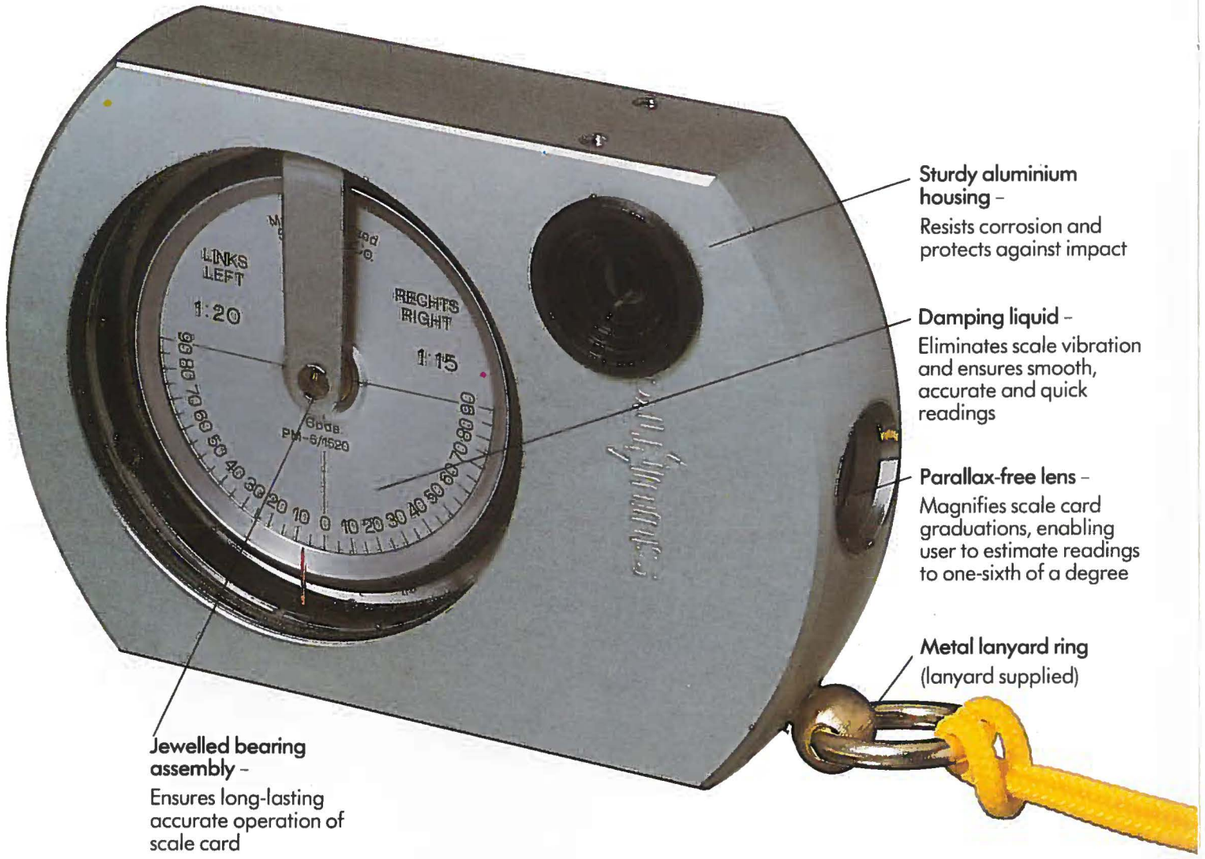

SUUNTO PRECISION INSTRUMENTS

SUUNTO CLINOMETERS AND HEIGHT METERS



Sturdy aluminium housing –
Resists corrosion and protects against impact

Damping liquid –
Eliminates scale vibration and ensures smooth, accurate and quick readings

Parallax-free lens –
Magnifies scale card graduations, enabling user to estimate readings to one-sixth of a degree

Metal lanyard ring
(lanyard supplied)

Jewelled bearing assembly –
Ensures long-lasting accurate operation of scale card

Suunto hand-held clinometers are precision instruments used all over the world by surveyors, engineers, cartographers, geologists, miners, architects and many others who need to be able to measure heights, vertical angles and slopes quickly and easily.

There is an extensive selection of scales to choose from. These include normal linear angle scales, i.e. degrees, gons and mils as well as per cent scales, topographic scales, metric or American and special secant scales.

The scales have graduations of one degree or one per cent, one foot or a quarter of a meter.

Suunto height meters are for measuring heights, especially the heights of trees, with great accuracy and speed. They can also be used to determine the angle of a gradient.

