

BA00205en



Operating Instructions

descon[®] dos sm

with stepper motor

article: 13000



**Read instruction manual
before commissioning the device!**

Keep for future reference!

NEXT WATER
GENERATION. [®]

descon

EC Declaration of Conformity



DESCON GMBH - INNOVATIVE WASSERTECHNIK

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Telefax: +49 (0)6023 50 701-20, E-mail: info@descon-trol.de | www.descon-trol.de
hereby declares that the measurement and control devices with series name:

descon[®] dos sm

comply with the requirements of the following EU directives:

EMC Directive 2004/108/EC,

Low Voltage Directive 2006/95/EC,

provided the installation regulations specified in the technical
product information are complied with.

The CE marking is based on the Council Directive 2004/108/EC of the
European Community on the harmonization of the laws of the Member
States, dated 15 December 2004.

Applied standards and technical specifications:

EN 61000 6-13-1(3), VDE 0839 Part 6-1(3): 2002 (Residential)

EN 61000 6-13-2(4), VDE 0839 Part 6-2(4): 2006 (Industrial)

EN 61326-1: 2006, VDE 0843-20-1: 2006 Electrical equipment for
measurement, control, regulation and laboratory use - EMC
requirements

EN 61010-1: 2002-08 Safety requirements for electrical equipment for
measurement, control and laboratory use

63755 Alzenau, 31 May 2010



Bernhard Thoma
Managing Director



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General information

1.1 General

This technical information provides instructions for the installation, commissioning, maintenance and repair of the **descon® dos sm** peristaltic metering pump.

It is imperative that the safety instructions and notes in bold type are observed at all times!

1.2 Notes in bold

In this technical information, the highlighted terms CAUTION, WARNING and NOTE have the following meaning:

- CAUTION: This heading is used if failure or non-compliance with operating instructions, working instructions, prescribed procedures and the like may result in injury or accidents.
- WARNING: This heading is used if failure or non-compliance with operating instructions, work instructions, prescribed procedures and the like may result in damage to the equipment.
- NOTE: This heading is used to call attention to important points.

1.3 Warranty

The manufacturer guarantees the operational safety and reliability under the following conditions:

Installation, connection, adjustment, maintenance and repair are carried out by authorized personnel. Only original accessories are used. Only original spare parts and wear parts are used for repair or replacement. The device/
the equipment is used in accordance with the instructions in the technical manual (specified normal operation/normal use).

WARNING: The use of concentrated hydrochloric acid in the immediate vicinity of our equipment will void the warranty.

1.4 Safety instructions

<p>The equipment has been manufactured and tested in accordance with DIN 57411/German VDE 0411 Part 1, Protective Measures for Electrical Equipment, and left the factory in a safe condition. To maintain this condition and to ensure a continued safe operation, the user must observe the notes and warnings contained in this technical information. If it must be assumed that a safe operation is no longer possible, turn the device off and put it out of service; secure it against unintended operation.</p>

This is the case:

- if the system shows visible damage,
- if the system seems no longer operational,
- after longer periods of storage under unfavourable conditions.

1.5 Transport damage

We generally pack the **descon®dos sm** peristaltic metering pump carefully for the purpose of transport. Please check that the delivery is complete and undamaged. Any transport damage must be reported immediately (freight carrier).

WARNING: The transport packaging must not be exposed to direct sunlight for longer periods during transportation. No liability is taken over for damage caused by non-observance of this information!

WARNING: The transport packaging must not be exposed to moisture during transportation. No liability is taken over for damage caused by non-observance of this information!

1.6 Conformity

The **descon®dos sm** peristaltic metering pumps meets the essential requirements of the following EC directives, harmonized standards and national standards:

EC directives:	Low Voltage Directive 2006/95/EC Machine directive (89/336/EEC)
Harmonised standards:	DIN EN 60335-1 DIN EN 55011/5502 DIN EN 61000-4-x

2. Product information

The **descon®dos sm** peristaltic metering pump is used for the metering of low viscosity, commercially available media, **without solid content**, used for the treatment of pool water.

The material of the pump hoses must be suitable for the pumped liquid. The hoses are to be replaced in due time. Maintenance works are to be carried out within the prescribed intervals.

The operator bears the sole responsibility and liability for uses other than the intended use.

3. Description

3.1 General

The **descon®dos sm** peristaltic metering pump is a high-quality microprocessor-controlled peristaltic metering pump with speed-controlled drive for a continuous metering of liquid water treatment agents.

Various operating modes and the use of different pump hoses make this pump extremely versatile.

3.2 Mode of operation

The peristaltic pump is self-priming, with no seals and no valves. Pump control by means of an adjustable stepper motor. A rotor moves spring-loaded pressure rollers, which press the pump hose together. This creates a vacuum that draws in the dosing medium to be pumped.

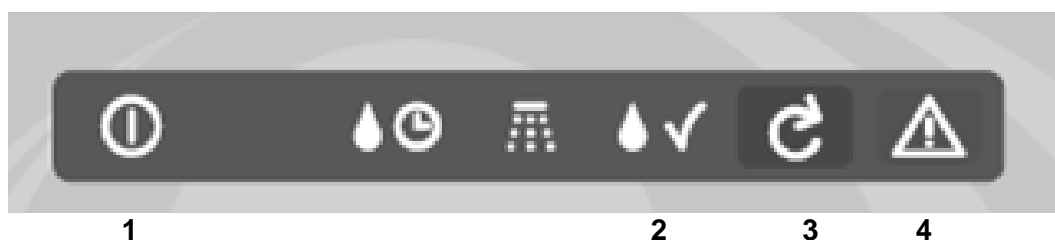
The flow rate is controlled by the rotation speed of the rotor and the hose diameter, taking into account the viscosity of the dosing medium.

