STARTER SET XXL

Introduction

The Flow Starter Set XXL is intended to introduce trainees in flow chemistry and to intensify the education for those who already work in the field. The Starter Set XXL was developed for laboratory syntheses. It permits the simple translation from batch process into a continuous one by using standard laboratory equipment. Thanks to its wide range of combination possibilities it is ideally suited for education purposes because a relatively broad spectrum of applications can be represented.

Content

4 x MR Lab reactors incl. connection bar	2 x syringe pumps MR. Q
1 x Frame work	10 m PTFE tube 1/8"
10 x fittings 1/8"	10 x ferrules 1/8"
4 x 10 ml glass syringe	1 x Manual for 13 reactions
1 x XXL-S-02 reactor	1 x control unit

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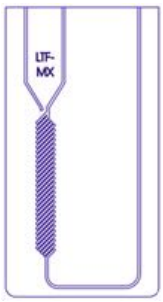
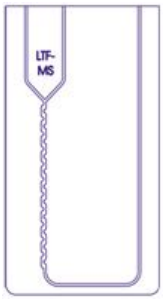
MICROREACTORS

The Starter Set XXL contains the following four LTF MR Lab reactors plus one XXL-S-02 reactor incl. connection bar:



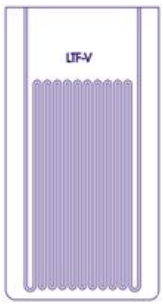
LTF MX

For mixture-intensive substances
Material: Borofloat33
Dimension: 115 x 60 x 6 ±0.5 mm
Volume: 0.2 ml
Channel size: 1 mm
0.1 - 10 ml / min / channel
Inclusive connection bar 1/4" unf 28



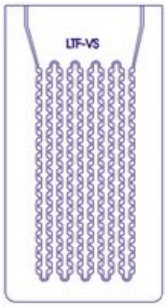
LTF MS

Not sensitive to blockage
Material: Borofloat33
Dimension: 115 x 60 x 6 ±0.5 mm
Volume 0.2 ml
Channel size: 1 mm
0.5 - 20 ml / min / channel
Inclusive connection bar 1/4" unf 28



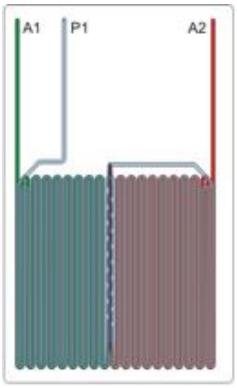
LTF V

Residence time
Material: Boroloat33
Dimension: 115 x 60 x 6 ±0.5 mm
Volume 1.7 ml
Channel size: 1 mm
Inclusive connection bar 1/4" unf 28



LTF VS

Residence time for mixture-intensive substances
Material: Borofloat33
Dimension: 115 x 60 x 6 ±0.5 mm
Volume 1.1 ml
Channel size: 1 mm
Inclusive connection bar 1/4" unf 28



XXL-S-02

Mixer and residence time
Material: Borofloat33
Dimension: 180 x 130 x 6.4 mm
Volume: 15 ml
Mixer base: Type "chicane"
Reagents: 2
Pressure area: 14 bar
Connection via 1/4” unf 28 glass thread

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Syringe Pump – MR. Q

The Starter Set XXL contains of two Mr. Q syringe pumps with the following specifications:

General technical data:

Dimensions:	120mm x 436mm x 200mm (WxHxD)
Weight:	approx. 5 kg
shape:	Sturdy structural design
lubrication:	Life time
Delivery flow:	1
The continuous sound pressure level:	< 70 dB(A)
Front panel mounting:	available on request
Allowable operating temperature range:	0 °C ... + 30°C
Allowable storage temperature:	-25°C ... +45°C.
Allowable atmospheric humidity:	20% ... 80%.
Degree of protection:	IP 43

Technical data of the pump module:

volume flow:	Continuously adjustable
single-flow	
Self-priming	
Allowable media temperature:	0 - 50°C **
Uniform volume flow	
Maximum allowable pressure:	10 bar
Pump parts in contact with media:	Teflon® and Perlast®
Connecting thread (female thread):	UNF1/4"x 28

Continuous delivery flow through reciprocating double piston principle
Higher delivery pressures on request

Electrical Data of the Control and Drive Module

Voltage supply through included mains adapter **

Mains-side connection:	230V ac (50 / 60 Hz)
Mains-side fuse protection:	max. 16 A
Nominal capacity:	ca. 100 W

With the included software the control and parameterisation of the syringe pump is possible
Free-from-play drive and delivery system
Interface for USB connection / controller unit or for integrating a customised control

**** Deviating data possible after approval by the manufacturer.**

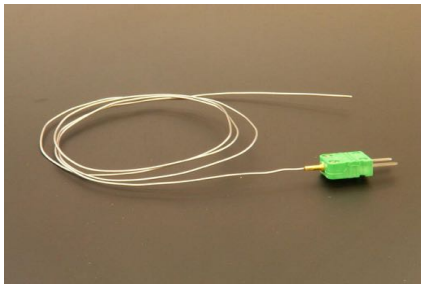
LTF-Control unit

The control unit is used to monitor the system. If the maximum temperature and/or pressure is exceeded, the control unit switches off the corresponding components automatically. The main switch and various cable connections are located on the rear of the control unit. In simple operation, only one connection for the temperature control unit is required. The econd socket is used for optional 2-stage operation (see Chapter 6.4.1 Connecting the power cable).

Material: Polycarbonate
Dimension: 222 x 185 x 133 mm
Wight: 1.66 kg
Temperature ranges: 0 to +55° C

The LTF-Control unit includes two temperature sensors and two pressure sensors:

Temperature sensors



Temperature sensor VA
Coated, K100
Quantity: 2 pcs.

Pressure sensors

Pressure range: 0-10 bar
Well chemical resistance
Low dead volume (≤ 47 µl)
Quantity: 2 pieces

REACTION MANUAL

The Flow Chemistry Starter Set includes a manual for the following 13 reactions:

001 Iodine clock reaction (Landolts reaction)

002 Hydrolysis of acetic acid chloride (acetyl chloride)

003 Alkaline hydrolysis of 4-nitrophenyl acetate

004 Esterification of 4-nitrophenol to 4-nitrophenyl acetate

005 Hippuric acid from glycine and benzoyl

006 Aldol condensation of acetone and benzaldehyde to dibenzalacetone (1,5- diphenyl-1,4-pentadiene-3-one)

007 Condensation of 1,3-diphenyl-2-propanone with benzyl to tetraphenylcyclopentadienone

008 Addition of phenylmagnesium bromide to fluorenone

009 Bromine addition to styrene to 1,2-dibromo-1-phenylethane

010 Oxidation of 2,2-dimethyl-1,3-propanediol to 2,2-dimethylmalonic acid

011 Bromination of anisole to 4-bromoanisole

012 Nitration of phenol to 2-nitrophenol and 4-nitrophenol

013 Photooxidation of p- methoxybenzyl alcohol to p-methoxybenzaldehyde in a microreactor with riboflavintetraacetat as a catalyst