

TALOS III Motor Laser System

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HIGHLIGHTS

- Highly accurate provision of the planned break-out profile
- Fast installation and simple operation
- No laser setting out lists required
- Instant profile control on site
- Remote operation (WLAN display) optional



Setting out of drill holes by WLAN-Display

Field of Application

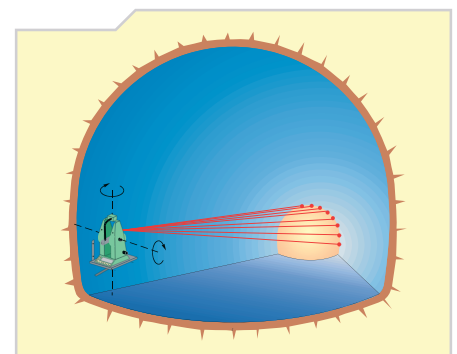
As an alternative to the use of tunnel lasers for direction control, a servo motor driven total station, equipped with a diode laser ocular, can also be used for heading control. In this way, the heading control for NATM or other cyclical tunnelling methods can be significantly more efficient and more accurate.

Not only can this system be used for accurately positioning supporting girders, but other setting out tasks such as starting points of drill holes, pipe umbrellas etc can also be performed.

System Description

Using the motor laser system, an arbitrary number of pre-defined points are shown in sequence by a laser beam at freely selectable time intervals. The parameters required for this purpose (actual chainage of the heading face or girder, point sequence to run through) are entered into a tunnel-approved control PC in a simple operation or are automatically measured.

The setting out process follows after an automatic orientation control procedure and can be carried out point by point or continuously. The EUPALINOS program system provides all the project and axis data as well as the coordinates of the instrument position and target positions required for the procedure. By using this system, laser setting out lists can be discarded and the time for setting up the



Principle of showing the laserpoints in sequence

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supporting girders or setting out the starting point for drilling can be shortened. With motor laser systems, the planned break-out profile can be created with high accuracy. The system can be operated remotely via radio control (WLAN display).

Performance Characteristics

Arbitrary number of freely definable profiles to adjust the over-profile

An arbitrary number of combinations of profile reference points can be defined for marking of the final profile. In this way it is possible particularly to adapt the required excavation profile (over-profile) or the change between different setting out methods (e.g. borehole starting points, girder points, etc.) at any time.

Spatial setting out for setting up drilling equipment etc.

By providing the required coordinates, 3D setting out can be performed by means of diode lasers.

Adjusting girders by using profile checks for rapidly setting up supporting girders.

A measurement option, determining the actual radial placement of a supporting girder by using special reflecting templates, is available for fast set-up of the supporting girders. The templates are attached to pre-defined positions on the girder at the start of setting up and enable the girder to be set up accurately without additional tools such as spirit levels and measuring tapes. Measurement data and coordinates recorded in the course of setting out are saved, thereby documenting the entire setting out process.

Automatic setting out of profile intersections

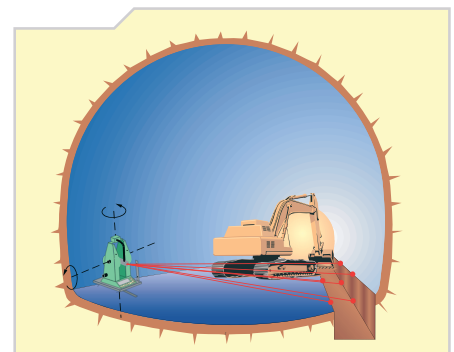
Intersections of different profiles, such as in the region of cross-cuts, can be set out fully automatically using iterative procedures.

Automatic recognition of the theodolite system

TALOS III recognises the connected instrument type and, provided a type TCA total station is present, supports all the functions required for automatic target recognition (ATR) and distance measurement (automatic orientation control, station identification of the heading face and profile control).

Automatic location of the heading face chainage before starting with setting out.

When a type TCA/TCRA total station is present, the representative position of the heading face or supporting girder can be determined by locating one or more points before starting to set out. This prevents setting out errors caused by erroneous chainage data.



Principle showing the setting-out of the abutment



Totalstation as part of a motor laser system on the side wall

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Automatic checking and correction of the pitch orientation.

Analogous to determination of the heading face position, the orientation of the instrument is again determined by measuring two or more reference targets before starting with setting out, - provided a total station with ATR is present. The orientation constant determined in this way is thereafter included in the setting out calculations, which avoids setting out errors arising from movements of the instrument console.

Determining the laser position by free stationing

If the laser position is uncertain, the actual coordinates of the laser console can be determined anew by free stationing in the course of every setting out process. Up to 10 reference points are available to calculate the corresponding coordinates or heights. Analogous to the orientation check, a total station with ATR is required for this option.

Full documentation of the setting out process in LOG file

All relevant data regarding the orientation check and setting out (user, date, time, location, heading face chainage, profile reference points, etc.) are saved in a LOG file, whereby the entire setting out process is documented.

Performing profile checks on site

The profile check measurement uses the automatic target recognition function of the total station with standard reflectors (profile disk). Profile checks can be carried out at any time after selecting arbitrary profile reference points. The required points are identified by projection of a diode laser beam. The measurement data are sorted according to profile and saved and are available for later analysis.

On-site graphical display of all measured profiles

The profiles are displayed graphically including the display of over- or under-profile for each point. All the saved profile measurements are available for display at any time. Any standard cross sections can be selected as reference lines. Plot outputs can be produced via the EUPALINOS program system.

The system can optionally also be used as a monitoring system (analogous to GeoRobot) e.g. for monitoring the heading face or measuring cross-sections near the heading face during idle periods.



Simple operation by use of mobile display

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Measuring process

The measuring process begins by checking the vertical axis inclination and by an automatic orientation check, i.e. the self-acting targeting of several reference targets and the subsequently required manual confirmation of a control target, which may be implemented as an aperture disk. The setting out process follows and can be carried out point by point or continuously. The EUPALINOS program system provides the entire project and axis data as well as the coordinates of the instrument and target positions required for the procedure. The measuring unit is placed and oriented on a console about 50 m away from the heading face for safety, the coordinates of which must first be captured.



System components

- Motorised Leica Totalstation with Diode Laser (range up to 200 m)
- Industry PC IP66
- Mobile Display (WLAN)
- Power supply: 220 V alternating current
- USB-Stick
- Surveying software EUPALINOS



TALOS III Hardware components

The following other data sheets are associated with this data sheet:

Services: *Heading Survey*
Software: *EUPALINOS Surveying Software*