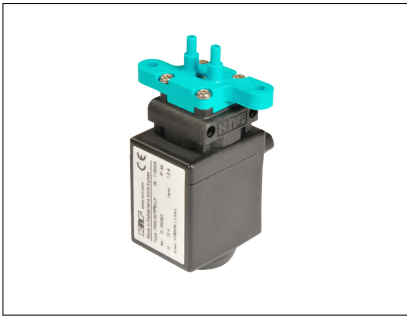


# DIAPHRAGM LIQUID PUMP WITH LINEAR DRIVE

FMM 20



FMM 20 KPDC-P



FMM 20 TTDC-P

## Features / Advantages

### Long lifetime

2 Billion strokes

### Adjustable dispense volume 5-17 $\mu$ l

This allows the pump to be calibrated.

### Large flow range

The pump can be operated between 0-20 Hz, which represents a flow range of 18 ml/min.

### Flow tight in both directions

At rest the pump is sealed internally for pressures up to 0.5 bar.

### High chemical resistance

Large choice of wetted materials.

### Self priming

Capable of pumping both liquids and gases.

### Quiet running

Noise suppression system

## Area of use

- Medical diagnostics
- Industrial dosing systems
- Inkjet printing
- Fuel cells
- Semi conductor industry
- Water analysis
- And more

PERFORMANCE DATA			
Type	Max. frequency	Flowrate at 20 Hz	Max. pressure
FMM 20	20 Hz	18 ml/min	10 mWg

# FMM 20

## ELECTRICAL DATA

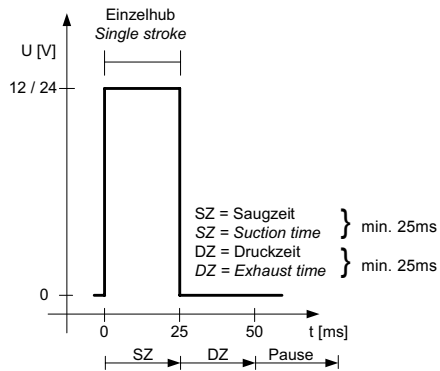
Voltage (V)	12 / 24
Max. allowed frequency (Hz)	20
I load max. during impulse (A)	1.45 / 0.6
Effective continuous current consumption (I <sub>rms</sub> ) at 20Hz (A)	0.85 / 0.36
Effective continuous power at 20Hz (W)	8.04 / 7.2
Minimum impulse on time (ms)	25
Motor leads (AWG)	24
Weight (g)	88
Protection factor	IP 54

## HYDRAULIC DATA

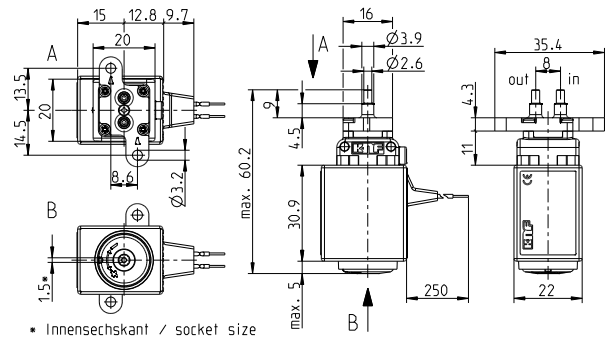
Nominal stroke volume (µl)	15 <sup>1)</sup>
Stroke volume range/calibration (µl)	5-17
Flowrate at 20 Hz (ml/min)	18
Max. allowed pressure (bar)	1.0
Suction height (mWg)	3

<sup>1)</sup> During the adjustment of the pump at KNF, ten consecutive strokes are measured. The nominal stroke volume is their average value, which lays between 14.5 and 15.5 µl.

