

Specifications

Output Range

AC Voltage

Range	Output Range ^{*1}	Resolution	Maximum Output	Output Resistance ^{*2}
1 V	0 to ± 1.25000 V	10 µV	0.5 A or more	6 mΩ or less
10 V	0 to ± 12.5000 V	100 µV	Approx. 600 mA	6 mΩ or less
30 V	0 to ± 37.5000 V	100 µV	Approx. 60 mA	6 mΩ or less
100 V	0 to ± 125.000 V	1 mV	Approx. 60 mA	6 mΩ or less
300 V	0 to ± 375.000 V	1 mV	Approx. 20 mA	6 mΩ or less
1000 V	0 to ±1250.00 V	10 mV	Approx. 6 mA	6 mΩ or less

AC Current

Range	Output Range ^{*1}	Resolution	Maximum Output
30 mA	0 to ± 37.5000 mA	0.1 µA	Approx. 15 V
100 mA	0 to ±125.000 mA	1 µA	Approx. 15 V
1 A	0 to ± 1.25000 A	10 µA	Approx. 15 V
10 A	0 to ± 12.5000 A	100 µA	Approx. 3 V
50 A	0 to ± 62.500 A	1 mA	Approx. 0.6 V

AUX

Range	Output Range ^{*1}	Resolution	Maximum Output	Output Resistance
500 mV	0 to ±625.00 mV	10 µV	Approx. 0.1 mA	1 Ω or less
5 V	0 to ± 6.2500 V	100 µV	Approx. 5 mA	1 Ω or less

*1: The output level can be set up to 120% of the range.

For outputs exceeding 120%, the ratio must be set to 100% or higher.

*2: When 758933, 758917, or B85062K is in use; excluding aging and the effects of measurement leads

Accuracy

Conditions Frequency: Using the internal oscillator
 Load: Pure resistance
 Temperature, humidity: 23°C ±3°C, 20% RH to 80% RH
 When the temperature is in the range of 5°C to 20°C or 26°C to 40°C, add the temperature coefficient.
 Output terminals: LO terminal grounding
 Measurement bandwidth: Up to 50 kHz

AC Voltage

Range	Display Resolution	Accuracy (1 year), ±(% of Setting + % of Range)					
		10% to 125% of range ^{*1}			1% to 10% of range ^{*1, *2}		
		50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*2}	400 Hz < f ≤ 1.2 kHz	50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*2}	400 Hz < f ≤ 1.2 kHz
1 V	10 µV	0.03 + 0.005	0.05 + 0.01	0.10 + 0.02	0.008	0.015	0.03
10 V	100 µV						
30 V	100 µV						
100 V	1 mV						
300 V	1 mV						
1000 V	10 mV						

AC Current

Range	Display Resolution	Accuracy (1 year), ±(% of Setting + % of Range)					
		10% to 125% of range			1% to 10% of range		
		50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*2}	400 Hz < f ≤ 1.2 kHz	50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*2}	400 Hz < f ≤ 1.2 kHz
30 mA	0.1 µA	0.04 + 0.005	0.06 + 0.01	0.12 + 0.02	0.009	0.016	0.032
100 mA	1 µA						
1 A	10 µA						
10 A	100 µA						
50 A	1 mA						

AUX

Range	Display Resolution	Accuracy (1 year), ±(% of Setting + % of Range)					
		10% to 125% of range ^{*1}			1% to 10% of range ^{*1}		
		50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*2}	400 Hz < f ≤ 1.2 kHz	50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*2}	400 Hz < f ≤ 1.2 kHz
500 mV	10 µV	0.04 + 0.01	0.06 + 0.01	0.12 + 0.02	0.014	0.016	0.032
5 V	100 µV						

*1: Excludes voltage drop due to the output resistance

*2: Includes the accuracy specification at LINE synchronization setting. However, there are no fluctuation in frequency and duty in LINE.

