LAB

LIQUIPORT

NF 100_ _.18
NF 1.100_ _.18
NF 300_ _.18
NF 1.300_ _.18
OPERATING INSTRUCTIONS

DIAPHRAGM LABORATORY PUMP

Before operating the pump and the accessories, please read the operating instructions and pay attention to the safety precautions.

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CONTENTS

CONTENTS

1. GENERAL INFORMATION

1.1 Information about the instructions

Contents

The Operating Instructions contain important notes on how to use the pump. In order to ensure safe working and proper functioning it is essential to observe all the specified safety precautions.

Storage location

These Operating Instructions are part of the product, and must be stored in its immediate vicinity in a location accessible to personnel at all times.

Passing on

These Operating Instructions are part of the product, and must be passed on to the next owner if the device is resold.

Project pumps

Customer-specific project pumps (pump models which begin with "PL" or "PML") may differ from the Operating Instructions, in which case the agreed specification is also applicable. It is listed with the other applicable documents.

Illustrations in the instructions

Illustrations in these Operating Instructions may be to scale, but do not have be.

The illustrations may differ slightly from the actual product.

1.2 Warnings

Warnings in the Operating Instructions are identified with the danger symbol, keywords and colors. These provide an indication of the extent of the danger.

DANGER

Indicates a dangerous situation which will lead directly to death or serious injury if it is not avoided.

WARNING

Indicates a dangerous situation which may lead to death or serious injury if it is not avoided.

CAUTION

Indicates a dangerous situation which may lead to moderate or minor injuries if it is not avoided.

NOTE

Indicates a situation which may cause damage to property if it is not avoided.

1.3 Symbols

The following symbols appear in the Operating Instructions, on labels on the device, and on its packaging:

⚠ WARNING

Danger of injuries and property damage caused by illegible labels

The labelling on the device may become illegible with time.

- Maintain labels on the device in a legible condition.
- Replace any illegible labels.

The following symbols in the Operating Instructions and on the device and its packaging indicate environmental protection considerations:

Recycling

Not to be disposed of with household waste

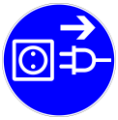
The following symbols in safety precautions and on the device indicate the nature of the danger:

General danger symbol
Further details of the nature of the danger are provided in the warning highlighted by this symbol.

Electrical danger

Danger of caustic burns or burns

Danger of automatic start-up



Disconnect device from power supply by pulling out the mains plug

1.4 Disclaimer of liability

In preparing the contents of these Operating Instructions, account has been taken of applicable regulations and the state of the art.

The manufacturer can accept no liability for any damage or malfunctions caused by failure to follow the Operating Instructions.

The manufacturer can accept no liability for any damage or malfunctions caused by modification or conversion of the device or improper handling.

The manufacturer can accept no liability for any damage or malfunctions caused by the use of non-approved spare parts and accessories.

1.5 Manufacturer's address

KNF Flodos AG
Wassermatte 2
6210 Sursee, Switzerland

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1.6 Year of manufacture

The year of manufacture is shown on the device's type plate.

1.7 Other applicable documents

The documents listed must also be taken into consideration.

- Chemical resistance list
- Sales documents
- GTCs

1.8 Copyright

1.9 Warranty conditions

The applicable warranty conditions are set out in the General Terms and Conditions of Business and the sales documents.

The warranty does not cover the following:

- Malfunctions caused by particles/fibres in the valve system
- Sticking of the valve system as a result of inadequate flushing

2. SAFETY

2.1 Intended use

This pump is intended exclusively for use as follows:

- For transferring and metering liquids.
- For indoor operation.
- For temporary operation in laboratories for research purposes.
- For operation in accordance with the operating parameters specified in the technical data (see Chapter 3) and other applicable documents.
- For transferring media which meet the requirements in the technical data and other applicable documents.
- For operation in fully assembled condition.
- For upright operation on a firm table top.

2.2 Reasonably foreseeable misuse

Operating safety of the pump is guaranteed only when it is used as intended in accordance with Section 2.1.

