

## The TCVJ® How it Works

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The video link in the Technical Reports section demonstrates the centering mechanism inside the Thompson Coupling that provides its true constant velocity nature. This writing serves to further describe the unique action of the TCVJ®.

As the coupling rotates each of the three principal axes – input axis, output axis and centering mechanism axis – remain fixed in space with their respective components rotating about each axes.

As the output shaft fades away you can see the spherical pantograph rotating inside with its combination of linkages.

The linkages are not flat but curved in space laying on an imaginary spherical shell. The pivots of the centering mechanism also lay on this sphere and project to a central focal point within the coupling itself. Hence as the linkage pivots move along great circles on this imaginary sphere, we thereby maintain point focussing at the coupling centre.

Connection pins further attach the outer linkage arms to each of the input and output shafts while the centre point of the linkages attaches to a centering ring. As rotation continues you will see the linkage mechanism expand and contract as each of the connecting pins work around their own respective axes.

As the angle between the input and output shafts changes, the centre of the pantograph is caused to move at half the included angle. The resulting bisection of the angle between input and output shaft is achieved through this spherical pantograph – a necessary requirement to produce constant velocity.

Finally the controlling element from the pantograph attaches to a centering ring. It is this ring that provides the restoring motion to a pair of orthogonal universal joint crosses. This ring is equivalent to the intermediate shaft connected to a pair of phased universal joints. Here though the intermediate shaft is 'zero length' as the 2 universal joint crosses, lie on the same plane as the focal point of the centering mechanism.

True constant velocity therefore occurs at all angles of rotation though the bisecting action of the spherical pantograph and the restoring action of the centering ring acting between the orthogonal crosses.