



funkwerk FT4: TETRA Radios for Industry and Personal Security

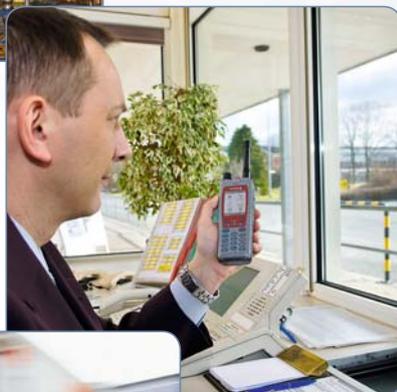
**The TETRA radio handset series:
top quality, robust, ergonomic.**

Communication and Security

Based in Salzgitter, Funkwerk Security Communications GmbH is a leading manufacturer of professional security and communication solutions based on DECT, GSM and TETRA technologies for use in industry, nursing facilities and by public authorities.

We are specialists in personal emergency signal systems and have mature know-how in the development and production of devices for use in explosive atmospheres and which satisfy the requirements of the Employer's Liability Insurance Association in Germany.

As one of the largest producers of personal security systems as well as DECT and TETRA-based handsets for professional and industrial applications, we produce about 250,000 mobile terminals per annum at our facility in Salzgitter.



Funkwerk FT4: TETRA radio handset series

Funkwerk and TETRA: the future of professional communication

As the pan-European standard, TETRA digital trunking radio offers all the advantages of professional communication and will replace analogue and proprietary radio and paging systems in the medium term. TETRA combines efficient individual and group communication as well as status and localisation information with powerful data transmission.

A new generation of efficient terminals offers the greatest possible range of individual features for commercial and industrial networks.

In developing these handsets, attention was also given to the requirements of users who operate at solitary workstations and who 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). Explosion-proof versions—certified in terms of the pan-European ATEX directives—are available for use in industrial environments with a high risk of explosion.

A further advantage lies in the short amortisation period, thanks to the savings in time and money achieved through reduced reaction times and decision processes.

The durability of the product and the easy-to-use, practical accessories ensure a high level of investment security.

funkwerk FT4 series: TETRA radio handsets for industry and personal security

With the FT4-series of TETRA handsets, Funkwerk 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 funkwerk FT4-series handsets.

In addition, the funkwerk FT4 S and FT4 S Ex Security handset versions offer high performance sensors for localisation 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 and DIN V VDE 0825-1.

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

Suitable for outdoor use (IP 65)

All funkwerk FT4 series handsets are dust-proof and protected against water jets. Maximum protection against external factors allows the equipment to be used under extremely harsh conditions.

Personal Emergency Signal functions

As top quality TETRA personal emergency signal handsets, the FT4 S and FT4 S Ex Security versions are equipped with high performance sensors for area and room-specific localisation, and automatic alarm triggering as well as separate, easily accessible alarm keys for manual alarms. → [pages 8/9](#)

Explosion protection

The funkwerk FT4 Ex and funkwerk FT4 S Ex versions have specially strengthened and sealed casings as well as electronic safety measures, which enable them to be used in industrial environments in which explosive dust and gases are present—certified strictly in accordance with ATEX. → [pages 10/11](#)

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 folder](#)

High-resolution, brilliant display

With a high-resolution (240 x 320 pixels and 262,000 colours) 2,2" TFT colour display, the funkwerk FT4-series offers the best display in its class.

Performance characteristics

Detailed performance characteristics of all versions of the funkwerk FT4-series handsets can be found together with the entries for each specific handset on the following pages.



Personal security with funkwerk TSS: protecting life and limb.

Alarm recognition, signalling, transmission and assistance

The funkwerk TSS TETRA Security System offers optimal personal security with specific functions as well as sensors for manual and automatic alarm-triggering integrated with the radio sets.

Eavesdropping and speech links with personnel affected by the alarm can be established and controlled from the control point. In addition, speech links can be established with other Security and telephone users at any time. The inherent flexibility of the system allows it to be adapted to your specific requirements.

