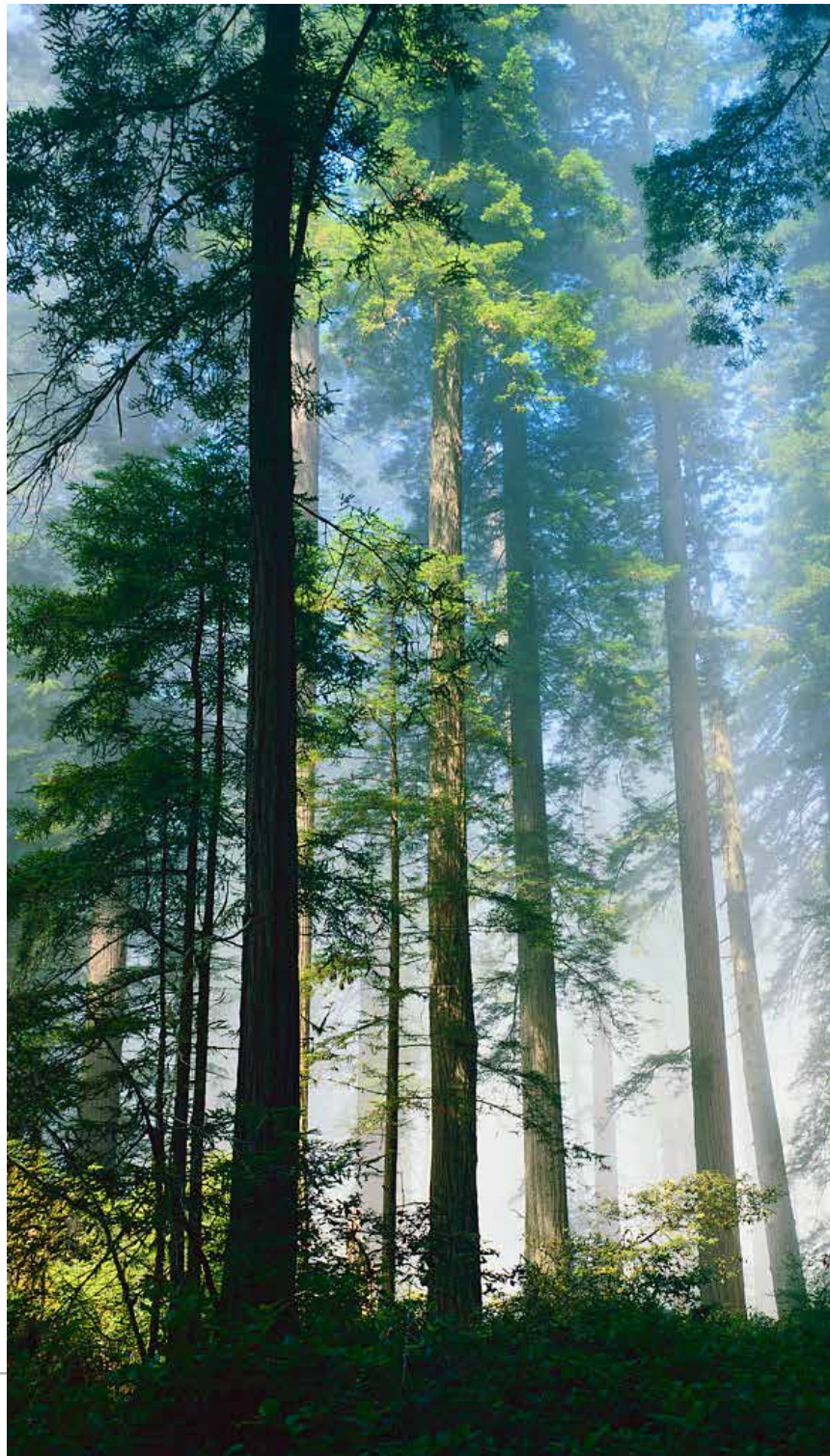
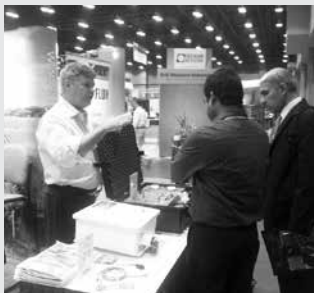


**WATER
WIND
SOLAR
INSTRUMENTS**



Dynamax





ABOUT US

Our goal at Dynamax is to maintain our position and recognition as a global leader in the production and integration of plant-environmental monitoring instrumentation. We are continuously building on that reputation by supplying only the highest grade sensors and monitoring systems for the professional, educational, industrial, governmental and commercial industries.

