



# Mission-Critical Paralleling Switchgear



**ASCO** Power Technologies™

ASCO 7000 SERIES  
Power Control Systems

[ascopower.com](http://ascopower.com)

Life Is On

**Schneider**  
Electric


# ASCO 7000 SERIES Power Control Systems


ASCO 7000 SERIES Power Control Systems (PCS) offer ASCO's widest range of Paralleling Switchgear for mission-critical facilities.


Engineered-to-order from 50+ years of ASCO switchgear experience, these fully customized solutions can parallel utility and emergency power sources for both low and medium voltage applications. ASCO 7000 SERIES PCS can be configured to provide the following capabilities:

- Parallels up to 32 generators
- Parallel generators with utility feeds
- Available segmented bus increases availability and speeds generator connection
- Controls up to 128 automatic transfer switches and/or circuit breakers
- Maximizes use of generator capacity by adding or removing generators according to real-time demand
- Available redundant PLCs and I/O pathways enhance reliability
- Load prioritization ensures the most important circuits receive power first
- Manually control addition and shedding of loads and power sources
- Connects Distributed Energy Sources to building power systems

## Power Knowledge

 [Power Control Systems Feature Comparison](#)

 [Power Control Systems Overview](#)

 [Power Control System Basics](#)




# Custom Power Management for Every Facility

ASCO 7000 SERIES PCS offers the most advanced paralleling switchgear capabilities available today. Every system is custom-engineered to meet specific application requirements. Every customer receives the full benefit of a century of ASCO critical power expertise.

ASCO 7000 SERIES PCS maximizes load distribution and generator efficiency based on real-time capacity and demand. Programmable Logic Controllers supervise sophisticated strategies to manage and optimize onsite energy sources. They also connect load banks to meet loading requirements for diesel-powered generators.

## Power Knowledge

 [Basic Power  
Source  
Synchronization  
and Paralleling](#)



Because every ASCO 7000 SERIES PCS is custom-engineered, facilities benefit from optimization at every level:

- Optimize use of available power capacity using custom sequences to keep more loads online
- Manage paralleling of multiple generators, regardless of fuel type or manufacturer
- Switch between distributed energy resources and parallel on-site sources with utility
- Customize bus configurations to hasten generator connection, increase redundancy, and maximize availability

# Get the Most from Power Sources

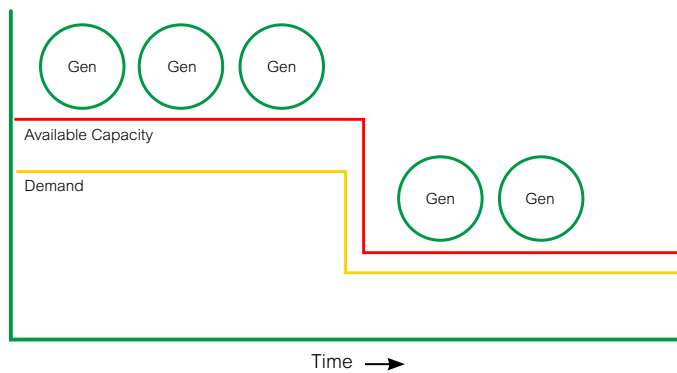
## Parallel Multiple Sources to Provide Greater Capacity

ASCO 7000 SERIES PCS synchronize and connect multiple power sources after comparing voltage, frequency, and phase angle. Bus segmentation enables facilities to connect gensets to priority loads quickly.



## Optimize Efficiency by Managing Generator Load Demand

Generator Load Demand maximizes the efficient use of power capacity by adding or removing sources according to demand. It enhances reliability and availability by connecting sufficient power when needed. By operating fewer sources at higher efficiencies, it conserves fuel to reduce emissions and improve sustainability and reduces engine-generator runtime.



## Parallel Different Types of Power Sources

Bringing power from a utility feed, generators, and renewables can offer significant operational, sustainability, and cost benefits. More than 50 years ago, ASCO produced its first system for paralleling utility power with generators and we have designed, manufactured, installed, and supported utility paralleling solutions ever since. Benefits include:

- *Utility Load Curtailment* – When utilities instruct users to reduce demand, facilities can add alternate distributed power sources instead of shedding load.
- *Peak Shaving* – To avoid demand surcharges, facilities can use distributed energy sources to replace a portion of utility power during peak demand periods.
- *Parallel Utility, Generators, and On-Site Renewables* – Parallel two or more power sources to enhance reliability, increase sustainability, and reduce energy costs. Support microgrids and integrate renewable power sources for a greener, more sustainable facility.

