

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

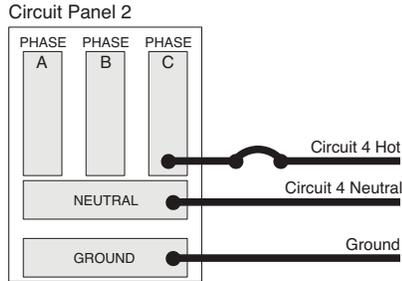
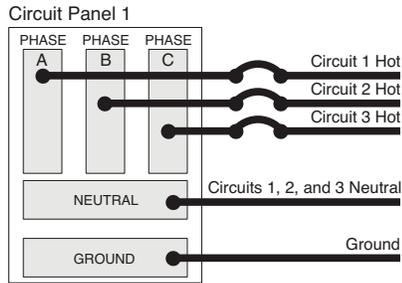
Rust = Three-circuit, separate neutrals (3SN)

Shared neutrals = 10 gauge

Non-shared neutrals = 12 gauge

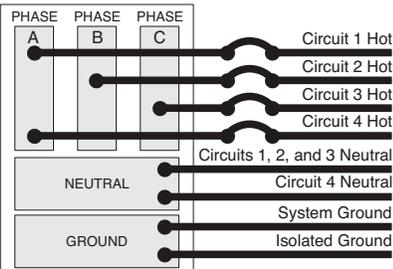
Hot wires = 12 gauge

Four-Circuit, 3+1



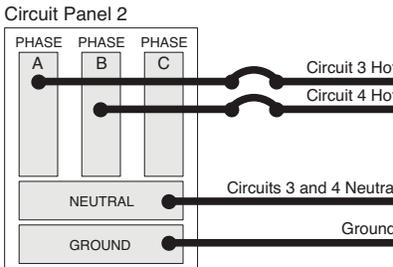
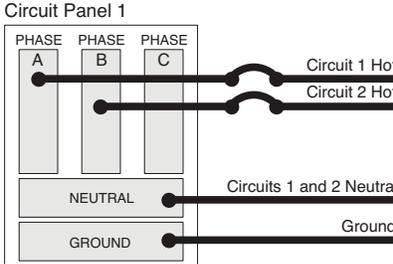
In the four-circuit 3+1 schematic, circuits 1, 2, and 3 are distributed from the first circuit panel and are supported with one shared neutral and one shared ground. Circuit 4 is distributed from a second circuit panel and is supported with a separate neutral and ground.

Single 3-Phase Circuit Panel



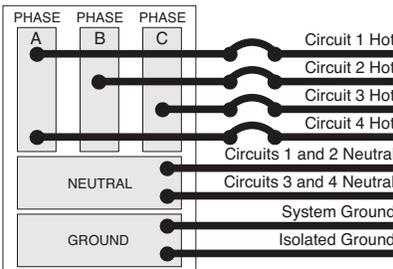
On a single 3-phase circuit panel, all four circuits are distributed as shown.

Four-Circuit, 2+2



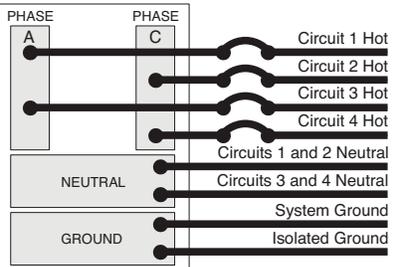
In the four-circuit 2+2 schematic, circuits 1 and 2 are distributed from two different phases from the first circuit panel and are supported with one shared neutral and one shared ground. Circuits 3 and 4 are distributed from a second circuit panel and supported by their own shared neutral and ground.

Single 3-Phase Circuit Panel



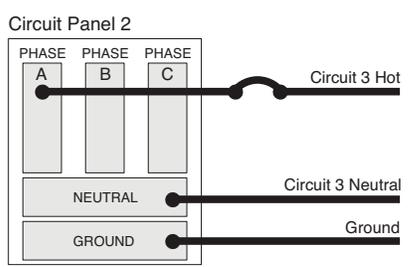
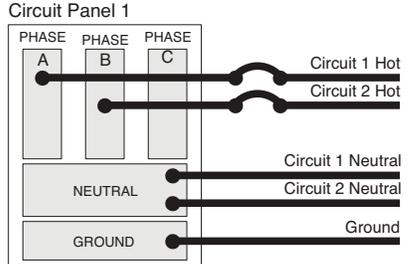
On a single 3-phase circuit panel, all four circuits are distributed as shown.

