



- **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)**

### DESCRIPTION

A precision module 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 calibrator, the source and measure capabilities with 0.02% accuracy mean the 7069 is a solution for most simulation and test applications.

The 7069 combines the advantages of digital accuracy with analog control. Based on the popular functionality of the Time Electronics 1048 portable calibrator, the 7069 offers voltage and current across the three ranges, and features such as transmitter simulation, sink loop control, output stepping and ramping, and incremental fine adjustment. These make the module 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.

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 7069 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 7069 module is 97mm wide, and can be fitted in either the primary or secondary CalBench console. Connections are by standard 4mm plugs or by simply clamping the wires under the terminals.

### APPLICATIONS

Common use is to simulate a transducer or measure the current flow in a transducer loop. The 7069 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 7069 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 7069 may be used in the same way as a DMM, checking DC voltages and current over 3 ranges with excellent resolution and accuracy.

# 7069 Specifications

## TECHNICAL SPECIFICATION

### VOLTAGE SOURCE

Range	Resolution	Accuracy	Output Current	Temp Coefficient	Noise
0 to 220mV	10 $\mu$ V, 100 $\mu$ V above 0.2V	0.05% of full scale	20mA	$\pm$ 150ppm/ $^{\circ}$ C	<30ppm of full scale
0 to 2.2V	100 $\mu$ V, 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	10 $\mu$ V, 100 $\mu$ V above 0.2V	0.05% of fs $\pm$ 1 digit	1M $\Omega$	$\pm$ 150ppm/ $^{\circ}$ C
0 to 2.2V	100 $\mu$ V, 1mV above 2V	0.02% of fs $\pm$ 1 digit	1M $\Omega$	
0 to 22V	1mV, 10mV above 20V	0.02% of fs $\pm$ 1 digit	10M $\Omega$	

### CURRENT SOURCE

Range	Resolution	Accuracy	Output Voltage	Temp Coefficient	Noise
0 to 220 $\mu$ A	10nA, 0.1 $\mu$ A above 200mA	0.05% of full scale	24V Max	$\pm$ 200ppm/ $^{\circ}$ C	<50ppm of full scale
0 to 2.2mA	0.1 $\mu$ A, 1 $\mu$ A above 2mA	0.02% of full scale			
0 to 22mA	1 $\mu$ A, 10 $\mu$ A above 20mA	0.02% of full scale			

### CURRENT MEASURE

Range	Resolution	Accuracy	Input Load	Temp Coefficient
0 to 220 $\mu$ A	10nA, 0.1 $\mu$ A above 200mA	0.05% of fs $\pm$ 1 digit	1k $\Omega$	$\pm$ 200ppm/ $^{\circ}$ C
0 to 2.2mA	0.1 $\mu$ A, 1 $\mu$ A above 2mA	0.02% of fs $\pm$ 1 digit	110 $\Omega$	
0 to 22mA	1 $\mu$ A, 10 $\mu$ A above 20mA	0.02% of fs $\pm$ 1 digit	16 $\Omega$	

**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  $\pm$ 1 digit.

**OUTPUT STEPS** ..... 5 fixed 4mA steps for current output 4, 8, 12, 16 & 20 mA  
 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  $\pm$ 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.

**Protection** ..... The 7069 can withstand open circuits, short circuits and reverse polarity up to 25V.  
 Additional protection is by an internal fuse.

## GENERAL SPECIFICATION

**Module Dimensions** ..... H201 x W97mm (can be fitted in primary or secondary console)  
**Optional Extras** ..... Calibration certificates traceable to NPL and UKAS

## ORDERING INFORMATION

**7069** ..... **Voltage/Current/Loop Calibrator Module**  
**C176** ..... Factory (NPL traceable) Calibration Certificate  
**C138** ..... UKAS Calibration Certificate (ISO 17025)

Due to continuous development Time Electronics reserves the right to change specifications without prior notice.

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