

One Step Ahead.



Be first in your market—with trendsetting mobile products and solutions.

Hazardous Rated Mobile Devices from ecom by Pepperl+Fuchs



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Ensuring Safety Across the Globe

Explosion protection is a matter of trust. That is why ecom sets the highest standards by collaborating directly with our customers. Only by working together can we tailor our solutions to our customers' exact requirements. Our global service network allows us to integrate this concept into the life cycle of our products. Personalized support is always just a phone call away.



Efficiency and Connectivity Anytime and Anywhere

Companies from a range of industries are facing mobile workforce challenges including:

- Maximizing workforce productivity
- Providing the right information when and where it is needed
- Accurate data capture for real-time decision making
- Minimizing time and costs
- Improving knowledge retention

Innovative Solutions from a Single Source

Pepperl+Fuchs offers a range of coordinated peripherals, accessories, and software solutions as an ideal complement.

Exploring Mobility

Organizations are starting to realize how mobility solutions can benefit their business. Today, the focus is on technologies that reduce costs and improve efficiency. Game-changing breakthroughs in mobile computing and communication technologies are enabling industries to improve workforce safety and productivity, data quality, and the speed and

accuracy of decision-making. The Internet of Things (IoT) has become increasingly important in the field of industry and will change the way companies deploy labor to use resources more effectively.



Applications 4.0

- Inspection/maintenance
- Asset management/tracking
- Collaborative working
- Scanning/auto ID
- Process automation/operations
- Lone worker protection/localization (GeoIP)
- Engineering/installation
- Augmented reality (AR)
- Security/safety
- Push-to-talk (PTT)



Hardware

Peripherals

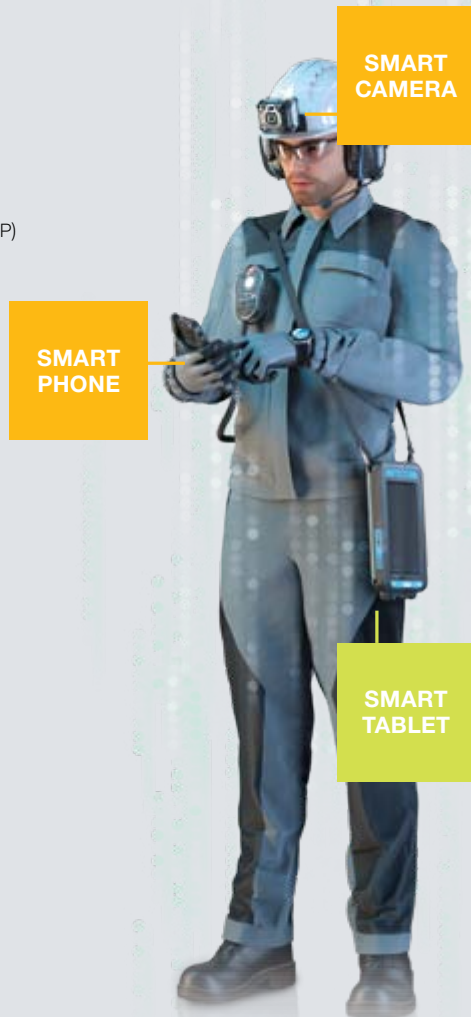
- Scanner
- Camera
- Headset
- Radio speaker microphone

Certification

- Ex certifications
- Regulatory
- Wireless certifications

Accessories

- Desktop charger/docking
- Spare battery
- Case
- Cradles



Software

- User management
- Customized roles and rights
- Android Enterprise Recommended (AER)
- Android Zero Touch
- Kiosk mode
- APKs
- API/3rd party



Safety

- Mobile worker
- Assets
- Data



Support

- Sales and application engineering
- Service-level agreements
- Service with repair and Ex testing



Digital Products and Services

- Preconfiguration/staging
- Mobile device management (over-the-air)
- Device analytics

Digital Products and Services

Digital Products and Services is a solution that combines automated staging, mobile device management, and device analytics. It can also be used as a full-fledged enterprise mobility management system if required.

At the customer's request, ecom's mobile devices can ship from the factory with predefined custom configurations such as security settings, applications, and wireless setup. This allows devices to be used anywhere in the world immediately upon delivery.

The devices can be managed via the ecom online platform and updated remotely at any time during operation without having to be sent to local IT staff or the headquarters.

Cloud servers hosted in Germany meet the highest data protection standards and guarantee high data availability and security.

One-time staging and enrolling can also be done internally via ecom's production servers. If required, device diagnostics and analytics can collect real-time operational data and fault analyses to continuously monitor device statuses and fix malfunctions preventively or immediately.

Additionally, the platform analyzes historical data to detect critical software events, installations, and other safety-critical processes. A statistical accumulation of events can be used to establish correlations and causalities between software errors, geographical data, and Wi-Fi coverage, for example.

Digital Products and Services is a ready-to-use service that ensures quality and security for all devices. This saves time and valuable resources.

Staging and Enrolling

eCSL – Custom Service Load

- Custom device preconfiguration
- Delivered ready-to-use

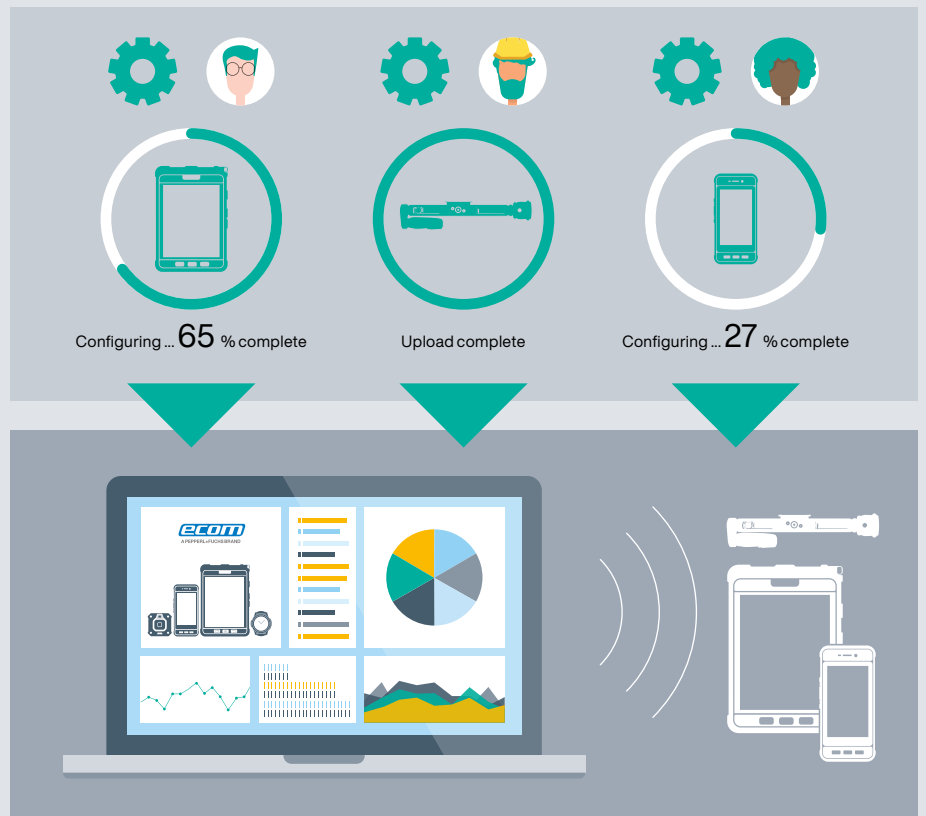
Configuring and Management

eMDM – Mobile Device Management

- Update devices around the world simultaneously

Device Diagnostics

- Analytics help avoid problems and correct errors



Smart-Ex® 02

The Next Generation of Rugged and Intrinsically Safe Smartphones



The Smart-Ex® 02 is the world's first intrinsically safe smartphone for Zone 1/21 and Div. 1 areas that meets Google's sophisticated Android Enterprise Recommended (AER) validation. In addition, it meets all important global hazardous area and regulatory certifications.

The rugged smartphone has a large, high-resolution display, powerful features, and optimized accessories. Its extended temperature range makes it suitable for even the harshest environments. Designed to support 21 LTE frequency bands, the Smart-Ex® 02 has no SIM lock and can be connected to different networks worldwide. An Android™ 11 operating system enables the intrinsically safe device to work safely, quickly, and efficiently.

The ergonomic design and intuitive user interface enhance the user experience, and optimized accessories and peripherals

ensure total compatibility with current and future ecom products. Equipped with the most **powerful replaceable battery** (4,400 mAh) on the market, the device can handle unexpectedly long shifts and runtimes.

The Smart-Ex® 02 also sets new standards when it comes to security. The Android Enterprise Recommended certification and regular security updates prevent unauthorized access to confidential personal and company data.

