

Coordinated Electrical Houses

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Specifications

See Eaton's *Product Specification Guide*, available on CD or on the Web.

CSI Format:	1995	2010
	Section 16920	Section 26 05 91



Typical Integrated Power Assembly

General Description

Power Distribution Products in a Single Enclosure at a Lower Installed Cost

Eaton's electrical business can supply different types of electrical distribution and control equipment in a modular building called an Integrated Power Assembly (IPA)...custom designed to meet each customer's specific requirements.

Each IPA Arrives Complete and Ready to Connect...Saving Time and Money

Eaton's IPA buildings are an alternative solution to sheltered-aisle equipment designs. See **Table 38.0-1** for product comparison.

When an IPA is delivered, all the customer typically needs to do is:

1) place it on the suitable foundation, such as a concrete pad or base, with sufficient strength and durability and (2) make the incoming and outgoing load connections. Because the IPA is a complete unit, it can be prewired and factory tested if required.

An IPA provides these significant cost savings:

- **Lower installation cost.** Job site labor and material costs are sharply reduced because an IPA arrives complete, ready for connections
- **Minimal startup time.** Each IPA is checked to ensure wiring accuracy, control scheme correctness and equipment operation
- **Installation delays reduced.** Job site delays caused by trying to coordinate multiple vendors are eliminated
- **Reduced procurement time.** Project management, scheduling and expediting are handled through a single point contact and only one purchase order is required

- **Construction efficiency.** Projects using IPA buildings are not as affected by weather conditions and seasonal labor shortages
- **Customized design.** Eaton IPA buildings are completely customized buildings. They may be made of any size, shape, or color and may contain not only Eaton equipment, but also customer supplied equipment from other manufacturers

Single Source for IPA

Eaton offers the industry's most complete family of electrical distribution and control equipment and components. The widest selection of ratings are provided, as well as IPAs that meet or exceed distribution system requirements.

As a single source supplier, the following significant advantages are provided:

- **Designing, assembling and testing.** Eaton certifies that all equipment and components are in compliance with applicable NEMA®, IEEE®, ANSI, UL® and IEC standards. The building is certified to meet IBC® and UL requirements, while the installation of the equipment meets NEC® requirements
- **Consistent terms and conditions.** Eaton provides a single uniform set of terms and conditions for all equipment and components. Additionally, the terms and conditions are compatible with those of other Eaton products that may be on the same project...providing the benefit of single package negotiation
- **One contact point.** Eaton's worldwide network of project managers, engineers, sales representatives and authorized distributors provides design and application assistance, pricing, delivery and warranty information
- **One overall warranty.** Eaton warrants all IPA equipment and components, plus the structure itself



Typical IPA

IPAs Offer Installation Flexibility

Installation flexibility is essential because IPAs are often used in applications where a controlled, protective environment is required. All buildings are designed with transportation to the end location in mind. Depending on where the final location is and the route/transportation method, buildings are designed and built to accommodate all shipping requirements. There is not a typical maximum size and or weight. Every building is different and all states have different shipping laws and constraints regarding size and weight. Transportation is evaluated during the quote stage. At that time, it is determined whether or not the size and weight required can be transported to the destination. If it is determined that the size and weight exceeds the shipping constraints, a multi-piece building option is taken into consideration.

While IPAs are designed and built as detached NEMA 3R outdoor, walk-in enclosures, they have been installed on roofs and indoors.

Eaton's electrical distribution and control equipment has undergone seismic simulation tests, and meets or exceeds performance requirements as identified in the International Building Code (IBC 2006) and the California Building Code (CBC 2007). It is important to note that Eaton has tested its equipment using the most typical mounting methods. All Eaton floor-mounted equipment has been seismically tested as free-standing units, with no lateral supports at the top that are affixed to adjacent walls or structures. This allows users to either secure it from the base alone or in combinations of base and top lateral supports. If required, the structural design of the IPA is reviewed and stamped by a professional engineer registered in the state where the project is located. For information regarding Eaton's seismic rated products, please visit www.eaton.com/seismic.

