

# Broadcasters Clinic

and

## Upper Midwest Regional Society of Broadcast Engineers Meeting



***Phasor Labs***

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# **Electrical Terminology**

**110, 115 or 120 volts?**

**Most equipment is designed  
for and rated at a nominal  
120 volt rating**

**208, 220, 230 or 240 volts?**

208 volts is the power provided from a 120/208 volt supply, it is intended to operate a 200 volt rated motor or device

**What's the difference?**

**208 volts**

**220 volts**

**230 volts**

**240 volts**

# **120/208 Volts - (3 phase)**

- 120 volt loads are fine...
- 208 volt supply is intended to operate a 200 volt rated motor or device

# **220 Volt Rating**

Most equipment  
nameplate rated 220  
volts can operate on 208  
to 240 volt systems

# **230/240 Volts - (1 phase)**

- 120 volt loads are fine
- 240 volt supply is intended to operate a 230 volt rated motor or device

# **230/240 Volts - (3 phase)**

Caution on 240 volt  
three phase, three or  
four wire systems!

# **120/240 Volts - (1 phase)**

- This is OK
- 120 volt loads are fine
- 230/240 volt loads fine

***277/480 Volts - (3 phase)***

480 volt supply is  
intended to operate 460  
volt rated equipment or a  
step-down transformer

# What does “VA” mean?

Volt-amperes

For most situations (1)

VA can be considered  
equal to (1)Watt

# What is “NEC”?

National Electrical Code

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Don't forget State and  
Local Codes

# **What Voltage is Best?**

Small station or  
large?

