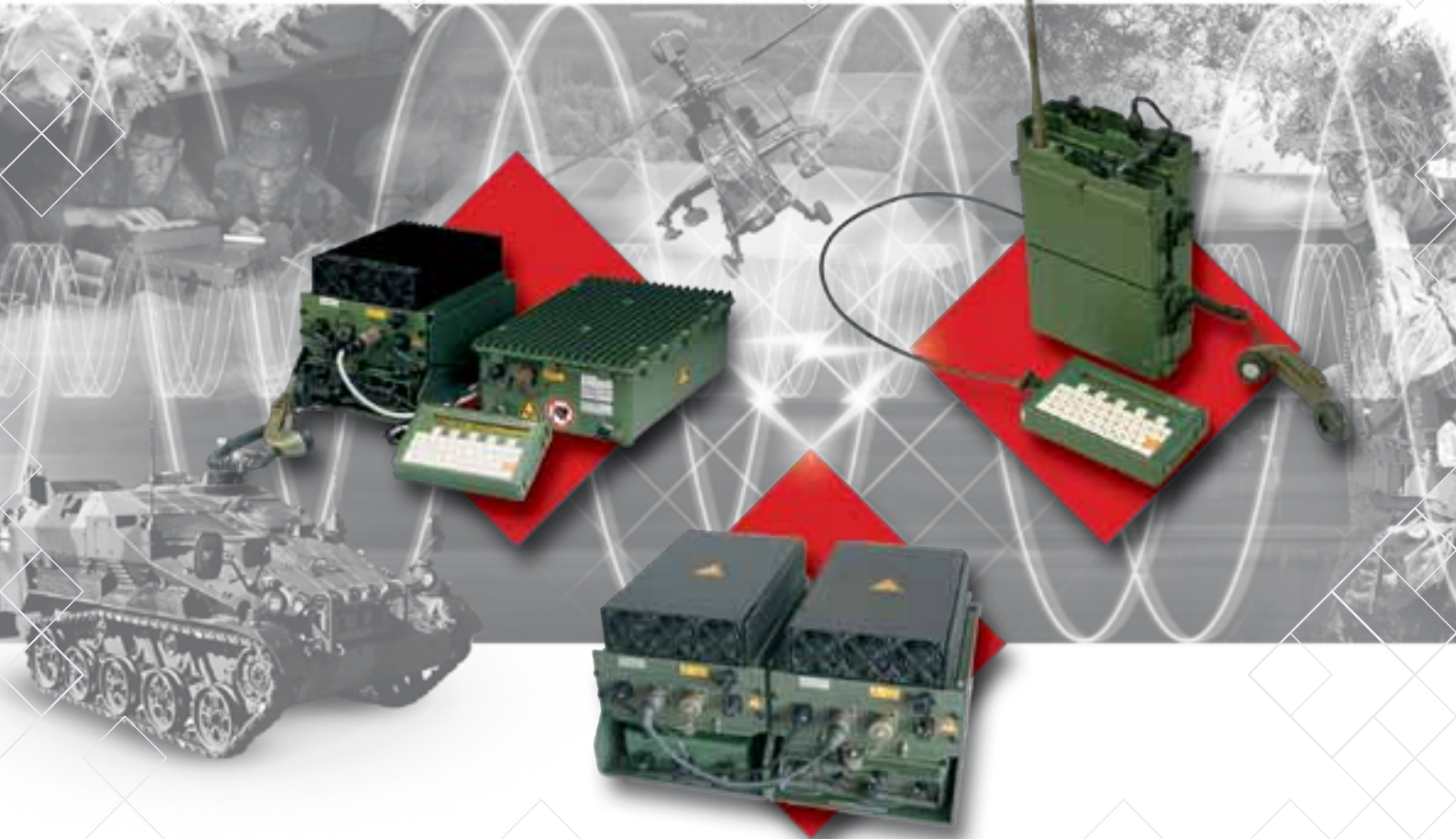
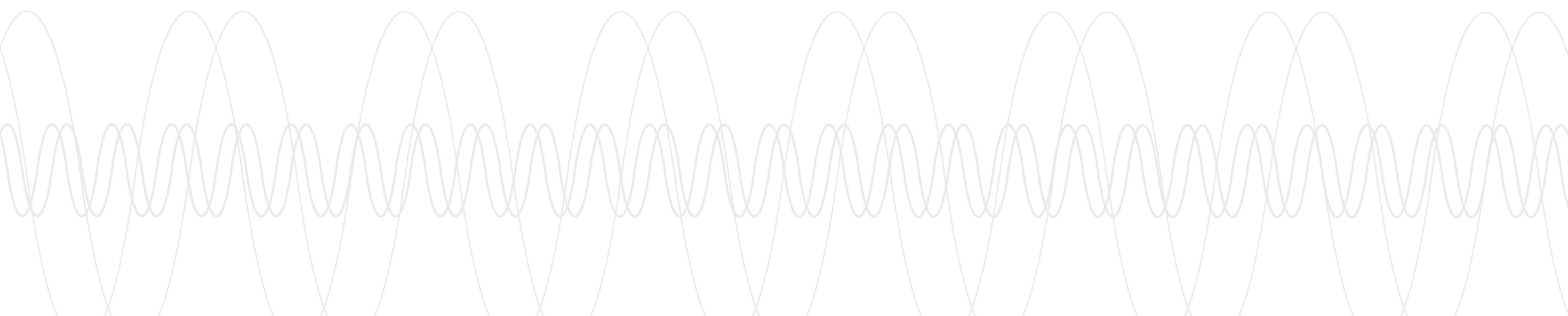




