

SOKKIA

**Industrial
Solutions**



**Precision &
Reliability**

Sokkia industrial measuring Experience leads to excellence

For years, Sokkia has taken the lead in developing and marketing industrial measuring solutions, encompassing all phases of the job from the place of production to data processing and analysis in the office. As one of the world's foremost manufacturers of industrial measuring equipment, Sokkia recognized the potential of industrial measuring solutions in the early nineties of the last century. Thanks to this early insight Sokkia has developed into a major player in the industrial measuring business.

In 1990 Sokkia introduced the first MONMOS 3-D station to respond to a global need for optimum precision, speed and ease in sophisticated industrial measuring tasks; the NET2. This first Monmos, which stands for Mono Mobile 3-D Station, was known for its outstanding precision, operating ease and mobility. These terms have always been our motive when developing new industrial measuring instruments. Not much later it became clear that more benefit from Sokkia's technology would come from combining it with a powerful software tool from a third party; A partnership with GLM was born.

Since 1991 GLM is specialized in complete tailor-made measuring solutions that meet the requirements of the customer. During the last 15 years they have been developing several software packages

which enable the user to prepare, process and save measured data in a smart, effective and user-friendly way. One of their latest software packages is 3-DIM, an essential tool for preparation and documentation of dimensional control tasks. This software embodies all experience and knowledge their team of engineers has gained through they years. In addition to this they offer a complete range of reflective target adapters which make the measuring job easier than ever.

Sokkia's latest innovation in the field is the NET05 motorized 3-D station, a new standard in large structure measuring. As a part of Sokkia's MONMOS range the NET05 sets the definite standard for 3-D measuring systems in fields such as range, speed and precision. The EDM with state-of-the art digital signal processing and sophisticated optical technologies delivers an outstanding performance. This results in an expanded measuring range of 200m with reflective targets.

The synergy between Sokkia and GLM, nowadays our official worldwide partner for industrial solutions, has lead into very powerful 3-D Measuring solutions of which large numbers have been sold all over the world. Due to our high capability in responding to specific markets, and our customer driven development teams we have been able to expand our solutions time and time again.





Milestones through the years



NET2



1920

Sokkia founded in Azabu, Tokyo, Japan as Sokkisha

1991

Introduction NET2, the first MONMOS system (Mono Mobile 3-D Station) Foundation of GLM in Bochum, Germany

1993

Release of first 3-DIM software version



NET1200



NET2100

1999

NET2100 the next generation of Monmos 3-D stations

2004

NET1200 3-DIM Observer electronic field book



NET1



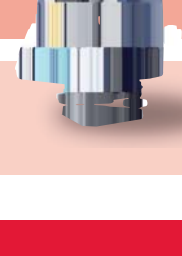
NET1100M

2006

NET1100M Motorized 3-D Station with high accuracy electronic distance meter

2007

NET1 Automated 3-D Station High accuracy tracking, scanning and monitoring with GLM partner software



NET05



NET05

2008

NET05 Automated 3-D Station. Superior accuracy with tracking, scanning and monitoring with GLM partner software

A variety of customers

A solution for every industry

A lot of industries already benefit from the industrial measuring solutions Sokkia offers. Monitoring of train bogies for example minimises the wastage of wheel sets and rails and quality inspection of production lines has led into reduction of down time and the streamlining of production processes. Using Sokkia measuring solutions can lead to huge cost savings when doing those measurements that are so essential and indispensable to the industrial business.

Railway industry

In the railway industry safety is an important issue. If a railway service is to be reliable, the equipment must be kept in good working order and regular quality control is the essential ingredient to achieve this. Sokkia's 3-D measuring solutions can play an important role during this quality control. Especially when doing the periodical dimension-tolerance measurements of the bogies. When using a template for measuring the bogies the technician is able to check one complete bogie within 20 minutes. This measuring technique is also very cost-effective for measuring tram bogies and during the production of new trains. For this reason the German railway is already using 40 MONMOS systems to guarantee safety.

Shipbuilding industry

Sokkia realizes that efficiency and precision are very important terms in the shipbuilding industry. Large scale projects like building ships involve huge investments, so it's important to reduce the building time to a minimum. Often not all parts are build in the same location so the shipbuilder needs to be very sure that the different segments will fit before shipping them. The 3-DIM software displays deviations by measuring the actual coordinates and analyzing the difference between the first and the second section. Subsequently 3-DIM suggests how to minimize the differences. Sokkia guarantees that they will fit before shipping them to the final dry-dock.

