



Typical Applications

- Pick and Place
- Inspection
- Alignment
- Assembly
- Deposition
- Light Load Contouring
- Dispensing
- Wafer Handling

General Specifications

Materials

Top and base — black anodized aluminum alloy (6061 and cast tool plate);
Ballscrew and guideways — DIN 1.6523 and 1.3505 steel;
Leadscrew nut — acetal

Cross Section

101.6mm x 63.5mm (4 inches x 2.5 inches)

Travel Lengths
(including limits and covers)

50.8mm (2 inches), 101.6mm (4 inches), 152.4mm (6 inches), 203.2mm (8 inches),
304.8mm (12 inches) and 406.4mm (16 inches)
(please refer to Travel Dependent Specifications)

Drive Screws

Preloaded precision ground ballscrew — JIS C3 (zero backlash)
Nominal diameter 16mm (0.63 inches)

Preloaded precision rolled leadscrew (zero backlash)
Nominal diameter 15.875mm (0.625 inches)

Ballscrew Lead Options

2.5mm (0.0984 inches), 5.08mm (0.2 inches) or 12.7mm (0.5 inches)

Leadscrew Lead Options

2.54mm (0.1 inches) or 5.08mm (0.2 inches)
(please refer to Travel Dependent Specifications for maximum speeds)

Bearings

Matched precision grade recirculating linear guideways
Nominal coefficient of friction 0.008
Special high precision assembly option available

Couplings

Bellows, Oldham or Stainless Steel Beam (please refer to Coupling Section)

Motors

Stepper (standard, T or V options) or Servo
Nominal NEMA 23 frame size
(please refer to Stepper Section G-1, Servo Section H-1 and Motor Section)

Limit Switches

Internal Hall Effect switches — non-adjustable
3 position or 2 position — normally closed
(please refer to Limit Switch Section)

Linear Encoder Resolution

1 micron (0.000039 inches) or 2 microns (0.000079 inches)
(please refer to Linear Encoder Section)

Covers

Neoprene Bellows (Nominal IP 53)

Environment

General industrial, clean room or vacuum
(please refer to Environmental Section)

Normal Ambient Temperature

20°C ± 15°C (68°F ± 27°F) — special high or low temperature preparation also
available

Normal Ambient Pressure

760 torr — 10⁻³ torr (standard preparation) - up to 10⁷ torr (special preparation)

Normal Cleanliness

Class 1000 (standard preparation) — up to Class 100 (special preparation)

Audible Noise (max.)

70 dB at top speed (1m away from positioning system)