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HF product family 7000



HF product family 7000

The HF product family 7000 is designed for the rough environmental conditions of tactical military operations.

Military troops with extensive tactical operation control, as well as special forces and authorities or organisations responsible for security, require highly mobile, autonomous means of communication such as the HF product family 7000 to accomplish their missions. In this product family, advanced technologies of analogue and digital signal processing were converted into highly efficient products.

02 The modular design allows various systems to be configured from basic components with a minimum of investment. This enables easy usage in Manpacks, vehicle stations or base stations. Corresponding undamped, tuned dipole antennas are available for the different systems. These dipole antennas enable a significant quality increase of the radio links.

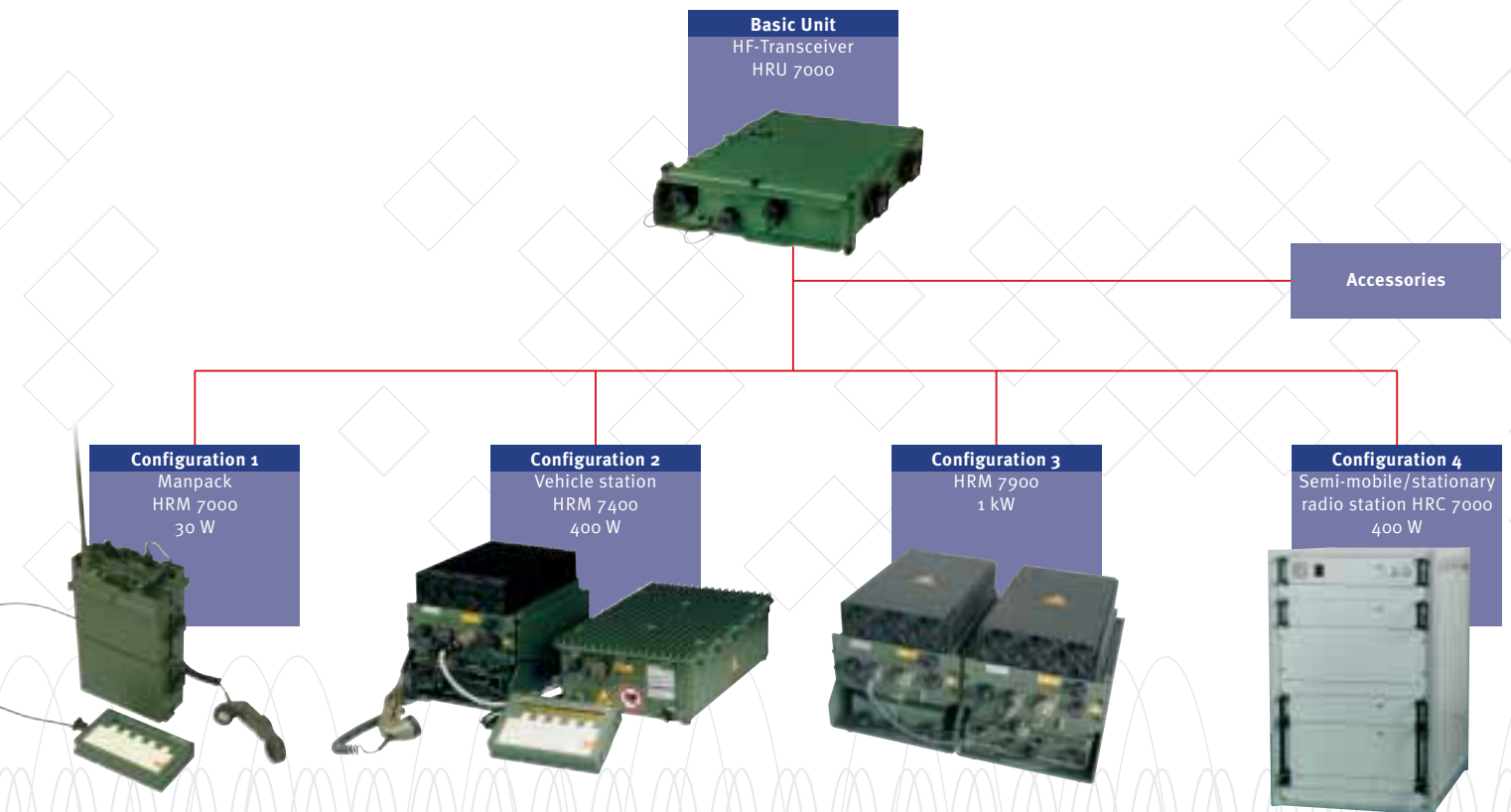
Besides some special proprietary data communication procedures military standard radio protocols and wave forms can also be loaded. According to the user's purposes the most suitable operating mode can be activated.

Configurations

The different radio stations that can be implemented with the HF product family 7000 are all based on the HF Radio Unit HRU 7000. The radio processor and the HF modem are already integrated in this 30 Watt transceiver.