Highlights railway industry

- Working efficiency; using macros from measurement to documentation
- Very easy series measurements of different bogie models
- Deformation control and



Highlights shipbuilding industry

- Easy-to-read display results (graphical and numerical)
- Guaranteed fitting of ship segments leads to cost reductions
- Checking welding induced shrinkage optimizes shipbuilding process





Wind energy industry

The wind energy industry is developing faster than ever before, this due to the efficiency developments in wind turbine technique. Sokkia noticed this fast increase in the number of wind turbines and offers solutions to do high accuracy roundness measurements of wind turbine towers and flanges to see if they are within tolerances. Measuring during the manufacturing process of the tower guarantees that the components will fit seamlessly when they are assembled during production and on their definite location. Sokkia also offers the possibility to measure the geometry of tower sections, the straightness of the towers and the erection of the towers.

Paper industry

The high production rates in the paper industry make regular inspection of machines very important. These machinery alignment measurements include pressing-cylinders and rollers. Every minute of down time must be prevented. Next to conventional measuring solutions Sokkia offers 3-D solutions equipped with 3-DIM software to do automated measurements which result in faster and more accurate results but most importantly guarantee less down time and thus saves money.



Highlights wind energy industry

- High accuracy roundness measurements
- Controlling during manufacturing process
- Surveying during construction phase



Highlights paper industry industry

- Quick alignment of cylinders and rollers
- Controlling while fabricating paper machines
- Stake out the machine base





Steel industry

Like with shipbuilding, efficiency and precision are very important issues in the whole steel industry. To prevent unnecessary costs Sokkia offers measuring solutions which can result in major savings and visibly improve production processes. Measuring large components during the production process can reduce manufacturing costs drastically. For example: During the production process of the pipes, the flanges are measured, and the data is sent to the place of final assembly. The flanges are shipped only after the data analysis shows a perfect match of flanges and pipes, saving transportation costs and time. Special functions like circle / flange / cylinder support the pipe builder. Centre points with basic information (radius) are created instantly.

Highlights steel industry

- **Creating production plans for pipe work replacement without disassembly or transport**
- **Measuring dimensions of crane or bridge sections before assembly**
- **Optimizing workflow**



Tunneling & mining

For the working progress of tunnels the engineers need to know the actual state. For this reason they have to measure cross-sections along their construction site. With motorized total stations and intelligent software the surveyor is able to automatically scan profiles reflectorless. The security in tunnelling is one of the most important issues. Auto-monitoring on prisms or reflector sheets will be done absolutely reliable.

Highlights tunneling & mining

- **Auto-monitoring on prisms and reflector sheets with high accuracy**
- **Reflectorless auto-scanning of tunnel sections**
- **Graphical 3-D documentation of full tunnel sections**



Moving staircases

New escalators are shipped around the world. The technicians have to follow them by plane to different sites. Therefore, the measurement equipment needs to be as lightweight as possible. The hard-top case includes all the equipment required and can be carried as hand luggage! Easy and time-saving alignment of escalators is guaranteed.

Highlights moving stairs

- **Quick alignment of staircase rollers**
- **Efficient and mobile solutions for jobs worldwide**
- **Controlling security**



Automated 3-D station

SOKKIA's High-Precision 3-D station is now automated. Another MONMOS goes into action. Construction management and maintenance for: Shipbuilding, Rail Vehicles, Automobiles, Bridges, Wind Turbine Generators, Plant Facilities and more. Automatic deformation monitoring in: Tunnels, Subways, Dams, Slopes and Heavy Construction Sites.

Automatic measurement function

In addition to a high-precision motor drive mechanism, NET05 and NET1 can perform auto-pointing using both reflective prisms and sheet targets. Automatic deformation monitoring is possible for early detection of earth or structure movement.

- Auto-pointing using a single prism can be performed from as far as 1,000m away.
- A dedicated auto-pointing algorithm* was developed specifically for NET05 and NET1 allowing it to accurately sight the target closest to the telescope center, even if multiple prisms and other reflective objects are in the telescopes field of view.
- In addition, NET05 and NET1 features an "Auto-tracking" function to constantly track a moving prism, further broadening measurement possibilities.

**With a normal auto-pointing function, the total station sights the target closest to the instrument with the strongest measuring light reflection. The NET 05 and NET1 automatically point to the closest targets to the crosshair center regardless of distance.*

High-precision EDM

- The NET Series' phase-comparison method EDM realizes a high distance accuracy to $(0.5 + 1 \text{ ppm} \times D)\text{mm}$ with reflective sheet targets, and $(0.8 + 1 \text{ ppm} \times D)\text{mm}$ using prisms.
- The NET1 offers a range of 300m for reflective sheets.
- The NET1 has a reflectorless measurement of 200m which enables you to work where no target can be placed.

