1:1 ratio
QF21 - Foldback with 2:1 ratio
QL11 - Inline with 1:1 ratio

Motor Mount Code
Wxxxx - Open Architecture p/n code

Mxxxx

Motor Code
Mxxxx - Cross reference to motor p/n. PHD provides motor installed as complete solution. See page 17.
Blank - No motor

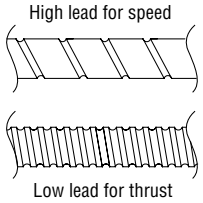
ROD ROTATION

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

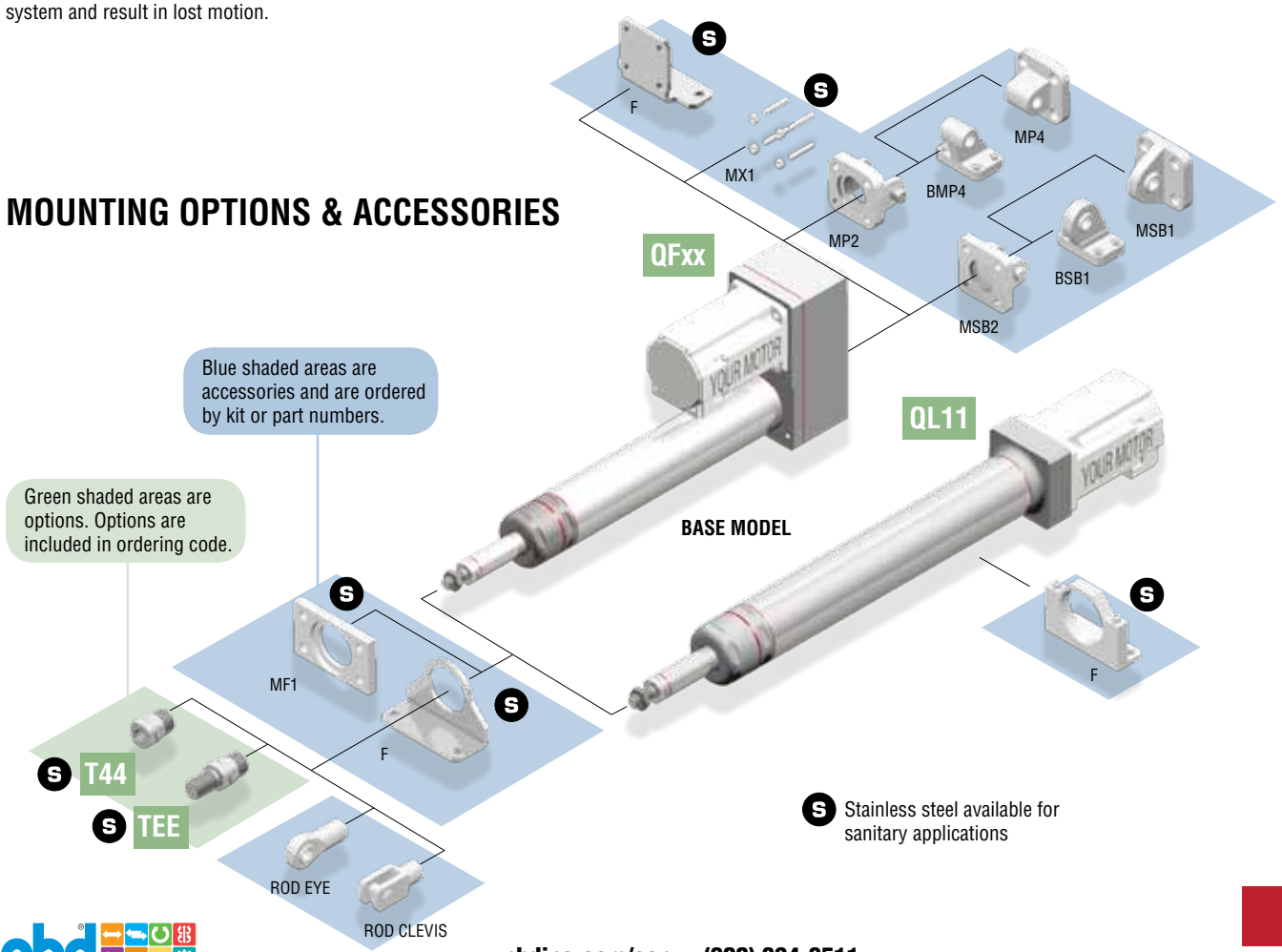
Series ECPR requires external guidance to provide non-rotation to the system. This must be rigidly coupled to the rod to ensure axial motion. Any rotation will directly affect the performance of the system and result in lost motion.

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.



MOUNTING OPTIONS & ACCESSORIES



BALL SCREW - RB

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 10)	
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 mm		40 mm		50 mm	
MECHANICS	MAXIMUM TRAVEL	mm [in]	750 [29.53]					
	DRIVE MECHANISM		Ball Screw					
	SCREW DIAMETER	mm	12		16		20	
	SCREW CONFIGURATION		-RB005	-RB010	-RB010	-RB016	-RB010	-RB020
	SCREW LEAD	mm	5	10	10	16	10	20
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	m/sec² [in/sec²]	19.6 [772]					
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]	Nm [in-lb]	1.20 [10.62]		4.30 [38.06]		7.80 [69.03]	
	NO-LOAD TORQUE	Nm [in-lb]	0.25 [2.20]		0.51 [4.50]		0.90 [8.00]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})		Refer to DIMENSIONS pages					
	TOTAL LENGTH ADDER (W_{LT})							
	MOVING @ ZERO STROKE (W_{OM}) BASE & -Y8	kg [lb]	0.33 [0.73]		0.54 [1.19]		1.01 [2.23]	
	MOVING @ ZERO STROKE (W_{OM}) -Y91	kg [lb]	0.36 [0.81]		0.59 [1.31]		1.08 [2.38]	
	MOVING LENGTH ADDER (W_{LM})	kg/mm [lb/in]	0.0007 [0.037]		0.0010 [0.058]		0.0018 [0.102]	
INERTIA	ACTUATOR @ ZERO STROKE (J_O)	kg-m² [lb-in²]	3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		4.84×10^{-5} [0.165]	
	LENGTH ADDER (J_L)	kg-m²/mm [lb-in²/in]	9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		7.95×10^{-8} [0.0069]	
	MOVING WEIGHT ADDER (J_M)	kg-m²/kg	6.21×10^{-7}	2.48×10^{-6}	2.48×10^{-6}	6.36×10^{-6}	2.48×10^{-6}	9.93×10^{-6}
		[lb-in²/lb]	[9.63×10^{-4}]	[3.85×10^{-3}]	[3.85×10^{-3}]	[9.86×10^{-3}]	[3.85×10^{-3}]	[1.54×10^{-2}]
	MOTOR CONFIGURATION (J_Q) -QF11	kg-m² [lb-in²]	1.40×10^{-5} [0.048]		4.71×10^{-5} [0.161]		4.65×10^{-5} [0.159]	
	MOTOR CONFIGURATION (J_Q) -QF21	kg-m² [lb-in²]	2.75×10^{-5} [0.094]		8.28×10^{-5} [0.283]		1.91×10^{-4} [0.654]	
	MOTOR CONFIGURATION (J_Q) -QL11	kg-m² [lb-in²]	3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		4.04×10^{-5} [0.138]	

NOTES:
1) UNIDIRECTIONAL
2) AXIAL FREE PLAY WHEN DRIVE SHAFT LOCKED
3) REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
4) REFER TO PERFORMANCE CHARTS ON PAGE 10
5) 2500 km [100 MILLION INCHES] LIFE
6) CORRESPONDS TO MAXIMUM THRUST
7) FOR HOMING AND INCREASED APPLICATION FLEXIBILITY, INCLUDE EXTRA TRAVEL WHEN NECESSARY
8) SERIES ECPR REPEATABILITY AND BACKLASH A FUNCTION OF COUPLING RIGIDITY TO EXTERNAL NON-ROTATING LOAD
9) 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 to 15]*
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_Q

FOR -QF21: INERTIA $_{Reflected}$ = [J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_Q

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 mm		40 mm		50 mm	
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]	Nm [in-lb]	1.20 [10.62]		4.30 [38.06]		7.80 [69.03]	
	NO-LOAD TORQUE	Nm [in-lb]	0.25 [2.10]		0.51 [4.50]		0.90 [8.00]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})		Refer to DIMENSIONS pages					
	TOTAL LENGTH ADDER (W_{LT})							
	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-mm^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} [1.18 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_Q)	-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 11
5) CORRESPONDS TO MAXIMUM THRUST

WEIGHT AND INERTIAL CALCULATIONS:

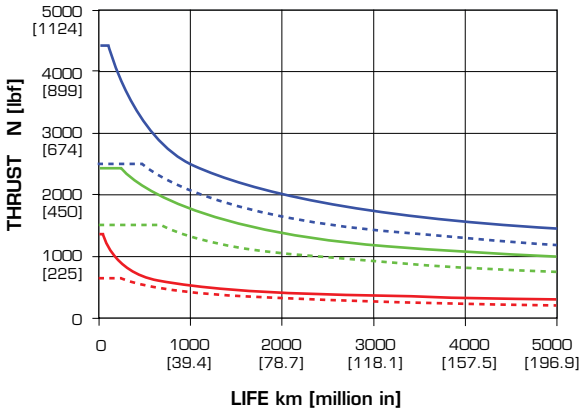
TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT *[reference pages 12 to 15]*
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

FOR -Qx11: INERTIA $_{Reflected}$ = J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT) + J_Q

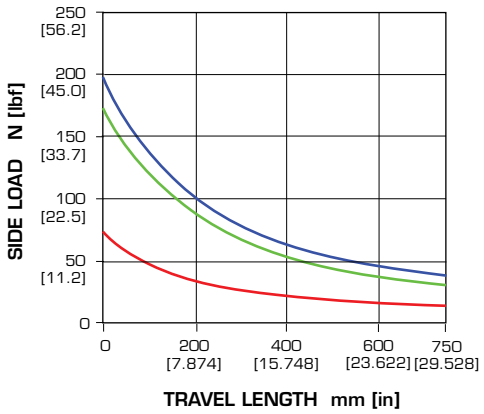
FOR -QF21: INERTIA $_{Reflected}$ = [J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_Q

BALL SCREW - RB

THRUST/LIFE

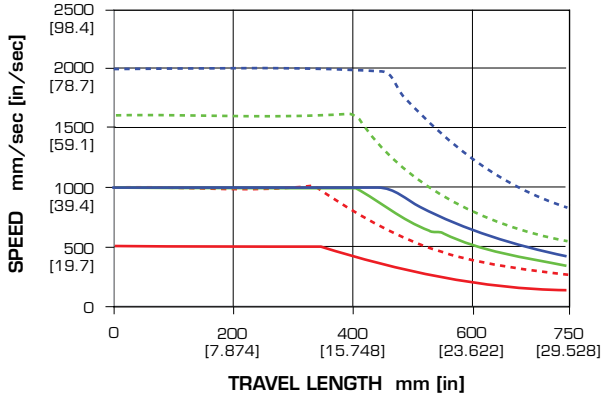


SIDE LOAD/TRAVEL

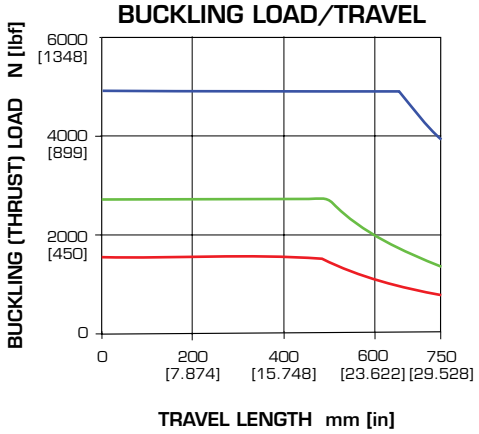


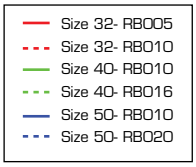
NOTE: THE MAXIMUM SPEED NOT TO EXCEED 200 mm/sec [7.87 in/sec]

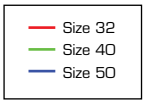
SPEED/TRAVEL



BUCKLING LOAD/TRAVEL



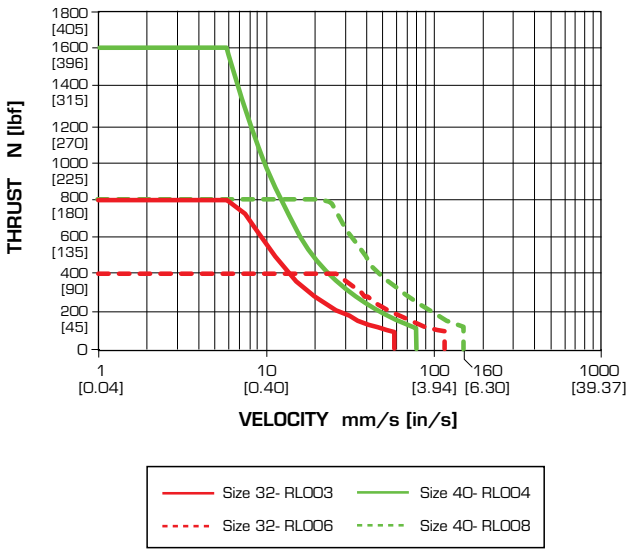




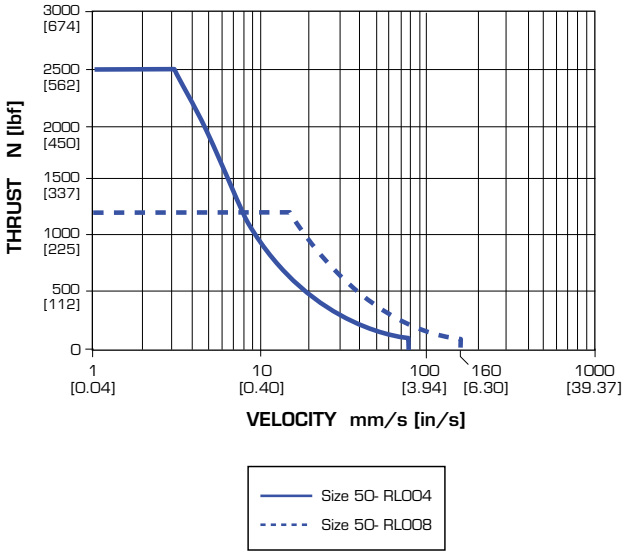
This section contains information on the capabilities of the Series ECP Ball Screw version. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer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

LEAD SCREW - RL

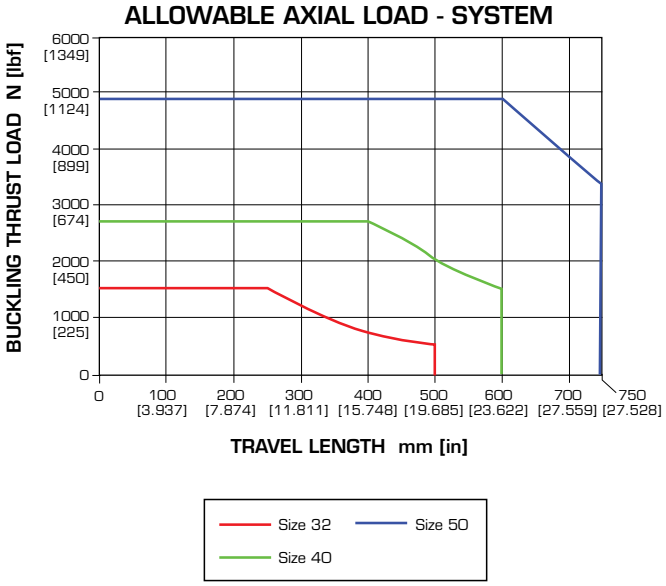
THRUST/VELOCITY - SIZES 32 & 40



THRUST/VELOCITY - SIZE 50



ALLOWABLE AXIAL LOAD - SYSTEM

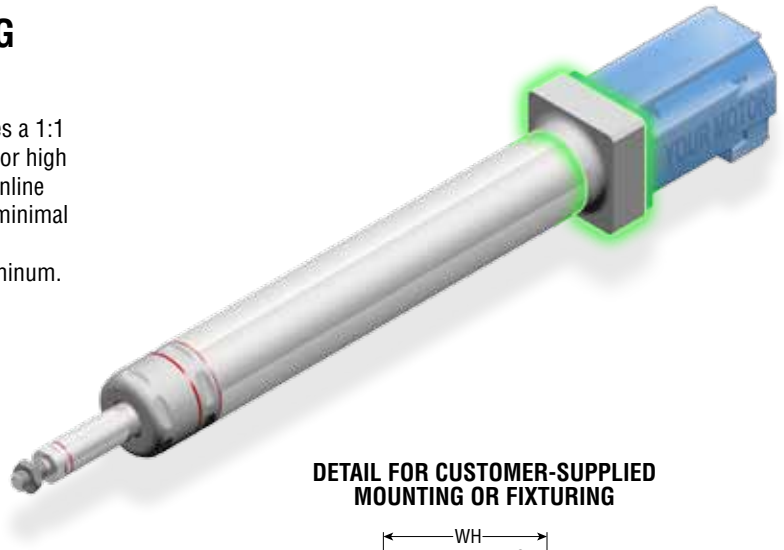


This section contains information on the capabilities of the Series ECP Lead Screw version. It is not intended to be a comprehensive selection guide. To simplify the selection process, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer Service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

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

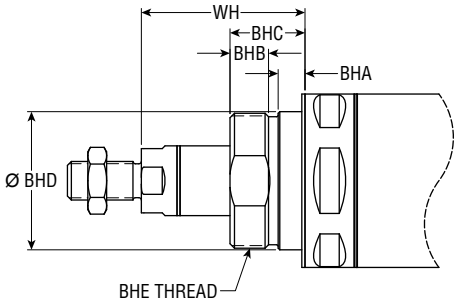
Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time.

Base unit head and motor mounts are anodized aluminum. Refer to pages 14 and 15 for USDA certified models.

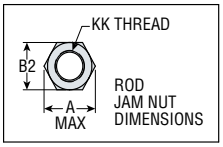


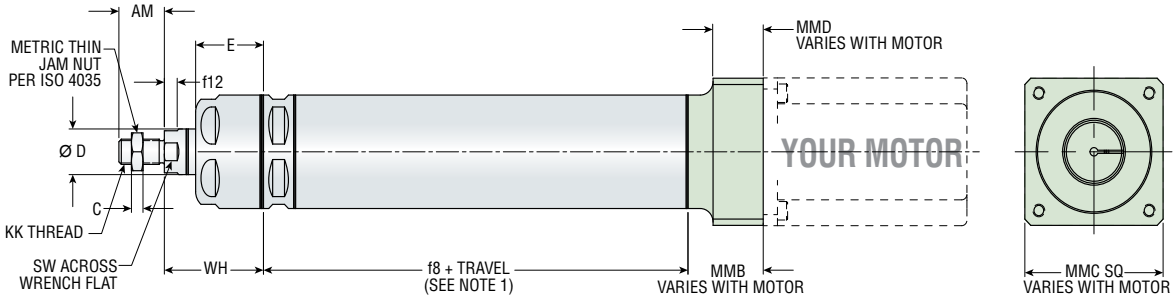
Removal of head on both inline and foldback units allow for customer-supplied mounting or fixturing. An extra seal is included for sealing of unit to mounting or fixturing. Refer to detail.

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 1.5	48.5
40	7.5	12.0	22.5	43.0	M42 x 1.5	50.1
50	8.5	12.0	23.5	53.0	M52 x 1.5	54.7





SIZE	A MAX	AM	B2	C MAX	ØD	E	f8	f12	KK	MMB MIN	MMC		MMD MIN	SW	WH	WEIGHT[4]			
																@ ZERO TRAVEL (kg)		TRAVEL ADDER (kg/mm)	
											STD.	OVERSIZE				-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	26.0	60.0	70.0	13.3	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	26.0	70.0	88.0	13.3	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	26.0	88.0	110.0	13.3	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

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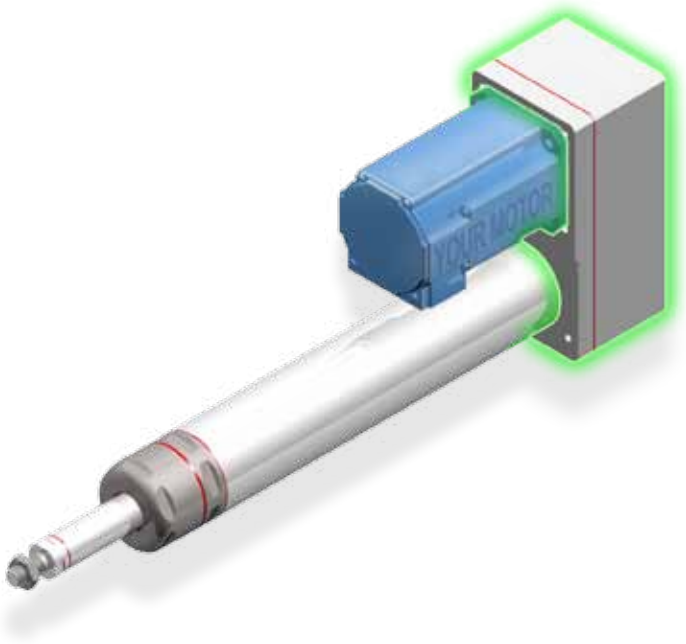
All dimensions are reference only unless specifically toleranced.

QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

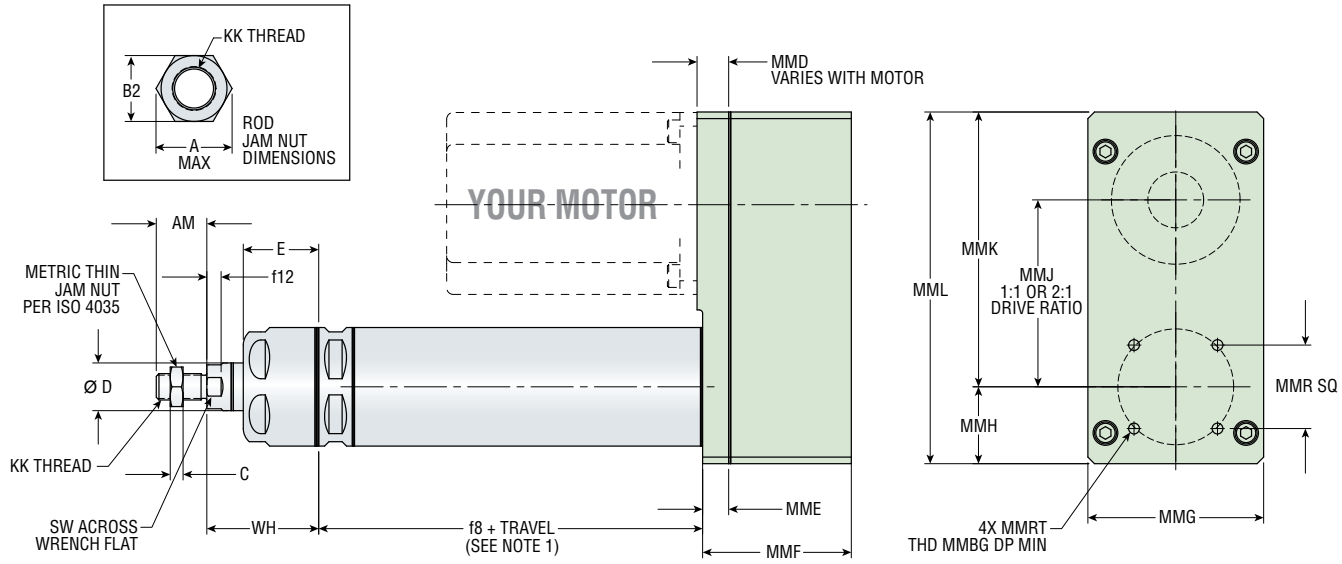
QF21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO

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. Refer to pages 14 and 15 for USDA certified models.



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 12.



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

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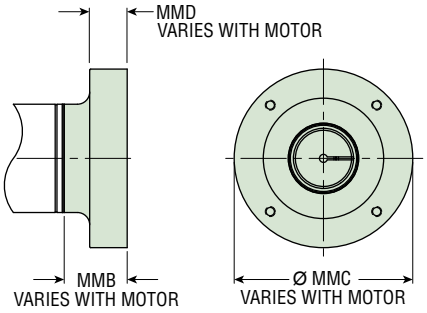
All dimensions are reference only unless specifically toleranced.

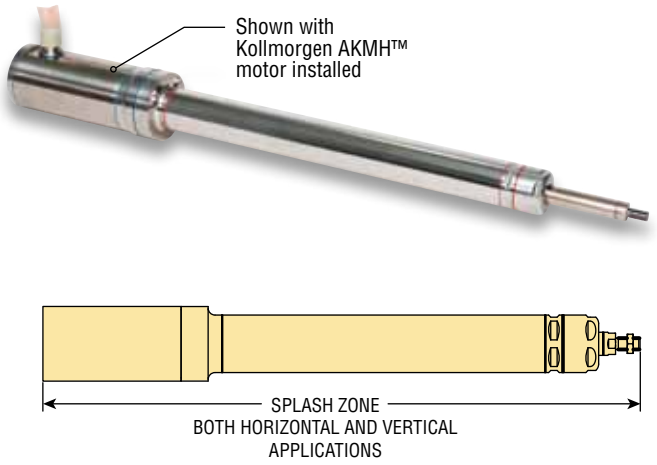
Y8 USDA Certified for Product Splash Zone

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.

For USDA certification from the manufacturer, the -Mxxxx Motor Code option is required. See page 17 for more details.

INLINE



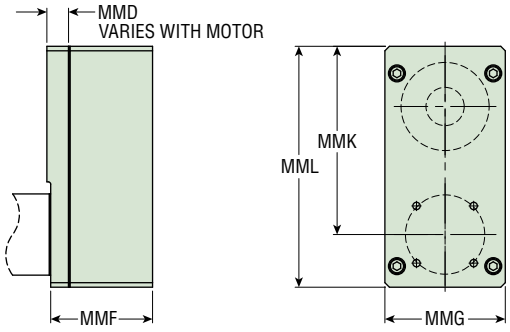


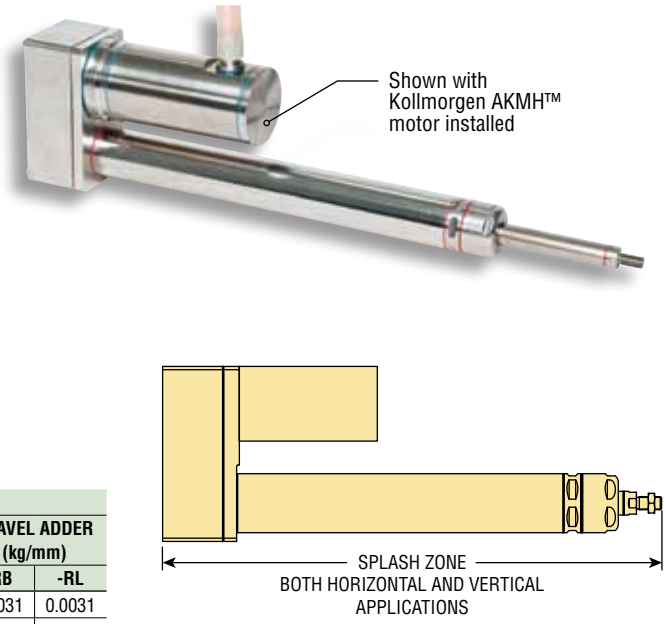
DIMENSIONS NOT SHOWN ARE SAME AS INLINE BASE UNIT

SIZE	MMB MIN	MMC MIN	MMD MIN	WEIGHT @ ZERO TRAVEL (kg)		WEIGHT TRAVEL ADDER (kg/mm)	
				-RB	-RL	-RB	-RL
32	26.0	79.0	13.3	2.2	2.13	0.0031	0.0031
40	26.0	89.0	13.3	2.77	2.67	0.0041	0.0041
50	26.0	113.0	13.3	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 @ ZERO TRAVEL (kg)		WEIGHT TRAVEL ADDER (kg/mm)	
	MIN	MAX					-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

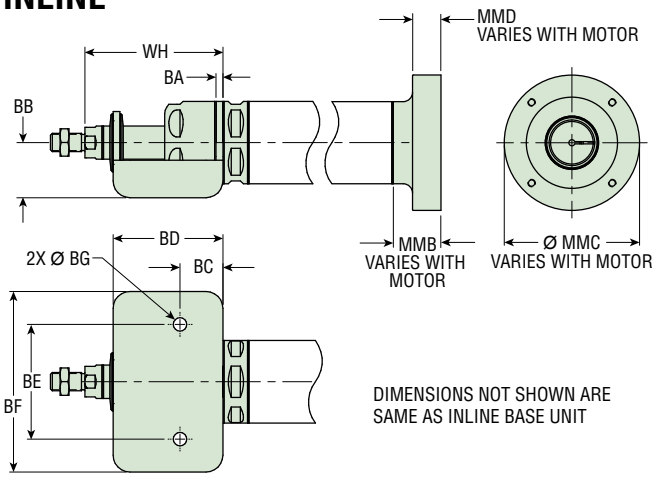
All dimensions are reference only unless specifically toleranced.

Y91 USDA Certified for Product Contact Zone

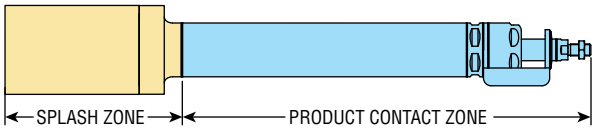
This option provides the Series ECP Cylinders with a 300 grade stainless steel head and motor mount suitable for food and dairy industry splash and product contact zone applications requiring clean-in-place (CIP) caustic washdown. See diagrams for zones clarification.

For USDA certification from the manufacturer, the -Mxxxx Motor Code option is required. See page 17 for more details.

INLINE



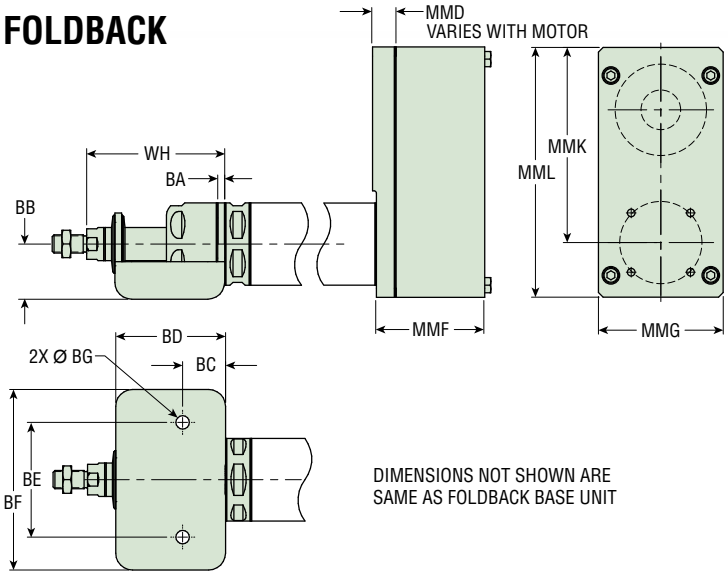
DIMENSIONS NOT SHOWN ARE SAME AS INLINE BASE UNIT



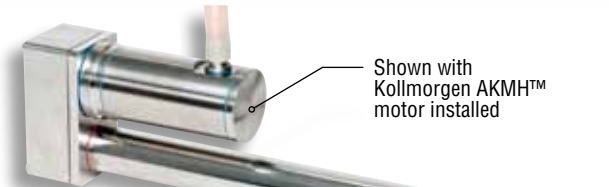
SIZE	BA	BB	BC	BD	BE	BF	Ø BG	MMB MIN	MMC MIN	MMD MIN	WH²	WEIGHT @ ZERO TRAVEL (kg)		WEIGHT TRAVEL ADDER (kg/mm)	
												-RB	-RL	-RB	-RL
32	4.7	32.0	24.0	71.8	65.5	10.45	6.8	26.0	79.0	13.3	88.5	2.72	2.65	0.0031	0.0031
40	4.7	36.0	28.0	71.8	75.0	118.0	8.8	26.0	89.0	13.3	90.1	3.38	3.28	0.0041	0.0041
50	6.4	45.0	32.0	73.8	87.5	132.5	8.8	26.0	113.0	13.3	94.7	5.20	5.00	0.0062	0.0062

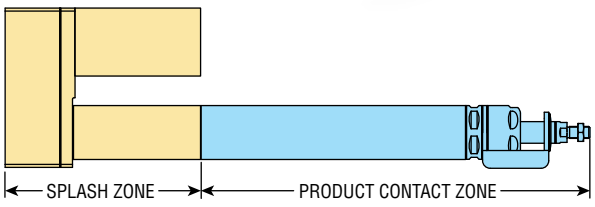
NOTES:
1) DIMENSIONS: mm
2) WHEN Y91 OPTION IS SELECTED, ADDITIONAL LENGTH IS ADDED TO ROD
3) FOR VARIABLE DIMENSIONS REFER TO ONLINE CAD CONFIGURATOR

FOLDBACK



DIMENSIONS NOT SHOWN ARE SAME AS FOLDBACK BASE UNIT





SIZE	BA	BB	BC	BD	BE	BF	Ø BG	MMD		MMF	MMG	MMK	MML	WH²	WEIGHT @ ZERO TRAVEL (kg)		WEIGHT TRAVEL ADDER (kg/mm)	
								MIN	MAX						-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

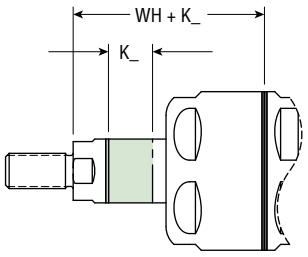
NOTES:
1) DIMENSIONS: mm
2) WHEN Y91 OPTION IS SELECTED, ADDITIONAL LENGTH IS ADDED TO ROD
3) FOR VARIABLE DIMENSIONS REFER TO ONLINE CAD CONFIGURATOR

All dimensions are reference only unless specifically toleranced.

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.

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

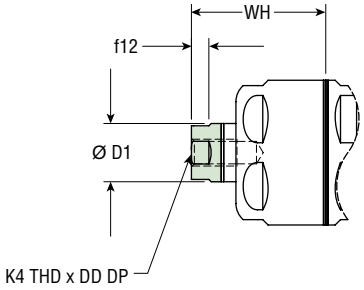


SIZE	WH	
	BASE & -Y8	-Y91
32	48.5	88.5
40	50.1	90.1
50	54.7	94.7

NOTE: DIMENSIONS: mm

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.

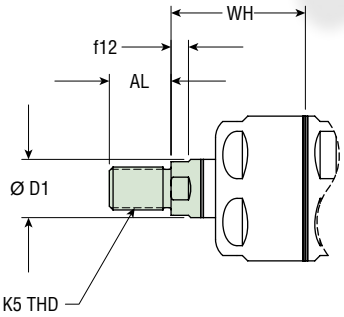


SIZE	D1	DD MIN	f12	K4	WH	
					BASE & -Y8	-Y91
32	18.5	14.0	6.0	M8 x 1.25	48.5	88.5
40	21.7	17.0	6.5	M10 x 1.5	50.1	90.1
50	28.1	19.0	8.0	M12 x 1.75	54.7	94.7

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, users may enter necessary motor features to generate the PHD motor code.

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

phdplus.phdinc.com

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 Mount Selection

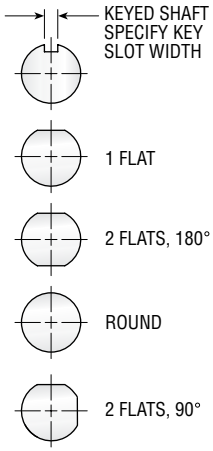
- Based on the performance requirements determined by online sizing, select an appropriate motor from your preferred motor manufacturer.
- Return to the online sizing software with identified motor parameters to verify motor to application compatibility

Step 3 - *Your Motor, Your Way* Configurator config.phdinc.com

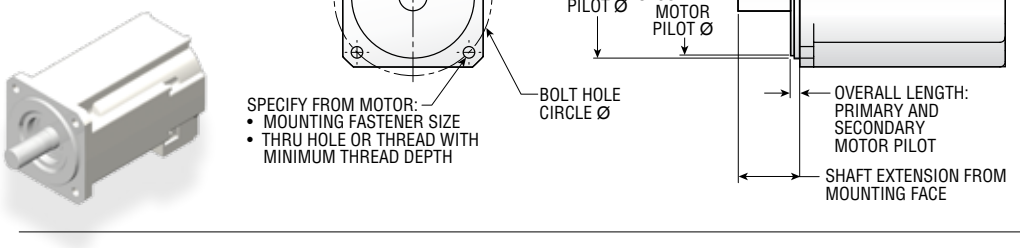
- Select your motor from the drop down menus or enter the necessary motor geometry
- The generated motor code for the compatible motor will complete the ordering data necessary to order the actuator tailored to your specific application
- 3D CAD models are also available

MOTOR GEOMETRY

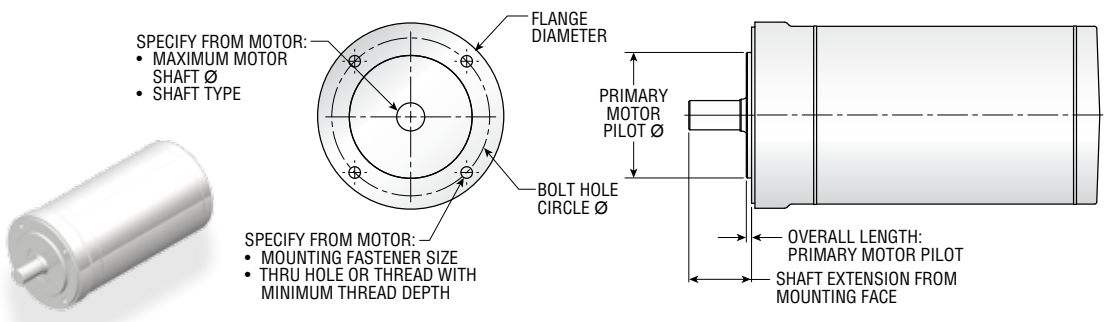
SHAFT TYPE:



Square Frame Motor



Round Frame Motor



All dimensions are reference only unless specifically toleranced.

Mxxxx MOTOR CODE

The -Mxxxx Motor Code option is available with -Y8 and -Y91 options and provides a motor installed by PHD. This option is required for the Series ECP cylinders to be factory USDA certified. PHD provides Kollmorgen motors and drives, and will provide a suitable AKMH™ motor for your application. The AKMH™ family of motors is designed for sanitary applications that require high temperature, high pressure clean-in-place (CIP) washdown, allowing the entire actuator and motor to be used in food processing and packaging environments.

Kollmorgen AKMH™
Stainless Steel Washdown Motor

KOLLMORGEN®

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, choose an appropriate motor.

