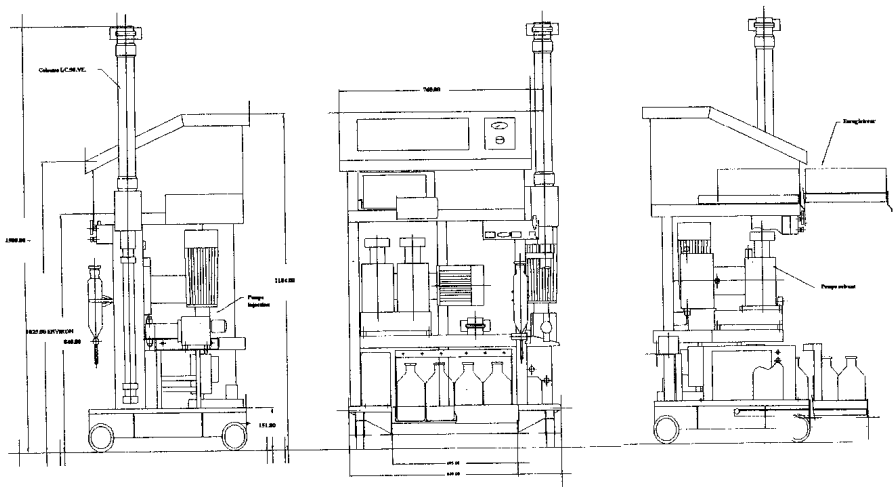
Chapter 1

INTRODUCTION

1.1 SYSTEM DESCRIPTION

This section comprises a general description of the laboratory preparative LC system (LAB.LC) Individual components of the system are described in greater detail in other sections of this manual and in individual manuals. For simplicity the system may be divided into three sections: the Solvent Delivery Module,the Dynamic Axial Compression Column Module and the Computer Control Module. For a complete description of the Dynamic Axial Compression Column Module and the Computer Control Module please see the specific.

The Solvent Delivery Module is shown schematically in the diagram below. Control of the system is performed either through a computer based Operating System (See LAB.LC CHROMSOFT manual) or a Manual/Semi automated Control Panel (Section 2.3).



1.1 SYSTEM DESCRIPTION (continued)

Three solvent lines enter the module (shown at the top left of the schematic). These solvents may be selected individually - manually, through the control panel or through the Operating System Control - or may be mixed dynamically either for isocratic or gradient elution through either the Operating System Control or the semi automated mode.

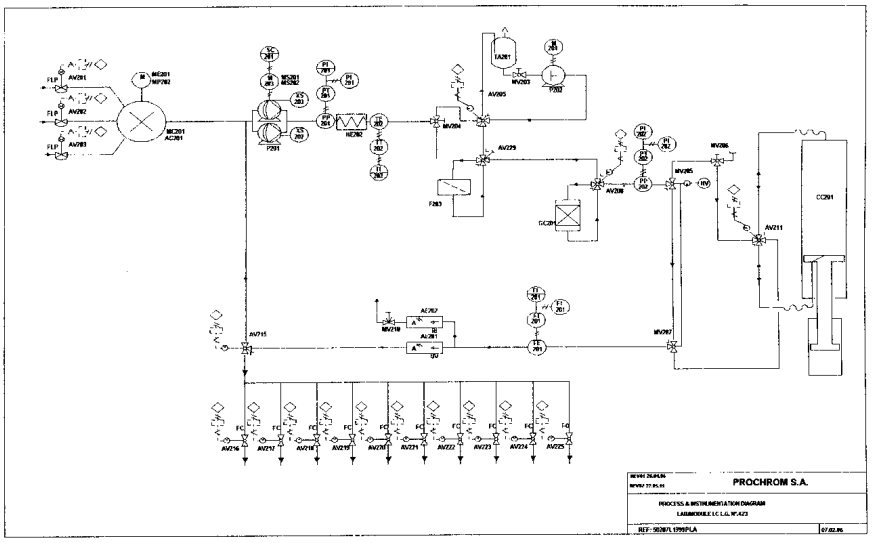
The solvent pump is of duplex piston-diaphragm design. This minimizes pressure pulsations (although extensive studies have demonstrated that the DAC columns are uniquely stable to pressure fluctuations, performing with equal stability and performance, regardless of the extent of flow pulsation) and also aids cleaning the pumping system. Flow is manually adjustable from 10 to 270 mL/min at 50 Hz. In addition, the pump motor speed may be adjusted from 20Hz to 70 Hz. This provides a wide range of flowrates to suit any application.

