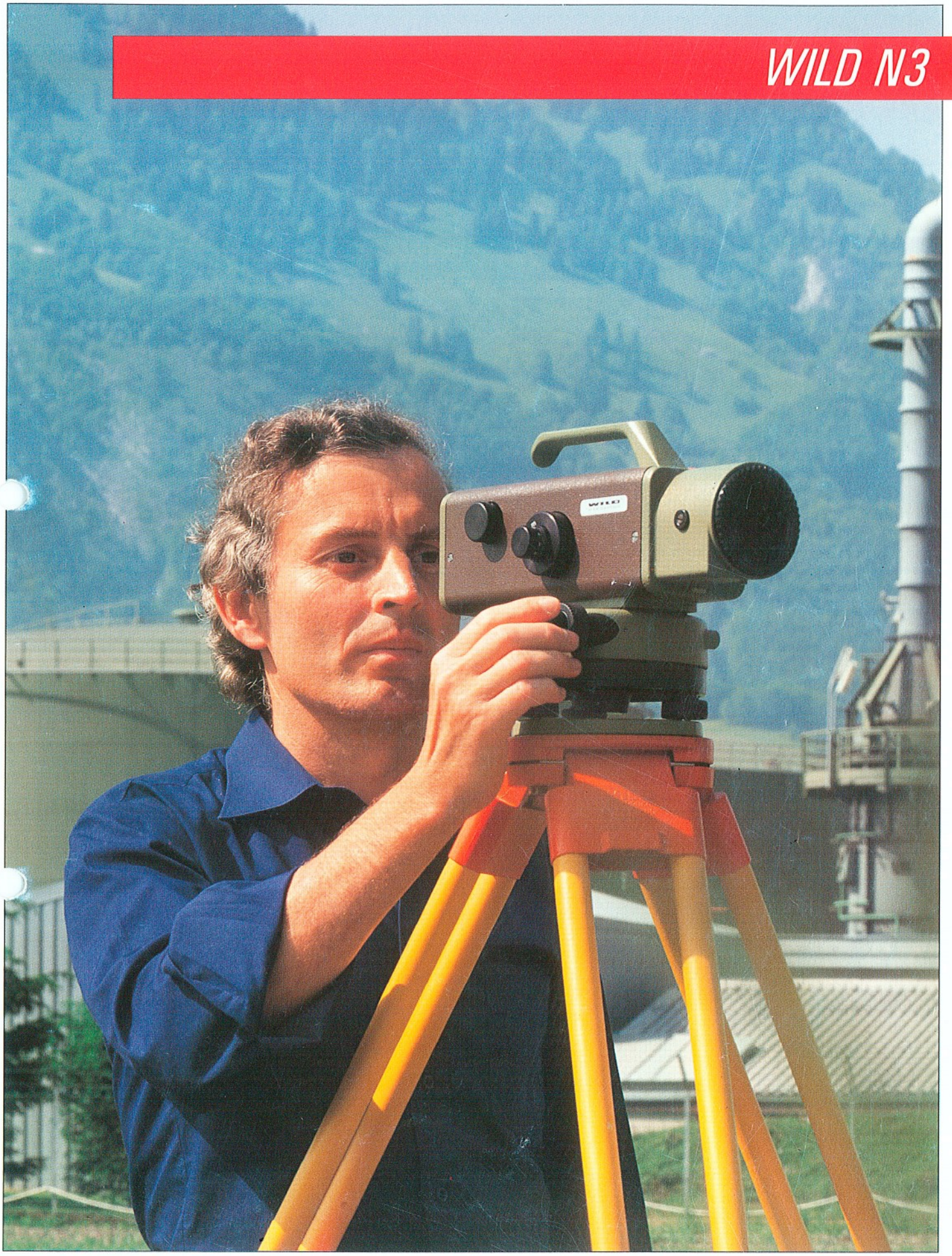
WILD N3



Precision level

Leica

WILD N3
The precision level with unique features

For years the WILD N3 has been a standard for precision and reliability. The latest N3 builds on this tradition.

The classical use of the instrument is for geodesy, particularly the measurement of national networks. For the highest accuracy requirements in engineering and for the control of structures, the N3 is widely employed. And there are other new and rapidly growing fields of application. Today, in industry, laboratories, for research and for special measurements, a precision level of the highest class is needed.

