



ADVANCED POWER  
TECHNOLOGIES

# Generator/Loadbank Quick Connection Switchboard



## FS2-Series Generator/Loadbank Quick Connection Solutions Brochure

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



ALN: 516 Rev. 01

# Standard Construction



Figure 1: Carbon Steel NEMA 3R Enclosure



Figure 2: 3000A GQC Switchboard with Temporary Generator Circuit Breaker Interior

## 800A-4000A Generator Quick Connection Switchboard

- UL Listed
- System Ratings:
  - Voltage: 208V-480V (3Ø, 4W)
  - Current: 800A-4000A
  - Interrupting Rating: 65, 100 kAIC
- Temporary Generator Protection
  - UL® 489 listed
  - Insulated Case Circuit Breaker
  - Fixed mount
  - Electronic trip unit with adjustable Long Time, Short Time, Instantaneous settings
  - 100% rated
  - Breaker Position Aux Contacts ("a" & "b")
- Silver-plated copper phase bus bar for permanent connection to the facility
- APT Mechanical Lugs for permanent facility-side connections & Alternate Generator Connections
- Alternative bus bar connections with NEMA standard hole pattern and mechanical lugs for use in the event a mobile genset is used that does not have cables with 'Cam-lok' E1016 compatible plugs
- Easy and spacious access to color coded, generator (male) & loadbank (female) E1016 cam-lok type receptacles with covers
  - A phase – Brown (480V) / Black (208V)
  - B phase – Orange (480V) / Red (208V)
  - C phase – Yellow (480V) / Blue (208V)
  - Neutral – White
  - Ground – Green
- Standard Enclosure:
  - Filtered ventilation louvers
  - Pad-lockable hinged main access door
  - Pad-lockable integral lower flip door (allows the main door to be closed with the mobile generator/loadbank cables connected)
  - Powder coated ANSI 61 Gray
  - NEMA 3R for outdoor applications
  - Permanent Connections: (Side/Rear/Bottom Exit)
  - Temporary Connections: (Lower Flip Door Entry)
  - Internal Climate Control to include (2) Space Heaters with a Thermostat - Requires customer supplied 120VAC, 10A circuit

# Switchboard Available Features

## Fully Customizable



Figure 3:  
Top left: Cam-lock Cover  
Top right: Male Cam-lock Receptacle  
Bottom Middle: Captive Key Provision

