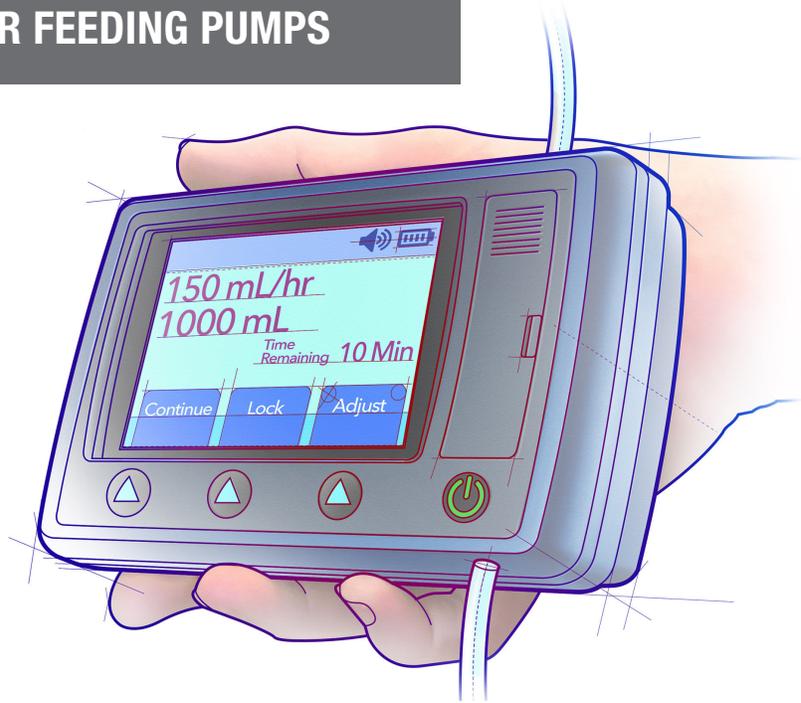


## CORELESS DC BRUSH MOTOR CONTROLS NUTRIENT FLOW FOR FEEDING PUMPS



*Enteral feeding pump driven by compact motion control system*

Enteral feeding pumps are used to nourish patients who are unable to safely consume food by mouth due to illnesses such as stroke, dementia and throat and mouth conditions, as well as loss of consciousness. These pumps include a built-in tube that can deliver nutrients directly to the stomach, making them preferable to intravenous (IV) feeding methods.

While enteral feeding pumps are portable and lightweight, their motor systems must deliver sufficient torque to maintain continuous nutrient flow. They also must be capable of adjusting flow rates — depending on the nutrition formula and patient needs — with accuracy and precision. Recently, an infusion system supplier developed an enteral feeding pump that required a compact motion system that could satisfy several challenges. The mechanism needed to:

- Deliver both low and high viscosity nutrients
- Ensure a smooth, continuous flow without peaks
- Generate speed for a wide range of flow rates
- Provide a long lifetime

The medical equipment manufacturer turned to Portescap because it has a history of solving precision medical pumping challenges, along with its technical know-how and ability to customize motion designs to exact specifications.

## CORELESS DESIGN ACHIEVES HIGH POWER DENSITY

Portescap engineers recommended the Athlonix™ 22N brushed DC motor with an F16 magnetic encoder and K24 gearhead, combined with the required mechanical customization. The 22 mm diameter motor weighs just 53 g and features neodymium magnets to deliver 15.7 mNm of continuous torque and achieves exceptional high power density. The miniature motor does not require a laminated core. Instead, the motor's windings create a self-supporting system with a small footprint. The coreless design without iron laminations offers many benefits to promote pump precision, such as:

- The ability to avoid peaks in flow rate
- Very low torque ripple to ensure smooth flow even at low speeds
- Reduced inertia and mass

The additional Portescap F16 magnetic encoder further enhanced the pump's control accuracy thanks to its integrated Hall sensors that offer greater reliability versus position and speed sensing — all in a compact package.

The Athlonix motor's coreless design has two additional advantages: low noise and low vibration. Both factors are essential for ambulatory nutrition pumps.

## MINI MOTORS DESIGNED FOR EFFICIENCY, LONG LIFE AND SAFETY

Since the enteral feeding pump is portable, energy efficiency is critical to maintain a long battery life. The Athlonix motor features precious metal commutation with low generated friction to achieve operational motor efficiency up to 90 percent. The K24 spur gearhead complements the efficiency thanks to driving low current consumption at the required output torques.

The motion system provides a long operating lifetime, and the motor's precious metal commutation satisfies low current requirements for continuous operation. It also performs under a variety of ambient conditions.



*Figure 1 - Portescap engineers recommended the Athlonix 22N brushed DC Motor with F16 magnetic encoder and K24 mini motor gearhead, along with the required customization.*

The brushes are designed for long life, and the motor's REE windings reduce electro-erosion to enhance system safety and reliability. And, the F16 encoder's integrated magnet is unaffected by challenging conditions such as fluctuating temperatures or ingress from unwanted materials.

Portescap engineers worked closely with the enteral feeding system supplier to create the integrated motor, encoder and gearhead combination along with the needed customizations. The Athlonix motor can be tailored with coil modifications, custom shafts and a choice of sleeve or ball bearings. The F16 encoder has options for cable and terminal outputs, and the K24 gearhead can be modified with custom shafts, as well as application or condition specific lubricants. In addition to assisting with product customizations, Portescap engineers are available to support mechanical optimization.

## A COST-EFFECTIVE, RELIABLE SYSTEM

Today, the enteral feeding pump promotes patient nourishment by providing precise fluid control with high reliability as a result of Portescap's integrated motion system. Portescap's 22mm DC Coreless motors with the same diameter spur gearbox covers the range of flow rates required. Feedback options range from magnetic to optical encoders, delivering the resolution needed to ensure accurate nutrition delivery. The cost-effective motion package also allows the manufacturer to mass-produce pumps to satisfy the needs of home and hospital customers. **P**

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