Split-Phase Circuit Panel



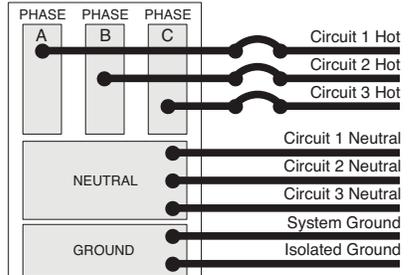
On a split-phase circuit panel, all four circuits are distributed as shown.

Three-Circuit, Separate Neutrals



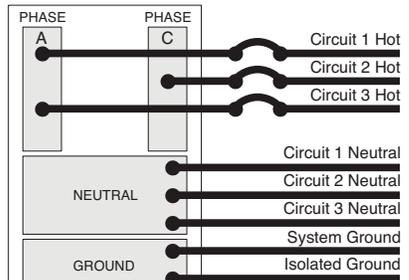
In the three-circuit, separate neutral schematic, circuits 1 and 2 are distributed from two different phases from the first circuit panel. Each circuit is supported with its own neutral and a common ground. Circuit 3 is distributed from the second circuit panel and is supported by its own neutral and 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 and 40 receptacles for each 4-circuit power-in.

These numbers refer to receptacles, not outlets. All Answer receptacles are duplex and include two outlets.

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) or 80 amps (20 amps times 4 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.

Requirements of Office Equipment in Amps

General Equipment (Typical Amperage)

A.C. adapter	0.05
Adding machine	0.05
Answering machine	0.08
Calculator	0.025
Clock	0.03
Coffee pot	10.00
Copy machine	15.00
Desk-top copiers	7.00 to 10.00
Electric eraser	0.25
Fan	0.50
Manuscript holder	0.75
Microwave	8.00 to 12.00
Pencil sharpener	0.25
Radio	0.05
Space heater, 1000 watts	8.50
Space heater, 1500 watts	12.50
Stand-alone copiers	15.00

Electronic Equipment (Typical Amperage)

Desk-top memory storage devices	0.08 to 0.15
Desk-top printers	1.20 to 2.00
DVD players	0.13 to 0.20
Flat-panel screens	3.50
Laptops	3.50 to 5.00
Modems	0.15
Stand-alone printers	1.50 to 2.50
VDTs and PCs	0.08 to 4.80

Steelcase Lighting (Actual Amperage)

<i>Shelf lights</i>	
24" wide, 17 watts	0.20
36" wide, 25 watts	0.30
48" wide, 32 watts	0.30

Cable Capacities

Test and verify capacities for your individual situation. We recommend that testing be conducted using your specific cable, as well as the furniture configuration you are considering. Cable capacities in this table are based on actual cable studies performed by an independent contractor following EIA/TIA codes and practices and can be taken as an accurate assessment of maximum practical capacity. Actual cable capacities may vary slightly depending on which manufacturer produced the cable and the specific field conditions.

Cable capacities are based on Category 6 and Category 6a cables at 55% fill capacity for cable study performed on junctions manufactured on or after October 10, 2011.
Note: Tests were performed on junctions with tall sleeves installed.

Cables Tested
A CommScope Systimax Gigaspeed 1071E Series Category 6 Cable
 OD=0.23"

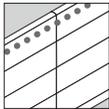
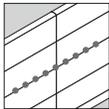
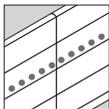
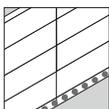
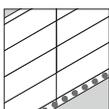
B CommScope Systimax X10D 1091B Series Category 6A Cable
 OD=0.285"

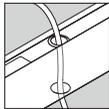
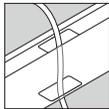
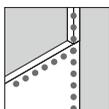
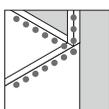
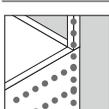
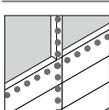
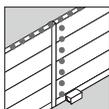
Power harnesses reduce cable capacity. An average of 10-15 cables will be reduced per harness used. However, this number varies according to installation practices and the type of cables used.

