



uCAL

UC12

Universal Calibrator



uCAL model UC12 Universal Calibrator is the compact, rugged and easy to use hand held device with graphical user interface for precise measuring and sourcing of electrical and physical parameters

Masibus UC12 Universal Calibrator is designed to provide the best accuracy in all modes of operation.

UC12 has source and measurement capability with independent parameter and range selection for source and measure. UC12 has mA/ V/ mV/ mA (24V)/ Switch-test / RTD/ TC/ Frequency/ Pulse measurement capability and also has mA/ V/ mV/ mA (2W)/ Resistance/ RTD/ TC/ Frequency/ Pulse source capability.

There is an isolation between measure and source/ measure sections.

UC12 Universal Calibrator has easy to operate short cut keys SCR1 and SCR2 for input selection for measure and source/ measure respectively.

Automatic step/ ramp output with Auto/ Man selection, data logging, Max/ Min/ Average values, scaling to engineering units and filter settings enhances the use of Universal Calibrator.

It has been designed to give maximum battery life on full charge, the backlight is adjustable for power saving and the display can be programmed to automatically enable the glance screen when not in use

UC12 comes with a mini USB connector for charging, logged data retrieval and firmware upgrade. Standard accessories provided are patch cables, charger, USB cable, instruction manual, logged data retrieval software CD and calibration certificate, all in an attractive

Features

- Compact, handheld, user friendly menu
- Available with EMI/EMC compliance
- Easy to read color graphical TFT LCD display
- Rechargeable lithium Ion battery with enhanced power control for prolonged battery life
- Measure: mA/ V/ mV/ mA (24V)/ Switch-test / RTD/ TC/ Frequency/ Pulse
- Source: mA/ V/ mV/ mA(2W)/ Resistance/ RTD/ TC/ Frequency/ Pulse
- 24 VDC Loop power supply to power transmitters and loops
- Step/Ramp functions with Auto/ Man selection
- Universal Serial Bus (USB) communication port for charging, data retrieve and firmware upgrade
- Data logging to measure long time drift
- Other features: Max/ Min/ Average, filter settings, tare facility, adjustable backlight, alarm annunciation (on display and buzzer), glance screen mode
- Continuity test
- Pulsed RTD transmitter compatible
- HART loop resistor

Applications

- Calibrating and checking temperature indicator/controllers, recorders, temperature transmitters, single conditioners, etc.
- Laboratory and site calibration purpose
- Drift test of transmitters and transducers
- Simulation of resistance for position indicators
- Sources mV signals for load cell amplifiers
- Check flow measurement instruments vide frequency/ pulse parameters

