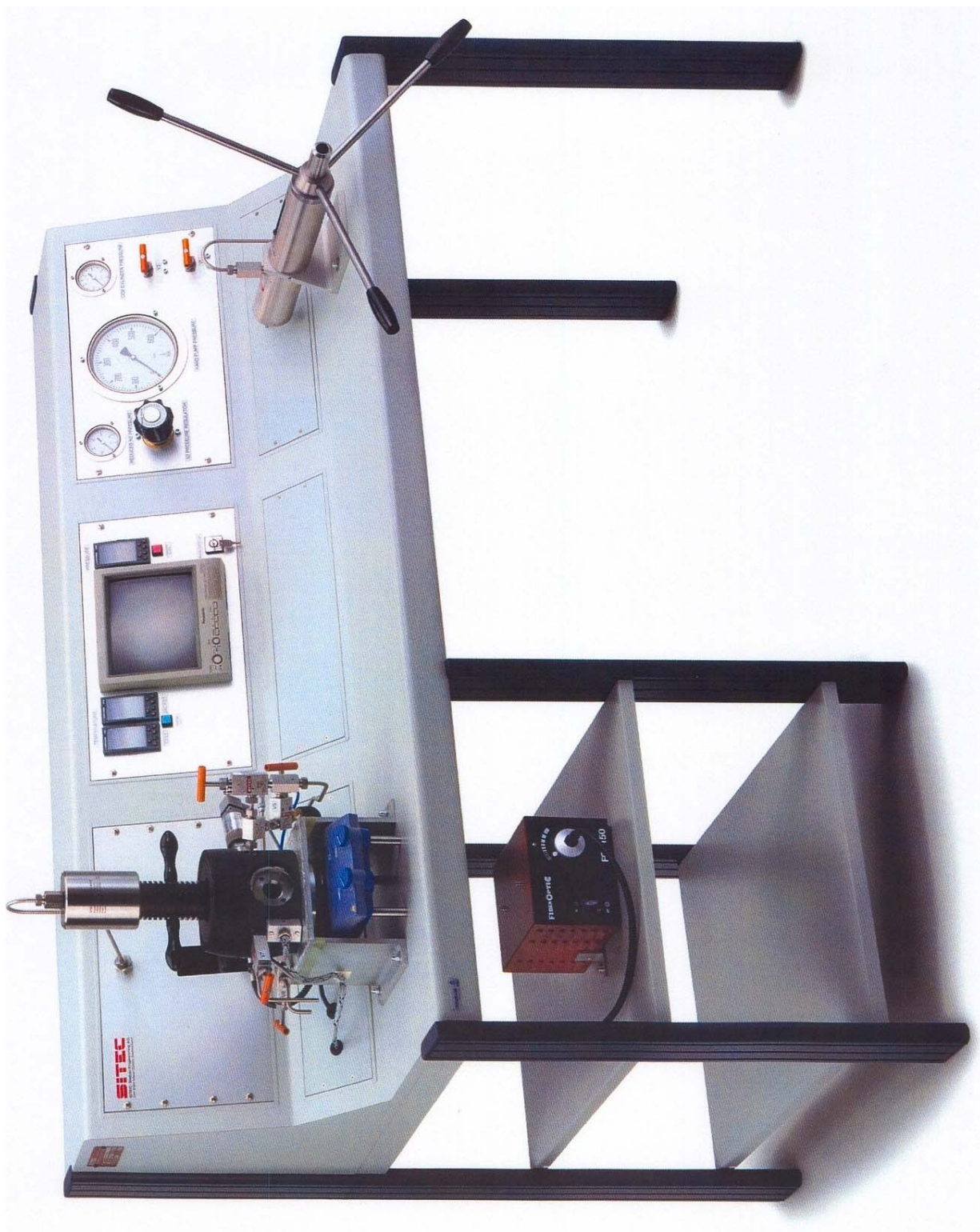


Supercritical Fluid Extraction (SFE)

Phase Equilibria Measurement



Phase Equilibria Apparatus (Technical Description)

This Phase Equilibria Unit is built for the measurement and detection of phase equilibria and phase transitions by optical means. The picture from the optical cell is transmitted through the sapphire windows to the directly connected camera system. It is displayed on the monitor in the front panel. The mixture of solute and solvent gas is agitated by the magnetic stirrer. Whenever samples are drawn from the top or the bottom connection of the cell, the directly connected counterbalance piston moves towards the centre of the cell, thus keeping the pressure in the measuring cell constant even during the sampling operation. No need to add additional solvent gas, which would change mass ratio and temperature and consequently result in a disturbed equilibria. This special design of an optical cell has been patented.

