Medicine Devices

USER MANUAL

MDC 1000yeast

MDC 1000part

Semi-automated hematology analyzer for blood count

Operator manual 1.0
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1 INTRODUCTION

The **Yeast-Cellcounter** is a German product that was originally developed for the application in medical laboratories.
Measuring cells with type of electronic measurement replaced the older and tenuous method of counting blood cells visually under the microscope.

Because of the similar structure and size of yeast cells and human blood cells it was possible with comparatively little technical changes to adapt the instrument to the purpose of counting yeast.
Thus, this instrument allows the user in the brewing industry to receive results much quicker than with any visual count and with a much higher reliability and precision than any photo-optical analysis.
The **Yeast Cellcounter** is offered in 2 versions.
The first version is a counter that replaces the conventional methods of counting. Practically this means high standard of quality, extreme shortening of the analysis time and simplification of sample processing.
This is a result of the use of microcomputer technology, which allows the control of measuring disturbances, the control of measuring volume and impulse frequency during the whole measurement.

Two photo-optical sensors affect the control of the measuring volume, which ensures an exact keeping of the sample volume.

The second version is the counter extended to an analyzer system, which offers depending on the requirements, different evaluation criteria.

If only the distribution curve of the yeast cells is of interest, the distribution can be presented graphically without any adoptions or evaluations.

However, if the cell distribution and the display of the cells during the complete process of fermentation is of interest a computer is required to store, calculate and present the data and to give it out on a printer.

Of course, even our smallest instrument offers a maximum in user friendliness. It shows all reports and displays in clear writing not in number codes on an alphanumerical display, informs on its status and makes suggestions in case of error reports.

The careful study of the following pages is suggested to help the user to get acquainted with the system concerning handling, application and working principle.

2 FUNCTIONAL UNITS

2.1 PARTS OF EQUIPMENT

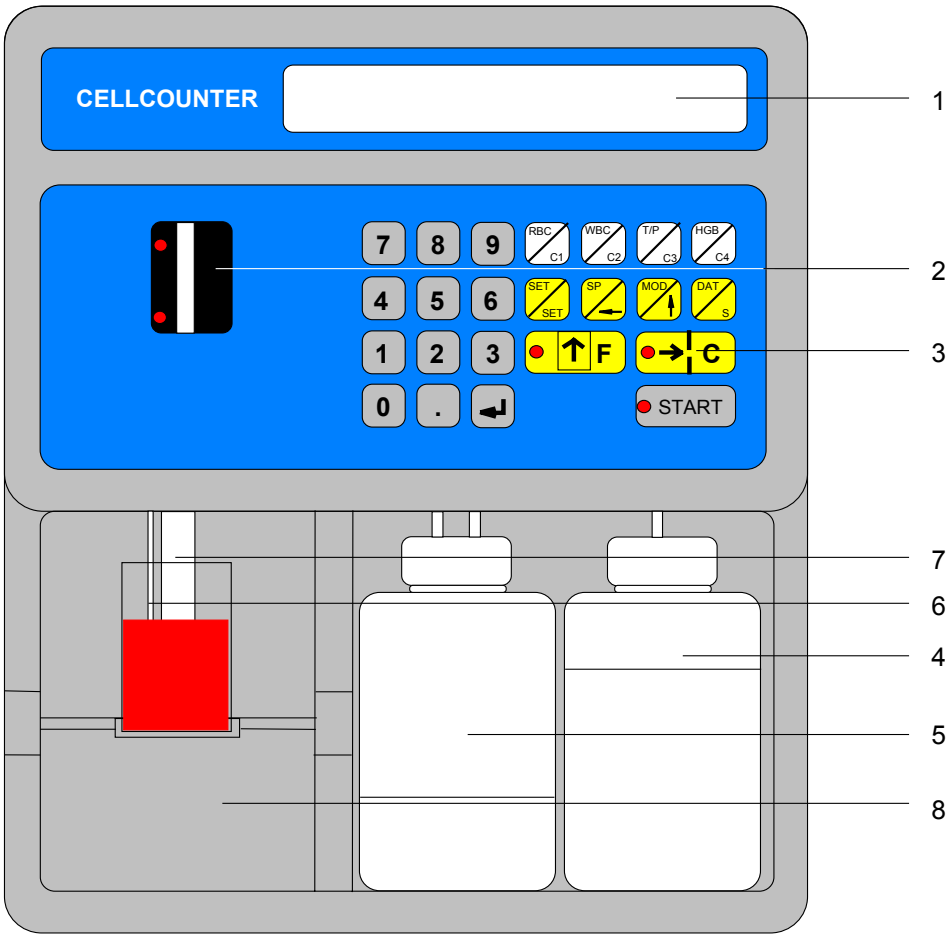
01.	Display	-	Display for measurement/working instructions
02.	Inspection Window	-	Control of the measuring system surveillance
03.	Keyboard	-	To feed the system with figures
04.	Filling Bottle	-	Supply bottle for filling the measuring system
05.	Waste Bottle	-	Collection container for waste
06.	Measuring Unit Consisting of: Aperture-tube Reference Electrode	 - -	 Instrument transducer (capillary aperture) Voltage
07.	Aperture-tube	-	Instrument transducer (capillary aperture)
08.	Platform	-	For the solution during the measuring cycle
09.	Mains Switch	-	Mains switch to switch on the instrument
10.	Plug/Power Switch	-	main switch and mains connection
11.	Fuse	-	for mains connection
12.	Parallel Connector	-	for printer connection
13.	Serial Connector	-	for computer connection

2.2 The Keyboard

01.	C1 - key	-	channel up to 10 Mio. cells per ml
02.	C2 - key	-	channel up to 100 Mio. cells per ml
03.	C3 - key	-	channel up to 10 Billion. cells per ml
04.	C4 - key	-	for calculation of the pitching rate
05.	START - key	-	starts all working functions
06.	FILL - key	-	to fill the measuring system
07.	CLEAN - key	-	to clean the capillary aperture.
08.	Set/Set - key	-	menu-button
09.	SP - key	-	to type in the sample number
10.	Mod - key	-	function choice button
11.	DAT - key	-	to type in the date to type in the contrast to select the print option to type in the yeast calculation
12.	Number-key	-	to type in the numerical values
13.	Enter-key	-	for confirming the input