Characteristics of the HF product family 7000

- ◆ Automated, reliable and independent telecommunication across various distances, without "dead zone"
- ◆ Fast data and voice transmission, conventional or with automatic link establishment (ALE)
- ◆ Message protection by encryption
- ◆ Flexible operating modes (adaptable to different operational requirements)
- ◆ Simple operation due to automatic processes and functions
- ◆ Very compact, light-weight devices and systems
- ◆ Low cabling requirement
- ◆ Easy-to-install in vehicles and systems
- ◆ Extremely economical and energy saving device and system design



HF-Radio Unit HRU 7000

The HRU 7000 is an HF transceiver operating in the frequency range 2 MHz to 30 MHz. It is designed for fast data and analogue voice transmission (SSB). During tuning, transmission and reception processes, a connected HF power amplifier unit PAU 7400 as well as antenna tuning units are controlled by the transceiver.

The radio processor integrated in the HF transceiver automates functional processes of the radio such as

- ◆ selection of the operating frequency
- ◆ automatic link establishment
- ◆ (ALE)adaptive frequency management
- ◆ data processing
- ◆ data integrity by error correction with FEC and automatic repeat request (ARQ) for non-correctable errors
- ◆ online and offline BITE

The adaptive modem of the Echotel family integrated in the HF transceiver is a key component for fast and safe data transmission.

