

OPERATION MANUAL

DOSER – Powder Dosing Instrument



LAMBDA DOSER Powder Dosing Instrument

The LAMBDA DOSER is a unique programmable pump for free-flowing solid substances. It allows the automatic or continuous addition of powders, powdery and crystalline substances without a spoon.

The LAMBDA DOSER will modernize your laboratory:

- Dosing speed range from 0 to 999
- Reproducible flow rate (e.g. from 50 mg/min to 50 g/min for NaCl)
- Programmable
- Easy assembly
- Necessary to comply with GLP requirements and safety standards
- Hermetic construction allows operation in controlled atmospheres (Ar, N₂...)
- Safe handling of dangerous and toxic substances
- Remote controls
- RS-485 interface (optional)
- Control software PNet (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

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1 SETTING UP THE POWDER DOSER

1.1 Pre-treatment of the dosing powder

The dosing sample (powders, crystals, solids, etc.) have to be homogenous and free flowing. If this is not the case, they should be recrystallized, dried and sieved to remove the fines.

The free flow of difficult solids can be achieved by the addition of AEROSIL 200 or 974 at a concentration of 0.1 to 2 %.

AEROSIL is super finely dispersed pure SiO₂. Its particles cover the surface of the crystals and make it free flowing. AEROSIL is non-toxic, chemically inert and can be removed by filtration. It can be obtained at a low price from us.

1.2 Assembly of the LAMBDA DOSER

The picture below depicts the parts of the powder feeding instrument, DOSER.



S. No.	Name of the parts	Art. No.
1.	Blind plug	5808-b
2.	Rubber sealing disc	5806
3.	Teflon disc	5803
4.	Control unit	5809
5.	Centering part	5807
6. & 7.	Screw cap SVL 42	5802
8.	Distributor (standard)	5804
9.	Plug-in power supply (12 V / 6 W) [Plug type: UK, USA, EU, AUS,...]	4820
10.	Glass adaptor with ground NS 29/32 fitting	5801
11.	Glass vessel with side arm (approx. 0.2 l)	5810

The setup of the powder dispensing system, LAMBDA DOSER is very easy - a short video of the installation is on: <http://www.lambda-instruments.com/?pages=video-powder-doser>



Figure 1-1: The ground glass piece is put through the threaded screw cap SVL 42.



Figure 1-2: The Teflon disc is put inside the screw cap and placed on the ground surface of piece.



Figure 1-3: The screw cap with the Teflon disc and ground glass piece is screwed to the Doser glass vessel with one side arm.



Figure 1-4: The distributor (standard) is inserted inside the glass tube with its opening directed downwards so that it will not be damaged.

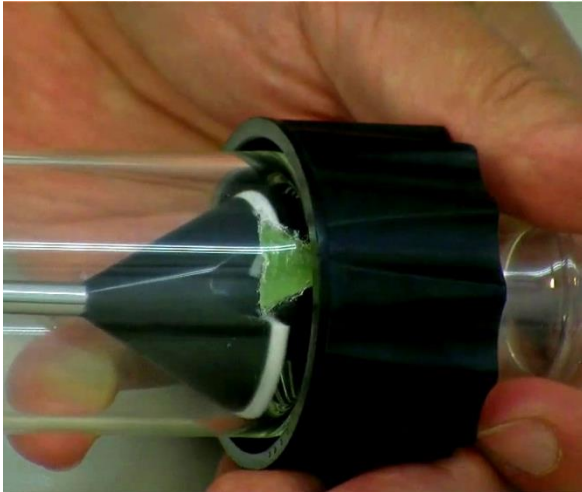


Figure 1-5: There is a silicon baffle on the lowest part of the tube. The distributor must be turned with its opening towards this baffle.