The pump may not:

- be operated in an explosive atmosphere;
- be used to transfer explosive media;
- be used to transfer media with a flashpoint of less than 40°C;
- be used to transfer foodstuffs or pharmacological products (additional certifications are required for this purpose);
- be used to transfer liquid bromine;
- be used to transfer media whose compatibility with the pump head, valves, diaphragm and seals has not been established;
- be used to transfer media containing solids with a particle size exceeding 70 µm.

2.3 Owner's responsibility

The operator is responsible for compliance with the safety precautions in these Operating Instructions and with any safety, accident prevention and environmental protection regulations which apply to the medium to be transferred and the range of applications of the device.

These include the following in particular:

- The operator must perform a risk assessment to identify any additional risks which may arise from the specific working conditions at the pump's installation location and the nature of the medium to be transferred. The operator must convert these into instructions for operating the device.
- The operator must ensure that any employees working with the pump have read the Operating Instructions.
- The operator must train personnel at regular intervals and inform them of the risks involved.
- The operator must provide personnel with the necessary protective equipment as specified in the safety data sheet for the medium to be transferred.
- The operator must maintain the pump in perfect working order.
- The operator must ensure compliance with the maintenance intervals described in the Operating Instructions.

2.4 Personnel requirements

⚠ WARNING

Danger of injuries and property damage caused by insufficiently qualified staff

Improper use of the pump may result in serious injury and damage to property.

- All activities must be performed only by adequately qualified personnel.

The following qualifications are specified for various activities in the Operating Instructions:

Trained personnel	These have been instructed in the task assigned to them and made aware of potential dangers and risks. This training is the minimum qualification for working on the device. Where no other qualification is specified, the activity must be performed by a trained individual as a minimum.
Specialist personnel	The specialist training, knowledge and experience of such personnel, together with their knowledge of the relevant regulations, standards and directives, allow them to perform their assigned duties correctly, and to independently identify and avoid potential dangers and risks.
Unauthorised personnel	Individuals whose reactions have been impaired by the consumption of medicines, alcohol, drugs or by other causes and conditions are not authorised to perform activities on the device.

2.5 Product-specific dangers

This chapter describes residual risks that have been identified in a risk assessment. Safety precautions and warnings in this chapter and in other chapters in the Operating Instructions must be observed in order to avoid dangerous situations.

⚠ DANGER

Danger of injuries and property damage caused by leaks in connections and the pump head

Poisoning and caustic burns, or undesirable reactions caused by escaping hazardous materials

- Maintain the torque of connections
- Check tightening torque of head screws regularly
- Only use pump if it is in perfect working order
- Operate pump in accordance with the technical data

⚠ DANGER

Danger of injuries and property damage caused by medium escaping from the discharge outlet

Poisoning and caustic burns, or undesirable reactions caused by escaping hazardous materials

- Place the pump in a suitable collecting vessel
- Never close the discharge outlet
- If medium escapes from the pump's discharge outlet, stop using the pump and contact your KNF dealer

⚠ WARNING

Danger of serious injuries or property damage caused by escaping media in the event of overpressure on the suction side

Excessive pressure on the suction side will result in uncontrolled escape of fluid, even if the pump is not operating

- Avoid overpressure on the suction side

2.6 Personal protective equipment

Special protective equipment must be used when performing certain tasks. These are indicated separately in the individual chapters.

Where the wearing of protective equipment is concerned it is essential to observe the safety data sheet for the medium to be transferred.

The following symbols appear in the working area or in the Operating Instructions:

Safety gloves

to protect skin from contact with the transferred medium in accordance with the safety data sheet.

Safety glasses

to protect the eyes from contact with the transferred medium in accordance with the safety data sheet.

Face protection

to protect skin and eyes from contact with the transferred medium in accordance with the safety data sheet.

