



ADVANCED POWER
TECHNOLOGIES

2.4kV-38kV SF6 Insulated Transfer Switchgear



MS6-T Load Transfer Switchgear Solutions Brochure

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**SAFE SMART SERVICEABLE SWITCHGEAR &
ENGINEERED POWER SYSTEM SOLUTIONS**



ALN: 522-AT Rev. 02

Standard Construction Features



Figure 1: Outdoor NEMA 3R Medium Voltage Gas Insulated Automatic Transfer Switchgear



Figure 2: Automatic Transfer Switch Load Takeoff Section Access

2.4kV-38kV (3Ø) Transfer Switchgear

- ⊙ Standard Emergency Transfer & Normal Source Return Control System Module Pairing:
 - ATO - APT Automatic Standby Open Transition Transfer
 - NA - Non-Automatic Operator Supervised Return to Normal
- ⊙ Emergency (Back-up) Transfer Control System Module Options:
 - MTO - Manual/Non-Automatic Standby Open Transition
 - ATO - APT Automatic Standby Open Transition Transfer
 - ATC - Automatic Standby Bumpless Closed Transition Transfer
 - SL1 - Automatic Standby Bumpless Closed Transition Transfer with Soft Loading
- ⊙ Normal Source Return Operation Options:
 - NA - Non-Automatic Operator Supervised Return to Normal
 - AR - Automatic Return to Normal
- ⊙ Design Amperage:
 - Up to 1200A (3 Sections)
- ⊙ Main Bus:
 - Tin or Silver-plated copper, with bolted connections optionally covered by insulating boots
- ⊙ Symmetrical Interrupting Capacity:
 - 2.4/5kV: 40kA or 50 kA
 - 12.47kV, 13.2kV, 13.8kV/15kV: 40 or 61kA
- ⊙ Available as the **world's smallest** ATS size with front & side access only
- ⊙ Source Advanced Power Metering
 - UL recognized ANSI C12-20-1998 Class 10 0.5% Accuracy
- ⊙ Enclosure
 - Available in NEMA 1 (indoor) and NEMA 3R (outdoor) installation.
 - Carbon Steel Powder coated ANSI 61 Gray
 - All hardware is stainless steel
 - Door handles are padlockable

Load Break Switches



Figure 3: Sealed SF6 Gas Insulated Switching Device

2.4kV-38kV (3Ø) Load Break Disconnect Switch Options

Disconnect

Disconnect Insulation Type	<ul style="list-style-type: none"> Sealed SF6 Gas Insulated 	
Mechanism Type	<ul style="list-style-type: none"> Snap Action K Mechanism Stored Energy A Mechanism 	
System Max kV/ Momentary Rating	<ul style="list-style-type: none"> 5.5kV/40kA 8.25kV/40kA 15kV/40kA 15kV/61kA 	<ul style="list-style-type: none"> 15.5kV/61 kA 17kV/40kA 27kV/32-40kA 38 kV/32-40 kA
BIL Rating	<ul style="list-style-type: none"> 60kV – 150kV 	
Switch Amperage Rating	<ul style="list-style-type: none"> 200 Amps 600 Amps 1200 Amps 	
Auxiliary Contact Switches	<ul style="list-style-type: none"> None 2 N.O. – 2 N.C. contact 3 N.O. – 2 N.C. contact 4 N.O. – 4 N.C. contact 	
Reference CAD Drawing	Available Upon Request	

Drawing

ATC – Control System Module



Figure 4: ATC - Automatic Closed Transition Transfer Control System Module with Operator Setpoints HMI & Source Power Meters

Automatic Standby with Manual Return Operation

Automatic Standby Transfer Operation:

1. When the generator is used as an Emergency source, the MV ATS will issue a start signal to the emergency generator upon sensing of failure of a Normal Source.
2. When a Normal Source failure is sensed by the MV ATS, and the Emergency Source is available, the Normal Source circuit breaker trips open and the Time Delay Neutral timer starts timing.
3. Once the Time Delay Neutral timer expires, the Emergency Source circuit breaker will close, and the Emergency Source will be supplying power to the facility.
4. With the APT MV ATS, operators are given the flexibility to utilize whether an automatic or manual return to Normal Source operation by selecting the desired mode of operation via HMI
5. A 100 mS Closed Transition Transfer back to the Normal Source is able to occur in the event that both sources are sensed to be synchronized. This will allow power from the Normal Source to resume feeding the load without causing a power outage.
6. When an automatic return to Normal Source mode of operation is selected, once the Normal Source is sensed to be healthy and Time Delay Emergency to Normal timer expires, and when the two power sources are in synch, the 100 mS closed transition to the Normal Source will occur. If the two power sources are in not synch, Emergency Source circuit breaker will open and the Normal Source circuit breaker will close after expiration of the adjustable Time Delay Neutral.

