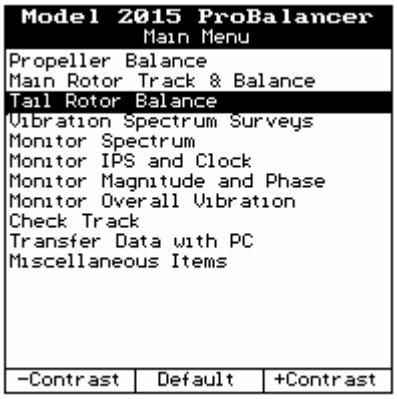
Chapter 6
Tail Rotor Balance

(Revision 3, April 2006)

"Tail Rotor Balance" is a ProBalancer function that is accessed from the ProBalancer Main Menu banner screen shown below. Selecting "Tail Rotor Balance" from the main menu brings up the "Tail Rotor Balance" banner screen (also shown below). Each of the listings on the "Tail Rotor Balance" banner screen menu are options within the "Tail Rotor Balance" function. Descriptions of each of these options follow, along with the information required to complete the menu screens within the options, and the steps necessary to perform the tail rotor balance function.



6.1 - Start Job

Selecting "Start Job" from the "Tail Rotor Balance" banner screen allows you to begin a tail rotor balance job. When you select this option, one of three screens will appear next depending on whether you are using the tail rotor function for the first time or have previously defined tail rotor setups.

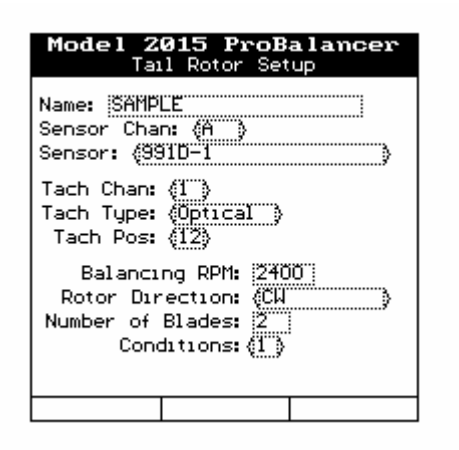
If you are using the ProBalancer for the first time, the "Tail Rotor Setup" banner screen will appear allowing you to define a new tail rotor setup to use.

If you have previously saved setups stored in the ProBalancer memory, a screen displaying the list of setups will be displayed. You can then select a setup from this list to use for the job.

If another job was already in progress but not completed, the "Incomplete Job" banner screen will be displayed and the ProBalancer will present a message prompting you to verify that you wish to finish the incomplete job or begin a new job. The screen will display the message; "The last job performed is incomplete. Finish it?" If you wish to return to the unfinished job, press the [F1] "Yes" key and you will be returned to the point where the in-progress job was stopped and allowed to complete it. If you wish to continue with a new job, press the [F3] "No" key, and the screen will then display the list of previously saved setups stored in the ProBalancer memory. Select a setup to use and press [ENTER] to continue.

6.1.1 - Tail Rotor Setup

When using the ProBalancer for the first time, or when using the Manage Setups "Edit" or "New" selections, the "Tail Rotor Setup" banner screen will be presented to allow you to define and store a tail rotor balance setup. As shown in the following figure, some fields in this screen have default values that appear automatically. You can use this information if appropriate or input your own specific setup information using the keypad. (Refer to Chapter 3, "Using the Model 2015 ProBalancer" if you are unfamiliar with using the keypad.)



To complete the "Tail Rotor Setup" banner screen, do the following:

1. In the "Name" field, use the keypad to enter a name to identify the setup such as the aircraft model. A name must be entered in this field or the setup will not be stored.

2. Use the [⇓] key to move to the "Sensor Chan" (Sensor Channel) field. Use the [⇒] key to toggle between the available selections for the field which are "A" or "B." The selection identifies which ProBalancer vibration channel you will be using to measure the tail rotor vibration.

