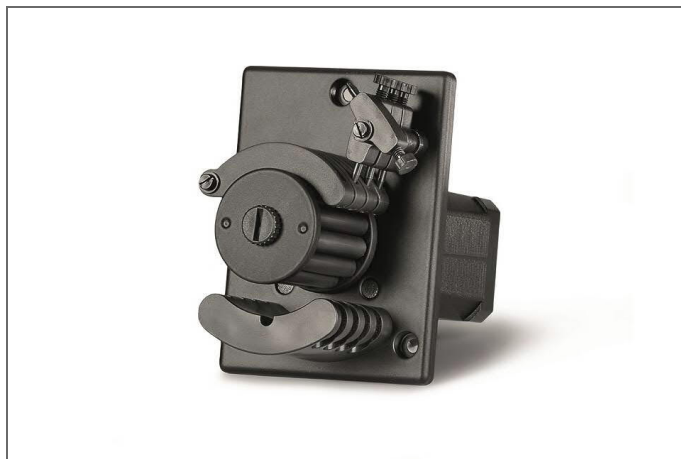
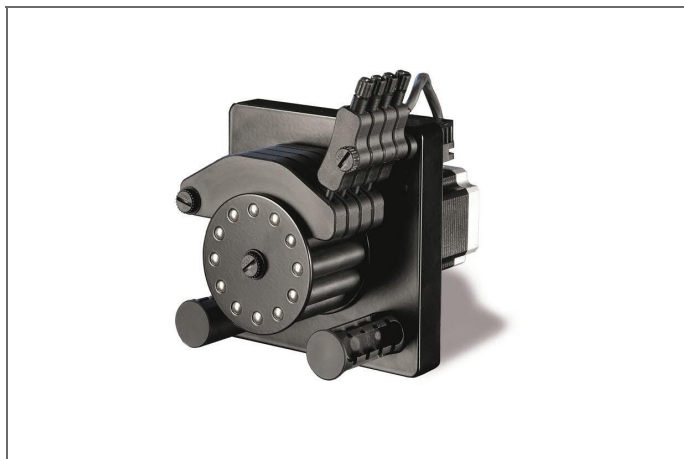


PRODUCT DESCRIPTION

12-11-2020



	Precision Standard	Precision Compact	Low cost mini
Mechanical	72 mm roller head	36 mm roller head	30 mm roller head
	12 rollers	12 rollers	6 rollers
Number of channels	1 – 6	1 – 4	3
Speed	0 – 60 rpm	0 – 100 rpm	0 – 100 rpm
Drive	Stepper motor without gearing, wear-free	Stepper motor without gearing, wear-free	Stepper motor without gearing, wear-free
Stepper motor	1.8°	1.8°	1.8°
Intermediate shaft	Mounted on 2 ball bearings	Mounted on 2 ball bearings	Mounted on 2 ball bearings
All parts	Either made from PVC, PP or powder-coated	Either made from PVC, PP or powder-coated	Either made from PVC, PP or powder-coated
Dosing range per channel	0 – 45 ml/min	0 – 6.5 ml/min	0 – 23 ml/min

THE VARIETY OF HIGH-PERFORMANCE PERISTALTIC TUBE PUMPS

SPETEC® PERISTALTIC PUMPS

Modern tube pumps that operate on the principle of peristalsis are often fitted in a wide variety of devices and equipment, where they transport precise volumes of fluids. The specific expertise of the pump manufacturer means that many OEMs that produce devices for tasks such as chemical/analytical measurements, medical use, in the foodstuffs industry or generally for tasks involving precise metering, do not manufacture the pumps themselves. Instead, they order them as OEM products. The pump manufacturer is expected to supply peristaltic pumps that operate extremely consistently and without pulsation and that have a longer service life than that of the device in which they are fitted. This requires not only special manufacturing methods, but also constant adaptations to performance and size. Ultimately, such constant, ongoing development of peristaltic tube pumps also has to be geared to the various tubing materials.

What are OEM tube pumps?

This type of peristaltic pump is often referred to as a roller pump or a tube pump. A distinction is made between standalone laboratory versions and OEM

pumps. Both types are fitted with the same kind of roller head and are built by Spetec in Erding. The pump manufacturer takes on all aspects of production, from the necessary planning and development work through to the procurement of parts and job handling.

