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SUBMITTAL FOR APPROVAL 90 kVA LIEBERT APM UNINTERRUPTIBLE POWER SUPPLY

Job Name	<u>Jefferson Lab</u>
Model	<u>NRF90CCSA0A3098</u>
Quantity	<u>One (1)</u>
Date	<u>August 01, 2011</u>
Quote #	<u>Q01590598</u>
Purchaser	<u>Jefferson lab</u>
P.O. #	<u></u>
Submitted By	<u>Heather Klesat – Liebert Virginia</u>



Bill of Material

BILL OF MATERIAL & ENGINEERING SPECIFICATION SHEET

One (1) UPS Capacity: 90 kVA / 90 kW Liebert APM Three Phase Uninterruptible Power Supply, model NRF90CCSA0A3098, with the following features and characteristics:

- System Input Voltage 480 VAC (3 Phase, 3 wire plus ground)
- System Output Voltage 208/120 VAC (3 Phase, 3 or 4 wire plus ground)
- UPS frame designed for and scalable from 15 kVA to 90KVA
- Single input, true on-line, double conversion
- Pulse-width modulated (PWM) rectifier
- Temperature compensated separate battery charger to allow use with valve-regulated lead acid (VRLA), wet cell lead acid, and NiCad battery systems
- Pulse-width modulated (PWM) inverter
- Automatic continuous duty static transfer switch
- Digital Signal Processing (DSP) based monitoring and control system
- Back-lit LCD Graphic Display with multilingual support and user friendly navigation menu
- Alarm History Database
- Three (3) Intellislot™ Communication Ports
- Air flow is from front to top (requires 24 inch clearance above unit)
- IP 20 enclosure
- Casters and leveling feet
- Meets ISTA transportation requirements
- FCC Part 15, Class A
- UL and cUL Listed to UL Standard 1778
- Withstand rating: 65kAIC
- Certified copy of the standard factory test documentation

Ship-Loose System Accessories Include:

- One (1) This IntelliSlot interface card delivers SNMP, SMS Text Messaging, Telnet and web-management capability for enhanced communications and control of Liebert UPS, Power Management or Precision Cooling systems. The card manages a wide range of operating parameters, alarms and notifications, transmitting data over the network.

Liebert APM External Battery Cabinet System rated to provide 9 minutes backup for a UPS Capacity: 90 kVA / 90 kW with the following model number(s): NRBP9WX1L1A0101

- Battery Cabinets are shipped separately and include interconnecting cables to allow the battery cabinet to be bolted to the left side of the UPS module

Liebert APM Bypass Distribution Cabinet, model NRMB1A9C0RA0111, with the following features:

- Front Access service design
- Casters and leveling feet
- Three breaker wrap-around maintenance bypass with interlock by solenoid key release (SKRU)
- Shipped separately and include interconnecting cables for bolting the MBP-T cabinet to the right side of the UPS

UPS System Start-up Services , including the following: Start-up includes one site trip by a LS customer engineer after the UPS has been installed. The site trip includes the following services for one UPS module: non-powered inspection, UPS electrical and operational checkout, full parts and labor for any remedial work required on the UPS or battery cabinets, and customer operation training. Start-up also includes remedial onsite labor, parts, and travel for the full one-year warranty period.

- Start-up is scheduled Monday thru Friday - 8 am to 5 pm

One (1) Liebert RDC, model RDC441GB25, with the following features and characteristics:

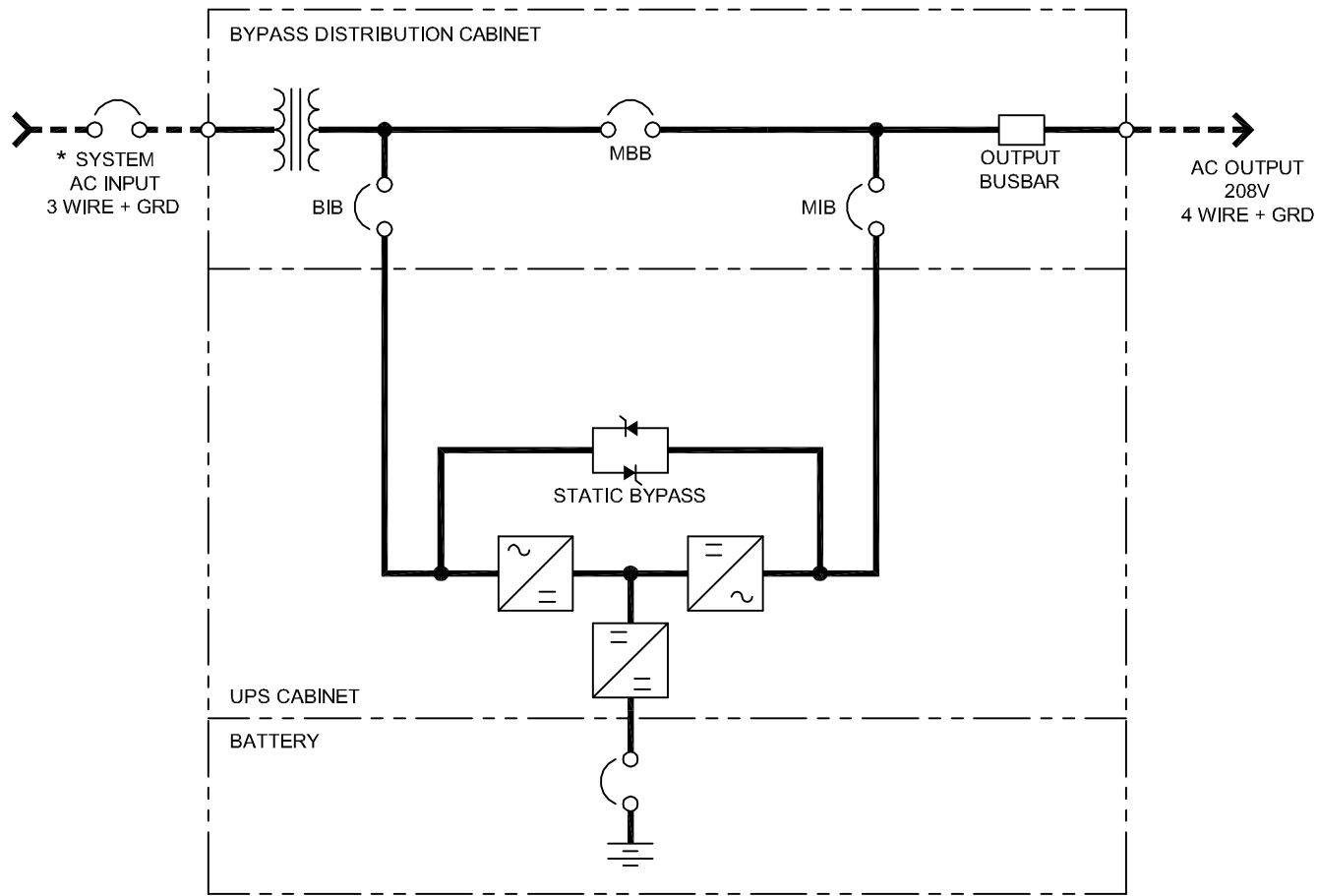
- AC input/output voltage 208V (three-phase, four-wire plus ground)
- 1 Input
- 24" x 24" footprint
- Front and rear key lockable doors with individual hinged panelboard access covers
- Doors and side panels painted ZP7021
- Current Monitoring Panel, phase and neutral current for each panelboard with front and rear displays
- 4 - 42 pole GE Bolt In panelboard with 22 kAIC panelboard main.

Start-up Services

- Start-Up 5x8



Layout & Control Wiring Drawings



NOTES:

1. INSTALL IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
2. INPUT AND BYPASS MUST SHARE THE SAME SINGLE SOURCE.
3. UPS SYSTEM INPUT AND OUTPUT CABLES MUST BE RUN IN SEPARATE CONDUITS.
4. CONTROL WIRING MUST BE RUN IN SEPARATE CONDUITS.
5. TRANSFORMER AVAILABLE: 480V OR 600V INPUT.

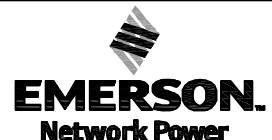
- BIB - BYPASS ISOLATION BREAKER
- MBB - MAINTENANCE BYPASS BREAKER
- MIB - MAINTENANCE ISOLATION BREAKER
- * EXTERNAL OVERCURRENT PROTECTION BY OTHERS



DRAWN BY V. CARMONA	SHEET NO. 1 OF 1
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

ONE-LINE DIAGRAM
SINGLE INPUT 208V OUTPUT
WITH INPUT ISOLATION TRANSFORMER
AND 3 BREAKER BYPASS DISTRIBUTION CABINET
LIEBERT APM

DWG. NO. UAM01002	DATE 2/10/11	REV. # 2	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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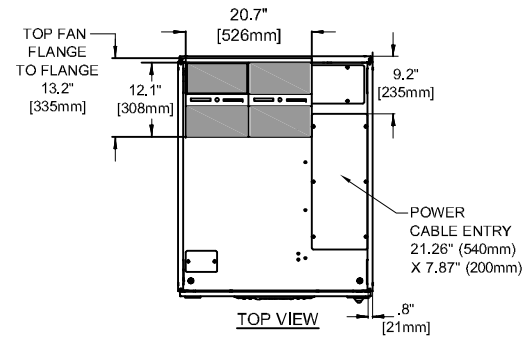
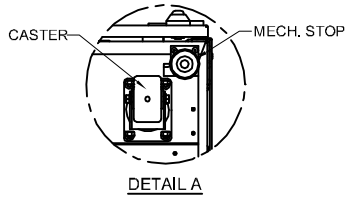
BDC POWER RATING	INPUT VOLTAGE	AC INPUT 3 PHASE 4 WIRE AND GROUND			DC INPUT 3 WIRE AND GROUND POSITIVE, MIDPOINT, AND NEGATIVE		AC OUTPUT 3 PHASE 4 WIRE AND GROUND		
		CURRENT		RECOMMENDED EXTERNAL OVERCURRENT PROTECTION	NOMINAL VOLTAGE	MAX DISCHARGE CURRENT	OUTPUT VOLTAGE	NOMINAL CURRENT	RECOMMENDED EXTERNAL OVERCURRENT PROTECTION
		NOM	MAX						
15KVA 15KW	208V	44	55	70A	288VDC (144 cells)	67	208V	42	60A
	220V	42	53	70A			220V	39	50A
	480V	20	25	30A					
	600V	16	20	25A					
30KVA 30KW	208V	89	111	150A	288VDC (144 cells)	135	208V	83	125A
	220V	84	105	150A			220V	79	100A
	480V	40	50	60A					
	600V	32	40	50A					
45KVA 45KW	208V	133	166	200A	288VDC (144 cells)	202	208V	125	200A
	220V	126	158	200A			220V	118	150A
	480V	60	74	90A					
	600V	48	60	80A					
60KVA 60KW	208V	177	221	300A	288VDC (144 cells)	269	208V	167	225A
	220V	168	210	300A			220V	158	200A
	480V	79	99	125A					
	600V	64	79	100A					
75KVA 75KW	208V	221	276	350A	288VDC (144 cells)	336	208V	208	300A
	220V	209	261	350A			220V	197	250A
	480V	99	123	150A					
	600V	79	99	125A					
90KVA 90KW	208V	266	332	400A	288VDC (144 cells)	404	208V	250	350A
	220V	251	314	400A			220V	236	300A
	480V	119	149	200A					
	600V	95	119	150A					
* NOTE: CUSTOMER MUST SUPPLY SHUNT TRIP BREAKER WITH 120V COIL					Not applicable. BDC is being used.		NOTE: CUSTOMER MUST SUPPLY BREAKER WHEN BDC IS NOT USED		

NOTES:

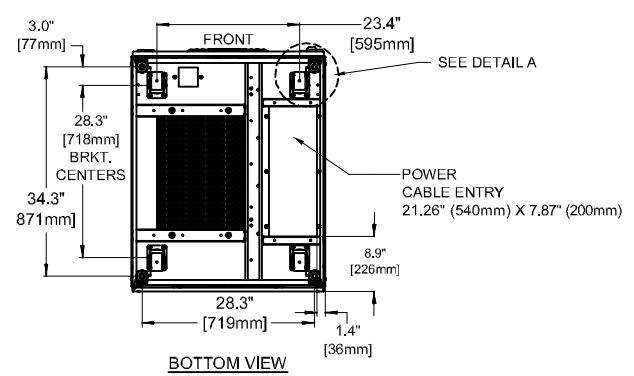
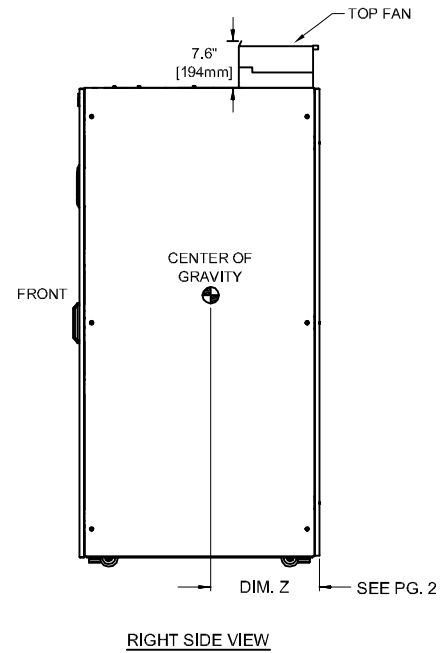
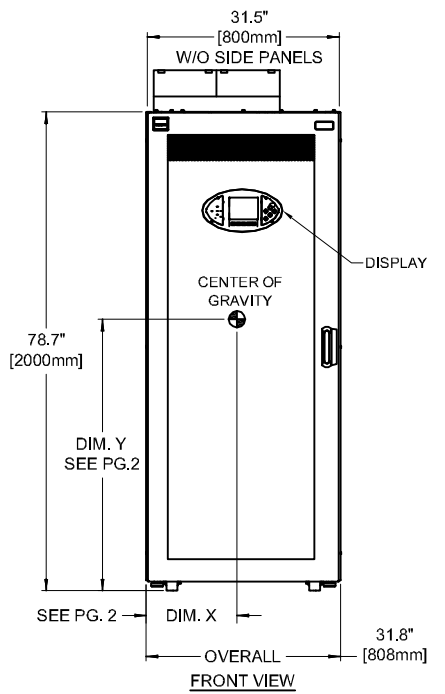
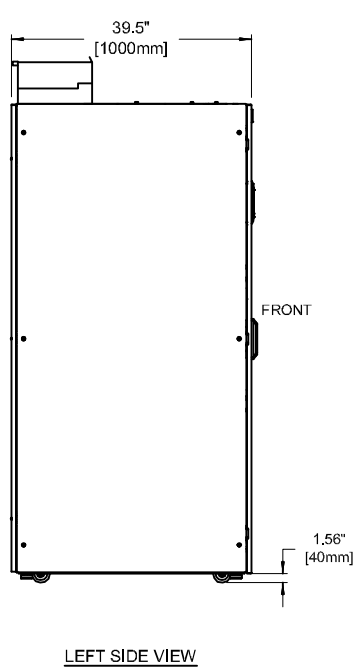
- NOMINAL INPUT CURRENT (CONSIDERED CONTINUOUS) IS BASED ON FULL RATED OUTPUT LOAD. MAXIMUM CURRENT INCLUDES NOMINAL INPUT CURRENT AND MAXIMUM BATTERY RECHARGE CURRENT (CONSIDERED NONCONTINUOUS). CONTINUOUS AND NONCONTINUOUS CURRENT ARE DEFINED IN NEC 100. RECOMMENDED OVERCURRENT PROTECTION IS BASED ON 80% RATED DEVICES. * THE RECOMMENDED OVERCURRENT PROTECTION REPRESENTS 125% OF NOMINAL FULL LOAD CURRENT (CONTINUOUS) PER NEC 215.
- MAXIMUM INPUT CURRENT IS CONTROLLED BY THE CURRENT LIMIT SETTING.

- RECOMMENDED AC INPUT EXTERNAL OVERCURRENT PROTECTION IS BASED ON 80% RATED DEVICES AND MAXIMUM INPUT CURRENT LIMIT SETTING.
- RECOMMENDED AC OUTPUT EXTERNAL OVERCURRENT PROTECTION IS BASED ON 80% RATED DEVICES AND FULL RATED OUTPUT CURRENT.
- NOMINAL BATTERY VOLTAGE IS SHOWN AT 2.0 VOLTS / CELL.
- INPUT POWER FACTOR OF 0.99 IS USED FOR THE CALCULATIONS.

DRAWN BY V. CARMONA	SHEET NO. 1 OF 1	ELECTRICAL DATA SPECIFICATION SHEET SINGLE INPUT 15kVA - 90kVA UPS FOR BDC LIEBERT APM					
CHK BY J. BEALE	ECN NO.						
REF. DWG.	ORDER NO.		DWG. NO. UAM07004	DATE 3/10/11	REV. # 4	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229	



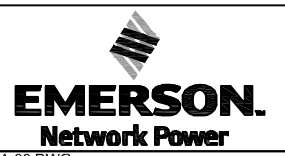
- NOTES:
1. ALL DIMENSIONS ARE IN inches [mm].
 2. 24" [610] MINIMUM CLEARANCE ABOVE UNIT AND 36" [914] FRONT ACCESS REQUIRED FOR SERVICE.
 3. KEEP CABINET WITHIN 15 DEGREES OF VERTICAL.
 4. TOP AND BOTTOM CABLE ENTRY AVAILABLE THROUGH REMOVABLE ACCESS PLATES. REMOVE, PUNCH TO SUIT CONDUIT SIZE AND REPLACE.
 5. UNIT BOTTOM IS STRUCTURALLY ADEQUATE FOR FORKLIFT HANDLING.
 6. CONTROL WIRING AND POWER WIRING MUST BE RUN IN SEPARATE CONDUITS.
 7. ONLY COPPER CABLES ARE RECOMMENDED.
 8. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
 9. SEE PAGE 2 OF 2 DRAWING: UAM02012B FOR WEIGHT TABLE AND CENTERS OF GRAVITY.



