

v s instrument pvt. ltd.

INSTRUMENTATION FOR AGRICULTURAL RESEARCH

AN ISO 9001:2008 Certified Company

PRODUCT OVERVIEW



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IFL INTEGRATED FLUOROMETER AND GAS EXCHANGE SYSTEM

- Light weight, battery operated with Graphical Display.
- Measured Parameters : CO₂, Water Vapour, PAR, Leaf & Air Temp., Stomatal Conductance, Transpiration, Photosynthetic Rate, Ci, Atmospheric Pressure and all chlorophyll fluorescence parameters.
- Measurement of leaf absorbance, transmittance and chamber leakage for more accurate and reliable data.
- Data Storage : 2 GB SD Card, downloading through USB or Card reader.
- Battery backup for 10 hours.
- Large touch screen, colour graphic display.
- Gas exchange measurements can be presented in either ppm/mbar or $\mu\text{mol mol}^{-1}/\text{mmol mol}^{-1}$.



AP4 AUTOMATIC POROMETER



- Portable Instrument for Measurement of Stomatal conductance/Resistance, PAR, RH & Leaf Temp.
- Inbuilt Data Storage for 1500 data sets with facility for 30 character note with each reading.
- Conductance : 5.0-1200 mmol/m²/s Resistance : 0.2- 40.0 s/cm.
- RH : 0-100% PAR : 0-2500 micromol /m²/s.
- Display : 8x40 Character LCD display.
- Battery Back up : 20 Hours duration.
- Qwerty Keypad for easy operation.
- Calibration Plate as standard accessory.

SUNSCAN CANOPY ANALYSIS SYSTEM

- Battery operated PAR base instrument to measure and calculate the Leaf Area Index PAR (Photosynthetically Active Radiation).
- Direct display of LAI.
- Usable in clear, cloudy and changeable weather conditions.
- Active Area : 1m x 13 mm wide sensor spacing 15.6mm.
- Spectral Range : 400-700 nm.
- Max Reading : 2500 $\mu\text{mol}/\text{m}^2/\text{s}$.
- Data Storage : 100 Mb Display : 1/4 VGA sunlight Readeable colour screen.
- Operating System : windows mobile 6.



HEMIVIEW TREE CANOPY ANALYSIS SYSTEM



- Battery operated 18.1 megapixel, digital SLR camera fixed with fish eye lense (180°) to measure the Leaf Area Index and related parameters of Trees/ Tall Canopies.
- Data Storage : 4GB.
- Self Levelling Mount.
- Digital Display, NO PC is required in the field for the operation.
- Image resolution : 18.1 megapixels
- Ideal for tall Irregular canopies.
- Results stored in Excel format.

LCi-SD PORTABLE PHOTOSYNTHESIS SYSTEM (IRGA)

- Light weight, battery operated with Graphical Display.
- Measured Parameters : CO₂, Water Vapour, PAR, Leaf & Air Temp., Stomatal Conductance, Transpiration, Photosynthetic Rate, Ci, Atmospheric Pressure etc.
- Wide Variety of Leaf Chambers to suit all type of samples like for Broad, Narrow, conifer, canopy, soil CO₂, Fruits Chamber.
- Data Storage : 2 GB SD Card, downloading through USB or Card reader.
- Battery backup for 10 hours.
- Range CO₂: 0-2000ppm H₂O : 0-75mb



LCpro-SD PORTABLE PHOTOSYNTHESIS SYSTEM (IRGA)



