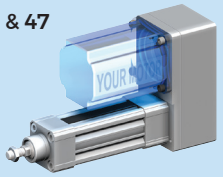
Electric Actuators

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

WHAT'S NEW

NEW OPTION!
-QPxx Foldback
Improved Performance
Series ECV & ESK/ESL

Pages 11 & 47



Your Motor Your Way

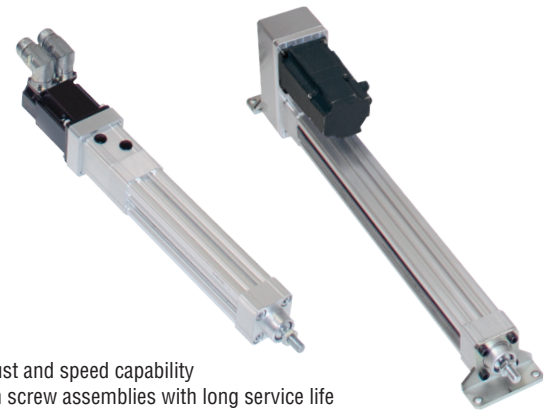
PHDEA04B

Member of the MAC Distributor Network

phdinc.com

phd Empowering Automation

SERIES ECV CYLINDER page 4



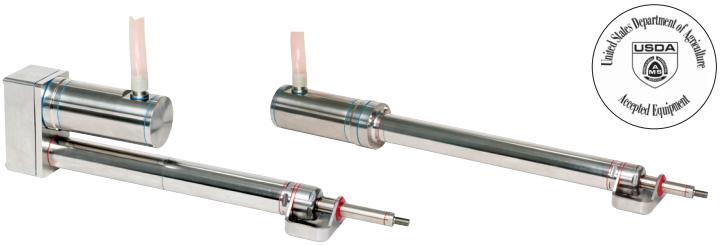
- High thrust and speed capability
- Precision screw assemblies with long service life
- Rigid construction with low backlash

DRIVE MODE	SIZE	LEAD	TRAVEL MAX	MAX THRUST*		MAX SPEED*	
		mm	mm	lbf	N	in/sec	mm/sec
Lead - RL	20	1.5	400	67.5	300	1.2	30
		4		33.7	150	3.15	80
	25	1.5	400	112	500	1.2	30
		3		56	250	2.4	60
Ball - RB	32	5	1000	366	1625	19.6	500
		10		191	850	39.3	1000
	40	10	1000	712	3165	39.3	1000
		16		445	1980	63.0	1600
	50	10	1000	1285	5710	39.3	1000
		20		731	3250	78.7	2000
	80	10	1000	5020	22340	39.3	1000

NEW

Significant increase in thrust and life.
See Engineering Data for details.

SERIES ECP IP69K CYLINDER page 22



- IP69K ingress protection
- 300 grade stainless steel versions (-Y8 and -Y91) for caustic washdown environments with USDA certifications for splash zone and product contact zones. See page 22 for details.
- High thrust or speed capability

DRIVE MODE	SIZE	LEAD	TRAVEL MAX	MAX THRUST*		MAX SPEED*	
		mm	mm	lbf	N	in/sec	mm/sec
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

SERIES ESK/ESL THRUSTER SLIDE page 38

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

DRIVE MODE	SIZE	LEAD	TRAVEL MAX	MAX THRUST*		MAX SPEED*		MAX MOMENT PITCH/YAW/ROLL		MAX PAYLOAD*	
		mm	mm	lbf	N	in/sec	mm/sec	in-lb	Nm	lb	kg
Ball - RB	4	5	600	366	1625	19.6	500	118	13	90	40.8
		10		191	850	39.3	1000				
	5	10	600	712	3165	39.3	1000	153	17	225	102
		16		445	1980	63	1600				
	6	10	700	1285	5710	39.3	1000	225	25	357	162.2
		20		731	3250	78.7	2000				

NEW

Significant increase in thrust and life.
See Engineering Data for details.

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

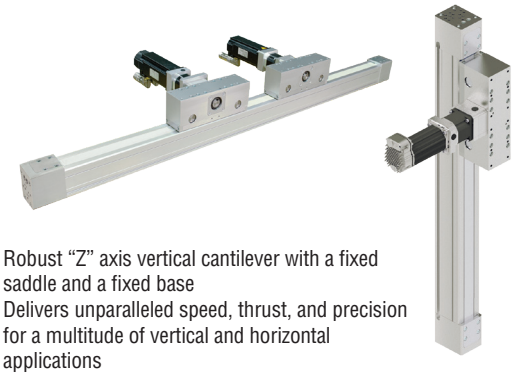
For intermediate sizes, longer travels, and alternate performance, contact PHD Applications Department.

SERIES ESU LINEAR ACTUATOR page 52

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

DRIVE MODE	SIZE	LEAD	TRAVEL MAX	MAX THRUST*		MAX SPEED*		MAX MOMENT* PITCH/YAW		MAX MOMENT* ROLL		MAX PAYLOAD*	
		mm	mm	lbf	N	in/sec	mm/sec	in-lb	Nm	in-lb	Nm	lb	N
Belt- RT	5	160	5500	326.0	1450	197.0	5000	3363	380	381	43	1103	4903
	6	192		586.0	2610			6328	715	832	94	1720	7648
	8	256		1222.0	5440			12975	1466	1469	166	2567	11410
Ball - RB	5	10	1000	547	2430	39.3	1000	3363	380	381	43	1103	4903
		16		342	1520	63	1600						
	6	10		992	4410	39.3	1000	6328	715	832	94	1720	7648
		20		565	2510	78.7	2000						
	8	10		5020	22340	39.3	1000	12975	1466	1469	166	2567	11410
		32		1570	6980	126	3200						

SERIES ESZ LINEAR CANTILEVER ACTUATOR page 70



- Robust "Z" axis vertical cantilever with a fixed saddle and a fixed base
- Delivers unparalleled speed, thrust, and precision for a multitude of vertical and horizontal applications
- Dual saddles available for increased load and moment loading

SIZE	LEAD	TRAVEL MAX	MAX THRUST		MAX SPEED		MAX MOMENT PITCH/YAW		MAX MOMENT ROLL		PAYLOAD	
	mm	mm	lbf	N	in/sec	mm/sec	in-lb	Nm	in-lb	Nm	lb	N
5	160	Fixed Saddle: 2000 Fixed Base: 5500	360	1600	197	5000	3363	380	381	43	1103	4903
6	192		748	3300			6328	715	832	94	1720	7648

SERIES EGRR HEAVY DUTY PARALLEL GRIPPER page 80

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

MODEL NUMBER	TOTAL JAW TRAVEL TRAVEL TOLERANCE +4.8 +2.1 mm	+0.189 +0.084 in	GRIPPER WEIGHT WITHOUT MOTOR SPEED REDUCER kg	lb	WITH MOTOR SPEED REDUCER kg	lb	GRIP FORCE N	lb
EGRR12-x-63 x 150	150	5.906	12.8	28.2	14.9	32.8	3561	809
EGRR12-x-63 x 200	200	7.874	15.3	33.7	17.4	38.3		
EGRR12-x-63 x 250	250	9.843	18.2	40.1	20.3	44.7		
EGRR12-x-63 x 300	300	11.811	20.5	45.1	22.5	49.7		
EGRR12-x-63 x 350	350	13.78	22.7	50.1	24.8	54.7		

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

Easy 3 Step Actuator and Motor Sizing

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

Your Motor Your Way

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

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

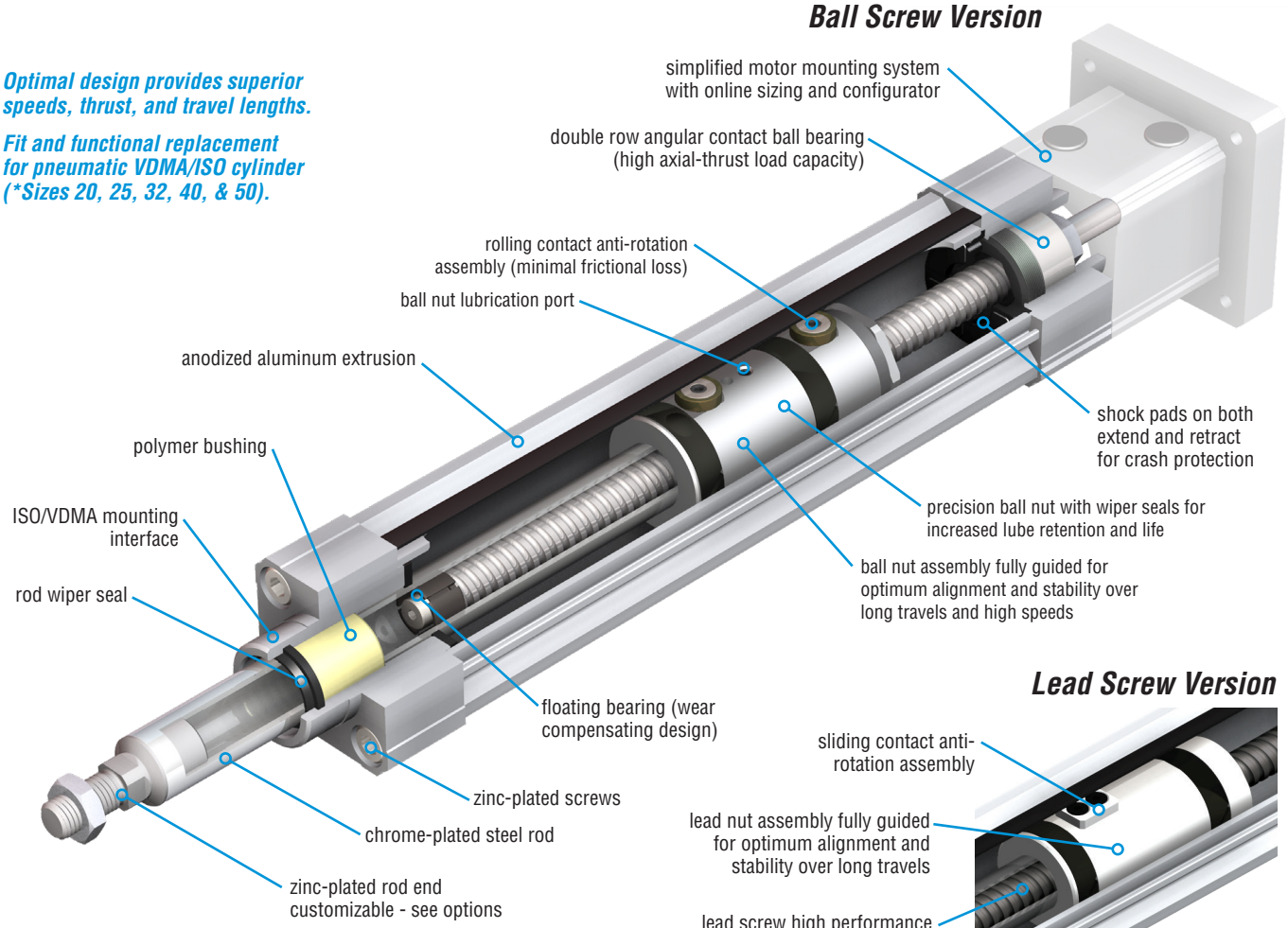
3 MOTOR CONFIGURATION:
Using PHD's CAD Configurator, a complete part number can be generated with a motor mount code specific to your actuator and motor combination.

See details in each product section.

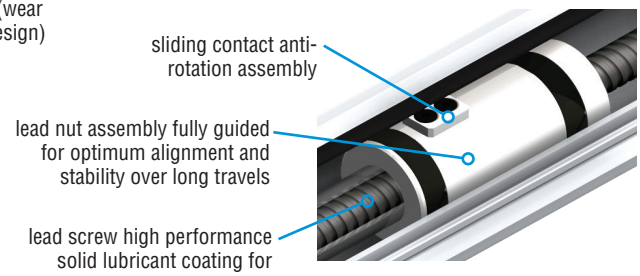
Optimal design provides superior speeds, thrust, and travel lengths.

Fit and functional replacement for pneumatic VDMA/ISO cylinder (*Sizes 20, 25, 32, 40, & 50).

Ball Screw Version



Lead Screw Version

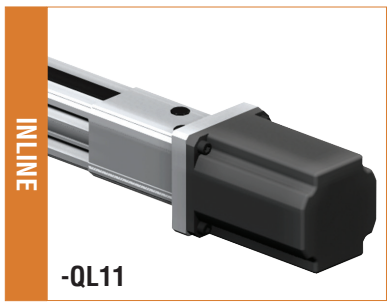


Your Motor Your Way

Major Benefits

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

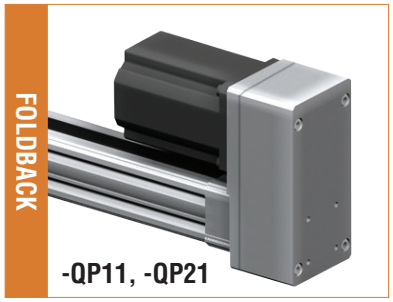
Choice of Inline or Foldback Motor Mounting



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

NEW

-QP upgraded foldback replaces -QF option. Provides a significant increase in performance. See page 11 for more details.



TYPE
Electromechanical

SERIES
VA - Non-rotating Rod
VR - Rotating Rod
VDMA 24562 Drop-in replacement sizes 32-50

SIZE
20
25
32
40
50
80

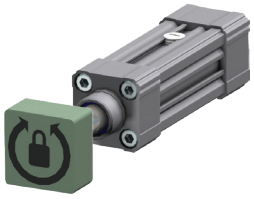
OPTIONS
K _ - Extra rod extension in 1 mm increments. Length code is K100=100 mm, K050=50 mm
T44 - Female rod end
TEE - Male rod end with oversize thread
Blank - No Options

MOTOR MOUNT CODE
Wxxxx - Open Architecture p/n code
W0000 - Blank motor mount

E C VA 5 50 x 1000 - RB010 - T44 - QP11 - Wxxxx

PRODUCT
Cylinder

DESIGN NO.
5 - Metric



TRAVEL (MAX.)

Size	mm
20	400
25	400
32	1000
40	1000
50	1000
80	1000

50 mm minimum travel in 50 mm increments. For longer travels, contact PHD.

SCREW CONFIGURATION

RB (Ball) Size	Type	Lead mm
32	RB005	5
32	RB010	10
40	RB010	10
40	RB016	16
50	RB010	10
50	RB020	20
80	RB010	10

RL (Lead) Size	Type	Lead mm
20	RL150	1.50
20	RL004	4
25	RL150	1.50
25	RL003	3

MOTOR CONFIGURATION
QL11 - Inline with 1:1 ratio
QP11 - Foldback with 1:1 ratio
QP21 - Foldback with 2:1 ratio
QF11* - Foldback with 1:1 ratio
QF21* - Foldback with 2:1 ratio
Blank - No Motor Mount
*QFxx is for sizes 20 and 25 only.

NEW FOLDBACK OPTION -QPxx

ROD ROTATION

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

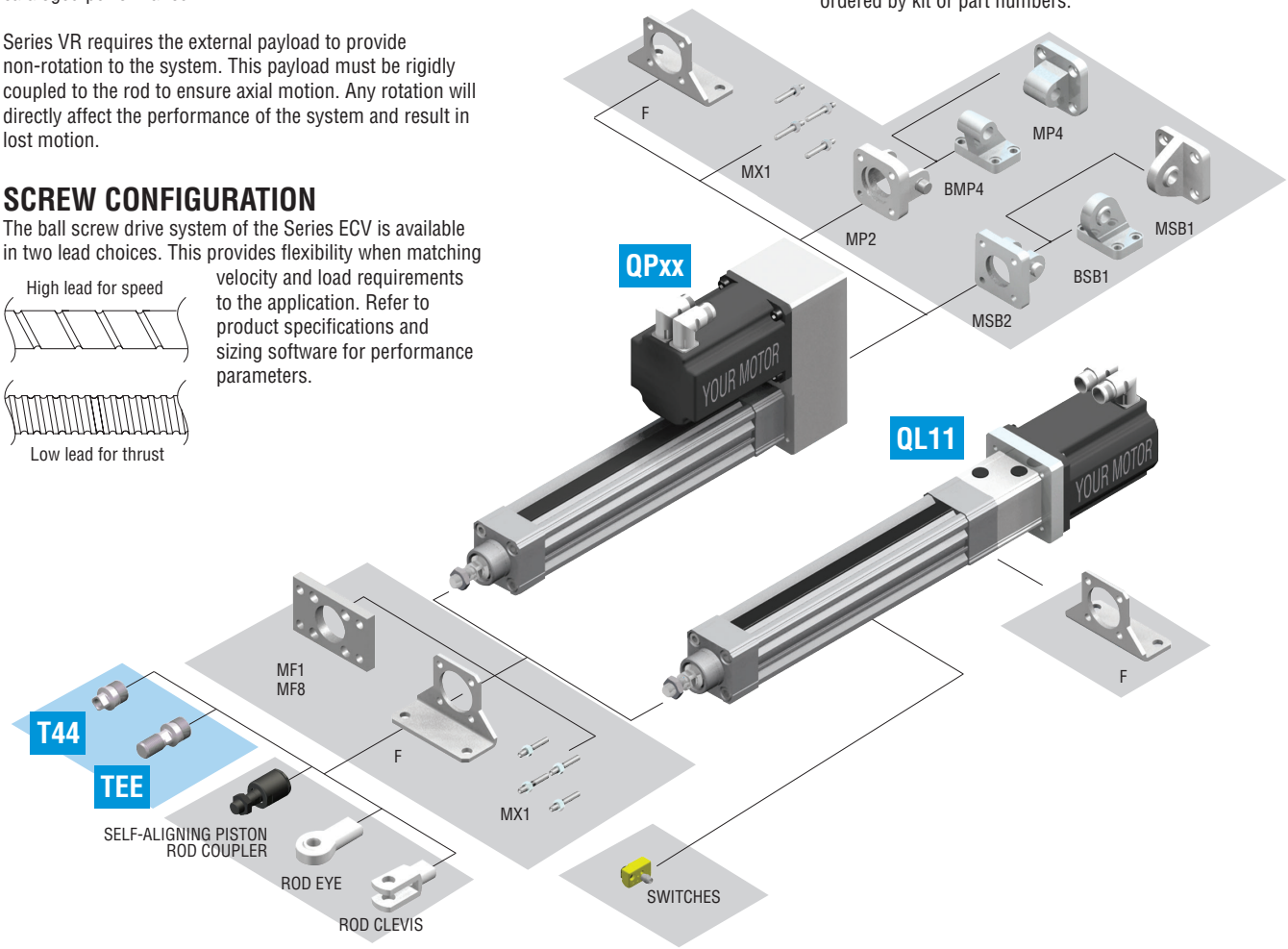
Series VR requires the external payload to provide non-rotation to the system. This payload must be rigidly coupled to the rod to ensure axial motion. Any rotation will directly affect the performance of the system and result in lost motion.

SCREW CONFIGURATION

The ball screw drive system of the Series ECV is 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

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



SPECIFICATIONS	-RB BALL SCREW	-RL LEAD SCREW
REPEATABILITY[1]	±0.01 mm [±0.0004 in]	±0.5 mm [±0.020 in]
MAXIMUM BACKLASH[2, 7]	0.025 mm [0.001 in]	0.20 mm [0.008 in]
RATED LIFE	Refer to Life vs. Thrust Chart (page 7)	Refer to Online Sizing
FULL TRAVEL TOLERANCE[6]	+3.5/-0.0 mm [+0.138/-0.000 in]	
DUTY CYCLE	100%	35%
OPERATING TEMPERATURE	4 - 65°C [40 - 150°F]	
LUBRICATION INTERVAL[3]	Horizontal: 2500 km [100 million in], Vertical: 1500 km [60 million in]	Horizontal: 500 km [20 million in], Vertical: 250 km [10 million in]
ENCAPSULATION CLASS	IP50	

-RB BALL SCREW SPECIFICATIONS			SIZE							
			32		40		50		80	
MAXIMUM TRAVEL		mm [in]	1000 [39.37]							
SCREW DIAMETER		mm	12		16		20		32	
SCREW CONFIGURATION			-RB005	-RB010	-RB010	-RB016	-RB010	-RB020	-RB010	
SCREW LEAD		mm	5	10	10	16	10	20	10	
MAXIMUM SPEED[4]		mm/sec [in/sec]	500 [19.6]	1000 [39.3]	1000 [39.3]	1600 [63.0]	1000 [39.3]	2000 [78.7]	1000 [39.3]	
MAXIMUM RPM[4]		rev/min	6000							
MAXIMUM ACCELERATION[4]	-QL11	m/sec^2 [in/sec^2]	19.6 [772]							
	-QPx1	m/sec^2 [in/sec^2]	9.8 [386]							
MAXIMUM THRUST[4]		N [lbf]	1625 [366]	850 [191]	3165 [712]	1980 [445]	5710 [1285]	3250 [731]	22340 [5020]	
PERMISSIBLE DRIVE TORQUE[5]		Nm [in-lb]	1.5 [13.3]		5.6 [49.6]		10.1 [89.4]		39.5 [349.6]	
NO-LOAD TORQUE		Nm [in-lb]	0.10 [0.89]		0.25 [2.21]		0.40 [3.54]		1.50 [13.27]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})	kg [lb]	1.16 [2.55]		1.49 [3.29]		2.36 [5.20]		8.67 [19.12]	
	TOTAL LENGTH ADDER (W_{LT})	kg/mm [lb/in]	0.0034 [0.19]		0.0046 [0.26]		0.0071 [0.40]		0.0177 [0.99]	
	MOVING @ ZERO STROKE (W_{OM})	kg [lb]	0.30 [0.66]		0.52 [1.14]		0.98 [2.15]		3.08 [6.80]	
	MOVING LENGTH ADDER (W_{LM})	kg/mm [lb/in]	0.0010 [0.058]		0.0010 [0.058]		0.0020 [0.111]		0.0037 [0.208]	
MOMENT OF INERTIA	ACTUATOR @ ZERO STROKE (J_O)	$kg-m^2$ [$lb-in^2$]	3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		4.84×10^{-5} [0.165]		2.82×10^{-4} [0.964]	
	LENGTH ADDER (J_L)	$kg-m^2/mm$ [$lb-in^2/in$]	9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		7.95×10^{-8} [0.0069]		6.50×10^{-7} [5.65×10^{-2}]	
	MOVING WEIGHT ADDER (J_M)	$kg-m^2/kg$ [$lb-in^2/lb$]	6.21×10^{-7} [9.63×10^{-4}]	2.48×10^{-6} [3.85×10^{-3}]	2.48×10^{-6} [3.85×10^{-3}]	6.36×10^{-6} [9.86×10^{-3}]	2.48×10^{-6} [3.85×10^{-3}]	9.93×10^{-6} [1.54×10^{-2}]	2.59×10^{-5} [4.02×10^{-2}]	
	MOTOR CONFIGURATION (J_O)	-QL11	3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		4.04×10^{-5} [0.138]		1.71×10^{-4} [0.583]	
		-QP11	1.41×10^{-4} [0.48]		3.59×10^{-4} [1.23]		5.72×10^{-4} [1.96]		2.65×10^{-3} [9.055]	
		-QP21	9.67×10^{-5} [0.33]		2.92×10^{-4} [1.00]		4.49×10^{-4} [1.53]		1.17×10^{-2} [39.921]	

-RL LEAD SCREW SPECIFICATIONS			SIZE			
			20		25	
MAXIMUM TRAVEL		mm [in]	400 [15.75]		400 [15.75]	
SCREW DIAMETER		mm	8		10	
SCREW CONFIGURATION			-RL150	-RL004	-RL150	-RL003
SCREW LEAD		mm	1.5	4	1.5	3
MAXIMUM SPEED[4]		mm/sec [in/sec]	30 [1.2]	80 [3.15]	30 [1.20]	60 [2.40]
MAXIMUM RPM[4]		rev/min	1200		1200	
MAXIMUM ACCELERATION[4]		m/sec^2 [in/sec^2]	0.3 [11.81]	1.0 [39.37]	0.3 [11.81]	1.0 [39.37]
MAXIMUM THRUST[4]		N [lbf]	300 [67.5]	150 [33.7]	500 [112]	250 [56]
PERMISSIBLE DRIVE TORQUE[5]		Nm [in-lb]	0.5 [4.42]		0.7 [6.20]	
NO-LOAD TORQUE		Nm [in-lb]	0.09 [0.80]		0.12 [1.00]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})	kg [lb]	0.57 [1.26]		0.77 [1.70]	
	TOTAL LENGTH ADDER (W_{LT})	kg/mm [lb/in]	0.0015 [0.08]		0.002 [0.11]	
	MOVING @ ZERO STROKE (W_{OM})	kg [lb]	0.08 [0.18]		0.14 [0.30]	
	MOVING LENGTH ADDER (W_{LM})	kg/mm [lb/in]	0.0004 [0.021]		0.0006 [0.034]	
MOMENT OF INERTIA	ACTUATOR @ ZERO STROKE (J_O)	$kg-m^2$ [$lb-in^2$]	1.66×10^{-6} [0.006]		2.09×10^{-6} [0.007]	
	LENGTH ADDER (J_L)	$kg-m^2/mm$ [$lb-in^2/in$]	1.59×10^{-9} [0.00014]		4.94×10^{-9} [0.00043]	
	MOVING WEIGHT ADDER (J_M)	$kg-m^2/kg$ [$lb-in^2/lb$]	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}]
	MOTOR CONFIGURATION (J_O)	-QF11	2.69×10^{-5} [0.092]		2.69×10^{-5} [0.092]	
		-QF21	—		—	
		-QL11	1.89×10^{-6} [0.006]		1.89×10^{-6} [0.006]	

WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT =
W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT
[reference pages 10 and 11]

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

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

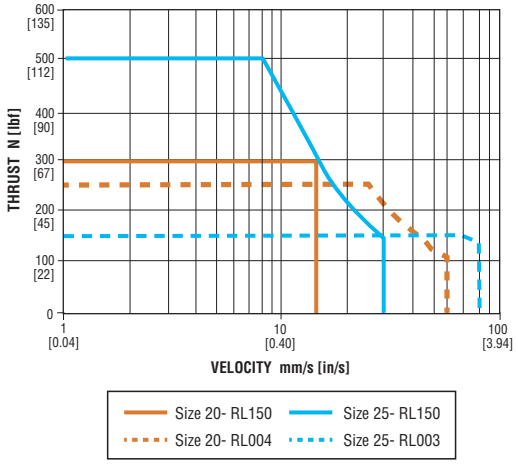
FOR -QP21:
$INERTIA_{Reflected} = [J_O + (J_L \times TRAVEL) + (J_M \times TOTAL\ MOVING\ WEIGHT)] / 4 + J_Q$

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 7
5) CORRESPONDS TO MAXIMUM THRUST
6) FOR HOMING AND INCREASED APPLICATION FLEXIBILITY, INCLUDE EXTRA TRAVEL WHEN NECESSARY.
7) SERIES ECVR REPEATABILITY AND BACKLASH A FUNCTION OF COUPLING RIGIDITY TO EXTERNAL NON-ROTATING LOAD
8) ALL DIMENSIONS ARE FOR REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED. REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES.

This section contains information on the capabilities of the 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 Inside Sales Department.

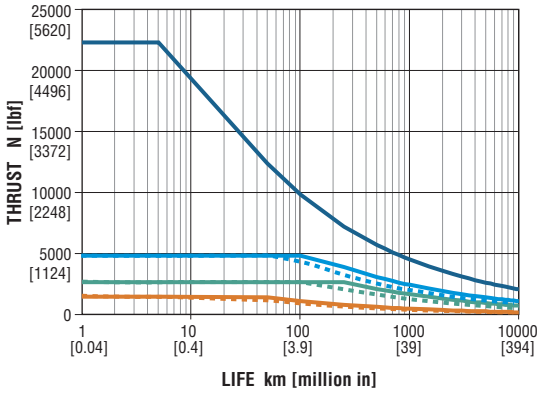
ECV LEAD SCREW -RL - SIZES 20 & 25

THRUST/VELOCITY

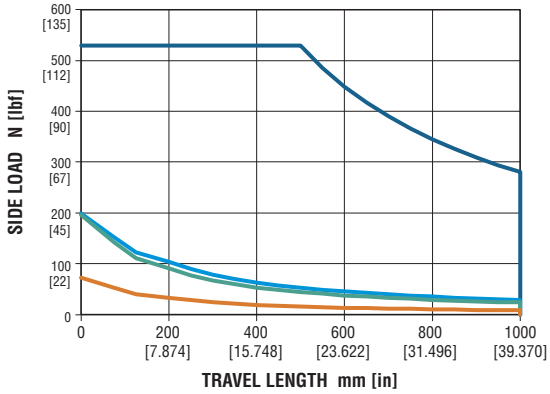


ECV BALL SCREW -RB - SIZES 32, 40, 50, & 80

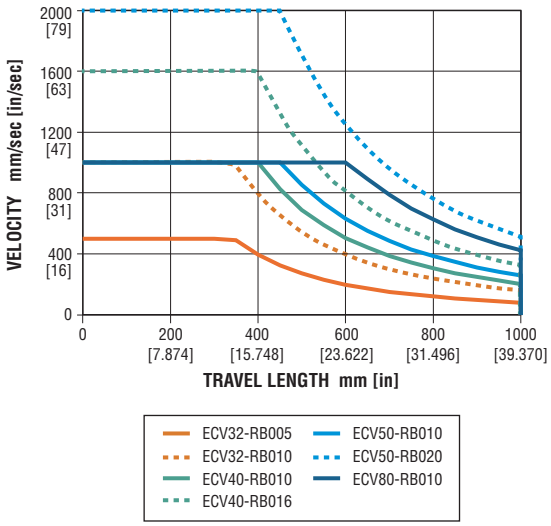
THRUST/LIFE



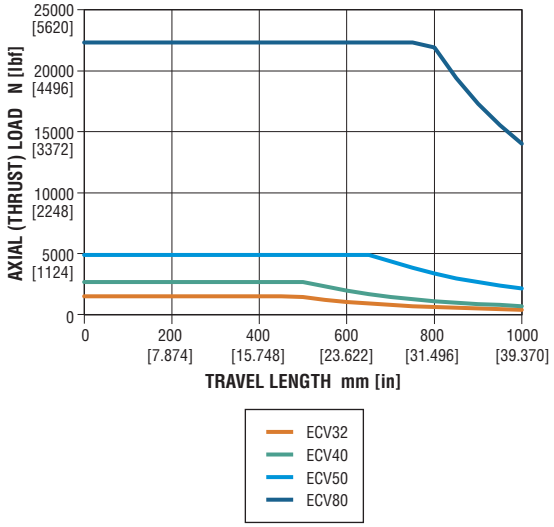
SIDE LOAD/TRAVEL



VELOCITY/TRAVEL

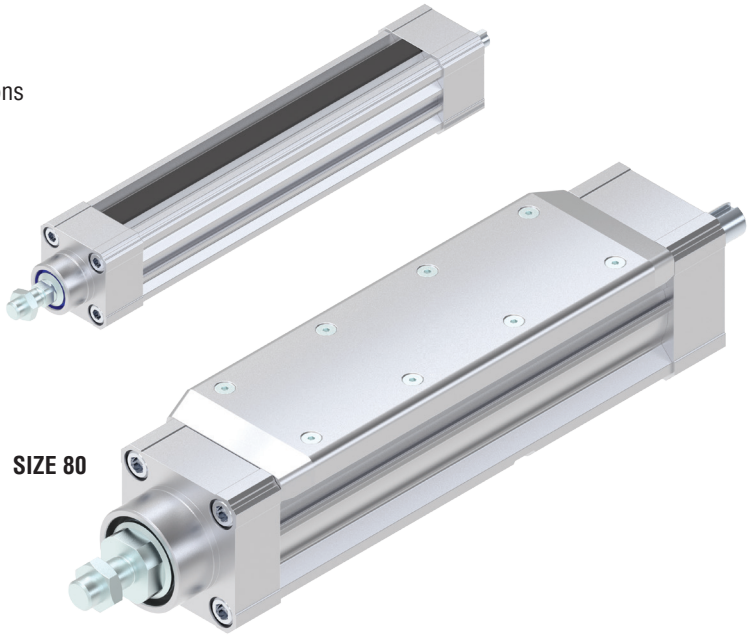


ALLOWABLE AXIAL LOAD

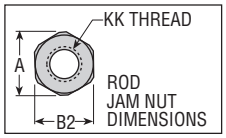


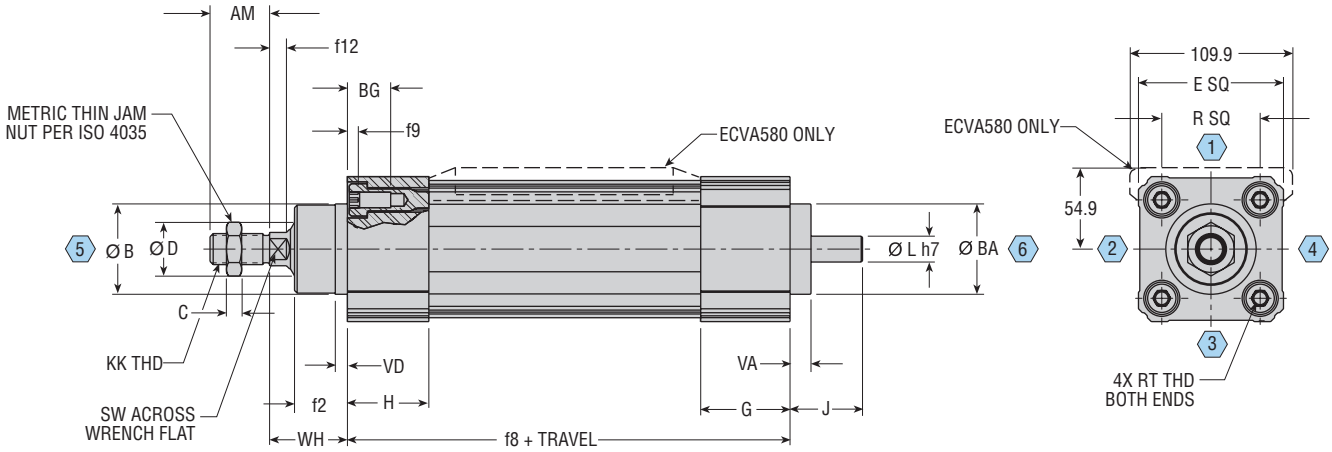
The Series ECV is available as a driver only or with inline or foldback ***Your Motor, Your Way*** configurations. These dimensions apply to the driver portion for all standard units.

SIZES 32/40/50



SIZE 80





SIZE	A MAX	AM	Ø B	B2	Ø BA	BG MIN	C	Ø D	E	f2	f8	f9	f12	G	H	J	KK	Ø L	R	RT	SW	VA	VD	WH
20	15.0	19.0	21.9	13.0	22.9	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 0.7	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 0.7	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	5.8	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
80	33.0	39.0	69.9	30.0	61.9	20.0	10.7	50.8	98.0	33.4	315.6	6.5	12.8	43.4	38.0	56.1	M20 x 1.5	22.0	72.0	M10 x 1.5	39.9	11.0	4.7	46.0

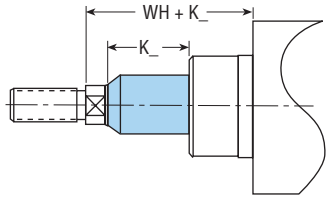
NOTES:
1) NUMBERS SHOWN IN ⎔ INDICATE CYLINDER POSITIONS
2) DIMENSIONS: mm

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.

For Size 80, contact PHD.



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

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

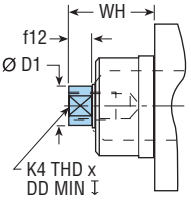
NOTE: DIMENSIONS: mm

T44 FEMALE ROD END

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

For Size 80, contact PHD.

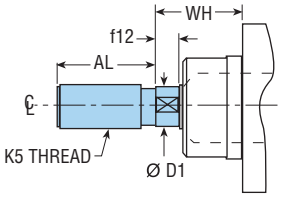
T44 FEMALE ROD END



TEE MALE OVERSIZE ROD END

For Size 80, contact PHD.

TEE MALE OVERSIZE ROD END



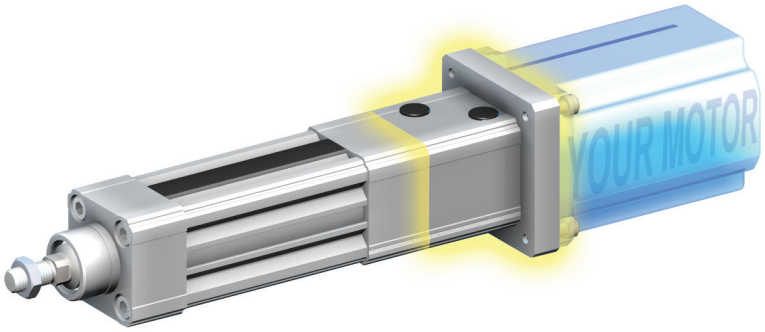
LETTER DIM	SIZE				
	20	25	32	40	50
AL	—	—	21.0	23.0	31.0
D1	8.00	10.01	11.35	15.21	18.27
f12	6.0	6.0	6.0	6.5	8.0
K4	M5 x 0.8	M6 x 1.0	M8 x 1.25	M10 x 1.5	M12 x 1.75
K5	—	—	M12 x 1.25	M16 x 1.5	M20 x 1.5
DD min	10.5	12.5	14.0	17.0	19.0
WH	24.0	28.0	26.0	30.0	37.0

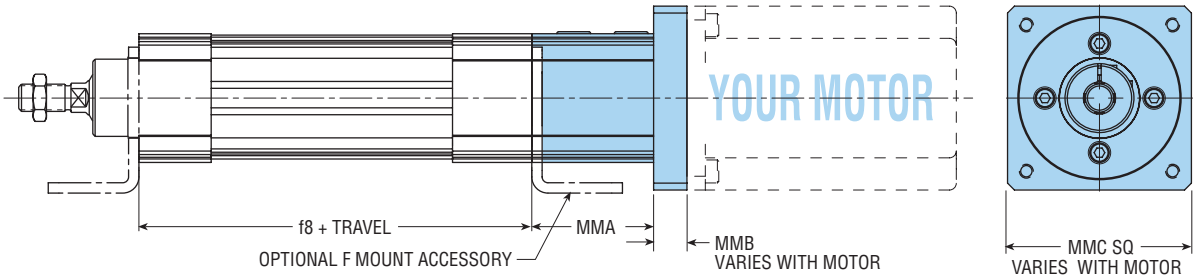
NOTE: DIMENSIONS: mm

All dimensions are reference only unless specifically 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 12.

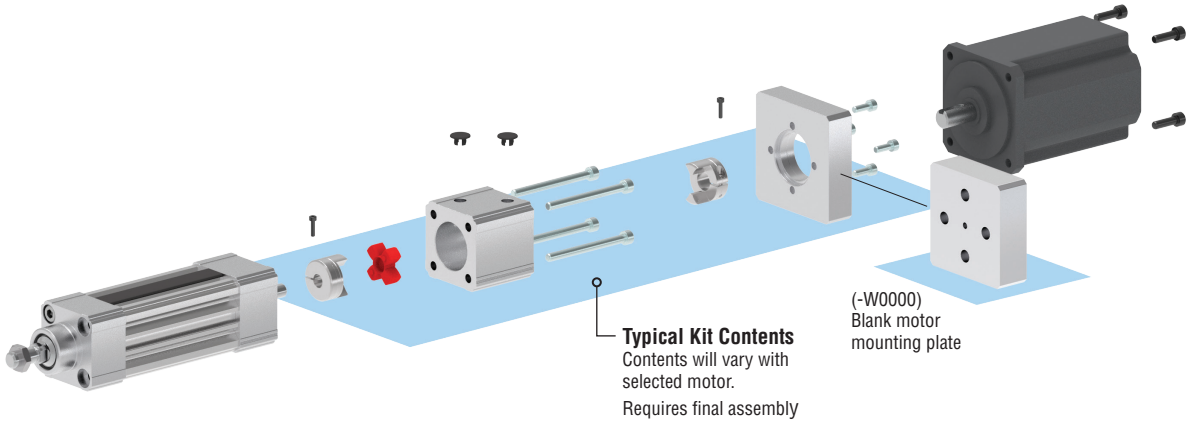




SIZE	f8	MMA	MMA WITH F MOUNT	MMB MAX	MMB MIN	MMC		WEIGHT kg
						STANDARD	OVERSIZE	
20	113.4	43.6	46.6	25.4	8.5	49.0	60.0	0.25
25	117.3	43.6	46.6	25.4	8.5	49.0	60.0	0.25
32	150.0	49.5	54.0	25.4	8.5	60.0	70.0	0.45
40	170.9	53.0	57.5	35.6	8.5	70.0	88.0	0.65
50	193.0	82.1	86.6	35.6	8.5	88.0	110.0	1.36
80	315.6	108.8	—	35.6	19.0	120.7	150.0	2.50

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, MOTOR PULLEY ID IS SUPPLIED WITH UNFINISHED ID Ø AND MOTOR MOUNTING PLATE IS SUPPLIED WITHOUT MOTOR MOUNTING FEATURES
4) DIMENSIONS: mm

Your Motor Your Way



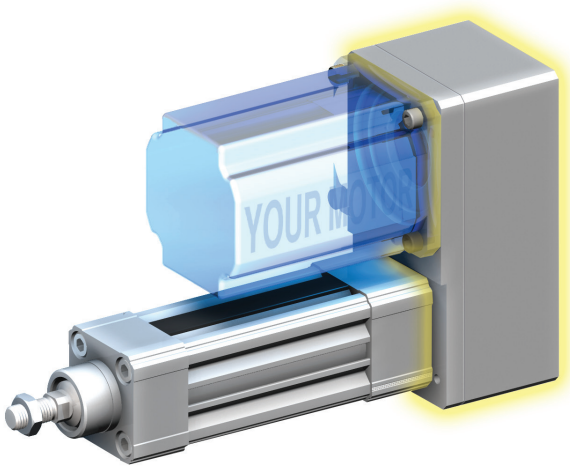
All dimensions are reference only unless specifically toleranced.

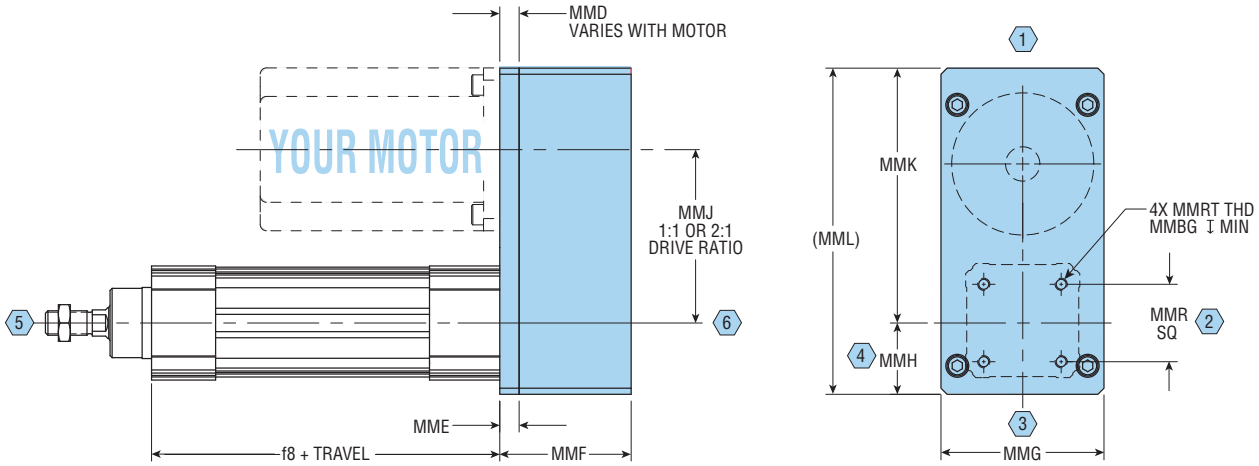
NEW

QP11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

QP21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO

The new -QP upgraded foldback option increases durability and torque capacity with a steel pulley, added rear bearing support, and a keyless coupler. These enhancements reduce shaft stress, improve power transfer, and boost load capacity by up to 25%, making it ideal for high-thrust applications. Foldback motor mounting with the -QP11 option provides a 1:1 drive ratio for performance similar to inline motor mounting but in a shorter overall length, while the -QP21 option offers a 2:1 reduction for greater motor flexibility. This mounting style also meets VDMA 24562 standards, allowing the use of many standard cylinder mounting accessories. For unique motor needs, a blank motor mount may be ordered using the -W0000 code for customer modification (see page 12).

