Projection of Points

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PROJECTIONS OF POINTS

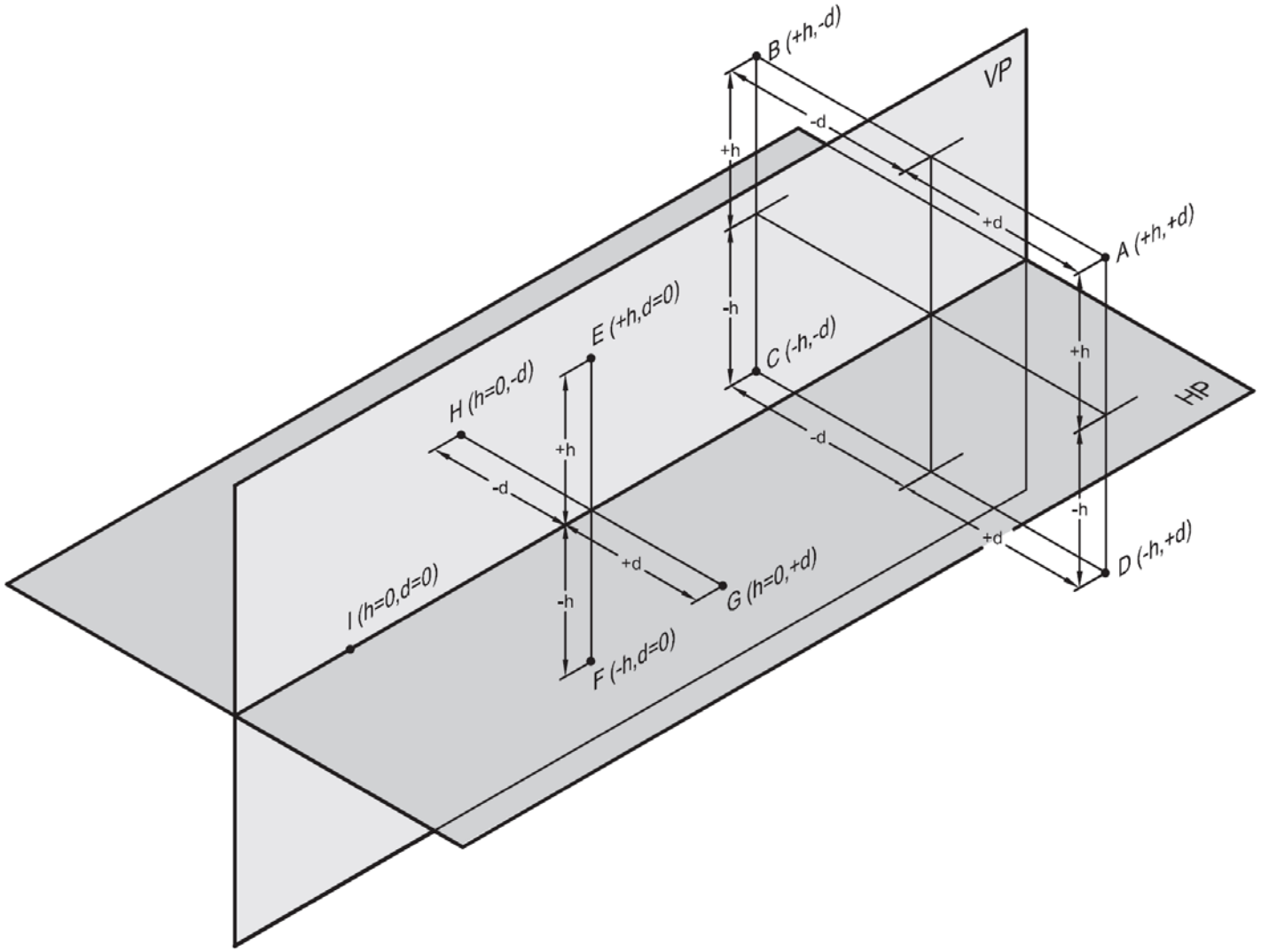
A point represents a location in space. It is a dimensionless geometrical entity which has simply position but no magnitude. A point is usually represented by a dot or a very small circle.