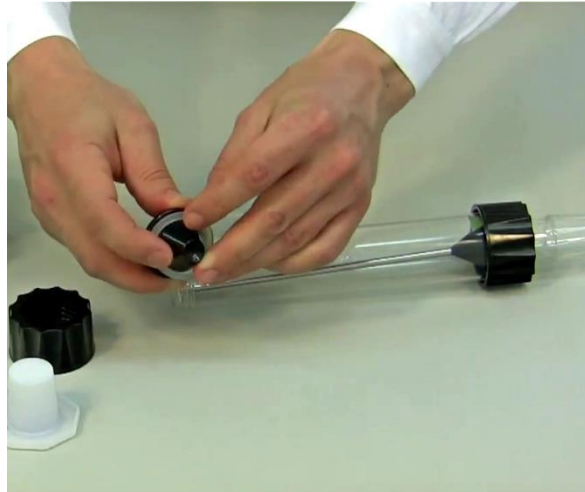


Figure 1-6: Teflon treated rubber seal is placed on the centering part with the Teflon layer facing outside (towards the glass tube).



Figure 1-7: Place the centering part with the rubber seal on the axis of the distributor.



Figure 1-8: Secure the centering part with through the axis of the distributor with the screw cap to the glass vessel.



Figure 1-9: Axis of the motor unit with metal pins and the centering part with six holes.



Figure 1-10: Press the axis of the motor unit completely inside the centering part. So that the metal pin of the motor unit will fit into one of the

six corresponding holes in the centering unit. This assures a perfect seal of the DOSER and a sufficient pressure of the distributor against the Teflon disc in the bottom of the Doser vessel.



Figure 1-11: The 12 V connector of the power supply is plugged into the 12 V DC socket of the motor unit and the power supply is connected to the mains.

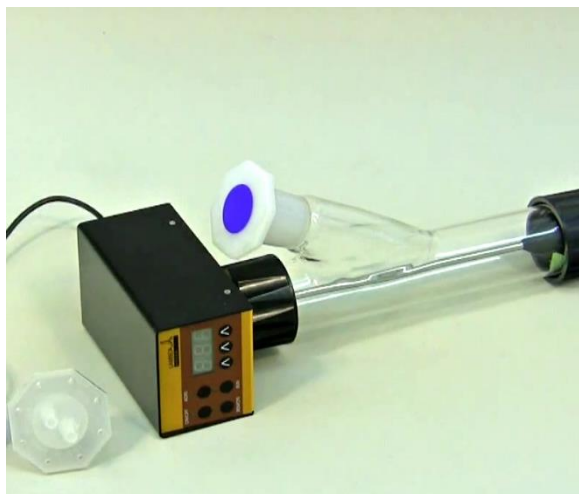


Figure 1-12: The solid is added through the filling arm of the tube. The filling arm can be closed with a ground glass or plastic stopper NS 29/32.

1.3 ON/OFF button

By pressing the **ON/OFF** button, the powder feeding instrument is switched on or off. The internal memory will show the last used speed and flow direction setting.

1.4 Setting of the dosing speed

The powder dosing rates depend on the powder properties and the DOSER motor rotation speed.

The speed of powder addition is selected by the control buttons $\wedge \wedge \wedge$ under the LED display. The digital selection allows for good reproducibility of the selected dosing rate.



Figure 1-13: Choosing the speed of powder addition with the help of control buttons $\wedge \wedge \wedge$.



Figure 1-14: Pressing On/Off button on the motor unit after choosing the dosing speed.

Since specific densities of solid substances vary considerably, it is important to calibrate the DOSER before starting the powder dosing. For this, the amount of substance delivered during a certain time period is measured (e.g. for 1 minute with speed setting 500). The speed of rotation of the distributor increases progressively with the speed setting value. Using this information the speed setting corresponding to the desired flow rate of the solid substance can be calculated easily (rule of three).

The dosing of the powdery substance is started by pressing the **ON/OFF** button. The corresponding LED indicates that powder dosing is in progress.

