

Quick Ship Rapid Deployment Switchgear
Twelve (12) 1200A Configurable Circuit Breakers
5kV – 15kV

APT
ADVANCED POWER
TECHNOLOGIES



Product Line Brochure

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**PROVIDING A COMPREHENSIVE
APPROACH TO RELIABLE POWER**

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Features and Benefits

The safest, most compact air insulated SF6-free Medium Voltage Switchgear on the market.



Lexan viewing Window for observing visual air disconnect switch position

Removable viewing window access metal panel provides additional arc flash safety

Circuit breaker position indicating lights

Figure 1: Carbon Steel NEMA 1 Enclosure

Switchgear Overview

- ❑ Space saving Front Access Only design, can be placed against the back wall.
- ❑ Smallest footprint 15 kV air insulated switchgear on the market, each section is only 40" deep and 28" wide.
- ❑ Increased operator safety:
 - o Remote controllable design
 - o Completely metal enclosed dead front
 - o Provision for connection of field grounding cables
 - o Removable metal panel for viewing blades position of the visible disconnect air insulated switch (through Lexan protected viewing window)
- ❑ Complete front access to all the components, bus and bolted joints.
- ❑ Easy to maintain & environmentally friendly:
 - o 100% air insulated, no SF6 gas used.
- ❑ Modular, slide-out design of the major power switching components to minimize the down time, should component replacement or repair be needed.
- ❑ Lower cost of installation: Insulating barriers provided between the phases, no need to tape or boot field cable terminations.
- ❑ All bus is manufactured from silver plated copper.

Vacuum Interrupters & Visible Disconnect

- ❑ Fixed mounted vacuum circuit breakers, installed on rollers. Rollers are provided to simplify the field removal of the circuit breakers.
- ❑ High-speed operation – complete fault clearing in less than 3 cycles
- ❑ Hermetically sealed vacuum interrupters protect contacts from corroding elements and contamination
- ❑ Inline visible air-disconnect switch, pad-lockable in open and/or closed position, to ensure personnel safety during power system service, maintenance and repairs.

Customer Cable Connections & Main Bus



Figure 3: Dead Front Removed Exposing Main Bus Compartment with Cover Over Visual Disconnect Window



