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Operating manual Peristaltic pumps Industrial

WG600F



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1 Safety instructions

⚠ **Important information: Read the operating instructions carefully before operating the pump.**

Symbol	Meaning
	Warning: Keep fingers away from moving parts.
	Warning: Caution.
	Warning: Caution, hot surface.
	Warning: Caution, electric shock hazard.
	Note: Recycle this product.
	Warning: Wear personal protective equipment.

Table 1 Safety symbols

1.1 Danger

⚠ Use the power supply specified on the device nameplate. Otherwise, the device may be damaged.

⚠ Do not dismantle the housing or modify the interior of the equipment yourself. This may cause malfunctions and electric shocks.

Switch off the power before inserting or removing the pump tubing. Keep clear of the rotating rollers to prevent fingers or clothing from becoming caught in the mechanism.

⚠ Switch off the power before connecting or disconnecting external control devices to prevent electric shock or equipment damage.

⚠ The protective earth contact of the mains plug must always be properly grounded. Otherwise, there is a risk of electric shock, electromagnetic interference or induced electrostatic charge.

When pumping hazardous liquids, operating procedures appropriate to the medium are required. Personnel must be protected against injury during use.

⚠ This product is not suitable for potentially explosive atmospheres and must not be used in them.

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1.2 Warning

Before use, check that the pumped liquid does not react chemically with the tubing or pump head. Otherwise, the tubing or pump head may be damaged. If in doubt, contact Labmaterial GmbH.

The tubing is a wear part and must be checked regularly. To the extent permitted by law, Leadfluid and Labmaterial GmbH accept no responsibility for losses resulting from tubing damage, particularly leaks of toxic, harmful or valuable liquids.

If actual environmental conditions exceed the technical specifications, for example temperature, humidity, acids, alkalis, organic solvents or other corrosive influences, dust or supply voltage, and this damages the device, the damage is not covered by the standard manufacturer's warranty. The manufacturer offers chargeable repairs in such cases.

Protection against injury from moving pump parts is primarily provided by the pump head safety device. Safety devices differ between pump head models. Refer to the section for the relevant pump head.

If the pump was running before a power failure, it will restart automatically when power is restored.

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2 Introduction to the peristaltic pump

A peristaltic pump conveys liquid through a tube. The liquid only contacts the inner wall of the tube. The valve-free and seal-free design with a continuous flow path helps maintain liquid purity and reduces the risk of leakage.

2.1 Operating principle

The tubing lies between the roller and the pressure block. It is sealed at the compressed contact point. As the roller rotates and moves along the tubing, the sealed contact point moves with it. Behind the roller, the tubing returns to its original shape. The resulting negative pressure draws in liquid.

Before the first roller reaches the end of the pressure block, a second roller begins compressing the tubing at the start of the block. The liquid is trapped between the two compression points. As the first roller leaves the pressure block, the second roller pushes the liquid towards the tubing outlet. At the same time, negative pressure forms behind the second roller and draws in more liquid from the inlet.

According to the manufacturer, the design prevents backflow and siphoning. When stopped, the pump closes the tubing; no separate valve is required for this operating principle.

2.2 Description

The Industrial peristaltic pump, model WG600F, features a colour LCD touchscreen. Four operating modes are available: flow, volume dispensing, timed dispensing and programming. The brushless servo drive provides high torque and requires no routine motor maintenance. Communication uses a standardised protocol. The stainless steel housing is corrosion-resistant and easy to clean; the cleaning instructions in Chapter 8 must still be observed.

Drive	Flow range	Speed range
WG600F	0.0013–13.2L/min	0.1–600rpm

Table 2 Drive and parameters

2.3 Applications

- The pump body does not come into contact with the liquid.
- No valve blockages; smooth tubing inner surface that is easy to clean.
- According to the manufacturer, the suction lift can reach 8m of water column.
- Low shear forces; suitable for transferring emulsions and liquids containing foam, cells and similar constituents.
- Suitable for liquids containing gas, magnetic beads or small suspended particles.
- Suitable for precise transfer and dispensing. Select the tubing diameter and filling rate to suit the application.
- Suitable for transferring liquids with a certain viscosity.
- The liquid comes into contact with the tubing only.
- With suitable food-grade or medical-grade tubing, the pump can be used for transfer and filling in corresponding applications. This product is not medically certified. If incorporated into a medical device, the medical device itself must hold the appropriate certification.
- Tubing made from special materials can be used for abrasive liquids.

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2.4 Functions and features

- Colour LCD; touchscreen and keypad operation.
- Flow, volume dispensing, timed dispensing and programming modes.
- Five storable parameter groups for volume and timed dispensing; up to 30 parameter sets in programming mode.
- Start/stop, clockwise/counterclockwise rotation, full speed, speed adjustment and power-failure state memory.
- Flow display, flow control, cumulative liquid volume and flow calibration.
- Speed resolution 0.1rpm; speed error less than ±0.2%.
- Brushless servo drive with high torque and high efficiency.
- Integrated expert system with guided operation.
- Intelligent temperature control to reduce operating noise.
- Optional Wi-Fi communication: After connection to the network, the pump can be monitored or controlled remotely via an app. See Chapter 7.7 for details.
- External analogue speed control via 0–5V, 0–10V or 4–20mA, selectable in software. External 5–24V signals control start/stop and direction; the signals are optically isolated.
- RS485 communication with MODBUS protocol and adjustable communication parameters.
- Protective coating on the circuit board against dust and moisture; high interference immunity and wide-range power supply.
- 304 stainless steel housing. The manufacturer describes its resistance to various acids, alkalis, salts and organic solvents. The cleaning instructions in Chapter 8 must nevertheless be observed.
- High torque; configurations with two pump heads are possible.
- Optional foot pedal for triggering filling.

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3 Components and interfaces

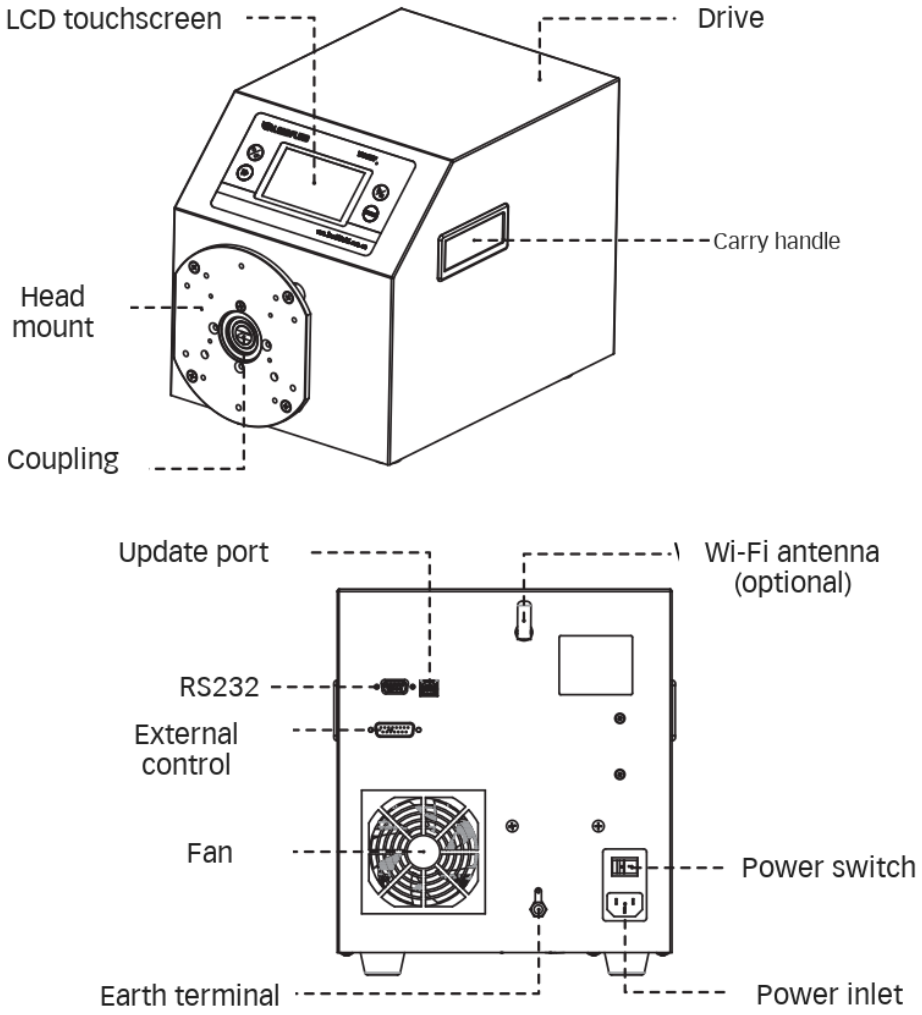

Figure 1 Components and interfaces

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4 Control panel and keys

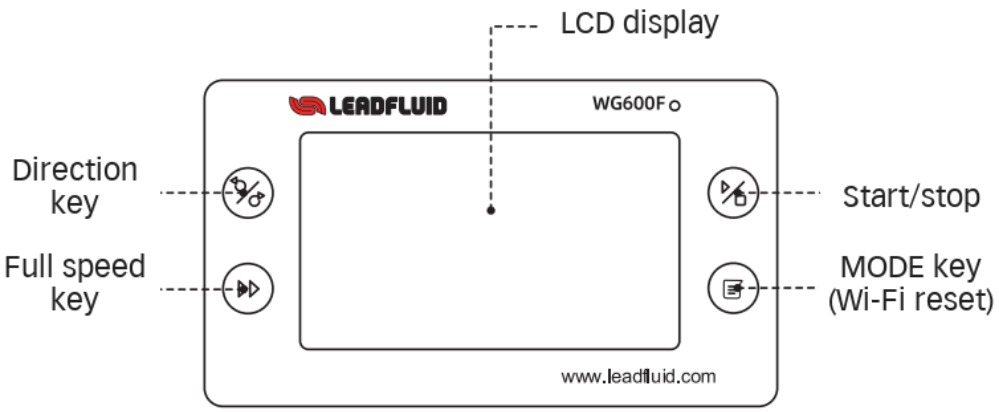

Figure 2 Control panel

4.1 Keypad

Start/stop key: Starts or stops the pump.

Direction key: Switches between forward clockwise rotation and reverse counterclockwise rotation.

Full speed key: The pump runs at maximum speed. This function fills or empties the tubing.

MODE key and Wi-Fi reset: On the main screen, select the operating mode while the pump is stopped. In other screens, return to the previous screen. On equipment with a Wi-Fi module, this key can reset the Wi-Fi connection; see Chapter 7.7.

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4.2 Screen icons

Symbol	Function	Symbol	Function
	Sound on/off		Locked/unlocked
	Internal control		Footswitch mode
	Current signal control		Voltage signal control
	Communication connected		Communication disconnected
	Direction of rotation		Start/stop
	Wi-Fi connected/disconnected		Wi-Fi connected to local network
	Operating mode settings		Already configured, connecting
	Quick settings		Preview
	System menu		Calibration wizard
	Previous step/previous page		Exit screen
	Confirm		Next step/next page
	Decrease		Increase

Table 3 Description of screen icons

4.3 Touchscreen and status bar

The touchscreen is divided into a status bar, operating area and navigation keys.



Figure 3 Touchscreen with status bar, operating area and navigation keys

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A Sound status: Indicates whether notification and key tones are on or off.

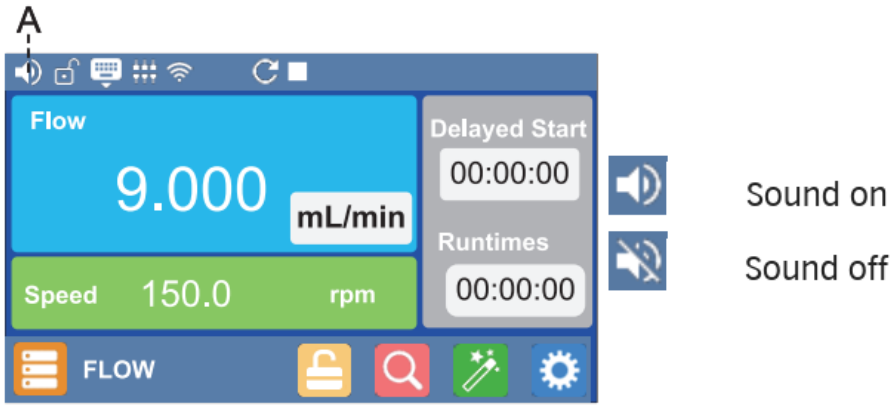

Figure 4 Sound on and off

B Lock status: Indicates whether the device is locked. When locked, the control method and system parameters cannot be changed.

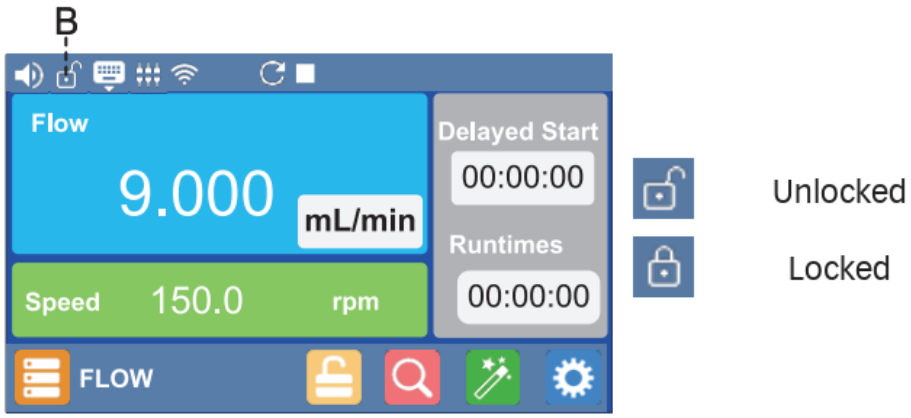

Figure 5 Unlocked and locked states

C Control method: Four control methods are available:

- Internal control: Keys and touchscreen control the pump.
- Foot switch control: The pedal controls start/stop; other parameters are set using the keypad and touchscreen.
- Current control: 4–20mA controls the flow rate; external signals control start/stop and direction. The keypad has no effect in this control method.

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• Voltage control: 0–5V or 0–10V controls the flow rate; external signals control start/stop and direction. The keypad has no effect in this control method.

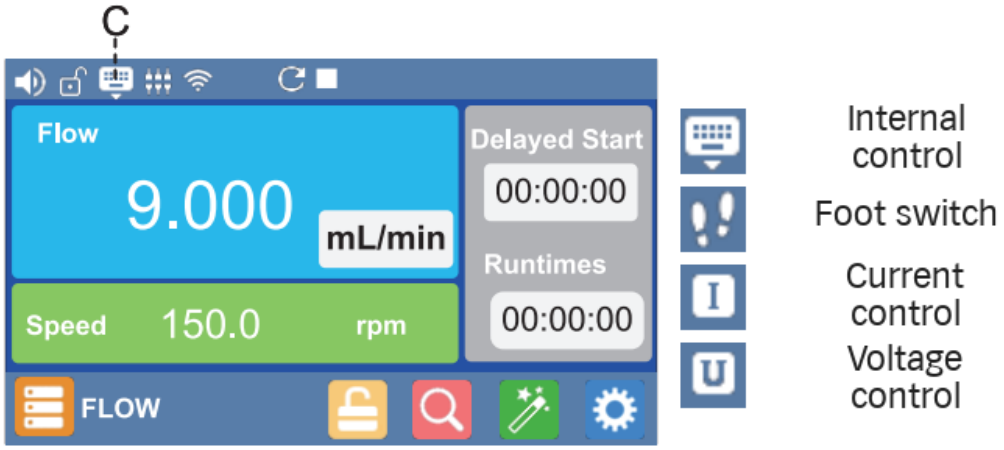

Figure 6 Four control methods

D Communication status: Indicates whether communication is connected or disconnected.

