



CALIFORNIA INSTITUTE OF TECHNOLOGY
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DCN No. **E990249-00-W**

SHEET **1** OF **1**

DOCUMENT CHANGE NOTICE (DCN)

| DOCUMENT No. (DOC-REV-GP. ID) | TITLE | NEW REV. |
|----------------------------------|---|----------|
| E980006-A-W | Heating Blanket Relay Panel Assemblies | B |
| E980008-A-W | Portable Electrical Power Panelboard Assemblies | B |
| | | |
| | | |

CHANGE DESCRIPTION (FROM/TO): Update cross-references and hyperlinks to as-built drawings.

REASON FOR CHANGE: Update to as-builts

ACTION: Incorporate change Attach DCN to drawing(s) Other action (specify):

DISPOSITION OF HARDWARE (IDENTIFY SERIAL NUMBERS)

- No hardware affected (record change only)
- List S/Ns which comply already:
- List S/Ns to be reworked or scrapped:
- List S/Ns to be built with this change: **All**
- List S/Ns to be retested per this change:
-
-
-
-

DCN DISTRIBUTION (X=incl. docs)

| | | |
|----------|-----------|-----------|
| Althouse | Barish | Coles |
| Coyne | Lazzarini | Lindquist |
| Raab | Sanders | Shoemaker |
| Stapfer | Tyler | Weiss |
| Whitcomb | Zydowicz | |

A. Sibley

SAFETY, COST, SCHEDULE, REQUIREMENTS IMPACT? No Yes (If yes, enter Change Request number)

| APPROVALS: | DATE | OTHER APPROVALS (specify) | DATE |
|----------------------------------|---------|---------------------------|------|
| ORIGINATOR: W. Althouse | 6/9/99 | | |
| TASK LEADER: | | | |
| GROUP LEADER: <i>W. Althouse</i> | 6/10/99 | | |
| DCC RELEASE: <i>Jynda Turner</i> | 6-23-99 | | |



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E980008-B-W

DRWG NO. REV. GID

SHEET 1 OF 3

COMPONENT SPECIFICATION

TITLE

Portable Electrical Power Panelboard Assemblies

| APPROVALS: | DATE | REV | DCN NO | BY | CHK | DCC | DATE |
|--------------------|--------|-----|--------------|-----|-----|-----|--------|
| DRAWN: W. Althouse | 2/2/98 | A | E980007-00-W | n/a | n/a | n/a | n/a |
| CHECKED: | | B | E990249-00-W | WEA | | | 6/9/99 |
| APPROVED: | | | | | | | |
| DCC RELEASE: | | | | | | | |

DESCRIPTION

Portable weatherproof electrical power panelboard assemblies A1, A2 and A3 provide 120/208 Volt 225 Amp 3 Phase service, and assemblies B1 and B2 provide 277/480 Volt 1000 Amp 3 Phase service. Each assembly includes a panelboard subassembly (A1-1, A2-1, A3-1, B1-1, B2-1) described herein and a portable mounting provided by others.

REQUIREMENTS

- General:** Assemblies shall be fabricated in accordance with the drawings listed herein and shall be tested to certify performance in accordance with this specification.
- UL Listing:** The final assemblies shall be UL listed.
- Materials:** All materials shall be new. Equipment items shall be UL approved. Substitutions for product types and manufacturers specified in the drawings must be approved by LIGO. Substitutions will be considered upon request and submission of appropriate product data.
- Panelboards:**
- A. Panelboards shall be rated as indicated on drawings.
 - B. Panel bus bars, neutral bus and ground bus shall be copper.
 - C. 480 Volt panels shall have A.I.C. rating of 65,000 or higher.
 - D. 208 Volt panels shall have A.I.C. rating of 14,000 or higher.
 - E. Panels shall be UL listed as suitable for service entrance rating.
 - F. Provide dead-front, circuit breaker panels, with size and quantity of circuit breakers noted on drawings.
 - G. Provide circuit breakers as indicated on drawings. Circuit breakers under 200 Amp rating shall be molded case, thermal-magnetic, quick-make/quick-break, over toggle type. The handle position shall provide good visual trip indication. Multi-pole circuit breakers shall be of a stack pole design to provide electrical phase isolation and shall have a common trip. Circuit breakers shall be of the bolt-on type.
 - H. Provide all hardware required for spaces for future breakers.
 - J. All circuit breakers shall be properly mounted in the panelboard as shown on the drawings.
- Wiring Devices:**
- A. For each panel provide special purpose outlets of a type shown on the drawings. Outlets shall be twist lock type. Outlets shall have screw terminals for back and side wiring only.
 - B. Provide UL approved device plates to match each device configuration. Device plates shall be attached with metal countersunk head screws.
 - C. Provide weatherproof covers for outlets as indicated on drawings.
 - D. Each outlet shall have a nameplate fastened to the outside of the panel adjacent to the associated device, engraved with the device designation as shown on the drawings. Nameplates shall be three-layer laminated plastic and shall be attached with screws. Lettering shall be white on dark background and shall be 1/4" high.