Flow from the solvent pump is directed to a manually operated purge valve. When set in the **PURGE** position, the flow is directed to waste. When in the **ELUTION** position, the valve directs the flow to the column via the injection valve. Injection can be either manual or automated. The injection device used is selected with another manual valve. The introduction of the sample from either the sample pump or a syringe to the column is controlled by a valve.

From the injection valve, the flow passes through a pressure transducer, through a filter to a valve which allows the inclusion of a guard column in the flow stream. This valve is used to switch the guard column in and out of the stream to allow removal of strongly retained material from the sample whilst maintaining a low dwell (or holdup) volume in the system for gradient operation. Because of the difficulty in packing wide diameter columns, guard columns are often a source of loss in efficiency and should be avoided if possible in high performance systems.

The flow then passes to the flow direction valve, which controls the direction of flow through the column. This allows both traditional backflushing techniques to be used as well as **FLIP-FLOP** operation of the column for enhanced production rates (see Section 5). After passing through the column the flow travels back through the flow direction control valve to the detector and then on to the recycle valve. This latter valve allows recirculation of the column effluent back to the inlet of the solvent pump either for solute recycle (to increase sample loading, in some cases, see Section 5) or simply to recirculate solvent while equilibrating the column or during periods when no sample is being run.

1.1 SYSTEM DESCRIPTION (continued)



Note: This PID shows all options available in the LAB Series. For your particular configuration, please see refer to the PID on the last page of this manual.

Finally, the flow reaches the fraction collection/waste selection valve where it is directed either to waste or to the fraction collection manifold. The latter can have up to 10 fraction collection ports, each activated by a solenoid valve.

1.2 INSTALLATION REQUIREMENTS

In order to successfully install the Lab.LC system the following facility services are required:

Compressed Air:
80 - 100 PSI with an air filter and control valve to maintain the proper pressure.

Mains Voltage:
380 VAC, 3 phase + neutral, 2 KW (≅ 10A). Contact Prochrom for the appropriate wall plug configuration.

1.3 CONTROL SYSTEMS

The LC.50 system may be operated in three separate ways, manually, semi-automatically and automatically. In automatic mode, manual override exists for some parameters.

PROCHROM LAB.LC SYSTEM
 # 435.050.VE.100

October 26, 1995

The unit #435 was designed, assembled and tested with a Prochrom LC50.VE.500.100 column skid. Please note that the Technical documentation refers to the LAB.LC50 and the LC50 column skid in various titles and sections.

Per the request of Scios Nova, the original LC50 column tube, piston, flange and harp section were removed. These items were replaced with Scios Nova's LC60.VE.500.70 column serial #393.060.VE.70 and the LC60 column has been integrated into the unit #435.050.VE.100.

Notations of this change have been made at the bottom of the unit #435 documentation pages.

Harlene Marks
General Manager
Prochrom, Inc.

TECHNICAL DESCRIPTION OF THE LAB.LC 50

N° 435

PROCHROM INC

REF: 50818X1891DOC

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TECHNICAL DESCRIPTION OF THE LAB.LC 50

N° 435

PROCHROM Inc.

REF: 50817X1891DOC

This laboratory preparative HPLC system designed for PROCHROM INC. is equipped with a self packing column using the ***Dynamic Axial Compression*** technology **(DAC*)**. Any kind of packing material can be used to fill the column. The length of the chromatographic bed can be easily adjusted by controlling the amount of material used to pack the column.
The maximum operating pressure is 100 bar.
(*) Roussel Uclaf patent.

Operating manuals, conformity certificats....are assembled in two binders (VOL-01 & VOL-02). They concern all instrumentations and fittings used on the LAB.LC.
A complete description of the unit, in the following pages, is composed of two parts :

1. The Solvent delivery module.
2. The column skid.

GENERAL DESCRIPTION

II.1. COLUMN BODY

The characteristics of the column body are as follows :

- Internal Diameter : 60 mm
- Length : 570 mm
- Maximum Bed Length : 350 mm
- Construction Material : SS 316 L (Z2CND17-12)
- Maximum Working Pressure : 70 bar (1000 psi)

The bottom of the column is chamfered (10 degree angle) to facilitate piston introduction. *Figure 3* shows a view of a longitudinal section of the column. The degree of finish of the inner wall of the column is such that there is minimum friction of the piston seal. It is important not to scratch or dent of the inside of the column to avoid leaks of solvent and/or packing material.