

Azura

▶ Control Unit CU 2.1 User Manual

V6850A



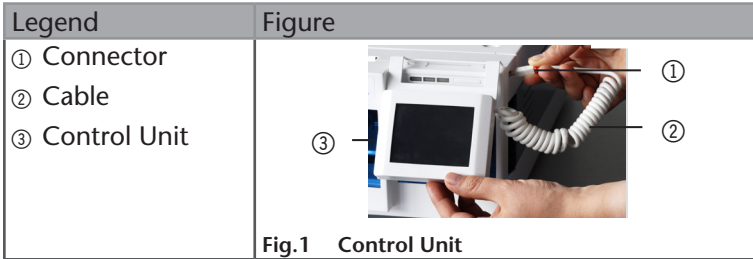
HPLC

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Control Unit







The Control Unit is a display with touchscreen functionality that is offered as an optional operating unit for the large devices ("L" devices) of the AZURA product line. The Control Unit controls one AZURA device at a time. To control another device, the Control Unit must be connected to it first.

Data transfer between the device and the Control Unit is realized through the firmly installed cable. The moment the cable is connected, the Control Unit starts automatically and reads out the device-specific parameters. After a short while, the status display shows on the start screen.

There are two hooks at the top that can be hooked to the housing of each device. Thereby you avoid the Control Unit getting in touch with liquids, which could cause damage to the electronic system.

Control

You can operate the Control Unit by tapping any grey field or button.

	The ON button starts the device with the set parameters, which are shown on the start screen.
	The back button moves one step back or, if pressed longer, back to the start screen.
	The menu button opens the menu.
	Use the arrows keys to scroll through the menu level.



Submits the entered parameters to the device.




Start Screen

The device-specific start screen shows the set parameters. The top line of the start screen always shows the name of the connected device.

Note: Tap on the gray fields to change the parameter shown in that field.

In addition to changing the device-specific parameters, the start screen allows you to set events. Events are manually activated or programmed short-circuit contacts.

You can program three types of contacts:

	Inactive contact
	Active contact
	Pulse contact

Main Menu

The main menu includes at least three menus: Setup, GLP, Default parameter (P 6.1L and DAD 6.1L), and Standby.

Setup	The setup menu allows additional settings that go further than the settings from the start screen.
GLP	GLP refers to "Good Laboratory Practice" which serves a safety check mechanism for the devices. The GLP menu lists all parameters but it does not allow to set parameters.
Default parameter	Default parameter resets all settings to default values. The entry has to be confirmed with Yes or No.

Standby

Each device can be brought to a device-specific standby mode. The Control Unit shuts down, and the screen reads "Standby". To end the standby mode, tap the screen.

For the pump P 2.1L, the P 6.1L, and the detector UVD 2.1L, the main menu also includes a Program menu and a Link menu.

Programs and Links

Altogether, 19 programs and one wake-up program can be stored. Links are used to connect or repeat programs. Altogether, 10 links can be stored.

Edit

Opens a program for editing, changing, deleting, or adding program lines.

Del

Deletes a current program or link.

New

Adds program lines to a program.

Tab


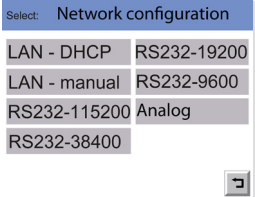
Shows the program lines of a program.

General Settings





You can find the general settings in the setup menu.

Network	Set the network.
Date/Time	Set date and time. Some devices only have the date menu.
Leak sensor	Activate or deactivate the leak sensor and set its sensitivity.
Event check	Check the settings of the Event outputs.
Wake Up	Set a point in time at which the device restarts automatically.