- Light weight, battery operated with Graphical Display and Micro climate control for CO₂, Water Vapour, Light & Temp.
- **Controls** - CO₂ : 0-2000ppm, RH : 0-75mb, PAR : upto 2000 $\mu\text{mol s}^{-2} \text{ sec}^{-1}$. Temp: $\pm 14^\circ\text{C}$ from ambient temp.
- Measured Parameters : CO₂ , Water Vapour, PAR, Leaf & Air Temp., Stomatal Conductance, Transpiration, Photosynthetic Rate, Ci, Atmospheric Pressure.
- Wide Variety of Leaf Chambers to suit all type of samples like for Broad, Narrow, conifer, canopy, soil CO₂ , Fruits Chamber.
- Data Storage : 2 GB SD Card, downloading through USB port or Card reader.
- Range CO₂: 0-3000ppm H₂O : 0-75mb

CCM300 CHLOROPHYLL CONTENT METER

- Light weight, field portable, battery operated instrument for measurement of relative chlorophyll content (mg/m²)/ CFR (Chlorophyll Fluorescence Ratio).
- Colour Display, Touch Screen, 2GB internal Memory, Data Averaging facility.
- CCM300 is suitable for all type of samples like leaves, stems, flowers, fruits, mosses, small grasses, Cactus, Algae etc.
- Each measurement takes only 5 seconds to perform and is presented as Chlorophyll Fluorescence Ratio (CFR) or relative chlorophyll content in mg/m².
- Resolution : 0.01 or 1mg/m².
- Measurement area : Fiberoptic Probe with 3mm diameter.



CCM200 Plus CHLOROPHYLL CONTENT METER



- Light weight, field portable, battery operated instrument for measurement of relative chlorophyll content as Index value.
- LCD Graphic Display, internal Memory for 1,60,000 data sets.
- Data Averaging facility, Data Download through USB port.
- Measurement area : 1cm dia circle.
- Battery : 9v Alkaline Battery.
- Resolution : 0.1 CCI.
- Sample Acquisition time : 2-3 Seconds.
- Repeatability : $\pm 1\%$.
- Weight : 162 g.

OS1p & OS5p + PULSE MODULATED CHLOROPHYLL FLUOROMETER



- Battery operated, field portable for measurement of Chlorophyll Fluorescence.
- Light weight, Touch Screen, Large backlit colour display, user friendly.
- Data Storage : 1 GB removable card.
- Fast Tests: FV/FM, Quantum Photosynthesis Yield, OJIP Kinetics Test, Quenching Relaxation, Stepped Actinic Test, Stress Test.
- Universal PAR clip available to suit wide variety of leaf samples.
- Battery Backup for 12 hours continuous operation.
- NO PC /PALMTOP IS REQUIRED FOR THE OPERATION.

ACM-200Aplus ANTHOCYANIN METER

- Light weight, field portable, battery operated instrument for measurement of ANTHOCYANIN in Leaves and Flowers.
- LCD Graphic Display, internal Memory for 1,60,000 data sets.
- Data Averaging facility.
- Data Download through USB port.
- Measurement area : 1cm dia circle.
- Battery : 9v Alkaline Battery.
- Resolution : 0.1 CCI.
- Sample Acquisition time : 2-3 Seconds.



GFP-III Meter Fluorescent Protein Meter



- Field portable, battery operated instrument for field as well as lab studies for measurement of green fluorescent protein and other compounds.
- Touch Screen colour graphic display
- 2 GB Internal memory
- Output through USB Port
- Measurement Parameters : User Programmable, can be calibrated to known concentrations or ratios.
- Multiple calibrations can be generated.

OS30p+ STRESS SCREENING DEVICE (Chlorophyll Fluorometer)

- Hand held battery operated instrument for the measurement of Photochemical efficiency (Fv/Fm) and OJIP analysis.
- Measured parameters: Fo, Fm, Fv/Fm, Fv/Fo, O, K, J, I, P, tFm, A, Mo and PI/ABS.
- Sampling rate: Variable from 10µS to seconds.
- Storage capacity: Up to 160,000 data sets and hundreds of experimental traces.
- Detection system: Related pulse excitation detection with high resolution sampling mode for Kautsky induction curve recording.