Maximum Input Torque

120 oz-in



Specifications

Global Specifications

Ballscrew Accuracy Tolerance^{1,2} (maximum lead error tolerance)	JIS C3 8 microns per 300mm — 6 microns per revolution 0.00032 inches per foot — 0.00024 inches per revolution
Unidirectional Repeatability (max.)^{1,2} (without linear encoder)	JIS C1 5 microns per 300mm — 4 microns per revolution 0.00020 inches per foot — 0.00016 inches per revolution
Bi-directional Repeatability (max.)^{1,2} (without linear encoder)	3 microns (0.00012 inches)
Leadscrew Accuracy Tolerance (maximum lead error tolerance)	6 microns (0.00024 inches)
Unidirectional Repeatability (max.)^{1,2}	90 microns per 300mm — 7.5 microns per 25mm 0.0036 inches per foot — 0.0003 inches per inch
Bi-directional Repeatability (max.)^{1,2}	5 microns (0.0002 inches)
Limit Switch Repeatability²	10 microns (0.0004 inches)
Breakaway Torque (max.)²	50 microns (0.002 inches) (please refer to Limit Switch Section)
Running Torque (max.)²	0.127 Nm (18 oz-in)
Nominal Acceleration (max.)²	0.106 Nm (15 oz-in)
Duty Cycle	2.0 g — Ballscrew; 1.0 g — Leadscrew
Normal Load Capacity (max.)²	100% — Ballscrew; 60% — Leadscrew
Side Load Capacity (max.)²	±44 kg(f) (97 lbs.) (please refer to stiffness specifications)
Axial Load Capacity (max.)²	±30 kg(f) (66 lbs.) (please refer to stiffness specifications)
Roll Moment Capacity (max.)^{2,3}	±14 kg(f) (30 lbs.) (please refer to stiffness specifications)
Pitch Moment Capacity (max.)^{2,3}	±59 Nm (44 ft-lb.) (please refer to compliance specifications)
Yaw Moment Capacity (max.)^{2,3}	±47 Nm (35 ft-lb.) (please refer to compliance specifications)
Nominal Straightness² (horizontal straightness)	±66 Nm (49 ft-lb.) (please refer to compliance specifications)
Precision Option	2 microns per 25mm (0.00008 inches per inch) Not to exceed travel dependent specifications
Nominal Flatness² (vertical straightness)	1 micron per 25mm (0.00004 inches per inch) Not to exceed travel dependent specifications
Precision Option	2 microns per 25mm (0.00008 inches per inch) Not to exceed travel dependent specifications
Normal Load Stiffness²	1 micron per 25mm (0.00004 inches per inch) Not to exceed travel dependent specifications
Side Load Stiffness²	4.5 kg(f) per micron (250,000 lbs. per inch)
Axial Load Stiffness²	3.6 kg(f) per micron (200,000 lbs. per inch)
Roll Moment Compliance²	0.5 kg(f) per micron (26,000 lbs. per inch)
Pitch Moment Compliance²	2.2 arc-sec per Nm (3 arc-sec per ft-lb.)
Yaw Moment Compliance²	2.2 arc-sec per Nm (3 arc-sec per ft-lb.)
Precision X-Y Mounting Orthogonality (XYP)²	3.7 arc-sec per Nm (5 arc-sec per ft-lb.)
Moving Mass (carriage and bearings)	15 arc-sec
	1.2 kg(f) (2.5 lbs.)

1 For applications requiring higher specification, interferometer testing, a higher accuracy ballscrew or a linear encoder may be necessary. Please refer to the Performance Verification Section and the Linear Encoder Section.

2 Please consult IDC if your application requirements exceed catalog specifications.

3 Based on the centerline of the table top.

All specifications are based on ISO 230-2 measurements of an unloaded, bolted down Precision Table with optimized motor tuning. These specifications were generated by measuring the performance of a complete motion system that utilized IDC motors, drives and controls.

Note: IDC accuracy measurements are based on a stable 20°C environment. Thermal variations can affect application results significantly.



Travel Dependent Specifications

Standard Travels - Precision Assembly Option Available

(Travel includes space for limit switches and bellows)

	RB4A-2	RB4A-4	RB4A-6
Travel — mm (inches)	50.8 (2)	101.6 (4)	152.4 (6)
Accuracy (error max.) — (ballscrew) — microns (inches)	12 (0.00048)	14 (0.00056)	16 (0.00064)
(leadscrew)	15 (0.0006)	30 (0.0012)	45 (0.0018)
Inertia — $\text{kgm}^2 \times 10^{-6}$ (oz-in-s ² × 10 ⁻³)	16.6 (2.4)	19.6 (2.8)	22.6 (3.2)
Total Table Weight (without motors) — kg(f) (lbs.)	2.7 (6)	3.2 (7)	3.6 (8)
Top Speed — 2.5MG screw — mm/s (inches/s)	201 (7.9)	201 (7.9)	201 (7.9)
Top Speed — 5G screw — mm/s (inches/s)	408 (16.1)	408 (16.1)	408 (16.1)
Top Speed — 2G screw — mm/s (inches/s)	N/A	N/A	N/A
Top Speed — 10A screw — mm/s (inches/s)	86 (3.4)	86 (3.4)	86 (3.4)
Top Speed — 5A screw — mm/s (inches/s)	181 (7.1)	181 (7.1)	181 (7.1)
Roll Deviation (max.) ^{2,3} — arc-sec (precision)	16 (8)	18 (9)	20 (10)
Yaw Deviation (max.) ^{2,3} — arc-sec (precision)	16 (8)	20 (10)	24 (12)
Pitch Deviation (max.) ^{2,3} — arc-sec (precision)	16 (8)	18 (9)	20 (10)
Nominal Straightness (max.) ^{2,3} — microns (inches)	8 (0.00032)	8 (0.00032)	8 (0.00032)
Precision Assembly Option	4 (0.00016)	4 (0.00016)	4 (0.00016)
Nominal Flatness (max.) ^{2,3} — microns (inches)	8 (0.00032)	10 (0.0004)	12 (0.00048)
Precision Assembly Option	4 (0.00016)	5 (0.0002)	6 (0.00024)