The N3 is designed to meet this multiplicity of requirements, and it incorporates the latest advances in technology.

The N3 is a spirit-level instrument. For very good reasons.

The inherent qualities of a well-designed precision spirit-level produce a basic stability that an automatic level can hardly match.

Although a few first-order automatic levels, such as the WILD NA2 with parallel-plate micrometer, are capable of levelling accuracies approaching that of the N3, there are circumstances and fields of application where the spirit-level instrument has important advantages.

When running lines of first-order levels in windy conditions, the N3 will give reliable results. The reason is the tubular level, the stability of the instrument.

Industrial users, laboratories and research establishments will find that the N3 is relatively unaffected by vibrations and that strong permanent magnetic fields have no influence at all.

Technical data

Standard deviation for 1 mile/1km double run levelling	±0.0008ft		±0.2mm
Telescope with panfocal optics			erect image
Clear objective aperture	2.05in		52mm

Magnification M and field of view FV

Distance	M	FV
∞	46×	1.0°
100m (330ft)	45×	1.83m (6.0ft)
10m (33ft)	34×	24cm (9.5in)
2m (6.5ft)	21×	8cm (3.1n)

Shortest focusing distance:			
Standing axis to target	17.7in	45cm	
Cover glass to target	11.0in	28cm	
Tubular level, sensitivity per 2mm		10″	
Setting accuracy of split bubble		±0.25″	
Circular bubble, sensitivity per 2mm		2′	
Tilting screw with graduation			8 revolutions
Range = 8 revs = 400 intervals (400:100 000)	0.400in/100in		4.00mm/1m
	0.0400ft/10ft		824″
1 revolution = 50 intervals (50:100 000)	0.050in/100in		0.50mm/1m
	0.0050ft/10ft		103″
1 interval on drum (1:100 000)	0.001in/100in		0.01mm/1m
	0.0001ft/10ft		2″
Accuracy of measurement	0.5″±0.4% of measured inclination		

Parallel-plate micrometer with glass scale	Range	Interval	Estimation
	10mm	0.1mm	0.01mm
	0.5in	0.001in	0.0005in

Environmental range	−30° to +60°C	−22° to +140°F

Weight

N3	5.1kg
with accessories in container	3.4kg
Tripod GST40, with rigid legs	6.0kg
Tripod GST20-9, with telescopic legs	6.5kg

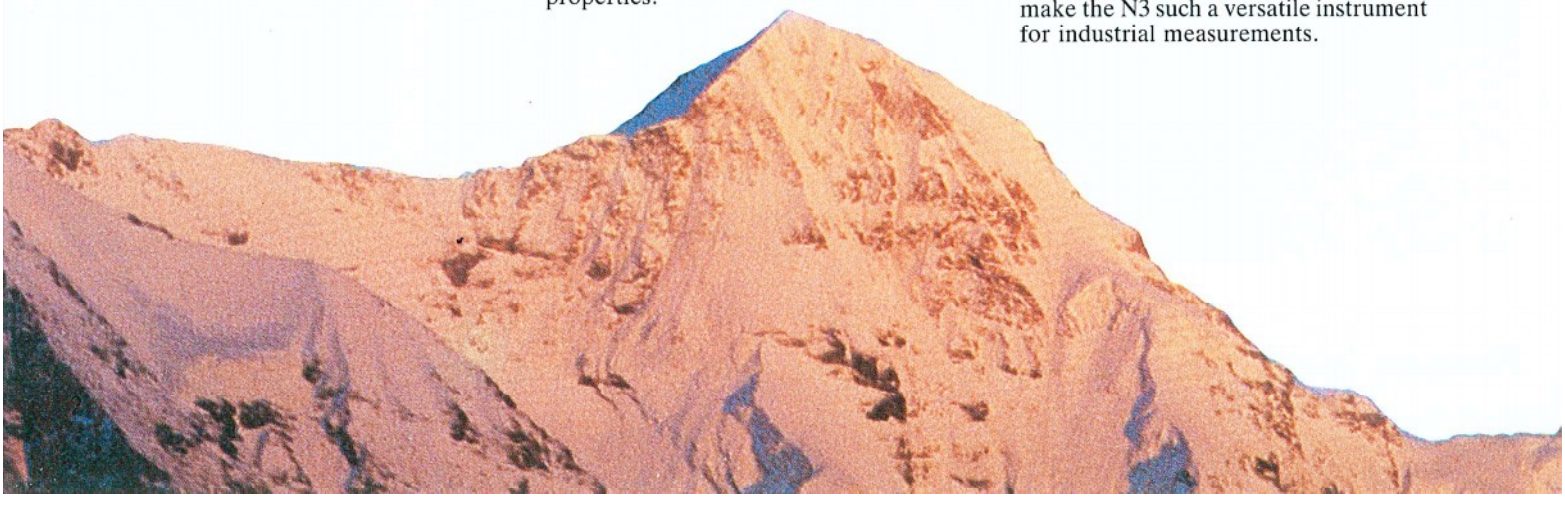
The N3 can be used for measuring small inclinations for river crossings in geodesy and for setting and controlling inclinations in industry.