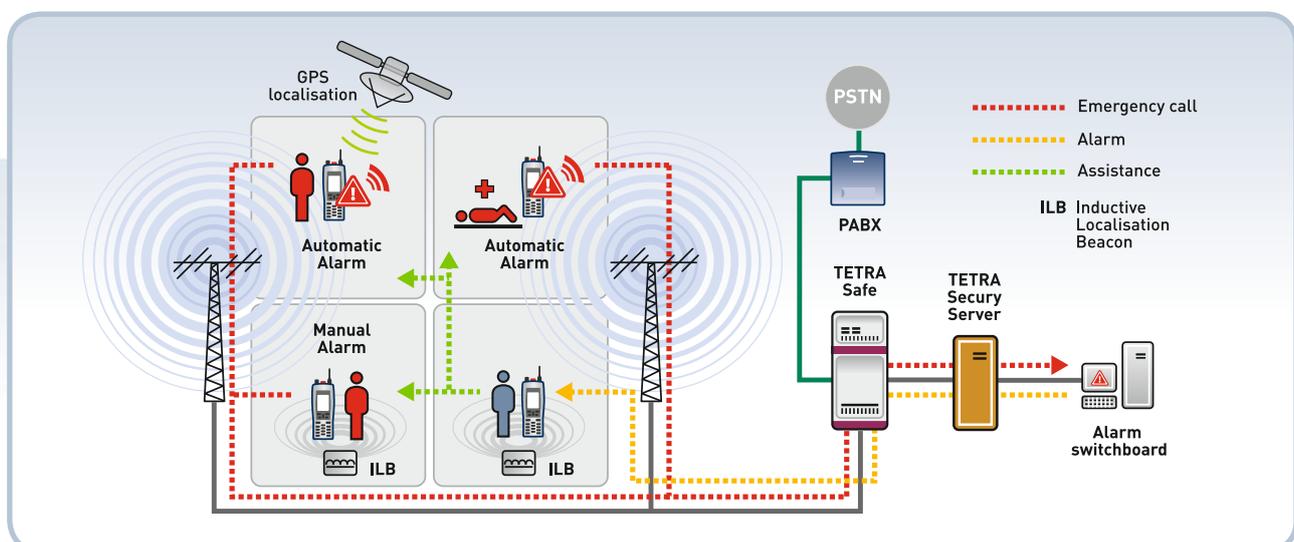
Integrated special functions enable the funkwerk FT4 S series handsets to deal with any emergency:

- ▶ Integrated sensors for localisation and alarms
- ▶ Automatic alarm modes—such as position, no-movement and time-dependent alarms
- ▶ Automatic loss-alarm (by means of a tear-away switch) in the event of the user being overpowered
- ▶ Manual alarms via separate, easy-to-reach emergency and warning keys
- ▶ Area and room-specific localisation after alarm has been triggered
- ▶ Immediate reporting of an alarm to the control point
- ▶ Transmission of alarms to other mobile devices (e.g. personnel in the area)

Every alarm report, together with localisation 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 for subsequent evaluation.

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

- ▶ Room and floor-specific localisation
- ▶ Integration with the funkwerk DSS DECT Security 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



funkwerk FT4: TETRA radio handset

Robust, ergonomic, powerful

Equipped with comprehensive TETRA performance features, the funkwerk FT4 handset is suited for operation not only in normal situations but also under harsh conditions in industrial environments and on construction sites. This is due to its IP65-class protection—making it dust-tight and water jets protected.

Thanks to its clearly demarcated and back-lit keys, the funkwerk FT4 is convenient to use even when wearing gloves. The outstanding display and symbol-based user-prompting ensure optimal control, even under conditions of poor visibility. An integral GPS module is available as an option, allowing localisation in outlying areas.

funkwerk FT4 (380-430 MHz)	5.010.910.100
funkwerk FT4 (410-470 MHz)	5.010.910.103
funkwerk FT4 with GPS (380-430 MHz)	5.010.911.100
funkwerk FT4 with GPS (410-470 MHz)	5.010.911.103