3. Move to the "Sensor" field using the [⇓] key. Use the [⇒] key to toggle between the options and select a sensor.

4. Use the [⇓] key to move to the “Tach Chan” field. Use the [⇒] key to select and identify which Tach input port on the ProBalancer you are using to acquire the tachometer signal.

5. Move to the “Tach Type” field using the [⇓] key. The selection in the “Tach Type” field identifies which tachometer sensor you are using as the once-per-revolution source. For tail rotors, this will most often be “Optical.” Use the [⇒] key to make this selection.

6. Use the [⇓] key to move to the “Tach Pos” field. Use the [⇒] key to select the clock position in hours (1-12) of the point at which the Phototach beam and the reflective tape intersect. The Tach position is entered from the opposite perspective from the phototach, or as if seen from the position you would stand if using a strobe light to acquire a clock angle.

7. Use the [⇓] key to move to the “Balancing RPM” field. Using the keypad, enter the expected tail rotor RPM at which the balance will be performed. This selection is only used as an RPM target for starting the job and may be over-ridden while performing the job.

8. Move to the “Rotor Direction” field using the [⇓] key. Using the [⇒] key, select the tail rotor direction of rotation as viewed from the opposite perspective from the phototach, or as if seen from the position you would stand if using a strobe light to acquire a clock angle.

9. Move to the “Number of Blades” field using the [⇓] key. Using the keypad, enter the number of blades of the tail rotor assembly you are balancing. Acceptable entries are from 2 to 20 blades.

10. Move to the “Conditions” field using the [⇓] key. Use the [⇒] key to enter the different conditions you will operate the helicopter in to balance the tail rotor assembly. In most cases this will be “1” for full power neutral pitch. There will be cases, such as: multiple power settings or multiple pitch settings that require additional conditions.

When all fields are completed to your satisfaction, press [ENTER] to accept the setup.

If this setup has been defined as a result of selecting to start a job with no previous setups stored, a message will appear on the screen, “Store this new setup?” Press the [F1] “Yes” key to store the setup or the [F3] “No” key to skip this process (This query will only be presented if the user assigns a name to the setup in the “Name” portion of the screen.). If using the “Manage Setups” “Edit” or “New” functions, this message will not appear.

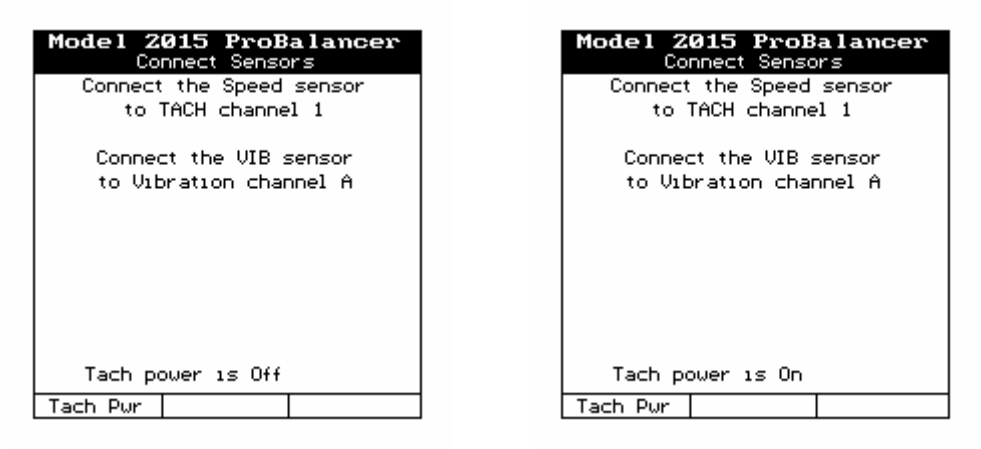
6.1.2 - Customer Information

After you complete the “Tail Rotor Setup” banner screen, the next screen that appears is the “Customer Information” banner screen. This information will appear on the job printout and will assist you in identifying this job when it is stored in the ProBalancer’s memory. Complete the information fields using the keypad. When finished, press [ENTER] to continue.