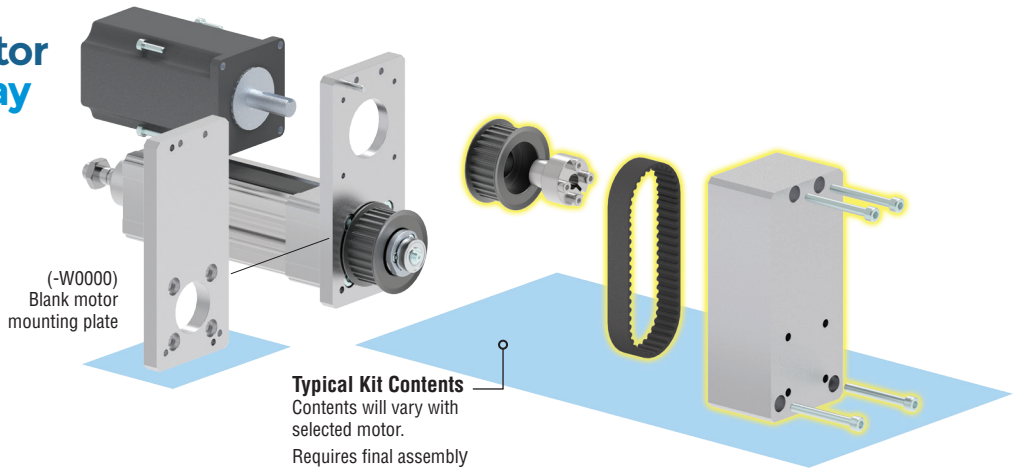




SIZE	f8	MMD MIN	MMD MAX	MME	MMF	MMG	MMH	MMJ 1:1	MMJ 2:1	MMK	MML	MMR	MMRT	MMBG	MMD BLANK	WEIGHT kg	MOTOR PULLEY ATTACHMENT	
																	QP11*	QP21
32	150.0	6.1	22.5	9.5	55.5	63.0	31.0	67.9	75.5	104.0	135.0	32.5	M6 x 1	11.5	13.5	1.51	COUPLER ≤ Ø 12 > KEY	KEY
40	170.9	6.1	22.5	9.5	64.5	80.0	35.0	85.0	81.5	125.1	160.1	38.0	M6 x 1	11.5	15.0	2.65	COUPLER ≤ Ø 14 > KEY	KEY
50	193.0	6.1	22.5	9.5	68.0	86.0	44.0	105.3	111.6	154.4	198.4	46.5	M8 x 1.25	14.5	15.0	3.58	COUPLER ≤ Ø 15 > KEY	KEY
80	315.6	15.0	25.4	15.0	86.0	134.0	67.0	144.0	145.6	226.1	293.1	72.0	M10 x 1.5	17.0	15.0	7.76	COUPLER ≤ Ø 32 > KEY	KEY

NOTES:
1) "YOUR MOTOR YOUR WAY" MOTOR MOUNTS -QPxx & -QL11 ARE PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO CYLINDER
2) KITS INCLUDE DIRECTIONS AND ALL PARTS REQUIRED TO ASSEMBLE A CYLINDER BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
3) WHEN (-W0000) IS SPECIFIED, MOTOR PULLEY ID IS SUPPLIED WITH UNFINISHED ID Ø AND MOTOR MOUNTING PLATE IS SUPPLIED WITHOUT MOTOR MOUNTING FEATURES
4) DIMENSIONS: mm
5) *MOTOR PULLEY ATTACHMENT METHODOLOGY IS DEPENDENT ON MOTOR SHAFT DIAMETER

Your Motor Your Way



All dimensions are reference only unless specifically toleranced.

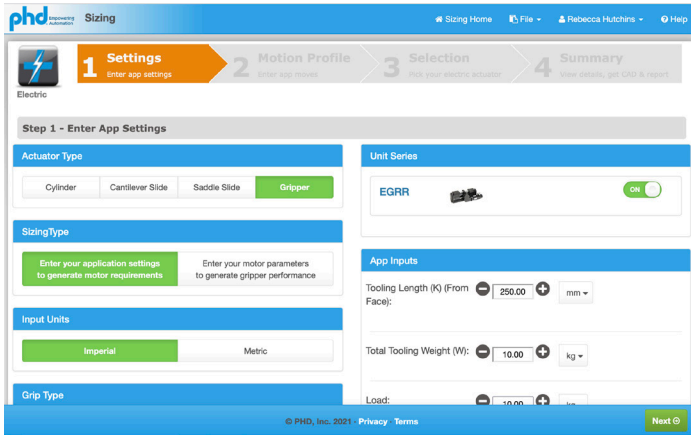
Wxxxx MOTOR MOUNT CODE

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

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

Your Motor Your Way

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



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

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

Step 2 - Motor Selection

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

Step 3 - CAD Configurator - config.phdinc.com

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

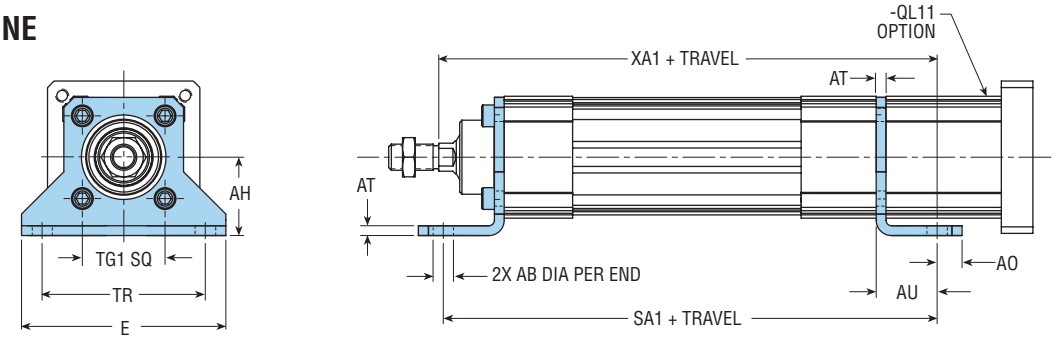
Contact PHD for ECV80 sizing and CAD.

F BASE MOUNTING KIT

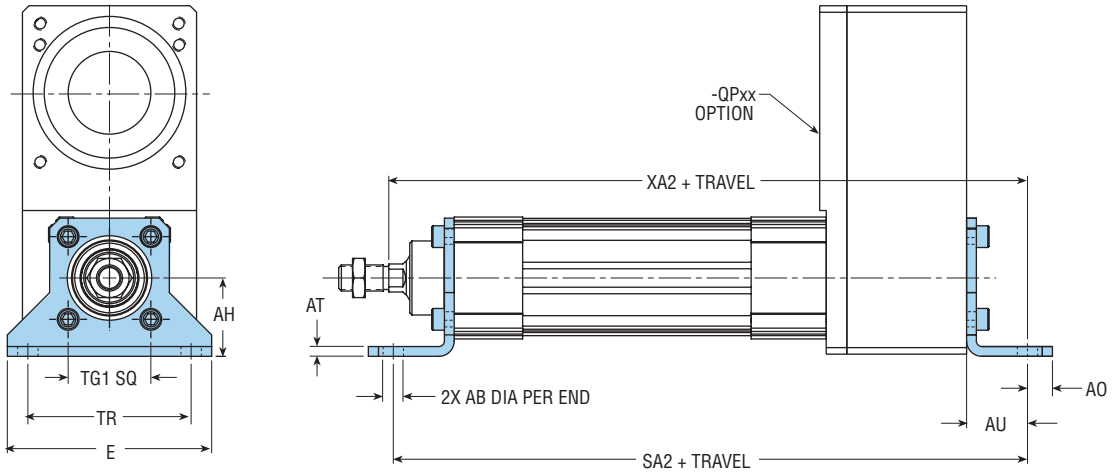
For Size 80, contact PHD.

NOTE: Base mounting kit bracket adds to overall length

INLINE



FOLDBACK



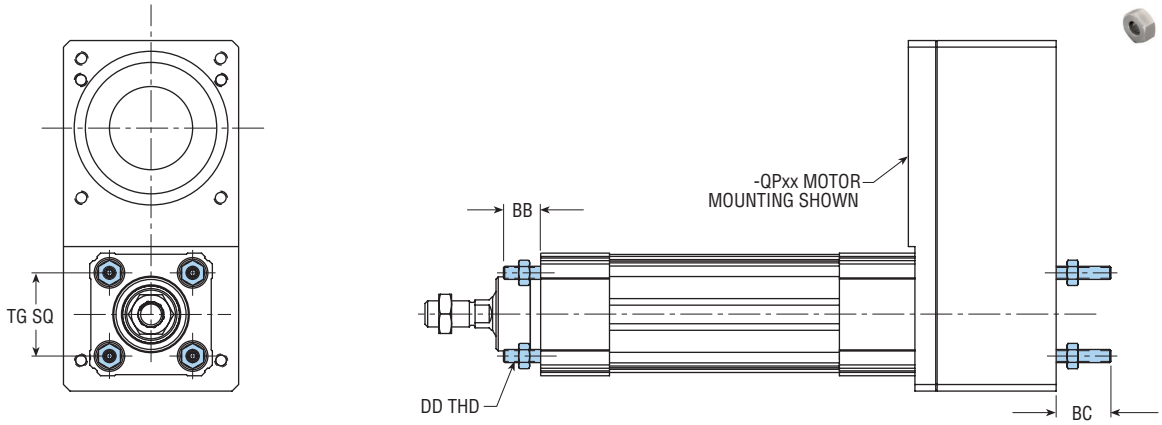
LETTER DIM	SIZE				
	20	25	32	40	50
AB	6.86	6.86	6.86	9.37	9.37
TG1	26.0	27.0	32.5	38.0	46.5
E MAX	65.3	68.48	80.4	94.6	109.0
TR	50.8	54.0	65.5	75.0	87.5
AO MAX	8.13	8.13	8.4	11.5	11.4
AU	19.99	19.99	24.0	28.0	32.0
AH	24.99	24.99	32.0	36.0	45.0
AT	3.05	3.05	4.5	4.5	5.5
SA1	153.34	157.25	198.0	226.9	257.0
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.

MX1 FASTENER MOUNTING KIT (PER ISO 6431)

Fastener mounting kit can be used on the rod end of all units.
This kit can also be used on the motor end of -QPxx 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
80	28.0	33.5	M10 x 1.5	72.0	63480-03-3

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) REAR MOUNTING REQUIRES:
   -QFxx FOR SIZES 20 AND 25
   -QPxx FOR SIZES 32, 40, 50, AND 80
4) DIMENSIONS: mm

MF8 FLANGE MOUNTING KIT (MF8 PER ISO 6432)

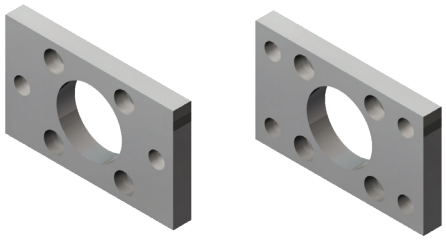
(SIZES 20 & 25)

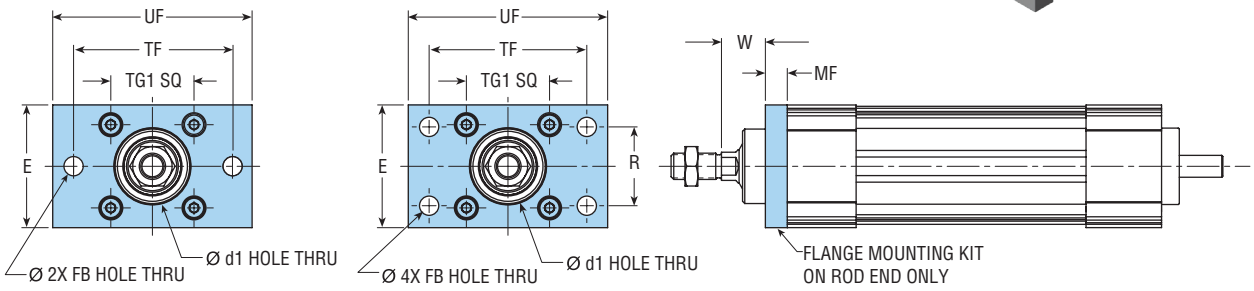
MF1 FLANGE MOUNTING KIT (PER VDMA 24562)

(SIZES 32, 40 & 50)

For Size 80, contact PHD.

SIZES 20 & 25 SIZES 32, 40, 50





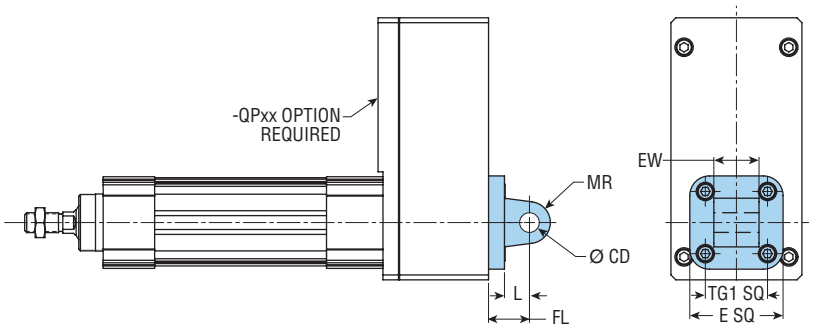
SIZE	LETTER DIMENSION/TOLERANCE									
	d1/H11	FB/H13	TG1	E MAX	R/JS14	MF	TF/JS14	UF MAX	W	KIT NO.
20	22.0	M6 x 1.0	26.0	40.0	—	5.0	50.0	70.0	19.0	85552-01-01
25	22.0	M6 x 1.0	27.0	40.0	—	5.0	50.0	70.0	23.0	85552-01-01
32	30.1	6.7	32.5	50.0	32.0	10.0	64.0	86.0	16.0	83219-01-01
40	35.0	8.8	38.0	58.0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

MP4 REAR MALE HINGE MOUNTING KIT (PER VDMA 24562)

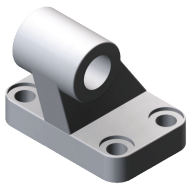
(PIVOT MOUNT ONLY)

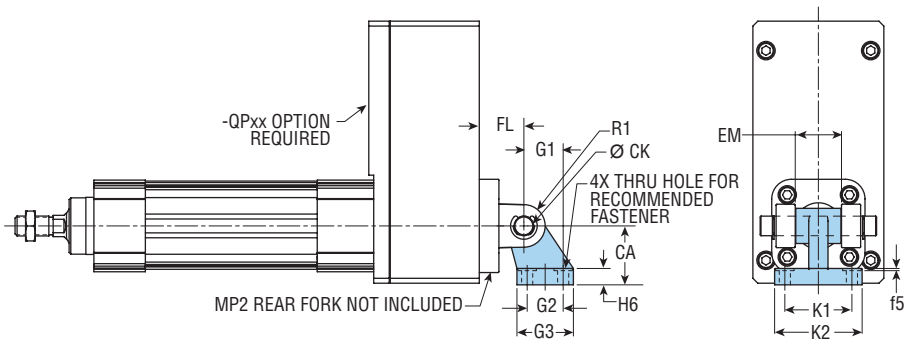


SIZE	LETTER DIMENSION/TOLERANCE							
	E MAX	EW MAX	TG1	FL (±0.2mm)	L MIN	CD/ H9	MR MAX	KIT NO.
32	50.0	26.0	32.5	22.0	12.2	10.0	11.0	83218-01-01
40	58.0	28.0	38.0	25.0	15.3	12.0	13.0	83218-02-01
50	70.0	32.0	46.5	27.0	15.3	12.0	13.0	83218-03-01
80	105.0	50.0	72.0	36.0	20.2	16.0	17.0	52486-05-3

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

BMP4 PILLOW BLOCK MOUNTING KIT (PER CETOP 107 P)



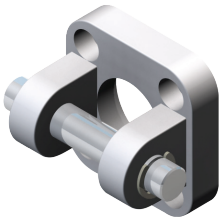


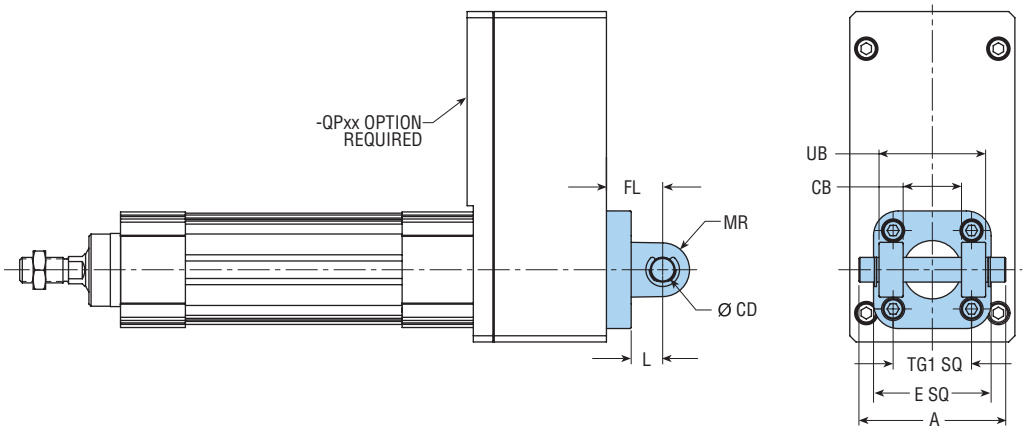
SIZE	LETTER DIMENSION/TOLERANCE													
	CK/H9	K1/JS14	K2 MAX	G1/JS14	f5 MAX	G2	EM MAX	G3 MAX	CA/JS15	H6	R1 MAX	FL	FASTENER	KIT NO.
32	10.0	38.0	51.0	21.0	1.6	18.0	25.8	31.0	32.0	8.0	10.0	22.0	M6	62818-001-00
40	12.0	41.0	54.0	24.0	1.6	22.0	27.8	35.0	36.0	10.0	11.0	25.0	M6	62818-002-00
50	12.0	50.0	65.0	33.0	1.6	30.0	31.8	45.0	45.0	12.0	13.0	27.0	M8	62818-003-00
80	16.0	66.0	86.0	47.0	2.5	40.0	49.8	60.0	63.0	14.0	15.0	36.0	M10	62818-005-00

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

All dimensions are reference only unless specifically toleranced.

MP2 REAR FORK MOUNTING KIT (PER VDMA 24562)

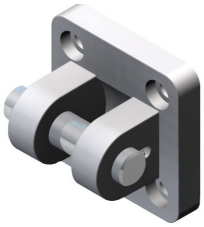


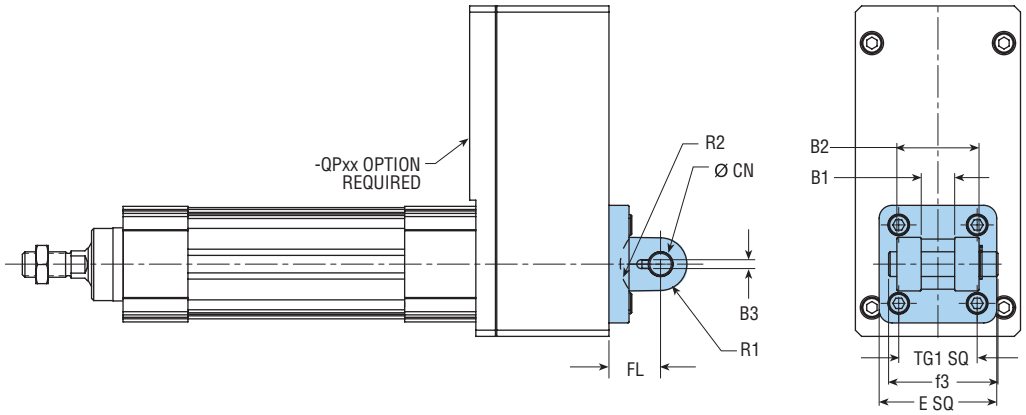


SIZE	LETTER DIMENSION/TOLERANCE									
	A MAX	E MAX	UB/h14	CB/H14	TG1	FL (±0.2 mm)	L MIN	CD/H9	MR MAX	KIT NO.
32	65.0	50.0	44.7	26.3	32.5	22.0	12.2	10.0	11.0	83214-01-01
40	72.0	58.0	51.6	28.3	38.0	25.0	15.0	12.0	13.0	83214-02-01
50	80.0	70.0	59.6	32.3	46.5	27.0	15.3	12.0	13.0	83214-03-01
80	115.0	105.0	89.6	50.3	72.0	36.0	20.2	16.0	17.0	52485-05-3

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 -QPxx OPTION
4) DIMENSIONS: mm

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



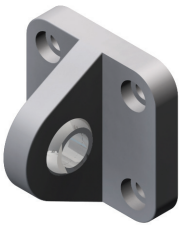


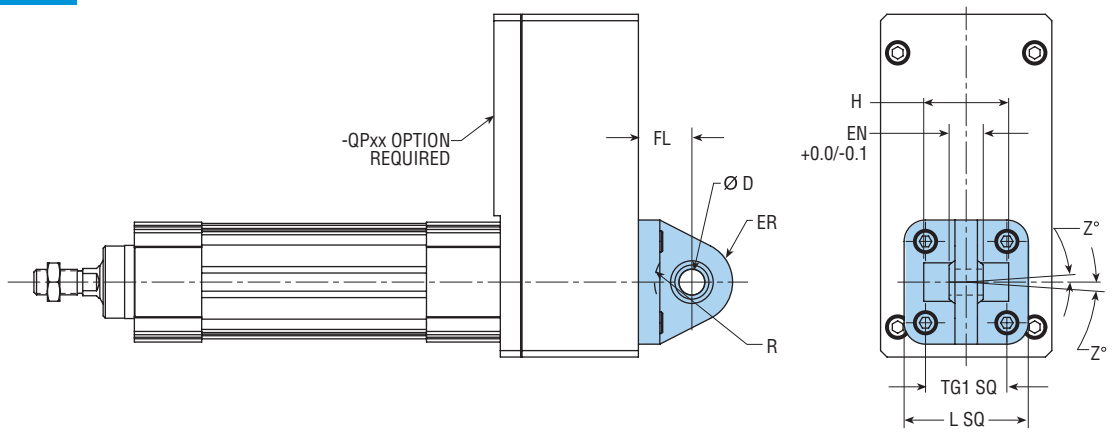
SIZE	LETTER DIMENSION/TOLERANCE										
	E MAX	B2/d12	B1/H14	TG1	B3 (±0.2 mm)	R2 MIN	f3	FL (±0.2 mm)	CN/F7	R1 MAX	KIT NO.
32	50.0	33.8	14.2	32.5	3.3	16.5	46.0	22.0	10.0	11.0	83215-01-01
40	58.0	39.8	16.2	38.0	4.3	19.5	53.0	25.0	12.0	13.0	83215-02-01
50	70.0	44.8	21.3	46.5	4.3	21.5	58.0	27.0	16.0	13.0	83215-03-01
80	105.0	64.7	25.3	72.0	4.3	29.5	80.0	36.0	20.0	22.0	52489-05-3

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 -QPxx OPTION
4) DIMENSIONS: mm

All dimensions are reference only unless specifically toleranced.

MSB1 REAR MALE HINGE MOUNTING FOR SPHERICAL BEARING KIT

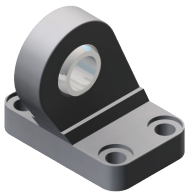


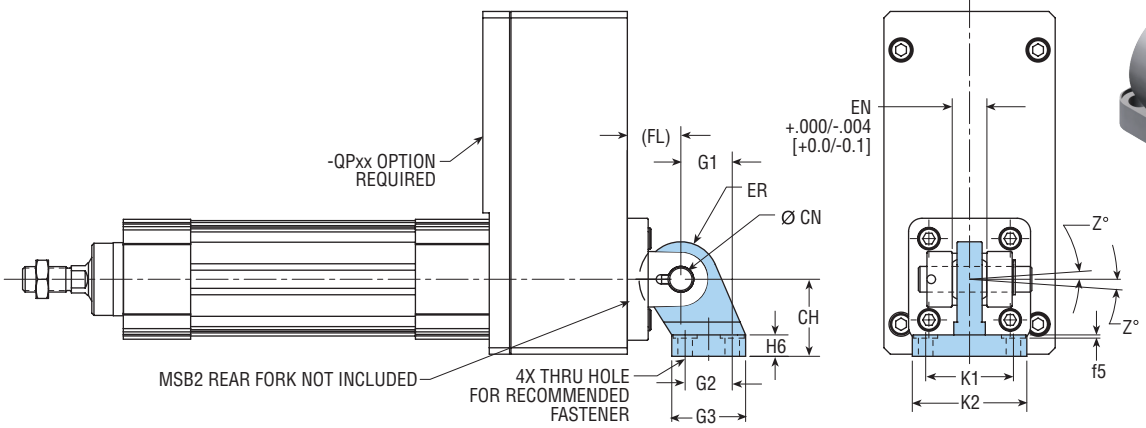


SIZE	LETTER DIMENSION/TOLERANCE									
	TG1	FL (±0.2 mm)	D/H7	EN	ER MAX	L MAX	Z	H	R	KIT NO.
32	32.5	22.0	10.0	13.9	16.0	50.0	4°	—	—	83216-01-01
40	38.0	25.0	12.0	16.0	19.0	58.0	4°	—	—	83216-02-01
50	46.5	27.0	16.0	21.0	21.0	70.0	4°	51.0	19.0	83216-03-01
80	72.0	36.0	20.0	25.0	28.0	105.0	4°	—	—	52488-05-3

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

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



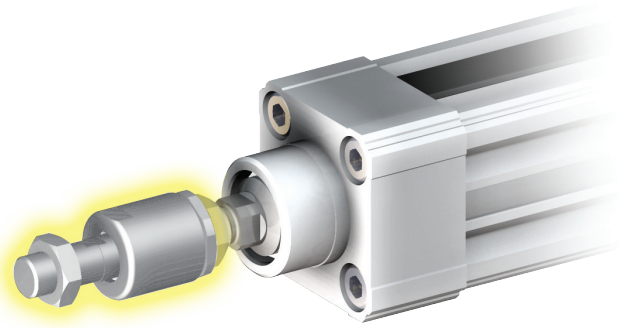


SIZE	LETTER DIMENSION/TOLERANCE														
	CN/ H7	K1/ JS14	K2 MAX	G1/ JS14	f5 MAX	G2/ JS14	EN	G3 MAX	CH/ JS15	H6	ER MAX	FL	Z	FASTENER	KIT NO.
32	10.0	38.0	51.0	21.0	1.6	18.0	13.9	31.0	32.0	10.0	16.0	22.0	4°	M6	62822-001-00
40	12.0	41.0	54.0	24.0	1.6	22.0	16.0	35.0	36.0	10.0	18.0	25.0	4°	M6	62822-002-00
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
80	20.0	66.0	86.0	47.0	2.5	40.0	25.0	60.0	63.0	14.0	28.0	36.0	4°	M10	62822-005-00

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

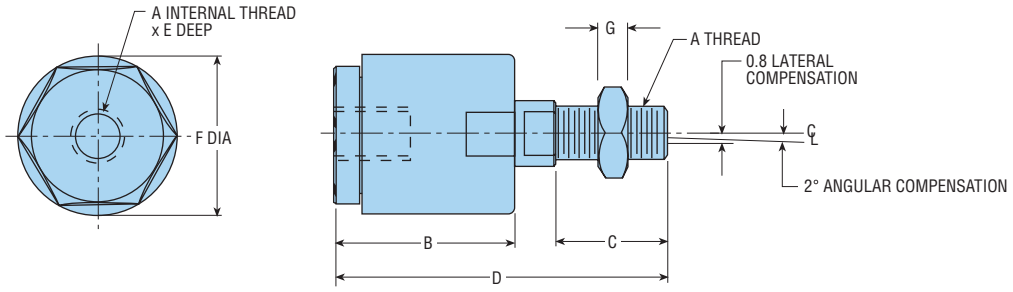
All dimensions are reference only unless specifically toleranced.

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



Major Benefits

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

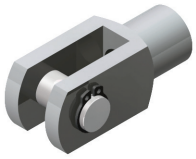


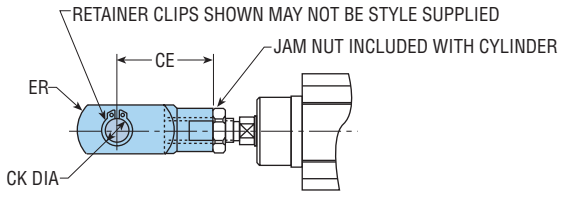
SIZE	LETTER DIMENSION/TOLERANCE								
	A	B MIN	C MIN	D MIN	E	F	G	PART NO.	CORROSION RESISTANT
20	M8 x 1.25	25.4	15.9	47.6	12.7	22.2	5.0	83275-02	51842-02
25	M10 x 1.25	25.4	15.9	47.6	12.7	22.2	5.0	83275-03	51842-03
32	M10 x 1.25	25.4	15.9	47.6	12.7	22.2	5.0	83275-03	51842-03
40	M12 x 1.25	28.6	16.5	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
80	M20 x 1.5	44.5	28.5	84.1	20.6	39.7	10.0	83275-06	51842-06

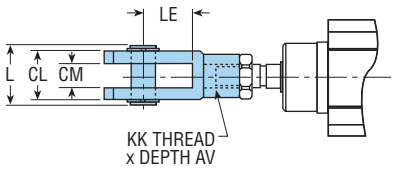
NOTE: DIMENSIONS: mm

All dimensions are reference only unless specifically toleranced.

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



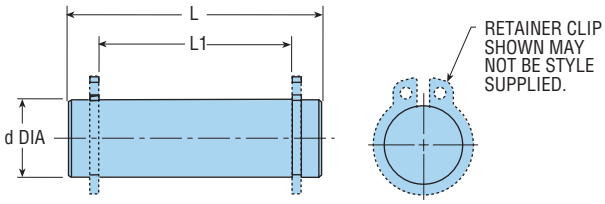




SIZE	LETTER DIMENSION/TOLERANCE									
	AV MIN	CE	CK/H9	CL MAX	CM MIN	ER MAX	KK	L	LE MIN	KIT NO.
20	16.0	32.0	8.02	16.0	8.0	13.0	M8 x 1.25	21.0	16.5	85578-01-01
25	20.0	40.0	10.0	20.0	10.0	16.0	M10 x 1.25	25.0	20.5	83221-01-01
32	20.0	40.0	10.0	20.0	10.0	16.0	M10 x 1.25	25.0	20.5	83221-01-01
40	22.0	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
80	33.0	80.0	20.0	40.0	20.0	32.0	M20 x 1.5	48.0	40.5	52492-04-3

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

ROD CLEVIS PIVOT PIN KIT

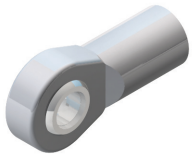


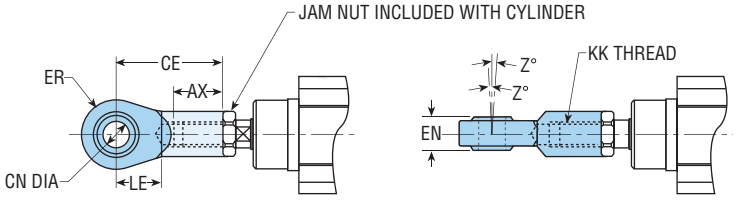
SIZE	d	L	L1	KIT NO.
20	8.0	21.0	—	65777-001-01
25	10.0	25.0	20.1	63463-01-2
32	10.0	25.0	20.1	63463-01-2
40	12.0	30.0	24.1	63463-02-2
50	16.0	39.0	32.1	63463-03-2
80	20.0	48.0	40.1	63463-04-3

NOTE: DIMENSIONS: mm

All dimensions are reference only unless specifically toleranced.

ROD EYE MOUNTING WITH SPHERICAL BEARING KIT

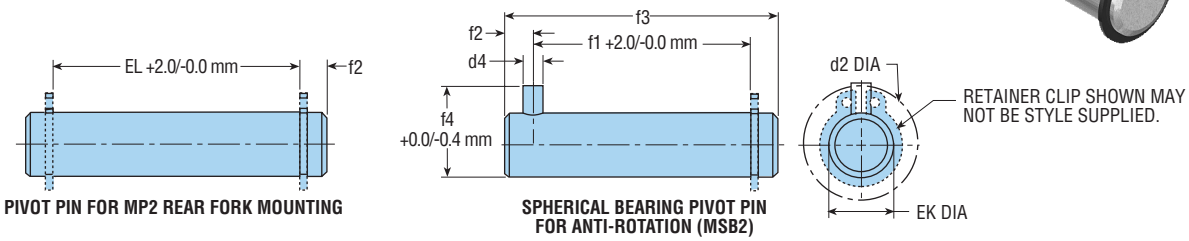




SIZE	LETTER DIMENSION/TOLERANCE								
	AX MIN	CE	CN/H9	EN/h12	ER MAX	KK	LE MIN	Z	KIT NO.
20	16.0	36.0	8.0	11.9	12.0	M8 x 1.25	13.0	4°	85576-01-01
25	20.0	43.0	10.0	13.9	14.0	M10 x 1.25	15.0	4°	83220-01-01
32	20.0	43.0	10.0	13.9	14.0	M10 x 1.25	15.0	4°	83220-01-01
40	22.0	50.0	12.0	15.9	16.0	M12 x 1.25	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
80	33.0	77.0	20.0	24.9	24.7	M20 x 1.5	27.0	4°	52493-04-1

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.
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
80	32.0	16.0	92.0	11.0	52490-05-3

NOTE: DIMENSIONS: mm

MSB2 PIVOT PIN

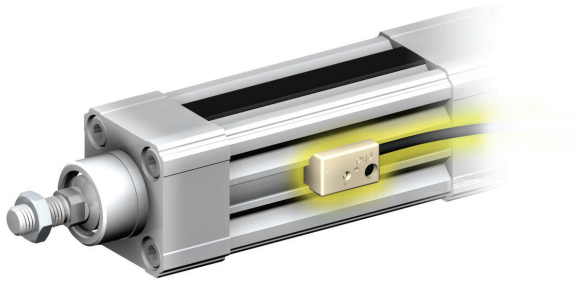
SIZE	LETTER DIMENSION/TOLERANCE							
	d2 MAX	d4/H12	EK/h9	f1	f2 MAX	f3 MAX	f4	KIT NO.
20	—	—	8.0	24.0	—	32.0	—	52491-07-2
25	—	—	8.0	24.0	—	32.0	—	52491-07-2
32	23.0	3.0	10.0	32.5	4.5	46.0	13.8	52491-01-2
40	25.0	4.0	12.0	38.1	6.0	53.0	15.8	52491-02-2
50	25.0	4.0	16.0	43.1	6.0	58.0	19.8	52491-03-2
80	32.0	4.0	20.0	63.1	6.0	80.0	23.8	52491-05-3

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

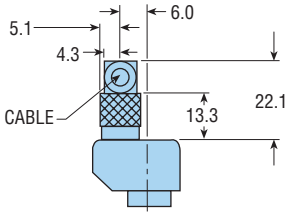
SERIES 6250 REED SWITCHES

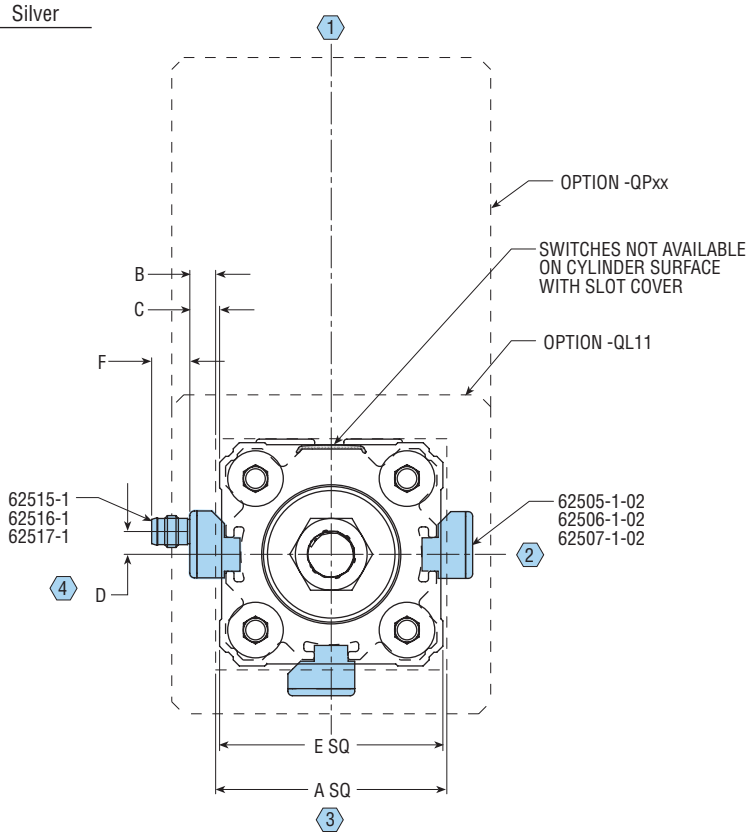
PART NO.	DESCRIPTION	COLOR
62507-1-02	AC/DC Reed, 2 m cable	Silver
62517-1	AC/DC Reed, Quick Connect	Silver

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

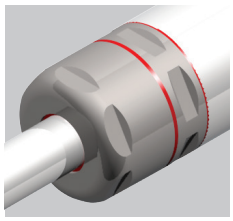




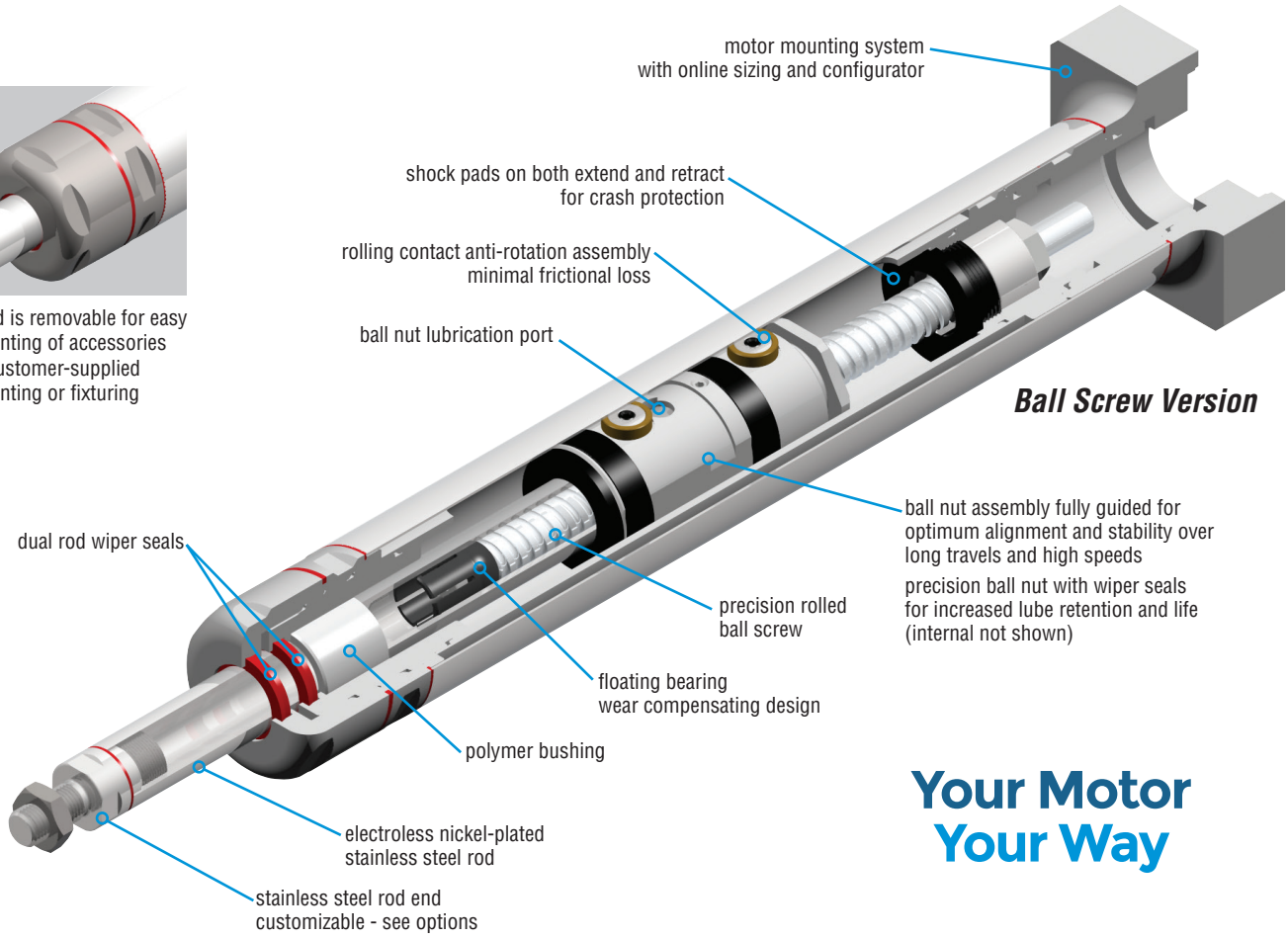
SIZE	A*	B	C	D	E	F
20	34.0	8.7	7.2	6.0	37.0	9.5
25	34.0	11.2	8.2	6.0	40.0	9.5
32	50.0	7.0	7.5	6.0	49.5	9.5
40	58.0	5.0	6.5	6.0	56.0	9.5
50	70.0	6.0	7.0	6.0	68.5	9.5
80	105.0	4.0	7.5	6.0	98.0	9.5

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

All dimensions are reference only unless specifically toleranced.



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



Ball Screw Version

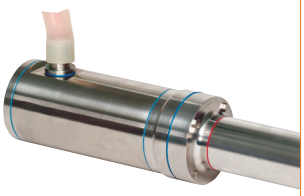
Your Motor Your Way

Major Benefits

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

Choice of Inline or Foldback Motor Mounting

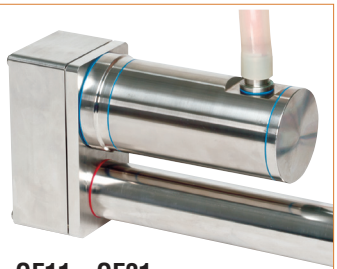
INLINE



-QL11

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

FOLDBACK



-QF11, -QF21

TYPE
Electromechanical

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

SIZE
32
40
50

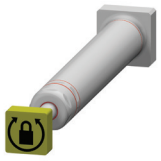
OPTIONS
K _ - Extra rod extension in 1mm increments. Length code is K100=100mm, K050=50 mm
T44 - Female rod end, stainless steel applications
TEE - Oversized, threaded, male rod end, stainless steel
Y8 - Stainless steel external construction compatible with caustic washdown. USDA Certified for Product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

MOTOR MOUNT CODE
Wxxxx - Open Architecture p/n code

E C PA 5 32 x 750 - RB010 - T44 - QF21 - Wxxxx

PRODUCT
Cylinder

DESIGN NO.
5 - Metric



TRAVEL (MAX.)

Size	RB (Ball) mm
32	750
40	750
50	750

50 mm minimum stroke in 50 mm increments

SCREW CONFIGURATION

Size	Ball Screw Type	Lead mm
32	RB005	5
32	RB010	10
40	RB010	10
40	RB016	16
50	RB010	10
50	RB020	20

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

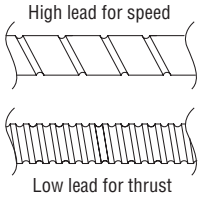
ROD ROTATION

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

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

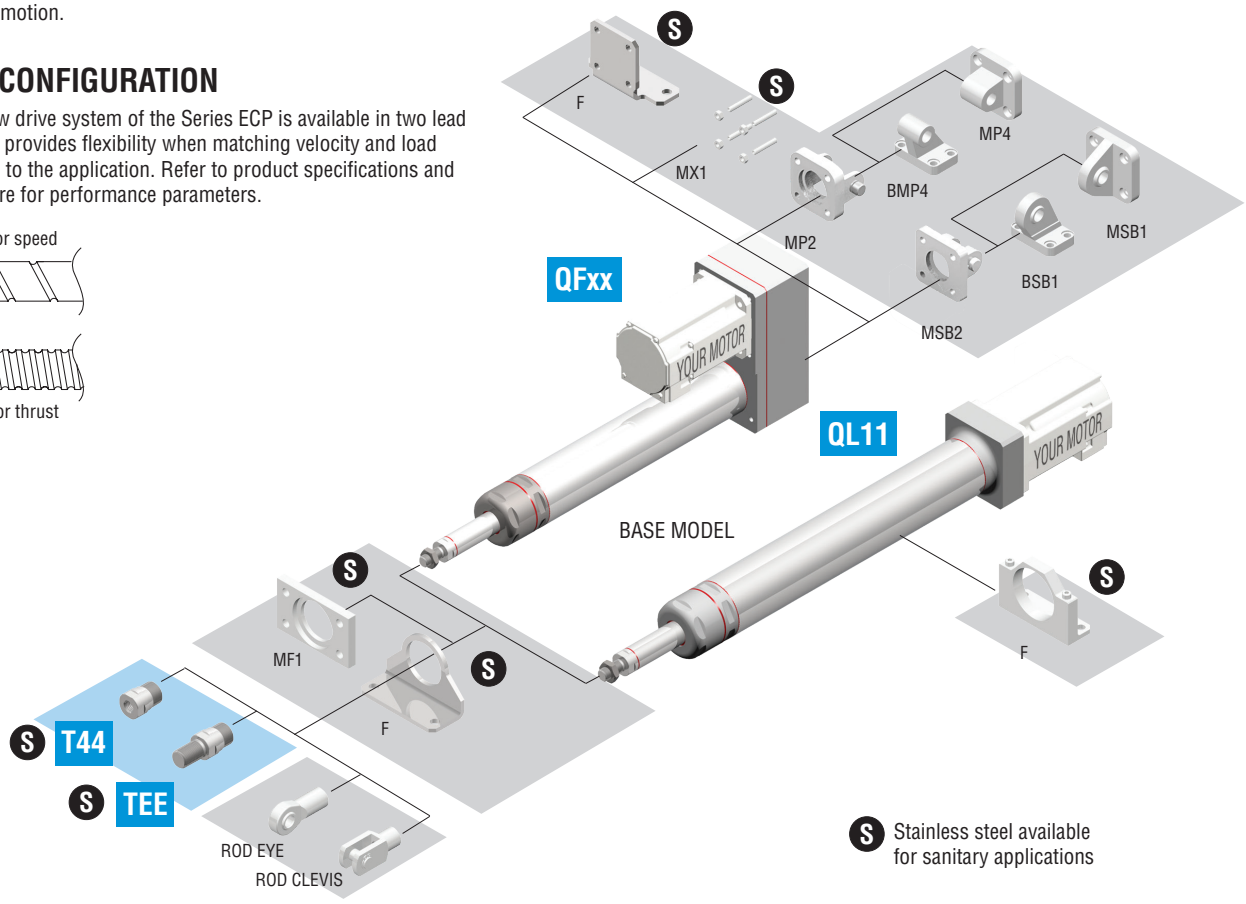
SCREW CONFIGURATION

The ball screw drive system of the Series ECP is 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

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



S Stainless steel available for sanitary applications

SPECIFICATIONS	BALL SCREW SERIES ECPA	BALL SCREW SERIES ECPR[8]
PISTON ROD	Non-Rotating	Rotating
REPEATABILITY[1]	±0.01 mm [±0.0004 in]	
MAXIMUM BACKLASH[2]	0.025 mm [0.001 in]	
RATED LIFE	Refer to Life vs. Thrust Chart (page 25)	
FULL TRAVEL TOLERANCE[7]	+3.5/-0.0 mm [+0.138/-0.000 in]	
DUTY CYCLE	75%	
OPERATING TEMPERATURE	4 - 65°C [40 - 150°F]	
LUBRICATION INTERVAL[3]	Horizontal: 2500 km [100 million in], Vertical: 1500 km [60 million in]	
ENCAPSULATION CLASS	IP69K	

SPECIFICATIONS				SIZE					
				32		40		50	
MECHANICS	MAXIMUM TRAVEL		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	-QL11	m/sec^2 [in/sec^2]	19.6 [772]					
		-QFx1	m/sec^2 [in/sec^2]	9.8 [386]					
THRUST[4]	MAXIMUM THRUST		N [lbf]	1360 [306]	680 [153]	2430 [546]	1520 [342]	4410 [991]	2510 [564]
TORQUE	PERMISSIBLE DRIVE TORQUE[6]	-QL11	Nm [in-lb]	1.2 [10.62]		4.3 [38.06]		7.8 [69.03]	
		-QFx1	Nm [in-lb]	0.84 [7.43]		3 [26.55]		5.46 [48.32]	
	NO-LOAD TORQUE		Nm [in-lb]	0.10 [0.89]		0.25 [2.21]		0.40 [3.54]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})			Refer to DIMENSIONS pages					
	TOTAL LENGTH ADDER (W_{LT})								
	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-m^2 [lb-in^2]	3.00×10^{-6} [0.010]		1.50×10^{-5} [0.051]		4.84×10^{-5} [0.165]	
	LENGTH ADDER (J_L)		kg-m^2/mm [lb-in^2/in]	9.85×10^{-9} [0.0009]		2.90×10^{-8} [0.0025]		7.95×10^{-8} [0.0069]	
	MOVING WEIGHT ADDER (J_M)		kg-m^2/kg	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-in^2/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-m^2 [lb-in^2]	1.40×10^{-5} [0.048]		4.71×10^{-5} [0.161]		4.65×10^{-5} [0.159]	
		-QF21		2.75×10^{-5} [0.094]		8.28×10^{-5} [0.283]		1.91×10^{-4} [0.654]	
		-QL11		3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		4.04×10^{-5} [0.138]	

NOTES:
1) UNIDIRECTIONAL
2) AXIAL FREE PLAY WHEN DRIVE SHAFT LOCKED
3) REFER TO OPERATING INSTRUCTIONS FOR RE-LUBRICATION DETAILS
4) REFER TO PERFORMANCE CHARTS ON PAGE 25
5) CORRESPONDS TO MAXIMUM THRUST
6) FOR HOMING AND INCREASED APPLICATION FLEXIBILITY, INCLUDE EXTRA TRAVEL WHEN NECESSARY
7) SERIES ECPR REPEATABILITY AND BACKLASH A FUNCTION OF COUPLING RIGIDITY TO EXTERNAL NON-ROTATING LOAD
8) ALL DIMENSIONS ARE FOR REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED. REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES.

