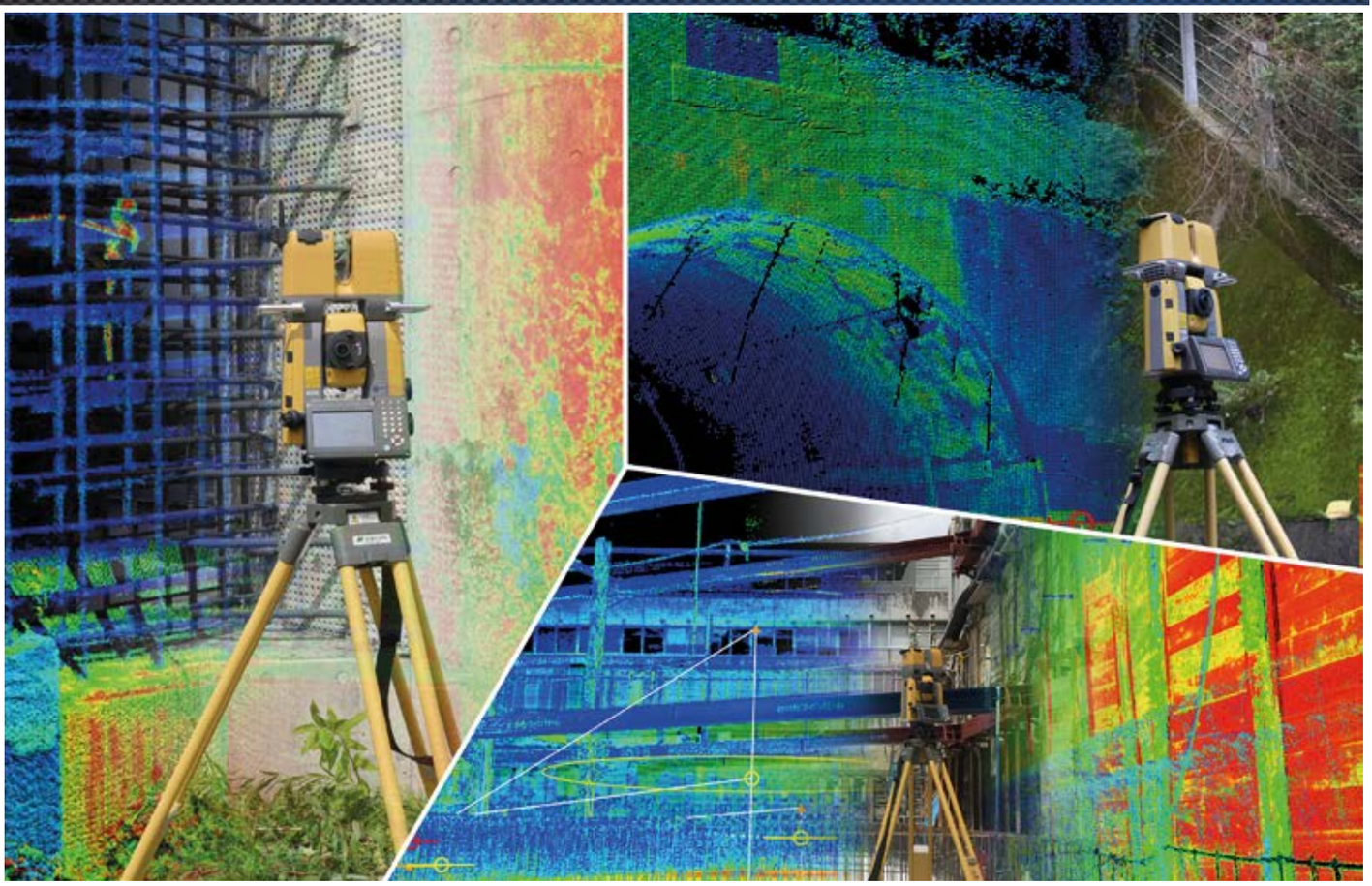
GTL-1000

3D Mass Data
Software Solution
MAGNET Collage Compliant!

TOPCON

GTL-1000

Laser Scanner Total Station



Remote Support System

TSshield

Protect your total station!

