Circuit-Safe Plant Survey

A plant survey of circuit breaker panels must be conducted to enable specification of the proper Circuit-Safe parts for each panel. During the survey, specific measurements are recorded for each panel in a Plant Survey Data Sheet.

A successful plant survey requires an understanding of how and where Circuit-Safe is attached to the panel, as well as the specific required measurements.

How Circuit-Safe is Attached
Typically, Circuit-Safe is attached to the deadfront of the circuit breaker panel using short self-tapping screws. Accordingly, Circuit-Safe must be located in a position on the panel that has clear space behind the deadfront where the screws penetrate. Appropriate length self-tapping screws are provided with each Circuit-Safe kit. Some users, based on their situation, have chosen to install Circuit-Safe with machine screws or pop rivets.

Where Circuit-Safe is Attached
Circuit-Safe must be attached in a location that enables the pins to effectively hold the circuit-breaker handles in the off position (or in the on position as desired). One-way and Two-way Pins can extend up to 2.5" out from the centerline of the Circuit-Safe rail, while a Spade Pin can extend out 3.75", a Cup Pin 3.5", and a Hook Pin 3.25". The slots in the Circuit-Safe rail must align with the center of the breaker handles. In addition, the rail must be positioned such that the hardware (e.g. self-tapping screws) used to attach the Circuit-Safe rail have adequate clear space behind the deadfront.

Specific Measurements
The minimum measurements required for each panel include the following:

1. The Spacing Between Circuit Breakers.
   The spacing between breakers is measured as the distance from the centerline of one circuit breaker handle to the centerline of the next circuit breaker handle. This is referred to as the circuit breaker "spacing." Typically, the spacing will be the same for all breakers on the panel. If there is variation, that variation must be noted. If necessary, a quick sketch can provide the best summary of breaker spacing. There is a column to record breaker spacing on the Plant Survey Data Sheet.

2. The Number of Breakers in One Column of Breakers in the Panel.
   Typically, panels have two columns of breakers with the same number of breakers in both columns (e.g. 15 on the left and 15 on the right in a 30 circuit panel). The quantity of breakers in one column is referred to as the "number" of breakers. There is a column to record the number of breaker columns (one or two) and a column to record the number of breakers in the Plant Survey Data Sheet. If the number of breakers in one column is higher than the other column, note the higher number.

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3. The Distance from the Circuit-Safe Rail to the Breaker Handle.
   On two column panels, the distance from the centerline between the two columns of breakers (which is where the Circuit-Safe rail will be located) to the circuit breaker handle in the "off" position is the relevant "distance." If the breaker handles are in the on position, do not move them to the off position unless authorized to do so. In some cases, you may have to estimate where the handle will be when it is in the "off" position. On single column panels, you must identify a location for installation of the Circuit-Safe rail that has clear space behind the dead-front and yet is as close to the breakers as possible. The distance for single column panels measures the distance from the centerline of the rail to the breaker in the "off" position. This distance will determine which, if any of the standard pins can be used. There is a column to record distance on the Plant Survey Data Sheet.

4. The Height of the Circuit Breaker.
   The elevation of the face of the circuit breaker above the surface of the panel deadfront is referred to as the "height" of the breaker. If the height is 1/8" or greater, a 1/8" shim is required to elevate the Circuit-Safe rail. If the height is ¼" or greater, a ¼" shim is required. Typically, this measurement is less than 1/8", requiring no shim. There is a column to record height on the Plant Survey Data Sheet.

Other Data Sheet Information
Location information about each panel is recorded on the Data Sheet to make it easy to match the Circuit-Safe hardware to the appropriate panel in the plant. In addition, use the notes column to identify any appropriate additional information for each panel.

Panels with Larger Breakers
Occasionally, panels with large breakers require more measurements than can be recorded on the Standard Panel Survey Data Sheet. This may be because the breakers are very large, they are spaced very far apart, they have irregular spacing, or the deadfront has multiple surface levels (e.g. a raised center column). In these cases, the Large Breaker Survey provides both a procedure for measuring the panel and for recording the measurements for each panel.

Additional Notes and Comments
Plant Survey Tools:
1. Prepare multiple copies of the Plant Survey Data Sheet and the Larger Breaker Survey Procedure and place them on a clip board. The clip board provides a convenient writing surface and an easy method of organizing these sheets. Other resources, such as the Standard Panel Survey Procedure or Installation Photos can also be added to the clip board for reference.
2. Cary a flexible plastic ruler and a small flashlight. The ruler, of course, is required for taking measurements. The flashlight often is required for illumination at some panel locations.

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Wide Spaced Breaker Columns:
When the breaker columns are too far apart to permit the pins on a single Circuit –Safe rail to reach the breaker handles, two Circuit-Safe rails can be used. One rail is located for the left column and one for the right column.

Hook Pins:
The Hook Pin can be used to hold breakers "on" or "off", depending on which side of the breaker the Circuit-Safe rail is located. On some panels, the best location for the Circuit-Safe rail is in the "off" side of the breaker column. In these situations, hook pins are used to hold breaker handles off rather than the normal One-way or Two-way Pins.

Spade Pins:
The Spade Pin extends farther than the One-way or Two-way Pins. It can be used to hold breaker handles "off" in situations where the Circuit-Safe rail is located more than 2.5" from the handle, but less than 3.75". Please note, the Spade Pin only works in one direction at a time and is therefore not a replacement for the Two-way Pin.

Cup Pins:
The Cup Pin is generally the best pin for holding a breaker handle in the "on" position.

8" 2-Way Pins:
This custom pin can be used in certain circumstances where the distance from the Circuit-Safe rail to the breaker exceeds the 2.5" accommodated by the standard 2-Way pin.

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