ASCO 7000 SERIES Power Control Systems (PCS) offer the most advanced power management features for mission-critical facilities. Every 7000 SERIES PCS is engineered-to-order to provide the full benefit of more than 50 years of ASCO PCS engineering excellence. Fully customized, these systems can parallel standby and utility sources for both low and medium voltage applications.

The 7000 SERIES models offer ASCO’s widest range of power control capabilities and features. Every 7000 SERIES PCS can provide the following capabilities:

- Parallel up to 32 generators
- Parallel generators with utility feeds and renewable energy sources
- Provide segmented bus to increase availability and connect multiple generators more quickly
- Control up to 128 automatic transfer switches and/or electrically operated circuit breakers
- Measure real-time demand to add and shed loads according to available generation capacity
- Employ redundant controls to enhance reliability

The 7000 SERIES models provide the advanced and reliable power management features available in our 4000 SERIES and SERIES 300 products. These include capabilities to:

- Synchronize multiple generators and automatically connect them to bus
- Prioritize loads to ensure the most important circuits receive power first
- Connect loads to bus according to priority
- Manually control the connection and disconnection of both loads and power sources
- Employ redundant controls to enhance reliability

For a summary of all ASCO PCS offerings, see the Power Control Systems Features Comparison at ascopower.com. For information about PCS equipment configuration, view the ASCO Power Control Systems Overview. To learn more about PCS design and function, read our white paper entitled Power Control System Basics.
CUSTOM POWER MANAGEMENT FOR EVERY FACILITY

ASCO 7000 SERIES PCS offers the most advanced power management capabilities available today. Because every 7000 SERIES PCS is custom-engineered to meet site and application requirements and customer expectations. Every customer receives the full benefit of a century of ASCO critical power expertise.

ASCO 7000 PCS maximizes load distribution and generator efficiency based on real-time generation capacity and demand. PCS controllers apply sophisticated strategies for connecting and disconnecting power sources and loads. They also connect load banks to meet loading requirements for diesel-powered generators.
Because every ASCO 7000 SERIES PCS is custom-engineered for a specific application, facilities benefit from feature optimization at every level:

- Custom sequences for optimizing usage of power source capacity
- Capabilities to manage paralleling of multiple generators, including both diesel and natural gas-fired units
- Capabilities to switch between or parallel utility, generator, and renewable power sources
- Custom bus configurations to hasten generator start-up and connection, increase redundancy, and maximize availability
- Custom sequences for adding, shedding, and managing loads and keeping them online

GET THE MOST FROM POWER SOURCES

Paralleling Multiple Sources

Monitoring and synchronizing generators is essential for any electrical system served by more than one power source. ASCO 7000 SERIES PCS synchronize and connect multiple sources after comparing voltage, frequency, and phase angle. They can parallel multiple bus segments to connect priority loads quickly.

Generator Load Demand

Generator Load Demand maximizes the efficient use of standby generator capacity by adding or removing generators according to demand. It ensures reliability and availability by connecting sufficient power when needed. It conserves fuel and reduces engine-generator wear-and-tear by operating fewer generators at higher efficiencies.

Parallel Different Types of Power Sources

Bringing power from both a utility feed and a generator can offer significant operational flexibility and cost benefits. More than 50 years ago, ASCO produced its first system for paralleling utility with generators, and we have designed, manufactured, installed, and supported utility paralleling applications ever since.

The benefits of paralleling different power sources include:

- **Utility Load Curtailment** – When utilities direct users to reduce demand, facilities can use generators to provide supplemental power instead of curtailing load.
- **Peak Shaving** – To avoid demand charges, facilities can run generators to replace a portion of utility power during peak use periods.
- **Parallel Utility, Generators, and On-Site Renewables** - Parallel two or more power sources to enhance reliability, reduce energy consumption, and lower 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 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, load is added to increase utilization.

**Dynamic Bus Optimization** can further increase generator utilization. By using power meters to measure discrete loads, a PCS system can more precisely compare capacity and real-time demand. This approach identifies the maximum available capacity to get discrete loads online and maximize generator usage.

**Priority Pass-Along**

ASCO 7000 SERIES PCS systems add and shed loads in the order of their assigned priorities. If a low-priority Automatic Transfer Switch (ATS) loses its normal power source 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 the previously assigned priorities. This ensures that impacted low-priority loads are quickly transferred to the alternate power source, without delays that could otherwise occur using other load prioritization schemes.