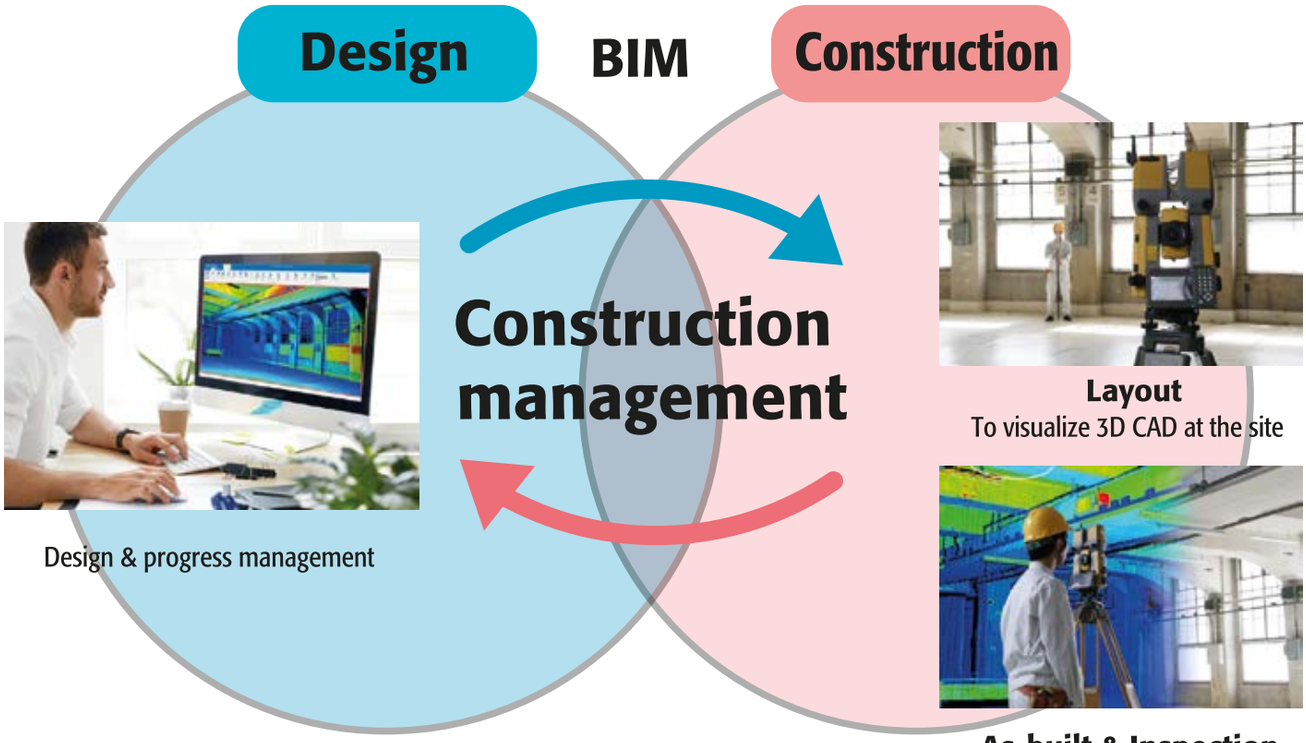
WORLD FIRST !*
Laser Scanner on Robotic Total Station

- GTL-1000 performs accurate 3D scanning PLUS As-Built & Layout
- One single unit operation saves work time drastically
- Semi automatic hardware point cloud registration
- Best solution for BIM construction verification as well as Civil, Survey, and Maintenance application
- Onboard MAGNET Field software
- One man Survey and remote control by a field controller

*As a rotating type laser scanner built on Auto Tracking Robotic TS as of Sep 2019

Revolutionizing Digital Construction Workflows

BIM (Building Information Modeling) has been getting more popular in construction industry, which enables the fast understanding of the site, or the time and cost management of the project. BIM has been driven by the design model as the front loading but 3D data has to come back and forth between the office (Virtual) and the site (Real) for updating 3D model. However, the lack of this update sometimes becomes the bottle neck in the construction. Laser Scanner Total Station GTL-1000 can collect 3D data at the site quickly to solve this bottle neck issue.



Design & progress management

Layout
To visualize 3D CAD at the site

As-built & Inspection
Comparison between As-built and design

One single unit operation saves work time drastically!!

Drastic reduction of the investment cost, the working hours and the number of workers!

