

Interface Box IFU 2.1 LAN

Instructions



Document No. V6795

HPLC



Note: For your own safety, read the instructions and follow the warnings and safety information on the device and in the instructions. Keep the instructions for future reference.



Note: In case you require this instruction in another language, submit your request including the corresponding document number via e-mail or fax to KNAUER.

Support: Do you have questions about the installation or the operation of your instrument or software?

International Support:

Contact your local KNAUER partner for support:

www.knauer.net/en/Support/Distributors-worldwide

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The information in this document is subject to change without prior notice. For the latest version of the instructions, visit our website: www.knauer.net/library.



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1. General

1.1 About these instructions

These operating instructions enable the safe and efficient operation of the device. The user must have carefully read and understood these operating instructions before starting any work.

The basic prerequisite for safe operation is compliance with all safety instructions. In addition to the safety and warning instructions in these operating instructions, the local accident prevention regulations and the national industrial safety regulations apply.

These operating instructions are an integral part of the device. It must be kept in the immediate vicinity of the device and accessible to the user at all times.

You can download these and other instructions from the KNAUER website: www.knauer.net/library

1.2 Intended use



Note: Only use the device for applications that fall within the range of the intended use. Otherwise, the protective and safety equipment of the device could fail.



Note: The Interface Box IFU 2.1 LAN (further on referred to as „interface box“) has 4 channels for data recording and device control for devices that are not supported by KNAUER software. This includes data recording from detectors via analog inputs, flow rate control for HPLC pumps via analog outputs or switching of valves via digital outputs. The only requirement is that the device supports these tasks. Further information comes included with the instructions of the device.

The interface box is no standalone device, which means that software control is strictly required (e. g. KNAUER ClarityChrom®).



Note: The functions of the interface box that are supported by the software are listed in the respective control software instructions.

1.3 Target group

The instructions address persons who have fundamental knowledge of liquid chromatography.

If you do not belong to this or a comparable professional group, you may not perform the work described in this instructions under any circumstances. In this case, please contact your superior.

1.4 Safety equipment

When working with the interface box, no measures according to lab regulations or protective clothing are needed.

1.5 What must the user take into account?

- All safety instructions in the instructions
- The environmental, installation, and connection specifications in the instructions
- National and international regulations pertaining to laboratory work
- Original spare parts, tools, and solvents made or recommended by KNAUER
- Good Laboratory Practice (GLP)
- Accident prevention regulations published by the accident insurance companies for laboratory work

More safety-relevant information is listed below:

- Power cable: Defective power cables are not to be used to connect the device and the power supply system.
- Power strip: If several devices are connected to one power strip, always consider the maximum power consumption of each device.
- Power supply: Only connect devices to voltage sources, whose voltage equals the device's voltage.

1.5.1 Where is use of the device prohibited?

Never use the system in potentially explosive atmospheres without appropriate protective equipment. For further information, contact the Technical Support of KNAUER.

1.5.2 Secure decommissioning



At any time, take the device completely out of operation by either switching off the power switch or by pulling the power plug.



1.5.3 Opening the device

The device may be opened by the KNAUER Technical Support or any company authorized by KNAUER only.

1.6 Signal words

Possible dangers related to the device are divided into personal and material damage in this instructions.

Symbol	Meaning
	DANGER (red) indicates a highly hazardous situation. If not avoided, it will result in death or serious injury.
	WARNING (orange) indicates a hazardous situation. If not avoided, it could result in death or serious injury.

Symbol	Meaning
	CAUTION (yellow) indicates a moderate hazardous situation. If not avoided, it could result in minor or moderate injury.
	NOTICE (blue) is used to address issues which are not related to physical injury.

1.7 Additional typographical conventions

Note: Specific information are prefixed with the word "Note" and an information icon.

 **Note:** This is an example.

1.8 Legal information

1.8.1 Liability limitation

The manufacturer is not liable for the following issues:

- Non-compliance of these instructions
- Non-observance of necessary safety precautions
- Improper use
- Operation of the device by unqualified personnel
- Use of non-approved spare parts
- Technical changes by the user such as opening the device and unauthorized modifications
- Violations of General Terms and Conditions (GTC)

1.9 Transport damage

The packaging of our devices provides the best possible protection against transport damage. However, check the packaging for transport damage. In case you notice any damage, inform the Technical Support and the shipping company within three workdays.