Table 38.0-1. Product Comparison (Sheltered Aisle vs IPA)

Sheltered Aisle	IPA
More space efficient	Provides more customization with increased footprint
Limited future expansion/equipment flexibility	Increased flexibility to future changes and equipment storage
Requires slab foundation	Can be provided with self-supporting base that may be placed on piers, a ring wall, or even a gravel pad
Increased installation time with possible storage time	Ships on site as completed assembly, or minimal shipping splits depending on house size
Equipment itself is more cost-efficient	Overall cost savings of project makes IPA an attractive solution

General Description

IPA Options and Features

■ **Insulation systems and ratings:**

Typical insulation includes fiberglass batt with a thermal-resistance rating of R-11 in the walls and ceiling, and sprayed polyurethane foam below the floor R-6. Higher insulation levels are available up to R-38 in the ceiling, R-19 in the walls (using rigid urethane board), and R-21 below the floor, but do not significantly reduce the air conditioning capacity required, specifically in the continental U.S.

- **Air conditioning options:** Self-contained, DX wall-mounted HVAC units are the most economical; however, roof-mounted, pad-mounted, split type and chilled water to air units are available for certain applications, or restricted wall space configurations. The rating guide for the HVAC system type is based on square footage. A closed loop HVAC system is recommended, but pressurization for general purpose or NFPA® hazardous locations is available, as well as various filtration options. Multiple wall-mounted units below six tons in capacity are most economical; however, up to 30-ton units are available. The HVAC system is sized in accordance with ASHRAE standards, considering the internal equipment heat loss, insulation levels (minimal effect on air conditioning), ambient conditions and any ventilation/pressurization requirements, to maintain the specified interior temperatures. A wide variety of thermostats/control is available including auto change over, digital, duplexing and multiplexing up to six units from one controller. If no air conditioning is desired (not recommended), space heaters are designed based on the insulation levels, ambient conditions and any ventilation/pressurization requirements, to maintain the specified interior temperature during colder periods. The rating guide for space heaters is also based on square footage

- **Undercoating:** Standard and recommended undercoating is Transcoat 101™ at a thickness of 10 Mils DFT (VOC-0.0/Federal Specification TT-C-520B/Asbestos Free/Flame Spread Rating-0), although several other options are available. Use of "Bitumastic" and "Coal-Tar Epoxy" under coatings has been precluded by the EPA

- **Paint finishes:** Standard exterior finishes are: Primer/Base Exterior-Epoxy mastic primer 2.0 Mils DFT/Primer/Walls, Roof and Fascia-Epoxy primer 1.5 Mils DFT/Finish-DuPont Imron high solids polyurethane enamel 1.8 Mils DFT. Standard interior finishes are: Primer-Epoxy primer 1.5 Mils DFT/Finish-High solids polyurethane enamel 1.8 Mils DFT. The film thickness may be increased if desired, but the standard coating system has been tested with G90 galvanized substrate to withstand over 3000 hours of salt spray resistance, along with a full battery of other ASTM specified tests. Other coating products are not recommended as their adhesion to the G90 galvanized substrate in the walls, roof and ceiling may not be guaranteed by the coating manufacturer. Any industrial color may be used, or a sample may be computer matched. Aggregate and other veneer materials may be added to the exterior for aesthetic or other applications

- **Wind load ratings:** Wind loading is dictated by, and resistance design is performed in accordance with the specified or prevailing code in the job site location, or the velocity and coefficients delineated in the job specific specifications. Designs up to and exceeding 170 MPH velocity have been effected

- **Wall and roof steel gauges:** A typical building is constructed of 18 gauge pre-galvanized G90 walls, roof and ceiling panels. As a custom manufacturer, all buildings are individually designed and calculated to meet the customer's specification as well as any and all structural and environmental conditions. Based on these design parameters and calculations, walls, roof and ceiling panels can be constructed of materials up to 12 gauge and in some cases, 11 gauge G90 steel, all manufactured to ASTM A653 standards. Along with these gauges of galvanized steel, walls and roof panels (exterior components) can be constructed of aluminum or stainless steel (304, 316 and 316L) in equivalent metal thicknesses. Interior components such as ceiling panels and wall liners typically remain galvanized

- **Floor:** A typical building is constructed with a 1/4-inch thick carbon steel plate floor. As a custom manufacturer, all buildings are individually designed and calculated

to meet the customer's specification as well as any and all structural and environmental conditions. Based on these design parameters and calculations, the floor plate can be constructed with a steel thickness ranging anywhere between 10 gauge and 1/2-inch thick. Along with these thickness options, the floor plate can be constructed of galvanized or stainless steel plate as well as aluminum (bolted checkered/diamond plate)

