

User manual

Proportioner for small quantities for liquid feed branch lines

Code No. 99-97-2701 GB

Edition: 11/2005

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1 Basic instructions



Please take care of this manual and always keep it in the same place for quick reference.

All persons working with the system, assembling, cleaning and servicing it have to be familiar with the contents of these instructions.

Please take into consideration the comprised safety instructions !

If this manual should get damaged or lost, **Big Dutchman** will be glad to provide you with a new copy.

1.1 Basics

The dosing system has been constructed according to the current state of the art and all acknowledged regulations regarding technical safety. The system is reliable. Upon operation, however, dangers to life and limb of the user or third persons or impairments of the system or other material property are still possible.

The system may only be mounted, attended, repaired and used

- for due use
- in an excellent state from the safety and technical point of view
- by persons who are familiar with the safety regulations and who have been authorized by the owner.

In the event of special problems which are not described in detail in this manual, we recommend to contact us for your own safety.

1.2 Designated use

The dosing system is intended solely for dosing of vitamins, minerals and customary medicines in liquid feed stub pipes. Acids and bases may only be dosed out after prior consultation with **Big Dutchman**.




The **Big Dutchman** installation may only be used according to its designated use. Every other use is considered as non-designated use. The manufacturer does not accept liability for damages resulting from other uses, the user alone has to bear the risk.


The designated use also includes the exact observance of the operation, maintenance and repair instructions as prescribed by the manufacturer.

The limit values indicated in the technical data must never be exceeded.


1.3 Explaining the symbols

Upon reading this manual you will come across the following symbols:

	Warning	This symbol indicates risks possibly leading to personal injury resulting in death or to severe injuries.
	Caution	This symbol indicates risks or insecure procedures possibly leading to injuries or material damage.
	Note	This symbol indicates notes leading to an effective, economic and environmentally-conscious handling of the installation.

	Warning against dangerous electric tension
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1.4 Ordering spare parts

	<p>Operational safety is the prime necessity !</p> <p>For you own safety only use original Big Dutchman spare parts. For foreign products that have not been released or recommended we cannot judge whether there is a safety risk in connection with Big Dutchman systems.</p>
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Indicate the following for ordering spare parts:

- Code No. and description of the spare part or
- Invoice No. of original invoice
- Current supply, e.g. 220/380V

1.5 Obligations

Closely adhere to the instructions in this manual.

A basic condition for safe operation and trouble-free handling of this system is the knowledge of the basic safety instructions and regulations.

These mounting instructions, particularly the safety instructions, have to be observed by everyone working with this system. Moreover, the regulations and instructions for the prevention of accidents valid at the respective place of use have to be observed.

The manufacturer is not responsible for any damages to the machine resulting from changes done by the user.

1.6 Warranty and liability

Warranty and liability claims regarding personal or material damage are excluded if they result from one or several of the following causes:

- non-designated use of the installation,
- inappropriate mounting and operating of the system,
- operating the system with defective safety equipment or not duly fixed or not functioning safety and protective devices,
- non-observance of the instructions in this manual regarding transport, stock keeping, mounting, maintenance and upgrading of the system,
- unauthorized modifications on the system
- inappropriate repairs,
- in the event of a disaster caused by foreign matters or force majeure.

1.7 Disorders due to power failure

We recommend the installation of warning systems for a better control of your production units or the use of an emergency power-generating set for supplying the system with power in case of power failure. By this, you protect the animals and thus your own economical health.

1.8 First aid

For the case of an accident, unless specified otherwise, a first-aid kit must always be available at the place of work. Material taken out and used is to be replaced immediately.

If you need help, describe the accident as follows:

- where it happened
- what happened
- the number of persons injured
- what type of injury
- who is reporting the accident! (your data)

1.9 Pollution abatement regulations

All works on and with the installation have to be carried out in compliance with the legal requirements concerning waste prevention and proper recycling / disposal of waste.

Special care has to be taken when carrying out installation, repair and maintenance works, as water pollutants like lubricating grease and oils, as well as solvent-containing cleaning solutions are not to pollute the soil or get into the canalisation! These materials have to be kept, transported, collected and disposed of in appropriate containers!

1.10 Waste disposal

After finishing the assembly or repair of this installation, dispose of the packing material and remains which do not need to be further used according to the legal provisions for recycling.

The same applies to the component parts after putting the installation out of service.

1.11 Notes for use

We reserve the right to modify the construction and technical data for reasons of further development.

Therefore, no claims can be derived from the information, pictures, drawings and descriptions. Subject to correction !

Get the information on mounting, adjusting, operating and maintaining before taking the system into operation.

Apart from the safety-relevant instructions in this manual and the safety precautions valid in the country of use, also consider the generally acknowledged technical regulations (safe and appropriate working according to UVV, VBG, VDE etc.).

1.12 Copyright

This manual is subject to copyright. The information and drawings included in this manual shall not be copied without the manufacturer's consent, nor shall they be used for anything other than the designated use. Neither shall they be given to third parties.

The contents of this manual can be altered without prior notice.

If you find mistakes or unclear information in this manual, please do not hesitate to let us know.

All trade marks mentioned or shown in the text are trade marks of their respective owners and are recognised as patented.

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2 Safety instructions

2.1 General safety instructions

All established safety precautions and other generally accepted safety regulations and medical references have to be observed. Please check safety and function control devices to ensure safe and accurate operation:




- before putting into operation
- at adequate time intervals
- after modifications or repairs.

Check the proper functioning of the system after any kind of repair works. You may only take the device into operation, when all protective systems have been put into place again.

Also observe the regulations of local water distribution and power supply companies.

2.2 Safety instructions when operating electrical appliances

You have to make sure that the system with the electrical appliances is operated and maintained according to the electro-technical regulations.

	Installations and work on the electric components/structural groups may only be carried out by qualified personnel according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).
	Dangerous electric tensions are bare in case of open control equipment. Please be aware of the danger and keep workers of other professions away from the danger zone !
	Do not install control units directly in the house but in the service room in order to prevent damages due to ammonia vapours (NH ₃).

Immediately switch off the installation in the event of malfunctions of the power supply units. Use a bipolar voltage probe to make sure that the electrical equipment is not alive.

Check the electrical wiring and cables for recognisable damage before putting the device into operation. Replace damaged wiring and cables before taking the device into operation.

Only use the fuses indicated in the circuit diagram. Immediately replace damaged fuses. Never repair or bypass the fuses!

Never cover the electrical motor. This can cause high temperatures resulting in fire and a break-down of the equipment.

The control box as well as the terminal and connector boxes of the installation must always be kept shut.

Let damaged or broken plugs be replaced by an electrician.

Do not pull the plug from the socket at the flexible cable.

For the respective connections please see the enclosed connecting plan of the system parts delivered.

2.3 Specific safety devices

These safety instructions are meant to make you familiar with important information on the handling of the installation. They are important for your safety and for the safety of the installation.

The service personnel has to familiarize itself with the function and arrangement of the safety devices, in particular of the emergency stop button.




Any maintenance works should only be carried out by especially trained personnel.




Missing knowledge on the structural design of the installation can lead to injuries.

Make yourself familiar with the design and construction of the installation
Inform yourself and your colleagues about the remaining dangers in connection with this installation!

