

	SURFACE VEHICLE STANDARD	SAE J1399 JUL2011
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		Superseding J1399 JUN1984
Electric Tachometer Specification		

RATIONALE

Controls and Displays Committee has elected to CANCEL this document since it is no longer in regular use and no one from C&D (or any other SAE committee) is willing to support/maintain these documents. Cancelled documents will still be available for purchase from SAE. (per November 9th, 2009 Controls and Displays Meeting Minutes)

1. **Scope**—This SAE Recommended Practice establishes minimum requirements for electric tachometer systems with and without hourmeter or revolution counter, for general applications as follows:

Class 1-Passenger Car
 Class 2-Bus and Truck
 Class 3-Off-Road Vehicles

2. **References**

- 2.1 **Applicable Publication**—The following publication forms a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

2.1.1 ASTM PUBLICATION—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B117-73

3. **Electric Tachometer System**—A typical electric tachometer system for engines using a Kettering ignition system or the newer electronic ignition systems, consists of an indicating unit that obtains a signal proportional to engine speed from the ignition system.

If the tachometer is intended for use on a diesel engine, a sender may be used to supply a signal proportional to engine speed. A signal may also be obtained from an a.c. tap on the alternator if the alternator is so equipped. If a sending unit is used, it will often be one of the following types: permanent magnet generator, magnetic switch, or magnetic sensor. The sender may be mounted on the engine outlet provided for mechanical tachometer cables, or it may be mounted so as to sense the number of teeth on the flywheel ring gear or some other location where a rotating element with teeth, slots, holes, or bosses may be sensed.

The indicating unit may contain an hourmeter. The hourmeter in an electric tachometer may be a true time indicator rather than an indication proportional to the number of engine revolutions. The latter indication is usually found in mechanical tachometers.

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- 4. Factors Affecting Tachometer and Hourmeter Accuracy**—Changes in ambient temperature and voltage may affect the tachometer and/or the hourmeter indication.
- 5. Tachometer and True Hourmeter Indication (Allowable System Variation)**
- 5.1 Tachometers Driven by Signal from Ignition System or Alternator A.C. Tap**—The tachometer indication shall be within $\pm 2\%$ of full scale with nominal voltage applied at a temperature of $24 \pm 3^\circ\text{C}$ when the tachometer is driven with a signal from an ignition system or from an alternator a.c. tap, as applicable. If a calibrator is used, it must supply a signal having the same characteristics as that supplied by an ignition system or an alternator a.c. tap. Calibration of tachometers shall be made with the instrument in approximately the same angular position that it will have when mounted in the vehicle. See Environmental Conditions for allowable variation within the instrument due to changes in ambient temperatures and voltage.
- 5.1.1 SECONDARY LOSSES**—The effect of the tachometer on the ignition system should not reduce the available secondary voltage by more than 4%. Testing is to be done with the exact ignition system to be used in actual practice. The distributor is to be run with the coil input voltage held constant at 14.0 V and the coil secondary open circuited. The exact test procedure for measurements shall be established by the supplier and consumer.
- 5.2 Sender Driven Units**—The tachometer indication shall be within $\pm 2\%$ of full scale with nominal voltage applied at a temperature of $24 \pm 3^\circ\text{C}$, when the tachometer is driven with a signal from a sender either rotated or excited in a fashion simulating actual operation. If a calibrator is used, it must supply a signal having the same characteristics as the sender. Calibration of tachometers shall be made with the instrument in approximately the same angular position that it will have when mounted in the vehicle. See Environmental Conditions for allowable variation within the instrument due to changes in ambient temperatures and voltage.
- 5.3 True Hourmeter**—The hourmeter indication shall be within $\pm 2\%$ of elapsed time with nominal voltage applied at a temperature of $24 \pm 3^\circ\text{C}$.
- 5.4 Hourmeter Proportional to Number of Engine Revolutions**—The time indication shall be within $\pm 0.3\%$ with nominal voltage applied, nominal input rpm required to indicate 1 h and at a temperature of $24 \pm 3^\circ\text{C}$.
- 6. Effects of Environmental Conditions**
- 6.1 Temperature (Allowable System Variation)**
- 6.1.1 TACHOMETER INDICATION**—With nominal voltage applied, the tachometer indication shall not vary more than $\pm 2\%$ of full scale from the reading determined in Section 5, while the indicating unit is operating over the range of -7 to $+54^\circ\text{C}$ and the sender (if required) is operating over the range of -40 to $+138^\circ\text{C}$. No permanent damage shall result from operating the indicating unit in a range of -40 to $+82^\circ\text{C}$.
- 6.1.2 TRUE HOURMETER**—With nominal voltage applied, the time indication shall not vary more than $\pm 1\%$ from a reading obtained at $24 \pm 3^\circ\text{C}$ while the instrument is operating over the range of -7 to $+54^\circ\text{C}$. No permanent damage shall result from operating the instrument in a range of -40 to $+82^\circ\text{C}$.
- 6.1.3 HOURMETER PROPORTIONAL TO NUMBER OF ENGINE REVOLUTIONS**—With nominal voltage applied and nominal input rpm required to indicate 1 h, the time indication shall not vary more than $\pm 0.3\%$ from a reading obtained in Section 5 while the instrument is operating over the range of -7 to $+54^\circ\text{C}$. No permanent damage shall result from operating the instrument in a range of -40 to $+82^\circ\text{C}$.
- 6.2 Temperature Extremes (Sender Only)**—It will be necessary to evaluate the specific application to specify the allowable temperature extremes.