$$
K^1_{102} = \begin{bmatrix}
\frac{\mathbf{i}}{2}\sqrt{3} & \frac{-U}{2t} & \frac{\frac{\mathbf{i}}{2}(\mathbf{i}+\sqrt{3})U}{\sqrt{2}t} & 0 & 0 & 0 & 0 & \frac{-3(\mathbf{i}+\sqrt{3})}{2\sqrt{2}} & 0 & 0 & 0 & \frac{-3\mathbf{i}+\sqrt{3}}{2\sqrt{2}} & 0 & \frac{-(\sqrt{3}U)}{2t} & \frac{-((-3\mathbf{i}+\sqrt{3})U)}{2\sqrt{2}t} & \frac{-\sqrt{3}}{2} \\
\frac{U}{2t} & \frac{-\mathbf{i}}{2}\sqrt{3} & \frac{3+\mathbf{i}\sqrt{3}}{2\sqrt{2}} & 0 & 0 & 0 & \frac{3\mathbf{i}}{\sqrt{2}} & 0 & \frac{3\mathbf{i}+\sqrt{3}}{2\sqrt{2}} & 0 & -\sqrt{\frac{3}{2}} & 0 & 0 & \frac{3\mathbf{i}}{2} & \frac{3(\mathbf{i}+\sqrt{3})}{2\sqrt{2}} & \frac{\frac{3\mathbf{i}}{2}U}{t} \\
\frac{\sqrt{2}U+\mathbf{i}\sqrt{6}U}{4t} & \frac{\frac{\mathbf{i}}{2}(3\mathbf{i}+\sqrt{3})}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{-3(-\mathbf{i}+\sqrt{3})}{2\sqrt{2}} & 0 & \frac{3(-\mathbf{i}+\sqrt{3})U}{2\sqrt{2}t} \\
0 & 0 & 0 & 0 & 0 & 0 & \frac{3-\mathbf{i}\sqrt{3}}{\sqrt{2}} & 0 & \sqrt{2} & 0 & \sqrt{2} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -2 & 0 & 1-\mathbf{i}\sqrt{3} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & \mathbf{i}\sqrt{3} & \frac{\frac{\mathbf{i}}{2}(3\mathbf{i}+\sqrt{3})U}{t} & 0 & 0 & \frac{-3-\mathbf{i}\sqrt{3}}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \frac{3\mathbf{i}}{\sqrt{2}} & 0 & \frac{-3-\mathbf{i}\sqrt{3}}{\sqrt{2}} & 0 & \frac{(3+\mathbf{i}\sqrt{3})U}{2t} & 0 & 0 & \frac{-\mathbf{i}}{2}(-\mathbf{i}+\sqrt{3}) & 0 & 1 & 0 & 0 & -\mathbf{i}\sqrt{\frac{3}{2}} & 0 & 0 \\
\frac{3(-\mathbf{i}+\sqrt{3})}{2\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{-(U+\mathbf{i}\sqrt{3}U)}{2t} & 0 & \frac{U-\mathbf{i}\sqrt{3}U}{2t} & -1 & 0 & 0 & 0 & \frac{\sqrt{2}+\mathbf{i}\sqrt{6}}{4} \\
0 & \frac{-(-3\mathbf{i}+\sqrt{3})}{2\sqrt{2}} & 0 & -\sqrt{2} & 2 & 0 & \frac{1-\mathbf{i}\sqrt{3}}{2} & \frac{U-\mathbf{i}\sqrt{3}U}{2t} & 0 & \frac{\sqrt{2}U}{t} & \frac{1-\mathbf{i}\sqrt{3}}{2} & \frac{-(U+\mathbf{i}\sqrt{3}U)}{2t} & \frac{\sqrt{2}U}{t} & \frac{\sqrt{2}-\mathbf{i}\sqrt{6}}{4} & -2 & 0 \\