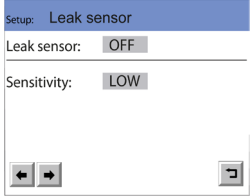
Choosing the Network

Process	Figure
<ol style="list-style-type: none"> 1. Tap  on the start screen. 2. Tap <i>Setup</i> > <i>Network</i>. 3. Choose network connection. 	 <p>Fig.2 Network configuration</p>


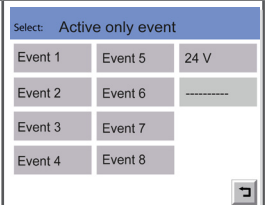
Setting the Date and Time

Process	Figure
<ol style="list-style-type: none"> 1. Tap  on the start screen. 2. Tap <i>Setup · Date/Time</i>. 3. Tap the field <i>Date</i>: 4. Enter a value for the day and confirm with . 5. Enter month and year and confirm accordingly. 6. Tap  to move up one level. 7. Tap the field <i>Time</i>: 8. Enter hour, minute, and second and confirm accordingly. 	 <p>Fig.3 Date</p> <p>Fig.4 Time</p>

Setting the Leak Sensor

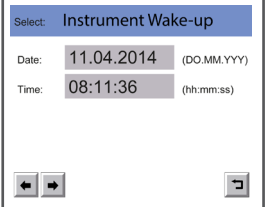
Process	Figure
<ol style="list-style-type: none"> 1. Tap  on the start screen. 2. Tap <i>Setup · Leak sensor</i>. 3. Tap the field <i>Leak sensor</i> and if necessary change the settings. 4. Tap <i>Sensitivity</i>: tap and select a level of sensitivity <i>Low · Medium · High</i>. 	 <p>Fig.5 Leak sensor</p>

Checking Events

Process	Figure
<ol style="list-style-type: none">1. Tap  on the start screen.2. Tap <i>Setup · Event check</i>.3. Tap the field <i>Active only:</i>.4. Select the event.	 <p data-bbox="643 469 932 507">Fig.6 Events</p>

Setting the System Wake-Up

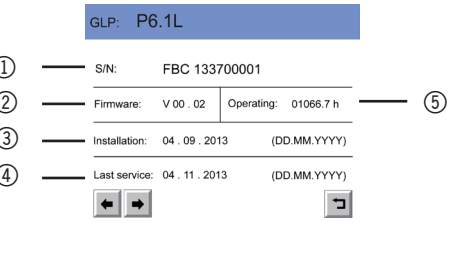
Under Instrument Wake-up, the point of time is set at which the devices in standby switch on automatically.

Process	Figure
<ol style="list-style-type: none">1. Tap <i>Setup · Wake-up</i>.2. Enter the date and start time respectively.	 <p data-bbox="643 956 932 983">Fig.7 Wake-up</p>

Reading Out the GLP Data

In the main menu of each device, you find the sub-item GLP. Selecting this item reads out and displays the GLP data of the respective devices.

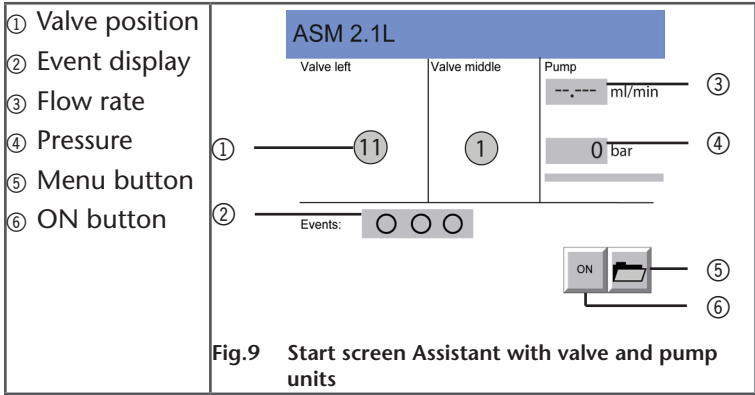
It is possible to display the data of the instrument (Instrument) or single components (Components).

