

# 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 stored in CSV 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<br>PRO D05: 2 or 3<br>M12 connector for DX digital probes                                                                                                                                                                                                         |
| Storage capacity<br>(only PRO D05) | Up to 1 million data sets, file system based. Each data set includes date/time stamp and measurement of connected probes.<br>Data are stored in CVS files.                                                                                                                   |
| Logging type<br>(only PRO D05)     | Automatic with manual start/stop                                                                                                                                                                                                                                             |
| Logging interval<br>(only PRO D05) | 1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30 min / 1 hour                                                                                                                                                                                                                     |
| Clock                              | User settable RTC<br>Max. drift 1 min/month @ 25 °C                                                                                                                                                                                                                          |
| Display                            | 140 x 160 dot matrix backlit LCD / visible area 42 x 50 mm<br>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<br>Mass Storage Device (only PRO D05)                                                                                                                                                                                                                                  |
| Power supply                       | PRO D01: 4 x AA alkaline batteries<br>PRO D05: 4x AA rechargeable NiMH batteries<br>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).<br>The effective autonomy depends on the number and type of connected sensors.                                                                                                                |
| Auto power off                     | User configurable<br>Automatically disabled if external power is connected                                                                                                                                                                                                   |
| Operating conditions               | -5...50 °C<br>0...95 %RH non-condensing                                                                                                                                                                                                                                      |
| Storage temperature                | -25...65 °C (without batteries)                                                                                                                                                                                                                                              |
| Protection degree                  | IP 67 (except probe connection)<br>IK 06 (1 Joule)                                                                                                                                                                                                                           |
| Dimensions                         | 170 x 78 x 38 mm                                                                                                                                                                                                                                                             |
| Weight                             | PRO D01: 340 g approx.<br>PRO D05.2: 370 g approx.<br>PRO D05.3: 380 g approx.                                                                                                                                                                                               |
| Housing material                   | ABS, TPE (side protection)<br>Polyester (front panel)                                                                                                                                                                                                                        |

## Ordering codes

|                                           |                                                                                                                                                         |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PRO D01</b><br>Art.No. 486134          | Single-input handheld meter for digital probes. Supplied with 4 x AA alkaline batteries.                                                                |
| <b>PRO D05.2</b><br>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. |
| <b>PRO D05.3</b><br>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

Art.No. 486229

Digital Pt100 immersion probe, wire wound sensor, high precision, stem Ø3 x 300 mm, cable length 2 m.



### RELATIVE HUMIDITY AND TEMPERATURE

DX 310-00

Art.No. 486793

Digital combined temperature and relative humidity probe, stem Ø14 x 101 mm.

DX 311-L01-00

Art.No. 486774

Digital combined temperature and relative humidity probe, stem Ø14 x 132 mm, cable length 1 m.



## General specifications

|                                  |                                                                                                                                      |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Sensor                           | Pt100 (Wire Wound)                                                                                                                   |
| Measuring range                  | -196...+500 °C                                                                                                                       |
| Resolution                       | 0.01 °C                                                                                                                              |
| Accuracy                         | ±0.05 °C (t = 0 °C)<br>±0.1 °C (0 °C ≤ t ≤ 100 °C)<br>±0.2 °C (-50 °C ≤ t < 0 °C, 100 < t ≤ 250 °C)<br>±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: Ø3 mm<br>L=300 mm (other lengths on request)<br>Handle length: 98 mm<br>Cable: Ø4 mm, L=2 m (other lengths on request)         |
| Weight                           | 110 g approx. with 2 m cable                                                                                                         |
| Materials                        | Stem: AISI 316<br>Handle: Polyamide (PA6-GF30)<br>Cable: PVC (-20...+105 °C)                                                         |
| Protection degree                | IP67                                                                                                                                 |

|                      |                                                                                                                                                                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensor               | RH = capacitive, temperature compensated<br>T = Pt100                                                                                                                                                                                        |
| Measuring range      | RH = 0...100%<br>T = -40...+125 °C (DX 310); -50...+160 °C (DX 311)                                                                                                                                                                          |
| Resolution           | RH = 0.01%<br>T = 0.01 °C                                                                                                                                                                                                                    |
| Accuracy             | RH = ±1.2% (0...85%) / ±2% (85...100%) @ T=0...50 °C<br>(1.5 + 1.5% of the measured value)% @ T= remaining range<br>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<br>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<br>DX 311 = -50...+160 °C / 0...100 %RH                                                                                                                                                                  |
| Output               | DX digital interface                                                                                                                                                                                                                         |
| Power consumption    | <1 mA typ.                                                                                                                                                                                                                                   |
| Connection           | 4-pole M12                                                                                                                                                                                                                                   |
| Dimensions           | DX 310 = Ø14 x 114,8 mm (stem: Ø14 x 101 mm)<br>DX 311 = stem: Ø14 x 132 mm - handle length 98 mm                                                                                                                                            |
| Weight               | DX 310 = 20 g approx.<br>DX 311 = 100 g approx. with 2 m cable                                                                                                                                                                               |
| Materials            | Stem and protector cap: PBT<br>Handle (DX 311): polyamide (PA6-GF30)<br>Cable (DX311): PVC                                                                                                                                                   |

