

# Dosistar Grainy 230V~



User manual  
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## Introduction

The dosing computer Dosistar Grainy LV is a control unit for driving electrical pumps. It is used for dosing and measuring liquids in agricultural environments. Multiple in and outputs allow variable use of the device. Extensive protection and control functions ensure the safe operation of the device.

The main functions of the device are:

- Driving of three-phase pumps and controlling their flow rate
- On demand: driving of pumps with capacitor motor
- Flow measurements with up to 10 different selectable external sensors. Each flowmeter can be calibrated separately
- Variable control through multiple inputs/outputs
- Two different dosing functions
  - o **Normal dosing:** controlling the flow rate at stable and adjustable values
  - o **Charge dosing:** dosing of a variable amount (1...9999litres) at stable and adjustable flow rates
- Protective functions:
  - o Dry running protection
  - o Under dosing
  - o Self-protection functions against over current and over temperature
- Variable control with multiple inputs/outputs
  - o Alarm output (potential free relais contact)
  - o Switching output for a conveyor
  - o Pick-up input
  - o Charge start input
- Separate logging, display and deletion of liquid consumption for up to 9 different customers

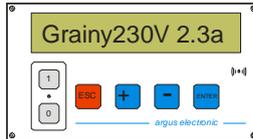
## Operation of the device

The device is controlled with the 4 keys **ESC**, **+**, **-** and **ENTER**.

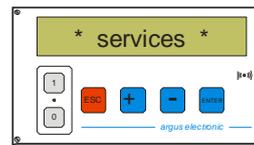
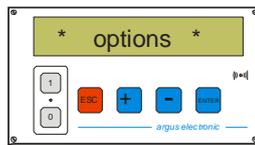
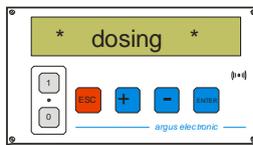
There are three main menu items:

\* dosing \*      \* options \*      \* service \*

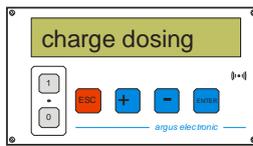
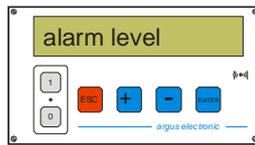
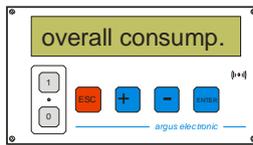
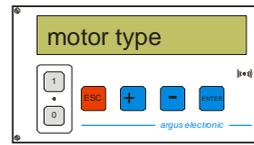
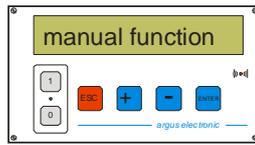
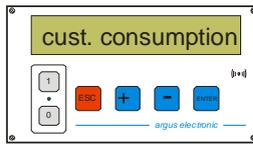
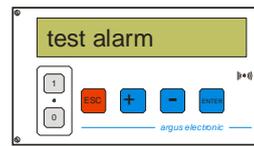
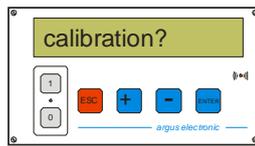
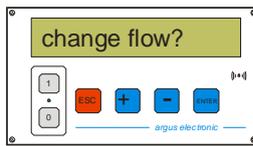
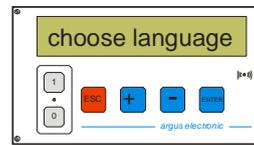
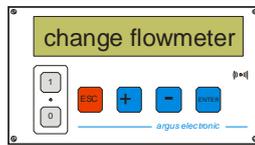
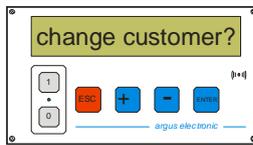
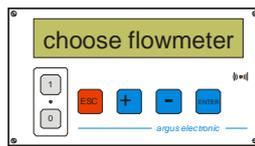
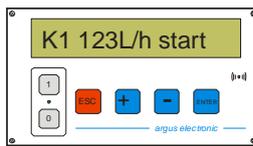
Each main menu item has several submenu items. You can switch between menu items on the same level with the +/- keys, and select a specific menu item with the ENTER key. Pressing the ESC key aborts the current activity or switches to a higher menu level.



