

## *Boiler Solutions*

# BONITRON

*Ride-Thru for critical VFD processes*

*Many require constant power to prevent costly downtime.*

*Trust a company with 20+ years of critical backup power experience*

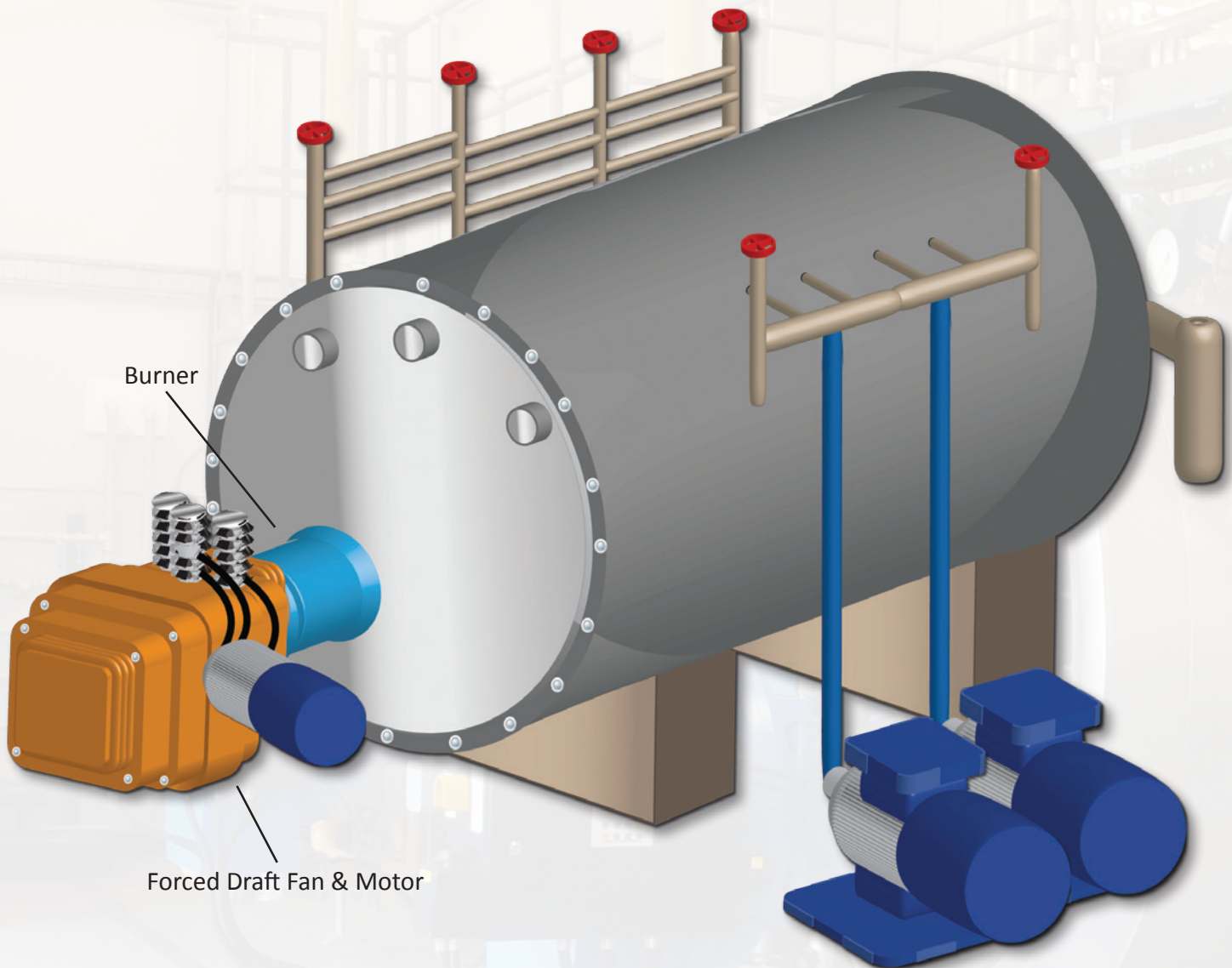


**Heating  
Pharmaceutical  
Foods  
Paper  
Textile  
+More!**



# Draft Fans

Industrial boilers use draft fans to either push or pull air into the furnace of the boiler. These fans need constant, uninterrupted power to maintain high efficiency. Sags and outages in the AC line can cause the drive running the draft fans to trip on an undervoltage condition, resulting in shutdown of the fan. Loss of airflow through the boiler can require shutdown resulting in long periods of downtime to restart the boiler. Draft fan drive trips may also cause excessive or catastrophic damage to the boiler. In these cases, the application can benefit from a Bonitron UPD Ride-Thru System.



