ASCO Power Technologies™

Applications for Service Entrance Automatic Transfer Switches

White Paper 107
Revision 0

Life Is On Schneider Electric

Applications for Service Entrance Automatic Transfer Switches

In 2018, ASCO Power Technologies described the advantages of Service Entrance Automatic Transfer Switches (SEATS) in a document entitled *Transfer Switch Solutions for Service Entrance Applications*. The following sections of this new document provide additional examples that underscore the flexibilities and benefits of SEATS.

INTRODUCTION

A SEATS unit is a single, manufacturer-engineered product that conveniently meets the needs of both service entrance and automatic load transfer applications, thereby simplifying design, specification, and procurement processes. Because the service disconnect and transfer switching equipment are integrated into one enclosure, the solution will typically require less floor or wall space than separate equipment installations. In addition, a SEATS is typically simpler and less costly to install than multiple devices because it saves equipment mounting and wiring time.

Defining Characteristics of Service Entrance Automatic Transfer Switches

Three essential characteristics differentiate SEATS from conventional automatic transfer switches. First, they integrate a service disconnect, typically a breaker, within the Automatic Transfer Switch (ATS) enclosure or an adjoining section, as shown in Figure 1. Second, they provide a means for connecting a building's neutral conductor to the utility's service neutral conductor, shown in the figure as the *Neutral Disconnect Link.* Third, they contain a means for disconnecting a building's grounding electrode conductor to and from the neutral conductor, shown in Figure 1 as the *Bonding Jumper.* These features are also shown in Figure 2. Additional NEC requirements for this type of transfer switch are summarized in our prior paper, Transfer Switch Solutions for Service Entrance Applications.

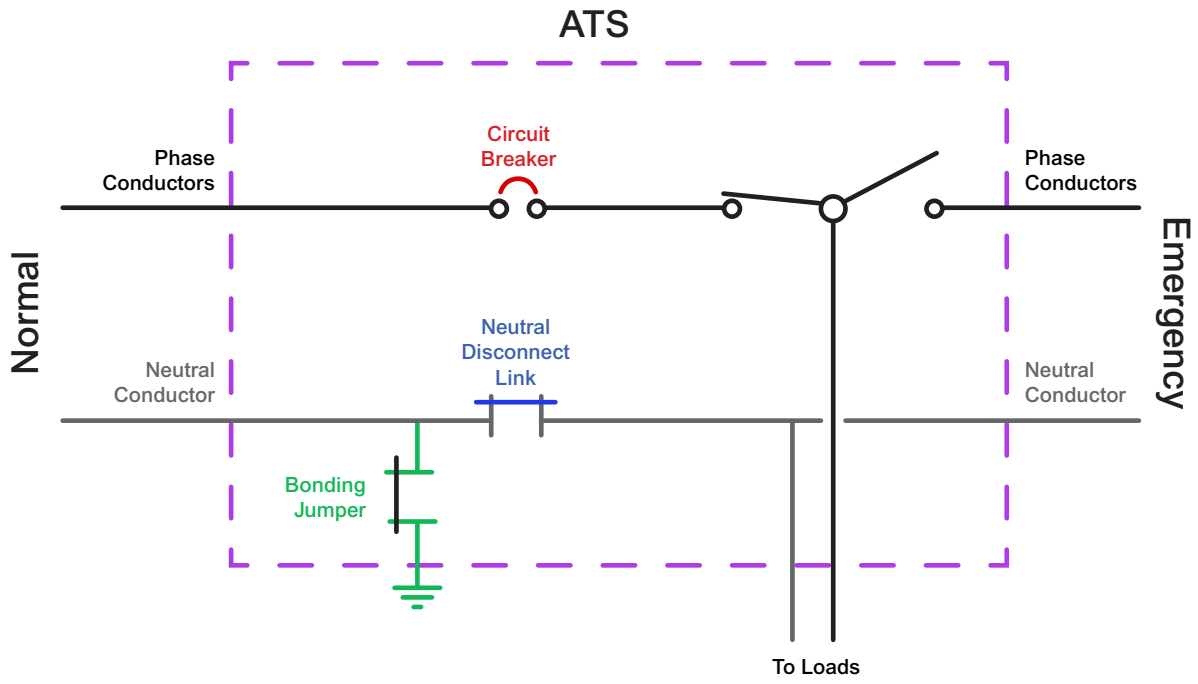

Figure 1: This simplified diagram shows the neutral disconnect and ground bonding jumper for a SEATS with a solid neutral.

