

# Symmetra MW Product Introduction



*Concept, Design & Philosophy*



# Symmetra MW<sup>®</sup>

*Modular, fault-tolerant power protection for large facilities, data centers and mission-critical applications*



***Think big, think scalable – introducing the world's first modular Megawatt UPS***

Symmetra MW

© 2003 APC corporation.

**APC**  
Legendary Reliability™

# Symmetra MW Unique Features

- **Modular Design**
- **Scalability**
- **N+1 Redundancy**
- **Fault Tolerant Inverter Coordination**
- **Servicability**

**All of these features combine to produce higher levels of reliability and availability.**

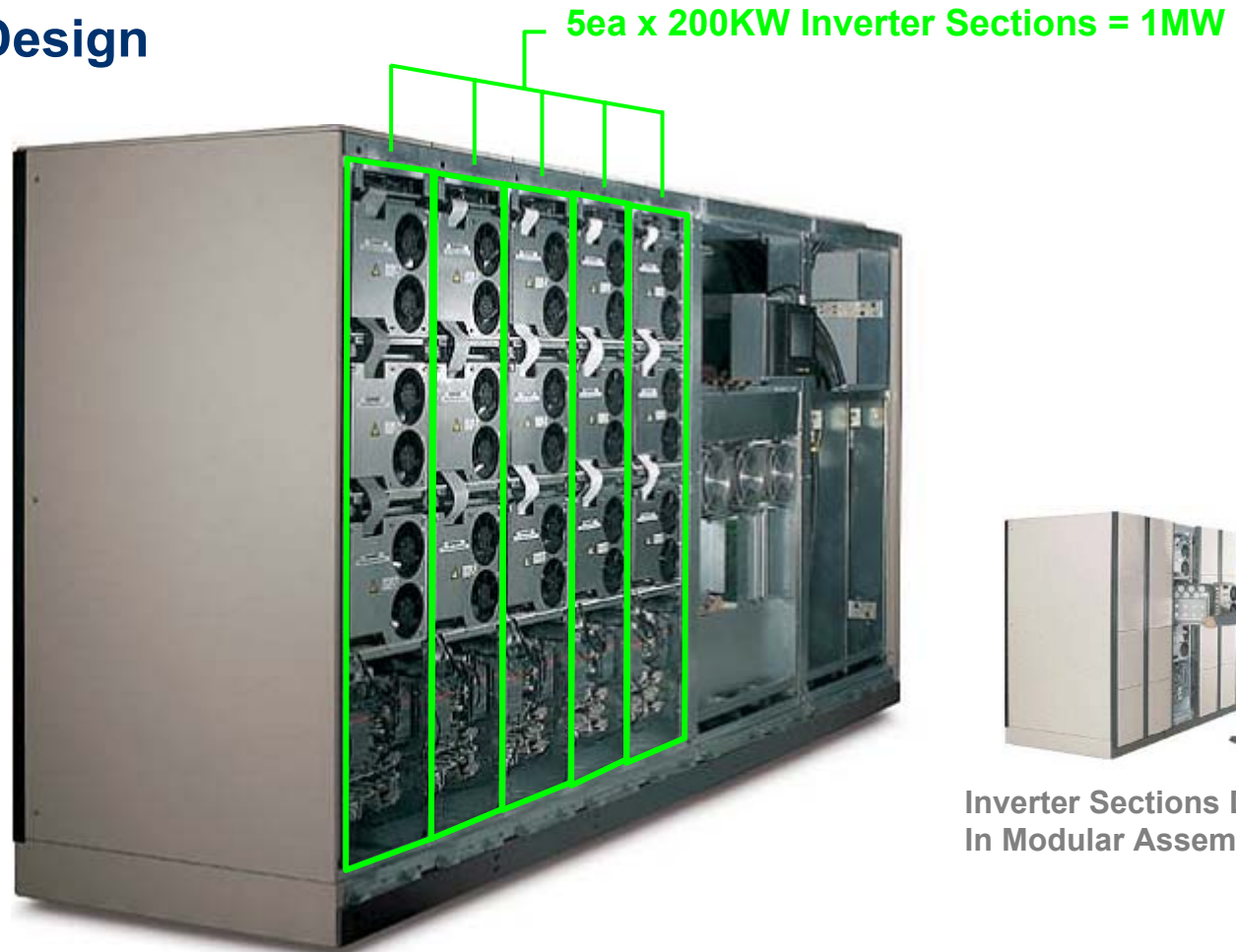
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# Symmetra MW Unique Features