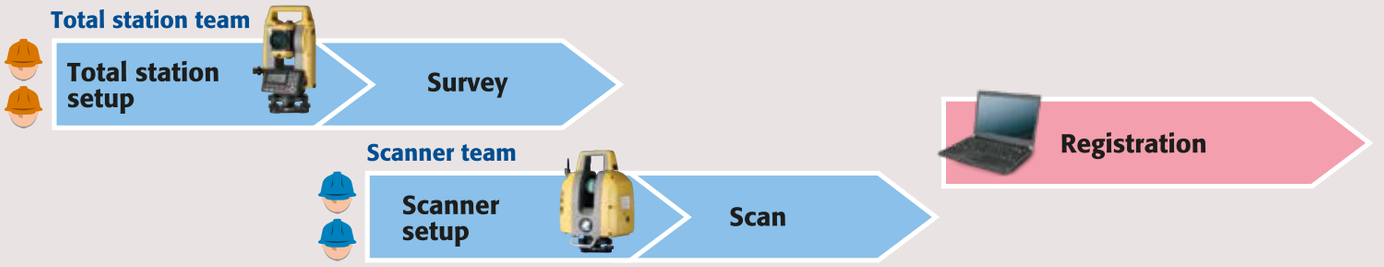
Robotic total station and full dome laser scanner got integrated into GTL-1000 ! In addition to the investment cost, GTL-1000 improves the workflows. It gives you more benefits.

Efficient workflow

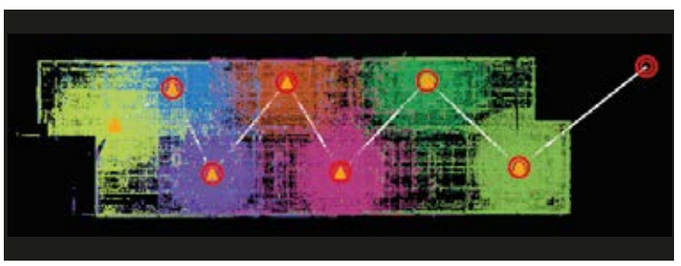
In a conventional way, it was required to use total station and laser scanner separately at the same site. Once we tried to work with total station and laser scanner simultaneously, we required more workers. If we tried to work with them and the same man power, we needed more time to complete the work.

New workflow with GTL-1000. It can perform both total station point measurement and scanning. So your team can be as small as possible and it enables you to do the field work in a fastest way. Point clouds registration time can be minimized because the point clouds are referred to the coordinate points where GTL-1000 measured.