- **Standard number and location of outlets:** Receptacles are provided at locations within the IPA to comply with known codes and standards. GFCI specification grade 20 A, 125 V duplex receptacles are standard

- **Rear hinged doors:** It is common that IPAs contain both personnel and equipment doors. Personnel doors are typically single leaf, double wall, honeycomb reinforced, galvanized, #18 gauge (1.214 mm), 1-3/4 inches (44 mm) thick. Panic hardware includes a thumb latch with a keyed cylinder lock. The button is aluminum and features a closer with stopping arm. Also provided is a wind safety chain, drip shield, weather stripping, stainless steel hinges, R2.4 thermal-resistance rating and a fire-resistance rating and label (1.5 hour minimum rating). Equipment doors are typically rear-access and mounted in the exterior walls. They are constructed using 12 gauge (1.214 mm) G90 galvanized steel and feature removable steel posts to provide full open access, of (at least) any four continuous doors without temporary structural reinforcement, for potential equipment replacement or the addition of future equipment. These doors are NEMA 3R rated, and feature stainless steel continuous piano-type hinges, stainless steel pad lockable vault handle, three-point latching system, a hold open device, gasketed and drip shield. Signage is added as appropriate for internal equipment.

- **Stainless steel** is available
 ■ **Concrete construction** is available
 ■ **Blast-resistant construction** is available



General Description



IPA Assembly Area



Two-Tiered IPA

Typical Eaton Equipment that Can Be Installed in an IPA

All types of Eaton electrical equipment can be installed in an IPA, including low and medium voltage switchgear, motor control centers, arc-resistant switchgear, panelboards, switchboards, drives, transformers, automatic transfer switches, metering, protection, control, and communications and monitoring devices. Because each IPA is engineered-to-order to meet individual project specifications, equipment configurations vary tremendously provided that they meet relevant electrical and structural codes. Eaton IPAs can be single or multi-story, and can range in size from small (i.e., 3 ft wide x 5 ft long) to “monster” (exceeding 50 ft wide x 150 ft long). As such, Eaton’s electrical integration partners have the capacity and flexibility to design an IPA to meet your individual power and dimensional requirements.

Arc-Resistant Switchgear

IPA houses may feature any of Eaton’s arc-resistant switchgear options. Houses feature fully coordinated arc duct exhaust to a controlled and barriered location external of the house, or internally if desired.



Arc Duct Option

Note: Arc duct exit shall be safely fenced off per appropriate switchgear instruction manuals. Refer to **Figures 5.5-72** and **5.5-73** for more detail.



Arc Resistant Switchgear Inside IPA

Note: Contact factory for specific application regarding clearances required above arc plenum.

Additional Equipment and Modifications

Because each IPA is custom designed, Eaton not only provides the electrical gear specified, but can include any additional equipment and modifications requested. Some examples include:

- Arc mitigating systems
- HVAC systems
- Pressurization units
- Battery systems
 - Contact Eaton project management or IPA application engineer for sizing support
- UPS systems
- Annunciators
- Communications equipment
- Security systems
- Marshaling cabinets
- Installation and wiring of customer-furnished PLCs and analyzers
- SCADA and DCS control cabinets
- Office or work areas
- Plumbing and restrooms
- Doors and windows
- Indoor, outdoor and emergency lights
- Wireway and cable trays
- Switches and receptacles
- Any other customer-specified equipment
- Custom paint finishes
- Custom exterior appearance
 - Brick
 - Split-faced block
 - Stucco
 - Aggregate panel

General Description

**A Variety of Industries
and Service Organizations**

- Communications
- Food processing
- Heavy industry
- Materials handling
- Medical
- Mining
- Petrochemical
- Pollution control
- Public utilities
- Pulp and paper
- Rail and mass transit
- Water and waste treatment
- Many others

**With a Broad Range
of Applications**

- Control center rooms
- Equipment skids
- Generator systems
- Motor control
- Offshore platforms
- Pipelines
- Power substations
- Process control
- Pumping stations
- Refineries
- Switchgear enclosures
- Many others

**Eaton products that are
currently indoor only**

- Unitized power center
- Arc resistant MVA
- Metal-enclosed front access switchgear
- Arc resistant LVA
- Arc resistant Ampgard

**Air Conditioned Unit****Front View****Rear Equipment Access Doors****Table 38.0-2. Heat Loss Quick Reference**

Product Line	Table
DTDT Transformer Losses ^①	Table 19.1-17
Power Equipment Losses ^②	Table 1.5-12
MV Metal-Clad Switchgear	Table 5.4-10
SC9000 EP AFD	Table 10.2-15
Non-Segregated Bus	Table 11.0-6
LVA Heat Loss Data	Table 20.1-7
Motor Control Centers	Table 29.2-6

^① Additional transformer losses may be found in the unit substation tabs.

