# RFD-200 S3

## portable relay test set


Vanguard Instruments
A DOBLE COMPANY

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### Product Overview

The RFD-200 S3 is a portable relay test set that delivers performance verification testing of electro-mechanical, electronic, and microprocessor-based protective relays in their operating installations. The RFD-200 S3 is a rugged test set suitable for testing a variety of protection relays operated in both indoor and outdoor environments. The unit's ergonomic design and intuitive control panel layout make it ideal for first-time users who have little or no training.

### Built-in Timer

The RFD-200 S3's digital timer features independent start and stop trigger inputs designed to measure the time between event transitions and to display the elapsed time in both milli-seconds and cycles. The RFD-200 S3's timer has three different trigger inputs – Internal Trigger, Dry-Contact, or Wet-Contact. The Internal Trigger can start or stop the timer by sensing the application or removal of the unit's voltage or current source. The Dry-Contact can trigger the timer by detecting a change in state of the dry-contact input. Similarly, the Wet-Contact can trigger the timer by detecting a change in state of the voltage input. Thus, the three inputs can trigger the timer by the presence or removal of the unit's voltage or current source or by changes in voltage or current states.

### AC Current Source

An AC current source with three outputs (10A, 40A, and 100A) provides test current to relays. The current source output can be programmed to synchronize with the RFD-200 S3's timer. After a test is completed, the test current reading is latched and displayed on the LCD screen. This feature reduces the possibility of overheating the relay coils.

### Auxiliary Output Contact

A set of NO/NC dry contacts change state when a test is initiated.

### AC Voltage Source

An AC voltage source is available for testing relays up to 250 Vac. The AC voltage source output can be programmed to synchronize with the RFD 200 S3's timer.

### DC Voltage Source

A 0 – 300 Vdc voltage source is also available. The DC voltage source can also be programmed to synchronize with the RFD-200 S3's timer.

### Volt Meter

One volt meter input (0 to 600 V input range) is available on the RFD-200 S3.

### Ampere Meters

The test current is displayed on the unit's back-lit LCD screen that is viewable in both bright sunlight and low-light levels. The current measuring range is from 0.00 to 250 A. A second ampere meter is also available and can be used to read an external current input. The external current input is rated at 6 A max and is protected by a circuit-breaker.

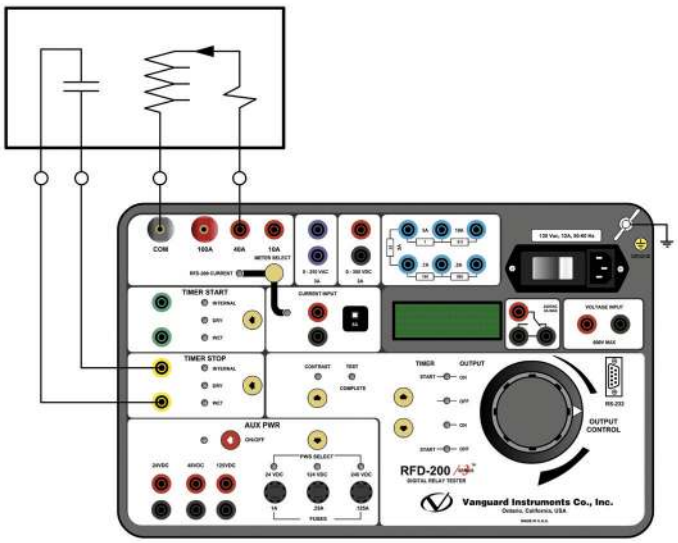
### Auxiliary AC/DC Power Supplies

The RFD-200 S3 provides three power supplies (24 Vdc, 48 Vdc and 124 Vdc) for powering solid-state or microprocessor-based relays.

### Built-in Power Resistors

The RFD-200 S3 features built-in power resistors for fine current adjustment.

