



Dedicated to engineering quality industrial electronics since 1962!



Introduction

Products/Applications

Question and Answer

Who's Bonitron?

1962

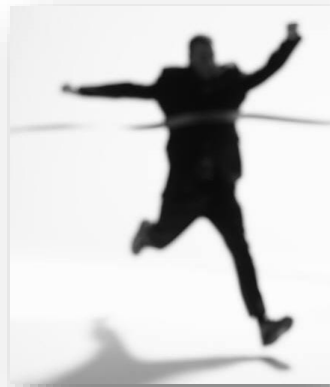
- Founded by Robert Benson
- Nashville, TN
- Vanderbilt University
- Government Research and Projects

1970's to Now

- AC Drive Solutions
 - Line Regen
 - Braking Transistor
 - Filtering
 - Etc.

Bonitron Team

- Nearly half of employees have been with Bonitron over a decade
- 10% over 30 years
- Strong emphasis on quality and customer satisfaction



www.bonitron.com

Reputation

- Successful in the variable frequency drive accessories and industrial electronics business for decades

Availability

- Typically stock to 2 weeks from receipt of order on most standard products
- Product or system dictates lead time

Why Bonitron?

- Dedicated sales team that works closely with engineering
- Trained and experienced engineers
- Certified solutions
- Satisfied customers worldwide!

Drives

No energy storage

- Filter capacitors drain almost immediately

No sag correction built in

- 6 pulse front ends have no boost capability

Cannot operate at full load and power

- Kinetic buffering causes speed changes





Introduction

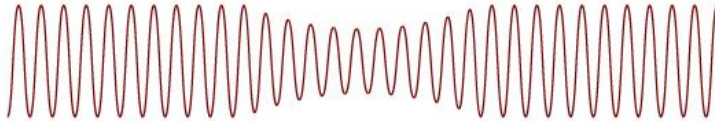
Products/Applications

Question and Answer

Bonitron UPD Ride-Thru systems are designed for AC drive systems that use a fixed DC bus, such as AC variable speed drives (VSD). Unfortunately, VSDs are quite susceptible to fluctuations in incoming power, such as voltage sags and complete outages from the utility. Bonitron UPD Ride-Thru systems provide the security of “riding through” these events.

Unprotected DC Bus

AC Line Voltage

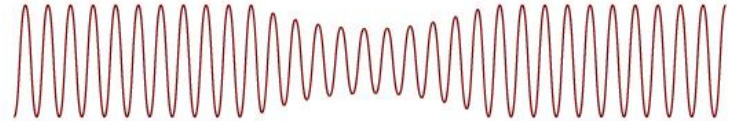


DC Bus Voltage



DC Bus with Ride-Thru Protection

AC Line Voltage



DC Bus Voltage



Uninterruptable Power for Drives

- DC-DC converter with or without energy storage

2-Second 50% 3-Phase Sags

- Bonitron Voltage Booster
- No energy storage necessary

Up to 2-Second Outage

- Bonitron Voltage Booster
- Charging System
- Ultracapacitors
- Safety Discharge

Up to 15-Minute Outage

- Bonitron Voltage Booster
- Charging System
- Batteries





Motor Inertia/Kinetic Buffering

Flying restart

VFD Active Front End

AC Line Sag Corrector

UPS

DC Bus Ride-Thru



Maintain speed and torque

- During an AC line sag or outage

Simple retrofit or initial installation

- Uses drive's existing DC bus connection
- Non-intrusive to variable frequency drive

Increased reliability

- Parallel configuration
- Local installation protects from external and internal plant grid faults

Increased efficiency

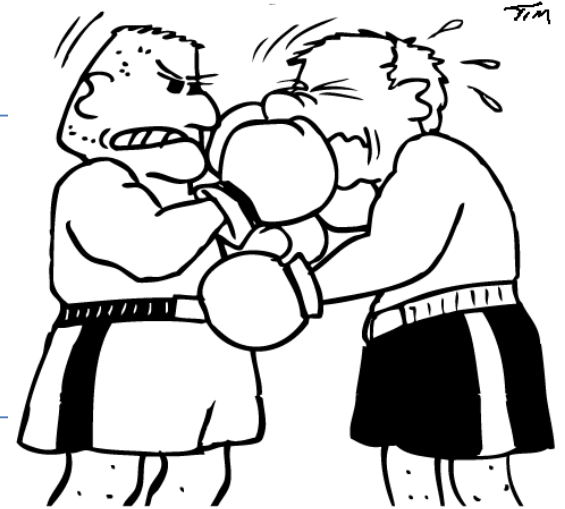
- Negligible losses during normal conditions
- Higher efficiency during backup, longer durations from energy storage

