



ADVANCED POWER  
TECHNOLOGIES

**NEMA 1 • Outdoor 3R • Walk-In**

# Data Center Switchgear & Related Products

## 208V–38kV



## DataCTR Power System Switchgear Solutions

Solutions Brochure



[www.appt-power.com](http://www.appt-power.com)



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Volume Production

Advanced Engineered Solutions



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# Data Center Switchboards & Switchgear

## Switchgear Built for Always-On Data Centers

APT engineers and manufactures medium- and low-voltage switchgear, transfer systems, and factory-integrated e-houses that support N+1/2N architectures up to Tier IV designs. From the utility intertie to the IT load, we deliver metal-clad MV with withdrawable VCBs, advanced transfer and paralleling controls, and SCADA visibility—so you can deploy faster, operate safer, and scale confidently.



Figure 1\*

Figure 2\*

## Why data centers choose APT

- ✓ **Resilience by design:** Utility intertie per IEEE 1547, generator paralleling, open/closed transition ATS, peak-shaving, islanding.
- ✓ **Speed & modularity:** PwrHouse walk-in and PwrContainer ISO-based enclosures arrive factory-wired, FAT-tested, and ready to set, cutting site time and risk.
- ✓ **Visibility & control:** APTView SCADA, revenue-grade metering, and comprehensive protective relaying (25/27/32/40/46/50/51/59/81/86/87) for real-time insight and faster recovery.
- ✓ **Standards & compliance:** Built to IEEE/NEMA/UL and utility requirements, advanced commissioning support available.
- ✓ **Lifecycle Support:** Commissioning, training, troubleshooting.

## End-to-end Balance of Plant Switchgear, Switchboards, Substations Scope of Supply

- ✓ **Planning & One-line Support:** Site planning, single-line, engineering review.
- ✓ **MV/LV Switchgear:** Utility, generator, tie, distribution—withdrawable breakers, Automatic Standby Source Transfer ATS configurations.
- ✓ **415/480V Generator Switchgear Solutions:** Extended Permanent Generator Terminal Switchboards for connection of many load cables, integrated load bank permanent or quick connection, temporary generator connection.
- ✓ **UPS Testing & Isolation Solutions:** Load Bank Quick Connection, high current bypass-isolation ATS options.
- ✓ **Integrated power:** MTL unit substations, LV Power Centers, indoor/outdoor MV/LV transformers.
- ✓ **Modular Walk-in Switchgear Enclosures & Skids:** PwrHouse PwrContainer
- ✓ **Controls & SCADA:** MCPs, utility/gen paralleling, auto/manual transfer, APTView SCADA.
- ✓ **Protection & Metering:** Relays, 86 lockouts, test switches, revenue metering, RC Surge Snubbers & arresters.
- ✓ **Grounding:** NGR/HRG systems and hardware.



# Applications – Why APT Switchgear?

## Rapid Response

Engineered to deploy fast when every second counts.



## Engineered-to-Order

Tailored engineering solutions no off-the-shelf compromises.



## Built for Tomorrow

Smaller, Smarter, Future-ready.



## Mobile Power Solutions

Reliable power that moves you anytime, anywhere



Figure 3\*



## Next-Generation Switchgear Technology



### Data Centers

- Medium Voltage (MV) Switchgear
- Low Voltage (LV) Switchgear
- Automatic Transfer & Distribution
- Engineered Control Power Cabinets



### Utilities & Prime Power

- Electric Supply Substations
- Electric Substation Backup
- Water & Wastewater Treatment Plants
- LNG, Trash & Recycling Plants



### Manufacturing & Industrial

- Textile
- Steel Mills
- Stamping



### Generators & Backup Power

- LV & MV Quick Connections Solutions
- Permanent Gen Protection
- Permanent or Temporary Load Bank
- Temporary Generator
- Manual or Automatic Transfer
- Extended Generator Terminal Boxes



### University & Medical Campuses

- Hospitals/Critical Care Centers
- Medical Clinics
- Airports, Train Stations



### Mining, Oil Field Drilling, & Fracking

- Vibration Withstand
- Integrated Transformers
- Automatic Paralleling & Transfer
- Integrated Power & Controls



### Renewable Energy Collection Control

- Solar, Wind, Geothermal, Biogas, Hydro
- Micro Grids & Reactors
- Energy Storage
- Education, Healthcare, & Transit



### Government

- Federal, State, & Local Buildings
- Correctional Facilities
- U.S. Army & Navy Bases

# NextGen Medium Voltage Switchgear

## Next-Generation Medium Voltage Switchgear Replacing Traditional Metal-Clad Switchgear



Figure 4\*



Figure 5\*

## Compact Metal Enclosed Withdrawable Vacuum Circuit Breaker Switchgear for Tomorrow's Critical Infrastructure

### Next-Generation Construction Advantages

**Smallest Compact Withdrawable Footprint on the Market:** 30% to 70% smaller footprint (depending on arrangement), compared to legacy metal-clad switchgear.

**Advanced Vacuum Circuit Breakers:** New Ultra Compact Withdrawable vacuum breakers with fast fault clearing and minimal maintenance.

**Enhanced Reliability & Safety:** Reduced complexity, simplified maintenance, enhanced safety features.

**Rapid Deployment:** Flexible construction options simplify and accelerate installation.

### Standard Ratings

Specification	Ratings & Options
Voltage Ratings	2.4 kV – 38 kV
Interrupting Capacity	25 kA, 31.5 kA
Main Bus Ampacity	600 - 4000 A
Bus Insulation Options	Standard Bare or Optional Insulated
Operation Modes	Manual, Auto Open or Closed Transition, Soft Loading, Parallel
Transfer/Control Configurations	Utility-to-Generator, Utility-to-Utility, Generator-to-Generator, 3-Way
Circuit Breaker Type	Withdrawable Vacuum
Reference Standards	ANSI/IEEE C37.20.3 and C37.20.2

### Flexible & Durable Enclosure Options

Standard Indoor: NEMA 1  
Weatherproof Outdoor: NEMA 3R Non-Walk-In (stainless hardware, pad-lockable doors)  
APT PwrSkid: Outdoor Non-Walk-In Skid-Mounted

#### Walk-in Solutions:

APT PwrContainer: Compact Containerized Outdoor Walk-In Enclosure  
APT PwrHouse: Outdoor Walk-In Enclosure

#### Material & Finish Options:

Carbon Steel, Aluminum, Stainless Steel (304 & 316)  
Powder-coated ANSI 61 Gray or the color of your choice!

## Utility & Generator Sections

### Simple To Service Modular Compartmentalized Switchgear

Our modular switchgear design is meticulously engineered for serviceability, reliability, and simplified integration, compliant with IEEE/ANSI, and component UL standards. Each specialized section is optimized and compartmentalizable to meet your exact application requirements.



Figure 6\*

### Incoming Main & Utility Intertie Feed Sections

- ✓ **Rated Voltage:** Up to 15kV, ensuring compatibility and safety with your utility grid.
- ✓ **Circuit Breakers:** Vacuum circuit breakers (VCBs) with withdrawable capability, simplifying maintenance and providing visible disconnect for operational safety.
- ✓ **Precision Instrumentation:** Integrated current transformers (CTs) and voltage transformers (PTs) configured for precise metering, monitoring, and protection.
- ✓ **Safety & Reliability:** Engineered with robust mechanical interlocks and clearly defined operational positions for maximum safety.

### Incoming Generator Sections

- ✓ **Enhanced Paralleling Capabilities:** State-of-the-art synchronizing equipment for seamless integration and paralleling of generators.
- ✓ **Flexible Breaker Configurations:** Fully withdrawable VCBs rated for continuous operation and quick maintenance.
- ✓ **Advanced Protection:** Comprehensive relay and protective systems safeguard generator integrity and ensure fault tolerance.
- ✓ **Maintenance Ease:** Optimized compartment design provides easy access to critical components, minimizing downtime.



## Tie & Distribution Sections

### Utility Bus Isolation Tie, Multi-Gen Bus Tie, Main-Tie-Main Sections

- ✓ **Robust Source Transfer:** Designed for dependable automatic or manual transfer between multiple power sources without service interruption.
- ✓ **Seamless Controls:** Equipped with intelligent transfer controllers capable of automatic and fast switching between the power sources.
- ✓ **Digital Integration:** Advanced digital relaying and metering enhance system monitoring and fault identification, improving uptime.
- ✓ **Maximum Flexibility:** Designed to accommodate various operational and expansion scenarios seamlessly.

### Distribution Feeder Sections

- ✓ **Precision Power Distribution:** Optimized layout to ensure efficient and secure distribution to downstream loads.
- ✓ **Comprehensive Protection:** Integrated CTs and PTs, meticulously engineered for accuracy and reliability in protection schemes and power management.
- ✓ **Expandability:** Future-ready provisions included, facilitating easy upgrades or expansions as your needs evolve.
- ✓ **High Short-Circuit Withstand:** Engineered internal bus bars with exceptional thermal and mechanical stress resilience.

### Easy Integration & Planning

- Detailed dimensional layouts, clear equipment labeling, and precise technical drawings provided, ensures a straightforward submittal approval process, with revisions as required to ensure compliance with the project intent.
- Choose reliable delivery, flexibility, and performance — choose APT Switchgear solutions for your critical power infrastructure.



Figure 7\*

# Withdrawable Vacuum Circuit Breakers

## APT's Withdrawable Vacuum Circuit Breakers (VCBs)

Engineered for seamless power system integration, our VCB combines a next generation compact Vacuum Circuit Breaker technology with our innovative compact withdrawable switchgear cells to ensure reliability, ease of maintenance and operational flexibility.



Figure 8\*

## Operational Simplicity & Familiarity

- ✓ **Withdrawable Removable Vacuum Circuit Breakers:** Provides visible disconnect of primary circuit to provide maintenance service on all types of downstream load equipment.
- ✓ **Integral Manual Charging Handle:** Allows for manual operation, ensuring ease of use without reliance on complex systems.
- ✓ **Test Position:** Allows for testing of every aspect of the circuit breaker manual and electrical operation (trip, charge, close, position contacts, etc.) while circuit breaker's primary terminals are fully disconnected from the switchgear cell.
- ✓ **Operation by any universal disconnect head hot stick** for operational flexibility, simplicity and enhanced operator safety. 4' hot stick is included with switchgear.

