

# TSINE

## Conditioned AC Power

### TSD *Advance* Series Servo Voltage Stabilizers

Precise, Stable, Undistorted,  
Conditioned AC Power to Your Power Infrastructure

The **TSD *Advance*** Servo Voltage Stabilizer presents optimized, robust power conditioning and performance, delivers versatility for many environments, vast range of applications whilst reducing TCO & time for ROI.

*Advance*



#### Key Applications



Industry



Data Center



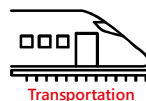
Medical



Telecom



Emergency



Transportation



Oil & Gas



Power Plant



Financial Institution

#### Product Snapshot

- Servo/ Electrodynamic microprocessor controlled design.
- Independent voltage stabilization for each phase.
- Enhanced adaptability & versatility, proven reliability & robustness in the field, in harshest environments.
- High performance industry leading AC~AC efficiency (up to 98%), more power density in minimum footprint.
- True RMS measurement & feedback loop between input and output.
- Better load protection from utility/ device failures.
- Great adaptability, optimised serviceability without sacrificing reliability.
- High short-circuit admittance, high overload capacity.
- Higher immunity to harmonics or energy backfeed generated by the load. (Regenerative loads are compliant, like CNC)
- Zero effect on output waveform, zero effect on harmonics of utility.
- Optional advanced supervision via front panel LCD display allowing user to capture real time data on input, output, power, load rates and status information in detail, measurements, status updates & alarms in English.
- Optional 200 different events memory record system (alarms or warnings), **TSD *AdvanceCare*** system includes a range of features designed to prolong service life of the stabilizer.

#### Features & Benefits

Stronger power performance, increased power quality  
Lowest TCO, fastest ROI in the industry.  
Proven reliability & maximised availability.  
Advanced diagnostics, ease of troubleshooting & repair.  
Advanced connectivity, monitorability & manageability.  
Ease of deployment.

#### Options

IP classified designs for outdoor use.  
Custom designed electrical characteristics.

#### Precise, Stable, Undistorted, Conditioned AC Power to Your Power Infrastructure

The TSD *Advance* Series microprocessor controlled high-speed servo/ electrodynamic voltage stabilizers delivers conditioned AC power to critical/sensitive load efficiently in a very compact & elegant design. For the applications requiring protection from electrical line problems without the need for back-up capability, FX Ultra is the essential equipment for your power infrastructure.

#### Robustness, Highest Availability & Versatility, Increased Power Performance

The technology & microprocessor control behind **TSD *Advance*** provides maximum power protection performance, increased power quality & continuous power for various industries/applications which demand stable, undistorted power worldwide. Its microprocessor controlled servo design with superfast H-Bridge motor-drive technology & true RMS feedback loop between the input and output ensures the critical / sensitive load to be supplied with the conditioned AC power.

**TSD *Advance*** includes a double-wound transformer, control boards and driver boards principally. It offers high electrical and mechanical robustness, proven high reliability & maximised availability which dramatically decrease operational downtimes and costs during its lifetime makes it indispensable to various industries worldwide.

Advanced **TSD *AdvanceCare*** design, zero impact to utility, generators & loads connected to the Stabilizer **TSD *Advance*** also makes it superior by the proven data against traditional legacy stabilizer systems along with rivals existing in the market.

**TSD *Advance*** Series and its advanced standard/optional features represents TSINE' s vast experience in power electronics design over twenty years and stands for state of art of electronics, the terms innovation & reliability worldwide.

## Stabilizer Rating [for TSD Advance, R21 Range]

Output Rated Power [kVA]	3,5	5	7,5	10	15	20	25	30	40	50	60
Output Rated Current [A]	15	22	7,5	33	44	66	88	110	132	176	220

@230VAC]

