Electron beam welding of 10mm thick austenitic stainless steel plates was performed to analyze the microstructure characteristic of the joints at constant heat input, in which the electron beam current and the welding speed were changed synchronously. The results show that the magnitude of the heat input is not only factor, however, the weld penetration and the microstructure are influenced by the mode of the heat input. For the partial penetration weld, the root crack is main defect and appears evidently in the joint at low welding speed (small beam current synchronously). The number of the dendritic crystal in the weld center and the weld penetration decrease with the welding speed decreasing (the electron beam current decreasing synchronously) at constant heat input. The mode of the heat input should be also taken into account in the practical electron beam welding application.