startup message



main menu



submenus

The service menu is locked

## Normal dosing

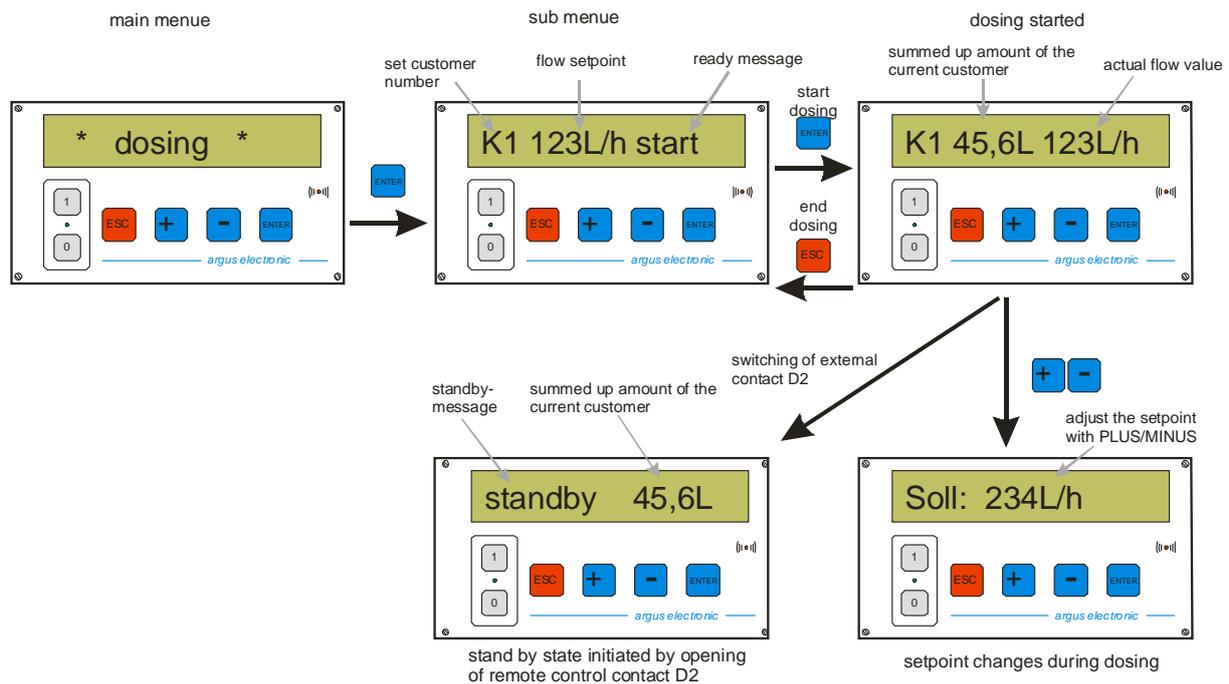
This menu item is the standard dosing function.

After choosing this menu item, pressing the ENTER key will automatically start the dosing. The pump will be controlled to hold the flow rate at the set level. Current flow rate and the summed up amount are displayed. The flow rate can be adjusted by pressing the +/- keys. ESC or ENTER will stop the dosing. The two control inputs D1 and D2 influence the dosing too.

**Input D1:** remote control input for e.g. level monitoring. This contact has to be closed for the device to work. If the contact is open dosing stops and won't resume automatically. The displayed error message has to be acknowledged with ENTER. Before the next start D1 has to be closed.

**Input D2:** Input for standby / pickup function.

This contact has to be open for the device to work. When the contact is closed the dosing will pause. Opening the contact will then resume the dosing. This allows remote control of the dosing after it has been configured and started once on the device itself.



## **Charge dosing**

The device can automatically dose charges between 1 and 999 liters with adjustable flow rates. Charge dosing can be started either manually by pressing the ENTER key or remotely with the contact D2.

### **Manual charge dosing**

*The terminals of D2 may not be connected.*

- Navigate to the menu “charge dosing” and press ENTER.
- The display will read „charge:“ and show the amount.
- Use the plus and minus keys to adjust the amount and confirm with ENTER.
- When the display reads “flow” adjust the desired flowrate with the plus and minus keys and confirm with ENTER.
- The display should now read “C 20l ready” (with 20l being the predefined amount).
- Pressing ENTER again will now start the dosing.
- During the dosing the display will show the customer number, the remaining amount of the charge and the current flow.
- The pump automatically stops if the desired amount has been fully pumped.
- Pressing ENTER starts the charge dosing once again with the same settings.
- To leave the charge dosing menu press ESC.
- During an active charge dosing pressing the ENTER key will pause and resume the dosing.