1.5 Fast filling function

If the **ADRS** button is pressed continuously for about 2 seconds, the distributor will rotate at maximum speed. After releasing this button the powder dosing is stopped. This is useful for fast filling of a recipient or emptying of the glass vessel of the LAMBDA DOSER at the end of operation. This "HOLD=MAX" function can be used even though the **ON/OFF** button has not been pressed.

1.6 Use of the DOSER during reflux or under controlled atmosphere

Vapours of boiling solvents can penetrate into the lower part of the DOSER and condense. The condensation disturbs the flow of the solid. This can be prevented by blowing a light stream of air or another convenient gas through the DOSER vessel. The vapours are displaced and cannot disturb the dosing.

The gas is introduced by a special stopper fitted with tubing. For this purpose we deliver a polyethylene stopper. However, any fitting compatible with NS 29/32 ground fittings (e.g. SVL threaded fittings which can be adapted to several tubing diameters are excellent). The slight gas stream passes through the hollow axis of the distributor and the lower part of the

DOSER vessel. The stream and pressure of the gas must be carefully controlled to prevent compression of the solid substance during the dosing process.

Since the DOSER is airtight, it can also be used for work under controlled atmosphere (nitrogen, argon etc). The DOSER withstands a pressure of ± 0.05 MPa. The airtight DOSER is particularly useful during work with oxygen sensitive or hygroscopic substances. In this case manual dosing is very difficult.

2 PROGRAMMING OF THE POWDER DOSER

Up to 27 pairs of time and speed settings (flow rates) may be programmed in a simple way. The programming mode is accessed by simultaneously pressing the buttons **REMOTE** and **RUN** until the indication “**PGM**” appears on display and the REMOTE and RUN LEDs are switched on.



Figure 2-1: Pressing Remote and Run buttons simultaneously and the “**PGM**” indication appears.



Figure 2-2: Continuous pressing of Remote and Run button even after the indication of “**PGM**” ends up with the “**cLE**” indication.

Remark: If you repeat this simultaneous pressing of the **REMOTE** and **RUN** buttons, the memory will be cleared and the indication “**cLE**” will appear on the display. To enter the programming mode again, press the **REMOTE** and **RUN** buttons again until “**PGM**” appears.



Figure 2-3: Press the **ON/OFF** button. The indication “**F01**” will appear for a short time on the display indicating that you can select the first flow rate (speed setting) value.



Figure 2-5: Press the **ON/OFF** button. The indication “**t01**” will appear for a few seconds on the display indicating that you can program the time period of the first step in minutes or 0.1 minute steps.



Figure 2-7: Press the **ON/OFF** button. The indication “**F02**” will briefly appear on the display.

Figure 2-4: Set the desired flow rate value for the first program step by pressing the buttons **▲▲▲** below the display (from 0 to 999, corresponding to 0 to 100% of the motor rotation speed).



Figure 2-6: Select the desired time period for the first program step by pressing the buttons **▲▲▲** below the display (from 0 to 999 minutes or 00.0 to 99.9 minutes).

By pressing the **ADRS** button, the time resolution can be set in minutes or 0.1 minutes. In the 0.1 minute time resolution a dot is displayed, e.g. “00.1”.



Figure 2-8: You can now enter the desired flow rate for the second program step.



Figure 2-9: Press the **ON/OFF** button again. The symbol “t02” will briefly appear on the display.



Figure 2-10: You can now set the time of the second program step.

In a similar way up to **27 program steps** can be entered.



Figure 2-11: After having entered the time of the last step, press the **ON/OFF** button. The flow rate (000) of the next step which will not be programmed appears on the display. For example: “F05”



Figure 2-12: Do not change the flow rate (000).

Remark: It is not possible to end the program after programming the time data.



Figure 2-13: Press both **REMOTE** and **RUN** buttons simultaneously and you will see the indication **“c01”** on the display. This indicates that the program will be executed only once and the powder dosing instrument will stop afterwards.