## General Characteristics

MTBF/ MTTR	Over 250000 Hours/ 15 Minutes
Stabilizer Type & Technology	VI Servo/ Electrodynamical Voltage Stabilization, Independent Phase Control, True RMS Analysis, High Speed Full Digital Microprocessor Control
Selectable Output Voltage	Standard
LVD, EMC, CE	COMPLIANT TO LATEST STANDARDS AND DIRECTIVES
Input Voltage Range	-27% ~ +14%, R21 Range
Standard Protection Features	Input Power Limiting, Over Temperature, Over Current, Smart Short Circuit, Automatic Shut Down When The Utility is Not Within Predefined Limits, Automatic Restart When The Utility Comes Back To Normal
Operating Conditions	20 °C, <2000m Above Sea Level, <45% to 55% RH, for Best Performance
Cooling/ Isolation	Forced Air Cooling via Redundant Fans, Smart Fan Speed Control  Standard: Digital Voltmeter for Output and Input Voltages Output Voltage is Adjustable Fron Front Panel. Standard LED Lights for Status of AVR Input&Outputs  Options: 1- 2*16 Character LCD Display with Backlight. Input and Output Parameters Can Be Seen via LCD. Event Log and Alarms Alerts Can Be Seen via LCD. Programmable Input&Output Parameters and High&Low Limits & Alarms/ Alerts in EEPROM
Instrumentation, Display & Parameters	2- Digital Input&Output Multimeter with Standard RS232 and RS485 Serial Comm. Connectivity.  3- Remote Monitoring of Alarms/Faults via Dry Contacts.  Displayed Input & Output Parameters: Currents [A] for Each Phase, Frequency [Hz], Line-Line Voltages, Line - Neutral Voltages, Reactive Power [kVA], Active Power [kW], Power Factor Alarms/ Faults: Phase Fault via LED, Output Fault via LED, Overload Fault via LED, Fuse Fault for Each Phases are Shown via LEDs Input Over Current, Input Low/ High Voltage&Frequency, Low/ High Voltage for Output
Bypass Breaker	STANDARD
MCCB for Protection	STANDARD for Output
Material [Casing]/ Colour	BLACK
Cable Entry	REAR

## Efficiency

AC~AC Mode	Better Than 98%
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## Input

Rated Voltage & Range [AC]	220/ 230/ 240 VAC 1P+N+PE -27% ~ +14% [at 100% Rated Load], 160~250VAC
Rated Frequency & Range	50/60 Hz ± 20%
Current Distortion [THDI]	< No Effect On Utility Harmonics

## Output Characteristics

Rated Voltage & Accuracy	220/ 230/ 240 VAC 1P+N+PE < ±0,5% at 100% Rated Linear-Static Load, < ±1,6% at Non-Linear Load; < ±2% at Dynamic Loads, While the mains voltage is within 160~250VAC, the Output will be a stable of 220/ 230VAC as adjusted. When the mains voltage drops below 160VAC or increases over 250VAC, the output will be decreasing or increasing from the reference of 220/ 230VAC. High/ Low voltage protection limits the output voltage values to the load.
Rated Frequency & Accuracy	50/ 60 Hz (Synchronized to Mains)
Voltage Distortion [THDv]	No Effect On Harmonics
Unbalanced Load Operation & Acceptable Load PF	Compatible with Operation on 100% Unbalanced Load, Independent Phase Control, 1 Lagging to 1 Leading
Overload Operation	10 mins @ 110% Rated Load, 60 seconds @ 125% Rated Load, 3000 milliseconds @ 200% Rated Load, 20 milliseconds @ 1000% Rated Load, Shuts Down over 10 mins Overload Operation.

## Communication & Supervision

Remote Monitoring & Management	Optional (As Hardware, Standard in Software): Remote Monitoring & Management Panel, Optional: RS232 Serial Comm. Port, RS485 Serial Comm. Port (MODBUS) Which is Communicates with AVR Itself.
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## Environment

Operating Temperature Range	0°C - 40°C / 20°C - 25°C / -30°C ~ 60°C
Prespecified Operating T.	0°C - 40°C / 20°C - 25°C / -30°C ~ 60°C
Storage Temperature	
Altitude/ Relative Humidity	< 2000m above sea level/ < 95% (non-condensing)
Noise	< 50 dBA

## Certifications

Safety [LVD]	EN 61000-6-3, EN 61000-6-4, 2006/95 EEC Council Directives
Electromagnetic Compability [EMC]	EN 61000-4-5, EN 61000-4-6, EN 61000-4-2
Quality Management	CE, ISO 9001:2015, ISO 14001

## Optional Features & Accessories

Isolation Transformer	Optional for Input & Output
Custom Input Voltage Range	Optional
IP Classified Enclosure	Available from IP21 ~ IP 66

## Physical

Dimensions & Weight	See Ratings & Dimensions Chart
Protection Degree	IP20 (Standard)



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