Step 3 - *Your Motor, Your Way* Configurator config.phdinc.com

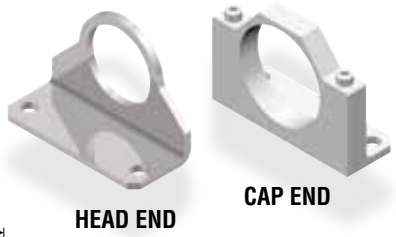
- Return to the online configurator, and from the pull-down menu, select the motor mounting code.
- The correct -Wxxxx Motor Mount Code will be added to your unit description.
- If you would like PHD to provide the appropriate Kollmorgen motor, choose the specific motor from the pull-down menu.
- The correct -Mxxxx Motor Code will be added to your unit description.

Now you have completed the unit selection and you can ask for CAD models and a quote.

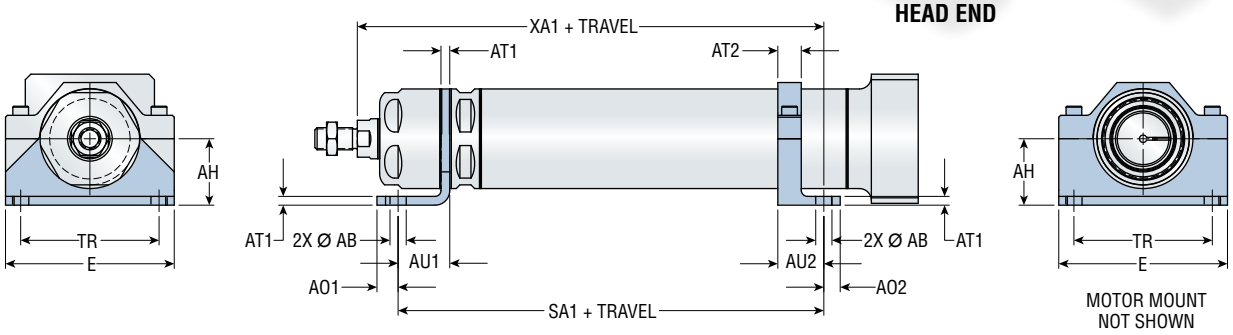
BASE MOUNTING KIT

F

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



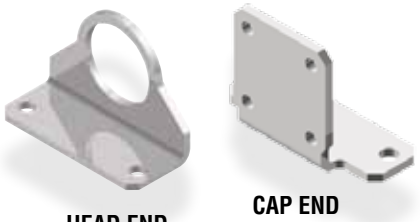
INLINE

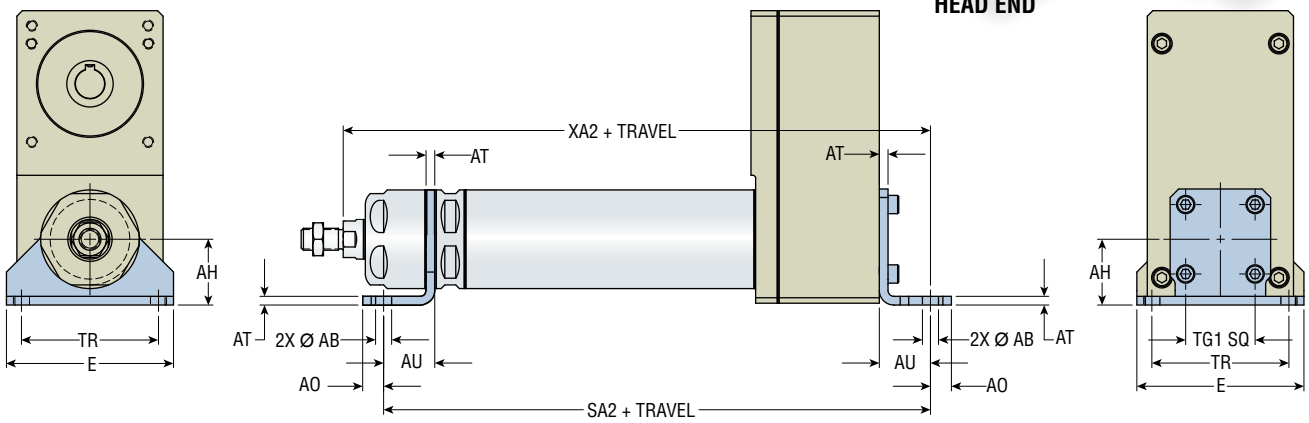


SIZE	AB	AH	AO1	AO2	AT1	AT2	AU1	AU2	E	SA1 MAX	TR	XA1 MAX	KIT NO. HEAD END[4]	SANITARY KIT NO. HEAD END[3]	KIT NO. CAP END[4]	SANITARY KIT NO. CAP END
32	6.8	32.0	8.4	6.8	4.7	12.7	24.0	22.9	79.6	212.6	65.5	237.1	86216-01-02	86216-01-02	86474-01-01	86474-01-02
40	8.8	36.0	11.5	8.9	4.7	12.7	28.0	24.9	91.4	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

FOLDBACK





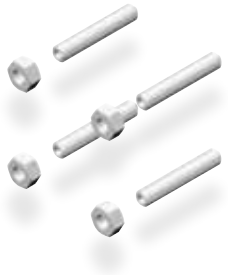
SIZE	AB	AH	AO	AT	AU	E	SA2	TG1	TR	XA2	KIT NO. HEAD END[4]	SANITARY KIT NO. HEAD END[3]	KIT NO. CAP END[4]	SANITARY KIT NO. CAP END
32	6.8	32.0	8.4	4.7	24.0	79.6	265.4	32.5	65.5	289.9	86216-01-02	86216-01-02	86474-01-04	86474-01-04
40	8.8	36.0	11.5	4.7	28.0	91.4	299.3	38.0	75.0	321.4	86216-02-02	86216-02-02	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

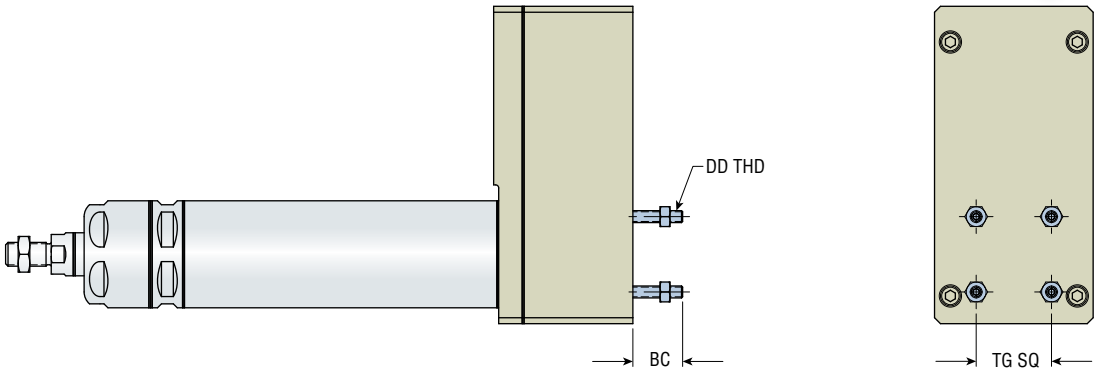
NOTES:
1) DIMENSIONS: mm
2) HEAD END BASE MOUNTING KIT NOT COMPATIBLE WITH -Y91 OPTION
3) SANITARY KIT INCLUDES ONLY STAINLESS STEEL COMPONENTS
4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically toleranced.

FASTENER MOUNTING KIT (PER ISO 6431)

MX1



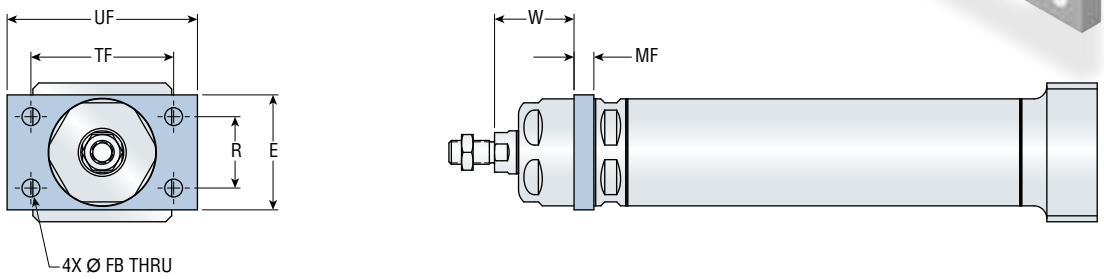


SIZE	BC	DD	TG	KIT NO.[3]	SANITARY KIT NO.[2]
32	25.0	M6 x 1	32.5	86217-01-01	86217-01-02
40	25.0	M6 x 1	38.0	86217-01-01	86217-01-02
50	31.4	M8 x 1.25	46.5	86217-02-01	86217-02-02

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

FLANGE MOUNTING KIT (PER VDMA 24562)

MF1



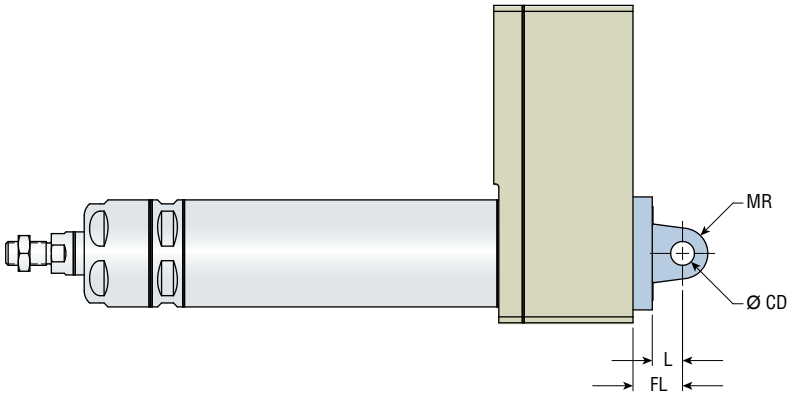
SIZE	E MAX	FB H13	MF	R JS14	TF JS14	UF MAX	W	KIT NO.[5]	SANITARY KIT NO.[4]
32	50.8	7.0	10.0	32.0	64.0	86.8	38.5	86215-01-01	86215-01-02
40	58.8	9.0	10.0	36.0	72.0	96.8	40.1	86215-02-01	86215-02-02
50	70.8	9.0	10.0	45.0	90.0	115.8	44.7	86215-03-01	86215-03-02

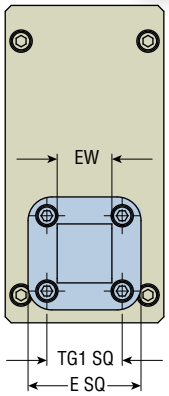
NOTES:
1) DIMENSIONS: mm
2) KIT INCLUDES FLANGE ONLY
3) FLANGE MOUNTING KIT NOT COMPATIBLE WITH -Y91 OPTION
4) SANITARY KIT INCLUDES ONLY STAINLESS STEEL COMPONENTS
5) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically toleranced.

REAR MALE HINGE MOUNTING KIT (PER VDMA 24562)

MP4 (PIVOT MOUNT ONLY)



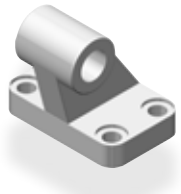


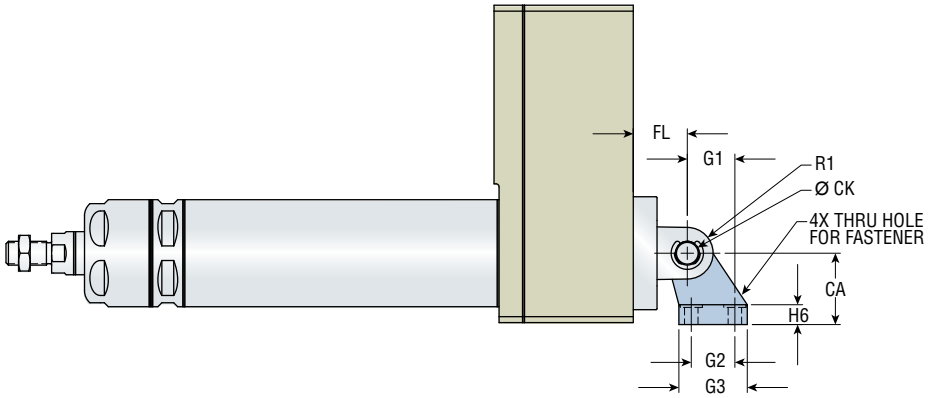
SIZE	CD H9	E MAX	EW MAX	FL (± 0.2)	L MIN	MR MAX	TG1	KIT NO.
32	10.0	53.0	25.8	22.0	12.0	11.0	32.5	86219-01-01
40	12.0	61.5	27.8	25.0	15.0	13.0	38.0	86219-02-01
50	12.0	73.0	31.8	27.0	15.0	13.0	46.5	86219-03-01

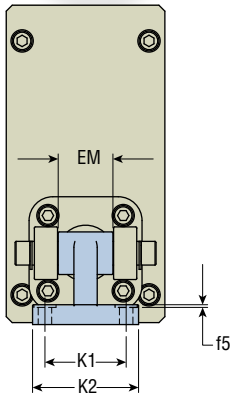
NOTES:
1) DIMENSIONS: mm
2) KIT INCLUDES MOUNTING HARDWARE
3) MP4 REAR MALE HINGE MOUNTING IS COMPATIBLE WITH MP2 REAR FORK AND MP2 PIVOT PIN
4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

PILLOW BLOCK MOUNTING KIT (PER CETOP 107 P)

BMP4







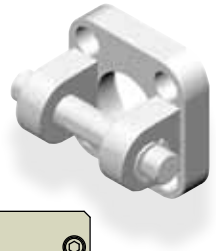
SIZE	CA JS15	CK H9	EM MAX	f5 MAX	FL	G1 JS14	G2	G3 MAX	H6	K1 JS14	K2 MAX	R1 MAX	FASTENER	KIT NO.
32	32.0	10.0	25.8	1.9	22.0	21.0	18.0	31.0	8.0	38.0	51.0	10.0	M6	62818-001-00
40	36.0	12.0	27.8	1.9	25.0	24.0	22.0	35.0	10.0	41.0	54.0	11.0	M6	62818-002-00
50	45.0	12.0	31.8	1.9	27.0	33.0	30.0	45.0	12.0	50.0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

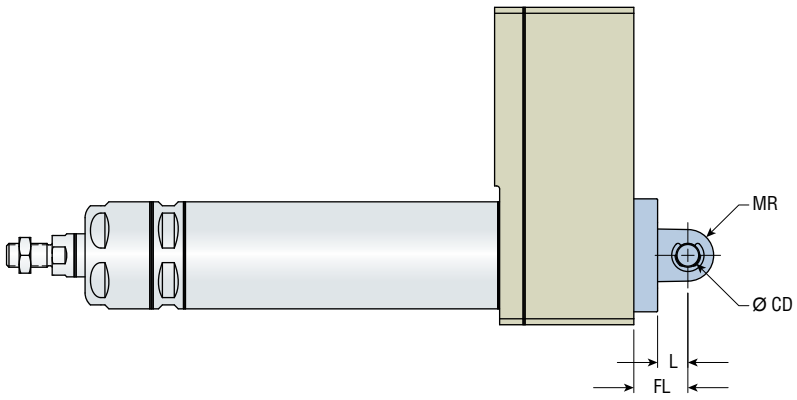
NOTES:
1) DIMENSIONS: mm
2) KIT INCLUDES MOUNTING HARDWARE
3) BMP4 PILLOW BLOCK IS COMPATIBLE WITH MP2 REAR FORK
4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

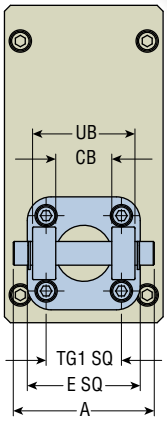
All dimensions are reference only unless specifically toleranced.

REAR FORK MOUNTING KIT (PER VDMA 24562)

MP2





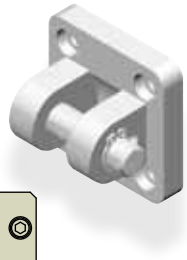


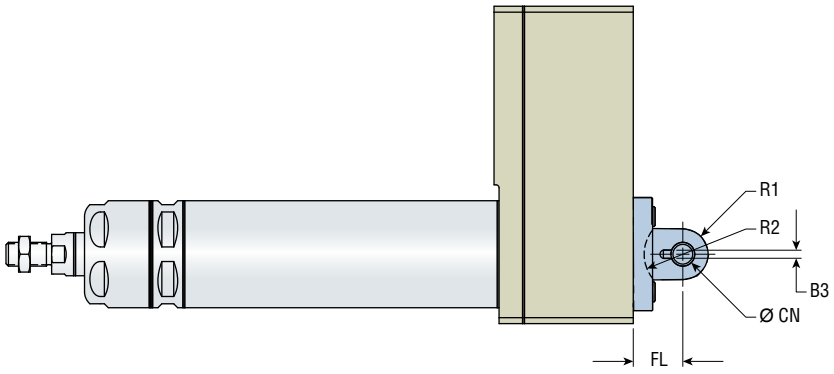
SIZE	A MAX	CB H14	CD H9	E MAX	FL (± 0.2)	L MIN	MR MAX	TG1	UB h14	KIT NO.
32	67.0	26.0	10.0	53.0	22.0	12.0	11.0	32.5	45.0	86218-01-01
40	74.3	28.0	12.0	61.5	25.0	15.0	13.0	38.0	52.0	86218-02-01
50	82.3	32.0	12.0	73.0	27.0	15.0	13.0	46.5	60.0	86218-03-01

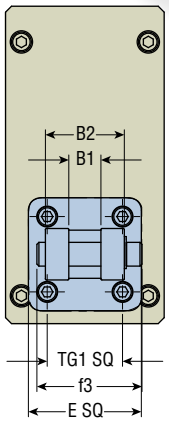
NOTES:
1) DIMENSIONS: mm
2) KIT INCLUDES MOUNTING HARDWARE, PIVOT PIN AND PIVOT PIN RETAINER CLIPS
3) MP2 REAR FORK MOUNTING IS COMPATIBLE WITH MP4 REAR MALE HINGE AND BMP4 PILLOW BLOCK
4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

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

MSB2







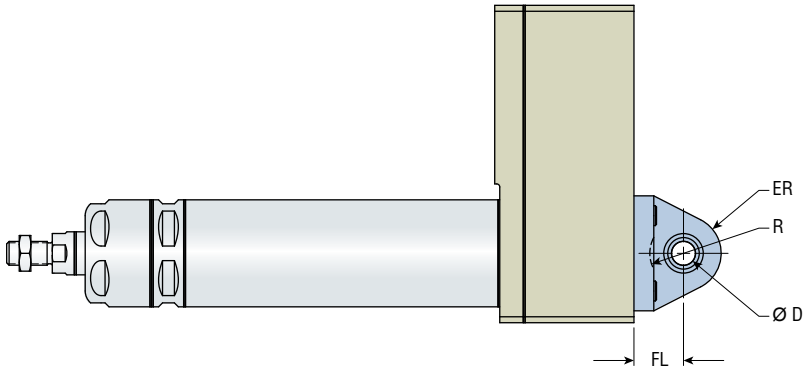
SIZE	B1 H14	B2 d12	B3 (± 0.2)	CN F7	E MAX	f3	FL (± 0.2)	R1 MAX	R2 MIN	TG1	KIT NO.
32	14.0	34.0	3.3	10.0	53.0	46.0	22.0	11.0	16.0	32.5	86476-01-01
40	16.0	40.0	4.3	12.0	61.5	53.0	25.0	13.0	19.0	38.0	86476-02-01
50	21.0	45.0	4.3	16.0	73.0	58.0	27.0	13.0	21.0	46.5	86476-03-01

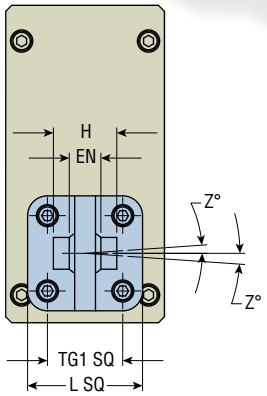
NOTES:
1) DIMENSIONS: mm
2) KIT INCLUDES MOUNTING HARDWARE AND PIVOT PIN
3) MSB2 REAR FORK MOUNTING IS COMPATIBLE WITH BSB1 PILLOW BLOCK, MSB1 REAR MALE HINGE AND ROD EYE
4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically toleranced.

REAR MALE HINGE MOUNTING FOR SPHERICAL BEARING KIT

MSB1



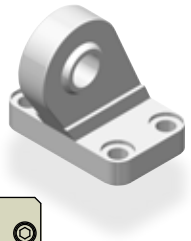


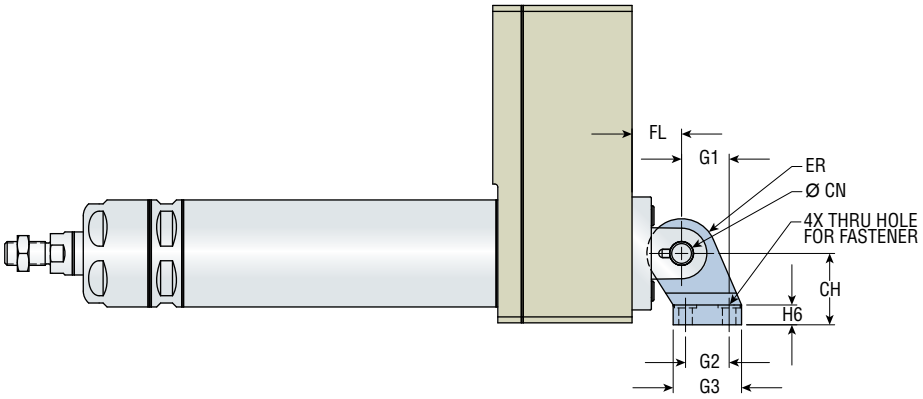
SIZE	D H7	EN (+0.0/-0.1)	ER MAX	FL (± 0.2)	H	L MAX	R	TG1	Z	KIT NO.
32	10.0	14.0	16.0	22.0	-	53.0	-	32.5	4°	86477-01-01
40	12.0	16.0	17.5	25.0	-	61.5	-	38.0	4°	86477-02-01
50	16.0	21.0	21.0	27.0	51.0	73.0	19.0	46.5	4°	86477-03-01

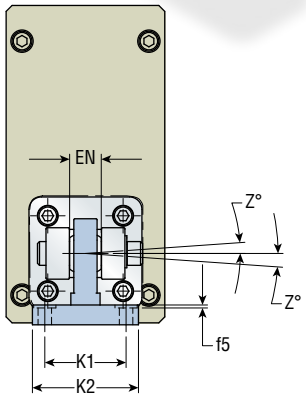
NOTES:
1) DIMENSIONS: mm
2) KIT INCLUDES MOUNTING HARDWARE
3) MSB1 REAR MALE HINGE MOUNTING IS COMPATIBLE WITH MSB2 REAR FORK
4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

PILLOW BLOCK MOUNTING SPHERICAL BEARING KIT (PER VDMA 24562)

BSB1





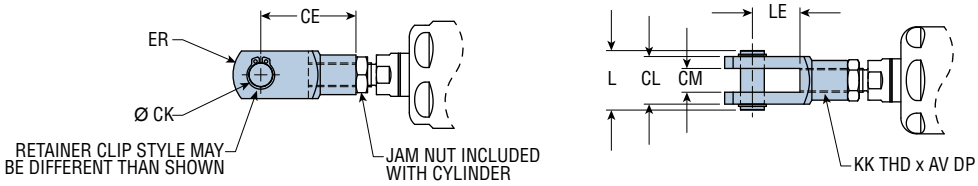


SIZE	CH JS15	CN H7	EN (+0.0/-0.1)	ER MAX	F5 MAX	FL	G1 JS14	G2 JS14	G3 MAX	H6	K1 JS14	K2 MAX	Z	FASTENER	KIT NO.
32	32.0	10.0	14.0	16.0	1.9	22.0	21.0	18.0	31.0	10.0	38.0	51.5	4°	M6	62822-001-00
40	36.0	12.0	16.0	18.0	1.9	25.0	24.0	22.0	35.0	10.0	41.0	54.5	4°	M6	62822-002-00
50	45.0	16.0	21.0	21.0	1.9	27.0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

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

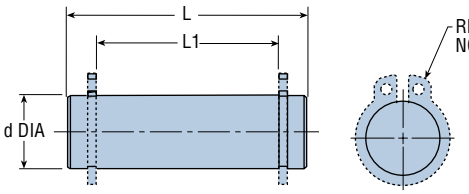


SIZE	AV MIN	CE	CK H9	CL MAX	CM MIN	ER MAX	KK	L	LE MIN	KIT NO.
32	20.0	40.0	10.0	20.3	10.0	16.0	M10 x 1.25	25.0	20.0	86479-01-01
40	22.0	48.0	12.0	24.3	12.0	19.0	M12 x 1.25	30.0	24.0	86479-02-01
50	28.0	64.0	16.0	32.3	16.0	25.0	M16 x 1.5	39.0	32.0	86479-03-01

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

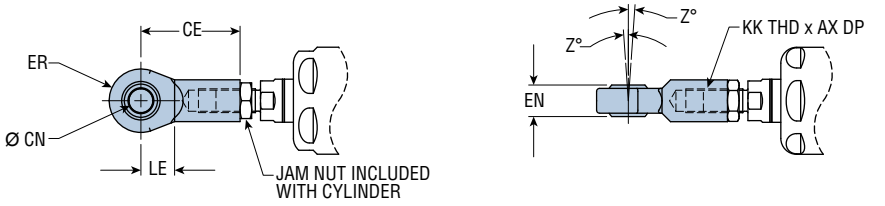
ROD CLEVIS PIVOT PIN KIT

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
50	16.0	39.0	32.1	63463-03-2



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

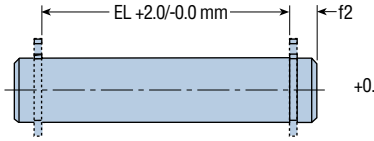
ROD EYE MOUNTING WITH SPHERICAL BEARING KIT



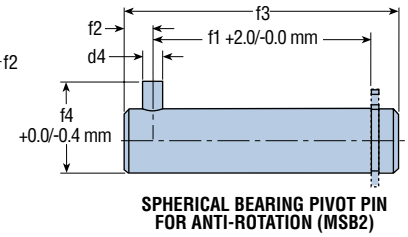
SIZE	AX MIN	CE	CN H9	EN h12	ER MAX	KK	LE MIN	Z	KIT NO.
32	20.0	43.0	10.0	14.0	14.0	M10 x 1.25	15.0	4°	86481-01-01
40	22.0	50.0	12.0	16.0	16.0	M12 x 1.25	17.0	4°	86481-02-01
50	28.0	64.0	16.0	21.0	21.0	M16 x 1.5	23.0	4°	86481-03-01

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

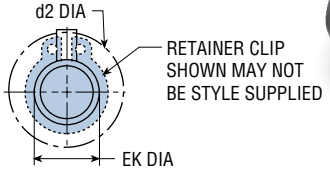
PIVOT PIN KIT

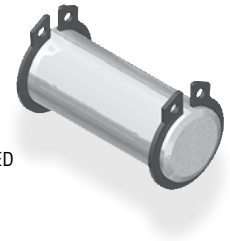


PIVOT PIN FOR MP2 REAR FORK MOUNTING



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 toleranced.

NOTES

SERIES ECV CYLINDER

Electric Automation Solutions

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

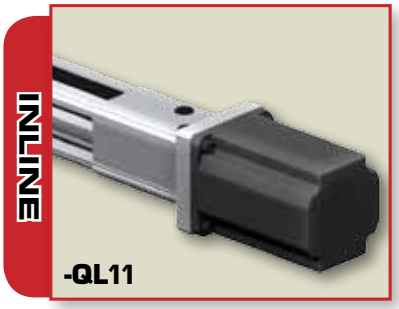
Fit and functional replacement for pneumatic VDMA/ISO cylinder.

Major Benefits

- High thrust and speed capability
- Precision screw assemblies with long service life
- Rigid construction with low backlash
- High degree of repeatability
- 1000 mm travel lengths 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 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

Example Ordering Data:

E	C	VA	5	20	x	400	-	RL004	-	T44	-	QF11	-	Wxxxx

E — Electromechanical Linear Actuator

C — Cylinder

VA — 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.

5 — Metric Design

20 — Size
20
25
32
40
50

400 — Travel (Max)

Size	RB (Ball) mm	RL (Lead) mm
20	—	400
25	—	400
32	1000	500
40	1000	600
50	1000	750

50 mm minimum travel in 50 mm increments

RL004 — Screw Configuration

	Size		Lead mm
Ball Screw	32	RB005	5
	32	RB010	10
	40	RB010	10
	40	RB016	16
	50	RB010	10
	50	RB020	20
Lead Screw	20	RL150	1.50
	20	RL004	4
	25	RL150	1.50
	25	RL003	3
	32	RL003	3
	32	RL006	6
	40	RL004	4
	40	RL008	8
	50	RL004	4
	50	RL008	8

T44 — Options
K__ - Extra rod extension in 1 mm increments. Length code is K100=100mm, K50=50 mm
T44 - Female rod end
TEE - Male rod end with oversize thread

QF11 — Motor Configuration
QF11 - Foldback with 1:1 ratio
QF21 - *Foldback with 2:1 ratio
QL11 - Inline with 1:1 ratio

Blank - No Motor Mount

*QF21 not available on sizes 20 and 25.

Wxxxx — Motor Mount Code
Wxxxx - Open Architecture P/N Code
W0000 - Blank motor mount

Blank - No Motor Mount

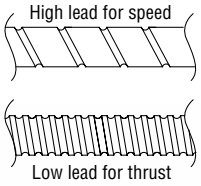
ROD ROTATION

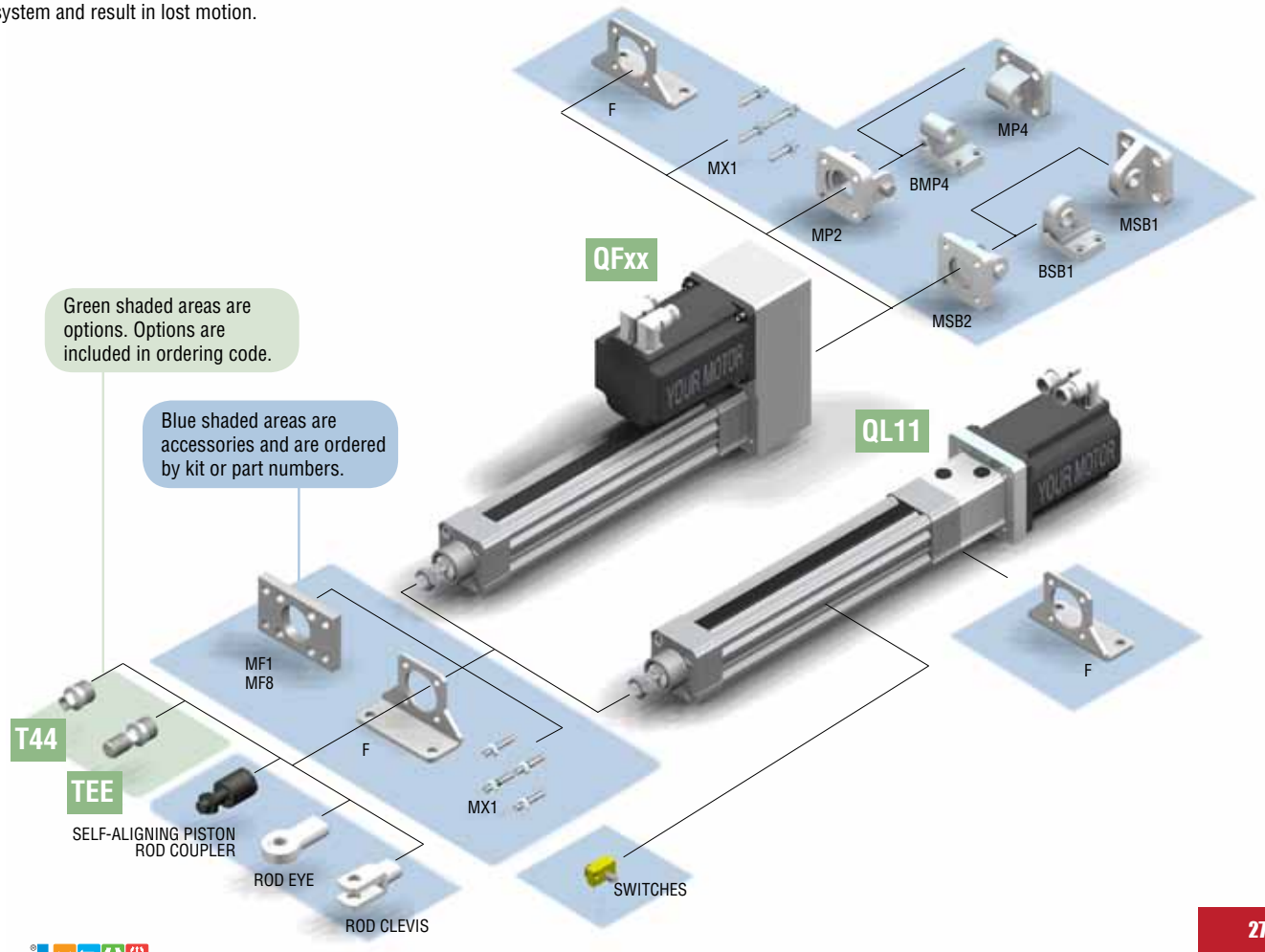
Series VA requires no external guidance/coupling for cataloged performance.

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.





