Operation MANUAL

OMNICOLL Fraction Collector - Sampler

LAMBDA OMNICOLL Fraction Collector - Sampler

The LAMBDA OMNICOLL introduces new concepts in fraction collection and sampling. The OMNICOLL fraction collector and sampler can be used for all kinds of chromatography. In the number of simultaneous chromatographic streams the OMNICOLL is **not outperformed by any other fraction collector on the market**.

- Collects fractions in any racks of your choice
- Collects unlimited number of fractions in single or multiple fractions
- No danger of spilling; the complete collector is placed above the tubes
- Unlimited number of programs
- Extremely easy programming of rack and tube position by means of a simple pen
- Fractionation according to time (0.1-999.9 min and 1-9999 min) or volume (0.05-500 ml or 0.1-30 l) or drops (with optional drop-counter)
- Sampling with pause (0.1-9999 min) and line washing; the fraction collector can be used for sampling during cell cultures, fermentations, chemical reactions, etc.
- Can be placed in a cold bath or any other thermo-stabilized container
- Solvent resistant metal construction with tubes easily accessible from all sides
- Multi-column attachment for simultaneous fraction collection (optional)
- Low voltage power supply – battery operation possible for field-applications)
- RS-232 interface (optional)

LAMBDA Laboratory Instruments

is developer and producer of special laboratory instruments mainly for biotechnology, microbiology, food and agricultural, chemical and pharmaceutical research and development as well as for general laboratory and research applications.

LAMBDA MINIFOR – highly innovative and compact fermenter/bioreactor system for laboratory scale fermentation and cell cultures

LAMBDA OMNICOLL – fraction collector-sampler for unlimited number of fractions

LAMBDA PRECIFLOW, MULTIFLOW, HIFLOW and MAXIFLOW peristaltic pumps – reliable, precise and extremely compact

LAMBDA SAFETY POWDER DOSER – allows automatic feeding of powders without spoon. Safe operation with hazardous material (GLP)

LAMBDA VIT-FIT polyvalent syringe pump with extremely robust mechanics – programmable infusion and filling from micro syringes to large volume syringes of 150 ml without adapter

LAMBDA MASSFLOW – precise gas flow measurement and control with data acquisition option

LAMBDA PUMP-FLOW INTEGRATOR – with LAMBDA pumps and doser allows the visualization and recording of the pumped volume

Table of contents

1 Setting up the Fraction Collector ... 3
1.1 Assembling the fraction collector ... 3
1.2 Assembly of fraction collection tubing ... 5
1.3 Connecting the drop-counter detector (optional) ... 6
2 Start of the fraction collection ... 7
3 Programming of the fraction collector ... 9
3.1 Principle of programming ... 9
3.2 Ready to use Fraction collector with the supplied tube racks ... 10
3.3 Programming the OMNICOLL for any tube racks or recipients ... 11
3.4 Control Panel of OMNICOLL Fraction Collector ... 12
3.5 Fraction collection according to the volume ... 16
3.6 Calibration of the peristaltic pump and the OMNICOLL ... 16
3.7 Fraction collection with a time interval in-between fractions (“high”) ... 18
3.8 Multi-channel fraction collection – multiple stream sampling ... 20
3.9 How to increase the capacity of the fraction collector? ... 23
4 Remote controls ... 23
4.1 Collection of single samples ... 24
4.2 Collection of multiple samples ... 24
5 Practical advice ... 24
6 Maintenance ... 25
7 For your safety ... 25
8 Technical specifications ... 26
8.1 General specification ... 26
8.2 Inputs/outputs ... 27
9 ACCESSORIES AND SPARE PARTS ... 27
9.1 List of accessories and spare parts ... 27
10 Guarantee ... 28
11 Appendix ... 29
11.1 RS communication protocol for LAMBDA OMNICOLL fraction collector-sampler ... 29
11.2 How to set the OMNICOLL Fraction Collector-Sampler address? ... 31
11.3 RS-connection scheme ... 31

1 SETTING UP THE FRACTION COLLECTOR

1.1 Assembling the fraction collector

The setup of the fraction collection - sampler, LAMBDA OMNICOLL is very easy - a short video of the installation can be found at http://www.youtube.com/watch?v=33J9U_2-b-o

Figure 1.1-1 Push the first tub-sheet into the slots on one of the shorter side of the yellow support.

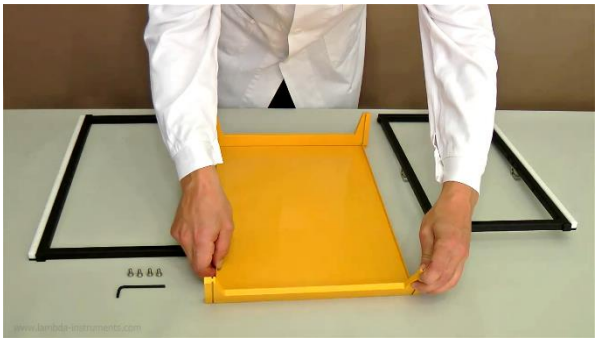


Figure 1.1-2 Push the second tub-sheet into the slots on another shorter side of the yellow support.

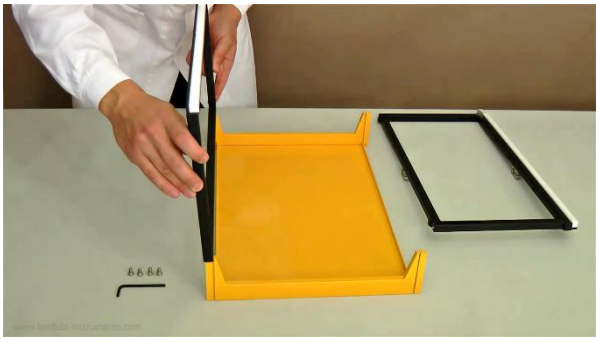


Figure 1.1-3 Insert the black frame into the corresponding slots of the yellow supports

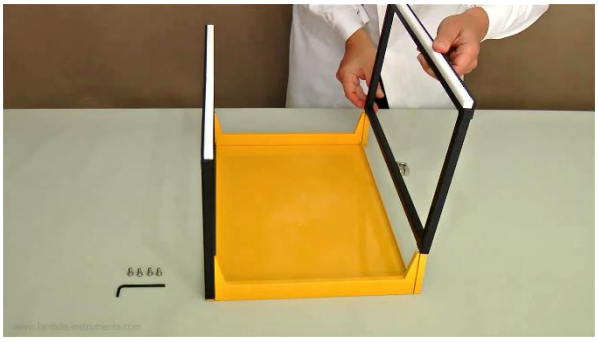


Figure 1.1-4 Pay attention to proceed at the same speed on both sides otherwise it will end up in blocking. The tub-sheet should not slip out of the slots.

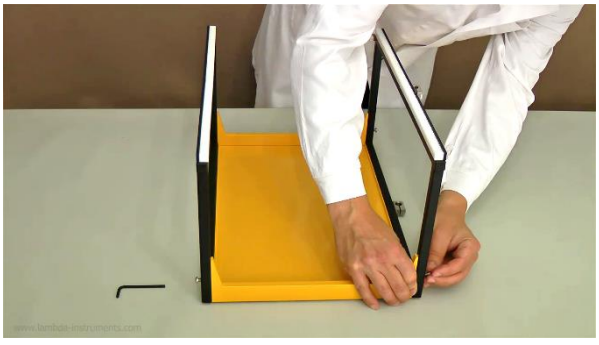


Figure 1.1-5 Fix both frames in position with four bolts.

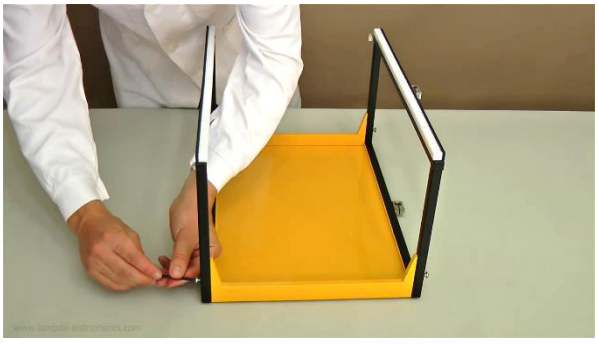


Figure 1.1-6 Tighten it securely with the help of the provided hexagonal key.