Projections of points have no practical significance. However, it serves the basis for projections of lines, projections of planes and projections of solids.

POSITIONS OF A POINT

The distances of a point from the HP and the VP are necessary to determine its position in space. We may use parameters (*h, d*) to indicate the position of the point in space—*h* indicates the height of the point above/below the HP, *d* indicates the distance of the point in front of/behind the VP. These parameters may be suffixed by a small alphabet for that point. For example, to indicate the point *P* in space, parameters (h_p, d_p) may be used. The space-coordinates h_p and d_p may be prefixed by a (+) or (–) sign to indicate whether the point is above the HP/in front of the VP or below the HP/behind the VP as illustrated in Figure.

PROJECTIONS OF POINTS



PROJECTIONS OF POINTS

The positions of a point may be as follows:

1. A point in the first quadrant, i.e., above the HP and in front of the VP (e.g., Point *A*)
2. A point in the second quadrant, i.e., above the HP and behind the VP (e.g., Point *B*)
3. A point in the third quadrant, i.e., below the HP and behind the VP (e.g., Point *C*)
4. A point in the fourth quadrant, i.e., below the HP and in front of the VP (e.g. Point *D*)
5. A point in the VP and above the HP (e.g. Point *E*)
6. A point in the VP and below the HP (e.g. Point *F*)
7. A point in the HP and in front of the VP (e.g. Point *G*)
8. A point in the HP and behind the VP (e.g. Point *H*)
9. A point in both the RPs (e.g. Point *I*)

PROJECTIONS OF POINTS

NOTATION SYSTEM

The notations to be followed are as given:

1. The TV of a point *P* shall be indicated by *p*
2. The FV of a point *P* shall be indicated by *p'*
3. The SV of a point *P* shall be indicated by *p"*

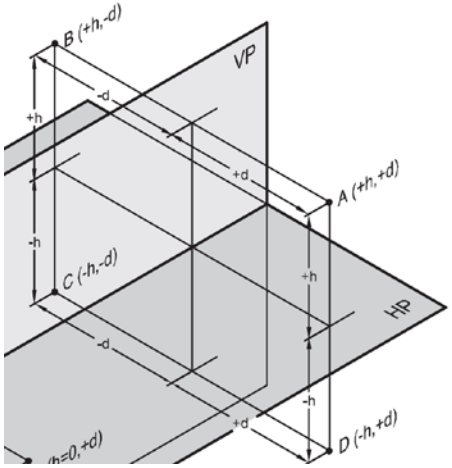
PROJECTIONS OF POINTS: SYSTEMATIC APPROACH

A Point in the First Quadrant

Example 1 Draw the projections of the **point A,** which is 50 mm above the HP and 30 mm front of the VP.

Solution Given, $h_a = +50$, $d_a = +30$

As h_a and d_a both are (+), the point A is in the first quadrant. Therefore, FV of the point will be seen above XY at a distance of 50 mm and TV will be seen below XY at a distance of 30 mm.



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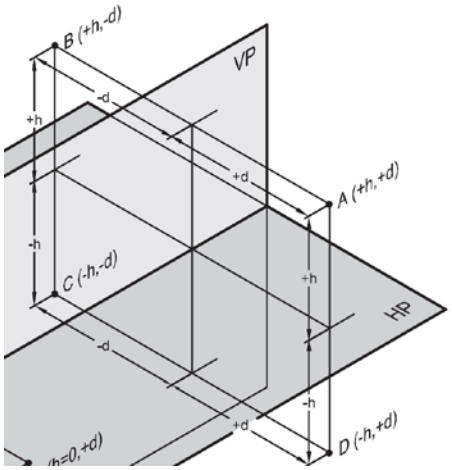
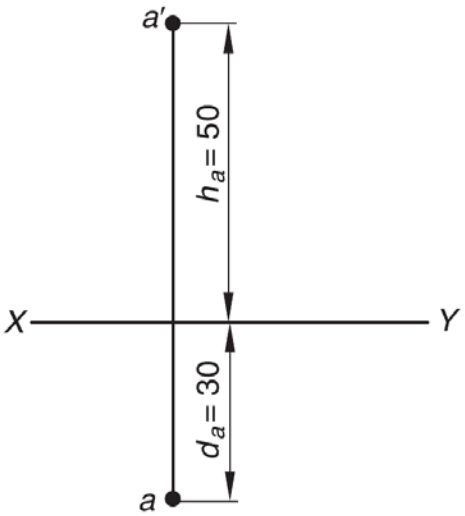