Our work at Dynamax is in the design and manufacture of unique and beneficial systems for assisting in understanding, regulating and managing plant, soil, water, solar, and wind resources. We offer complete solutions and provide the vital link between the plant and its environment. Our customer base includes researchers, universities, agronomists, farmers, horticulturists, the forest science community, and sports field managers.

The health and well-being of mankind depends on the water cycle and limited water resources. Accordingly, urban growth, agricultural productivity and our everyday environment depend on water, water quality, and

water-efficient plant production. In that effort, Dynamax is solely focused on plant bio-sensors, plant transpiration measurement, plant bio-productivity and environmental conditions.

Within our wide range of products, our Dynagage Sap Flow Sensors record plant activity and water uptake for commercial production and for research. Sap flow sensing methods are key techniques in water management, nutrient uptake, plant-water status and food product quality. Transpiration, plant growth and biomass production are analyzed with Dynamax sensors.

At Dynamax, scientific excellence is our foundation for unique instruments and systems based on proven, sound, scientific principles.

Mike van Bavel, President



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TRANSPIRATION SAP FLOW

DYNAGAGE SAP FLOW SENSOR

FEATURES

- **Measures total plant water use**
- **Absolute measurement with no calibration required**
- **Reusable and portable**
- **Harmless and conforms to plant size**
- **Reliable and proven method**
- **Helps correct decision making**

The Dynagage Sap Flow Sensors are used for measuring the sap flow, and thus the water consumption of plants. These energy balance sensors measure the amount of heat carried by the sap which is converted into real-time sap flow in grams or kilograms per hour.

The sensors are non-intrusive and not harmful since the plants are heated up 1° C to 5° C typically. The principles of heat balance sensors are scientifically proven and references exist for most major crops and many tree species. Unlike other methods, Dynagages require no calibration since sap flux is directly determined by the energy balance and rates of heat convection by the sap flow.

Dynamax introduced the first sap flow sensor prototypes in 1988 and today offers a full range of sensors from 2 mm up to 150 mm.



EXO-SKIN SAP FLOW SENSOR

FEATURES

- **Low cost**
- **Low maintenance**
- **Same accuracy as Dynagage sensors**
- **Flexible sensor for odd shaped plant stems and growth**
- **NEW water shielding layer provided**

The EXO heat balance sap flow sensors offer more flexibility for stems 9 to 25 mm in diameter, and the stretchable Velcro insulation makes installation on uneven or branchy stems very easy. EXO sensors may be used on most crops or trees, in the greenhouse or in the field, and are excellent for determining plant transpiration, for irrigation scheduling, or for monitoring plant stress.



TDP SAP VELOCITY PROBE

FEATURES

- **Easy to install**
- **Continuous sap velocity measurement**
- **No heat pulses**
- **Compatible with most data loggers**
- **Teflon coated probes for easier removal**
- **Proven Granier heat dissipation method**

The newest method of transpiration measurement is now available from Dynamax for large trees and plants. The Thermal Dissipation Probe (TDP) transpiration sensor measures sap velocity which is converted to volumetric flow rate. TDP is a simple and affordable device originally proposed by Granier. The basic TDP probe has two thermocouple needles inserted in the sapwood, the upper one containing an electric heater. The probe needles measure the temperature difference (dT) between the heated needle and the sapwood ambient temperature below. The dT variable and the maximum dT_m at zero flow provide a direct conversion to sap velocity.

For uniform trees in a closed canopy, only one sensor per tree is needed. For irregular canopies or with mixed species, sap flow may vary around the circumference of the trees. Thus multiple probes are recommended in a single tree to make flow calculations accurately. Normally, install two probe sets per tree for trees 3" to 6" (75 to 150 mm) in diameter, and four probe sets per tree for trees 6" to 18" in diameter (>150 mm). Calibration is recommended for new species.



