



Advanced Test Equipment Corp.

www.atecorp.com 800-404-ATEC (2832)

Test&Measurement

YOKOGAWA 



**Each click of a dial
opens a doorway to
precision.**

**2553A
Precision DC Calibrator**



Yokogawa is a leader in providing high precision measurement equipment electric voltage/current, electric resistance, pressure, and temperature fields. A leadership that dates back to the early 1970's.

Globally respected as the authority in developing and producing highly accurate and precision instruments and technology, engineers can trust in first class quality and reliable performance.

The new Yokogawa 2553A is a precision DC calibrator ideal for calibrating measurement instruments including analog meters, thermometers, temperature transmitters and data loggers.

The 2553A delivers:

Confidence – Yokogawa's attention to quality, accuracy and precision ensures the engineer can trust in the product's reliability.

Familiarity – Ease of use and intuitive operation are a must for all engineers and dials for each digit and 7-segment LEDs makes the 2553A all the more simpler to use.

Variety – Flexibility and the availability of commonly used thermocouples, RTD generation and user defined functions enables an all in one instrument calibration.

Features and benefits

High basic accuracy*

DC Voltage: ± 75 ppm DC Current: ± 120 ppm

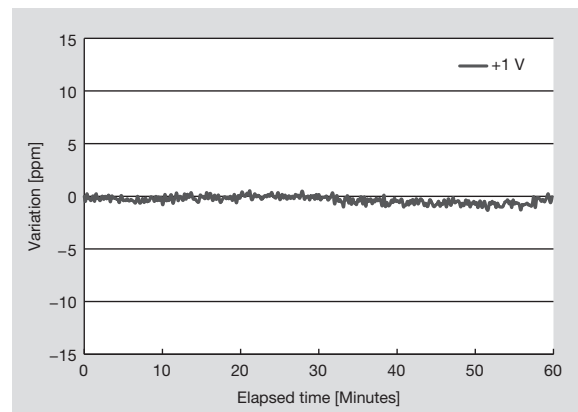
High stability and low noise*

Stability: ± 15 ppm/h Noise: $2 \mu\text{Vrms}$

High resolution

5.5 digits ± 120000 count output resolution

*See Page 6 for details.



High stability As reference data.



- 1 Main set value
- 2 Temperature type selection
- 3 Voltage/current range selection
- 4 Output ON/OFF switch
- 5 Output terminals

Intuitive operation

Dials and switches are provided for each digit and function. Traditional 7-segment LEDs provide clear visibility.

Various temperature calibrations

The 2553A provides well used K, T, E, J, and additional 6 types of thermocouples. These 10 types are all regulated in IEC.

It also provides widely used Pt100 as an RTD. Resistance as well as temperature value can be set as an output value, enabling instrument calibration by both values.

Use existing 2553 programs*

The 2553A communication command is backwardly compatible with previous 2553 model. By using 2553 command mode, it is possible to replace 2553 to 2553A without modifying your programs. It is also possible to mix 2553As and 2553s in the same system.

* Programs may need some modifications.

| TC type | Source Range [°C] |
|-------------------|-------------------|
| R | -50 to 1768 |
| S | -50 to 1768 |
| B | 0 to 1820 |
| J | -210 to 1200 |
| T | -270 to 400 |
| E | -270 to 1000 |
| K | -270 to 1300 |
| N | -270 to 1300 |
| C | 0 to 2315 |
| A | 0 to 2500 |
| RTD | Source Range [°C] |
| Pt100 | -200 to 850 |
| Resistance output | Source Range [Ω] |
| 400 Ω | 18 to 400 |