DRAWN BY V. CARMONA	SHEET NO. 1 OF 2
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

OUTLINE DRAWING (PAGE 1 OF 2)
WITH TOP FAN
15KVA - 90KVA UPS
LIEBERT APM

DWG. NO. UAM02012A	DATE 11/1/10	REV. # 0	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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NOTES:

- 1. SEE PAGE 1 OF 2 DRAWING: UAM02012A FOR OUTLINE.
- 2. THE 90KVA FRAME DOES NOT HAVE INTERNAL BATTERIES.
- 3. FOR SHIPPING WEIGHT ADD 70LBS (32KG).

CENTER OF GRAVITY AND UNIT WEIGHTS
APM UPS (90KVA FRAME)

KVA RATING	UPS DIMENSIONS CENTER OF GRAVITY WITHOUT BATTERIES						UPS W/O BATTERIES	
	DIM. X		DIM. Z		DIM. Y		WEIGHT	
	INCH	mm	INCH	mm	INCH	mm	LBS	KG
15	16.65	423	18.78	477	37.64	956	705	320
30	16.18	411	18.54	471	38.66	982	780	354
45	15.79	401	18.35	466	39.88	1013	855	388
60	15.47	393	18.15	461	41.30	1049	930	422
75	15.16	385	17.99	457	42.87	1089	1005	456
90	14.88	378	17.83	453	44.57	1132	1080	490

CENTER OF GRAVITY AND UNIT WEIGHTS
APM UPS (45KVA FRAME)

KVA RATING	12HX100 BATTERIES							
	DIM. X		DIM. Z		DIM. Y		LBS	KG
	INCH	mm	INCH	mm	INCH	mm		
15	14.29	363	21.30	541	31.50	800	1981	899
30	13.94	354	21.59	548.4	33.46	850	2052	931
45	13.62	346	21.73	552	35.04	890	2127	965

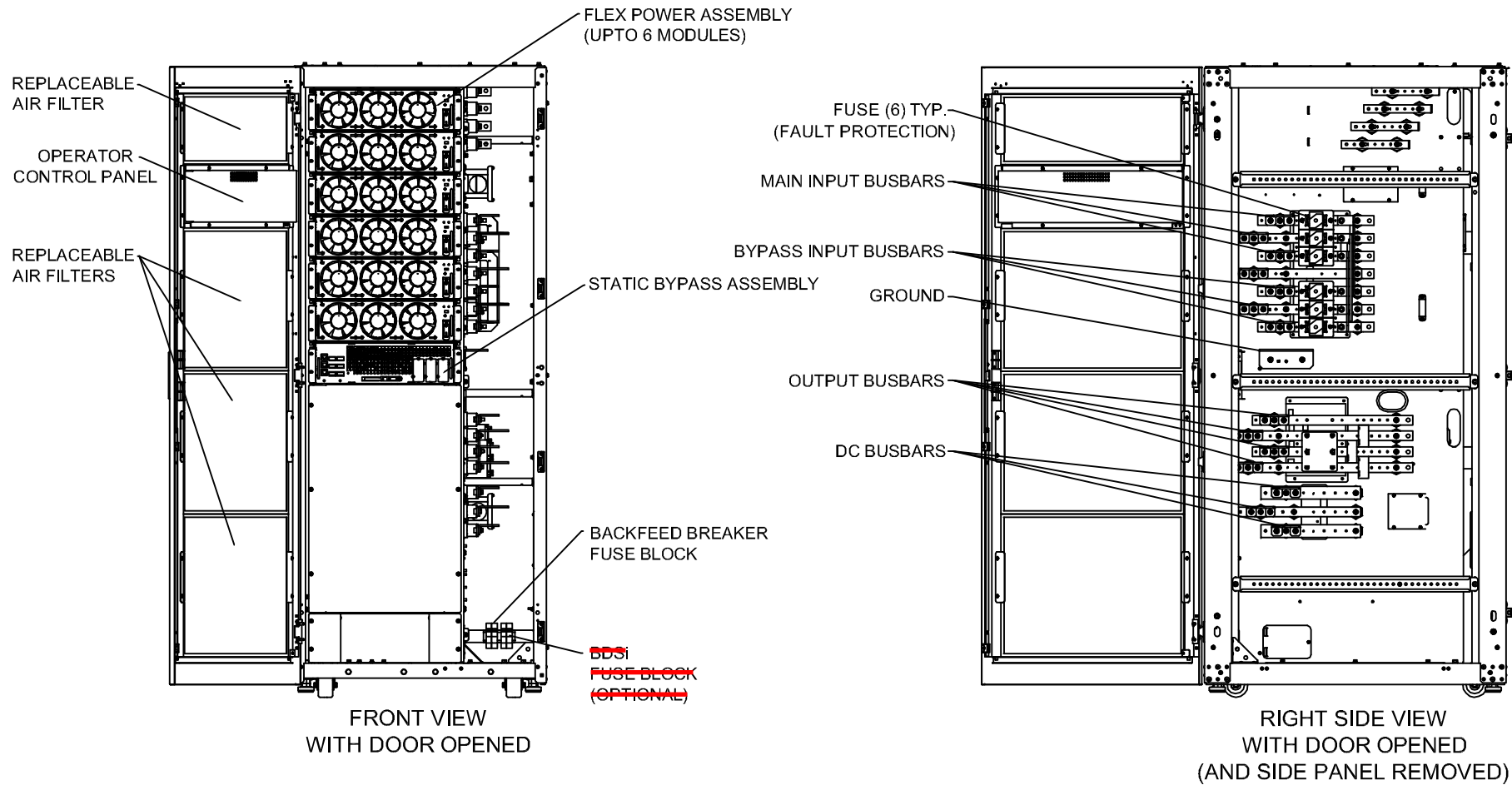
KVA RATING	12HX150 BATTERIES							
	DIM. X		DIM. Z		DIM. Y		LBS	KG
	INCH	mm	INCH	mm	INCH	mm		
15	14.25	362	21.54	547	30.91	785	2455	1114
30	13.78	350	21.81	554	32.87	855	2530	1148
45	13.39	340	22.05	560	34.72	882	2605	1182

DRAWN BY V. CARMONA	SHEET NO. 2 OF 2
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

OUTLINE DRAWING (PAGE 2 OF 2)
WITH TOP FAN
15KVA - 90KVA UPS
LIEBERT APM

DWG. NO. UAM02012B	DATE 11/1/10	REV. # 0	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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DRAWN BY V. CARMONA	SHEET NO. 1 OF 1
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

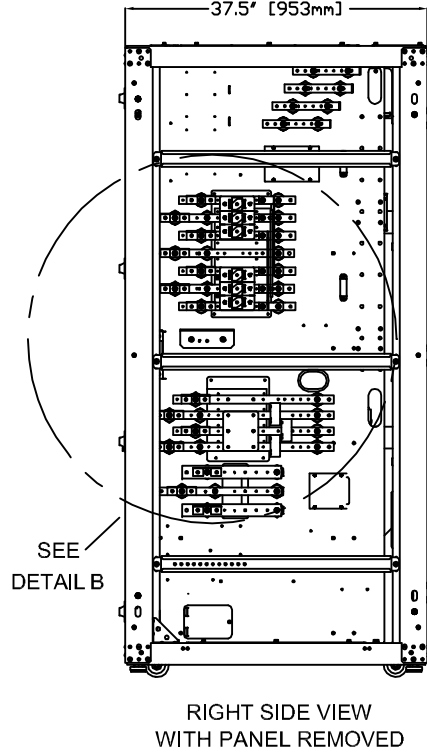
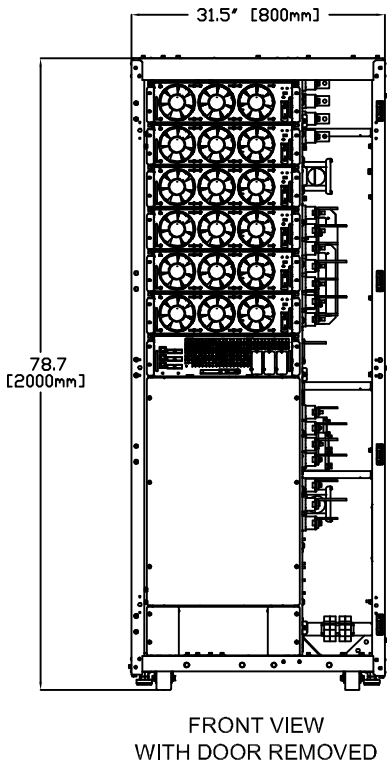
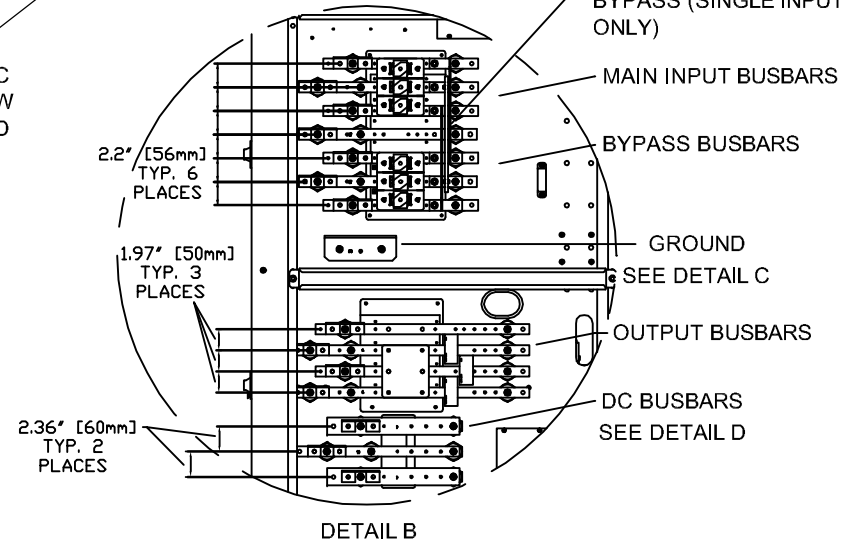
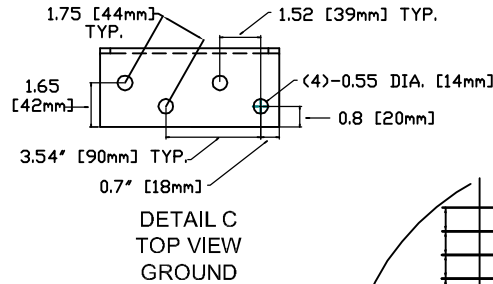
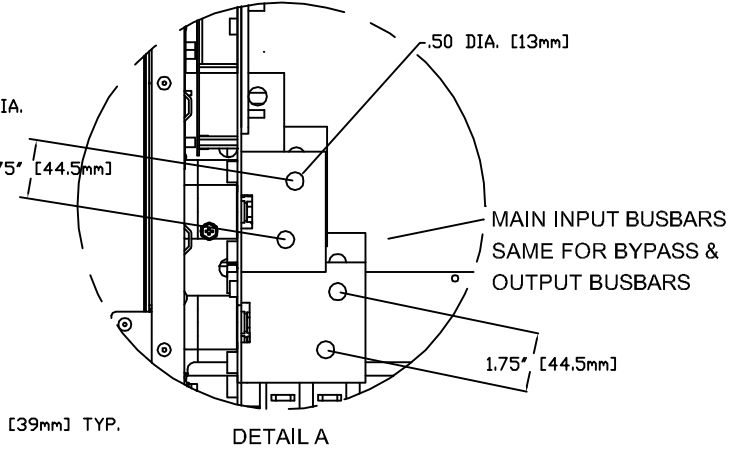
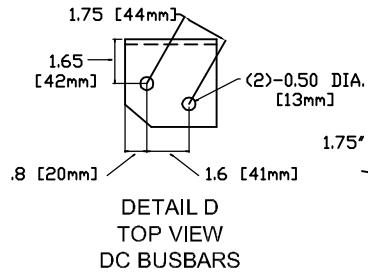
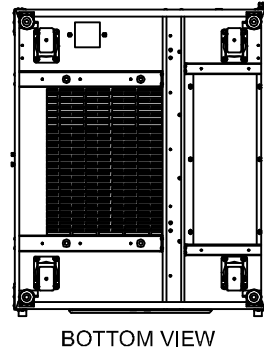
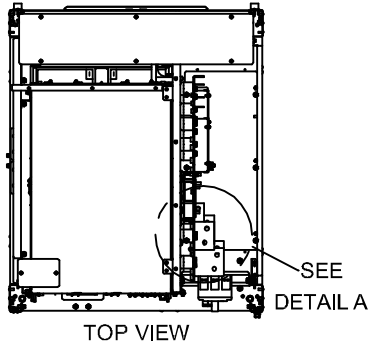
MAIN COMPONENTS DRAWING
15KVA - 90KVA UPS
LIEBERT APM

DWG. NO. UAM02002	DATE 6/29/10	REV. # 1	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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- NOTES:
 1. ALL DIMENSIONS ARE IN inches [mm].
 2. CONTROL WIRING AND POWER WIRING MUST BE RUN IN SEPARATE CONDUITS.
 3. COPPER CABLES ONLY ARE RECOMMENDED.
 4. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.

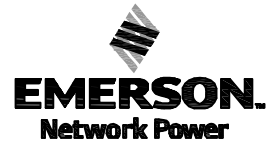
UPS TERMINAL SPECIFICATIONS			
UNIT RATING	BOLT SHAFT SIZE	UTILITY CONFIGURATIONS	
		LB-IN	N-M
15-90	M10	240	27

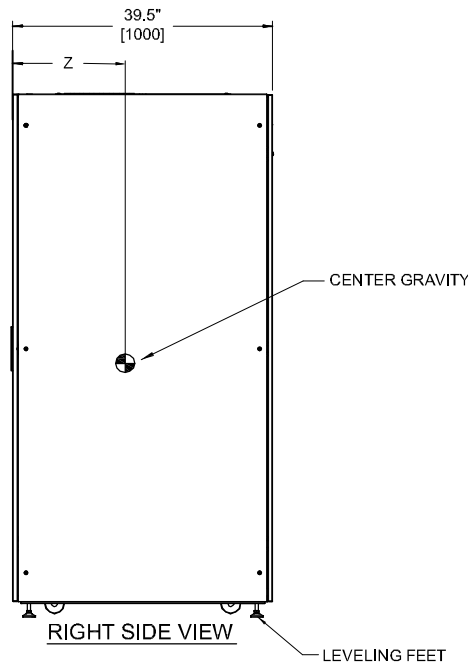
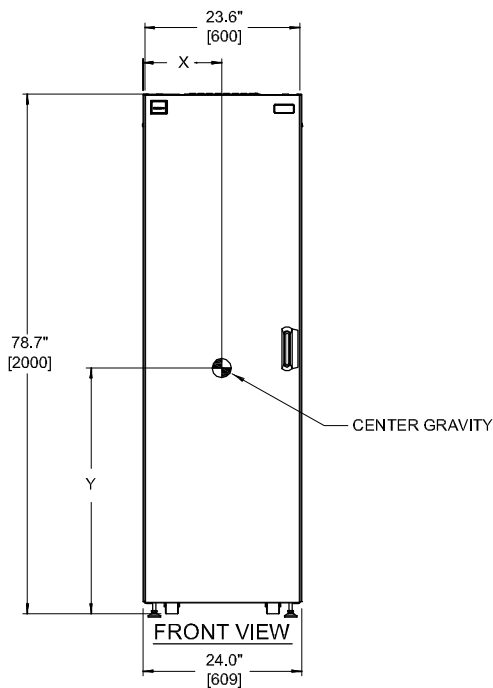
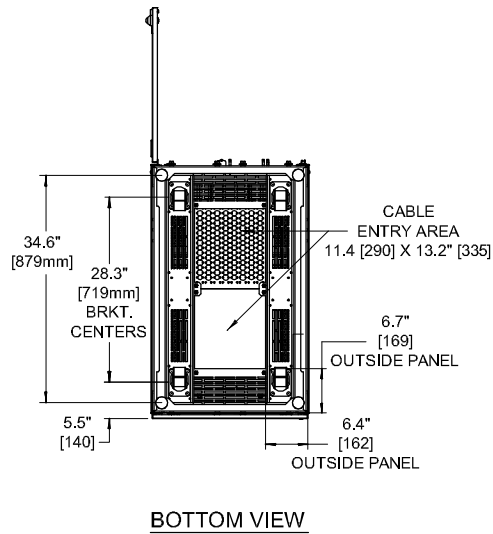
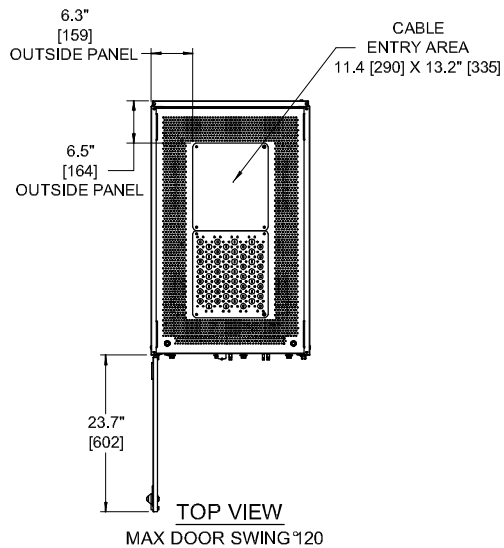


DRAWN BY V. CARMONA	SHEET NO. 1 OF 1
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

TERMINAL DETAILS
 15KVA - 90KVA UPS
 LIEBERT APM

DWG. NO. UAM02021	DATE 1/3/11	REV. # 2	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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NOTES:

1. ALL DIMENSIONS ARE IN inches [mm].
2. 24" [610] MINIMUM CLEARANCE ABOVE UNIT AND 36" [914] FRONT ACCESS REQUIRED FOR SERVICE.
3. KEEP CABINET WITHIN 15 DEGREES OF VERTICAL.
4. TOP AND BOTTOM CABLE ENTRY AVAILABLE THROUGH REMOVABLE ACCESS PLATES. REMOVE, PUNCH TO SUIT CONDUIT SIZE AND REPLACE.
5. CONTROL WIRING AND POWER WIRING MUST BE RUN IN SEPARATE CONDUITS.
6. COPPER CABLES ONLY ARE RECOMMENDED.
7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.