## **Forced Draft Fan**

- Fan pushes combustion air into the burner, and through the combustion chamber
- Fan pushes the flue gases out through the vent
- Creates positive pressure in the furnace

## **Induced Draft Fan**

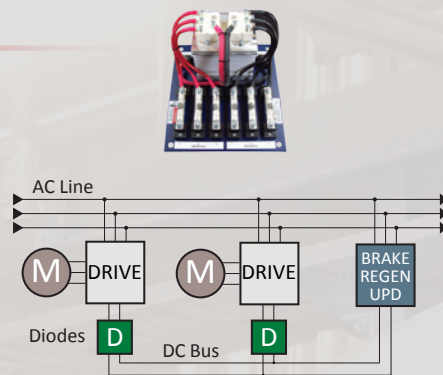
- Fan pulls air into the burner, and through the combustion chamber
- Fan pushes the flue gases out through the vent
- Creates negative pressure in the furnace



# Bonitron Solutions

## Common Bus Sharing Diodes

- M3345CBM
- Allows for shared power and components between drives on the DC bus
- Prevents potentially damaging circulating currents between drives



## Common Bus Isolation Diodes

- M3460D
- Allows one-way flow of power
- Create a common DC Bus to share components while isolating the drives from each other

Bonitron UPD Ride-Thru Systems protect boiler draft fan drives from undervoltage drive trips by providing seamless power to draft fan drives in the event of sags and outages. Long periods of downtime and possible damage to the boiler caused by loss of power to the drives can be prevented using Bonitron UPD Ride-Thru Systems, resulting in maintained efficiency and extended uptime.

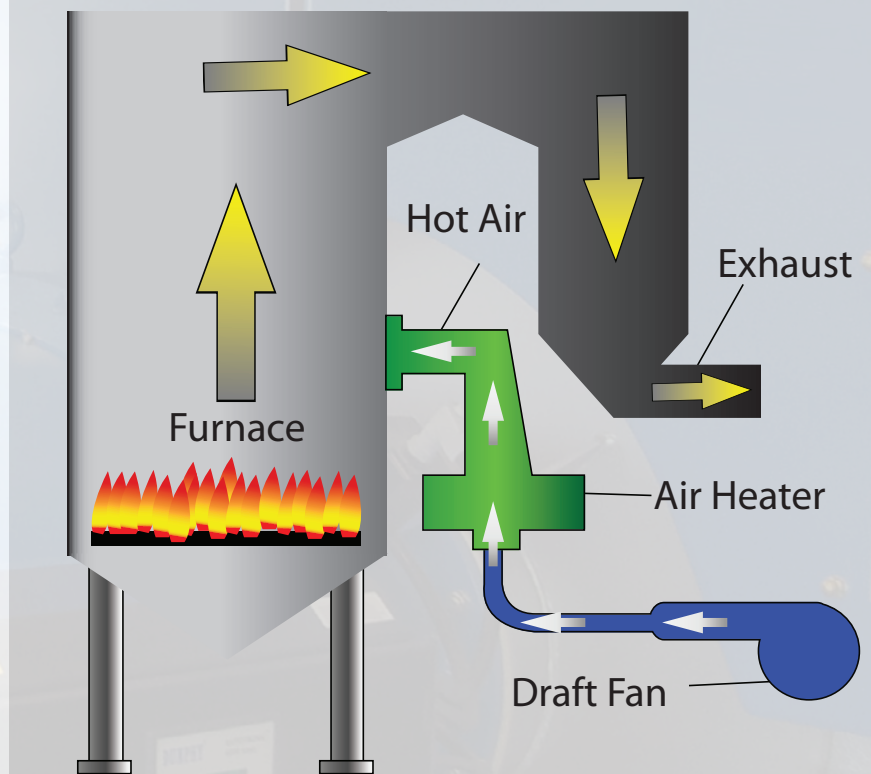
Systems with multiple boilers can also benefit from the use of a shared common DC bus. The use of a common bus allows for the reduction of wiring and components, and the linked drives can share components, such as a UPD Ride-Thru System.