BALL SCREW - RB

SPECIFICATIONS	BALL SCREW SERIES ECVA	BALL SCREW SERIES ECVR[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 30)	
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 mm		40 mm		50 mm	
MECHANICS	MAXIMUM TRAVEL		mm [in]	1000 [39.37]					
	DRIVE MECHANISM			Ball Screw					
	SCREW DIAMETER		mm	12		16		20	
	SCREW CONFIGURATION			-RB005	-RB010	-RB010	-RB016	-RB010	-RB020
	SCREW LEAD		mm	5	10	10	16	10	20
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		m/sec^2 [in/sec^2]	19.6 [772]					
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]		Nm [in-lb]	1.20 [10.62]		4.30 [38.06]		7.80 [69.03]	
	NO-LOAD TORQUE		Nm [in-lb]	0.10 [0.89]		0.25 [2.21]		0.40 [3.54]	
WEIGHT	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]	
	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]	
INERTIA	ACTUATOR @ ZERO STROKE (J_O)		$kg\text{-}m^2$ [$lb\text{-}in^2$]	3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		4.84×10^{-5} [0.165]	
	LENGTH ADDER (J_L)		$kg\text{-}m^2/mm$ [$lb\text{-}in^2/in$]	9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		7.95×10^{-8} [0.0069]	
	MOVING WEIGHT ADDER (J_M)		$kg\text{-}m^2/kg$ [$lb\text{-}in^2/lb$]	6.21×10^{-7} [9.63×10^{-4}]	2.48×10^{-6} [3.85×10^{-3}]	2.48×10^{-6} [3.85×10^{-3}]	6.36×10^{-6} [9.86×10^{-3}]	2.48×10^{-6} [3.85×10^{-3}]	9.93×10^{-6} [1.54×10^{-2}]
	MOTOR CONFIGURATION (J_Q)	-QF11	$kg\text{-}m^2$ [$lb\text{-}in^2$]	1.40×10^{-5} [0.048]		4.71×10^{-5} [0.161]		4.65×10^{-5} [0.159]	
		-QF21		2.75×10^{-5} [0.094]		8.28×10^{-5} [0.283]		1.91×10^{-4} [0.654]	
		-QL11		3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		4.04×10^{-5} [0.138]	

NOTES:
1) UNIDIRECTIONAL
2) AXIAL FREE PLAY WHEN DRIVE SHAFT LOCKED
3) REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
4) REFER TO PERFORMANCE CHARTS ON PAGE 30
5) 2500 km [100 MILLION INCHES] LIFE
6) CORRESPONDS TO MAXIMUM THRUST
7) FOR HOMING AND INCREASED APPLICATION FLEXIBILITY, INCLUDE EXTRA TRAVEL WHEN NECESSARY.
8) SERIES VR REPEATABILITY AND BACKLASH A FUNCTION OF COUPLING RIGIDITY TO EXTERNAL NON-ROTATING LOAD
9) 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 34 and 35]*
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

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

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

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 mm		25 mm		32 mm		40 mm		50 mm	
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	
	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]	15 [.60]	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	
	MAXIMUM ACCELERATION	mm/sec² [in/sec²]	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	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]	Nm [in-lb]	0.5 [4.42]		0.7 [6.20]		1.20 [10.62]		4.30 [38.06]		7.80 [69.03]	
	NO-LOAD TORQUE	Nm [in-lb]	0.09 [0.80]		0.12 [1.00]		0.14 [1.20]		0.17 [1.5]		0.27 [2.4]	
WEIGHT	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]	
	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 (W_{OM})	kg [lb]	0.08 [0.18]		0.14 [0.30]		0.23 [0.50]		0.41 [0.90]		0.78 [1.72]	
	MOVING LENGTH ADDER (W_{LM})	kg/mm [lb/in]	0.0004 [0.021]		0.0006 [0.034]		0.0010 [0.058]		0.001 [0.058]		0.002 [0.114]	
INERTIA	ACTUATOR @ ZERO STROKE (J_O)	kg-m² [lb-in²]	1.66×10^{-6} [0.006]		2.09×10^{-6} [0.007]		3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		4.84×10^{-5} [0.165]	
	LENGTH ADDER (J_L)	kg-m²/mm [lb-in²/in]	1.59×10^{-9} [0.00014]		4.94×10^{-9} [0.00043]		9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		7.95×10^{-8} [0.0069]	
	MOVING WEIGHT ADDER (J_M)	kg-m²/kg [lb-in²/lb]	3.8×10^{-8} [5.89×10^{-5}]	1.01×10^{-7} [1.57×10^{-4}]	3.8×10^{-8} [5.89×10^{-5}]	7.6×10^{-8} [1.18×10^{-4}]	7.6×10^{-8} [1.18×10^{-4}]	1.52×10^{-7} [2.36×10^{-4}]	1.01×10^{-7} [1.57×10^{-4}]	2.03×10^{-7} [3.14×10^{-4}]	1.01×10^{-7} [1.57×10^{-4}]	2.03×10^{-7} [3.14×10^{-4}]
	MOTOR CONFIGURATION (J_Q) -QF11	kg-m² [lb-in²]	2.69×10^{-5} [0.092]		2.69×10^{-5} [0.092]		1.40×10^{-5} [0.048]		4.71×10^{-5} [0.161]		4.65×10^{-5} [0.159]	
	MOTOR CONFIGURATION (J_Q) -QF21	kg-m² [lb-in²]	–		–		2.75×10^{-5} [0.094]		8.28×10^{-5} [0.283]		1.91×10^{-4} [0.654]	
	MOTOR CONFIGURATION (J_Q) -QL11	kg-m² [lb-in²]	1.89×10^{-6} [0.006]		1.89×10^{-6} [0.006]		3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		4.04×10^{-5} [0.138]	

NOTES:
1) UNIDIRECTIONAL
2) VALUES CORRESPOND TO INITIAL (AS SUPPLIED NEW) CONDITION. BACKLASH MAY INCREASE OVER TIME
3) REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
4) REFER TO PERFORMANCE CHARTS ON PAGE 31
5) CORRESPONDS TO MAXIMUM THRUST

WEIGHT AND INERTIAL CALCULATIONS:

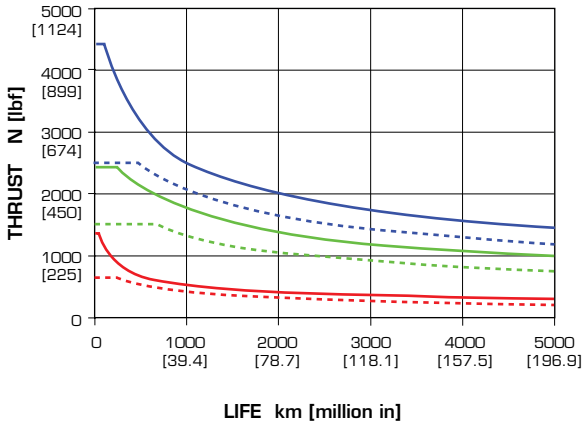
TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT *[reference pages 34 and 35]*
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

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

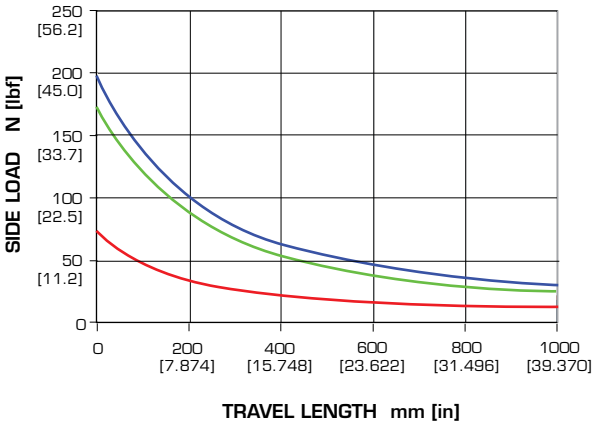
FOR -QF21: $INERTIA_{Reflected} = [J_O + (J_L \times TRAVEL) + (J_M \times TOTAL\ MOVING\ WEIGHT)] / 4 + J_Q$

BALL SCREW - RB

THRUST/LIFE

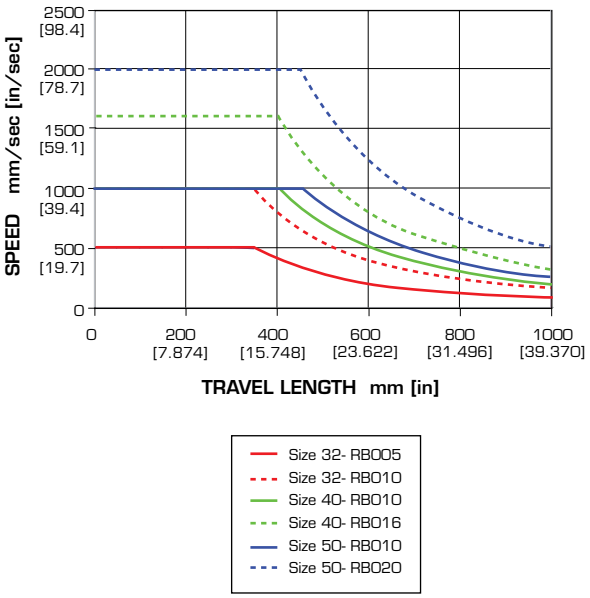


SIDE LOAD/TRAVEL

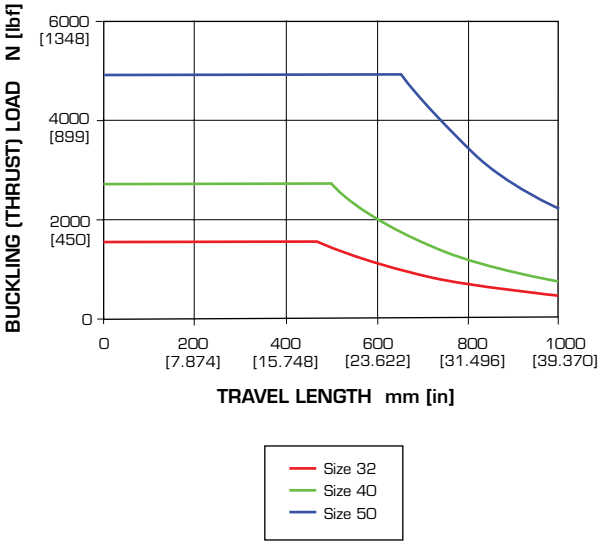


NOTE: THE MAXIMUM SPEED NOT TO EXCEED 200 mm/sec [7.87 in/sec]

SPEED/TRAVEL



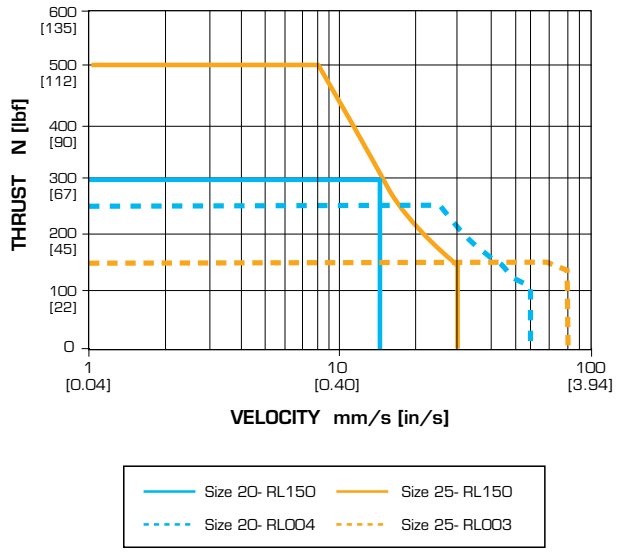
BUCKLING LOAD/TRAVEL



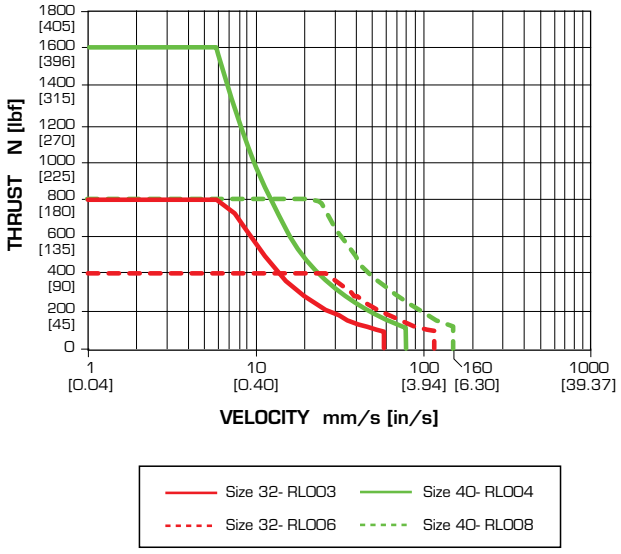
This section contains information on the capabilities of the Ball Screw Series ECV. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer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

LEAD SCREW - RL

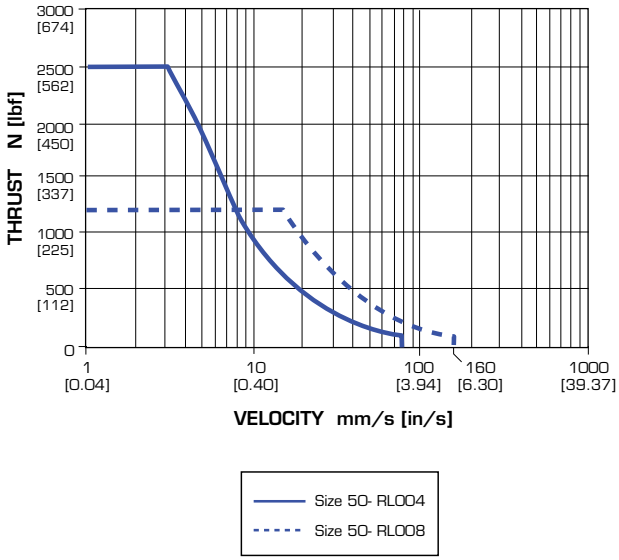
THRUST/VELOCITY - SIZES 20 & 25



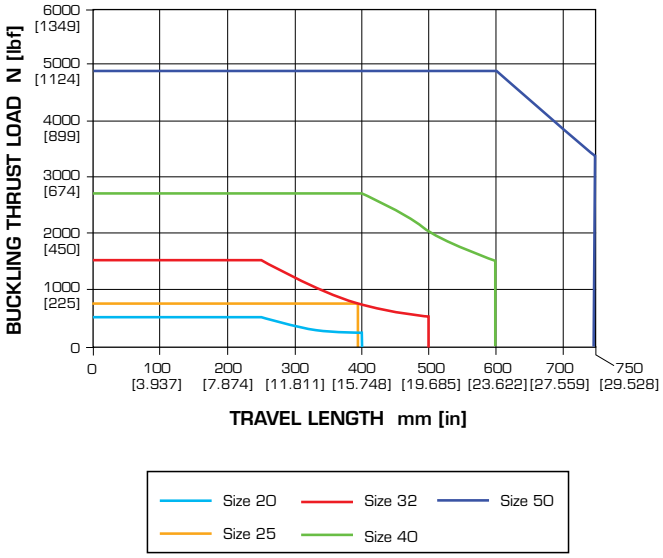
THRUST/VELOCITY - SIZES 32 & 40



THRUST/VELOCITY - SIZE 50



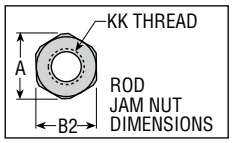
ALLOWABLE AXIAL LOAD - SYSTEM

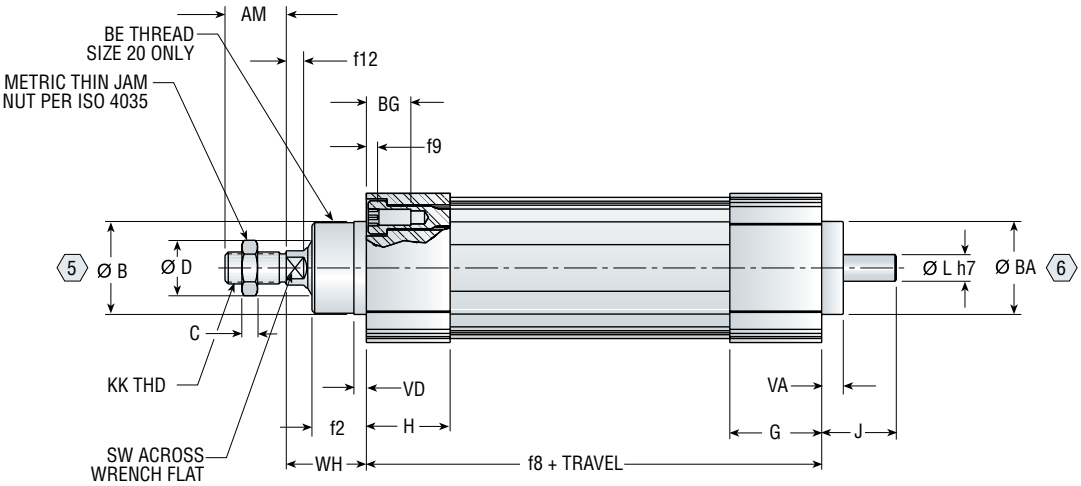


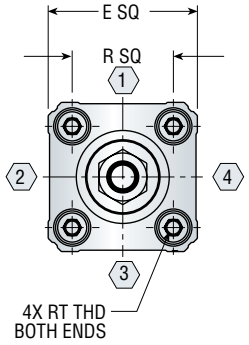
This section contains information on the capabilities of the Lead Screw Series ECV. It is not intended to be a comprehensive selection guide. To simplify the selection process, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer Service Department.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

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.







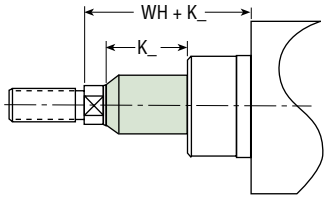
SIZE	A MAX	AM	ØB	ØB2	ØBA	BE	BG MIN	C	ØD	E	f2	f8	f9	f12	G	H	J	KK	ØL	R	RT	SW	VA	VD	WH
20	15.0	19.0	21.9	13.0	22.9	M22 x 1.5	12.0	3.9	12.6	37.0	16.6	113.4	3.6	6.0	22.4	20.0	24.4	M8 x 1.25	5.0	26.0	M4 x .7	7.0	8.1	2.0	24.0
25	18.5	21.0	21.9	16.0	24.9	–	12.0	4.9	15.8	40.0	16.6	117.3	3.6	6.0	22.4	20.0	24.4	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 toleranced.

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.



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

NOTE: DIMENSIONS: mm

Length Code

Metric

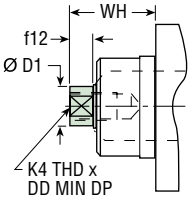
K5 = 5 mm extra rod extension

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. See catalog dimensional page for standard rod end. This rod end deviates from ISO 6431/VDMA 24562.

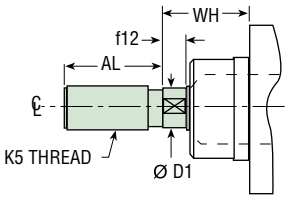
T44 FEMALE ROD END



TEE MALE OVERSIZE ROD END

(Only available on sizes 32, 40 & 50)

TEE MALE OVERSIZE ROD END



LETTER DIM	BORE SIZE				
	20 mm	25 mm	32 mm	40 mm	50 mm
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

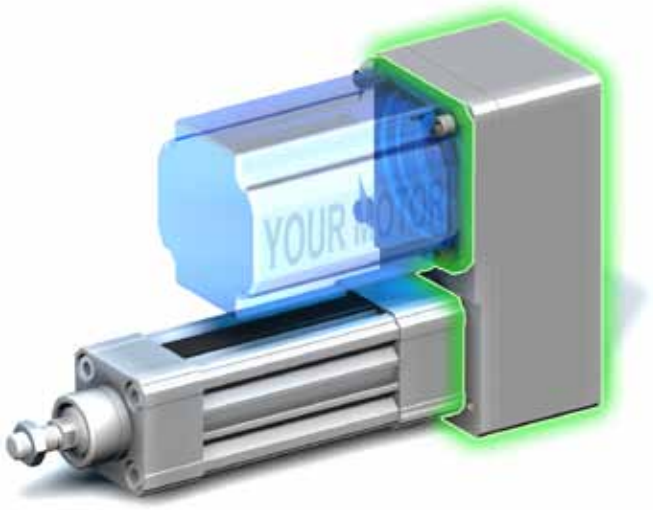
NOTE: DIMENSIONS: mm

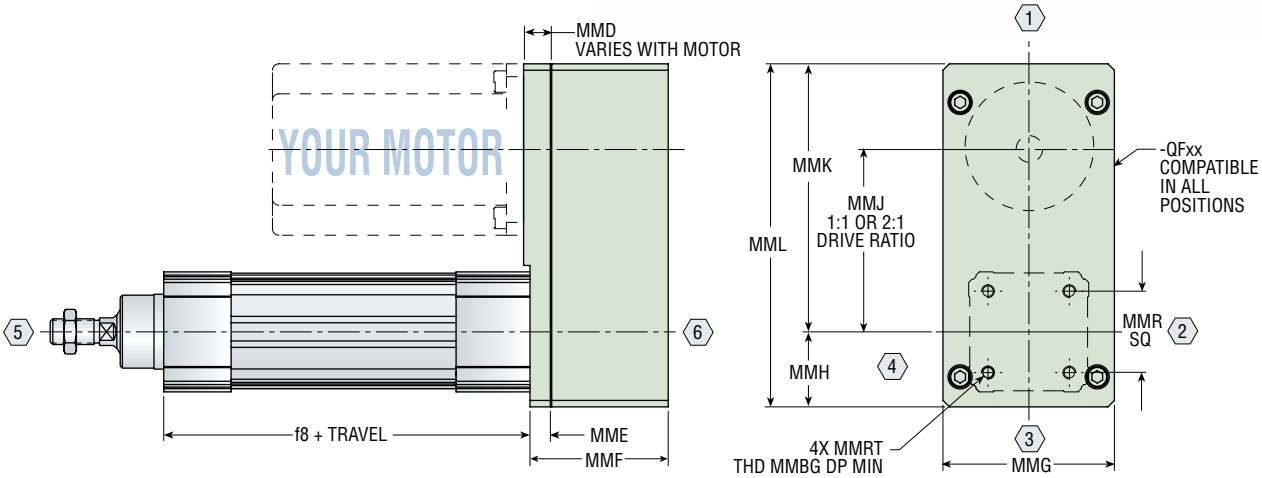
QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

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 36.

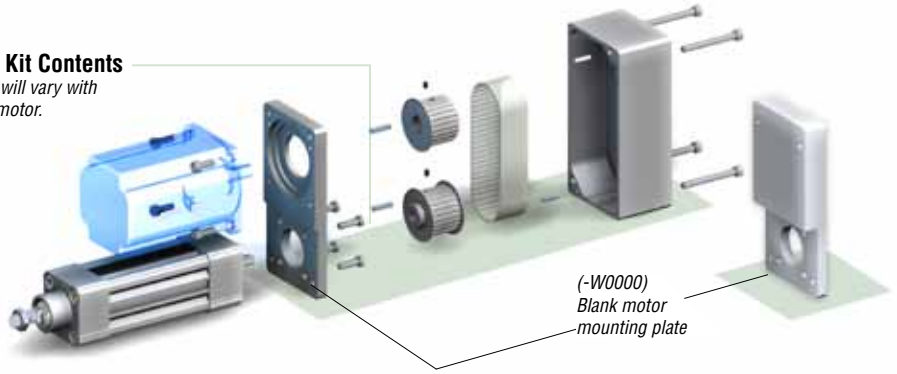




SIZE	f8	MMD MIN	MMD MAX	MME	MMF	MMG	MMH	MMJ 1:1	MMJ 2:1	MMK	MML	MMR	MMRT	MMBG	WEIGHT kg
20	113.4	6.1	22.5	9.5	55.5	58.0	24.0	67.5	–	96.5	120.5	26.0	M4 x .7	11.5	.79
25	117.3	6.1	22.5	9.5	55.5	58.0	24.0	67.5	–	96.5	120.5	27.0	M4 x .7	11.5	.79
32	150.0	9.5	31.5	9.5	55.5	63.0	31.0	72.5	70.5	104.0	135.0	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:
1) YOUR MOTOR, YOUR WAY MOTOR MOUNT -QFxx 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, 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

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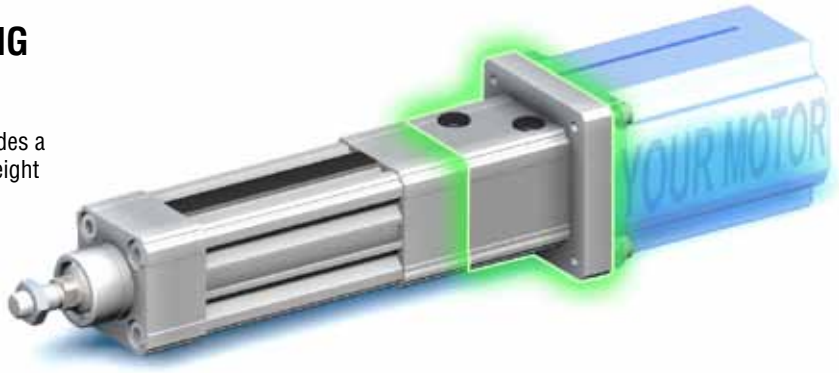
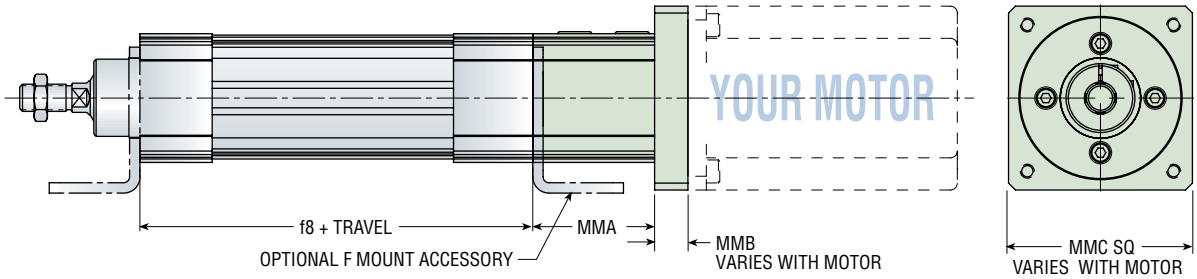
All dimensions are reference only unless specifically toleranced.

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 36.

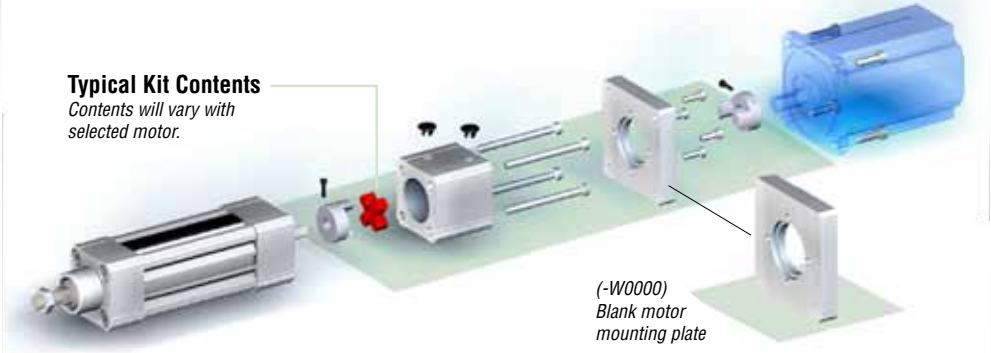




SIZE	f8	MMA	MMA WITH F MOUNT	MMB MAX	MMB MIN	MMC		WEIGHT kg
						STANDARD	OVERSIZE	
20	113.4	43.6	46.6	25.4	8.5	49.0	60.0	.25
25	117.3	43.6	46.6	25.4	8.5	49.0	60.0	.25
32	150.0	49.5	54.0	25.4	8.5	60.0	70.0	0.45
40	170.9	53.0	57.5	35.6	8.5	70.0	88.0	0.65
50	193.0	82.1	86.6	35.6	8.5	88.0	110.0	1.36

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

Typical Kit Contents
Contents will vary with selected motor.



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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.

phdplus.phdinc.com

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.

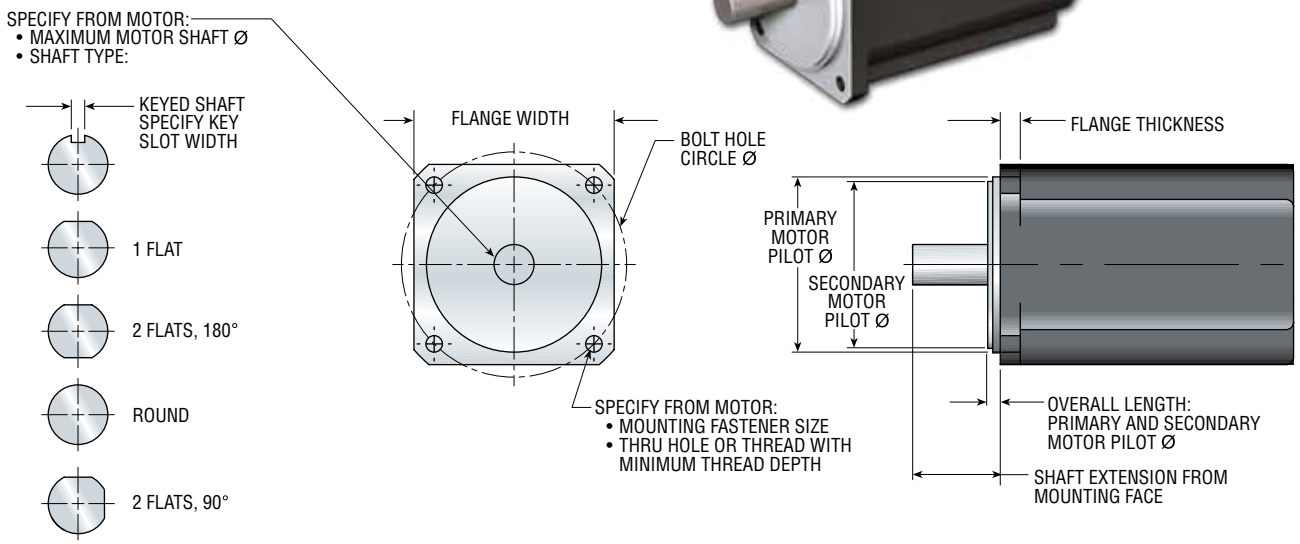
Step 2 - Motor Selection

- Based on the performance requirements determined by online sizing, select an appropriate motor from your preferred motor manufacturer.
- Return to the online sizing software with identified motor parameters to verify motor to application compatibility.

Step 3 - Your Motor, Your Way Configurator config.phdinc.com

- Select your motor from the drop down menus or enter the necessary motor geometry.
- The generated motor mount code for the compatible motor will complete the ordering data necessary to order the actuator tailored to your specific application.
- 3D CAD models are also available.
- If a blank motor mount is desired for special motor requirements, use -W0000 to order a motor mount intended for customer modification.

MOTOR GEOMETRY



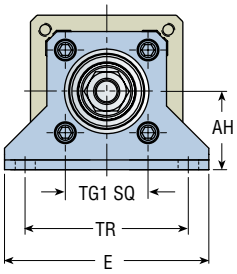
All dimensions are reference only unless specifically toleranced.

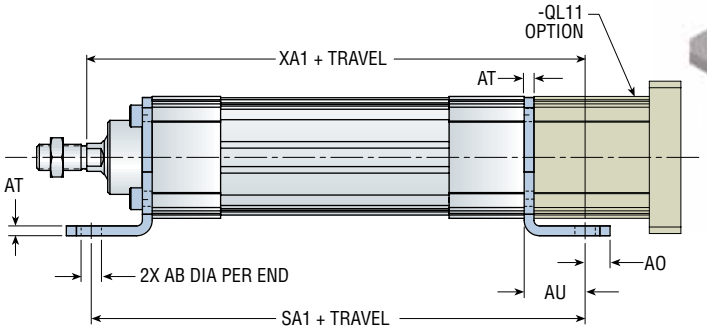
BASE MOUNTING KIT

F

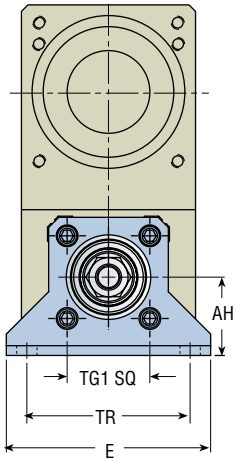
NOTE: BASE MOUNTING KIT BRACKET ADDS TO OVERALL LENGTH

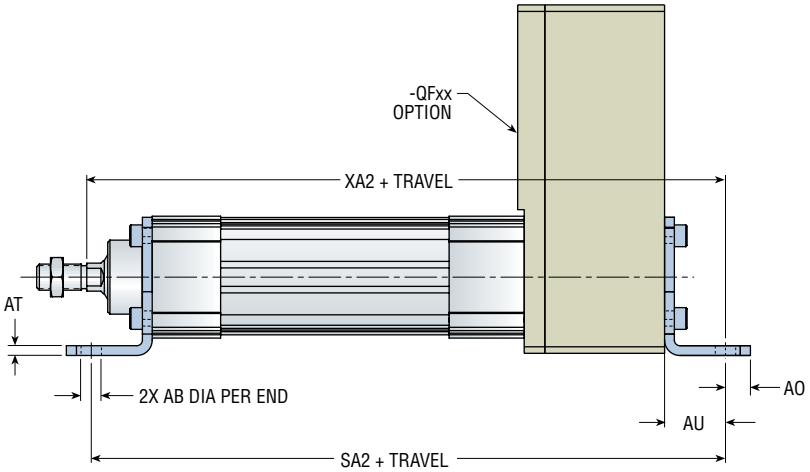
INLINE





FOLDBACK





LETTER DIM	BORE SIZE				
	20 mm	25 mm	32 mm	40 mm	50 mm
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

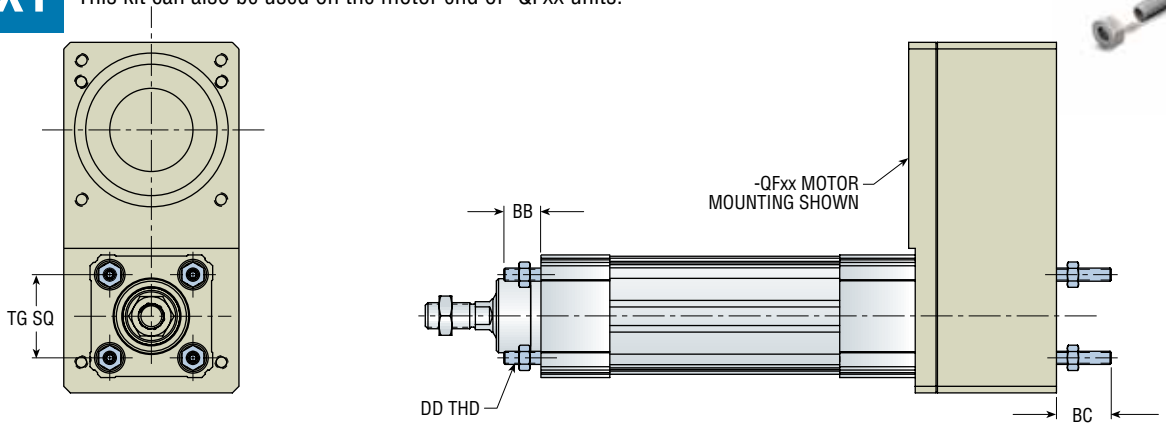
NOTES:
1) KIT INCLUDES BRACKET AND CYLINDER MOUNTING HARDWARE FOR ONE END ONLY
2) DIMENSIONS: mm

All dimensions are reference only unless specifically toleranced.

FASTENER MOUNTING KIT (PER ISO 6431)

MX1

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

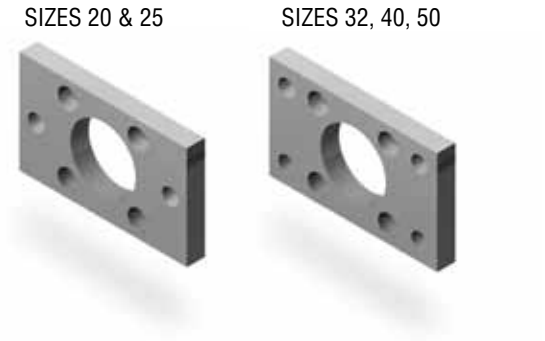
NOTES:
1) KIT INCLUDES STUD AND NUTS FOR ONE END ONLY
2) ROD END MOUNTING (BB) COMPLIES WITH ISO 6431, REAR MOUNTING (BC) DOES NOT
3) REQUIRES -QFxx FOR REAR MOUNTING
4) DIMENSIONS: mm

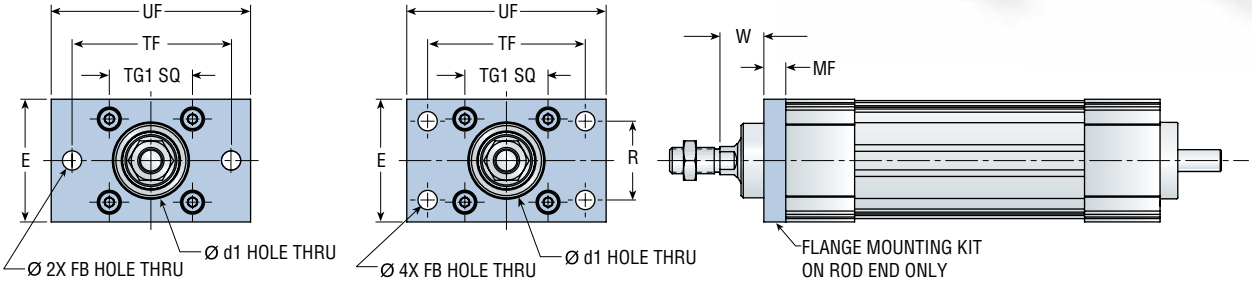
FLANGE MOUNTING KIT (MF8 PER ISO 6432)

MF8 **(SIZES 20 & 25)**

FLANGE MOUNTING KIT (PER VDMA 24562)

MF1 **(SIZES 32, 40 & 50)**





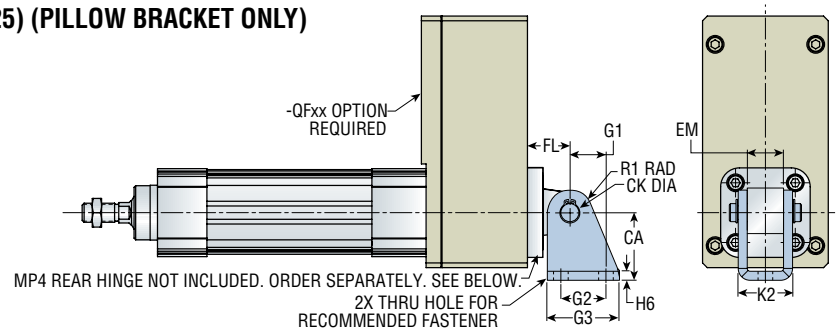
SIZE	LETTER DIMENSION/TOLERANCE									
	d1/H11	FB/H13	TG1	E MAX	R/JS14	MF	TF/JS14	UF MAX	W	KIT NO.
20	22.0	M6 x 1.0	26.0	40.0	–	5.0	50.0	70.0	19.0	85552-01-01
25	22.0	M6 x 1.0	27.0	40.0	–	5.0	50.0	70.0	23.0	85552-01-01
32	30.1	6.7	32.5	50.0	32.0	10.0	64.0	86.0	16.0	83219-01-01
40	35.0	8.8	38.0	58.0	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 toleranced.