APPROXIMATE WEIGHTS BYPASS DISTRIBUTION CABINET		
UNIT WT.	LBS	KG
NO DISTRIBUTION	550	250
WITH 2-225A SUBFEED BREAKERS	660	300
WITH 400A PANELBOARD	660	300
NO DISTRIBUTION, WITH 480V XFMR	1522	692
NO DISTRIBUTION, WITH 600V XFMR	1507	685
WITH 2-225A SUBFEED BRKR & 480V XFMR	1632	742
WITH 2-225A SUBFEED BRKR & 600V XFMR	1617	735
WITH 400A PANELBRD & 480V XFMR	1632	742
WITH 400A PANELBRD & 600V XFMR	1617	735

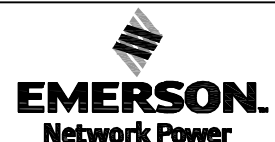
FOR SHIPPING WT. ADD 150LBS (68KG)

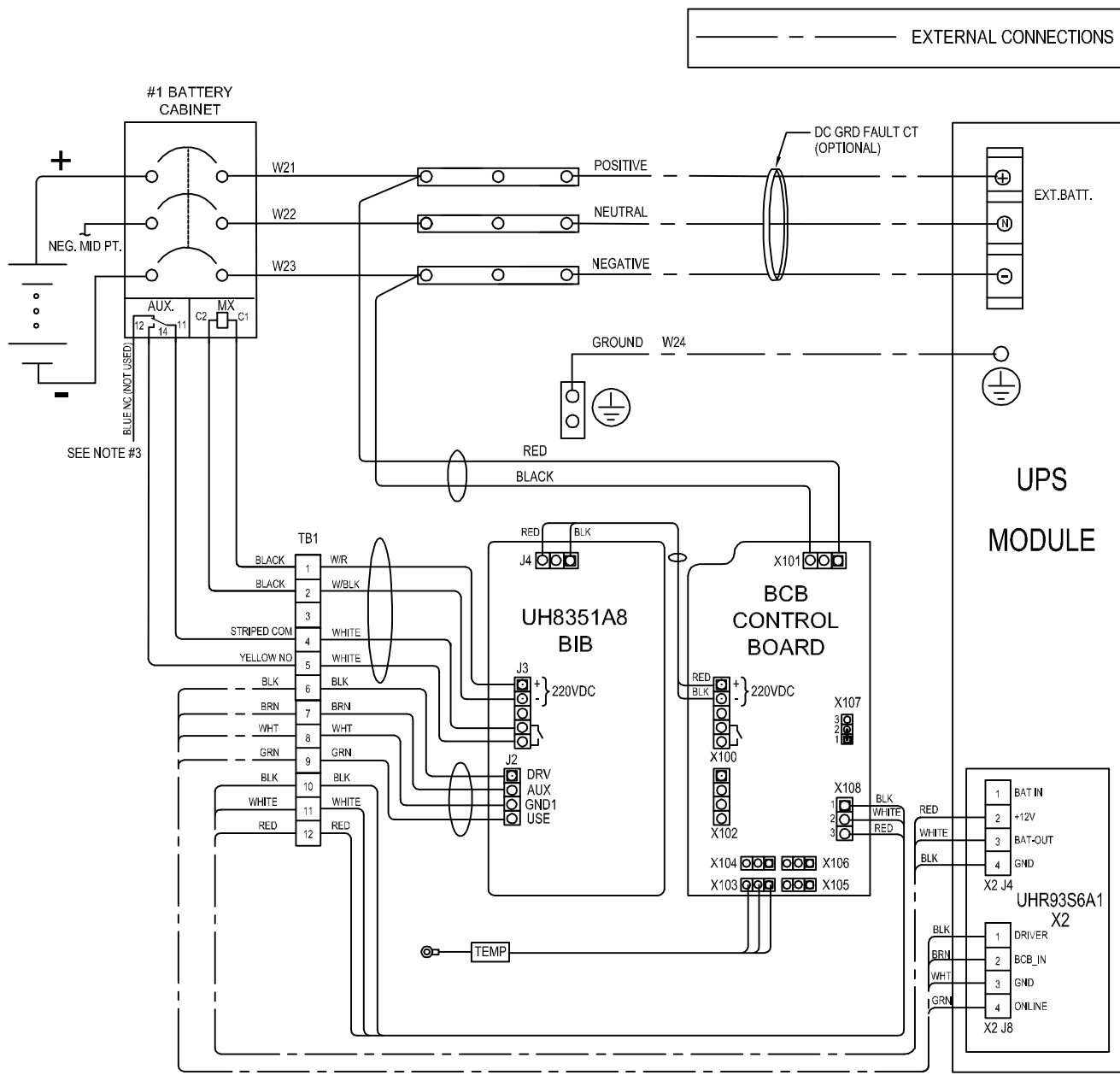
LOCATIONS FOR CENTER OF GRAVITY			
DIMENSION	X	Y	Z
MODEL			
NO DISTRIBUTION	11.8" [300]	39.4" [1000]	14.9" [379]
WITH 2-225A SUBFEED BREAKERS	11.8" [300]	39.4" [1000]	14.9" [379]
WITH 400A PANELBOARD	11.8" [300]	39.4" [1000]	14.9" [379]
NO DISTRIBUTION, WITH 480V XFMR	11.8" [300]	32.7" [830]	24.8" [630]
NO DISTRIBUTION, WITH 600V XFMR	11.8" [300]	32.7" [830]	24.8" [630]
WITH 2-225A SUBFEED BRKR & 480V XFMR	11.8" [300]	32.7" [830]	24.8" [630]
WITH 2-225A SUBFEED BRKR & 600V XFMR	11.8" [300]	32.7" [830]	24.8" [630]
WITH 400A PANELBRD & 480V XFMR	11.8" [300]	32.7" [830]	24.8" [630]
WITH 400A PANELBRD & 600V XFMR	11.8" [300]	32.7" [830]	24.8" [630]

DRAWN BY V. CARMONA	SHEET NO. 1 OF 1
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

OUTLINE DRAWING
BYPASS DISTRIBUTION CABINET
15kVA - 90kVA
LIEBERT APM

DWG. NO. UAM06010	DATE 4/11/11	REV. # 4	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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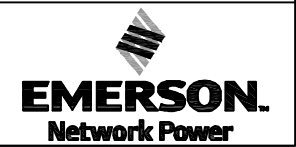


- NOTES:
1. ALL SERVICE AND INITIAL CONNECTIONS OF BATTERIES MUST BE PERFORMED BY QUALIFIED SERVICE PERSONNEL.
 2. THE JUMPER X107 MUST SHORT CIRCUIT PIN 1 AND PIN 2.
 3. THE AUX. BLUE WIRE IS NOT USED.
 4. SHUNT TRIP DRIVE IS 220VDC @ 2.4A.

DRAWN BY V. CARMONA	SHEET NO. 1 OF 1
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

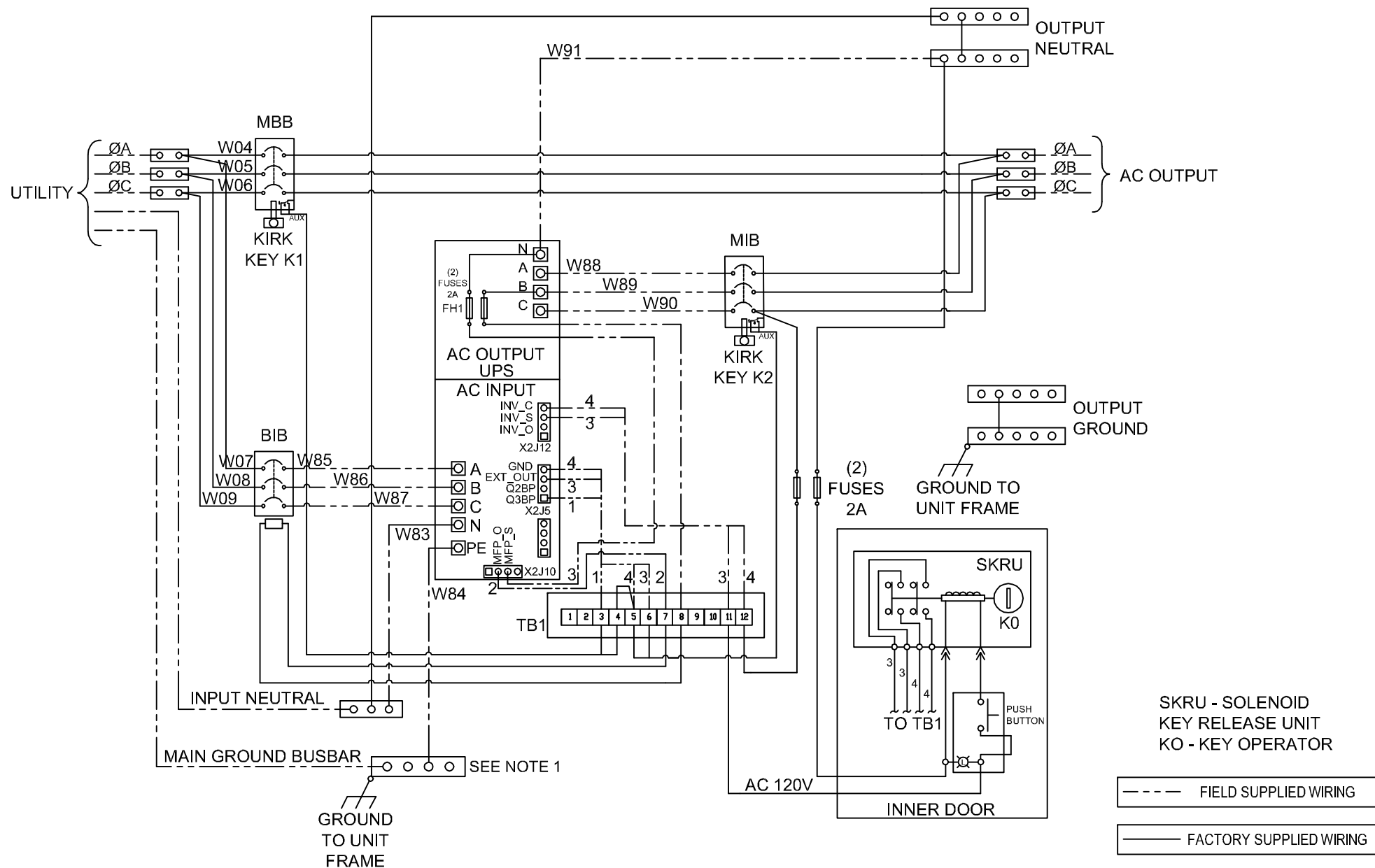
CONTROL WIRING DIAGRAM
SINGLE BATTERY CABINET CONNECTIONS TO UPS
15KVA - 90KVA
LIEBERT APM

DWG. NO. UAM04000	DATE 6/24/10	REV. # 1	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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NOTES:

1. CUSTOMER FURNISHED ELECTRODE CONDUCTOR TO BE INSTALLED IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
2. SEE INSTALLATION MANUAL FOR ADDITIONAL CONNECTION INFORMATION.



DRAWN BY V. CARMONA	SHEET NO. 1 OF 1
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

CONTROL WIRING DIAGRAM
UPS AND BYPASS DISTRIBUTION CABINET
15KVA - 90KVA
LIEBERT APM

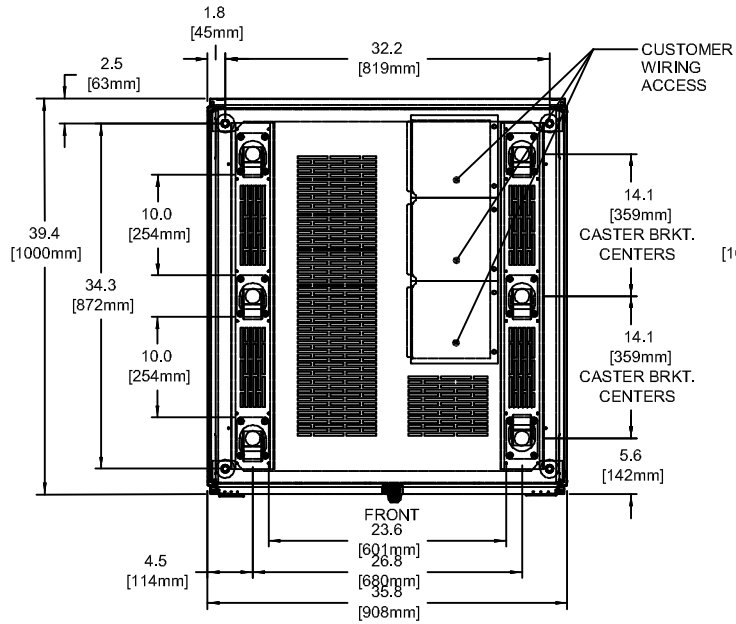
DWG. NO. UAM04012	DATE 7/1/11	REV. # 4	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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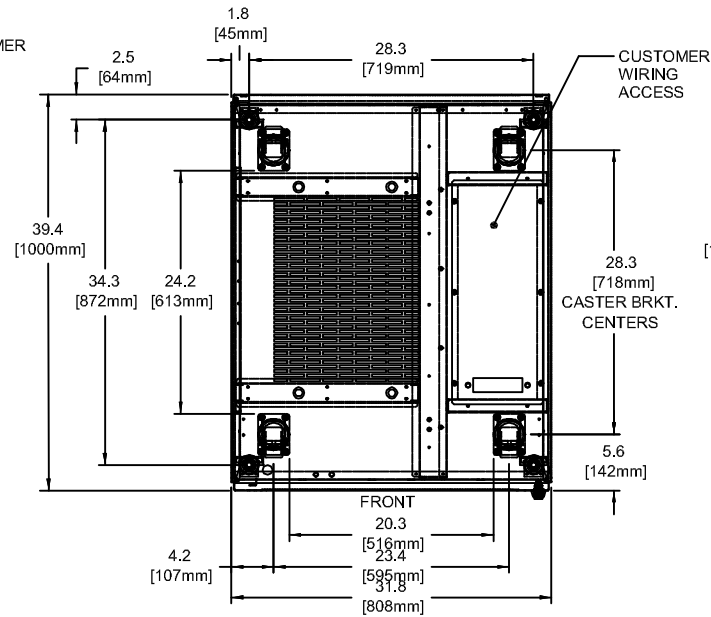


NOTES:

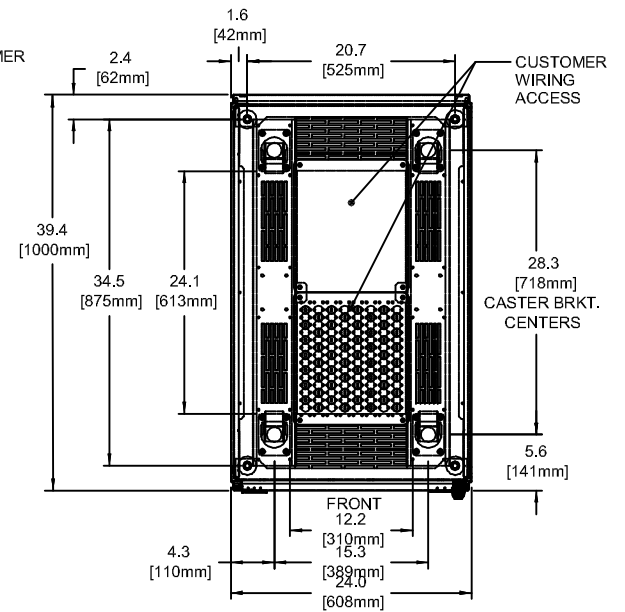
1. ALL DIMENSIONS ARE IN inches [mm].
2. UNIT BOTTOM IS STRUCTURALLY ADEQUATE FOR FORKLIFT HANDLING.