PLANT STRESS KIT

Compact and affordable Y (II)/ETR & Fv/Fm meters One case, two instruments. One for measuring light adapted Quantum Yield of PSII or Y(II) and one for dark adapted Maximum Potential Quantum Efficiency of PS (II) or Fv/Fm

Features

- Y(II) and ETR corrected for absorbance
- Leaf absorbance using RGB sensors
- PAR and leaf temperature measured
- Fm' correction according to Loriaux 2013
- Long-term fluorescence monitoring mode
- Rapid measurement of large populations –
- Lightweight dark adaption clips –
- Graphic Fv/Fm trace display –
- Compact, ergonomic design –
- Measurements from the same known state

Parameters measured Y(II) and Fv/Fm

- Y(II): Quantum Photosynthetic Yield of PS(II)
- ETR: Electron transport rate
- PAR: Photosynthetically active radiation
- T: Leaf temperature
- FMS (or FM'): Maximum fluorescence at steady state
- FS (or F): Fluorescence under steady state
- Loriaux 2013 correction of ETR and FM'
- α : Leaf absorbance & transmittance
- RH: Relative humidity 5% to 95% (+/-2% over the range)
- Monitor mode: Fv/Fm, Y(II), ETR, absorbance, PAR, T, RH and ETR
- Fv/Fm: Maximum potential quantum efficiency of PSII
- Fv/Fo: A normalised ratio that may be used to improve stress detection
- Fo: Fluorescence after dark adaption
- Fm: Maximum fluorescence during a saturating pulse following a period of dark adaption
- Ft: Instantaneous fluorescence



Y (II) Meter

A compact and affordable light adapted Y(II) & ETR meter Quantum Yield of PSII or Y (II) is a test that allows the measurement of the efficiency of Photosystem II under actual light adapted environmental and physiological conditions.



Features

- Y(II) and ETR corrected for absorbance
- Leaf absorbance using RGB sensors
- PAR and leaf temperature measured
- Fm' correction according to Loriaux 2013
- Long-term fluorescence monitoring mode
- 2Gb of on-board memory with USB output

Parameters measured

- Y(II): Quantum Photosynthetic Yield of PS(II)
- ETR: Electron transport rate
- PAR: Photosynthetically active radiation
- T: Leaf temperature
- FMS (or FM'): Maximum fluorescence at steady state
- FS (or F): Fluorescence under steady state
- Loriaux 2013 correction of ETR and FM'
- α : Leaf absorbance & transmittance
- RH: Relative humidity 5% to 95% (+/-2% over the range)
- Monitor mode: Fv/Fm, Y(II), ETR, absorbance, PAR, T, RH and ETR

AUTOMATIC WEATHER STATION GP1 Type



- GP1 Data Logger : battery operated, easy to install and easy to handle. Pre-wired ready to use.
- Fix for Air Temp, RH, Wind speed, Wind Direction, Rainfall, Radiation.
- Data Logger GP1 stores 6,00,000 data sets with option of recording from 1 sec to 24 hours.
- Option to record minimum/ maximum/ average data
- Data downloading through RS 232-USB or GPRS modem
- 2 meter tripod mast
- Pre-loaded sensor library in the programme for easy operation.
- Can be operated through 9 volt battery without solar panel or through 12v battery and solar charging option.

AUTOMATIC WEATHER STATION GP2 Type & DATA LOGGER

- GP2 Data Logger : 16 channel data logger, 12 analog and 4 digital channels
- Sensors for Air Temp, RH, Wind speed, Wind Direction, Rainfall, Solar Radiation, Soil Temperature, Soil Moisture, Surface wetness, sunshine, atmospheric pressure, net radiation etc.
- Data Logger GP2 stores 2.5 million (4mb) data sets with option of recording from 1 sec to 24 hours.
- Option to record minimum/ maximum/ average data
- Data downloading through USB, GPRS modem and icloud
- 2 meter mast and cross arm accessories
- Pre-loaded sensor library in the programme for easy operation.
- Can be operated through 12v battery and solar charging option.