2.7 Safety equipment

2.7.1 Discharge outlet

⚠ DANGER

Danger of injuries and property damage caused by medium escaping from the discharge outlet

Poisoning and caustic burns, or undesirable reactions caused by escaping hazardous materials

- Place the pump in a suitable collecting vessel
- Check the discharge outlet regularly for leaks
- Never close the discharge outlet (see Fig. 1)
- If medium escapes from the pump's discharge outlet, stop using the pump and contact your KNF dealer

Fig. 1: Discharge outlet

If the pump diaphragm ruptures, the transferred medium is channelled out of the pump through the discharge outlet (see Fig. 1).

2.7.2 Emergency Stop

Pulling out the mains plug acts as an Emergency Stop. If the pump is installed permanently, an Emergency Stop and a maintenance switch must be fitted.

2.8 Environmental protection considerations

All replacement parts should be properly stored and disposed of in accordance with the applicable environmental protection regulations. Ensure adherence to the pertinent national and international regulations. This applies especially to parts contaminated with toxic substances.

Dispose of any packaging material that is no longer required in an environmentally friendly manner. The packaging materials are recyclable.

Dispose of end-of-life equipment in an environmentally friendly manner. Use appropriate waste collection systems for the disposal of end-of-life equipment. Used pumps contain valuable recyclable materials.

2.9 Danger areas

When transferring corrosive, poisonous, ionising, flammable or biological media, escaping medium may cause a hazard.

The danger area of the pump is to be limited by means of safety work stations complying with DIN EN 12469 and DIN 12980, and collecting tanks.

2.10 Declaration of conformity

EG – Konformitätserklärung / EC declaration of conformity

Hiermit erklärt der Hersteller:
Herewith the manufacturer:

KNF Flodos AG, Wassermatte 2, CH-6210 Sursee

dass folgende Membranpumpen,
declares that the following diaphragm pumps,

(Seriennummer siehe Typenschild / Serial number see type label)

FEM 1.10__.18S UFEM 1.10__.18S
FEM 1.10__.18RC UFEM 1.10__.18RC

FEM1.02__.18S
FEM1.02__.18RC
FEM1.02__.18RCP

allen einschlägigen Bestimmungen folgender Richtlinien entspricht:
fulfil all the relevant provisions of the following Directives:

Richtlinie 2006/42/EG Maschinen
Directive 2006/42/EC machinery

Richtlinie 2004/108/EG über elektromagnetische Verträglichkeit
Directive 2004/108/EC about the electromagnetic compatibility

Richtlinie 2005/32/EG für Umweltgerechte Gestaltung für energiegetriebene Produkte
Directive 2005/32/EC for ecodesign requirements for energy using products

Richtlinie 2011/65/EU zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten
Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Dokumentationsverantwortlicher:
Authorised person to compile the relevant technical documentation:

D. Kohli, KNF Flodos AG, Wassermatte 2, 6210 Sursee, Schweiz

Folgende harmonisierte Normen wurden angewandt:
The following harmonized standards have been used:

EN 61010-1
EN 61326-1
EG 278/2009

3. TECHNICAL DATA

3.1 Items included in delivery

- LIQUIPORT pump
- Mains plug
- Operating instructions

3.2 Storage conditions

- Pumps must be stored in a dry place and protected from contamination.
- The storage temperature must be between 5°C and 40°C.
- The pump is supplied with protective caps. These protective caps must be fitted during storage.
- Store pump upright and with protection.

3.3 Pump materials

The type designation **KT** stands for:

Assembly	Material[1)]
Pump head	PP
Valve plate / seals	FFKM
Diaphragm	PTFE-coated
Housing	PA, TPE, PC

Tab. 1: KT *[1)] according to DIN ISO 1629 and 1043.1*

The type designation **TT** stands for:

Assembly	Material[1)]
Pump head	PVDF
Valve plate / seals	FFKM
Diaphragm	PTFE-coated
Housing	PA, TPE, PC

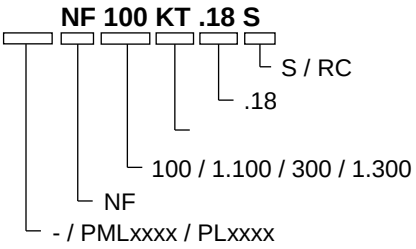
Tab. 2: TT *[1)] according to DIN ISO 1629 and 1043.1*

