

MSG No. 110.248  $I4'_1cd'$  [ Type III, 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	$\{2_{001} 0\}$	$\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	1	1
3	$\{m_{100} 00\frac{1}{2}\}$	$\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$	-1	1
4	$\{m_{010} 00\frac{1}{2}\}$	$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$	-1	1
5	$\{4_{001}' 0\frac{1}{2}\frac{1}{4}\}$	$\begin{bmatrix} 0 & -1 & 0 & 0 \\ 1 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & \frac{1}{4} \end{bmatrix}$	1	-1
6	$\{4_{001}' 0\frac{1}{2}\frac{1}{4}\}$	$\begin{bmatrix} 0 & 1 & 0 & 0 \\ -1 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & \frac{1}{4} \end{bmatrix}$	1	-1
7	$\{m_{110}' \frac{1}{2}0\frac{1}{4}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{1}{2} \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & \frac{1}{4} \end{bmatrix}$	-1	-1
8	$\{m_{1-10}' \frac{1}{2}0\frac{1}{4}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{1}{2} \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & \frac{1}{4} \end{bmatrix}$	-1	-1
9	$\{1 \frac{1}{2}\frac{1}{2}\frac{1}{2}\}$	$\begin{bmatrix} 1 & 0 & 0 & \frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$	1	1
10	$\{2_{001} \frac{1}{2}\frac{1}{2}\frac{1}{2}\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{1}{2} \\ 0 & -1 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$	1	1
11	$\{m_{100} \frac{1}{2}\frac{1}{2}0\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & 0 \end{bmatrix}$	-1	1
12	$\{m_{010} \frac{1}{2}\frac{1}{2}0\}$	$\begin{bmatrix} 1 & 0 & 0 & \frac{1}{2} \\ 0 & -1 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & 0 \end{bmatrix}$	-1	1
13	$\{4_{001}' \frac{1}{2}0\frac{3}{4}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{1}{2} \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & \frac{3}{4} \end{bmatrix}$	1	-1

*continued ...*

Table 1

No.	tag	matrix (polar)	det	TR
14	$\{4_{001}^-   \frac{1}{2}0\frac{3}{4}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{1}{2} \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & \frac{3}{4} \end{bmatrix}$	1	-1
15	$\{m_{110}^-   0\frac{1}{2}\frac{3}{4}\}$	$\begin{bmatrix} 0 & -1 & 0 & 0 \\ -1 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & \frac{3}{4} \end{bmatrix}$	-1	-1
16	$\{m_{1-10}^-   0\frac{1}{2}\frac{3}{4}\}$	$\begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & \frac{3}{4} \end{bmatrix}$	-1	-1