Storage Options

- Can size battery banks to allow for "right sized" installation
- Can use maintenance free ultracapacitors to replace standard 5 year battery banks

VFD's not recommended with UPS Systems

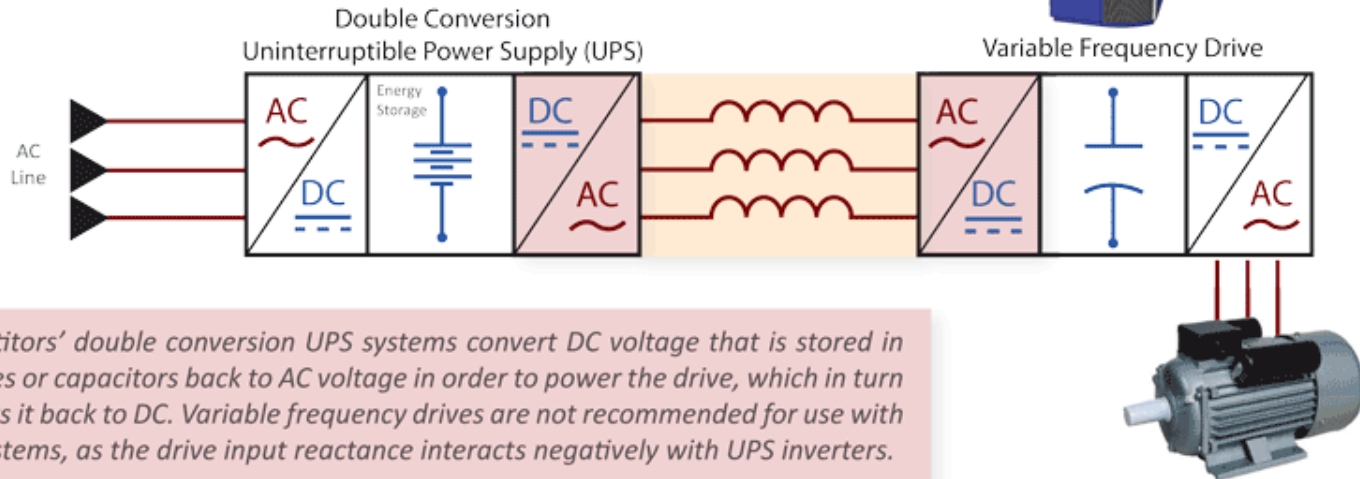
- VFD input reactance interacts with UPS inverters
- Reduced efficiency due to extra conversions
- Extra point of failure



In-line UPS Disadvantages

- Series Connection
 - Decreased reliability
- Decreased efficiency
 - Unnecessary conversions
 - Converts energy storage back to AC

UPS



Bonitron UPD Advantages

- Bonitron UPD Systems power the DC bus of the drive via DC bus connection terminals on the drive. This eliminates an unnecessary and energy wasting DC to AC conversion.*



50% Sag Systems

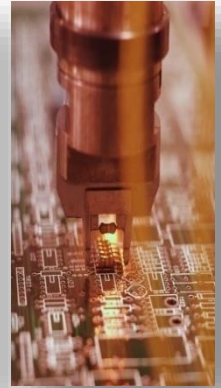
- 2 second symmetrical 3 phase sag, 1 phase full outage
- 230-460VAC
- 5-750kW

100% Outage Low Maintenance Systems

- 2 second Full Outage
- 230-260VAC
- 5-750kW
- Ultracapacitor storage replaces traditional battery strings
- Integrated discharging allows for safe maintenance

100% Outage Long Duration Systems

- >2 second Full Outage
- 230-260VAC
- 5-750kW
- Batteries can be maintained by existing maintenance contractor



