

98 / 99 Series Swivels

Backlash free, fatigue rated swivel joints for dynamic testing of structures and components.

BIA West 98 series rod end swivel joints and 99 series base end swivel joints allow pivoting

movement around a spherical center with **backlash**

free reversing load capacity. They are designed to **reduce side loads and force alignment issues** in actuators. All swivels use a sealed, **maintenance free**, spherical bearing; eliminating the need for periodic lubrication. The swivels are designed for use with BIA West actuators while maintaining **mounting pattern compatibility** with competitor's products.

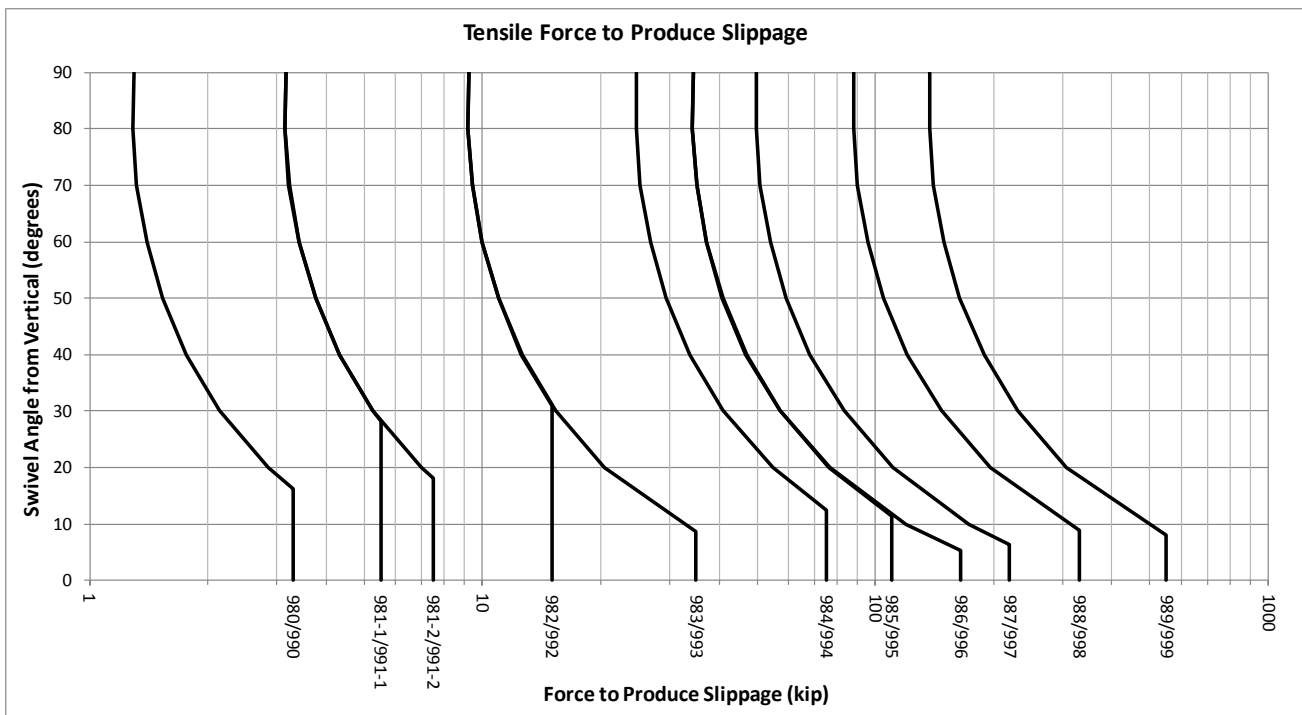


BIA West 98 / 99 series swivels allow for backlash adjustment to eliminate clearance between the bearing and housing, resulting in **increased bearing life** and **repeatable data.** A single bolt is used to preload the bearing on swivels rated up to 75 kip. Swivels rated above 75 kip use a multi-jackbolt tensioner (torquenut) with multiple smaller jack bolts to obtain the high clamp loads required. Swivels rated at 110 kip and above are also available without backlash adjustment. These swivels are an **economical alternative** for applications without fully reversing loads.