TRANSPIRATION SAP FLOW

SAPIP-IRT WIRELESS IR TEMPERATURE

FEATURES

- **Very narrow field of view**
- **Excellent for Pivot or drip irrigation**
- **Rechargeable batteries (solar- 2 W sold separately)**
- **Up to 27 units per network on a coordinator**
- **10 sec to 60 min output timing**
- **± 0.5 C accuracy over wide range of ambient (0° to 60° C)**
- **300 – 500 ft range based on antennas distance**
- **Analog output versions available**



The SapIP-IRT wireless infrared (IR) temperature sensor is the latest development in IR leaf temperature sensing for use in irrigation scheduling and plant stress detection. This new system allows for up to (27) IRT sensors to be distributed throughout a field, and data to be collected with a single coordinator or gateway. Using the "Watcher" software, all data can be collected from the coordinator and stored on your computer. The data can easily be imported into a spreadsheet for analysis and graphing. Plant

stress models are available and can be used to determine if, and when, your crops need irrigation, and flags are used when irrigation is required.

IRT Stress Accumulator Data Loggers can be used when remote IR sensor networks are required. Up to (25) IR sensors can be monitored simultaneously, and repeaters can be used to add distance and expand the system by adding more IRT sensors. Data is collected using a WiFi connection up to 50 ft away. Web page data access and mapping is included.

TRANSPIRATION SAP FLOW

FLOW32-1K SAP FLOW SYSTEM



FEATURES

- Real-time sap flow
- Automatic power down
- Modular and expandable system
- Auto Ksh zero stability algorithm - built in
- Easy to use support software
- Noninvasive sensors
- Direct transpiration readings
- No calibration

The Dynagage Flow32-1K Sap Flow system has been servicing research plant scientists throughout the world for over 25 years. Powerful functions include auto zero and sensor status built into the data logger program. Sap flow data recalculation and automatic charting with an Excel™ Macro link makes the system a superior water relations measurement tool. Sap Flow has never been easier and more powerful.

Below are examples of research and commercial industries where the Flow32-1K Sap Flow System is actively applied:

Agriculture	Agroforestry	Crop Physiology	Environmental
Forestry	Genetic Engineering	Horticulture	Hydrology
Irrigation	Mining Rehabilitation	Orchards	Phytoremediation
Urban Forestry	Viticulture	Stress Management	Varietal Evaluation

FLGS-TDP SAP VELOCITY SYSTEM



FEATURES

- Built-in program computes sap flow for specific trees
- 2 MB data memory, for up to 500,000 data values, or 200 days of hourly records
- Automatic night time zero set, saves processing time
- High-efficiency, 90%+, voltage regulators for sensor heater power

FLGS-TDP XM1000 is a completely integrated measurement system for TDP sap velocity sensors. The XM1000 version of our TDP Sap Flow System includes the latest Expanded Memory Data Logger platform and extended features such as real-time sap flow calculations and auto zero. Each FLGS-TDP system can read up to 32 TDP10, 30, or 50 sensors.

This basic system can be expanded with additional multiplexer subsystems to read up to 128 TDP sensors. Each TDP thermocouple is connected to a differential channel on the logger. All the necessary electronics, software and sensors are assembled into a complete solution.

TRANSPIRATION SAP FLOW

SAPIP WIRELESS NETWORK



FEATURES

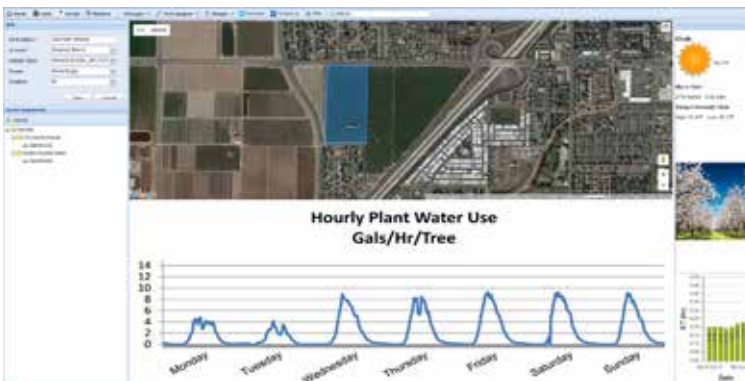
- Available with soil moisture, sap flow, and weather
- Gateway collects and forwards all radio data to Agrisensors.NET servers
- Data can be transmitted with local area network (LAN) if on-site internet accessible
- Fully integrated wireless sensor mesh networking platform
- Self-Healing Network
- 25 SapIP Nodes per Gateway Network
- GPRS Cellular Data Retrieval for remote sites

The SapIP system from Dynamax, Inc., with EXO or Dynagage sap flow sensors, can be used to measure plant water use in "real-time" with no calibration. The SapIP gateway can monitor up to (25) SapIP nodes, that may be located up to 1000 meters away, and up to (5) hops are possible. This gives a total distance of 5 km or about 2.5 miles radius from the gateway. SapIP nodes for plant water use, soil moisture, or weather may be connected altogether in one wireless network system. Data is either collected directly from the SapIP nodes or accessed through the Dynamax Agrisensors.NET website for easy monitoring, graphing, and data download.