Highlights of the funkwerk FT4 series

- ▶ High resolution 2,2" TFT colour display, 240 x 320 pixels (QVGA), 262,000 colours
- ▶ IP 65-class protection (dust-tight and water jets protected), suitable for outdoor use
- ▶ Robust, impact-resistant casing with full rubber encapsulation for additional shock absorption
- ▶ Illuminated, clearly demarcated keys for easy use—even with gloves
- ▶ Two microphones, one loudspeaker and earpiece for loud and clear audio communication
- ▶ Large red emergency button
- ▶ Individually assignable function keys
- ▶ Integrated GPS receiver (optional)
- ▶ Various memory card slots:
 - ▷ MicroSD card for storage of user-specific settings and parameters
 - ▷ SIM card for E2E encryption
 - ▷ Mini SIM card for network provider data



Charger with additional charging slot for second battery



Robust, shock-resistant housing, illuminated keypad with good differentiation for use when wearing gloves

Technical data funkwerk FT4

Housing and Display

Dimensions	145 x 60 x 36 mm (without antenna)
Weight	325 g incl. battery 2900 mAh
Protection class	Water, dust and shock protected (IP 65) (dust-tight and water jets protected 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 colour display
Resolution	240 x 320 Pixel, 262,000 colours Support for Chinese and Cyrillic character sets

Power Supply

Battery	Lithium-Polymer, 3.7 V, 2900 mAh, incl. vibration
Operating time	up to 24 h (5/5/90, without GPS)

RF Specification

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	-112 dBm / -103 dBm (static / dynamic)

Fully integrated sGPS Receiver (option)

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) Protocol

Operating Elements

Operation	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 defined setting of audio parameter
	User defined settings for behaviour of FT4 in charger (Mute / Display / TETRA)
	MicroSD memory card

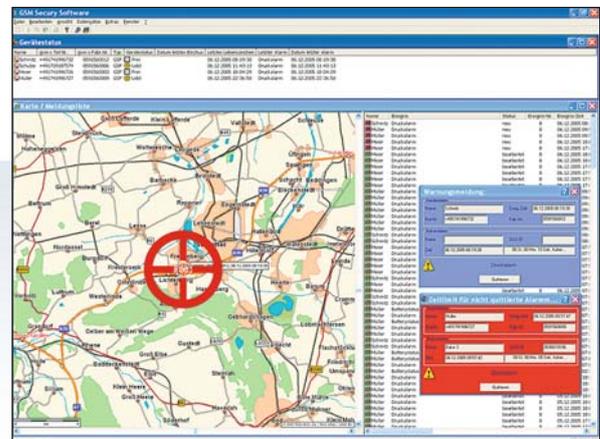
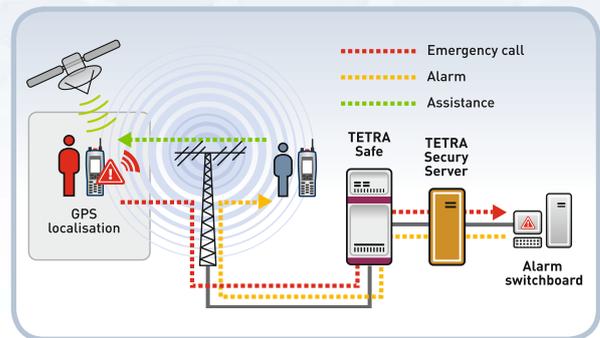
Services

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) Late Entry 16 scan lists with up to 16 groups per list 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)
Information Security	Authentication Air Interface Encryption Class 2 & 3 SIM card based End to End Encryption (E2EE)

GPS localisation: integrated sGPS receiver module optionally available for all versions of the funkwerk FT4 series

All TETRA handsets in the FT4 series are available with an optional GPS receiver. This allows the localisation of person and terminals by satellite, as well as the use of Automatic Vehicle Location (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. The terminals determine their position at pre-set intervals by means of the GPS and then send this data via the TETRA infrastructure (e.g. TETRA Safe) to the dispatcher's workstation, where they can be displayed on a map. In addition to showing actual positions, movement profiles for individual terminals can be shown as required, to manage workflow and processes.



funkwerk FT4 S: TETRA radio handset for optimal personal security

The funkwerk FT4 S handset provides mobile personal security (PES) for solitary workers in hazardous workplaces and is integrated with the funkwerk TSS TETRA security system—complying 100% with the BGR139 regulations of the German employers' liability insurance association and DIN V VDE 0825-1.