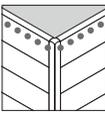
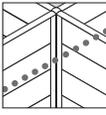
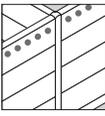
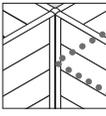
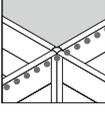
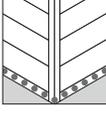
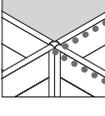
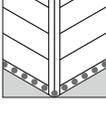
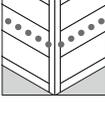
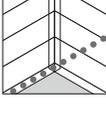
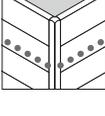
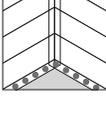
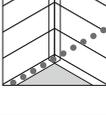
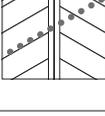
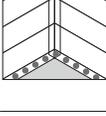
If glass window is used at the top of a panel, top cap lay-in cable capacity is 20 for category 6 cables.

When laying cables vertically behind skins, capacity is dependent on skin width.

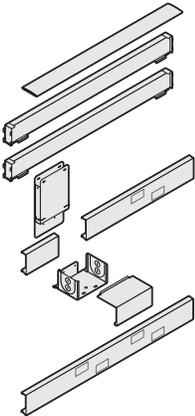
When using stacking junctions, the fork connector does not reduce cable capacity.

	A	B
Straight Horizontal Routing		
 Lay-in cable routing at top of panel (in-line junction)	40	30
 Horizontal pass-through (straight) at cable routing opening (available every 12" inside frame)	12	7
 Horizontal pass-through (straight) at rectangular opening for modular power harness (available every 12" inside frame)	72	47
 Lay-in cable routing at base of panel with power	36	22
 Lay-in cable routing at base of panel without power or with power harness routed above ▶ Page 70	48	30

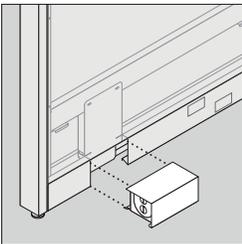
	A	B
Straight Vertical Routing		
 Vertical cable routing through round openings of horizontal connecting bar; two locations per bar	11	7
 Vertical cable routing through rectangular openings of horizontal connecting bars; two locations per bar	24	16
 Vertical cable routing inside junction utility pole (used on square and oval in an end, L or T configuration or on thin in an end)	48	39
 Vertical cable routing inside thin trim utility pole and exiting via top cable lay-in area	42	34
 Vertical cable routing inside thin trim utility pole and exiting into the panel in openings below the top lay-in area	50	40
 Vertical cable lay-in in a ceiling-access lay-in utility package	100	98
 Vertical cable lay-in in a floor-access lay-in utility package	80	54

		A	B			A	B
L, T, X, V, and Y Horizontal Routing			L, T, X, V, and Y Horizontal Routing				
	Lay-in cable routing at top of panels in L or V configuration	16	11		Horizontal pass-through (straight) at rectangular opening for modular power harness (available every 12" inside frame)	72	47
	Lay-in cable routing at top of panels in T configuration	30	20		Horizontal pass-through (corner) at cable routing opening (available every 12" inside frames in T or X configuration)	8	5
	Lay-in cable routing in top of panels in X or Y configuration	30	20		Lay-in cable routing (corner) at base of panel with power in L, T, or V configuration	14	9
	Lay-in cable routing (around the corner) at the top of a panel in T or X configuration	16	11		Lay-in cable routing (corner) at base of panel without power in L, T, or V configuration	14	9
	Horizontal pass-through at cable routing opening (available every 12" inside frames in L or V configuration)	8	5		Lay-in cable routing (straight) at base of panel with power in X or Y configuration	36	22
	Horizontal pass-through (corner) at rectangular opening for modular power harness	48	26		Lay-in cable routing (corner) at base of panel with power in X or Y configuration	11	6
	Horizontal pass-through (straight) at cable routing opening (available every 12" inside frames in T configuration)	12	7		Lay-in cable routing (straight) at base of panel without power, or with power harness routed above in X or Y configuration ▶ Page 70	48	30
	Horizontal pass-through (straight) at cable routing opening (available every 12" inside frames in X or Y configuration)	12	7		Lay-in cable routing (corner) at base of panel without power, or with power harness routed above in X or Y configuration ▶ Page 70	14	9

Product Details



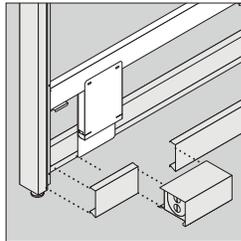
Floor-access lay-in utility package includes: top cap, two lay-in horizontal connecting bars, base utility box with hardware, one standard base trim, and one modified base trim. Package can be specified with thin, square, or oval top trim. It is available in 30", 36", 42", and 48" widths to match standard panel widths.