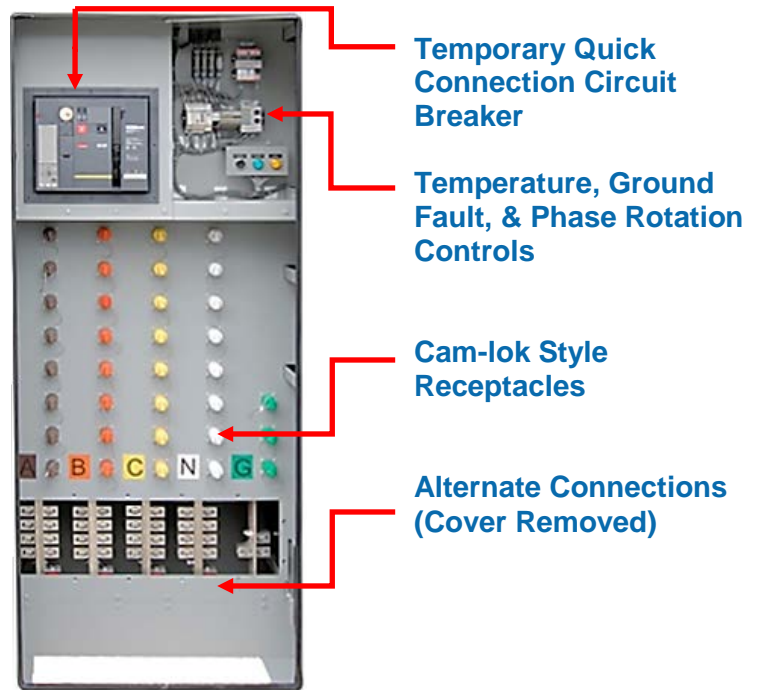


Figure 4: Component Locations

## Interlocking, Monitoring, and Options

- **Interlocking:**
  - NEC 700.3 compliant key interlocking to prevent inadvertent paralleling of the temporary generator source with normal source(s)
- **Phase Rotation Monitoring:**
  - Provides visual assurance that mobile generator set phase rotation matches that of the facility
  - Configured to prevent circuit breaker from being closed if phase rotation is incorrect
  - Instructions to easily fix incorrect phase rotation are on a label inside each panel
- **Ground Fault Monitoring:**
  - Trips the circuit breaker on ground fault or provides alarm indication only
  - Configured at the factory per your order
  - Easily re-configurable in the field
- **NEC 700.3 compliant temporary generator source connected indication**
- **Shunt Trip:**
  - 120VAC for tripping circuit breaker if phase rotation is incorrect or ground fault logic is configured for tripping on ground fault sensing
- **Enclosure options:**
  - NEMA 1 for indoor installation
  - NEMA 3R for outdoor installation:
    - Type 304 Stainless Steel
    - Type 5052 Aluminum
  - Enclosure Climate Control:
    - Anti-condensation Heater w/ Thermostat & Humidistat
- **Other Options**
  - No Neutral Bus or Cam-locks
  - 100% Ground
  - Surge Protection Device (SPD)
  - Generator Remote Start/Stop Terminal Blocks
  - Generator Block Heater Receptacle
  - 480VAC or 240VAC Twist-lock Receptacle
  - 120VAC Battery Charger/Convenience Receptacle
  - Load Dump Receptacle/Terminal
  - Extra Large Enclosure for Conduit Entry/Exit
  - Custom Color
  - Convenience Light
  - SCADA Connection Interface

# Key Interlocking Configurations



Figure 5: 3000A Permanent to Temporary Generator Manual Transfer Switchboard



Figure 6: 2500A Service Entrance Utility & Temporary Generator Quick Connection



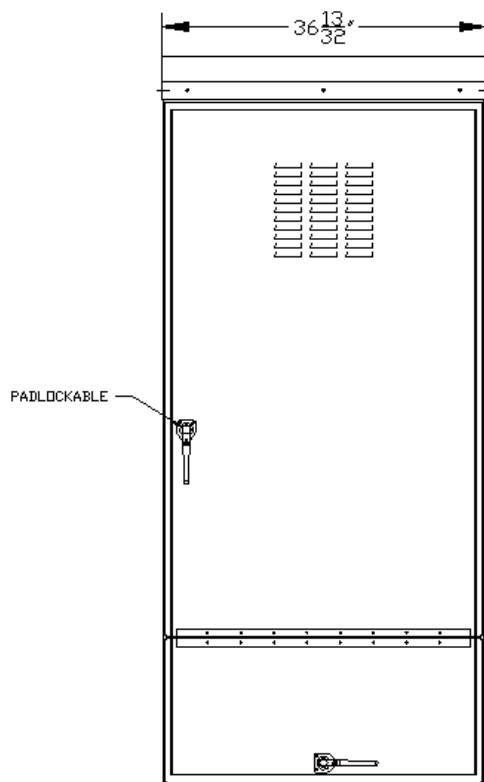
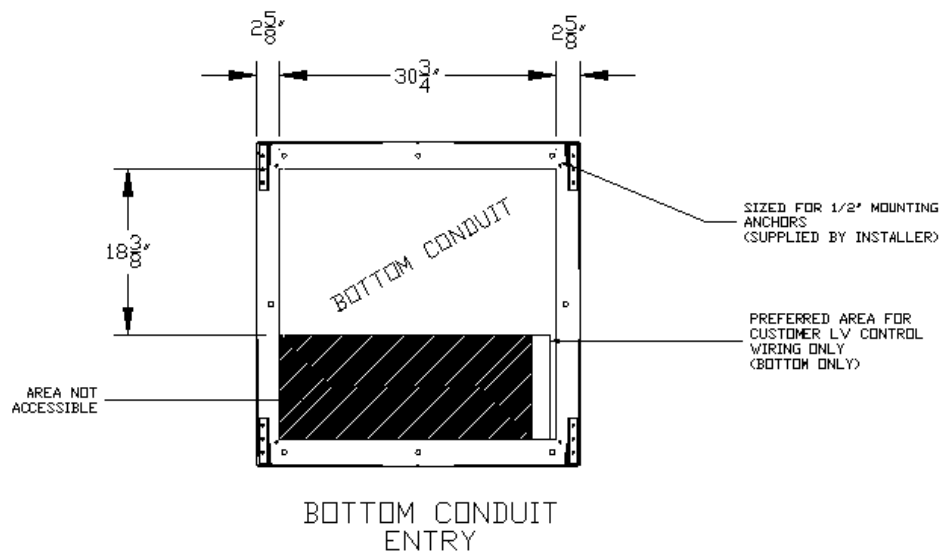
Figure 7: Auxiliary Feeder Section w/ Captive Key Transfer Block & Interlocks

