

**Nikon**

# TOTAL STATION DTM-502 SERIES

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## DTM-552/532/522



## The next step in Total Station excellence

**W**ith the new DTM-502 Series of Total Stations, Nikon has expanded and improved on its highly successful DTM-500 Series. Celebrated for superior optics, mechanical integrity, battery life and measuring speed, the new line boasts an easy-to-read graphic LCD and ergonomic keyboard on both faces. Combine these features with the feature-packed on-board software and you've got a lineup of Total Stations that are unmatched for performance, ease of use and productivity.



**Dawn till dusk with one battery**



## Main features

- Faster initial distance measurement of only 1 sec., with 0.5-sec. updates in normal mode and 1.0-sec. updates in precise mode
- Higher distance accuracy of  $\pm(2 + 2\text{ppm} \times D)\text{mm}$  in precise mode and  $\pm(4 + 2\text{ppm} \times D)\text{mm}$  in normal mode
- Higher distance resolution of 0.1mm in precise mode (1mm in normal mode)
- Nitride-finished steel horizontal-axis with a zero-clearance ball bearing design for high angle stability and DIN 1" accuracy with 0.5" reading (DTM-552)
- Lighter weight of 5.5kg/12.1 lbs., including battery
- Longer battery life of 10.5 hrs. continuous distance/angle measurement, or 24 hrs. with one distance measurement every 30 sec.
- Ergonomic keyboard design with direct numeric input and unique function keys suited to field use
- Convenient alphanumeric code input methods
- Compact and handy display of necessary information
- 100% software resume function
- IPX4 all-weather construction
- Lumi-Guide with Right/Left and In/Out distance information
- Compact, high-quality telescope incorporating a powerful and stable EDM
- Powerful and practical on-board programs

### Long battery life

A single BC-80 clip-on battery provides approximately 10.5 hrs. of continuous distance/angle measurement, or 24 hrs. of one measurement every 30 sec., which means an entire day's work can be performed without having to change the battery. The lower power consumption pattern of the DTM-502 Series also minimizes memory effect on the battery.

### Compact, stable telescope

Nikon's unique optical system has been further improved for even clearer sighting in all conditions, for example oblique or low-light situations. The telescope employs a unique linear focusing mechanism that improves focusing at both short and long distances. The focusing knob has also been designed to improve ergonomics and operational feeling.

### LLV (Low Light Visible) green color

To increase on-site safety and identification of the instrument, the LLV green color was chosen for the DTM-502 Series.

### Accurate and stable angle measurement

The DTM-502 Series uses a nitride-finished steel horizontal-axis with a zero-clearance ball bearing, introduced in Nikon's top-of-the-line Field Station DTM-800 Series, so accuracy of angle measurements is improved and stability under all field conditions is maintained.

### Faster, more accurate distance measurement

Digitization and clever integration of electronic parts in the DTM-502 Series have resulted in a compact and lightweight EDM that boasts an initial distance measurement speed of just 1.0 sec. Accuracy of  $\pm(2 + 2\text{ppm} \times D)\text{mm}$  in precise mode and  $\pm(4 + 2\text{ppm} \times D)\text{mm}$  in normal mode is assured, and distance can be displayed in either 0.1mm or 1mm resolution in precise mode. The multiple-reflection-correction software means that measurements taken using reflector sheets are as fast and accurate as those taken with glass prisms.

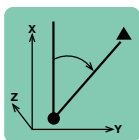
### Large, easy-to-read graphic display and ergonomic keyboard

The keyboard arrangement is ergonomically and logically designed for easy operation and efficiency in field situations. The DTM-502 provides various keys such as USR keys, full-cursor keys and a MENU key, MODE key, and HOT key to access job managing operations, frequently adjusted settings, view/edit of data and timesaving feature code input methods such as Quick Codes and a stack of previously input codes. You can assign a specific function to each of the USR keys, giving you one-touch access to frequently used functions. The full numeric keyboard is essential for convenient input of angle and height of target.