Legend	Figure
<ul style="list-style-type: none"> ① Serial number ② Firmware version ③ Date of installation ④ Last service date ⑤ Number of operating hours 	 <p>The screenshot shows the GLP data for pump P6.1L. The data is displayed in a structured format with labels and values. The labels are: S/N, Firmware, Operating, Installation, and Last service. The values are: FBC 133700001, V 00 .02, 01066.7 h, 04 . 09 . 2013 (DD.MM.YYYY), and 04 . 11 . 2013 (DD.MM.YYYY). There are navigation buttons at the bottom: a left arrow, a right arrow, and a square button with a right arrow.</p>
<p>Fig.8 GLP data of the pump P 6.1L</p>	

Assistant

The start screen of the assistant displays which micro devices are integrated as units. Units shown on the start screen are the pumps P 4.1S and P 2.1S, the detector UVD 2.1S, the valve drive V 2.1S, and Vici/Valco valves.

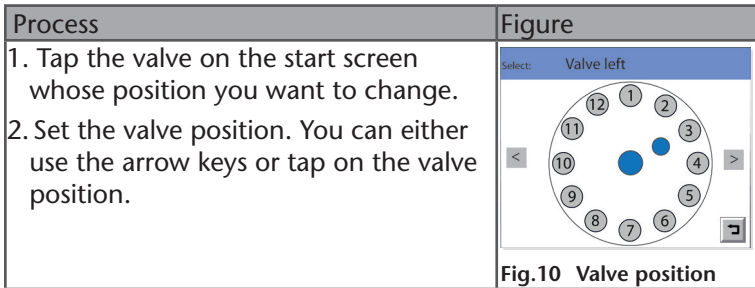
They can be operated from the setup menu. Degassers do not have an operating interface and are displayed as empty modules.



This chapter describes how to operate valves. Further information on operating detectors and pumps can be found in the respective chapters.

Changing the Valve Position

The start screen shows the current valve position. To change the valve position, tap the valve.




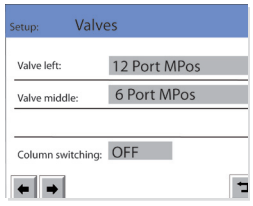
Result: The valve position is changed. If there are two identical

valves installed in the assistant and column switching is activated, the valve positions of both valves are changed simultaneously.

Choosing the Valve


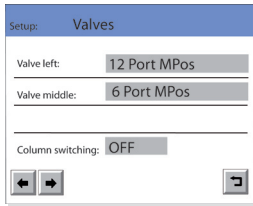
The correct valve head is factory-set in the setup menu. If you replace a 6-port valve head, you have the option to choose between 2-position valve or multiposition valve.

Note: The installed valve head must be compatible with the set valve head in the setup menu.

Process	Figure
<ol style="list-style-type: none"> 1. Tap  on the start screen. 2. Tap <i>Setup > Valves</i>. 3. Choose valve. 	 <p>Fig.11 Valve selection</p>

Activating the Column Switching

If two identical multi-position valves are installed in the assistant, column switching can be activated.

Process	Figure
<ol style="list-style-type: none"> 1. Tap  on the start screen. 2. Tap <i>Setup > Valves</i> . 3. Tap the field <i>Column switching</i> .: 4. Change the status. 	 <p>Fig.12 Column switching</p>

Result: Both valves are switched synchronously.

Detector

The start screen of the detector shows signal settings and wavelength. The **AZ** button initiates an autozero. Depending on the number of activated channels, several channels are displayed on the start screen.