Conventional workflow



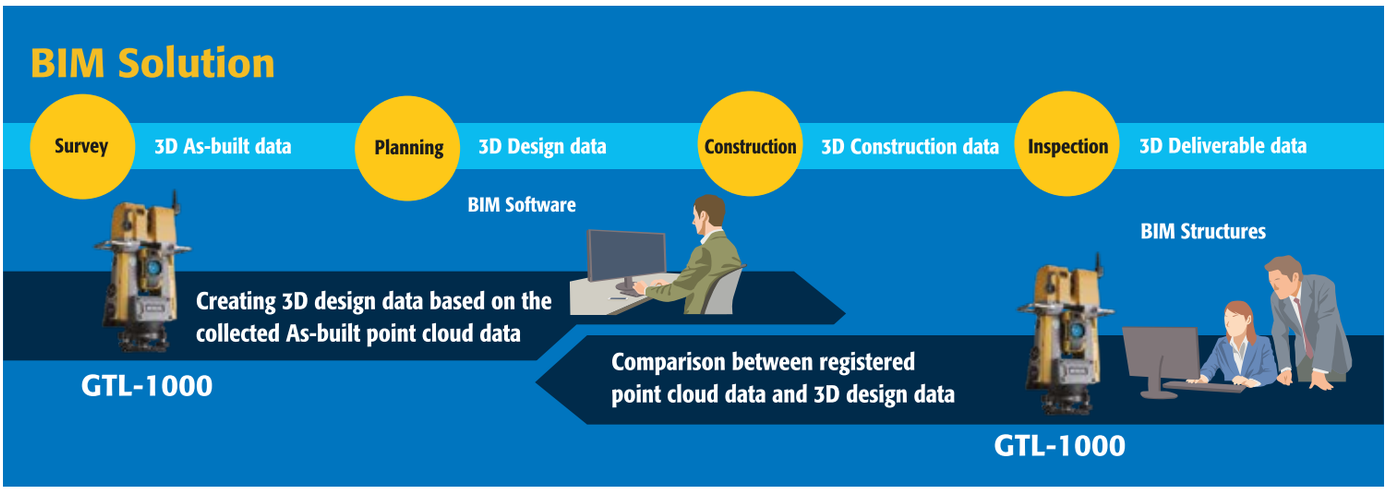
GTL-1000 workflow



Generation of scanned point cloud data based on the local coordinate system

While we are doing traverse survey with GTL-1000, we can use the same GTL-1000 for scanning. So we can register the point clouds data accurately even for the multiple rooms and floors building, or the objects with no particular features. GTL-1000 gives the solution for the accurate point cloud registration for you to work faster, more accurately and safely.

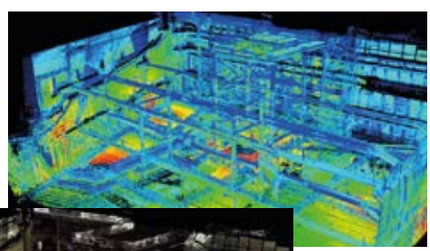
Applications for GTL-1000

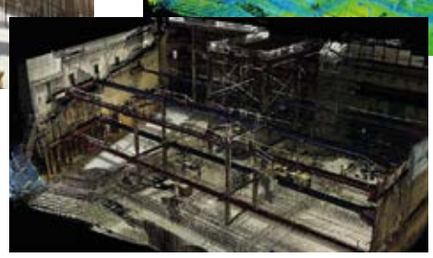


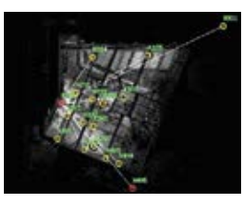
BIM application

BIM (Building Information Modeling)

The divers BIM applications or GTL-1000 include scanning terrains, As-built checking for refurbishment of outdoor and indoor area. You can leverage 3D point clouds data for the design data creation. Once you complete the scanning at the site, you can utilize it for the maintenance and renovation afterwards.





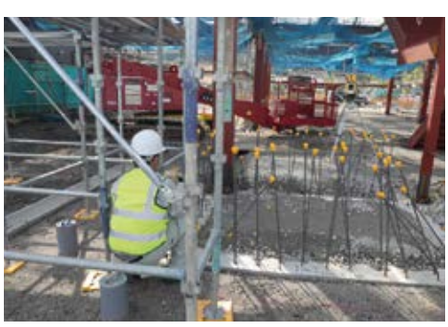


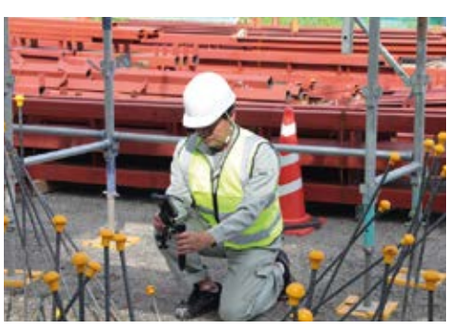
As-built checking for the facility structure

It is required for a pre-check and verification once you work on facility replacement, renovations. It is beneficial for the facility measurement if you are able to scan in a short time with accurate point cloud data. You can create 3D drawing based on point clouds, simulate the pipe installation, clash detection and so on.

Layout

Using designed 3D model, CAD drawing data, you can mark on the centre line on the pillar, finishing surfaces of floors, walls, reference lines for the construction etc.