Highlights NET05/NET1

- Target illumination for increased productivity in dark environments
- Good visible LCD touchscreen and fully illuminated keyboard
- Superior 0.5" angle accuracy and 200m distance measurement on sheet targets for NET05
- High accurate 1" angle accuracy and 300m distance measurement on sheet targets for NET1
- Bluetooth® Wireless Communication for cable-free connections to controllers, PC and other peripherals.
- IP64 environmental protection



The NET Series feature target illumination, ideal in combination with reflective targets



For working in dark environments; the good visible display and fully illuminated keyboard.

Auto-pointing, Auto-tracking, Motor Drive, Remote Control.
Equipped with new features to dramatically increase measurement efficiency and save labor.

GLM, Sokkia's industrial business partner

GLM, our Germany based official worldwide industrial partner is specialized in complete tailor-made systems to meet the requirements of the customer, offering both complete optical 3-D solutions and software. Being active for over a decade GLM has gained experience in many industrial applications. Sokkia's superior accuracy measurement 3-D stations in combination with GLM's 3-DIM software and range of reflective targets offer a solution for almost every industrial measuring job.

3-DIM Software

Software for industrial surveying applications

The easy-to-use 3-DIM software range is especially developed for industrial surveying applications. For shipbuilders, railway engineers, bridge builders and many others, 3-DIM is an essential tool for preparation and documentation of dimensional control tasks. Since the first release 3-DIM has continuously improved, considering new requirements of customers and supported by the experience of GLM's industrial surveying engineers. The software runs on different platforms such as controllers and PC's.



3-DIM Observer

The new data logger for Sokkia 3-D stations

Robust hardware fit to withstand the most rugged environments with a quality already proven in practical global applications is the foundation for a new generation of data loggers featuring many advantages compared to all predecessors. The 3-DIM Observer brings software solutions for many industrial applications and is developed to save time in measuring objects. It will lead you through pre-defined measurement routines where aiming at the reflective target is the most time consuming and difficult job.

Benefits 3-DIM Observer

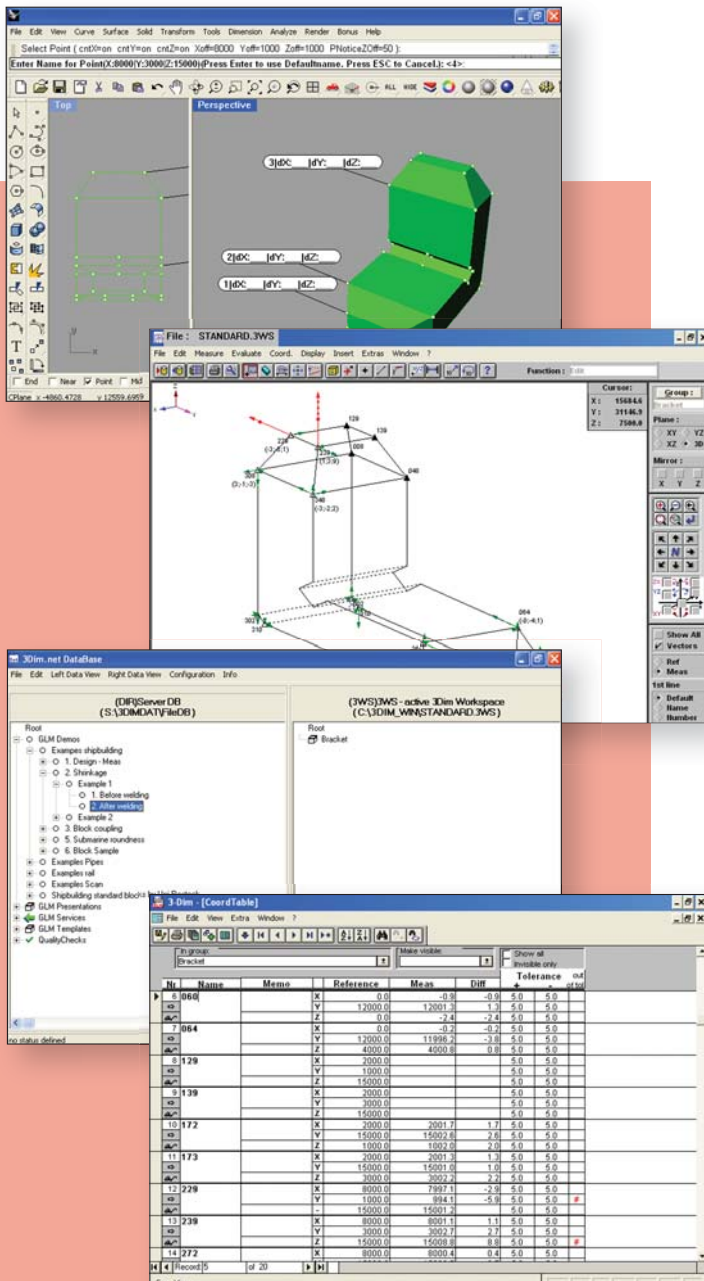
- Simple "One-click" measurements
- Very flexible in defining coordinate systems
- Measuring with templates for series of the same measurements
- Easily defining new targets at any time
- Numerous evaluations for the analyses of measured data
- Reflectorless measurement of edges
- **Bluetooth®** wireless technology for communication with the sensor



