



Philips Respironics Membrane switch

The challenge

Philips Respironics, a long-time GM Nameplate customer, came to GMN to manufacture a membrane switch and overlay for their ventilator. As a medical device, the part needed to meet rigorous medical requirements. Respironics knew GMN had extensive experience in manufacturing medical parts and sought GMN's prototyping capabilities to help in their design process.

Demanding medical standards led to several design difficulties. Challenges included protecting the membrane from harsh cleaning chemicals, having enough circuit power to power the ventilator, and protecting the membrane tail from damage. All of these issues were addressed during the prototype and design phases.

Project goals

- Block liquids from damaging the membrane circuit
- Meet the circuit power requirements in an extremely limited membrane area
- Prevent harming the membrane tail during final assembly

The solution

Throughout the design process, Respironics received several prototypes to review. The prototypes allowed Respironics to evaluate their current design and ultimately led to an exceptional finished part. Respironics required a sealed membrane to prevent liquids from entering the device during thorough, routine cleaning and a membrane tail to exit the middle of the part to line up with the bezel components.

PARTS
MANUFACTURED
60K

CASE STUDY

3
OVERLAY
COLORS

Damaging the tail proved to be another challenge, as the membrane tail traces would scratch off. Preventative measures had to be taken to ensure all of the traces would remain unharmed in the customer’s assembly line and the device would work efficiently.

GMN sealed the membrane with a panel filler, which enclosed the part with a protective layer against all liquids and harsh cleaning chemicals. GMN then manufactured a tail insulator for the membrane tail to keep the tail from damage during final assembly.

The middle exiting tail proved to be a more difficult challenge. Having enough circuit power was essential for optimal device performance. GMN decided to manufacture a two-sided circuit with via holes to increase the width of the traces and increase real estate potential.

The final overlay came in three different color versions: black, light gray, and white. The part design included several color options in English and non-English versions. With GMN’s precise color matching capabilities, the part color was matched to the exact Philips Respironics’ branding colors.

With GMN’s one-stop-shop manufacturing capabilities, Respironics decided to ask GMN to manufacture the two labels and the rotary dial as well. The rotary dial was in the upper right hand corner of the ventilator device to allow the user to scroll through information on the ventilator screen. GMN’s diverse set of capabilities helped Respironics receive multiple parts from one manufacturer, reducing their supply chain costs.

This Respironics part highlights GMN’s rapid prototyping and diverse manufacturing capabilities. GMN worked with Respironics throughout the entire design process to ensure the product matched their needs and expectations. GMN solved design challenges faced by Respironics and was able to manufacture a high-quality part that met the strict medical industry standards.