Both clinometers and height meters have sturdy bodies made of corrosion-resistant anodized aluminium alloy. The scale cards run on special bearings in hermetically sealed plastic containers filled with a liquid which guarantees that they run freely and stop quickly. The liquid will not freeze nor evaporate, retains full damping properties in all working conditions and eliminates irritating scale vibrations.

For work in twilight conditions or even in total darkness, they can be supplied with built-in, maintenance-free light sources.

Optical height meter PM-5/1520 P

This instrument is for heights, especially the heights of trees, with great accuracy. It is available in several versions. (See product specifications table on page 6).

Suunto height meters can also be used to determine the angle of a gradient. This is done by using the 20m scale and the conversion table imprinted on the back.

Optical reading clinometer PM-5/360 PCT

This sturdy but lightweight (110 g or 4 ozs) pocket-size instrument is suitable for every kind of work. Scale reading is easy through a built-in-parallax-free lens.

Sighting and scale reading are done simultaneously. There are no screws to turn, no bubbles to centre, and nothing to adjust.

Where space is limited, inclinations can be read by placing the instrument on the inclined surface and reading the angle through the side window.

The optical scales are graduated in degrees from 0 ° to ± 90 °, and from 0 % to ± 150 %.

Accuracy: can be read directly to one degree or one per cent and estimated to 10 minutes of arc or one-fifth of one per cent with readings around to zero level. Absolute accuracy about one third of a degree.

T-models are equipped with a built-in light source. See product specifications table on page 6.

Optical reading clinometer PM-5/360 PCB

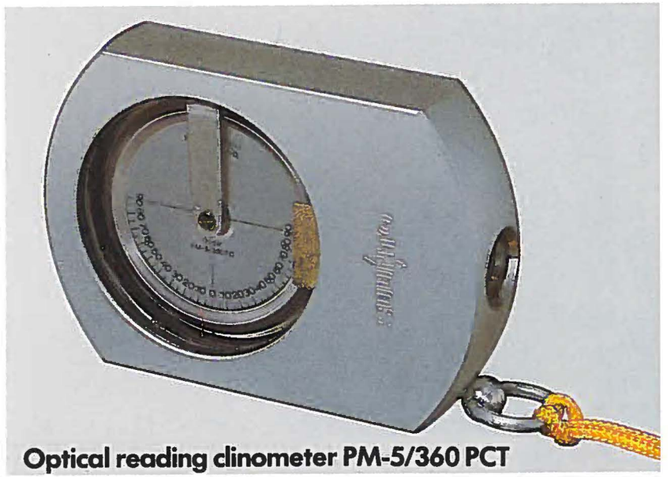
As the PM-5/360 PCT, but with lithium battery-powered illumination.

Rubber cover

Intended for heavy-duty professional use. Suits all PM-5 models except the rangefinder (P) variants manufactured before 1987.

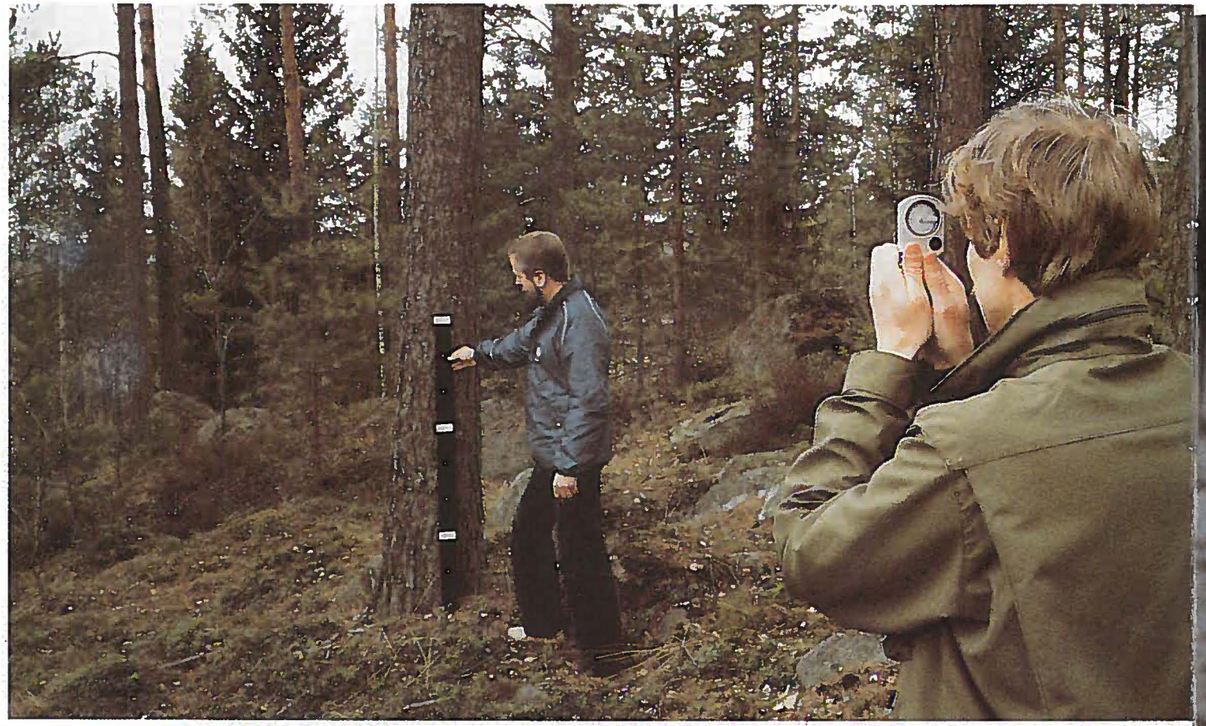
The instruments shown on this page are examples of the broad range illustrated completely on page 6.

