



# CA150/CA71 Multifunction Calibrators

Portable Source and Measure Calibrators

The Yokogawa CA150/CA71 multifunction calibrators can be used for simulating or measuring DC voltage, DC current, temperature, RTD, Ohms, and pulse signals. They also have the ability to simultaneously generate and measure each unit of calibration. This easy-to-use multifunction calibrator fits comfortably in the palm of your hand and is easy to read due to its backlight LCD display, making it one of the most user friendly multifunction calibrators in the market.

## Introduction

A Source Measure Unit is a special kind of instrument that can work as a constant current source or as a constant voltage source. It simultaneously sources to a pair of terminals, measuring the current or voltage across those terminals. Typically when an SMU sources constant voltage it measures current through the terminals. When it sources constant current through the terminals, it measures the voltage built up across those terminals.

SMUs are typically used in a lab environment in automatic test equipment and usually come with an interface such as GPIB or USB to enable connection to a computer. However, they can also be used for characterization purposes, similar to curve a tracer. Typically, source meters have four terminals- two for source and measurement and two more for kelvin connection.

Having a need for portable use, the CA150 and CA71 multifunction calibrators were developed by Yokogawa. These calibrators are capable of supplying loop power functions, DC power function to be powered and calibrated in a field application to perform maintenance or calibration.

## Features

The main features of the CA150/CA71 calibrators include:

- **High accuracy**

The CA150 and CA71 have a 0.02% accuracy for the source and measurement functions. Source and measurement function: DCV voltage, DC mA, ohms, frequency and temperature (thermocouple, RTD) and 24 VDC power supply function.



Figure 1 - External view of CA150/CA71

- **Simultaneous Source and Measurement for Process Devices**

In conventional calibration applications, multiple devices such as a standard generator, dial resistor and a multimeters were required. Now with a single CA150 unit, it is possible to perform operation checks at regular inspections and maintenance of thermocouples, RTDs and instruments, as well as maintenance and equipment diagnosis of process devices such as transmitters, thermostats and signal converters.

- **Loop Power Supply Function**

It is possible to measure generated current signals while supplying loop power 24VDC from a two-wire type transmitter (up to 22 mA DC).

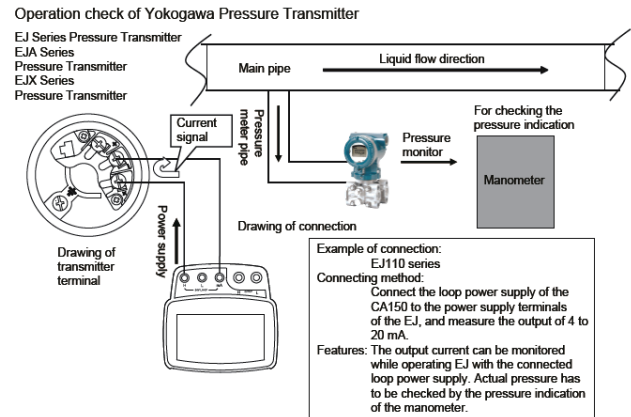


Figure 2 - Example of connection to Pressure Transmitter and Temperature Transmitter

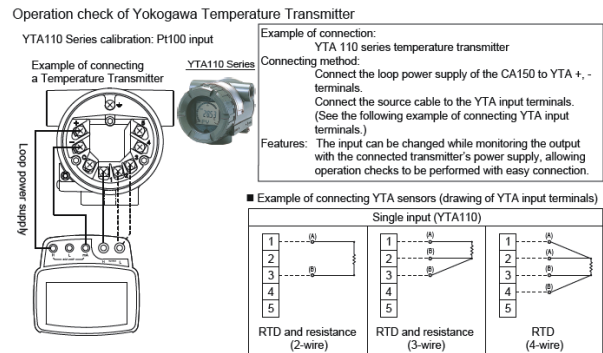


Figure 2 - Example of connection to Pressure Transmitter and Temperature Transmitter

- **Output Functions**

Automatic Output Function: Step/sweep function changes the output in a staircase (step) pattern at fixed intervals. Linear sweep function increases or decreases the output linearly with respect to the generated value. Program sweep function outputs source setting values stored by the data memory function sequentially in the order they are stored in the memory.