And it has a powerful telescope with zoom characteristics and alignment properties.

Accessories

The invar staffs and interchangeable eyepieces are of particular interest to the geodetic engineer.

The optical tooling expert will appreciate the variety of specialized accessories which make the N3 such a versatile instrument for industrial measurements.

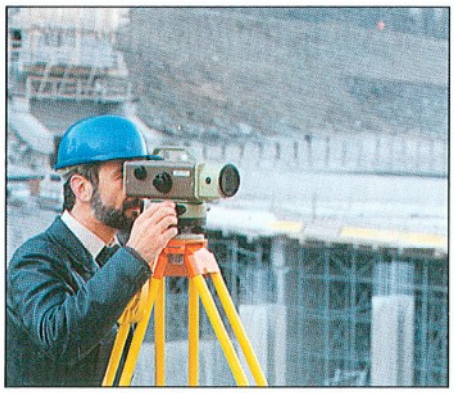


For the highest accuracy in geodesy, engineering and industry

First-order geodetic levelling

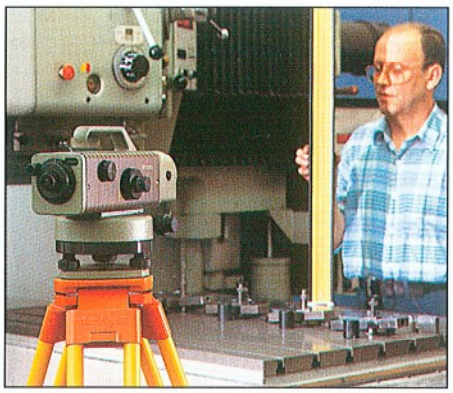
- First-order geodetic levelling for national networks.
- 0.2mm standard deviation for 1km double-run.
- Carrying lines of levels over wide rivers.
- Determining crustal movements.
- Height measurements for scientific studies.

Engineering and deformation surveys



- Height control for engineering projects.
- Deformation and subsidence measurements.
- Checking bridges and structures.
- Monitoring movements.

Optical tooling, industry and special tasks



- Measuring the heights of machine components.
- Setting base plates and rollers horizontal and at the required height.
- Investigating the deformation of bearings and drive shafts.
- Measuring the flatness of beds, blocks and plates.
- Aligning and positioning components.
- Checking the straightness of axes and rails.
- Determining and setting inclinations.
- Establishing and calibrating optical and mechanical control systems.
- And a wide variety of other specialized tasks.

Leica Ernest Igl Design

Powerful panfocal telescope with micrometer For precise measurements and alignment

Panfocal telescope with erect image

The telescope is outstanding. The large, light-gathering objective provides a bright, high-contrast image, even in poor light. The N3 telescope has the power needed for work of the highest precision.

Zoom characteristics

In contrast to the commonly used anallactic telescope, both the magnification and the field of view of the N3 telescope vary with focusing distance.

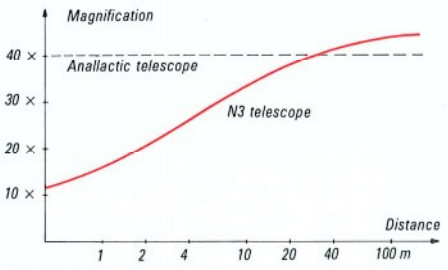
When running lines of levels with the staff at the usual 30m to 50m, the magnification is in the 40× to 45× range needed for geodetic work.