2.2.1 Diagram of the Equipment

Dia. 1 The Instrument and its functions (front)

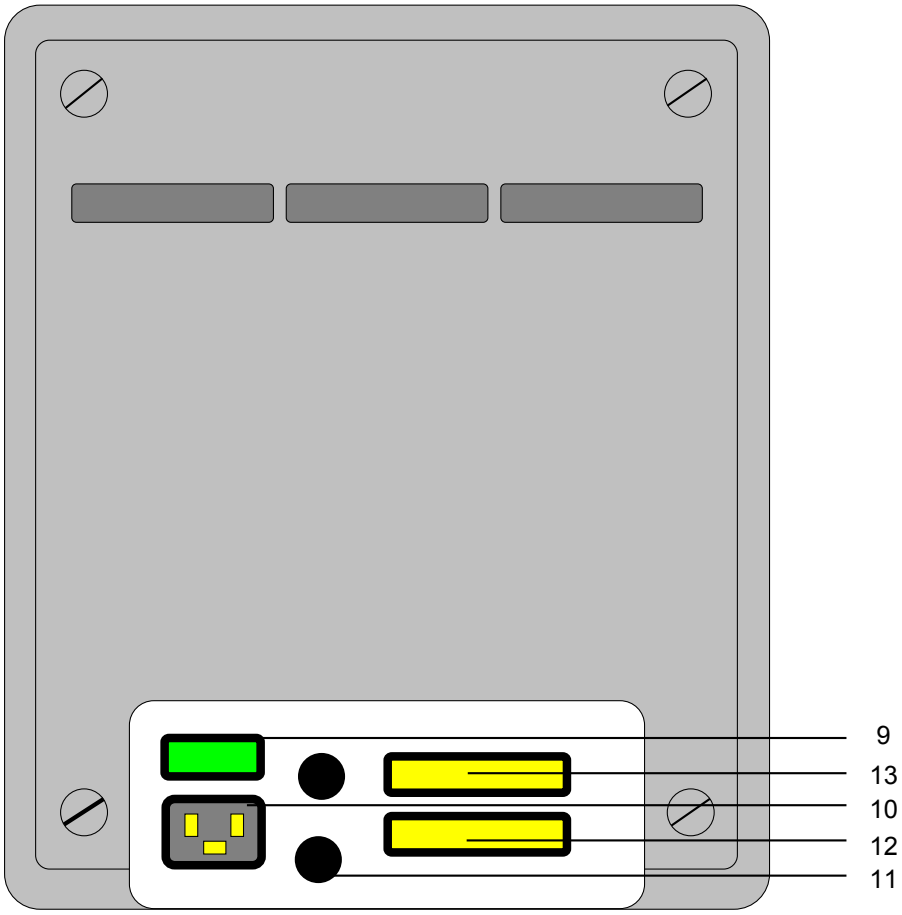


Functional units

01. Display
02. Inspection Window
03. Keyboard
04. Filling Bottle
05. Waste Bottle
06. Outside electrode
09. Capillary
08. Platform

2.2.2 Diagram of the Equipment

Dia. 2 The Instrument and its functions (back)

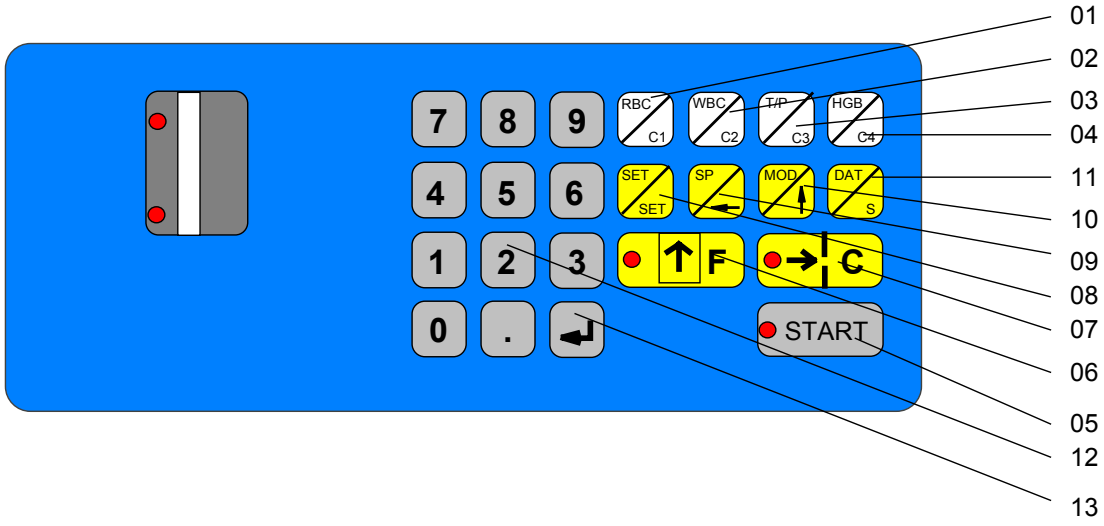


Functional units

09. Mains Switch
10. Plug
11. Fuse
12. Serial Port
13. Printer Port

2.2.3 Diagram of the Equipment

Dia. 3 The Keyboard



Functional units

01. C1-key
02. C2-key
03. C3-key
04. C4-key

05. START-key
06. FILL-key
07. CLEAN-key
08. SET-key
09. SP-key
10. MOD-key
11. DAT-key
12. NO.-key
13. ENTER-key

2.3 EXPLANATION OF TEXT USED ON DISPLAY

2.3.1 Equipment Displays and their Meanings

The **Yeast Cellcounter** is controlled by a microprocessor and has a 2 x 35- digit display.
Disturbances are shown on this display.