See also separate leaflets on TANDEM and TWIN combination instruments.



Optical reading clinometer PM-5/360 PCT

Optical reading clinometer PM-5/360 PCB



FOREST SURVEYING MADE EASY

A Suunto height meter is an invaluable aid in surveying forests and estimating wood volumes. Only a few minutes' practice are needed to learn to use it quickly and accurately. The user keeps both eyes open and looks through the lens and along the side of the instrument's housing. Through an optical illusion, the horizontal sighting line appears to be projected onto the side of the housing. One places the projected sighting line on the target and simultaneously reads the scale.

SUUNTO RELASCOPE

A Suunto relascope in the PM-5/1520 PS model is a simple means of estimating the basal area of forest stands. Once the basal area is known the cubic content of the forest stand can be estimated when the average height and the form factor of the trees are known.

To estimate the basal area of a tree stand, position yourself in its centre, hold one end of the chain against your cheek and aim through the opening at the other end. If the tree, at breast height, more than fills the opening, it is counted. In borderline cases, i.e. where the tree just fills the opening, one counts every second tree.

When you have gone through a full circle, you will be able to express the number of counted trees directly as a basal area for the forest stand in question.

In determining the centre of the stand you want to measure, remember that the distance to its edge should not be shorter than that to the largest tree within it.

HEIGHT MEASUREMENT USING THE SUUNTO HEIGHT METER

This example applies to Suunto PM-5/66P, which can be used for distances of 66 and 132 ft. If other distances are required, especially 100 ft, a percent scale is recommended as in e.g. PM-5/66PC(P), PM-5/360PC(P) etc.

A. ESTABLISHING OF BASIC DISTANCE (picture at top of left page)
Unfold target and place against the object to be measured. Look through the prism and note the double image of the target. Step back far enough until the mark of the correct distance (in this example 66 ft) coincides with the O mark. You are now at the correct distance (66 ft).
If an instrument with prism and target is not available, you can of course use a tape measure in determining the basic distance.

B. MEASURING THE HEIGHT
Hold the instrument as in the picture at the top of this page and tilt it until the hair line coincides with the top of the object. The reading of the right, 66 ft scale gives the height of the top directly in feet from eye level. Adding your eye-to-ground distance gives the total height of the object.

ILLUSTRATED EXAMPLES

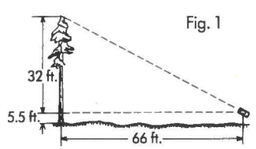


Fig. 1

1. When the base of the tree is at the same level as your feet, add your eye-to-ground height directly to the reading.
32 ft + 5.5 ft = 37.5 ft

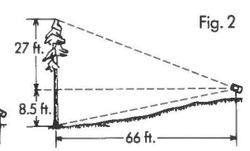


Fig. 2

2. On sloping ground when the base of the tree is below your eye level also take the reading to the base of the tree and add these figures.
27 ft + 8.5 ft = 35.5 ft

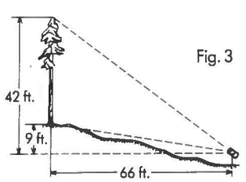


Fig. 3

3. On sloping ground when the base of the tree is above your eye level take the reading to the base of the tree and subtract the readings.
42 ft − 9 ft = 33 ft

MEASURING UNDERGROUND SLOPES

Suunto clinometers have proved very useful in mines, quarries and tunnels where inclines have to be measured with great accuracy. They have also helped speleologists to explore caves where nobody has ever gone before.