- Scalability

1ea x 200KW Inverter Sections = 200KW



# Symmetra MW Unique Features

- Scalability

2ea x 200KW Inverter Sections = 400KW



# Symmetra MW Unique Features

- Scalability



# Symmetra MW Unique Features

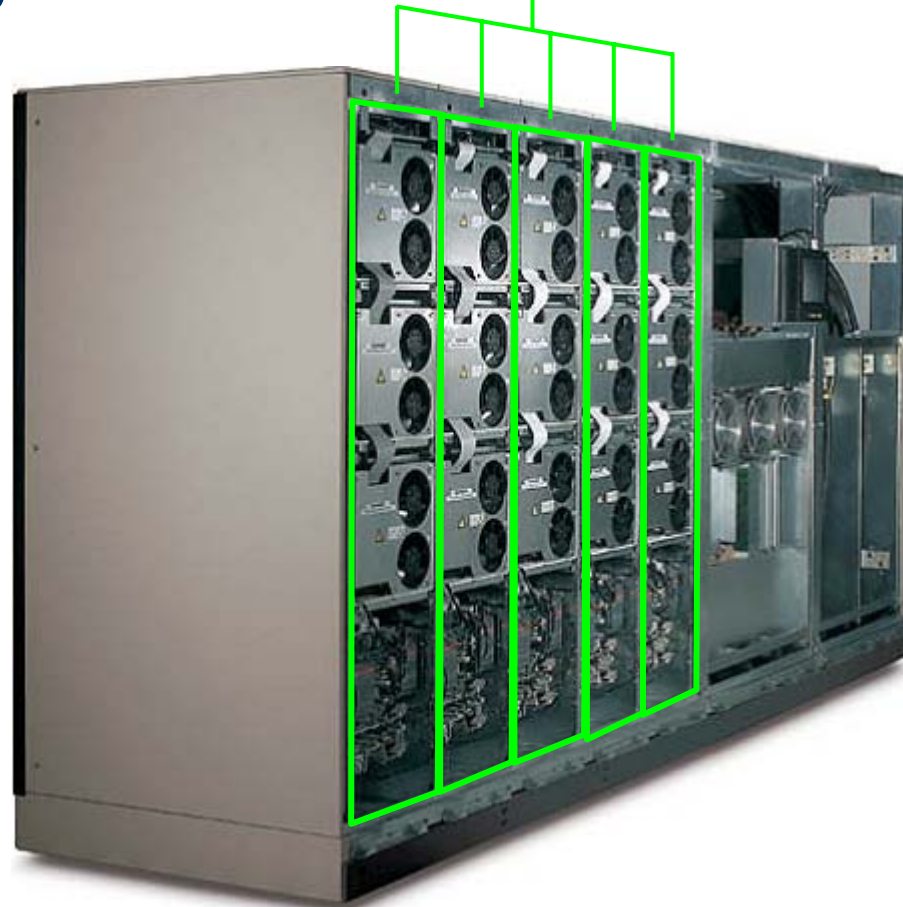
- Scalability



# Symmetra MW Unique Features

- Scalability

5ea x 200KW Inverter Sections = 1MW



Internal Scalability  
By Adding Inverter Sections.

# Symmetra MW Unique Features

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# Symmetra MW Unique Features

- N+1 Redundancy

1ea x 200KW Inverter Sections = 200KW N+0



# Symmetra MW Unique Features

- N+1 Redundancy

2ea x 200KW Inverter Sections = 200KW N+1



# Symmetra MW Unique Features

- N+1 Redundancy

3ea x 200KW Inverter Sections = 400KW N+1



# Symmetra MW Unique Features

- **N+1 Redundancy**

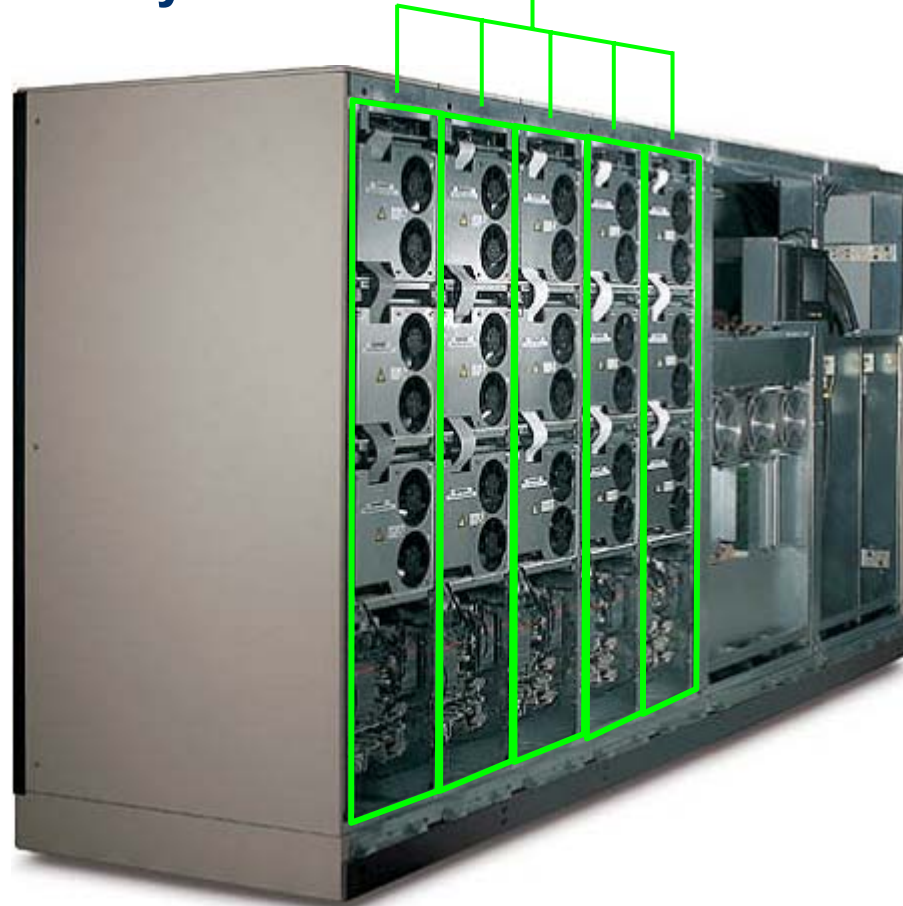
4ea x 200KW Inverter Sections = 600KW N+1



