Two-port vector network analyzer
ARINST VNA-DL 1-8800MHz

Operation manual (passport)

1. Purpose

1.1. Two-port vector network analyzer **ARINST VNA-DL 1-8800 MHz** (hereinafter analyzer, device) is designed to measure the elements of the scattering matrix (complex reflection and transmission coefficients) of two-port networks. Measures parameters S11 and S21, voltage standing wave ratio (VSWR), impedance, admittance, phase, group delay time, distance to cable fault. Requires a PC running Windows 7-10. (Not included in the package).

1.2. The analyzer is used to configure and match the characteristics of passive and active radio devices[1] (antennas, cables, filters, attenuators, amplifiers, etc.), checking the integrity and measuring the parameters of high-frequency cables, other radio engineering measurements.

1.3. The device is intended for radio amateur use, as it is not a professional measuring instrument.

1.4. When purchasing an analyzer, check its completeness. **Attention! After the purchase of the device, claims for incompleteness are not accepted!**

2. Structure of the device
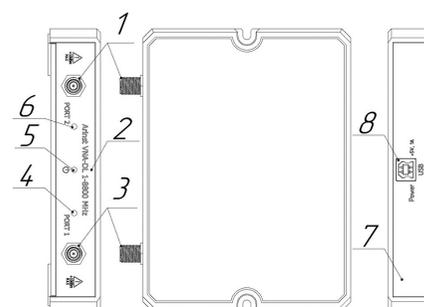
Structure
1. Measuring port 1 (PORT 1)
2. RF connector panel
3. Measuring port 2 (PORT 2)
4. Port 1 activity indicator.
5. Indicator STATUS
6. Port 2 activity indicator.
7. Patch panel
8. Connector USB-B

Due to the constant improvement of the device and software, the manufacturer reserves the right to make changes to its technical characteristics and completeness.

3. Contents of delivery

Vector network analyzer **ARINST VNA-DL 1-8800 MHz**	1 pc.
Cable 2xUSB2.0 (male) -A - USB2.0 (male) -B	1 pc.
Adapter SMA (female) - SMA (female)	2 pc.
Operation manual (passport)	1 pc.
Package	1 pc.

4. Specifications

Parameter		value
Working frequency range		1-8800 MHz
Frequency resolution	for frequencies 1-140 MHz	100 Hz
	for frequencies 140-8800 MHz	10 kHz
Maximum number of scan points		1000
Maximum scanning speed		500 points/s
Dynamic range S21 (IF=20 Hz)	for frequencies 1-4000 MHz	>80 dB type 85
	for frequencies 4000-6900 MHz	>75 dB type 80
	for frequencies 6900-8800 MHz	>65 dB type 75
Bridge directivity uncorrected in the entire range, not less		12 dB
Directivity effective[2] (after full one-port calibration), not less		55 dB
Standing wave ratio, no more		2 (1.3 type)
Phase measurement precision[2], no more		0,7°
Magnitude measurement precision[2], no more		0,25 dB
Resolution of determining the distance to the fault[3]		$(C \times VF)/2S$ m
Maximum length of the measured cable[4], when VF=1		3000 m
Compensation of the electrical cable length, when VF=1		±3 m
Maximum DC Input Voltage		25 V
Maximum input power supplied to ports		+10 dBm
Maximum power of the probing signal, no more		-3 dBm
Displayed graphs	■Smith chart; ■polar chart; ■phase of reflection coefficient (RC) and transmission coefficient (TC); ■magnitude of RC and TC; ■logarithmic magnitude RC and TC; ■SWR; ■distance to fault; ■cable loss; ■group delay time	
The number of stored user settings		not limited
The number of traces to remember		not limited
Working temperature range		0 … +40℃
PC connection interface		USB
Maximum current consumption, no more than		1 A
Overall dimensions (L×W×H)		155×127×29 mm
Weight		0,25 kg

---

[1] The devices must allow the possibility of applying a stimulating signal from the analyzer to the test port. The analyzer manufacturer is not responsible for the failure of devices that do not allow the supply of a stimulating signal to the analyzed port.

[2] The measurement is performed after warming up the device for at least five minutes with a complete (open load, short load, 50 Ohm load) one-port calibration. The change in ambient temperature from the moment of calibration to measurements should not exceed ± 3 ° C.

[3] Where C is the speed of light, m / s; VF is the speed factor (the ratio of the speed of propagation of an electromagnetic wave in a cable to the speed of propagation of an electromagnetic wave in a vacuum), takes on a value depending on the cable from 0.1 to 1; S - scanning frequency range (Hz).

[4] It depends on the amount of attenuation in the cable and is the limit of the indication.

5. Turning on the device

⚠ **Attention! Correlate the signal power and voltage supplied to ports P1 and P2 with the maximum technical characteristics of the device indicated in the table.**

To work with the device, you will need a personal computer that meets the following requirements:
- OS Windows 7-10
- one free USB port.

5.1. Before switching on, make sure that the device has no external damage.

5.2. The device is turned on immediately after power is supplied from the USB port of a personal computer. It is recommended to use the supplied USB cable to connect the device to a PC.

5.3. Before starting to work with the device, you need to install special software **Arinst Virtual Lab**. The installation file is available on the website: **www.arinst.net**

5.4.After downloading the installation file, it must be run as administrator. The software installation procedure is standard, you just need to follow the instructions of the installer. If the PC does not have a driver for the analyzer to work correctly, the installer will offer to install it along with the software.

6. User interface

The network analyzer application structurally includes two components: the analyzer connection interface and the control interface.

6.1. Connection interface

To connect the device to a PC, it is necessary to connect the cable from it to the USB port of the computer. Then start the control software and click on the «Connect» button in the upper right corner. After that, a window for selecting a connection port will appear. In this window, select the required port in the drop-down list and click the «Connect» button. When the device is connected, it checks for firmware updates. If there are updates, you will be prompted to install it. It is recommended to install device updates. After installing the updates, you can start working with the device.

6.2. Control interface

If the firmware version of the device is up-to-date or an update was made when connecting to a PC, the module suitable for the analyzer is loaded and the device control interface opens. The «Connection» button glows green. The scanning process is underway. What is notified by the glowing «Pause» button .

6.3. Measurement mode:
- **S11** – mode for measuring reflection coefficient, cable loss and distance to fault;
- **S21** –transmission coefficient measurement mode.

6.4. Designation of the instrument calibration type:
- **No Call** – there is no custom calibration.

SOL / SOL+T – full one-port / two-port calibration. Displayed in white.

If the measurement frequency range is within the calibration range, the instrument calculates calibrations based on the interpolation method. Measurement accuracy is lower. Calibration is displayed in blue.

If the frequency range is outside the calibration range, the instrument calculates calibrations based on the extrapolation method. The calibration type is displayed in red. The measurement accuracy is the lowest.

7. Turning off the device

To complete work with the device and turn it off, follow these steps:

- In the user interface menu, end the session with the device by clicking on the "Connect" button. In the window that appears, click on the "Disconnect" button. In this case, the port activity indicators will stop blinking, only the STATUS indicator will remain on, the device will go into standby mode.

- To completely turn off the device, disconnect the USB cable from the personal computer.

The complete instruction manual for the device in PDF format is available on the websites www.kroks.ru , www.arinst.ru , www.arinst.net