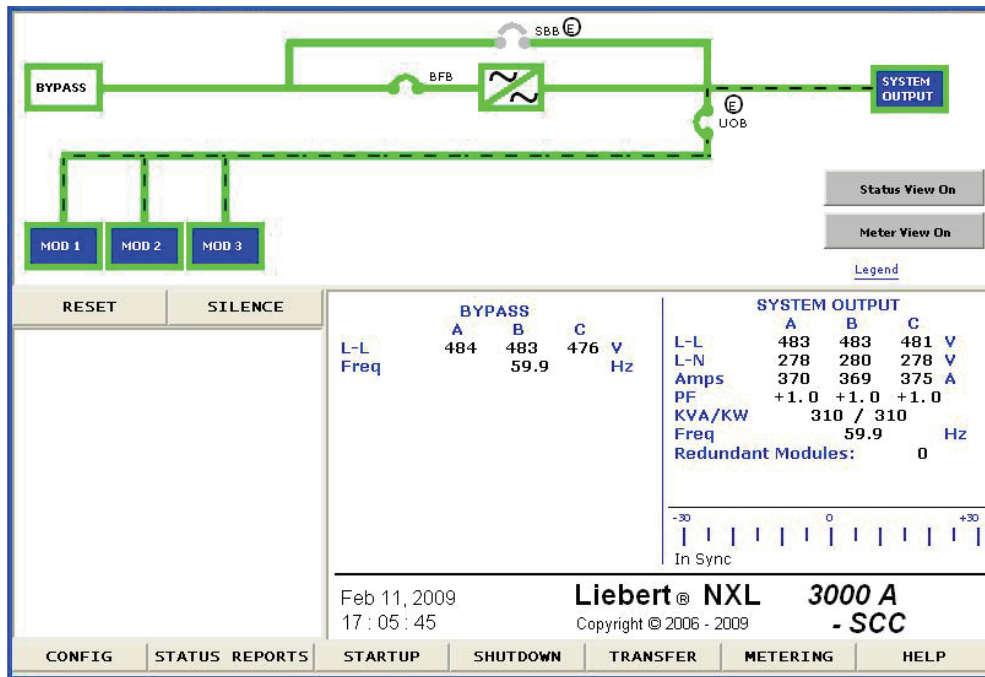


Liebert® NXL™ System Control Cabinet , SCCi

Installation Manual – 1600A-5000A, 60Hz, Three-Phase



CONTACTING EMERSON NETWORK POWER FOR SUPPORT

Contact Emerson Network Power Liebert Services for information or repair service in the United States at 1-800-LIEBERT (1-800-543-2378).

For repair or maintenance service outside the 48 contiguous United States, contact Liebert Services, if available in your area. For areas not covered by Liebert Services, the authorized distributor is responsible for providing qualified, factory-authorized service.

Have the following information available before calling Liebert Services:

Part Numbers: _____

Serial Numbers: _____

kVA Rating: _____

Date Purchased: _____

Date Installed: _____

Location: _____

Input Voltage/Frequency: _____

Output Voltage/Frequency: _____

Battery Reserve Time: _____

Product Warranty Registration

To register for warranty protection, visit the **Service and Support** section of our Web site at:

www.liebert.com

Click on **Product Registration** and fill out the form.

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation of your Liebert NXL™ SCCi Bypass Static Switch and Ebox. Read this manual thoroughly, paying special attention to the sections that apply to your installation, before working with the unit. **Retain this manual for use by installing personnel.**



WARNING

Risk of electrical shock. Can cause personal injury or death.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should be involved in installing the modules or preparing the modules for installation. When performing maintenance with any part of the equipment under power, service personnel and test equipment should be standing on rubber mats.

In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or those approved for use in fighting electrical fires.

Extreme caution is required when performing installation and maintenance.


Special safety precautions are required for procedures involving handling, installation and maintenance of the UPS system. Observe all safety precautions in this manual before handling or installing the module. Observe all precautions in the Operation and Maintenance Manual, SL-25414, before as well as during performance of all maintenance procedures.



WARNING

Risk of heavy unit falling over. Improper handling can cause equipment damage, injury or death.

Exercise extreme care when handling UPS cabinets to avoid equipment damage or injury to personnel. The Bypass Static Switch module's weight is approximately 1000lb (455kg).

Locate center of gravity symbols  and determine unit weight before handling each cabinet. Test lift and balance the cabinets before transporting. Maintain minimum tilt from vertical at all times.

Read all of the following instructions before attempting to move, lift, or remove packaging from unit, or prepare unit for installation.



WARNING

Risk of electrical shock and fire. Can cause equipment damage, personal injury or death.

Under typical operation and with all doors closed, only normal safety precautions are necessary. The area around the system should be kept free of puddles of water, excess moisture and debris.

Only test equipment designed for troubleshooting should be used. This is particularly true for oscilloscopes. Always check with an AC voltmeter to ensure safety before making contact or using tools. Even when the power is turned Off, dangerously high potential electric charges may exist at the capacitor banks.

All wiring must be installed by a properly trained and qualified electrician. All power and control wiring must comply with all applicable national, state and local codes.

One person should never work alone, even if all power is disconnected from the equipment. A second person should be standing by to assist and to summon help in case of an accident.



NOTE

Materials sold hereunder cannot be used in the patient vicinity (e.g., use where UL, cUL or IEC 60601-1 is required). Medical applications, such as invasive procedures and electrical life support equipment, are subject to additional terms and conditions.

NOTICE

This unit complies with the limits for a Class A digital device, pursuant to Part 15 Subpart J of the FCC rules. These limits provide reasonable protection against harmful interference in a commercial environment. This unit generates, uses and radiates radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this unit in a residential area may cause harmful interference that the user must correct at his own expense.

1.0 MECHANICAL INSTALLATION

1.1 Introduction

The Liebert NXL SCCi switchgear cabinet can be used to interconnect multiple Liebert NXL UPS units into a single power system. The system of Liebert NXL modules provides continuous, high-quality AC power to your business-critical equipment, such as telecommunications and data processing equipment.

The Liebert NXL UPSs will supply power that is free of the disturbances and variations in voltage and frequency common to utility power, which is subject to brownouts, blackouts, surges and sags.

The Liebert SCCi will permit the user to switch the entire system into maintenance bypass simultaneously for maintenance or repair without interruption in service.

1.2 Preliminary Checks

This chapter is a guide to general procedures and practices that should be observed by the installing personnel. The particular conditions of each site will determine the applicability of such procedures.

Before installing the Liebert NXL SCCi, please carry out the following preliminary checks:

- Examine the Liebert NXL SCCi for transit damage, both internally and externally. Report any damage to the shipper immediately.
- Verify that the correct equipment is being installed. The Liebert NXL SCCi cabinet has an identification tag on the interior doors listing the type, size and main calibration parameters of the UPS.
- Verify that the UPS room satisfies the environmental conditions stipulated in the equipment specification, paying particular attention to the ambient temperature and air exchange system.

1.3 Bypass Backfeed Breaker

For systems using the 4000A or 5000A 480V static switch at 150kAIC, the Bypass Backfeed Breaker (BFB) must be Listed UL 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker) that is required to be used in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating not exceeding 480V at 150,000 amperes, for five cycles.

1.4 Neutral Connections

All UPS output neutrals in a Liebert NXL system must be tied together. This keeps any unbalanced currents or circulating currents off the ground path. If the system is a 3-wire system, Emerson recommends putting the neutral-ground bond at this tie point.

