Retrofit: Rapid F to Xstream

Remote Plasma Source with Increased Reliability, Efficiency, and Functionality

The Advanced Energy (AE) Retrofit Program aims to replace existing, aged AE legacy products with a new drop-in solution. With a retrofit of your existing Rapid F unit to the Xstream, Total Cost of Ownership improvements can be realized through reduced tool down time, improved process performance, and efficiency gains.

Overview

As semiconductor tools and process power components age, factories are seeing increases in failure rates and repair costs of those components. A retrofit of Rapid F to Xstream® remote plasma source provides a reset of the unit life, and an upgrade in unit capability and reliability. A retrofit maximizes tool uptime while reducing overall maintenance costs.

The Rapid F product line is no longer in production. Retrofitting your Rapid F remote plasma source is the preferred service option as:

- Used equipment available on the market is in unknown condition
- Repairing existing units could be limited in the future due to obsolete components

Total Cost of Ownership (TCoO)

TCoO in the process power space on a semiconductor tool extends beyond the transactional cost of a repair:

- Tool down time: lost production dollars
- Wafer scrap
- Wafer yield
- Operational costs (efficiency)

Benefits

- Increased uptime with longer mean time between failures (MTBF)
- Custom alloy and advanced anodization of chamber provides longer chamber life
- Higher flow and improved dissociation rate decreases chamber clean time
- Improved reliability attributed to optimized chamber materials, isolated O-rings, and lower ion bombardment
- Better process performance through improved gas flow, precise power control, and improved plasma ignition

Features

- Includes 12-month, whole-box warranty
- Resets the clock on aging tools
- Provides cost-effective, modern replacements for discontinued or aging remote plasma sources
- Presents an efficient upgrade process that is replicable for subsequent tools
- Retrofit kit designed to be a seamless drop-in replacement for Rapid F
- Modern communication protocols, including EtherCat, provide faster response times and more precise process control

Return on Investment (ROI)[1]

The AE Quality Advantage – Maximizing Uptime

With a retrofit of Rapid F to Xstream:

- Save up to 78% annually on repair and maintenance costs with new units[2]
- See a five-year ROI[3] of 255%
- Break even in 1.41 years

1 *Figures are for illustrative purposes only. Contact AE for a customized ROI calculation specific to your install base. Trade-in and volume discounts are also available.*
2 *Annual savings achieved through reduced tool downtime, improved process and wafer yields, and efficiency gains.*
3 *Figures calculated off of 30-unit population.*

Specification Comparison – Rapid F to Xstream

With the inclusion of a retrofit kit, which contains all required interfaces and adapters, transitioning to a newer product is made seamless by eliminating equipment changes.

Feature	Rapid F	Xstream	Benefits to Retrofit
Integrated Impedance Matching Network	Available	Included	Accommodates wide impedance operating range
Chamber Material	Anodized Aluminum	Custom Aluminum Alloy, Type III Hard Anodization	Eliminates the need for coatings and extends life of chamber
Plasma Power Range	1500 W to 6000 W	1000 W to 8000 W	Wider operating range
Maximum Plasma Voltage	115 V_{RMS}	145 V_{RMS}	Higher voltage limit
Maximum Supply Current	74 A_{RMS}	107 A_{RMS}	Higher current limit
Ground leakage current	< 3.5 mA	< 3.5 mA	No change
Frequency	290 kHz to 650 kHz	225 kHz to 667 kHz	Wider frequency range
Vacuum Leak Rate	He: < 10^{-6} mbar-liters/second	He: < 10^{-6} mbar-liters/second	No change
Warm-up delay	60s for AC on	< 20s for AC on	Reduced process time
NF3 Dissociation Efficiency	> 98%	> 98%	No change
Flow Range	At least 2.5 slpm at 6 Torr	Up to 6 slpm at 6 Torr	Higher flow range
Analog Interface	25-pin D-sub	25-pin D-sub	No change
Serial Interface	9-pin D-sub, AEBus Protocol	9-pin D-sub, AEBus Protocol	No change
Input Power	200 / 208 VAC ± 10%, 3 ph	200 /208 VAC ± 10%, 3 ph	No electrical panel rewiring
Efficiency	> 80%	> 85%	Lower operating costs
Weight	25 kg	28.7 kg	Similar weight
Height	256 mm	267 mm	Similar footprint
Width	253 mm	252.5 mm	No change
Depth	457 mm	478 mm	Similar footprint
Cooling	Water and Air	Water and Air	Mixed cooling
Coolant Rate	1.3 to 2.0 gpm	1.0 to 2.0 gpm	No change
Water Fittings	SAE 5/16”, straight thread	SAE 9/16”-18, straight thread	Adapters provided in retrofit

Get in Touch

To learn more about your retrofit fit options, contact Advanced Energy Technical Support at **technical.support@aei.com** or reach out to your local Service Center.

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