

****CAUTION****CAUTION****CAUTION****

Protect your investment. Even today's modern "leakproof" batteries will leak under adverse conditions. Remove a dead battery promptly and don't leave one installed for extended periods of non-use under conditions of extreme dampness or temperature. For seasonal storage record TOTAL time in log and remove battery.

Do not under any circumstances connect the input leads directly to a spark plug terminal; as permanent damage will result. Connections to the spark plug can only be done by inductive pick consisting of no more than a couple of turns of the input lead wrapped around the spark plug wire insulation.

Although the instrument is ruggedly built and can withstand severe vibration, no device can be made totally vibration proof. Mount the instrument securely, paying particular attention to avoid any installation where the unit is allowed to visibly bounce up and down by excessive amounts.

SPECIFICATIONS

● GENERAL

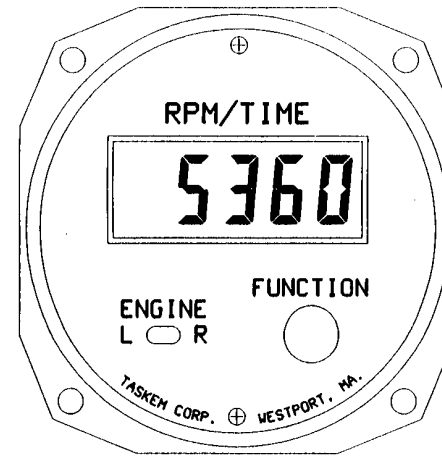
- DISPLAY: 4½ digit, high contrast, liquid crystal display with ½" high characters. All digits and legends visibly tested on power up.
- DISPLAY UPDATE RATE: 0.6 seconds.
- MEMORY: Engine times and redline continuously maintained by internal battery.
- OPERATION: All functions selectable by single, front panel, pushbutton switch. Unit shuts itself off after 3 minutes of non-use.
- SERIAL OUTPUT: The current flight time and RPM are output every 0.6 seconds in standard, 5 Volt, RS-232 format at 9600 baud. Baud rate is not adjustable.
- TIMING/FREQUENCY REFERENCE: Quartz crystal.
- POWER REQUIREMENTS: Internal 9V alkaline battery, NEDA type 1604A or equivalent.
- BATTERY LIFE: 400 hours operating (engine running) or 5 years nonoperating, or any combination of both.
- LOW BATTERY INDICATION: A "LO BAT" legend begins flashing when only 5 hours of battery life remains.

● GENERAL (continued)

- WEIGHT: 9 ounces.
- TEMPERATURE RANGE: Full performance from -10 to +50°C (+14 to +122°F).
- TACHOMETER FUNCTIONS
- RANGE: 200 to 19,990 RPM.
- RESOLUTION: 10 RPM.
- ACCURACY: Better than 0.04% of reading, (4 RPM @ 10,000 RPM).
- REDLINE: User settable from 200 to 19,900 RPM in 100 RPM steps via front panel pushbutton.

● TIMER FUNCTIONS

- TOTAL ACCUMULATED ENGINE TIME: 0 to 999.9 hours in 0.1 hour steps. Resettable to zero via internal switch.
- LAST/CURRENT ENGINE TIME: 0 to 99:59 (99 hours, 59 minutes) in 1 minute increments. Current engine time is temporarily viewable in RPM mode by pressing pushbutton.
- TIMING ACCURACY: Better than 0.04% of reading, (0.1 hour @ 250 hours).



User's Manual

Model J

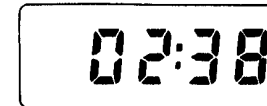
Tachometer/Timer

Congratulations on your purchase of the TASKEM Model J Tachometer/Timer. Please take a few moments to read this manual so you will get the most out of your purchase. The Model J is an all solid state design which provides highly accurate engine RPM, CURRENT or LAST flight time and TOTAL accumulated engine time. It is available in single or dual engine versions (Models J1 and J2), both covered by this manual. The Model J2 is pictured above.

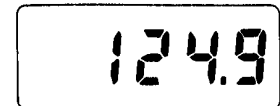
All units are shipped with a battery installed, so it's ready to operate as soon as you take it out of the box. To turn it on, momentarily press the FUNCTION switch. All character segments of the liquid crystal display (LCD) will illuminate for about four seconds in order to visually check its operation. You should get the display shown at left below. After the LCD segment test, the display will then continuously alternate between the time of the LAST flight and the TOTAL accumulated engine time, showing each for about one second. It is easy to distinguish one from the other since the LAST flight time has a colon separating hours and minutes, and the TOTAL accumulated time has a decimal point separating hours from tenths of an hour as shown below.



