

# mAcal

## milliAmp Calibrator



# Product Description

**T**he mAcAl milliAmp Calibrator is an economical and easy-to-use calibration device for sourcing and measuring mA signals.

The instrument is designed specifically for 2-wire transmitter loops with 4 to 20 mA signals and it is delivered with traceable certification.

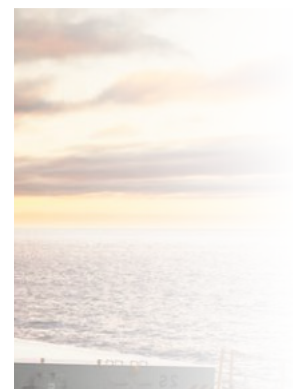
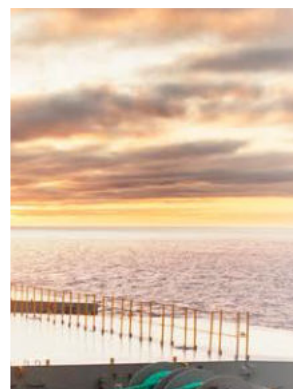
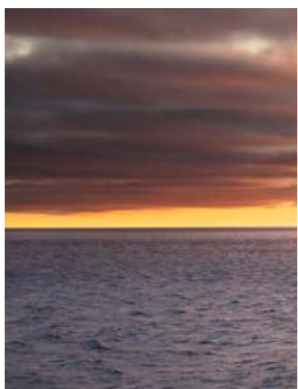
The keypad is easy-to-use and provides positive tactile feedback. Each key is labeled for easy operation. A large, high-contrast 5-digit LCD display indicates numeric values in mA, %, V, or sec. The resolution is 0.001 mA in measurement mode. The user can change the display to read in % of Full Scale and flow readings are shown in % of Flow.

The display also indicates error codes. Visual warnings are displayed for loop mismatch, reverse polarity, and over range. It is also equipped with a user adjustable automatic shut-off feature that prevents accidental battery discharge when the unit is not in use. A built-in, permanent fuse eliminates the need to replace the fuse in the case of overloads: no need to return the unit to the factory or replace the fuse.

The mAcAl provides loop power in the range of 0 to 45 VDC, and the instrument is designed to generate a stable 24 VDC supply for the loop. The mAcAl also reduces the time and complexity often associated with loop calibration. The instrument features special fixed steps for performing linear and flow transmitter or valve positioner calibrations. The instrument has seven different built-in current values, and the user may choose between manual or automatic steps with 10 or 30 seconds between steps. You can perform an entire test by placing the mAcAl in the process loop and take readings from the control room.

## Key Features

- ▶ **Sources and Measures Current**  
Allows for calibration of transmitters in a two-wire loop.
- ▶ **Stable Source**  
Internal 24 VDC supply for consistent loop power.
- ▶ **High Resolution**  
Read to 0.001 mA in the measurement mode.
- ▶ **% of Full Scale Reading**  
Displays a percentage to provide for easy analysis of results.
- ▶ **Timesaving Features**  
Fast one-key-one-function access to the features such as the step function or loop supply power.
- ▶ **Large Display**  
Includes large numbers for unit reading, a percentage display, and dedicated icons for calibrator status, including a low battery indicator.
- ▶ **Traceable Calibration**  
For your confidence, the unit is supplied with a calibration certificate that is fully traceable to a national standards lab such as NIST or NPL.
- ▶ **Complete Marine Program**  
Part of a complete program of marine approved temperature, pressure, and signal calibrators; including temperature sensors.



# Product Overview

## Connections

Connections for + and – test leads.

## Mains Adapter

Connection to mains adapter.  
6 VDC, 230 mA.

Note: The mains adapter does not charge rechargeable batteries.

## PWR

Switch between external and internal loop power supply EXT. (the +24 VDC of the current loop is generated by an external power supply) and INT. (the +24 VDC of the current loop is generated by the mAcal itself).

## ON/OFF

Switches instrument on and off. Auto shut-off to extend battery life (user programmable).

## mA%/SETUP

Alternating between readout in mA and %. If the key is held down for more than 2 seconds, a change to SETUP takes place. Under SETUP, this key is used to select next parameter.

## AUTO

AUTO ramp or AUTO-STEP function is started or stopped.



## Display

Shows numerical value in mA, %, V or sec., and for readout of error codes, etc.

## FUNC

This key allows for changing functions between SOURCE mA, MEASURE mA, and MEASURE Volt functions.

## STEP

The STEP function is activated or de-activated.

## Up Arrow

Functions to increase entered values or to scroll up.

## Down Arrow

Functions to decrease entered values or to scroll down.

## JOFRA mAcal Softcase



**mAcal** standard delivery includes a handy soft case that allows operation of the unit while protected in the case. The soft case has space to store test leads and clips.

# Specifications

## Technical Specifications

Current Source		Current Measurement		Voltage Measurement	
Range	0 to 24 mA	Range	0 to 24 mA	Range	0 to 45 VDC
Resolution	0.01 mA	Resolution	0.001 mA	Resolution	0.1 VDC
Accuracy (k=2)	± 0.05% of F.S.	Accuracy (k=2)	± 0.05% of F.S.	Accuracy	± 0.5 VDC
Maximum Load	900 ohm	Input Impedance	10 ohm	Input Impedance	10M ohm
Temperature Coefficient	0.005% per °C (-10 to 40 °C) 0.003% per °F (-14 to 104 °F)	Temperature Coefficient	0.003% per °C (-10 to 40 °C) 0.002% per °F (-14 to 104 °F)		

## Physical Specifications

Power Supply		Miscellaneous	
External Power Adapter	6 VDC / 240 mA / 1.3 mm DC female connector	Operating (ambient) Temperature	-10 to 40 °C (-14 to 104 °F)
Batteries	4 Type LR6, AA, 1.5 VDC Alkaline	Storage (ambient) Temperature	-20 to 50 °C (-4 to 122 °F)
Battery Life	200 hours with external loop power 20 hours with 12 mA output/internal loop power	CE Conformity	EN 61326-1:2013
Instrument Weight & Dimensions (including batteries, leads and case)		The JOFRA mAcal is type approved by Det Norske Veritas.	
Weight	0.8 lbs / 355 g	Approval Certificate Number	TAA00001JX
Size: L x W x H	6.85 x 2.6 x 1.0 in / 174 x 66 x 26 mm		

# Ordering Information

## Standard Delivery

### The mAcal Calibrator Includes:

- mAcal Calibrator
- Soft Carrying Case
- 2 Test Leads with Crocodile Clip
- 4 Batteries, Type LR6, AA
- User Manual

## Accessories

Mains Adapter for mAcal – US / Japan.....	103964
Mains Adapter for mAcal – Europe.....	103950
Mains Adapter for mAcal – UK.....	103957
4x 1.5 Volt Rechargeable Batteries.....	124716
Charger for Rechargeable Batteries – 115 / 230 VDC.....	124718



## Order Numbers

MACAL	Base Model Number	
	MACAL .....	mAcal Calibrator with Standard Accessories
F	Calibration Certificate	
	F .....	International traceable calibration certificate
	H .....	17025 Accredited calibration certificate, DANAK
Sample Order Number		
MACAL-F		
mAcal Calibrator with standard accessories, plus traceable certificate to international standards.		

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**JOFRA**  
calibration

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