

Eindhoven  
Nederland

Philips Usfa B.V.

SPENDEX 10.

#### Purpose

Spendex 10 provides automatic speech security for simplex one-channel communications such as occur on tactical radio networks. It can also be used for the secure transmission of data of max. 600 baud. It can be used with all types of transmission media with an audio bandwidth of approximately 10 kHz, such as military FM transceivers, unloaded field cables, grouped carrier telephony channels, service channels on radio relay systems, and leased or fixed lines. With the aid of adaptors Spendex 10 can also be used on carrier telephony systems and other transmission media.

Spendex 10 is primarily intended for encyphering and decyphering speech on tactical radio sets and is inserted between the handset and the wideband audio socket of the transceiver.

The crypto security is determined exclusively by the key setting, which takes the form of twenty lever-operated key setting switches, each with 8 positions, which must be set to the appointed position. A total of  $8^{20}$  or  $10^{18}$  different key settings is possible. For correct operation, each of the 20 switches must be in the correct position. The key setting information itself can easily be distributed within the organisation in written form.

The key setting switches are grouped on the front panel and hidden from view behind a lockable cover. In case of emergency the switches can be reset to zero instantaneously, thanks to the protruding levers of the switches.

### Tactical speech security terminal Spendex 10



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**Operation**

Spendex 10 is a simplex device which automatically operates in the crypto mode. When the correct key setting is used, crypto transmission in progress is received immediately as soon as the terminal is switched on. The transmitting mode is achieved only when the press-to-talk switch in the handset is pressed. A station with the correct key setting can enter existing networks immediately.

Synchronization, key starting, and operation are entirely automatic and instantaneous. A receiving Spendex 10 automatically differentiates between crypto speech, crypto data, and clear speech. Automatic reception of clear speech, even from sets which are not equipped with Spendex 10, is always possible; transmission of clear speech is only possible as long as a springloaded "Secure/Clear"-switch on the front panel is kept pressed. As soon as this switch is released, secure cryptophonic operation ensures automatically. Of course, clear speech through a Spendex 10 equipped transceiver can be received by noncrypto stations. All types of broadcasts (either crypto or clear) can be received by Spendex 10.

Normal radio procedure is not affected by the use of Spendex 10 and virtually no additional training of operators is required: when the correct key setting is used, only the press-to-talk switch in the handset has to be operated. Instead of a handset with dynamic microphones, a throat microphone with separate headphones and press-to-talk switch can be employed.

Spendex 10 has only two operating controls: a potentiometer for adjusting the loudness of the received signal and a single 3-position on/off switch which also serves as crypto/clear speech control.

