

## TWO PIECE AXLES

Instructions for using:

RT 8732 Diff. & Pinion Backlash Setting Gauge.  
& RT 8730 Pinion & Diff. Setting Gauge.

### Determining Diff. End Float.

1. Separate axle casings, remove the pinion bearing cones from the diff. carrier and diff. bearing cups from each axle case using the appropriate tools. Thoroughly clean all components.
2. Place the two dummy bearings RT 8730/3 on the ends of the diff. carrier without shims and assemble in the axle casing, bolting both halves together.
3. Screw the two circular plates of the tool RT 8732 on to the push rods, RT 8732/2. Insert these through the axle tube, ensuring that the swivel pad on each end is felt to locate in each side of the diff. carrier bore. Screw the plates up to the axle tube flange and secure with the bolts supplied. Unscrew both rods slightly before finally clamping the plate. The two round knurled gauging nuts should be screwed on to the push rod which is facing the crown wheel or pinion side of the crown wheel, which for convenience of explanation should be on the L.H. side of the operator as he faces the axle and referred to as the L.H. side throughout these instructions.
4. Unscrew the R.H. side push rod approximately  $\frac{1}{2}$  in. Screw in the L.H. push rod with a load of 2-4 lb ft maximum, thus pushing the diff. assembly over into the R.H. housing.

Screw up the gauging nut lightly to the face of the circular plate, carefully and securely with the other nut, lock together, screw the push rod back approximately  $\frac{1}{2}$  in ensuring the gauge nuts move with the screw as they come away from the plate. Screw in the R.H. push rod 2-4lb ft maximum thus pushing the diff. in to the L.H. housing. Screw in the L.H. push rod until a stop is felt. Measure the gap between the circular plate and the gauge nut with feelers and record the figure which represents overall end float.

5. Separate the casings and remove the diff. assembly complete with dummy bearings, but do not remove the dummy bearings from the diff. carrier.

### Setting the Pinion.

6. Ensure the pinion bearing cups are seating correctly.
7. Locate the thick pinion washer on the Dummy Pinion RT 8730/2 followed by the taper bearing cone.
8. Locate in the pinion housing, place the outer bearing cone in position, followed by the flange and nut, tighten to give the running pre-load. Thus settling the rollers.
9. Place the Mandrel RT 8730/1 in the diff. side bearing bore, ensure that it is seating correctly and measure with feelers the gap between the outside diameter and the dummy pinion face. Any amount in excess of .030in will be the shims required to bring the pinion to its correct mounting distance, taking account of any figure stamped

on the pinion itself which represents any variation in manufacture from its nominal distance, i.e. if a figure of  $+.003\text{in}$  is stamped on the pinion head, this means it has been manufactured high and must be reduced in height by the same amount. Assuming the gap measured is  $.044\text{in}$  shims required will be  $.044 - .030 - .003\text{in} = .011\text{in}$ .

10. Remove the dummy pinion assembly, place the selected shims on the pinion and assemble the bearing cone, using the appropriate tool. Fit the pinion assembly in the axle case to the manufacturer's instructions.

#### Determining Correct Backlash

11. Replace the diff. assembly with dummy bearings and bolt the axle cases together again.

12. If removed, refit the push rods of the tool as before, slacken the R.H. side and screw in the L.H. push rod as before, using a torque wrench set to 2-4 lb ft maximum. This will give maximum backlash, screw up the gauging nut lightly to the face of the disc and lock in position as before.

13. Unscrew the L.H. side approximately  $\frac{1}{2}\text{in}$  and screw in the R.H. side until the correct backlash is obtained. This should be checked at the pinion flange according to manufacturer's workshop manual. Screw in the L.H. side until a stop is felt. Re-check the backlash and adjust both push rods if any correction is necessary.

