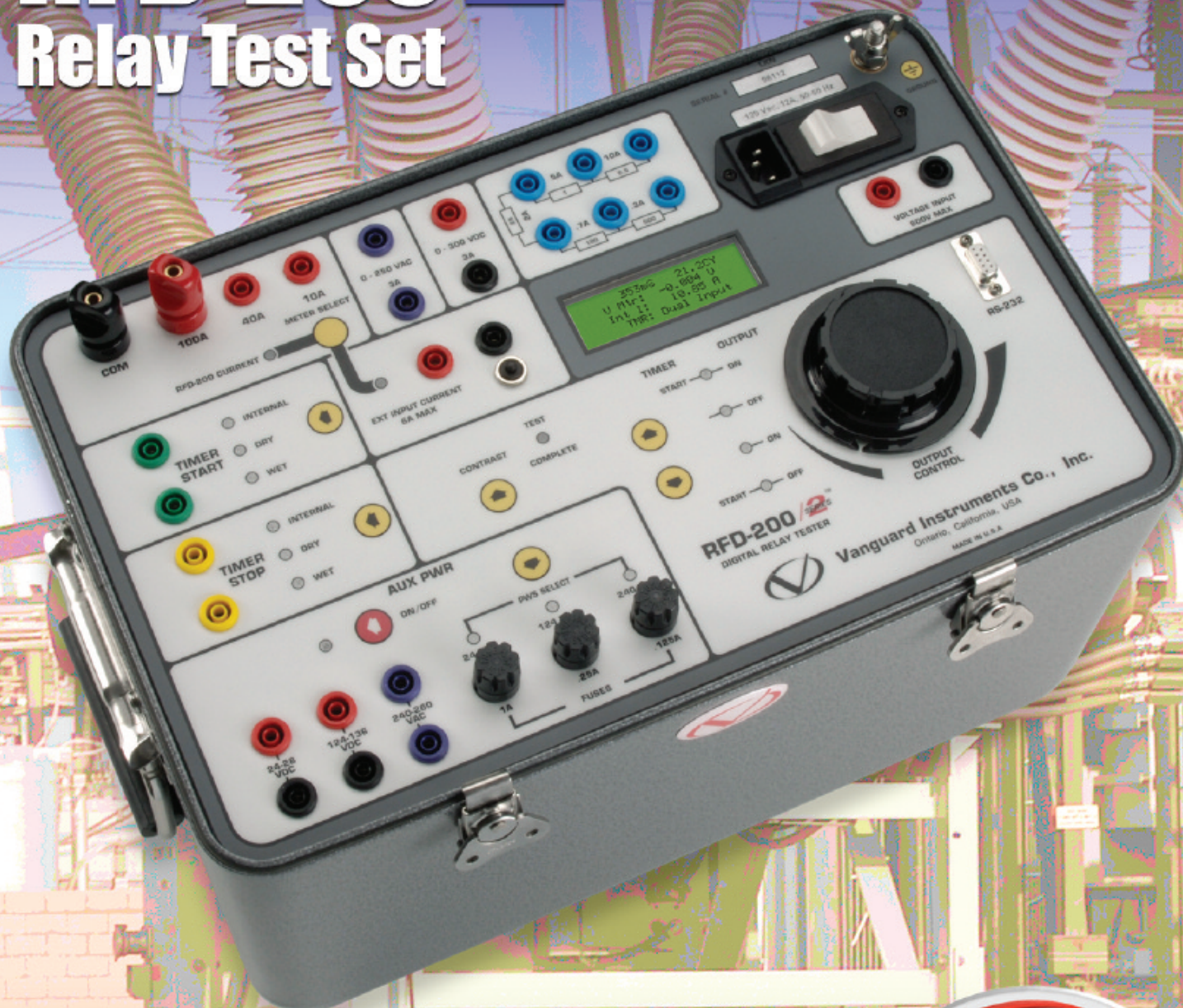


RFD-200 ^{Series} 2

Relay Test Set



Vanguard Instruments Company

www.vanguard-instruments.com



Ergonomic Design a Make Performance



RFD-200™ / Series 2

Vanguard's Model RFD-200 S2 is a portable relay test set that delivers performance verification testing of electromechanical, electronic, and microprocessor-based protective relays in their operating installations. The Model RFD-200 S2 is a rugged test set that provides testing of a variety of protection relays that operate in both indoor and outdoor environments. Ergonomic design allows intuitive operating choices to be made by first time users with little or no training

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 S2 timer. Test current reading is latched and displayed on the LCD (after the test is completed). This feature reduces the possibility of overheating the relay coils.

