Temporary Maintenance Instruction
TMI 139-494 Rev. A

Tail Rotor Drive Line - Direct Alignment Check

All AW139 equipped with Tail Rotor Drive Installation 4G6500A00212

The technical content of this document is approved under the authority of DOA nr. EASA.21J.005.

The present TMI will be evaluated for its introduction in the standard set of Technical Publication.
If no further notice is received, the present document expires on: December 20th 2022.

2021-12-20

Introduction

The purpose of this TMI is to provide an alignment procedure for the Tail Rotor Drive Line P/N 4G6500A00212; application of this procedure can be requested in conjunction with maintenance activities (i.e. repair) in order to verify that alignment requirements of TRDL are still complied with after job completion.

The alignment procedure of the TRDL P/N 4G6500A00212 takes into account an helicopter configuration with the tail assy assembled to the rear fuselage.

Tail Rotor Drive Line - Direct Alignment Check

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References

Table 1**: **References

Data Module	Title
39-A-00-20-00-00A-120A-A	Helicopter safety - Make the helicopter safe for maintenance

Table 2: Access Point

Access Panel / Door Id	Data Module
No Access Point	

Table 3: Zones	
Zone ID	Data Module
No Zones	

Preliminary Requirements

Required conditions

Table 4: Required conditions	
Data Module	Data Module/Technical Publication
39-A-00-20-00-00A-120A-A	Helicopter safety - Make the helicopter safe for maintenance
39-A-63-20-00-00A-720A-A	MGB must be installed on helicopter upper deck and locked into its nominal position.
39-A-65-21-01-00A-720A-A	The Intermediate gearbox must be installed on helicopter
39-A-65-22-01-00A-720A-A	The Tail gearbox must be installed on helicopter
39-A-64-21-01-00A-720A-A	The tail rotor head must be installed on helicopter
39-A-53-40-00-00A-720A-A	The tail assembly is assembled to the rear fuselage

Support equipment

Table 5: Support Equipment		
Nomenclature	Identification No.	Qty
1. Alignment check tool for lightened TRLD	PEC-139-009-01	1

Supplies

Table 6: Supplies		
Nomenclature	Identification No.	Qty
No supplies are required		

Spares

Table 7*: *Spares

Nomenclature	Identification No.	Qty
No spares are required		

Safety condition

None

Procedure

Note:
The local/relative coordinate system is the coordinate system x,y,z which is used to check the alignment and it is defined as follows:
x : lateral axis on the sight (corresponds to the BL helicopter coordinate)
y : vertical axis on the sight (corresponds to the WL helicopter coordinate)
z : axis of sight (corresponds to the STA helicopter coordinate)

Note:
The alignment procedure hereafter described must be repeated two times: before and after the maintenance operation for which it has been requested the alignment check.

1. Install the direct alignment tooling P/N PEC-139-009-01 on the bearing support coupling (Position “C”. See Alignment Data Sheet Fig. 1).

2. Rotate the tail drive line until the protruding part of the tool is contained in the Y-Plane (vertical), upwards with respect to the coupling and set the dial gauge to zero, as indicated in Fig. 3.

3. Rotate the tail drive line of 180° until the protruding part of the tool is contained again in the Y-Plane (vertical), but this time downwards with respect to the coupling and record the displacement measure (positive value for elongation; negative value for contraction), as indicated in Fig. 3.

4. Repeat steps 1 and 2 for the X-plane (horizontal) setting the dial gauge to zero on the left side position of the flexible coupling as indicated in Fig. 4.

5. The measures on X-plane and Y-plane (set of measures No.1) shall be recorded in the frozen working sheet (Fig. 5).

6. Repeat the procedure above described after the maintenance operation has been performed and record the new measures (set of measures No.2).

7. Contact the manufacturer in order to recover the measures on the MGB output (A) and IGB input (B) couplings recorded according to the final direct alignment during helicopter manufacturing.

8. Extract the displacement margin

$$\Delta_m = 2 \cdot (0.79 - \max(\Delta_A; \Delta_B)) \geq 0$$

9. The vectorial composition of the measures of the central bearing support coupling (C) on X-plane (horizontal, H) and Y-plane (vertical, V), after the substitution of the fuselage floor panel (set of measures No.2), shall be contained inside the tolerance of 0.79 mm:

$$\Delta_{C2} = \sqrt{(\Delta_{C2V})^2 + (\Delta_{C2H})^2} \leq 0.79mm$$

This formula is to verify that the misalignment of coupling C after the maintenance operation has been performed is within the acceptable limit.

