

Precision Shaft Levels

	<p>Generally used to check the setting of the horizontal level of machine tool slide ways and beds                  Main Bubble Resolution:                  0.02mm/1m = 4 seconds of arc                  Cross bubble for general alignment                  Ground flat base with vee groove</p>
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Packed Weight and Dimensions

Code	Description	Weight g	W mm	H mm	L mm
51-650-150	Precision Shaft Level: 150mm	1359	77	63	172
51-650-200	Precision Shaft Level: 200mm	1990	80	63	220

Code	Vial Graduation Represents a Gradient of	Vial Graduation Represents an Angle of	Length mm	Height mm	Width mm
51-650-150	0.02mm/m	4'	150	44	40
51-650-200	0.02mm/m	4'	200	46	46

Precision Frame Levels

	<p>Generally used to check the setting of the horizontal and vertical slide ways of machine tools.                  Main Bubble Resolution:                  0.02mm/1m = 4 seconds of arc                  Cross bubble for general alignment                  Ground flat base plus one upright side provided with a ground vee groove.</p>
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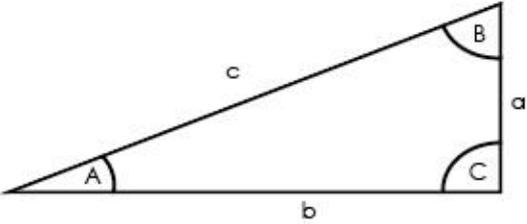
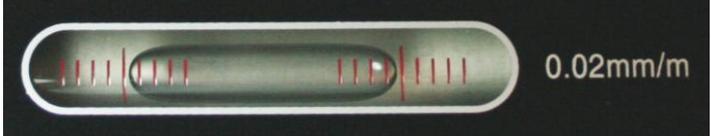
Packed Weight and Dimensions

Code	Description	Weight g	W mm	H mm	L mm
51-675-150	Precision Frame Level: 150mm	2575	175	60	178
51-675-200	Precision Frame Level: 200mm	3825	225	60	230

Code	Vial Graduation Represents a Gradient of	Vial Graduation Represents an Angle of	Length mm	Height mm	Width mm
51-675-150	0.02mm/m	4'	150	150	38
51-675-200	0.02mm/m	4'	200	200	40

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Sensitivity:

 <p>Bubble movement for 1 division marked on vial  <math>A = 4'</math>  <math>c = 1 \text{ metre}</math>  <math>a = 0.02\text{mm}</math></p>	<p>The sensitivity of these levels is defined as the change of gradient or angle required to move the bubble one division marked on the vial which is 0.02mm/m or 4' (seconds of arc)</p> 
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Calibration:

All Precision Levels in this range are calibrated and preset at the factory prior to shipment  
 We however recommend that a calibration check is carried out following receipt of the new level and also at regular dates following continued use

How to Calibrate:

Equipment required: One adjustable mechanically stable flat surface, ideally a steel or granite surface table  
 The table need not be perfectly level but should be within the range of the instrument to be calibrated  
 Thoroughly clean the top surface of the table and the underside of the level  
 Place the level onto the table and allow the bubble to settle, this can take up to 15 seconds  
 Note the position of the bubble once it has settled  
 Turn the level through 180° ensuring it sits in the same footprint as the first position  
 Note the position of the bubble once it has settled in this second position

- A: If the Level and the Surface are both level the bubble will be in equally positioned between both graduation Scales
- B: If the Level is set correctly and the Surface is out of level the bubble will move in the same direction when turned through 180°
- C: If the Surface is correct and the Level is out of calibration the bubble will move in opposite directions when turned through 180°
- D: If both the Surface and the Level are out of level then the readings will be different when turned through 180°

