

# Precision Power Center

TECHNICAL DATA MANUAL



*Three Phase*  
*15-225 kVA*  
*50 & 60 Hz*



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## NO-COMPROMISE POWER DISTRIBUTION AT LOWER INSTALLED COST

Liebert Precision Power Centers offer distribution, computer-grade grounding, and monitoring. Unlike conventional built-up systems, these Liebert packaged power systems provide easy low-cost installation, simple relocation, security, proven design and performance, electrical isolation, and effective noise suppression.

Figure 1 Conventional built-up system

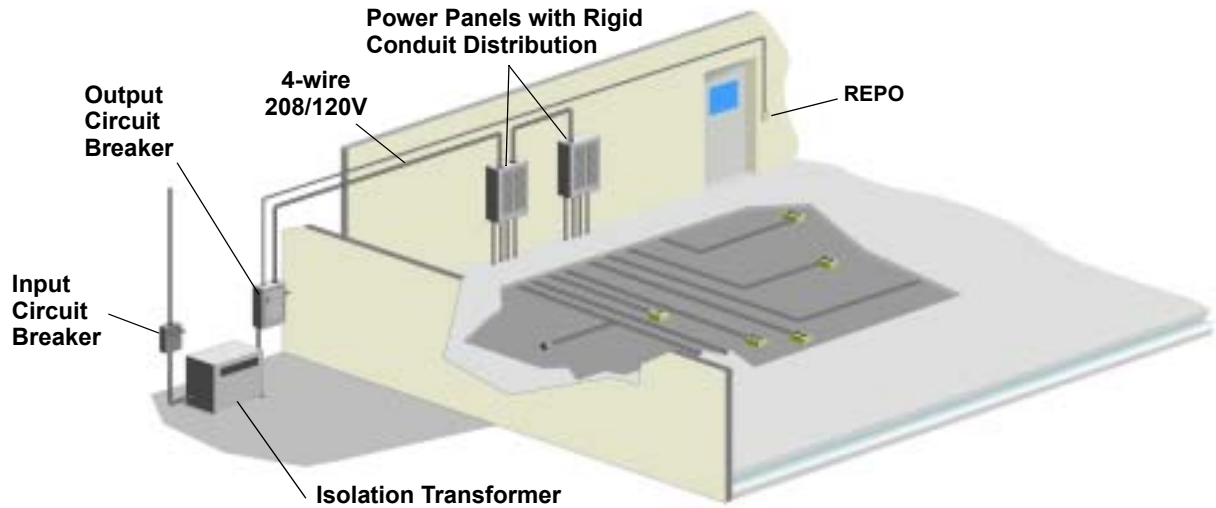


Figure 2 Liebert Precision Power Center

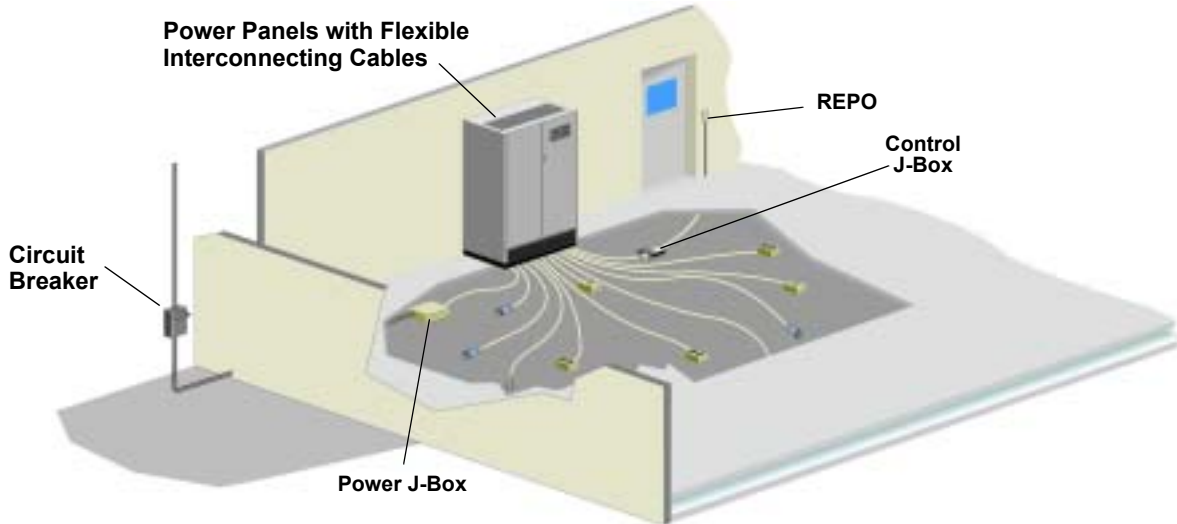
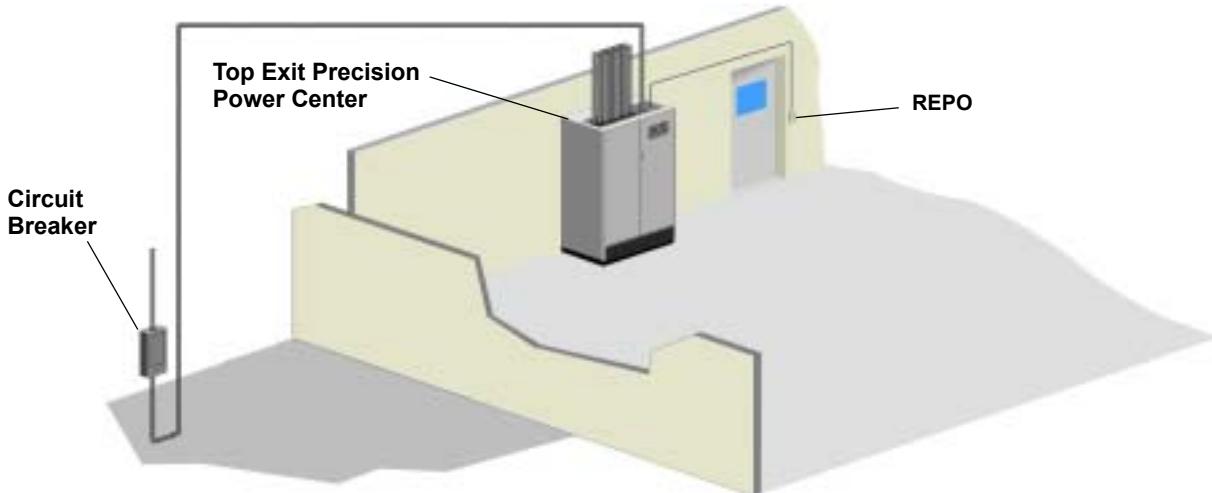


