YOKOGAWA

Handy Calibrators

CA51/CA71

- Source and measure operations can be performed at the same time.
  (Select from the following source signal and measurement signal options: voltage, current, resistance, thermocouple (TC), resistance temperature detector (RTD), frequency, pulse).
- AC voltages, including supply voltage, can be measured.
- Includes a wide array of additional functions.
- Easy operation.
- Compact size and Lightweight

CE



Actual Size

Yokogawa Meters & Instruments Corporation

Bulletin CA71E

CA51/CA71

Handy Calibrators

Comprehensive source/measure instruments for all your calibration and equipment checking needs at maintenance sites

Sensors and instruments require a wide variety of operation checks in the field. The CA71 Handy Calibrator is a small, lightweight, multifunction calibrator that can simultaneously source and measure voltage, current, resistance, TC, RTD, frequency, and pulse signals. The CA51 Handy Calibrator is a basic model with the same functions as the CA71 except TC and RTD measurement functions and online communication functions.

Simultaneous signal source and measurement capability

The CA71 lets you handle regular tests on TCs, RTDs and various other types of sensors and instruments, as well as operation checks when a problem has occurred. By itself it can source signals for input to equipment, and check output signal from equipment. With the CA71, you don't need to worry about synchronizing operations with other setting devices.
(TC and RTD measurement functions are CA71 only.)



A wide array of useful functions

- **Source**
  Values set in steps of 4–20 mA
  24V DC Power Supply to Transmitter
- **Divided output (n/m) function**
  Output settings are divided, eliminating the need for bothersome calculations for percentage output.
- **Autostep function**
  Changes the output value in step form based on the setting from the divided output (n/m) function. Changes can be sourced automatically every 10% or 25%.
- **Online communication (CA71 only)**
  RS-232C-compliant optically isolated interface
- **Sweep function**
  Linearly increases or decrease the output. The increasing/decreasing time can be set to either 16 or 32 seconds.
- **Memory function**
  Source values and measurements forming individual value sets can be saved to or read from the Handy Calibrator's internal memory (maximum 50 value sets).
- **Temperature monitor function**

AC voltage (including supply voltage) measurement capability

In cases where numerous signal converters and other devices are mounted on a rack or panel, the Handy Calibrator can be used to check the input and output signals of each device, while simultaneously checking the power supply. There is no need for a separate multimeter to measure supply voltage.