Active Power (Watt)

Output range	Accuracy (1 year)					
	±{(% of VA) × PF + % of range + PWRerror (% of VA)} ^{*3, *4, *5}			±{% of range + PWRerror (% of VA)} ^{*3, *4, *5}		
	10% to 125% of range			1% to 10% of range		
Frequency range	50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*6}	400 Hz < f ≤ 1.2 kHz	50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*6}	400 Hz < f ≤ 1.2 kHz
Accuracy	0.040 + 0.005 + PWRerror	0.060 + 0.010 + PWRerror	0.120 + 0.020 + PWRerror	0.009 + PWRerror	0.016 + PWRerror	0.032 + PWRerror

*3: For phase setting \varnothing , power factor PF = $\cos\varnothing$
 Equation for calculating the value to add to the active power accuracy for the phase error ($\Delta\varnothing$)
 $PWRerror (\%) = 100 \times \{\cos\varnothing - \cos(\varnothing + \Delta\varnothing)\}$
 Example: For 60 Hz, phase $\varnothing = 60^\circ$, $\Delta\varnothing = +0.03^\circ$
 $PWRerror (\%) = 100 \times \{\cos(60) - \cos(60.03)\} = 0.0453\%$
 *4: Add 0.005% of range for AUX output.
 *5: The output range that the power accuracy applies to is for when the voltage and current (including AUX) are at least 1% of the range.
 *6: Includes the accuracy specification when LINE synchronization is set. However, no fluctuation in the LINE frequency or duty ratio is assumed.

Reactive Power (VAR)

Output range	Accuracy (1 year)					
	±{(% of VA) × PF + % of range + VARerror (% of VA)} ^{*7, *8, *9}			±{% of range + VARerror (% of VA)} ^{*7, *8, *9}		
	10% to 125% of range			1% to 10% of range		
Frequency range	50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*10}	400 Hz < f ≤ 1.2 kHz	50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*10}	400 Hz < f ≤ 1.2 kHz
Accuracy	0.040 + 0.005 + VARerror	0.060 + 0.010 + VARerror	0.120 + 0.020 + VARerror	0.009 + VARerror	0.016 + VARerror	0.032 + VARerror

*7: For phase setting \varnothing , power factor PF = $\sin\varnothing$
 Equation for calculating the value to add to the reactive power accuracy for the phase error ($\Delta\varnothing$)
 $VARerror (\%) = 100 \times \{\sin\varnothing - \sin(\varnothing + \Delta\varnothing)\}$
 Example: For 60 Hz, phase $\varnothing = 60^\circ$, $\Delta\varnothing = +0.03^\circ$
 $VARerror (\%) = 100 \times \{\sin(60) - \sin(60.03)\} = -0.0262\%$
 *8: Add 0.005% of range for AUX output.
 *9: The output range that the power accuracy applies to is for when the voltage and current (including AUX) are at least 1% of the range.
 *10: Includes the accuracy specification when LINE synchronization is set. However, no fluctuation in the LINE frequency or duty ratio is assumed.

Phase (between the voltage and current outputs when used alone or between the voltage outputs of the master and slave devices when linked)

Frequency range	Accuracy (1 year)		
	50/60 Hz	40 Hz ≤ f ≤ 400 Hz ^{*12}	400 Hz < f ≤ 1.2 kHz
Current output (I1) corresponding to voltage (V1) or between the voltage outputs of the master and slave devices when linked ^{*11}	±0.03°	±0.10°	±0.40°
AUX output (I1) corresponding to voltage (V1) ^{*11}	±0.05°	±0.10°	±0.40°
Slave voltage (V2) corresponding to master voltage (V1) ^{*11}	±0.03°	±0.10°	±0.40°

*11: The output level can be set 10% to 125% of the range.
 *12: Includes the accuracy specification at LINE synchronization setting. However, there are no fluctuation in frequency and duty in LINE.