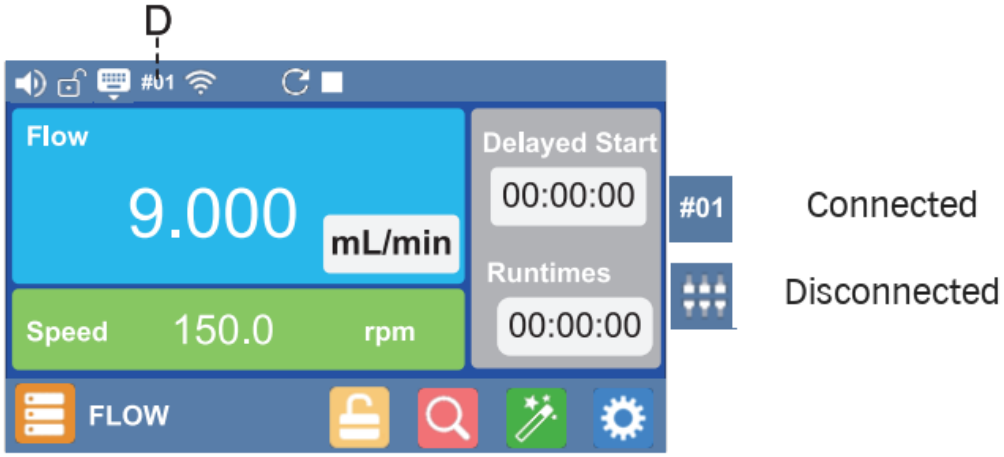

Figure 7 Communication status

E Wi-Fi status: Shows the connection status of the optional Wi-Fi equipment.

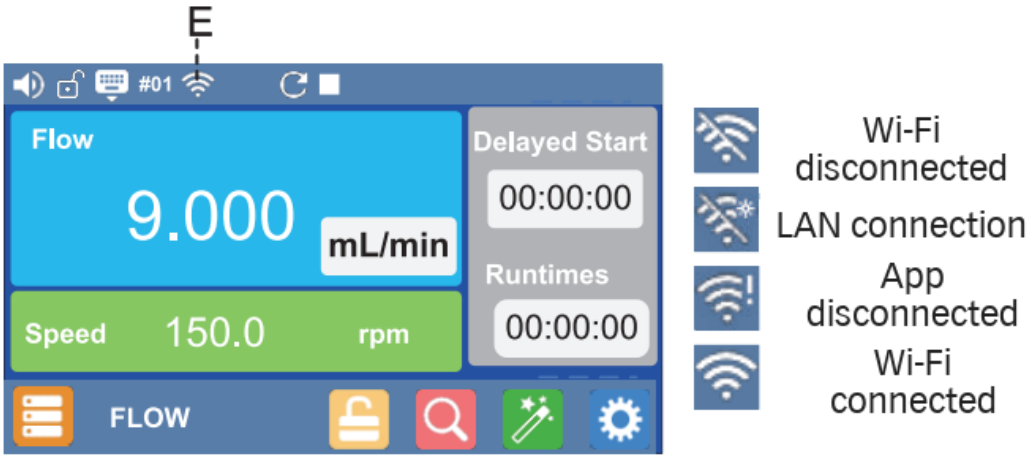

Figure 8 Wi-Fi connection states

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F Direction: When stopped, the selected direction is displayed. During operation, the moving orange ring illustrates the direction of rotation.

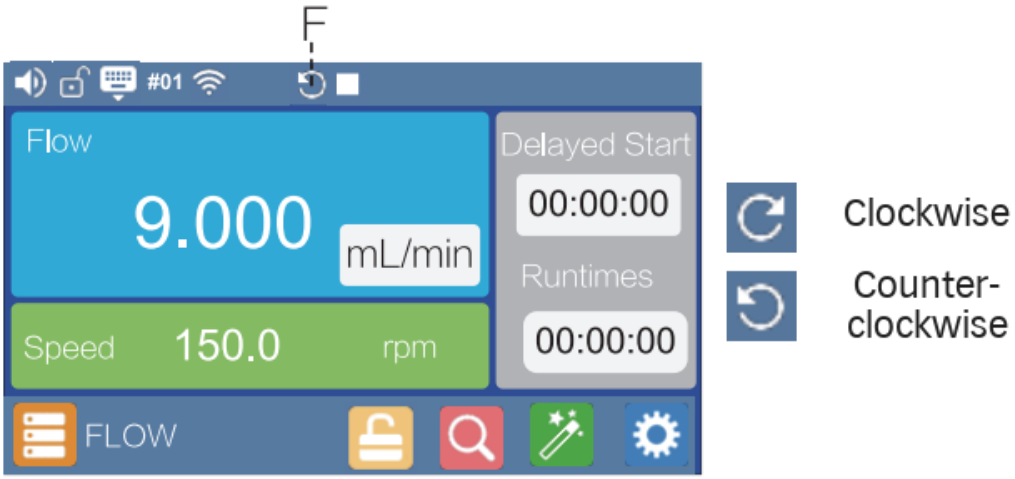

Figure 9 Direction display when the pump is stopped

G Operating status: The symbol indicates whether the pump is running or stopped.

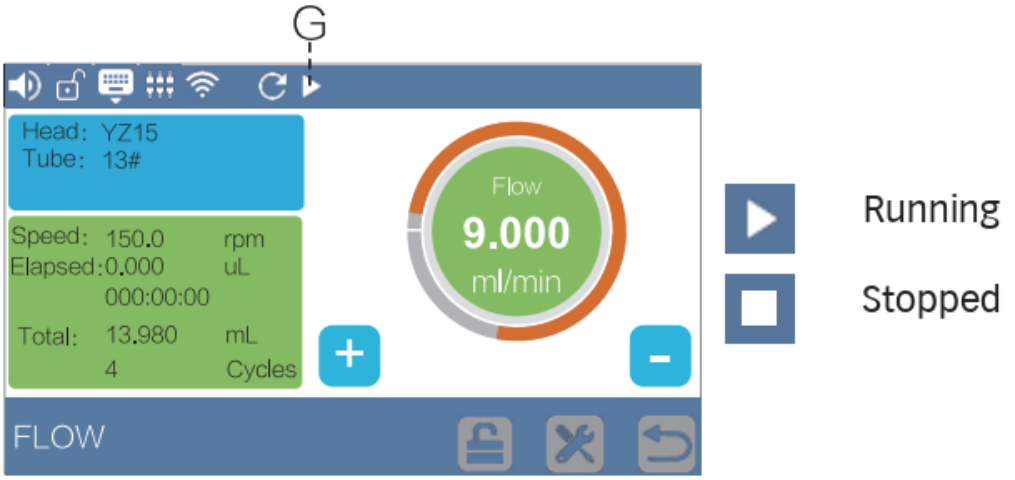

Figure 10 Operating status and direction during operation

4.4 Operating area

Numerical values: While the pump is stopped, tap the value to change. Enter the value in the input window; observe the permitted range and unit.



Figure 11 Numerical input window

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⚠ **Note:** The flow must be calibrated for an accurate flow display.

Units: While the pump is stopped, tap the unit and select the required unit in the selection window.



Figure 12 Flow unit selection

4.5 Navigation keys

Mode settings: Sets the parameters for the selected operating mode. The sound and lock can also be switched on or off here.

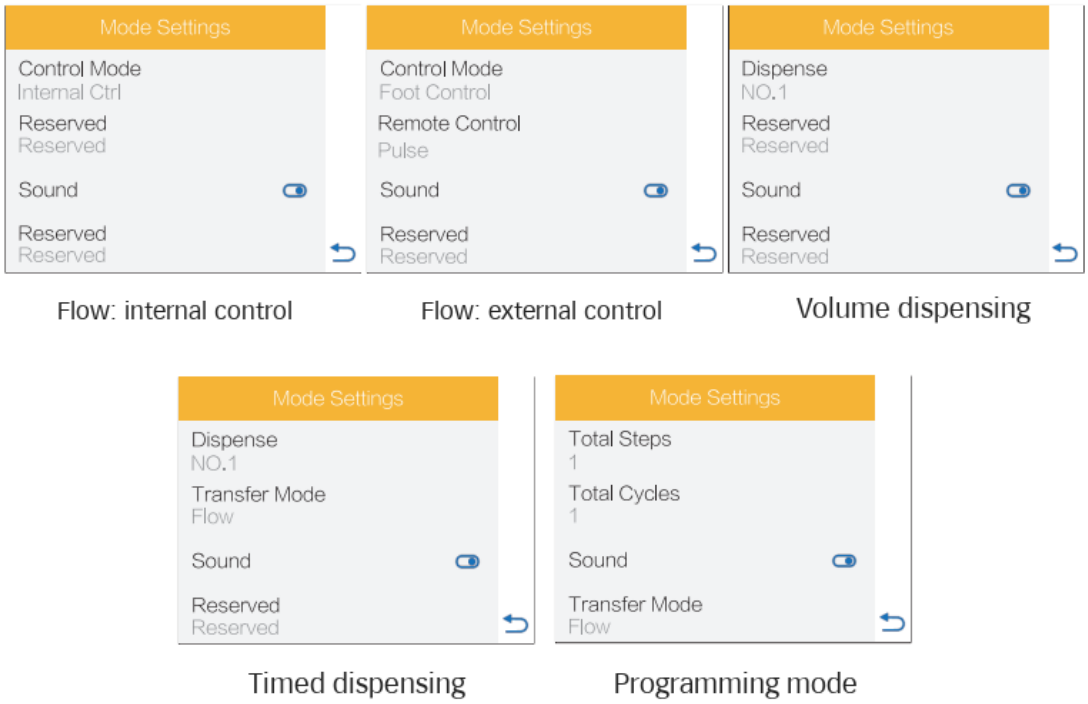

Figure 13 Settings for the different operating modes

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Preview: Shows the current operating parameters on the left and the operating status on the right.

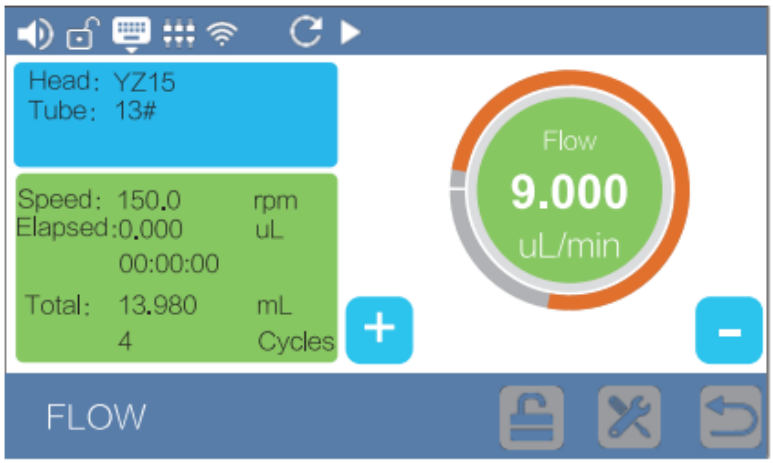

Figure 14 Preview screen

In flow mode, orange means stopped and green means running. Yellow indicates a pause.

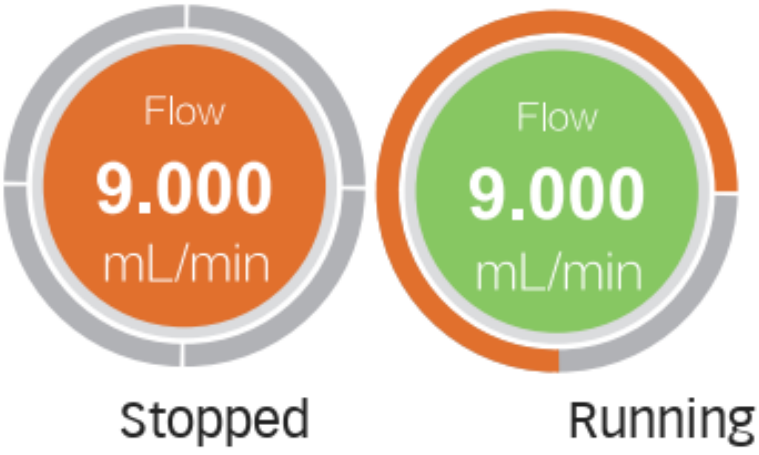

Figure 15 Status display in flow mode

During operation, the continuous movement of the ring indicates the direction: movement from left to right means clockwise; the opposite movement means counterclockwise.

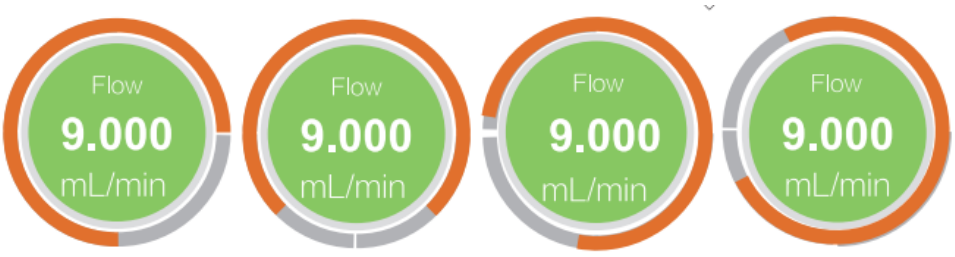

Figure 16 Direction indicated by the rotating ring

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In dispensing mode, orange means stopped, green means running and yellow means paused.

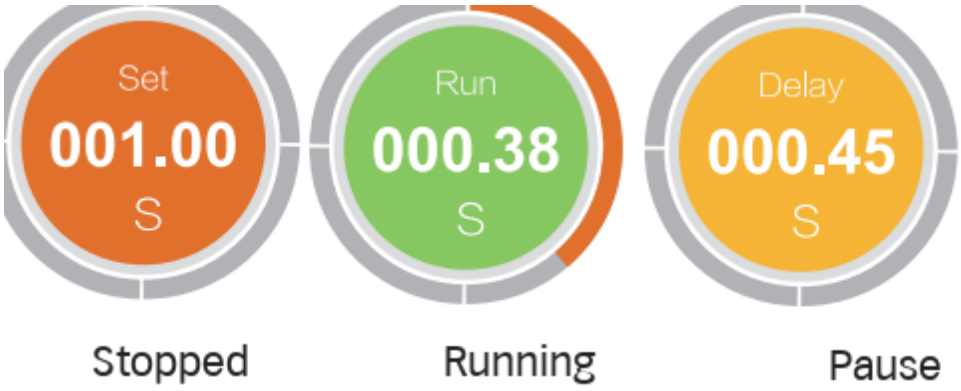

Figure 17 Status display in dispensing mode

Quick settings: Resets the accumulated liquid volume and number of cycles, and switches the sound and lock on or off.

