

Precision Rotation Stages

URS SERIES



The URS Series provides precision 360° continuous motion in a low profile package. They meet the requirements of numerous research and industrial applications and may be assembled directly with Newport's VP (URS75), XM, GTS, ILS (URS100), IMS (URS100 and URS150) and other series of linear stages. URS 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 microsteps. 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 microsteps and the actual motion of the stage.

- Economical, general purpose
- Flexible preloading system guarantees backlash-free operation
- Tilted worm screw arrangement and 4 symmetric mounting holes provide better support for cantilevered loads with a smaller footprint
- Vacuum compatible version available

Furthermore, except for the URS50 stages, all other versions feature adjustable limit switches to prevent over travel.

All URS 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 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

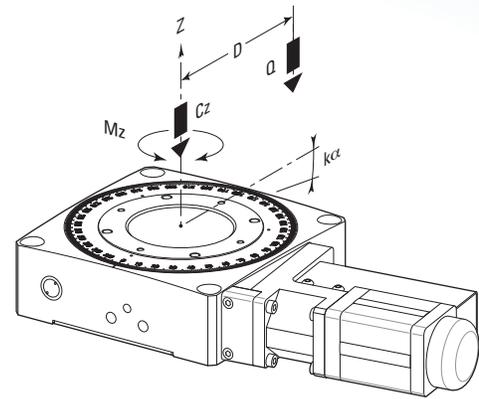
Stage	URS75	URS100	URS150
VP	✓	–	–
XMS	✓	✓	–
GTS	–	✓	–
ILS	–	✓	–
IMS	–	✓	✓

URS SERIES

DESIGN DETAILS

Base Material	Hardened steel body
Bearings	Large diameter ball bearings
Drive Mechanism	Ground worm gear with self-compensating preload Additional 1÷14 gearbox for URS50BCC version Additional 1÷2.75 drive belt for URS75BCC to URS150BCC versions
Worm Gear Ratio	URS50: 1÷80 URS75 to URS150: 1÷90
Feedback	URS50BCC: Encoder at motor rear, no index pulse URS75BCC to URS150BCC: Worm mounted 8,000 cts/rev encoder, index pulse URS-PP versions: None
Limit Switches	Two independently adjustable optical limit switches (Except URS50)
Origin	Optical, fixed at position 0° Typical 0.0005° repeatability for URS-CC versions and 0.04° repeatability for URS-PP versions
Manual Adjustment	Via allen wrench at the end of the worm screw. Allen wrench is included.
Cable	3 m long cable included

LOAD CHARACTERISTICS AND STIFFNESS



		URS50	URS75	URS100	URS150
Cz,	Normal centered load capacity (N)	100	200	300	300
Kcα,	Transversal compliance (µrad/Nm)	100	30	10	5
Mz,	Nominal torque (Nm)	0.25	0.5	1.0	2.0
a,	Construction parameter (mm)	20	25	35	55
Q,	Off-center load (N)	$Q \leq Cz \div (1 + D/a)$			
	Where D = Cantilever distance (mm)				

RECOMMENDED CONTROLLERS/DRIVERS

Model	Description
XPS-D	1- to 8-axis universal high-performance motion controller/driver
XPS-DRV11	Universal digital driver card for stepper, DC and direct motors
XPS-RL	1- to 4-axis universal high-performance motion controller/driver
XPS-DRV01	PWM drive module for DC brush and stepper motors, 3 A/43 V max.
ESP301	1- to 3-axis motion controller/driver
SMC100CC	Single-axis DC motor controller/driver
SMC100PP	Single-axis stepper motor controller/driver