Frequency Accuracy (1 year): ±100 ppm

Other specification

Stability

Conditions Output range: 1% to 125% of range
 Output state: The same output state is retained (no load fluctuation).
 Frequency: Using the internal oscillator.
 Add 50 ppm of range for 1 kHz to 1.2 kHz.
 Output terminals: LO terminal grounding
 Temperature, humidity: 23°C ±3°C, 20% RH to 80% RH, no fluctuation
 Other conditions: No fluctuation (such as wind)
 Time: From 1 minute to 1 hour after the output is turned on

Item	±(ppm of Setting + ppm of Range)
Voltage	20 + 30
Current	20 + 30
Power (PF = 1)	40 + 60

Temperature coefficient

Item	Specifications	
Voltage output/ Current output/ AUX output	50/60 Hz	±30 ppm/°C of setting, at 5°C to 20°C and 26°C to 40°C
	Other frequencies 40 Hz to 1.2 kHz ^{*1}	±50 ppm/°C of setting, at 5°C to 20°C and 26°C to 40°C
Phase	50/60 Hz	±0.001 °/°C, at 5°C to 20°C and 26°C to 40°C
	Other frequencies 40 Hz to 1.2 kHz ^{*1}	±0.002 °/°C, at 5°C to 20°C and 26°C to 40°C

*1: Includes the accuracy specification when LINE synchronization is set.

Response Time

Item	Specifications
Voltage/current/ AUX output	Approx. 2 sec, at 0 -> 100% of the setting (until the output converges to 0.02% of the last value)

Distortion Rate

Conditions Frequency range: 40 Hz to 1.2 kHz
 Load: Pure resistance
 The load current during voltage generation and the load voltage during current generation are less than or equal to 20% of the maximum output.
 Output range: 40% to 125% of range

Item	Specifications
Voltage output	0.07% or smaller
Current output	0.18% or smaller
AUX output	0.10% or smaller

Settings and Display Items			
Setting			
	Items	Setting Value	Resolution
Voltage	Range	1 V, 10 V, 30 V, 100 V, 300 V, 1000 V	Refer to "Output Range"
	Level	0 to 120% (of range)	
	Level Ratio	0 to 120% (of setting) ^{*1}	0.001%
	Phase Angle	-180° to +359.999°	0.001°
Current	Range	30 mA, 100 mA, 1 A, 10 A, 50 A, 100 A ^{*2} , 150 A ^{*2} AUX Output 500 mV, 5 V	1P2W (HI Current) ^{*2}
	Level	0 to 120% (of range)	
	Level Ratio	0 to 120% (of setting) ^{*1}	0.001%
	Phase Angle	-180° to +359.999	0.001°
Power Factor		LEAD/LAG -1 to 0 to +1	0.0001
Frequency		40 Hz to 1.2 kHz	0.001 Hz
Wiring ^{*2}	kind of wiring	1P2W, 1P2W (HI Current) ^{*2} , 1P3W, 3P3W, 3P3W (3V3A), 3P4W	
Oscillator	INTernal	40 Hz to 1.2 kHz	0.001 Hz
	EXTernal	Input from the external oscillator (I/Q)	Refer to "Explanation of External Input"
	LINE	50/60 Hz	0.001°
Sweep	Time	8 s, 16 s, 32 s, 64 s	
	Range ^{*3}	0 to 100%, 0 to 105%, 0 to 110%, 0 to 120%	
AUX	V/A Conversion Ratio ^{*4}	0.0001 mV/A to 99999.9999 mV/A	0.0001 mV/A
Ground/Ungrounded ^{*5}		Voltage and current (including AUX) can be switched separately.	

*1: The output value is determined by "level × level ratio", but the maximum output is 125% of range.

*2: When synchronous operation is in use and the master wiring is not 1P2W, all the items above are set on the master side.
The 100 A range that becomes available using 1P2W (HI current) can be output with two units. The accuracy specification twice that of the 50 A range.
The 150 A range can be output with three units. The accuracy specification three times that of the 50 A range.