Manually Initiated Return Transfer Operation:

1. Operators have the ability to initiate a manual transfer signal locally or remotely by customer SCADA or DCS system (via Modbus TCP/IP Ethernet), the Preferred Source circuit breaker trips open causing a power outage
2. At this time, the Emergency Source circuit breaker closes and the Emergency Source is supplying power to the site load
3. Operators have the option to automatically or manually initiate the transfer of the load back to the Normal Source.
4. A Closed Transition Transfer back to the Normal Source is able to occur in the event that both sources are sensed to be synchronized. This will allow power from the Normal Source to resume feeding the load without causing a power outage.
5. In the event that the two sources are sensed to be out of sync, the load will be disconnected from the power and an Open Transition Transfer will occur.

Note: When a source's Circuit Breaker control switch is in maintained "Open" position, the circuit breaker will not close, regardless of the operation of any other control

Source Sensing Setpoints:

Undervoltage, overvoltage (adjustable in Volts), underfrequency, overfrequency (adjustable in 1/100 of Hertz). Each setpoint has corresponding time delay adjustable in seconds.

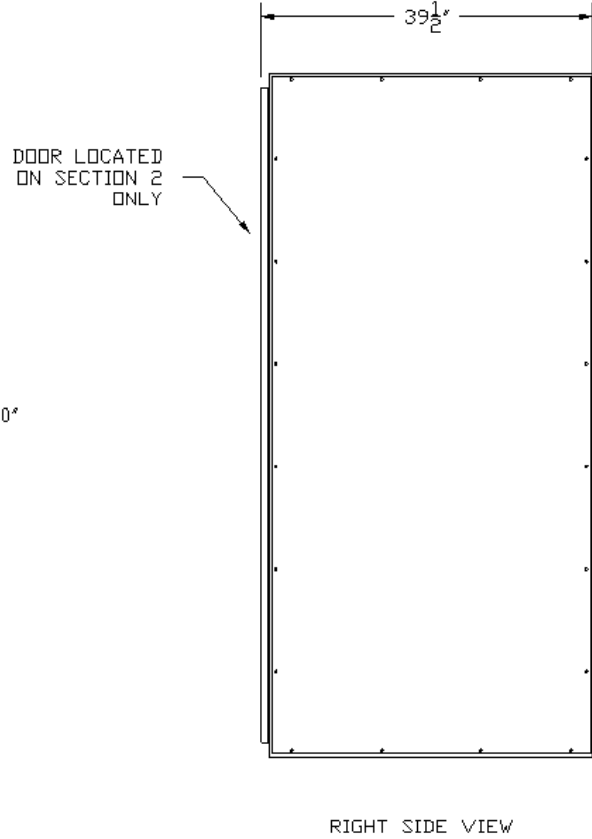
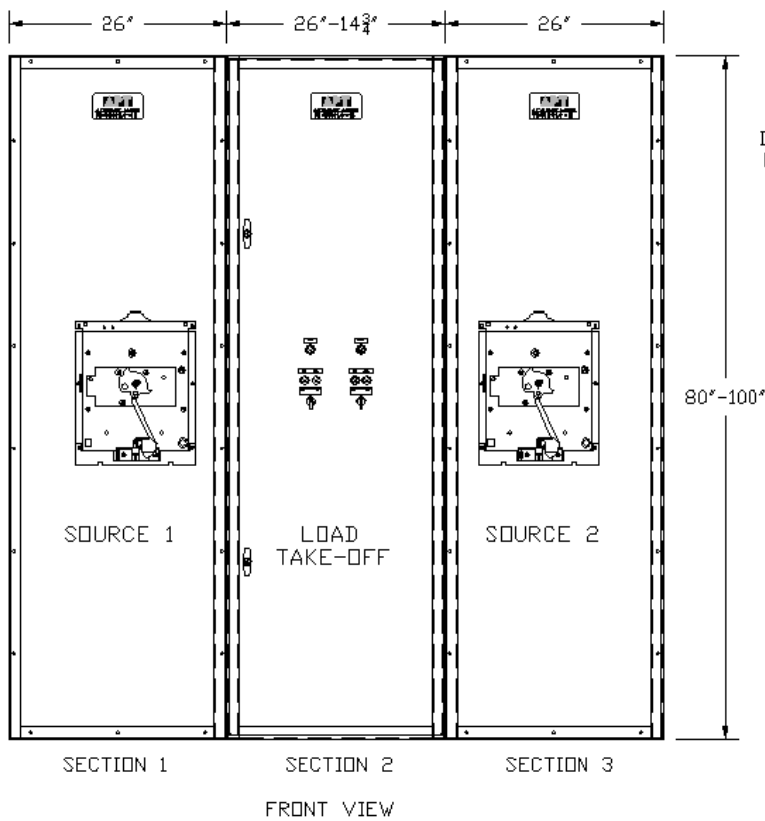
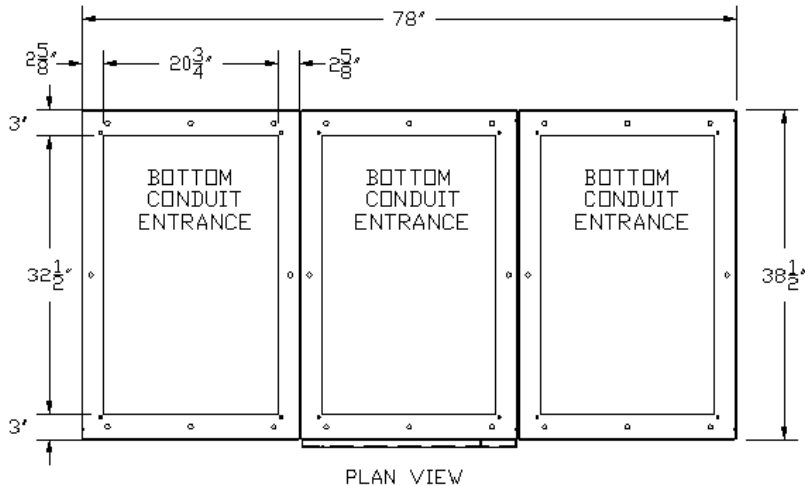
Transfer Control System Modules