The type designation **FT** stands for:

Assembly	Material[1)]
Pump head	PTFE
Valve plate / seals	FFKM
Diaphragm	PTFE-coated
Housing	PA, TPE, PC

Tab. 3: FT *[1)] according to DIN ISO 1629 and 1043.1*

3.4 Product key



Description	Meaning
PML / PL	Customer-specific designs
NF	Flodos liquid pump
100 / 1.100 / 300 / 1.300	Pump type
KT / TT / FT	Head material
.18	Laboratory device with housing
S / RC	S without external actuation RC with external actuation (remote control)

Tab. 4: Product key

3.5 Dimensions

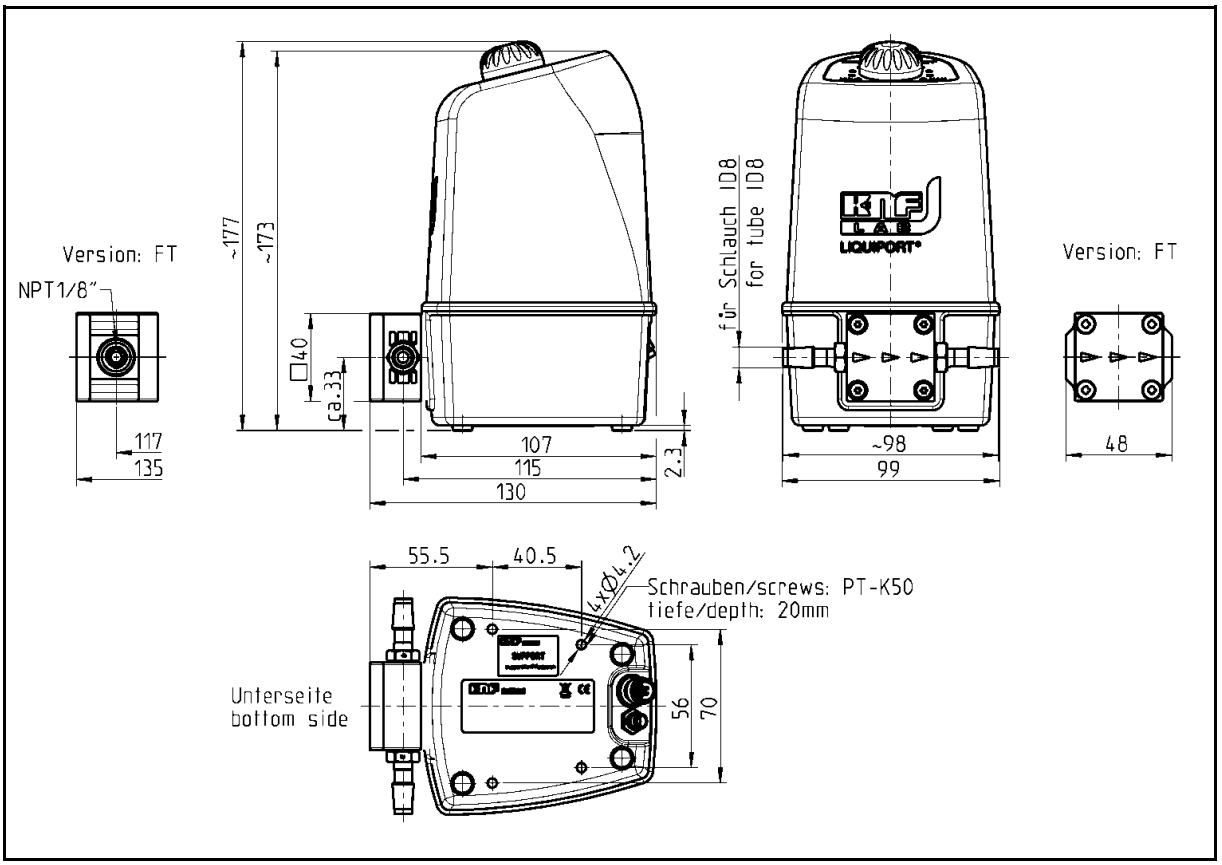


Fig. 2: Mounting dimensions LIQUIPORT 100 / LIQUIPORT 1.100