BATTERY CABINET (900mm)
(VIEWED LOOKING TOP DOWN)



UPS
(VIEWED LOOKING TOP DOWN)

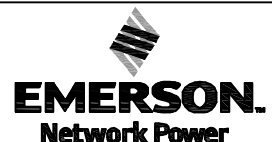


DISTRIBUTION BYPASS CABINET
(VIEWED LOOKING TOP DOWN)

DRAWN BY V. CARMONA	SHEET NO. 1 OF 1
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

BASE DETAIL
UPS, BATTERY CABINET (900mm)
AND BYPASS DISTRIBUTION CABINET
LIEBERT APM

DWG. NO. UAM08011	DATE 11/10/10	REV. # 0	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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Battery System Data & Drawings

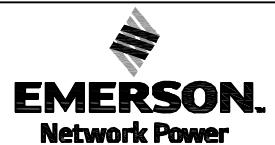
Bypass Distribution Cabinet Circuit Breaker Information

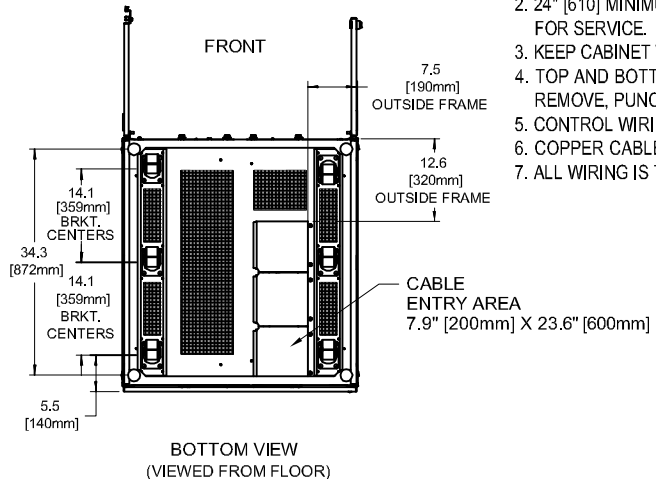
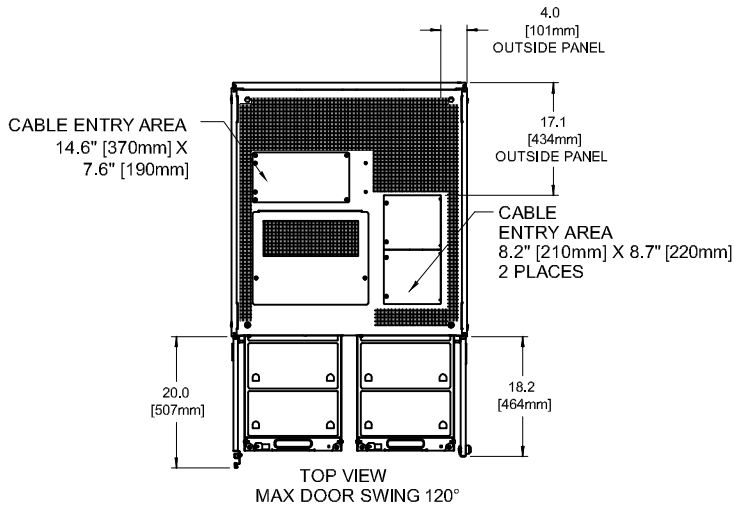
BDC Rating (kW)	Breaker Type	Mfg	Mfg PN	Frame Amps	Trip Amps
45	BIB	SQ-D	JGF36200AEYE	F-200	200A
45	MBB/MIB	SQ-D	JGF36175YE	F-175	175A
90	BIB	SQ-D	DGF36400E20AE	F-400	400A
90	MBB/MIB	SQ-D	DGF36400E20	F-400	350A

DRAWN BY V. CARMONA	SHEET NO. 1 OF 1
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

CIRCUIT BREAKER INFORMATION
 BYPASS DISTRIBUTION CABINET
 45kW & 90kW
 LIEBERT APM

DWG. NO. UAM07020	DATE 3/15/2011	REV. # 2	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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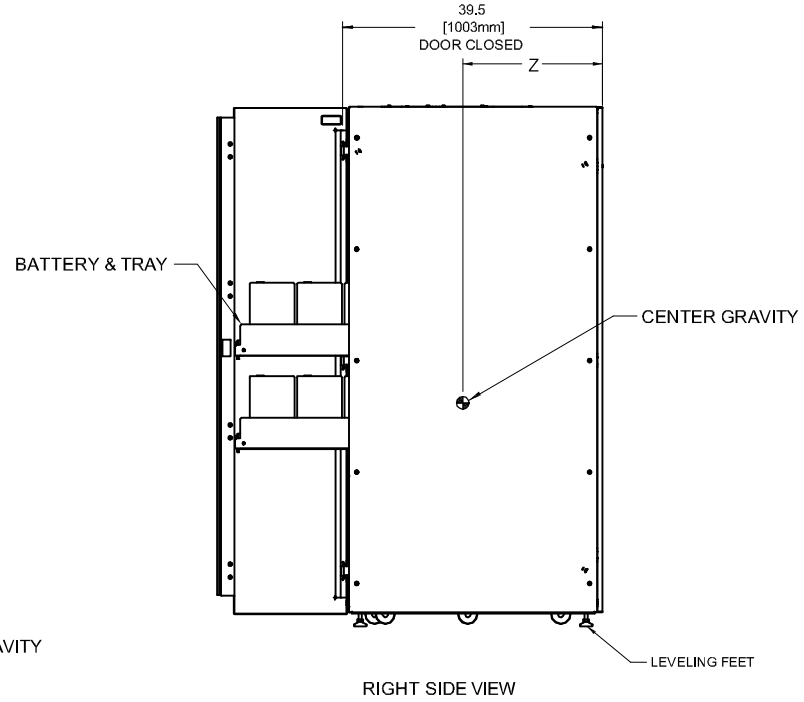
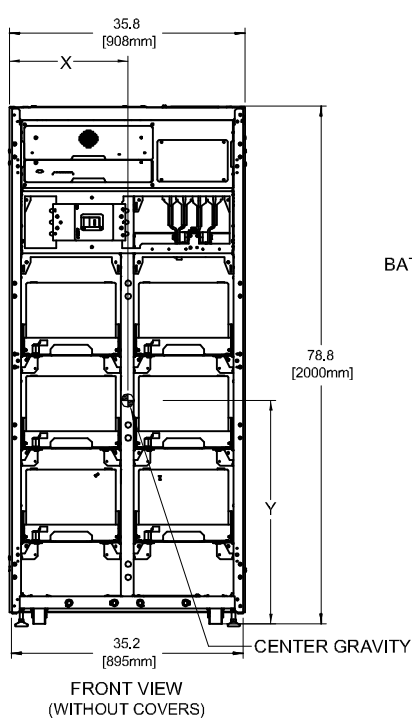




- NOTES:
1. ALL DIMENSIONS ARE IN inches [mm].
 2. 24" [610] MINIMUM CLEARANCE ABOVE UNIT AND 36" [914] FRONT ACCESS REQUIRED FOR SERVICE.
 3. KEEP CABINET WITHIN 15 DEGREES OF VERTICAL.
 4. TOP AND BOTTOM CABLE ENTRY AVAILABLE THROUGH REMOVABLE ACCESS PLATES. REMOVE, PUNCH TO SUIT CONDUIT SIZE AND REPLACE.
 5. CONTROL WIRING AND POWER WIRING MUST BE RUN IN SEPARATE CONDUITS.
 6. COPPER CABLES ONLY ARE RECOMMENDED.
 7. ALL WIRING IS TO BE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.

CENTER OF GRAVITY TABLE IN mm

BATTERY TYPE	X	Y	Z
12HX400-FR	440	890	510
12HX505-FR	440	840	530
12HX540-FR	440	840	530



APPROXIMATE WEIGHTS

BATTERY TYPE	UNIT WEIGHT	
	LBS	KG
12HX400-FR	2693	1224
12HX505-FR	3245	1475
12HX540-FR	3345	1520

FOR SHIPPING WEIGHT ADD 85LBS. (39kg)

DRAWN BY V. CARMONA	SHEET NO. 1 OF 1
CHK BY J. BEALE	ECN NO.
REF. DWG.	ORDER NO.

OUTLINE DRAWING
BATTERY CABINET 900mm
LIEBERT APM

DWG. NO. UAM05012	DATE 4/8/11	REV. # 1	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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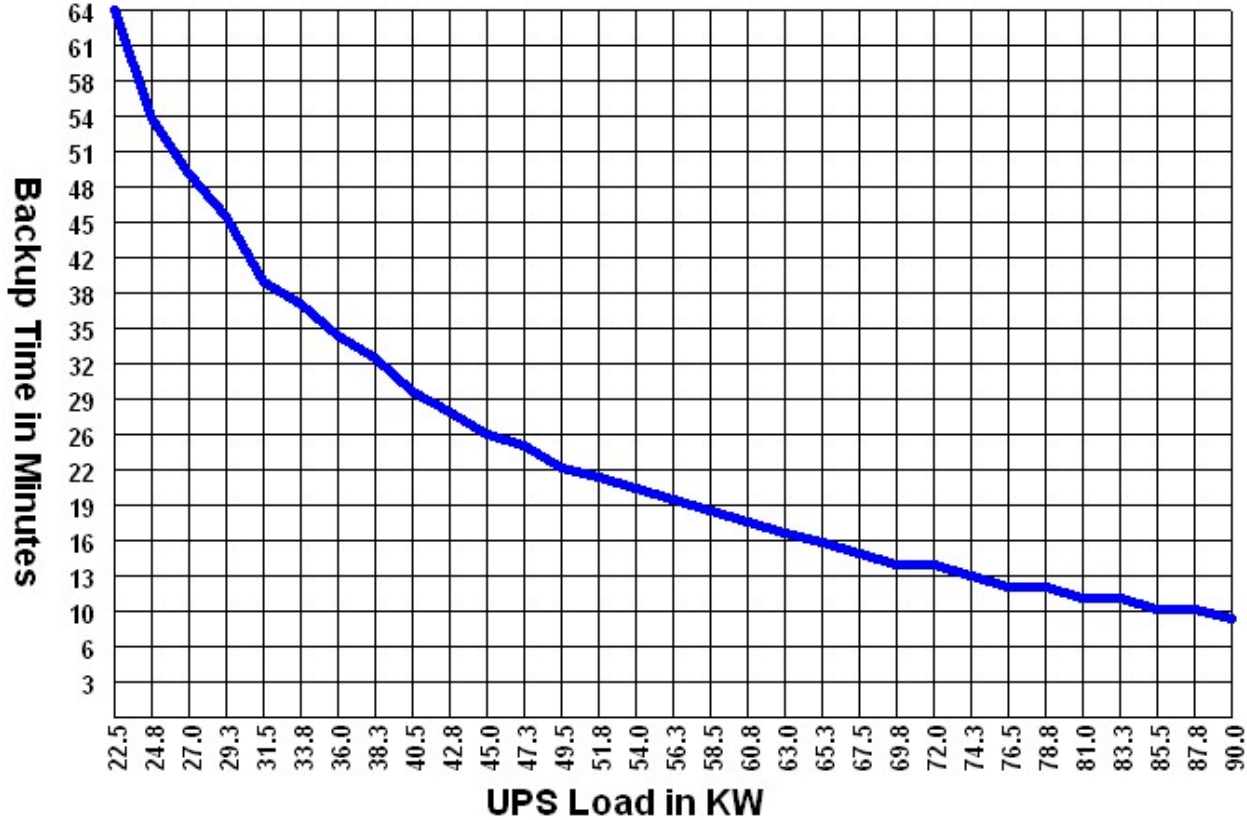


Backup Time versus Load

Save A Copy

EXIT

UPS Model: NRF90CCSA0A0 Battery Model: HX505-FR Cell Count: 144 Quantity of 1



UPS Load	Backup Time	UPS Load	Backup Time	UPS Load	Backup Time	UPS Load	Backup Time
22.5 KW	64 Minutes	40.5 KW	30 Minutes	58.5 KW	19 Minutes	76.5 KW	12 Minutes
24.8 KW	55 Minutes	42.8 KW	28 Minutes	60.8 KW	18 Minutes	78.8 KW	12 Minutes
27.0 KW	50 Minutes	45.0 KW	26 Minutes	63.0 KW	17 Minutes	81.0 KW	11 Minutes
29.3 KW	46 Minutes	47.3 KW	25 Minutes	65.3 KW	16 Minutes	83.3 KW	11 Minutes
31.5 KW	40 Minutes	49.5 KW	23 Minutes	67.5 KW	15 Minutes	85.5 KW	10 Minutes
33.8 KW	38 Minutes	51.8 KW	22 Minutes	69.8 KW	14 Minutes	87.8 KW	10 Minutes
36.0 KW	35 Minutes	54.0 KW	21 Minutes	72.0 KW	14 Minutes	90.0 KW	9 Minutes
38.3 KW	33 Minutes	56.3 KW	20 Minutes	74.3 KW	13 Minutes		

RANGE SUMMARY



Introduction to . . . The DataSafe® HX Battery Range

data safe[®]
HX

The DataSafe® HX battery range of valve regulated lead acid batteries has been designed to offer superior solutions for the Information Technology and Uninterruptible Power Supply markets.

DataSafe HX batteries are the ideal source of power to protect vital systems. DataSafe HX batteries incorporate select design features that maximize reliability while ensuring superior performance and an excellent service life.

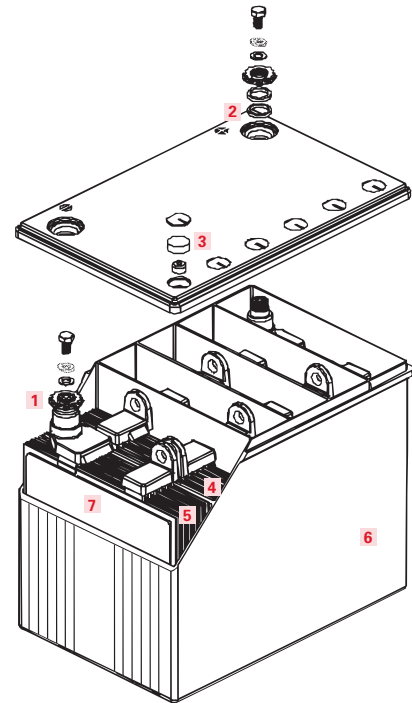
Gas recombination technology for valve regulated lead acid batteries has totally changed the concept of standby power.

The minimal level of gas evolution allows battery installation in cabinets or on stands, in offices or near main equipment, maximizing space utilization and reducing storage and maintenance costs.

DataSafe HX batteries deliver superior performance, occupying less space than conventional standby power batteries.

Construction

- 1 High conductivity terminals**
Brass insert with threaded receptacle (HX80-HX800), bolt terminal (HX80 - HX150), or faston tab (HX25-HX50) for maximum conductivity and ease of installation.
- 2 High integrity terminal seal**
Compression grommet (HX205-HX800) or dual welded/epoxy seal (HX25-HX150) designed for long life.
- 3 Self-regulating relief valve**
Low pressure non-return valve prevents ingress of atmospheric oxygen.
- 4 Rugged high performance positive plates**
Grids designed to resist corrosion and prolong active life.
- 5 Balanced negative plates**
Ensure optimum recombination efficiency.
- 6 Tough cell containers**
Thick-wall plastic, highly resistant to shock and vibration. Flame retardant material is the standard offering.
- 7 Separators**
Low resistance microporous glass fiber. The electrolyte is absorbed within this material.



Features & Benefits

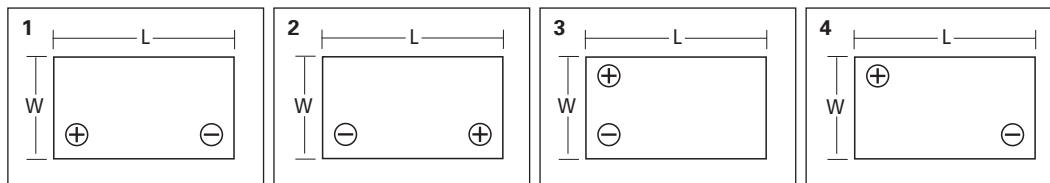
- Positive and negative plate grids made of lead-calcium-tin alloy for long life and efficient recharge.
- Flame retardant case and cover to meet UL1778.
- Individual cell vents.
- DataSafe® HX battery containers and covers are hermetically sealed to provide leak resistance over the life of the product.
- AGM separators - The electrolyte is completely absorbed into the separator.
- High performance brass threaded receptacle, bolt terminal, and faston terminals.
- Increased energy density.
- Computer optimized electrochemistry for increased power up to the 15 minute rate.
- 100% initial battery capacity.