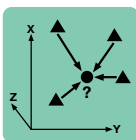


### Compact and lightweight, with IPX4 all-weather construction

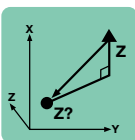
Advanced technologies include a lightweight EDM and a lightweight long-life battery. The DTM-502 weighs only 5.5kg/12.1 lbs. with its battery and is water-resistant to IPX4 standards, which state: "Water splashed against the enclosure from any direction must produce no harmful effects."



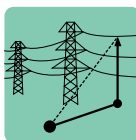
Known station



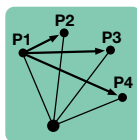
Resection



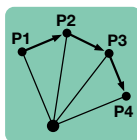
Remote benchmark



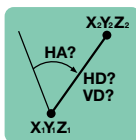
REM



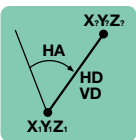
RDM-radial



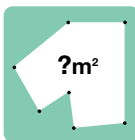
RDM-continuous



Cogo-HD+HA



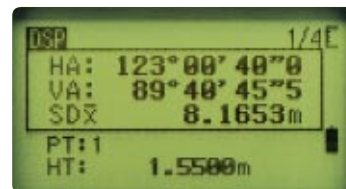
Cogo-Pt-Pt



Area calculation

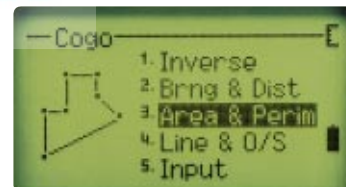


In addition to direct code input and a stack of previously used codes, Quick Codes can be set up for 10 'one touch' keys, and a user-defined code list can be created. Quick Codes work by assigning frequently used codes to numeric keys 0 through 9. Once the desired codes are set, simply aim at the target and press one of the preset keys to measure and record a point with full coding.



## On-board COGO calculation

The DTM-502 Series provides on-board coordinate geometric calculations, including area and perimeter.



## F1/F2 averaged measurement

F1/F2 measurements can be taken to improve accuracy, with both the raw measurements and the averaged record stored for later reference.

## Multiple resection

Instrument XYZ position and orientation is calculated by the Least Squares method after measuring to a minimum of 2 and a maximum of 10 known points. Measurements can consist of any combination of F1/F2 averaged shots, angle only shots, or full distance shots. Any measured point can be selected as the backsight.

## Fast, on-site setting change capability

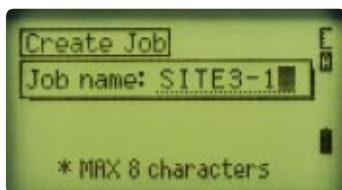
Some settings are changed frequently in the field. With the unique HOT key and the MSR key, settings can be quickly changed without interrupting work flow.

## Measurement home base

Simple key names enable quick-and-easy access to STN setup, measurement (MSR1/MSR2), and other common operations from the basic measuring screen. Two USR keys provide direct access to favorite functions and programs.

## Easier to record data

Recorded data can be stored for up to 32 separate jobs. Data in a job file can easily be checked, edited, deleted,



input and searched directly on the instrument. Also, survey control point coordinates can be stored in a job file that is accessible from other jobs. Up to 10,000 records can be stored in memory.

## Easy input of feature codes

Various code input methods have been implemented on the DTM-502, greatly improving convenience and efficiency when recording many points in the field.