2.3.1 Clothing for personal safety

	When operating, maintaining and cleaning the system, avoid wearing wide, fluttering clothes, rings and watches.
	Make sure that long hair is tied back when approaching moving system parts. Hair can get caught in the moving parts and thus create severe injuries.
	Wear protective clothes and safety footwear upon operating, maintaining and cleaning the system, if required also use safety glasses and protective gloves.

2.3.2 Assembly and maintenance



	<p>Interrupt all electrical connections before carrying out any maintenance or repair works.</p> <p>Close all valves and depressurize them.</p>
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Assembly of the installation can be carried out by the farmer himself or by an authorized person. We assume that the operator or authorized person either have some sort of technical training or have the necessary knowledge or practical experience that are a main condition for a proper assembly of the installation.



Repairs may only be carried out by persons who are competent and can guarantee proper handling because of special training or knowledge and practical experience with the unit. The farmer has the sole power of decision.

Work on the electric components may only be carried out by technically skilled personnel and under consideration of German Industry Standards, VDE regulations, safety instructions and electro-technical regulations of the power supply industry (EVU).

Only work with appropriate tools; in case of possible danger to hands, use protective gloves, and safety glasses in case of danger to the eyes.


	<p>Repair, maintenance and cleaning operations as well as the removal of functional disorders may generally only be carried out when the installation is turned off and the power supply is disconnected.</p>
	<p>Protect the installation by means of a sign fixed to the main switch reading Do not put into operation! Refer to maintenance works in case of need.</p>

After any assembly, repair or maintenance works, check the proper functioning of the system. Scattered parts on the installation and around the installation can cause someone to trip or to fall, thus leading to injuries caused by the building components of the installation. Scattered parts in resp. on the building components can lead to serious damage of the installation.

	<p>Never deposit objects (e.g. spare parts, replaced parts, tools, cleaning tools etc.) after repair or maintenance works in the accessible areas of the installation or in the surrounding area.</p> <p>Before re-starting the system, assure yourself that all loose or replaced parts have been removed from the installation components.</p>
	<p>You may only take the device into operation, when all protective systems have been put into place again.</p>

2.3.3 Employing external personnel

Mounting, maintenance and repair work is frequently carried out by non-operating personnel, which is not familiar with the special circumstances and the inherent dangers.

	<p>As supervisor, you are responsible for the safety of external personnel!</p>
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You as operator are to survey the personnel and to define responsibilities and powers. Inform these people in detail on the dangers of their area of work. Check their method of working and intervene as soon as possible.

2.4 Special safety instructions



- H₂SO₄ (sulphuric acid). All pumps are tested with water. Therefore, the inlet / outlet for liquids (pump head, valves and diaphragm) must be completely dry in case solutions are used that might react with water (such as sulphuric acid, for example).
- The pump should only be erected in places where the ambient temperature does not exceed 40°C and where the relative air humidity does not exceed 90%. To prevent extremely high temperatures inside the pump, the pump should not be exposed to insolation from the sun. The casing is water-proof and protected from dust to allow for an outdoor installation. Nonetheless, the pump should never be operated under water.
- The pump should be installed at a location that can easily be accessed for future inspections and maintenance works. In order to guard against shocks and vibration, the pump must have a secure fixing.
- Verify the voltage stated on the type plate and compare it to the connected source of current.
- If the pump is operated together with other systems under pressure, you have to make sure that the supply pressure does not exceed the nominal pressure of the pump (stated on the type plate). Relieve the pressure connections before connecting or disconnecting other systems.

2.5 Dangers resulting from the non-compliance with the safety instructions

Non-observance of these instructions can cause severe danger for life and health of people or can lead to material or environmental damages and to the forfeiture of any claim for damages. To be precise, the non-observance of these instructions can lead to:

- Failure of vital functions of the installation
- Failure of prescribed maintenance methods
- Dangers for people owing to electrical and mechanical influences.

3 Assembly and operation

3.1 Proportioner for small quantities cpl for liquid feed branch lines

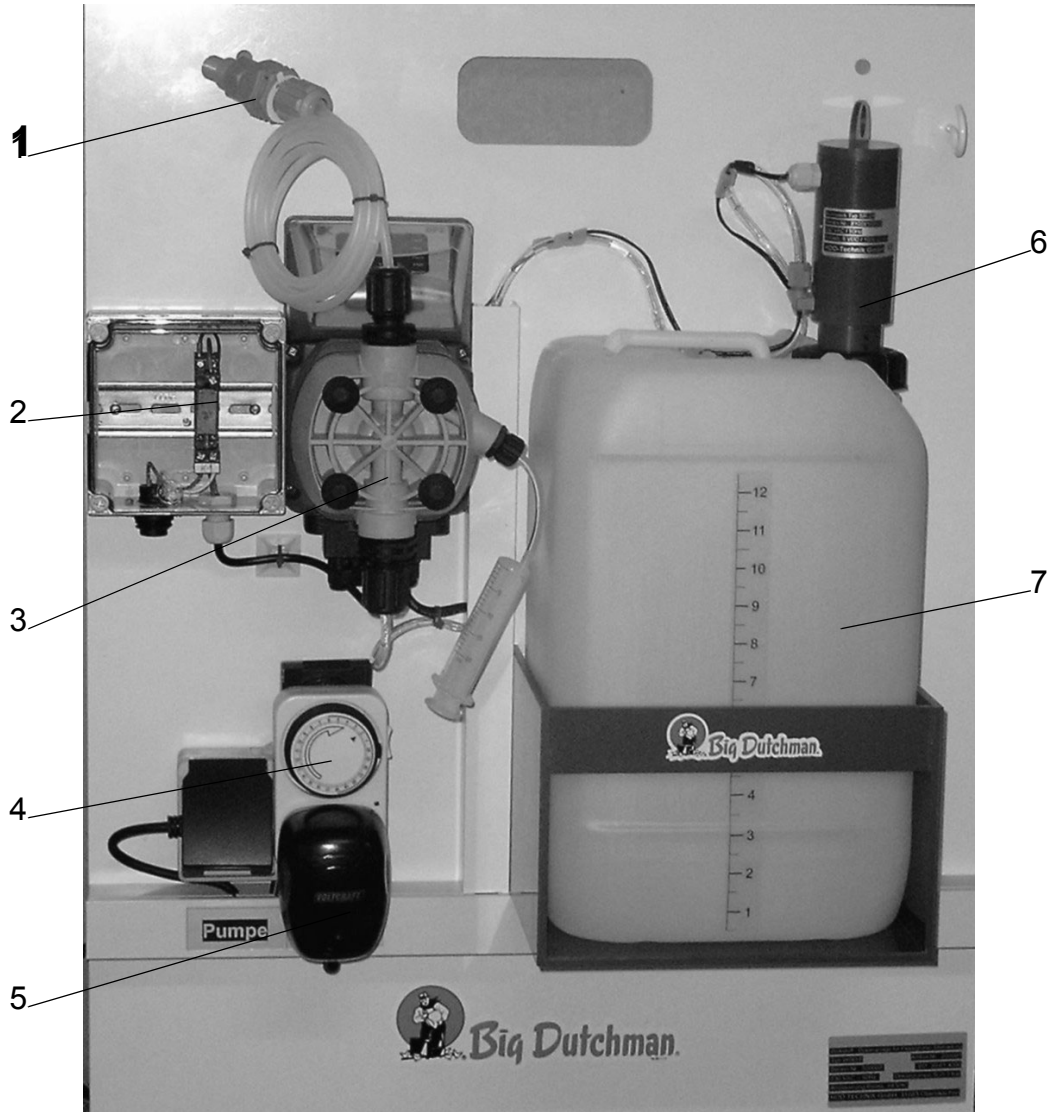


Figure 3-1: Code no. 30-61-4300

Pos.	Code no.	Description
	30-61-4300	proportioner for small quantities cpl for liquid feed branch lines
1	30-61-4392	inoculating valve w/non-return 1/2" & 3/8"AG for tube 6/4
2	-	relay for drive current 24V/50Hz and 24V/DC*
3	-	diaphragm dosing pump 23l/h at 3bar with digital panel
4	-	timer for agitator
5	-	power supply with speed control for agitator
6	-	speed-controllable agitator incl. suction lance for canister
7	-	12 litre canister with scale

