

# PRO D01

# PRO D05

## HANDHELD MULTIFUNCTION METERS / DATA LOGGERS FOR DIGITAL PROBES

### INTRODUCTION

**PRO D01** (1-connector), **PRO D05.2** (2-connector) and **PRO D05.3** (3-connector) are high class professional multifunction handheld meters with a rich set of features, high grade robustness and operating comfort for safe and reliable use. PRO D05.2 and PRO D05.3 also have **data logging capabilities** and a USB-rechargeable battery system.

### FEATURES

#### Display

The multilingual large dot matrix/clear text LCD has ergonomic wide-angle visibility from daylight to darkness, thanks to the backlight. It displays either large scale values, statistical data or the live chart of measurement history.

The HOLD feature allows freezing the measurements on display, while the REL feature allows showing the measurement against the measured value. Many units of measurement are available, depending on the connected probes.

#### Data Logging (only PRO D05)

Large storage capacity: up to 1 million data sets, file system based.

The logged data are store in CVS files that can be easily viewed connecting the instrument to a PC via USB: the instrument is seen by the PC as a mass storage device, the data can be read out and evaluated without software necessarily needed. Automatic log with configurable interval. The comfortable data management software ProXware is downloadable at [senseca.com](http://senseca.com) - for free.

The instruments integrate a Real Time Clock: date and time of each logged sample are stored.

#### Alarm

Configurable alarm thresholds and optionally hysteresis can be set. LCD indication and buzzer activation when thresholds are exceeded.

### CONFIGURATION & MEASUREMENT

#### Probes

The meters communicate digitally with the probes of the DX series, allowing the use of longer probe cables (up to 10 m). The wide range of digital probes available allows measuring temperature, pressure (absolute, relative and differential), humidity (relative, absolute, dew point and multiple calculated quantities); photo-radiometric quantities, indoor air quality (CO<sub>2</sub> and VOC index) and soil moisture.

The digital probes are supplied factory adjusted with adjustment data stored internally, allowing for interchangeability without the need for recalibration when changing the probes. As soon as connected, the instruments switch supply from battery to USB.

#### Connection to PC

Via the USB C port, for viewing or downloading the files stored in the instrument internal memory (only PRO D05) or connecting to the application software ProXware.

#### Statistics

Detection of MIN, AVG (average) and MAX. The user can clear the statistical info to start a new statistical calculation.



### HIGHLIGHTS

- 1 (PRO D01), 2 (PRO D05.2) or 3 sensor connectors (PRO D05.3)
- Wide range of interchangeable digital probes of DX-series available
- Fast and accurate
- Backlit dot matrix/clear text display, multilingual
- Life chart display
- Data logger with files read out via USB (only PRO D05)
- Min, Avg, Max statistical functions
- Acoustic/optic alarm
- Foldable stand and magnet for flexible operation
- Shock and impact proof, IP 67 waterproof
- NiMH batteries rechargeable via USB (except PRO D01)

## General specifications

Inputs	PRO D01: 1 PRO D05: 2 or 3 M12 connector for DX digital probes
Storage capacity (only PRO D05)	Up to 1 million data sets, file system based. Each data set includes date/time stamp and measurement of connected probes. Data are stored in CVS files.
Logging type (only PRO D05)	Automatic with manual start/stop
Logging interval (only PRO D05)	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30 min / 1 hour
Clock	User settable RTC Max. drift 1 min/month @ 25 °C
Display	140 x 160 dot matrix backlit LCD / visible area 42 x 50 mm Multiple choice of measurement screens: <ul style="list-style-type: none"> <li>• Large digit single value</li> <li>• Multi-row</li> <li>• Statistical info (Min/Avg/Max)</li> <li>• Live chart view</li> </ul>
User interface	Multilingual (en, de, it, fr, es)
PC connection	USB C Mass Storage Device (only PRO D05)
Power supply	PRO D01: 4 x AA alkaline batteries PRO D05: 4x AA rechargeable NiMH batteries External 5 Vdc via USB C (power adapter or PC USB port)
Power consumption	10 mA typ. (excluding probes)
Battery autonomy	> 200 h typ. continuous operation (fully charged batteries and backlight off). The effective autonomy depends on the number and type of connected sensors.
Auto power off	User configurable Automatically disabled if external power is connected
Operating conditions	-5...50 °C 0...95 %RH non-condensing
Storage temperature	-25...65 °C (without batteries)
Protection degree	IP 67 (except probe connection) IK 06 (1 Joule)
Dimensions	170 x 78 x 38 mm
Weight	PRO D01: 340 g approx. PRO D05.2: 370 g approx. PRO D05.3: 380 g approx.
Housing material	ABS, TPE (side protection) Polyester (front panel)