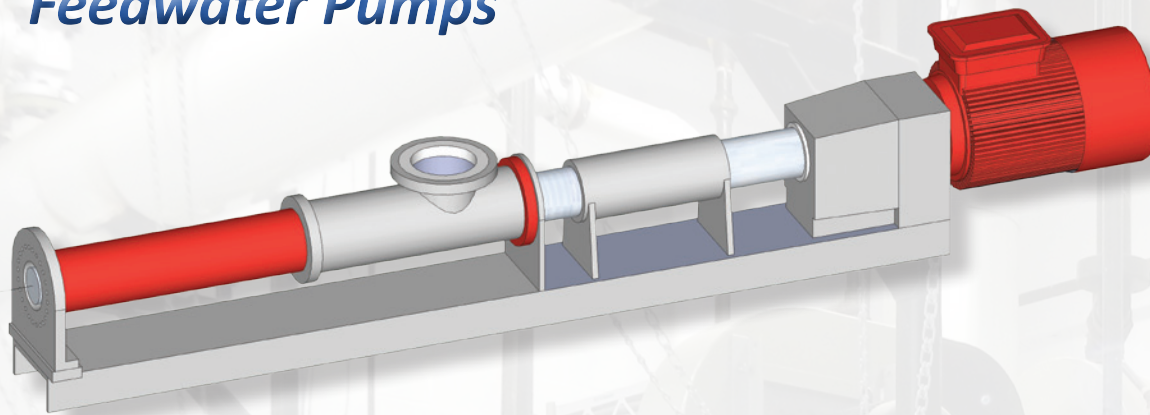
## UPD Uninterruptible Power for Drives

- Protect from power sags and outages
- S3460 and S3534 Series
- Various sizes and durations available

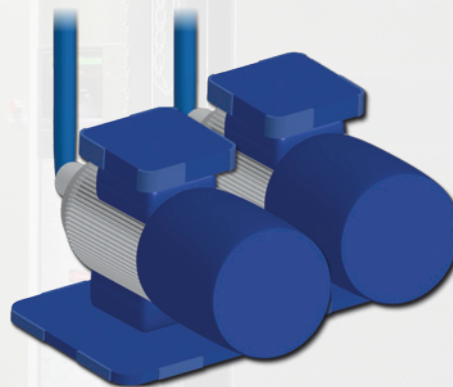
## Typical Air Flow in a Boiler



# Feedwater Pumps



Industrial boilers use feedwater pumps to supply the needed water to the boiler to generate steam. It is critical for this pump to have constant, uninterrupted power. If the drive running the feedwater pump loses power and trips on an undervoltage condition, the water level in the boiler will lower. Low water conditions may cause the boiler to overheat, possibly resulting in severe or catastrophic damage. If the boiler is equipped with a low water trip switch, the boiler will shut off in these low water situations and may result in costly downtime. The Bonitron Uninterruptible Power for Drives (UPD) Ride-Thru System prevents these undervoltage drive trips, resulting in more uptime for boiler applications.



## Bonitron Solutions



### UPD Uninterruptible Power for Drives

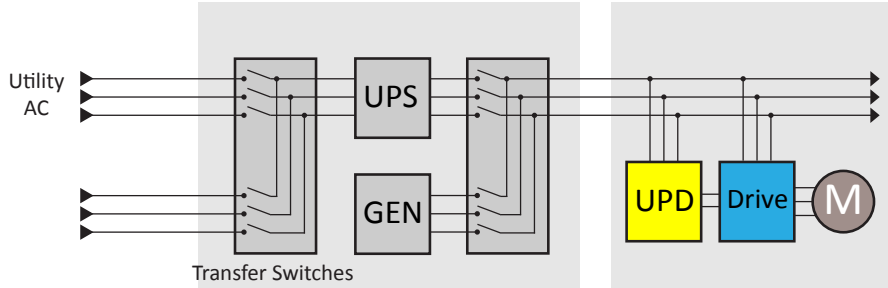
- Protect from power sags and outages
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# Undervoltage Solutions

## Uninterruptible Power for Drives

Electricity travels miles to reach the drives and motors that control your process. While outdoor power lines and substations are vulnerable to power outages caused by cars, weather, and even animals, the lines inside your plant are susceptible to power quality events as well.