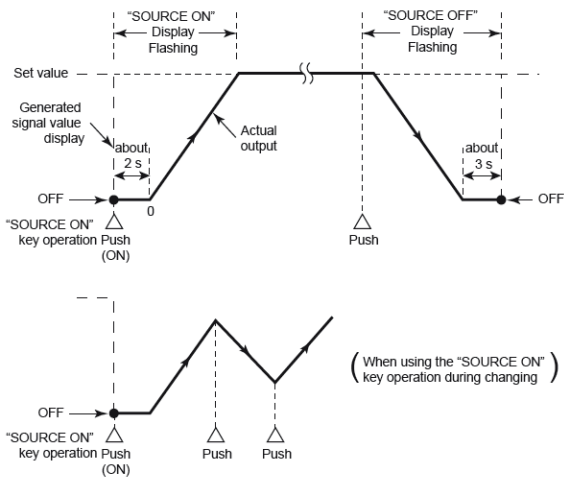


Figure 4 - Linear Sweep Function

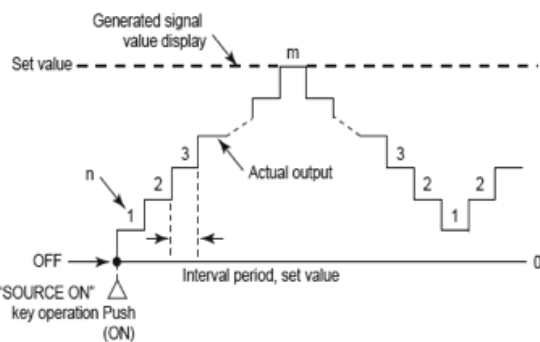


Figure 5 Step Sweep Function

- **Multi Temperature Measurement**

Measurements can be made using ten types of TC and two types of RTD. For RTD, three-wire measurement is also available.

- **Source and Measurement of Pulses**

The source frequency can be set in the range of 1 Hz to 50 kHz, and the measurement frequency in the range of 1 Hz to 11 kHz. This is useful for checking a flow meter or receiver.

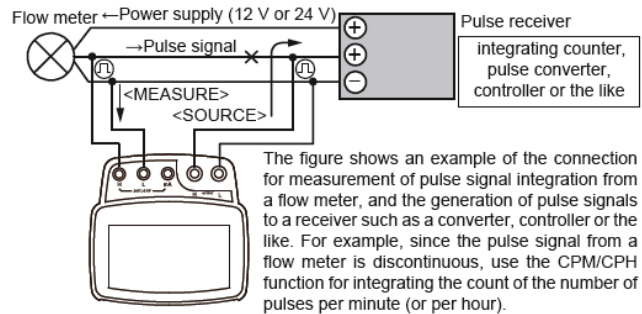


Figure 6 - Example of Pulse signal integration

## Conclusion

In this article, we have discussed the operation principles, functions and features of the CA150 and CA71 source measurement unit calibrators. The CA150 and CA71 feature superior basic performance with a wide range of DC and Temperature inputs and a variety of functions.

This means users can simultaneously source and measure different types of calibrations for DC voltage, DC current, temperature, RTD, Ohms and pulse signals without having to use three different instruments. These measurements can be done by using just one CA150 or CA71 calibrator.

## References

1. Yokogawa technical general specifications for CA150, No. CA150-01E, 2007, pp. 1-11
2. Yokogawa technical general specification for CA71, No. GS 77W02A01-01E, 2002, pp. 1-6

## About Us

Since its foundation in 1915, Yokogawa has been recognized as a technology leader. Annually, Yokogawa reinvests nearly a quarter billion dollars in research and development, much of it aimed at core technologies like test and measurement. As a result, Yokogawa's annual corporate revenues have grown to nearly \$4 Billion while amassing more than 6,000 patents and registrations. All of us within the Test and Measurement Division recognize it as our mission to continuously develop and supply the best possible solutions with optimum quality and value to customers and society, thereby contributing to our customer's growth.