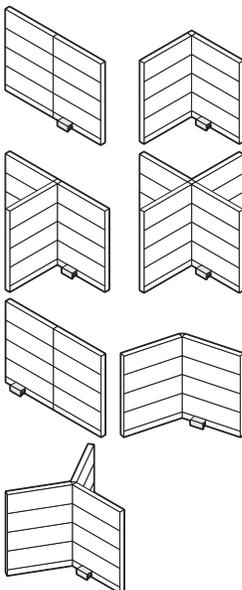
Base utility box is positioned at the left-hand side of the modified base trim. Entry on the other end would be accomplished from the other side of the panel.

Floor-access lay-in utility package takes the place of a standard horizontal frame package. Don't double order.

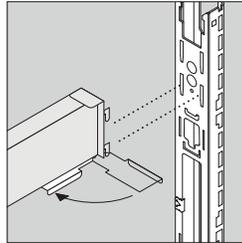
Connections



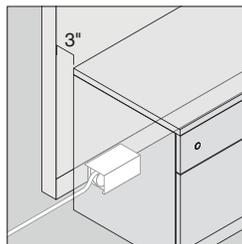
Bracket attaches the base utility box to the lower lay-in horizontal connecting bar.



Floor-access lay-in utility package can be installed in in-line, L, T, X, V, Y, and end-of-run panel configurations. End-of-run condition reduces cable capacity.



Quick-lock mechanism on the lay-in horizontal connecting bar engages the junction in a tight structural connection. Quick-lock mechanism is the same as on the standard horizontal connecting bars.

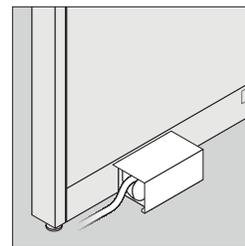


Power infeed sits proud of the panel approximately 3" and will interfere with Universal storage with the Universal 3" base, FrameOne foot base, or c:scape glide.

Wiring & Cabling

24"W powerkit, ordered separately, can be used in the base of 36"W, 42"W, and 48"W floor-access lay-in utility packages. Power kit must be located to the right of the base utility box. No powerkit can be used in 30"W floor-access lay-in utility packages.

Power harness, ordered separately, is shielded to permit the floor-access lay-in utility package to accommodate power and communication cable routing at the same time.



Base utility box routes cables and/or Answer harnesses into the panel from the floor. Base power infeeds are not intended for use with the floor-access lay-in utility package.

Floor-access lay-in utility package can accommodate up to 80 cat 6 cables. Deduct 10-15 cables for each power harness or modular connector routed through the base utility box.

Surface Materials

Base utility box, base trim, and top cap

- Paint
- Wood veneer (option on top cap only)

Lay-in horizontal connecting bars

- Black paint

Tip: Bars are hidden when panel is properly installed.

Application Topics

Base utility box protrudes 4" from the base trim on one side of the panel. When planning, locate the base utility box underneath a workstation instead of a hallway.

Specify change-of-height top cap on your lay-in utility package if it is the lower panel in a change-of-height configuration.

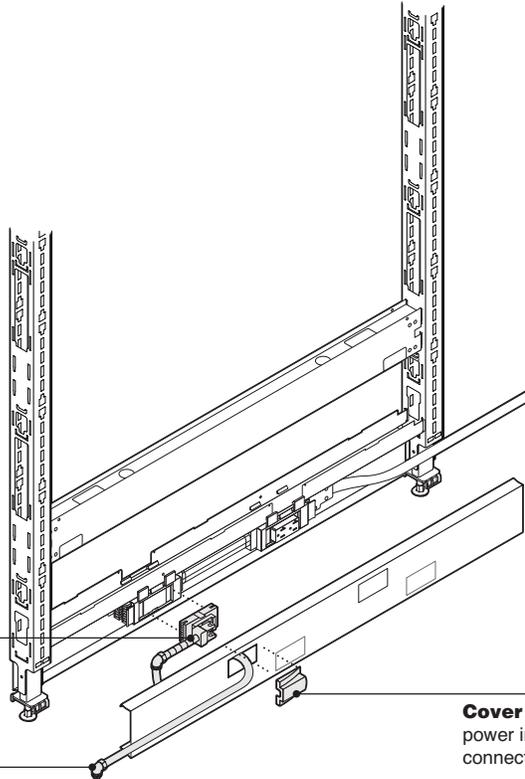
Base utility box is for routing of cable and power only. Not to be used as a termination point or for the routing of power cords.

