

SOLENOID DIAPHRAGM METERING PUMP

FMM 80



FMM 80 KPDC-P



FMM 80 TTDC-P

Concept

The FMM 80 pump is a solenoid driven diaphragm pump which has been designed to dispense an accurate volume of 80 µl per stroke. The volume can be adjusted between approx. 30 and 80 µl thus allowing the pump to be calibrated to fit the parameters of the application.

An electrical impulse 12 or 24 V sent to the solenoid creates a magnetic field which in turn draws the diaphragm down compressing a spring. As the impulse stops the spring pushes the diaphragm up which, coupled with the patented valve system, creates a pumping action.

The pump can be mounted in any position using either a manifold or tubing.

Features

Long service life

Over >500 million cycles.

Dispense volume from 30 to 80 µl

Mechanical calibration between 30 and 80 µl. If desired, the pumps can be supplied with a dispense volume that cannot be adjusted externally.

Large flow range

The pump can be operated between 0 - 10 Hz (flow rate of 0 - 48 ml/min).

Flow tight in both directions

At rest, the pump is flow tight in both directions.

Pressure stable

There is only minimal variation in stroke volume, between 0 and 1 bar of counterpressure.

High chemical resistance

The use of PP, PVDF, EPDM, FFKM and PTFE (TFM) as materials that come into contact with media enables the transfer of a large number of neutral and corrosive media.

Self-priming

The sophisticated diaphragm technology and the precise valve technology allows a suction height of 4 mWS, at nominal engine capacity.

Quiet running

A patented and tried-and-tested noise suppression system means that the pump is extremely quiet.

High repeatability

Stable pump characteristics over the products entire service life.

Maintenance-free

The pump is maintenance-free over the complete life time.

Area of use

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

PERFORMANCE DATA				
Type	Nominal volume	Calibration range	Max. Frequency	Max. Pressure
FMM 80	80 µl	30 - 80 µl	10 Hz	1 bar

THE KNF MODULAR CONCEPT OF SELECTION

KNF modular system

Clearly-defined basic elements form the foundation of our versatile product range that responds to our customers specific needs. You can determine for yourself which properties fulfil your requirements in the most effective way, using the following modules to put together your diaphragm liquid pump:

1 Material of head components

KNF Flodos supplies a wide selection of material combinations for applications in direct contact with media. These enable the transfer of almost any medium.

2 Solenoid

The FMM 80 pump is a magnetically-driven linear pump. Sending an electrical impulse to the pump generates a magnetic field, which carries out a stroke movement. The solenoid possesses a fixed transient voltage suppressor. This enables a controlled discharge to take place, thereby preventing damage to the electronic control system. To avoid disturbing the control signal the electronic control should not contain any diode.

3 Voltage

The solenoids inside the FMM 80 pumps can be supplied as standard in the voltage ratings 12 V or 24 V.

TYPE DESCRIPTION			
Basic model	1	2	3
FMM80			
e.g.	KP	DC-P	24V

1	MATERIALS OF HEAD COMPONENTS	
KP	Head Valves/O-rings Diaphragm Resonating diaphragm	PP EPDM EPDM EPDM
KT	Head Valves/O-rings Diaphragm Resonating diaphragm	PP FFKM PTFE coated FFKM
TT	Head Valves/O-rings Diaphragm Resonating diaphragm	PVDF FFKM PTFE coated FFKM

2	SOLENOID
DC-P	Direct current impulses for the magnetic drive

3	VOLTAGE
12 / 24 V	for a direct current solenoid

General notes

All values given in this data sheet are based on the standard FMM 80 pump and depend on the liquid, choice of head materials and tubing.

The standard FMM 80 is adjusted to a stroke volume of 80 µl per stroke using standardised test equipment.

Important notes

Accuracy

The 80 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 dispense volume to fit the specific conditions of the application by adjusting the stroke length using the calibration screw on the base of the pump between approx. 30 - 80 µl.

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 a low frequency, it will take longer for the maximum vacuum to be built up. If the stroke volume is reduced, the inlet vacuum is also reduced.

Priming

Before dispensing starts it is important that the system is completely filled with liquid as air bubbles will lead to false results.

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.