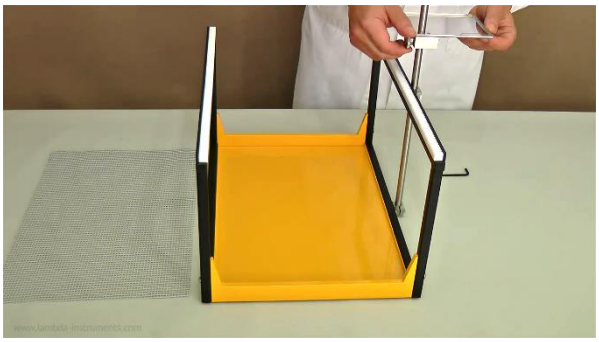


Figure 1.1-7 Push the metal rod through both fixation nuts on the right side of the frame and fasten them with screws. If needed fix the support plate on the metal.

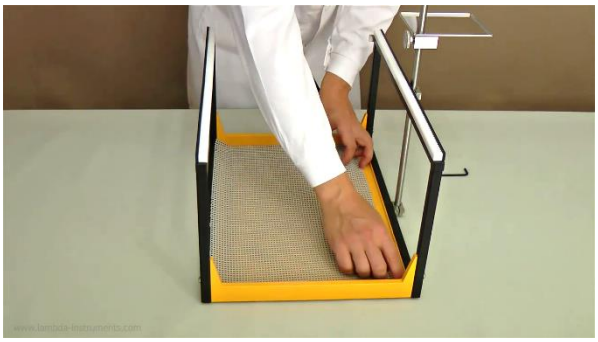


Figure 1.1-8 Place the fixing mat in the support. When needed clean the mat from dust and dirt with a humid cloth. Make sure that the mat is dry before use.

Figure 1.1-9 Place the control unit just at the beginning of the gear rails.
The distance from the edge should be the same on the left and right sides. The gear wheels of the control unit must engage correctly in the gears of both rails.
Be sure that nothing will disturb the movement of the control unit during fractionation.

Figure 1.1-10 Connect the cable of the control unit of the LAMBDA OMNICOLL fraction collector and sampler with the cable of the power supply plug.

Figure 1.1-11 Place the supplied magnet on the right inner side of the frame to stop the fraction collection.

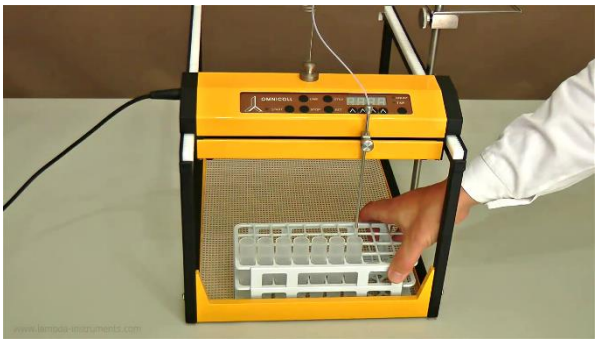


Figure 1.1-12 Place the tube rack on the fixing mat, so that the first tube is just under the tip of the tubing and the edge of the rack is parallel to the yellow frontal support.

1.2 Assembly of fraction collection tubing

(a) PTFE tubing (external diameter 1.8 mm)
(b) Fixing nut
(c) O-ring (1 x 1.5mm)
(d) Tubing guide

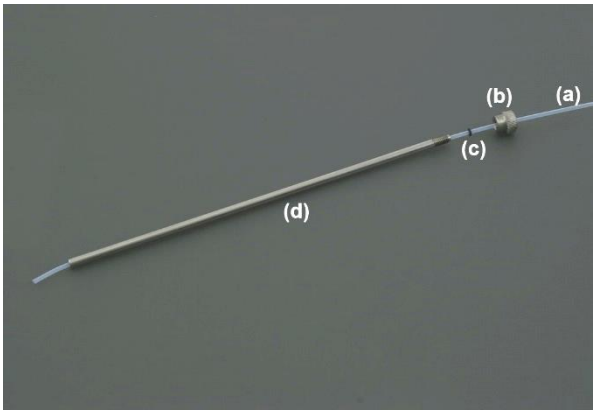


Figure 1.2-1 Place the magnetic tubing holder conveniently in the center of the fraction collector carriage and control unit.

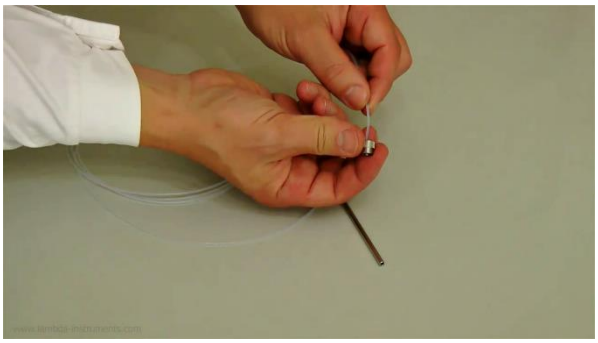


Figure 1.2-2 Push the delivered PTFE tubing through the pipe guide as shown.

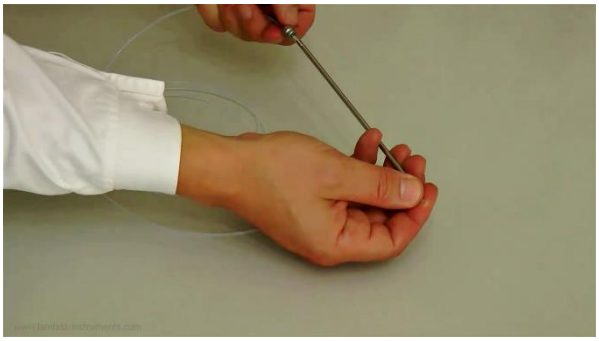


Figure 1.2-3 Slide the O-ring on the PTFE tubing.

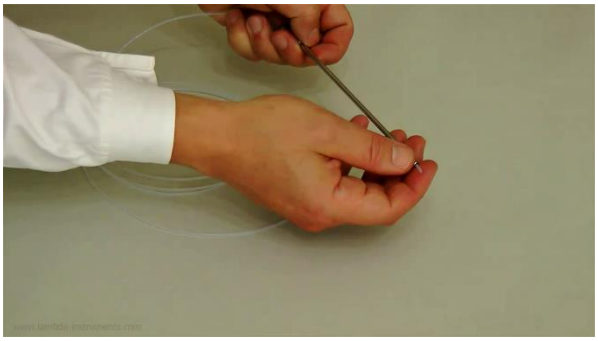


Figure 1.2-4 Push the tubing through the tubing guide and make sure a few mm (≈ 5mm) of PTFE tubing reach out of the tubing guide so that the drops form only at the tip of PTFE tubing.

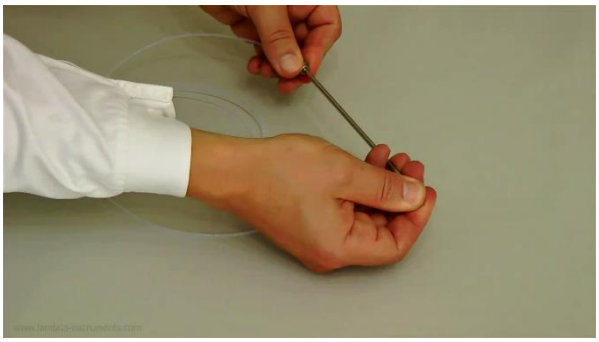


Figure 1.2-5 Screw the pipe guide onto the tubing guide to such an extent that the PTFE tubing does not move freely inside the tubing guide.
Do not screw more strongly than necessary!

