Wiring Schematics

Details for the Electrician

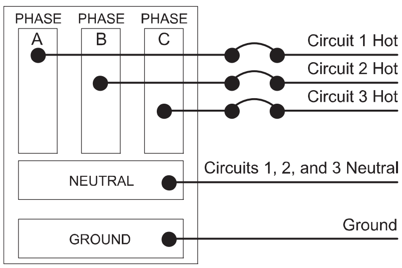
Answer offers three different wiring schematics to allow you to match your specific wiring strategy to any typical building wiring plan.

Tip: All the components in an electrical system must use the same wiring schematic. The components are keyed and color coded to make it impossible to connect mismatched parts.

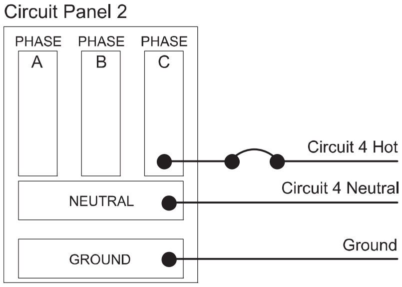
Black = Four-circuit, 3+1
Brown = Four-circuit, 2+2
Rust = Three-circuit, separate neutrals (3SN)
Shared neutrals = 10 gauge
Non-shared neutrals = 12 gauge
Hot wires = 12 gauge

Four-Circuit, 3+1

Circuit Panel 1

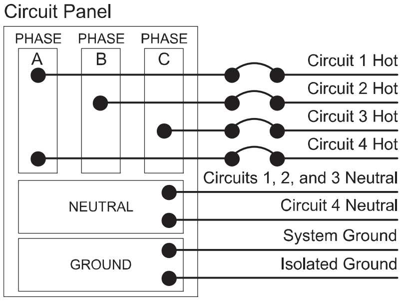


Circuit Panel 2



In the four-circuit 3+1 schematic, circuits 1, 2, and 3 are distributed from the first circuit panel and are supported with one shared neutral and one shared ground. Circuit 4 is distributed from a second circuit panel and is supported with a separate neutral and ground.

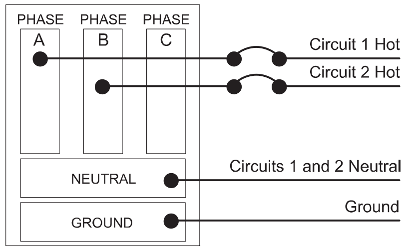
Single 3-Phase Circuit Panel



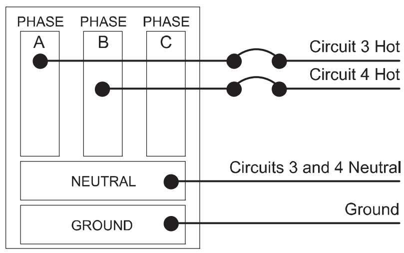
On a single 3-phase circuit panel, all four circuits are distributed as shown.

Four-Circuit, 2+2

Circuit Panel 1

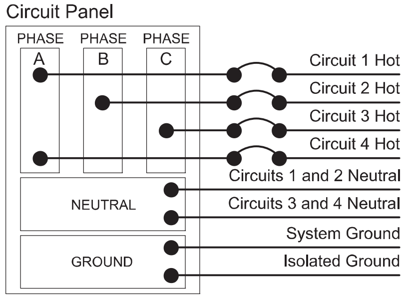


Circuit Panel 2



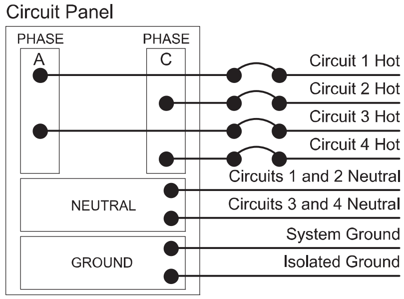
In the four-circuit 2+2 schematic, circuits 1 and 2 are distributed from two different phases from the first circuit panel and are supported with one shared neutral and one shared ground. Circuits 3 and 4 are distributed from a second circuit panel and supported by their own shared neutral and ground.

Single 3-Phase Circuit Panel



On a single 3-phase circuit panel, all four circuits are distributed as shown.

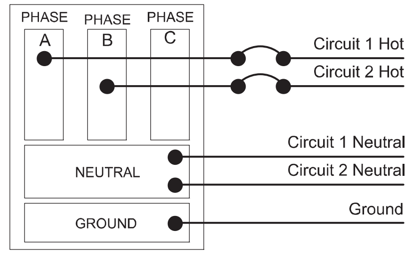
Split-Phase Circuit Panel



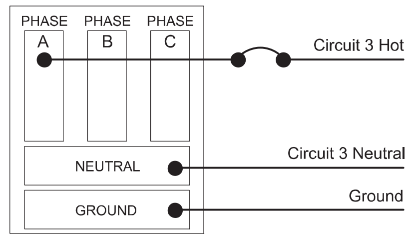
On a split-phase circuit panel, all four circuits are distributed as shown.