TECHNICAL SPECIFICATIONS

Electrical Measurement Parameters and Accuracy				Pulse Counting	
Parameter	Range	Resolution	Accuracy	Feature	Specification
V	0 to 30.00 VDC	0.001 V	±0.02% of reading ± 2 count	Range	0 to 999999 pulses
mA	0 to 24.000 mA	0.001 mA	±0.02% of reading ± 2 count	Trigger level	0 to 12V in 1 V steps
Electrical Simulation Parameters and Accuracy				Frequency Generation	
Parameter	Range	Resolution	Accuracy	Range	Resolution
V	0 to 12.000 VDC	0.001 V	±0.02% of reading ± 2 count	0.0005 to 0.5Hz	0.00001 Hz
mA	0 to 24.000 mA	0.001 mA	±0.02% of reading ± 2 count	0.5 to 50 Hz	0.0001 Hz
Thermocouple/mV Measurement /Simulation Resolution and Accuracy				50 to 500 Hz	0.001 Hz
TC Type	Range	Resolution	Accuracy	500 to 5000 Hz	0.01 Hz
E	-200.0 to 1000.0 °C	0.1 °C	0.3 °C	5000 to 10000 Hz	0.1 Hz
J	-200.0 to 1200.0 °C	0.1 °C	0.3 °C	Feature	Specification
K	-200.0 to 1372.0 °C	0.1 °C	0.3 °C	Output amplitude positive square wave	0 to 12VPP (±0.5V)
T	-200.0 to 400.0 °C	0.1 °C	0.3 °C	Output amplitude symmetric Square wave	0 to 6 VPP (±0.5V)
B	450.0 to 1800.0 °C	0.1 °C	0.5 °C	Accuracy	±0.02% of Reading ± 2 count
R	0.0 to 1750.0 °C	0.1 °C	0.5 °C	Duty cycle	1 to 99% (up to 500Hz)
S	0 to 1750.0 °C	0.1 °C	0.5 °C	Supported units	Hz, KHz, cph, cpm, sec, msec, usec
N	-200.0 to 1300.0°C	0.1 °C	0.3 °C	Pulse Generation	
mV	-10.000 to 80.000 mV	0.001 mV	±0.02% of reading ± 4uV	Feature	Specification
	-10.00 to 250.00 mV	0.01mV	±0.02% of reading ± 0.02mV	Range resolution	0 to 999999 pulses
Note: temperature standard ITS-90				Resolution	1 Pulse
Frequency Measurement				Output amplitude positive Square wave	0 to 12VPP (±0.5V)
Range		Resolution		Output amplitude symmetric Square wave	0 to 6 VPP (±0.5V)
0.0143 to 9.9999		0.0001 Hz		Pulse frequency	0.0005 to 10000Hz
10 to 99.999Hz		0.001 Hz		Duty cycle	1 to 99% (up to 500Hz)
100 to 999.99Hz		0.01 Hz			
1000 to 9999.9 Hz		0.1 Hz			
10000 to 50000 Hz		1 Hz			
Feature		Specification			
Trigger Level		0 to 12V in 1 V Steps			
Accuracy		±0.01% of Reading ± 1 count			
Supported units		Hz, KHz, cph, cpm, sec, msec, usec			
Measurement & Simulation Range					
Parameters	Range	Resolution		Accuracy	
Resistance (Ohms)	0 to 400 Ω	0.01Ω		4 wire measurement ±0.02% of reading ±0.01Ω simulation: ±0.02% of reading ± 0.02Ω	
	400 to 4000Ω #	0.1Ω		4 Wire measurement: ±0.02% of reading ±0.1Ω, simulation: ±0.02% of reading ± 0.15Ω	
Pt10 to Pt1000	-200 to 200 °C	Pt10 to Pt400: 0.01°C		4 wire measurement: ±0.15°C simulation*: ±0.15 °C	
	200 to 600 °C	Pt500, Pt1000: 0.1°C		4 wire measurement: ±0.2 °C simulation*: ±0.25 °C	
	600 to 850 °C			4 wire measurement: ±0.3 °C simulation*: ±0.35 °C	
Ni100	-60 to 180 °C	0.01 °C		4 wire measurement: ±0.1 °C	
Ni120	-80 to 260 °C	0.01 °C		simulation*: ±0.15 °C	
Cu10 to Cu100	-200 to 260 °C	0.01 °C		4 wire measurement: ±0.2°C simulation*: ±0.8°C	
Note: # For 4 wire Resistance measurement 0.01Ω resolution available in 0 to 1600 ohm range					
*Accuracy is valid with an excitation current >0.2mA (0...400 ohm), >0.1mA (400...4000 ohm)					
** Read accuracy is based on 4-wire input. For 3-wire RTD measurements assuming all three RTD leads are matched, add 1.0°C (Pt10 and Cu10), 0.6°C (Pt50 and Cu50), and 0.4°C (other RTD types) to the specifications					
Compatible RTD Types					
Pt10 (385)	Pt400 (385)	Ni100 (672)	Cu10 (427)		
Pt50 (385)	Pt500 (385)	Ni100 (618)	Cu50 (427)		
Pt100 (385)	Pt1000 (385)	Ni120 (672)	Cu100 (427)		
Pt200 (385)	Pt100 (3926)				

