- The SI unit for velocity is m/s or m s^{-1}, although km h^{-1} is used in many everyday applications. Like displacement, average velocity is also a vector quantity and its direction is along the direction of Total displacement.

INSTANTANEOUS VELOCITY AND SPEED

The rate of change of position with respect to time, at given instant is called instantaneous velocity.

Mathematically the velocity at an instant is defined as the limit of the average velocity as the time interval Δt becomes infinitesimally small. In other words,

$$V_{inst} = V = \lim_{\Delta x \to 0} \left(\frac{\Delta x}{\Delta t} \right) \qquad \text{.....[5]}$$

where the symbol $\lim_{\Delta x \to 0}$ stands for the operation of taking limit as $\Delta t \to 0$ of the quantity on its right.

In the language of calculus, the quantity on the right hand side of Eq. (5) is the differential coefficient of x with respect to t and is denoted by $\frac{dx}{dt}$. So,

$$V_{inst} = V = \frac{dx}{dt} \qquad \text{.....[6]}$$

"The magnitude instantaneous velocity of a body is called its instantaneous speed."

The speedometer of vehicle reads its instantaneous speed.