Supplement to Operating Manual
R&S®NRT-Z14/-Z43/-Z44 Directional Power Sensor
R&S®NRT-Z5 USB Interface Adapter

Contents

The following pages correspond to Chapter 1 of the manual for the R&S®NRT-Z14/-Z43/-Z44 sensors (1171.6121.35-01). The chapter includes detailed instructions for operating the sensor via the R&S®NRT-Z5 USB interface adapter.

1   Putting into Operation

CAUTION   The following instructions should be strictly observed, in particular when putting the instrument into operation the first time, to avoid damage to the instrument and hazards to persons.

1.1   Unpacking

After unpacking the sensor, check for completeness of the delivery and carefully check all parts for any damage. In case of any damage you should immediately inform the transport agent and keep all packing material so as not to forfeit your claims. The original packing should also be used for any later transport or shipment of the sensor.

1.2   Connecting the Sensor
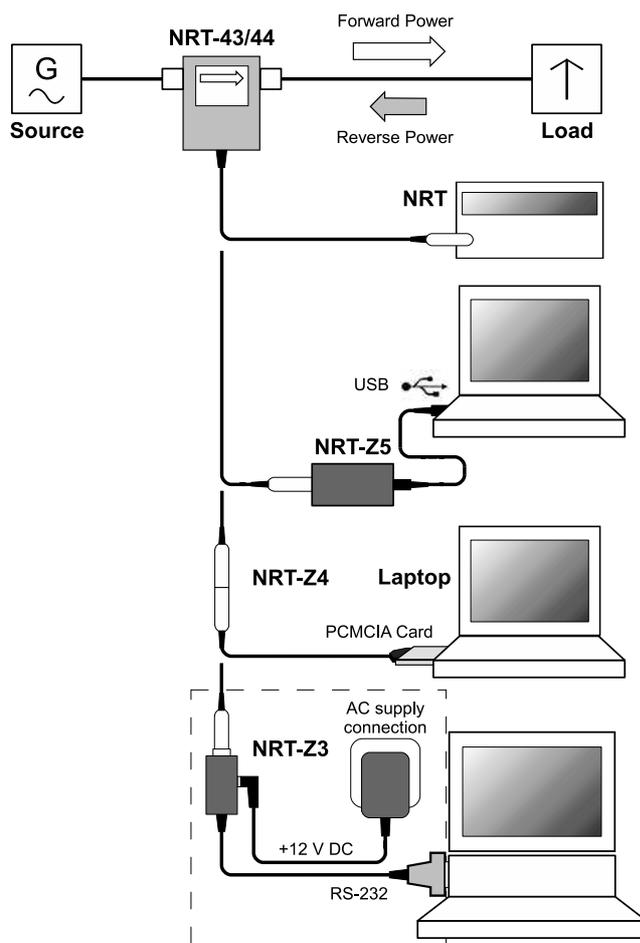
The directional power sensor may be operated from the R&S NRT base unit (see section 1.3) or from a PC/laptop equipped with a USB, serial RS-232 or PCMCIA interface. The R&S NRT-Z5 interface adapter is required for the USB interface, the R&S NRT-Z4 interface adapter is required for the PCMCIA interface, and the R&S NRT-Z3 interface adapter is required for the serial interface. The sensor is power-supplied via the R&S NRT or the controller, the only exception being R&S NRT-Z3 where an external plug-in power supply unit (provided with R&S NRT-Z3) must be used.

The sensor is connected between source and load and measures the power flow in both directions, i.e. from the source to the load (forward power) and conversely (reverse power). The ratio of forward and reverse power is a measure of the matching of the load which can be measured as standing wave ratio (SWR), return loss or reflection coefficient.

The R&S NRT-Z43/Z44 directional power sensors are of unsymmetrical design and should therefore be connected into the test circuit so that the arrow on the sensor points to the forward power direction. In this configuration, all measurement functions are available. Connecting the sensors the other way round is advisable if the average of forward powers below 7.5 W (R&S NRT-Z43) or below 30 W (R&S NRT-Z44) is to be measured with high accuracy and matching measurements are of secondary importance.

Fig. 1-1   **Connection of power sensor**

When measuring high power levels, the following instructions should be strictly observed to avoid damage to the sensor or injury to persons.

CAUTION	Do not exceed permissible continuous loading (see diagram on the rear).
	Switch sensor into test circuit only with the RF power switched off.
	Tighten RF connector by hand.
	Non-observance may cause injuries, i.e. skin burns, damage to the instruments used and premature wear of the RF connectors.