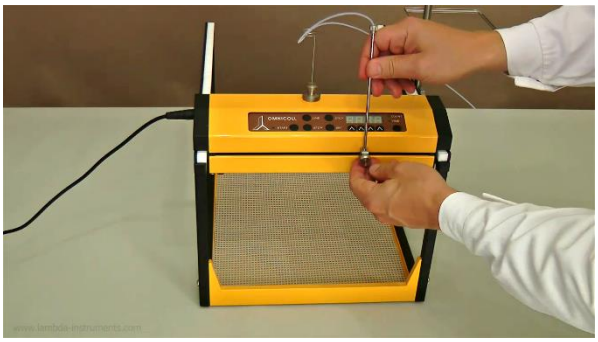


Figure 1.2-6 Let the PTFE tubing pass through the magnetic tubing holder. Fix the tubing guide, with the help of the adjusting screw in the holder, on the moving arm of the fraction collector at a convenient distance above tubes.

1.3 Connecting the drop-counter detector (optional)

The drop counter is an optional device which could be obtained on request.

Fractionation can also be done according to the desired number of drops in the fraction collector using the drop-counter.

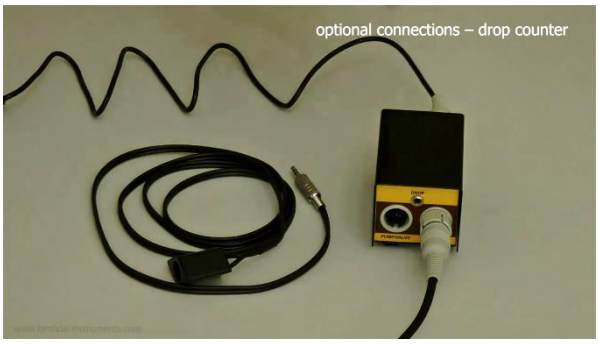


Figure 1.3-1 Showing drop counter (detector) cable with the communication module (Art. No.: 6929)

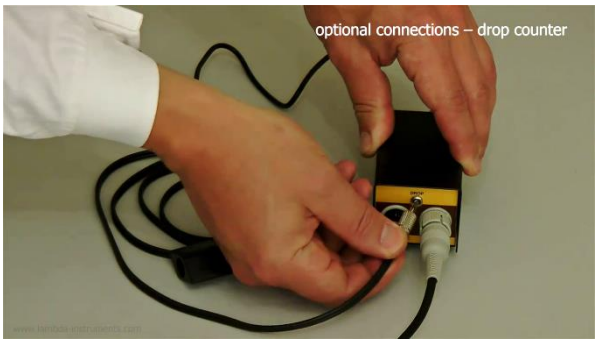


Figure 1.3-2 Connect the drop-counter (detector) cable to the “DROP” socket of the communication module.

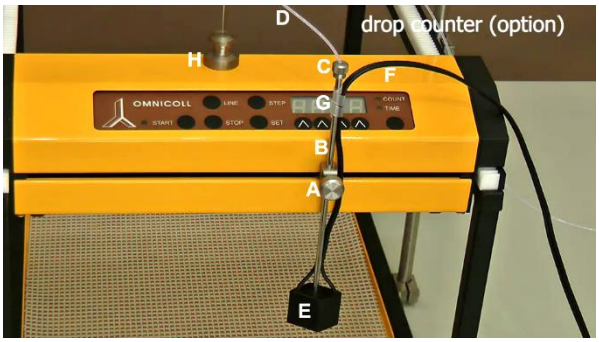


Figure 1.3-3 Partially unscrew the tubing guide holder screw (**A**), so that the tubing guide (**B**) can be rotated. Slightly loosen the nut (**C**), so that the PTFE tubing (**D**) can move freely inside the tubing guide (**B**).

Screw the drop counter (**E**) on the lower end of the tubing guide (**B**).

Tighten the tubing guide holder screw (**A**) until the tubing guide (**B**) does not move freely. Securely tighten the nut (**C**), to prevent the movement of PTFE tubing (**D**) inside the tubing guide (**B**).

Fix the drop counter cable (**F**) to the tubing guide (B) with the help of Teflon or a spiral wrap, etc.

Let the drop-counter cable (**F**) pass together with the PTFE tubing (**D**) through the magnetic holder (**H**).

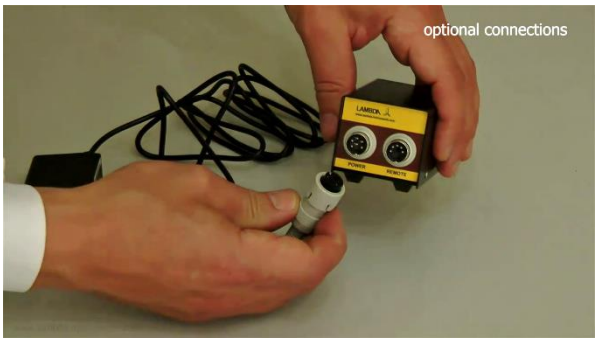


Figure 1.3-4 Connect the power supply to the “POWER” socket in the communication module.

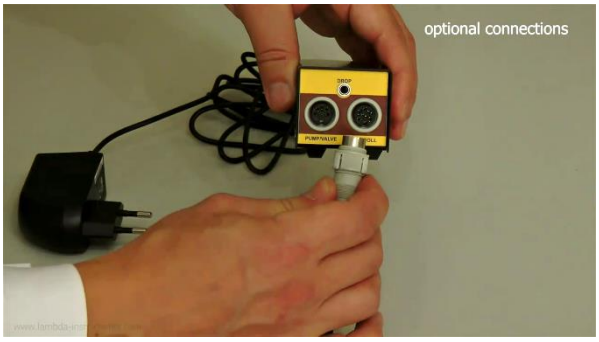


Figure 1.3-5 Connect the OMNICOLL fraction collector to the “OMNICOLL” socket in the communication module.

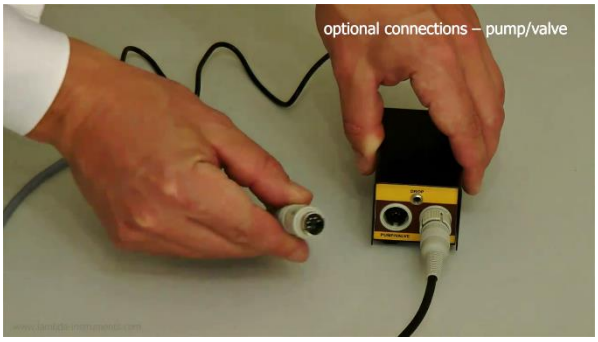


Figure 1.3-6 If required, the LAMBDA pump or valve to the “PUMP/VALVE” socket in the communication module.

2 START OF THE FRACTION COLLECTION

- ✓ Place the control unit just at the beginning of the gear rails. (Figure 1.1-9) The distance from the edge should be the same on the left and right sides. The gear wheels of the control unit must engage correctly in the gears of both rails. Be sure that nothing will disturb the movement of the control unit during fraction collection.

- ✓ Connect the cable of the control unit of the OMNICOLL fraction collector and sampler with the power supply plug. (Figure 1.1-10)
- ✓ Connect the power supply to the AC mains (95-240 V / 50-60 Hz). The control unit and its arm move automatically to the first position in the first row.
- ✓ Press the **SET** button (a short acoustic signal is heard). By pressing the **COUNT/TIME** button you can select fractionation according to time or volume. The yellow LED indicates which collection mode has been selected. (Refer section 3.4.1 also).
- ✓ Use the four buttons **Λ Λ Λ Λ** under the display to select the desired value. Confirm it by pressing the **SET** button again (a long acoustical signal is heard). The fraction time can be set from 0.1 min to 999.9 min (about 16.6 hours) in 0.1 min steps or from 1 to 9999 min in 1 min steps. To change the time resolution, please refer to section 3.4.2. For the setting of the volume, please refer to section 3.5.
- ✓ Pass the dispensing tubing (PTFE) through the tubing holder as describe in section 1.2 and tighten the tube holder in the collector arm so that the dispensing tubing is about 1 cm above the tubes or recipients.
- ✓ Place the tube rack on the fixing mat (Figure 1.1-8), so that the first tube is just under the tip of the tubing and the edge of the rack is parallel to the yellow frontal support (Figure 1.1-12). Place the additional tube racks immediately behind the first and following racks.
- ✓ Make sure that nothing will block the movement of the control unit during the fraction collection and that the tubing length is sufficient for taking all fractions or samples.
- ✓ Press the START button to begin the collection of fractions or sample taking (Figure 3.6-6). The green LED will be on and, if you use a LAMBDA peristaltic pump (PRECIFLOW, MULTIFLOW, HIFLOW or MAXIFLOW), it will be activated automatically. (refer section 3.6)
- ✓ You may use the magnetic block to stop the fraction collection. Place the supplied magnet on the right inner side of the frame (Figure 1.1-11)

It might happen that the position of the optical sensors lies outside the coding lines of the magnetic band inserted into the carriage.

