

**CAPTIV Ergonomics  
Analysis and Design Tools**

*Wireless sensors, video and task analysis –  
all in sync!*



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- CAPTIV L2100

## CAPTIV Hardware Options

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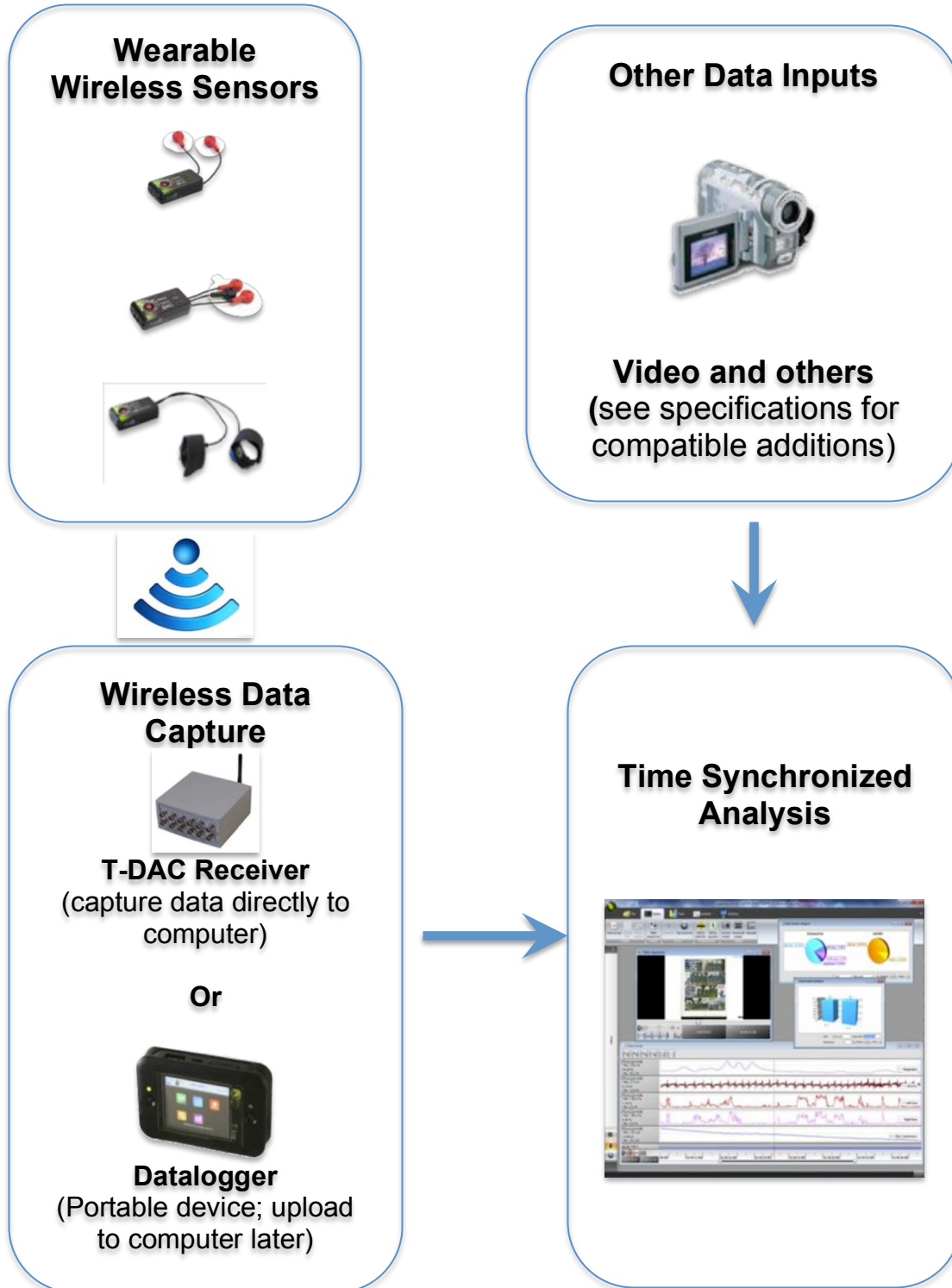
### Input/Output & wireless acquisition module:

- T-DAC / T-DAC8

### T-Sens wireless sensor options:

- Force (Force Sensing Resistors)
- Load Cell (Force Transducer)
- Accelerometer
- Goniometer (angle) & Torsiometer (rotation)
- Orientation
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- Heart rate
- Respiration
- Temperature
- Skin conductance
- GSR & Temperature
- ECG
- Universal

## System Overview





# CAPTIV Software Options

*Also see the specifications and comparison matrix on the next page for more details.*

## **L7000**

### **Premium Package – All Inclusive**

- Synchronized recording of videos and wireless sensor measurements and other data inputs (see specifications matrix, below)
- Detailed observations; includes all of the capabilities of L2100 software, described below
- Visual comparison between videos and measured or observed events,
- Evaluation of constraints and physical capabilities in the context of a specific activity
- Preparation of multimedia reports
- and more...

## **L2100-V**

### **Data Analysis Package**

- Detailed observation protocols: gestures, postures, actions, events, etc
- Real-time or post-coding of visual observations with user-friendly editor
- Dynamic display of graphs of activity, in sync with video sequences
- Statistics with a click: durations, frequencies, repetitions, simultaneities, transitions, etc
- Multiple-criteria search with numerous customizable parameters
- Export images and files for multimedia reports

## **L2100-M**

### **Data Analysis Package +**

- All the capabilities of L2100, plus the import of other data files with ease of synchronization & replay

## Software Feature Comparison

	L2100-V	L2100-M	L7000
Activation dongle	✓	✓	✓
30-day trial	✓	✓	
<b>Compatible CAPTIV Hardware</b>			
T-USB key for real-time (1 to 6 T-Sens sensors)			✓
T-Log datalogger (1 to 6 T-Sens sensors)			✓
T-DAC			✓
T-DAC 8			✓
T-Sens Sensors			✓
<b>Compatible 3<sup>rd</sup> Party Hardware</b>			
ProComp / FlexComp Infinity			✓
Biometrics DATALOG			✓
BAPPU			✓
Others			Contact us
<b>Compatible 3<sup>rd</sup> Party Eye-Tracking</b>			
faceLAB version 5			✓
Tobii T Series and X Series			✓
Others			Contact us
<b>Video</b>			
Real-time video recording via USB			One channel
Real-time video recording via IP			Coming soon
Video import			✓
Multi-display of 1 to 4 videos simultaneously			✓
<b>Task Analysis</b>			
Encoding of imported video(s)	✓	✓	✓
Real-time encoding	✓	✓	✓
<b>Data Files / Measurements</b>			
Import of data files in .TXT		✓	✓
Import of T-Log data files Import of datafiles in .CSV .EDF and other validated formats			✓
Export of raw data			✓

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## Software Feature Comparison

	L2100-V	L2100-M	L7000
<b>Analysis Features</b>			
Synchronous display of video and observations	✓	✓	✓
Synchronous display of video, observations and measurements		✓	✓
Statistics on task analysis (summary, histograms, transitions, overlaps, ...)	✓	✓	✓
Statistics on data files		✓	✓
Multicriteria search (data files and observations)		✓	✓
Comparison with thresholds			✓
Export of results & tables	✓	✓	✓
<b>Other Tools</b>			
Assisted synchronization of video and data files in .TXT		✓	✓
Assisted synchronization of video and data files in .TXT and other validated formats			✓
Assisted synchronization of video and T-Log data files			✓
Advanced processing capabilities			Coming soon
Reporting			Coming soon

# Wireless Data Collection

*No wires, no tethers, no hassles*

**Wearable  
Wireless Sensors**




**Wireless Data  
Capture**



**T-USB**  
(capture data directly to computer)

**Or**



**Datalogger**  
(Portable device; upload to computer later)

CAPTIVE L7000 Compatible Sensors		
Sensors	Biomechanics	Force
		Goniometer & Tensiometer (angle and rotation)
		Acceloration
		Inclination
		Orientation
	Physiology	sEMG
		Heart Rate
		Oxymetry
		Respiration
		Temperature
		GSR + T°C
		EKG/ECG
		Skin Conductance
	Environmental	Temperature
		Pressure
Universals Module (0-3V): Compatible with sensors for organic volatile compounds, dust, light, noise, vibration, etc.		
Others by special request		
Eye Tracking	faceLAB	
	Tobii	
	Others: contact us	

## Portable Datalogger



With its large touch-screen and its powerful CAPTIV-L7000 analysis software, T-Log is a unique solution providing unchallenged flexibility to demanding professionals, whether in the lab or in the real world. Captures data from up to 6 simultaneous T-Sens wireless sensors (additional available by special order).