### DTM-502 menu tree

#### Basic measurement screen

MSR 1  
MSR 2  
DSP  
ANG  
STN  
S-O  
O/S  
PRG  
LG  
DAT  
USR definable  
COD  
HOT  
Leveling

#### HOT

1. Height of target  
2. Temp. & pressure  
3. Target settings  
4. Note input

#### Menu

1. Job manager  
2. Cogo  
3. Settings  
4. Data view/edit  
5. Communications  
6. Keys settings  
7. Calibration  
8. Time & date

#### Cogo

1. Inverse  
PT-PT  
3-PT angle  
2. Bearing & HD  
AZ+HD  
Traverse  
3. Area & perimeter  
4. Line & O/S  
5. Input XYZ

#### ANG

1. 0-set  
2. Input angle  
3. Repeat angle  
4. F1/F2 measurement  
5. Hold

#### STN

1. Known station setup  
2. Resection  
3. Quick station setup  
4. Remote benchmark  
5. Backsight check

#### Stakeout

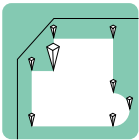
1. Angle & distance  
2. Coordinate  
3. Divide line S-O  
4. Reference line S-O

#### Offset measurement

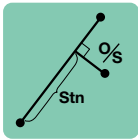
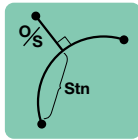
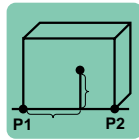
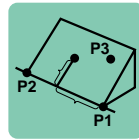
1. Taped  
2. Angle  
3. 2-prism pole  
4. +Line by HA  
5. Input HD  
6. Corner  
7. Circle  
8. Input dSD

#### PRG

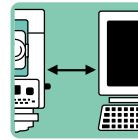
1. 2-PT reference line  
2. Arc reference line  
3. RDM (radial)  
4. RDM (continuous)  
5. Remote elevation  
6. Vertical plane  
7. Sloped plane



Stakeout


2-point  
reference line

ARC  
reference line

Vertical  
reference plane

Sloped  
reference plane


Job manager


Data  
communication


Quick Code

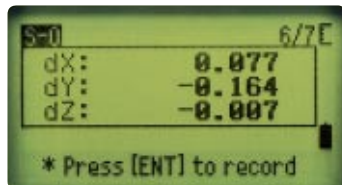
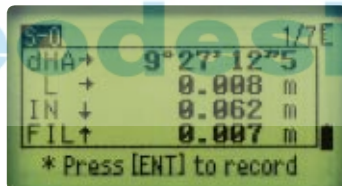

F1/F2  
measurement


## Switching/configurable displays

By simply pressing the DSP key, the measured data displayed is scrolled through various standard sets that suit different field requirements. Because the display can be switched before, during and after a measurement, it is not necessary to select your desired display before measuring. Some measurement and stakeout screens are user-configurable to suit operator preferences.

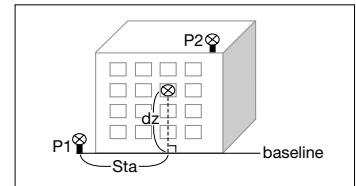
## Stakeout

Stakeout can be performed by specifying point name, code, radius from the instrument, or by manually keying in either coordinate or distance and angle information.

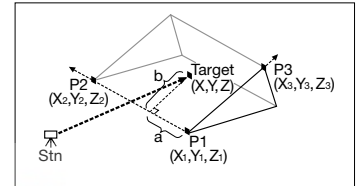


## Powerful measurement functions

- 2-point reference line
- 2-point vertical reference plane
- 3-point sloped reference plane
- Arc reference line



