

BE10, BE11, BJ11 Series Square Head Industrial Tie Rod Cylinders

Installation & Operation Instructions

P-3020-BG
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 **Boston**[®]
Gear

An **Altra Industrial Motion** Company

⚠ WARNING These cylinders are intended for use with the operating mediums, temperature ranges and pressure ranges listed below.

Installation

Before mounting the cylinder be sure that all supply lines are free of any foreign matter which can be detrimental to cylinder life.

The cylinder must be accurately aligned so that the load direction coincides as close as possible to the centerline of the piston rod. The initial alignment of the cylinder should always be done with the piston rod retracted to eliminate any false readings.

Alignment must be rechecked under load and adjusted accordingly. Any side load or off-center thrust can result in premature cylinder failure.

Cushions or external stops must be provided to stop the piston from bottoming out against the head or cap. This will increase cylinder life by eliminating the impacting of the piston against the cylinder.

It is important to select a mounting method which will avoid imposition of the full load on the mounting screws. The following mounting groups are listed in order of preference.

Series	Operating Medium		Temperature Range (°F)	Maximum Operating Pressure (PSIG) Pneumatic
	Pneumatic	Hydraulic		
BE10	Filtered and Lubricated Air	Petroleum-Based Hydraulic Fluids	0 - 160	250
BE11			0 - 200	250
BJ11	-----		0 - 200	-----

Series	Bore	Rod	Mounting	Maximum Operating Pressure (PSIG) Hydraulic	
				Severe	Moderate Non-Shock
BE10	ALL	ALL	ALL	300	500
BE11	ALL	ALL	ALL	300	500
BJ11	1-1/2	ALL	S4	450	750
			Remaining	1500	2000
	2	ALL	S4	450	750
			Remaining	1500	2000
	2-1/2	ALL	S4	450	750
			Remaining	1000	1500
	3-1/4	ALL	S4	450	750
			Remaining	900	1250
	4	ALL	S4	300	500
			Remaining	750	1000
	5	ALL	S4	300	500
			Remaining	725	950
	6	ALL	S4	300	500
			Remaining	675	900
	8	ALL	S4	300	500
			Remaining	500	750

Flange and Tie Rod Mountings (F1, F2, F5, F6, X1, X2 and X3)

These fixed centerline mounts are the strongest because they distribute the load equally over a large area. The mounts can be centered by using the rod bearing housing diameter as a pilot. After aligning and securing, the flange mount should be doweled to its support to prevent shifting.

Mounting	Recommended Support Location	
	Compression (Push)	Tension (Pull)
F2, F6	Flange Side	Cap Side
F1, F5	Head Side	Flange (Rod) Side

The Head Extended Tie Rod (X3) mounting is recommended for tension (pull) applications while the Cap Extended Tie Rod (X2) mounting is recommended for compression (push) applications.

The Square Flange (F5, F6) mountings are recommended when operating at maximum pressures and/or shock loads. Mounting hardware should be of the high tensile variety.

Trunnion Mountings (T1, T2, and T4)

These mountings are required when the load does not travel in a straight path. Rigid and accurately aligned, regreasable, pillow blocks (NOT SELF-ALIGNING) are to be used and mounted as close as possible to the trunnion's adjacent surface (head or cap). These mountings are designed for shear loading only; therefore, they must be accurately aligned or compensated for misalignment to remove any bending through the trunnions. The Intermediate Trunnion (T4) can be mounted in a manner to eliminate the weight of the cylinder by locating the mounting approximately 1/3 of the overall cylinder length from the rod end in the retracted position.

Pivot Mountings (P1, P2 and P3)

Pivot (clevis and eye) mountings require a provision on both ends for pivoting in one direction. These mounts can compensate for misalignment in one plane only. Select the rod attachment desired with a pivot pin of the same diameter as the pin specified for the cylinder mounting.

Lug, Angle and Tapped Mountings (S2, S4 and S7)

These fixed mounts do not absorb loads on the cylinder centerline and generate moments that tend to rotate the cylinder out of alignment. In order to overcome this problem, these mounts should be keyed or pinned to their mounting surface. The diameter of the pin should be equal to the mounting bolt diameter and the key square should be equal to the lug height. In all cases, the keys and pins are to be located on one end of the cylinder only. In compression (push) applications they are to be located at the head end with keys behind the lugs (cylinder side) and pins behind the screws in lugs (cylinder side). In tension (pull) applications, the same location of keys and pins are as mentioned above except on the cap side only.

The Side Tapped (S4) and Side End Lugs (S7) mountings cannot be pinned. Therefore, keys should be welded or bolted and pinned to the mounting surface and located behind the head in compression (push) applications and in front of the cap (cylinder side) in tension (pull) applications.

In all cases, bolts of the high-tensile variety should be used.

Piston Rod Connection

Care must be exercised when securing attachments to the piston rod, not to scratch or nick rod finished diameter, which could cause seal leakage. Use the flats provided on the piston rod.

Maintenance

Periodically disassemble the cylinder for cleaning and inspection. All parts may be cleaned by using a non-flammable solvent for metal parts and using soap and water for rubber parts. Rinse all parts thoroughly and blow dry with a low-pressure air stream. Replace those parts which are damaged or worn. Service kits are available for replacing the rod bearings, seals and packings.

When reassembling the cylinder, care must be taken not to nick or scratch surface finishes and Lubricate all seals and packings with the systems hydraulic fluid. For pneumatic cylinders use a general purpose grease.

The rod bearing is assembled into the head end of the cylinder and securely tightened.

The piston is assembled with the counterbored side facing the end of the rod and the piston nut is threaded onto the rod behind the piston and tightened to the recommended torques listed.

Thread Size	Torque Ft.-Lbs.
1/2 - 20	65
3/4 - 16	185
1 - 14	375
1-1/4 - 12	690

Thread Size	Torque Ft.-Lbs.
1-1/2 - 12	995
1-7/8 - 12	1415
2-1/4 - 12	1970
2-1/2 - 12	2515

After the cylinder has been reassembled, the tie rod nuts must be torqued to the specific torque listed below. Alternately tighten the tie rod nuts in small load steps, following a diagonal cross corner pattern until the specified torque has been applied.

Bore	Torque (Ft. - Lbs.)
1-1/2	10
2	15
2-1/2	15
3-1/4	35
4	35
5	60
6	60
8	120

Note: All torque values are for non-lubricated threads. When threads are lubricated use 2/3 of torque values.

Upon completing reassembly, test for correct operation and any evidence of leakage.

Lubrication

Pneumatic cylinders are to be continuously lubricated by the use of an air lubricator using AW HYDRAULIC OIL32 or equivalent (I.S.O. Grade #32). Hydraulic cylinders do not need to be lubricated, due to the hydraulic fluid which acts as a lubricant.

Warranty

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