^② Only location for Ampgard, MVS, and panelboard ratings.

Note: Please contact Eaton project management/IPA application engineer for additional support.

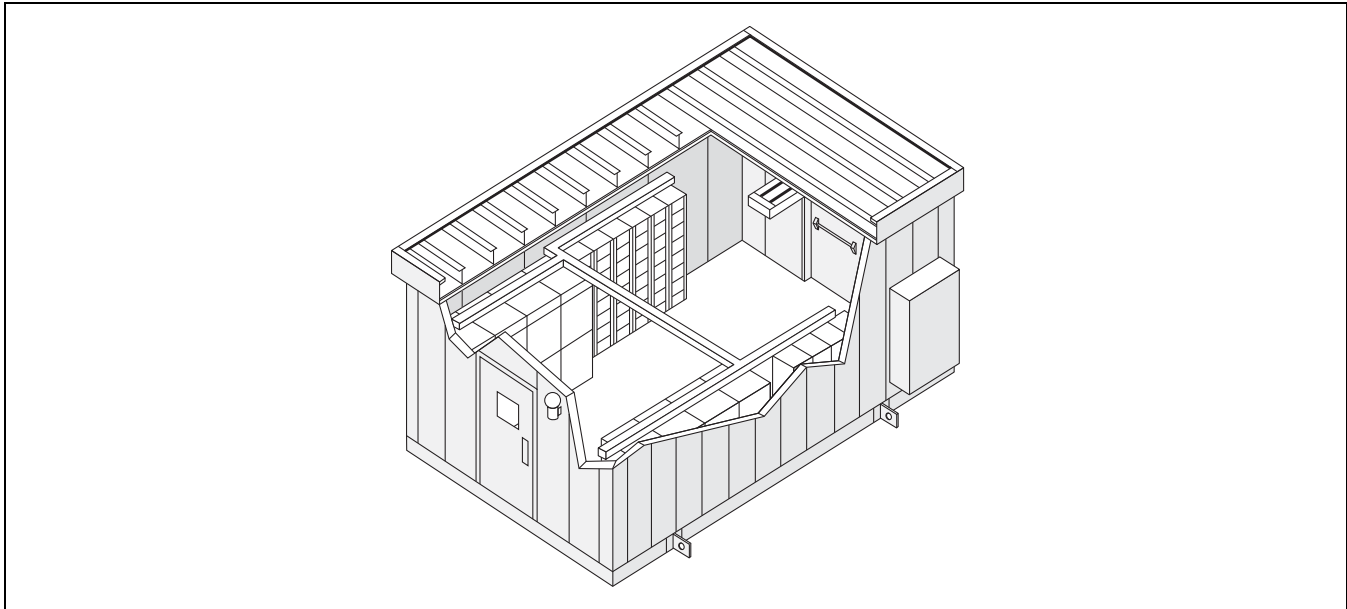


Figure 38.0-1. Integrated Power Assembly Section View

Elevation Views

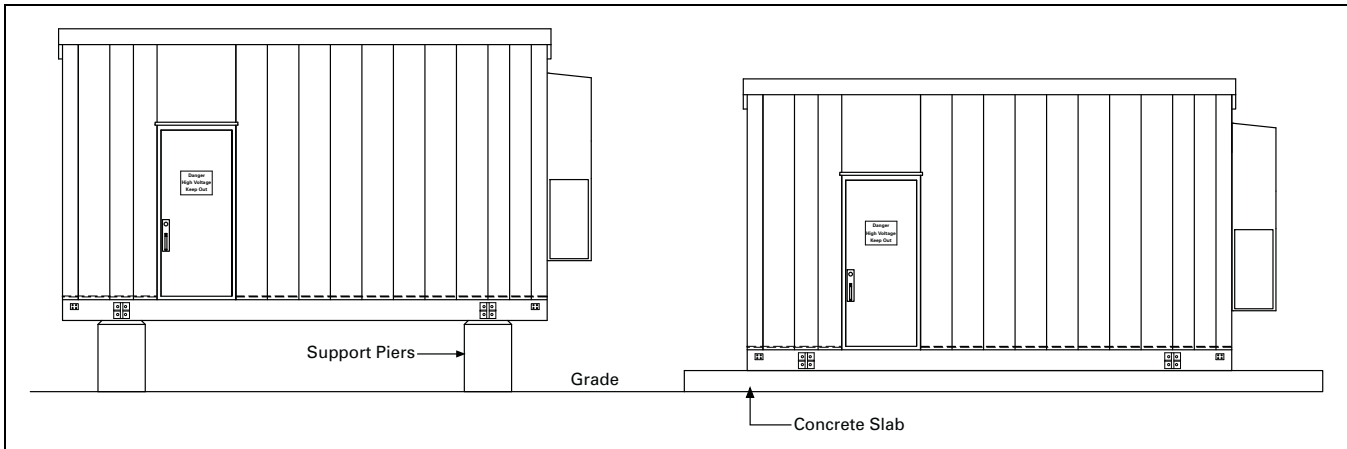


Figure 38.0-2. Typical Elevation View Showing Pad Mounting vs. Pier Mounting

Note: Buildings are engineered and designed to be either pad-mounted or pier-mounted, dictated by the site civil engineering team as well as building application. When pier mounting is required, the IPA supplier defines minimum pier location and spacing. Suggested mounting details are provided with every drawing package.

