

**Nikon**

# FIELD STATION DTM-801 SERIES

DTM-851/831/821

Superior Nikon features offer higher performance and productivity



# Advanced Nikon technology delivers optimum productivity.



- Faster, more accurate EDM
- Ultra-precise horizontal axis
- Longer battery life
- Industry standard PCMCIA cards
- Data security system
- 100% resume function

## Superior Distance Measurement Accuracy Assured for Both Prism and Reflector Sheet

Thanks to Nikon's new multiple-reflection-correction software, the compact and lightweight EDM offers the same measurement accuracy with either prism or reflector sheet modes. The series also features a measurement accuracy of  $\pm(2+2\text{ppm} \times D)\text{mm m.s.e.}$  in MSR mode and  $\pm(4+2\text{ppm} \times D)\text{mm m.s.e.}$  in TRK mode.

## Faster, More Accurate Distance Measurement

In addition to a resolution of 0.1mm, the DTM-801 series features a fast measurement speed of 1.2 sec. in MSR mode. The series ensures 1mm resolution and a high-speed measurement of 0.5 sec. in TRK mode.



	DTM-851	DTM-831	DTM-821
Accuracy			
MSR mode	$\pm(2+2\text{ppm} \times D)\text{mm m.s.e.}$		
TRK mode	$\pm(4+2\text{ppm} \times D)\text{mm m.s.e.}$		
Measurement intervals			
MSR mode	1.2 sec.		
TRK mode	0.5 sec.		

## Nitride-Finished Horizontal Axis

A newly designed zero-clearance ball bearing nitride-finished horizontal axis improves angle measurement accuracy and stability for surveys of the highest order.



## Longer Battery Life

The new lightweight BC-80 battery provides 5 hours continuous distance measurement on a single charge and incorporates an innovative battery lock system reducing the likelihood of mistakes when changing batteries.

The Q-75 battery charger (see p.7) fully charges a battery in 2.0 hrs. and includes a full cycle discharge function to keep the batteries in top condition.



## Reliable System Structure

The DTM-801 Series employs reliable user-tested DTM-800/700 Series technology incorporating advanced data security features specially designed for surveying.

### • Advanced data storage system

Data can be recorded as it is measured, without the time delay or communication problems often experienced when using cables. In addition, you can choose from various data cards — 128K, 256K, 512K or



1M — to meet your capacity needs. In principle, any PCMCIA-compatible card can be used with the DTM-801 to allow further expansion of capacity. (These are not, however, covered by the Nikon warranty.)

Now, data exchange with your office can be as easy as transferring a compact card. And because DTM-801 is MS-DOS® compatible, you can directly upload and download data to and from any MS-DOS® compatible notebook or hand-held computer.

**• Data security system**

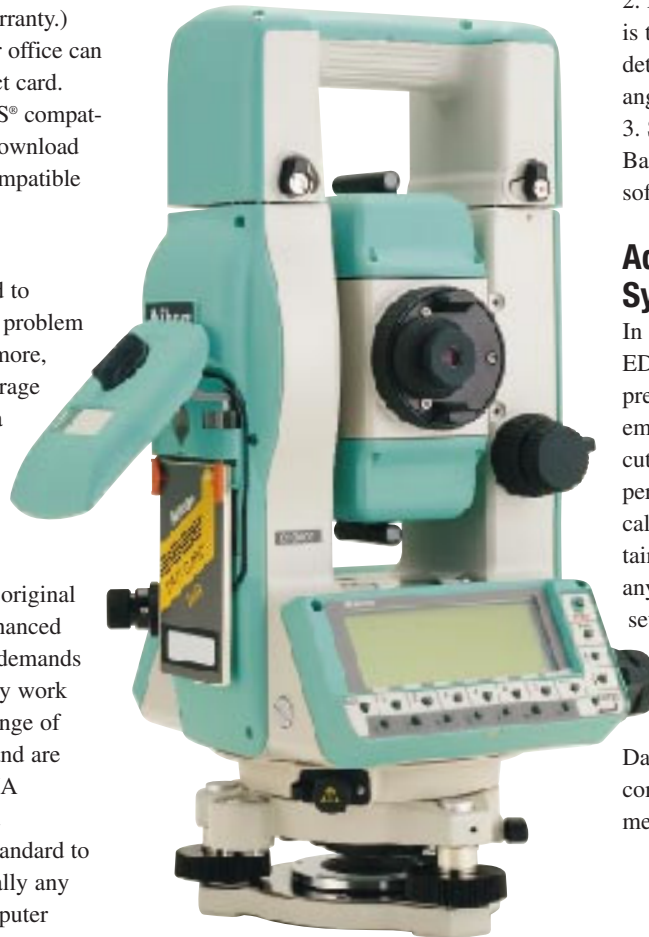
Storage of recorded data is secured to prevent data loss, even if a system problem occurs or the battery dies. Furthermore, Nikon has designed an internal storage system that backs up recorded data and protects against worst case scenarios, such as losing a data card.

