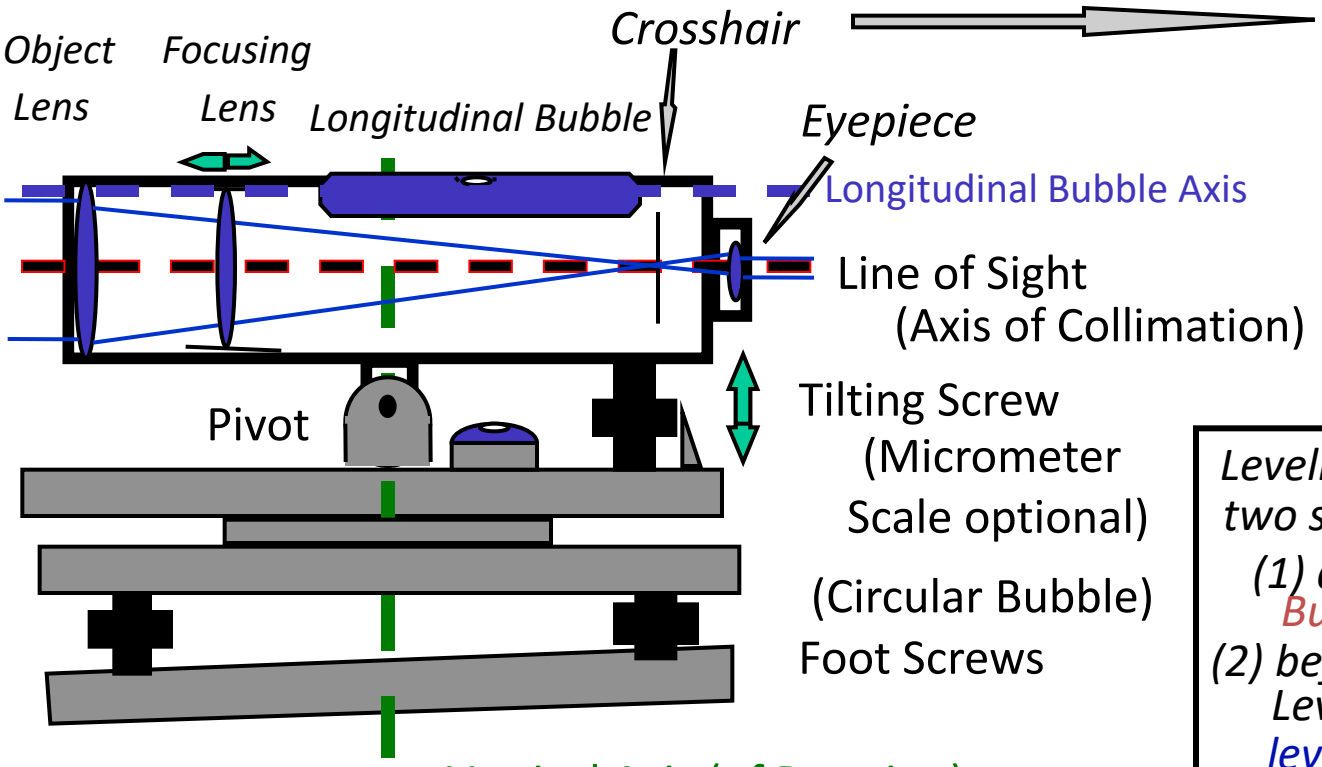
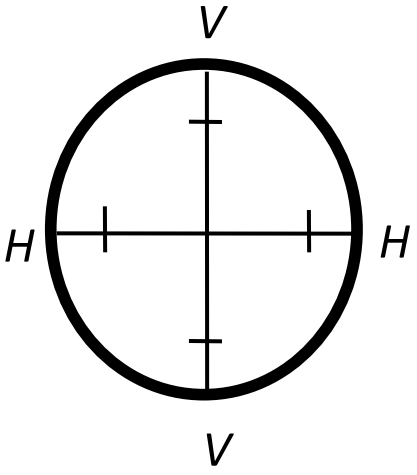
Level Equipment