GENERAL SPECIFICATIONS

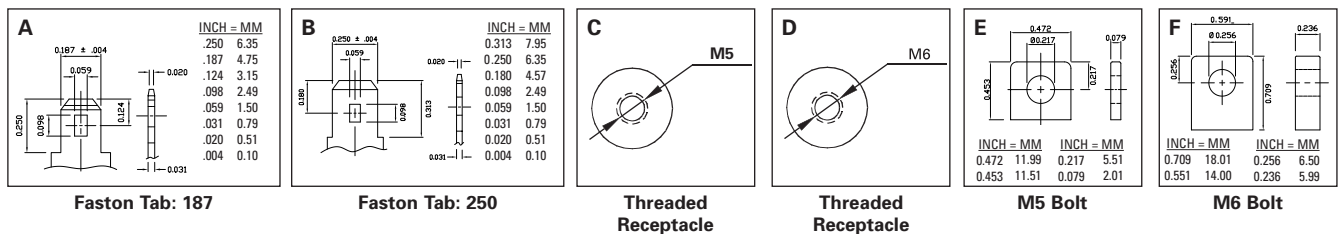
Type	Nominal Voltage (V)	Nominal Ah		Watts/Cell		Nominal Dimensions				Typical Weight		Short Circuit Current (A)	Max Discharge Current (Amps-2 min rate)	Internal Resistance (mΩ)	Layout	Terminals
		8 hr rate to 1.75 volts/cell end voltage at 77°F/25°C	@ 15 min. rate to 1.67 volts/cell end voltage at 77°F/25°C	mm	inch	mm	inch	mm	inch	mm	lbs					
12HX25	12	4.5	23	107	4.2	70	2.8	90	3.5	2.0	4.4	300	41	16.5	1	A/B
12HX35	12	7	36	100	3.9	65	2.6	151	5.9	2.8	6.1	500	62	13.2	3	A/B
6HX50	6	11	53	99	3.9	50	2.0	151	5.9	2.1	4.7	720	93	6.1	1	A/B
12HX50	12	11	53	99	3.9	99	3.9	152	6.0	4.1	9.1	720	93	12.2	3	A/B
12HX80	12	16	80	167	6.6	76	3.0	181	7.1	6.4	14.0	1000	140	8.5	2	C/E
12HX100	12	21	100	175	6.9	125	4.9	166	6.5	10.0	22.0	1500	171	7.1	2	C/E
12HX135B	12	28	135	180	7.1	130	5.1	198	7.8	11.8	26.0	1800	238	5.6	2	F
12HX135R	12	28	135	169	6.7	130	5.1	196	7.7	11.8	26.0	1800	238	5.6	2	C
12HX150	12	32	150	170	6.7	165	6.5	197	7.8	14.5	32.0	2400	277	5.0	2	D/F
12HX205	12	44	204	206	8.1	140	5.5	226	8.9	19.5	43.0	2775	439	4.5	1	D
12HX300	12	70	284	208	8.2	175	6.9	259	10.2	27.2	60.0	3175	503	3.9	1	D
12HX330	12	82	336	213	8.4	173	6.8	300	11.8	32.2	71.0	3700	586	3.4	1	D
12HX400	12	94	381	211	8.3	173	6.8	338	13.3	36.3	80.0	4225	670	3.0	1	D
12HX505	12	119	506	272	10.7	173	6.8	338	13.3	46.7	103.0	4510	913	2.8	1	D
12HX540	12	123	540	272	10.7	173	6.8	338	13.3	48.1	106.0	4775	961	2.6	1	D
6HX800	6	200	780	211	8.3	173	6.8	340	13.4	36.3	80.0	6200	1272	1.0	4	D

* Including Terminal
All dimensions given are +/-0.08 in (2mm)

LAYOUT



TERMINAL



- Normal operating temperature range -4°F/-20°C to 122°F/50°C
- Float charging voltage 2.25 - 2.28 Volts per cell at 77°F/25°C
- Charging current DataSafe® HX batteries can be safely recharged at high current rates.
- Storage time DataSafe HX batteries can be stored for up to 6 months at 77°F/25°C before a freshening charge is required. At higher temperatures this time interval will be reduced.

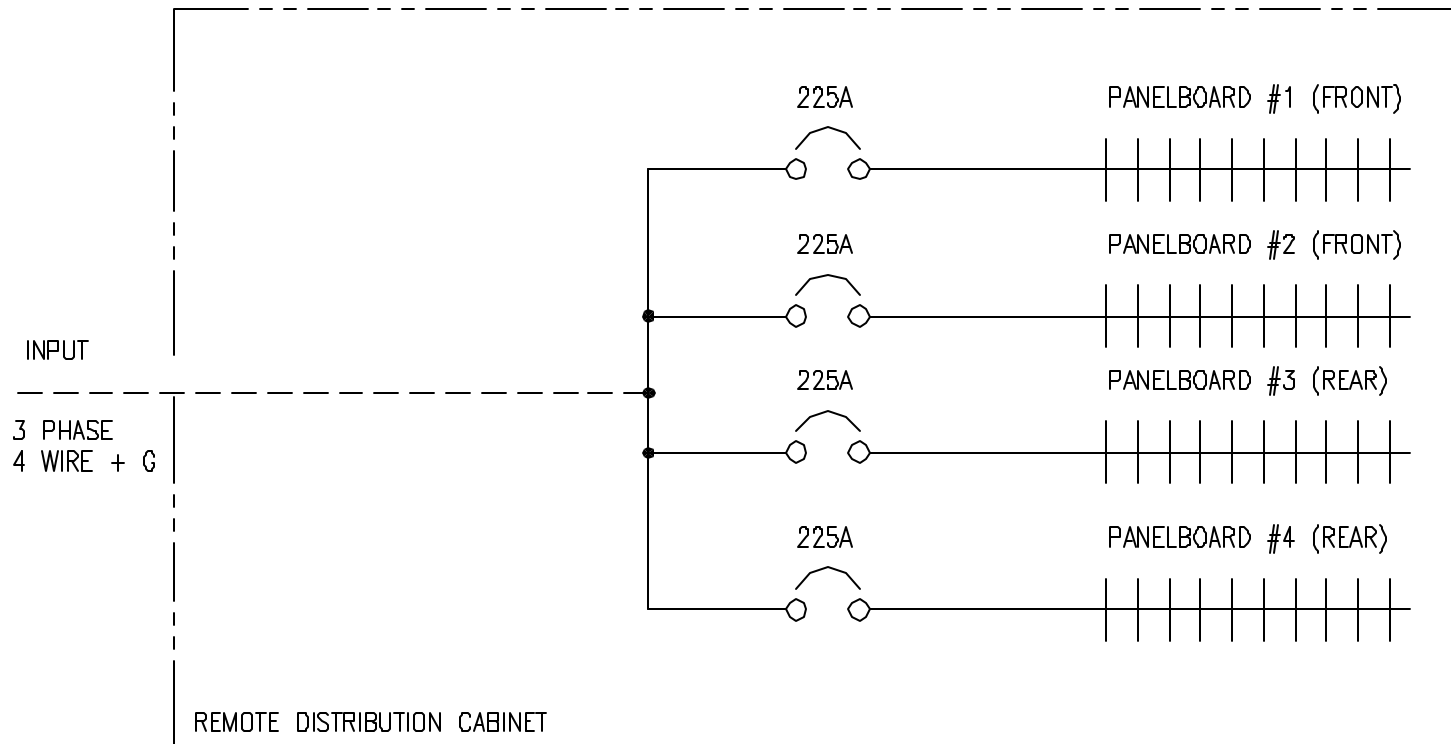
- Torque specifications - M5 Bolt - 40 in-lbs (4.5 Nm) ± 5% M6 Bolt - 58 in-lbs (6.5 Nm) ± 5% M5 Receptacle - 31 in-lbs (3.5 Nm) ± 5% M6 Receptacle - (HX80-HX150) 44 in-lbs (5 Nm) ± 5% M6 Receptacle - (HX205-HX800) 60 in-lbs (6.8 Nm) ± 5%
- DataSafe HX batteries are designed to be installed on their base. Consult your local EnerSys® dealer before installing in any other orientation.

Standards

- UL listing - File No MH16464 (HX25-HX150) or MH12544 (HX205-HX800)
- Manufactured to EnerSys standards in ISO 9001 registered production facilities worldwide.
- Approved for shipping as non-hazardous, non-spillable - per IATA Special Provision A67 and 49 CFR




Remote Distribution Cabinet



--- FIELD SUPPLIED WIRING

MAXIMUM AMP RATING	VOLTAGE	SUGGESTED WIRE SIZE
500A	208/120V	2-350KCML

REF. DWG.	TITLE ONE-LINE DIAGRAM SINGLE INPUT REMOTE DISTRIBUTION CABINET WITH FOUR PANELBOARDS	DWG. NO. RDC12003	DATE 11/2/01	 1050 DEARBORN DRIVE, PO BOX 29186 COLUMBUS, OHIO 43229
		REV. NO. 02	ORDER NO.	

FILE NAME: RDC12003

LIEBERT RDC CIRCUIT BREAKER SCHEDULE

MAIN PANELBOARD CIRCUIT BREAKER

VOLTAGE 60 Hz	VENDOR	TYPE	FRAME AMPS	TRIP AMPS	MODEL NUMBER	INTERRUPTING RATING AIC
208V	ABB	FIX MTD	225A	225A	T3N225TW	22K
208V	ABB	PLUG-IN	225A	225A	T3S225TW	22K

PANELBOARD BRANCH CIRCUIT BREAKER

VOLTAGE 60 Hz	VENDOR	TYPE	FRAME AMPS	TRIP AMPS	MODEL NUMBER	INTERRUPTING RATING AIC
208V	SQUARE D	PLUG-IN	100A	15-100A	QO	10K
208V	SQUARE D	BOLT-IN	100A	15-100A	QOB	10K
208V	SQUARE D	PLUG-IN	100A	15-100A	QOxxVH	22K
208V	SQUARE D	BOLT-IN	100A	15-100A	QOBxxVH	22K
208V	GE	PLUG-IN	100A	15-100A	THQL	10K
208V	GE	BOLT-IN	100A	15-100A	THQB	10K
208V	GE	PLUG-IN	100A	15-100A	THHQL	22K
208V	GE	BOLT-IN	100A	15-100A	THHQB	22K

DRAWN BY
K. STACY
CHK BY
B. BARCUS
REF. DWG.

SHEET NO.
1 OF 1
ECN NO.
ORDER NO.

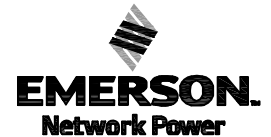
CIRCUIT BREAKER SCHEDULE
RDC

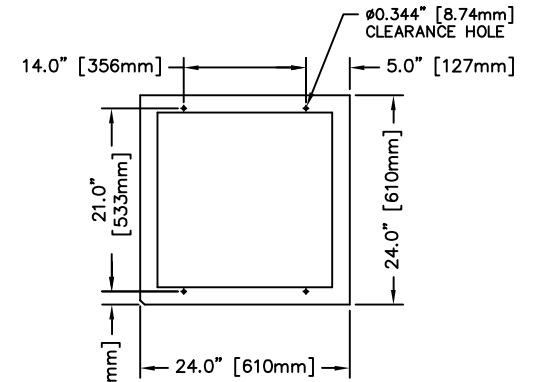
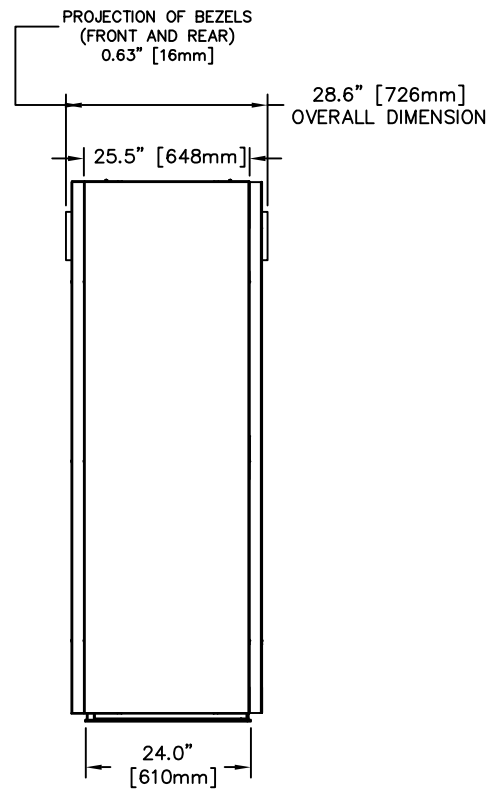
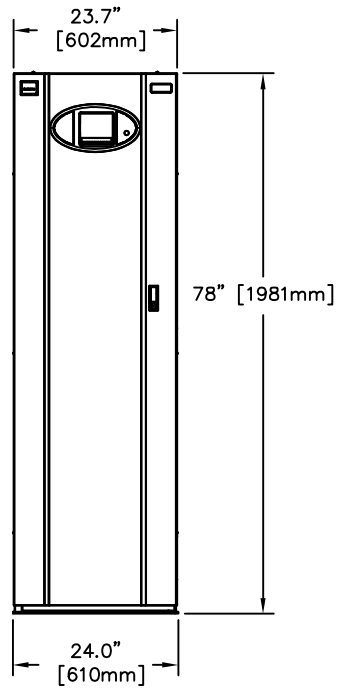
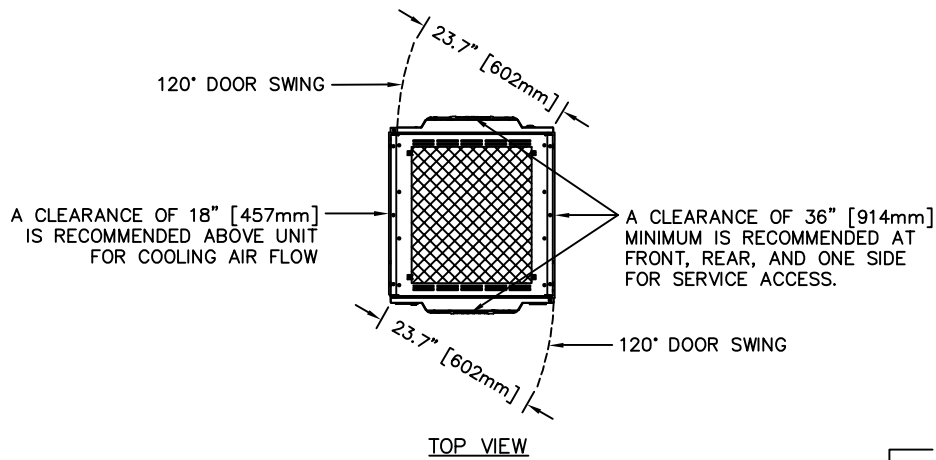
DWG. NO.
RDC15500

DATE
4/9/10

REV. #
0

1050 DEARBORN DRIVE
P.O. BOX 29186
COLUMBUS, OHIO 43229





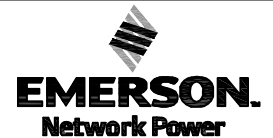
- NOTES:
1. WEIGHT: 750 LBS (340 KG)
 2. HEAT OUTPUT: 3,412 BTU/HR (1 KW)

DRAWN BY K. STACY	SHEET NO. 1 OF 1
CHK BY B. BARCUS	ECN NO.
REF. DWG.	ORDER NO.

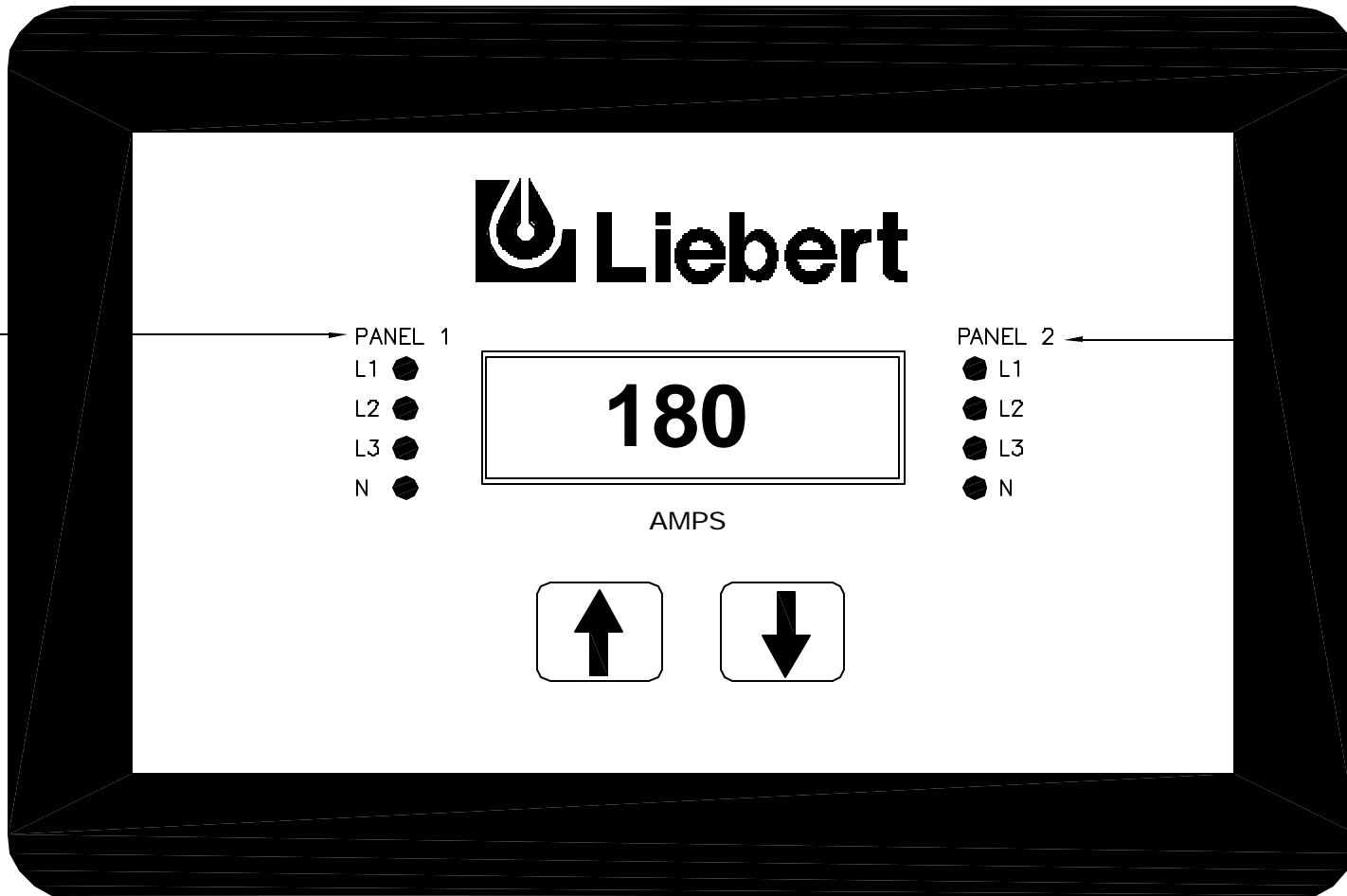
OUTLINE
LIEBERT RDC

DWG. NO. RDC11014	DATE 7/10/09	REV. # 0	1050 DEARBORN DRIVE P.O. BOX 29186 COLUMBUS, OHIO 43229
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FILE NAME: I:\APPL\Ohio Appl\RDC\Drawings\Outlines\RDC11XXX\RDC11014-00.DWG