CLINOMETERS AND HEIGHT METERS

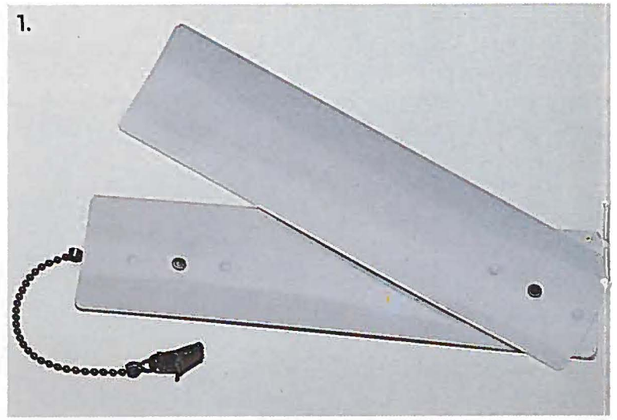
		Scales										Accessories									Conversion table			
												Recommended targets				Prism	Relascope	Illumination						
		0 ± 90 °	0 ± 100 g gons	0 ± 150 %	0 ± 1600 mils	secant	15 m	20 m	66 feet	L-1520	L-40	L-132	L-100	L-20			Lamp	Luminous point	Battery-powered illumination	cosines 0–45 °	cosines 0–50 g	%-- degrees	20 m -- degrees
CLINOMETERS	PM-5/360 PC	●		●															○	●			
	PM-5/360 PCT	●		●													●			●			
	PM-5/360 PCP	●		●									●			●			○			●	
	PM-5/360 PCPT	●		●									●			●	●					●	
	PM-5/360 S	●				●													○	●			
	PM-5/360 ST	●				●											●			●			
	PM-5/400 PC		●	●															○		●		
	PM-5/400 PCT		●	●													●				●		
	PM-5/6400			●	●														○				
	PM-5/6400 T			●	●												●						
	PM-5/SPC			●		●													○			●	
	PM-5/SPCT			●		●											●					●	
HEIGHT METERS	PM-5/1520						●	●											○				●
	PM-5/1520 T						●	●									●						●
	PM-5/1520 P						●	●		○	●			○	●				○				●
	PM-5/1520 PT						●	●		○	●			○	●		●						●
	PM-5/1520 PS						●	●		○	●			○	●	●			○				●
	PM-5/1520 PST						●	●		○	●			○	●	●	●						●
	PM-5/66	●							●										○	●			
	PM-5/66/T	●							●								●			●			
	PM-5/66 P	●							●			●			●				○	●			
	PM-5/66 PT	●							●			●			●		●			●			
	PM-5/66 PS	●							●			●			●	●			○	●			
COMBINED HEIGHT- & CLINOM.	PM-5/1520 PC			●			●	●											○				
	PM-5/1520 PCP			●			●	●		○	●			○	○	●							●
	PM-5/1520 PCPT			●			●	●		○	●			○	○	●	●						●
	PM-5/1520 D	●					●	●											○	●			
	PM-5/1520 DT	●					●	●									●			●			
	PM-5/1520 DP	●					●	●		○	●			○	●				○	●			
	PM-5/1520 DPT	●					●	●		○	●			○	●		●			●			
	PM-5/66 PC			●					●										○			●	
	PM-5/66 PCT			●					●								●					●	

○ = optional

When ordering instruments with battery-powered illumination, please use the code suffix B, for example PM-5/360 PCB.

HINGED TARGET PLATES

These target plates are intended as auxiliary devices for height meters with prisms. They are used to establish the measuring distance from the observer to the object.



1.

2.

3.

1. L-1520. White aluminium plate with chain and hanging clip for measuring distances of 15–20m. Only 50 x 200 mm when folded. Weight 35 g. No separate marks.

2. L-40, L-132 Black bakelite plate with fixing holes at both ends. For measuring distances of 66' to 132' (L-132) or 15,20,30,40 metres (L-40). White mark plates with black imprints. Only 68 x 200 mm when folded. Weight 238 g.

3. Carrying cases for clinometers. Imitation leather. Real leather version with belt loop also available.

PROFESSIONAL COMPASSES

MC-1 D/L MIRROR COMPASS

GEO-5 GEOLOGIST´S COMPASS

Suunto professional compasses are used by a great variety of people who require precise directional measurements. They include people who are often in wilderness or mountain areas, on the sea or large lakes; geologists, surveyors, miners, architects, soldiers, firefighters and rescue patrols etc. Antenna technicians find these instruments very useful as well.