98 / 99 Series Swivels can be sized for your specific needs with force rating from 3.3 kip up to 550 kip in both base end and rod end configurations. Higher force ratings are available upon request. If more tilt angle is required, high tilt versions are also available for most models.

Features

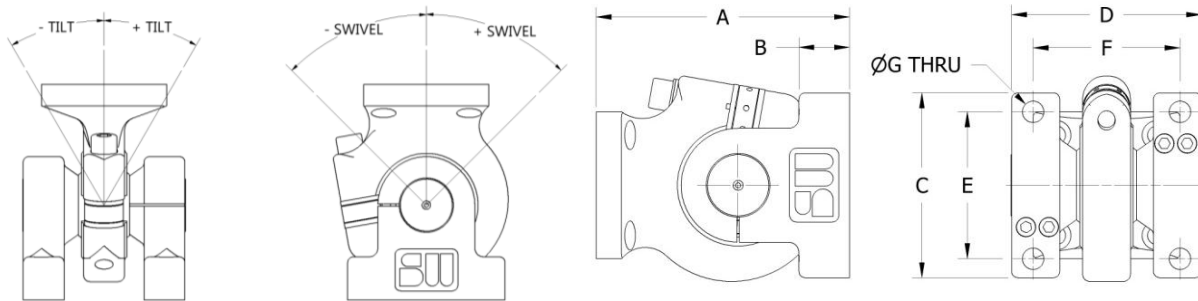
- **Maintenance free bearings:** Sealed, maintenance free bearings are used on all swivels, eliminating any need for grease fittings and periodic lubrication. The seals minimize dust and other contaminants from entering the bearing surface and prematurely wearing the bearing.
- **Ductile Iron:** Cast ductile iron is used for all 98 / 99 Series swivels to achieve an optimal combination of strength, ductility, and durability at a reasonable cost. Using proprietary tang and bracket castings allows BIA West to take full advantage of these material qualities.
- **Backlash Free:** Using a preload bolt and spacer set, the bearing can be preloaded to eliminate clearance without crushing the bearing. This provides a back lash free joint, eliminating data spikes or audible clicks during fully reversed cycles.



Rod End Swivels				
Model Number	Force Rating [Kip (kN)]	Tilt Angle (Degrees)	Swivel Angle (Degrees)	Weight [lbs (kg)]
980	3.3 (14)	±10	-70, +90	4 (1.8)
981-1	5.5 (24)	±7	-80, +90	6 (2.7)
981-2	7.5 (30)	±18	-25, +90	6 (2.7)
982	15 (65)	±17	-90, +90	21 (9.5)
983	35 (150)	±17	-80, +90	56 (25.5)
984	75 (333)	±14	-90, +90	120 (55)
985	110 (500)	±6	-35, +90	330 (150) *
985HT	110 (500)	±14	-35, +90	350 (159) *
986	170 (756)	±7	-30, +90	635 (288) *
986HT	170 (756)	±16	-30, +90	635 (288) *
987	220 (1000)	±8	-30, +90	950 (431) *
987HT	220 (1000)	±16	-25, +70	950 (431) *
988	330 (1500)	±7	-30, +90	1500 (681) *
988HT	330 (1500)	±14	-30, +90	1600 (726) *
989	550 (2500)	±7	-25, +90	3300 (1497)
989HT	550 (2500)	±15	-25, +90	3500 (1588)

Base End Swivels				
Model Number	Force Rating [Kip (kN)]	Tilt Angle (Degrees)	Swivel Angle (Degrees)	Weight [lbs (kg)]
990	3.3 (14)	±10	-70, +90	4 (1.8)
991-1	5.5 (24)	±7	-80, +90	8 (3.6)
991-2	7.5 (30)	±18	-25, +90	10 (4.5)
992	15 (65)	±17	-90, +90	25 (11.5)
993	35 (150)	±17	-80, +90	65 (29.5)
994	75 (333)	±14	-90, +90	140 (63.5)
995	110 (500)	±6	-35, +90	310 (141)
995HT	110 (500)	±14	-35, +90	330 (150)
996	170 (756)	±7	-30, +90	550 (250)
996HT	170 (756)	±16	-30, +90	550 (250)
997	220 (1000)	±8	-30, +90	800 (363)
997HT	220 (1000)	±16	-25, +70	800 (363)
998	330 (1500)	±7	-30, +90	1250 (567)
998HT	330 (1500)	±14	-30, +90	1350 (613)
999	550 (2500)	±7	-25, +90	3300 (1497)
999HT	550 (2500)	±15	-25, +90	3500 (1588)

