



2018/19

Surveying instruments
and accessories



Contents

GPS SYSTEM

| | |
|----------------------------------|----|
| GNSS System FGS 1 | 6 |
| Field Controller DC 6 | 8 |
| Tablet Mesa ² Juniper | 9 |
| FGS 1 Sets | 10 |
| GNSS-System FGS 100 | 12 |
| FGS 100 Sets | 14 |
| CORS FRS 300 Pro | 16 |
| GNSS-Antennas GAT 300 | 18 |
| GNSS-Antennas GAT 500 | 18 |

TOTAL STATIONS

| | |
|------------------------------|----|
| Total Stations FTS 101 | 20 |
| Total Stations FTS 102 | 20 |
| Total Stations FTS 202 | 22 |
| TheoDist [®] FTD 05 | 24 |

THEODOLITE

| | |
|------------------------------------|----|
| Electronic Theodolite FET 402K-L | 26 |
| Electronic Theodolite FET 405K | 26 |
| Electronic Theodolite FET 420K | 26 |
| Electronic Theodolite FET 220 | 27 |
| Opto-mechanical Theodolite FET 500 | 27 |

ENGINEERS' AUTOMATIC LEVEL LASER ZENITH PLUMMET

| | |
|---|----|
| Engineers' Automatic Level GFE 32, 360° | 28 |
| Engineers' Automatic Level GFE 32-L, 360° | 28 |
| Laser Zenith Plummet FPL 100 | 29 |

ACCESSORIES

| | |
|------------------------------------|----|
| Tripod | 31 |
| Telescopic Leveling Staff | 31 |
| EDM Accessories | 32 |
| EDM Accessories | 33 |
| Two-way Radio | 34 |
| Metal Detector | 35 |
| Precision Measuring Wheels & Tapes | 36 |
| Measuring Wheel | 37 |
| Marking Spray | 38 |
| Surveying Accessories | 39 |



AT OUR CORE:

PRECISION AND INNOVATION.

Decades of experience – an important factor in the quality of our instruments. You can depend on geo-FENNEL surveying instruments to provide precise, reliable results under all working conditions. Whether electronic or optical – our construction and engineering instruments are characterised by their intuitive ease of use, innovation and high accuracy.

Dear Customers,

Each day at geo-FENNEL we seek to become even better for you. It is not for nothing that our surveying instruments enjoy an excellent reputation worldwide. Many years of experience, direct interaction with our customers and our innovations have all resulted in us producing premium-quality surveying products: automatic levels, laser plummets, theodolites, total stations and GPS systems.

At geo-FENNEL you get the surveying instruments you deserve – namely only the best.

This special catalogue is devoted to surveying. The needs of our customers spurn us on each day, and all the time we focus on trust, honesty and fairness. In short, we're your partner! Providing a good service is the driving force behind our daily work. Although we have grown from a small family business into an internationally-active company, we continue to act flexibly to meet the needs of our customers.

It is not for nothing that geo-FENNEL products are considered to be particularly innovative, robust and reliable. And thanks to our wide range of products, we have the right instruments for all needs. In the future, tradesmen will be able to continue to rely on the precision and proven quality of geo-FENNEL. No matter what the challenge waiting for you, with geo-FENNEL products you are optimally equipped for every task. Our broad product portfolio is as diverse as the areas in which they are used. With us you will always find the right measuring instrument – or rather, the optimum solution for any difficult task.

geo-FENNEL products are the instruments of choice when measurements need to be as precise as possible – and not only in building construction and civil engineering.

And now have fun discovering our products!





Would you like to know more about geo-FENNEL?

It all started with rod levels and measuring wheels. Because it was with these two products that Richard Führer decided to go it alone and found the company Führer & Co. in Germany. In 1964, as a sales representative travelling around in his VW Beetle, he laid the foundation for what has been a unique success story in the surveying industry and today's geo-FENNEL GmbH.

We now have over 40 employees working in sales, quality control and production, and the company is based in Baunatal, North Hesse. Since 2001, geo-FENNEL GmbH has been owned by Bernd Vogel, who started out as an employee of Richard Führer in 1986. In 2009, he appointed Martin Haslbauer to the management board. We enjoy an excellent reputation in the industry, and today supply more than 90 countries with high-quality laser measuring and surveying technology. Road construction, building construction and civil engineering companies around the world appreciate our quality, flexibility, service and precision. New markets and, above all, new products are constantly being added. We are particularly proud of our German innovativeness, which, in cooperation with our partners in the Asian region, constantly leads to new, high-quality surveying instruments. As a result of a high export ratio geo-FENNEL products are in use worldwide.

Our relatively small size and the down-to-earth approach with which we conduct our business guarantee our success. What counts for us is to have an honest and cooperative relationship with our customers. Another important part of our company philosophy is the high level of employee responsibility and our associated view of the future of the market. Remaining autonomous, driving innovation and maintaining our independence are all values of crucial importance to us. And our customers appreciate that. It is not only our excellent products that win them over, but above all our unique after-sales service and, should the need arise, our reliable repair service – in fact, everything geo-FENNEL stands for.

FGS 1 geo-FENNEL GNSS-System



» The geo-FENNEL GNSS Receiver FGS 1 is produced especially for working in challenging terrain.

» It covers all available GNSS-Sources, such as GPS, GLONASS, GALILEO and BEIDOU or can be limited to specific sources by the user. The integrated anti-jamming capability makes it possible to work under difficult conditions.

The receiver is standardly equipped with Bluetooth, an integrated radio modem (Rx, Tx) and a 4G modem.

The system can be connected with other receivers easily and is supported by application software like Carlson SurvCE or MicroSurvey FieldGenius.

The intelligent design makes the FGS 1 a compact and lightweight device.



- 1 Small and compact
- 2 Clear keypad
- 3 Hot-swap battery design

| TECHNICAL DATA | FGS 1 | TECHNICAL DATA | FGS 1 | FEATURES |
|---|--|-----------------------------------|----------------------------------|--|
| ART. NO. | 751000 | | | |
| Signal tracking | | geo-FENNEL Binary update to 20 Hz | | <ul style="list-style-type: none"> · High-speed processing · Support for both post-processing and kinematic · Processing ability separate or to be combined with GPS, GLONASS, GALILEO and BEIDOU · Support for downloads & use of precise ephemeris · Generation of various reports · User friendly |
| 256 channels with simultaneously tracked satellite signals | | | | |
| GPS | L1, L2, L2C, L5 | Physical | | |
| GLONASS | L1/L2 | Size (W x H) | 15.8 x 7.5 cm | |
| BEIDOU | E1, E5a, E5b | Weight | 0.95 kg (including battery) | |
| GALILEO | Yes, but not activated | Environmental | | |
| SBAS | WAAS, EGNOS, MSAS, GAGAN | Operating temperature | -40 °C – +65 °C (40 °F – 149 °F) | |
| Performance specifications | | Storage temperature | -40 °C – +85 °C (40 °F – 185 °F) | |
| Cold start | < 50 s | Humidity resistance | 100 % condensation | |
| Warm start | < 30 s | Dust and water protection | IP67 (withstands 1 m submersion) | |
| Initialisation time typically | < 10 s | Shock and vibration proofing | Yes (survives a 2 m pole drop) | |
| Initialisation reliability typically | > 99.9 % | Electrical | | |
| Signal reacquisition | < 1.5 s | Input voltage | 5 – 27 VDC | |
| Positioning specifications | | Power consumption | 3.1 W (3 constellations) | |
| Post processing static | | Power supply | Li-Ion 2 x 2,000 mAh | |
| Horizontal | 2.5 mm + 0.5 ppm RMS | Operating time | 9 hours | |
| Vertical | 5.0 mm + 0.5 ppm RMS | Memory | 8 GB (up to 32 GB) | |
| Real time kinematic | | | | |
| Horizontal | 8 mm + 1 ppm RMS | | | |
| Vertical | 15 mm + 1 ppm RMS | | | |
| E-RTK (< 100 km) | | | | |
| Horizontal | 0.20 m + 1 ppm RMS | | | |
| Vertical | 0.40 m + 1 ppm RMS | | | |
| Code differential GNSS positioning | | | | |
| Horizontal | 0.25 m + 1 ppm RMS | | | |
| Vertical | 0.50 m + 1 ppm RMS | | | |
| SBAS typically | < 1 m 3D RMS | | | |
| Stand-alone | < 1.5 m RMS | | | |
| Communication | | | | |
| 1 serial port (7-pin LEMO), baud rates up to 921,600 bps | | | | |
| Radio modem (optional) | Tx/Rx with full frequency range from 410 to 4702 MHz | | | |
| Transmit power | 0.5 – 2 W adjustable | | | |
| Integrated GSM | 4G modem | | | |
| Positioning update rate | 1 Hz, 2 Hz, 5 Hz, 10 Hz, 20 Hz | | | |
| 5 LED indicating lights | Power, satellite tracking, differential data and data recording | | | |
| Bluetooth®; V 4.0 protocol, work compatible with Windows 7®, Windows mobile® and Android® | | | | |
| Data format | | | | |
| Data inputs/outputs | | | | |
| Correction data I/O | RTCM 2.x, 3.x, CMR & CMR+ (GPS only) | | | |
| Position data outputs | | | | |
| ASCII | NMEA-0183 GSV, RMC, HDT, VHD, GGA, GSA, ZDA, VTG, GST, PJK, PTNL, AVR, GGK | | | |



Juniper Mesa²

A Powerful Tablet



» **Mesa² – combines the advantages of a tablet PC and a robust data collector.**

» In a slim case with the highest protection against water and dust IP68, the Mesa² tablet is the ideal companion even in the toughest environments. With the Windows 10 interface, it brings a powerful functionality for mobile data collection.