MC-1 mirror compass

This mirror compass has many features that make it outstanding in its class. A standard feature is the gear-operated declination adjustment system which makes this compass excellent, for instance in areas with large magnetic variations. Another standard feature is the clinometer which can be used for the measurement of different slopes; slopes of terrain, height measurement, free space over obstacles when assembling a CCTV-antenna, etc. The luminous bezel is available with azimuth (0–360°) or quadrant (0°–90°–0°–90°) graduations with two-degree intervals. Parallax error can be eliminated by means of the dever arrangement of luminous points and color lines. The bezel is also available in black.

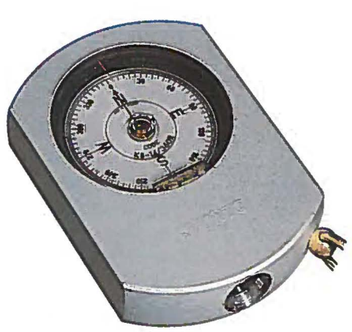
MC-1 mirror compass is compact, robust, anatomically designed, and includes a lanyard that is equipped with a sliding lock.

New version is the **MC-1 Global** with a special needle balanced for worldwide use.

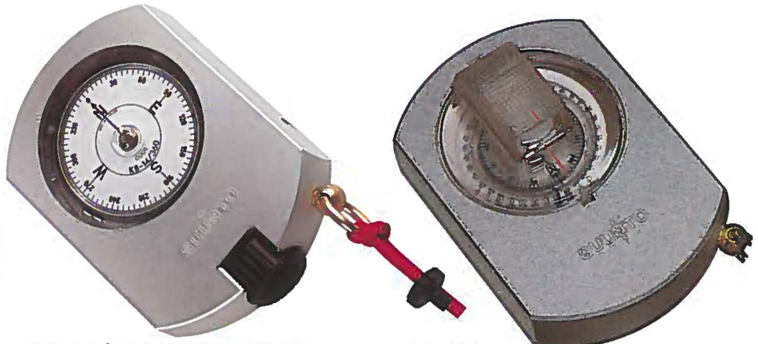
G-5 geologist´s compass

A protractor, bubble-level and fixed clinometer scale make this compass a versatile tool for every geologist. It utilises the high quality acrylic M-series capsule. The measurement of dip and strike is facilitated by using the straight rear side of the baseplate. Other advantages include a longer, narrower shape and rounded corners which make it easier to grasp and a lanyard with a sliding lock. Models with quadrant graduations are also available.

HAND-BEARING COMPASSES



KB-14



KB-14/360 DECLINATION

KB-77

Hand-bearing compass KB-14

This compass boasts a reading accuracy of 1/6 degree. The housing is made of solid, noncorrosive anodized light-weight alloy. Weighing only 115 g, this instrument boasts absolute accuracy better than 0.3 of a degree, and is excellent for such users as foresters, surveyors and geologists.

Its plastic counterpart, the KB-20 weights only 40 g and its absolute accuracy is better than 1 degree.

The newest version, the **KB-14 D**, comes with a patented adjustable declination correction scale, and optical adjustment.

Another new version is the **KB-14 OPTI**, which is equipped with an optical adjustment feature.

Hand-bearing compass KB-14/360 B

As KB-14, but with battery-powered illumination.

Rubber cover for KB-14s and KB-77s

Rubber cover suits all KB-14 and KB-77 models. It is made of a saltwater- and UV-resistant mixture of EPDM and natural rubber.

Prismatic hand-bearing compass KB-77

Equipped with a viewing prism, the KB-77 is extremely easy, quick and accurate to read. It has a compact lightweight alloy housing. The card has three scales: a precision scale which is read through the prism, a corresponding reverse scale and in addition a top scale, readable from above. The compass weighs only 110 g.

