Bell Everman
Solutions For A World Of Motion

ServoBelt Rotary Stage

Precision rotary motion in an easy-to-integrate package.

- **Big Througholes, Small Package.** Available in 50, 100 and 200 mm through holes and profiles under 67-mm, these belt-drive stages are easy to integrate into tight machine envelopes.
- **Direct Drive Performance.** Designed for NEMA 23 motors, the belt-drive stages offer speeds up to 1,000 rpm, continuous torque to 6.6 N-m and accuracies down to 0.27 arc-sec with Renishaw ring encoders.
- **Robust Bearings.** ServoBelt Rotary incorporates large bearings for its size, imparting moment and load capacities far in excess of its usual application requirements. This excess load capacity translates into virtually limitless bearing life. Lubed-for-life, full duplex, preloaded angular contact bearings.
- **Cost Effective.** ServoBelt Rotary offers an economical solution for a variety of medium-duty rotary motion jobs such as driving carousel tables on packaging and assembly machines and providing fourth-axis rotary motion for laser cutting and mini CNC machines.

PART NUMBERING — SBR – XX – XX – XX – XX – XX – XX – XX

Series
Servobelt Rotary Stage (SBR)

Size (mm throughole)
50, 100, 200

Motor
232P (NEMA 23, 2 stack, parallel wound), 232S (NEMA 23, 2 stack, series wound),
233P (NEMA 23, 3 stack, parallel wound), 233S (NEMA 23, 3 stack, series wound),
234P (NEMA 23, 4 stack, parallel wound), 234S (NEMA 23, 4 stack, series wound)

Configuration
UP, DN (Motor mounted up or down)

Feedback (Encoder)
16K (16,000 count rotary encoder)
RE1 (1µ RGH 24 readhead with 270 degrees of tape scale)
RE.5 (0.5µ RGH 24 readhead with 270 degrees of tape scale)
RE.2 (0.2µ RGH 24 readhead with 270 degrees of tape scale)
RE.1 (0.1µ RGH 24 readhead with 270 degrees of tape scale)

Sensor Type
NPN (Sinking Sensors, Normally Closed)
PNP (Sourcing Sensors, Normally Closed)
REED (Normally Open)

Accessories
PC (Pinion cover), BC (Back cover), PCBC (Pinion cover & back cover)

Operating Environment
N (Normal use, supplied with standard lubricants) or C (Clean room use, supplied with clean room lubricants)

EXAMPLE — SBR – 200 – 233S – UP – RE1 – PNP – PCBC – C

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DATA SHEET

TECHNICAL SPECIFICATIONS	ServoBelt Rotary Size/Feedback				
	SBR-50 with 16KCPR motor encoder	SBR50 with ring encoder	SBR-100 with 16KCPR motor encoder	SBR100 with ring encoder	SBR200 with 20KCPR motor encoder
Type	NEMA 23 3:1 Belt Drive Rotary		NEMA 23 5:1 Belt Drive Rotary		NEMA 34 11:1 Belt Drive Rotary
Bearing type	Preloaded duplex angular contact				
Motor type	3-phase brushless, with encoder				
Through hole	50.8mm (2.00 in.)		101.6mm (4.00 in.)		203.2 (8.00 in.)
Accuracy (±arc-sec) Deviation from commanded angle.	90	16	45	16	60
Kinematic Wobble (±arc-sec) Tilt of rotary axis irrespective of table flatness or physical runout of table top.	16		8		8
Kinematic Radial Runout (µm TIR) In-plane wander of rotational centerline irrespective of table roundness or physical runout of table top OD.	8		8		10
Table top parallelism to base (µm TIR) Total indicated worse-case parallelism top to bottom.	25		25		35
Table top physical Runout (µm TIR) Total indicated runout of the top of the rotating table under stationary indicator at the table's outer edge.	10		10		15
Bi-directional Repeatability With motor encoder versions only, assumes 0.2 degrees lost motion at pinion, divided by ratio.	±120 arc-sec	Control Dependent, ±1 count possible	±40 arc-sec	Control Dependent, ±1 count possible	±100 arcsec
Uni-directional Repeatability Angular conversion of 10µm at bull gear radius.	±30 arc-sec	Control Dependent, ±1 count possible	±12 arc-sec	Control Dependent, ±1 count possible	±15 arcsec
Resolution choices	16k @ motor	1µm, 0.5µm, 0.2µm, 0.1µm (75mm ring)	16k @ motor	1µm, 0.5µm, 0.2µm, 0.1µm (150mm ring)	16k @ motor (255mm ring)
Table Resolution (KCPR) Measured in thousands of pulses per revolution of the table (KCPR).	48	314.9, 629.8, 1574, 3149	80	472, 944, 236, 4720	220
Speed Limit (RPM) Note that maximum speed for ring encoder units decreases as resolution increases.	1300	1300-134	800	764-66	360
Continuous Torque, N-m(motor) RMS torque allowed at table. Assume peak torque to be 3 times RMS torque for no longer than 3 seconds.	2.4(-2), 3(-3), 4.0(-4)		4.1(-2), 5.1(-3), 6.6(-4)		20(-2), 30(-3), 38(-4)
Load capacity Axial/Radial (kN) Load capacity are for L10 rating life of 1 million table revolutions. Load capacity is not equivalent to payload. The ability to servo control a given payload is dependent on inertia, motion profile, duty cycle and control architecture.	8.6 / 7.7		14.0 / 11.7		25/21
Max. Moment (N-m) Moment loads are for L10 rating life of 1 million table revolutions.	120		370		1050
Rotational Inertia (kg-m^2) Rotational inertia of table.	0.00018	0.00047	0.005	0.006	0.0366
Stage weight (kg, less motor)	1.32		3.3		7.5
Recommended payload maximum, Kg Bearing capacity is far in excess of these numbers for enhanced bearing life. Ability to control recommended payloads entirely dependent on move profile and moment of inertia.	10		25		100