1.10 Warranty conditions

For information on warranty please refer to our general terms and conditions on the website: www.knauer.net/terms

1.11 Decontamination Report

Devices without a completed Decontamination Report will not be repaired. If you would like to return a device to KNAUER, make sure to enclose a completed **Decontamination Report** with the device: www.knauer.net/servicerequest


1.12 Declaration of conformity

The Declaration of Conformity accompanies the product as a separate document and is available online:

<https://www.knauer.net/de/Support/Declarations-of-conformity>

1.13 Symbols and signs

The following symbols and signs can be found on the device or in the instructions:

Symbol	Meaning
	A device or system marked with CE fulfills the product specific requirements of European directives. This is confirmed in a Declaration of Conformity.

2. Product information

2.1 Scope of delivery



Note: Only use original parts and accessories made by KNAUER or a company authorized by KNAUER.

- Interface Box IFU 2.1 LAN
- Interface Box IFU 2.1 LAN accessories kit

Content of the accessories kit:

- 2 x 9-pin female connector
- 2 x 10-way ribbon cable
- 2 x connecting cable (CINCH-wire end)
- 1 x operating tool
- 1 x power cable (connecting cable for distribution box)
- 1 x LAN cable

Related documents

- Instructions (German/English)
- Declaration of Conformity (English)

2.2 Views

2.2.1 Side view

Legend:

- ① Power connector
- ② LAN Port

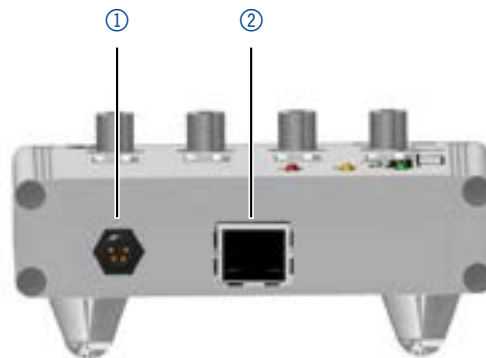
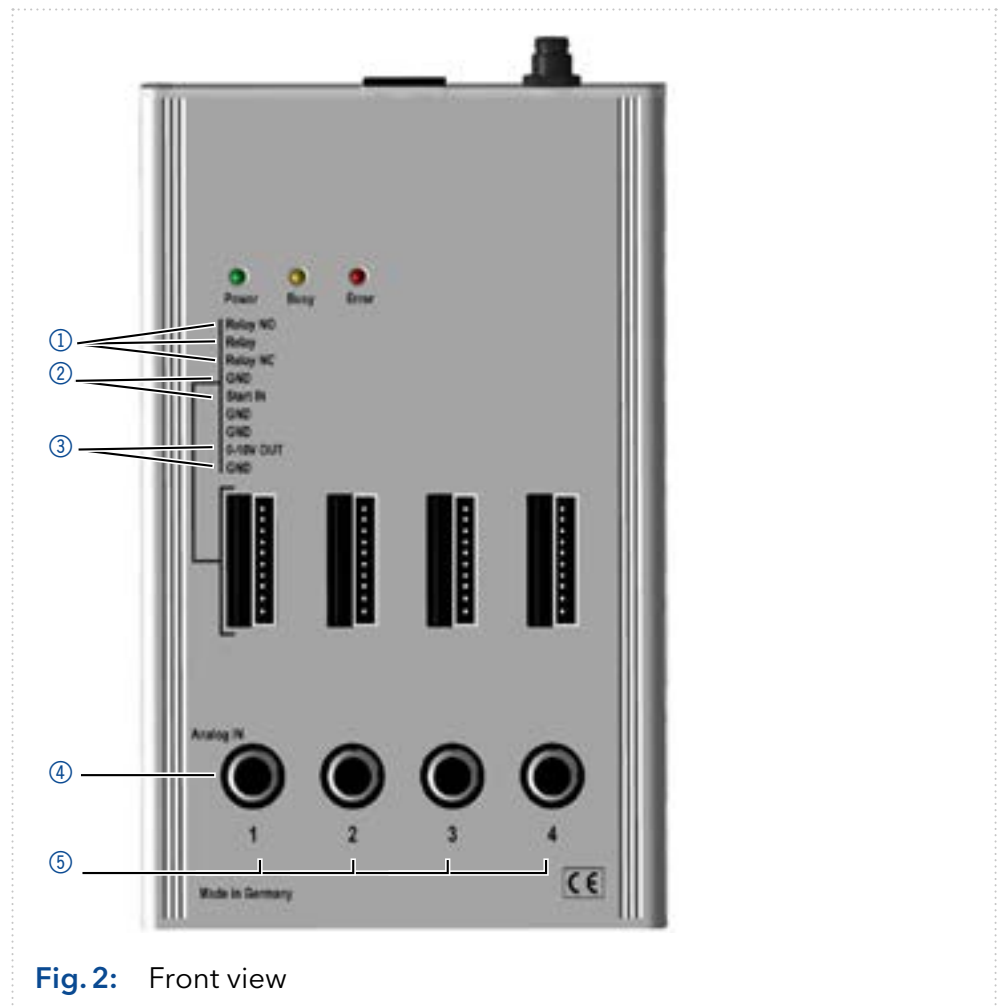