Comparison with previous model 2553

| | 2553A | 2553 | |
|-------------------------|--|---|--------------------------|
| DC Voltage | Range | 10 mV, 100 mV, 1 V, 10 V, 30 V | 10 mV, 100 mV, 1 V, 10 V |
| | Accuracy (1 V range) | ±75 ppm (1 year) | ±300 ppm (1 year) |
| | Output resistance (100 mV range) | ≤10 mΩ | ≤1.5 Ω |
| DC Current | Range | 1 mA, 10 mA, 30 mA (MAX. 30 V output) , 100 mA | 1 mA, 10 mA, 100 mA |
| | Accuracy (1 mA range) | ±120 ppm (1 year) | ±400 ppm (1 year) |
| Temperature | Thermocouple type | R, S, B, J, T, E, K, N, C, A, User defined | R, J, T, E, K |
| | RTD | Pt100, User defined | Unsupported |
| Resistance generation | 400 Ω range | Unsupported | |
| Main setting digits | 5.5 | 4.5 | |
| Number of dials | 5 | 3 | |
| Dimensions | 213 (W) × 132 (H) × 300 (D) mm | 228 (W) × 149 (H) × 365 (D) mm | |
| Weight | Approx. 3 kg | Approx. 8 kg | |
| Communication Interface | USB-TMC, Ethernet, GP-IB (also 2553 compatible mode) * | GP-IB (option) | |

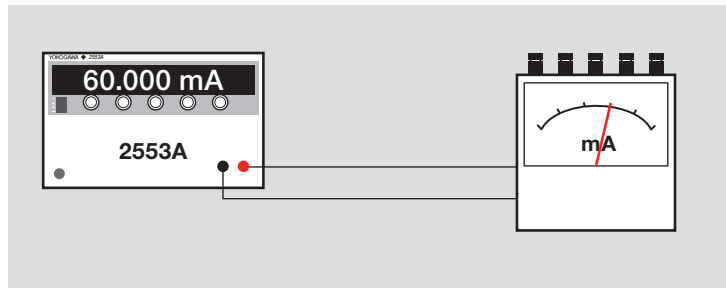
Improved items are written in bold.

*Programs may need some modifications.

Application

Calibrating and testing analog meters

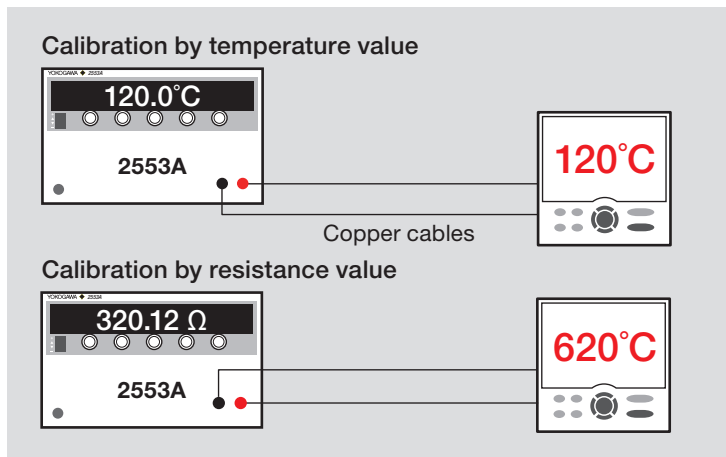
The 2553A can calibrate and test analog meters up to ± 32 V voltage and ± 120 mA current. The strong click from the dial enables easy adjustment of output value without actually looking at the front panel of 2553A.



Calibrating and testing temperature controllers

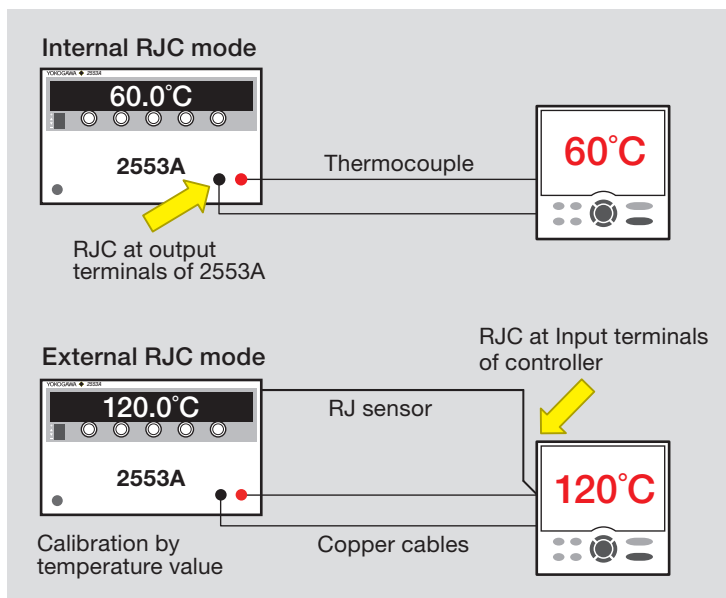
The 2553A can calibrate and test temperature controllers and data loggers using thermocouple and RTD.