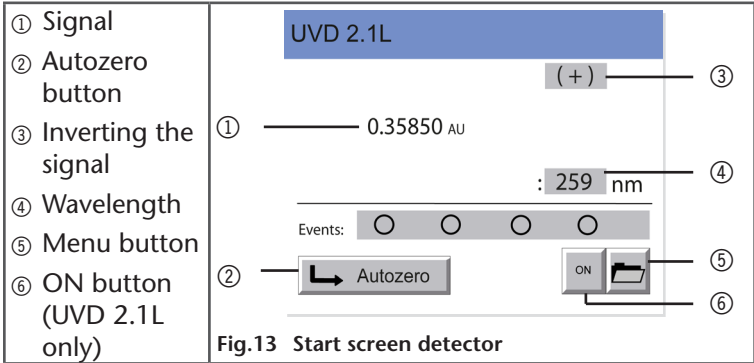


Fig.13 Start screen detector



Entering the Wavelength

Process	Figure
<ol style="list-style-type: none"> 1. Tap the wavelength on the start screen. 2. Enter the value for the wavelength. 3. Tap BW to save the settings. 4. Press the return button to return to the start screen. 	<p>The screenshot shows the wavelength entry screen. At the top, it displays 'Wavelength 1: 400 nm' and 'Bandwidth 1: 4nm'. Below this is a numeric keypad with buttons for '>', '0', '1', '2', '3', '4', '5', '6', '7', '8', '9', and 'Del'. On the left side, there are three buttons: 'BW', 'WL', and 'Disable', each with a left-pointing arrow. A return key is located at the bottom right.</p>

Fig.14 Wavelength

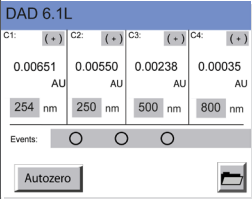
Entering the Bandwidth


For DAD 6.1L, DAD 2.1L, MWD 2.1L it is possible to set a bandwidth for each wavelength.

Process	Figure
<ol style="list-style-type: none"> 1. Tap a channel on the start screen. 2. Enter the value of the wavelength. 3. Tap  to save the settings. 4. Press the return button to return to the start screen. 	 <p>Fig.15 Bandwidth</p>

Activating/Deactivating the Channels


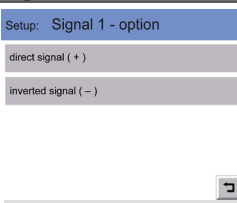
With DAD 6.1L, DAD 2.1L, MWD 2.1L it is possible to take several measurements simultaneously. Up to four channels can be activated with the Control Unit.

Process	Figure
<ol style="list-style-type: none"> 1. Tap a channel on the start screen. 2. Enter a wavelength and bandwidth for each channel to be activated. 3. Press the return button to return to the start screen. 	 <p>Fig.16 Channel settings window</p>


To deactivate channels, tap the wavelength of the channel on the start screen and tap .

Inverting the Signal

With this setting, the measuring signal can be inverted.

Process	Figure
<ol style="list-style-type: none"> 1. Tap (+) on the start screen. 2. Tap . 	 <p>Fig.17 Signal</p>

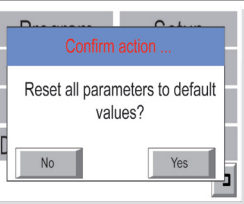
Initiating an Autozero

After each solvent change, an autozero should be performed. To do so, tap .

The display shows 0,000 AU after the autozero.

Resetting the Detector to Default Settings

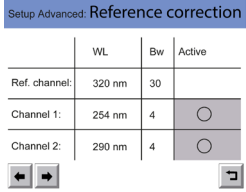
With the *Default parameter* functionality, the detector can be reset to the factory-set parameters. Since it is possible to change a number of different detector parameters, it is helpful to reset the detector in case problems occur.

Process	Figure
<ol style="list-style-type: none"> 1. Tap the menu. 2. Tap <i>Default parameters</i>. 3. Confirm action in separate window. 	 <p>Fig.18 Reset</p>

Selecting Reference Wavelength Correction

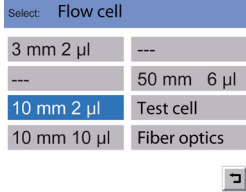
For DAD 6.1L, DAD 2.1L, MWD 2.1L you can activate or deactivate the reference wavelength correction under *Menu Setup · Advanced · Reference correction*.

The wavelength as well as the bandwidth can be adjusted.

