PT790 Ex

Intrinsically safe TETRA handheld radio

Offering a robust design and advanced safety features, the PT790Ex ensures that users working in combustible environments (such as mining or oil and gas) can maintain critical communications using this specially crafted handset.
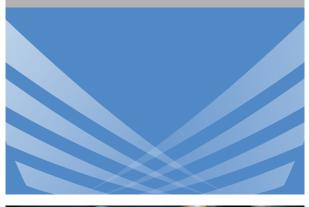
Radio

PT790 Ex

TETRA handheld radio (ATEX)

For many workers, two-way radios represent an indispensable tool in their day-to-day work. For those working in environments containing explosive gases, combustible dust, or in the mining industry, safety is of particular importance.

The intrinsically-safe handheld PT790 Ex radio offers first class protection for users who are dependent on reliable TETRA radio technology. As the first TETRA radio with the "ia" approval worldwide, the PT790 Ex meets the highest requirements that can be imposed on an intrinsically safe product giving you complete confidence in your Hytera communications.

Highlights

Maximum safety
As the first TETRA handheld radio throughout the world with "ia" approval, the PT790 Ex can be used in areas in which an explosive atmosphere containing a mix of air and combustible gases, vapors, or mists are permanently present (Zone 0).

Robust & reliable
The PT790 Ex deliver excellent communications even under harsh operating conditions. The device is dust-proof and water-proof in accordance with IP67 degree of protection, withstanding submersion in 1 metre of water for a duration of up to 30 minutes. Furthermore, the PT790 Ex meets the requirements of the US MIL-STD-810 F/G standard.

Functions for industrial safety
To offer the maximum possible industrial safety, the PT790 Ex features a man-down alarm sensor, and an adjustable time alarm (lone worker). The standard equipment GNSS module receives positioning data via GPS, GLONASS and Beidou, and can transfer this data for further analysis to the control room, or an AVL dispatcher.

Immediate and direct TETRA communication
The PT790 Ex provides rapid access to the TETRA radio network and to its services. It meets the regulations of the ETSI TETRA standard, and is therefore compatible with infrastructures and terminals from various manufacturers.

Versatile functions
Besides voice and data communication, the PT790 Ex offers many additional functions: encryption, programmable keys, etc. Moreover, with connection options for expansions and optional accessories, flexible to meet your requirements.

The features marked with * are available in future versions of the PT790 Ex.
Encryption features are optional and have to be configured separately. They are also subject to European export regulations.

Intelligent antenna design: Separate rotary buttons ensure simple operation

Clearly arranged, multilingual menu

Hytera

TMO
ISSI
Hytera
Func   Options

1 !<   2 ABC   3 DEF
4 GHI   5 JKL   6 MNO
7 P   8 TUV   9 WXYZ
* _   0 +   # ↑

Ergonomic and lightweight chassis

20 programmable buttons

High-strength LCD protective cover
The high-strength LCD protective cover is extremely scratch-resistant, and can withstand being struck by a 1-kg hammer.

Innovative battery latch
The patented lock of the battery ensures that the battery cannot fall out if the radio should be dropped onto a hard surface.

Visible "ia" certification
The green frame of the display indicates that this is an "ia"-certified handheld radio.

Countersunk screws
To minimize the possibility of a discharge at the belt clip, the screws for fastening the belt clip are countersunk. If the radio should ever be dropped, the screws will not touch the ground.
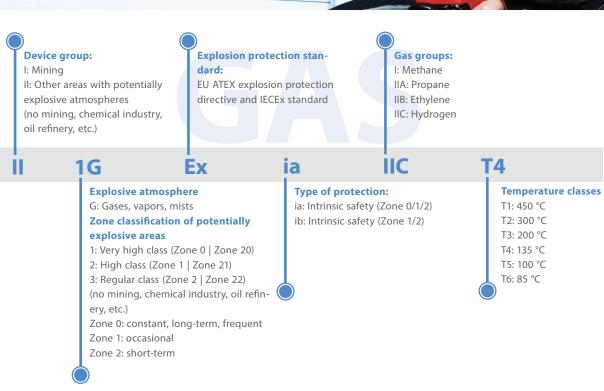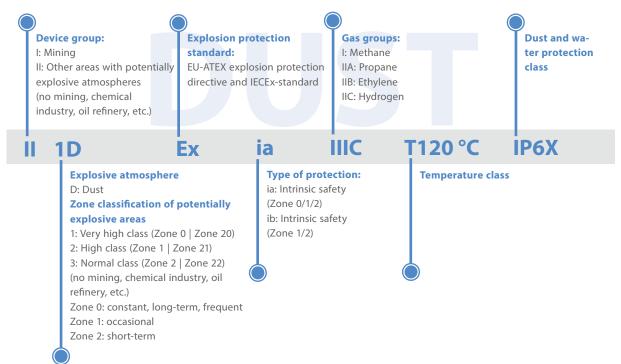
Anti-slip design
The rear part of the battery and both sides of the chassis are equipped with an anti-slip material to prevent the radio from slipping and falling down, and to ensure a solid grip.
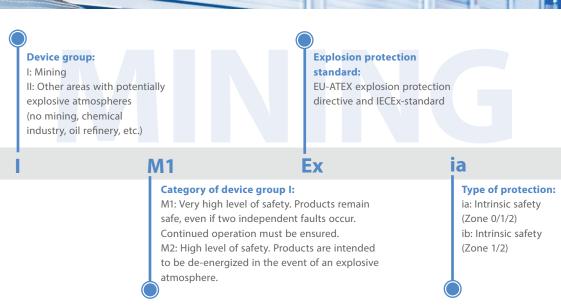
Innovative silicone encapsulation
To protect the internal circuits of the PT790 Ex against liquids, dust and gases, they are encapsulated with silicone.