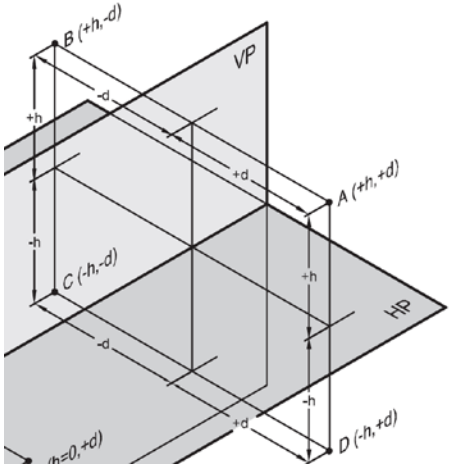
PROJECTIONS OF POINTS

A Point in the Second Quadrant

Example 2 Draw the projections of the **point B,** which is 50 mm above the HP and 30 mm behind the VP.

Solution Given, $h_b = +50$, $d_b = -30$

As h_b is (+) and d_p is (–), the point B lies in the second quadrant. Therefore, FV and TV, both will be seen above XY at a distance of 50 mm and 30 mm respectively. This is because when the HP is rotated in a clockwise direction about XY, the TV on the HP will go up on the side of the FV.



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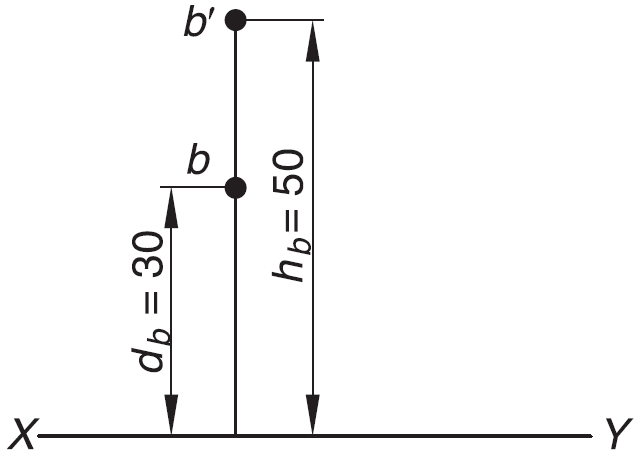


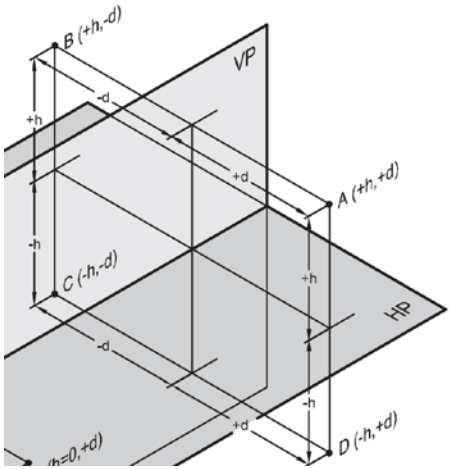
PROJECTIONS OF POINTS

A Point in the Third Quadrant

Example 3 Draw the projections of the **point C,** 50 mm below the HP and 30 mm behind the VP.

Solution Given, $h_c = -50$, $d_c = -30$

As h_c and d_c both are (–), the point C is in the third quadrant. Therefore, FV will be seen 50 mm below XY and TV will be seen 30 mm above XY.