## T-USB

Same concept as the T-Log, but data is received directly on your computer, bypassing the portable touch screen T-Log offers. Captures data from up to 6 simultaneous T-Sens wireless sensors (additional available by special order).



## Available T-Sens sensors

- Force (FSR)
- Goniometer & Torsiometer
- Heart Rate (BPM)
- EKG/ECG
- Accelerometer 3 axis
- Inclinator 2 axis
- Orientation 360°
- Surface EMG (RMS)
- Skin temperature
- Skin conductance
- GSR & Temperature
- Respiration
- Load Cell - Universal module (0-3Vcc)
- Customized sensors: contact TEA





## T-Sens Wireless Sensors

*Wearable, light-weight, portable, non-intrusive*



## T-Sens sEMG

### *Surface Electromyography (sEMG).*

The RMS data is calculated by the module itself. Can be used with single electrode or with the trio.



Electrical specifications	
Number of channels	: 1
Calibration	: F-max
Unit	: $\mu\text{V}$
Power supply	: Li-Ion battery 190mAh
Battery life	: 8hrs
Recharging time	: 3hrs
Sensors specifications	
Sampling rate	: 2048Hz
RMS calculation	: 128Hz
Resolution	: 16Bits
Range	: 4000 $\mu\text{V}$ , 2000 $\mu\text{V}$ , 1400 $\mu\text{V}$ , 700 $\mu\text{V}$
Mechanical specifications	
Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g
Operating conditions	
T°	: 0°C to 40°C
Humidity	: < 60%

## T-Sens FSR

### *Force Sensing Resistors*

Comes with 3 standard cells sized especially for fingers, palms, foot soles, etc. (other sizes available, contact us).



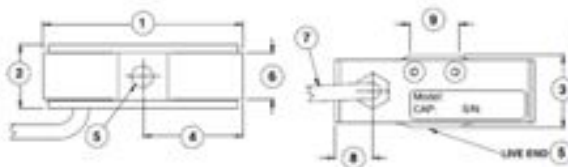
Electrical specifications	
Number of channels	: 3
Calibration	: 2 pts (rest point and maximal force value)
Unit	: Kg/cm <sup>2</sup> or FMV (%)
Frequency	: 32Hz / channel
Resolution	: 0,01 Kg/cm <sup>2</sup>
Power supply	: Li-Ion battery 190mAh
Battery life	: 8hrs
Recharging time	: 3hrs
Mechanical specifications	
Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g
Cable length	: 10cm
Operating conditions	
T°	: 0°C to 40°C
Humidity	: < 60%

(load range: 0-6 Kg/ cm<sup>2</sup>; maximum force: 35 Kg/cm<sup>2</sup>; active area: 1.23 cm<sup>2</sup>; Repeatability: +/-2%)

# T-Sens Load Cell

*Measures push / pull force*

Two threaded holes allow sensor to be attached to devices such as handles, carts, or other equipment.



See drawing	CAPACITY Newton (lbf)					
	22.2 (5), 44.5 (10)		111.2 (25), 222.4 (50), 444.8 (100)		889.6 (200), 1334.5 (300), 2224.1 (500), 4448.2 (1000)	
	inch	mm	inch	mm	inch	mm
①	1.80	45.7	2.00	50.8	2.12	53.8
②	0.52	13.2	0.64	16.4	0.90	22.9
③	0.73	18.6	0.73	18.6	0.98	24.9
④	0.90	22.9	1.00	25.4	1.06	26.9
⑤	10-32 UNF-2B .20 deep		1/4-28 UNF-2B .25 deep		3/8-24 UNF-2B .38 deep	
⑥	0.34	8.6	0.46	11.8	0.72	18.3
⑦	0.13	3.3	0.13	3.3	0.13	3.3
⑧	0.29	7.4	0.38	9.7	0.46	11.7
⑨	0.50	12.7	0.50	12.7	0.57	14.5

### T-Sens specifications

Calibration : N/A  
 Unit : N (Newton)  
 Frequency : 32Hz  
 Resolution : 16 bits  
 Power supply : Li-Ion battery  
 : 220mAh  
 Battery life : 8hrs  
 Recharging time : 3hrs  
 Dimensions : 52mmx25mmx14mm  
 Weight : 20g