3.3 Function

A potentiometer is used for adjusting the flow rate in different modes:

- External analog signal 0(4) -20mA - **Standard mode!**
- External analog signal 20-4(0) mA
- Frequency control and potentiometer
- Pulse-width modulation and potentiometer
- Integrated leakage monitoring (turns the pump off in case of a leaky hose)
- Integrated temperature monitoring (turns the pump off when the housing temperature is too high)

3.4 Display



- | | |
|-------------------------|--|
| 1 Operation LED (green) | Flashes when the operating voltage is applied, lights with "Pump on" |
| 2 LED | Lights, flashes when metering function is active |
| 3 On / Off button | |
| 4 Error LED (red) | For example if the leakage monitoring has responded (See chapter 10) |

4. Technical data

4.1 Chemical resistance

NOTE: Ensure that you use only water treatment products that have been tested and recommended by **descon®**, and that have been specifically developed for this application area and are subject to continuous quality controls.

The pump hoses are resistant to the following liquids (without manufacturer-specific additions) (at 25°C):

Sodium hypochlorite (NaClO) up to 13%
 Polyaluminum chloride (PAC)
 Organic chlorine products up to 10%
 Other chemicals on request.

Hydrochloric acid (HCl) up to 20%
 Sulphuric acid (H₂SO₄) up to 38%
 Natriumhydroxid up to 27%

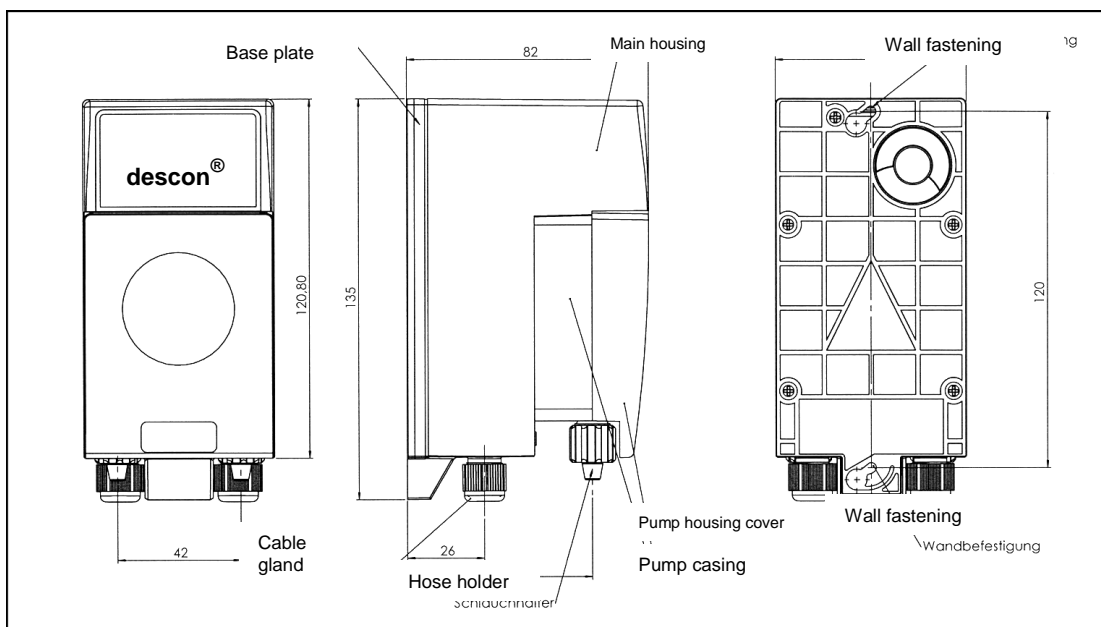
4.2 Pump capacities

Hose kit	Flow rate ml / h	Back pressure*	Hose Ø
descon-dos DLS 10000	120 – 10000	1.5 bar	8.0 mm
descon-dos DLS 4000	50 – 4000	1.5 bar	6.4 mm
descon-dos DLS 3000	25 - 3000	1.5 bar	5.6 mm
descon-dos DLS 1000	15 – 1000	1.5 bar	4.8 mm
descon-dos DLS 240	5 – 240	1.5 bar	4.0 mm

- In case of a lower back pressure, the capacity is increased by about 10%. The flow rate can be adjusted to the desired flow rate within a range between about 2% to 100% (depending on peristaltic metering pump/metering hose). When the operating voltage is applied, the pump continuously adds the medium at the set flow rate.

4.3 Dimensions and weight

Dimensions (WxHxD):	90x170x130 mm
Weight:	approx. 1.5 kg
Operating temperature:	+10° C to max. +50° C
Connections suction/metering lines:	DN 4 6/4 mm
Speed range:	0.1 to 100 rpm
Protection class/protection type:	IP 65 / II
Mains connection:	230 V, +/- 10%, 50/60 Hz
Power consumption:	approx. 16 VA max.
Back pressure:	max: 1.5 bar
Suction lift:	max.: 1.8 m
Cable entries:	4 (<u>no</u> additional openings permitted)



The **descon® dos sm** peristaltic metering pumps are delivered either individually or as completely assembled and wired version together with an appropriate measuring and control device on a mounting panel (complete system).