It provides 10 types thermocouple regulated in IEC. By setting temperature value, it generates thermocouple electromotive power and calibrates temperature controllers. It covers various temperature controllers, since it generates higher accuracy voltage than previous model. 2553A supports widely used Pt100. By setting temperature value, it generates temperature related resistance value. Settings can be done by not only temperature but also resistance value, making it possible to calibrate using resistance value.



RJC at output terminals

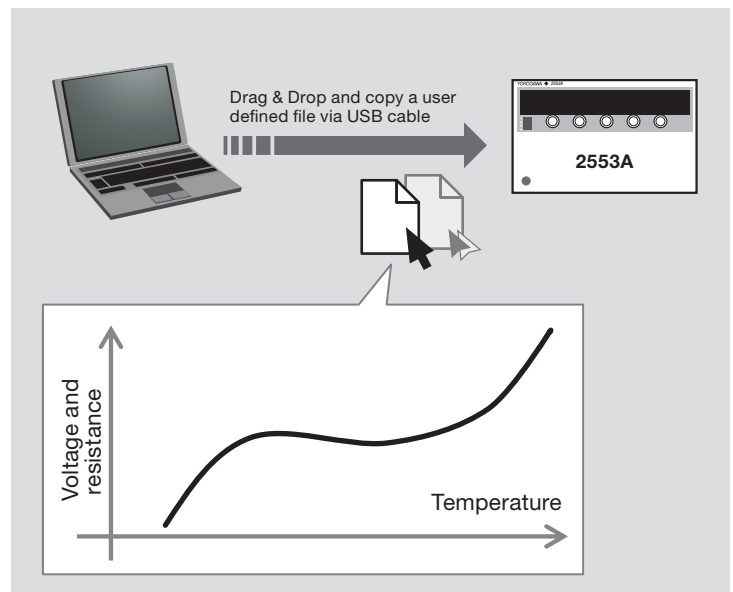
Since the 2553A has “Internal RJC mode” which the reference point is output terminals of 2553A, it is possible to connect the objective measurement instruments by thermocouple without an external reference junction. In “External RJC mode”, your choice of Pt100 can be used with versatile terminal for external sensor. It also has “Manual RJC mode” which enables you to set by entering reference value.



5 User defined temperature calibration

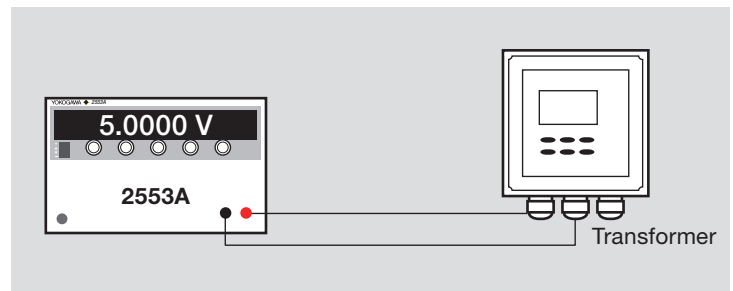
The 2553A provides user defined thermocouple and RTD. By copying text file including relation parameters between temperature and voltage or between temperature and resistance, it is able to generate various types of thermocouple and RTD. Text files can be easily created by text editor or Excel on PC. Files can be easily transferred by drag & drop operations when PC and 2553A is connected via a USB cable, letting PC recognize the 2553A's internal memory as mass storage drive.

