

**NOTE**



All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  [ $\pm 0.005$ ] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

## 1. INTRODUCTION

This specification covers the requirements for application of the Battery Interconnect System, designed for use in battery pack applications. The system consists of a two-piece battery housing assembly (customer supplied) and a printed circuit (pc) board mounted header assembly. This Battery Interconnect System is designed with a voltage key positioned relative to the contacts so that only battery packs of corresponding voltages will mate.

The header assembly is available with pre-installed contacts for mounting to the pc board in a right-angle style. These header assemblies are divided into two categories; right-angle and vertical. Each category describes the direction of contacts with respect to solder tines. Headers provide polarization and alignment features for mating of the battery pack to the header assembly. A position one identifier is located over the contact adjacent to the alignment post. The two-piece battery housing assembly consists of top and bottom housings. The bottom housing contains female contacts for mating with the header assembly. These contacts have an exposed flat surface for an internal wiring attachment.

Figure 1 provides terminology for product features that will be used throughout this specification. Use of these terms will facilitate assistance when corresponding with TE Connectivity Representatives.

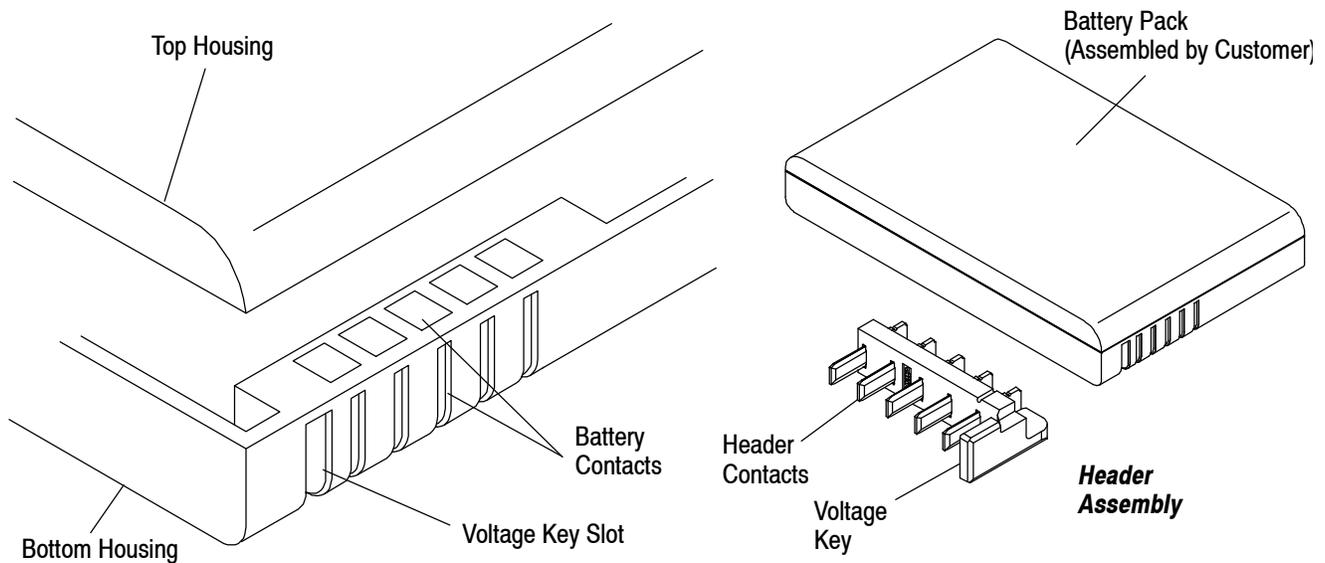


Figure 1

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

This paragraph is reserved for a revision summary covering the most recent additions and changes made to this specification which include:

- Updated document to corporate requirements.

### 2.2. Customer Assistance

Reference Part Number 787092 and Product Code 2197 are representative numbers of the Battery Interconnect System. Use of these numbers will identify the product line and expedite your inquiries through an TE service network established to help you obtain product and tooling information. Such information can be obtained through a local TE Representative (Field Sales Engineer, Field Applications Engineer, etc) or, after purchase, by calling the Tooling Assistance Center or Product Information numbers at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for specific products are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any other technical documentation supplied by TE.

### 2.4. Manuals

Manual 402-40 is available upon request and can be used as a guide in soldering. This bulletin provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is attached to the bulletin as a guide for information on soldering problems.

### 2.5. Specifications

Product Specification 108-1501 covers test and performance requirements.

## 3. REQUIREMENTS

### 3.1. Storage

#### A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the header assemblies.

#### B. Shelf Life

Each header assembly is packaged and shipped in an individual anti-static tube container. To prevent damage to the solder tails, the header assemblies should remain in the tube until ready for installation. Also to prevent possible storage contamination and preserve maximum solderability, the header assemblies should be used on a first in, first out basis.