## Enhanced Safety Mechanisms

- ✓ **Mechanical Interlocks:** Prevent withdrawal or insertion of the circuit breaker when main contacts are not open, ensuring operator safety.
- ✓ **Intermediate Position Lockout:** Breaker cannot be electrically or mechanically closed unless it is in fully connected or fully disconnected (in Disconnected or Test position), preventing unsafe operations.
- ✓ **Automatic Shutters:** Automatically cover primary connections when the circuit breaker is in Disconnected or Test position, or removed from the cell, reducing operator's exposure to live parts.
- ✓ **Stop bumpers:** Prevent circuit breaker from accidental rolling out of the cell on to the operator, when in Test/Disconnected Position.



# GTB-Series Gen Term Switchboards

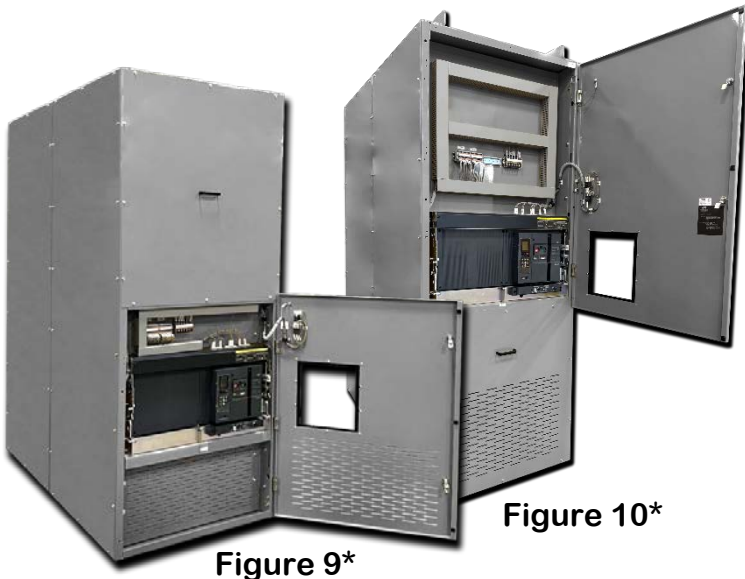


Figure 9\*

Figure 10\*

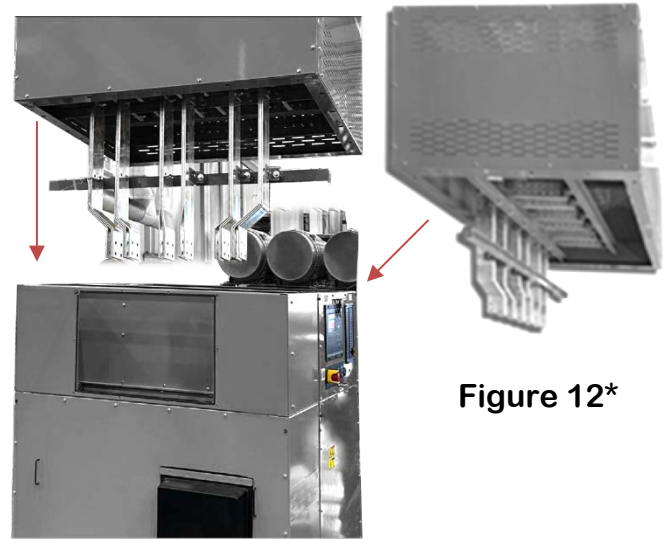


Figure 11\*

Figure 12\*

## APT Extended Generator Terminal Boxes Gives Customizable Options that the Factory Doesn't!

- UL 891 Listed & Labeled
- Voltage:
  - 415V-480V, 600V, 208V (3Ø), 3-Wire/4-Wire
  - Three Pole & Four Pole Isolation Options
- Frequency:
  - 60Hz or 50Hz
- Silver-plated copper bus
- Standard bus ampacity up to 4000A
- Bus Access & Cable Entry
  - Front or Rear Access for either top or bottom cable entry
- Insulated Case Circuit Breakers:
  - Available from 3000A up to 5000A+
  - 3-Pole (standard) & 4-Pole (available)
  - Manually Operated
  - Electrically Operated with Motor Operator Add-on
  - 100% Rated
  - Shunt Trip
  - Fixed or Drawout Mounted
- Optional Molded Case Circuit Breakers for Auxiliary or Fire Pump power
- 65kAIC @480V standard Interrupting Rating
- Optional 100kAIC+
- Busbar connections NEMA standard hole pattern for output cables
- Circuit Breaker Trip Unit Options:
  - Basic Electronic
  - LI – Adjustable long time, instantaneous trip settings
  - LSI – Adjustable long & short time, instantaneous trip settings
  - LSIG – Adjustable long & short time, instantaneous trip settings, with ground fault trip settings
  - LSIA – Ground Fault Indication – Bell Alarm,
  - Power & Energy Metering Trip Unit
  - Neutral CT
  - Breaker position Aux Contacts (“a” and “b”)
  - Pad-lockable
- Surge Protection Device:
  - Type 1 & Type II Available
- No Limits on Optional Features!
  - Intelligent close prevents simultaneous connection of multiple generators to dead bus with the addition of an APT Generator Paralleling Control Module
  - Pick as many options from the latest APT Part Number Selection Options Available List, Available from an APT Power Solutions Development Engineer

# Temporary Generator / Load Bank

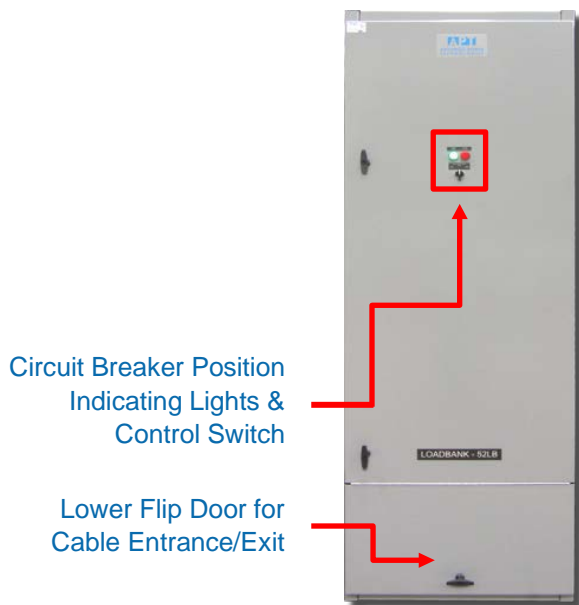


Figure 13\*

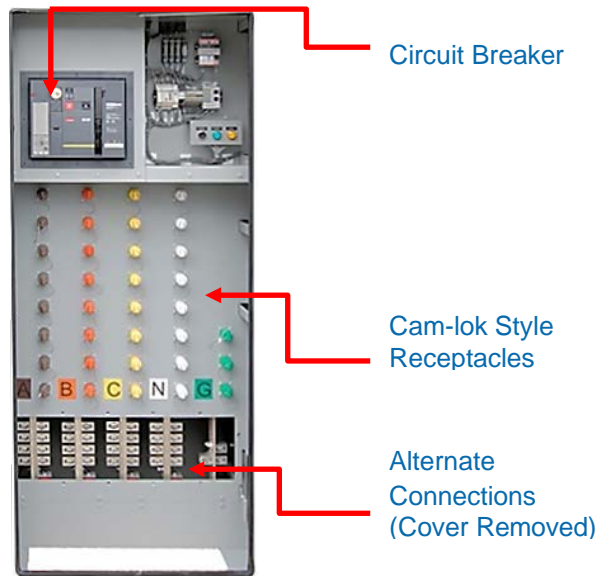


Figure 14\*

## Integrated Generator/Load Bank Quick Connection Section

- Per NEC 700.3, temporary generator connection applications require either mechanical or electrical interlocking of the power sources to safely prevent the inadvertent paralleling of the normal & emergency power sources:
  - Service Entrance Rated Manual Transfer Switchboard (two integrated keys)
    - Utility service entrance circuit breaker with mechanical key interlock
    - Temporary generator circuit breaker with mechanical key interlock
  - Temporary Generator Connection Only
    - External service main no temporary generator circuit breaker protection
    - One integrated mechanical key interlock, one ship loose with mechanical key interlock for installation on facility service main
  - Multiple generators or feeders circuit breaker sections (multiple mechanical key interlocks, transfer block)
- Operation sequence without the interlocking of sources is available for systems that achieve NEC 700.3 source interlocking externally
- Load bank connection only applications
  - Easily connects a temporary load bank to a facility's permanent generator(s)
  - Utilizes female cam-lok type receptacles
  - Does not require the use of interlocking
  - Circuit breaker and monitoring options available
- Integrated Generator & Load bank Quick Connection
  - Integrates male & female cam-loks into one unit for all your temporary connection needs in one location
  - Dual-purpose termination cabinet allows for safe and clean connection of a portable temporary generator or load bank
- Alternatively, cam-lok gender changeover adapters are available to convert Generator Quick Connection into Load bank Quick Connection\*

# SGU-Series Switchboards



Figure 15\*



Figure 16\*

## Designed to Meet UL® 891 Requirements

- UL 891 Listed & Labeled up to 4000A
  - 5000A+ available, built to UL, non-UL listed
- Voltage:
  - 208V – 690V, 3Ø
- Frequency:
  - 60Hz or 50Hz
- Silver-plated copper bus
- Standard bus ampacity up to 4000A
- Bus Access & Cable Entry
  - Front or Rear Access for either top or bottom cable entry
- Insulated Case Circuit Breakers
  - Fixed Mount or Draw-out
- Molded Case Circuit Breakers
- Intelligent close prevents simultaneous connection of multiple generators to dead bus with the addition of APT Generator Paralleling Modules to the generator
- 65kAIC @480V standard Interrupting Rating
  - Optional 100kAIC+
- Busbar connections with NEMA standard hole pattern
- Enclosure Environment Rating Options:
  - NEMA 1 (indoor)
  - NEMA 3R (outdoor) Non-Walk-In
  - Integrated onto APT PwrSkid Outdoor Non-Walk-In Switchgear Skid
  - Integrated into APT PwrContainer ISO Container Based Outdoor Walk-In Switchgear Enclosure Module
  - NEMA 3R hardware is stainless steel
  - NEMA 3R Doors are Pad lockable
  - Carbon Steel Powder coated ANSI 61 Gray
  - Optional Power System Mimic Bus
- Surge Protection Device:
  - Type 1 & Type II Available
- No Limits on Optional Features!
  - Pick as many options from the latest APT Part Number Selection Options Available List Available from an APT Power Solutions Development Engineer