LCD segment test



LAST flight time
2 hours 38 minutes



TOTAL accumulated time
124.9 hours

If the engine is not started this alternating LAST/TOTAL time format will continue for about three minutes then the instrument will shut itself off to conserve battery power. The times are still retained in memory and will be displayed for another three minutes if turned on again by pressing the FUNCTION switch.

If the engine is started, the alternating LAST/TOTAL time format stops and the LCD will then show RPM. On dual models, starting either engine will put the device in the RPM mode. Also, the left/right ENGINE switch selects which engine RPM is being displayed. Another result of entering the RPM mode is that the internal flight timer is cleared to zero and starts timing this latest (CURRENT) flight. Pressing the FUNCTION switch at any time while RPM is displayed will temporarily show the CURRENT flight time for two seconds.

After stopping the engine (both engines in the case of a dual), the instrument will automatically revert to the alternating LAST/TOTAL time display for three minutes before shutting itself off. Since the LAST time represents engine time (which includes warm up and taxiing), it is typically just a few minutes longer than the actual flight time and is useful for maintaining an accurate log. If you missed it or forget what it was, just press the FUNCTION switch again without restarting the engine and it will be displayed for another three minutes.

The instrument also incorporates a REDLINE function to alert the operator if the RPM goes over a specified value. The REDLINE can be set to any desired value using only the front panel FUNCTION



Developers and Manufacturers of Quality Electronic Products
12 Tickle's Road • Westport, MA 02790 • USA • 508-679-9339

switch. Once set, it is maintained in continuous memory so it doesn't have to be set each time the instrument is turned on. Whenever the engine goes over the REDLINE setting the display continuously flashes on and off as a warning. Also, the dual engine model will flash the same warning if **either engine** goes over REDLINE, regardless of which one is currently selected and displayed by the ENGINE select switch.

To set the REDLINE or observe the current value you must start with the unit off. Press and hold the FUNCTION switch without releasing it until the LCD goes blank (about 5 seconds). Then release the FUNCTION switch and the current REDLINE will be displayed and can be altered. Each press of the FUNCTION switch will then increment the REDLINE by 100 RPM. To decrement it, press and hold the FUNCTION switch until the negative sign appears (about two seconds). Each press of the FUNCTION switch will then decrement the display by 100. To increase it again, press and hold the FUNCTION switch once more until the negative sign disappears to return to the increment mode. After fifteen seconds of inactivity the instrument will shut itself off and the REDLINE setting is retained in memory.

There are numerous ways in which the instrument can be connected to the engine and each has its own special characteristics. For instance, it could be coupled to the engine's ignition system via a direct connection to the magneto, spark coil, kill switch, an accessory magneto winding such as a lighting coil, or via an indirect connection to one of the spark plugs. Alternately, the ignition system can be avoided entirely by incorporating a separate optical or magnetic pickup on one of the engine's rotating parts. In each case a certain number of electrical pulses will be produced for each revolution of the engine and this is the value of importance.

The Model J can be configured for either 2, 1 or 0.5 pulses per revolution by moving an internal jumper plug. The 0.5 setting corresponds to 1 pulse per 2 revolutions, and finds its greatest use with 4 stroke engines which fire each plug on every other rotation. As a tachometer, the instrument basically counts the number of pulses per second applied to its input, then multiplies this value by either 30, 60 or 120 (depending on the position of the jumper) to get revolutions per minute.

Referring to Figure 1, the jumper positions labelled 1, 2 and 3 correspond to 0.5, 1 and 2 pulses per revolution respectively. The jumper can be lifted with a fingernail or needle nosed pliers, and should be firmly seated to the new desired position. Note that although the jumper can be moved with the instrument on, it will have no effect on the current displayed readings since its position is only read by the electronics when the unit is first turned on. A listing of popular engines together with recommended wiring and appropriate jumper positions is included as an addendum to this manual. The list is frequently revised as new engine data becomes available. If your specific engine is not listed, call or write for the latest version and be sure to specify your engine make and model.

UNITS ARE NORMALLY SHIPPED WITH THE JUMPER IN POSITION 3. THIS IS COMPATIBLE WITH THE LIGHTING COIL (YELLOW WIRES) OF THE POPULAR ROTAX 2-CYLINDER ENGINES WHICH GENERATE 2 PULSES PER REVOLUTION.

