

## VOLTAGE/CURRENT STANDARDS

YOKOGAWA

2553

2553  
DC Voltage/Current Standard

**255342**  
233 × 149 × 364 mm 8 kg  
(9-1/4 × 5-7/8 × 14-3/8" 17.6 lbs)

The 2553 is an ultra-stable, high-resolution DC voltage and current source which delivers output voltages from 1  $\mu$ V to 12 V, and output currents from 0.1  $\mu$ A to 120 mA at an accuracy of  $\pm 0.02\%$ .

Output voltage and current are set using three dials on the front panel. Settings are controlled by digital signals passing through photocouplers and microprocessors, and are displayed on a red 5-digit LED.

The 2553 also features the five most commonly used TC ranges conforming to ANSI, DIN or JIS standard for calibrating and testing thermocouple thermometers or related devices. Corresponding emf outputs are available by selecting the relevant range and setting the temperature in  $^{\circ}$ C.

The 2553 can be remotely programmed and controlled using an optional General Purpose Interface Bus (GP-IB) that meets the IEEE 488 Standard. This enables the 2553 to be interfaced easily with other instruments and to be applied in a fully automatic calibration or test system.

## AVAILABLE MODELS

| Model  | Temperature Setting Range | Description               |
|--------|---------------------------|---------------------------|
| 255341 | IEC 584-1 ( $^{\circ}$ C) | Standard model            |
| 255342 |                           | Standard model with GP-IB |

- High accuracy of output —  $\pm 0.02\%$  on all ranges
- emf output for 5 thermocouple types conforming to IEC 584-1
- Output divider from 1 to 15 divisions  
The OUTPUT DIVIDER divides any voltage and current setting from 1 up to 15. This function is invaluable for

calibration, testing or adjustment of most meters of non-decade ranges.

- Non-contact output setting for long-term reliable operation  
The 2553 completely eliminates switch and relay contact problems. Output voltage, current and emf are set using optical couplers.
- Easy-to-read, red LED display
- Fully protected against overload and short circuits  
The maximum output voltage and current are automatically limited to prevent damage to the circuitry in the event of accidental short circuits.
- GP-IB-programmable with optional IEEE interface  
The output range, polarity, voltage, current and output ON/OFF are remotely programmable to facilitate system interface.
- Optional semiconductor probe with built-in reference junction compensator

## SPECIFICATIONS

## Output Voltage/Current Ranges and Accuracy of Output:

| Range  | Output Voltage/Current | Resolution  | Accuracy of Output (at $23 \pm 3^{\circ}$ C)    |
|--------|------------------------|-------------|---|
| 10 V   | 0 to $\pm 12.000$ V    | 1 mV        | $\pm 0.02\%$ of range                           |
| 1 V    | 0 to $\pm 1.2000$ V    | 100 $\mu$ V | $\pm 0.02\%$ of range                           |
| 100 mV | 0 to $\pm 120.00$ mV   | 10 $\mu$ V  | $\pm 0.02\%$ of range                           |
| 10 mV  | 0 to $\pm 12.000$ mV   | 1 $\mu$ V   | $\pm (0.02\% \text{ of range} + 4 \mu\text{V})$ |
| 100 mA | 0 to $\pm 120.00$ mA   | 10 $\mu$ A  | $\pm 0.02\%$ of range                           |
| 10 mA  | 0 to $\pm 12.000$ mA   | 1 $\mu$ A   | $\pm 0.02\%$ of range                           |
| 1 mA   | 0 to $\pm 1.2000$ mA   | 0.1 $\mu$ A | $\pm 0.02\%$ of range                           |

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## Maximum Output and Internal Resistance:

| Range  | Maximum Output (approx.)                | Internal Resistance (approx.) |
|--------|---|-------------------------------|
| 10V    | 120 mA                                  | Less than 10 mΩ               |
| 1 V    | 120 mA                                  | Less than 10 mΩ               |
| 100 mV |   | Less than 1.5 Ω               |
| 10 mV  |   | Less than 1.5 Ω               |
| 100 mA | 12 V (0 to 50 mA)<br>9 V (50 to 100 mA) | 1 MΩ<br>1 MΩ                  |
| 10 mA  | 15 V                                    | 10 MΩ                         |
| 1 mA   | 15 V                                    | 10 MΩ                         |

**Output Setting:** 3 dials on the front panel (opto-setting using photo-couplers),

1st and 2nd dials... 16 steps, 3rd (lowest digit) dial... 32 steps

**Setting Value Indication:** Red 5-digit LED display

**Output Unit Marks:** mV, V, mA or °C

**OUTPUT DIVIDER:**

DIVIDER output = output setting × n/m, m and n are selectable by OUTPUT DIVIDER dual-dial, m ... 1, 2 through 15 in 15 uniform divisions, n ... 0, 1 through 15 (n ≤ m)