SPECIFICATIONS

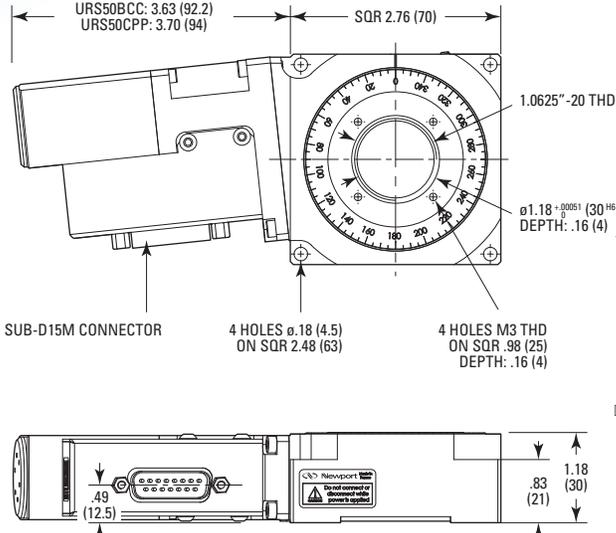
	URS50CPP	URS50BCC	URS75BPP to URS150BPP	URS75BCC to URS150BCC
Travel Range (°)			360 continuous ⁽¹⁾	
Minimum Incremental Motion (°)	0.0005	0.001	0.0002	0.002
Uni-directional Repeatability ⁽²⁾ , Typical (Guaranteed) (°)	±0.0006 (±0.001)	±0.0003 (±0.001)	±0.00035 (±0.001)	±0.00035 (±0.001)
Bi-directional Repeatability ⁽²⁾ , Typical (Guaranteed) (°)	±0.001 (±0.003)	±0.0005 (±0.002)	±0.00044 (±0.006)	±0.0014 (±0.003)
Accuracy ⁽²⁾ , Typical (Guaranteed) (°)	±0.012 (±0.025)	±0.010 (±0.020)	±0.008 (±0.015)	±0.006 (±0.0115)
Maximum Speed (°/s)	40	20	40	80
Wobble ⁽²⁾ , Typical (Guaranteed) (µrad)			±12 (±25)	
Eccentricity ⁽²⁾ , Typical (µm)		URS50: ±3.0		URS75: ±0.3 URS100: ±0.4 URS150: ±0.5
MTBF	20000 h @ 25% load and a 30% duty cycle			

⁽¹⁾ With disabled limit switches.

⁽²⁾ For the definition of Typical and Guaranteed specifications see "Motion Basics Terminology & Standards" Tutorial at www.newport.com

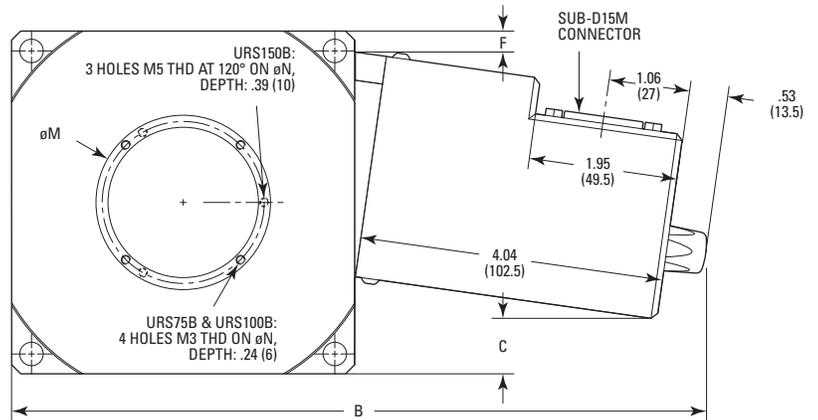
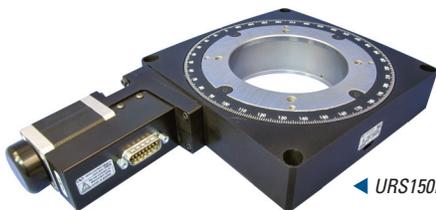
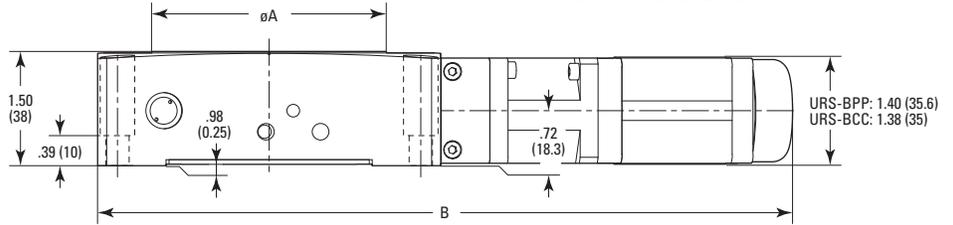
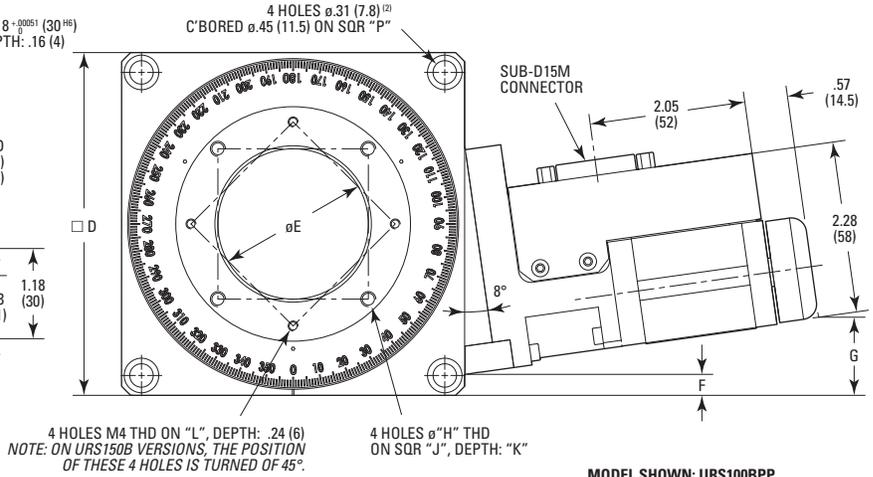
DIMENSIONS