* different power supply available on request

3.1.1 Dosing pump

Dosing principle:

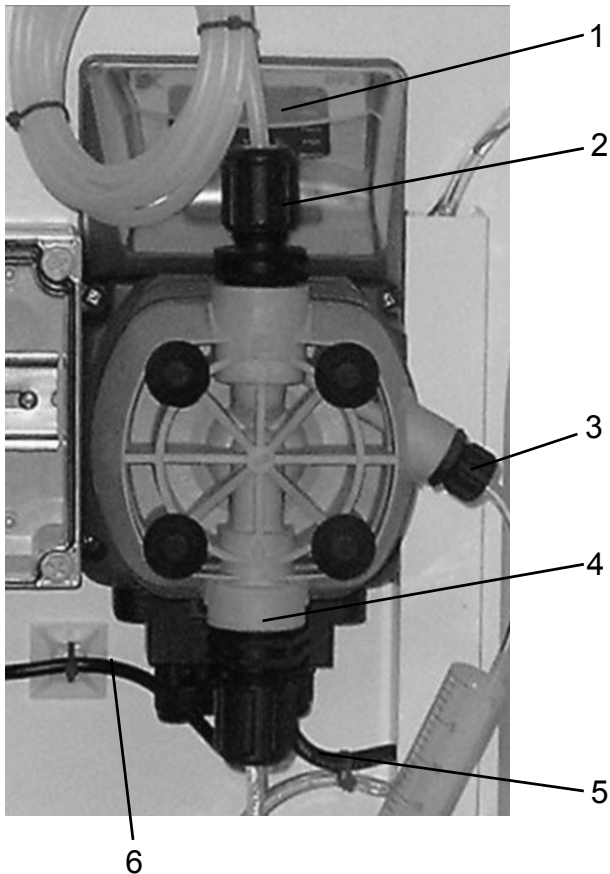
- electromagnetic diaphragm pump
- pulses over internal digital input (0-100%)

Material:

- diaphragm: Full-Teflon (PTFE)

Dosing properties:

- number of strokes per hour: max. 24000
- stroke volume: 0.96 ml at 3bar
- delivery pressure: max. 5bar



- 1 - digital display with settings for dosing capacity
- 2 - delivery side
- 3 - venting
- 4 - suction side
- 5 - power supply
- 6 - connection for relay to enable power supply

Figure 3-2: dosing pump Minima-20

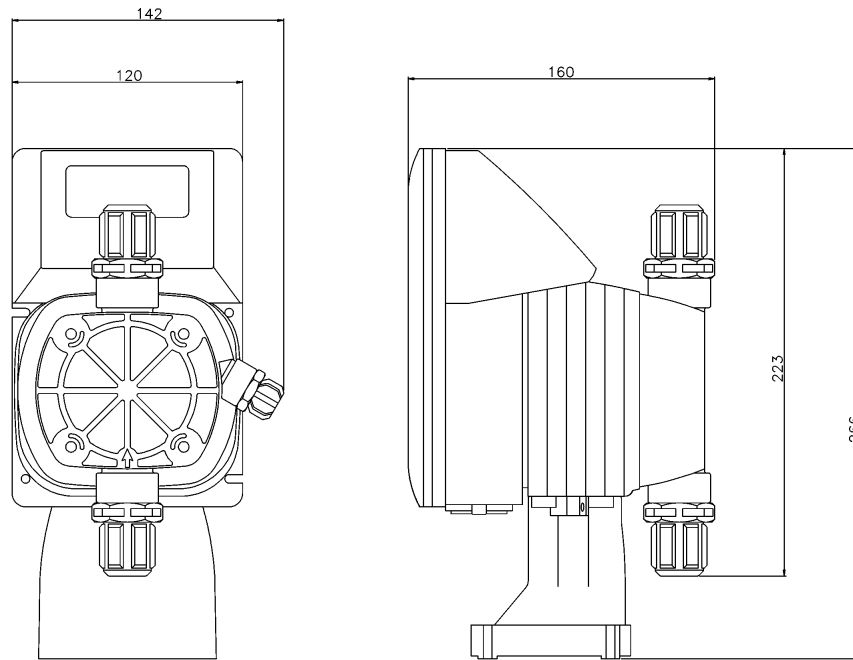


Figure 3-3: dimensions of the pump

3.1.2 Speed-controllable agitator incl. suction lance for canister



- with integrated suction pipe for dosing pump
- casing PVC
- drive 6V
- suction pipe 6mm
- propeller 1000 min⁻¹
- manual speed control

Figure 3-4: canister with agitator

3.1.3 Inoculating valve cpl. with accessories

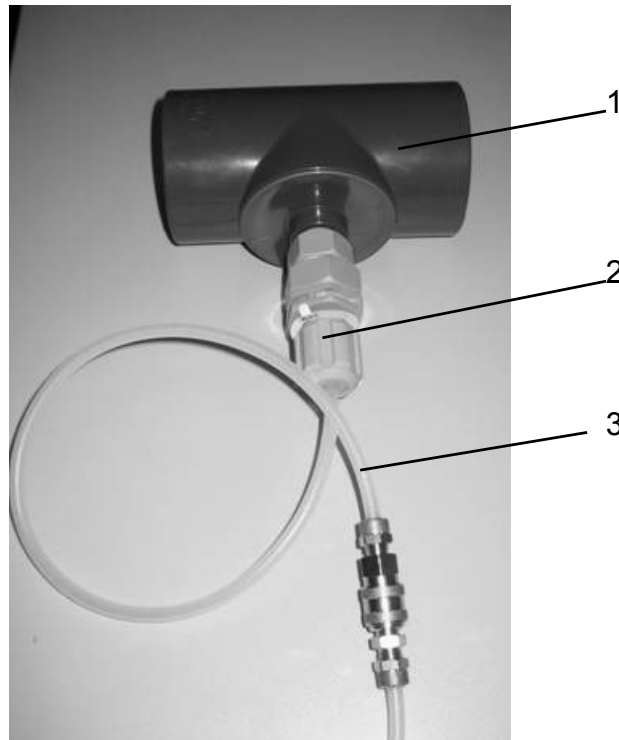


Figure 3-5: inoculating valve cpl.