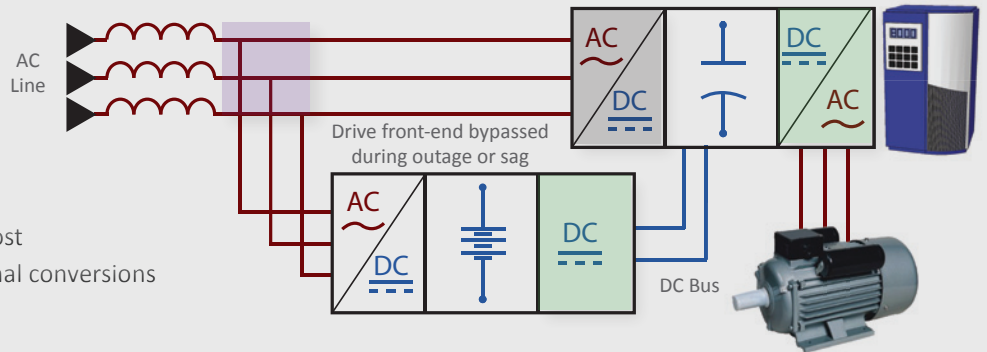


Unlike typical plant wide solutions, Bonitron designed its UPD solutions to connect directly to the DC terminals of one or multiple drives. If drive voltage sags, the Bonitron UPD immediately provides power so motor speed is not affected and the process never sees a disturbance. When properly sized, Bonitron UPD systems provide drives with full-load power until the AC line is restored or generators are online.

*Bonitron UPD Systems use battery or capacitor DC energy to 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.*

### Bonitron UPD Advantages

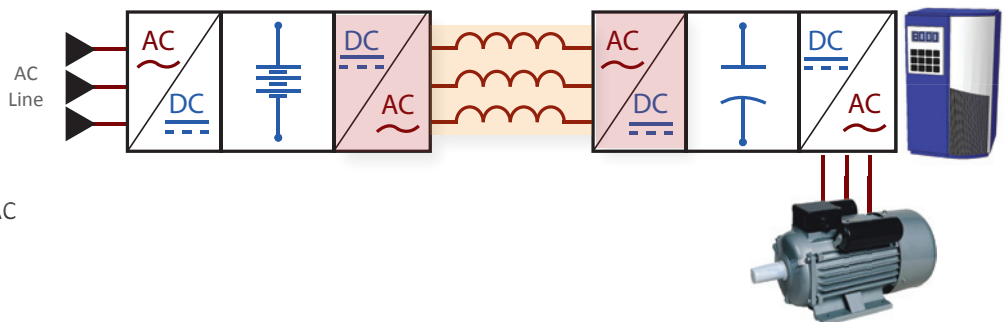
- Parallel Connection
  - High reliability
  - Seamless power source transfer
- Increased efficiency
  - Ultra-low standby power
  - Sized to drive system for reduced cost
  - Power supplied to DC bus for minimal conversions



*Competitors' double conversion UPS systems convert DC voltage that is stored in batteries or capacitors back to AC voltage in order to power the drive, which in turn converts it back to DC. Variable frequency drives are not recommended for use with UPS Systems, as the drive input reactance interacts negatively with UPS inverters.*

