Rotary Series Worm Drive Precision Stages

The Rotary Stage Series offers an unparalleled combination of high accuracy and high load capacity. These rotary stages utilize a precision worm gear with the worm "flexed" against the gear to ensure a proper mesh. This feature provides high repeatability with very smooth operation. Additionally, the rotary stages incorporate an oversized preloaded cross roller bearing, offering exceptional stiffness and load capacity.

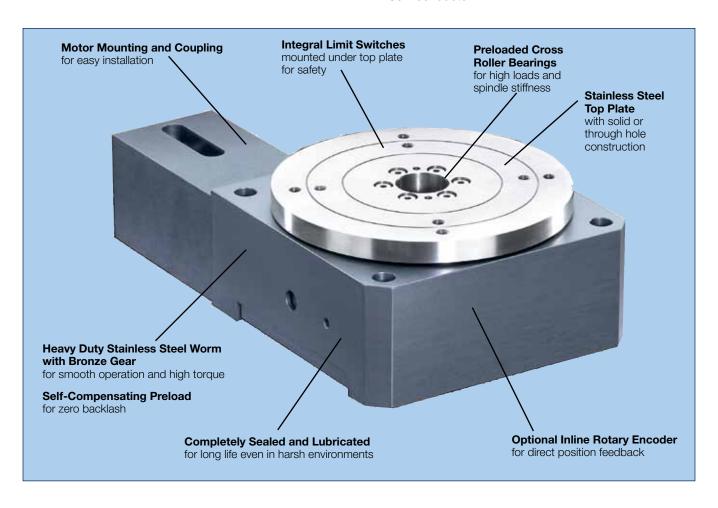
- Unique self-compensating preload to limit backlash
- Solid or thru bore construction
- Robust bearing design for high-load capacity
- Built-in limit switches
- Aluminum construction with stainless steel top plate

When to Use

- High accuracy
- High loads
- Compact
- High stiffness

Applications

- Electronic assembly
- Fiber optics
- Medical
- Packaging
- Pharmaceutical
- Robotics
- Semiconductor







Rotary Series Specifications

Performance Specifications

	Ах	ial	Perpendicular Capacity					
	Сара	Capacity		mm	@150 mm			
Model No.	(kg)	(lb)	(kgf)	(lb)	(kgf)	(lb)		
R100M	100	220	22	48	7	15		
R150M	400	880	88	194	33	73		
R200M	600	1320	200	440	85	187		
R300M	1000	2220	325	715	160	352		



	Worm	Unidirectional Repeatability (1)		put Torque PM Input	Peak Output Speed	Wei	ight	Iner	tia
Model No.	Gear Ratio	(arc-min)	(Nm)	(in-lb)	(RPM)	(kgf)	(lbf)	gm-cm sec²	oz-in sec²
R100M	60:1	0.2	8	70.8	30	2.3	5.0	0.0057	0.0000784
R150M	72:1	0.2	25	221	30	6.0	13.0	0.055	0.00076
R200M	72:1	0.2	55	487	30	15.0	33.0	0.148	0.00210
R300M	90:1	0.2	75	664	30	35.0	77.0	0.368	0.00516

Accuracy Specifications (1)

	Main Bearing Runout	Wobble	Positional Accuracy ⁽¹⁾	Bidirectional Repeatability (1)		inning Torque d at 2 rps)
	(microns)	(arc-min)	(arc-min)	(arc-min)	(Nm)	(oz-in)
R100M	±15	±0.5	5	0.5	0.141	20
R150M	±20	±0.5	3	0.5	0.177	25
R200M	±25	±0.5	3	0.5	0.212	30
R300M	±30	±0.5	3	0.5	0.247	35

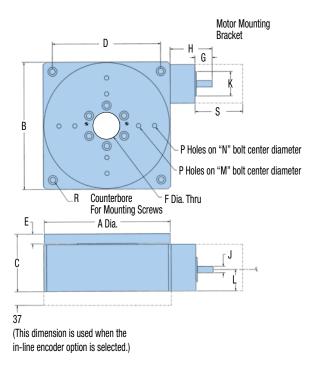
(1) Accuracy and repeatability are based on stage mounted to a flat granite surface and measured at 25 mm above the center of the stage.