Figure 3 Liebert Precision Power Center—Top Exit



## LIEBERT PACKAGED POWER SYSTEM ADVANTAGES COMPARED TO CONVENTIONAL, BUILT-UP SYSTEMS

Desirable Features	Conventional Built-Up Systems	Liebert Packaged Power System
<b>Proven System Design</b>	<b>No.</b> Each site is a one-of-a-kind installation. "Design" depends on engineer and installer.	<b>Yes.</b> Liebert power systems are complete, proven-design, factory tested to ensure consistent performance. Designed-in distribution flexibility accommodates all installation sites.
<b>Agency Approved</b>	<b>Not as a system.</b> Even though listed components may be used, site-fabricated distribution is subject to acceptance by local inspecting authorities.	<b>Yes.</b> UL listing as a complete system is an assurance of safety.
<b>Factory Tested</b>	<b>No.</b> Testing of performance is done at the site, if at all.	<b>Yes.</b> Factory testing the complete system ensures performance and safety of the system.
<b>Power Quality Improvement</b>	<b>Doubtful.</b> Because of the variables in design and installation, site-fabricated distribution does not consistently offer computer-grade power isolation or ground systems.	<b>Yes.</b> Because packaged power systems have shielded isolation transformers close to the load, they offer power line noise attenuation and controlled grounding.
<b>Computer-Grade Grounding</b>	<b>Difficult.</b> Since site-fabricated distribution seldom includes an isolation transformer in the computer room, a local single point ground system that minimizes common mode disturbances is difficult to establish.	<b>Yes.</b> The packaged power system with isolation transformer automatically establishes a local single-point ground for the critical load. The power grounding point is the same as the computer system grounding point, minimizing common mode disturbances.
<b>Secure Distribution</b>	<b>Possibly.</b> Only if the entire distribution panel is dedicated to the computer and the panel is in the computer room.	<b>Yes.</b> Power distribution panel is in the computer room. Access is limited to authorized personnel.
<b>Circuit Identification</b>	<b>Possibly.</b> Circuit number and receptacle references might be supplied, depending on the installing electrician and available information.	<b>Yes.</b> Identification tags adjacent to each circuit breaker provide circuit identification and description of load served. Each cable is tagged with circuit number and cable length.
<b>Monitoring</b>	<b>Seldom.</b> Some add-on monitoring systems are available, but monitoring also depends on the installing electrician and available information.	<b>Yes.</b> Built-in power parameter monitoring, alarm, and control capabilities are standard in packaged power systems.
<b>Ease of Installation</b>	<b>No.</b> All site-fabricated distribution wiring becomes part of premises wiring.	<b>Yes.</b> A packaged system requires only a single connection to the premises wiring.
<b>Easy System Expansion</b>	<b>No.</b> Conduit installation and wire pulling is time-consuming, and can hamper operations while in progress.	<b>Yes.</b> New cable(s) can be routed quickly with minimal disruption.
<b>Easy System Rearrangement</b>	<b>No.</b> Site-fabricated distribution cannot be easily rearranged. Old conduit and wiring must be removed and new installed.	<b>Yes.</b> Even after major equipment rearrangement, redistributing power from packaged systems becomes a simple matter of re-routing the flexible interconnecting cables.
<b>Easy To Move</b>	<b>No.</b> New distribution must be built at the new site and old conduit and wiring usually must be removed from the former site.	<b>Yes.</b> The package is easily moved with the computer system to the new site.

## CAPACITIES AND CONFIGURATIONS

Liebert packaged power systems provide isolation, monitoring control, conditioning, and local single-point ground to ensure computer-grade power.

With sizes ranging from 15 kVA to 225 kVA in a wide variety of configurations, the Liebert packaged distribution and conditioning systems can meet the requirements of almost any application.

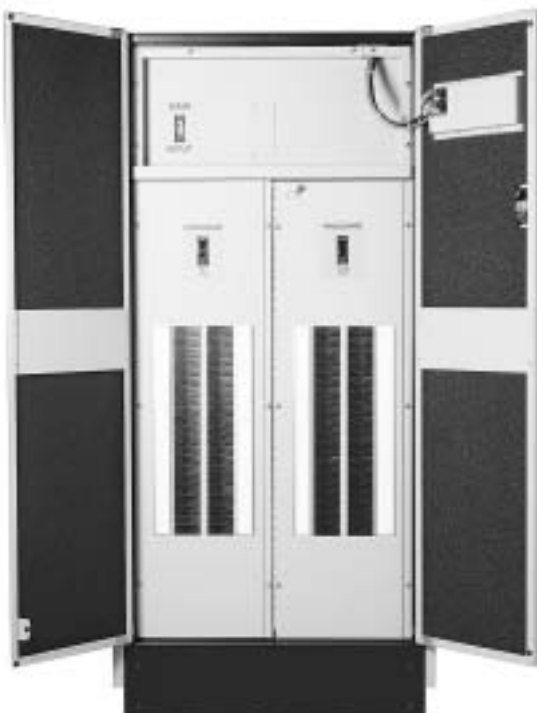
**Figure 4 Precision Power Center, 1-4 panelboards**



