Excellent quality,
robust, ergonomic

TETRA handsets from funktel
Security in the workplace

funktel FT5 / FT5 S
funktel FT4 Ex / FT4 S Ex

TETRA radio handsets from funktel

TETRA
SECURITY
SYSTEM **TSS**

TETRA solutions
from funktel: the future
of professional communication

■ TETRA digital trunking is the global radio standard and offers all the advantages of professional communication. TETRA radio will soon replace analogue and proprietary radio and paging systems. TETRA combines efficient individual and group communication as well as status and localization information with powerful data transmission.

Funktel has been in the TETRA business for over 10 years and recently announced the FT5 series, a new generation of ergonomic, robust and powerful handsets that offer the same excellent range of features for commercial and industrial networks but is only two-thirds the size of the previous FT4 models.

In developing these handsets, funktel aimed to meet the requirements of users who work alone and require a high level of personal security (in accordance with the BGR139 regulations of the German employers' liability insurance association and DIN V VDE 0825-1). Funktel also offers intrinsically-safe handsets for use in industrial environments with a high risk of explosion and are certified according to the European ATEX directive.

High-End TETRA radio handsets
funktel FT4 and funktel FT5

Suitable for outdoor use (IP 65)

All funktel TETRA handsets are dust-proof and water-jet protected. Maximum protection against external factors allows the equipment to be used under extremely harsh conditions.

Explosion protection

The funktel FT4 Ex and funktel FT4 S Ex versions have specially strengthened and sealed casings as well as electronic safety measures that enable them to be used in industrial environments in which explosive dust and gases are present —certified strictly in accordance with ATEX and IECEx standards.
→ page 6

High-resolution, brilliant display

With a high-resolution (240 x 320 pixels and 262,000 colors) 2.2" TFT color display, the funktel TETRA handset series offers the best display in its class.

funktel FT4 S Ex

funktel FT5 S

Accessories

Enhance the functionality of your TETRA handsets with high quality original equipment accessories— ranging from chargers and batteries to carrying systems or headsets.
→ see Accessories brochure

Personal emergency signal functions

As top-quality TETRA personal emergency signal handsets, the FT5 S and FT4 S Ex Security versions are equipped with high-performance sensors for area and room-specific localization and automatic alarm triggering as well as separate, easily accessible alarm keys for manual alarms. → page 7

Features

Detailed performance characteristics of all versions of the funktel TETRA handsets can be found along with the information on each specific handset on the following pages.

■ With the FT5 and FT4 series of TETRA handsets, funktel has once again set the benchmark for functionality as well as ease of use and convenience. Optimal ergonomics, comprehensive protection against external influences and extensive TETRA performance features are the key differentiators of the funktel FT5 and FT4 series handsets.

In addition, the funktel FT5 S and FT4 S Ex handset versions offer high performance sensors for localization as well as manual and automatic alarm triggering.

The handsets ensure that the safety of solitary workers in hazardous work environments can be actively secured —complying with the stringent BGR139 regulations of the German employers' liability insurance association.

Maximum future-proofing is ensured by a continuous process of further development and seamless integration with existing funktel Security systems or TETRA infrastructure.

funktel FT5 series
Smart TETRA—robust, ergonomic, safe

Features

- High-End TETRA radio according to ETSI standard
- Vibration
- Large red and easy accessible emergency button
- Emergency call in TMO and DMO mode
- Audio amplifier 500 mW (1 W at audio interface)
- Two memory card slots:
  - Micro SIM for E2E Encryption (on request)
  - Micro SD for user-specific settings
- Sensors for health & safety:
  - Hall sensor for loss alarm**
  - Timer and acceleration sensor
  - Automatic brightness control
- Micro SD card functionality (optional)
  - Storage of individual alarm and device settings
  - Storage of different device settings (switchable)

Localization

- Inductive receiver for exact localization up to room and floor level
- Bluetooth module for rough localization**
- 4-way satellite receiver module (GPS, GLONASS, Galileo, BeiDou)

Health & Safety Functionalities

- Automatic detection of emergency situations
- Wide range of alarm and localization sensors
- Cyclic life check with automatic initiation of technical alarm
- Test of safety and localization sensors while log-in
- Automatic registration at control center