Process	Figure
<ol style="list-style-type: none"> 1. Select a channel. 2. Tap <i>Active</i> to activate the reference wavelength correction. 	 <p>Fig.19 Reference wavelength correction</p>

Selecting the Flow Cell

For DAD 6.1L, DAD 2.1L, MWD 2.1L, the installed flow cell has to be set.

Process	Figure
<ol style="list-style-type: none"> 1. <i>Flow cell</i> · tap the flow cell field. 2. Select the installed flow cell. 	 <p>Fig.20 Selecting a flow cell</p>

If a fiber optics adapter is used, select *Fiber optics* in this menu.

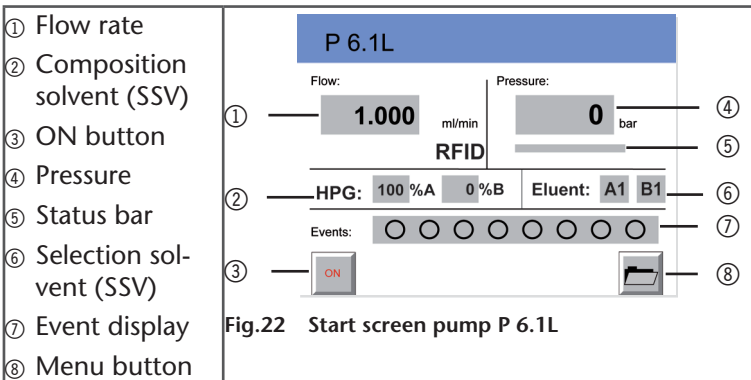
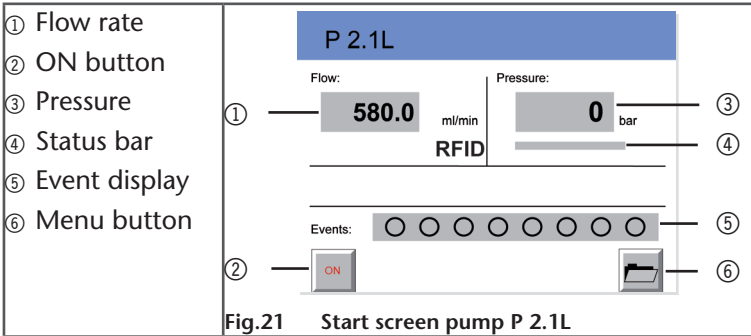
Settings in the Setup Menu

The following menu points are detector specific.

Menu	Meaning
Lamps	Turn lamp(s) on or off and initialize calibration or validation.
Time Const	Smoothen output signal for analog out.
Intensity	Show light intensity of signal and reference channel (UVD 2.1L only)
Advanced	Wavelength and bandwidth correction (DAD 6.1L, DAD 2.1L, MWD 2.1L)
Analog out	Absorption is documented by external devices depending on voltage.
Analog in	Control wavelength depending on voltage (UVD 2.1L only).
Flow cell	Select flow cell (DAD 6.1L, DAD 2.1L, MWD 2.1L)
Fraction	Define fraction collection depending on absorption (UVD 2.1L only).

Pump

The status bar under the flow rate in the start screen indicates that the pump is running.



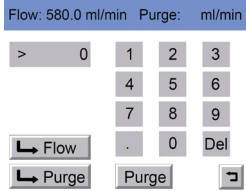
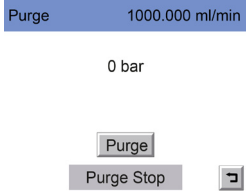
Setting the Flow Rate

Process	Figure
<ol style="list-style-type: none"> 1. Tap the field Flow on the start screen. 2. Enter the value for the flow rate. 3. Tap Flow to save the settings. 4. Keep tapped to return to the start screen and to start the pump from there. 	


Fig.23 Flow rate

Purging the Pump

To purge the pump, use the field Flow. The set flow rate is not changed by the purging.

