



# FELIX INSTRUMENTS – APPLIED FOOD SCIENCE

## SALES TRAINING

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# OVERVIEW

- Introduction to Felix Instruments
- Explanation of each product
  - Why it's important
  - How it works
  - Use cases and Applications
  - Advantages
- Sales opportunities

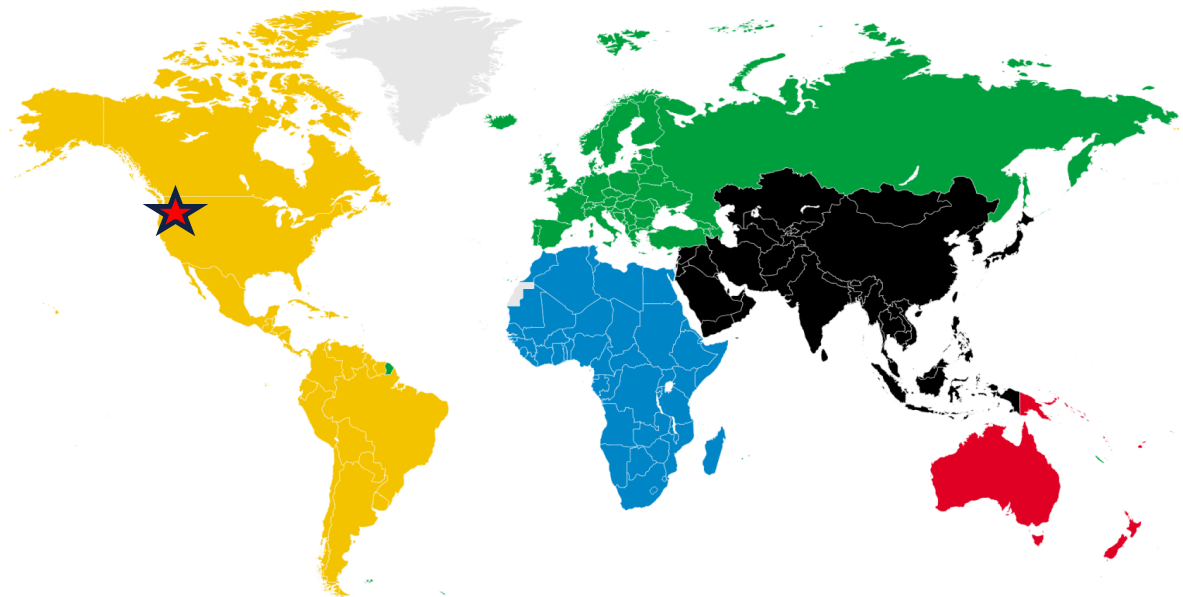


# ABOUT FELIX INSTRUMENTS – APPLIED FOOD SCIENCE

- Engineering, Manufacturing, and Business under one roof
- Created in 2012
- Subsidiary of CID Bio-Science, Inc.
  - Portable Instrumentation for Plant Physiology Measurement
  - Founded in 1989
- Created to expand our market to commercial food producers