Pos.	Quantity	Code no.	Description
	1	30-61-4305	inoculating valve cpl. with accessories and T-piece PVC 50x1/2"lx50
1	1	99-40-4006	T-piece 50x1/2"lx50 PVC
2	1	30-61-4392	inoculating valve w/non-return 1/2" & 3/8"AG for tube 6/4
3	2	99-40-3568	tube for compressed air PE 6x1
	5	91-00-3605	valve cable ÖLFLEX-110 5x0,75 black/no.white-1 x green/yellow
	1	99-30-3102	junction box with 3 connections
	3	91-00-3601	blinder red for valve cable

Pos.	Quantity	Code no.	Description
	1	30-61-4306	inoculating valve cpl. with accessories and T-piece PVC 63x1/2"lx63
1	1	99-40-4086	T-piece 63x1/2"lx63 PVC
2	1	30-61-4392	inoculating valve w/non-return 1/2" & 3/8"AG for tube 6/4
3	2	99-40-3568	tube for compressed air PE 6x1
	5	91-00-3605	valve cable ÖLFLEX-110 5x0,75 black/no.white-1 x green/yellow
	1	99-30-3102	junction box with 3 connections
	3	91-00-3601	blinder red for valve cable

3.1.4 Accessories

Coupler set for inoculating valve

For the connection of the connection board, movable



Figure 3-6: coupler set cpl.

Quantity	Code no.	Description
1	30-61-4390	coupler set for inoculating valve proportioner for small quantities
1	99-40-1066	socket NG 5 for quick-action coupler of air pipe 6/4
1	30-61-4391	apparatus plug 4-pole 24V for proportioner
1	99-40-1067	plug NG 5 for quick-action coupler of air pipe 6/4

3.2 Path of the liquid

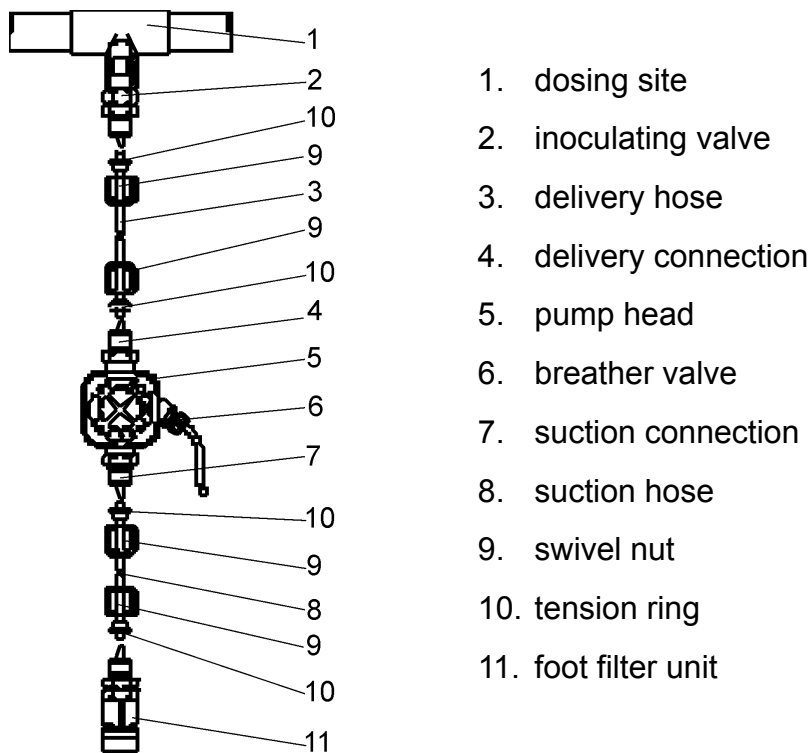


Figure 3-7: path of the liquid

3.3 Monitoring panel for the dosing pump

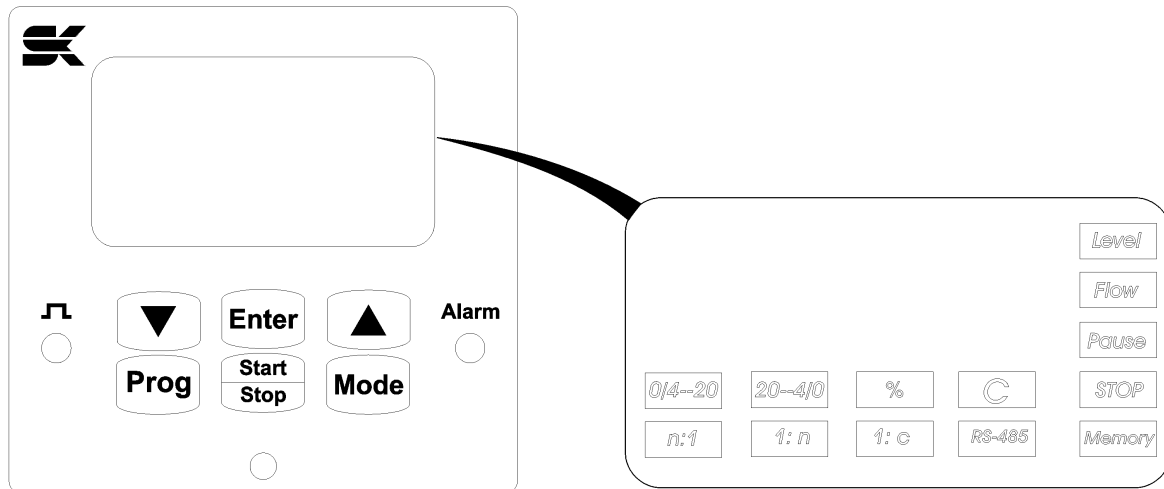


Figure 3-8: operating panel with display

Table 3-1: Display

Icon	Function of the pump
Level	alarm level monitoring
Flow	free
Pause	free
STOP	pump standstill
Memory	storage function
0/4—20	free
20—4/0	free
%	display of flow rate
C	pump operates in constant mode
n:1	n:1 mode
1:n	1:n mode
1:C	free
RS-485	free