SapIP wireless monitoring systems will help you schedule irrigation and manage plant stress. With Dynamax SapIP, irrigation scheduling has never been easier and more maintenance free.

You will have accurate data you can depend on to let you know the water status of your crops.

AGRISENSORS.NET DATA PLATFORM



FEATURES

- Maps show sensor locations
- Account management with password access to field specific data
- Data history saved for a full year or growing season
- Interactive data graphics defined by the customer to show desired date ranges
- Plant water use with soil moisture and field weather data displayed

Using Agrisensors.NET you will have access to control and configure your SapIP sensors, locate them on a map, download and upload data remotely and get status reports from each unit. The data accumulated allows you to see daily sap flow rates, see how much water your plants are actually using each day. Also using your soil moisture data you can set your weekly irrigation schedule.

With the Dynamax SapIP wireless systems and Agrisensors.NET, graphical data is presented on the internet and accessible anytime by computer, cellphone or tablet, and system locations in your fields are displayed in Google maps. All data is password protected and accessible only by you, and those designated by you the end user.

PLANT HYDRAULIC CONDUCTANCE

HIGH PRESSURE FLOW METERS



HPFM FEATURES

- **High resolution generation 3**
- **Works on roots or shoots, stems or petioles**
- **Stem ranges - 1 mm to 55 mm**
- **Measures conductivity of the entire root system**
- **USB powered data acquisition**
- **High speed sensor conversion module**

The HPFM-Gen3 measures how water movement relates to the pressure differences required to draw water from the soil or through a plant. The hydraulic conductivity relationship is a quantitative analysis for roots and stems. The measurement is performed in the field, where in-situ root system can be measured in its natural environment. In the HPFM method, the resistance of the root and shoot are measured separately by pressure perfusion and added together. The HPFM will help plant physiologists and agronomists look forward to those seasonal studies of root and shoot progression, water potential, or soil treatment effects.

HCFM-XP GEN FLOW METERS

HCFM-XP FEATURES

- **Very portable briefcase design**
- **In-situ analysis of hydraulic conductance**
- **Stem Ranges - 1 mm to 36 mm**
- **Works on roots or shoots, stems or petioles**
- **Intelligent regression**
- **Flow Rates 0.01 to 100 ml/hr**

The HCFM-XP-Gen3 Hydraulic Conductance Flow Meter, 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.



WEATHER STATIONS

SAPIP-MICRO WIRELESS WEATHER STATION



FEATURES

- Complete packages available
- Wide variety of environmental sensors possible
- RH & Air Temperature
- Wind Speed & Direction
- Solar Radiation
- Rainfall
- Calculate ETp at your location
- Uses 12 Volt battery & solar panel
- Pre-configured before shipping

The SapIP-MICRO can be used as a stand-alone weather station, or as an add-on to an existing SapIP wireless network. When monitoring plant water use using the Dynagage or EXO sap flow sensors, it is useful to compare transpiration results with ET from a weather station.

INTELMET WEATHER STATIONS



INTELMET ADVANTAGE 5 FEATURES

- MaxiMet 500 Compact weather station
- Tipping Bucket Rain Gage
- Barometric Pressure Measurement
- Dew Point Measurement
- Wind Speed & Direction Measurement
- Air Temp & Relative Humidity Measurement
- Solar Radiation Measurement
- Lightning rod



INTELMET ADVANTAGE 6 FEATURES

- MaxiMet 600 Compact weather station
- Optical Rain Gage
- Barometric Pressure Measurement
- Dew Point Measurement
- Wind Speed & Direction Measurement
- Air Temp & Relative Humidity Measurement
- Solar Radiation Measurement
- Lightning rod

The IntelliMet Advantage is a complete ETp (Evapotranspiration) weather station range that includes the DynaLog200 data logger and the MaxiMet compact weather station kit. The system comes with all software for programming, data collection, and calculation of ETp. The optical rain sensor on the IntelliMet 6 model has no moving parts, so needs very little maintenance. A battery and solar panel, grounding kit, and lightning rod kit are also included. The IntelliMet's are low-cost weather station ideal for research, commercial, or agricultural applications. The systems comes ready to mount on a 2" rigid pipe, or tripod.

