Precision Rotation Stages

URS-B SERIES

- Backlash-free continuous rotation with 20,000 MTBF
- 8,000 cts/rev rotary encoder on some DC motor versions enables 0.0005° resolution
- Unique, compact 2-piece bearing design provides exceptional wobble and eccentricity
- Economic stepper motor versions with high motion sensitivity

The URS-B Series provides precision 360° continuous motion in a low profile package. They meet the requirements of numerous research and industrial applications and some are directly compatible with Newport's VP (URS75B), XM, GTS, ILS (URS100B), IMS (URS100B and URS150B) and other series of linear stages. URS-B rotation stages are available in two versions:

- The URS75BCC to URS150BCC DC-motor versions features an ultra-high resolution 8,000 cts/rev rotary encoder with index pulse for precision homing and is the recommended choice for applications requiring accurate bi-directional positioning. For the tightest position control, the rotary encoder is mounted directly on the worm screw. This eliminates most of the possible error sources associated with indirect read feedback devices. The high-torque of some DC motor versions provides the highest dynamic speed range and allows for rotating speeds up to 80 °/s. The URS50BCC DC-version is our smallest version and its motor encoder feature provides a very compact and easy to integrate version which can go up to 20 °/s with 100 N maximum load capacity.
- The stepper motor version is a more economical version for less demanding applications. When used with motion controllers with high micro-step capability, like the XPS or ESP301, low noise operation and very small incremental motions are guaranteed. The stepper motor versions do not use encoder feedback, but reach a position by the number of commanded steps and micro-steps. For this purpose, the stepper motor is directly attached to the worm screw using a proprietary bellows coupling that has a high torsional stiffness, eliminating the need for a gear or belt drive. The high output torque of the stepper motor minimizes the risk of lost steps and provides good linearity between commanded micro-steps and the actual motion of the stage.

Furthermore, except for the URS50B stages, all other versions feature adjustable limit switches to prevent over travel.

All URS-B rotation stages feature a proprietary ball bearing to provides a low-profile compact stage with exceptional stiffness, high reliability and outstanding wobble and eccentricity. The tilted worm screw arrangement allows for 4 symmetric mounting holes as compared to other designs that only feature 2 or 3 mounting holes. This enables the URS-B stages to provide better support of higher or off-centered loads. Additionally, the flexible preloading system for the worm gear was improved to guarantee a backlash-free operation with an MTBF of 20,000 hours.

STAGE COMPATIBILITIES

Stage	URS75B	URS100B	URS150B
VP	✓	–	–
XMS	✓	✓	–
GTS	–	✓	–
ILS	–	✓	–
IMS	–	✓	✓

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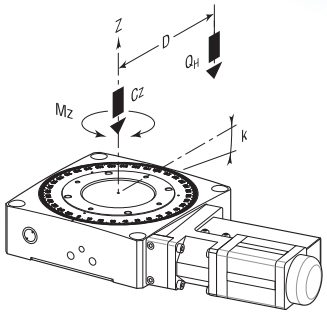
URS-B SERIES

DESIGN DETAILS

Base Material	Hardened steel body
Bearings	Large diameter ball bearings
Drive Mechanism	URS50BCC: Gearbox 1:14, no belt. URS75B to URS150B: Ground worm gear with self-compensating preload. Additional 1:2.75 drive belt with URS75BCC to URS150BCC versions (no belt on URS-BPP versions)
Worm Gear Ratio	URS50B: 1:80 URS75B to URS150B: 1:90
Feedback	URS50BCC: Encoder at motor rear, no index pulse URS75BCC to URS150BCC: Worm mounted 8,000 cts/rev encoder, index pulse URS-BPP: None
Limit Switches	Two independently adjustable optical limit switches (Except URS50B)
Origin	Optical, fixed at position 0°. Typical repeatability: 0.05° for URS50BCC, 0.0005° for URS75BCC and URS150BCC and 0.04° repeatability for URS-BPP
Manual Adjustment	Via allen wrench at the end of the worm screw. Allen wrench is included.
Motor	URS50BCC: UE18CC DC servo motor URS75BCC to URS150BCC: UE34CC DC servo motor URS50BPP: UE28PP Two phase stepper motor, 1 full step = 0.0225° URS75BPP to URS150BPP: UE34PP Two phase stepper motor, 1 full step = 0.02°
Cable	3 m long cable included