URS50 Stages



MODEL SHOWN: URS50BCC
DIMENSIONS IN INCHES (AND MILLIMETERS)

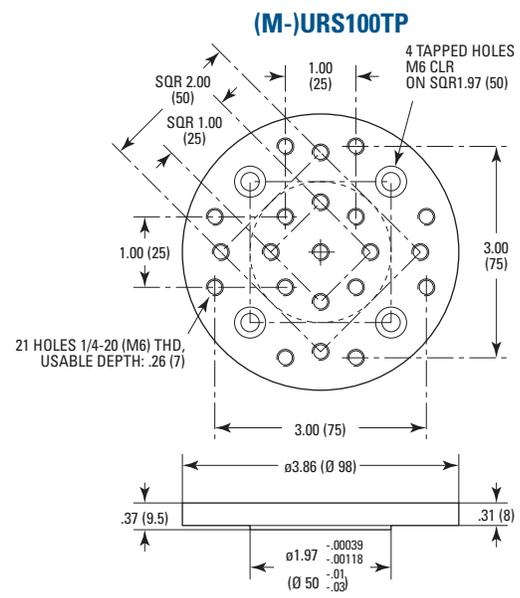
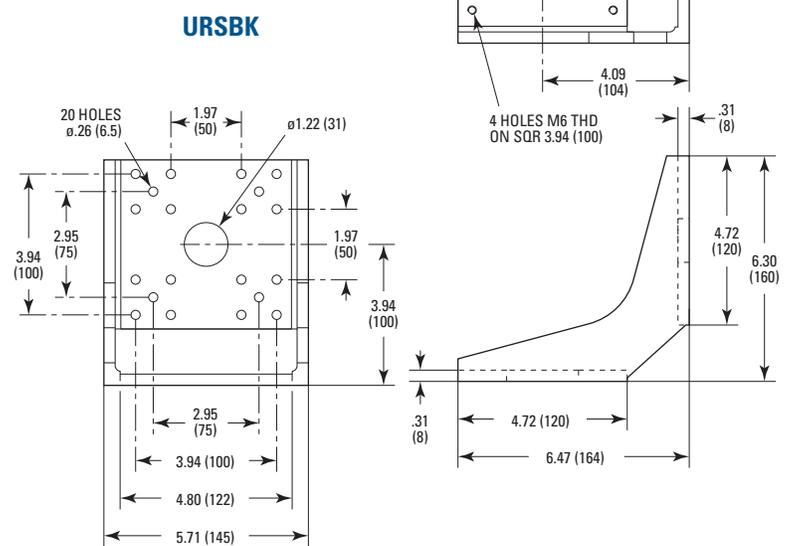
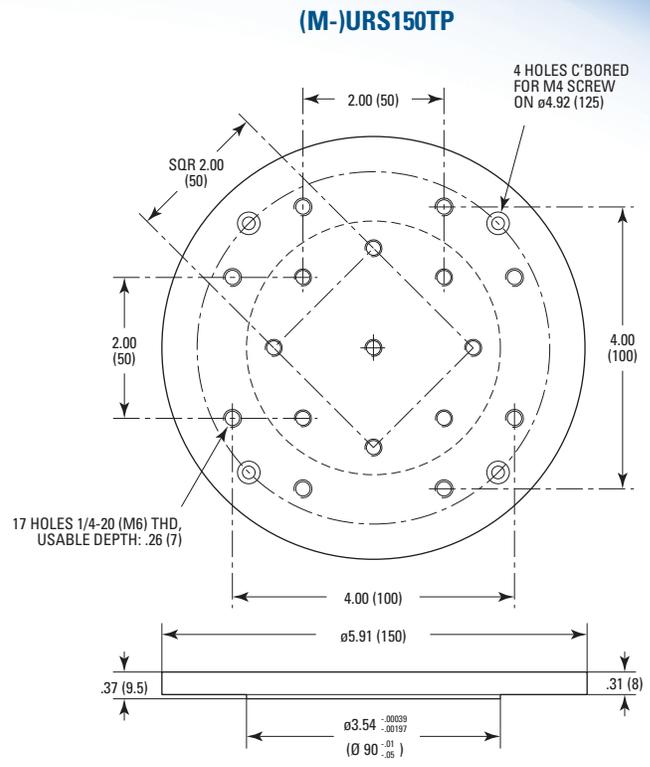
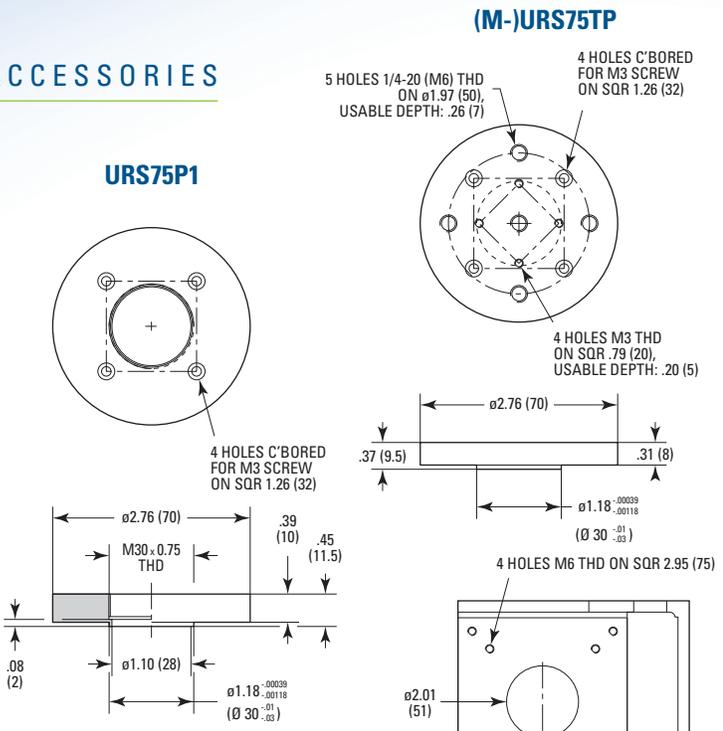
URS75 to URS150 Stages