Electrolytic Capacitors



700v assembly

Ultracapacitors



180v module



48v module

Batteries



12v battery

Up to ½ second
full outage

- Short outages
- Low HP drives

Up to 3 seconds
full outage

- Short outages
- High HP drives

Up to 15 minute
full outage

- Long outages
- All drives

Applications

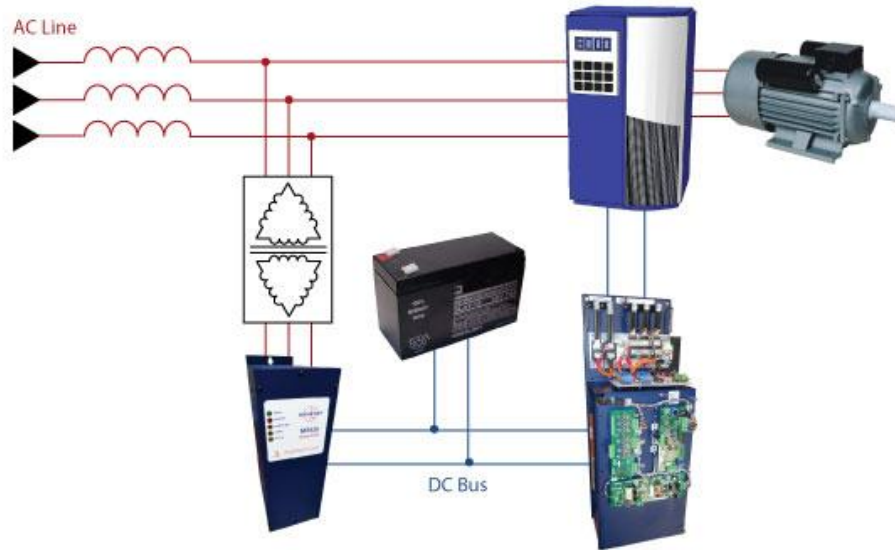
- Clean room air handling systems
- Cooling water systems
- Synthetic fibers spinning
- Semiconductor fabrication
- Turbine Lubrication pumps
- Oilfield extraction pumps

Reasons for Ride-Thru

- Must maintain constant power to prevent costly production losses or equipment damage



15 second Full outage



Application

- Secondary Chill Water Systems
- Core Cooling
- Chill water loss causes core meltdown within 15 seconds.

Application

- Clean room air handling and environmental systems
- Cooling water systems for machine tools (wafer etching)
- Must maintain constant air and water flow rates to maintain product quality
- Industry requirement:
 - Semi-F47



90-Second Full Outage



GLOBALFOUNDRIES

Singapore 2-Second 50% 3-Phase Sag



SAMSUNG

Austin, TX

1-Second Outage



Application

- Process Cooling Water
- Clean room air handling and environmental systems
- Cooling water systems for machine tools (wafer etching)
- Must maintain constant air and water flow rates to maintain product quality
- Industry requirement:
 - Power Vaccine



Application

- Fabric roller and tension systems
- Positional fiber lines
- Injection pumps
- Must maintain constant speed/tension on rollers and un-rollers

INDORAMA
CORPORATION

½ Second Outage

Indonesia

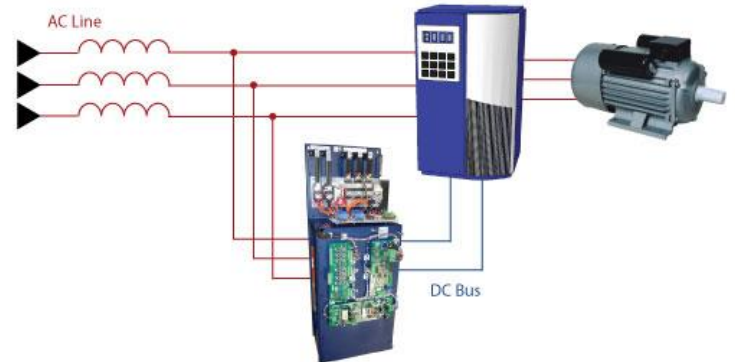


DUPONT® USA

KORDSA

INVISTA™

2-Second 50% Sag





Venezuela

½ Second Outage

Application

- Heavy crude extraction
- Progressive Cavity Pumps
- Drive trip creates excessive downtime
- Return on Investment of 2 months at \$50/barrel



