

Broadcasters Clinic

and

Upper Midwest Regional Society of Broadcast Engineers Meeting



Phasor Labs

5420 Glenway Circle Oregon, Wisconsin 53575

608-835-9605 voice
608-835-9039 fax
cforster@phasorlabs.com

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

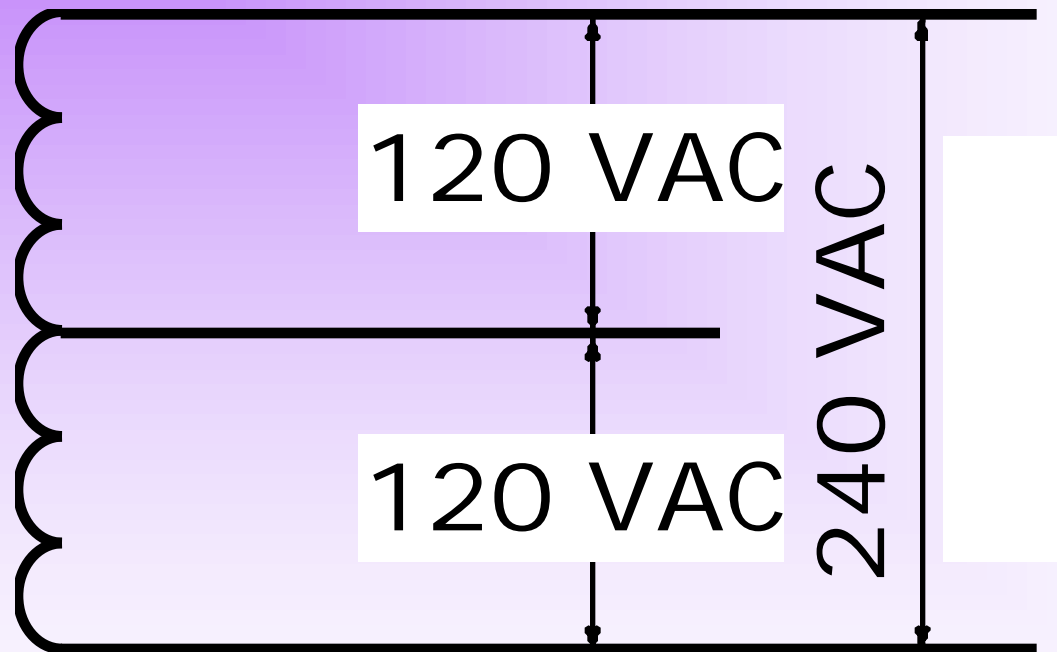
120/208 volt three phase

277/480 volt three phase

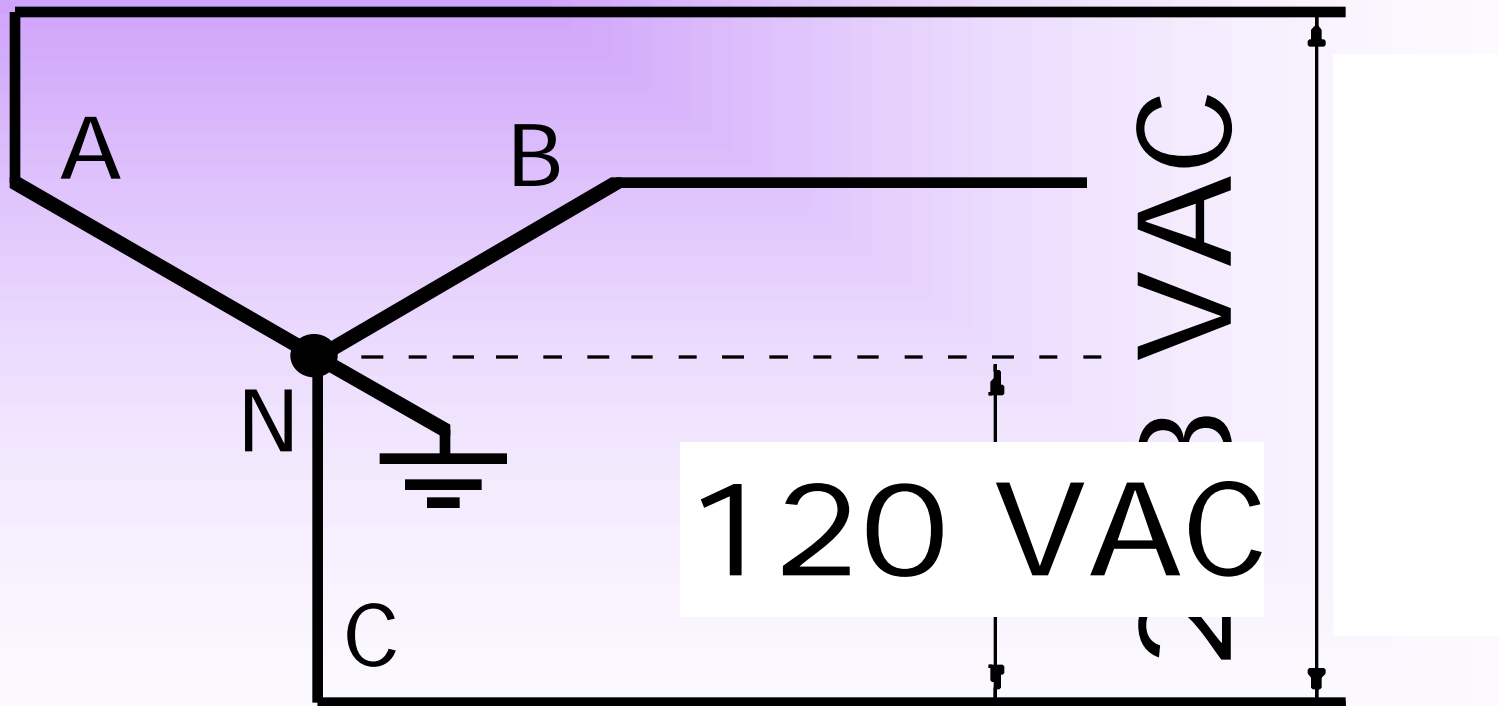
OK, which one?