REAR MALE HINGE MOUNTING BRACKET KIT

(SIZES 20 & 25) (PILLOW BRACKET ONLY)

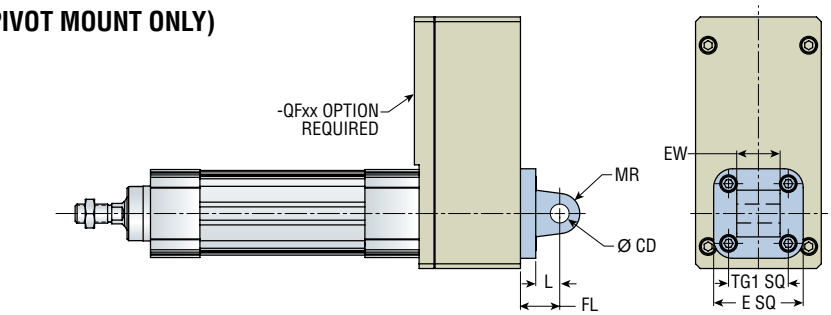


SIZE	LETTER DIMENSION/TOLERANCE											
	CA	CK	EM	FL	G1	G2	G3	H6	K2	R1	FASTENER	KIT NO.
20	30.0	8.0	16.1	21.7	16.0	20.0	32.0	4.0	24.1	10.0	M6	65778-01-2
25	30.0	8.0	16.1	21.7	16.0	20.0	32.0	4.0	24.1	10.0	M6	65778-01-2

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

REAR MALE HINGE MOUNTING KIT (PER VDMA 24562)

MP4 **(PIVOT MOUNT ONLY)**

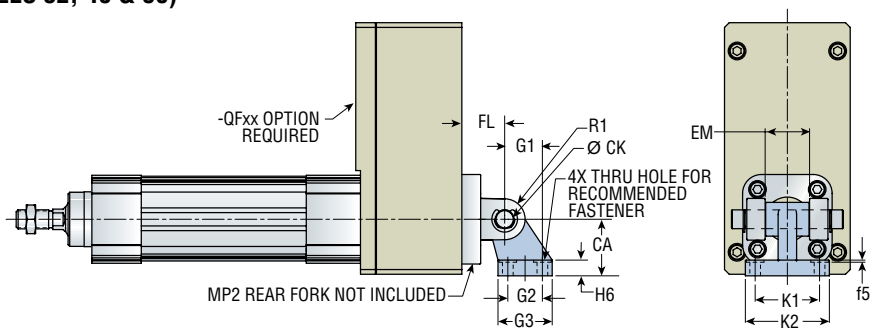


SIZE	LETTER DIMENSION/TOLERANCE							
	E MAX	EW MAX	TG1	FL (±0.2mm)	L MIN	CD/ H9	MR MAX	KIT NO.
20	40.5	16.0	26.4	21.7	12.0	8.0	10.0	85973-01-01
25	40.5	16.0	26.4	21.7	12.0	8.0	10.0	85973-01-01
32	50.0	26.0	32.5	22.0	12.2	10.0	11.0	83218-01-01
40	58.0	28.0	38.0	25.0	15.3	12.0	13.0	83218-02-01
50	70.0	32.0	46.5	27.0	15.3	12.0	13.0	83218-03-01

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

PILLOW BLOCK MOUNTING KIT (PER CETOP 107 P)

BMP4 **(SIZES 32, 40 & 50)**



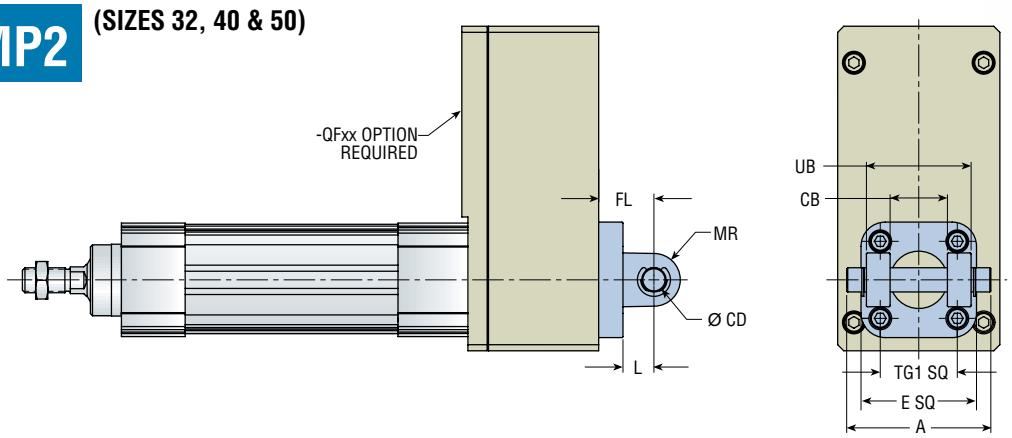
SIZE	LETTER DIMENSION/TOLERANCE													
	CK/H9	K1/JS14	K2 MAX	G1/JS14	f5 MAX	G2	EM MAX	G3 MAX	CA/JS15	H6	R1 MAX	FL	FASTENER	KIT NO.
32	10.0	38.0	51.0	21.0	1.6	18.0	25.8	31.0	32.0	8.0	10.0	22.0	M6	62818-001-00
40	12.0	41.0	54.0	24.0	1.6	22.0	27.8	35.0	36.0	10.0	11.0	25.0	M6	62818-002-00
50	12.0	50.0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

REAR FORK MOUNTING KIT (PER VDMA 24562)

MP2 (SIZES 32, 40 & 50)

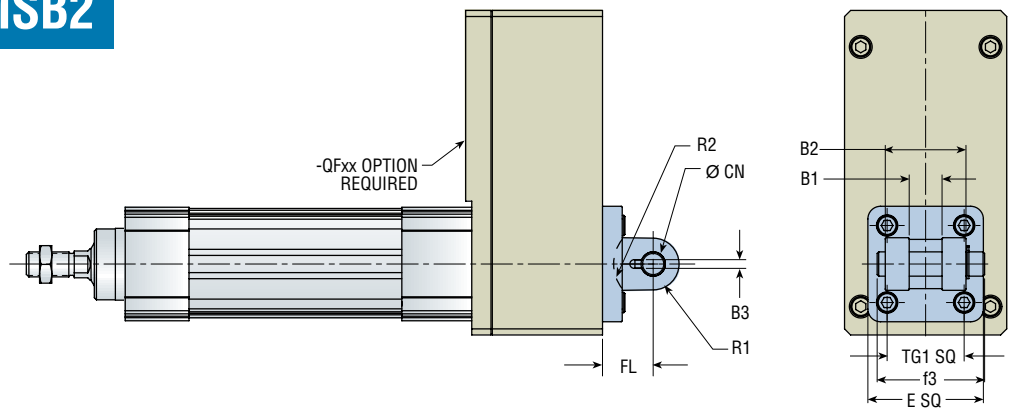


SIZE	LETTER DIMENSION/TOLERANCE									
	A MAX	E MAX	UB/h14	CB/H14	TG1	FL (±0.2 mm)	L MIN	CD/H9	MR MAX	KIT NO.
32	65.0	50.0	44.7	26.3	32.5	22.0	12.2	10.0	11.0	83214-01-01
40	72.0	58.0	51.6	28.3	38.0	25.0	15.0	12.0	13.0	83214-02-01
50	80.0	70.0	59.6	32.3	46.5	27.0	15.3	12.0	13.0	83214-03-01

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

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

MSB2 (SIZES 32, 40 & 50)



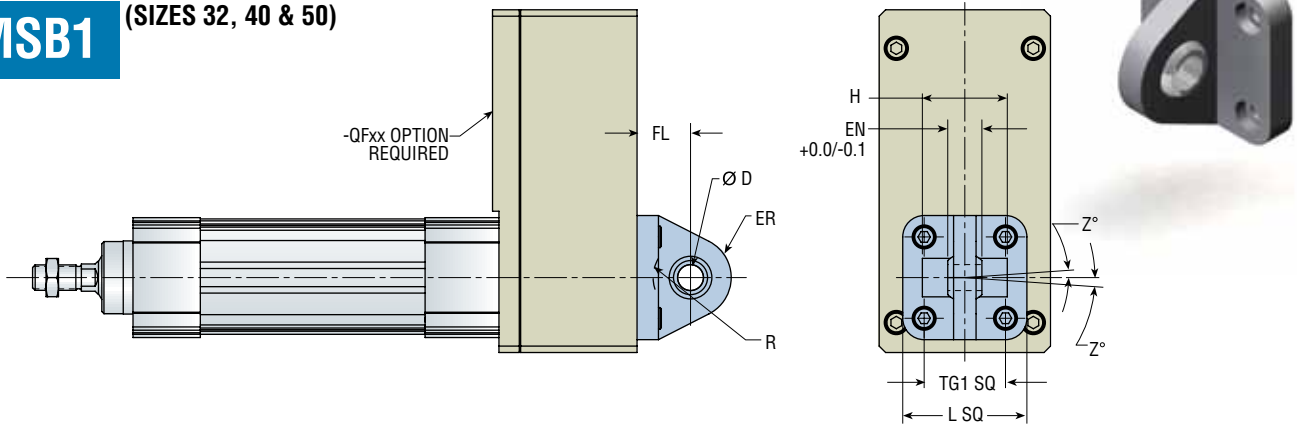
SIZE	LETTER DIMENSION/TOLERANCE										
	E MAX	B2/d12	B1/H14	TG1	B3 (±0.2 mm)	R2 MIN	f3	FL (±0.2 mm)	CN/F7	R1 MAX	KIT NO.
32	50.0	33.8	14.2	32.5	3.3	16.5	46.0	22.0	10.0	11.0	83215-01-01
40	58.0	39.8	16.2	38.0	4.3	19.5	53.0	25.0	12.0	13.0	83215-02-01
50	70.0	44.8	21.3	46.5	4.3	21.5	58.0	27.0	16.0	13.0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

REAR MALE HINGE MOUNTING FOR SPHERICAL BEARING KIT

MSB1 (SIZES 32, 40 & 50)

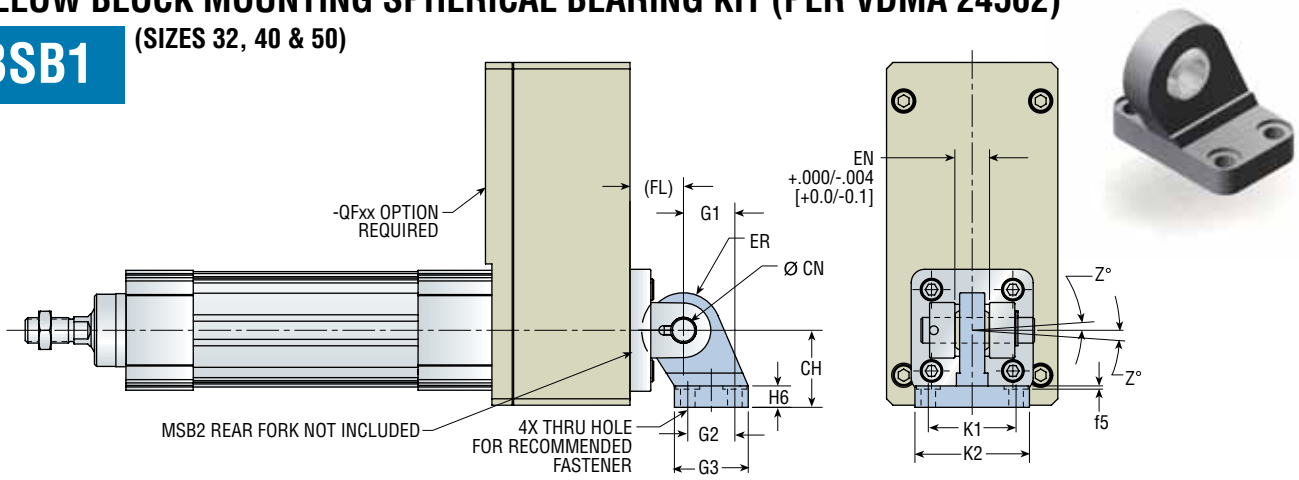


SIZE	LETTER DIMENSION/TOLERANCE									
	TG1	FL (±0.2 mm)	D/H7	EN	ER MAX	L MAX	Z	H	R	KIT NO.
32	32.5	22.0	10.0	13.9	16.0	50.0	4°	–	–	83216-01-01
40	38.0	25.0	12.0	16.0	19.0	58.0	4°	–	–	83216-02-01
50	46.5	27.0	16.0	21.0	21.0	70.0	4°	51.0	19.0	83216-03-01

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

PILLOW BLOCK MOUNTING SPHERICAL BEARING KIT (PER VDMA 24562)

BSB1 (SIZES 32, 40 & 50)



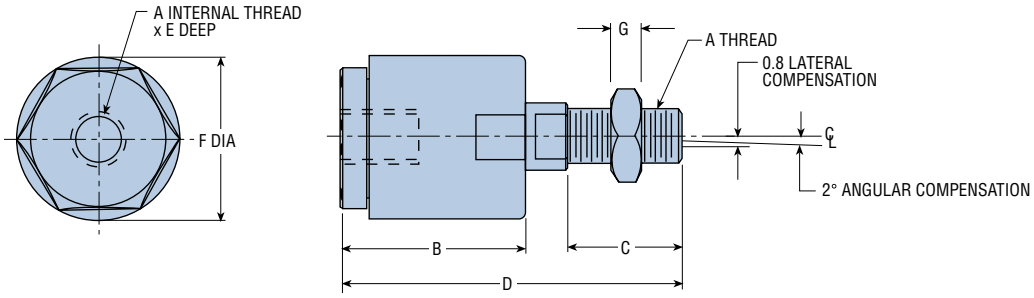
SIZE	LETTER DIMENSION/TOLERANCE														
	CN/ H7	K1/ JS14	K2 MAX	G1/ JS14	f5 MAX	G2/ JS14	EN	G3 MAX	CH/ JS15	H6	ER MAX	FL	Z	FASTENER	KIT NO.
32	10.0	38.0	51.0	21.0	1.6	18.0	13.9	31.0	32.0	10.0	16.0	22.0	4°	M6	62822-001-00
40	12.0	41.0	54.0	24.0	1.6	22.0	16.0	35.0	36.0	10.0	18.0	25.0	4°	M6	62822-002-00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

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

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.

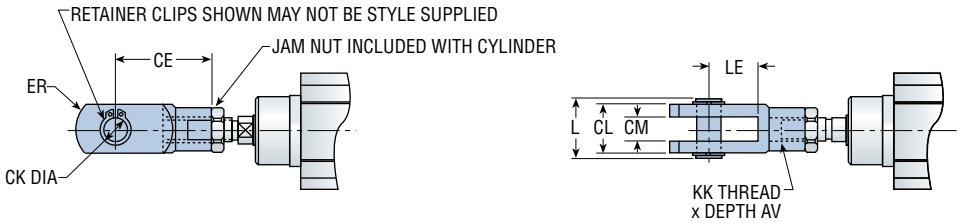


SIZE	LETTER DIMENSION/TOLERANCE								
	A	B MIN	C MIN	D MIN	E	F	G	PART NO.	CORROSION RESISTANT
20	M8 x 1.25	25.4	15.9	47.6	12.7	22.2	5.0	83275-02	51842-02
25	M10 x 1.25	25.4	15.9	47.6	12.7	22.2	5.0	83275-03	51842-03
32	M10 x 1.25	25.4	15.9	47.6	12.7	22.2	5.0	83275-03	51842-03
40	M12 x 1.25	28.6	16.5	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 toleranced.

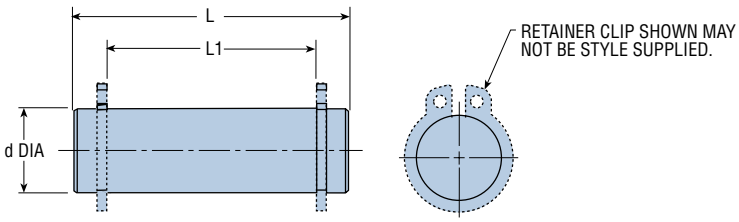
ROD CLEVIS MOUNTING KIT FOR METRIC ROD ENDS (PER DIN 8140)



SIZE	LETTER DIMENSION/TOLERANCE									
	AV MIN	CE	CK/H9	CL MAX	CM MIN	ER MAX	KK	L	LE MIN	KIT NO.
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

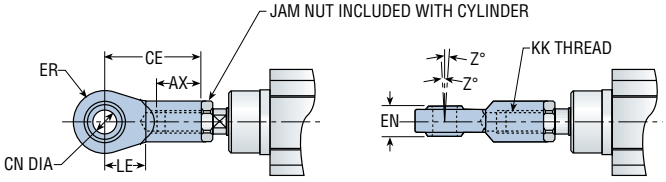
ROD CLEVIS PIVOT PIN KIT



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

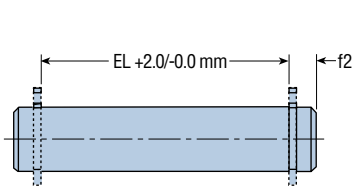
ROD EYE MOUNTING WITH SPHERICAL BEARING KIT



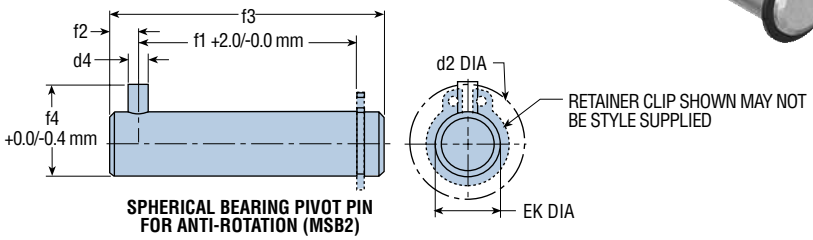
SIZE	LETTER DIMENSION/TOLERANCE								
	AX MIN	CE	CN/H9	EN/h12	ER MAX	KK	LE MIN	Z	KIT NO.
20	16.0	36.0	8.0	11.9	12.0	M8 x 1.25	13.0	4°	85576-01-01
25	20.0	43.0	10.0	13.9	14.0	M10 x 1.25	15.0	4°	83220-01-01
32	20.0	43.0	10.0	13.9	14.0	M10 x 1.25	15.0	4°	83220-01-01
40	22.0	50.0	12.0	15.9	16.0	M12 x 1.25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

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

PIVOT PIN KIT



PIVOT PIN FOR MP2 REAR FORK MOUNTING



SPHERICAL BEARING PIVOT PIN FOR ANTI-ROTATION (MSB2)

MP2 PIVOT PIN

SIZE	LETTER DIMENSION/TOLERANCE				
	d2 MAX	EK/e8	EL	f2	KIT NO.
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							
	d2 MAX	d4/H12	EK/h9	f1	f2 MAX	f3 MAX	f4	KIT NO.
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 toleranced.

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

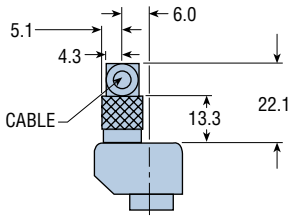
SERIES 6250 REED SWITCHES

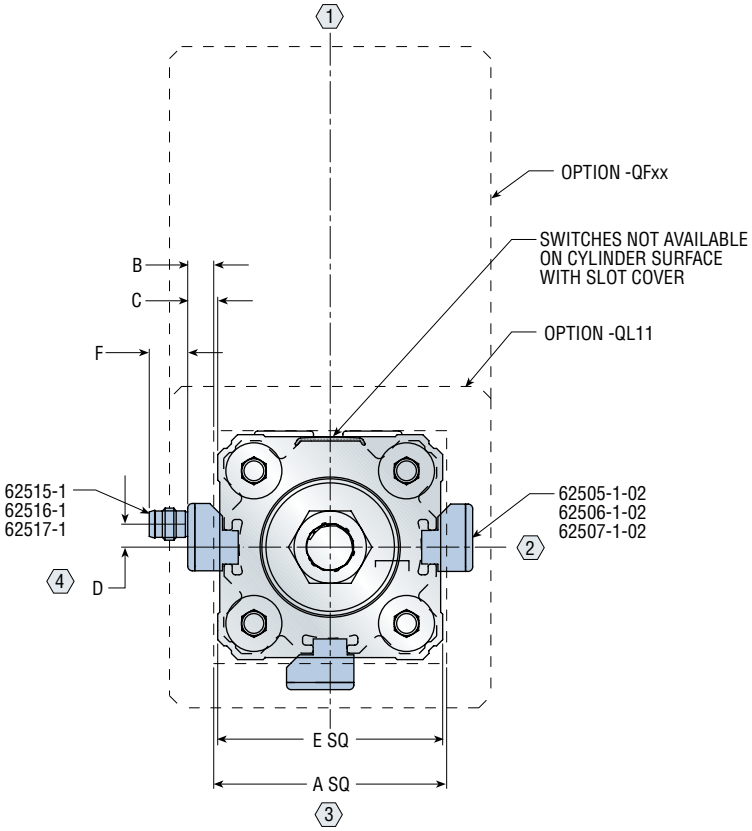
PART NO.	DESCRIPTION	COLOR
62507-1-02	AC/DC Reed, 2 m cable	Silver
62517-1	AC/DC Reed, Quick Connect	Silver

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

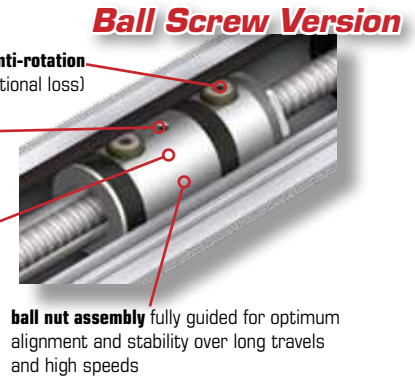




SIZE	A*	B	C	D	E	F
20	34.0	8.7	7.2	6.0	37.0	9.5
25	34.0	11.2	8.2	6.0	40.0	9.5
32	50.0	7.0	7.5	6.0	49.5	9.5
40	58.0	5.0	6.5	6.0	56.0	9.5
50	70.0	6.0	7.0	6.0	68.5	9.5

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

SERIES ESK/ESL SLIDE

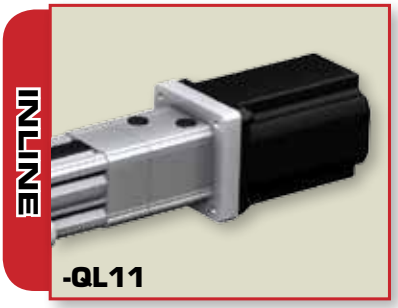


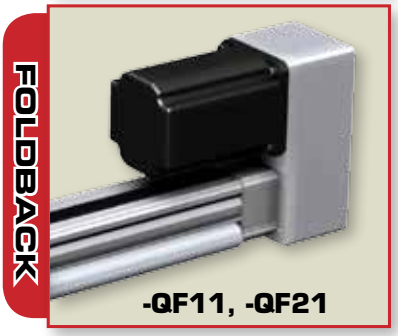
Major Benefits

- 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
- 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 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 SLIDE

Example Ordering Data:

E	S	K	C	5	2	x	300	-	RL150	-	G30	-	QF11	-	Wxxxx

Electromechanical Linear Actuator

Slide

Series
K - Short Body
L - Long Body

Type
B - Ball Bushing
C - TC Bushing

Ball Bushing available only on Ball Screw sizes 4,5 & 6.

TC Bushing available only with Lead Screw.

Metric Design

Size
2
3
4
5
6

Travel (Max)

Size	SK mm	SL mm
2	300	300
3	300	400
4	450	500
5	450	600
6	550	700

50 mm minimum travel in 50 mm increments

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
	6	RL004	4
	6	RL008	8

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

Motor Configuration
QF11 - Foldback with 1:1 ratio
QF21 - *Foldback with 2:1 ratio
QL11 - Inline with 1:1 ratio

Blank - No Motor Mount

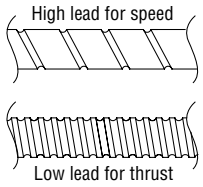
*QF21 not available on sizes 20 and 25

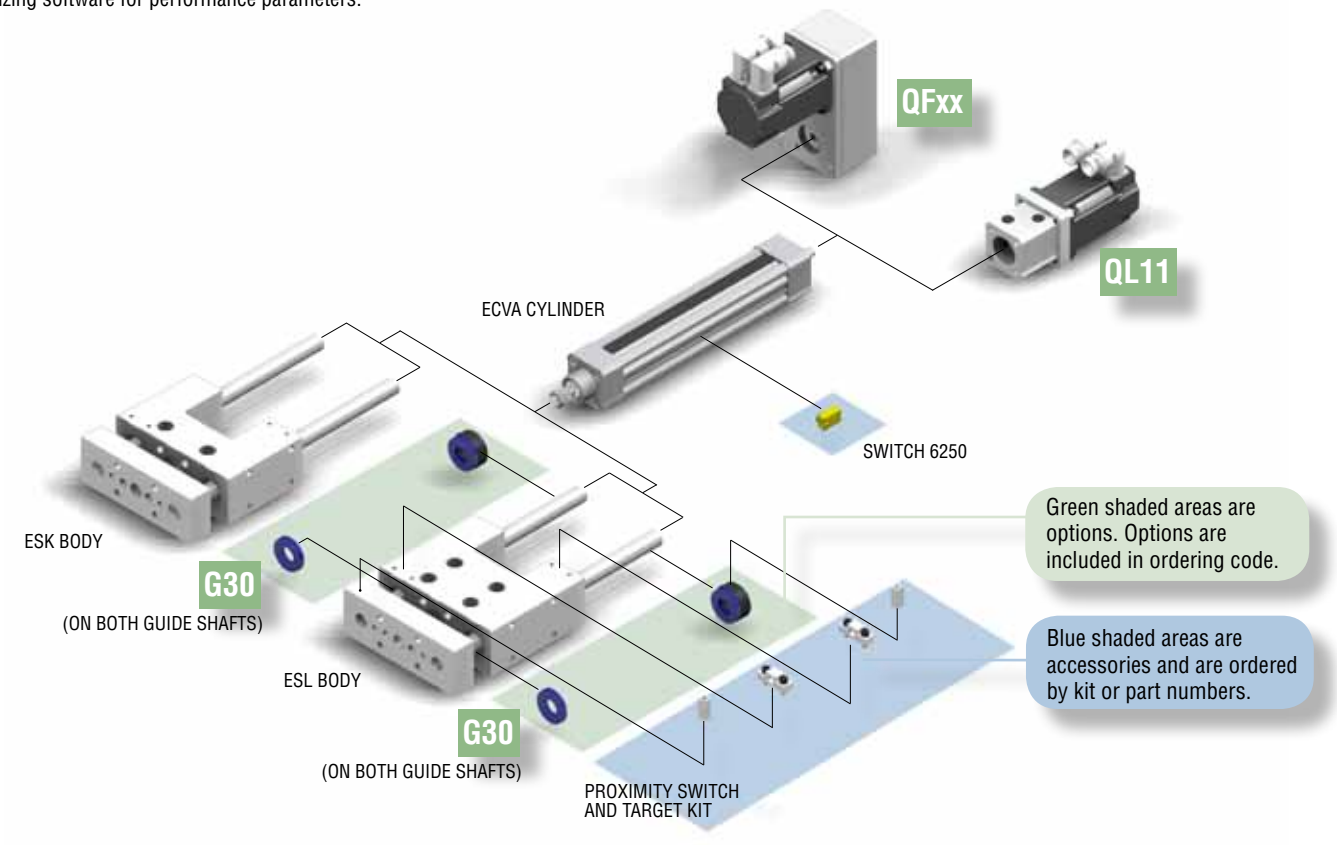
Motor Mount Code
Wxxxx - Open Architecture P/N Code
W0000 - Blank motor mount

Blank - No Motor Mount

SCREW CONFIGURATION

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





BALL SCREW - RB

SPECIFICATIONS	BALL SCREW SERIES ESK/ESL
REPEATABILITY[1]	±0.010 mm [±0.0004 in]
MAXIMUM BACKLASH[2]	0.18 mm [0.007 in]
RATED LIFE	Refer to Life vs. Thrust Chart (page 50)
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		SIZE 5		SIZE 6	
MECHANICS	MAXIMUM TRAVEL	ESK	mm [in]	450 [17.72]		450 [17.72]		550 [21.65]	
		ESL		600 [23.62]		600 [23.62]		700 [27.65]	
	DRIVE MECHANISM			Ball Screw					
	SCREW DIAMETER		mm	12		16		20	
	SCREW CONFIGURATION			-RB005	-RB010	-RB010	-RB016	-RB010	-RB020
	SCREW LEAD		mm/rev	5	10	10	16	10	20
	GUIDE SHAFT DIAMETER		mm	16		20		25	
	GUIDE SHAFT BEARING TYPE			Ball Bushing					
SPEED[4]	MAXIMUM SPEED		mm/sec [in/sec]	500 [19.6]	1000 [39.3]	1000 [39.3]	1600 [63.0]	1000 [39.3]	2000 [78.7]
	MAXIMUM RPM		rev/min	6000					
	MAXIMUM ACCELERATION		m/sec^2 [in/sec^2]	19.6 [772]					
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]		Nm [in-lb]	1.20 [10.62]		4.30 [38.06]		7.80 [69.03]	
	NO-LOAD TORQUE		Nm [in-lb]	0.15 [1.33]		0.40 [3.54]		0.60 [5.31]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})	ESK	kg [lb]	3.55 [7.83]		5.34 [11.77]		9.50 [20.93]	
		ESL		4.20 [9.26]		6.38 [14.07]		11.68 [25.76]	
	TOTAL LENGTH ADDER (W_{LT})		kg/mm [lb/in]	0.0073 [0.41]		0.0105 [0.59]		0.0145 [0.81]	
	MOVING @ ZERO STROKE (W_{OM})	ESK	kg [lb]	1.28 [2.83]		2.25 [4.97]		4.15 [9.16]	
		ESL		1.44 [3.17]		2.54 [5.61]		4.74 [10.45]	
	MOVING LENGTH ADDER (W_{LM})		kg/mm [lb/in]	0.0039 [0.216]		0.0059 [0.333]		0.0097 [0.544]	
INERTIA	ACTUATOR @ ZERO STROKE (J_O)		kg-m^2 [lb-in^2]	3.00 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} [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	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) AXIAL FREE PLAY WHEN DRIVE SHAFT LOCKED
3) REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
4) REFER TO PERFORMANCE CHARTS ON PAGE 50
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 58 and 59]*
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_Q
FOR -QF21: INERTIA $_{Reflected}$ = [J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_Q

LEAD SCREW - RL

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

SPECIFICATIONS				SIZE									
				2		3		4		5		6	
MECHANICS	MAXIMUM TRAVEL	ESK	mm [in]	300 [11.81]		300 [11.81]		450 [17.72]		450 [17.72]		550 [21.65]	
		ESL		300 [11.81]		400 [15.75]		500 [19.69]		600 [23.62]		700 [27.65]	
	SCREW DIAMETER		mm	8		10		12		16		20	
	SCREW CONFIGURATION			-RL150	-RL004	-RL150	-RL003	-RL003	-RL006	-RL004	-RL008	-RL004	-RL0080
	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]	15 [0.6]	80 [3.15]	30 [1.20]	60 [2.40]	60 [2.40]	120 [4.80]	80 [3.15]	160 [6.3]	80 [3.15]	160 [6.3]
	MAXIMUM RPM		rev/min	1200									
	MAXIMUM ACCELERATION		m/sec² [in/sec²]	0.3 [11.81]	1.0 [39.37]	0.3 [11.81]	1.0 [39.37]	0.3 [11.81]	1.0 [39.37]	0.5 [19.69]	1.0 [39.37]	0.5 [19.69]	1.0 [39.37]
THRUST[4]	MAXIMUM THRUST		N [lbf]	300 [67.5]	150 [33.7]	500 [112]	250 [56]	800 [180]	400 [90]	1600 [360]	800 [180]	2500 [562]	1250 [281]
TORQUE	PERMISSIBLE DRIVE TORQUE[5]		Nm [in-lb]	0.5 [4.42]		0.7 [6.20]		1.20 [10.62]		4.30 [38.06]		7.80 [69.03]	
	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]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})	ESK	kg [lb]	1.84 [4.06]		2.33 [5.13]		3.55 [7.83]		5.23 [11.53]		9.50 [20.93]	
		ESL		2.24 [4.94]		2.90 [6.39]		4.20 [9.26]		6.27 [13.83]		11.68 [25.76]	
	TOTAL LENGTH ADDER (W_{LT})		kg/mm [lb/in]	0.003 [0.17]		0.004 [0.20]		0.0073 [0.41]		0.0105 [0.59]		0.0145 [0.81]	
	MOVING @ ZERO STROKE (W_{OM})	ESK	kg [lb]	0.65 [1.43]		0.85 [1.88]		1.28 [2.83]		2.15 [4.73]		4.15 [9.16]	
		ESL		0.72 [1.58]		0.97 [2.14]		1.44 [3.17]		2.43 [5.36]		4.74 [10.45]	
	MOVING LENGTH ADDER (W_{LM})		kg/mm [lb/in]	0.002 [0.092]		0.002 [0.140]		0.0039 [0.216]		0.006 [0.333]		0.0097 [0.544]	
INERTIA	ACTUATOR @ ZERO STROKE (J_O)		kg-m² [lb-in²]	1.66×10^{-6} [0.006]		2.09×10^{-6} [0.007]		3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		4.84×10^{-5} [0.165]	
	LENGTH ADDER (J_L)		kg-m²/mm [lb-in²/in]	1.59×10^{-9} [0.00014]		4.94×10^{-9} [0.00043]		9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		7.95×10^{-8} [0.0069]	
	MOVING WEIGHT ADDER (J_M)		kg-m²/kg [lb-in²/lb]	3.8×10^{-8} [5.89×10^{-5}]	1.01×10^{-7} [1.57×10^{-4}]	3.8×10^{-8} [5.89×10^{-5}]	7.6×10^{-8} [1.18×10^{-4}]	7.6×10^{-8} [1.18×10^{-4}]	1.52×10^{-7} [2.36×10^{-4}]	1.01×10^{-7} [1.57×10^{-4}]	2.03×10^{-7} [3.14×10^{-4}]	1.01×10^{-7} [1.57×10^{-4}]	2.03×10^{-7} [3.14×10^{-4}]
	MOTOR CONFIGURATION (J_Q)	-QF11	kg-m² [lb-in²]	2.69×10^{-5} [0.092]		2.69×10^{-5} [0.092]		1.40×10^{-5} [0.048]		4.71×10^{-5} [0.161]		4.65×10^{-5} [0.159]	
		-QF21		–		–		2.75×10^{-5} [0.094]		8.28×10^{-5} [0.283]		1.91×10^{-4} [0.654]	
		-QL11		1.89×10^{-6} [0.006]		1.89×10^{-6} [0.006]		3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		4.04×10^{-5} [0.138]	

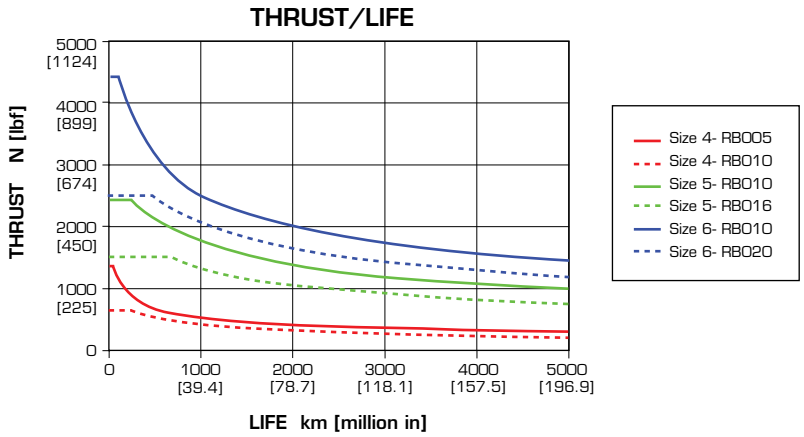
NOTES:
1) UNIDIRECTIONAL
2) VALUES CORRESPOND TO INITIAL(AS SUPPLIED NEW) CONDITION. BACKLASH MAY INCREASE OVER TIME
3) REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
4) REFER TO PERFORMANCE CHART ON PAGE 51
5) CORRESPONDS TO MAXIMUM THRUST

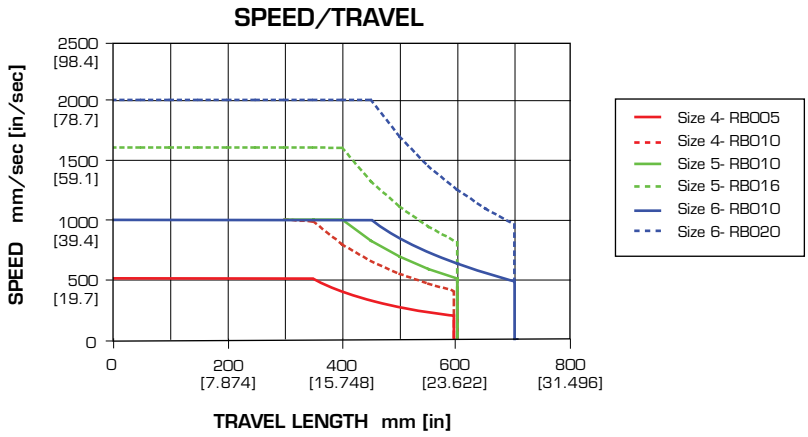
WEIGHT AND INERTIAL CALCULATIONS:

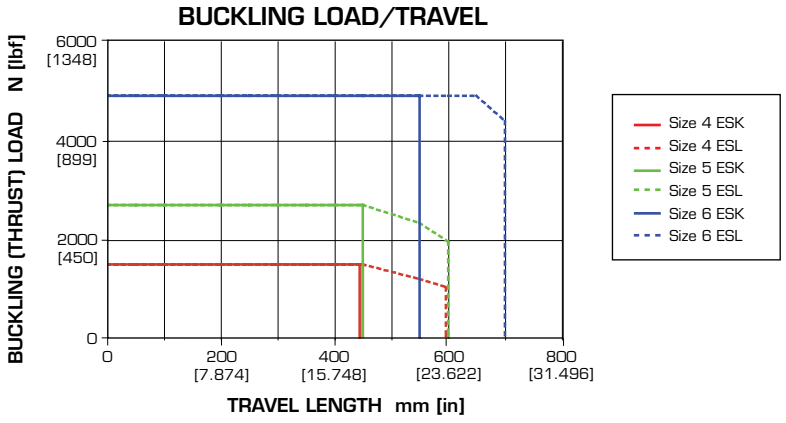
TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT *[reference pages 58 and 59]*
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

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

BALL SCREW - RB



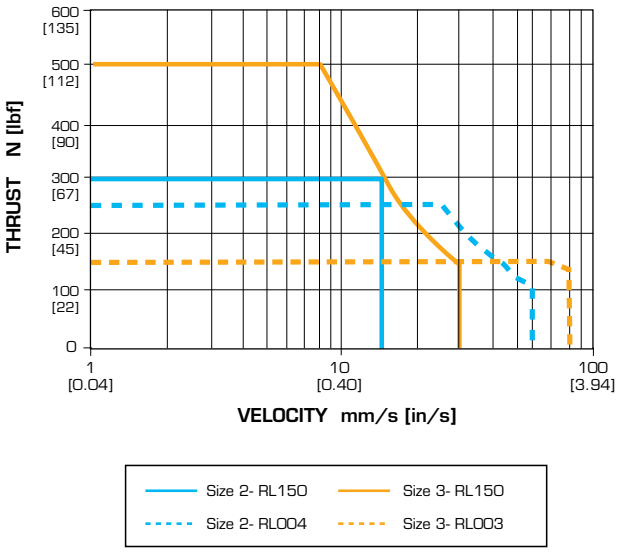




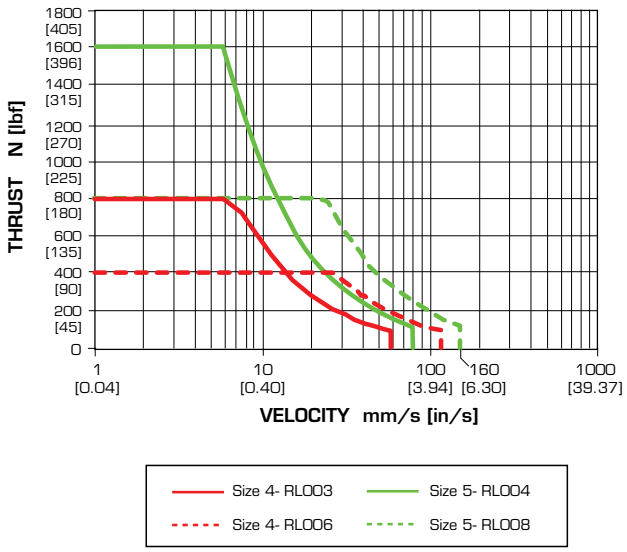
This section contains information on the capabilities of the Ball Screw Series ESK/ESL. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer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

LEAD SCREW - RL

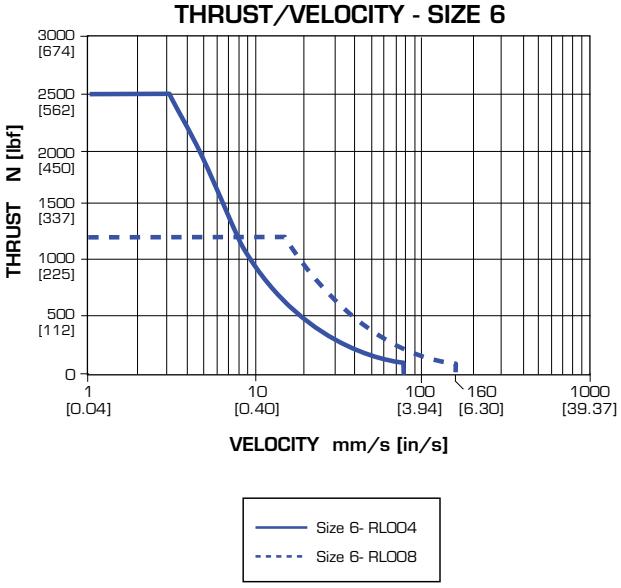
THRUST/VELOCITY - SIZES 2 & 3



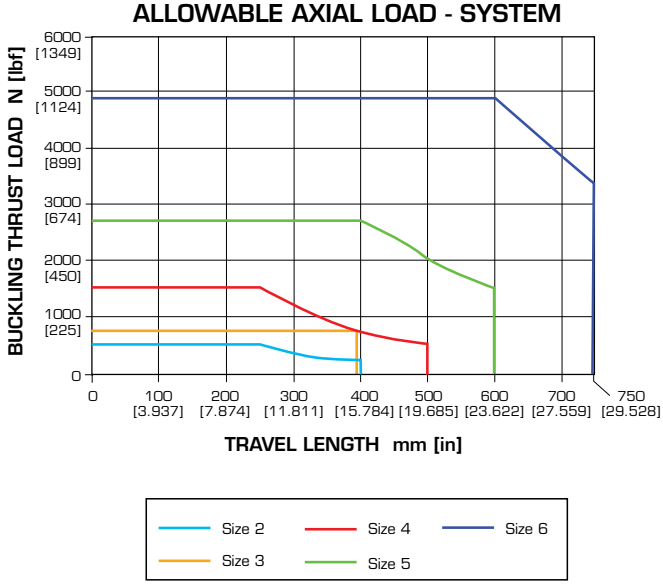
THRUST/VELOCITY - SIZES 4 & 5



THRUST/VELOCITY - SIZE 6



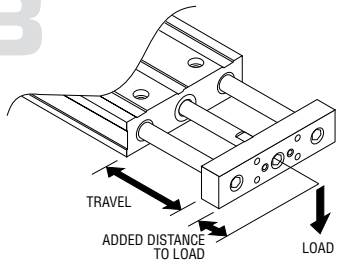
ALLOWABLE AXIAL LOAD - SYSTEM



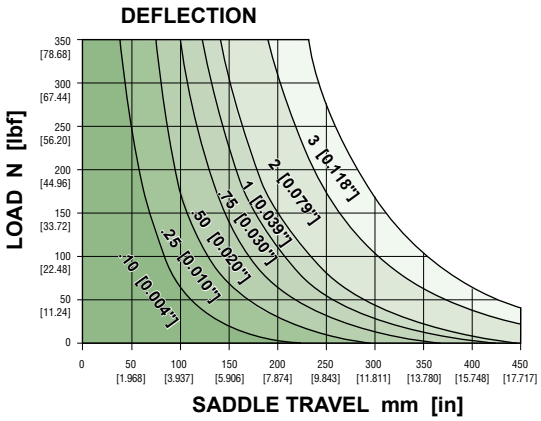
This section contains information on the capabilities of the Lead Screw Series ESK/ESL. It is not intended to be a comprehensive selection guide. To simplify the selection process, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer Service Department. Use the Application Sizing Questionnaire at the back of this catalog.