Fig. 1: Side view

2.2.2 Front view

Legend:

- ① Digital out
(or autozero)
- ② Digital in
(Trigger input)
- ③ Analog out (output of
analog control signal)
- ④ Analog in
(data signal input)



3. Unpacking and setup

Only if the requirements for ambient conditions of the operating environment are met, can the intended use be ensured. Details on the operating conditions can be found in the Technical Data section.

3.1 Preparations

3.1.1 Location requirements

- Position the device on a level and even surface.
- Protect the device against direct exposure to sunlight.
- Set up the device at a location not exposed to air drafts (A/C systems).
- Do not set up the device near other machines that cause floor vibrations.

3.1.2 Unpacking the device

Prerequisite Check packaging for damage caused during transportation. If necessary, put forward any claim for damages to the carrier.

- Process**
1. Set up the package in such a way that you can read the label. Using the utility knife, cut the adhesive tape and open the packaging.
 2. Remove the foam insert. Take out the accessory kit and the instructions.
 3. Open the accessory kit and check the scope of delivery. In case any parts are missing, contact the Technical Support.
 4. Check the device for signs of damage that occurred during transport. In case you notice any damage, contact the Technical Support.
 5. Place the device in its site of operation.

Next steps Store packaging and keep the included packing list for repeat orders

3.2 Power supply

For power supply, use the distribution box or its respective main adapter if no additional auxiliary device has to be powered.

Inspect the provided power cable beforehand to ensure that it is approved for your country. Replace defective power cables only with accessories from KNAUER. Detachable power cables are not allowed to be replaced with other cable types. The maximum power input is 36 VA.

NOTICE

Device defect

No electrical insulation is provided for the interface box. Voltages above 10 V could damage connected devices.

- Take protective measures.
- Use the device according to the specifications.

NOTICE

Electronic defect

A short circuit in the board occurs if the analog connector plugs of the interface box are already connected while you connecting power supply.

- Turn off the device before connecting cables.
- Unplug the analog connector plugs.
- Connect the power adapter.
- Connect the analog connector plugs.

3.3 Connecting the Interface Box to a computer

To establish a connection between the interface box and the computer, you take the USB cable from the accessories kit and plug it into both devices.

It is possible that your computer does not feature the correct drivers. In this case, go to the website of the product and download the correct drivers. The computer identifies the interface box as a serial device even though it was connected using the USB interface. Now check for the COM ports in the Windows device manager.

3.3.1 Including the interface box in KNAUER chromatography software



Note: Read this segment carefully if the serial number of your interface box is > 65000 and if you use OpenLAB®, ChromGate® or EuroChrom® 2000 for Windows. OpenLAB® and ChromGate®: Upon registration you are asked to enter the serial number of the interface box of which you need to enter the last 5 digits only. EuroChrom®: When the software requests the serial number of the interface box in the hardware module, only the last 5 digits can be seen.

3.4 Analog inputs

If the analog output of a device (e. g. 1 V integrator output of a detector) should be connected to the analog input of the interface box, use a Cinch cable supplied or recommended by KNAUER. Alternatively use a matching cable included with the interface box accessory kit.

