$$\begin{array}{c|c} La & \xrightarrow{\operatorname{id}} & La & \xleftarrow{\operatorname{id}} & La \\ \operatorname{id} & Lf & Lf & Lf \\ La & \xrightarrow{Lf} & Lb & \xleftarrow{\operatorname{id}} & Lb \\ \operatorname{id} & \operatorname{id} & Lg & Lg \\ La & \xrightarrow{Lf} & Lb & \xleftarrow{Lg^{-1}} & Lc \end{array}$$