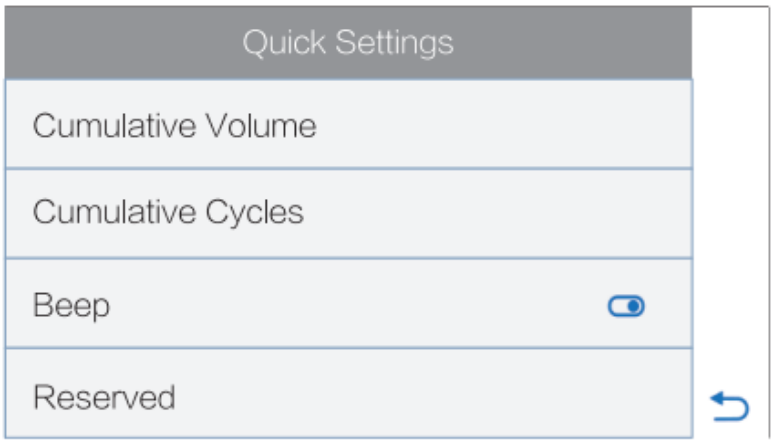

Figure 18 Quick settings

Fine adjustment: In the flow preview, change the flow rate during operation using plus or minus, one smallest unit at a time. Hold a key for at least one second to change the value more quickly.



Figure 19 Fine adjustment of the flow rate

Calibration wizard: Use a balance or graduated cylinder to determine the actual flow rate and match it to the displayed value. The complete procedure is in Chapter 7.2.

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System menu: While the pump is stopped, opens general settings, calibration wizard, system settings, information, operating guidance and password management.



Figure 20 System menu

4.6 General parameters

Scroll vertically to display all general parameters.

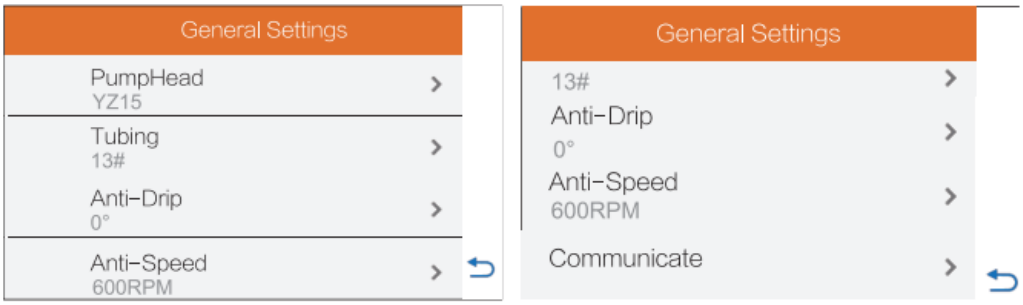

Figure 21 General parameters

Pump head: Select the pump head actually installed. Swipe to display further models.

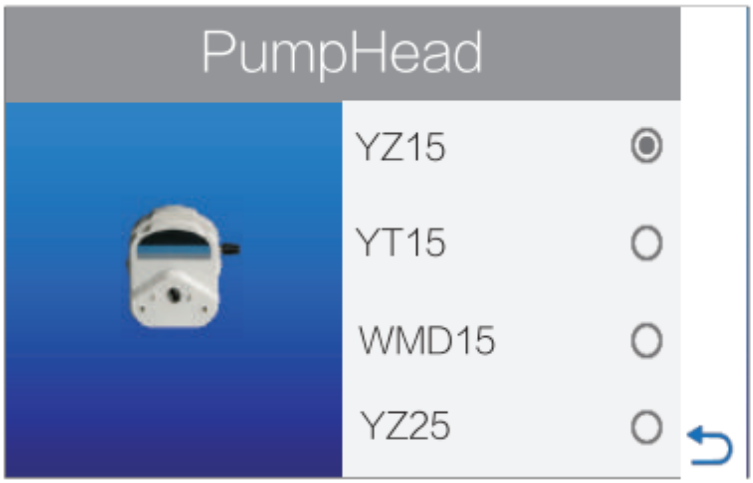

Figure 22 Selecting the pump head

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When DG or DT10 heads are selected, the system limits the maximum speed to 100rpm. This general menu function does not approve arbitrary head/drive combinations; the allocation in Chapter 14 applies to the WG600F.

Tubing: Select the tubing actually used and suitable for the head. Swipe to display further options.

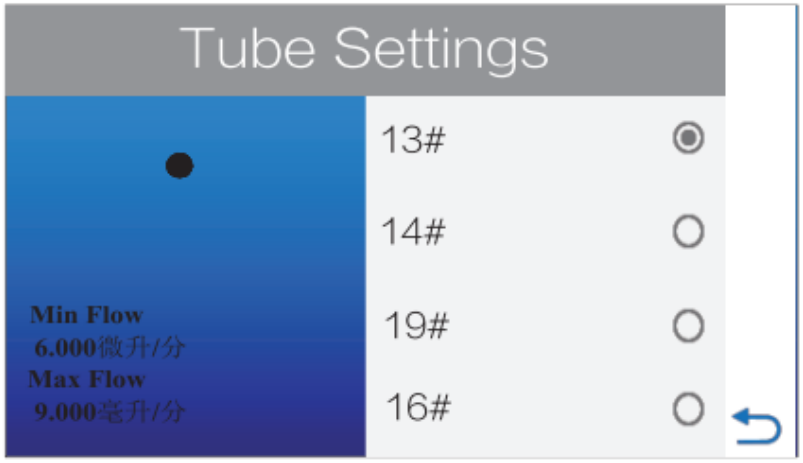

Figure 23 Selecting the tubing

Anti-drip: After stopping, the motor reverses through a set angle and draws liquid back into the tube. An angle of 0 disables this function.

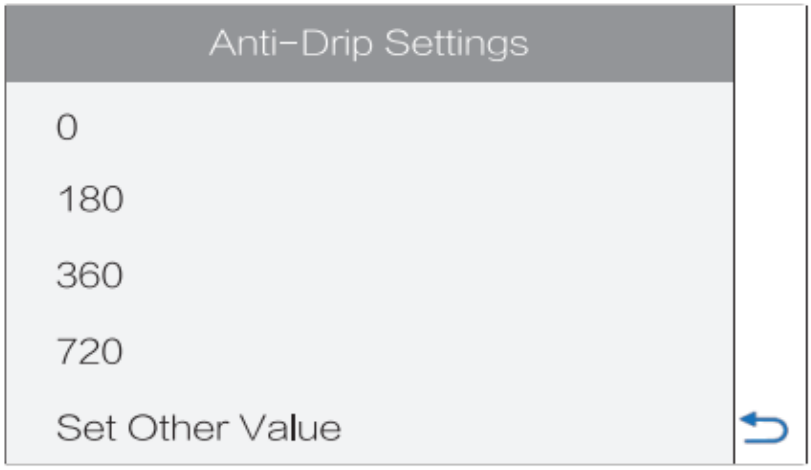

Figure 24 Setting the reverse angle

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Reverse speed: Adjust the suck-back speed to suit the application.



Figure 25 Setting the reverse speed

Communication: Set the RS485 connection parameters.

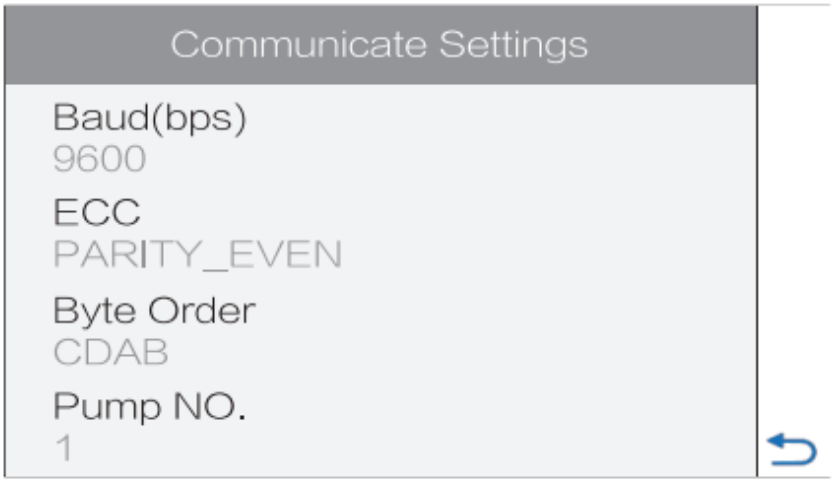

Figure 26 Communication settings

Advanced parameters: After entering the correct user password – blank by default – open the general parameters again. Swipe to display further parameters.

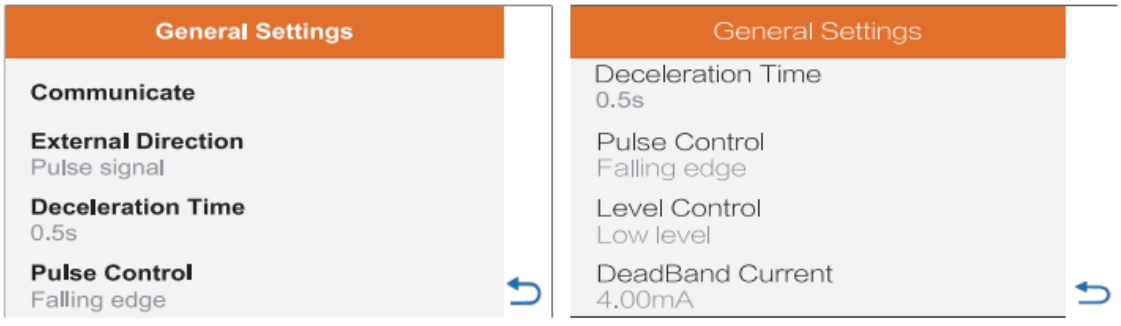

Figure 27 Advanced general parameters

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External direction control: Select level or pulse control. With level control, the applied high or low level determines the direction. With pulse control, the transition between levels is evaluated, for example using a momentary pushbutton. This setting applies to external control mode.

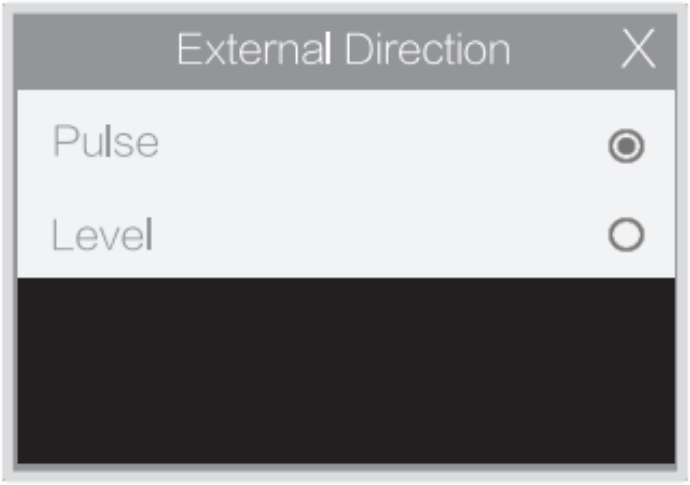

Figure 28 Setting external direction control

Stop delay: Time between receipt of the stop signal and actual standstill. A suitable setting can reduce splashing during filling. The input window shows 0.5–20.0s.

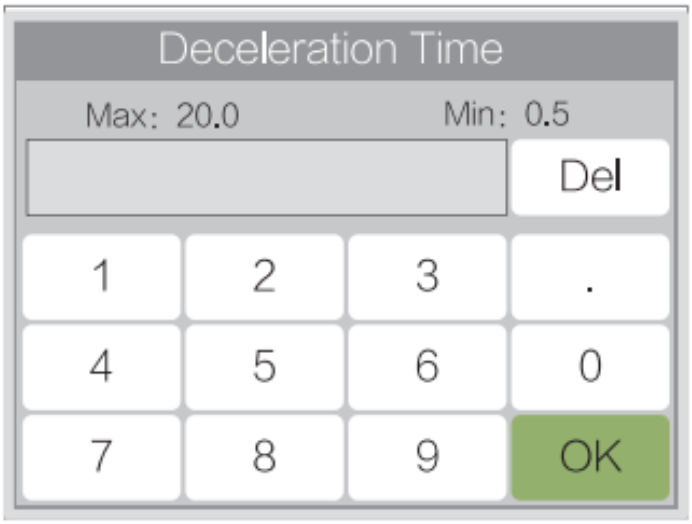

Figure 29 Setting the stop delay

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Pulse edge: Select a falling or rising edge as the effective signal transition. A falling edge is a transition from high to low level; a rising edge is the reverse.

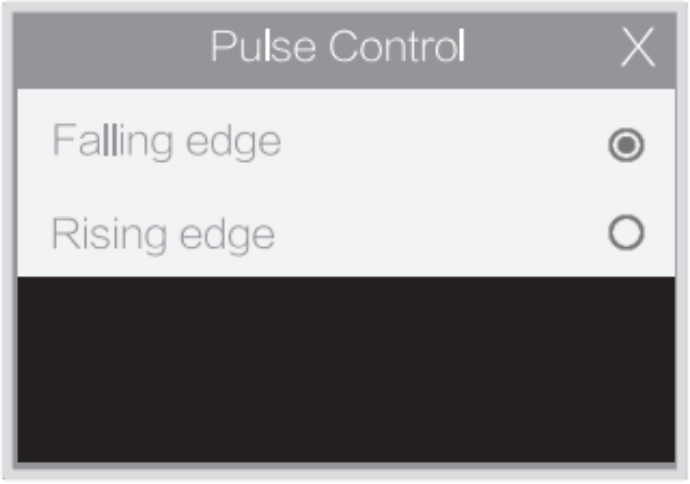

Figure 30 Selecting the effective pulse edge

Level: Select low or high level as the effective control level.



Figure 31 Selecting the effective level

Calibration wizard: For accurate flow indication and delivery, measure and calibrate the actual delivered volume; see Chapter 7.2.

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4.7 System parameters

Swipe vertically to display further system parameters.