|                      |                                                                                                                                                                                                                                                                                                |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensor               | T/RH = CMOS<br>Pressure = Piezoresistive<br>CO <sub>2</sub> = Non-Dispersive Infrared (NDIR)<br>VOC = Metal-Oxide film                                                                                                                                                                         |
| Measuring range      | T = -20...+80 °C<br>RH = 0...100%<br>Pressure = 300...1250 hPa<br>CO <sub>2</sub> = 0...5000 ppm<br>VOC = 1...500 (dimensionless index)                                                                                                                                                        |
| Resolution           | T = 0.1 °C<br>RH = 0.1%<br>Pressure = 0.1 hPa<br>CO <sub>2</sub> = 1 ppm<br>VOC = 1                                                                                                                                                                                                            |
| Accuracy             | T = ± 0.1 °C (20...60 °C) / ± 0.2 °C (remaining range)<br>RH = ± 2% (0...80%RH) / ± 3% (80...100%RH) @<br>T=10...50 °C<br>Pressure = ± 0.5 hPa (300...1100 hPa / -20...65 °C)<br>CO <sub>2</sub> = ± (50 ppm + 3% of the measure) @ 25 °C / 1013 hPa<br>VOC = relative qualitative measurement |
| Temperature drift    | Pressure = ± 0.75 Pa/°C (0...55 °C / 700...1100 hPa)<br>CO <sub>2</sub> = 1 ppm/°C (-20...45 °C)                                                                                                                                                                                               |
| Long-term drift      | T = < 0.03 °C/year<br>RH = < 0.25 %RH/year<br>Pressure = ± 0.33 hPa/year<br>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)<br>CO <sub>2</sub> = < 120 s (T <sub>90</sub> with 2 m/s air flow)                                                                                                                                                                         |
| Operating conditions | -20...+60 °C<br>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 Differential pressure probe.  
Measuring range:  $\pm 2,5$  hPa.

Art.No. 486674

DX 210-20hPa-00-L01-00 Differential pressure probe.  
Measuring range:  $\pm 20$  hPa.

Art.No. 486675

DX 210-500hPa-00-L01-00 Differential pressure probe.  
Measuring range:  $\pm 500$  hPa.

Art.No. 486676

DX 210-200kPa-00-L01-00 Differential pressure probe.  
Measuring range:  $\pm 200$  kPa.

Art.No. 486677

DX 210-700kPa-00-L01-00 Differential pressure probe.  
Measuring range:  $\pm 700$  kPa.

Art.No. 486678

DX 240-200kPa-00-L01-00 Absolute pressure probe.  
Measuring range: 0...200 kPa.

Art.No. 486679



## SOIL MOISTURE

DX 721-L02-P Digital wide range soil moisture probe, 2 m PVC cable, DX connector M12.

Art.No. 487434

DX 721-L05-P Digital wide range soil moisture probe, 5 m PVC cable, DX connector M12.

Art.No. 486675



|                     |                                                                                                                                                                                                                                           |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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<br>To process = for $\varnothing 6 \times 1$ mm (internal $\varnothing 4$ mm) and $\varnothing 8 \times 1$ mm (internal $\varnothing 6$ mm) hoses.<br>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<br>Temperature = IC                                                     |
| Measuring range      | Soil moisture = 0...60% VWC volumetric water content (up to 100% VWC with limited accuracy)<br>Temperature = -40...+80 °C            |
| Resolution           | Soil moisture = 0.1% VWC<br>Temperature = 0.1 °C                                                                                     |
| Accuracy             | Soil moisture = typ. $\pm 3\%$ , depending on soil conditions<br>Temperature = typ. $\pm 0.2$ °C, max. $\pm 0.4$ °C over whole range |
| Operating conditions | -40...+80 °C<br>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<br>182 mm x 30 mm x 12 mm (measuring area thickness ca 1.6 mm)<br>Cable length: 2 or 5 m                    |
| Weight               | 95 g approx. with 2 m cable<br>150 g approx. with 5 m cable                                                                          |
| Materials            | In contact with soil: FR4 epoxy<br>Handle: Luran / stainless steel screws<br>Cable: PVC                                              |

## ILLUMINANCE (lux)

|                                                         |                                                           |                    |                  |                    |
|---------------------------------------------------------|-----------------------------------------------------------|--------------------|------------------|--------------------|
| Measuring range                                         | 0.10...<br>199.99                                         | 200.0...<br>1999.9 | 2000...<br>19999 | 20000...<br>400000 |
| Resolution                                              | 0.01                                                      | 0.1                | 1                | 10                 |
| Spectral range                                          | in accordance with standard photopic curve V( $\lambda$ ) |                    |                  |                    |
| (temperature coefficient) $f_{\delta}(T)$               | <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/m²)

|                                     |                     |                    |                    |                    |
|-------------------------------------|---------------------|--------------------|--------------------|--------------------|
| Measuring range                     | 0.0010...<br>1.9999 | 2.000...<br>19.999 | 20.00...<br>199.99 | 200.0...<br>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...<br>199.99 | 200.0...<br>1999.9 | 2000...10000 |
| Resolution                                   | 0.01              | 0.1                | 1            |
| Spectral range                               | 400...700 nm      |                    |              |
| Calibration uncertainty                      | <5%               |                    |              |
| f <sub>2</sub> (response as law of cosines)  | <6%               |                    |              |
| f <sub>3</sub> (linearity)                   | <1%               |                    |              |
| f <sub>4</sub> (error in instrument reading) | ±1 digit          |                    |              |
| f <sub>5</sub> (fatigue)                     | <0.5%             |                    |              |
| 1 year drift                                 | <1%               |                    |              |

## UVA IRRADIANCE (W/m²)

|                                     |                            |                    |                    |                    |
|-------------------------------------|----------------------------|--------------------|--------------------|--------------------|
| Measuring range                     | 0.0010...<br>1.9999        | 2.000...<br>19.999 | 20.00...<br>199.99 | 200.0...<br>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