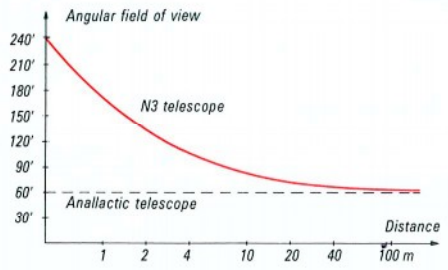
Extremely short minimum-focusing distance

A target 30cm (12 inches) in front of the cover glass can be brought into perfect focus.

When focusing close up, the magnification decreases but the field of view widens to provide an overall view and perfect reading of optical tooling scales.

A short minimum focus is essential for measurements in industry and laboratories.

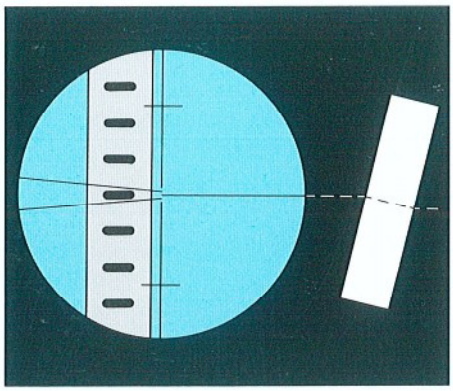




Built-in parallel-plate micrometer

The micrometer is an integral part of the N3. A cover glass protects the objective and plane-parallel glass plate from dust and moisture.

Tilting the plate produces a parallel shift of the line of sight in the vertical plane. The total shift corresponds to the graduation interval on Wild invar staffs.



Reticle with wedge-shaped hairs and single line

In geodetic levelling, precise setting to the graduations on Wild invar staffs is facilitated by the wedge-shaped hairs. By turning the micrometer, a graduation is centred exactly within the wedge.

For long sights when levelling, or for close-up measurements in industry to optical tooling scales, the single horizontal hair is used.

Alignment properties

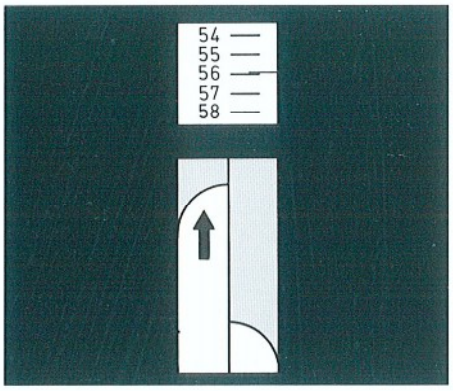
The bore of the telescope tube, the centring of the optics and the run of the focusing lens are all to a high degree of exactness. These factors, coupled with the inherent stability of the instrument, allow the N3 to be used as an alignment telescope.

When changing focus from 100m to 20m, any variation of the line of sight will not exceed 0.5″. From 30cm to 2m, linear deviations will be less than 20 microns.

Split bubble and micrometer scale in one eyepiece

Quick setting of the bubble-ends in coincidence is facilitated by an arrow, which indicates how to turn the tilting screw.

As the bubble and micrometer scale are seen together in the same eyepiece, the observer is always certain that the bubble is set when reading the micrometer.



Micrometer readings are taken from a glass scale. 0.1mm is read directly in figures; 0.01mm can be estimated.

Metric and inch versions of the N3 are available.

With the parallel-plate micrometer, staff readings are taken with an accuracy that matches the ±0.25″ setting accuracy of the N3.

Standing axis made of steel

The shaft and bush of the main axis are turned out of nitralloy steel. Minute manufacturing tolerances in the micron range ensure the perfect match needed for complete stability and precise rotation.

Gradienter screw and other design features
Rugged, stable, superb to handle

Frictionless tilting axis

Intense research led to a new type of tilting axis. Crossed spring plates provide a joint that is immensely strong yet completely frictionless and free from wear and tear.

This solution guarantees high instrumental stability and precision.

Calibrated tilting screw

The tilting screw is a gradienter. One interval of the drum corresponds to 1:100 000 (0.01mm per 1m, 0.001 inch per 100 inches). In angular terms, 1 interval equals 2.06″. The drum has 50 intervals. The range is 8 revolutions.