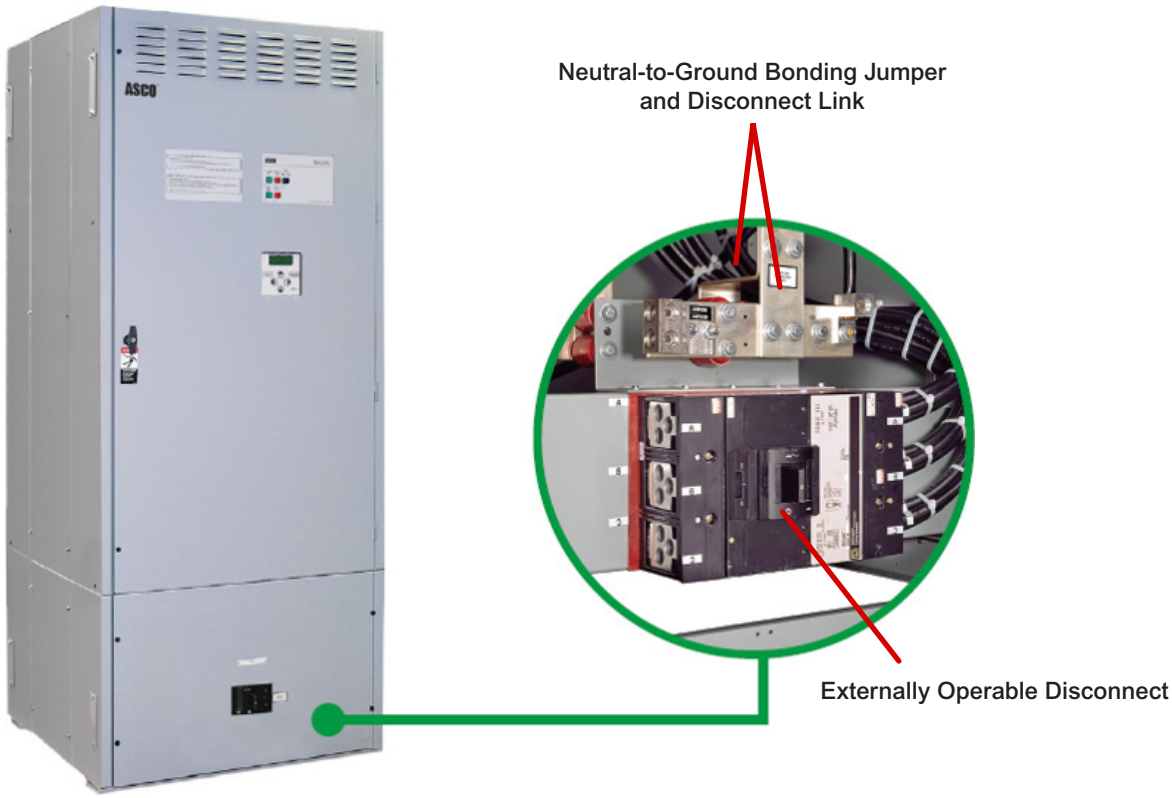

Figure 2: Provisions for disconnecting the ground and neutral

Straightforward SEATS Application

Applications for SEATS are wide-ranging. They may be used in almost any facility where a transfer switch is required because all buildings require a disconnect at the service entrance. Figure 3 shows a SEATS for a basic application. An ATS in this configuration offers all of the benefits associated with service entrance designs, including streamlined procurement and installation that results from integrating the service disconnect and ATS into one enclosure. This type of SEATS would typically be found in commercial, industrial, healthcare, municipal and education applications.

SEATS with Two Breakers

Standby generators must be equipped with circuit breakers to disconnect downstream circuits, and to protect downstream circuits and loads from faults. Just as SEATS can integrate a breaker for a service disconnect, they can also integrate a secondary circuit breaker for disconnecting a facility's generator, or for a second utility service. The latter would be set in a dedicated service entrance compartment.