When started in such a position, the fraction collecting arm will move either to the extreme left or right position, according to the instrument setting and is blocked there.

After several seconds an automatic protection will switch off the motor.

To move the arm into the coding mark signals just press the button STEP. The arm will move to the border coding line and will operate correctly within the marked limits of the inserted magnetic coded band.

If the moving arm is blocked in its movement or operated without inserted magnetic coding band, the motor will stop and the message “Eror” will appear on the display. Switch off the power, resolve the problem and start again as usual.

3 PROGRAMMING OF THE FRACTION COLLECTOR

A short video on programming the OMNICOLL fraction collector can be found at
http://lambda-instruments.com/?pages=video-fraction-collector-and-sampler

3.1 Principle of programming

Laboratory practice shows that programming of instruments equipped with microprocessors is not simple and mistakes are easily made, especially when such instruments are used occasionally.

We have developed a new method, which should eliminate such problems and make the programming easy for all types of tube racks.

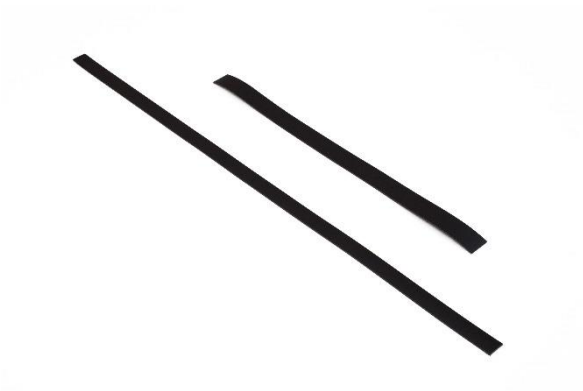


Figure 3.1-1 Magnetic coding band used for the fraction positioning.

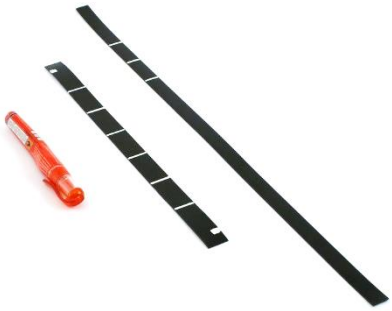


Figure 3.1-2 The fraction positions are indicated by white lines drawn on the black magnetic coding band as shown.

The white lines should be about 2 mm broad and full-length. These lines are detected by the photo-detectors of the OMNICOLL fraction collector and the fraction collector stops at these positions. The actual fraction position is about 1 mm after the first edge of the white lines.

Figure 3.1-3 The beginning and the end of a row are indicated by short lines (about half the length of the normal stripes or less and ~5 mm broad) made on the lower edge (for the beginning) and upper edge (for the end) of the coding band, respectively.

Figure 3.1-4 The distance between the fraction rows is programmed in a similar way. If you wish to switch off the collector automatically after the last row, draw the last line broader (approx. 1 cm)

The beginning and end signals (at Figure 3.1-3) **determine at the same time the position of the first and the last fraction in the row**. The fraction position is about 2 mm after the first edge of the white line of the beginning and end stripes.

This simple coding principle allows the use of any racks and fraction stands or other recipients with the LAMBDA OMNICOLL fraction collector and sampler.

3.2 Ready to use Fraction collector with the supplied tube racks

The magnetic coding bands programmed with white lines for the desired tube racks are provided with the OMNICOLL Fraction collector.

Figure 3.2-1 Place the longer and narrower coding band (Y-axis) on the left inner metal frame just under the gear-bar as shown. The first coding line should lie approximately 10cm from the front frame.

Figure 3.2-2 Pull the X-axis coding band holder from the OMNICOLL control unit as shown.

Figure 3.2-3 Place the shorter and broader magnetic coding band into the X-axis holder.

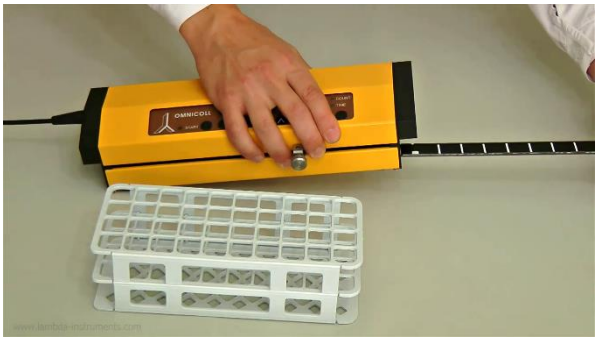


Figure 3.2-4 Insert the X-axis holder with coding band into the desired slot of the control unit, with the white coding stripes facing up.

Place the magnetic coding strip strictly horizontally into the corresponding slot! Otherwise, the optical detectors could be damaged.

3.3 Programming the OMNICOLL for any tube racks or recipients

3.3.1 Coding X-axis for tube distance in row

Measure the distance between the tube centres of the desired rack and choose the number of fractions in a row.

Figure 3.3-1 Place the coding bands on the tube rack and mark the fractioning position with a normal pencil.

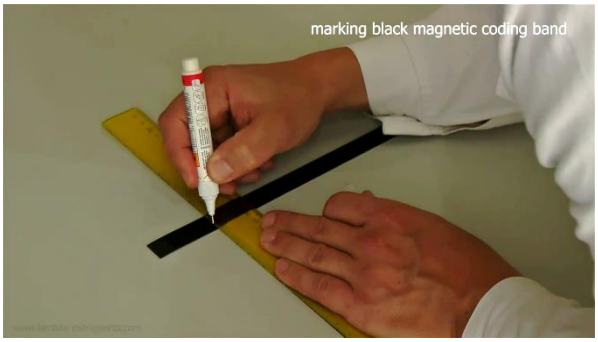


Figure 3.3-2 Draw the white lines correctly on the pre-marked places. Reserve approximately 2cm of the coding band for the beginning and end-position signals.

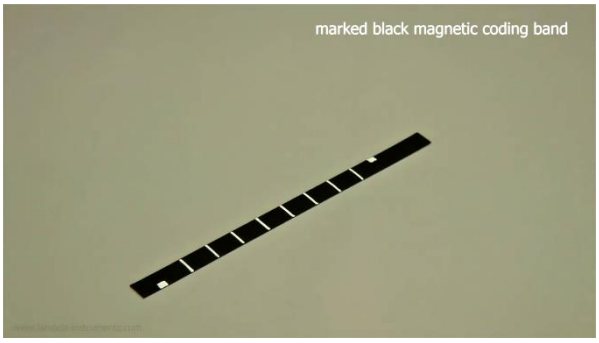


Figure 3.3-3 Mark the beginning and end signals on the lower and upper edge of the coding band respectively.
Leave a minimum of about 6mm free space between the first and last line of the row and the beginning and end signals.

Figure 3.3-4 Place the coding band in the X-axis holder and insert into the desired slot of the control unit, with white stripes facing up.

The beginning and end signals at the lower or upper edge of the coding band informs the microprocessor whether the arm of the control unit is on right or left.

3.3.2 Coding Y-axis for row distance

Measure the distance between rows. When several tube racks are used, pay attention to the difference in distance between the last row of the first rack and the first row of the second rack.

Figure 3.3-5 Mark the row distance with a pencil on the coding band for Y-axis and draw the white lines with the provided correction pen.

Figure 3.3-6 Place the coding band on the left internal side of the metal frame just under the gear bar.

