

Dosistar VD

Instruction manual, rev. 0.03



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Overview

The Dosistar VD is a control unit for electrical pump systems. It is used for dosing and measuring fluids, especially in agriculture. Simultaneously the current flow and the total amount dosed are shown on the display. The DOSISTAR VD keeps the selected flow constant by special control algorithms.

The DOSISTAR VD allows:

- Controlling the power of electric engines up to 12A or linear electric valves from 12V to 24V DC.
- Switching of external relays to control AC electric drives with higher voltage.

2 control modes are available:

- Control of a desired flow
- Control of a desired quantity (charge dosing)

The DOSISTAR VD is easy to operate and shows the important messages in the back-lighted display.

The DOSISTAR VD can be remote controlled by external sensors like a pick-up-switch or a wheel-switch.

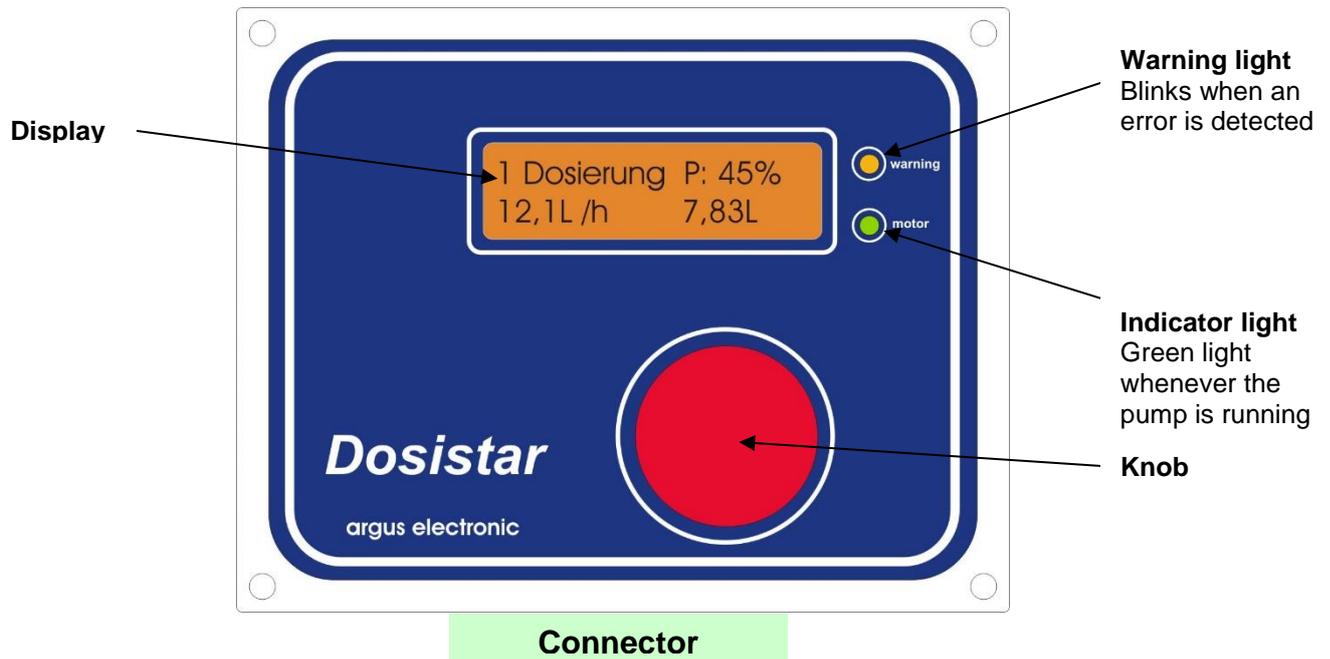
Main features of Dosistar VD:

- 4 memory cells for different fluids or flowmeter calibration values (29999 pulses per litres.)
- Display for current flow 9999 litres per hour
- Complex control algorithm for constant flow
- Different scales are available: ltrs./h, ltrs./min, mltrs./min or tons/h
- Display of the daily volume up to 99999 ltrs.
- Display of over all volume up to 999999 ltrs.
- Variable scale accuracy (0,01ltrs. from 0 ltrs. to 10ltrs. / 0,1ltrs. from 10ltrs. to 100ltrs. / 1ltrs. above)
- Different calibration options automatically or manual
- Pick-Up or wheel sensor on the tire stops the pump
- Remote controlled start off the charge dosing with the Pick-Up-switch (as an alternative to the Pick-Up pause function)

Protection functions

- Short-circuit protection
- Overload protection adjustable from 2A to 12A
- Overheat protection
- Reverse battery protection
- Protection against running dry
- Soft start

Operating and display elements



With the knob all settings of the device are carried out. In addition, it serves for turning ON and OFF the device. The knob can be turned without limitation in both directions. Effected settings are confirmed with the push knob functionality.