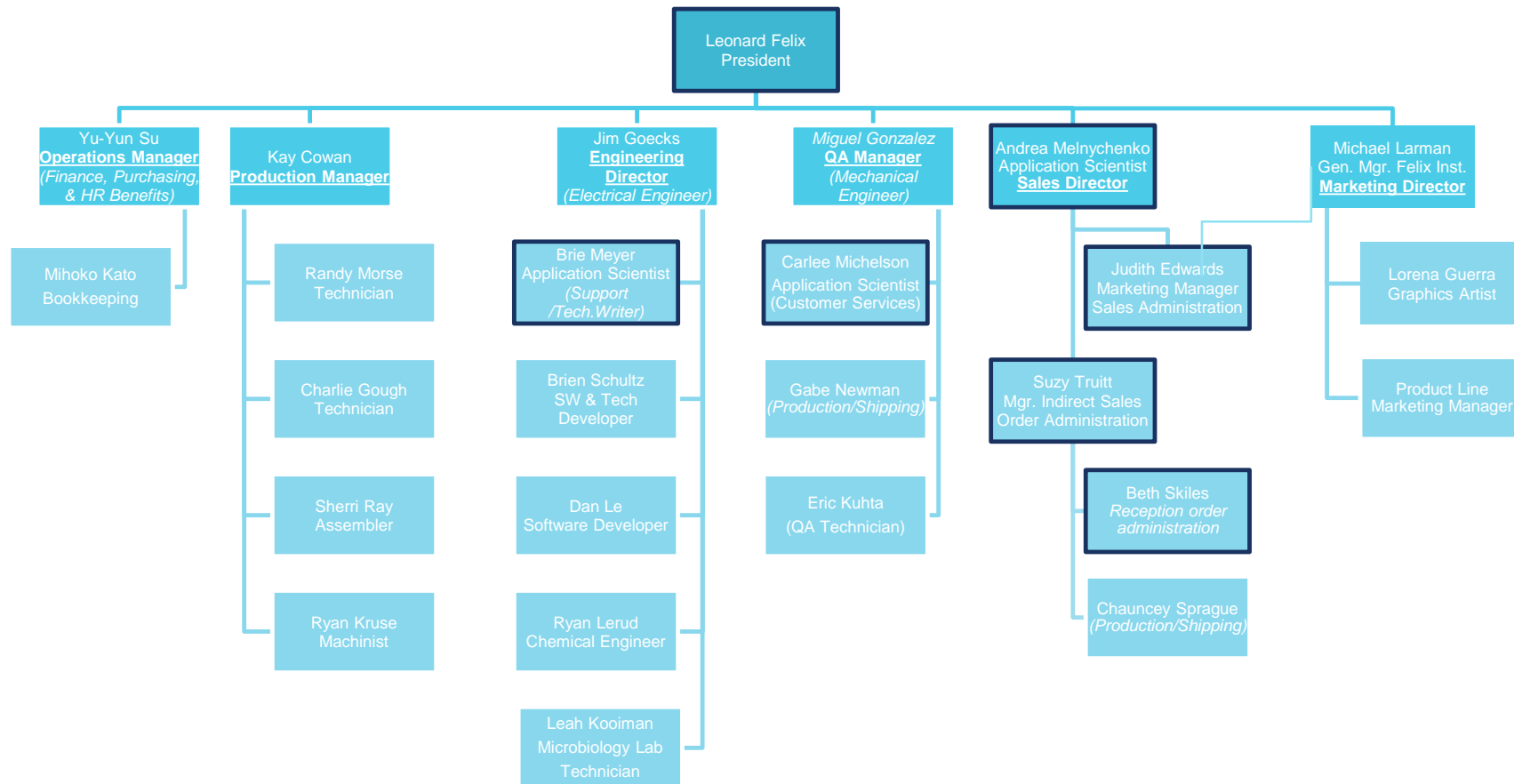


DESIGN | ENGINEER | BUILD



All instruments built in  
Camas, WA USA

# OUR COMPANY



# FULL FELIX INSTRUMENTS PRODUCT LINE

F-750



Produce Quality Meter

F-900



Portable Ethylene Analyzer

F-950



Three Gas Analyzer

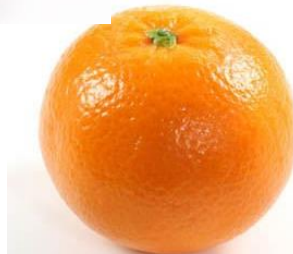
All Felix Instruments feature:

- SD Card for internal data-logging
- GPS for mapping sample locations

Bringing plant science technology from the laboratory and into the hands of the commercial produce industry.