The graduated tilting screw provides the geodetic engineer with the perfect means of carrying 1st-order level lines over wide rivers and gorges. River crossings can now be made with the level itself, the new WILD N3.

The tilting screw enables the optical-tooling engineer to measure inclinations and changes in inclination. It allows the N3 to be employed for autocollimation measurements. Measurements can even be taken with the main axis inclined to the vertical.

Robust, stable, precise

A single casting is used for the telescope body and tubular level mount.

Covers enclose a space through which air circulates in order to insulate the level and telescope. They are attached in such a way that thermal expansion and contraction have no influence. Even the carrying handle is fixed at one end only to prevent the warmth of the hand being transferred to the telescope body.

These factors, the steel standing axis, the tilting axis of crossed spring plates, the sturdy base and the tubular level, provide the built-in strength and stability that guarantee precision and reliability, year after year in the toughest field conditions, on construction sites and in machine halls.

Other technical features

Full revolutions of the tilting screw are shown on a scale close to the eyepiece.

To adjust the line of sight, simply turn the cover glass (a thin wedge). It is easy and exact. There are no visible adjustment screws for the tubular level to concern the user.

A horizontal clamp and fine motion drive are provided for alignment work.

The detachable eyepiece permits the use of various accessories.

Ergonomically designed, superb to handle

The design and positioning of the controls and reading elements are the result of a detailed study of the handling of precision levels.

Control knobs are large and easy to operate with a fine touch. The tilting screw and micrometer knob are arranged coaxially as are the horizontal clamp and drive screw. The focusing knob has coarse and fine motion.

There are two eyepieces side by side. The split bubble and micrometer are seen in one, the staff image in the other. Separate eyepieces ensure that the telescope field of view is fully utilized, that brightness is uniform and the eye relaxed, and that the observer can concentrate on setting the bubble ends together and the hair on the staff graduation.