Switch on and switch off

Push the knob shortly to switch the DOSISTAR VD on. To switch off the unit push the knob for 3 seconds.

Navigation in the menu

All the selections will be done in the main menu.
Here you will find

1. flow or quantity
2. daily quantity
3. total quantity
4. select calibration value
5. emergency work without flowmeter
6. extend menu
7. *select quantity of your charge* (only if charge dosing is selected)

The mode of the DOSISTAR VD will be selected in the extend menu point 18.
Depending on the setting, menu 1 will show either “Dosing” or “Charge”

The selections in the extend menu are shown below:

10. calibration value adjustment (manually)
11. select language
12. select unit
13. calibration of flowmeter with fluid
14. select type of pump
15. select pick-up-function
16. select maximum motor current
17. select output
18. select function
19. select value litres per tons
20. select control parameters
21. --- not used ---
22. Select Pick-Up function (standby or start charge dosing)

To find a point of the menu rotate the knob.

If you find the desired point of the menu select it by pushing the knob.

Main menu

1 Measure flow (function 'measure flow' see menu 18.)

After switching the unit on, you are automatically in the measure flow function.



1 Dosierung P: 45%
12,1L/h 7,83L

Pushing the knob starts the dosing process. By rotating the knob the flow can be regulated. After rotating the knob the desired value is shown for 5 seconds. After this the real flow is shown. The regulation now controls the pump to get the desired flow. Please be sure that the desired flow is achievable with your common configuration of pump, nozzle and dosing liquid.

On the display you see the temporary flow and the total amount after start. The next push on the knob will interrupt the dosing process.

1 Charge (function 'pump fix charge' see menu 18.)

After switching on, the menu 'Charge' is automatically selected. Pushing the knob again starts dosing the amount specified in menu 7. By rotating the knob it is possible to increase or decrease the pumped value in 5% steps. On the display the values for current motor power, current flowrate and the amount still to pump are shown. The next push on the knob will stop the dosing process and bring you back to the menu. The preselected motorpower and the amount dosed will be shown. Pressing the knob again will start the next charge. You can repeat the charge dosing process indefinitely.

2 Performance of the day

The total performance since the last reset of this memory is displayed. By rotating right and selecting 'yes' it is possible to reset the value by pushing the knob.

3 Total quantity

The total performance after the last reset of this memory is displayed. By rotating right and selecting 'yes' it is possible to reset the value by pushing the knob. This also resets the value of the performance of the day.

4 Select calibration value

The calibration value is the number of pulses generated by the flowmeter if 1 litre flows through the flowmeter. It depends of the flowmeter and the viscosity of the liquid to measure. This menu selects the special calibration value for your process. By selecting this menu the actual calibration value and its memory place is displayed. Choose the memory place to select by turning the knob. The calibration values can be changed in menu 10 and 13.

5 Emergency work without flowmeter

This menu allows to work without flowmeter and pick-up-sensors. It shall be used with defect flowmeters or by filling in processes.

!! The prevention for pumping without liquids is deactivated **!!**

The knob regulates the pump. The performance and the motor current are shown.

6 Extend menu

Activate the extended menu to set up the DOSISTAR VD.

7 Select quantity of a charge

This menu is only available if the function “charge dosing” is selected.

Here it is possible to enter a predetermined amount to dose. Choose the amount to dose (between 0.1 and 9999.8 ltrs.) by turning the knob. The value is entered one digit at a time.

Extend menu

10 Calibration value adjustment

This menu organises the memory places for calibration. You can assign a name to each memory place consisting of a word with a maximum length of 8 letters or numbers. This assigned name should have a connection to the name of the liquid that is stored at this memory place.

First select the memory place to edit by rotating the knob. The stored name is shown on the display and the first letter is blinking. You can now change the letter by turning the knob. After pushing the knob the letter is stored and the next letter can be changed.

Every memory place has its own calibration value. It is possible to change it with the knob. Possible values are between 1 and 29999.

Below are the calibration values shown for DIGMESA Flowmeters and water at 20°C.