The radio processor uses the HF data transmission standard HRS* 7000. The parameters

- ◆ bandwidth
- ◆ modulation
- ◆ data rate
- ◆ FEC

are optimised in order to achieve highest reliability and high autonomy even with manpacks.

HF-Radio Unit HRU 7000/M

This transceiver version has an additional interface for SW download / ext. crypto units and the alternative capability of switching in the HRS 7000 or MAHRS** operating mode.

HF Radio Unit HRU 7000/N

The use of this transceiver version allows the following operating modes:

- ◆ HRS 7000
- ◆ MAHRS
- ◆ STANAG 5066
(wave forms: STANAG4285, 4539 and MIL-STD-188-110A)
- ◆ STANAG 4538 (optional)



HRU 7000/M
HRU 7000/N

Power amplifier unit PAU 7400

This 400 Watt HF power amplifier unit is especially designed for highly mobile use. Compared to a conventional high-power-amplifier, its outstanding feature is significantly reduced power consumption with considerably lower dimensions/weight.



PAU 7400

* HRS = HF Radio System

** MAHRS = Multiple Adaptive HF Radio System

04 Antenna tuning unit ATU 7000/7400

Whip antennas, long-wire and undamped dipole antennas (DPA 7xxx) are quickly and effectively adapted with the automatic tuning units ATU 7000 and ATU 7400. The preset functions ensure short setting times.



ATU 7000



ATU 7400



VCH 7000

Terminal Crypto Unit TCU 7000XP

The TCU 7000XP can be used for data encryption and for operation of the radio stations HRM 7000 (Manpack) or HRM 7400 (vehicle station) in the HRS operating mode. In this application it also offers simple message handling functions (message management and pre-defined message processing). The TCU 7000XP is equipped with a 2-line LCD display, function keys (softkeys) and an alphanumeric keypad. An optical interface is available for the connection of data terminals or for hand over to other communication systems.



TCU 7000 XP

Vocoder Crypto Handset VCH 7000

The Vocoder Cipher Handset VCH 7000 is used with radios for extremely secure speech encryption. It is based on a new concept which enables excellent recognisable speech quality in real time. The interface for key initialisation is compatible with Key-Gun KSP.

Battery power unit BPU 7000

Battery unit with high capacity (at -20°C >15 Ah) in a water-proof aluminium housing with the following integrated protective elements:

- ◆ short circuit
- ◆ charge protection
- ◆ bursting protection
- ◆ full-discharging protection



BPU 7000

Accumulator Power Unit APU 7000

The APU 7000 is a rechargeable accumulator unit with high power cells (5 Ah), installed in a water-proof aluminium housing. It has the following protective elements:

- ◆ short circuit
- ◆ charging temperature monitoring



APU 7000

Manpack 30 W, HRM 7000

The HRM 7000 Manpack is a portable radio which enables mobile user radio communication even under most difficult operational conditions.

Features

- ◆ Conventional data and voice transmission or with automatic link establishment (ALE)
- ◆ 30 Watt power output
- ◆ Environmental requirements for military use in accordance with MIL-STD-810 E
- ◆ Antenna tuning unit via simple coaxial cable, detachable up to 10 m
- ◆ Controlled/remote controlled via separate terminal/PDA
- ◆ Standard interface enables data transmission, operation and programming via PC, Laptop or PDA
- ◆ Offers a high degree of autonomy and low weight for long lasting missions

Standard equipment

- ◆ HF transceiver HRU 7000 (with integrated radio processor and modem)
- ◆ Antenna tuning unit ATU 7000
- ◆ Terminal crypto unit TCU 7000 XP
- ◆ Battery
- ◆ Antenna

Accessories

- ◆ Long-wire antenna LWA 7000
- ◆ Whip antenna
- ◆ Dipole antenna DPA 7000
- ◆ Accumulator power unit APU 7000
- ◆ Battery power unit BPU 7000
- ◆ Charging unit ACU 7000
- ◆ Handset standard/encrypted
- ◆ Backpack
- ◆ Ruggedized PDA incl. software

05



HRM 7000 in use



Manpack HRM 7000

Vehicle Station 400 W, HRM 7400

The HRM 7400 is a highly mobile HF radio station for use in vehicles. Its compact design and low power consumption make installation in vehicles particularly easy.