15-30 kVA, 1 panelboard



50-225 kVA, 4 panelboards



50-125 kVA, 2 panelboards



50-225 kVA, 3 panelboards

Figure 5 Top Exit Precision Power Center, 1-2 panelboards

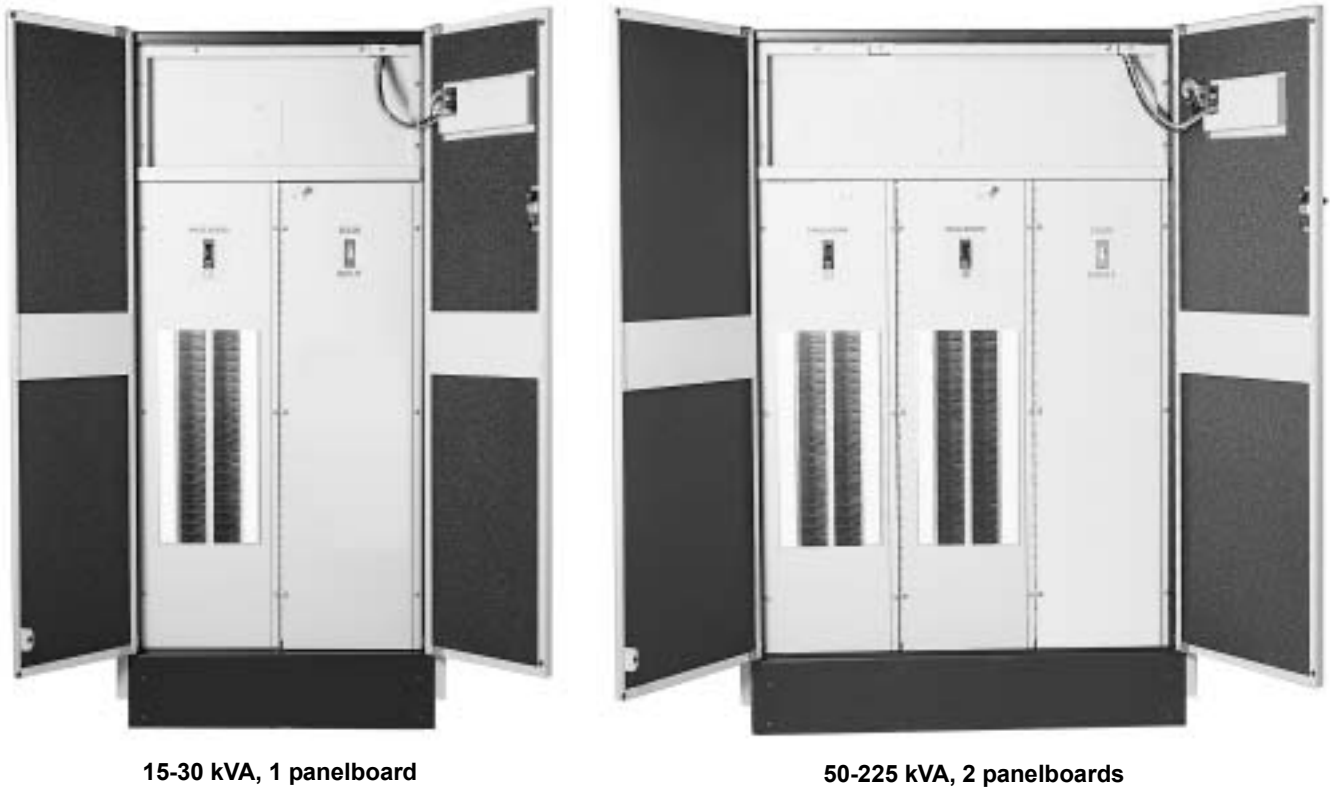
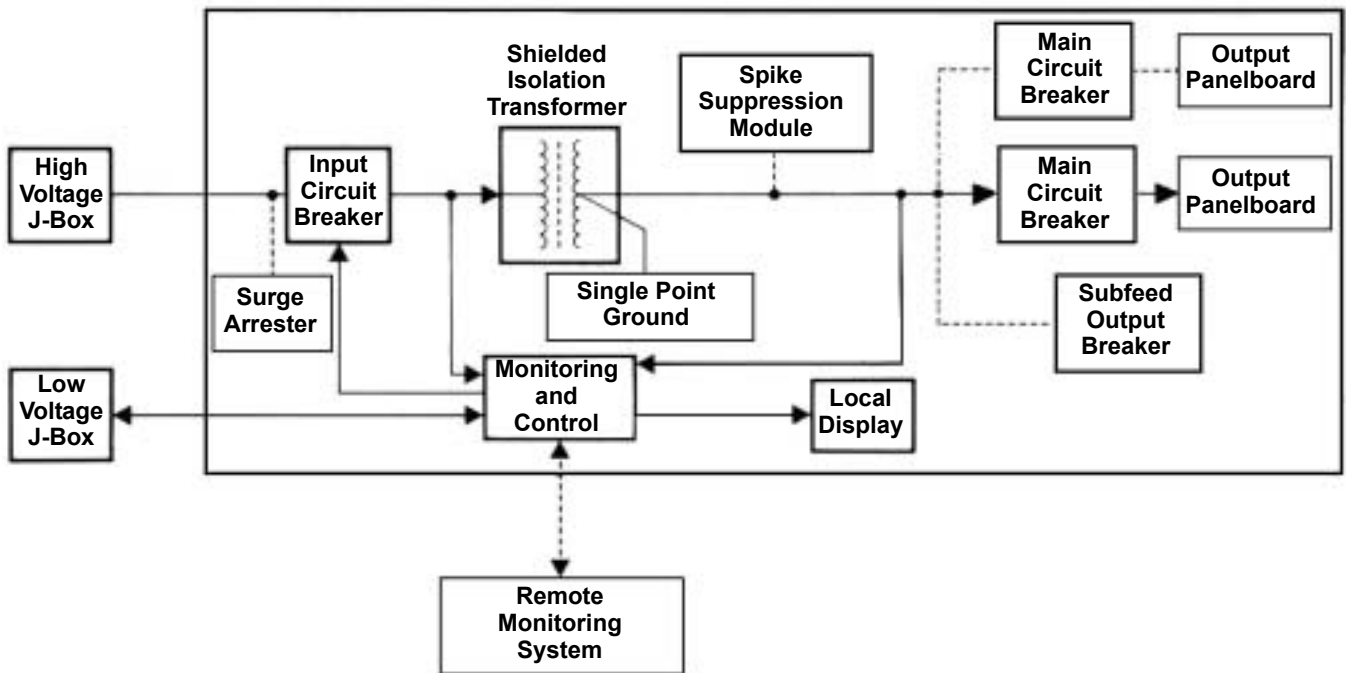


Figure 6 Precision Power Center diagram



## STANDARD FEATURES FOR ALL SYSTEMS



**Shielded Isolation Transformer**



**Temperature Sensors**



**Input Circuit Breaker**

All Liebert distribution and conditioning systems incorporate standard features that ensure load protection and simplify maintenance.

Precision Power Centers use quality, dry type, shielded isolation transformers for noise reduction up to 120 dB, with harmonic voltage distortion of 0.5 percent. Depending on kVA capacity, output impedance is between 3 and 5.5 percent, while full-load efficiency is between 96.5 and 98 percent.

The transformer has temperature sensors in the windings to provide an alarm if internal temperature exceeds 180°C. It will shut down the system if internal temperature exceeds 200°C. Full Class H 220°C transformer insulation and all copper windings are used for long life and efficient operation.

A main input circuit breaker provides either manual control, or automatic shutdown of the system in the event of an overcurrent condition. The breaker is sized for 125 percent of the system input full load amperes. In addition to manual and thermal-magnetic trip, the input breaker can be tripped by an electrically actuated shunt trip mechanism. As a standard feature, the shunt trip of the input circuit breaker is activated by the 200°C temperature sensor, local Emergency Power Off switch, and Manual Restart circuit.

The local Emergency Power Off (EPO) switch is an illuminated push button, easily accessible for emergency shutdown, but fully guarded by a hinged cover to prevent accidental operation.

The manual restart circuit shunt-trips the main input breaker whenever input power fails. This isolates the system from repetitive power applications during fault-clearing operations by the utility, and allows an orderly restart of the system when normal power returns.

The manual restart circuit can be disabled by the manual restart select switch. The auto position of the switch defeats manual restart, and allows the conditioner to automatically restart when power returns. Auto restart is useful for unattended remote sites where the load can automatically restart, and in

those applications where the manual restart function is provided elsewhere in the system.

The low-voltage shunt trip circuit also allows system shutdown by external relays, Remote Emergency Power Off (REPO) switches, or other remote devices. A double-pole, double-throw (dpdt) building interface relay is powered by a 24 VDC supply from the output of the unit. Energized whenever the system is on, the relay drops out if the output voltage disappears. The relay can be used for remote alarming of system shutdown, or shutdown interface with additional loads such as environmental control units.

Power conditioner system components are housed in a welded steel frame with removable panels for maximum accessibility to the interior. For safety and security, any panels that provide access to high voltage require a tool for removal.

### Panelboards

One 42-pole panelboard is provided on 15 and 30 kVA Precision Power Centers. Two 42-pole panelboards (for a total of 84 poles) are provided on 50 through 125 kVA Precision Power Centers. Three 42-pole panelboards (for a total of 126 poles) are provided on 150 through 225 kVA Precision Power Centers. (The three-panelboard configuration is not available on Top Exit units.) Each panelboard is enclosed for safety and has individual isolated neutral and safety ground busbars.

Each panelboard is protected by a main circuit breaker, which also allows manual shutdown of the entire panelboard without affecting the other panelboard(s).

Output circuits are protected by single-, two-, or three-pole thermal-magnetic molded-case branch circuit breakers sized specifically for the load to be served. (Standard panelboards use plug-in breakers.)

## ADDITIONAL FEATURES FOR ALL SYSTEMS

### Flexible Output Cables and Terminations

A flexible output cable system is available for Precision Power Centers. Insulated cable conductors are protected by jacketed, liquid-tight, flexible steel conduit with an integral copper shielding conductor. Each output cable is fabricated to the specified length and type of termination to match the equipment it will be connected to. "Add-on" UL listed cables for field installation are also available.



Terminations include receptacles to match equipment plugs and conduit termination fittings with conductor pigtails for hard wire connection.