10. The vectorial composition of the difference between the correspondent values of the two set of measures (before and after the substitution of the floor panel) shall be contained inside the following tolerance:

$$\sqrt{(\Delta_{C1V} - \Delta_{C2V})^2 + (\Delta_{C1H} - \Delta_{C2H})^2} \leq \Delta_m$$

This formula is to verify that the misalignment of couplings A and B after the maintenance operation has been performed is within the acceptable limit.

11. Tell the manufacturer if you find that the measures are not within limits.

Requirement after job completion

1. Remove all the tools and other items from the work area.
2. Make sure that work area is clean.
3. Return helicopter to flight configuration

AIRCRAFT S/N :

COUPLING POSITION	MEASURED VALUES ONLY FOR P/N 4G6500A00211 /12	ALLOWABLE LINEAR DISPLACEMENT [mm]
MGB Output (A)	Δ_A	≤ 0.79
IGB Input (B)	Δ_B	≤ 0.79
Central Bearing Support (C)		≤ 0.79

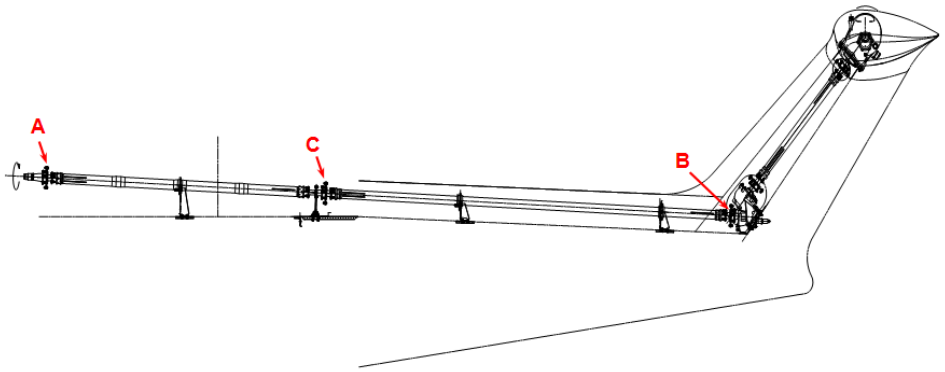


Figure 1: Alignment Data Sheet

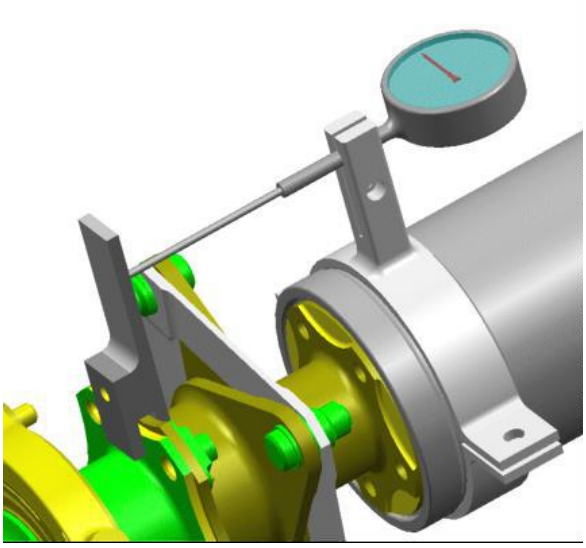


Figure 2: Linear Gage Installation on the TDS flexible coupling

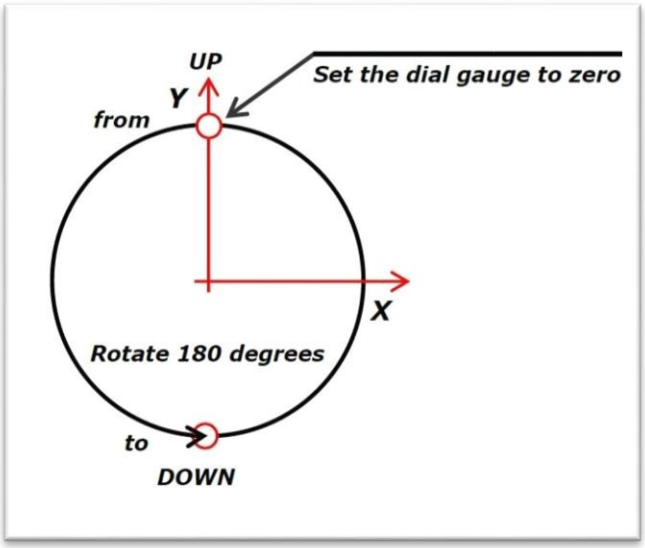