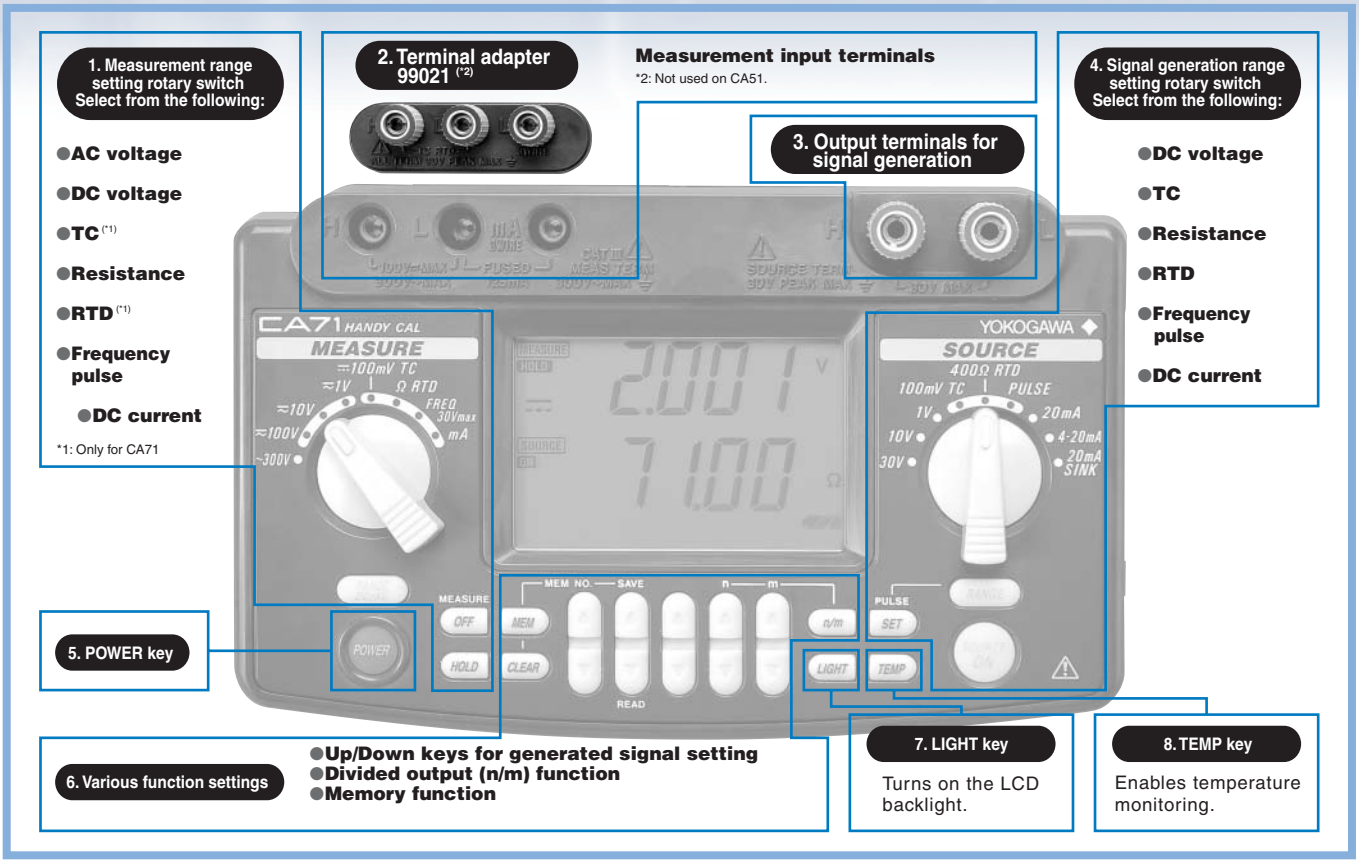


Easy operation

The Handy Calibrator incorporates rotary switches for simple handling. Just open the carrying case cover and connect the cables, and you're ready to take measurements.



Panel layout



●Spare parts

Product	Source signal lead cable	Measurement lead cable	Carrying case	Terminal adapter	Fuse
					
Model	**98020**	**RD031**	**93016**	**99021**	**A1501EF**
Remarks	One set, including one red cable and two black cables. Length: approximately 1.7 meters	One set, including one red cable and one black cable. Length: approximately 1.0 meter	The carrying case can hold the source signal and measurement lead cables, terminal adapter, four spare batteries, fuses, AC adapter, and user's manual.	Used in temperature measurement (for CA71).	For current terminal input protection. (10pcs/set)

●Optional accessories (sold separately)

Product	AC adapter	RJ sensor	Accessory carrying case	Communication cable (RS232)
				
Model	**94012, 94013, B9108WB**	**B9108WA**	**B9108XA**	**91017**
Remarks	94012: 100 V AC power supply adapter 94013: 120 V AC power supply adapter B9108WB: 220–240 V AC power supply adapter	For reference junction compensation	Can hold lead cables, RJ sensor, etc.	D-sub 9-pin (female)

●Handy Calibrator main unit

Product	CA71 Handy Calibrator	CA51 Handy Calibrator
		
Model	**CA71**	**CA51**
Standard accessories	**All of the following are included:** Source signal lead cables (one red, two black): 98020 Measurement lead cables (one red, one black): RD031 Carrying case: 93016 Terminal adapter for CA71: 99021 User's manual: IM CA71-E Fuse: A1501EF (for current terminal input protection) Four AA alkaline batteries: A1070EB ×4	

●Related product

Product	Handy Calibrators	Handy Calibrator
		
Model	**CA11E/CA12E**	**CA150**
Remarks	CA11E: Voltage/current model CA12E: Temperature model	Multi-functional Hand-held Calibrator Source and measurement can be performed simultaneously. Loop power supply function Sink function

CA51 and CA71 Specifications

●Signal sourcing unit range and accuracy (for both CA51 and CA71)

±(setting percentage plus μV, mV, mA, Ω or °C)

