Liebert
Keeping Business In Business

POWER CONVERSION/DISTRIBUTION

Precision Power Center

TECHNICAL DATA MANUAL

Three Phase
15-225 kVA
50 & 60 Hz

EMERSON
Network Power

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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

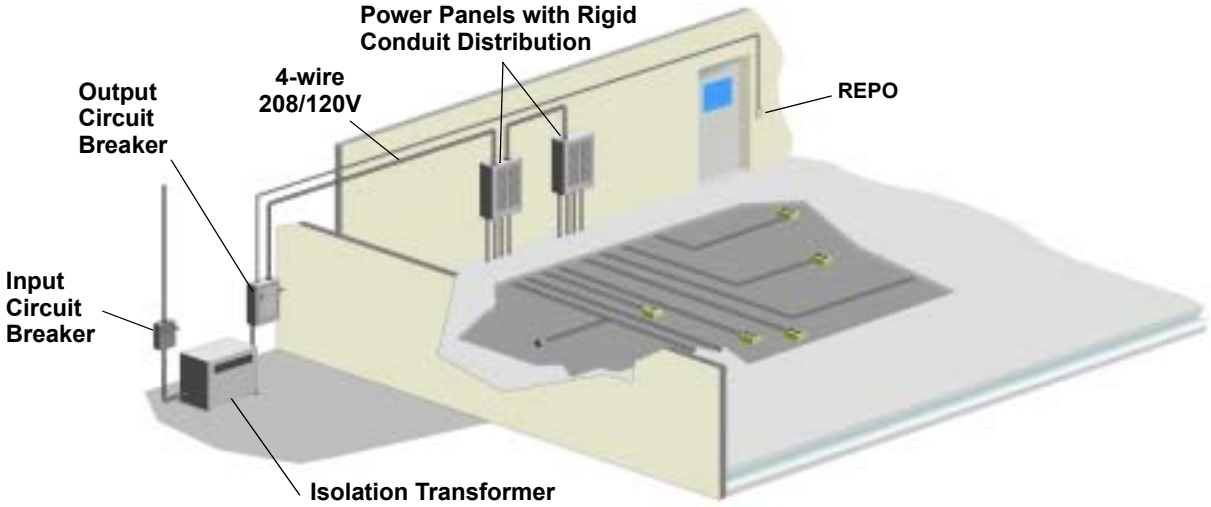


Figure 2 Liebert Precision Power Center

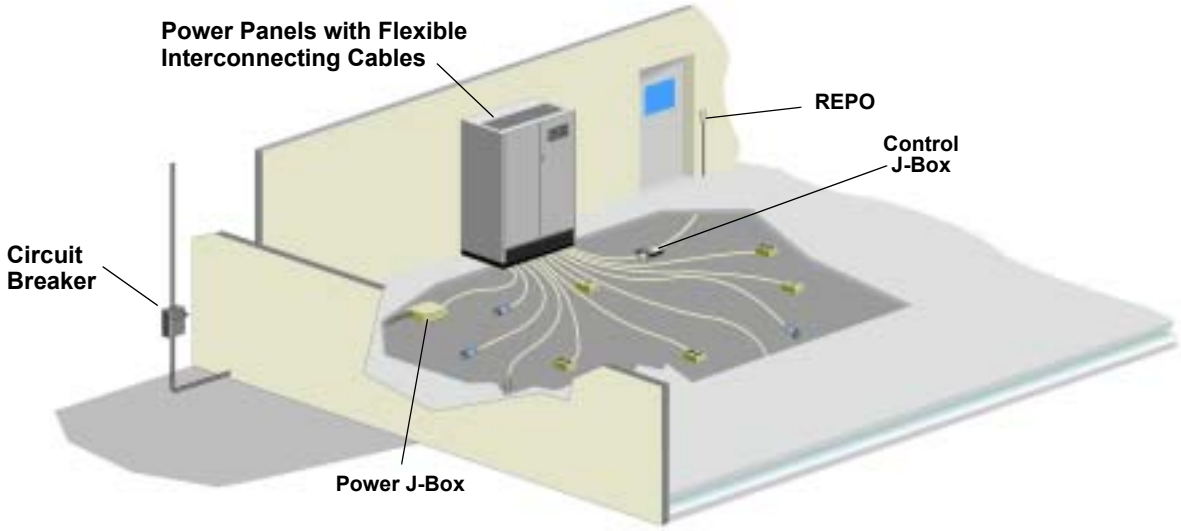
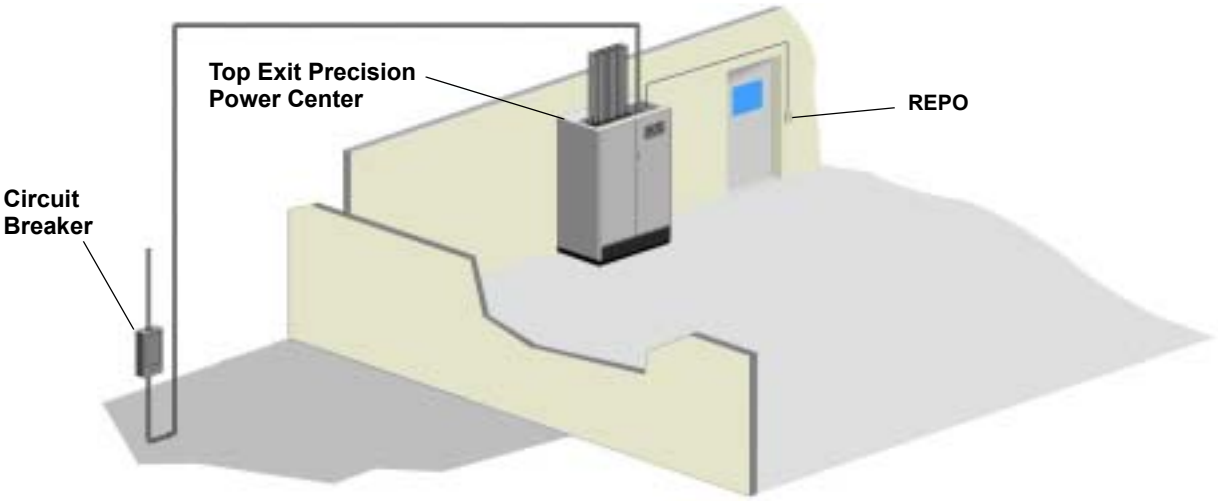


