

SECTION 10 - ON-LINE SCIENCE

Index

Wireless Interfaces	Page 174
MBL Sensors	Page 176
USB Sensors	Page 182



Teaching guide in digital format



Minimum invoiced order: € 130,00 + VAT

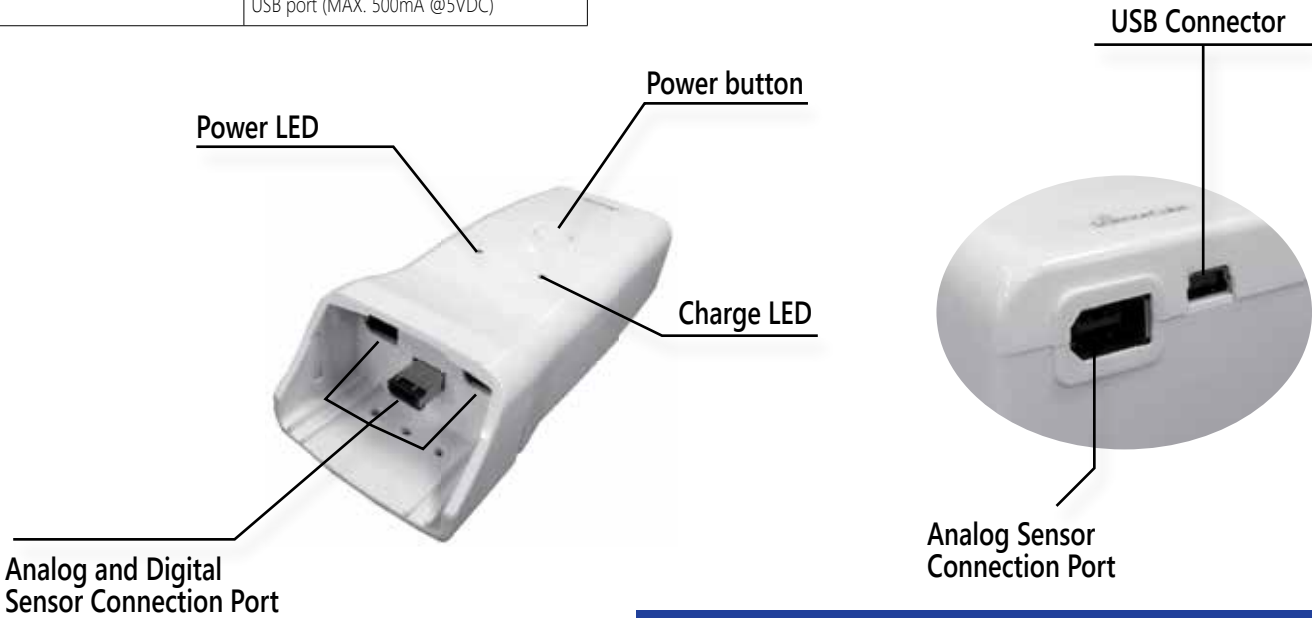


Free Linker

9107

Features

Input port	4 channels (analog and digital)
Network	Wireless bluetooth (RF 2.4GHz) / USB 2.0
Sampling rate	Max 10 kHz / 1 CH
Resolution	12bit ADC
Battery	Li - polymer 1100mAh
Charge	USB port (MAX. 500mA @5VDC)



9107



ScienceCube Pro

9001



Features

- Dimensions: 160x90x25 mm
- Display: 128x64 ampio graphic mono screen
- Data management: it is able to collect up to 50.000 data - up to 16 experiments
- Battery: rechargeable Lithium-polymer (1250mAh)
- Sensor input: up to 3 channels at the same time.
- Sampling rate:
 - Sampling rate:
 - 0.05 sec (3 channels)
 - 0.005 sec (1 channel)
 - stan-alone mode: 0.0001 sec (1 channel)
- Resolution: 12 bit A/D
- Digital input/output channel: 1 channel output: PWM, sine, square, triangularsawtooth wave
- Communication port: USB, serial port.
- USB cable and 3 sensor connection cables included.

Features

- It can be used as a stand-alone: the interface can be used without a PC connection.
- Easy to use and portable.
- It doesn't need any special card or driver. Sensors are identified automatically.
- Thanks to the LCD graphic display, you are able to read easily the collected data.
- Different languages are available.
- The firmware is constantly updated and implemented. ScienceCube Pro will update itself to be able to interface with the new sensors.