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CONTINUATION SHEET

TITLE

Portable Electrical Power Panelboard Assemblies

- Wiring:**
- A. All conductors shall be installed in accordance with latest requirements of NEC. Conductor insulation shall be rated for 90 °C or greater.
 - B. Label each conductor as indicated on connection diagram with heat shrink type label (Panduit LS4H Heat Shrink Marking System or equal).
 - C. Install cable ties to neatly train and lace cables inside cabinets.
 - D. No more than two conductors shall be terminated at any one terminal location.
- Metering:**
- A. Equipment shall be installed in accordance with latest requirements of NEC.
 - B. Provide current transformers and potential transformers in type B2 panelboards on load side of breakers as shown on drawings.
 - C. Provide secondary metering fuses, conductors, CT shorting blocks and terminals integral with type B2 panelboard enclosure.
 - D. Provide owner-accessible terminal strip for connection of owner-furnished metering.
- Identification:**
- Each panelboard shall be identified with an engraved three-layer plastic nameplate on the panel door carrying the panelboard designation shown on the drawings. Nameplates shall be three-layer laminated plastic and shall be attached with screws. Lettering shall be white on dark background and shall be 1/4" high.
- Panel schedules:**
- Provide typed panel schedules in glass or clear plastic covers. Indicate spare circuit breakers with pencil.
- Testing:**
- Functional testing shall be performed to assure continuity of each circuit. A written test report shall be furnished with each assembly.
- Preparation for delivery:**
- Assemblies shall be packaged for shipping to prevent damage from vibration, shock and climatic condition.



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CONTINUATION SHEET

TITLE

Portable Electrical Power Panelboard Assemblies

DRWG NO. TITLE

SUBASSEMBLY A1-1:

- D980050-B-W Subassembly 'A1-1' - Panel 'A1'
- D980051-C-W Panel Schedule for Panel 'A1'
- D980052-B-W Materials List - Subassembly 'A1-1' 120/208 Volt 225 Ampere 3 Phase Panel 'A1'

SUBASSEMBLY A2-1:

- D980056-C-W Subassembly 'A2-1' - Panel 'A2'
- D980057-D-W Panel Schedule for Panel 'A1'
- D980058-C-W Materials List - Subassembly 'A2-1' 120/208 Volt 225 Ampere 3 Phase Panel 'A2'

SUBASSEMBLY A3-1:

- D980062-B-W Subassembly 'A3-1' - Panel 'A3'
- D980063-C-W Panel Schedule for Panel 'A3'
- D980064-B-W Materials List - Subassembly 'A3-1' 120/208 Volt 225 Ampere 3 Phase Panel 'A3'

SUBASSEMBLY B1-1:

(Deleted)

SUBASSEMBLY B2-1:

- D980090-B-W Subassembly 'B2-1' Schematic Diagram





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SHEET 1 OF 2

TITLE

Heating Blanket Relay Panel Assemblies

| APPROVALS: | DATE | REV | DCN NO | BY | CHK | DCC | DATE |
|--------------------|--------|-----|--------------|-----|-----|-----|--------|
| DRAWN: W. Althouse | 2/2/98 | A | E980007-00-W | n/a | n/a | n/a | n/a |
| CHECKED: | | B | E990249-00-W | WEA | | | 6/9/99 |
| APPROVED: | | | | | | | |
| DCC RELEASE: | | | | | | | |

DESCRIPTION

Heating blanket temperature controller and power switching relay assemblies, connecting cords and junction boxes, including single-channel assembly H1 and multi-channel assemblies H2, H3, and H4, connecting cord set HC, and junction boxes HJ1 and HJ2.