Figure 3: Direct Alignment check Y – plane

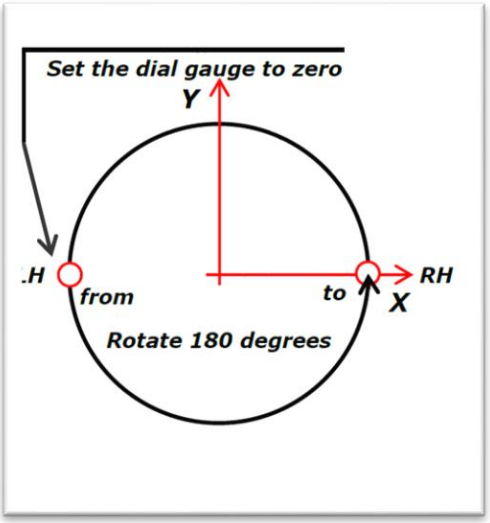


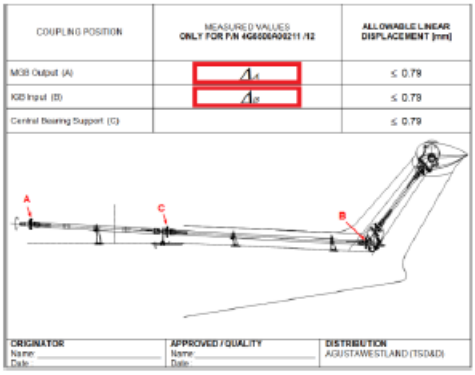
Figure 4: Direct Alignment check X - plane

AIRCRAFT S/N :						
ORIGINAL ALIGNMENT DATA			Δ_A	_____ (1)	Δ_B	_____ (1)
COUPLING POSITION	LINEAR DISPLACEMENT [mm]					
	BEFORE FLOOR PANEL SUBSTITUTION		AFTER FLOOR PANEL SUBSTITUTION		DIFFERENCE	
(C)	Vertical plane Δ_{C1V}	Horizontal plane Δ_{C1H}	Vertical plane Δ_{C2V}	Horizontal plane Δ_{C2H}	Vertical plane $\Delta_{C1V} - \Delta_{C2V}$	Horizontal plane $\Delta_{C1H} - \Delta_{C2H}$
Central Bearing Support	_____ (1)	_____ (1)	_____ (1)	_____ (1)	_____ (1)	_____ (1)

Alignment Requirements Verification:

Formulas	Results	OK / Not OK
$\Delta_m = 2 \cdot (0.79 - \max(\Delta_A; \Delta_B)) \geq 0$	_____ (1)	_____ (1)
$\Delta_{C2} = \sqrt{(\Delta_{C2V})^2 + (\Delta_{C2H})^2} \leq 0.79mm$	_____ (1)	_____ (1)
$\sqrt{(\Delta_{C1V} - \Delta_{C2V})^2 + (\Delta_{C1H} - \Delta_{C2H})^2} \leq \Delta_m$	_____ (1)	_____ (1)

Note: (1) field to be fulfilled by the operator



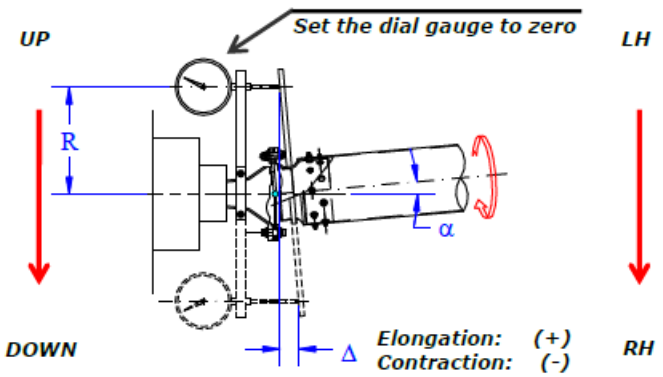


Figure 5: Alignment check table