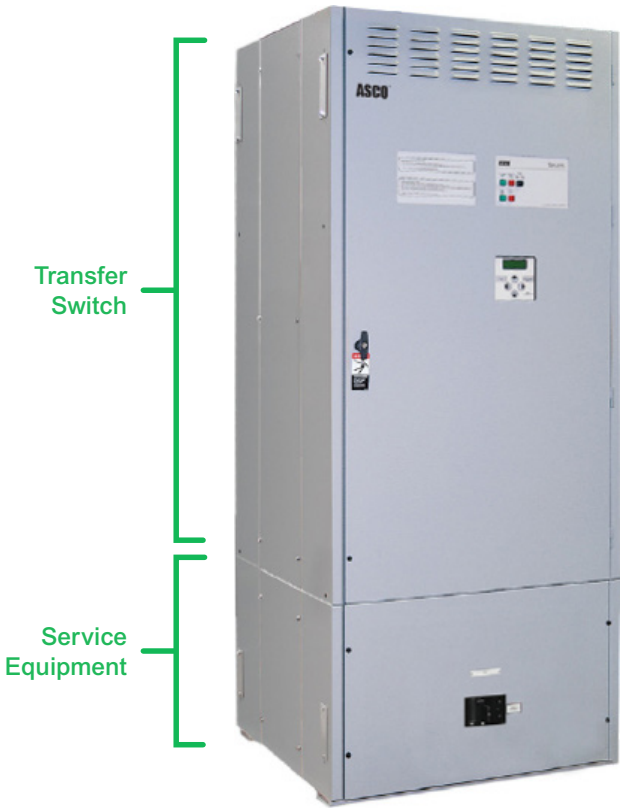

Figure 3: This SEATS contains both a transfer switch and a circuit breaker for disconnecting the Normal electrical service to a building.

SEATS with Generator Breaker

A Generator Breaker can be integrated into a SEATS. By locating the breakers in the ATS lineup at the service entrance, personnel can connect or disconnect two or more power sources from a single location. Incorporating the generator and service entrance breakers into rugged, integrated enclosures speeds installation and enhances operability.

A two-breaker SEATS can be used in many applications where a backup generator is present. For instance, in ASCO's experience, SEATS are commonly used in agricultural applications, where standby power is needed to maintain heating and ventilation equipment for sensitive livestock. Figure 4 shows a schematic of this type of SEATS.