Table 3-2: Control keyboard

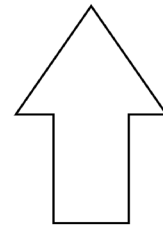
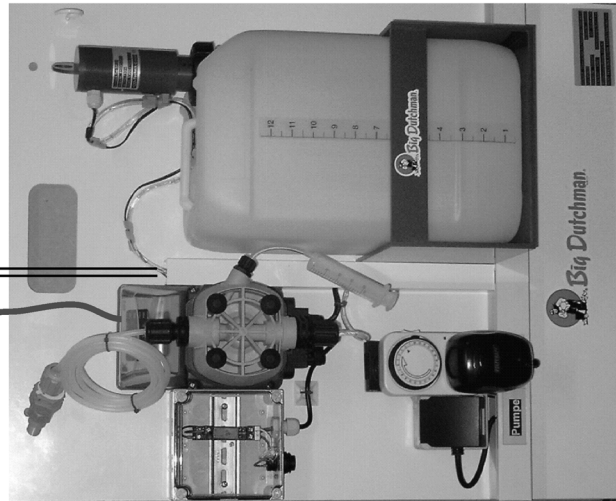
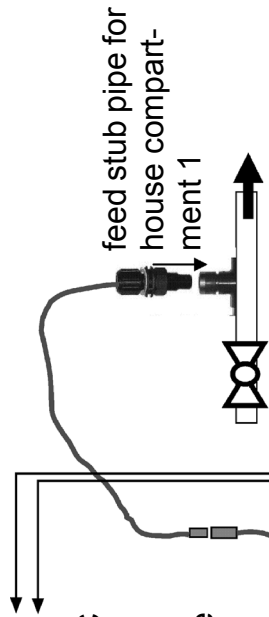
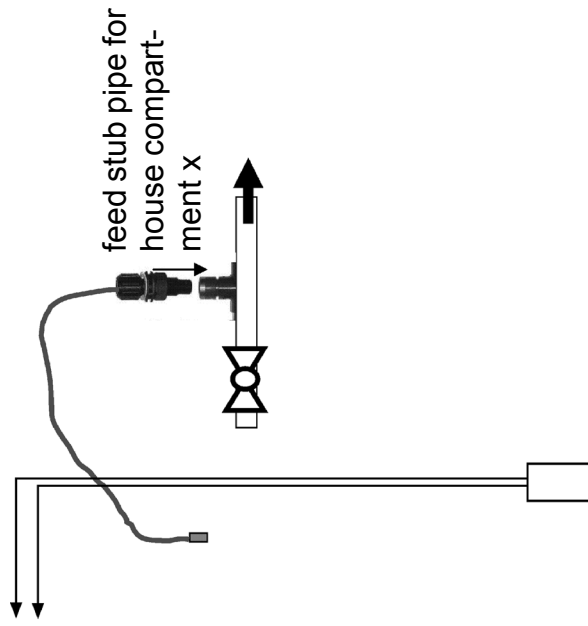
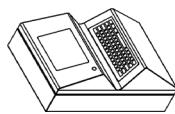
key	Function of the pump
Prog	programming mode
Start/Stop	pump ON/OFF
Mode	adjustment of flow rate
▼	cursor for adjustments
▲	cursor for adjustments

3.4 Operation

Start signal from the preliminary valve

Enabled as 24V 50Hz or 24V/DC optional 230V

For multi-phase ECO: start signal transmitted from the MC99



dose proportioner movable

For stub pipes (except for multi-phase ECO), the release for the start of the dosing pump is transmitted by the start valve of the respective feed stub pipe.

Alternatively, it is possible to receive a release signal from the feeding computer. This is required for multi-phase ECO as there are 2 start valves in every stub pipe.

Figure 3-9: Connection diagram

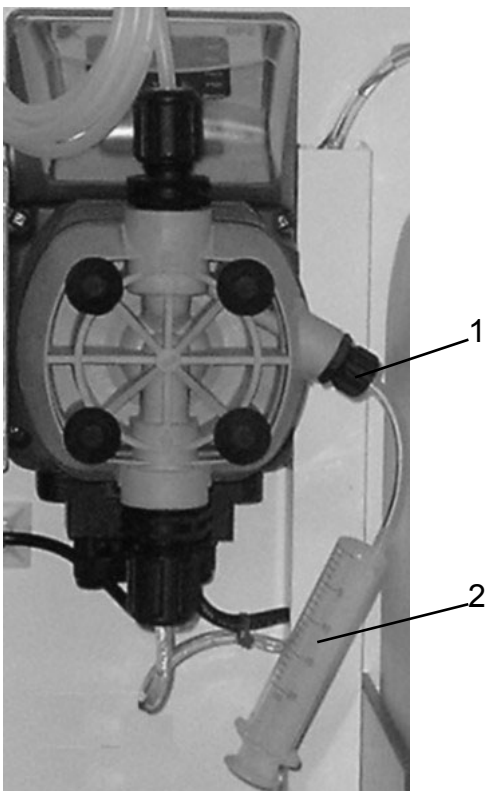
4 Connections

4.1 Installation of the dosing pump

The pump should be erected at a location that provides a good connection to both the storage tank and the dosing head.

The pump should only be erected in places where the ambient temperature does not exceed 40°C and where the relative air humidity does not exceed 90%. To prevent extremely high temperatures inside the pump, the pump should not be exposed to insolation from the sun. The casing is water-proof and protected from dust to allow for an outdoor installation. Nonetheless, the pump should never be operated under water.

4.2 Venting of the pump



1. Connect the suction tube and delivery hose.
2. Open the handwheel (pos. 1) of the ventilation valve (counterclockwise).
3. Slowly fill the syringe (pos. 2) until the dosing liquid leaves the syringe without air bubbles.
4. Close the handwheel of the ventilation valve.
5. Now the pump is deaerated and ready for use.

4.3 Electrical connection



All work involved may only be carried out by authorized personnel and under consideration of the established regulations (e.g. VDE)!

Connect the electric connection cables according to the terminal connection plan. The connection must be carried out by means of a durable and safe bonding. All cable and tubes have to be protected against damages during operation.

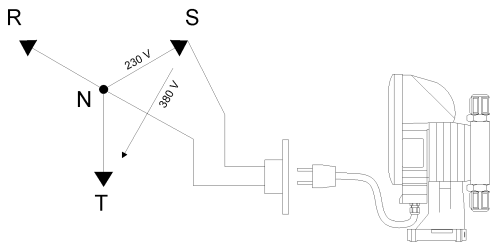
4.3.1 Wiring

The pump may only be connected to a source of current that complies with the data on the type plate.

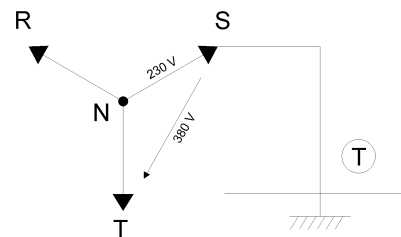
TEKNA pumps do not have to be grounded as the materials used and their fabrication allow for a double insulation.

The switching circuits of the pump are able to balance minor surges. To avoid errors caused by strong fluctuations of current, the containers should not be operated simultaneously with devices that cause high tension.

Connection to threephase/380V AC is done over phase and neutral. Avoid any connection between phase and grounding.



CORRECT WIRING



WRONG!!!