1.5 Static Switch Installation

WARNING

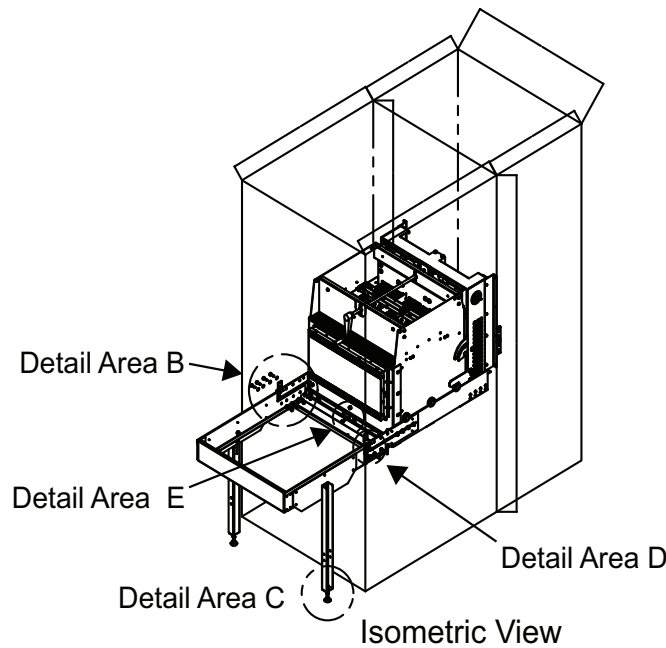
Risk of heavy object falling suddenly. Can cause equipment damage, personal injury or death. The static switch is heavy (975lb. [442kg]) and could fall if it is not properly supported when it is extended. Do not attempt to rack out static switch before all hardware is installed as instructed in the steps below.

When the front support plate is removed the static switch is free to roll onto the static switch support table. The support table must be leveled before the static switch is racked out of the cabinet.

Ensure that no gets under the static switch for any reason when it is racked out of the cabinet and supported by the static switch table support.

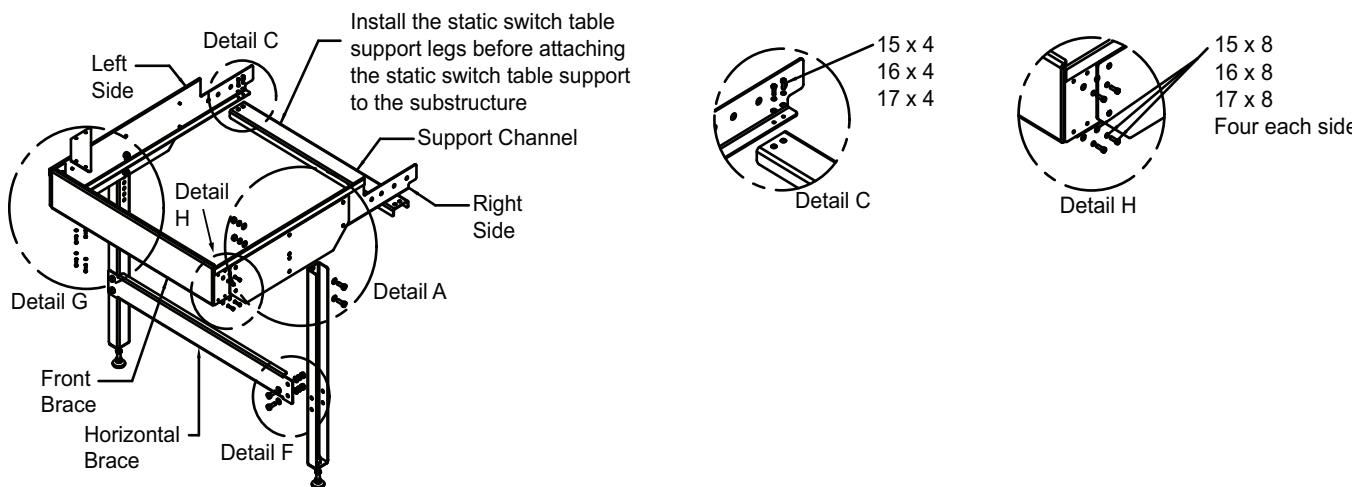
Refer to **Figure 1** and to the following steps to install the static switch.

Figure 1 Static switch installation



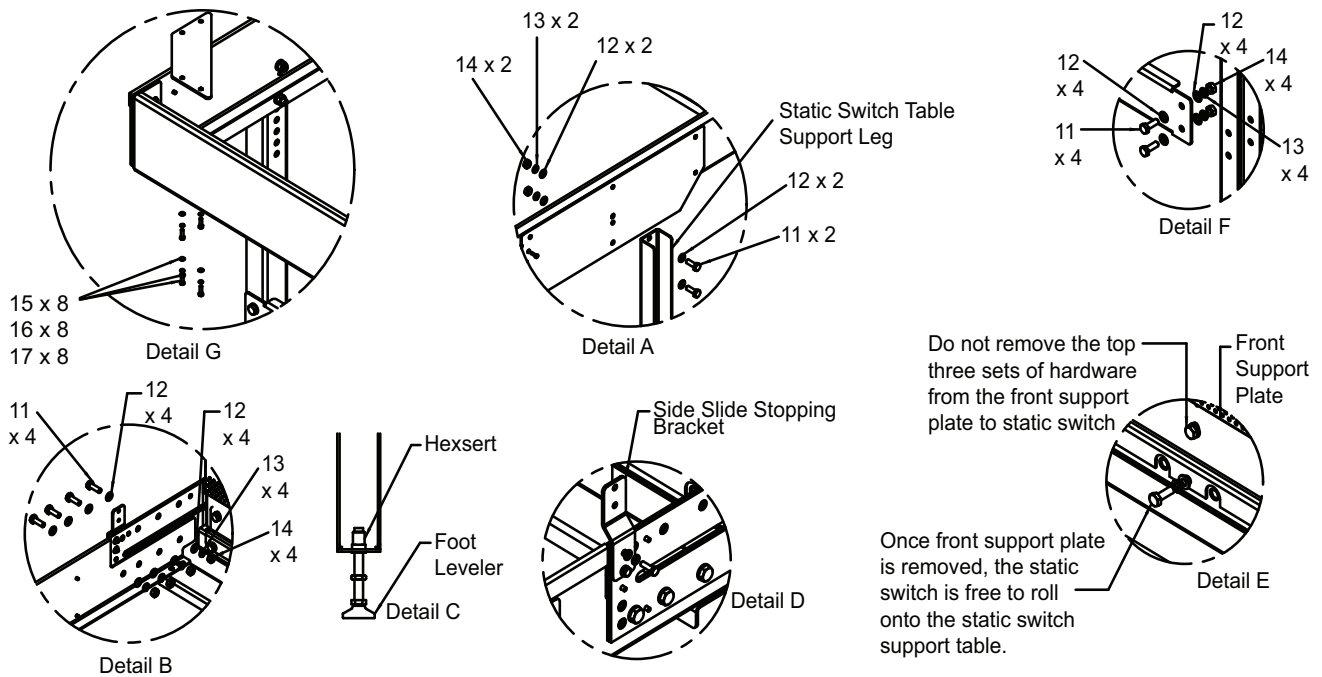
1. Remove the static switch support table kit from under the static switch.
2. Attach the support channel to the left and right sides using the hardware shown in Detail C in **Figure 2**.
3. Attach the front brace to the left and right sides with the hardware shown in Detail H in **Figure 2**.