WILL READ "PANEL 3"
ON REAR OF UNIT



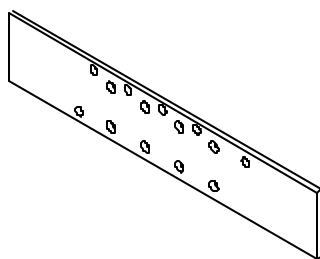
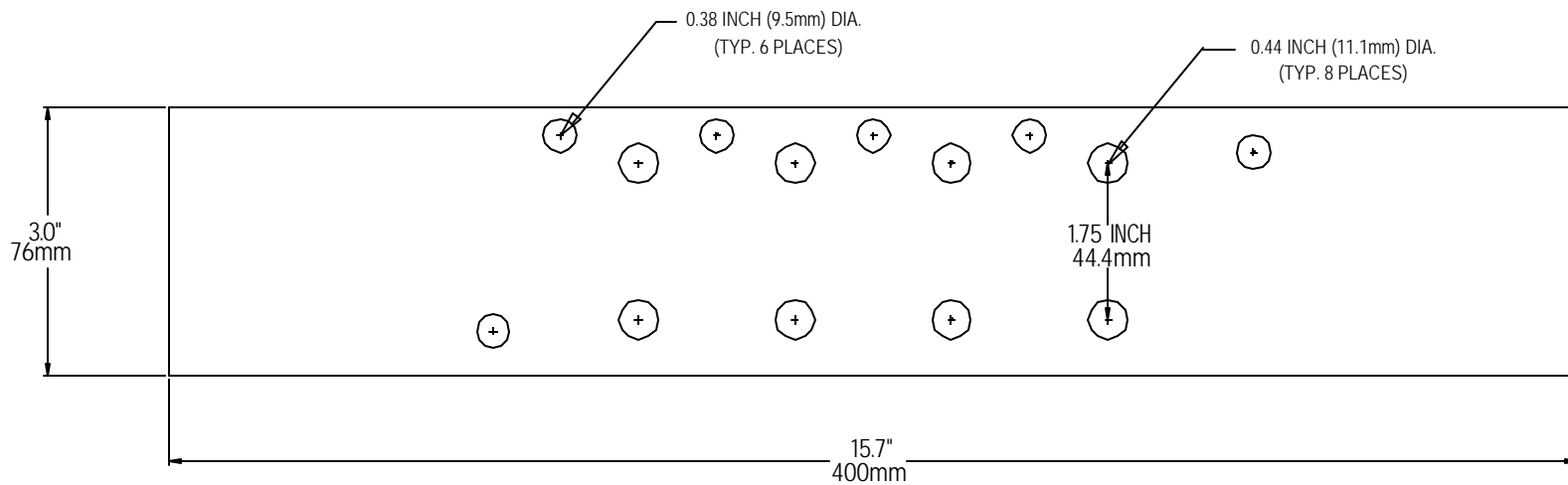
CURRENT MONITORING PANEL MONITORS AND
DISPLAYS THE FOLLOWING PARAMETERS:

- PHASE CURRENT FOR EACH PANELBOARD
- NEUTRAL CURRENT FOR EACH PANELBOARD

	TITLE		
	OUTLINE DRAWING CURRENT MONITORING PANEL	DWG. NO. RDC12005	DATE 3/22/01
REF. DWG.		REV. NO. 01	ORDER NO.



FILE NAME: RDC12005.DWG



NOTES:

1. MATERIAL TO BE COPPER.
2. BUSBAR APPROX. .25 INCH THICK.

REF. DWG.

TITLE

OUTLINE DRAWING
NEUTRAL BUSBAR

DWG. NO.
RDC12020

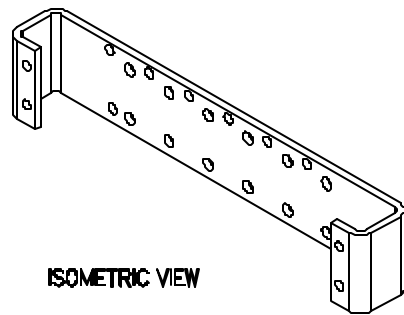
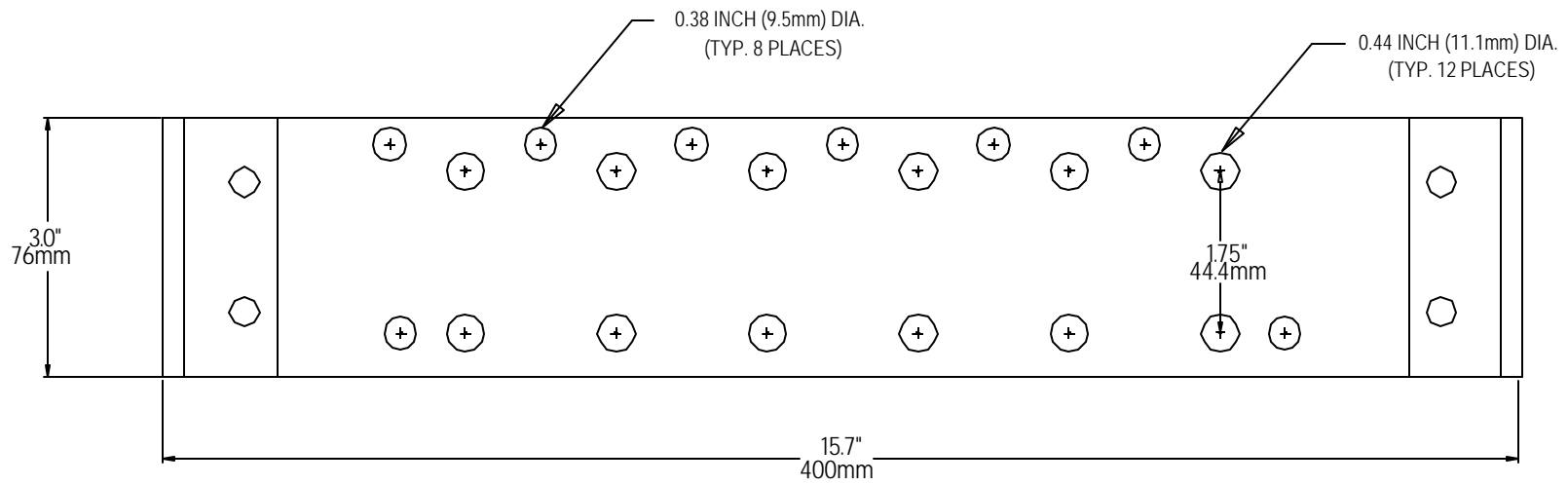
DATE
11/5/01

REV. NO.
02

ORDER NO.



FILE NAME: RDC12020.DWG



NOTES:

1. MATERIAL TO BE COPPER.
2. BUSBAR APPROX. .25 INCH THICK.

REF. DWG.

TITLE

OUTLINE DRAWING
GROUND BUSBAR

DWG. NO.
RDC12021

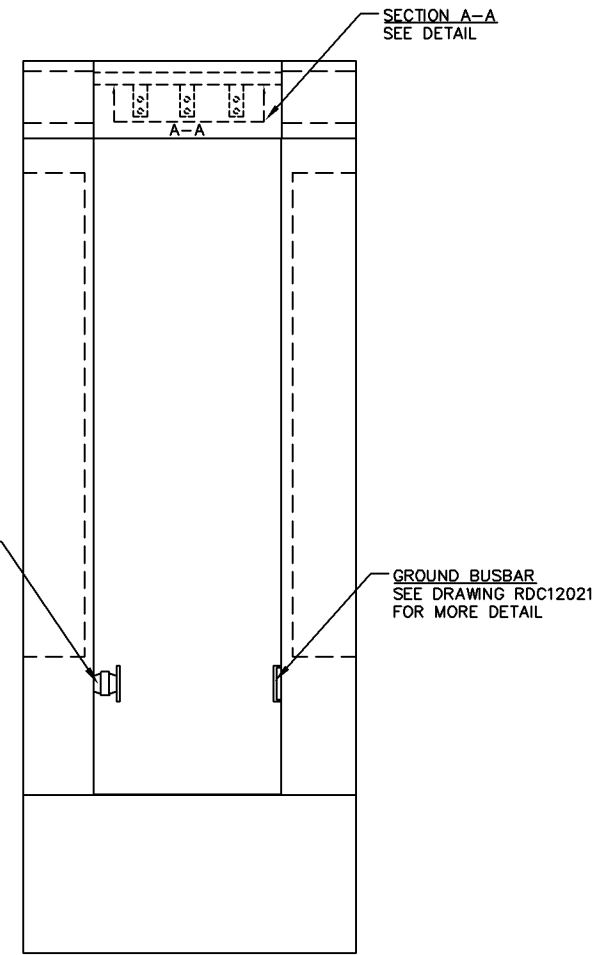
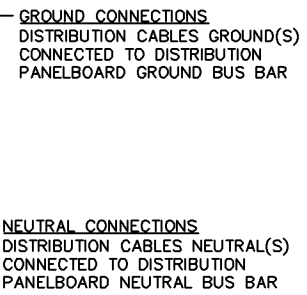
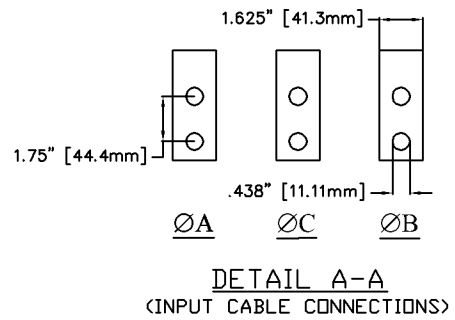
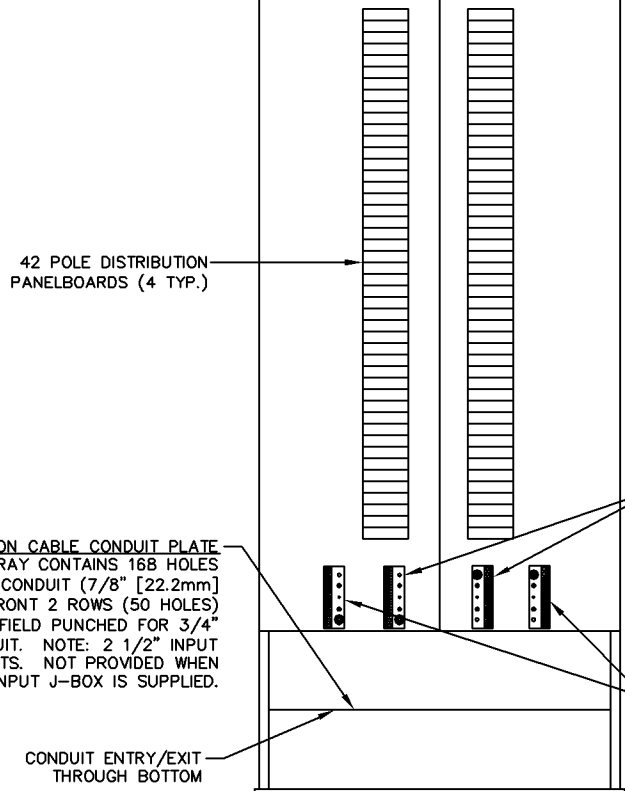
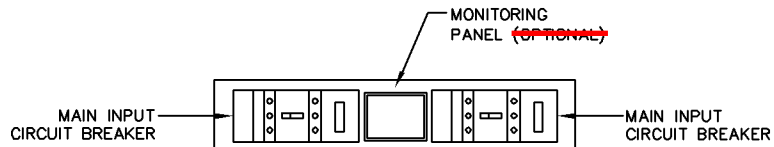
DATE
11/5/01

REV. NO.
02

ORDER NO.

 **Liebert**
1080 DEARBORN DRIVE, PO BOX 29188,
COLUMBUS, OHIO 43228

FILE NAME: RDC12021.DWG



FRONT AND REAR VIEW
(WITH DOOR AND PANEL REMOVED)

SIDE VIEW
(WITH PANEL REMOVED)

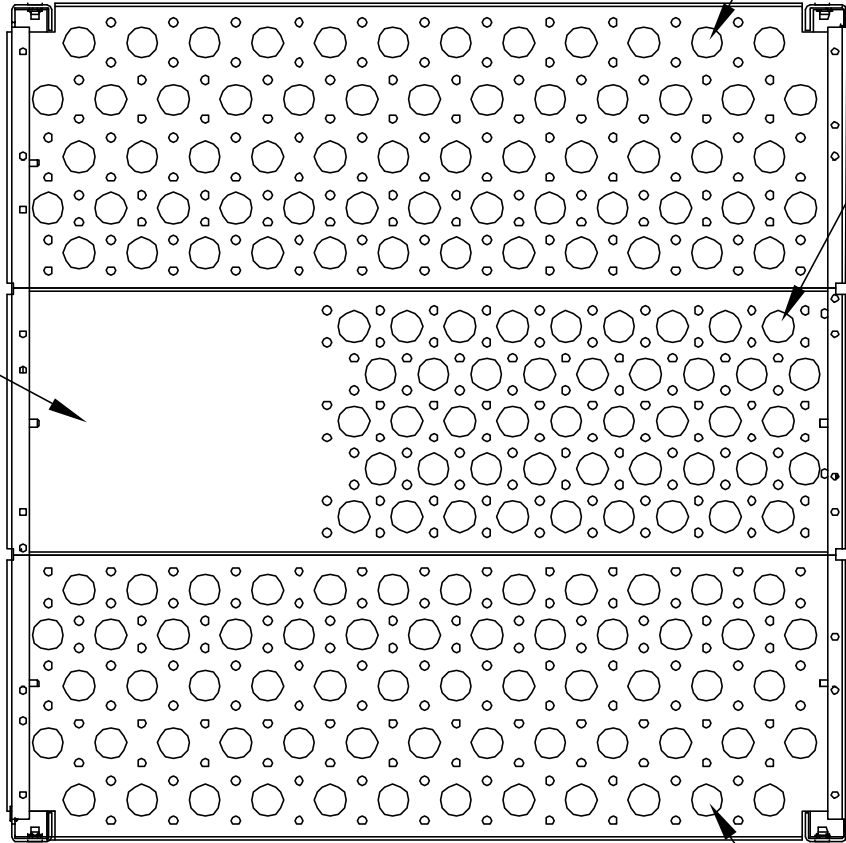
DRAWN BY V. CARMONA CHK BY B. BARCUS REF. DWG.	SHEET NO. 1 OF 1 ECN NO. ORDER NO.	ELECTRICAL FIELD CONNECTIONS REMOTE DISTRIBUTION CABINET SINGLE INPUT WITH GE PANELBOARDS	DWG. NO. RDC15028 REV. NO. 1 DATE 8/5/08	Liebert P.O. BOX 29186 COLUMBUS, OHIO 43229	EMERSON Network Power
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SIZED FOR (62) 1/2" CONDUITS


SIZED FOR (45) 1/2" CONDUITS

SIZED FOR (62) 1/2" CONDUITS

AREA PROVIDED FOR CONTRACTOR TO PUNCH HOLES FOR INPUT CONDUITS. MAXIMUM CONDUIT SIZES ARE: (2) - 3" DIA. OR (1) - 4" DIA.



BOTTOM VIEW OF STANDARD CONDUIT PLATES

REF. DWG.	TITLE OUTLINE DRAWING REMOTE DISTRIBUTION CABINET CONDUIT TRAY	DWG. NO. RDC12040	DATE 3/20/02	 1050 DEARBORN DRIVE, PO BOX 29186, COLUMBUS, OHIO 43229
		REV. NO. 03	ORDER NO.	