## Ordering codes

PRO D01 Art.No. 486134	Single-input handheld meter for digital probes. Supplied with 4 x AA alkaline batteries.
PRO D05.2 Art.No. 486136	2-input handheld data logger for digital probes. Supplied with 4 NiMH rechargeable batteries, USB cable and software downloadable from Senseca website.
PRO D05.3 Art.No. 486137	3-input handheld data logger for digital probes. Supplied with 4 NiMH rechargeable batteries, USB cable and software downloadable from Senseca website.
<b>Probes must be ordered separately.</b>	



PRO D01 - 1 input, M12 sensor connectors



PRO D05.2 - 2 inputs, M12 sensor connectors



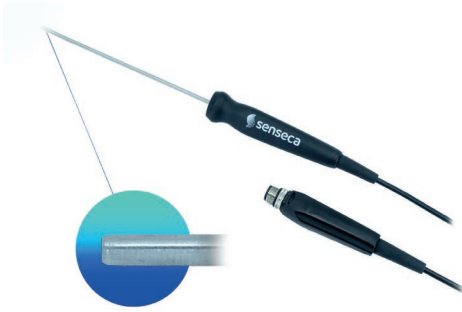
PRO D05.3 - 3 inputs, M12 sensor connectors



## Attachable probes

### TEMPERATURE

**DX 115-00-300-L02** Digital Pt100 immersion probe, wire wound sensor, high precision, stem  $\varnothing 3 \times 300$  mm, cable length 2 m.  
Art.No. 486229



### RELATIVE HUMIDITY AND TEMPERATURE

**DX 310-00** Digital combined temperature and relative humidity probe, stem  $\varnothing 14 \times 101$  mm.  
Art.No. 486793

**DX 311-L01-00** Digital combined temperature and relative humidity probe, stem  $\varnothing 14 \times 132$  mm, cable length 1 m.  
Art.No. 486774



## General specifications

Sensor	Pt100 (Wire Wound)
Measuring range	-196...+500 °C
Resolution	0.01 °C
Accuracy	±0.05 °C (t = 0 °C) ±0.1 °C (0 °C ≤ t ≤ 100 °C) ±0.2 °C (-50 °C ≤ t < 0 °C, 100 < t ≤ 250 °C) ±0.3 °C (t = remaining range)
Response time (T <sub>63</sub> )	3 s
Output	DX digital interface
Power consumption	<1 mA typ.
Connection	4-pole M12
Dimensions	Stem: $\varnothing 3$ mm L=300 mm (other lengths on request) Handle length: 98 mm Cable: $\varnothing 4$ mm, L=2 m (other lengths on request)
Weight	110 g approx. with 2 m cable
Materials	Stem: AISI 316 Handle: Polyamide (PA6-GF30) Cable: PVC (-20...+105 °C)
Protection degree	IP67

Sensor	RH = capacitive, temperature compensated T = Pt100
Measuring range	RH = 0...100% T = -40...+125 °C (DX 310); -50...+160 °C (DX 311)
Resolution	RH = 0.01% T = 0.01 °C
Accuracy	RH = ±1.2% (0...85%) / ±2% (85...100%) @ T=0...50 °C (1.5 + 1.5% of the measured value) @ T= remaining range T = ±0.1 °C ± 0.1% of the measured value
RH response time	10 s (10 → 80 %RH; air speed=2 m/s @ constant temperature)
Long-term drift	RH = ±0.5 %RH/year T = ±0.03 °C/year
Calculated quantity	Dew Point - Wet bulb temperature - Absolute humidity - Specific humidity - Mixing ratio - Specific enthalpy - Partial vapor pressure - Frost point temperature - Saturation vapor pressure above water - Saturation vapor pressure above ice
Operating conditions	DX 310 = -40...+80 °C / 0...100 %RH DX 311 = -50...+160 °C / 0...100 %RH
Output	DX digital interface
Power consumption	<1 mA typ.
Connection	4-pole M12
Dimensions	DX 310 = $\varnothing 14 \times 114,8$ mm (stem: $\varnothing 14 \times 101$ mm) DX 311 = stem: $\varnothing 14 \times 132$ mm - handle length 98 mm
Weight	DX 310 = 20 g approx. DX 311 = 100 g approx. with 2 m cable
Materials	Stem and protector cap: PBT Handle (DX 311): polyamide (PA6-GF30) Cable (DX311): PVC