Figure 2 Static switch installation, steps 1 through 3



4. Attach the support angles to the front brace and sides using the hardware shown in Detail G in **Figure 3**.
5. Prior to installing static switch table support to the substructure, install the static switch table support legs using the hardware as shown in Detail A in **Figure 3**.
6. Attach horizontal brace using hardware as shown in Detail F in **Figure 3**.
7. Pull out the substructure slides and attach the static switch table support to substructure slides using hardware as shown in Detail B in **Figure 3**.
8. Level the static switch table support to the floor using the foot levelers attached to each static switch table support leg. ensure that a minimum of (2) full threads are showing past the hexsert when leveling the static switch support table in Detail C in **Figure 3**.
9. Remove the hardware from side slide stopping brackets as shown in Detail D in **Figure 3**.
10. Remove only the hardware that attaches the front support plate to the substructure. Leave the support plate and associated hardware attached to the static switch as shown in Detail E in **Figure 3**. The static switch can be moved forward after removal of the side slide stopping brackets and front support plate.
11. Rack out the static switch. After the static switch has been disengaged, move it forward to the front of the static switch table support.

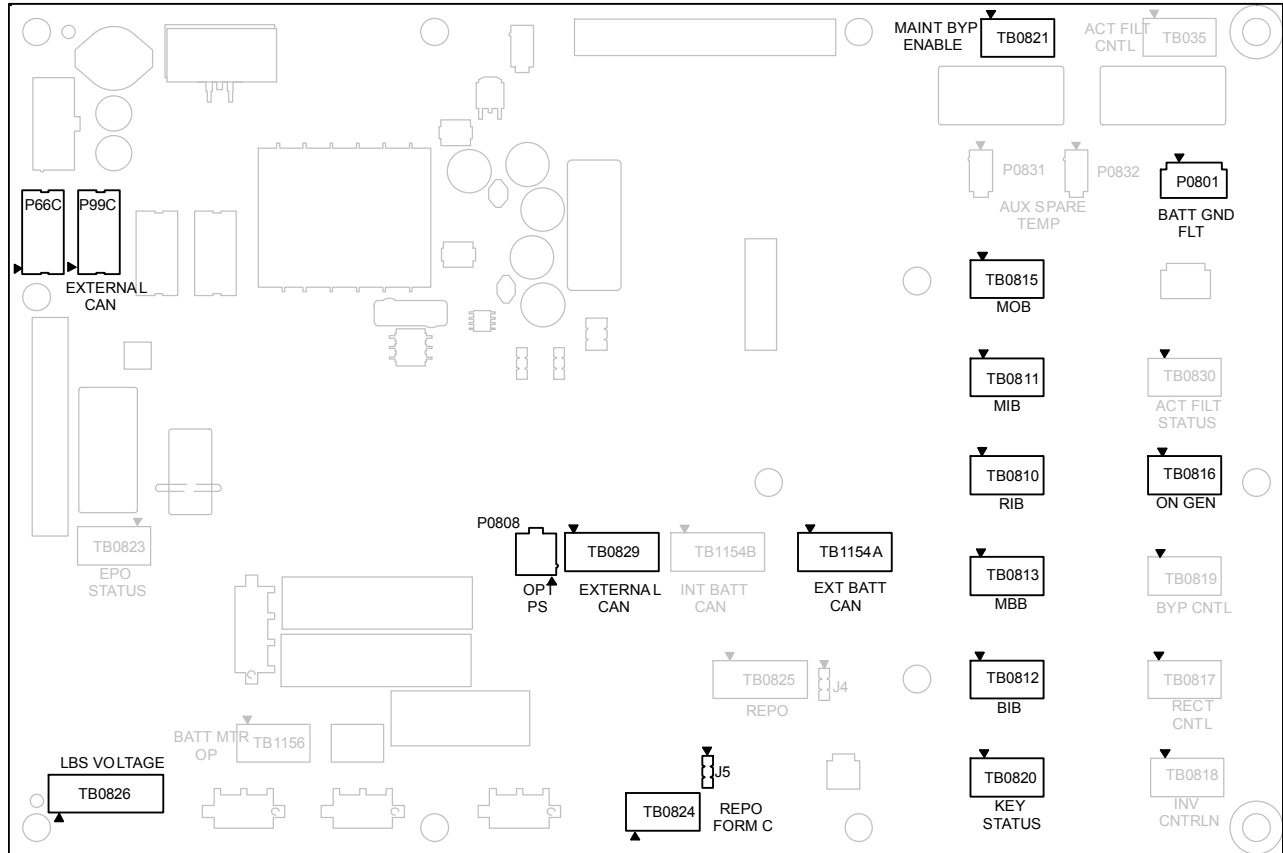
Figure 3 Static switch installation, steps 4 through 10



2.0 CONTROL CABLE CONNECTIONS AND COMMUNICATION

Based on your site's specific needs, the SCC may require auxiliary connections to communicate with a personal computer, provide alarm signaling to external devices or for Remote Emergency Power Off (REPO). The External Interface Board, arranged for this purpose, is next to the option box in the Rectifier section (refer to 3.0 - Installation Drawings).

Figure 4 External Interface Board connections layout



2.1 Dry Contacts



NOTE

If connection to more than one module is required, use a separate contact for each module.

Table 1 SCC input dry contacts

Item	Terminal Block	Pin	Connects to (Description of External Item)	Wire Size/ Max Length
Remote EPO Input Form C	TB0824	1	REPO Switch, normally open contact	14AWG/ 500ft. (150m)
		2	REPO Switch, common contact	
		3	REPO Switch, normally closed contact, set jumper J5: 1-2 to enable, 2-3 to disable	
On Generator Input Form C	TB0816	1	On Generator switch, closed = On Generator	
		2	On Generator switch, common	
		3	On Generator switch, closed = Not On Generator	

Table 2 SCC control contacts with maintenance bypass

Item	Terminal Block	Pin	Connects to (Description of External Item)	Wire Size/ Max Length
Maintenance Isolation Breaker (MIB) Form C	TB0811	1	CB aux. contact, closed = CB is closed	14AWG/500ft. (150m)
		2	CB aux. contact, common	
		3	CB aux. contact, closed = CB is open	
Maintenance Bypass Breaker (MBB) Form C	TB0813	1	CB aux. contact, closed = CB is closed	14AWG/500ft. (150m)
		2	CB aux. contact, common	
		3	CB aux. contact, closed = CB is open	
Maintenance Bypass Enable Form C	TB0821	1	Maintenance Bypass Cabinet, closed = load not on inverter	14AWG/500ft. (150m)
		2	Maintenance Bypass Cabinet, common	
		3	Maintenance Bypass Cabinet, closed = load on inverter	
Remote EPO Input	TB0825	1	REPO Switch, normally open contact	14AWG/500ft. (150m)
		2	REPO Switch, common contact	
Key Status Input Form C ¹	TB0820	1	Key status switch, closed = key removed	14AWG/500ft. (150m)
		2	Key status switch, common	
		3	Key status switch, closed = key inserted	
Module Output Breaker (MIB) Form C	TB0815	1	CB aux. contact, closed = CB is closed	14AWG/500ft. (150m)
		2	CB aux. contact, common	
		3	CB aux. contact, closed = CB is open	
Rectifier Input Breaker (RIB) Form C	TB0810	1	CB aux. contact, closed = CB is closed	14AWG/500ft. (150m)
		2	CB aux. contact, common	
		3	CB aux. contact, closed = CB is open	
Bypass Input Breaker (BIB) Form C	TB0812	1	CB aux. contact, closed = CB is closed	14AWG/500ft. (150m)
		2	CB aux. contact, common	
		3	CB or Switch aux. contact, closed = CB or switch is open	