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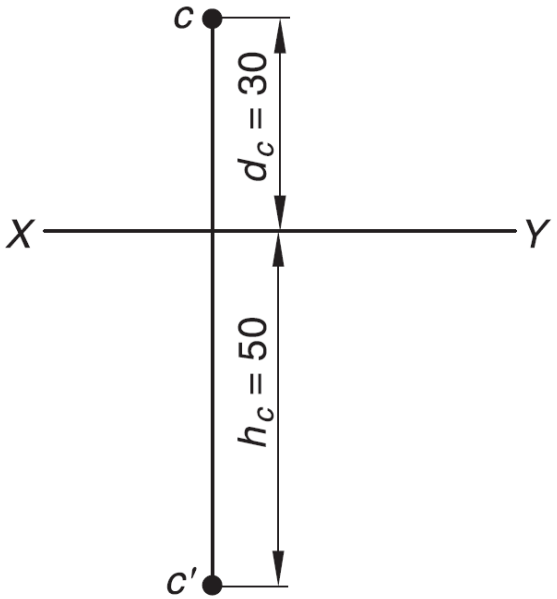


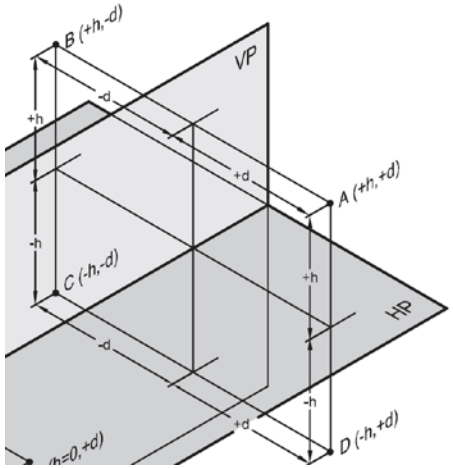
PROJECTIONS OF POINTS

A Point in the Fourth Quadrant

Example 4 Draw the projections of the **point D,** which is 50 mm below the HP and 30 mm in front of the VP.

Solution Given, $h_d = -50$, $d_d = +30$

As h_d is (–) and d_d is (+), the point D lies in the fourth quadrant. Therefore, FV and TV both will be seen below XY at a distance of 50 mm and 30 mm respectively. When the HP is rotated in a clockwise direction about XY, the TV on the HP will go down on the side of the FV.



PROJECTIONS OF POINTS

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Example 4 Draw the projections of the **point D,** which is 50 mm below the HP and 30 mm in front of the VP.

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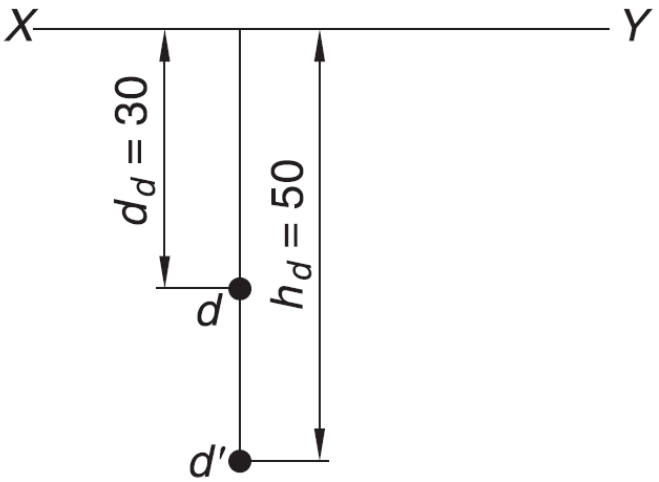
As h_d is (–) and d_d is (+), the point D lies in the fourth quadrant. Therefore, FV and TV both will be seen below XY at a distance of 50 mm and 30 mm respectively. When the HP is rotated in a clockwise direction about XY, the TV on the HP will go down on the side of the FV.



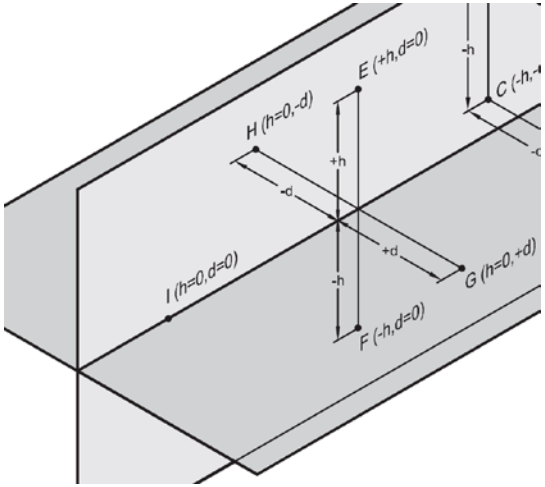
PROJECTIONS OF POINTS

A Point in the VP and Above the HP

Example 5 Draw the projections of the **point E,** in the VP and 50 mm above the HP.