Sample files are available on our Website.
<http://tmi.yokogawa.com/products/generators-source/standard/2553a-precision-dc-calibrator/>



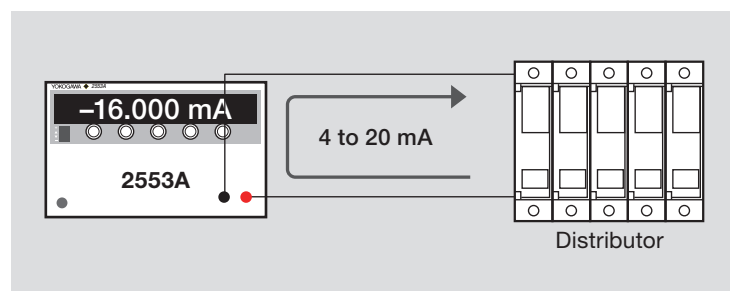
Calibrating and testing sensor transformers

The 2553A calibrates the transformers and transmitters for pressure, volume flow, and temperature. It also calibrates transformers for analytical instruments such as pH, ORP, EC, and DO meters. High voltage output accuracy of 2553A will enable support for transformers which require higher accuracy. 2553A will come in use even in developing and testing transformers.



Simulating the two wire transmitters

In 30 mA range, the 2553A can sink the current. For example, by sinking the current from the distributors, it can simulate the two wire transmitters which output 4 to 20 mA signals.



Specifications

Voltage generation

| Range | Source range | Resolution | Stability (1h)* ±(ppm of setting + μV) | Accuracy (180 days)* ±(ppm of setting + μV) | Accuracy (1 year)* ±(ppm of setting + μV) |
|--------|--------------|-------------------|---|--|--|
| 10 mV | ±12.0000 mV | 100 nV | 20 + 3 | 40 + 4 | 60 + 4 |
| 100 mV | ±120.0000 mV | 1 μV | 20 + 3 | 40 + 4 | 60 + 4 |
| 1 V | ±1.20000 V | 10 μV | 5 + 10 | 40 + 10 | 60 + 15 |
| 10 V | ±12.0000 V | 100 μV | 5 + 100 | 40 + 100 | 60 + 150 |
| 30 V | ± 32.000 V | 1 mV | 5 + 300 | 40 + 300 | 60 + 450 |

| Range | Temperature Coefficient ±(% of setting + μV)/°C | Max. Output (Typical) | Output Resistance | Output Noise | |
|--------|--|--------------------------|----------------------|---------------------|---------------------|
| | | | | 0.1 to 10 Hz | 10 Hz to 10 kHz |
| 10 mV | 10 + 0.1 | — | Approx. 1 Ω | 1 μVrms | 10 μVrms |
| 100 mV | 5 + 0.3 | ≤10 mA | ≤10 m Ω | 2 μVrms | 10 μVrms |
| 1 V | 3 + 1.5 | 120 mA | ≤10 m Ω | 2 μVrms | 20 μVrms |
| 10 V | 3 + 15 | 120 mA | ≤10 m Ω | 15 μVrms | 30 μVrms |
| 30 V | 3 + 45 | 30 mA | ≤10 m Ω | 20 μVrms | 50 μVrms |

Current generation

| Range | Source range | Resolution | Stability (1h)* ±(ppm of setting + μA) | Accuracy (180 days)* ±(ppm of setting + μA) | Accuracy (1 year)* ±(ppm of setting + μA) |
|--------|--------------|-----------------|---|--|--|
| 1 mA | ±1.20000 mA | 10 nA | 5 + 0.015 | 50 + 0.03 | 80 + 0.04 |
| 10 mA | ±12.0000 mA | 100 nA | 5 + 0.15 | 70 + 0.4 | 100 + 0.5 |
| 30 mA | ± 32.000 mA | 1 μA | 10 + 0.9 | 70 + 1.2 | 100 + 1.5 |
| 100 mA | ±120.000 mA | 1 μA | 10 + 3 | 70 + 4 | 100 + 5 |