Flowmeter-type	Pulses per litres
1,0 mm	2223
2,5 mm	764
4,0 mm	382
5,6 mm	256
7,0 mm	165

11 Select language

Different languages for the menu are possible. German and English are standard. Other languages are possible by request, contact argus! info@argus-electronic.de

12 Select unit

For different use are different unit available. Possible are:

- L/h litres per hour
- mL/min millilitres per minute
- t/h tons per hour (see menu 19)
- L/min litres per minute

Use the knob for the selection.

13 Calibration

The most precise way to obtain the right calibration value is to calibrate the device with the liquid you want to dose.

- Fill the whole system with the liquid (pipes, pump, flowmeter...). For this use the emergency menu 5.
- Select menu 13 calibration
- Select flowmeter memory place
- Select the quantity for calibration 1...10 litres, depending from measuring jug.
- Dose the desired quantity into the measuring jug and stop when quantity is reached.
- On display the number of pulses from the flowmeter is shown.
- If the procedure was successful the value can be stored in memory by selecting "save? yes".

Make sure you always pump into and not out of the measuring jug.

14 Select type of pump

The Dosistar VD can use different methods for calculation to adapt the system to the used pump. It is possible to use pumps with constant or with pulsing flow like in peristaltic pumps. This menu decides the type of the pump.

15 Pick-Up- Function

The dosing process can be controlled by an external pick-up-switch and an optional wheel-switch. This menu adapts the switches to the system
4 variations are given:

1. pick-up active open and wheel-switch deactivated
2. pick-up active closed and wheel-switch deactivated
3. pick-up active open and wheel-switch activated
4. pick-up active closed and wheel-switch activated

The selection is made by the knob (rotate and push).

If you work with neither pick-up-switch nor wheel-switch choose option 2.

16 Select maximum motor current

To protect the pump from overload the current is limited inside the DOSISTAR VD. The maximum is adjusted by the knob and should be 30% above the typical current of the pump.

If the pump needs more than the adjusted value a yellow warning light is blinking and the current will be limited.

17 Select output

The output of the DOSISTAR VD can be used in 2 functions.

First the controlling of pumps and second the controlling of relays. If pumps are selected the output of the DOSISTAR VD is controlled smoothly to set the motor power. If relay is chosen the output will only switch between on and off.

With the knob it is possible to select the characteristic of the output: pump or relay.

18 Select function

The Dosistar VD can be used in 2 basic functions.

1. Flow control
The pump will be controlled, the flow and quantity is shown
This function is programmed in the delivery state
2. Charge dosing
This function specifies the quantity to be dosed. After the desired quantity has been dosed the pump stops automatically. During the dosing process the actual flow and quantity are shown on the display until the dosing stops. The values for this function can be set in menu 7.

19 Select value litres. per tons

If 'tons per hour' is selected in menu 12, this menu changes the factor for litres per ton.

20 Select control parameters

The controlling algorithms of the Dosistar VD allow a fast controlling of the pump. Under special conditions it might be necessary to change these parameters.

These parameters are:

1. maximal flow under full power
2. proportional part K_p . (standard 1800)
3. integral part I . (Standard 600)

These parameters can be changed and actualised by the knob.

Be careful in changing these parameters to protect against swinging effects.

The maximal flow is the flow of the system with pipes and nozzles.

21 not used

This menu is currently not used

22 Select Pick-up function

The standard use of the pick-up-input is that of a pause/standby-switch. If activated the dosing stops until the input gets deactivated again.

For charge dosing this menu allows to change the function of the pick-up-input into a remote control input. Once the input is activated the DOSISTAR VD will start dosing a single charge.

Integration

The Dosistar VD has a central 10pin connector. This connector is used for all electrical connections. The figures A and B are showing the installation. Please use the housing of the plug and pay attention to the use of the lock screws.

Recommend cables for motor and power supply

maximum 6A: 2,5mm² or more
 maximum 12A: 4mm² or more

By using cables that are too thin, fire or malfunction is possible.