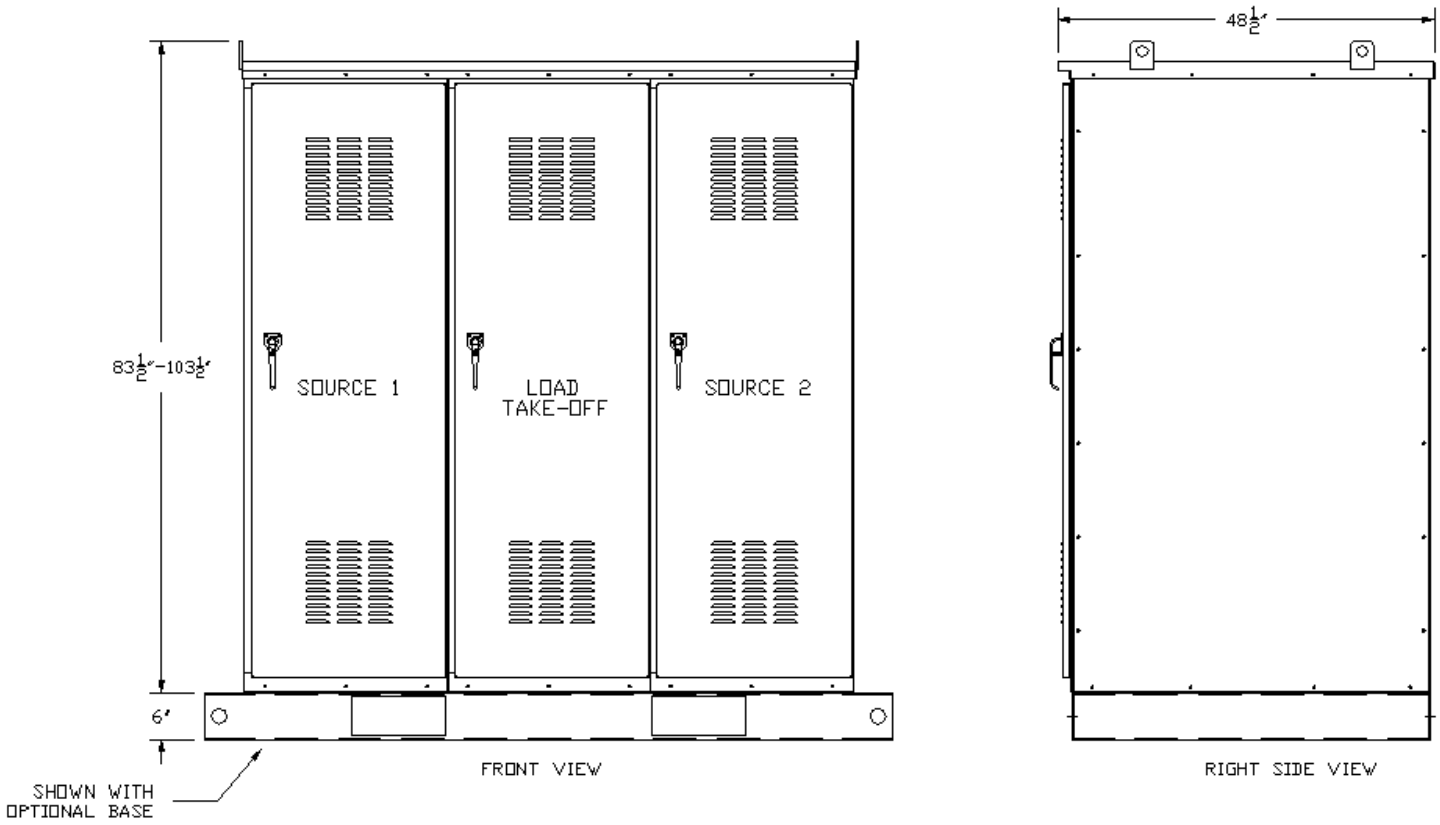
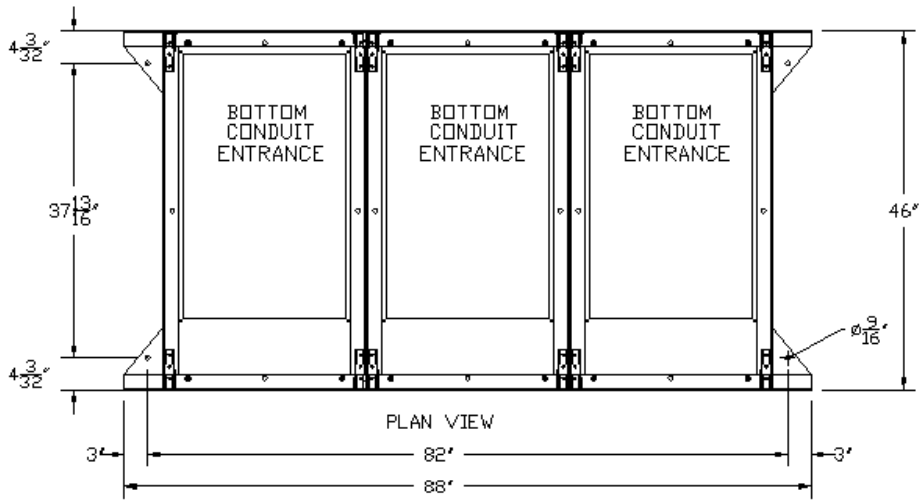
Figure 5: Standard ATS System Controllers consisting of ATO - Automatic Standby Open Transition Transfer with NA - Non-Automatic Operator Supervised Return to Normal Control