To ensure unlimited, long-term use of the smartphone, ecom offers a three-year service level agreement. Pepperl+Fuchs' global sales and service network provides excellent customer service around the globe. Support from ecom's system engineers and development teams is also available when software requirements change.





Operating System
Android™

Connectivity
Wi-Fi Standard 802.11 a/b/g/n/ac/e/k/r/h
Wi-Fi 2.4 GHz and 5 GHz support
Bluetooth® 4.2 incl. BLE
GPS/A-GPS/GLONASS/BeiDou/Galileo/NFC

Band
Supports 21 LTE frequency bands
Dual SIM allows flexible integration in business environments

Ports
Waterproof magnetic USB 2.0 connection

2 Cameras (Front and Rear)
12 MP camera with autofocus and LED flash + 5 MP camera

Dedicated Keys
User-programmable buttons for special functions, e. g., camera, alarms

Memory
3 GB RAM, 32 GB ROM
Up to 128 GB additional memory with microSD

Power
Powerful replaceable battery, lasts an entire working day (4400 mAh)

Extended Temperature Range
-20 °C ... +60 °C



Highlights



World's 1st Android Enterprise Recommended smartphone with ATEX/IECEx Zone 1/21, Div.1



21 LTE frequency bands, no SIM lock, and SIM free for flexible use around the world



Individualized service and support around the globe with faster response times



Ultra-rugged, 5" multitouch display can be operated with gloves



Latest Android™ operating system: quick, safe, and efficient



Ergonomic design and an intuitive user interface: dedicated keys like push-to-talk and volume control can be configured individually

Smart-Ex® 02



Smart-Ex® 02DZ1



Smart-Ex® 02DZ2

Extensive Range of Accessories and Peripherals from a Single Source

Components such as remote speaker microphone (RSM) and headsets expand the range of applications for the new Smart-Ex® 02 and are perfectly suited for future IIoT applications.

Accessories

- Travel charger TC S02
- Desktop charger DS S02
- Battery charger DC Ex-BP S02
- USB data cable PC S02

Compatible Peripherals

SM1P

Bluetooth®
Headset



Ident-Ex® 01

Barcode scanner/
RFID reader



RSM-Ex 01

Remote Speaker
Microphone



Technical Data: Smart-Ex® 02

Operating system	Android™ Latest available Android firmware release For details, see https://www.ecom-ex.com/products/communication/cell-phones/
Chipset	Qualcomm Snapdragon 450 platform
Band	Cellular frequency bands: 4G LTE FDD: B1, B2, B3, B4, B5, B7, B8, B11, B12, B13, B20, B21, B25, B26, B28, B66, B71 4G LTE TDD: B38, B39, B40, B41 3G UMTS: 850/900/1,700/1,900/2,100 MHz 2G GSM: 850/900/1,800/1,900 MHz
Wi-Fi	Wi-Fi 2.4 GHz and 5 GHz support Wi-Fi Standard 802.11 a/b/g/n/ac/e/k/r/h
Memory	3 GB RAM, 32 GB ROM
User memory	SD card up to 128 GB
Applications	Google Play Store certified
Bluetooth® SMS, MMS (text, image, audio, video)	Bluetooth® 4.2 incl. BLE (Bluetooth® Low Energy) Support SMS and MMS
GPS, NFC	GPS/A-GPS/GLONASS/BeiDou/Galileo/NFC
Email client	EAS, Gmail, POP3, IMAP
Power	Li-ion 3.7 V/4,400 mAh/16.28 Wh
Operating temperature	-20 °C ... +60 °C
Protection class	IP68, MIL-STD-810G
Size	163 × 82 × 22 mm
Weight	Approx. 380 g
Dedicated keys	Alarm/power/multifunction/volume/hardware buttons for Android features
Ports	3.5 mm jack connection with special ecom mounting solution Waterproof magnetic USB 2.0 connection
Display size	12.7 cm (5.0 in)
Display type	Extreme shock- and scratch-resistant Gorilla® Glass with glove touch and wet mode
Microphone	Dual mic solution with three selectable background noise suppression options
Speaker	Loudspeaker with GORE® Protective Vents
Camera	12 MP rear with autofocus and LED flash with flashlight function/5 MP front (optional)
Video streaming	Support MP4, M4V, 3GP, 3G2, TS, WMV, ASF, AVI, FLV, MKV, WEBM
LED flashlight	Yes

Ex-Handy 10

The Next Generation of Rugged and Intrinsically Safe Feature Phones

Ex-Handy 10— Flexible Communication in Hazardous Areas

Simple, rugged, and practical: the Zone 1/21- and Div. 1-certified 4G/LTE feature phone is ideal for a wide range of applications—from pure communication to lone worker protection and innovative Industry 4.0 applications.

The Ex-Handy 10 is suitable for global 4G communication, supports 21 LTE bands, and offers both keypad and touch-screen operation. The display is made of extremely durable, scratch-resistant Gorilla® Glass (IP68-rated) and can even be operated with gloves. The Ex-Handy 10 is designed for the harshest environments—it is operable in temperatures from -20 °C to +60 °C and provides good readability in direct sunlight.

The feature phone has an optional 8 MP camera, which includes autofocus, LED flash, and flashlight. An advanced rechargeable battery and energy management provide outstanding operating times.

The Android™ operating system offers regular patches and security updates. To ensure unlimited, long-term use of the feature phone, ecom offers a three-year service level agreement. Pepperl+Fuchs' sales and support network provides excellent customer service around the globe. Support from ecom's system engineers and development teams is also available when software requirements change.





Operating System
Android™

Connectivity
Wi-Fi 2.4 GHz and 5 GHz support
Wi-Fi standard 802.11 a/b/g/n/e/k/r/h
Bluetooth® 4.2 (incl. BLE)
NFC
GPS/A-GPS/GLONASS/BeiDou

LTE
Supports 21 LTE bands

Ports
Waterproof magnetic USB 2.0 connection

Camera
8 MP camera with autofocus, LED flash, and flashlight function

Dedicated Keys
User-programmable buttons for special functions, e. g., alarms

Memory
2 GB RAM + 16 GB ROM
SD card up to 128 GB

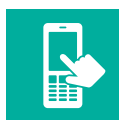
Power
Powerful battery lasts an entire working day

android 

Highlights



Global approvals for Zone 1/21, Div. 1 and Zone 2/22, Div. 2



Supports both keypad and touch-screen operation



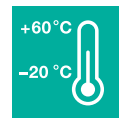
Powerful battery lasts an entire working day



Extremely rugged dust- and waterproof housing with a scratch-resistant display



Supports 21 LTE frequency bands and has no SIM lock for use around the world



Made for use in operating temperatures from -20°C...+60°C

Ex-Handy 10



Ex-Handy 10 DZ1



Ex-Handy 10 DZ2

Extensive Range of Accessories and Peripherals from a Single Source

Components such as remote speaker microphone (RSM) and headsets expand the range of applications for the new Ex-Handy 10 and are perfectly suited for future IIoT applications.

Accessories

- Leather case LC H10
- Leather holster LH H10
- Cradle CR-Ex H10

Additional accessories can be found at pepperl-fuchs.com/pf-mcc-accessories

Compatible Peripherals

SM1P

Bluetooth® Headset



Ident-Ex® 01

Barcode scanner/
RFID reader



RSM-Ex 01

Remote Speaker
Microphone



Technical Data: Ex-Handy 10

Operating system	Android™ Latest available Android firmware release For details, see https://www.ecom-ex.com/products/communication/cell-phones/
Chipset	Qualcomm Snapdragon MSM8909 platform
Band	Cellular frequency bands: 4G LTE FDD: B1, B2, B3, B4, B5, B7, B8, B11, B12, B13, B20, B21, B25, B26, B28, B66, B71 4G LTE TDD: B38, B39, B40, B41 3G UMTS: 850/900/1,700/1,900/2,100 MHz 2G GSM: 850/900/1,800/1,900 MHz
Wi-Fi	Wi-Fi 2.4 GHz and 5 GHz support Wi-Fi Standard 802.11 a/b/g/n/e/k/r/h
Memory	2 GB RAM + 16 GB ROM
User memory	SD card up to 128 GB
Applications	Google Play Store certified
Bluetooth® SMS, MMS (text, image, audio, video)	Bluetooth® 4.2 incl. BLE (Bluetooth® Low Energy) Support SMS and MMS
GPS, NFC	GPS/A-GPS/GLONASS/BeiDou/NFC
Email client	EAS, Gmail, POP3, IMAP
Power	Li-ion 3.7 V/4,400 mAh/16.28 Wh
Battery life	Up to 600 hours standby
Operating temperature	-20 °C ... +60 °C
Protection class	IP68, MIL-STD-810G
Size	148 × 67 × 24 mm
Weight	Approx. 330 g
Dedicated keys	Power/multifunction/volume/hardware buttons for Android features
Ports	3.5 mm jack connection with special ecom mounting solution Waterproof magnetic USB 2.0 connection
Display size	6.6 cm (2.6 in)
Display type	Extreme shock- and scratch-resistant Gorilla® Glass with glove touch and wet mode
Microphone	Dual mic solution with three selectable background noise suppression options
Speaker	Loudspeaker with GORE® protective vents
Camera	8 MP rear camera with autofocus and LED flash (optional)
Video streaming	Support MP4, M4V, 3GP, 3G2, TS, WMV, ASF, AVI, FLV, MKV, WEBM
LED flashlight	Yes