1. Key Status Input can be either Form-C, N.O. or N.C. contact

Table 3 SCC control contacts to remote alarm status panel

Item	Terminal Block	Pin	Connects to (Description of External Item)	Wire Size/ Max Length
CAN Bus and 24V Power Supply	TB0829	1	Remote Status Panel TB-2	18AWG/1000ft. (300m)
		2	Remote Status Panel TB-1	
		3	Remote Status Panel TB-3	
		4	Remote Status Panel TB-4	

2.2 Multi-Module Communication

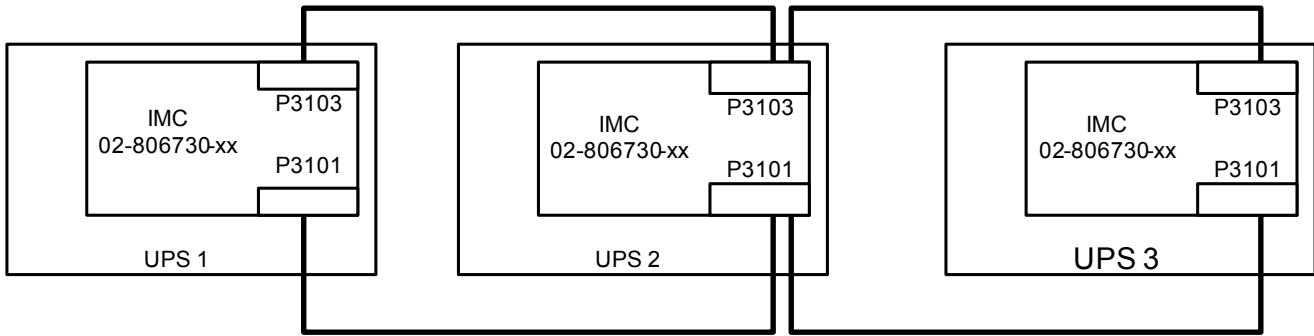
Paralleling cables that connect the module to the system are connected to terminals P3101 and P3103 on the Inter-Module Communication (IMC) board (refer to **3.0 - Installation Drawings**).

Table 4 Parallel from SCC module Inter-Module Communication Board to other Inter-Module Communication Board in system

Terminal Designation		Signal Name	Wire Size/ Max Length
From	To		
Primary Connections			
P3101-1	P3101-1	Share CAN +24V	#24AWG/ 1000ft. (300m)
P3101-2	P3101-2	Share CAN common	
P3101-3	P3101-3	System CAN +24V	
P3101-4	P3101-4	System CAN common	
P3101-5	P3101-5	SER synch CAN+24V	
P3101-6	P3101-6	SER synch CAN common	
P3101-7	P3101-7	Ground	
P3101-14	P3101-14	Ground	
P3101-8	P3101-8	PWM synch CAN +24V	
P3101-9	P3101-9	PWM synch CAN common	
P3101-10	P3101-10	MMS synch CAN +24V	
P3101-11	P3101-11	MMS synch CAN common	
Redundant Connections			
P3103-1	P3103-1	Redundant share CAN +24V	#24AWG/ 1000ft. (300m)
P3103-2	P3103-2	Redundant share CAN common	
P3103-3	P3103-3	Redundant system CAN +24V	
P3103-4	P3103-4	Redundant system CAN common	
P3103-5	P3103-5	Redundant SER synch CAN +24V	
P3103-6	P3103-6	Redundant SER synch CAN common	
P3103-7	P3103-7	Ground	
P3103-14	P3103-14	Ground	
P3103-8	P3103-8	Redundant PWM synch CAN +24V	
P3103-9	P3103-9	Redundant PWM synch CAN common	
P3103-10	P3103-10	Redundant MMS synch CAN +24V	
P3103-11	P3103-11	Redundant MMS synch CAN common	

1. Must only use Belden 8106 or Belden 8102.
2. Each cable group should be run in a separate grounded conduit to ensure redundancy.
3. The maximum lengths must include all the parallel cables from the first module to the last module. The primary and redundant cable lengths can be counted separately. The ground pins on the Inter-Module Communication Board (pins 7 and 14) are connected together on the board. If using cable with only one (1) drain wire, then connect to the ground to pin 7.
4. If using (4) Belden 8102 cables, all (4) cables must be run in the same conduit.

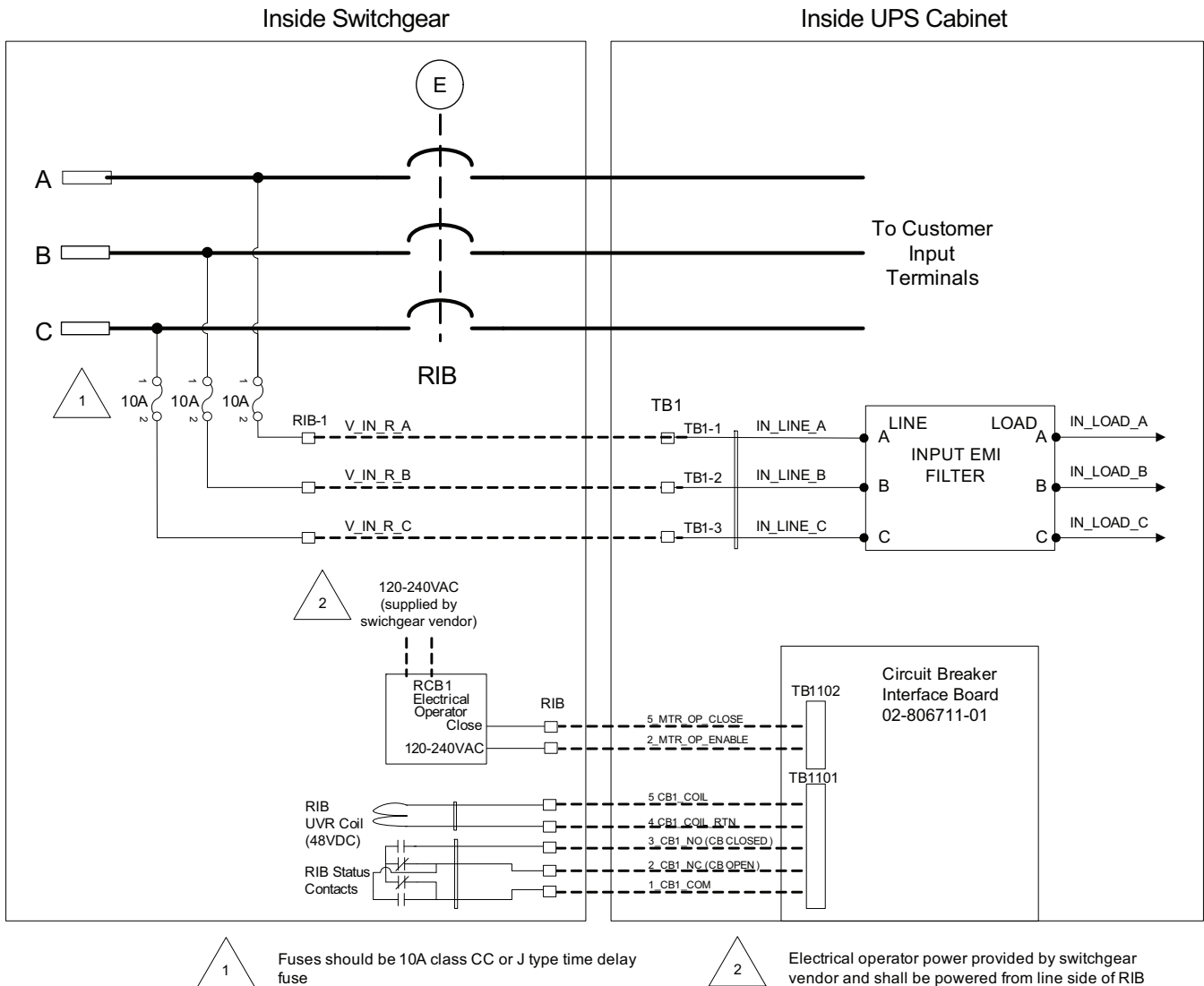
Figure 5 Inter-Module Communication Board wiring diagram—Multi-modules



2.3 Remote Input Breaker (RIB)

For systems that use Remote Input Breakers (RIB), the controls for the Aux contacts, UVR, Motor Operator (optional) and voltage sense will go between the Remote breaker and the SCC Input I/O section. See Figure 6.