Peristaltic metering pumps with pre-mounted power cord with power plug (Schuko 2-wire), hose kit (pump hose kit)*, mounting screws/dowels Ø 6mm, operating manual. Packaging unit: 1 unit 420 x 200 x 120 mm.

* Pump hose kits must always be ordered separately.

5. Assembly

An ambient temperature between +10 to +40 °C must be ensured at the installation place.

NOTE: If the peristaltic pump is used for pumping of hazardous substances, all safety regulations, provisions, guidelines and dangers involved in the handling and storing of hazardous substances must be observed. The corresponding safety data sheets must be observed.

RECOMMENDATION: Use drip trays under the chemical containers to avoid danger and damage, e.g. due to a rupture of a pump hose (order number: 15090).

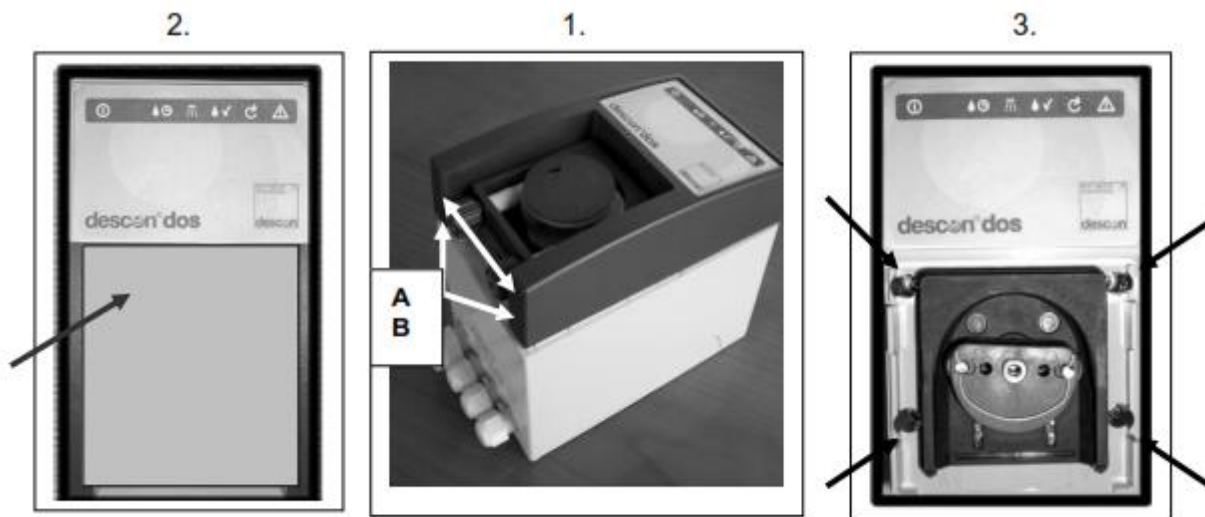
The max. suction lift of 1.80 m must not be exceeded. The peristaltic metering pump or the complete system is to be installed at a location that is protected from:

- > mechanical damage
- > shocks
- > water, steam, alkalis and acids

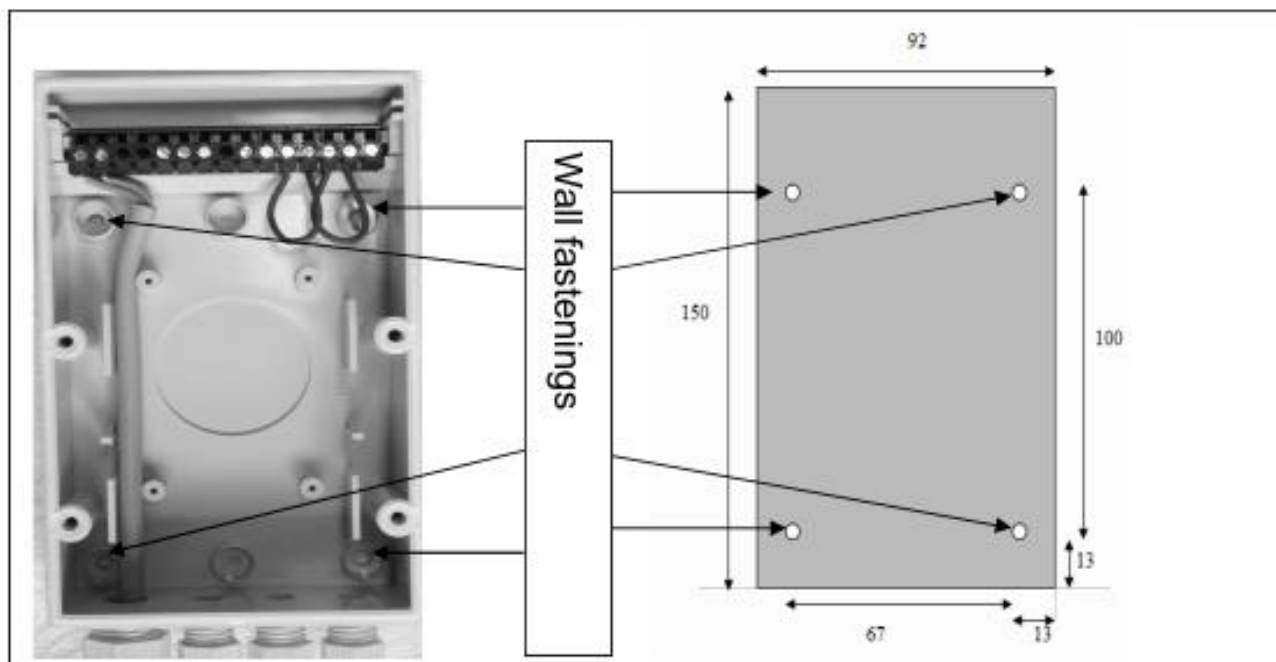
Installation position: Vertically above the level of supply container, hose connections on bottom.

