Consider the initial value problem (IVP) for nonlinear Schrödinger equations of the form

$$\begin{cases} \partial_t u = i\mathcal{L}u + P(u, \nabla_x u, \overline{u}, \nabla_x \overline{u}), & t \in \mathbb{R},\ x \in \mathbb{R}^n, \\ u(x,0) = u_0(x), \end{cases} \tag{1.1}$$

where $u = u(x,t)$ is a complex valued function, $\mathcal{L}$ is a non-degenerate constant coefficient, second order operator

$$\mathcal{L} = \sum_{j\leq k} \partial_{x_j}^2 - \sum_{j>k} \partial_{x_j}^2, \qquad \text{for some} \quad k \in \{1,..,n\}, \tag{1.2}$$

$$\nabla_x u = (\partial_{x_1} u, .., \partial_{x_n} u), \tag{1.3}$$

and

$$P : \mathbb{C}^{2n+2} \longrightarrow \mathbb{C}, \tag{1.4}$$

is a polynomial, having no constant or linear terms, i.e.

$$P(z) = P(z_1, .., z_n) = \sum_{l_0 \leq |\alpha| \leq d} a_\alpha z^\alpha, \qquad l_0 \geq 2. \tag{1.5}$$

We are interested in the local solvability of the IVP (1.1). More precisely, we shall establish that (1.1) is locally well posed in appropriate Sobolev spaces.