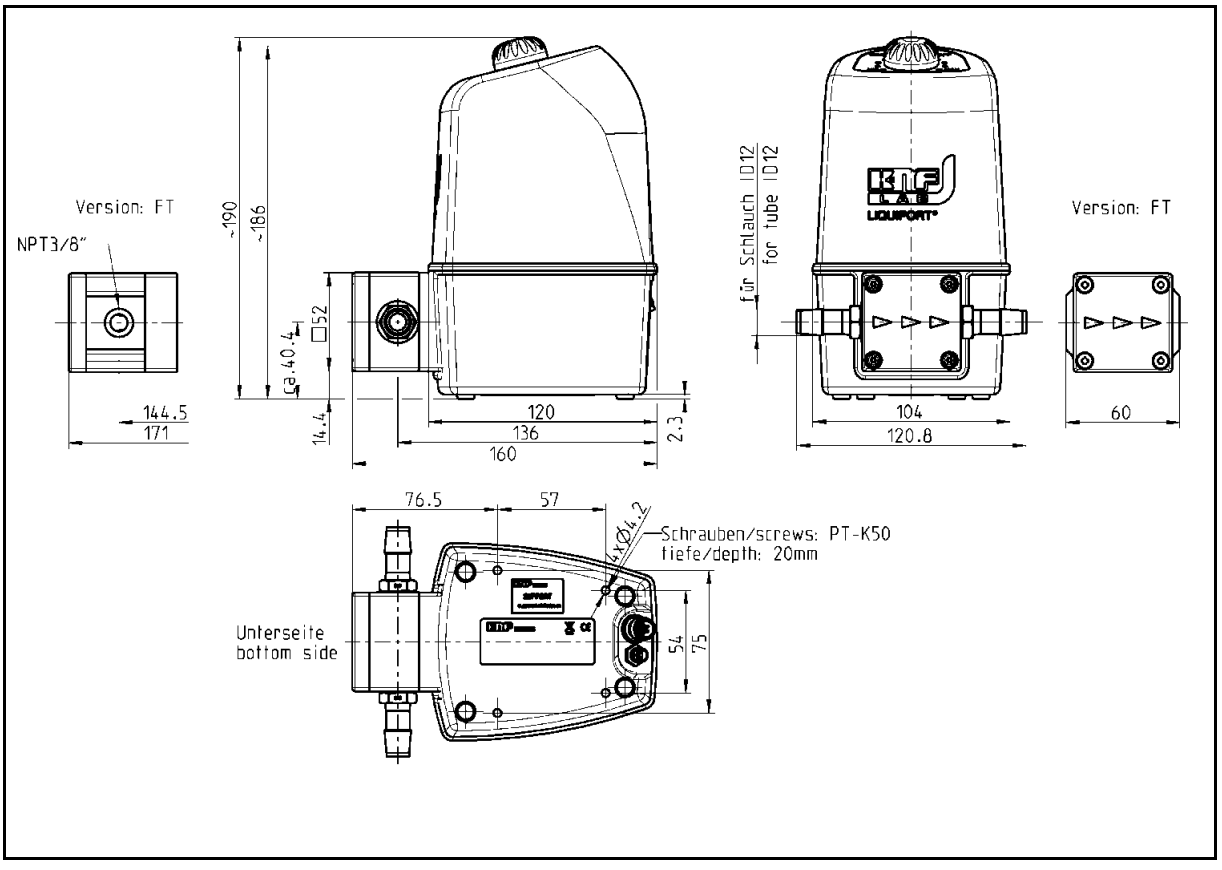


Fig. 3: Mounting dimensions LIQUIPORT 300 / LIQUIPORT 1.300

3.6 Electrical connections and performance data

Pump type	LIQUIPORT 100	LIQUIPORT 1.100
Nominal mains voltage [V]	100 – 240V AC +/- 10%,	
Frequency [Hz]	50-60 Hz	
Max. power consumption AC 100 V / 115 V / 240 V [W]	12 / 12 / 12	15 / 15 / 16
Max. power consumption DC [W]	12	15
Pump DC voltage [V]	24V DC	
Maximum operating current, DC RMS 24 V [A]	0.5	0.63
Max. short-term peak current [A]	0.8	0.8
Power supply fuse	Electronic overload protection	
Pump fuse	Electronic overload protection	