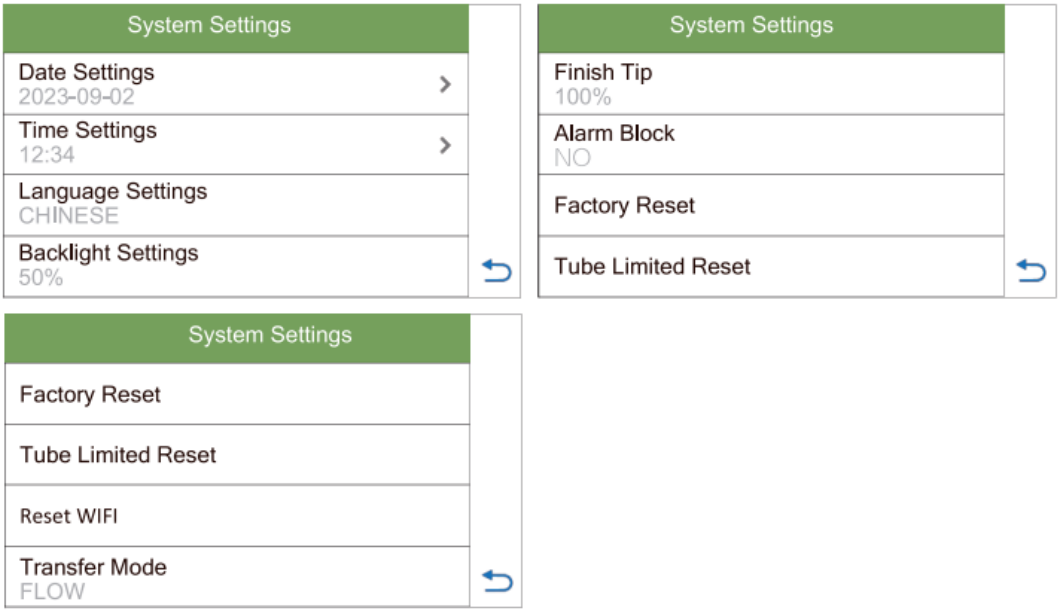

Figure 32 System parameters

Date: Select the year and month with the arrow keys, then tap the day. The set date is saved when leaving the screen.

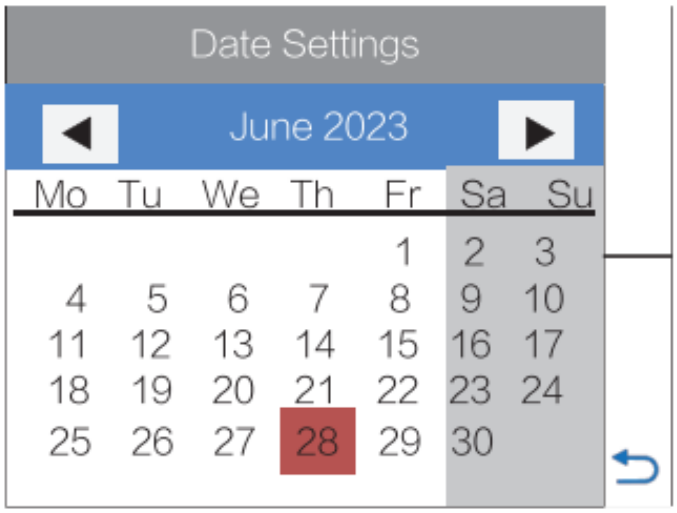

Figure 33 Setting the date

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Time: Set hours, minutes and seconds using the up and down keys. The time is saved automatically when leaving the screen.

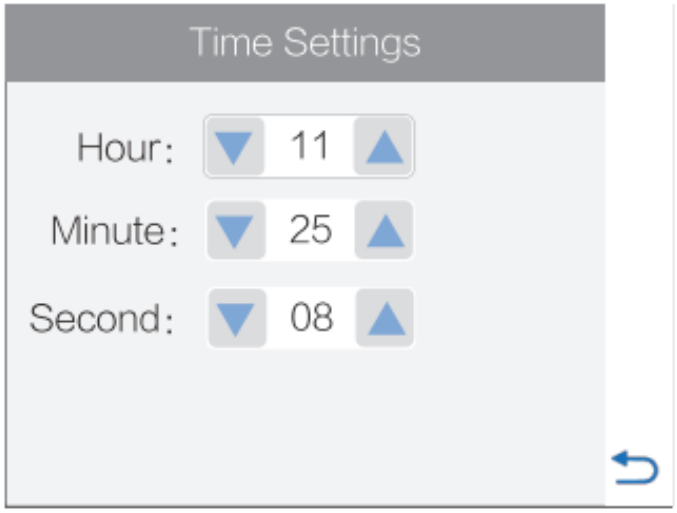

Figure 34 Setting the time

Language: Select Chinese or English.



Figure 35 Selecting the device language

Backlight: Set LCD brightness between 1% and 100%.

Completion notification: In volume dispensing and programming, a notification can be triggered when the set progress of 0–100% of the last working step is reached. On a networked Wi-Fi version, the notification is sent via the app. The factory setting is 0, which disables the notification.

Stall alarm: If enabled, the drive stops automatically when the motor stalls. This function is disabled by default.

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Factory settings: Reset all parameters and restart the drive to apply the reset. Alternatively, with the power off, hold the direction key and MODE key simultaneously and switch on. Once the normal main screen appears, factory settings have been restored.



Figure 36 Restoring factory settings

Tubing replacement reminder: On suitably equipped Wi-Fi devices, the app gives a reminder when the theoretical remaining tubing life reaches 0. Check the tubing for damage and replace it in good time. The reminder is disabled by default.

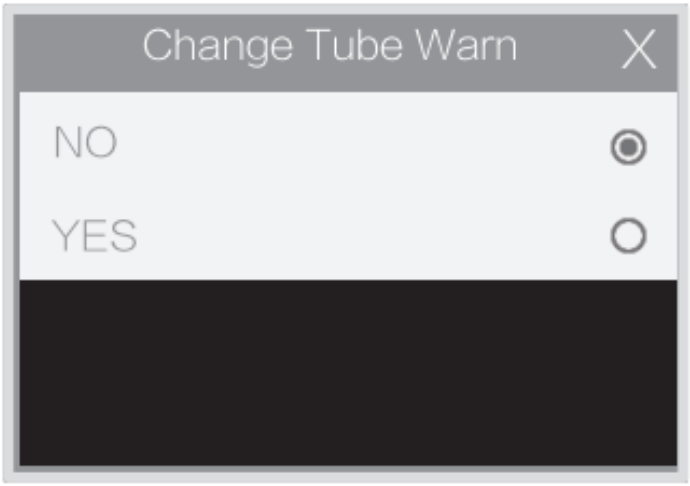

Figure 37 Setting the tubing replacement reminder

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Reset tubing life: After replacing the tubing, reset the counter to its initial value.



Figure 38 Resetting tubing life

Reset Wi-Fi: Deletes the saved Wi-Fi association and prepares the device for a new network connection. Alternatively, hold MODE for ten seconds on the main screen of any operating mode.



Figure 39 Resetting the Wi-Fi connection

Wi-Fi functions marked with an asterisk only apply to suitably equipped versions. These settings have no effect on equipment without this feature.

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Transfer mode: In volume dispensing, select volume/flow or volume/time. This makes it easier to enter the required parameters.

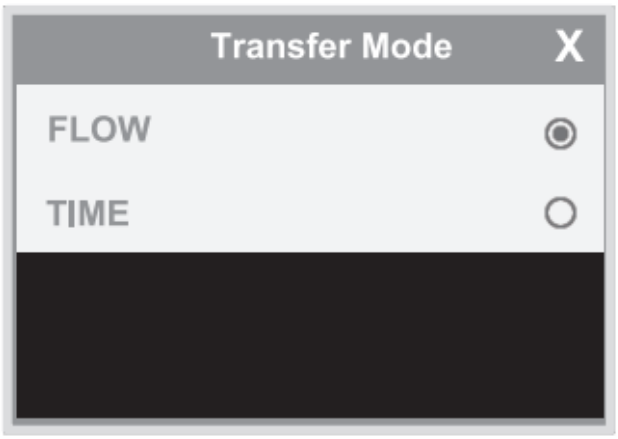

Figure 40 Selecting the transfer mode

4.8 Information and password

Information: Display software, hardware, speed, accuracy, temperature and serial number information. Swipe to display further entries.

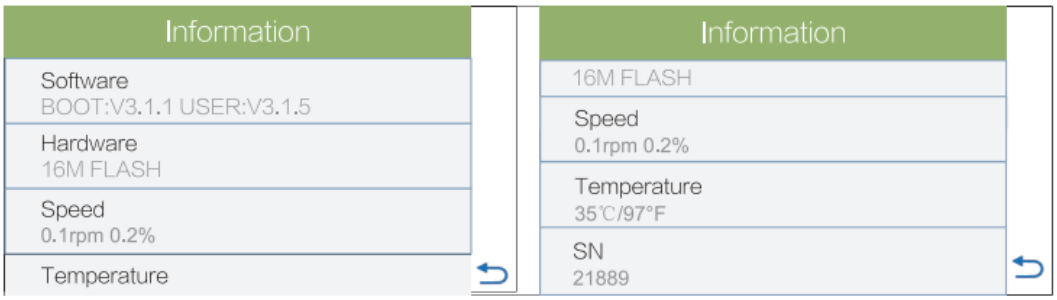

Figure 41 Device information

Operating information or About: Shows contact details and a brief introduction to Leadfluid.

Password: The user password locks and unlocks the device, prevents changes by other people and enables additional general parameters. No password is set by default.

On the main screen, tap operating mode settings and then the padlock. A blue padlock indicates a locked device. Tapping the padlock again opens password entry. After entry and confirmation, the device returns to the main screen. Open operating mode settings again: a grey padlock indicates the device is unlocked. The device also returns to the main screen after an incorrect entry. Therefore, check the actual lock status using the padlock.

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Change password: On initial setup, the Change Password button is initially absent. First tap OK and return to the main screen. Open password settings again; the required password can now be entered and saved with Change Password. The password may contain one to eight digits.

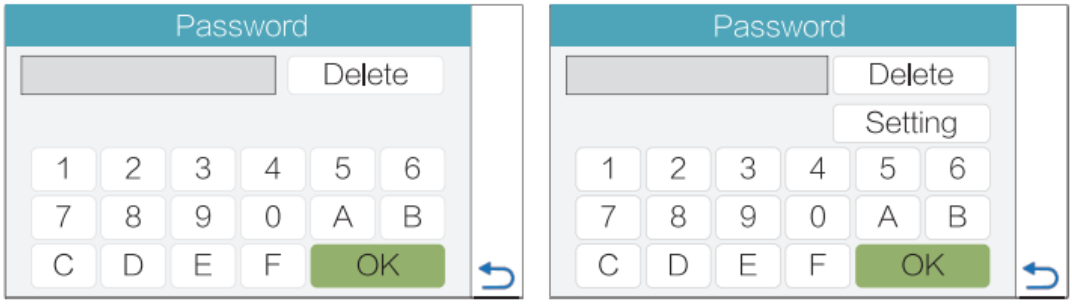

Figure 42 Setting and changing the password

If the password is forgotten, contact Labmaterial GmbH for resetting or recovery.

Return to main screen: Use the corresponding key to leave the system menu and open the main screen.

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5 External control interface

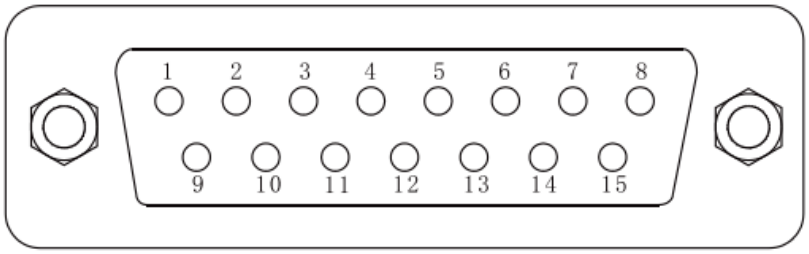

Figure 43 DB15 connector numbering

DB15 pin	Signal	Description
1	ADC_W	Positive external analogue signal input
2	B	RS485 communication line B
3	A	RS485 communication line A
4	VCC_W	External DC supply input
5	DAC	Analogue voltage signal output
6	CW_W	External direction input
7	PWM	Pulse signal output
8	COM	Common connection for external signals
9	AGND	Negative external analogue signal input
10	+12V	Positive connection of the internal 12V supply
11	GND	Internal supply ground
12	CW	Internal direction status output
13	RS_W	External start/stop input
14	PWM_W	External pulse signal input
15	RS	Internal start/stop status output

Table 4 External control connector pin assignments

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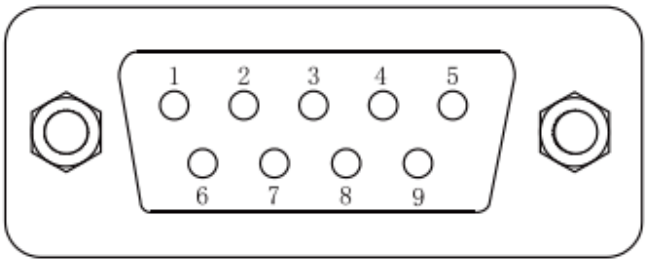

Figure 44 DB9 connector numbering

DB9 pin	Signal	Description
1	—	—
2	RXD	Receive data
3	TXD	Transmit data
4	—	—
5	GND	Signal ground
6	—	—
7	—	—
8	—	—
9	—	—

Table 5 RS232 connector pin assignments

⚠ **Note:** Do not connect mains voltage to the external control connector. Apply only the signals shown in the connection diagrams to the corresponding pins. Do not exceed the permitted signal ranges or apply supply voltage to other pins. Otherwise, permanent damage not covered by the manufacturer's warranty may occur.

⚠ **Note:** Low-voltage signals must be separated from the mains supply. Use a separate shielded ground wire.

⚠ **Note:** Use suitable ferrules on the ends of stranded wires. Otherwise, equipment damage may occur.

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6 Installation

6.1 Before commissioning

- When unpacking, check against the packing list that all accessories are complete, correct and undamaged. Contact Labmaterial GmbH immediately if anything is wrong.
- Read the operating instructions carefully and keep them accessible for future reference.
- Place the pump on a level surface. Leave at least 20cm clearance behind the pump.

6.2 Installing the pump head and tubing

The individual installation steps are described in detail in the instructions for the relevant pump head.

Mounting the YZ35 head: Align the flat of the pump head shaft with the groove in the drive coupling and insert it. Rotate the head so that its screw holes align with the holes in the head bracket. Fully seat the head. Insert and tighten the three fixing screws in the designated holes. Insert the tubing according to the corresponding YZ35 instructions and close the head securely.

6.3 Mains connection

Rated supply: 230V, 50/60Hz. Insert the supplied power cable into the mains connector on the rear of the drive.

⚠ **Note:** All supply cables must be rated for the device's power consumption.

⚠ **Note:** Position the pump so it can easily be disconnected from the power supply during use.

⚠ **Note:** The power supply must match the nameplate specification. Otherwise, the device may be damaged.

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7 Operation

7.1 First startup and factory settings

The pump has preset operating parameters. Before first use, set the pump head and tubing to match the actual configuration and calibrate the flow rate.

Parameter	Factory setting
Language	Chinese
Backlight	50%
Password	Blank
Notification sound	Enabled
Operating mode	Internal control, flow mode
Flow rate	13.48mL/min
Speed	1.0rpm
Direction of rotation	Clockwise
Delayed start	Disabled
Pump head	YZ35
Tubing	#73
Reverse angle	0°, disabled
Reverse speed	600rpm
Baud rate	9'600bit/s
Parity	Even
Byte order	CDAB
Pump number	1
External direction control	Pulse signal
External start/stop signal in foot switch mode	Pulse signal
External start/stop signal in other external control methods	Level signal
Stopping deceleration time	0.5s
Active pulse edge	Falling edge
Effective level	Low level

Table 6 Device factory settings

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7.2 Flow calibration

Measure the actual delivered liquid using a suitable balance or graduated cylinder. Calibrate in the following cases:

- First startup.
- Changing the pump head or tubing.
- Transfer of the same liquid with two pump heads.
- Reinserting the tubing.
- Prolonged continuous operation.