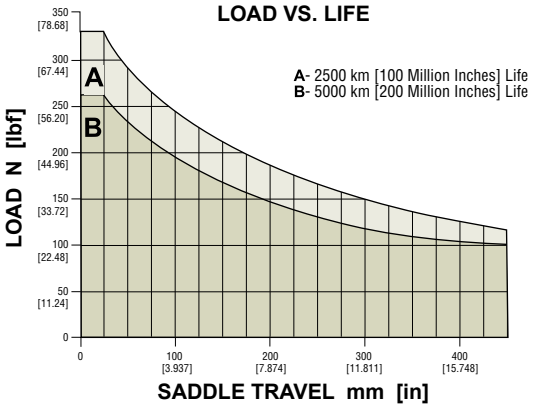
BALL SCREW - RB

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





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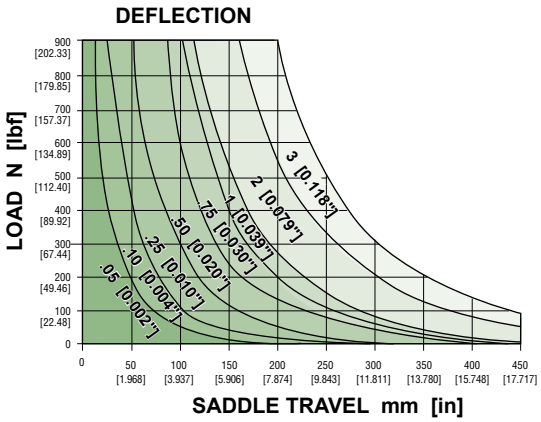
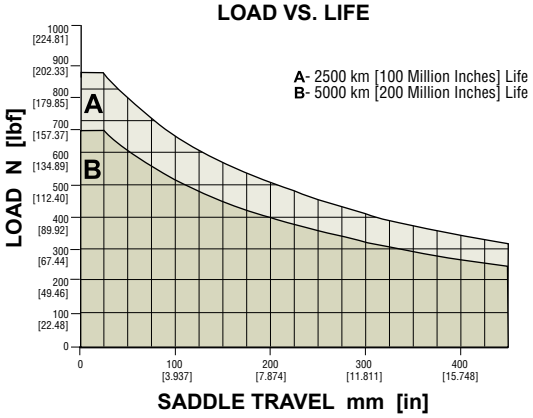
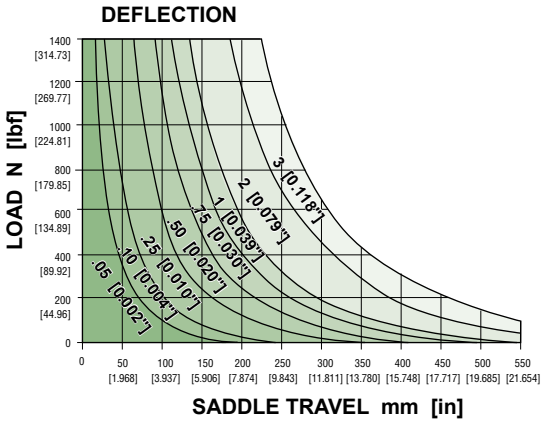
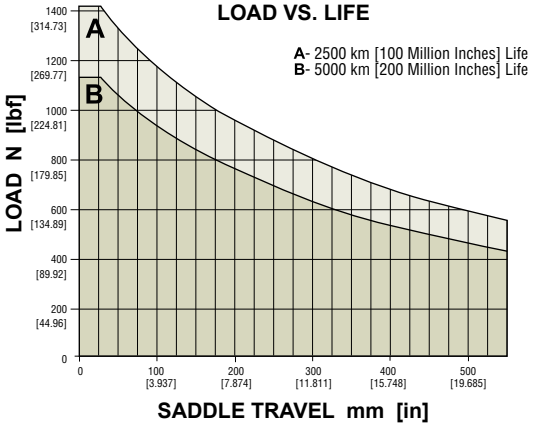




ESKB56

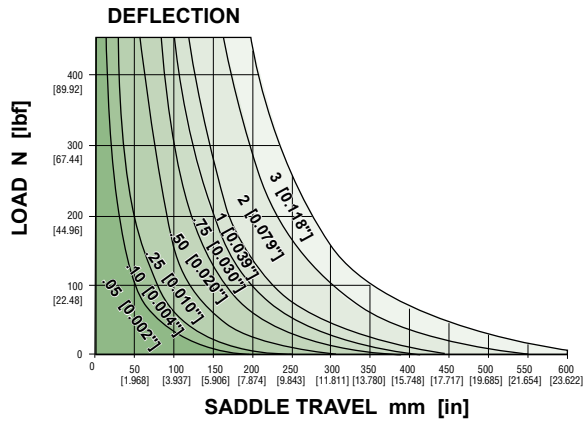


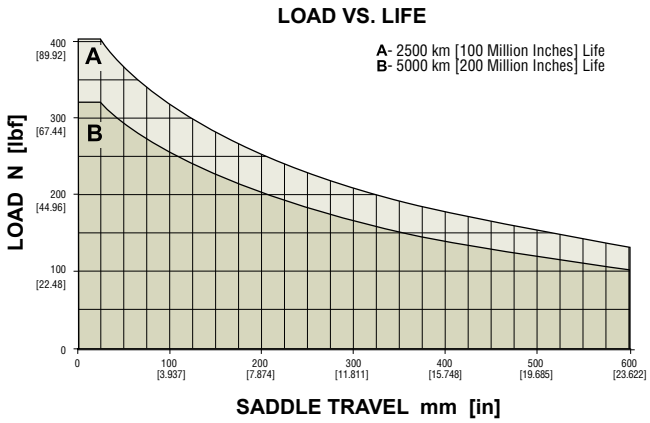


NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

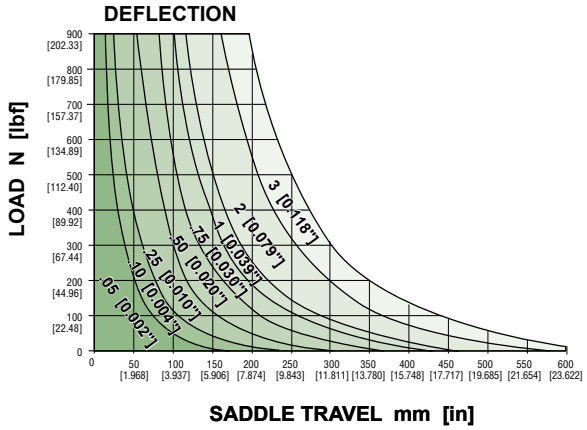
BALL SCREW - RB

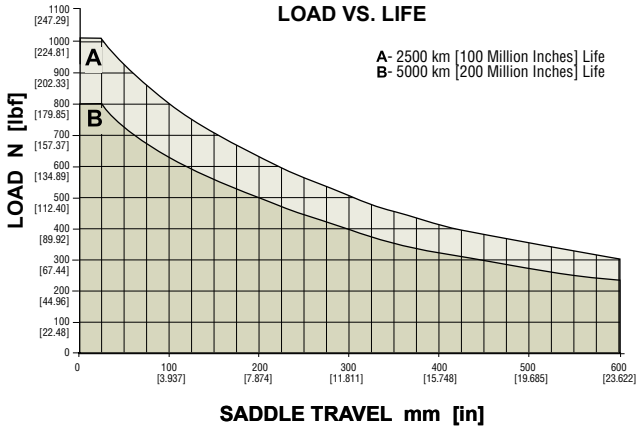
ESLB54





ESLB55





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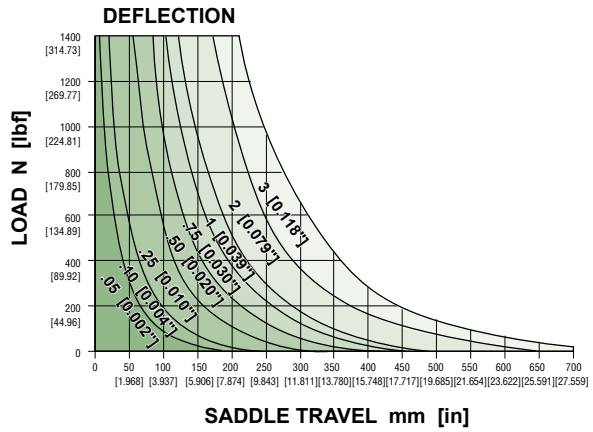
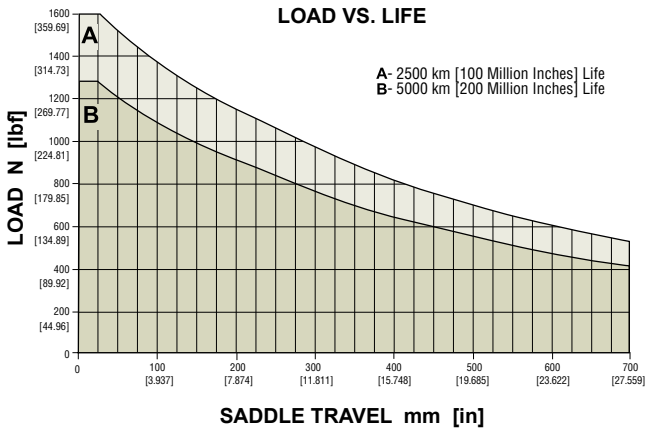
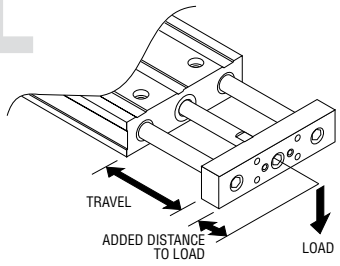




NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

LEAD SCREW - 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.



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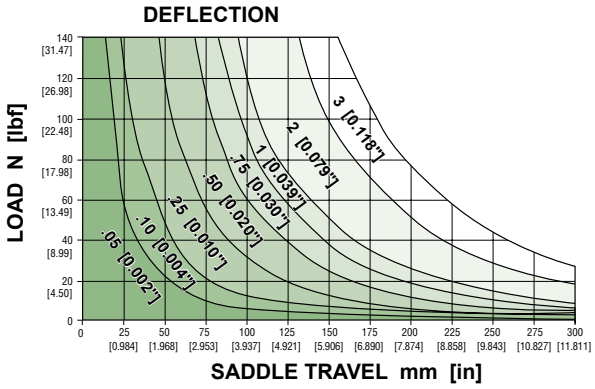
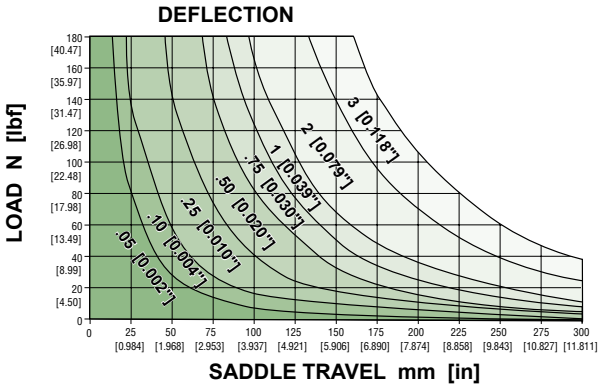


ESLC52



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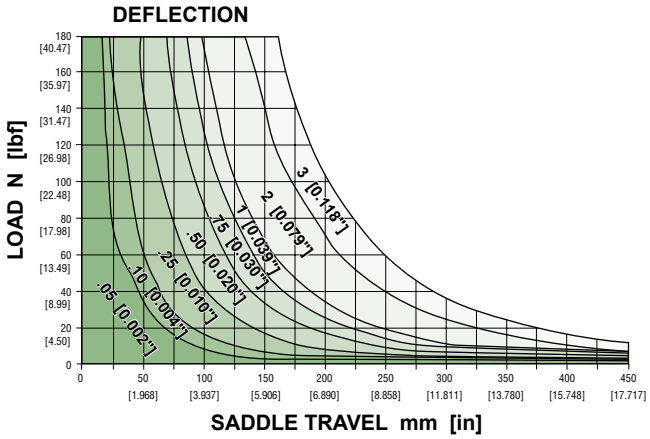

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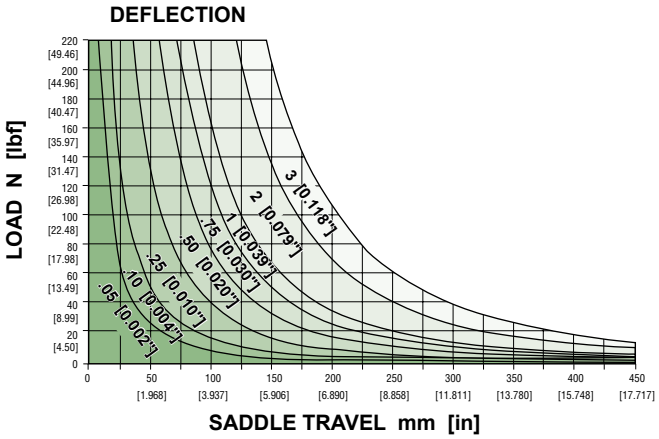
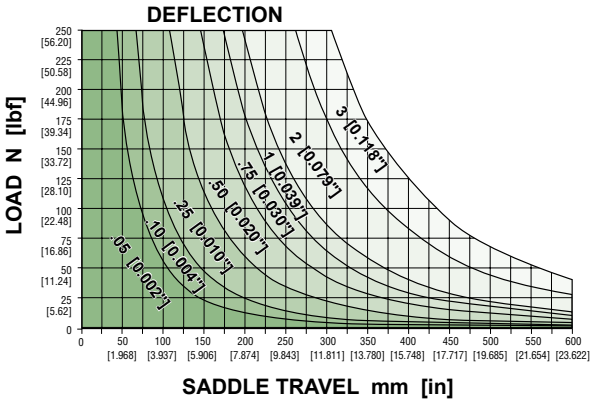


NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

LEAD SCREW - RL

ESKC54



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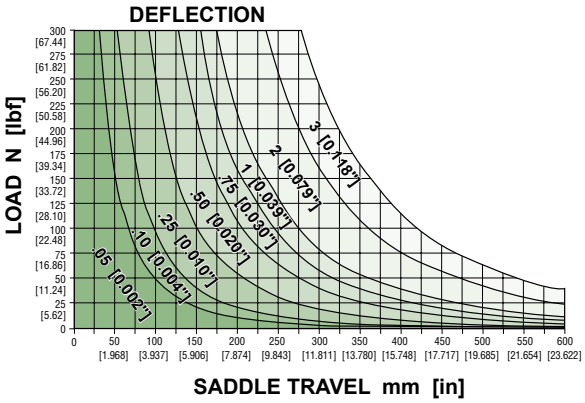

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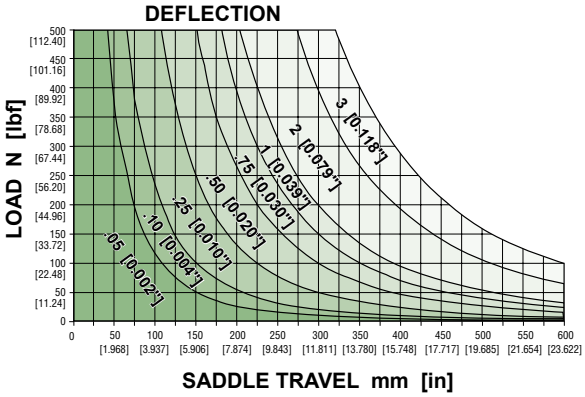

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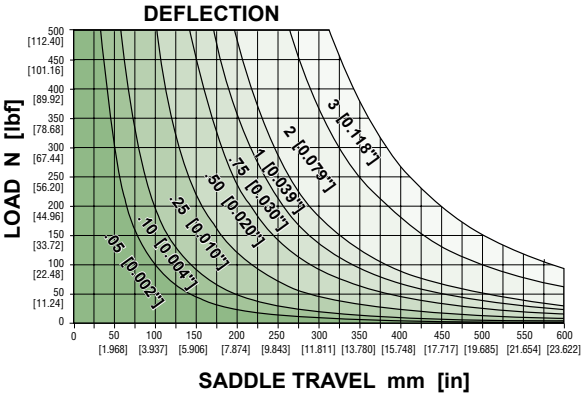

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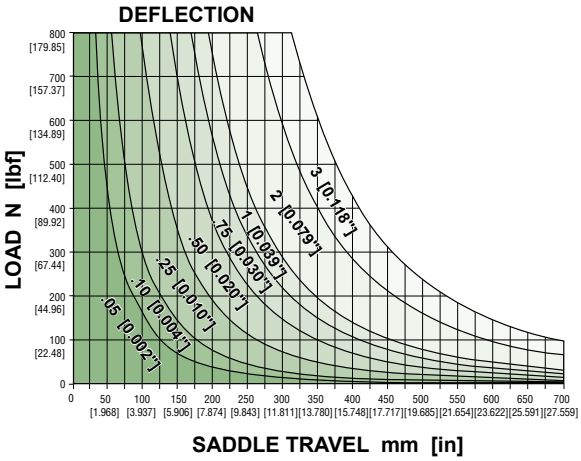

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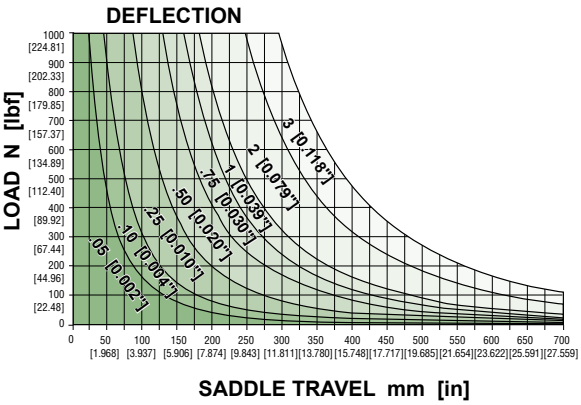
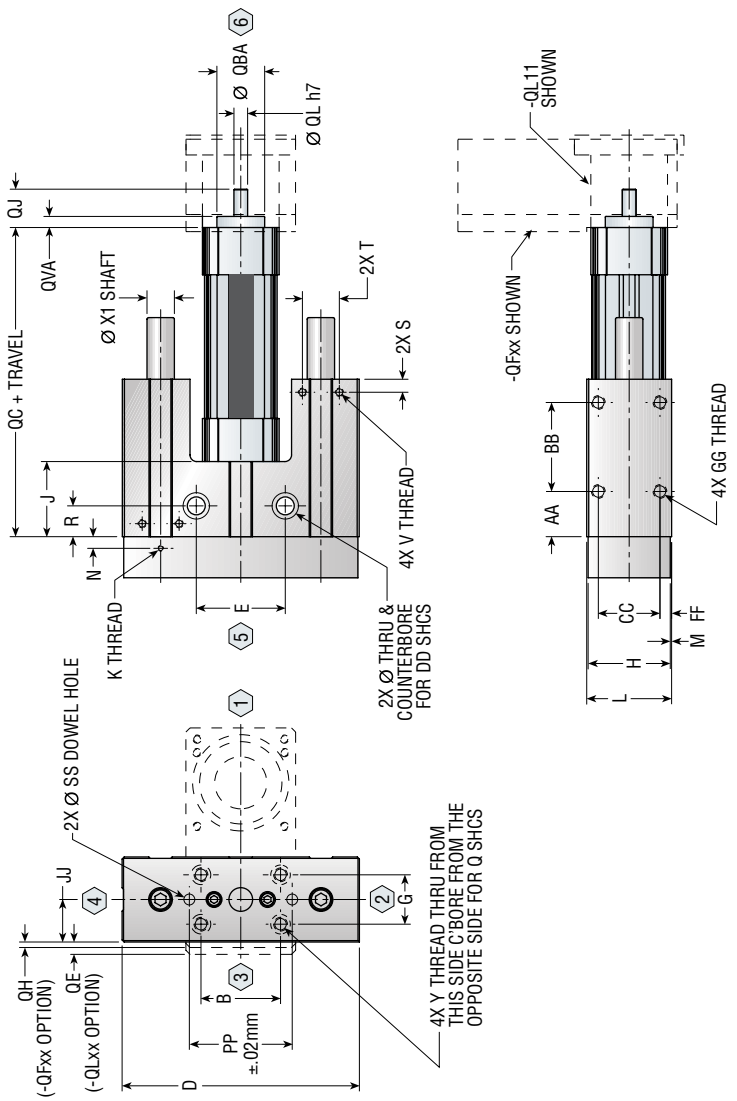
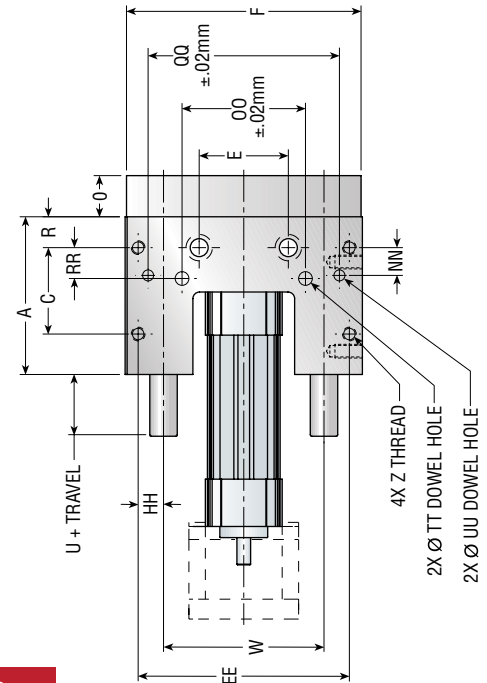


NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

DIMENSIONS: SERIES ESK SLIDE





DOWEL HOLE TOLERANCES

Ø DOWEL HOLE	STANDARD DOWEL TOLERANCE
5	+.015/-.023
6	+.015/-.023
8	+.018/-.020
10	+.018/-.020

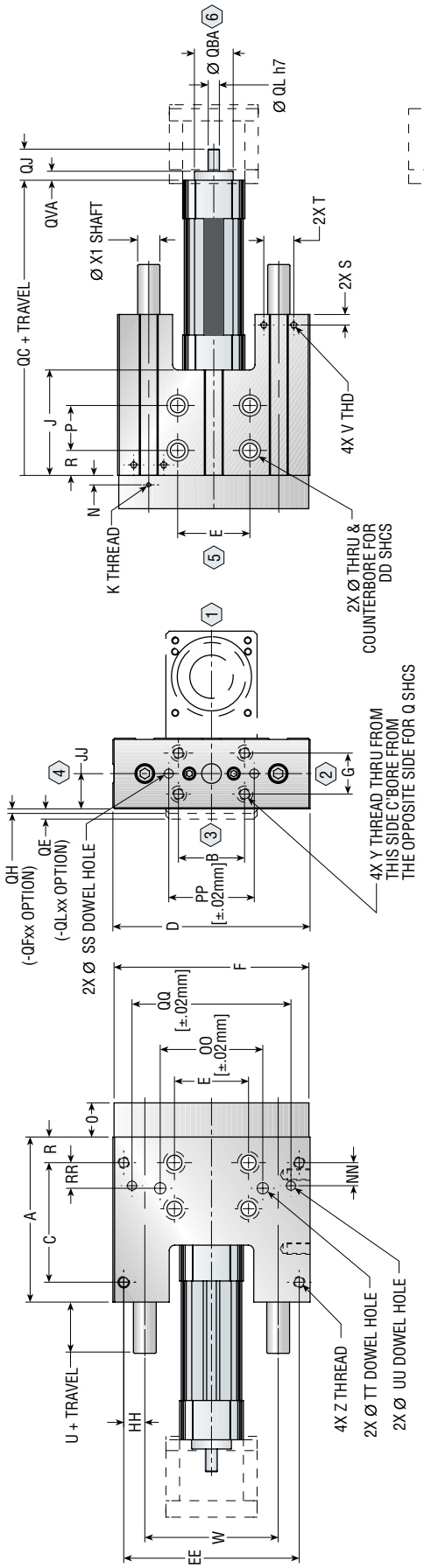
SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	O	Q	R	S	T	U	V	W	X1	Y	Z
2	82.5	38.5	51	107	50	105	23	38.1	45	M4 x 0.7 x 10 mm DP	39.9	1.1	5.0	24	M4	23	10.9	19.1	39	M5 x 0.8 x 9.5 mm DP	76	10	M5 x 0.8	M5 x 0.8 x 9 mm DP
3	89.9	50	66	122	47.5	120	30	42.9	51	M4 x 0.7 x 6.5 mm DP	45.5	1.1	11.0	22	M5	15.6	6.7	19.1	45	M5 x 0.8 x 9.5 mm DP	81	12	M6 x 1.0	M6 x 1.0 x 10 mm DP
4	100	47.5	70	143	58	141	32	48	48	M4 x 0.7 x 11 mm DP	50.5	1	10.1	25	M6	22	8.1	27.0	45	M6 x 1.0 x 15 mm DP	97	16	M8 x 1.25	M8 x 1.25 x 16 mm DP
5	115	58	63	173	65	171	36	60	54.9	M4 x 0.7 x 11 mm DP	62	1	8.5	30	M8	22.5	9.5	27.0	45	M6 x 1.0 x 15 mm DP	117	20	M10 x 1.5	M10 x 1.5 x 19 mm DP
6	150	65	100	215	80	213	45	70.1	66	M4 x 0.7 x 11 mm DP	73	1.5	7.4	35	M10	25.5	12.4	34.9	51	M8 x 1.25 x 16 mm DP	143	25	M12 x 1.75	M12 x 1.75 x 20 mm DP

SIZE	AA	BB	CC	DD	EE	FF	GG	HH	NN	OO	PP	QQ	RR	SS	TT	UU	JJ	QC	QVA	QJ	QL	QBA	QE	QH
2	12	50	30	M6	95	4.9	M5 x 0.8 x 12 mm DP	9.5	17.5	50	49	76.5	15.0	Ø 5 x 5 mm DP	Ø 5 x 5 mm DP	Ø 8 x 8 mm DP	20.1	158.4	8.1	24.4	5.0	22.9	4.4	3.9
3	25.1	47.5	32	M8	110	6.0	M6 x 1.0 x 15 mm DP	14.5	19.5	64	50	100.5	16.0	Ø 5 x 5 mm DP	Ø 6 x 8 mm DP	Ø 8 x 8 mm DP	22.6	169.3	8.1	24.4	6.0	24.9	1.9	1.3
4	31.5	58	36	M10	128	7.3	M8 x 1.25 x 16 mm DP	15.5	18.0	75.0	64.0	114.0	18.0	Ø 6 x 8 mm DP	Ø 8 x 8 mm DP	Ø 8 x 8 mm DP	25	198	8.1	25.0	6.0	29.9	5.0	6.0
5	33	65	45	M12	154	8.5	M10 x 1.5 x 20 mm DP	18.5	20.25	90.0	75.0	139.5	22.5	Ø 8 x 8 mm DP	Ø 10 x 10 mm DP	Ø 8 x 8 mm DP	31	225.9	8.1	28.0	10.0	34.9	4.0	4.0
6	44.5	65	50	M12	197	11.5	M12 x 1.75 x 20 mm DP	27	38.0	–	90.0	197.0	–	Ø 10 x 10 mm DP	–	Ø 10 x 10 mm DP	36.5	259	9.1	34.6	12.0	48.6	7.5	7.5

NOTES:
1) NUMBERS SHOWN IN ⬡ INDICATE SLIDE POSITIONS.
2) DIMENSIONS: mm

All dimensions are reference only unless specifically toleranced.

DIMENSIONS: SERIES ESL SLIDE



DOWEL HOLE TOLERANCES

Ø DOWEL HOLE	STANDARD DOWEL TOLERANCE
5	+.015/-.023
6	+.015/-.023
8	+.018/-.020
10	+.018/-.020

SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X1	Y	Z
2	110	38.5	79	M6	95	105	50	23	38.1	77	M4 x 0.7 x 10 mm DP	39.9	1.1	5	24	35	M4	23	10.9	19.1	39	M5 x 0.8 x 9.5 mm DP	76	10	M5 x 0.8	M5 x 0.8 x 9 mm DP
3	125	50	94	M8	128	120	47.5	30	42.9	86	M4 x 0.7 x 11 mm DP	45.5	1.1	11	22	39	M5	15.6	6.7	19.1	45	M5 x 0.8 x 9.5 mm DP	81	12	M6 x 1.0	M6 x 1.0 x 10 mm DP
4	130	47.5	96	M10	128	141	58	32	48	85.1	M4 x 0.7 x 11 mm DP	50.5	1	10.1	25	36	M6	22	8.1	27.0	45	M6 x 1.0 x 15 mm DP	97	16	M8 x 1.25	M8 x 1.25 x 16 mm DP
5	145	58	105	M12	154	171	65	36	60	95	M4 x 0.7 x 11 mm DP	62	1	8.5	30	40.5	M8	22.5	9.5	27.0	45	M6 x 1.0 x 15 mm DP	117	20	M10 x 1.5	M10 x 1.5 x 19 mm DP
6	200	65	150	M12	197	213	80	45	70.1	116	M4 x 0.7 x 11 mm DP	73	1.5	7.4	35	55	M10	25.5	12.4	34.9	51	M8 x 1.25 x 16 mm DP	143	25	M12 x 1.75	M12 x 1.75 x 20 mm DP

SIZE	AA	BB	CC	DD	EE	FF	GG	HH	NN	OO	PP	QQ	RR	SS	TT	UU	JJ	QC	QVA	QJ	QL	QBA	QE	QH
2	12	50	30	M6	95	4.9	M5 x 0.8 x 12 mm DP	9.5	17.5	50.0	49	76.5	15	Ø 5 x 5 mm DP	Ø 5 x 5 mm DP	Ø 8 x 8 mm DP	20.1	190.4	8.1	24.4	5	22.9	4.4	3.9
3	25.1	47.5	32	M8	128	6.0	M6 x 1.0 x 15 mm DP	14.5	19.5	64	50	100.5	16	Ø 5 x 8 mm DP	Ø 6 x 8 mm DP	Ø 8 x 8 mm DP	22.6	204.3	8.1	24.4	6	24.9	1.9	1.3
4	31.5	58	36	M10	128	7.3	M8 x 1.25 x 16 mm DP	15.5	18	75	64	114	18	Ø 6 x 8 mm DP	Ø 8 x 8 mm DP	Ø 8 x 8 mm DP	25	235	8.1	25.0	6	29.9	5	6
5	33	65	45	M12	154	8.5	M10 x 1.5 x 20 mm DP	18.5	20.25	90	75	139.5	22.5	Ø 8 x 8 mm DP	Ø 10 x 10 mm DP	Ø 8 x 8 mm DP	31	265.9	8.1	28.0	10	34.9	4	4
6	44.5	65	50	M12	197	11.5	M12 x 1.75 x 20 mm DP	27	38	–	90	197	–	Ø 10 x 10 mm DP	–	Ø 10 x 10 mm DP	36.5	309	9.1	34.6	12	48.6	7.5	7.5

NOTES:
1) NUMBERS SHOWN IN ⬡ INDICATE SLIDE POSITIONS.
2) DIMENSIONS: mm

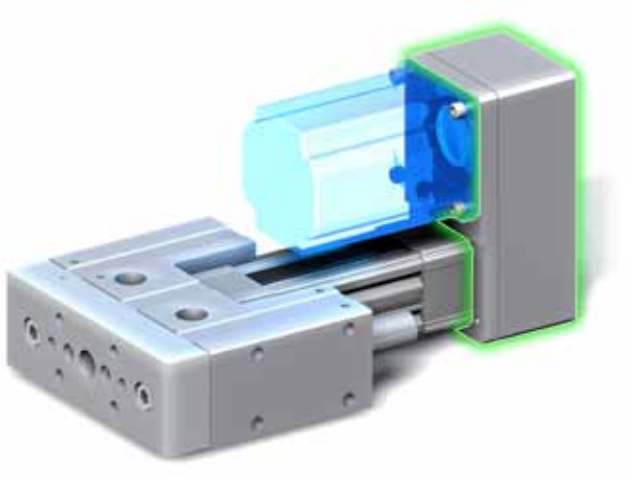
All dimensions are reference only unless specifically toleranced.

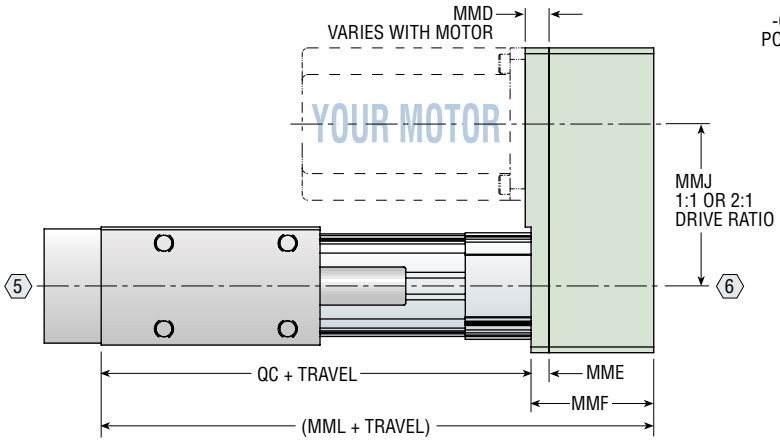
QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

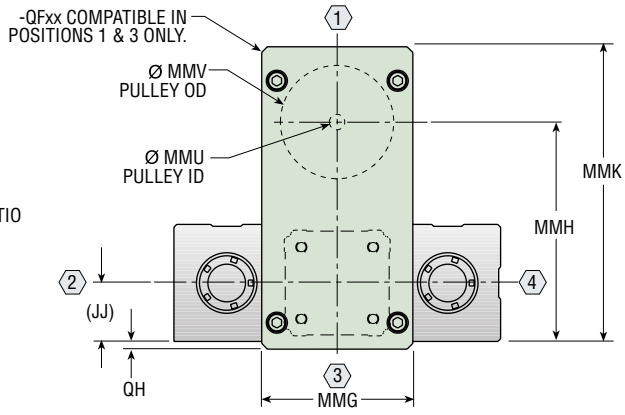
QF21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO

(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 36.



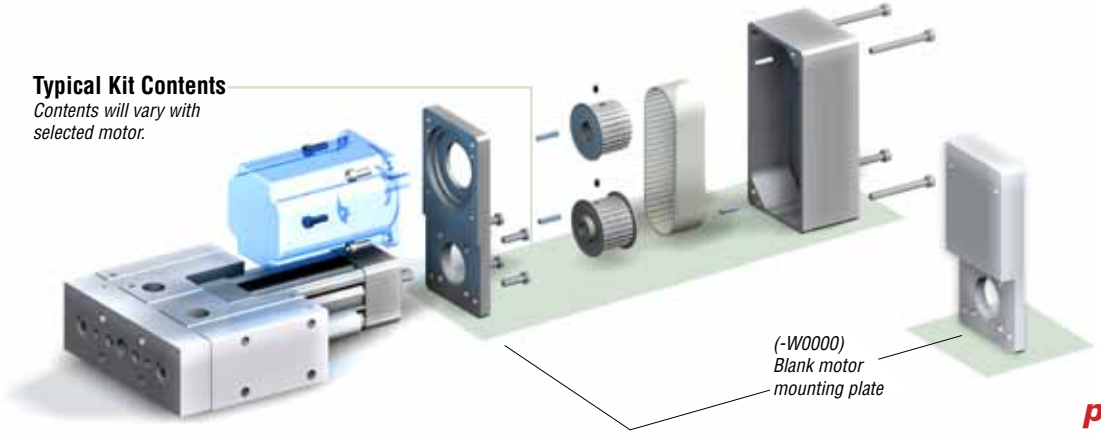




SIZE	QC (ESKCxx)	QC (ESLCxx)	(JJ)	QH	MMD MIN	MMD MAX	MME	MMF	MMG	MMH 1:1	MMH 2:1	MMJ 1:1	MMJ 2:1	MMK	MML (ESKBxx)	MML (ESLBxx)	WEIGHT kg
2	158.4	190.4	20.1	4	6.1	22.5	9.5	55.5	58	88.4	–	67.5	–	116.6	213.7	245.7	.79
3	169.3	204.3	22.6	4	6.1	22.5	9.5	55.5	58	90.2	–	67.5	–	119.3	224.7	259.7	.79
4	198	235	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
6	259	309	36.5	7.5	9.5	22.5	9.5	68	86	139	148	102.5	111.4	190.9	327	377	2.37

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

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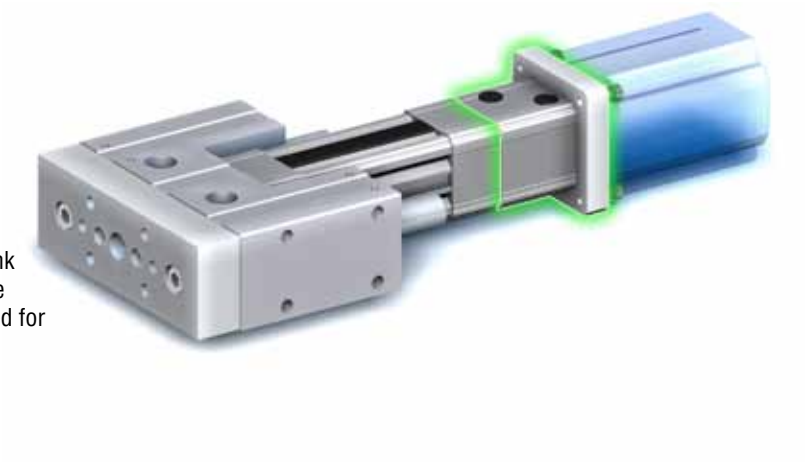
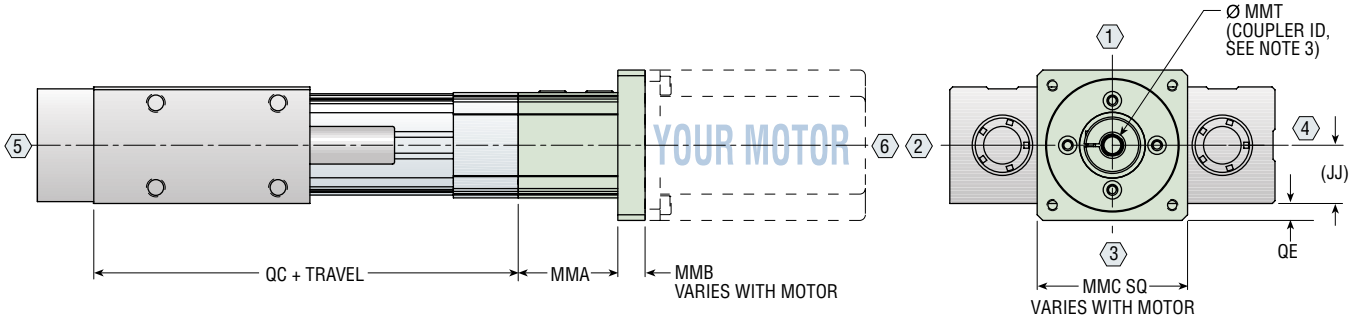
All dimensions are reference only unless specifically toleranced.

