



## Electrical: Emergency Power

The current electrical system for the von Liebig Center will not be changed a great deal. The system is currently oversized due to unfinished area in the lower level. The current electrical system is as follows:

The electrical service is an underground 4160-volt feed served from the campus distribution system. A 1000 KVA, 4160 – 480Y/277 volt, pad-mounted transformer is on the north side of the building to serve the main distribution panel. The main distribution panel contains a 1600 amp, main, molded case, circuit breaker with GFI protection and a metering section to indicate building electrical loads. Transient voltage surge protection with noise filters are installed at the main service entrance. The main distribution panel serves 480Y/277 volt distribution panels located in the basement and penthouse. 480-208Y/120 volt transformers serve 208Y/120 volt distribution panels located in the electric rooms on each floor to serve laboratory panels. 480/277-volt panels are on each floor to serve lighting and other laboratory equipment loads.

One area I will focus on is emergency power. The current 500kW generator is located in a different building and serves various sources other than the von Liebig Center. A new generator will serve only the von Liebig Center.

The generator will supply power to life safety and equipment loads.

### Life Safety

Egress Lighting  
Fire Alarm System/Monitoring  
Safety Equipment

### Equipment

Critical Research Equipment  
Freezers  
Refrigerators  
Pumps  
Monitoring Systems  
A Small Number of Lab Receptacles  
Selected Ventilation/Room Lighting Systems

### **Totals Loads**

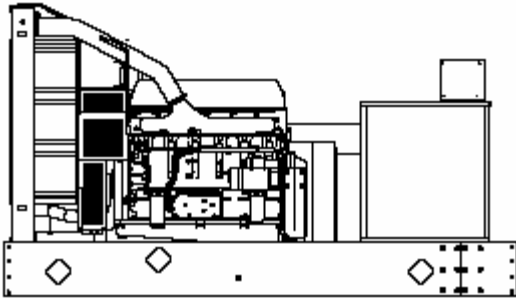
Equipment: 197,700W  
Life Safety: 11,750W  
209,450W = 209.45kW





## Emergency Generator

A power load of 209.45kW was obtained from the various emergency equipment and life safety loads. When picking a generator, a Kohler 250kW model was chosen to overcompensate.



Kohler Power Systems Model 250REOZD  
4-Cycle Diesel

Standby: 265kW/331kVA (60Hz) 398A  
Prime: 240kW/300kVA (60Hz) 361A

The generator is connected to a switchboard panel, which distributes power to the equipment and life safety panels. This assembly of circuit breakers provides switching and overcurrent protection.

From the switchboard panel, an automatic transfer switch (ATS) transfers the loads from normal source to that of the emergency generator when the building loses power. ASCO Automatic Transfer Switches were chosen in a 400A version for equipment loads and a 100A for life safety.

ASCO Automatic Transfer Switches are the standard of the industry. High speed transfer of loads between alternate sources of power, regardless of ampacity size, is achieved by a reliable, field proven solenoid operating mechanism. When combined with a programmable microprocessor controller with keypad and LCD display, they offer the most advanced method of transferring all types of loads, such as, motors, electronic drives, UPS's and microprocessor based systems. 7000 Series automatic transfer switches are available open or enclosed, in ampacity sizes from 30 through 4000 amperes with the largest selection of optional accessories offered anywhere.