Figure 4: Main Bus with Visual Disconnect Window Removed



Figure 2: Single Front Access Section with Dead Fronts Attached

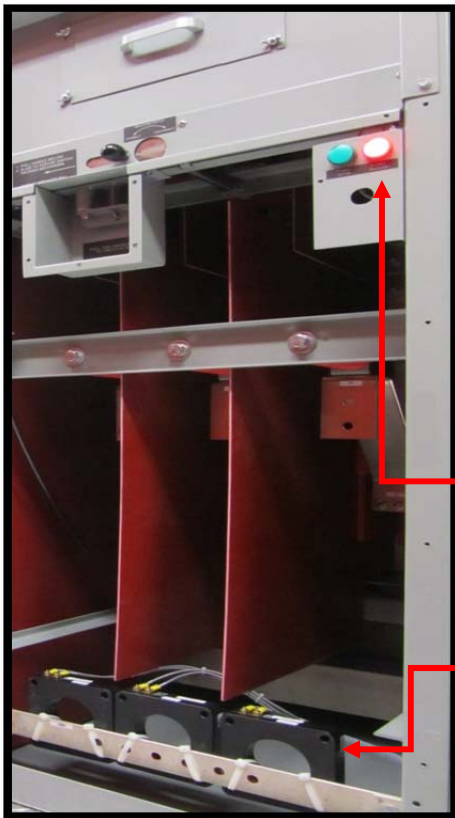


Figure 5: Cable Connection Compartment Dead Front Removed

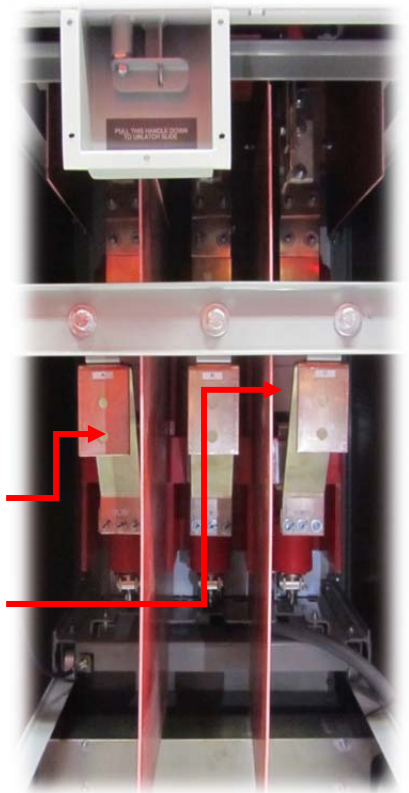


Figure 6: Inside cable connection compartment

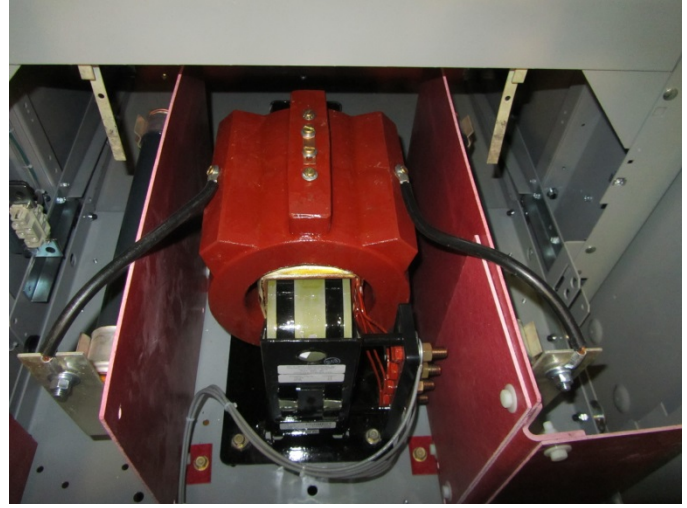
Circuit breaker position indicating lights

CTs for installation over the cables

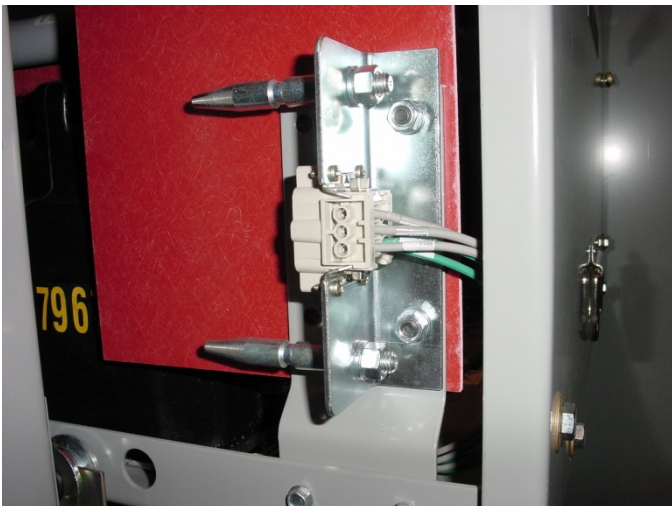
Cable Connections

Vacuum Interrupters

Auxiliary Drawers



Auxiliary Drawers can accommodate Fuses, Control Power Transformers or Voltage Transformers. For operator safety these devices are automatically grounded during movement to disconnected position



Auxiliary Drawer Secondary
Contacts are of self-aligning design and can accommodate up to six independent circuits