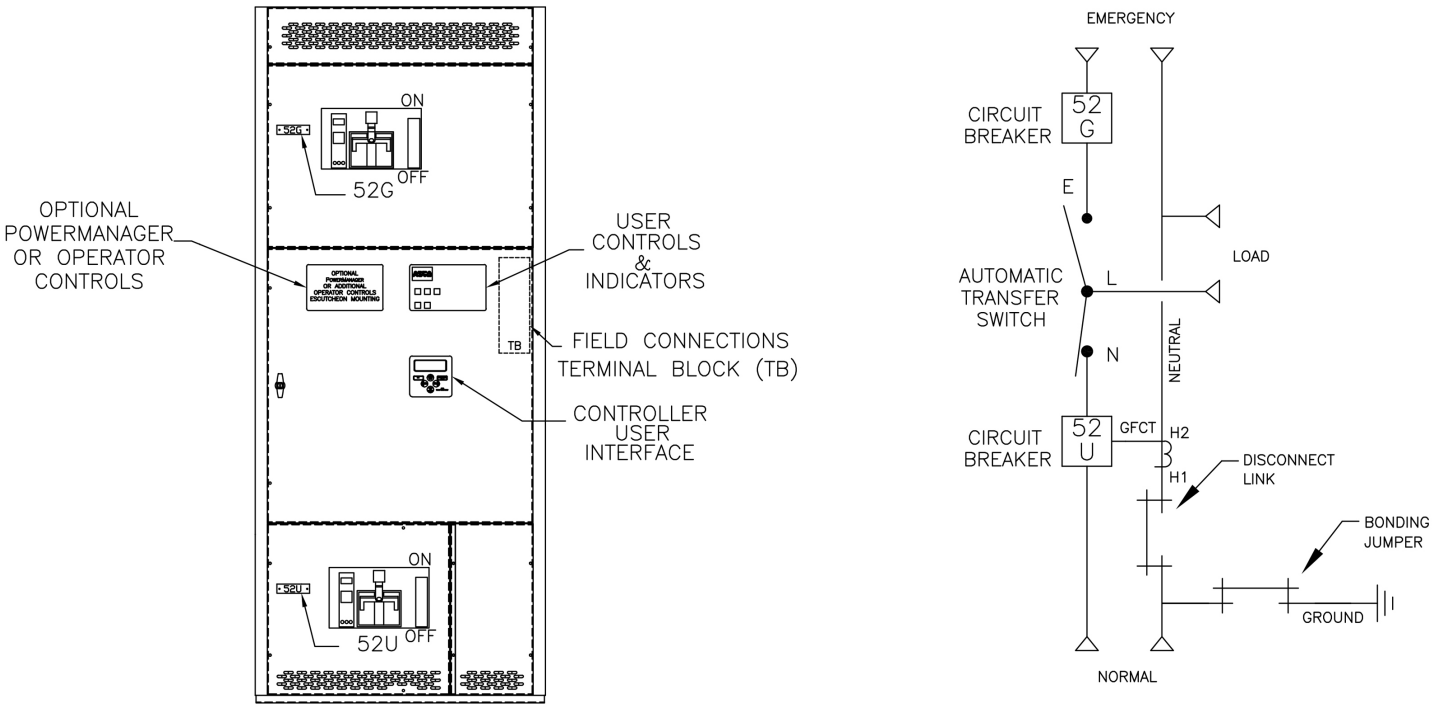

Figure 4: Front View and One-Line Diagram for an ASCO 7000 SERIES 1000-1200 Amp ATS with an RJF Breaker in a Service Entrance Compartment and an RJF breaker for a generator. The Emergency breaker is located near the top of the enclosure; the Normal breaker is in a service entrance compartment near the bottom. This unit features a solid neutral.

SEATS with Dual Service Entrances

Some facilities have dual utility feeds and require a transfer switch between them. Transfer switches can be provided with in dual service entrance configurations. An example is shown in Figure 5.

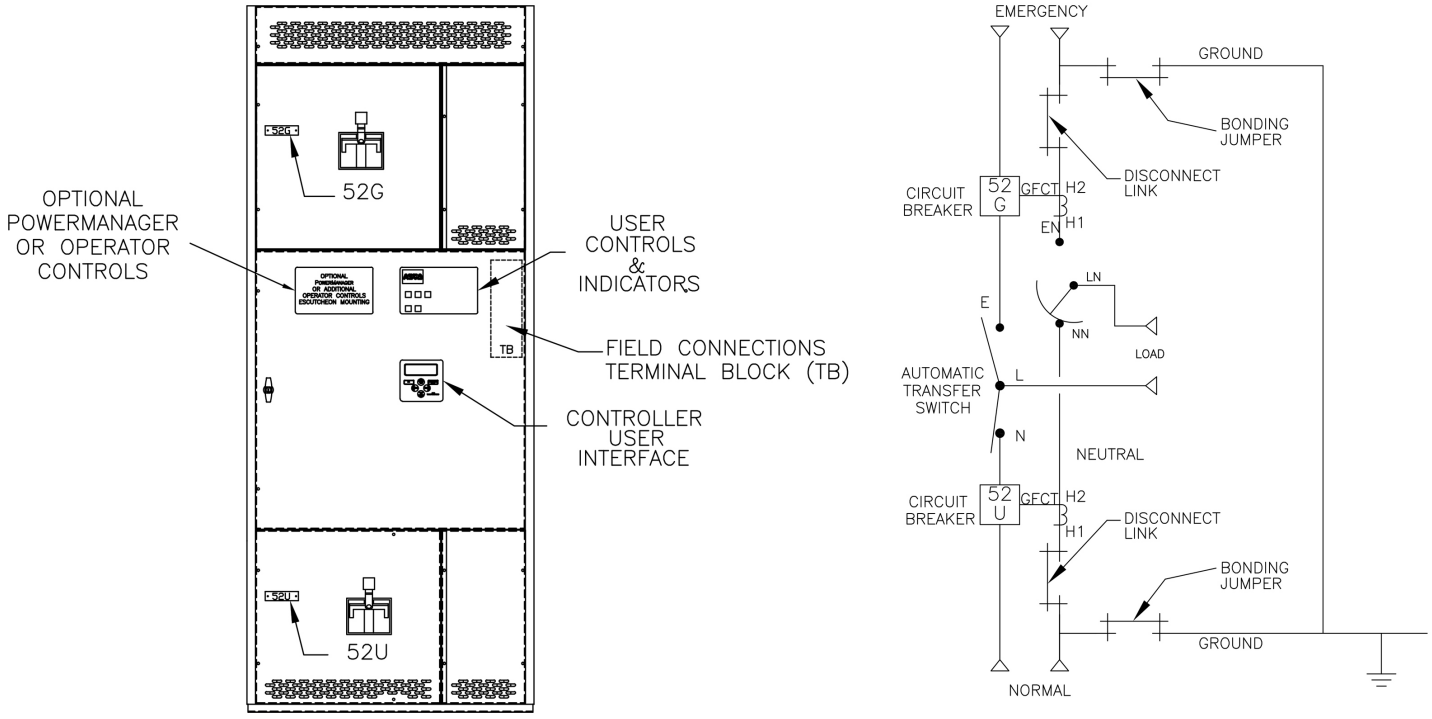

Figure 5: An ASCO 7000 SERIES 1000-1200 Amp Dual Service Entrance ATS with RJF Breakers for each source. This unit features a switched neutral.