The processor has the following functions:

1. Control of the complete mechanical course

2. Processing of the measured values

3. Error control

4. Control of the indicator

2.3.2 Indicator Text

By using a 2-line-LCD many tests can be shown in their original length.
For the sake of simplicity, only additional functions are explained.

SYSTEMTEST	-	Control of working system
TIME	-	Control of measuring time
SEC	-	Seconds
SP:	-	Sample number
FILL	**-**	System fill from the supply bottle
CLEAN	**-**	Pressure on the capillary aperture
C1	-	Measuring of low concentration
C2	-	Yeast measuring (normal level, during production)
C3	-	Yeast concentration (high)
C4	-	Yeast calculation

2.3.3 System options

PRINTING SINGLE SAMPLE ?	Printing sample from the memory
SINGLE MEASUREMENT ?	Sample will not be saved
SERIES MEASUREMENT ?	Sample will be saved and printed
SERIES PRINTING ?	All results in the memory will be printed
DELETE SERIES ?	The database will be deleted completely

2.3.4 System adjustments

SET DATE AND TIME ?	Set Date and Time
SET CONTRAST ?	Change contrast of LCD
SET PRINT MODE ?	Switch ON/OFF curve printout Switch ON/OFF curve saving
YEAST CALCULATION ?	Modification of the factors and data for the yeast calculation

Notice:
If no printer is available or switched off, with some printing options the results will be shown on the LCD.

2.3.5 Suggestions for the Elimination of Errors

ERROR: CAPILLARY BLOCKED !	Measuring time too high Push C-button
ERROR: AIR IN SYSTEM !	The volume-control has recognized air-bubbles in the system Check sample and filling bottle Push F-key
UNTERTIME: AIR IN SYSTEM !	The volume control has detected air-bubbles in the volume unit Check sample and filling bottle Push F-key
OVERTIME: CAPILLARY BLOCKED !	The Stop-light-barrier was not reached. Push C-key Eventually clean capillary
ERROR: NO MEASURING VALUES !	Measuring was interrupted Measure sample again
VOLUME ERROR: FILL SYSTEM !	The volume control has detected air-bubbles in the volume unit Check sample and filling bottle Push F-key
INFORMATION: MEMORY FULL !	Memory is full The system switches off the memory
ERROR: CLEAN CAPILLARY !	Push C-key eventually clean capillary manually

2.3.6 Function-description

The waste-bottle collects the waste of the measuring solution.
It originates 200 µl waste per measurement.

The fill-bottle should always be filled up with **Celloton**. Exchange **Celloton** in filling-bottle ca. every 2 - 3 weeks.

The outside-electrode provides for the current.

The capillary serves as measuring transducer. By using the standard-volume-unit it takes 200 µl test-liquid for a count of the particles.

3 ASSEMBLY OF THE INSTRUMENT

3.1 INSTALLATION

Remove the coverlid; check if all parts are in correct position.

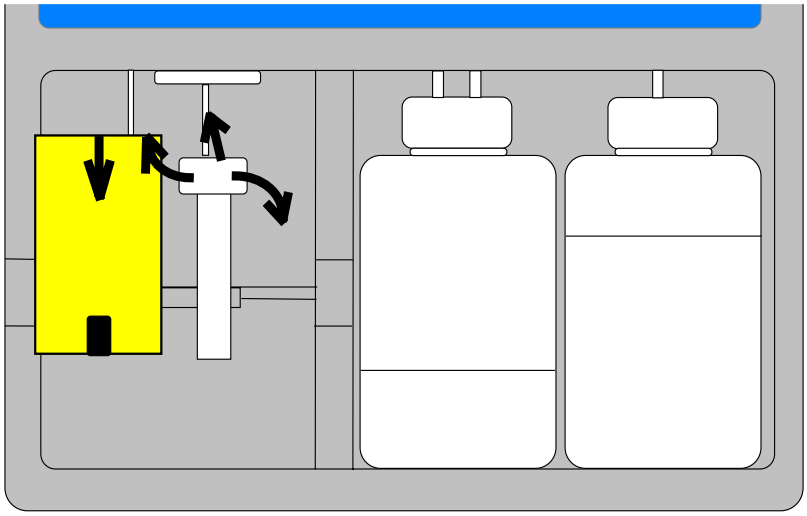
Fill supply bottle with isotonic solution, place supply tube in the provided hole and let it sink to the bottom of the bottle.

Connect the waste tubes to the waste bottle.

3.1.1 Fitting the Capillary

As seen in Dia. 2, the capillary is placed into the measuring chamber as follows:
Remove screw-lid and insert capillary into the screw-lid.
Now screw in the capillary with the screw-lid with moderate strength.

Dia. 4 Fitting the Capillary



Note:
The delivered protection for the capillary is only used for high frequency disturbances and can be removed if it is not necessary.

4 FUNCTION PANEL

The **keyboard** of the **A_L Yeast Counter** has been subdivided into equipment control keys, function choice buttons, numeric keys and measuring range choice buttons.

4.1.1 FILL-button

Press **F-key** briefly. System is filled automatically through the supply bottle.
When the system is being filled, there must be solution under the capillary.
This cycle is only needed when the capillary is changed or if there are bubbles in the measuring system.

4.1.2 CLEAN-button

If the capillary is blocked partially, it is possible, through operating of the **clean-key**, to practice a pressure through the inside pump-system on the capillary-orifice.
The adjusted cleaning-time indicates the length of the pressure.

4.1.3 The START-key

By pressing the **START-key**, the measuring cycle will be started.
If the **START-key** is pressed again **the functions then operates like a STOP-key. The measurement will be interrupted**.

4.1.4 AREA-SELECTION-keys

Through the **AREA-SELECTION-keys** the measuring-parameters are chosen.
If the parameter on the display is switched off, you automatically enter into the time-mode to control the measuring time.

