Bio Instruments S.R.L.

SENSORS AND SYSTEMS
FOR MONITORING GROWING PLANTS

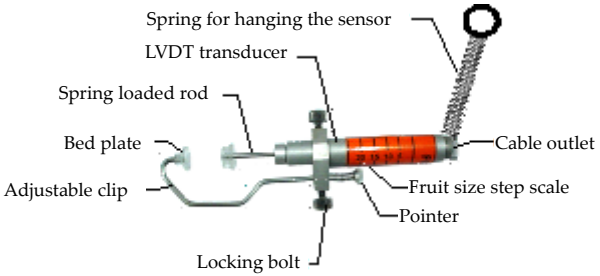
FI-XST-SDI12

Fruit Growth Sensor
(for 4 to 30 mm fruits)

www.phyto-sensor.com

Introduction

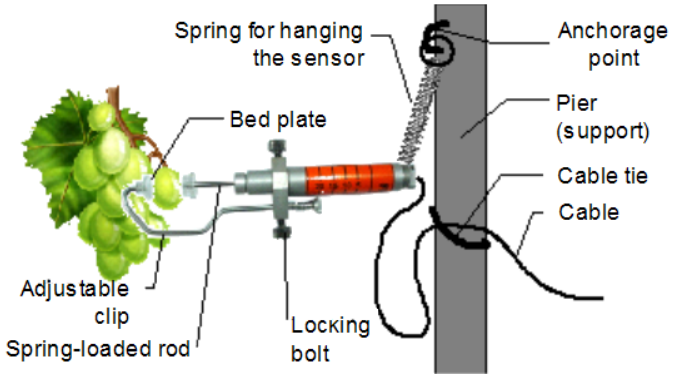
The FI-XS sensor is designed for monitoring growth of extra small rounded fruits, 4 to 30 mm in diameter. The sensor includes a linear displacement transducer (LVDT) provided with a special clip for positioning the sensor on a fruit under study. The LVDT stroke is 10 mm while the bed plate position may be adjusted to the fruit size within 4 to 30 mm.



Standard cable length between sensor and signal conditioner is 0.5 meter. The standard output cable length is 3.5 m (4 m total length). The length may be customized in the order if need be.

Installation

Figure below illustrates a proper positioning of the sensor on a plant.



A stationary pier (support) is to be used for positioning the sensor and its cable. At first, adjust the sensor's clip to the fruit diameter by using a step scale located on the sensor's body.

1. Hang the sensor in the vicinity of the fruit using the attached hanging spring.
2. Free locking bolt and move the adjustable clip apart from LVDT transducer. Move the clip back until both a bed plate and a cup of the spring-loaded rod touch the fruit. Continue to move

the clip until the pointer reaches the next closest line of the step scale. Fix the locking bolt.

The bedplate must have a firm contact to the fruit surface, which is opposite to the spring-loaded rod. Thus, the fruit is slightly gripped between the bed plate and the rod's cup.

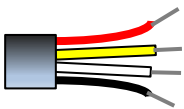
The hanging spring holds the sensor and pulls it slightly backward, providing necessary position of the bedplate, which has to be in close contact with the fruit surface all the time. In this case, the rod moves forward and backward, relatively to the bedplate, following variations of fruit diameter.

The cable shall be secured also as it is shown in the picture.

The actual fruit size may be evaluated as a sum of a sensor reading and a step scale value indicated by the pointer.

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 5 to 24 Vdc
Yellow: SDI-12 Input/Output
White: Ground
Black: Shield

Data reading

SDI-12 :

In accordance with SDI-12 Standard (version 1.3)

Power

The FI-sensors are to be powered from an external regulated power supply with 5 to 24 Vdc output voltage.

Specifications

Measurement linear range (LVDT stroke)	0 to 10 mm
Adjustable range of fruit diameter	4 to 30 mm
Outputs	SDI-12
Resolution	12 bit
Operating temperature	0 to 50°C
Temperature effect	< 0.02% total stroke / °C
Supply voltage	5 to 24 Vdc, 10 mA max.
Excitation time	0.3 s
Overall dimensions, mm	110 W × 40 H × 15 D
Cable length	Customized (4 m total length standard)

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