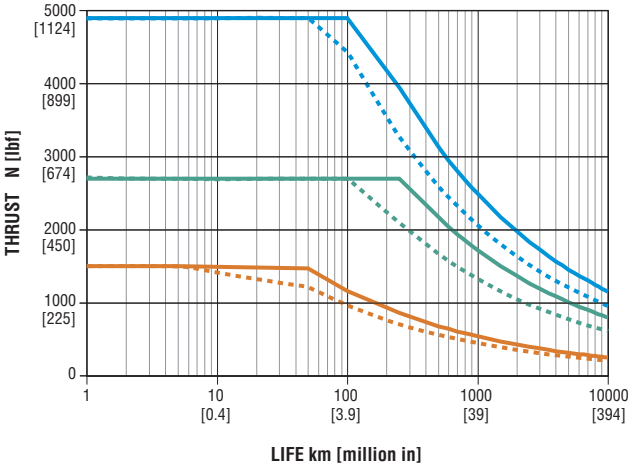
WEIGHT AND INERTIAL CALCULATIONS:

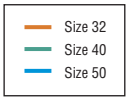
TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT [reference pages 26 to 27]
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

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

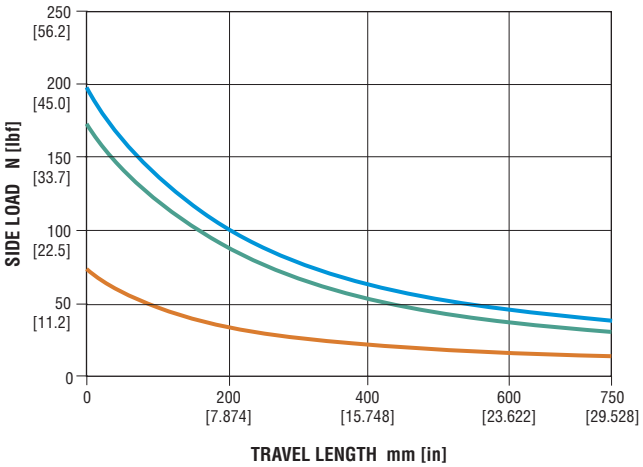
This section contains information on the capabilities of the Series ECP. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Inside Sales Department.

THRUST/LIFE



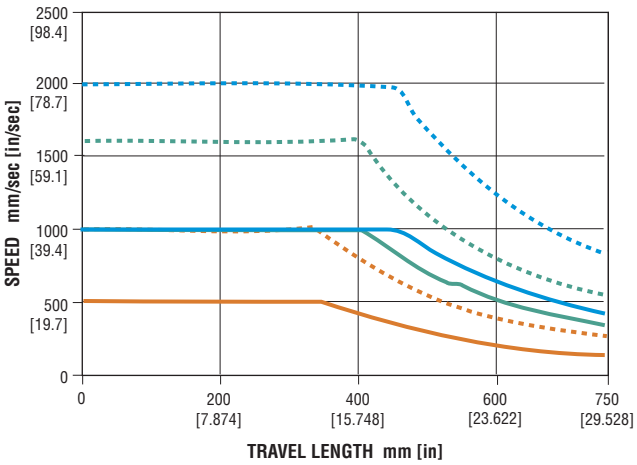


SIDE LOAD/TRAVEL

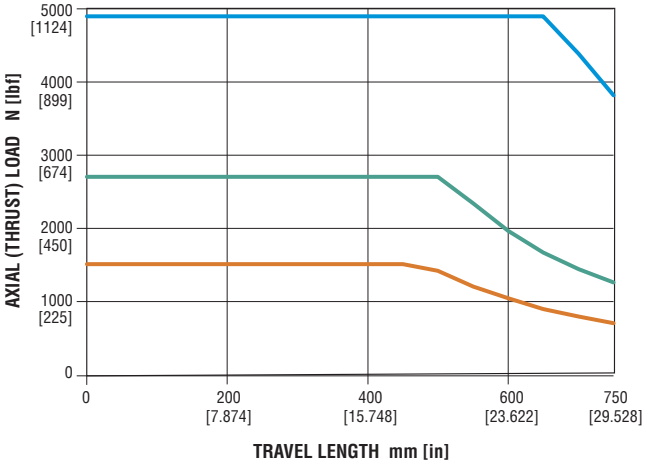


NOTE: THE MAXIMUM SPEED NOT TO EXCEED 200 mm/sec [7.87 in/sec]

SPEED/TRAVEL



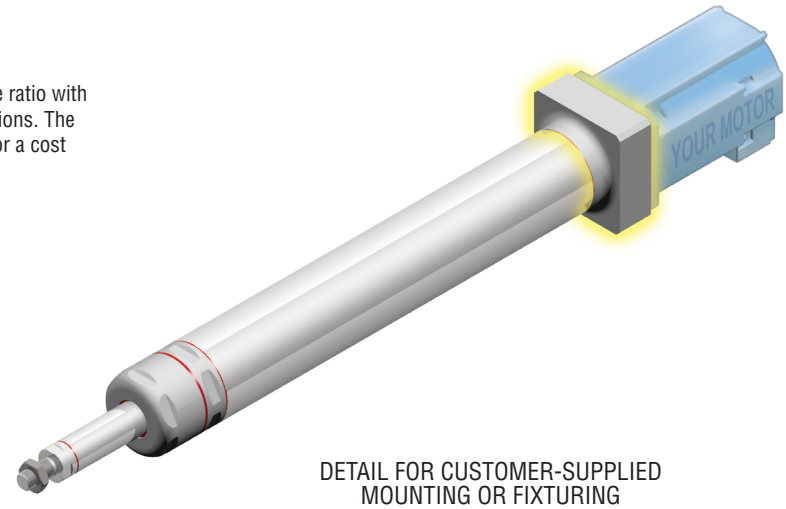
ALLOWABLE AXIAL LOAD



QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

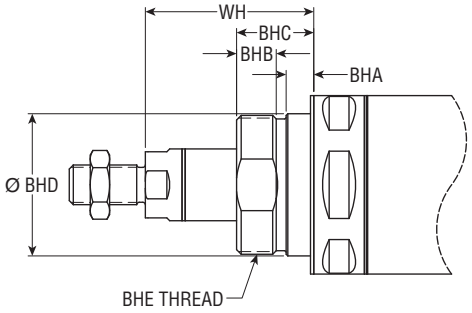
Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time.

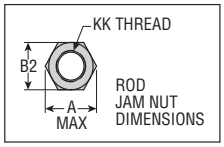
Base unit head and motor mounts are anodized aluminum.



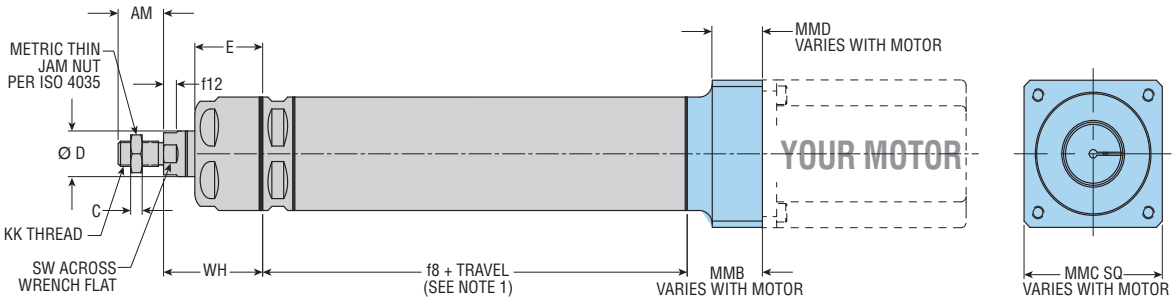
Removal of head on both inline and foldback units allow for customer-supplied mounting or fixturing. An extra seal is included for sealing of unit to mounting or fixturing. Refer to detail.

DETAIL FOR CUSTOMER-SUPPLIED MOUNTING OR FIXTURING





SIZE	BHA	BHB	BHC	Ø BHD	BHE	WH
32	7.5	12.0	22.5	35.3	M35 x 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	Ø D	E	f8	f12	KK	MMB MIN	MMC		MMD MIN	SW	WH	WEIGHT[4] @ ZERO TRAVEL (kg)		WEIGHT[4] 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	22.5	60.0	70.0	9.8	17.0	48.5	1.59	1.52	0.0031	0.0031
40	21.1	23.0	18.0	6.0	21.7	33.5	215.8	6.5	M12 x 1.25	22.5	70.0	88.0	9.8	20.0	50.1	2.07	1.96	0.0041	0.0041
50	26.8	31.0	24.0	8.0	28.1	34.5	264.2	8.0	M16 x 1.5	22.5	88.0	110.0	9.8	26.0	54.7	3.28	3.08	0.0062	0.0062

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

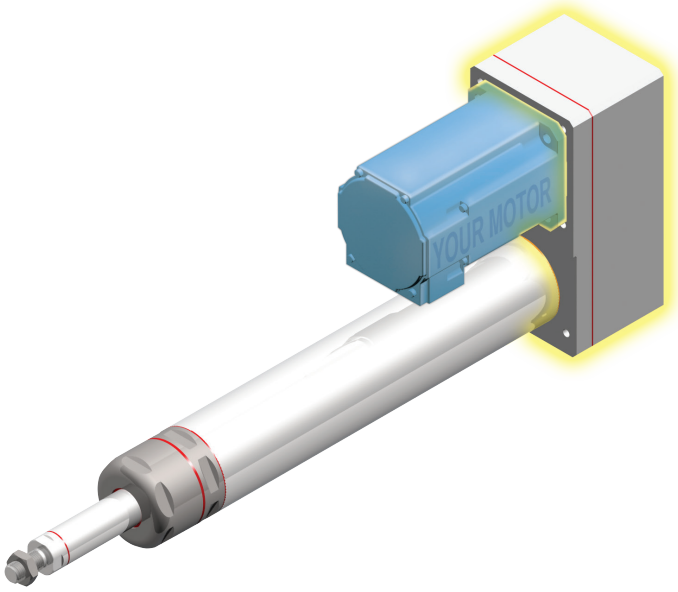
All dimensions are reference only unless specifically toleranced.

QF11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

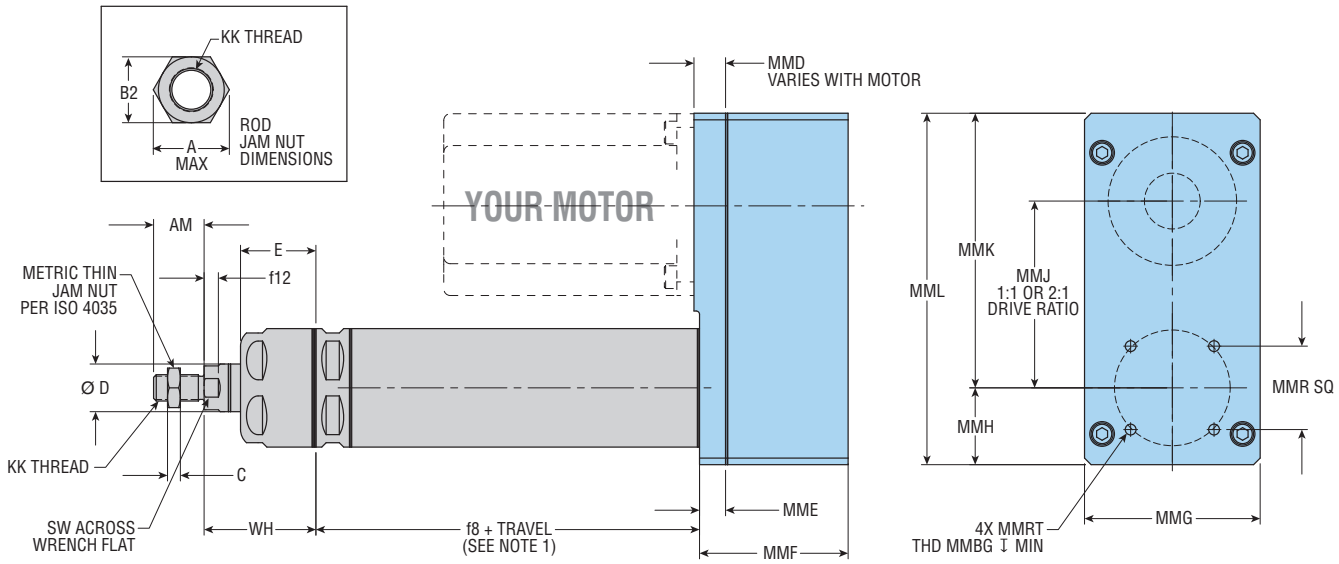
QF21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO

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.



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 26.



SIZE	A MAX	AM	B2	C MAX	ØD	E	f8	f12	KK	MMD MIN	MMD MAX	MME	MMF	MMG	MMH	MMJ 1:1	MMJ 2:1	MMK
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) -RB	@ ZERO TRAVEL (kg) -RL	TRAVEL ADDER (kg/mm) -RB	TRAVEL ADDER (kg/mm) -RL
32	135.0	32.5	M6x1	11.5	17.0	48.5	2.20	2.13	0.0031	0.0031
40	160.1	38.0	M6x1	11.5	20.0	50.1	3.15	3.04	0.0041	0.0041
50	198.4	46.5	M8x1.25	14.5	26.0	54.7	4.60	4.41	0.0062	0.0062

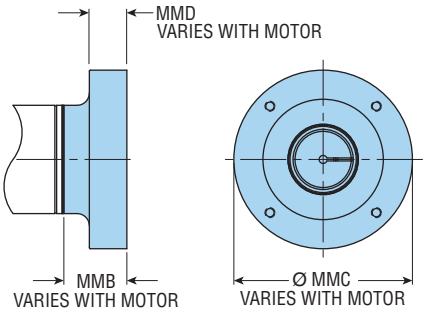
NOTES:
1) DIMENSION f8 IS TO MOUNTING SURFACE
2) DIMENSIONS: mm
3) FOR VARIABLE DIMENSIONS REFER TO ONLINE CAD CONFIGURATOR
4) UNIT WEIGHTS SHOWN ABOVE ARE FOR BASE ECP WITH ALUMINUM HEAD AND MOTOR MOUNT. SEE OPTION PAGES FOR ECP WITH -Y8 OR -Y91 FOR WEIGHTS WITH STAINLESS STEEL

All dimensions are reference only unless specifically toleranced.

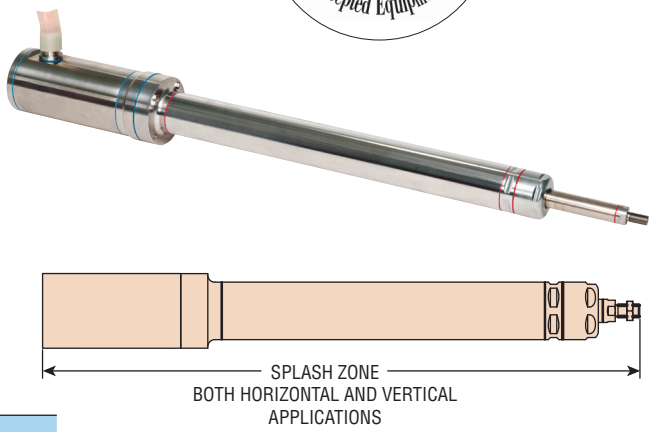
Y8 USDA CERTIFIED FOR PRODUCT SPLASH ZONE

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

INLINE



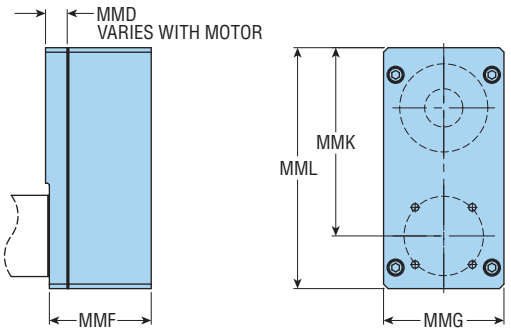
DIMENSIONS NOT SHOWN ARE SAME AS INLINE BASE UNIT



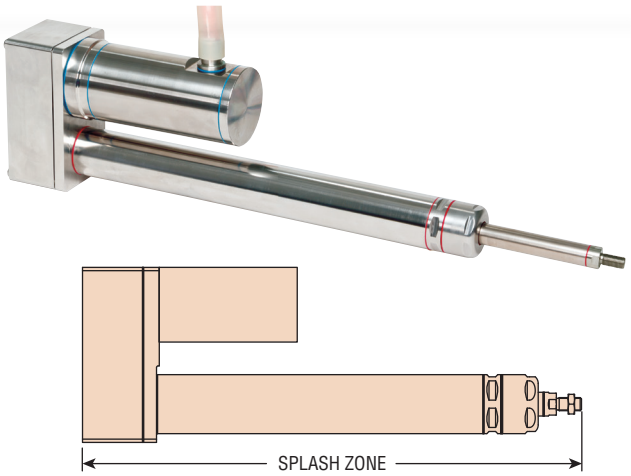
SIZE	MMB MIN	MMC MIN	MMD MIN	WEIGHT			
				@ ZERO TRAVEL (kg)		TRAVEL ADDER (kg/mm)	
				-RB	-RL	-RB	-RL
32	22.5	79.0	9.8	2.2	2.13	0.0031	0.0031
40	22.5	89.0	9.8	2.77	2.67	0.0041	0.0041
50	22.5	113.0	9.8	4.32	4.12	0.0062	0.0062

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

FOLDBACK



DIMENSIONS NOT SHOWN ARE SAME AS FOLDBACK BASE UNIT



SIZE	MMD		MMF	MMG	MMK	MML	WEIGHT			
							@ ZERO TRAVEL (kg)		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

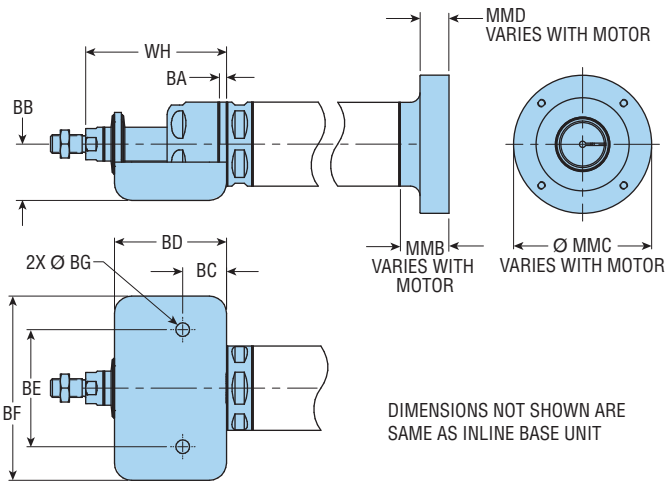
All dimensions are reference only unless specifically toleranced.

Y91 USDA CERTIFIED FOR PRODUCT CONTACT ZONE

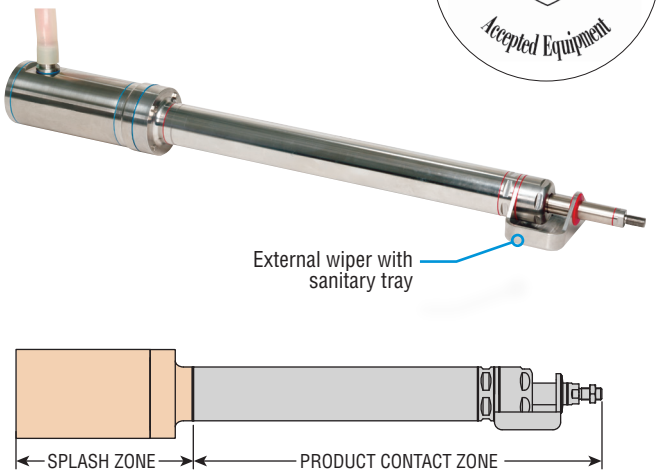
This option provides the Series ECP Cylinders with a 300 grade stainless steel head and motor mount suitable for food and dairy industry splash and product contact zone applications requiring clean-in-place (CIP) caustic washdown. See diagrams for zones clarification.

USDA certification requires motor with IP69K rating.

INLINE



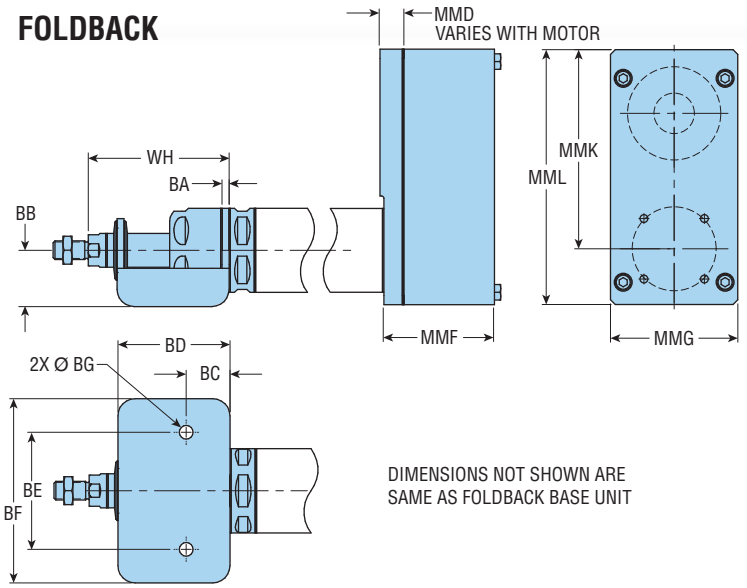
DIMENSIONS NOT SHOWN ARE SAME AS INLINE BASE UNIT



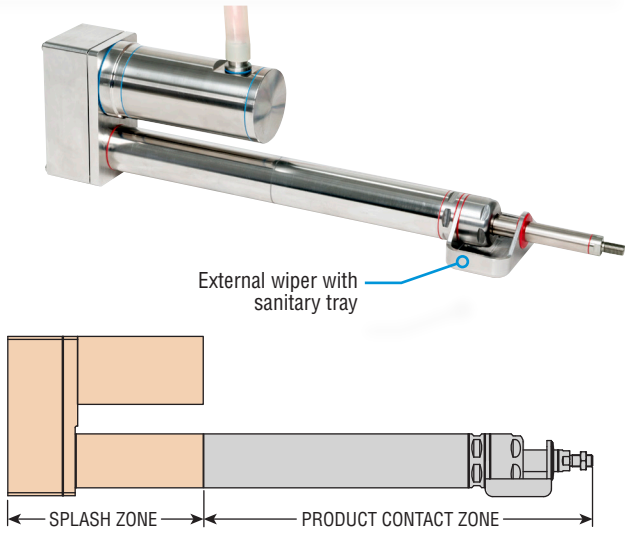
SIZE	BA	BB	BC	BD	BE	BF	Ø BG	MMB MIN	MMC MIN	MMD MIN	WH²	WEIGHT @ ZERO TRAVEL (kg)		WEIGHT TRAVEL ADDER (kg/mm)	
												-RB	-RL	-RB	-RL
32	4.7	32.0	24.0	71.8	65.5	10.45	6.8	22.5	79.0	9.8	88.5	2.72	2.65	0.0031	0.0031
40	4.7	36.0	28.0	71.8	75.0	118.0	8.8	22.5	89.0	9.8	90.1	3.38	3.28	0.0041	0.0041
50	6.4	45.0	32.0	73.8	87.5	132.5	8.8	22.5	113.0	9.8	94.7	5.20	5.00	0.0062	0.0062

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

FOLDBACK



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

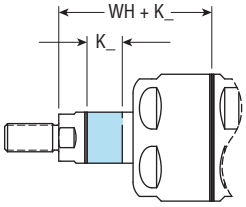
Extra rod extension can be achieved by specifying the option -K followed by the length code. Rod extension is available in 1 mm increments (250 mm max). Rod extension can impact load capacity, therefore rod extension and travel should not exceed 750 mm.

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

NOTE: DIMENSIONS: mm

Length Code

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

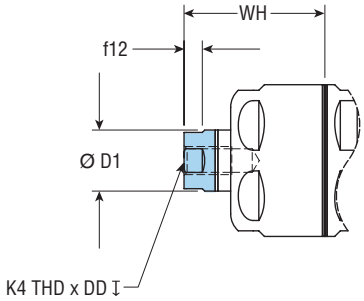


T44 FEMALE ROD END

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

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

NOTE: DIMENSIONS: mm

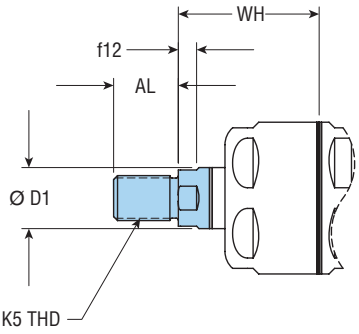


TEE MALE OVERSIZE ROD END

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

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

NOTE: DIMENSIONS: mm



All dimensions are reference only unless specifically toleranced.

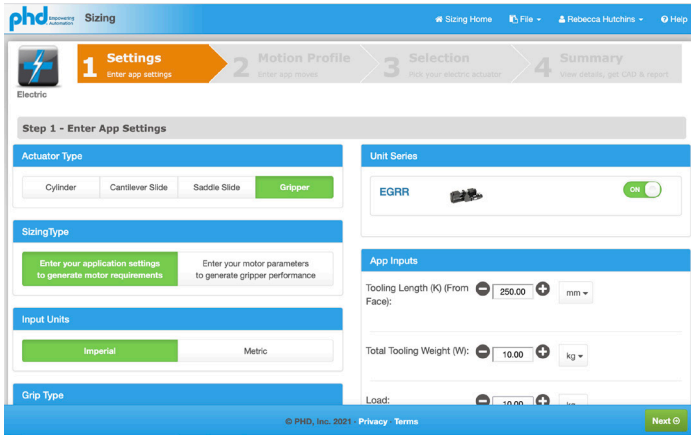
Wxxxx MOTOR MOUNT CODE

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

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

Your Motor Your Way

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



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

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

Step 2 - Motor Selection

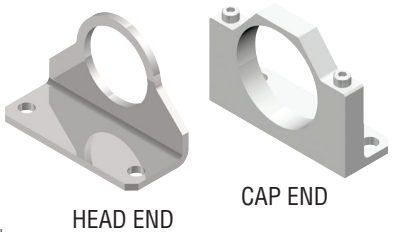
- Based on the performance requirements determined by online sizing, select an appropriate motor from your preferred motor manufacturer.

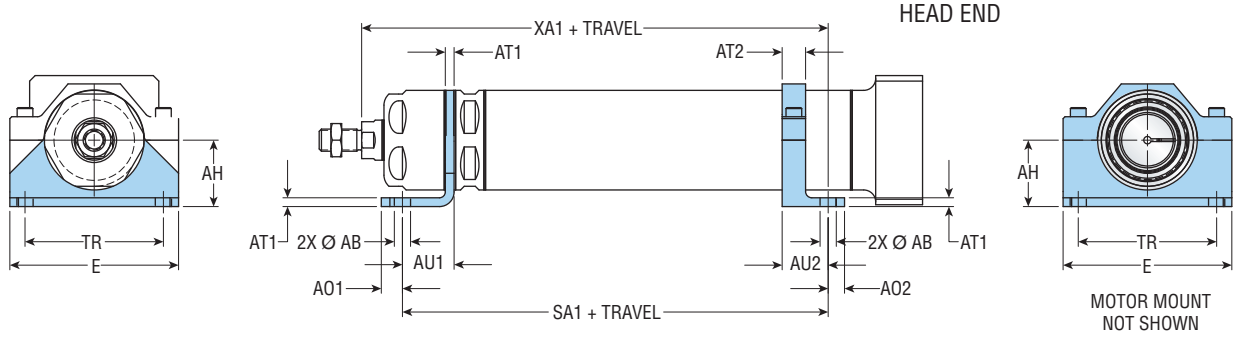
Step 3 - CAD Configurator - config.phdinc.com

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

F BASE MOUNTING KIT

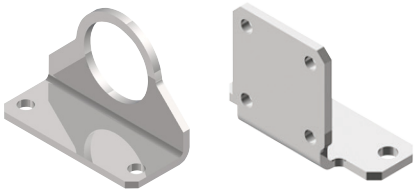
NOTE: HEAD END BASE MOUNTING KIT BRACKET ADDS TO OVERALL LENGTH.

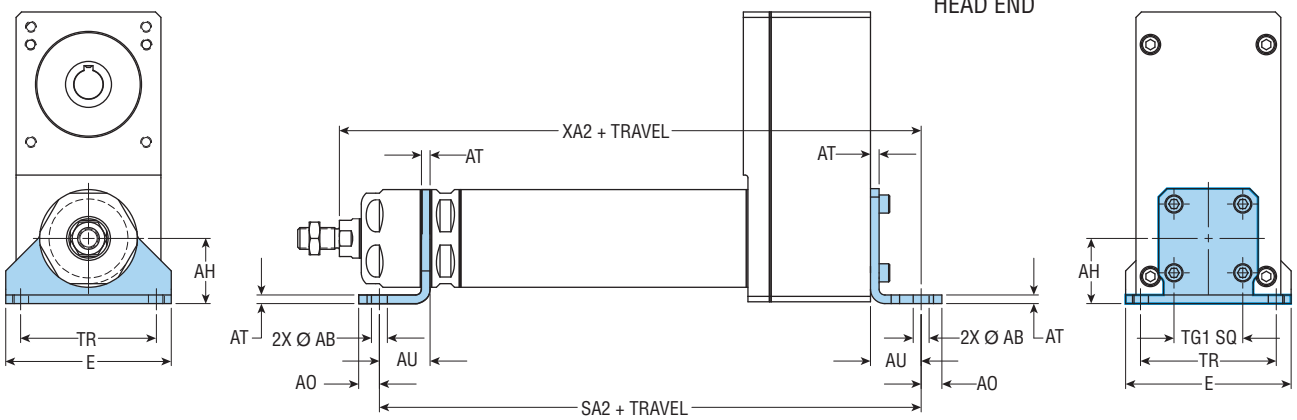




SIZE	AB	AH	AO1	AO2	AT1	AT2	AU1	AU2	E	SA1 MAX	TR	XA1 MAX	KIT NO. HEAD END[4]	SANITARY KIT NO. HEAD END[3]	KIT NO. CAP END[4]	SANITARY KIT NO. CAP END
32	6.8	32.0	8.4	6.8	4.7	12.7	24.0	22.9	79.6	212.6	65.5	237.1	86216-01-01	86216-01-02	86474-01-01	86474-01-02
40	8.8	36.0	11.5	8.9	4.7	12.7	28.0	24.9	91.4	234.9	75.0	257.0	86216-02-01	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	86216-03-01	86216-03-02	86474-03-01	86474-03-02

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



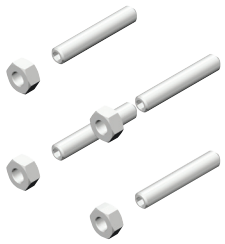


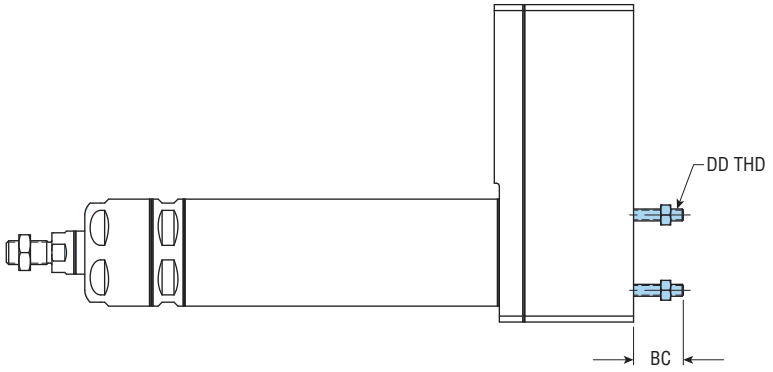
SIZE	AB	AH	AO	AT	AU	E	SA2	TG1	TR	XA2	KIT NO. HEAD END[4]	SANITARY KIT NO. HEAD END[3]	KIT NO. CAP END[4]	SANITARY KIT NO. CAP END
32	6.8	32.0	8.4	4.7	24.0	79.6	265.4	32.5	65.5	289.9	86216-01-01	86216-01-02	86474-01-03	86474-01-04
40	8.8	36.0	11.5	4.7	28.0	91.4	299.3	38.0	75.0	321.4	86216-02-01	86216-02-02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

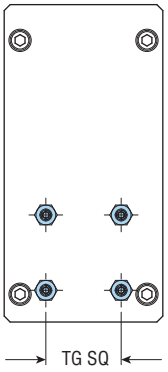
NOTES:
1) DIMENSIONS: mm
2) HEAD END BASE MOUNTING KIT NOT COMPATIBLE WITH -Y91 OPTION
3) SANITARY KIT INCLUDES ONLY STAINLESS STEEL COMPONENTS
4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically toleranced.

MX1 FASTENER MOUNTING KIT (PER ISO 6431)



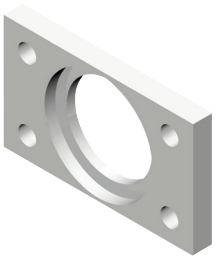


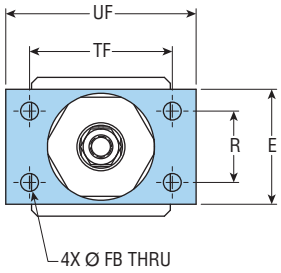


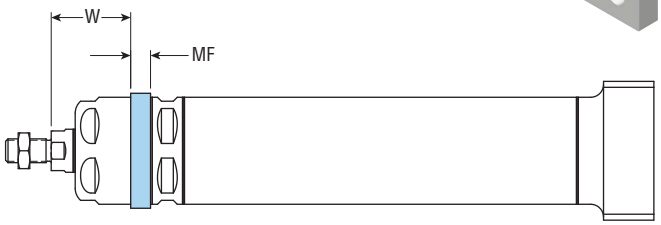
SIZE	BC	DD	TG	KIT NO.[3]	SANITARY KIT NO.[2]
32	25.0	M6 x 1	32.5	86217-01-01	86217-01-02
40	25.0	M6 x 1	38.0	86217-01-01	86217-01-02
50	31.4	M8 x 1.25	46.5	86217-02-01	86217-02-02

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

MF1 FLANGE MOUNTING KIT (PER VDMA 24562)





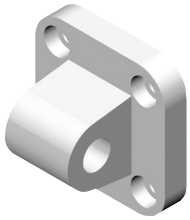


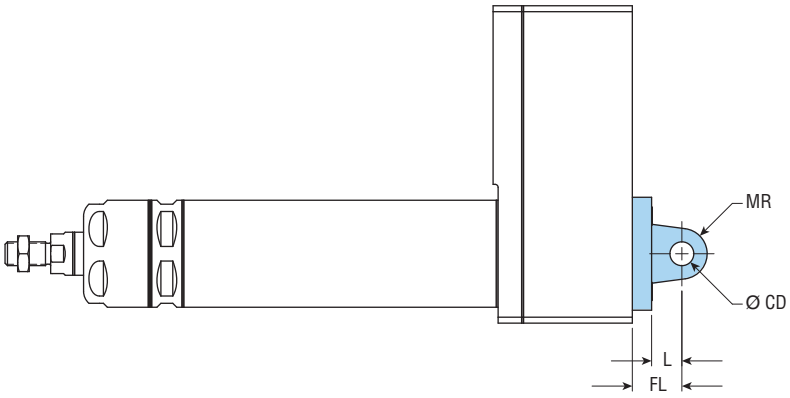
SIZE	E MAX	FB H13	MF	R JS14	TF JS14	UF MAX	W	KIT NO.[5]	SANITARY KIT NO.[4]
32	50.8	7.0	10.0	32.0	64.0	86.8	38.5	86215-01-01	86215-01-02
40	58.8	9.0	10.0	36.0	72.0	96.8	40.1	86215-02-01	86215-02-02
50	70.8	9.0	10.0	45.0	90.0	115.8	44.7	86215-03-01	86215-03-02

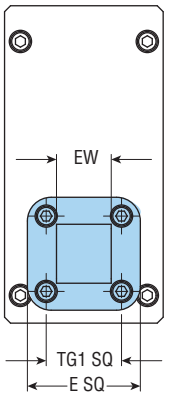
NOTES:
1) DIMENSIONS: mm
2) KIT INCLUDES FLANGE ONLY
3) FLANGE MOUNTING KIT NOT COMPATIBLE WITH -Y91 OPTION
4) SANITARY KIT INCLUDES ONLY STAINLESS STEEL COMPONENTS
5) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically toleranced.

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



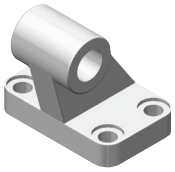


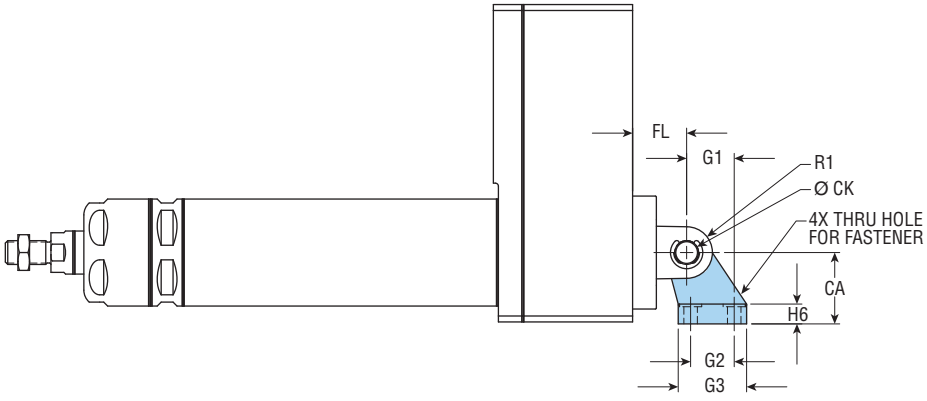


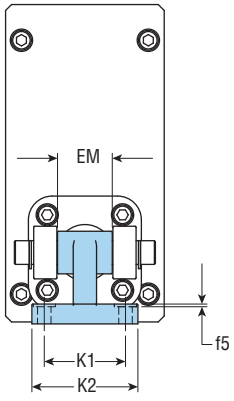
SIZE	CD H9	E MAX	EW MAX	FL (± 0.2)	L MIN	MR MAX	TG1	KIT NO.
32	10.0	53.0	25.8	22.0	12.0	11.0	32.5	86219-01-01
40	12.0	61.5	27.8	25.0	15.0	13.0	38.0	86219-02-01
50	12.0	73.0	31.8	27.0	15.0	13.0	46.5	86219-03-01

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

BMP4 PILLOW BLOCK MOUNTING KIT (PER CETOP 107 P)





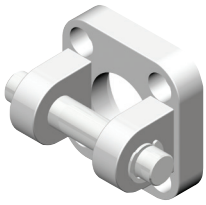


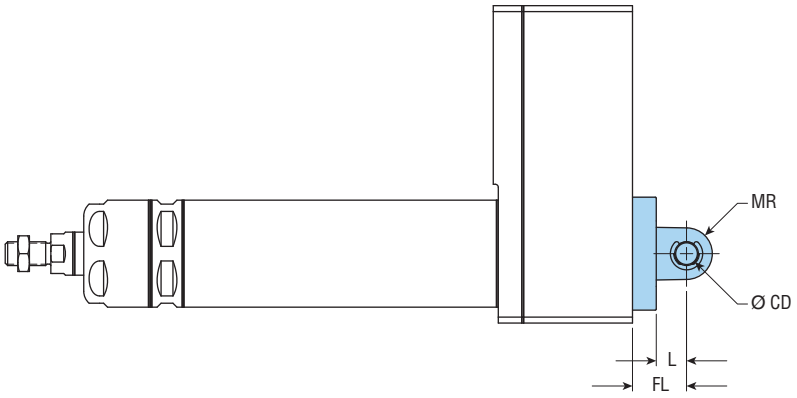
SIZE	CA JS15	CK H9	EM MAX	f5 MAX	FL	G1 JS14	G2	G3 MAX	H6	K1 JS14	K2 MAX	R1 MAX	FASTENER	KIT NO.
32	32.0	10.0	25.8	1.9	22.0	21.0	18.0	31.0	8.0	38.0	51.0	10.0	M6	62818-001-00
40	36.0	12.0	27.8	1.9	25.0	24.0	22.0	35.0	10.0	41.0	54.0	11.0	M6	62818-002-00
50	45.0	12.0	31.8	1.9	27.0	33.0	30.0	45.0	12.0	50.0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

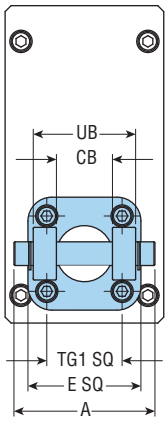
NOTES:
1) DIMENSIONS: mm
2) KIT INCLUDES MOUNTING HARDWARE
3) BMP4 PILLOW BLOCK IS COMPATIBLE WITH MP2 REAR FORK
4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

All dimensions are reference only unless specifically toleranced.

MP2 REAR FORK MOUNTING KIT (PER VDMA 24562)



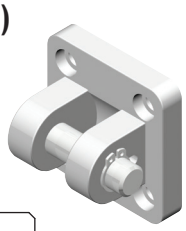


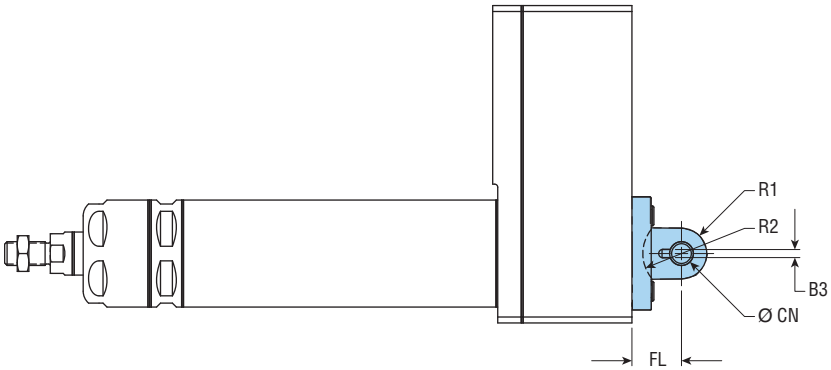


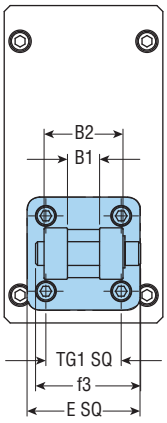
SIZE	A MAX	CB H14	CD H9	E MAX	FL (± 0.2)	L MIN	MR MAX	TG1	UB h14	KIT NO.
32	67.0	26.0	10.0	53.0	22.0	12.0	11.0	32.5	45.0	86218-01-01
40	74.3	28.0	12.0	61.5	25.0	15.0	13.0	38.0	52.0	86218-02-01
50	82.3	32.0	12.0	73.0	27.0	15.0	13.0	46.5	60.0	86218-03-01

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

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





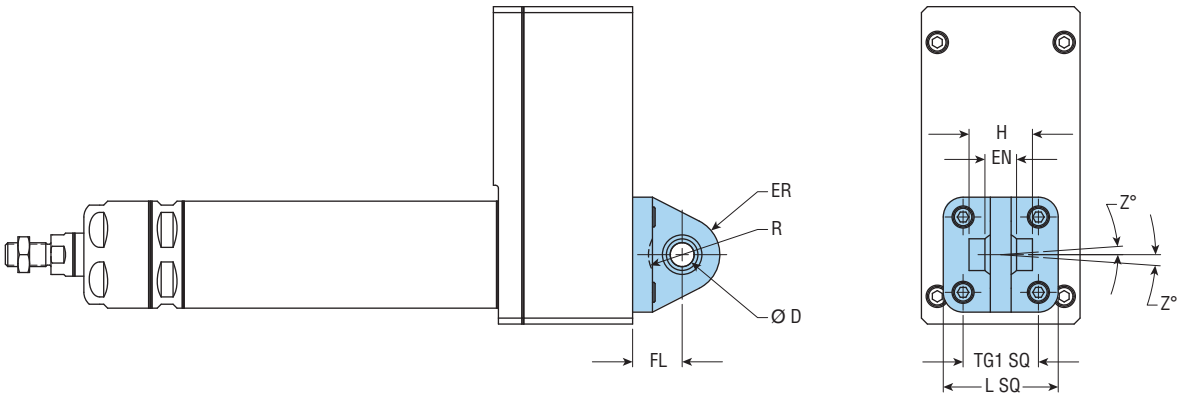


SIZE	B1 H14	B2 d12	B3 (± 0.2)	CN F7	E MAX	f3	FL (± 0.2)	R1 MAX	R2 MIN	TG1	KIT NO.
32	14.0	34.0	3.3	10.0	53.0	46.0	22.0	11.0	16.0	32.5	86476-01-01
40	16.0	40.0	4.3	12.0	61.5	53.0	25.0	13.0	19.0	38.0	86476-02-01
50	21.0	45.0	4.3	16.0	73.0	58.0	27.0	13.0	21.0	46.5	86476-03-01

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

All dimensions are reference only unless specifically toleranced.