Figure 2-14: If you wish to repeat the same program 2 times, increase the cycle number to **“c02”** by pressing the buttons **^ ^ ^** below the display (from 0 to 99 cycles). The program can be repeated up to 99 times, indicated by **“c99”**. If 0 is entered for the cycle number **“c00”**, the program will run continuously (**infinite loop**).



Figure 2-15: Press the **ON/OFF** button again until the indication “**End**” appears on the display to confirm and save the program.



Figure 2-16: To **START** the program, press the **RUN** button. The **RUN** and **ON/OFF** LEDs are on.

To **stop** the running program definitively, press the **RUN** button. The **RUN** and **ON/OFF** LEDs are off.

It is possible to **stop** the pump by pressing the **ON/OFF** button, to change the rotation speed during any running program step. This allows reaction in emergency situations.

Remark: Do not forget to switch the powder **DOSER** on again (by pressing the **ON/OFF** button) after you have finished your intervention.

3 REMOTE CONTROLS

3.1 ON/OFF remote control

By interlinking the contacts no. 4 and 5 of the socket at the rear of the pump (see *figure 6–1* and section 6.2), the powder dosing instrument will be blocked and the ON/OFF LED is off.

The same effect will be obtained by applying a voltage of 3 to 12 V DC to the contact no. 5 (0 line must be connected to contact no. 3). The remote control cable (Art. no. 4810) is used for the transmission of the remote control signals.

Remark: In some cases a reversed logic for the remote control might be desired. Please contact us in this case.

3.2 Remote control of the dosing pump

The LAMBDA DOSER powder can be controlled over the whole speed range by an external signal (0 - 10 V DC, option 0-20 or 4-20 mA). The plus pole of the signal is connected to the contact no.1, 0 line to the contact no.3.

Press the button **REMOTE** on the front panel. The corresponding LED diode will go on and the display will indicate the approximate voltage of the external signal. This indication may become unstable when no external connection is made and indicates the high sensitivity of the electronics.



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

3.3 PC control

If the instrument has been equipped with the optional RS-232 or RS-485 interface, it can be controlled digitally, e.g. from a PC by **PNet control software**.

To look up/modify the instrument address, disconnect the DOSER from mains. Press the **ADRS** button continuously and at the same time connect the DOSER 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 powder dosing instrument. To change the address press the buttons **▲ ▲ ▲** under the display until the desired number is obtained. To confirm and save the address, press the **ON/OFF** button.

4 CLEANING THE POWDER DOSER

After use, the motor unit is pulled out of the DOSER head until both separate. (Do not be afraid to pull hard, as the blocking mechanism requires it). Loosen both threaded caps and separate all components inside the tube. The parts can now be washed by common laboratory methods (for example with ethanol, acetone, diluted acids or bases). It is however not recommended to expose parts to these reagents for long periods of time.

The motor and control unit can be cleaned only with a piece of cloth soaked in water containing a mild detergent, diluted ethanol or with more care iso-propanol. Use of other solvents could damage the surface of the unit.

5 FOR YOUR SAFETY

Thanks to the use of a plug-in power supply giving only a low voltage of 12 V DC the danger of electrical shock during the use of the DOSER powder feeder system has been virtually eliminated, even when an electro conductive solution penetrates the DOSER.

If the powder dispensing pump 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 powder doser is not in use.

