



Electrical Wiring Technical Bulletin

Overview

In general, SIP construction is easier and more cost effective when things are planned and thought out before the panels are manufactured. This process will reduce the installation time in the field saving valuable time and money. Wiring in SIPs is no different than conventional construction electrical wiring. When an electrical installation in SIPs is forethought, not an afterthought, the installation will be much faster and easier. You have the option of ordering your SIPs panel package with custom installed electrical chases per your electrical drawings, factory installed generic electrical chases or you can order your panels without electrical chases and field install them in the locations necessary. Let's start out by understanding where the 1" diameter generic factory installed wire chases are located in the panel, where to drill for chases and when to do the drilling. When this drilling is done properly, the electrician should be able to wire a SIP building in about the same time as a stick-built building, or even faster as they become experienced working with the Innova Panel System.

Factory Installed Wire Chases

In the wall panels, Innova can include generic horizontal chases at the 16" level AFF (for outlets) and at the 44" level AFF (for switches and counter height outlets). Vertical chases, which are typically located 4' O.C., allow wire to run vertically through the wall panels to access switch locations and at other locations as needed to provide vertical wiring options for the electrician. (See figure G-10). (All wire chases are marked on the OSB or cement board surface with a 1" wide black ink marker.) Innova typically installs wire chases according to this standard, but for an additional charge, wire chases can be installed to exactly match an electrical plan. Custom wire chase placement per an electrical plan is done while the panel layout drawings are being designed. A detailed electrical plan would be required at that time to ensure proper coordination with the manufacturing process. Installing electrical chases in the field is a simple process that is detailed in this document.

In roof panels, wire chases can be factory installed upon request. (Adding wire chases to roof panels will be done at a small additional charge.) When a building has a cathedral ceiling with a SIP roof, having wire chases installed in the panels will make wiring for lighting, fans, smoke detectors, etc. easier. Wiring can be run from an interior wall or can be run in conduit along an exposed overhead beam or hidden in a soffit used to conceal ductwork. There are many different options depending on the building use and floor plan. The roof ridge can also be used to run wiring from roof panel to roof panel as necessary. (See figure G-1 below) The roof ridge area is then filled with expandable foam (provided with kit) and the ridge piece (provided with kit) is installed, after the electrical wiring has been inspected by the building inspector.

Required Field Installed Chases and Holes

As the structural insulated panels are installed, the SIP installer will need to provide an open chase way for the electrician by drilling the sill and top plates, and any lumber connecting splines as necessary to create access for the electrical wiring chases installed in the panels at the factory. If this step is skipped during panel installation, it is possible to cut and drill for access to the chases afterward, but it is much easier and faster to do this drilling during installation.



When the electrician comes to the building site, they will review the electrical plan and wire run options to determine which chases to use. Most SIP buildings will still have stick-framed or metal stud framing for interior walls and conventional concrete floor systems, which give additional flexibility for wiring installations. Wiring is simplified if major horizontal wire runs take place in the floor systems, using horizontal panel chases for local runs only. When concrete slabs are installed, we recommend that the vertical chases in the panels be installed in the field to ensure proper alignment with the electrical slab rough-in.

When the horizontal wire circuits must continue from one wall to another intersecting wall, the electrician can use a vertical chase to go up and over, then back down into the intersecting wall panel, or the electrician could cut a notch into the inside corner at the height of the wire chase then use this notch to pull the wire around the corner and into the intersecting wall.

Wire Installation

The recommended sequence for wiring is to first locate the outlet, switch, and other box locations. The locations are then marked on the interior OSB or cement board panel skin with a marker. (Boxes should be offset from the wire chase location so the box will not block the chase following installation.) Typically, the electrician will use a tool like a RotoZip (figure G-3) and a template to cut the panel for the electrical boxes. After the openings are cut, the electrician will use a putty knife to pry out the cut panel and EPS foam as necessary to accommodate the electrical box. Care should be taken in not removing too much of the EPS insulation. The electrician will then fold over the end of the wire and push or pull the wire through the chases as required for the circuits. If needed, wires can be pulled using a fish tape or by a vacuum and string. Finally, the ends of the pulled wire will be inserted into the boxes and the boxes will be mounted using surface type fasteners. See detail G-2.

After rough wiring is complete and the electrical boxes are mounted on the SIPs panel, carefully seal around the box using expanding foam sealant. Also, use expanding foam sealants to seal both used and unused chases at the top and bottom of the panels and anywhere else that chase openings are accessible.



Figure G- 1
Romex wiring installation between roof panels in roof ridge prior to foam and ridge cap piece installation



Figure G-2



Figure G-3

Other Options for Wire Access

Installing electrical chases in the field is a simple process. Many experienced SIP installers order the Innova building kits without electrical chases and install the chases in the field when installing the SIP panels. This is totally a matter of preference to the installer.



Innova will manufacture the panels to the client's preference as long as the requirements are coordinated at the time of order. When no pre-cut panel chases are provided, there are various other options for field installation of the chases. A 1" round chase may be installed in the panel using a heated 1" steel ball bearing. Locate the area for the necessary switch or receptacle box and cut the necessary opening in the panel as described in the paragraph above. Place a 1" x 1" x 1' piece of metal angle into the panel opening pushing the angle into the midpoint of the panel. After the panel is installed and prior to installing the top plate a 1" ball bearing is heated using a portable torch. (See figure G-4) Using a level, mark a vertical line at the top inside face of the panel that is plumb with the desired electrical box location. Using vice grips the heated ball is then placed at the desired location at the top of the panel in the EPS foam area. Once the ball is positioned with your location mark, release the ball. (See figure G-5) If the panel is properly installed (plumb), the ball will melt the EPS foam to create a perfect plumb 1" round wire chase. The ball bearing will melt down to the angle positioned in the electrical box location and exit the panels face falling to the ground.