Process	Figure
<ol style="list-style-type: none"> 1. Open the venting screw to prevent a pressure surge and damage to the column. 2. Tap the field Flow on the start screen. 3. Enter the value for the flow rate. 4. Tap ← Purge to save the settings. 5. Tap Purge to start the purging process. 6. Tap Purge Stop to stop the purging process. 7. Keep ↩ tapped to return to the start screen. 	 <p>Fig.24 Pump</p>  <p>Fig.25 Purge</p>

Setting the Minimum and Maximum Pump Pressure

Process	Figure
<ol style="list-style-type: none"> 1. Tap the field Pressure on the start screen. 2. Enter a value for minimal pressure. 3. Tap ← Min to save the settings. 4. Enter a value for maximal pressure. 5. Tap ← Max to save the settings. 6. Keep ↩ tapped to return to the start screen. 	 <p>Fig.26 Pressure</p>

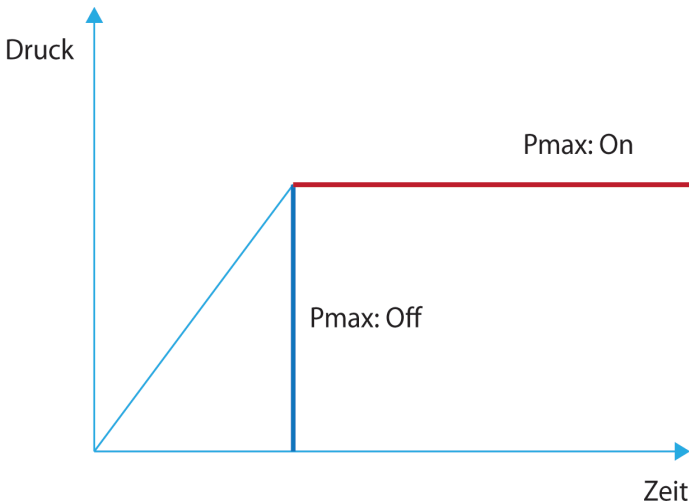
Setting the PMax Mode und Maximum Pump Pressure

The *PMax Mode* functionality protects the column material from strong pressure fluctuations. It regulates the pump's behavior in case the maximum pressure is reached. If the *PMax* functional-

ity is activated, the pump switches from constant flow operation to constant pressure operation. It continues to convey solvent with the pre-set maximum pressure. One maximum flow rate can be set.

The following options can be selected:

- PMax Mode: Off
If the maximum pressure is reached, the pump is stopped.
- PMax Mode: On
Although the maximum pressure has been reached, the pump continues to operate with the pre-set *maximum pressure*.



Settings in the Setup Menu



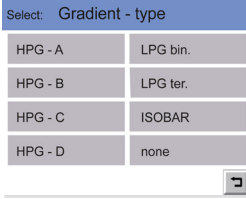
The setup menu for the pump unit in the assistant includes pump head, units, and I-control.

Parameter	Meaning
Pump head	Choose pump head.
Gradient	Decide on operating mode HPG, LPG, or isocratic. Not for P 2.1S/P 4.1S.
Units	Decide on pressure unit (bar, MPa, psi).

Parameter	Meaning
Analog out	Pressure is defined by external devices depending on voltage. Not for P 2.1S/P 4.1S.
Analog in	Control flow rate depending on voltage. Not for P 2.1S/P 4.1S.
Start input	Start/stop loaded programs. External signal sends a command. <ul style="list-style-type: none"> - Enabled: External signal starts a program. - Disabled: External signals get ignored. - Start pump: Pump starts with set flow rate. - Stop pump: Pump runs with set flow rate and can be stopped by external signal. Not for P 2.1S/P 4.1S.
I-Control	Pump stops when maximal pressure has been reached, with maximal pressure being determined by motor voltage. Only for P 2.1S/P 4.1S.

Setting the Gradient

The pump can be operated isocratically, as high pressure gradient (HPG) or low pressure gradient (LPG). If the gradient has been set using software, the settings are displayed on the start screen.