### In-line UPS Disadvantages

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



## Bonitron UPD Highlights

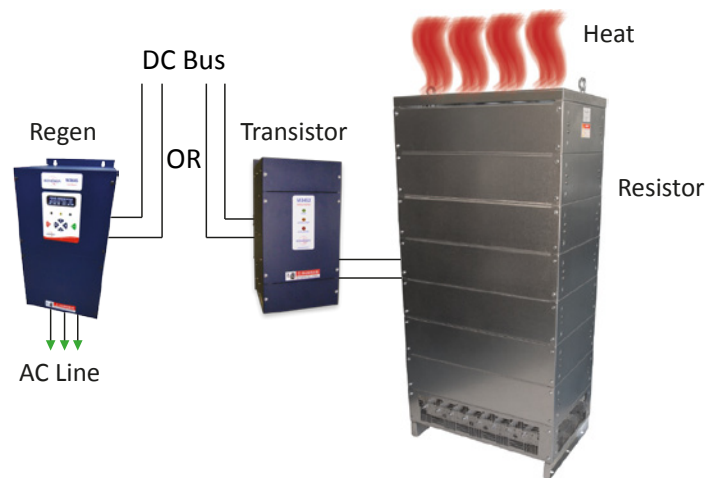
- Seamless transfer from: Utility power - Bonitron - Generator (if necessary)
- Parallel connection for high reliability and remarkable life expectancy
- Delivers DC power for increased efficiency
- Ultra-low standby power
- Easily installs at drive location
- Scalable to your power and outage specifications
- Sag correction solutions available with no energy storage required
- Monitor power quality events with a digital user interface with data logging
- \*SEMI-F47, IEC 61000-4-11, IEC 61000-4-34, Samsung Power Vaccine



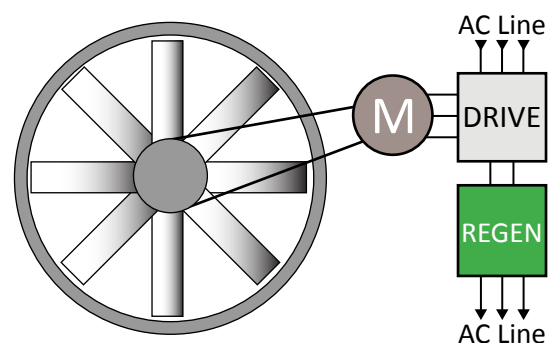
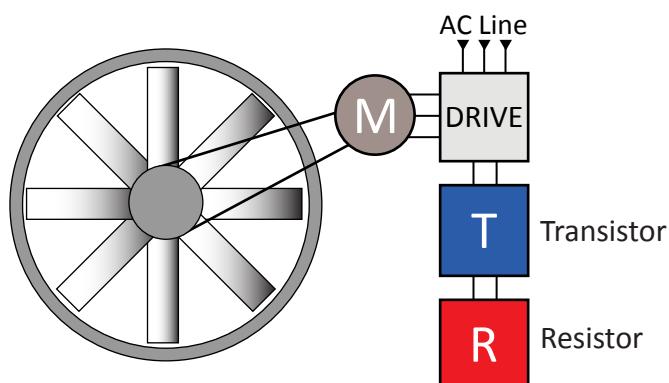
\*Contact Bonitron to discuss power standards per model

## Overvoltage Solutions

In some applications, fans exceed 15 feet in diameter. With a fan this large, it is important to have a reliable way to stop it. This can be done with either a dynamic brake or a regenerative brake. VFDs use the fan motor as generator which slows down the fan. The generated energy has to go somewhere or it will damage the drive. The **dynamic brake** takes the energy out as heat through a transistor and resistor combination. The **regenerative brake**, or regen, puts the electric energy back onto the AC line.



Depending on how often the fan is stopped, the dynamic brake can be the more affordable alternative. Some drives already have the transistor built into them and only require a resistor to dissipate the energy. The heat generated by the resistors can increase cost if the resistors are indoors and need to be cooled with AC. Resistors also need time to cool down after a braking cycle. If the braking will be frequent or constant, a regen would be the better choice.



The regen has many advantages over the dynamic brake. The lack of heat generation is good for multiple reasons. First, because the unit does not generate high levels of heat, it does not need to be cooled. Second, the unit can run continuously without the need of a cool down period. Third, the lack of heat generation allows its use in environments where there might be flammable material such as feathers, dust, or wood. The regen also boosts energy efficiency as it puts energy back onto the utility line.