# Low Voltage Mains & Feeders

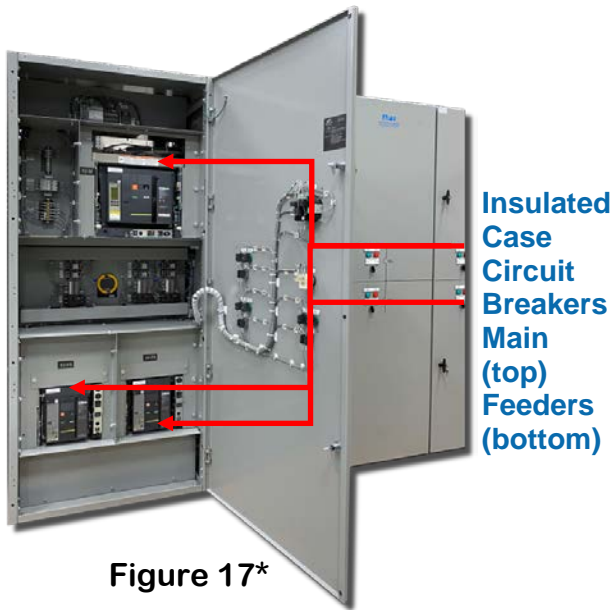


Figure 17\*

Circuit  
Breaker  
Position  
Indicating  
Lights &  
Control  
Switch

Molded  
Case  
Circuit  
Breaker  
Feeders

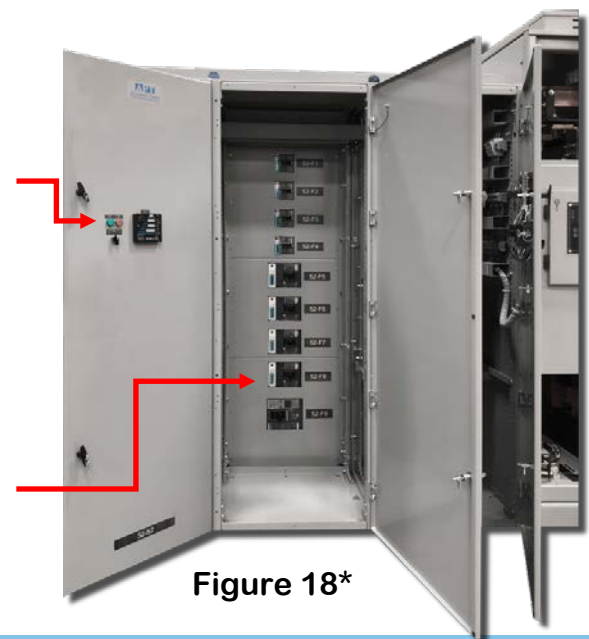


Figure 18\*

## Large & Small Branch Circuit Protection Sections

- ◎ Low Voltage:
  - 208V – 690V, 3Ø
- ◎ ANSI/UL 891 Listed & Labeled Low Voltage Main Protection and Feeder Sections Options:
  - UL 489 Insulated Case & Molded Case Circuit Breakers
  - Built to IEEE Std C37.20.1 with UL 1066 Listed Low Voltage Power Circuit Breakers
- ◎ Interrupting Rating:
  - 18kA – 200kA @ 480V<sub>AC</sub>
- ◎ Circuit breaker position Aux Contacts (“a” and “b”)
- ◎ Your Choice of Circuit Breakers:
  - Low Voltage Power Circuit Breakers (LVPCBs)/ Insulated Case Circuit Breakers (ICCBs):
    - Available from 100A up to 6000A
    - LVPCBs UL® 1066 Listed
    - ICCBs UL® 489 Listed
    - See page 9 for table of available circuit breaker frame ratings
    - Electrically or Manually Operated
    - 100% Rated
    - Fixed Mounted or Drawout
    - Electronic Trip Units – LI, LSI, LSIG
  - Molded Case Circuit Breakers:
    - UL® 489 Listed
    - Available up to 3000A
    - Manually Operated
    - Electrically Operated with Motor Operator Add-on
    - Standard or 100% Rated
    - Fixed Mounted
    - Thermal Magnetic or Electronic Trip Units – LI, LSI, LSIG

# MTL-Series Unit Substations



Figure 19\*



Figure 21\*



Figure 23\*



Figure 20\*



Figure 22\*



Figure 24\*

## Versatile Substations with Numerous Configurations

- ⊙ Medium Voltage:
  - 2.4kV – 38kV, 3Ø
- ⊙ Medium Voltage Main Protection Disconnect Sections Options:
  - IEEE Std C37.20.2 - Metal-clad Drawout Vacuum Circuit Breaker
  - IEEE Std C37.20.3 - Metal-enclosed Fused Air Insulated Loadbreak Interrupter Switch (LIS)
  - Metal-enclosed Drawout Vacuum Circuit Breaker
  - Metal-enclosed Unfused Air Insulated Switch with Fixed or Roll Out Vacuum Circuit Breaker
  - IEEE 386 – Loadbreak or Deadbreak Bushings with Optional Grounding
  - IEEE Std C37.23 - Metal-enclosed Bus Stabs with NEMA Standard 2-hole pattern directly to the transformer or incoming line pull section

# IPC-Series Integrated Power Centers



Figure 25\*

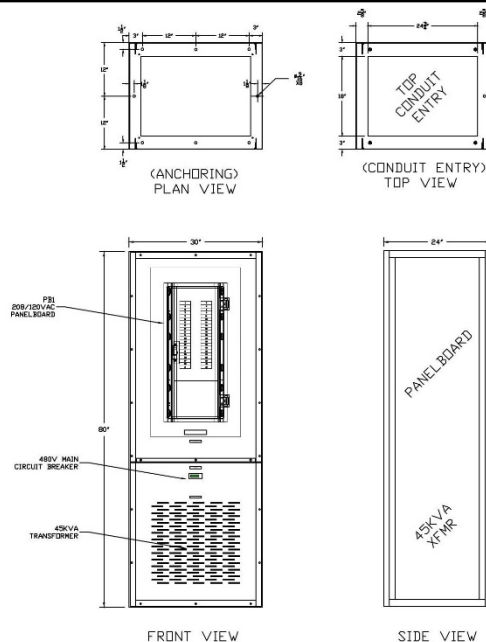


Figure 26\*

## Compact Power Distribution

- Integrated Power Centers (IPCs)
  - Transformer and panel combination suited for projects having both 480V and 208V requirements.
- IPC sections come factory assembled, saving electrical room space and installation time at the job site.
- The IPC's close-coupling sections eliminate the need for interconnecting conduits, box connectors, and shorten feeder cable runs.
- Three large rectangular openings are provided between sections, allowing you to quickly and easily route cables.
- Customizable Internal Components with standard configuration:
  - 480V Main Circuit Breaker
  - 480:208/120V, 3-Phase Transformer – Customer to specify required load size
  - Panelboard with Main Circuit Breaker – Customer to specify number of panelboard circuits
- Benefits
  - Saves electrical room wall space with an integrated footprint.
  - Saves valuable hours in the field.
  - Lower total project costs.
  - Reduced material handling.



# Outdoor Walk-In Switchgear Enclosures

## Engineered Precision, Delivered Performance

APT's **PwrHouse** and **PwrContainer** enclosures deliver industry-leading reliability, flexibility, and rapid deployment capabilities. Each solution is fully customizable to precisely meet your specific site and operational requirements, ensuring robust performance for critical power infrastructure.



Figure 27\*



Figure 28\*

## Custom Modular Enclosures: Built for Specialization

### **PwrHouse:**

- Tailored dimensions and modular flexibility to application-specific requirements.
- Fully integrated switchgear delivered ready for rapid commissioning.
- Robust construction adhering to stringent structural and environmental standards.
- Galvanized steel structure.
- Kynar 500 coated galvalume panels.
- Eliminates the need for shipping splits with compact, integrated switchgear design.
- Optional enhancements for critical operational conditions.

## ISO Container Enclosures: Compact, Mobile, & Ready

### **PwrContainer:**

- 20', 40', 45' ISO container-based, engineered for portability and immediate operational readiness.
- Ideal for rapid global deployment.
- Factory integrated switchgear and equipment in one self-contained unit significantly reducing on-site installation time.
- Easily Transportable by standard logistics networks: truck, rail, or ship.
- Optional features to withstand marine-grade environments, extreme seismic events, and Category 5 hurricanes available upon request.
- Optional Enhanced Marine-grade reinforced structural integrity with corrosion-resistant finishes and integrated environmental control.

# APT PwrHouse – Walk-In Enclosure

## Custom-Built Durability and Integration

APT's PwrHouse walk-in enclosures are meticulously engineered and factory-integrated to ensure structural integrity, durability, and simplified onsite deployment, explicitly designed to accommodate critical electrical systems safely and efficiently.



Figure 29\*

## Precision Engineered Modular Solutions

- **Robust Structural Integrity:**
  - Galvanized structural steel framing exceeding building code requirements.
  - ASTM A36 steel base ensures structural integrity for lifting and placing fully loaded enclosures.
  - Multi-rib panels with Kynar 500 finish, offer superior corrosion resistance.
  - Standing-Seam Metal Roof with UL 580 Class 90 Roof Uplift Certification.
- **Enhanced Safety & Comfort:**
  - Insulated steel doors with heavy-duty stainless-steel hinges and panic hardware.

## Factory-Built for Rapid Onsite Deployment

- **Flexible Sizing & Rapid Deployment:**
  - Delivered fully integrated with no field assembly of internal components needed.
  - Compact design streamlines logistics, reduces installation time, and accelerates commissioning.
- **Compliance and Excellence:**
  - Detailed, accurate submittal documentation streamlines project approvals, reduces engineering, and installation risks.