In addition to the standard performance features, the funkwerk FT4 S offers efficient integrated sensor and localisation functionality, with cyclic function testing. In addition to manual alarms (emergency and warning alarm), automatic alarm modes (position, loss, no-movement and time-dependent alarm), which comply with the German BG standards. An integral GPS module is available as an option, allowing localisation in outlying areas.

funkwerk FT4 S (380-430 MHz)	5.010.930.100
funkwerk FT4 S (410-470 MHz)	5.010.930.103
funkwerk FT4 S with GPS (380-430 MHz)	5.010.931.100
funkwerk FT4 S with GPS (410-470 MHz)	5.010.931.103



Highlights of the funkwerk FT4 S series

- ▶ Comprehensive integration of the personal emergency signal functions:
 - ▶ Large red emergency push-button with two-stage Security alarm
 - ▶ Integrated sensors for automatic recognition of alarm situations
 - ▶ 4 manual alarms: Push (1+2), Warning (1+2)
 - ▶ 4 automatic alarms: position, no-movement, time-dependent and loss
 - ▶ Room and floor-specific localisation using inductive location beacons (ILBs)
 - ▶ Contactless guard control function
 - ▶ Cyclic life-check for technical alarm at the alarm control point
 - ▶ Sensor and localisation test at log-on
 - ▶ Log-in and log-out at alarm control point
- ▶ BG PNA certification for dangerous workplaces in accordance with BGR 139, DIN V VDE 0825-1
- ▶ High resolution 2,2" TFT colour display, 240 x 320 pixels (QVGA), 262,000 colours
- ▶ IP 65-class protection (dust-tight and water jets protected)—suitable for outdoor use
- ▶ Robust, impact-resistant casing with full rubber encapsulation for additional shock absorption
- ▶ Illuminated, clearly demarcated keys for easy use—even with gloves
- ▶ Two microphones, one loudspeaker and earpiece for loud and clear audio communication
- ▶ Individually assignable function keys
- ▶ Integrated GPS receiver (optional)
- ▶ Various memory card slots:
 - ▶ MicroSD card for storage of user-specific settings and parameters
 - ▶ SIM card for E2E encryption
 - ▶ Mini SIM card for network provider data

Technical data funkwerk FT4 S

Housing & Display

Dimensions	145 x 60 x 36 mm (without antenna)
Weight	325 g incl. battery 2900 mAh
Protection class	Water, dust and shock protected (IP 65) (dust-tight and water jets protected 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 colour display
Resolution	240 x 320 Pixel, 262,000 colours, support for Chinese and Cyrillic character sets

Power Supply

Battery	Lithium-Polymer, 3.7 V, 2900 mAh, incl. vibration
Operating time	up to 24 h (5/5/90, without GPS or IOS)

RF Specification

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	-112 dBm / -103 dBm (static / dynamic)

Security Functions

Certification	According to German BGR 139, DIN V VDE 0825-1, security for dangerous workplaces
Alarm and localisation sensors	Fully integrated sensors
Manual alarm types	emergency alarm (1+2), warning alarm (1+2), each configurable: active/inactive (emergency alarm 1 is always active)
Automatic alarm types	Position, No-motion, Time and Loss alarms (configurable: reaction times, pre-alarm times, active/inactive) Position alarm: trigger angle configurable (standard: 55 ° ±5 %)
Guard control function	Contactless / integrated
Localisation indoor/outdoor	Via inductive localisation beacons (IOS), receiver fully integrated

Fully integrated sGPS Receiver (option)

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) Protocol

Operating Elements

Operation	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
	Tear-away contact for loss alarm
	Phone book with up to 750 entries
	User defined setting of audio parameter
	User defined settings for behaviour 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)
	Late Entry
	16 scan lists with up to 16 groups per list
	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)
Information Security	Authentication
	Air Interface Encryption Class 2 & 3
	SIM card based End to End Encryption (E2EE)

Alarm types funkwerk FT4 S (Ex)

Push alarms



Position alarm



Loss alarm



No-motion alarm



Time alarm



funkwerk FT4 Ex: TETRA radio handset

Intrinsically safe

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

With its top equipment protection level, the funkwerk FT4 Ex fulfils highest health and safety requirements for equipment and can be used even in hazardous explosive atmospheres with conductive dust or special gases (i.e. hydrogen or acetylene)—as usually for example in the chemical industry or in special refineries.