2-point vertical reference plane

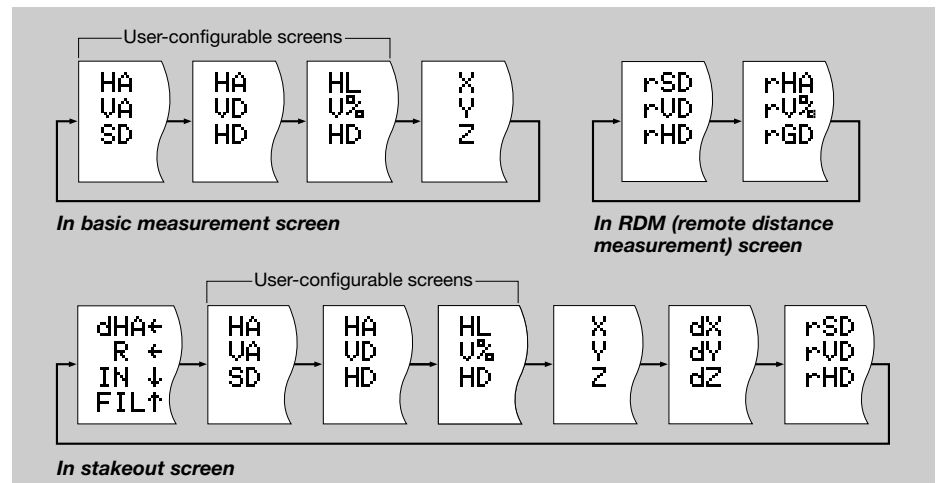


3-point sloped reference plane

These versatile applications allow direct measurement to remote lines and surfaces such as roads, fences, building walls and industrial surfaces and can be used for data collection or stakeout. The points that define lines and surfaces can be predefined or measured in the field, and the measured results can be stored as both raw data and notes showing the line and offset information.

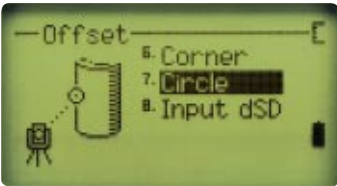
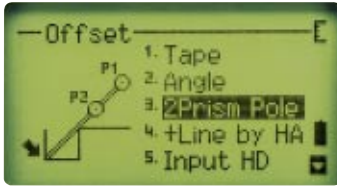
## Clear status indication

The vertical status bar clearly displays the EDM return signal level, cursor input mode and remaining battery level.



## Offset measurement

Various offset measurements are available on board as well as dynamic vertical/horizontal angle offset and taped offset.



## Downloading and uploading of data

Data can be downloaded and uploaded to a PC with readily available standard communications software. The user's personal code list can also be uploaded. Flexible formats are supported for both uploading and downloading, thus communication with third party PC software can be performed with fewer steps. Of course, Nikon's own Translt™ transfer and conversion software is also available.

## User-definable upload

Operators can define coordinate data "order of upload" to match the source data.

## Feet/inches input and display

Numeric input and display in feet and inches are available for greater user flexibility.

## Optional Translt™ Data Transfer and Conversion Software

Translt™ is a Microsoft Windows® based software application that is used with Nikon Field Stations, Total Stations and other third party PC software. Translt™ supports download/upload between PCs and Nikon Field Stations and Total Stations, view/edit of data, coordinate recalculations and complete support for all units and corrections.



DTM-501 Series Total Station

## Supported Nikon Field Stations, Total Stations and Data Recorder:

DTM-800 Series, DTM-700 Series, DTM-500 Series, DTM-400 Series, DTM-310, DTM-300 Series and Data Recorder DR-48

## Supported import file formats:

DTM-800 Series, DTM-700 Series, AP-800/700 Database, Nikon Raw, ASCII coordinate (comma/space delimited; 2D & 3D), DTM-500 Series, DTM-400 Series, DTM-310, DTM-300 Series and DR-48

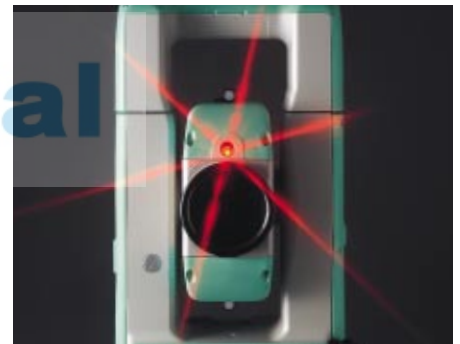
## Supported export file format:

DTM-800 Series, DTM-700 Series, AP-800/700 Database, Nikon Raw, ASCII coordinate (comma/space delimited; 2D & 3D), DXF and SDR-2x