### Additional Pole Capacity

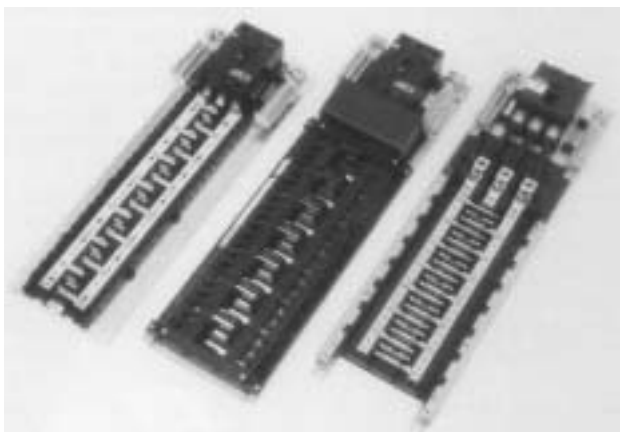
Additional panelboard pole capacity is available for all power distribution units.

An additional 42-pole panelboard can be added to the Precision Power Center for a total of 84 poles.

The Precision Power Center can have three 42-pole panelboards for a total of 126 poles. (The three-panelboard configuration is not available on Top Exit units.) For additional poles, distribution side sections can be added. Each side section provides another 42-pole panelboard.

### Optional Panelboard Types

Branch circuit panelboards that accept bolt-in circuit breakers are optional, as are panelboards for plug-in or bolt-in breakers manufactured by Square-D Company.



### Subfeed Output Circuit Breaker

A subfeed output circuit breaker, powered ahead of the output panelboards, is available on the Precision Power Center to feed a remote distribution unit, panelboards, or other loads. Multiple Subfeed Output Breakers are available upon request.



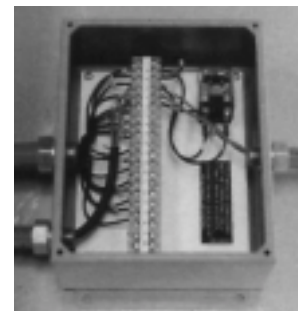
### High-Voltage Junction Box With Flexible Input Cable

The high-voltage junction box can be installed under a raised floor system. The junction box contains terminals for connecting the incoming power line and ground conductors. A 10-foot (3 m) flexible cable is furnished for connection between the junction box and the power conditioning system.



### Low-Voltage Junction Box With Flexible Input Cable

The low-voltage junction box can be installed under a raised floor. It contains terminals for connection of all building interface alarms or controls, and all Remote Emergency Power Off switches. A 10-foot (3-meter) flexible control cable for the system is furnished for connection between the junction box and the power conditioning system.



### Secondary Class Surge Arrester

A secondary class surge arrester using high capacity utility-grade metal oxide resistors is wired to all three phases of the input power to shunt voltage surges to building ground. The arrester is rated for a maximum FOW spark-over of 3200 volts with maximum discharge voltage of 2.2 kV at 1500 amperes, assuming a standard 8 x 20 microsecond waveform. The surge arrester provides protection against high voltage surges that can cause insulation or wiring failures.



### Spike Suppression Module

The spike suppression module consists of AC filter capacitors and dynamic peak limiting devices with a response time of less than 1 nanosecond. Normal mode high frequency noise is attenuated, while high-speed, high-energy transients are limited to a safe level.

### Transformerless System (Not Available on Top Exit Units)

The Precision Power Center can be supplied without a transformer for use with separate power conditioning systems. If step-down and isolation are not necessary, transformerless systems provide the packaged power system advantages of security, distribution, monitoring, and upgrade flexibility.

### Remote Emergency Power Off (REPO) Switch

Pressing the REPO push button activates the shunt trip mechanism of the main input circuit breaker, shutting down the system.

The illuminated and fully guarded REPO button is mounted in a wall box. The assembly includes 50 feet (15.2m) of 3-conductor cable for wiring to the unit. Additional lengths of cable are available.



### Floor Pedestals

In rooms without a raised floor, the floor pedestals provide space for the bottom entrance/exit of cables in Precision Power Center. The height of the floor pedestals is customer-specified. Standard floor pedestal height range is adjustable from 8.6 to 13.25 in. (218 to 336 mm). Other available ranges: 6 to 8.5 in. (152 to 216 mm), and 13.5 to 18 in. (343 to 457 mm). Non-raised floor applications for the Precision Power Center are not CSA approved.



### Transient Suppression Plate

The transient suppression plate is a one-square-meter plate mounted to (and bonded to) the high-voltage junction box. It reduces the effects of transients on the ground system by providing a capacitive coupling to building steel.

### Phase Rotation Meter

The phase rotation meter is a hand-held instrument with clip-on leads for connecting to the circuit under test. The meter shows the circuit phase rotation in “ABC” or “BAC” sequence.

The phase rotation meter can verify rotation sequence of any circuit up to 600 volts.

**Table 1 Features available by model**

	PPC 15-30 kVA	Top Exit 15-30 kVA	PPC 50-125 kVA	Top Exit 50-150 kVA	PPC 150-225 kVA
<b>Panelboards</b>	42 poles standard (one 42-pole panelboard)	42 poles standard (one 42-pole panelboard)	84 poles standard (two 42-pole panelboards)	84 poles standard (two 42-pole panelboards)	126 poles standard (three 42-pole panelboards)
<b>Flexible Output Cables and Terminations</b>	Available	Available	Available	Available	Available
<b>Additional Pole Capacity</b>	Optional 84 poles	Optional 84 poles	Optional 126 or 168 poles	Optional 126 poles	Optional 168 or 210 poles
<b>Optional Panelboard Types</b>	Optional	Optional	Optional	Optional	Optional
<b>Subfeed Output Circuit Breaker</b>	Not available	Not available	Optional (up to 225 A)	Not available	Optional (up to 400 A)
<b>High-Voltage Junction Box with Flexible Input Cable</b>	Standard	Not available	Standard	Not available	Standard
<b>Low-Voltage Junction Box with Flexible Input Cable</b>	Optional	Not available	Optional	Not available	Optional
<b>Secondary Class Surge Arrester</b>	Optional	Optional	Optional	Optional	Optional
<b>Spike Suppression Module</b>	Optional	Optional	Optional	Optional	Optional
<b>Transformerless System</b>	Optional	Not available	Optional	Not available	Optional
<b>Remote Emergency Power Off (REPO) Switch</b>	Optional	Optional	Optional	Optional	Optional
<b>K-20 Transformer</b>	Optional	Optional	Optional	Optional	Optional
<b>Multi-Winding Transformer</b>	Optional	Optional	Optional	Optional	Optional
<b>Floor Pedestals</b>	Optional	Not available	Optional	Not available	Optional
<b>Transient Suppression Plate</b>	Optional	Not available	Optional	Not available	Optional

## HARMONICS SOLUTIONS

### Solutions to Harmonics Problems

Precision Power Centers are available with several harmonic solution options, along with the standard product features, to provide flexible power distribution for today's nonlinear loads.

The basic Precision Power Center is designed to accommodate moderate levels of harmonic currents. All Precision Power Center isolation transformers provide cancellation of the load triplen harmonic currents and are designed to tolerate neutral currents up to 1.73 times full load. When severe levels of harmonic currents are anticipated, several additional power center features are available.

### K-Factor Transformers

Shielded isolation transformers with a K-20 rating are specially designed to minimize the heating effects of the load's harmonic currents and to tolerate full harmonic loading without overheating.

### Multi-Winding Transformers

Shielded isolation transformers with multiple secondary windings that are phase shifted provide cancellation of the load's non-triplen harmonic currents.