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

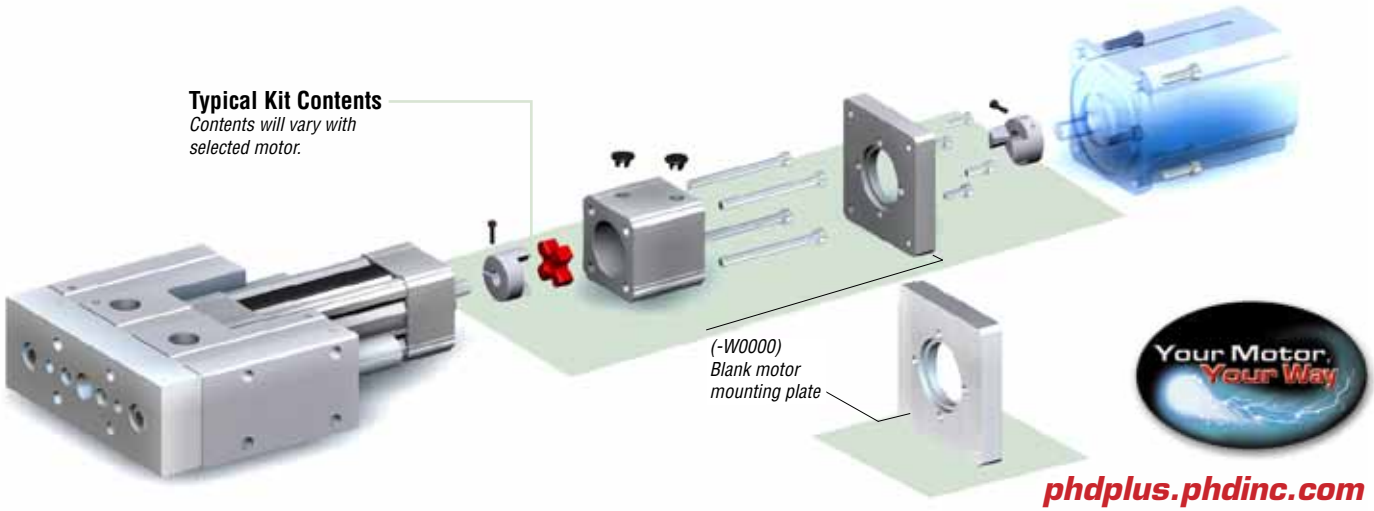
Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 36.





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



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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. See page 36.

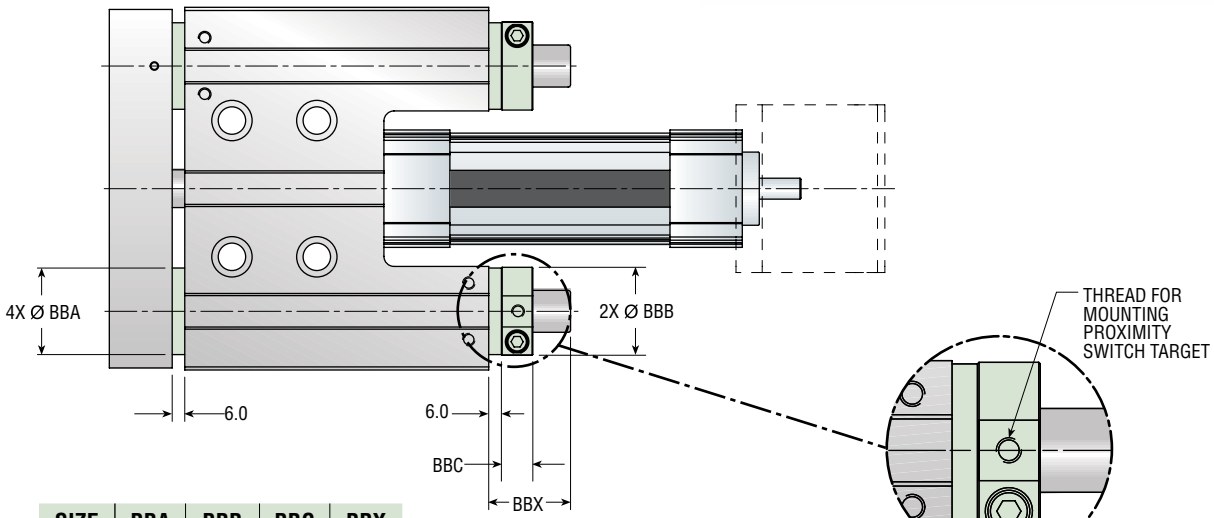
Q1 CORROSION RESISTANT GUIDE SHAFTS

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

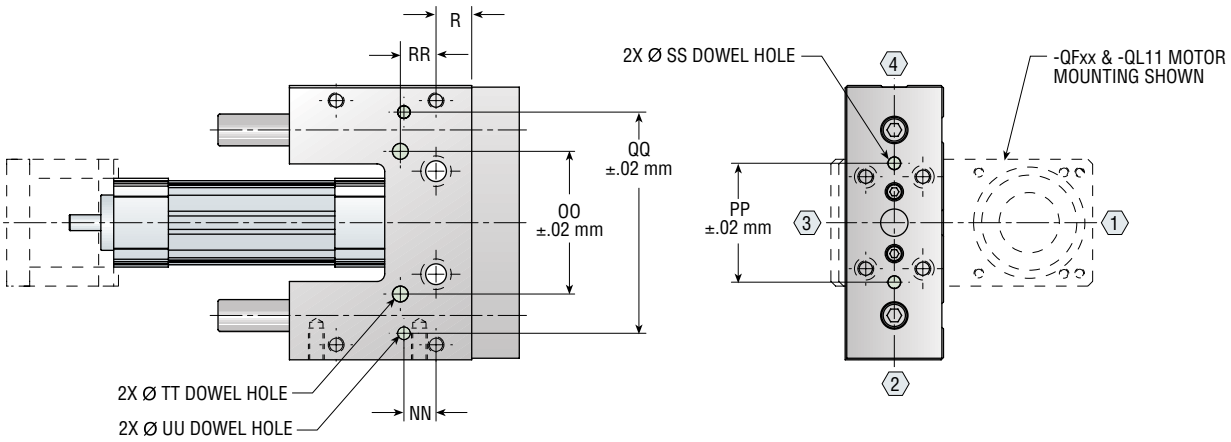
J3 TRANSITION FIT DOWEL HOLES

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	+.038/-.011	+.012/-.000
6	+.038/-.011	+.012/-.000
8	+.041/-.016	+.015/-.000
10	+.041/-.016	+.015/-.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.

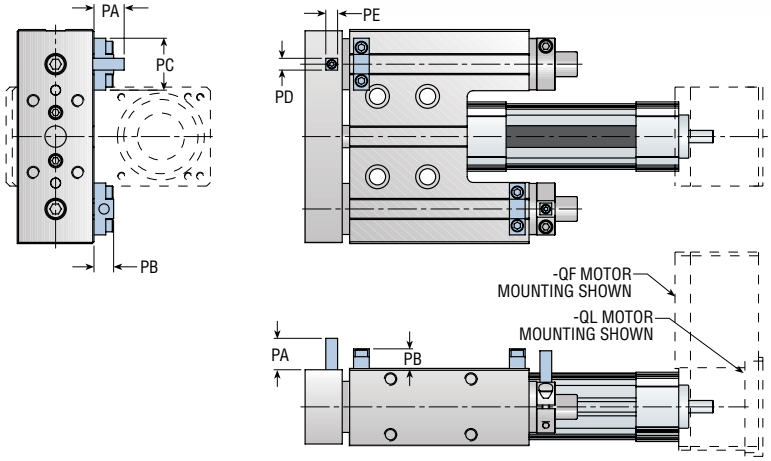
H11 SLIDE REPLACEMENT ONLY (WITHOUT CYLINDER)

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).

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

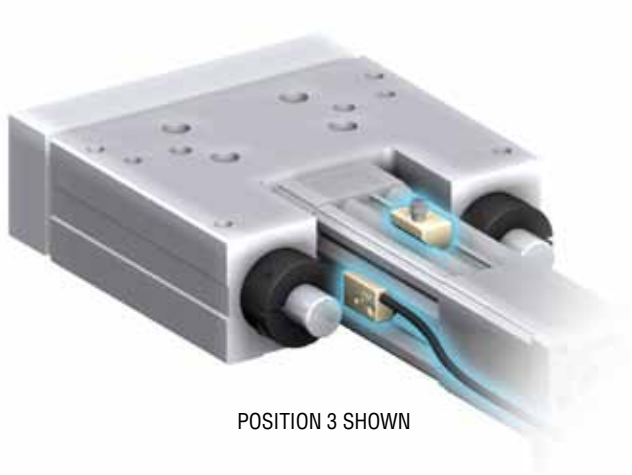
INDUCTIVE PROXIMITY SWITCHES

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, NPN with 2 meter Cable
51422-006-02	8 mm Inductive Proximity Switch, PNP with 2 meter Cable
15561-001	12 mm Inductive Proximity Switch, NPN with 3 meter Cable
15561-002	12 mm Inductive Proximity Switch, PNP with 3 meter Cable
15561-003	12 mm Inductive Proximity Switch, AC 35-250 with 3 meter Cable

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.



POSITION 3 SHOWN

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

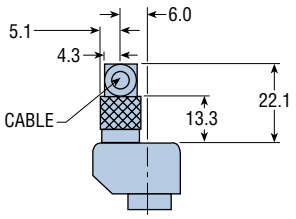
SERIES 6250 REED SWITCHES

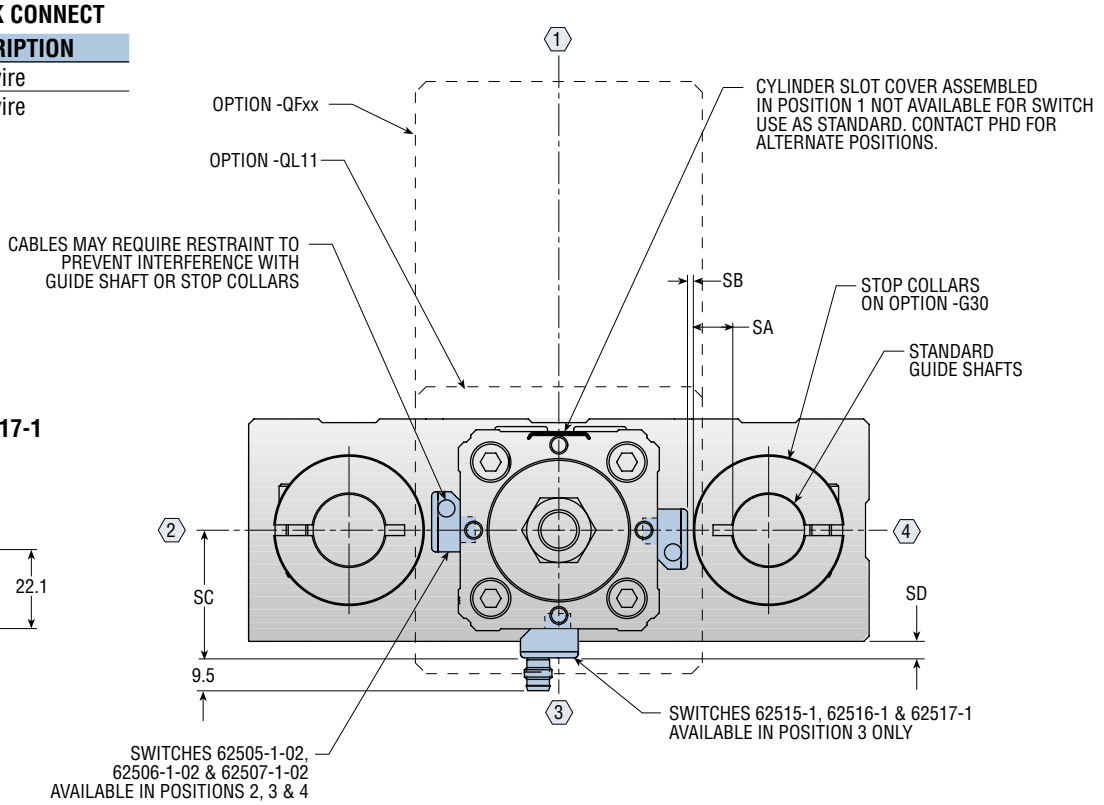
PART NO.	DESCRIPTION	COLOR
62507-1-02	AC/DC Reed, 2 m cable	Silver
62517-1	AC/DC Reed, Quick Connect	Silver

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



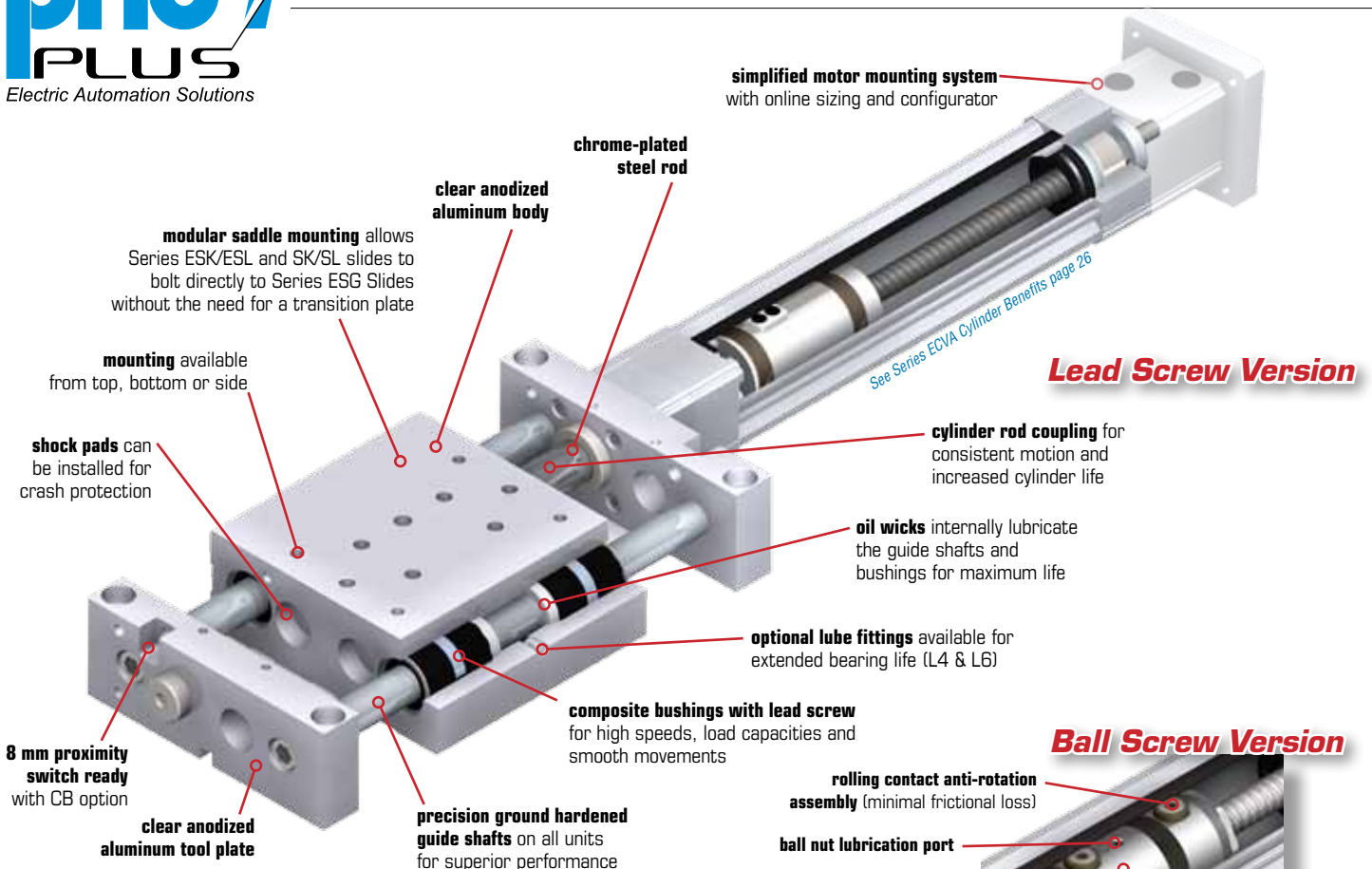


SIZE	SA	SB	SC	SD
2	–	–	25.4	5.3
3	–	–	27.9	5.3
4	9.1	–	31.5	6.5
5	13.0	1.3	35.6	4.6
6	18.5	6.4	40.4	4.1

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

All dimensions are reference only unless specifically toleranced.

SERIES ESG SLIDE



Lead Screw Version

Ball Screw Version

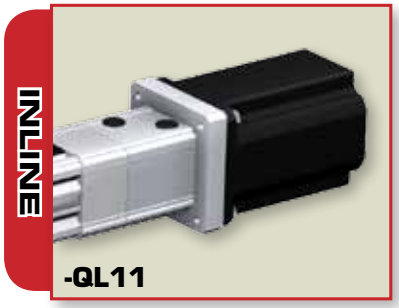
ball nut assembly fully guided for optimum alignment and stability over long travels and high speeds

Major Benefits

- Electrically driven gantry slide based on the proven PHD Series SG Slide
- 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 900 mm
- IP50 ingress protection
- 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
- Choice of options/accessories similar to pneumatic Series SG Slides
- 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 ESG SLIDE

Example Ordering Data:

E	S	G	C	5	2	x	300	-	RL150	-	BB	-	L6	-	QF11	-	Wxxxx

Electromechanical Linear Actuator | **Slide** | **Gantry**

Type

B - Ball Bushing
C - TC Bushing

Ball Bushing available only on Ball Screw sizes 4,5 & 6.

TC Bushing available only with Lead Screw.

Metric Design

Size

2
3
4
5
6

Travel (Max)

Size	Ball mm	Lead mm
2	—	300
3	—	400
4	500	500
5	600	600
6	900	600

50 mm minimum travel in 50 mm increments

Screw Configuration

	Size		Lead* mm
Ball Screw	4	RB005	5
	4	RB010	10
	5	RB010	10
	5	RB016	16
	6	RB010	10
	6	RB016	16
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
	6	RL004	4
	6	RL008	8

Options

H4 - Cylinder replacement only
H11 - Without cylinder option
CB - Proximity switch ready with shock pads on extension and retraction
BB - Shock pads on extension and retraction
L4 - Lube fitting in saddle port position 2 and 4
L6 - Lube fitting in saddle port position 3
Q1 - Corrosion resistant guide shafts (both ends unplated)

Motor Configuration

QF11 - Foldback with 1:1 ratio
QF21 - *Foldback with 2:1 ratio
QL11 - Inline with 1:1 ratio

Blank - No Motor Mount

*QF21 not available on sizes 2 and 3.

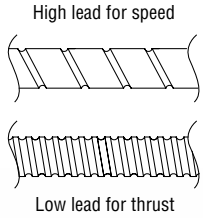
Motor Mount Code

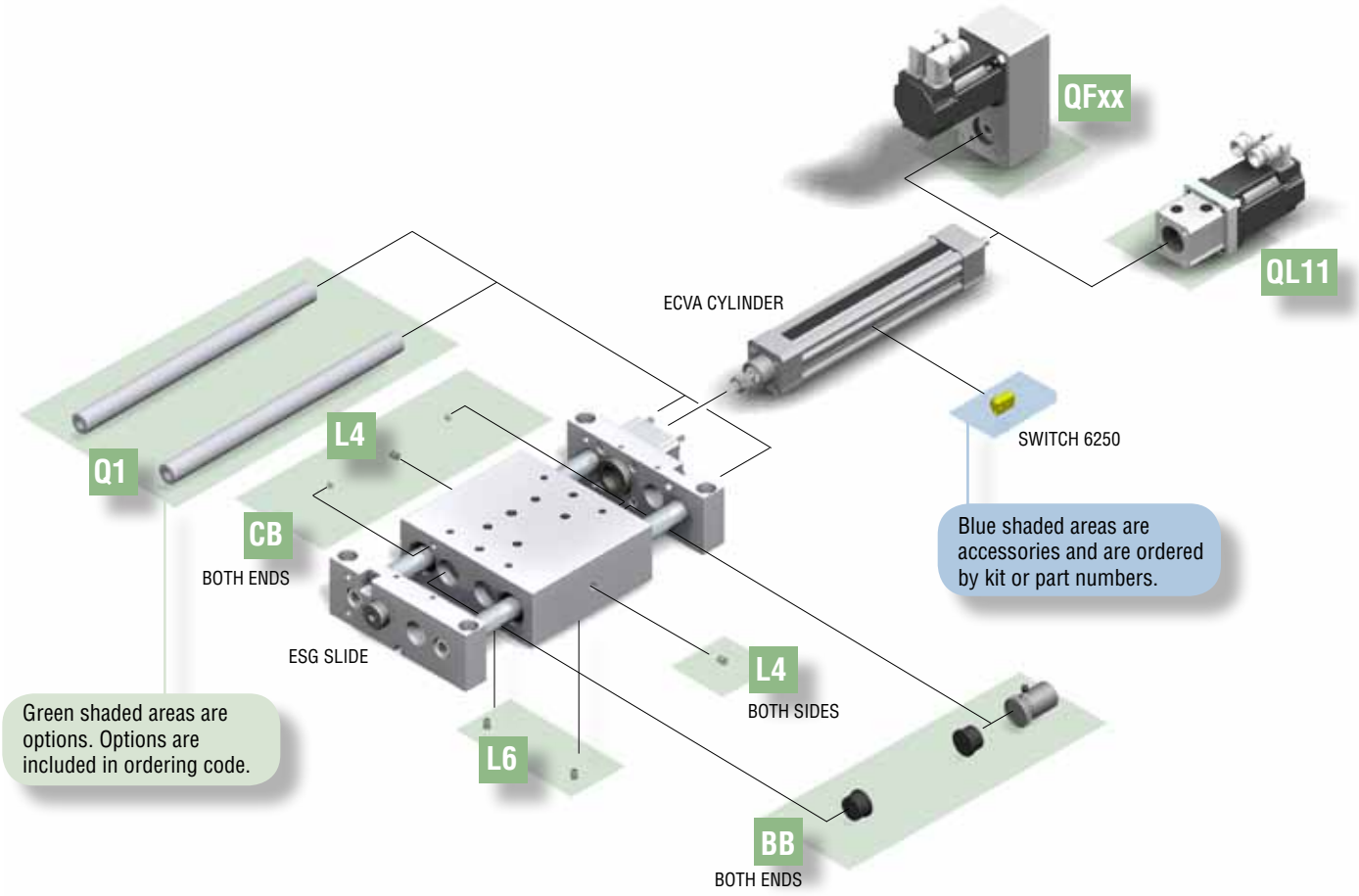
Wxxxx - Open Architecture P/N Code
W0000 - Blank motor mount

Blank - No Motor Mount

SCREW CONFIGURATION

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





BALL SCREW - RB

SPECIFICATIONS	BALL SCREW SERIES ESG
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 68)
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]	500 [19.69]		600 [23.62]		900 [35.43]	
	DRIVE MECHANISM			Ball Screw					
	SCREW DIAMETER		mm	12		16		16	
	SCREW CONFIGURATION			-RB005	-RB010	-RB010	-RB016	-RB010	-RB016
	SCREW LEAD		mm/rev	5	10	10	16	10	16
	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]	1600 [63.0]
	MAXIMUM RPM		rev/min	6000					
	MAXIMUM ACCELERATION		mm/sec² [in/sec²]	19.6 [772]					
THRUST[4]	MAXIMUM THRUST		N [lbf]	1360 [306]	680 [153]	2430 [546]	1520 [342]	2430 [546]	1520 [342]
	NOMINAL THRUST[5]		N [lbf]	400 [90]	330 [74]	1270 [285]	975 [219]	1270 [285]	975 [219]
TORQUE	PERMISSIBLE DRIVE TORQUE[6]		Nm [in-lb]	1.20 [10.62]		4.30 [38.06]		4.30 [38.06]	
	NO-LOAD TORQUE		Nm [in-lb]	0.15 [1.33]		0.40 [3.54]		0.60 [5.31]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})		kg [lb]	6.21 [13.7]		8.56 [18.87]		11.19 [24.67]	
	TOTAL LENGTH ADDER (W_{LT})		kg/mm [lb/in]	0.010 [0.57]		0.132 [0.74]		0.0169 [0.92]	
	MOVING @ ZERO STROKE (W_{OM})		kg [lb]	2.45 [5.41]		3.84 [8.47]		4.89 [10.67]	
	MOVING LENGTH ADDER (W_{LM})		kg/mm [lb/in]	0.0006 [0.038]		0.0010 [0.058]		0.0010 [0.058]	
INERTIA	ACTUATOR @ ZERO STROKE (J_O)		kg-m² [lb-in²]	3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		1.50×10^{-5} [0.051]	
	LENGTH ADDER (J_L)		kg-m²/mm [lb-in²/in]	9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		2.90×10^{-8} [0.0025]	
	MOVING WEIGHT ADDER (J_M)		kg-m²/kg [lb-in²/lb]	6.21×10^{-7} [9.63×10^{-4}]	2.48×10^{-6} [3.85×10^{-3}]	2.48×10^{-6} [3.85×10^{-3}]	6.36×10^{-6} [9.86×10^{-3}]	2.48×10^{-6} [3.85×10^{-3}]	6.36×10^{-6} [9.86×10^{-3}]
	MOTOR CONFIGURATION (J_Q)	-QF11	kg-m² [lb-in²]	1.40×10^{-5} [0.048]		4.71×10^{-5} [0.161]		4.71×10^{-5} [0.161]	
		-QF21		2.75×10^{-5} [0.094]		8.28×10^{-5} [0.283]		8.28×10^{-5} [0.283]	
		-QL11		3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		6.11×10^{-6} [0.021]	

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 68
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 73 and 74]*
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_Q

FOR -QF21: INERTIA $_{Reflected}$ = [J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_Q

LEAD SCREW - RL

SPECIFICATIONS	LEAD SCREW SERIES ESG
REPEATABILITY[1]	±0.5 mm [±0.020 in] (Typical)
MAXIMUM 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]	300 [11.811]		400 [15.70]		500 [19.69]		600 [23.62]		600 [23.62]	
	SCREW DIAMETER	mm	8		10		12		16		16	
	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 [0.394]		12 [0.472]		16 [0.630]		20 [0.787]		25 [0.984]	
	GUIDE SHAFT BEARING TYPE		Composite Bushing									
SPEED[4]	MAXIMUM SPEED	mm/sec [in/sec]	15 [0.60]	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/sec² [in/sec²]	0.3 [11.81]	1.0 [39.37]	0.3 [11.81]	1.0 [39.37]	0.3 [11.81]	1.0 [39.37]	0.5 [19.69]	1.0 [39.37]	0.5 [19.69]	1.0 [39.37]
THRUST[4]	MAXIMUM THRUST	N [lbf]	300 [67.5]	150 [33.7]	500 [112]	250 [56]	800 [180]	400 [90]	1600 [360]	800 [180]	1600 [360]	800 [180]
TORQUE	PERMISSIBLE DRIVE TORQUE[5]	Nm [in-lb]	0.5 [4.42]		0.7 [6.20]		1.20 [10.62]		4.30 [38.06]		4.30 [38.06]	
	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]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})	kg [lb]	2.57 [5.66]		3.37 [7.42]		6.13 [13.54]		8.45 [18.63]		11.08 [24.43]	
	TOTAL LENGTH ADDER (W_{LT})	kg/mm [lb/in]	0.003 [0.14]		0.004 [0.21]		0.010 [0.57]		0.0132 [0.74]		0.017 [0.92]	
	MOVING @ ZERO STROKE (W_{OM})	kg [lb]	1.07 [2.35]		1.50 [3.31]		2.38 [5.25]		3.73 [8.23]		4.735 [10.43]	
	MOVING LENGTH ADDER (W_{LM})	kg/mm [lb/in]	0.0004 [0.021]		0.0007 [0.038]		0.0007 [0.038]		0.0010 [0.058]		0.0010 [0.058]	
INERTIA	ACTUATOR @ ZERO STROKE (J_O)	kg-m² [lb-in²]	1.66×10^{-6} [0.006]		2.09×10^{-6} [0.007]		3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		1.50×10^{-5} [0.051]	
	LENGTH ADDER (J_L)	kg-m²/mm [lb-in²/in]	1.59×10^{-9} [0.00014]		4.94×10^{-9} [0.00043]		9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		2.90×10^{-8} [0.0025]	
	MOVING WEIGHT ADDER (J_M)	kg-m²/kg [lb-in²/lb]	3.8×10^{-8} [5.89×10^{-5}]	1.01×10^{-7} [1.57×10^{-4}]	3.8×10^{-8} [5.89×10^{-5}]	7.6×10^{-8} [1.18×10^{-4}]	7.6×10^{-8} [1.18×10^{-4}]	1.52×10^{-7} [2.36×10^{-4}]	1.01×10^{-7} [1.57×10^{-4}]	2.03×10^{-7} [3.14×10^{-4}]	1.01×10^{-7} [1.57×10^{-4}]	2.03×10^{-7} [3.14×10^{-4}]
	MOTOR CONFIGURATION (J_Q) -QF11	kg-m² [lb-in²]	2.69×10^{-5} [0.092]		2.69×10^{-5} [0.092]		1.40×10^{-5} [0.048]		4.71×10^{-5} [0.161]		4.71×10^{-5} [0.161]	
	-QF21		–		–		2.75×10^{-5} [0.094]		8.28×10^{-5} [0.283]		8.28×10^{-5} [0.283]	
	-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]		6.11 x 10^{-6} [0.021]	

NOTES:
1) UNIDIRECTIONAL
2) VALUES CORRESPOND TO INITIAL (AS SUPPLIED/NEW) CONDITION. DUE TO FRICTIONAL WEAR BACKLASH MAY INCREASE OVER TIME.
3) REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
4) REFER TO PERFORMANCE CHARTS ON PAGE 69
5) CORRESPONDS TO MAXIMUM THRUST

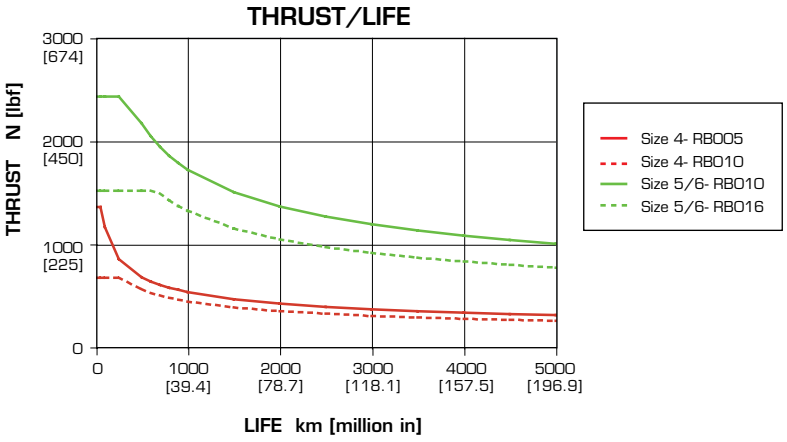
WEIGHT AND INERTIAL CALCULATIONS:

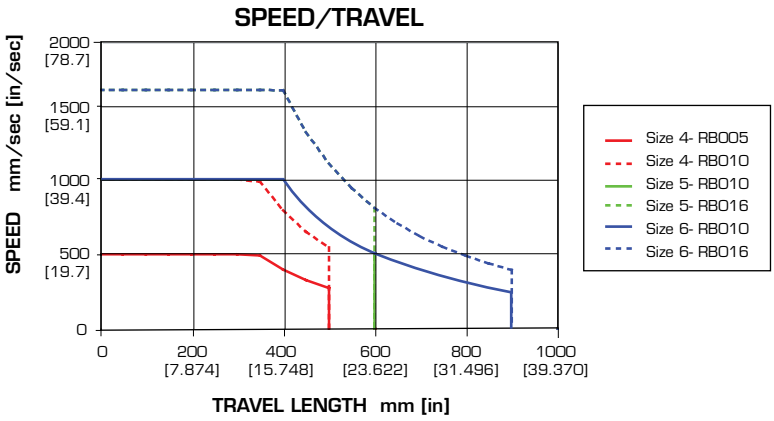
TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT *[reference pages 73 and 74]*
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

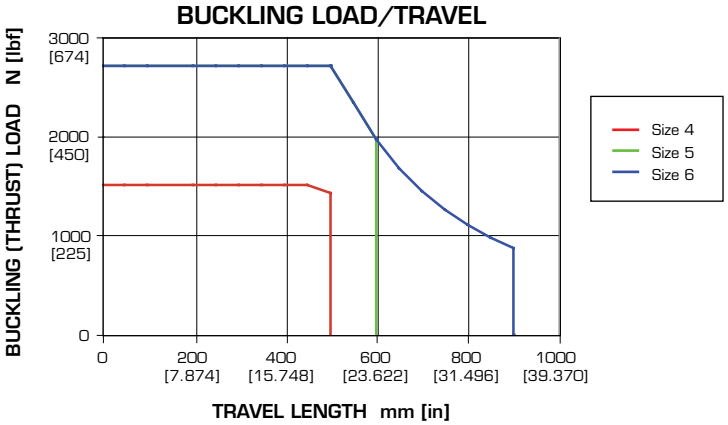
FOR -Qx11: INERTIA $_{Reflected}$ = J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT) + J_Q

FOR -QF21: INERTIA $_{Reflected}$ = [J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_Q

BALL SCREW - RB



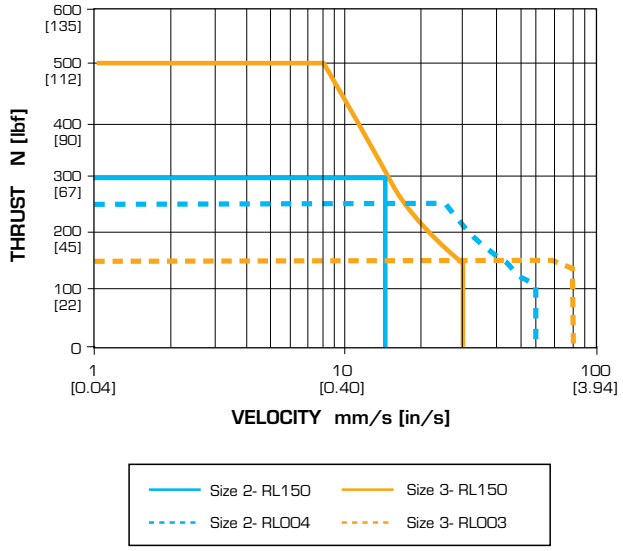




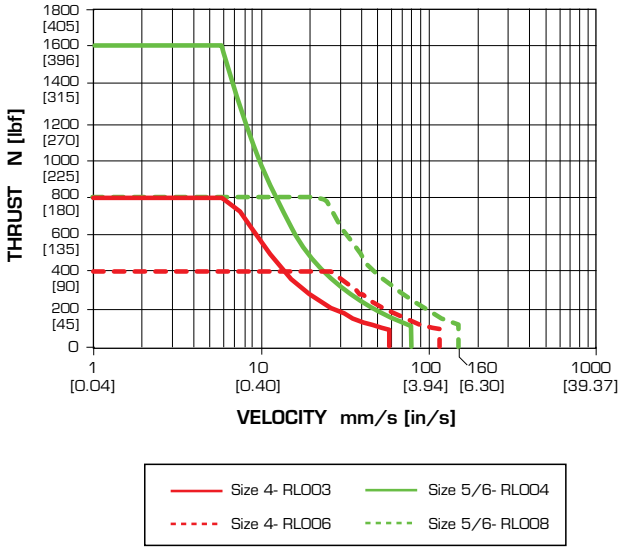
This section contains information on the capabilities of the Ball Screw Series ESG. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Customer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

LEAD SCREW - RL

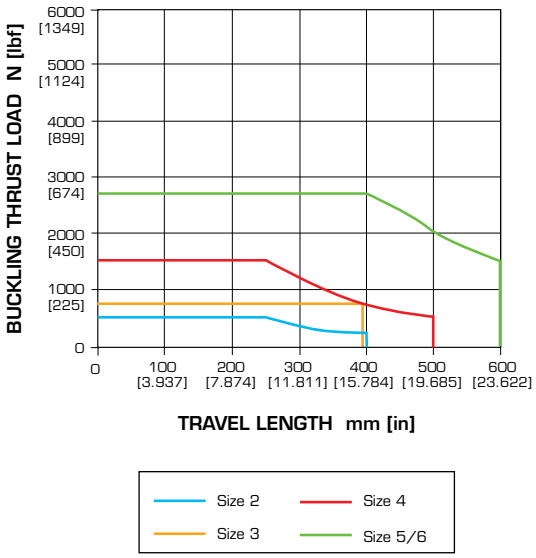
THRUST/VELOCITY - SIZES 2 & 3



THRUST/VELOCITY - SIZES 4, 5 & 6



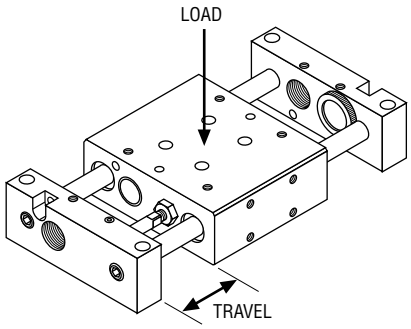
ALLOWABLE AXIAL LOAD - SYSTEM



This section contains information on the capabilities of the Lead Screw Series ESG. 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. Use the Application Sizing Questionnaire at the back of this catalog.