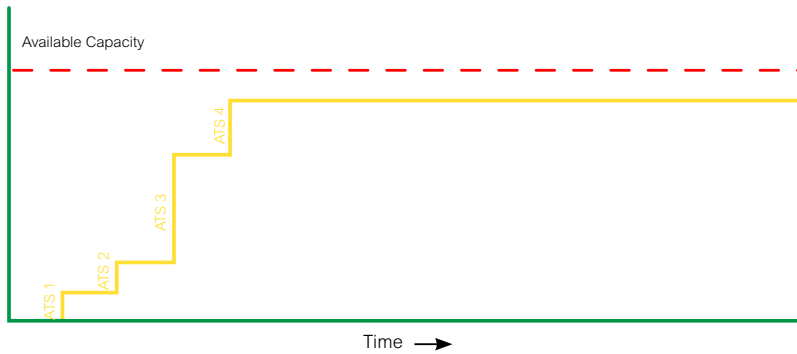
# Add and Keep More Load Online

## Bus Optimization

ASCO 7000 SERIES PCS are available with either of two bus optimization capabilities

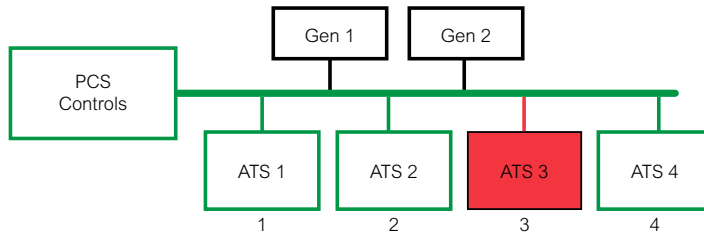
*Standard Bus Optimization* evaluates the available capacity of online generators and compares it to the maximum expected value of the next priority load block. If the generation capacity is sufficient, the load block is added to increase utilization.

*Dynamic Bus Optimization* can further increase generator utilization. When power meters measure discrete loads, a PCS system can more precisely compare capacity and real-time demand. This approach puts the most load online and maximizes generator utilization.



## Priority Pass-Along

ASCO 7000 SERIES PCS add and shed loads in order of assigned priorities. If a low-priority Automatic Transfer Switch (ATS) loses normal power before other high-priority loads, engine-generators start and supply power to the affected ATS. If other ATSs subsequently require backup power, PCS controllers add them according to their previously assigned priorities. This ensures that impacted low-priority loads are quickly transferred to an alternate power source.



With Priority Pass-Along, the loss of normal power at ATS 3 triggers an engine start. If normal power is subsequently lost on other ATSs, they would be added to bus in prioritized order - in this case, ATSS 1 and 2 together, then ATS 4.

## Load Prioritization - A Key to Effective Load Control

ASCO 7000 SERIES PCS products provide unsurpassed power distribution control by managing up to 128 prioritized transfer switches and/or electrically operated circuit breakers. Assigning priorities and sub-priorities to discrete loads in load blocks refines control to maximize generator utilization.

# Configure Bus to Maximize Performance

## Advanced Bus Segmentation

An extensive range of available bus configurations optimize flexibility, reliability, and performance benefits for every type of facility and application. Here are a few of many possible arrangements.