1.3 Connecting the Sensor to the R&S NRT Power Reflection Meter
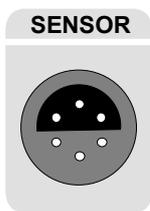
SENSOR

The sensor can be connected to the *SENSOR* connector on the front panel of the R&S NRT or to the *SENSOR 2* or *SENSOR 3* connector on the rear panel (only with option R&S NRT-B2). The R&S NRT should recognize the sensor in an initialization routine a few seconds after the connection is made or after power-up, respectively, and immediately start measurements.

Operation of the R&S NRT is described in detail in the associated operating manual.

1.4 Operating the Sensor on a PC via the R&S NRT-Z5 USB Interface Adapter

To operate the sensor on a PC via the R&S NRT-Z5 USB interface adapter, the following requirements must be met:

➢ The PC must have a USB port that can supply current of 500 mA. To be on the safe side, you can determine the current available on the USB ports as follows:

- Select **Control Panel** or **Settings – Control Panel** in the Windows™ start menu

- Select the **System** icon

- Select the **Hardware** tab

- Click the **Device Manager** button to start the device manager

- Open the **Universal Serial Bus controllers** item (listing all USB controllers, hubs and USB devices)

- Double-click **USB Root Hub** (or right-click and select **Properties** in the context menu)

- Select the **Power** tab: If the hub is self-powered and the total power available indicated under **Hub information** is 500 mA per port, the R&S NRT-Z5 can be safely operated.
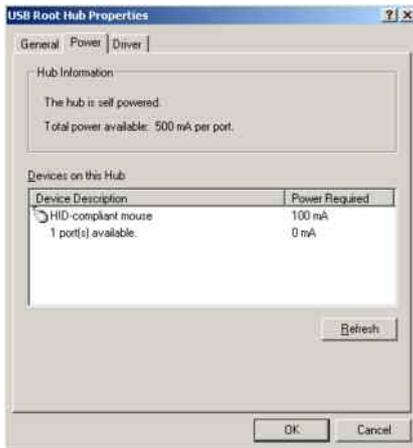
The PC operating system must support the USB and the device driver for the R&S NRT-Z5. This is the case for Windows™ 2000, Windows™ XP and Windows™ Vista.

1.4.1 Installing Device Drivers

For the R&S NRT-Z5 USB interface driver, two device drivers must be installed (for the USB interface and the virtual COM port).

➢ Connect the R&S NRT-Z5 USB interface adapter to the PC using the supplied USB cable. The wizard for finding new hardware starts automatically:

➢ Now insert the supplied installation CD into the CD drive and click **Next**. If the first part of the installation was completed successfully, the LED on the R&S NRT-Z5 will light up green and the following window will appear:

➤ Click **Finish**. The wizard for finding new hardware will start a second time:

➤ Click **Next**. If the first part of the installation was completed successfully, the following window will appear:

➤ Click **Finish** to conclude the installation of the device drivers. Now connect the sensor to the R&S NRT-Z5 interface adapter and test the function using the Windows™ user interface (chapter 2).

### 1.4.2 Checking and Changing the Virtual COM Port

To check the assigned virtual COM port and to change it if necessary, proceed as follows:

➤ Select **Control Panel** or **Settings – Control Panel** in the Windows™ start menu

➤ Select the **System** icon

➤ Select the **Hardware** tab

➤ Click the **Device Manager** button to start the device manager

➤ Open the **Ports (COM & LPT)** item. The assigned COM port is indicated directly to the right of **R&S NRT-Z5**:

➤ *To change the assigned COM port, double-click* **R&S NRT-Z5** *(or right-click and select* **Properties** *in the context menu)*

➢ Select the **Port Settings** tab and click the **Advanced…** button
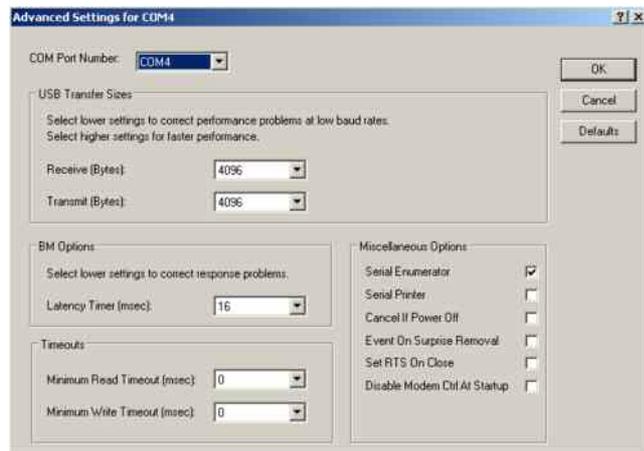
➢ Under **COM Port Number**, change the virtual COM port and click **OK**

1.5 Operating the Sensor on a PC via the R&S NRT-Z4 PCMCIA Interface Adapter

These applications require a controller with a PCMCIA type II connector and an R&S NRT-Z4 interface adapter. The sensor is power-supplied by the controller via the PCMCIA interface and handled as a peripheral unit equipped with a serial interface (COM1 to COM4).

