



***Bio Instruments S.R.L.***

SENSORS AND SYSTEMS  
FOR MONITORING GROWING PLANTS

## **FI-XSM**

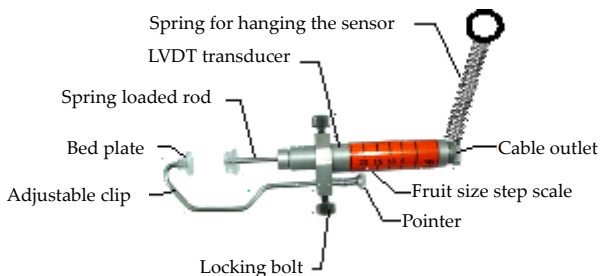
*Fruit Growth Sensor  
(for 4 to 30 mm fruits)*



[www.phyto-sensor.com](http://www.phyto-sensor.com)

## ***Introduction***

The FI-XSM 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.

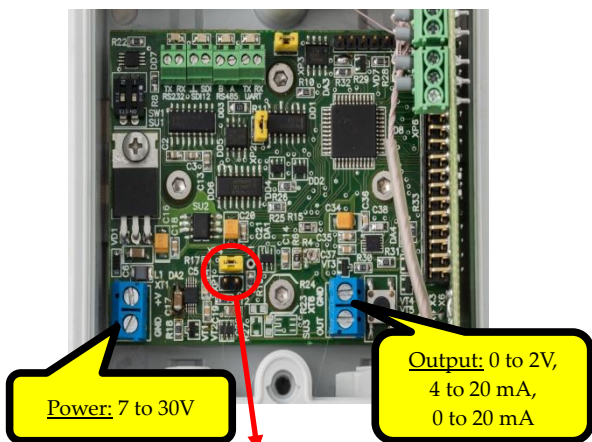


Standard cable length between sensor and signal conditioner is 2 meter. The output cable length should be specified in the order if required.




## Connection

For models supplied without output cable, please use a four-core cable with 3 to 6 mm outer diameter. The connection diagram is shown in the picture below:

### Connection Diagram



### Output configuration

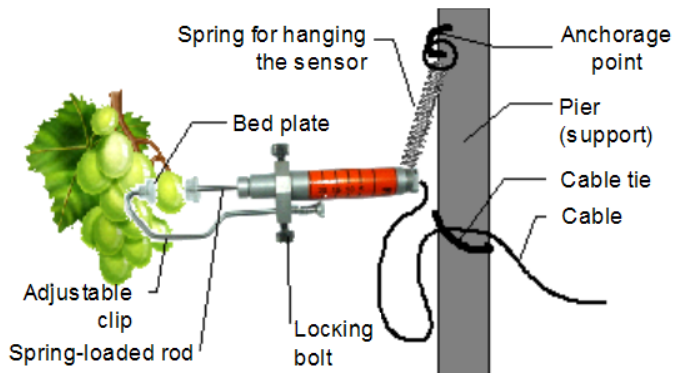
		
Jumper on XP4 0 to 2 Vdc	Jumper on XP1 4 to 20 mA	No jumper 0 to 20 mA

Maximal length of the output cable is 4 m for sensors with voltage output and up to 200 m for sensors with 4 to 20 and 0 to 20 mA output.

**For models supplied with the optional output cable,** please refer to a wiring diagram attached to the sensor.

### ***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.

## ***Calibrations table***

<b>V</b>	<b>mA</b>		<b>mm</b>
0,000	4,000	0.000	0,000
2,000	20,000		10,000

## ***Calibrations equations***

0 to 2 V output:  $\Delta D = 5 \times U$

4 to 20 mA output:  $\Delta D = 0.625 \times I - 2.5$

0 to 20 mA output:  $\Delta D = 0.5 \times I$

Where

$\Delta D$  – fruit diameter variations in mm

$U$  – output voltage in Volts

$I$  – output current in mA

## ***Specifications***

Measurement linear range (LVDT stroke)	0 to 10 mm
Adjustable range of fruit diameter	4 to 30 mm
Outputs	0 to 2 VDC 4 to 20 mA 0 to 20 mA
Resolution	0.005 mm (w/filter)
Operating temperature	0 to 50°C
Temperature effect	< 0.02% total stroke / °C
Supply voltage	7 to 30 VDC
Output auto update time	5s
Excitation time	1s
Overall dimensions, mm	110 W × 40 H × 15 D
Cable length between probe and signal conditioner	2 m



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](mailto:info@phyto-sensor.com)

[www.phyto-sensor.com](http://www.phyto-sensor.com)