Typical Layout Plan Views—Dimensions in Feet and Inches

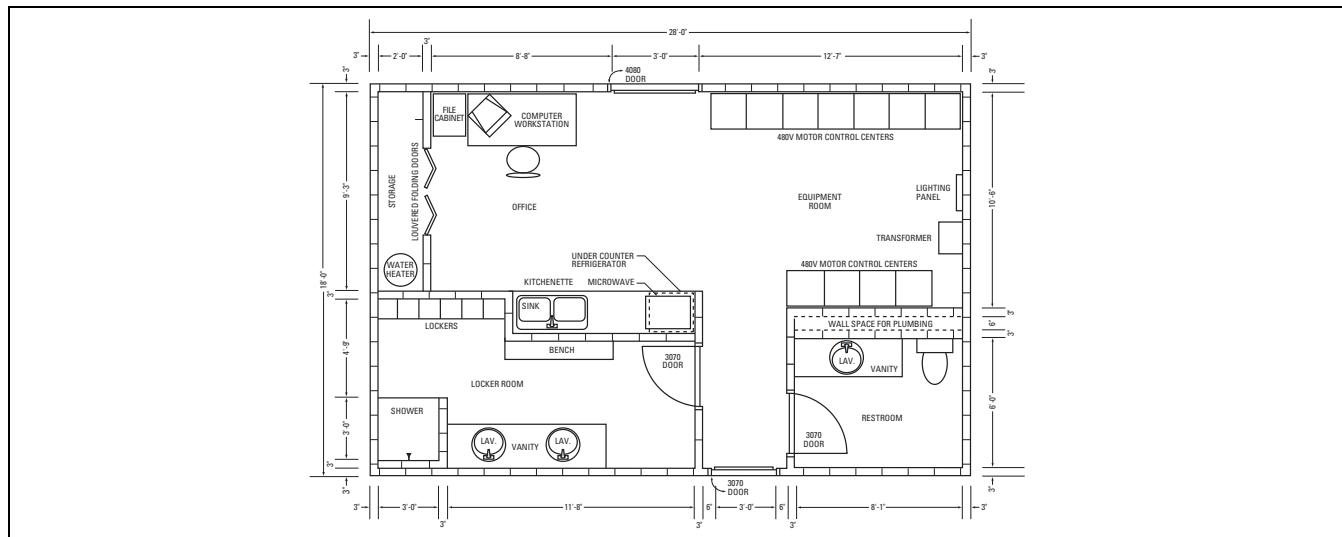


Figure 38.0-3. Typical Layout Plan Views

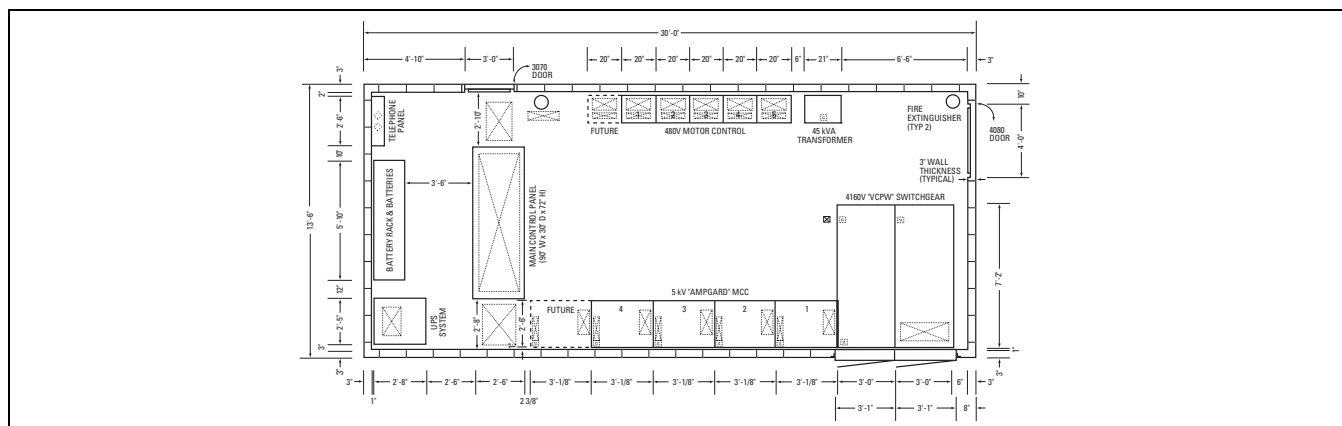


Figure 38.0-4. Typical Layout Plan Views