GAS

Device group:
I: Mining
II: Other areas with potentially explosive atmospheres
(no mining, chemical industry, oil refinery, etc.)

Explosion protection standard:
EU ATEX explosion protection directive and IECEx standard

Gas groups:
I: Methane
IIA: Propane
IIB: Ethylene
IIC: Hydrogen

II	**1G**	**Ex**	**ia**	**IIC**	**T4**

Explosive atmosphere
G: Gases, vapors, mists
Zone classification of potentially explosive areas
1: Very high class (Zone 0 | Zone 20)
2: High class (Zone 1 | Zone 21)
3: Regular class (Zone 2 | Zone 22)
(no mining, chemical industry, oil refinery, etc.)
Zone 0: constant, long-term, frequent
Zone 1: occasional
Zone 2: short-term

Type of protection:
ia: Intrinsic safety (Zone 0/1/2)
ib: Intrinsic safety (Zone 1/2)

Temperature classes
T1: 450 °C
T2: 300 °C
T3: 200 °C
T4: 135 °C
T5: 100 °C
T6: 85 °C

DUST

Device group:
I: Mining
II: Other areas with potentially explosive atmospheres
(no mining, chemical industry, oil refinery, etc.)

Explosion protection standard:
EU-ATEX explosion protection directive and IECEx-standard

Gas groups:
I: Methane
IIA: Propane
IIB: Ethylene
IIC: Hydrogen

Dust and water protection class

II	**1D**	**Ex**	**ia**	**IIIC**	**T120 °C**	**IP6X**

Explosive atmosphere
D: Dust
Zone classification of potentially explosive areas
1: Very high class (Zone 0 | Zone 20)
2: High class (Zone 1 | Zone 21)
3: Normal class (Zone 2 | Zone 22)
(no mining, chemical industry, oil refinery, etc.)
Zone 0: constant, long-term, frequent
Zone 1: occasional
Zone 2: short-term

Type of protection:
ia: Intrinsic safety (Zone 0/1/2)
ib: Intrinsic safety (Zone 1/2)

Temperature class

MINING

Device group:
I: Mining
II: Other areas with potentially explosive atmospheres (no mining, chemical industry, oil refinery, etc.)

Explosion protection standard:
EU-ATEX explosion protection directive and IECEx-standard

I   M1   Ex   ia

Category of device group I:
M1: Very high level of safety. Products remain safe, even if two independent faults occur. Continued operation must be ensured.
M2: High level of safety. Products are intended to be de-energized in the event of an explosive atmosphere.

Type of protection:
ia: Intrinsic safety (Zone 0/1/2)
ib: Intrinsic safety (Zone 1/2)

"ia" Safety of the highest level

The operating resources employed in the potentially explosive area contain only intrinsically safe circuits. A circuit is considered intrinsically safe if no spark and no thermal effect that occur under defined testing conditions, can cause the ignition of a specific explosive atmosphere.

Device groups

The device groups are divided into two different areas (I and II). Group I is designated for devices that are being used in mining operations. Group II applies to all areas that could be subject to a potentially explosive atmosphere. Both device groups are again divided into individual categories that define the scope of protection and application area of the devices.

Zone classification

The zone classification of potentially explosive areas is divided into Zone 0, 1, 2 for gases and 20, 21, 22 for dust. In this context, the zones differ by how often and how long dangerous explosive materials occur. Distinctions are made between: "constant, over long periods of time or frequent" (0|20), "occasional" (1|21) and "none or short-term" (2|22).

Functions

The PT790 Ex handheld radio was developed in compliance with the open TETRA standard of the European Telecommunications Standards Institute (ETSI).

Operating mode
- Trunked radio mode (TMO): communication via the TETRA radio network (semi-duplex and duplex mode)
- Direct mode (DMO): direct communication between the radios (semi-duplex)

Voice services
Group calls
- Group call with defined priority (incl. pre-emptive priority)
- Dynamic Group Number Assignment (DGNA)
- Broadcast call (group, TMO)
- Talking party indication (TPI)
- Late Entry
- Open group call
- Group scan with priorities

Individual call
- Individual call half-duplex and individual call duplex (TMO)
- Individual call with defined priority (also pre-emptive priority)
- Calling Line Identification Presentation (CLIP)

Emergency call
- Emergency call to selected or pre-defined group
- Emergency call as individual call and as call to a telephone network (PSTN/PABX)
- Emergency call microphone & cyclic change of permission to talk during the emergency call
- Silent alarm (TMO)