funkwerk FT4 Ex (380-430 MHz)	5.010.920.100
funkwerk FT4 Ex (410-470 MHz)	5.010.920.103
funkwerk FT4 Ex with GPS (380-430 MHz)	5.010.921.100
funkwerk FT4 Ex with GPS (410-470 MHz)	5.010.921.103



Technical data funkwerk FT4 Ex

Housing & Display

Dimensions	145 x 60 x 36 mm (without antenna)
Weight	325 g incl. battery 2900 mAh
Protection class	Water, dust and shock protected (IP65) (dust-tight and water jets protected 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 colour display
Resolution	240 x 320 Pixel, 262,000 colours Support for Chinese and Cyrillic character sets

Explosion Protection

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

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)

RF Specification

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	-112 dBm / -103 dBm (static / dynamic)

Fully integrated sGPS Receiver (option)

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) Protocol

Operating Elements

Operation	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 defined setting of audio parameter User defined settings for behaviour of FT4 in charger (Mute / Display / TETRA) MicroSD memory card
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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) Late Entry 16 scan lists with up to 16 groups per list 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)
Information Security	Authentication Air Interface Encryption Class 2 & 3 SIM card based End to End Encryption (E2EE)

funkwerk FT4 S Ex: TETRA radio handset Intrinsically safe with personal security functions

As a high-end product of the funkwerk FT4 series, the funkwerk FT4 S Ex handset has the same comprehensive sensors as the funkwerk FT4 S as well as being certified according to the most stringent ATEX and IECEx directives (IIC T4). All personal emergency signal functions can be used in highly sensitive and potentially explosive areas. Thanks to the IP 65-class protection, the funkwerk FT4 S Ex handsets also resist the harshest conditions.

The funkwerk FT4 S Ex is the first TETRA radio that covers all known application scenarios and is suitable for use in hazardous and solitary working environments, such as in the chemical industry or in oil or gas companies. Of course the FT4 S Ex is optional available with an integrated GPS module.

funkwerk FT4 S Ex (380-430 MHz)	5.010.940.100
funkwerk FT4 S Ex (410-470 MHz)	5.010.940.103
funkwerk FT4 S Ex with GPS (380-430 MHz)	5.010.941.100
funkwerk FT4 S Ex with GPS (410-470 MHz)	5.010.941.103



Technical data funkwerk FT4 S Ex

Housing & Display

Dimensions	145 x 60 x 36 mm (without antenna)
Weight	325 g incl. battery 2900 mAh
Protection class	Water, dust and shock protected (IP65) (dust-tight and water jets protected 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 colour display
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Explosion Protection

ATEX (gas & dust)	BVS 11 ATEX E 083 X: II 2G Ex ib IIC T4 Gb / II 2D Ex ib IIIIC T125°C IP6x Db
IECEx (gas & dust)	IECEx BVS 11.0099X: Ex ib IIC T4 Gb / Ex ib IIIIC T125°C IP6x Db
Mining	Marking: I M2 Ex ib I Mb (under preparation)

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 or IOS)

RF Specification

Frequency range	380-430 MHz or 410-470 MHz, others on request
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RF Transmission power	1 W, performance class 4
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Certification	According to German BGR 139, DIN V VDE 0825-1, security for dangerous workplaces
Alarm and localisation sensors	Fully integrated sensors
Manual alarm types	Emergency alarm (1+2), warning alarm (1+2), each configurable: active/inactive (emergency alarm 1 is always active)
Automatic alarm types	Position, No-motion, Time and Loss alarms (configurable: reaction times, pre-alarm times, active/inactive) Position alarm: trigger angle configurable (standard: 55 ° ±5 %)
Guard control function	Contactless / integrated
Localisation indoor/outdoor	Via inductive localisation beacons (IOS), receiver fully integrated

Fully integrated sGPS Receiver (option)

Sensitivity	182 dBw (-152 dBm) / 185 dBw (-155 dBm) (Acquisition / Tracking)
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Services

See left	identical to funkwerk FT4 Ex
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Communication and Security

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