1. Mount the pump head and tubing. Prepare a suitable balance or graduated cylinder and a collecting vessel.
2. In the general parameters, select the pump head and tubing actually installed; see Chapter 4.6.
3. Use the full speed key to fill the tubing completely with liquid.
4. With the pump stopped, open the calibration wizard using the navigation key or the system menu .
5. In the wizard, set the flow rate and test liquid volume. Tap either value and its unit to change them. The illustrated example shows 9.000mL/min and 6.000mL; these are example values. Select Next to proceed to measurement or Back to return to the system menu without calibration.

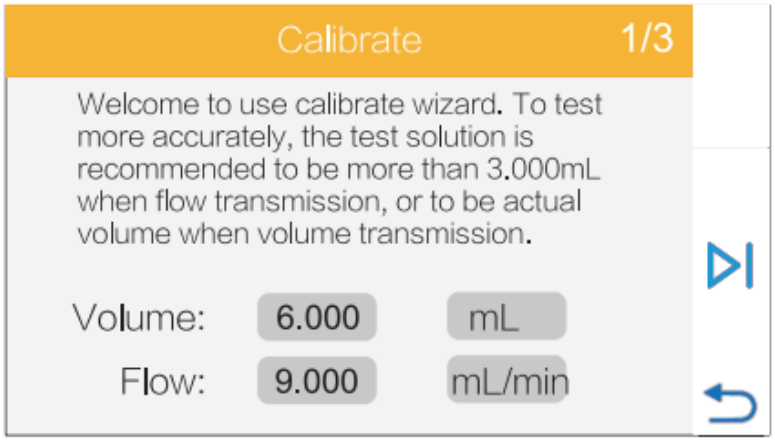

Figure 45 Setting calibration flow rate and test volume

6. Ensure that the tubing is completely filled with liquid. Press START/STOP . The pump performs the test and stops automatically after the specified delivery. Observe the progress indicator. Measure the actual delivered volume and enter it with the correct unit under Test1. Repeat for Test2 and Test3. Then select Next to proceed to calculation.



Figure 46 Measuring and entering actual delivery

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⚠ **Note:** In flow mode, use at least the test volume recommended by the system. For volume dispensing, preferably calibrate using the actual filling volume.

⚠ **Note:** START/STOP can interrupt a test early if necessary. Pressing it again restarts the test. One or more measured values can be entered; the system calculates their average. Use Back to change the test flow and volume. Select Exit to return to the system menu.

7. The system calculates the new correction factor and displays the previous factor for comparison. If the difference exceeds a factor of two, check particularly for measurement errors, incorrect units, incorrect head/tubing settings, high viscosity and the use of two heads. If the factor is plausible, select Confirm to save. You can also test again or return to the system menu without saving.

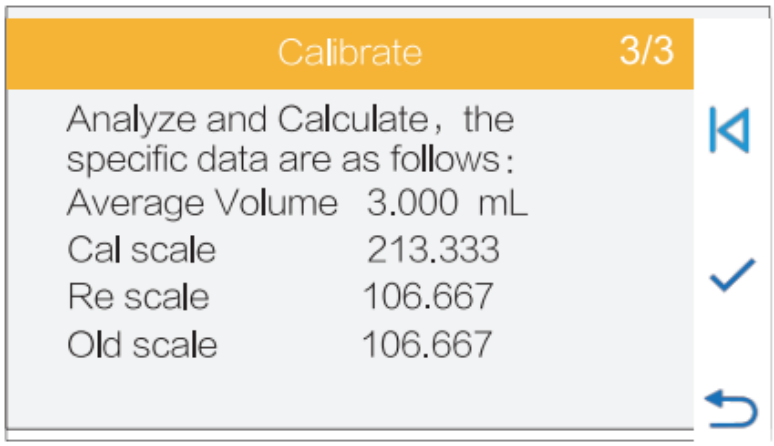

Figure 47 Calibration calculation result

If no measurement data have been entered, the following screen appears. Return to measurement and enter the data.

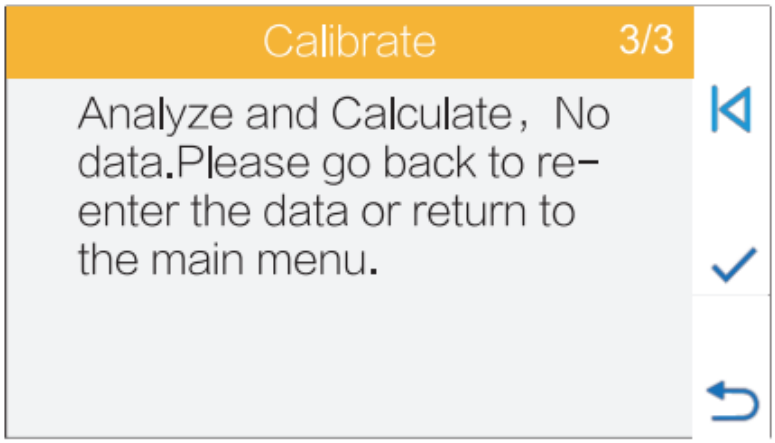

Figure 48 Calibration without entered measurement data

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7.3 Selecting operating modes

With the pump stopped on the main screen, press MODE. Select flow, timed dispensing, volume dispensing or programming.

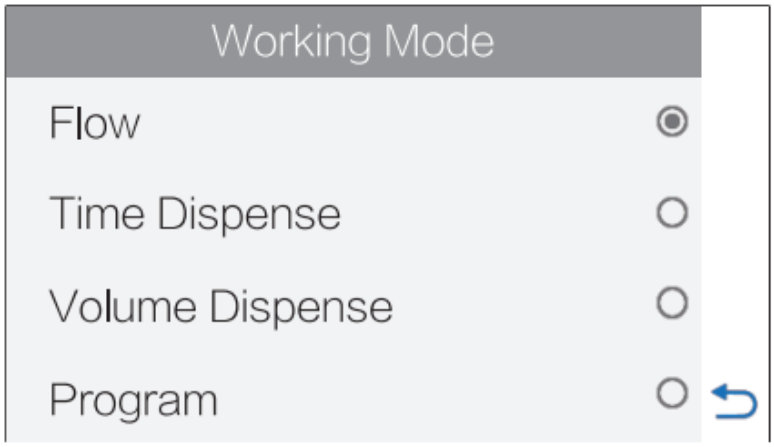

Figure 49 Selecting the operating mode

7.3.1 Flow mode

The pump runs continuously at the set flow rate and accumulates the delivered liquid volume. Set the flow rate and unit on the main screen. Changing the speed also affects the flow rate. The preview shows the head, tubing, running time and accumulated volume; plus and minus provide fine adjustment.

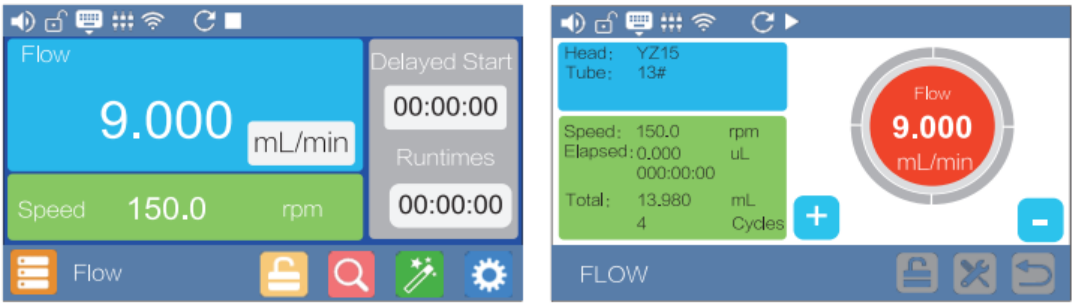

Figure 50 Main screen and preview in flow mode

Delayed start and timed stopping are available. To start after 30 minutes and then run for one hour and 30 minutes, tap the corresponding time fields and set Delayed Start and Runtimes.

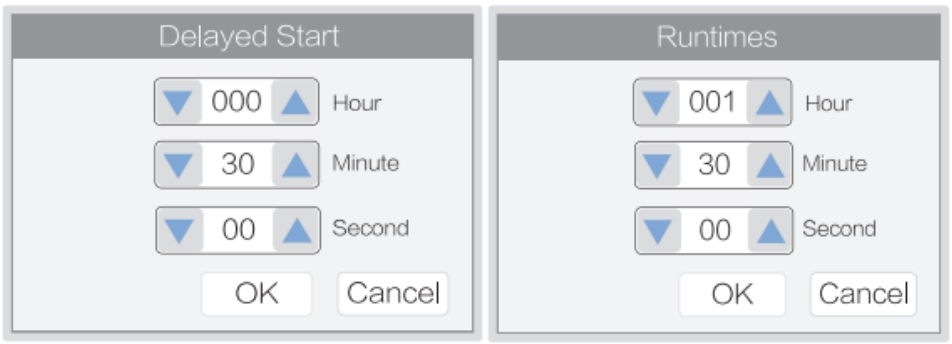

Figure 51 Setting start delay and running time

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Then press START/STOP. The sequence begins with the start delay; an alarm clock symbol appears in the status bar.

⚠ **Note:** A set start delay has no effect when the running time is 0.

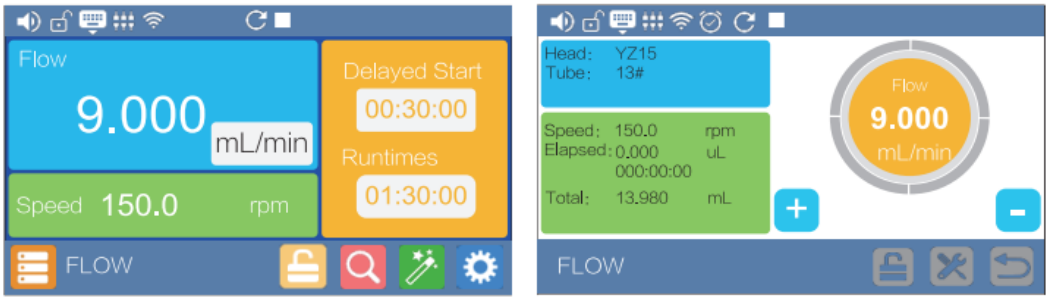

Figure 52 Display with an active timed sequence

7.3.2 Volume dispensing

Set the liquid volume and flow rate; the equipment calculates the required dispensing time. Alternatively, switch to volume/time in mode settings .

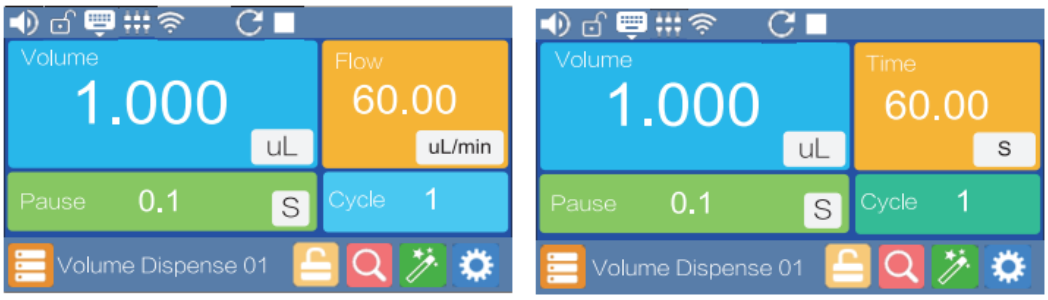

Figure 53 Volume dispensing with flow or time setting

The preview displays the pump head and tubing, current running time, cumulative liquid volume and number of runs.

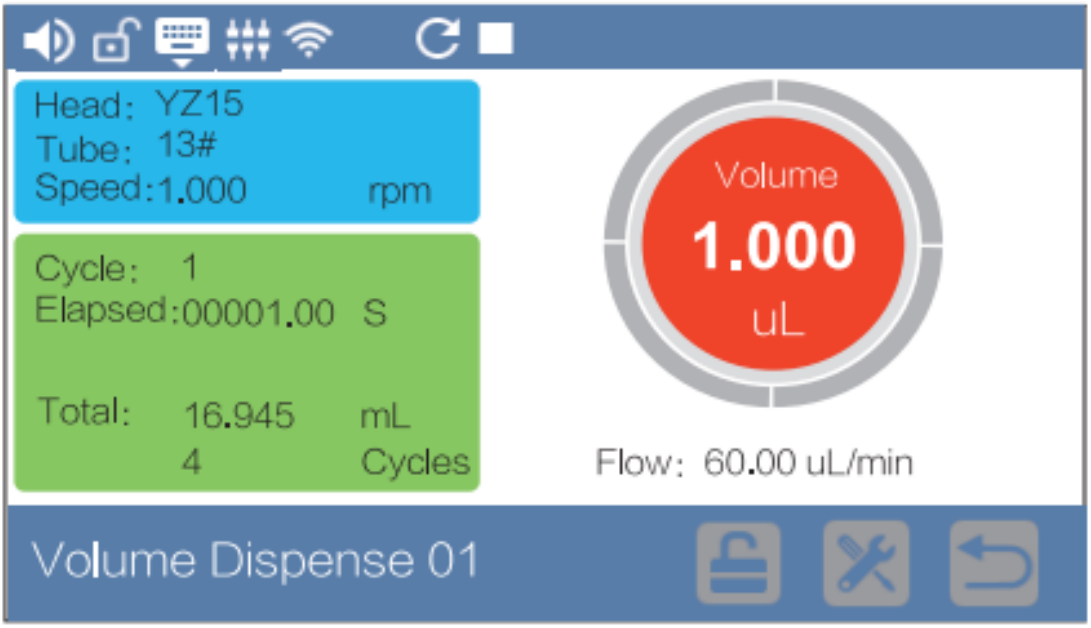

Figure 54 Volume dispensing preview

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Parameter	Meaning
Volume	Volume to deliver per dose in µL, mL or L
Flow rate	Delivery rate during dispensing in µL/min, mL/min or L/min
Time	Dispensing duration in hours, minutes or seconds
Pause	Standstill time between successive doses in hours, minutes or seconds
Cycles	Number of doses

Table 7 Volume dispensing parameters

With the number of cycles set to 0, dispensing continues cyclically until START/STOP is pressed. At 1, a single dose is delivered and the pause has no effect. Above 1, the pump stops automatically after the set number of cycles.

Select a parameter group in mode settings . Five groups can be stored.