4.3.2 Wiring

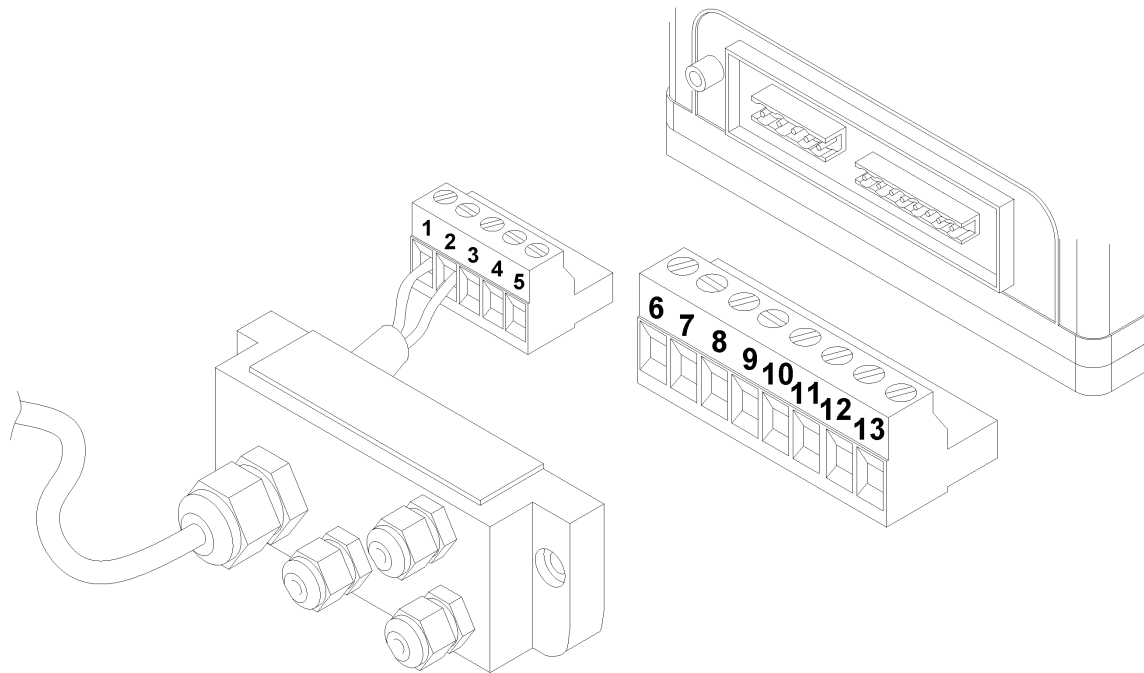


Figure 4-1: Wiring of connections

Power unit

1	phase
2	neutral

Relay repeat alarm (optional)

3 Normally closed (NC)	NC= 3+5 NO= 4+5
4 Normally open (NO)	
5 Common (C)	

6, 7	free
------	------

Level probe

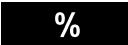
8 ground	Level-alarm with pump stop 9 (+8) Level-alarm without pump stop 10 (+8)
9 lev	
10 preall	

Input

11	Input Frequency Signal (water meter) 12 + 11
12	
13 free	

5.3 Adjusting the pump capacity

To increase or decrease the pump capacity, press the **Mode** button and at the same time either ▼ or ▲. The value is indicated in the display. It is displayed as percentage value of the maximum pump capacity.

The letter **P** is shown on the display, followed by a percentage value. In this mode, the  icon is illuminated.

Adjustable values range from 100% (corresponds to 400 strokes/min) to 1% (4 strokes/min).

Example:

P 80 indicates that the dosing pump operates with a capacity of 80% of the maximum stroke frequency. The pump operates with a stroke frequency of 320 strokes/minute.

The pump capacity may also be indicated by the display of the stroke frequency. In order to switch between both display modes, press the **Mode** button for at least 3 seconds. Then the display automatically switches to the respective opposite mode.

If the stroke frequency is used, the letter **F** is displayed on the display panel, followed by the stroke frequency value.


Adjustable values range from 400 strokes/minute (corresponds to 100%) to 1 stroke / min.

Example:

F 350 indicates that the dosing pump operates with a frequency of 350 strokes/minute.

The stroke frequency may be increased or decreased by pressing **Mode** and ▼ or ▲.



The pump capacity may be adjusted during standstill ( icon illuminated) as well as during dosing.

5.4 Level monitoring of dosing release

To monitor the level of the dosing release, you may use a level probe.

There are two operating modi:

- a) Connection of level probe to terminals 8 and 9 (see illustration 4-1).

As soon as the liquid reaches the respective level, the pump stops. In the display, the **Level** icon is illuminated and the **Alarm** LED is active.

- b) Connection of level probe to terminals 8 and 10 (see illustration 4-1).

As soon as the liquid reaches the respective level, the pump is activated. In the display, the **Level** icon is illuminated and the **Alarm** LED blinks.

5.5 Selection of operating modus

The MINIMA-20 dosing pump operates either in CONSTANT MODE or in PROPORTIONAL MODE.

Press the **Prog** button to select the operating modus. The letter **C** appears on the display and the **C** icon blinks (the **STOP** icon is illuminated). CONSTANT MODE is activated.

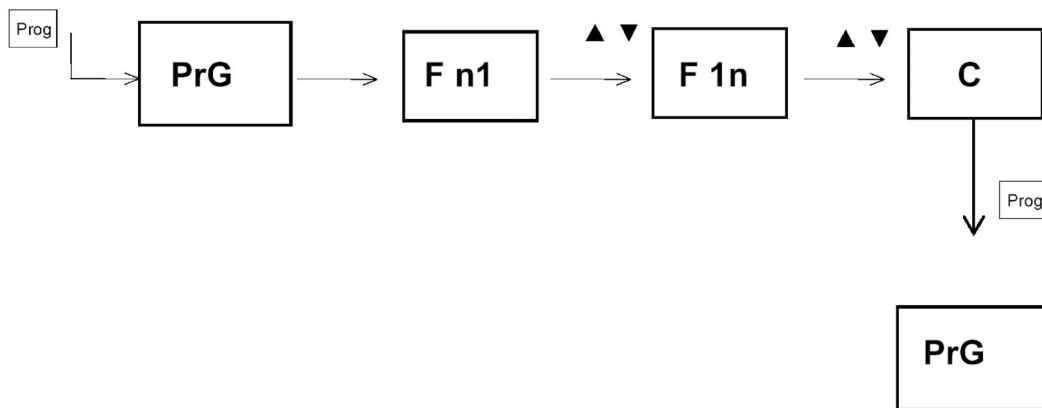
F 1n , **1:n** icon blinks (the **STOP** icon is illuminated). 1:n Mode is activated.

F n1 , **n:1** icon blinks (the **STOP** icon is illuminated). n:1 Mode is activated.

Press ▼ or ▲ to activate the desired operating modus.



5.5.1 CONSTANT MODE



Press the **Prog** button for 3 seconds to select CONSTANT MODE, then **Prog** appears on the display for approximately one second. The selected pump capacity is then displayed (see chapter 5.3). The **C** icon stays illuminated.

In this mode, the pump operates with a steady, continuous flow rate according to the set value.

The dosing pump may be started or stopped by hand by pressing the **Start/Stop** button (the **STOP** icon is off or illuminated, depending on the status).



The dosing pump stops automatically upon receiving a signal from the level monitoring unit (the **Level** icon is illuminated and the **Alarm** LED is active), see chapter 5.4.

5.5.2 PROPORTIONAL MODE

When operating in this mode, the dosing pump operates with a flow rate that is determined by an external signal. The following options are available:

1. **Mode 1:n**

After every external pulse, transmitted from a measuring device for example, the dosing pump carries out "n" strokes.