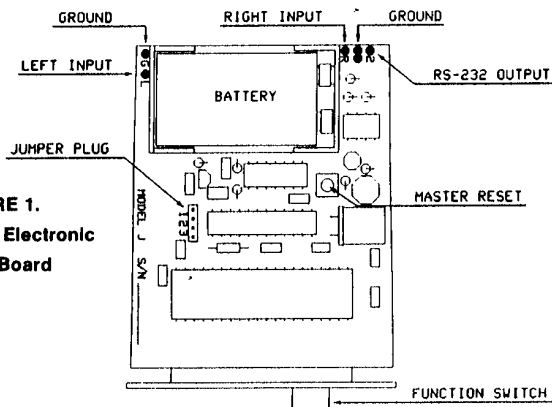


FIGURE 1.
Top View of Electronic
Circuit Board

Input to the single engine version is applied to the adjacent terminals labelled RIGHT INPUT and GROUND as shown in Figure 1. All units come prewired with about 8 feet of wire which can be lengthened if necessary. The second engine input on the Model J2 is applied to the LEFT INPUT and GROUND terminal pair. These terminals are non-functional on the Model J1.

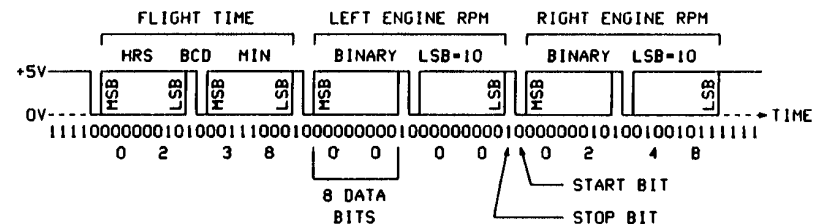
You can't kill the battery by forgetting to turn it off since it turns itself off. Battery life is extremely long, providing over 400 hours in RPM mode or 5 years non-operating (memory retention) or various combinations of both. For instance, 200 hours/2.5 years or 300 hours/1.25 years. These ratings are for a standard 9V alkaline battery. Lithium batteries will provide even longer lifetimes. When the battery nears the end of its useful life, a LOBAT legend will appear. If the old battery is removed and a fresh one put in its place within 30 seconds (easy to do), the memory will not be lost and the LAST/TOTAL time and REDLINE will be retained.

To open the unit, remove the two screws using a #1 Phillips screwdriver being careful not to scratch the front panel. Use the right screwdriver — don't strip the screws! Pull on the FUNCTION knob and remove the electronics assembly from the case. If you haven't already done so, record the current TOTAL time in your log, just in case something goes wrong and the unit is without power for an extended time. **Wait for the unit to shut itself off.** The unit must be off to change the battery, otherwise the memory will be lost.

Have a fresh battery ready. Note that the plastic battery socket secures the battery firmly from all sides. As a result, removal and installation is a bit more difficult than might first be expected. Remove the existing battery by lifting up on the back end to clear the back of the plastic holder then pull it firmly away from the socket terminals. Instead of pulling, a non-metallic tool such as an ice cream stick can be used to pry between the socket terminals and the battery. Install the new battery by placing it near the socket and rotate it so that the terminals will mate correctly (male to female). Lower the front of the battery partway in while aligning the terminals, then carefully push the battery all the way in to seat it properly.

Press the FUNCTION switch. If everything was done quickly and correctly, the display should show the same LAST/TOTAL times as before. If the display shows erroneous times or meaningless characters, the unit will have to be RESET to clear the memory. This can also be done anytime it is desired to clear the internal TOTAL time counter to zero. To RESET the memory, first wait until it shuts itself off then press and hold the MASTER RESET pushbutton shown in Figure 1. Press and release the FUNCTION switch while still holding the MASTER RESET. After about four seconds, the display should show alternating LAST/TOTAL times of zero and the MASTER RESET can then be released. RESET also causes the REDLINE to be preset to 7000 RPM. Change the REDLINE to the desired setting using the procedure previously given.

The instrument incorporates a serial output suitable to interface it to most modern computers and computer accessories such as printers, recorders and other peripherals. The data format adheres to the RS-232 standard and has one stop bit, 8 data bits and no parity. Output voltage is +5V logic with a 10K ohm source impedance, as opposed to true RS-232 bipolar levels. Certain applications may require a buffer or level converter such as the "1488". Baud rate is fixed at 9600 and is not adjustable. The specific data format is shown in Figure 2 and is identical for both models. The data field for the left engine on the Model J1 version is present but filled with zeroes.



A FIELD OF 6 DATA BYTES IS OUTPUT EVERY 600 MILLISECONDS. THE BIT STREAM EXAMPLE SHOWN ABOVE DEPICTS CURRENT FLIGHT TIME = 02:38, LEFT ENGINE = 0 RPM, RIGHT ENGINE = 024B HEX = 587 DECIMAL = 5870 RPM.

FIGURE 2. Serial Output Data Format