VIT-FIT

Polyvalent syringe pump

LAMBDA

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

Some users need a standard syringe from a certain producer; others use only glass, metal or plastic syringes. Volumes start from few microlitres to over 150 millilitres. 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 allows almost any syringe to be used, from micro syringes to large volume syringes, without the use of an adapter. The syringe is tightly held in both directions – infusion and filling.

In addition, the handling of the syringes is very easy.

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Construction advantages and properties of the VIT-FIT (HP) 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 ball screws with highest mechanical load capacity**. This is an expensive component in our instrument, but it offers decisive advantages to the user in terms of **efficiency and mechanical yield/force** of the system. This is crucial for a **pulsation-free operation**. The precise mechanics is protected in the instrument casing and the pusher arm does not reach out from one side (as it is 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 solvent resistant protection.

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 preset speed. Up to **99 program steps** can be memorized by the processor. The syringe pump can be programmed in both directions - delivery (infusion) and filling of the syringe. The program can be **repeated in 1 to 99 cycles or endlessly**.

- *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:* Stepwise increase of the flow rate over time (to make gradients)
- *Decrement:* Stepwise decrease of the flow rate
- *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.

Safe Switching Power Supply

As the mechanical losses are so small we can use a miniature 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 automatically when the syringe is empty or has been refilled.

Remote control

Several remote control possibilities 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 or RS-232 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 flow rates and delivered volumes corresponding to each speed setting are then easily calculated.

Specifications:

Type:	microprocessor-controlled, programmable syringe pump; infusion/withdrawal and valve control
Program:	up to 99 steps of speed and time
Time resolution:	0 to 999 minutes in 1 minute steps
Maximum program length:	1650 hours
Accuracy:	+/- 1 %
Reproducibility:	+/- 0.2 % (electronically)
Syringes:	glass, plastic, metal syringes; with volumes from 5 µl to over 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:	VIT-FIT: 30 kg (reducible to 8 kg by a switch) VIT-FIT HP (high-pressure): 60 kg (reducible to 16 kg by a switch)
Maximum pressure:	2 MPa with 10 ml syringe
Motor:	microprocessor controlled, long life brushless BLDC motor with neodymium magnets
Transmission:	efficient force transmission by a ball screw with highest mechanical load capacity of 12'000 N
Pusher travel:	120 mm
Pusher travel rate:	minimum 0.1 mm/min; maximum 100 mm/min
Speed range:	000 to 999
Interface:	RS-485 or RS-232 (option)
Power supply:	95 to 240 V/50–60 Hz AC (input) plug integrated switching power supply; DC 12V/12 W (output) possible field operation on 12 V accumulator
Dimensions:	12.5 cm x 26.5 cm x 13 cm (H x W x D)
Weight:	3.5 kg

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