Solenoid diaphragm metering pump FMM 80

DATA SHEET 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. Different connection possibilities can be seen on the last page.

Area of use

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

Function

- **Long service life**
  Over >500 million cycles.
- Dispense volume adjustable 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 membrane technology and the precise valve technology allows a suction hight 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.
- Maintenace-free
  The pump is maintenance-free over the complete life time.

Performance Data

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

FMM 80

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 (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.

Pump type			
Type	Modular system		
	1	**2**	**3**
FMM80			

1	Materials (head components)	
KP	Head	PP
	Valves / O-rings	EPDM
	Diaphragm	EPDM
	Resonating diaphragm	EPDM
KT	Head	PP
	Valves / O-rings	FFKM
	Diaphragm	PTFE-coated
	Resonating diaphragm	FFKM
TT	Head	PVDF
	Valves / O-rings	FFKM
	Diaphragm	PTFE-coated
	Resonating diaphragm	FFKM

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

3	Voltage
12 / 24V	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 80µl per stroke using standardised test equipement.

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.

FMM 80

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 (incl. 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

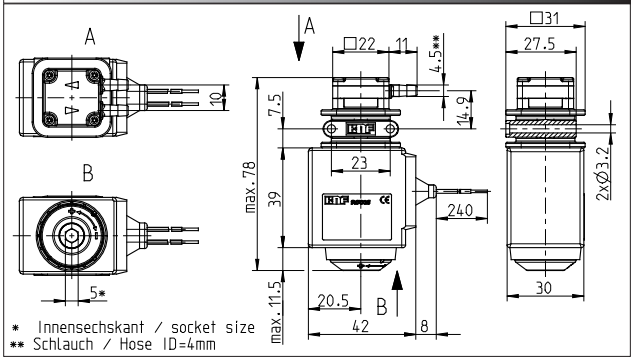
1) at nominal engine capacity

General Data

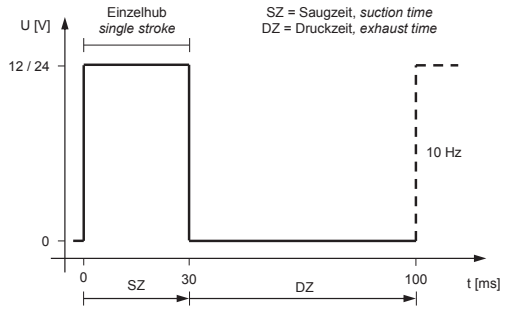
Service life	>500 million cycles
Noise level	≤40 dBA[2)]
Weight	210 g
Adjusting the pump	Allen key 5 mm
Size	77 x 50 x 31 mm
Allowed ambient temperature	+5 to +40 °C
Allowed liquid temperature	+5 to +80 °C

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

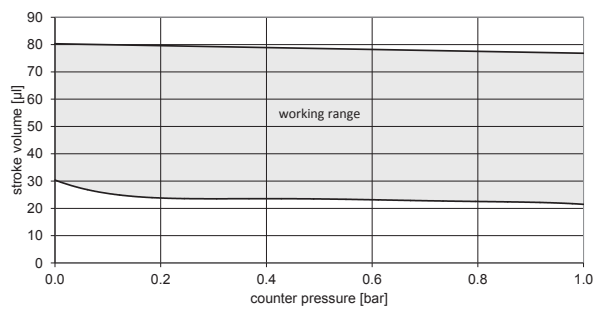
FMM 80_DC-P



Control signal



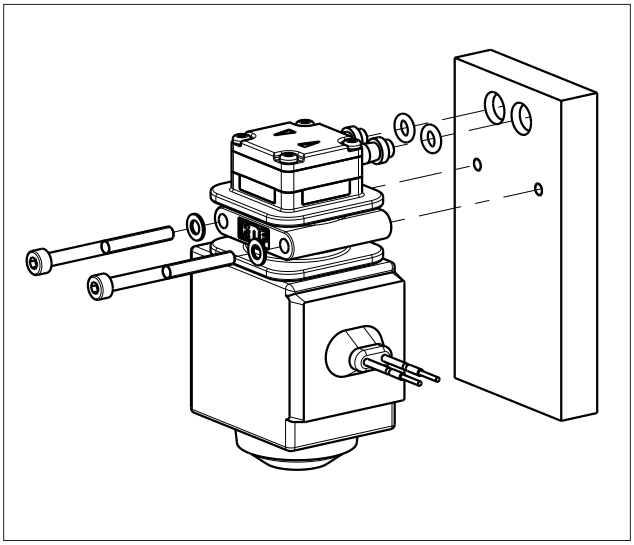
Characteristic curve



FMM 80

Connections

Flat manifold mounting



This type of connection enables the pump to be mounted directly to a plate. Two O-rings are used to provide a perfect seal.

Additional types of connection are available upon request.

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 dampeners which can be used to make the perfect fluidic solution for your application.

We specialise in tailor made solutions. For all the possible options feel free to contact us.

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