HOW TO SET UP LINKAGE

THROTTLE SHAFT TRAVEL

Since most throttle plates have a 14° seat angle, they only have to rotate 76° to be 90° to the throttle bore, which is wide open throttle.

THE SAFEST LINKAGE

Is one in which the driven arm makes a 90° angle to the hex link at half travel, so that the total travel is split about evenly to both sides of the 90° point... about 38° to each side. This keeps well away from having the driven arm go to an over-center position...See "CAUTION" on "Uneven Four Bar Linkage."

FOUR BAR LINKAGE

Is called "Four Bar," because it consists of four bars. Looking at Fig. 1.0: One bar is "Arm A," a second is "Arm B," a third is the "Hex Link." The fourth is whatever holds the two shafts in place, be it a manifold casting, a bracket, etc. All the bars may be different lengths.

PARALLEL FOUR BAR LINKAGE

If the hex link is made the same center-to-center (c-c) distance as the two shafts, and the c-c of "Arm A" is equal to "Arm B." As the arms rotate they will remain parallel to each other, and the Hex Link will remain parallel to the Base Line. The significance is that "Shaft A" will move the same number of degrees as "Shaft B" at every point, which is needed when linking the shafts on the left and right side of the manifold, see Fig. 1.0-1.1.

PART THROTTLE AIR FLOW

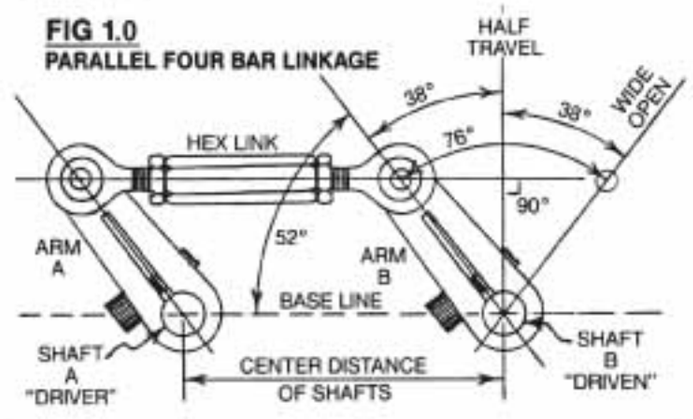
When using Parallel Linkage, the throttle shafts both rotate in the same direction, so the lower edges of all the throttle plates slope to the right or to the left. At part throttle this will direct the air differently to the ports on the right side of the engine versus the left. Some racers claim this gives rough part throttle operation. At wide open throttle the throttle plates are all straight open, so it shouldn't affect full power.

OVER-UNDER LINKAGE

Counter-rotates the throttle shafts allowing the butterflies to be installed with the lower edge of each butterfly out toward the valve cover. This will direct the air the same to every port as the throttles are opened. While geometry can be set satisfactory, it is never exact (see Table in Fig. 2.0), and if the arms are loosened, it is difficult to get them back exactly right...their initial angles are critical. Every shaft c-c distance and arm length combination requires different initial arm angles, see Fig. 2.0-2.1

DRAWING LINKAGE

Measure the c-c of the two shafts to be connected. Though one shaft may be higher than the other, for convenience draw the shafts as horizontal. Draw a dashed Base Line and put the shaft centers on it. Draw an arc with the c-c of Arm-A. Draw another with the c-c of Arm-B. Draw lines from the center of the shafts to represent the initial trial position of the arms. The distance between these two points on the arcs is the length of the Hex-Link. Set the compass at this distance. Mark off 10° increments along arc-A. Set the point of the compass on each of these and make a mark on arc-B for each. Example: see the 40° and 40.5° marks in Fig. 2.0. Measuring the angles of the marks on arc-B allows a table to be made of the relative movements. If the numbers are not satisfactory, try other arm settings and/or Hex Link length, see Fig. 3.0 Shaft Rotation Ratio Page 24-M.



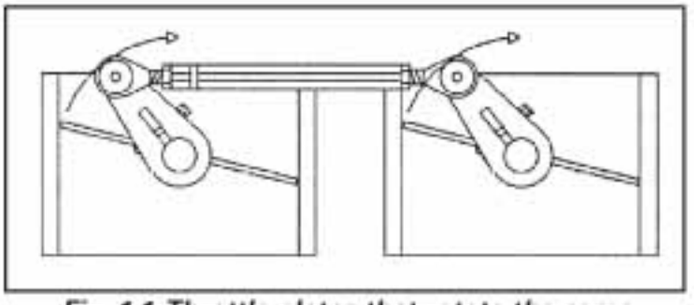
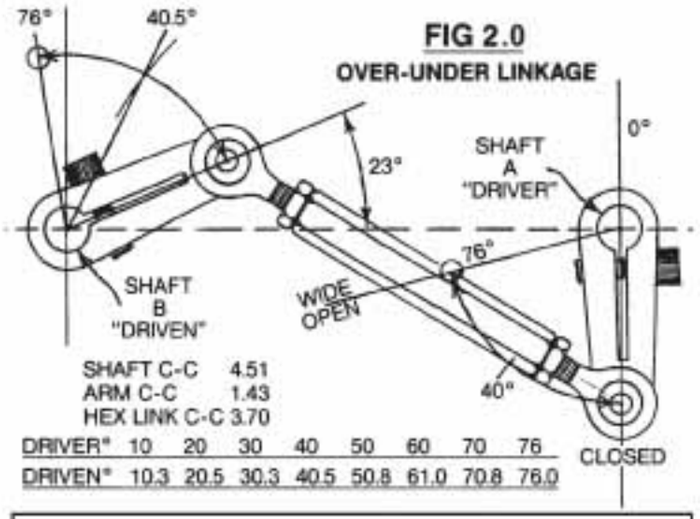


Fig. 1.1: Throttle plates that rotate the same direction, use parallel linkage.



DRIVER°	10	20	30	40	50	60	70	76
DRIVEN°	10.3	20.5	30.3	40.5	50.8	61.0	70.8	76.0

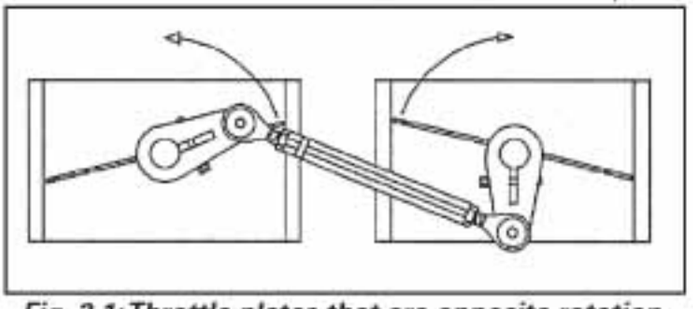


Fig. 2.1: Throttle plates that are opposite rotation, typically use over-under linkage.