Rotary Series Dimensions





	. A	4	E	3	C	;			E	
Model No.	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
R100M	98.5	3.88	100	3.94	55	2.16	85	3.35	8	0.32
R150M	147.6	5.81	150	5.90	75	2.95	125	4.92	11	0.43
R200M	197.7	7.78	200	7.87	90	3.54	170	6.70	15	0.59
R300M	297.7	11.72	300	11.81	108	4.25	270	10.63	16	0.63

	F	=	C	à	H	1	,	J	ŀ	(
Model No.	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
R100M	12	0.47	15	0.59	45	1.77	5	0.197	18	0.709
R150M	25.5	1.00	27	1.06	66	2.60	10	0.394	38.1	1.50
R200M	38	1.50	27	1.06	66	2.60	10	0.394	38.1	1.50
R300M	51	2.00	39	1.53	113	4.45	12	0.472	73	2.875

	L	-	N	Л	1	N	Р	R	5	6	Stage	Weight
Model No.	(mm)	(in)	(mm)	(in)	(mm)	(in)	Тар	CBore	(mm)	(in)	(kg)	(lb)
R100M	21	0.83	45	1.772	75	2.953	M5 x 0.8	M5	38.1	1.50	1.8	3.97
R150M	30.1	1.18	100	3.937	125	4.921	M6 x 1	M6	60.2	2.37	5	11
R200M	33.5	1.32	100	3.937	150	5.905	M8 x 1.25	M8	60.2	2.37	13	28.66
R300M	44.2	1.74	150	5.905	250	9.843	M8 x 1.25	M8	73.1	2.88	29	63.93

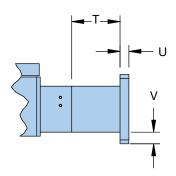




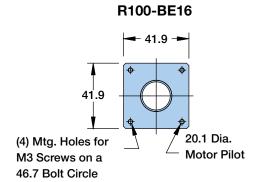
Rotary Table Motor Block Dimensions



Dimensions (mm)

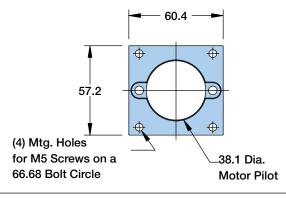


Rotary		٦		Į	J	'	/
Stage Size	Motor Size	mm	in	mm	in	mm	in
	BE16 M16	47	1.85	_	_	_	_
R100M	LV/HV23 M22 BE23 M23	47	1.85	6	0.24	7.6	0.3
	BE16 M16	55	2.17	_	_	_	_
R150M	LV/HV23 M22	51	2.01	_	_	_	_
	BE23 M23	62	2.44	_	_	_	_
	LV/HV23 M22	51	2.01	_	_	_	_
R200M	BE23 M23	62	2.44	_	_	_	_
	BE34 M34	60	2.36	11	0.43	9.5	0.37
	LV/HV23 M22	75	2.95	_	_	_	_
R300M	BE23 M23	75	2.95	_	_	_	_
	BE34 M34	73	2.87	_	_	-	



R100-LV/HV23 & BE23 57.2 -Φ $\overline{\Phi}$ 57.2 (4) Mtg. Holes 38.1 Dia. for M5 Screws on a **Motor Pilot** 66.68 Bolt Circle R150-BE16 60.4 57.2 (4) Mtg. Holes 20.1 Dia. for M3 Screws on a **Motor Pilot**

R150-LV/HV23 & BE23



46.7 Bolt Circle

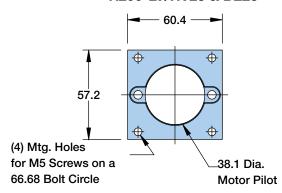




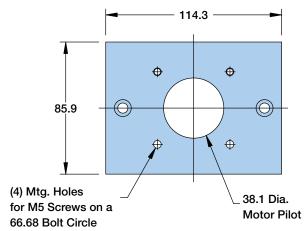
Rotary Table Motor Block Dimensions

Dimensions (mm)

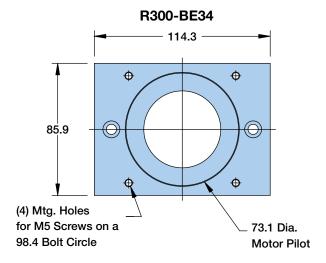
R200-LV/HV23 & BE23



R300-LV/HV23 & BE23



R200-BE34 86.0 (4) Mtg. Holes for M5 Screws on a 98.4 Bolt Circle





Rotary Series Ordering Information



Fill in an order code from each of the numbered fields to create a complete model order code.