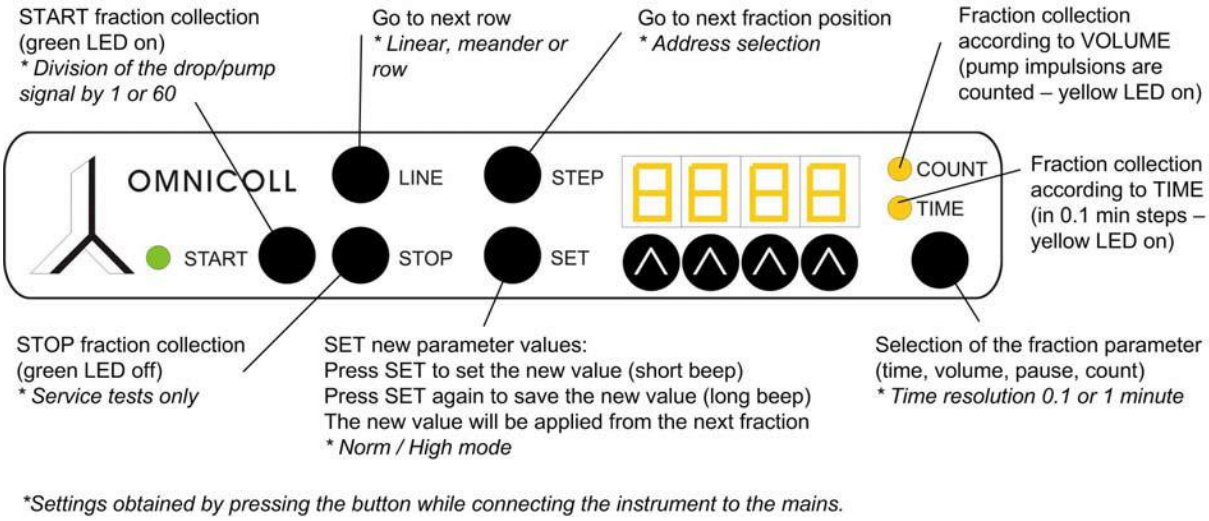
If the fraction collection should be stopped at the last row, then make the last line broader (approximately 1cm thick). This functions as the stop signal.

Since the coding band is kept in place by magnetic force, it can be easily positioned.

The first row line of the Y-axis should be ca 10 cm from the front.

When the control unit is placed in the starting position on the front of the frame, the photoelectric detector on the left side of the control unit must be situated before the first line. Otherwise the control unit will stop at the position of the next row.

3.4 Control Panel of OMNICOLL Fraction Collector



*Settings obtained by pressing the button while connecting the instrument to the mains.

3.4.1 Selection of linear, meander-like or row collection

The LAMBDA OMNICOLL fraction collector-sampler allows the following operation modes:

Line: The fractions are collected from the left to the right. After the last fraction of the row, the collecting arm moves to the left to the first position of the next row.

Meander: The fractions are taken alternatively from the left to the right and in the following row from the right to the left and so forth.

Row: The collecting arm does not move within the row. The collector moves only from row to row. This collection mode is mainly used in the simultaneous (multi-channel) fraction collection mode.

Figure 3.4-1 Press the button **LINE** continuously while plugging the power supply into the mains.

Figure 3.4-2 *"rouu"* for row mode of collection appear on the display. Press the **SELECTION** (below COUNT / TIME) button to select the desired mode of collection.

Figure 3.4-3 *"Mean"* for meander-like mode of collection appear on the display.

Figure 3.4-4 *"Line"* for linear mode of collection appear on the display.

Figure 3.4-5 Confirm the selected mode of collection by pressing **SET** button

In the row mode, the position of the fraction collecting arm can be adjusted by using the **STEP** button.

A small difference in the fraction positions with respect to the tube centres may occur between fractions taken in opposite collection directions. If the fraction lines are not too broad (about 2 mm), this difference in position is of approx. 1 mm

3.4.2 Time resolution (0.1 or 1 minute)

The time resolution of the OMNICOLL fraction collector can be selected in the following way:

Figure 3.4-6 Press the button **COUNT/TIME** while connecting the power supply to the mains.

Figure 3.4-7 The actual time resolution will appear on the display ***"0.1M"*** or ***"1M"***.

Figure 3.4-8 By pressing the button **COUNT / TIME** below the COUNT and TIME LEDs you can select to use 0.1 minute steps ***"0.1M"*** or 1 minute steps ***"1M".***

Figure 3.4-9 Confirm the choice by pressing the button **SET**.

3.4.3 Drops and count divider (Division co-efficient)

This function allows increasing considerably (by 60 times) the volume of fractions either using a drop counter (art. no. 6926) or motor impulsions counter (counts).

The divider can be set either to divide by one or divide by 60. In the first setting, every drop and every impulsion of motor are counted. In the second setting, sixty drops or impulsions give just one signal.

Figure 3.4-10 Press the button START while plugging the power supply into the mains.

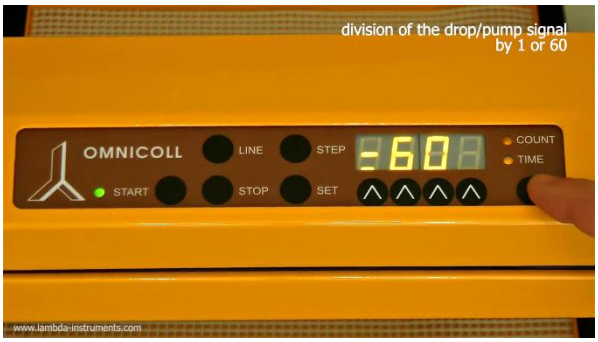


Figure 3.4-11 ***"div"*** and then ***"=01"*** or ***"=60"*** will appear on the display.

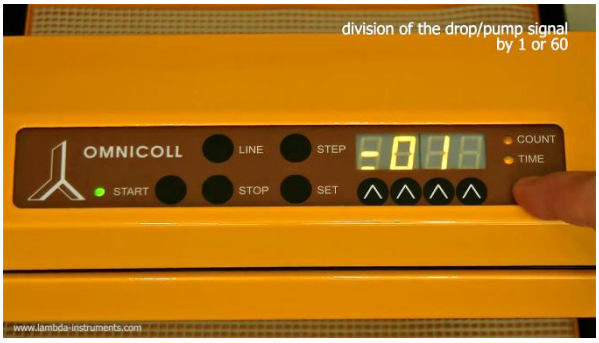


Figure 3.4-12 By pressing the **COUNT/TIME** button select the desired division factor.

Figure 3.4-13 Confirm the choice by pressing the button **SET.**

The volume of fractions can be also varied by the selection of tubing of internal diameters from 0.5 to 4 mm, when constant volume fractions are collected by counting pump impulsions (in ***"COUN"*** operation mode – COUNT LED is on, see section 3.5).

3.4.4 Address selection (for PC control)

When the OMNICOLL fraction collector and sampler has been equipped with the optional RS-232 interface, it can be controlled digitally, e.g. from a PC.

Figure 3.4-14 While keeping the direction button **STEP** pressed connect the fraction collector to the mains.

Figure 3.4-15 The message **"A"** and two numbers will appear on the display. This number from **00** to **99** is the current address of the fraction collector.

Figure 3.4-16 To change the address press the buttons **Λ Λ Λ Λ** under the display until the desired number is obtained.

Figure 3.4-17 Confirm the choice by pressing the button **SET**

3.5 Fraction collection according to the volume

If you use the OMNICOLL fraction collector together with LAMBDA peristaltic pumps PRECIFLOW, MULTIFLOW, HIFLOW or MAXIFLOW, you can take fractions of precise volume (from 0.05 to 500 ml or 0.6 to 30 litres per fraction).

The heart of these pumps is a stepping motor or BLDC motor, controlled by a generator of electric impulses (microprocessor). After each impulse the pump motor moves by one step. This movement displaces a very small and precise volume of liquid.

The collector counts these impulses and thus makes it possible to deliver an exact volume of liquid for each fraction. This method is an attractive alternative to the old drop counting procedure, where the volume is affected by the viscosity, surface tension etc. of the respective liquid.

Since the diameter of the tubing used in the peristaltic pumps affects the speed of the flow (flow rate), the pump has to be calibrated before use in order to establish the relation between the count number and the delivered liquid volume.