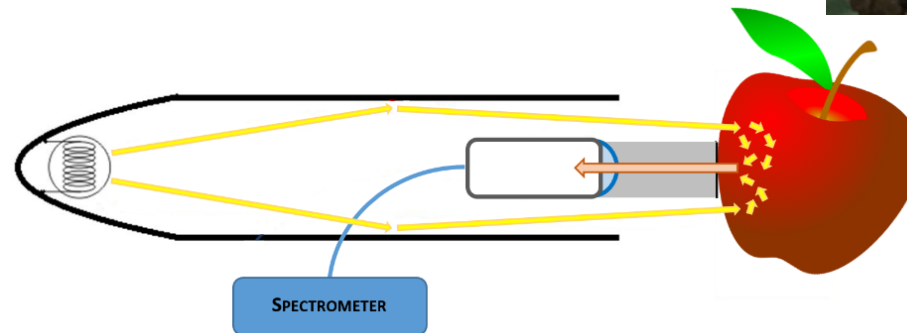
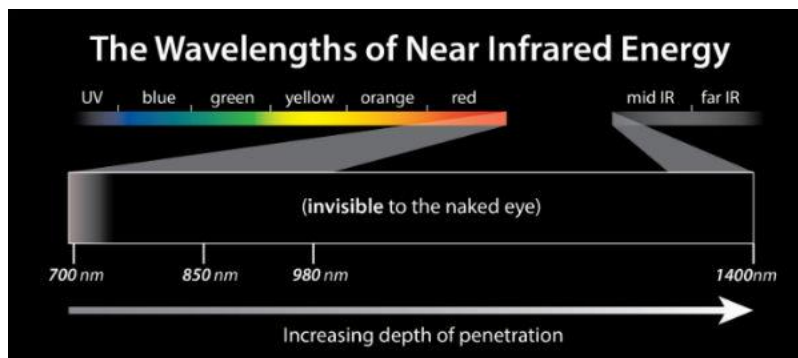
# F-750 PRODUCE QUALITY METER – WHY WE NEED IT

- Fruit is complex
  - Sugars
  - Acids
  - Dry Matter
- Molecules inside the fruit change as fruit ripens
- Consumers prefer different types of flavors
- Need a non-destructive, standardized way to measure quality!



# F-750 PRODUCE QUALITY METER – HOW IT WORKS

- Non-destructive tool for rapid quality assessment
- Acts like a high-powered flashlight – light enters fruit and returns to F-750
- Measures light interactance with groups of molecules
- NIR and visible spectrometer 310-1100 nm
- Builds models tailored to specific commodities
- Measures internal qualities of produce in under 6 seconds



Lets you see tissue  
instead of skin



# F-750 PRODUCE QUALITY METER – CALIBRATION

- Equipped with generic demonstration models
  - Users build their own custom model
1. Scan fruits and vegetables to create a training set
  2. Make destructive, reference measurements from scanned fruits
  3. Use the F-750 Model Builder Software package to marry the training set scans to the reference values and create a model with accuracy metrics
  4. Use the new model to measure hundreds of samples non-destructively

# F-750 PRODUCE QUALITY METER - USES

- Use as a crop management tool
- Time harvest with periods of peak quality
- Assign incoming produce to various controlled atmosphere storage
- Assess quality at import locations
- Assign produce to specific retail markets
- Inspection tool for retail outlets



# F-750 PRODUCE QUALITY METER - ADVANTAGES



- Non-destructive measurements
- No technique required once models are built
- Models are specific to the qualities and commodities of the user
- Improved fruit quality means produce can sell for a higher cost
- Consistency builds brand or commodity appreciation

# GAS ANALYZERS



F-900 Portable Ethylene Analyzer



F-950 Three Gas Analyzer

# RIPENING GASES – WHY THEY ARE IMPORTANT

**C<sub>2</sub>H<sub>4</sub>**: Many fruits ripen faster with **ethylene** present

- Ethylene is **made** by fruits **and sensed** by fruits
- Ethylene can quickly lead to **decay** and **spoilage** in sensitive commodities
- Ethylene can be added to **stimulate ripening** or degreening

**CO<sub>2</sub>**: Produce respire **carbon dioxide** as it breaks down sugars for energy.

- Determine **metabolic activity** by measuring CO<sub>2</sub>
- Artificially elevating CO<sub>2</sub> through **modified atmosphere packaging** or in **controlled atmosphere storage** can slow respiration rates, making produce last longer.