Parameter	Reference	Range	Accuracy (23±5°C per year)	Resolution	Remarks
DC voltage	100 mV	-10.00–110.00 mV	±(0.02% + 15 μV)	10 μV	
	1 V	0–1.1000 V	±(0.02% + 0.1 mV)	0.1 mV	Maximum output: 5 mA
	10 V	0–11.000 V	±(0.02% + 1 mV)	1 mV	Maximum output: 10 mA
	30 V	0–30.00 V	±(0.02% + 10 mV)	10 mV	Maximum output: 10 mA *1
DC current	20 mA	0–24.000 mA	±(0.025% + 3 μA)	1 μA	Maximum load: 12 V
	4–20 mA	4/8/12/16/20 mA		4 mA	
mA SINK	20 mA	0.1–24.000 mA	±(0.05% + 3 μA)	1 μA	External power supply: 5–28 V
Resistance	400 Ω	0–400.00 Ω	±(0.025% + 0.1 Ω)	0.01 Ω	Excitation current: 0.5–5 mA *3 If 0.1 mA, add 0.25 Ω or 0.6°C. Subject device input capacitance: 0.1 μF or less
RTD	Pt100 *2	-200.0–850.0°C	±(0.025% + 0.3°C)	0.1°C	
	JPt100	-200.0–500.0°C			
TC *4	K	-200.0–1372.0°C	±(0.02% + 0.5°C) (-100°C or greater) ±(0.02% + 1°C) (-100°C or less)	0.1°C	TC source accuracy does not include RJ sensor accuracy. RJ sensor specs Measurement range: -10–50°C Accuracy (when combined with main unit) 18–28°C: ±0.5°C Other than the above: ±1°C
	E	-200.0–1000.0°C			
	J	-200.0–1200.0°C			
	T	-200.0–400.0°C			
	N	-200.0–1300.0°C	±(0.02% + 0.5°C) (0°C or greater) ±(0.02% + 1°C) (0°C or less)		
	L	-200.0–900.0°C			
	U	-200.0–400.0°C			
	R	0–1768°C	±(0.02% + 2.5°C) (100°C or less) ±(0.02% + 1.5°C) (100°C or greater)	1°C	
	S				
	B	600–1800°C	±(0.02% + 2°C) (1000°C or less) ±(0.02% + 1.5°C) (1000°C or greater)		
Frequency, pulse	500 Hz	1.0–500.0 Hz	±0.2 Hz	0.1 Hz	Output voltage: +0.1–+15 V (zero base waveform) Amplitude accuracy: ±(5% + 0.1 V) Maximum load current: 10 mA Contact output (with 0.0 V amplitude setting, FET switch ON/OFF) Maximum open/close voltage/current: +28 V/50 mA
	1000 Hz	90–1100 Hz	±1 Hz	1 Hz	
	10 kHz	0.9 kHz–11.0 kHz	±0.1 kHz	0.1 kHz	
	Pulse	1–99,999 cycles	–	1 cycle	
	cycle *5				

Temperature coefficient: Accuracy shown above × (1/5)/°C
*1: Output up to 24 V/22 mA is possible when using the AC adapter.
*2: As per JIS C 1604-1997 (ITS-90). IPTS-68 may be selected through internal settings (DIP switch).
*3: Excitation current: If less than 0.1 mA to 0.5 mA, then add [0.025/Is (mA)] Ω or [0.06/Is (mA)]°C.
*4: As per JIS C 1602-1995 (ITS-90) (L and U are DIN specs).
K, E, J, T, N, R, S, and B may be switched to IPTS-68 through internal settings (DIP switch) (L and U are not switched).
*5: Frequency (interval between one pulse and another) and amplitude during pulse cycle generation may have the same range as during frequency generation.

●Measurement unit range and accuracy (for both CA51 and CA71)

Accuracy: ±(reading percentage plus μV, mV, μA, Ω or dgt (digit))

Parameter	Reference	Range	Accuracy (23±5°C per year)	Resolution	Remarks
DC voltage	100 mV	0–±110.00 mV	±(0.025% + 20 μV)	10 μV	Input resistance: 10 MΩ or greater
	1 V	0–±1.1000 V	±(0.025% + 0.2 mV)	0.1 mV	
	10 V	0–±11.000 V	±(0.025% + 2 mV)	1 mV	Input resistance: Approximately 1 MΩ
	100 V	0–±110.00 V	±(0.05% + 20 mV)	0.01 V	
DC current	20 mA	0–±24.000 mA	±(0.025% + 4 μA)	1 μA	Input resistance: Approximately 14 Ω
	100 mA	0–±100.00 mA	±(0.04% + 30 μA)	10 μA	
Resistance	400 Ω	0–400.00 Ω	±(0.05% + 0.1 Ω)	0.01 Ω	Accuracy during 3-wire measurement
AC voltage	1 V	0–1.100 V	±(0.5% + 5 dgt)	1 mV	Input resistance: Approximately 10 MΩ/10 pF; Input frequency: 45–65 Hz; Input voltage range: 10%–100%; Measurement method: Average value rectification
	10 V	0–11.00 V		0.01 V	
	100 V	0–110.0 V		0.1 V	Input resistance: Approximately 1 MΩ/10 pF
	300 V	0–300 V	±(0.5% + 2 dgt)	1 V	
Frequency, pulse	100 Hz	1.00–100.00 Hz	±2 dgt	0.01 Hz	Maximum input: 30 V peak Input resistance: 200 kΩ or greater Sensitivity: 0.5 V peak or greater Contact input: Maximum 100 Hz Notes CPM: Counts per minute CPH: Counts per hour
	1000 Hz	1.0–1000.0 Hz		0.1 Hz	
	10 kHz	0.001–11.000 kHz		0.001 kHz	
	CPM	0–99,999 CPM		1 CPM	
	CPH	0–99,999 CPH		1 CPH	

Temperature coefficient: Accuracy shown above × (1/5)/°C

●Measurement unit (temperature; CA71 only) range and accuracy

Accuracy: ±(reading percentage + °C)