With its 7" large and extra-clear display for images, maps and application programmes and its powerful battery of up to 20 hours, the Mesa² is up to all requirements in the field.

| TECHNICAL DATA | JUNIPER MESA ² | TECHNICAL DATA | JUNIPER MESA ² |
|--------------------------|---|-------------------------------------|--|
| ART. NO. | 750080 | | |
| Operating System | Microsoft® Windows 10 Pro | Wireless connectivity | Bluetooth® wireless technology 4.0, extra-long range |
| Processor | Quad-core Intel® Atom™ Z3745 | | Wi-Fi 802.11 a/b/g/n 2.4 GHz and 5 GHz |
| Memory | 4 GB RAM (LPDDR3) | | Micro-SIMSlot 4G LTE, GSM, Verizon |
| Primary data storage | 64 or 128 GB flash storage | | |
| Micro SD/SDXC card slot | SD/SDXC slot, user accessible | | |
| | | Environmental ratings and standards | IP68 rating (1.4 meters for 2 hours), waterproof and dustproof |
| Physical features | | | |
| Dimensions, standard | 137 mm x 215 mm x 35 mm | | |
| Weight | 0,68 - 0,9 kg | | |
| Display | | | |
| Active viewing area | 7" (178 mm) | SUPPLIED WITH | |
| Resolution | WXGA 800 x 1280 pixel resolution | | |
| Touchscreen | Capacitive multi-touch interface for use with gloves or fine-tip stylus, and in wet conditions | | |
| | Chemically strengthened Dragontrail™ high ion exchange (HIE™) cover glass for impact and scratch resistance | | |
| Keyboard | Programmable keys | | |
| | Backlit keys | | |
| Batteries | Rechargeable li-ion battery pack, 3.65 VDC 10,600 mAh, 38.7 Whr | | |
| | Run time of up to 20 hours | | |
| | User-replaceable | | |
| Connector ports | USB 3.0 host (full-size A connector) | | |
| | | | |
| | | | |
| | | | |

SUPPLIED WITH

- Removable li-ion battery
- AC wall charger with international plug kit
- Input: 100–240 VAC, 50/60 Hz, 0.5 A
- Output: 12 VDC, 1.67 A
- Capacitive fine-tip stylus with tether

FGS 1 Set



SUPPLIED WITH GNSS-SYSTEM FGS 1 COMPLETE SET

| | |
|--------------------|-----------------|
| incl. SurvCE: | ART. NO. 751060 |
| incl. FieldGenius: | ART. NO. 751050 |

- 2 x GNSS antenna FGS 1
- 1 x MicroSurvey Fieldgenius-Software or Carlson SurvCE-Software
- 1 x field controller DC 6
- 2 x USB cable for FGS 1
- 2 x RS-232 cable for FGS 1
- 1 x measuring tape 3 m
- 1 x tribrach AJ 10 black
- 1 x tribrach adaptor AL 11-D black with optical plummet
- 1 x container
- 1 x user manual



SUPPLIED WITH GNSS-SYSTEM FGS 1 COMPLETE SET

| | |
|--------------------|-----------------|
| incl. SurvCE: | ART. NO. 751095 |
| incl. FieldGenius: | ART. NO. 751090 |

- 2 x GNSS antenna FGS 1
- 1 x MicroSurvey Fieldgenius-Software or Carlson SurvCE-Software
- 1 x field controller Mesa²
- 2 x USB cable for FGS 1
- 2 x RS-232 cable for FGS 1
- 1 x measuring tape 3 m
- 1 x tribrach AJ 10 black
- 1 x tribrach adaptor AL 11-D black with optical plummet
- 1 x container
- 1 x user manual

FGS 1 Set



SUPPLIED WITH GNSS-SYSTEM FGS 1 NETWORK SET

| | |
|--------------------|-----------------|
| incl. SurvCE: | ART. NO. 750160 |
| incl. FieldGenius: | ART. NO. 750100 |

- 1 x GNSS antenna FGS 1
- 1 x MicroSurvey Fieldgenius-Software or Carlson SurvCE-Software
- 1 x field controller DC 6
- 1 x USB cable for FGS 1
- 1 x RS-232 cable for FGS 1
- 1 x measuring tape 3 m
- 1 x container
- 1 x user manual



SUPPLIED WITH GNSS-SYSTEM FGS 1 NETWORK SET

| | |
|--------------------|-----------------|
| incl. SurvCE: | ART. NO. 750195 |
| incl. FieldGenius: | ART. NO. 750090 |

- 1 x GNSS antenna FGS 1
- 1 x MicroSurvey Fieldgenius-Software or Carlson SurvCE-Software
- 1 x field controller Mesa²
- 1 x USB cable for FGS 1
- 1 x RS-232 cable for FGS 1
- 1 x measuring tape 3 m
- 1 x container
- 1 x user manual



FGS 100

geo-FENNEL GNSS-System



» The new geo-FENNEL GNS receiver FGS 100 is, due to its unique-in-its-class compact design, a reliable partner in the field, given its suitability for working under rough conditions and in difficult terrain.

» It is equipped with an internal TILT-sensor and compensates slopes of the antenna pole up to 30°. This function makes the survey job much easier than before.

Equipped with a powerful UHF modem (Rx & Tx), Wi-Fi and a 4G modem, it offers a variety of connectivity options.

The receiver with its 572 channels supports all available GNSS sources, such as GPS, GLO-NASS, GALILEO and BEIDOU without the need for further activation.

The system is open to third-party software and supports the Carlson SurvCE and MicroSurvey® FieldGenius software solutions.



| TECHNICAL DATA | | FGS 100 | TECHNICAL DATA | | FGS 100 | FEATURES |
|---|---|-----------------------------------|--------------------|--|---------|---|
| ART. NO. | | 760010 | | | | |
| Signal Tracking | | | Data Format | | | <ul style="list-style-type: none"> Working distance of internal UHF varies in different environments; the maximum distance is 5 km in ideal situations Works with all kinds of CORS-systems worldwide Integrated TILT-sensor with an accuracy up to 3 cm Small and handy design Supports MicroSurvey Field-Genius and Carlson SurvCE |
| Channels, which are simultaneously tracked | 572 | Correction data I/O | | RTCM 2.X, 3.X, CMR, CMR+ (GPS only) | | |
| GPS | L1, L2, L2C, L5 | Position data output | | NMEA-0183 GSV, RMC, HDT, VHD, GGA, GSA, ZDA, VTG, GST; PTNL, PJK; PTNL, AVR; PTNL, GGK | | |
| GLONASS | L1, L2 | ASCII | | | | |
| GALILEO | E1, E5a, E5b | geo-FENNEL Binary update to 20 Hz | | | | |
| BEIDOU | B1, B2, B3 | Physical | | | | |
| QZSS | Yes (reserved) | Size | | Ø 15.8 cm × 7.5 cm | | |
| SBAS | WAAS, EGNOS, MSAS, GAGAN | Weight | | 0.95 kg with two batteries | | |
| Performance Specifications | | Environmental | | | | |
| Cold start | < 50 s | Operating temperature | | -40 °C to + 65 °C | | |
| Warm start | < 30 s | Storage temperature | | -40 °C to + 85 °C | | |
| Hot start | < 15 s | Humidity | | 100% condensation | | |
| Initialisation time | < 10 s | Waterproof and dustproof | | IP67 | | |
| Signal reacquisition | < 2 s | Shockproof | | Designed to survive a 2 m drop onto concrete | | |
| Initialisation reliability | > 99.9 % | Electrical and Memory | | | | |
| Tilt sensor | Up to 30° | Input voltage | | 5–27 VDC | | |
| Positioning Specifications | | Power consumption | | 3.1 W | | |
| Static | | Power supply | | 2 × 2,000 mAh, up to 9 hours typically | | |
| Horizontal | 2.5 mm + 0.5 ppm RMS | Internal memory | | 8 GB | | |
| Vertical | 5.0 mm + 0.5 ppm RMS | | | | | |
| Real-time kinematic(RTK) | | | | | | |
| Horizontal | 8.0 mm + 1 ppm RMS | | | | | |
| Vertical | 15.0 mm + 1 ppm RMS | | | | | |
| E-RTK (< 100 km) | | | | | | |
| Horizontal | 0.20 m + 1 ppm RMS | | | | | |
| Vertical | 0.40 m + 1 ppm RMS | | | | | |
| DGPS | < 0.4 m RMS | | | | | |
| SBAS | 1 m 3D RMS | | | | | |
| Stand-alone | 1.5 m 3D RMS | | | | | |
| Data Communication | | | | | | |
| 1 serial port (7-pin LEMO) baud rates up to 921,600 bps | | | | | | |
| UHF modem | Tx/Rx with a frequency range from 410–470 MHz | | | | | |
| Transmitting power | 0.5 – 2 W | | | | | |
| Range | 1 – 5 km | | | | | |
| Wi-Fi/4G modem | | | | | | |
| 4G bands | 800 / 900 / 1,800 / 2,100 / 2,600 MHz | | | | | |
| 3G bands | 900 / 2,100 MHz | | | | | |
| 2G bands | 900 / 1,800 MHz | | | | | |
| Support GSM, point to point/points and NTRIP | | | | | | |
| Position data output rates | 1 Hz, 2 Hz, 5 Hz, 10 Hz, 20 Hz | | | | | |
| 5 LEDs | Indicating power, satellite tracking, GPRS status and differential data | | | | | |
| Bluetooth® | V 4.0 protocol, compatible with Windows OS and Android OS | | | | | |

SUPPLIED WITH

Depends on the constellation of additional field controller and usage as base/rover or network system.