TECHNICAL SPECIFICATIONS

General Specifications		Power Supply	
Display mode	Measure: mA/ V/ mV/ mA(24V)/ Switch-test / RTD/ TC/ Frequency/ Pulse Source: mA/ V/ mV/ mA(2W)/ Resistance/ RTD/ TC/ Frequency/ Pulse	Battery type	Rechargeable Li-ion battery pack, 3000mAh 3.7V
		Charging time	<5 hours max
Supported units for RTD/ TC type	°C/ °F/ °K	Charger supply	100-240 VAC, 50/60 Hz; Output 5V DC@1A
RTD measurement current	300 uA	Battery life on full charge	>17 hours for RTD/Q/TC/V/mV measure/source with minimum backlight. >9 hours for mA generation with minimum backlight.(24VDC @12mA)
Maximum resistance excitation current (simulation-resistance/ RTD mode)	3 mA (0...650 Ω measure/source with I exec 2.0V/ Rsim (650....4000Ω)		Battery status indication
Settling time (pulsed currents RTD simulation)	>1 ms	Physical	
CJC error (for thermocouple) internal reference junction	±± 0.5 °C	Dimensions	185.6 mm (L) x 97.1 mm (W) x 41.3 mm (H)
CJC selection	Manual/ Internal/ External *	Housing material	ABS plastic
Max. input voltage (EM terminal) temperature coefficient	30 VDC ≤30 ppm	Electrical terminals: Measure:-V/mA/mA(24V)/ switch/Frq/Pulse	Two nos., 4 mm safety sockets
Input impedance	TC/ mV/ V/ Frequency/ Pulse >1MΩ mA =10 Ω	RTD Terminals/Electrical Terminals: Source:- V/mA/mA(2W)/Frq./ Pulse	Four nos., 4 mm safety sockets
Response time	Input <100ms, Output <100ms >4.7KΩ for TC/mV/V/Pulse/frequency O/P <750Ω for mA O/P	Measure /Source:- Resistance/ RTD	
Load impedance		TC Terminals:- TC/mV (measure /Source)	Thermocouple minijack socket (cu type)
Display update rate	10 readings / sec	Weight	<500 grams
Isolation	500VDC between measure section & source/ measure section	Protection	IP20
Data logging	Logged data is stored in a user defined file in internal memory Periodic logging: 150000 readings max	Environmental	
Communication Interface	USB 2.0	Operating temperature	0 to 55 °C
*with RTD sensor at RTD terminal for external CJC		Operating temperature while Charging batteries	0 to 45 °C
		Storage temperature	-20 to 60 °C
		Relative humidity	30% to 90% RH non-condensing
		Warm-up time	5 Minutes
		Accessories	
Display & Keys	3.2" TFT LCD, 262K color, graphical, 48.6 mm x 64.8 mm, 240x320 pixels, white LED backlight	Calibration certificate	
		User guide	
Keys	9 membrane keys	3 Sets of 4mm to 4mm banana cable	
Special Features		3 Sets of 4mm crocodile cable	
Loop power output	24V DC, ±10% (24mA maximum)	1 Test lead Cu-Cu (Miniature TC Plug Cu type to 4mm test lead)	
HART mA loop resistor	250 Ω ± 20%	USB A Male to USB mini B Male cable for PC communication and charging.	
Special function	Step/Ramp functions: Automatic/Manual. √x, x² : for mA/V measure/source	5 VDC@1A charging adaptor	
Continuity test	Audible sounds when resistance measure value crosses the specified threshold. (selectable up to 100Ω)	Carrying bag	
		Data logging software CD - mCAL	
		Directive Conformity*	
Automatic wire detection	Automatic detection RTD measure wire connection. (2-wire, 3-wire or 4-wire)	Electromagnetic compatibility directive 2014/30/EU	EN 61326-1:2013
		Low voltage directive 2014/68/EU	EN 61010-1:2010
Switch test	- Potential free contacts Trigger level : 24V, 24mA (2V) - Voltage level detection Trigger level : 0 to 30V in 1V steps	*(Applicable only for CE marked)	