It is also possible to synchronize OMNICOLL fraction collector with third-party (e.g.: Cole parmer, Ismatec, Flexicon, etc.) multi-channel or single channel peristaltic pumps. We can offer customized remote control cable and communication module for pump switching and RS-232 connection (Art. no.: 6911), for the desired peristaltic pump connection.

3.6 Calibration of the peristaltic pump and the OMNICOLL

The LAMBDA peristaltic pump is connected to the OMNICOLL fraction collector via the remote control cable (Art. No. 4810-s) and the communication module box (Art. No. 6911 or Art. No. 6929). The plug-in power supply is also connected to this connection box. (It is impossible to make a wrong connection because the connectors will not fit to the wrong sockets).

Figure 3.6-1 Connect the peristaltic pump remote control cable to the communication module box.

Figure 3.6-2 With the **COUNT/TIME** button select the count modus (the COUNT LED will be switched ON)

Figure 3.6-3 Select the desired count number with the button **Λ Λ Λ Λ** under the display, for example: 55.

Figure 3.6-4 Confirm the selection by pressing the **SET** button.

Figure 3.6-5 Select the speed control on the peristaltic pump (e.g. 700), choose the pump rotation direction and switch the pump on.

Figure 3.6-6 Press the **START** button on the collector to start fraction collection.
If the tubing was not filled completely with the liquid, for example water, take a second fraction.

Measure the volume of this fraction. This volume corresponds to the pre-set count number.

From this ratio (volume/count number) you can easily calculate the count number corresponding to the desired fraction volume.

Since tubing of 0.5 to 4 mm of internal diameter (with a tubing wall thickness ~1 mm) can be used in the LAMBDA peristaltic pumps, the fraction volume can be selected in a wide range. For example, when tubing with an internal diameter of 3 mm is used, then one count corresponds approximately to one drop.

3.7 Fraction collection with a time interval in-between fractions (“high”)

LAMBDA OMNICOLL fraction collector and sampler could be used for the collection of samples with a time interval between consecutive fractions varying between 0.1 min and 16.6 hours (999.9 min) or 1 min and 166 hours (9999 min).

This is particularly useful during fermentations and other biological and chemical processes. For this application, switch the microprocessor of the control unit to the **“high” mode**.

Selecting the high mode:

Figure 3.7-1 Press the **SET** button on the control unit and connect the plug-in power supply to the mains.

Figure 3.7-2 Use the **COUNT/TIME button** to select the **“high”** mode.

Figure 3.7-3 Confirm the selection by pressing the **SET** button (long beep signal).

In the **“high” mode** you can successively select the parameters **TIME, COUNT, PAUSE** and **NUMBER** by pressing the **COUNT/TIME** button.

After selection of the parameter with the **COUNT/TIME** button, press the **SET** button.

After a short beep the name of the parameter will appear during one second, followed by last used value of the parameter.

You can change this value by means of the four buttons **Λ Λ Λ Λ** under the display. Press the button **SET** to confirm the new value (long beep).

Figure 3.7-4 Selecting parameter **COUNT** (volume).
[Count LED: ON;
Time LED: OFF;
Display: coUn]

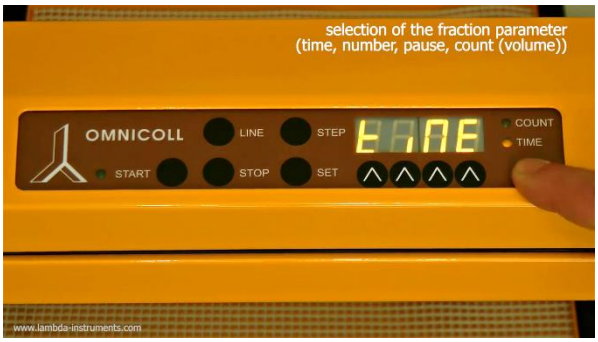


Figure 3.7-5 Selecting the parameter **TIME** to perform the program for a desired time.
[Count LED: OFF;
Time LED: ON;
Display: tiMe]

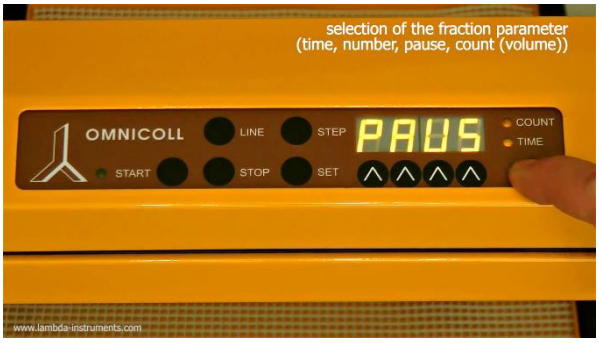


Figure 3.7-6 Selecting the parameter **PAUSE** for introducing pauses in the program.
[Count LED: ON;
Time LED: ON;
Display: PAUS]

Figure 3.7-7 Selecting the parameter **NUMBER** for collecting a number of samples.
[Count LED: OFF;
Time LED: OFF;
Display: nUMb]

After setting of the parameters, the fraction collection is started by pressing the **START** button.

The collector will take the number of samples as programmed under the **NUMBER** setting and will stop for the time programmed under the **PAUSE** setting. This cycle will go on until a STOP signal will be encountered. The LAMBDA peristaltic pump is activated automatically only during fraction collection.

When the fraction collection is controlled from the panel (i.e. not by remote control signal) the fraction collector will collect the number of fractions/samples introduced in the parameter **NUMB** of duration **TIME** or volume **COUNT** (if a drop counter or LAMBDA pumps are used), followed by the PAUSE, if a PAUSE was set.

Then, the fraction collector will repeat this till the **STOP** signal is encountered (i.e. STOP is pressed or the fraction collector is stopped by the end magnet). This collection mode allows for e.g. a line washing step before the relevant fraction is taken.

If operated by external (analog) remote control signal, the fraction collector will take the set number of fractions/samples of duration TIME or volume COUNT (if a drop counter or LAMBDA pumps are used), and will then stop till the reception of a new external remote control signal.

The parameter PAUSE is ignored in this operation mode.

Such a collection mode could be useful for taking of fractions/samples in a process where an alarm situation of a selected process parameter has occurred and the samples can be used for further analysis.

3.8 Multi-channel fraction collection – multiple stream sampling

LAMBDA OMNICOLL fraction collector and auto-sampler can be used for all kinds of chromatography such as normal or low pressure chromatography. It is also suitable for medium pressure chromatography sometimes called FPLC (Fast Protein Liquid Chromatography) or high pressure liquid chromatography (HPLC), also referred to as high performance liquid chromatography.

An interesting property of the LAMBDA OMNICOLL fraction collector is the possibility to collect simultaneously the streams of many chromatographic columns.

Multi-stream assembly is available for 2 to 18 or even more effluents of multiple chromatography columns.

In the number of simultaneous chromatographic streams the OMNICOLL is not outperformed by any other fraction collector on the market.

This multi-stream assembly is technically very simple and polyvalent. It allows an easy adaptation of various experimental needs directly by the user.

Figure 3.8-1 Example of taking 4x2 fractions in a **4-channel configuration**

Figure 3.8-2 Example of taking 6x2 fractions in a **6-channel configuration**

Figure 3.8-3 Example of taking 20 simultaneous fractions in a **20-stream (channel) configuration**

3.8.1 Mounting of the front multiple stream adapter

Figure 3.8-4 Unscrew the tubing guide holder screw on the moving arm of the OMNICOLL fraction collector

Figure 3.8-5 Place the bar holder on the tubing guide holder screw.

Figure 3.8-6 Insert the rectangular bar into the bar holder as shown.

Figure 3.8-7 Slide the right end of the bar through the opening on the guide plate.

Figure 3.8-8 Screw the bar holder on the moving arm of the fraction collector with the corresponding socket key (hex-key).
Use e.g. a thin spatula to push the screw through the moving arm.