## Temporary Generator Only, Loadbank Only, Generator/Loadbank Applications

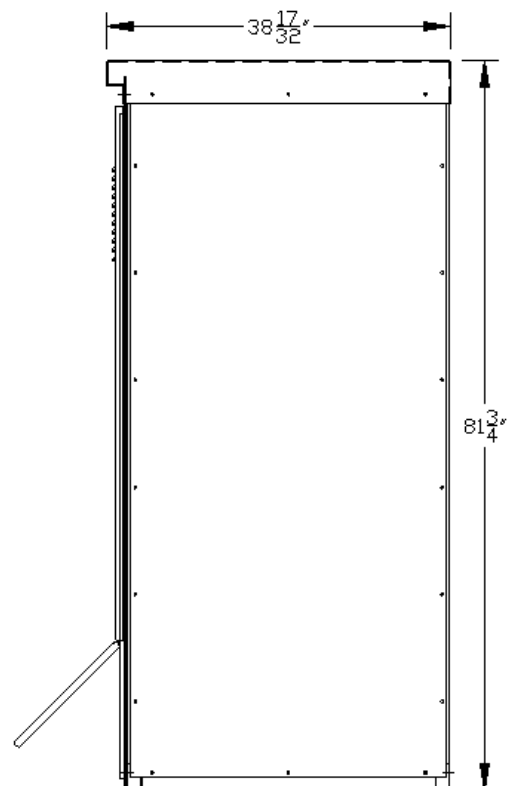
- Per NEC 700.3, temporary generator connection applications require either mechanical or electrical interlocking of the power sources to safely prevent the inadvertent paralleling of the normal & emergency power sources:
  - Service Entrance Rated Manual Transfer Switchboard (two integrated keys)
    - 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
- Loadbank connection only applications
  - Easily connects a temporary loadbank 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 & Loadbank 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 loadbank
- Alternatively, cam-lok gender changeover adapters are available to convert Generator Quick Connection into Loadbank Quick Connection\*

