B. If companion flange run-out is over 0.15mm (.006 in.) but less than 0.28mm (.011 in.) and balance weight is at or near low point of companion flange run-out, no further action is required.
   If balance weight is not at or near low point of companion flange run-out, remove weight.
C. If companion flange run-out is over 0.28mm (.011 in.), but no greater than 0.38mm (.015 in.) and balance weight is at or near low point of companion flange run-out, no further action is required.
   If balance weight is not at or near low point of companion flange runout, remove weight and reindex companion flange until run-out is 0.25 mm (.010 in.) or less.
   If impossible to achieve 0.25mm (.010 in.) or less run-out, install a new companion flange and recheck for 0.25mm (.010 in.) or less run-out.
   Service replacement companion flanges are not equipped with balance weights and no weights should be added.

UNIVERSAL JOINT ANGLE MEASUREMENT

When torque is transmitted through any ordinary universal joint, the driven yoke fluctuates slightly in speed. In other words, although the driving yoke rotates at a constant speed, the driven yoke speeds up and slows down twice per revolution. This flucutation of the driven yoke is in direct proportion to the angle through which the universal joint is operating; the greater the angle, the greater the fluctuation.

Whenever two universal joints are used, this fluctuation effect can be eliminated by staggering the joints so that the two driving yokes are 90 degrees apart provided the two joints are transmitting torque through the same angle.

Therefore, when two universal joints are used, he angles through which they operate must be very nearly the same. This allows the alternate acceleration and deceleration of one joint to be offset by the alternate acceleration and deceleration of one joint to be offset by the alternate deceleration and acceleration of the second joint. When the two joints do not run at approximately the same angle, operation is rough and an objectionable vibration is produced.

The actual optimum angles desired must take into consideration the effects of various passenger loadings and rear axle windup during acceleration; therefore, it is unlikely that the front and rear universal joint angles will be found to be the same in actual practice.

In addition, universal joints are designed to operate safely and efficiently within certain angles. If the designed angle is exceeded, the joint may be broken or otherwise damaged.

The front universal joint angle is actually the angle between the engine-transmission centerline and the propeller shaft centerline. This angle is determined by the design of the frame assembly and may be altered by adding or removing shims between the transmission and the transmission mount.

Adding one shim at the transmission mount will decrease the transmission universal joint angle by 1/2° and increase differential universal joint angle by 1/4°. If one shim is removed the tranmission angle will increase 1/2° and decrease differential angle 1/4°. The production transmission mount bolt is an M10-1.5 x 35 mm. When installing two or more shims, an M10-1.5 x 50 mm bolt must be used.

All complaints of propeller shaft vibrations should be accompanied by rear trim height measurements at curb weight. An incorrect trim height may cause some vibration. If vibration is severe enough, removal or installation of spring shims may be required. If any irregular roughness or vibration is detectable in the drive line, the front and rear universal joint angles should be checked. Should the vehicle become involved in a severe rear end collision, or should the rear axle carrier be replaced, the rear universal joint angle should be checked and control arms should be replaced if necessary.

Inclinometer Method

Figure 4A-6

This method can be used with the vehicle over a pit or on a drive-on platform hoist, as long as the vehicle is at curb weight with a full tank of gasoline. Bounce vehicle up and down to assure curb height. Before universal joint angles can be checked, the measurements specified (the distance between the top of the axle tube and the bottom of the frame) must be met. To insure an accurate measurement, weight may have to be added to the vehicle to reach these specifications.

Readings should be taken at the following locations in the following manner.

Angle Measurement at Rear Universal Joint

Figures 4A-7 and 4A-8

1. Place inclinometer J-23498 on rear propeller shaft bearing cap. Center bubble in sight glass and record measurement. Bearing cap must be straight up and down and free of dirt or other foreign material to obtain an accurate measurement.
2. Rotate propeller shaft 90 degrees and place inclinometer on the companion flange bearing cap. Center bubble in sight glass and record measurement.
3. Subtract smaller figure from larger figure to obtain existing rear universal joint angle.

Angle Measurement at Front Universal Joint

Figures 4A-9 and 4A-10

1. Place inclinometer on front propeller shaft bearing cap. Center bubble in sight and record measurement.
2. Rotate propeller shaft 90 degrees and place inclinometer on the slip yoke bearing cap. Center bubble on sight glass and record measurement.
3. Substract smaller figure from larger figure to obtain existing front universal joint angle.