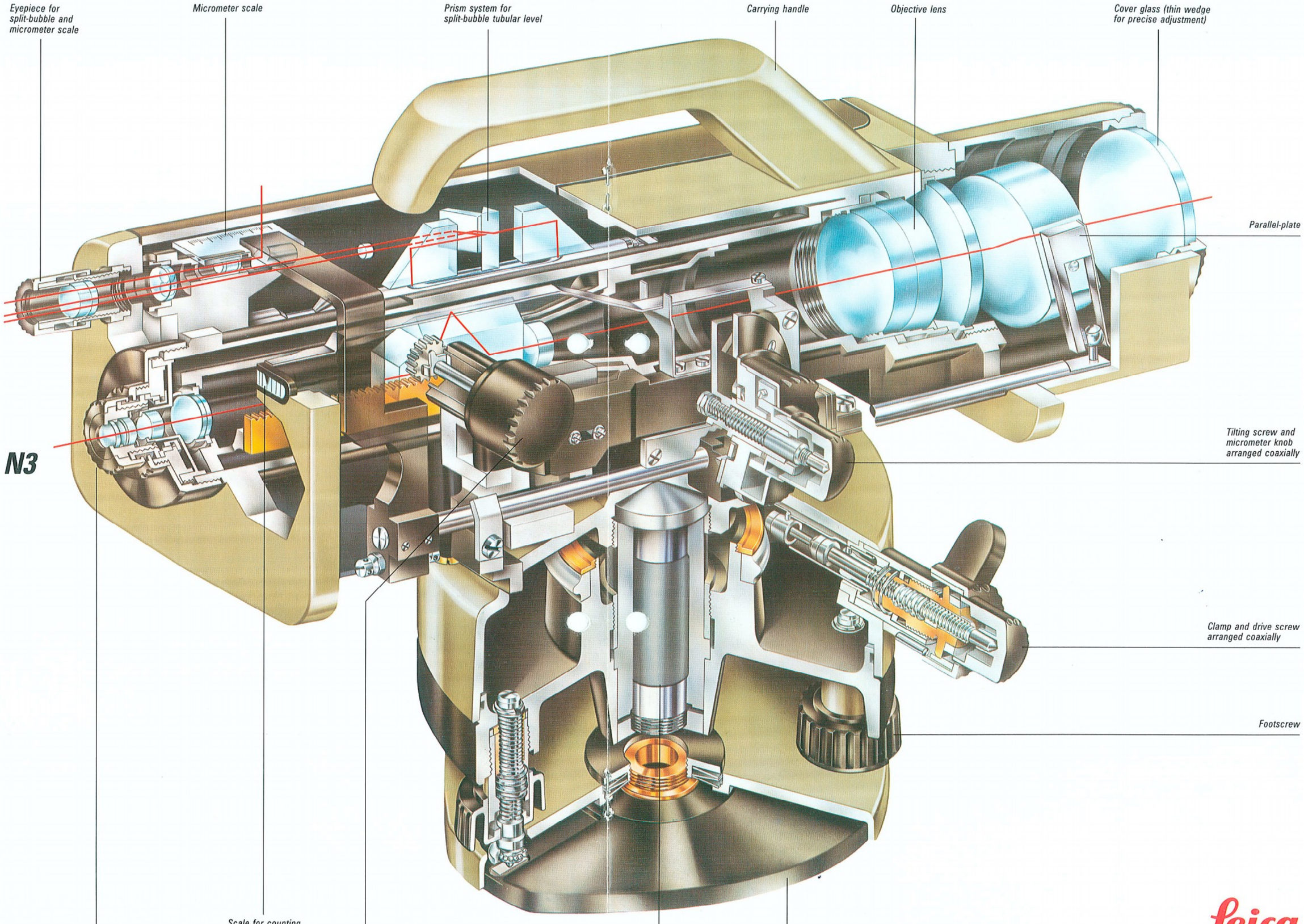
Quick to use

The N3 can be set up quickly and easily at a comfortable height for observing. View the circular bubble via the pentaprism and centre it by turning the rapid-action footscrews. Put the tilting screw to the approximately-required position. The ends of the split bubble will be seen. Only a slight turn of the tilting screw is now needed to set the line of sight horizontal.
The time needed to measure the height difference between two staffs is 25% less than with a standard type of precision spirit level.
The speed of geodetic levelling with the new N3 compares favourably to that with automatic levels.

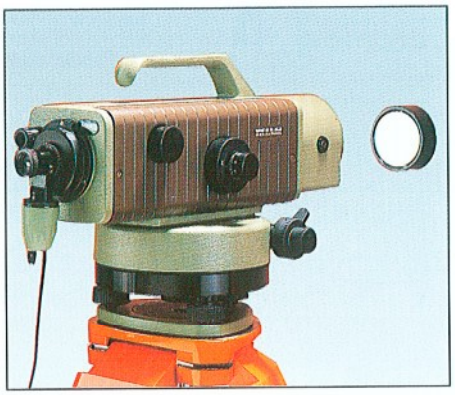
Container

A rugged, foam-padded container made of high performance synthetic material protects the N3 against weather, bumps, jolts and shocks. It is bright red to be easily seen. A screwdriver with adjusting pin, a rain/dust cover and the instruction booklet are all kept in the container.

WILD N3


Eyepiece for split-bubble and micrometer scale
Micrometer scale
Prism system for split-bubble tubular level
Carrying handle
Objective lens
Cover glass (thin wedge for precise adjustment)
Parallel-plate
Tilting screw and micrometer knob arranged coaxially
Clamp and drive screw arranged coaxially
Footscrew
Telescope eyepiece
Scale for counting revolutions of tilting screw
Focusing knob
Steel axis
Base plate

Optional eyepieces
Accessories for special tasks



Eyepiece	Magnification at various distances		
	100 m	10 m	2 m
FOK117	29	22	14
FOK77	45	34	21
FOK53	65	49	31

Autocollimation eyepiece

Fitting the GOA2 autocollimation eyepiece converts the N3 into an autocollimation instrument. The inclination and changes in inclination of a mirror, or object fitted with a mirror, are measured with the tilting screw.

The method is excellent for setting machine parts and measuring flatness. With a mirror on a 20 cm-long base, a change in inclination of one interval of the tilting screw corresponds to a height difference or out-of-flatness of 2 microns.

Autocollimation mirror

The WILD GAS1 autocollimation mirror is an optically flat front-surface mirror of 50mm diameter in a titanium housing. Three holes tapped with an M4 thread in the rear of the housing allow the mirror to be attached and adjusted to many types of mounts.