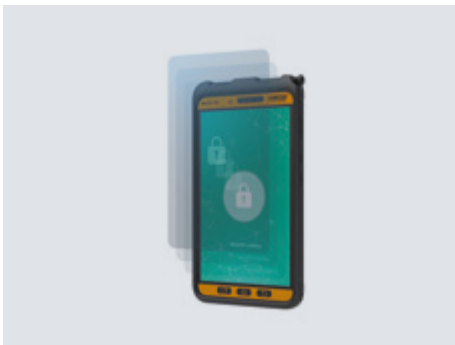
The Next Generation of 8" Android Tablets for Use in Hazardous Areas

The rugged, highly secure, and hazardous area-rated tablet Tab-Ex® 03 continues the success story with the 3rd generation 8" Tab-Ex® series. The Tab-Ex® 03 DZ2/D2 comes in a slim and lightweight design with a new high-performance operating system that powers the tablet with industry-leading performance in hazardous areas. The Samsung DeX function turns the compact tablet into a full desktop computer, and additional accessories, peripherals, digital products, and services ensure superior flexibility.



Total Reliability, Assuring User-Friendliness

ecom's new 8" Android tablet Tab-Ex® 03 DZ2/D2 comes in a slim and lightweight design. Despite the slim form factor the tablet ensures high performance for use in Zone 2/22 and Div. 2. The multitouch display can be operated with an S Pen and with gloves, and offers optimal readability even in direct light. From indoor pharmaceutical applications to harsh ambient conditions, the Tab-Ex® 03 is designed for use in temperatures ranging from -20 °C to +55 °C and in the most demanding industries. As a proven product for industrial and harsh environments, it stands for a long-term strategic partnership with Samsung.



Advanced Security, Protecting Data and Device

Based on Samsung's state-of-the-art Galaxy Tab Active3, the device ensures high data and device security via Google Android™ operating system and Samsung Knox. The Tab-Ex® 03 supports all Knox features like mobile enrollment, configuration management and E-FOTA. Besides biometric authentication and a baseline protection against malware, privacy hacks and more, the basic device, Samsung Galaxy Tab Active3, is part of the Android Enterprise Recommended (AER) program. Devices awarded with Android Enterprise Recommended fulfill the highest performance and security requirements of Google.



Efficiency to Go, Taking Mobile Working to New Dimensions

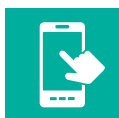
Via Samsung DeX mode, the Tab-Ex® 03 can be quickly and easily connected to a keyboard, mouse, and monitor in the office, providing a full desktop experience and offering with its one-device-strategy a cost-saving, equal alternative to desktop PCs. Charging and data transfer take place via a pogo pin connector. Special keys on the new Tab-Ex® 03 can be customized—for example, as an emergency key for maximizing safety. Google ARCore™ is used to implement important augmented reality applications, such as remote support and training, and tailor-made tools for predictive maintenance. These features support quality assurance and make plants safer. Pepperl+Fuchs' and ecom's Digital Products and Services complete the solution with ready-to-use devices optimized for individual requirements.



Highlights



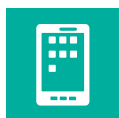
The slim and lightweight 8 Android Tablet for use in Zone 2/22 and Div.2



Ultra-rugged multitouch display can be operated with gloves and S Pen



Latest Android™ operating system: quick, safe, and efficient



Based on Samsung's state-of-the-art Galaxy Tab Active3, MIL-STD-810H certified



Connect a keyboard, mouse, and monitor via Samsung DeX mode for a full desktop experience



Digital Products and Services provide a ready-to-use service that ensures quality and security

Tab-Ex® 03



Extensive Range of Accessories and Peripherals from a Single Source

Components such as the Viator Bluetooth® HART Interface expand the range of applications for the new Tab-Ex® 03 and are perfectly suited for future IIoT solutions.

Accessories

- LC T03 leather case
- CH T03 chest harness
- Belt clip
- Carrying strap

Compatible Peripherals

Viator Bluetooth® HART Interface

Modem




Ident-Ex® 01

Barcode scanner/
RFID reader



RSM-Ex 01

Remote Speaker
Microphone



Technical Data: Tab-Ex® 03

Operating system	Android™ Unless otherwise specified, the product is shipped with the latest firmware release. Latest firmware release: Android™ 12
Chipset	Exynos 9810 (Lhotse) Octa-Core 64-Bit; 4 x 2.7 GHz, 4 x 1.7 GHz
RAM	4 GB
Internal data memory	64 GB, free available memory 48.6 GB
microSD	512 GB (optional), up to 1 TB possible
Display	1920 x 1200 pixels (WUXGA), 8", TFT, 480 nit brightness, operation: also with gloves/in wet conditions & snow
Sensors	Accelerometer, gyro sensor, geomagnetic sensor, hall sensor, RGB light sensor, proximity sensor
Dimensions	213.8 mm x 126.8 mm x 9.9 mm, approx. 610 g
Operating temperature	-20 °C ... +55 °C
Degree of protection	IP64 according to EN/IEC 60079-0 (ATEX/IECEX)
Connectivity	<ul style="list-style-type: none"> ■ Wi-Fi 802.11 a/b/g/n/ac/ax (2.4GHz + 5GHz), 2x2 MIMO ■ Bluetooth® 5.0 ■ Wi-Fi Direct ■ NFC EMV L1 ■ GPS, GLONASS, BeiDou, Galileo ■ USB 3.1 Type-C ■ Wi-Fi does not support cellular
Frequency bands	<p>Supported cellular frequency bands:</p> <ul style="list-style-type: none"> ■ 4G LTE FDD: B1, B2, B3, B4, B5, B7, B8, B12, B13, B17, B20, B28, B66 ■ 4G LTE TDD: B38, B40, B41 ■ 3G UMTS: B1, B2, B4, B5, B8 ■ 2G GSM: 850 / 900 / 1800 / 1900 MHz <p>US-Version: LTE-Support: AT&T, Sprint, T-Mobile, Verizon</p> <p>Supported cellular frequency bands:</p> <ul style="list-style-type: none"> ■ 4G LTE FDD: B2, B3, B4, B5, B7, B12, B13, B14, B17, B25, B26, B29, B66, B71 ■ 4G LTE TDD: B41 ■ 3G UMTS: B1, B2, B4, B5, B8
SIM	1x Nano SIM (optional)
Security	Samsung KNOX, Face Recognition
Camera: Rear + front	13 MP AF + 5 MP/optional: Non-camera
Battery capacity	Li-ion battery 3.8 V/18.87 Wh/4900 mAh/runtime of up to 11 hours
Applications	Google ARCore, MDM Systems

Tab-Ex® Pro

The World's First 10" Android Tablet for Hazardous Areas

The new Tab-Ex® Pro is the next major component in ecom's successful tablet series. Featuring the world's first 10" display with Zone 2/22 and Div. 2 approvals, the device is ideal for web-based content and the most demanding Industry 4.0 applications. The Samsung DeX function turns the compact tablet into a full desktop computer, and additional accessories, peripherals, digital products, and services ensure superior flexibility.

Total Reliability, Global Use

ecom's new Tab-Ex® Pro is the world's first 10.1" Android tablet to be certified for Zone 2/22 and Div. 2. Based on the Samsung Galaxy Tab Active Pro, the device stands for tested quality, compatibility, and a long-standing, successful partnership with Samsung. Despite the large screen, the tablet is impressively slim, lightweight, and easy to use. The multitouch display

can be operated with an S Pen and with gloves, and offers optimal readability even in direct light. From indoor pharmaceutical applications to environments—the Tab-Ex® Pro is designed for worldwide use in temperatures ranging from -20 °C to +55 °C in the most demanding industries.

High Security Standards, Complete Protection

By combining Samsung Knox with the Android operating system, ecom's Tab-Ex® Pro ensures that company data and processes are secure. The multilayered security mechanisms of the Knox platform work together to protect against viruses, malware, and similar threats. For additional security and convenience, the device offers biometric authentication via facial recognition and a fingerprint scanner (only valid for the D2 version).

