Revisions to this SIL are noted
by a stripe in the left hand margin.

SUBJECT: Engine/Transmission Adaptation Requirements

EQUIPMENT AFFECTED: AED™, 1000 Series, 2000 Series, 3000 Series, 4000 Series, TC10, AT 500, MT 600, and HT 700 Series Transmissions

Transmission performance may be adversely affected by improper tolerances existing between engine to transmission mating components. The drive connection between the engine and transmission converter must transmit engine power, properly locate and pilot the torque converter, and aid in controlling the forward thrust of the converter in AED™, 1000 Series, 2000 Series, 3000 Series, 4000 Series, TC10, AT 500, MT 600 and HT 700 models. Experience has shown these requirements can best be satisfied with a flexplate drive connection.

Vibration, converter section oil leaks, a worn front bushing or bearing, and/or a worn engine crankshaft thrust bearing are frequently the result of exceeding recommended tolerances in engine to transmission mating components. When these conditions are encountered, certain important measurements should be investigated before installing a repaired or new transmission.

These measurements are summarized below and are further detailed on the following pages. Table 1, the Adaptation Requirements Checksheet, specifies the tolerance by transmission model. Figure 1 illustrates the typical tooling required for these measurements and Figures 2 through 10 explain the measurements in more detail and show examples of each measurement as it is being performed.

SUMMERY OF MEASUREMENTS AND INSPECTIONS

Component or Subassembly	Required Inspections
Flywheel Housing	Bore Diameter Bore Eccentricity Face Squareness
Crankshaft Hub and/or Adapter	Converter Pilot Diameter Face Squareness Eccentricity
Flexplate	Check for Radial Cracks Check for Elongated Mounting Holes Check for Any Signs of Distress and/or Wear
Mounted Flexplate	Axial Location Flatness

Table 1.

RO Number _____ **Technician Name/Number _____**

THE ADAPTATION REQUIREMENTS CHECKSHEET

	AT 500	MT 643/653	MT 644/654	HT 700	Ref. Fig.	Record Reading
FLYWHEEL HOUSING: BORE DIAMETER	16.125 $\frac{+0.005}{-0.000}$ in. (409.58 $\frac{+0.13}{-0.00}$ mm)	17.625 $\frac{+0.005}{-0.000}$ in. (447.68 $\frac{+0.13}{-0.00}$ mm)	17.625 $\frac{+0.005}{-0.000}$ in. (447.68 $\frac{+0.13}{-0.00}$ mm)	20.125 $\frac{+0.005}{-0.000}$ in. (511.18 $\frac{+0.13}{-0.00}$ mm)	2	
BORE ECCENTRICITY (Limits are for installed engines.)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R.* (0.51 mm)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R. (0.51 mm).	3	
FACE SQUARENESS (Limits are for installed engines.)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R.* (0.51 mm)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R. (0.51 mm).	4	

* For MT 600 Model transmissions prior to S/N 2410033458 which have not been updated with the converter pump bushing P/N 6881926 or converter pump hub roller bearing P/N 7451944, bore eccentricity and face squareness limits are 0.008 in. (0.20 mm) T.I.R.

CRANKSHAFT HUB AND/OR ADAPTOR: CONVERTER PILOT DIAMETER	1.703-1.705 in. (43.26-43.31 mm)	1.703-1.705 in. (43.26-43.31 mm)	1.703-1.705 in. (43.26-43.31 mm)	2.437-2.439 in. (61.90-61.95 mm)	5 & 6	
FACE SQUARENESS (T.I.R. per inch of diameter or T.I.R. per 25 mm of diameter)	0.0005 in. (0.013 mm)	0.0005 in. (0.013 mm)	0.0005 in. (0.013 mm)	0.0005 in. (0.013 mm)	7	
PILOT ECCENTRICITY (With respect to crankshaft center of rotation)	0.010 in. T.I.R. (0.25 mm)	0.010 in.* T.I.R. (0.25 mm)	0.010 in.* T.I.R. (0.25 mm)	0.005 in. T.I.R. (0.13 mm)	8	

* For MT 600 Model transmissions prior to S/N 2410033458 which have not been updated with the converter pump bushing P/N 6881926 or converter pump hub roller bearing P/N 7451944, pilot eccentricity is 0.005 in. (0.13 mm) T.I.R.

