

**White Paper**

**UL Standards for Power Control  
System Equipment**

# UL Standards for Power Control System Equipment

## *An Introduction to UL 891 and UL 1558*

Commercially available Power Controls Systems (PCS) can be obtained with either UL 891 or UL 1558 listings. This paper describes some principle differences between the standards, and provides guidance for selecting UL 891 or UL 1558-listed PCS equipment.

### UL STANDARDS FOR PCS

*UL 1558 - Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear* defines safety tests for switchgear assemblies that service circuits operating at nominal ac voltages of not more than 1,000 volts. UL 1558 testing evaluates switchgear that is designed in accordance with ANSI C37.20.1 and ANSI C37.51. UL 1558-compliant PCS equipment features compartmentalized construction that limits arcing risks from inadvertent contact with energized equipment.

*UL 891 – Switchboards* defines safety tests for power control equipment serving circuits operating at nominal ac voltages of not more than 600 volts. UL 891 testing is referenced throughout *NEMA PB 2 - Deadfront Distribution Switchboards*, the design document from which UL 891 was developed. Compartmentalized construction is not required by UL 891. In practice, some major PCS manufacturers incorporate UL 1558 compartmentalization into their equipment regardless of whether UL 891 or UL 1558 ratings are required for an application.



Figure 1: ASCO UL 1558 PCS equipment with UL 1066 circuit breakers.



Figure 2: Each draw-out breaker is compartmentalized by grounded barriers.



Figure 3: Front-connected UL 891 PCS equipment.



Figure 4: UL 891 Distribution Equipment - If this were UL 1558 equipment, panels would separate the front of the enclosure from the rear, and side panels would enclose the left side.



## OVERCURRENT PROTECTION

UL 1558 restricts overcurrent protection to enclosed devices listed to *UL 1066 - Standard for Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures*. Enclosed devices offer less opportunity for inadvertent contact and arcing. UL 1066-compliant devices use draw-out designs to facilitate inspection and service.

UL 891 allows additional circuit breaker types in within the PCS equipment. As a result, UL 891 PCS can be equipped with both UL 1066 breakers and breakers listed to *UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures*. These include molded-case breakers, molded-case switches, fused disconnect switches, insulated case breakers, and power breakers. Because the use of draw-out breakers is unnecessary, more equipment can be placed in UL 891 PCS than in UL 1558 equipment.

## RATINGS

### Quantity of Cycles

UL 891 requires that equipment-under-test tolerate fault currents for 3 cycles, while UL 1558 requires fault current to be held for 4 cycles. Consequently, UL 1558 ratings suggest more robust fault tolerance for the same amount of current.

### Short-Time Ratings

UL 891 equipment is typically available with fault current ratings of up to 150 KAIC. UL 1558 PCS is typically available with ratings of up to 200 KAIC. However, UL 1558 testing also produces short-time ratings for 30 cycles, or optionally, 60 cycles. Testing must also demonstrate compliance with temperature rise limitations specified by the standard. Short-time ratings and temperature monitoring are not required by UL 891.