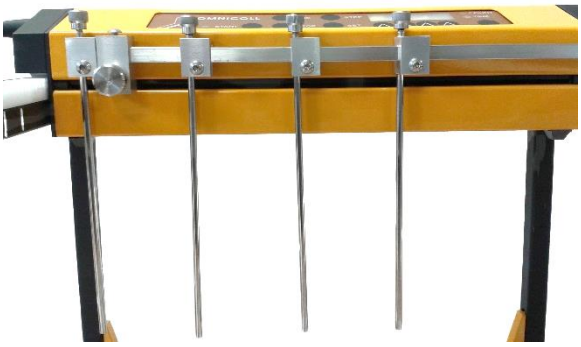


Figure 3.8-9 Slide the tubing guide into the tubing guide holder, so that a convenient height above the tubes is obtained.

Fix the tubing guide to the holder using the corresponding socket key (hex-key).

Figure 3.8-10 Place the tubing guide holder at the desired fraction position and secure it with the socket head screw using the corresponding socket key (Allen key).

Figure 3.8-11 Place the tubing guide holder in position above the first fraction of each stream (channel).

If 4 streams are collected in a row, the place:
first tubing guide over tube no. 1,
second tubing guide over tube no. 4,
third tubing guide over tube no. 7 and
fourth tubing guide over tube no. 10

For more information about the multiple stream mounting, please do not hesitate to contact us support@lambda-instruments.com.

3.9 How to increase the capacity of the fraction collector?

Since several lower parts of the collector can be coupled together, the capacity of the collector can be increased many times.

The control unit can move freely from one lower unit to the other on the gear rails. Only two rectangular coupling bars are needed to keep two units together.

• Remove the two blind bars from the rear side of the frame of the first lower part unit and the front side of the second lower part unit. Insert the coupling bars (Art. No. 6912) on their place and fix with the four bolts.

• Be aware that you must remove the fixed stop signal from the first frame unit and place it onto the next one. You may also use the magnetic stop contact.

• Make sure that nothing will block the movement of the control unit during the fraction collection.

Figure 3.9-1 Fraction collector with extended capacity for 12 streams and 250ml fraction collection bottles.

The tube capacity of the LAMBDA OMNICOLL fraction collector and sampler can be easily increased by the addition of lower support. Virtually any number of capacity extensions can be added.

4 REMOTE CONTROLS

Sometimes it could be useful to take samples during a process, at a moment which is not known in advance.

For example, during fermentation (or any other biological, chemical or physical processes) certain limit values activates the alarm signal. This signal can be used to take a fraction. This fraction may be essential to recognize the reason for the alarm.

The fraction collector can take one or several samples after detection of a signal 3 to 12 V (or 12 to 30V with a 3300 ohm resistor switched in series). The LAMBDA peristaltic pump will be activated automatically.

For safety reasons the voltage of the external signal must **not exceed** 48 V to earth!

4.1 Collection of single samples

If the collector operates in normal modus, it will take a single fraction of selected time or volume after the reception of a signal impulsion. It will then move to the next position and wait the following signal. This operation will go on until the detection of a stop signal.

4.2 Collection of multiple samples

If the collector operates in the high modus, after detection of a signal it will take the number of fractions programmed under **"NUMB"**, e.g. from 1 to 999 (refer section 3.7).

This feature is particularly interesting, when it is necessary to wash tubing before taking the fresh significant sample. This is very important during fermentation processes or cell cultures, where the culture may be inactivated when kept in the tubing for a long period of time. The same is true for any other process where the sample quality might be affected by staying in the tubing.

5 PRACTICAL ADVICE

- Keep all the magnetic coding strips with signal lines clean. If necessary, you can remove the old or damaged signal lines with mild soap and soft water. Dry it and draw new lines at the same position.
- Keep the fixing mat clean and dry. Humidity or dust will provide only low adhesion of the fixing mat. The fixing mat can be washed with water to regain the original adhesion power.
- Take only 10 fractions in a row, even though your stand allows more positions. It will help you to find the desired fraction more easily and you will eliminate mistakes.
- The alignment of the tube rack will be easier, if you press it against the front part of the frame supports. By pushing the magnetic Y-axis coding strip you will find the position corresponding to this rack position.
- By removing the tub sheet from the frame unit, it is possible to use even larger or taller collecting containers. We can also supply tub sheets to use with funnels or according to your needs. This makes it possible to use even largest containers for taking fractions. For such applications a modified tubing holder can also be made.
- On demand we can also supply an adapter for simultaneous collection of multiple fractions. This enables to collect simultaneously the streams of several chromatographic columns. (Refer section 3.8 for multi-stream operation instructions.)

6 MAINTENANCE

The LAMBDA OMNICOLL fraction collector does not require any special maintenance. Keep you fraction collector clean. If necessary, clean it with damp cloth. You may use neutral detergents or ethyl alcohol.

If you have any difficulties or questions concerning your OMNICOLL fraction collector, please contact our service office (support@lambda-instruments.com).

7 FOR YOUR SAFETY

Thanks to the use of a plug-in power supply giving only a low voltage of 9 V DC the danger of electrical shock during the use of the LAMBDA OMNICOLL fraction collector and sampler has been virtually eliminated.

If the fraction collector is not used for an extended period of time, disconnect it from the mains. A modern miniaturized switching power supply is used, which has only a negligible consumption of electric current when the fraction collector is not in use.

8 TECHNICAL SPECIFICATIONS

8.1 General specification

Type:	LAMBDA OMNICOLL – microprocessor-controlled programmable fraction collector – sampler
Collection mode:	Linear (line), meander (zigzag) or row collection
Normal modus:	
Time:	0.1 to 999.9 minutes (16.67 hours) in 0.1 min steps or 1 to 9999 minutes (166.7 hours) in 1 min steps
Volume:	0.01 to 500 ml or 0.6 to 30 litres (external counts using LAMBDA peristaltic pump)
High modus:	same as Normal modus, but **with a pause** between fractions (from 0.1 to 999.9 minutes or 1 to 9999 minutes)
Remote control:	
Normal modus:	Collector takes a **single** fraction after an external voltage pulse of 3-12 V (or 12-30 V with a 3300 ohm resistor)
High modus:	Collector takes a **1 to 999 fractions** after a single external voltage pulse of 3-12 V (or 12-30 V with a 3300 ohm resistor)
Capacity:	**Any tube rack** or container type with a surface smaller than 45x31cm
Using supplied racks:	360 tubes of 12-13 mm diameter 240 tubes of 16 mm diameter 160 tubes of 20 mm diameter 96 tubes of 30 mm diameter
	The capacity can be increased many times by coupling several lower fraction collector parts together.
Non-volatile memory:	storage of all settings
Interface:	RS-232 (optional)
Power supply:	95–240 V/60–50 Hz AC plug-in power supply with DC 9V/12W output; possible field operation on 12 V accumulator
Dimensions:	34 (W) x 30 (H) x 49 (D) cm
Weight:	6.5 Kg
Safety:	CE, meets IEC 1010/1 norm for laboratory instruments
Operation temperature:	0-40 °C
Operation humidity:	0-90% RH, not condensing
Remote control:	0-10 V; (option 0-20 or 4-20 mA)
Fuse:	1.5 A (on printed circuit board)

For safety reasons, the voltage of the external signal must not exceed 48V to earth!