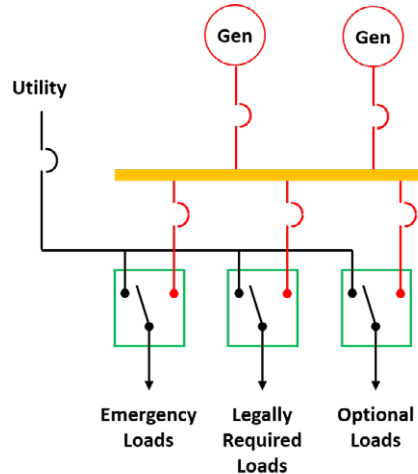
Power Knowledge

Increasing Power Redundancy

### Single Emergency Bus

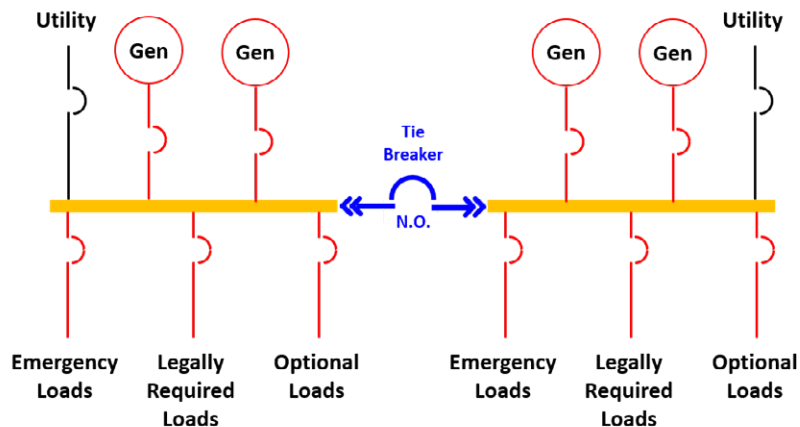
A simple cost-effective configuration for managing power sources and loads:

- Synchronize generators as each engine reaches operating speed and voltage
- Manage connection of loads to the bus according to available generator capacity
- Shed the lowest priority loads to match available bus or generation capacity
- A fault on the Emergency Bus will not disrupt the delivery of utility power to loads, and a fault in the utility power pathway will not affect the availability of generators



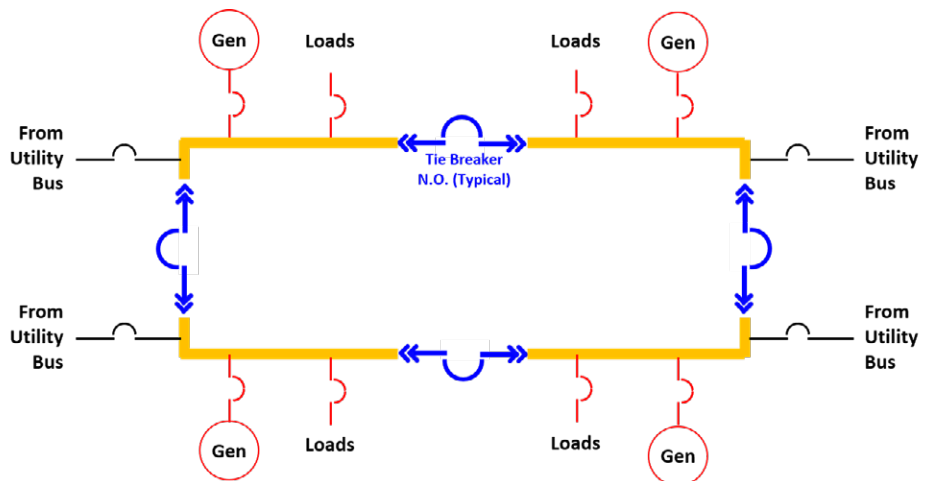
### Main-Tie-Main Using Common Bus

This configuration can connect any remaining power source to any remaining load.



### Ring Bus

Unlike linear arrangements, ring bus offers two separate pathways between sources and loads on different bus segments.



# Unsurpassed Integration

Custom integration of switching and control elements brings comprehensive monitoring and control capabilities unavailable using other technologies. Through color touchscreen interfaces, operator can manage:

- Synchronizer and Load Share Controllers
- Programmable Logic Controllers
- Power Meters
- Power Quality Meters
- Automatic Transfer Switches
- Circuit Breakers
- Protective Relays



ASCO PCS can provide the following capabilities and benefits:

- Automatic notifications and alarming through local switchgear interfaces, remote annunciators, and Schneider Electric EcoStruxure
- Connectivity to building and emergency power management systems via Modbus
- Optional Ethernet-over-Fiber communications for enhanced connectivity
- Technician access to detailed diagnostic data
- User access through remote interfaces to important diagnostics and password-protected controls
- Capability to maintain minimum generator loads using one or more load banks
- Optional email and SMS notifications of system alarms and events

## Manual Load Controls

Manual Load Controls maximize operating flexibility by enabling the following features:

**Load Shed Bypass/Reset:** Manually re-add previously shed load blocks. To protect generators, any excess loads are automatically re-shed.