# Symmetra MW Unique Features

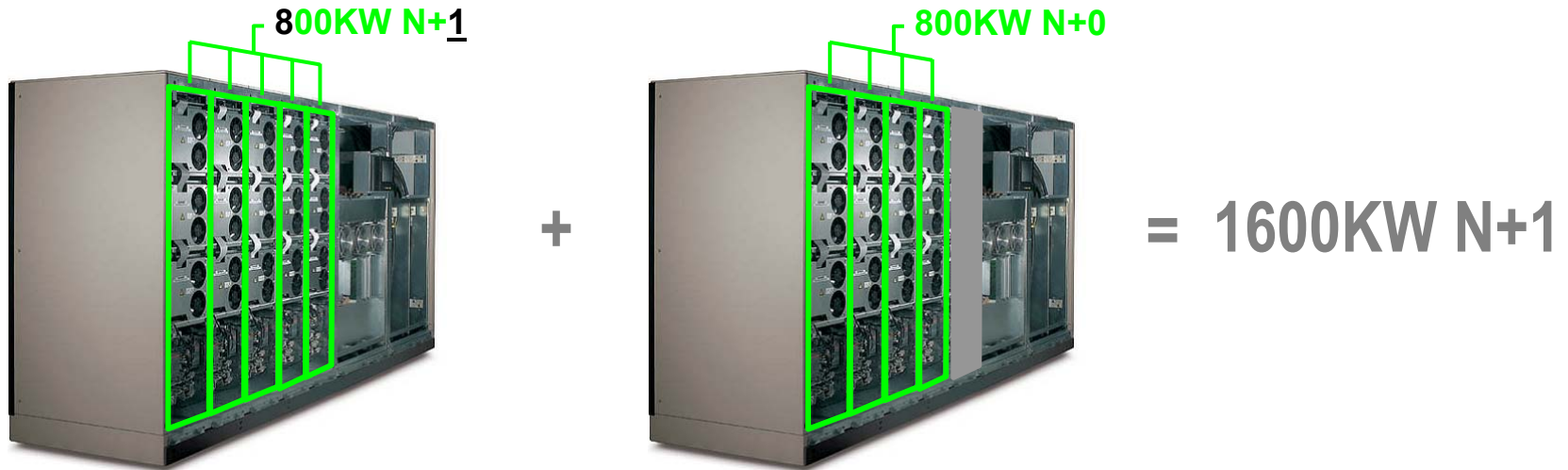
- **N+1 Redundancy**

5ea x 200KW Inverter Sections = 800KW N+1



# Symmetra MW Unique Features

- N+1 Redundancy



**Symmetra MW Can Also Be Paralleled With Unlike Unit Sizes.  