CAUTION: Disconnect the pump from the mains supply before opening the housing!

1. Use a small screwdriver to lever the anthracite-coloured frame at points A/B to the outside and remove it.
2. Remove the transparent pump rotor cover (lever to the front).



3. Loosen the four screws, then remove the entire pump housing from the base plate (Phillips screwdriver).
4. Attach the wall mounting plate on the wall using four screws/dowels.
5. Attach the supplied protective caps on the screws (IMPORTANT: Without caps, IP65 cannot be guaranteed).



Terminal strip descon® dos sm

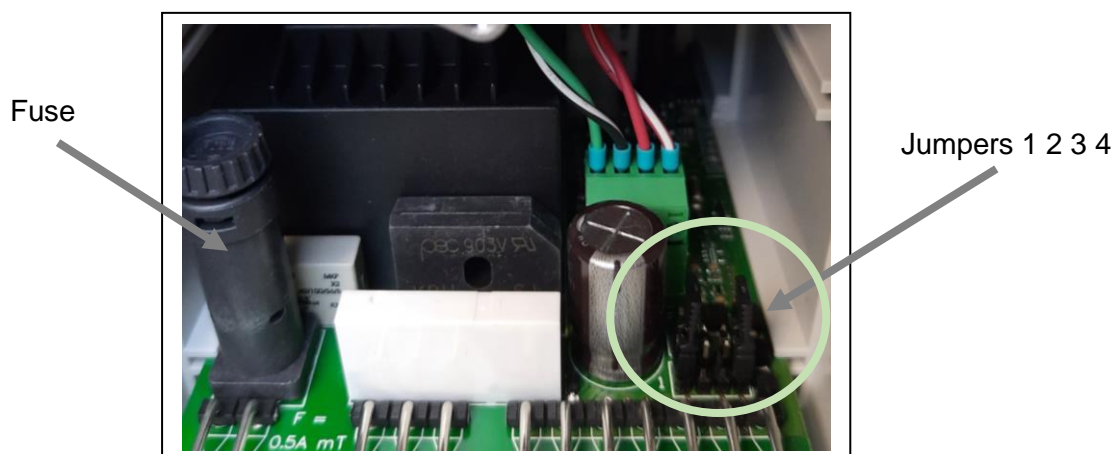
1	2	5	6	7	9	10	11	12	13	14	15
N	L										
●	●	○	○	○	○	○	●	●	●	●	○
230 V		Alarm output				Suction lance			On/Off		

Delivery condition: terminal 11-12 bridged (empty warning)

The terminal configuration depends on the desired operating mode:

1. Mode On-Off (13/14)
2. Mode 0/4 - 20 mA (9/10)
3. Mode Frequency control (13/14)
4. Mode Pulse interval (13/14)

The corresponding mode is set by means of jumpers (plug-in jumpers). The relevant bar is located above the connector strip on the electronics board.



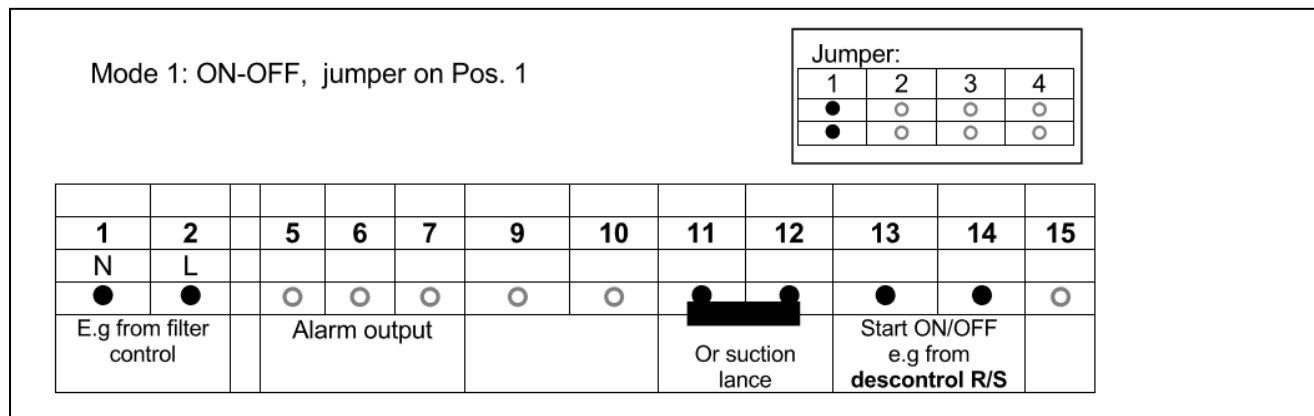
NOTE: In case of delivery of "complete systems", the peristaltic pumps have been set to the appropriate mode at the works.

