



**EMS Brno**

**Data Acquisition Environment**  
Hardware – Software – Cloud application  
[www.emsbrno.cz](http://www.emsbrno.cz)

## **Dendrometer increment sensor DRL27 LTE with built-in LTE modem**

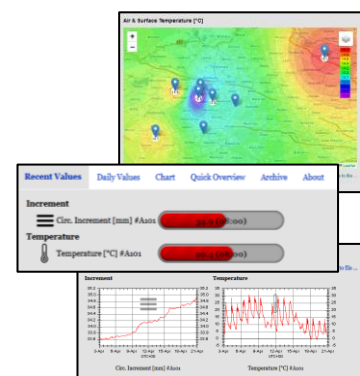
### **Main features:**

- Sensor for long-term on-line monitoring of tree trunk circumference increment
- Built-in LTE modem
- Non-invasive fixing
- Step-less reading
- No upper limit in stem diameter
- Internal temperature sensor
- Manufactured by EMS



### **Brief specifications:**

- Minimal stem diameter 8 cm
- Circumference increment range 71 mm
- Resolution less than one micrometer
- Linearity 2% over full range
- Battery capacity more than 3 years (when measuring every 30 minutes and transmitting data twice a day)
- Battery replacement without opening the enclosure
- Optional measurement/storing interval 10 or 30 min
- Optional sending interval 2, 4, 8 or 12 hrs



## General description

Dendrometer increment sensor **DRL27 LTE** is designed for continuous long-term on-line monitoring of stem increment of stems with diameter 8 cm and larger. The sensor output is calibrated directly in millimetres of stem circumference increment from the starting position.

Data transmitting is provided by built-in LTE/GPRS modem. Inserted global SIM card enables use of any available local operator without the need for further setup. Data visualization, archiving and downloading is fully supported by EMScloud application.

The sensor is designed with respect to easy and fast installation. It is fastened on the measured object by means of stainless tape wrapped around the stem. Adherence pressure is set as a compromise between the influence on plant tissues and stability of position.

## Specification

Increment sensors type	rotary position
Range	71 mm of circumference
Linearity	2 % of full scale
Resolution	1 $\mu$ m
Internal temperature accuracy	$\pm 0.3$ °C
Tape strength	15 to 20 N in the whole range, stem diameter independent
Tape temperature coefficient	16 $\mu$ m/m,K
Operating environment temperature	-40 to 60 °C
Operating environment humidity	0 to 100 %
Battery lifetime (when measure in 30 minutes intervals and transmitting data twice a day)	ca 3 years
Measuring interval	30 min (by default)
Storing interval	30 min (by default)
Internal backup memory (accessible with manufacturer's assistance)	128 kB (50,000 values)
Modem activity	12 hrs (by default)
Data transmission	LTE or GPRS network (according to signal availability)
SIM card size	nano-SIM (4FF)
Clock accuracy	Daily synchronization with server
Battery	SAFT LSH20 (encapsulated, with connector M8)
Weight (incl. battery)	540 g
Protection	IP 63

## Sensor installation notes

The sensor is attached to the stem with measuring tape without any additional fixing aids. It shall be positioned on a relatively flat and regularly shaped part of the shank in a relatively smooth location with no irregularities around the circumference. See installation manual or video for details.

# **Software**

## **EMScLOUD application**

Is a complex application for data flow of transmitting EMS devices. The application is responsible for the receiving of data, their verification for integrity, archiving and visualization.

Clear visualization on application website is ideal for quick checking of measured data, control of measuring infrastructure but also as instant data presentation. Warning system with e-mail notification alerts users about any outages or damages of device.

## **Mini32**

Mini32 is universal software running under Windows® 8, 10 and 11. Its data processing part is made for work with large and long-time data series. It offers exceptionally sophisticated visualization and data manipulation, it includes basic statistic features, creates graphs and exports data to different file formats.

## **Application programming interface (API)**

This interface enables automated (programmer-created) communication and subsequent storage of data (DCV, XLSX or CSV) or images (PNG) in the customer's server. The API callbacks are created and sent to the customer server after each receiving of data from the assigned device.