Tilting LEVEL



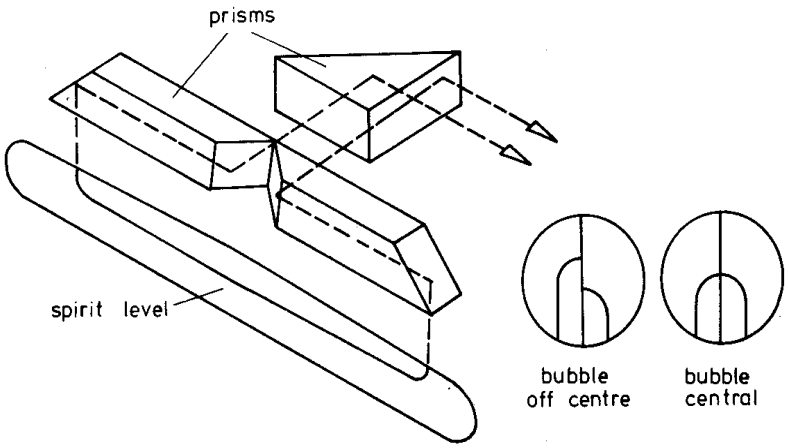


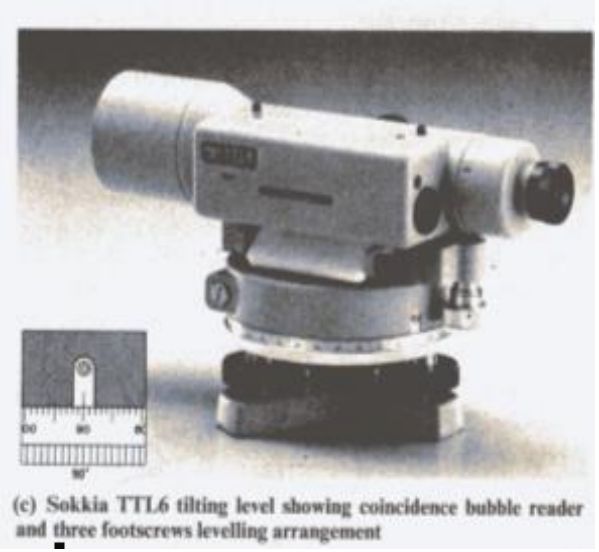
Levelling of Instrument in two stages:

(1) at set-up: level circular Bubble

(2) before every reading at Level Staff: level Longitudinal Bubble

Longitudinal Bubble (tilt level)