6. Modes of operation

The desired operating mode is set with a wire link (jumper) on the electronics module. The factory default setting of the device is mode 1.

6.1 Operating mode 1: ON-OFF, jumper pos. 1

In case of a closed control contact (13/14), the pump delivers with the set speed (setting via potentiometer P1/P2 - see "Setting of capacity").



In mode 1, the rotor speed of the pump can be set to a fixed value. Depending on the used hose kit, it is possible to set precise dosing quantities in this way.

Hose kit	Poti		Poti		Poti		Poti		Poti		Poti		Poti		Poti		Poti		Poti	
	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
	0	1	1	1	2	1	3	1	4	1	5	1	6	1	7	1	8	1	9	1
DLS 10000	2		22		42		62		82		102		122		142		162		182	
DLS 4000	0,9		9,8		18,7		27,6		36,5		45,3		54,3		63,1		72,0		80,9	
DLS 3000	0,6		7,9		13,2		20,7		26,7		33,3		39,9		46,5		56,3		60,0	
DLS 1000	0,22		2,5		4,4		6,7		8,9		11,1		13,3		15,5		17,8		20,0	
DLS 240	0,055		0,6		1,2		1,7		2,3		2,8		3,4		4,0		4,5		5,1	
max.	ml/min		ml/min		ml/min		ml/min		ml/min		ml/min		ml/min		ml/min		ml/min		ml/min	

Reference values for the setting: The flow rate may differ by up to +/-10% due to hose tolerances, back pressure, etc. and must therefore be gauged (volumetric measurement), if required. Fine tuning at potentiometer 2 is required in this case.

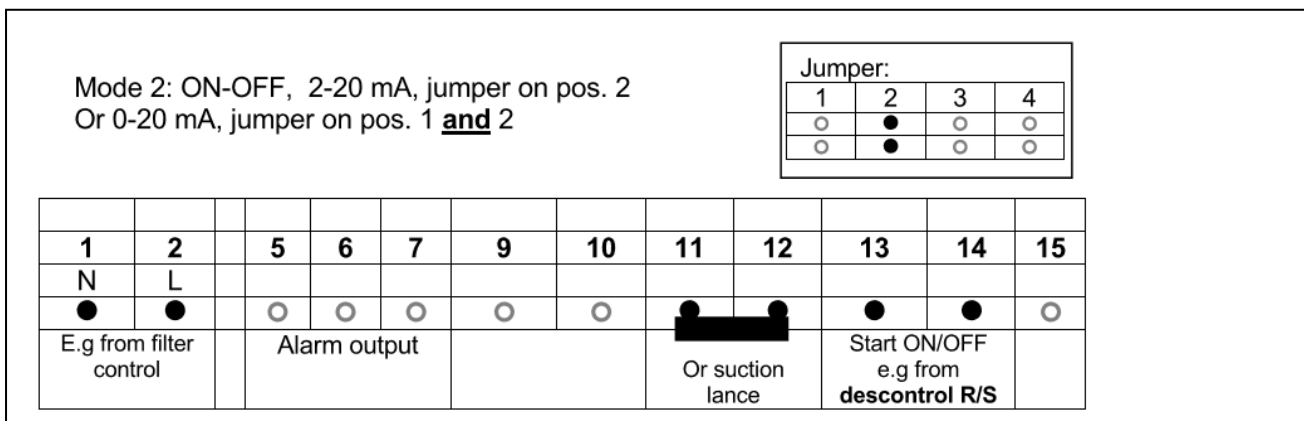
The position of slide switch 1-SW-2 determines the rotational speed (rpm).

Slide switch 1-SW-2 on position 1 on the left: Rotation speed 0.1 up to 10 rpm

Slide switch 1-SW-2 on position 2 on the right: Rotation speed 1 up to 100 rpm

6.2 Operation 0(4) - 20 mA or 20 - (0)4 mA, jumper on position 2

The speed of the pump results from the speed set at the two potentiometers P1/P2. The lowest rotation speed is 0.1 rpm at about 4.12mA. The maximum rotation speed at about 19.88 mA.



If jumper 3 is set **additionally**, the control direction is reversed:

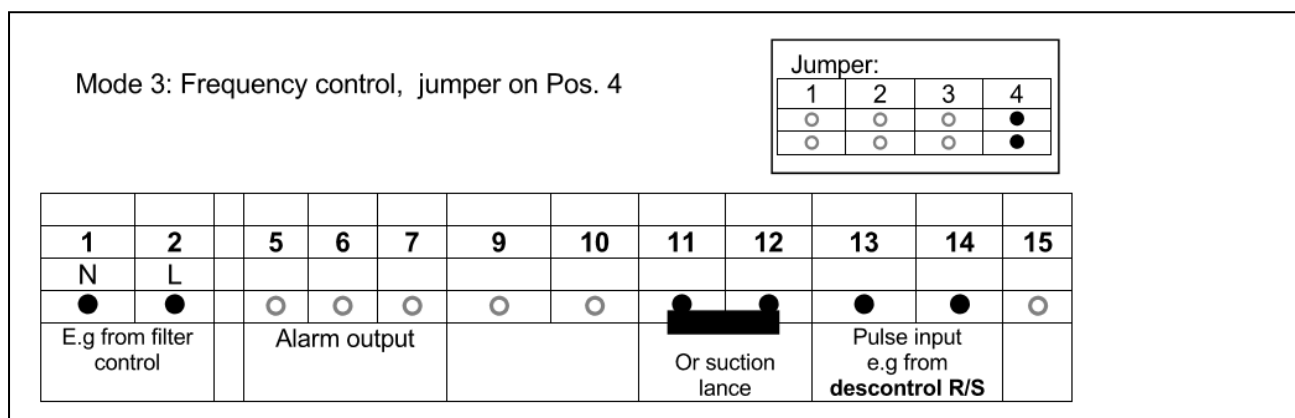
The lowest rotation speed is 0.1 rpm at about 19.88mA. The maximum rotation speed at about 4.12mA. The slide switch is without function.