# Common DC Bus

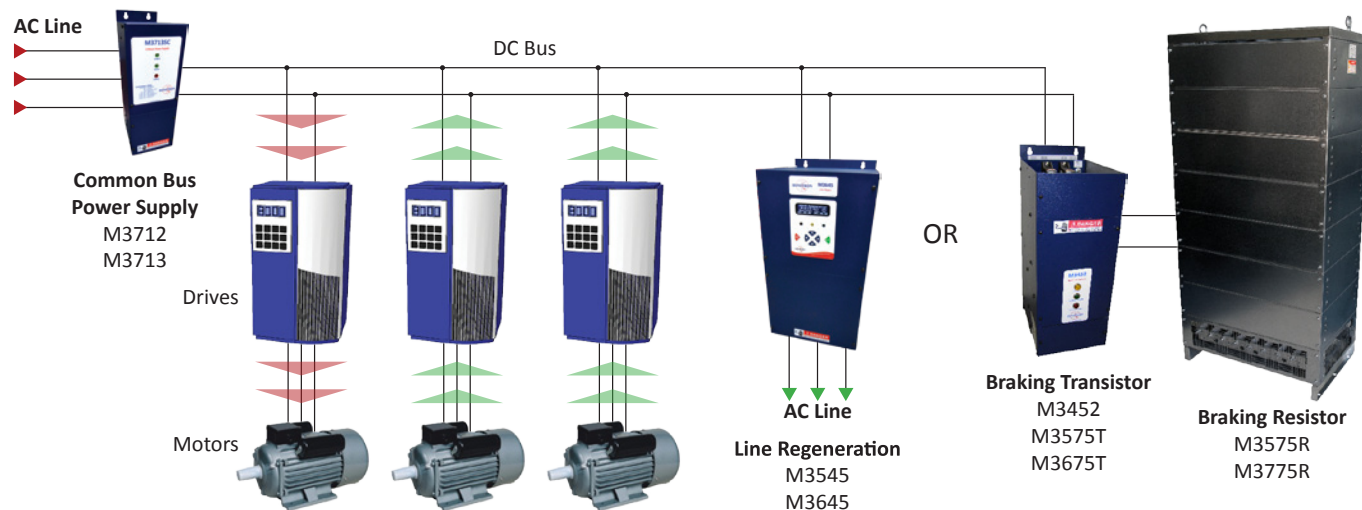
Boiler applications can require the use of multiple electric motors in a system and can benefit from the use of a common DC bus. The use of a common bus allows for the **reduction of wiring and components** in the system as the linked drives can now share many components. It can also allow for the direct **sharing of power between drives**, reducing amount of power needed from the grid. This can be achieved with either a common bus power supply or with diode sharing.

## Common Bus Power Supply

M3712, M3713

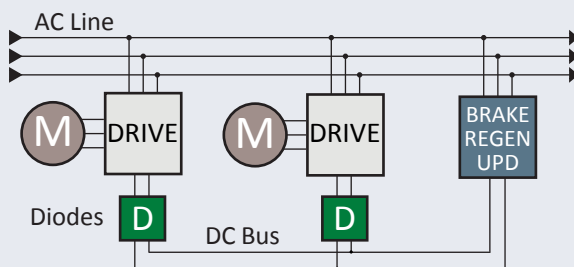
Using a common bus power supply reduces the amount of wiring and components in a system, resulting in a reduction of maintenance and footprint of the system. In a system with multiple motors, some motors may be regenerating while others are motoring. **The common bus allows the regenerating drives to share power with the motoring drives, thus reducing the amount of power needed from the grid.** If the drives are creating a net surplus of energy, a single line regen or braking unit can be installed to dissipate the excess energy.

A common bus power supply can also allow the use of single phase AC power with 3-phase motors without having to oversize the drive. The M3712 can create a common DC bus from single phase power while the M3713 uses 3-phase input power.