Process	Figure
<ol style="list-style-type: none"> 1. Tap  on the start screen. 2. Tap <i>Setup > Gradient</i>. 3. Choose HPG, LPG, or "none" for isocratic. 4. Keep  tapped to return to the start screen. 	 <p>Fig.27 Gradient</p>

ISOBAR is used for Constant Pressure Mode.

High-Pressure Gradient (HPG)

To set up a pump as HPG, the individual pumps have to be set as parts of the HPG. To do so, connect every pump to the Control Unit and set HPG-A for pump A and HPG-B for pump B. Up to four pumps can be set. These settings cannot be made in the P 6.1L menu because this pump is pre-set as HPG, LPG, or isocratic. The settings described are a prerequisite for controlling an HPG system with chromatography software. If two pumps are set as HPG (HPG-A and HPG-B), it is not possible to control them with the Control Unit.

Low-Pressure Gradient (LPG)



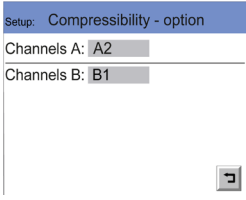
To set up an LPG pump, a valve block with switching valves has to be mounted to the pump head. When working with LPG, the start screen shows the active channels. By tapping the gray fields, the gradient distribution can be entered.

For LPG, you can choose between LPG binary with 2 channels and LPG ternary with 3 channels. For analytical pumps there are also quaternary gradients (with 4 channels).


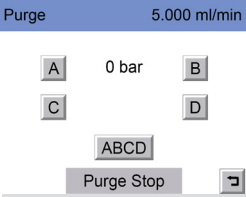
If necessary, single channels can be activated/deactivated.

Solvent Selection Valve

The P 6.1L is equipped with Solvent Selection valves. Solvent Selection valves enable the user to select between 2 solvents per channel of the binary pump. This way, the intake tubes do not have to be changed when the user switches to different solvents. Only a different valve has to be selected. This valve has two inlets (for solvents) and one outlet which is connected directly to the pump head inlet.


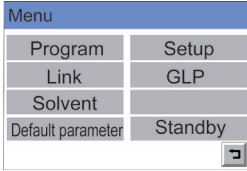
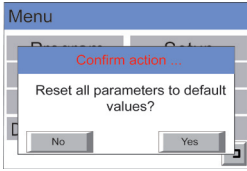
Process	Figure
<ol style="list-style-type: none"> 1. Tap  on the start screen. 2. Tap <i>Setup > Compressibility</i>. 3. Select a combination of channels A1, A2, B1, B2 to choose between different solvents. 4. Keep  tapped to return to the start screen. 	 <p>Fig.28 Solvent Selection valve</p>

Flushing a Pump with Valve Block

Process	Figure
<ol style="list-style-type: none"> 1. Carry out steps 1–5 from the instructions on flushing the pump. 2. Choose channels A, B, C, D, or ABCD to start the flushing process. 3. Tab <i>Purge stop</i> to stop the flushing process. 4. Keep  tapped to return to the start screen. 	 <p>Fig.29 Flushing</p>

Resetting the Pump to Default Settings

With the functionality *Default parameter* the pump can be reset to default settings. Because a number of different parameters can be set for the pump, it can be helpful to reset to pump to default settings when problems occur.

Process	Figure
<ol style="list-style-type: none"> 1. Tap <i>Menu</i> > <i>Default parameter</i>. 2. Tap <i>Yes</i> to confirm resetting the parameters to default settings. 3. Keep  tapped to return to the start screen. 	 <p data-bbox="643 389 912 423">Fig.30 Default settings</p>  <p data-bbox="643 679 912 713">Fig.31 Confirm reset</p>

Using the Constant Pressure Mode



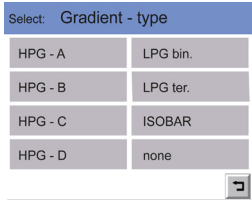
In this mode, the pump pumps with a constant pressure. It is not possible to use gradients.