FGS 100 Set



**SUPPLIED WITH
GNSS-SYSTEM FGS 100 COMPLETE SET**

incl. SurvCE: ART. NO. 761060
incl. FieldGenius: ART. NO. 761050

- 2 x GNSS antenna FGS 100
- 1 x MicroSurvey Fieldgenius-Software or Carlson SurvCE-Software
- 1 x field controller DC 6
- 2 x USB cable for FGS 100
- 2 x RS-232 cable for FGS 100
- 1 x measuring tape 3 m
- 1 x tribrach AJ 10 black
- 1 x tribrach adaptor AL 11-D black with optical plummet
- 1 x Container
- 1 x user manual



**SUPPLIED WITH
GNSS-SYSTEM FGS 100 COMPLETE SET**

incl. SurvCE: ART. NO. 761095
incl. FieldGenius: ART. NO. 761090

- 2 x GNSS antenna FGS 100
- 1 x MicroSurvey Fieldgenius-Software or Carlson SurvCE-Software
- 1 x field controller Mesa²
- 2 x USB cable for FGS 100
- 2 x RS-232 cable for FGS 100
- 1 x measuring tape 3 m
- 1 x tribrach AJ 10 black
- 1 x tribrach adaptor AL 11-D black with optical plummet
- 1 x container
- 1 x user manual

FGS 100 Set



**SUPPLIED WITH
GNSS-SYSTEM FGS 100 NETWORK SET**

incl. SurvCE: ART. NO. 760160
incl. FieldGenius: ART. NO. 760150

- 1 x GNSS antenna FGS 100
- 1 x MicroSurvey Fieldgenius-Software or Carlson SurvCE-Software
- 1 x field controller DC 6
- 1 x USB cable for FGS 100
- 1 x RS-232 cable for FGS 100
- 1 x measuring tape 3 m
- 1 x container
- 1 x user manual



**SUPPLIED WITH
GNSS-SYSTEM FGS 100 NETWORK SET**

incl. SurvCE: ART. NO. 760195
incl. FieldGenius: ART. NO. 760190

- 1 x GNSS antenna FGS 100
- 1 x MicroSurvey Fieldgenius-Software or Carlson SurvCE-Software
- 1 x field controller Mesa²
- 1 x USB cable for FGS 100
- 1 x RS-232 cable for FGS 100
- 1 x measuring tape 3 m
- 1 x container
- 1 x user manual



CORS FRS 300 Pro Reference Station

» The geo-FENNEL Reference Station FRS 300 Pro is an easy-to-use system for creating your own reference network. Use in conjunction with other reference stations in a CORS network and stand-alone use are both possible.

» With the geo-FENNEL Reference Station FRS 300 Pro, all available GNSS systems, such as GPS, GLONASS, GALILEO and BEIDOU can be used without effort. The integrated lithium-ion battery prevents data loss and continues to operate reliably until power is restored.

The built-in web server makes it easy to modify receiver, status and firmware settings. User management can be created and monitored easily with the supplied software. The geo-FENNEL Reference Station FRS 300 Pro is the ideal partner for agriculture, deformation monitoring and surveying.



GAT 300/500 GNSS-Antennas

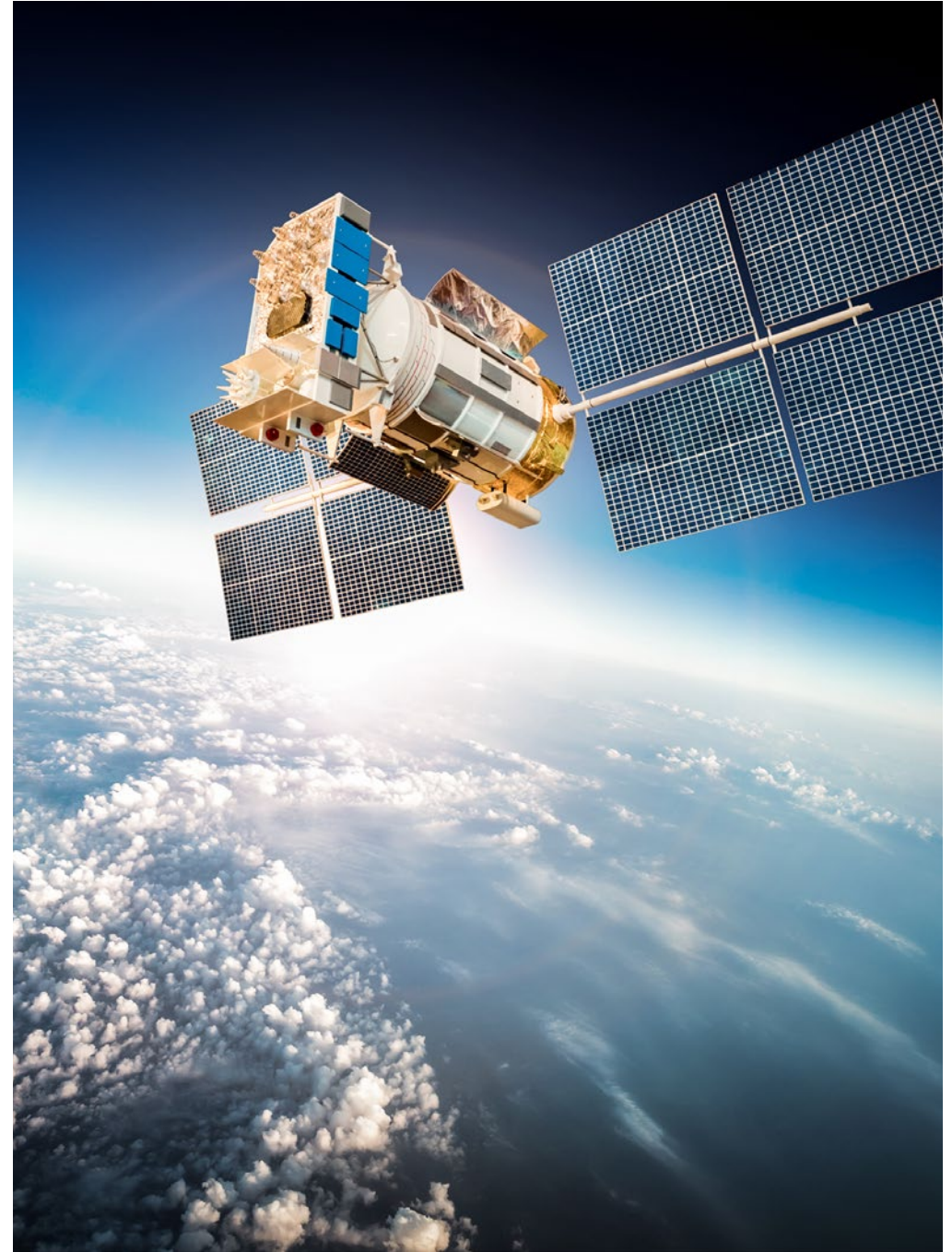
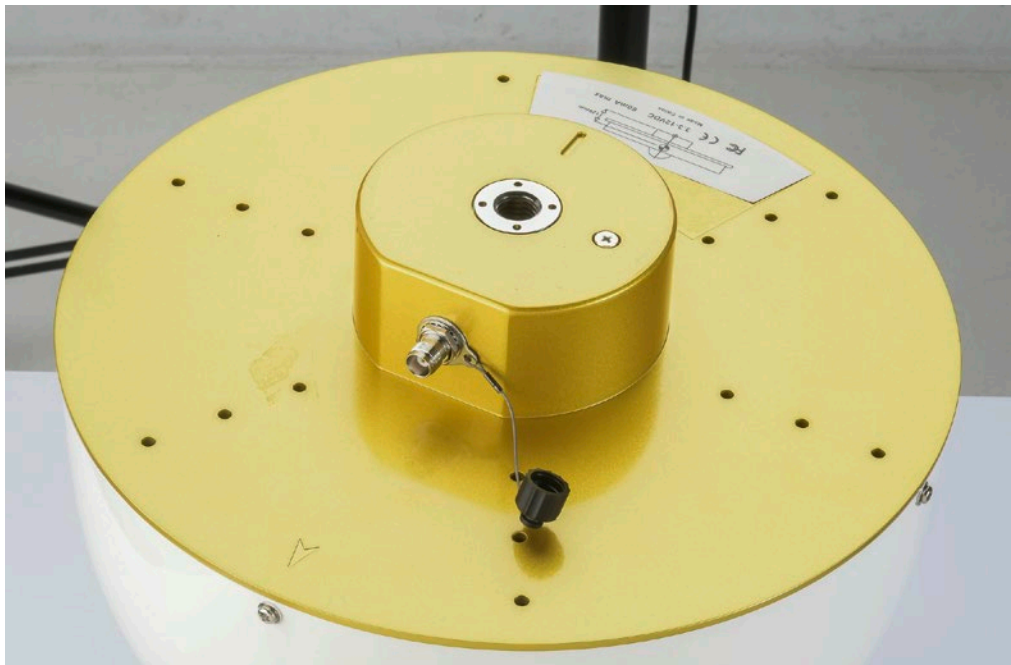