FLEXPLATE:						
CHECK FOR RADIAL CRACKS	For all models					
CHECK FOR ELONGATED MOUNTING HOLES	For all models					
CHECK FOR ANY SIGNS OF DISTRESS OR WEAR	For all models					
MOUNTED FLEXPLATE:						
CONVERTER AXIAL LOCATION: Prior to Oct. 1, 1984	1.600-1.740 in. (40.64-44.20 mm)	N/A	N/A	N/A		
CONVERTER AXIAL LOCATION: After Oct. 1, 1984	1.581-1.741 in. (40.16-44.22 mm)	2.854-3.014 in. (72.49-76.56 mm)	4.331-4.491 in. 110.01-114.07 mm)	3.592-3.413 in. (91.24-86.69 mm)	10	
FLATNESS (Area adjacent to each converter mounting hole)					9	
FORMED PLATES*	0.039 in. (0.99 mm)	0.039 in. (0.99 mm)	0.039 in. (0.99 mm)	N/A		
FLAT PLATES	0.157 in. (3.99 mm)	0.157 in. (3.99 mm)	0.157 in. (3.99 mm)	N/A		

* A formed flexplate will not be flat, but may have raised areas at the bolt holes and/or have offset bends in the plate.

NOTE: This form is to be completed and retained with the Repair Order records when performing Allison Transmission Warranty, ETC or Policy repairs.

Table 2.

RO Number _____ **Technician Name/Number _____**

THE ADAPTATION REQUIREMENTS CHECKSHEET

	AED™	1000/2000 Series SAE No. 2 Housing	1000/2000 Series SAE No. 3 Housing	3000 Series	4000 Series, TC10	Ref. Fig.	Record Reading
FLYWHEEL HOUSING: BORE DIAMETER	17.625 $\frac{+0.005}{-0.000}$ in.	17.625 $\frac{+0.005}{-0.000}$ in.	16.125 $\frac{+0.005}{-0.000}$ in.	17.625 $\frac{+0.005}{-0.000}$ in.	20.125 $\frac{+0.005}{-0.000}$ in.		
	(447.68 $\frac{+0.13}{-0.00}$ mm)	(447.68 $\frac{+0.13}{-0.00}$ mm)	(409.58 $\frac{+0.13}{-0.00}$ mm)	(447.68 $\frac{+0.13}{-0.00}$ mm)	(511.18 $\frac{+0.13}{-0.00}$ mm)	2	
BORE ECCENTRICITY (Limits are for installed engines.)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R. (0.51 mm).	0.020 in. T.I.R. (0.51 mm).	3	
FACE SQUARENESS (Limits are for installed engines.)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R. (0.51 mm)	0.020 in. T.I.R. (0.51 mm).	0.020 in. T.I.R. (0.51 mm).	4	
CRANKSHAFT HUB AND/OR ADAPTOR:							
CONVERTER PILOT DIAMETER	2.006-2.008 in. (50.94-50.99 mm)	1.703-1.705 in. (43.26-43.31 mm)	1.703-1.705 in. (43.26-43.31 mm)	2.006-2.008 in. (50.94-50.99 mm)	2.006-2.008 in. (50.94-50.99 mm)	5 & 6	
FACE SQUARENES (T.I.R. per inch of diameter or T.I.R. per 25 mm of diameter)	0.0005 in. (0.013 mm)	0.0005 in. (0.013 mm)	0.0005 in. (0.013 mm)	0.0005 in. (0.013 mm)	0.0005 in. (0.013 mm)	7	
PILOT ECCENTRICITY (With respect to crankshaft center of rotation)	0.005 in. T.I.R. (0.13 mm)	0.010 in. T.I.R. (0.25 mm)	0.010 in. T.I.R. (0.25 mm)	0.005 in. T.I.R. (0.13 mm)	0.005 in. T.I.R. (0.13 mm)	8	
FLEXPLATE:							
CHECK FOR RADIAL CRACKS	For all models						
CHECK FOR ELONGATED MOUNTING HOLES	For all models						
CHECK FOR ANY SIGNS OF DISTRESS OR WEAR	For all models						
MOUNTED FLEXPLATE:							
INPUT DAMPER AXIAL LOCATION (AED™)	1.98-2.09 in. (50.36-53.06 mm)	N/A	N/A	N/A	N/A		
CONVERTER AXIAL LOCATION (EXCEPT AED™)	N/A	1.201-1.361 in. (30.50-34.56 mm)	1.581-1.741 in. (40.15-44.21 mm)	1.943-1.983 in. (49.36-50.38 mm)	1.732-1.842 in. (44.0-46.8 mm)	10	
FLATNESS (Area adjacent to each converter mounting hole)	N/A	0.030 in. T.I.R. (0.076 mm)*	0.030 in. T.I.R. (0.076 mm)*	N/A	N/A	9	

* When measured at 11.5 inch (292 mm) diameter.

NOTE: This form is to be completed and retained with the Repair Order records when performing Allison Transmission Warranty, ETC or Policy repairs.