**• Reliable Nikon data card**

Nikon offers performance-assured original data memory cards that feature enhanced specifications to handle the tough demands of the surveying environment. They work within an operating temperature range of -20°C to +60°C/-4°F to +140°F, and are 100% compatible with the PCMCIA (Personal Computer Memory Card International Association) world standard to enable processing of data on virtually any card reader/writer or personal computer using PCMCIA card specifications.

**100% Resume Function**

To eliminate the waiting time required for MS-DOS® start-ups, the DTM-801 Series features a 100% resume function that enables the unit to revert to the same display shown prior to turning the power off. This feature proves particularly useful when changing batteries. Instrument orientation is also backed up during resume function.



**Retrieving Horizontal Orientation When Powering On/Off**

Select among the following available methods to retrieve horizontal orientation when turning power on and off.

1. Use the same orientation in use at the time when power was last shut off with resume function by turning the power on while sighting the point at which unit power was turned off.
2. Reset (initialize) the encoder when power is turned on, by turning the unit to make it detect the zero position of the horizontal angle encoder.
3. Sight the known point again using the Backsight Check function in the application software.

**Advanced Power Management System**

In addition to the Auto Power Cutoff and EDM Power Save functions employed by previous Total Stations, the DTM-801 Series employs an auto power save function that cuts power consumption after a designated period of nonuse. Both horizontal and vertical angle sensors remain active, fully maintaining the instrument's orientation. Pressing any key returns the instrument to the same setting that was active prior to power save.

**Wide Selection of Peripherals**

Data can be read and written from any computer or hand-held unit using PCMCIA memory card specifications.



*A computer with a PCMCIA card drive eliminates the need to upload and download data.*



*An external PCMCIA card drive, such as the Card Pro or Databook TMD-650, can be attached to your desktop computer.*



# Easy operation and wide-ranging application software contribute to higher productivity.



- Large 256 x 80 pixel graphic LCD
- Feather touch keyboard
- Pre-installed software for basic surveying
- Extensive support of optional software
- Software development kit

## Large, Graphic LCD

The Field Station DTM-801 Series features a front-mounted 256 x 80 pixel graphic display and simple, easy-to-use keyboard where most system operations take place. The large,

ambient temperature drops to approximately 5°C/41°F.

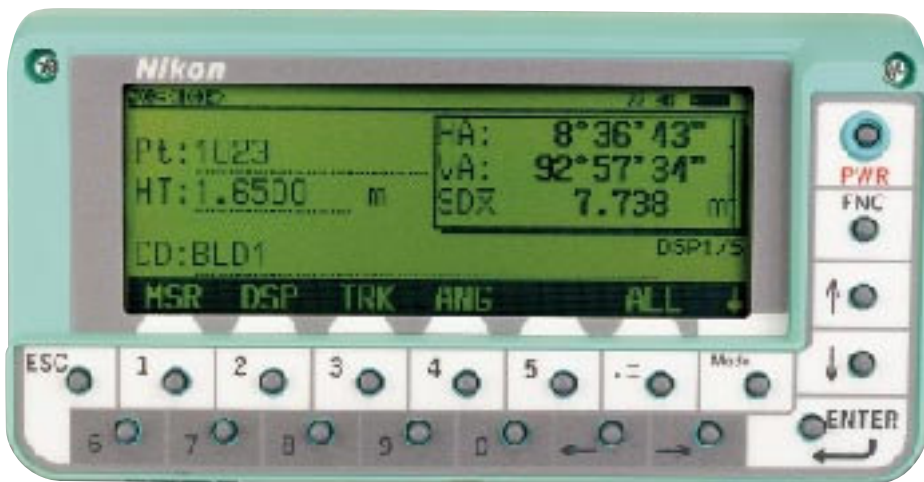
Quite simply, the LCD was designed so that all features contribute to easier, more efficient operation.

