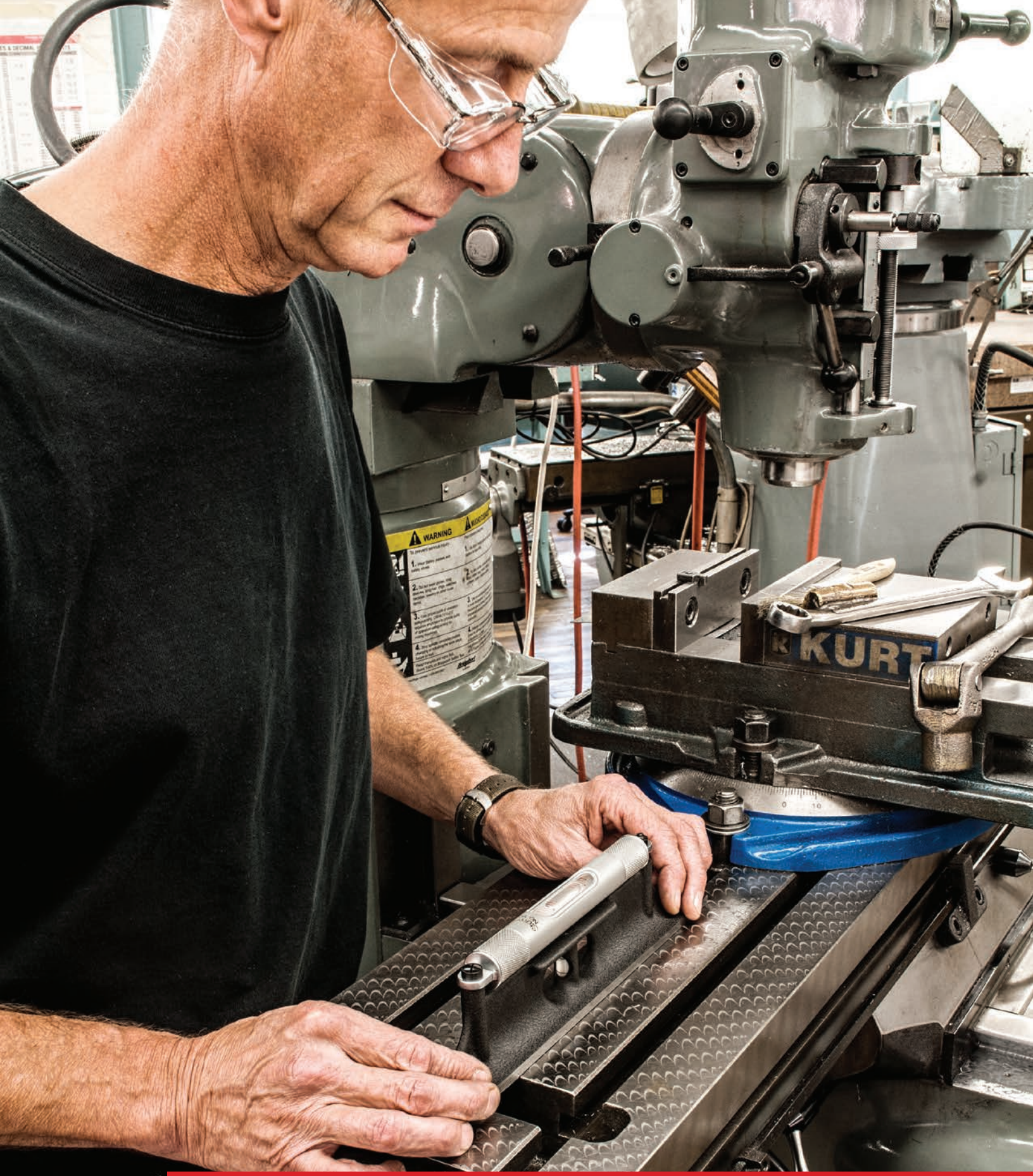


MACHINISTS' LEVELS

Master Precision Levels

199 Master Precision Level

15"/380MM

The efficiency of modern, high speed machinery depends to a large degree upon the levelness of the machine set-up.