**O<sub>2</sub>**: Produce needs **oxygen** to maintain cellular function

- Decreased O<sub>2</sub> can **extend lifetimes** of produce during long-term storage
- At very low O<sub>2</sub>, **anaerobic respiration** occurs, damaging produce and causing spoilage

# THE F-900 PORTABLE ETHYLENE ANALYZER



Ethylene Range: 0-200 ppm

Lower Detection Limit: 0.04 ppm

## Optional Sensors



0-2000 ppm



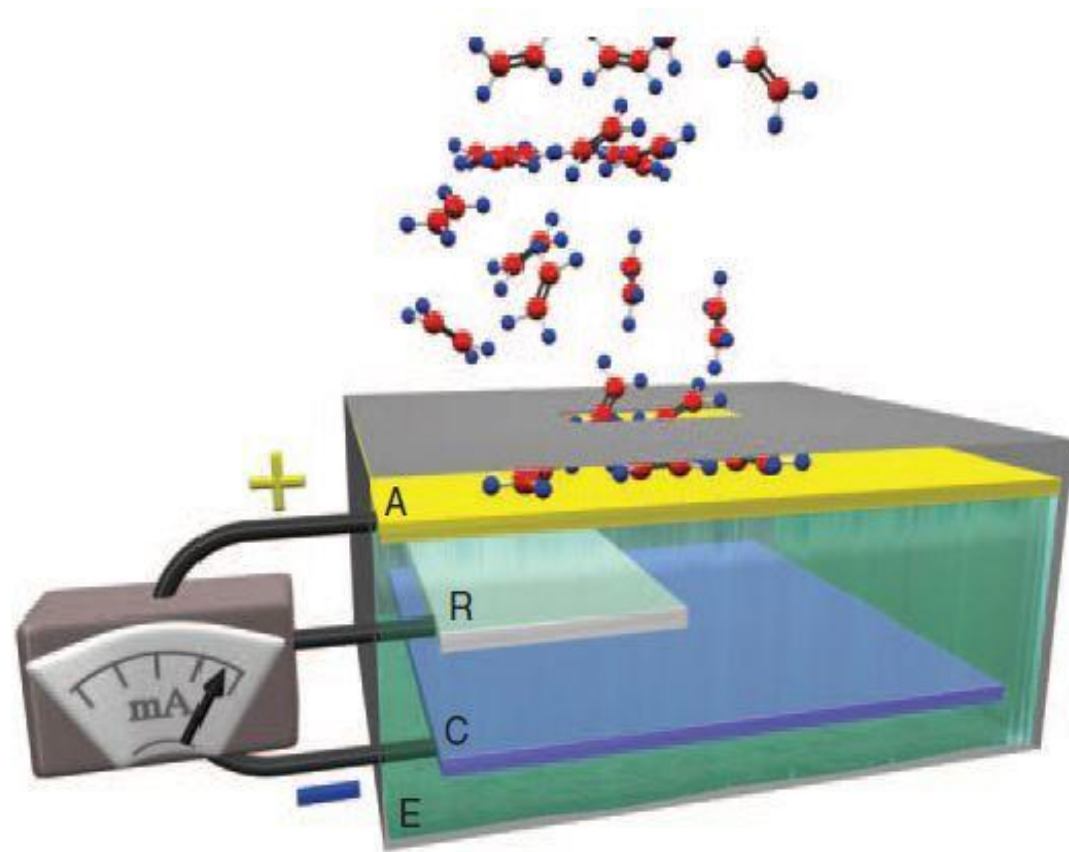
0-20%

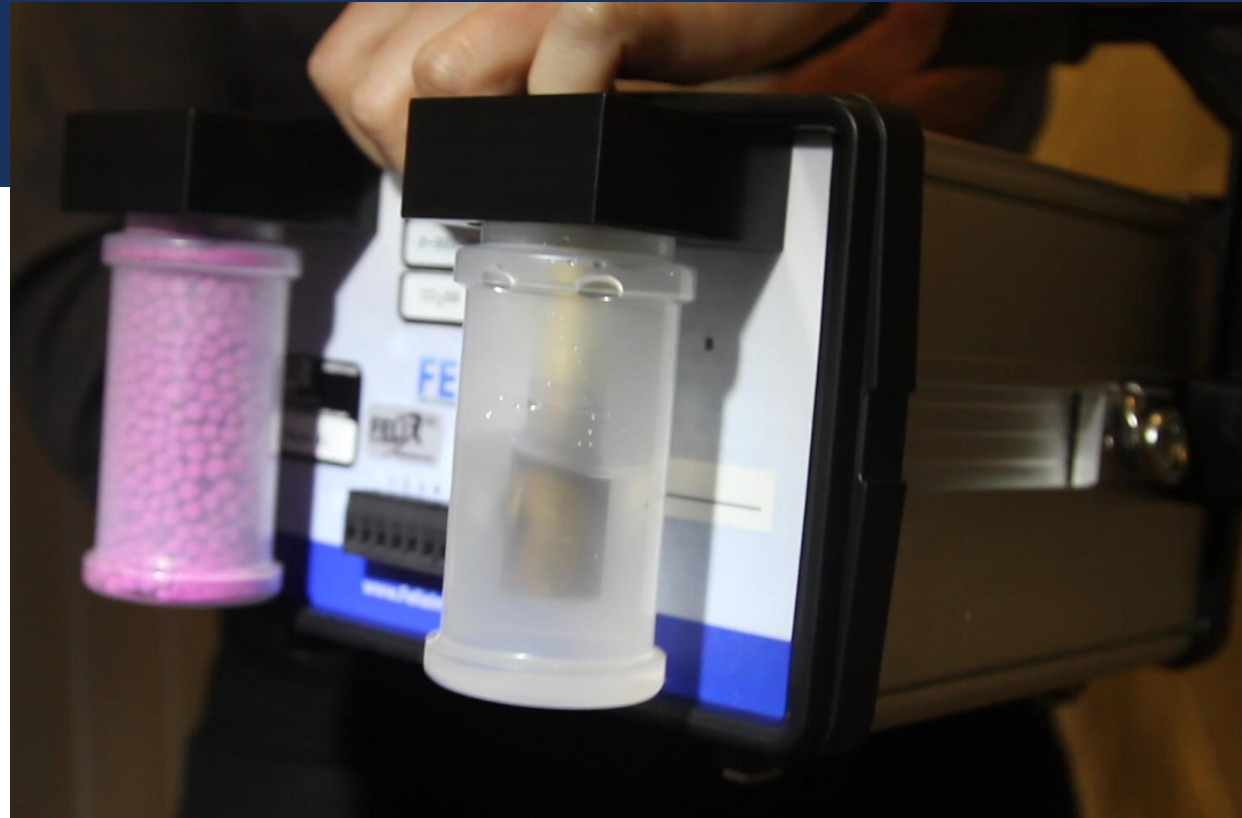


0-100%

# THEORY OF OPERATION – ETHYLENE SENSOR

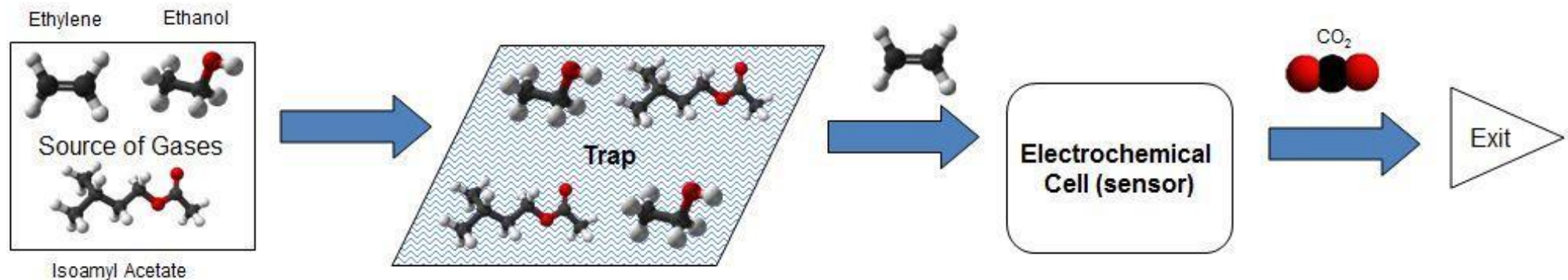
- ▶ Real-time measurement device
- ▶ Open or Closed System
- ▶ Two electrochemical sensor
  - ▶ PPB sensor: Down to 0.040 ppm (40 ppb)
  - ▶ PPM sensor: Up to 200 ppm