**Accuracy of Output Divider:** Within ±1 digit of LSD

**Temperature Coefficient:** 50 ppm/°C at 5 to 40°C

**Calibration Cycle:** 3 months

**Ripple:** Less than ±0.01% of setting range on 100 mV, 1, 10 V, 10, 100 mA ranges (for DC to 60 Hz components), less than ±0.05% of setting range on 1 mA range

**Common Mode Rejection (DC to 60 Hz):** Approx. 120 dB for voltage output, approx. 0.1 μA/V for current output

**Effect of Power Supply Voltage Fluctuation:** Within ±0.02% of range against ±10% fluctuation in rated value

**Overcurrent Protection:** Automatically limits output current at approx. 120 mA

**Overvoltage Protection:** Automatically sets output voltage to zero at approx. 15 V

**Polarity Selection:** + or –

**Insulation Resistance:** More than 100 MΩ at 500 V DC between case and guard, and between power line and case

**Dielectric Strength:** 1,500 V AC for one minute between power line and case, 100 V AC for one minute between case and guard

**Operating Temperature Range:** 5 to 40°C (41 to 104°F)

**Humidity Range:** 5 to 95% relative humidity

**Warmup Time:** Approx. 30 minutes

**Power Requirements:** 100, 120, 200, 220 or 240 V AC (must be specified), 50 and 60 Hz

**Power Consumption:** 50 VA max

**Accessories supplied at no extra cost:** Power cord (2- or 3-prong type)... 1 set, fuses... 2 pcs

| Standard  | TC Type (RANGE) | Setting Range (emf output)                 | Accuracy (at 23±3°C)                    |                               | Resolution (approx.) | Internal Resistance (approx.) |
|-----------|-----------------|--|---|-------------------------------|----------------------|-------------------------------|
|           |                 |  | At 25°C×n setting (n: positive integer) | At setting other than 25°C×n  |                      |                               |
| IEC 584-1 | R               | 0 to 1000.0°C<br>1000 to 1768°C            | ±3.00°C<br>±3.36°C                      | ±3.37°C<br>±3.76°C            | 1.5°C Max            | 1.5 Ω Max                     |
|           | K               | -200 to 0°C<br>0 to 900°C<br>900 to 1200°C | ±0.94°C<br>±0.50°C<br>±0.70°C           | ±1.17°C<br>±0.57°C<br>±0.77°C | 0.15°C Max           | 1.5Ω Max                      |
|           | E               | 0 to 700°C                                 | ±0.35°C                                 | ±0.41°C                       | 0.15°C Max           | 1.5Ω Max                      |
|           | J               | -200.0 to 0°C<br>0 to 600°C                | ±0.68°C<br>±0.47°C                      | ±0.90°C<br>±0.54°C            | 0.15°C Max           | 1.5 Ω Max                     |
|           | T               | -200.0 to 0°C<br>0 to 200°C                | ±0.35°C<br>±0.21°C                      | ±0.50°C<br>±0.30°C            | 1μV equiv.           | 1.5 Ω Max                     |

**Note:** Compensation accuracy when used with an optional semiconductor probe: ±0.38°C (±0.76°C for R) in 0 to 50°C measuring range.

## • OPTION

## General Purpose Interface Bus (GP-IB)... 255342

**Functional, Electric and Mechanical Specifications:**

Meets IEEE Standard 488-1978 "Digital Interface for Programmable Instrumentation", interface function and identification... SH 1, AH 1, T 6, L 4, SR 1, RL 1, PP 0, DC 1, DT 1, C0

**Interconnected Devices:** 0 up to 15 maximum.

- Notes:**
- GP-IB should always be ordered together with the standard instrument since the combination instrument will be tested at YOKOGAWA.
  - Interface cable to controller is not provided (must be prepared by user).

## • OPTIONAL ACCESSORY FOR 2553

## 257825 Semiconductor Probe

**Measuring Range:** -20 to 60°C

**Accuracy:** ±0.3°C (with the 2553)

**Insulation Resistance:** More than 100 MΩ at 500 V DC between terminal tips and the 2553 ground terminal

**Dielectric Strength:** 100 V AC for one minute between terminal tips and 2553 ground terminal

**Cord Length:** Approx. 2 m (6.6 ft)

**Terminal Material:** Copper

**Accessories Supplied:** Round tips... 5 pcs