2

3

4

(5)

6

7

E0

8

Order Example:

R 150M

7

MP2 C04 L1H1

R1

Series

R Worm Gear Rotary Series

2 Metric Square Width

100M 100 mm 150M 150 mm 200M 200 mm 300M 300 mm

Gear Ratio

60:1 (R100)

7 72:1 (R150 and R200)

9 90:1 (R300)

4 Motor Mounting

M00 No motor block included

M16 Motor block for Parker BE16(1,2,3 stack) M22 Motor block for Parker LV/HV23, SM23(1,2,3) Motor block for Parker BE23(1,2,3 stack) M23

Motor block for Parker BE34 motors M34

MP1 Including motor and mount with BE163CJ-NPSN MP2 Including motor and mount with BE233FJ-NSPN MP3 Including motor and mount with HV233-02-10

S Coupling Code

C00 No coupling included

C01 0.1875 inch coupling included

C02 5 mm coupling included

C03 0.250 inch coupling included (for BE16,LV/HV23) C04 0.375 inch coupling included (for BE23/SM23(1,2,3)

C05 8 mm coupling included C06 9 mm coupling included C07 11 mm coupling included

C08 0.500 inch coupling included (for BE34 motors)

C09 14 mm coupling included C10 16 mm coupling included

6 Limits Switches

L0H0 No Home or Limit Sensors included

L0H1 1 normally open NPN home sensor included L1H0 2 normally closed NPN limit sensors included L1H1 1 home and 2 limit sensors included

7 Encoder in Line with Top Plate

E0 No encoder included

E1 2000 line in-line rotary encoder included

8 Environment

R1 Standard environmental protection

R2 Cleanroom preparation included to class XX(TBD)





Rotary Series: Direct Drive Precision Stages

Bayside's Direct Drive Rotary Stages feature a robust construction and high performance in a compact package, providing smooth, near frictionless motion with zero backlash.





Performance Specifications

Model No.	Axial Capacity		Perpendicular Capacity @ Radius	Continuous Output Torque		put Output		Maximum Output Speed ⁽¹⁾
	(kgf)	(lb)		(Nm)	(in lb)	(Nm)	(in lb)	(RPM)
R100D	75	165.3	20kgf @ 50mm	0.65	5.75	1.96	17.34	700
R150D	150	330.6	75kgf @ 75mm	4.00	35.4	12.00	106.2	500
R200D	250	551.1	150kgf @ 100mm	7.00	61.95	21.00	185.85	300

Model No.	Radial Runout @ øH	Axial Runout @ øK	Wobble @ Axis of Rotation	Ine	rtia	Stage W	eight
	(microns)	(microns)	(arc sec)	(gm cm sec ²)	(oz in sec ²)	(kg)	(lb)
R100D	20	18	60	14.2	0.197	2.2	4.85
R150D	26	23	45	86.4	1.200	5.8	12.79
R200D	36	30	30	338.0	4.695	10.5	23.15

Resolution Data

Model No.	R100D	R150D	R200D
Total Number of counts/rev (2)	472,000	632,000	944,000
Frequency at Max Speed (2) (Mhz)	5.5	5.2	4.7
Resolution after x4 (arc sec)	2.7458	2.0506	1.3728
Repeatability after x4 (arc sec)	± 8.4	± 6.15	± 4.1

- (1) Maximum speed may be limited by input frequency response of controller or drive. (2) Post quadrature (includes 10x interpolation and 4x of control)

Motor Specifications

Model No.	Voltage Constant K _E		Constant	Resistance R	Inductance L
	(V/kRPM)	(Nm/amp)	(in lb/amp)	(ohms@ 25°C)	(mH)
R100D	75	0.72	6.37	59.9	12
R150D	210	2	17.7	11.4	15.5
R200D	210	2	17.7	3.72	4.0

Model No.	Rated Voltage (V)	Icont (amps)	lpeak (amps)	Logic Voltage (V/amp)	Pole Count
R100D	300	0.9	2.72	5V @ 600 ma	8
R150D	300	2.0	6.0	5 V @ 600 ma	20
R200D	300	3.5	10.5	5 V @ 600 ma	32



• Rotary Series: Direct Drive Precision Stages

When to Use:

- Precision rotary motion
- ZERO backlash
- Compact
- Rugged

Applications:

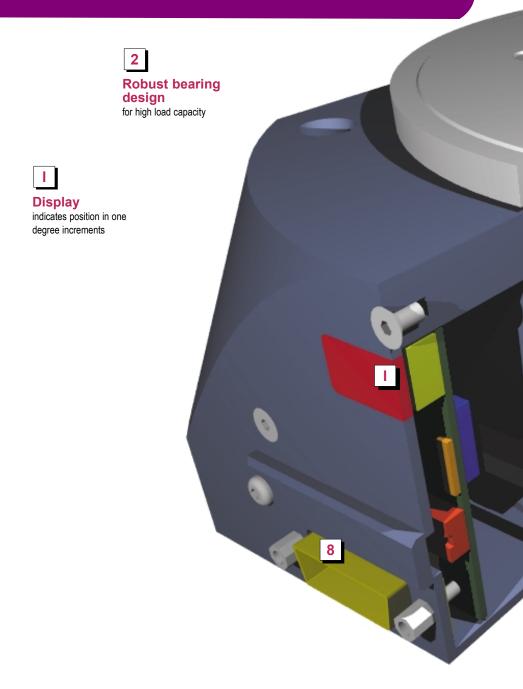
- Electronic assembly
- Fiber Optics
- Medical
- Packaging
- Pharmaceutical
- Robotics
- Semiconductor

High Performance in a Compact Package

Bayside's Direct Drive Rotary Stage, featuring an integral brushless DC servomotor, has several distinct advantages over traditional worm gear-driven stages. The elimination of the worm gearing offers the ability to reduce wear with zero backlash while exhibiting near frictionless motion.

Its high positioning accuracy, solely based on the stage's encoder, provides repeatability within \pm 2 encoder counts, with resolutions ranging to 0.5 arc seconds. The RD Direct Drive features speeds up to 500 RPM with significant torque capability.

In addition, there are three absolute programmable position reply outputs, plus a three-digit display, indicating absolute position in one degree increments.







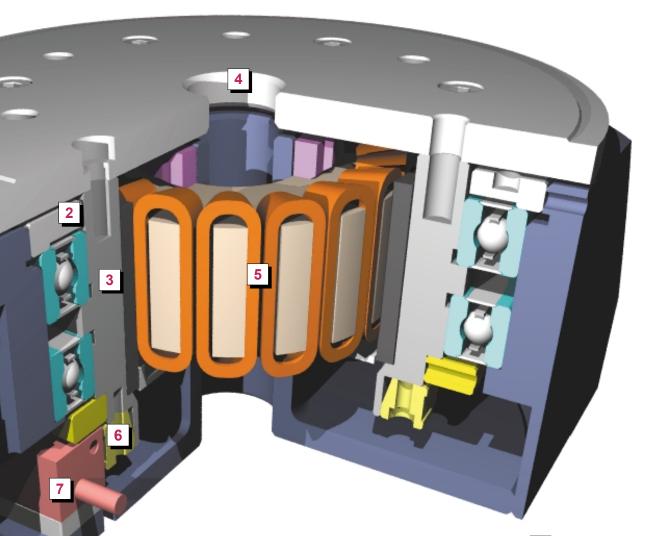
Rotor / Shaft

motor rotor and top plate shaft as one piece construction for high stiffness



Stainless Steel Top Plate precision ground for

accurate mounting



5

Integrated Brushless Motor

unique design with high copper slot and rare earth magnet for maximum torque efficiency

Sub "D" connectors

for "plug & play" operation and easy hook-up.



Built-in "Virtual" **Limit Switches**

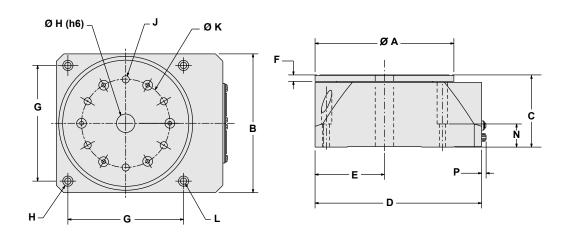
for high positioning accuracy

Inline Rotary Encoder for direct position feedback



ROTATY Series: Direct Drive Precision Stages

Dimensions



Model No.	A			В	C	;	١	D	E	E		F	G		
	(mm)	(in)	(mm)	(in)	(mm)	(in)									
R100D	100	3.94	100	3.94	75	2.95	130	5.12	50	1.96	5	0.196	85	3.34	
R150D	150	5.9	150	5.9	78	3.07	180	7.08	75	2.95	7	0.275	125	4.92	
R200D	200	7.87	200	7.87	100	3.94	230	9.05	100	3.94	10	0.393	160	6.29	