* : includes flange adapter and preload stud



Swivel Mount Dimensions							
Model Number	A [in (mm)]	B [in (mm)]	C [in (mm)]	D [in (mm)]	E [in (mm)]	F [in (mm)]	G [in (mm)]
980 / 990	3.50 (88.9)	0.50 (12.7)	2.75 (69.9)	2.75 (69.9)	2.00 (50.8)	2.00 (50.8)	0.28 (7.1)
981-1 / 991-1	4.75 (120.7)	1.00 (25.4)	3.38 (85.7)	3.38 (85.7)	2.50 (63.5)	2.50 (63.5)	0.41 (10.3)
981-2 / 991-2	4.75 (120.7)	1.00 (25.4)	3.38 (85.7)	3.38 (85.7)	2.50 (63.5)	2.50 (63.5)	0.41 (10.3)
982 / 992	7.00 (177.8)	1.50 (38.1)	5.88 (149.2)	5.88 (149.2)	4.50 (114.3)	4.50 (114.3)	0.69 (17.5)
983 / 993	9.38 (238.1)	2.00 (50.8)	7.38 (187.3)	7.38 (187.3)	5.75 (146.0)	5.75 (146.0)	0.69 (17.5)
984 / 994	12.50 (317.5)	2.50 (63.5)	9.13 (231.8)	9.38 (238.1)	7.25 (184.2)	7.25 (184.2)	1.06 (27.0)
985 / 995	16.00 (406.4)*	3.50 (88.9)	12.50 (317.5)	12.50 (317.5)	9.50 (241.3)	9.50 (241.3)	1.31 (33.4)
985HT / 995HT	16.00 (406.4)*	3.50 (88.9)	12.50 (317.5)	12.50 (317.5)	9.50 (241.3)	9.50 (241.3)	1.31 (33.4)
986 / 996	18.00 (457.2)*	4.00 (101.6)	14.00 (355.6)	14.00 (355.6)	11.00 (279.4)	11.00 (279.4)	1.31 (33.4)
986HT / 996HT	18.00 (457.2)*	4.00 (101.6)	14.00 (355.6)	15.50 (393.7)	11.00 (279.4)	12.50 (317.5)	1.31 (33.4)
987 / 997	21.50 (546.1)*	4.00 (101.6)	16.00 (406.4)	16.00 (406.4)	11.75 (298.5)	11.75 (298.5)	1.56 (39.7)
987HT / 997 HT	21.50 (546.1)*	4.00 (101.6)	16.00 (406.4)	17.00 (431.8)	11.75 (298.5)	12.75 (323.9)	1.56 (39.7)
988 / 998	25.00 (635.0)*	6.00 (152.4)	21.00 (533.4)	17.00 (431.8)	16.00 (406.4)	12.00 (304.8)	2.06 (52.3)
988HT / 998HT	25.00 (635.0)*	6.00 (152.4)	21.00 (533.4)	19.00 (482.6)	16.00 (406.4)	14.00 (355.6)	2.06 (52.3)
989 / 999	36.50 (927.1)	9.00 (228.6)	32.00 (812.8)	22.00 (558.8)	contact SWM	contact SWM	1.31 (33.4)
989HT / 999HT	36.50 (927.1)	9.00 (228.6)	32.00 (812.8)	25.00 (635.0)	contact SWM	contact SWM	1.31 (33.4)

* : does not include flange adapter on rod end swivel, increase height by the following:
[2.0" (51 mm) to 985, 2.5" (64 mm) to 986, 3.0" (76 mm) to 987, and 4.0" (102 mm) to 988]