Three-Circuit, Separate Neutrals

Circuit Panel 1

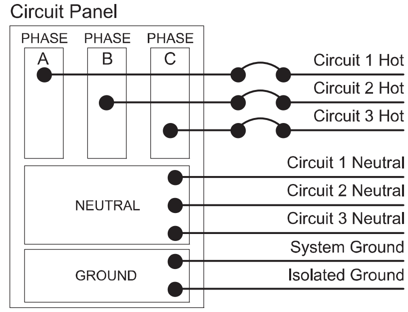


Circuit Panel 2



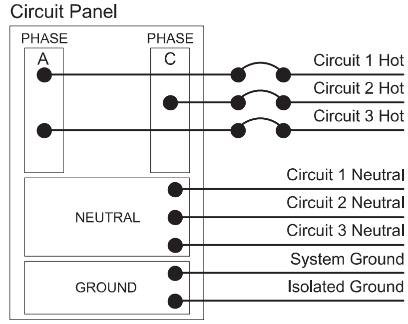
In the three-circuit, separate neutral schematic, circuits 1 and 2 are distributed from two different phases from the first circuit panel. Each circuit is supported with its own neutral and a common ground. Circuit 3 is distributed from the second circuit panel and is supported by its own neutral and ground.

Single 3-Phase Circuit Panel



On a single 3-phase circuit panel, three circuits are distributed as shown.

Split-Phase Circuit Panel



On a split-phase circuit panel, three circuits are distributed as shown.

How to Calculate Power Needs

Use This to Determine How Many Power-Ins You'll Need

When planning a power network, you must calculate the amperage requirements of all your electrical components so you can provide sufficient electricity to power them.

If your usage is not known in advance:
The National Electrical Code (NEC) allows a maximum of 13 receptacles on each 20-amp circuit. This provides up to 30 receptacles for each 3-circuit power-in.

If your usage is known in advance:
Add up the amperage used by each piece of equipment in the workstation. Whenever you reach 60 amps (20 amps times 3 circuits) from items that are likely to be used at the same time, you have reached the limit for a single power-in. Specify another power-in and continue until all equipment is powered.

If the circuits will normally be subject to a continuous load (three or more hours of continuous use, such as lights or computers), the NEC requires that circuit capacity be "de-rated" by 20 percent. Therefore, treat circuits used for continuous loads as if they were rated at 16 amps instead of the regular 20 amps.

Try to anticipate future increases in power requirements and build some excess capacity into your plan.
▶See table at right for typical and actual amperage usages for components.

To calculate amperage when the wattage of a device is known, divide watts by 120.

Some appliances, such as large copiers, coffee makers, or space heaters require most of the current available on a 20-amp circuit. It is recommended that such devices be supplied with their own receptacle/circuit, directly from the building. This leaves the capacity of the furniture circuits available for the more dynamic requirements of the office equipment.

Local electrical codes vary. Consult a qualified electrical contractor or engineer for the proper planning of electrical circuits in your locale.

Approximate power consumption for common devices

• Device	• Wattage	• Amperage	• Voltage	• Number of Devices Supported on Single 20 Amp Circuit
Laptop (Low)	30	0.25	120	64
Laptop (High)	100	0.83	120	19
CPU/Desktop Computer (Low)	65	0.54	120	30
CPU/Desktop Computer (High)	150	1.25	120	13
Monitor (Low)	15	0.13	120	128
Monitor (High)	80	0.67	120	24
Phone	5	0.04	120	384
High Power Tablet	10	0.08	120	192
Lower Power Tablet	45	0.38	120	43
Desktop Printer	40	0.33	120	48
42" LCD Screen	120	1.00	120	16
Projector (Small)	50	0.42	120	38
Projector (Medium)	250	2.08	120	8
Projector (Large)	800	6.67	120	2
Desktop Lamp	20	0.17	120	96
Large Printer/Copier	1600	13.33	120	1
Small Printer/Copier	800	6.67	120	2
Paper Shredder (Small)	250	2.08	120	8
Paper Shredder (Large)	800	6.67	120	2
Desktop Fan	25	0.21	120	77
Standing Fan	125	1.04	120	15
Coffee Maker (Low)	500	4.17	120	4
Coffee Maker (High)	1500	12.50	120	1
Microwave (Low)	600	5.00	120	3
Microwave (High)	1000	8.33	120	2
Refrigerator (Low)	200	1.67	120	10
Refrigerator (High)	1500	12.50	120	1
Vacuum (Low)	200	1.67	120	10
Vacuum (High)	1500	12.50	120	1
Space Heater (Low)	400	3.33	120	5
Space Heater (High)	1500	12.50	120	1
Height-Adjustable Desk (Low Power Consumption)*	200	1.67	120	10
Height-Adjustable Desk (High Power Consumption)*	550	4.58	120	3

Tip: These calculations are estimations and are meant solely for informational purposes. It is important to conduct proper power planning for each installation to prevent overloading a circuit.
** Refer to the* Height-Adjustable Desks Specification Guide *for specific product information.*