### Load Cell specifications

Range available (lbf) : 5, 10, 25, 50, 100, 200,  
 : 300, 500, 1000  
 Accuracy : +/- 0.1%  
 Overload capacity : 800%  
 : 150%  
 Screw thread : cf. chart (US type)

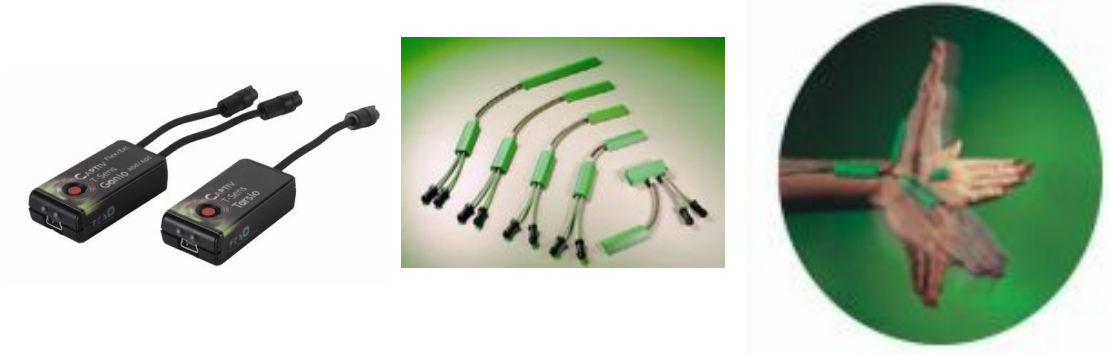
### Operating conditions

T° : 0°C to 40°C  
 Humidity : < 60%

# T-Sens Gonio & Torsio

## *Measures angles and rotation*

Flexion/extension Abduction/Adduction is measured with goniometers. Torsion is measured with torsimeters.

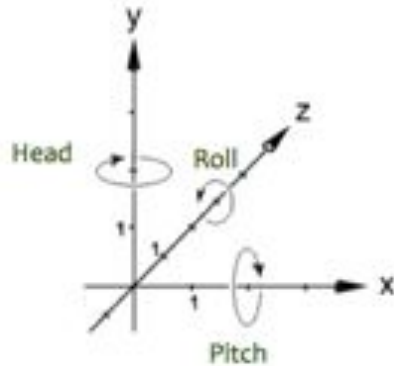


	Goniometer	Torslometer
<b>Electrical specifications</b>		
Number of channels	: 2	1
Calibration	: rest position	
Unit	: Degree (°)	
Measuring range	: +/- 180°	
Frequency	: 32Hz / channel	
Accuracy	: 2°	
Power supply	: Li-Ion battery - 190mAh	
Battery life	: 5hrs	
Recharging time	: 3hrs	
<b>Mechanical specifications</b>		
Dimensions	: 52mm x 25mm x 14mm	
Weight	: 20g	
<b>Operating conditions</b>		
T°	: 0°C to 40°C	
Humidity	: < 60%	

# T-Sens Orientation

*Measures spatial orientation in 3 dimensions*

Captures the orientation of an object or body around 3 axis.



## Electrical specifications

Number of channels	: 3 (Head, Pitch, Roll)
Calibration	: Rest position
Unit	: Degree (°)
Frequency	: 16Hz / Channel
Accuracy	: 12 Bits
Power supply	: Li-Ion Battery - 190mAh
Battery life	: 8hrs
Recharging time	: 3hrs

## Sensor specifications

Measuring range	
Head, Roll	: +/- 180°
Pitch	: +/- 90°
Accuracy	
Head	: 3°
Pitch, Roll	: 1° if <15°
Pitch, Roll	: 2° if >15°

## Mechanical specifications

Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g

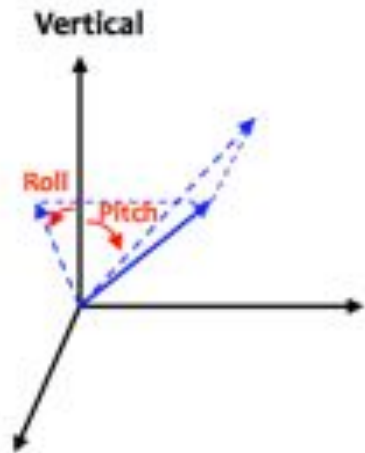
## Operating conditions

T°	: 0°C to 40°C
Humidity	: < 60%

# T-Sens Inclino

*Measures inclination in 2 dimensions*

Captures the inclination of an object or body part around 2 axis.