» GAT 500



» GAT 300

| TECHNICAL DATA | GAT 300 | GAT 500 |
|--------------------------|--------------------|--------------------|
| ART. NO. | 752010 | 752020 |
| Antenna type | Geodetic | Choke ring |
| GPS | L1, L2, L5 | L1, L2, L5 |
| GLONASS | L1, L2 | L1, L2, L3 |
| GALILEO | E1, E2, E5 | E1, E5a, E5b |
| BEIDOU | B1, B2, B3 | B1, B2, B3 |
| SBAS | No | Yes |
| Impedance | 50 Ohm | 50 Ohm |
| Polarisation | RHCP | RHCP |
| Axial ratio | ≤ 3 dB | ≤ 3 dB |
| Azimuth coverage | 360° | 360° |
| Noise figure | ≤ 2.0 | ≤ 2.0 |
| Gain at zenith | 5.5 dBi | 7 dBi |
| Phase at centre accuracy | ± 2 mm | ± 1 mm |
| LNA | | |
| LNA gain | 40 dB | 50 dB ± 2 dB |
| Noise figure | ≤ 2 dB | ≤ 2 dB |
| VSWR output | ≤ 2.0 | ≤ 2.0 |
| Operation voltage | 3 – 18 VDC | 3.3 – 12 VDC |
| Operation current | ≤ 45 W | ≤ 55 W |
| Ripple | ± 1 dB | ± 2 dB |
| Group delay | < 5 ns | < 5 ns |
| Physical | | |
| Size | Ø 152 x 62.2 mm | Ø 379 x 311 mm |
| Connector | TNC female | 2.4 kg |
| Weight | 374 g | 6.9 kg |
| Environmental | | |
| Operating temperature | -40 °C to + 85 °C | -40 °C to + 85 °C |
| Storage temperature | -55 °C to + 85 °C | -45 °C to + 85 °C |
| Humidity | 95% non-condensing | 95% non-condensing |



Total Stations FTS 101/102

» The geo-FENNEL Total Station FTS 101/102 is smart in its design and really easy to handle. It comes with the Windows CE-based application software Micro-Survey FieldGenius or Carlson SurvCE optionally.



| TECHNICAL DATA | | FTS 101 | |
|---|---|--|--------------------------|
| Objective Telescope | | Circular vial | 8' / 2 mm |
| Image | Erect | | |
| Objective aperture | 45 mm | Laser Plummet | |
| Magnification | 30x | Accuracy | ± 0.5 mm / 1.5 m |
| Field of view | 1° 30' | Laser class | 2 |
| Resolving power | 3" | | |
| Shortest focus distance | 1.0 m | Power Supply | |
| | | Li-ion battery | 4,400 mAh |
| | | Operating time | 8 h |
| Operation | | Display | |
| Reflectorless | 1 – 500 m | Dual TFT | 3.5" colour display |
| Reflective tape target | 1 – 800 m | Backlight | Yes |
| Mini prism | 1 – 1200 m | Keyboard | 26 keys |
| Single standard prism | 1 – 3500 m | | |
| Accuracy | ± 2 mm + 2 ppm | Data Process | |
| | | CPU/clock frequency | 2 GB / 528 MHz |
| Angle Measurement | | OS | Windows CE 7 |
| Minimum reading resolution | 1" / 5" | Application software | SurvCE / FieldGenius |
| Angle accuracy FTS 101 | 1" | I/F | RS-232C, Bluetooth®, USB |
| Angle accuracy FTS 102 | 2" | | |
| Angle units | 100% / 360° / 400 gon | Other | |
| | | IP class | IP55 |
| Compensator | | Operating temperature | - 20 °C – 50 °C |
| Axis | 2 | Dimensions | 183 x 342 x 167 mm |
| Range | ± 3° | Weight | 5.4 kg |
| Vial Sensitivity | | | |
| Plate level vial | 30" / 2 mm | | |
| FEATURES | SUPPLIED WITH | FTS 101 + FIELD GENIUS | FTS 101 + SURVCE |
| <ul style="list-style-type: none"> · Easy-to-use on-board software · Easy-to-read display, even in direct sunlight · Fast import and export of different data formats without additional software · Fast and accurate measurements · Intensity of the laser plummet can be changed gradually · Compact and smart design | <ul style="list-style-type: none"> · Desktop charger · 2 x li-ion battery · Data cable · Container · Stake-out aid RS 96 | ART. NO. 711000 | ART. NO. 711100 |
| | | FTS 102 + FIELD GENIUS | FTS 102 + SURVCE |
| | | ART. NO. 710000 | ART. NO. 710100 |
| | | ZENITH EYEPIECE 710500 (OPTIONAL) | |



1



2



3



4



5



6

1 Easy handling

2 Touch pen quickly accessible

3 Protected connection ports

4 What's in the kit

5 Clear display

6 Simple system set-up

» Its touchscreen display greatly improves the workflow of accessing menus and software modes quickly and reliably. The FTS 101 / 102 features a full alphanumeric keypad as well as a "pop-up" keyboard, which both ensure fast and accurate entering of data.

In addition to the ready-supplied applications, the FTS 101/102's software package supports road planing, volume calculation and simple CAD options to make work in the field much easier. Measurements can be easily transferred into different formats to or from existing software like AutoCAD and similar. Due to its usability, it is easily possible to measure and check points, stake-out lines and single points as well as to set up the instrument quickly and accurately.

All features are smartly integrated in a compact and well-designed instrument: Fast and long-range EDM allows for measurements up to 3,500 m with standard prism, and reflectorless up to 500 m. An integrated laser plummet allows quick and accurate set-up over measuring points, including also under difficult conditions. All total stations are equipped with the RS 96 stake-out aid for fast and secure stake-outs.

The FTS 101/102 measurements can be transferred by standard RS-232 cable but also by Bluetooth® or USB stick. Its two rechargeable li-ion batteries allow the use of the FTS 101/102 for even longer than one working day. All its connectors are well protected against dust and water, which results in IP55.

Total Station FTS 202



» The geo-FENNEL Total Station FTS 202 is an innovative solution with a reflectorless distance-measuring module with a range of more than 500 m (with reflector, up to more than 3,000 m). Equipped with an electronic level, the geo-FENNEL Total Station FTS 202 provides an exceptionally powerful, cost-effective solution for a wide range of general and specialised construction and engineering applications.

| TECHNICAL DATA | | FTS 202 | | FEATURES | |
|----------------------------|-----------------------|-----------------------|----------------------------------|--|--|
| ART. NO. | | 710200 | | | |
| Telescope | | | | Laser Plummet | |
| Image | Erect | Accuracy | ± 0.5 mm / 1.5 m | <ul style="list-style-type: none"> · Easy-to-use on-board software · Easy-to-read display, including in direct sunlight · Fast import and export of different data formats without additional software · Fast and accurate measurements · Intensity of the laser plummet can be changed gradually · Compact and smart design | |
| Objective aperture | 45 mm | Laser class | 2 | | |
| Magnification | 30 x | Power Supply | | | |
| Field of view | 1°30' | Li-ion battery | 4,400 mAh | | |
| Resolving power | 3" | Operating time | 20 h | | |
| Shortest focus distance | 1.0 m | Display | | | |
| Operation | | | | | |
| Reflectorless | 1 – 300 m | Dual 240 x 96 pixel | 20 characters x 8 lines | <ul style="list-style-type: none"> · Desktop charger · 2 x li-ion battery · Data cable · Container · Stake-out aid RS 96 | |
| Reflective tape target | 1.5 – 600 m | Backlight | Yes | | |
| Mini prism | 1.5 – 1,500 m | Keyboard | 22 keys | | |
| Single standard prism | 1.5 – 4,000 m | Data Process | | | |
| Accuracy | ± 2 mm + 2 ppm | Data recording | 2 GB / 528 MHz | | |
| Angle Measurement | | Internal memory | 20,000 coordinates | | |
| Minimum reading resolution | 1" / 5" | Special function | PowerTopoLite | | |
| Angle accuracy | 2" | I/F | RS-232C, Bluetooth, USB, SD-Card | | |
| Angle units | 100% / 360° / 400 gon | Other | | | |
| Compensator | | | | | |
| Axis | 2 axis | IP class | IP56 | | |
| Range | ± 3° | Operating temperature | - 20 °C – +50 °C | | |
| Vial Sensitivity | | Dimensions | 190 x 343 x 177 mm | | |
| Plate level vial | 30" / 2 mm | Weight | 5.7 kg | | |
| Circular vial | 8' / 2 mm | | | | |
| | | | | ZENITH EYEPIECE 710250 (OPTIONAL) | |



» **Integrated and comprehensive software package**

Selection of applications that support the software in your daily work:

- Construction & engineering surveying
- Stake-out
- Point-to-line, bends
- Graphic display
- Free stationing and resection
- Height determination
- 2D/3D interface
- Indirect distance measurement
- Right-angle coordinates, polar coordinates
- Roads
- Volume determination
- Geodetic tasks and cadastral surveys

Simple, intuitive user interface with large graphic LC display and illuminated, high-contrast displays.