\*Subject to implemented options

# GLQC Switchboard Drawing



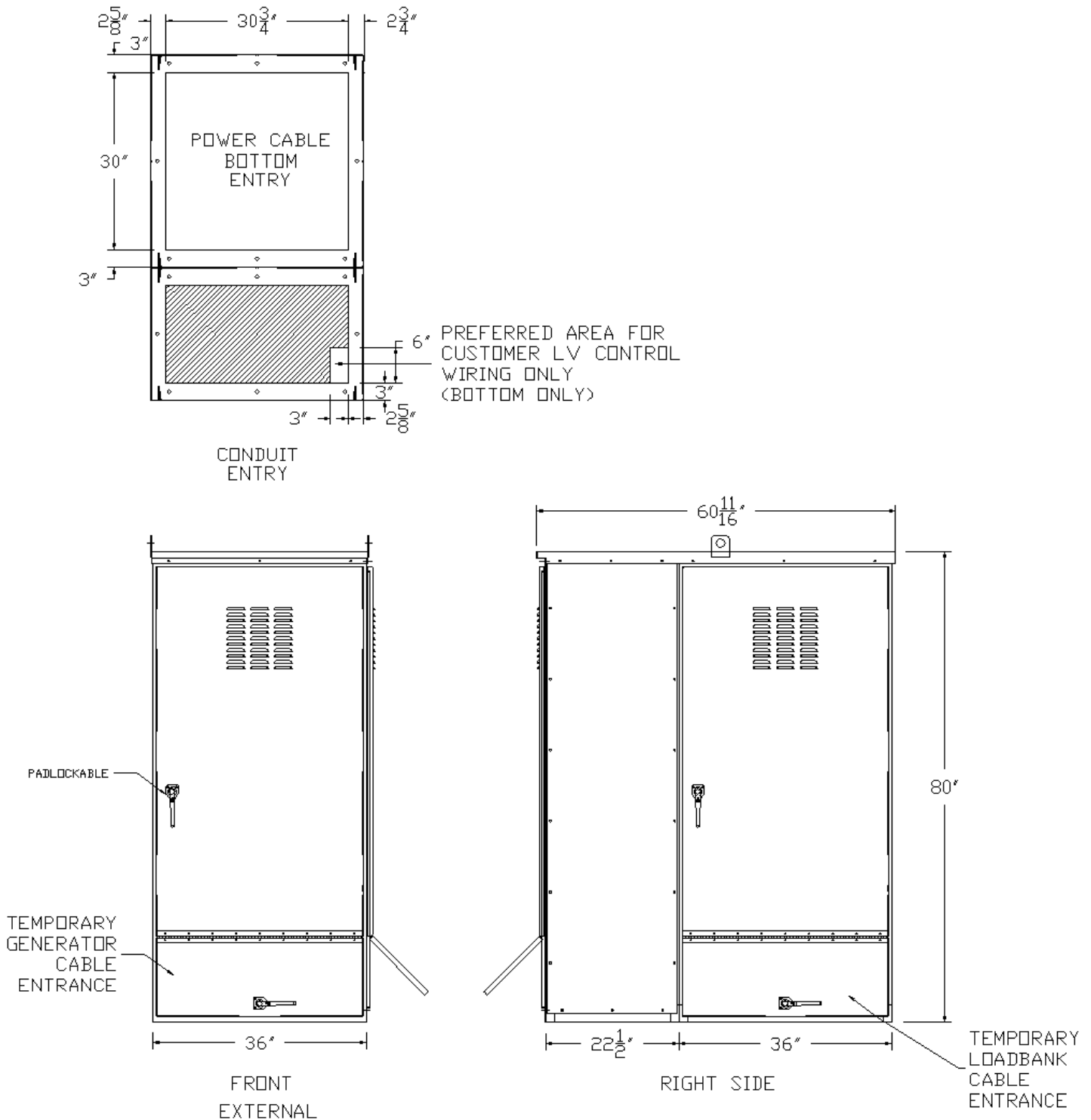
FRONT



SIDE

EXTERNAL

# Dual GLQC Switchboard Drawing



# APT Product Part Number Builder

Base Size		Option Number						
BPN	A	EM	ET	CB	CC	KK	MO	OO
Example:	APN1623	G	CS	3R	1	1	1	3-5-6-1a
Your P/N:								

**Base Part Number**

(APN1623) - 800A
(APN1624) - 1200A
(APN1625) - 1600A
(APN1626) - 2000A
(APN1627) - 2500A
(APN1628) - 3000A
(APN1629) - 4000A

**Application**

(G) - Generator Only
(L) - Loadbank Only
(GL) - Generator & Loadbank
(SE) - Service Entrance
(TL) - Termination Lugs Only (No Cam-loks)

**Enclosure Metal**

(CS) - Carbon Steel
(AL) - Aluminum
(SS) - Stainless Steel

**Enclosure Type**

(3R) - NEMA 3R
(01) - NEMA 1

**# of Circuit Breakers\***

(1) - One CB
(2) - Two CBs
(0) - None

**Climate Control**

(1) - Heater w/Thermostat
(2) - Heater w/Thermostat & Humidistat
(0) - None

**Kirk Key Interlocking**

(1) - One Integrated Lock, One Ship Loose Lock
(2) - Two Integrated Locks (Manual Transfer)
(0) - None

**Monitoring**

(3) - Phase Rotation & Ground Fault
(2) - Ground Fault Only
(1) - Phase Rotation Only

**Other Options\***

(1) - No Neutral Bus or Cam-loks
(2) - 100% Ground
(3) - Surge Protection Device (SPD)
(4) - Generator Remote Start/Stop Terminal Blocks
(5) - Generator Block Heater Receptacle
(6) - 480VAC or 240VAC Twist-lock Receptacle
(7) - 120VAC Battery Charger/Convenience Receptacle
(8) - Load Dump Receptacle/Terminal
(9) - Extra Large Enclosure for Conduit Entry/Exit
(1a) - Custom Color
(2a) - Convenience Light
(3a) - SCADA Connection Interface
(4a) - Alternate Portable Generator Lug Connections
(0) - None