4.1.5 The Set-key

By pressing of the **SET-key** the calibration can be changed after a measurement.

4.1.6 The SP / ← -key

By pressing the **SP-key** a memory-number, which is increased by one after each measurement, can be typed in.
The memory number can be changed after every measuring.
Also it is used as a delete key.

4.1.7 The MOD / ↑ - key

By pressing the **MOD-key** the Options menu is displayed.
By pushing the key several times further options are shown and can be chosen.

4.1.8 The ENTER-key

With the **ENTER-key** all inputs and options will be confirmed.

4.1.9 The DAT / S-key

By pressing the **DAT-key** the **options-menu** opens.
By pushing the key several times further options are shown and can be chosen.
The time, date, contrast, print and curve saving mode can be changed after pushing the **ENTER-key**.
If you are in the “Measuring Menu” the printout can be set (single printout or series)

4.1.10 The number-key 0-9

With the **NUMERIC-keys** the results of the adjustments can be changed.

4.1.11 The DOT-key

With the **DOT-key** a dot can be set into numbers.

Information:
If any key pushed while working, the circle will be interrupted.

4.1.12 Test of Instrument

Fill measuring cup with isotonic solution and place it under the measuring capillary. Switch on the instrument with the mains switch.

For all buttons with lamps, the following applies:

Button lamp on = Function on
Button lamp off = Function off

All displays are in normal writing, not in number

```
THIS IS THE LCD-DISPLAY
```

After the instrument was switched on information on the system version appears.

```
YEAST ANALYZER                (V1.0)
DAT: 01.01.2000          TIME: 11:11:11
```

Push **F-key** briefly

```
                                [11:12:00]
SYSTEM IS BEING FILLED...
```

The system is filled.

When the filling cycle is correct, the lower LED-control lights up in the inspection window and the measuring tubes of the volume unit are free of bubbles. When the tube system was empty, it is possible that the procedure has to be repeated.

In order to perform a system test switch off all parameters, push **START-key**.

```
SP: 23                          [12:31:14]
TIME        00,0 SEC
```

This way a measuring time control is carried out. Simultaneously a mechanical check and a check of the capillary are performed.

```
SP: 23                          [12:31:14]
TIME        10,5 SEC
```

When a parameter is chosen and the **START-key** is pressed the measuring was started.

The volume unit is emptied and a measurement is carried out.
The process can be watched through the inspection window.

The lower LED-Control shows “start of the measurement”.
The upper LED-Control shows “end of the measurement”.

When the measurement is completed the result is shown on the display.

```
SP: 100                          [11:12:00]
C2:  21,2 Mill. / ml
```

In case of an incorrect measurement, the instrument gives an error signal
(see section Errors).

4.1.13 Determination of Blank Value

Choose the measuring channel with the **AREA-keys** and determine the blank value of the measuring solution:

Place a cup of solution under the capillary and press the **START-key**.

```
C1-MODE MEASURING . . .
SERIES MEASUREMENT   2/90    SP: 100
```

When the measuring is completed the blank value of the activated parameter is displayed.

```
SP: 100                          [11:12:00]
C2:  0,2 Mill. / ml
```

Blank Value normal for:

C1	up to	1000
C2	up to	0,7
C3	up to	0,07
C4	up to	0,07

Attention!
If the indicated blank-values are not reached during a measuring with blank solution, the instrument is only partially operational!
(see also Error-Description).

4.2 THE DATE / TIME MENU

The instrument can be operated with different basic adjustments.
The most important adjustments will be shown here.

4.2.1 Set date and time

By pushing the **DAT-key** the date can be shown.
With **ENTER-key** the function will be activated and confirmed.

```
SET DATE AND TIME ?
OPERATE OPTION = ENTER
```

After pushing the **ENTER-key** the day, month, year can be typed in
by the number-keys.

```
CHANGE DATE / TIME
DAT:  11.02.2000      TIME: 14:32:12
```

4.2.2 Set contrast

By pushing the **DAT-key** the contrast can be selected.

```
SET CONTRAST ?
OPERATE OPTION = ENTER
```

With **ENTER-key** this function can be activated and confirmed.

```
CHANGE CONTRAST = ARROW KEY
DISCONTINUE = ENTER
```

Through the arrow-keys the intensity of the display can be chosen.
By pushing the **ENTER-key** you leave this function.
The adjustment will be saved and used when the system will be started again.

4.2.3 Set curve mode

By pushing the **DAT-key** the option **print / save curve** can be chosen.

```
SET CURVE MODE ?
OPERATE OPTION = ENTER
```

With **ENTER-key** this function will be activated.

```
PRINT CURVE   ON=1     OFF=0
PRINTMODE: (0)          _
```

Is this option switched off, the curves will not be printed.

```
SAVE CURVE   ON=1   OFF=0   BREAK=2
PRINTMODE: (0)          _
```

Is this option switched off, the curves will not be saved.
The measuring memory will be increased from **32 to 90 samples**.
If there is a change the measuring memory will be deleted.

4.2.4 Change yeast calculation

By pushing **DAT-key** the setting of yeast calculation can be changed**.**

```
DILUTION FACTOR: (1.0)      _ _ _
```

Enter the required number with the number keys, if the standard dilution is not used.
With **ENTER-key** the setting will be activated and confirmed.

```
EXPECTED NUMBER OF CELLS: (22.0)  _ _ _
```

Now the computer asks for the expected amount of yeast in the original wort.
Enter the required number with the number keys.
With **ENTER-key** the setting will be activated and confirmed.

```
WORT WITHOUT YEAST: (200.0 hl)    _ _ _
```

For calculations now enter the original wort in hectoliters.
With **ENTER-key** the setting will be activated and confirmed.