Figure 6 Remote Input Breaker diagram



RIB must be Listed UL 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker) that are required to be used in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating not exceeding 480 Volts at 150K Amperes, for 5 cycles.

See **Table 9** for required current ratings.

Table 5 RIB UV coil, aux. contacts from SCC RIB CB interface board to remote CB1

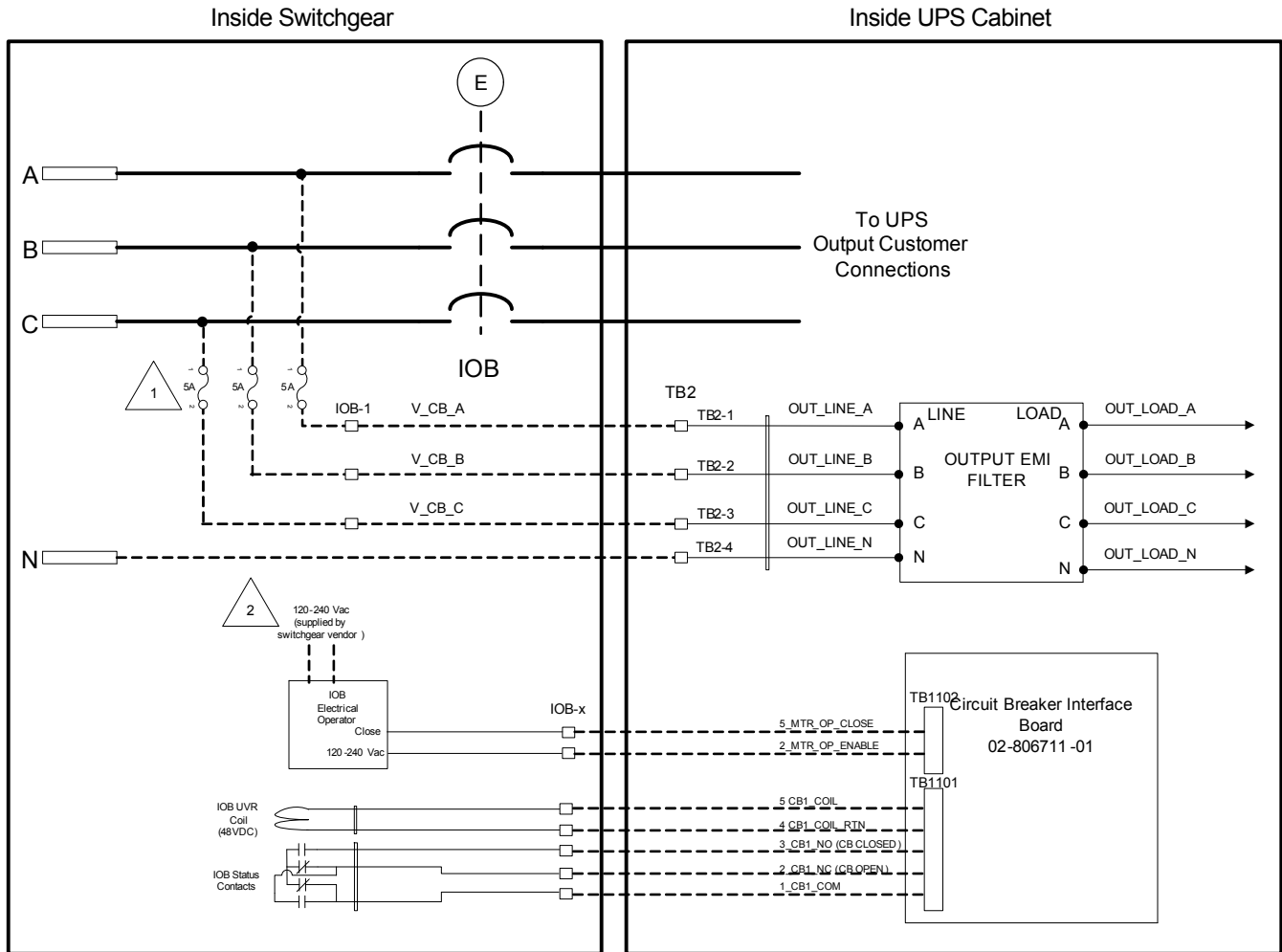
Terminal Designation		Signal Name	Wire Size/ Max Length
From	To		
Remote Breaker Contacts	TB1101-1	RIB aux. common	#14AWG/ 500ft. (150m)
	TB1101-2	RIB aux. N.C. (closed = CB is open)	
	TB1101-3	RIB aux. N.O. (closed = CB is closed)	
	TB1101-4	RIB trip coil (-)	
	TB1101-5	RIB trip coil (+)	
Remote RIB motor operator control contacts from remote breaker to SCC RIB CB interface board (optional)			
Remote Breaker Motor Operator Contacts	TB1102-2	AC line	#14AWG/ 500ft. (150m)
	TB1102-5	Motor operator close	
Remote RIB voltage sense from remote breaker to SCC			
Remote Breaker Voltage Sense	TB1-1	Voltage sense PH A	#14AWG/ 500ft. (150m)
	TB1-2	Voltage sense PH B	
	TB1-3	Voltage sense PH C	

2.4 Inverter Output Breaker (IOB)

For systems that use Inverter Output Breakers (IOB), the controls for the Aux contacts, UVR, Motor Operator (optional) and voltage sense will go between the Remote breaker and the SCC Output I/O section. See **Figure 7**.

IOB must be Listed UL 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker) that are required to be used in UL-listed switchgear or switchboards. The circuit breaker must have a short-time rating not exceeding 480 Volts at 150K Amperes, for 5 cycles.

Figure 7 Remote Output Breaker diagram



1 Fuses should be 5A class CC or J type time delay fuse

2 Electrical operator power provided by switchgear vendor and shall be powered from UPS side of IOB

See Table 10 for required current ratings.