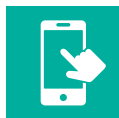




Highlights



World's first 10" Android tablet for Zone 2/22; Division 2



Ultra-rugged 10" multitouch display can be operated with gloves



Latest Android™ operating system: quick, safe, and efficient



The wide screen is designed for IIoT and web-based applications



Connect a keyboard, mouse, and monitor via Samsung DeX mode for a desktop-like experience



Digital Products and Services provide a ready-to-use service that ensures quality and security

Tab-Ex® Pro



Tab-Ex® Pro D2



Tab-Ex® Pro DZ2

Extensive Range of Accessories and Peripherals from a Single Source

Components such as desktop charger, remote speaker microphone (RSM), and headsets expand the **range of applications for the new Tab-Ex® Pro** and are perfectly suited for future IIoT solutions.


Accessories

- LC TPRO X2 leather case
- CH TPRO X2 chest harness
- BC T01 belt clip
- Carrying strap

Compatible Peripherals

SM1P

Bluetooth® Headset




Ident-Ex® 01

Barcode scanner/
RFID reader



RSM-Ex 01

Remote Speaker
Microphone



Technical Data: Tab-Ex® Pro

Operating system	Android™11
Applications	<ul style="list-style-type: none">■ Google ARCore■ Samsung Knox
Processor	Qualcomm SDM670 Octa-Core 64 bit 2.0 GHz, 1.7 GHz
Memory	RAM: 4 GB, internal data memory: 64 GB, with external microSD up to 512 GB
Display	<ul style="list-style-type: none">■ 1,920 × 1,200 pixels (WUXGA),■ 10.1" (25.6 cm), TFT, 550 nit brightness;■ Operation also possible with gloves/in wet conditions
Sensors	Accelerometer, barometer, fingerprint sensor (D2 device only), gyroscope, geomagnetic sensor, hall effect sensor, RGB light sensor, proximity sensor
GPS, NFC	Yes
Dimensions and weight	243.5 × 170.2 × 9.9 mm (W × H × D); approx. 850 g (D2), 930 g (DZ2)
Operating temperature	-20 °C ... +55 °C
Connectivity	<ul style="list-style-type: none">■ LTE; Wi-Fi Standard 802.11 a/b/g/n/ac (2.4 GHz+5 GHz), VHT80■ Bluetooth® 5.0 (LE up to 2 MBit/s)■ Wi-Fi Direct■ NFC EMV L1■ Headphone out: 3.5 mm■ USB 3.1 Type-C■ Pogo pin (for charging, data transfer, and USB signal for keyboard)
SIM	1 x Nano SIM
Frequency bands	Supported cellular frequency bands: <ul style="list-style-type: none">■ 4G LTE FDD: B1, B2, B3, B4, B5, B7, B8, B12, B13, B17, B20, B28, B66■ 4G LTE TDD: B38, B40, B41■ 3G UMTS: B1, B2, B4, B5, B82G■ GSM: 850/900/1,800/1,900 MHz US Version LTE-Support: AT&T, Sprint, T-Mobile, Verizon Supported cellular frequency bands: <ul style="list-style-type: none">■ 4G LTE FDD: B2, B3, B4, B5, B7, B12, B13, B14, B17, B25, B26, B29; B66, B71■ 4G LTE TDD: B41■ 3G UMTS: B1, B2, B4, B5, B8
Camera	Rear: 13 MP with flash; front: 8 MP
Battery capacity	Li-ion Battery 3.8 V/7,400 mAh/28.12 WH/runtime of up to 15 hours of + battery is replaceable

Windows Tablet: Rugged Mobility at Its Finest for Zone 2 and Div. 2

Pad-Ex® 01 P8 redefines the mobile tablet PC with Windows® support. In addition to its incredible ruggedness, Pad-Ex 01 P8 meets all demands and supports Intel® Core™ i5 and i7 processor. It also provides battery life up to 7/14 hours and Windows® 10 support. The combination of durability, superior performance, and a large display makes the device an ideal addition to or replacement for desktop PCs, laptops, or wall-mounted displays in the field.

Reliably Rugged: Thin, Light, and Strong

Pad-Ex® 01 P8 is rugged mobility at its finest. Its ultrathin, lightweight exterior measures only 20 mm in height and 1.2 kg in weight.

With its ultra-compact design, Pad-Ex 01 P8 complies with IP64 and MIL-STD-810G for vibration. Additional display protection offers durability in harsh environments and an ergonomic design makes it easy to transport.

11.6" Widescreen Display

- Sunlight-readable display
- Capacitive multitouch screen

Integrated Options for Various Applications

- Data collection
- 1-D/2-D barcode scanner (optional)
- 5 MP autofocus camera with LED flashlight





Highlights



Global certifications for Zone 2/22 and Div. 2



Optional various applications like barcode scanner



Sunlight-readable, 11.6" capacitive multitouch display with optional display protection



Thin, light, and strong design



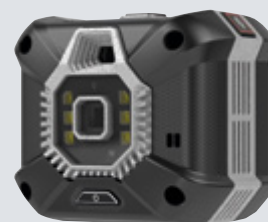
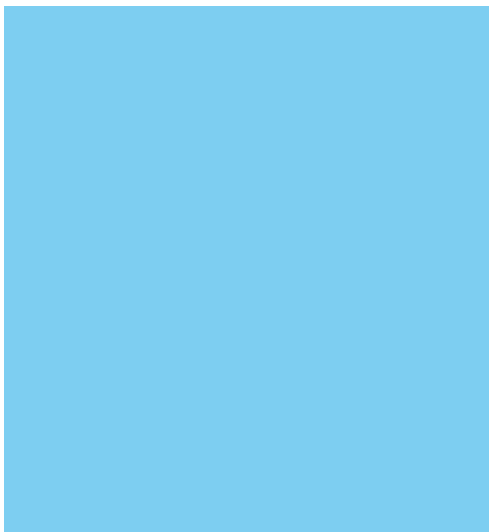
High-speed Windows operating system * 10

Rugged features	<ul style="list-style-type: none"> ■ IP64 according to EN/IEC 60079-0 (ATEX/IECEX) ■ IP65 according to EN/IEC 60529 (industrial standard) ■ MIL-STD-810G certified (drop, shock, vibration, rain, dust, altitude, freeze/thaw, high/low temperature, temperature shock, humidity) MIL-STD-461 certified (conduction, radiation, conducted susceptibility, radiated susceptibility) ■ ANSI/ISA 12.12.01-2000, Class I, Division 2 ■ 4' drop 26 faces
Environment	<p>Operating temperature: -10 °C ... +55 °C (14 °F ... 131 °F)</p> <p>Storage temperature: -10 °C ... +55 °C (14 °F ... 131 °F)</p> <p>Humidity operating: 5 % to 95 %</p>
Operating system	Windows® 10 Pro (64 Bit)
CPU	<ul style="list-style-type: none"> ■ Intel® Core™ i5-8250U (8th Gen.) 1.6GHz processor with Turbo Boost Technology up to 3.4GHz, 6MB cache ■ Intel® Core™ i7-8550U (8th Gen.) 1.8GHz processor with Turbo Boost Technology up to 4.0GHz, 8MB cache
Memory	One DDR4 socket for 8 GB
Storage	M2-SATA SSD 256 GB (extended temperature range)
Display	<ul style="list-style-type: none"> ■ 29.46 cm/11.6" (1,920 × 1,080) FHD LCD Panel ■ Capacitive multitouch ■ Optical, sunlight-readable display
Audio	<ul style="list-style-type: none"> ■ Speaker x 1/70 dB ■ Microphone x 1
Camera	<ul style="list-style-type: none"> ■ 2 MP front-facing camera ■ 5 MP rear camera with flashlight
Communication	<ul style="list-style-type: none"> ■ WWAN LTE + GPS Combo (optional) ■ Intel Wireless AC9260 802.11 a/b/g/n/ac ■ Bluetooth® 5.0
Data collection	<ul style="list-style-type: none"> ■ Optional 1-D/2-D barcode scanner
I/O ports	<ul style="list-style-type: none"> ■ Two USB 3.0 ■ One headphone out/mic- in jack ■ One docking connector ■ Two RF pass-through connectors for WWAN and GPS
Expansion slots	<ul style="list-style-type: none"> ■ One microSD card slot support SDHC and SDXC ■ One SIM card slot for WWAN data communication
Button	<ul style="list-style-type: none"> ■ Power ■ Volume ■ Windows touch button ■ Barcode/camera touch button ■ Programmable touch button
Battery	<ul style="list-style-type: none"> ■ One 3,950 mAh Li-polymer battery pack: 7 hrs ■ Optional (spare part) 7,800 mAh Li-polymer battery pack: 14 hrs
AC adapter	19 V/3.42 A/65 W
Dimensions	298 mm × 192 mm × 20 mm
Weight	1.2 kg