*)   at operation with funktel TETRA Secury Systems, certification in progress

**)   components present, software integration in progress

■ The compact, handy and new generation of funktel FT5 / FT5 S TETRA hand-held radios are fully certified for dangerous solo workstations according to DIN VDE and DGUV*. The FT5 series, with a high-performance transmission power of up to 3 W, guarantees trouble-free communication under almost all conditions. Additionally, the innovative quadruple GNSS satellite receiver, supplemented by short-range inductive localization, ensures reliable location in any situation. Bluetooth 4.0 (LE) Smart Ready supports audio connections and additional location information, even with older protocols. The shapely, intuitively operable housing in high-quality and at the same time extremely robust design sets new standards for professional communication with optimal security.

funktel FT5 3a gb (with GPS and Bluetooth)   6.110.113.000
funktel FT5 S 3a igb (with IOS, GPS, and Bluetooth)
6.110.133.000

ET 17012+   dguv.de/dguv-test

*) in progress

Technical data funktel FT5 / FT5 S:

Housing & Display	
Size (H x W x D): (w/o antenna and clip)	138 x 55 x 27 mm (with standard battery) 138 x 55 x 32 mm (with extended battery)
Weight:	189 g (w/o battery) / 245 g (with standard battery) / 283 g (with extended battery)
Protection class:	IP 65 (acc. to IEC 60529, water-jets protected & dust tight)
Temperature range:	Operation: -20… +55 ° C Charge: 0… +40 ° C Storage: -30… +75 °C
Display:	High resolution 2,2'' TFT color display, 240 x 320 Pixel (QVGA), 262.000 colors, support of Cyrillic character sets

Power Supply	
Battery:	Li-Polymer, 3.8 V
Capacity:	1,900 mAh (standard battery) / 3,850 mAh (extended battery)
Operating time (5/5/90):	> 22 h, with extended battery, incl. GNSS (up to 31 h standby) > 12 h, with standard battery, incl. GNSS (up to 21 h standby)

Safety	
Certification:	DIN VDE V 0825-1 and -11, DGUV 112-139, of German government safety organization, for use at dangerous workplaces *
Manual alarm types:	emergency alarm (step 1+2), warning alarm (step 1+2) (each configurable active/inactive)
Automatic alarm types:	Position, No-motion, Time, Loss, each configurable active / inactive, reaction times, pre-alarm times and activator angle for position alarm (default: 55° +/- 5%)
Guard control functionality:	contact-less arrival point detection, for monitoring and validation of watchmen patrol way and time
"Security Light" functionality:	Alarm forwarding to defined TETRA identities incl. rough localization via BT or GNSS (without localization via IOS)

Localization	
Inductive (IOS):	IOS receiver module for exact indoor localization up to room and floor accuracy (via inductive beacons)
Satellite (GNSS): Sensitivity: Accuracy:	Receiver module for GPS, GLONASS, Galileo, BeiDou, Outdoor localization acc. to ETSI LIP protocol -156 dBm (Hot Start) / -160 dBm (reacquisition) 5 m (50% probability), 10 m (95% probability)
Bluetooth (BT):	BT module (4.0/LE) for rough localization** (via BT beacons)

RF Specification	
Frequency range:	380–430 MHz (other frequency ranges available on request)
Channel- / Duplex space:	25 kHz / 10 MHz
Output power:	3 W (power class 3), adjustable in 4 steps of 5 dB
Class of emission:	18KO G7WDT
Receiver class:	A&B
Sensitivity:	-111 dBm (acc. to ETSI EN 302561 V2.1.1)

Operating elements	
Keypad:	Illuminated, alphanumeric keypad with navigation key, two selection keys for easy navigation with quick-access, free assignable numeric keys for special tasks
Function elements:	Free assignable function key at the side (i.e. for warning alarm), two-level rotary knob (volume & group selection), large emergency button
Special functions:	Phone book with up to 1,000 individual and group entries, MicroSD and Micro SIM card slot, accessory interface at the side, Bluetooth for audio and data**, individually configurable audio parameter, configurable charging mode (mute / display / TETRA)