6 TECHNICAL SPECIFICATIONS

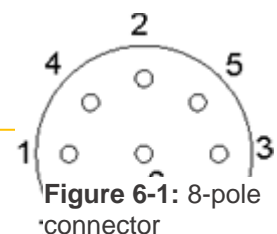
6.1 General specification

<i>Type:</i>	LAMBDA DOSER – microprocessor-controlled programmable powder dosing instrument
<i>Programming:</i>	up to 27 steps of speed and time
<i>Time resolution:</i>	0 to 999 minutes in 1 minute steps or 0 to 99.9 minutes in 0.1 minute steps: time resolution can be selected individually for each program step
<i>Non-volatile memory:</i>	storage of all settings
<i>Motor:</i>	microprocessor controlled stepping motor
<i>Speed control range:</i>	0 to 999
<i>Interface:</i>	RS-485 (optional)
<i>Power supply:</i>	95–240 V/60–50 Hz AC plug-in power supply with DC 12V/6W output; possible field operation on 12 V accumulator
<i>Volume:</i>	approx. 0.2l and 1l glass vessel
<i>Dimensions:</i>	motor unit: 6 (H) x 7 (W) x 13 (D) cm glass vessel approx. 0.2 l: 30 (H) x12 (W) x 5 (D) cm glass vessel approx. 1 l: 30 (H) x 18 (W) x 14 (D) cm
<i>Weight:</i>	950 g
<i>Safety:</i>	CE, meets IEC 1010/1 norm for laboratory instruments
<i>Operation temperature:</i>	0-40 °C
<i>Operation humidity:</i>	0-90% RH, not condensing
<i>Remote control:</i>	0-10 V; (option 0-20 or 4-20 mA)



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

6.2 Remote control (Inputs/outputs)



No.	Colour	Description
1	yellow	(+) input remote speed control 0-10V *)
2	grey	step signal from stepping motor (0 and 12V)
3	green	earth, 0 V
4	brown	+ 12 V
5	white	(+) input remote ON/OFF; 0V = ON, 3–12 V = OFF (this logic can be inverted on demand)
6	pink	earth, ground (GND)
7	red	RS 485 B (-)
8	blue	RS 485 A (+)

*) (zero line connected to the contact no. 3)

6.3 Input (12 V DC)

Contact No.	Description
1	+ 12 V DC
2	0 V
3	not connected

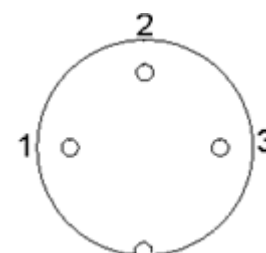


Figure 6-2: 3-pole connector

7 ACCESSORIES AND SPARE PARTS

7.1 Pump flow integrator (Art. No. 4803)

The DOSER powder feeding pump and the other LAMBDA pumps are the only pumps on the market, which allow a **simple and precise integration of the amount of liquid, solid or gas that has been delivered by the pump.**

The electrical impulses, which move the pump motor, are registered and transformed into a direct voltage. This voltage can be measured or recorded by common recorders or voltmeters. The RS 485 interface allows the control

In processes where the pump is controlled e.g. by a pH-stat during a fermentation or cell culture to keep the pH of the medium constant, it is often important to know when and how much acid or base were added. **This data yields important information about the process, its kinetics and time of completion, etc.**

Another use of the INTEGRATOR is for the **measurement of enzyme activities** (e.g. amidases, esterases, lactamases, lipases, proteases and other enzymes).

The pump-flow INTEGRATOR can now be electronically implemented inside the DOSER powder dosing instrument and therefore, does not require any additional valuable laboratory bench space.

The activated INTEGRATOR within the LAMBDA pumps allows **new and unusual pump applications** (e.g. gradient making, counter flow elution, liquid chromatography, electronic burette, etc.).

7.2 PNet control software for peristaltic and syringe pumps, DOSER or MASSFLOW (Art. No. 6600)

PNet is a PC control software for the remote control of LAMBDA laboratory instruments (peristaltic pumps PRECIFLOW, MULTIFLOW, HIFLOW, MAXIFLOW, syringe pump VIT-FIT, powder dosing instrument DOSER and gas flow controller MASSFLOW).

The pumps are connected to the computer through a RS-232 or RS-485 interface. Up to 6 LAMBDA laboratory instruments and 12 INTEGRATORS can be connected and controlled simultaneously.