Peripherals for Use in Hazardous Areas



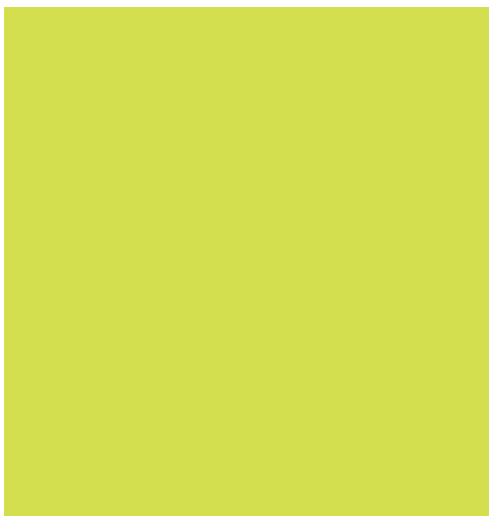
Smart Glasses
Visor-Ex® 01



Ex Camera
CUBE 800



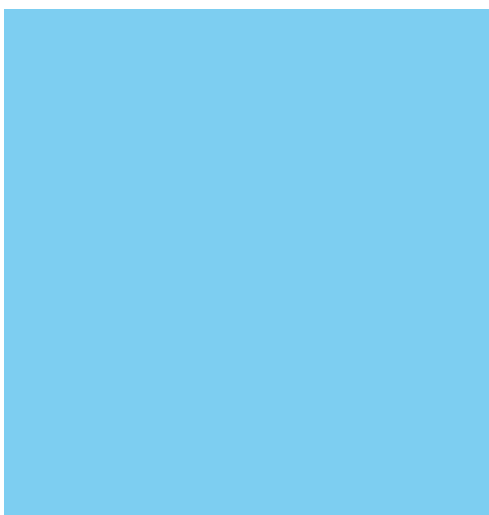
Bluetooth® Headset
SM1P



Remote Speaker Microphone
RSM-Ex 01



Scanner
Ident-Ex® 01



BLE Beacon
Loc-Ex® 01

Distributed components in seamless interaction

Visor-Ex® 01 provides a new generation of mobile workers with extensive information and communication capabilities. For this purpose, a uniquely designed set of smart glasses was combined with a versatile smartphone solution to enable a new level of remote interaction within the work environment of a digital enterprise. The lightweight head unit offers high-quality audio and video communication and includes an optical zoom lens for laser scanning on-site.

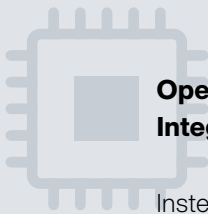


Distributed weight: Comfortable to wear and intuitive to use

Visor-Ex® 01 was designed with a new generation of mobile workers in mind. Instead of integrating all components in the head unit itself, they are distributed into separate units that can be conveniently attached to the body.

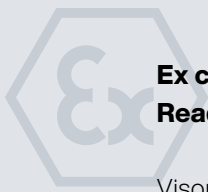
The Visor-Ex® 01 head unit can be clamped to the helmet. It works with various headsets for flawless audiovisual communication and serves. It serves as the visual interface between the worker and his digital environment. As the only smart glasses of this type on the market, Visor-Ex® 01 offers an optical zoom lens for laser scanning of product identification.

The pocket unit and the communication and CPU unit Smart-Ex® 02 can be attached to various belts and provide interference-free communication via cables.



Open standards: Integration into any system environment

Instead of using proprietary technologies, Visor-Ex® 01 is an open system that will seamlessly work out-of-the-box with a variety of software applications due to its smartphone integration. The CPU is the smartphone here, which provides a touch display for a facilitated user experience. It enables standard Wi-Fi as well as 3G / 4G wireless communication.



Ex certification: Ready for explosion hazardous areas

Visor-Ex® 01 works flawlessly in any industrial environment from the automotive to chemical and pharmaceutical, to the oil and gas industry, to name a few typical examples. The system even conforms to the demanding requirements of the process industry and offers intrinsic safety for explosion hazardous areas.





Smart Glasses

- Audiovisual head unit with OLED display, LED light, two cameras, laser, speaker, microphone, additional camera with optical zoom for barcode scanning and touch pad.

Input

- Media of choice: Touch pad, smartphone and voice commands

Connectivity

- Coiled USB cable for data transmission and connection to the Smart-Ex® 02. Coax cable for power supply and data transmission.

Pocket unit

- Power supply for 24/7 operation

Smart-Ex® 02

- Full-featured Android® 11 smartphone
- CPU, touch screen and interface for Wi-Fi and 3G / 4G wireless communication
- Launch applications via smartphone

Thermal Imaging Camera

Longwave infrared, 8–14 μm
< 50 mK thermal sensitivity
Auto flat field correction (FFC)
Typical measurement accuracy: *
Greater than $\pm 5^\circ\text{C}$ or 5 % where scene temperature = $-10^\circ\text{C} \dots +120^\circ\text{C}$
Greater than $\pm 10^\circ\text{C}$ or 10 % where scene temperature = $+120^\circ\text{C} \dots +450^\circ\text{C}$

Storage

48 GB onboard storage

Communication

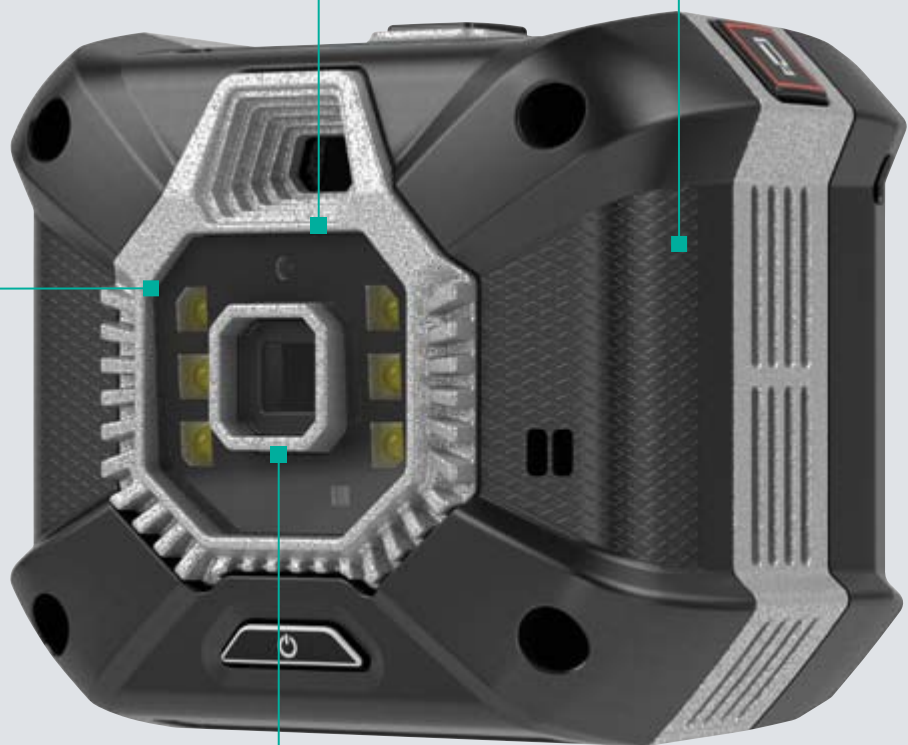
Configuration and live collaboration using Onsite Connect software
iOS 11 for Android™ 5.0 (Lollipop) or higher
Integrated IEEE 802.11 a/b/g/n
Dual-band Wi-Fi (2.4 GHz and 5 GHz)
Bluetooth® 4.1 (LE) for pairing to host device
Direct Wi-Fi connection to the host phone

Power

Rechargeable 2,200 mAh Li-ion battery
5 V DC, 1.8 A AC adapter
Charging from any standard USB port
Magnetic charging connector
Up to 4 hours of runtime, depending on media and illumination settings

Optical Performance

13 MP camera (3 × digital zoom)
Focus range (10 cm to infinity)
Automatic focus and white balance
Integrated LED light field
Class 1 laser pointer



Highlights



Certifications for ATEX/IECEx Zone 1/21 and Div. 1



Compatible with mobile devices such as the Smart-Ex™ 02



Flexible design for mounting on a helmet, handheld, or monopod for hands-free operation



Dual camera system with HD optics and thermal imaging technology



Allows remote working with experts via Onsite Connect



Storage greater than 3 months maximum $+45^\circ\text{C}$

Technical Data: Visor-Ex® 01

Hardware

Camera	<ul style="list-style-type: none">■ 2x central 16 MP camera and 4:3 aspect ratio with flashlight LED, notification LED■ 6x optical zoom with liquid lens for fast autofocus and built-in laser (Class 1)
Scanner	<ul style="list-style-type: none">■ Basic: QR, EAN-13■ Advanced: 2D, Aztec, multiple barcodes
Sensors	9-axis sensor (accelerometer, gyroscope, compass)
Speaker	85 dB loudspeaker for noisy environments
Microphone	Microphone array for voice commands and echo cancellation Multilingual voice commands
Display	<ul style="list-style-type: none">■ 640 x 400 active color matrix OLED display■ Touchpad
Contrast	1:10000
Brightness	Up to 2000 nits