Services	
Voice services (TMO) a.o.:	Group call (half duplex), Single call (half/full duplex), Telephony (full duplex), Emergency call (TETRA and public, i.e. "911"), Late entry, Dynamic group number assignment (DGNA), Scan list (16 lists with up to 16 talk groups per list)
Voice services (DMO) a.o.:	Group call, Single call, Emergency call to DMO group, operation at DMO gateway and DMO repeater**
Data services (TMO + DMO):	Short data service (SDS) (up to 16 SDS templates), Status messages (up to 32)
Encryption (option):	Authentication, Air Interface Encryption (AIE) Class 2 & 3 SIM card based end-to-end encryption (E2EE) on request

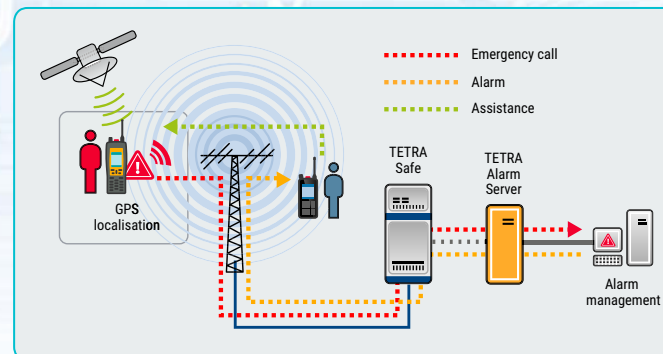*) at operation with funktel TETRA Security Systems, certification in progress
**) components present, software integration in progress
***) without GNSS usage

GPS localization: integrated 4-way GPS receiver module available for all versions of the funktel FT5 series (optionally with funktel FT4)

■ All TETRA handsets from funktel are available with an integrated GPS receiver. This allows the localization of person and terminals by satellite, as well as the use of Automatic Vehicle Localization (AVL).

By means of an AVL application (e. g. a dispatcher workstation with AVL) the actual position of terminals can be shown on a map. In addition, movement profiles can be shown as required, to manage and optimize work-flow and processes.

Desktop charger with extended slot, suitable for all battery types

funktel FT4 Ex series
Intrinsically safe

- The funktel FT4 Ex is an efficient TETRA radio handset for professional users, certified in accordance to the stringent ATEX and IECEx directives for safe operation in highly sensitive areas, even in mining environments

The funktel FT4 S Ex handset is a high-end handset and is certified according to the most stringent ATEX and IECEx directives. It is also equipped with an integrated GPS module. The funktel FT4 S Ex provides the same comprehensive alarm sensors as the funktel FT5 S, which means that all personal alarm functions can be used in highly sensitive and potentially explosive areas as well. Thanks to the unique mining certifcation and IP65 class protection, the funktel FT4 S Ex handsets also resist the harshest conditions.

funktel FT4 Ex with GPS (380-430 MHz)	5.010.921.100
funktel FT4 Ex with GPS (410-470 MHz)	5.010.921.103
funktel FT4 S Ex with GPS (380-430 MHz)	5.010.941.100
funktel FT4 S Ex with GPS (410-470 MHz)	5.010.941.103

Certified for hazardous mining
I M2 Ex ib I Mb

Technical data funktel FT4 Ex / FT4 S Ex:

Housing & Display
Size (H x W x D):	145 x 60 x 36 mm (without antenna)
Weight:	384 g incl. Battery FT4 Ex 1700 mAh
Protection class	Water, dust and shock protected – IP 65 (water-jet and dust proof according to IEC 60529)
Temperature range	Operation: -20... +55 °C charging: 0... +40 °C Storage: -30... +75 °C (without battery)
Type of display:	high resolution 2.2" TFT color display, 240 x 320 pixels, 262,000 colors, support of Cyrillic character sets

Explosion Protection
ATEX (mining/gas/dust):	BVS 11 ATEX E 083 X: I M2 Ex ib I Mb / II 2G Ex ib IIC T4 Gb / II 2D Ex ib IIIC T125°C IP6x Db
IECEx (mining/gas/dust):	IECEx BVS 11.0099X: Ex ib I Mb / Ex ib IIC T4 Gb / Ex ib IIIC T125°C IP6x Db