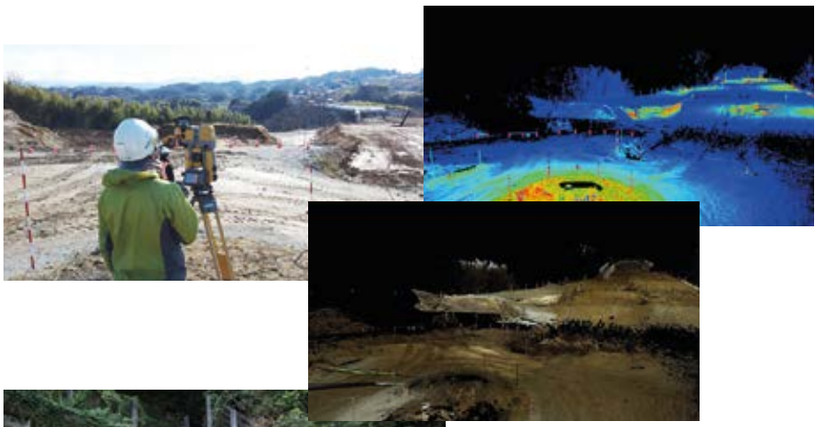




Civil application

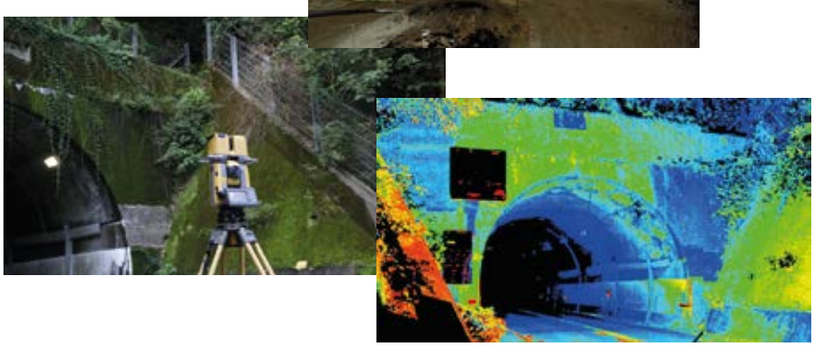
i-Construction

i-Construction which is to promote the productivity improvements of the construction sites in Japan by Japanese Ministry of Land, Infrastructure and Transport. (MLIT) Laser scanner, UAV technologies have been leveraged for terrain survey, progress and deliverable management. You can remarkably save the construction time of earthworks, paving, slope shaping, structure installation works and inspection documents submission.



Cross section scan for Tunnels

Scan tunnel cross sections and collect 3D surface and shape information. Therefore, it is painless to make a 3D drawing even the complicated tunnel shapes like curves, intersections. You can extract cross sections wherever you want. And it is effortless to understand the differences between the design data and the scanned past shapes.



Survey application

Works for Survey/Registered land & building investigator

Enabled by MAGNET Field and office software, GTL-1000 efficiently performs land survey application. You can leverage GTL-1000 for public survey works like control points establishments. Regarding terrain survey, not only the general survey works but also you can scan terrains to capture 3D point clouds.

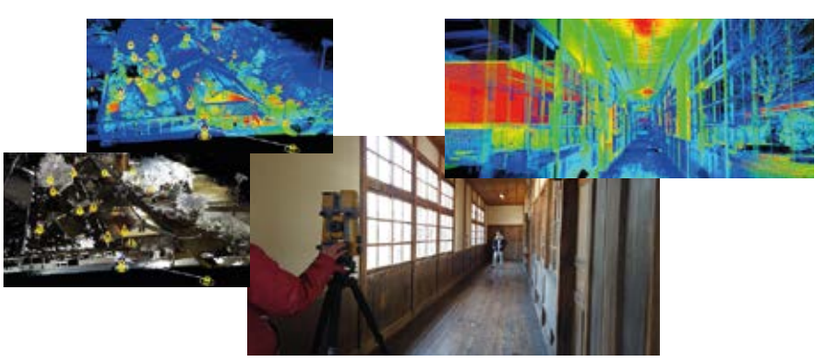
Maintenance application

Maintenance for infrastructure

Based on 3D point clouds which you scan the entire structure information, you can know the specific areas where you need to repair as a maintenance point of view, measurements of dimensions and shapes, calculating the costs which related to the repair etc. Plus, we do periodical measurement for aging deterioration check.

Historical structures/ archaeological heritages

There is no design drawing for the most of historical, archaeological heritages structures. Once you use laser scanner which is allowing you not to touch/step on the structures, you are able to scan and collect detail point clouds without any damages on the structures. Your point clouds is colourised based on the real colour of the structures so that you can reproduce the feel of the structures. The collected point cloud data leverage the drawing for the maintenance as well as archives.



Main features

Rotation type, High speed, high accurate scan

GTL-1000 can complete the full dome scan in about 1 minute. You can collect 3D point cloud data quickly. Surface accuracy is 5mm at 10 meter so that it fits the architectural construction.

Auto-tracking

Layout with auto-tracking expands your workflow. One man operation with auto-tracking navigates you to the design point. Even for many design points, your job can be done quickly.