# APT PwrContainer – ISO Container

## Rapid, Efficient, & Robust Deployment

Engineered within ISO-certified sea-worthy containers, APT's **PwrContainer** enclosures offer unmatched portability, rapid deployment, and comprehensive environmental resilience for permanent & temporary global urban & rural operations and emergency response scenarios.



Figure 30\*

## Rugged, Robust Design ISO Container-Based Design

- **Superior Mobility and Reliability:**
  - Modified ISO shipping containers (20', 40', 45') allow international mobility, ideal for permanent, temporary, emergency, urban, or remote sites.
  - Eliminates onsite assembly; containers arrive fully tested and ready to operate immediately upon placement and acceptance testing.
- **Optional Marine-Grade Construction & Protection:**
  - Heavy-duty, reinforced steel framing and structural floor replacement ensures seismic stability and Category 5 hurricane resistance.
  - Corrosion-resistant marine-grade paint provides exceptional durability and heat deflection.

## Fully Integrated Plug-and-Operate System

- **Enclosure Features:**
  - Insulated personnel doors with quick-escape panic hardware.
  - Closed-cell polyurethane foam insulation protects internal equipment from temperature extremes and condensation.
- **Integrated Systems and Optional Features:**
  - For additional customizable features such as corrosion-resistant coatings, HVAC redundancy, marine-grade protections, and advanced operational safety enhancements, please see the comprehensive list of optional features provided on the following page.



# Optional Walk-In Enclosure Features

## Tailored Optional Features

Customize your APT Walk-In Enclosure with specialized enhancements designed to maximize performance, reliability, safety, and adaptability for your exact operational needs.



Figure 31\*



Figure 32\*

## Environmental Control & Interior Options

- (WA) – Climate-Controlled HVAC Systems (Heating, AC, Humidity Control)
- (WR) – Redundant Dual HVAC Systems with Automatic Lead-Lag Changeover
- (WH) – Anti-Condensation Aisle Strip Heating
- (WS) – Humidity Control System with Integrated Humidistat
- (WM) – Motorized Louvers for Optimized Ventilation
- (WN) – Corrosion-Resistant HVAC Coils
- (WL) – Enhanced Interior LED Lighting ( $\geq 300$  lux)
- (WF) – Aluminum Diamond Plate Flooring
- (WK) – Non-Skid Epoxy Flooring

## Optional Additions & Features Available

- (RD) – Rear Access Doors
- (WW) – Hinged Wireway
- (WC) – Cable Tray
- (WE) – Eye Wash Station
- (WU) – Corrosion-Resistant Aluminum Panels (PwrHouse Only)
- (WV) – Marine-Grade Corrosion Protection
- (WP) – Advanced Panel Insulation
- (WI) – Install UPS/BESS System
- (WD) – Control Room Desk
- (WJ) – Interior Divider Wall
- (WG) – Arc-Gas Venting Plenum System
- (WO) – Overhang Over Entrance Doors
- And more!

# Master Control Panels (MCP)



Figure 33\*



Figure 34\*



Figure 35\*

## Master Control Panel Benefits

- ✓ Provides for the central point of control and monitoring of an entire system and interfaces with control systems at other locations.
- ✓ Configurable for control of incoming/outgoing utilities, tie breakers, generation sources, and load feeders for the ultimate in control flexibility.
- ✓ Customizable for any system/requirements.
- ✓ Provides events logging and automatic responses to changing conditions.
- ✓ Integrates the various pieces defined in other documents and makes them a system.
- ✓ Allows for full operational control and monitoring while keeping the operator outside of the arc-flash zone.
- ✓ Uninterruptable Power Supply keeps unit powered during unplanned outages

## APT Intelligent Master Control Features and Parameters

- Monitoring of generator, utility and load electrical data:
  - Line to line voltages: Vab, Vbc, Vca
  - Source frequency: Hz
  - Phase currents: Ia, Ib, Ic
  - 3Ø power: kW, PF, kVAR, kVA
  - 3Ø energy: kWh import, kWh export, kVARh import, kVARh export
- Bus electrical data:
  - Line to line voltages: Vab, Vbc, Vca
  - Bus Frequency: Hz
- System Status Information (alarm and events log):
  - Source and Feeder circuit breakers position
  - Circuit breaker control switch in Trip position
  - Protective relaying trip
  - Battery charger alarms



# Utility & Generator Control/Paralleling



Figure 36\*



Figure 38\*



Figure 40\*

## Connect, Protect, Control

### Utility Integration & Load Management

- Utility Intertie (UI)
- Utility Paralleling (UP)
  - Peak Shaving (PS)
  - Import/Export Control (IE)



Figure 37\*



Figure 39\*



Figure 41\*

## Seamless Power Continuity

### Generator Paralleling & Redundancy

- ACM 5150 Paralleling Controller (PG1)
- N+1 Redundant Backup Transfer (N1)



# Automatic & Manual Transfer Controls

## Switch Smarter, Power Safer

### Automatic Transfer Systems

- Open Transition (OT2)
- Closed Transition (CT1)
- Soft loading & Unloading (SL1)
- Automatic Return to Normal (AR) – Standard
- Operator-Supervised Return (NA) – Optional



Figure 42\*



Figure 46\*

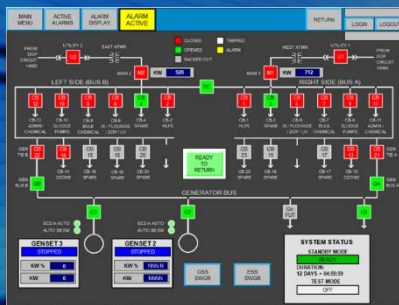


Figure 43\*

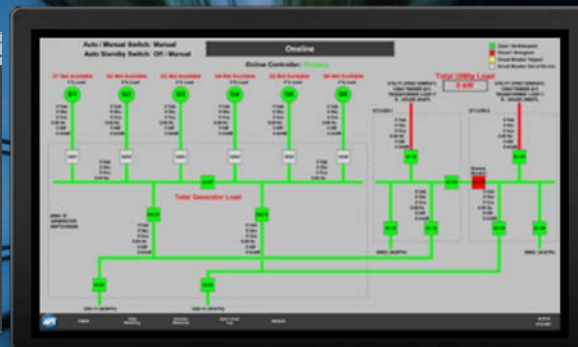


Figure 45\*

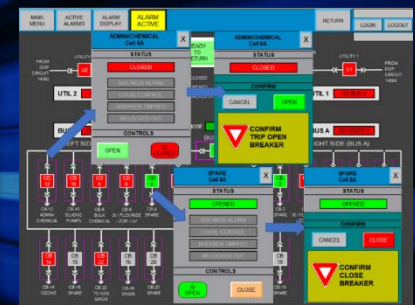


Figure 47\*



Figure 44\*

## Safe Maintenance, Minimized Downtime

### Maintenance & Bypass Isolation

- Main-Tie-Main Operation (MTM)
- Automatic Bypass (ATO-BI)
- Manual Bypass/Isolation (BI)
- Manual Transfer (MT) w/Captive Key Interlocking
- Solenoid Key Release Bypass (SK)

# Advanced SCADA Controls - APTView

## Demand Control, Simplified

### Advanced Load Management

- Load Shed Prioritization (LSC)
- Load Add Control (LAC)
- Load Demand Optimization (LDC)



Figure 48\*

## Advanced Master Control

### 20" minimum Touchscreen Display Microgrid & Island Mode Capabilities

- Black Start for Turbines
- Island Mode Control (IM)
- Microgrid Integration (MG)



Figure 49\*



**APTView  
Enabled**

## Control From Anywhere, Anytime

### SCADA & Remote Management

- APTView Remote SCADA (AV)
- External BAS Integration (BSI)



Figure 50\*



# Generator Protection & Control



Figure 51\*



Figure 52\*



Figure 53\*

## Advanced Generator Protection & Control Sections

- Behind door mounted generator protection circuit breaker provides an added layer of operator protection
- Provide ability to automatically parallel multiple generators in the same or multiple sections:
- Complete Manual Paralleling Facilities
  - Synch Check Relay
  - Synch Lights
- Complete 3Ø Generator Protection
  - Under/overvoltage, under/over frequency
  - Reverse Power (two setpoints)
  - Reverse VARs (two setpoints)
  - Current balance (two setpoints)
- Optional 3Ø Bus Protection
  - Under/overvoltage and under/over frequency
- Remote Start/Stop Interface
- Prevention of Closing of Multiple Generators to a Dead Bus Simultaneously
- First Up – First On logic Connects First Available genset to a Dead Bus
- Uninterruptable Power Supply to trip the generator circuit breaker when main control power battery source fails
- Insulated Case Circuit Breaker
- Backlit 3.5" Color HMI:
  - Provides control & viewing of all the switchgear protective, process control, and configuration setpoints
  - Displays generator set operating parameters, real time system status, and historical list of events/alarms
- Complete 3Ø Generator & Bus Metering:
  - True RMS Digital metering with accuracy within 0.3% for voltage & current 0.6% for power & energy
  - Direct 3Ø voltage sensing
  - 0-5 Amp sensing from generator or switchgear CTs
  - Generator metering includes:
    - A, V, Hz, kW, PF, kVAR, kWh, kVARh
  - Bus metering:
    - V, Hz



# Protective Relaying Functions



Figure 54\*

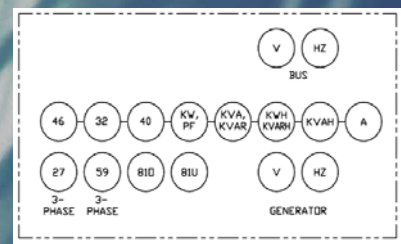


Figure 55\*

## Digital Multifunction Relays

APT uses industry-leading relay brands such as SEL, GE Multilin, Basler, Beckwith, ABB, Eaton, Siemens and more for overcurrent, voltage, frequency, differential, distance, directional power and ground fault protection in the following applications:

- ✓ Utility Intertie
- ✓ Paralleling Protection
- ✓ Advanced Generator Protection
- ✓ Tie Protection
- ✓ Transformer Protection
- ✓ Feeder Protection
- ✓ Various Differential Protection Schemes

All devices are factory-labeled and documented in submittals with wiring diagrams.

