

# direct voltage and current standard SN 8310



SN 8310 is a standard dc voltage and current source. It will supply voltages from 100 nV to 110 V and currents from 1 nA to 110 mA with an accuracy of better than 0,002% (20 ppm).

Remotely programmable using either RS 232C and IEEE 488 digital interface, the SN 8310 is easily integrated into a rack system, allowing it to be used in bench test sets.

- High precision: 0.002%, 6 digits
- Programmable via RS232 and IEEE488
- Traceable to international metrology standards
- Mains and NiCd battery rechargeable

## functions

**Applications**.....  
The exceptional precision, stability and extended range of the SN 8310 mean it can address a wide variety of applications. These can be grouped into 3 types:

- DC voltage and current standard for calibrating or testing voltmeters or ammeters (bench or panel mounted) up to 5 digits with 2000, 20 000, or 200 000 counts; also electronic systems, such as dividers, amplifiers, converters, oscillators and other components whether linear or not.
- Simulation of sensors such as  $\mu\text{V}$ , mV or mA sources to calibrate controllers, transmitters, recorders and other instruments used in process control.
- Ultra-stable, programmable, high precision power supply.

Output	Range	Span	Resolution	Accuracy (1)	
				90 days	1 year
DC Voltage	100 V	- 5 to + 110 V	100 $\mu\text{V}$	0.002% + 2	0.004% + 3
	10 V	- 1.10 to + 11.00 V	10 $\mu\text{V}$	0.002% + 2	0.004% + 3
	1 V	- 0.11 to + 1.10 V	1 $\mu\text{V}$	0.0025% + 4	0.005% + 6
	100 mV	- 11.00 to + 110 mV	100 nV	0.0035% + 20	0.007% + 20
DC Current	100 mA	- 11.00 to + 110 mA	100 nA	0.008% + 4	0.001% + 8
	10 mA	- 1.10 to + 11.00 mA	10 nA	0.008% + 4	0.001% + 8
	1 mA	- 0.11 to + 1.10 mA	1 nA	0.008% + 4	0.001% + 8

(1)  $\pm$ (% of setting + counts) at 23  $\pm$ 1 $^\circ\text{C}$

Range	Compliance with positive output	Compliance with negative output	Output impedance	Stability (1) 24 h DC- 0.1 Hz	Noise	
					0.1-10 Hz	10 Hz-10 kHz
100 V	(2)	- 11 mA	< 0.5 m	0.0001% + 1	50 $\mu\text{V}$	600 $\mu\text{V}$
10 V	110 mA	- 11 mA	< 0.5 m	0.0001% + 1	5 $\mu\text{V}$	60 $\mu\text{V}$
1 V	110 mA	- 11 mA	< 0.5 m	0.0001% + 2	5 $\mu\text{V}$	60 $\mu\text{V}$
100 mV	-	-	99	0.0001% + 5	500 nV	10 $\mu\text{V}$
100 mA	(2) (3)	- 5 V	> 10 M	0.0003% + 3	500 nA	5 $\mu\text{A}$
10 mA	110 V (3)	- 10 V	> 10 M	0.0003% + 3	50 nA	500 nA
1 mA	110 V (3)	- 10 V	> 10 M	0.0003% + 3	5 nA	100 nA

1)  $\pm$ (% of setting + counts) at 23  $\pm$ 1 $^\circ\text{C}$

(2) Power delivered by instrument is limited to approximately 1.4 W

(3) Maximum output voltage can be limited to 25 V.

Temperature coefficient  
< 10% of accuracy/°C.  
Warm-up time: 30 seconds to obtain an  
output within 0.002% of final value,

5 minutes to obtain an output within  
0.0002% of final value.

Linearity < 0.0003% of range.

Overshoot < 5%.  
Response time < 3 seconds to be within  
specified accuracy + 1 second when  
changing range or inverting polarity.

## special functions

- The unit stores 200 calibration values in memory and will recall them:
  - either via keyboard,
  - or via the digital interface,
  - or in automatic sequence with a programmable time interval between each value.
- It can generate programmable value increments, so that it steps (manually or automatically) through a particular range starting from a specified point.

- Digital communications
  - standard RS 232C
  - IEEE 488.

The instrument is designed for ease of use: conversational, illuminated alphanumeric liquid crystal display.

- The user can generate a value either
- by direct entry using the SN 8310 keyboard,
  - via the digital interface,

- increasing or decreasing each digit displayed in steps starting from the previous value (equivalent to a thumbwheel switch).

- Outputs on the front panel terminals are duplicated on the rear panel, this enables it to be used in rack-mounted applications.

Pre-set ranges straddle zero, change of polarity is also catered for.

## general specifications

Display .....  
Backlit LCD display (height 11.5 mm) up to 7 digits + units of measurement displayed. 6 digit resolution (1 000 000 counts).

Temperature operating range.....  
0 to 45°C.

Common mode voltage .....  
250 V max between earth and output terminals.

Power supply .....  
- Mains 115 to 230 V ± 10%; 50 to 400 Hz

- NiCd rechargeable battery and charger (optional).

Supplied in a bench-style case with optional rack mounting kit.  
Dimensions: 225 x 88 x 310 mm.  
Weight: 2 to 3 kg depending on options.

## traceability

Each SN 8310 is tested according to French standard NFX07-011 guidelines, with apparatus traceable (through AOIP metrology department) to the French COFRAC calibration chain (Electricity-Magnetism). An AOIP calibration and test report is delivered together with copies of the COFRAC calibration certificates. These certificates are recognized by the following signatories of the EA (European

Accreditation):  
BMWV - Austria  
BKO-OBE - Belgium  
CAI - Czech Republic  
DANAK - Denmark  
DKD - Germany  
NAB - Ireland  
SIT - Italy  
RVA - The Netherlands  
NA - Norway

IPQ - Portugal  
ENAC - Spain  
SWEDAC - Sweden  
SAS - Switzerland  
UKAS - United Kingdom  
NIST - USA  
NATA - Australia  
MRA - South Africa  
IANZ - New Zealand.

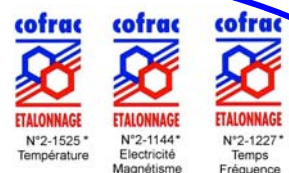
## ordering instructions

Calibrator with AC power supply SN 8310-3  
Calibrator with AC power supply + NiCd battery pack SN 8310-4

Accessories .....  
Carrying case AN 6901  
Panel mounting kit AN 5883  
Accessories for rack mounting AN 5884  
RS 232C connector cable (9 pin male-25 pin female) AN 5874  
RS 232C connector cable (9 pin male-9 pin male) AN 5875  
RS 232C connector cable (9 pin male-25 pin male) AN 5876  
IEEE 488 connector cable AN 5836  
User PC Software LC 104



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