Figure 3 Liebert Precision Power Center—Top Exit



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

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

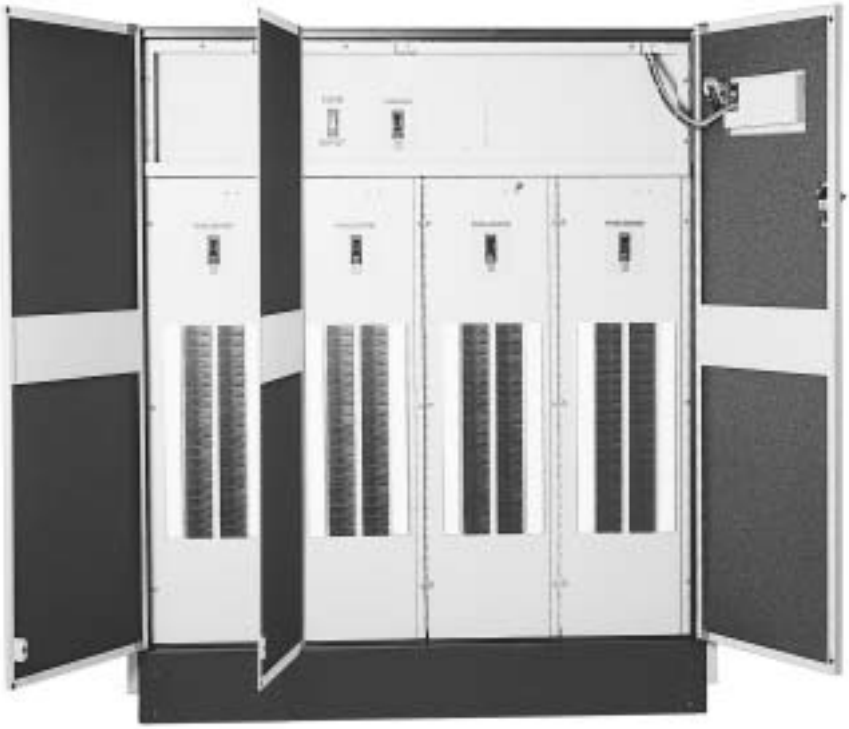
CAPACITIES AND CONFIGURATIONS

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

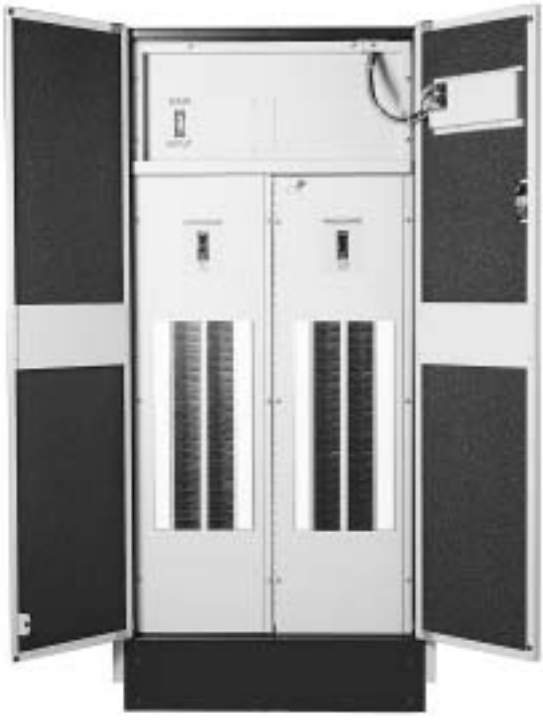
With sizes ranging from 15 kVA to 225 kVA in a wide variety of configurations, the Liebert packaged distribution and conditioning systems can meet the requirements of almost any application.