Built-in Power Resistors

Built-in power resistors allow fine current adjustment for relay testing.

AC Voltage Source

A 0-250 Vac voltage source is available for testing relays up to 250Vac. The voltage source output can be programmed to synchronize with the RFD-200 S2 timer.

DC Voltage Source

A 0-300 Vdc voltage source is also available. Again, the voltage source can be programmed to synchronize with the RFD-200 S2 timer.

Built-in Digital Timer

The RFD-200 S2 contains a digital timer with independent start and stop trigger

inputs designed to measure the time between event transitions and to display the elapsed time in both milliseconds and cycles. The RFD-200 S2 timer has three different trigger inputs: 1) *Internal Trigger*: The timer can be started and stopped by the application or removal of the RFD-200 S2 voltage or current source. 2) *Dry Contact*: Changes of state of a dry-contact input. 3) *Wet Contact*: Change of state of a voltage input. Thus, the timer can be triggered to both start and/or stop by transitions in voltage, current, or by the presence or removal of the RFD-200 S2 voltage or current source.

Auxiliary AC/DC Power Supply

The RFD-200 S2 provides three power supplies (24 VDC, 124VDC and 240VAC) to power solid-state/microprocessor relays.

RFD-200 S2 Ampere Meters

The RFD-200 S2 test current is displayed on an LCD. The current measuring range is from 0.00 to 250A. The second ampere meter can be used to read an external current input. The external current input is protected by a circuit breaker and rated at 6A max.

RFD-200 S2 Volt Meter

One volt meter input (0 to 600V input range) is available on the RFD-200 S2.

FEATURES AT A GLANCE

- A built-in Timer displays contact time in both cycles and milliseconds
- Provides variable AC current source (up to 250 amps)
- Provides variable AC voltage source (up to 240 Vac)
- Provides variable DC voltage source (up to 300 Vdc)
- Auxiliary AC/DC power supplies (to power solid-state relays)
- Results displayed on a 4-line by 20-character backlit LCD
- Test current transformer excitation
- Test transformer turns ratio

Test a Wide Variety of Relays in their Outdoor

and Intuitive Controls e Verification Testing *a Breeze*

SPECIFICATIONS

INPUT POWER	90–130 Vac or 200-220 Vac (factory pre-set), 50–60 Hz
PHYSICAL SPECIFICATIONS	16.8"W by 12.6"H by 12"D (42.7 cm x 32.0 cm x 30.5 cm), Weight: 35 lbs (15.9 kg)
AMPERE METER	Internal Input Ranges: 0 to 250 A, Accuracy: 2% of reading \pm 10 mA, External Input Ranges: 0–6A, Accuracy: 1% of reading \pm 10mA (AC) External Input Ranges: 0 to 6A, Accuracy: 0.5% of reading \pm 1 count (DC), Measurement Method: True RMS for AC
VOLT METER INPUT RANGE	0 to 600.0V; Accuracy 1% of reading \pm 1 count for AC; Accuracy 0.5% of reading \pm 1 count for DC Measurement Method: True RMS for AC
AUXILIARY POWER SUPPLY	24VDC @ 1 Amp, 124VDC @ 0.25 Amp, 240VAC @ 0.125 Amp
TRIGGER OUTPUT CONTACT RATING	Max voltage: 250Vac or 120 Vdc @ 1A
SAFETY	Designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2
ENVIRONMENT	Operating: -10°C to 50° C (15°F to +122° F); Storage: -30° C to 70° C (-22°F to +158° F)
OPTIONS	Transportation Case
WARRANTY	One Year Parts & Labor

AC Current Output				
Range	No-Load Voltage	Load Voltage	Load Current	Load/Unload Times
10 A	90 Vac	75 Vac	10 A	2 min / 15 min
40 A	25 Vac	20 Vac	40 A	1 min / 15 min
100 A	10 Vac	7.25 Vac	100 A	1 min / 15 min
100 A	10 Vac	3 Vac	250 A	1 sec / 5 min
AC Voltage Output				
Range	No-Load Voltage	Load Voltage	Load Current	Load/Unload Times
250 Vac	260 Vac	240 Vac	3 A	10min / 45 min
DC Voltage Output				
Range	No-Load Voltage	Load Voltage	Load Current	Load/Unload Times
300 Vdc	300 Vac	250 Vdc	2 A	10 min / 45 min