Auto-collimating

You don't need to focus the lens or collimating the target center manually. Auto-collimating provides consistent accuracy and speed regardless of operator's skill levels and condition.

Data storage on SD card

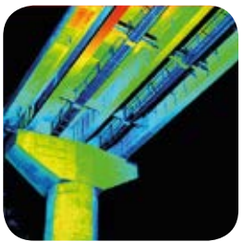
Data storage is done on SD card. The points measured by total station and 3D point cloud data captured by scanner are both stored on SD card as the package file.

Various types of measuring targets

For high precise measurement, it can use the prism as well as reflective target. Reflectorless mode is also available.
360 degree prism is useful for the control points to be measured from any scanning positions.

Laser pointer

It can emit the precise laser point by tapping the button. The rod man can move to the point with laser pointer.



Full dome scan

GTL-1000 has the rotating laser scanner to perform the full dome scanning quickly. Both inside and outside the buildings, GTL-1000 can work to collect 3D point cloud data to generate the shape of the object.

One man survey

As robotic total station, one man survey can be done to measure each point.
Besides that, those area which cannot be scanned such as inside the bush, can be measured with total station.

Remote control scanning

Using the data collector, you can control GTL-1000 remotely. Now GTL-1000 can be setup at any dangerous area such as the slope, over the cliff, and can be operated remotely from safe places.

Set Collection

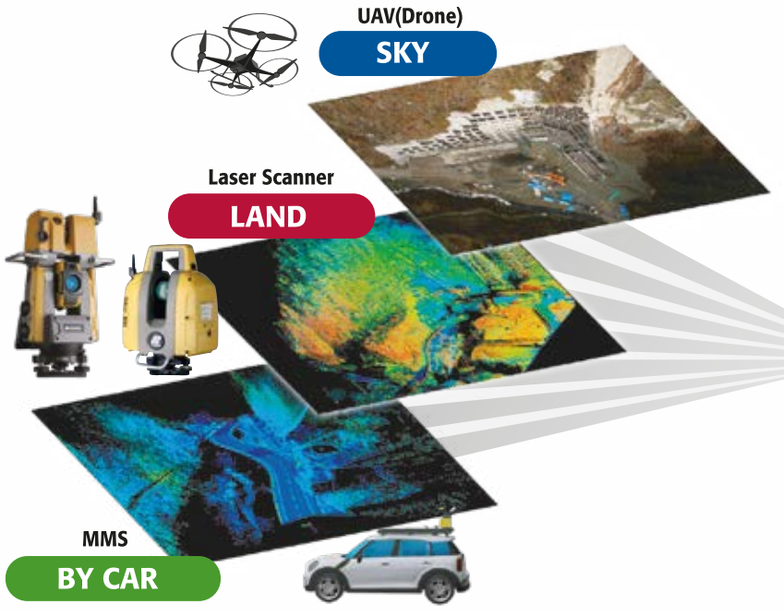
GTL-1000 can be purely used for Surveying. Set collection can be done automatically.

MAGNET™ Field

MAGNET Field is a powerful and intuitive field application software that enables you to collect survey mapping data and perform construction and road layout using total stations, levels, GNSS receivers and GTL-1000.

MAGNET Collage connects 3D solution to seamless site.

MAGNET Collage is 3D Mass Data Software Solution to support processing, editing, exporting, and integrating point cloud data.
3D model can be created in short time.



MAGNET Collage can generate and integrate 3D mass data from multiple sensors in one single platform!

MAGNET™ Collage
3D Mass Data Software Solution

Supporting various registration methods

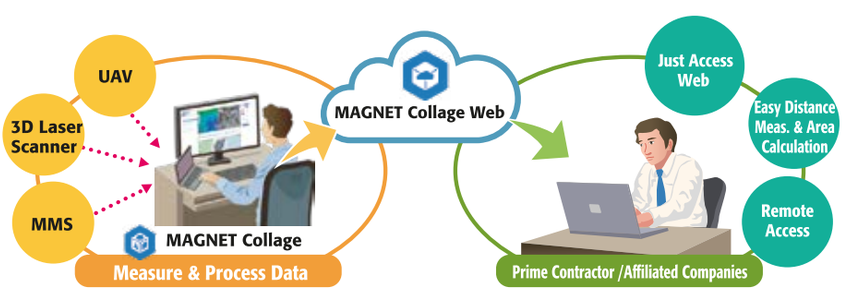
GTL-1000 can execute field work similar to that of total stations by supporting various registration methods.