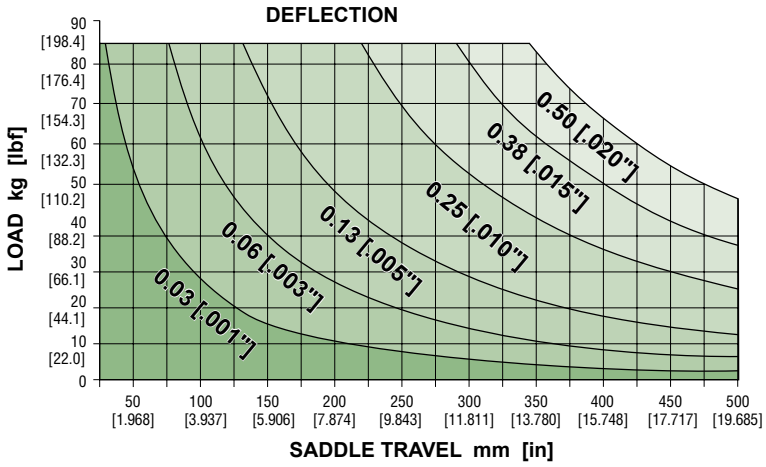
BALL SCREW - RB

The deflection figures given in these charts are based on the effect of external loads. Shaft straightness, shaft weight, and bearing alignment will affect the accuracy of the saddle location. For torsional deflection calculations, see the SG Slide in the Product Sizing. Deflections shown are theoretical and reflect the performance of the unit at mid-travel. Deflections at ends of travel will be greatly reduced.



Horizontal load values are based on the load centered on the saddle as shown.

ESGB54



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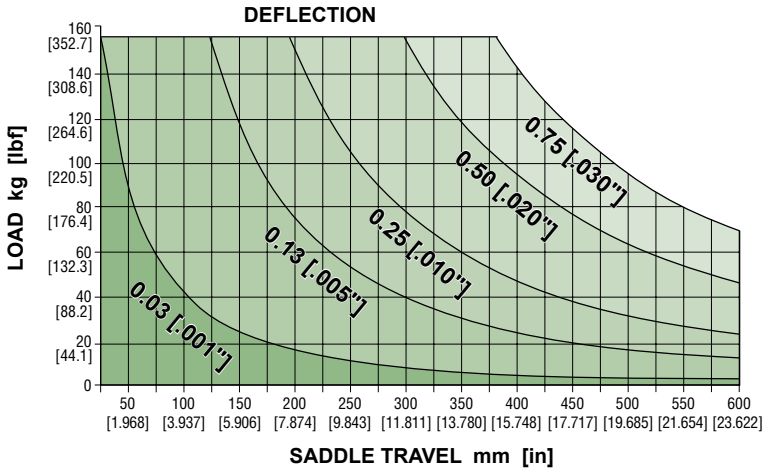
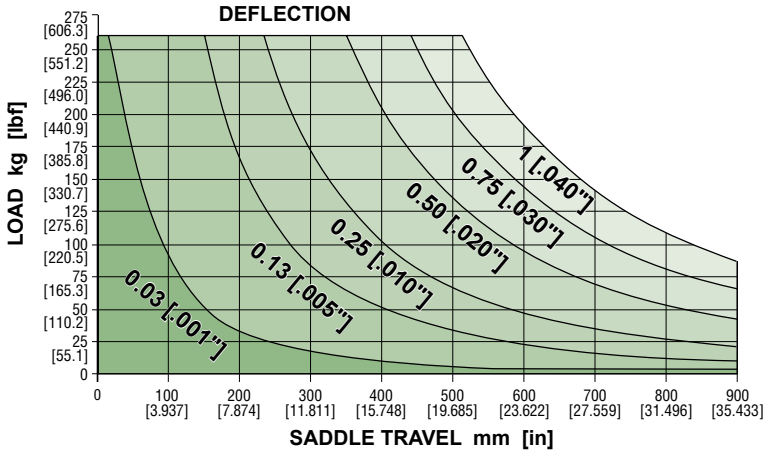


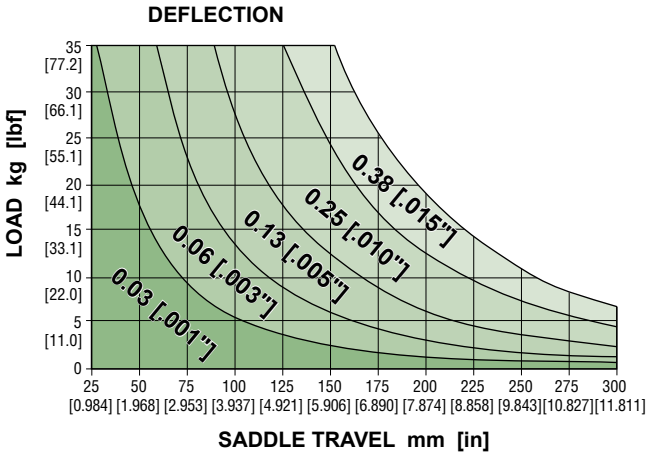
ESGB56



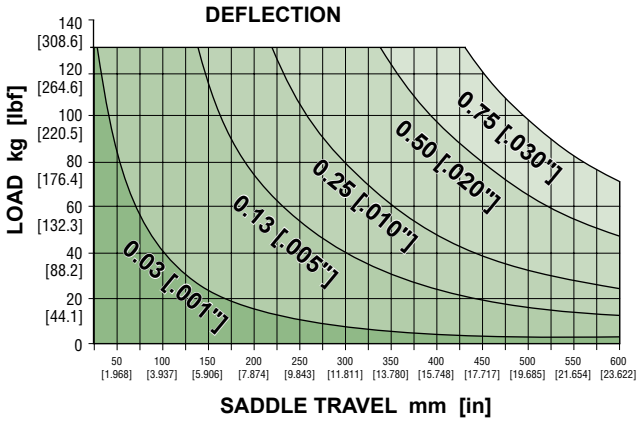
NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

LEAD SCREW - RL

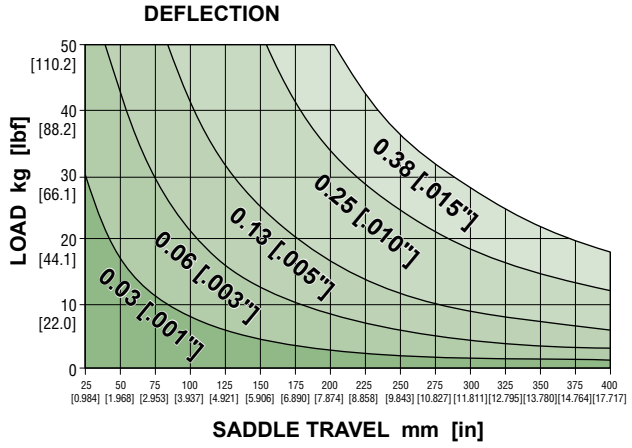
ESGC52



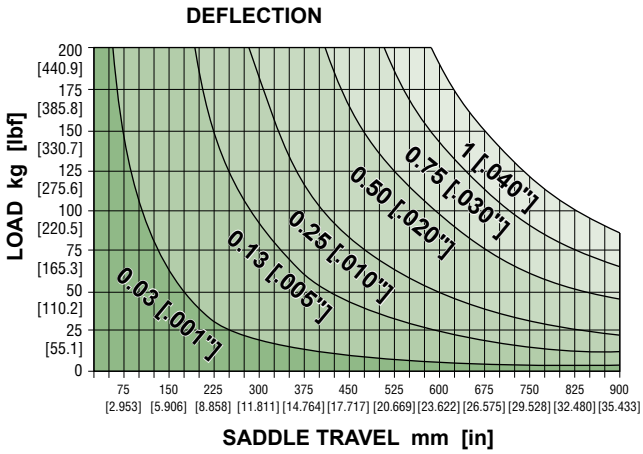
ESGC55



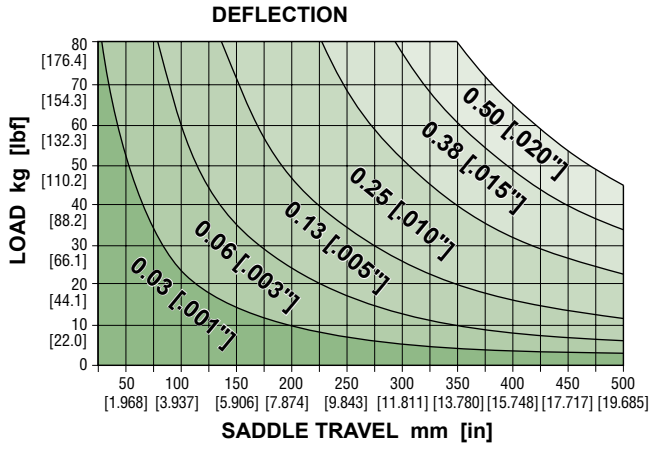
ESGC53



ESGC56

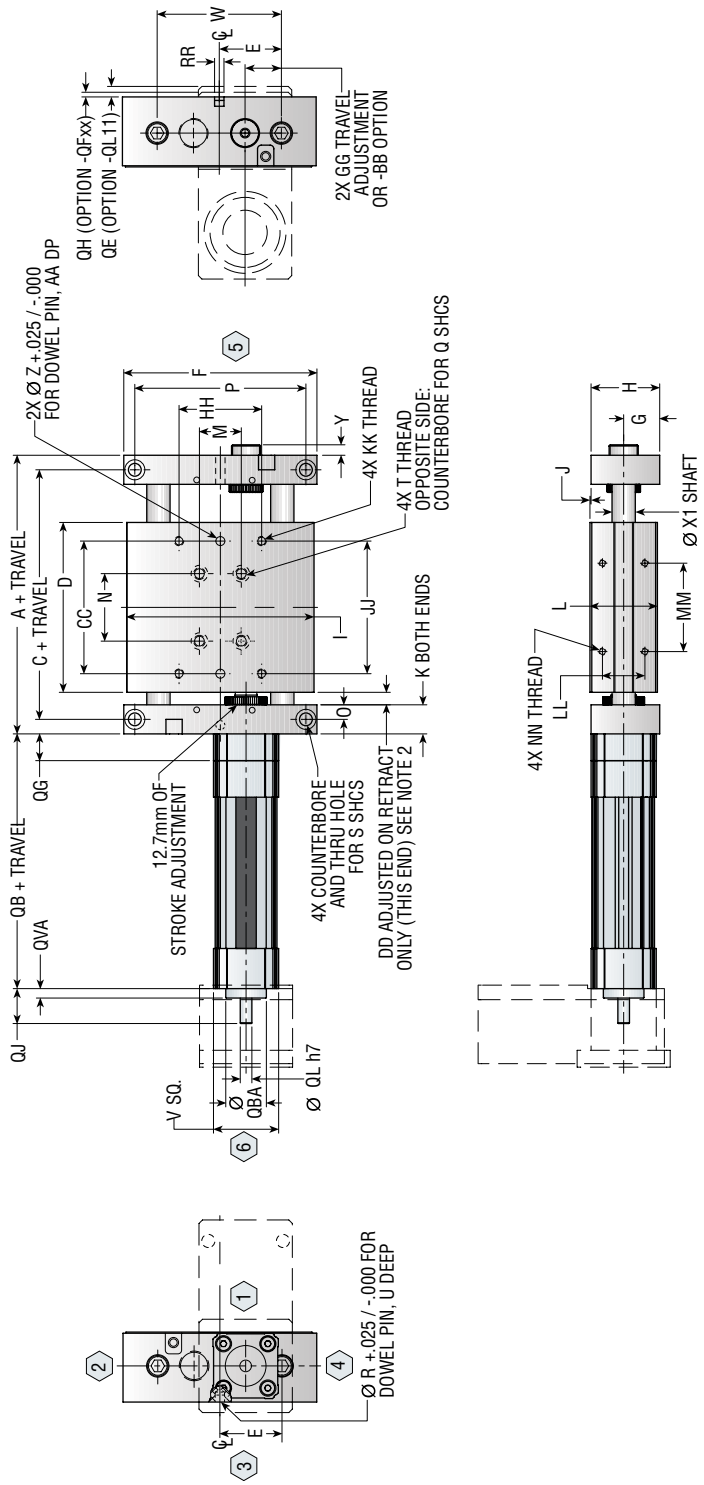


ESGC54



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

DIMENSIONS: SERIES ESG SLIDE



SIZE	A	QB	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
2	145.5	129.9	126.5	90	38	110	20	40	107	1	19	40	34.5	38.5	9.5	96	M4	5	M6	M5 x 0.8 x 16	5	37
3	170	140.6	145	101.5	40.5	126	24.5	46	122	1	25	45	35	50	12.5	108	M5	8	M6	M6 x 1.0 x 16	6	40
4	189	175.0	164	120.5	48.5	147	27	52	143	1	25	51	39	47.5	12.5	126	M6	8	M8	M8 x 1.25 x 25	6	49.5
5	214.5	193.9	189.5	146	53.24	166	31	59	161	1	25	58	36	58	12.5	147	M8	8	M10	M10 x 1.5 x 25	6	56
6	240	193.9	215	171.5	58.5	179	33	63	173	1	25	62	40.5	65	12.5	160	M10	8	M10	M12 x 1.75 x 25	6	56

SIZE	W	X1	Y	Z	AA	CC	DD	GG	HH	JJ	KK	LL	MM	NN	QVA	QBA	QE	QH	QG	QJ	QL	RR
2	76	10	17	5	11.5	66	8.5	22.5	–	–	–	17.5	74	M5 x 0.8 x 6.5	8.1	22.9	2.5	2	16.5	24.4	5	5.02
3	81	12	9	8	12.5	76.5	8.5	25	–	–	–	29.5	70	M6 x 1.0 x 9	8.1	24.9	0	-.5	22.3	24.4	6	8.05
4	97	16	9	8	12.5	100.5	8.5	29	67.5	100.5	M6 x 1.0 x 12	34	50.5	M6 x 1. 0 x 9	8.1	29.9	3	4	25	25.0	6	8.05
5	106.5	20	9	8	12.5	114	8.5	31.1	71	114	M8 x 1.25 x 12	36.5	76.0	M6 x 1.0 x 9	8.1	34.9	4	4	23	28.0	10	8.05
6	117	25	9	8	12.5	139.5	8.5	34.8	72	139.5	M10 x 1.5 x 15	36.5	101.5	M6 x 1.0 x 9	8.1	34.9	2	2	23	28.0	10	8.05

NOTES:
1) NUMBERS SHOWN IN ⬡ INDICATE SLIDE POSITIONS
2) DUE TO TRAVEL TOLERANCE ALLOWANCES, DIMENSION DD WILL NOT BE THE SAME ON BOTH ENDS OF THE UNIT
3) DIMENSIONS: mm

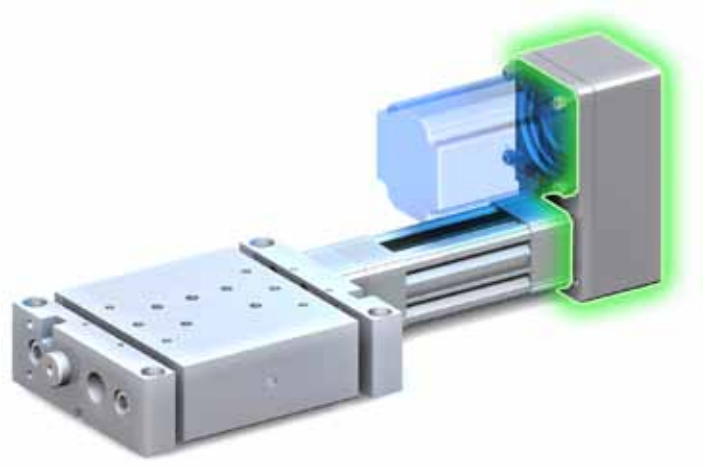
All dimensions are reference only unless specifically toleranced.

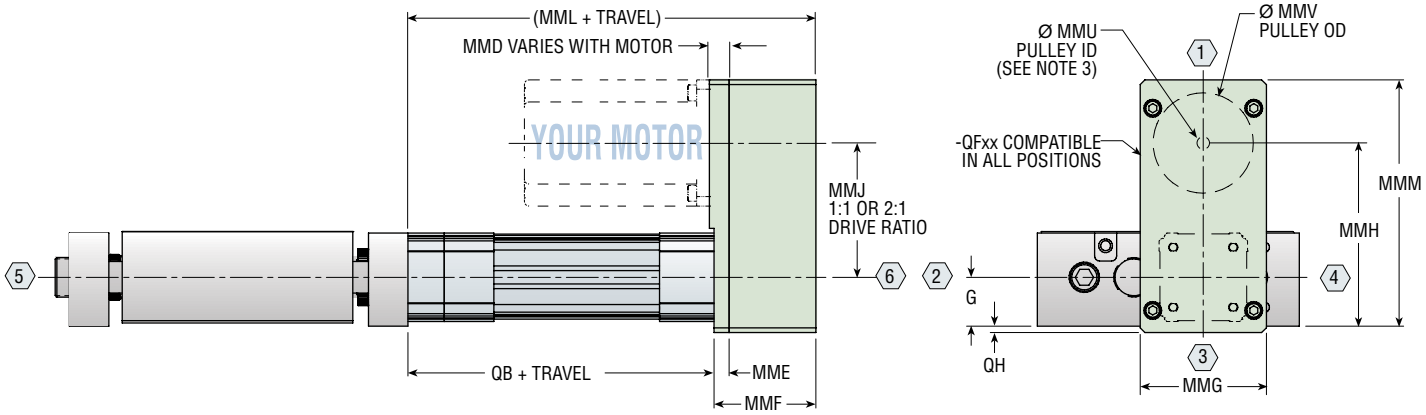
QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

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 36.

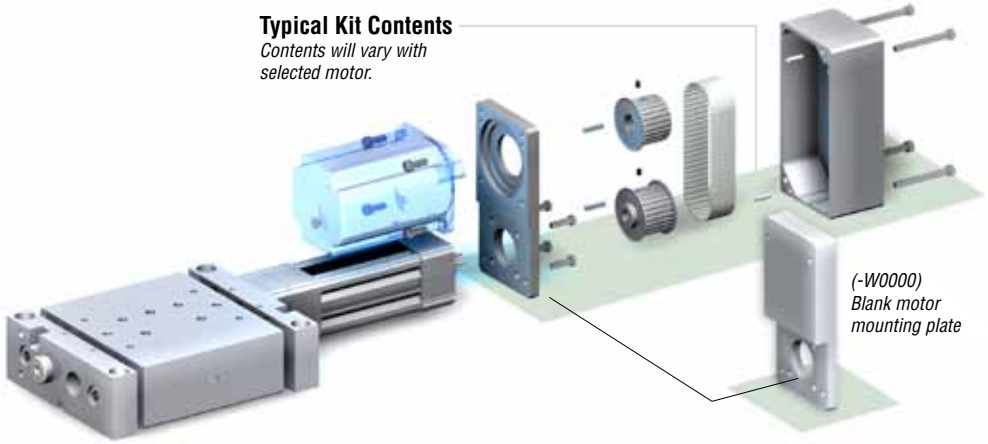




SIZE	QB	(G)	QH	MMD MIN	MMD MAX	MME	MMF	MMG	MMH 1:1	MMH 2:1	MMJ 1:1	MMJ 2:1	MMM	MML	WEIGHT kg
2	129.9	22	2	6.2	22.5	9.5	55.5	58	89.6	–	67.5	–	118.5	170	.79
3	140.6	24.5	-0.5	6.2	22.5	9.5	55.5	58	92.1	–	67.5	–	121	205.1	.79
4	175.0	27	4	9.5	31.5	9.5	55.5	63	99.5	97.5	72.5	70.5	131	231	1.02
5	193.9	31	4	9.5	22.5	9.5	64.5	80	116.1	114.9	85.1	83.9	156.1	258.4	1.70
6	193.9	33	11	9.5	22.5	9.5	68.0	86	118.1	116.9	85.1	83.9	158.1	258.4	2.37

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

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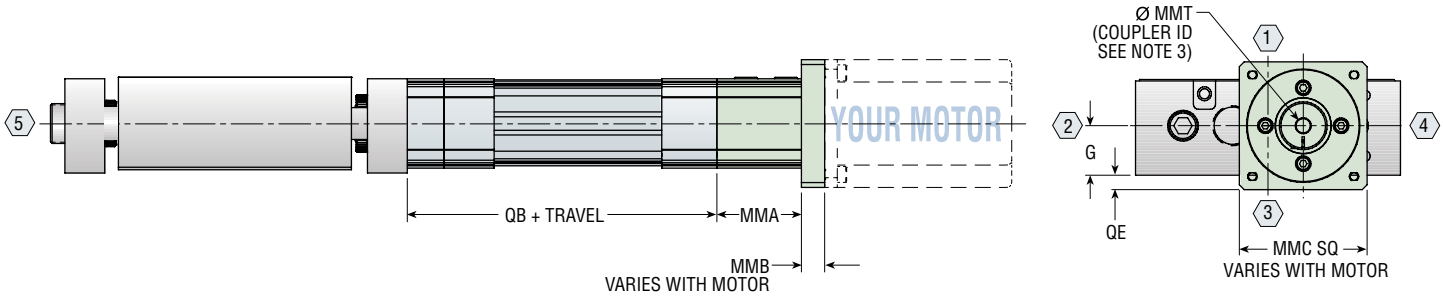
All dimensions are reference only unless specifically toleranced.

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

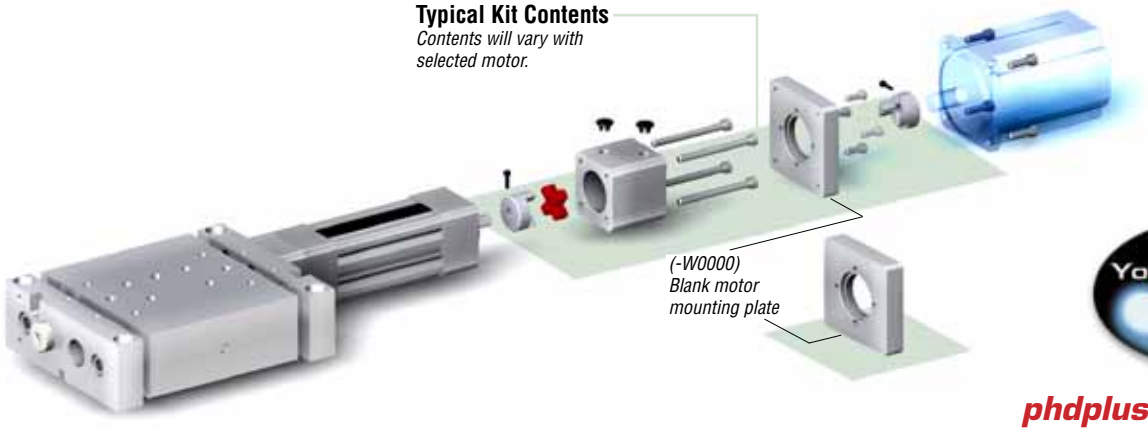
Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 36.



SIZE	QB	(G)	QE		MMA	MMB MAX	MMB MIN	MMC		WEIGHT kg
			STANDARD	OVERSIZE				STANDARD	OVERSIZE	
2	129.9	22	2.5	8	43.6	25.4	8.5	49	60	0.25
3	140.6	24.5	0	5.5	43.6	25.4	8.5	49	60	0.25
4	175.0	27	3	8	49.5	25.4	8.5	60	70	0.45
5	193.9	31	4	15.5	53	35.6	8.5	70	88	0.65
6	193.9	33	11	22	53	35.6	8.5	88	110	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

Typical Kit Contents
Contents will vary with selected motor.



Your Motor Your Way

phdplus.phdinc.com

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 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. See page 36.

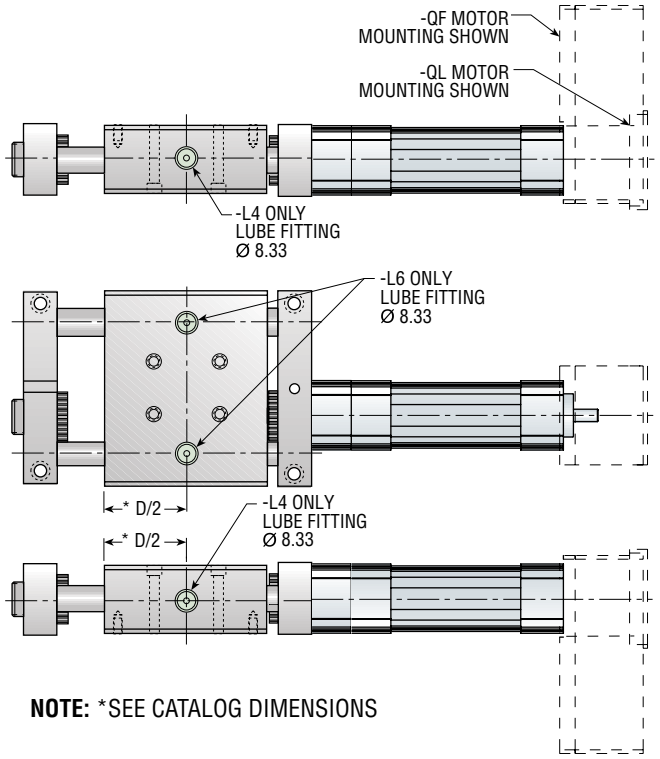
Q1 CORROSION RESISTANT GUIDE SHAFTS

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.

L4 LUBE FITTING IN SADDLE PORT POSITION 2 AND 4

L6 LUBE FITTING IN SADDLE PORT POSITION 3

Lube fittings provide an easy efficient method for lubricating the bearings and shafts for extended life beyond the normal catalog specifications. Periodic lubrication (every 635 km of travel [25 million in]) is recommended for applications where heat, dust, or other conditions will dry out the bearings and shafts. PHD suggests a lightweight oil.



NOTE: *SEE CATALOG DIMENSIONS

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)

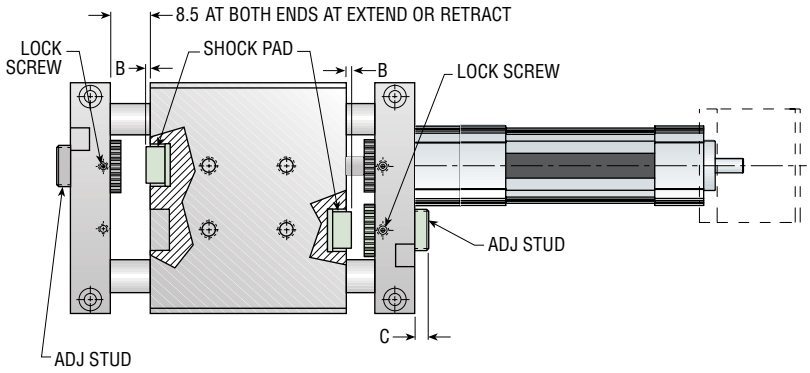
This option provides the slide mechanism only without cylinder or motor mounting. Included with option -H11 is all the hardware required for mounting standard PHD Series ECVA Cylinders or pneumatic standard VDMA/ISO cylinders to the slide. A self-aligning rod coupling is also provided, making it easy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

BB SHOCK PADS BOTH DIRECTIONS

This option provides urethane shock pads on retraction and extension for crash protection, eliminating metal-to-metal contact as the saddle reaches physical end of travel. This -BB option does not affect the overall slide length.

SIZE	B	C
2	5.5	17
3	5.5	9
4	3	9
5	3	9
6	3	9

NOTE: DIMENSIONS: mm

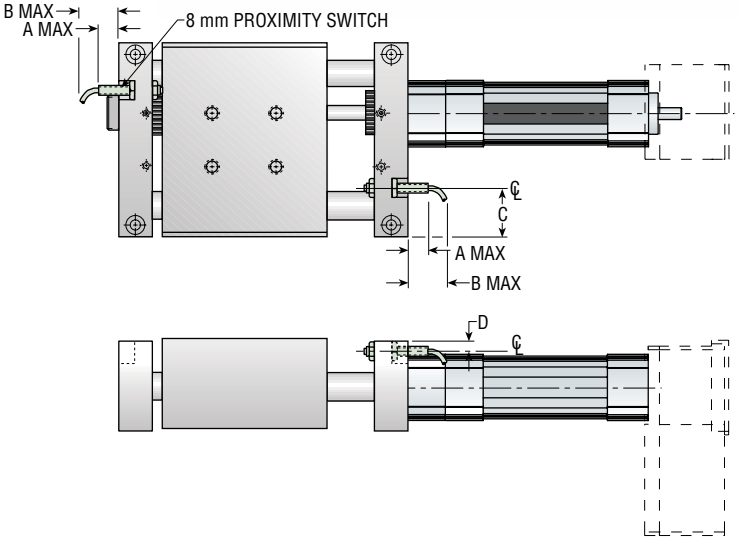


CB PROXIMITY SWITCH READY BOTH ENDS

This option provides targets in the slide saddle for use with 8 mm inductive proximity switches. The end plates of the slide come standard with provisions for mounting the 8 mm proximity switches on both ends. Proximity switches must be ordered separately. See next page for switch information.

SIZE	A	B	C	D
2	20.5	34	27.5	7.5
3	14.5	28	32	9
4	14.5	28	37.5	9
5	14.5	28	43	8
6	14.5	28	51	8

NOTE: DIMENSIONS: mm



All dimensions are reference only unless specifically toleranced.

INDUCTIVE PROXIMITY SWITCHES

Inductive proximity switches are available for use with PHD Series ESG Slides (requires option -CB). See Switches and Sensors section of PHD's main catalog for complete switch specifications.

PART NO.	DESCRIPTION
51422-005-02	8 mm Inductive Proximity Switch, NPN with 2 meter Cable
51422-006-02	8 mm Inductive Proximity Switch, PNP with 2 meter Cable

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

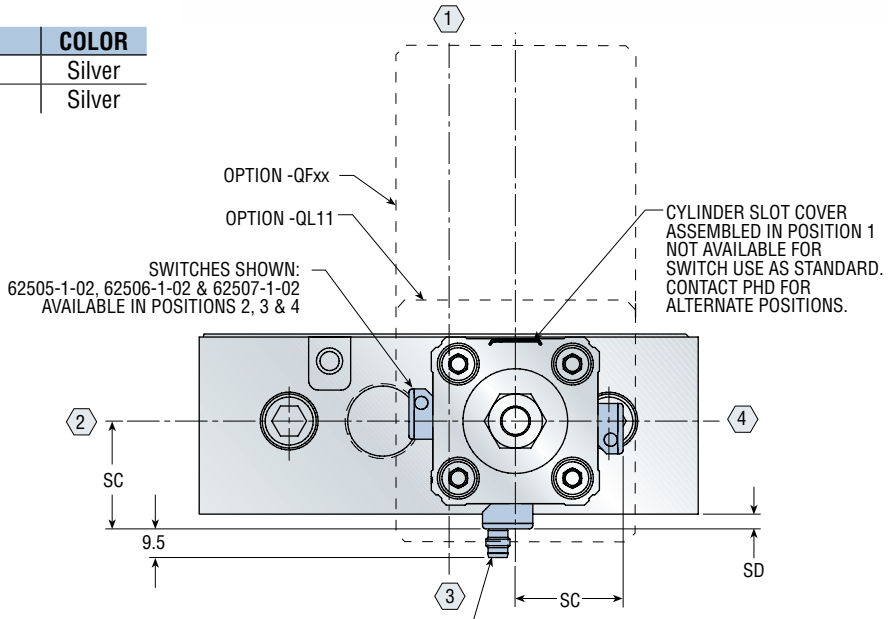
PART NO.	DESCRIPTION	COLOR
62505-1-02	NPN (Sink) DC Solid State, 2 m cable	Brown
62506-1-02	PNP (Source) DC Solid State, 2 m cable	Tan
62515-1	NPN (Sink) DC Solid State, Quick Connect	Brown
62516-1	PNP (Source) DC Solid State, Quick Connect	Tan

SERIES 6250 REED SWITCHES

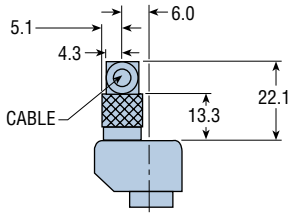
PART NO.	DESCRIPTION	COLOR
62507-1-02	AC/DC Reed, 2 m cable	Silver
62517-1	AC/DC Reed, Quick Connect	Silver

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

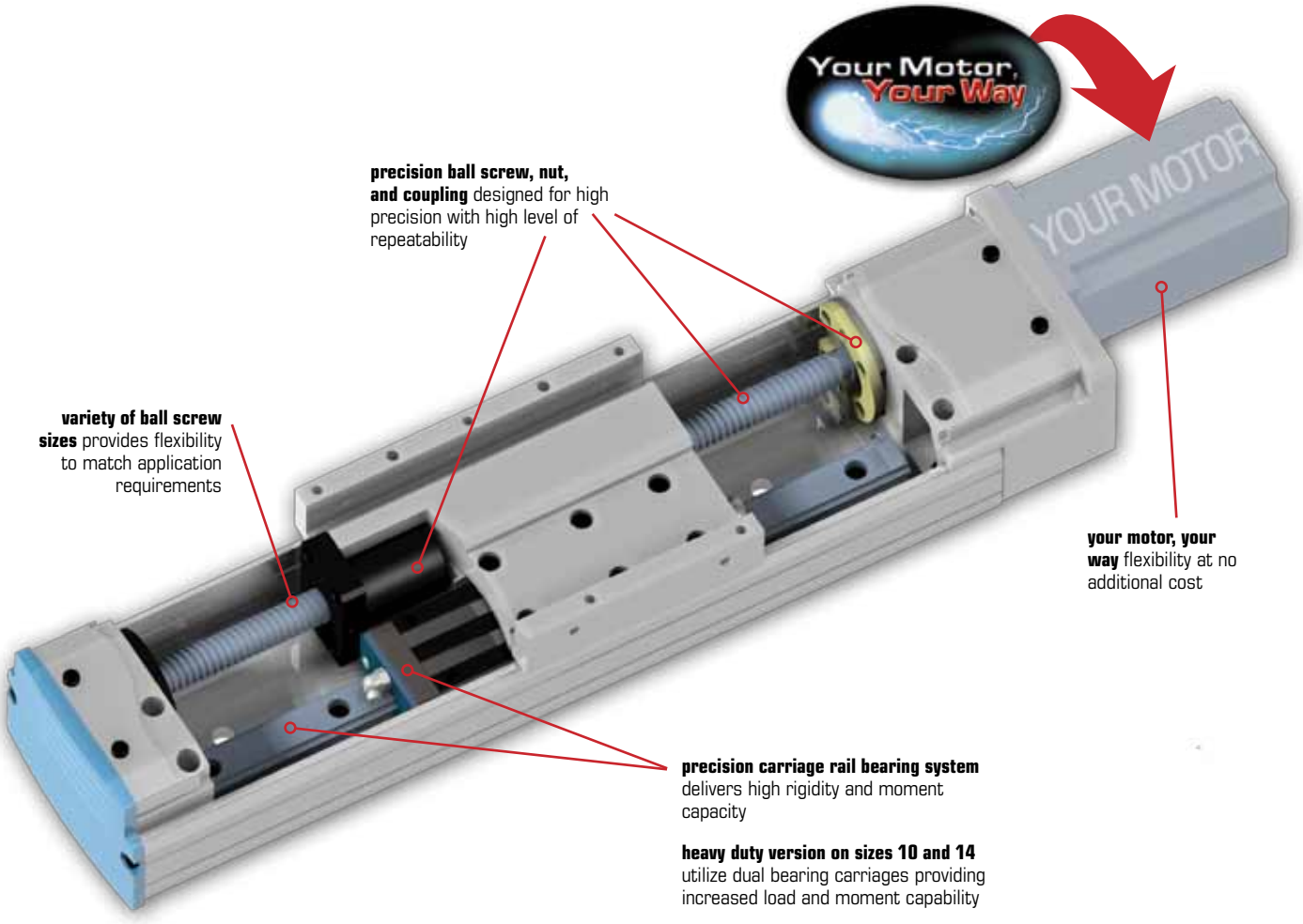


SIZE	SC	SD
2	25.4	3.4
3	27.9	3.4
4	31.5	4.5
5	35.6	4.6
6	40.4	7.4

NOTE: DIMENSIONS: mm

All dimensions are reference only unless specifically toleranced.