8.2 Inputs/outputs

No.	Colour	Description
1	blue	Input remote speed control +3-12V
2	green	Impulses of the stepping motor of the LAMBDA peristaltic pump (0 and 12 V)
3	white	Reserved for RS-232 TTTL
4	red	Input voltage + 9 V
5	brown	Output remote control for the pump (+ 9-12 V)
6	yellow	Reserved for RS-232 RTTL shield = common zero
7		Shielding is the common ground

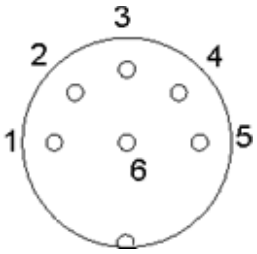


Figure 8.2-1: 6-pole connector

9 ACCESSORIES AND SPARE PARTS

9.1 List of accessories and spare parts

Art. No.	Accessories
4801	PRECIFLOW peristaltic pump, 0-600 ml/hr, not programmable
4901	MULTIFLOW peristaltic pump, 0-600 ml/hr, programmable
5001	HIFLOW peristaltic pump, 0-3’000 ml/hr, programmable
6001	MAXIFLOW peristaltic pump, 0-10’000 ml/hr, programmable
6910	Remote control cable for fraction collector (analog)
6910-rs	RS-232 connection cable
6911	Communication module for pump switching and RS-232 connection
6912	Set for keeping two lower parts together
6913-1	Tube rack for tubes diam. 12/13 mm
6913-2	Tube rack for tubes diam. 16 mm
6913-3	Tube rack for tubes diam. 20 mm
6913-4	Tube rack for tubes diam. 25 mm
6913-5	Tube rack for tubes diam. 30 mm
6920	Accessory for “moving” front side simultaneous fractions (incl. 3 pipe guides)
6923	Accessory for “fixed” rear side multiple fractions (up to more than 18 fractions)
6930	Gear bar extensions (2 pieces)
6926	Drop-counter (detector)
6927	Inert valve (one way)
6929	Communication module with RS-232, drop counting electronics, valve interface
6914	Pump remote control cable (2 poles, with open end)
4810-s	Remote control cable for LAMBDA pumps (5 poles)
4810-ISM15	Remote control cable for ISMATEC multi-channel pump (15 pin connector)
4810-ISM15-9	Converter cable for ISMATEC multi-channel pump (15 pin to 9 pin connector)

Spare parts

6902	Support (lower part of collector)
6903	Plug-in power supply (9V)
6904	Fixing mat
6905	Support for pump
6906-S	Supporting rod for columns diam. 12 mm 60cm
6906-L	Supporting rod for columns diam. 12 mm 100cm
6907	Lateral supports for rod
6908	Tube guide
6909	Stop magnet
6916	PTFE tubing ext. diam. 1.8 mm (5 m)
6917	Coding magnetic band for X-axis (5 pieces)
6918	Coding magnetic band for Y-axis (5 pieces)
6919	Support for coding magnetic band for X-axis
6921	Pipe guide for simultaneous fractions 1 piece
6922	Magnetic tubing guide
6924	Hexagonal key set
6925	O-ring for tubing fixing (5 pieces)
6928	White pen for fraction position marking

10 GUARANTEE

LAMBDA provides a two-year guarantee on material and manufacturing defects, if the instrument was used according to the operation manual.

Conditions of guarantee:

- The instrument must be returned with a complete description of the defect or problem. In order to send back the equipment for repair, you will need a returns authorization number from LAMBDA.
- The customer will send the instrument to our service office.
- Damage or loss of items during transport will not be compensated for by LAMBDA.
- Failure to fulfil these requirements will disqualify the customer from compensation.

Serial Number: _____

Guarantee from: _____

11 APPENDIX

11.1 RS communication protocol for LAMBDA OMNICOLL fraction collector-sampler

11.1.1 Format of data sent by the PC to the fraction collector and back

Data sent by the PC: #ss mm a xxxx qs c
Data sent back by the fraction collector: <mm ss a xxxx qs c
where,

#	is the first sign of a command sent by PC
<	is the first sign of a message sent by fraction collector
ss	is the address of the fraction collector (slave)
mm	is the address of the PC (master)
A	is the command (see section 11.1.2)
xxxx	is the data value (4 ASCII numbers from 0 to 9; sent from the highest order digit to the lowest order digit)
Qs	is the control sum in HEX format (2 ASCII characters of the type 0…9ABCDEF)
C	is the end sign cr (carriage return) The collector will fulfil the task and block any manual command on the front panel.

11.1.2 Commands

# ss mm **r** qs c	start (run)
# ss mm **e** qs c	activates remote control of the collector (front panel deactivated)
# ss mm **g** qs c	activates local mode (front panel activated)
# ss mm **s** qs c	stop
# ss mm **f** qs c	step forward
# ss mm **b** qs c	step back
# ss mm **w** qs c	step in actual moving direction (depending on LINE or MEAN setting) [corresponds to pressing the STEP button]
# ss mm **l** qs c	step to next line
# ss mm **h** qs c	“high” mode
# ss mm **u** qs c	“normal” mode
# ss mm **m** qs c	“MEAN” collection mode (meander or zigzag collection mode)
# ss mm **v** qs c	“LINE” collection mode (collects fractions always from left to right)
# ss mm **i** qs c	“ROW” collection mode, the collector moves only from row to row
# ss mm **d** qs c	unit setting – 0.1 minute step time setting (XXX.X)
# ss mm **j** qs c	unit setting – minute step time setting (XXXX)
# ss mm **o** qs c	open valve
# ss mm **c** qs c	close valve
# ss mm **a** qs c	division coefficient setting “1”
# ss mm **k** qs c	division coefficient setting “1/60”
# ss mm **p** xxxx qs c	number of pulses from pump or drop counter
# ss mm **t** xxx.x qs c	collection time (in 0.1 minute steps)
# ss mm **t** xxxx qs c	collection time (in minute steps)
# ss mm **q** xxx.x qs c	pause time between two fractions (in 0.1 minute steps) (fraction collector automatically enters “high” mode)

# ss mm **q** xxxx qs c	pause time between two fractions (in minute steps) (fraction collector automatically enters “high” mode)
# ss mm **n** xxxx qs c	number of fractions (fraction collector automatically enters “high” mode)
# ss mm **G x** qs c	to request the fraction collector to send data to the PC

where x is a number from 0-3:

0: collection time setting (TIME)

1: pulse setting (COUNT)

2: pause time setting (PAUSE)

3: number of fractions setting (NUMBER)

The answer of the OMNICOLL fraction collector-sampler is the following:

< mm ss **B** xxx.x qs c	time xxx.x in 0.1 minute steps (collector is in stand-by mode)
< mm ss **B** xxxx qs c	time xxxx in minute steps resp. number of pulses or fractions (collector is in stand-by mode)
< mm ss **R** xxx.x qs c	time xxx.x in 0.1 minute steps (collector is in operation)
< mm ss **R** xxxx qs c	time xxxx in minute steps resp. number of pulses or fractions (collector is in operation)

11.1.3 Checksum control

The following examples show, how the checksum is calculated:

mm = 01 [PC address (master) is set to 01]
ss = 02 [Device address (slave) is set to 02]

The PC sends: #0201*g*4D*cr*

The control addition (checksum) is made in the following way (only the **last byte** (2 ASCII characters of the type 0…9ABCDEF) is taken):

#	0	2	0	1	*g*	4D (last byte)	*cr*
23h	+30h	+32h	+30h	+31h	+67h	=1**4D**h	0Dh

The PC sends: #0201*t*102320*cr*

The control addition (checksum) is made in the following way (only the last byte (2 ASCII characters of the type 0…9ABCDEF) is taken):

#	0	2	0	1	*t*	1	0	2	3	20 (last byte)	*cr*
23h	+30h	+32h	+30h	+31h	+74h	+31h	+30h	+32h	+33h	= 2**20**h	0Dh

11.1.4 Format of the data transmission

Speed: 2400 Bd (Baud)
8 data bits, odd parity, 1 stop bit

11.2 How to set the OMNICOLL Fraction Collector-Sampler address?

When the LAMBDA OMNICOLL fraction collector and sampler has been equipped with the optional RS-232 interface, it can be controlled digitally, e.g. from a PC.

Disconnect the fraction collector-sampler from the mains. While keeping the direction button **STEP** pressed connect the fraction collector to the mains again. The message ***"A"*** and two numbers will appear on the display. This number from 00 to 99 is the current address of the fraction collector.

To change the address press the buttons **Λ Λ Λ Λ** under the display until the desired number is obtained. Confirm your choice by pressing the button **SET**.

11.3 RS-connection scheme

The 5-pole DIN connector "REMOTE" of the communication module (Art. No. 6911 or 6929) is used for the remote control and RS connection.

When the optional RS-232 interface is available the pins are used as follows:

No.	Colour	Description
1	blue	Input remote control +3-12 V
2	white	RS-232 TTTL (TXD)
3	black	Ground (GND)
4		
5	yellow	RS-232 RTTL (RXD)

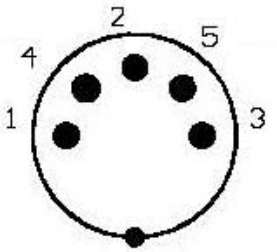


Figure 11.3-1: 5 pole connector

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