NOTE
If no customer information is entered, the job will be commonly labeled "Unnamed" in the resume and manage job lists. This will complicate finding a specific job, as multiple jobs are stored. We recommended you enter a customer name.

6.1.3 – Connect Sensors

After you complete the "Customer Information" banner screen, the "Connect Sensors" banner screen will be displayed. Messages that appear on this screen prompt you to perform the physical installation and connection of the Tach and vibration sensors to the input ports you specified in the setup. On the lower portion of the screen a Tach power status message appears. Pressing the [F1] "Tach Pwr" key will toggle the power to the phototach on or off as shown by the message. You are NOT REQUIRED to turn the tachometer power on to start a job; this is done automatically by the ProBalancer at the appropriate times. Go to paragraphs 6.1.3.1 and 6.1.3.2 for generic vibration sensor and phototach installation instructions.



6.1.3.1 - Vibration Sensor Installation

Install the vibration sensor in the location specified by the applicable balance chart you are using. Be sure to orient the connector in the direction specified by the chart as this will drastically affect the accuracy of the balance chart.

6.1.3.2 - Phototach Installation and Test

To install and test the Phototach, do the following:

1. Install the PhotoTach in a location on the gearbox or tail boom at a location not more than 18 inches away nor closer than 4 inches from the tail rotor assembly component you plan to install tape on.

2. Pick a blade or hub component that will be used as the "Target" blade (This should be defined by the chart you are using.).

3. Next, rotate the "Target" blade in front of the Phototach. Check the bottom of the ProBalancer screen for the message, "Tach Power is ON." If this message is not

displayed, press the [F1] “Tach Pwr” key to power the Phototach. The message “Tach power is ON” should now be displayed.

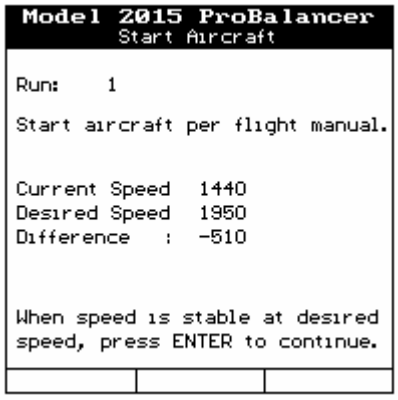
4. Cut a piece of reflective tape approximately 3 inches long and hold it in front of the Phototach on the “Target” blade or component. Observe the back of the Phototach for the red LED gate light to illuminate. Adjust the position of the tape on the target blade until this occurs.

5. When satisfied with the position, mark it, then remove the backing and attach the tape to the target and verify that the red LED gate light still illuminates with the tape in front of the Phototach.

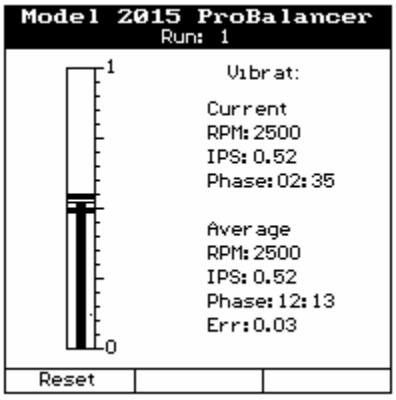
When you have completed the physical equipment setup tasks, press [ENTER] on the ProBalancer to continue with the tail rotor balance job.

6.1.4 - Start Aircraft

The ProBalancer will display the “Start Aircraft” banner screen shown in the illustration above. This screen shows the current speed in RPM, desired speed, and the difference between the two. When the current speed matches the desired speed, press [ENTER] to begin acquiring a measurement. If you choose to use a different RPM setting than that which is defined in the setup, simply press [ENTER] when the RPM signal is satisfactory to continue. Refer to your aircraft’s flight manual for aircraft start and operation instructions.



