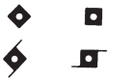
Table 2.1.2.5
Graphical symbols of symmetry axes normal to the plane of projection and symmetry points in the plane of the figure

Description	Alphanumeric symbol	Graphical symbol†	Screw vector of the defining operation of the screw axis (in units of the shortest lattice translation vector parallel to the axis)	Symmetry elements represented by the graphical symbol
Twofold rotation axis Twofold rotation point (two dimensions)	2		None	2
Twofold screw axis: '2 sub 1'	2_1		$\frac{1}{2}$	2_1
Threefold rotation axis Threefold rotation point (two dimensions)	3		None	3
Threefold screw axis: '3 sub 1'	3_1		$\frac{1}{3}$	3_1
Threefold screw axis: '3 sub 2'	3_2		$\frac{2}{3}$	3_2
Fourfold rotation axis Fourfold rotation point (two dimensions)	4		None	4
Fourfold screw axis: '4 sub 1'	4_1		$\frac{1}{4}$	4_1
Fourfold screw axis: '4 sub 2'	4_2		$\frac{1}{2}$	4_2
Fourfold screw axis: '4 sub 3'	4_3		$\frac{3}{4}$	4_3
Sixfold rotation axis Sixfold rotation point (two dimensions)	6		None	6
Sixfold screw axis: '6 sub 1'	6_1		$\frac{1}{6}$	6_1
Sixfold screw axis: '6 sub 2'	6_2		$\frac{1}{3}$	6_2
Sixfold screw axis: '6 sub 3'	6_3		$\frac{1}{2}$	6_3
Sixfold screw axis: '6 sub 4'	6_4		$\frac{2}{3}$	6_4
Sixfold screw axis: '6 sub 5'	6_5		$\frac{5}{6}$	6_5
Centre of symmetry, inversion centre: '1 bar' Reflection point, mirror point (one dimension)	$\bar{1}$		None	$\bar{1}$
Inversion axis: '3 bar'	$\bar{3}$		None	$\bar{3}$, $\bar{1}$, 3
Inversion axis: '4 bar'	$\bar{4}$		None	$\bar{4}$, 2
Inversion axis: '6 bar'	$\bar{6}$		None	$\bar{6}$, 3
Twofold rotation axis with centre of symmetry	$2/m$		None	2, $\bar{1}$
Twofold screw axis with centre of symmetry	$2_1/m$		$\frac{1}{2}$	2_1, $\bar{1}$
Fourfold rotation axis with centre of symmetry	$4/m$		None	4, $\bar{4}$, $\bar{1}$
'4 sub 2' screw axis with centre of symmetry	$4_2/m$		$\frac{1}{2}$	4_2, $\bar{4}$, $\bar{1}$
Sixfold rotation axis with centre of symmetry	$6/m$		None	6, $\bar{6}$, $\bar{3}$, $\bar{1}$
'6 sub 3' screw axis with centre of symmetry	$6_3/m$		$\frac{1}{2}$	6_3, $\bar{6}$, $\bar{3}$, $\bar{1}$

† Notes on the 'heights' h of symmetry points $\bar{1}$, $\bar{3}$, $\bar{4}$ and $\bar{6}$:
(1) Centres of symmetry $\bar{1}$ and $\bar{3}$, as well as inversion points $\bar{4}$ and $\bar{6}$ on $\bar{4}$ and $\bar{6}$ axes parallel to [001], occur in pairs at 'heights' h and $h+\frac{1}{2}$. In the space-group diagrams, only one fraction h is given, *e.g.* $\frac{1}{4}$ stands for $h=\frac{1}{4}$ and $\frac{3}{4}$. No fraction means $h=0$ and $\frac{1}{2}$. In *cubic* space groups, however, because of their complexity, *both* fractions are given for vertical $\bar{4}$ axes, including $h=0$ and $\frac{1}{2}$.
(2) Symmetries $4/m$ and $6/m$ contain vertical $\bar{4}$ and $\bar{6}$ axes; their $\bar{4}$ and $\bar{6}$ inversion points coincide with the centres of symmetry. This is not indicated in the space-group diagrams.
(3) Symmetries $4_2/m$ and $6_3/m$ also contain vertical $\bar{4}$ and $\bar{6}$ axes, but their $\bar{4}$ and $\bar{6}$ inversion points alternate with the centres of symmetry; *i.e.* $\bar{1}$ points at h and $h+\frac{1}{2}$ interleave with $\bar{4}$ or $\bar{6}$ points at $h+\frac{1}{4}$ and $h+\frac{3}{4}$. In the tetragonal and hexagonal space-group diagrams, only *one* fraction for $\bar{1}$ and one for $\bar{4}$ or $\bar{6}$ is given. In the cubic diagrams, *all four* fractions are listed for $4_2/m$; *e.g.* $Pm\bar{3}n$ (223): $\bar{1}$: 0, $\frac{1}{2}$; $\bar{4}$: $\frac{1}{4}$, $\frac{3}{4}$.

The meaning of a graphical symbol on the space-group diagrams is often confused with the set of symmetry elements that constitute the site-symmetry group associated with the symmetry element displayed. As an example, consider the rotoinversion axis $\bar{6}$ (described as 'Inversion axis: 6 bar' in Table 2.1.2.5). The site-symmetry group $\bar{6}$ can be decomposed into three symmetry elements: $\bar{6}$, 3 and m (*cf.* de Wolff *et al.*, 1989). However, the graphical symbol of $\bar{6}$ in the diagrams represents the two symmetry elements $\bar{6}$ and 3, as the symmetry element 'm' (that 'belongs' to $\bar{6}$) is represented by a separate graphical symbol.