Another method for field installing electrical chases is to lay the panel on its side, locate the box location on the panel face. Using a chalk line, mark the chase location on the panel face. Using a 1" conduit or #9 rebar, heat the end with a portable torch. When the end is red hot, insert the hot point into the EPS edge of the panel following the chalk line to the desired location. Remember to keep the conduit straight so that you have a properly aligned chase when finished. You can also use a long flexible drill bit to field drill the chases (see figure G-6)

Additionally, flush mounted chases such as WireMold can also be used for electrical options. (See figure G-7) Exposed conduit which conforms to local code requirements can also be used as an option for garages and other industrial installations. (See figure G-8) In rooms where there is an aesthetic issue, like Foyers or dining rooms, it may be possible to locate the electrical outlets horizontally in the baseboard (local codes permitting), just above the floor. This makes the electrical outlet nearly "go away" visually since it no longer contrasts with the wall color and doesn't present itself as an object intruding on the wall. (See figure G-9)

Important Notes

Standard "Romex" type wire, labeled as NM-B should be used. The wire should be sized by an electrical engineer and be of sufficient wire gauge as required for the anticipated maximum amperage loading of the building. Installing recessed lighting or "can" lights in a SIP roof is NOT recommended. If you wish to use recessed lighting, restrict these fixture locations to framed soffits and framed ceiling areas of the building.



Figure G-4



Figure G-5



Figure G-6

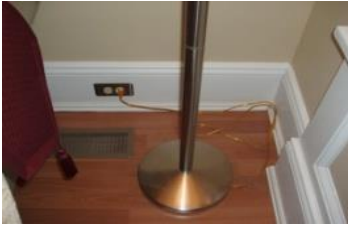


Figure G-9
Baseboard Outlets



Figure G-8
Commercial Wire Mold



Figure G-7
Flush Mounted Wire Mold

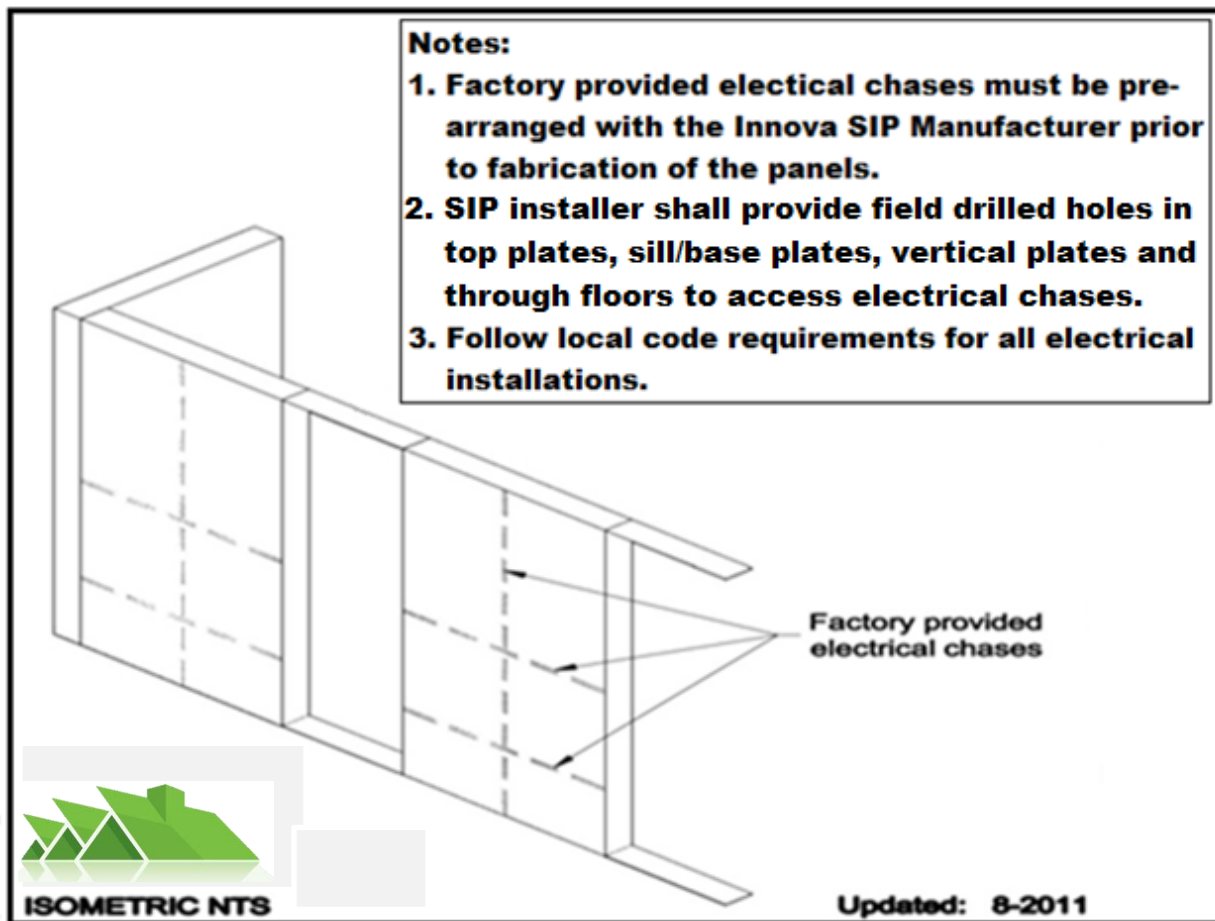


Figure G-10