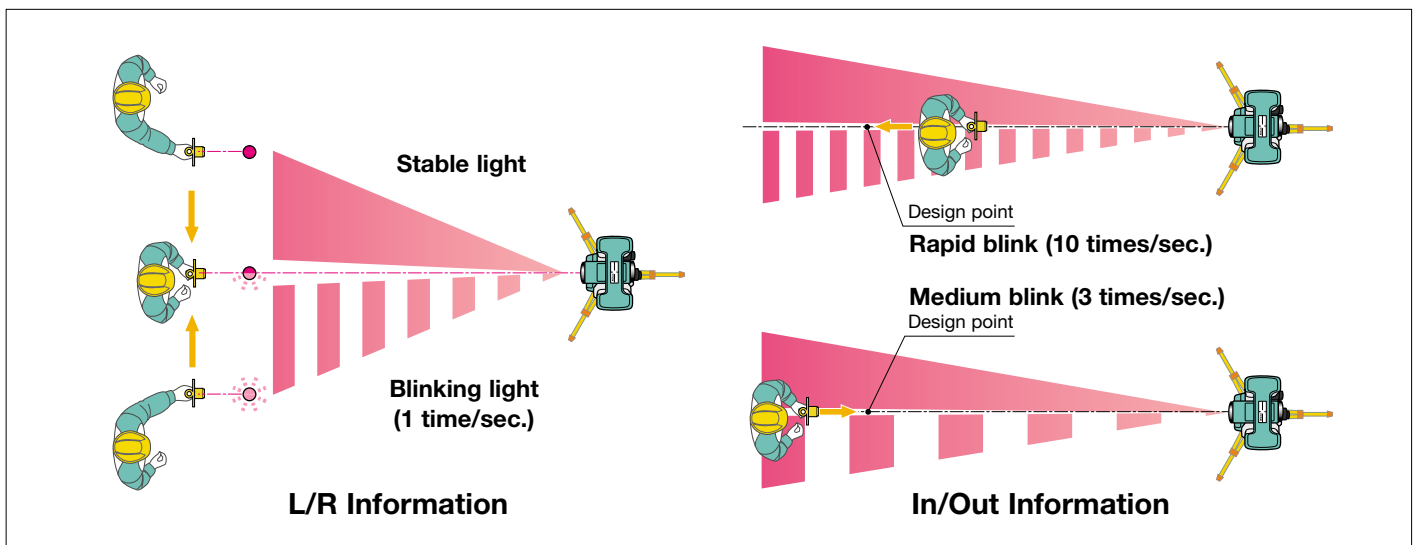
## Lumi-Guide

All DTM-502 Series models feature Nikon's unique Lumi-Guide red tracking light above the telescope objective lens. The Lumi-Guide emits two visible beams of coherent red light, one steady and one blinking, enabling the rodman to locate the correct line quickly and easily by finding the position where both are visible.