## 2MB Program Area for Future Expansion

The DTM-801 Series has an internal 2MB program memory area allowing for future expansion of application programs and installation of multiple application programs at one time.

## Pre-Installed Software

The basic emergency software of the DTM-700 has been replaced by a more functional pre-installed software on the DTM-801 Series. The pre-installed software includes functionality similar to that found on conventional total stations and is a simple-to-use option for those who don't need an application program right away. Optional application programs can be installed over the top of the pre-installed software, but it can be easily reinstalled if required again.



Data Collection Display of Pre-Installed Software

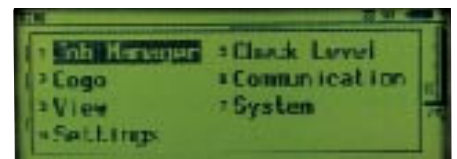
high-resolution LCD provides easy-to-grasp measurement diagrams for precise on-site visual confirmation.

The rear display has a simple 16-character x 4-line LCD with five keys.

Front display offers full backsights, with intensity adjustable to seven levels assuring clear readability in all light conditions. There's even an internal heater in the front display that automatically starts when the

## Feather Touch Keyboard

The DTM-801 is equipped with an ultralight keyboard that provides superb performance in any operating environment. The soft key system enables optimum productivity, including rapid input of alpha characters with a minimum number of keys.



Menu Screen of Pre-Installed Software

## Optional Application Programs

In addition to the pre-installed software, Nikon offers powerful application programs to fine-tune the DTM-801 for a wide range of surveying tasks. Please refer to the additional application software brochures for details.

### • Field Information System Software AP-800

Nikon's field proven all-purpose survey program card incorporates a modern database, job manager, COGO, 2 point reference line, traverse adjustment and a host of convenient measurement tools to increase measuring speed and accuracy.



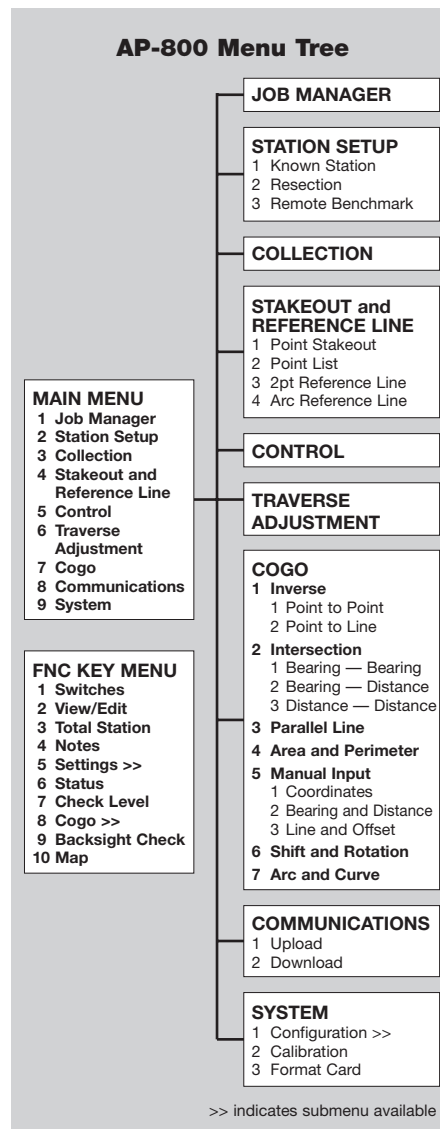
AP-800 Main Menu



Map (stakeout)



Data Collection screen showing Error Checking



### • FastMAP 700

This British-designed software is especially powerful and suitable for road layouts and other jobs involving design lines and surfaces.