06 Features

- ◆ Conventional data and voice transmission or with automatic link establishment (ALE)
- ◆ Various communication methods, international and national standards can be activated by software
- ◆ 400 Watt power output
- ◆ Compact design
- ◆ Detachable antenna tuning unit

Standard equipment

- ◆ HF transceiver HRU 7000 (with integrated radio processor and modem)
- ◆ HF power amplifier unit PAU 7400
- ◆ Vehicle mounting unit VMU 7000
- ◆ SW package for data communication and control

Accessories

- ◆ Whip antenna
- ◆ Vehicle dipole antenna DPA 7402
- ◆ Semi-mobile dipole antenna DPA 7400
- ◆ Antenna tuning unit ATU 7400
- ◆ Handset standard/encrypted
- ◆ Communication computer (e.g. PC, Laptop, PDA)
- ◆ Terminal crypto units TCU 7000 XP, ED4-2,*



HRM 7400 installed in a tank



Vehicle Station HRM 7400

* other devices on request

Vehicle station 1kW, HRM 7900

The HRM 7900 is made of components of the product family 7000. It is an HF radio station of the Kilowatt class. The compact design and low power consumption make installation in vehicles particularly easy.

Features

- ◆ Conventional data and voice transmission or with automatic link establishment (ALE)
- ◆ Various communication methods, international and national standards can be activated via software
- ◆ 1 kW power output
- ◆ Compact design
- ◆ Detachable antenna tuning units
- ◆ High system efficiency

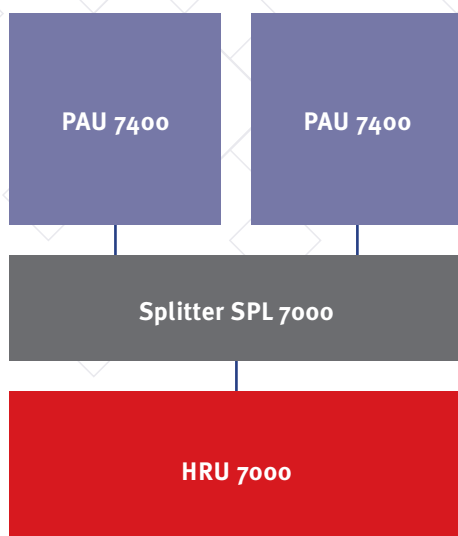
Standard equipment

- ◆ 1 x HF transceiver HRU 7000 (with integrated radio processor and modem)
- ◆ 1 x Splitter SPL 7000
- ◆ 2 x HF -power amplifier unit PAU 7400
- ◆ 2 x Vehicle mounting unit VMU 7000
- ◆ 1 x SW package for data communication and control

Accessories

- ◆ Whip antenna
- ◆ Vehicle dipole antenna DPA 7902
- ◆ Semi-mobile dipole antenna DPA 7900
- ◆ Antenna tuning unit ATU 7400
- ◆ Power combiner
- ◆ Handset standard/encrypted
- ◆ Communication computer (e.g. PC, Laptop, PDA)
- ◆ Terminal crypto units TCU 7000 XP, ED4-2,*

07



System structure of HRM 7900



Vehicle Station HRM 7900

* other devices on request

Semi-mobile/stationary radio stations, HRC 7000

For installation in conventional 19" racks, corresponding components of the product family 7000 are available. At customer's request, configurations are according to operational requirements. Transceiver systems and split-site systems can be implemented at all different configuration levels, also with multiple transmit / receiver paths for parallel operation of radio lines, remote work stations, diversity operation and interfaces to C3 I systems.

