

MSG No. 167.105 $R\bar{3}'c$ [Type III, trigonal]

* 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	{3 ⁺ ₀₀₁ 0}	$\begin{bmatrix} 0 & -1 & 0 & 0 \\ 1 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	1	1
3	{3 ⁻ ₀₀₁ 0}	$\begin{bmatrix} -1 & 1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	1	1
4	{m ₁₀₀ 00 ₂ ¹ }	$\begin{bmatrix} -1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$	-1	1
5	{m ₁₁₀ 00 ₂ ¹ }	$\begin{bmatrix} 0 & -1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$	-1	1
6	{m ₀₁₀ 00 ₂ ¹ }	$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & -1 & 0 & 0 \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$	-1	1
7	{2 ₁₀₀ ' 00 ₂ ¹ }	$\begin{bmatrix} 1 & -1 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & \frac{1}{2} \end{bmatrix}$	1	-1
8	{2 ₁₁₀ ' 00 ₂ ¹ }	$\begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & \frac{1}{2} \end{bmatrix}$	1	-1
9	{2 ₀₁₀ ' 00 ₂ ¹ }	$\begin{bmatrix} -1 & 0 & 0 & 0 \\ -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & \frac{1}{2} \end{bmatrix}$	1	-1
10	{-1' 0}	$\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$	-1	-1
11	{-3 ⁺ ₀₀₁ ' 0}	$\begin{bmatrix} 0 & 1 & 0 & 0 \\ -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$	-1	-1
12	{-3 ⁻ ₀₀₁ ' 0}	$\begin{bmatrix} 1 & -1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$	-1	-1
13	{1 ₃ ² ₃ ¹ ₃ ¹ }	$\begin{bmatrix} 1 & 0 & 0 & \frac{2}{3} \\ 0 & 1 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{1}{3} \end{bmatrix}$	1	1

continued ...

Table 1

No.	tag	matrix (polar)	det	TR
14	$\{3_{001}^+ \frac{2}{3} \frac{1}{3} \frac{1}{3}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{2}{3} \\ 1 & -1 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{1}{3} \end{bmatrix}$	1	1
15	$\{3_{001}^- \frac{2}{3} \frac{1}{3} \frac{1}{3}\}$	$\begin{bmatrix} -1 & 1 & 0 & \frac{2}{3} \\ -1 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{1}{3} \end{bmatrix}$	1	1
16	$\{m_{100} \frac{2}{3} \frac{1}{3} \frac{5}{6}\}$	$\begin{bmatrix} -1 & 1 & 0 & \frac{2}{3} \\ 0 & 1 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{5}{6} \end{bmatrix}$	-1	1
17	$\{m_{110} \frac{2}{3} \frac{1}{3} \frac{5}{6}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{2}{3} \\ -1 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{5}{6} \end{bmatrix}$	-1	1
18	$\{m_{010} \frac{2}{3} \frac{1}{3} \frac{5}{6}\}$	$\begin{bmatrix} 1 & 0 & 0 & \frac{2}{3} \\ 1 & -1 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{5}{6} \end{bmatrix}$	-1	1
19	$\{2_{100}' \frac{2}{3} \frac{1}{3} \frac{5}{6}\}$	$\begin{bmatrix} 1 & -1 & 0 & \frac{2}{3} \\ 0 & -1 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{5}{6} \end{bmatrix}$	1	-1
20	$\{2_{110}' \frac{2}{3} \frac{1}{3} \frac{5}{6}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{2}{3} \\ 1 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{5}{6} \end{bmatrix}$	1	-1
21	$\{2_{010}' \frac{2}{3} \frac{1}{3} \frac{5}{6}\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{2}{3} \\ -1 & 1 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{5}{6} \end{bmatrix}$	1	-1
22	$\{-1' \frac{2}{3} \frac{1}{3} \frac{1}{3}\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{2}{3} \\ 0 & -1 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{1}{3} \end{bmatrix}$	-1	-1
23	$\{-3_{001}^+ \frac{2}{3} \frac{1}{3} \frac{1}{3}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{2}{3} \\ -1 & 1 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{1}{3} \end{bmatrix}$	-1	-1
24	$\{-3_{001}^- \frac{2}{3} \frac{1}{3} \frac{1}{3}\}$	$\begin{bmatrix} 1 & -1 & 0 & \frac{2}{3} \\ 1 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{1}{3} \end{bmatrix}$	-1	-1
25	$\{1 \frac{1}{3} \frac{2}{3} \frac{2}{3}\}$	$\begin{bmatrix} 1 & 0 & 0 & \frac{1}{3} \\ 0 & 1 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{2}{3} \end{bmatrix}$	1	1
26	$\{3_{001}^+ \frac{1}{3} \frac{2}{3} \frac{2}{3}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{1}{3} \\ 1 & -1 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{2}{3} \end{bmatrix}$	1	1
27	$\{3_{001}^- \frac{1}{3} \frac{2}{3} \frac{2}{3}\}$	$\begin{bmatrix} -1 & 1 & 0 & \frac{1}{3} \\ -1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{2}{3} \end{bmatrix}$	1	1

continued ...

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No.	tag	matrix (polar)	det	TR
28	$\{m_{100} \frac{1}{3} \frac{2}{3} \frac{1}{6}\}$	$\begin{bmatrix} -1 & 1 & 0 & \frac{1}{3} \\ 0 & 1 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{1}{6} \end{bmatrix}$	-1	1
29	$\{m_{110} \frac{1}{3} \frac{2}{3} \frac{1}{6}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{1}{3} \\ -1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{1}{6} \end{bmatrix}$	-1	1
30	$\{m_{010} \frac{1}{3} \frac{2}{3} \frac{1}{6}\}$	$\begin{bmatrix} 1 & 0 & 0 & \frac{1}{3} \\ 1 & -1 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{1}{6} \end{bmatrix}$	-1	1
31	$\{2_{100}' \frac{1}{3} \frac{2}{3} \frac{1}{6}\}$	$\begin{bmatrix} 1 & -1 & 0 & \frac{1}{3} \\ 0 & -1 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{1}{6} \end{bmatrix}$	1	-1
32	$\{2_{110}' \frac{1}{3} \frac{2}{3} \frac{1}{6}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{1}{3} \\ 1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{1}{6} \end{bmatrix}$	1	-1
33	$\{2_{010}' \frac{1}{3} \frac{2}{3} \frac{1}{6}\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{1}{3} \\ -1 & 1 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{1}{6} \end{bmatrix}$	1	-1
34	$\{-1' \frac{1}{3} \frac{2}{3} \frac{2}{3}\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{1}{3} \\ 0 & -1 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{2}{3} \end{bmatrix}$	-1	-1
35	$\{-3_{001}' \frac{1}{3} \frac{2}{3} \frac{2}{3}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{1}{3} \\ -1 & 1 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{2}{3} \end{bmatrix}$	-1	-1
36	$\{-3_{001}' \frac{1}{3} \frac{2}{3} \frac{2}{3}\}$	$\begin{bmatrix} 1 & -1 & 0 & \frac{1}{3} \\ 1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{2}{3} \end{bmatrix}$	-1	-1