LOAD CHARACTERISTICS AND STIFFNESS



	URS50B	URS75B	URS100B	URS150B
Cz, Normal centered load capacity (N)	100	200	300	300
a, Construction parameter (mm)	20	25	35	55
kα, Transversal compliance (µrad/Nm)	100	30	10	5
Mz, Nominal Torque (Nm)	0.25	0.5	1	2
Q, Off-center load with D = Cantilever distance in mm	Q ≤ Cz ÷ (1 + D/a)			

SPECIFICATIONS

	URS50BPP		URS50BCC		URS75BPP to URS150BPP		URS75BCC to URS150BCC	
	Typical	Guaranteed [3]	Typical	Guaranteed [3]	Typical	Guaranteed [3]	Typical	Guaranteed [3]
Travel Range (°)	360 continuous [1]							
Minimum Incremental Motion, Linear (°)	0.0005		0.001		0.0002 [2]		0.002	
Uni-directional Repeatability (°)	0.0005	0.002	0.0005	0.002	0.001	0.002	0.001	0.002
Bi-directional Repeatability (°)	0.0045	0.008 or ±0.004	0.0015	0.006 or ±0.003		0.02 or ±0.01		0.006 or ±0.003
Absolute Accuracy (°)	0.017 or ±0.0085	0.05 or ±0.025	0.015 or ±0.0075	0.04 or ±0.02	0.016 or ±0.008	0.030	0.012	0.023
Maximum Speed (°/s)	40 [4]		20		40		80	
Wobble (µrad)		50 or ±25		50 or ±25	20	50	20	50
Eccentricity (µm)		6 or ±3		6 or ±3	3	3	3	3
MTBF	20000 h @ 25% load and a 30% duty cycle							

[1] With disabled limit switches (±160° with actived limit switches).
[2] MIM with the SMC100PP is 0.0005° and 0.0002° with the XPS and ESP301.
[3] Shown are peak to peak, guaranteed specifications or ± half the value as sometimes shown. The typical specifications which about 2X better than the guaranteed values.
[4] Speed is reduced by 2.5x of the rated speed (ie, 40% of rated speed) when used with SMC100PP controller.

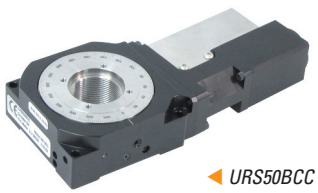
RECOMMENDED CONTROLLERS/DRIVERS

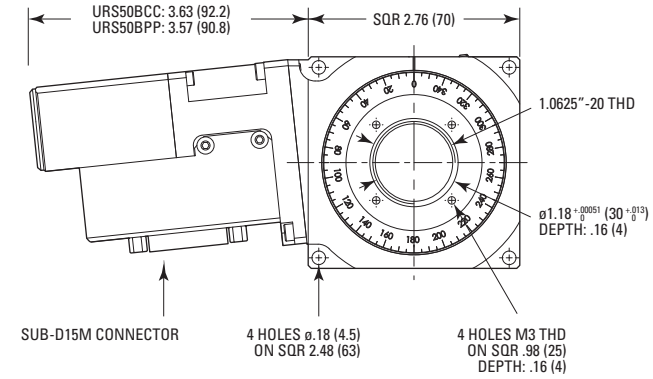
XPS	Universal High-Performance Motion Controller/Driver
ESP301	3 Axis Motion Controller/Driver
SMC100	Single-Axis DC or Stepper Motion Controller

DIMENSIONS

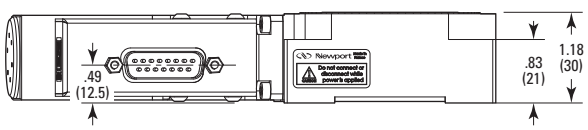
URS50B Stages


◀ *URS50BPP*


◀ *URS50BCC*

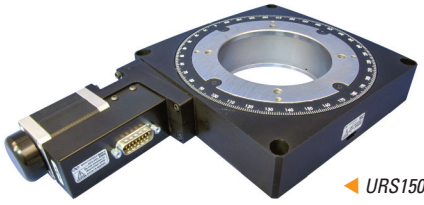


MODEL SHOWN: URS50BCC
DIMENSIONS IN INCHES (AND MILLIMETERS)