6.3 Frequency control, jumper on pos. 4

If a pulse input is detected when contact 13/14 is closed, the pump starts with the smallest rotation speed and waits for new pulses. If there are no further pulses in the next 50 seconds, the pump is switched off. If further pulses are detected during this time, the speed is increased and the number of pulses adjusted. The speed is continuously adjusted. A lack of new pulses can be noticed immediately by a slowing, new pulses by a speed increase.

The minimum closing time of the contact is 50 ms (minimum pulse time). The maximum pulse frequency is 1 Hz, a higher frequency is indicated by a flashing LED "Metering".

The maximum rotation speed of the pump and/or the metering capacity results from the speed set by means of the two potentiometers P1/P2.



6.5 Setting of capacity

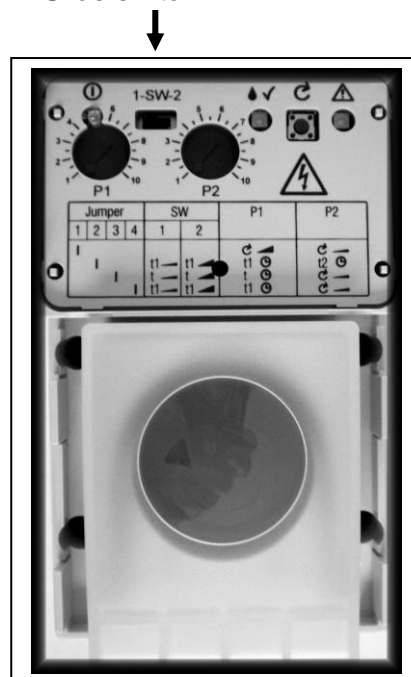
The adjustment potentiometers are located behind the operating panel.

1. Remove the anthracite pump frame (see chapter 5).
2. Remove the operating panel. There are slots provided above the housing for this purpose.
3. Reattach the panel after the settings are completed.
Operating the unit without this cover voids the operating license.



The adjustment of the delivery rate and/or the dosing times is made with two potentiometers. These are located behind the cover with the control keys. The cover can be removed without having to use any tools.

Slide switch



The maximum pump output is set with the two potentiometers.

The left potentiometer P1 is intended for coarse adjustment (0- 20- ... 100 rpm), the right potentiometer is for fine adjustment (0-10 rpm). The position of the slide switch should be observed:

1. Slide switch is on the left position: Rotation speed (rpm) of pump = (set value P1 + set value P2) x 0.1. This results in an adjustment range of 0.1 to 10 rpm.

Example: The desired speed setpoint is 2.5 rpm. Set P1 to 20, P2 to 5.

2. Slide switch on the right position: Rotation speed (rpm) of pump = (set value P1 + set value P2). This results in an adjustment range of 1 to 100 rpm.

NOTE: In case of high speeds (>50 rpm) and full use (100 %) with full back pressure, an increased wear of the pump hose is to be expected! In case of dosing volumes in the upper range, it is preferable, for example with the **descon® dos DLS 4000**, to use the larger hose version (Ø 6.4 mm) and reduce the speed.

6. Switching on / Initial commissioning

LED green: operating condition

Pump: On/Off's



If the operating voltage is present, the LED „A“ flashes every 2 seconds. Dosing is switched off.

Now press the "E" button twice times (double click).

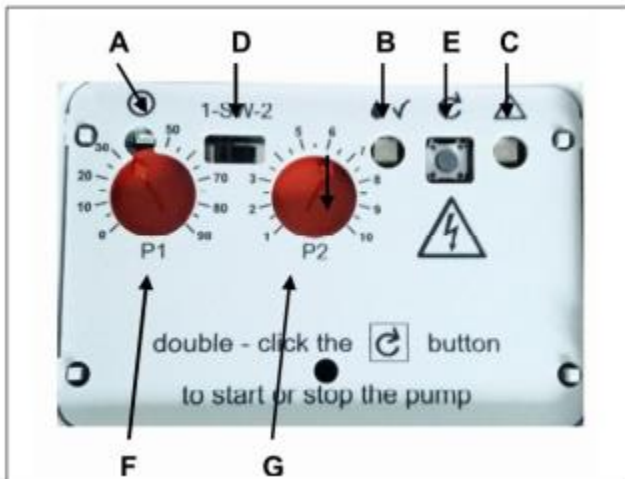
The LED A lights up. If dosing is requested externally, LED „B“ also flashes and the pump runs with the set delivery rate.

If you press the "E" button for longer than one second, the pump runs at full power for 60 seconds (e.g. for venting the dosing lines).

The pump automatically switches to the previous state after the 60 seconds (Dosing or stand by).

The dosing pump is switched off again with a double click- LED“A“ flashes.