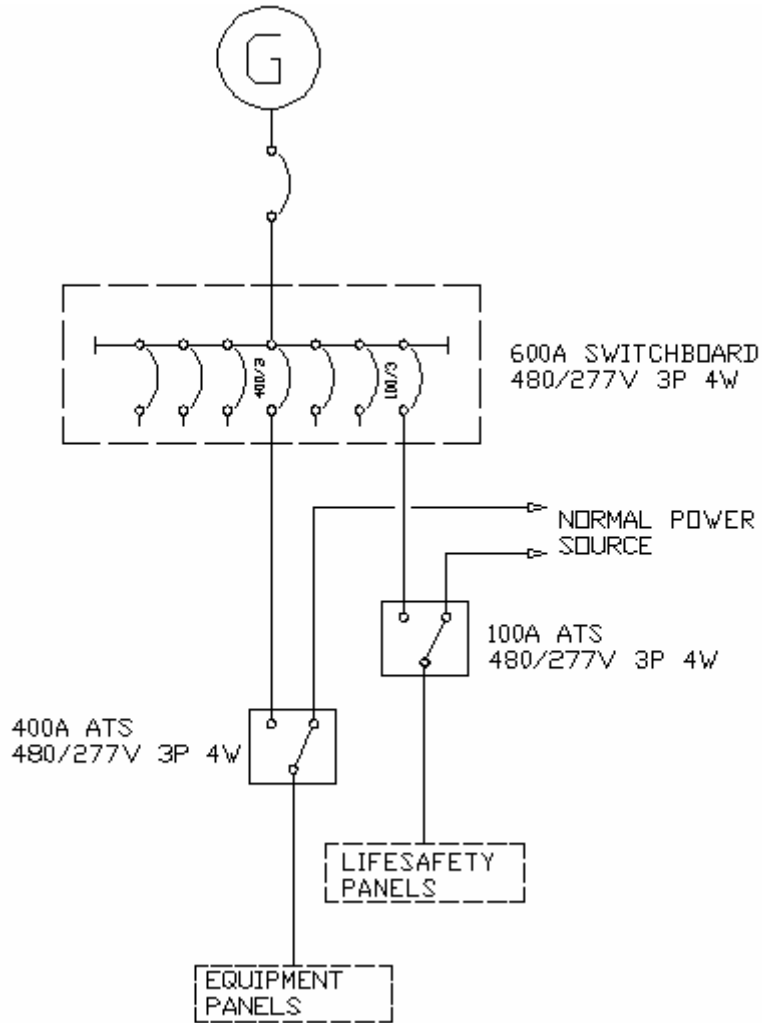


**ASCO** Power Technologies

<http://www.asco.com/home.htm>



# Emergency Single Line Riser Diagram

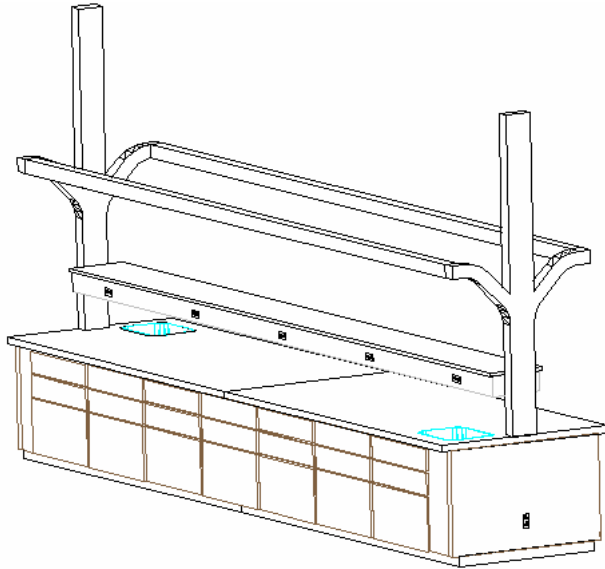


The ATS' are shown at normal power use. In the case of power failure, they will automatically switch to emergency use.



## Lab Bench Electrical

A custom lab bench was designed for the chemical synthesis laboratory. Each bench has a total of twelve receptacles along with light fixtures. Wiring is routed through the utility towers located at each end of the bench.



The lighting consists of eight 42W strip lights. These will be on one circuit for a total load of 336W or 420VA.

Due to receptacles being mounted near water and chemical substances, all will be a GFI or Ground-Fault-Interrupter. These receptacles will automatically disconnect the circuit when the flow of current to ground exceeds 5mA. A total of twelve duplex receptacles are mounted on the bench. Five are located on each side above the lab surface and one on each side of the bench. There will be three receptacles per circuit for a total of four circuits per bench at 540VA per circuit, 2160VA total.



A typical GFI receptacle manufactured by Leviton is shown to the left.

Lab receptacles are NEMA 5-20R.



### Circuiting per lab bench

Load	Circuits	VA Per Circuit
Lighting	1	420VA
Receptacle	4	540VA