P 2.1L

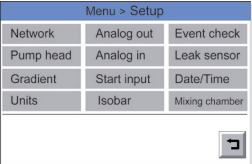
If a valve block is installed, channel A is used for pumping. It is recommended to use the Constant Pressure Mode without a valve block, because this may cause disturbances during operation.

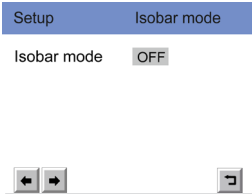
Prerequisite

- Minimum and maximum pressure is set.
- Flow rate is set.


Process	Figure
<ol style="list-style-type: none"> 1. Tap  on the start screen. 2. Tap <i>Setup > Gradient</i>. 3. Choose ISOBAR. 4. Keep  tapped to return to the start screen. 	 <p>Fig.32 Gradient</p>

Target pressure is reached within 15 s. If the target pressure is not reached because the maximum flow rate has been reached before, a note appears on the Control Unit.

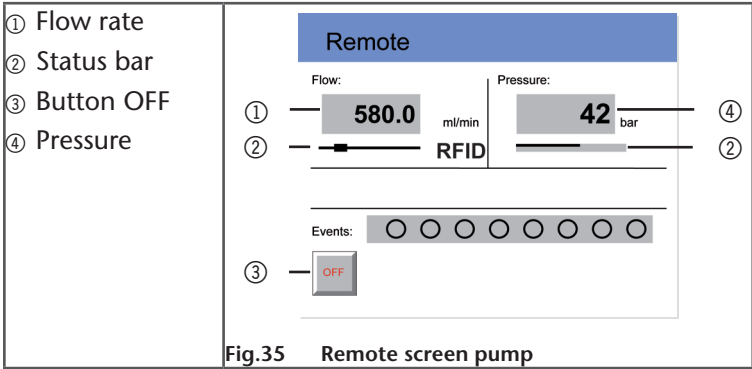
Process	Figure
<ol style="list-style-type: none"> 1. In the P 6.1L menu, tap <i>Menu · Setup · Isobar</i>. 	 <p>Fig.33 Isobar</p>

Process	Figure
<ol style="list-style-type: none"> 1. In the P 6.1L menu, choose between <i>ON</i> and <i>OFF</i> under the menu item <i>Isobar</i>. 	 <p>Fig.34 Isobar mode</p>

Remote Operation

During remote operation, the software controls the devices. The device name is replaced with "Remote" on the screen. All fields are blocked and cannot be operated. Only exception is the button  that can be operated even in remote operation and stops the device.

The remote screen for the running pump is as follows:



Scope of Delivery

- Control Unit
- User Manual

Declaration of Conformity

KNAUER Wissenschaftliche Geräte GmbH

Hegauer Weg 38

14163 Berlin, Germany

Control Unit CU 2.1L – Product number: EZD00

The device complies with the following requirements and product specifications:

- DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast)
- IEC 60799 (1998) Electrical accessories
- Cord sets and interconnection cords
- IEC 61010-1 (2011) Safety requirements for electrical equipment for measurement, control and laboratory use
- Low voltage directive (2006/95/EC)
- DIN EN 61000-3-2 (2006 + A1:2009 + A2:2009) Electromagnetic compatibility (EMC) Part 3-2
- EMC standard (2004/108/EC)
- IEC 61326-1 (2006) Electrical equipment for measurement, control and laboratory use – EMC requirements
- EN 61326-1 Corrigendum 2 (2011)
- Directives for an environmentally sound use of electrical and electronic equipment
- RoHS directives 2002/95/EC (2003) and 2011/65/EU (2012) on the restriction of the use of certain hazardous substances in electrical and electronic equipment
- WEEE directive 2002/96/EC (2003) on waste electrical and electronic equipment

The product was tested with a typical configuration.



Alexandra Knauer (CEO & Owner)

Berlin, 2014-10-01



The mark of conformity has been applied to the rear panel of the device.

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