Eyepiece lamp

The eyepiece lamp transforms the N3 into a collimator. Collimators are used as references for measurements and for checking and adjusting optical instruments.
The horizontal setting, the tilting mechanism, the precise rotation, and the large objective of the N3, are all valuable features for a collimator.

Optional eyepieces

The most suitable eyepiece for most environments and most applications is FOK77, the standard eyepiece for the N3.

FOK53 gives a higher magnification. It is sometimes used for alignment tasks in laboratories or for geodetic levelling when sighting conditions are excellent.

Diagonal eyepiece

The diagonal eyepiece enable the operator to observe through the telescope from above and from the side. The eyepiece with universal joint can be positioned in any convenient position.

Translation stage

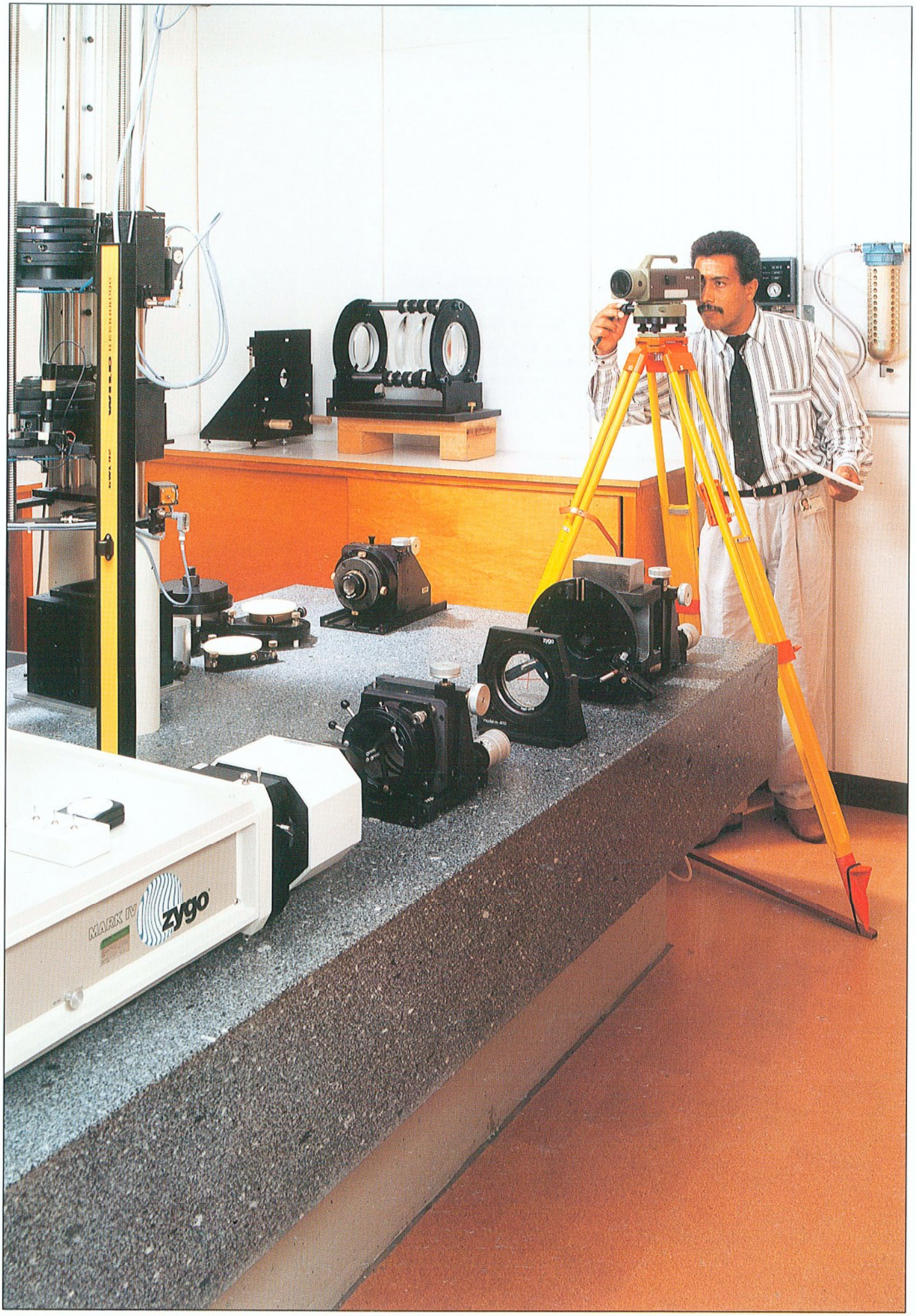
The GMT5 translation stage is useful for determining lateral displacements when the N3 is being used for monitoring or for measuring deformations. The translation stage can be used with or without tribrach on tripods or mounts. When screwed into position, the N3 can be displaced with the micrometer screw within a range of 40mm. The micrometer drum is readable to 0.01mm. For further information, please refer to the translation stage flyer G1 437e.