# Small Station

Use 120/240 volt single  
phase

# Large Station

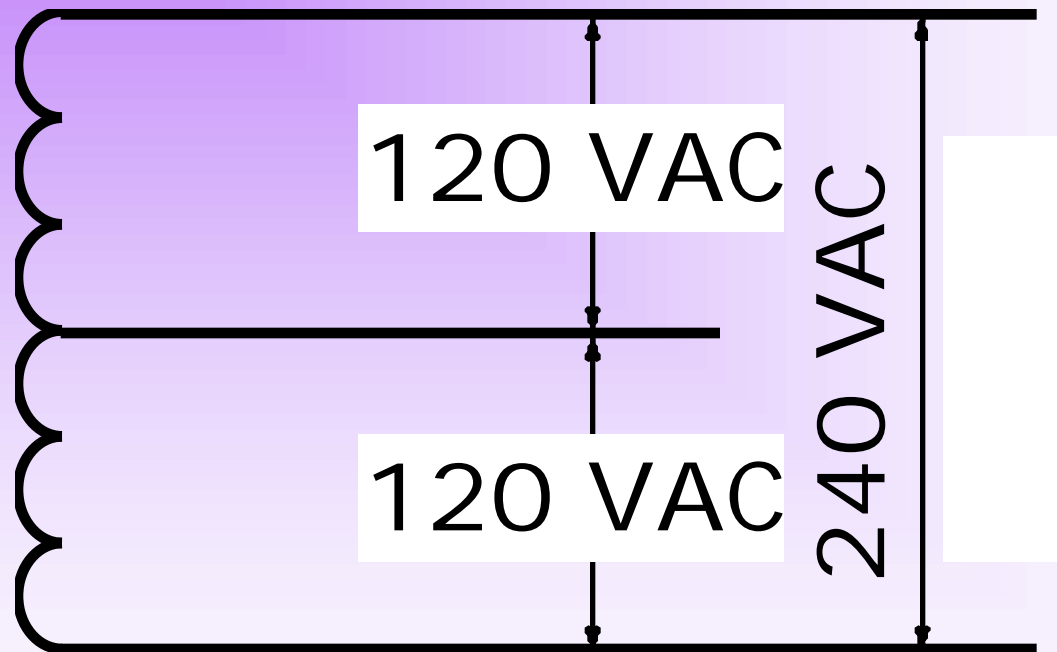
120/208 volt three phase

277/480 volt three phase

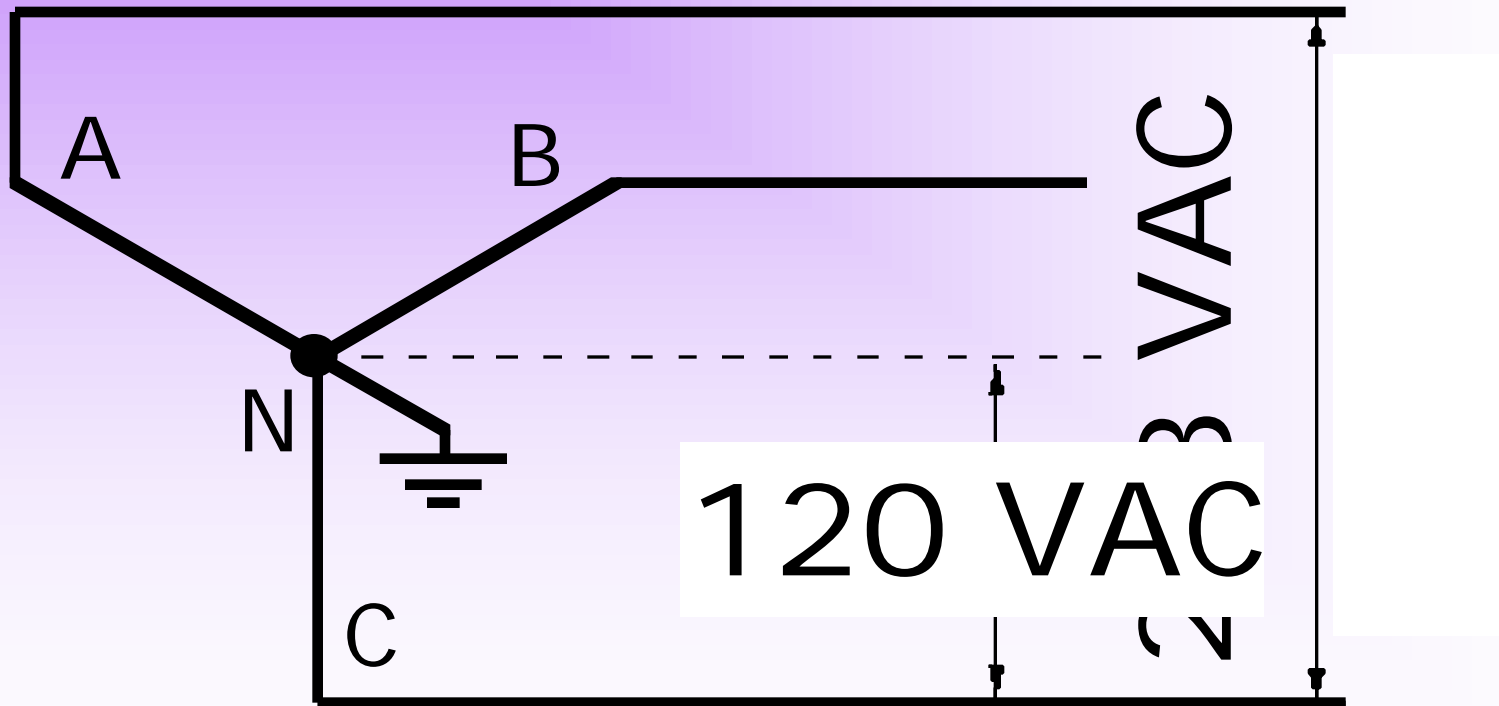
**OK, which one?**

Can you get the power  
you need?