Features Comparison	Basic System	With K-Factor Transformer	With Multi-Winding Transformer
Designed for nonlinear loads	X	X	X
Neutral sized for greater than 1.73X FLA	X	X	X
Available with multiple outputs for mainframe computers	X	X	X
Reduces harmonic current distortion	X	X	X
Improves harmonic power factor	X	X	X
Cancels triplen (3rd, 9th, 15th, etc.) harmonics	X	X	X
Tolerates higher levels of harmonic currents		X	X
Cancels non-triplen (5th, 7th, etc.) harmonics			X

## SYSTEM MONITORING

Monitoring systems for Liebert power conditioners range from temperature sensing to multiple-parameter monitoring with remote display and printout.

All units are equipped with a guarded and illuminated Local Emergency Power Off switch; provisions for connecting Remote Emergency Power Off switch; selectable auto or manual restart feature, to allow an orderly system restart after a power failure; a summary alarm contact; and a building interface relay.



### Power Monitor Panel

True RMS techniques are used to provide accurate measurements of Precision Power Center operation, while the high visibility Liquid Crystal Display provides clear reporting. The microprocessor-based power monitoring system continuously monitors and sequentially displays the following parameters:

- Input voltages, line-to-line for each phase
- Output voltages, line-to-line and line-to-neutral for each phase
- Output currents for each phase, including neutral and ground currents
- Output voltage THD for each phase
- Output current THD, K-factor and crest factor for each phase
- Output power including kVA, KW, KW-hours, power factor, percent load and output frequency

The monitor panel also provides warning of out-of-spec conditions through audible alarm and displayed alarm messages. All alarmed conditions are retained in a non-volatile memory until reset. Alarm thresholds are adjustable, to meet individual site needs.

Alarmed conditions include:

- Output overvoltage
- Output undervoltage
- Output voltage THD
- Output overcurrent
- Neutral overcurrent
- Ground overcurrent
- Transformer overtemperature
- Frequency deviation
- Phase sequence error
- Phase loss
- Five customer-specified alarm conditions

For additional application flexibility, the following alarms can be configured to shut down the Precision Power Center-output over/under voltage; phase sequence error; phase loss; ground overcurrent.

Through a two-conductor communications cable, the system can communicate alarms and monitored conditions to a Liebert SiteScan central monitoring system. An isolated RS-232 ASCII communication port is provided for communication to other monitoring systems.

### Basic Temperature Monitoring Panel

The Transformer Overtemperature alarm indicator is a part of the 180°C transformer temperature sensing circuit. This configuration is optional on all units.

## Remote Monitoring Systems

### SiteScan

SiteScan is an on-line center for monitoring and controlling all support systems in a large data processing installation. SiteScan provides early warning alarms and total site management data. A software-based system using a microcomputer as the central processing center, SiteScan is programmable, menu-driven, and upgradeable.



Four primary site management programs are built into SiteScan:

- **Alarm functions** provide instant warning of potential problems. A seven level selection of options for response to each alarm offers total flexibility in designing a custom-tailored alarm system.
- **Control functions** allow critical setpoints and sensitivities to be adjusted by remote control for dynamic, single-point site management. Password access preserves site security.
- **Status functions** provide complete information on all computer support systems, including real-time status of all monitored parameters and any alarm conditions.
- **History functions** offer database management capabilities. These functions track, store and graphically display crucial data and trends for site management activities such as capacity analysis, growth predictions, and energy management. SiteScan makes full use of all features of its computer-based central processor, including RS-232 communications and other output ports and unlimited expansion via multiplexers. For critical data processing facilities, the SiteScan system offers total site management capability in a virtually obsolescence-proof configuration.

**PHYSICAL/ELECTRICAL DATA****Table 2 Electrical and mechanical characteristics, 60 Hz**

Size, kVA	Input Volts	Output Volts	Model Number	Weight lbs (kg)	Total Output Poles (Standard)	Input Full Load Amps	Main Input Circuit Breaker	Dimensions W x D x H inches (mm)
<b>15 kVA</b>								
(with transformer)	600V	208/120V	PPB015C	550 (250)	42	15	20	20 x 32 x 68 (508 x 813 x 1727)
	480V	208/120V	PPA015C	550 (250)	42	19	25	
	208V	208/120V	PPC015C	550 (250)	42	43	60	
(without transformer)	208/120V	208/120V	PRC015	300 (136)	42	42	60	
<b>30 kVA</b>								
(with transformer)	600V	208/120V	PPB030C	700 (320)	42	30	40	20 x 32 x 68 (508 x 813 x 1727)
	480V	208/120V	PPA030C	700 (320)	42	38	50	
	208V	208/120V	PPC030C	700 (320)	42	87	110	
(without transformer)	208/120V	208/120V	PRC030	300 (136)	42	83	110	
<b>50 kVA</b>								
(with transformer)	600V	208/120V	PPB050C	850 (380)	84	50	70	32 x 32 x 68 (813 x 813 x 1727)
	480V	208/120V	PPA050C	850 (380)	84	63	80	
	208V	208/120V	PPC050C	850 (380)	84	145	200	
(without transformer)	208/120V	208/120V	PRC050	400 (175)	84	139	175	
<b>75 kVA</b>								
(with transformer)	600V	208/120V	PPB075C	1050 (470)	84	74	100	32 x 32 x 68 (813 x 813 x 1727)
	480V	208/120V	PPA075C	1050 (470)	84	93	125	
	208V	208/120V	PPC075C	1050 (470)	84	215	300	
(without transformer)	208/120V	208/120V	PRC075	400 (175)	84	208	300	
<b>100 kVA</b>								
(with transformer)	600V	208/120V	PPB100C	1275 (580)	84	99	125	32 x 32 x 68 (813 x 813 x 1727)
	480V	208/120V	PPA100C	1275 (580)	84	124	175	
	208V	208/120V	PPC100C	1275 (580)	84	286	400	
(without transformer)	208/120V	208/120V	PRC100	450 (200)	84	277	350	
<b>125 kVA</b>								
(with transformer)	600V	208/120V	PPB125C	1450 (660)	84	124	175	32 x 32 x 68 (813 x 813 x 1727)
	480V	208/120V	PPA125C	1450 (660)	84	155	200	
	208V	208/120V	PPC125C	1450 (660)	84	358	450	
(without transformer)	208/120V	208/120V	PRC125	450 (200)	84	347	450	
<b>150 kVA</b>								
(with transformer)	600V	208/120V	PPB150C	1750 (790)	126	148	200	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA150C	1750 (790)	126	185	250	
	208V	208/120V	PPC150C	1750 (790)	126	427	600	
(without transformer)	208/120V	208/120V	PRC150	700 (320)	126	416	600	
<b>200 kVA</b>								
(with transformer)	600V	208/120V	PPB200C	2100 (950)	126	197	250	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA200C	2100 (950)	126	247	350	
<b>225 kVA</b>								
(with transformer)	600V	208/120V	PPB225C	2250 (1020)	126	222	300	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA225C	2250 (1020)	126	278	350	

**NOTES**

- All input and output ratings are three-phase.
- Consult factory for voltages and applications not shown.
- For extra panelboard option: 84 pole models are 32" (813 mm) wide; 126 pole models are 44" (1118 mm) wide; and 168 pole models are 62" (1575 mm) wide.

Standard main input circuit breaker interrupting ratings are as follows. Other ratings available on request.