Standard Travels - Precision Assembly Option Available

(Travel includes space for limit switches and bellows)

	RB4A-8	RB4A-12	RB4A-16
Travel — mm (inches)	203.2 (8)	304.8 (12)	406.4 (16)
Accuracy (error max.) — (ballscrew) — microns (inches)	18 (0.00072)	20 (0.00080)	22 (0.00088)
(leadscrew)	50 (0.0024)	90 (0.0036)	120 (0.0048)
Inertia — $\text{kgm}^2 \times 10^{-6}$ (oz-in-s ² × 10 ⁻³)	25.5 (3.6)	31.5 (4.5)	37.3 (5.3)
Total Table Weight (without motors) — kg(f) (lbs.)	4.1 (9)	5.0 (11)	5.9 (13)
Top Speed — 2.5MG screw — mm/s (inches/s)	201 (7.9)	201 (7.9)	154 (6.1)
Top Speed — 5G screw — mm/s (inches/s)	408 (16.1)	408 (16.1)	312 (12.3)
Top Speed — 2G screw — mm/s (inches/s)	1020 (40.2)	1020 (40.2)	781 (30.8)
Top Speed — 10A screw — mm/s (inches/s)	86 (3.4)	86 (3.4)	66 (2.6)
Top Speed — 5A screw — mm/s (inches/s)	181 (7.1)	181 (7.1)	139 (5.5)
Roll Deviation (max.) ^{2,3} — arc-sec (precision)	22 (11)	24 (12)	26 (13)
Yaw Deviation (max.) ^{2,3} — arc-sec (precision)	28 (14)	32 (16)	36 (18)
Pitch Deviation (max.) ^{2,3} — arc-sec (precision)	22 (11)	24 (12)	26 (13)
Nominal Straightness (max.) ^{2,3} — microns (inches)	10 (0.00040)	12 (0.00048)	14 (0.00056)
Precision Assembly Option	5 (0.00020)	6 (0.00024)	7 (0.00028)
Nominal Flatness (max.) ^{2,3} — microns (inches)	14 (0.00056)	16 (0.00064)	18 (0.00072)
Precision Assembly Option	7 (0.00028)	8 (0.00032)	9 (0.00036)

Drive Screw Data

	Diameter mm (inches)	Efficiency	Direction	Duty Cycle	Contouring Thrust Load (max.) kg(f) (lbs.)
2.5MG	16 (0.63)	85%	Right Hand	100%	8.0 (17.6)
5G	16 (0.63)	90%	Right Hand	100%	12.0 (26.5)
2G	16 (0.63)	93%	Right Hand	100%	7.0 (15.4)
10A	15.875 (0.625)	41%	Right Hand	60%	N/A
5A	15.875 (0.625)	59%	Right Hand	60%	N/A

Life Calculation Constants (Dynamic Load Capacity)

(please refer to Bearing and Drivescrew Section)

Bearings	190 kg(f)
2.5MG Ballscrew	78 kg(f)
5G Ballscrew	232 kg(f)
2G Ballscrew	111 kg(f)

2 Please consult IDC if your application requirements exceed catalog specifications.

3 Based on the centerline of the table top.

Note: IDC accuracy measurements are based on a stable 20°C environment. Thermal variations can affect application results significantly.