FILE NAME: RDC12040



Start Up Scopes of Work



UNINTERRUPTIBLE POWER SYSTEMS ALL 3-PHASE MODELS SCOPE OF WORK

START-UP SERVICE 8X5

- One site trip within the 48 contiguous states by a factory trained Liebert Customer Engineer after the UPS System has been installed and cabling terminated. Visit to be scheduled during standard work hours; Monday-Friday, 8am-5pm, (excluding national holidays).
- Any customer site visit is limited to eight (8) hours per visit. Any time beyond forty (40) hours/wk or eight (8) hrs/day will be billed separately.
- Includes parts and labor coverage for repair of defects found during commissioning which are a result of manufacturing. Defects or damage resulting from installation are not covered.
- Visit must be scheduled 10 business days in advance of need by contacting the Liebert Services Customer Response Center at 1-800-LIEBERT, or by contacting the region office.
- Start-up expenses incurred due to delays beyond the control of Liebert Services will be billed at cost.
- LS start-up validates 12-month material and labor warranty on Liebert UPS System.
- Subject to all Terms & Conditions as noted in the Liebert Services Terms & Conditions.

SERVICE PERFORMED

1. Perform a complete visual inspection of the equipment, checking for broken, damaged, or stressed components.
2. Check all nuts, bolts, screws, and connectors for tightness.
3. Clean any foreign material and dust from equipment.
4. Verify that the system is installed correctly.
5. Perform an operational test of the system including unit transfer and battery discharge.
6. Ensure that input, output, and DC voltages are within tolerance.
7. Verify proper operation of installed options.
8. Calibrate UPS meters and ensure all UPS metering is within UPS specification.
9. Verify proper operation with customer load, if available.
10. Verify proper operation with generator, if available.
11. Review equipment installation and train customer on unit operation.

Note1: Start-Up Plus (if purchased) includes one annual preventative maintenance visit during the warranty period. See 3-Phase UPS PM Only scope of work for details.



SEALED VRLA BATTERIES SCOPE OF WORK

START-UP SERVICE 8X5

- Any customer site visit is limited to eight (8) hours per visit. Any time beyond forty (40) hours/wk or eight (8) hrs/day will be billed separately.
- Flooded battery systems not installed by Liebert Services do not include parts or labor coverage for repair of defects found during commissioning, which are a result of manufacturing or installation.
- Liebert Services start-up validates 12-month material and labor warranty on Liebert Battery Cabinets.
- Liebert supplied cabinets include parts and labor coverage for repair of defects found during commissioning which are a result of manufacturing.
- Start-up expenses incurred due to delays beyond the control of Liebert Services will be billed at cost.
- Two site trips within the 48 contiguous states by a factory trained Liebert Customer Engineer after the UPS System has been installed and cabling terminated. Visit to be scheduled by the customer between 8 am-5 pm, Monday-Friday (excluding national holidays).
- Visit must be scheduled 10 business days in advance of need by contacting the Liebert Services Customer Response Center at 1-800-LIEBERT, or by contacting the region office.
- Subject to all Terms & Conditions as noted in the Liebert Services Terms & Conditions.

SERVICE PERFORMED

Visual Inspections

1. Visually inspect the battery room for safety concerns, i.e. lighting, signage, water present or leaking, ventilation, clearances, etc.
2. Visually inspect the battery installation to insure the batteries are installed according to the manufacturer's recommendations.
3. Visually inspect the batteries, wires, cables, and buss bars, for cracks, leaks, swelling, corrosion, proper hardware, labeling, loose connections, cable stress relief, and general cleanliness.
4. Visually inspect the cabinet or rack for proper installation including grounding, cabinet ventilation, loose hardware, and proper clearances.
5. On systems utilizing cabinets, insure placement of air barriers if applicable.

Mechanical Inspections

1. Verify all inter-cell connections for proper torque.
2. Verify all hardware connections on the rack or cabinet are tight or torqued according to the manufacturer's specifications.
3. Connect all inter-tier connections and torque accordingly (battery cabinets only).

Measurements

1. Measure and verify the open circuit voltage of the individual batteries and the battery string to insure proper voltage.
2. Check for proper polarity of the battery string at the battery breaker or fuses and at the UPS.
3. Measure the ambient temperature.
4. Verify that no ground faults are present.

Charging

1. Perform an initial or freshening charge according to the manufacturer's specifications.
2. After the initial or freshening charge, place the system on the proper float charge according to the manufacturer's recommendation.
3. Measure and record system values after initial or freshening charge



POWER DISTRIBUTION SYSTEMS NX BYPASS DISTRIBUTION CABINET SCOPE OF WORK

START-UP SERVICE 8X5

- Any customer site visit is limited to eight (8) hours per visit. Any time beyond forty (40) hours/wk or eight (8) hrs/day will be billed separately.
- Includes parts and labor coverage for repair of defects found during commissioning which are a result of manufacturing. Defects or damage resulting from installation are not covered.
- LS start-up validates 12-month material and labor warranty on Liebert Power System.
- Start-up expenses incurred due to delays beyond the control of Liebert Services will be billed at cost.
- Visit must be scheduled 10 business days in advance of need by contacting the Liebert Services Customer Response Center at 1-800-LIEBERT, or by contacting the region office.
- One site trip within the 48 contiguous states by a factory trained Liebert Customer Engineer after the Power System has been installed and cabling terminated. Visit to be scheduled during standard work hours; Monday-Friday, 8am-5pm, (excluding national holidays).
- Subject to all Terms & Conditions as noted in the Liebert Services Terms & Conditions.

SERVICE PERFORMED

1. Perform a complete visual inspection of the equipment, checking for broken, damaged, or stressed components.
2. Check all nuts, bolts, screws, and connectors for tightness.
3. Check continuity of all fuses.
4. Clean any foreign material and dust from equipment.
5. Verify that the system is installed and configured correctly.
6. Check all control wiring is installed in accordance with applicable schematics.
7. Verify proper phase rotation for the Input, Output (including panelboard main and/or subfeed breakers), and Maintenance Bypass (if applicable).
8. (If permitted) Measure voltage and current on the input and output and verify values are within specification.
9. (If applicable) Verify the voltage and current readings match the displayed values. Calibrate if necessary.
10. Verify the Maintenance Bypass Interlock (Kirk Key) option is operating properly (if installed).
11. Install or perform Engineering Field Change Notices (FCN) as necessary.
12. (If applicable) Verify proper operation of installed options (ION6200, LDM and VPMP Monitoring).
13. (If applicable) Perform operational test of the system (i.e. Maintenance Bypass and monitoring options).
14. Verify proper operation with customer load, if available.
15. Conduct thermal scan on all connections, components and transformer terminals for evidence of overheating.

16. Check that all interior and exterior protective panels and covers have been replaced and no holes or gaps are present.
17. Review equipment installation and train customer on unit operation.



**POWER DISTRIBUTION SYSTEMS
ALL MODELS
SCOPE OF WORK**

START-UP SERVICE 8X5

- Any customer site visit is limited to eight (8) hours per visit. Any time beyond forty (40) hours/wk or eight (8) hrs/day will be billed separately.
- Includes parts and labor coverage for repair of defects found during commissioning which are a result of manufacturing. Defects or damage resulting from installation are not covered.
- LS start-up validates 12-month material and labor warranty on Liebert Power System.
- Start-up expenses incurred due to delays beyond the control of Liebert Services will be billed at cost.
- Visit must be scheduled 10 business days in advance of need by contacting the Liebert Services Customer Response Center at 1-800-LIEBERT, or by contacting the region office.
- One site trip within the 48 contiguous states by a factory trained Liebert Customer Engineer after the Power System has been installed and cabling terminated. Visit to be scheduled during standard work hours; Monday-Friday, 8am-5pm, (excluding national holidays).
- Subject to all Terms & Conditions as noted in the Liebert Services Terms & Conditions.

SERVICE PERFORMED

1. Perform a complete visual inspection of the equipment, checking for broken, damaged, or stressed components.
2. Check all nuts, bolts, screws, and connectors for tightness.
3. Clean any foreign material and dust from equipment.
4. Verify that the system is installed and configured correctly.
5. Verify proper input voltage phase rotation.
6. Verify that all voltage and current readings are within tolerance.
7. Verify proper operations of any installed options (Tie-Breaker, LDM, ION 6200 etc.).
8. Conduct a thermal scan of the interior of equipment and subassemblies for evidence of overheated components.
9. Install or perform Engineering Field Change Notices (FCN) as necessary.
10. Verify proper operation with customer load, if available.
11. Verify proper operation with generator, if available.
12. Review equipment installation and train customer on unit operation.



Warranty

LIMITED WARRANTY FOR UPS PRODUCTS

This Warranty is given ONLY to purchasers who buy for commercial or industrial use in the ordinary course of each purchaser's business.

General:

Liebert Corporation products and systems are in our opinion the finest available. We take pride in our products and are pleased that you have chosen them. Under certain circumstances we offer with our products the following One Year Warranty Against Defects in Material and Workmanship.

Please read your Warranty carefully. This Warranty sets forth our responsibilities in the unlikely event of defect and tells you how to obtain performance under this Warranty.

ONE YEAR LIMITED WARRANTY AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP

LIEBERT PRODUCTS COVERED:

Liebert® Series 300™ UPS, Liebert® Series 600™ UPS, Liebert® Series 610™ UPS, Liebert® UPStation® S3 UPS, Liebert® Npower™ UPS, Liebert® NX™ UPS, Liebert® NXL™ UPS, Liebert® APM™ UPS

Terms of Warranty:

As provided herein, the Liebert product is warranted to be free of defects in material and workmanship for a period of one year from the Warranty Inspection date, provided that Warranty Inspection is performed by Liebert personnel, occurs within six (6) months of the Liebert shipping date and the product has been stored in a suitable environment prior to Warranty Inspection. The Warranty Inspection date will be determined only from the completed inspection and Warranty Inspection sheet provided by Liebert to User. The product shipment date will be determined only from the Liebert bill of lading. If any part or portion of the Liebert product fails to conform to the Warranty within the Warranty period, Liebert, at its option, will furnish new or factory remanufactured products for repair or replacement of that portion or part.

Warranty Extends to First Purchaser for Use, Non-transferable:

This Warranty is extended to the first person, firm, association or corporation for whom the Liebert product specified herein is originally installed for use (the "User") in the fifty United States or Canada. This Warranty is not transferable or assignable without the prior written permission of Liebert.

Assignment of Warranties:

Liebert assigns to User any warranties which are made by manufacturers and suppliers of components of, or accessories to, the Liebert product and which are assignable, but Liebert makes NO REPRESENTATIONS as to the effectiveness or extent of such warranties, assumes NO RESPONSIBILITY for any matters which may be warranted by such manufacturers or suppliers and extends no coverage under this Warranty to such components or accessories.

Drawings, Descriptions:

Liebert warrants for the period and on the terms of the Warranty set forth herein that the Liebert product will conform to the descriptions contained in the certified drawings, if any, applicable thereto, to Liebert's final invoices, and to applicable Liebert product brochures and manuals current as of the date of product shipment ("Descriptions"). Liebert does not control the use of any Liebert product. Accordingly, it is understood that the Descriptions are NOT WARRANTIES OF PERFORMANCE and NOT WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE.

Warranty Claims Procedure:

Within a reasonable time, but in no case to exceed thirty (30) days, after User's discovery of a defect, User shall contact Liebert at (800) LIEBERT (543-2378). Subject to the limitations specified herein, a Liebert field service representative will repair the non-conforming Liebert product warranted hereunder, without charge for material or labor, provided Liebert personnel performed the Warranty Inspection of the Liebert product. Warranty coverage will be extended only after Liebert's inspection discloses the claimed defect and shows no signs of treatment or use that would void the coverage of this Warranty. All defective products and component parts replaced under this warranty become the property of Liebert.

Warranty Performance of Component Manufacturers:

It is Liebert's practice, consistent with its desire to remedy Warranty defects in the most prompt and effective manner possible, to cooperate with and utilize the services of component manufacturers and their authorized representatives in the performance of work to correct defects in the product components. Accordingly, Liebert may utilize third parties in the performance of Warranty work, including repair or replacement hereunder, where, in Liebert's opinion, such work can be performed in less time, with less expense, or in closer proximity to the Liebert product.

Items Not Covered By Warranty:

THIS WARRANTY DOES NOT COVER DAMAGE OR DEFECT CAUSED BY misuse, improper application, wrong or inadequate electrical current or connection, negligence, inappropriate on site operating conditions, repair by non-Liebert designated personnel, accident in transit, tampering, alterations, a change in location or operating use, exposure to the elements, Acts of God, theft or installation contrary to Liebert's recommendations or specifications, or in any event if the Liebert serial number has been altered, defaced, or removed.

THIS WARRANTY DOES NOT COVER shipping costs, installation costs, external circuit breaker resetting or maintenance or service items and further, except as may be provided herein, does NOT include labor costs or transportation charges arising from the replacement of the Liebert product or any part thereof or charges to remove or reinstall same at any premises of User.

THIS WARRANTY IS VOID if User allows any battery for the Liebert product to discharge below the minimum battery voltage cutoff point. The warranty is void if the User does not start recharging a discharged, or partially discharged, battery within forty-eight (48) hours of the discharge period.

THE PRODUCTS LISTED IN THIS WARRANTY ARE NOT FOR USE IN THE CONTROL AREA OR ANY REACTOR CONNECTED OR SAFETY APPLICATIONS OR WITHIN THE CONTAINMENT AREA OF A NUCLEAR FACILITY OR WHERE THE PRODUCTS HAVE POTENTIAL FOR DIRECT PATIENT CONTACT OR WHERE A SIX (6) FOOT CLEARANCE FROM A PATIENT CANNOT BE MAINTAINED AT ALL TIMES. THE PRODUCTS LISTED IN THIS WARRANTY MAY BE USED IN APPLICATIONS INVOLVING LIFE-SUSTAINING OR LIFE-SUPPORTING DEVICES ONLY WHERE THE END-USE CUSTOMER HAS SIGNED LIEBERT'S HEALTHCARE APPLICATION SALES AGREEMENT, OTHERWISE THE WARRANTY IS VOID.

REPAIR OR REPLACEMENT OF A DEFECTIVE PRODUCT OR PART THEREOF DOES NOT EXTEND THE ORIGINAL WARRANTY PERIOD.

Limitations:

THIS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

USER'S SOLE AND EXCLUSIVE REMEDY IS REPAIR OR REPLACEMENT OF THE LIEBERT PRODUCT AS SET FORTH HEREIN.

IF USER'S REMEDY IS DEEMED TO FAIL OF ITS ESSENTIAL PURPOSE BY A COURT OF COMPETENT JURISDICTION, LIEBERT'S RESPONSIBILITY FOR PROPERTY LOSS OR DAMAGE SHALL NOT EXCEED THE NET PRODUCT PURCHASE PRICE.

IN NO EVENT SHALL LIEBERT ASSUME ANY LIABILITY FOR INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES OF ANY KIND WHATSOEVER, INCLUDING WITHOUT LIMITATION LOST PROFITS, BUSINESS INTERRUPTION OR LOSS OF DATA, WHETHER ANY CLAIM IS BASED UPON THEORIES OF CONTRACT, NEGLIGENCE, STRICT LIABILITY, TORT, OR OTHERWISE.

Miscellaneous:

NO SALESPERSON, EMPLOYEE OR AGENT OF LIEBERT IS AUTHORIZED TO ADD TO OR VARY THE TERMS OF THIS WARRANTY. Warranty terms may be modified, if at all, only by a writing signed by a Liebert officer.

Liebert obligations under this Warranty are conditioned upon Liebert timely receipt of full payment of the product purchase price and any other amounts due. Liebert reserves the right to supplement or change the terms of this Warranty in any subsequent warranty offering to User or others.

In the event that any provision of this Warranty should be or becomes invalid and/or unenforceable during the warranty period, the remaining terms and provisions shall continue in full force and effect.

This Warranty shall be governed by, and construed under, the laws of the State of Ohio, without reference to the conflict of laws principles thereof.

This Warranty represents the entire agreement between Liebert and User with respect to the subject matter herein and supersedes all prior to or contemporaneous oral or written communications, representations, understandings or agreements relating to this subject.

LIMITED WARRANTY FOR TEN (10) YEAR DESIGN LIFE VRLA BATTERIES & BATTERY CABINET PRODUCTS

This Warranty is given **ONLY** to purchasers who buy for commercial or industrial use in the ordinary course of each purchaser's business.

General:

Liebert Corporation products and systems are in our opinion the finest available. We take pride in our products and are pleased that you have chosen them. Under certain circumstances we offer with our products the following Warranty Against Defects in Material and Workmanship.

Please read your Warranty carefully. This Warranty sets forth our responsibilities in the unlikely event of defect and tells you how to obtain performance under this Warranty.

LIMITED WARRANTY AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP

PRODUCTS COVERED:

Ten (10) Year Design Life Valve Regulated Lead Acid (VRLA) Batteries, and Liebert-manufactured battery cabinets, for Uninterruptible Power Supply (UPS) system applications.

Terms of Warranty:

Liebert-Manufactured Battery Cabinets (not including batteries): As provided herein, each Liebert-manufactured battery cabinet is warranted to be free of defects in material and workmanship for a period of: (i) one year from the start-up date provided start-up is performed by Liebert Global Services personnel, occurs within six (6) months of the Liebert shipping date and the product has been stored in a suitable environment prior to start-up; or (ii) in any event, a maximum of eighteen (18) months from date of product shipment from Liebert. The warranty duration shall be whichever period described in the preceding sentence expires first. The start-up date will be determined only from the completed inspection and start-up sheet provided by Liebert Global Services to User. The product shipment date will be determined only from the Liebert bill of lading. If any part or portion of the Liebert product fails to conform to the Warranty within the Warranty period, Liebert Global Services, at its option, will furnish new or factory remanufactured products for repair or replacement of that portion or part.