In essence, peristaltic pumps work on the principle that a certain minimum number of rollers alternately compress and release the tubing containing the fluid, thus causing it to be transported in one direction. Smooth, constant transport without pulsations depends on a number of factors. These include the speed at which the rollers move, the number of rollers and their contact pressure, which depends on the tubing material. It is the job of the pump manufacturer, with their many years of expertise, to perfect the interaction of all these factors. Furthermore, the pump manufacturer must be able to adjust the overall size of the OEM pumps to meet requirements without sacrificing any performance. If these pumps are fitted to the exterior of other equipment, it is relatively easy to replace tubing as this becomes necessary. But replacement must also be easy if the pump is fitted where it cannot be seen.

And for these reasons, more than 20 years ago Spetec started designing various types of peristaltic OEM tubing pumps (Figures 1: OEM versions of peristaltic tube pumps (precision compact) as built-in models) and offering them to manufacturers of laboratory and measuring equipment across the globe. And because the pumps and tubing are mutually dependent, the manufacturer also produces the appropriate tubing themselves .

There is a sheer variety of OEM tube pumps which, depending on size and requirements, may have 6 or 12 rollers and different roller head diameters. (Table 1) It is common to have between one and six parallel channels, which can be chosen to suit the intended application. The most stringent requirements in respect of smooth and constant pump performance, aggressive fluids or those with varying viscosity and aqueous or organic media are encountered in the context of ICP or mass spectrometry, where they are of crucial significance for ensuring the reproducibility of the results. It may also be necessary to maintain constant volumes over time in mixing processes. Therefore, alongside discovering suitable tubing material, the designers are primarily concerned with optimizing the performance of the peristaltic operation of these tube pumps. Constant development in collaboration with the OEMs led first to the Low-Cost Mini pump with a roller head diameter of 30 mm and then to other types, known as the Precision Compact pumps.

The different pump types illustrate how the company uses a number of basic components, which they manufacture in house, but that the actual visual and geometric design is done to individual customer requirements. The design of the pump and the base plate, including the color, is custom, meaning that the design concept of the OEM is retained.

So what improvements was it possible to achieve?

The use of stepper motors represents a key advance in respect of the speed ranges, the greater stability of the drive shafts and the low level of wear of the motor as a result of there being no need for gearing. This is complemented by the development of a stepper motor controller (SM04), which is also used in the Symax syringe pump.

This SM04 is designed for operating two-phase stepper motors with 1.8° and 0.9° step angles. This results in extremely smooth operation, where a full step is divided into 64 micro-steps, ultimately giving 12,800 individual steps per revolution. Other features include simple control via the analog input, current matching across the entire speed range and internal temperature monitoring. Pre-loading the shaft prevents axial play and the motor does not need to be geared down for low speeds, as the speed range of the stepper motor is far greater than that of geared motors (by a factor of around 50). In addition, a stepper motor accelerates and brakes immediately.

What are the different pump types?

The exclusive development of the SM04 allows compact fitting on built-in pumps, as can be seen on the Precision Standard tube pumps, the Low-Cost Mini variant and the Precision Compact tube pumps (Table 1).

Fitted with a roller head with 12 rollers, the Precision Standard pump is suitable for the most stringent requirements in respect of low pulsation and consistency of fluid delivery. With its roller head diameter of 72 mm and speeds of between 0 and 80 rpm, it can handle up to 6 channels. The dosing range per channel is 0-45 ml/min.

The Precision Compact pump has a smaller roller head (36 mm diameter) and at speeds of between 0 and 100 rpm can only handle up to 4 channels. The dosing range per channel is 0 – 8.5 ml/min.

The third variant is the Low-Cost Mini pump with an even smaller roller head (30 mm diameter). It covers the same speed range of 0 – 100 rpm, but only handles three channels, with a dosing range per channel of 0-23 ml/min.

All three types are fitted with a wear-free stepper motor (1.8°) and incorporate a shaft mounted on two ball bearings. All parts are made of PVC, polypropylene or are powder coated. As described, the peristaltic tube pumps are fitted with a stepper motor. This is another step towards individuality in custom-built pumps,

which are also easy and inexpensive to fit during final assembly.