Connections:

- | | | |
|-----|---------|--|
| 1. | output: | flowmeter power-supply + |
| 2. | input: | flowmeter signal |
| 3. | output: | flowmeter power-supply - |
| 4. | input: | wheel sensor |
| 5. | input: | pick-up- sensor |
| 6. | output: | power-supply pick-up-sensor and wheel sensor |
| 7. | output: | pump - |
| 8. | output: | pump + |
| 9. | input: | battery - |
| 10. | input: | battery + |



1 2 3 4 5 6 7 8 9 10

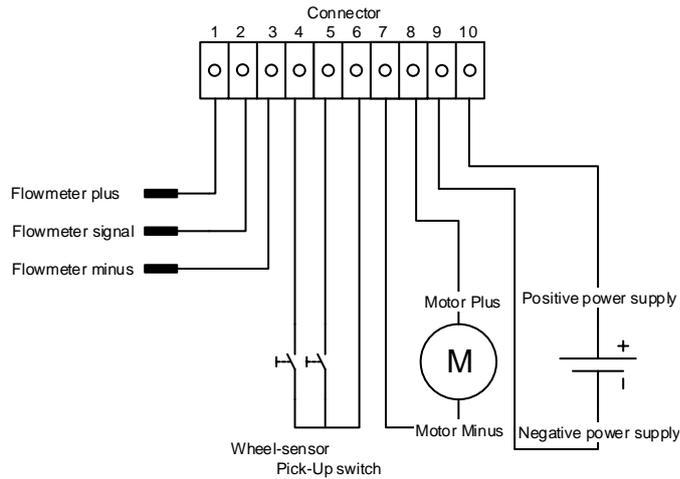


Figure 1: connection A

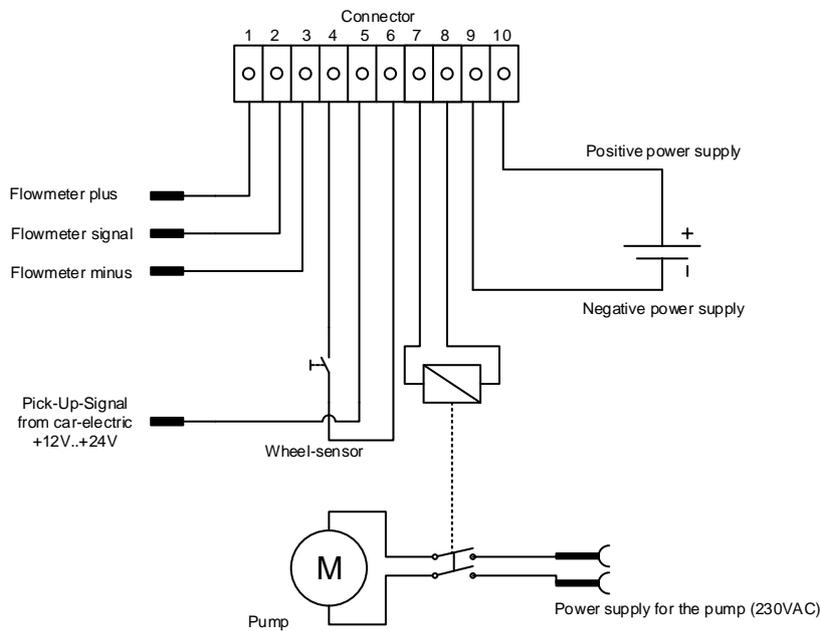


Figure 2: connection B

Connection of the flowmeter

The Dosistar VD is for use of flowmeters with open collector NPN outputs. Please use a shielded cable for the connection to the flowmeter. Install the cables to the flowmeter away from the cables for the pump and the supply of the Dosistar VD.

Take care of the right polarity!

Connection pick-up and wheel-sensor

The connections 4 and 5 are voltage inputs. For active state connect a voltage between 10V and 24V. There are 2 possibilities to achieve this:

1. Use the voltage from contact 6 to contact 4 or 5. Connect these pins with a switch or a reed-contact See figure A.
2. Use external voltage. See figure B.
3. Use a sensor with pnp-output:
 - connect sensor supply voltage to DOSISTAR VD pin 6 (12V sensor supply)
 - connect sensor ground to DOSISTAR VD pin 3 (sensor ground from flowmeter)
 - connect sensor output signal to DOSISTAR VD pin 5 (pick-up) or to pin 4 (wheel-sensor)
4. Use a sensor with npn-output (**not recommended**)
The DOSISTAR VD is not prepared for the use with npn-sensors. However if no other sensor is available it is possible to use an npn-sensor in the described way:
 - connect sensor supply voltage to DOSISTAR VD pin 6 (12V sensor supply)
 - connect sensor ground to DOSISTAR VD pin 3 (sensor ground from flowmeter)
 - connect sensor output signal to DOSISTAR VD pin 5 (pick-up)
 - **additionally:** add a resistor (1k Ω) between DOSISTAR VD pins 5 and 6
make sure all wires are properly isolated

Connection load

The contacts 7 and 8 are for the electrical load. This can be an electrical engine in a pump, an electrical relay, an analog electrical valve or a switching valve. Be sure that the cable is thick enough for the load and keep the cables as short as possible.

