Cylindrical

$$x_1 = x = \rho\cos\phi \quad \Rightarrow \quad \dot{x} = \dot{\rho}\cos\phi - \rho\dot{\phi}\sin\phi$$
$$x_2 = y = \rho\sin\phi \quad \Rightarrow \quad \dot{y} = \dot{\rho}\sin\phi + \rho\dot{\phi}\cos\phi$$
$$x_3 = z = z \quad \Rightarrow \quad \dot{z} = \dot{z}$$

$$\dot{x}^2 = \dot{\rho}^2\cos^2\phi + \rho^2\dot{\phi}^2\sin^2\phi - 2\rho\,\dot{\rho}\dot{\phi}\sin\phi\cos\phi$$
$$\dot{y}^2 = \dot{\rho}^2\sin^2\phi + \rho^2\dot{\phi}^2\cos^2\phi + 2\rho\,\dot{\rho}\dot{\phi}\sin\phi\cos\phi$$
$$\dot{z}^2 = \dot{z}^2$$

$$\dot{x}^2 + \dot{y}^2 + \dot{z}^2 = \dot{\rho}^2 + \rho^2\dot{\phi}^2 + \dot{z}^2$$

Spherical

$$x_1 = x = r\sin\theta\cos\phi \quad \Rightarrow \quad \dot{x} = \dot{r}\sin\theta\cos\phi + r\dot{\theta}\cos\theta\cos\phi - r\dot{\phi}\sin\theta\sin\phi$$
$$x_2 = y = r\sin\theta\sin\phi \quad \Rightarrow \quad \dot{y} = \dot{r}\sin\theta\sin\phi + r\dot{\theta}\cos\theta\sin\phi + r\dot{\phi}\sin\theta\cos\phi$$
$$x_3 = z = r\cos\theta \quad \Rightarrow \quad \dot{z} = \dot{r}\cos\theta - r\dot{\theta}\sin\theta$$

$$\dot{x}^2 + \dot{y}^2 + \dot{z}^2 = \dot{r}^2 + r^2\dot{\phi}^2\sin^2\theta + r^2\dot{\theta}^2$$