Base Power Infeed

Base power infeed connects power in the building floor to a powerkit in the base of a panel. Infeed occupies one receptacle opening.
 ▶ Specifying, page 471

Connector on end of base power infeed harness occupies one receptacle location in power block.

Flexible harness makes hardwired connection to building monument. The harness must be backfed through the base trim prior to connection into the building monument.



Cover is included with base power infeed to conceal the connection.

Wiring & Cabling

Connector on base power infeed must be placed behind panel base trim and harness must be backfed through base trim opening prior to an electrician making the connection to power in the building floor.

Three wiring schematics are available—3+1, 2+2, and three circuits with separate neutrals (3SN). All the components in an electrical distribution system must use the same wiring schematic. For safety the components are keyed, labeled, and color-coded to make it impossible to connect mismatched parts.
 ▶ Page 139

All Answer electrical components are listed by Underwriters Laboratory (UL) and certified by the Canadian Standards Association (CSA).

Local electrical codes vary. Consult a qualified electrical contractor or engineer for the proper installation of all electrical components.

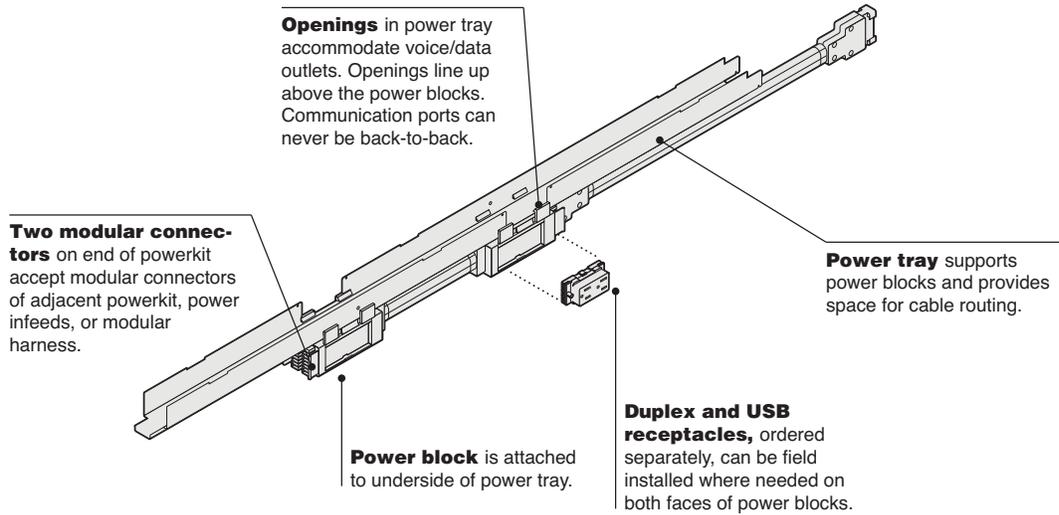
Special requirements are needed for San Francisco.
 ▶ See page 471 for specification.

Distribution Products

Powerkits are a combination of modular power blocks, harnesses, and connectors that attach to a power tray for installation inside an Answer panel. Powerkits are available in widths that correspond to panel widths.

► Specifying, page 466

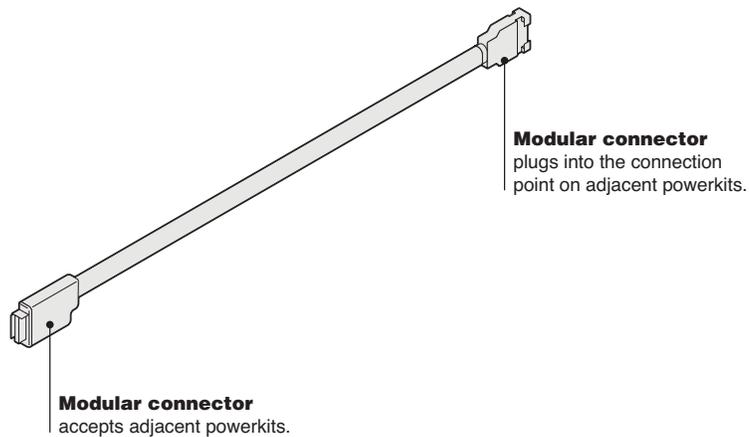
Powerkits may be specified in a non-PVC version. For those trying to gain the LEED Innovation in Design credit, non-PVC should be selected.