9001



MBL sensors - need interface code 9107 or 9001

Accelerometer 5g**9019**

Range: $-47 \text{ m/s}^2 \sim +47 \text{ m/s}^2$
 Best resolution: $-19.6 \text{ m/s}^2 \sim +19.6 \text{ m/s}^2$
 Resolution: 0.038 m/s^2
 Frequency response: $0 \text{ Hz} \sim 100 \text{ Hz}$



9019

Accelerometer 25g**9020**

Range: $-245 \text{ m/s}^2 \sim +245 \text{ m/s}^2$
 Best resolution: $-98 \text{ m/s}^2 \sim +98 \text{ m/s}^2$
 Resolution: 0.2 m/s^2
 Frequency response: $0 \text{ Hz} \sim 100 \text{ Hz}$



9020

Motion sensor (II)**9041**

Range: $0.15 \text{ m} \sim 6 \text{ m}$ (max. 10 m)
 Resolution: 1 mm
 Ultrasonic transducer
 Beam angle: cone, 15° circa
 Sampling rate: max. 100 samples/s, depends on measuring distance
 Application: contactless, measure distance vs time
 Channel A is used as digital channel



9041

Photogate**9046****Inner Gate**

Infrared source peak wavelength: 880 nm
 Rising time: 2.5 ms
 Falling time: 3.8 ms

External Gate

Infrared source peak wavelength: 880 nm
 Spectrum sensitivity: $500 \text{ nm} \sim 1050 \text{ nm}$
 Rising time: 8 ms
 Falling time: 10 ms

Includes 13 cm metal support rod.



9046

Cart picket fence**9050**

It is a useful accessory for the low friction rail.



9050

Picket fence**9049**

This type of barrier is recommended for free fall experiments.



9049

Pulley**9047**

Effective circumference: 20 cm
 Pulse/rotation: 10
 Diameter: 64 mm
 External diameter: 67 mm



9047

Rotational motion sensor (analogic)**9124**

Range: $0^\circ \sim 360^\circ$ (10 turns)
 Resolution: 0.88°



9124

Red laser pointer**9048**

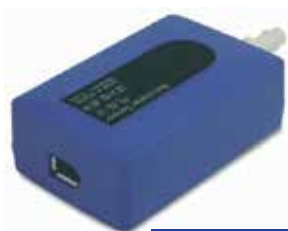
Wavelength: 650 nm
 Security class: 2
 Max power: $< 1 \text{ mW}$



9048

Barometer**9021**

Range: $0 \text{ hPa} \sim 2068 \text{ hPa}$
 Resolution: 0.6 hPa



9021

Absolute pressure sensor**9120**

Range: $0 \text{ hPa} \sim 6900 \text{ hPa}$
 Resolution: 1.69 hPa



9120

MBL sensors - need interface code 9107 or 9001

Gas pressure sensor (A) 9033

Range : - 1000 hPa ~ + 3000 hPa
Resolution: 1.3 hPa
Differential relative pressure
Response time: average 0.2 ms



9033

Gas pressure sensor (B) 9034

Range : - 650 hPa ~ + 650 hPa
Resolution: 0.335 hPa
Differential relative pressure
Response time: average 0.2 ms



9034

Current probe 9027

Range: DC /AC -1.2A ~ +1.2A
Resolution: 0.6 mA
This sensor is insulated from ground
Max 5W (0.01 W)



9027

Differential voltage probe 9029

Input voltage range: - 12.0V ~ + 12.0V
Input impedance (to ground): 10mW
Linearity: 0.01%
Resolution: 3.1 mV
Supply voltage: 5V DC
Supply current (typical): 9 mA
Output voltage range: 0 V ~ 5 V



9029

Galvanometer 9028

Range: DC
- 12.5 mA ~ + 12.5 mA
- 1.25 mA ~ + 1.25 mA
- 0.125 mA ~ + 0.125 mA
Resolution: 6mA, 0.6mA, 0.06mA
This sensor is insulated from ground



9028

Charge sensor 9133

Ranges: $\pm 0.5 \text{ V}$ ($\pm 5 \text{ nC}$)
 $\pm 2 \text{ V}$ ($\pm 20 \text{ nC}$)
 $\pm 10 \text{ V}$ ($\pm 100 \text{ nC}$)
Input max: $\pm 150 \text{ V}$
Typical bias input current: 0.005pA
Instrument time constant: 0.1s
Operating conditions:
humidity: 0 ~ 95% RH
temperature: 0 ~ 50°C