Ten (10) Year Design Life VRLA Batteries: Liebert does not manufacture batteries, but does warrant certain ten (10) year design life VRLA batteries. Subject to the further conditions and limitations set forth in this document, C&D brand Dynasty model "UPS High Rate," "UPS High Rate Max," and EnerSys brand DataSafe model "HX" ten (10) year design life VRLA batteries (the "VRLA Warranty Batteries") that are purchased from Liebert and used in Liebert-manufactured battery cabinets are warranted to be free of defects in material and workmanship for a period of: (i) three years from date of shipment on a full replacement basis with a functionally equivalent battery; and (ii) after the third year, an additional seven years on a pro rata basis. The product shipment date will be determined only from the Liebert bill of lading. Additional conditions and limitations applicable to this ten (10) year design life VRLA battery warranty are set forth below.

From time-to-time Liebert is requested by Users, as defined below, to procure non-VRLA Warranty Batteries for User on a per-order basis. Liebert assigns to User any warranties which are made by the manufacturers and suppliers of such non-VRLA Warranty Batteries and which are assignable, but Liebert makes **NO REPRESENTATIONS** as to the effectiveness or extent of such warranties, assumes **NO RESPONSIBILITY** for any matters that may be warranted by such manufacturers or suppliers and extends no coverage under this Warranty to such non-VRLA Warranty Batteries.

Warranty Extends to First Purchaser for Use, Non-transferable:

This Warranty is extended to the first person, firm, association or corporation for whom the Liebert product specified herein is originally installed for use in the United States or Canada (the "User"). This Warranty is not transferable or assignable without the prior written permission of Liebert.

Drawings, Descriptions:

Liebert warrants for the period and on the terms of the Warranty set forth herein that the covered product will conform to the descriptions contained in the certified drawings, if any, applicable thereto, to Liebert's final invoices, and to applicable Liebert product brochures and manuals published as of the date of product shipment ("Descriptions"). Liebert does not control the use of any product. Accordingly, it is understood that the Descriptions are **NOT WARRANTIES OF PERFORMANCE** and **NOT WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE**.

Warranty Claims Procedure:

Within a reasonable time, but in no case to exceed thirty (30) days, after User's discovery of a defect, User shall contact Liebert Global Services (LGS) at 1-(800) LIEBERT (543-2378). All defective products and component parts replaced under this warranty become the property of Liebert.

Liebert-Manufactured Battery Cabinets: Subject to the terms and conditions specified herein, should Liebert determine that the battery cabinet is defective, an LGS field service representative will repair or replace (at Liebert's option) the non-conforming Liebert product warranted hereunder, without charge for material or labor, provided start-up of the Liebert product was performed by LGS personnel. In all other instances, User will be charged for labor performed at Liebert's then current rates. Warranty coverage will be extended only after Liebert's inspection discloses the claimed defect and shows no signs of treatment or use that would void the coverage of this Warranty.

Ten (10) Year Design Life VRLA Batteries: Subject to the terms and conditions specified herein, should Liebert determine that a VRLA Warranty Battery is defective within the initial three year warranty period, LGS will replace the VRLA Warranty Battery with a functionally equivalent battery. During the pro rata portion of the warranty period, LGS will replace a VRLA Warranty Battery that Liebert determines to be defective based on the below pro rata formula. The formula yields a pro rata credit value, which shall be applied against the manufacturer's then current published list purchase price of a new product of equal or greater Ampere Hour capacity.

Non-VRLA Warranty Batteries: With respect to non-VRLA Warranty Batteries procured by Liebert for Users, Liebert makes NO REPRESENTATIONS as to the effectiveness or extent of warranties that may be assigned to Users for such non-VRLA Warranty Batteries, assumes NO RESPONSIBILITY for any matters that may be warranted by manufacturers or suppliers of non-VRLA Warranty Batteries and extends no coverage under this Warranty to such non-VRLA Warranty Batteries.

PRO RATA CALCULATION FOR CREDIT:

$$\frac{[(\text{Manufacturer's Then Current Published List Purchase Price for the VRLA Warranty Battery}) \times (\# \text{ of Months of Un-Expired Warranty})]}{\# \text{ of Months of Total Warranty}} = \text{Pro Rata Credit Value}$$

Warranty Performance of Component Manufacturers:

It is Liebert's practice, consistent with its desire to remedy Warranty defects in the most prompt and effective manner possible, to cooperate with and utilize the services of component manufacturers and their authorized representatives in the performance of work to correct defects in the Liebert components. Accordingly, Liebert may utilize third parties in the performance of Warranty work, including repair or replacement hereunder, where, in Liebert's opinion, such work can be performed in less time, with less expense and in closer proximity to the Liebert product.

Items Not Covered By Warranty:

THIS WARRANTY DOES NOT COVER DAMAGE OR DEFECT CAUSED BY misuse, improper application, wrong or inadequate electrical current or connection, inadequate water or drain services, negligence, inappropriate on site operating conditions, repair by non-Liebert designated personnel, accident in transit, tampering, alterations, a change in location or operating use, exposure to the elements, Acts of God, theft or installation contrary to Liebert's recommendations or specifications, or in any event if the Liebert (for cabinets) or other manufacturer's (for batteries) serial number has been altered, defaced, or removed.

THIS WARRANTY DOES NOT COVER shipping costs, installation costs, circuit breaker resetting or maintenance or service items and further, except as may be provided herein, does NOT include labor costs or transportation charges arising from the replacement of the product or any part thereof or charges to remove same from any premises of User.

THIS WARRANTY IS VOID if User allows any battery for the Liebert UPS product to discharge below the minimum battery voltage cutoff point. The warranty is void if the user does not start recharging a discharged battery within forty-eight hours.

REPAIR OR REPLACEMENT OF A DEFECTIVE PRODUCT OR PART THEREOF DOES NOT EXTEND THE ORIGINAL WARRANTY PERIOD.

Limitations

- THIS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
- USER'S SOLE AND EXCLUSIVE REMEDY IS REPAIR OR REPLACEMENT OF THE PRODUCT AS SET FORTH HEREIN.
- IF USER'S REMEDY IS DEEMED TO FAIL OF ITS ESSENTIAL PURPOSE BY A COURT OF COMPETENT JURISDICTION, LIEBERT'S RESPONSIBILITY FOR PROPERTY LOSS OR DAMAGE SHALL NOT EXCEED ONE TIMES THE NET PRODUCT PURCHASE PRICE.
- IN NO EVENT SHALL LIEBERT ASSUME ANY LIABILITY FOR INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES OF ANY KIND WHATSOEVER, INCLUDING WITHOUT LIMITATION LOST PROFITS, BUSINESS INTERRUPTION OR LOSS OF DATA, WHETHER ANY CLAIM IS BASED UPON THEORIES OF CONTRACT, NEGLIGENCE, STRICT LIABILITY, TORT, OR OTHERWISE.

Additional Limitations & Conditions for Batteries

- A battery will only be considered defective if it fails to deliver at least 80 percent of its rated capacity during the warranty period. Rated capacity is that which is published in the manufacturer's official product literature for the specific product at the

time of shipment.

- Batteries must be charged, discharged, stored and serviced in accordance with applicable manufacturer's instructions.
- Each battery must be the proper size, design and capacity for its intended UPS application at 25 degrees Centigrade.
- The purchaser (end user) shall give a freshening charge to the battery every six months after the date code on the battery until final installation.
- Temperature:
 - a. Average annual temperature shall not exceed 25 degrees Centigrade (77 degrees Fahrenheit).
 - b. Cell temperature shall not exceed 32 degrees Centigrade (90 degrees Fahrenheit) for any 30-day period.
 - c. Operation or storage of any product for any length of time in an environment having a temperature above 40 degrees Centigrade will void the warranty with respect to those products.
- The warranty period shall be adjusted based on actual operating conditions such as temperature and frequency of discharge as published and specified by the battery manufacturer. The warranty period will be reduced 50% for every 8 degrees Centigrade increase in operating temperature above 25 degrees Centigrade (base temperature).
- Batteries in the same string must be the same manufacturer, same model. If not, the warranty is void.
- The warranty does not apply to batteries used in cycle application.

Miscellaneous:

- NO SALESPERSON, EMPLOYEE OR AGENT OF LIEBERT IS AUTHORIZED TO ADD TO OR VARY THE TERMS OF THIS WARRANTY. Warranty terms may be modified, if at all, only by a writing signed by a Liebert officer.
- Liebert obligations under this warranty are conditioned upon timely receipt of full payment of the product purchase price and any amounts due from User under this Warranty. Liebert reserves the right to supplement or change the terms of this Warranty in any subsequent warranty offering to User or others.
- In the event that any provision of this Warranty should be or becomes invalid and/or unenforceable during the warranty period, the remaining terms and provisions shall continue in full force and effect.
- User shall complete the attached User Information Card and forward it to Liebert within thirty (30) days of receipt of the Liebert product.
- This Warranty shall be governed by, and construed under, the laws of the State of Ohio.
- This Warranty represents the entire agreement between Liebert and User with respect to the subject matter herein and supersedes all prior or contemporaneous oral or written communications, representations, understandings or agreements relating to this subject.

LIMITED WARRANTY FOR POWER CONDITIONING AND DISTRIBUTION SYSTEM PRODUCTS

This Warranty is given ONLY to purchasers who buy for commercial or industrial use in the ordinary course of each purchaser's business.

General:

Liebert Corporation products and systems are in our opinion the finest available. We take pride in our products and are pleased that you have chosen them. Under certain circumstances we offer with our products the following One Year Warranty Against Defects in Material and Workmanship.

Please read your Warranty carefully. This Warranty sets forth our responsibilities in the unlikely event of defect and tells you how to obtain performance under this Warranty.

ONE YEAR LIMITED WARRANTY AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP

LIEBERT PRODUCTS COVERED:

Computer Isolation Transformer, Precision Power Center, Datawave® Magnetic Synthesizer, Static Transfer Switch, Static Transfer Switch 2, Static Transfer Switch 2 Power Distribution Unit, SmartSwitch®, Remote Distribution Cabinet, Expansion Cabinet, Liebert FPC, Liebert FDC

Terms of Warranty:

As provided herein, the Liebert product is warranted to be free of defects in material and workmanship for a period of: (i) one year from the Warranty Inspection date provided Warranty Inspection is performed by Liebert authorized personnel, Warranty Inspection occurs within six (6) months of the Liebert shipping date, and the product has been stored in a suitable environment prior to Warranty Inspection; or (ii) in any event, a maximum of eighteen (18) months from date of product shipment by Liebert. The warranty duration shall be whichever period described in the preceding sentence expires first. The Warranty Inspection date will be determined only from the completed inspection and Warranty Inspection sheet provided to User by Liebert. The product shipment date will be determined only from the Liebert bill of lading. If any part or portion of the Liebert product fails to conform to the warranty within the warranty period, Liebert, at its option, will furnish new or factory remanufactured parts for repair or replacement of that portion or part. If Liebert performs the Warranty Inspection service, then labor and travel costs are covered under this warranty. If Liebert does not perform the Warranty Inspection, the warranty covers parts only, and labor, travel and other costs will be charged at then-current rates.

Warranty Extends to First Purchaser for Use, Non-transferable:

This Warranty is extended to the first person, firm, association or corporation for whom the Liebert product specified herein is originally installed for use (the "User") in the fifty United States or Canada. This Warranty is not transferable or assignable without the prior written permission of Liebert.

Assignment of Warranties:

Liebert assigns to User any warranties which are made by manufacturers and suppliers of components of, or accessories for, the Liebert product and which are assignable, but Liebert makes NO REPRESENTATIONS as to the effectiveness or extent of such warranties, assumes NO RESPONSIBILITY for any matters which may be warranted by such manufacturers or suppliers and extends no coverage under this warranty to such components or accessories.

Drawings, Descriptions:

Liebert warrants for the period and on the terms of the Warranty set forth herein that the Liebert product will conform to the descriptions contained in the certified drawings, if any, applicable thereto, Liebert's final invoices, and to applicable Liebert product brochures and manuals published as of the date of product shipment ("Descriptions"). Liebert does not control the use of any Liebert product. Accordingly, it is understood that the Descriptions are NOT WARRANTIES OF PERFORMANCE and NOT WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE.

Warranty Claims Procedure:

Within a reasonable time, but in no case to exceed thirty (30) days, after User's discovery of a defect, User shall contact Liebert at 1-(800) LIEBERT (543-2378). Subject to the limitations specified herein, a Liebert field service representative will repair the non-conforming Liebert product warranted hereunder, without charge for material or labor, provided Liebert personnel performed the Warranty Inspection of the Liebert product. In all other instances, User will be charged for labor performed, and associated travel expenses, at Liebert's then current rates, or User may elect to perform the necessary labor at User's own expense using materials provided by Liebert. If replacement parts or components are shipped or caused to be shipped by Liebert prior to inspection of the product claimed to be defective, the replacement part or portion shall be invoiced in the full current price amount and shipped freight collect F.O.B. the Liebert facility. Warranty coverage will be extended only after Liebert's inspection discloses the claimed defect and shows no signs of treatment or use that would void the coverage of this Warranty. All defective products and component parts replaced under this Warranty become the property of Liebert.

Warranty Performance of Component Manufacturers:

It is Liebert's practice, consistent with its desire to remedy warranty defects in the most prompt and effective manner possible, to cooperate with and utilize the services of component manufacturers and their authorized representatives in the performance of work to correct defects in the product components. Accordingly, Liebert may utilize third parties in the performance of warranty work, including repair or replacement hereunder, where, in Liebert's opinion, such work can be performed in less time, with less expense, or in closer proximity to the Liebert product.

Items Not Covered By Warranty:

THIS WARRANTY DOES NOT COVER DAMAGE OR DEFECT CAUSED BY misuse, improper application, wrong or inadequate electrical current or connection, negligence, repair by non-Liebert designated personnel, accident in transit, tampering, alterations, a change in location or operating use, exposure to the elements, acts of nature, theft or installation contrary to Liebert's recommendations, or in any event if the Liebert serial number tag has been altered, defaced, or removed.

THIS WARRANTY DOES NOT COVER shipping costs, installation costs, circuit breaker resetting or maintenance or service items and further, except as may be provided herein, does NOT include labor costs or transportation charges arising from the replacement of the Liebert product or any part thereof or charges to remove or reinstall the same at any premises of User.

THE PRODUCTS LISTED IN THIS WARRANTY ARE NOT FOR USE IN THE CONTROL AREA OR ANY REACTOR CONNECTED OR SAFETY APPLICATIONS OR WITHIN THE CONTAINMENT AREA OF A NUCLEAR FACILITY OR WHERE THE PRODUCTS HAVE POTENTIAL FOR DIRECT PATIENT CONTACT OR WHERE A SIX (6) FOOT CLEARANCE FROM A PATIENT CANNOT BE MAINTAINED AT ALL TIMES. THE PRODUCTS LISTED IN THIS WARRANTY MAY BE USED IN APPLICATIONS INVOLVING LIFE-SUSTAINING OR LIFE-SUPPORTING DEVICES ONLY WHERE THE END-USE CUSTOMER HAS SIGNED LIEBERT'S HEALTHCARE APPLICATION SALES AGREEMENT, OTHERWISE THE WARRANTY IS VOID.

REPAIR OR REPLACEMENT OF A DEFECTIVE PRODUCT OR PART THEREOF DOES NOT EXTEND THE ORIGINAL WARRANTY PERIOD.

Limitations:

THIS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

USER'S SOLE AND EXCLUSIVE REMEDY IS REPAIR OR REPLACEMENT OF THE LIEBERT PRODUCT AS SET FORTH HEREIN.

IF USER'S REMEDY IS DEEMED TO FAIL OF ITS ESSENTIAL PURPOSE BY A COURT OF COMPETENT JURISDICTION, LIEBERT'S RESPONSIBILITY FOR PROPERTY LOSS OR DAMAGE SHALL NOT EXCEED THE NET PRODUCT PURCHASE PRICE.

IN NO EVENT SHALL LIEBERT ASSUME ANY LIABILITY FOR INDIRECT, SPECIAL, INCIDENTAL EXEMPLARY OR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER, INCLUDING WITHOUT LIMITATION LOST PROFITS, BUSINESS INTERRUPTION OR LOSS OF DATA, WHETHER ANY CLAIM IS BASED UPON THEORIES OF CONTRACT, NEGLIGENCE, STRICT LIABILITY, TORT, OR OTHERWISE.

Miscellaneous:

NO SALESPERSON, EMPLOYEE OR AGENT OF LIEBERT IS AUTHORIZED TO ADD TO OR VARY THE TERMS OF THIS WARRANTY. Warranty terms may be modified, if at all, only by a writing signed by a Liebert officer.

Liebert obligations under this warranty are conditioned upon Liebert timely receipt of full payment of the product purchase price and any other charges due. Liebert reserves the right to supplement or change the terms of this Warranty in any subsequent warranty offering to User or others.

In the event that any provision of this Warranty should be or becomes invalid and/or unenforceable during the warranty period, the remaining terms and provisions shall continue in full force and effect.

This Warranty shall be governed by, and construed under, the laws of the State of Ohio, without reference to the conflict of laws principles thereof.

This Warranty represents the entire agreement between Liebert and User with respect to the subject matter herein and supersedes all prior or contemporaneous oral or written communications, representations, understandings or agreements relating to this subject.