



APPLICATION NOTES

FOR TEAM CORPORATION

HYDROSTATIC SPHERICAL COUPLINGS

Description

The TEAM hydrostatic bearing spherical coupling is a replacement to Conventional rod end bearings in applications requiring high stiffness, Zero backlash and virtually infinite wear life. The spherical surfaces are separated by a small fluid film of oil under high pressure, (about .001 inches at 3000psi.) Because of the mechanical configuration of the bearing surfaces, the load path is quite stiff; that is there is a minimum amount of bending elements. This is contrasted by the bending in a pin through the center of a conventional rod end.

The bearings may be used in singles or pairs. In addition, they are configured as a large angular amplitude coupling, two coaxial spheres, or as a single spherical surface used in small angle application. The following schematics illustrate the basic four units.

Model 420.XX

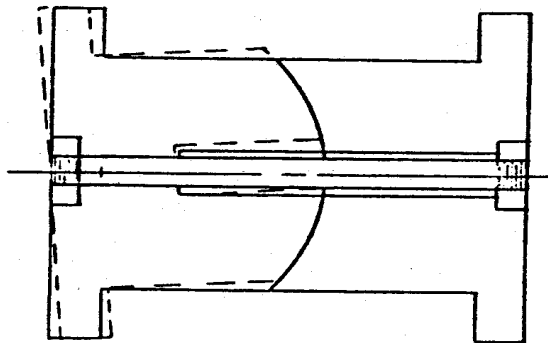
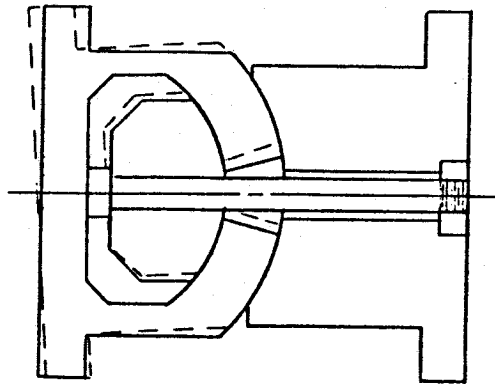


Fig. 1

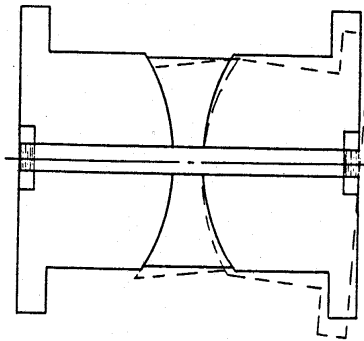
Single pivot point – single spherical surface with a bending bolt preloading the coupling surface together. This coupling has a limited angular rotation of $\pm 1/2^\circ$.

Single pivot point – coaxial spherical surfaces are pre-loaded by a stud.
This unit has higher operating angles with a standard of $\pm 6^\circ$.

Model 421.XX



Model 422.XX



Double pivot point – two of the 420.XX are put back to back to allow
some lateral motion, as well as angular.

Double pivot point – in this coupling, two coaxial couplings are joined by a common socket to form a double pivot. This is used for large angular and translation displacements.

Model 423.XX

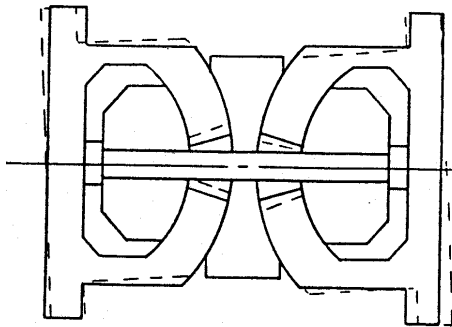


Fig. 4

The couplings have a very high spring rate, both in tension and compression. The fluid film spring rate is 10 or more times greater than the longitudinal rate of the parent material. Therefore, the stiffness of the coupling can be approximated as the longitudinal spring rate of a solid cylinder, $K = EA/L$, where A is the wetted area.

The bolt stiffness adds in parallel, but since the longitudinal spring rate of the bolt is so much smaller than the coupling, it is irrelevant. (This is true so long as we are in the operating preload range.)

operating preload range.)

