$$K_{96}^2 = \begin{bmatrix}
0 & \frac{\frac{-\mathbf{i}}{4}\left(-3\,\mathbf{i}+\sqrt{3}\right)U^2}{t^2} & 0 & 0 & 0 & 0 & \frac{\left(3\,\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & \frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & -\left(\frac{\sqrt{\frac{3}{2}}\,U}{t}\right) & 0 & \frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & \frac{-\left(\left(-3\,\mathbf{i}+\sqrt{3}\right)U\right)}{2\sqrt{2}\,t} & 0 & \frac{\sqrt{3}\,U}{2\,t} & -3\,\mathbf{i}+\sqrt{3} & \frac{\left(-3\,\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} \\
\frac{\frac{\mathbf{i}}{4}\left(3\,\mathbf{i}+\sqrt{3}\right)U^2}{t^2} & \frac{-15\,U}{4\,t} & \frac{\frac{-\mathbf{i}}{2}\sqrt{\frac{3}{2}}\,U^2}{t^2} & 0 & 0 & -\left(\sqrt{\frac{3}{2}}\,U\right) & 0 & \frac{3\,\mathbf{i}\,U}{\sqrt{2}\,t} & 0 & 0 & \frac{\frac{-3\,\mathbf{i}}{2}U}{\sqrt{2}\,t} & 0 & \frac{-\left(\left(-3\,\mathbf{i}+\sqrt{3}\right)U\right)}{2\,t} & 0 & \frac{\frac{-3\,\mathbf{i}}{4}U}{t} & \frac{\frac{-3\,\mathbf{i}}{2}U^2}{\sqrt{2}\,t^2} \\
0 & \frac{\mathbf{i}}{2}\sqrt{\frac{3}{2}}\,U^2 & \frac{-3\,U}{t} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & 0 & 0 & \frac{-3\left(\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & \frac{\left(3\,\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & -\left(\sqrt{\frac{3}{2}}\,U^2\right) & \frac{\sqrt{3}\,U}{t} \\
0 & 0 & 0 & \frac{-2\,U}{t} & \frac{\mathbf{i}\left(\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} & 0 & \frac{\frac{\mathbf{i}}{2}\left(\mathbf{i}+\sqrt{3}\right)U}{t} & 0 & 0 & \mathbf{i}\sqrt{2}\,\left(\mathbf{i}+\sqrt{3}\right) & 0 & -\left(\frac{U}{t}\right) & \sqrt{2}\,\left(3+\mathbf{i}\sqrt{3}\right) & 0 & 0 & 0 \\
0 & 0 & 0 & \frac{\left(-1-\mathbf{i}\sqrt{3}\right)U}{\sqrt{2}\,t} & \frac{-5\,U}{t} & 0 & \frac{\frac{\mathbf{i}}{2}\left(5\,\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} & 0 & \frac{\frac{\mathbf{i}}{2}\left(\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} & 0 & 0 & \frac{\left(-1-3\,\mathbf{i}\sqrt{3}\right)U}{2\sqrt{2}\,t} & 0 & 0 & 0 & 0 \\
0 & \frac{-\left(\sqrt{\frac{3}{2}}\,U\right)}{2\,t} & 0 & 0 & 0 & \frac{-3\,U}{t} & \frac{-U^2}{2\,t^2} & 0 & 0 & \frac{\left(3+\mathbf{i}\sqrt{3}\right)U}{\sqrt{2}\,t} & \frac{\frac{-\mathbf{i}}{2}\sqrt{3}\,U}{t} & \frac{\left(1-\mathbf{i}\sqrt{3}\right)U^2}{4\,t^2} & 0 & 0 & \frac{\mathbf{i}}{2}\sqrt{\frac{3}{2}}\,U & 0 \\