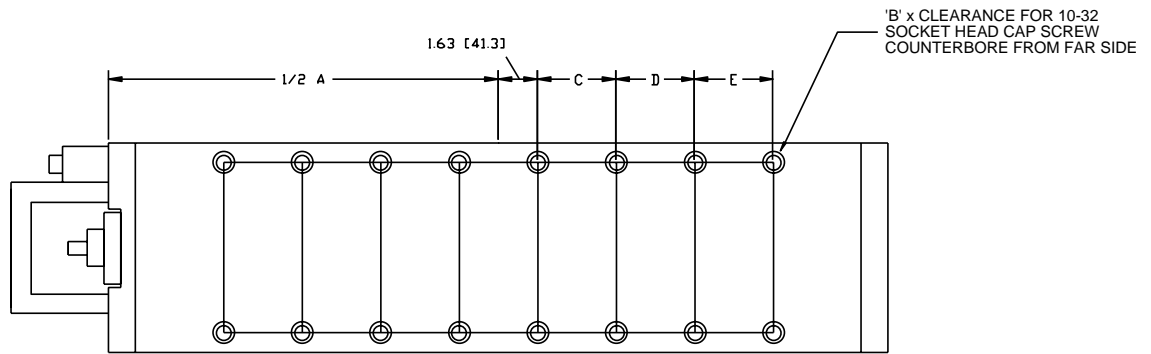
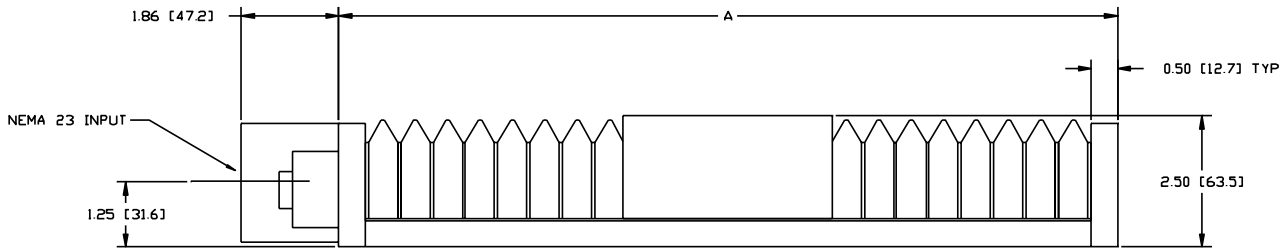
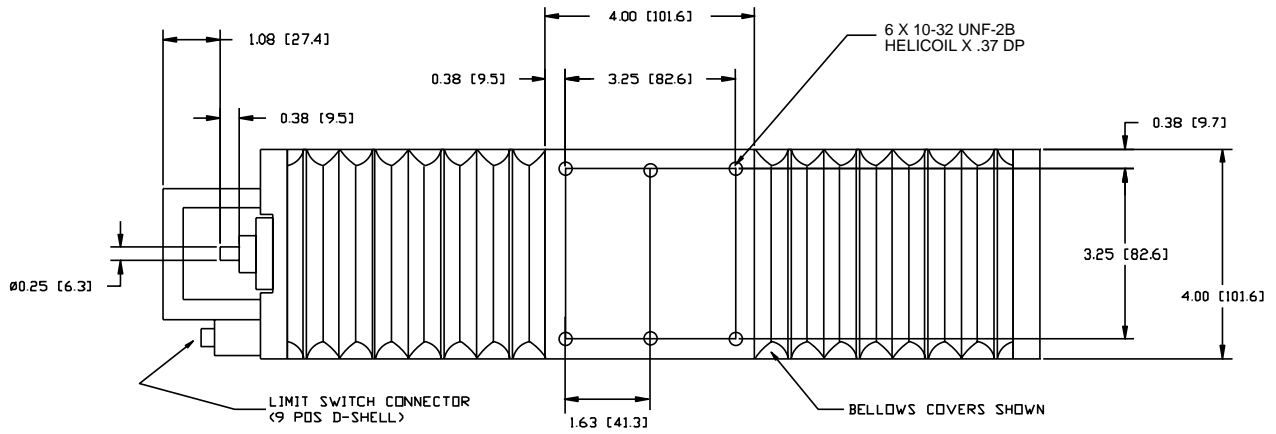




Specifications

High Precision—Small Footprint—Recirculating
Linear Bearings
Light Load Capacity—
Versatile