	Resection	Reference Line	Traverse	Tie Point	Shape Matching	Manual Registration	Station Set
Target Setting	"Necessary (More than 2 points)"	"Necessary (More than 2 points)"	Necessary (1 point)	Necessary (many)	Unnecessary	Unnecessary	Combined Registration
Localization	Possible	Possible	Possible	Possible	Not Possible	Not Possible	
Working Time	Quick	Quick	Quick	Long	Quick	Quick	
Registration Accuracy	High	High	High	Standard	Low	Low	

MAGNET™ Collage Web

3D Mass Data Viewer (Optional)

MAGNET Collage Web is the web application to view point cloud mass data via the web browser. It can show slice view, measure a distance and calculate an area so you can check more detail information.



Protect your total station.

Remote Support System
TSshield

	GTL-1000
List of registered total stations	Basic Features
Google Map view of registered total stations	Basic Features
Online firmware updates	Basic Features
Remote locking and chasing	Basic Features
Total station health checks	Premium Features
Remote access support	Premium Features
Geofence	Premium Features
Timefence	Premium Features
Maintenance schedule and dashboard	Premium Features
Performance analysis and reporting	Premium Features
Message delivery to the total station	Premium Features

TSshield provides remote support capabilities and other features that keep total stations running optimally. TSshield also limits where or when the instrument can be used.

SPECIFICATIONS

Type	Laser Scanner Total Station
Model	GTL-1003
Auto Pointing /Auto Tracking / Motor	
Auto Pointing	●
Auto Tracking	●
Motor Type	Direct drive by ultrasonic motor
Rotation speed/Auto Tracking speed	180 degree/sec / 20 degree/sec
Auto Pointing/Auto Tracking distance measuring range[*1]	360 degree Prism ATP1/ATP1S: 2 to 600m[*2] Prism-5: 1.3 to 500m Prism-2: 1.3 to 1,000m Reflective sheet RS10/30/50: 5 to 50m[*3] RS90N-K: 10 to 50m[*3]
Telescope	
Magnification / Resolving power / Length / Aperture / Image / Field of view / Minimum focus	30x / 2.5" / 142mm / 38mm (EDM: 38mm) / Erect / 1 degree 30' (26m / 1,000m) / 1.3m
Angle measurement	
Minimum display	1" / 5"
Accuracy	3"
Range of compensation	+/- 6'
Distance measurement	
Laser classification[*4]	Reflectorless mode: Class 3R Prism and reflective sheet: Class 1
Measuring range	Reflectorless[*6]: 0.3 to 800m (to 1,000m)[*7] Reflective sheet[*8] : RS90N-K : 1.3 to 500m, RS50N-K : 1.3 to 300m, RS10N-K : 1.3 to 100m Prism-5[*9] : 1.3 to 500m Prism-2[*9] : 1.3 to 5,000m (to 6,000m[*7]) 360 degree Prism ATP1A/ATP1S: 1.3 to 1,000m
Minimum display	Fine measurement: 0.0001m/0.001m Rapid measurement: 0.0001m/0.001m Tracking/Road measurement: 0.001m/0.01m
Accuracy[*5] (Fine measurement)	"Reflectorless[*6] : (2+2ppm X D)mm [*10] Reflective sheet[*8]: (2+2ppm X D)mm Prism: (1+2ppm X D)mm"
Measuring time[*7*11]	Fine measurement[*5]: Less than 1.5 sec + every 0.9 sec or less Rapid measurement[*8]: Less than 1.3 sec + every 0.6 sec or less Tracking/Road measurement[*9]: Less than 1.3 sec + every 0.4 sec or less
OS / Control panel / Memory / Communication	
Operation system	Windows Embedded Compact 7
Control panel	Display: 4.3 inch Transmissive TFT VWGA color LCD, touch panel, key backlight Keyboard: 24 keys with key backlight
Trigger key	Yes (right side)
Memory	Internal: 1GB (includes modmory for program files) External: USB flash drive (up to 32GB)
Data transfer	RS-232C compatible, USB2.0 (Type A / miniB)
Wireless communication	Cellular 3G/2G, mini-SIM(2FF) (25 x 15 x 0.75mm) Bluetooth Class 1, Usable range: to 100m [*12*13] W-LAN 802.11 n/b/g