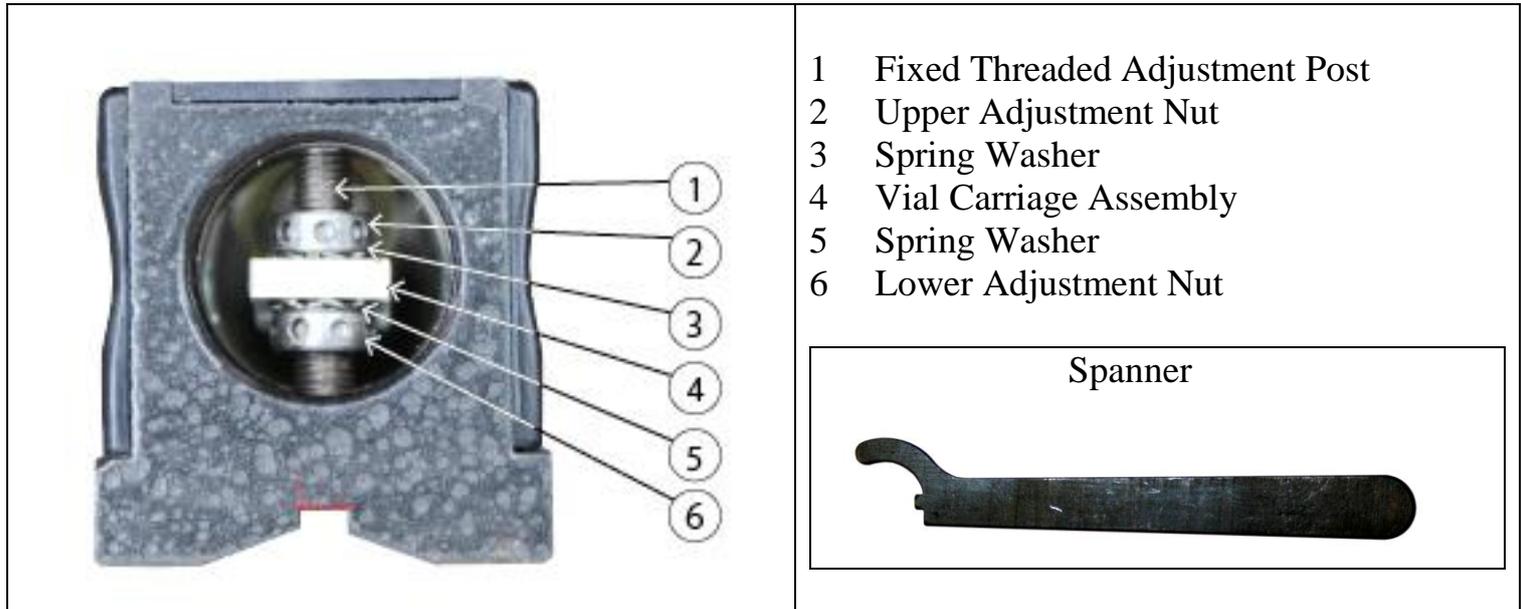
How to calculate adjustments:

<p>Example 1;                  First bubble reading 3 divisions left                  Move 180° second bubble reading 2 divisions right                  Level Error = Total Error ÷ 2 = (3+2 = 5÷2) = 2.5                  Surface Error = Difference ÷ 2 = (3-2 = 1÷2) = 0.5</p>	<p>Example 2:                  First bubble reading 4 divisions left                  Move 180° second bubble reading 2 divisions left                  Level Error = Total Error ÷ 2 = (4-2 = 2÷2) = 1                  Surface Error = Difference ÷ 2 = (4+2 = 6÷2) = 3</p>
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## Precision Levels

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How to make adjustments to the Level:



Remove the circular black plastic cap from the right hand end of the Level  
Push the tip of the spanner through the central hole in the cap and pull

If the bubble is too far to the right the Vial Carriage Assembly (4) needs to be lowered  
Insert the notch on the spanner into a hole situated around the circumference of the Lower Adjustment Nut (6)  
Turn the Nut by a small amount in a clockwise direction  
Now insert the spanner into the Upper Adjustment Nut and turn in a clockwise direction to clamp  
Do not over tighten as there are spring washers which will apply the final locking pressure

Check the bubble for the required alignment against the scale.

It may be necessary to repeat this procedure of moving the Vial Carriage Assembly either up or down until the required bubble position is achieved

Once the nuts have been locked, replace the plastic end cap and the Level is ready for use.

## Vee Location:

When using the Vee location to sit on a cylindrical part it is necessary to ensure that bubble in the small cross level vial is in the central position to ensure that the Level is sitting correctly