The sensor may be operated using the supplied *Virtual NRT* Windows™ user interface (see chapter 2) or via an application program (chapter 3). The *Virtual NRT* program simulates the user interface of a power reflection meter on the monitor and enables manual power measurements.

1.5.1 Installing a PCMCIA Interface Card (SIO Card)

➢ Connect SIO card to sensor via connecting cable (see Fig. 1-2).

➢ Switch off controller and plug SIO card into the empty PCMCIA type II slot. The printed side of the SIO card must be turned upwards.

➢ Switch on controller and wait for booting.

The following steps depend on the operating system used. They are described in detail on the installation disks of the R&S NRT-Z4 interface adapter; see ASCII files liesmich.txt (German) or readme.txt (English).

It is essential that the controller can access the SIO card after installation as a peripheral unit with serial interface.

➢ Connect the sensor to the connecting cable and test it by means of the *Virtual NRT* program (chapter 2).
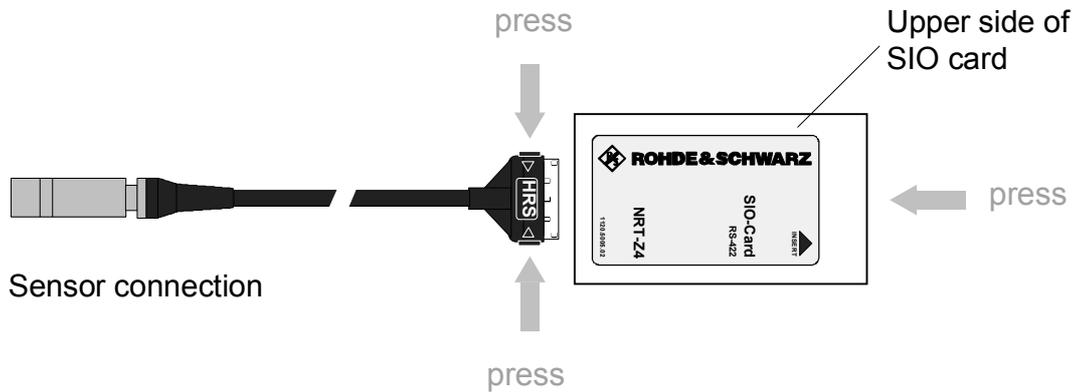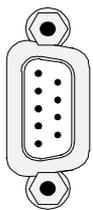
press

Upper side of
SIO card

press

Sensor connection

press

Fig. 1-2   Connecting the cable to the PCMCIA interface card (SIO card)

## 1.6   Operating the Sensor on a PC via the R&S NRT-Z3 Interface Adapter

RS-232

The R&S NRT-Z43 and R&S NRT-Z44 directional power sensors have been devised as self-contained measuring instruments with remote-control capability via a serial RS-422 interface and can therefore be operated from a suitable computer. For use with a PC or laptop, the R&S NRT-Z3 interface adapter is available for connecting the R&S NRT-Z43/Z44 to a standard RS-232 interface (Fig. 1-1).

The sensor can be controlled via the supplied *Virtual NRT* Windows™ user interface (see chapter 2) or via a user program (chapter 3). The *Virtual NRT* program simulates the user interface of a power reflection meter on the monitor and enables manual power measurements.

1.7   Connection to AC Supply
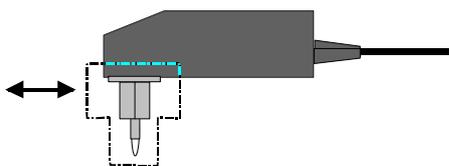
The direct plug-in power supply for the R&S NRT-Z3 can be connected to any single-phase AC supply with a rated voltage from 100 V to 240 V and a rated frequency from 50 Hz to 60 Hz. It automatically adjusts itself to the local AC supply so that there is no need for external switchover.

Four adapter plugs (Euro, U.S.A., U.K., Australia) are supplied with the sensor to adapt the direct plug-in power supply to the socket outlet in question. For replacing an adapter, no tools are required; the adapter is withdrawn and another adapter inserted until it engages.

The following safety instructions should be observed:

NOTICE	The direct plug-in power supply is intended for indoor use only.
	Allow direct plug-in power supply with condensation to dry before connecting it to the AC supply.
	Observe permissible ambient temperature range of 0 °C to +50 °C.

The direct plug-in power supply is internally fused. Replacement of fuse or opening of the unit is not possible.