



**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:  $\pm 75$  ppm DC Current:  $\pm 120$  ppm

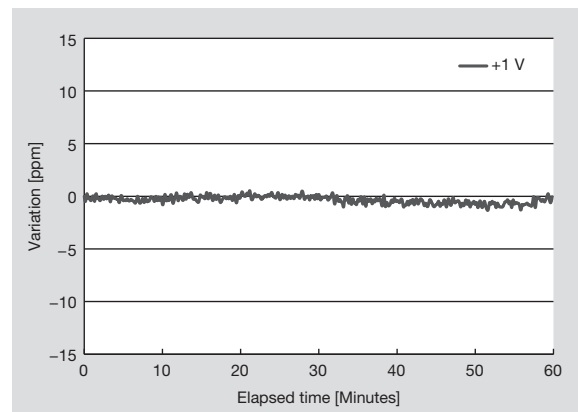
### High stability and low noise\*

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

### High resolution

5.5 digits  $\pm 120000$  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, <b>30 V</b>	10 mV, 100 mV, 1 V, 10 V
	Accuracy (1 V range)	<b>±75 ppm (1 year)</b>	±300 ppm (1 year)
	Output resistance (100 mV range)	<b>≤10 mΩ</b>	≤1.5 Ω
DC Current	Range	1 mA, 10 mA, <b>30 mA (MAX. 30 V output)</b> , 100 mA	1 mA, 10 mA, 100 mA
	Accuracy (1 mA range)	±120 ppm (1 year)	±400 ppm (1 year)
Temperature	Thermocouple type	<b>R, S, B, J, T, E, K, N, C, A, User defined</b>	R, J, T, E, K
	RTD	<b>Pt100, User defined</b>	Unsupported
Resistance generation	<b>400 Ω range</b>	Unsupported	
Main setting digits	<b>5.5</b>	4.5	
Number of dials	<b>5</b>	3	
Dimensions	213 (W) × 132 (H) × 300 (D) mm	228 (W) × 149 (H) × 365 (D) mm	
Weight	<b>Approx. 3 kg</b>	Approx. 8 kg	
Communication Interface	<b>USB-TMC, Ethernet,</b> GP-IB (also 2553 compatible mode) *	GP-IB (option)	

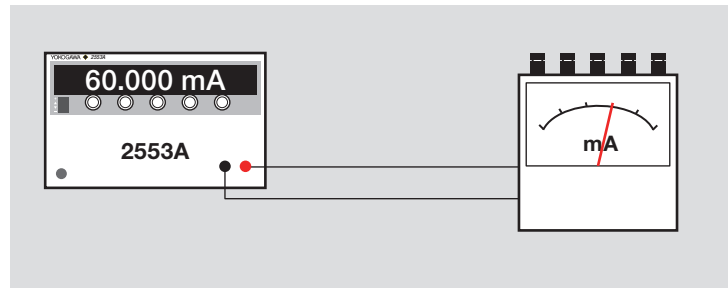
Improved items are written in bold.

\*Programs may need some modifications.

# Application

## Calibrating and testing analog meters

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



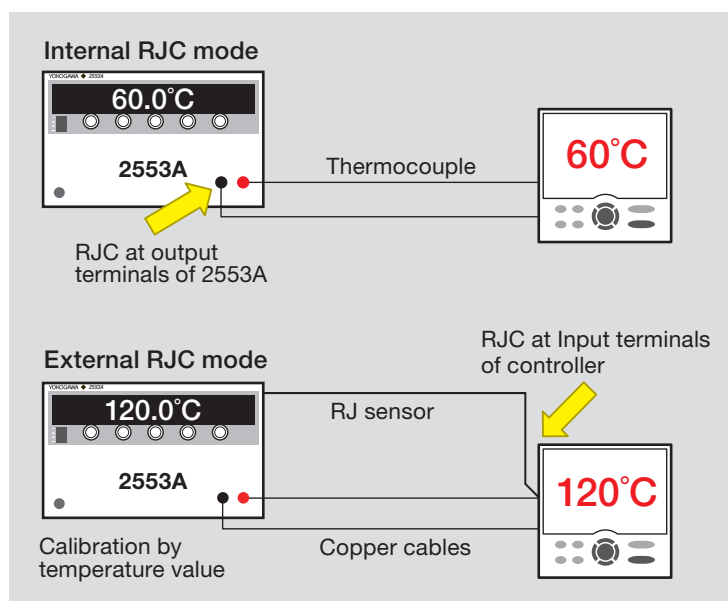
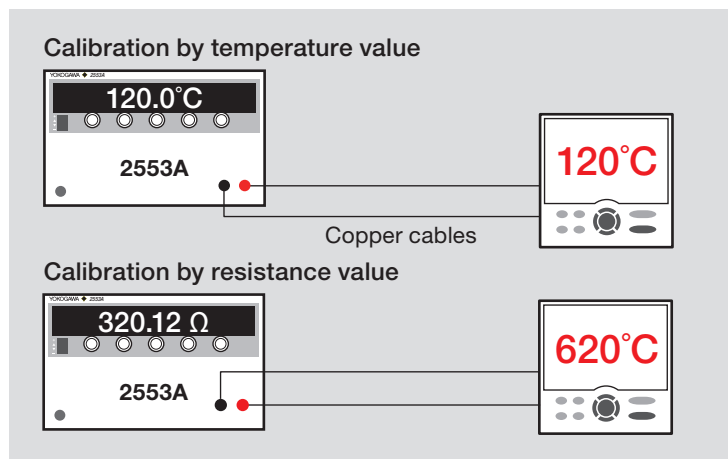
## Calibrating and testing temperature controllers