### **Remote controlled charge dosing**

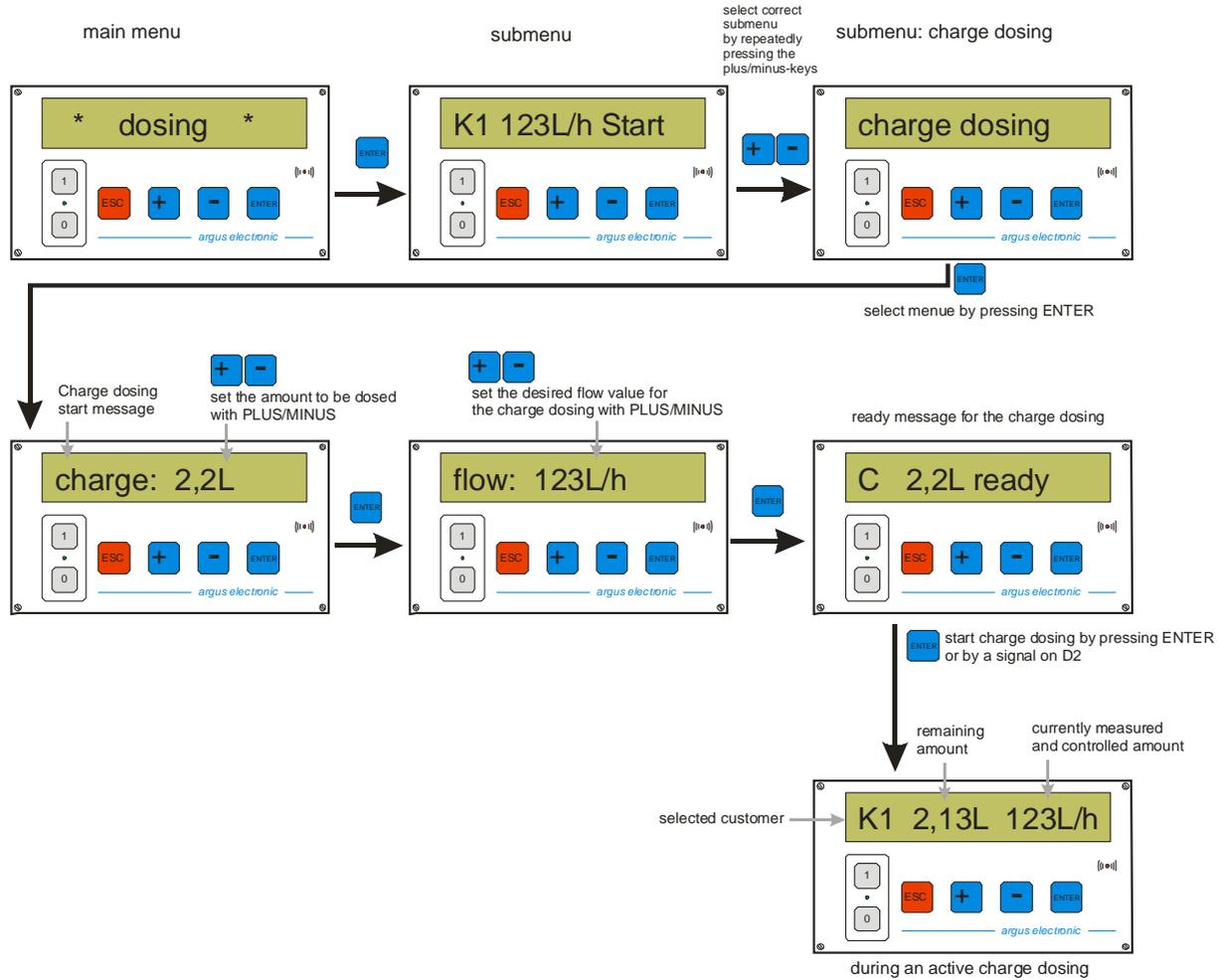
For automated or remote controlled charge dosing a remotely controlled switch contact has to be connected to the terminals of D2. The Switch contact should be normally open. Closing the contact for a short amount of time (1sec) is sufficient to start the dosing process.