3-DIM PC-Basic

PC software for 3-D measurement and evaluation in industrial applications

3-DIM PC-Basic is the easy-to use tool for preparation, measurement and documentation developed for PC's. It displays data in both a graphical and numerical interface from which the data can be edited. The software runs on a powerful database which is accessible from everywhere around the world and every project directory offers the possibility to save all files needed (such as project pictures).



Benefits 3-DIM PC-Basic

- Automatic evaluation for series production, evaluation work can be performed automatically. Macros to align coordinate systems to the object and to evaluate data, can be created by the user
- By selecting points in the graphical interface many different evaluations can be performed
- Optical 3-D measuring of sections
- Alignment and coordinate transformation; data may be transformed to the desired coordinate system at any time, even during the measurement process. All following readings will directly be transformed to the desired coordinate system
- Perfect visualization; error vectors show size and direction of deviation in both graphical and numerical interface
- 3-DIM PC-Basic can be extended with 3 extra modules: 3-DIM PC-Basic Cad-Port, 3-DIM PC-Basic Optimizer and 3-DIM PC-Basic Roundness.

3-DIM Observer Motorized

The new data logger for motorized Sokkia 3-D Stations

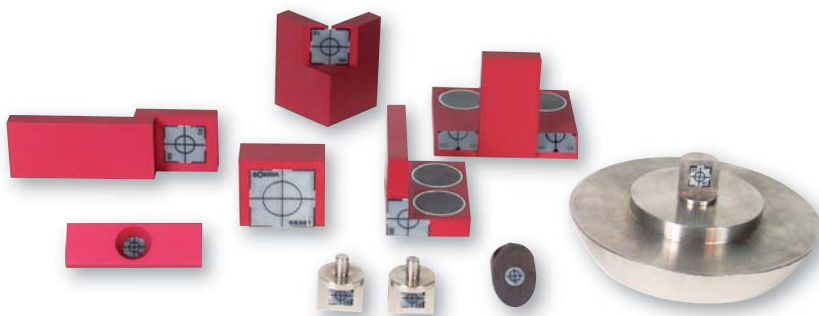
Especially designed for motorized Sokkia 3-D stations, 3-DIM Observer Motorized software makes it possible to automatically create design coordinates with maximum tolerances. After scanning, 3-DIM Observer Motorized shows the deviation between the measurement and the design coordinate. Points which are out of tolerance will be marked immediately. In addition 3-DIM motorized offers a lot of other functions for intelligent measuring.

Benefits 3-DIM Observer Motorized

- Intelligent stake-out of design coordinates enables the instrument to find the position of the design coordinates. The user can determine the accuracy of the result by determining the tolerances
- Monitoring in combination with Sokkia's auto pointing total stations

A complete range of reflective target adapters

To make the measuring with Sokkia's MONMOS systems easier and more accurate GLM developed a complete range of reflective target adapters. This range of adapters is very economic in comparison to the use of prisms; prisms break more easily and are much more expensive. The range includes side wall target adapters, paired target adapters, adapters with pin, spherical adapters, target adapters for edges, target adapters for front or rear faces and shipbuilder's target adapters for molding edges. Of course any other adapter can be designed whenever needed because they are developed and manufactured on request.



GLM target adapters

Our membership in the German calibration service (DKD), which is controlled by the German federal physical and technical agency (PTB), guarantees compliance of longitude and angle with national norms and regulations. Results of the calibration are listed in a special certificate, the DKD-calibration license. This certificate conforms to all requirements of the DIN ISO series of standards for control of inspection, measuring and test equipment.



DKD-Calibration laboratory for the measurement categories longitude and angle

All Sokkia industrial instruments and GLM targets adapters are calibrated and certificated by the DKD-Calibration laboratory (Germany) before delivery. This to guarantee our customers a high accuracy. All check-ups, calibrations and certifications are done in compliance with EN-standards.