Besides the monitor, the following instruments are assembled in the front panel:

- Digital display of the pressure in the optical cell
- Temperature controller and digital display of the temperature in the optical cell
- Solvent gas bottle pressure
- Gauge for the solvent gas feed pressure
- Counterbalance pressure
- Counterbalance high pressure alarm

In addition the following operation instruments are assembled in the front panel:

- Main switch
- On/off-switch for the magnetic stirrer
- Magnetic stirrer speed adjustment

Picture page 13:

Phase Equilibria Apparatus (500 bar, 120 °C, capacity 11-25 ml depending on pressure balance piston position, b/w camera with endoscope)

- On/off-switch for the light beam
- Adjustment of the light intensity
- On/off-switch for the heating system
- Top and bottom sampling valves
- Pressure reducing valve for the fine adjustment of the counterbalance pressure

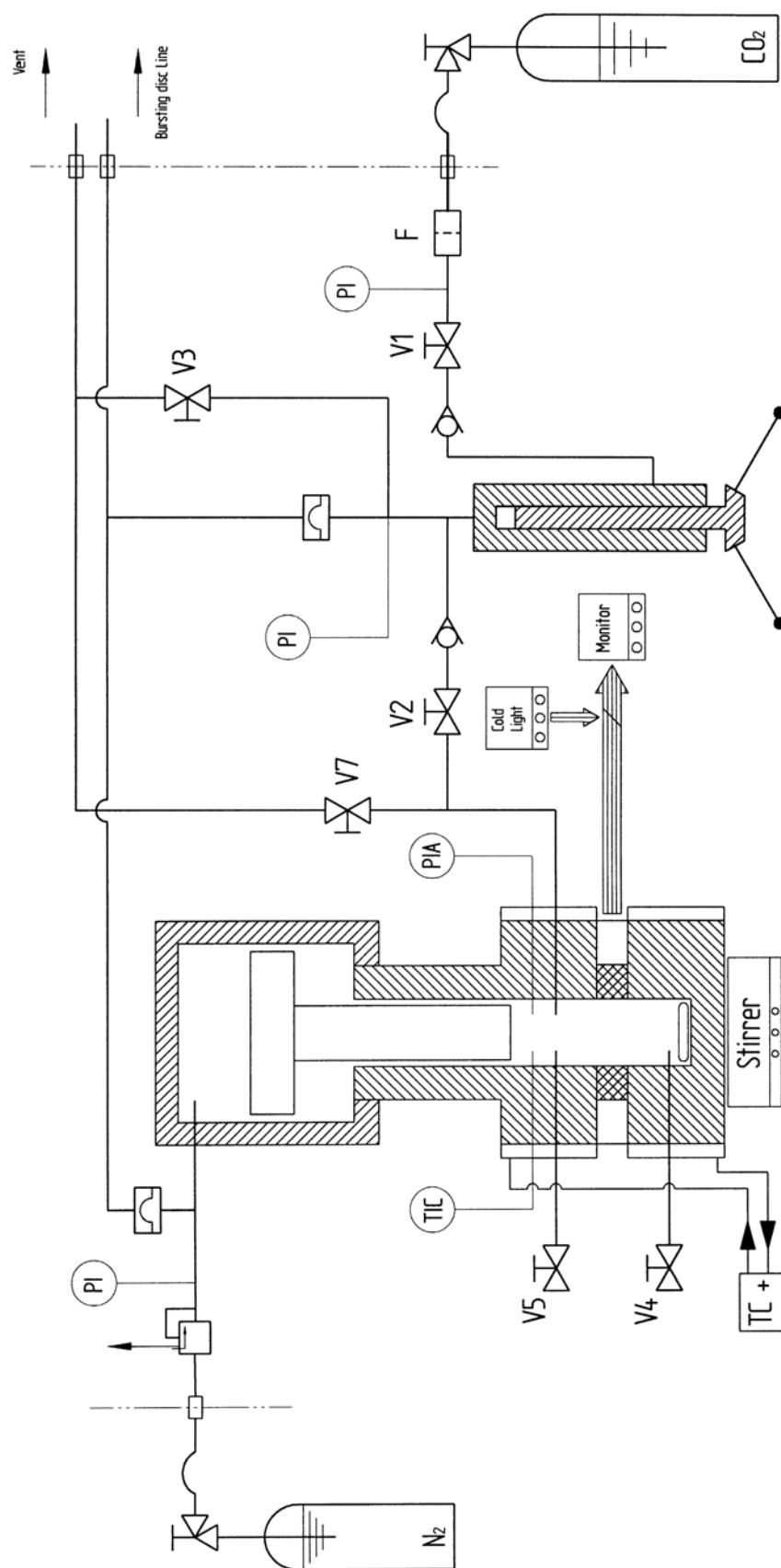
The solvent gas pressure is generated by a hand operated pressure generator which allows a very fine adjustment of the required cell pressure. For the very last adjustment the counterbalance-piston may be used for the final approach.

The cell pressure is measured by a pressure transducer which is directly mounted to the cell.

The temperature in the optical cell is measured by a thermocouple and controlled by a temperature controller which acts on a superimposed heating system.

The optical cell with camera, the magnetic stirrer and the pressure generator are assembled on the bench; the light generator, the piping and wiring in the unit.

The two sampling valves may be connected directly to an SFC or by sampling vessels used for GC analytic.



Phasengleichgewichtsapparat / Phase equilibria apparatus

Standard Design and Options (Please mark required data)

Max. operating pressure: **500 bar** 700 bar 1000 bar

Max. operating temperature: **120 °C** 150 °C 200 °C 450 °C

Supercritical solvent: **carbon dioxide**

Equilibria cell capacities: **25 ml (with pressure balance piston)**
 50 ml (with pressure balance piston)

Options:

- Position indication for pressure balance piston
- Pulsation-free external recirculation of upper or lower phase (gear pump)
- Data acquisition system by PC
- Motor driven piston pump for pressure generation (instead of hand pump)
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