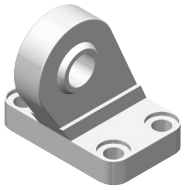
MSB1 REAR MALE HINGE MOUNTING FOR SPHERICAL BEARING KIT

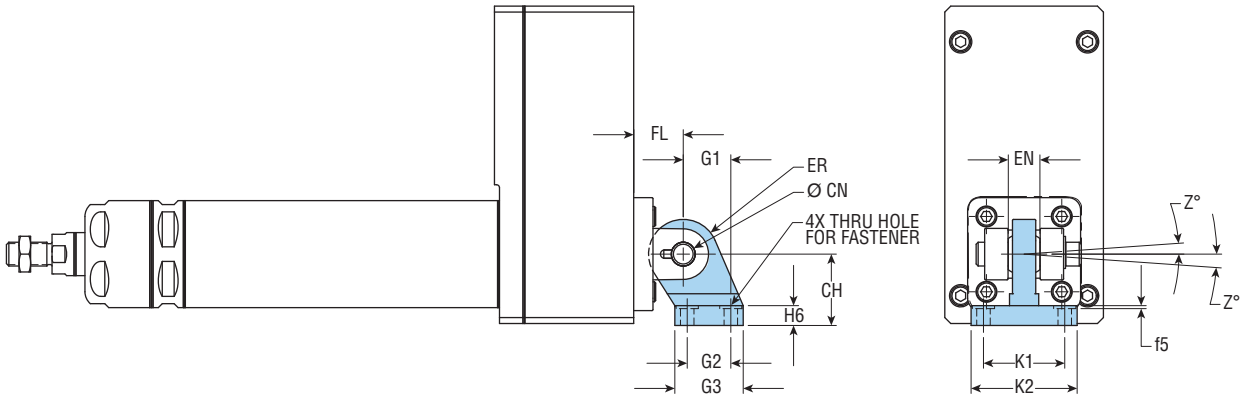


SIZE	D H7	EN (+0.0/-0.1)	ER MAX	FL (± 0.2)	H	L MAX	R	TG1	Z	KIT NO.
32	10.0	14.0	16.0	22.0	—	53.0	—	32.5	4°	86477-01-01
40	12.0	16.0	17.5	25.0	—	61.5	—	38.0	4°	86477-02-01
50	16.0	21.0	21.0	27.0	51.0	73.0	19.0	46.5	4°	86477-03-01

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

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



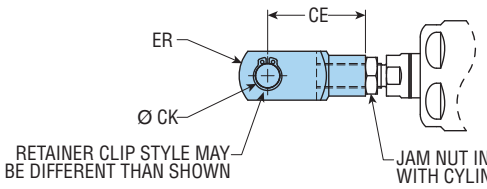


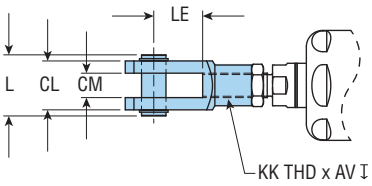
SIZE	CH JS15	CN H7	EN (+0.0/-0.1)	ER MAX	F5 MAX	FL	G1 JS14	G2 JS14	G3 MAX	H6	K1 JS14	K2 MAX	Z	FASTENER	KIT NO.
32	32.0	10.0	14.0	16.0	1.9	22.0	21.0	18.0	31.0	10.0	38.0	51.5	4°	M6	62822-001-00
40	36.0	12.0	16.0	18.0	1.9	25.0	24.0	22.0	35.0	10.0	41.0	54.5	4°	M6	62822-002-00
50	45.0	16.0	21.0	21.0	1.9	27.0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

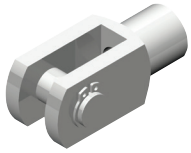
NOTES:
1) DIMENSIONS: mm
2) KIT INCLUDES PILLOW BLOCK ONLY
3) BSB1 PILLOW BLOCK MOUNTING IS COMPATIBLE WITH MSB2 REAR FORK (NOT INCLUDED)
4) KIT INCLUDES ZINC PLATED STEEL COMPONENTS
5) MOUNTING IS FUNCTIONAL ONLY AS SHOWN

All dimensions are reference only unless specifically toleranced.

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



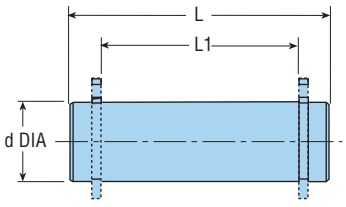


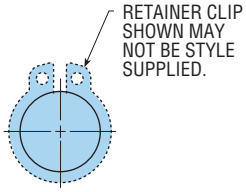


SIZE	AV MIN	CE	CK H9	CL MAX	CM MIN	ER MAX	KK	L	LE MIN	KIT NO.
32	20.0	40.0	10.0	20.3	10.0	16.0	M10 x 1.25	25.0	20.0	86479-01-01
40	22.0	48.0	12.0	24.3	12.0	19.0	M12 x 1.25	30.0	24.0	86479-02-01
50	28.0	64.0	16.0	32.3	16.0	25.0	M16 x 1.5	39.0	32.0	86479-03-01

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

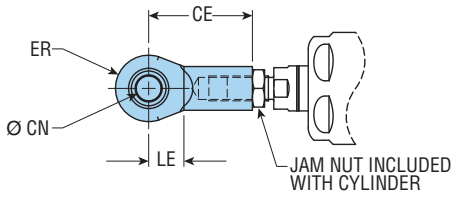


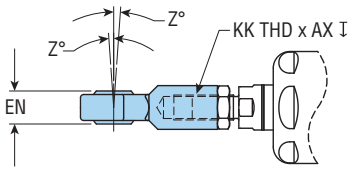


SIZE	d	L	L1	KIT NO.
32	10.0	25.0	20.1	63463-01-2
40	12.0	30.0	24.1	63463-02-2
50	16.0	39.0	32.1	63463-03-2

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

ROD EYE MOUNTING WITH SPHERICAL BEARING KIT

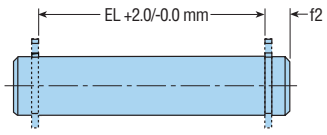




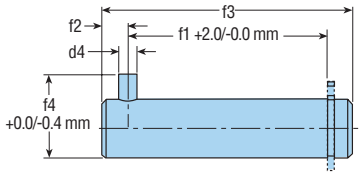
SIZE	AX MIN	CE	CN H9	EN h12	ER MAX	KK	LE MIN	Z	KIT NO.
32	20.0	43.0	10.0	14.0	14.0	M10 x 1.25	15.0	4°	86481-01-01
40	22.0	50.0	12.0	16.0	16.0	M12 x 1.25	17.0	4°	86481-02-01
50	28.0	64.0	16.0	21.0	21.0	M16 x 1.5	23.0	4°	86481-03-01

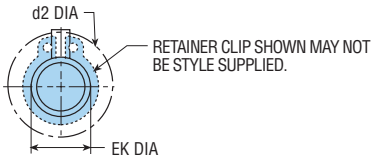
NOTES:
1) DIMENSIONS: mm
2) ROD EYE MOUNTING IS COMPATIBLE WITH MSB2 REAR FORK
3) KIT INCLUDES ZINC PLATED STEEL COMPONENTS

PIVOT PIN KIT



PIVOT PIN FOR MP2 REAR FORK MOUNTING





SPHERICAL BEARING PIVOT PIN FOR ANTI-ROTATION (MSB2)

MP2 PIVOT PIN

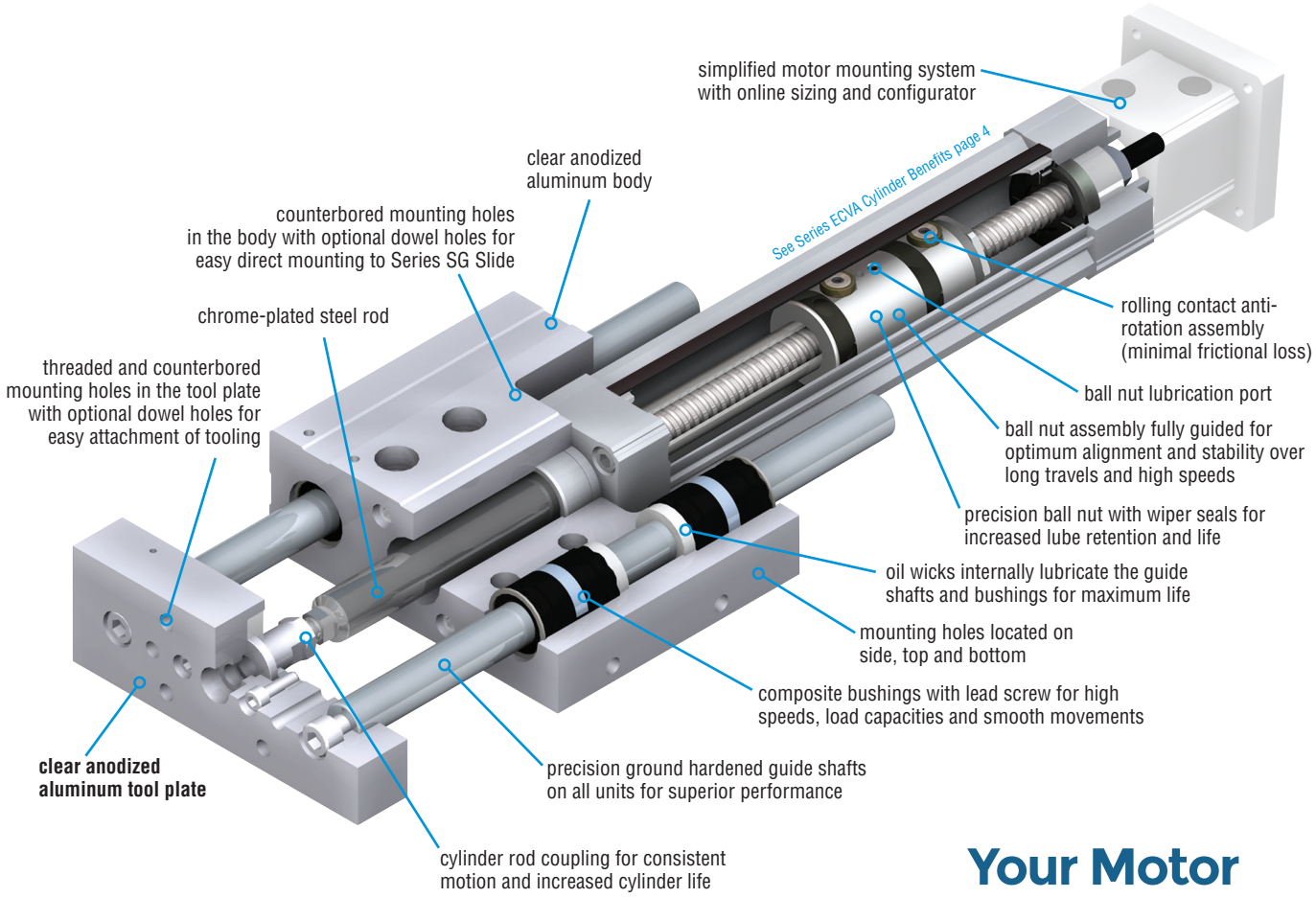
SIZE	d2 MAX	EK/e8	EL	f2	KIT NO.
32	23.0	10.0	46.0	8.5	52490-01-2
40	25.0	12.0	53.0	8.5	52490-02-2
50	25.0	12.0	61.0	8.5	52490-03-2

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.



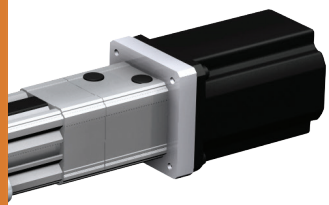
Your Motor Your Way

Major Benefits

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

Choice of Inline or Foldback Motor Mounting

INLINE



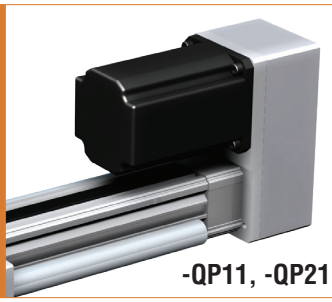
-QL11

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

NEW

-QP upgraded foldback replaces -QF option. Provides a significant increase in performance. See page 47 for more details.

FOLDBACK



-QP11, -QP21

TYPE
Electromechanical

SERIES
K - Short Body
L - Long Body

SIZE
4
5
6

TRAVEL (MAX.)

Size	SK mm	SL mm
4	450	600
5	450	600
6	550	700

50 mm minimum travel in 50 mm increments

OPTIONS
H4 - Cylinder replacement only
H11 - Without cylinder option
G30 - Proximity switch ready with shock pads on extension and retraction
J8 - Precision fit dowel holes (in both tool plate and housing)

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

E	S	K	B	5	4	x	450	-	RB010	-	G30	-	QP11	-	Wxxxx

PRODUCT
Slide

BUSHING
B - Ball Bushing

DESIGN NO.
5 - Metric

SCREW CONFIGURATION

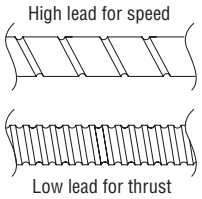
Size	Ball Screw Type	Lead mm
4	RB005	5
4	RB010	10
5	RB010	10
5	RB016	16
6	RB010	10
6	RB020	20

MOTOR CONFIGURATION
QL11 - Inline with 1:1 ratio
QP11 - Foldback with 1:1 ratio
QP21 - Foldback with 2:1 ratio
Blank - No Motor Mount

NEW FOLDBACK OPTION -QP11

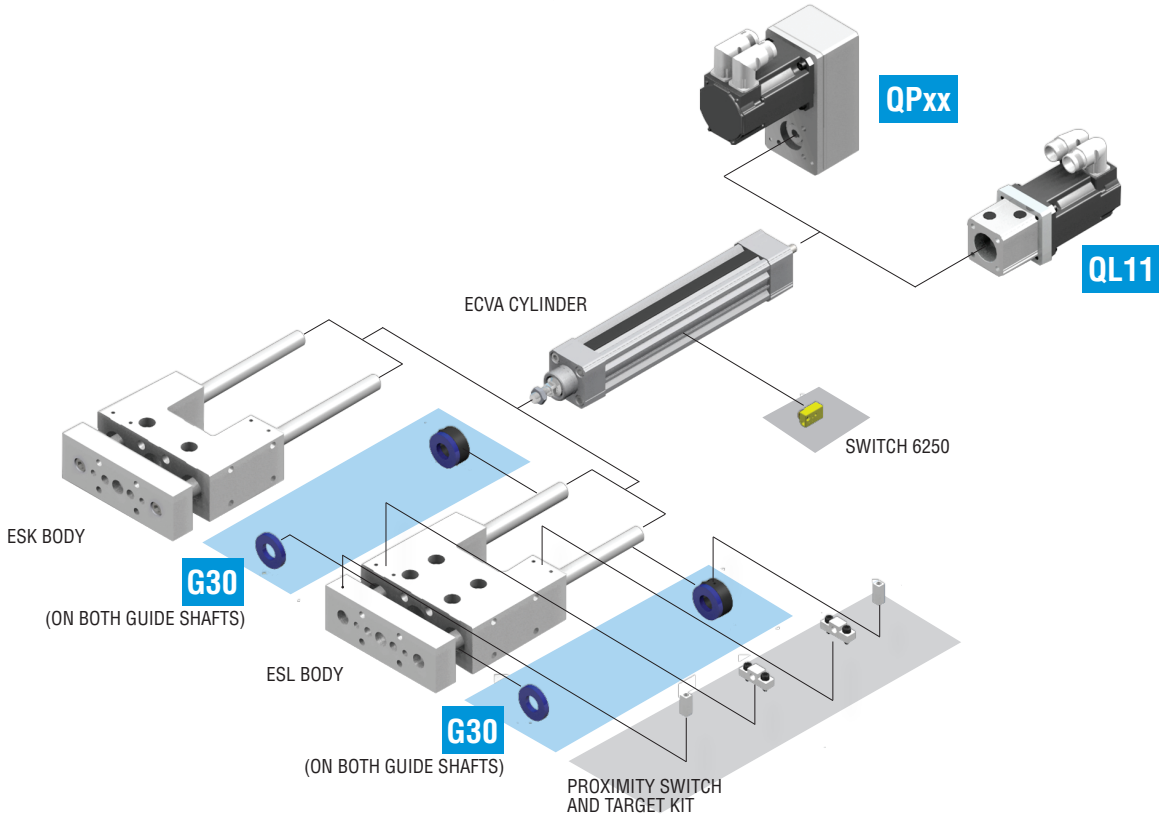
SCREW CONFIGURATION

The ball screw drive system of the Series ESK/ESL is 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

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



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 41)
FULL TRAVEL TOLERANCE[7]	+3.5/-0.0 mm [+0.138/-0.000 in]
DUTY CYCLE	100%
OPERATING TEMPERATURE	4 - 65°C [40 - 150°F]
LUBRICATION INTERVAL[3]	Horizontal: 2500 km [100 million in], Vertical: 1500 km [60 million in]

SPECIFICATIONS				SIZE					
				4		5		6	
MECHANICS	MAXIMUM TRAVEL	ESK	mm [in]	450 [17.72]		450 [17.72]		550 [21.65]	
		ESL		600 [23.62]		600 [23.62]		700 [27.65]	
	DRIVE MECHANISM			Ball Screw					
	SCREW DIAMETER		mm	12		16		20	
	SCREW CONFIGURATION			-RB005	-RB010	-RB010	-RB016	-RB010	-RB020
	SCREW LEAD		mm/rev	5	10	10	16	10	20
	GUIDE SHAFT DIAMETER		mm	16		20		25	
	GUIDE SHAFT BEARING TYPE			Ball Bushing					
SPEED[4]	MAXIMUM SPEED		mm/sec [in/sec]	500 [19.6]	1000 [39.3]	1000 [39.3]	1600 [63.0]	1000 [39.3]	2000 [78.7]
	MAXIMUM RPM		rev/min	6000					
	MAXIMUM ACCELERATION	-QL11	m/sec^2 [in/sec^2]	19.6 [772]					
		-QPx1	m/sec^2 [in/sec^2]	9.8 [386]					
THRUST[4]	MAXIMUM THRUST		N [lbf]	1625 [366]	850 [191]	3165 [712]	1980 [445]	5710 [1285]	3250 [731]
TORQUE	PERMISSIBLE DRIVE TORQUE[6]		Nm [in-lb]	1.5 [13.3]		5.6 [49.6]		10.1 [89.4]	
	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)		$kg\text{-}m^2$ [$lb\text{-}in^2$]	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)	-QL11	$kg\text{-}m^2$ [$lb\text{-}in^2$]	3.14×10^{-6} [0.011]		6.11×10^{-6} [0.021]		4.04×10^{-5} [0.138]	
		-QP11		1.41×10^{-4} [0.48]		3.59×10^{-4} [1.23]		5.72×10^{-4} [1.96]	
		-QP21		9.67×10^{-5} [0.33]		2.92×10^{-4} [1.00]		4.49×10^{-4} [1.53]	

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 41
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.

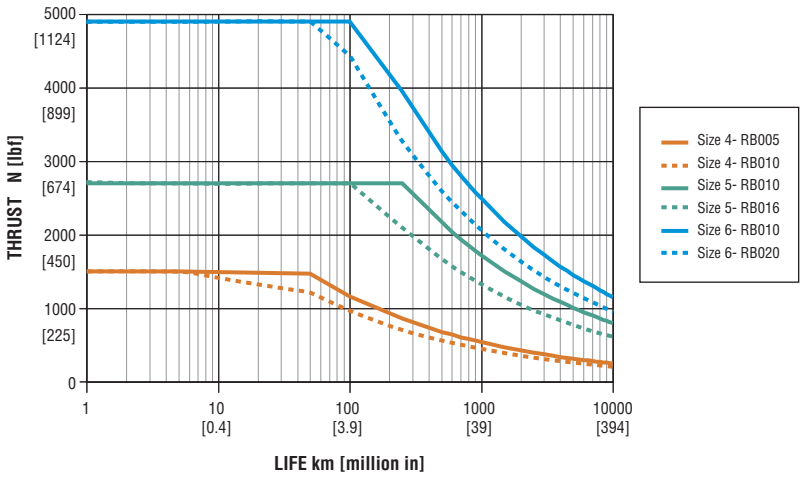
WEIGHT AND INERTIAL CALCULATIONS:

TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT [reference pages 46 and 47]
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

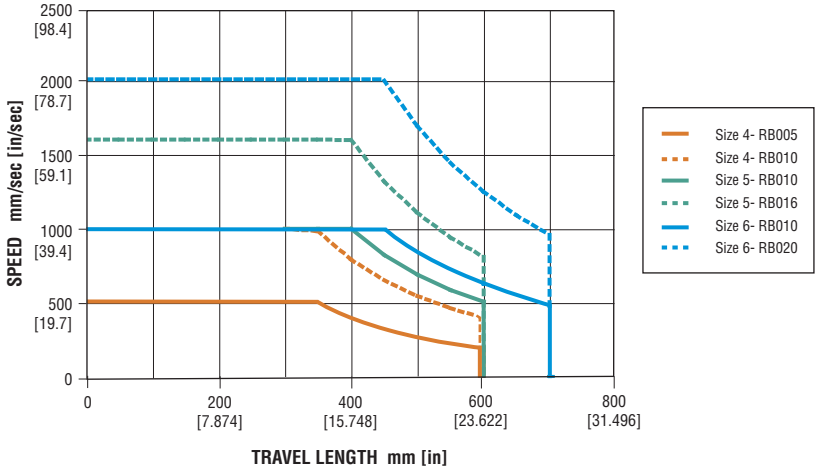
FOR -Qx11: INERTIA $_{Reflected}$ = J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT) + J_Q
FOR -QP21: INERTIA $_{Reflected}$ = [J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)] / 4 + J_Q

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

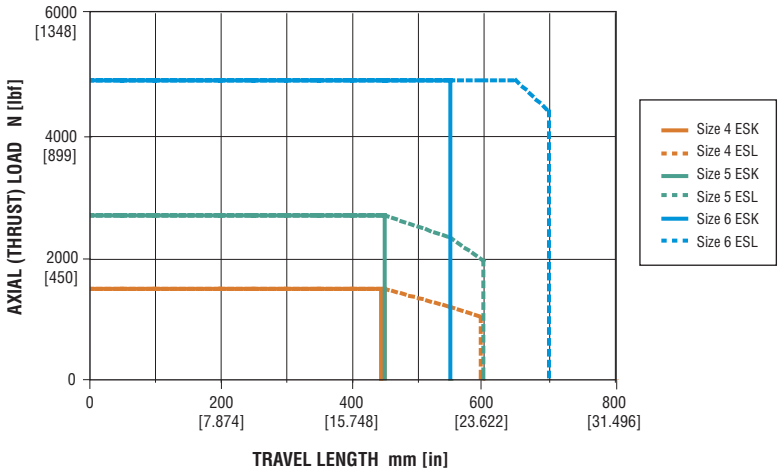
THRUST/LIFE



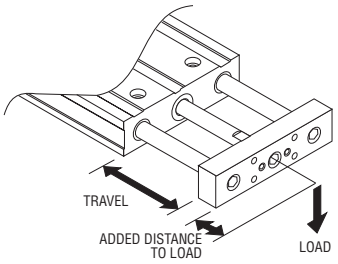
SPEED/TRAVEL



ALLOWABLE AXIAL LOAD

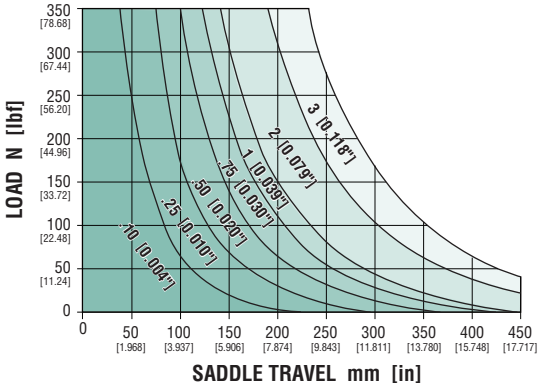


The deflection figures given in these charts are based on the effect of external loads. Shaft straightness and bearing alignment will affect the accuracy of the tool plate location. When the load is attached to the face of the tool plate, add the distance between load center of gravity and tool plate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

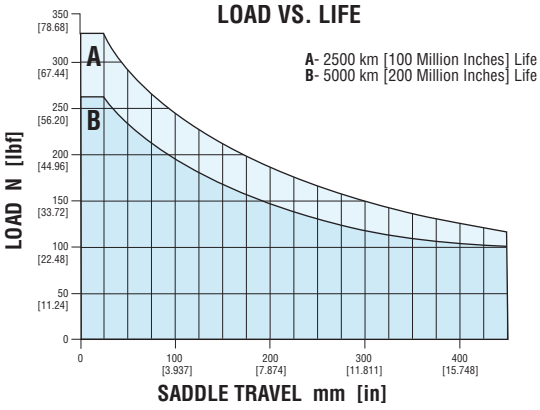


ESKB54

DEFLECTION

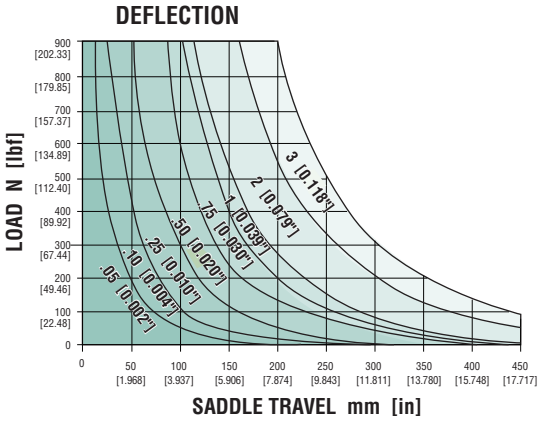


LOAD VS. LIFE

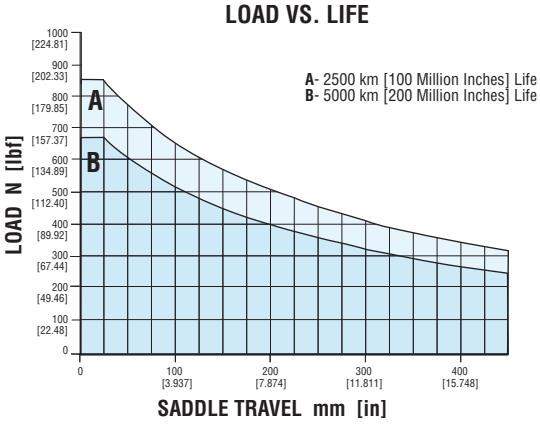


ESKB55

DEFLECTION

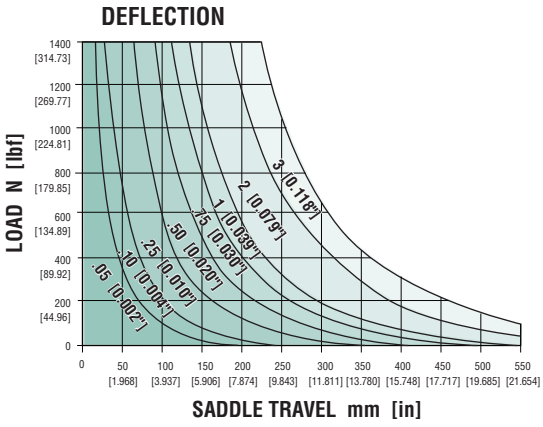


LOAD VS. LIFE

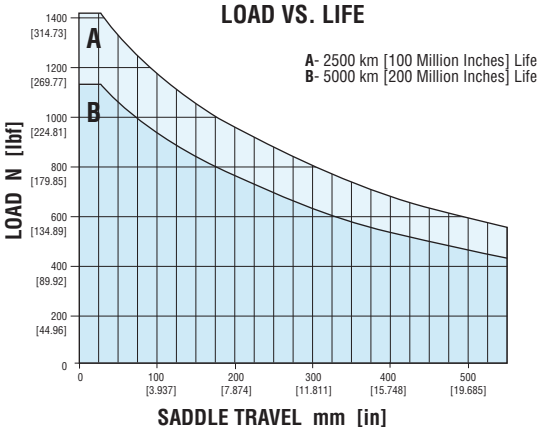


ESKB56

DEFLECTION



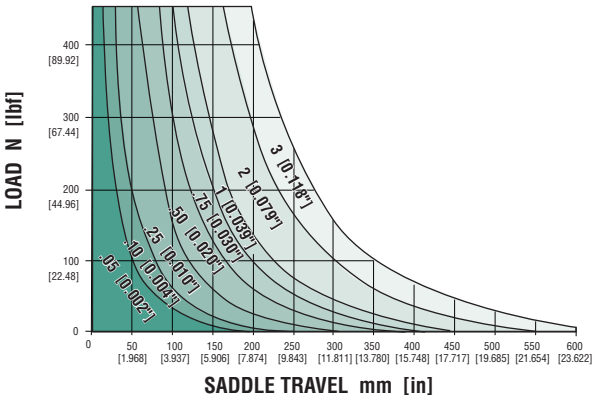
LOAD VS. LIFE



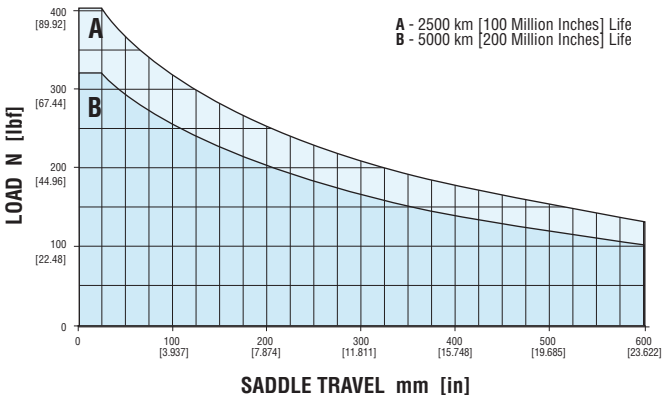
NOTE: CHARTS ARE FOR REFERENCE ONLY, REFER TO ONLINE SIZING SOFTWARE FOR ACTUAL VALUES

ESLB54

DEFLECTION

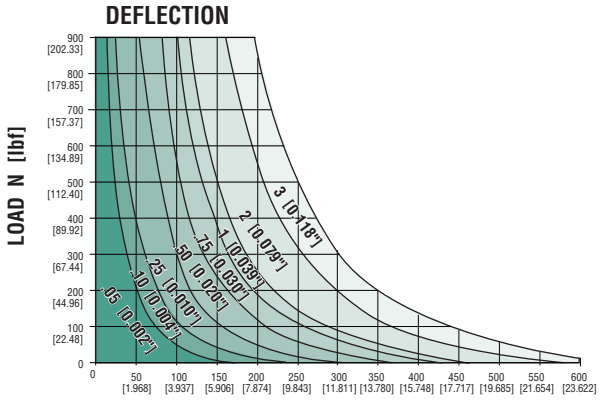


LOAD VS. LIFE

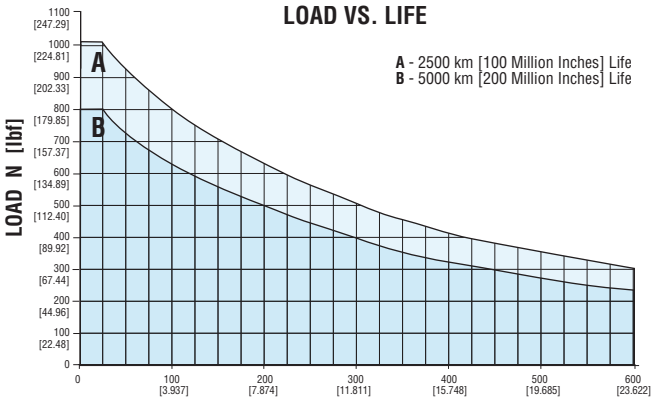


ESLB55

DEFLECTION

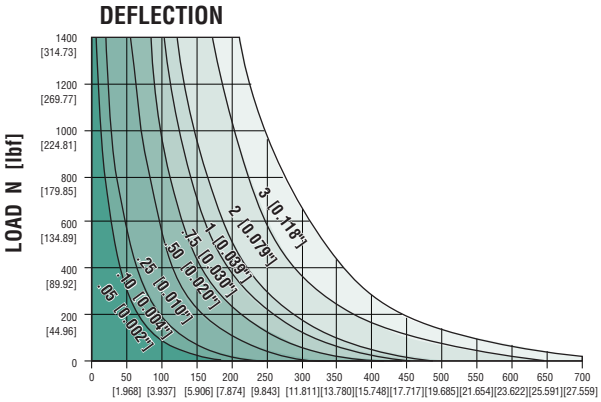


LOAD VS. LIFE

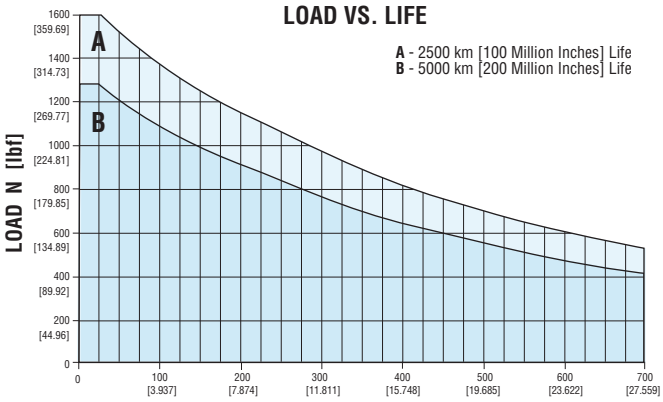


ESLB56

DEFLECTION

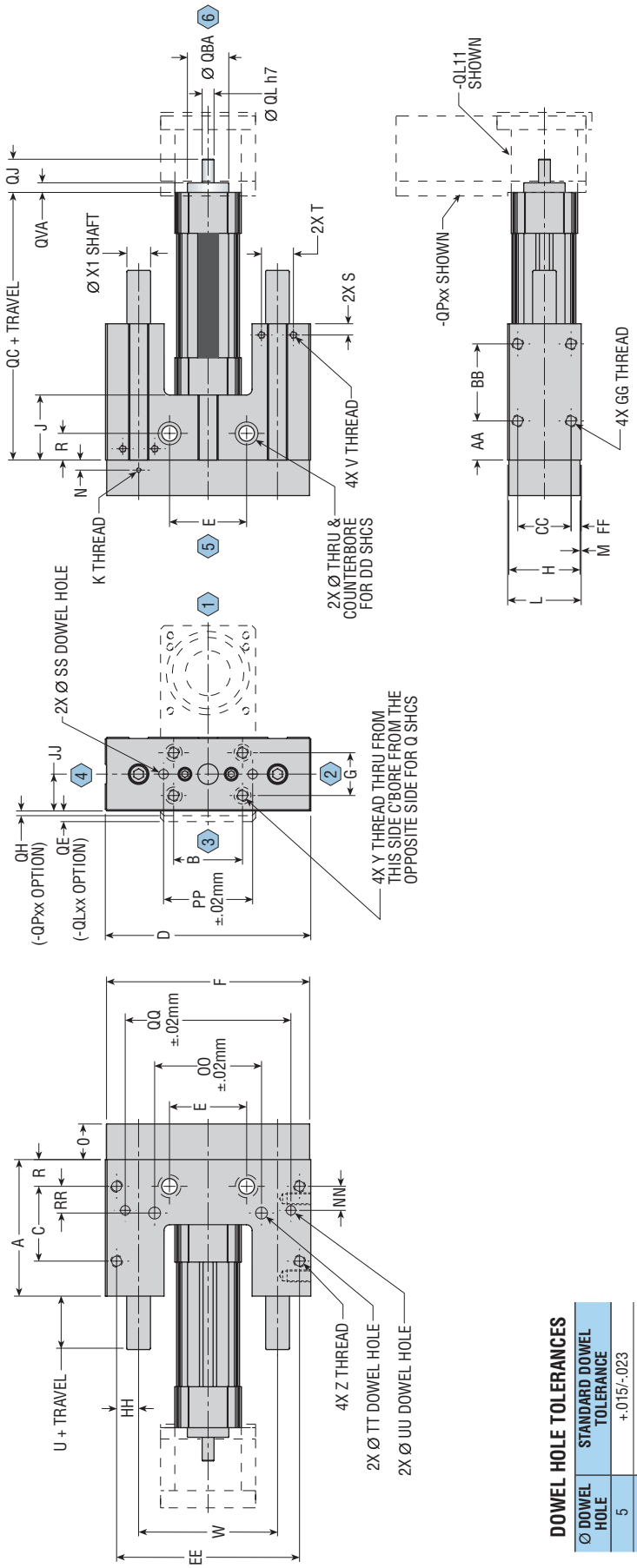


LOAD VS. LIFE



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

DIMENSIONS: Series ESK Thruster Slide



DOWEL HOLE TOLERANCES

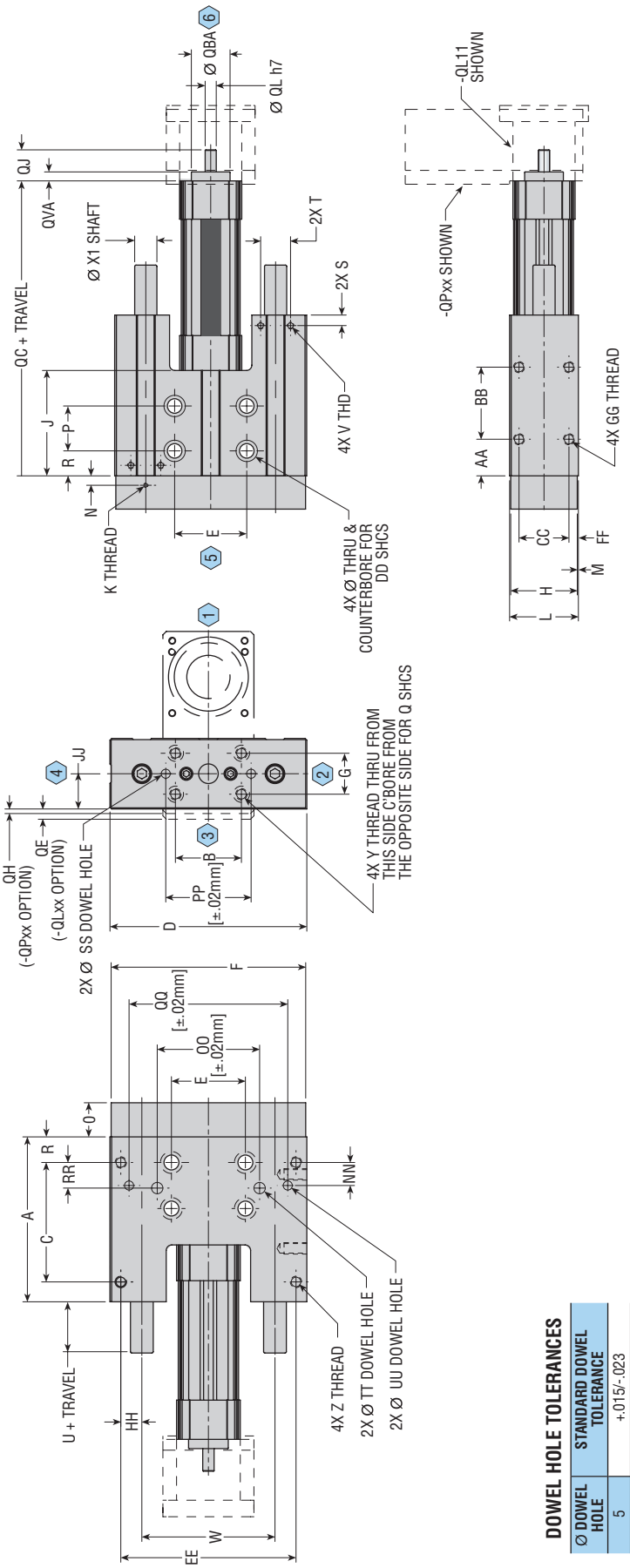
Ø DOWEL HOLE	STANDARD DOWEL TOLERANCE
5	+.015/-.023
6	+.015/-.023
8	+.018/-.020
10	+.018/-.020

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
4	100	47.5	70	143	58	141	32	48	48	M4 x 0.7 x 11 mm ↧	50.5	1	10.1	25	M6	22	8.1	27.0	45	M6 x 1.0 x 15 mm ↧	97	16	M8 x 1.25	M8 x 1.25 x 16 mm ↧
5	115	58	63	173	65	171	36	60	54.9	M4 x 0.7 x 11 mm ↧	62	1	8.5	30	M8	22.5	9.5	27.0	45	M6 x 1.0 x 15 mm ↧	117	20	M10 x 1.5	M10 x 1.5 x 19 mm ↧
6	150	65	100	215	80	213	45	70.1	66	M4 x 0.7 x 11 mm ↧	73	1.5	7.4	35	M10	25.5	12.4	34.9	51	M8 x 1.25 x 16 mm ↧	143	25	M12 x 1.75	M12 x 1.75 x 20 mm ↧

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
4	31.5	58	36	M10	128	7.3	M8 x 1.25 x 16 mm ↧	15.5	18.0	75.0	64.0	114.0	18.0	Ø 6 x 8 mm ↧	Ø 8 x 8 mm ↧	Ø 8 x 8 mm ↧	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 ↧	18.5	20.25	90.0	75.0	139.5	22.5	Ø 8 x 8 mm ↧	Ø 10 x 10 mm ↧	Ø 8 x 8 mm ↧	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 ↧	27	38.0	—	90.0	197.0	—	Ø 10 x 10 mm ↧	—	Ø 10 x 10 mm ↧	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.



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
4	130	47.5	96	143	58	141	32	48	85.1	M4 x 0.7 x 11 mm ↧	50.5	1	10.1	25	36	M6	22	8.1	27.0	45	M6 x 1.0 x 15 mm ↧	97	16	M8 x 1.25	M8 x 1.25 x 16 mm ↧
5	145	58	105	173	65	171	36	60	95	M4 x 0.7 x 11 mm ↧	62	1	8.5	30	40.5	M8	22.5	9.5	27.0	45	M6 x 1.0 x 15 mm ↧	117	20	M10 x 1.5	M10 x 1.5 x 19 mm ↧
6	200	65	150	215	80	213	45	70.1	116	M4 x 0.7 x 11 mm ↧	73	1.5	7.4	35	55	M10	25.5	12.4	34.9	51	M8 x 1.25 x 16 mm ↧	143	25	M12 x 1.75	M12 x 1.75 x 20 mm ↧

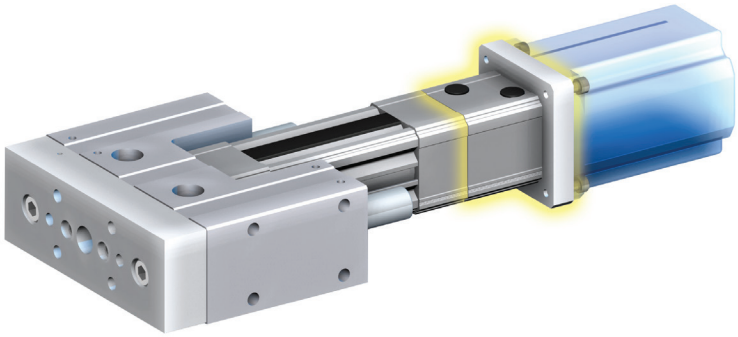
SIZE	AA	BB	CC	DD	EE	FF	GG	HH	NN	OO	PP	QQ	RR	SS	TT	UU	JJ	QC	QVA	QJ	QL	QBA	QE	QH
4	31.5	58	36	M10	128	7.3	M8 x 1.25 x 16 mm ↧	15.5	18	75	64	114	18	Ø 6 x 8 mm ↧	Ø 8 x 8 mm ↧	Ø 8 x 8 mm ↧	25	235	8.1	25.0	6	29.9	5	6
5	33	65	45	M12	154	8.5	M10 x 1.5 x 20 mm ↧	18.5	20.25	90	75	139.5	22.5	Ø 8 x 8 mm ↧	Ø 10 x 10 mm ↧	Ø 8 x 8 mm ↧	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 ↧	27	38	—	90	197	—	Ø 10 x 10 mm ↧	—	Ø 10 x 10 mm ↧	36.5	309	9.1	34.6	12	48.6	7.5	7.5

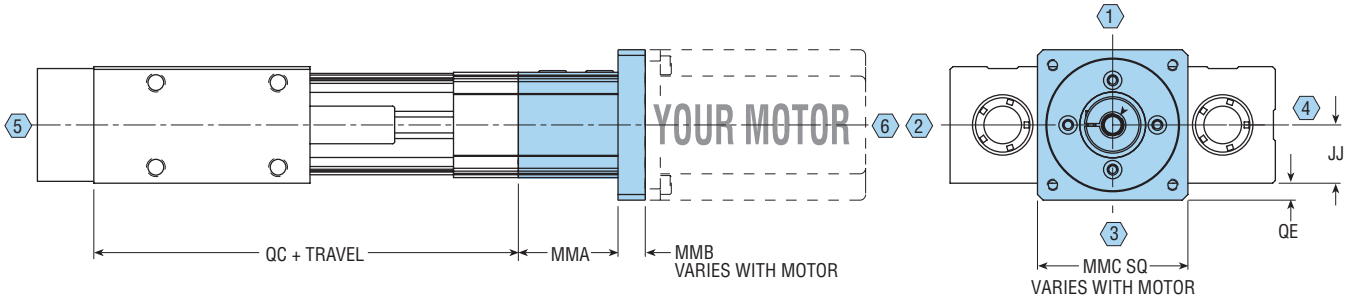
NOTES:
1) NUMBERS SHOWN IN ⬡ INDICATE SLIDE POSITIONS.
2) DIMENSIONS: mm

All dimensions are reference only unless specifically toleranced.