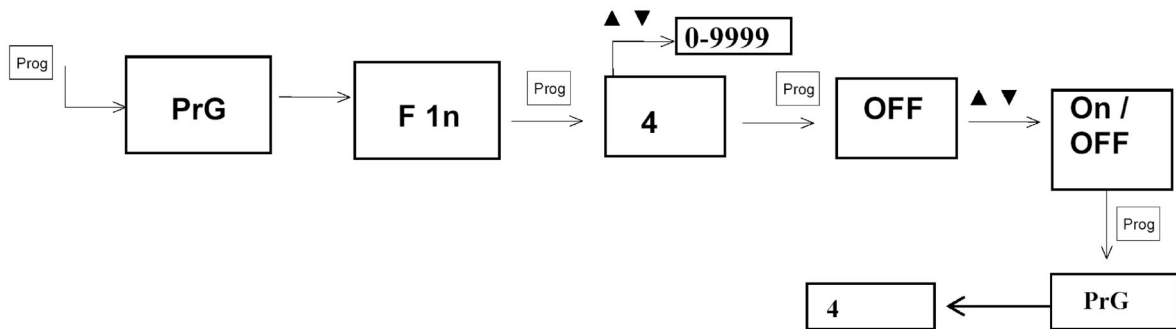
2. **Mode n:1**

After "n" external pulses, transmitted from a measuring device for example, the dosing pump carries out 1 stroke.



The block diagrams show the order in which the commands have to be entered in order to access the desired mode. The values displayed in the diagram correspond to the presettings (default values).

Mode 1:n



This mode allows to carry out "n" strokes for every external pulse that is transmitted for example from a flow measuring unit which is equipped to send signals.

The set number of strokes is the number that is processed at full stroke frequency.

Press the **Prog** button and select PROPORTIONAL MODE (see selection of operating modes), mode 1:n is preset: The string **F 1.n** appears on the display and the **1:n** icon blinks.

Press ▼ or ▲ to adjust the value for **n**.

Press the button **Prog** for 3 seconds, to confirm this mode and the value for **n** appears on the display. This value indicates the number of strokes that are activated by an external signal.

Example:

If a CB1 flow meter is connected and $n=8$, every pulse transmitted from the flow meter (1 pulse/l) causes 8 strokes of the dosing pump. Thus the pump delivers 8 strokes per litre.

After entering the value 8 for **n**, you may push the buttons ▼ ▲ to select the **Memory** function (see below). For confirmation press **Prog** for 3 seconds.

Memory function

This function allows saving of external pulses in case the dosing pump was not immediately ready to process the corresponding strokes. A microprocessor saves these pulses up to a maximum number of 65,535. The saved strokes are processed as soon as possible, for example, once no further signals are transmitted (example: no water flow at the flow meter).

- **Memory** function is at **OFF** (**Memory** icon is deactivated)

The dosing pump does not save left-out pulses. The system indicates that some pulses have not been processed: the display shows **ALL2**. This notification disappears once the set parameters are inserted again.

- **Memory** function is at **ON** (**Memory** icon is illuminated)

Once the dosing pump starts to save waiting pulses, the **Memory** icon starts to blink and it will continue to blink until all corresponding strokes are processed.

If the storage capacity is exceeded (more than 65,535 pulses are saved) an alarm is activated (the **Memory** icon blinks continuously)

You may cancel the dosing of saved strokes by simultaneously pressing ▼ and ▲. These are taken up again, if further external signals are received.



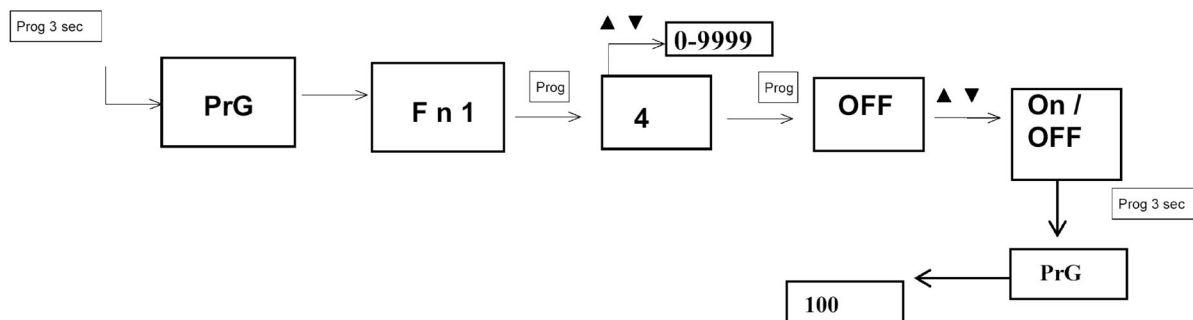
If the dosing pump is switched off, all saved pulses are lost.

Press **Prog** for 3 seconds to save the set values and leave the programming mode. The notification **Prog** appears on the display for approximately 1 second, then the previously selected value of the pump capacity appears.

Press **Start/Stop** to start the dosing pump (the **STOP** icon disappears).



The dosing pump stops automatically upon receiving a signal from the level monitoring unit (the **Level** icon is illuminated and the **Alarm** LED is active), see chapter 5.4.

Mode n:1

This mode allows to carry out 1 stroke for "n" external pulses, for example from a flow meter.

Press the **Prog** button for 3 seconds and select PROPORTIONAL MODE, then press the **Prog** button (see diagram); the n:1 mode has now been selected and the character string **F n.1** appears on the display. The **n:1** icon blinks.

Press the button **Prog** to confirm this mode and the value for n appears on the display. "n" is the number of external pulses that must be transmitted to the dosing pump so that the pump carries out 1 stroke. Press ▼ or ▲ to adjust the value.

Example:

If a CB1 flow meter is connected and n=8, then 8 pulses transmitted from the flow meter (1 pulse/l) cause 1 stroke of the dosing pump. Thus the dosing pump does one stroke for every 8 litres that flow through the pump.

After selecting the value, press the **Prog** button to select the **Memory** function (see below) and confirm by pressing **Prog** for 3 seconds.

OFF (or **ON**) appears on the display to indicate the status of the **Memory** function: activated or deactivated. The **Memory** icon blinks.

Press ▼ or ▲ to activate or deactivate the function (**ON** or **OFF**).

Memory function

This function allows saving of external pulses in case the dosing pump was not immediately ready to process the corresponding strokes. A microprocessor saves these pulses up to a maximum number of 65,535. The saved strokes are processed as soon as possible, for example, once no further signals are transmitted (example: no water flow at the flow meter).

- **Memory** function is at **OFF** (**Memory** icon is deactivated)

The dosing pump does not save left-out pulses. The system indicates that some pulses have not been processed: the display shows **ALL2**. This notification disappears once the set parameters are inserted again.

- **Memory** function is at **ON** (**Memory** icon is illuminated)

Once the dosing pump starts to save waiting pulses, the **Memory** icon starts to blink and it will continue to blink until all corresponding strokes are processed.

If the storage capacity is exceeded (more than 65,535 pulses are saved) an alarm is activated (the **Memory** icon blinks continuously)

You may cancel the dosing of saved strokes by simultaneously pressing ▼ and ▲. These are taken up again, if further external signals are received.



If the dosing pump is switched off, all saved pulses are lost.

Press the **Prog** button for a little while to save the settings and terminate the programming mode. For approximately one second, the display **PrG** appears on the screen, subsequently, the number 100 appears.

1:n and **%** icons are active.

Press **Start/Stop** to start the dosing pump (the **STOP** icon disappears).



The dosing pump stops automatically upon receiving a signal from the level monitoring unit (the **Level** icon is illuminated and the **Alarm** LED is active), see chapter 5.4.

Dosing settings

If the programming mode was abandoned in the n:1 mode, the number 100 appears on the display: this is the percentage of the dosing frequency which is dosed every n strokes:

Example:

n=4

If the pump works at 100% it doses 1 stroke for every 4 pulses.

