

Operation Manual  
LB 953 AutoLumat Plus

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# Introduction

Berthold LB953 AutoLumat *Plus* is an automatic, chain-based universal luminometer designed for a wide variety of applications in ATP-measurements, immunoassays, DNA probe assays, reporter gene assays and cellular chemiluminescence. Software is available for many applications, either running on the built-in microprocessor or an external computer. It has a sample changer for a maximum of 164 sample tubes. There can be 1, 2 or 3 injectors. The volume of each injector is adjustable in the range 25 – 300 µl to provide you with great flexibility in creating new assays. The sample compartment may be temperature-controlled from ambient to 42°C, thereby functioning also as an incubation area.

AutoLumat *Plus* may be operated as a stand-alone instrument through its own microprocessor or from a PC. In the latter case the TubeMaster PC software allows easy data evaluation and data transfer to a spreadsheet program.

The alpha-numeric display allows you to interact with AutoLumat *Plus* and the displays are generally self-explanatory. For a more detailed description of the displays, see the Instrument Manual. There is an alphabetical index of displays to help you to quickly identify the one you need more information about.

This manual describes the main steps in operation. A detailed description of all operations will be found in the Instrument Manual.

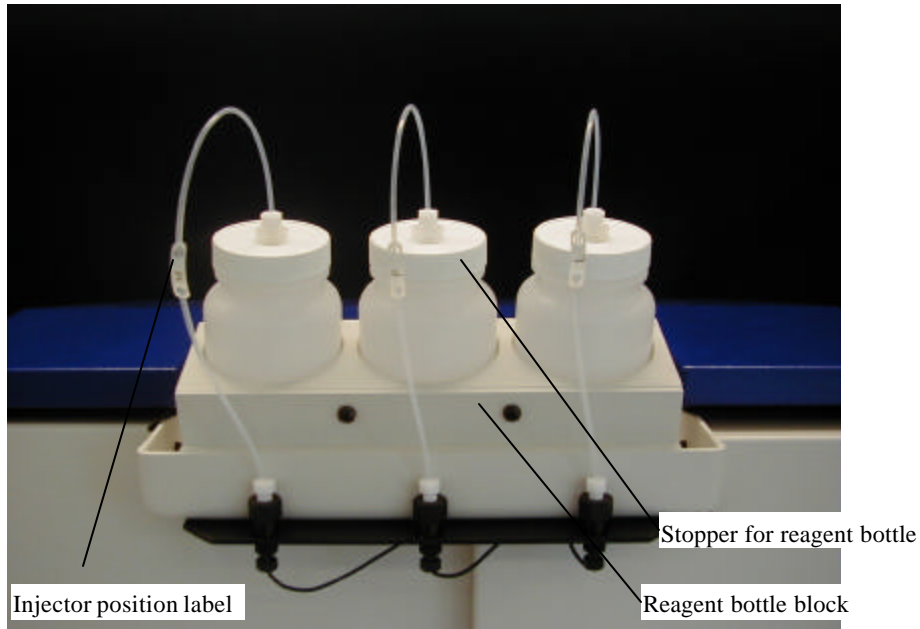
## Start-up and Preparation

### Switching on



Switch on AutoLumat *Plus* with the mains switch at the back of the instrument.

## Loading reagents



Put reagent bottles in the reagent bottle block, see the figure above. Fit the injector tubing into the reagent bottles. Make sure the filter at the end of the tube is properly in the reagent. Each tube is connected to a different injector and is labelled according to the following scheme:

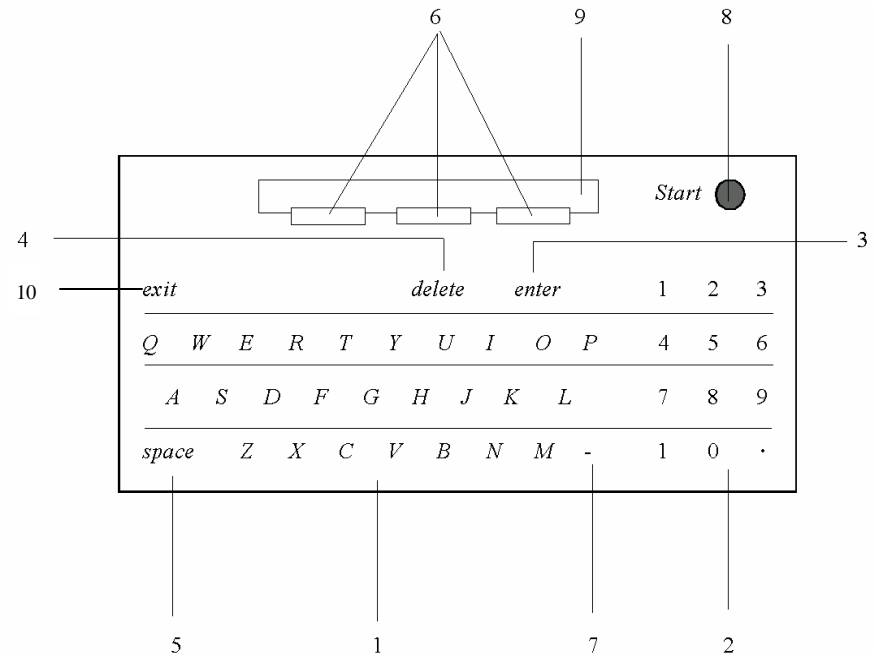
Injector L (lysis ) delivers reagent to a tube in the position two places before the measuring position i.e. position  $-2$ .

Injector P (pre-position) delivers reagent to a tube in the position one place before the measuring position i.e. position  $-1$ .

Injector M (measuring position) delivers reagent to a tube in the measuring position i.e. position  $0$ .

## Keyboard and display

You communicate with *AutoLumatPlus* via the keyboard and the LCD-display located on the front panel of the instrument, see the figure below. The parts of the keyboard are listed below the figure.



- 1 Alphanumeric keyboard
- 2 Numeric keyboard
- 3 Enter key
- 4 Delete key
- 5 Space key
- 6 Softkeys (left, centre, right) for scrolling through the menu
- 7 Dash & minus key
- 8 Start button
- 9 Display
- 10 Exit

## Protocol selection for measurement

Note: this chapter assumes you have been through the normal parameter setting procedure described in chapter 4 "Parameters" of the Instrument Manual. This means that you have protocols set up ready and you can select the one you want by giving the number. This is done as follows:

```
READY          <date>          <time>
  MEASURE      PROTOCOL      - OTHERS -
```

Starting display after POWER ON or EXIT. Press MEASURE.

```
SELECT TYPE OF MEASUREMENT
PROTOCOLS      DIRECT ENTRY
```

Select the type of measurement, in this case it is PROTOCOLS.

```
ENTER PROTOCOL NO.
PRINT LIST
```

Give the number of the protocol to be used. Note: if you do not remember the number, print out a list of ready protocols to remind yourself. In the next display, the number of the selected protocol appears first, then at the end of the line, the name.

```
<No.>: PROTOCOL          OK ?          <name>
YES                      NO
```

Confirm the protocol you have selected. The protocol name appears as well as the number.

The type of display that appears next depends on the type of protocol selected. The following example shows the simplest sequence of displays. Examples of the exact sequence for each type of protocol are given in the Instrument Manual chapter 5.

## Protocol selection for measurement

---

USER NAME	<name>
-----------	--------

Give the user name (up to 11 characters). Press Enter.

If you are running the assay for the first time since loading reagents, you need to PRIME the injectors. If you have been using the injectors earlier but there has been a break for more than one hour, select REFRESH to correct for any evaporation that may have occurred at the injector tips.

In both the PRIME and REFRESH cases, tell which injectors are to be used, ALL or P and M, or give the specific injector number. These operations are described in chapter 5 of the Instrument Manual.

Once you have completed any necessary priming or refreshing, or if these are not necessary, you can proceed with actually running samples as shown in the example below.

SYSTEM		< name >
PRIME	<b>RUN</b>	REFRESH

Select RUN to start the assay. The following display will appear:

LOAD CHAIN, CLOSE DOOR AND -> START EXIT
---

See the next chapter for tube loading.