\frac{\left(-3\,\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & 0 & 0 & \frac{-\left(U+\mathbf{i}\sqrt{3}\,U\right)}{2\,t} & \frac{\frac{-\mathbf{i}}{2}\left(-5\,\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} & \frac{-U^2}{2\,t^2} & \frac{-4\,U}{t} & 1-\mathbf{i}\sqrt{3} & \frac{\frac{\mathbf{i}}{4}\left(5\,\mathbf{i}+\sqrt{3}\right)U}{t} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & \frac{\left(4-4\,\mathbf{i}\sqrt{3}\right)t^2+\left(-1-\mathbf{i}\sqrt{3}\right)U^2}{4\,t^2} & \frac{U+5\,\mathbf{i}\sqrt{3}\,U}{4\,t} & \frac{\left(1-\mathbf{i}\sqrt{3}\right)U^2}{2\sqrt{2}\,t^2} & 0 & \sqrt{2}-\mathbf{i}\sqrt{6} & \frac{U-\mathbf{i}\sqrt{3}\,U}{2\,t} \\
\frac{3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & \frac{-3\,\mathbf{i}\,U}{\sqrt{2}\,t} & 0 & 0 & 0 & 0 & 1+\mathbf{i}\sqrt{3} & \frac{-7\,U}{2\,t} & \frac{\frac{-\mathbf{i}}{4}\left(-\mathbf{i}+\sqrt{3}\right)U^2}{t^2} & \frac{\sqrt{2}\,U-\mathbf{i}\sqrt{6}\,U}{4\,t} & \frac{U}{t} & -1-\mathbf{i}\sqrt{3} & 0 & \frac{-1-\mathbf{i}\sqrt{3}}{\sqrt{2}} & \frac{U}{\sqrt{2}\,t} & 0 \\
-\left(\frac{\sqrt{\frac{3}{2}}\,U}{t}\right) & 0 & 0 & 0 & \frac{\frac{-\mathbf{i}}{2}\left(-\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} & 0 & \frac{\frac{-\mathbf{i}}{4}\left(-5\,\mathbf{i}+\sqrt{3}\right)U}{t} & \frac{\mathbf{i}}{4}\frac{\left(\mathbf{i}+\sqrt{3}\right)U^2}{t^2} & \frac{-4\,U}{t} & 0 & 0 & \frac{\left(5-\mathbf{i}\sqrt{3}\right)U}{4\,t} & 0 & 0 & 0 & \frac{U-\mathbf{i}\sqrt{3}\,U}{t} \\
0 & 0 & \frac{3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & -\sqrt{2}-\mathbf{i}\sqrt{6} & 0 & \frac{\left(3-\mathbf{i}\sqrt{3}\right)U}{\sqrt{2}\,t} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & \frac{\sqrt{2}\,U+\mathbf{i}\sqrt{6}\,U}{4\,t} & 0 & \frac{-5\,U}{t} & 0 & \frac{\frac{-\mathbf{i}}{2}\left(-\mathbf{i}+\sqrt{3}\right)U^2}{\sqrt{2}\,t^2} & 0 & 0 & 0 & \frac{-1-\mathbf{i}\sqrt{3}}{\sqrt{2}} \\
\frac{3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & \frac{\frac{3}{2}\mathbf{i}\,U}{\sqrt{2}\,t} & 0 & 0 & 0 & \frac{\frac{\mathbf{i}}{2}\sqrt{3}\,U}{t} & \frac{\left(4+4\,\mathbf{i}\sqrt{3}\right)t^2+\mathbf{i}\left(\mathbf{i}+\sqrt{3}\right)U^2}{4\,t^2} & \frac{U}{t} & 0 & 0 & \frac{-2\,U}{t} & -1-\mathbf{i}\sqrt{3}-\frac{U^2}{2\,t^2} & \frac{3\left(3+\mathbf{i}\sqrt{3}\right)U}{2\sqrt{2}\,t} & \frac{-1-\mathbf{i}\sqrt{3}}{\sqrt{2}} & \frac{-U}{2\sqrt{2}\,t} & 0 \\