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO

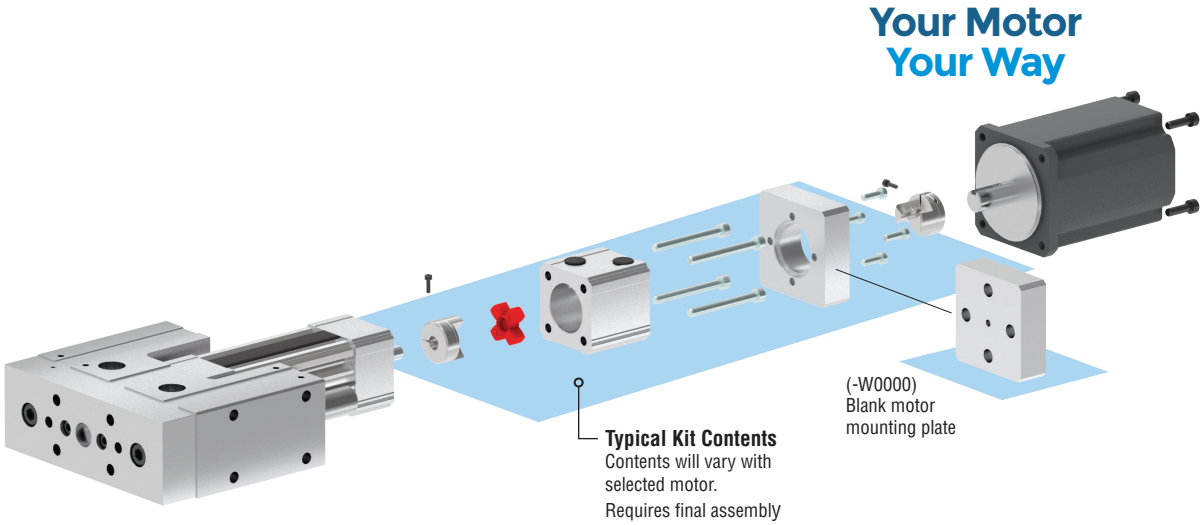
Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 48.





SIZE	QC (ESK)	QC (ESL)	JJ	QE		MMA	MMB MAX	MMB MIN	MMC		WEIGHT kg
				STANDARD	OVERSIZE				STANDARD	OVERSIZE	
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, MOTOR PULLEY ID IS SUPPLIED WITH UNFINISHED ID Ø AND MOTOR MOUNTING PLATE IS SUPPLIED WITHOUT MOTOR MOUNTING FEATURES
4) DIMENSIONS: mm



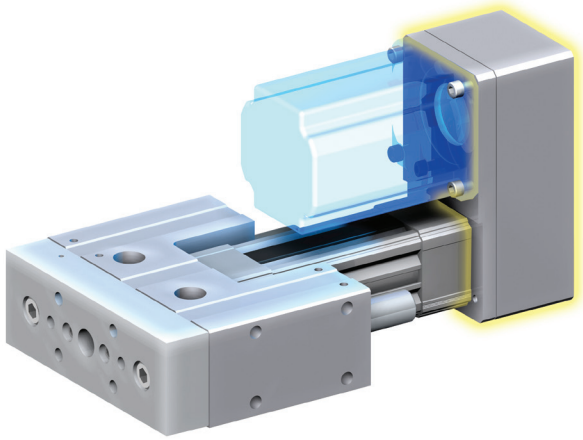
All dimensions are reference only unless specifically toleranced.

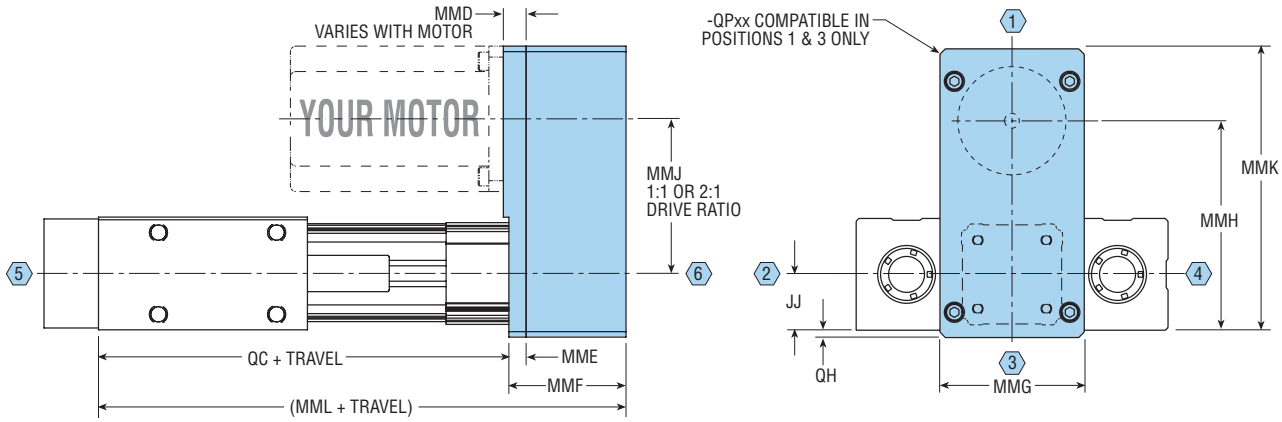
NEW

QP11 FOLDBACK MOTOR MOUNTING WITH 1:1 DRIVE RATIO

QP21 FOLDBACK MOTOR MOUNTING WITH 2:1 DRIVE RATIO

The new -QP upgraded foldback option increases durability and torque capacity with a steel pulley, added rear bearing support, and a keyless coupler. These enhancements reduce shaft stress, improve power transfer, and boost load capacity by up to 25%, making it ideal for high-thrust applications. Foldback motor mounting with the -QP11 option provides a 1:1 drive ratio for performance similar to inline motor mounting but in a shorter overall length, while the -QP21 option offers a 2:1 reduction for greater motor flexibility. This mounting style also meets VDMA 24562 standards, allowing the use of many standard cylinder mounting accessories. For unique motor needs, a blank motor mount may be ordered using the -W0000 code for customer modification (see page 48).

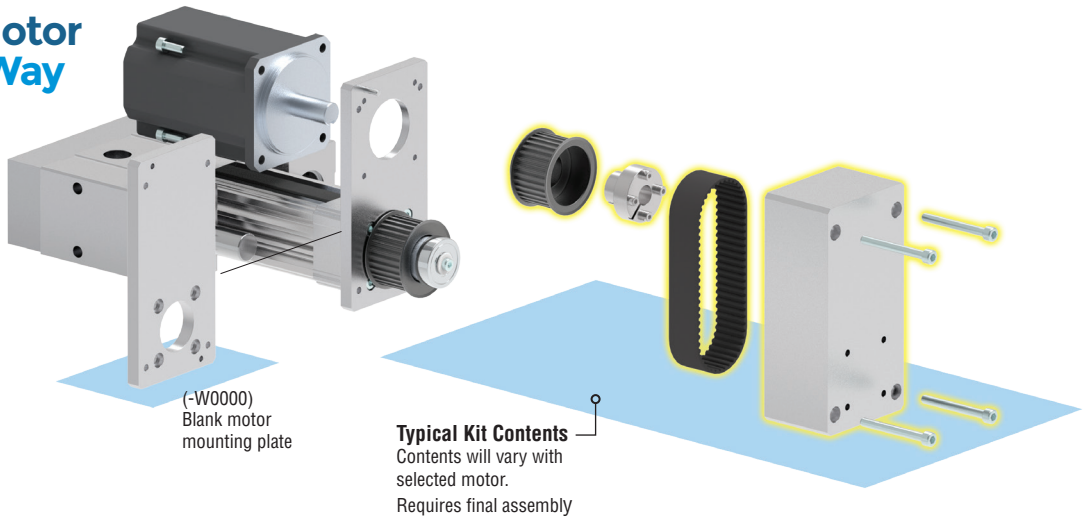




SIZE	QC (ESK)	QC (ESL)	JJ	QH	MMD MIN	MMD MAX	MME	MMF	MMG	MMH 1:1	MMH 2:1	MMJ 1:1	MMJ 2:1	MMK	MML (ESK)	MML (ESL)	WEIGHT kg	MOTOR PULLEY ATTACHMENT	
																		QP11*	QP21
4	198	235	25	6.0	6.1	22.5	9.5	55.5	63.0	92.8	90.6	67.8	75.5	129.0	253.5	290.5	1.51	COUPLER ≤ Ø 12 > KEY	KEY
5	226	266	31	4.0	6.1	22.5	9.5	64.5	80.0	116.9	105.5	86.0	81.5	156.1	290.4	330.4	2.65	COUPLER ≤ Ø 14 > KEY	KEY
6	259	309	36.5	7.5	6.1	22.5	9.5	68.0	86.0	141.8	148	105.3	111.6	190.9	327	377	3.58	COUPLER ≤ Ø 15 > KEY	KEY

NOTES:
1) YOUR MOTOR, YOUR WAY MOTOR MOUNT -QPxx 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, MOTOR PULLEY ID IS SUPPLIED WITH UNFINISHED ID Ø AND MOTOR MOUNTING PLATE IS SUPPLIED WITHOUT MOTOR MOUNTING FEATURES
4) DIMENSIONS: mm

Your Motor Your Way



All dimensions are reference only unless specifically toleranced.

Wxxxx MOTOR MOUNT CODE

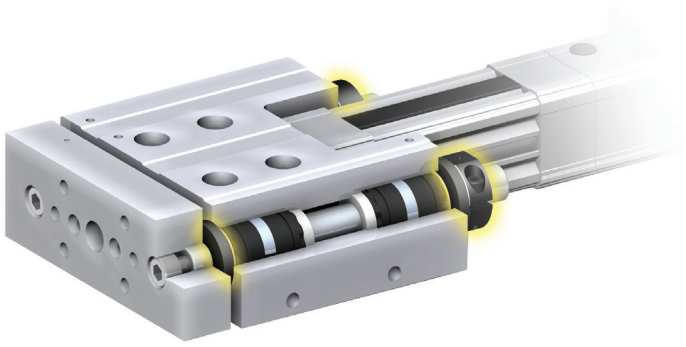
Your Motor
Your Way

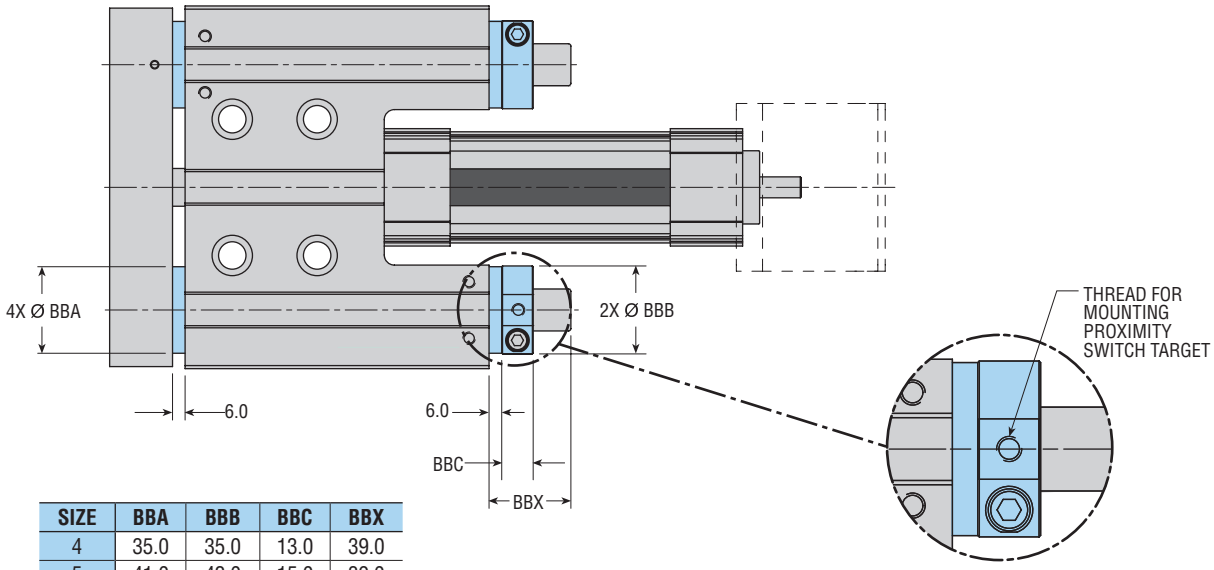
Your Motor, Your Way customizable motor mounting is generated by PHD's extensive motor database at config.phdinc.com. Users may select their compatible motor of choice from the pre-populated motor database. In the event the chosen motor is not in the database, they may enter necessary motor features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

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

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
4	35.0	35.0	13.0	39.0
5	41.0	42.0	15.0	39.0
6	47.5	48.0	15.0	45.0

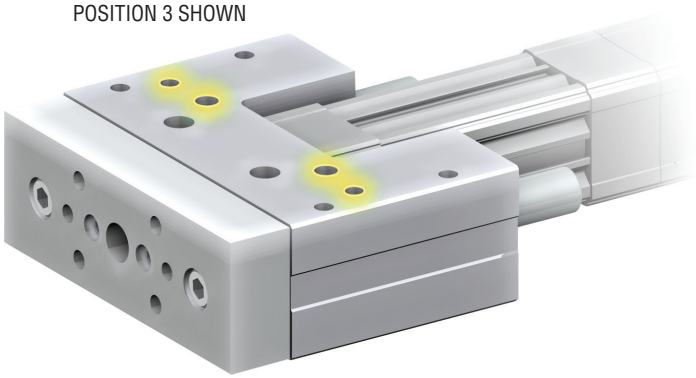
NOTE: DIMENSIONS: mm

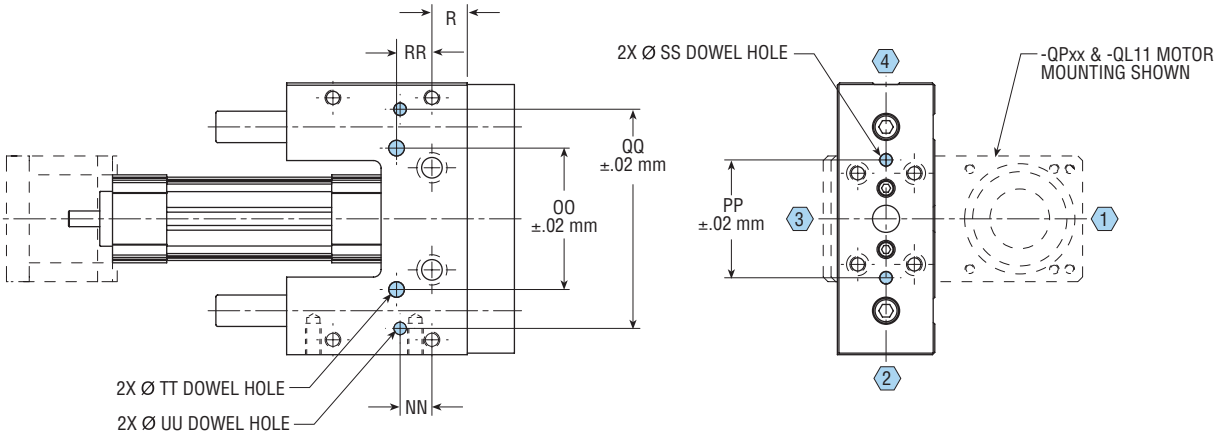
All dimensions are reference only unless specifically toleranced.

J8 PRECISION FIT DOWEL HOLES

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

POSITION 3 SHOWN





SIZE	R	NN	OO	PP	QQ	RR	SS	TT	UU
4	22	18	75	64	114	18	Ø 6 x 8 mm ↧	Ø 8 x 8 mm ↧	Ø 8 x 8 mm ↧
5	22.5	20.24	90	75	139.5	22.5	Ø 8 x 8 mm ↧	Ø 10 x 10 mm ↧	Ø 8 x 8 mm ↧
6	25.5	38	—	90	197	—	Ø 10 x 10 mm ↧	—	Ø 10 x 10 mm ↧

NOTE: DIMENSIONS: mm

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

NOTE: DIMENSIONS: mm

H4 CYLINDER REPLACEMENT ONLY (WITHOUT SLIDE)

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

H11 SLIDE REPLACEMENT ONLY (WITHOUT CYLINDER)

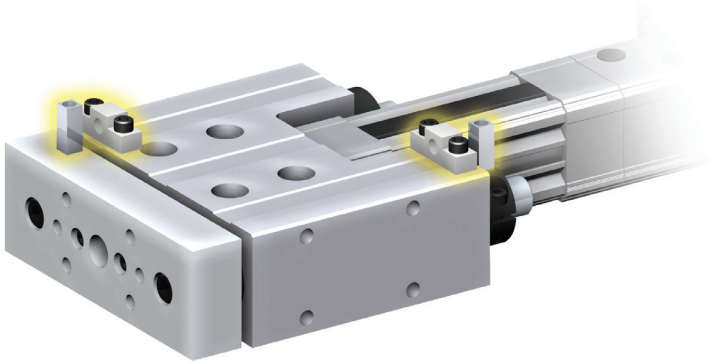
This option provides the slide mechanism only without cylinder or motor mounting. Included with option -H11 is all the hardware required for mounting standard PHD Series ECVA Cylinders or pneumatic standard VDMA/ ISO cylinders to the slide. A self-aligning rod coupling is also provided, making it easy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

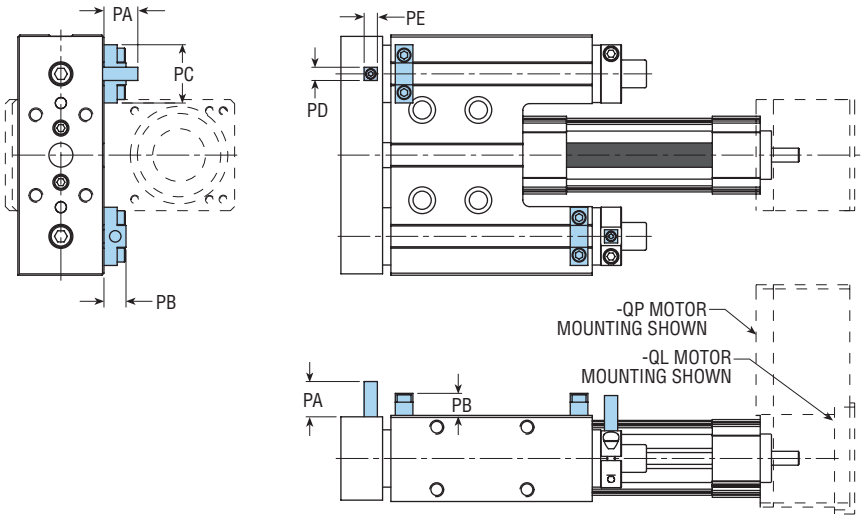
All dimensions are reference only unless specifically toleranced.

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
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
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
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

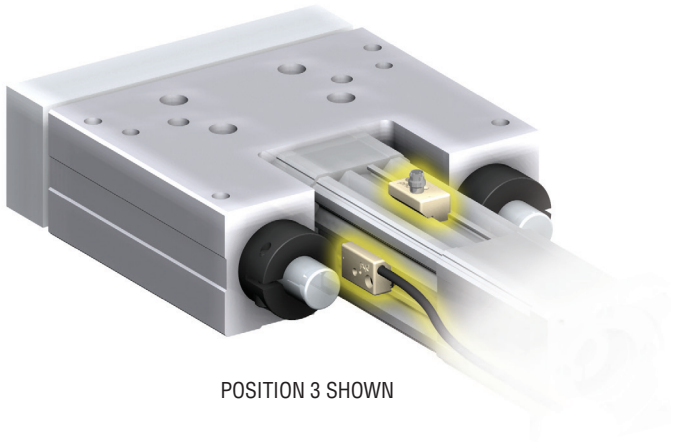
Two models of inductive proximity switches are available for use with PHD Series ESK and ESL Slides (-G30 option required on extend).

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

All dimensions are reference only unless specifically toleranced.

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

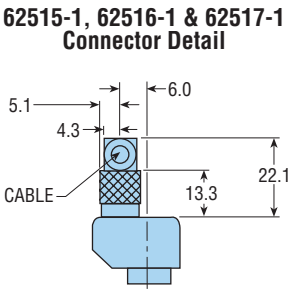
PART NO.	DESCRIPTION	COLOR
62505-1-02	NPN (Sink) DC Solid State, 2 m cable	Brown
62506-1-02	PNP (Source) DC Solid State, 2 m cable	Tan
62515-1	NPN (Sink) DC Solid State, Quick Connect	Brown
62516-1	PNP (Source) DC Solid State, Quick Connect	Tan

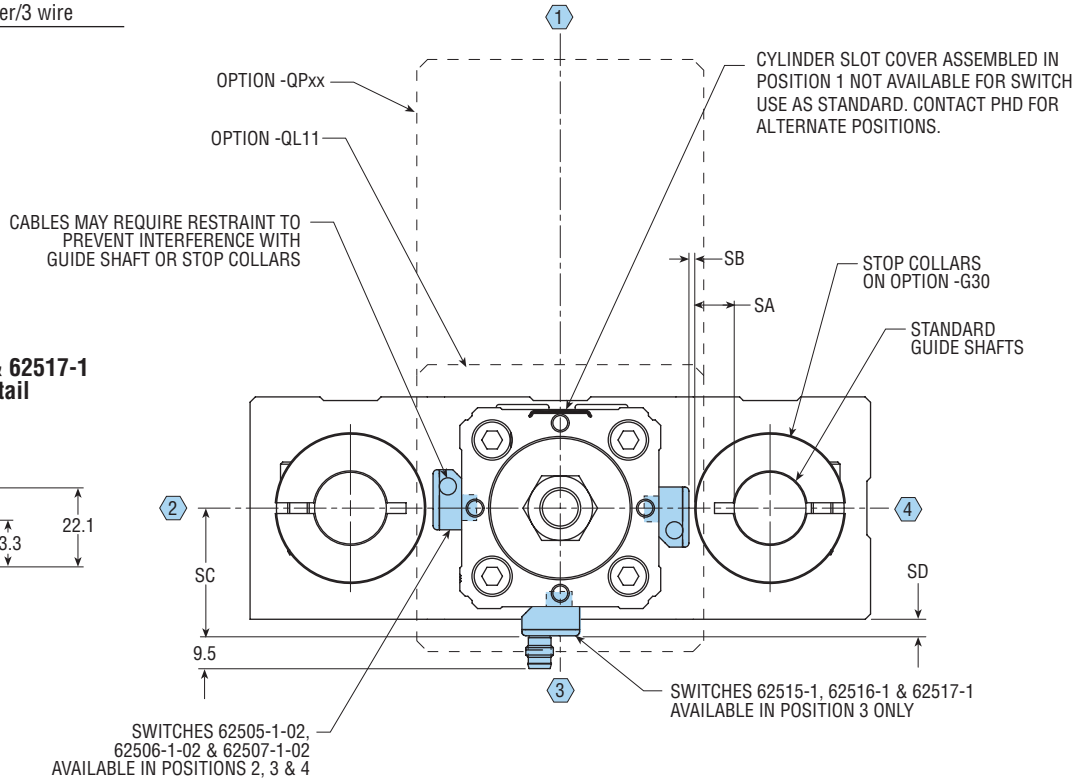
SERIES 6250 REED SWITCHES

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

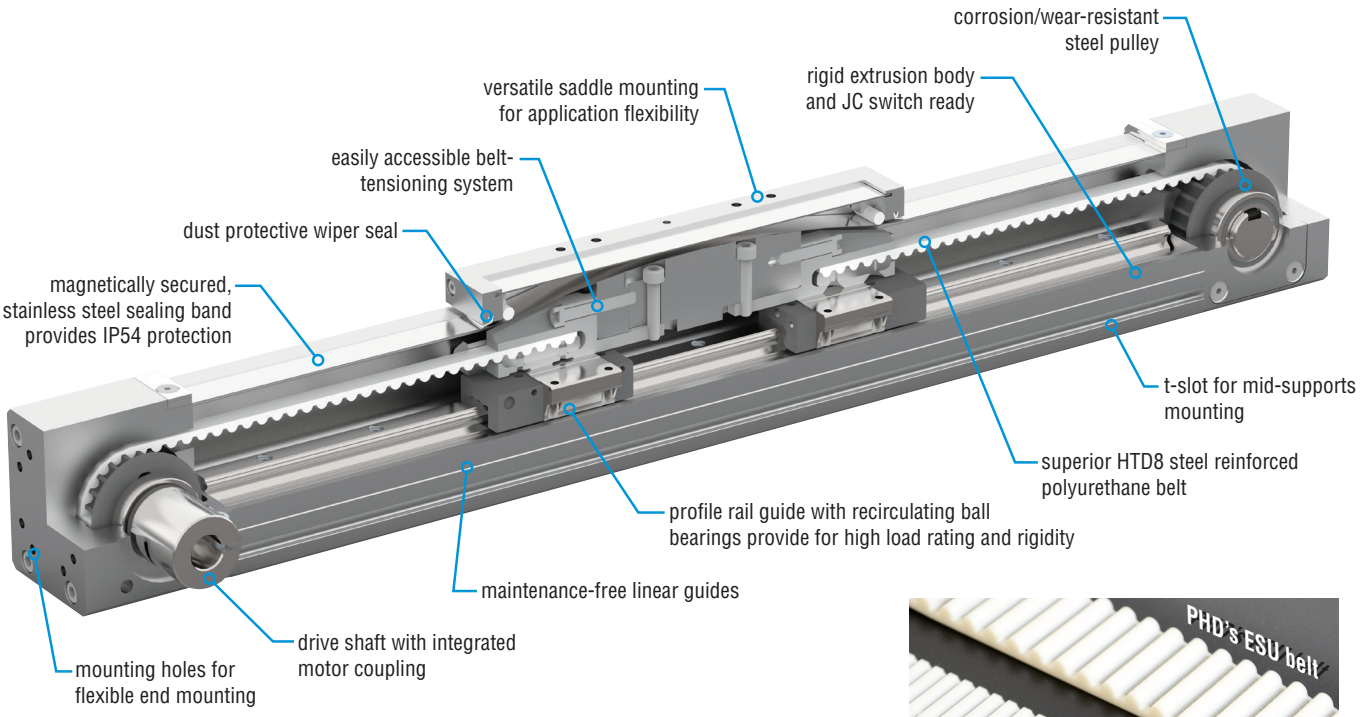


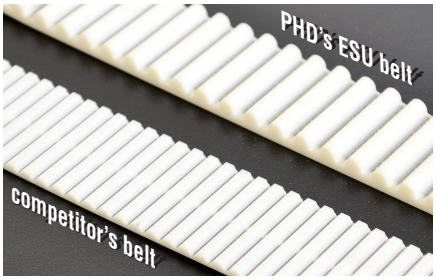


SIZE	SA	SB	SC	SD
4	9.1	—	31.5	6.5
5	13.0	1.3	35.6	4.6
6	18.5	6.4	40.4	4.1

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

All dimensions are reference only unless specifically toleranced.



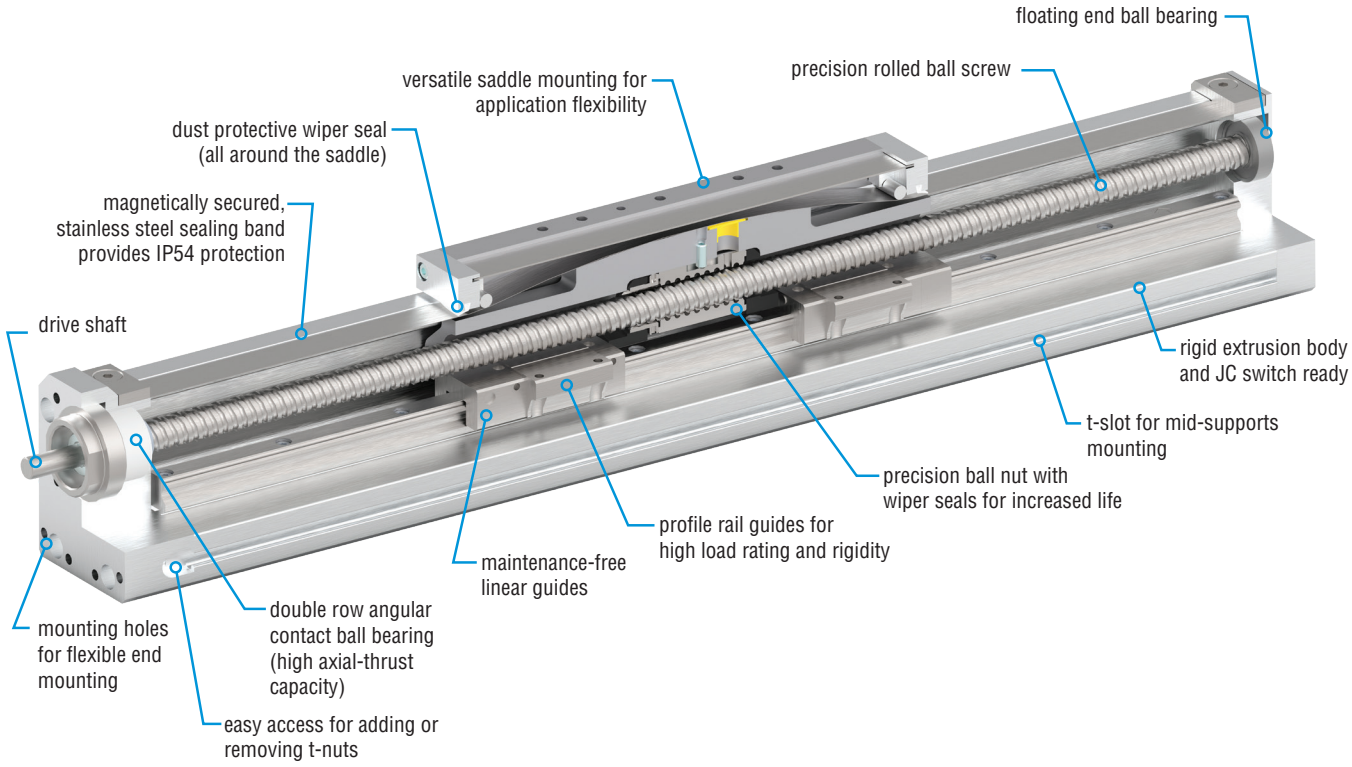


-RT Belt-Driven Major Benefits

- Travel lengths up to 5500 mm
- Maximum speed 5000 mm/s, acceleration 50 m/s^2
- Superior HTD8 steel reinforced polyurethane belt for uniform load distribution, precise tooth engagement, and improved performance
- Corrosion-resistant steel pulleys provide high structural strength and minimal wear
- Easy access belt tensioning system
- Integrated shaft coupling allows for a rigid connection and zero backlash

Common Major Benefits

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

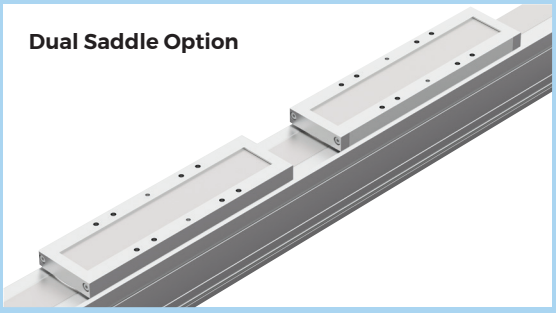


-RB Ball Screw Major Benefits

- Travel lengths up to 1000 mm
- Maximum speed 3200 mm/s, acceleration 20 m/s^2
- Precision ball screw assemblies with long service life

Your Motor Your Way

Dual Saddle Option



PRODUCT
Slide

SIZE
5
6
8

DRIVE MODE: BELT (RT)

Size		Lead mm
5	RT160	160
6	RT192	192
8	RT256	256

RT000 = Passive Unit (without drive)
Must be ordered with QL00 option.

MOTOR CONFIGURATION
QL11 - Inline with 1:1 ratio (Standard)
QLT1 - Inline Plain Shaft
QLD1 - Inline Dual Shaft 1:1 Ratio
QLTD - Inline Dual Plain Shaft 1:1 Ratio
QL00 - No Shaft (Passive Configuration), Must be ordered with RT000 option.

MOTOR MOUNT CODE
Wxxxx - Open Architecture
W0000 - Blank Motor Mount
Blank - Slide Only (No motor mount)

END/MID SUPPORTS
Head Support Qty
KS**0**xx or KS**1**xx
Qty Support (Max 1)
Mid Support Qty
KSx**0**x to KSx**9**x
Qty Support (Max 9)
See Options page for recommended spacing
Cap Support Qty
KSxx**0** or KSxx**1**
Qty Support
(Max 1, Motor End)

ESU S 5 5 x 300 - RTxxx - QL11 - H71 - Wxxxx - KSxxx - SCNK2

TYPE
S - Single Saddle
D - Dual In-Line Saddle

DESIGN NO.
5 - Metric

TRAVEL (MAX.)

ESUS Size	mm	ESUD Size	mm
5	5500	5	5350
6	5500	6	5250
8	5500	8	5100

50 mm minimum travel in 50 mm increments

DRIVE SHAFT ORIENTATION
Blank - Right Hand (Standard)
H71 - Left Hand

SWITCH BUNDLE (OPTIONAL)
S C N K 2

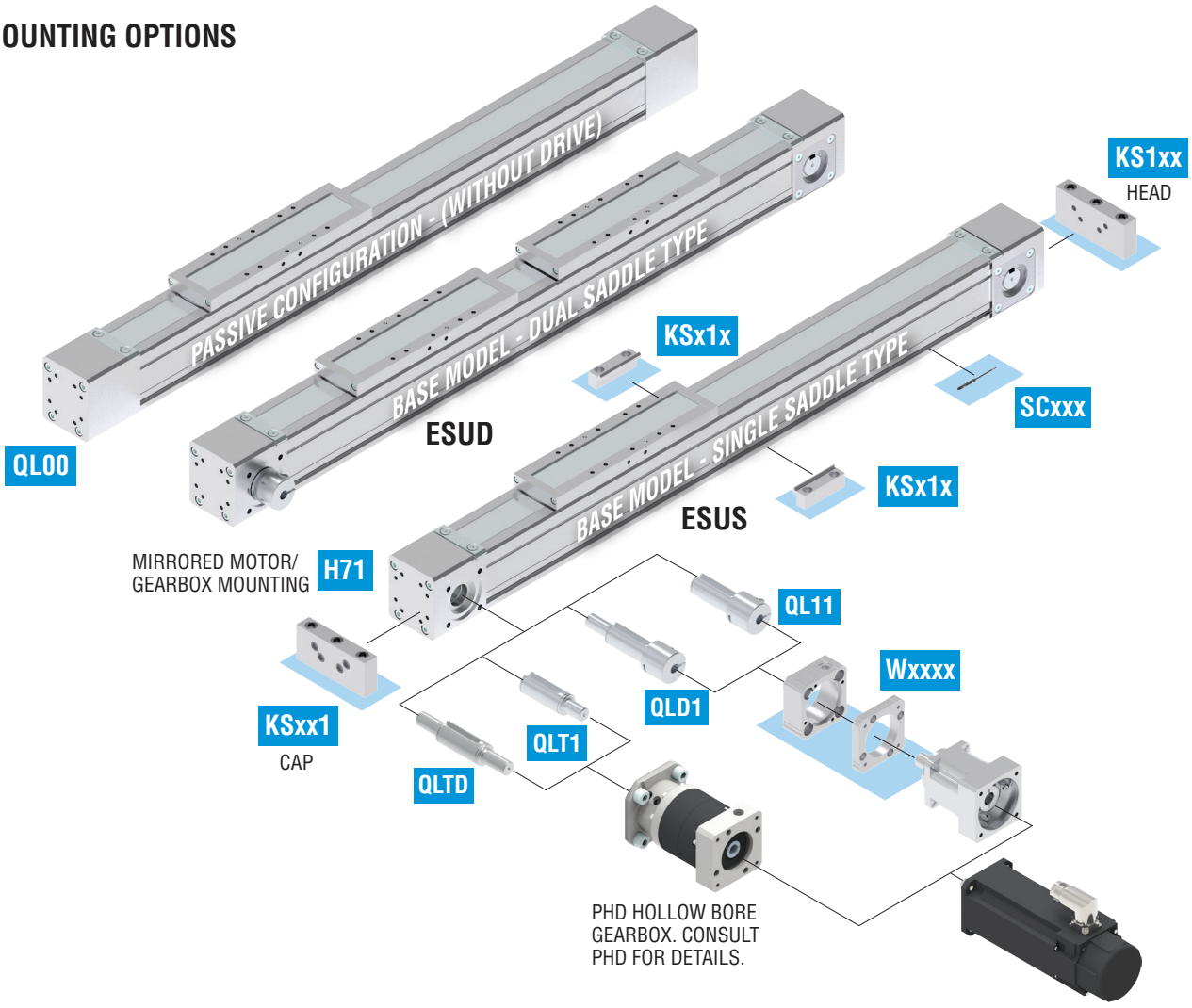
SWITCH SERIES
C - JC1SDx-x Series Single Position

QUANTITY
1 to 9
(JC1SDx-x)

SWITCH CIRCUITRY
N - NPN (Sink)
P - PNP (Source)

CABLE TYPE
K - Quick Connect only (JC1SDx-K)
5 - 5 Meter Length Cable (JC1SDx-5)

MOUNTING OPTIONS



PRODUCT
Slide

SIZE
5
6
8

BALL SCREW CONFIGURATION

Size		Lead mm
5	RB010	10
5	RB016	16
6	RB010	10
6	RB020	20
8	RB010	10
8	RB032	32

RB000 = Passive Unit (without drive)
Must be ordered with QL00 option.

MOTOR CONFIGURATION
QL11 - Inline with 1:1 ratio
QF11 - Foldback with 1:1 Ratio
QF21 - Foldback with 2:1 Ratio
QL00 - No Shaft (Passive Configuration), Must be ordered with RB000 option.

END/MID SUPPORTS
Head Support Qty
KS**0**xx or KS**1**xx
Qty Support (Max 1)
Mid Support Qty
KSx**0**x to KSx**9**x
Qty Support (Max 9)
See Options page for recommended spacing
Cap Support Qty
KSxx**0** or KSxx**1**
Qty Support
(Max 1, Motor End)

ESU S 5 5 x 300 - RBxxx - QL11 - Wxxxx - KSxxx - SCxxx

TYPE
S - Single Saddle
D - Dual In-Line Saddle

DESIGN NO.
5 - Metric

TRAVEL (MAX.)

Size	mm
5	1000
6	1000
8	1000

50 mm minimum travel in 50 mm increments

MOTOR MOUNT CODE
Wxxxx - Open Architecture
W0000 - Blank Motor Mount
Blank - Slide Only (No motor mount)

SWITCH BUNDLE (OPTIONAL)
S C N K 2

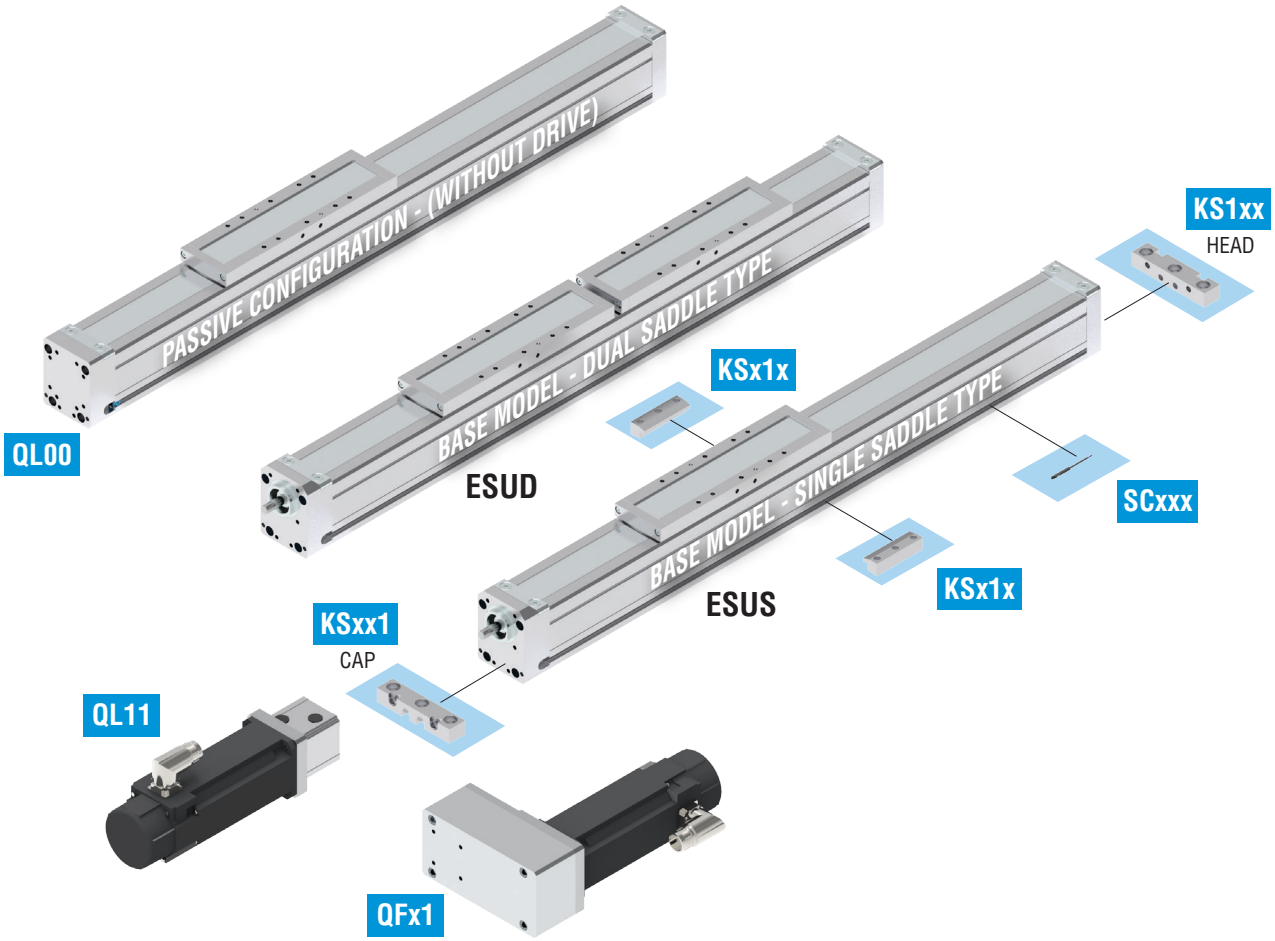
SWITCH SERIES
C - JC1SDx-x Series Single Position

QUANTITY
1 to 9 (JC1SDx-x)

SWITCH CIRCUITRY
N - NPN (Sink)
P - PNP (Source)

CABLE TYPE
K - Quick Connect only (JC1SDx-K)
5 - 5 Meter Length Cable (JC1SDx-5)

MOUNTING OPTIONS



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

SPECIFICATIONS				SIZE		
				5	6	8
MECHANICS	DRIVE MECHANISM			Timing Belt		
	GUIDE			Recirculating Ball- Linear Motion Guide & Rail System		
	ESUS MAX. TRAVEL[1]		mm [in]	5500 [216.53]		
	ESUD MAX. TRAVEL[1]		mm [in]	5350 [210.62]	5250 [206.69]	5100 [200.78]
	BELT			HTD8		
	PITCH (LINEAR TRAVEL PER REVOLUTION)		mm [in]	160 [6.3]	192 [7.56]	256 [10.08]
	PULLEY DIAMETER		mm [in]	50.93 [2.005]	61.12 [2.406]	81.5 [3.208]
SPEED	MAXIMUM SPEED		mm/s [in/sec]	5000 [197]		
	MAXIMUM ACCELERATION		m/s^2 [ft/s^2]	50 [164.05]		
THRUST	MAXIMUM THRUST[2]		N [lbf]	1450 [326]	2610 [586]	5440 [1222]
TORQUE	MAX. PERMISSIBLE DRIVE TORQUE[3]		Nm [in-lb]	32 [283]	71 [628]	208 [1842]
	NO-LOAD TORQUE		Nm [in-lb]	1.5 [13.3]	2.4 [22]	3.6 [32]
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})	STANDARD	kg [lb]	6.38 [14.08]	13.69 [30.21]	25.66 [56.74]
		DUAL SADDLE	kg [lb]	9.46 [20.87]	20.43 [45.09]	37.47 [82.92]
	TOTAL TRAVEL ADDER (W_{LT})		kg/mm [lb/in]	6.5×10^{-3} [0.366]	1.04×10^{-2} [0.582]	1.54×10^{-2} [0.881]
	MOVING @ ZERO TRAVEL (W_{OM})	STANDARD	kg [lb]	1.81 [3.99]	4.35 [9.59]	7.48 [16.52]
		DUAL SADDLE	kg [lb]	3.03 [6.69]	7.29 [16.09]	12.16 [26.87]
	MOVING TRAVEL ADDER (W_{LM})		kg/mm [lb/in]	3.0×10^{-4} [1.57×10^{-2}]	4.0×10^{-4} [2.35×10^{-2}]	7.0×10^{-4} [3.92×10^{-2}]
INERTIA	ACTUATOR @ ZERO STROKE (J_O)	STANDARD	$kg\text{-}m^2$ [$lb\text{-}in^2$]	1.17×10^{-3} [4.00]	4.06×10^{-3} [13.90]	1.24×10^{-2} [42.50]
		DUAL SADDLE	$kg\text{-}m^2$ [$lb\text{-}in^2$]	1.97×10^{-3} [6.70]	6.81×10^{-3} [23.30]	2.02×10^{-2} [69.10]
	TRAVEL ADDER (J_L)		$kg\text{-}m^2/mm$ [$lb\text{-}in^2/in$]	1.82×10^{-7} [1.58×10^{-2}]	3.92×10^{-7} [3.40×10^{-2}]	1.16×10^{-6} [1.01×10^{-1}]
	EXTERNAL PAYLOAD ADDER (J_M)		$kg\text{-}m^2/kg$ [$lb\text{-}in^2/lb$]	6.84×10^{-4} [1.01]	9.34×10^{-4} [1.45]	1.66×10^{-3} [2.57]

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

WEIGHT AND INERTIAL CALCULATIONS:

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

INERTIA $_{Reflected}$ = J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)

The max dynamic loads Fz and Fy and the moment Mx of a dual saddle Series ESU are doubled. The max dynamic moment of My and Mz depends on the distance between the saddles; the distance calculation follows the note 4 and 5 on pages 60 and 61 respectively.