	A	B	C	D	E	F	G	H	J	K	L	M	N	P
URS75B	1.97 (50)	8.19 (208)	-.06 ⁽¹⁾ (-1.5) ⁽¹⁾	3.54 (90)	1.18 ^{+0.0051} (30 ¹⁶)	.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 ^{+0.0063} (50 ¹⁶)	.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	5.20 (132)	11.14 (283)	2.56 (65)	6.50 (165)	3.54 ^{+0.0087} (90 ¹⁶)	.41 (10.5)	1.14 (29)	M4	2.95 (75)	.31 (8)	$\phi 4.92$ (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 .06 IN. (1.5 MM) FROM THE BODY.
² URS150B: 4 SLOTS COUNTERBORED.

ACCESSORIES



ORDERING INFORMATION

Model	Description
URS50BCC	Precision rotation stage, DC motor
URS50CPP	Precision rotation stage, stepper motor
URS75BCC	Precision rotation stage, DC motor
URS75BPP	Precision rotation stage, stepper motor
URS100BCC	Precision rotation stage, DC motor
URS100BPP	Precision rotation stage, stepper motor
URS150BCC	Precision rotation stage, DC motor
URS150BPP	Precision rotation stage, stepper motor

Model	Description
URSBK	90° mounting bracket URS Series rotation stages
URS75P1	Optics Holder, 1 inch diameter, for URS75 stages
URS75TP	Solid top mounting plate for URS75 stages, 1/4"-20 threaded holes
M-URS75TP	Solid top mounting plate for URS75 stages, M6 threaded holes

Model	Description
URS100TP	Solid top mounting plate for URS100 stages, 1/4"-20 threaded holes
M-URS100TP	Solid top mounting plate for URS100 stages, M6 threaded holes
URS150TP	Solid top mounting plate, for URS150 stages, 1/4"-20 threaded holes



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