Sensor	T/RH = CMOS Pressure = Piezoresistive CO <sub>2</sub> = Non-Dispersive Infrared (NDIR) VOC = Metal-Oxide film
Measuring range	T = -20...+80 °C RH = 0...100% Pressure = 300...1250 hPa CO <sub>2</sub> = 0...5000 ppm VOC = 1...500 (dimensionless index)
Resolution	T = 0.1 °C RH = 0.1% Pressure = 0.1 hPa CO <sub>2</sub> = 1 ppm VOC = 1
Accuracy	T = ± 0.1 °C (20...60 °C) / ± 0.2 °C (remaining range) RH = ± 2% (0...80%RH) / ± 3% (80...100%RH) @ T=10...50 °C Pressure = ± 0.5 hPa (300...1100 hPa / -20...65 °C) CO <sub>2</sub> = ± (50 ppm + 3% of the measure) @ 25 °C / 1013 hPa VOC = relative qualitative measurement
Temperature drift	Pressure = ± 0.75 Pa/°C (0...55 °C / 700...1100 hPa) CO <sub>2</sub> = 1 ppm/°C (-20...45 °C)
Long-term drift	T = < 0.03 °C/year RH = < 0.25 %RH/year Pressure = ± 0.33 hPa/year CO <sub>2</sub> = 5% of the measure/5 years
Response time	T / RH = 10 s (T <sub>63</sub> with 1 m/s air flow) CO <sub>2</sub> = < 120 s (T <sub>90</sub> with 2 m/s air flow)
Operating conditions	-20...+60 °C 0...95 %RH non-condensing (*)
Output	DX digital interface
Power consumption	< 6 mA typ
Connection	4-pole M12
Dimensions	177 x 30 x 19 mm
Weight	45 g approx
Material	ABS

(\*) The sensor shows best performance when operated in 20...80 %RH humidity range. Long term exposure outside the indicated range (especially at high humidity) may temporarily offset the sensor response.

## AIR QUALITY

DX 330-00 Digital VOC index, CO<sub>2</sub>, temperature, relative humidity and atmospheric pressure probe.  
Art.No. 486786



## PRESSURE

DX 210-2.5hPa-00-L01-00 Art.No. 486674	Differential pressure probe. Measuring range: $\pm 2,5$ hPa.
DX 210-20hPa-00-L01-00 Art.No. 486675	Differential pressure probe. Measuring range: $\pm 20$ hPa.
DX 210-500hPa-00-L01-00 Art.No. 486676	Differential pressure probe. Measuring range: $\pm 500$ hPa.
DX 210-200kPa-00-L01-00 Art.No. 486677	Differential pressure probe. Measuring range: $\pm 200$ kPa.
DX 210-700kPa-00-L01-00 Art.No. 486678	Differential pressure probe. Measuring range: $\pm 700$ kPa.
DX 240-200kPa-00-L01-00 Art.No. 486679	Absolute pressure probe. Measuring range: 0...200 kPa.



## SOIL MOISTURE

DX 721-L02-P Art.No. 487434	Digital wide range soil moisture probe, 2 m PVC cable, DX connector M12.
DX 721-L05-P Art.No. 486675	Digital wide range soil moisture probe, 5 m PVC cable, DX connector M12.



Sensor	MEMS
Measuring range	From $\pm 2.5$ hPa to $\pm 700$ kPa differential or 0...200 kPa absolute depending on model
Resolution	Depending on sensor model
Accuracy	$\pm 0.5$ %FS @ 25 °C
Overall error	$\pm 2.5$ %FS over the whole compensated temperature range
Warm-up time	2.3 ms
Long-term stability	< 1%FS / year
Compensated temp.	0...+50 °C
Operating T / RH	-25...+85 °C / 0...95% RH non-condensing
Storage temperature	-40...+125 °C
Overpressure	3 x FS
Burst pressure	6 x FS
Output	DX digital interface
Connection	To meter = 4-pole M12 To process = for $\varnothing 6 \times 1$ mm (internal $\varnothing 4$ mm) and $\varnothing 8 \times 1$ mm (internal $\varnothing 6$ mm) hoses. 2 inputs for differential probes, 1 input for absolute probes
Dimensions	$\varnothing 21.7 \times 62$ mm
Weight	74 g approx.
Material	Stainless steel
Protection degree	IP 65
Applications	Only air and non-aggressive dry gases