Power Transfer Load Center

A Power Transfer Load Center (PTLC) shows the increasing value of integrating additional electrical devices with a transfer switch. A PTLC integrates a load distribution panel and other devices into a SEATS to provide connectivity and control for power sources, load transfer equipment, and load circuits from a single location. This design further streamlines procurement, installation, and operation of electrical equipment to reduce overall installed and lifecycle costs.

Some of the advantages of a PTLC can be seen by comparing the photographs in Figure 6 and Figure 7. Figure 6 shows the electrical equipment typically found near the service entrance. The wall-mounted devices include an ATS, disconnect breakers for the Normal and Emergency power sources, and Surge Protection Devices (SPDs). In Figure 7, six devices are consolidated into a single wall-mount cabinet. This design requires less effort to mount and connect. Integrating six devices eliminates the need for five enclosures, reducing the required wall area by 30 percent.

The device consolidation provided by PTLCs can present important benefits for any facility with limited available space. For instance, PTLCs are commonly selected for Mobile Telephone Switching Offices (cell sites). They are also suited for space-limited facilities that will be replicated at multiple locations, such as franchised fast-food restaurants, convenience stores, and fueling stations. For the latter, PTLCs can form part of a cost-effective backup power solution that enable these businesses to supply needed fuel to customers during post-storm utility power outages. With the emergence of connected Internet-of-Things applications, a SEATS/PTLC solution could be standardized for multiple edge computing facilities.

Figure 6: A wall-mounted transfer switch, distribution panel, two disconnects and two SPDs at a service entrance.

Figure 7: A wall-mounted PTLC that incorporates the same equipment in a single enclosure.

Adding Surge Protection and Metering Provides Additional Value

Part of the value that SEATS provide results from preassembly and testing by the manufacturer prior to shipment to job sites. Integrating additional equipment into the product further streamlines procurement and installation and increases value. Two types of devices that are often integrated are SPDs and power meters. SPDs for traditional and Service Entrance set-ups can be seen in prior Figures 6 and 7, respectively.

Power Meters are used for monitoring and logging power information to assess billing, diagnose operating issues, and manage power usage. The ASCO 5210 is an example of an easy-to-integrate power meter. Power Quality Meters offer higher level diagnostics and can often record extensive amounts of power data. They are useful for applications that focus on forensic analyses of power events and increasing power efficiency. The ASCO 5450 is an example of a power quality meter. While a full discussion of metering benefits is beyond the scope of this paper, both types of metering can be integrated into SEATS by equipment manufacturers.

Outdoor Enclosures Increase Application Flexibility

All preceding examples have described indoor installation. The breadth of application flexibility becomes clearer when outdoor installations are considered.

SEATS can be installed at outdoor locations inside appropriate enclosures, typically NEMA or UL 50 Types 3R or 4. This enables the equipment to be positioned alongside buildings and generators, or at other locations when necessary. Selecting an appropriate enclosure is important for protecting the equipment – see our papers entitled Equipment Enclosure Classifications and Selecting Secure Enclosures to Protect Equipment from Ultraviolet Radiation for information on both enclosure standards and the benefits of door-over-door designs.

The advantages of outdoor location capability are several. For instance, at gasoline stations and convenience stores, retail floor space is at a premium. Minimizing indoor space requirements for infrastructure leaves more space for revenue-generating uses. Installing a SEATS/PTLC alongside an outdoor generator could make more space available within the store. It could also locate breakers for outdoor loads where an operator can readily see the equipment they control, such as outdoor lighting, signage, fuel pumps and more.

SUMMARY

Service Entrance Automatic Transfer Switches place service disconnect and automatic load transfer equipment into a single unit or lineup that standardizes design, streamlines installation, shrinks space requirements, and reduces overall installed costs. The scope of application is nearly as broad as applications for standard transfer switches, and the associated benefits increase as additional electrical equipment is integrated into SEATS designs. SEATS can incorporate circuit breakers for Normal and Emergency sources, distribution panels for connecting and protecting loads, meters to monitor and assess power usage, and SPDs to limit the effects of potentially damaging transient overvoltages. SEATS are especially effective where a standard design can be replicated from site-to-site at facilities ranging from cell sites to fueling stations to edge computing facilities.

ASCO Power Technologies - Global Headquarters
160 Park Avenue
Florham Park, NJ 07932
Tel: 800 800 ASCO

whitepapers.ascopower.com
customercare@ascopower.com