This Is Naturally Inherent To The Design.**

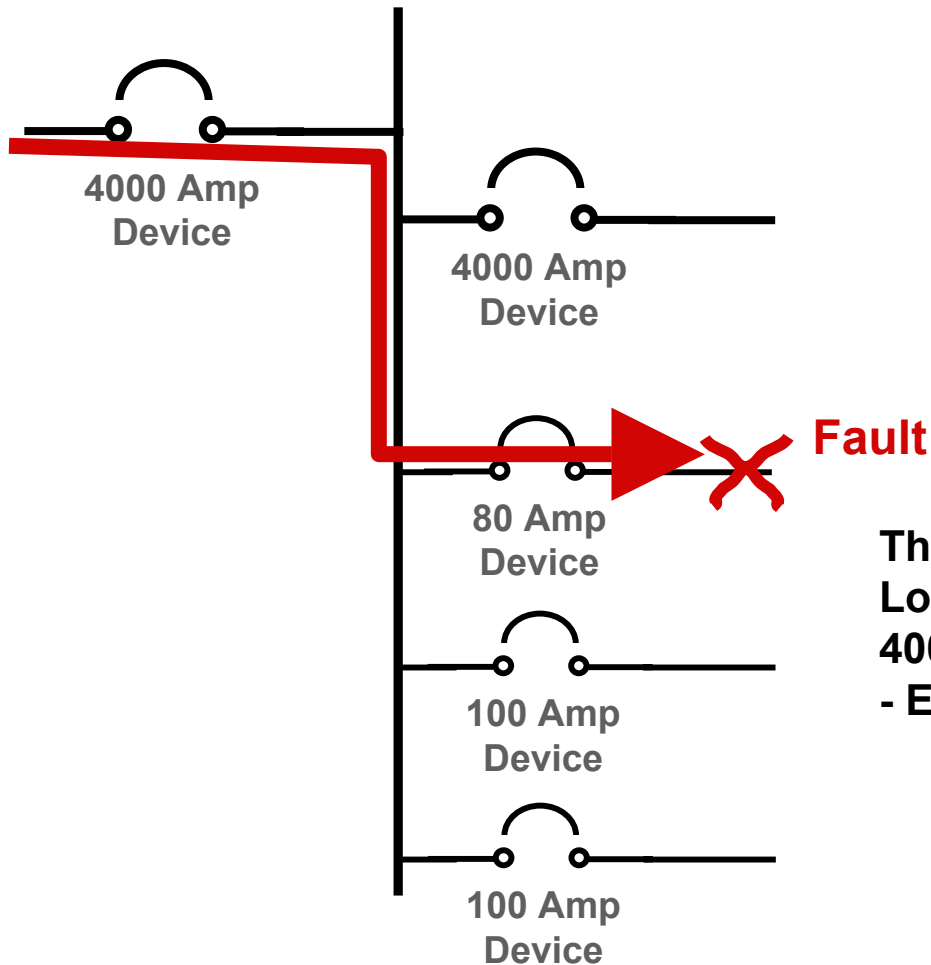
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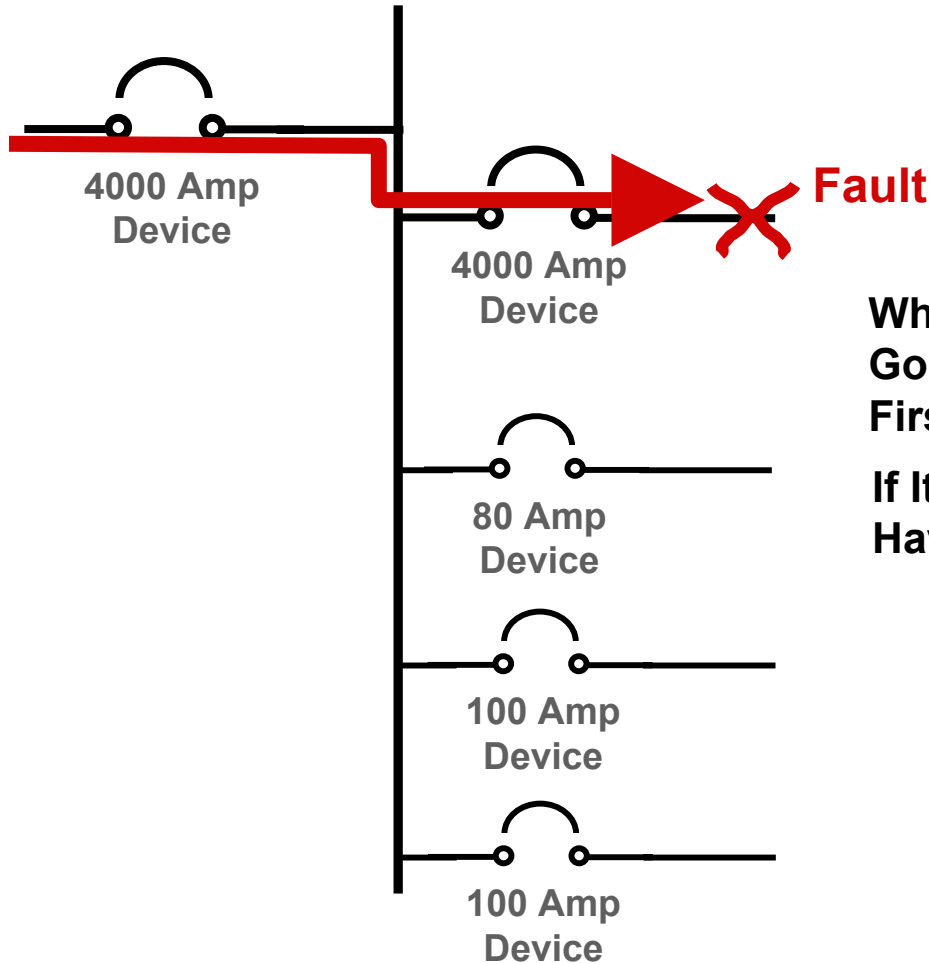
## Basic Circuit Breaker/Fuse Coordination Issue:



**The 80 Amp Device Will Clear  
Long Before The Upstream  
4000 Amp Device Does.  
- Easy, Reliable Coordination -**

# Symmetra MW Unique Features

## Basic Circuit Breaker/Fuse Coordination Issue:



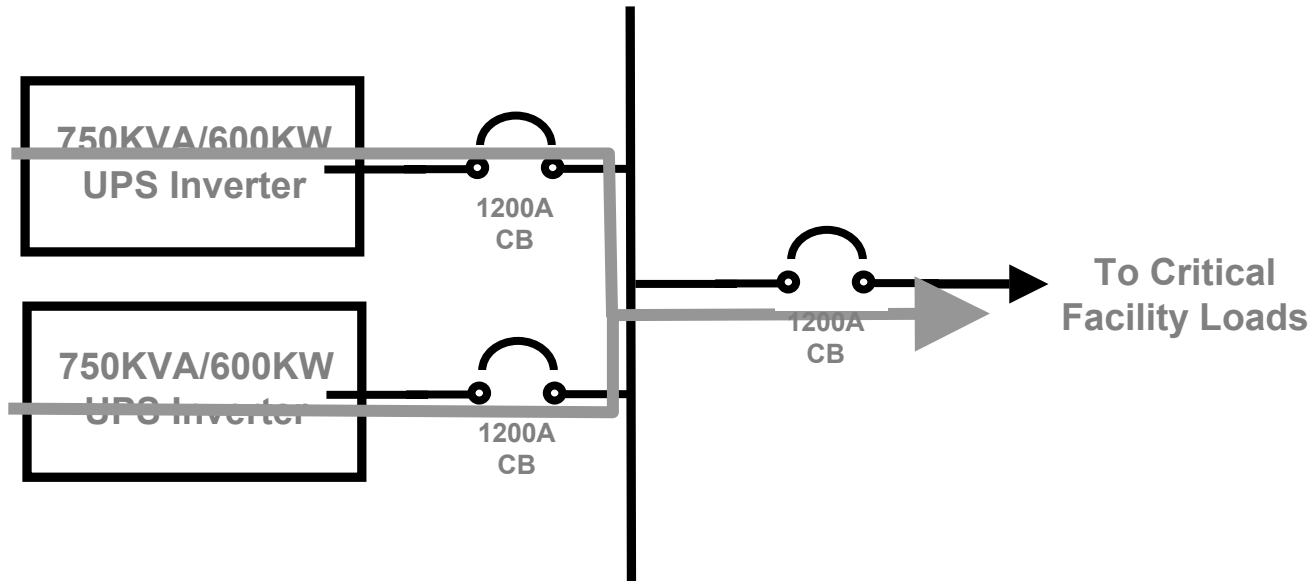
**Which 4000A Device Is Going To Clear The Fault First ?**

**If It's The Wrong One, You Have A Big Problem . . .**

# Symmetra MW Unique Features

Similar Issues Apply To Selective Tripping of Equivalent Size  
Parallel Redundant Inverters:

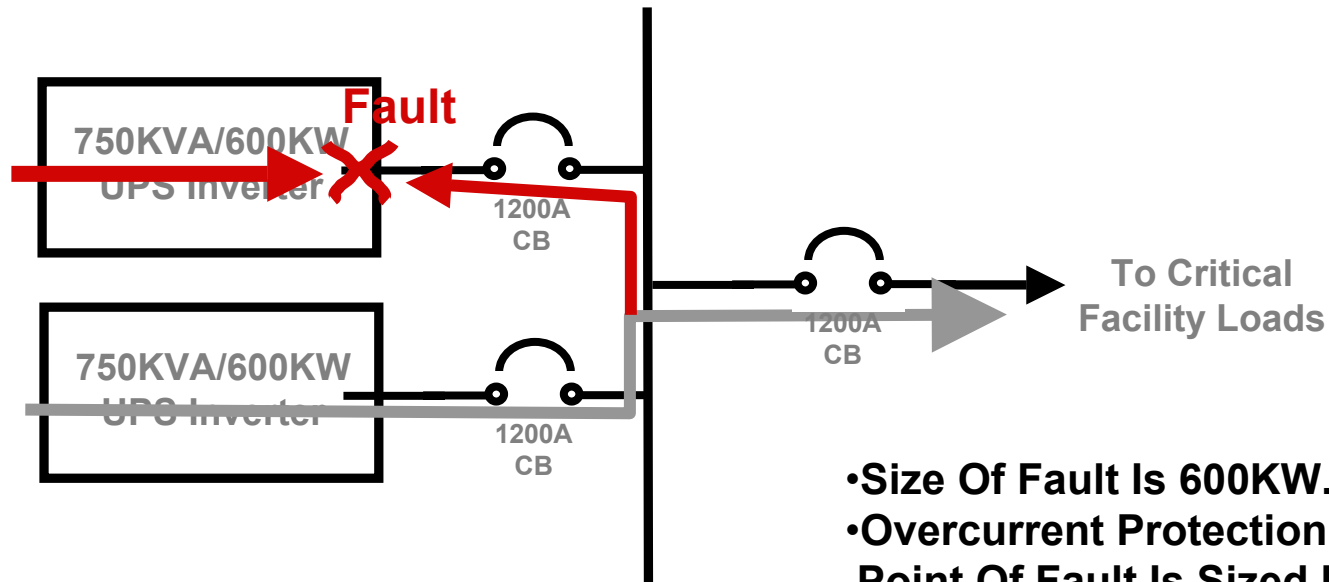
600KW  
Redundant  
System



# Symmetra MW Unique Features

Similar Issues Apply To Selective Tripping of Equivalent Size Parallel Redundant Inverters:

600KW  
Redundant  
System



- Size Of Fault Is 600KW.
- Overcurrent Protection At Point Of Fault Is Sized For A 600KW Block.
- Size Of Surviving Inverter Capacity Is Also Only 600KW.
- A 1:1 Ratio.