» **Reliable and safe:**

The exchange of data takes place via standard interfaces or Bluetooth®. The software supports uploads and downloads between the geo-FENNEL Total Station FTS 202 and computers. The software geo-FENNEL DL-01 allows direct exchange of data with any software.



- 1 Protected connections
- 2 Clear display
- 3 Simple system structure
- 4 Suitcase included

FTS 202 + ZENITH EYEPIECE (OPTIONAL)
ART. NO. 710250



TheoDist® FTD 05

Reflectorless Total Stations



» FTD 05

» **The geo-FENNEL TheoDist® is designed to be user friendly and quick to set up on any construction site. Easy to handle, robust, exact and reliable.**

» The main features of the geo-FENNEL TheoDist® are:

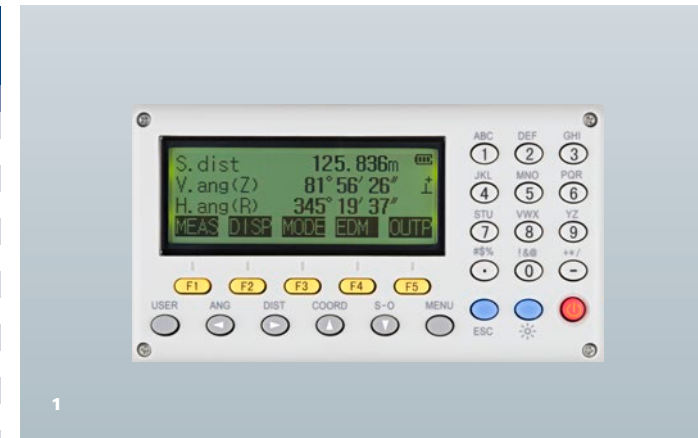
- Measuring programmes that provide efficient and easy solutions for setting out
- Three-dimensional measurement of coordinates
- Menu-driven software with intuitive structure to maximise productivity
- A visible laser pointer to improve targeting accuracy, allowing measurements to be taken without looking through the telescope
- Data upload and download to PC via the RS-232 connection or SD card (FTD 02)
- Measuring range of up to 300 m (FTD 05: 200 m) without reflector
- Quick and easy set-up with the integrated laser plummet

» The geo-FENNEL TheoDist® series is equipped with a variety of programmes, from simple distance and angle measurement to precise three-dimensional setting out.

- Missing line
- Offset
- Remote elevation measurement
- Resection
- Integrated application programmes for setting out office-generated designs
- Area

» The communication software supplied with the geo-FENNEL TheoDist® allows the user to save the data in various formats. The data files can be converted into DXF format, making them suitable for upload into CAD software such as AutoCAD®.

| TECHNICAL DATA | | FTD 05 | |
|-----------------------------|-----------------------|---------------------------|------------------------|
| ART. NO. 700000 | | | |
| Telescope | | Laser Pointer | |
| Image | Erect | Laser classification | 3R |
| Objective aperture | 45 mm | Laser Plummet | |
| Magnification | 30x | Accuracy | ± 1 mm / 1.5 m |
| Field of view | 1° 30' | Laser classification | 2 |
| Resolving power | 4" | Display | |
| Shortest focus distance | 1.5 m | Dual LCD | 4 lines, 24 characters |
| Distance Measurement | | Power | |
| Reflectorless | 200 m | Rechargeable battery type | 7.2 VDC NiMH |
| Reflective tape target | 600 m | Operating time | 5 h |
| Single standard prism | 600 m | Charger | 100 / 240 V |
| Accuracy | 3 mm + 2 ppm | Vial Sensitivity | |
| Offset | "0" | Plate level vial | 30" / 2 mm |
| Measuring Time | | Circular vial | 8' / 2 mm |
| Fine/rapid/tracking | 1.5 s / 0.9 s / 0.3 s | General Specs | |
| Minimum reading | 1 mm | Internal memory | 50,000 points |
| Distance units | m / ft | External memory | -/ |
| Angle Measurement | | Weight | 6.0 kg |
| Minimum reading resolution | 1" / 5" / 10" | Operating temperature | -20 °C – +50 °C |
| Angle accuracy | 5" | IP class | IPX4 |
| Angle units | 100% / 360° / 400 gon | I/O port | RS-232 |
| Compensator | | | |
| Type | Electronic | | |
| Range | ± 3° | | |
| | | | |
| | | | |
| | | | |



1



2

| FEATURES | SUPPLIED WITH |
|---|---|
| <ul style="list-style-type: none"> Coordinate measuring Setting out points Resection Missing line measurement Offset point Remote elevation measurement Area calculation | Charger, 2 rechargeable batteries, serial cable, software, stake-out aid RS 96, container |

| ZENITH EYEPIECE (OPTIONAL) |
|---|
| ART. NO. 700500 |
| <ol style="list-style-type: none"> Clearly visible display with all functions FTD 05 RS-232 data connection for universal use of FTD 05 Complete kit supplied for FTD 05 |



3

FET 402K-L

With Dual-Axis Compensator and Laser Pointer

FET 405K/FET 420K

With Dual-Axis Compensator

» Coaxial, focusable laser beam integrated into the telescope



» FET 402K-L



» FET 405K and FET 420K

| TECHNICAL DATA | FET 402K-L | FET 405K | FET 420K | FEATURES |
|-----------------------------|---------------------------|---------------------------|---------------------------|--|
| ART. NO. | 316000 | 315000 | 314000 | |
| Magnification | 30x | 30x | 30x | <ul style="list-style-type: none"> · 2 large, easy-to-read LCDs · Simultaneous reading of horizontal and vertical circles · Illumination of display and field of view · Clockwise/anti-clockwise horizontal angle reading · "0" set or hold of horizontal circle at any desired position · "V" circle reading in gon/degrees or % of slope |
| Clear objective aperture | 45 mm | 45 mm | 45 mm | |
| Shortest focussing distance | 1.4 m | 1.4 m | 1.4 m | |
| Angle measurement | Incremental | Incremental | Incremental | |
| Accuracy | 0.6 mgon (2") | 1 mgon (5") | 4 mgon (20") | |
| Minimum reading | 0.2 mgon (1") | 1 mgon (5") | 2 mgon (10") | |
| Compensator | Dual axis | Dual axis | Dual axis | |
| Measuring units | 400 gon / 360° / mil | 400 gon / 360° / mil | 400 gon / 360° / mil | |
| Target | Focusable | - | - | |
| Laser class | 3R | - | - | |
| Beam diameter | 5 mm / 100 m | - | - | |
| Maximum visibility | 180 m | - | - | |
| Deviation | 5" | - | - | |
| Laser plummet | Yes | - | - | |
| Optical plummet | - | 3 x | 3 x | |
| Focussing range | - | 0.5 - ∞ | 0.5 - ∞ | |
| Plate level | 30" / 2 mm | 30" / 2 mm | 30" / 2 mm | OPTIONAL |
| Circular level | 8' / 2 mm | 8' / 2 mm | 8' / 2 mm | |
| Operating time/power supply | 35 h NiMH / 40 h alkaline | 35 h NiMH / 40 h alkaline | 35 h NiMH / 40 h alkaline | ART. NO. 314500 |
| Theodolite and laser | 24 h NiMH / 30 h alkaline | - | - | |
| Temperature range | -20 °C - +45 °C | -20 °C - +50 °C | -20 °C - +50 °C | |
| Dust/water protection | IP54 | IP54 | IP54 | |
| Tribrach | Detachable | Detachable | Detachable | |
| Weight | 4.5 kg | 4 kg | 4 kg | |

FET 220

Electronic theodolite – easy to use

» For use in engineering, civil engineering and general construction.

Particular attention has been paid to making the FET 220 user-friendly with a large easy-to-read display and a laser plummet for precise positioning over a ground point.