Table 6 Remote IOB contacts from remote breaker to SCC IOB CB interface board

Terminal Designation		Signal Name	Wire Size/ Max Length
From	To		
Remote Breaker Contacts	TB1101-1	IOB aux. common	#14AWG/ 500ft. (300m)
	TB1101-2	IOB aux. N.C. (closed = CB is open)	
	TB1101-3	IOB aux. N.O. (closed = CB is closed)	
	TB1101-4	IOB trip coil (-)	
	TB1101-5	IOB trip coil (+)	
Remote IOB contacts from remote breaker to SCC IOB CB interface board			
Remote Breaker Motor Operator Contacts	TB1102-2	AC line	#14AWG/ 500ft. (300m)
	TB1102-5	Motor operator close	
Remote IOB contacts from remote breaker to SCC IOB CB interface board			
Remote Breaker Voltage Sense	TB1-1	Voltage sense PH A	#14AWG/ 500ft. (300m)
	TB1-2	Voltage sense PH B	
	TB1-3	Voltage sense PH C	

2.5 Digital LBS

The Load Bus Sync interface enables independent SCC units to remain in sync when operating on battery or when supplied by unsynchronized input sources.

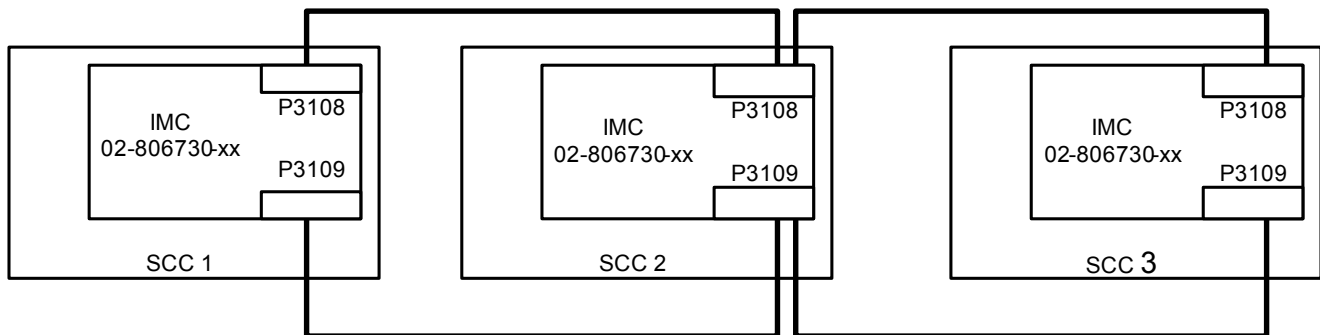
Digital LBS cables that connect the module to the system are connected to terminals P3108 and P3109 on the Inter-Module Communication (IMC) board. See **Figure 8**.

Table 7 Wire size, length for digital LBS connection of SCC Inter-Module Communication Boards

Terminal Designation		Signal Name	Wire Size/ Max Length
From	To		
Digital LBS from SCC Inter-Module Communication Board to other SCC Inter-Module Communication Board			
P3108-1	P3108-1	LBS SYNCH CANH	#24AWG/3000ft (900m)
P3108-2	P3108-2	LBS SYNCH CANL	
P3108-3	P3108-3	GROUND	
Redundant Digital LBS from SCC Inter-Module Communication Board to Other SCC Inter-Module Communication Board			
P3109-1	P3109-1	REDUNDANT LBS SYNCH CANH	#24AWG/3000ft (900m)
P3109-2	P3109-2	REDUNDANT LBS SYNCH CANL	
P3109-3	P3109-3	GROUND	

1. Must use Belden 8102.
2. Each cable group should be run in a separate grounded conduit to ensure redundancy.
3. The maximum lengths must include all the LBS cables from the first module to the last module.
4. The primary and redundant cable lengths can be counted separately.