## CONTROL SIGNAL (IMPULSE)

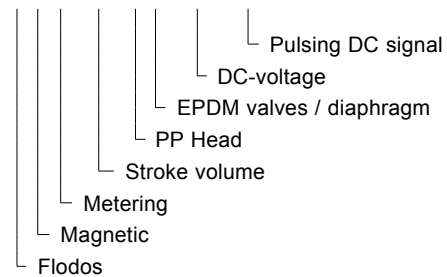


## FMM 20\_DC-P



## PUMP DESCRIPTION

### FMM 20 KP DC - P



## MATERIALS OF HEAD COMPONENTS

Pump type	Head material	Valve material	Diaphragm material
FMM 20 KPDC - P 12 / 24V	PP	EPDM	EPDM
FMM 20 KTDC - P 12 / 24V	PP	FFKM	FFKM
FMM 20 TTDC - P 12 / 24V	PVDF	FFKM	FFKM

# IMPORTANT NOTES

## General notes

All values given in this data sheet are based on the standard FMM 20 pump. The pumps are adjusted to a stroke volume of 15 µl per stroke using standardised test equipment. External parameters, such as hose material, hose length, supply voltage, pulse width, frequency, ambient temperature, viscosity and liquid temperature, have a significant influence on the accuracy and repeatability of the pump.

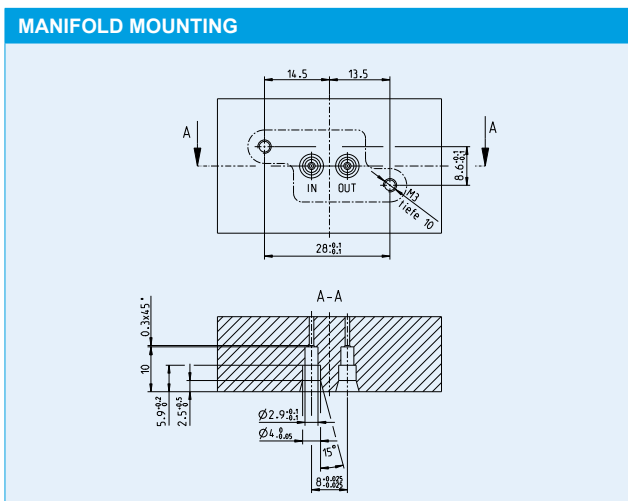
For more information, please contact your KNF technical adviser.

## Manifold mounting the pump

The standard FMM 20 pump comes with two top ports designed for manifold mounting (see drawing). To seal the manifold we suggest using an O-ring 2.5 x 1. It is also possible to use 3 mm tubing on the ports but only if no pressure build up is in the system.

We also offer different tubing / manifold connection possibilities depending on your requirements (see next page).

O-ring material	Dimensions	Order No.
EPDM	2.5 ID / 4.5 AD	157 604
FFKM	2.5 ID / 4.5 AD	157 734



## Accuracy

The 15 µl is set and measured during testing at KNF. If the pump is subject to different parameters then the stroke volume can differ.

## Calibration

It is possible to calibrate the flowrate to fit the specific conditions of the application by adjusting the stroke length using the calibration screw on the base of the pump (allen key 1.5).

## Repeatability

In order to achieve the best accuracy and repeatability it is important to ensure that the surrounding parameters stay constant. E.g. pressure, suction height, liquid temperature, type of hosing, etc.

## Vacuum

At low frequencies the time taken to achieve the maximum vacuum will be longer. The end vacuum may vary depending on the adjusted stroke length.

## Priming

Before dispensing starts it is important that the system is completely filled with liquid as air bubbles will lead to false results. The system is best primed by running the pump at 20 Hz.

## Fittings

Check that the fittings are connected properly and are not letting air in.

## Filter

The presence of particles in the liquid being pumped can result in the valves being blocked. We therefore recommend the use of an approx. 50 micron filter on the suction side.

## OPTIONS

### Connections (available on request)



**Flat manifold mounting** - It is possible to flange the pump straight onto a manifold using o-rings to seal the two surfaces.



**Hose barbs** - A good option when using 3 mm ID tubing. At high pressures it may be necessary to fix the tubing on with a clamping device.



**UNF 1/4"-28 inside threads** - This type of fitting is becoming very popular. As the fitting is screwed in a clamp ring is compressed creating a very good seal. Also available with resonating chamber. This reduces the influence of changing parameters in the customer's system on the performance of the pump.

The connections are available in several materials such as PP, PPS and PVDF.

## ACCESSORIES

Control module for test purposes available on request.

KNF offers a wide range of accessories such as pressure control valves or pulsation dampers which can be used to make the perfect fluidic solution for your application.