4.3 The MOD-Menu

The instrument is working with an option to printout and save the measured results.
For use of the instrument, a printer is not necessary.
The system can be operated in direct/memory or in memory/printing mode
All measured and saved results can be printed in series or single.
The data can be stored with the available curves and also can be printed out.
If the curves are not needed the printout of curves can be switched off.
The **memory** then will be **increased** from **32** to **90 samples** and the **memory** will be **deleted**.

During a measurement the display shows information in which mode the system is working.

4.3.1 Working with a printer

A selection can be made with the **MOD-key**.
SP: = Memory No. which automatically will be increased by one however with **SP-key** it can be corrected individually.
After switching on the instrument it is working in the serial mode.

4.3.1.1 Printing sample from memory

A stored value can be selected by the **SP-number** and printed or displayed.
Press MOD-key, choose the desired option and confirm with **ENTER-key.**

```
PRINTING SINGLE SAMPLE ?
OPERATE OPTION = ENTER
```

Confirm printing single sample with the **ENTER-key.**

```
SET SAMPLE NUMBER !
SP: (1/56)          1_ _ _
```

Choose the stored measuring value with the sample number.
Now the measuring value is displayed and printed if the printer is switched on.

```
SP: 100                                  [11:12:00]
C2:   21,2 Mill. / ml
```

4.3.1.2 Single measurement

The **single measurement** can be activated or deactivated. A measuring will be carried out and the **measured results** can be **shown** and with the printer it can be **printed** out, however the **data will not be saved**.
During measurement the printing mode, saving mode, the total memory amount and the sample number will be shown.

If you have chosen several repeated measurements, the mean value will be calculated from the measured results.

Press MOD-key, choose the desired option and confirm with **ENTER-key.**

```
SINGLE MEASUREMENT ?
OPERATE OPTION = ENTER
```

If singles measurement is confirmed with the **ENTER-key**, every measurement is immediately printed after the measuring. The result will not be saved.

```
C2-MODE MEASURING . . .
SERIES MEASUREMENT    2/90    SP: 100
```

After the measuring the result is displayed.

```
SP: 100                                [11:12:00]
C2:   21,2 Mill. / ml
```

4.3.1.3 Series measurement

The serial measurement can be activated or deactivated. After the measurement the measured result will be **displayed** and **saved**.
If the option printing is switched on, the result will be printed out.
During the measurement the printing mode, memory number, total number of memory and the sample number are shown.

Press MOD-key, choose the desired option and confirm with **ENTER-key.**

```
SERIES MEASUREMENT ?
OPERATE OPTION = ENTER
```

If **SERIES** measurement is confirmed with the **ENTER-key**, every measurement is immediately printed and saved after the measuring.

```
C1-MODE MEASURING . . .
SERIES MEASUREMENT    2/90    SP: 100
```

After the measuring the result is displayed.

```
SP: 100                                [11:12:00]
C2:   21,2 Mill. / ml
```

If the printout is not finished, the print option can be turned off in the **DAT-menu**.

4.3.1.4 Printing series

It is possible to print out the existing data from the memory completely.
Later the saved data also can be printed out.

Press MOD-key, choose the desired option and confirm with **ENTER-key.**

```
SERIES PRINTING ?
OPERATE OPTION = ENTER
```

If **series print** is confirmed with **ENTER-key**, every available data will be printed.

```
PRINTING SERIES !
```

4.3.1.5 Delete Series

To avoid a mix-up of old and new measuring data, the saved data has to be deleted before the new measuring series will be started.
This will be especially recommended if the option **measuring/printing** was chosen.

Press MOD-key, choose the desired option and confirm with **ENTER-key.**

```
DELETE SERIES ?
OPERATE OPTION = ENTER
```

On the display will be confirmed that the memory was deleted.

```
DELETE SERIES !
SERIES DELETED !
```

4.4 CHECK OF CALIBRATIONS

The system is factory-calibrated with control substances. In order to check the system with a suitable control it is recommended to check samples for all parameters as described in section preparation of samples.

4.4.1 Check of C1 to C4 measuring

In order to check the **calibration**, select the **C2 channel** and place a cup of blank solution under the capillary and start the determination of the blank value by pressing the **START-key.**
When the blank value is acceptable, place the prepared solution under the capillary and determines the correspondent value for **C1 to C4 range**.

```
PRODUCE C2-SAMPLE AND
MEASURE WITH START-key . . .    SP:(1)
```

Press **START-key** for measuring the sample.

```
SP: 100                                [11:12:00]
C2:   21,2 Mill. / ml
```

Notice:
Should the values differ from the required ones, carry out a standard calibration as described in section **calibration**.

4.5 CALIBRATION

To change the calibration, measure a control in the corresponding measuring range and select the option **calibration** with **SET-key**.
If you try to change a result, which was not measured before, the information **not measured** will appear on the display.
If this option was activated by mistake, it can be interrupted with **ENTER-key**.
The measuring results only should be changed in normal range.

4.5.1 Important Information for Calibration

In order to check the functions of the measuring system and the individual measuring channels, switch on the individual channels with **keys** (one by one) and carry out a determination of the blank and standard values from the blank solution and the prepared samples.

The determined values should be compared with the given control results.
The value that was measured ought to be within the acceptable range of the control.

Attention!
In case you are using various kinds of control, be aware that not every control is suitable to be measured with a cell-counting system, as the discriminators and analyzing criteria are set up for yeast cells.

For this reason it is important that the measured values match the yeast cells that is measured and not necessarily the control.

If the system is calibrated with defective- or wrong control, the measured results will be wrong.

Important Notice !
By adding Cellolyse^3 the yeast cells change in size.
The adjustments for MCV (mean cell volume) were set accordingly and do not correspond to the real cell volume. If no Cellolyse^3 is used the curves and calculation of the cell-size are displayed wrong however the amount of cells is nearly the same.