- ⊙ MT - Manual & Non-Automatic Open Transition Control:
 - System operator executes a sequence of operational steps to actuate electrically or mechanically interlocked source disconnects to prevent inadvertent paralleling of sources.
- ⊙ SL1 - Automatic Standby with Soft-loading/Unloading Control:
 - Time delayed control sensor detects if a utility outage has occurred.
 - When timer expires, the generator set is automatically started and brought up to speed and voltage.
 - Utility circuit breaker and the designated feeder breakers will open and generator circuit breakers will close (after adjustable time delay). The synchronizing circuit breaker of the first available generator closes to a dead bus. At this time the generator is supplying power to the site load.
 - When a healthy Utility is connected for a set time delay, the soft close transition of the load to the utility shall begin.
 - The generator bus synchronizes with the utility source. Once synchronized, the utility circuit breaker closes. At this time soft unloading of a generator set shall begin.
 - When the genset loads are gradually reduced to the level of the unload trip set point the generator synchronizing breakers trip open and the gensets are put in the cooldown mode of operation.
- ⊙ BL – Generator Base Load Control:
 - Soft loads the generator set to a constant load level against utility.
- ⊙ UP - Sustained Utility Paralleling Control:
 - Automatic transfer shall be configurable for the sustained Utility Paralleling operation as initiated and controlled by the generator paralleling switchgear.
- ⊙ GP – ACM Generator Paralleling Control:
 - Automatic generator paralleling controls shall be configurable to bring multiple generators on-line to service the load.
- ⊙ IE - Import/Export Control (add-on to UP/PS):
 - Maintains constant utility contribution to a site load. This is accomplished by monitoring utility contribution and trimming generator set load levels up and down as site loads change.
 - Import control means the generator set is contributing less than the total site load requirements and the utility supplies the difference.
 - Export control means the generator set is contributing more than the total site load requirements and the utility is absorbing the difference.
- ⊙ Automatic transfer control can be provided by others.
- ⊙ For more information on **Transfer Control Options**, Please contact APT!