SUPPLIED WITH FET 220

- Tribrach
- Rechargeable battery
- Charger
- Battery compartment for alkaline batteries
- Container



| TECHNICAL DATA | FET 220 |
|-------------------------------|------------------|
| ART.-NO. | 313000 |
| Magnification | 30x |
| Clear objective diameter | 45 mm |
| Shortest focussing distance | 1,5 m |
| Angle measurement | absolute encoder |
| Accuracy | 20" (6 mgon) |
| Minimum reading | 10" (3 mgon) |
| Measuring units | 400 gon / 360° |
| Laser plummet: spot size | Ø 2 mm at 1,5 m |
| Laser plummet: laser class | 2 |
| Operating time / power supply | 18 h / NiMH |
| Temperature range | -20°C to +50°C |
| Dust / water protection | IP 54 |
| Weight (instrument only) | 4,2 kg |

| FEATURES |
|---|
| · Large easy-to-read LCD |
| · Laser plummet for easy set up over the ground point |
| · Illumination of LCD and field of view |
| · Horizontal circle: Hold-Function, 0-set at any desired position, clockwise/anti-clockwise reading |
| · Vertical circle: reading in gon / degrees / percent |

FET 500

Construction Theodolite

» The versatile starter model for many applications.



| TECHNICAL DATA | FET 500, 400 GON FET 500, 360° |
|-----------------------------|-----------------------------------|
| ART. NO. 400 GON | 350000 |
| ART. NO. 360° | 350360 |
| Magnification | 20 x |
| Objective aperture | 30 mm |
| Shortest focussing distance | 1.2 m |
| Direct reading | 0.1 gon |
| Estimation | 10 mgon |
| Temperature range | -40 °C – +50 °C |
| Weight | 2.0 kg |

GFE 32

Engineers' Automatic Level

» A high-quality engineers' automatic level with the most robust compensator available on the market. Brilliant optical system for clear view in all conditions.



» Engineers' Automatic Level GFE 32, 360°



» Engineers' Automatic Level GFE 32-L, 360°

By mirroring an index mark into the eyepiece (swing position of the compensator), measurements can be carried out with high accuracy **1**

Extremely robust compensator **2**

| TECHNICAL DATA | ENGINEERS' AUTOMATIC LEVEL GFE 32, 360° | ENGINEERS' AUTOMATIC LEVEL GFE 32-L, 360° | SUPPLIED WITH |
|--|---|---|--|
| ART. NO. | 210332 | 210333 | |
| Magnification | 32 x | 32 x | <ul style="list-style-type: none"> · Container · Adjustment pin · Screwdriver · Dust brush · Plumb bob |
| Clear objective aperture | 45 mm | 45 mm | |
| Field of view | 1° | 1° | |
| Shortest focussing distance | 2 m | 2 m | |
| Mean error per 1 km double run levelling | ±2 mm | ±2 mm | |
| using index reference mark | < 1 mm | < 1 mm | |
| Multiplication constant | 100 | 100 | |
| Working range of compensator | ±15' | ±15' | |
| Levelling accuracy compensator | 2" | 2" | |
| Circular bubble | 8' / 2 mm | 8' / 2mm | |
| Horizontal circle | 360° | 360° | FEATURES <ul style="list-style-type: none"> · Robust and temperature insensitive · Highly accurate and free-moving vertical axis · Separate horizontal clamp · Accurate tangential screw movement and focussing drive without backlash · Optical sighting device · Excellent image quality · Service friendly due to simple construction |
| Dust/water protection | IP54 | IP54 | |
| Weight | 2.5 kg | 2.7 kg | |
| Dimensions | 280 x 160 x 140mm | 280 x 160 x 140 mm | |
| Temperature range | -25 °C – +50 °C | -25 °C – +50 °C | |
| Laser beam switchable/class | — | 635 – 670 nm / 2 | |
| Beam diameter | — | 2 mm | |
| Laser working range | — | 120 m (during day) 300 m (twilight) | |
| Deviation | — | 5" | |
| Operating time/power supply | — | 8 h / 2 x AAA | |
| Laser filter for eyepiece | — | Yes | |





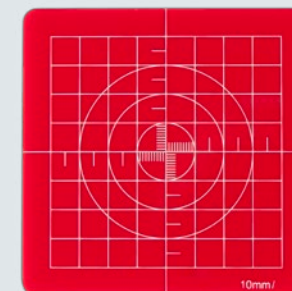
FLP 100 Laser Zenith Plummet

» A precise laser plummet incorporating a coaxial telescope for both laser and optical observations.



| TECHNICAL DATA | FLP 100 |
|-------------------------------|------------------|
| Magnification | 26x |
| Clear objective aperture | 36 mm |
| Shortest focussing distance | 0.4 m |
| Laser Pointer | |
| Laser class/wave length | 2M / 635 nm |
| Spot size Ø | 3 mm / 80 m |
| Max. visible distance (day) | ≥ 120 m |
| Max. visible distance (night) | ≥ 250 m |
| Deviation to optical axis | ≤ 3" |
| Accuracy | ± 2.5 mm / 100 m |
| Optical Plummet | |
| Laser class/wave length | 1 / 650 nm |
| Accuracy | ± 1 mm / 1.5 m |
| Plate level | 20" / 2 mm |
| Power supply | 2 x AA alkalines |
| Temperature range | -10 °C – +50 °C |
| Dust/water protection | IP54 |
| Weight | 2.8 kg |

| FEATURES | SUPPLIED WITH |
|--|--|
| <ul style="list-style-type: none"> · Easy to use with two laser plummets (up and down) · Laser dot visible up to ≥ 120 m · High accuracy for precision work | <p>ART. NO. 310000</p> <ul style="list-style-type: none"> · Set of alkaline batteries · Target plate · Container |





OUR INVITATION:
**ALWAYS NEW CHALLENGES
TO CONQUER.**

The versatility of measuring instruments from geo-FENNEL can be increased significantly by using our wide range of precisely coordinated surveying accessories. Regardless of the profession or application, the know-how of many decades of experience in the field of measurement technology and surveying resides in our products.

FS 23 FS 23 W/S Aluminium Tripod



| TECHNICAL DATA | FS 23 |
|----------------|---|
| | ART. NO. 152 |
| | ART. NO. 152 W/S |
| | Aluminium Tripod FS 23 |
| · Flat head | · Ideal for all measuring instruments |
| · 105–170 cm | · Quick clamp system |
| · 5.1 kg | · Flat head |
| | · Shoulder carrying strap |
| | · Diameter of tripod head: 143 mm |
| | Aluminium Tripod FS 23 W/S |
| | · Same as FS 23 tripod, but with screw clamp system |

FS 24 FS 24 W/S Wooden Tripod



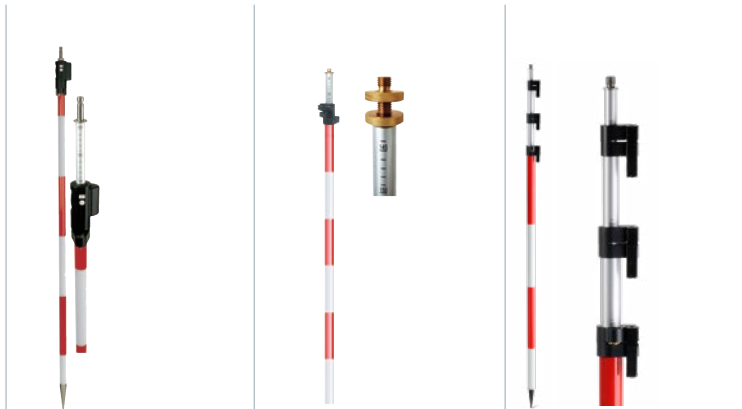
| TECHNICAL DATA | FS 24 |
|----------------|---|
| | ART. NO. 154 |
| | ART. NO. 154 W/S |
| | · Robust wooden tripod for theodolites and total stations |
| · Flat head | · Quick clamp system |
| · 105–170 cm | · Flat head |
| · 6.5 kg | · Shoulder carrying strap |
| | · Diameter of tripod head: 140 mm |
| | · Same as FS 24 W/S tripod, but with screw clamp system |

TN15 TN15-0 Telescopic Levelling Staff



| TN 15 | |
|------------------|--|
| ART. NO. TN 15 | 485 |
| ART. NO. TN 15-0 | 486 |
| | High-quality levelling staff similar to TN 15, except: |
| | · Rear face graduated in mm with "0" at the bottom |

L 23, L 25, L 50 Prism Poles



| TECHNICAL DATA | L 23 | L 25 | L 50 |
|---------------------------|---------------------------|--------------|--------------|
| ART.-NO. | 223-S01, 223-S02, 223-S03 | 225 | 228 |
| Length | 122 – 208 cm | 134 – 250 cm | 160 – 500 cm |
| Adapters | | 5/8" | 5/8" |
| 223-S01 | Optical square (Ø 10 mm) | | |
| 223-S02 | 5/8" | | |
| 223-S03 | Leica pin | | |
| Adapter height adjustable | No | Yes | No |
| Clamp type | Quick-release clamp | Quick clamp | Quick clamp |
| Circular bubble | Yes | Yes | Yes |
| Case | Yes | Yes | Yes |
| Weight | 0.9 kg | 1.5 kg | 2.35 kg |