Specifications

Battery Type	Li-ion with 3.7 V / 4400 mAh / 16.28 Wh (built-in)
Ambient Temperature	-20 ... +50 °C
Degree of protection	IP54
Connection	<ul style="list-style-type: none">■ 3.5 mm jack connection (for optional headphones and microphone)■ Coax connection■ Magnetic USB connection
Weight	<ul style="list-style-type: none">■ Head Unit: approx. 180 g■ Pocket Unit: approx. 300 g
Dimensions (W x H x D)	<ul style="list-style-type: none">■ Head Unit: 212 mm x 53 mm x 53 mm■ Pocket Unit: 82 mm x 148 mm x 20 mm

CUBE 800

Intrinsically Safe Wearable Camera for Zone 1/21 and Div. 1

Tailored for Hazardous Areas

Designed for safe operation in Ex-certified and rugged environments, the CUBE 800 brings hands-free collaboration to the world's toughest locations.

Dual cameras allow users to choose between optical and thermal camera modes. The integrated thermal imaging camera provides infrastructure health analysis and trending information, while the optical camera provides HD video and images. An integrated light ring provides high-quality visuals even in low light conditions and with the laser pointer the user knows exactly where the camera is aligned.

Optimized for Remote Collaboration

The CUBE 800 can be used to share live videos and images via the Onsight platform or store them locally. Simply pair the

CUBE 800 to an Onsight Connect-enabled mobile device such as the Smart-Ex® 02.

During a live Onsight session, remote participants can control camera settings including zoom and camera modes. Remote control allows for a completely hands-free experience for workers.

With the new body-heat mode the CUBE 800 can be used for temperature screenings and non-contact temperature measurements of groups and individuals. Now it is possible to also check for increased body temperature.

Using the body-heat mode, relative temperature differences within ± 0.625 °C, or ± 1.125 °F, can be made visible.



Thermal Imaging Camera

Longwave infrared, 8–14 μm
< 50 mK thermal sensitivity
Auto flat field correction (FFC)
Typical measurement accuracy: *
Greater than $\pm 5^\circ\text{C}$ or 5 % where scene temperature = $-10^\circ\text{C} \dots +120^\circ\text{C}$
Greater than $\pm 10^\circ\text{C}$ or 10 % where scene temperature = $+120^\circ\text{C} \dots +450^\circ\text{C}$

Storage

48 GB onboard storage

Communication

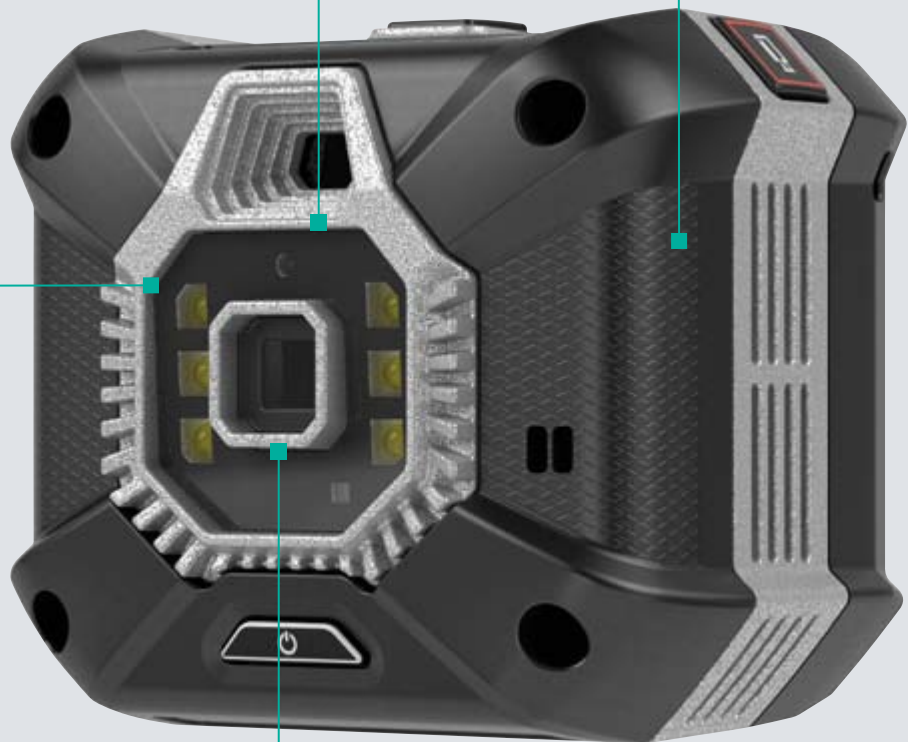
Configuration and live collaboration using Onsite Connect software
iOS 11 for Android™ 5.0 (Lollipop) or higher
Integrated IEEE 802.11 a/b/g/n
Dual-band Wi-Fi (2.4 GHz and 5 GHz)
Bluetooth® 4.1 (LE) for pairing to host device
Direct Wi-Fi connection to the host phone

Power

Rechargeable 2,200 mAh Li-ion battery
5 V DC, 1.8 A AC adapter
Charging from any standard USB port
Magnetic charging connector
Up to 4 hours of runtime, depending on media and illumination settings

Optical Performance

13 MP camera (3 × digital zoom)
Focus range (10 cm to infinity)
Automatic focus and white balance
Integrated LED light field
Class 1 laser pointer



Highlights



Certifications for ATEX/IECEX Zone 1/21 and Div. 1



Compatible with mobile devices such as the Smart-Ex™ 02



Flexible design for mounting on a helmet, handheld, or monopod for hands-free operation



Dual camera system with HD optics and thermal imaging technology



Allows remote working with experts via Onsite Connect



Storage greater than 3 months maximum $+45^\circ\text{C}$

Technical Data: CUBE 800

Optical performance	<ul style="list-style-type: none">■ 13 MP camera (3 × digital zoom)■ 10 cm to infinity focus range■ Automatic focus and white balance■ Integrated LED light field■ Class 1 laser pointer
Thermal imaging camera	<ul style="list-style-type: none">■ Longwave infrared, 8–14 μm■ < 50 mK thermal sensitivity■ Auto flat field correction (FFC)■ Typical measurement accuracy: * Greater than +/-5 °C or 5 % where scene temperature = -10 °C ... +120 °C Greater than +/-10 °C or 10 % where scene temperature = +120 °C ... +450 °C
Audio	<ul style="list-style-type: none">■ Built-in omni-directional microphone for ambient sound■ Built-in speaker for CUBE status alerts
Video standard	<ul style="list-style-type: none">■ H.264/AVC■ HD capture and stream up to 1,080-pixel resolution■ Frame rates up to 30 fps
Communication	<ul style="list-style-type: none">■ Configuration and live collaboration using Onsite Connect software iOS 11 for Android™ 5.0 (Lollipop) or higher■ Integrated IEEE 802.11 a/b/g/n■ Dual-band Wi-Fi (2.4 GHz and 5 GHz)■ Bluetooth® 4.1 (LE) for pairing to host device■ Direct Wi-Fi connection to the host phone
Media capture and storage	<ul style="list-style-type: none">■ 48 GB onboard storage■ USB cable for file transfer
Security	<ul style="list-style-type: none">■ WLAN network authentication: WPA, WPA2, WPA-PSK, WPA2-PSK, open■ WLAN data encryption: AES, WEP, TKIP, or disabled■ 802.1x authentication: PEAP■ AES-256 media encryption for file storage
Rugged features	<ul style="list-style-type: none">■ 6' drop to concrete at 20°C■ 75 mm (W) × 64 mm (H) × 50 mm (D)■ IP64■ Weight: 257 g
Operating temperature	<ul style="list-style-type: none">■ Optical camera: -20 °C ... +55 °C■ Thermal imaging: -10 °C ... +55 °C
Storage temperature	<ul style="list-style-type: none">■ -30 °C ... +60 °C* (greater than 3 months max. +45°C)
Humidity (non-condensing)	<ul style="list-style-type: none">■ Short-term storage (up to 3 months) minimum 5 %, max. 85 %■ Operating minimum 5 %, maximum 95 % RH
Altitude	<ul style="list-style-type: none">■ Storage (12 °C) minimum 0 ft, maximum 15,000 ft■ Operating (27 °C) minimum 0 ft, maximum 10,000 ft
Power	<ul style="list-style-type: none">■ Rechargeable 2,200 mAh Li-ion battery■ 5 V DC, 1.8 A AC adapter■ Charging from any standard USB port■ Magnetic charging connector■ Up to 4 hours of runtime, depending on media and illumination settings

* Depends on usage and environmental conditions

Ident-Ex® 01

Intrinsically Safe Barcode Scanner and RFID Reader

Modular Head Design

Using a unique modular design, Ident-Ex® 01 can be specifically configured to the customer's requirements by selecting different head modules. When requirements change, the head module on the unit can be replaced by one of the ecom-approved service centers.