08 Features

- ◆ Conventional data and voice transmission or with automatic link establishment (ALE)
- ◆ Various communication methods, international and national standards can be activated via software
- ◆ Transmission power scalable
- ◆ Compact design
- ◆ Various antenna systems can be used
- ◆ High system efficiency

Standard equipment

- ◆ HF transceiver HRT 7000, based on HRU 7000
- ◆ HF power amplifier AMP 7000, based on PAU 7400
- ◆ Control panel AFP 7000
- ◆ 1 x SW package for data communication and control

Accessories

- ◆ Communication computer (e.g. PC, Laptop)
- ◆ Terminal crypto units CRE 7000, based on TCU 7000 XP
- ◆ Antenna systems
- ◆ Antenna tuning unit ATU 7400
- ◆ Power combiner
- ◆ Handset standard/encrypted
- ◆ Frame GG 7000



Semi-mobile radio station with several transceivers, supplied from 24 VDC on-board power supply



Stationary radio station with several transceivers, supplied from mains voltage

The DPA 7xxx antenna family consists of relatively small antennas optimised for maximum power radiation. Its technical design enables various propagation characteristics, from high angle radiation (NVIS) to low angle radiation achieved with uniform hardware. Various power classes are available, tailor-made for different platforms.

Advantages

- ◆ Radiated transmission power with high angle radiation (NVIS) typically 10 dB higher than with traditional antennas
- ◆ No “dead zone”
- ◆ Enables antenna configurations for any distance range

Dipole antenna DPA 7000 for use with Manpack HRM 7000

Features

- ◆ Simple adaptation of the radiation diagram via corresponding configuration
- ◆ Particularly high radiation efficiency
- ◆ Very low weight

Standard equipment

- ◆ Antenna radiator / wire
- ◆ Balun transformer SYM 7000
- ◆ 10 m coaxial cable
- ◆ Overvoltage protection



Structure configuration “inverted vee”

10 Dipole antennas DPA 7400 / DPA 7900*

Dipole antennas for high transmission power, quick and easy to install, for semi-mobile applications.

Features

- ◆ Simple adaptation of the radiation diagram via corresponding configuration
- ◆ Particularly high radiation efficiency

Standard equipment

- ◆ Base plate for ATU 7400
- ◆ Balanced-to-unbalanced converter
- ◆ Antenna suspensions, incl. carrying bag

Accessories

- ◆ Telescopic mast
- ◆ Coaxial cable



Structured configuration "inverted vee" DPA 7400

Dipole antennas DPA 7402 / DPA 7902*

Dipole antennas for mobile radio operation during vehicle movement or particularly in situation with confined antenna installation ground.

Features

- ◆ Omni-directional radiation characteristic
- ◆ No "dead zone" (NVIS)
- ◆ High radiated transmission power

Standard equipment

- ◆ Power splitter
- ◆ Antenna legs
- ◆ Whip elements
- ◆ Control cable

Necessary accessories

- ◆ 2 x ATU 7400
- ◆ Coaxial cable



Configuration for vehicle operation



Example configuration installed on flat roof

* DPA 74xx = 400 W
DPA 79xx = 1 kW

HF-Transceiver HRU 7000 (Basic Unit)	
▶ Frequency range	2 – 30 MHz
Receiver unit	
▶ Input sensitivity	≤ -108 dBm for SINAD = 15 dB
▶ Bandwidth	≤ 3,0 kHz
▶ Image frequency suppression	≥ 80 dB
▶ IF dielectric strength	> 100 dB
▶ LF output	variable, max. 50 mW/600 Ω
Transmission unit	
▶ Power output, PEP	30 Watt
▶ Signal-harmonics ratio	40 dB on average, depending on frequency
▶ Inter-modulation ratio	32 dB on average, depending on frequency
▶ LF input with compressor on 150 Ω	100 mV ± 3 Veff
▶ LF input without compressor on 150 Ω	30 mV ± 1 Veff
Operating modes	
▶ Download via software	
▶ Selection via software	