## Electrical specifications

Number of channels	: 2 (Pitch, Roll)
Calibration	: Rest position
Unit	: Degree (°)
Frequency	: 16Hz / channel
Resolution	: 12 Bits
Power supply	: Li-Ion Battery - 190mAh
Battery life	: 8hrs
Recharging time	: 3hrs

## Sensor specifications

Measuring range	
Roll	: +/- 180°
Pitch	: +/- 90°
Accuracy	
Pitch, Roll	: 1° if <15°
Pitch, Roll	: 2° if >15°

## Mechanical specifications

Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g

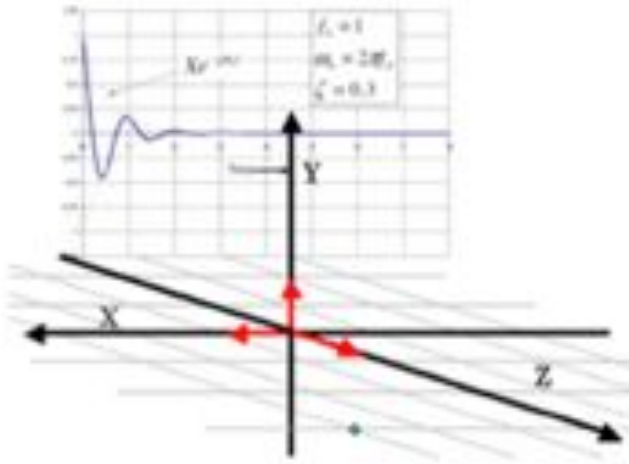
## Operating conditions

T°	: 0°C to 40°C
Humidity	: < 60%

# T-Sens Accelerometer

*Measures acceleration in 3 directions*

Measurements consist of linear acceleration on 3 axes.



## Electrical specifications

Number of channels	: 3 (X, Y, Z)
Calibration	: N/A
Unit	: g
Frequency	: 32Hz to 128Hz channel
Resolution	: 3 mg
Power supply	: Li-Ion Battery 190mAh
Battery life	: 8hrs
Recharging time	: 3hrs

## Sensor specifications

Measuring range	: +/- 6g
Linearity	: 120mg
Offset max (X, Y)	: +/- 30mg
Offset max (Z)	: +/- 20mg

## Mechanical specifications

Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g

## Operating conditions

T*	: 0°C to 40°C
Humidity	: < 60%



## T-Sens Heart Rate

*Measures heart rate in beats/minute*

Comes with a thoracic belt to hold the sensor securely in place.



### Electrical specifications

Number of channels	: 1
Calibration	: N/A
Unit	: BPM
Measuring range	: 10 – 220 BPM
Frequency	: 16Hz
Accuracy	: 1 BPM
Power supply	: Li-Ion battery - 150mAh
Battery life	: 8hrs
Recharging time	: 3hrs
Compatibility	: Non coded Polar or equivalent

### Mechanical specifications

Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g

### Operating conditions

T°	: 0°C to 40°C
Humidity	: < 60%

CAPTIV L7000 software includes the processing capabilities for heart rate analysis.

## T-Sens Respiration

*Measures respiration/ breathing rhythm and amplitude*

Comes with a thoracic belt to hold the sensor securely in place.



### Electrical specifications

Number of channels	: 1
Calibration	: N/A
Unit	: % (deformation)
Frequency	: 32Hz
Resolution	: 0.01%
Power supply	: Li-Ion Battery 190mAh
Battery life	: 8hrs
Recharging time	: 3hrs

### Belt specifications

Length	: 1 meter
Measurement range	: 0-75%
Maximum stretch	: 7cm (75%)

### Mechanical specifications

Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g

### Operational conditions

T*	: 0°C to 40°C
Humidity	: < 60%

## T-Sens ECG

*Measures ECG (electrocardiogram/ heart) signals*

Comes with a thoracic belt to hold the sensor securely in place.