For an overview of all currently available head modules, please have a look at the Ident-Ex® 01 configurator at www.ecom-ex.com.



Scan

Performance

RFID = up to 1.5 m
Barcode = 3 cm to 5 m

Note: The reading range depends on the rfid tag type, barcode type and the environment.

Bluetooth *

Class II, up to approx. 10 meters

Internal Storage

Offline batch mode
2 MB barcode = 500+
RFID tags (ID only) = 500+

Power

Li-ion rechargeable; 12+ hours;
10,000+ scans with one battery charge



Highlights



Global certifications for Zone 1/21 and Div.1



Powerful battery for 12-hour shifts



Flexible on- and offline scanning and changeable head modules



Can be connected via Bluetooth * to any device



Rugged design and easy to use

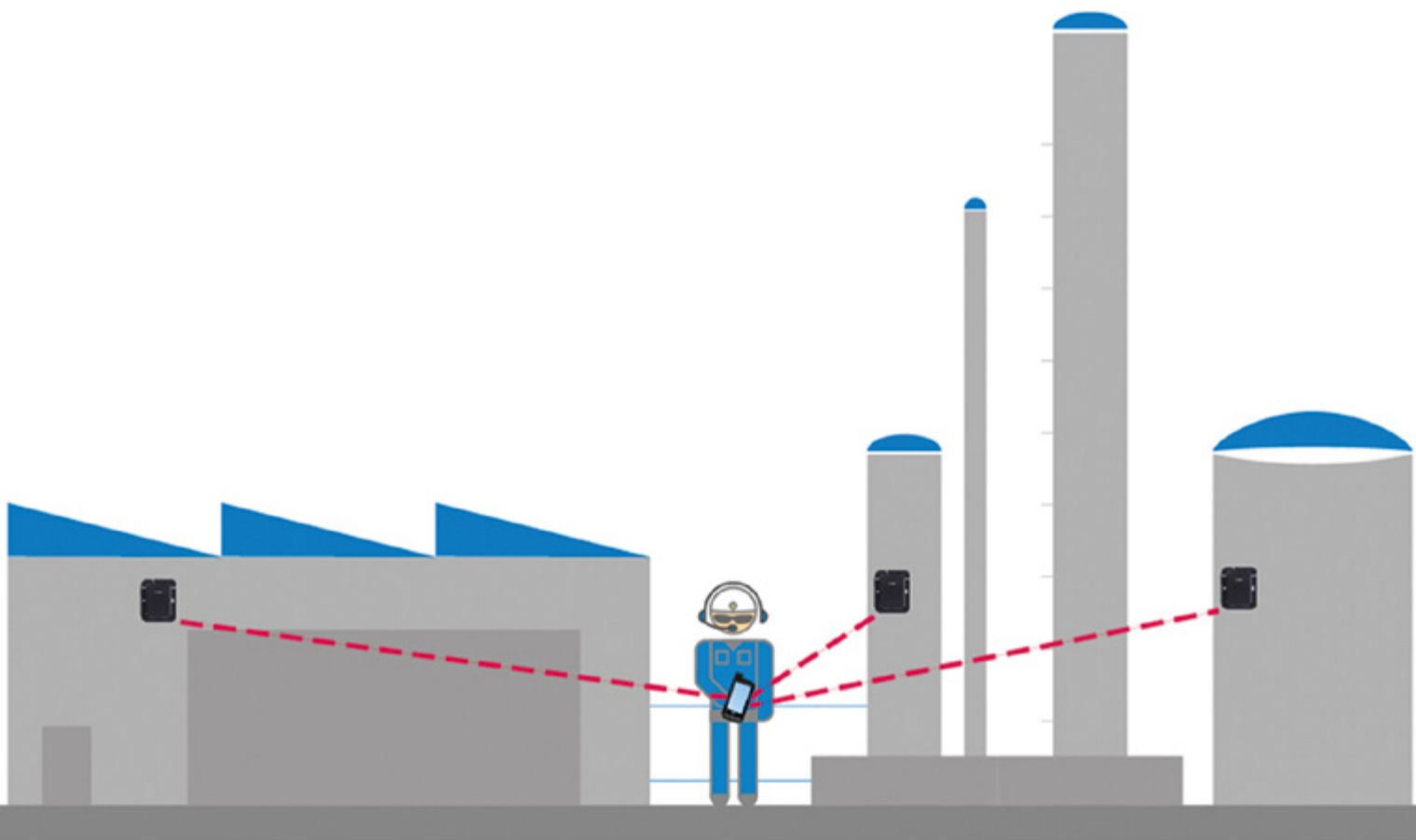
Technical Data: Ident-Ex® 01

Dimensions	221 × 84 × 58
Weight	425 g to 560 g (depends on head module)
Battery	Li-ion rechargeable; 12+ hours; 10,000+ scans with one battery charge
Operating temperature	-20 °C ... +50 °C
Internal storage	Offline batch mode 2 MB barcode = 500+ RFID tags (ID only) = 500+
Bluetooth®	Class II, up to approx. 10 meters
Scan performance	RFID = up to 1.5 m Barcode = 3 cm to 5 m Note: The reading range depends on the rfid tag type, barcode type and the environment.

Head module

NL-TLB30-B	125/134 kHz LF RFID, air coil
NF-TLB30-B	125/134 kHz LF RFID, ferrite antenna
NH-UNI13-B	13.56 MHz HF RFID
NE-UNI900-A	868 MHz UHF RFID
NU-UNI900-A	915 MHz UHF RFID
NT-LID-B	TROVAN LF RFID R/W Module
ZN-SE965-A	1-D laser barcode scanner
ZL-SE965-TLB30-A	Combi module 1-D barcode + LF RFID, air coil
ZF-SE965-TLB30-A	Combi module 1-D barcode + LF RFID, ferrite antenna
ZH-SE965-UNI13-A	Combi module 1-D barcode + HF RFID
ZT-SE965-LID-A	Combi module 1-D barcode + Trovan

Intrinsically Safe Bluetooth® Beacon



Description

BLE beacons are small radio beacons that emit a signal at periodic intervals. The Bluetooth® 4.0 standard makes the beacons compatible with most smartphones and tablets, and they can be recognized at distances up to 200 m (geolocation).

Mobile devices can evaluate beacon signals and interact with the user or other programs by using special applications. They can be mounted directly onto a suitable surface or with the optional mounting base.

For Use Inside and Outside of Hazardous Areas

The beacons are available for ATEX/IECEx Zone 1/21 and Div. 1 (Loc-Ex® 01). Their UV-resistant housing makes it possible for them to be used indoors and outdoors.

Benefits

- Indoor localization
- Lone worker protection
- Physical access control
- Guard control system
- Guiding visitors
- BLE beacon as replacement for NFC beacon



More information:
pepperl-fuchs.com/pf-loc-ex

Highlights



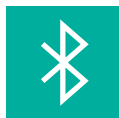
Certifications for ATEX/IECEx Zone 1/21 and Div. 1



Operating parameters can be programmed remotely



Rugged, UV-resistant housing with IP64 rating



Compatible with Bluetooth® Low Energy from version 4.0



Up to 30 m range inside and up to 200 m outside buildings



Open firmware for individual BLE profile development

Technical Data: Loc-Ex® 01

Operating temperature	-20 °C ... +55 °C
Storage temperature	-30 °C ... +30 °C
Power supply	2 × LS14500
Operating time	Approx. 4 years
Transmission power	Max. 8 dBm
Dimensions	48 × 111 × 102 mm (H × L × W)
Weight	Approx. 180 g (with batteries)

RSM-Ex 01

Remote Speaker Microphone for Use in Hazardous Areas

Effective Communication in Harsh Environments

The RSM-Ex 01 comes with an IP65/67 rating and a built-in noise-reduction function. It provides clear, high-volume audio (up to 103 dB). The RSM is intuitive and easy to use, even when wearing gloves.

The new 3.5 mm plug is intended for industrial applications and offers a rugged design, a safety screw for attaching the plug to a smartphone, and compatibility with current and future ecom products.

Additional headsets can be connected using the standard 3.5 mm plug.