## PolarCept™

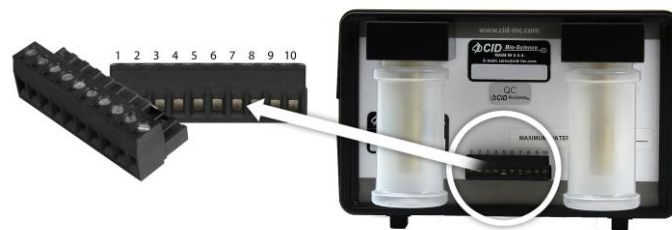
Patented water filter  
removes competing  
gases from the sample  
gas stream





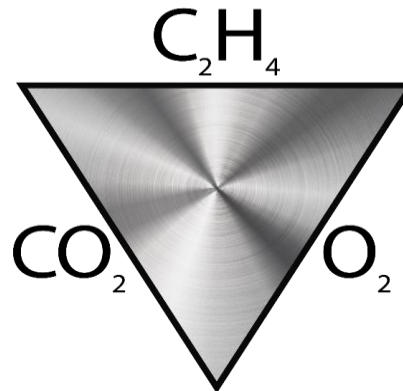
# APPLICATIONS

- ▶ Continuous monitoring
  - ▶ Storage facility, greenhouse
- ▶ Inspection device
  - ▶ CA rooms, containers
- ▶ Fluxes from fruits and leaves
  - ▶ Pre-harvest, post-harvest
- ▶ Headspace accumulation
  - ▶ Small volume samples



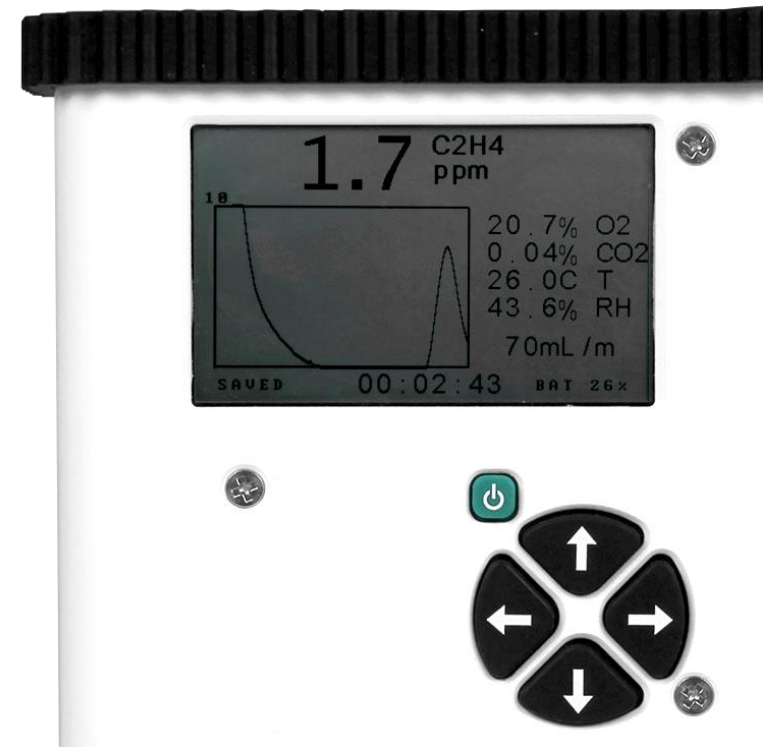
# F-950 THREE GAS ANALYZER

- Measures CO<sub>2</sub>, O<sub>2</sub> and ethylene (C<sub>2</sub>H<sub>4</sub>) in real time
  - Ethylene from 0.5 ppm to 200 ppm
  - CO<sub>2</sub> from 0-20%
  - O<sub>2</sub> from 0-100%
- Data-logged internally
- Open or closed system measurements