## Tube loading

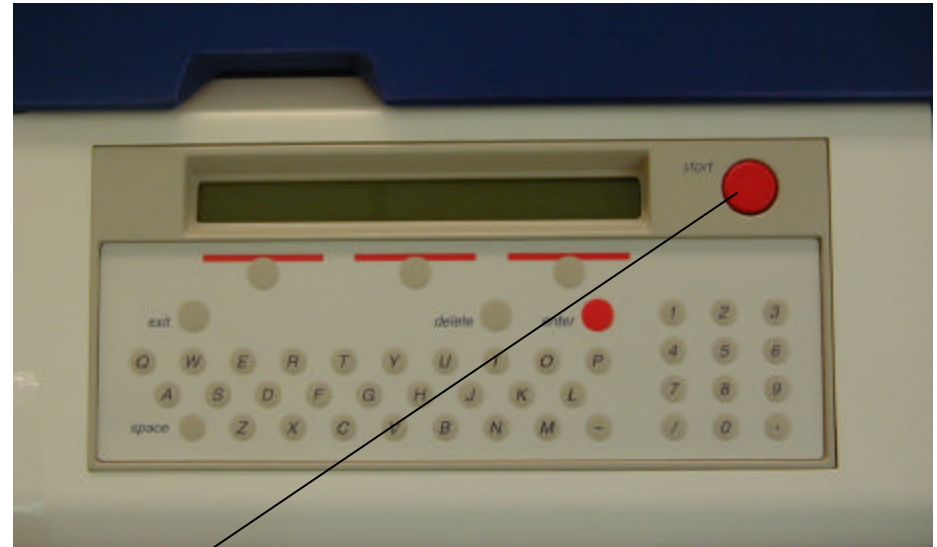


To load samples, lift the lid and put tubes into the chain starting from the position nearest to the metal piece sticking out over the conveyor in front of the entrance to the injection and measurement area. See the figure. If you have just a few tubes you can start them anywhere convenient in the chain. The conveyor moves in a clockwise direction.

If you start from the position in front of the metal piece you can load up to 164 tubes. If you do not need the whole capacity of the conveyor chain, you can re-configure it as described in chapter 2 of the instrument manual.

When you have finished loading tubes, close the lid.

## Starting operation



Press the START button.

The lid will lock and samples will be moved to the injector/measurement area. When the chain is moving the display will show:

MOVING CHAIN TO NEW SAMPLES ...

Note: during measurement the conveyor lid is locked and cannot be opened.

When a sample is being measured the display will show:

MEASURING ...

## Tube loading

---

Other messages may appear on the display depending on the type of assay, whether or not background measurement has been selected etc.

If any error message appears see chapter 9 in the Instrument Manual.

## **Results**

Results will be printed out with a printer and or sent to an external computer.

If you are using the TubeMaster software running on the external computer, see the documentation with that software describing result handling.

## After completing a measurement

When all samples have been measured the following message will appear:

```
MOVING LAST SAMPLES OUT ...
```

The samples will be moved out from the injection/measuring position and the conveyor will stop. A beep will sound and the conveyor lid will be unlocked so that you can open it and remove samples.

The display will show the READY state menu.

```
READY          <date>          <time>  
  MEASURE      PROTOCOL      - OTHERS -
```

If you want to run other assays, follow again the sequence of operations described on pages 7 - 10. If you have finished operation follow the Shut-down procedure.

## Shut-down

You should clean the tubing and remove unused reagents before shutting down. This is done as follows:

### 1. Wash operation:

READY	<date>	<time>
MEASURE	PROTOCOL	- OTHERS -

Starting display after POWER ON or EXIT. Press OTHERS twice to reach Operator functions and press OPER FUNCTIONS.

OPERATOR FUNCTIONS		
REAGENT	PERF. CHECK	- OTHERS -

Select REAGENT. Then select OTHERS.

	<date>	<time>
INJ. WASH	MANUAL UNLOAD	- OTHERS -

Depending on how many injectors have been used, select either ALL, INJ. P/M or give the specific injector number.

This procedure is described in detail in section 6.1.1 in the Instrument Manual.

**2. Check that the conveyor is empty of tubes.**

**3. Close the lid of the conveyor.**

**4. Switch off power to the instrument.**