9133

Oscilloscope probe 9125

Range: - 100 V ~ + 100 V
- 10 V ~ + 10 V
Sampling rate: 40 K S/s



9125

Dual range force sensor II 9032

Range: - 10 N ~ + 10 N
- 80 N ~ + 80 N
Resolution: 0.0056 N
0.056 N
Sensor type: electrical strain gage



9032

Thermocouple probe 9062

Range: - 200°C ~ + 1200°C
Resolution: 0.6°C
Sensor properties: K-type, stainless steel covered
Linearity: 0°C ~ 400°C ($\pm 3^\circ\text{C}$)
- 200°C ~ 0°C ($\pm 2^\circ\text{C}$)
Chemical resistance: 15 min (1 M HCl)



9062

Temperature probe Stainless steel body 9061

Range: - 25°C ~ + 125°C
Resolution: 0.1°C
Sensor properties: thermistor, stainless steel covered.
Reading speed: 10 s (90%)
Chemical resistance: 15 min (1 M HCl)



9061

Platinum temperature probe Stainless steel body 9060

Range: - 50°C ~ + 180°C
Resolution: 0.06°C
Sensor properties: platinum temperature element (RTD), stainless steel covered.
Reading speed: 10 s (90%)
Chemical resistance: 15 min (1 M HCl)



9060

Thermocouple probe with wire 9063

Range: - 200°C ~ + 1200°C
Resolution: 0.6°C
Sensor properties: K-type, stainless steel covered
Linearity: 0°C ~ 400°C ($\pm 3^\circ\text{C}$)
- 200°C ~ 0°C ($\pm 2^\circ\text{C}$)



9063

MBL sensors - need interface code 9107 or 9001

Conductivity probe 9023

Range_1: 0 ~200 mS/cm (0 ~100 mg/L TDS)
 Range_2: 0 ~2000 mS/cm (0 ~1000 mg/L TDS)
 Range_3: 0 ~20000 mS/cm (0 ~10000 mg/L TDS)
 Resolution :
 Range_1: 0.1 mS/cm (0.05 mg/L TDS)
 Range_2: 1 mS/cm (0.5 mg/L TDS)
 Range_3: 10 mS/cm (5 mg/L TDS)



9023

Salinity sensor 9090

Range : 0 ppt ~50 ppt
 Resolution : 0.02 ppt



9090

Dissolved CO₂ in water sensor 9135

Range: 1 x 10⁻⁴ a 10⁻² M (4.4 ~ 400 ppm CO₂)
 Resolution 12 bit: 0.5 mV
 Range pH: samples and standars must be adjusted between 4.0 e 4.5pH
 Temperature range: 0 ~ 50°C
 Electrode resistance: less than 1000 M Ω
 Reproducibility: ± 2%



9135

CO₂ gas sensor 9022

Range: 0 ppm ~ 5000 ppm (0 ~ 0.5%)
 Resolution: 2.44 ppm
 Accuracy (a pressione standard 1 Atm):
 ±100 ppm (0 ppm ~ 1000 ppm)
 ±10% (1000 ppm ~ 5000 ppm)



9022

CO₂ gas sensor High concentration 9089

Range of measured CO₂ concentration:
 0% ~ 10% (0 ppm ~ 100000 ppm)
 Resolution: 30 ppm
 Accuracy (at standard pressure of 1 atm):
 0 ppm ~ 10000 ppm: ± 1000 ppm or ± 10% of the value read;
 10000 ppm ~ 50000 ppm: ± 20% of the value read;
 over 50000 ppm: qualitative measurements only.



9089

O₂ gas sensor (0~100%) 9126

Range : 0 ~ 100%
 Resolution: 0.03%
 Accuracy: Full Scale ± 1.0% or ± 1.0% on the value read
 Power: 15 mA



9126

Dissolved oxygen probe 9030

Range: 0 mg/L ~ 15 mg/L (or ppm)
 Accuracy: 0.3 mg/L
 Resolution: 0.004 mg/L
 Response time: 95% in 30 secondi
 98% in 45 secondi
 Temperature compensation: automatic at 5°C ~ 35°C