### Sensors specifications

Number of channels	: 1
Unit	: $\mu\text{V}$
Power supply	: Li-Ion battery 220mAh
Autonomy	: 8hrs
Recharging time	: 3hrs

### Electrical specifications

Sampling frequency	: 256Hz
Over sampling	: x4 (1024Hz)
Resolution	: 16Bits
Range	: $\pm 4.4\text{mV}$ , $\pm 2.2\text{mV}$ , $\pm 1.46\text{mV}$

### Mechanical specifications

Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g

### Operating conditions

T°	: 0°C to 40°C
Humidity	: < 60%

# T-Sens Temperature

*Measures skin or ambient temperature*



## Electrical specifications

Number of channels	: 1
Calibration	: N/A
Unit	: °C
Frequency	: 32Hz
Resolution	: 0.1°C
Power supply	: Li-Ion battery 190mAh
Battery life	: 8hrs
Recharging time	: 3hrs

## Sensor specifications

Measurement range	: -40°C to 120°C
Linearity	: 0.5°C
Precision	: 2°C

## Mechanical specifications

Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g

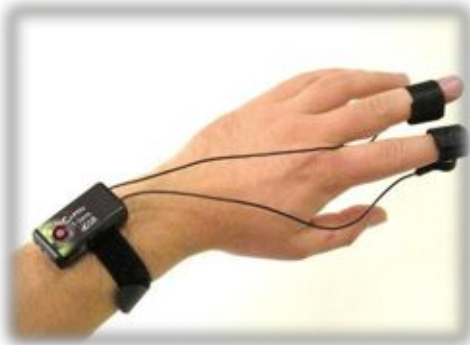
## Operation conditions

T <sup>°</sup>	: 0°C to 40°C
Humidity	: < 60%

# T-Sens Skin Conductance

*Measures skin conductance*

Can be applied in stress analysis and biofeedback applications.



## Electrical specifications

Number of channels	: 1
Calibration	: N/A
Unit	: $\mu\text{S}$ (Siemens)
Frequency	: 32Hz
Resolution	: 16 Bits
Power supply	: Li-Ion Battery 190mAh
Battery life	: 8hrs
Recharging time	: 3hrs

## Sensor specifications

Range of measurement	: 0 -30 $\mu\text{S}$
----------------------	-----------------------

## Mechanical specifications

Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g

## Operating conditions

T°	: 0°C to 40°C
Humidity	: < 60%

# T-Sens GSR + T°C

*Measures skin conductance and temperature simultaneously*

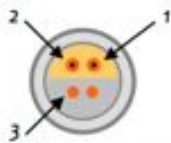


	GSR	T°C
<b>Electrical specifications</b>		
Number of channels	:	1
Calibration	:	N/A
Unit	:	μS (Siemens)   °C
Frequency	:	32Hz
Resolution	:	16 Bits   0.1°C
Power supply	:	Li-Ion Battery 190mAh
Battery life	:	8hrs
Recharging time	:	3hrs
<b>Sensor specifications</b>		
Measurement range	:	0-30μS   -40°C to 120°C
Linearity	:	N/A   0.5°C
Precision	:	N/A   2°C
<b>Mechanical specifications</b>		
Dimensions	:	52mm x 25mm x 14mm
Weight	:	20g
<b>Operating conditions</b>		
T°	:	0°C to 40°C
Humidity	:	< 60%

# T-Sens Universal

*Collects measurements from one analog input*

Provides an interface for any sensor with a 0-3V analog output.



PCA.0S.304.CLLC37



FFA.0S.304.CLA37

Pin	Function
1	Input
2	3V (40mA max)
3	GND
4	Not connected

Connector cabling

## Electrical specifications

Number of channels	: 1
Calibration	: N/A
Unit	: V
Frequency	: 32Hz to 256Hz / channel
Resolution	: 15 bits
Power supply	: Li-ion battery 190mAh
Battery life	: 8hrs
Recharging time	: 3hrs


## Caractéristiques de compatibilité

Measurement range	: 0 – 3V
Precision	: 250µV
Connector (default)	: Lemo FFA0S304CLA37

## Mechanical specifications

Dimensions	: 52mm x 25mm x 14mm
Weight	: 20g

## Operating conditions

Max. Input voltage	:  Any input above 3V will damage this T-Sens permanently
T°	: 0°C to 40°C
Humidity	: < 60%



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PO Box 2353  
Carefree, AZ 85377