DYNAMIC LOADS AND MOMENTS

f_C = Equivalent Load Factor

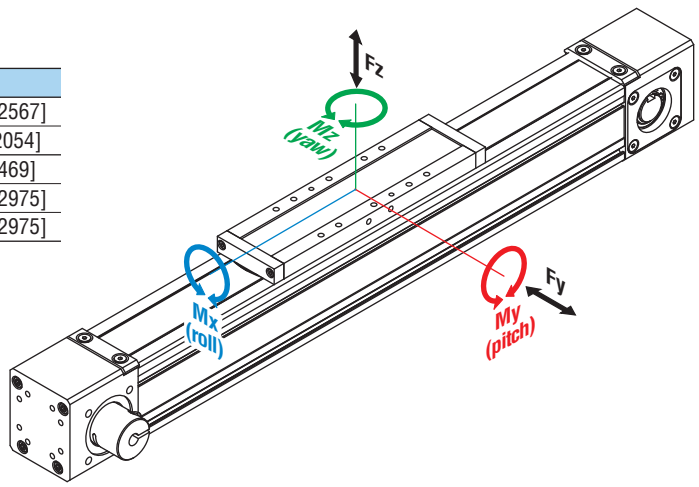
			5	6	8
Load (Max)	Fz	N [lb]	4903 [1103]	7648 [1720]	11410 [2567]
	Fy	N [lb]	3923 [883]	6120 [1377]	9129 [2054]
Bending Moments (Max)	Mx	Nm [in-lb]	43 [381]	94 [832]	166 [1469]
	My	Nm [in-lb]	380 [3363]	715 [6328]	1466 [12975]
	Mz	Nm [in-lb]	380 [3363]	715 [6328]	1466 [12975]

$$f_C = \frac{Fz}{Fz\ max} + \frac{Fy}{Fy\ max} + \frac{Mx}{Mx\ max} + \frac{My}{My\ max} + \frac{Mz}{Mz\ max} \leq 1$$

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

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

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



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

SPECIFICATIONS				SIZE					
				5		6		8	
MECHANICS	DRIVE MECHANISM			Ball Screw					
	GUIDE			Recirculating Ball - Linear Motion Guide & Rail System					
	MAX. TRAVEL[1]		mm [in]	1000 [39.37]					
	BALL SCREW DIAMETER		mm	15		20		32	
	SCREW CONFIGURATION			-RB010	-RB016	-RB010	-RB020	-RB010	-RB032
	PITCH (LINEAR TRAVEL PER REVOLUTION)		mm [in]	10	16	10	20	10	32
SPEED	MAXIMUM SPEED[2]		mm/s [in/sec]	1000 [39.3]	1600 [63.0]	1000 [39.3]	2000 [78.7]	1000 [39.3]	3200 [126.0]
	MAXIMUM ACCELERATION	-QL11	m/s² [in/s²]	19.6 [772]					
		-QFx1		9.8 [386]					
THRUST	MAXIMUM THRUST[3]		N [lbf]	2430 [547]	1520 [342]	4410 [992]	2510 [565]	22340 [5020]	6980 [1570]
TORQUE	MAXIMUM PERMISSIBLE DRIVE TORQUE[4]	-QL11	Nm [in-lb]	4.3 [38.06]		7.8 [69.03]		39.5 [349.6]	
		-QFx1		3 [26.55]		5.46 [48.32]		11.4 [101]	21.7 [192]
	NO-LOAD TORQUE		Nm [in-lb]	0.40 [3.54]		0.55 [4.87]		1.50 [13.27]	
WEIGHT	TOTAL @ ZERO STROKE (W_{OT})	STANDARD	kg [lb]	4.83 [10.67]	4.91 [10.84]	10.36 [22.87]	10.54 [23.27]	21.23 [46.86]	21.26 [46.94]
		DUAL SADDLE	kg [lb]	8.01 [17.68]	8.09 [17.85]	17.03 [37.59]	17.21 [38.00]	33.63 [74.23]	33.66 [74.31]
	TOTAL TRAVEL ADDER (W_{LT})		kg/mm [lb/in]	0.008 [0.436]	0.008 [0.436]	0.012 [0.700]	0.012 [0.700]	0.022 [1.224]	0.022 [1.224]
	MOVING @ ZERO TRAVEL (W_{OM})	STANDARD	kg [lb]	1.53 [3.36]	1.61 [3.54]	3.28 [7.22]	3.46 [7.61]	6.00 [13.21]	6.03 [13.29]
		DUAL SADDLE	kg [lb]	2.66 [5.86]	2.74 [6.04]	5.78 [12.73]	5.96 [13.13]	9.86 [21.74]	9.90 [21.82]
MOMENT OF INERTIA	ACTUATOR @ ZERO STROKE (J_O)	STANDARD	kg-m² [lb-in²]	8.36×10^{-6} [0.029]	8.94×10^{-6} [0.031]	2.98×10^{-5} [0.102]	2.94×10^{-5} [0.101]	2.52×10^{-4} [0.860]	2.82×10^{-4} [0.964]
		DUAL SADDLE	kg-m² [lb-in²]	1.50×10^{-5} [0.051]	1.63×10^{-5} [0.056]	5.38×10^{-5} [0.184]	5.29×10^{-5} [0.181]	4.71×10^{-4} [1.611]	5.42×10^{-4} [1.853]
	TRAVEL ADDER (J_L)		kg-m²/mm [lb-in²/in]	2.64×10^{-8} [2.29×10^{-3}]	2.95×10^{-8} [2.56×10^{-3}]	8.0×10^{-8} [6.94×10^{-3}]	7.81×10^{-8} [6.78×10^{-3}]	5.49×10^{-7} [4.77×10^{-2}]	6.50×10^{-7} [5.65×10^{-2}]
	EXTERNAL PAYLOAD ADDER		kg-m²/kg [lb-in²/lb]	2.53×10^{-6} [3.93×10^{-3}]	6.48×10^{-6} [1.01×10^{-2}]	2.53×10^{-6} [3.93×10^{-3}]	1.01×10^{-5} [1.57×10^{-2}]	2.53×10^{-6} [3.93×10^{-3}]	2.59×10^{-5} [4.02×10^{-2}]
	MOTOR CONFIGURATION	-QL11	kg-m² [lb-in²]	6.11×10^{-6} [0.021]	6.11×10^{-6} [0.021]	4.04×10^{-5} [0.138]	4.04×10^{-5} [0.138]	1.71×10^{-4} [0.583]	1.71×10^{-4} [0.583]
		-QF11		2.03×10^{-4} [0.694]	2.03×10^{-4} [0.694]	1.96×10^{-4} [0.669]	1.96×10^{-4} [0.669]	2.65×10^{-3} [9.055]	2.65×10^{-3} [9.055]
		-QF21		3.59×10^{-4} [1.227]	3.59×10^{-4} [1.227]	8.02×10^{-4} [2.742]	8.02×10^{-4} [2.742]	1.17×10^{-2} [39.921]	1.17×10^{-2} [39.921]

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

WEIGHT AND INERTIAL CALCULATIONS:

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

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

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

DYNAMIC LOADS AND MOMENTS

f_C = Equivalent Load Factor

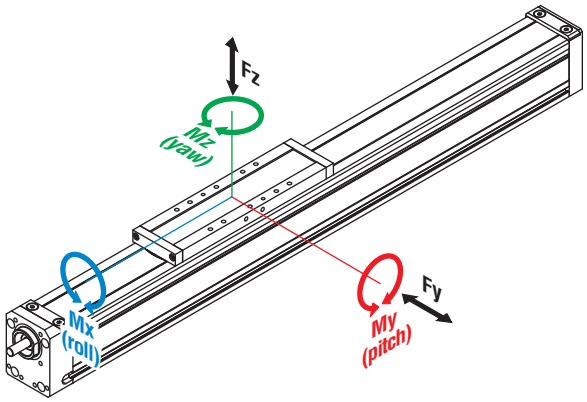
			5	6	8
Load (Max)	Fz	N [lb]	4903 [1103]	7648 [1720]	11410 [2567]
	Fy	N [lb]	3923 [883]	6120 [1377]	9129 [2054]
Bending Moments (Max)	Mx	Nm [in-lb]	43 [381]	94 [832]	166 [1469]
	My	Nm [in-lb]	380 [3363]	715 [6328]	1466 [12975]
	Mz	Nm [in-lb]	380 [3363]	715 [6328]	1466 [12975]

$$f_C = \frac{Fz}{Fz\ max} + \frac{Fy}{Fy\ max} + \frac{Mx}{Mx\ max} + \frac{My}{My\ max} + \frac{Mz}{Mz\ max} \leq 1$$

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

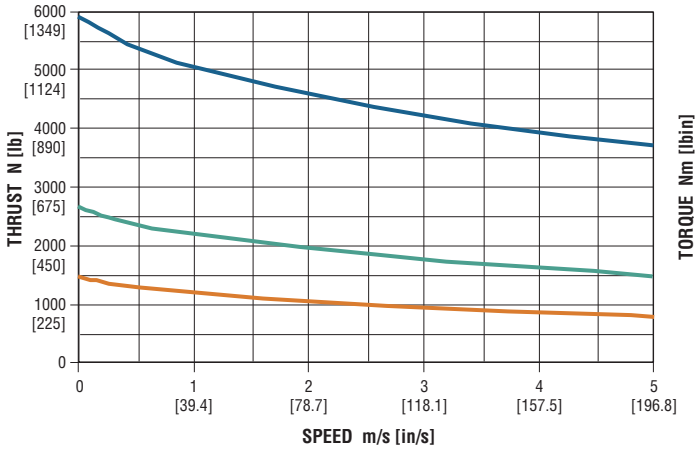
Mx, My and Mz are total Moments (Static + Dynamic)

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

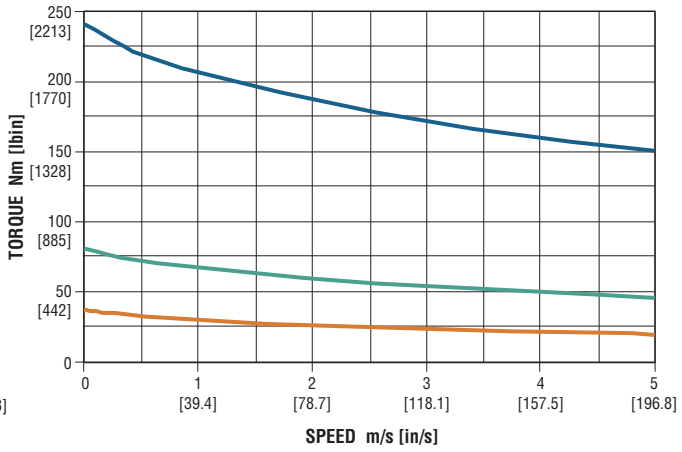


This section contains information on the capabilities of the Series ESU -RT version. It is not intended to be a comprehensive selection guide. To make the selection process simple and quick, refer to PHD's sizing software. You may request application assistance from your distributor or PHD's Inside Sales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

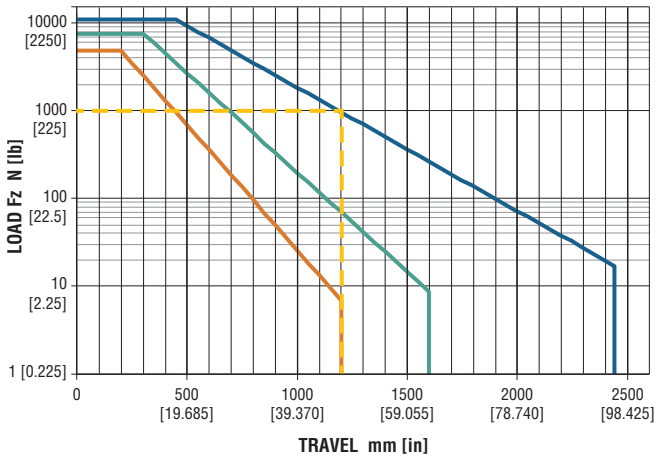
SPEED VS. THRUST

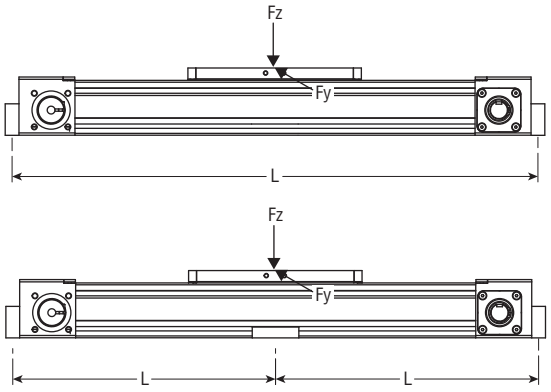


SPEED VS. TORQUE



Load Fz/Fy vs. Maximum Unsupported Length





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

MID-SUPPORT CALCULATION

Example (Application Requirements)

Actuator – ESUS size 8
Load Fz – 1000 N [225 lb]
Travel – 3000 mm

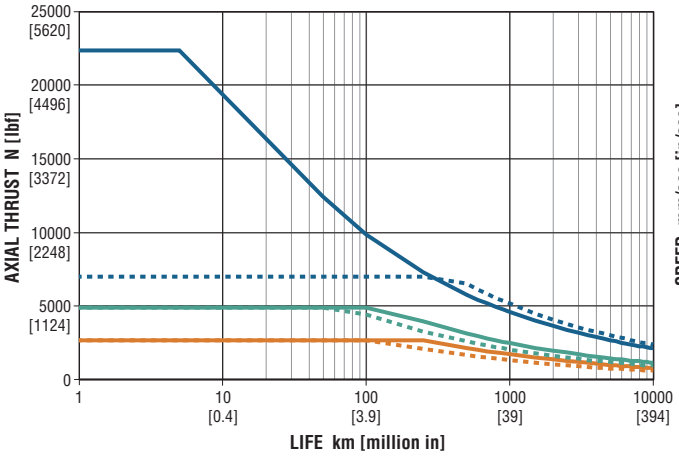
Use Load Fz/Fy vs Maximum Unsupported Length graph

1) Find **Maximum Unsupported Length** from the above graph [1000 N = 1200 mm]
2) Calculate **Total Actuator Length** (refer to Dimensions page 60)
   Total Travel + Dimension A = Total Actuator Length

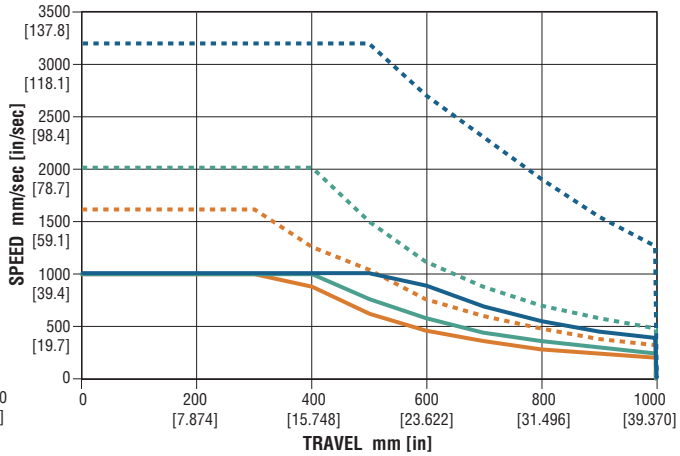
   3000 + 628.1 = **3628.1 mm**
3) Determine **number of required mid-supports**
   (Total Actuator Length / Maximum Unsupported Length) - 1 = Required mid-supports
   (3628.1 mm / 1200 mm) - 1 = **2 mid-supports** (round up to next whole number)

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

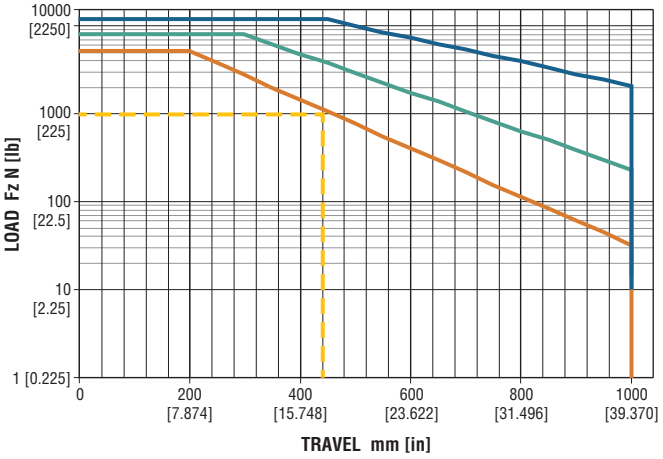
THRUST / LIFE

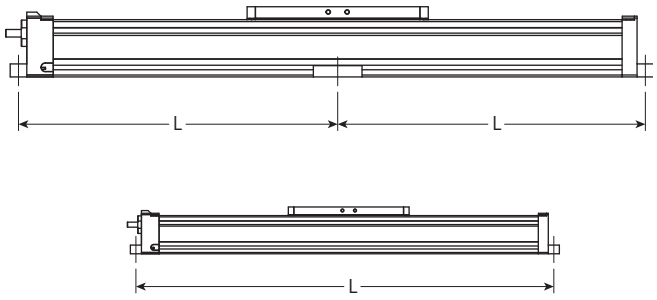


SPEED / TRAVEL



Load Fz/Fy vs. Maximum Unsupported Length





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

MID-SUPPORT CALCULATION

Example (Application Requirements)

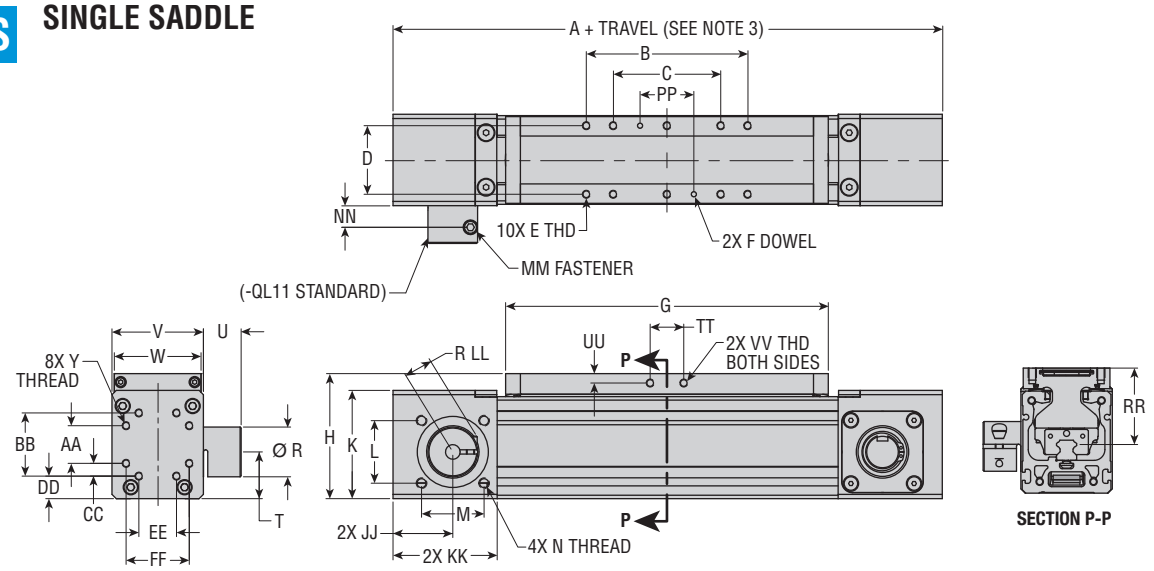
Actuator – ESUS size 5
Load Fz – 1000 N [225 lb]
Travel – 1000 mm

Use Load Fz/Fy vs Maximum Unsupported Length graph

1) Find **Maximum Unsupported Length** from the above graph [1000 N = 440 mm]
2) Calculate **Total Actuator Length** (refer to Dimensions page 61)
   Total Travel + Dimension A = Total Actuator Length

   1000 + 308.5 = **1308.5 mm**
3) Determine **number of required mid-supports**
   (Total Actuator Length / Maximum Unsupported Length) - 1 = Required mid-supports
   (1308.5 mm / 440 mm) - 1 = **2 mid-supports** (round up to next whole number)

ESUS SINGLE SADDLE



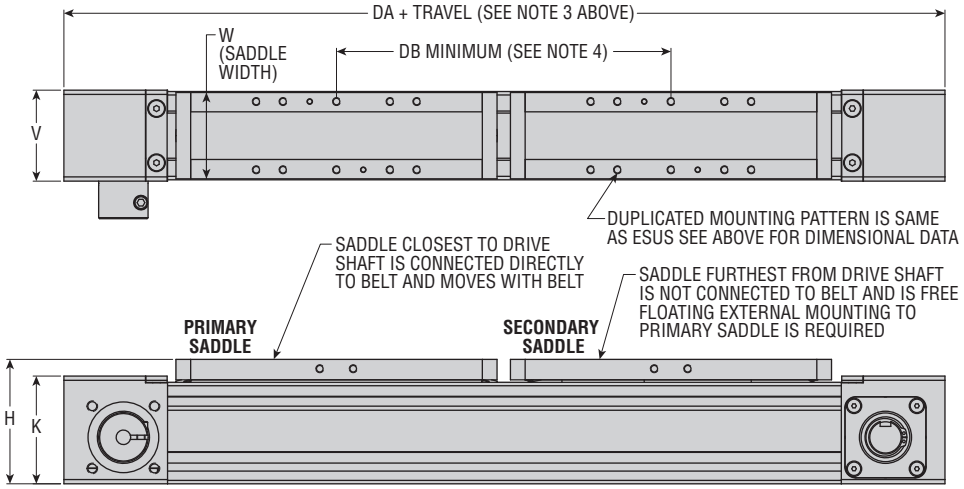
SIZE	A	B	C	D	E	F	G	H	K	L	M	N	R	T	U	V	W
5	408.5	120.0	80.0	51.0	M6 x 1 x 8.5 ↧	4 x 4 ↧	240.0	93.0	80.5	46.5	46.5	M8 x 1.25 x 12 ↧	37.0	34.8	28.1	68.0	64.5
6	514.0	160.0	100.0	70.0	M6 x 1 x 10.2 ↧	5 x 5 ↧	287.0	115.0	100.2	46.5	46.5	M8 x 1.25 x 14 ↧	42.0	41.1	31.4	88.0	83.5
8	628.1	175.0	105.0	75.0	M8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

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

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

ESUD DUAL SADDLE

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



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

REFER TO SINGLE SADDLE DIMENSIONS ABOVE FOR DATA NOT SHOWN

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

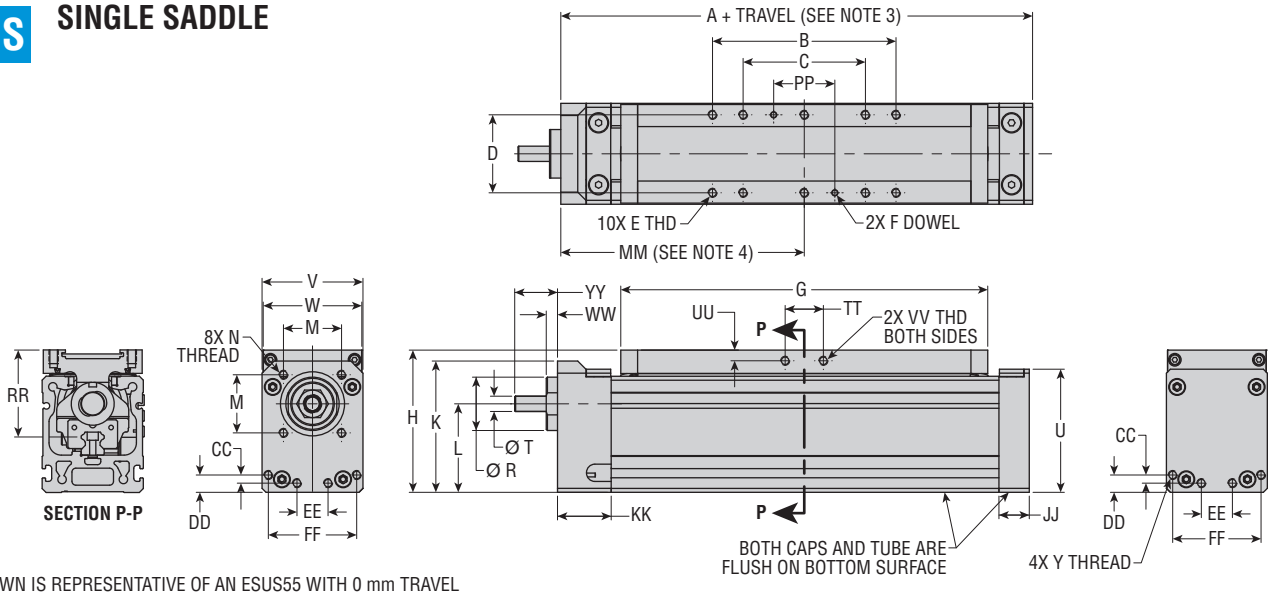
EXAMPLES:

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

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

All dimensions are reference only unless specifically toleranced.

ESUS SINGLE SADDLE



UNIT SHOWN IS REPRESENTATIVE OF AN ESUS55 WITH 0 mm TRAVEL

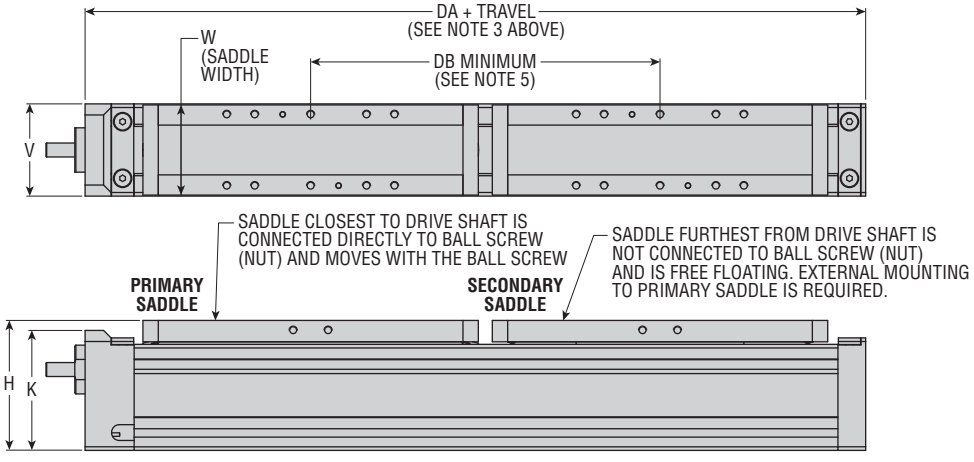
SIZE	A	B	C	D	E	F	G	H	K	L	M	N	Ø R	Ø T	U	V
5	308.5	120.0	80.0	51.0	M6 x 1 x 8.5 ↧	4 x 4 ↧	240.0	93.0	85.9	57.9	38.0	M6 x 1 x 18.7 ↧	34.9	10.0	80.5	66.0
6	414.0	160.0	100.0	70.0	M6 x 1 x 10.2 ↧	5 x 5 ↧	287.0	115.0	105.2	71.0	46.5	M8 x 1.25 x 22 ↧	48.5	12.0	100.2	86.0
8	528.1	175.0	105.0	75.0	M8 x 1.25 x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

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

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

ESUD DUAL SADDLE

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



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

REFER TO SINGLE SADDLE DIMENSIONS ABOVE FOR DATA NOT SHOWN

EXAMPLES:

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

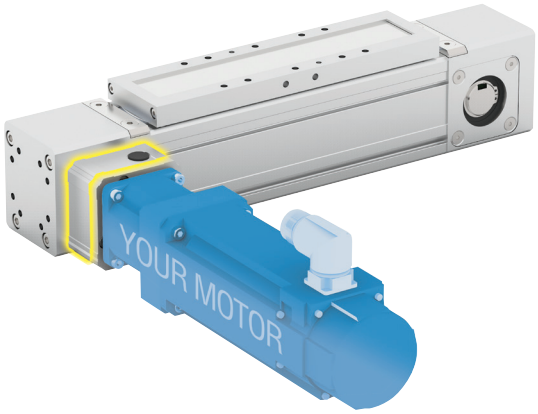
SIZE 5 WITH 500 mm TRAVEL WITH "DB" DISTANCE OF 350 mm
ESUD55 x 600 -RBxxx (WILL NEED ADDITIONAL 100 mm STROKE ADDER)
FOR AN END RESULT OF 500 mm TRAVEL

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

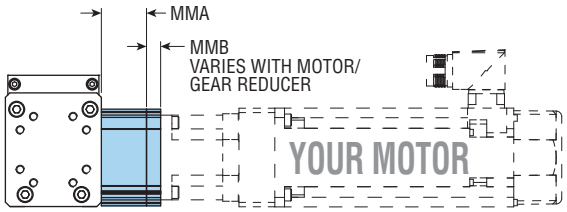
All dimensions are reference only unless specifically toleranced.

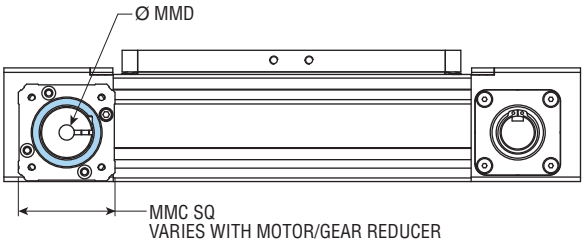
QL11 INLINE WITH 1:1 RATIO (STANDARD ON -RT)

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

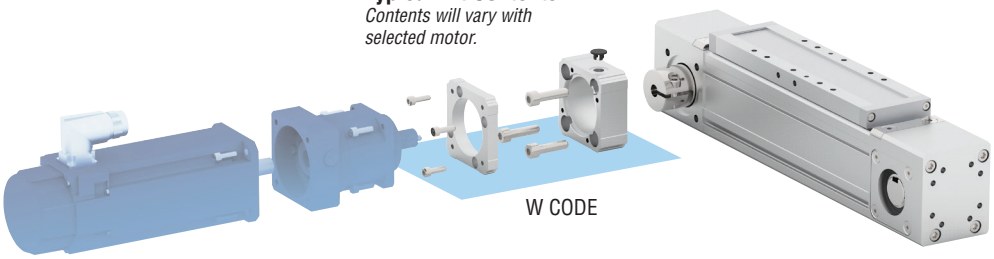


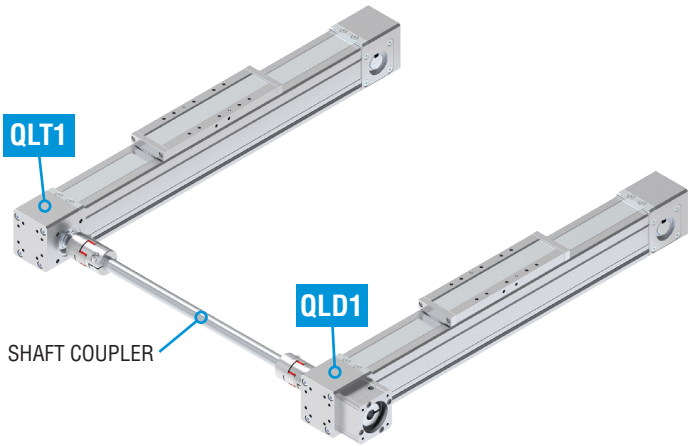
SINGLE SADDLE

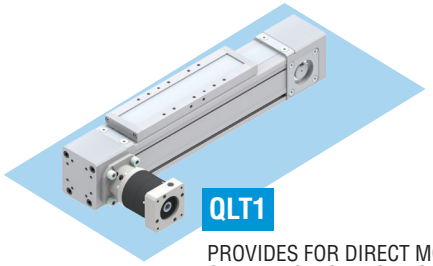




Typical Kit Contents
Contents will vary with selected motor.







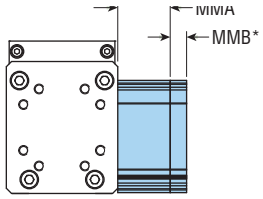
PROVIDES FOR DIRECT MOUNTING OF PHD HOLLOW BORE GEARBOX. GEARBOX SOLD SEPARATELY.

H71 LEFT HAND DRIVE SHAFT ORIENTATION (-RT ONLY)

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

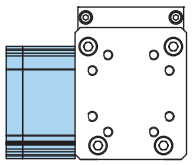
QL11 INLINE WITH 1:1 RATIO (STANDARD ON -RT)

Direct ***Your Motor, Your Way*** adaptation with a 1:1 drive ratio and the lowest overall weight. This simple, low inertia design ensures a cost-effective solution with minimal assembly effort. For blank mounting, use the -W0000 code for a customizable blank plate.



*Varies with motor/ gear reducer

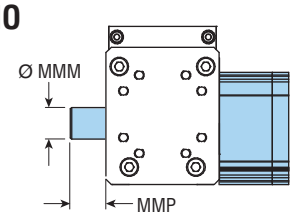
-QL11 - H71



Motor/gear mounts included but not shown

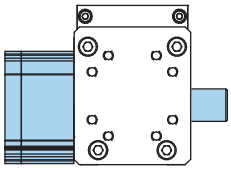
QLD1 INLINE DUAL SHAFT 1:1 RATIO (-RT ONLY)

Direct ***Your Motor, Your Way*** adaptation with the addition of a single plain shaft. This option allows for mechanical coupling of additional ESU linear actuators via a shaft coupler.



Motor/gear mounts included but not shown

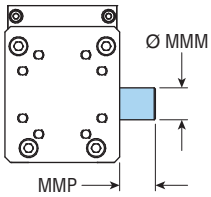
-QLD1 - H71



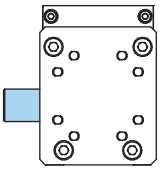
Motor/gear mounts included but not shown

QLT1 INLINE PLAIN SHAFT (-RT ONLY)

Single plain shaft for direct attachment of PHD's hollow bore gearbox or mechanical coupling to other ESU linear actuators via a shaft coupler.

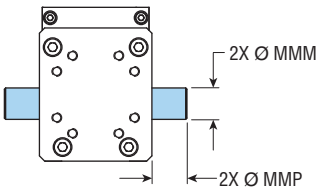


-QLT1 - H71



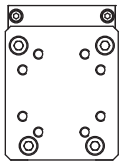
QLTD INLINE DUAL PLAIN SHAFT 1:1 RATIO (-RT ONLY)

Dual Plain Shaft for direct attachment of PHD's hollow bore gearbox and mechanical coupling of other ESU linear actuators via a shaft coupler.



QL00 NO SHAFT (AVAILABLE ON -RT AND -RB)

Unit without shaft and does not include coupler housing, or motor mounting plate used with the -RT000 or -RB000 passive configuration. For use when external payload load or moment capability is required.



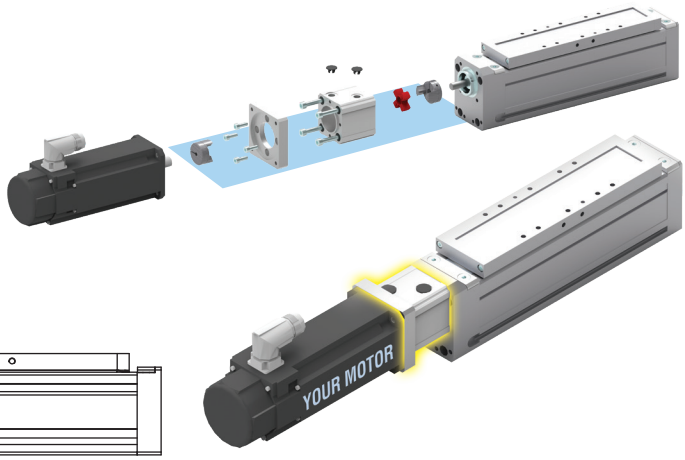
SIZE	-QL11 & -QLD1						-QL11-W0000		-QLD1 & -QLT1		-QLTD	
	MMA	MMB MAX	MMB MIN	MMC STANDARD	MMC OVERSIZE	WEIGHT kg	MMC	MMD	MMM	MMP	MMM	MMD
5	27.0	31.0	12.5	68.5	88.0	0.36	88.0	19.0	16.0	30.0	16.0	30.0
6	32.2	33.0	14.0	88.0	115.0	0.54	115.0	24.0	20.0	30.0	20.0	30.0
8	46.0	56.0	16.5	115.0	138.0	1.04	138.0	32.0	30.0	40.0	30.0	40.0

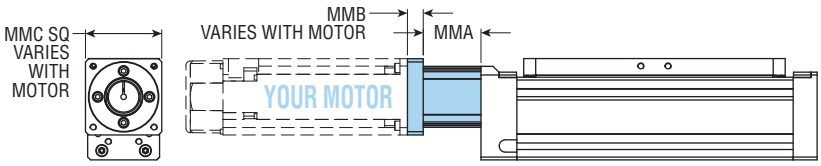
NOTES:
1) *YOUR MOTOR, YOUR WAY* MOTOR MOUNTS -QL11 & -QLD1 ARE PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO ACTUATOR
2) KIT INCLUDES ALL PARTS REQUIRED TO ASSEMBLE AN ACTUATOR BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
3) DIMENSIONS: mm

All dimensions are reference only unless specifically toleranced.

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

Inline motor mounting with the QL11 option provides a 1:1 drive ratio with the lowest overall unit weight and height for high speed applications. The simple, low inertia design of the inline motor mounting allows for a cost effective solution with minimal assembly time. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 65.





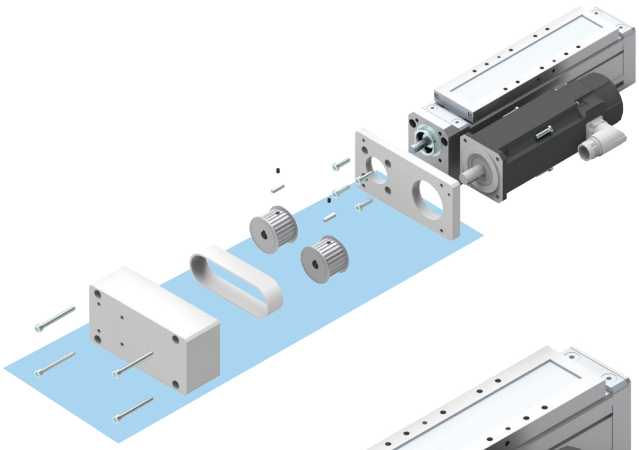
SIZE	MMA	MMB MAX	MMB MIN	MMC STANDARD	MMC OVERSIZE	WEIGHT kg
5	53.0	35.6	8.5	70.0	88.0	0.65
6	82.2	35.6	8.5	88.0	110.0	1.36
8	108.8	35.6	19.0	120.7	150.0	2.50

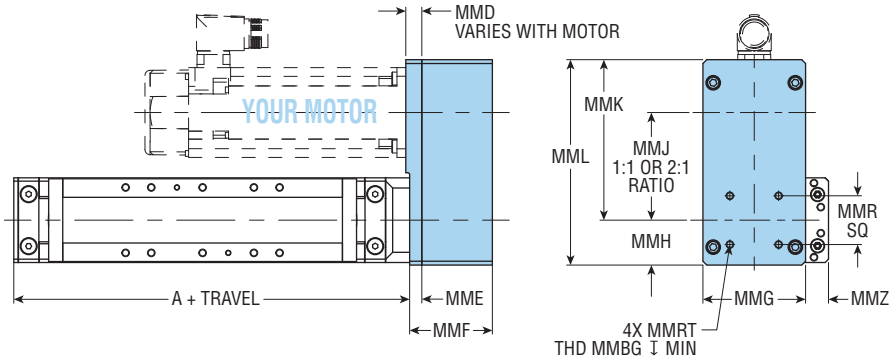
NOTES:
1) YOUR MOTOR, YOUR WAY MOTOR MOUNTS -QL11 IS PROVIDED IN KIT FORM TO ALLOW ASSEMBLY OF MOTOR TO ACTUATOR
2) KITS INCLUDE DIRECTIONS AND ALL PARTS REQUIRED TO ASSEMBLE AN ACTUATOR BASED ON -Wxxxx CODE SUPPLIED BY CUSTOMER
3) WHEN (-Wxxxx) IS SPECIFIED, COUPLER ID IS SUPPLIED WITH UNFINISHED ID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

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

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

Foldback motor mounting with the QF11 option provides a 1:1 drive ratio allowing similar performance to the inline motor mounting in a shorter overall length. The QF21 option provides a 2:1 drive ratio reduction for applications that require higher thrust. Foldback motor mounting also provides a VDMA 24562 compliant mounting pattern that allows the use of many standard cylinder mounting accessories. If a blank motor mount is desired for special motor requirements, use -W0000 motor mount code to order a motor mount intended for customer modification. See page 65.





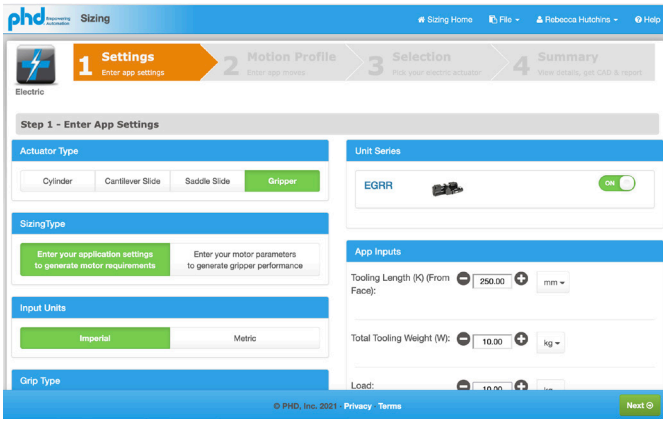
SIZE	A	MMD MIN	MMD MAX	MME	MMF	MMG	MMH	MMJ 1:1	MMJ 2:1	MMK	MML	MMR	MMRT	MMBG	MMZ	WEIGHT kg
5	308.5	9.5	22.5	9.5	64.5	80.0	35.0	85.1	83.9	125.1	160.1	38.0	M6 x 1	11.5	17.9	1.7
6	414.0	9.5	22.5	9.5	68.0	86.0	44.0	102.5	111.4	154.4	198.4	46.5	M8 x 1.25	14.5	28.0	2.37
8	528.1	15.0	25.4	15.0	86.0	120.0	60.0	140.3	158.2	223.1	283.1	72.0	M10 x 1.5	17	34.3	5.9

All dimensions are reference only unless specifically toleranced.

Wxxxx MOTOR MOUNT CODE

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

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



Your Motor Your Way

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

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

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

Step 2 - Motor Selection

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

Step 3 - CAD Configurator - config.phdinc.com

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

KSxxx END/MID SUPPORTS

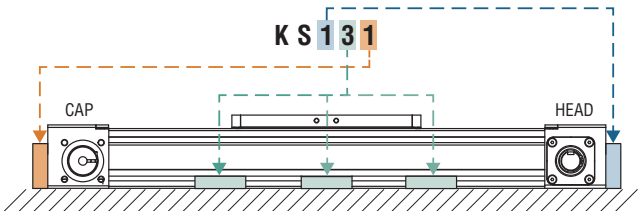
Mounting with optional supports using the integrated T-slot. Recommended number of mid-support mounts can be determined by finding the maximum distance between supports based on the load per your application. See Engineering Data page, Load Fz/Fy vs. Maximum Unsupported Length graph.

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

Mid supports include one set of brackets.

See dimensions on next page.