# Symmetra MW Unique Features

- Fault Tolerant Inverter Coordination

3ea x 1-Phase 66.7KW  
Power Modules =  
200KW



# Symmetra MW Unique Features

- Fault Tolerant Inverter Coordination

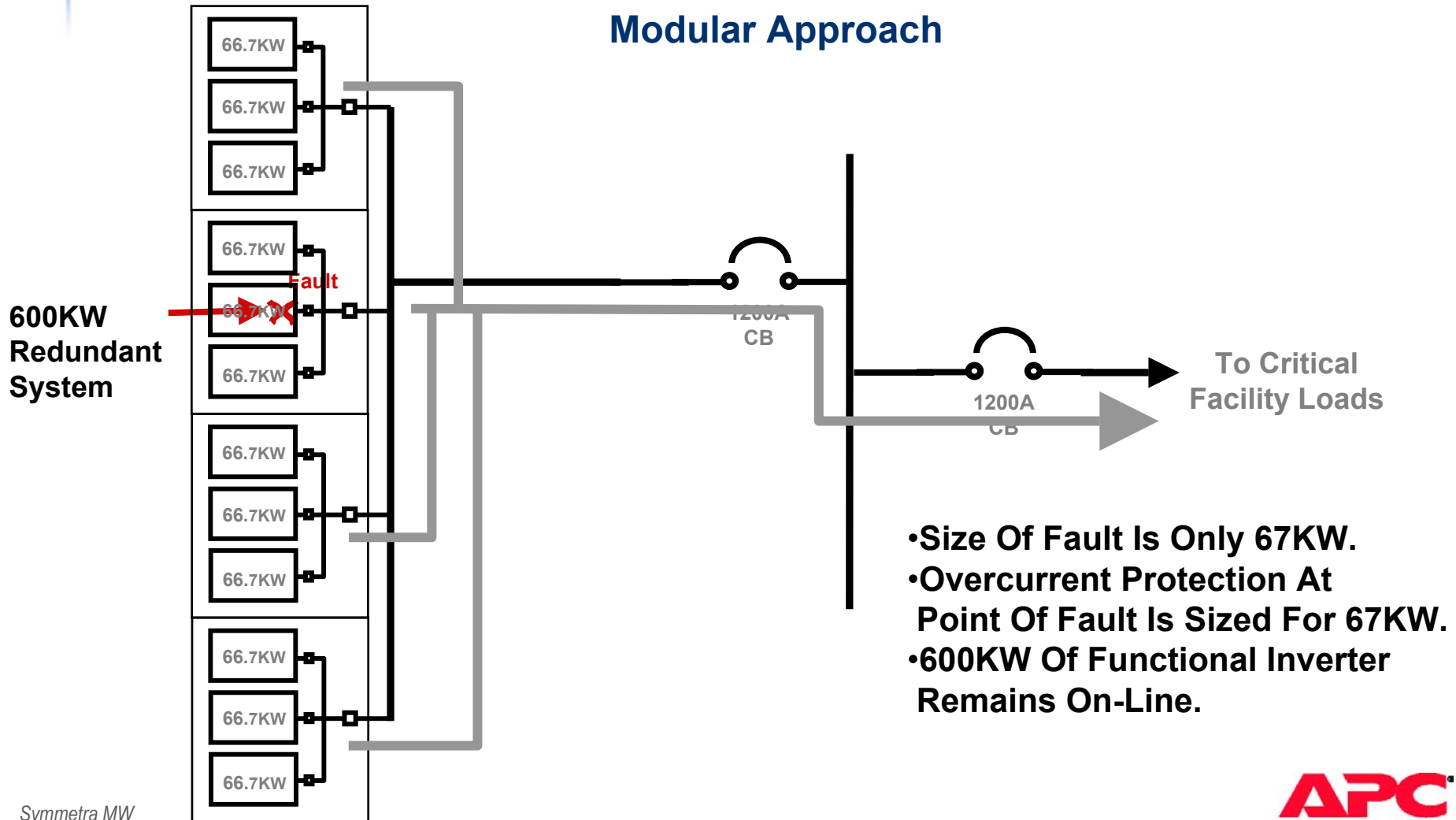
3ea x 1-Phase 66.7KW  
Power Modules =  
200KW



Each Power Module  
Is Both Physically  
And Electrically Isolated  
By Design.