Figure 4 Precision Power Center, 1-4 panelboards

15-30 kVA, 1 panelboard



50-225 kVA, 4 panelboards



50-125 kVA, 2 panelboards

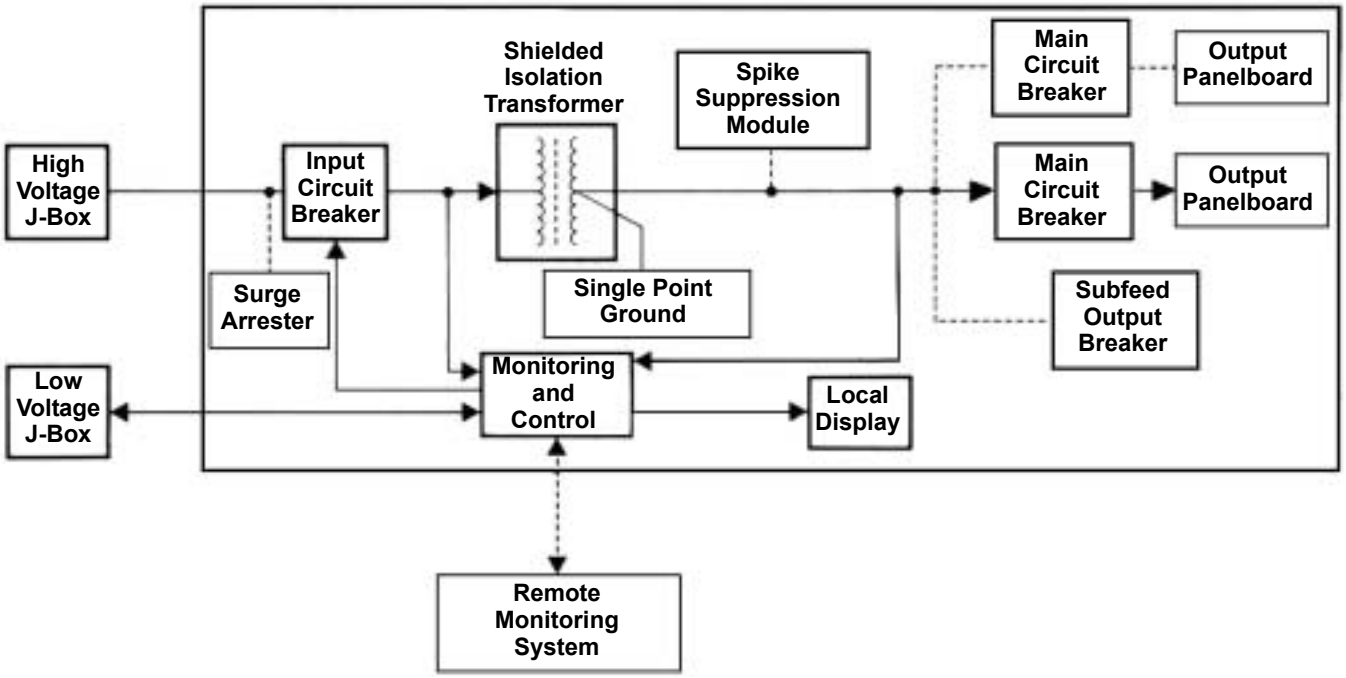
50-225 kVA, 3 panelboards

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

15-30 kVA, 1 panelboard

50-225 kVA, 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

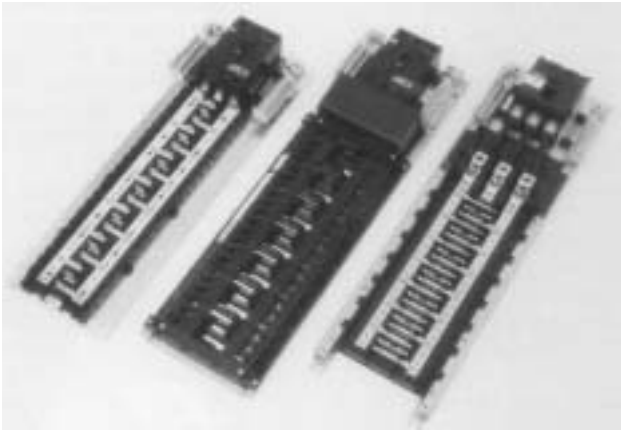
Additional panelboard pole capacity is available for all power distribution units.

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.



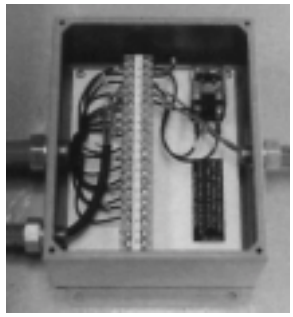
Subfeed Output Circuit Breaker

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

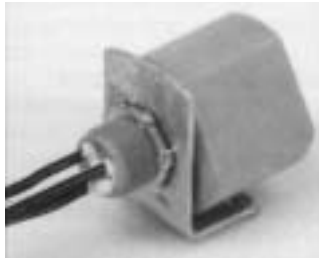
The high-voltage junction box can be installed under a raised floor system. The junction box contains terminals for connecting the incoming power line and ground conductors. A 10-foot (3 m) flexible cable is furnished for connection between the junction box and the power conditioning system.

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 (15.2 m) 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
Panelboards	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)
Flexible Output Cables and Terminations	Available	Available	Available	Available	Available
Additional Pole Capacity	Optional 84 poles	Optional 84 poles	Optional 126 or 168 poles	Optional 126 poles	Optional 168 or 210 poles
Optional Panelboard Types	Optional	Optional	Optional	Optional	Optional
Subfeed Output Circuit Breaker	Not available	Not available	Optional (up to 225 A)	Not available	Optional (up to 400 A)
High-Voltage Junction Box with Flexible Input Cable	Standard	Not available	Standard	Not available	Standard
Low-Voltage Junction Box with Flexible Input Cable	Optional	Not available	Optional	Not available	Optional
Secondary Class Surge Arrester	Optional	Optional	Optional	Optional	Optional
Spike Suppression Module	Optional	Optional	Optional	Optional	Optional
Transformerless System	Optional	Not available	Optional	Not available	Optional
Remote Emergency Power Off (REPO) Switch	Optional	Optional	Optional	Optional	Optional
K-20 Transformer	Optional	Optional	Optional	Optional	Optional
Multi-Winding Transformer	Optional	Optional	Optional	Optional	Optional
Floor Pedestals	Optional	Not available	Optional	Not available	Optional
Transient Suppression Plate	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)
15 kVA								
(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	
30 kVA								
(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	
50 kVA								
(with transformer)	600V	208/120V	PP8050C	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	
75 kVA								
(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	
100 kVA								
(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	
125 kVA								
(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	
150 kVA								
(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	
200 kVA								
(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	
225 kVA								
(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