**Hand-Off-Auto:** Touchscreen controls for connecting individual automatic transfer switches and circuit breakers to the main bus.

**Manual Paralleling:** For manually connecting of generators to the main bus if automatic paralleling becomes inoperable.

**Generator Control Station:** Every generator control section is equipped with manual controls for engine-generator testing, including:

- *Emergency Stop Pushbutton* - Stop engine-generators quickly using instantly recognizable controls
- *Five-Position Engine Control Switch* - Select from the following automatic and manual operating modes:
  - *Automatic* - Select Normal automatic operation
  - *Test Online* - Test gensets by starting and automatically connecting them to the bus
  - *Test Offline* - Test isolated engine-generators
  - *Off-Cool-Down* - Run engines in cool-down mode for user-defined times
  - *Lockout/Reset* - Immediately stop engines and clear alarms

# Enhanced Visualization

The ASCO 7000 SERIES PCS color touchscreens present a user-friendly intuitive interface that can be conveniently located anywhere in a facility. Every ASCO 7000 SERIES PCS can be provisioned with:

- Custom-engineered one-line diagrams that provide dynamic, readable, color-coded circuit elements and power flow schematics
- Switchgear status indicators for consistent display and instant familiarity
- Touch-linked circuit elements provide rapid access to metering and power information
- Diagnostics for communication networks, programmable logic controllers, synchronizers, meters, and other devices
- Operator-accessible trend plots for rapid assessment of power and equipment conditions
- Alarm history with up to 500 entries and an event archive of 3 months or more
- Multiple security levels for controls and individual accounts for users





# Intelligent Simulation

The available ASCO PCS Simulator provides a digital environment for evaluating procedures and anticipating outcomes. It simulates operation of paralleling gear, transfer switches, circuit breakers, generator controls, switchgear control stations, alarm annunciation, and response. Every Simulator is provisioned with:

- A virtual interface and code that is identical to its real-time system
- Virtual copies of the same hardware and software used on live operator interfaces
- A computer that replicates ASCO 7000 PCS switchgear and connected devices and provides a virtual control console



## Applications

### Training

The ASCO PCS Simulator provides reliable and accurate simulation to maximize the benefit of any training exercise. The Simulator can also be used to evaluate operator and equipment performance under multiple operating scenarios, without risk of power system downtime.

### Event Sequence Testing

The Simulator can be used to evaluate existing and proposed operating sequences without disrupting live operations. It provides a platform for demonstrating performance improvements for systems.

### Predictive Simulation

The Simulator is perfect for evaluating test scenarios including:

- Synchronization failure
- Utility failure and restoration
- Bus under-frequency
- Generator failure
- Loss of bus segment
- Circuit breaker failure
- Bus differential events

# Efficient Regulatory Reporting

When equipped with a *Joint Commission Reporting Package*, ASCO 7000 SERIES PCS can generate and distribute documents in ways that make industry and regulatory reporting easy. Generators can be monitored through ASCO Power Metering Units or directly using Modbus protocols. ASCO Critical Power Management Appliances automatically track device performance during outages and test events.

After the last switch has re-transferred to its normal power source, a detailed report is automatically emailed to authorized recipients, which may be used to comply with reporting requirements including NFPA 99, NFPA 110, Joint Commission, CALEA, and CMMS.

**Power Knowledge**

Three Benefits of Automated Critical Power Reporting

**TEST REPORT**

Facility Name  
160 Park Avenue  
Florham Park, NJ 07932

Generated By: Automated  
Created: Nov 30, 2018 at 12:55:38 PM  
Period: Nov 30, 2018 to Nov 30, 2018

**Summary of Results**

Load Type	Test Duration (Sec)	Transfer Time (Sec)	Emergency Conditions (N/A/Pass/Fail)	Maximum Transferable Time (Sec)	Result
16 sec	-	01:20:33	-	Level 1 (10 sec.)	Pass

**Generator Run Summary**

Name	Location	Load Type	Power Rating (kW)	Current Rating (Amps)
Gen 5	Gen Feeding System	-	3000	454

**Transfer Switch Summary**

Location	Rating	Maximum Transferable Time
Dr Parking	400	Level 3 (20 sec.)