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

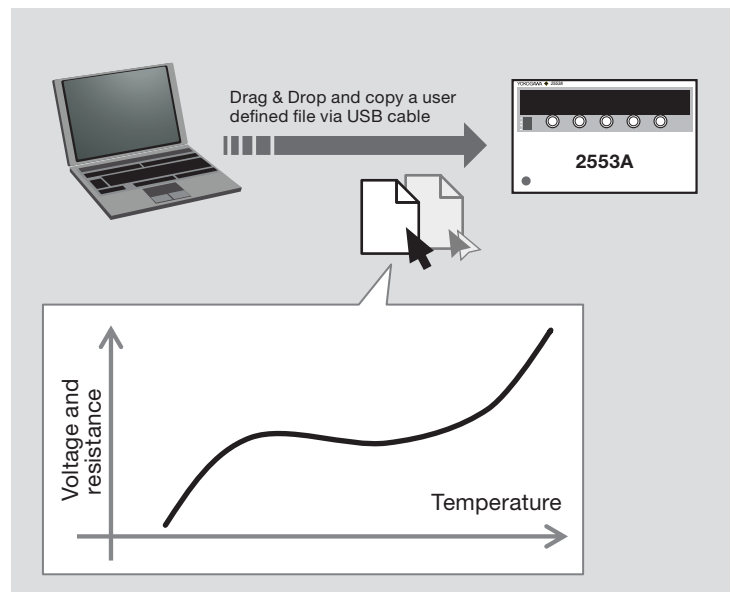
Since the 2553A has “Internal RJC mode” which the reference point is output terminals of 2553A, it is possible to connect the objective measurement instruments by thermocouple without an external reference junction. In “External RJC mode”, your choice of Pt100 can be used with versatile terminal for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



## 5 User defined temperature calibration

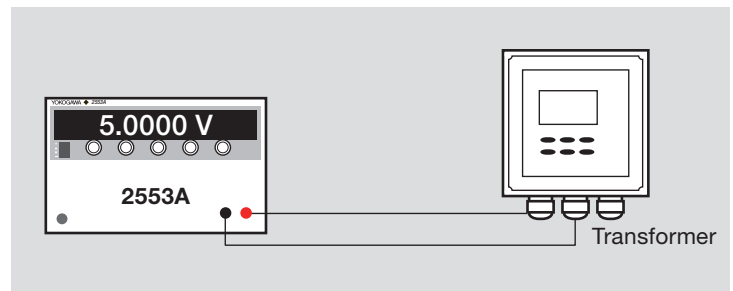
The 2553A provides user defined thermocouple and RTD. By copying text file including relation parameters between temperature and voltage or between temperature and resistance, it is able to generate various types of thermocouple and RTD. Text files can be easily created by text editor or Excel on PC. 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/>



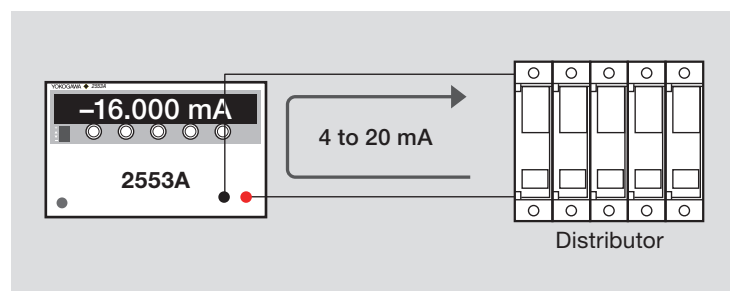
## Calibrating and testing sensor transformers

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 + $\mu$ V)	Accuracy (180 days)* ±(ppm of setting + $\mu$ V)	Accuracy (1 year)* ±(ppm of setting + $\mu$ V)
10 mV	±12.0000 mV	100 nV	20 + 3	40 + 4	60 + 4
100 mV	±120.0000 mV	1 $\mu$ V	20 + 3	40 + 4	60 + 4
1 V	±1.20000 V	10 $\mu$ V	5 + 10	40 + 10	60 + 15
10 V	±12.0000 V	100 $\mu$ V	5 + 100	40 + 100	60 + 150
30 V	± 32.000 V	1 mV	5 + 300	40 + 300	60 + 450