Isolated Switchgear Control Panel

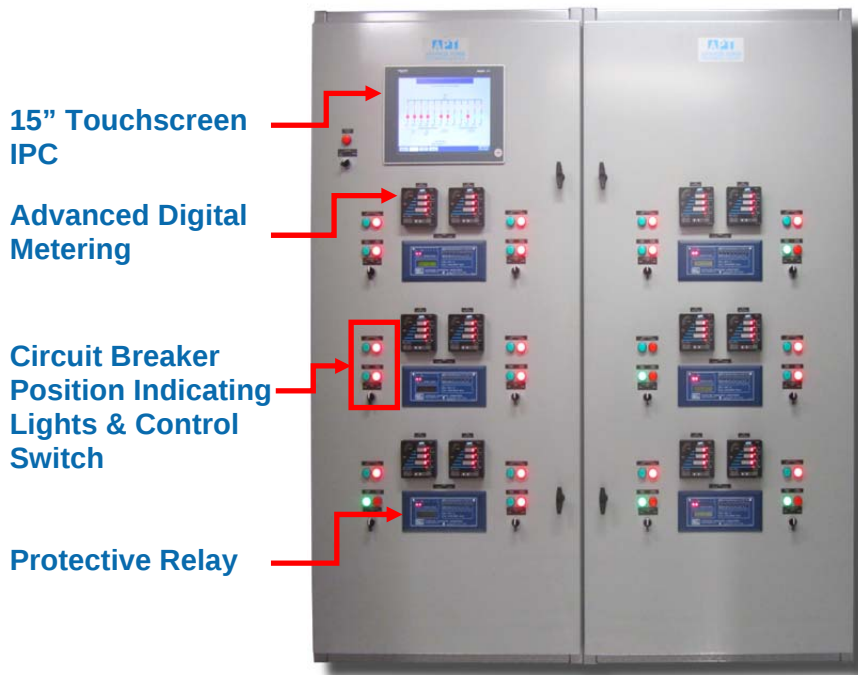


Figure 7: Isolated Local Operator Station



Figure 8: Secure Remote Access to Operator Station allows users to access the "Virtual Switchgear"

Isolated Remote Operator Control Station Includes:

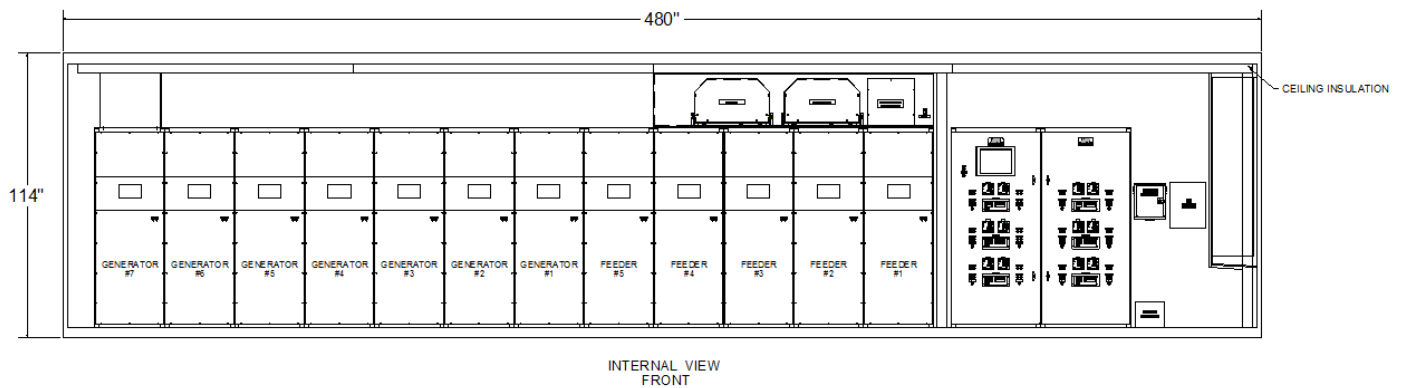
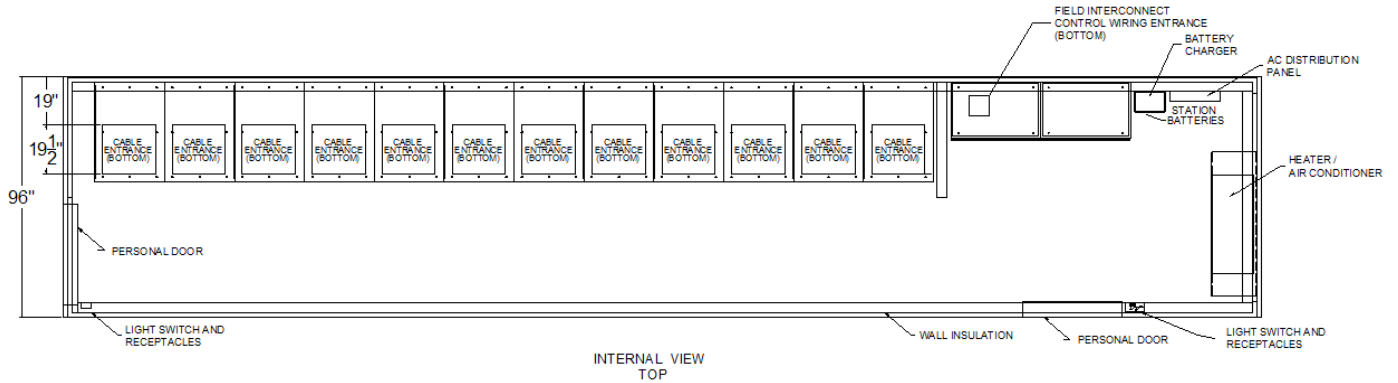
- Human Machine Interface (HMI):
 - Industrial Personal Computer (IPC)
 - 15" Color Touchscreen
 - Windows 7 operating system
 - Provides graphical interface
- APT View Virtual Switchgear
 - Local & Remote SCADA Access
 - Graphical displays:
 - System One line diagram with color coded real time position of every circuit breaker
 - Detailed electrical information
 - Load transfer and Generator loading controls
 - Alarm annunciation
 - Storage of all the monitored data every minute with date and time stamp
 - Events log with date and time stamp
 - Remote monitoring and remote control software
 - Capability of remote system troubleshooting
- Uninterruptable Power Supply keeps unit powered during unplanned outages
- Each main, feeder or generator circuit breaker electrical data:
 - Line to line voltages: V_{ab} , V_{bc} , V_{ca}
 - Generator frequency, Hz
 - Phase currents: I_a , I_b , I_c
 - 3Ø power: kW, PF, kVAR, kVA
 - 3Ø energy: kWh import, kWh export, kVARh import, kVARh export
 - Harmonics
- Main bus electrical data:
 - Line to line voltages: V_{ab} , V_{bc} , V_{ca}
 - Bus frequency, Hz
- System Status Information (alarm and events log) :
 - All circuit breakers and switches position
 - Circuit breaker control switch in Trip position
 - Every protective trip
- SCADA control:
 - Opening and closing of every circuit breaker, Generators Start/load, Stop/unload

