

Solutions a measure of **Solutions** Success Solutions



The Challenge

Successful Solution

"You stuck with us when others wouldn't. For us, that's the sign of a great vendor."

**Chuck Schneider, Forensics Engineer,
Mercury Marine**

Marine engines are exposed to unforgiving environments. Temperature extremes, vibration, and the corrosive effects of salt water are the norm. Mercury Marine understands this, and sets high standards for their designs, and for their suppliers. When Mercury needed a momentary switch that could survive such conditions, they chose Delta Systems. Delta sealed momentary switches have been an integral part of Mercury Marine products for many years.

Mercury designed a new engine throttle and shifter assembly for their Smart Craft program. An important safety feature of the assembly was to know when it was in the neutral position. From their past favorable experiences, Mercury chose to use a Delta sealed momentary switch to handle this safety function. Problems surfaced during initial testing. Boats equipped with the Smart Craft system were reporting errors in the neutral safety circuit. Chuck Schneider, an experienced investigation engineer with Mercury, was assigned to find out why. The results of his analysis pointed to the sealed momentary switch. That's when he called Delta for help.

Together We Found The Issues

Smart Craft represented a new application for the switch, and Delta needed to understand it fully. A design that used to use mechanical linkages was now being replaced with electronic controls. Delta personnel visited Mercury test facilities in Florida and Wisconsin to gather information about the new application. Back at Delta, test systems simulating the mounting and actuation of the switch were built. Mercury and Delta personnel worked side-by-side to analyze the switch operation and performance. The fundamental issue turned out to be the lower operating voltage and current in the new application.



Together We Solved The Problem

What at first appeared to be a simple design modification quickly turned into an electromechanical design challenge. Delta made several internal modifications to the switch and its assembly processes. Mercury tested samples of each design iteration. Early versions, while representing an improvement, did not provide enough operational cycles. Delta did not give up, and was able to deliver a switch meeting Mercury's demanding specifications. Mercury visited Delta and inspected the design and manufacturing processes of the final design, and approved the switch for their Smart Craft program.

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