If the pump works at 80%, it doses 1 stroke for every 5 pulses (the flow rate equals 80% of the rate set for "n").

5.6 Programming diagram

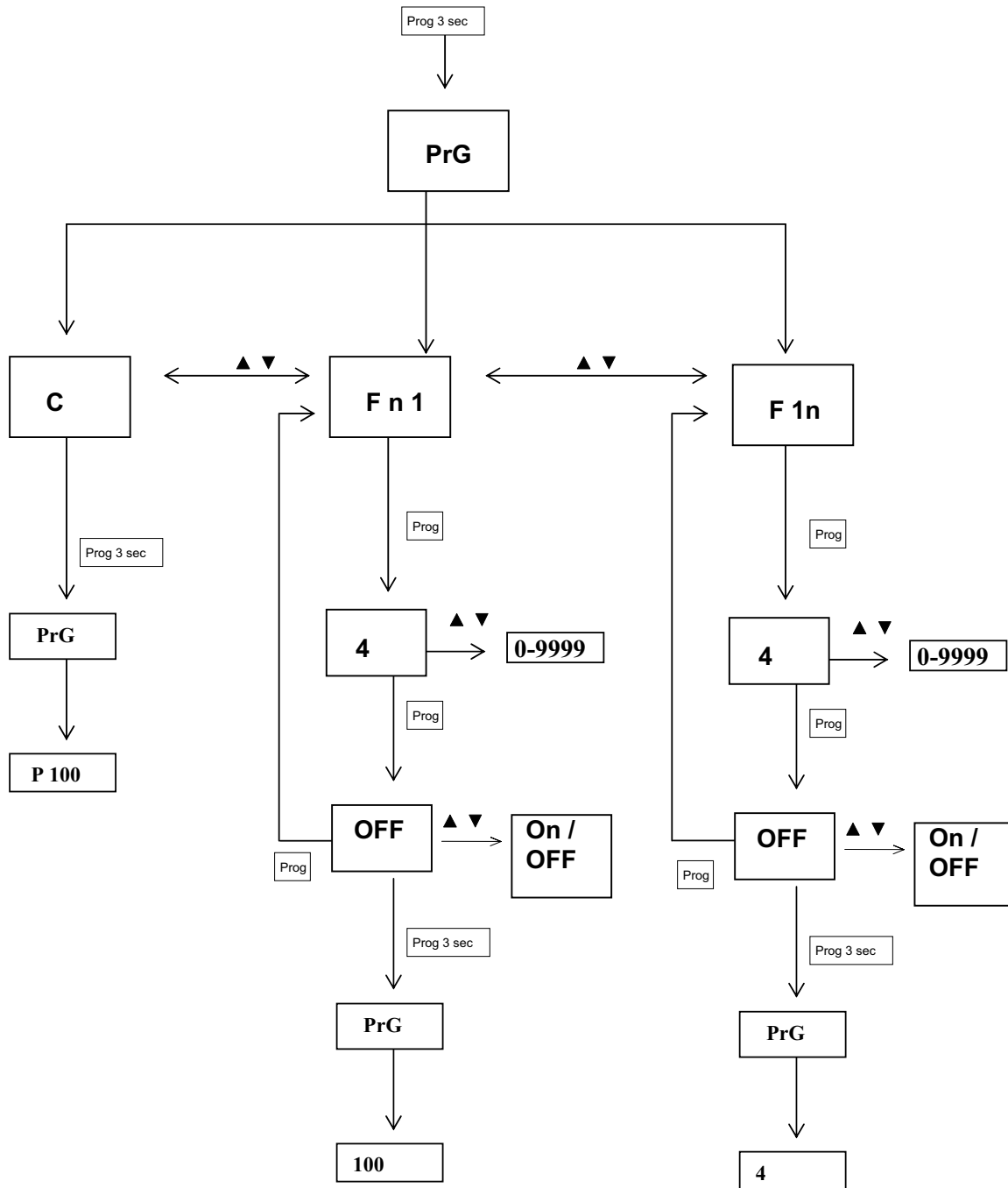


Figure 5-1: Program flow

5.7 Factory settings

dosing pump in mode **C** (Constant)

Output: **P** (percent) 75

100% = 24000 dosing strokes per hour, at 3bar the dosing amount equals 0.96ml per stroke, that means, the dosing amount per hour equals $0.96 \times 24000 = 23$ litres per hour.

75% = 18000 dosing strokes per hour, at 3bar the dosing amount equals 0.96ml per stroke, that means, the dosing amount per hour equals $0.96 \times 18000 = 17.28$ litres per hour.

50% = 12000 dosing strokes per hour, at 3bar the dosing amount equals 0.96ml per stroke, that means, the dosing amount per hour equals $0.96 \times 12000 = 11.5$ litres per hour.

25% = 6000 dosing strokes per hour, at 3bar the dosing amount equals 0.96ml per stroke, that means, the dosing amount per hour equals $0.96 \times 6000 = 5.76$ litres per hour.

Pumping rates:

2bar = 1.29ml per stroke
3bar = 0.96ml per stroke
4bar = 0.54ml per stroke
5bar = 0.30ml per stroke

Mode of operation:

Once the feeding computer triggers the K1 relay (24V AC), the supply voltage (230V AC) is conducted to the dosing pump which in turn starts dosing. The button **Start/Stop** may be used to activate / deactivate the dosing pump, at any time.

Press the **Mode** button and at the same time the ▼ or ▲ button to adjust the desired dosing rate in %.

5.8 Alarm signals

Display	status of pump	Trouble	trouble shooting
Level icon + Alarm LED are illuminated	pump stopped	The dosing liquid has reached its minimum level.	Refill the liquid. When the solution has been refilled, the Level icon and the Alarm LED are switched off. Press the START/STOP button to restart the pump.
Level icon is illuminated + the Alarm LED blinks	pump is running	The dosing liquid has reached its minimum level.	Refill the liquid. When the solution has been refilled, the Level icon and the Alarm LED are switched off.
Memory icon blinks	pump is running	Pump has saved one or more pulses that are dosed as soon as possible.	This icon stops blinking when no more pulses are saved. If the pump is switched off, all saved pulses will be erased.
Memory icon blinks + the Alarm LED is on	pump is running	No more memory available (the pump has saved 65,535 pulses) it is not possible to save further pulses.	This icon stops blinking when no more pulses are saved. If the pump is switched off, all saved pulses will be erased. The LED switches off, as soon as less than 65,535 pulses are saved.
Shown in the display ALL2	pump is running	During the programming session, the memory function was set to OFF, thus the pump does not save un-processed pulses.	The notification ALL2 disappears, once the pump is enabled to dose all external pulses again.
Shown in the display t°C + Alarm LED is on	pump stopped	The working temperature of the pump is too high (exceeding 100°C for the TEKNA 900 series, exceeding 80°C for the TEKNA 600 series).	The notification t°C disappears once the temperature is reduced again. Press the START/STOP button to restart the pump.
Shown in the display Err + Alarm LED is on	pump stopped	Hardware problems.	Contact the technical support!
Shown in the display Fail + Alarm LED is on	pump stopped	Hardware problems.	Contact the technical support!