

Navigator II Vacuum Capacitor Health Predictive Maintenance with PowerInsight

INDUSTRY

Semiconductor

SOLUTION

PowerInsight by Advanced Energy™

EQUIPMENT

Navigator® II and a Process Chamber

CHALLENGE

Predicting the remaining life of vacuum capacitors, key components of match networks, can help prevent unplanned downtime and costly maintenance of the wafer chamber and the match network.

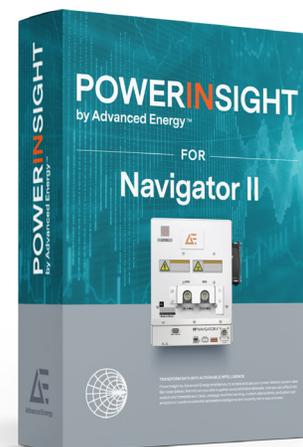
It would be ideal if the remaining life of the vacuum caps inside the match generators were solely dependent on time or energy. However, the lifetime of a match network strongly depends on the usage pattern and the application due to the unlimited number of unique tool setups and processes.

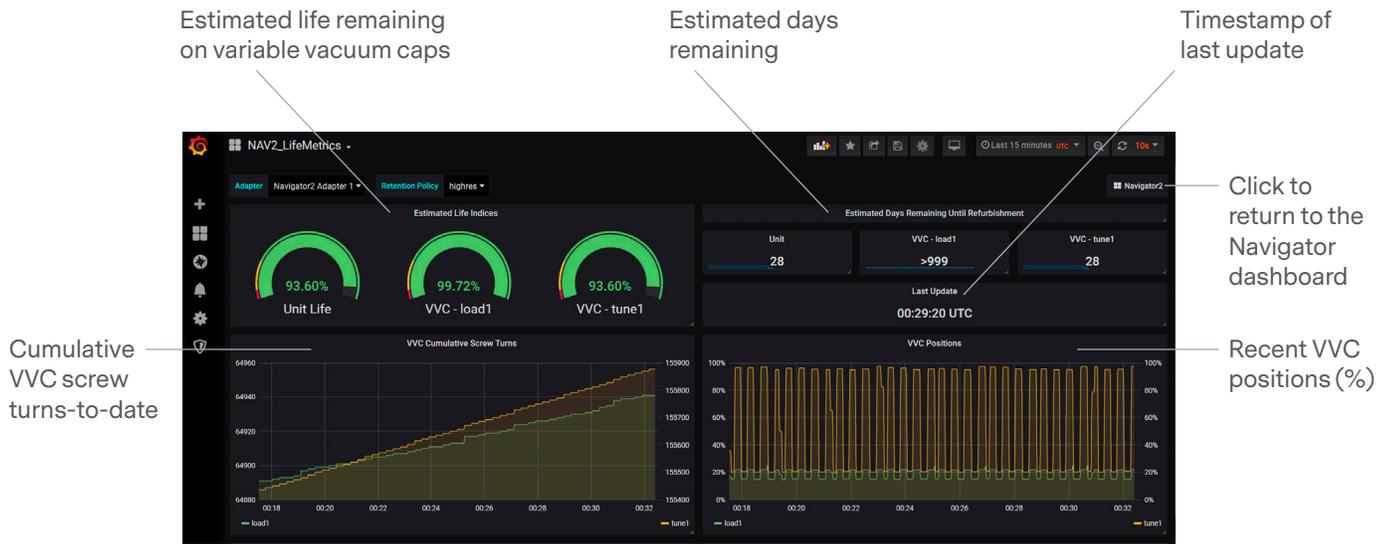
SOLUTION

PowerInsight by Advanced Energy provides the industry's most accurate method of determining the remaining life of vacuum capacitors.

Advanced Energy's in-house reliability lab conducted highly accelerated life testing to validate mechanical wear and failure models from the manufacturer. This provided the input to drive predictive models and analytics for PowerInsight.

PowerInsight unlocks access to more than 50 fields of internal processor and control data from the Navigator II through its visualization engine. With the new data fields collected, PowerInsight develops proprietary algorithms to observe details of vacuum capacitor movements and compare them with historical usage patterns to estimate “consumed life” of the vacuum capacitor.





For many Advanced Energy products, including the Navigator II, PowerInsight uses a “plug-and-play” hardware device – the Explorer – with integrated edge computing capacity.

By connecting the Explorer to a browser, customers can see the data flow and customized analysis chart on the dashboard right away.

RESULT

PowerInsight enabled the customer to take a proactive approach and predict when their unit was at the recommended manufacturer refurbishment interval for vacuum capacitors. With unrivaled insights to inform more accurate maintenance cycles, the customers reduced unplanned downtime by over 80 percent.

CONCLUSION

Even the most modern vacuum capacitors wear out over time. However, knowing how to measure vacuum capacitor health and predict maintenance has been the biggest challenge the customer faced. The customer typically made refurbishments upon failure due to inaccurate forecasting of vacuum capacitor lifetime. PowerInsight by Advanced Energy's proprietary algorithm translated AE's decades of power delivery application know-how into a user-friendly dashboard and accurately predicted the lifetime of the vacuum capacitor. By implementing PowerInsight, the customer can develop a more accurate refurbishment schedule and save costs by avoiding unplanned downtime and lost production.



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