7.3 List of accessories and spare parts

Art. No.	Accessories
4803	<i>PUMP-FLOW INTEGRATOR (for LAMBDA pumps, DOSER and MASSFLOW)</i>
4810	<i>Pump remote control (analog and digital) cable, 8 poles (open ends)</i>
4802	<i>Pump ON/OFF remote control cable, 2 poles (open ends)</i>
4823	<i>Foot switch for ON/OFF control, 8 poles</i>
4824	<i>Cable for inverted analog ON/OFF control, 8 poles</i>
Interface and Control software	
4822	<i>RS232 interface (for connection of the instruments to the serial port)</i>
4816	<i>RS485 interface (for connection of the instruments to the serial port)</i>
4817	<i>RS232/485 converter</i>
4818	<i>Power supply for RS232/485 converter (5V/1W)</i>
4819	<i>RS-line connection cable (serial)</i>
6600	<i>PNet control software for peristaltic and syringe pumps, DOSER or MASSFLOW</i>
800202	<i>Quadruple plug box (Power and RS-connection for up to 4 LAMBDA laboratory instruments)</i>
Spare parts	
4820	<i>Plug-in power supply (12V/6W) for PRECIFLOW, MULTIFLOW, DOSER, MASSFLOW</i>
5801	<i>Glass adaptor with ground NS 29/32 fitting</i>
5802	<i>Screw cap SVL 42</i>
5803	<i>Teflon disc</i>
5804	<i>Distributor (normal)</i>
5805	<i>Distributor for very fluid powders</i>
5806	<i>Rubber/Teflon sealing disc</i>
5807	<i>Centering part</i>
5808-b	<i>Blind plug</i>
5808-g	<i>Gassing plug</i>
5809	<i>Control unit</i>
5810	<i>Glass vessel with side arm (approx. 0.2l)</i>
5811	<i>Glass vessel with side arm (approx. 1l)</i>
5810-s	<i>Silicone coated glass vessel with side arm (approx.. 0.2l)</i>
5811-2	<i>Silicone coated glass vessel with side arm (approx. 1l)</i>

8 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: _____

9 APPENDIX

9.1 RS communication protocol for LAMBDA DOSER, VIT-FIT, PRECIFLOW, MULTIFLOW, HIFLOW and MAXIFLOW pumps

9.1.1 Format of data sent by the PC to the pump and back

Data sent by the PC: #ss mm a ddd qs c

Data sent back by the pump: <mm ss a ddd qs c

where,

- #** is the first sign of a command sent by PC
- <** is the first sign of a message sent by pump
- ss** is the address of the pump
- mm** is the address of the PC
- a** is the command for the sense of rotation:
- r** for clockwise (cw) rotation (to the right)
- l** for counter-clockwise (ccw) rotation (to the left) (not for DOSER and MASSFLOW)
- ddd** is the speed of rotation (3 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 signs of the type 0...9ABCDEF)
- c** is the end sign cr (carriage return) The pump will fulfill the task and block any manual command on the pump front panel.

9.1.2 Commands not containing data

- # ss mm **g** qs c activates the local command of the pump
- # ss mm **s** qs c the pump is stopped
- # ss mm **G** qs c to send pump data to the PC

9.1.3 Checksum control

The PC sends: #0201r123EEcr

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

#	0	2	0	1	r	1	2	3	EE (last byte)	cr
23h	+30h	+32h	+30h	+31h	+72h	+31h	+32h	+33h	=1EEh	0Dh

9.1.4 Format of the data transmission

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

9.2 Examples

Address of the PC: 01
Address of the pump: 02

The PC sends: #0201r123EEcr
The pump will rotate cw at the speed of 123

The PC sends: #0201G2Dcr
The answer of the pump: <0102r12307cr

The PC sends: #0201l123E8cr
The pump will rotate ccw at the speed of 123. (not for DOSER and MASSFLOW)

The PC sends: #0201s59cr
The pump stops.