DATA LOGGERS

The GP1 Data Logger is a compact research grade data logger with smart irrigation control capability

- Y(II) High accuracy 7 channel data logging
- Smart relay suitable for irrigation control
- Waterproof IP67 enclosure
- 600,000 readings

Operated through Internal 9V battery and option to connect with 12 V Battery and solar power charging.

Compatible with all Environmental sensors like RH/Temp, Wind speed, Wind direction, Rainfall, Solar radiation, Soil temperature, Soil moisture etc.

Data downloading through RS232-USB, GPRS modem facility.

GP2 DATA LOGGER AND CONTROLLER .

The GP2 is a powerful, weatherproof, research grade data logger with unique features for recording and controlling field experiments

- 12 differential channels
- High performance microvolt sensitivity
- 2.5 Million Data Storage Capacity
- Flexible configuration
- Versatile communication options
- Excellent analog accuracy
- Powerful Script Editor
- Virtual channels
- Unique program Simulator
- Data visualisation
- Operated through Internal 1.5V X 6 battery and option to connect with 12 V Battery and solar power charging.
- Compatible with all Environmental sensors like RH/Temp, Wind Speed, Wind Direction, Rainfall, Solar Radiation, Soil Temperature, Soil Moisture, Net Radiometer, Albedometer, Sunshine Sensors, Surface Wetness
- Data downloading through RS232-USB, GPRS modem facility.



PROFILE PROBE SOIL MOISTURE METER



- Battery operated, research grade instrument for measurement of soil moisture at different depths down to 1 meter and 1/2 meter.
- PR2/6 : 10,20, 30, 40, 60, 100 cm depth (1 meter probe).
- PR2/4 : 10, 20, 30, 40 cm depths. (1/2 meter probe).
- User selectable output : % Volumetric, $m^3.m^3$
- Facility to store 5 user specific soil calibration.
- Single probe with independent sensors at different depths.
- LCD display to view the data before you store it.
- Access tube installation tool kit and Extraction tool kit supplied with the instrument.
- Data storage and downloading facility.

SDI-12 Version

The PR2 SDI-12 is a new digital alternative to the well-established analogue PR2 Profile Probe. It shares the many strengths of the analogue PR2 soil moisture probe, but with the addition of SDI-12 compatibility - allowing integration into new and existing SDI-12 systems.

- Multiple PR2 SDI-12s can be connected to a compatible data logger via a single cable
- Enables the creation of low cost highly flexible sensor networks
- Compatible with existing PR2 access tubes and auguring kits
- Conforms to industry standard SDI-12 (v1.3) spec
- Flexible integration with 3rd party SDI-12 hardware
- New low power design; ideal for remote sites



WET SENSOR KIT

- It measures Water content, EC, Temperature of the Soil.
- User selectable output : % Volumetric , $m^3.m^3$ for water content.
- Facility to store 5 user specific soil calibration.
- LCD display to view the data before you store it.
- Direct insertion in the soil.
- Maximum Sensor length : 7 cm.
- 3 Parameters with single insert.



SM150 SOIL MOISTURE PROBE



- Battery operated, portable instrument for measurement of Soil Moisture.
- Direct insertion in the Soil.
- Extension Tubes upto 1 meter used for deeper depth.
- Digital display.
- Operated through 2 x AA battery.
- Absolute accuracy : $\pm 3\%$.
- Cost effective.
- Maximum Sensor length : 5.1 cm.

THETA PROBE SOIL MOISTURE METER

- Battery operated, portable instrument for measurement of Soil Moisture content.
- Direct insertion in the soil.
- Extension Tubes upto 1 meter used for deeper depth.
- Inbuilt Data Storage facility.
- Digital display. % Volumetric , $m^3.m^3$.
- Operated through 9v battery.
- Accuracy : $\pm 1\%$ Frequency : 100MHz.
- Maximum Sensor length : 6 cm.