## Common Relaying functions

- 50/51 – Inst./Time Overcurrent
- 50N/51N – Inst./Time Ground Overcurrent
- 27/59 – Under/Overvoltage
- 59N – Ground Overvoltage
- 81U/81O – Under/Overfrequency
- 25 – Synch Check
- 32 – Reverse Power
- 40 – Loss of Excitation
- 60 – Current Balance
- 67 – Directional Overcurrent
- 86 – (LO) Lock-Out Relay (Knob Grip)
- 87 – Differential Protective Relay
- 87B – Bus Differential
- 87G – Generator Differential
- And More!

# Lockout Relays & Test Switches



Figure 56\*

## Lockout 86 Function

- **Fail-Safe Design:** Designed to remain in the lockout condition until manually or electrically reset, ensuring full inspection before re-energization.
- **Knob-Grip Manual Reset:** Heavy-duty mechanical lockout relay with a manual reset knob. Activates on critical protection trips to disable automatic reclosing.
- **Visible Mechanical Target:** Red "TRIPPED" indicator shows at-a-glance breaker lockout condition.

## Optional Test Switches & Test Plugs

- Provide a safe, simple, fast, and reliable method to isolate, test, and service installed equipment without disturbing the power system.
- Permits convenient isolation of relays, meters, and instrument transformers (PTs & CTs).
- Allows for quick and easy multi-circuit testing by conventional test methods.
- **Test Plug:** Enables easier measurement, calibration, verification and maintenance of relays, meters, PTs, & CTs.
- Conveniently connects external instruments to the same currents and voltages being applied to the panel relays and meters by the PTs, & CTs, without interrupting or short-circuiting the circuit.



Figure 57\*

# Power Sensing & Revenue Grade Metering



Figure 58\*



Figure 59\*

## High Accuracy Power Quality Metering

METERING			
Parameters	Accuracy	Resolution	Range
Voltage	0.5%	0.1V	20V1000kV ~
Current	0.5%	0.001A	0 ~ 50000A
Current Demand	0.5%	0.001A	0 ~ 50000A
Power	0.5%	1W	-9999MW 9999MW ~
Reactive Power	0.5%	1Var	-9999Mvar 9999Mvar ~
Apparent Power	0.5%	1VA	0 ~ 9999MVA
Power Demand	0.5%	1W	-9999MW 9999MW ~
Reactive Power Demand	0.5%	1Var	-9999Mvar 9999Mvar ~
Apparent Power Demand	0.5%	1VA	0 ~ 9999MVA
Power Factor	0.5%	0.001	-1.0 ~ 1.0
Frequency	0.2%	0.01Hz	45.00 ~ 65.00Hz
Energy	0.5%	0.1kWh	0 ~ 99999999.9kWh
Reactive Energy	0.5%	0.1kvarh	0 ~ 99999999.9kvarh
Apparent Energy	0.5%	0.1 VAh	0 ~ 99999999.9kVAh
Harmonics	1.0%	0.01%	
Meter Running Time		0.1hrs	0 ~ 99999999.9hrs
Load Running Time		0.1hrs	0 ~ 99999999.9hrs

- Optional Revenue Grade
  - Active Energy Accuracy according to ANSI C12.20: Class 0.2s
- Optional Data Logging
- Optional Time of Use
- Optional Waveform Capture & Event Logging
- Optional Harmonic Resolution to the 63<sup>rd</sup>

## Standard Advanced Metering Functions

- Voltage:  $V_A, V_B, V_C, V_{AB}, V_{BC}, V_{CA}$
- Current:  $I_A, I_B, I_C, I_N$
- Power:  $P_A, P_B, P_C, P_{sum}$
- Reactive Power:  $Q_A, Q_B, Q_C, Q_{sum}$
- Apparent Power:  $S_A, S_B, S_C, S_{sum}$
- Frequency:  $F$
- Power Factor:  $PF_A, PF_B, PF_C, PF$
- Energy:  $E_{pimport}, E_{pexport}$
- Reactive Energy:  $E_{qimport}, E_{qexport}$
- Apparent Energy:  $E_s$
- Demand:  $Dmd_{IA}, Dmd_{IB}, Dmd_{IC}, Dmd_P, Dmd_Q, Dmd_S$
- Power Quality
- Voltage Harmonics: 2nd - 31st and THD
- Current Harmonics: 2nd - 31st and THD
- Voltage Unbalance Factor:  $U_{unbl}$
- Current Unbalance Factor:  $I_{unbl}$
- Max/Min Statistics
- Meter Running Time and Load Running Time
- Pulse Output option
- RS485, industry standard Modbus RTU protocol
- Alarm Parameters
- Active Energy Accuracy according to ANSI C12.20: Class 0.5s



# APT Transfer Control System Modules

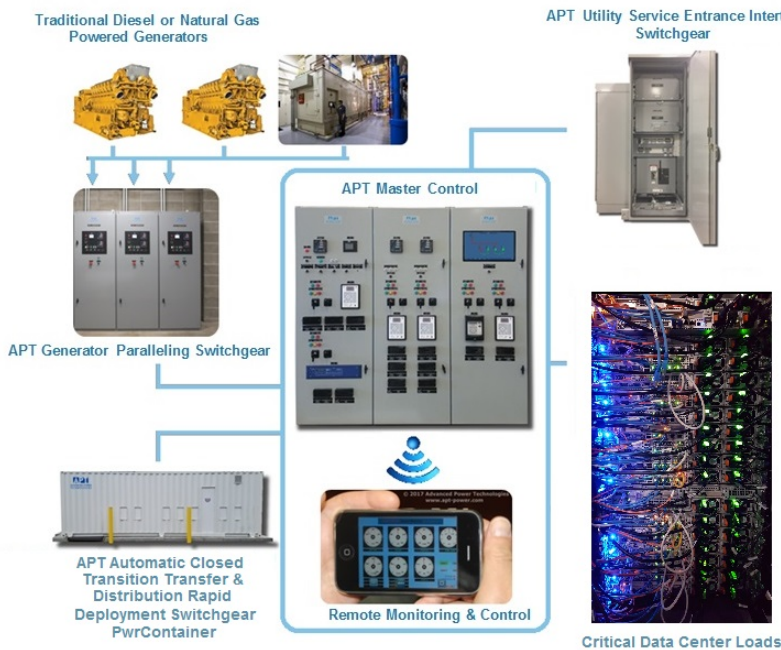


Figure 60\*



Figure 61\*

## Multi-source Open & Closed Transfer Control Modules

### ➤ Sample Sequence of Operation:

- Closed Transition – Power can be transferred between utility and generator in a “make-before-break” fashion by utilizing active generator synchronizing. After the end of the utility outage, power is transferred back from generator to utility using “make-before-break” sequence. This mode of operation can also provide a method of testing the back-up system without producing a power outage. This mode can also be used as an effective means of “peak shaving” facility loads to reduce utility demand charges.
- This mode can be also initiated remotely by a utility RTU or facility energy control system.
- If utility failure condition remains upon expiration of the Time Delay Engine Start timer the generator set shall be automatically started and brought up to speed and voltage. At that time utility circuit breaker shall be automatically open and generator circuit breaker shall close (after adjustable time delay). At this time the generator is supplying power to the site load.
- Upon sensing of utility return (utility voltage and frequency are within set tolerances) the Time Delay Emergency to Normal timer shall start timing. If utility power remains healthy (utility voltage and frequency are within set tolerances) upon expiration of the Time Delay Emergency to Normal timer the transition of the load to the utility shall begin.
- The generator shall be synchronized with the utility source and when in synchronism (as determined by the synchronizing check relay), close the utility circuit breaker. At this time the generator breaker shall be tripped immediately. The load is now powered by the utility.

# SBU-ATO-BI Transfer Switchboards

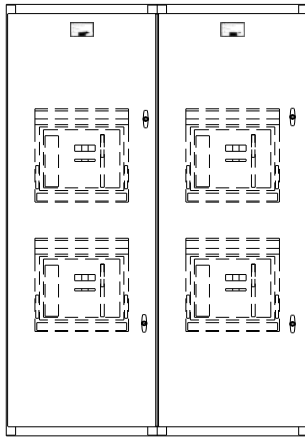
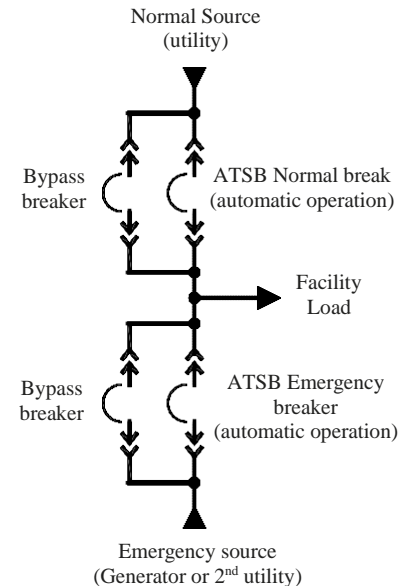


Figure 62\*



## 2000A+ Automatic Transfer Switchgear with Bypass Isolation for Critical Circuit Continuity

- Provide independent electrical fault protection for all sources:
  - 27/59 – Three-phase under/over voltage
  - 81O/U – Over/under frequency (Optional)
- Automatic Transfer – Overview:
  - If there is a total loss of utility power, this mode of operation will cause the generator to automatically start, come on-line, and assume site load.
  - After utility power returns, a sequence of functions may be executed to return the breakers to their normal positions in an open transition.
  - After the return to normal, the generator(s) automatically come off-line, cools down, and is ready for the next start.
- Manual Control – Overview:
  - Designed to control the power system in a very simplified and automated manner.
  - Should higher levels of functionality fail, or should the power system not have been properly set up for automatic operation, lower levels of manual control are available.
- The manual controls allow an operator to accomplish the following:
  - Manually trip/close the breakers as required with breaker status indication
- HMI provides a means of programming setpoints and diagnosing fault conditions. Touchscreen HMI allows operators to select the following features:
  - Alarms – Shows all monitored alarm and fault conditions
  - Event Log – Provides event log
  - Metering – Provides simultaneous metering of generator and bus/utility
  - Normal Source Setpoints – Provides protection setpoints (under/overvoltage, etc.)
  - Emergency Source Setpoints – Provides protection setpoints (under/overvoltage, etc.)
  - Automatic Standby Setpoints – Provides time delays for operation of auto standby
  - Testing Status / Setpoints – Provides controls for operation of generator testing
  - Advanced Setpoints – Password protected menu of higher-level functionality setpoints