Calls to telephone networks (PSTN/PABX) (TMO)
- PSTN/PABX individual call, full-duplex
- PSTN/PABX individual call, half-duplex
- DTMF
  Calling Line Identification Presentation (CLIP)

Additional call services
- Callout
- Gateway call (DMO) / repeater call (DMO)

Security services
- Authentication (by system and mutual)
- Air interface encryption (TEA1, TEA2*, TEA3, TEA4)
- End-to-end encryption (E2EE) by software (AES128 / AES256), by SIM card, encryption of voice and SDS
- Access control with PIN/PUK code
- TETRA security class 1, 2, 3: non-encrypted, static encryption (SCK), dynamic encryption (CCK/DCK)
- Key distribution via air interface (OTAR)
- Static encryption in the DMO mode (SCK)
- Attachment/deactivation via air interface (Enable/Disable)
- Ambience Listening

Security functions for the user
- Emergency button
- Lone worker function /man-down alarm
- Tilt alarm
- Silent alarm
- Call barring
- Programmable key lock (individual keys can be excluded from the lock)
- Configuration protection / configuration password
- TX Inhibit (TXI)

Data / message services
- Short data service (SDS) – types 1, 2, 3, 4 and TL
- Concatenated SDS (Long SDS) and Flash SDS
- Status message/text message
- Notification of new messages during a call
- Packet data service (packet data, single-slot, multi-slot)
- Java™ platform MIDP 2.0, WAP

Functions of the user interface

— 20 programmable keys for direct access to the individual
  Functions (shortcut keys)
— 4-ways navigation key
— Separate rotary switches for call groups and audio volume
— Call log: Missed/answered calls, dialed numbers
— Flexible dialing (e.g. direct dialing, redialing, dialing lists etc.)
— Special microphone
    — upper microphone for half-duplex calls
    — lower microphone for duplex calls
— Adjustable screen brightness & screensaver
— Many international languages are already available, installation of
  several selectable languages on radio
— Positioning according to ETSI LIP or NMEA protocol
    — Completely integrated GPS/GLONASS/Beidou receiver
    — Completely programmable position updating
    — Display of direction and position of the other call parties
    — Transmission of the position data on emergency call

— PEI interface
— Clock synchronization via GPS/SAT, radio network or local time
— Energy saving mode
— Automatic cell re-selection without call interruption (handover)
— Programming several selectable network identifications (TMO,
— DMO) Programming several selectable PSTN / PABX gateways
— Customizable alarm tones
— Radio User Assignment (RUA)
— Over The Air Interface (OTAP)

In the box

| Antenna (GPS integrated) | Intrinsically Safe Lithium-Ion Battery (1800mAh) BL1813-Ex | Universal Standard Switching Power Adapter PS1044 | MCU Rapid-Rate Charger CH10A07 | Belt Clip BC19 | Hand strap |

Technical Data

General data

Frequency ranges	380 – 430 MHz / 806 – 870 MHz
Dimensions (H × W × D)	141 × 55 × 39 mm
Weight	approx. 515 g (with 1800 mAh battery and antenna)
Operating voltage	7.4 V
Battery (lithium-ion)	1800 mAh (standard battery)
Battery life (5-5-90 duty cycle)	Approx. 14 hours (standard battery)
Maximum audio power output	> 1,2 W

User interface

LCD colour display	1.8 inch, 160 × 128 pixel, 65,536 colors
Call groups – TMO	3000
Call groups – DMO	2000
Phone book	1000 entries
Group lists – TMO (use for scanning, scan lists)	200 (200 groups per list)
Group lists – DMO	50 (200 groups per list)
Number of short messages (SDS) (inbox, sent, drafts)	400 / 50 / 50
Number of status messages	200

Environmental conditions

Operating temperature range (in non-hazardous environment)	-30 °C to +60 °C
Operating temperature range (in hazardous environment)	-20 °C to +55 °C
Storage temperature range	-40 °C to +85 °C
Relative humidity	ETS 300 019 (95 %)
Protection against dust and moisture	IEC60529, IP67
Shock and vibration resistance	MIL-STD-810 F/G
Explosion protection	Gas: II 1G Ex ia IIC T4 Dust: II 1D Ex ia IIIC T120 °C IP6x Mine: I M1 Ex ia

Radio characteristics

Channel spacing	25 kHz
Transmitting power	1 W
RF power control	± 2 dB
Receiver class	ETSI EN 392-2 / 396-2 class A
Static receiver sensitivity	-112 dBm (typical -116 dBm)
Dynamic receiver sensitivity	-103 dBm (typical -105 dBm)

GNSS (GPS / GLONASS / Beidou)

Receiving sensitivity	≤ -144 dBm
Signal tracking sensitivity	≤ -157 dBm
Precision	≤ 10 m
Time to first position recognition (TTFF) cold start	< 50 seconds
Time to first position recognition (TTFF) warm start	< 1 second

All technical information was determined at the factory and in accordance with the corresponding standards. Subject to change on the basis of continuous development.

The illustrations below are solely for reference.
The products themselves may deviate from these representations.

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Hytera
Respond & Achieve

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