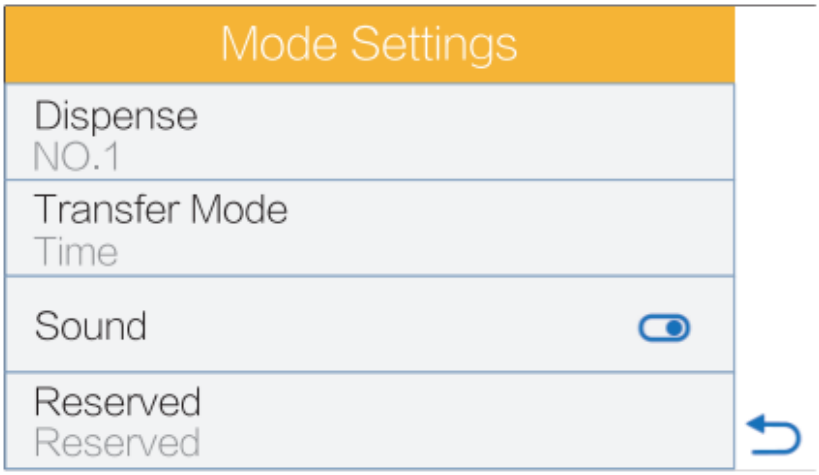

Figure 55 Selecting a volume dispensing parameter group

7.3.3 Timed dispensing

Set the running time and flow rate; the pump calculates the volume to deliver. The preview shows the head, tubing, running time, accumulated volume and number of cycles.

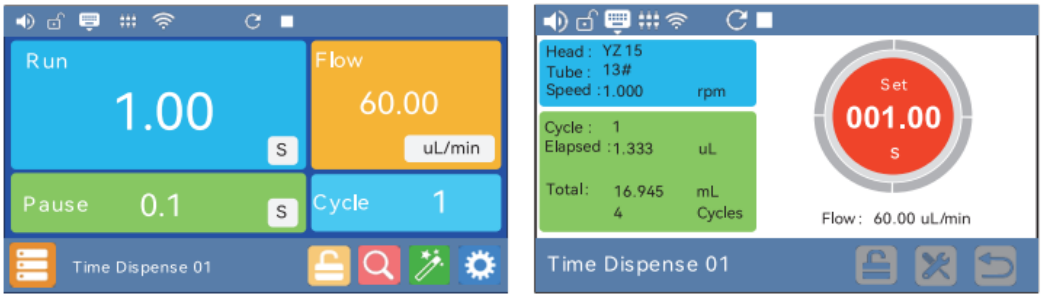

Figure 56 Main screen and preview of timed dispensing

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Parameter	Meaning
Running time	Duration of one dispensing operation
Flow rate	Delivery rate during dispensing
Pause	Standstill time between successive doses in hours, minutes or seconds
Cycles	Number of doses

Table 8 Timed dispensing parameters

With the number of cycles set to 0, dispensing continues cyclically until START/STOP is pressed. At 1, a single dose is delivered and the pause has no effect. Above 1, the pump stops automatically after the set number. Select one of the five storable groups in mode settings .

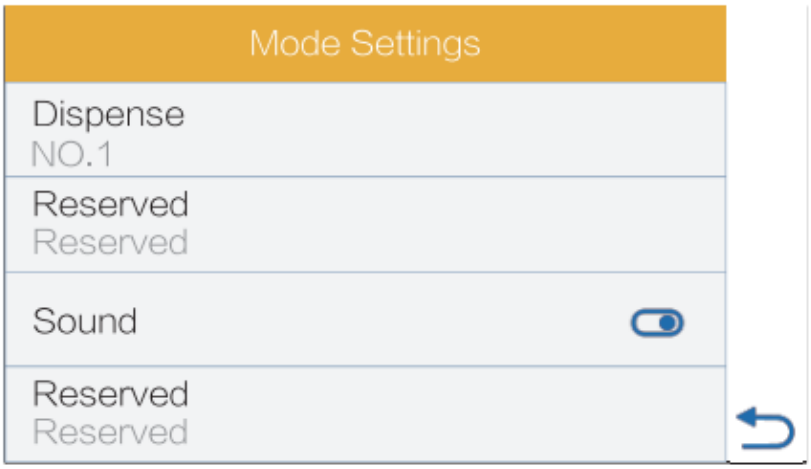

Figure 57 Selecting a timed dispensing parameter group

7.3.4 Programming mode

Set the number of steps and cycles. The pump automatically executes the set steps in sequence. The preview shows the head, tubing, running time, accumulated liquid volume and number of cycles.



Figure 58 Main screen and preview of programming mode

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Parameter	Meaning
Volume	Volume to deliver per dose in µL, mL or L
Flow rate	Delivery rate during dispensing in µL/min, mL/min or L/min
Time	Dispensing duration in hours, minutes or seconds
Pause	Standstill time between successive doses in hours, minutes or seconds
Cycles per step	At 1, a single dose with no effective pause; at higher values, execute the set number and then proceed to the next step
Direction of rotation	Clockwise or counterclockwise

Table 9 Programming mode parameters

Set Total Steps and Total Cycles in mode settings . Programming mode supports up to 30 parameter sets for different dispensing steps.

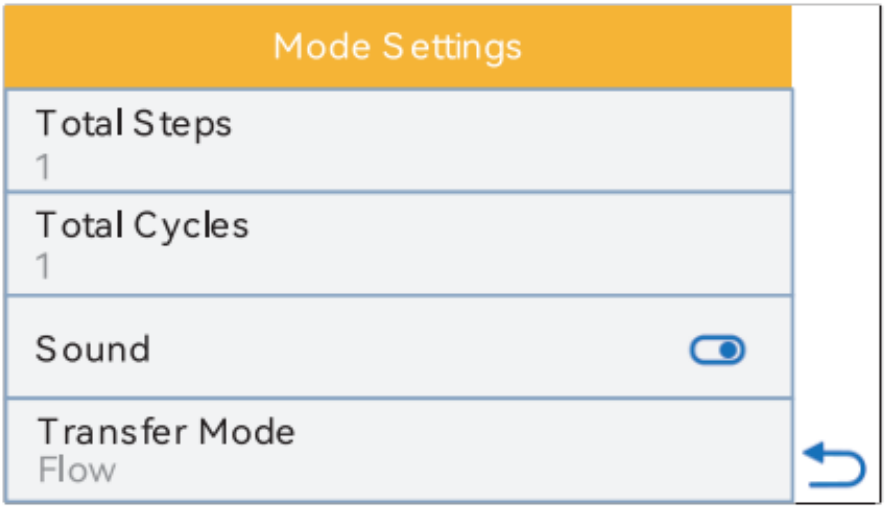

Figure 59 Setting the total number of steps and programme cycles

7.4 External control

The external analogue signal controls the speed; external signals control start/stop and direction. The front keypad has no effect in this control method.

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1. Switch off the power. Wire according to the diagram matching the power supply used and connect the DB15 plug to the pump control connector.

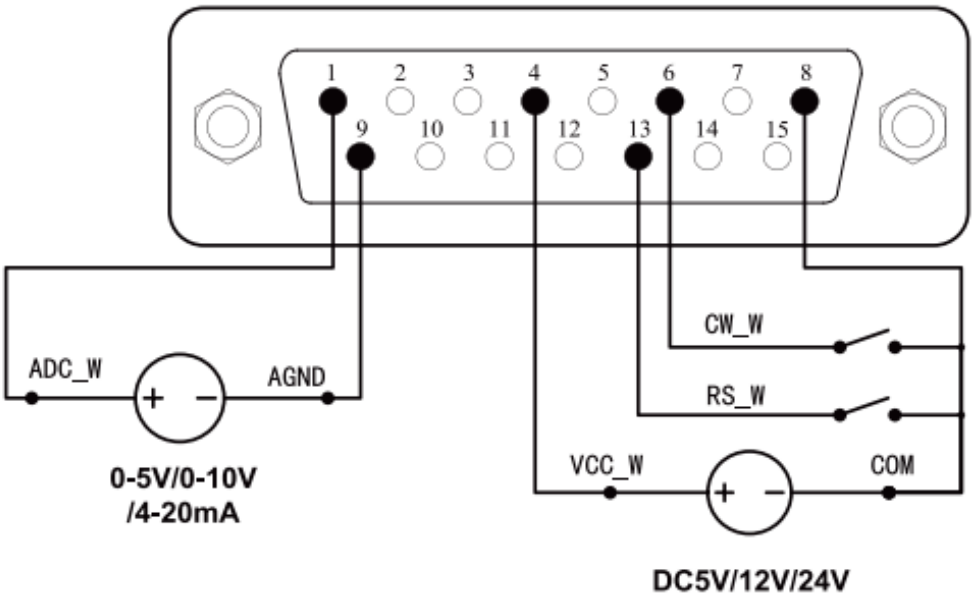

Figure 60 External analogue control with an external control power supply

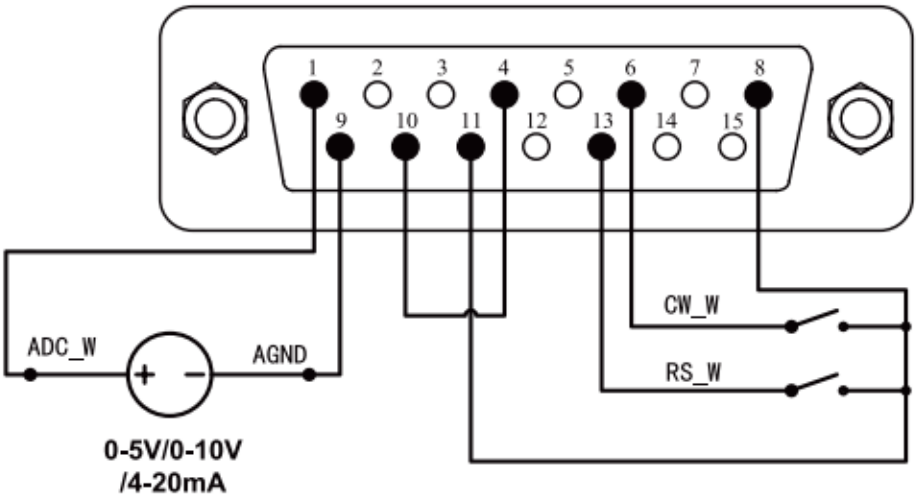

Figure 61 External analogue control with internal control supply

⚠ **Note:** Do not connect mains voltage to the external control connector. Apply only the signals shown in the connection diagrams to the corresponding pins. Do not exceed the permitted signal ranges or apply supply voltage to other pins. Otherwise, permanent damage not covered by the manufacturer's warranty may occur.

⚠ **Note:** Low-voltage signals must be separated from the mains supply. Use a separate shielded ground wire.

⚠ **Note:** Use suitable ferrules on the ends of stranded wires. Otherwise, equipment damage may occur.

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2. Switch on and press MODE. Select flow mode. Select current or voltage control in mode settings .

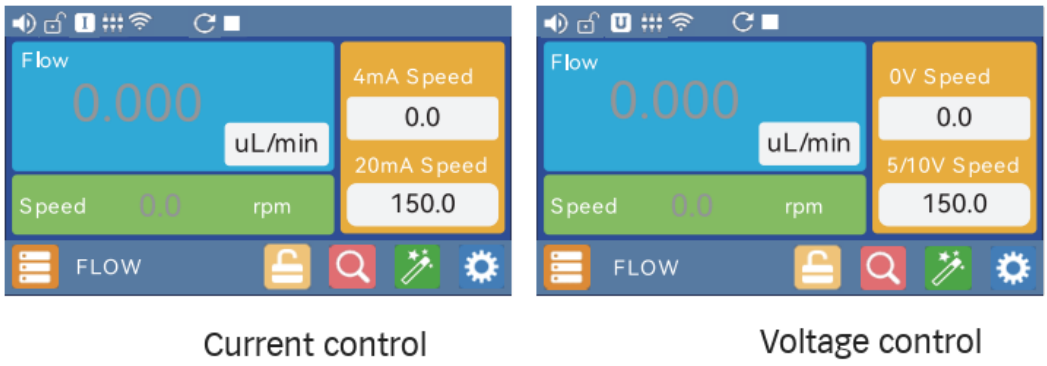

Figure 62 Current and voltage control

3. Select level or pulse control for the external start/stop input.

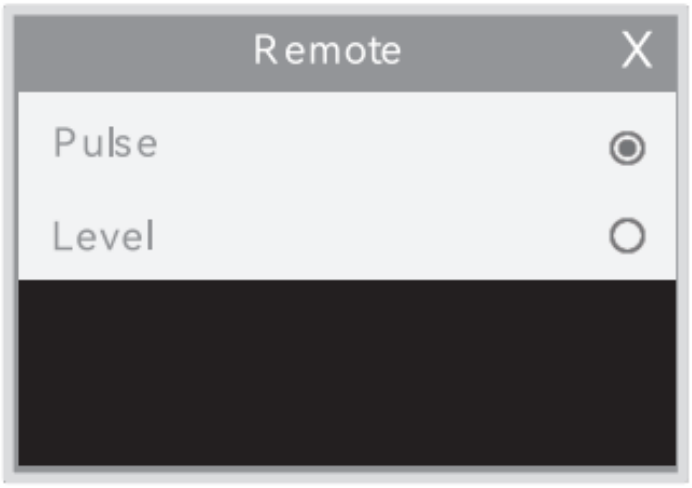

Figure 63 Selecting external start/stop control

With level control, close the RS_W switch and apply the analogue signal. The speed follows the analogue signal. Opening the switch stops the pump. With pulse control, close and reopen RS_W once to start. Closing and reopening it again stops the pump.

External direction control is set in the general parameters. With level control, an open CW_W switch means clockwise and a closed switch means counterclockwise. With pulse control, close and reopen once to change direction; the next operation changes it again. Observe the configured effective edge and level.

7.5 Communication via RS485 and Modbus

RS485 supports the MODBUS protocol and control of various pump functions. The registers and commands are given in the separate English Modbus communication protocol. The F-series section applies to the WG600F.

RS485 is not an Ethernet port. An appropriate external gateway is required for an Ethernet connection. The RS485 port does not provide a direct Ethernet connection or Modbus TCP.

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1. Switch off the power. Wire according to the appropriate diagram and connect the DB15 plug to the pump.