RB4A



Travel	A	B	C	D	E
2.00 (50.8)	8.31 (211.1)	4	—	—	—
4.00 (101.6)	10.62 (269.7)	4	—	—	—
6.00 (152.4)	12.93 (328.4)	8	3.25 (82.6)	—	—
8.00 (203.2)	15.24 (387.1)	8	3.25 (82.6)	—	—
12.00 (304.8)	19.72 (500.9)	12	3.25 (82.6)	3.25 (82.6)	—
16.00 (406.4)	24.34 (618.2)	16	3.25 (82.6)	3.25 (82.6)	3.25 (82.6)

Precision Positioning Tables



Basic Stepper Configuration

RB4A-___-5G-OE4-P21T-LI3-E0-CV1

- | | |
|------------------------------------|--|
| Standard Precision Assembly | High Performance Step Motor (P21) |
| Precision Ground Ballscrew (5G) | 3 Position Internal Limit Switches (LI3) |
| Travel (inches) 2, 4, 5, 12 and 16 | No Linear Encoder (E0) |
| 0.25 inch Oldham Coupling (OE4) | Neoprene Bellows Cover (CV1) |
- (please refer to How to Order page for additional standard options)

Basic Servo Configuration

RB4A-___-5G-BE4-BN21-LI3-E0-CV1

- | | |
|---------------------------------------|--|
| Standard Precision Assembly | High Performance Servo Motor (BN21) |
| Precision Ground Ballscrew (5G) | 3 Position Internal Limit Switches (LI3) |
| Travel (inches) 2, 4, 6, 8, 12 and 16 | No Linear Encoder (E0) |
| 0.25 inch Bellows Coupling (BE4) | Neoprene Bellows Cover (CV1) |
- (please refer to How to Order page for additional standard options)

Make it an IDEal System

Include an IDC drive or control that is preconfigured for and tested with each Precision Table axis.

Stepper Choices: NextStep, SmartStep23, SmartStep, S6961 or S6962

Servo Choices: B8001, B8961 or B8962

(order as a separate line item)

- | | | |
|----------|-------------------------------|---|
| Example: | RB4A-6-5G-OE4-P21T-LI3-E0-CV1 | 2 |
| | RB4A XYP | 1 |
| | SMART STEP23 | 2 |
| | IDEAL SYSTEM | 2 |

(please refer to the IDEal System Section for further details)



Standard Multi-Axis Configuration

Standard Precision X-Y Mounting (XYP) — 15 arc-sec Orthogonality — (dowel pinned assembly)

(ordered as a separate line item to assemble 2 separate tables)

- | | | |
|----------|-------------------------------|---|
| Example: | RB4A-8-5G-BE4-BN21-LI3-E0-CV1 | 2 |
| | RB4A XYP | 1 |

(for applications requiring more complicated assemblies than XYP, please refer to the Multi-Axis Section)

Standard Environmental Preparations

All standard IDC precision tables are designed to operate in general industrial environments.

Standard environmental preparation for Class 100 Clean Room or 10⁻⁷ Vacuum environments is also available.

(ordered as a separate line item per axis)

- | | | | | | |
|----------|--------------------------------|---|----------|-------------------------------|---|
| Example: | RB4A-12-5G-OE4-P21T-LI3-E0-CV0 | 2 | Example: | RB4A-4-5G-BE4-BN21-LI3-E0-CV0 | 2 |
| | CLEAN 100 | 2 | | VACUUM | 2 |
| | RB4A XYP | 1 | | RB4A XYP | 1 |

(for applications requiring other non-standard environments, please refer to the Environmental Section)

Performance Verification and Testing

(ordered as separate line item per axis)

- | | | |
|----------|--------------------------------|---|
| Example: | RB4A-16-5G-OE4-P21T-LI3-E0-CV1 | 1 |
| | TEST 1-1 | 1 |

(for applications requiring testing, please refer to the Performance Verification Section)

More Info?

More information, including a copy of the Owner's Manual is available by visiting IDC's web site or by contacting IDC.