## RFD-200 S3 connections




## ordering information

| Part No. | Description |
|---|---|
| 9032-UC | 110V RFD-200 S3 and cables |
| 9082-UC | 220V RFD-200 S3 and cables |

# RFD-200 S3 Features


# RFD-200 S3 technical specifications

| | |
|---|---|
| **physical specifications** | **Dimensions:** 17"W x 12½"H x 12"D (42.7 cm x 32.0 cm x 30.5 cm)<br>**Weight:** 35 lbs. (15.9 Kg) |
| **ampere meter input ranges** | Internal input range: 0 – 250 A; accuracy: 2% of reading ±10 mA,<br>External AC input range: 0 – 6A; accuracy: 1% of reading ±10mA;<br>External DC input range: 0 - 6A; accuracy: 0.5% of reading ±1 count<br>Measurement method: True RMS for AC |
| **power resistors** | 5 Ω/50 W, 1 Ω/50 W, 25 Ω/50 W, 100 Ω/50 W, 500 Ω/50 W |
| **auxiliary power supplies** | 24 Vdc @ 1 A, 48 Vdc @ 0.25 A, 124 Vdc @ 0.125 A |
| **temperature** | **Operating:** -10°C to +50°C (+15°F to +122°F)<br>**Storage:** -30°C to +70°C (-22°F to +158°F) |
| **cables** | furnished with complete set of testing leads |
| **options** | shipping case<br>transformer load tap-changer remote control device |

| | |
|---|---|
| **input power** | 100 – 120 Vac or 200 – 240 Vac (factory pre-set), 50/60 Hz |
| **volt meter input range** | 0 – 600.0V;<br>AC accuracy: 1% of reading ±1 count;<br>DC accuracy 0.5% of reading ±1 count<br>Measurement Method: True RMS for AC |
| **dry contact output** | 3A, 240 Vac or 120 Vdc |
| **safety** | designed to meet IEC 61010 (1995),<br>UL 61010A-1, and CSA-C22.2 standards |
| **humidity** | 90% RH @ 40°C (104°F)<br>non-condensing |
| **altitude** | 2,000 m (6,562 ft)<br>to full safety specifications |
| **warranty** | one year on parts and labor |

**NOTE :** the above specifications are valid at nominal voltage and ambient temperature of +25°C (+77°F). Specifications are subject to change without notice.

**Timer Second Display**
(in seconds and cycles - 50/60 Hz programmable)

| range | resolution | accuracy |
|---|---|---|
| 0 to 9.999 sec | 1 ms | ±(1 ms + 0.01%) |
| 10.00 to 99.99 sec | 10 ms | ±(10 ms + 0.01%) |
| 100.00 to 999.999 sec | 100 ms | ±(100 ms + 0.01%) |

**Timer Cycles Display**

| range | resolution | accuracy |
|---|---|---|
| 0 to 9.999 cycles | 0.1 cycles | ±(0.1 cycle + 0.01%) |
| 1,000 to 49,999 cycles / 50 Hz | 1 cycle | ±(1 cycle + 0.01%) |

**AC Current Output**

| range | no-load voltage | load voltage | load current | load/unload time |
|---|---|---|---|---|
| 10A | 90 Vac | 75 Vac | 10A | 2 min / 15 min |
| 40A | 25 Vac | 20 Vac | 40A | 1 min / 15 min |
| 100A | 10 Vac | 7.25 Vac | 100A | 1 min / 15 min |
| 100 A | 10 Vac | 3 Vac | 250A | 1 sec / 5 min |

**AC Voltage Output**

| range | no-load voltage | load voltage | load current | load/unload time |
|---|---|---|---|---|
| 250 Vac | 260 Vac | 240 Vac | 3A | 10 min / 45 min |

**DC Voltage Output**

| range | no-load voltage | load voltage | load current | load/unload time |
|---|---|---|---|---|
| 300 Vdc | 300 Vdc | 250 Vdc | 2A | 10 min / 45 min |

## Instruments designed and developed by the hearts and minds of utility electricians around the world.

Founded in 1991 and located in Ontario, California, USA, Vanguard Instruments™ offers a wide range of diagnostic test equipment that accurately and efficiently measures the health of critical substation equipment, such as transformers, circuit breakers, and protective relays.

Our first product was a computerized, extra high voltage (EHV) circuit breaker analyzer, which became the forerunner of an entire line of EHV circuit breaker test equipment. Over the years, our portfolio has grown tremendously to include microcomputer-based precision micro-ohmmeters; single- and three-phase transformer winding turns-ratio testers; transformer winding-resistance meters; mega-ohm resistance meters; and a variety of other application-specific products.

Our instruments are rugged, reliable, accurate, and user friendly. They eliminate tedious and time-consuming operations, while providing fast, complex test-result calculations. Using our equipment helps reduce errors and eliminates the need to memorize long sequences of procedural steps.

In 2017, Vanguard Instruments became a part of Doble Engineering Company, an energy industry leader in hardware, software, and services that diagnose and monitor the health of critical assets.

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