Model No.	Н		J	ı	K	L		М		N			Р
	(mm)	(in)	Тар	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
R100D	20	0.787	M5	60	2.36	5.5	0.216	9.5	0.374	25	0.984	5	0.196
R150D	20	0.787	M6	95	3.74	6.5	0.255	11.2	0.440	25	0.984	5	0.196
R200D	30	1.18	M8	125	4.92	8.5	0.334	14.0	0.551	25	0.984	5	0.196

Linear & Rotary Positioning Stages

Rotary Series:

Direct Drive Precision Stages How to Order



Order Numbering Example:







Α







В	MODEL			_
_	10	0	100 mm	
	15	50	150 mm	
	20	0	200 mm	

C	DRIVE		
		D	Direct Drive

Cable Options:

Mating Power Cable

Part Number	Length	Used With
10963018	3 meters	Flying Leads
10963067	8 meters	Flying Leads

Mating Sensor Cable

Part Number	Length	Used With
10963019	3 meters	Flying Leads
10963137	3 meters	i-Drive
10963066	8 meters	Flying Leads
10963138	8 meters	i-Drive
10963136 ⁽¹⁾	_	i-Drive / Controller

(1) NOTE: When an external controller is used in a closed loop mode an additional sensor cable, part number 10963136, is required.

Specifications are subject to change without notice.

How to Order

Direct Drive Rotary Stages are supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at **www.baysidemotion.com**.



Screw Driven automation tables

Precise multi-axis positioning systems play an integral part in today's semiconductor, computer peripheral, solar power, flat panel, life sciences, lab automation, biomedical and electronics industries. The demands for tighter specifications, improved throughput and consistent quality have become increasingly stringent. Because of the complexity associated with these systems, many manufacturers insist on a single source supplier to eliminate multiple vendor design incompatibilities and delivery conflicts. With over forty years' experience as a global leader in the development of products and technology, Parker provides the most advanced, easy to integrate high-precision electromechanical systems.

Contents

30-33	Overview
34-63	400XR Series Precision Linear Positioners
64-69	XRS Cartesian Systems
70-79	402/403XE Series Positioners
80-89	404XE Series Positioners
90-111	HD Series Industrial Linear Positioners
112-127	Ultra Series Precision Stages
128-133	100CT & 800CT Series Tables
134-137	200RT Series Rotary Tables
138-141	R Series Worm Drive Rotary Tables
142-145	ZP200 Series Vertical Lift "Wedge" Table
146-150	Additional Products

200RT Series Rotary Tables

Features

- Highly repeatable indexing (12 arc-sec)
- Load capacities to 200 lbs
- 360 degrees continuous travel
- Performance tested worm gear drive
- · Selectable table sizes and drive ratio
- Dual race angular contact support bearing

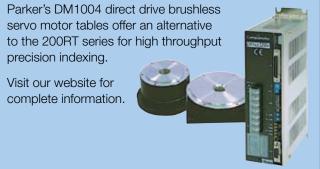
Quality Design and Construction

The 200RT Series Rotary Tables are designed for precise motor-driven rotary positioning and indexing. These tables are designed to function independently or in conjunction with linear tables used in the high-precision and precision automation applications. Their low profile design minimizes stack height in multi-axis configurations and enables them to fit in many places where other motorized rotary devices cannot.

Models are available in 5, 6, 8, 10, or 12 inch diameters and are offered with four gear ratios making it convenient to match size, speed, and load requirements. They can be selected in either English or metric mounting. They are found in virtually all industries where intermittent part indexing, part scanning, skew adjustment, or precise angular alignment is required.

At the heart of these tables is a rugged main support bearing which is comprised of two preloaded angular contact bearing races. It is designed for high load capacity and smooth, flat rotary motion. The drive is a precision worm gear assembly which is preloaded to remove backlash. The top and base are constructed of high quality aluminum with an attractive black anodized finish. The top and bottom mounting surfaces are precision ground to assure flatness.

High Performance Direct Drive Rotary Tables





Options and Accessories

Motor Couplings

A wide range of coupling styles and bores are available to match motor requirements. Bellows-style couplings, offering the lowest windup are required for all precision grade tables, while the aluminum and stainless steel helix couplers offer good windup characteristics and high durability at a lower cost.