Laser eyepiece

With the WILD GLO2 laser eyepiece fitted, the N3 becomes a laser level for alignment control, marking points, defining horizontal planes, lines and grades.

The laser beam coincides exactly with the line of sight and is parfocal with the telescope to give a sharp point of laser light at any position from 30cm in front of the cover glass.

If a laser eyepiece is available, it can be useful to locate an autocollimation image, particularly if the mirror is small or the distance is long.


MARK IV
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A wide selection of tripods, staffs and scales

WILD GPLE invar staffs for geodetic levelling

For top-precision measurements, Nedo invar levelling staffs are offered. The invar strip carrying 1cm graduations has a negligeable coefficient of expansion (1 micron per 1m per 1°C). It nestles in a non-distortion aluminium profile on the staff in such a manner that expansion or contraction of the staff does not affect the graduated strip. To provide a check, the strip carries two sets of graduations, one being displaced and numbered differently. The staff has a polished steel base and should be set up on a Wild ground plate. A ring ensures that the same point of the base always rests on the bolt of the ground plate.

Invar staffs can be hand-held, but for work of the highest accuracy a pair of supporting struts should be used. These allow the staff to be turned on the base plate, but without touching the struts, as the instrument is moved to the next set-up. A circular bubble defines verticality. See brochure G1 905e.

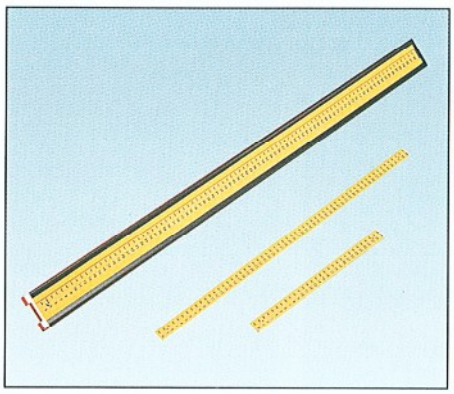
WILD GWL industrial staffs and scales for industry, tunnelling and special applications

These invar staffs are designed for industrial applications. However, they are also used for levelling in restricted spaces where the GPLE geodetic staffs would be too long and unwieldy.

Industrial staffs are lighter than those used for geodetic levelling and the invar strip carries only one set of graduations, either 1cm or 0.5 inch as required. There are two lengths, 92cm (36 inch) and 182cm (72 inch). In order to be fully adaptable to the various set-ups required in industry, each staff is supplied with two interchangeable base plates. Another base, with a rectangular mounting surface, is available on request.

The GWL30 is 30cm long, the GWL60 is 60cm.

Engineers engaged in industry sometimes manufacture special bases and stands to which scales have to be fitted. Leica can supply glass scales of various lengths and graduations.



Wild tripods

For geodetic levelling, when the N3 is always set up at eye level, the tripod GST40 with rigid legs is recommended.

For industry, where the instrument has to be set at different heights, the tripod GST20-9 with telescopic legs will often be more suitable.

WILD N3

- The WILD N3 is a spirit-level instrument for very good reasons: It guarantees the highest precision at all times. In areas where strong winds prevail, you can be sure of geodetic results. And in industry, where vibrations and magnetic fields occur, measurements will be precise.
- First-order levelling for national control.
- Precision levelling for engineering.
- Deformation measurements and control of structures.
- Determining subsidence and monitoring crustal movements.
- Checking, aligning and positioning machinery.
- Measuring small angles and changes in inclination.

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