Solution Given, $h_e = +50$, $d_e = 0$

As $h_e = +50$, FV will be seen above XY. As $d_e = 0$, TV will be seen on XY.



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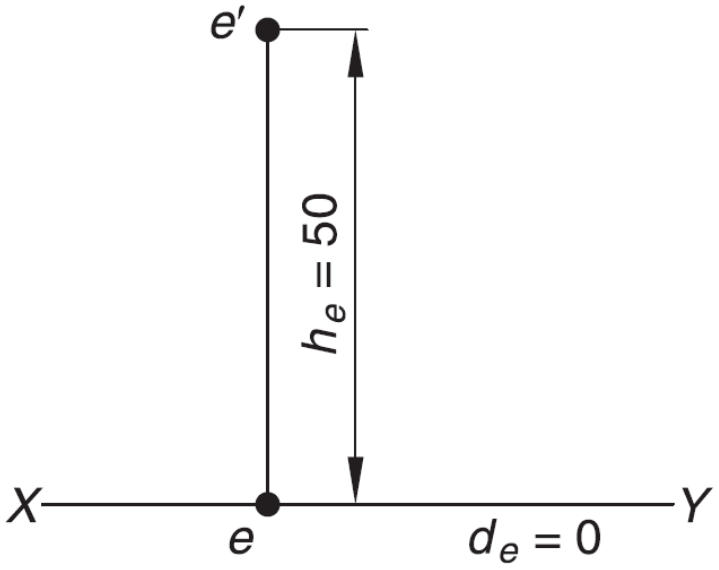


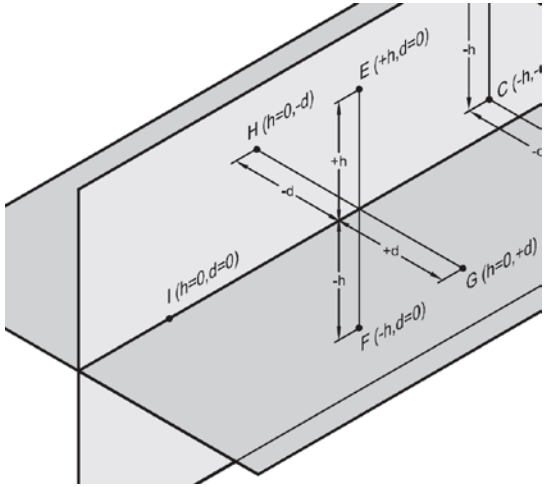
PROJECTIONS OF POINTS

A Point in the VP and Below the HP

Example 6 Draw the projections of the **point F,** in the VP and 50 mm below the HP.

Solution Given, $h_f = -50$, $d_f = 0$

As $d_f = 0$, TV will be seen on XY. As $h_f = -50$, FV will be seen 50 mm below XY.



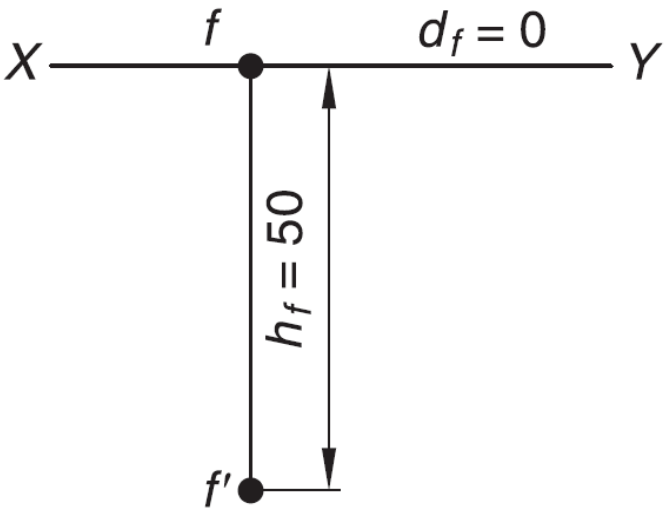
PROJECTIONS OF POINTS

A Point in the VP and Below the HP

Example 6 Draw the projections of the **point F,** in the VP and 50 mm below the HP.