9030

ORP Sensor 9043

ORP Electrode
 Type: sealed, gel-filled, epoxy body, Ag(AgCl)
 Storage solution: pH 4, KCl (10g KCl in 100 ml, pH 4 buffer solution)
 Temperature range: 0°C ~60°C
 Impedance: ~20 MW a 25°C
 Electrode ORP Amplifier
 Amplifier input range:
 -450 mV ~ +1100 mV
 Resolution : 0.5 mV



9043

Oxygen gas sensor (II) 9044

Range: 0% ~ 27%
 Output voltage range:
 0 V ~ 4 V in air at 25°C sea level
 Resolution: 0.01%



9044

CO₂ - O₂ three-way tube 9045

Dimensions: 45x12.5x12.5 mm
 Material: plastic
 Quantity: 10pcs in 1 set



9045

Relative humidity sensor 9038

Range : 0% RH ~ 100% RH
 Resolution: 0.0375% RH



9038

pH-meter 9053

Range : pH 0 ~ 14
 Resolution: 0.0036 unità pH



9053

MBL sensors - need interface code 9107 or 9001
Electrode amplifier 9082

The selective ion electrodes amplifier can be connected to pH sensors, ORP and TDS. It is designed to amplify small signals at a higher level with low noise



9082

Drop counter 9129

Rising time: < 2.5 ms Falling time: < 3.8 ms
Power supply: 5V DC, 20 mA



9129

Turbidity sensor 9057

Range: 0 NTU ~ 200 NTU
Resolution: 0.25 NTU



9057

Ion selective Electrode

The electrode amplifier code 9082 must be used.


Calcium probe (Ca²⁺) 9076

Range: 5x10⁻⁷ M ~ 1 M
(0.02 ppm ~ 40000 ppm)
Resolution: 0.5 mV

Nitrate probe (NO³⁻) 9078

Range: 5x10⁻⁷ M ~ 1 M
(0.1 ppm ~ 14000 ppm)
Resolution: 0.5 mV

Ammonium probe (NH⁴⁺) 9077

Range: 5x10⁻⁶ M ~ 1 M
(0.1 ppm ~ 18000 ppm)
Resolution: 0.5 mV

Chloride probe (Cl⁻) 9079

Range: 5x10⁻⁶ M ~ 1 M
(1.8 ppm ~ 35000 ppm)
Resolution: 0.5 mV

9076 - 9078 - 9077 - 9079

Colorimeter (II) 9025

Range: 10 ~ 90% T
Resolution: 0.035 T
Wavelength: 430 nm, 470 nm, 565 nm, 635 nm



9025

Cuvette 9026

Dimension: 45x12.5x12.5 mm
Material: plastic
Quantity: 10pcs in 1 set



9026

Photodiode light sensor 9052

Range: 0 lux ~ 15000 lux
General purpose range: 0 lux ~ 6000 lux
Sensitive range: 0 lux ~ 600 lux
Resolution: adjusted according to range settings
Spectral response range : 330 nm ~ 720 nm
Peak spectral response: 580 nm



9052

Electric field meter 9084

Range : 1 ~ 1999V/m
Type: plate type
Output: V-RMS
Accuracy: ± 1 [dB] of reading
Operating temperature: -10°C ~ 70°C
Sampling time: 0.2s
Frequency range: 15Hz ~ 2kHz



9084

UV sensor 9132

Unit: mW/m²
Range : 0 ~ 1000 mW/m²
Resolution: 0.25 W/m²
Accuracy (in this range): ±5%, @25°C



9132

MBL sensors - need interface code 9107 or 9001

Magnetic field meter**9083**

Range : 0.1 mG ~ 199,9 mG
 1 mG ~ 1999 mG (auto range)
 Type: pick up coil
 Output: V-RMS
 Accuracy: ± 1 [dB] of reading
 Operating temperature: $-10^{\circ}\text{C} \sim 70^{\circ}\text{C}$
 Sampling time: 0.2s
 Frequency range: 30 Hz ~ 2 kHz



9083

Magnetic field sensor**9039**

Range : - 50 G ~ + 50 G (5 mT)
 Resolution: 0.024 G
 Sensor length: 5.0 mm
 Sensor type: radiometric, linear hall effect sensor
 Strobe timing: changes according to interface used
 (max. 0.1 ms)



9039

**Magnetic field sensor (II)
(with scale)****9091**

Range: - 50 G ~ + 50 G (5 mT)
 Resolution: 0.024 G



9091

Radiation sensor (II)**9055**

Range: 0 mR/hr ~ 20 mR/hr
 (0 CPM ~ 20000 CPM)
 Resolution: 1 CPM
 Temperature range: $0^{\circ}\text{C} \sim 50^{\circ}\text{C}$