	Scales						Intervals				Illumination			Reading through		Housing	
Model	0–360 °	0–400 g gons	0–90 ° quadrants	0–6000 mils	0–6400 mils	Reverse	0.5 °	1 °	1 g	10.ᵛ	Lamp	Battery-powered illumination	Luminous point	Lens	Prism	Anodized light-alloy	Plastic (ABS)
KB-14/360	●						●							●		●	
KB-14/360 B	●						●					●		●		●	
KB-14/360 T	●						●				●			●		●	
KB-14/360 R	●					●	●							●		●	
KB-14/360 RB	●					●	●					●		●		●	
KB-14/360 RT	●					●	●				●			●		●	
KB-14/360 Q			●					●						●		●	
KB-14/360 QB			●					●				●		●		●	
KB-14/360 QT			●					●			●			●		●	
KB-14/400		●							●					●		●	
KB-14/400 B		●							●			●		●		●	
KB-14/400 T		●							●		●			●		●	
KB-14/6000				●						●				●		●	
KB-14/6000 B				●						●		●		●		●	
KB-14/6000 T				●						●	●			●		●	
KB-14/6400					●					●				●		●	
KB-14/6400 B					●					●		●		●		●	
KB-14/6400 T					●					●	●			●		●	
KB-14/360-6400	●				●		●			●				●		●	
KB-14/360-6400 B	●				●		●			●		●		●		●	
KB-14/360-6400 T	●				●		●			●	●			●		●	
KB-20/360 R	●					●		●						●			●
KB-20/360 RT	●					●		●			●			●			●
KB-77/360 RL	●					●		●					●		●	●	
KB-77/360 RT	●					●		●			●				●	●	

OPERATION

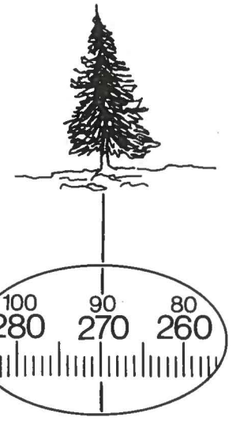
With both eyes open, aim the compass so that the hairline is superimposed on the target, when viewed through the lens.

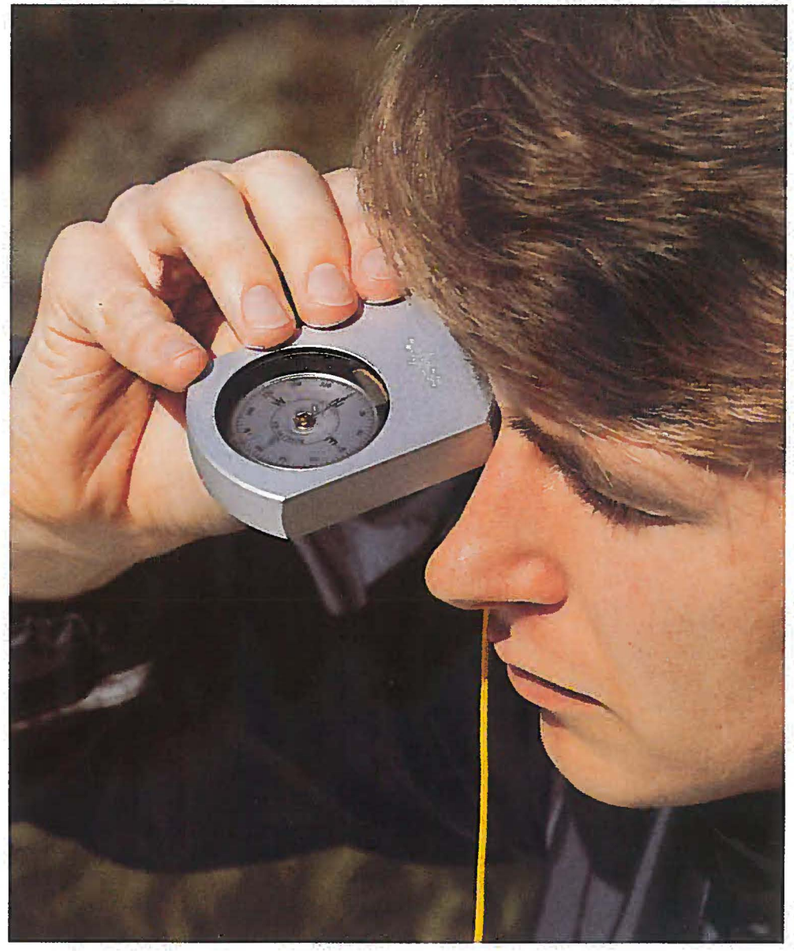
On the R model the main scale gives the bearing from your own position to the target, the small reversed scale the bearing from the target to your position. This feature is of great assistance when calculating a precise position, particularly at sea.

Use the left or the right eye as preferred. With both eyes open, an optical illusion makes the hairline appear to continue above the instrument frame, superimposed on the target. This improves reading accuracy and speed.