- Navigate to the menu “charge dosing” and press ENTER.
- The display will read „charge:“ and show the amount.
- Use the plus and minus keys to adjust the amount and confirm with ENTER.
- When the display reads “flow” adjust the desired flowrate with the plus and minus keys and confirm with ENTER.
- The display should now read “C 20l ready” (with 20l being the predefined amount).
- The device now waits until the switch contact on S2 is closed
- If the contact closes, the dosing automatically starts and ends once the entire charge has been pumped.
- Every new impulse on D2 will dose another charge.
- During an active charge dosing pressing the ENTER key will pause and resume the dosing.

*The Terminals of D2 may only be closed for the start of the dosing. If they are connected before or after the charge dosing the device will first wait for the contacts to be opened. The display will then read “input D2 closed”*

*During charge dosing Input D1 is without function.*

*The amounts pumped will be summed up in the appropriate customer memory.*



## ***Management of customer consumptions***

The device has memory space to store the consumption of 9 different customers (K1...K9). The pumped amount will be summed up and saved. In the menu “show amount?” the total amount for each customer can be displayed and deleted. Choosing a customer can be done in the “change customer?” menu. During the dosing the current customer number will be displayed on the left side of the display.

### **Displaying and deleting of customer consumptions**

- Navigate to the “show amount?” menu
- Pressing the ENTER key will display the current customers amount
- Displaying other customers and their consumption is possible with the plus and minus keys
- To leave the menu press ESC
- To delete the currently displayed amount press ENTER
- You will be prompted “delete?” press ENTER for deleting or ESC if you want to abort

The maximum consumption for a single customer can be up to 99999 liters.

### **Choosing a Customer**

- Navigate to the “change customer?” menu and press ENTER
- Cycle through the customers with the plus and minus keys.
- Choose the currently displayed customer by pressing ENTER

### **Total consumption**

Total consumption accumulates the total amount of liquid pumped by all customers up to a total amount of 999999 liters. It can be displayed in the “total consumption” menu. To delete the displayed amount press ENTER. The deletion itself is password protected. When being prompted “CODE” enter the correct, manufacturer specified number with the plus and minus keys, then press ENTER.

**ATTENTION:** Deleting the total consumption will also delete all customer specific amounts.

## ***Managing flowmeter settings***

The flowmeter measures the amount of liquid flowing through it and outputs impulses at intervals corresponding to the flow rate. The number of impulses per liter is the characteristic figure of the flowmeter. That figure is dependent of the flowmeter type and the viscosity of the liquid. The viscosity itself is dependent of the temperature. Therefore the flowmeter has to be calibrated before use.

### **Choosing a flowmeter**

- Navigate to the “choose flowmeter” menu item and press ENTER
- The number of the currently chosen flowmeter and its calibration value will be displayed
- Choose a flowmeter with the +/- keys and confirm with ENTER

### **Changing a flowmeters calibration value**

- Navigate to the “change flowmeter” menu item and press ENTER
- Select the flowmeter you want to edit with the +/- keys and press ENTER
- Adjust the calibration value with the +/- keys
- Pressing ENTER will save the value

### **Flowmeter calibration**

- Navigate to the menu “calibration?” and press ENTER
- The current calibration value is displayed for a short timeframe and then the display reads “new calibration?” Press ENTER to continue or ESC to abort calibration
- Choose the amount of liquid pumped during calibration (1L or 10L) and confirm with ENTER -
- The display now reads “1L start” or “10L start” Confirming with ENTER will start the pump.
- Catch the liquid in a measuring cup or another appropriate container
- Once the chosen amount (1L or 10L) is reached stop the pump by pressing ESC.
- The detected number of impulses per liter is displayed
- Save the new value by pressing ENTER or discard it by pressing ESC

The calibration procedure should be carried out with utmost care. Calibration errors directly influence the measurement accuracy.

## ***Emergency operation mode***

If there is an external failure in the system (switches, flow-meter) or you want to fill the tubes or test the pump you can use the emergency operation mode. To do so, enter the “manual function” menu.

With the plus and minus keys one can directly adjust the power of the pump (the third displayed value is the motorpower in %, disregard the first two numbers).

In order to activate the manual function navigate to the menu and press ENTER. You can now set the starting motor power with the PLUS/MINUS keys. Pressing ENTER again starts the pump with the set power. While the pump is running you can adjust the motor power with the PLUS/MINUS keys.

In this mode there is no flow control.

**ATTENTION:** the dry-running-protection does not work in this mode.

In order to stop the pump and leave the menu simply press ESC.

During emergency operation the “Transport” relais switches just like during normal operation.