### • TDS-800

Tripod Data Systems Inc.'s data recorder functionality is extensive and well accepted in many parts of the world, particularly throughout the United States, and is available on the DTM-801 Series.



## Data Upload/Download

The DTM-801 pre-installed software and optional application programs handle uploading/downloading of data very flexibly by supporting a number of industry standard formats. Data upload/download to a PC can be by the standard PCMCIA card, or an RS-232C cable. PC utility programs are available to directly access database files on PCMCIA cards.

## PC Utility Software (optional) TransIt™ Data Transfer & Conversion Software

This Microsoft Windows-based software supports upload and download between Nikon surveying instruments and PCs, as well as providing data format conversions. TransIt™ features:

- \* Data upload/download through an RS-232C cable or a data card between a PC and Nikon DTM-801/800/700/500/400/310/300 surveying instruments.
- \* Full insertion and editing capabilities including manual data input.
- \* Coordinate calculation from raw survey data.
- \* Coordinate re-calculation function for radial side when station coordinates are edited.

- \* Support for all common distance/angle units and corrections such as map projection.
- \* Direct access to AP-800 and AP-700 database files.

## NS-95 Utility Software

This MS-DOS®-based utility software is designed to work with AP-800 and runs on palmtop computers such as HP-95LX/100LX/200LX/300LX or a PC.

Functions include:

- Job manager
- Manual coordinate input
- Import ASCII coordinate file or Civilsoft file
- Export Nikon Raw, DXF, ASCII, TDS, SDR2X, Civilsoft, Softdesk, and Wild Topofile
- Create AP-800 code file and parameter files.

## AP-800 Demo Disk

This program recreates the AP-800 environment on a PC, providing help for each function and emulating both the instrument display and keyboard on the screen. It allows users to be trained without requiring a physical DTM-801 instrument, and is used as a utility for office calculations and job preparation.

## DTM-SHOW Program

Connect the instrument to a PC with an RS-232C cable and this program dynamically projects images from the unit's LCD onto a PC monitor, including key operation. This makes it very useful for training groups in the DTM-801's actual operation.

# Basic functions ensure superior performance.



- Dual-axis tilt sensor
- Diametrical detection
- New Ni-MH battery BC-80
- Lumi-Guide
- Nikon's world-renowned superior optics

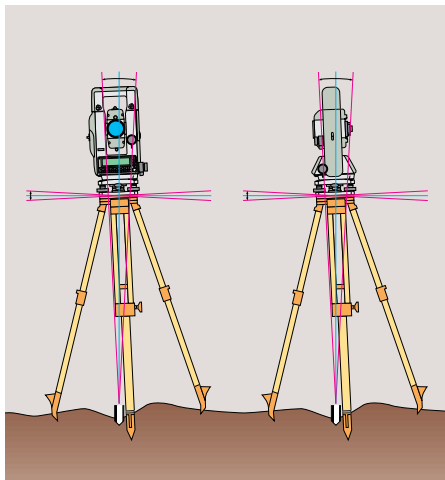
## Distance and Angle Measurements

### • Distance measurements

Nikon's EDM technology is recognized and accepted by users throughout the world. Nikon applies this experience to ensure that the DTM-801's high-frequency wavelength reduces cyclic error and delivers a high level of distance measurement performance and reliability.

### • Dual-axis tilt sensor

The DTM-801 Series uses a precision internal dual-axis tilt sensor to provide automatic compensation for both vertical and horizontal angles and ensure superior accuracy even when the instrument is out of level.



### • Higher-accuracy angle detection system

The diametrical reading photoelectric encoder eliminates eccentric deviation to ensure increased accuracy of angle measurements.

## New Ni-MH Battery BC-80

The new BC-80 battery provides over 5 hours continuous distance measurement. By using the Q-75 battery charger, the BC-80 can be fully recharged in less than 2 hours.

	Continuous angle/distance measurement	Angle measurement only
Clip-on Ni-MH Battery BC-80	5.0 hours (about 15,000 shots in MSR mode)	7.5 hours

(at 20°C/68°F)

## Discharge Function (Q-75 Charger)

Nickel metal, hydrogen and nickel-cadmium storage cells exhibit a memory effect when used repeatedly under shallow discharge conditions.