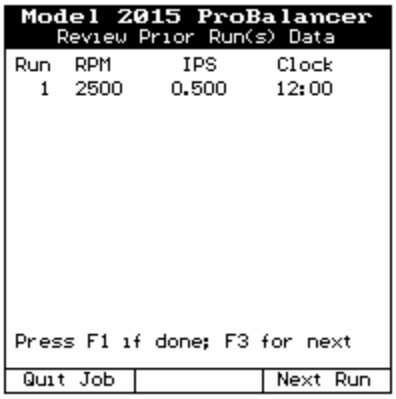
6.1.4.1 – Run 1, Acquiring Vibration Data



After a short delay, the ProBalancer now displays the vibration data being acquired (See Chapter 16, “Reading Spectrum and Scales” for a detailed explanation of this screen.). The screen banner will indicate the current run number. Allow the ProBalancer to average the data for a short period prior to stopping acquisition. During the acquisition process, you may choose to reset the vibration average by pressing the [F1] key. When you are satisfied with the quality of the measurement, press [ENTER].

6.1.4.2 - Review Prior Run(s) Data

The “Review Prior Run(s) Data” screen will appear. This screen allows you to track the vibration data for all runs you have measured. Take the current run’s vibration data and plot it on the applicable balance chart to make corrections. When finished making corrections, press the [ENTER] or [F1] keys to go to the next run, or [F3] to quit the job.

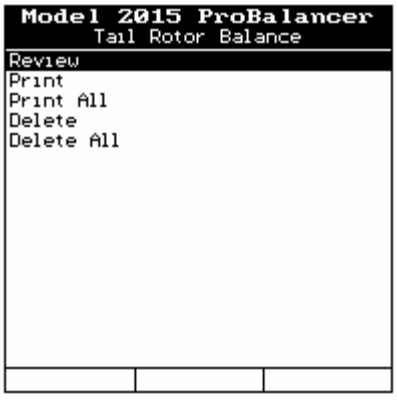


6.2 - Resume Job

Selecting “Resume Job” from the “Tail Rotor Balance” banner screen menu allows you to select an unfinished job to resume. Using the [⇓] key, highlight the job you wish to complete from the list of incomplete jobs, and press [ENTER]. You will be taken to the last step completed in the job process.

NOTE
If no customer information was entered to identify the job when it was started, it will be labeled as an “Unnamed” job. You may wish to use the review job function to identify which job to resume prior to selecting.

6.3 - Manage Jobs



Selecting “Manage Jobs” from the “Tail Rotor Balance” banner screen menu presents several sub-menu choices (shown above right) to choose from. These choices allow you to “manage” previously stored job data in the ProBalancer.

6.3.1 - Review

Selecting the “Review” option presents a list of stored jobs on the “Job List” banner screen. You can select one job for on-screen viewing. When viewing is complete, press the [BACKUP] or [ENTER] key to exit the screen. The ProBalancer will then return you to the "Manage Jobs" menu screen to select another function.

6.3.2 - Print

The “Print” option presents a list of stored jobs on the “Job List” banner screen. From the list, you may select one job for printing. See Chapter 14, “Printing,” for a detailed explanation of how to set up the ProBalancer to print.

6.3.3 - Print All

The “Print All” option sends all currently stored jobs to the printer. When you select “Print All,” a message will appear on the ProBalancer “Print All Jobs” banner screen asking you to verify that you want to print all jobs. Answer the prompt, “Are you sure?” by pressing the [F1] key for “Yes” or the [F3] key for “No.” If you choose the “Yes” answer, ensure your printer is prepared (paper, print cartridge, etc.) to complete the number of jobs stored. The “Yes” answer will send *all* currently stored jobs to the printer. The “No” answer will return you to the previous menu.