- Specially designed to set up, check and test machinery of all types
- At-a-glance reading of the exact variation of machinery levelness
- Ground and graduated main vial of 10-second accuracy; one division equals 1/2 thousandth of an inch (0.0005") per foot, or 0.04mm per meter
- Main vials have seven graduations on each side of the bubble
- Auxiliary level vial shows lateral position and assists in horizontal setting
- Level vials are positioned so breakage is reduced to a minimum
- Special alloy iron used to obtain freedom from thermal effects
- Seasoned, machined castings
- Scraped reference surface
- Nonconductive top plate and black wrinkle finish on nonmachined surfaces
- Finished wood case

199Z

199 Master Precision Level							
		Length Base		Width Base		Height Level	
Cat. No.	EDP	in	mm	in	mm	in	mm
199Z	50719	15	380	1-5/8	40	3	75
199Z W/SLC*	66932						

* Includes redemption card for Standard Letter of Certification (SLC).

Level Use

To get a correct reading with a level, both ends of the bubble should be viewed. If the gaps between the ends of the bubble and the lines are unequal at any time, then they should be averaged out. The reason for this is temperature, which affects the size of the bubble. As a level is warmed the liquid expands, thereby reducing the size of the bubble so that at true-level there will be gaps at both ends between the bubble and the reading lines. Conversely, if the temperature is very cold, the bubble could expand and overlap the reading lines.

Excessive hand heat on the center of the level for an extended period of time could expand the center, causing the working surface to become slightly convex and also create a tendency to spin on flat surfaces. This is more noticeable on very precise levels.

Any level can be checked for accuracy on any flat surface regardless of whether it is level or not. Simply put the level on the surface and note the position of the bubble. Then reverse the level in the same spot. If the level is true, the bubble will be in the same relative position both ways.

Some models, like our 98 machinist levels with an adjustable system, have an adjustment that can be made on the job.

Level Vial Information

The accuracy of a level is dependent on the proper machining of the working surface, the straightness, and rigidity of the construction and the sensitivity of the level vial. Accuracies are very often specified in parts of degrees such as 10-second accuracy or 43-minute accuracy. Technically, we are referring to the sensitivity of the level vial, but many interchange these terms. Since this means little to most people, we use the more practical definition of inches per foot of elevation. For instance, a 10-second vial accuracy means if the level is on an incline that is .0005" per foot, then the bubble on the vial will move .100" (slightly less than 1/8").

There are three general types of level vials. Ground vials are generally used in precision levels; bent glass and plastic vials are used in most other levels.

Most level vials have just two lines spanning the length of the bubble because most users just want to know if something is level or not.

The more precise levels have vials with a number of reading lines on each side of the bubble. All Inch reading vial graduations are .100" apart. This will show the machinist in a very precise manner how level the equipment is.

Metric reading levels have vial graduations 2mm apart and accuracies are usually described as millimeters per meter. This is an easy conversion to make, so we converted our Inch specifications to an understandable metric reading. Machinists only need to know how far they are out of level if the bubble moves to the next line.

199, 98 and 132 Precision Machinists' Levels

These are the finest levels available, used for precision work that is typically required in the industry. They all have these features:

- All level bases are made from the finest quality seasoned cast iron and are precision-machined on the reference surface
- Non-machined surfaces have an attractive, black wrinkle finish
- All models except the 199 have an involute longitudinal groove between the bearing flats for accurate seating on round work. This groove has a special involute design, permitting better centering and greater capacity to handle larger rounds
- Groove and bearing flats are machined together for maximum accuracy

Machinists' Levels

98 Machinists' Levels with Ground and Graduated Vials

4-18"/100-450MM

These levels have ground and graduated main vials. All sizes have a cross test vial except the 4" (100mm) model.

The 12" (300mm) model also has a plumb vial and the 18" (450mm) size has a double plumb vial.