Tab. 5: Electrical data Liquiport 100

Pump type	LIQUIPORT 300	LIQUIPORT 1.300
Nominal mains voltage [V]	100 – 240V AC +/- 10%,	
Frequency [Hz]	50-60 Hz	
Max. power consumption AC 100 V / 115 V / 240 V [W]	22 / 22 / 24	30 / 30 / 32
Max. power consumption DC [W]	22	29
Pump DC voltage [V]	24V DC	
Maximum operating current, DC RMS 24 V [A]	0.92	1.2
Max. short-term peak current [A]	1.3	1.3
Power supply fuse	Electronic overload protection	
Pump fuse	Electronic overload protection	

Tab. 6: Electrical data Liquiport 300

3.7 Other parameters

Pump type	LIQUIPORT 100 LIQUIPORT 1.100	LIQUIPORT 300 LIQUIPORT1.300
Pump weight [kg] 1)	1.0	1.5
Permissible ambient temperature [°C]	+5 to +40	
Permissible media temperature [°C]	+5 to +80	
Permissible working height [m above sea level]	2000	
Max. humidity	90% (non-condensing)	
Nominal speed [rpm]	3000 rpm	
Noise level [dBA]	< 40dBA	
Pump protection type	IP 65	
Power supply protection type	IP 40	
Protection class	III	

Tab. 7: Other parameters

1) The weight may differ slightly from the stated value, depending on the version.

3.8 External actuation (RC version only)

Parameter	Value
Analog input	
Signal range	0-10V
Signal range optional 1)	0-20mA
Input resistance	133 kΩ at 0-10 V 510 Ω at 0-20mA
Dielectric strength	24V DC
Digital input	
Signal range	Pull up to 24 V
Dielectric strength	24V DC
Voltage level without external wiring	19V typ.
Level low	≤ 4.0V = low
Level high	≥ 14.0V = high
Pull-up resistance	10 kΩ
Resistance to ground/GND	43 kΩ
Digital output – open-collector output (NPN transistor to GND)	
Dielectric strength	24V DC
Loading capacity/output current low level	0…10mA typ. 20mA max.

Tab. 8: External actuation

[1)] Optional on request.

1 Analog input
Brown
2 External actuation jumper
White
3 Pulse input
Blue
4 Open collector output
Black
5 Ground
Grey

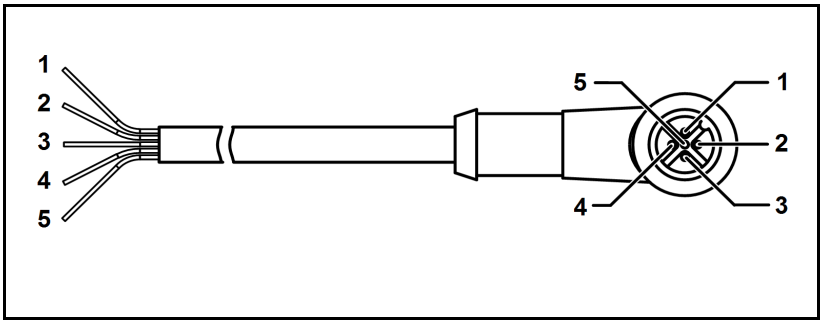


Fig. 4: RC cable pin assignment

Pin no.	Lead color	Description	Function
1	brown	Analog input	(0%) 15% to 100% flow rate
2	white	External actuation jumper	Switches pump over to external actuation. → Control knob is deactivated
3	blue	Pulse input	Start/Stop via external actuation
4	black	Open collector output	Operating mode output (On/Off)
5	grey	Ground/GND	--

Tab. 9: RC cable pin assignment