Manpack HRM 7000	
▶ Supply voltage	11.4 – 19 VDC
▶ Power sources	Nickel-cadmium accumulator, 5 Ah lithium battery, 20 Ah
▶ Tuning time	Learning phase typically 0.6 s Preset 50 ms
▶ Tuning power	max. 10 mW
▶ Antennas used	3.3 m whip Long-wire Dipole
▶ Operating temperature	
▶ Terminal TCU 7000 XP	- 20 °C to + 55 °C
▶ Radio	- 30 °C to + 65 °C
▶ Environmental requirement	
▶ EMC, EMP	in accordance with VG 95332 in accordance with VG 95370, VG 95373 VG 95903
▶ Tempest	in accordance with AMSG 784 B
Dimensions and weight	
▶ Volume	approx. 6l
▶ Weight (incl. TCU)	approx. 8 kg

Vehicle station HRM 7400	
▶ Supply voltage	19 – 32 VDC
▶ Power output, PEP	400 Watt
▶ Tuning time	
▶ Learning phase	typically 0.6 s
▶ Preset mode	25 ms
▶ Tuning power	max. 1 Watt
▶ Antennas used	Whips from 5 m Long-wire Dipole
▶ Operating temperature	
▶ terminal TCU 7000 XP	- 20 °C to + 55 °C
▶ Radio	- 30 °C to + 65 °C
▶ Shock	30 g, 11 ms
▶ Vibration	in accordance with MIL-STD-810 E
Dimensions and weight	
▶ Dimensions (WxHxD)	
▶ HRU 7000 + PAU 7400 + VMU 7000	240 x 250 x 333 mm
▶ Weight	
▶ HRU 7000 + PAU 7400 + VMU 7000	approx. 18 kg

Vehicle station HRM 7900	
▶ Power output, PEP	1 kW
▶ Operating voltage	
▶ Standard version	24 VDC
▶ 19" version	90 ffi 260 VAC
▶ Power consumption (Rx / Tx)	
▶ Standard version	75 / 2100 W
▶ 19" version	80 / 2300 W
▶ Tuning time	
▶ Learning phase	typically 0.8 s (initial tuning)
▶ Preset mode	25 ms
▶ Tuning power	2 Watt max.
▶ Antennas used	Whips from 5 m Long-wire Dipole
▶ Shock (standard version)	30 g, 11 ms
▶ Vibration	in accordance with MIL-STD-810 E
Dimensions and weight	
▶ Weight (incl. ATUs)	
▶ standard version	55 kg
▶ 19" version	85 kg (without rack)
▶ Volume (incl. ATUs)	
▶ standard version	80 l
▶ 19" version	180 l (without rack)

Dimensions and weights		
Assembly	Dimensions (in mm)	Weight (in kg)
▶ HRU 7000	226 x 67,4 x 327	3,7
▶ APU 7000	224 x 50 x 148	2,6
▶ BPU 7000	224 x 50 x 148	2,1
▶ TCU 7000	224 x 50 x 148	2,6
▶ ATU 7000	224 x 53 x 175	1,1
▶ VCH 7000		0,5
▶ ATU 7400	285 x 140 x 530	8,5
▶ PAU 7400	232 x 173 x 332	10,5
▶ HRT 7000	483 x 89 x 450	9,8
▶ AMP 7000	483 x 222 x 600	23
▶ CRE 7000 (with 2 TCUs)	483 x 45 x 450	4,8
▶ AFP 7000	483 x 89 x 450	7,2
▶ DPA 7000		2,6
▶ DPA 7400 (without mast)		13
▶ DPA 7402		7



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