4.5.2 Standard calibration for C1 to C4-channel

Push area key on **keyboard**.

```
PRODUCE C1-SAMPLE AND
MEASURE WITH START-key . . .    SP:(1)
```

Produce and measure **standard-solution**.

```
C2-MODE MEASURING . . .
SERIES MEASUREMENT    2/90    SP: 100
```

When the measurement is finished the display shows: (e. g.)

```
SP: 1                                   [11:12:00]
C2:   24,5 Mill. / ml
```

Press **SET-key.**

```
ADJUSTMENT RANGE   1.0  -  9999
C2  24.5     RATED VALUE: _ _ _ _
```

Type in required value in digits by **keyboard.**
Confirm with **ENTER-key**.
After this confirmation the display shows the correct result.

Notice:
A different calibration of the channels C3 and C4 will result in a different calculation of the yeast in channel C4, if channel C3 will be switched to C4 without measuring.

4.5.3 Delete Calibration

To delete the calibration and return back to the factory-calibration, switch off the instrument, push **SET-key** and keep it pressed while you switch on the system again.

5 WORKING WITH THE INSTRUMENT

5.1 SYSTEM-HANDLING

The mains switch at the backside switches on the instrument. It is immediately ready to work.

Make sure that the filling bottle (right) is full and the waste bottle (left) is empty.

After removing the cup with cleaning solution prepare a cup of Celloton and place one cup under the capillary.

Activate the test cycle by switching off all measuring channels. Start the instrument and check the measuring time.

Measuring time is: 10,5 sec. + 1,5 - 1 sec.

If the measuring time is not correct, the instrument indicates an appropriate error report. Please clear the disturbance with the recommended steps given on the display (see chapter errors).

A check of the isotonic solution in the **C2-area** shows that the measuring system is working correctly.

The blank value should not exceed 0,7. If this is not the case, the cycle should be repeated with fresh isotonic solution.

5.1.1 Preparing of the Samples

As the **yeast-samples cannot** be used **directly**, first a suitable measuring sample has to be prepared. A measuring sample can be prepared manually or with an automatic **Diluter**.

Place the **sample** into a **particle-free Cellcup** and add the corresponding reagent as per manufacturer's instructions.

Degasify the yeast sample in an ultrasonic bath and mix the sample.

It is **mixed** exactly, if **no air bubbles** can be seen.

Then **dilute** the sample with **Celloton** by using a **Pipette** or an automatic **Diluter** and **measure** the prepared **sample** in the **corresponding** measuring channel.

5.1.2 The Diluter

The instrument can be operated with a dilutor with one dilution ratio.

In the following the diluter that is usually provided with ALyeast is described briefly.

Diluter consists of the following parts:

1. Sample tip
2. Touch plate
6. Main switch

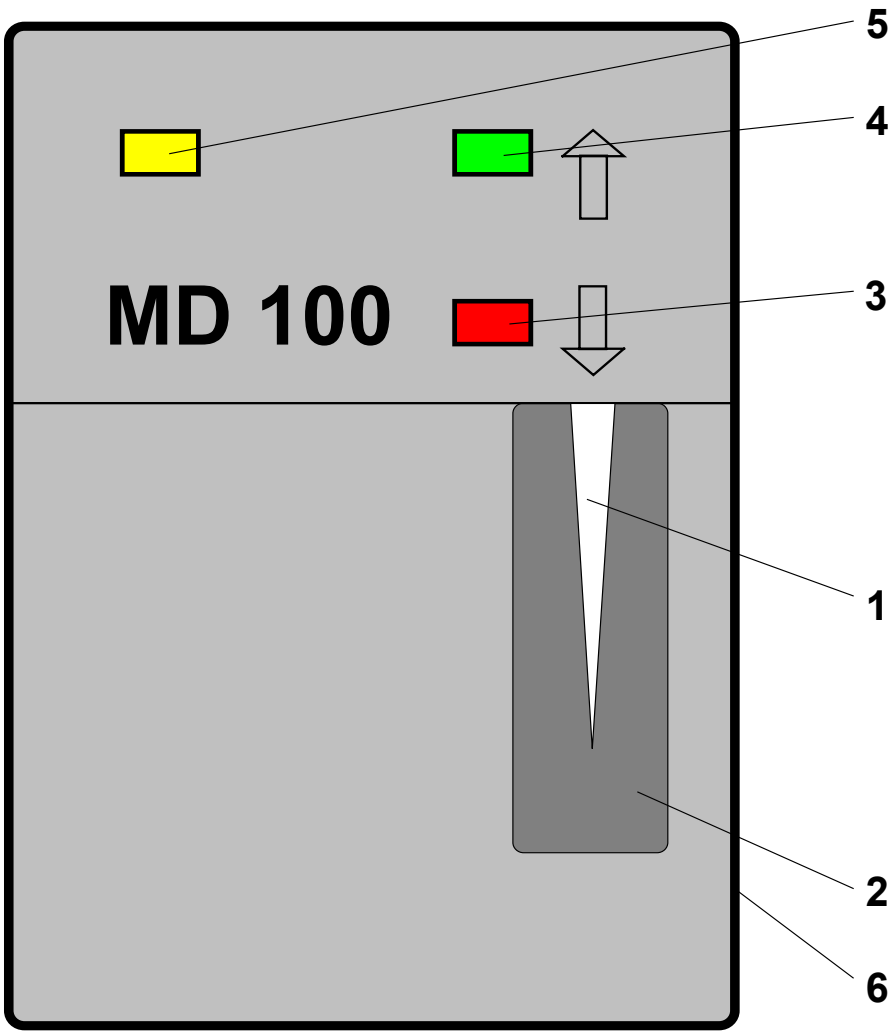
Control lights:

3. Diluting mode (red)
4. Sample aspiration (green)
5. Power (yellow)

A burning yellow light signals that the diluter is ready for sample aspiration.
The red light signals readiness to dilute.

5.1.3 Diagram of the Diluter

Dia. 5 The Diluter and his functions (front)



The functional units

1. Sample tip
2. Touch plate
3. Control light out
4. Control light in
5. Control light power
6. Main switch / Prime

5.1.4 Diluter - Handling

Switch the dilution and take the yeast sample under the sample tube.

