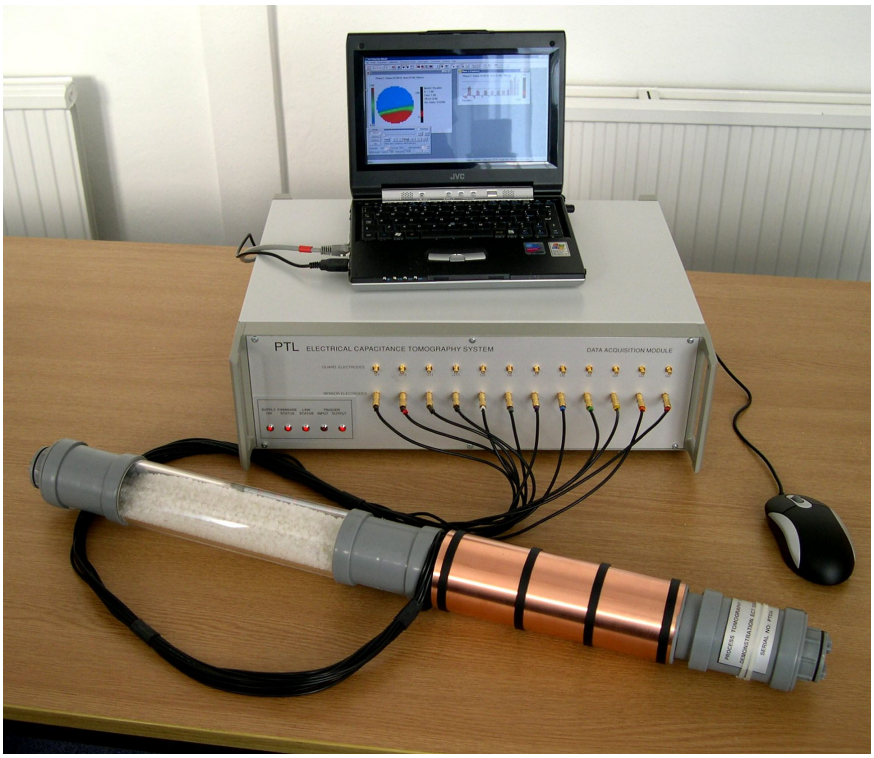
PROCESS TOMOGRAPHY LTD
ELECTRICAL CAPACITANCE TOMOGRAPHY SYSTEM
TYPE PTL300E



Single-Plane PTL300E-SP-G Electrical Capacitance Tomography System

The **PTL300E-SP** is an enhanced **Electrical Capacitance Tomography** (ECT) system controlled by Windows-based software. **Sets of Capacitance data** can be captured at 100 frames per second for a 12-electrode sensor and at correspondingly higher rates for sensors with smaller numbers of electrodes (either 6 or 8). The ECT system displays, captures and replays images based on **variations in the permittivity** of the material inside the sensor, which, in the case of a mixture of 2 dielectric materials, is related to the **concentration** of the **higher permittivity** material in the mixture. The images displayed are approximate and of relatively low resolution, but can nevertheless give a good insight into the distribution and concentration of the materials inside the sensor.

The single plane ECT system (type **PTL300E-SP-G**) consists of a laptop PC, together with a **Capacitance Measurement Unit** type **DAM200E-SP-G** and a **demonstration 12 electrode ECT sensor**. Capacitance sensors containing sets of either 6, 8 or 12 measurement electrodes, together with driven axial guard electrodes can be used with the system.

A further version of the system (type **PTL300E-TP-G**), suitable for **imaging in two axial planes**, is also available. This is similar to the single plane system but uses a **dual-plane Capacitance Measurement Unit** type **DAM200E-TP-G.** This version can be used to measure the **velocity** and **flow** profile of the sensor contents over the sensor cross-section under suitable flow conditions, using additional **Flowan** software available from our associate company **Tomoflow Ltd.**

Although the **DAM200E** capacitance measurement unit must be located close to the capacitance sensor, the control PC can be located remote from the sensor as it communicates with the DAM200E via an ethernet link.

Applications of the **PTL300E** ECT system include the imaging of fluidised beds, combustion, dense and medium phase pneumatic conveying, mixed oil and gas flows and the measurement of moisture profiles. When used with the optional Flowan software, the **twin-plane version** of the system functions as an advanced **2-phase flow analysis and measurement system**.

Model Options

PTL300E-SP-G	Single plane ECT system with driven guard drive circuitry.
PTL300E-TP-G	Twin-plane ECT system with driven guard drive circuitry.

PTL300E-SP/TP-G SYSTEM SPECIFICATION

Number of capacitance measurement and driven guard electrodes: 12 maximum of each per plane.

Number of measurement planes: 1 (SP version) or 2 (TP version)

Data capture rates can be set by the user up to the following maximum values for twin-plane systems:

300 image frames per second with 6 electrode sensor
200 image frames per second with 8 electrode sensor
100 image frames per second with12 electrode sensor

External trigger signals can be used to synchronise the start of data capture with other equipment and the captured images can be replayed at the same rate as captured, or at reduced speed.

Image details:

With the supplied software and standard sensitivity matrices, images are displayed in colour on a 32 X 32 pixel grid and an on-screen cursor probe allows the normalised value of each pixel to be displayed. Software is supplied for generating sensitivity matrices of any resolution for circular sensors and other pixel grids can be realised by generating suitable sensitivity matrices. Image resolution (the minimum size of phase boundary/particles which can be resolved) is approximately 1 part in E of the diameter or the circumference, where E is the number of electrodes used. For phase variations or particles below this minimum size, the ratio of phases can be estimated although individual particles can not be resolved.

Measurement Sensitivity:

This depends on the design of the sensor and the permittivities of the materials to be imaged. The capacitance measurement noise level is typically better than 0.07fF rms and the effective measurement resolution is 0.1fF. Typically, sample concentrations down to 1% of the upper calibration value (corresponding to the case where the sensor is filled with the higher permittivity material) can be measured.

Capacitance Sensor Characteristics

The maximum sensor inter-electrode capacitance should not exceed approximately 2.0 pF with the higher permittivity material inside the sensor (the measuring system saturates at 2.5pF). The maximum electrode-to-screen capacitance (including connecting leads) must not exceed 200 pF and the recommended maximum length for the sensor connecting leads is 1.5m. The recommended minimum lengths for measurement electrodes are 3.5cm for 8-electrode and 5cm for 12-electrode sensors, subject to the provision of effective driven guard electrodes in the sensor design.

System Software

The ECT system is supplied with a comprehensive set of pre-installed software for data capture and replay (**ECT32v2**), capacitance measurement and diagnostics (**ECT Toolkit**), circular sensor sensitivity map generation (**Makemap**), post-processing image reconstruction (**IU2000**) and a set of optional utilities for use with Matlab (**MatECT**). Additional software supplied includes an advanced file conversion utility (**BCPconvert**), advanced calibration software (**Recal)** and a 3-D imaging utility (**Plot3d**). Both on and off-line iterative image reconstruction can be carried out to produce improved images. All of the supplied software can run under any version of the MS Windows operating system from W98 onwards. Additional flow measurement and analysis software (**Flowan**) is available from our associate company, Tomoflow Ltd.

For further information, please contact us at the address below, or visit our internet web site at : **www.tomography.com** which contains comprehensive sales and application data.

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