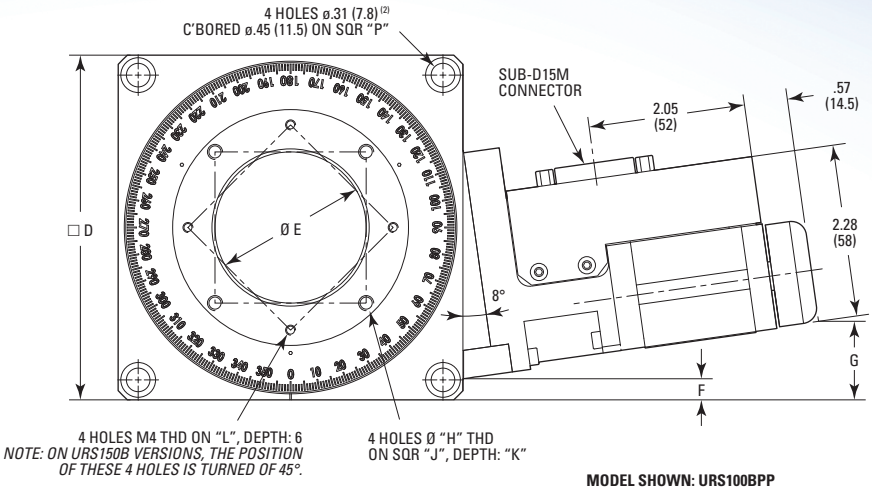


URS75B to URS150B Stages

◀ *URS75BCC*

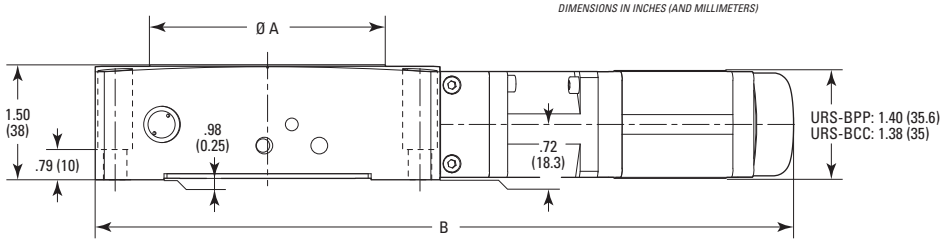


◀ *URS150BPP*

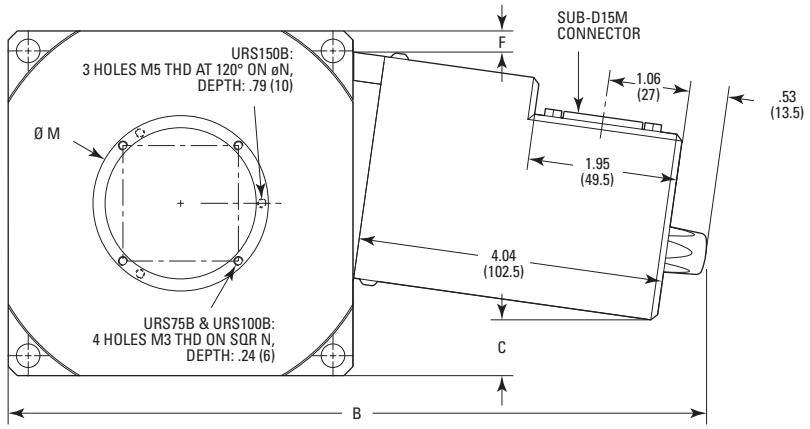


MODEL SHOWN: URS100BPP

DIMENSIONS IN INCHES (AND MILLIMETERS)