Because of an eye condition called heterophoria, the reading accuracy of some users may be impaired. Check for this as follows:

Take a reading with both eyes open and then close the free eye. If the reading does not change appreciably there is no disalignment of the eye axes, and both eyes can be kept open. Should there be a difference in the readings, keep the other eye closed and sight half-way above the instrument body. The hairline now rises above the instrument body and is seen against the target.





Suunto bearing compasses are designed to combine extreme accuracy with ease and speed of operation. Their flat, compact housings have no protruding or adjustable parts and are designed to stand up to heavy-duty wear.

The cards of these compasses are immersed in a special dampening fluid that ensures vibrationless, smooth movement. They are pivoted on polished sapphire tips. The bearing assembly is to all intents and purposes subject to no wear and the liquid remains clear and its viscosity low under all conditions.

The compasses have been given permanent anti-static treatment. The lens apertures of the KB-14 and KB-20 types are restricted horizontally by a column, which automatically centres the eye on the optical axis, thus eliminating parallax.

ILLUMINATION

For use in twilight conditions or even total darkness, the compasses can be supplied with a built-in, maintenance-free light source, which will function perfectly for at least 15 years.

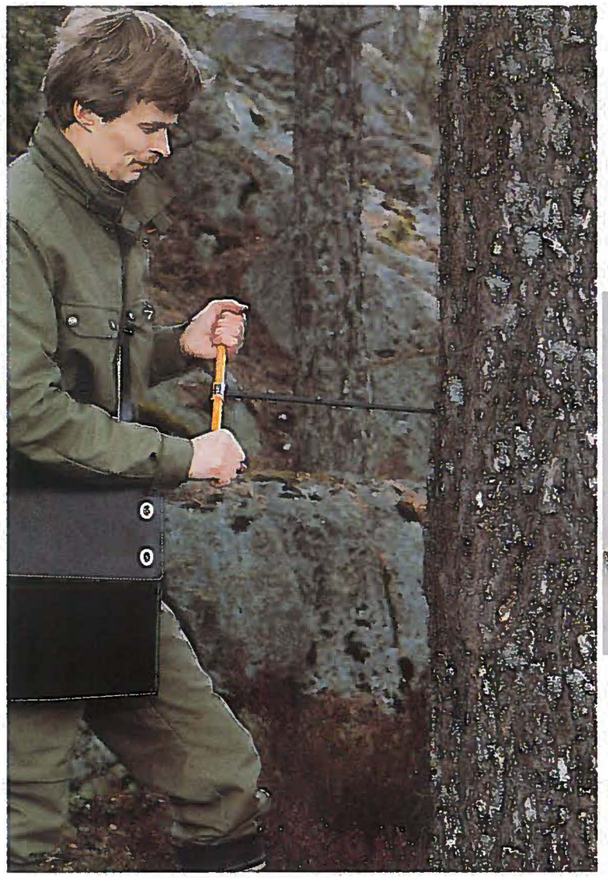
KB-14 compasses are also available with efficient lithium battery powered illumination. Water resistant with changeable battery.

SATELLITE ANTENNA BEARING

It is expected that in a few years from now there will be millions of antennas picking up signals from geostationary satellites poised some 36,000 kilometres above the equator. These antennas have to be focused with great accuracy. Suunto instruments are already being used to orient them all over the world.

The Suunto KB-14 compass is used for measuring horizontal angles and the PM-5 clinometer for vertical angles.

SUUNTO INCREMENT BORERS



INCREMENT BORERS

Suunto increment borers are used for examining wood quality and measuring growth rates.

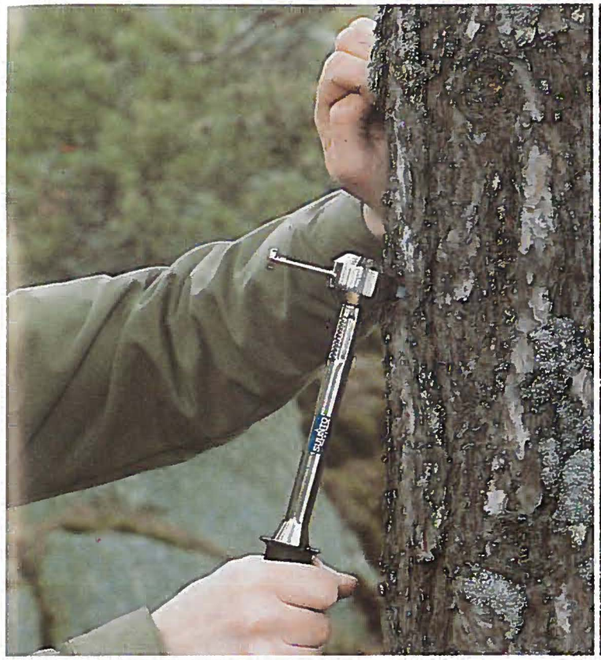
The extent of woodworm or termite damage, impregnation depth etc. can also be measured with these borers made of finest steel. However, these special uses can cause extra wear to the borer bit.