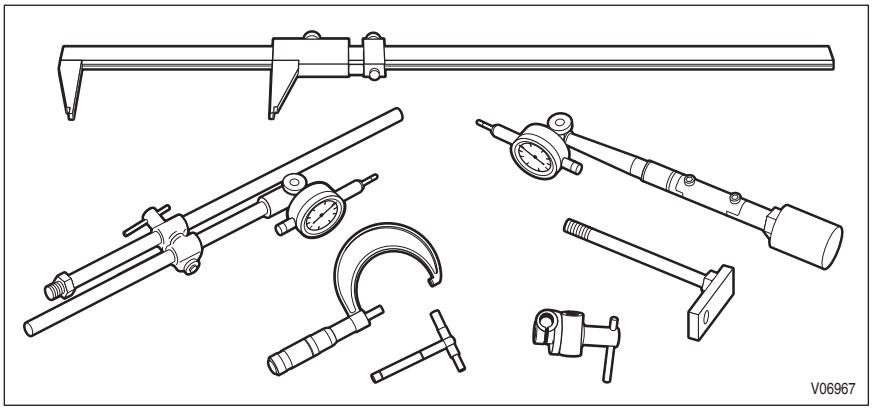


Figure 1. This is a typical set of tooling used to determine the adaptation requirements of an AT 500 series transmission.

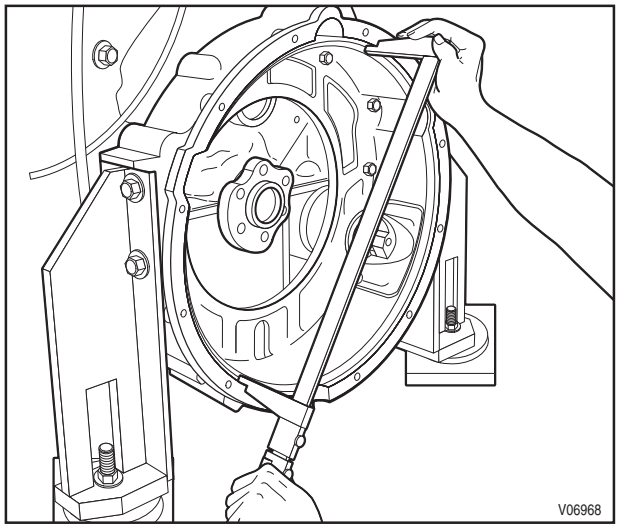


Figure 2. This illustrates measurement of the flywheel housing bore diameter using an inside caliper.

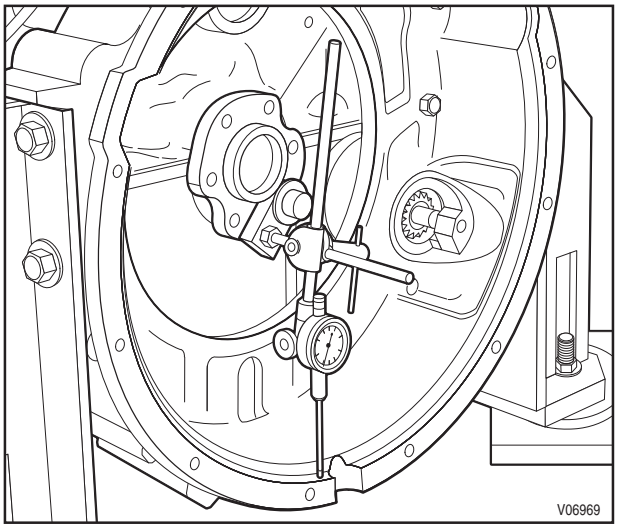


Figure 3. This illustrates measurement of the eccentricity of the flywheel housing bore using a dial indicator. Securely fasten the base of the dial indicator support extension to the crankshaft hub. Rotate the crank shaft so that the dial indicator will sweep the entire flywheel housing bore. Record the maximum and minimum readings. The difference in these readings should not be greater than the tolerances specified on the adaptation checksheet.