How To Order

High Precision—Small Footprint—Recirculating
Linear Bearings
Light Load Capacity—
Versatile

RB4A

Ordering Example

RB4A	—	4	—	5G	—	BE4	—	BN21	—	LI3	—	E0	—	CV1
Model		Travel		Drive Screw		Coupling		Motor		Limit Switches		Linear Encoder		Covers

Product Model

RB4A	Standard Assembly
RB4AP	Precision Assembly (lower angular errors)

Travel (inches)

2, 4, 6, 8, 12, 16

Drive Screws

(see Drive Screw Section)

2.5MG	2.5mm (0.0984 inch) JIS C3 Precision Ground Ballscrew Preloaded — Zero Backlash
5G	5.08mm (0.2 inch) JIS C3 Precision Ground Ballscrew Preloaded — Zero Backlash
2G	12.7mm (0.5 inch) JIS C3 Precision Ground Ballscrew Preloaded — Zero Backlash
2.5MGP	2.5mm (0.0984 inch) JIS C1 Precision Ground Ballscrew Preloaded — Zero Backlash
5GP	5.08mm (0.2 inch) JIS C1 Precision Ground Ballscrew Preloaded — Zero Backlash
2GP	12.7mm (0.5 inch) JIS C1 Precision Ground Ballscrew Preloaded — Zero Backlash
10A	2.54mm (0.1 inch) Precision Rolled Leadscrew Preloaded — Zero Backlash
5A	5.08 (0.2 inch) Precision Rolled Leadscrew Preloaded — Zero Backlash

Coupling — Type and Input Shaft

(see Coupling Section)

BE4	Stainless Steel Bellows 0.25 inch shaft diameter
BE5	Stainless Steel Bellows 0.3125 inch shaft diameter
OE4	Oldham 0.25 inch shaft diameter
OE5	Oldham 0.3125 inch shaft diameter
SE4	Stainless Steel Beam 0.25 inch shaft diameter
SE5	Stainless Steel Beam 0.3125 inch shaft diameter

Motors - Stepper

(see Stepper Section on page G-1 and Motor Section)

P21n	Performance NEMA 23 (0.25 inch coupling)
P22n	Performance NEMA 23 (0.25 inch coupling)
S21n	Standard NEMA 23 (0.25 inch coupling)
S22n	Standard NEMA 23 (0.25 inch coupling)
S23n	Standard NEMA 23 (0.25 inch coupling)

n = T (Series), V (Parallel), N (Flying leads)

Motors - Servo

(see Servo Section on page H-1 and Motor Section)

BN21	Performance NEMA 23 (0.25 inch coupling)
BN23	Performance NEMA 23 (0.25 inch coupling)
B22	Standard NEMA 23 (0.3125 inch coupling)
B23	Standard NEMA 23 (0.3125 inch coupling)
B23H	Standard NEMA 23 (0.3125 inch coupling)

Motors - Customer Supplied

(see Motor Section)

X23n	Standard NEMA 23 Motor Mount
	n = X Customer Supplied and Mounted
	n = C Customer Supplied and IDC Mounted

Limit Switches

(see Limit Switch Section)

L0	No Limit Switches
LI2	2 Position Internal Hall Effect Limit Switch (2 over travel limit switches)
LI3	3 Position Internal Hall Effect Limit Switch (2 over travel limits & 1 home limit switch)

Encoders

(see Linear Encoder Section)

E0	No Linear Encoder
EM1	1 Micron Resolution
EM2	2 Micron Resolution
EMR	Standard Motor Mounted Rotary Encoder
EMKR	1000 Line Encoder (where available)

Covers (see Cover Section)

CV0	No Covers
CV1	Neoprene Bellows Cover

Special Features (see preceding page)

(ordered as a separate line item)

Special Options (see Specials Section)

Please contact IDC for non-standard applications or components.

Lead-times for complete positioning systems are determined by the lead-times of the individual components (precision tables, motors, gearmotors, drives and controls, etc.). Standard precision table lead-times apply to basic configurations and standard catalog options. Extended travels, environmental preparations, special components, special testing, special modifications and custom systems may require additional lead-time. Please contact IDC for further details.