Although this may cause an apparent reduction in capacity, the battery cell can be kept in top condition by using the discharge function which is available on the Q-75 charger.

## Auto Power Cut/Auto Power Save Function

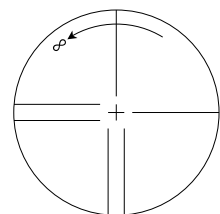
To save battery life, the DTM-801 Series Field Station features an auto power cut function that turns the instrument off

automatically after a certain time. In addition, the main unit and EDM unit have a power save function that lets the instrument and/or EDM unit remain in standby mode.

## Superior Nikon Optics

Nikon's decades of innovation and experience in optics goes into the telescope and optical prism, assuring the outstanding performance you expect from Nikon.

It is in low-visibility environments, such as at dusk or in dim places indoors, that the difference between Nikon instruments and those of other makers becomes obvious. Even when Nikon instruments are used over long periods of time (from morning to evening), you'll find that observation is generally more efficient, and eye fatigue is greatly reduced. Compare Nikon's telescopes with those of other instruments under the same conditions and you will surely see — and appreciate — the differences immediately.

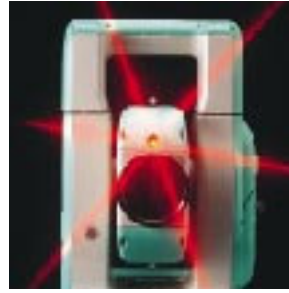


Telescope reticle supplied for easier, more accurate aiming

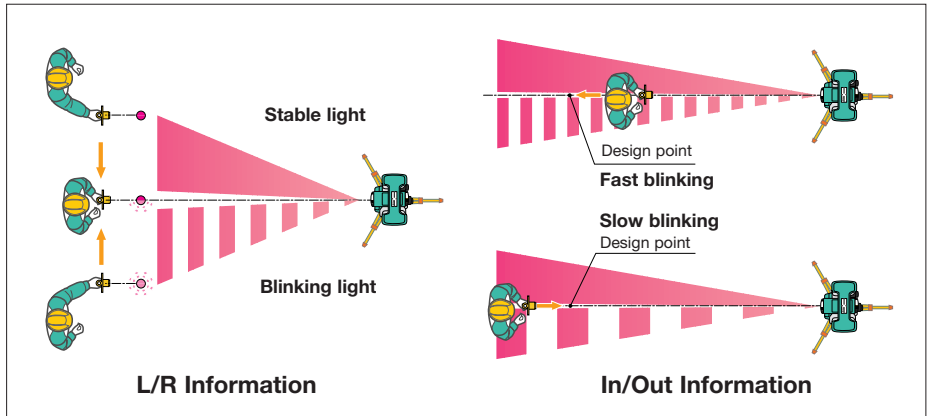
## Lumi-Guide Tracking Light

All DTM-801 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.