RFD-200 Timer Second Display In seconds and cycles (50/60 Hz programmable)		
Range	Resolution	Accuracy
0 to 9.999 sec	1 ms	\pm 1 ms
10.00 to 99.99 sec	10 ms	\pm 10 ms
100.0 to 999.999 sec	100 ms	\pm 100 ms
Timer Cycles Display		
Range	Resolution	Accuracy
0 to 9.999 cycles	0.1 cycles	\pm 1 ms
1,000 to 49,999 cycles / 50 Hz	1 cycle	\pm 10 ms
1,000 to 59,999 cycles / 60 Hz	1 cycle	\pm 100 ms

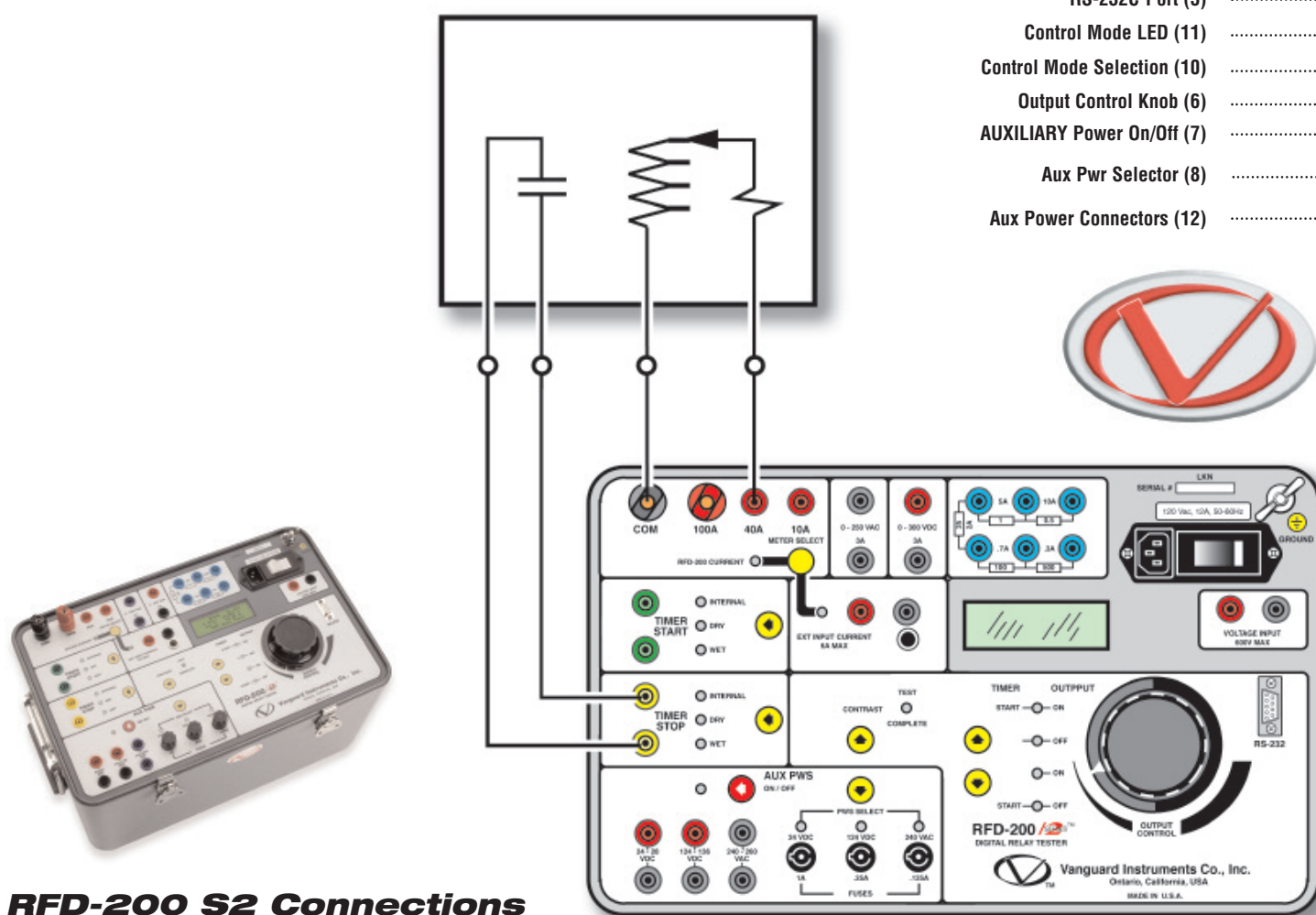
Note: The above specifications are valid at nominal voltage and ambient temperature of +25°C (+77°F). Specifications are subject to change without notice.