India
Full Outage



Turbine Lubrication

- System backup power
- Dark Start
- Loss of lubrication system creates catastrophic damage to gas turbine



Bonitron UPD Ride-Thru System Selection

		Ride-Thru Duration	Voltage Regulator	Charger	Energy Storage	Discharger	Interactive Display
SAG	S3534SR	Sag 2 sec	●	N/A	N/A	N/A	●
	S3460SR	Sag 2 sec	●	N/A	N/A	N/A	●
OUTAGE (CAPACITOR)	S3534EC	Outage 0.5 sec	N/A	N/A	Electrolytic	N/A	
	S3534CR	Outage 1 sec	●	●	Electrolytic	●	Optional
	S3534UR	Outage 2 sec	●	●	Ultracapacitor	●	●
	S3460UR	Outage 2 sec	●	●	Ultracapacitor	●	●
OUTAGE (BATTERY)	S3534BR	Outage Up to 60 sec	●	●	Battery	N/A	●
	S3460BR	Outage Up to 4 min	●	●	Battery	N/A	●



**1-Second Full
Outage
6kW**



**1-Second Full
Outage
150kW**



**1-Second Full
Outage
150kW**

Bonitron.com/contact.html

615-244-2825
info@bonitron.com

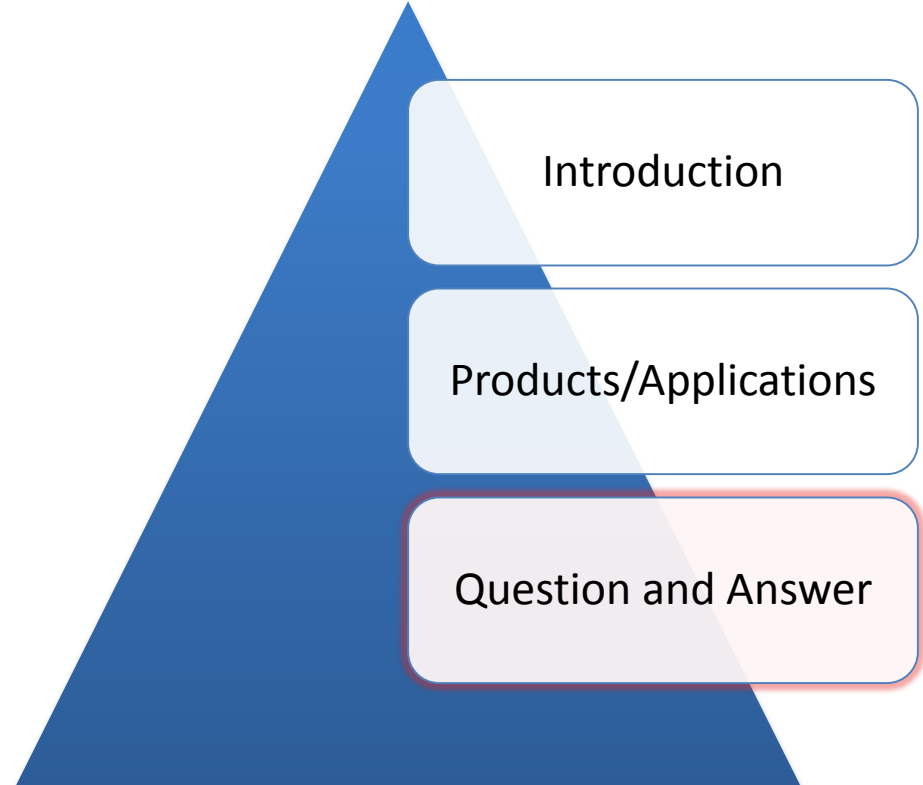
521 Fairground Ct.
Nashville, TN 37211





Questions?

- Call us at 615-244-2825
- Or email info@bonitron.com



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Dedicated to Designing
and Manufacturing
Quality Industrial Electronics