Can you get the power
you need?

What is Single Phase?



What is Three Phase?



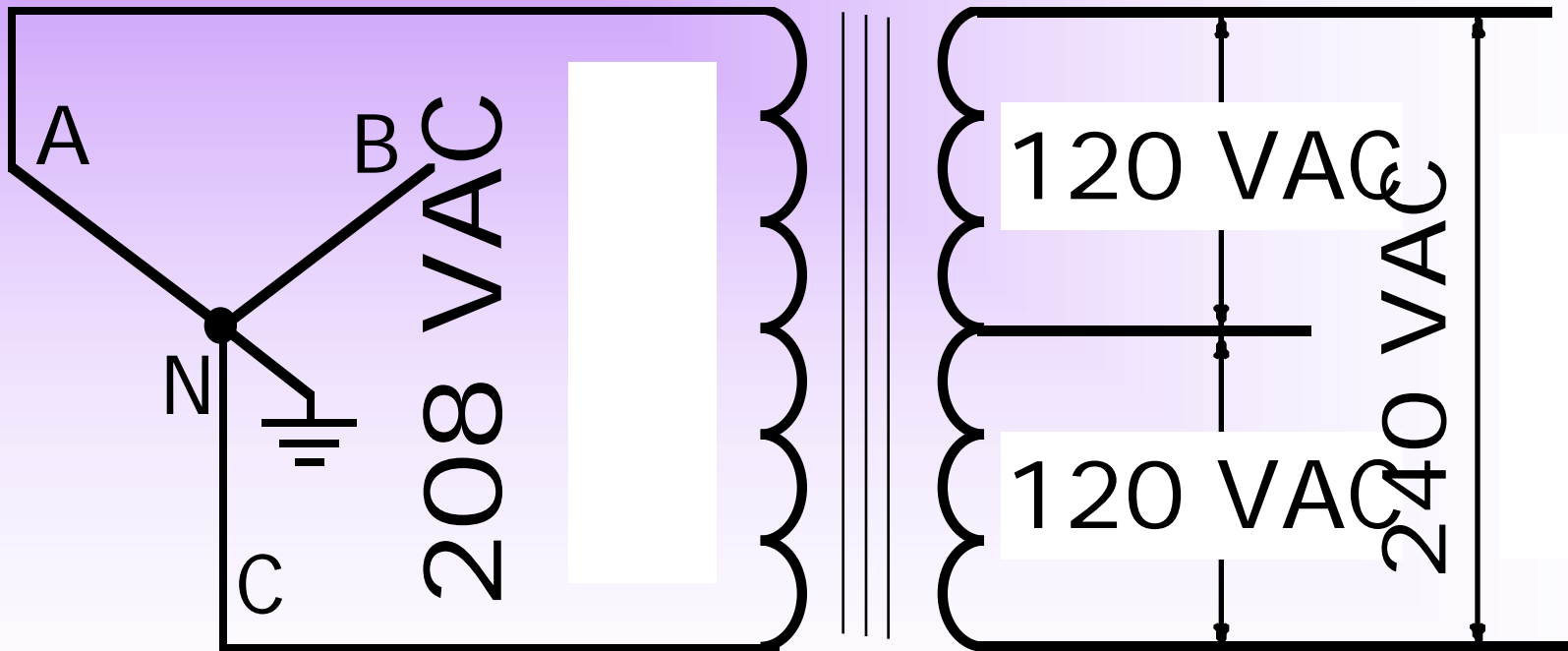
What do I do?