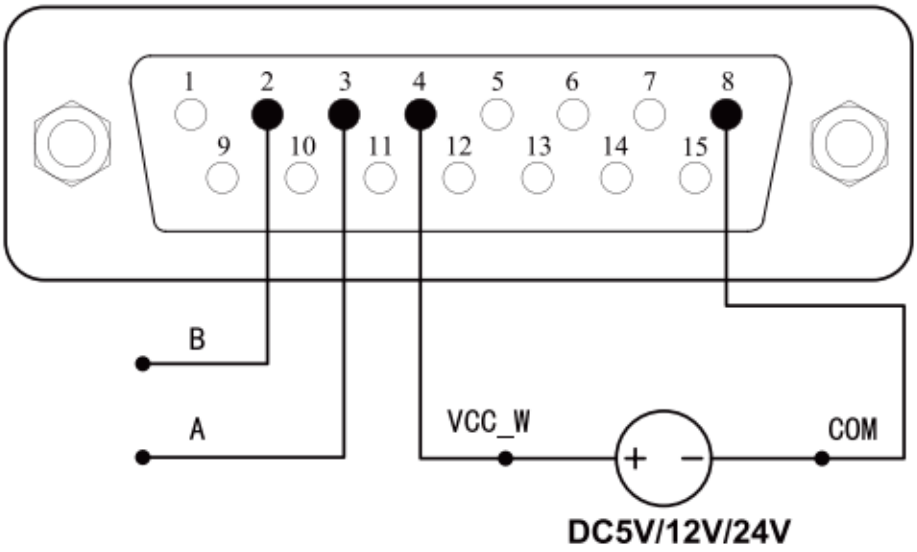

Figure 64 RS485 communication with an external control power supply

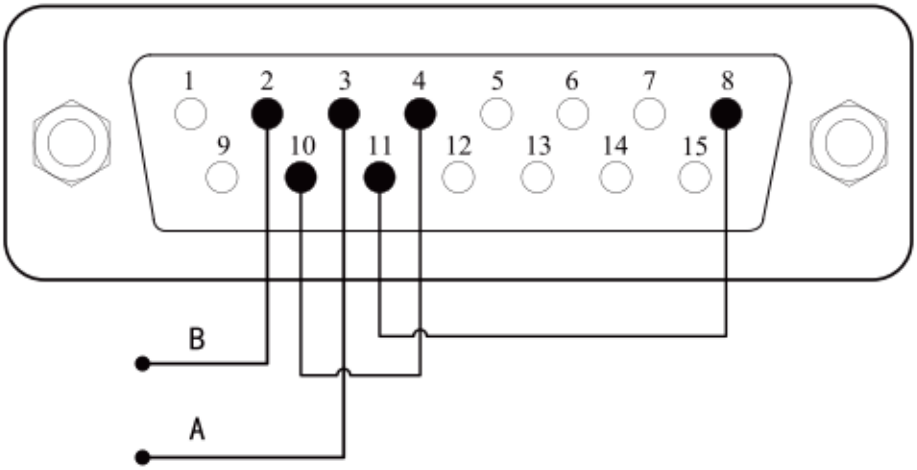

Figure 65 RS485 communication with internal control supply

⚠ **Note:** Do not connect mains voltage to the external control connector. Apply only the signals shown in the connection diagrams to the corresponding pins. Do not exceed the permitted signal ranges or apply supply voltage to other pins. Otherwise, permanent damage not covered by the manufacturer's warranty may occur.

⚠ **Note:** Low-voltage signals must be separated from the mains supply. Use a separate shielded ground wire.

⚠ **Note:** Use suitable ferrules on the ends of stranded wires. Otherwise, equipment damage may occur.

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2. Switch on. When communication is connected in internal control mode, the pump number is shown in the status bar. If this indication is absent, communication is not connected.



Figure 66 Display with communication connected

Parameter	Default setting
Baud rate	9'600bit/s
Data bits	8
Parity	Even
Stop bits	1

Table 10 Default communication settings

The communication parameters can be changed in general settings. The displayed choices include 4'800, 9'600, 19'200 and 38'400bit/s, none/odd/even parity, and CDAB and ABCD byte orders.

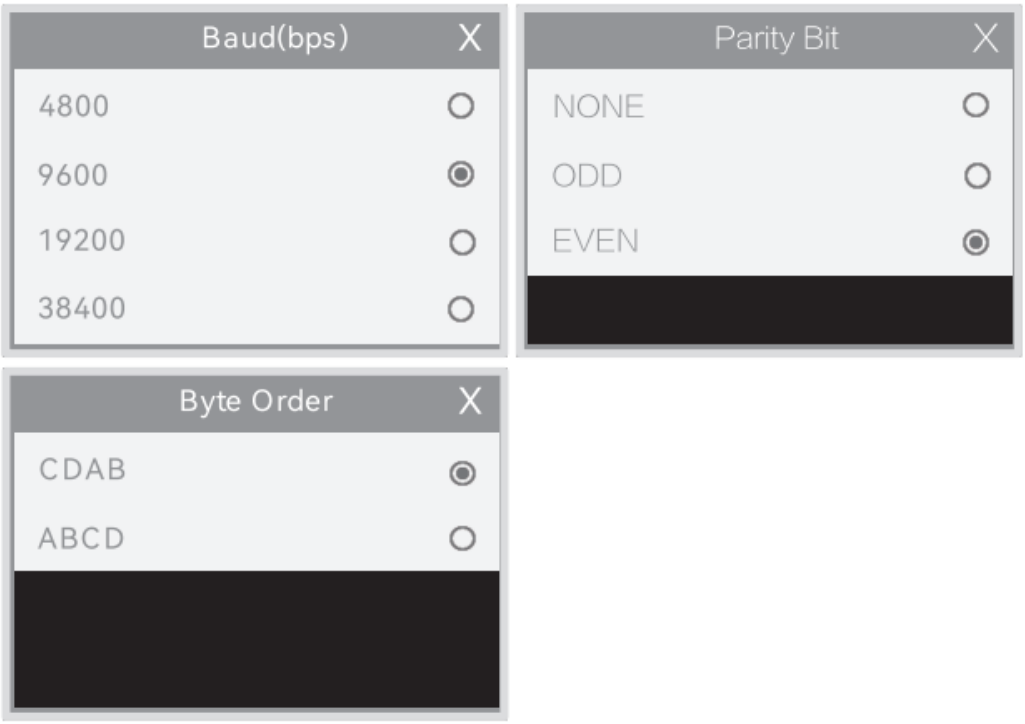

Figure 67 Selecting baud rate, parity and byte order

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3. Once connected, control the pump functions using the appropriate communication commands. Use the register addresses, data types and units specified in the corresponding protocol section.

7.6 Foot pedal control

1. Switch off the power. Wire according to the appropriate diagram and connect the DB15 plug to the pump.

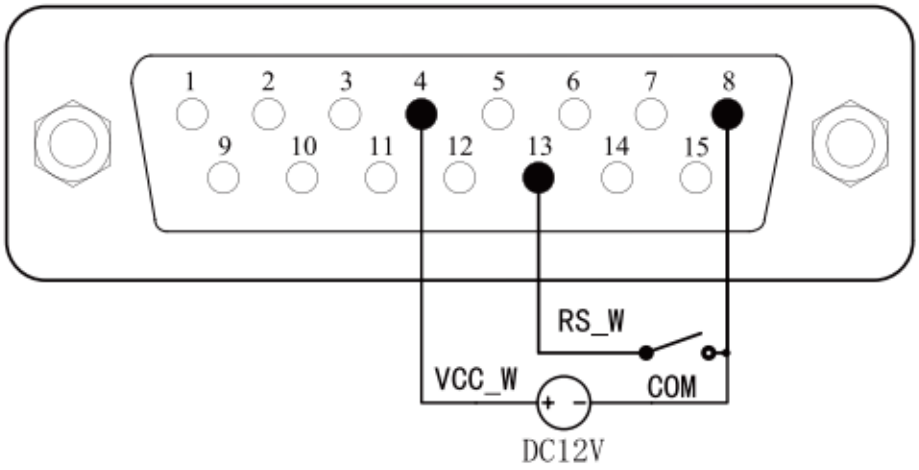

Figure 68 Foot switch with an external control power supply

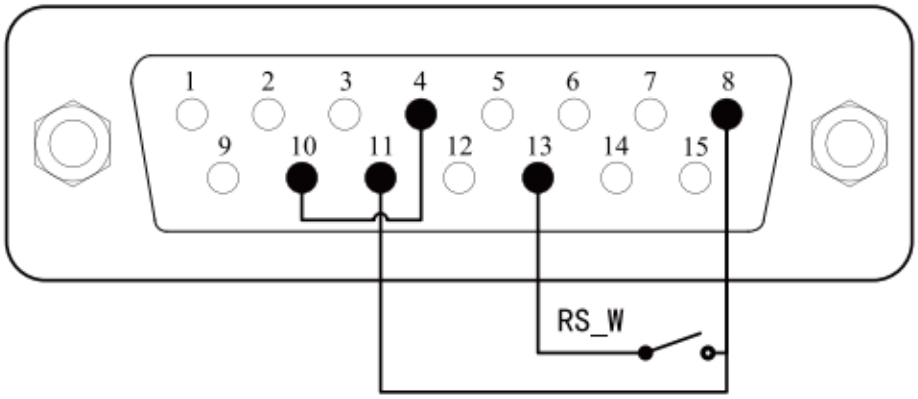

Figure 69 Foot pedal with internal control supply

⚠ **Note:** Do not connect mains voltage to the external control connector. Apply only the signals shown in the connection diagrams to the corresponding pins. Do not exceed the permitted signal ranges or apply supply voltage to other pins. Otherwise, permanent damage not covered by the manufacturer's warranty may occur.

⚠ **Note:** Low-voltage signals must be separated from the mains supply. Use a separate shielded ground wire.

⚠ **Note:** Use suitable ferrules on the ends of stranded wires. Otherwise, equipment damage may occur.

2. Switch on. In internal control mode, the pedal can trigger a dispensing operation in volume dispensing, timed dispensing and programming: close and reopen the switch once.
3. In foot pedal mode with level control, the pump runs while the switch is closed and stops when it opens.

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4. In foot pedal mode with pulse control, closing and reopening once starts the pump; closing and reopening again stops it.



Figure 70 Foot pedal control display

7.7 Wi-Fi connection

This section only applies to equipment with the optional Wi-Fi module. A Wi-Fi display or menu item alone does not indicate that this is standard equipment.

Preparation:

1. Download and install the Lead Fluid Cloud Pump app from the appropriate app store. Android: Google Play Store, where available; iOS: Apple App Store. Availability may change.

Figure 71 Information for obtaining the manufacturer's app

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2. Register and sign in following the app instructions.



Figure 72 Signing in to the manufacturer's app

3. Grant the Bluetooth and location permissions requested by the app.
4. Connect the phone to a 2.4GHz Wi-Fi network. Place the phone, pump and router close together during setup.

Setting up the connection:

1. Hold MODE for ten seconds on the main screen of any operating mode. The Wi-Fi symbol starts flashing; a beep confirms readiness. The device waits three minutes for network setup.

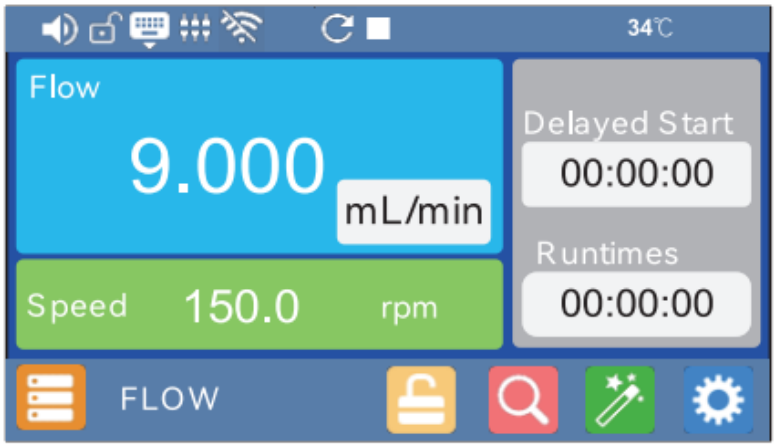

Figure 73 Device awaiting network setup

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2. On the app home screen, select plus at the top right and Add Device. Add the detected device with Add and follow the instructions.



Figure 74 Completed network setup

3. After successful setup, the equipment can be controlled using the manufacturer's app.

If setup fails, check:

- Is the pump still in setup mode? The Wi-Fi symbol flashes rapidly, approximately three times per second.
- Are Bluetooth and location enabled on the phone and permitted for the app?
- Is the network accessible, and are the phone, device and router close enough together?
- Is the Wi-Fi password entered correctly?
- Is a 2.4GHz Wi-Fi network being used?

Then try again. If the problem persists, contact Labmaterial GmbH.

7.8 Updating firmware via Wi-Fi

Only the Wi-Fi version supports the online update described here.

1. When new firmware is available, follow the instructions in the manufacturer's app and select Online Upgrade.



Figure 75 Preparing the firmware update

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2. After approximately three seconds, transfer of the firmware package starts.

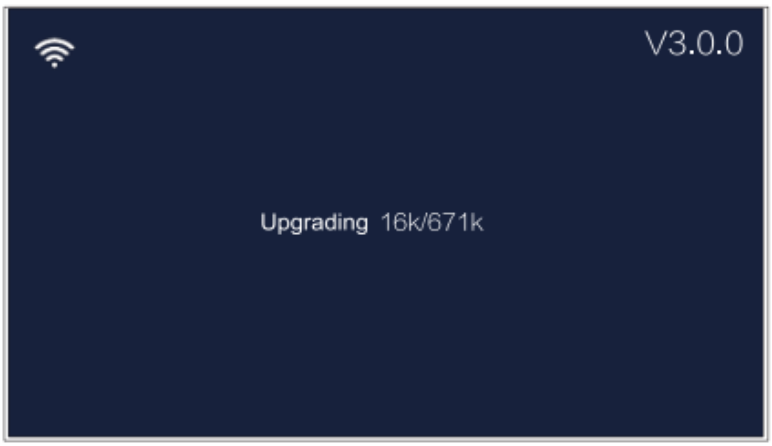

Figure 76 Firmware update in progress

3. When the download is complete, a success message appears. The device automatically returns to the operating screen. The version information can then confirm that the latest version is installed.

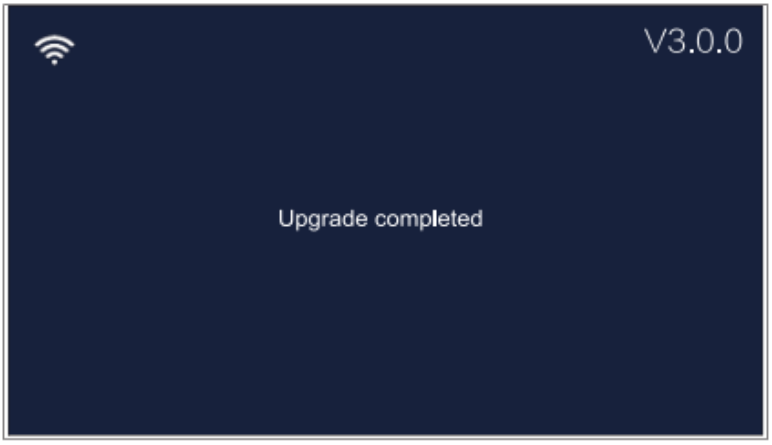

Figure 77 Update completed successfully

⚠ **Note:** Do not interrupt the power supply during the update. After a failed update, restart the device and try updating again via the app.

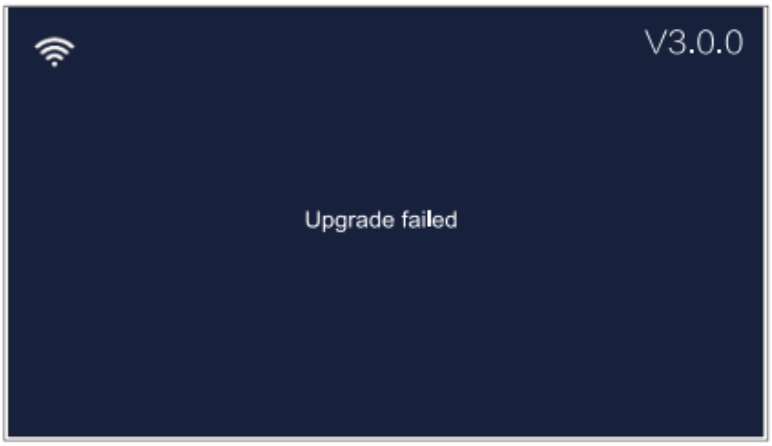

Figure 78 Failed update

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8 Troubleshooting and maintenance

8.1 Manufacturer's warranty and customer service

The WG600F series has a three-year manufacturer's warranty from Leadfluid. Contact Labmaterial for warranty handling and the conditions applicable at the time of purchase.