Power

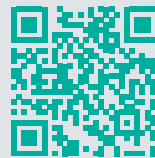
- Li-ion 2,200 mAh

Buttons

- PTT button operable with thick gloves
- Front-facing multifunction button
- Volume up/down
- Red button (optional)

Loudspeaker Performance

- Up to 103 dB



More information:
pepperl-fuchs.com/pf-rsm-ex

Highlights



Global certifications for Zone 1/21 and Div. 1



Extremely long operating times with high voice volume—up to 78 hours



Outstanding volume and sound performance—up to 103 dB



Wired connection or wireless (Bluetooth® version planned)



Rugged design and easy to use



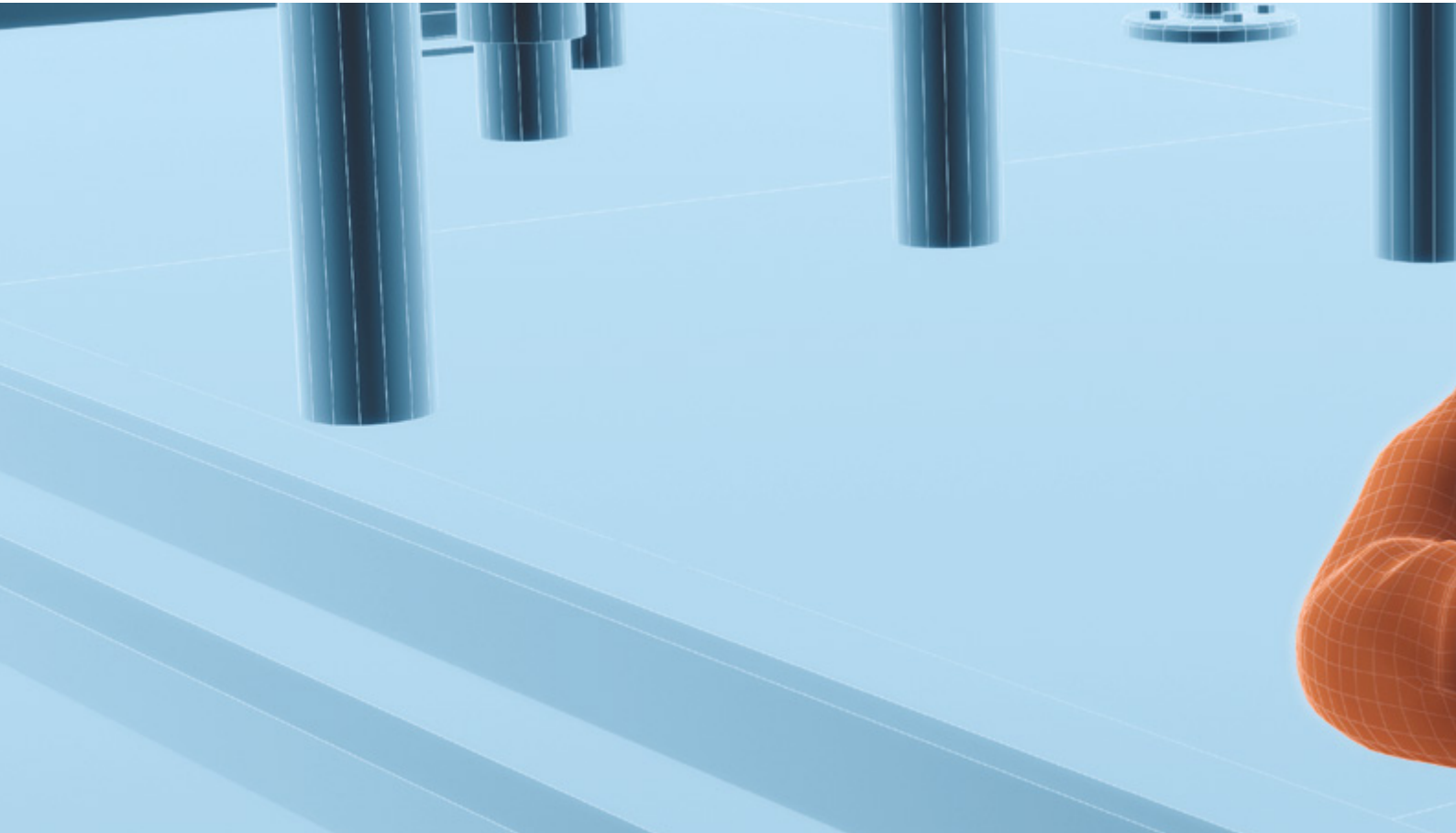
Good operability, even with gloves

Technical Data: RSM-Ex 01

Loudspeaker performance	Up to 103 dB			
Power supply	Li-ion 2,200 mAh			
Charging	<ul style="list-style-type: none"> ■ Charging cable and docking station with magnetic charging plug; similar concept to Smart-Ex® 01 or Ident-Ex® 01. A docking station without any electronics and a mounting option for the charging plug. ■ Optical charging level indication (multiple LEDs) 			
Connector	<ul style="list-style-type: none"> ■ Plug, 3.5 mm, 4-pin, straight, with lock (Smart-Ex® 01 / Ex-Handy 09) or ■ Plug, 3.5 mm, 4-pin, right-angled or ■ Plug, 3.5 mm, 4-pin, straight or ■ Plug, 3.5 mm, 4-pin, straight, Next Generation (Smart-Ex® 02 / Ex-Handy 10) or ■ Plug, 3.5 mm, 4-pin, right-angled, Next Generation (Ex-Handy 10) 			
Connection	Socket, 3.5 mm, for headset			
Buttons	<ul style="list-style-type: none"> ■ PTT button operable with thick gloves ■ Front-facing multi-function button ■ Volume up / down ■ Red Button 			
Features	<ul style="list-style-type: none"> ■ Lone worker ready (Red button) ■ IOT ready (4 standard Google intents usable and/or optional 4 additional Android intent) ■ Build in NFC Technology 			
Run times	Use time in % with typical user profiles Speak / Hear / Standby	Noisy areas with sound level above 100 dB	Noisy areas with sound level between 84 and 100 dB	Noisy areas with sound level up to 84 dB
	5/5/90	-> 55 h	-> 72 h	-> 72 h
	25/25/50	-> 28 h	-> 70 h	-> 71 h
	50/50/0	-> 17 h	-> 67 h	-> 69 h
		Highest noise level (8/8)*	Very high noise (4/8)*	High noise level (2/8)*
<p>*There are 8 different volume levels possible. **determined runtimes on the Smart-Ex® 01 based on RSM-Ex 01 software version V 16</p>				
Standby time	Approx. 75 hours after commissioning via the 3.5 mm jack of an Android or Windows device			
Temperature range	-20 °C ... +55°C			
IP rating	<ul style="list-style-type: none"> ■ IP 64 following EN/IEC 60079-0 (ATEX/ IECEx). ■ IP 65 / 67 following EN/IEC 60529 (industrial standard). 			

Comprehensive Solutions

Digitalizing hazardous areas. Enabling connectivity. Enhancing mobility.



The Pepperl+Fuchs brand ecom is a leading manufacturer of comprehensive solutions for intrinsically safe mobile computing and industrial communication in hazardous areas.



Since 1986, ecom has played a key role in pioneering explosion protection for mobile devices. The company has demonstrated its technological expertise with a number of innovations and tried-and-tested mobile solutions—from intrinsically safe smartphones, cell phones, and tablets to accessories like wireless headsets and barcode scanners. ecom's new Digital Products and Services platform completes the portfolio, offering automated staging during device production, mobile device management, and device analytics; the platform can also be used as a full-fledged enterprise mobility management system.

Each of ecom's solutions combines uncompromised security with the highest level of functionality, and includes all necessary approvals and certifications for global use. A global sales and support network with service centers in Germany, the US, Singapore, and the United Arab Emirates completes the range of products.

Customers around the world know the Pepperl+Fuchs Group as a pioneer and innovator in electrical explosion protection and sensor technology. Building on decades of experience and technical leadership, the company develops components and solutions tailored to the needs of its customers. Solutions for mobile safety and communication from the Pepperl+Fuchs brand ecom allow customer applications to be digitalized quickly and easily. This opens up completely new possibilities and increases the safety, efficiency, and transparency of operations in both conventional and Industry 4.0 applications.

For more information about ecom, visit:

ecom-ex.com and pepperl-fuchs.com/pf-mcc

Your automation, our passion.

Explosion Protection

- Intrinsic Safety Barriers
- Signal Conditioners
- FieldConnex® Fieldbus Infrastructure
- Remote I/O Systems
- Electrical Explosion Protection Equipment
- Purge and Pressurization Systems
- HMI Systems
- Mobile Computing and Communications
- HART Interface Solutions
- Surge Protection
- Wireless Solutions
- Level Measurement

Industrial Sensors

- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- Industrial Ethernet
- AS-Interface
- IO-Link
- Identification Systems
- Displays and Signal Processing
- Connectivity

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