Pass-through powerkits are available for applications where you want to extend the power between panels but have no need for access in a specific panel.

► Specifying, page 467

Pass-through powerkits may be specified in a non-PVC version. For those trying to gain the LEED Innovation in Design credit, non-PVC should be selected.

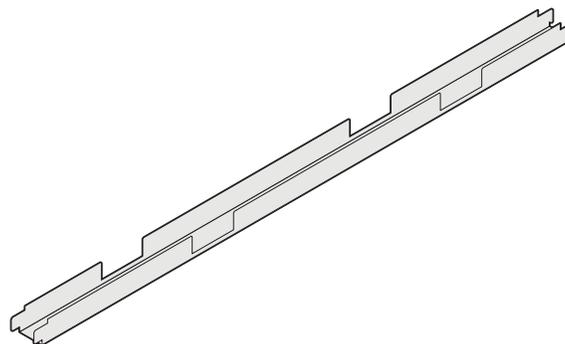


Cable trays can be installed every 6" vertically and rearranged at various heights within a panel for communications access and cable routing.

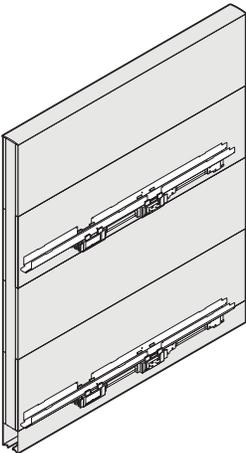
► Specifying, page 465
Exception: Cable tray cannot be used in the base of the panel.

Cable tray can accept added cable carriers attached below tray to expand horizontal cable management options.

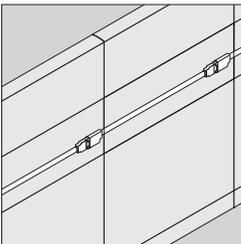
► See *Montage Specification Guide* for cable carrier (ZCC).



Product Details



Powerkits can be installed every 12" vertically. Typically they are positioned in the panel base, at worksurface height, or in both locations.



Pass-through power kits extend power between panels.

Width of panel in a non-base application determines how many receptacle and communication locations are available for non-base applications.

18"W Pass through routing only.

24"W with one power block. Communication opening lines up above power block on one side of panel only.

30"W with two power blocks. Communication openings line up above the right-hand power block. One opening on each side of panel.

36"W to 48"W with two power blocks. Communication openings line up above the right-hand power block. One opening on each side of panel.

60"W to 72"W with four power blocks. Communication openings line up above the right-hand power block of each pair. Two openings on each side of panel.

Tip: For base locations, same power block locations apply, but communication openings are located below and to the right of each single or double block.



15-amp or 20-amp duplex receptacles snap into powerkits on one side or both sides of the panel.



USB receptacles available in three wiring schematics with multiple line options, snap into powerkits on one side or both sides of the panel. USB receptacles offer easy access to two charging ports. Each port provides 1 ampere of output. Install receptacles only where you want them. Add more receptacles in the future.

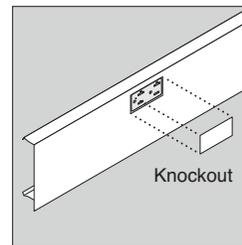
Exception: When using technology skins, receptacles are required in all power block locations.

Tip: If receptacles are not specified for all power block locations, you must order filler through Service Parts (891500350MP, package of 20).

Three wiring schematics are available—3+1, 2+2, and three circuits with separate neutrals (3SN). All the components in an electrical distribution system must use the same wiring schematic. For safety the components are keyed, labeled, and color-coded to make it impossible to connect mismatched parts.