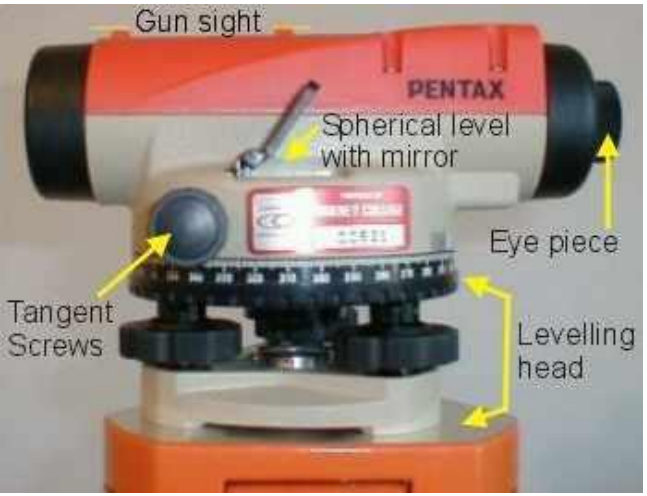


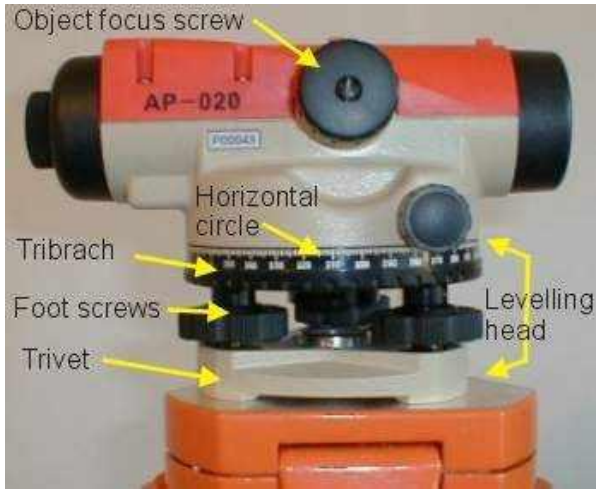


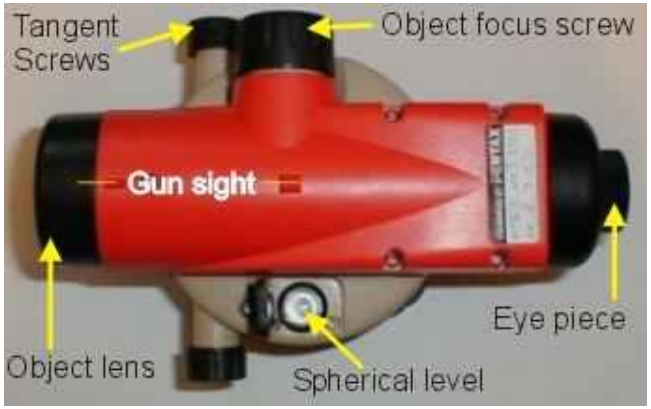
(c) Sokkia TTL6 tilting level showing coincidence bubble reader and three footscrews levelling arrangement