NOTICE

Electronic defect

If the allowed maximum voltage is exceeded, the interface box can be damaged.

→ Pay attention to the allowed maximum voltage.

3.5 Analog outputs

The analog output have to match the control input of the connected device. The respective information has to be checked in the device instructions. Particular attention has to be paid to the allowed maximum voltage, since the non-compliance of limits can damage the device. KNAUER can not be held reliable in this case. The required components of the remote connector are part of the accessories kit of the interface box.

3.6 Digital connections

Digital inputs can be used to forward trigger signals coming from the injection unit. The connector for the trigger signal is the digital input of the channel, which also serves for recording data from the detector.

Digital outputs can be programmed via control software.

The required components of the remote connector are part of the accessories kit of the interface box. If you require a NO connect the contacts 1 and 2 or the contacts 2 and 3 if a NC is required, respectively (front view, Fig. 2).



Note: If the analog input of a channel is used, it is not possible to program the digital output of the same channel. In this case, the digital output sends a sampled signal at the start of run that e. g. can be used as autozero signal for a detector.

3.7 Mounting the remote connector

Follow the instructions below if you are to connect cables to the remote connector.

1. Guide the blunt side of the depressor tool into the square opening of the desired connector.
2. Press down the lever as indicated by the arrow.
3. Guide the non-insulated end of the cable into the opening below the lever.
4. At first let go of the lever and secondly remove the depressor tool from the plug.
5. The cable is now well-connected to the remote connector.

3.7.1 Cable plan

The exemplary cable plan shows a possible connection scheme for the connectors. Pay attention to the fact that the digital output and analog input of a channel can not be used at the same time, except the analog input is used for autozero of a detector.