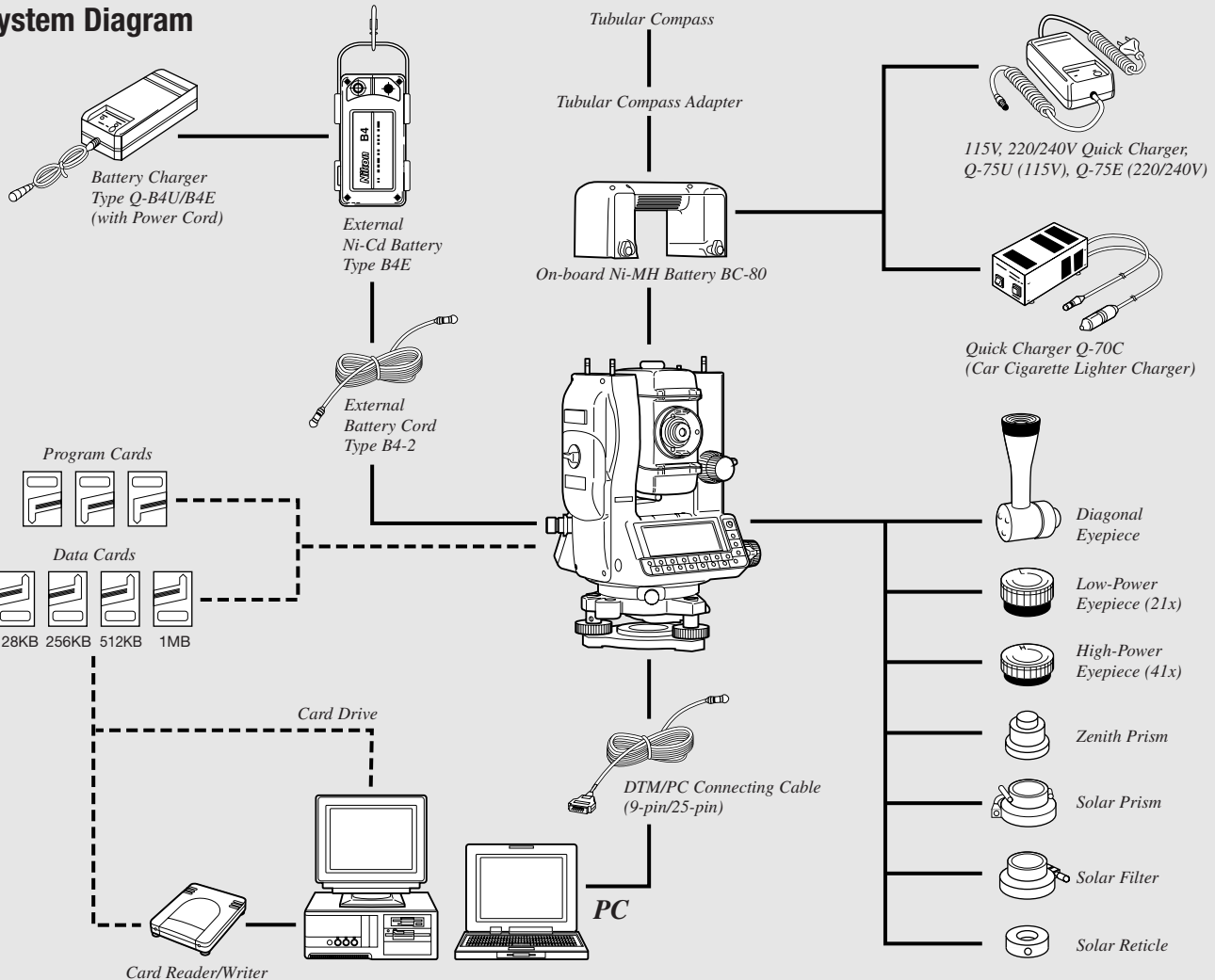
In addition, during stakeout the blinking cycle changes to indicate if the rodman needs to 'come' or 'go' to reach the design position. In addition to indicating the stakeout direction, the Lumi-Guide can be used as a convenient signal to the rodman, assists in one-man clearing of lines and works as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