Motor Mounts

The motor mount is designed for an industry standard NEMA 23 motor flange and a maximum shaft length of 0.85".

Home Sensor

The Home sensor provides a fixed reference point to which the table can always return. This is a mechanical reed switch which is mounted the body of the rotary table and is activated by a magnet imbedded on the table top.

Rotary Encoders

High resolution, high accuracy rotary encoders can be added for direct positional feedback of the table top position. Rotary encoders can be mounted directly to the base of the rotary table. The encoder input shaft is then coupled directly to the rotary table top, supplying positional feedback of the table top, with no drive train errors. They can be supplied with or without a base housing which encloses and protects the encoder.

Seals

Custom designed sealed units are offered to prevent excessive wear or internal damage resulting from dust and contaminates.

Motors, Drives & Controls

Micro-step motors with drives are available for direct mounting to the rotary tables. Motion controllers can also be added to provide systems with seamless connectivity.





200RT Common Characteristics

	Units	Precision	Standard
Positional Repeatability (unidirectional)	arc-min	0.2	0.5
Duty Cycle	%	50	50
Table Runout (Max.)	in (µm)	±0.001 (±25)	±0.003 (±75)
Concentricity	in (µm)	±0.001 (±25)	±0.005 (±127)
Wobble	arc-sec	30	60
Input Velocity (Max.)	revs./sec.	15	15

Travel Dependent Characteristics

			Accuracy	/ arc-min					Weight	lb (kgf)
Table Diameter inches	Drive Ratio	Load Capacity Ibs (kgf)	Precision	Standard	Output Torque in-lb (N-m)	Inertia 10 ⁻³ -ozin-sec ² (10 ⁻⁶ kg-m- sec ²)	Input Breakaway Torque (max.) ozin (N-m)	Running Torque (max) oz-in (N- m)	Standard Top	Total
5.0	180:1	25 (11) 3	3	10	25 (2.8)	0.14 (0.102)	22 (0.16)	20 (0.13)	0.67 (0.3)	6.0 (2.7)
5.0	90:1	25 (11)	3	10	25 (2.8)	0.15 (0.112)	22 (0.16)	20 (0.13)	0.67 (0.3)	6.0 (2.7)
5.0	36:1	25 (11)	5	12	25 (2.8)	0.24 (0.173)	22 (0.16)	20 (0.13)	0.67 (0.3)	6.0 (3.6)
6.0	180:1	150 (68)	3	10	40 (4.5)	0.16 (0.112)	22 (0.16)	20 (0.13)	0.91 (0.42)	8.0 (2.7))
6.0	90:1	150 (68)	3	10	40 (4.5)	0.20 (0.132)	22 (0.16)	20 (0.13)	0.91 (0.42)	8.0 (3.6)
6.0	45:1	150 (68)	5	12	40 (4.5)	0.29 (0.204)	22 (0.16)	20 (0.13)	0.91 (0.42)	8.0 (3.6)
8.0	180:1	150 (68)	3	10	40 (4.5)	0.24 (0.163)	28 (0.19)	25 (0.18)	2.23 (1.01)	15.0 (6.8)
8.0	90:1	150 (68)	3	10	40 (4.5)	0.66 (0.459)	28 (0.19)	25 (0.18)	2.23 (1.01)	15.0 (6.8)
8.0	36:1	150 (68)	5	12	40 (4.5)	0.90 (0.642)	28 (0.19)	25 (0.18)	2.30 (1.05)	15.0 (6.8)
10.0	180:1	200 (90)	3	10	190 (21.5)	0.74 (0.530)	33 (0.22)	30 (0.21)	5.26 (2.30)	29.0 (13.1)
10.0	90:1	200 (90)	3	10	190 (21.5)	1.02 (0.734)	33 (0.22)	30 (0.21)	5.26 (2.30)	29.0 (13.1)
10.0	45:1	200 (90)	5	12	190 (21.5)	2.13 (1.53)	33 (0.22)	30 (0.21)	5.26 (2.30)	29.0 (13.1)
12.0	180:1	200 (90)	3	10	190 (21.5)	0.99 (0.713)	33 (0.22)	30 (0.21)	7.67 (3.49)	32.0 (14.5)
12.0	90:1	200 (90)	3	10	190 (21.5)	1.59 (1.12)	33 (0.22)	30 (0.21)	7.67 (3.49)	32.0 (14.5)
12.0	45:1	200 (90)	5	12	190 (21.5)	3.83 (2.75)	33 (0.22)	30 (0.21)	7.67 (3.49)	32 (14.5)