# Symmetra MW Unique Features

This Issue Is Greatly Simplified With The Symmetra MW's Modular Approach

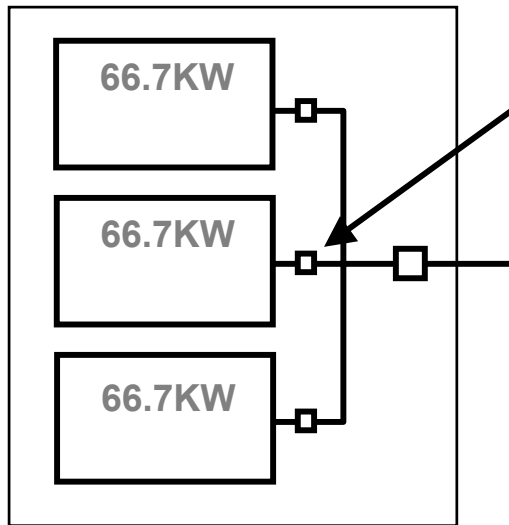


- Size Of Fault Is Only 67KW.
- Overcurrent Protection At Point Of Fault Is Sized For 67KW.
- 600KW Of Functional Inverter Remains On-Line.

# Symmetra MW Unique Features

This Issue Is Greatly Simplified With The Symmetra MW's  
Modular Approach

200KW Inverter Section



More Importantly, The Individual 67KW  
Power Modules Are Each Selectively Fused.  
The Coordination Between This Fuse And The  
200KW Inverter Section Fuse Is Straightforward  
And Is 100% Predictable.

The Smaller Fuse Will Always Clear First.

# Symmetra MW Inverter Section

## 200kW power sections

Consists of 3 1-phase power modules, a common 3-phase delta transformer and a common 3-phase power module controller (PMC)

## Slide in/out power modules

For ease of service. A unique crane that allows the module to be changed by a single person ships with the UPS

## Seperate input/output fusing and Contactors

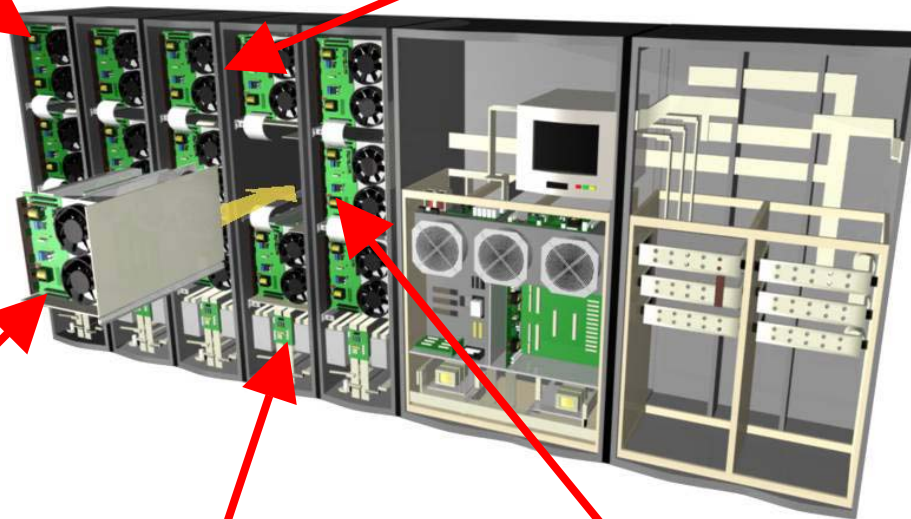
To ensure that a faulty section can be isolated