Input OPD	208V	480V	600V
Up to 250 Amps	65 kA	35 kA	22 kA
300 to 600 Amps	65 kA	35 kA	25 kA

**Table 3 Electrical and mechanical characteristics, 50 Hz**

Size, kVA	Input Volts	Output Volts	Model Number	Weight lbs (kg)	Total Output Poles (Standard)	Input Full Load Amps	Main Input Circuit Breaker	Dimensions W x D xH inches (mm)	
<b>15kVA</b>									
(with transformer)	415V	415/240V	PPG015G	600 (275)	42	22	30	20 x 32 x 68 (508 x 813 x 1727)	
	400V	400/230V	PPU015U	600 (275)	42	23	30		
	380V	380/220V	PPF015F	600 (275)	42	24	30		
(without transformer)	415/240V	415/240V	PRG015	300 (136)	42	21	30		
	380/220V	380/220V	PRF015	300 (136)	42	23	30		
<b>30 kVA</b>									
(with transformer)	415V	415/240V	PPG030G	775 (350)	42	43	60	20 x 32 x 68 (508 x 813 x 1727)	
	400V	400/230V	PPU030U	775 (350)	42	45	60		
	380V	380/220V	PPF030F	775 (350)	42	47	60		
(without transformer)	415/240V	415/240V	PRG030	300 (136)	42	42	60		
	380/220V	380/220V	PRF030	300 (136)	42	46	60		
<b>50 kVA</b>									
(with transformer)	415V	415/240V	PPG050G	925 (420)	84	72	100	32 x 32 x 68 (813 x 813 x 1727)	
	400V	400/230V	PPU050U	925 (420)	84	75	100		
	380V	380/220V	PPF050F	925 (420)	84	79	100		
(without transformer)	415/240V	415/240V	PRG050	400 (175)	84	70	90		
	380/220V	380/220V	PRF050	400 (175)	84	76	100		
<b>75 kVA</b>									
(with transformer)	415V	415/240V	PPG075G	1150 (520)	84	108	150	32 x 32 x 68 (813 x 813 x 1727)	
	400V	400/230V	PPU075U	1150 (520)	84	112	150		
	380V	380/220V	PPF075F	1150 (520)	84	117	150		
(without transformer)	415/240V	415/240V	PRG075	400 (175)	84	104	150		
	380/220V	380/220V	PRF075	400 (175)	84	114	150		
<b>100 kVA</b>									
(with transformer)	415V	415/240V	PPG100G	1400 (630)	84	143	200	32 x 32 x 68 (813 x 813 x 1727)	
	400V	400/230V	PPU100U	1400 (630)	84	149	200		
	380V	380/220V	PPF100F	1400 (630)	84	157	200		
(without transformer)	415/240V	415/240V	PRG100	450 (200)	84	139	175		
	380/220V	280/220V	PRF100	450 (200)	84	152	200		
<b>125 kVA</b>									
(with transformer)	415V	415/240V	PPG125G	1575 (710)	84	179	225	32 x 32 x 68 (813 x 813 x 1727)	
	400V	400/230V	PPU125U	1575 (710)	84	186	250		
	380V	380/220V	PPF125F	1575 (710)	84	196	250		
(without transformer)	415/240V	415/240V	PRG125	450 (200)	84	174	225		
	380/220V	380/220V	PRF125	450 (200)	84	190	250		
<b>150 kVA</b>									
(with transformer)	415V	415/240V	PPG150G	1900 (860)	126	214	300	44 x 32 x 68 (1118 x 813 x 1727)	
	400V	400/230V	PPU150U	1900 (860)	126	223	300		
	380V	380/220V	PPF150F	1900 (860)	126	234	300		
(without transformer)	415/240V	415/240V	PRG150	700 (320)	126	209	300		
	380/220V	380/220V	PRF150	700 (320)	126	228	300		
<b>200 kVA</b>									
(with transformer)	415V	415/240V	PRG200G	2300 (1045)	126	285	400	44 x 32 x 68 (1118 x 813 x 1727)	
	400V	400/230V	PPU200U	2300 (1045)	126	297	400		
	380V	380/220V	PPF200F	2300 (1045)	126	312	400		
<b>225 kVA</b>									
(with transformer)	415V	415/240V	PPG225G	2450 (1110)	126	321	450		44 x 32 x 68 (1118 x 813 x 1727)
	400V	400/230V	PPU225U	2450 (1110)	126	334	450		
	380V	380/220V	PPF225F	2450 (1110)	126	351	450		

**NOTES**

- All input and output ratings are three-phase.
- Consult Factory for voltages and applications not shown.
- For extra panelboard option: 84 pole models are 32" (813 mm) wide; 126 pole models are 44" (1118 mm) wide; and 168 pole models are 62" (1575 mm) wide.

Standard main input circuit breaker interrupting ratings (rated symmetrical ultimate breaking capacity per IEC 947-2) are as follows. Other ratings available upon request.

INPUT OPD	380-415V
Up to 110 Amps	15 kA
125 to 600 Amps	25 kA

**Table 4 Electrical and mechanical characteristics, Top Exit**

Size, kVA	Input Volts	Output Volts	Model Number	Weight lbs (kg)	Total Output Poles (Standard)	Input Full Load Amps	Main Input Circuit Breaker	Dimensions W x D x H inches (mm)
15 kVA	600V	208/120V	PPB015C	600 (272)	42	15	20	32 x 32 x 68 (813 x 813 x 1727)
	480V	208/120V	PPA015C	600 (272)	42	19	25	
	208V	208/120V	PPC015C	600 (272)	42	43	60	
30 kVA	600V	208/120V	PPB030C	750 (340)	42	30	40	32 x 32 x 68 (813 x 813 x 1727)
	480V	208/120V	PPA030C	750 (340)	42	38	50	
	208V	208/120V	PPC030C	750 (340)	42	87	110	
50 kVA	600V	208/120V	PPB050C	900 (408)	84	50	70	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA050C	900 (408)	84	63	80	
	208V	208/120V	PPC050C	900 (408)	84	145	200	
75 kVA	600V	208/120V	PPB075C	1100 (499)	84	74	100	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA075C	1100 (499)	84	93	125	
	208V	208/120V	PPC075C	1100 (499)	84	215	300	
100 kVA	600V	208/120V	PPB100C	1325 (601)	84	99	125	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA100C	1325 (601)	84	124	175	
	208V	208/120V	PPC100C	1325 (601)	84	286	400	
125 kVA	600V	208/120V	PPB125C	1500 (680)	84	124	175	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA125C	1500 (680)	84	155	200	
	208V	208/120V	PPC125C	1500 (680)	84	358	450	
150 kVA	600V	208/120V	PPB150C	1750 (794)	84	148	200	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA150C	1750 (794)	84	185	250	
	208V	208/120V	PPC150C	1750 (794)	84	427	600	
200 kVA	600V	208/120V	PPB200C	2100 (958)	84	197	250	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA200C	2100 (958)	84	247	350	
225 kVA	600V	208/120V	PPB225C	2250 (1021)	84	222	200	44 x 32 x 68 (1118 x 813 x 1727)
	480V	208/120V	PPA225C	2250 (1021)	84	278	250	

**NOTES**

- All input and output ratings are three-phase.
- Consult factory for voltages and applications not shown.
- For extra panelboard option: 84 pole models are 44" (1118 mm) wide; and 126 pole models are 62" (1575 mm) wide.

Standard main input circuit breaker interrupting ratings are as follows. Other ratings available on request.