*3: The sweep range (%) indicates the level ratio range.

*4: Default value; 1000 mV/A

*5: When the Lo terminal is grounded, voltage cannot be applied between Lo and ground.

Display ^{*1}		
	Item	Display
Voltage (Vout)	Output level	Level setting × Ratio setting
	Output level	Level setting × Ratio setting
Current (Iout)	Output level	Level setting × Ratio setting
	Output level	Level setting × Ratio setting
Phase ^{*2}		Displays the output phase setting relative to the reference signal
Power Factor (PF) ^{*3}		Displays the power factor equivalent to the current phase relative to the voltage
Active Power (W)		Displays the power calculated from active power (W) $V_{out} \times I_{out} \times \cos\theta$ or $V_{out} \times I_{out} \times PF$.
Reactive Power (var)		$V_{out} \times I_{out} \times \sin\theta$

*1: All output displays show values derived from the above equations.

*2: If the wiring is 1P2W, the voltage and current phases can be set separately.

For other wiring systems, set the current phase relative to the voltage.

The phase is positive when the current leads the voltage.

*3: LEAD indicates that the current phase is leading the voltage. LAG indicates that the current phase is lagging the voltage.

External Input and Output

Master/Slave Synchronous Operation Input and Output (Two terminals each; four terminals total)

Item	Specifications
Input/output voltage	3 V ± 0.1 Vrms, sine wave
Frequency range	40 Hz to 1.2 kHz
Input resistance	Approx. 1 MΩ
Output resistance	Approx. 50 Ω

Terminal		Frequency selection		
		Internal oscillator	EXT ^{*1}	LINE (50 Hz to 60 Hz) ^{*2,*3}
Input	cos (I)	Not used	Used	Not used
	sin (Q)	Not used	Used	Not used
Output	cos (I)	Internal cos (I) signal	Connected to input terminal cos (I)	Internal cos (I) signal
	sin (Q)	Internal sin (Q) signal	Connected to input terminal sin (Q)	Internal sin (Q) signal

*1: Phase difference between I and Q: Within 90°±0.1°

*2: If the commercial power frequency is less than 45 Hz or greater than 65 Hz, the instrument generates an error and cannot produce output.

*3: If the duty ratio exceeds 50 ±5%, the instrument generates an error and cannot produce output.

Computer Interface

USB for PC Connection

Connector type	Type B connector (receptacle)
Electrical and mechanical	Complies with USB Rev. 2.0
Supported transfer modes	HS (High Speed; 480 Mbps) and FS (Full Speed; 12 Mbps)
Supported protocols	USBTMC-USB488 (USB Test and Measurement Class Ver.1.0)

Ethernet

Connector type	RJ-45 connector
Electrical and mechanical	Conforms to IEEE 802.3
Transmission system	100 BASE-TX/10 BASE-T
Transfer rate	100 Mbps max.
Supported services	VXI-11, DHCP

GP-IB

Electrical and mechanical	Complies with IEEE St'd 488-1978
Functional specifications	SH1, AH1, T5, L4, SR1, RL1, PP0, DC1, DT1, C0
Protocol	Complies with IEEE St'd 488.2-1992
Address	0 to 30

Connecting interface

Connector type	Type B connector (receptacle)
Electrical and mechanical	Equivalent to USB Rev. 2.0
Supported system environment	Valid only for the connection between the master and slave LS3300