Parameter	Reference	Range	Accuracy (23±5°C per year)	Resolution	Remarks
TC *7	K	-200.0–1372.0°C	±(0.05% + 1.5°C) (-100°C or greater) ±(0.05% + 2°C) (-100°C or less)	0.1°C	
	E	-200.0–1000.0°C			
	J	-200.0–1200.0°C			
	T	-200.0–400.0°C			
	N	-200.0–1300.0°C			
	L	-200.0–900.0°C			
	U	-200.0–400.0°C			
	R	0–1768°C	±(0.05% + 2°C) (100°C or greater) ±(0.05% + 3°C) (100°C or less)	1°C	
	S	0–1768°C			
	B	600–1800°C			
RTD	Pt100 *6	-200.0–850.0°C	±(0.05% + 0.6°C)	0.1°C	Accuracy during 3-wire measurement
	JPt100	-200.0–500.0°C			

Temperature coefficient: Accuracy shown above × (1/5)/°C
*6: As per JIS C 1604-1997 (ITS-90). IPTS-68 may be selected through internal settings (DIP switch).
*7: As per JIS C 1602-1995 (ITS-90) (L and U are DIN specs).
K, E, J, T, N, R, S, and B may be switched to IPTS-68 through internal settings (DIP switch) (L and U are not switched).

●General specifications (for both CA51 and CA71)

Parameter	Specification
Signal generating unit response time	Approximately 1 second (time between start of voltage change and when voltage enters accuracy range)
Signal generating unit voltage limiter	Approximately 32 V
Signal generating unit current limiter	Approximately 25 mA
Divided output (n/m) function	Output = setting × (n/m) n = 0–m; m = 1–19; n ≤ m
Auto-step output function	n value sent automatically when n/m function selection is selected (two options: approximately 2.5 seconds/step or approximately 5 seconds/step)
Sweep function	Sweep time (two options: approximately 16 seconds or approximately 32 seconds)
Memory function	50 value sets (generated and measured values are stored as value sets with the same address (up to 50 value sets can be stored))
Measuring unit maximum input	Voltage terminal: 300 V AC Current terminal: 120 mA DC
Current terminal input protection	Fuses: 125 mA/250 V
Measuring unit ground voltage	Maximum 300 V AC
Measurement display updating rate	Approximately once per second
Serial interface	Enabled when communication cable (RS232) is connected; sold separately as optional accessory (CA71 only)
Display	Segmented LCD (approximately 76 mm × 48 mm)
Backlight	LED backlight; auto-off after one minute (from when LIGHT key is turned on)
Power supply	Four AA alkaline batteries, or special AC adapter (sold separately)
Battery life	Measurement off, output 5 V DC/10 kΩ or greater: Approximately 40 hours Simultaneous signal generation/measurement, output 5 V DC/10 kΩ or greater: Approximately 20 hours Simultaneous signal generation/measurement, output 20 mA/5 V: Approximately 12 hours (using alkaline batteries, with backlight off)
Consumed power	Approximately 7 VA (using 100 V AC adapter)
Auto-power-off function	Approximately 10 minutes (auto-power-off can be disabled through a DIP switch setting)
Applicable standards	IEC61010-1, IEC61010-2-31 EN61326-1 EN55011, Class B, Group 1
Insulation resistance	Across input terminal and output terminal, 500 V DC, 50 MΩ or greater

Parameter	Specification
Withstand voltage	Across input terminal and output terminal, 3.7 kVAC, for one minute
Operating temperature and humidity ranges	0–50°C, 20–80% RH (no condensation)
Storage temperature and humidity ranges	-20–50°C, 90% RH or less (no condensation)
External dimensions (WHD)	Approximately 190 × 120 × 55 mm
Weight	Approximately 730 g (including batteries)
Standard accessories	All of the following are included: Signal generating lead cables (one red, two black): 98020 Measurement lead cables (one red, one black): RD031 Carrying case: 93016 Terminal adapter for CA71: 99021 User's manual: IM CA71-E Fuse: A1501EF (for current terminal input protection) Four AA alkaline batteries: A1070EB × 4
Optional accessories (sold separately)	AC adapter: 94012 (100 V AC power supply) AC adapter: 94013 (120 V AC power supply) AC adapter: B9108WB (220–240 V AC power supply) RJ sensor: B9108WA (For reference junction compensation) Accessory carrying case: B9108XA Communication cable: 91017
Spare parts	Signal generating lead cables (one red, two black): 98020 Measurement lead cables (one red, one black): RD031 Carrying case: 93016 Terminal adapter: 99021 Fuse: A1501EF (for current terminal input protection)

YOKOGAWA
Yokogawa Meters & Instruments Corporation

World Wide Web site at
http://www.yokogawa.com/MCC

NOTICE
● Before using the product, read the instruction manual carefully to ensure proper and safe operation.

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