

DEF

2000



AZIMUT

Automatic Direction Finder

DF 2000

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Purpose

The automatic direction finder (ADF) DF 2000 is intended for the bearing of aircraft (during the operation of on-board radiostation transmitter) via 2–16 frequency channels (depends on a delivered configuration).

Operational Principle

The ADF provides bearing of AM-modulated VHF signals using a phase method. The ADF utilizes electric switching of array vibrators (adcock antenna), which causes the rotation of one vibrator.

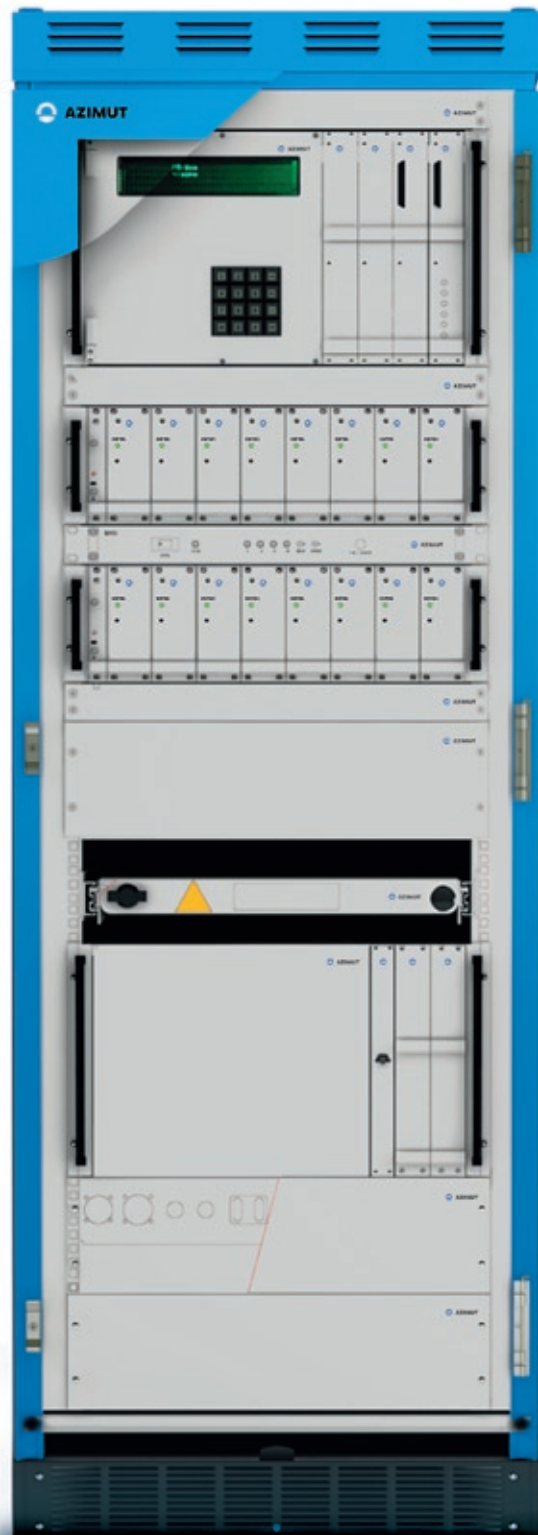
ADF Composition

The ADF consists of: processing rack, antenna system, antenna with a test generator (TG), remote control equipment and a shelter with a life-support system.

The following equipment is used for remote control:

- RCE 2000 equipment;
- reserve command post (RCP) equipment, which provides back-up of all the main functions of the RCE 2000 and is located in the RCP premises (no more than two RCP equipment sets are used).

The remote control equipment can be located up to 10 kilometers away the processing rack. The ADF is designed on a modular principle, which allows to create an optimum configuration according to the customer's requirements.





Control

The ADF can be controlled using:

- the local control panel;
- the RCE 2000 remote control equipment;
- the RCP equipment.

Changes in the state of the equipment and the ADF parameters are notified by light and sound signaling.

The RCE 2000 equipment provides access to the information about the ADF state and parameters via the local network Ethernet using TCP/IP protocol, or via the ATN network in accordance with CCITT X.25 protocol if necessary.

Direction Finding Information Presentation

The direction finding information is presented on the remote indication modules (IM) of the RCE 2000 and RCP equipment, which are situated at the controller working position (CWP). It is possible to transmit information to the displaying equipment of radar complex and to air traffic control automated systems (ATCAS).

Monitoring and Back-up

The ADF provides back-up of the direction finding channels. In the case of failure of one of the main channels, the back-up channel is automatically set to the frequency of the failed channel. Built-in test equipment (BITE) provides automatic monitoring of all the ADF main parameters and search and localization of faults up to Line Replacement Unit (LRU) level. The ADF parameters and the state of equipment are displaying in graphic mode on the colour displays of the remote control equipment. All the changes in the state of the ADF and all the actions of the service staff are recorded and are stored in the RCE 2000 equipment within 30 days.

The ADF equipment provides automatic monitoring of the communication line between the ADF and the remote equipment, and switch-over to the back-up line if the main line fails. In the case of fault of communication lines, the ADF remains in its state at this moment.

Design and Electronic Components

The rack and the modules design has been developed according to the IEC 297 Standard (Euromechanics). Unified modules, boards and devices are used in the ADF equipment. Modern electronic components and surface mounting technology are utilized.

Power Supply

The ADF power supply are provided from the main and the reserve network 220 V, 50 Hz. The ADF operates in uninterrupted 24-hour mode and does not demand the constant presence of staff.

Main Technical Specifications of the DF 2000

Frequency range	100 MHz to 400 MHz
Frequency spacing	25 kHz; 8.33 kHz
Modulation type of the direction finding signal	AM
Modulation depth, at most	80%
Number of channels operating simultaneously	2–16 depending upon configuration
Direction finding sensitivity by each channel, at most	3 μ V/m
Root-mean-square error of direction finding, at most	1°
Direction finding distance at height, at least:	
(150 \pm 50) m	45 km
(300 \pm 50) m	65 km
(1000 \pm 50) m	120 km
(3000 \pm 50) m	200 km
(10 000 \pm 50) m	360 km
Duration of the direction finding signal, at least	0.5 s
Coverage in the vertical plane	60°

Dimensions

Container (width×height×depth)	2100×2250×3150 mm
Antenna (diameter)	3.2 m
Height of the Tower	5.7 m
Processing rack (width×height×depth)	1600×600×600 mm
Indication module (width×height×depth)	200×300×200 mm

Power Supply

Main and reserve network	220 (+10%; –15%) V, 50Hz
Power consumption of the equipment inside the container (indoors), at most:	
· of the main equipment	1.0 kVA
· when the thermoregulation system is on	3.5 kVA

Operating Conditions

Antennas, antennas with TG, container:	
· environment temperature	–50°C to +50°C
· precipitation effect (rain intensity), at most	3 mm/min
· wind force effect (wind speed), at most	50 m/s
Equipment inside of the container	–40°C to +50°C
Remote control equipment	5°C to 40°C
IM number, up to:	
· connected to the RCE 2000 equipment	32
· connected to the RCP equipment	16

Reliability

MTBF, at least	30 000 hours
Life cycle	15 years