1. All input and output ratings are three-phase.
2. Consult factory for voltages and applications not shown.
3. 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)
15kVA								
(with transformer)	415V 400V 380V	415/240V 400/230V 380/220V	PPG015G PPU015U PPF015F	600 (275) 600 (275) 600 (275)	42 42 42	22 23 24	30 30 30	20 x 32 x 68 (508 x 813 x 1727)
(without transformer)	415/240V 380/220V	415/240V 380/220V	PRG015 PRF015	300 (136) 300 (136)	42 42	21 23	30 30	
30 kVA								
(with transformer)	415V 400V 380V	415/240V 400/230V 380/220V	PPG030G PPU030U PPF030F	775 (350) 775 (350) 775 (350)	42 42 42	43 45 47	60 60 60	20 x 32 x 68 (508 x 813 x 1727)
(without transformer)	415/240V 380/220V	415/240V 380/220V	PRG030 PRF030	300 (136) 300 (136)	42 42	42 46	60 60	
50 kVA								
(with transformer)	415V 400V 380V	415/240V 400/230V 380/220V	PPG050G PPU050U PPF050F	925 (420) 925 (420) 925 (420)	84 84 84	72 75 79	100 100 100	32 x 32 x 68 (813 x 813 x 1727)
(without transformer)	415/240V 380/220V	415/240V 380/220V	PRGO50 PRF050	400 (175) 400 (175)	84 84	70 76	90 100	
75 kVA								
(with transformer)	415V 400V 380V	415/240V 400/230V 380/220V	PPG075G PPU075U PPF075F	1150 (520) 1150 (520) 1150 (520)	84 84 84	108 112 117	150 150 150	32 x 32 x 68 (813 x 813 x 1727)
(without transformer)	415/240V 380/220V	415/240V 380/220V	PRG075 PRF075	400 (175) 400 (175)	84 84	104 114	150 150	
100 kVA								
(with transformer)	415V 400V 380V	415/240V 400/230V 380/220V	PPG100G PPU100U PPF100F	1400 (630) 1400 (630) 1400 (630)	84 84 84	143 149 157	200 200 200	32 x 32 x 68 (813 x 813 x 1727)
(without transformer)	415/240V 380/220V	415/240V 280/220V	PRG100 PRF100	450 (200) 450 (200)	84 84	139 152	175 200	
125 kVA								
(with transformer)	415V 400V 380V	415/240V 400/230V 380/220V	PPG125G PPU125U PPF125F	1575 (710) 1575 (710) 1575 (710)	84 84 84	179 186 196	225 250 250	32 x 32 x 68 (813 x 813 x 1727)
(without transformer)	415/240V 380/220V	415/240V 380/220V	PRG125 PRF125	450 (200) 450 (200)	84 84	174 190	225 250	
150 kVA								
(with transformer)	415V 400V 380V	415/240V 400/230V 380/220V	PPG150G PPU150U PPF150F	1900 (860) 1900 (860) 1900 (860)	126 126 126	214 223 234	300 300 300	44 x 32 x 68 (1118 x 813 x 1727)
(without transformer)	415/240V 380/220V	415/240V 380/220V	PRG150 PRF150	700 (320) 700 (320)	126 126	209 228	300 300	
200 kVA								
(with transformer)	415V 400V 380V	415/240V 400/230V 380/220V	PRG200G PPU200U PPF200F	2300 (1045) 2300 (1045) 2300 (1045)	126 126 126	285 297 312	400 400 400	44 x 32 x 68 (1118 x 813 x 1727)
225 kVA								
(with transformer)	415V 400V 380V	415/240V 400/230V 380/220V	PPG225G PPU225U PPF225F	2450 (1110) 2450 (1110) 2450 (1110)	126 126 126	321 334 351	450 450 450	44 x 32 x 68 (1118 x 813 x 1727)

