



Application Note

Application Note Number	A-ECAS330-332-2020E-OC
Revision	0
Function	Oil Cooler Balance
Airframe	Eurocopter AS330 and 332
Engine	N/A
E-Setup Number	A-ECAS330-332-2020E-OC.asf
ACES Systems Analyzer	Model 2020 w/Tail Rotor Enhanced Software
Firmware Version	2.00 or greater
Procedure	N/A

Introduction

This Application Note covers the required equipment, equipment installation, analyzer setup, data acquisition and solution process for using the ACES Systems' Model 2020 with Enhanced Tail Rotor Performance Software to perform oil cooler fan balance on the Eurocopter AS330 and 332 helicopters. General instructions for the use of the Model 2020 can be found in user manual #2020OM-01. All procedures for balance and adjustments should be made in accordance with the applicable Eurocopter Maintenance Manual.

A. Required Equipment

The following ACES Systems' equipment is required.

Item	Quantity	Description	Part Number
1.	1	Model 2020 Analyzer	10-100-2020
2.	1	Phototach	10-100-1773*
3.	1	Cable, Tachometer, 50 ft.	10-320-0126*
4.	1	Magnetic Pickup	75-900-0187*
5.	1	Interrupter, Oil Cooler, AS330/332	22-430-0134*
6.	1	Cable, Magnetic Pickup, 50'	10-320-0123*
7.	1	Sensor, Vibration, 991D-1	69-100-0075
8.	1	Cable, Sensor, 991D-1, 50'	10-320-0163

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9.	1	Mount, Phototach/Magnetic Pickup, Oil Cooler	22-430-0137
10.	1	Reflective Tape	10-400-0176

* Oil cooler balance can be performed using a magnetic pickup and interrupter or phototach and reflective tape.

Miscellaneous Equipment

Tape, tie wraps or cable clamps to secure cables to airframe.

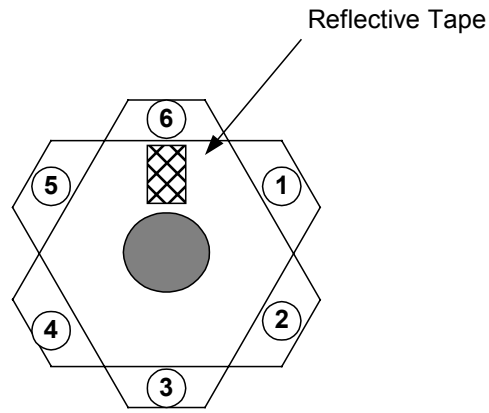
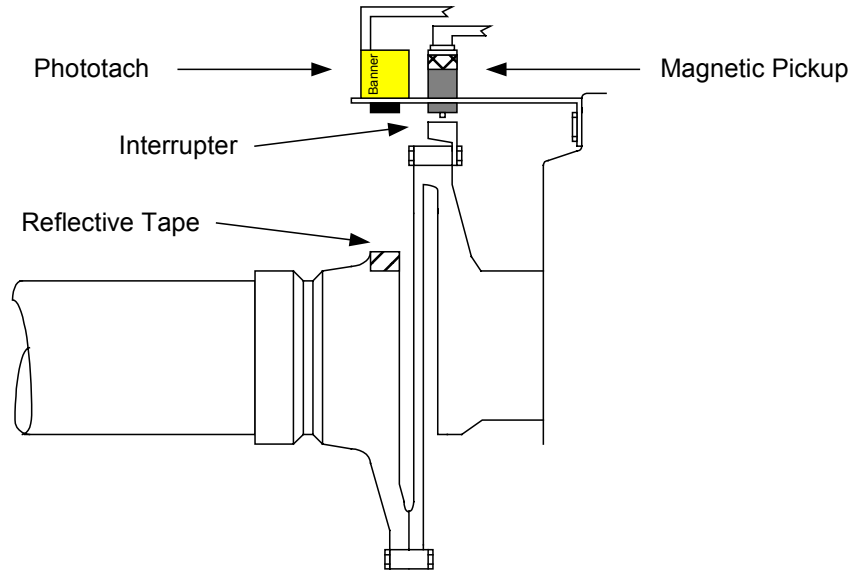
B. Equipment Installation