Load Prioritization – A Key to Effective Load Control

Assigning unique and structured priorities to loads enables sophisticated power management strategies. When loads are prioritized, PCS controllers can manage transfer switches and circuit breakers to add or shed individual or block loads.

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 sub-priorities to discrete loads in load blocks refines control to maximize generator utilization.

Load Latch

ASCO 7000 SERIES PCS features Load Latch, which first compares the total unused capacity of the remaining online generators to the real-time demand of the online load blocks. This feature prevents unnecessary disconnection of loads, another way that ASCO PCS solutions enhance critical power availability. Without Load Latch, the failure of one engine-generator could unnecessarily shed an entire priority block of loads.

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.

---

**Diagram:**

```
  PCS Controls
     /       \
#--#       #--#
AT1  Gen1   AT2  Gen2
     |       |     |       |
  ATS 1  ATS 2  ATS 3  ATS 4
     1     2     3     4
```

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.
**Manual Load Controls**

ASCO PCS provides manual controls to maximize operating flexibility, including:

**Load Shed Bypass/Reset:** Dedicated hardware for manually re-adding shed load blocks. To protect generators, any excess loads are automatically re-shed.

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

**Manual Paralleling:** Allows manual connection 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. Control panel features include:

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

**CONFIGURE BUS TO MAXIMIZE PERFORMANCE**

**Advanced Bus Segmentation**

ASCO 7000 SERIES PCS products offer the flexibility, reliability, and performance benefits of multiple bus configuration options.

**Single Bus** is the simplest and most cost effective configuration for managing a limited quantity of 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
Segmented Bus. Adding one or more tie breakers between bus segments enables power systems to:

- Concurrently connect generators on isolated segments to bring multiple gensets online within the 10-second timeframe required for critical power applications
- Distribute remaining generation capacity to the loads on each bus when segments are tied together – this increases overall capacity to maximize availability if a generator fails
- Isolate faults if one bus is lost, keeping the remainder of the facility powered

Ring Bus. If a generator or bus segment fails, ring architecture enables power to be distributed from any remaining sources to any remaining loads. This configuration enhances the ability to isolate faults to the segment on which they occur. Often used on medium voltage applications, ring configurations provide higher levels of redundancy and availability.
CONFIGURABLE FOR A WIDE RANGE OF APPLICATIONS

Custom Engineering and Manufacturing Optimizes PCS for Each Facility

**Single Bus**
3 Generators, 6 Loads
- Parallel multiple generators to provide sufficient emergency capacity
- Separate utility feed to Automatic Transfer Switches

**Dual Bus**
4 Permanent Generators, Many Loads
- Normally open tie breaker isolates busses to allow priority loads to come online quickly
- Tie breaker can close to parallel energized busses
- Power either bus from either set of generators
- Connectivity for temporary generator
Segmented Bus
3 Generators, 2 Utility Feeds, 2 Loads

- Parallel generators with either of two utility feeds
- Connect any source to any load
- Circuit breaker sequences provide “Closed Transition” operation to momentarily parallel utility and generators without interruption
UNSURPASSED INTEGRATION

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

- Synchronizer and load share controllers
- Programmable logic controllers
- Power meters
- Power quality meters
- Automatic transfer switches
- Circuit breakers
- Protective relays

Integrating PCS elements with the ASCO Critical Power Monitoring System provides the following capabilities and benefits:

- Automatic notifications and alarming through local switchgear interfaces, remote annunciators, and the ASCO Critical Power Monitoring System interfaces
- Connectivity to building and emergency power management systems via BACnet® or Modbus®
- Optional fiber optic Ethernet communications for enhanced connectivity in large facilities
- Technician access to detailed diagnostic data
- User access to important diagnostics and password-protected controls through remote operator interfaces
- Capability to maintain minimum generator loads using one or more integrated, permanently installed load banks
- Optional email and SMS notification of system alarms and events

ENHANCED VISUALIZATION

The 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 that allow rapid access to metering and status 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 7000 SERIES PCS Simulator provides a platform for evaluating procedures, anticipating outcomes and sharing knowledge. ASCO PCS equipment provides an effective platform for simulating operations involving ATSs, circuit breakers, generator controls, switchgear control stations, and alarm annunciation and response. Every PCS Simulator is equipped with:

- A programmable controller and logic that is identical to the real-time system
- The same PowerQuest hardware and software used on live operator interface terminals
- A computer that replicates PCS 7000 switchgear and connected devices and provides a control console

Training Applications

Whether educating new operators or testing existing personnel, the ASCO PCS Simulator provides reliable and accurate simulation that maximizes 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 7000 SERIES PCS Simulator can be used to evaluate existing and proposed operating sequences without disrupting live operations. It provides facility managers with a platform for demonstrating measurable performance improvements for operators and systems.