Increase setting out efficiency with Lumi-Guide



## System Diagram





# Specifications

		DTM-851	DTM-831	DTM-821	
<b>Telescope</b>	Tube length	158mm/6.22 in.			
	Magnification	33x (21x, 41x with optional eyepiece)			
<b>Angle measurement</b>	Effective diameter of objective	45mm/1.77 in. (50mm/1.97in. for EDM)			
	Image	Erect			
	Field of view	1°20' (2.3m at 100m/2.3 ft. at 100 ft.)			
	Resolving power	2.5"			
	Minimum focusing distance	1.3m/4.26 ft.			
	Reticle illumination	Provided (3 steps)			
	Reading system	Photoelectric incremental encoder (Diametrical detection for H/V circles)			
	Circle diameter (reading)	88mm/3.46 in. (79mm/3.11 in.)			
<b>Dual-axis tilt sensor</b>	Minimum display increment	0.5°/1"	1°/5"		
	(360°)	0.1mgon/0.2mgon	0.2mgon/1mgon*		
	(400G)	0.002mil/0.005mil	0.005mil/0.02mil		
	(MIL6000/MIL6400)	1°/0.3mgon	2°/0.6mgon	3°/1mgon	
<b>EDM</b>	Method	Liquid-electric detection			
	Compensation range	±3'			
<b>Distance range with Nikon prisms</b>	Setting accuracy	±1"			
	Under good conditions	With reflector sheet	(no haze with visibility over 40km/25 miles)		
		With mini prism	5 ~ 100m/16.4 ~ 328.1 ft.		
		With single prism	1,100m/3,600 ft.	2,500m/8,200 ft.	2,000m/6,600 ft.
	Under normal conditions	With triple prisms	2,700m/8,900 ft.	3,300m/10,800 ft.	2,800m/9,200 ft.
		With nine prisms	3,600m/11,800 ft.	4,200m/13,800 ft.	3,500m/11,500 ft.
		With triple prisms	4,400m/14,400 ft.		
	Under normal conditions	With reflector sheet	(ordinary haze with visibility about 20km/12.5 miles)		
		With mini prism	5 ~ 100m/16.4 ~ 328.1 ft.		
		With single prism	950m/3,100 ft.	2,200m/7,200 ft.	1,600m/5,300 ft.
	With triple prisms	With triple prisms	3,100m/10,200 ft.	2,900m/9,500 ft.	2,300m/7,600 ft.
		With nine prisms	3,700m/12,100 ft.	3,600m/11,800 ft.	3,000m/9,800 ft.
	Readout display	9999.9999m/29999.999 ft.			
	Accuracy	MSR mode	±(2+2ppm x D)mm m.s.e.		
		TRK mode	±(4+2ppm x D)mm m.s.e.		
Least count	MSR mode	0.1mm/1mm, 0.005 ft./0.002 ft. selectable			
Measurement intervals	TRK mode	1mm/10mm, 0.002 ft./0.02 ft. selectable			
	MSR mode	1.2 sec. (initial 2.5 sec.)			
Atmospheric correction	TRK mode	0.5 sec. (initial 1.5 sec.)			
	Temperature range	-40°C ~ +55°C/-40°F ~ +131°F			
Prism offset correction	Barometric pressure	400 ~ 999mmHg/533 ~ 1,332hPa/15.8 ~ 39.3 in.Hg			
		-999 ~ +999mm			
<b>Lumi-Guide</b>	Light source	LED			
	Visible range	Over 100m/330 ft.			
	Positioning accuracy	Approx. 6cm/2.4 in. at 100m/330 ft.			
	Beam spread	Approx. 1.5° (2.6m/8.5 ft. at 100m/330 ft. point)			
<b>Clamps/tangent screws</b>	Coaxial dual speed tangents				
<b>Tribrach</b>	Detachable				
<b>Level vial sensitivity</b>	Plate level vial	20"/2mm	30"/2mm		
	Circular level vial	10"/2mm			
<b>Front display/key</b>	Type	Graphic (256 x 80 pixel) LCD with 7-level adjustable backlight illumination and 20 keys			
	Heater	Automatic sensor control			
<b>Rear display/key</b>	Type	16-character x 4-line dot matrix LCD with backlight illumination and 5 keys			
<b>Communications port</b>	Type	RS-232C			
	Baud rate	19,200 max.			
<b>Clip-on Ni-MH battery BC-80</b>	Output voltage	7.2V DC, rechargeable			
	Continuous operation time	7.5 hours (angle measurement only)			
		5.0 hours/approx. 15,000 measurements (continuous distance/angle measurements)			
	Recharge time	2.0 hours with Charger Q-75U/Q-75E			
<b>Internal computer</b>	Discharge time	17.0 hours with Q-75U/Q-75E			
	Operating system	MS-DOS® compatible			
	Internal auxiliary memory	128KB			
External card drives	1				
<b>Environmental performance</b>	Operating temperature range	-20°C ~ +50°C/-4°F ~ +122°F			
<b>Dimensions</b>	W x D x H	166 x 168 x 365mm/6.5 x 6.6 x 14.4 in.			
<b>Weight (approx.)</b>	Main unit	5.6kg/12.3 lbs. (with battery BC-80)			
	Battery (BC-80)	0.6kg/1.3 lbs.			
	Battery charger	0.6kg/1.3 lbs.			
	Carrying case	4.0kg/8.8 lbs.			

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

The export of these products (DTM-801 Series and battery chargers Q-75U/E, Q-70C, Q-B4U/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. Microsoft® and Windows® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Products and brand names are trademarks or registered trademarks of their respective companies. Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. February 2000  
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