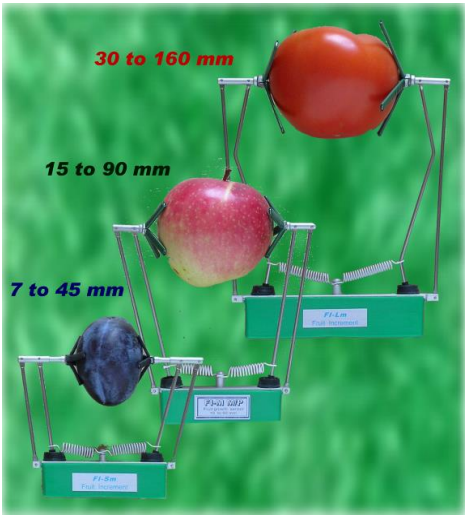
Bio Instruments S.R.L.

SENSORS AND SYSTEMS
FOR MONITORING GROWING PLANTS

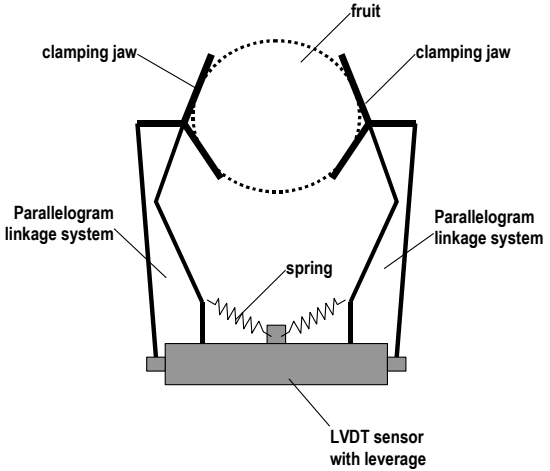
FI-ST-S, FI-MT-S, and FI-LT-S
Fruit Growth Sensors

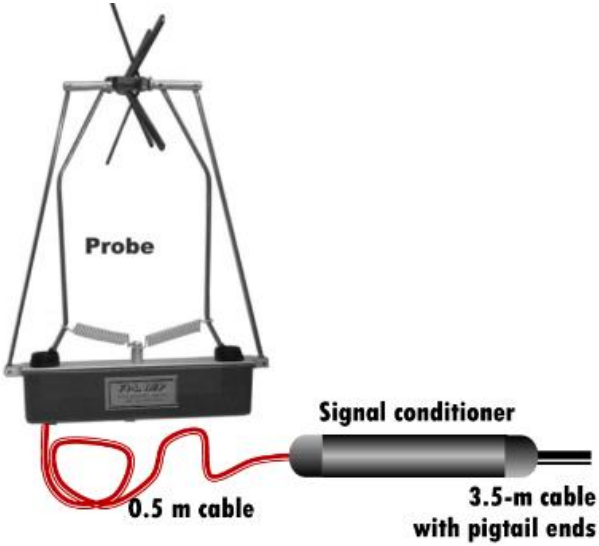


www.phyto-sensor.com

Introduction

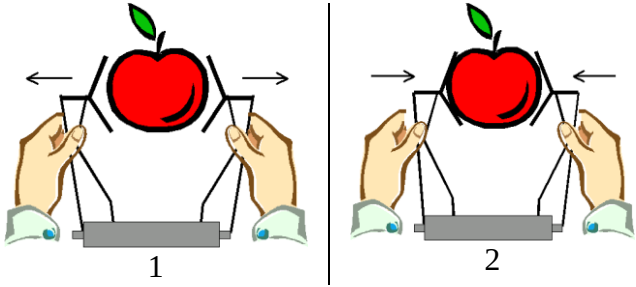
A series of absolute displacement sensors provides recording both size and growth rate of intact rounded (like tomato and apple) and oblong (like cucumber and banana) fruits in three diameter ranges within 7 to 160 mm. Original parallelogram design of moving arms provides firm and straight positioning of the sensor on a fruit under study. The FI-type sensor consists of an LVDT transducer mounted in a special clip, and a DC powered signal conditioner.





Installation

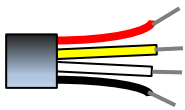
- Choose a fruit for attaching the sensor.
- Move clamping jaws apart so as the sensor can hold the fruit in the desired position.



- Check if the sensor holds the fruit firmly and cannot easily slide down with application of gentle force.
- Secure the sensor's cable on a stem near the fruit in order to prevent occasional movement of the sensor.
- Check the position of the sensor regularly.

Connection

The connection diagram is shown below. The shield shall be grounded at the data loggers side or connected to the 'minus' contact of the power source.



Red:	+Power 2.8 to 12 Vdc or 5 to 16 Vdc
Yellow:	UART TTL Output
White:	Ground
Black:	Shield

Data reading

Digital outputs have data format: UART TTL, Baud Rate = 9600, 8N1.
Decimal data format: XXX.XX (mm).
In a basic version, the UART-TTL operates as following:

1. After power is on, the sensor takes the first measurement within 300 ms approximately, and, then, sends the measured value in ASCII code. For instance, if the measured value is 35.45 mm, the string looks like **35.45<CR><LF>**. Where
<CR> - Carriage Return
<LF> - Line Feed

2. Then the sensor takes new measurement and sends the new reading every 5 second while power is on. Upon customer's request, the factory basic protocol can be modified with another (a) the string content (to add header, CRC, etc.), (b) Baud rate, (c) sampling time (any value from 1 s and more).

Power

The FI-sensors are to be powered from an external regulated power supply with 2.8 to 12 Vdc output voltage (S1 modification) or 5 to 16 Vdc (S2 modification).

Specifications

Model	**FI-LT-S**	**FI-MT-S**	**FI-ST-S**
Measurement range	30 – 160 mm	15 – 90 mm	7 – 45 mm
Resolution, mm	<0.1	<0.05	<0.02
Operating temperature	0 to 50°C		
Temperature effect	<200 ppm FS/°C		
Output	UART TTL		
Supply voltage	S1: 2.8 to 12 Vdc@15mA max.		
	S2: 5 to 16 Vdc@15mA max.		
Output auto update time	5 s		
Excitation time	0.3s		
Protection index	IP 64		
Cable length:	Customized (4 m total length standard)		

Customer Support

If you ever need assistance with your sensor, or if you just have questions or feedback, please e-mail at support@phyto-sensor.com. Please include as part of your message your name, address, phone, and fax number along with a description of your problem.

Phyto-Sensor Group

BIO INSTRUMENTS S.R.L.

20 Padurii St., Chisinau MD-2002
REPUBLIC OF MOLDOVA
Tel./Fax: +373-22-550026
info@phyto-sensor.com
www.phyto-sensor.com