When the **touch plate** behind the **sample tube** is pressed, yeast is sucked in and the red control light turns on.

Now the **sample tip must be cleaned** carefully.

The dilution ratio indication is on yeast and the **red dilution light signals** readiness to **dilute**.

Take measuring cup under the sample taker and **press touch plate** to dilute into the cup. This is the measuring solution for channel two.
For more information show sample preparation and short manual.

Note:
When diluting into sample cup avoid foaming and air bubbles. Best if cup is held in a 45 degree angle that liquid can run down the walls of the cup, otherwise you might destroy the cells!

5.1.5 The Sample Sequence

While one sample is measured a new sample can already be diluted. This way the sample sequence can be increased considerably.

5.2 DETERMINATION OF YEAST ANALYSIS

5.2.1 Required Materials

Apart from the measuring instrument, the following equipment is required for measuring.

- Diluting Solution	Celloton	Order No. 78411
- Lysis reagent	Cellolyze^3	Order No. 78410
- Dilution Container (Cell-)	Cups	Order No. 78664
- Stand for Samples	Sample Rack	Order No. 78004
- Diluter		Order No. 8710
- Mixer (ultrasound)		

5.3 SAMPLE PREPARATION

5.3.1 Control of Current Production

Choose C2-channel: (Pitching, rocky heads, tunnage)
Dilute sample with Diluter 1x,
Deproteinate the sample with **cellolyse^3**.
Degasify with an ultrasonic bath and measure the sample in **Channel 2**.

5.3.2 Precision-counting

Choose C1-channel: < 1Mio./< 100.000 cells/ml (for low concentrations)
Dispense 10 ml **Celloton** out of the Diluter into a **Cellcup**.
Take out 1 ml with a pipette.
Then add 1 ml sample to the remaining 9 ml **Celloton**.
(Diluting ratio = 1:10). Add. 4-5 drops **Cellolyse^3** to the sample.
Degasify (ultrasonic bath), and count in **Channel 1.**

Result x Dilution ratio = result which is displayed on the LCD.

5.3.3 Measuring of Yeast / Strain Yeast

Choose C3-channel:
Dilute a 20 ml yeast sample with 980 ml distilled water and homogenize the yeast by stirring.
(Diluting radio = 1 + 49).
This is the pre-dilution.
Dilute pre-dilution with the diluter by pressing the touch plate of the diluter to suck in your sample.
Press touch plate again and you receive your sample (use a new cup).
Add. lysing agent (4 - 5 drops) and degasify the sample with ultrasonic bath.
Measure the dilution - the result appears in billion cells/ml.

5.3.4 Calculation of Yeast / Strain Yeast

Choose C4-channel:
Use sample or result from **C3-channel** change the range to **C4-channel**.
C4 shows **" 98 l YEAST TO 200 hl WORT"**.
Prerequisite: Parameter setting with **DAT-button**.

Notice:
A different calibration of the channels C3 and C4 will result in a different calculation of the yeast in channel C4, if channel C3 will be switched to C4 without measuring.

5.4 PREPARATION OF THE SAMPLE

The well-mixed yeast sample, which was prepared in the mixer, is processed as follows:

5.4.1 Sample for a Dilution

Absorb 20 µl yeast with the diluter.
By pressing the touch plate it will be
transferred into a cup (dilution 1 : 500),
alternatively
mix 20 µl capillary yeast with 10,0 ml
of isotonic solution.
(Add 4-5 drops of lysing agent)

5.4.2 Notice

Between each dilution stage, the sample-taker of the diluter must be thoroughly cleaned with a fluff-free cloth (e.g. paper towel).

6 VARIOUS INFORMATION

6.1 REQUIRED MATERIALS AND REAGENTS

To operate the instrument, high quality solutions and disposable materials are required, which are guaranteed to be particle-free and always of the same quality.

When in doubt, always use the original **Accessories**.

In the following, you will find names and order numbers as well as packing sizes of all **Accessories**.

ARTICLE	NAME	USING	PACK SIZE
78411	Celloton	Diluting solution	2x10 l
78410	Cellolyse^{3}	Lysing / HGB reagent	6x15 ml
77664	Cellcup	Particle free cups	1.800 pcs.
78415	Celloclean^{E}	Cleaning solution	3x500 ml

ADDITIONAL EQUIPMENT

Diluter for the preparation of dilutions

6.2 DILUTION-RATIOS

The **Yeast Counter** work at an end-dilution ratio of

C1 = 1 : 10
C2 = 1 : 500
C3 = 1 : 24500
C4 = 1 : 24500

In order to have a higher precision and reproducibility it is recommended to use a diluter for preparation of the samples.

6.2.1 Dilution C1:

1000 µl suspension (yeast) to 10 ml Celloton = 1 : 10

6.2.2 Dilution C2:

20 µl yeast to 10 ml Celloton = 1 : 500

6.2.3 Dilution C3 bis C4:

20 ml yeast to 980 ml distilled water = 1 : 49
20 µl yeast suspension to 10 ml Celloton = 1 : 24500

Note:
The suction tube of the Diluter must be carefully cleaned from all external remains with a fluff free cloth.
After the addition of 4-5 drops of hemolysis reagent Cellolyze3 the sample is ready for measurement.

7 ERRORS, WHICH OFTEN OCCUR

Most of the disturbances in the measuring cycle and of the result are avoidable. Therefore, please accept the following advice:

Use tested solutions and particle-free one-way material.

Most errors are caused by partial or complete blockage of the capillary aperture.

Other causes are:

Particle polluted sample containers
Pollution of the reagents
Pollution caused by unsuitable cloths
Unclean aids (pipettes a.s.o.)

Further causes are incorrect wiping of the suction tube and therefore inaccurate dilution.

The **Yeast Counter** are recognized most electrical and mechanical disorders. This is vital for the correctness of the measuring results.