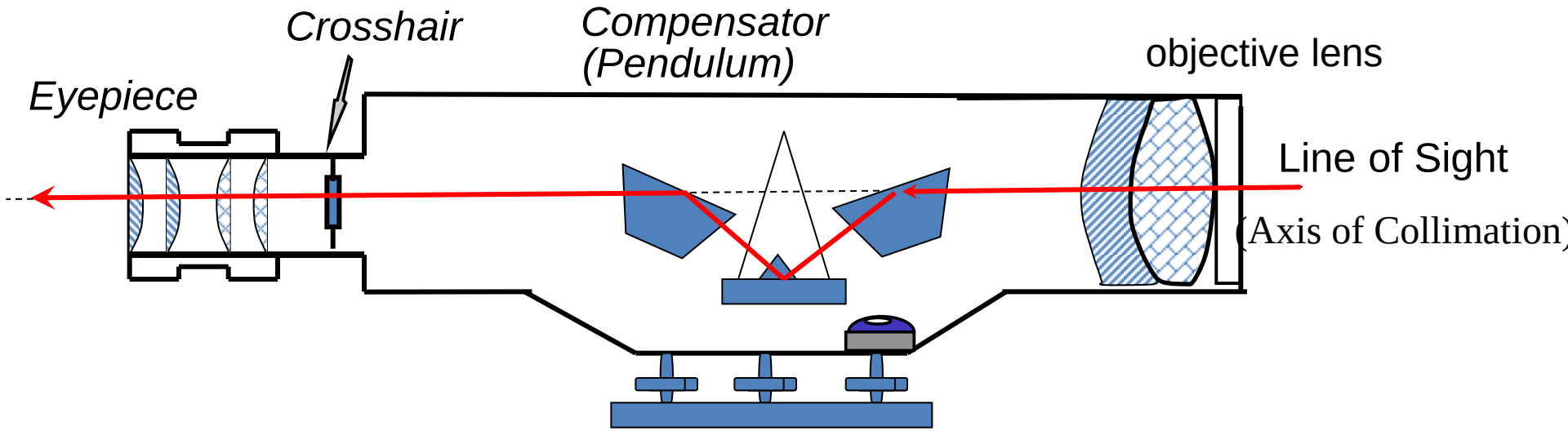
U-shape

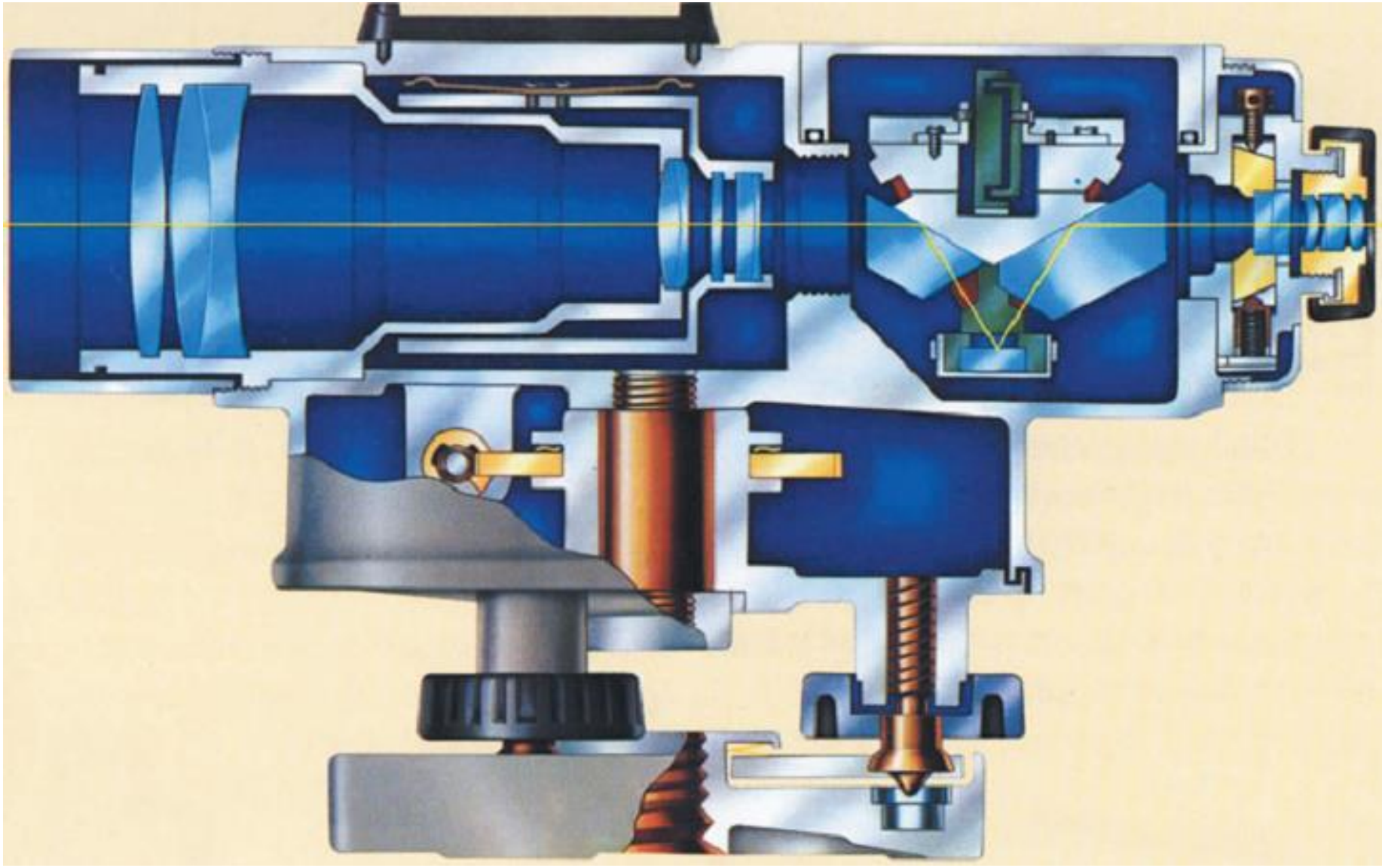
Automatic LEVEL

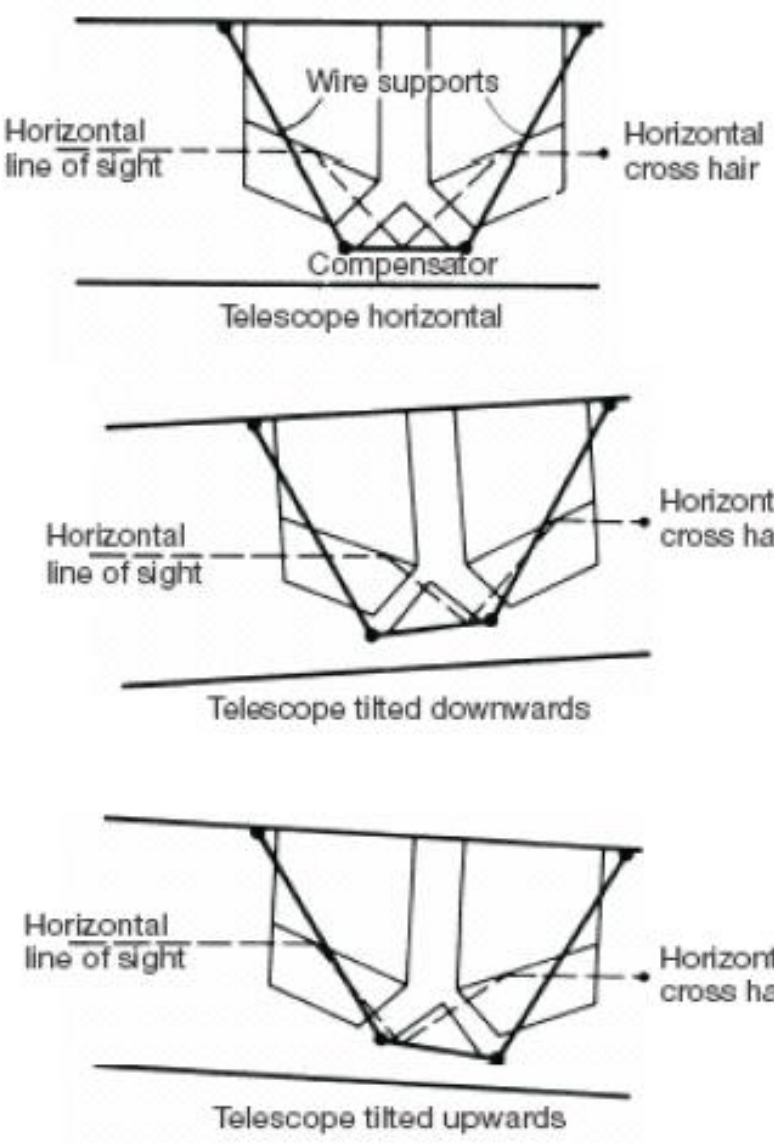











Wire supports
Horizontal line of sight
Horizontal cross hair
Compensator
Telescope horizontal
Horizontal line of sight
Horizontal cross hair
Telescope tilted downwards
Horizontal line of sight
Horizontal cross hair
Telescope tilted upwards

Digital Level

Carrying handle

Sample of Bar code Staff

Focus Knob

Horizontal tangent knob

Battery location

Keyboard and display

Measurement button

Digital level system

• This type of instrument has a compensator similar to that on an automatic level, but the graduated leveling staff is not observed and read by the operator.

•The operator has only to point the instrument at a bar-code-type staff, which then can be read by the level itself. The digital level eliminates human reading error and increases the speed at which leveling work can be performed.

•The only significant disadvantage is the high cost as compared to the optical automatic level.

Digital level system

- The measuring system of the digital level consists of a level comprising optics and compensator, a bar code scale mostly on an invar band fixed into a rod frame, a CCD linear array and a software controlling all operations, procedures and process of the digital level (Ingensand 1999).

- When we operate with a digital levelling system, a CCD camera takes picture from the rod, which covers a certain sector of the bar code scale above and below the horizontal level. The picture is then compared to the picture of the whole scale stored in the memory of the instrument. Each manufacturer has its own method to process the rod reading (Ingensand 1999).