1. Park the helicopter on a flat surface with the nose facing into the wind.
2. Install sensor 991D-1 (P/N 69-100-0075) into sensor support at the 12:00 position on the fan stator and secure.
3. Install oil cooler phototach/magnetic pickup mount (P/N 22-430-0137) on main gearbox accessory drive housing and secure. Install phototach (P/N 10-100-1773) into outboard hole in mount and secure with nut. Bond a piece of reflective tape (P/N 10-400-0176) to the shaft in-line with the phototach and one of the flexible coupling attachments. Ensure the reflective target is illuminated by the phototach beam.
4. Connect phototach cable (P/N 10-320-0126) to phototach and connect sensor cable (P/N 10-320-0163) to sensor and route cables into cabin area. Connect sensor cable to channel A of balancer. Connect phototach cable to Tach 1 channel of balancer.
5. If using a magnetic pickup (P/N 75-900-0187), install the pickup into the inboard mounting hole and hand tighten the jam nuts. Install interrupter (P/N 22-430-0134) on one of the three main gearbox drive flange flexible coupling shaft bolts and adjust gap to 1.25mm. Secure magnetic pickup with jam nuts and safety wire. Install one or more washers opposite the interrupter to compensate for the weight of the interrupter. The washers are placed between the original washer and nut. Torque per maintenance manual and check that bolt protrudes sufficiently (1.5mm).
6. Connect magnetic pickup cable (P/N 10-320-0123) and connect sensor cable (P/N 10-320-0163) to sensor and route cables into cabin area. Connect sensor cable to channel A of balancer. Connect magnetic pickup cable to Tach 1 channel of balancer.

Note

Route all cables as not to interfere with hot or rotating components.

Equipment Installation Diagram



Balance Point Labeling

C. Analyzer Set Up

1. Turn the analyzer “ON”
2. From the “Main Menu”, select “Tail Rotor Balance” and press **[Enter]**. From the “Tail Rotor Balance” menu, select “Manage Setups” and press **[Enter]**. From the “Manage Setups” menu, select “New” and press **[Enter]**.
3. If setups are already stored in the analyzer, a setup list will be presented. If the AS330/332 is not among this list, press the **[F-1]** key for a “New” setup.

Warning

It is important that the following setup information be entered exactly as shown, as errors may lead to possible failure of jobs performed with this setup.

4. The “Tail Rotor Setup” screen now appears. Enter the oil cooler job setup information as shown in the appropriate fields. When completed, press **[Enter]**.

Model 2020 ProBalancer	
Tail Rotor Setup	
Name:	AS330/332 OIL COOLER
Sensor Chan:	(A)
Sensor:	SS10-1
Tach Chan:	(1)
Tach Type:	Optical
Tach Pos:	(12)
Balancing RPM:	8100
Rotor Direction:	CW
Number of Blades:	6
Max Baln. Wts:	4

5. The “Tail Rotor Chart Setup” screen now appears. Enter the setup chart influence information exactly as shown. When finished, press **[Enter]**, **[Backup]**, and **[Start Job]**.

Model 2020 ProBalancer			
Tail Rotor Chart Setup			
Name:	AS330/332 OIL COOLER		
Chart Type:	(Regular)		
No. of WtPos:	6		
Grams/IPS:	1.00		
WtPos	Add @	WtPos	WtPos
1	8 : 0		
2	10 : 0		
3			
4			
5			
6			
WtPos MUST be in CW or CCW order			

D. Data Acquisition

1. Turn the analyzer **[ON]**. From the “Main Menu”, select “Tail Rotor Balance” and press **[Enter]**. From the “Tail Rotor Balance” menu, select “Start a Job” and press **[Enter]**.
2. Next, select the AS330/332 setup from the analyzer’s setup list, select it and press **[Enter]**.

Select Setup List		
1 >	AS330/332 OIL COOLER	
2 >	SA315/316	
3 >	SIKORSKY S-58 T/R	
4 >	HILLER	
5 >	BELL 47 NEW STYLE	
6 >	BELL 47 OLD STYLE	
7 >	SCHWEIZER 269/300	
8 >	EC-120 TAIL ROTOR	
9 >	S-76	
10>	BELL 407	
11>	AS355 270 NR	
12>	AS355 T/R NOMINAL	
13>	AS365	
14>	BELL 206B	
New		

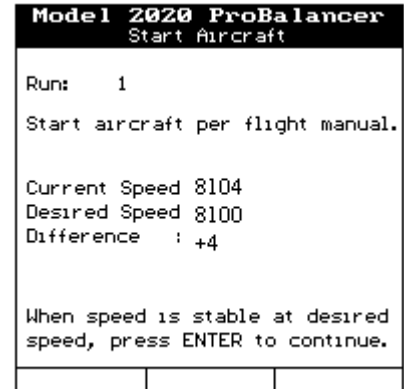
3. The “Customer Information” screen appears. You may enter this optional customer information and press **[Enter]**. If you have used the analyzer prior to this job, you will be able to recall a list of names to select from by pressing the **[F-1]** “Names” key. It is recommended that you enter at least a customer name, as it will aid in recalling the data at a later date.