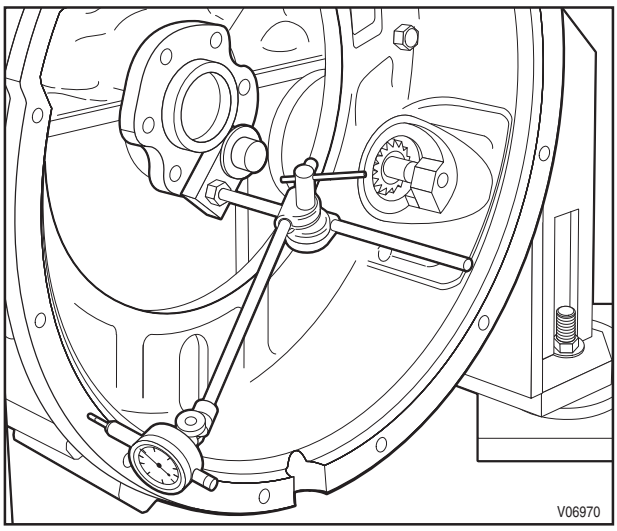
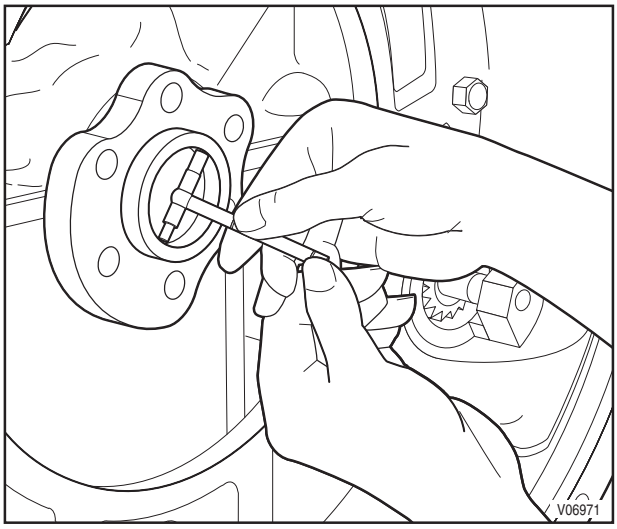
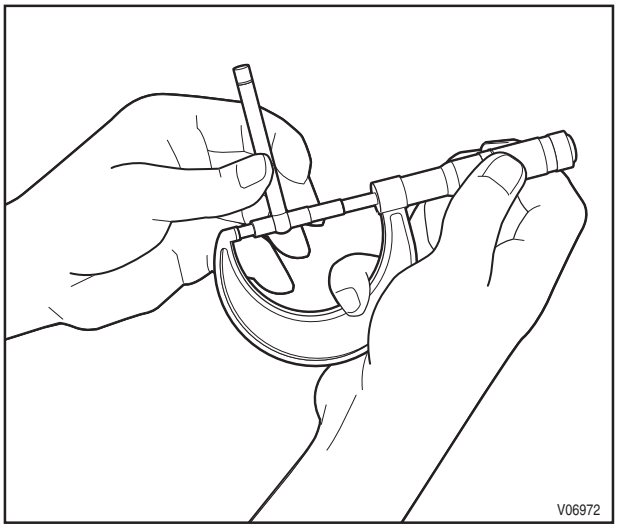


Figure 4. This illustrates measurement of the squareness of the flywheel housing face using a dial indicator. The dial indicator must be securely fastened to the crankshaft hub. While pressing the crankshaft rearward to remove all crankshaft end play, rotate the crankshaft so that the dial indicator sweeps the entire surface of the flywheel housing face. Record the maximum and minimum readings. The difference in these two readings should not be greater than the tolerance specified on the adaptation checksheet.





Figures 5 & 6. These illustrations demonstrate the use of an inside micrometer to measure the pilot diameter of the converter hub.

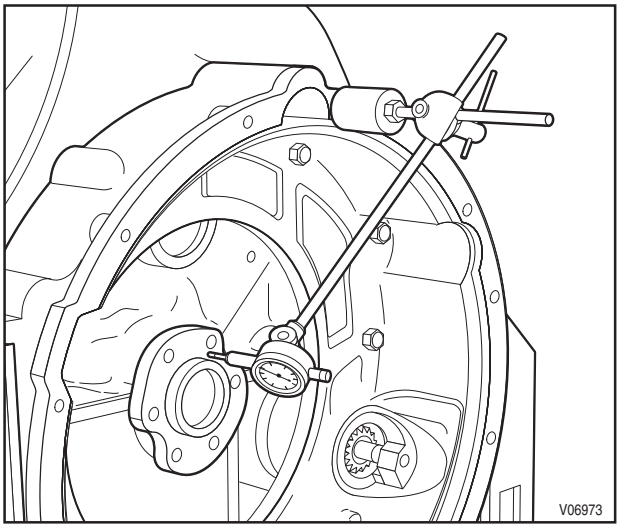


Figure 7. This illustrates measurement of the squareness of the crankshaft hub face. Securely fasten the base of the dial indicator to the flywheel housing and adjust the indicator to measure the outer edge of the crankshaft hub face. While pressing the crankshaft rearward to remove all crankshaft end play, rotate the crankshaft so the dial indicator sweeps the entire diameter of the crankshaft hub face. Record the maximum and minimum readings. The difference in these two readings should not be greater than the tolerance specified on the adaptation checksheet. Remember, this tolerance is given as T.I.R. per inch of diameter or T.I.R. per 25 mm of diameter, so multiply the tolerance from the checksheet by the diameter at which the reading is taken.