TECHNICAL DATA

ELECTRICAL DATA

Rated voltage	12 V	24 V
Max. current consumption	2 A	1 A
Mean continuous current consumption at 10Hz	0.42 A	0.21 A
Power rating at 10 Hz	5 W	
Max. permitted frequency	10 Hz	
ON-Time impulse	30 ms	
Min. OFF-Time impulse	>70 ms	
Motor leads	AWG22	
Built-in transient voltage suppressor (Transient Voltage Suppressor)	Limits transient voltage to a max. of 70 V when deactivating the solenoid	
EMC Directive	EN 61000-6-3 (inkl. EN 55022 / EN 55011)	
Protection class	IP 54	

HYDRAULIC DATA

Nominal stroke volume	80 µl
Repeatability (CV value) ¹⁾	0.5 %
Setting tolerance	±2 µl
Permitted stroke volume calibration range	30 - 80 µl
Max. permitted pressure	1.0 bar
Flow tight in both directions	max. 1.0 bar
Max. flow rate	≤48 ml/min ¹⁾
Max. suction height ¹⁾	4 mWg

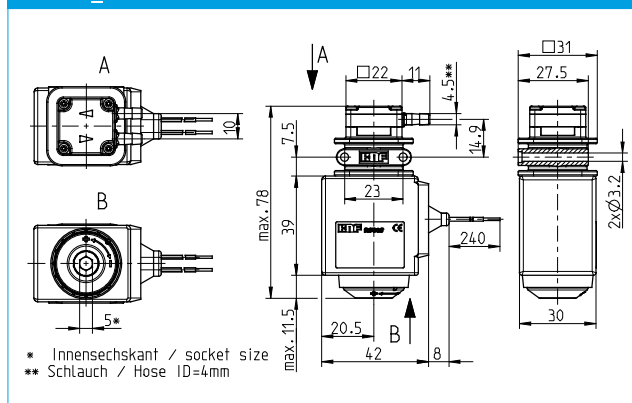
1) At nominal engine capacity

GENERAL DATA

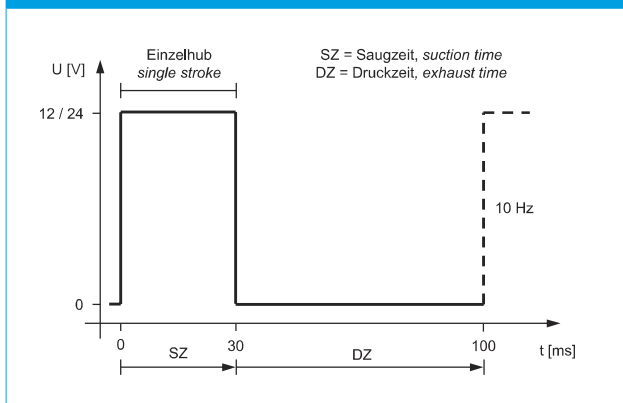
Service life	>500 million cycles
Noise level	≤40 dBA ²⁾
Weight	210 g
Adjusting the pump	Allen key 5 mm
Size	77 x 50 x 31 mm
Allowed ambient temperature	+5 to +40 °C
Allowed liquid temperature	+5 to +80 °C

2) Compliant to DIN 45635, wet-tested, without counterpressure

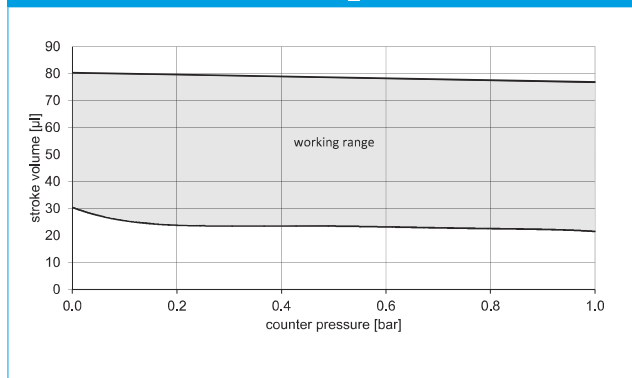
FMM 80_DC-P



CONTROL SIGNAL



CHARACTERISTIC CURVE FMM 80_DC-P



OPTIONS

Starter kit FSK 4 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.