Cover hood and front membrane removed



- A: LED operation
- B: LED dosing
- C: LED error
- D: Ambit switch SW
- E: Max. Power button
- F: Potentiometer P1
- G: Potentiometer P2

Before the initial start-up switch suction and pressure line:

Left: Suction line from supply container

Right: Pressure line to the dosing point

8. Inserting the pump hose (hose kit)

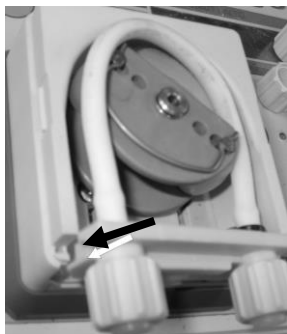
The pump hose kits are **not** inserted at the factory. They are to be installed right before initial commissioning according to the following instructions. **Hose kits are always to be ordered separately!**



The pump hose kits (hose kit = complete with bracket, hose and fittings) and the roller rotors are wear parts and are available as spare parts.

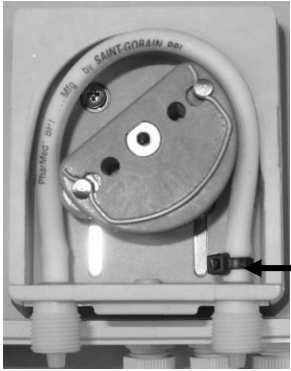
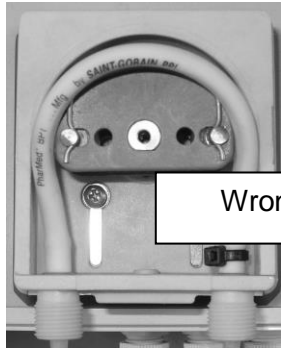
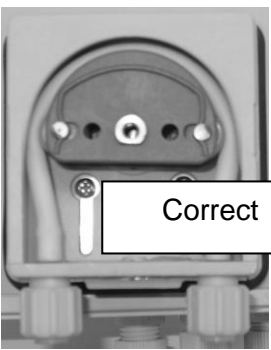


Remove the transparent cover and the anthracite rotor cover from the pump.



Press the retaining plate of the pump hose kit into the guide groove on the pump housing.

The pressure connection - which can be recognized by the black cable clip - must be placed on the right side.

	<p>Thread the pump hose into the pump housing by turning the rotor to the right at the same time.</p> <p>Black cable clip = pressure side</p> <p>The installation of hoses with a large diameter can be facilitated by using a "rotor runner".</p>
 <p>Wrong</p>	 <p>Correct</p>

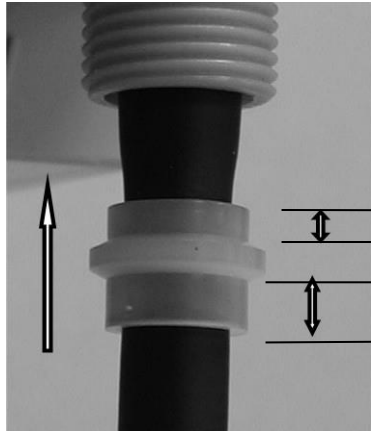

Place the rotor cover and the transparent housing cover back on the pump housing. Demounting is carried out in reverse order:

WARNING: Take care not to overstretch or bend the pump hose while inserting it.

After the pump hose kit has been properly installed, the suction and pressure lines can be connected. In the direction of rotation of the pump (clockwise), the suction line is connected on the left and the metering line on the right. The pumps are self-priming, and shut off automatically on the pressure side.

8.1 Connecting suction line and metering line

Attach the union nut and clamp ring to the hose (see figure). Press the end of the hose firmly onto the cone and secure it with the nut.

	<p>IMPORTANT!</p> 
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In case of metering lines supplied by **descon®**, the short side of the jacking ring points in the direction of the pump housing. With different thickness, it may be necessary to install the jacking ring the other way round.

NOTE: Each time you change a pump hose, cut off 1 cm from the suction line and dosing line.

NOTE: The valve hoses of the dosage pumps have a limited working life. After a maximum of 1 year of operation, the pump hose kits are to be replaced, in case of heavy duty usage earlier!

WARNING: Non-observance of this instruction (replacement of pump hose kits at regular intervals) voids the warranty!

If the pump does not start by itself during **initial commissioning** or after **replacement** of the pump hose kit, the drive shaft of is to be turned by hand for **a full revolution** to the right after assembling the hose.

If there is too much air in the suction and pressure line during the start-up phase, the pump should be supported. Proceed as follows: Loosen the metering line at the pressure site of the pump and allow the liquid to drip out into a plastic container. Reconnect the line after it has been completely ventilated.

Be careful when handling chemicals!

9 Maintenance

9.1 General

The pump hoses of the metering pumps have a limited working life. After a maximum of 1 year of operation, the pump hose kits (hose kits) are to be replaced, in case of heavy duty usage earlier!

Non-observance of the instruction of a regular replacement of pump hose kits voids any warranty!

9.2 Disassembling the pump hose kit (hose kit)

- De-energise the device.
- Wear protective gloves and safety goggles.
- Remove the transparent pump hose cover.
- Remove the suction and metering line under a cloth.

WARNING: Risk of splashing!

- Pull the hose kit out of the pump housing to the front.
- Turn the rotor by hand to remove the pump hose kit from the housing.