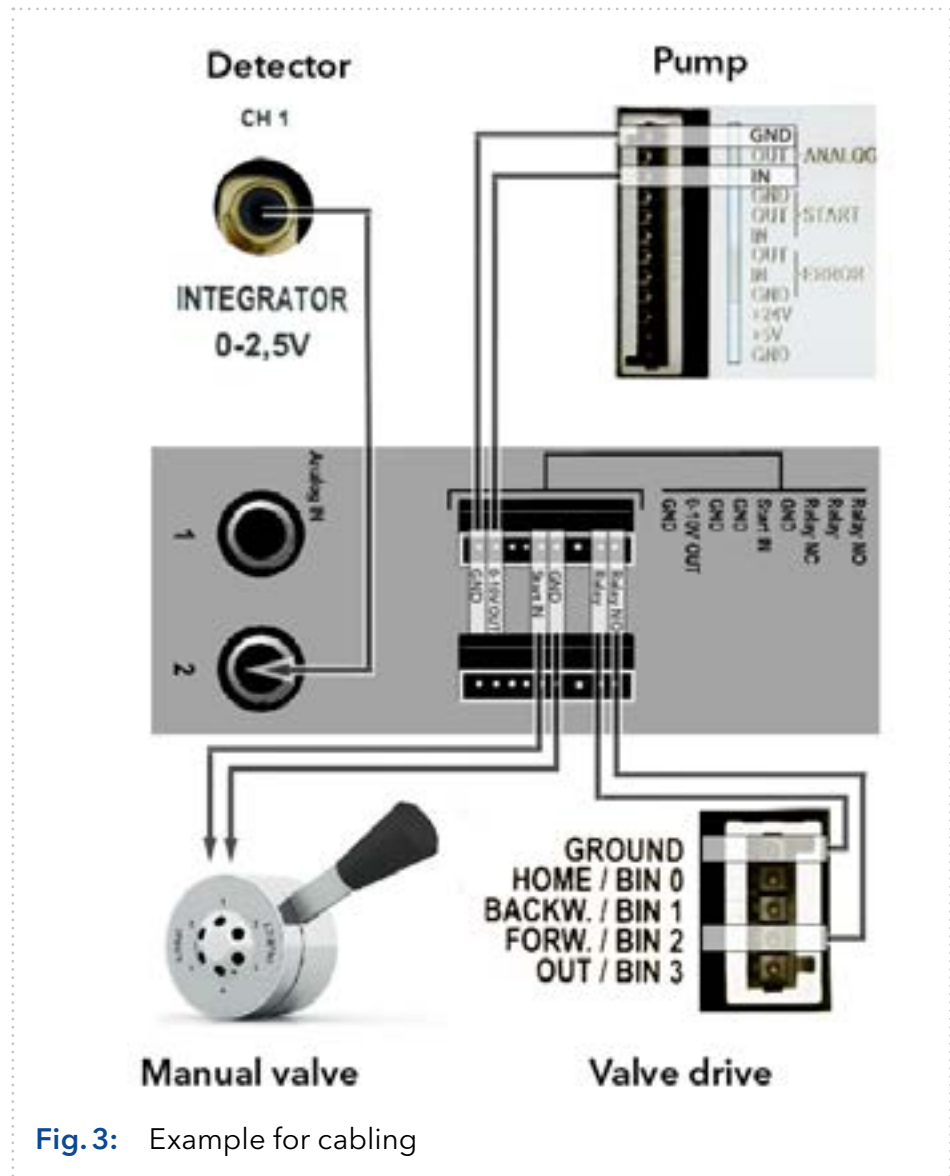


Fig. 3: Example for cabling

4. Functionality tests



Note: Standard processes regarding IQ and OQ in single devices may be handled differently in individual cases.

4.1 Installation Qualification (IQ)

The customer may request the Installation Qualification, which is free of charge. In case of a request, the technical support of KNAUER or a provider authorized by KNAUER performs this functionality test during the installation.

The Installation Qualification is a standardized document that includes the following:

- confirmation of flawless condition at delivery
- check if the delivery is complete
- certification on the functionality of the device

You can either use the IQ document attached to this instruction manual or download a digital version from our website:



4.2 Operation Qualification (OQ)

The Operation Qualification includes an extensive functionality test according to KNAUER standard OQ documents. The Operation Qualification is a standardized document and free of charge. It is not part of the delivery. Please contact the technical support in case of a request.

The Operation Qualification includes the following:

- definition of customer requirements and acceptance terms
- documentation on device specifications
- device functionality check at installation site

Test intervals To make sure that the device operates within the specified range, you should test the device regularly. The test intervals depend on the usage of the device.

Execution The test can be carried out either by the technical support of KNAUER or by a provider authorized by KNAUER (for a fee). For further information visit our website:






5. Operation

Further information about the operation of the interface box is listed in the respective control software instructions.

5.1 Device status

The colour of the lighting LED indicates the current status of the interface box.

LED	Status
 Power (green)	Green LED lighting permanently: Connected to power supply.
 Busy (yellow)	Yellow LED flashing: During calibration or after receiving a signal from the control software. Calibration is done when starting a device or a run. Yellow LED lighting permanently: Control software checks on the device's status regularly, e. g. every second.
 Error (red)	Red LED lighting permanently: Error is detected while running the self-test or if the software sends a signal that is not recognized by the device.

6. Troubleshooting

Further information on troubleshooting of the interface box is listed in the respective control software instructions.

6.1 LAN

Go through the following steps, in case no connection between the computer and the devices can be established. Check after each step if the problem is solved. If the problem cannot be located, call the Technical Support.

1. Check the status of the LAN connection in the Windows task bar:



If no connection was established, test the following:

- Is the router switched on?
 - Is the patch cable connected correctly to the router and the computer?
2. Check the router settings:
 - Is the router set to DHCP server?
 - Is the IP address range sufficient for all the connected devices?
 3. Check all connections:
 - Are the patch cable connected to the LAN ports and not the WAN port?
 - Are all cable connections between devices and router correct?
 - Are the cables plugged in tightly?
 4. If the router is integrated into a company network, pull out the patch cable from the WAN port.
 - Can the devices communicate with the computer, even though the router is disconnected from the company network?
 5. Turn off all devices, router, and computer. Firstly, switch on the router and wait until its self-test is finished. Secondly, switch on the devices and the computer.
 - Has this been successful?
 6. Replace the patch cable to the device with that no connection could be established.
 - Has this been successful?
 7. Make sure that the IP port of the device matches the port in the chromatography software.

7. Maintenance and care

7.1 Cleaning

Clean the interface box from dust with a dry cloth.

NOTICE

Device defect

Intruding liquids can cause damage to the device.

- Place solvent bottles next to the device or in a solvent tray.
 - Moisten the cleaning cloth only slightly.
-

7.2 Transport

Carefully prepare the device for transport. If you want to return your device to KNAUER for repairs, enclose the Service Request Form which can be downloaded from our website.