14. Measure the gap between the gauge nut and disc and record the figure. This represents the amount of shims, taking in to account bearing width variation plus manufacturer's pre-load, that must be fitted to the R.H. side diff. carrier bearing. The remainder of the shims from the overall float, taking in to account again any bearing width variation, will be fitted to the L.H. or pinion side of the diff.

#### Example.

Total end float recorded  $.050\text{in}$   
To give correct backlash shims required on R.H. side -  $.030\text{in}$ .  
Therefore shims on L.H. side will be  $.050 - .030\text{in} = .020\text{in}$ .  
These figures have been obtained using the dummy bearings.  
Separate cases, remove diff. and proceed as follows:

Measure and compare each dummy bearing with the overall width of the taper bearing assembly to be fitted on each end, ensuring the rollers are settled by rotating before measurement. Plus readings from dummy bearing width, subtract from selected shims. Minus readings, add to selected shims.

#### Example

##### R.H. Side

Dummy bearing width say,  $.710\text{in}$ .  
Taper bearing width say,  $.715\text{in}$   
Actual shims required =  $.030 - .005$   
=  $.025\text{in}$ , plus half of manufacturer's pre-load allowance.

##### L.H. Side

Dummy bearing width say,  $.712\text{in}$ .  
Taper bearing width say,  $.710\text{in}$ .  
Actual shims required =  $.020 + .002\text{in}$   
=  $.022\text{in}$ , plus the remaining half of the manufacturer's pre-load allowance.

15. Place the shims on the diff. carrier and assemble the bearing cones using the appropriate tool. Assemble the bearing cups in each axle case, according to manufacturer's instructions. Re-fit the diff. assembly and bolt the cases together.

### THREE PIECE AXLES

Instructions for using:

RT 8732 Diff and Pinion Backlash Setting Gauge  
& RT 8731 Pinion Setting Gauge.

Strip down the axle, remove all bearings and service as required. Fit only roller bearing on the pinion outer-race and distance piece in the pinion housing at this stage. Do not fit any ball bearing.

#### To determine Diff. End Float and Setting Pinion

1. Refit the side of the diff. casing that is facing the crown wheel or pinion side of the crown wheel, using existing bolts and secure in position. This will be referred to as the L.H. side throughout these instructions and should be on the L.H. side of the operator as he faces the axle.

2. Take the pinion and refit the inner distant piece without shims. In place of the outer ball bearing fit Dummy Bearing No. RT 8731/1 and replace pinion in the centre housing.

Replace the bearing retaining cover ensuring that you have a gap of approximately .002in between cover and pinion casing. The reason for this is that when you tighten down the bearing retaining cover you will secure the dummy bearing on to the outer spacer. Tighten the bearing cover, replace the pinion flange and secure with the nut.

3. Next place Mandrel assembly No. RT 8731/3 into the secured L.H. side of the diff. bearing housing with arm upright (on the centre line of the pinion). Measure with feelers the gap between pinion and arm. Any amount above .030in should be the amount of shims required to bring the pinion to its correct position, plus or minus any amount that may be marked on the pinion. Record this figure for later use.

#### Example.

Gap measured .035in

Pinion is marked - .001in

Added together = .036in.

Subtract .030in standard gap. This gives .006in for the shims required.

Note: A plus reading on the pinion is taken away from the gap measured.

A minus reading on the pinion (as in the example) is added to the gap measured.

4. Remove the bolts holding the bearing retaining cover in position and remove the pinion complete with dummy bearing and roller race as an assembly taking care to keep all parts free from foreign matter. Remove the dummy bearing, place the selected shims on the pinion up to the inner sleeve, assemble the ball race and place the pinion assembly to one side for the moment. Remove the Mandrel and replace on the tool board.

5. Place Dummy bearings RT8731/2 without shims on the diff. carrier. Assemble diff. carrier with Dummy Bearings into diff. casings and bolt casings together. The diff. will now be free to move from side to side.