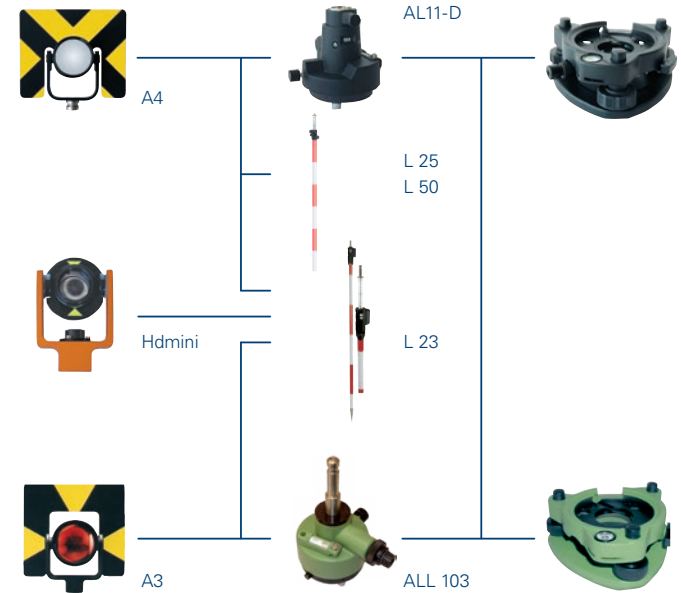
B 18 Bipod

» For GPS rods and prism poles



| B 18 |
|--|
| ART. NO. 640 |
| <ul style="list-style-type: none"> · Made of aluminium · Working range of legs: 1.10 m – 1.80 m · Quick-release clamping mechanism for legs · Possible rod diameters: 19 – 38 mm · Staffs and poles secured with thumb screw · Weight: 2 kg · Supplied with leg clip and nylon case |

Combination options



G 20, G 25 GPS Antenna Poles



| TECHNICAL DATA | G 20 | G 25 |
|---------------------|--------------|--|
| ART. NO. | 630 | 635 |
| Length | 200 cm | 136 – 248 cm |
| Adapter | 5/8" | 5/8" |
| Material lower tube | Carbon fibre | Carbon fibre |
| Material upper tube | Carbon fibre | Aluminium |
| Connection | Fixed | Telescopic |
| Clamp type | – | Screw clamp |
| Circular bubble | Yes | Yes |
| Case | Yes | Yes |
| Weight | 0.6 kg | 1.1 kg |
| Remark | Lightweight | Steel locking pin can be inserted at 1.80, 2.00, 2.20 m to guarantee no slipping |

Prism Set A3 (Leica Style)



ART. NO. 401700

- Tilting prism holder made of plastic, yellow/black target made of metal
- Bag included
- Single prism: Ø 62.5 mm
- Accuracy: ± 2"
- Offset: -34 mm
- Axis height: 84 mm

Mini Prism Pin Pole Set ADS 103



ART. NO. 403100

- The pin pole has 3 sections that screw together to form a height of 0.6, 1.2 or 1.8 m.
- The adjustable 25 mm prism can be locked anywhere along its length.
- Offset: 0 mm
- Many accessories

FP 50 Flat Prism



ART. NO. 403400

- Tilting flat prism with one-sided reflective film, with padded bag
- Diameter: 48 mm
- Offset: 0 mm
- Axis height: 88 / 112 mm (depending on adapter)
- Supplied with Leica, 5/8" and M 17 x 1.25 adapters
- Weight: 130 g

AJ 10 and AJ 10-D Tribrachs



ART. NO. BLACK 400103
ART. NO. GREEN 400101

AJ 10

- Without optical plummet
- Available in black and green



ART. NO. BLACK 400003
ART. NO. GREEN 400001

AJ 10-D

- With optical plummet
- Available in black and green

Prism Set A4



ART. NO. 401800

- Tilting prism holder made of metal, yellow/black target made of metal
- Bag included
- Single prism: Ø 62.5 mm
- Accuracy: ± 2"
- Offset: 0 / -30 mm
- Axis height: 97 mm

AL11-D Tribrach Adapter



ART. NO. 400203

AL11-D

- Optical plummet
- Height adjustable
- Tubular vial
- Available in black

ALL 103 Tribrach Adapter



ART. NO. 400205

ALL 103

- Leica adapter
- Optical plummet
- Tubular vial
- Available in green

Mini Prism Set Hdmini



ART. NO. 403000

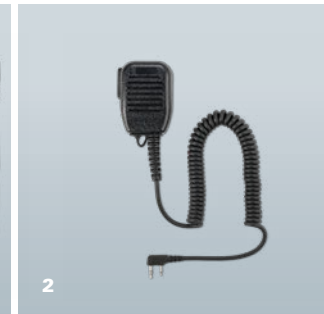
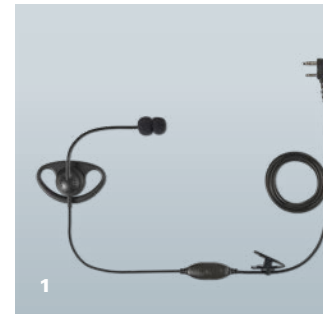
- With circular levelling vial, padded bag, 5/8" female base, hook for plumb bob
- Single prism: Ø 25 mm
- Accuracy: ± 2"
- Offset: 0 / -30 mm
- Axis height: 70 mm

F6 Two-way Radio

» Robust and powerful PMR 446 Two-way radio for professional use



- 1 F6-EM earphone/clip microphone
- 2 F6-HM hand microphone
- 3 Charger



| TECHNICAL DATA | F6 |
|--|------------------------------------|
| RF output power | 0.5 W |
| Frequency range | 446.000 – 446.100 MHz |
| Channels | 16 |
| Audio output | 1 W |
| Accu./operating time | 12 V Li-Po 1,300 mAh / 12 h – 30 h |
| Temperature range | -25 °C – +55 °C |
| Dust/water protection | IP54 |
| Shock/vibration | MIL STD 810 C/D/E & TIA/EIA 603 |
| Working ranges | |
| Outside, open terrain | 5 km |
| Outside, area between buildings | 3 km |
| OPTIONAL | OPTIONAL |
| ART. NO. 870100 | ART. NO. 870150 |
| · F6-HM hand microphone with jacket clip | · F6-EM earphone/clip microphone |

| FEATURES |
|---|
| <ul style="list-style-type: none"> · Clear audio quality · Automatic squelch · TOT time-out timer to stop transmitting automatically · Monitoring function · DCS/CTCSS encoder and decoder to prevent interference at the same frequency · Housing made of die-cast and high-resistant plastic · Powerful lithium polymer rechargeable battery · Battery-saving mode · Channel annunciation in English language · LED showing receipt, transmission and battery status · Europe-wide licence and toll-free use · PC programmable (optional): · Frequency, functions and settings can be set by the optional programming software |

| SUPPLIED WITH |
|---|
| ART. NO. 870000 |
| <ul style="list-style-type: none"> · Two-way radio · Rechargeable battery · Charger · Belt clip · Hand strip |

FMD 60 Metal Detector

- » Easy-to-use metal detector. Detection and localisation of manhole covers, site marks, pipes, etc. under earth, mud, water, snow, paths, ...



FEATURES HEADPHONE FH 1 (OPTIONAL)

ART. NO. 800810

- For the use of FMD 60 in loud surroundings
- Padded earcups and headband



| TECHNICAL DATA | FMD 60 | FEATURES |
|--------------------------------------|--------------------------|--|
| Measuring depth | 60 cm | <ul style="list-style-type: none"> · Detection of all kinds of metals · Handle adjustable, length 114 – 139 cm · Headphone jack |
| Operating time | 30 h | |
| Measuring disc | Ø 24 cm | |
| Dust/water protection measuring disc | IP67 | |
| Weight | 2.0 kg | SUPPLIED WITH |
| Weight | 3.3 kg with case and box | |
| | | ART. NO. 800800 |
| | | <ul style="list-style-type: none"> · 8 x AA alkaline batteries · Carrying bag |

M10 Precision Measuring Wheel

M 10

ART. NO. 110

- Wheel circumference 1 m
- Clamp for wheel
- Robust support allows M 10 to stand upright
- Dirt remover
- Precision counter with "0" reset
- Sturdy spokes offer low resistance to wind, ensuring ease of use
- The highly visible colour of the wheel increases operator safety during use on roads
- Weight: 2.7 kg



M10S Precision Measuring Wheel

M 10S

ART. NO. 141

Same as M 10, except:

- Heavy model with double-disk wheel made of metal
- Weight: 3.4 kg



High-Speed Tape

- » **4x speed rewind.**
- » Nylon-coated steel tape. Abrasion resistant and virtually unbreakable. Ergonomically designed to be comfortable and easy to use.



HIGH-SPEED TAPE

| | |
|----------------------|----------------|
| ART. NO. 30 m | M313030 |
| ART. NO. 50 m | M313050 |

- Tape width: 12,5 mm
- Graduation in mm
- Easy to grip
- Accuracy: CE class II



M 10K Case

M 10K CASE

ART. NO. 011

Sturdy case for M 10 and M 10S made from high-quality materials



M 10T Bag

M 10T BAG

ART. NO. 010

Bag for M 10 and M 10S made from high-quality materials



EasyWheel M20 Measuring Wheel

- » Compact and durable multi-purpose measuring wheel
- » Easy-to-read display
- » Foldable for easy storage and transportation
- » Brake and zero-reset button incorporated into handle



- 1 The counter counts forward and backward
- 2 Robust hinge mechanism
- 3 Large folding stand for stability
- 4 Ergonomic handle with non-slip pistol grip



| TECHNICAL DATA | FEATURES | |
|--|--|------------------------|
| ART. NO. 120 | <ul style="list-style-type: none"> · Ergonomic handle with non-slip pistol grip · Brake and zero-reset integrated into the handle for ease of use · Smallest unit of measurement 10 cm · Counter adds when moving forward and subtracts in reverse · Movable pointer to ensure accuracy of starting point and finishing position · Large folding stand for stability · Coated wheel for excellent traction over a variety of surfaces | |
| Accuracy | | ± 0.1% |
| Measuring distance | | 0 – 9.9999 m |
| Wheel circumference | | 1 m |
| Extended size | | 1,000 (L) x 140 mm (B) |
| Folded size | | 510 (L) x 140 mm (B) |
| Weight | 1.8 kg | |
| SUPPLIED WITH M20 | | |
| <ul style="list-style-type: none"> · Measuring wheel · Carrying case with shoulder strap | | |

Marking Spray



- » For permanent wall/floor marking.
- » Professional marking for building and road construction, civil engineering, construction sites, surveying jobs.