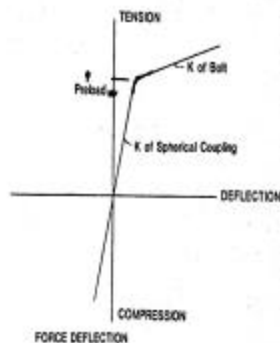


Fig. 5

Applications

Figure 6
In vibration testing, the 422's are used to align the shaker to the horizontal table.

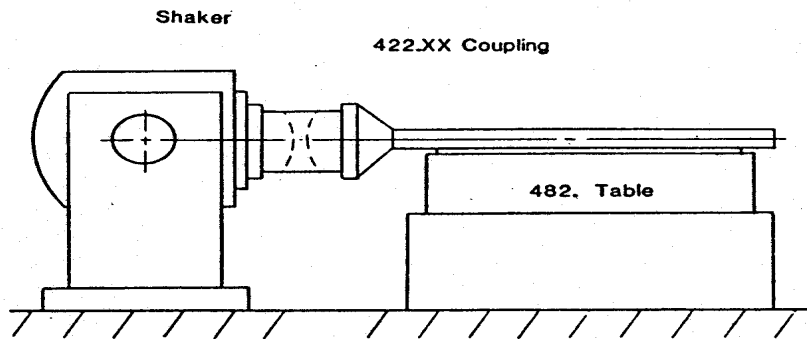


Fig. 6

Figure 7 –
For multishaker, long stroke electrohydraulic use, the 423.XX can be used to protect the package from out of phase conditions.

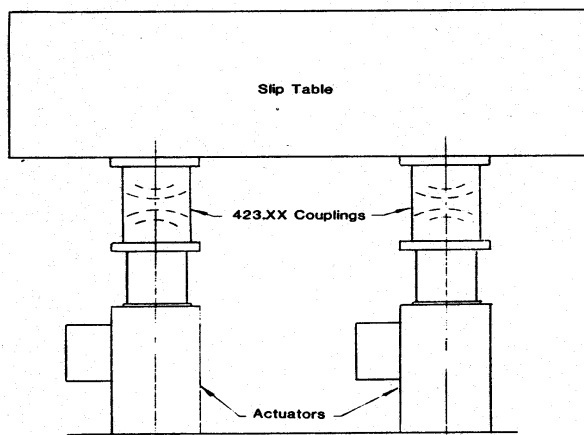


Fig. 7

Figure 8
A triaxial electrodynamic shaker system can be constructed using the 423.XX couplings as drive connections to the shakers in the horizontal plane.

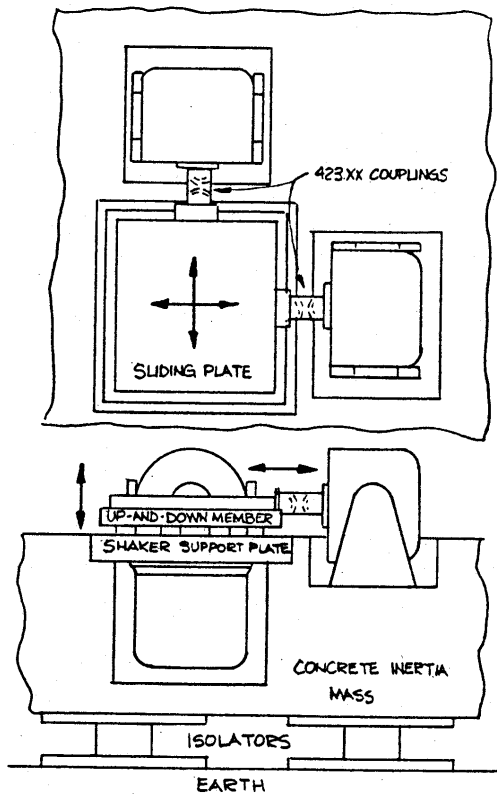


Fig. 8

Model numbers

The model number defines the configuration: 42X.

Where the X defines the specific type of coupling:

- 0 is single ball, single pivot.
- 1 is coaxial sphere, single pivot.
- 2 is single spheres, double pivot
- 3 is coaxial spheres, double pivot

The force rating of the coupling, in K lbs. is defined by the last 2 digits.

Example –

422.20 = A 20,000 lb. coupling with single spheres and double pivot.