Easy Testing of Electro-mechanical, Electronic

RFD-200 S2 Compatibility

RELAY TYPE	IEEE #
Over Current Relays	50/76
Ground Fault Relays	50N
Time Over Relays	51
Under Current Relays	37
Over Voltage Relays	59
Under Voltage Relays	27
Motor Protection Relays	86
Tripping Relays	94
Voltage Regulating Relays	
Thermal Relays	

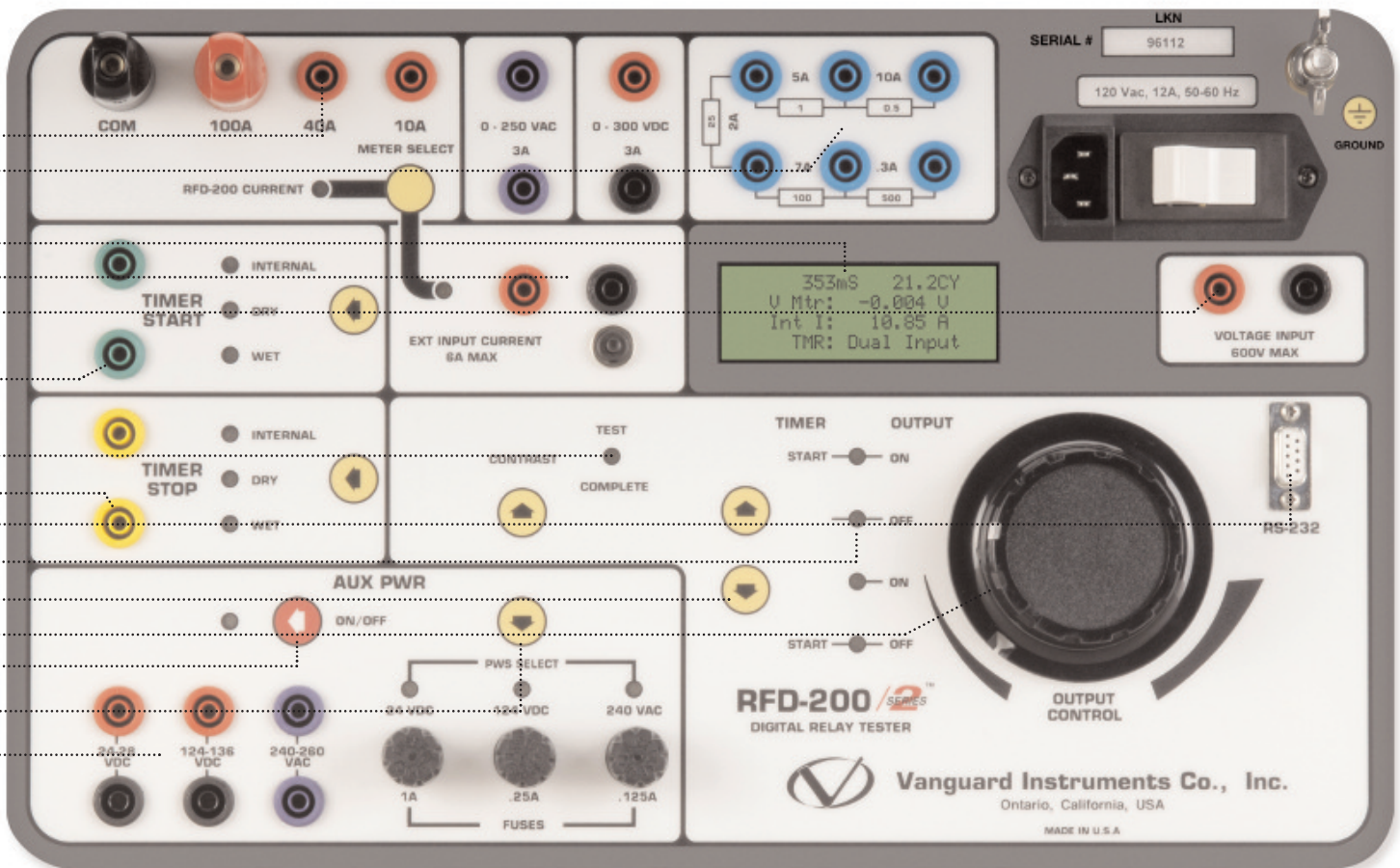
Current Source (1)	.....
Built-in Power Resistor (3)	.....
20 Character by 4-line LCD Display	.....
External Input Current (2)	.....
Voltage Input (4)	.....
Timer Start (14)	.....
Test Completed LED (9)	.....
Timer Stop (13)	.....
RS-232C Port (5)	.....
Control Mode LED (11)	.....
Control Mode Selection (10)	.....
Output Control Knob (6)	.....
AUXILIARY Power On/Off (7)	.....
Aux Pwr Selector (8)	.....
Aux Power Connectors (12)	.....