I'm on 208...

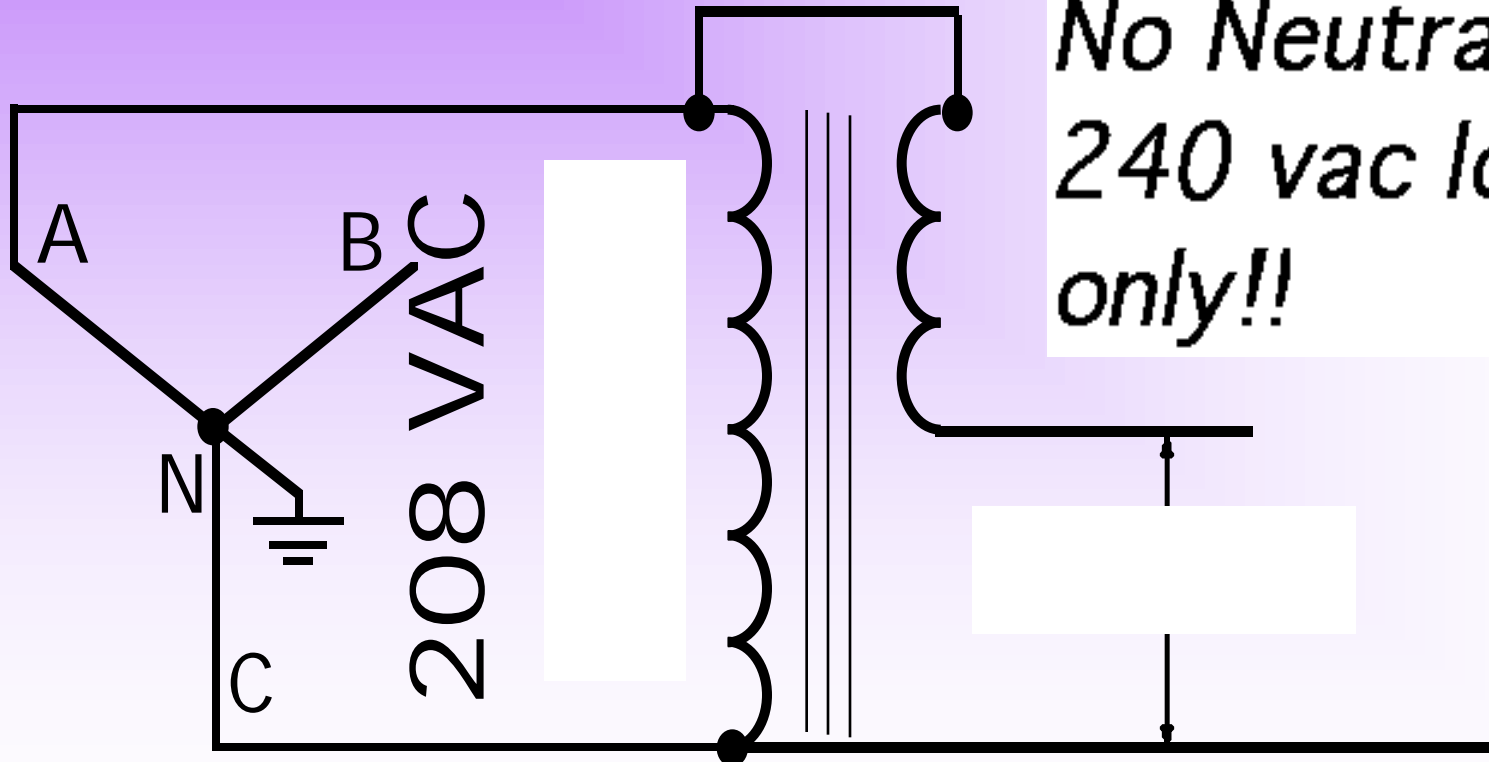
I MUST

have 240 volts!

Use an isolation step-up transformer



Do NOT do this!!!



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