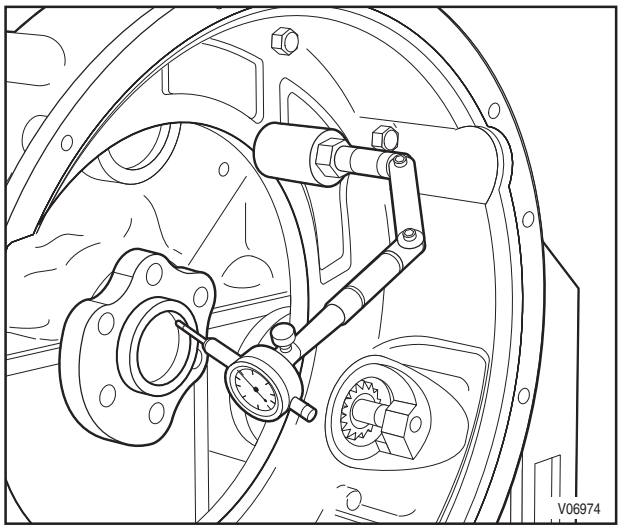


Figure 8. In this example, the crankshaft hub eccentricity is measured. With the dial indicator fastened to the flywheel housing, rotate the crankshaft so the indicator sweeps the entire inside diameter of the crankshaft hub. Note the maximum and minimum readings. The difference of these readings should not be greater than the tolerance specified on the adaptation checksheet.

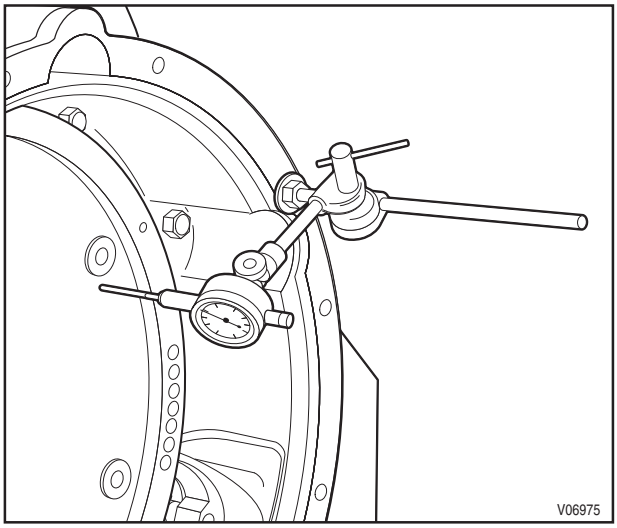


Figure 9. This illustrates measurement of the flexplate flatness. Fasten the dial indicator to the flywheel housing and measure only in an area adjacent to each converter mounting hole in the flexplate. If a two-piece flexplate is being checked, both pieces must be bolted together on the engine. Refer to adaptation checksheet for tolerance.

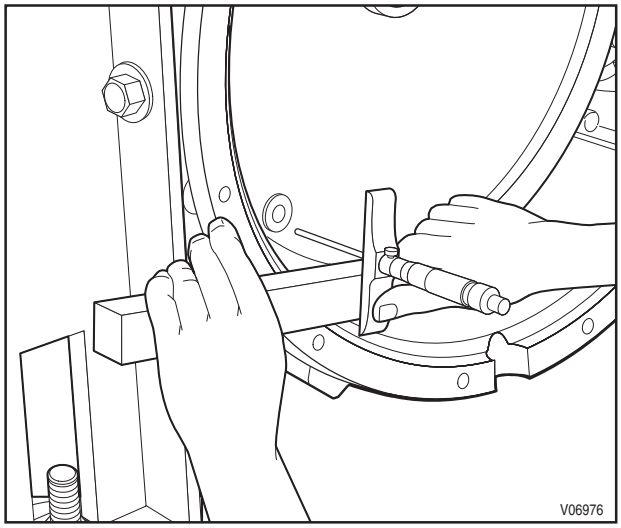


Figure 10. In this example, converter axial location is measured. While pressing the crankshaft rearward to remove all crankshaft end play, measure from the rear face of the flywheel housing to the rear face of the flexplate, adjacent to the converter mounting holes. The measurement should be within the tolerance specified on the adaptation checksheet.