Suunto increment borers come in core diameters of 5 or 12 mm and are coated with Teflon to reduce friction heat (an important consideration when growing trees are involved). The Teflon coating also makes the borers easy to extraxt. Both thread styles (two and three threads) are designed to make the borer easy to extract from the wood.

INCREMENT BORERS						Standard dimensions		
	2 thread complete	2 thread bit only	3 thread complete	3 thread bit only	Extractor only	boring depth		core diameter/ outer diameter
						mm	inch	
5 mm 6"	o	o	●	●	●	150	6	5 mm/11.5 mm
8"	o	o	●	●	●	200	8	
10"	o	o	●	●	●	250	10	
12"	o	o	●	●	●	300	12	
14"	o	o	●	●	●	350	14	
16	o	o	●	●	●	400	16	
20	o	o			o	500	20	5 mm/14.8 mm
24"	o	o			o	600	24	
30"	o	o			o	750	30	
12 mm 12"	o	o			o	300	12	12 mm/22 mm
18"	o	o			o	450	18	
30"	o	o			o	750	30	

● stock items
o special order items

AND HAMMERS, BARK GAUGES



INCREMENT HAMMERS AND BARK GAUGES

These handy instruments are ideal for measuring bark thicknesses and annual growth rates. Both have graduated scales to facilitate measurement of the sample.

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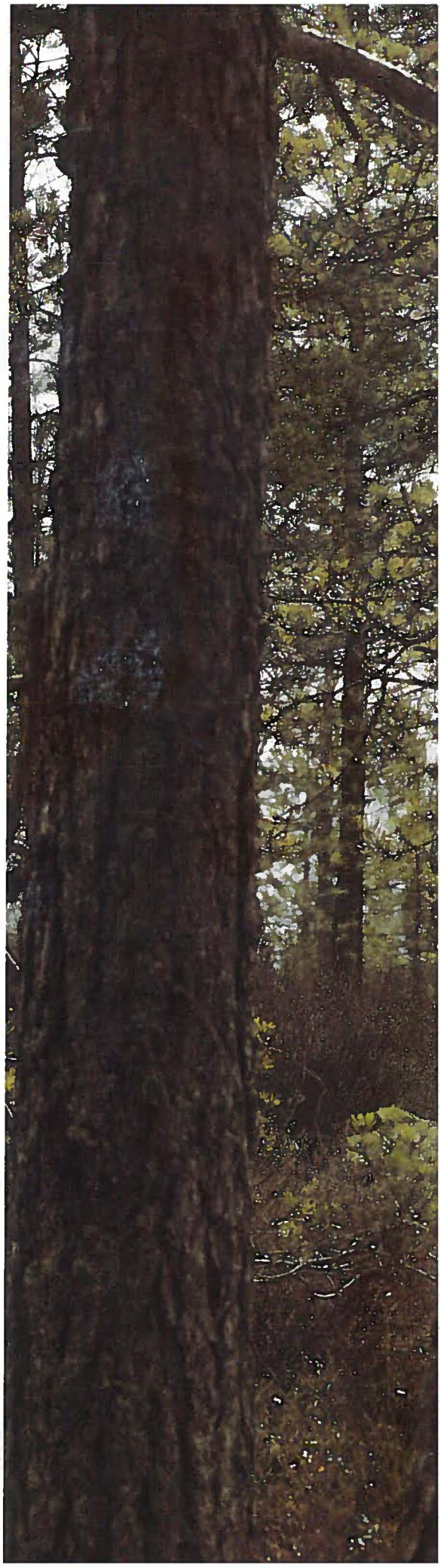

SUUNTO – OVER HALF A CENTURY IN THE SERVICE OF PRECISION

Suunto's establishment in 1936 marked the arrival of the world's first liquid-filled orienteering compass, which had been invented by the founder of the firm.

The main product during the early years was a field compass for military use, which is still part of the product line.

In the intervening decades, Suunto's research and development programmes have led to several new products. Today's line includes orienteering, hand bearing and diving compasses, height meters and clinometers as well as a wide range of marine compasses.

The company attaches great importance to quality and quality control as well as to service so as to guarantee that users are always looked after in the best possible way.

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