SM 150T SOIL MOISTURE PROBE



- Battery operated, portable instrument for measurement of Soil Moisture.
- Digital Display
- Research grade sensor at a greater price
- Robust and buriable
- Moisture accuracy is 3% (after soil specific calibration)
- Built-in temperature sensor achieves 0.5°C accuracy.
- Please note that the HH150 Meter supplied with the SM150 Kit is a readout-only device. If PC connectivity for data storage and download is a requirement, the SM150T should be used with the HH2 Moisture Meter instead.
- NB: When used in portable mode the SM150T Sensor does not provide temperature indication.

ACE SOIL CO₂ EXCHANGE SYSTEM / SOIL RESPIRATION SYSTEM



- Automatic Soil CO₂/Soil Respiration measurement system. It Measures Soil CO₂ Exchange, (Respiration Rate).
- Soil Temp, Soil Moisture and PAR (Photosynthetically Active Radiation).
- IRGA located near to Soil Chamber for fast response.
- Measurement Range CO₂, : 0-896ppm (differential open/close system).
- Measurement PAR : 0-3000 micromol/m²/s.
- Option to measure Soil Temperature at 6 points & Moisture at 4 points.
- Operated through 12v, 7Ah battery for portable use.
- Data Storage : 2GB compact Flash Cards.
- Chamber automatically opens and closes between measurements.

EGA-CO₂, O₂ AND HUMIDITY MONITOR

- CO₂ infra-red gas analyser with advance sensors for water vapour measurement
- Accurate CO₂ infra-red gas analyser
- H₂O by laser trimmed sensor
- Auto logging to SD memory card
- CO₂ – 0-2000 ppm as standard
- Resolution – 1ppm
- Oxygen – 0-100%
- H₂O – 0-100% RH
- Resolution – 1% RH
- 7 Analogue Inputs
- USB and analogue output
- 12v Battery Operated



AM350 PORTABLE LEAF AREA METER



- Portable instrument for Leaf area, width, maximum length, perimeter, average area, ratio, shape factor.
- Inbuilt Data storage for 2000 data sets. Display : 64x240 LCD graphic display.
- Maximum Measuring width: 103mm with 0.065mm² resolution.
- Measurement Units: user selectable (mm/cm).
- Long leaves can be measured on independent white board.
- Leaf Image Display, storage and download facility through USB Port.

WINDIAS IMAGE ANALYSIS SYSTEM

- Lab Model, operated through 220v AC power. compatible with Windows operating system.
- Measures Leaf area, Length, width, perimeter, object count, hole area, disease area.
- Convyer Belt attachment facility for fast measurement.
- Resolution : 1280 x 1024 pixels.
- Throughout Leave/hour : approx 800 samples.
- maximum Object size : 1 pixel.
- Maximum sample area : 250 x290 (conveyor attachment) .
- 250 x 1000 mm long leaf mode.
- Colour depth : 24bit colour space (16 million colours).



SPN1 SUNSHINE PYRANOMETER

- It measures Global (Total) Diffused and Sunshine hours.
- WMO sunshine threshold : 120 W/m² direct beam.
- No routine adjustment or pollar alignment.
- No moving parts, shade rings, trackers.
- Works at any altitude.
- Spectral Range : 400 - 2700 nm.
- Range : 0-2000W/m².
- Response time : <200ms.
- Resolution : 0.6 W/m² = 0.6Mv.
- Compatibe with GP1 Data logger : 600,000 data storage capacity.



BF5 SUNSHINE SENSOR



- It measures Global (Total) Diffused and Sunshine hours.
- No routine adjustment or pollar alignment required.
- No moving parts, shade rings, trackers.
- Works at any altitude.
- Spectral Range : 400 - 700 nm.
- Range : 0-2000W/m².
- Output : PAR / ENERGY / LUX (User selectable).
- PAR : 0-2500 micromol/m²/s Energy : 0-1250 W/m² Illuminance : 0-200klux.
- Compatibe with GP1 Data logger : 600,000 data storage capacity.