END/MID SUPPORT ORDERING EXAMPLE:



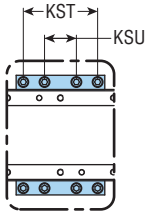
SUPPORT LOCATION	QUANTITY
Head - KS0xx or KS1xx	0 or 1
Mid - KSx0x to KSx9x	0 to 9
Cap - KSxx0 or KSxx1	0 or 1

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

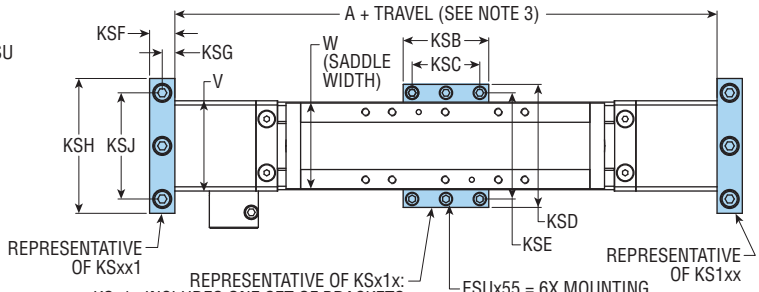
SUPPORT REPLACEMENT KITS

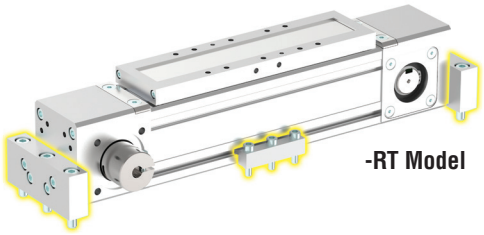
SUPPORT KITS	-RB SIZE			-RT SIZE		
	5	6	8	5	6	8
Head or Cap	90090-01	90090-02	90090-03	90036-01	90036-02	90036-03
Mid	90037-01	90037-02	90037-03	90037-01	90037-02	90037-03

KSxxx END/MID SUPPORTS (CONTINUED)

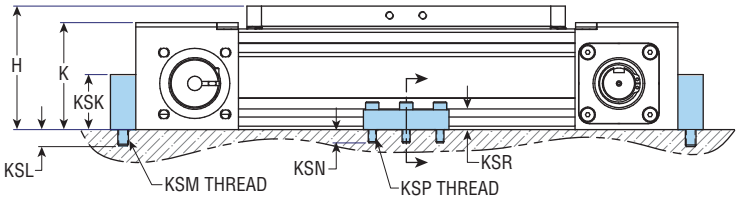


MID SUPPORT DETAIL SIZES 6 & 8





-RT Model

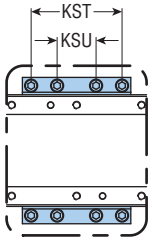


REFER TO PAGE 60 FOR DIMENSIONAL DATA NOT SHOWN

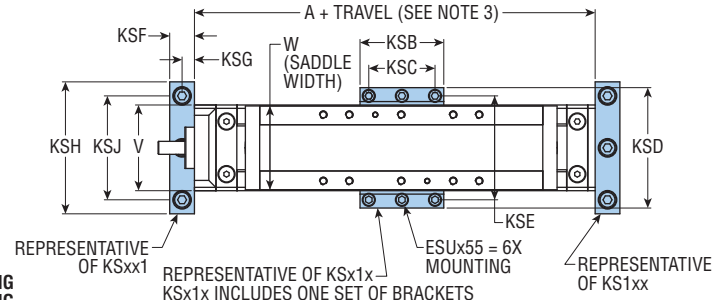
ESU -RT MODEL

SIZE	A	H	K	V	W	KSB	KSC	KSD	KSE	KSF	KSG	KSH	KSJ	KSK	KSL	KSM	KSN	KSP	KSR	KST	KSU
5	408.5	93.0	80.5	68.0	64.5	64.5	51.0	92.7	80.0	19.1	9.5	101.6	80.0	41.4	12.2	M8 x 1.25	10.0	M6 x 1.0	15.0	–	–
6	514.0	115.0	100.2	88.0	83.5	83.5	–	112.7	100.0	25.4	12.7	152.4	100.0	42.8	17.8	M10 x 1.5	12.5	M6 x 1.0	27.5	70.0	30.0
8	628.1	149.0	131.2	105.0	99.0	99.0	–	136.4	120.0	25.4	12.7	152.4	120.0	57.5	18.2	M10 x 1.5	14.5	M8 x 1.25	35.5	75.0	25.0

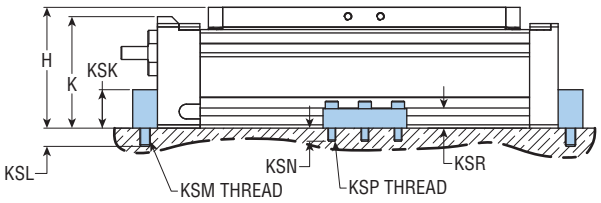
NOTES:
1) DIMENSIONS: mm
2) SADDLE SHOWN IN MID POSITION
3) PHD RECOMMENDS ADDING 50 mm TO THE TOTAL WORKING TRAVEL FOR OVER-TRAVEL PROTECTION (25 mm PER END)
4) BRACKETS AND HARDWARE BAGGED AND SHIPPED WITH UNIT



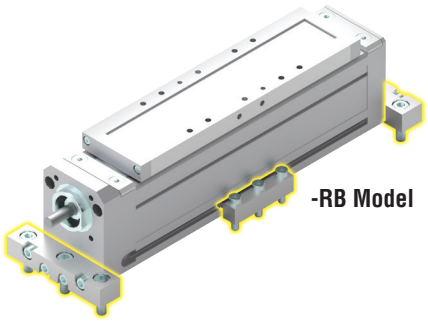
ESUx56 = 8X MOUNTING
ESUx58 = 8X MOUNTING



SHOWN IN APPROX MID LOCATION, MAY BE POSITIONED ANYWHERE ALONG TUBE AS LONG AS WITHIN APPLICATION SPECIFICATIONS



REFER TO PAGE 61 FOR DIMENSIONAL DATA NOT SHOWN



-RB Model

UNIT SHOWN IS REPRESENTATIVE OF AN ESUx55 WITH 0 mm TRAVEL

ESU -RB MODEL

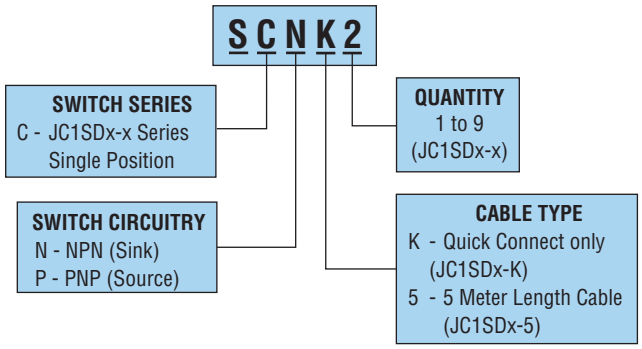
SIZE	A	H	K	V	W	KSB	KSC	KSD	KSE	KSF	KSG	KSH	KSJ	KSK	KSL	KSM	KSN	KSP	KSR	KST	KSU
5	308.5	93.0	85.9	66	64.5	64.5	51.0	92.7	80.0	22	9.5	101.6	80.0	17.2	16.4	M8 x 1.25	10.1	M6 x 1.0	15.0	–	–
6	414.0	115.0	105.2	86.0	83.5	83.5	–	112.7	100.0	25.4	12.7	127.0	100.0	25.4	25.2	M10 x 1.5	12.5	M6 x 1.0	27.5	70.0	30.0
8	528.1	149.0	143.3	103.0	99.0	99.0	–	135.9	120.0	25.4	12.7	152.4	120.0	33.6	26.1	M10 x 1.5	14.5	M8 x 1.25	35.5	75.0	25.0

All dimensions are reference only unless specifically toleranced.

Sxxxx SWITCH BUNDLE

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

SWITCH BUNDLE (OPTIONAL)



SERIES JC1SDx-x SINGLE POSITION MAGNETIC SWITCH

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

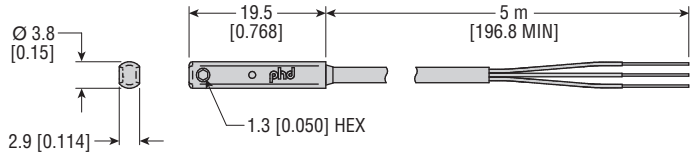
SERIES JC1SDx SINGLE POSITION SWITCHES

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

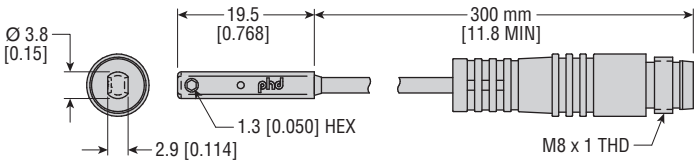
SERIES JC1SDx CORDSET

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

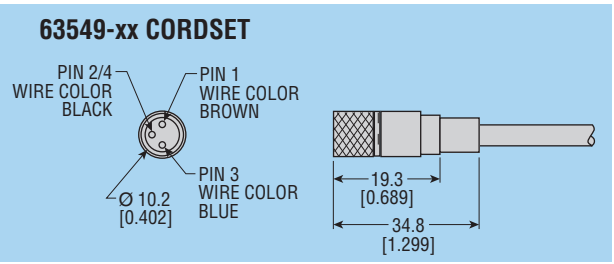
JC1SDx-5



JC1SDx-K (Quick Connect)



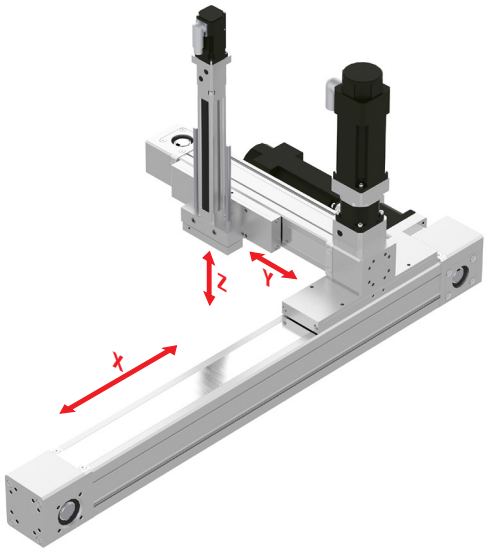
63549-xx CORDSET



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

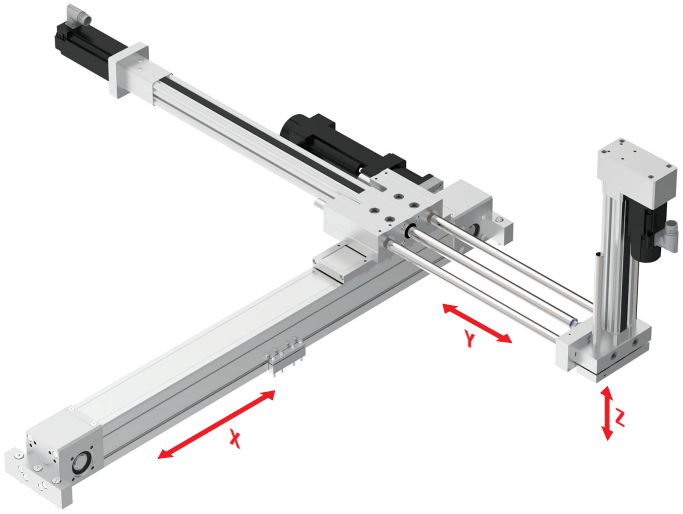
3-Axis Cartesian Robot, Permanent Arm Type

Z- Axis = ESCV Thruster Slide
Y- Axis = ESU -RT Linear Actuator
X- Axis = ESU -RT Linear Actuator
Advantages - Small footprint, high accuracy, high speed



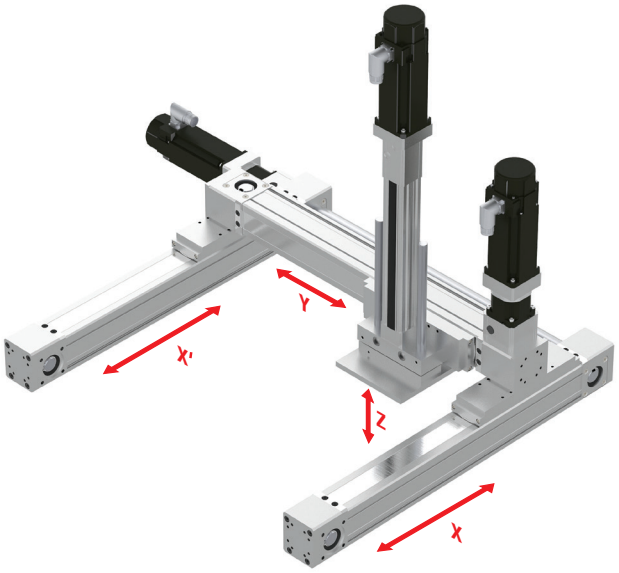
3-Axis Cartesian Robot, Retracting Arm Type

Z- Axis = ESCV Thruster Slide
Y- Axis = ESL Thruster Slide
X- Axis = ESU -RT Linear Actuator
Advantages - Small footprint, lower cost



3-Axis Cartesian Robot, Gantry Type

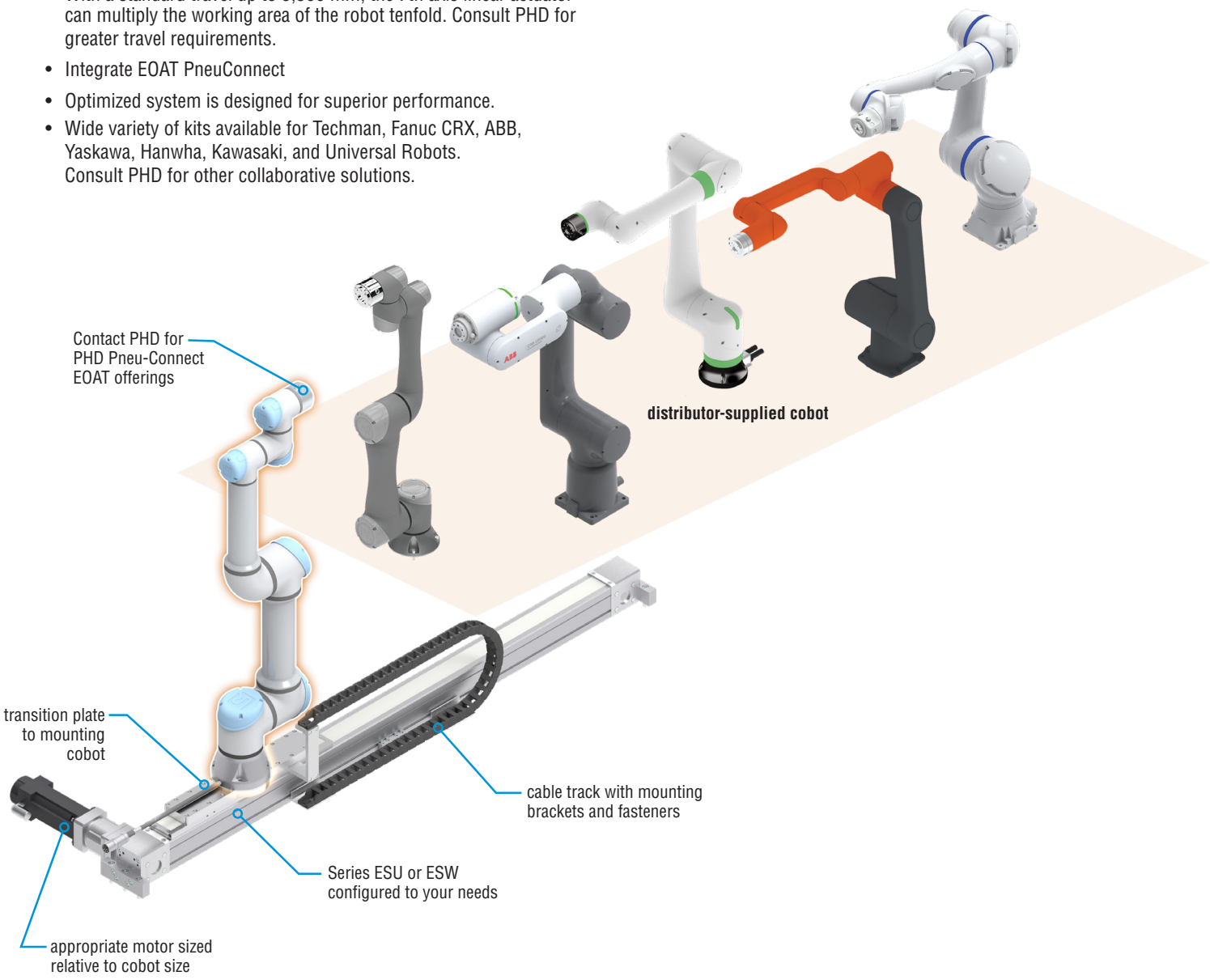
Z- Axis = ESCV Thruster Slide
Y- Axis = ESU -RT Linear Actuator
X- Axis = ESU -RT Linear Actuator
X- Axis = ESU -RT Linear Actuator
Advantages - Large working area, high payload, high speed



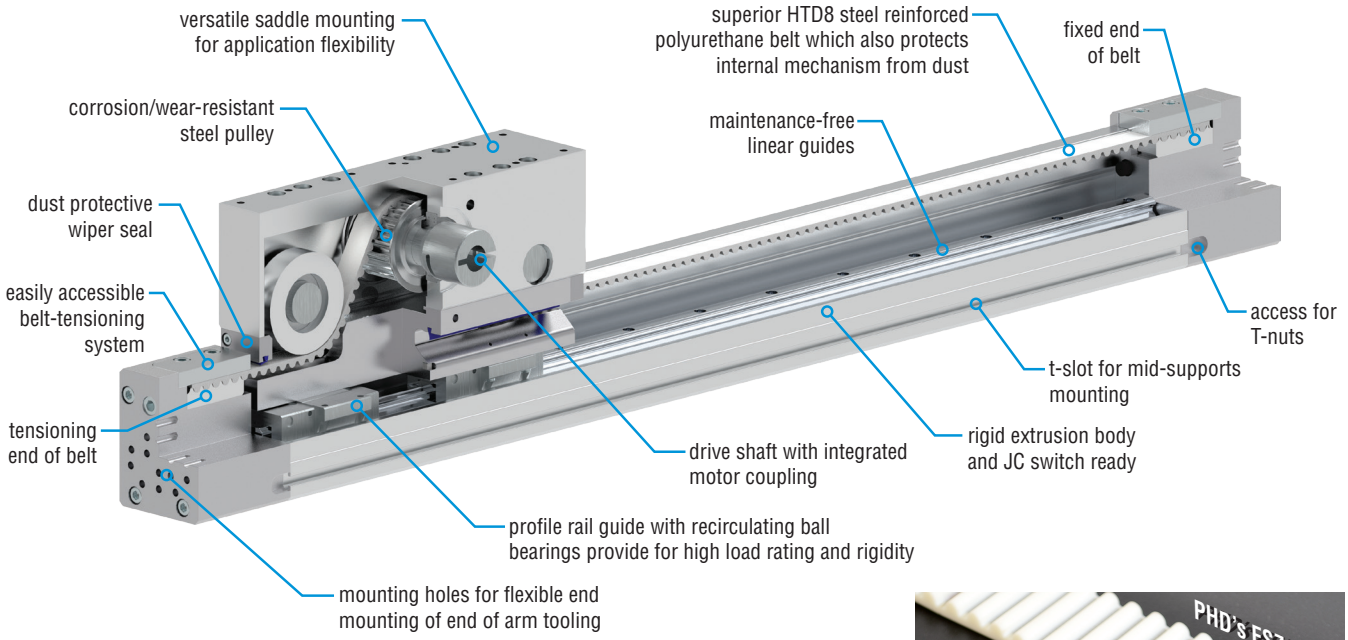
Robot Transfer Units for Cobots

DESCRIPTION AND BENEFITS

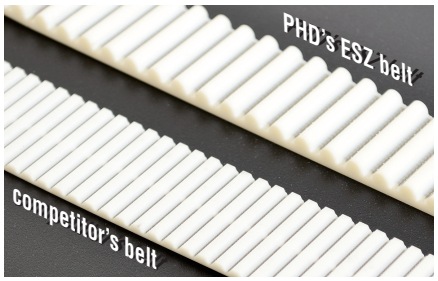
- The robust design of the Series ESU and ESW Electric Belt-Driven Linear Actuators provide a superior RTU (robot transfer unit) to support the robot in various orientations.
- Torque limiting servo-driven linear actuator can provide fault in case of collisions. Series ESx is not collaborative rated from PHD. Customer assumes the responsibility of risk assessment.
- With a standard travel up to 5,500 mm, the 7th axis linear actuator can multiply the working area of the robot tenfold. Consult PHD for greater travel requirements.
- Integrate EOAT PneuConnect
- Optimized system is designed for superior performance.
- Wide variety of kits available for Techman, Fanuc CRX, ABB, Yaskawa, Hanwha, Kawasaki, and Universal Robots. Consult PHD for other collaborative solutions.



Information about PHD's New Series ESW Heavy Duty Electric Linear Actuators



Your Motor Your Way

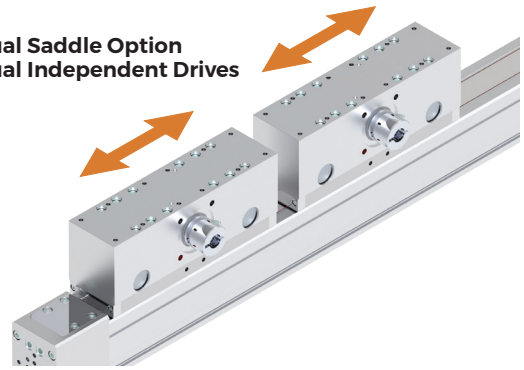


Major Benefits

- High-capacity rail bearing provides superior moment and load capability
- Integrated shaft coupling allows for a rigid connection and zero backlash
- Self-lubricating linear guides provide maintenance-free operation
- Travel lengths up to 2000 mm in fixed saddle applications, and 5,500 mm for fixed base applications.
- Maximum speed 5000 mm/s, acceleration 50 m/s^2
- Superior HTD8 steel-reinforced polyurethane belt for uniform load distribution, precise tooth engagement, and improved performance
- Easy access belt tensioning system
- Rigid construction with low backlash
- High degree of repeatability
- Switch ready as standard
- Mid-support(s) mounting for long travels and high payloads in traditional fixed base applications
- Dual saddle option for higher load/moment loading capabilities
- A model with two independently driven saddles is available for gripping/pick and place applications.

Dual Saddle Option
Single Drive

Dual Saddle Option
Dual Independent Drives



SERIES
Z - Rodless Linear Cantilever Actuator, Vertical Axis

CLASSIFICATION
Electromechanical

DESIGN NO.
5 - Metric

SIZE
5
6

MOTOR CONFIGURATION
QL11 - Inline with 1:1 Ratio (Standard)

MOTOR MOUNT CODE
Wxxxx - Open Architecture
W0000 - Blank motor mount
BLANK - Slide Only (No Motor Mount)

ESZ S 5 5 x 300 - RTxxx - QL11 - H71 - Wxxxx - KSxxx

PRODUCT
S - Slide

TYPE
S - Single Saddle
D - Dual In-line Saddle (One Driving, One Driven)
G - Dual In-line Saddle (Both Driving)

TRAVEL
50 mm minimum travel in 50 mm increments
Belt (-RT)

Size	Max (mm) Fixed Saddle	Fixed Base
5	2000	5500
6	2000	5500

DRIVE MODE (BELT)
RT160 (5)
RT192 (6)

DRIVE SHAFT ORIENTATION (RT ONLY)
BLANK - Right Hand (Standard)
H71 - Left Hand

END/MID SUPPORTS
Head Support Qty
KS**0**xx or KS**1**xx
Qty Support (Max 1)
Mid Support Qty
KSx**0**x to KSx**9**x
Qty Support (Max 9)
See Options page for recommended spacing
Cap Support Qty
KSxx**0** or KSxx**1**
Qty Support
(Max 1, Motor End)

NOTE: -KS supports are only needed in fixed base applications.

SWITCH BUNDLE (OPTIONAL)
- SCNK2

SWITCH SERIES
C - JC1SDx-x Series Single Position

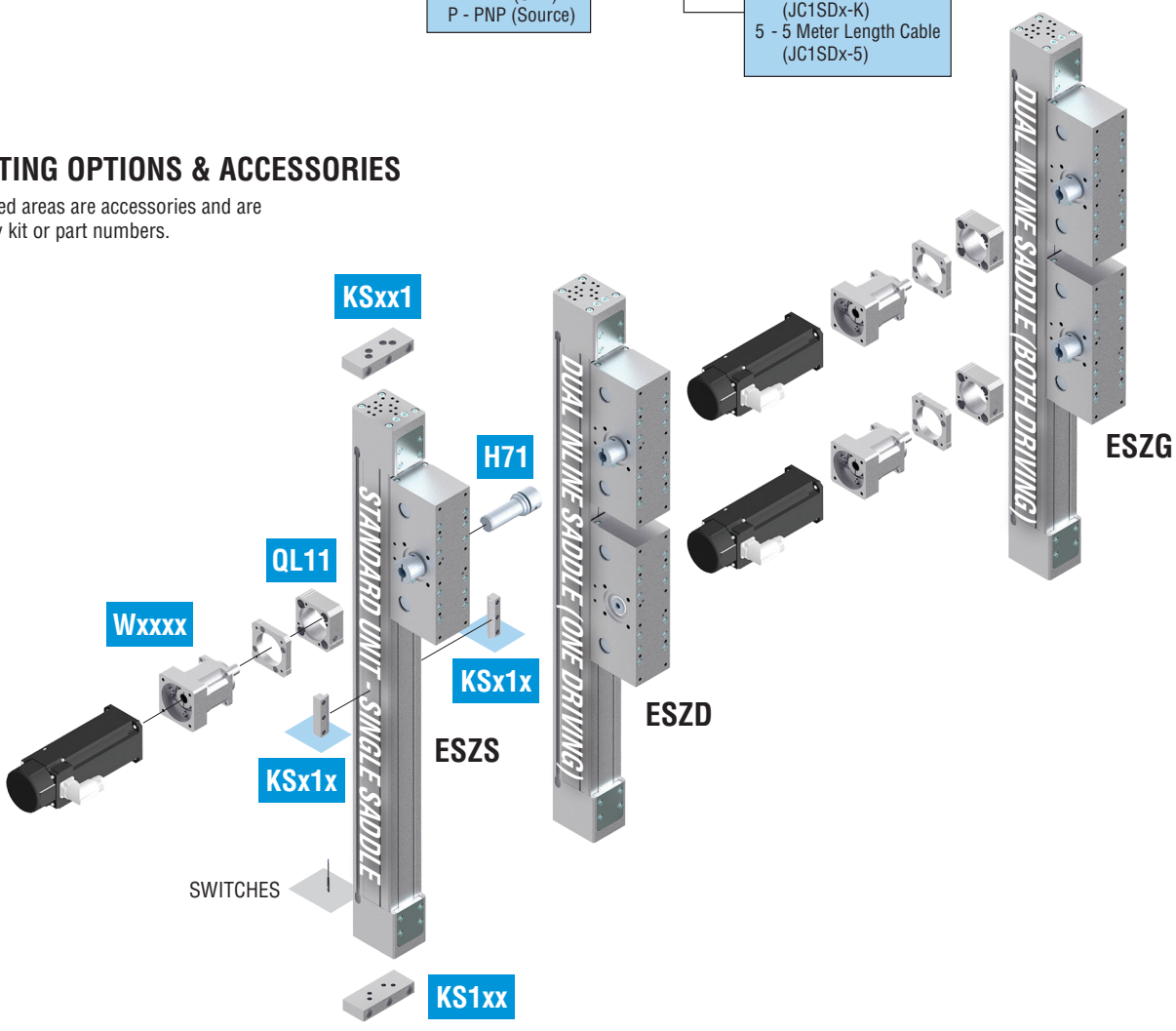
QUANTITY
1 to 9 (JC1SDx-x)

SWITCH CIRCUITRY
N - NPN (Sink)
P - PNP (Source)

CABLE TYPE
K - Quick Connect only (JC1SDx-K)
5 - 5 Meter Length Cable (JC1SDx-5)

MOUNTING OPTIONS & ACCESSORIES

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

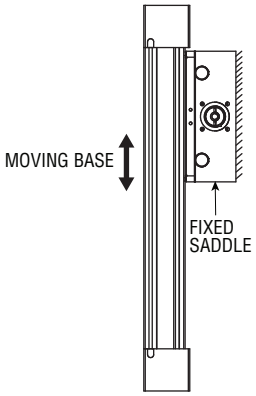


SPECIFICATIONS	SIZE 5	SIZE 6
REPEATABILITY	±0.05 mm [±0.002 in]	
TRAVEL TOLERANCE	+2.5 mm/ -0.0 mm [+0.100 in/ -0.000 in]	
DUTY CYCLE	100%	
OPERATING TEMPERATURE	4 - 65°C [40 - 150°F]	
LUBRICATION INTERVAL	Factory lubricated for life	
ENCAPSULATION CLASS	IP40	

	SPECIFICATIONS		SIZE 5	SIZE 6
MECHANICS	DRIVE MECHANISM		Timing Belt	
	GUIDE		Recirculating Ball- Linear Motion Guide & Rail system	
	MAX TRAVEL	mm [in]	Fixed Saddle: 2000 [78.740], Fixed Base: 5500 [216.535]	
	BELT		HTD8	
	PITCH (LINEAR TRAVEL PER REVOLUTION)	mm [in]	160 [6.3]	192 [7.56]
	PULLEY DIAMETER	mm [in]	50.93 [2.005]	61.12 [2.406]
SPEED	MAXIMUM SPEED	mm/sec [in/sec]	5000 [197]	
	MAXIMUM ACCELERATION	m/sec^2 [in/sec^2]	50 [1970]	
THRUST	MAXIMUM THRUST	N [lbf]	1600 [360]	3330 [748]
TORQUE	PERMISSIBLE DRIVE TORQUE	Nm [in-lb]	41 [360]	102 [901]
	NO-LOAD TORQUE	Nm [in-lb]	2.5 [23]	3.2 [29]

SPECIFICATIONS					SIZE 5			SIZE 6		
					Single Saddle - S	Dual - D	Dual - G	Single Saddle -S	Dual - D	Dual - G
WEIGHT	TOTAL ACTUATOR WEIGHT	@ ZERO TRAVEL (W_{OT})		lb	22.713	36.787	37.145	47.603	77.195	77.758
				kg	10.289	16.664	16.827	21.564	34.969	35.224
		LENGTH ADDER (W_{LT})		lb/in	0.351			0.566		
				kg/mm	6.26×10^{-3}			1.01×10^{-2}		
	MOVING WEIGHT	@ ZERO TRAVEL (W_{OM})	FIXED SADDLE	lb	11.147	14.619	14.619	22.808	29.457	29.457
				Kg	5.050	6.622	6.622	10.332	13.344	13.344
			FIXED BASE	lb	11.566	21.280	22.526	24.795	45.656	48.300
				Kg	5.239	9.640	10.204	11.232	20.682	21.880
		LENGTH ADDER (W_{LM})	FIXED SADDLE	lb/in	0.351			0.566		
				kg/mm	0.006			0.010		
			FIXED BASE	lb/in	—			—		
				kg/mm	—			—		
INERTIA	STANDARD- ACTUATOR @ ZERO TRAVEL (J_O)			$lb\text{-}in^2$	11.204	—	—	33.016	—	—
				$[kg\text{-}m^2]$	3.27×10^{-3}	—	—	9.65×10^{-3}	—	—
	DUAL SADDLE- ACTUATOR @ ZERO TRAVEL (J_O)	FIXED SADDLE		$lb\text{-}in^2$	—	14.694	14.694	—	42.642	42.642
				$[kg\text{-}m^2]$	—	4.29×10^{-3}	4.29×10^{-3}	—	1.25×10^{-2}	1.25×10^{-2}
		FIXED BASE		$lb\text{-}in^2$	—	21.389	22.642	—	66.090	69.918
				$[kg\text{-}m^2]$	—	6.25×10^{-3}	6.62×10^{-3}	—	1.93×10^{-2}	2.04×10^{-2}
	LENGTH ADDER (J_L)			$lb\text{-}in^2$ /in	0.353			0.820		
				$kg\text{-}m^2$/mm	4.06×10^{-6}			9.43×10^{-6}		
	MOVING WEIGHT ADDER			$lb\text{-}in^2$/in	1.005			1.448		
				$kg\text{-}m^2$/kg	6.48×10^{-4}			9.34×10^{-4}		

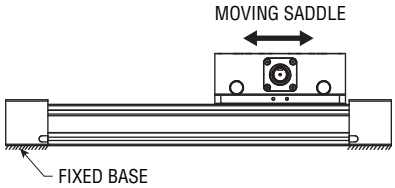
NOTE: STRONGLY RECOMMENDED: ORDERED TRAVEL = WORKING TRAVEL + SAFETY TRAVEL ON BOTH ENDS

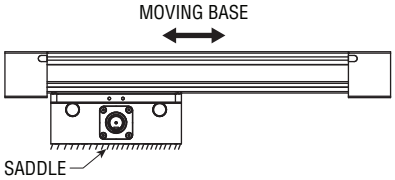


WEIGHT AND INERTIAL CALCULATIONS:

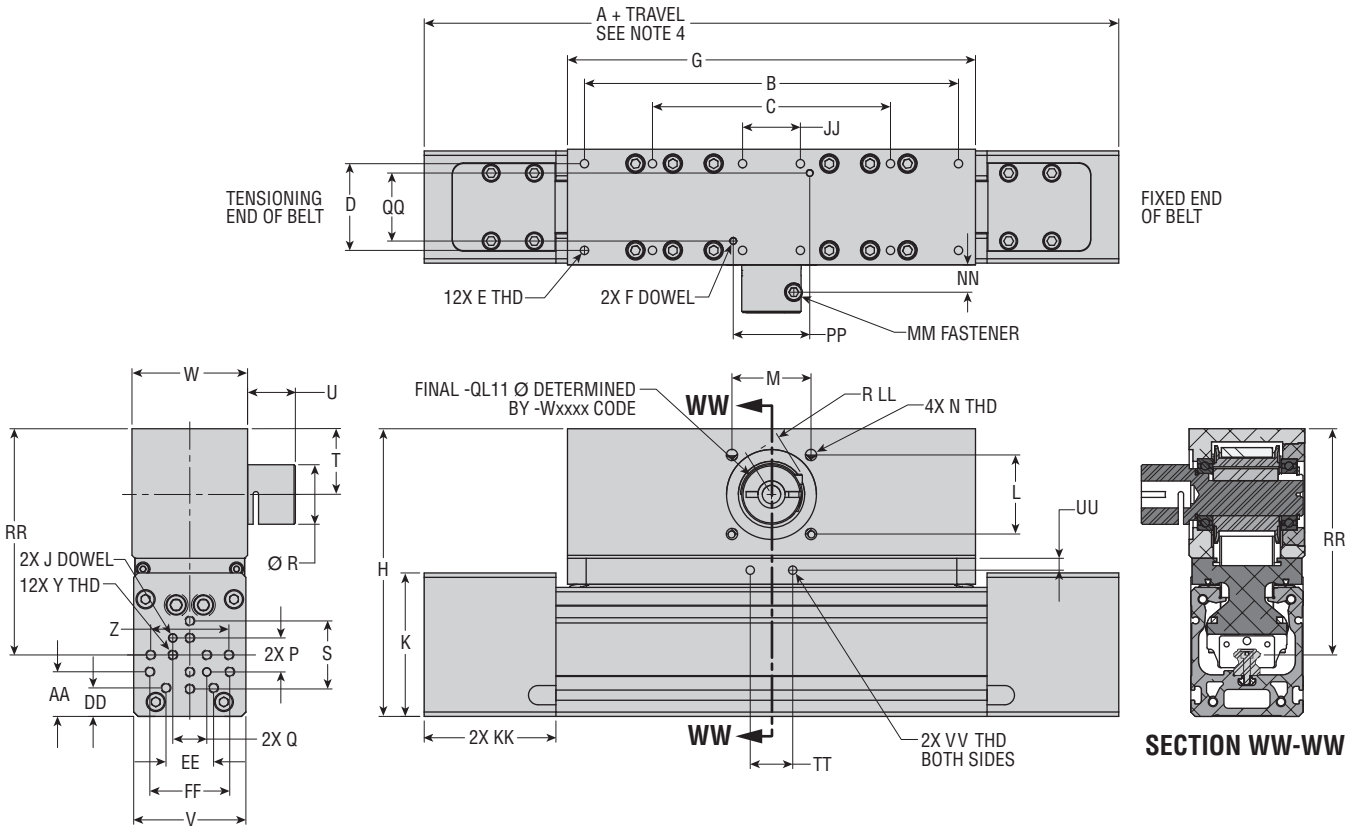
TOTAL WEIGHT = W_{OT} + (W_{LT} x TRAVEL) + MOTOR MOUNT WEIGHT
TOTAL MOVING WEIGHT = W_{OM} + (W_{LM} x TRAVEL) + EXTERNAL PAYLOAD

INERTIA $_{Reflected}$ = J_O + (J_L x TRAVEL) + (J_M x TOTAL MOVING WEIGHT)





STANDARD UNIT



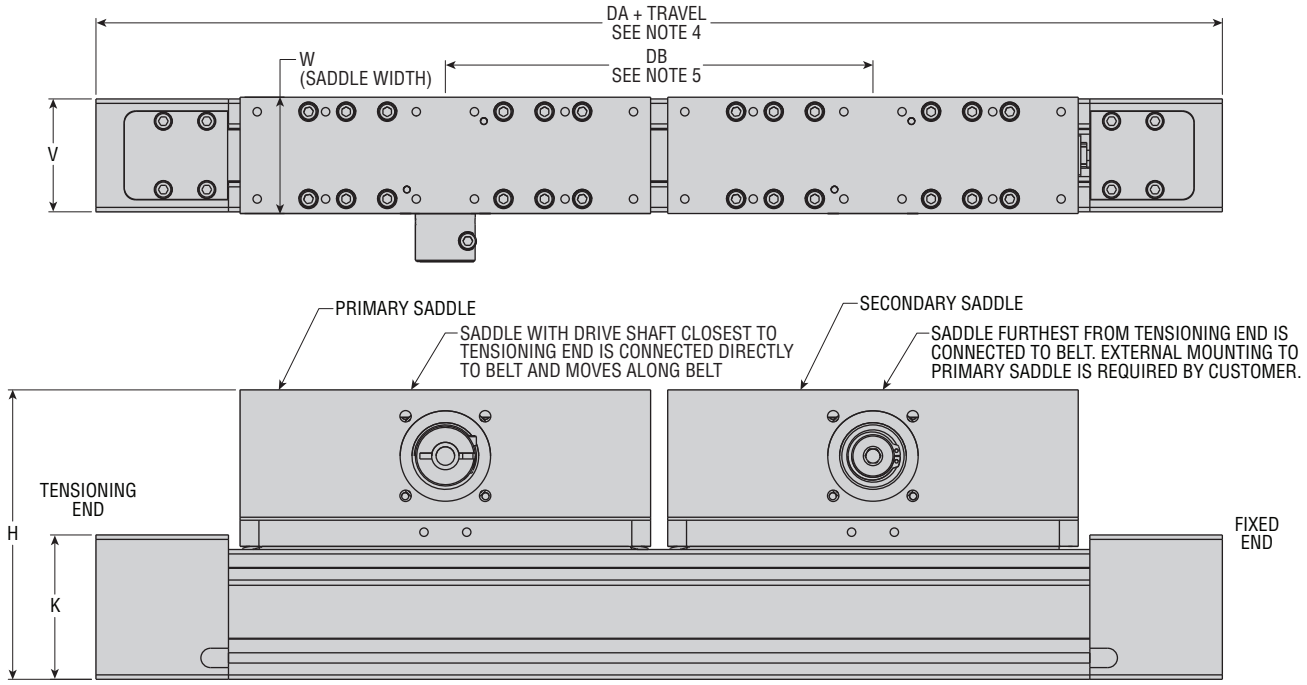
SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W
5	408.5	220.0	140.0	51.0	M6 x 1 x 10 ↧	4 x 4 ↧	240.0	169.2	5 x 10 ↧	84.4	46.5	46.5	M8 x 1.25 x 12 ↧	20.0	20.0	35.0	40.0	38.7	28.1	66.0	68.0
6	514.0	220.0	135.0	72.0	M6 x 1 x 10 ↧	5 x 5 ↧	287.0	225.5	5 x 10 ↧	107.9	46.5	46.5	M8 x 1.25 x 12 ↧	30.0	30.0	42.0	60.0	47.7	31.4	86.0	98.5

SIZE	Y	Z	AA	DD	EE	FF	JJ	KK	LL	MM	NN	PP	QQ	RR	TT	UU	VV
5	M6 x 1 x 12 ↧	46.0	26.3	16.8	28.0	47.0	34.0	77.5	21.4	M6 x 1	16.1	45.0	40.0	133.0	25.0	7.0	M6 x 1 x 8 ↧
6	M8 x 1.25 x 16 ↧	60.0	30.1	18.1	40.0	64.0	50.0	105.0	24.3	M6 x 1	15.9	50.0	50.0	182.7	25.0	7.0	M6 x 1 x 8 ↧

NOTES:
1) DIMENSIONS: mm
2) SADDLE SHOWN IN MID POSITION
3) UNIT SHOWN IS REPRESENTATIVE OF AN ESZS55 WITH 0 mm TRAVEL
4) PHD RECOMMENDS TO ADD 50 mm TO THE TOTAL WORKING TRAVEL FOR SAFETY (25 mm PER END)

All dimensions are reference only unless specifically toleranced.

DUAL SADDLE (ONE DRIVING)



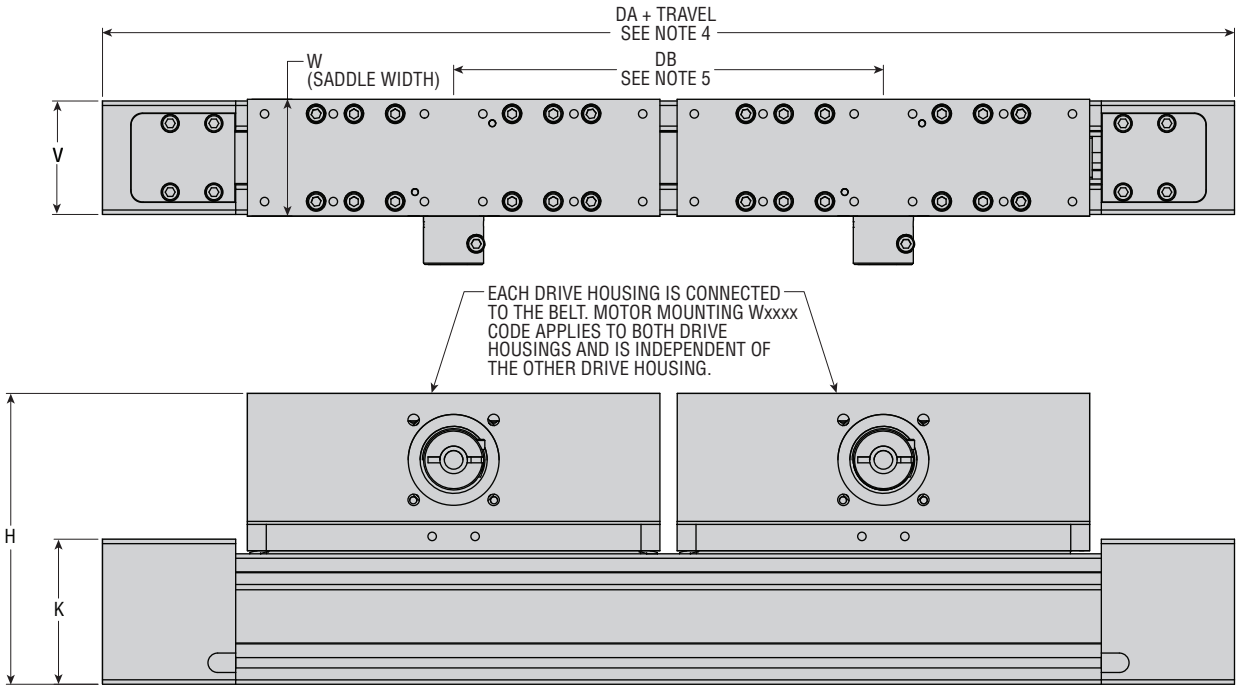
REFER TO SERIES ESZS DIMENSIONS PAGE FOR DATA NOT SHOWN

NOTES:
1) DIMENSIONS: mm
2) SADDLES SHOWN IN MID POSITION
3) UNIT SHOWN IS REPRESENTATIVE OF AN ESZD55 WITH 0 mm TRAVEL
4) PHD RECOMMENDS TO ADD 50 mm TO THE TOTAL WORKING TRAVEL FOR SAFETY (25 mm PER END)
5) SADDLE TO SADDLE DISTANCE SHOWN IS THE MINIMUM ALLOWED BETWEEN SADDLES. IF ADDITIONAL DISTANCE BETWEEN SADDLES IS REQUIRED, ADD APPROPRIATE LENGTH TO TOTAL TRAVEL IN 50 mm INCREMENTS
   EXAMPLES:
   SIZE 5 WITH 500 mm TRAVEL WITH STANDARD "DB" DISTANCE OF 250 mm
   ESZD55 x 500 -RTxxx (NO ADDITIONAL STROKE ADDER NEEDED)
   SIZE 5 WITH 500 mm TRAVEL WITH "DB" DISTANCE OF 350 mm
   ESZD55 x 600 -RTxxx (WILL NEED ADDITIONAL 100 mm STROKE ADDER) FOR AN END RESULT OF 500 mm TRAVEL

SIZE	DA	DB	H	K	V	W
5	658.5	250.0	169.2	84.4	66.0	68.0
6	814.0	300.0	225.5	107.9	86.0	98.5

All dimensions are reference only unless specifically toleranced.