Dimensions of NEMA 1 Sections



Dimensions of NEMA 3R Sections



About Advanced Power Technologies



Advanced Power Technologies (APT) is on the cutting edge of the latest engineered power system smart technologies, as it relates to microgrid & storage management, renewable & conventional energy source deployment, demand peak shaving, and facility back-up and co-generation power systems. Located in the central United States and headquartered in Lafayette, Indiana with solutions development engineers around the country, APT provides domestic and international products and services to industry leading companies from around the world. APT engineers have decades of power system experience from working with some of the largest companies in industry. Over the last two decades, we have produced successful solutions for hundreds of large-scale electric power projects involving utility/generator paralleling, transfer, peak shaving, and distribution. We pride ourselves in providing electrical power systems that are engineered and custom built, utilizing state-of-the-art technologies to fit our customer's exact needs. The core of our business is low & medium voltage engineered power systems for a wide range of indoor & outdoor applications, such as:

- ⊙ Utility(ies) and Generator(s) Paralleling/Transfer/Peak Shaving/Distribution Switchgear
- ⊙ Microgrids, Microgrid Master Control Panels, SCADA systems
- ⊙ Containerized Battery Energy Storage Systems (BESS)
- ⊙ Photovoltaic (PV) Solar Power Collection/Distribution & Renewable Energy Storage Systems
- ⊙ Low & High Resistance Grounding Systems, Grounding Systems for Photovoltaic Effective Grounding
- ⊙ High Efficiency Combined Heat and Power Switchgear & Control Systems (CHP, Co-generation)
- ⊙ Outdoor Walk-In Electrical Houses (E-Houses) & Skid-Mounted Switchgear
- ⊙ Motor Control Centers & Motor Control Switchgear
- ⊙ Automatic & Manual Load Transfer Switchgear
- ⊙ Bypass/Isolation & Power Distribution Circuit Breaker Switchboards
- ⊙ Generator/Loadbank Quick Connection Switchgear, Switchboards, & Tap Boxes
- ⊙ Industrial Control Panels

Please see our product webpages on www.appt-power.com for product brochures and relevant information. Actual products may look different from images shown on the website and in brochures, based on actual specifications.

APT cares and understands that each power system is different. We will evaluate various solutions in order to develop the best solution for a site. APT focuses on our ability to a combine several traditional pieces of equipment/functionality into as little of a footprint possible. This saves on space, the cost of equipment, cost of installation, and accomplishes the most optimal/state-of-the-art design your facilities. APT's desires to foster and grow a culture of continued open communication with each customer. Let APT be your source to provide fully engineered power system equipment solutions for the full customer facility on time, on or under budget, and in the smallest footprint possible. We are always available to assist customers and engineers representing customers in the development of complex power solutions for all facility types.