Figure 8 Inter-Module Communication Board wiring diagram—Digital LBS



3.0 INSTALLATION DRAWINGS

Figure 9 Control wiring layout for Liebert NXL SCC

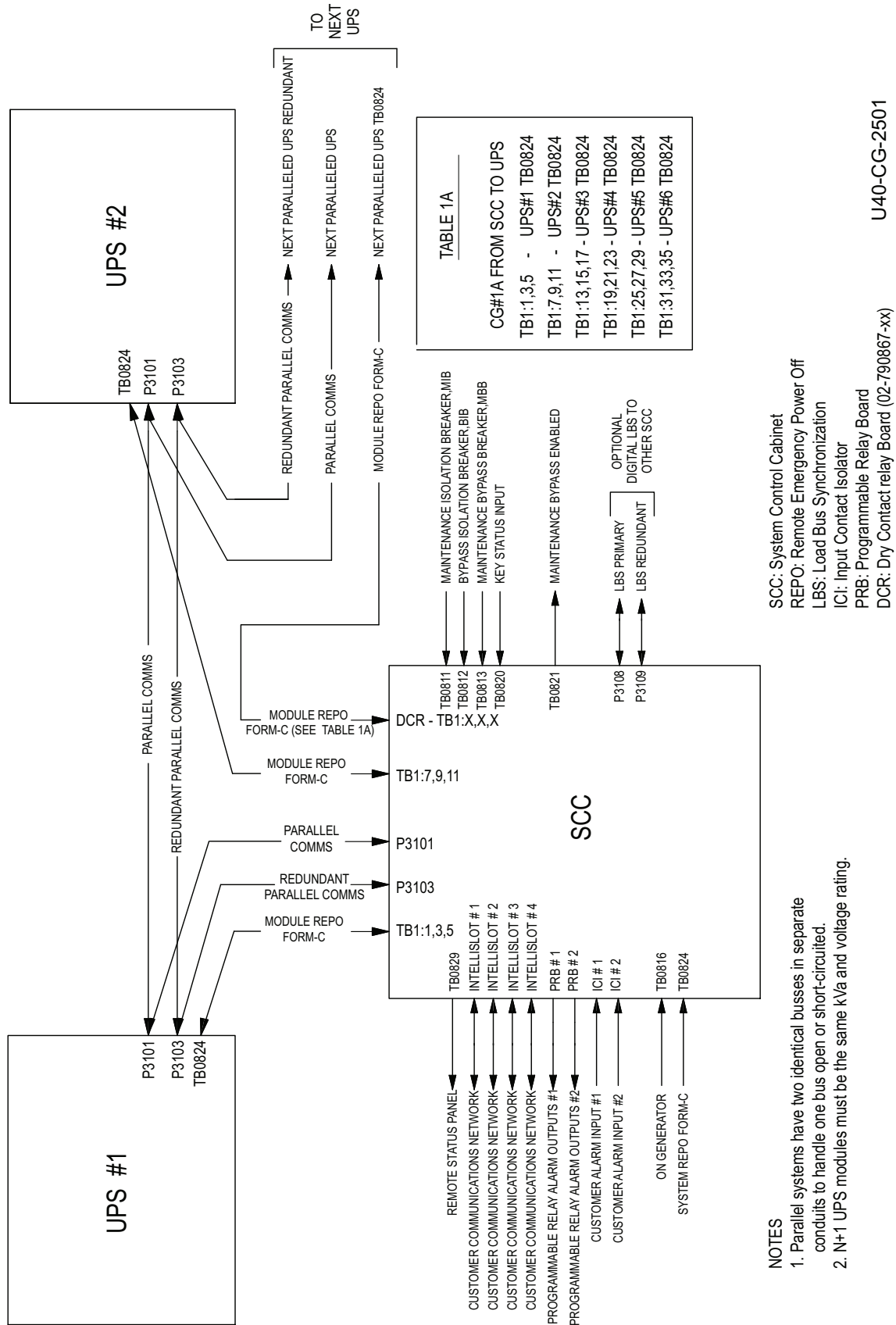
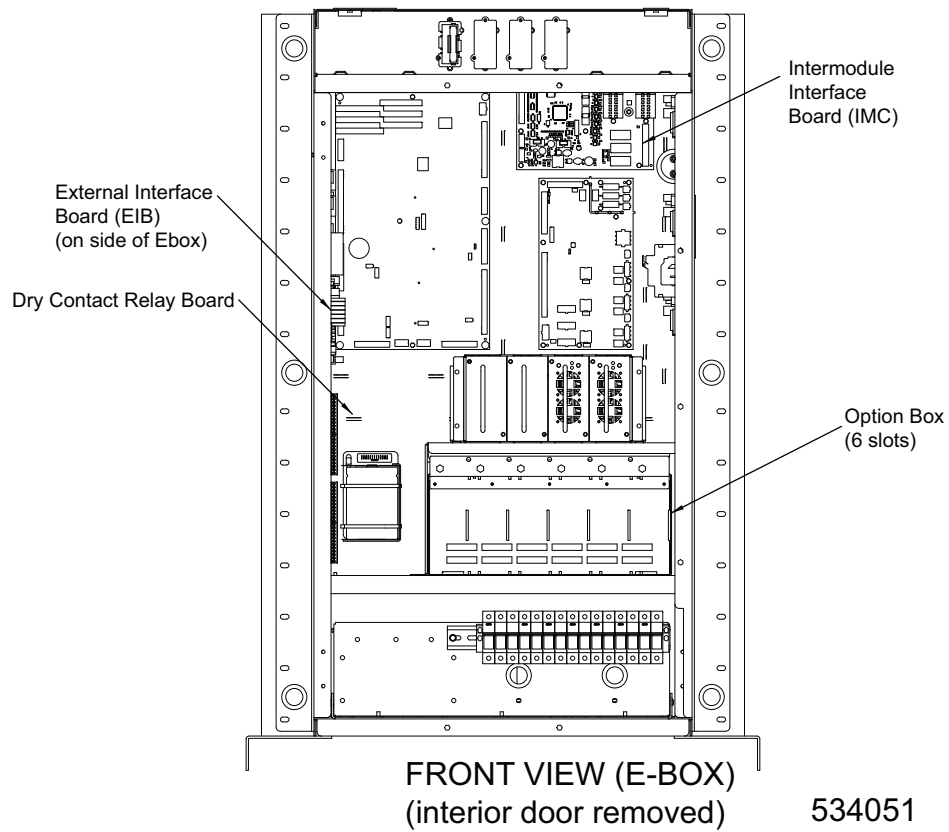
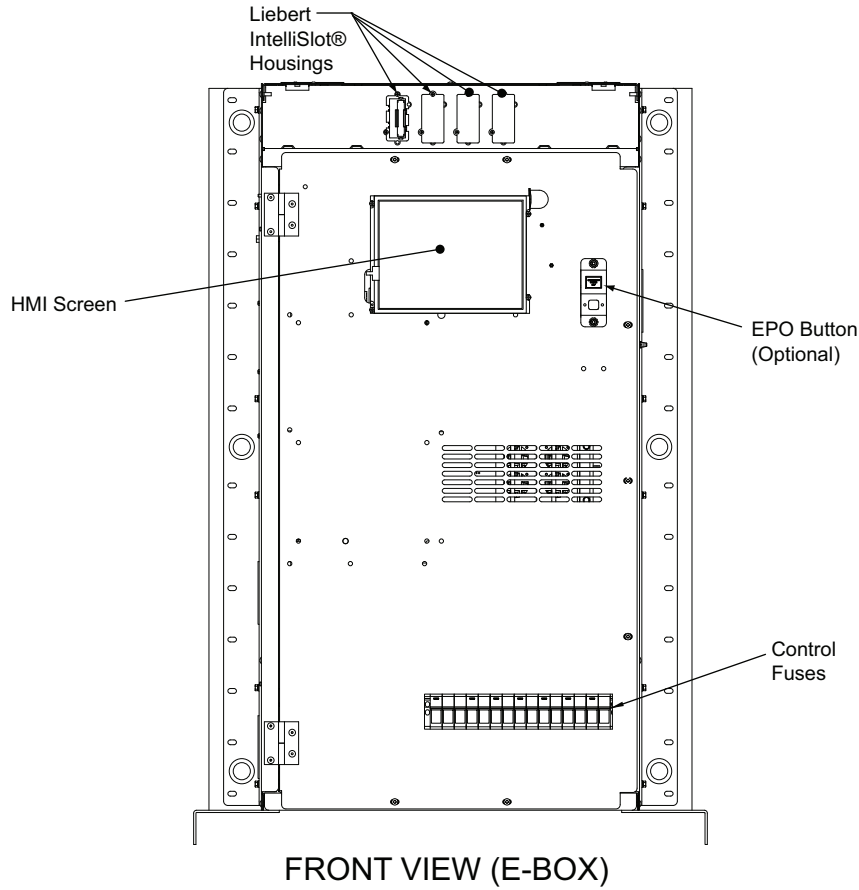
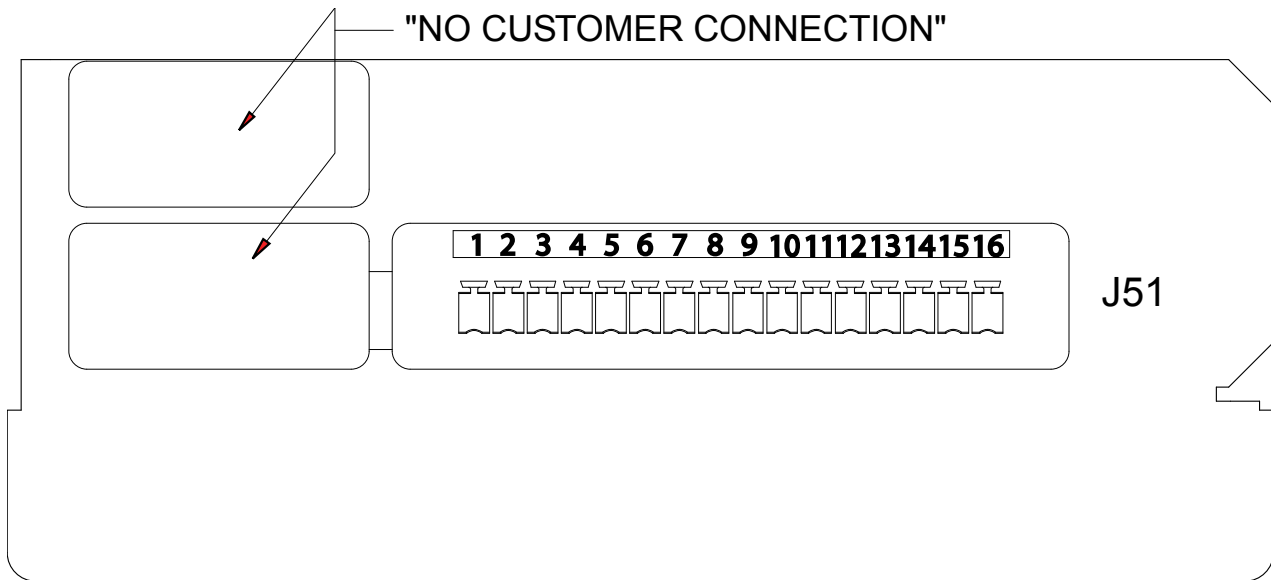


