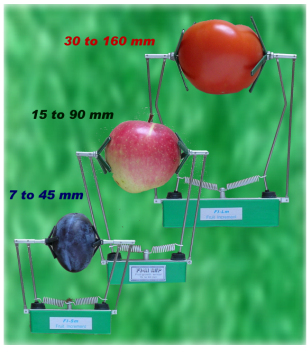
FI-xM (FI-SM, FI-MM, FI-LM)
Fruit Growth Sensors
Quick Start Guide

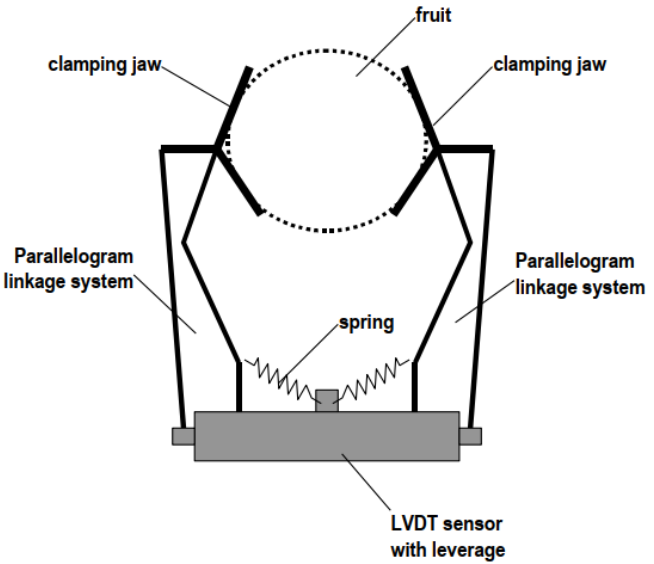


phyto-sensor.com

Series 5000

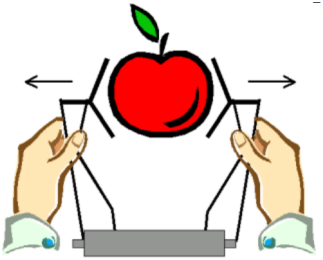
Introduction

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 to prevent occasional movement of the sensor.
- Check the position of the sensor regularly.



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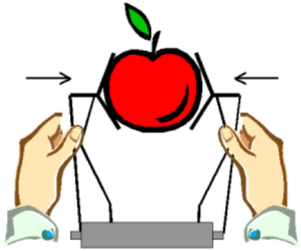

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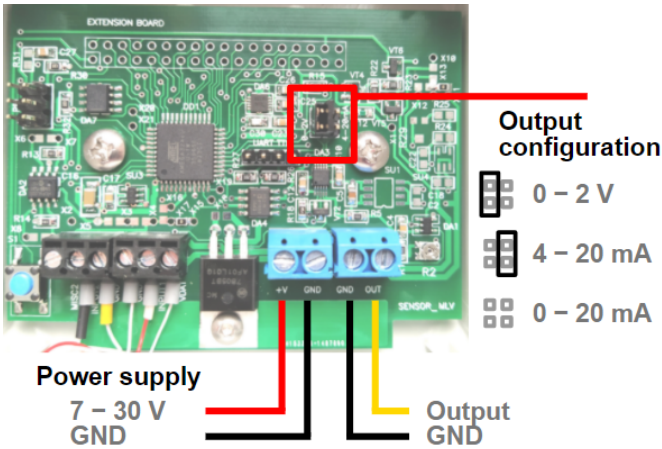
Connection

Please use a four-core cable with 3 to 6 mm outer diameter.

The connection diagram is shown in the picture below (modification of the output is determined by appropriate jumpers):



First, please choose a right output cable for connecting the sensor to a datalogger. The cable must be round with four wires. The maximal diameter of the cable is 6.5 mm. The cable length shall not exceed 10 m for 0 to 2 Vdc output (model FI-xM) and with about 1 km maximal length for 4 to 20 mA or 0 to 20 mA output (model FI-xMi).

Power supply

The 7 to 30 Vdc @ 30 mA (+20 mA for current output) regulated power supply may be used.

In case of using the intermittent power supply, please respect the following recommendations: When using analog outputs, all possible measures for reducing instrumental errors shall be undertaken:

- Screened cables.
- Cables with low impedance.
- Filtration of the signal with low cutoff frequency.
- Digital filtration of the signal.

Calibration table

U, Volts	I, mA 4 to 20	I, mA 0 to 20	FI-SM, mm	FI-MM, mm	FI-LM, mm
0.0	4.0	0.0	7.00	15	30
0.5	8.0	5.0	15.50	33.75	62.50
1.0	12.0	10.0	26.00	52.50	95.00
1.5	16.0	15.0	35.50	71.25	127.50
2.0	20.0	20.0	45.00	90.00	160

Calibration equations

0 to 2 Vdc Output:

$D = 19 \times U + 7$ **(FI-SM)**

$D = 37.5 \times U + 15$ **(FI-MM)**

$D = 65 \times U + 30$ **(FI-LM)**

4 to 20 mA Output:

$D = 2.375 \times I - 2.5$ **(FI-SM)**

$D = 4.6875 \times I - 3.75$ **(FI-MM)**

$D = 8.125 \times I - 2.5$ **(FI-LM)**

0 to 20 mA Output:

$D = 1.9 \times I + 7$ **(FI-SM)**

$D = 3.75 \times I + 15$ **(FI-MM)**

$D = 6.5 \times I + 30$ **(FI-LM)**

where:
D — measured diameter, mm
U — output voltage, V
I — output current, mA

Specifications

Measurement range	*FI-SM*	7 to 45 mm
	FI-MM	15 to 90 mm
	FI-LM	30 to 160 mm
Temperature effect		< 200 ppm FS/°C
Outputs		0 to 2 Vdc 4 to 20 mA, 0 to 20 mA
Output auto update time		5 s
Excitation time		200 ms
Supply voltage		7 to 30 Vdc
Current consumption		< 30 mA (+20 mA for current output)
Operating temperature		5 to 50°C
Protection index		IP64
Cable length between probe and signal conditioner		1 m

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.

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