Power Supply
Battery:	Ex battery lithium ion, 3.7 V, 1700 mAh, incl. vibration
Operating time:	up to 14 h (5/5/90, without GPS), up to 18 h standby

RF Specifcation
Frequency range:	380-430 MHz or 410-470 MHz, others on request
Channel Spacing:	25 kHz
Duplex Spacing:	10 MHz (at 380-470 MHz)
RF Transmission power:	1 W, performance class 4
Class of emission:	25K0 / W7D / W
Receiver class:	A&B
Transmission power regulation:	3 steps of 5 dB
Sensitivity (stat. / dyn.):	-116 dBm (min. -112) / -107 dBm (min. -103)

Security Functions FT4 S Ex
Certifcation:	According to German BGR 139, DIN V VDE 0825-1, security for dangerous workplaces
Alarm and localization sensors:	Fully integrated sensors
Manual alarm types:	Emergency alarm (1+2), warning alarm (1+2), each confgurable active/inactive (emergency alarm 1 always active)
Automatic alarm types:	Position, no-motion, time and loss alarms (confgurable: reaction times, pre-alarm times, active/inactive)
Position alarm:	Trigger angle configurable (standard: 55° +/- 5%)
Guard control function:	Contact-less / integrated
Localization indoor/outdoor:	Inductive localization (IOS) / GPS; fully integrated receiver
Secury Light functionality:	Personal alarms to TETRA identities (without IOS)

Fully integrated GPS Receiver
Sensitivity:	182 dBw (-152 dBm) / 185 dBw (-155 dBm) (acquisition / tracking)
Accuracy:	5 meter (50% probability), 10 meter (95% probability)
Protocol:	ETSI Location Standard Reporting (LIP)

Operating Elements
Illuminated alphanumeric keypad, 3 free assignable function keys at the side, big and easy reachable emergency button, 3 navigation- and 2 selection keys for easy menu navigation

Fast access to sub menus via navigation keys

Two-level rotary button for volume and group selection

Phone book with up to 750 entries

User-defned setting of audio parameter

User-defned settings for behavior of FT4 in charger (Mute / Display / TETRA)

MicroSD memory card

Services
Voice Services TMO: Group calls (half-duplex), single call (half-/full-duplex), telephone call (full-duplex), emergency call (TETRA and public networks, i.e. 911), up to 1000 talk group entries, 16 scan lists with up to 16 groups per list, Late Entry, Dynamic Group Number Assignment (DGNA)

Voice Services DMO: Group call, single call, emergency call to DMO group, support of DMO gateway and repeater mode, Multiple DMO groups and channel

Data Service: Status messages (up to 32), Short Data Service SDS (up to 16 SDS templates), Packet Mode Data

Security: Authentication, Air Interface Encryption Class 2 & 3, SIM card based End-to-End encryption (E2EE)