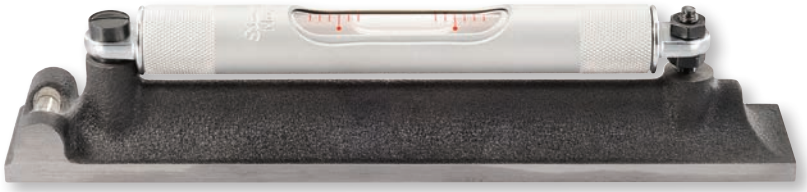
These vials are adjustable to a positive setting and are housed in a satin chrome finished brass tube with a friction-fit closing cover to prevent breakage.

The base of the levels features an involute groove running the length of the base, which provides a reliable seat for round work such as pipes or shafting.

With the cross test vial, it is possible to simultaneously level in both directions. This prevents inaccuracies in the main vial reading caused by canting the level sidewise on round work.

The 6" through 18" (150-450mm) main level vials have graduations that are approximately 80-90 seconds or .005" per foot (0.42mm per meter). There are five, six, or seven lines on each side of the bubble, depending on the base length.

End view showing involute groove



98 Machinists' Levels with Ground and Graduated Vials

Without Case		In Finished Wood Case		Tube and Plug Assemblies		Size		
Cat. No.	EDP	Cat. No.	EDP	Part No.	EDP	in	mm	Description
98-4	50440					4	100	Without cross test vial
98-6	50441			PT99430	64497	6	150	With cross test vial
98-6 W/SLC	66935							With cross test vial, Standard Letter of Certification*
98-8	50442			PT99431	64498	8	200	With cross test vial
98-12	50443	98Z-12	50444	PT99432	64499	12	300	With single plumb vial and cross test vial
98-12 W/SLC	66934	98Z-12 W/SLC	66933					With single plumb vial and cross test vial, Standard Letter of Certification*
98-18	50445	98Z-18	50446			18	450	With double plumb vial and cross test vial

To guarantee extreme accuracy, the length of your level should not be longer than the work you are leveling.
* Includes redemption card for Standard Letter of Certification (SLC)

Precision Bench Levels

132 Precision Bench Levels with Double Plumbs

6-24"/150-600MM

These are moderately priced levels designed for the all-around use of machinists, maintenance and set-up mechanics and carpenters. They are available in a wide range of sizes to suit every requirement.

- The attractive filigree design of these levels provides a lighter weight, and the curved design evenly dissipates excess heat
- The base of the levels has an involute groove running the full length, which provides a reliable seat for round work
- All sizes have a main vial and double plumb vials. Each vial has two graduated lines
- The main vials have approximately 19-minute sensitivity, meaning if the bubble moves 1/8" off the graduated lines, the out-of-level is approximately .080" per foot. If the bubble is off 2mm, then the out-of-level is approximately 4.4mm per meter.

End view showing involute groove

132 Precision Bench Levels

Cat. No.	EDP	Size in	mm	Description
132-6	50562	6	150	With main vial and double plumb vial
132-9	50563	9	225	
132-12	50564	12	300	
132-24	50566	24	600	

To guarantee extreme accuracy, the length of your level should not be longer than the work you are leveling.

132-12

Cross Test Levels

134 Cross Test Level and Plumb

2 X 3"/50 X 75MM

This is an especially useful little level, invaluable for plumbing, approximate squaring and leveling work. Made from brass with nickel finish, all working surfaces are flat and true. The level has two vials at right angles for cross test leveling without moving the tool and a plumb level at the top. An accurate, well-made and reliable tool, it is also very light and compact and can be easily carried in the pocket.

134

134 Cross Test Level				
		Size		
Cat. No.	EDP	in	mm	Description
134	50569	2 x 3	50 x 75	With cross test vials and plumb vial

136

136 Cross Test Level

2-3/4 X 2-3/4"/70 X 70MM

Similar to our 134 level, the 136 has two vials at right angles which permit leveling in both directions without moving the level from the work. The level is light and compact, with an attractive black wrinkle finish and a ground reference surface. Made from cast iron.