General Specifications

Item	Specifications
Warm-up time	Approx. 30 minutes
Operating environment	Temperature: 5°C to 40°C
	Humidity: 20% RH to 80% RH (no condensation)
Storage environment	Temperature: -15°C to 60°C
	Humidity: 20% RH to 80% RH (no condensation)
Operating altitude	Up to 2000 m
Installation location	Indoors
Orientation	Horizontal. Vertical installation is prohibited.
Rated supply voltage	100 VAC to 120 VAC, 200 VAC to 240 VAC
Permitted supply voltage range	90 VAC to 132 VAC, 180 VAC to 264 VAC
Rated supply frequency	50 Hz/60 Hz
Permitted power supply frequency range	48 Hz to 63 Hz
Maximum power consumption	Approx. 200 VA
Withstand voltage	1500 VAC for 1 minute between the power supply and case
External dimensions	426 (W) × 132 (H) × 450 (D) mm
Weight	Approx. 20 kg

Model and Suffix code

Model	Suffix code	Description
LS3300		AC Power Calibrator
Power cord	-D	UL/CSA standard, PSE compliant
	-F	VDE standard
	-R	AS standard
	-Q	BS standard
	-H	GB standard
	-N	NBR standard

Standard accessories :

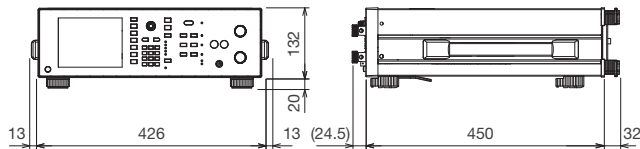
Power cord (1), B8506ZK, B8506WA (each 1), B8506ZL Alligator clip adapter set (1), Rubber feet (2 sets (4)), User's manual (1)

Rack Mounting Kits

Model	Product	Description
751535-E3	Rack mounting kit	EIA standalone installation
751535-J3	Rack mounting kit	JIS standalone installation

External dimensions

Unit: mm



Unless otherwise specified, tolerances are $\pm 3\%$ (however, tolerances are ± 0.3 mm when below 10 mm).

Related product

2558A AC Voltage Current Standard

Accuracy Voltage: $\pm 0.04\%$
Current: $\pm 0.05\%$

Stability ± 50 ppm/h

Frequency range 40 to 1000 Hz

Range Voltage: 1.00 mV to 1200.0 V
Current: 1.00 mA to 60.00 A



2560A Precision DC Calibrator

Accuracy Voltage: $\pm 0.005\%$
Current: $\pm 0.007\%$

Stability ± 10 ppm/h

Resolution 6.5 digits,
 ± 120000 count display

Range Voltage: ± 1224.00 V
Current: -12.2400 A to 36.720 A
Thermocouple, RTD



Accessories

Model	Name	Description	
B8506ZK	Measurement lead set	2 voltage output cables (red and black). 1 m. Rating 1500 V	
B8506WA	Measurement lead set	2 current output cables. 1.5 m. Rating 80 A	
758933	Measurement lead set	2 safety terminal cables (red and black). 1 m. Rating 1000 V	
758917	Measurement lead set	2 safety terminal cables (red and black). 0.75 m. Rating 1000 V	
B8506ZL	Alligator clipadapter set	2 safety terminal—alligator clip adapters (red and black). Rating 1500 V	
758929	Alligator clipadapter set	2 safety terminal—alligator clip adapters (red and black). Rating 1000 V	
758922	Alligator clipadapter set	2 safety terminal—alligator clip adapters (red and black). Rating 300 V	
758921	Fork terminal adapter	2 safety terminal—fork terminal adapters (red and black).	
758923	Spring clamp Adapter Set	2 safety terminal—spring clamp adapters (red and black).	
758931	Screw fastened Adapter Set	2 safety terminal—screw fastened adapters (red and black).	
366924	BNC Cable	Total length: 1 m	
A1421WL	USB Cable	Total length: 2 m USB2.0 Hi-Speed	

⚠ Due to the nature of this product, it is possible to touch its metal parts. Therefore, there is a risk of electric shock, so the product must be used with caution.

NOTICE

- Before operating the product, read the user's manual thoroughly for proper and safe operation.

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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.

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YMI-KS-MI-SE04

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[Ed: 01/b]

Printed in Japan, 707(KP)