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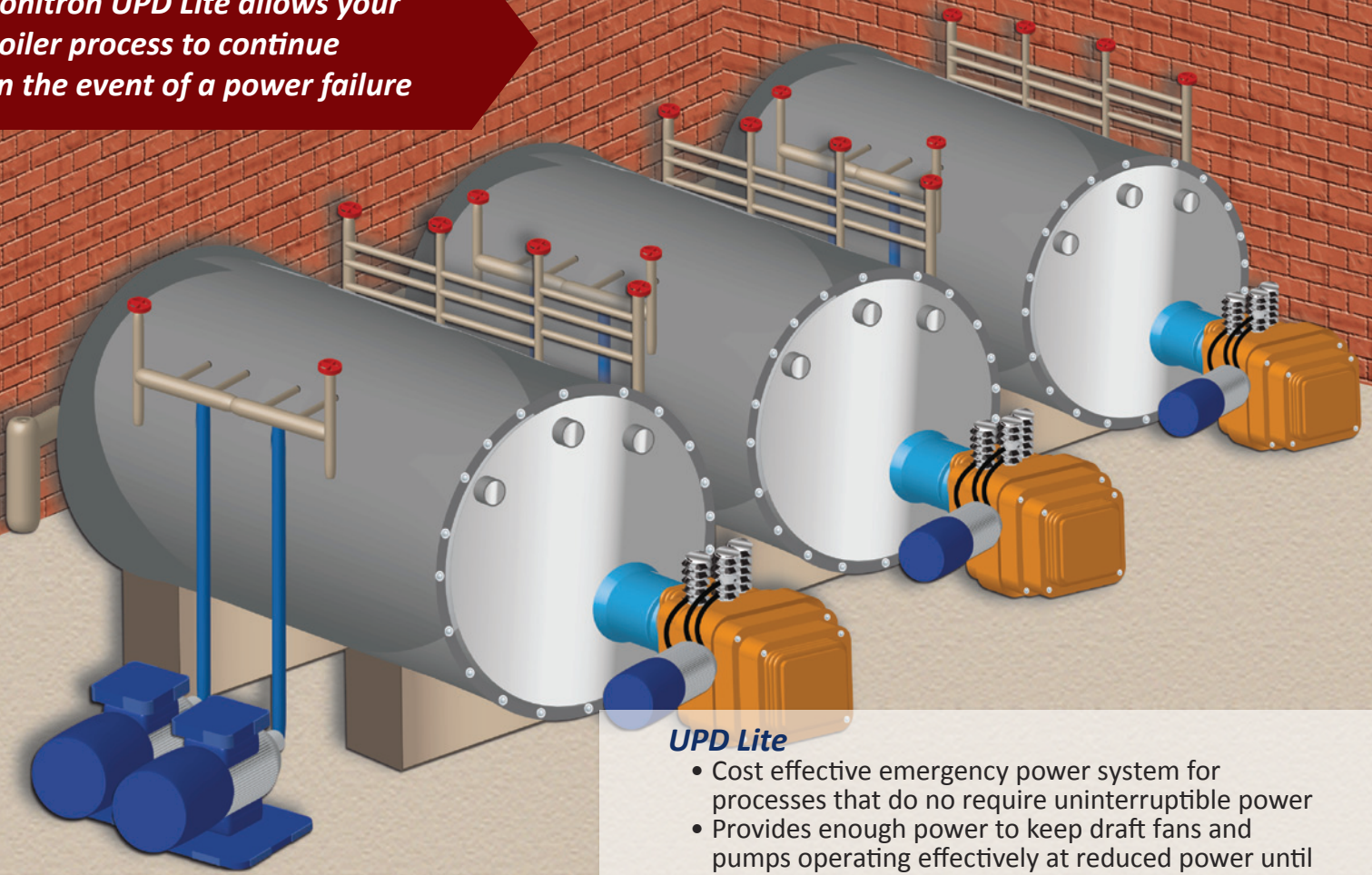


### Common Bus Isolation Diodes

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**Bonitron UPD Lite allows your boiler process to continue in the event of a power failure**



**UPD Lite**

- Cost effective emergency power system for processes that do not require uninterruptible power
- Provides enough power to keep draft fans and pumps operating effectively at reduced power until power is restored

**Additional Solutions**

[bonitron.com/industry-boiler.html](http://bonitron.com/industry-boiler.html)



**Scan the QR code to learn more about Bonitron Boiler Industry Solutions**



Connect to any brand VSD with DC bus connections



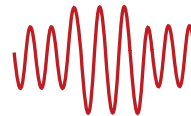
**Common Bus**

- Single Phase Power Supplies
- 3-Phase Power Supplies
- Common Bus Sharing Diodes
- Isolation Diodes
- Bus Filter Capacitance



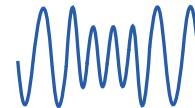
**Maintenance**

- Capacitor Formers
- Capacitor Testers



**Overvoltage**

- Braking Transistors
- Braking Resistors
- Line Regeneration
- Braking for Servo Drives



**Undervoltage**

- Uninterruptible Power for Drives (DC Bus Ride-Thru)
- Voltage Regulators
- Chargers and Dischargers
- Energy Storage