RFD-200 S2 Connections

Test a Wide Variety of Relays in their Outdoor

AC & Microprocessor Based Protective Relays



RFD-200 Series 2 Control Panel Description

1. Current Source

Produces outputs of: 0-250A AC, or 0-250Vac, or 0-300Vdc. Only one output is active at any one time. The output is set by an RFD-200 S2 Output Control Knob. The Current source output is controlled by a START/STOP switch and can be programmed to work with the timer.

2. Ext Input Current

Range: 0.000 to 6.000 A. This input is protected by a 10-Ampere circuit breaker.

3. Built-in Power Resistor

Built-in Power Resistor provides fine current regulation

4. Voltage Input

External input voltmeter range: 0.00 to 600.0V true RMS for AC & DC voltages

5. RS-232C Port

This RS-232C port is used for factory calibration and diagnostics.

6. Output Control Knob

The Output Control knob sets the voltage or current levels.

7. AUXILIARY Power On/Off

This switch turns the AUXILIARY power source on or off.

8. Aux. Power Selector

Selects 24VDC, 124VDC or 240VAC AUXILIARY power.

9. Test Complete LED

This LED flashes to indicate that a timing event was completed.

10. Control Mode Selection

This switch selects the RFD-200 output.

11. Control Mode LED

Four control modes can be selected for the current source:

- Output is turned on and timer starts.
- Current and Voltage sources are turned off.
- Current and Voltage sources are turned on.
- Output is turned off and timer starts

12. Aux Power Connectors

Auxiliary AC/DC power supplies: Used to power solid-state/microprocessor relays. AUXILIARY power connectors for 24VDC, 124VDC, 240VAC.

13. Timer Stop

The Timer can be stopped with an internal trigger (i.e., when the current source is turned on or off), or by a change-in-state of dry-contact input, or by a change in state of the voltage input.

14. Timer Start

The timer can be stopped with the internal trigger (i.e., when the current source is turned on or off), or by a change in state of dry contact input, or by change in state of the voltage input.

Vanguard Instruments Company, Inc.

Vanguard Instruments Co., (VIC), was founded in 1991. Currently, our 28,000 square-foot facility houses Administration, Design & Engineering, and Manufacturing operations. From its inception, VIC's vision was, and is to develop and manufacture innovative test equipment for use in testing substation EHV circuit breakers and other electrical apparatus.

The first VIC product was a computerized circuit-breaker analyzer, which was a resounding success. It became the forerunner of an entire series of circuit-breaker test equipment. Since its beginning, VIC's product line has expanded to include microcomputer-based, precision micro-ohmmeters, single and three-phase transformer winding turns-ratio testers, winding-resistance meters, transformer tap-changing controllers, megaohm resistance meters, and a variety of other electrical utility maintenance support products.

VIC's performance-oriented products are well suited for the utility industry. They are rugged, reliable, accurate, user friendly, and most are computer controlled. Computer control, with innovative programming, provides many automated testing functions. VIC's instruments eliminate tedious and time-consuming operations, while providing fast, complex, test-result calculations. Errors are reduced and the need to memorize long sequences of procedural steps is eliminated. Every VIC instrument is competitively priced and is covered by a liberal warranty.



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