Range	Temperature Coefficient ±(% of setting + $\mu$ V)/°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 $\Omega$	1 $\mu$ Vrms	10 $\mu$ Vrms
100 mV	5 + 0.3	≤10 mA	≤10 m $\Omega$	2 $\mu$ Vrms	10 $\mu$ Vrms
1 V	3 + 1.5	120 mA	≤10 m $\Omega$	2 $\mu$ Vrms	20 $\mu$ Vrms
10 V	3 + 15	120 mA	≤10 m $\Omega$	15 $\mu$ Vrms	30 $\mu$ Vrms
30 V	3 + 45	30 mA	≤10 m $\Omega$	20 $\mu$ Vrms	50 $\mu$ Vrms

## Current generation

Range	Source range	Resolution	Stability (1h)* ±(ppm of setting + $\mu$ A)	Accuracy (180 days)* ±(ppm of setting + $\mu$ A)	Accuracy (1 year)* ±(ppm of setting + $\mu$ A)
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 $\mu$ A	10 + 0.9	70 + 1.2	100 + 1.5
100 mA	±120.000 mA	1 $\mu$ A	10 + 3	70 + 4	100 + 5

Range	Temperature Coefficient ±(% of setting + $\mu$ A)/°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 $\Omega$	0.015 $\mu$ Arms	0.5 $\mu$ Arms
10 mA	5 + 0.015	15 V	≤100 M $\Omega$	0.03 $\mu$ Arms	1 $\mu$ Arms
30 mA	7 + 0.045	30 V	≤ 10 M $\Omega$	0.05 $\mu$ Arms	2 $\mu$ Arms
100 mA	10 + 0.15	15 V	≤ 10 M $\Omega$	0.3 $\mu$ Arms	10 $\mu$ Arms

## 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 + $\Omega$ )	Accuracy (1 year)* ±(ppm of setting + $\Omega$ )	Temperature Coefficient	Nominal Current
400 $\Omega$	18.00 to 400.00 $\Omega$	0.01 $\Omega$	55 + 0.015	75 + 0.015	±0.002 $\Omega$ /°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.



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### Temperature generation for Thermocouple Setting temperature : Accuracy for 1 year (±°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	

See page 2 for source range.  
 Resolution: 0.1°C  
 Output Resistance: Approx. 1 Ω  
 Temperature scale is ITS-90.  
 Accuracy apply at 23±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 ±(60 ppm + 4 μV) for generated voltage.

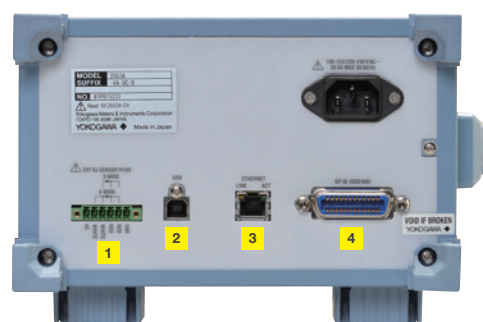
3 RJC modes  
 INT\*: Detect temperature of output terminal as compensation value. Temperature measurement accuracy is ±0.3°C.  
 EXT\*: Detect compensation value by sensor connected to RJC terminal  
 MAN: Input compensation value

\*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 ±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 uA/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) × 132 (H) × 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:

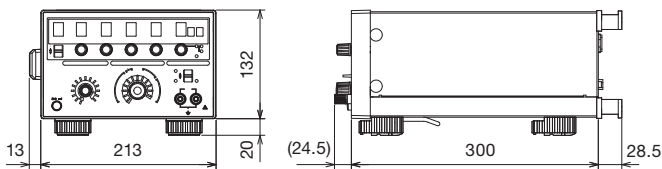
Power cord (1), 366961 Measurement lead (1), Rubber feet (1), Terminal plug (1), User's manual (1)

## 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:  $\pm 50$  ppm/h

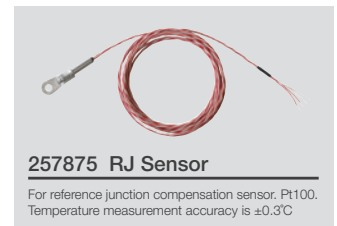
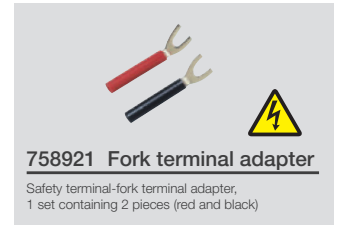
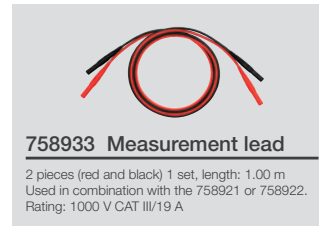
**Wide generation range**  
AC voltage: 1.00 mV to 1200.0 V  
AC current: 1.00 mA to 60.00 A

**Wide frequency range**  
40 to 1000 Hz (Frequency accuracy:  $\pm 50$  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.

■ Any company's names and product names mentioned in this document are trade names, trademarks or registered trademarks of their respective companies.

### 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

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