▶ Page 139

Performance tackable acoustical skins and tackable acoustical skins can be cut in the field to allow access to duplex receptacles, USB receptacles, and communication outlets. Order cutting templates through Service Parts (T500940SR). Steel skins do not have cutouts and cannot accommodate receptacles. Install power receptacles and communication ports in the panel base cover below the steel skin or use a technology skin.



Knockouts and cutouts for receptacles in the panel base trim and skins are always 10⁵/₈" from the outside edges of the panel. Knockouts for communication in base accommodate modular furniture size only.

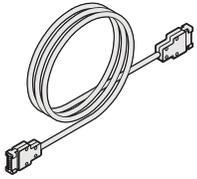
Filler to close unwanted openings in base trim is available from Service Parts.

Wire separators are not required. All electrical harnesses are shielded.

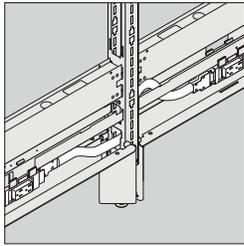
Local electrical codes vary. Consult a qualified electrical contractor or engineer for the proper installation of all electrical components.

Chicago and New York have special requirements. ▶ Pages 153 and 160

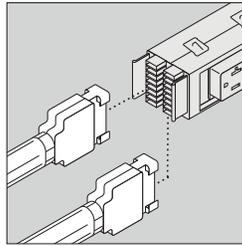
Modular Harness



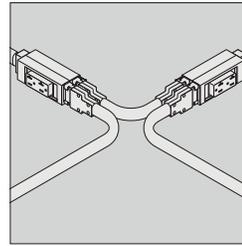
► Specifying, page 474



In an in-line application extra length modular harness is not required when a powerkit is in the bottom (not base) location in a panel with open base.

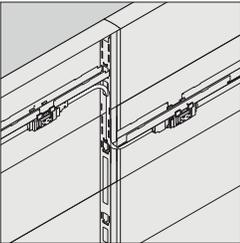


Harnesses plug into connection points on the powerkit. Every powerkit has multiple connection points to allow branching of power.



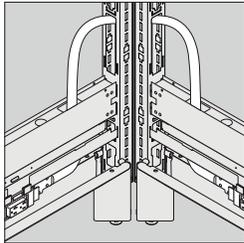
X-connection is formed by connecting two harnesses to two successive power blocks.

Product Details

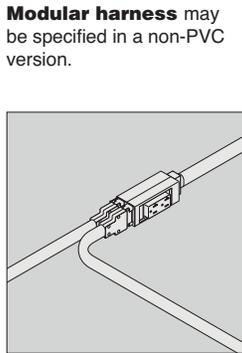


Modular harnesses are available to connect powerkits at different heights. Available in 43" and 80" lengths.

Extra length modular harness is required when connecting two power kits located at different heights inside the panel in a corner or in-line application.



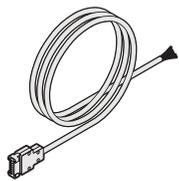
In a corner application extra length modular harness is required when a powerkit is in the bottom (not base) location in a panel with open base trim. In this circumstance, the modular harness will need to be routed through the first large opening in the junction located above the powerkit. The modular harness cannot be routed through the foot area of the panel due to the open base trim.



T-connection is formed by connecting two harnesses to a power block.

Modular harness may be specified in a non-PVC version. For those trying to gain the LEED Innovation in Design credit, non-PVC should be selected.

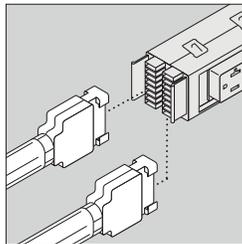
Multipurpose Power Infeed



► Specifying, page 473

Product Details

Multipurpose power infeed is shielded to allow power and communication routing side by side. Available in 12' and 24' lengths.



Multipurpose power infeeds bring power into the panel and make a modular connection to a powerkit.

Multipurpose power infeeds can be used with ceiling- and floor-access lay-in utility packages and utility poles. Specify power harness separately.

Multipurpose power infeeds may be specified in a non-PVC version. For those trying to gain the LEED Innovation in Design credit, non-PVC should be selected.

**Modular Junction Box
Faceplate**

► Specifying, page 470

Product Details

Modular junction box faceplate can be ordered separately and used with any modular harness length when 12 and 24 foot lengths are not appropriate. Straight/flush and 90° faceplates are available. Non-PVC is standard. PVC version can be optioned.