Circuit Breaker Ratings

Table 1: Available Circuit Breaker Ratings

MVA Rating (reference only)	Actual MVA @ Operating Voltage	Rated Continuous Current	Voltage		Dielectric Ratings		Short Circuit Current					Mechanical Endurance
			Max Rated Voltage	Range Factor	Power Frequency	Impulse 1.2 x 50μs	System Interrupting	Close and Latch Rating	Short-Time Current Rating	Short-Time Current Duration	Interrupting Time	No Load Mechanical Operations
		A RMS	kV RMS	K	kV RMS	kV peak	kA RMS	kA peak	kA RMS	s	Cycles	
250	330	1200	4.76	1.0	19	60	40	104	40	2	3	10,000
250	330	2000	4.76	1.0	19	60	40	104	40	2	3	10,000
250	330	3000	4.76	1.0	19	60	40	104	40	2	3	5000
350	412	1200	4.76	1.0	19	60	50	130	50	2	3	5000
350	412	2000	4.76	1.0	19	60	50	130	50	2	3	5000
350	412	3000	4.76	1.0	19	60	50	130	50	2	3	5000
500	572	1200	8.25	1.0	36	60	40	104	40	2	3	10,000
500	572	2000	8.25	1.0	36	95	40	104	40	2	3	10,000
500	572	3000	8.25	1.0	36	95	40	104	40	2	3	5000
500	650	1200	15	1.0	36	95	25	65	25	2	3	10,000
500	650	2000	15	1.0	36	95	25	65	25	2	3	10,000
500	650	3000	15	1.0	36	95	25	65	25	2	3	5000
750	1039	1200	15	1.0	36	95	40	104	40	2	3	10,000
750	1039	2000	15	1.0	36	95	40	104	40	2	3	10,000
750	1039	3000	15	1.0	36	95	40	104	40	2	3	5000
1000	1299	1200	15	1.0	36	95	50	130	50	2	3	5000
1000	1299	2000	15	1.0	36	95	50	130	50	2	3	5000
1000	1299	3000	15	1.0	36	95	50	130	50	2	3	5000

Layout of 40' Outdoor Walk-in Switchgear Module



Services



Advanced Power Technologies (APT) offers a unique combination of Power Systems products and services. Our uniqueness and strength is our ability to assist in all phases of the project. At the beginning stages of the project, we can assist the Owner and Engineers in evaluating the existing power system, calculate the available fault currents and advise on the optimal switchgear configuration and operation. Our engineers can explain pros and cons and assist in selecting solidly grounded, low impedance grounded or high impedance grounded systems, various protective relaying, power monitoring and automation schemes as well as perform all the calculations necessary to supply equipment for a functional and coordinated power system.



When our equipment is installed, we can provide and oversee a comprehensive system commissioning, testing and integration. We will continue ongoing support during the lifetime of the installation.