BOTTOM VIEW OF THE URS100BCC



	A	B	C	D	E	F	G	H	J	K	L	M	N	P
URS75B	1.97 (50)	8.19 (208)	-.20 [1] (-5) [1]	3.54 (90)	$1.18^{+.00051}_{0}$ ($30^{+.013}_{0}$)	.08 (2)	.83 (21)	M3	1.26 (32)	.24 (6)	–	1.50 (38)	1.34 (34)	2.98 (75.6)
URS100B	3.07 (78)	9.13 (232)	.71 (18)	4.49 (114)	$1.97^{+.00063}_{0}$ ($50^{+.016}_{0}$)	.26 (6.5)	1.02 (26)	M6	1.97 (50)	.24 (6)	SQR 1.89 (SQR 48)	2.28 (58)	2.13 (54)	3.97 (100.8)
URS150B	5.18 (131.5)	11.14 (283)	2.56 (65)	6.50 (165)	$3.54^{+.00087}_{0}$ ($90^{+.022}_{0}$)	.41 (10.5)	1.14 (29)	M4	2.95 (75)	.31 (8)	ø4.92 (Ø 125)	4.13 (105)	3.86 (98)	5.91 AND 6 [2] (150 AND 152.4) [2]

NOTES:
[1] THE DRIVE BOX OF THE URS75BCC EXCEEDS .20 IN. (5 MM) FROM THE BODY.
[2] URS150B: 4 SLOTS COUNTERBORED.

ORDERING INFORMATION

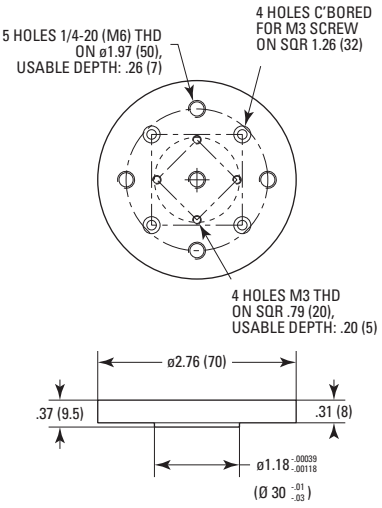
Model	Description
URS50BCC	Precision rotation stage, DC motor
URS50BPP	Precision rotation stage, stepper motor
URS50BPPV6	URS50B rotation stage, stepper motor, vacuum version
URS75BCC	Precision rotation stage, DC motor
URS75BPP	Precision rotation stage, stepper motor
URS75BPPV6	URS75B rotation stage, stepper motor, vacuum version
URS100BCC	Precision rotation stage, DC motor
URS100BPP	Precision rotation stage, stepper motor

Model	Description
URS150BCC	Precision rotation stage, DC motor
URS150BPP	Precision rotation stage, stepper motor
URSBK	90° mounting bracket URS-B Series rotation stages
URS75P1	Optics Holder, 1 inch diameter, for URS75B stages
URS75TP	Solid top mounting plate for URS75B stages, 1/4"-20 threaded holes
M-URS75TP	Solid top mounting plate for URS75B stages, M6 threaded holes

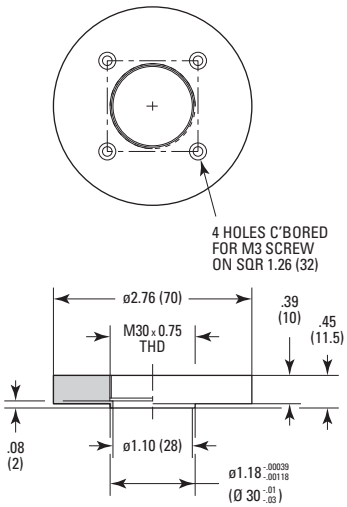
Model	Description
URS100TP	Solid top mounting plate for URS100B stages, 1/4"-20 threaded holes
M-URS100TP	Solid top mounting plate for URS100B stages, M6 threaded holes
URS150TP	Solid top mounting plate, for URS150B stages, 1/4"-20 threaded holes