NET RADIOMETER

- Net radiometer is a thermopile sensor head which is exposed to both the downward and upward fluxes of radiation.
- Measuring range – -0.5 to +1(kw.m⁻²)
- Spectral Range – 0.25-60μm
- Operating Temp – -40 to 60°C
- Sensitivity – 100mV per (kw.m⁻²)
- Field of view – 180°upper and lower sensor
- Compatible with GP1/GP2 Data logger. Data Storage capacity for 6, 00,000 data sets. Data logging interval option from 1 sec to 24 hours
- Includes data downloading software, data downloading cable, instructions manual and basic spares and accessories.



ALBEDOMETER



- It consists of two identical pyranometers that measure the incoming global solar radiation and radiation from the surface below.
- Measuring range – 0 to 2(kw.m⁻²)
- Spectral Range – 305-2800nm
- Operating Temp – -40 to 80°C
- Sensitivity- 10-35mV /kw.m⁻²
- Compatible with GP1/GP2 Data logger. Data Storage capacity for 6, 00,000 data sets. Data logging interval option from 1 sec to 24 hours
- Includes data downloading software, data downloading cable, instructions manual and basic spares and accessories

SAP FLOW SYSTEM

For sap flow/xylam flow study. Useful for Crops and Trees
Different TDP Needles & Gauges are available to suit all type varieties.

- Easily inserted and removed for reuse.
- Constant heat, thermal dissipation method; not heat pulse.
- Continuous measurement method.
- No waiting periods and no heat pulses.
- Stainless steel needles that are Teflon coated.
- Compatible with most data loggers.
- Differentially wired T-type thermo couples.
- Electronics & connectors sealed / weatherproofed.
- Wires directly to data logger, one differential channel each.
- Ten ft. cables, sensor insulation, and manuals included.



PSP32 MONITORING FLUOROMETER SYSTEM



“The next generation of monitoring fluorescence system”

The new Opti-science Monitoring Fluorescence System is a ground-breaking, multi-head, fluorometer which, for the first time, enables the long-term, unattended measurement of advanced fluorescence parameters.

The unique, daylight, dark adaption mechanism allows measurement of q_E fast acting Xanthophyll cycle, q_M chloroplast migration, q_T state transitions, q_i photoinhibition, pNPQ photoprotective NPQ and qPd photochemical quenching in the dark, immediately after actinic illumination, several times per day.

Red (640nm) or Blue (455nm) Led light sources are available. Giving a $10,000 \mu\text{mol m}^{-2} \text{s}^{-1}$ square topped saturating pulse or a $7,000 \mu\text{mol m}^{-2} \text{s}^{-1}$ multi-phase flash for F_m' determination.

HYDRAULIC CONDUCTANCE FLOW METER (HCFM)

HCFM is designed to perform quantitative root and stem analysis without having to dig up roots or drag limbs back to the lab. In most cases, the analysis of a sample root or shoot is completed in as little as 10 minutes. You can quickly measure the major components of the hydraulic conductance in the soil-plant-atmosphere continuum . One can measure the values of the individual hydraulic resistances, then compute the pattern of water flow and water potentials in the resistance network. Technical Specifications

- Stem Ranges 1 mm to 36 mm diameters
- Flow Rates 0.01 to 350 grams/hr in 5 overlapping ranges
- Conductance $7.7\text{E-}08$ to $3.5\text{E-}04 \text{ Kg s-1 MPa-1}$
- Data Interface USB, USB powered
- Capacity 24 oz. Degassed Water
- Maximum Pressure 90 psi (620 kPa)
- Air Gas Tank 6 cu. ft. (170 liter) with CGA-580 Valve & Connector



Our Principals



Delta-T Devices Ltd., UK
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