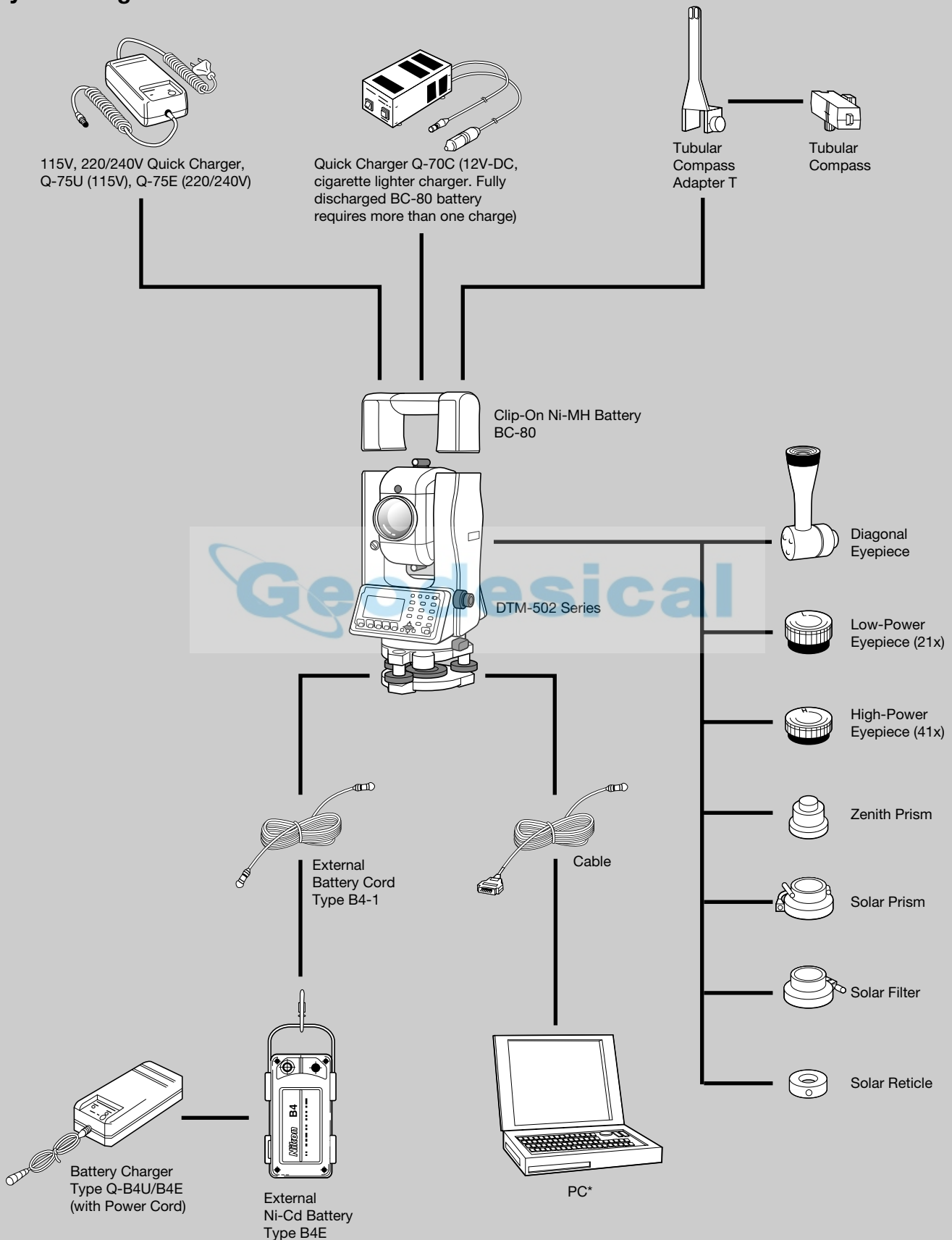
Further, during stakeout the blinking rate changes to indicate if the rodman needs to 'come' or 'go' to reach the design position. In addition to indicating the stakeout direction, the Lumi-Guide can be used as a convenient signal to the rodman, assists in one-man clearing of lines and works as a prism illuminator in night surveying.



