VIT~FIT

Polyvalent syringe pump

LAMBDA

These days there are so many different types of syringes and so many different volumes used…

Some need a stadard syringe from a certain producer; others use only glass, metal or a PTFE syringe. Volumes go from a microlitre to 150 mililitres. Is it possible to satisfy everybody with just a single syringe pump?

With our new VIT~FIT syringe pump we have tried to solve just this problem. Our new syringe fixing system VIT~FIT allows almost any syringe to be used from micro syringes to large volume syringes without the use of an adapter and in addition handling the syringes is very easy. The syringe is tightly held in both directions – infusion and filling.

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Construction advantages and properties of the VIT~FIT syringe pump:

To move the pusher we have selected a **new Swiss made motor** which uses new technology to ensure very **high torque and ten times longer lifetime**. For the transformation of the rotation into a linear movement required for pushing the syringe plunger we have introduced for the first time new **Swiss made linear bead bearings**. This is an expensive component in our instrument, but it offers decisive advantages to the user in terms of efficiency and the mechanical yield/force of the system. The precise mechanics with a volumetric spiral is protected in the instrument casing and the pusher arm does not reach out from one side (as in usual with existing syringe pumps), but is integrated into the rear of the instrument. The casing and the main body are made of **metal** with partial PTFE protection. Therefore it is less sensitive to solvents.

The **microprocessor electronics** allow control of the activity of the pump in an easy but effective way. The movement of the new brushless neodymium magnet motor is constantly under the control of the microprocessor, which corrects immediately any deviation from the pre-set speed. Up to **99 program steps** can be memorised by the processor. The pump can be programmed in both directions (for delivery and filling of the syringe). The program can be **repeated in 1 to 99 cycles**.

– *Constant flow rate*
In this standard application of the pump - the flow rate will be kept constant during the pre-selected time period
– *Profile*
Permits varying flow rates to be pre-programmed (including exponentially increasing flow rate as used for e.g. in feeding cultures during fermentation, etc.)
– *Increment*
Increasing flow rate in steps over time (to make gradients)
– *Decrement*
Decreasing flow rates steps as above
– *Pause*
Stops the pump for a specified time before going on to the next step
– *Timer*
By programming a required time interval with zero flow rate as the first step before the program the pump can be automatically switched on or off
– *Stop*
Stops the pump after the program has finished when zero flow rate has been programmed as the last step. If the flow rate of the last step is different from zero then the pump will continue pumping at the specified flow rate until the syringe is empty.

Safe Switching Power Supply
As the mechanical losses are so small we can use a miniature in-plug integrated switching power supply using line voltages from 95 to 240 V AC, 50/60 Hz. During field application the pump can be powered by a 12 V accumulator or a 12 V battery.

Automatic switch off
The motor will be switched off when the syringe is empty or has been refilled.

Remote control
Several remote control commands are available:
– simple ON/OFF (signal 3 to 12 V DC or higher with resistor)
– progressive speed control over the whole range signal 0 to 10 V DC, (0 to 20 or 4 to 20 mA option)
– RS 485 interface (option) for communication with a PC or similar device

Speed selection / syringe calibration
To be able to fit the many types of syringes used, the speed selection is made using speed numbers corresponding to the velocity of the rotation of the motor. The selected syringe has to be calibrated. This means that the speed number (from 000 to 999) has to be put into relation with the delivered volume as a function of time (flow rate). The delivered volumes and flow rates as well as settings are then easily calculated.

Specifications:

Type:	Microprocessor programmable syringe pump; infusion/withdrawal and valve control
Program:	up to 99 steps of speed and time
Time resolution:	0 to 999 min. in 1 min. steps
Maximum program length:	1650 hr
Accuracy:	+/- 1 %
Reproducibility:	+/- 0.2 % (electronically)
Syringes:	glass, plastic, metal; from 5 µl to 150 ml
Flow rate range:	minimum 0.01 µl/min. with 5 µl syringe; maximum 120 ml/min. (7 l/hr) with 150 ml syringe
Non-volatile memory:	storage of all settings
Maximum force:	30 kg (reducible to 8 kg by switch)
Maximum pressure:	2 MPa with 10 ml syringe
Motor:	microprocessor controlled brushless long life BLDC motor with neodymium magnets
Transmission:	linear bead bearings
Pusher travel:	120 mm
Pusher travel rate:	minimum 0.1 mm/min; maximum 100 mm/min.
Speed range:	1 to 1000
Interface:	RS 485 (option)
Voltage:	95 to 240 V/60–50 Hz AC plug integrated switching power supply DC 12V/12 W or similar (field operation on 12 V accumulator)
Dimensions:	12.5 × 26.5 × 13 cm (H × W × D)
Weight:	3.5 kg