# What is Single Phase?



# What is Three Phase?



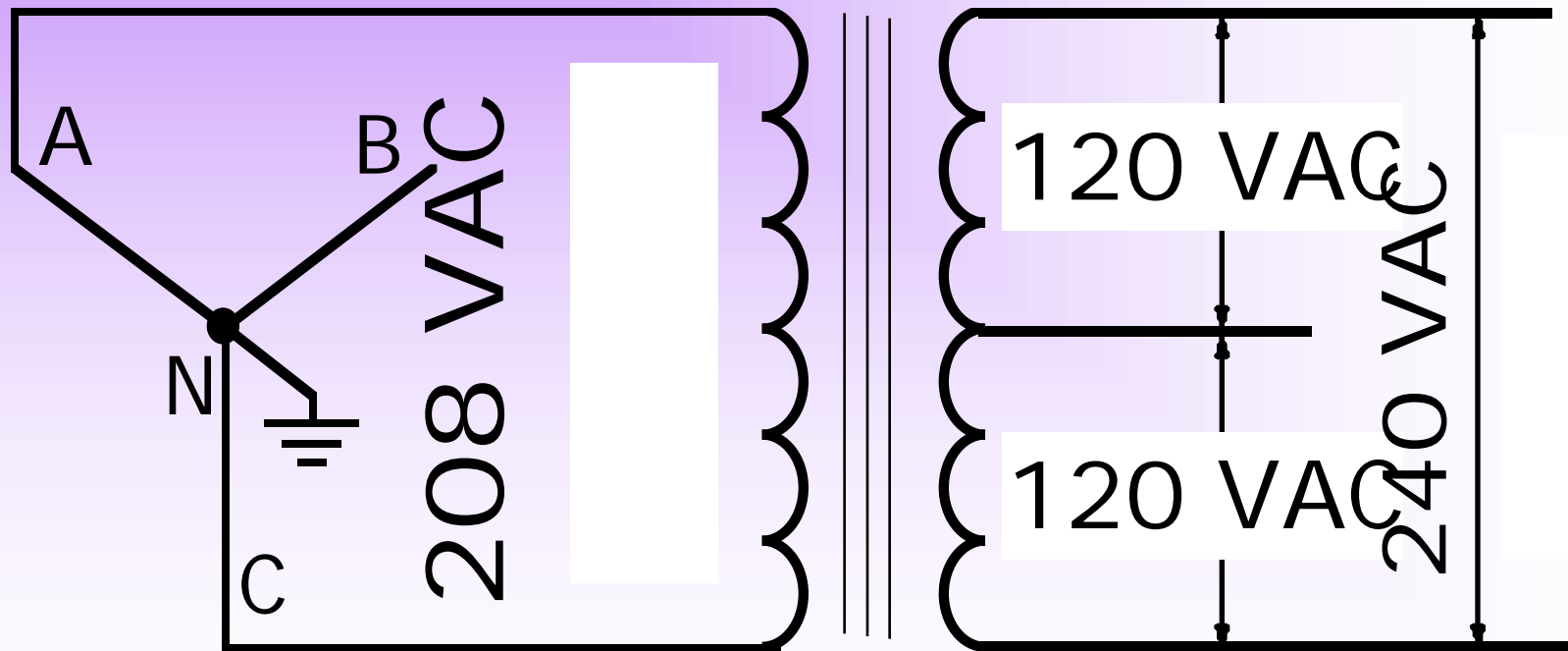
**What do I do?**

**I'm on 208...**

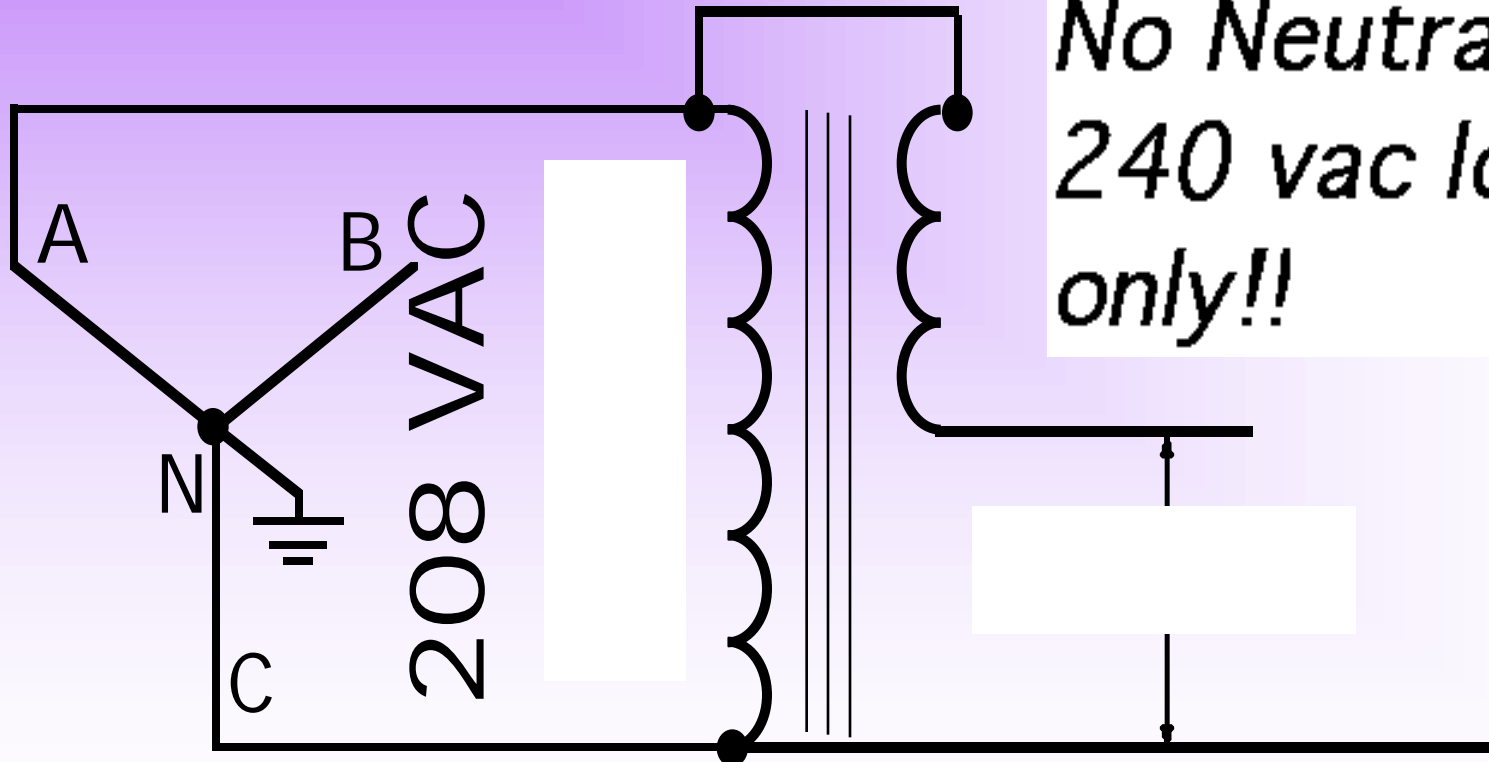
**I MUST**

**have 240 volts!**

# Use an isolation step-up transformer



# Do NOT do this!!!



*No Neutral!!!!  
240 vac loads  
only!!*

**Tell the staff..**

*This station offers 120  
or 208 volt ac power*

***Do not connect 230 or  
240 volt equipment***

# **Tell the staff**

*This station offers 120 or  
240 volt ac power*

***Do not connect 208 volt  
equipment***

# How much power is needed?

Lights = 360 VA = 3 A @ 120

Refrig = 360 VA = 3 A @ 120

Micro = 960 VA = 8 A @ 120

Coffee = 960 VA = 8 A @ 120

# How much power is needed?

$$A/C_{7,500\text{BTU}} = 1,200 \text{ VA} = 10 \text{ A}$$

$$D.W. = 1200 \text{ VA} = 10 \text{ A @ } 120$$

$$\text{Heater} = 1920 \text{ VA} = 16 \text{ A @ } 120$$

# How much is a 200A panel good for?

The total load must be equal to or less than **160** amperes @ **208** or **240** volts. **WHY??**

Single phase 240 v =  $160 * 240 = 38,400$  VA

Three phase 208 v =  $160 * 208 * 1.732 = 57,600$  VA

# How much is a 400A panel good for?

The total load must be equal to or less than **320** amperes @ **208 or 240** volts. **WHY??**

Single phase 240 v =  $320 * 240 = 76,800$  VA

Three phase 208 v  
=  $320 * 208 * 1.732 = 115,200$  VA

**Do not forget  
about voltage  
drop**

**Is one type of service  
best for all stations?**

Here are some items to  
consider

# Check with the Utility

- What sources are avail?
- Contribution-in-Aid of construction?
- Single or three phase?

# Layout of Station

- Voltage drop
- Feeder length
- Xfmr sites