Solution Given, $h_f = -50$, $d_f = 0$

As $d_f = 0$, TV will be seen on XY. As $h_f = -50$, FV will be seen 50 mm below XY.



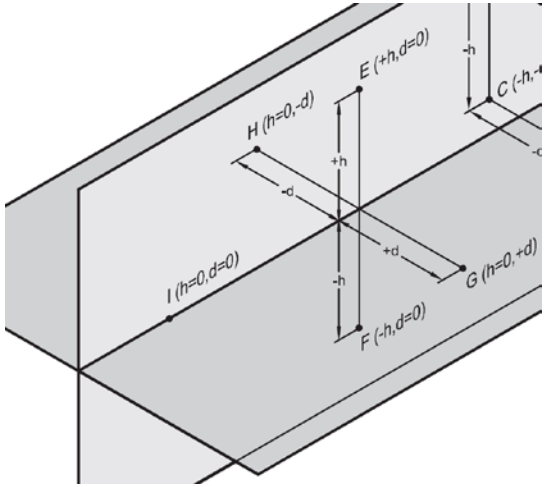
PROJECTIONS OF POINTS

A Point in the HP and in Front of the VP

Example 7 Draw the projections of the **point G,** which is in the HP and 30 mm in front of the VP.

Solution Given, $h_g = 0$, $d_g = +30$

As $h_g = 0$, FV will be seen on XY. As $d_g = +30$, TV will be seen 30 mm below XY.



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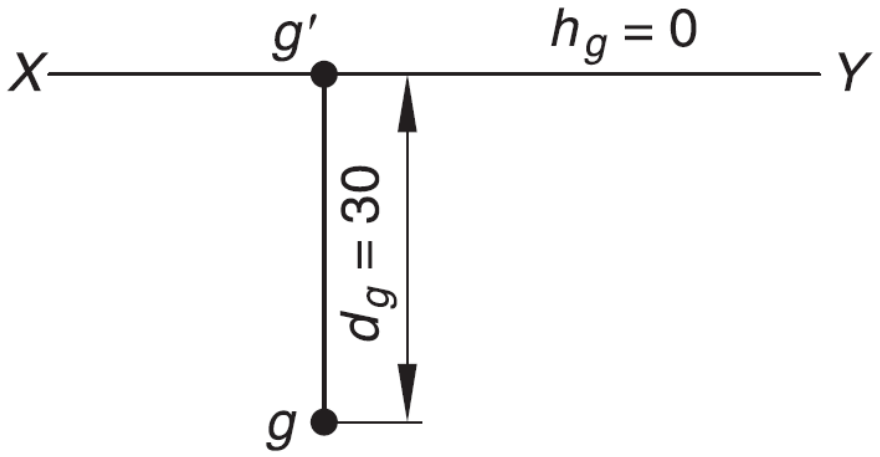


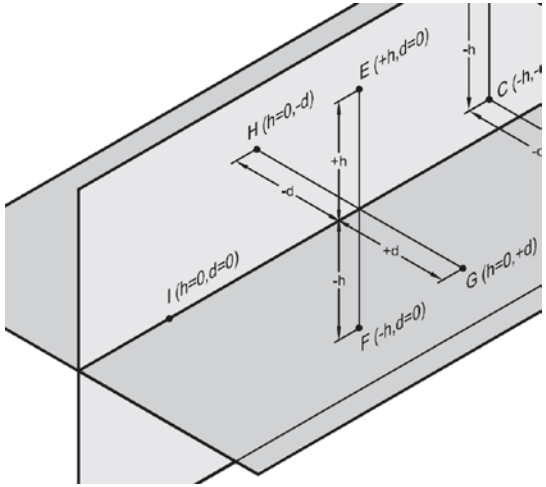
PROJECTIONS OF POINTS

A Point in the HP and Behind the VP

Example 8 Draw the projections of the **point H,** which is in the HP and 30 mm behind the VP.