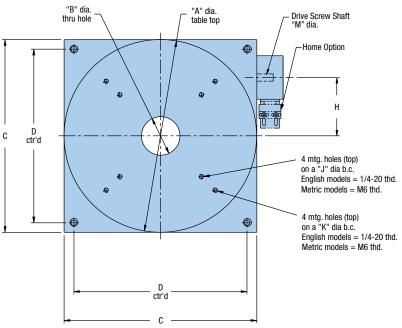
NOTE: For moment load calculations, refer to the technical section of Parker's web site www.parkermotion.com

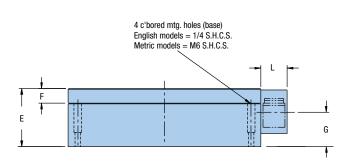


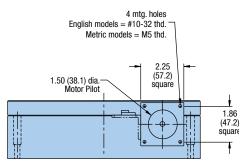


200RT Series Dimensions

Dimensions - inches (mm)







English Units

A	В	С	D	E Standard (T2)	E I Option (T3)	F Standard (T2)	F Option (T3)	G	н	J	K	L	М
5.0	1.0	5.0	4.0	1.8	2.42	0.38	1.00	1.11	1.66	3.0	4.0	1.38	0.188
6.0	1.75	6.0	5.0	2.0	2.62	0.38	1.00	1.23	2.04	4.0	5.0	1.38	0.25
8.0	1.75*	8.0	6.0	2.5	3.12	0.50	1.00	1.57	2.04	4.0	6.0	1.38	0.25
10.0	2.0	10.0	9.0	3.0	3.62	0.75	1.00	1.81	3.03	6.0	8.0	1.38	0.25
12.0	2.0	10.0	9.0	3.0	3.62	0.75	1.00	1.81	3.03	8.0	10.0	2.38	0.25

^{*}On the 8.0" (203,2) diameter table with 36:1 ratio, this dimension is 1.0" (25,4).

Metric Units

				E Standard	E Option	F Standard	F Option						
Α	В	С	D	(T2)	(T3)	(T2)	(T3)	G	н	J	K	L	M
127.0	25.4	127.0	100	46.0	61.5	9.6	25.0	28.1	42.1	75	100	35	4.76
152.4	44.5	152.4	125	50.8	66.5	9.6	25.0	31.4	51.8	100	125	35	6.35
203.2	44.5*	203.2	175	63.5	79.2	12.7	25.0	39.8	51.8	100	150	35	6.35
254.0	50.8	254.0	225	76.2	91.9	19.0	25.0	45.9	76.9	150	200	35	6.35
304.8	50.8	254.0	225	76.2	91.9	19.0	25.0	45.9	76.9	200	250	60.4	6.35

^{*}On the 8.0" (203,2) diameter table with 36:1 ratio, this dimension is 1.0" (25,4).





Fill in an order code from each of the numbered fields to create a complete model order code.

0 2 3 4 3 6 7 8 9 0 10

Order Example: 2 08 01 RT M S H1 C1 M1 E1 T1

Series

2

2 Table Diameter

5 in, 125 mm
6 in, 150 mm
8 in, 200 mm
10 in, 250 mm
12 in, 300 mm

3 Gear Ratio

01 180:1, Available on all dia.02 90:1, Available on all dia.

45:1, Available on 6", 10" and 12" dia. only36:1, Available on 5" and 8" dia. only

4 Table Style

RT

Mounting

E English

M Metric (800CT only)

6 Grade

S StandardP Precision

7 Home

H1 No home switchesH2 Magnetic home switches

8 Motor Coupling

C1 No coupling

C2 0.25 in bore, helix, aluminumC3 0.25 in bore, helix, stainless steel (not available on 205 model)

0.25 in bore, bellows, required for precision grade

C5 0.375 in bore, helix, aluminumC6 0.375 in bore, helix, stainless steel

(not available on 205 model)

C7 0.375 in bore, bellows, required for precision grade

Motor Mount

M1 23 frame size

(10) Encoder

C4

E0 No encoder

E8 Ring encoder – 314,880 post quad. counts/rev
E9 Ring encoder – 3,148,800 post quad. counts/rev

(1) Table Top

T1 No top

T2 Standard top

T3 Oversized top (raises height to clear NEMA 23

motor)