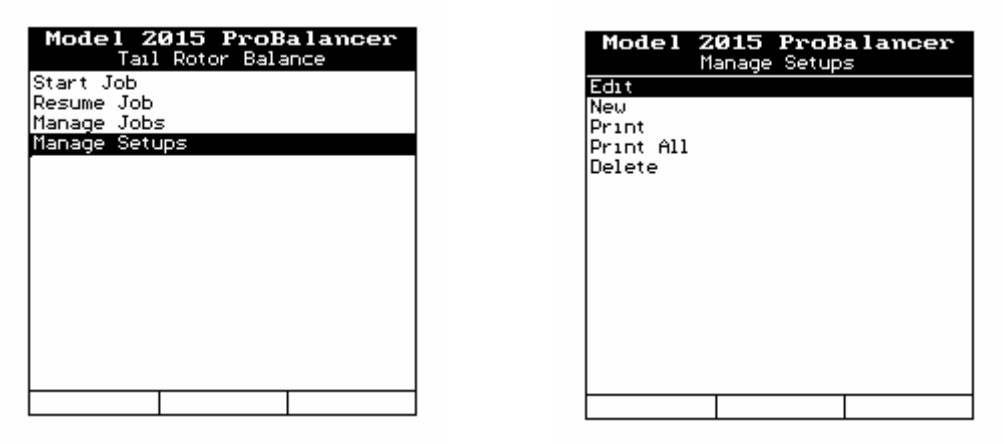
6.3.4 - Delete

The “Delete” option presents a list of stored jobs on the “Job List” banner screen. From the list, you may select one job for deletion. After making your selection, the “Delete Job” banner screen will appear, asking you to verify your intent to delete the selected job by pressing the [F1] key for “Yes” or the [F3] key for “No.” You may wish to print the job for reference or permanent record prior to deleting. Once deleted, the job cannot be retrieved from the ProBalancer.

6.3.5 - Delete All

The “Delete All” option will delete all currently stored jobs. After selecting this option, the “Delete All Job” banner screen will appear, asking you to verify your intent to delete all the jobs by pressing the [F1] key for “Yes” or the [F3] key for “No.” You may wish to print the jobs for reference or permanent record prior to deleting. Once deleted, the jobs cannot be retrieved from the ProBalancer.

6.4 - Manage Setups



Selecting “Manage Setups” from the “Tail Rotor Balance” banner screen menu presents several sub-menu choices (shown above left) to choose from. These choices allow you to “manage” setups you have stored previously in the ProBalancer.

6.4.1 - Edit

Selecting the “Edit” function displays the “Setup List” screen. Select the setup you wish to edit. The screen will display the “Tail Rotor Setup” screen. Edit the setup as necessary and press [ENTER] to store and exit the edited setup screen. If no setups are stored in the ProBalancer, the “Tail Rotor Setup” banner screen will appear allowing you to define and store a new setup. Do this as described in paragraph 6.1.1, “Tail Rotor Setup.”

6.4.2 – New

When the “New” function is selected, the “Tail Rotor Setup” banner screen appears allowing you to define and store a new setup. Do this as described in paragraph 6.1.1, “Tail Rotor Setup.”

6.4.3 - Print

The “Print” option presents a list of stored setups on the “Job List” banner screen. From the list, you may select one setup for printing. See Chapter 14, “Printing,” for a detailed explanation of how to set up the ProBalancer to print.

6.4.4 - Print All

Selecting “Print All” sends all currently stored setups to the printer. When making this selection, you will be asked to verify “Are you sure?” by pressing the [F1] key for “Yes,” or the [F3] key for “No.” If choosing the “Yes” answer, ensure your printer is prepared (paper,

print cartridge, etc.) to complete the number of jobs stored. The “Yes” answer will send *all* currently stored setups to the printer. The “No” answer will return you to the previous menu.

6.4.5 - Delete

The “Delete” option presents you with a list of stored setups. From the list, you may select one setup for deletion. If you wish to delete all stored setups, you must delete them individually. After making your selection, you will be asked to verify your intent to delete the selected job by pressing the [F1] key for “Yes,” or the [F3] key for “No.” We highly recommend you print the setup for reference or permanent record prior to deleting them. Once deleted, the setups cannot be retrieved from the ProBalancer.