## ***Alarm level***

The device possesses two different adjustable alarm levels. Both alarm levels can be set in the \*options\* → alarm level menu. They are set in % of the current flowrate. If the current flowrate falls below the given percentage of the setpoint for a set amount of time the alarm is triggered.

Factory settings are

- 20% / 10 seconds for dry running
- 75% / 6 seconds for under dosing.

If the dry running alarm triggers the pump stops and an error message will be displayed. This error must be acknowledged by pressing ESC before you can continue dosing.

If the underdosing alarm is triggered, the alarm relais will switch periodically. The dosing won't be interrupted.

Both alarm functions are active during charge dosing and normal dosing. They are inactive in the emergency operation mode.

In order to deactivate an alarm function, set the corresponding alarm level to 0%.

## Wiring

The wiring should be carried out very carefully by a specialist. The designation of the terminals is marked on the PCB. It is important to ensure proper wire cross sections and proper insulation especially for the connections to the power supply and the pump. During installation the system has to be disconnected from power. It is important to ensure that the cable entries do not affect the tightness of the device.

**Netz:** Power 230VAC  
PE Protective earth  
L Phase 1  
N Neutral conductor

If you use a normal plug, L and N are the current-carrying conductors.

**Motor OUT:** PE U V W  
connection of the pump motor (three phase asynchronous motors only)  
PE Protective earth, connected to the motor housing  
U Phase 1  
V Phase 2  
W Phase 3

The direction of rotation can be changed by swapping any two phases.

**Alarm:** potential free contact (max. 3A 250V AC)  
During alarm or fault conditions this relay is closed, after removing the problem the relay opens automatically. One can choose between

- Closing contact: left and middle terminal
- Opening contact: middle and right terminal

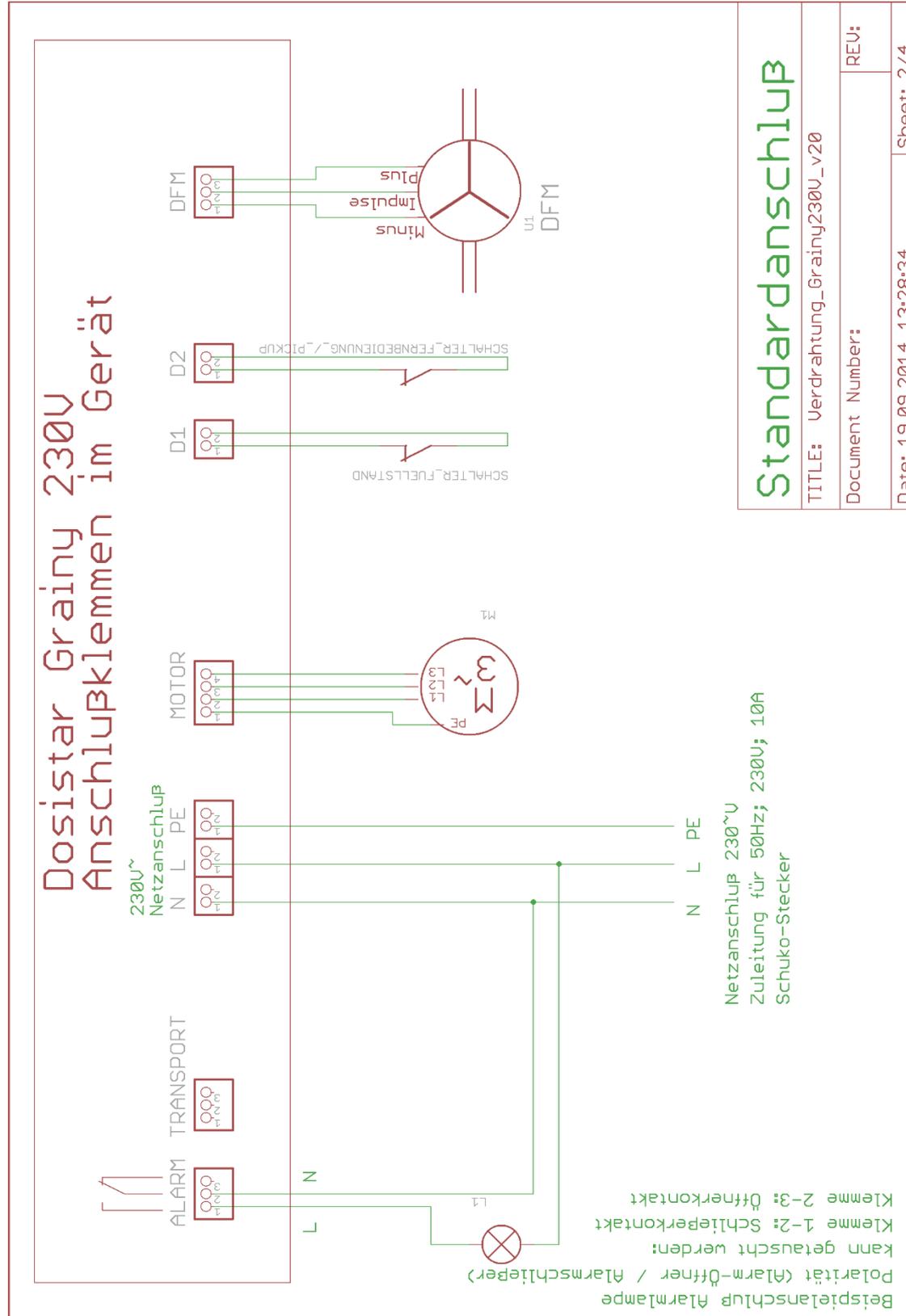
Use this relay to switch an acoustic or visual alarm system.