## Fault containment

The inverter sections are seperated by steel plates

## Redundant power supplies

For increased availability of the inverter section



# Symmetra MW Unique Features

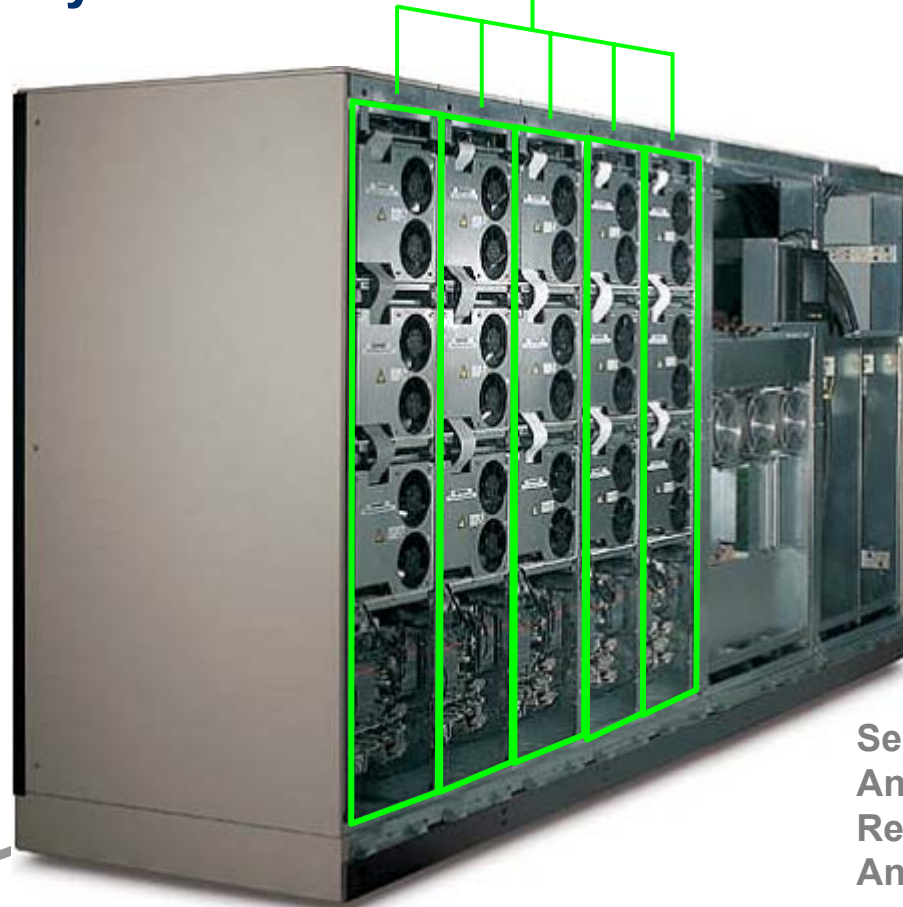
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# Symmetra MW Unique Features

- **Serviceability**

5ea x 200KW Inverter Sections = 1MW



Self Diagnostic Functions  
And Module Level Repair  
Result in A Lower MTTR  
And Higher System Availability.

# Symmetra MW Product Design Benefits



## High Efficiency

Up to 97% efficiency at full load provides reduced heat dissipation and energy costs

## Inverter Section

Load-sharing 200 kW power modules provide the flexibility to scale power capacity and adds N+1 capability

## Front Access Maintenance

All parts are accessible from the front for ease of maintenance

## Control Section: Static Bypass Switch

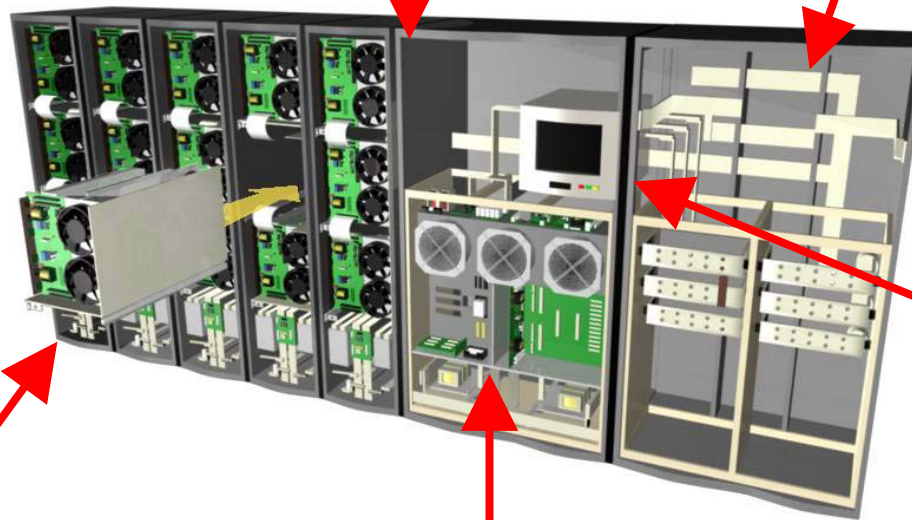
The built-in static bypass switch (400 and 600kW models) provides for safe transfer to an alternate source without interrupting the supply to the load

## Input/Output Section

Spacious cable section for ease of installation. Top or bottom, left or right side cable entry.

## Control Section: LCD Touch-screen

Configurable touch-screen with network interface offers easy access to all critical UPS and ancillary equipment data.



# Symmetra MW Input/Output Section

## Cable first in rough environments

The modular concept allows for the Input/Output section to be installed first, in order to avoid dust, humidity etc that could affect critical electronic components.



## Top or bottom cable entry

Both options are available for ease of installation and shorter cable lengths

## Cable Entry Section

For easy fitting of cables, the Input/Output Section has been made spacious

## Right or left positioning

For increased adaptability the Input/Output Section can be positioned either to the left or the right of the Inverter Section, whichever fits the application best

# Symmetra MW Unique Features

## Summary:

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- **N+1 Redundancy**
- **Fault Tolerant Inverter Coordination**
- **Servicability**

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# Symmetra MW Unique Features

*For The Next Presentation When We Have More Than 8 Minutes:*

- **Highly Efficient Design - 97%**
- **Output Capacity Rating Is 1.0 - KW = KVA**
- **Power Factor Corrected Input - ~ 1.0**
- **Distributed, Fault Tolerant Controls**
- **Advanced Diagnostics and Control Interface**

**All of these features combine to produce higher levels of reliability and availability.**

# Symmetra MW



- Questions ?