Input OPD	208V	480V	600V
Up to 250 Amps	65 kA	35 kA	22 kA
300 to 600 Amps	65 kA	35 kA	25 kA

**HEAT OUTPUT****Table 5 Heat output**

kVA	1/2 Load BTU/hr (kW)	3/4 Load BTU/hr (kW)	Full Load BTU/hr (kW)
15	1300 (.38)	1900 (.57)	2500 (.73)
30	2200 (.64)	3400 (1.00)	4600 (1.35)
50	3100 (.91)	4650 (1.36)	6200 (1.82)
75	4100 (1.20)	6150 (1.80)	8150 (2.39)
100	5050 (1.48)	7700 (2.26)	9900 (2.90)
125	5800 (1.70)	8700 (2.55)	11500 (3.37)
150	6300 (1.85)	9400 (2.75)	12500 (3.66)
200	7700 (2.26)	11500 (3.37)	15500 (4.54)
225	7800 (2.29)	11800 (3.46)	15800 (4.63)

**Environmental Characteristics**

Temperature, operating:	0°C to +40°C
Temperature, storage:	55°C to + 85°C
Relative humidity:	0% to 95% (non-condensing)

## SYSTEM SIZING

Sizing a power center to meet present and future needs is a fundamental requirement.

### Present Requirements

Estimating the present system size in kilovolt amperes (kVA) is done in a number of ways. Typical sources include computer site planning manuals, equipment nameplate data, and electrical service data. kVA requirements are estimated using any of the following formulas:

V = volts	pf = power factor
A = amperes	• = "multiplied by"
kVA = kilovolt-amperes	BTU/hr = British Thermal Units per hour (heat output)
kW = kilowatts	Kcal/hr = kilocalories per hour (heat output)

1. Power profile of equipment. (This is the most reliable base from which to estimate present kVA loading.)

For three-phase systems:

$$\text{kVA} = \frac{V \cdot A \cdot (1.73)}{1000}$$

$$A = \frac{\text{kVA} \cdot 1000}{V \cdot (1.73)}$$

For single-phase equipment:

$$\text{kVA} = \frac{V \cdot A}{1000}$$

$$A = \frac{\text{kVA} \cdot 1000}{V}$$

2. Kilowatts (kW) and Power Factor (pf).

$$\text{kVA} = \frac{\text{kW}}{\text{pf}}$$

(If pf is not given, assume 0.8.)

3. Ampere specifications for the electrical service feeding the site:

$$\text{kVA} = \frac{V \cdot A \cdot (1.73)}{1000}$$

(for three-phase systems)

4. BTU/hr or Kcal/hr specifications:

$$\text{kW} = \frac{\text{BTU}/(\text{hr})}{3413} = \frac{\text{kcal}/(\text{hr})}{860}$$

$$\text{kVA} = \frac{\text{kW}}{\text{pf}}$$

(If pf is not known, assume 0.8.)

After the present kVA requirement has been determined, the anticipated growth and the special characteristics of the load must be considered.

### Growth Requirements

The power center should be sized to anticipate growth. Growth rates associated with data processing centers double power requirements in a short time. Therefore it is reasonable to size the system for twice the present kVA load. Even in a minimum growth environment, the power center should be sized for 125% of the estimated kVA load.

### Special Load Characteristics

For special load characteristics, factory application engineers should be consulted for recommended system sizing.

### System Grounding Considerations

The grounding of any power conditioning system is critical to its performance. The National Electrical Code provides for a safe electrical system. The ground path required by the NEC for safety should be enhanced or improved for system performance, never defeated or eliminated. For detailed system grounding considerations, refer to the Precision Power Center Installation Operation and Maintenance Manual.

## SERVICE ACCESS AND CLEARANCE REQUIREMENTS

Precision Power Centers are designed for easy servicing. Access areas and minimum clearances of each are described below.

### Precision Power Center - 15-225 kVA sizes

Recommended minimum service clearances for Precision Power Centers should be at the front and one other side, or rear. Service clearance extends 42 in. (1067 mm) from the unit in accordance with the National Electrical Code. If bottom cable exit is desired, there must be at least 6" (143 mm) clearance at the bottom of the unit.

(NOTE: If bottom cable exit or distribution cables are used, the unit must be installed on a raised floor or floor pedestals must be provided. **Non-raised floor applications are not CSA approved.**)

Units with a transformer require 18" (427 mm) above the unit for cooling airflow.

Figure 7 Dimensions, clearances, 1 panelboard

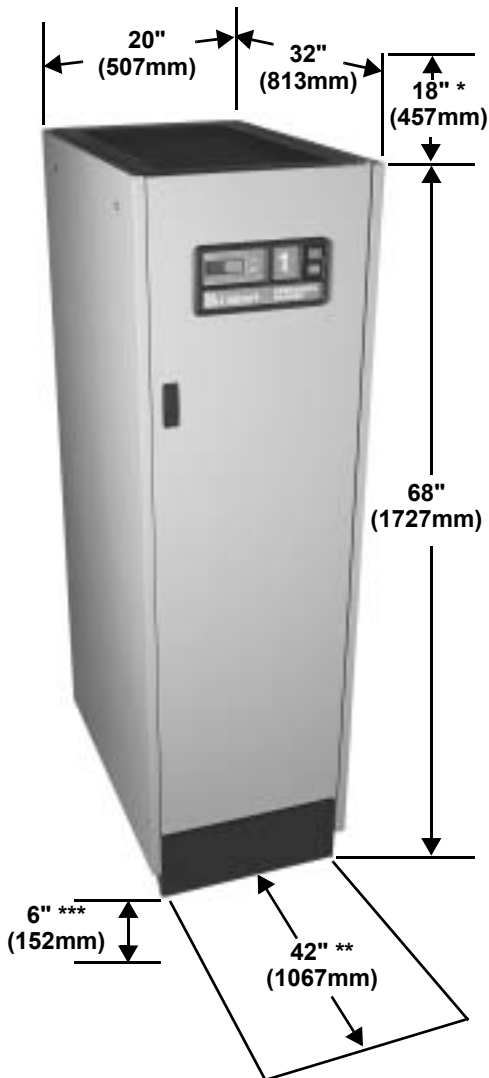


Figure 8 Dimensions, clearances, 2 panelboards



- \* 16For units with transformer
- \*\* Required in front of unit plus on one other side or in back
- \*\*\* For bottom cable exit