Figure 10 Main Components, Liebert NXL SCC Ebox



534051

Figure 11 Control wiring input Contact Isolator Board, optional



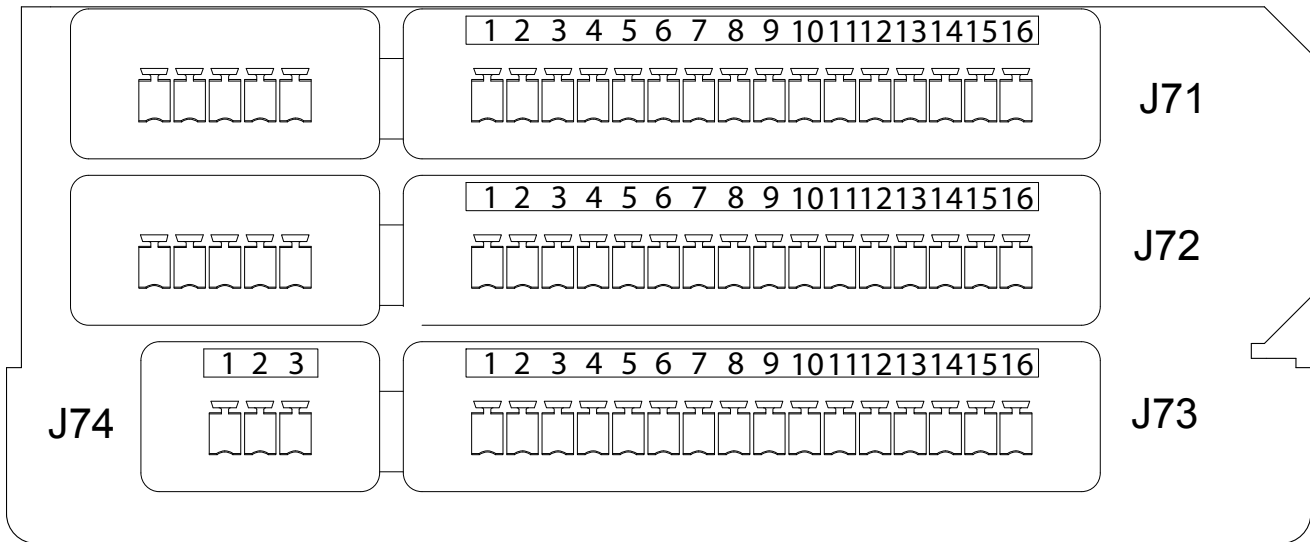
INPUT CONTACT ISOLATOR BOARD
02-810012-XX

1. Customer control wiring connection points are Terminals 1 through 16 (see table at right).
2. Customer provided normally open dry contacts for user alarm messages.
3. All control wiring (by others) must be run separate from power wiring. Control wiring runs should not be combined in the same conduit.
4. Signal voltage: 100mA @ 12VDC.
5. Maximum cable length 500 ft. (152m) with #16AWG flexible stranded cable.
6. All wiring must be in accordance with national and local electrical codes.

See operation and maintenance manual, SL-25514, for programming option.

Input Contact	Pin No.
1	1
	2
2	3
	4
3	5
	6
4	7
	8
5	9
	10
6	11
	12
7	13
	14
8	15
	16

Figure 12 Control wiring Programmable Relay Board, optional



1. Customer control wiring connection points are Terminal Blocks 1 through 15.
2. Programmable relay board option includes eight signal channels with (2) Form-C dry contacts per channel. See table at right. (C=Common, NC=Normally Closed, NO=Normally Opened)
3. All control wiring (by others) must be run separate from power wiring. Control wiring runs should not be combined in the same conduit.
4. Contact ratings: 1A @ 30VDC, 200mA @125VAC.
5. Maximum cable length 500 ft. (152m) with #16AWG flexible stranded cable.
6. All wiring must be in accordance with national and local electrical codes.

See operation and maintenance manual, SL-25514, for programming option.

	Channel	Pin No.	C	NC	NO	
J71	CH1	A	1-3	1	2 3	
		B	4-6	4	5 6	
	CH2	A	7-9	7	8 9	
		B	10-12	10	11 12	
	CH3	A	13-15	13	14 15	
		B	1-3	1	2 3	
J72	CH4	A	4-6	4	5 6	
		B	7-9	7	8 9	
	CH5	A	10-12	10	11 12	
		B	13-15	13	14 15	
	J73	CH6	A	1-3	1	2 3
			B	4-6	4	5 6
CH7		A	7-9	7	8 9	
		B	10-12	10	11 12	
CH8		A	13-15	13	14 15	
		B	1-3	1	2 3	
J74						

Pin 16 not used on J71, J72, & J73

4.0 SPECIFICATIONS

Table 8 Liebert NXL SCCi Bypass Static Switch and Ebox specifications

Input Parameters	1600A - 4000A	5000A
Voltage, VAC, 3-phase, 3-wire or 4-wire	480V / 575V / 600V	480V
Input Voltage Range, VAC	+10% to -30%	
Input Frequency, Hz	60	
Permissible Input Frequency Range, Hz	55 to 65	
Physical Parameters and Standards, in (mm)		
Static Bypass Weight, Unpackaged, lb (kg), approx.	1000 (454)	
Maximum Heat Dissipation, Full Load, BTU/hr (kWH)	189,000 (55.3)	
Cooling Air, CFM (m ³ /s)	15,760 (7.4)	
Standards and Conformities	UL 1778, 4th Ed. CSA 22.2 107.3 FCC Part 15, Class A IEC62040-2, Level 4, Criteria A EN61000-4-3, Level 3, Criteria A EN61000-4-6, Level 4, Criteria A EN61000-2-2, Criteria A EN61000-4-4, Level 4, Criteria A ANSI C62.41, Category A3 & B3 ISTA Procedure 1H WEEE	
Environmental Parameters		
Storage Temperature Range, °F (°C)	-13 to 158 (-25 to 70)	
Operating Temperature Range, °F (°C)	32 to 104 (0 to 40) (UPS)	
Relative Humidity	95% or Less Non-Condensing (Operating and Non-Operating)	
Maximum Altitude Above mean sea level, ft (m)	4920 (1500) (per IEC 62040/3) - 1% Max kW derate / 328 rise between 4921-9842 (100m rise between 1500-3000m)	

Table 9 UPS current ratings—rectifier input

UPS Rating		Voltage, VAC			Rectifier Type	Nominal Current	Maximum Current	External 100% Breaker Trip, Amps
kVA	kW	Input	Bypass	Output				
500	450	480	480	480	12P + Filter	650	812	900
625	562.5	480	480	480	12P + Filter	799	999	1000
750	675	480	480	480	12P + Filter	975	1219	1400
750	675	575	575	575	12P + Filter	815	1018	1200
750	675	600	600	600	12P + Filter	759	949	1000

Table 10 UPS current ratings—output

UPS Rating		Voltage, VAC			Rectifier Type	Nominal Current	10 Minute Overload	External Breaker Trip, Amps
kVA	kW	Input	Bypass	Output				
500	450	480	480	480	12P + Filter	601	752	800
625	562.5	480	480	480	12P + Filter	752	940	1000
750	675	480	480	480	12P + Filter	902	1128	1200
750	675	575	575	575	12P + Filter	753	941	1000
750	675	600	600	600	12P + Filter	722	902	1000

Notes on Tables

1. 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.
2. Maximum input current is controlled by the current limit setting which is adjustable. Values shown are for maximum setting of 125%. Standard factory setting is 125%. If a smaller input feed breaker is used, the input current limit must be adjusted accordingly.
3. All recommended external overcurrent protections are based on 80% rated breakers, unless noted otherwise.
4. The Rectifier Input Feed Breaker must be set to handle the Liebert NXL transformer inrush of up to eight times the nominal current.

Ensuring The High Availability Of Mission-Critical Data And Applications.

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