Increase setting out efficiency with Lumi-Guide



# System diagram



\* not Nikon product

## Specifications

		DTM-552	DTM-532	DTM-522
<b>Telescope</b>	Tube length Image Effective diameter of objective Magnification Field of view Resolving power Minimum focusing distance Reticle illumination	158mm/6.22 in. Erect 45mm/1.77 in. (EDM: 50mm/1.97 in.) 33x (21x/41x with optional eyepieces) 1°20' (2.3m at 100m/2.3 ft. at 100 ft.) 2.5" 1.3m/4.26 ft. Provided (3 steps)		
<b>Distance measurement</b>	Under good conditions With reflector sheet With mini prism With single prism With triple prisms With nine prisms Under normal conditions With reflector sheet With mini prism With single prism With triple prisms With nine prisms	(no haze with visibility over 40km/25 miles) 5 to 100m/16.4 to 328.1 ft. 1,100m/3,600 ft. 2,700m/8,900 ft. 3,600m/11,800 ft. 4,400m/14,400 ft. (ordinary haze with visibility about 20km/12.5 miles) 5 to 100m/16.4 to 328.1 ft. 950m/3,100 ft. 2,400m/7,900 ft. 3,100m/10,200 ft. 3,700m/12,100 ft.		
<b>Readout display</b>		9999.9999m/29999.999 ft.		
<b>Accuracy</b>	Precise mode Normal mode	±(2 + 2ppm x D)mm ±(4 + 2ppm x D)mm		
<b>Least count</b>	Precise mode Normal mode	0.1mm/1mm, 0.0005 ft./0.002 ft. selectable 1mm/10mm, 0.002 ft./0.02 ft. selectable		
<b>Measuring intervals</b>	Precise mode Normal mode	1.0 sec. (initial 1.0 sec.) 0.5 sec. (initial 1.0 sec.)		
<b>Ambient temperature range</b>		-20°C to 50°C/-4°F to 122°F		
<b>Atmospheric correction</b>	Temperature range Barometric pressure Prism offset correction	-40°C to 60°C/-40°F to 140°F 400 to 999mhg/533 to 1332hpa/15.8 to 39.3 in.hg -999 to 999		
<b>Angle measurement</b>	Reading system Circular diameter Minimum increment (Degree) (Gon) (MIL6400) Accuracy (horizontal and vertical)	Photoelectric detection by incremental encoder (diametrical detection for H/V circles) 79mm 0.5"/1"/5" 0.1mgon/0.2mgon/1mgon 0.002mil/0.005mil/0.02mil 1"/0.3mgon (Standard deviation on DIN18723)	1"/5"/10" 0.2mgon/1mgon/2mgon* 0.005mil/0.02mil/0.05mil 2"/0.5mgon 3"/1mgon	
<b>Dual-axis compensator</b>	Method Compensation range Setting accuracy	Liquid-electric detection ±3' ±1"		
<b>Lumi-Guide</b>	Working range Positioning accuracy	100m/330 ft. Within approx. 6cm/2.4 in. at 100m/330 ft.		
<b>Level vials</b>	Sensitivity of plate level vial Sensitivity of circular level vial	20"/2mm 10"/2mm	30"/2mm	
<b>Optical plummet</b>	Image Magnification Field of view Focusing range	Erect 3x 5° 0.5m/1.6 ft. to ∞		
<b>Display</b>	Type	Graphic dot-matrix LCD (16 characters x 4 lines; 128 x 64 dot) on both sides		
<b>Point memory</b>	Raw/coordinates	10,000 records		
<b>Dimensions (W x D x H) (approx.)</b>		166 x 156 x 365mm/6.5 x 6.1 x 14.4 in.		
<b>Weight (approx.)</b>	Main unit (without battery) BC-80 clip-on battery Plastic carrying case	4.9kg/10.8 lbs. 0.6kg/1.3 lbs. 3.1kg/6.8 lbs.		
<b>Clip-on Ni-MH battery BC-80</b>	Output voltage Operating time	7.2V DC Approx. 10.5 hours (continuous distance/angle measurement) Approx. 24 hours (distance/angle measurement every 30 seconds) Approx. 30 hours (angle measurement)		
<b>Quick charger Q-75U/E (Q-75U for 115V, Q-75E for 220/240V)</b>	Recharging time Discharging time	Approx. 2.0 hours for full recharge Approx. 7.5 hours		
<b>Quick charger Q-70C (12V-DC, cigarette lighter charger)</b>	Recharging time	Approx. 2.0 hours (fully discharged BC-80 requires more than one charge)		

\*0.1mgon/0.2mgon/1mgon available as a manufacturer's option

The export of these products (DTM-502 series and battery chargers Q-75U/E) is controlled by Japanese Foreign Exchange and Foreign Trade Law and International export control regime. They shall not be exported without authorization from the appropriate governmental authorities. Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. August 2002 ©2002 NIKON GEOTECS CO., LTD.

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