9.3 Installing the pump hose kit (hose kit)

- Clean the pump housing, if necessary, and dry it.
- Push the pump hose kit (hose kit) into the pump housing
- (see chapter 8), turn the rotor by hand to thread the pump hose.*
- Put the transparent pump hose cover back in place.
- Reconnect the suction and pressure lines.
- Switch the operating voltage on again.

NOTE:	It is recommended to cut off about 12 cm of the suction and pressure lines each time the hose kit is replaced to ensure the connections are tight.
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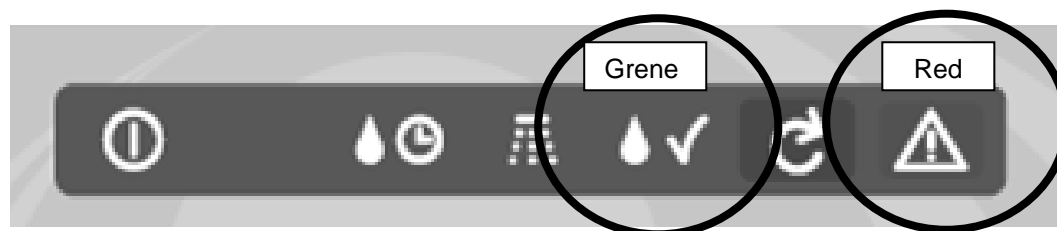
*= The use of a "rotor runner" is recommended for installing larger hoses (see spare parts).

10. Troubleshooting

Error	Cause	What to do
Pump not running	<ul style="list-style-type: none"> ● No mains connection ● Incorrect line voltage ● Power failure 	<ul style="list-style-type: none"> ☞ Check the voltage supply ☞ Send pump to the works for repair
	<ul style="list-style-type: none"> ● No request from measuring unit 	<ul style="list-style-type: none"> ☞ Check measuring and control unit, turn the metering function on
	<ul style="list-style-type: none"> ● Container empty, low-level indicator has responded ● No request from measuring unit 	<ul style="list-style-type: none"> ☞ Replace container ☞ Check the measuring and control device: Has the metering function been activated?
Pump not priming	<ul style="list-style-type: none"> ● Leaking suction line ● Cross section of suction line too narrow or too long ● Suction line clogged ● Foot valve defective or not positioned vertically in the tank ● Suction line bent ● Crystalline deposits in suction line ● Pump hose torn or defective (wear) 	<ul style="list-style-type: none"> ☞ Replace or seal suction line ☞ Check against factory data ☞ Rinse suction line or replace ☞ Place suction line higher ☞ Install suction line properly, check for damage ☞ Clean the line ☞ Replace
No metering	<ul style="list-style-type: none"> ● Metering valve clogged ● Metering line clogged ● Metering line leaking ● Back pressure at injection point too high 	<ul style="list-style-type: none"> ☞ Check for above errors ☞ Check injection point, clean if required ☞ Check metering line, replace if required ☞ Check pressure of overall system (max. 1.5 bar)
Pump running too slowly	<ul style="list-style-type: none"> ● Over temperature monitor has responded, the inside temperature of the pump has surpassed 70°C 	<ul style="list-style-type: none"> ☞ Allow the pump to cool, determine the cause of the failure
Error LED flashing	<ul style="list-style-type: none"> ● Container empty, low-level indicator has responded 	<ul style="list-style-type: none"> ☞ Fill container or replace
Error LED lights	<ul style="list-style-type: none"> ● The leakage control has responded 	<ul style="list-style-type: none"> ☞ Clean the pump housing, dry, remove liquids below the rotor/hose kit, clean metallic contacts of the leakage monitoring. Switch pump off and on again

10.1 LED signals

The LEDs operation/alarm have different patterns of lighting/flashing at different states



LED	Flashing pattern	Definition	
Green	Duration on	Metering function is not active, setpoint reached	
Green	Flashing normally	Metering function is active, setpoint not reached	
Red	Duration off	No fault/error	
Red	Duration on	Leakage message - hose rupture detected	☞ Clean the pump housing, dry, remove liquids below the rotor/hose kit, clean metallic contacts of the leakage monitoring. Switch pump off and on again
Red	Flashing normally	Empty message - container empty Float on the suction lance stuck or inserted incorrectly	☞ Fill container or replace ☞ Lift suction lance out of the container; if the error is gone, the float has been installed incorrectly (Correct: when float is down, contact is opened, alarm is triggered)

11. Wear parts

NOTE: Wear parts (hoses and rotors) are not covered by the warranty. Only original spare parts and wear parts may be used.

Hose kit

(pump hose mounted on hose support = pump hose kit)

- 13201 for descon-dos DLS 10000 (120-10000 ml/h, hose d=Ø 8.0 mm)
- 13202 for descon-dos DLS 4000 (50-4000 ml/h, hose d=Ø 6.4 mm)
- 13204 for descon-dos DLS 1000 (15-1000 ml/h, hose d=Ø 4.8 mm)
- 13205 for descon-dos DLS 240 (5-240 ml/h, hose d=Ø 4.0 mm)
- 13220 Roller rotor with counter thrust bearing and spring, blue
- 13222 Cover for rotor
- 13223 Cover transparent

12. Maintenance documentation

The **descon[®]-dos sm** peristaltic metering pump is easy to maintain, but must be serviced by a specialized company at regular intervals.

Date:	Type of maintenance / spare parts used:	Carried out by:

BA00205en

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