## SBU-BI & SBU-SK Transfer



Figure 63\*



Figure 64\*

## UPS Maintenance Bypass Manual Transfer Switchboards

- (BI) – APT UPS Maintenance Bypass/Isolation with Manual, Non-electric Kirk Key Operation:
  - Three (3) identical Kirk Key locks with Two (2) identical Kirk Keys allow for only two circuit breakers to be closed at the same time. Remove key from source 1 and insert into the bypass circuit breaker to enable source 2 to provide power to the load normally served by source 1.
- (SK) – APT UPS Bypass/Isolation with Solenoid Key Release Unit (SKRU):
  - Solenoid Key Release Unit (SKRU) with A-1 Key held captive. UPS output breaker A is closed supplying the critical load through the UPS. Key B-1 is held captive in the L-O interlock on breaker A. Maintenance bypass breaker B cannot be closed until the UPS is placed in bypass mode, sending a signal to the SKRU allowing release of key A-1. The SKRU has an apartment lock that will accept either key A-1 or B-1.
  - To supply critical load through the maintenance bypass breaker, proceed as follows:
    1. Place the UPS in bypass mode.
    2. Upon receipt of the proper signal, key A-1 in SKRU can be turned changing status of SKRU internal contacts and releasing key A-1.
    3. Insert key A-1 in L-O interlock on maintenance bypass breaker B and turn to unlock.
    4. Close maintenance bypass breaker B. Key A-1 is now held.
    5. Open UPS output breaker A.
    6. Turn key B-1 in interlock on UPS output breaker A to lock open. Key B-1 is now free.
    7. Insert key B-1 in SKRU and turn to return the SKRU internal contacts to the original position. Key B-1 is now held in the SKRU.



# MV-LV Power Transformers



Figure 65\*



Figure 66\*



Figure 67\*

## Medium Voltage to Low Voltage Power Transformer

- ⊙ Up to 4MVA Transformers
  - Dry-Type
  - Cast-Coil
  - Oil-Filled
- ⊙ Built to all applicable IEEE C57.12.34
- ⊙ High Voltage Side:
  - Aluminum windings
  - 2.4kV - 34,500 V Delta or Wye Connected
  - BIL up to 200 kV
  - Tap changer:  $\pm 2, 2.5\%$
  - Live front
  - Radial feed
  - Optional Bushing wells
- ⊙ Low Voltage Side:
  - Aluminum windings
  - Single Low Voltage Winding
  - 208V - 120 V Delta or Grounded Wye Connected
  - BIL up to 10 kV
- Epoxy 2 piece-bushings with 4-holes blade
- ⊙ Cooling class: ONAN
- ⊙ Pad Mount, Step Down
- ⊙ Ratings:
  - 500kVA - 4,000 kVA
  - Frequency: 60 Hz
  - Impedance:  $5.75\% \pm 7.5\%$
  - Temperature rise:  $65^{\circ}\text{C}$
- ⊙ Options:
  - Dead front
  - Loop feed
- ⊙ Enclosure
  - Indoor NEMA 1 or Outdoor NEMA 3R
  - Mild steel tank & cabinet
  - Powder paint system; Color: ANSI 70 or Green Munsell 7GY 3.29/1.5
  - Weights: 7000 – 17500 lbs

# SurgeStop-Series RC Snubbers



Figure 68\*

## Integrated RC Snubber Features

- **IEEE C57.142-2010 Compliant:** to meet transformers transient mitigation standard.
- **Controls Steep Voltage Rises:** Reduces  $dV/dt$  to protect winding insulation in transformers and rotating machines.
- **Suppresses Oscillations & Ringing:** Damps resonance from switching or current chopping events.
- **Protects Against Switching & Lightning Surges:** Complements surge arresters to reduce fast waveform overshoots.
- **Non-inductive components:** Features non-inductive resistors and capacitors.
- **Integrated in switchgear or Optional Standalone Cabinet:** Remote-mounted version for installation next to or in the transformer enclosure. Ideal for use with outdoor transformers or legacy switchgear installations. See APT's SurgeStop-Series RC Surge Snubbers.

## Reducing Fast Transients Protecting Equipment

- Fast transients caused by vacuum breaker switching—such as current chop, prestrike, or re-strike—can result in steep voltage waves that exceed what standard surge arresters are designed to suppress. These fast-rising impulses can overstress insulation systems and cause premature transformer or motor failures.
- Extends Transformers, Generators & Motors Life: Prevents insulation stress from repeated high-frequency transients.
- Improves Switching Safety: Reduces pre-strike/re-strike effects during breaker operation.
- Recommended to be installed next to the protected equipment: Transformer, Generator or Motor.



Figure 69\*

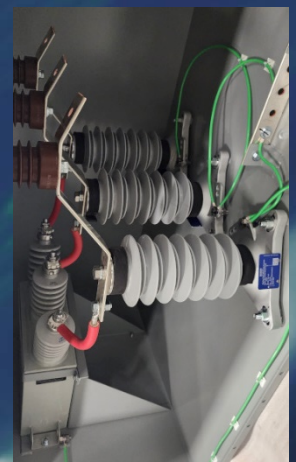


Figure 70\*

# Surge Arrester Technology

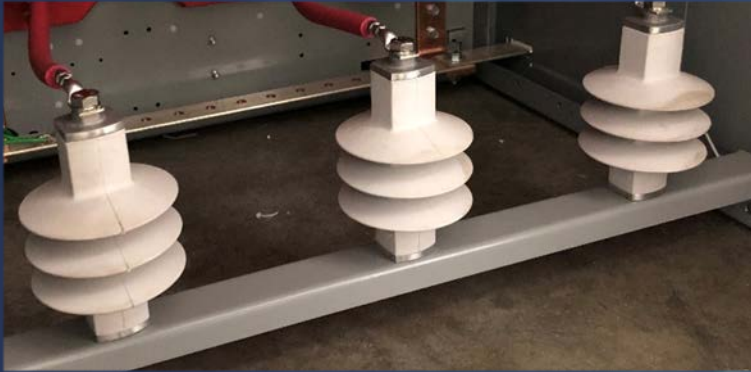


Figure 71\*

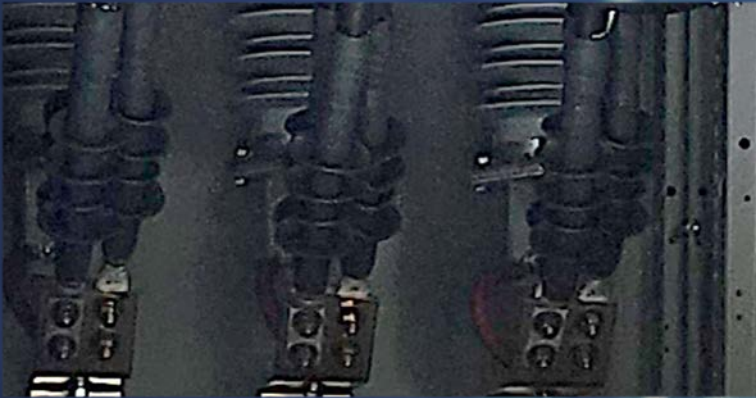


Figure 72\*

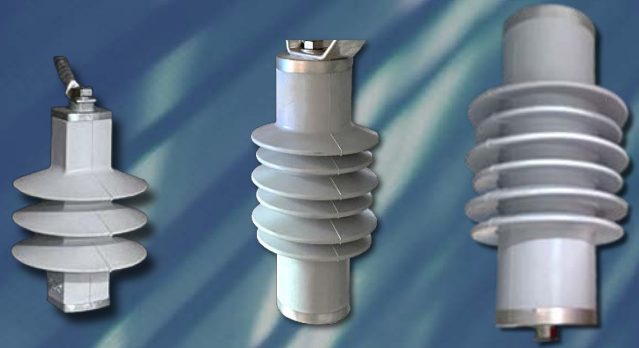


Figure 73\*

## Available Arresters Characteristics & Classes

- **Metal-Oxide Varistor (MOV) Design:** Gapless design ensures fast, consistent clamping without triggering delays.
- **Polymer Encapsulated Housing:** UV- and weather-resistant for long-term performance.
- **Maintenance-Free:** No required service or inspections over arrester life.
- **Placement Options:** Configurable for incoming lines, main bus taps, and feeder sections depending on system exposure and equipment sensitivity.

Class	Use Case	Key Performance Features
<b>Distribution Class</b>	General duty protection for 15 kV systems	<ul style="list-style-type: none"> <li>• Available in light, normal, and heavy duty</li> <li>• Compact size</li> <li>• Ideal for transformer and feeder protection</li> </ul>
<b>Intermediate Class</b>	Enhanced protection for moderate surge environments	<ul style="list-style-type: none"> <li>• Better clamping performance than distribution</li> <li>• Higher energy handling</li> <li>• Rugged, compact design for switchgear integration</li> </ul>
<b>Station Class</b>	Highest-performance arrester for critical assets	<ul style="list-style-type: none"> <li>• Best voltage protection</li> <li>• Highest energy and fault current withstand</li> <li>• Preferred for rotating machinery protection</li> </ul>

## Integrated Protection for Medium Voltage Switchgear

APT switchgear integrates high-performance metal oxide surge arresters to protect 2.4–15 kV systems from transient overvoltages caused by lightning strikes and switching surges. These arresters safeguard critical components; such as breakers, buses, and transformers as well as loads by limiting voltage to safer levels during surge events.