DUAL SADDLE (BOTH DRIVING)



REFER TO SERIES ESZS DIMENSIONS PAGE FOR DATA NOT SHOWN

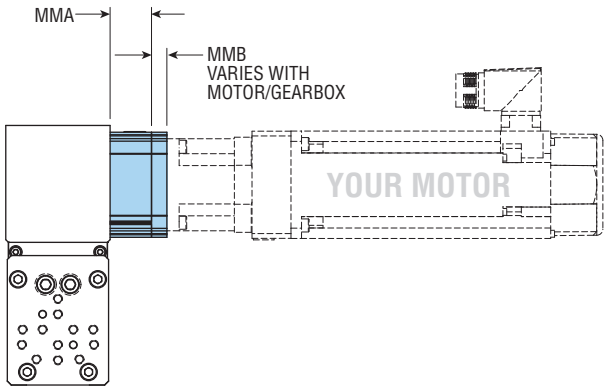
NOTES:
1) DIMENSIONS: mm
2) SADDLES SHOWN IN MID POSITION
3) UNIT SHOWN IS REPRESENTATIVE OF AN0 ESZG55 WITH 0 mm TRAVEL
4) PHD RECOMMENDS TO ADD 50 mm TO THE TOTAL WORKING TRAVEL FOR SAFETY (25 mm PER END)
5) SADDLE TO SADDLE DISTANCE SHOWN IS THE MINIMUM ALLOWED BETWEEN SADDLES. IF ADDITIONAL DISTANCE BETWEEN SADDLES IS REQUIRED, ADD APPROPRIATE LENGTH TO TOTAL TRAVEL IN 50 mm INCREMENTS
   EXAMPLES:
   SIZE 5 WITH 500 mm TRAVEL WITH STANDARD "DB" DISTANCE OF 250 mm
   ESZG55 x 500 -RTxxx (NO ADDITIONAL STROKE ADDER NEEDED)
   SIZE 5 WITH 500 mm TRAVEL WITH "DB" DISTANCE OF 350 mm
   ESZG55 x 600 -RTxxx (WILL NEED ADDITIONAL 100 mm STROKE ADDER) FOR AN END RESULT OF 500 mm TRAVEL

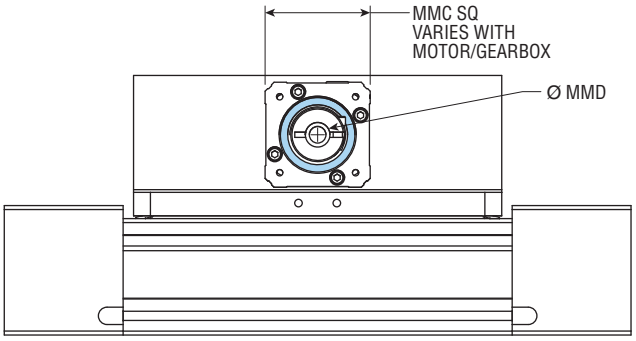
SIZE	DA	DB	H	K	V	W
5	658.5	250.0	169.2	84.4	66.0	68.0
6	814.0	300.0	225.5	107.9	86.0	98.5

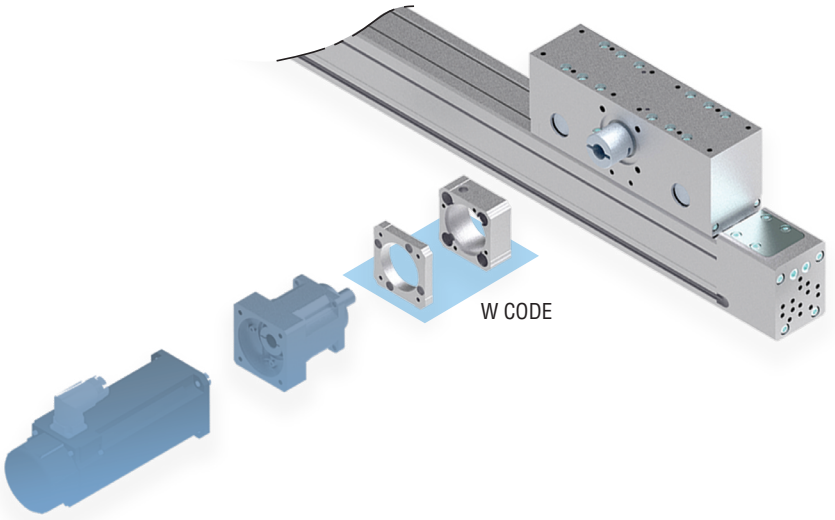
All dimensions are reference only unless specifically toleranced.

QL11 INLINE MOTOR MOUNTING WITH 1:1 DRIVE RATIO (STANDARD)

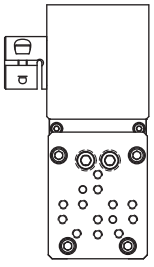
SIZE	-QL11						-QL11-W0000	
	MMA	MMB MAX	MMB MIN	MMC STANDARD	MMC OVERSIZE	WEIGHT kg	MMC	MMD
5	27.0	31.0	12.5	68.5	88.0	0.36	88.0	19.0
6	32.2	33.0	14.0	88.0	115.0	0.54	115.0	24.0

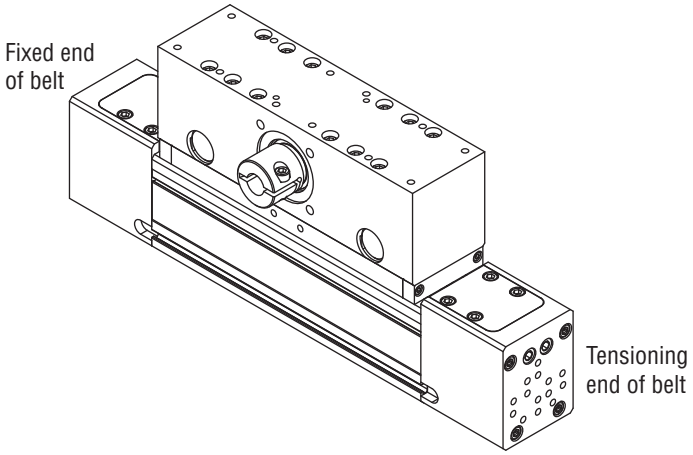






H71 LEFT HAND DRIVE SHAFT ORIENTATION





All dimensions are reference only unless specifically toleranced.

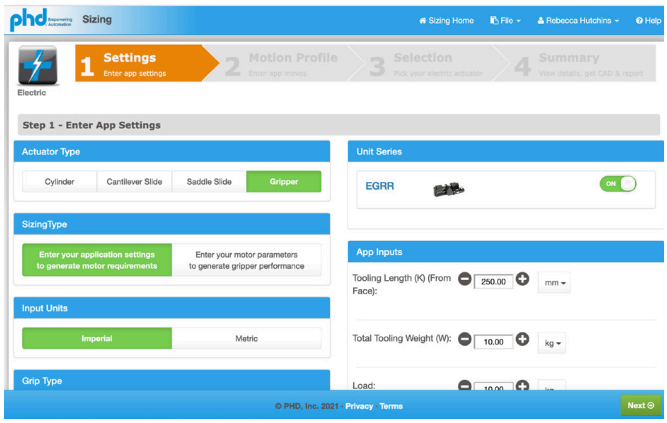
Wxxxx MOTOR MOUNT CODE

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

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

Your Motor Your Way

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



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

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

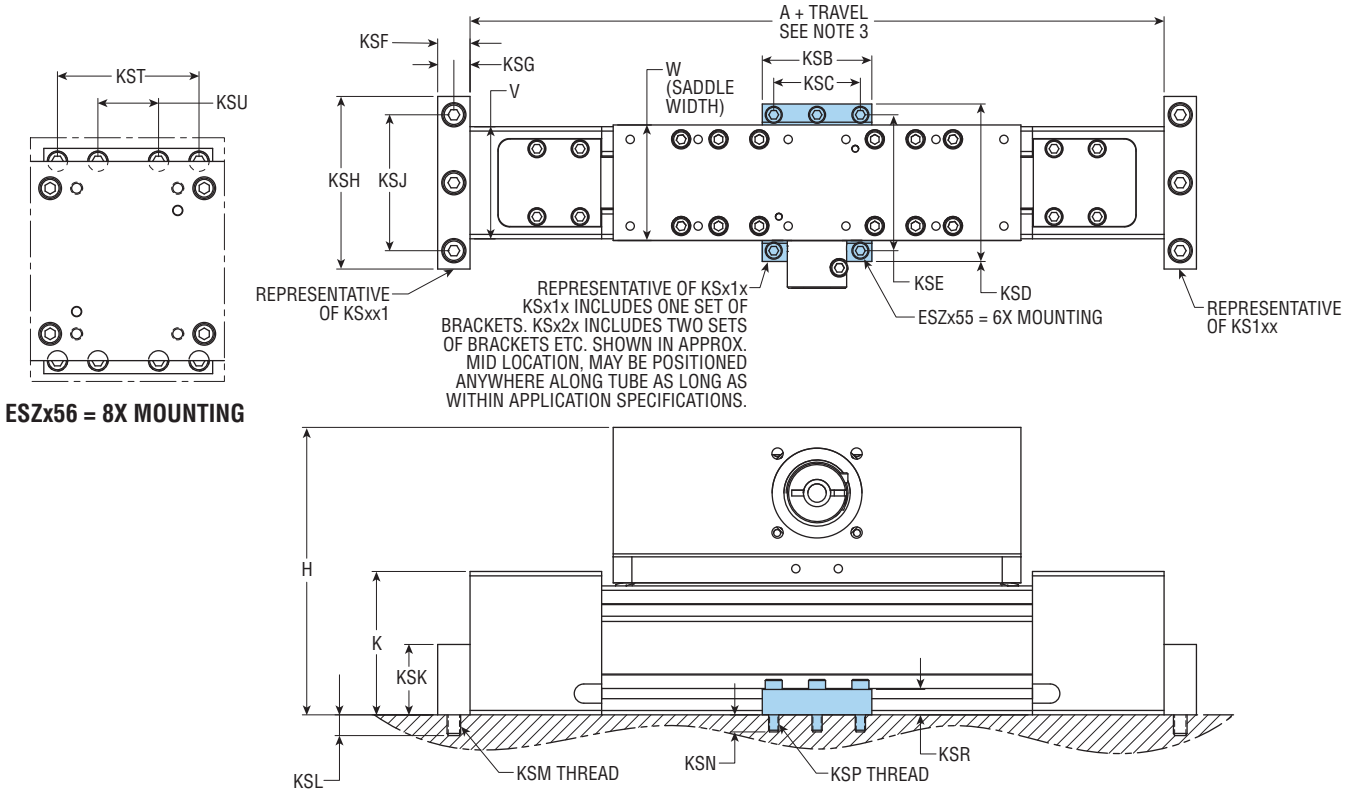
Step 2 - Motor Selection

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

Step 3 - CAD Configurator - config.phdinc.com

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

KSxxxx END AND MID MOUNTING



SIZE	A	H	K	V	W	KSB	KSC	KSD	KSE	KSF	KSG	KSH	KSJ	KSK	KSL	KSM	KSN	KSP	KSR	KST	KSU
5	408.5	169.2	84.4	66.0	68.0	64.5	51.0	92.7	80.0	19.1	9.5	101.6	80.0	41.4	12.2	M8 x 1.25	10.0	M6 x 1.0	15.0	—	—
6	514.0	225.5	107.9	86.0	98.5	83.5	—	112.7	100.0	25.4	12.7	152.4	100.0	42.8	17.8	M10 x 1.5	12.5	M6 x 1.0	27.5	70.0	30.0

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

All dimensions are reference only unless specifically toleranced.

Sxxxx SWITCH BUNDLE

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

SWITCH BUNDLE (OPTIONAL)

- S C N K 2

SWITCH SERIES
C - JC1SDx-x Series Single Position

SWITCH CIRCUITRY
N - NPN (Sink)
P - PNP (Source)

QUANTITY
1 to 9 (JC1SDx-x)

CABLE TYPE
K - Quick Connect only (JC1SDx-K)
5 - 5 Meter Length Cable (JC1SDx-5)

SERIES JC1SDx-x SINGLE POSITION MAGNETIC SWITCH

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

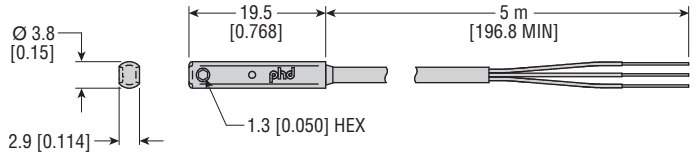
SERIES JC1SDx SINGLE POSITION SWITCHES

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

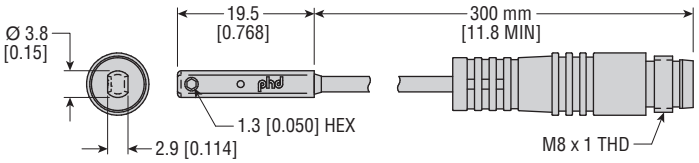
SERIES JC1SDx CORDSET

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

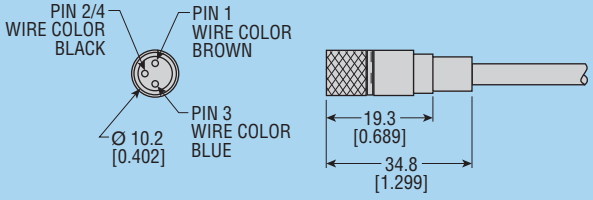
JC1SDx-5



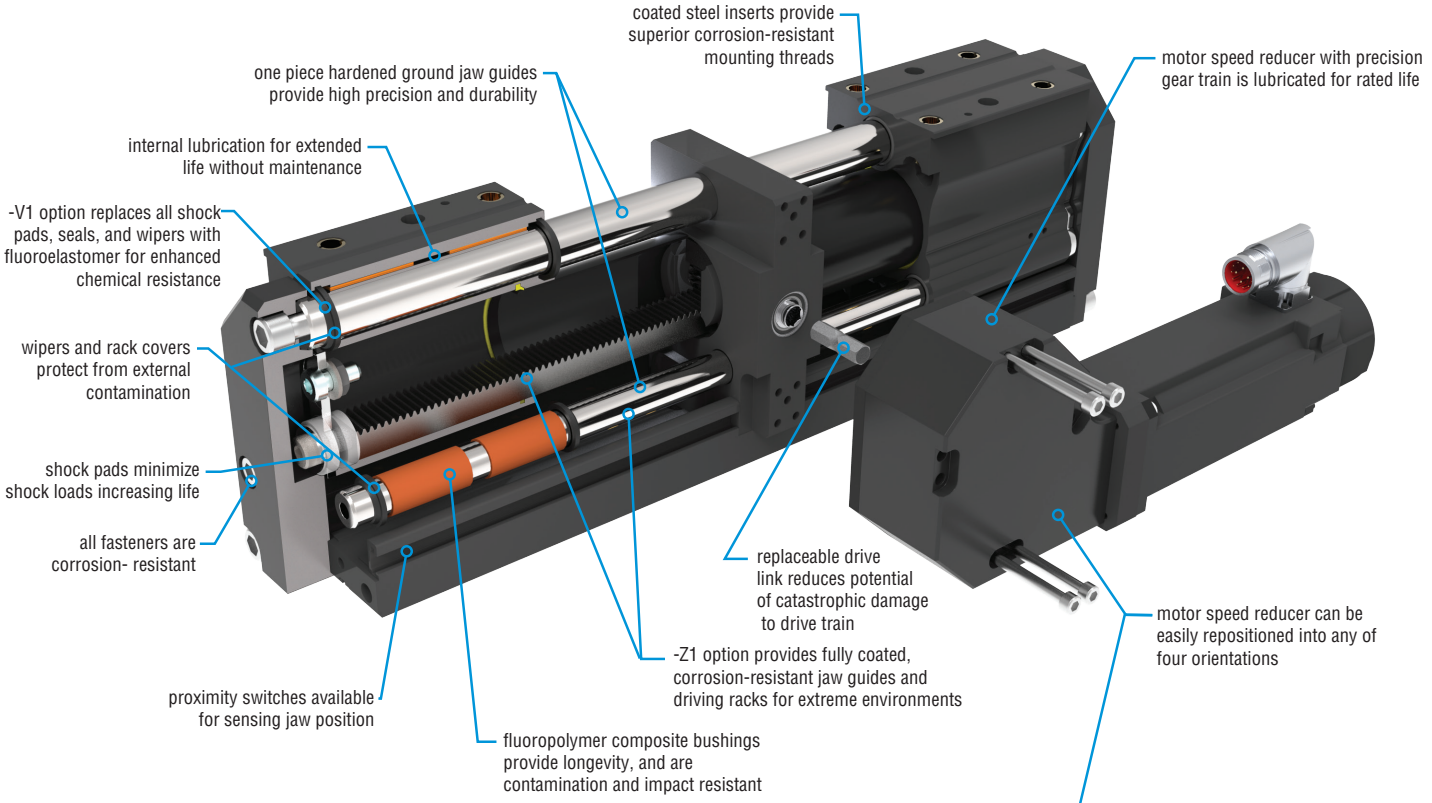
JC1SDx-K (Quick Connect)



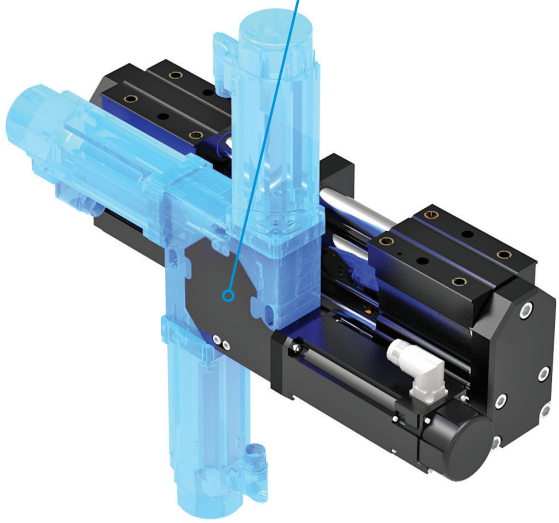
63549-xx CORDSET



All dimensions are reference only unless specifically toleranced.



Your Motor Your Way



Major Benefits

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

E	G	R	R	1	2	5	63	x	200	-	V1-Z1	-	RW151	-	Wxxxx

TYPE
Electromechanical

SERIES
R - Regular Duty

JAW STYLE
2

SIZE
63

TYPE
V1 - Fluoroelastomer seals and wipers
Z1 - Fully corrosion-resistant coating on jaw guides and drive racks
Fasteners are corrosion resistant as standard

MOTOR SPEED REDUCER
15:1

PRODUCT
Gripper

Long Travel, High Capacity Parallel Gripper

Synchronized, Standard Grip

DESIGN NO.
1 - Imperial
5 - Metric
See Note

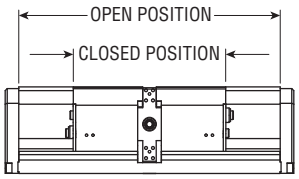
JAW TRAVEL

mm	in
150	5.906
200	7.874
250	9.843
300	11.811
350	13.780

Home positioning may reduce usable travel

MOTOR MOUNT CODE
Wxxxx - Open architecture part number code (configure code online)
W0000 - Blank Motor Mount

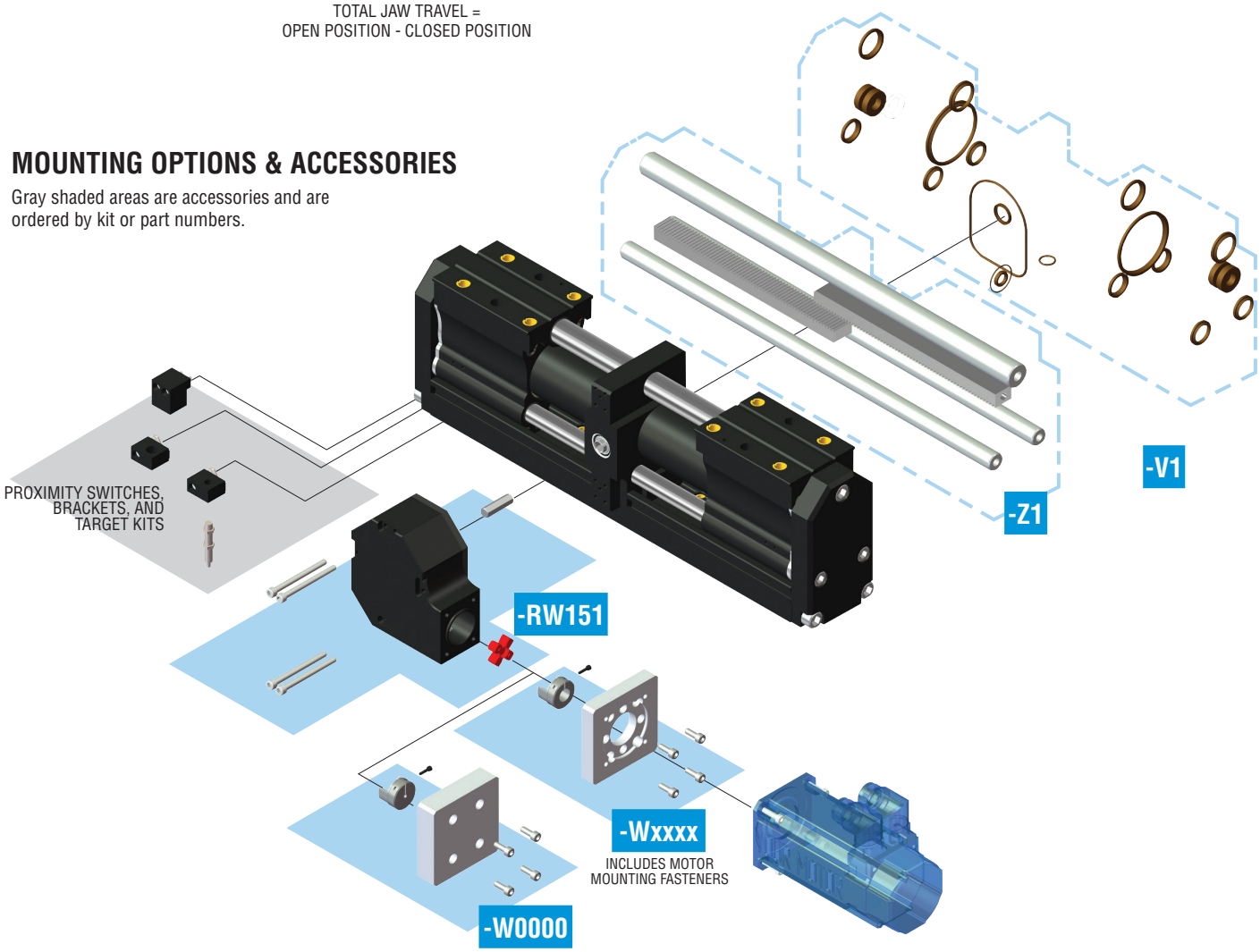
NOTE: Design Number dictates imperial or metric mountings. Dowel pin holes are metric regardless of design number.



TOTAL JAW TRAVEL =
OPEN POSITION - CLOSED POSITION

MOUNTING OPTIONS & ACCESSORIES

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



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

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

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

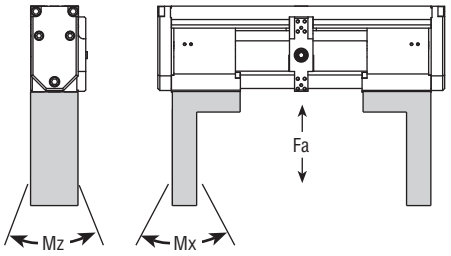
* Grip force varies with tooling length

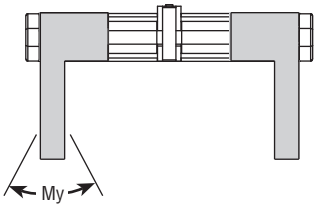
**Time factors assume a total jaw acceleration and deceleration of 1G (0.5 G per jaw) to and from jaw running speed

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

MAXIMUM ALLOWABLE FORCES AND MOMENTS

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





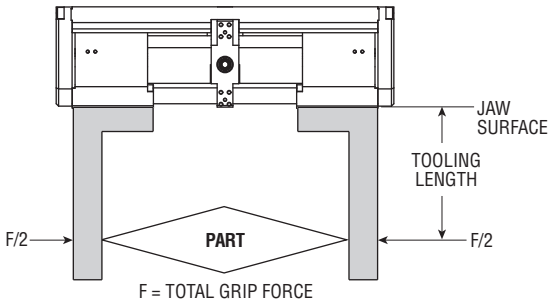
Fa: Total for both jaws
Mx: Allowable moment per jaw, measured from jaw mounting surface
My: Allowable moment per jaw, measured from geometric center of jaw
Mz: Allowable moment per jaw, measured from jaw mounting surface

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

MOMENT VALUES ASSUME THE USE OF ALL THREADED MOUNTING HOLES.

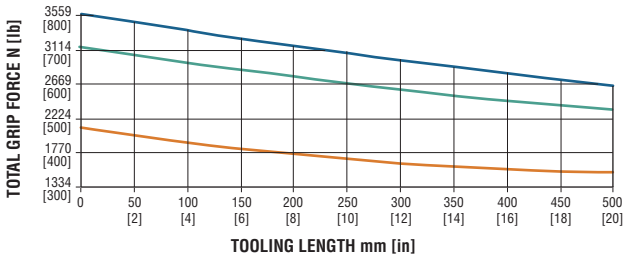
GRIP FORCE

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

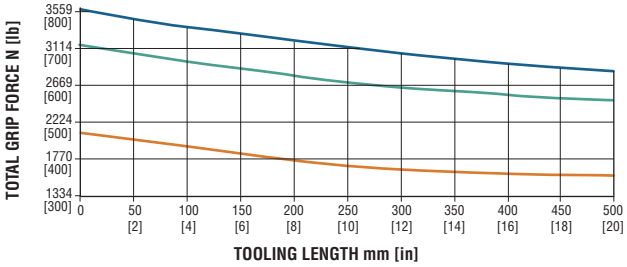


*Maximum rated performance

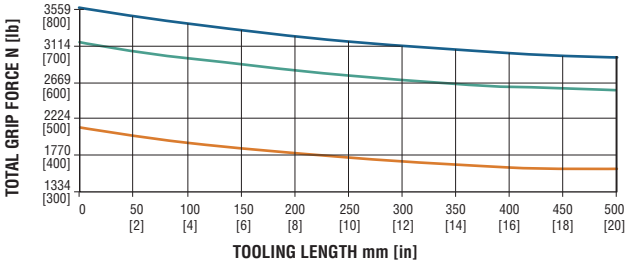
150 mm TRAVEL



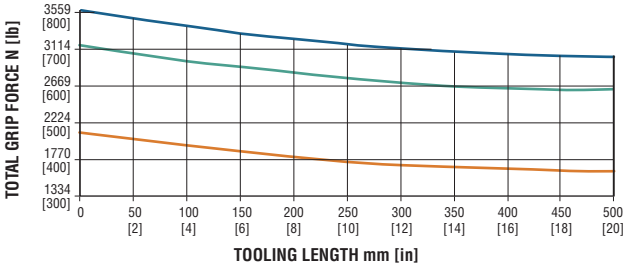
200 mm TRAVEL



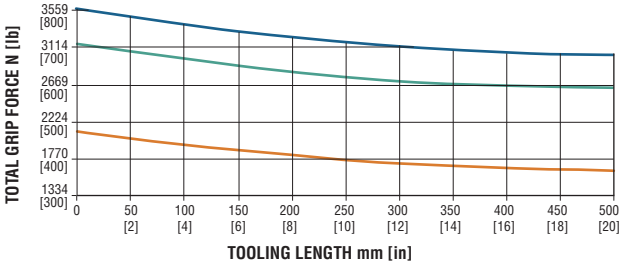
250 mm TRAVEL



300 mm TRAVEL



350 mm TRAVEL

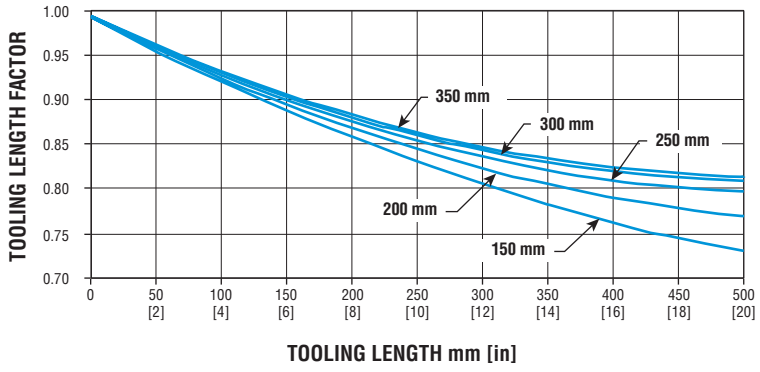


TOOLING LENGTH FACTOR

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

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

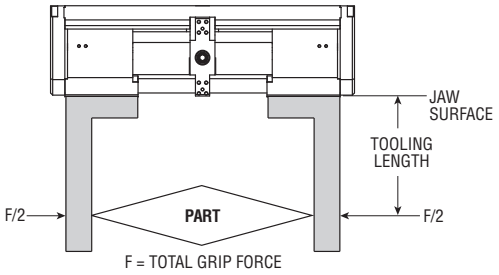
TOOLING LENGTH DERATING FACTOR



GRIP FORCE EQUATIONS:

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

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



GRIP FORCE CALCULATION EXAMPLE:

Gripper: Series EGRR Size 63 x 200
Common Parameters:
Input Torque = 3.4 Nm [30 in-lb]
Tooling Length = 254 mm [10 in]

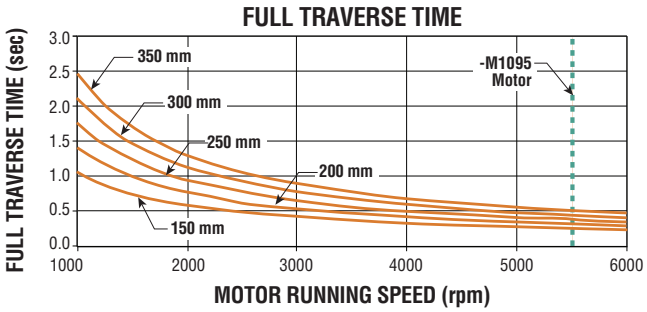
1. **Determine Grip Force Factor G_F** = 937 [23.8] (from table on page 82)
2. **Determine Tooling Length Factor** = 0.84 [0.84] (from Tooling Length Factor graph on page 83)
3. **Total Grip Force Calculations:**

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

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

FULL TRAVERSE TIME

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



FULL TRAVERSE TIME EQUATION:

TIME (sec) = [C_F1 ÷ Running Speed (rpm)] + [Running Speed (rpm) ÷ 69120]

FULL TRAVERSE TIME CALCULATION EXAMPLE:

Gripper: Series EGRR Size 63 x 200

Common Parameters:

Motor Running Speed = 5500 rpm

1. **Determine Time Factors:**

   C_F = 1410 (from table on page 82)

2. **Release Time Calculations:**

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

   Open or Close Time = [1410 ÷ 5500 rpm] + [5500 rpm ÷ 69120] = 0.336 sec

JAW TRAVEL EQUATIONS:

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

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

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

JAW TRAVEL CALCULATION EXAMPLE:

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

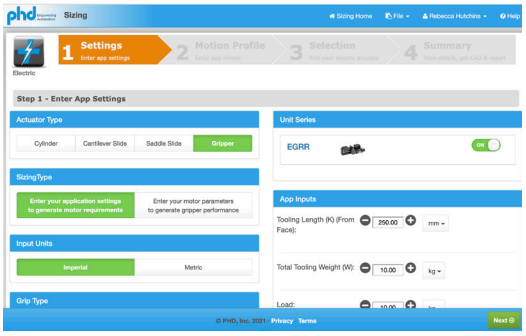
Common Parameters:

Motor Rotation = 2 rev

1. **Determine Jaw Travel Factor J_T** = 8.512 [0.335] (from table on page 82)
2. **Jaw Travel Calculations:**

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

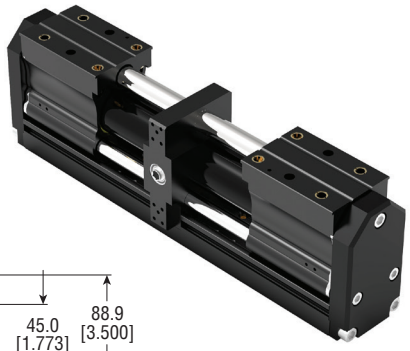
   Total Jaw Travel = 2 rev x 8.512 = 17.024 mm [2 rev x 0.335 = 0.670 in]

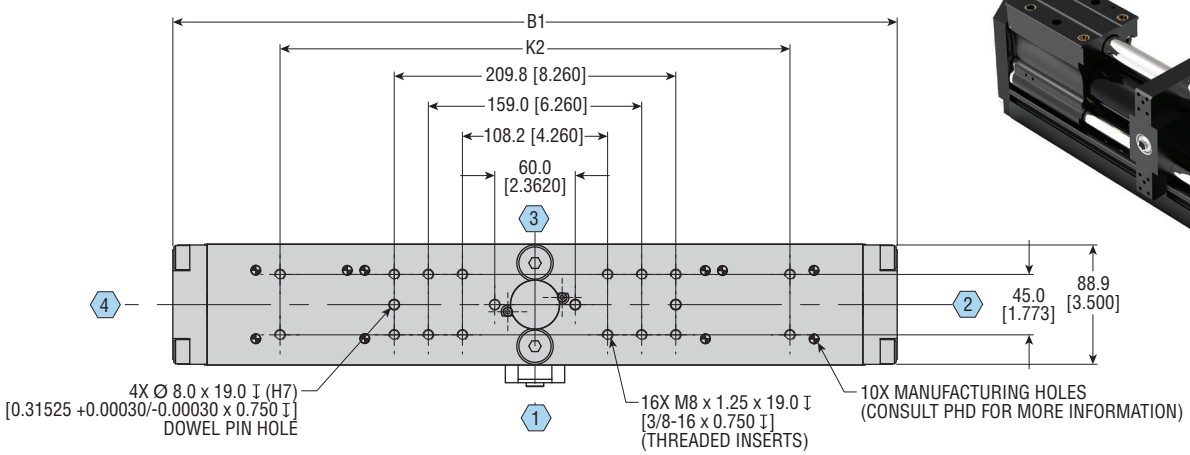


Series EGRR Sizing Software

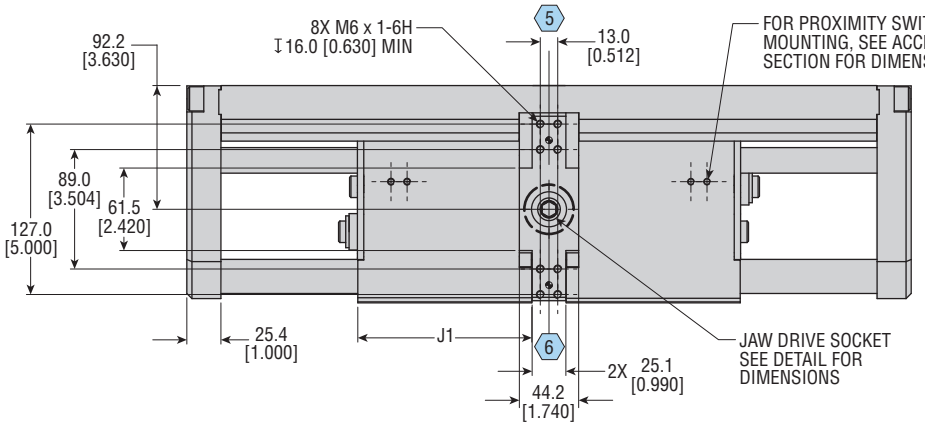
Engineering requirements, concept and detail design

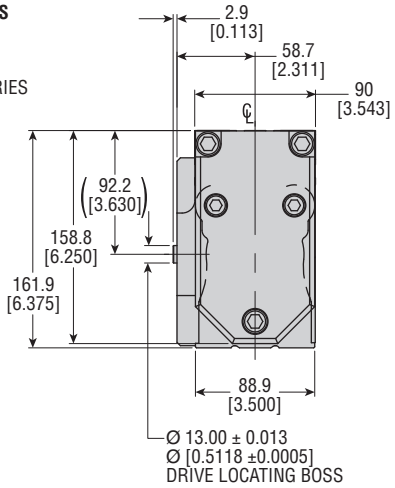
size.phdinc.com

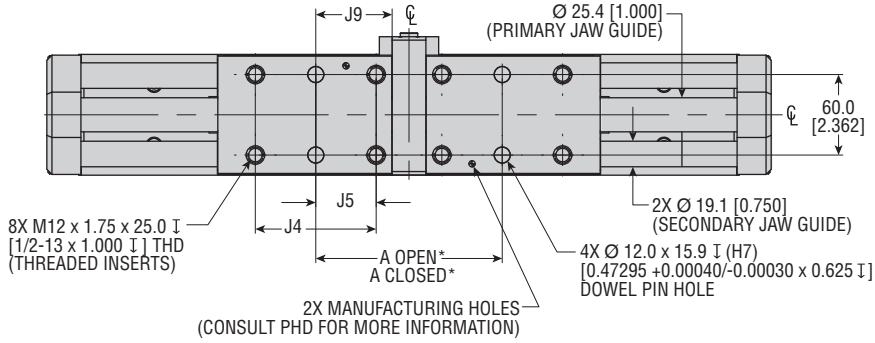


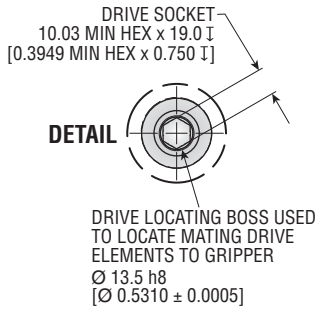


MOMENT CAPABILITY REQUIRES USE OF ALL THREADED MOUNTING HOLES









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

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

Z1 CORROSION-RESISTANT

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

V1 FLUORO-ELASTOMER SEALS

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

RW151 MOTOR SPEED REDUCER

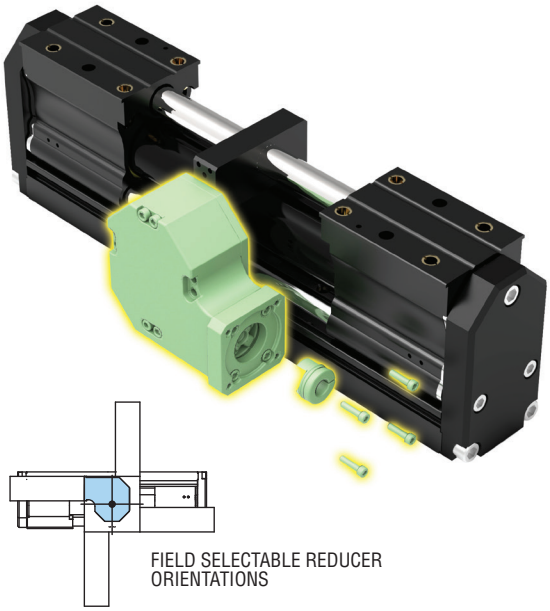
A 15:1 drive ratio motor speed reducer is installed onto the gripper. The reducer is factory lubricated for the rated life of the gripper. The motor speed reducer provides a convenient means of matching the output torque and shaft speed of many motors to the input requirements of the gripper.

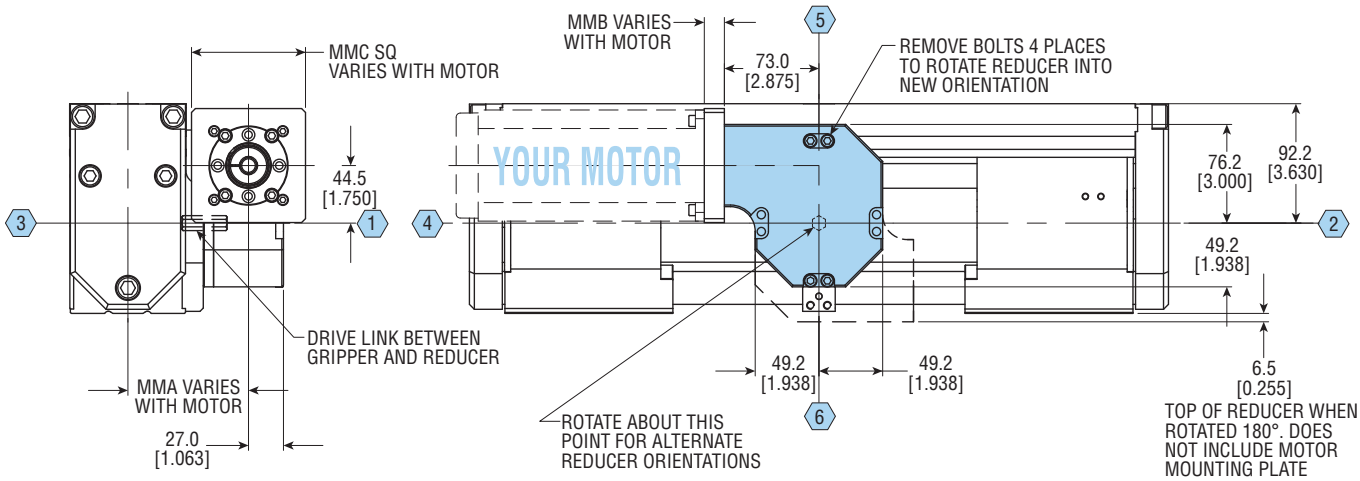
The reducer must be ordered with a motor mounting code. See page 95 for details.

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

Use **-W0000** motor mount code to order a motor mount intended for customer modification. See page 87.

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





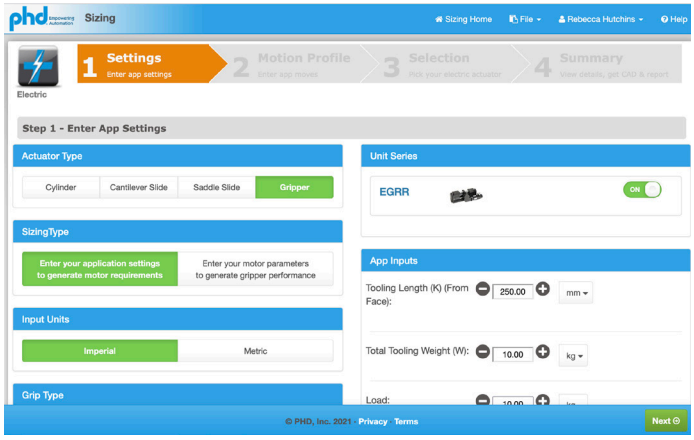
OPTION	MMA				MMB				MMC SQUARE			
	STANDARD		OVERSIZED		STANDARD		OVERSIZED		STANDARD		OVERSIZED	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Wxxxx*	93.6	3.685	111.6	4.394	11.0 MIN	0.433 MIN	11.0 MIN	0.433 MIN	88.0	3.465	130	5.118
W0000	93.6	3.685	–	–	22.6	0.890	–	–	88.0	3.465	–	–

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

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.



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

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

Step 2 - Motor Selection

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

Step 3 - CAD Configurator - config.phdinc.com

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

Your Motor Your Way

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

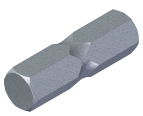
DRIVE LINK

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

DRIVE LINK KIT

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

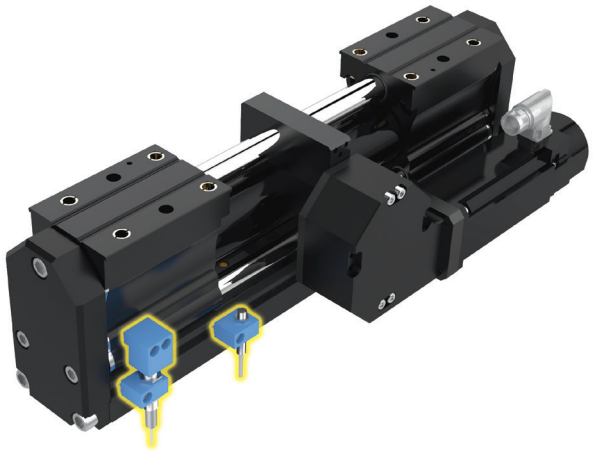
Kit includes one drive link and installation instructions



PROXIMITY SWITCHES - EXTERNAL

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

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



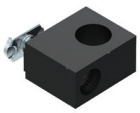
8 mm THREADED INDUCTIVE PROXIMITY SWITCHES

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

8 mm & 12 mm THREADED INDUCTIVE PROXIMITY SWITCH TARGET KIT

CORROSION-RESISTANT
74994-33

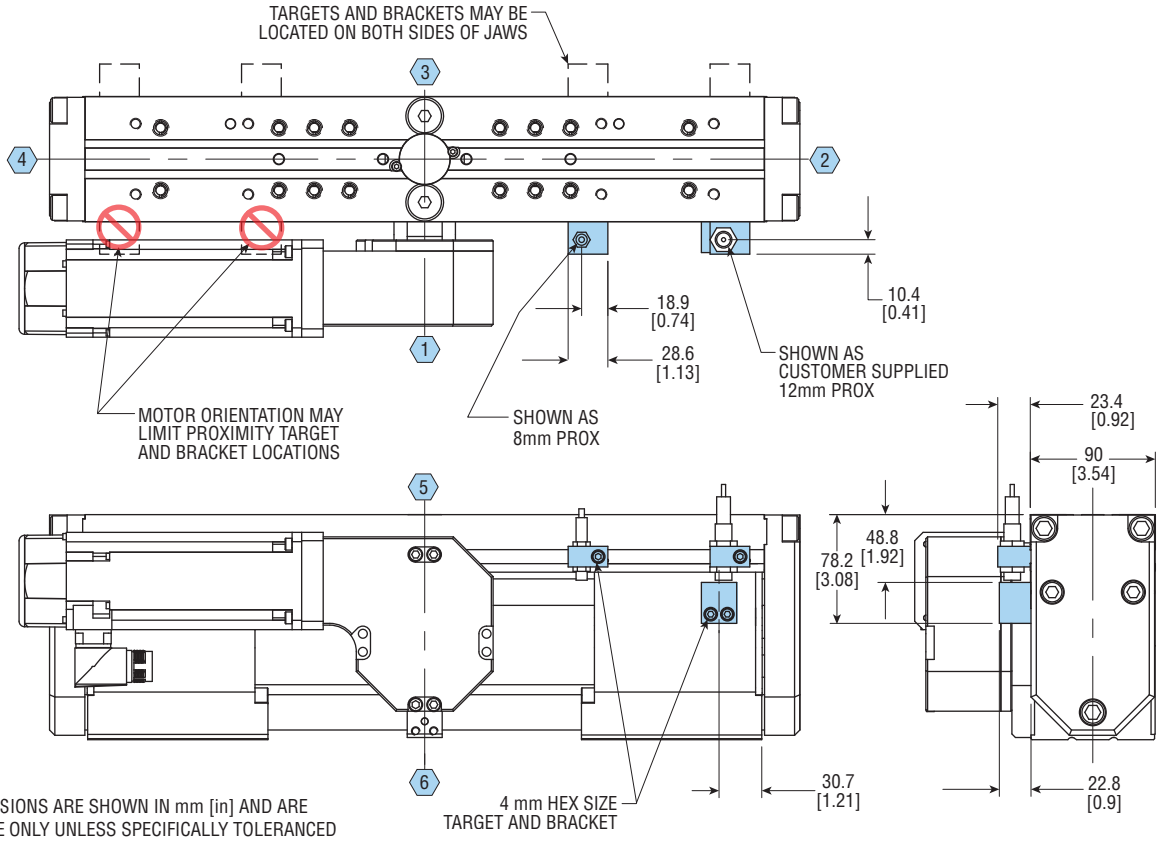
Kit includes 1 proximity switch target and 2 target mounting screws



THREADED INDUCTIVE PROXIMITY SWITCH MOUNTING BRACKET KITS

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

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



NOTES:

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

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