The PC sends: #0201g4Dcr
The pump will go to the local command (pump front panel is activated).

9.3 How to set the DOSER address?

To look up/modify the instrument address, disconnect the DOSER from mains.

Press the **ADRS** button continuously and at the same time connect the DOSER 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 powder dosing instrument.

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

To confirm and save the address, press the **ON/OFF** button.

9.4 RS-connection scheme

The 8-pole DIN connector “REMOTE” is used for the remote control and RS-485 connection. When the optional RS-485 interface is available the pins are used as follows:

No.	Colour	Description
1	yellow	(+) input remote speed control 0-10V *)
2	grey	step signal from stepping motor (0 and 12V)
3	green	earth, 0 V
4	brown	+ 12 V
5	white	(+) input remote ON/OFF; 0V = ON, 3–12 V = OFF (this logic can be inverted on demand)
6	pink	earth, ground (GND)
7	red	RS 485 B (-)
8	blue	RS 485 A (+)

*) (zero line connected to the contact no. 3)

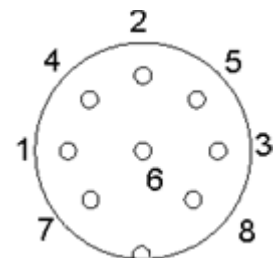


Figure 9-1: 8 pole connector

9.5 RS communication protocol for the on-board INTEGRATOR (optional)

9.5.1 Communication between the PC and the INTEGRATOR of the LAMBDA instrument

From the PC to the INTEGRATOR:

#ss mm z qs c

From the INTEGRATOR to the PC:

<mm ss = qs c confirmation of the reception of a command
<mm ss dddd qs c sending of the requested data

where,

- #** is the first sign of a command sent by the MASTER (PC)
- <** is the first sign of a message sent by the SLAVE (INTEGRATOR)
- ss** is the address of the subordinate station (address of the instrument with integrated INTEGRATOR)
- mm** is the address of the commanding station (PC)
- z** is a command (see below): small letters indicate a command, capital letters request data transfer from the subordinate station
- =** confirmation of reception
- aa** new address of the subordinate station (ss) (two numbers and possibly other ASCII characters A B C D E F)
- dddd** transferred data (values are two bytes in hexadecimal form. Single bytes are transformed into two ASCII characters 0,...,9,A,B,C,D,E,F)
- qs** is the control sum (obtained by the addition modulo 256 of binary values of all preceding characters including the leading sign) in HEX format (2 ASCII signs of the type 0...9ABCDEF)
- c** is the end sign cr (carriage return)

9.5.2 Commands for the INTEGRATOR

- n** reset (sets the INTEGRATOR to zero)
- i** start of integration
- e** stop of integration
- I** sends the integrated value
- N** sends the integrated value and sets the integrator to zero
- L** sends the integrated value ccw rotation (to the left) (not for DOSER)
- R** sends the integrated value of cw rotation (to the right)

9.5.3 Examples

Address of the PC: 01
 Address of the instrument with on-board INTEGRATOR: 02

The PC sends: #0201I2Fcr

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

#	0	2	0	1	I	2F (last byte)	cr
23h	+30h	+32h	+30h	+31h	+49h	=12Fh	0Dh

The PC sends: #0201i4Fcr
 i.e. in hexadecimal form: 23h 30h 32h 30h 31h 69h 34h 46h 0Dh
 This means: For a subordinate station (SLAVE) with address 02 from commanding station (MASTER) with address 01
 Start of integration
 The control sum is 14Fh (last byte: **4F**); end of message cr (carriage return)
 The INTEGRATOR answers: <0102=3Ccr

The PC sends: #0201N34cr
 The INTEGRATOR answers: <0102N03C225cr (integrated value is 03C2h)
 and resets to zero

The PC sends: #0201e4Bcr
 The integration will be stopped and the command will be confirmed.
 The INTEGRATOR answers: <0102=3Ccr



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