Personal Security with funktel TSS: Life-Saving Protection

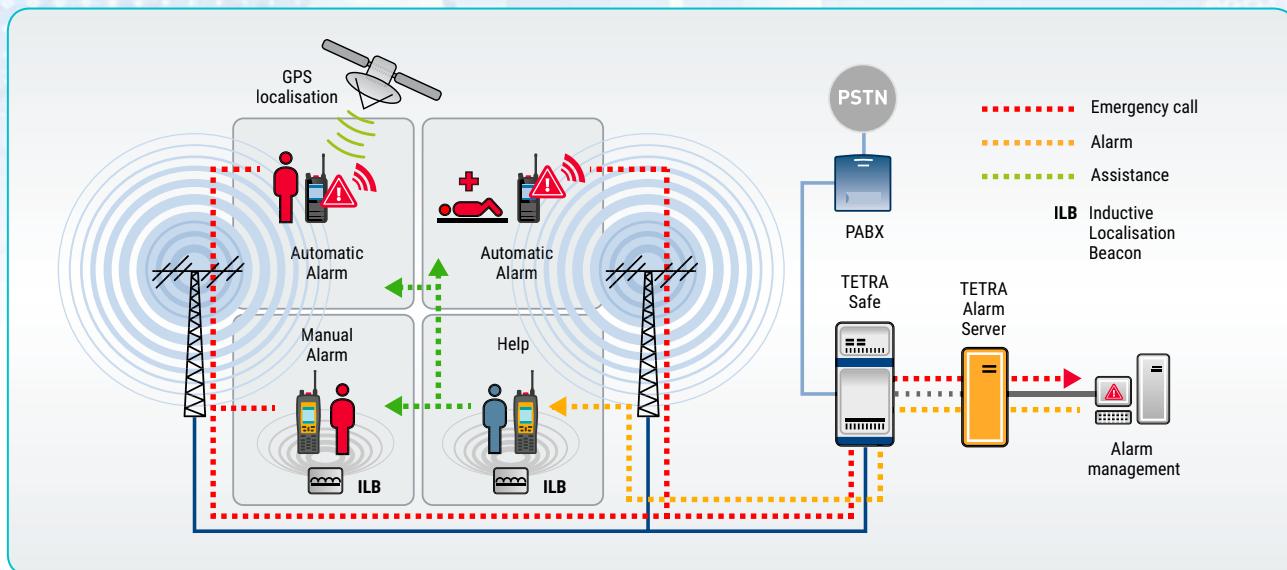**Alarm recognition, signaling, transmission, and assistance**

■ The funktel TSS TETRA Security System offers optimal personal security with specific features as well as sensors for manual and automatic alarm-triggering that are integrated in the handsets.

A voice and monitoring connection can be established by the control center that offers immediate assistance to a colleague who has sounded an alarm. In addition, a voice connection can be established with other system and telephone users at any time. Each reported alarm along with localization data is sent to the central server and the control point respectively, and can be indicated on a floor plan of the building. In this way, assistance can be given without delay and monitoring of activities can be guaranteed. The entire event is comprehensively documented by the funktel Security System for subsequent evaluation.
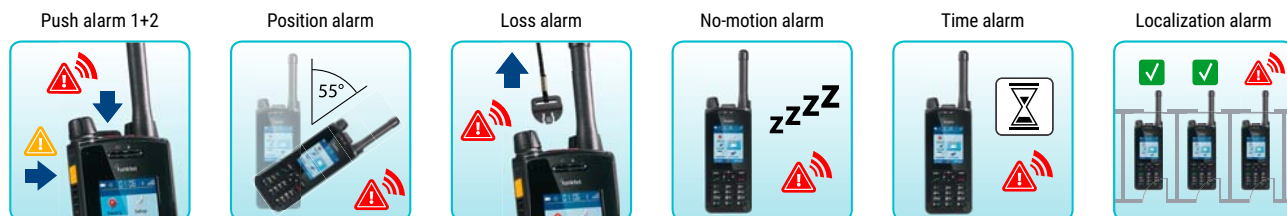
The inherent flexibility of the system allows it to be adapted to your specific requirements.

In addition to the outstanding speech and group communication offered by TETRA radio systems and the forwarding of text reports and alarm signaling to the handsets, the system offers additional capabilities and security functionality, for example:

- Room and floor-specific localization
- Integration with the funktel DSS DECT Secury System
- Integration via PBX and gateways to other communication systems
- Connection to video systems
- Connection to machine and switch contacts to trigger alarm—with either manual or automatic status reporting

Alarm types funktel FT5 S / funktel FT4 S Ex

| Push alarm 1+2 | Position alarm | Loss alarm | No-motion alarm | Time alarm | Localization alarm |

Security & Communication

MORE THAN 50 YEARS OF EXPERIENCE

Personal Security

Guard Round Control

Localization

Explosion Protection

People Tracking

Messaging

With its head office in Salzgitter, funktel GmbH is a leading manufacturer of professional security and communication solutions based on DECT and TETRA for industry, public utilities and authorities.

We are specialists in personal emergency signal systems with mature know-how in developing and producing intrinsically safe devices that also satisfy the directives of the Employer's Liability Insurance Association (of Germany).

As one of the largest manufacturers of handsets for professional and industrial applications, our facility in Salzgitter develops and produces mobile terminals and certified personal emergency signal systems based on DECT and TETRA.