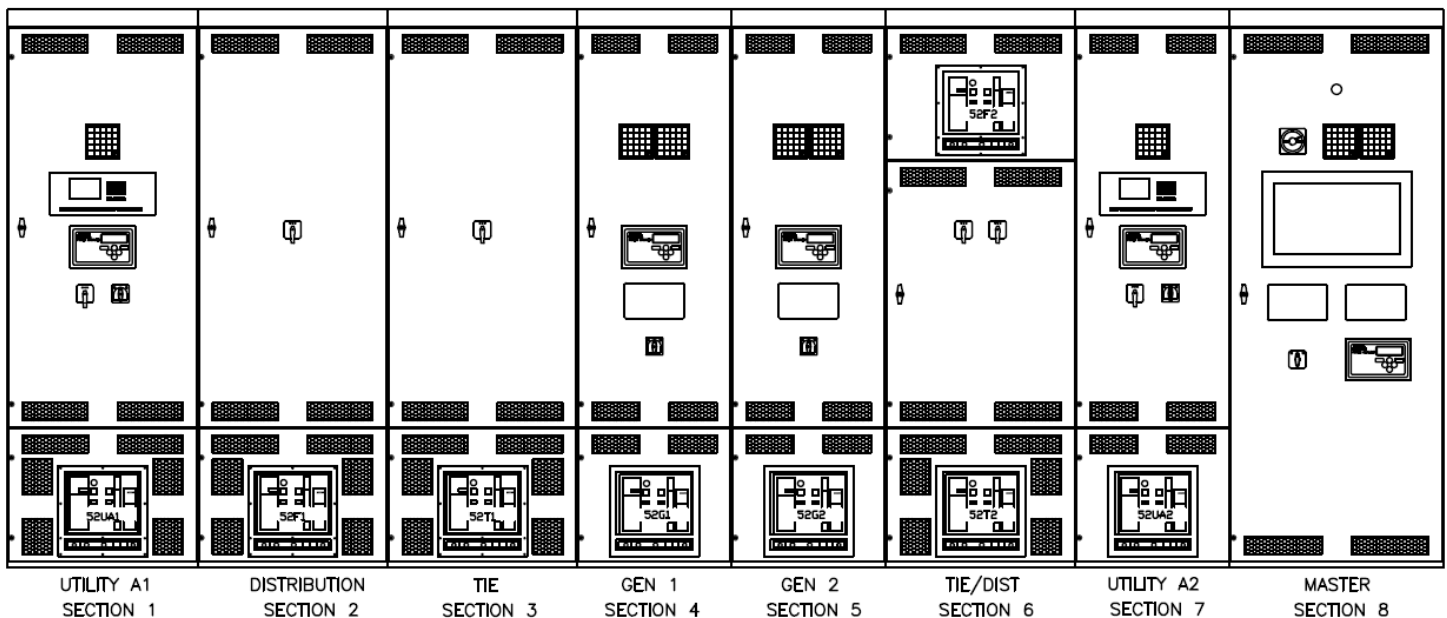
Under UL 1558, short-time ratings provide additional flexibility for selectively coordinating overcurrent protection devices throughout a power distribution system. ASCO PCS equipment offers ratings of up to 200 KIAC for 4 cycles and 85 KAIC for 60 cycles.



## CONFIGURABILITY

Two principal elements affect PCS configurability. As noted, under UL 891, internal barriers are not required to compartmentalize PCS equipment housings. This allows a greater amount of equipment to be installed in each frame, and provides increased accessibility for inspecting and servicing equipment and components. Nevertheless, energized components remain more accessible for inadvertent contact. Under UL 1558, internal barriers must separate functional areas within equipment housings to reduce the potential for contact and arcing. Barriers must be individually grounded to provide additional protection from faults from energized components.

Secondly, automatic transfer switches (ATs) and panelboards cannot be installed in UL 1558 lineups, in part, because they do not use UL 1066 breakers or compartmented construction. Consequently, this equipment must be located separate from UL 1558 lineups, an important consideration when planning equipment layouts. Under UL 891, ATs and panelboards can be installed in the same lineup as the remaining power control equipment, offering a potentially smaller footprint. In some cases, this can result in reduced equipment and installation costs while requiring less floor space than UL 1558 configurations.



## SUMMARY

PCS equipment is available in both UL 891 and UL 1558 designs. Choosing UL 891 can provide (1) a wider range of overcurrent protection devices, (2) the most compact equipment configurations, and (3) potentially lower costs. Alternatively, selecting UL 1558 can provide (1) the higher voltage and fault current ratings; (2) lower risk of accidental contact with, and discharges from, energized components; (3) short-time ratings; and (4) additional flexibility for selectively coordinating overcurrent protection devices. Qualified manufacturer representatives can provide further guidance for specific applications.

### Choose UL891 for:

- A wider range breaker types
- Compact equipment configuration
- Potentially lower costs

### Choose UL 1558 for:

- Highest voltage and fault current ratings
- Short-time ratings
- Added flexibility for selective coordination
- Reduced potential for contact with, and discharges from, energized components

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