Time Electronics

1048 Voltage / Current / Loop Calibrator

- **Source/measure voltage and current**
- **3 source ranges: 0 to 22mA & 0 to 22V**
- **3 measure ranges: 0 to 70mA & 0 to 50V**
- **Accuracy 0.02%**
- **Transmitter simulator/sink loop control**
- **Output steps and ramps**
- **Fine adjustment (inching)**
- **20 hours typical battery life**
- **Optional mains power supply**

DESCRIPTION

A portable instrument that operates as a current and voltage source and a multi-purpose loop calibrator. High performance and simple operation make it suitable for R&D, service, process control engineers, and calibration technicians. As a versatile handheld calibrator, the source and measure capabilities with 0.02% accuracy mean the 1048 is a compact solution for most simulation and test applications.

The 1048 combines the advantages of digital accuracy with analog control. Based on the popular functionality of the Time Electronics 1044 calibrator, the 1048 offers higher voltage and current across the three ranges, and improved accuracy. The additional features of transmitter simulation, sink loop control, output stepping and ramping, and incremental fine adjustment make the instrument ideal for use in the process industry.

The large, easy to read 4.5 digit LCD display shows the actual output, even when the connected load exceeds the specifications. This important feature eliminates the risk of large errors when connecting to unknown loads. The display also indicates if the battery becomes critically low.

In the source mode, voltage up to 22V and current up to 22mA may be generated in three ranges. When in current source mode the 1048 has a high 24V compliance voltage which is ideal for powering process loops. In the measurement mode, the range and function can be easily selected, with the measured input accurately shown on the display.

The step, ramp, and inching functions are simple operation, with no key press menus to learn, just switches and buttons. A multi-turn potentiometer controls the output, with up/down incrementing buttons for fine control. The output can be reversed (+/-) and zeroed at the flick of a switch. The automatic ramp function enables the user to choose either 5, 11, or 21 point calibration. Manual operation can be quickly restored by a single push of a button.

The 1048 is housed in a pocket sized ABS case, with carry case supplied as standard. Connections are by standard 4mm plugs or by simply clamping the wires under the terminals. A single 9V battery powers the unit or an external 12V DC power supply may be used which disconnects the internal battery.

APPLICATIONS

Common use is to simulate a transducer or measure the current flow in a transducer loop. The 1048 can be used to check a 4 to 20mA system in either source or measure modes of operation, with the 24V compliance voltage powering the loop when current source mode is selected. In the source mode, the 1048 may be used to calibrate meters, thermocouple indicators, data loggers, for signal injection, semiconductor characterisation, or as a backing off source. In the measure mode, the 1048 may be used in the same way as a DMM, checking DC voltages and current over 3 ranges with excellent resolution and accuracy.

1048 Specifications

TECHNICAL SPECIFICATION

VOLTAGE SOURCE

Range	Resolution	Accuracy	Output Current	Temp Coefficient
0 to 220mV	10µV, 100µV above 0.2V	0.05% of full scale	20mA	± 6ppm/°C
0 to 2.2V	100µV, 1mV above 2V	0.02% of full scale		
0 to 22V	1mV, 10mV above 20V	0.02% of full scale		

VOLTAGE MEASURE

Range	Resolution	Accuracy	Measure Load	Temp Coefficient
0 to 220mV	10µV, 100µV above 0.2V	0.05% of fs ± 1 digit	1MΩ	± 3ppm/°C
0 to 2.2V	100µV, 1mV above 2V	0.02% of fs ± 1 digit	1MΩ	
0 to 22V	1mV, 10mV above 20V	0.02% of fs ± 1 digit	10MΩ	

CURRENT SOURCE

Range	Resolution	Accuracy	Output Voltage	Temp Coefficient
0 to 220µA	10nA, 0.1µA above 200mA	0.05% of full scale	24V Max	± 12ppm/°C
0 to 2.2mA	0.1µA, 1µA above 2mA	0.02% of full scale		
0 to 22mA	1µA, 10µA above 20mA	0.02% of full scale		

CURRENT MEASURE

Range	Resolution	Accuracy	Input Load	Temp Coefficient
0 to 220µA	10nA, 0.1µA above 200mA	0.05% of fs ± 1 digit	1kΩ	± 8ppm/°C
0 to 2.2mA	0.1µA, 1µA above 2mA	0.02% of fs ± 1 digit	110Ω	
0 to 22mA	1µA, 10µA above 20mA	0.02% of fs ± 1 digit	16Ω	

SINK (TX SIM) ..... 2 wire transmitter simulation: External excitation voltage, 3V min, 50V max.
The current sink levels are adjustable, with accuracies as in the 3 source ranges shown above. Note: Accuracies in all measure modes are +/- 1 digit.

OUTPUT STEPS ..... 5 fixed 4mA steps for current output 4, 8, 12, 16 & 20mA
11 fixed 1V steps for voltage output 0,1,2...10V
21 fixed steps 1V/1mA for V & I output 0,1,2...20
Stepping can be done manually or automatically (Autostep). Stepping speed is adjustable (1-9 sec/step). Dwell time (top and bottom) is one step period. In step mode the accuracy is limited to 0.05% of span +/- 1 digit.

OUTPUT RAMP ..... Current Ramp 4 to 20, or 0 to 20 on all ranges.
Voltage Ramp 0 to 10, or 0 to 20 on all ranges.
Ramp time 7 seconds. Dwell (top/bottom) 5 seconds. Manual restart. Ramp operation is also available in Sink (TX SIM).

OUTPUT ADJUSTMENT ..... A ten turn potentiometer for quick setting, with fine adjust using up/down increment buttons.

Connections ..... Made by 4mm connectors or clamped using the wire compression feature.

Power ..... PP3 size, 9V battery. Approximately 20 hours life depending on the current sourced. Alternatively an optional 12V power supply can be plugged into the 2.5mm socket on the top of the unit.

Protection ..... The 1048 can withstand open circuits, short circuits and reverse polarity up to 25V. Additional protection is by an internal fuse.

GENERAL SPECIFICATION

Dimensions ..... H142 x W78 x D50mm
Weight 0.30kg
Operating temperature ..... -10 to 50°C. Storage temperature -30 to 70°C.
Operating humidity ..... 0 to 90% non-condensing at 25°C
Optional Extras ..... 230V or 110V Mains Power Supply. Calibration Certificates – traceable to NPL and UKAS

ORDERING INFORMATION

1048 ..... **Voltage/Current/Loop Calibrator**
7643 ..... 230V Mains Power Supply
7652 ..... 110V Mains Power Supply
C176 ..... Factory (NPL Traceable) Calibration Certificate
C138 ..... UKAS Calibration Certificate (ISO 17025)

Time Electronics Ltd, Unit 11 Sovereign Way, Botany Industrial Estate, Tonbridge, Kent, TN9 1RH. United Kingdom.
T: +44 (0) 1732 355993 F: +44 (0) 1732 770312 E: mail@timeelectronics.co.uk
www.timeelectronics.com