Predictive Simulation

The 7000 SERIES PCS Simulator is the perfect platform 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 the ASCO Critical Power Monitoring System (CPMS), ASCO 7000 SERIES PCS generate and distribute documents that make industry and regulatory reporting easy. Generators can be monitored through ASCO Power Metering Units and accessories, or directly using Modbus protocols. CPMS systems automatically track facility and equipment performance during outages and test events, and begin recording power data when a transfer switch or an engine-generator changes state.

After the last switch has re-transferred to its Normal power source, a detailed report is automatically generated and emailed to recipients designated by the user. The CPMS stores the information on a server, which may be used to comply with industry and regulatory reporting requirements including NFPA 99, NFPA 110, Joint Commission, CALEA, and CMS. For additional information, see the CPMS Overview brochure and our white paper entitled Automated Reporting for Emergency Power Systems.
## FEATURES AND OPTIONS

### FEATURES
- **System Voltage**
  - 600V Max.
  - 5kV/15kV (consult factory for higher)

### MODES OF OPERATION
- **Isolated Bus (Open-Transition)**
- **Generator Soft Load/Unload**
- **Utility Tie (Momentary Closed Transition)**
- **Utility Tie (Soft Load/Unload)**
- **Generators**
  - Yes
  - Yes
  - Yes
  - Yes
  - 32

### CONSTRUCTION
- **Main Bus Amp size available**
  - Up to 10,000 A
  - UL 1558 (Std.)
  - UL 891 (Opt.)
- **Switchgear Standard**
  - ANS/IEEE C37.20.2
  - ANS/IEEE C37.20.7 (optional)
- **Bus Bracing level, kA**
  - Optional
- **Arc Resistant/Arc Protection Relaying**
  - Optional
- **Enclosure**
  - Type 1 /Type 3R
  - Indoor/Outdoor/Outdoor Sheltered Aisle

### CIRCUIT BREAKERS
- **Generator Paralleling Breakers**
- **Max. Generator Breaker Frame Size**
  - 3200 A (2)
  - 5000 A (1)
  - Optional
- **Tie and/or Utility Circuit Breaker Available**
  - 1 per cubicle
  - Optional

### MASTER CONTROLS
- **Master Controls**
  - Integrated | Segregated
  - 24" Std. / up to 42"
  - Optional
  - Yes
- **Master Controls Touch Screen**
  - Optional
  - Yes
  - Yes
  - Yes
  - Optional
  - Optional
  - Optional
- **Redundant Touch Screens**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Engine-Generator Info Screen**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **NFPA 110 Generator Monitoring**
  - Standard
  - Standard
  - Standard
  - Standard
  - Optional
  - Optional
- **Master PLC**
  - Standard
  - Standard
  - Standard
  - Standard
  - Optional
  - Optional
- **Redundant Master PLC**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Hardwired Manual Paralleling**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Bus Load Optimization**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Generator Load Demand**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Max Number of ATSs for Load Control (MO DCB)**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Max Number of ATSs for Load Control (EO DCB)**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Main Bus – Maximum Segments**
  - 8

### GENERATOR CONTROLS SECTIONS
- **Generator Controls**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Generator Synchronizer Type**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Generator PLC**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Hardwired Backup Controls**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Generator Controls Touch Screen**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional

### DISTRIBUTION CIRCUIT BREAKERS
- **Manually Operated Distribution Circuit Breakers**
  - Optional
  - N/A
- **Electrically Operated Distribution Circuit Breakers**
  - Optional
  - Standard

### REMOTE MONITORING
- **Remote Annunciator Panel, LED type**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **Remote Annunciator Panel, Touch Screen Type**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **42" Color Touch Screen**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **PowerQuest Remote Desktop Monitoring**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **NFPA Test Report Package**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional
- **JC Reporting Package**
  - Optional
  - Optional
  - Optional
  - Optional
  - Optional

### SIMULATOR
- **Simulator for Testing and Training**
  - Optional
  - Optional