For a secure transport, note the weight and dimensions of the device (see chapter "Technical data").

⚠ CAUTION

Bruising danger

Damage to the device by carrying or lifting it on protruding housing parts. The device may fall and thus cause injuries.

- Lift the device only centrally on the side of the housing.
-

8. Repeat orders

This list for reorders is valid for the time the document has been published. Deviations afterwards are possible.

For reorders of spare parts use the enclosed packing list. Contact the Technical Support in case there are any questions on spare parts or accessories.

Further information Further information on spare parts and accessories can be found online: www.knauer.net

Name	Order No.
Interface Box IFU 2.1 LAN accessories kit	FZB00XA
Distribution box	AZS80SA

9. Technical data

9.1 General

Power connection	24 V - 1.5 A, external
Dimensions	105 x 26 x 161.5 mm (W × H × D)
Weight	0.35 kg

9.2 Connectors

9.2.1 Analog inputs

Serving the purpose of receiving analog signals, up to 4 channels or devices can be connected to the interface box. Channels are independent of each other and can be used simultaneously by one system or various systems.

Voltage range	-2.56 to +2.56 V (bipolar mode)
Absolute max. ratings	-10 V to +10 V
Input impedance	10 MΩ
Max. resolution	24 bit
Min. noise level	7 μV (1 Hz, time constant 0.1 s)
Max. data rate	Up to 50 Hz (when using a single channel)
Gain factor (for all channels)	1, 2, 4, 8, 16

9.2.2 Analog outputs

These outputs send analog voltage signals to control devices, which have the necessary inputs. According to the number of outputs, four of these devices can be controlled with one interface box. The outputs can be programmed independently of each other. This e. g. refers to the control of pumps in a high pressure gradient system.

Voltage range	0 V to +10 V
Min. voltage step (DAC resolution)	2.5 mV (12 bit)
Max. load resistance	2 kΩ

9.2.3 Digital inputs

These inputs are trigger inputs receiving a start signal from the injection system. They work with contact end on ground and are compatible for TTL/CMOS or open collectors. If the channels are used for different systems, it is possible to start each channel individually.

High level input voltage (min. - max.)	+2.5 V to +15 V
Low level input voltage (min. - max.)	-15 V to +1 V
Max. input, current at $V_{(in)} = 0,5V$	10 mA

9.2.4 Digital outputs

These outputs are electromechanical relays with single pole switch (SPDT) meaning they are to be used as NO (normally open, connectors 1 - 2, see front view) or as NC (normally closed, connectors 2 - 3, see front view). You can program sampled signals or steady rate signals. A sampled signal has a duration of approx. 1 s, the length of the steady rate signal is not predetermined.

Output type	Either NO or NC
Max. switching voltage	Max. 175 V, DC
Max. switching current	Max. 0.25 A

10. Disposal

Hand in old devices or disassembled old components at a certified waste facility, where they will be disposed of properly.

10.2.1 AVV marking in Germany

Further information According to the German „Abfallverzeichnisverordnung“ (AVV) (January, 2001), old devices manufactured by KNAUER are marked as waste electrical and electronic equipment: 160214.

10.2.2 WEEE registration

KNAUER as a company is registered by the WEEE number DE 34642789 in the German „Elektroaltgeräteregister“ (EAR). The number belongs to category 8 and 9, which, among others, comprise laboratory equipment.

All distributors and importers are responsible for the disposal of old devices, as defined by the WEEE directive. End-users can send their old devices manufactured by KNAUER back to the distributor, the importer, or the company free of charge, but would be charged for the disposal.

10.2.3 Solvents and other operating materials

All solvents and other operating materials must be collected separately and disposed of properly.

All wetted components of a device, e. g. flow cells of detectors or pump heads and pressure sensors for pumps, have to be flushed first with isopropanol and then with water before being maintained, disassembled or disposed.

Installation Qualification (IQ) for a Device

	Created	Reviewed	Approved
Function			
Name			
Date			
Signature			

0. Customer approval

Prior to installation at the customer site, the customer has reviewed the IQ document and agrees with the design and scope.