ACCESSORIES

(M-)URS75TP



URS75P1



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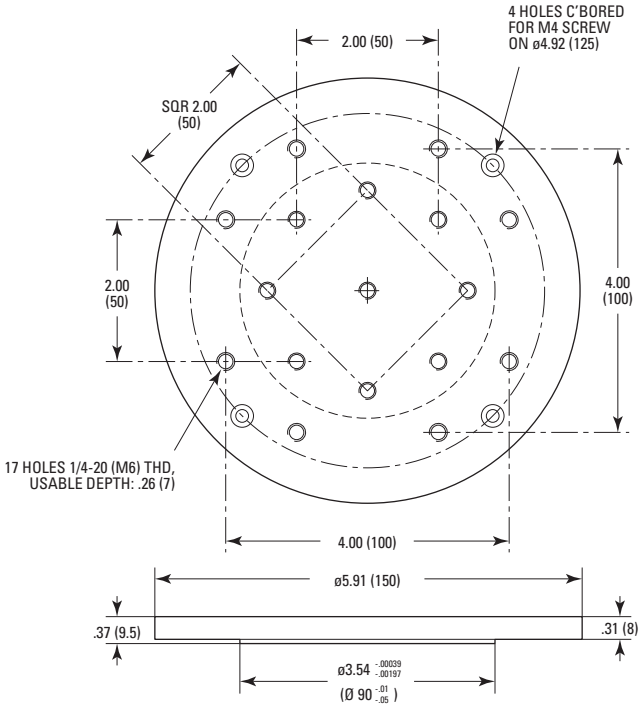
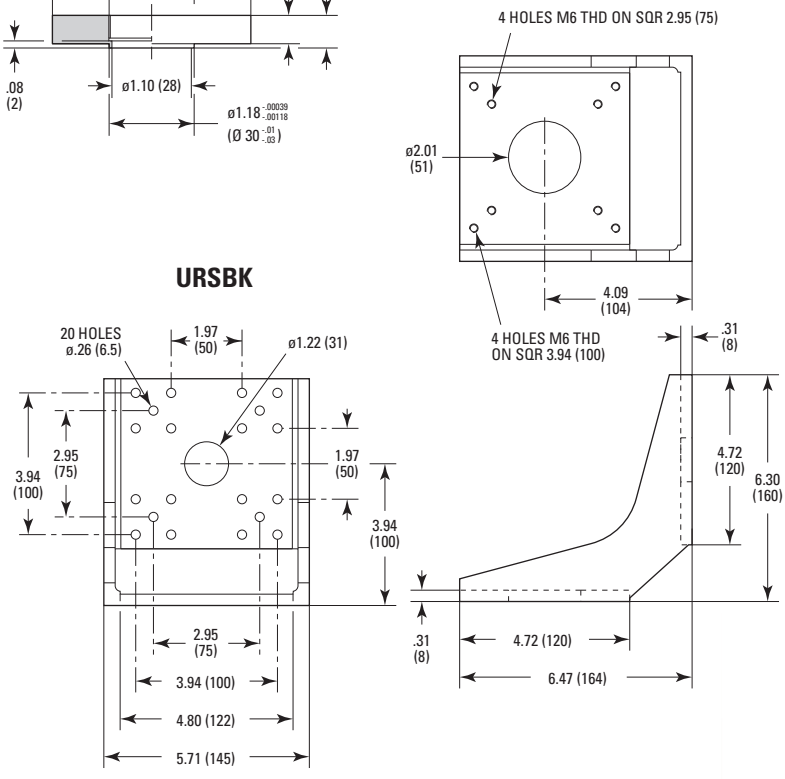
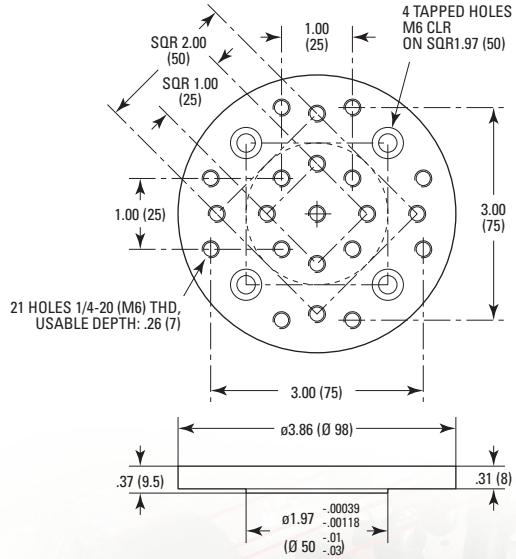


URSBK



(M-)URS100TP



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