# APT Grounding Equipment

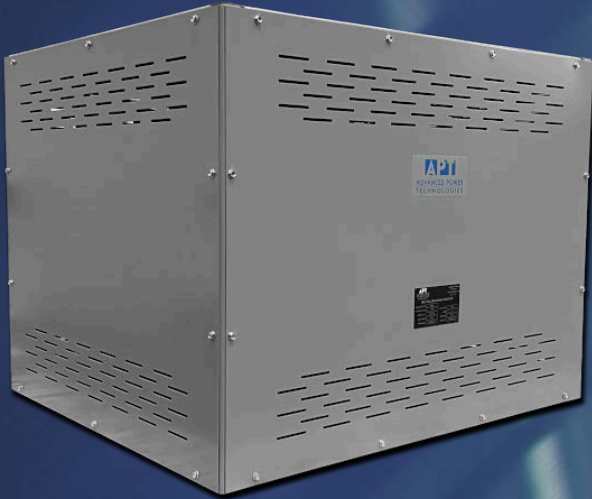


Figure 74\*

## Grounding Systems for Generators, Transformer, Motors

APT offers a full range of grounding system options tailored to your medium-voltage equipment application. From arc flash mitigation to transient suppression and equipment protection, our grounding solutions help engineers achieve the safety, performance, and uptime demanded by critical systems.

## Low & High Resistance Neutral Grounding Systems

- ✓ **Low-Impedance Grounding (NGR / Resistor):** Limits ground fault to 100–400A, enabling fast trip without excessive fault stress.
  - Reduces damage to equipment while maintaining full relay coordination.
  - Damps surges and protects insulation from voltage stress.
- ✓ **High-Resistance Grounding (HRG):** Limits fault current to ~5–10A, allowing continued operation on first ground fault.
  - Greatly reduces arc flash risk by preventing arcing faults from sustaining.
  - Prevents transient overvoltages, extends

## Why APT Grounding?

- **Application-Driven Selection:** We help engineers choose the right grounding method based on system size, exposure, and safety goals.
- **Seamless Integration:** Grounding components can be installed within switchgear lineups or in standalone assemblies.
- **Full Arc Flash Strategy Support:** From HRG systems to reactor-based current limiting, our solutions align with your safety objectives and energy coordination goals.

## Low Resistance Grounding (NGR)

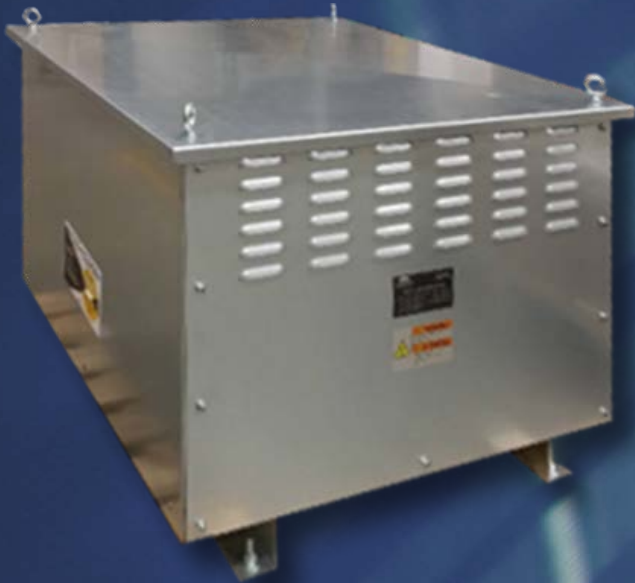


Figure 75\*

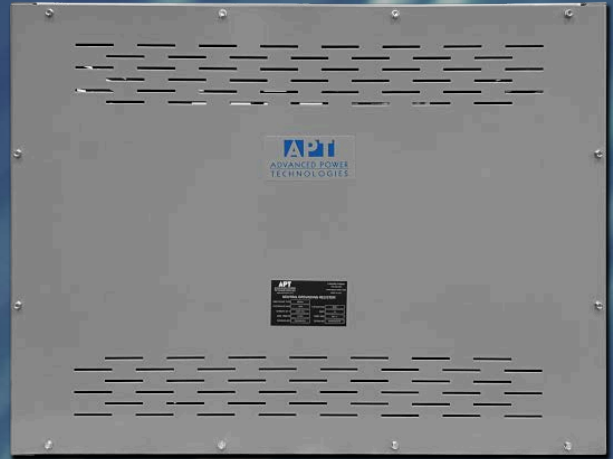


Figure 76\*

### Neutral Grounding Resistor

- ✓ Limits ground fault current to a defined level (typically 100–400A) that supports fast protection operation without subjecting equipment to full fault duty.
- ✓ Grounded through a resistor sized for expected current and time duration (10s, 30s, 60s, continuous)
- ✓ Ensures sufficient current to operate ground-fault relays without damaging downstream equipment
- ✓ Provides inherent damping of ground-fault generated transients
- ✓ Avoids high transient voltages by ensuring charge dissipation path
- ✓ Relays configured for selective ground-fault isolation (GFP, directional, etc.)

### Application Situations

- Suitable for systems requiring immediate fault clearance to maintain operational safety or compliance.
- Applied where service continuity is less critical than system protection coordination.
- Used when downstream relay sensitivity and selectivity are critical to system stability.

# High Resistance Grounding (HRG)



Figure 77\*

## High Impedance Grounding System Features

- Allows continued operation on a first line-to-ground fault by limiting fault current to very low levels (typically  $\leq 10A$ ), reducing insulation stress and arc energy.
- Fault current limited to levels below arc-sustaining thresholds
- Neutral grounded via high ohmic resistor; compatible with non-grounded loads
- Requires monitoring system with fault alarm and second-fault tripping logic
- Prevents transient overvoltages caused by arcing faults
- Requires 3-wire system and insulation rated for full line-to-line voltage to ground
- Optional fault-locating pulse injection circuitry for energized fault tracking

## Application Situations

- Chosen when continuity of service is critical and fault isolation is not immediately required.
- Appropriate for systems with minimal capacitance and no line-to-neutral loads.
- Ideal for minimizing insulation degradation and maximizing equipment life under ground-fault conditions.



Figure 78\*



# Medium Voltage Vacuum Circuit Breakers

## Ratings and Features



Figure 79\*

### Available Ratings:

Maximum Voltages, kV	4.76 / 15
Power Frequency Withstand (1 minute), kV	19 / 36
BIL, kV	60 / 95
Continuous Current – Circuit Breakers, A	600, 800, 900, 1200, 2000, 3000**, 4000**
Continuous Current – Main Bus, A	600 - 4000
Interrupting Capacity – symmetrical, kA	25, 31.5, 40**, 50**
Short time withstand, 2 seconds, kA	25, 31.5, 40**, 50**
Mechanical endurance, operations	10,000 (class M2 per IEEE C37.04 and C37.06)
Interrupting Time	3 cycles
Opening Time	Less than 40ms

\*\* Requires increased switchgear depth



Figure 80\*

- ✓ **High-Speed Operation:** Fault clearing in under 3 cycles with performance matching or exceeding industry-leading breakers, optimized for simplicity.
- ✓ **Rated Operation Sequences:**
  - O-0.3s-CO-15s-CO
  - O-0.3s-CO-3min-CO
  - O-3min-CO-3min-CO
- ✓ **Mechanisms and Interlocks:** Manufactured from stainless steel and other metals ensure reliable operation and ease of repairs.
- ✓ **Insulation:** No reliance of custom moldings or extrusions. Industry standard readily available insulation type and shapes used in construction.
- ✓ **Captive Key Mechanical Interlocking:** Multiple provisions and options available.

# Low Voltage Circuit Breaker Ratings

Breaker Type	Frame Rating (A)	Interrupting Rating (kA)			Sensor Plug (A)
		240V	480V	600V	
Drawout	800	65	65	50	100, 250, 400, 600, 800
		100	100	85	
		200	150	100	
		200	150	100	
	1200	65	65	50	600, 800, 1000, 1200
		100	100	85	
		200	150	100	
		200	150	100	
	1600	65	65	50	800, 1000, 1200, 1600
		100	100	85	
		200	150	100	
		200	150	100	
	2000	65	65	50	1000, 1200, 1600, 2000
		100	100	85	
		200	150	100	
		200	150	100	
	2500	100	100	85	1200, 1600, 2000, 2500
		200	150	100	
	3000	100	100	85	1600, 2000, 2500, 3000
		200	150	100	
	4000	100	100	85	2000, 2500, 3000, 4000
		200	150	100	
	5000	100	100	85	2500, 3000, 4000, 5000
		200	150	100	
	6000	100	100	85	3000, 4000, 5000, 6000
		200	150	100	
Fixed	800	65	65	50	100, 250, 400, 600, 800
		100	100	85	
	1200	65	65	50	600, 800, 1000, 1200
		100	100	85	
	1600	65	65	50	800, 1000, 1200, 1600
		100	100	85	
	2000	65	65	50	1000, 1200, 1600, 2000
		100	100	85	
	2500	100	100	85	1200, 1600, 2000, 2500
	3000	100	100	85	1600, 2000, 2500, 3000
	4000	100	100	85	2000, 2500, 3000, 4000
	5000	100	100	85	2500, 3000, 4000, 5000
	6000	100	100	85	3000, 4000, 5000, 6000

