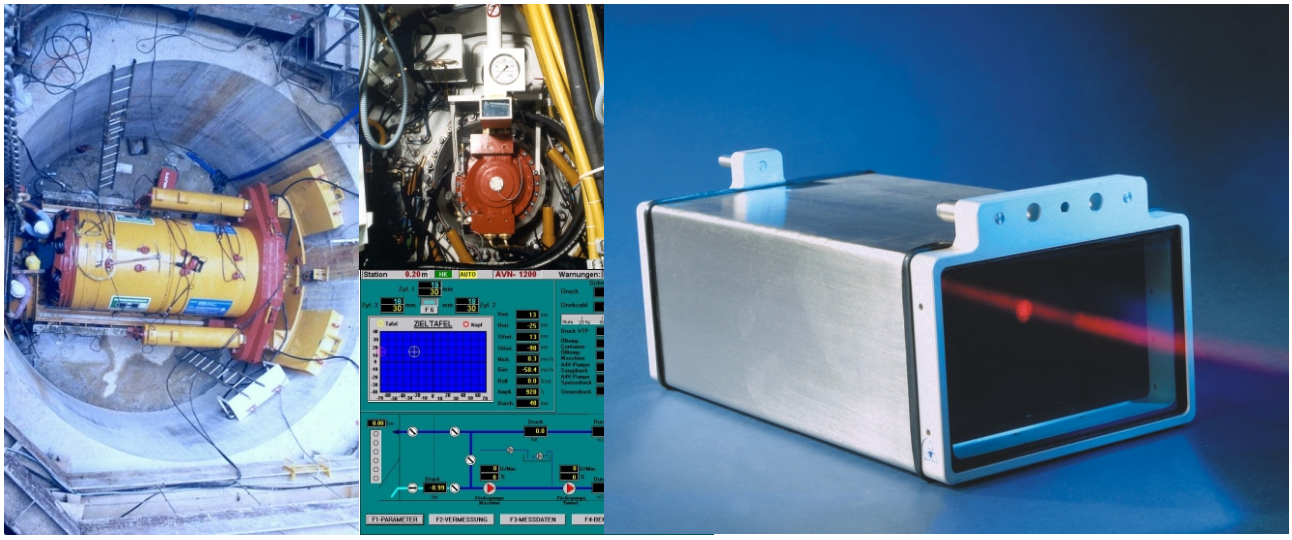
GeneSys
Elektronik GmbH

ELS: Electronic Laser System - with CAN Interface



Electronic Laser Target for Tunnelling Machines

The ELS laser target is used for guiding tunnelling machines. By means of this laser target the vertical and horizontal position of the machine in relation to the guiding laser beam can be determined over long distances. In addition, the heading, pitch and roll angles of the tunnelling machine can be measured precisely. This gives the machine operator full control of the machine at all times. The system is now available with CAN interface.

Special Features

- △ Thorough development of the extensively tested laser target
- △ Precise heading angle measurement
- △ High precision inclination measurement; stable across the entire temperature range
- △ Selectable TTY or CAN-Bus serial interface
- △ Robust, watertight IP68 metal housing with quick-change mount
- △ Improved laser light sensitivity for long distances
- △ Usable with all current tunnel lasers
- △ Roll alarm-switching contact to prevent excess rolling

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Description

The ELS laser target captures the position of a red laser beam on its detector surface with reference to the centre point. All current continuous wave lasers from 1 to 5 mW can be used. The measuring principle has been widely used for many years for the control of tunnelling machines and has been extensively developed.

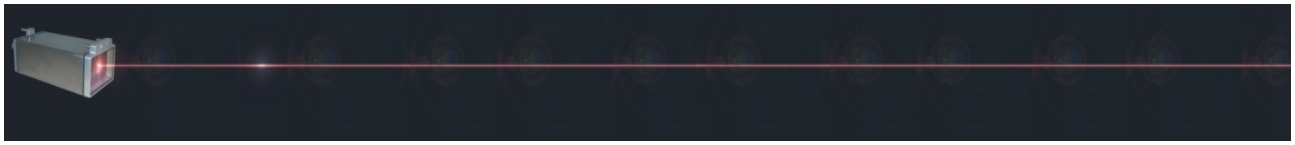
Depending on the laser quality the laser target detects the deviation in the horizontal and vertical position, even over long distances (>100m). Interference from external light sources is almost totally suppressed.

In addition to position data the ELS provides inclination and heading angles. In this way the machine operator has full control of the machine in order to keep the tunnelling machine on the planned trajectory.

The inclination of the machine is measured with high-precision and long-term stable inclinometers; temperature dependence and non-linearity of the inclinometer are computer compensated. In this way angle accuracy better than 0.05 ° is achieved across the full measurement and temperature range.

The measurement results are transmitted every 500 ms via a serial interface (TTY). For direct data communications with local area network control units (SPCs) a CAN Bus connection is also available.

The device is exceedingly vibration and shock resistant and operates reliably over a wide temperature range. The robust, watertight metal housing is very compact and can be easily installed. It is therefore ideally suited for use in harsh environmental conditions.



Technical data

△ Position measurement:	150 x 85 mm measuring area, 1 mm accuracy, 0.1 mm resolution
△ Pitch angle:	± 10 ° measuring range, 1 mm/m accuracy over the full temperature range
△ Roll angle:	1 mm/m accuracy in the measuring range ± 10 °; 5 ° Accuracy in measuring range ± 180 °
△ Heading angle:	± 6 ° measuring range, 1 mm/m accuracy
△ Laser wavelength:	600 nm to 700 nm
△ Laser sensitivity:	Suitable for continuous wave lasers from 1 to 5 mW, beam diameter from 5 to 50 mm
△ Laser range:	Several hundred metres, depending on laser beam quality
△ Housing:	Robust metal housing with quick-change mount
△ External dimensions without mount:	Height 110 mm; width 165 mm; length 330 mm
△ Protection type:	IP68 according to DIN 40050, 5 m immersion depth
△ Weight: 9.0 kg	
△ Operational temperature range:	-10 to +60 °C
△ Voltage supply:	24 V DC ± 6 V, 20 W
△ Communication interfaces:	TTY (20 mA-current loop) and CAN Bus
△ Data output rate TTY:	2 Hz
△ Baudrate CAN:	20kBit/s
△ Roll alarm:	Switching contact activated at approx. 8 ° roll, normally closed contact max 50 W/250 V DC/5 A

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