6. Screw the two circular plates of the tool RT 8732 on to the push rods RT 8732/2. Insert these through the axle tube ensuring the swivel pad on each end is felt to locate in each side of the diff. carrier bore, Screw the circular plates up to the axle tube flange and secure

with the bolts supplied. Unscrew both push rods slightly before finally clamping plates. The two round knurled gauging nuts should be screwed on to the push rod which is facing the crown wheel which, if the previous instructions have been carried out, will be on the L.H. side as the operator faces the axle on the bench.

7. Unscrew the R.H. side push rod approximately  $\frac{1}{8}$ in. Screw in L.H. side push rod with a load of 2-4 lb ft maximum, thus pushing the diff. carrier over into the R.H. housing. Screw up the gauging nut lightly to the face of the circular plate carefully and securely with the other nut lock together. Unscrew the L.H. push rod approximately  $\frac{1}{8}$ in ensuring the gauge nuts move with the screw as they come away from the plate. Screw in the R.H. push rod at 2-4 lb ft maximum thus pushing the diff. carrier into the L.H. housing. Now screw in L.H. push rod until a stop is felt. Measure the gap between the circular plate and the gauging nuts with feelers and record this figure which represents the overall end float. Now unscrew the R.H. push rod approximately  $\frac{1}{8}$ in. Screw in the L.H. push rod pushing the diff. carrier into the R.H. housing. Leave in this position.

#### Setting Pinion.

8. Take the pinion assembly previously assembled with the correct shims and install in its housing. Ensure it is fed into mesh with the crownwheel carefully to avoid tooth damage.

Now fit the bearing retaining cover complete with oil seal, adjust shims as necessary to give approximately, .002in nip on the bearing and secure with the retaining screws. Replace the pinion flange and secure to the manufacturer's recommended torque. The pinion is now set.

#### Determining Correct Backlash.

9. Now check that the push rods of the tool or locking nuts have not been accidentally moved by unscrewing the R.H. push rod approximately  $\frac{1}{8}$ in. Check that the L.H. Push rod is fully screwed in at 2-4lb ft this gives maximum backlash. Screw up the gauging nuts to the face of the circular plate, and lock in position as previously instructed.

10. Unscrew L.H. push rod approximately  $\frac{1}{8}$ in, screw in the R.H. side push rod until the correct backlash is obtained. This should be checked at the pinion flange according to manufacturer's instructions. Screw in L.H. push rod until a stop is felt. Re-check the backlash and adjust push rods in any correction is necessary.

11. Measure the gap between the gauging nut and circular plate with feelers and record the figure. This figure represents the amount of shims, taking into account bearing width variations and manufacturer's pre-load, that must be fitted to the R.H. side diff. carrier bearing. The remainder of the shims from the overall float, taking, into account again any variation in bearing width, will be fitted to the L.H. pinion side of diff. carrier.

#### Example.

Total end float as recorded in paragraph 7 = .050in

To give correct backlash shims required, as recorded in paragraph 11 to insert in the R.H. side - .030in.

Therefore shims required on the L.H. side will be .050 - .030in = .020in  
These figures have been obtained by using dummy bearings.

12. Remove both sides of axle casings, remove diff, carrier and proceed as follows:

Measure and compare each dummy bearing with the overall width of ball bearing to be fitted. If a plus reading is obtained from the dummy bearing width, subtract the same amount from the selected shims.

If minus reading is obtained from the dummy bearing width, add the same amount to the selected shims.

Example

L.H. Side

Dummy bearing width say, .710in  
Ball bearing width say, .715in  
Difference of .005in  
Actual shims required = .020 - .005in  
= .015in plus half manufacturer's  
pre-load allowance.

R.H. Side

Dummy bearing width say, .712in  
Ball bearing width say, .710in  
Difference .002in  
Actual shims required .030 + .002in  
= .032in plus the remaining half of the  
manufacturer's pre-load allowance.

14. Place the selected shims on the diff. carrier and assemble the ball bearings, using the appropriate tool. Reassemble the axle as stated in manufacturer's workshop manual.