Connection supply

The contacts 9 and 10 are for the supply of the Dosistar VD.

Be sure that the cable is thick enough for the load and keep the cables as short as possible. Use a fuse to protect the circuit (15A).

Mechanical assembling

The Dosistar VD uses a strong magnet for assembly at metallic surfaces.

If no metallic surfaces are available use the delivered metal plate.

Start into dosing step by step

1. Select function (menu 18).
Select flow measured dosing or quantity measured dosing (charge dosing).
2. Select output (menu 17)
select motor or relays as output
3. Select a calibration value for the flowmeter (menu 4), or adjust the known value in menu 10, or calibrate the flowmeter in menu 13 (this is the most accurate option).
4. Select the type of pump (menu 14). In most cases select „steady flow“.
5. Select the function of the pick-up inputs (menu 15). If no pick-up or wheel sensor is used select „close switch and wheel sensor NO“.
6. Adjust the maximal current for the motor (menu 16)(you find it in the manual of the pump)
7. Select the best unit for the flow of your application (menu 12). If using the unit harvested tons per hour (t/h) adjust the desired litres per tons in menu 19.
8. Select the maximum reachable flow (menu 20).
9. Select 1 'Dosing' and push the knob to start the process

Technical Data:

Usable voltages:	10V to 28V DC
Maximum output current ⁽¹⁾⁽²⁾ :	9A continuous, 12A peak (motor startup)
Maximum frequency of flowmeter:	2...600Hz
Calibration value:	25...29999 pulses/litres
Dimensions:	120mm x 95mm x 65mm
Ambient temperature range ⁽¹⁾⁽²⁾ :	-20°C to 45°C
Weight:	0,45kg
Protection:	IP54

⁽¹⁾ Tested at 20°C ambient temperature with 12V supply over 3 hours.

Always test your specific setup.

For accuracy, current measurement should be done externally with a true RMS current meter, since the internal measurement of the dosistar is merely an estimate.

Continuous maximum power output can be reduced under certain conditions:

- Reduced cooling due to insufficient airflow around the case or because of increased ambient temperatures
- Additional power losses in the system (corroded connectors, insufficient cable diameters, motor not running smooth)
- Different supply voltages or specific system setups
- Customer specific modifications not reflected by this manual

⁽²⁾ maximum power output is limited by 2 independent alarm circuits:

- Current limiting (adjustable through the [menu 16](#), default set to 12A), gives the “! Load !” warning, does not stop the motor but limits maximum current, can be used to limit overall power output although this might reduce maximum flowrate
- Temperature (not adjustable, measured internally), this is for self protection of the Dosistar, gives the “! Overheat !” alarm and shuts the motor down

Trouble shooting

Switch on is not possible	Check the power-supply - voltage and polarity
Warning "pick-up", no pick-up-sensor connected	Check the settings in menu 15
Motor stops after start	Low voltage through high start up current check menu 17. Power-supply may not be strong enough or cables are too thin.
Device shows short circuit.	Check all connections. Loose connections can cause high start up currents. Do not add an additional switch into the motor cable.
Device shows liquid failure	No signals from flowmeter. Check if liquid is present, also check for blocked tubes. Check flowmeter and cables.
Device stops with "high temperature"	Check for overload and proper ventilation surrounding the DOSISTAR VD. Make sure the pump is running smoothly.
False dosing quantities	Check calibration. Check for dirt or air in the flowmeter. Check for reverse flow and check that the pump is running.
Slow or swinging regulation	Check maximum flow parameter menu 20

General handling information

- Do not use voltages above 28V DC!
- Do not use battery chargers as power-supply! Open circuit voltage can be in excess of 50V!
- Look for right polarities and save connections!
- Look into the security manuals of the liquids you want to dose
- The housing of the Dosistar is used for heat transfer! Make sure there is proper ventilation around the Dosistar
- Be sure that there is no moisture at the contacts!
- Do not use high-pressure cleaning equipment to clean the Dosistar VD!
- Be carefully with the foil above the display, do not use pointy things on it!

Options

We offer you a wide range of accessories:

- Flowmeters for different liquids and flow ranges
- switches, pick-up sensors
- magnet sensors to use as wheel sensors
- power-supplies for indoor use of the DOSISTAR VD

To control AC electrical engines we deliver a module with relays, fuse, emergency switch and alarm lamp.

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