# Low Voltage One-Line Applications

## Sample Utility & Generator Configurations

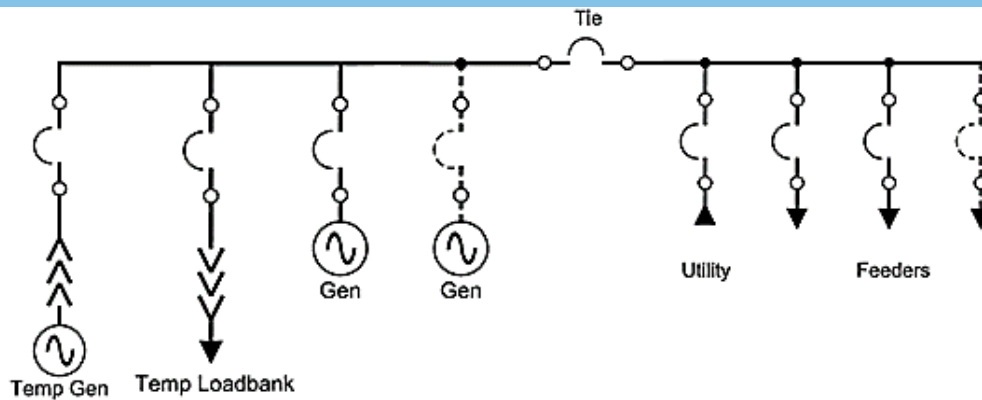


Figure 81\*

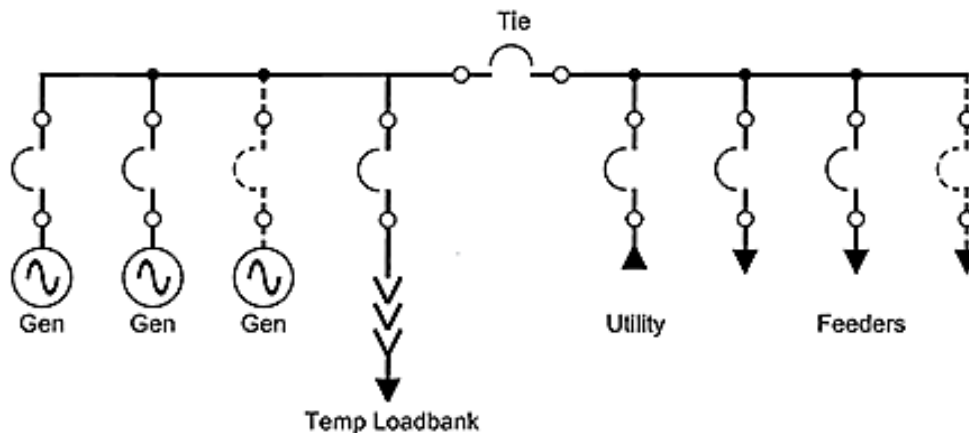


Figure 82\*

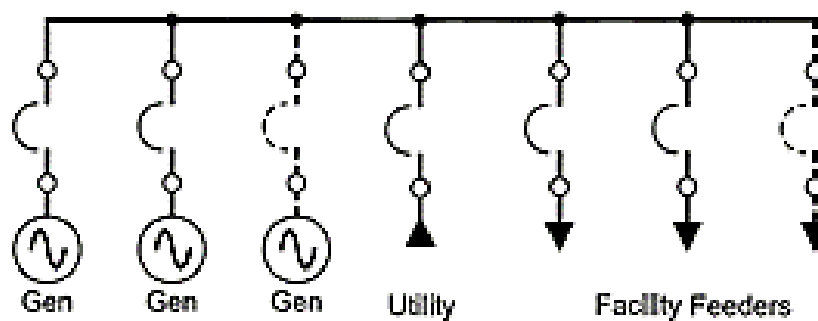


Figure 83\*



# Medium Voltage One-Line Applications

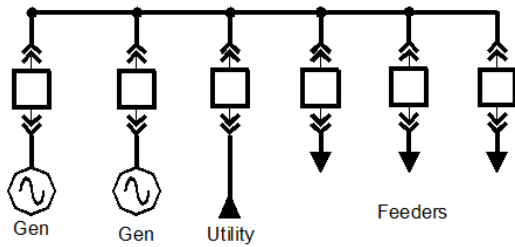


Figure 84\*

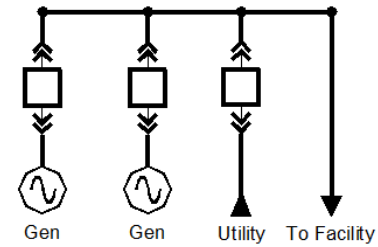


Figure 88\*

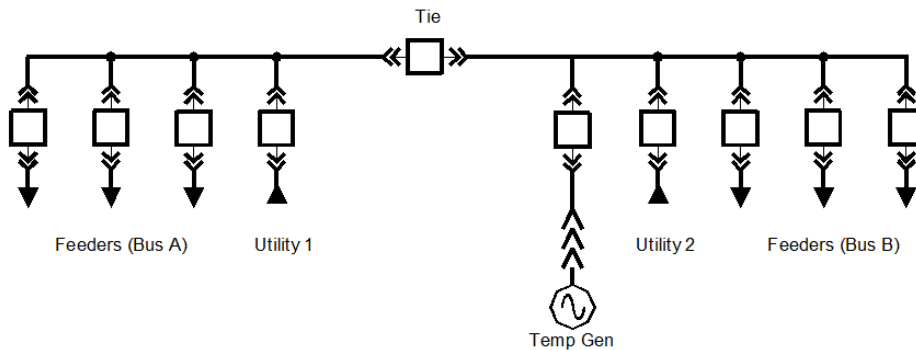


Figure 85\*

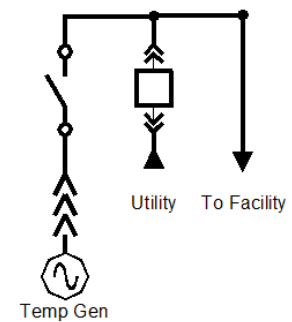


Figure 89\*

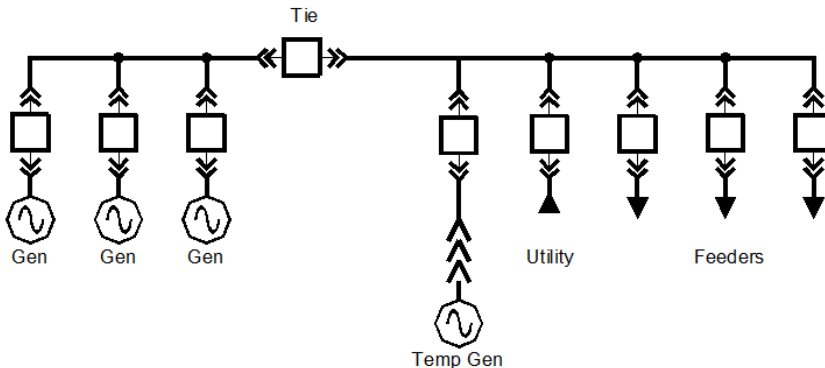


Figure 86\*

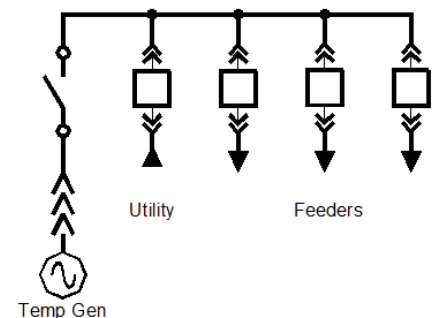


Figure 90\*

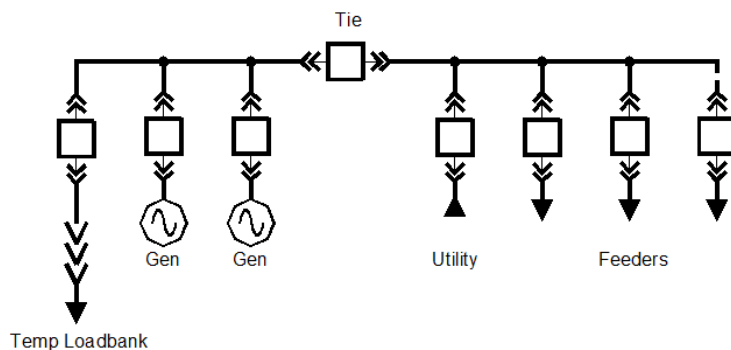


Figure 87\*

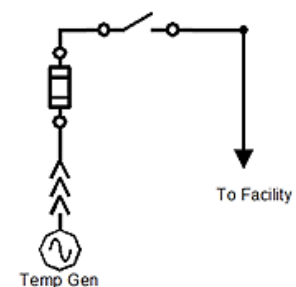


Figure 91\*

# About Advanced Power Technologies



Advanced Power Technologies (APT) is a leading innovator in engineered low and medium voltage power systems, delivering customized solutions worldwide. From our strategically central headquarters in Lafayette, Indiana, we design and manufacture precision-crafted switchgear, switchboards, and electrical infrastructure systems.

## Decades of Expertise, Customized Solutions

Our skilled engineering team brings extensive experience across industries such as utilities, data centers, healthcare, agriculture, education, and commercial manufacturing. Leveraging cutting-edge switchgear technologies, we specialize in:

- ✓ 208V-800VAC Switchgear & Switchboards
- ✓ 2.4kV-38kV Custom Metal Enclosed/Clad Style Switchgear
- ✓ Generator Enclosure Package Integrated Equipment
- ✓ Utility and Generator Paralleling, Transfer, Peak Shaving & Distribution Switchgear
- ✓ Automatic & Manual Load Transfer Switchgear
- ✓ Outdoor Walk-In Electrical Houses (E-Houses) & Skid-Mounted Switchgear
- ✓ Containerized Switchgear & Battery Energy Storage Systems (BESS)
- ✓ Generator/Load Bank Quick Connection Switchgear, Switchboards, & Tap Boxes
- ✓ Microgrids, Master Control Panels, SCADA Systems
- ✓ Low & High Resistance Grounding Systems
- ✓ Bypass/Isolation & Power Distribution Circuit Breaker Switchboards
- ✓ Photovoltaic (PV) Solar Power Collection & Renewable Energy Storage Systems
- ✓ Motor Control Centers & Motor Control Switchgear
- ✓ High Efficiency Combined Heat and Power (CHP, Co-generation) Switchgear & Control Systems
- ✓ Industrial Control Panels

## Precision Manufacturing & Innovation

APT proudly offers complete in-house, Made-in-USA manufacturing with precision metal fabrication capabilities, ensuring unparalleled quality, rapid turnaround, and tailored solutions that meet your exact specifications. As an OEM partner with industry leaders like Siemens, Square D, ABB, LG, and Eaton/Cutler Hammer, we integrate superior components into every system.

## Flexible, Efficient, Scalable Solutions

APT provides highly flexible solutions with efficient production processes and scalable manufacturing capacities, tailored specifically to meet the demands of high-volume customers. Our capabilities position us ideally to serve large-scale operations including oil and gas producers, large data centers, extensive solar portfolios, and projects specified by leading engineers and facility managers.

## Compact, Efficient, Reliable

APT excels at optimizing facility footprints and reducing installation costs through innovative, space-efficient designs. Each project benefits from our collaborative approach, open communication, and relentless commitment to customer success.

Discover more at [www.apr-power.com](http://www.apr-power.com), and let APT engineer the perfect power solution for your facility.