Figure 9 Dimensions, clearances, 3 panelboards



Figure 10 Dimensions, clearances, 4 panelboards

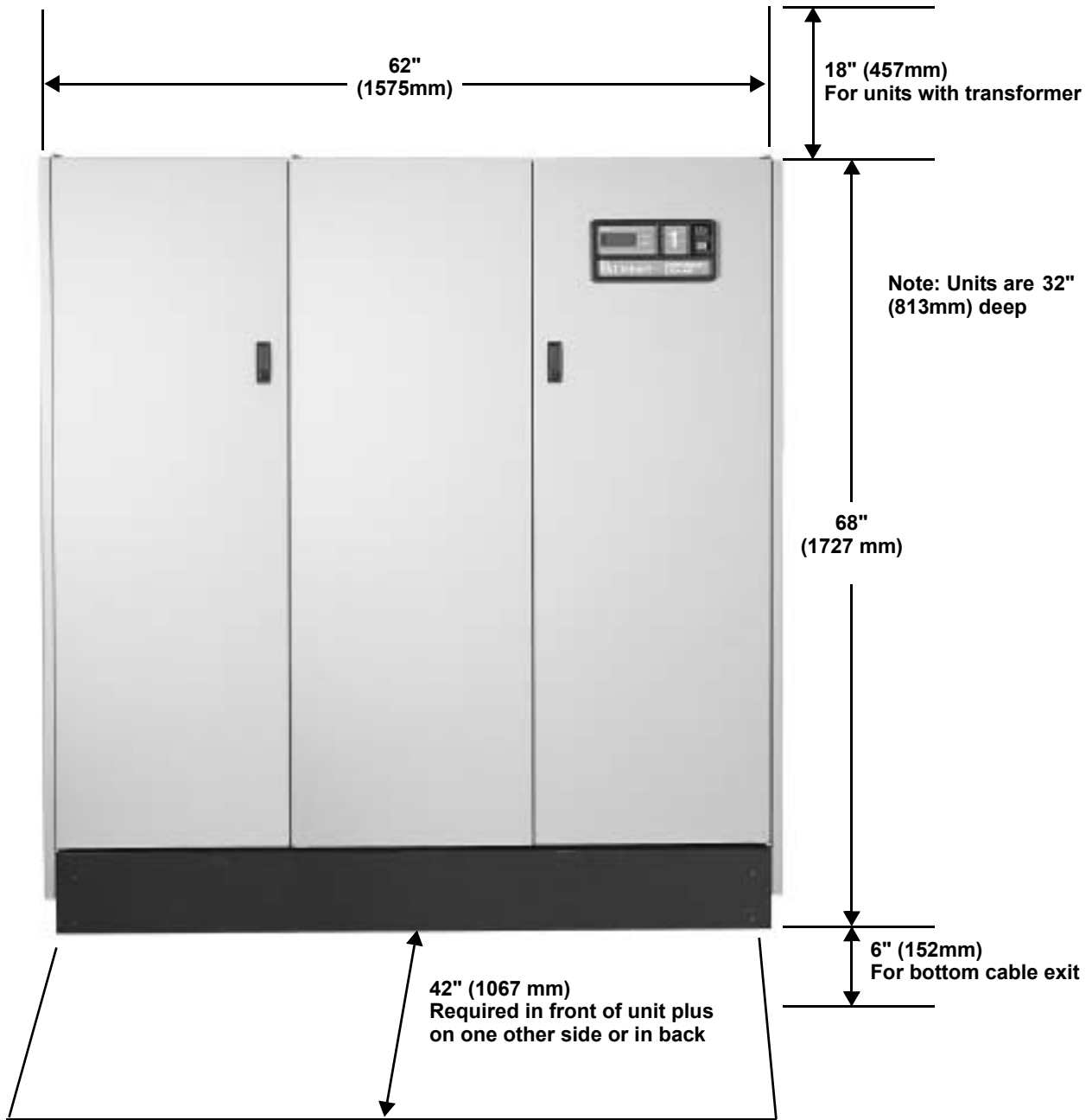
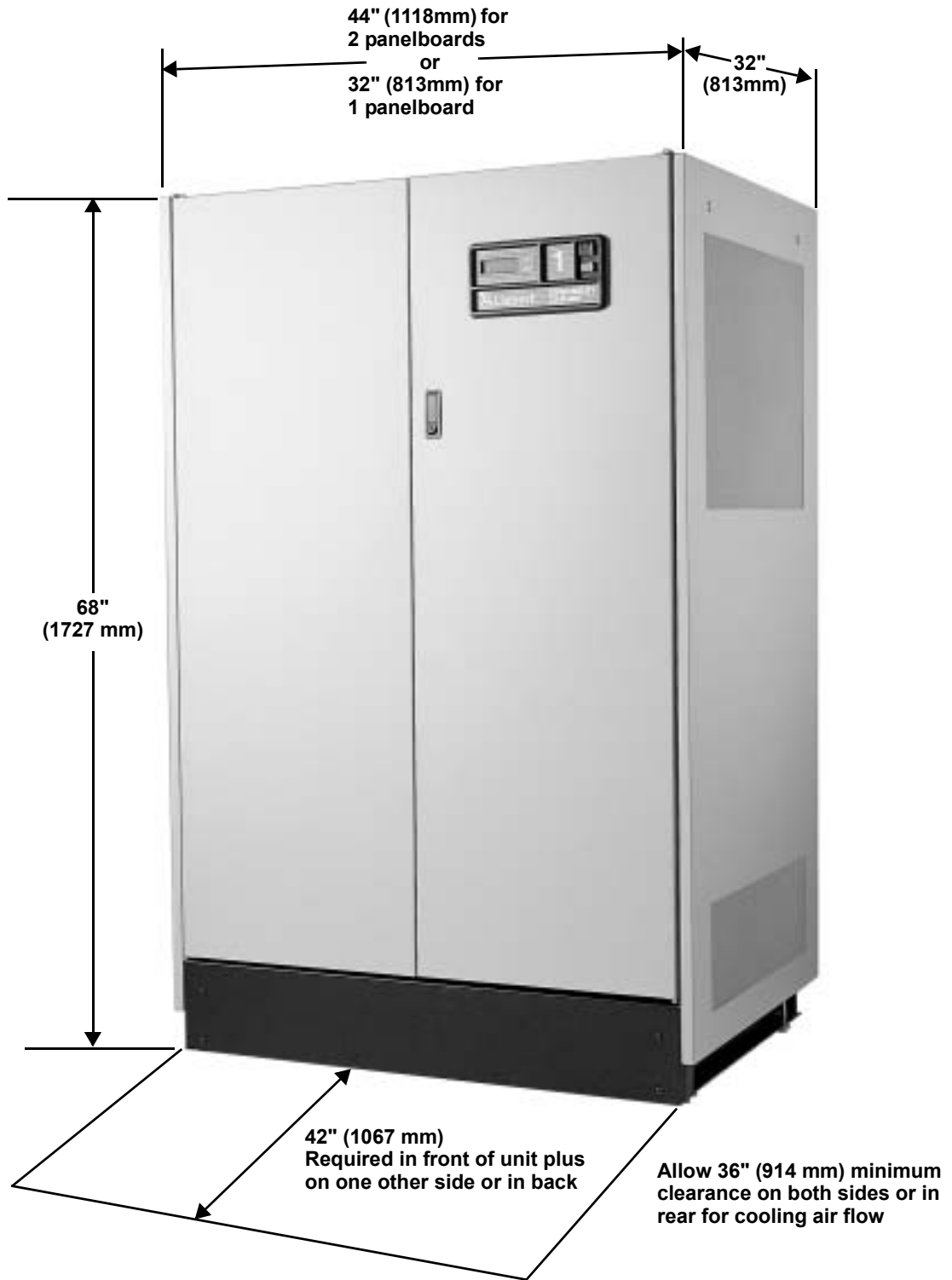


Figure 11 Dimensions, clearances, Top Exit unit







# Precision Power Center

## TECHNICAL DATA MANUAL

### The Company Behind the Products

With over a million installations around the globe, Liebert is the world leader in computer protection systems. Since its founding in 1965, Liebert has developed a complete range of support and protection systems for sensitive electronics:

- Environmental systems—close-control air conditioning from 1 to 60 tons
- Power conditioning and UPS with power ranges from 300 VA to more than 1000 kVA
- Integrated systems that provide both environmental and power protection in a single, flexible package
- Monitoring and control—from systems of any size or location, on-site or remote
- Service and support through more than 100 service centers around the world and a 24/7 Customer Response Center

While every precaution has been taken to ensure the accuracy and completeness of this literature, Liebert Corporation assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions.

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