

LOW PRESSURE

chem-SCAN

A fully automated reaction screening system for the rapid evaluation of chemical processes



better chemistry - faster

LOW PRESSURE Chem-SCAN

FOR PARALLEL AND AUTOMATED SCREENING OF PROCESS VARIABLES

The Chem-SCAN is a fully automated robot-based workstation for the rapid evaluation of chemical reactions parameters, including temperatures, feeds and agitation control.

It is a fully modular design allowing for the dedication of a system that best suits your application demands now, and is upgradeable in the future to include more reactions, independent temperature control and full sampling including HPLC control.

Capability

The system consists of an x-y-z robotic liquid handling system built around the central chemical reactor blocks. Each reactor block features 10 reactors, all of which are 2-10ml and magnetically agitated. The large robot can handle up to 40 reactors and the smaller version up to 20.

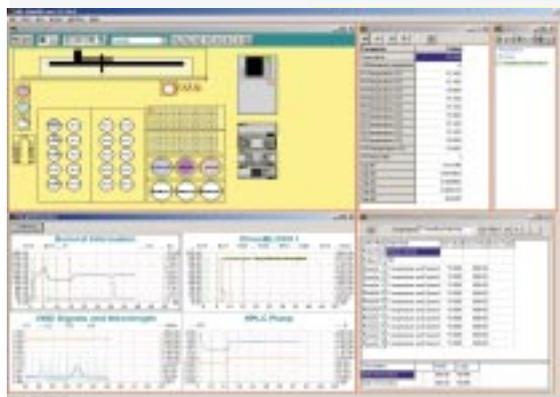
The WinISO software allows for the control of all reaction parameters, including temperature, agitation and reagent addition using the robot.

In addition, sampling of the reactors, allowing for direct injection into an HPLC system or off line analysis is available.

Reagent addition from a variety of sources, from other reactors, bottles on a rack or from the multiple reagent addition bar is possible (up to 15 different reagents can be utilised).

THE SMALLER ROBOT CAN ACCOMMODATE

2 X Chem-BLOCK I (20 reactors),
1 X Chem-BLOCK II (10 reactors)
or 1 X Chem-BLOCK II
(8 reactors accessible)
plus 1 X Chem-BLOCK I



Controlling Software (WinISO)

The defining feature of our software is the consistency of the user interface. It allows inexperienced operators to quickly use the system whilst having sufficient depth to satisfy advanced requirements.

Recipe Editor

HEL developed WinISO software allows for easy scheduling and walk-away reaction and sampling operation.

The software also facilitates experiment definition allowing the programming of complex operations in minutes.

Key features include:

- ▲ Predefined macros that contain a list of commonly required steps
- ▲ Drag-and-drop feature for easy programming
- ▲ Range of advanced features for experienced users and complex applications

THE LARGER ROBOT CAN ACCOMMODATE:
 4 X Chem-BLOCK I (40 reactors),
 2 X Chem-BLOCK II (20 reactors)
 or 2 X Chem-BLOCK I
 plus 1 X Chem-BLOCK II
 (30 reactors)



Advanced feature editing of macros

Creation of new macros

Visual representation of scheduling documentation including documentation of actions

Actual sequence in which steps will be performed, obeying user-defined priorities and references.

List of steps for each separate chemblock system

HEL'S LC-VIEW SOFTWARE
 Immediate and easy comparison of LC data from different runs and different reactions

Data from selected files

MAIN WINDOW FOR DEFINING ROBOT STEPS

Drag and drop from any location

Scheduler
 The software facilitates the automatic scheduling of tasks. There is clear visual indication of sequence and detailed attention to unique events.

On-line analysis
 Samples taken can be either stored for off line analysis, or a suitable device can be supplied to make analysis fully automatic.
 HEL'S solutions for reactor sampling and HPLC analysis go a lot further than just injection into an automated valve. We are able to provide full control of selected brands and more importantly bring the data back into our software. This allows us to

label the data samples with important process information and, display the information graphically in pseudo-real time.

HEL'S iQ SOFTWARE
 Report preparation including export to word, excel etc.

Flexibility of reactor block combinations

The Chem-SCAN supports two types of heating/cooling blocks with varying capabilities.

Chem-BLOCK I



Chem-BLOCK I

There is uniform magnetic agitation throughout the blocks, enabling a consistent temperature throughout. Block temperatures can be recorded and varied during reaction.

The single block temperatures can vary between ambient to 150°C and ambient to 300°C through electrical heating. There is an additional option of

operating the block at -30°C to 150°C using an HEL jacket on the block in combination with the chiller. Ramping of temperature is also possible.

Chem-BLOCK II



Chem-BLOCK II

Each individual reactor has the capability of separate temperature control as well as individual magnetic agitation. All these individual readings are recorded and can be viewed real-time.

Individual stirring speeds can be set for each reactor or for the block if preferred as can individual temperatures.

The temperature range for each reactor is -15°C to 150°C with water cooling and -30°C to 150°C using a chiller unit.

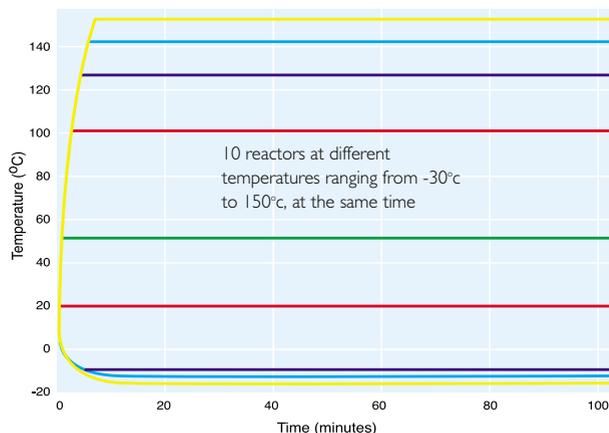
Reactors

Reactors with a volume of 10ml and ~2ml may be used. Facilities for gas purge and reflux operations are available.

Applications

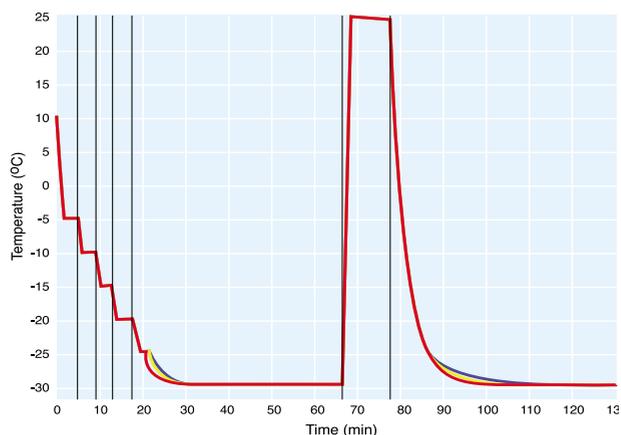
The Low Pressure Chem-SCAN is used primarily in process Screening, namely the selection of reagents, catalysts and solvents.

The system is also ideal for identifying the best basic reaction conditions such as temperature. Multi-step reactions can also be performed - product of one reaction can be fed to another reactor.



Range of Temperatures in Multiple Reactors

Separate temperatures in 10 reactors in a CHEM-BLOCK II. The data shows a temperature range of 170°C achieved at the same time with excellent stability.



Uniform Temperature in Multiple Reactors

Identical control in 10 different reactors in a CHEM-BLOCK II unit, taken through a number of cycles. The data shows exceptional uniformity with a high degree of automation.

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