REQUIREMENTS

- General:** Assemblies shall be fabricated in accordance with the drawings listed herein and shall be tested to certify performance in accordance with this specification.
- UL Listing:** The final assemblies shall be UL listed.
- Materials:** All materials shall be new. Equipment items shall be UL approved. Substitutions for product types and manufacturers specified in the drawings must be approved by LIGO. Substitutions will be considered upon request and submission of appropriate product data.
- Wiring:**
 - A. All conductors shall be installed in accordance with latest requirements of NEC. Conductor insulation shall be rated for 90 °C or greater.
 - B. Label each conductor as indicated on connection diagram with heat shrink type label (Panduit LS4H Heat Shrink Marking System or equal).
 - C. Install cable ties to neatly train and lace cables inside cabinets. Thermocouple conductors shall be routed in bundles separated from power and control conductors by at least 2 inches.
 - D. No more than two conductors shall be terminated at any one terminal location.
- Identification:** Each assembly shall be identified with an engraved label on the front panel carrying the assembly drawing number ("LIGO-D980021-A-W", "LIGO-D980025-A-W", "LIGO-D980029-A-W", or "LIGO-D980033-A-W", as appropriate). Labels shall be three-layer laminated plastic and shall be attached with screws. Lettering shall be white on dark background and shall be 1/4" high.
- Nameplates:** Engraved nameplates shall be marked and installed as designated on drawings. Nameplates shall be three-layer laminated plastic and shall be attached with screws. Lettering shall be white on dark background and shall be sized as indicated on drawings.
- Testing:** Functional testing shall be performed to assure proper operation of each controller circuit and continuity of each connecting cord and junction box. A written test report shall be furnished with each assembly.
- Preparation for delivery:** Assemblies shall be packaged for shipping to prevent damage from vibration, shock and climatic condition.



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COMPONENT SPECIFICATION

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CONTINUATION SHEET

TITLE

Heating Blanket Relay Panel Assemblies

DRWG NO. TITLE

ASSEMBLY H1:

- D980021-A-W Heating Blanket Relay Panel Box 'H1' Assembly
- D980038-A-W Materials List - Assembly 'H1' Heating Blanket Relay Box
- D980023-B-W Heating Blanket Relay Panel Assembly 'H1' Schematic Diagram
- D980022-B-W Heating Blanket Relay Panel Assembly 'H1' Connection Diagram

SUBASSEMBLY H2-1:

- D980025-A-W Subassembly 'H2-1' -Heating Blanket Panel 'H2'
- D980040-A-W Materials List - Subassembly 'H2-1' Heating Blanket Relay Panel
- D980027-B-W Subassembly 'H2-1' Schematic Diagram
- D980026-B-W Subassembly 'H2-1' Connection Diagram
- D980091-A-W Controller Display and Equipment Connector Details

SUBASSEMBLY H3-1:

- D980029-A-W Subassembly 'H3-1' -Heating Blanket Panel 'H2'
- D980042-A-W Materials List - Subassembly 'H3-1' Heating Blanket Relay Panel
- D980031-B-W Subassembly 'H3-1' Schematic Diagram
- D980030-B-W Subassembly 'H3-1' Connection Diagram
- D980091-A-W Controller Display and Equipment Connector Details

SUBASSEMBLY H4-1:

- D980033-A-W Subassembly 'H4-1' -Heating Blanket Panel 'H2'
- D980044-A-W Materials List - Subassembly 'H4-1' Heating Blanket Relay Panel
- D980035-B-W Subassembly 'H4-1' Schematic Diagram
- D980034-B-W Subassembly 'H4-1' Connection Diagram
- D980091-A-W Controller Display and Equipment Connector Details

ASSEMBLY HC:

- D980036-A-W Heating Blanket Cord Set Assembly 'HC'
- D980045-A-W Materials List - Assembly 'HC' Heating Blanket Cord Set

ASSEMBLY HJ1:

- D980037-A-W 6-Way Heating Blanket Junction Box Assembly 'HJ1'
- D980046-A-W Materials List - Assembly 'HJ1' 6-Way Heating Blanket Junction Box

ASSEMBLY HJ2:

- D980092-A-W 2-Way Heating Blanket Junction Box Assembly 'HJ2'
- D980093-A-W Materials List - Assembly 'HJ2' 2-Way Heating Blanket Junction Box