Solution Given, $h_h = 0$, $d_h = -30$

As $h_h = 0$, FV will be seen on XY. As $d_h = -30$, TV will be seen 30 mm above XY.



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A Point in the HP and Behind the VP

Example 8 Draw the projections of the **point H,** which is in the HP and 30 mm behind the VP.

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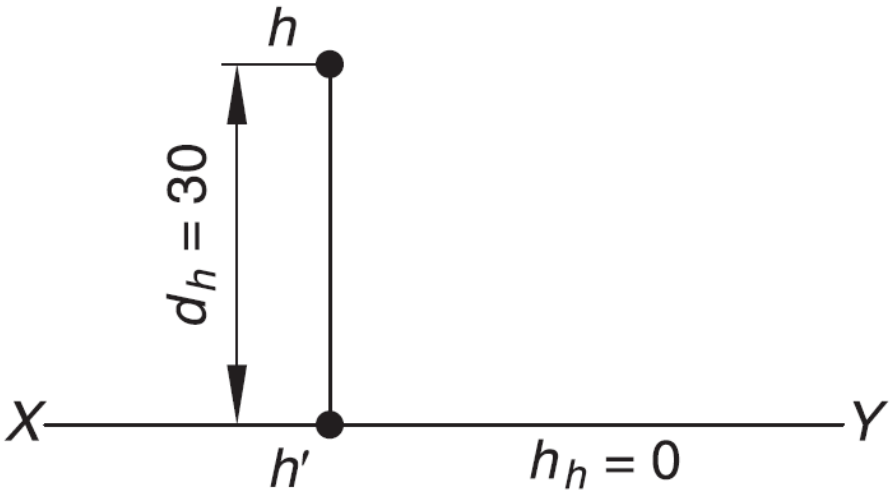


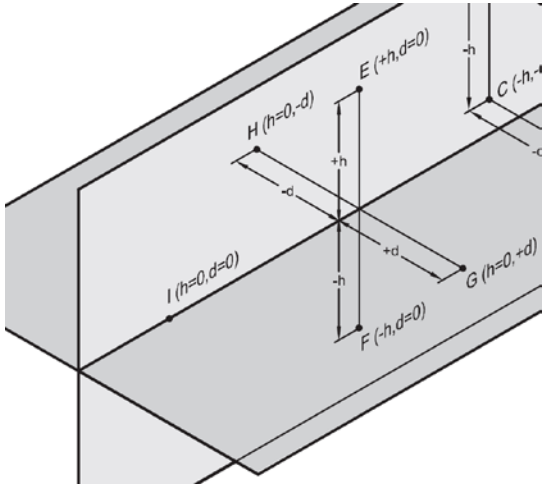
PROJECTIONS OF POINTS

A Point in Both the RPs

Example 9 Draw the projections of the **point I,** which lies in both the RPs.

Solution Given, $h_i = 0$, $d_i = 0$

If the point I lies in both the RPs then it lies at the intersection of the two RPs, i.e., on XY. Hence, its FV and TV both will coincide on XY.



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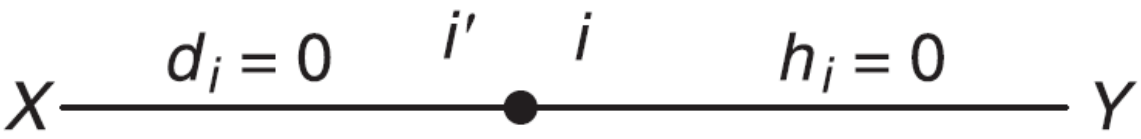

PROJECTIONS OF POINTS

SV OF THE POINT

The SV of the point is obtained by projecting the FV and TV with respect to *X*1*Y*1 as explained in the following examples.

Example 10 Draw the LHSV of the **point A** mentioned in Example 1.

Solution

SV is always drawn to the side of FV. Here, the LHSV of the point is drawn to the right side of FV, because the point is in first quadrant. X1 Y1 may be taken arbitrarily at any suitable distance from FV and TV.

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