Laser level

(rotating head – Laser Detector)

Laser Detector

Laser level

- Although this type of instrument is categorized as laser, these levels actually employ three different types of light sources: tube laser, infrared diode, and laser diode.
- The instrument uses a rotating head to project the laser beam in a level 360 degree plane.
- The advantages are twofold: no operator is required once the instrument is set up; and different people in various locations can work by using a single light source.
- The disadvantages are that accuracy is less than that provided by other types of levels and that the cost is significantly higher.

Specifications

Items	C300	C310	C320	C330
Telescope				
Length	215mm (8.5 in.)			
Objective aperture	36mm (1.4 in.)		32mm (1.3 in.)	
Magnification	28x	26x	24x	22x
Image	Erect			
Resolving power	3.5"		4.0"	
Field of view	1° 25' (2.5m)			
Minimum focussing distance	0.3m (1.0ft)			
Reticle	Cross hairs			
Stadia multiplication constant	100			
Stadia additive constant	0			
Coarse sighting	Peep sight		Gun sight	
Compensator				
Damping system	Magnetic			
Working range	±15'			
Setting accuracy	0.5"			
Leveling Accuracy				
Standard deviation for 1km double-run leveling	2.0mm (0.08in.)			
Horizontal Circle				
Diameter	103mm (4.1 in.)			
Graduation/Estimation	1° (1gon)/0.1° (0.1gon)			
General				
Sensitivity of circular level	10'/2mm			
Mirror for circular level	Plane mirror			
Horizontal fine motion screws	Double-sided endless drive			
Water resistance	Conforms to IPX4 (IEC60529)			
Base	Concave and flat			
Base screw	ø5/8in.			
Size (W x D x H)	133mm x 215mm x 135mm (5.2 x 8.5 x 5.3 in.)			
Weight	Approx. 1.7kg (3.7 lbs)			