0 & 0 & 0 & 0 & 0 & \frac{3-\mathbf{i}\sqrt{3}}{\sqrt{2}} & 0 & 0 & -\left(\frac{\sqrt{2}U}{t}\right) & 0 & \frac{(1-\mathbf{i}\sqrt{3})U}{\sqrt{2}t} & 0 & 0 & 0 & 0 & 0 \\
0 & \sqrt{\frac{3}{2}} & 0 & -\sqrt{2} & -1-\mathbf{i}\sqrt{3} & 0 & -1 & \frac{-(U+\mathbf{i}\sqrt{3}U)}{2t} & \frac{-\mathbf{i}}{2}(-\mathbf{i}+\sqrt{3}) & \frac{(-1-\mathbf{i}\sqrt{3})U}{\sqrt{2}t} & 0 & \frac{\mathbf{i}}{\frac{1}{2}}\frac{(\mathbf{i}+\sqrt{3})U}{t} & \frac{(1-\mathbf{i}\sqrt{3})U}{\sqrt{2}t} & -\left(\frac{1}{\sqrt{2}}\right) & -2 & 0 \\
\frac{-(3\mathbf{i}+\sqrt{3})}{2\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 & 1 & \frac{U-\mathbf{i}\sqrt{3}U}{2t} & 0 & \frac{U+\mathbf{i}\sqrt{3}U}{2t} & 0 & \frac{1+\mathbf{i}\sqrt{3}}{\sqrt{2}} & 0 & 0 & \frac{\frac{\mathbf{i}}{2}(3\mathbf{i}+\sqrt{3})}{\sqrt{2}} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\left(\frac{\sqrt{2}U}{t}\right) & 0 & \frac{(-1-\mathbf{i}\sqrt{3})U}{\sqrt{2}t} & \frac{\mathbf{i}(\mathbf{i}+\sqrt{3})}{\sqrt{2}} & 0 & 0 & 0 & -2 \\
\frac{\sqrt{3}U}{2t} & \frac{3\mathbf{i}}{2} & \frac{3(\mathbf{i}+\sqrt{3})}{2\sqrt{2}} & 0 & 0 & 0 & -\mathbf{i}\sqrt{\frac{3}{2}} & 0 & \frac{\frac{-\mathbf{i}}{2}(-\mathbf{i}+\sqrt{3})}{\sqrt{2}} & 0 & \frac{1}{\sqrt{2}} & 0 & 0 & \frac{\mathbf{i}}{2}\sqrt{3} & \frac{\frac{-\mathbf{i}}{2}(-3\mathbf{i}+\sqrt{3})}{\sqrt{2}} & \frac{\frac{-\mathbf{i}}{2}\sqrt{3}U}{t} \\
\frac{(3\mathbf{i}+\sqrt{3})U}{2\sqrt{2}t} & \frac{-3(-\mathbf{i}+\sqrt{3})}{2\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 & 2 & 0 & 2 & 0 & 0 & \frac{3-\mathbf{i}\sqrt{3}}{2\sqrt{2}} & 0 & \frac{\frac{\mathbf{i}}{2}(3\mathbf{i}+\sqrt{3})U}{\sqrt{2}t} \\
\frac{\sqrt{3}}{2} & \frac{\frac{3}{2}\mathbf{i}U}{t} & \frac{-3(\mathbf{i}+\sqrt{3})U}{2\sqrt{2}t} & 0 & 0 & 0 & 0 & \frac{\mathbf{i}}{\frac{1}{2}}\frac{(\mathbf{i}+\sqrt{3})}{\sqrt{2}} & 0 & 0 & 0 & \frac{3+\mathbf{i}\sqrt{3}}{2\sqrt{2}} & 2 & \frac{\frac{-\mathbf{i}}{2}\sqrt{3}U}{t} & \frac{(3+\mathbf{i}\sqrt{3})U}{2\sqrt{2}t} & \frac{\mathbf{i}}{2}\sqrt{3}
\end{bmatrix}
$$