1 Patented one-hand safety cap with easy-touch release

MARKING SPRAY

- For fast, clean and precise marking of asphalt, concrete, masonry, plaster, wood, earth and many other substrates
- Markings remain strongly visible up to 9 months
- Marks and sticks to any surface, even if it is wet
- Reliable even at sub-zero temperatures (down to -20 °C)
- Patented one-hand safety cap with easy-touch release
- Guaranteed marking without painted fingers
- Colour-coordinated cap
- Also easy to apply while wearing gloves
- Self-cleaning system, can be 100% emptied by spraying
- Environmentally friendly and non-hazardous to health

COLOURS

| | |
|----------------------|-----|
| ART. NO. fluo orange | 901 |
| ART. NO. fluo red | 902 |
| ART. NO. fluo blue | 903 |
| ART. NO. fluo yellow | 904 |
| ART. NO. fluo green | 905 |
| ART. NO. fluo pink | 906 |
| ART. NO. red | 911 |
| ART. NO. yellow | 913 |
| ART. NO. white | 915 |

- Contents 500 ml
- Sales packing 12 cans per carton

Marking Wheel



- » Marking wheel for comfortable marking with GEO-MARKER Marking Spray.
- » No need to remove safety cap for use with marking wheel.

MARKING WHEEL

ART. NO. 940

- Length 83 cm
- Weight 0.6 kg

F1, F2, J2, F10, F8 Optical squares

» For staking out right angles or alignments in a straight line



» F1/F10



» J2



» F8

OPTICAL SQUARES

| | |
|---|-----|
| Optical square F1/1' | 210 |
| Optical square F1/1' with metal housing | 211 |
| Optical square F2/1' | 220 |
| Optical square F2/1' with metal housing | 222 |
| Optical square J2 | 242 |
| Optical square F10 | 250 |
| Optical square F10 with metal housing | 251 |
| Optical square F8 without case | 280 |
| Zip case FE 1A | 012 |
| Press stud case FE 1B | 013 |
| Range pole adapter L1 | 277 |

| Type | Housing | Accuracy |
|------|------------------|----------|
| F1 | Metal or plastic | > 1' |
| F2 | Metal or plastic | > 1' |
| J2 | Plastic | > 2' |
| F10 | Metal or plastic | > 2' |
| F8 | Plastic | > 1' |

Rod Levels

» For holding, fixing or suspending to ranging poles and levelling rods



» LR 1



» LR 34



» LR 39



» LR 5

ROD LEVELS

| | |
|-----------------------------------|-----|
| ART. NO. LR 39, plastic | 390 |
| ART. NO. LR 39, metal | 391 |
| ART. NO. LR 1, metal, adjustable | 310 |
| ART. NO. LR 34, metal, adjustable | 330 |
| ART. NO. LR 5, wood | 350 |

| | |
|-------------------|----------------|
| LR 39 plastic | Not adjustable |
| LR 39 metal | Not adjustable |
| LR 34 + LR1 metal | Adjustable |
| LR 5 wood | Adjustable |

Surveyors' Folding Rules

SURVEYORS' FOLDING RULES

| | |
|-------------------------------------|-----|
| Surveyors' folding rule, 3 m, erect | 410 |
| Surveyors' folding rule, 2 m, erect | 412 |
| T1 surveyors' field bag | 601 |

- Made from the finest-quality wood with strong joint springs
- Front side: Levelling graduations (E reading) 1 m black, 1 m red
- Reverse side: mm graduation in black
- Available in 2 m and 3 m lengths

Surveyors' Folding Frames

» Carrying strap included



SURVEYORS' FOLDING FRAMES

| | |
|---------------------------------|-----|
| DIN A4, wood | 541 |
| DIN A4, plastic (red) | 542 |
| DIN A4, Plexiglas (transparent) | 543 |
| DIN A3, wood | 531 |





Tailor-made information

- » You know best which special requirements you have for our surveying equipment. For further details, data concerning our products, catalogue downloads and all the latest news and information, please visit our website.



Further information is available @

www.geo-fennel.com

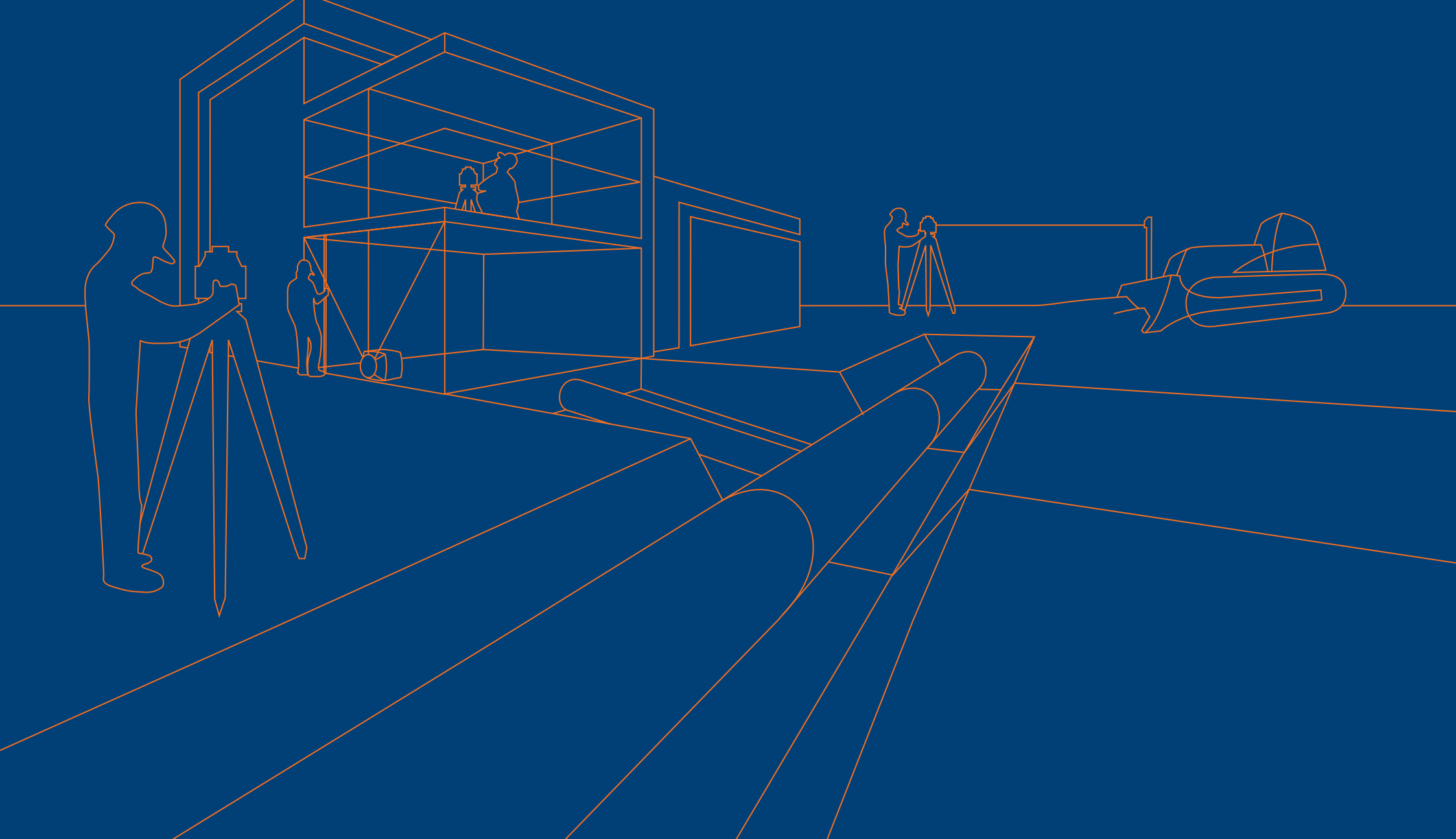


Laser Measuring Tools & Environmental Measuring Instruments

» Here you can view all the other products in our current 2018 catalogue. You can download it as a PDF file from our website at geo-fennel.de/en/downloads. If you have further questions about individual products or require printed catalogue copies, for example, please contact us. We are always open to your wishes and suggestions – you have our word for it!







geo-FENNEL GmbH
Kupferstraße 6
D-34225 Baunatal
Tel. +49 (0)561 - 49 21 45
Fax +49 (0)561 - 49 72 34
info@geo-fennel.de

www.geo-fennel.com

geo
F E N N E L