Company name:

Name	Function	Reviewed & approved	Date	Signature

Installation Qualification (IQ) for a Device

1. Definition of the Installation Qualification

The qualification document „Installation Qualification (IQ)“ is part of the quality management system at the company KNAUER Wissenschaftliche Geräte GmbH.

2. Scope

The customer can request the Installation Qualification. In case of a request, the technical support of KNAUER or a provider authorized by KNAUER performs this functionality test during the installation. The IQ is a standardized document and includes the following:

- Confirmation of flawless condition at delivery
- Check if the delivery is complete
- Certification on the functionality of the device

3. Instructions

All deviations from the specifications that occurred during installation have to be recorded in this document.

In addition, all measures taken to eliminate the deviations have to be noted down as comments in the list of rectifications (LOR) on page 4.

If certain items in the report are not applicable, this has to be indicated in the table as „N/A“ (not applicable). Major sections that are not used have to be crossed out (diagonal line), marked „N/A“, dated and signed.

All required documents have to be completed by the end of the installation. The document has to be reviewed and approved by an authorized person. The review and approval have to be documented with signature and date (DD/MM/YYYY).

The tests have to be carried out in a suitable environment, as described in the user instruction of the device.

4. About this document

The information in this document is subject to change without prior notice. This document may not be used, reproduced or translated without written consent of KNAUER Wissenschaftliche Geräte GmbH. Depending on the customer's quality assurance system, the signed document either has to be filed in the device folder or scanned and stored in an electronic archive.

5. Device data

Device name		Product number	
Serial number		Order number	
Firmware version			
Installation location			

6. Customer and manufacturer data

	Customer	Manufacturer
Company		KNAUER Wissenschaftliche Geräte GmbH
Customer number		-
Contact person/agent		
Address		Hegauer Weg 38
Postal code/City		14163 Berlin
Phone		+49 30 80 97 27 111
E-Mail		support@knauer.net

Installation Qualification (IQ) for a Device

7. Installation Qualification Tests

Test	Description	Specification	Passed	Failed	N/A	Comment/LOR no.
1	Identify the device.	The name on the device matches the name on the delivery order.				
2	Check the device for transport damage.	No transport damage is observed.				
3	Check the scope of delivery.	The scope of delivery matches the packing list and/or the delivery order.				
4	Check that the technical documentation provided is correct and complete (material documentation of wetted parts, calibration certificates etc.)	The documentation is correct and complete.				
5	Check that all equipment is properly and correctly labeled according to the delivery order and/or the labeling specifications document, if applicable.	The equipment is labeled correctly.				
6	Connect all loose parts (e.g. capillaries, tubings, measuring head) according to the user instructions.	The device is fully assembled and ready to use.				
7	Ensure that the installation site is suitable according to the user instructions.	The installation site matches the specifications in the user instructions.				
8	Connect the device to the power supply and switch it on.	The device starts (operating noise). The power LED or the display lights up.				

Installation Qualification (IQ) for a Device

8. List of rectifications (LOR)

LOR no.	Test no.	Type of deviation*	Description of the deviation	Action plan	Persons responsible	Due date	Date/signature

*Type of deviation:

A = acceptable (e.g. not a GMP-critical deviation)

N = not acceptable

Continuation of qualification activities into the next qualification phase is only possible when deviation is rectified.

T = temporarily acceptable

a) Release and use of the system is possible, even when the deviation is not rectified.

b) A continuation of qualification activities into the next qualification phase is possible, even when the deviation is not rectified.

Installation Qualification (IQ) for a Device

9. List of changes to the document

Revision no.	Description of change	Additional information	Date/signature

Installation Qualification (IQ) for a Device

10. Certificate and approval

A KNAUER employee or an employee authorized by KNAUER has checked the device and performed all tests described in the IQ.

The IQ form has to be signed by an authorized person. The scope of the IQ meets the customer's requirements.

The results of the IQ, any changes made as well as the IQ process have been documented in this form in writing. The users listed below were instructed and are familiar with how to operate the device. Both parties confirm that the IQ has been performed to the customer's satisfaction by signing it.

10.1 Customer approval

Name	Function	Date	Signature

10.2 KNAUER agent approval

Name	Function	Date	Signature

11. Comments / recommendations

Science with Passion



Latest KNAUER instructions online:
www.knauer.net/library

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