**Statistics for Electrical Parameters**

Electrical Parameters	Minimum	Average	Maximum	Unit
Total Equipment Power	12	211.63	134	kVA
Total Power Meter	74	90.91	100	kW
Voltage (V-L)	455	465.50	479	V
Voltage (V-N)	266	269.84	274	V
Voltage (L-N)	400	407.30	413	V
Frequency	59.96	59.98	60.00	Hz
Power Factor	0.75	0.8	0.87	-
Total Amperes	117	137.45	167	A
Current Phase A	116	131.42	166	A
Current Phase B	115	137.54	165	A
Current Phase C	107	136.85	160	A

# 7000 SERIES Features and Options

7000 SERIES Models with System Voltage	600 V Max.	5kV/15kV (consult factory for higher)
<b>Modes of Operation</b>		
Isolated Bus (Open Transition)	Yes	Yes
Generator Soft Load/Unload	Yes	Yes
Utility Tie (Momentary Closed Transition)	Yes	Yes
Utility Tie (Soft Load/Unload)	Yes	Yes
Generators	32	32
<b>Construction</b>		
Main Bus Amp Size Available	Up to 10,000 A	Up to 3000 A
Switchgear Standard	UL 1558 (Standard) UL 891 (Optional)	ANSI/IEEE C37.20.2 ANSI/IEEE C37.20.7 (Optional)
Bus Bracing level, kA	Up to 200	Up to 63
Arc Resistant/Arc Protection Relaying	Optional	Optional
Enclosure	Type 1/Type 3R	Indoor/Outdoor/Outdoor Sheltered Aisle
<b>Circuit Breakers</b>		
Generator Paralleling Breakers	1 or 2 per cubicle	1 per cubicle
Maximum Generator Breaker Frame Size	3200 A (2) 5000 A (1)	Up to 2000 A
Tie and/or Utility Circuit Breaker Available	Optional	Optional
<b>Master Controls</b>		
Master Controls	Integrated   Segregated	Integrated   Segregated
Master Controls Touch Screen	24" Std. / Up to 42"	24" Std. / Up to 42"
Redundant Touch Screens	Optional	Optional
Engine-Generator Info Screen	Yes	Yes
NFPA 110 Generator Monitoring	Yes	Yes
Master PLC	Yes	Yes
Redundant Master PLC	Standard, unless otherwise specified	Standard, unless otherwise specified
Redundant Master I/O	Optional	Optional
Hardwired Manual Paralleling	Standard	Standard
Bus Load Optimization	Standard	Standard
Generator Load Demand	Standard	Standard
Max. Number of ATSS for Load Control (MO DCB)	32 Std. / Up to 128	32 Std. / Up to 128
Max. Number of ATSS for Load Control (EO DCB)	32 Std. / Up to 128	32 Std. / Up to 128
Main Bus - Maximum Segments	8	8
<b>Generator Controls Sections</b>		
Generator Controls	Integrated   Segregated	Integrated   Segregated
Generator Synchronizer Type	Digital	Digital
Generator PLC	Yes	Yes
Hardwired Backup Controls	Standard	Standard
Generator Controls Touchscreen	Optional	Optional
<b>Distribution Circuit Breakers</b>		
Manually Operated Distribution Circuit Breakers	Optional	N/A
Electrically Operated Distribution Circuit Breakers	Optional	Standard
<b>Remote Monitoring</b>		
Remote Annunciator Panel, LED Type	Optional	Optional
Remote Annunciator Panel, Touchscreen Type	Optional	Optional
42" Color Touchscreen	Optional	Optional
PowerQuest Remote Desktop Monitoring	Optional	Optional
NFPA Test Report Package	Optional	Optional
JC Reporting Package	Optional	Optional
<b>Simulator</b>		
Simulator for Testing and Training	Optional	Optional

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

[www.ascopower.com](http://www.ascopower.com)  
[customercare@ascopower.com](mailto:customercare@ascopower.com)