\*Customer to provide description of the features desired (if necessary)



# Typical Applications for GQC & LQC

## Generator Only Configurations

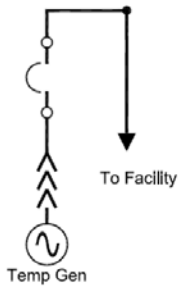


Figure 8: Single Circuit Breaker Option

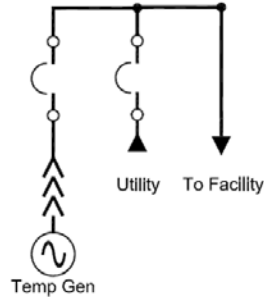


Figure 9: Dual Circuit Breaker Option with Utility & Gen Breaker

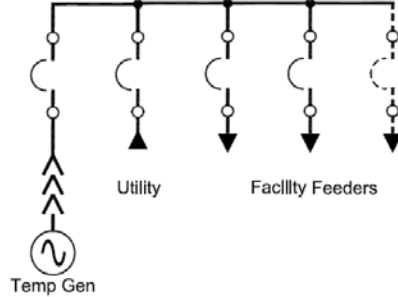


Figure 10: Multiple Circuit Breakers Option

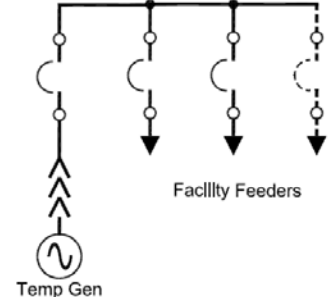


Figure 11: Feeder Circuit Breakers Option

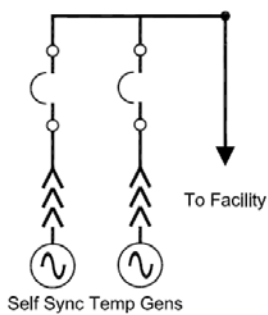


Figure 12: Two Self Sync Temp Gensets into two sets of Cam-locks

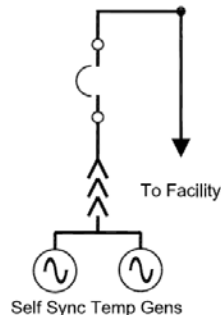


Figure 13: Two Self Sync Temp Gensets into one set of Cam-locks

