



## N-Pen N 110

**N-Pen N 110** is a light-weight, battery-powered reflectance-based instrument that provides a convenient, cost-effective method for effective nitrogen management in plants throughout their growing season. Essentially, the N-Pen characterizes nitrogen amount by means of reflectance and by the concept of a close link between chlorophyll content and nitrogen content in plants.

Rugged and compact N-Pen can be favorably used on the field, in the plant biology lab or for education. The use of the N-Pen is non-destructive and permits quick, repeated measurements throughout the growing season. It takes rechargeable Li-ion battery and is supplied in a robust case.

N-Pen versions with a USB and Bluetooth communication module for data transfer are available. Comprehensive FluorPen 1.1 software provides data transfer routines and many additional features for data presentation in tables and graphs.

### ▼ CURRENTLY AVAILABLE CALIBRATIONS

- Maize
- Wheat
- Barley

### ▼ KEY FEATURES

- Lightweight, hand-held design
- Non-invasive measurement method
- Easy two-button operation
- Quick and easily repeatable measurements
- Battery-operated

### ▼ APPLICATIONS

- Significant yield increase
- Quick tuning of nitrogen management in crops
- Increasing nitrogen use efficiency
- Reducing the risk of yield-limiting N deficiencies
- Saving labor and/or application costs
- Reducing the risk of excessive fertilizer applications and subsequent contamination of the environment
- Agronomy research



# 01 / Pocket-Sized Devices

## ▼ N-PEN MEASURES

- Nitrogen content correlating with Normalized Difference Greenness Index:
- $NDGI = (R_{780} - R_{665}) / (R_{780} + R_{665})$
- Nitrogen content displayed as %

## ▼ SOFTWARE

- FluorPen 1.1 software (Windows 7, or higher compatible)
- Bluetooth and USB communication
- Visualization and data transfer routines to Microsoft Excel (optional)
- GPS mapping

## ▼ TECHNICAL SPECIFICATION

- **Measured Parameters:**  
Nitrogen content calibrated for particular plant
- **Measuring Light:**  
Dual wavelength light source – 565 nm, 760 nm
- **Detector Wavelength Range:**  
500 to 800 nm bandpass filters
- **Memory Capacity:**  
16 Mbit
- **Internal Data Logging:**  
Up to 100,000 data points
- **Display:**  
Graphical display
- **Keypad:**  
Sealed, 2-key tactile response
- **Keypad Escape Time:**  
Turns off after 3 minutes of no use
- **Power Supply:**  
Li-ion rechargeable battery
- **Battery Life:**  
48 hours typical with full operation
- **Low Battery Detection:**  
Low battery indication displayed
- **Size:** 135 × 65 × 33 mm
- **Weight:** 188 g
- **Operating Conditions:**
  - Temperature: 0 to 55 °C
  - Relative humidity: 0 to 95 % (non-condensing)
- **Storage Conditions:**
  - Temperature: -10 to +60 °C
  - Relative humidity: 0 to 95 % (non-condensing)