Other available industrial brochures



Sokkia NET05
Product brochure
PDF: www.sokkia.net



Sokkia NET1
Product brochure
PDF: www.sokkia.net



Sokkia NET1200
Product brochure
PDF: www.sokkia.net



SPECIFICATIONS

		NET05	NET1	NET1200
Telescope		Fully transiting, coaxial sighting and distance measuring optics. Magnification: 30x, Resolving power: 2.5", Minimum focus: 1.3m		
Angle Measurement	Accuracy	0.5" / 0.15mgon, 0.0025mil	1" / 0.3mgon / 0.005mil	1" / 0.3mgon / 0.005mil
Automatic dual-axis compensator		Dual-axis liquid tilt sensor, Working range $\pm 4'$ (± 74 mgon)		Dual-axis liquid tilt sensor, Working range $\pm 3'$ (± 55 mgon)
Distance measurement		Modulated laser, phase comparison method with red laser diode, coaxial optics		
Laser output ^{*2}		Class 2 (max. 0.99mW)	Class 3R (max. 5mW)	Class 3R (max. 5mW)
Measuring range	With reflective sheet target ^{*5}	1.3 to 200m	1.3 to 300m	1.3 to 200m
	Reflectorless ^{*4}	0.3 to 40m ^{*6}	0.3 to 200m ^{*7}	1.3 to 40m
Accuracy	With reflective sheet ^{*5}	$\pm (0.5 + 1\text{ppm} \times D)\text{mm}$	$\pm (1 + 1\text{ppm} \times D)\text{mm}$	$\pm (0.6 + 2\text{ppm} \times D)\text{mm}$
	Reflectorless ^{*4}	$\pm (1 + 1\text{ppm} \times D)\text{mm}^{*6}$	$\pm (3 + 1\text{ppm} \times D)\text{mm}^{*7}$	$\pm (1 + 2\text{ppm} \times D)\text{mm}$
General		White LED, Blink / On / Off, selectable, Brightness selection available		
Operating temperature		-10 to +50 °C		
Weight with handle & battery	Instrument sizes	W201 x D202 x H375mm		W165 x D171 x H341mm
		7.6kg		5.5kg
Power Supply		7.2V DC		
Detachable battery		BDC58, Li-ion rechargeable battery, 2 are included as standard accessories		BDC46A Li-ion rechargeable battery, 2 are included as standard accessories
(Continuous use at 20 °C)	Standard detachable battery	BDC58 (Li-ion, 4.3Ah): Approx. 3 hours		BDC46A: Approx. 6 hours
	External battery	BDC61 (Ni-HH, 13Ah): Approx. 9 hours		-

		DT210	PL1
Telescope	Length	165mm	303mm
	Objective aperture	45mm	50mm
	Magnification	30x	42x
	Image	Erect	Erect
	Resolving power	3"	2"
	Field of view	1°30'(26m/1,000m)	Field of view (at 100m)
	Minimum focus	0.9m from telescope center	Stadia multiplication constant
	Accuracy (ISO 17123-3:2001)	2"/0.6mg/0.01mil	100
Automatic dual-axis compensator		Dual-axis liquid tilt sensor	Leveling Accuracy
	Working range	$\pm 3'$ (± 55 mg)	Standard deviation for 1km double run leveling
	Operating temperature	-20 to +50°C	0.2mm
	Dust and water protection	IP66 (IEC 60529: 1989)	Size
	Size with handle	W165 x D165 x H341mm	Dimensions
	Weight with handle	4.7kg	L303 x W140 x H180mm
			Weight
			4.8kg
Power supply	Battery	LR14/C batteries x 2	
Continuous use with alkaline batteries at 25°C		Approx. 75 hours	

*1 Class 2 laser product model is a factory option. *2 IEC 60825-1Amd.2: 2001 / FDA CDRH 21 CFR Part1040.10 and 1040.11 (Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No.50, dated July 26, 2001.) *3 Using 50x50mm sheet, when facing the target. Average conditions: Slight haze, visibility about 20km, sunny periods, weak scintillation. *4 With white side of a KODAK Gray Card (90% reflective), range and/or accuracy may be varied according to measuring objects, observation situations and environmental conditions. *5 When facing the target. *6 Measured object brightness: 5.000 lx or less (indoor, underground or dim conditions) *7 Measured object brightness: 30.000 lx or less (cloudy weather, or similar conditions)

SOKKIA CO. LTD., founded in 1920 in Japan, is a leading manufacturer in developing complete measurement solutions for surveying, construction and industrial measurement applications. Sokkia's portfolio includes GNSS systems (Global Navigation Satellite Systems), reflectorless and robotic total stations, digital theodolites, automatic/digital levels, rotation/line lasers and software.

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