The following disturbances may occur:

The capillary aperture is partly or completely blocked
Bubbles are in the hydraulic system
Measuring unit is polluted
Instrument needs a follow-up calibration
Wrong dilution was measured

8 MAINTENANCE

8.1 DAILY MAINTENANCE

The **Yeast Counter** will work with little disturbances, if the following steps will be considered:

8.1.1 The System:

Empty the waste bottle daily and refill the supply bottle if necessary. Discard the leftovers in the supply bottle, so that leftovers of an older bottle do not pollute new Celloton.

8.1.2 The Capillary:

The capillary aperture must always be kept in cleaning solution (**Celloclean^{E}**) in order to dissolve pollution and proteins.

Take care that there is always sufficient solution under the capillary so that it can not dry out.

Never use any other solutions than those, which have been mentioned, because otherwise the valve system could be damaged.

8.2 REGULAR MAINTENANCE / INSPECTION

8.2.1 The Capillary

To enable the equipment to run free of disturbances, the capillary must be kept in good condition. In the surrounding of the aperture and inside the aperture, protein deposits can occur, especially when yeast corpuscles are counted.

The following guidelines are to be kept:

Never let the capillary dry out

Never let the capillary stand in a sample for too long.

Rinse the system well with Celloton and cleaning solution between working phases or when the Cellcounter is not going to be used for some time.

Inspect the aperture regularly under a microscope with a 10 x enlargement for deposits or cracks.

Cleaning of the Capillary:

Depending on the amount of samples that are measured, the capillary should be replaced from time to time. For cleaning, the capillary is emptied and taken into fresh Celloclean E, so that the inside of the capillary is filled with the cleaning solution through the aperture which is thus rinsed and freed of albumin deposits.

Then rinse well with distilled water and keep the capillary stored dry.

Notice:
For cleaning the capillary never use any cleaning agents that contain alcohol or other aggressive substances that could attack plastic materials and Plexiglas !

The Cellcounter is equipped with one capillary. However to be safe, a spare capillary should always be at hand.

Before reinstalling the capillary must be well rinsed. Never let any cleaning solution enter the tube system.

Important!
The capillary must never be cleaned mechanically or with ultrasound. Do not use alcohol or other cleaning solutions that attack plastic materials.

8.2.2 Measuring and Volume Unit

This part is to be inspected occasionally through the inspection window at the front of the instrument. The inside walls of the volume tubes must not show any signs of stains or deposits. This can be avoided by using an appropriate cleaning reagent.
In extreme cases, remove the cap and clean glass tube with a tube brush.

8.2.3 System

To avoid soiling of the valves and glass parts, the fluid system must be rinsed with cleaning agent during the work-series or when the Cellcounter is out of action for some time.

Place a cup of cleaning solution under the capillary, push the **F-key** and rinse the system several times.

Attention !
Never rinse the Cellcounter with other fluids such as concentrated bleaching reagents.
Regular rinsing with cleaning solution secures of sufficient cleanliness.

8.2.4 Long-Period Usage Break

Empty the waste-bottle and fill the supply bottle with aqua-dest (distilled water). Remove and empty the capillary and insert it again. Place a Cellcup filled with distilled water under the capillary and start the instrument by pressing the **Fill-key** two to three times.

Attention !
Never use other fluids than the solutions mentioned, otherwise the valve system may be damaged.

When the instrument is taken back into operation after a longer time, replace distilled water with isotonic-solution and reverse the process.

9 ERROR DESCRIPTION

9.1 WHAT TO DO WHEN?

Situation	Possible Reason	Solution
instrument does not work	loose wire or plug	check wire and plug of the instrument and mains plug
no display	mains switch out or fuse defective	turn on mains switch, check fuse, if necessary replace it (pay attention to correct value!)
	electrical defect	inform service
instrument out of action, display on	fuse on power board defective	replace fuse
	wires loose at PC-board or aggregate	check correct placement of wire and connect to correct plug if necessary
	loose mechanical parts or aggregate	
	motor defective	inform service
instrument works but turns off after a short time	no vacuum	check measuring
	system leaks	
	capillary placed incorrectly	check placement of capillary
	seal defective	replace seal
	filling cycle was forgotten	start filling cycle
	aperture blocked	clean capillary, if necessary replace it by a clean capillary or inform service

Situation	Possible Reason	Solution
no filling cycle or turns off immediately	filling bottle empty or filling tube not in filling solution	fill bottle, sink tube to the bottom of the bottle
	filling tube bent capillary leaks	check path of tube check capillary for correct placement
	no cup with solution under capillary	check cup and solution
	mechanical defect	inform service
blank values too high	aperture blocked or polluted	replace or clean capillary
	capillary or seal broken	check seal, check capillary replace if necessary
	solution soiled diluter soiled	replace solution clean diluter
	bubbles in the solution	don’t shake solution too much, or if the diluter tip is too thin, replace it
	electronic defect	inform service

Situation	Possible Reason	Solution
measuring value too high	yeast sample defective or wrong concentration	check yeast extraction system (tubes) check diluter, carry out counter control
	measuring cup soiled i.e. not particle free	check cup for cleanliness (blank value)
	wrong sample	use dilution
	electrical or mechanical defect	inform service
measuring value too low	yeast sample defective or wrong measuring volume	check yeast extraction system (tubes), check diluter, carry out counter control with capillary solution if necessary

Situation	Possible Reason	Solution
instrument does not measure	measuring system not filled	fill system with filling cycle
	aperture blocked	replace or clean capillary
	measuring optic soiled tube	clean measuring unit
	electronic defect	inform service
instrument shows function aborted on the display	upper light barrier defect or glass tubes soiled	clean glass tube clean system
	incorrect placement of capillary	place capillary correctly
	protective function	not necessary a mistake;
	vacuum system was activated	if it occurs repeatedly, use special cleaning cycle
	electronic or mechanic defect	inform service

INDEX