136 Cross Test Level				
		Size		
Cat. No.	EDP	in	mm	Description
136	50572	2-3/4 x 2-3/4	70 x 70	With cross test vials

Machinists' Levels

130 Bench Level

3-3/8"/85MM

This is a very handy, compact bench level with a sensitive and accurate single vial. The body is made of seasoned cast iron with black wrinkle finish and an accurately machined base leveling surface.

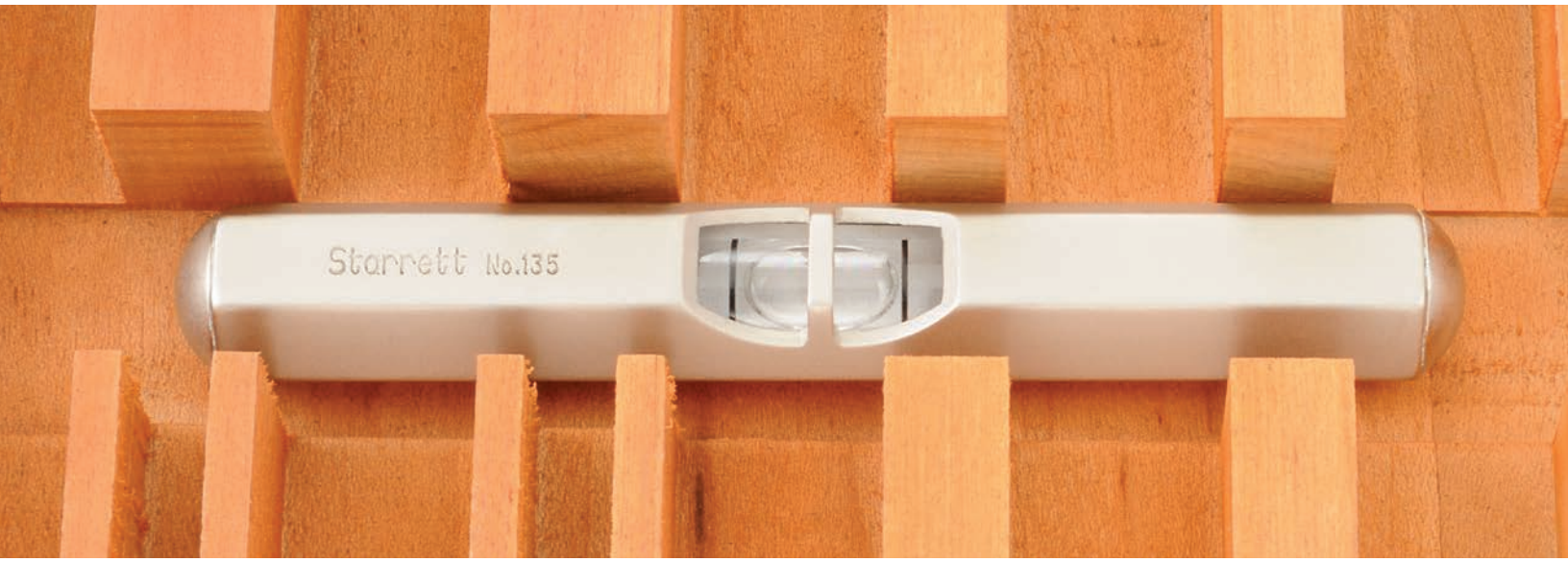
130 Bench Level				
		Size		
Cat. No.	EDP	in	mm	Description
130	50560	3-3/8	85	With main vial

130

135B

135 Pocket Levels with Satin Nickel-Plated Finish

2-1/2 AND 3-1/2"/63 AND 88MM

Another extremely useful Starrett level that fits handily in the pocket with no sharp edges. Made from hexagonal stock with convex ends and satin nickel-plated finish.

135 Pocket Levels with Satin Nickel-Plated Finish				
		Size		
Cat. No.	EDP	in	mm	Description
135A	50570	2-1/2	63	With main vial
135B	50571	3-1/2	88