WEATHER STATIONS

DYNAMET WEATHER STATIONS



DYNAMET-2 FEATURES

- MaxiMet 500 Compact weather station
- Tipping Bucket Rain Gage
- Barometric Pressure Measurement
- Dew Point Measurement
- Wind Speed & Direction Measurement
- Air Temp & Relative Humidity Measurement
- Solar Radiation Measurement
- Lightning rod



DYNAMET-5 FEATURES

- MaxiMet 500 Compact weather station
- Tipping Bucket Rain Gage
- Barometric Pressure Measurement
- Dew Point Measurement
- Wind Speed & Direction Measurement
- Air Temp & Relative Humidity Measurement
- Solar Radiation Measurement
- Lightning rod



DYNAMET-6 FEATURES

- MaxiMet 600 Compact weather station
- Optical Rain Gage
- Barometric Pressure Measurement
- Dew Point Measurement
- Wind Speed & Direction Measurement
- Air Temp & Relative Humidity Measurement
- Solar Radiation Measurement
- Lightning rod

The DynaMet Weather Station Range is a complete ETp (Evapotranspiration) system that includes the MaxiMet compact weather station kit and the DynaLog200 or DynaLog1000 data logger depending on the system chosen. The system comes with all software for programming, data collection, and calculation of ETp. The DynaMet's are a low-cost, research grade, weather station ideal for research and commercial, or agricultural applications. They come complete with a 6 ft Tripod, cross-arm, grounding kit, rechargeable battery and 10 Watt solar panel.

WEATHER STATION COMPARISON CHART

Model	Wind	Air Temp.	Humidity	Pressure	Solar Radiation	Rain	Compass	Dew Point	Solar Panel	Logger	Soil Temp.	Soil Moisture	Tripod	GPS (optional)
SapIP-MICRO		X	X							SapIP				
SapIP-MICRO1		X	X			Bucket				SapIP	X	X		
SapIP-MICRO2	X	X	X		X	Bucket				SapIP				
IMET-ADV5	X	X	X	X	X	Bucket	X	X	X	CR200				X
IMET-ADV6	X	X	X	X	X	Optical	X	X	X	CR200				X
DYNAMET 2	X	X	X	X	X	Bucket	X	X	X	CR200	X		X	X
DYNAMET 5	X	X	X	X	X	Bucket	X	X	X	CR1000	X		X	X
DYNAMET 6	X	X	X	X	X	Optical	X	X	X	CR1000	X		X	X

DEX ELECTRONIC DENDROMETERS



FEATURES

- **Non-destructive**
- **Measure plant growth or stress level**
- **Long-term measurements possible**
- **Weatherproof and rugged for field study**
- **Woody stemmed, herbaceous plants, & fruits**
- **Real-Time measurements**

The DEX20, DEX70, DEX100 and DEX200 are highly precise electronic dendrometers that measure the growth and size of plant stems and fruits. The effects of environmental factors on the water balance of plants and stem size variations over time are easily monitored with a temperature compensated dendrometer. The DEX is a caliper-style device with a full bridge strain gage attached to a flexible arm. The output signal is then recorded by a data logger or computer in real time. The millivolt sensor output shows both the diurnal and long term growth or stress level of the plant. The device has been used to test plants under conditions of water stress, elevated ozone and other atmospheric pollutants. Applications for screening plants for growth rate and stress tolerance are also common.

DEX-LOG DEX LOGGER SYSTEM



FEATURES

- **Complete DEX logging kit**
- **Measure growth or stress**
- **Long term monitoring possible**

The DEX-Log dendrometer data logging system is comprised of a GP1 data logger and (2) DEX electronic dendrometers and can be used to monitor plant growth rate or stress levels over long periods of time, and can operate completely unattended. The GP1 data logger offers a self-contained solution for monitoring DEX electronic dendrometers, soil moisture and weather sensors. Data can be monitored and displayed in real-time or output to a PC using the supplied RS-232 serial data cable.

The DEX Electronic Dendrometers can be clamped on stems or fruits (citrus, apples, plums, etc.) and can measure very tiny changes in stem or fruit diameter (~0.004 mm). A trend upward represents the growth rate of the plant, whereas a leveling off or trend downward indicates plant stress. This way, growers know when, and how much stress the plants are under. This information can then be used to schedule irrigation or fertilizer applications as well as keeping track of growth rates over time.

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