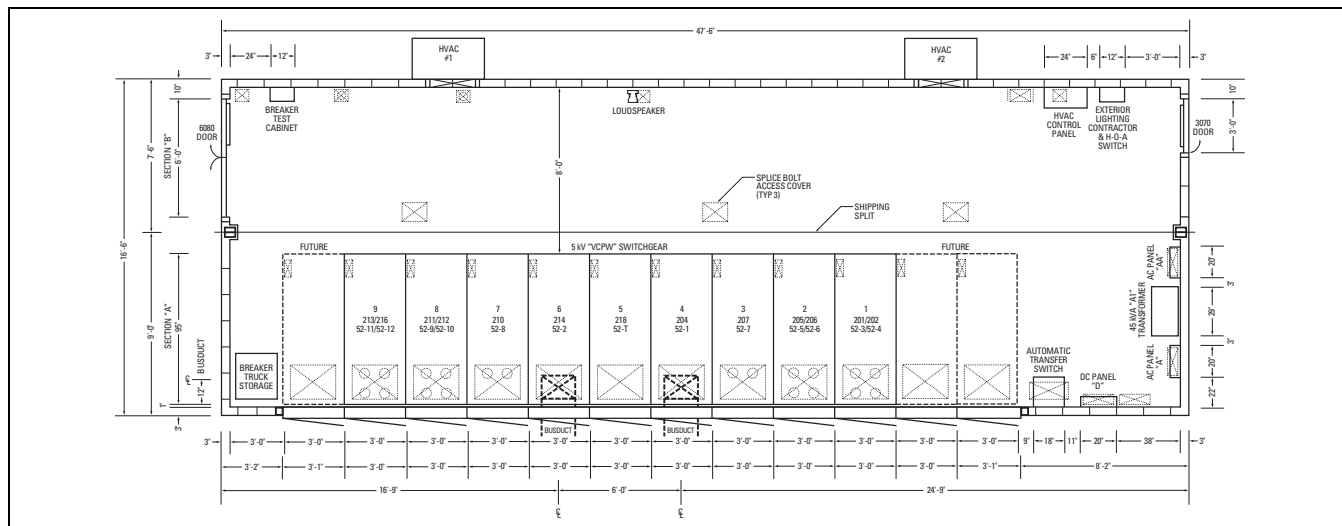


Figure 38.0-5. Typical Layout Plan Views

Note: For metric conversion, inches x 25.4 = mm.

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