| Range | Temperature Coefficient ±(% of setting + μA)/°C | Max. Output (Typical) | Output Resistance | Output Noise | |
|--------|--|--------------------------|----------------------|------------------------|----------------------|
| | | | | 0.1 to 10 Hz | 10 Hz to 10 kHz |
| 1 mA | 3 + 0.0015 | 15 V | ≤100 M Ω | 0.015 μArms | 0.5 μArms |
| 10 mA | 5 + 0.015 | 15 V | ≤100 M Ω | 0.03 μArms | 1 μArms |
| 30 mA | 7 + 0.045 | 30 V | ≤ 10 M Ω | 0.05 μArms | 2 μArms |
| 100 mA | 10 + 0.15 | 15 V | ≤ 10 M Ω | 0.3 μArms | 10 μArms |

Temperature generation for RTD

| Type | Source Range | Resolution | Accuracy (180 days)* | Accuracy (1 year)* | Temperature Coefficient | Nominal Current |
|-------|-------------------|------------|-------------------------|-----------------------|-------------------------|--------------------|
| Pt100 | -200.0 to 850.0°C | 0.1°C | ±0.1°C | ±0.15°C | ±0.006°C/°C | 0.5 to 2 mA |

Resistance generation

| Range | Source Range | Resolution | Accuracy (180 days)* ±(ppm of setting + Ω) | Accuracy (1 year)* ±(ppm of setting + Ω) | Temperature Coefficient | Nominal Current |
|--------------|--------------------------|---------------|---|---|-------------------------|--------------------|
| 400 Ω | 18.00 to 400.00 Ω | 0.01 Ω | 55 + 0.015 | 75 + 0.015 | ±0.002 Ω /°C | 0.5 to 2 mA |

* 1-hour stability values apply at 23±1°C. Accuracy values apply at 23±5°C. Add the temperature coefficient at 5°C to 18°C and 28°C to 40°C. Accuracy might be affected by instrument's inside temperature increase immediately after sinking over 30 mA.

Temperature generation for Thermocouple Setting temperature : Accuracy for 1 year ($\pm^{\circ}\text{C}$)

| R | S | B | J | T |
|--------------|--------------|--------------|--------------|--------------|
| -50°C: 1.10 | -50°C: 1.03 | 400°C: 1.00 | -210°C: 0.25 | -250°C: 0.72 |
| 0°C: 0.80 | 0°C: 0.75 | 600°C: 0.70 | -100°C: 0.11 | -200°C: 0.29 |
| 100°C: 0.55 | 100°C: 0.56 | 1000°C: 0.50 | 0°C: 0.08 | -100°C: 0.16 |
| 600°C: 0.40 | 400°C: 0.47 | 1200°C: 0.44 | 1200°C: 0.15 | 100°C: 0.10 |
| 1600°C: 0.40 | 1600°C: 0.44 | 1820°C: 0.44 | | 400°C: 0.09 |
| 1768°C: 0.45 | 1768°C: 0.51 | | | |

| E | K | N | C | A |
|--------------|--------------|--------------|--------------|--------------|
| -250°C: 0.50 | -250°C: 0.94 | -240°C: 1.00 | 0°C: 0.30 | 0°C: 0.34 |
| -200°C: 0.20 | -200°C: 0.30 | -200°C: 0.44 | 200°C: 0.26 | 100°C: 0.29 |
| -100°C: 0.10 | -100°C: 0.15 | -100°C: 0.21 | 600°C: 0.25 | 600°C: 0.28 |
| 0°C: 0.07 | 0°C: 0.11 | 0°C: 0.16 | 1000°C: 0.30 | 1600°C: 0.47 |
| 1000°C: 0.12 | 800°C: 0.15 | 800°C: 0.15 | 2000°C: 0.51 | 2500°C: 0.79 |
| | 1300°C: 0.21 | 1300°C: 0.20 | 2315°C: 0.70 | |

7

See page 2 for source range.
 Resolution: 0.1°C
 Output Resistance: Approx. 1 Ω
 Temperature scale is ITS-90.
 Accuracy apply at 23 \pm 5°C and without reference junction compensation.
 Accuracy doesn't include the thermocouple's error.
 Accuracy for temperature between setting temperature is calculated by linear interpolation.
 Accuracy not shown in left table is $\pm(60 \text{ ppm} + 4 \mu\text{V})$ for generated voltage.