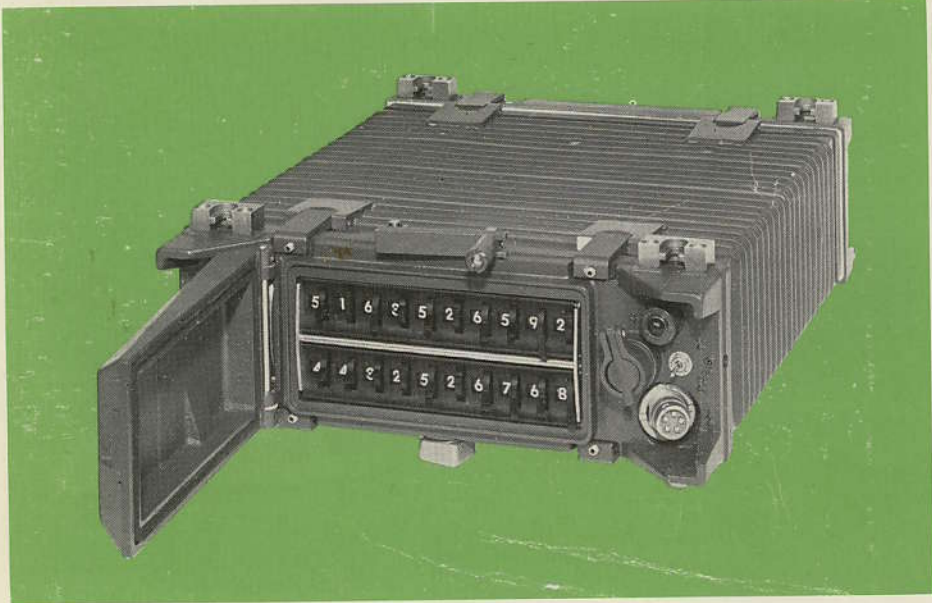
**Mechanical Design**

The construction of Spendex 10 is based on the construction of the family of tactical transceivers RT 3600 made by Philips Telecommunication Industries of Hilversum, Netherlands. Spendex 10 has been designed as an integral part of this family and can be connected to these transceivers without any modification or preparation whatever. The units can be stacked on top of each other and clipped together for mounting in command vehicles or such. Of course, the mechanical design of Spendex 10 is not limited just to a fitting of the RT 3600 alone; it can be made to match the casings of other types of transceivers, provided enough room is made available for the circuitry and key setting switches.

Spendex 10 has length of 315 mm, a height of 80 mm, a width of 255 mm, a weight of only 5 kg, and a volume of some 7 litres.

Spendex 10 is of modular construction, with interchangeable plug-in units on two frames which are strapped together inside a watertight casing.

The 20 key setting switches, grouped on the front panel, are hidden from view behind a lockable door. Next to this door the sockets for connection of Spendex 10 to the handset and to the transceiver, as well as the "On/Off" and "Clear/Secure"-switch, the red and green pilot lamps, and the loudness control, are located. The rear panel accommodates the sockets for the power supply, for the data and for the adaptors.



**Technical Data**

**Operational data**

- 3 operating modes: - crypto speech
- clear speech
- crypto data

Entirely passive reception, automatically differentiating between the 3 operating modes.

Intentional transmission of clear speech only as long as the "Clear/Secure"-switch is kept pressed.

Simplex device with a press-to-talk switch, hence normal radio procedure not affected.

Only 2 operating controls, viz "On/Off" - & "Clear/Secure"-switch and volume control.

**Transmission data**

Decrease in range, caused by use of Spendex 10: 15% average.

Signal-to-noise ratio of received signal: minimum 10 dB.

Dynamic range of audio input levels: 30 dB, plus some 25 dB obtained by an adjustable A.V.C. in the microphone amplifier.

Speech digitalization by means of digitally controlled delta modulation, requiring neither rigid frame nor bit synchronization.

Sampling frequency: 9,6 kbits/second; other frequencies applicable.

Frequency spectrum of digital signal: 20 Hz to 10 kHz.

Digital output: 6 volts peak-to-peak or less, as required.

Required level of received signal: between 20 mV and 10 volts.

Data input: logical levels maximum 600 baud, minimum 1 baud.

Required bandwidth: flat to within 1.5 dB between 10 and 6000 Hz, gently sloping with max. 6 dB/octave between 6000 and 10.000 Hz.

**Cryptophonic data**

Cryptophonic principle suitable for tactical use and transmission of all classifications. Reconstruction of key setting by means of intercepted crypto signals impossible. More than 50% logatom-intelligibility, equivalent to better than 95% sentence intelligibility, at 9,6 kbits sampling frequency.

Entirely automatic and instantaneous synchronization, key starting and operation.

Capable of joining networks communications and broadcasts at any moment without delay.

Key setting by means of twenty lever-operated key setting switches, hidden from view behind a lockable cover.

**Technical data**

Physical data (pertaining to the RT 3600 design); length 315 mm, height 80 mm, width 255 mm, weight 5 kg, volume 7 litres. Power requirements: 12 W between 20 and 31 volts d-c.

Operating temperatures from -30 °C to +55 °C.

Storage temperatures from -50 °C to +70 °C.

Immersible to 1 metre below surface.

Mean Time Between Failures estimated to be well in excess of 2000 hours.

Suppression of radio interference according to MIL-Std-461-A, class 1c.

Meets relevant DEF 133 tests, category L2, and/or equivalent FINABEL 17-E-1 tests for panclimatic serviceability.