Sensor	Soil moisture = TDT high frequency, measuring area 110x30 mm Temperature = IC
Measuring range	Soil moisture = 0...60% VWC volumetric water content (up to 100% VWC with limited accuracy) Temperature = -40...+80 °C
Resolution	Soil moisture = 0.1% VWC Temperature = 0.1 °C
Accuracy	Soil moisture = typ. $\pm 3\%$ , depending on soil conditions Temperature = typ. $\pm 0.2$ °C, max. $\pm 0.4$ °C over whole range
Operating conditions	-40...+80 °C 0...100 %RH
Output	DX-Sensor-Interface
Power consumption	$\varnothing 0.5$ mA typ.
Connection	4-pole M12 via cable
Dimensions	Measuring area 110x30 mm 182 mm x 30 mm x 12 mm (measuring area thickness ca 1.6 mm) Cable length: 2 or 5 m
Weight	95 g approx. with 2 m cable 150 g approx. with 5 m cable
Materials	In contact with soil: FR4 epoxy Handle: Luran / stainless steel screws Cable: PVC

## ILLUMINANCE (lux)

Measuring range	0.10... 199.99	200.0... 1999.9	2000... 19999	20000... 400000
Resolution	0.01	0.1	1	10
Spectral range	in accordance with standard photopic curve V( $\lambda$ )			
(temperature coefficient) $f_6(T)$	<0.05% K			
Calibration uncertainty	<4%			
$f_1$ (accordance with photopic response $V(\lambda)$ )	<6%			
$f_2$ (response as law of cosines)	<3%			
$f_3$ (linearity)	<1%			
$f_4$ (error in instrument reading)	<0.5%			
$f_5$ (fatigue)	<0.5%			
Class	B			
1 year drift	<1%			
Reference standard	CIE n°69 - UNI 11142			

## IRRADIANCE (w/m<sup>2</sup>)

Measuring range	0.0010... 1.9999	2.000... 19.999	20.00... 199.99	200.0... 1999.9
Resolution	0.0001	0.001	0.01	0.1
Spectral range	400...1050 nm			
Calibration uncertainty	<5%			
$f_2$ (response as law of cosines)	<6%			
$f_3$ (linearity)	<1%			
$f_4$ (error in instrument reading)	$\pm 1$ digit			
$f_5$ (fatigue)	<0.5%			
1 year drift	<1%			

## PAR ( $\mu\text{mol}/\text{m}^2\text{s}$ )

Measuring range	0.10... 199.99	200.0... 1999.9	2000...10000	
Resolution	0.01	0.1	1	
Spectral range	400...700 nm			
Calibration uncertainty	<5%			
$f_2$ (response as law of cosines)	<6%			
$f_3$ (linearity)	<1%			
$f_4$ (error in instrument reading)	$\pm 1$ digit			
$f_5$ (fatigue)	<0.5%			
1 year drift	<1%			

## UVA IRRADIANCE (w/m<sup>2</sup>)

Measuring range	0.0010... 1.9999	2.000... 19.999	20.00... 199.99	200.0... 1999.9
Resolution	0.0001	0.001	0.01	0.1
Spectral range	315...400 nm (Peak 365 nm)			
Calibration uncertainty	<5%			
$f_3$ (linearity)	<1%			
$f_4$ (error in instrument reading)	$\pm 1$ digit			
$f_5$ (fatigue)	<0.5%			
1 year drift	<2%			

## PHOTO-RADIOMETRY

DX 611-L02	Digital photometric probe for the measurement of illuminance, cable 2 m.
Art.No. 486775	
DX 621-L02	Digital radiometric probe for the measurement of irradiance, cable 2 m.
Art.No. 486776	
DX 631-L02	Digital quantum-radiometric probe for the measurement of photon flux in the PAR range, cable 2 m.
Art.No. 486777	
DX 641-UVA-L02	Digital radiometric probe for the measurement of irradiance in UVA spectral range, cable 2 m.
Art.No. 486778	



## ALL PHOTO-RADIOMETRIC PROBES

Output	UART (TTL 3.3V)
Power consumption	< 1 mA typ
Connection	Fixed cable ending with M12 connector
Operating T	0...+50 °C
Dimensions	Ø59 x 45 mm
Weight	200 g approx.
Material	Anodized aluminium

Further variants are available.  
Please refer to [senseca.com](http://senseca.com) or contact:

V.2.2