\frac{-\left(\left(3\,\mathbf{i}+\sqrt{3}\right)U\right)}{2\sqrt{2}\,t} & 0 & 0 & -\left(\frac{U}{t}\right) & \frac{\left(-1+3\,\mathbf{i}\sqrt{3}\right)U}{2\sqrt{2}\,t} & \frac{\left(1+\mathbf{i}\sqrt{3}\right)U^2}{4\,t^2} & \frac{U-5\,\mathbf{i}\sqrt{3}\,U}{4\,t} & -1+\mathbf{i}\sqrt{3} & \frac{\left(5+\mathbf{i}\sqrt{3}\right)U}{4\,t} & \frac{\frac{\mathbf{i}}{2}\left(\mathbf{i}+\sqrt{3}\right)U^2}{\sqrt{2}\,t^2} & -1+\mathbf{i}\sqrt{3}-\frac{U^2}{2\,t^2} & \frac{-4\,U}{t} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & 0 & \mathbf{i}\sqrt{2}\,\left(\mathbf{i}+\sqrt{3}\right) & \frac{\frac{\mathbf{i}}{2}\left(\mathbf{i}+\sqrt{3}\right)U}{t} \\
0 & \frac{-\left(\left(3\,\mathbf{i}+\sqrt{3}\right)U\right)}{2\,t} & \frac{-3\left(-\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & \sqrt{2}\,\left(3-\mathbf{i}\sqrt{3}\right) & 0 & 0 & \frac{\left(1+\mathbf{i}\sqrt{3}\right)U^2}{2\sqrt{2}\,t^2} & 0 & 0 & 0 & \frac{3\left(3-\mathbf{i}\sqrt{3}\right)U}{2\sqrt{2}\,t} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & \frac{-3\,U}{t} & 0 & 0 & \frac{3-\mathbf{i}\sqrt{3}}{\sqrt{2}} \\
\frac{\sqrt{3}\,U}{2\,t} & 0 & \frac{\left(-3\,\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & 0 & 0 & 0 & 0 & \frac{\mathbf{i}\left(\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & 0 & 0 & \frac{\mathbf{i}\left(\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & 0 & 0 & \frac{-6\,U}{t} & \frac{\frac{\mathbf{i}}{4}\left(\mathbf{i}+\sqrt{3}\right)\left(4\,t^2+U^2\right)}{t^2} & \frac{\mathbf{i}\left(\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} \\
3\,\mathbf{i}+\sqrt{3} & \frac{\frac{3}{4}\mathbf{i}\,U}{t} & \frac{-\left(\sqrt{\frac{3}{2}}\,U^2\right)}{2\,t^2} & 0 & 0 & \frac{\frac{-\mathbf{i}}{2}\sqrt{\frac{3}{2}}\,U}{t} & \sqrt{2}+\mathbf{i}\sqrt{6} & \frac{U}{\sqrt{2}\,t} & 0 & 0 & \frac{-U}{2\sqrt{2}\,t} & -\sqrt{2}-\mathbf{i}\sqrt{6} & 0 & \frac{\frac{-\mathbf{i}}{4}\left(-\mathbf{i}+\sqrt{3}\right)\left(4\,t^2+U^2\right)}{t^2} & \frac{-15\,U}{4\,t} & \frac{U^2}{2\sqrt{2}\,t^2} \\
\frac{\left(3\,\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & \frac{\frac{3}{2}\mathbf{i}\,U^2}{\sqrt{2}\,t^2} & \frac{\sqrt{3}\,U}{t} & 0 & 0 & 0 & \frac{U+\mathbf{i}\sqrt{3}\,U}{2\,t} & 0 & \frac{U+\mathbf{i}\sqrt{3}\,U}{t} & \frac{\mathbf{i}\left(\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & 0 & \frac{-\left(U+\mathbf{i}\sqrt{3}\,U\right)}{2\,t} & \frac{3+\mathbf{i}\sqrt{3}}{\sqrt{2}} & \frac{\left(-1-\mathbf{i}\sqrt{3}\right)U}{\sqrt{2}\,t} & \frac{U^2}{2\sqrt{2}\,t^2} & \frac{-5\,U}{t}
\end{bmatrix}$$