NOTES

1. All input and output ratings are three-phase.
2. Consult Factory for voltages and applications not shown.
3. 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 480V 208V	208/120V 208/120V 208/120V	PPB015C PPA015C PPC015C	600 (272) 600 (272) 600 (272)	42 42 42	15 19 43	20 25 60	32 x 32 x 68 (813 x 813 x 1727)
30 kVA	600V 480V 208V	208/120V 208/120V 208/120V	PPB030C PPA030C PPC030C	750 (340) 750 (340) 750 (340)	42 42 42	30 38 87	40 50 110	32 x 32 x 68 (813 x 813 x 1727)
50 kVA	600V 480V 208V	208/120V 208/120V 208/120V	PP8050C PPA050C PPC050C	900 (408) 900 (408) 900 (408)	84 84 84	50 63 145	70 80 200	44 x 32 x 68 (1118 x 813 x 1727)
75 kVA	600V 480V 208V	208/120V 208/120V 208/120V	PPB075C PPA075C PPC075C	1100 (499) 1100 (499) 1100 (499)	84 84 84	74 93 215	100 125 300	44 x 32 x 68 (1118 x 813 x 1727)
100 kVA	600V 480V 208V	208/120V 208/120V 208/120V	PPB100C PPA100C PPC100C	1325 (601) 1325 (601) 1325 (601)	84 84 84	99 124 286	125 175 400	44 x 32 x 68 (1118 x 813 x 1727)
125 kVA	600V 480V 208V	208/120V 208/120V 208/120V	PPB125C PPA125C PPC125C	1500 (680) 1500 (680) 1500 (680)	84 84 84	124 155 358	175 200 450	44 x 32 x 68 (1118 x 813 x 1727)
150 kVA	600V 480V 208V	208/120V 208/120V 208/120V	PPB150C PPA150C PPC150C	1750 (794) 1750 (794) 1750 (794)	84 84 84	148 185 427	200 250 600	44 x 32 x 68 (1118 x 813 x 1727)
200 kVA	600V 480V	208/120V 208/120V	PPB200C PPA200C	2100 (958) 2100 (958)	84 84	197 247	250 350	44 x 32 x 68 (1118 x 813 x 1727)
225 kVA	600V 480V	208/120V 208/120V	PPB225C PPA225C	2250 (1021) 2250 (1021)	84 84	222 278	200 250	44 x 32 x 68 (1118 x 813 x 1727)

NOTES

1. All input and output ratings are three-phase.
2. Consult factory for voltages and applications not shown.
3. 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:

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

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

   For single-phase equipment:

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

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

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

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

   (If pf is not given, assume 0.8.)

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

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

   (for three-phase systems)

4. BTU/hr or Kcal/hr specifications:

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

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

   (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 Mainenance 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