General	
Guide Light[*14]	Visible distance range: 1.3 to 150m, Resolving power at center area (width): 4'
Laser-pointer function[*14]	ON/OFF (selectable)
Sensitivity of levels	Electric circular levels (graphic):6' (inner circle) Circular level (on base plate): 10' / 2mm Circular level (for main unit) (optional accessory) 8' / 2mm
Plummet	Optical plummet - Image:Erect, Magnification: 3X, Minimum focus:0.5m Laser plummet (optional) - Class 2 laser, beam diameter: less than 1mm in 1.3 m height, brightness adjustment function
Tribrach	Detachable
Dust and water resistance / Operating temperature	IP54 (IEC 60529:2001)/ - 10 C to 50 C
Dimension	212 (W) x 178 (D) x 424 (H)mm
Instrument height	192.5mm from tribrach mounting surface
Weight	7.2 kg (with BDC70)
Power Supply	
Power source BDC70 Working duration BDC70	Rechargeable lithium-ion battery Approx. 2 hours [*15]
Scan Unit	
Scanning data rate	Maximum of 100,000 points per second
Laser classification[*4]	Class1
Wave length	870 nm
Resolving power	
Point increment	Fine 11mm (at 10m), Standard 22mm (at 10m)
Maximum point number	V 4,320 points/line (270 degree), H 5,760 poins/line (360 degree)
Field of view	V: 270 degree / H: 360 degree (maximum)
Range of measuremnet[*16*18]	0.6 to 70m
Distance accuracy[*17*18]	σ 4mm@10m, σ 6mm@20m, σ 8mm@30m
Surface accuracy[*18]	σ 3mm@10m, σ 5mm@20m, σ 7mm@30m
Coordinate accuracy[*18]	σ 5mm@10m, σ 7mm@20m, σ 10mm@30m
Camera	
Field of view	V: 270 degree / H: 360 degree (maximum)
Number of effective pixels	5M pixels
Interface	
Card slot	SD card (Class 10 or more, up to 32GB (FAT32)

*1:No haze, visibility over 20 km, slightly overcast (less than 30000 lx), no scintillation. *2:When using a reflective sheet for Auto Pointing, the size of sheet (10 to 90 mm) must be selected to correspond to the distance being measured. Use smaller reflective sheets for shorter distances. *3:Figures when the Auto Pointing beam strikes within 15° of the reflective sheet target. *4:IEC60825-1 Ed. 3.0: 2014/FDA CDRH 21CFR Part1040.10 and 1040.11 (Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No.50, dated June 24, 2007.) *5 : Slight haze, visibility about 20 km, sunny periods, weak scintillation. *6 : Figures when using Kodak Gray Card White side (reflection factor 90%), brightness level is less than 5,000 lx and the laser beam strikes orthogonally the White side. *7 : Figures when using Kodak Gray Card White side (reflection factor 90%), brightness level is less than 500 lx and the laser beam strikes orthogonally the White side. *8 : Figures when the laser beam strikes within 30° of the reflective sheet target. *9 : Face the prism toward the instrument during the measurement with the distance at 10 m or less. *10 : Accuracy is (5 + 2 ppm X D) mm for distance range 0.3 to 0.66 m. *11 : No haze, visibility about 40 km, overcast, no scintillation. *12:No obstacles, few vehicles or sources of radio emissions/interference in the near vicinity of the instrument, no rain. *13:Usage range could be shorter depending on specifications of Bluetooth device to communicate. *14:Guide Light and Laser-pointer dose not work at the same time. *15: Figures will change depending on the operating environment including temperatures and observation conditions. *16:Face the object toward the instrument. *17:Overall EDM accuracy considering surface accuracy and linearity. *18:Surface of reflection factor 90%

Standard Package Components

- Main unit
- Battery (BDC70)
- Charger(CDC68A)
- Power cable(EDC113)
- Stylus pen
- Lens cap
- Lens hood
- Tool pouch
- Screw driver
- Lens brush
- Adjusting pin
- Hexagonal wrench
- Silicon cloth
- Quick guide
- Startup guide(This sheet)
- SD card
- USB flash drive (Manual)
- Serial card
- Laser caution sign-board
- Carrying case
- Carrying strap
- Export restrictions card

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