# MSG No. 96.143 $P4_32_12$ [ Type I, tetragonal ]

* symmetry operation

Table 1: Symmetry operations for 3d polar vector.

| No. | tag | matrix (polar) | det | TR |
|---|---|---|---|---|
| 1 | $\{1\|0\}$ | $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$ | 1 | 1 |
| 2 | $\{4^+_{001}\|\frac{1}{2}\frac{1}{2}\frac{3}{4}\}$ | $\begin{bmatrix} 0 & -1 & 0 & \frac{1}{2} \\ 1 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & \frac{3}{4} \end{bmatrix}$ | 1 | 1 |
| 3 | $\{4^-_{001}\|\frac{1}{2}\frac{1}{2}\frac{1}{4}\}$ | $\begin{bmatrix} 0 & 1 & 0 & \frac{1}{2} \\ -1 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & \frac{1}{4} \end{bmatrix}$ | 1 | 1 |
| 4 | $\{2_{100}\|\frac{1}{2}\frac{1}{2}\frac{1}{4}\}$ | $\begin{bmatrix} 1 & 0 & 0 & \frac{1}{2} \\ 0 & -1 & 0 & \frac{1}{2} \\ 0 & 0 & -1 & \frac{1}{4} \end{bmatrix}$ | 1 | 1 |
| 5 | $\{2_{010}\|\frac{1}{2}\frac{1}{2}\frac{3}{4}\}$ | $\begin{bmatrix} -1 & 0 & 0 & \frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{2} \\ 0 & 0 & -1 & \frac{3}{4} \end{bmatrix}$ | 1 | 1 |
| 6 | $\{2_{001}\|00\frac{1}{2}\}$ | $\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$ | 1 | 1 |
| 7 | $\{2_{110}\|0\}$ | $\begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$ | 1 | 1 |
| 8 | $\{2_{1-10}\|00\frac{1}{2}\}$ | $\begin{bmatrix} 0 & -1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & -1 & \frac{1}{2} \end{bmatrix}$ | 1 | 1 |