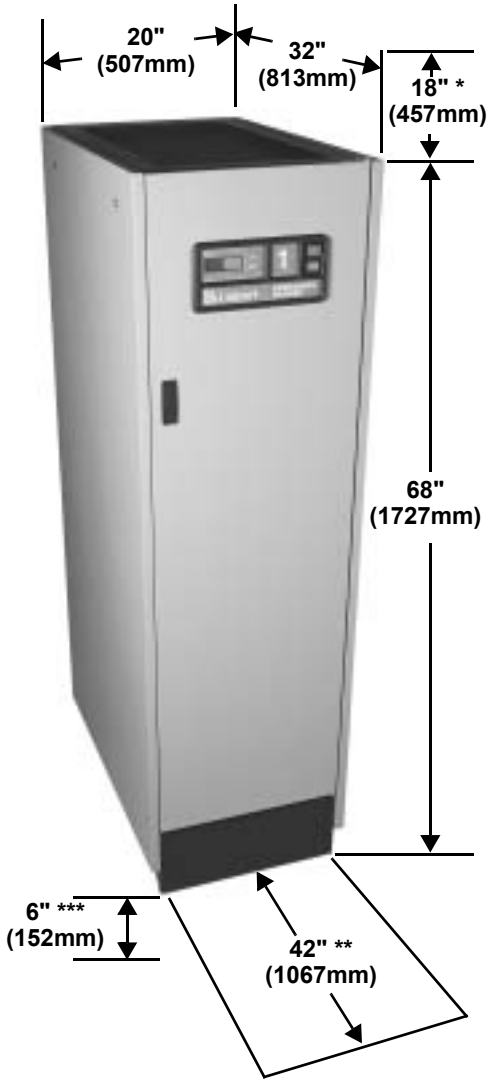


Figure 8 Dimensions, clearances, 2 panelboards

* 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

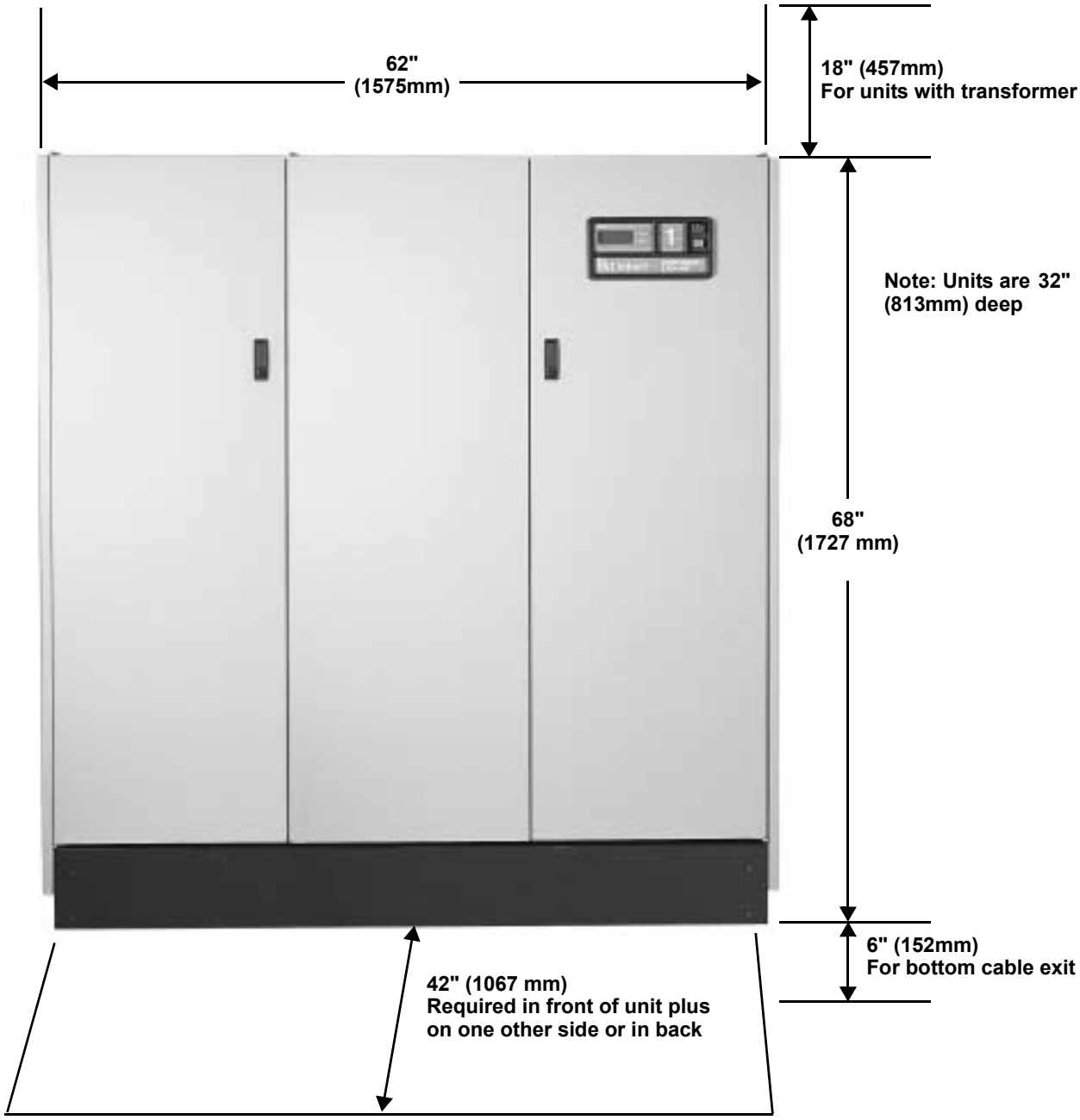


Figure 11 Dimensions, clearances, Top Exit unit

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POWER CONVERSION/DISTRIBUTION

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

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