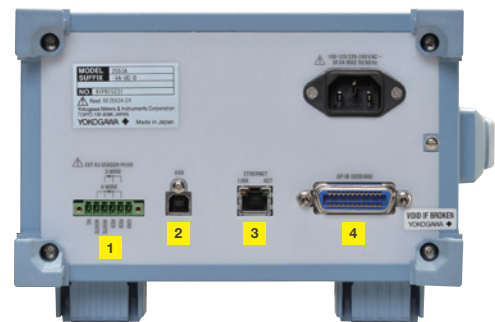
3 RJC modes
 INT*: Detect temperature of output terminal as compensation value. Temperature measurement accuracy is $\pm 0.3^{\circ}\text{C}$.
 EXT*: Detect compensation value by sensor connected to RJC terminal
 MAN: Input compensation value

*When using RJC, add the reference junction compensation error in "2553A Temperature generation for Thermocouple (Detail)" on our web site.

Other generation specification

| | |
|-------------------------|--|
| Transient response time | Voltage/Current generation: within 500 ms (No load, Time to reach $\pm 0.01\%$ of final value) RTD/Resistance generation: within 0.1 ms (Time constant at changing current) |
| Max. LC load | C load 10 μF , L load 1 mH |
| CMRR | Voltage 120 dB or more (DC, 50/60 Hz) Current 0.1 $\mu\text{A/V}$ or more (DC, 50/60 Hz) |

Rear panel



- 1** RJ sensor connector terminal
- 2** USB interface
- 3** Ethernet
- 4** GP-IB interface

General specification

| | |
|--|--|
| Warm-up time | Approx. 30 minutes |
| Operating environment | Temperature: 5 to 40°C Humidity: 20 to 80% RH* |
| Storage environment | Temperature: -15 to 60°C Humidity: 20 to 80% RH |
| Operating Height | 2000 m or less |
| Operating Attitude | Horizon |
| Rated power supply voltage | 100 to 120 VAC/200 to 240 VAC |
| Allowable power supply voltage fluctuation range | 90 to 132 VAC/180 to 264 VAC |
| Rated power supply frequency | 50/60 Hz |
| Allowable power supply frequency fluctuation range | 48 to 63 Hz |
| Max. power consumption | 30 VA |
| Withstand voltage | Between power and case: 1500 VAC 1 min. |
| Dimensions | 213 (W) \times 132 (H) \times 300 (D) mm |
| Weight | Approx. 3 kg |

* 20 to 70%RH for 30°C and over

Communication Interface

USB interface (PC connection)

| | |
|--|-------------------------------|
| Connector | Type B connector (receptacle) |
| Electric and mechanical specifications | Complies with USB Rev. 2.0 |
| supported transfer modes | High Speed, Full Speed |

Ethernet interface

| | |
|--|----------------------------|
| Connector | RJ-45 connector |
| Electric and mechanical specifications | Confirms to the IEEE 802.3 |
| Transfer methods | 100 BASE-TX/10 BASE-T |
| Transfer speed | Max. 100 Mbps |

GP-IB interface

| | |
|--|---|
| Electric and mechanical specifications | Complies with IEEE St'd 488-1978 |
| Functional specifications | SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0 |
| Address | 0 to 30 |

Model and Suffix code

| Model | Suffix code | Description |
|-------|-------------|-------------------------|
| 2553A | | Precision DC Calibrator |
| | -VA | Version A |
| | -UC | Deg C |
| | -UF | Deg C and F |
| | -D | UL/CSA standard, PSE |
| | -F | VDE standard |
| | -R | AS standard |
| | -Q | BS standard |
| | -H | GB standard |
| | -N | NBR standard |

Standard accessories:

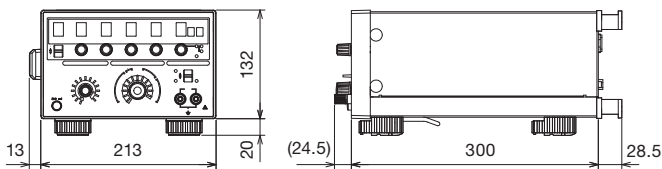
Power cord (1), 366961 Measurement lead (1), Rubber feet (1), Terminal plug (1), User's manual (1)

Rack Mount

| Model | Product | Description |
|-----------|----------------|-----------------------------|
| 751533-E3 | Rack mount kit | EIA standalone installation |
| 751533-J3 | Rack mount kit | JIS standalone installation |
| 751534-E3 | Rack mount kit | EIA connected installation |
| 751534-J3 | Rack mount kit | JIS connected installation |

External dimensions

Unit: mm



Related product

AC Voltage Current Standard 2558A

High accuracy

AC voltage: $\pm 0.04\%$
AC current: $\pm 0.05\%$



High stability

AC voltage/current: ± 50 ppm/h

Wide generation range

AC voltage: 1.00 mV to 1200.0 V
AC current: 1.00 mA to 60.00 A

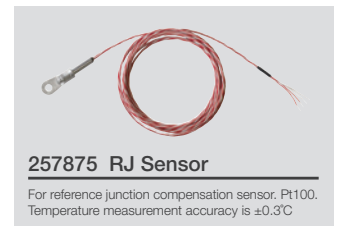
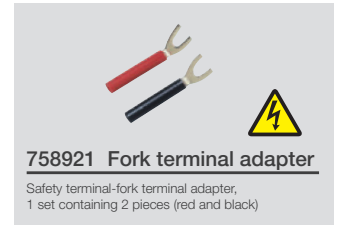
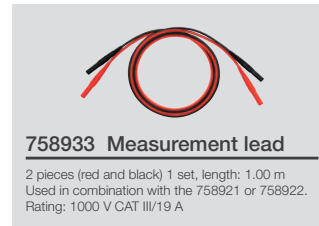
Wide frequency range

40 to 1000 Hz (Frequency accuracy: ± 50 ppm)

| model | Description |
|-------|-----------------------------|
| 2558A | AC voltage current standard |

Accessories

| Model | Product | Specifications |
|--------|------------------------------|---|
| 758933 | Measurement lead | 1 m safety terminal cable with two leads (red and black), 1 set |
| 758917 | Measurement lead | 0.75 m safety terminal cable with two leads (red and black), one set |
| 366961 | Measurement lead | 1.2 m, Non-isolated 42 V or less |
| 758922 | Small alligator clip adapter | Safety terminal-alligator clip adapter, 1 set containing 2 pieces (red and black) |
| 758921 | Fork terminal adapter | Safety terminal-fork terminal adapter, 1 set containing 2 pieces (red and black) |
| 257875 | RJ Sensor | For reference junction compensation sensor. Pt100, 1.95 m |



To avoid electric shocks when using accessories, do not touch the metal parts.

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Yokogawa's Approach to Preserving the Global Environment

- Yokogawa's electrical products are developed and produced in facilities that have received ISO14001 approval.
- In order to protect the global environment, Yokogawa's electrical products are designed in accordance with Yokogawa's Environmentally Friendly Product Design Guidelines and Product Design Assessment Criteria.

This is a Class A instrument based on Emission standards EN61326-1 and EN55011, and is designed for an industrial environment. Operation of this equipment in a residential area may cause radio interference, in which case users will be responsible for any interference which they cause.

YOKOGAWA

YOKOGAWA METERS & INSTRUMENTS CORPORATION

Global Sales Dept. / Phone: +81-42-534-1413 Fax: +81-42-534-1426

Email: tm@cs.jp.yokogawa.com

tmi.yokogawa.com

YOKOGAWA CORPORATION OF AMERICA
YOKOGAWA EUROPE B.V.
YOKOGAWA ENGINEERING ASIA PTE. LTD.

Phone: (1)-770-253-7000
Phone: (31)-88-4641000
Phone: (65)-62419933

Fax: (1)-770-254-0928
Fax: (31)-88-4641111
Fax: (65)-62412606

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