Model 2020 ProBalancer Customer Information		
Enter the following optional Customer Information.		
Name:	CUSTOMER NAME	
A/C Registrations:	N12345	
A/C Total Time:	1225	
Press ENTER to continue.		
Names		

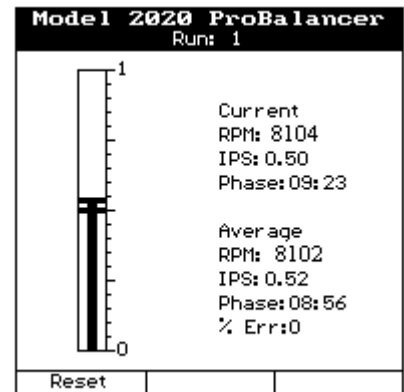
4. The equipment setup screen will appear next, directing you to install and connect the vibration sensor and tachometer sensor to the channels assigned in the job setup. Press **[Enter]** to continue.

Model 2020 ProBalancer Tail Rotor Equipment Setup		
Install the speed sensor and connect to tach channel 1		
Install vibration sensor and connect to vib. channel A		
Tach power is off		
Tach On		

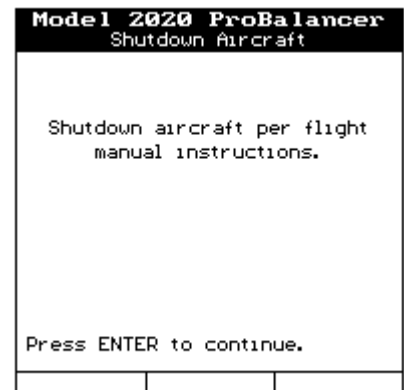
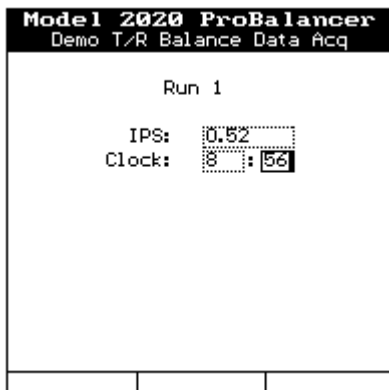
- The “Start Aircraft” screen as shown is presented next. This screen has an rpm monitor to allow verification of the tail rotor speed prior to acquiring data. When the rotor speed is as desired, press **[Enter]** to continue.



- The analyzer will present the data acquisition screen. This screen allows you to monitor both the current and averaged vibration readings. While monitoring the measurement, you may press the **[F-1]** “Reset” key to restart the averaging process. When the % error shown has reached its lowest point, press **[Enter]** to stop the acquisition process.



- The balancer will now display the imbalance reading. After review press **[Enter]** and shutdown the aircraft.



8. The analyzer will now present the “Review Prior Run(s) Data” screen . If you wish to re-measure the data just acquired, you may press **[F-1]** “Retake”. If you wish to continue, press **[Enter]**.

Model 2020 ProBalancer			
Review Prior Run(s) Data			
Run	RPM	IPS	Clock
1	2500	0.520	08:56
Retake #1			

9. The solution screen as shown will now present the recommended corrections for the current run. The example shows the solution of adding .3 grams to #4 and .3 grams to #5. Record the actual weight installed between runs and its location. If you opt to remove weight from an opposite position, you may either enter a negative weight installation (by using the – sign) or leave the positive value in the original position. If you enter the negative value, you must erase the opposite value from the screen or the analyzer will total both values and the influence will be calculated incorrectly for the next run.

Model 2020 ProBalancer			
T/R Sugg. & Inst. Wts			
Run 1		Suggestion:	
#4	0.3	#5	0.3
----- Enter Installed Wts -----			
1	0.0		
2	0.0		
3	0.0		
4	0.3		
5	0.3		
6	0.0		
Inst=Sugg		Inst=None	
Quit Job			

10. To continue to the next run press **[Enter]**. If you wish to terminate the job, press the **[F-3]** “Quit Job” key and the job will be stored as completed. Using the quit job option will terminate the ability to re-start the job later. If you wish to leave the job and be able to restart it later, press the **[Main Menu]** key.
11. When you have finished with the solution process, you will be taken the “Start Aircraft” screen to start the next run.

Note

It is important to remember that when installing or removing weights and recording their positions that the influence used for the next run will be updated by the result from the previous run’s solution, therefore be as accurate as possible when recording adjustments made regardless whether the recommended solution is implemented. The only entries on this screen should reflect the actual solution implemented.



Application Note

Eurocopter AS330 and 332

Oil Cooler Fan Balance

Part Number: 11-200-0109

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