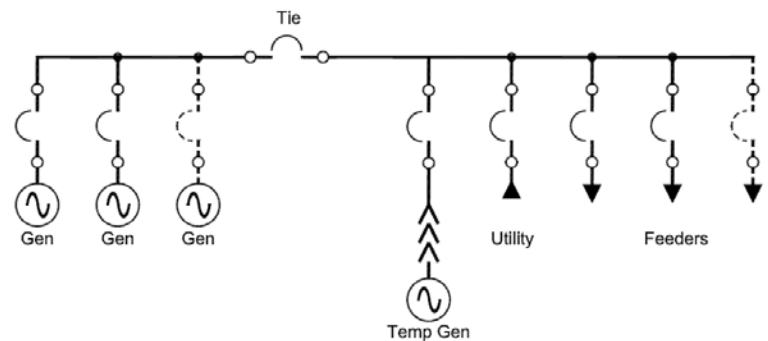


Figure 14: GQC integrated into Low Voltage Switchgear

## Loadbank Only Configurations

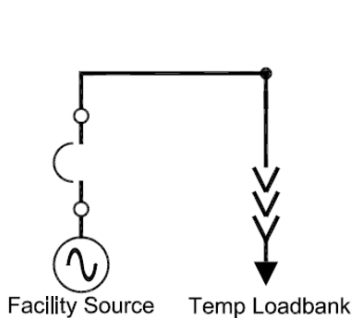


Figure 15: LQC Single Circuit Breaker Option

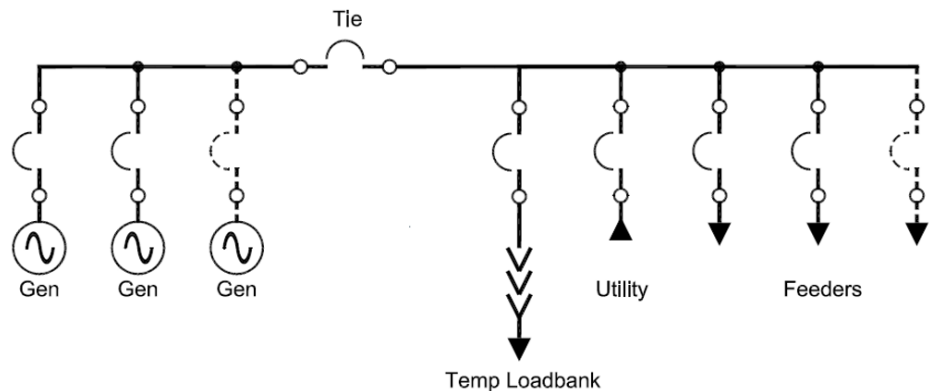


Figure 16: LQC integrated into Low Voltage Switchgear for annual Genset Testing



## Typical Applications for GLQC

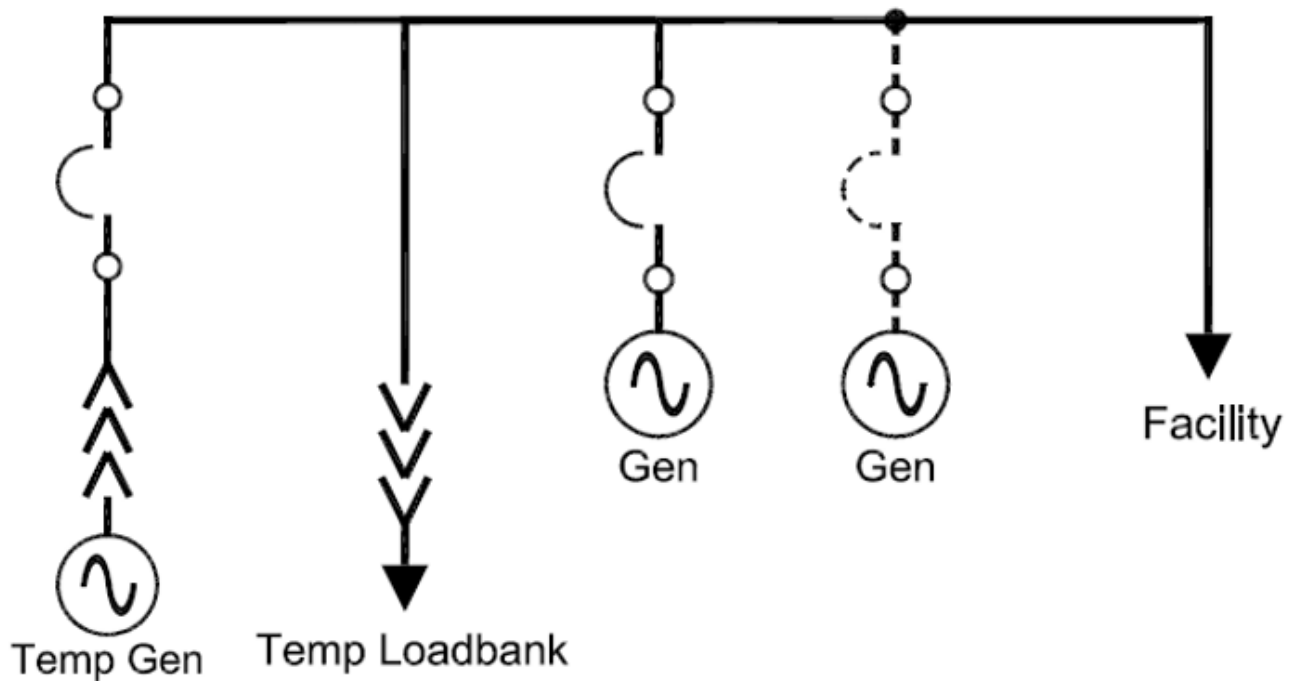


Figure 17: Generator & Loadbank Quick Connection Switchboard with Temporary & Permanent Generator Circuit Breakers

# 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](http://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 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.