9055

Microphone**9042**

Range: 20 Hz ~ 20000 Hz
 - 50 dB Vrm ~ + 20 dB Vrm

No interface required

9042

Sound level sensor**9130**

Unit : dBA
 Range : 40 ~ 11 dBA
 Resolution (12-bit) : 0.12 dB
 Accuracy (a 94 dBA, $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$): ± 3 dB



9130

Sound level meter**9065**

Range: 35 dB ~ 130 dB
 Accuracy: - 1.5 dB ~ + 1.5 dB

No interface required

9065

Stethoscope**9056**

With this stethoscope you can see your heartbeat
 on a chart.

No interface required

9056

Spirometer**9122**

Typical range: - 5 ~ +5 L/S
 Range max: -10 ~ +10 L/S



9122

Blood pressure sensor**9127**

Unit: mm Hg, Range: 0 ~ 250 mm Hg
 Resolution: 0.0685 mm Hg



9127

EKG Set**9031**

EKG
 Range: 0 mV ~ 5 mV
 Resolution: 5mV
 PULSE
 Number of pulse: 47 bpm ~ 250 bpm
 Resolution: 1 bpm



9031

Heart rate monitor**9037**

Range: 0 bpm ~ 250 bpm
 Resolution: 1 bpm



9037

MBL sensors - need interface code 9107 or 9001

Heart rate monitor (hand-grip type) 9121

Range: 0 BPM ~ 250 BPM

Resolution: 1 BPM



9121

Heart rate monitor (Ear clip type) 9123

Range: 0 BPM ~ 250 BPM

Resolution: 1 BPM



9123

Digital control unit 9134

Technical data:

Channels: 3, independent

Tolerance: AC less than 250V - 5A, DC less than 30V - 5A (for each channel)

Response time: more than 10 ms

Operating temperature: 0 ~ 60°C

Operating humidity: 5 ~ 85% RH



9134

Adapter for sensors 9058

Range: 0 ~ 5 V

Resolution: 0.0012 V

Power supply: 3 mA



9058

SERIES OF USB SENSORS TO BE USED WITHOUT AN INTERFACE

ScienceCube produces sensors with USB connection which can be connected directly to the computer.

The sensors don't need any connection interface and can be used directly through ScienceCube software which is supplied free of charge with each sensor.

The USB sensors are easy to use and allow recording of the conditions of any experiment.

Till in stock

USB distance sensor**9066**

Range: 0,16 ~ 6 m (Max. 10m)
 Resolution: $\pm 1,5$ mm
 Measurement principle: Sonar
 Field of view: Conical, approximately 15°
 Sampling frequency:
 Max. 100 mesure/s



9066

USB temperature sensor**9085**

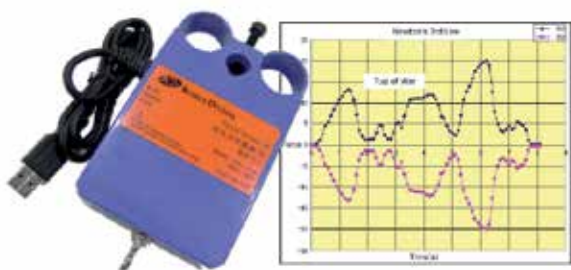
Range: $-25^\circ\text{C} \sim +125^\circ\text{C}$
 Resolution: $\pm 0,1^\circ\text{C}$
 Type of sensor: Thermistor
 Protected by stainless steel
 Response time: 10s (90%)
 Chemical resistance: 15 minutes (1M HCl)



9085

USB force sensor**9068**

Range: $\pm 10\text{N} \sim \pm 80\text{N}$
 Resolution: $\pm 0,0056 \sim \pm 0,056$
 Type of sensor: extensometric



9068

USB light sensor**9072**

Range: 0 ~ 15000 Lux
 Resolution: Depending on sensitivity
 Sensitivity:
 Low: 0 ~ 15000 Lux
 Average: 0 ~ 6000 Lux
 High: 0 ~ 600 Lux
 Spectrum range:
 $3300\text{\AA}(330\text{nm}) \sim 7200\text{\AA}(720\text{nm})$
 Wavelength at the maximum sensitivity: $5800\text{\AA}(580\text{nm})$



9072