SERIES ESFX
ELECTRIC LINEAR ACTUATOR SLIDE



Major Benefits

- Highly rigid aluminum frame provides superior support and strength
- High allowable load/moment capacities
- Can be combined to create Cartesian robot systems
- Heavy duty versions ESFXH10 and ESFXH14 provide additional bearing support for high load and offset applications
- *Your Motor, Your Way* for configuration of motor mounting plates, with a database of electric motors from major manufacturers

Units can be combined to create Cartesian systems

ORDERING DATA: SERIES ESFX SLIDE

Example Ordering Data:

E S FX	H	-	5	-	10	x	550	-	RB020	-	QL11	-	Wxxxx
Electromechanical Linear Actuator / Slide / Ball Screw	Duty **Blank** - Nomal **H** - Heavy Duty (Size 10 & 14 only)		Design No.		Size 10 14 17		Travel		Ball Screw Configuration		In-Line Motor Mounting		Motor Mount Code Wxxxx - Open Architecture W0000 - Blank Motor Mounting

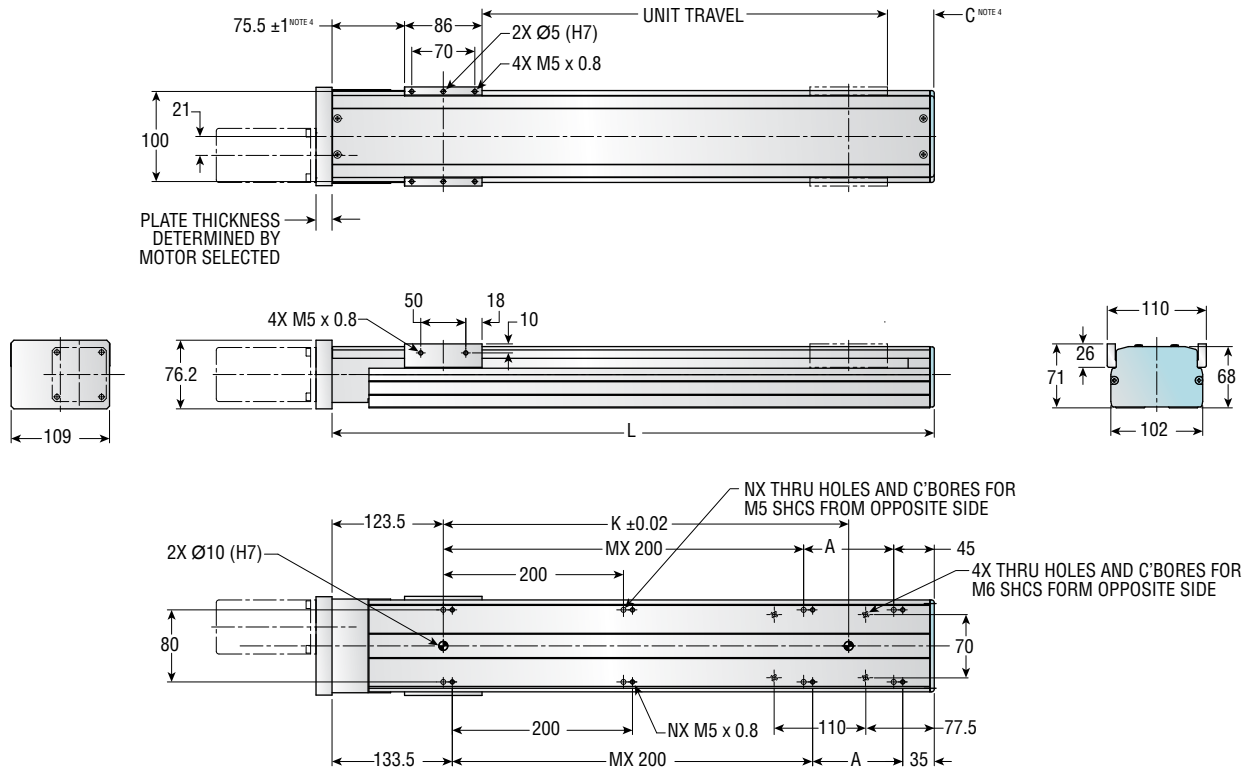
Travel mm	10	14	17
150	•	•	
200			•
250	•	•	•
350	•	•	•
450	•	•	•
550	•	•	•
650	•	•	•
750	•	•	•
850	•	•	•
950	•	•	•
1050	•	•	•
1150			•
1250			•

CODE	Lead mm	10	14	17
RB005	5	•	•	
RB010	10	•	•	•
RB020	20	•	•	•
RB030	30	•	•	
RB040	40			•

OVERVIEW/SELECTION GUIDE:

Model	Lead (mm)	Payload (kg)		Travel (mm) and maximum speed (mm/s)												Repeatability (mm)
		Horizontal	Vertical	150	200	250	350	450	550	650	750	850	950	1050	1150	1250	
ESFX510	30	60	25	1800		1800					1440	1170	900	810			+/-0.01
	20	60	25	1200		1200					960	780	600	540			
	10	60	25	600		600					480	390	300	270			
	5	60	25	300		300					240	195	150	135			
ESFXH510 ESFX514	30	100	30	1800		1800					1440	1170	900	810			+/-0.01
	20	100	30	1200		1200					960	780	600	540			
	10	100	30	600		600					480	390	300	270			
	5	100	30	300		300					240	195	150	135			
ESFXH514	30	120	30	1800		1800					1440	1170	900	810			+/-0.01
	20	120	30	1200		1200					960	780	600	540			
	10	120	30	600		600					480	390	300	270			
	5	120	30	300		300					240	195	150	135			
ESFX517	40	150	50		2400							1920	1680	1440	1200	960	+/-0.01
	20	150	50		1200							960	840	720	600	480	
	10	150	50		600							480	420	360	300	240	

DIMENSIONS: SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES - SIZE 10



Effective Travel		150	250	350	450	550	650	750	850	950	1050
L		368.5	468.5	568.5	668.5	768.5	868.5	968.5	1068.5	1168.5	1268.5
Leads 5-20	C	47 ± 1									
Lead 30	C	44.5 ± 1									
A		200	100	200	100	200	100	200	100	200	100
M		0	1	1	2	2	3	3	4	4	5
N		4	6	6	8	8	10	10	12	12	14
K		150	250	350	450	550	650	750	850	950	1050
Weight (kg) Note 5		5.0	5.3	6.0	6.8	7.6	8.3	9.1	9.9	10.6	11.4

NOTE: DIMENSIONS: mm

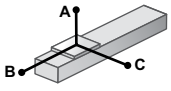
ENGINEERING DATA:

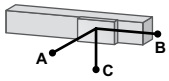
Specifications

Repeatability Note 1 (mm)		+/-0.01			
Drive system		Ball screw (Class C7)			
Ball screw lead (mm)		30	20	10	5
Maximum speed Note 2 (mm/sec)		1800	1200	600	300
Maximum payload (kg)	Horizontal	60	60	60	60
	Vertical	25	25	25	25
Rated thrust (N) Note 3		469	287	348	281
Travel (mm)		150 to 1050 (100mm pitch)			
Maximum dimensions of cross section of main unit (mm)		W110 × H71			
Linear guide type		4 rows of circular arc grooves × 1 rail			

NOTES:
1) Positioning repeatability in one direction
2) When the travel is longer than 700mm, resonance of the ball screw may occur depending on the operation conditions (critical speed). In this case, reduce the speed setting on the program by referring to the maximum speeds shown in the selection guide on page 79.
3) For 10,000 km of unit life
4) Distance from ends to internal mechanical stop
5) Maximum weight regardless of lead. Does not include motor

Allowable Overhang





Horizontal Mount

	A	B	C
5kg	900	300	300
10kg	500	140	130
15kg	390	80	80
20kg	250	50	50
30kg	420	20	20
40kg	120	10	10

Wall Mount

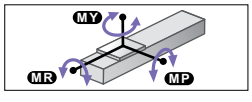
	A	B	C
5kg	230	220	500
10kg	120	60	300
15kg	60	10	160
20kg	30	10	120
30kg	10	10	10

Vertical Mount

	A	C
2kg	600	600
4kg	300	350
8kg	150	200
10kg	120	150
15kg	60	95
20kg	30	65

NOTE: Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.

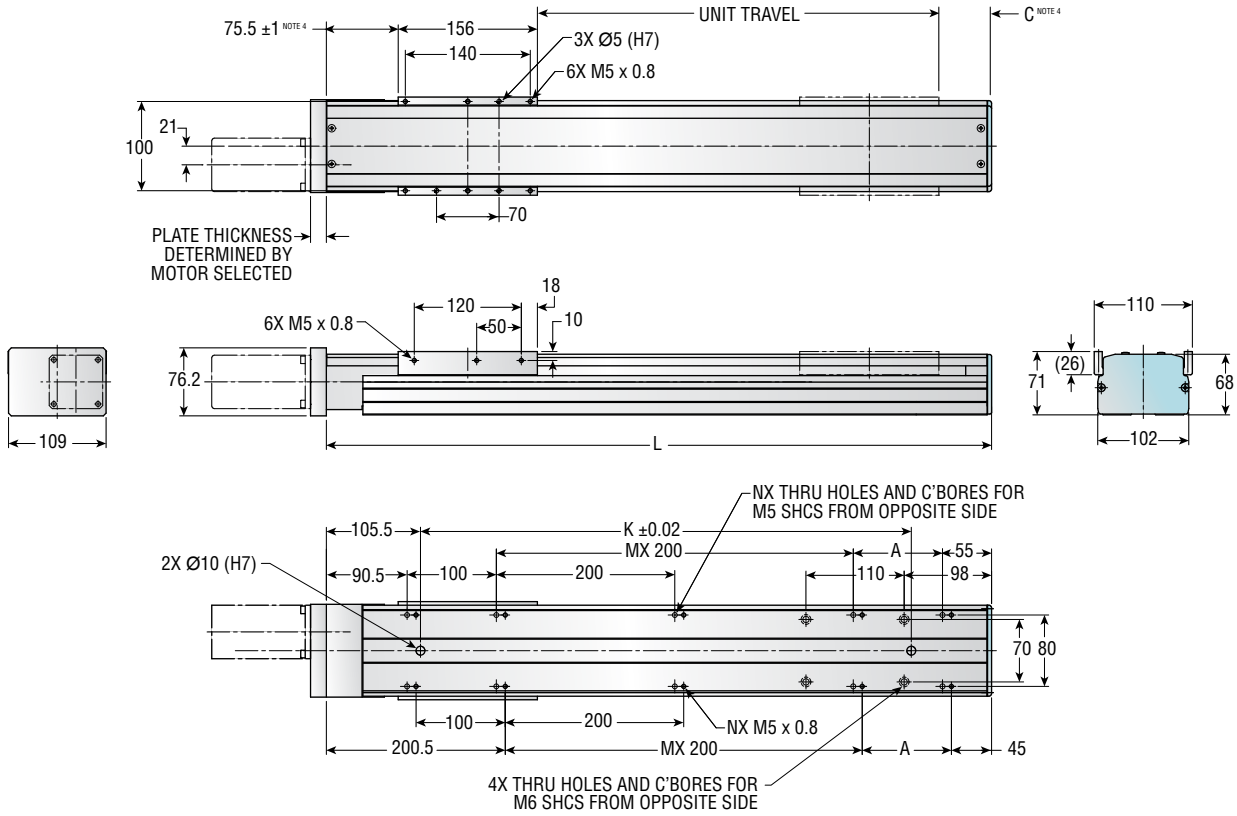
Static Loading Moment



(Unit: N-m)

MY	MP	MR
131	131	115

All dimensions are reference only unless specifically toleranced.



Effective Travel		150	250	350	450	550	650	750	850	950	1050
L		445.5	545.5	645.5	745.5	845.5	945.5	1045.5	1145.5	1245.5	1345.5
Leads 5-20	C	54 ± 1									
Lead 30	C	51.5 ± 1									
A		200	100	200	100	200	100	200	100	200	100
M		0	1	1	2	2	3	3	4	4	5
N		6	8	8	10	10	12	12	14	14	16
K		250	350	450	550	650	750	850	950	1050	1150
Weight (kg) NOTE 5		6.0	6.8	7.5	8.3	9.1	9.8	10.6	11.3	12.1	12.9

NOTE: DIMENSIONS: mm

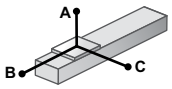
ENGINEERING DATA:

Specifications

Repeatability NOTE 1 (mm)		+/-0.01			
Drive system		Ball screw (Class C7)			
Ball screw lead (mm)		30	20	10	5
Maximum speed NOTE 2 (mm/sec)		1800	1200	600	300
Maximum payload (kg)	Horizontal	100	100	100	100
	Vertical	30	30	30	30
Rated thrust (N) NOTE 3		469	287	348	281
Travel (mm)		150 to 1050 (100mm pitch)			
Maximum dimensions of cross section of main unit (mm)		W110 × H71			
Linear guide type		4 rows of circular arc grooves × 1 rail			

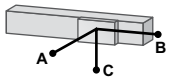
NOTES:
1) Positioning repeatability in one direction
2) When the travel is longer than 600mm, resonance of the ball screw may occur depending on the operation conditions (critical speed). In this case, reduce the speed setting on the program by referring to the maximum speeds shown in the selection guide on page 79.
3) For 10,000 km of unit life
4) Distance from ends to internal mechanical stop
5) Maximum weight regardless of lead. Does not include motor

Allowable Overhang



Horizontal Mount

	A	B	C
10kg	2000	700	300
20kg	1200	400	260
30kg	1100	300	140
40kg	900	240	100
50kg	700	190	90
60kg	550	160	70
80kg	400	130	50
100kg	300	100	40



Wall Mount

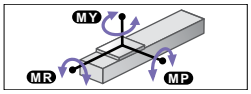
	A	B	C
5kg	450	800	1600
10kg	230	650	1400
20kg	90	350	1000
25kg	60	250	700
30kg	40	150	450
40kg	10	60	200

Vertical Mount

	A	C
2kg	900	850
4kg	750	700
8kg	600	580
10kg	550	540
15kg	450	480
20kg	360	390
30kg	250	290

NOTE: Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.

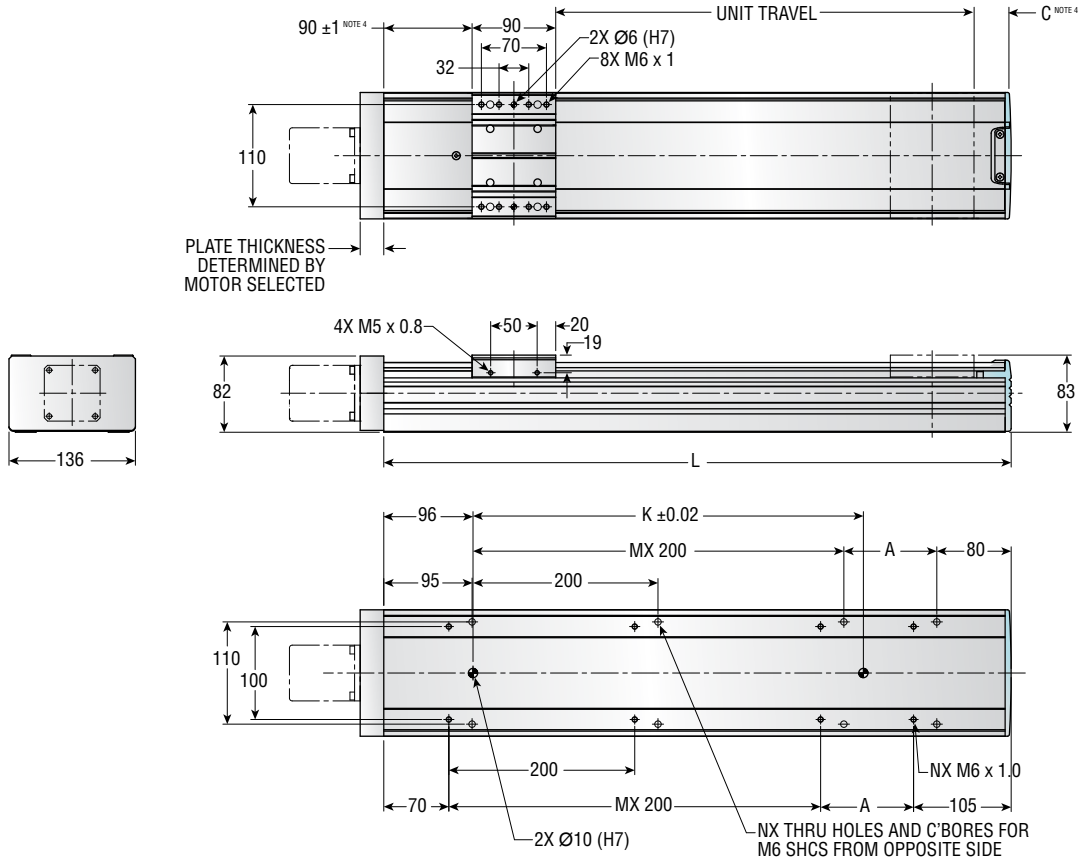
Static Loading Moment



(Unit: N·m)

MY	MP	MR
348	348	160

DIMENSIONS: SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES - SIZE 14



Effective Travel		150	250	350	450	550	650	750	850	950	1050
L		375	475	575	675	775	875	975	1075	1175	1275
Leads 5-20	C	35 ± 1									
Lead 30	C	32.5 ± 1									
A		200	100	200	100	200	100	200	100	200	100
M		0	1	1	2	2	3	3	4	4	5
N		4	6	6	8	8	10	10	12	12	14
K		240	240	420	420	600	600	780	780	960	960
Weight (kg) Note 5		5.7	7.0	8.3	9.6	10.9	12.1	13.4	14.7	16.0	17.3

NOTE: DIMENSIONS: mm

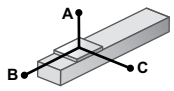
ENGINEERING DATA:

Specifications

Repeatability Note 1 (mm)		+/-0.01			
Drive system		Ball screw (Class C7)			
Ball screw lead (mm)		30	20	10	5
Maximum speed Note 2 (mm/sec)		1800	1200	600	300
Maximum payload (kg)	Horizontal	100	100	100	100
	Vertical	25	25	25	25
Rated thrust (N) Note 3		469	287	348	281
Travel (mm)		150 to 1050 (100mm pitch)			
Maximum dimensions of cross section of main unit (mm)		W136 × H83			
Linear guide type		4 rows of circular arc grooves × 2 rail			

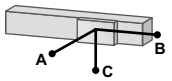
NOTES:
1) Positioning repeatability in one direction
2) When the travel is longer than 750mm, resonance of the ball screw may occur depending on the operation conditions (critical speed). In this case, reduce the speed setting on the program by referring to the maximum speeds shown in the selection guide on page 79.
3) For 10,000 km of unit life
4) Distance from ends to internal mechanical stop
5) Maximum weight regardless of lead. Does not include motor

Allowable Overhang



Horizontal Mount

	A	B	C
5kg	2200	700	1000
15kg	1500	240	600
20kg	1200	180	480
30kg	1200	110	320
40kg	900	75	250
60kg	800	48	170
80kg	720	33	120



Wall Mount

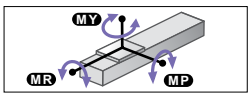
	A	B	C
5kg	1200	1000	1800
15kg	460	280	1200
20kg	390	210	820
30kg	220	120	750
40kg	125	70	700
60kg	40	22	550

Vertical Mount

	A	C
2kg	450	280
4kg	400	250
8kg	300	220
10kg	280	200
15kg	200	160
20kg	180	135
30kg	120	95

NOTE: Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.

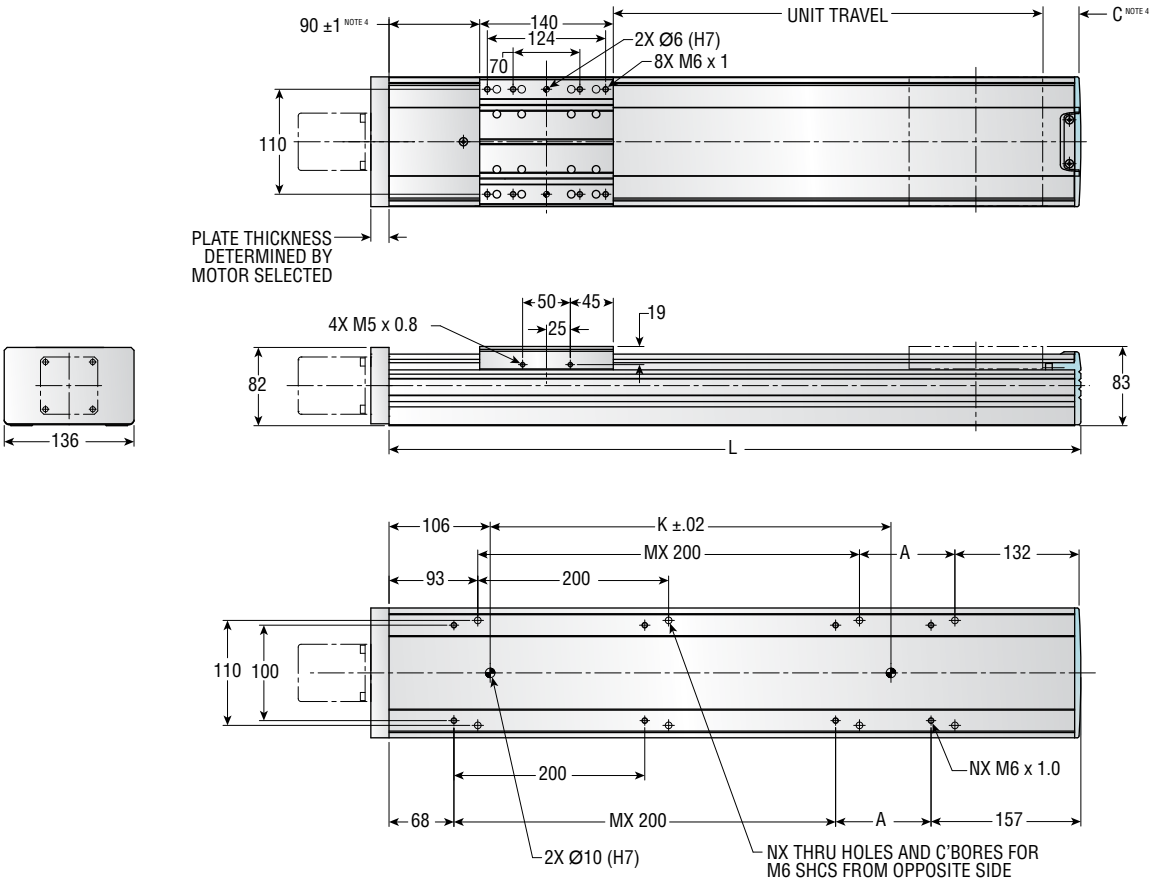
Static Loading Moment



(Unit: N·m)

MY	MP	MR
232	233	204

All dimensions are reference only unless specifically toleranced.



Effective Travel		150	250	350	450	550	650	750	850	950	1050
L		425	525	625	725	825	925	1025	1125	1225	1325
Leads 5-20	C	35 ± 1									
Lead 30	C	32.5 ± 1									
A		200	100	200	100	200	100	200	100	200	100
M		0	1	1	2	2	3	3	4	4	5
N		4	6	6	8	8	10	10	12	12	14
K		240	240	420	420	600	600	780	960	960	1140
Weight (kg) Note 5		6.6	7.9	9.2	10.5	11.8	13.0	14.3	15.6	16.9	18.2

NOTE: DIMENSIONS: mm

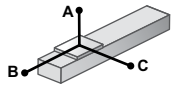
ENGINEERING DATA:

Specifications

Repeatability Note 1 (mm)		+/-0.01			
Drive system		Ball screw (Class C7)			
Ball screw lead (mm)		30	20	10	5
Maximum speed Note 2 (mm/sec)		1800	1200	600	300
Maximum payload (kg)	Horizontal	120	120	120	120
	Vertical	30	30	30	30
Rated thrust (N) Note 3		469	287	348	281
Travel (mm)		150 to 1050 (100mm pitch)			
Maximum dimensions of cross section of main unit (mm)		W136 × H83			
Linear guide type		4 rows of circular arc grooves × 2 rail			

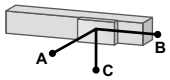
NOTES:
1) Positioning repeatability in one direction
2) When the travel is longer than 750mm, resonance of the ball screw may occur depending on the operation conditions (critical speed). In this case, reduce the speed setting on the program by referring to the maximum speeds shown in the selection guide on page 79.
3) For 10,000 km of unit life
4) Distance from ends to internal mechanical stop
5) Maximum weight regardless of lead. Does not include motor

Allowable Overhang



Horizontal Mount

	A	B	C
10kg	2300	1050	1000
20kg	1600	520	700
25kg	1600	410	550
30kg	1550	340	510
40kg	1450	250	360
50kg	1400	195	340
60kg	1400	160	330
80kg	1350	115	240
100kg	1300	90	185



Wall Mount

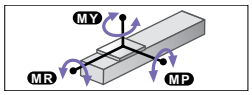
	A	B	C
10kg	1100	1300	1800
20kg	790	620	1300
25kg	520	540	1300
30kg	420	380	1280
40kg	330	290	650
50kg	230	230	650
60kg	180	165	650
80kg	100	90	650
100kg	50	45	600

Vertical Mount

	A	C
4kg	980	580
6kg	880	540
10kg	760	470
15kg	650	410
20kg	540	360
25kg	470	325
30kg	410	285

NOTE: Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.

Static Loading Moment

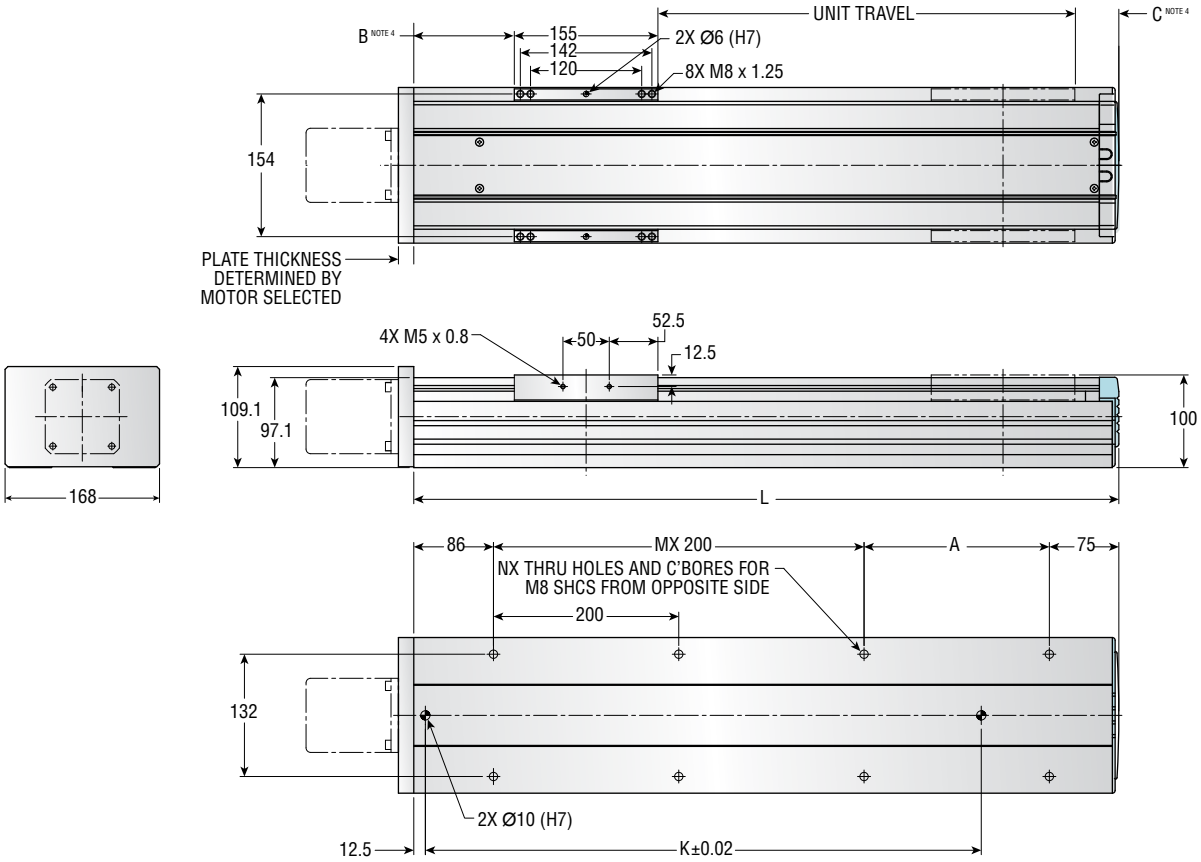


(Unit: N-m)

MY	MP	MR
551	552	485

All dimensions are reference only unless specifically toleranced.

DIMENSIONS: SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES - SIZE 17



Effective Travel		200	250	350	450	550	650	750	850	950	1050	1150	1250
Leads 10-20	L	511	561	661	761	861	961	1061	1161	1261	1361	1461	1561
	B	102.5 ± 1											
	C	42.5 ± 1											
Lead 40	L	521	571	671	771	871	971	1071	1171	1271	1371	1471	1571
	B	103.5 ± 1											
	C	43.5 ± 1											
A		150	200	100	200	100	200	100	200	100	200	100	200
M		1	1	2	2	3	3	4	4	5	5	6	6
N		6	6	8	8	10	10	12	12	14	14	16	16
K		240	240	420	600	600	780	780	960	960	1140	1140	1320
Weight (kg) Note 5		13.4	14.2	15.9	17.5	19.2	20.8	22.5	24.1	25.8	27.4	29.1	30.7

NOTE: DIMENSIONS: mm

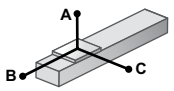
ENGINEERING DATA:

Specifications

Repeatability Note 1 (mm)		+/-0.01		
Drive system		Ball screw (Class C7)		
Ball screw lead (mm)		40	20	10
Maximum speed Note 2 (mm/sec)		2400	1200	600
Maximum payload (kg)	Horizontal	150	150	150
	Vertical	50	50	50
Rated thrust (N) Note 3		1107	571	737
Travel (mm)		200 to 1250 (100mm pitch)		
Maximum dimensions of cross section of main unit (mm)		W168 × H100		
Linear guide type		4 rows of circular arc grooves × 2 rail		

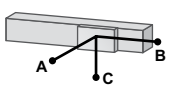
NOTES:
1) Positioning repeatability in one direction
2) When the travel is longer than 850mm, resonance of the ball screw may occur depending on the operation conditions (critical speed). In this case, reduce the speed setting on the program by referring to the maximum speeds shown in the selection guide on page 79.
3) For 10,000 km of unit life
4) Distance from ends to internal mechanical stop
5) Maximum weight regardless of lead. Does not include motor

Allowable Overhang



Horizontal Mount

	A	B	C
10kg	4000	1510	2100
20kg	2600	750	1250
30kg	2550	495	1010
40kg	2500	365	810
50kg	1820	285	620
60kg	1740	235	585
80kg	1510	170	390
100kg	1490	135	345
120kg	1450	110	280



Wall Mount

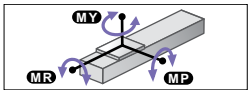
	A	B	C
10kg	2300	2350	3500
20kg	1450	1100	2600
30kg	910	690	2550
40kg	640	490	2500
50kg	480	370	1710
60kg	370	285	1680
80kg	240	185	1310
100kg	160	120	1290
120kg	110	85	1240

Vertical Mount

	A	C
5kg	1020	650
10kg	880	570
15kg	770	490
20kg	680	450
25kg	595	405
35kg	475	340

NOTE: Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.

Static Loading Moment



(Unit: N·m)

MY	MP	MR
1032	1034	908

All dimensions are reference only unless specifically toleranced.

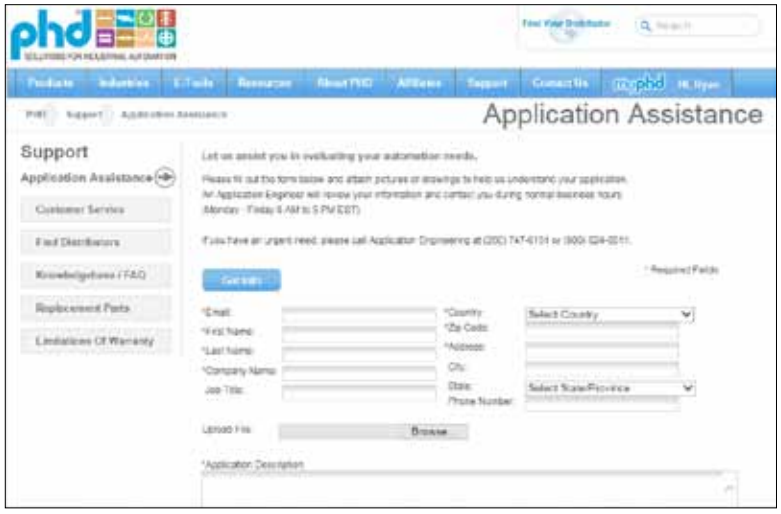
Wxxxx MOTOR MOUNT CODE

Your Motor, Your Way customizable motor mounting is generated by PHD's extensive motor database. PHD will select the compatible motor.

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

phdplus.phdinc.com

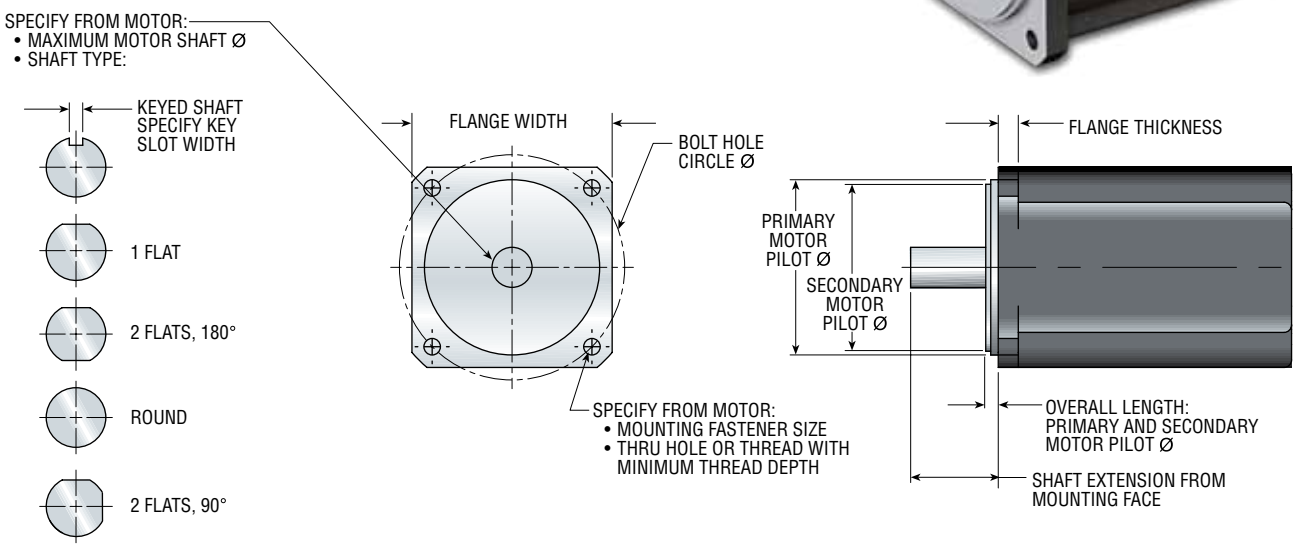
E S FX H - 5 - 10 x 550 - RB020 - QL11 - Wxxxx



Contact PHD Application Department for sizing & motor mounting code.

Email apps@phdinc.com or call 800-624-8511

MOTOR GEOMETRY



All dimensions are reference only unless specifically toleranced.

ESFX APPLICATION SIZING QUESTIONNAIRE:

APPLICATION SHEET

Date: _____ Completed By: _____

Distributor Name: _____

Customer Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Contact Name /Title: _____ Telephone _____

E-Mail Address: _____

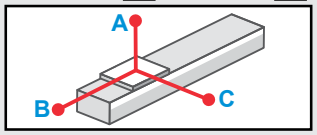
End Customer (if other than above): _____ Location: _____

APPLICATION DETAILS

General Robot Description: _____

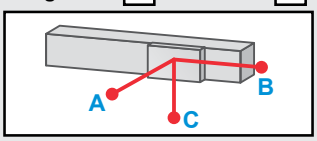
Application Type(Check all that apply):

Single Axis ☐ Multi Axis ☐



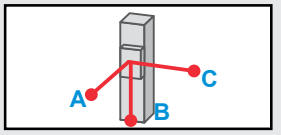
Horizontal Installation or X Axis

Single Axis ☐ Multi Axis ☐



Wall Installation or Y Axis

Single Axis ☐ Multi Axis ☐



Vertical Installation or Z Axis

	X Horizontal	X Load Offset (mm)	Y Horizontal	Y Load Offset (mm)	Z Vertical	Z Load Offset (mm)
Travel:	mm =	A =	mm =	A =	mm =	A =
Travel Time One direction:	sec =	B =	sec =	B =	sec =	B =
Payload:	kg =	C =	kg =	C =	kg =	C =

Duty Rate: Cycles/ Minute ☐ Hour/ Day ☐ Days/ Week ☐ Weeks/ Year ☐

Interpolation Move: YES ☐ NO ☐

Repeatability	Environment
± .04 mm ☐	Standard ☐
± .02 mm ☐	Cleanroom ☐
± .01 mm ☐	Food/Medical ☐
± .005 mm ☐	Dusty ☐
	Coolant ☐
	Other ☐

Describe motion sequence:

Complete this form, save the file, and send via email to: apps@phdinc.com It can also be printed and faxed to 260-747-6754, or call Customer Service at 800-624-8511 for assistance.

NOTES

APPLICATION SIZING QUESTIONNAIRE:

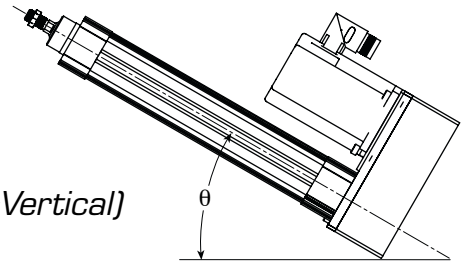
Your Name: _____ **Organization:** _____

Project Name: _____ **Contact Info:** _____

Email: _____ **Zip Code:** _____

For sizing application assistance, please fill out the following questionnaire and email (apps@phdinc.com) or fax (260-479-2315) it to us. You can also size your application by using our online sizing software at sizing.phdinc.com.

Actuator Type
- ❍ ECVA Cylinder
- ❍ ECVR Cylinder
- ❍ ESK/ESL Slide
- ❍ ESG Slide
- ❍ ECP Cylinder



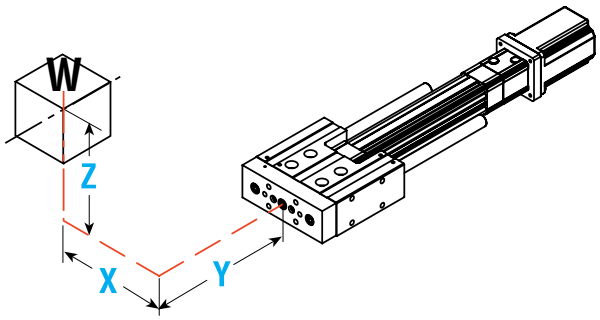
Mounting Inclination _____ *(0°=Horizontal/90°=Vertical)*

Travel Length _____ *(in/mm)*

Payload (W) _____ *(lbf/kg)*

Is the payload guided? ❍ YES ❍ NO

(Unguided load may require selection of slide)



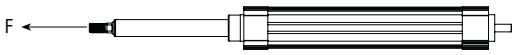
Payload's C.G.

offset (y) _____ ❍ in ❍ mm

offset (x) _____ ❍ in ❍ mm *(only allowed on slides)*

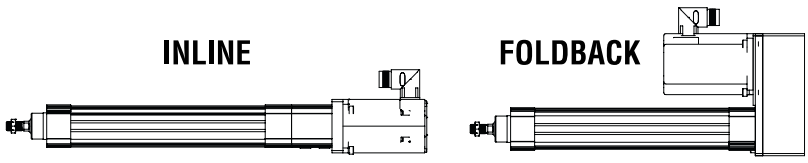
offset (z) _____ ❍ in ❍ mm *(only allowed on slides)*

Axial Thrust Force (F) _____ *(lbf/N)*



Motor Mounting Style
- ❍ Inline
- ❍ Foldback

Foldback Gear Ratio
- ❍ 1:1
- ❍ 2:1



MOTION PROFILE: *Please include all the moves that make up one complete cycle.*

	DISPLACEMENT	TOTAL TRAVEL TIME	ACCEL./DECCEL. TIME	PAYLOAD (W)	AXIAL THRUST (F)	DWELL/IDLE TIME
	in [mm]	seconds	seconds	lb [kg]	lbf [N]	seconds
HOME						
Move 1						
Move 2						
Move 3						
Move 4						

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