1. The warranty applies solely to the complete WG600F peristaltic pump drive. The pump head, tubing and other consumables are excluded.
2. The warranty period starts on the purchase date shown on the customer's valid proof of purchase.
3. Within the warranty period, Leadfluid provides free repair or replacement of covered parts.
4. Damage caused by human intervention, for example water, dropping or improper use, is not covered. For such cases, Leadfluid specifies repairs without labour charges, with material costs charged.

⚠ **Special notes:** Check model and specifications before using tubing and other consumables. After unpacking and use, the manufacturer excludes returns and exchanges except for quality defects.

8.2 Drive spare parts

Spare part	Specification
Fuse	1A
Power cable	250V, 10A

Table 11 Drive spare parts

8.3 Daily maintenance

- Follow the maintenance table below for regular servicing.
- The fan is at the rear of the pump. Do not cover it, to avoid impairing heat dissipation.
- Do not rinse the peristaltic pump with water. If tubing bursts during operation, immediately remove liquid from the head and dry the affected areas.
- Do not use chemical solvents to clean the surfaces of the pump or head.

⚠ **Note:** Always disconnect the pump from the mains before opening the head cover to change tubing, or before installation, removal or maintenance.

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8.4 Maintenance schedule

Regular scheduled maintenance helps reduce damage to pump components and protect people and property.

Task	Frequency	Action if abnormal
Check pump for leaks and damage	Before every start; daily visual inspection; regularly during operation	Repair leaks and damage before operation; replace parts if necessary; remove spilled liquid completely.
Check for unusual temperature or noise	Daily visual inspection and regularly during operation	Check and replace worn parts.
Check whether tubing replacement is required	Check tubing condition at least every three days	Replace tubing if flow falls below 75% of the original value, the tubing has burst or is badly worn, or the specified replacement interval is reached.
Check pump head and rotor assembly	Check rollers weekly for free movement; check when changing tubing; perform a complete annual wear inspection including bearing play and operation	Worn or damaged surfaces can damage tubing prematurely. Replace worn parts in good time.

Table 12 Maintenance tasks

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8.5 Troubleshooting

No.	Type	Fault	Remedy
1	Hardware	No display	Check power cable and connection. Check whether the fuse is faulty; contact Labmaterial GmbH for replacement if it is.
2	Hardware	Motor does not rotate	Check whether a very low flow or speed is set, for example 0.1rpm.
3	Hardware	Motor vibrates	Check that pump head screws and locking lever are secure.
4	Hardware	Motor rotates in one direction only	Check the direction key and external direction signal.
5	Hardware	Key does not respond	Check whether the device is locked.
6	Hardware	Loud operating noise	The manufacturer identifies resonance ranges around 70rpm and 120rpm with increased noise. Check that pump head screws and locking lever are secure.
7	Hardware/Software	Communication does not work	First check software: Is communication mode selected? Reset device address. Rule out duplicate bus addresses. Then check hardware: wiring and external control supply.
8	Hardware/Software	External control does not work	First check operating mode. Then check external control wiring and supply.
9	Hardware/Software	Inaccurate flow display	Calibrate the flow.

Table 13 Faults and remedies

⚠ **Note:** There are no user-repairable parts inside the pump. According to the manufacturer, unauthorised repairs void the pump warranty. If a fault persists after checking software and external connections, contact Labmaterial GmbH and do not repair the device yourself.

⚠ **Note:** This product is not medically certified. If used as part of a medical device, the medical device itself must hold the appropriate certification.

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9 Dimensions

Drive dimensions: 333 × 233 × 269mm (L × W × H).

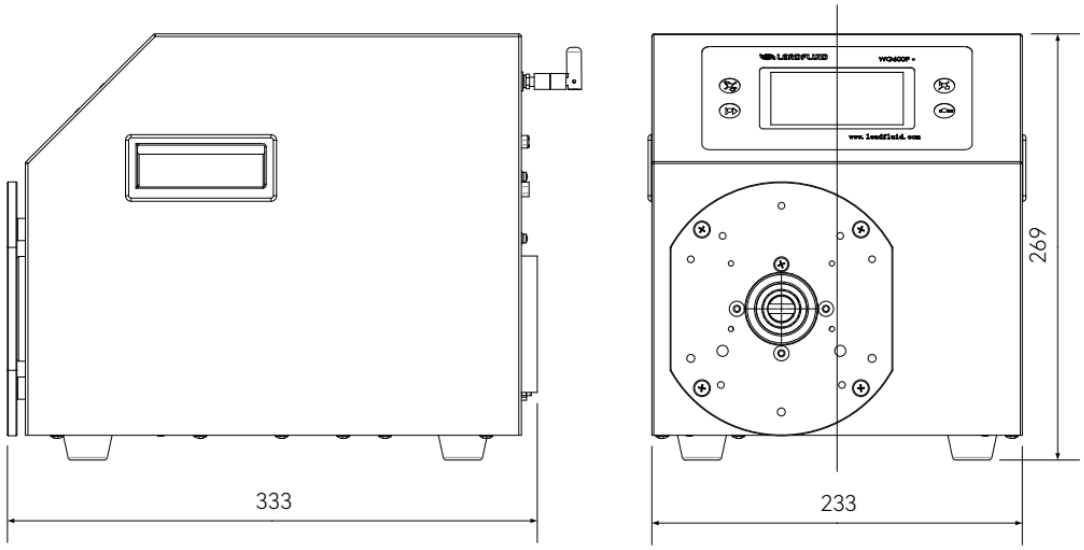

Figure 79 Dimensions of the WG600F drive in millimetres

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10 Ordering information

Product code	Product name	Drive and pump head
1703_1	Peristaltic pump – Industrial – 1 channel	WG600F + YZ35
1703_2	Peristaltic pump – Industrial – 2 channels	WG600F + 2×YZ35

Table 14 Ordering information

10.1 Optional accessories

Product code	Accessory	Use
P1701_1	Footswitch for peristaltic and gerotor pumps	WG600F; function according to the selected control method

Table 15 Optional accessories

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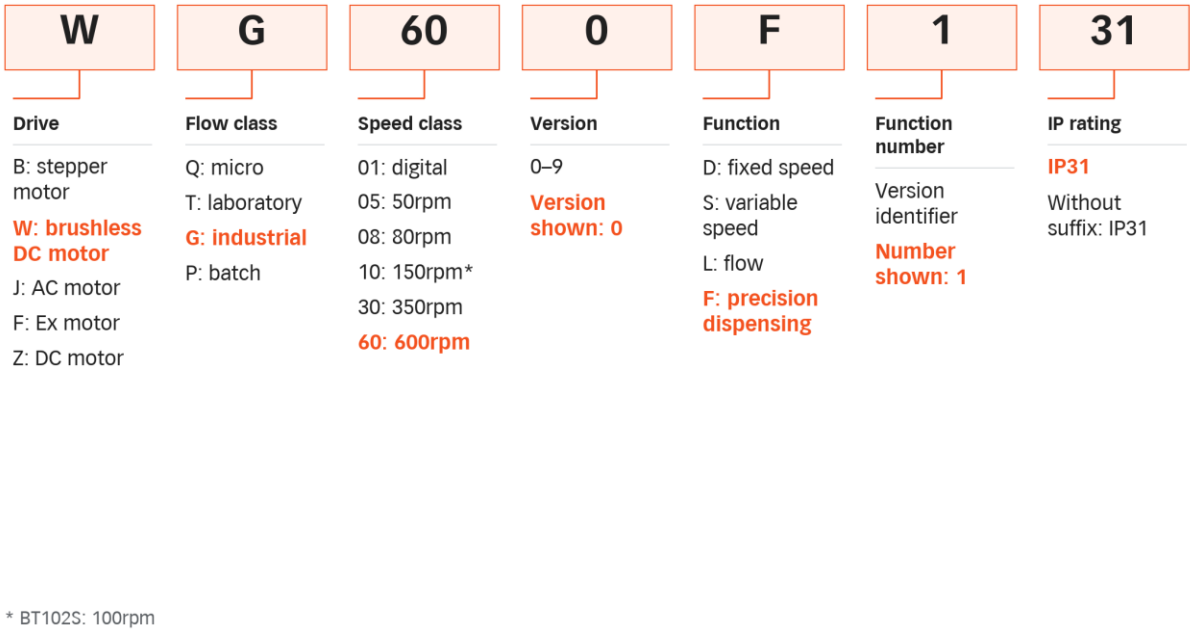
11 Model designation



* BT102S: 100rpm

Figure 80 Model designation system

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12 Technical data

Property	Specification
Suitable pump head	YZ35, also available with two heads
Operating functions	Start/stop, direction, full speed and power-failure state memory
Operating modes	Flow, volume dispensing, timed dispensing and programming modes
External control	Foot switch; optically isolated start/stop and direction; external control signals 5–24V; analogue control 0–5V, 0–10V or 4–20mA selectable in software
Communication	RS485, MODBUS; Wi-Fi remote control only with optional Wi-Fi module
Display	Colour LCD touchscreen
Direction of rotation	Forward and reverse rotation freely selectable

Table 16 WG600F functions and equipment

Property	Specification
Flow range	0.0013–13.2L/min
Speed range	0.1–600rpm
Speed resolution	0.1rpm
Speed error	Less than ±0.2%
Operation	Membrane keys and touchscreen
Mains supply	230V, 50/60Hz
Power consumption	<400W
Ambient temperature	0–40°C
Relative humidity	<80%
Drive dimensions (L × W × H)	333 × 233 × 269mm
Drive weight	10.2kg
Protection rating	IP31
Pollution degree	2

Table 17 WG600F performance data

Actual delivery depends on the pump head, tubing, liquid and setup. Adjustable dispensing values do not guarantee that every volume can be dispensed with equal accuracy using every tube.

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13 Pump flow table

Drive	Pump head	Channels	Compatible tubing	Flow rate per channel L/min
WG600F	YZ35	1	#73, #82	0.0013–13.2
WG600F	2×YZ35	2	#73, #82	0.0013–13.2

Table 18 Suitable heads, channels, tubing and flow rate per channel

⚠ **Note:** The listed pump heads, channel counts and flow values per channel were determined with purified water and tubing at normal laboratory temperature and pressure. The values are for reference. Pressure, temperature, pumped medium properties, tubing material and other operating conditions affect actual flow performance. Contact Labmaterial GmbH for the specific application.

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14 Suitable pump heads



Figure 81 YZ35 pump head

The WG600F is offered with one or two YZ35 pump heads. Follow the installation instructions for the corresponding head. An illustration or menu option for another head model does not approve other combinations.

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15 Electrical data for control inputs and outputs

15.1 Digital inputs

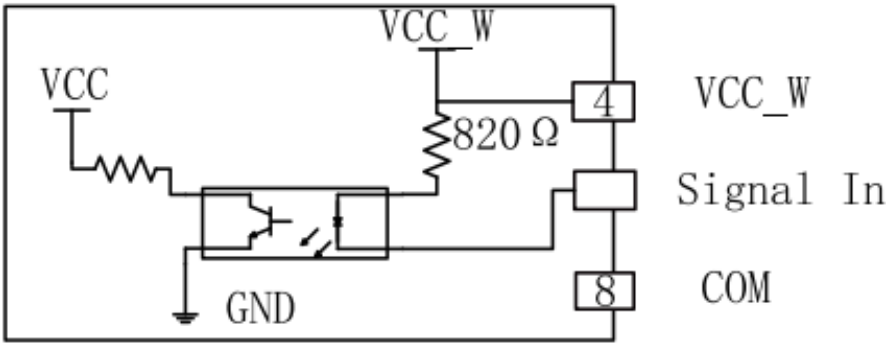

Figure 82 Optically isolated input circuit principle

Property	Parameter
Current when input active	5.5mA < I_on < 15mA
Current when input inactive	I_off < 1.5mA
Signal type	Open/closed contact or open-collector NPN transistor
External control voltage	5V, 12V or 24V
Input circuitry	According to the input table, no additional series resistor is required
Isolation	Optoelectronic

Table 19 Electrical data of digital inputs

15.2 Digital outputs

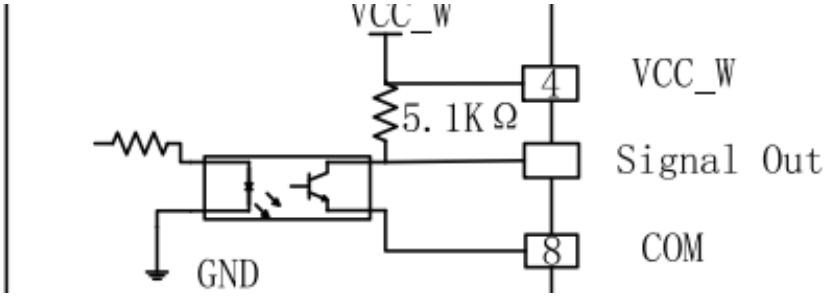

Figure 83 Optically isolated output circuit principle

Property	Parameter
Output type	Open-collector NPN transistor with internal pull-up
Isolation	Optoelectronic

Table 20 Electrical data of digital outputs

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15.3 Analogue inputs

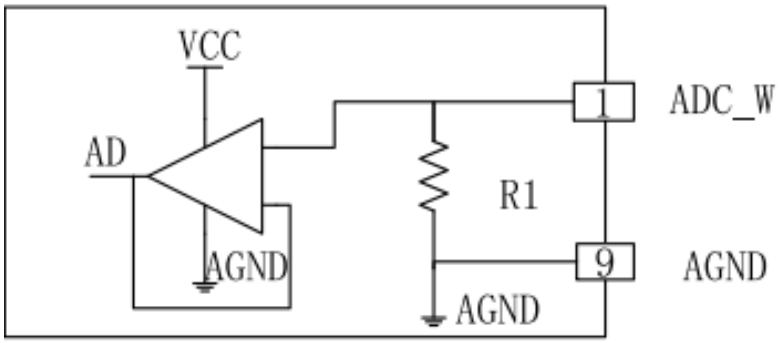

Figure 84 Analogue input circuit principle

Signal range	Input impedance below 100Hz	Permitted error	Resolution
0–5V	R1 = 4kΩ	±1%	5mV
0–10V	R1 = 4kΩ	±1%	10mV
4–20mA	R1 = 248Ω	±1%	16µA

Table 21 Analogue input data

15.4 Internal auxiliary supply

Property	Parameter
Output voltage	12V DC ±1V
Permitted output current	<130mA

Table 22 Internal auxiliary supply

15.5 External control circuit supply

Property	Parameter
Permitted input voltage	5–25V DC
Required available current	>350mA

Table 23 External control circuit supply

The external control power supply does not replace the pump's mains supply. Digital input signals must not exceed the specified 24V.

Disclaimer

The suitability of the pump, pump head and tubing for the intended application must be checked before use. To the extent permitted by law, Labmaterial GmbH accepts no liability for damage caused by improper use, failure to follow these instructions, unauthorised modifications or the use of unsuitable media and tubing. Liability for intent and gross negligence and mandatory statutory product liability remain unaffected.