**Transport:** potential free contact for conveyor systems (max. 3A 250V AC)  
This contact switches simultaneously with the pump. A screw conveyor can be connected here via a power contactor.

**D1:** Remote control input for e.g. level monitoring  
This contact has to be closed for the device to work. If this contact opens the dosing stops and won't resume automatically.

**D2:** Remote control input for temporary interruption of the dosing process. This contact has to be open for the device to work. If the contact closes, dosing stops until it is opened again. This allows remote control of the dosing process after it has been configured and started on the device itself once.

**DFM:** connector for a flowmeter **Open Collector NPN**  
**GND:** flowmeter supply voltage ground connection  
**Imp.:** impulse signal from the flowmeter  
**+** : +12V supply voltage  
 Maximum current consumption of the flowmeter: 75mA



## Common problems

Problem	Reason	Countermeasure
motor does not rotate	wrong motor type	three phase asynchronous motors only
		use condensator motors only after modification
motor rotates in the wrong direction	false sense of direction of the output voltage	swap any two motor connections (e.g. U - V)
FI-protection of the building installation responds	<ul style="list-style-type: none"> <li>- inherently occurs with frequency converters</li> <li>- occurs increasingly when connecting multiple devices to a single FI-protection</li> </ul>	<ul style="list-style-type: none"> <li>- Use FI-switch with higher tripping current</li> <li>- use without FI-protection (allowed only for fixed installations)</li> <li>- use a separate 230V~ supply for the dosistar Grainy, so that the tripping current is not divided between multiple devices</li> </ul>
	wrong wiring	<ul style="list-style-type: none"> <li>- connect motor with all three phases (phases U, V, W)</li> <li>- additionally connect protective earth</li> </ul>
irregular engine running	wrong selection of motor type	<p>choose the correct motor type in the service menu:</p> <ul style="list-style-type: none"> <li>- choose 3phase for standard asynchronous motors</li> <li>- choose 2phase for modified condensator motors</li> </ul>
faulty impulse measurement		use a shielded cable for the wiring of the flowmeter

## Help for choosing the correct flowmeter

To obtain optimal results for measurement and control, it is important to choose a flowmeter appropriate for the intended flow rate. The following table serves as a first indicator.

Digmaesa flowmeter-type	flowmeter value for water [Imp/L]	max. flow rate [L/h]	min. recommended flow rate [L/h]
1,0mm	2223	35	9
1,2mm	1787	46	11
1,5mm	1386	80	13
2,0mm	1013	139	18
2,5mm	754	164	24
3,0mm	572	293	32
4,0mm	382	435	48
5,6mm	256	498	75
7,0mm	165	1080	110

Please take note that the flowmeter values can differ for other liquids or if nozzles are used.

## Technical data:

Power supply:	230V AC single phase
Internal current consumption:	200mA
Sensor supply (DFM, D1, D2):	12V/ 200mA
	On request 24V/200mA available
Maximum output power:	360W
Switching relais alarm/transport:	max. 3A 250V AC
Switching cycles of the relais:	500000 Schaltvorgänge
Dimensions (BxHxT):	230mm x 230mm x 100mm
Protection:	IP65

The case reaches its protection only with closed and locked cover. Moisture can lead to destruction of the device and malfunction.

## Manufacturer:

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