# APPLICATIONS – CONTINUOUS MODE

- Continuous Mode
  - Live-updating graphs of gas concentrations
  - Data saved every one second
- For measurements in a changing environment
- Use for tracking down areas of high gas accumulation



# APPLICATIONS – TRIGGER MODE

- Trigger Mode
  - Continuous flow-through until stable value is reached
  - One final value is reported and recorded
- Inspection tool
- Ideal for gas levels checks of static locations



## APPLICATIONS – FIXED VOLUME MODE

- Fixed Volume Mode
  - 10-15 mL samples pulled into instrument
  - Gas is recirculated and a single concentration is reported
- Measurements from Modified Atmosphere Packaged
- Measurements of headspace accumulation in jars



# CALIBRATIONS

<b>Instrument</b>	<b>Sensor</b>	<b>Zero</b>	<b>Span</b>	<b>Full</b>
F-900	PPB Ethylene	Daily	Weekly	Annually
F-900	PPM Ethylene	Daily	Bi-annually	Annually
F-900	CO2 PPM	Weekly	Bi-annually	Annually
F-900	CO2 PERCENT	Bi-annually	Bi-annually	Annually
F-900	O2	Weekly	Bi-annually	Annually
F-950	PPM Ethylene	Daily	Bi-annually	Annually
F-950	CO2 PERCENT	Bi-annually	Bi-annually	Annually
F-950	O2	Weekly	Bi-annually	Annually

# COMPETITORS

	<b>F-750</b>	<b>NIRvana</b>
<b>Wavelength</b>	303- 1070 nm	350-1100 nm
<b>Resolution</b>	8-13 nm	8-13 nm
<b>Battery life</b>	16,000 samples	Full day of operation

	<b>F-900</b>	<b>F-950</b>	<b>EMS MACView</b>	<b>Mocon</b>	<b>OxyBaby</b>
<b>Ethylene range</b>	0.04-200 ppm	0.5-200 ppm	0-5 ppm	Not available	Not available
<b>CO2</b>	Optional 0-2000 ppm Optional 0-20%	0-20%	Not available	0-30%	0-100%
<b>O2</b>	Optional 0-100%	0-100%	Not available	0-100%	0-100%
<b>Calibration</b>	Weekly, Bi-annually	Annually	Weekly	Annually	Annually

# CONFERENCES TO PRESENT FELIX INSTRUMENTS

- Tradeshows
  - Produce Marketing Associations
  - Regional produce conferences
- Academic Conferences
  - Horticultural conferences
  - Postharvest conferences
- Commodity-specific events



**World Conference on Horticultural Research**  
17-20 June 1998 in Rome, Italy



**Postharvest Unlimited**  
ISHS International Conference  
10-13 June 2014 • Cyprus





# KEY CUSTOMERS

- **Companies focused on Brand and Quality**

- Quality Assurance Managers
- Fieldmen
- Crop consultants
- Warehouse Managers
- Research and Development Staff
- Importers
- Exporters
- Fruit Surveyors

- **Academic fruit and vegetable Researchers**



# SALES OPPORTUNITIES

- Customer visits
- **Evaluations are key!**
- Commodity-specific brands
- Regional knowledge of the marketplace
- Annual maintenance recommended for all
  - Revenue opportunity after sale if performed by distributor
- Model Building Service for revenue

# FELIX INSTRUMENTS DIRECT SALES PIPELINE

Send Pricing Quickly

Phone call with  
Application Scientist

Follow up!

# RESOURCES

## Sales Team Website

[www.felixinstruments.com/salesteam](http://www.felixinstruments.com/salesteam)

- Brochures
- Photos
- Graphics
- Logos
- Videos
- Certificates
- Press Releases
- Manuals
- Specifications Documents
- Training
- Newsletters

We offer **Complimentary Technical Training** for all of our instruments!

Excellent Resource for:

- New customer training
- Sales advantage over competitor instruments
- Technicians or technical sales staff

# QUESTIONS

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