### 3.2. PC Board

#### A. Thickness

The header assemblies are designed for 1.57 to 2.36 ± 0.13 [.062 to .093 ± .005] thick pc boards. For suitability of other board thicknesses, contact the Product Information Center number listed at the bottom of page 1.

#### B. Layout

The pc board mounting holes must be precisely located to ensure proper placement and optimum performance of the header assemblies. See Figure 2 for pc board layout dimensions.

**NOTE**

*Datums and basic dimensions are established by the customer.*



#### C. Material

PC board material must be glass epoxy (FR-4, G-10). For suitability of other pc board materials, consult the Tooling Assistance Center number at the bottom of page 1.

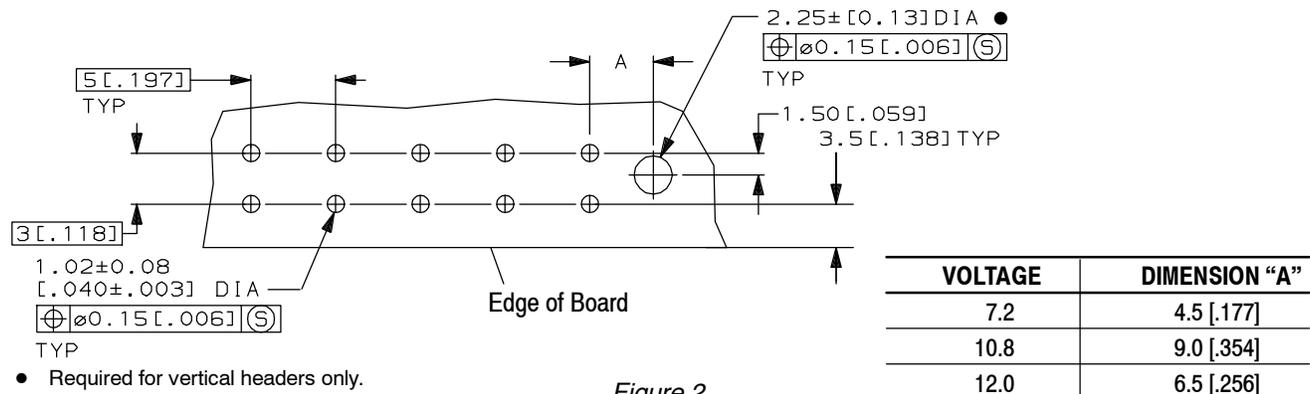


Figure 2

- Required for vertical headers only.

## D. Tolerance

The maximum allowable bow of the pc board is 0.03 [.001] over the length of the header.

### 3.3. Header Assembly

The header assembly has contacts for direct placement on pc boards by hand or machine. Customers may elect either placement method with right-angle or vertical header assemblies. Three styles of the 7.2 volt system right-angle header assemblies are shown in Figure 3.

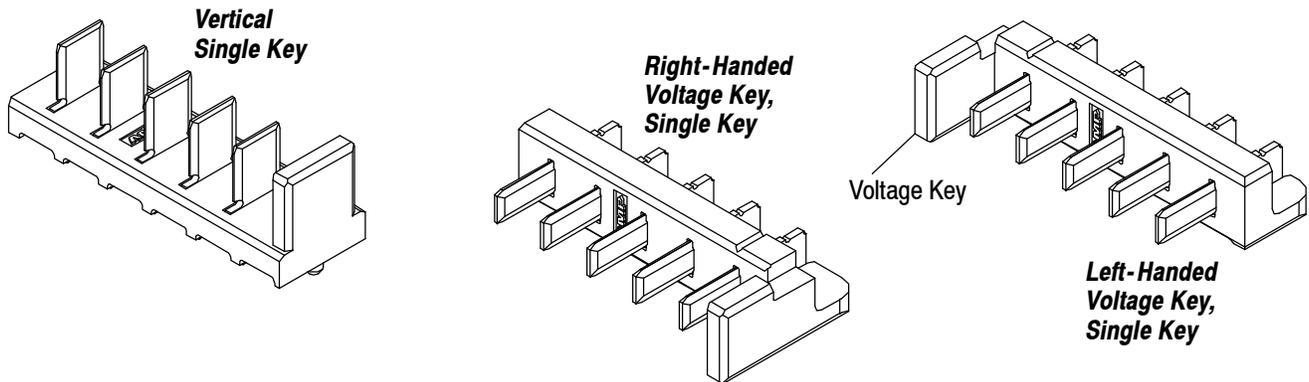


Figure 3

### 3.4. Electrical Engagement

The dimensions shown in Figures 4, 5, and 6 must be met to ensure full mating between the battery pack and header assemblies. These dimensions must be considered when designing device battery compartments and position of the header assembly with respect to the compartment.

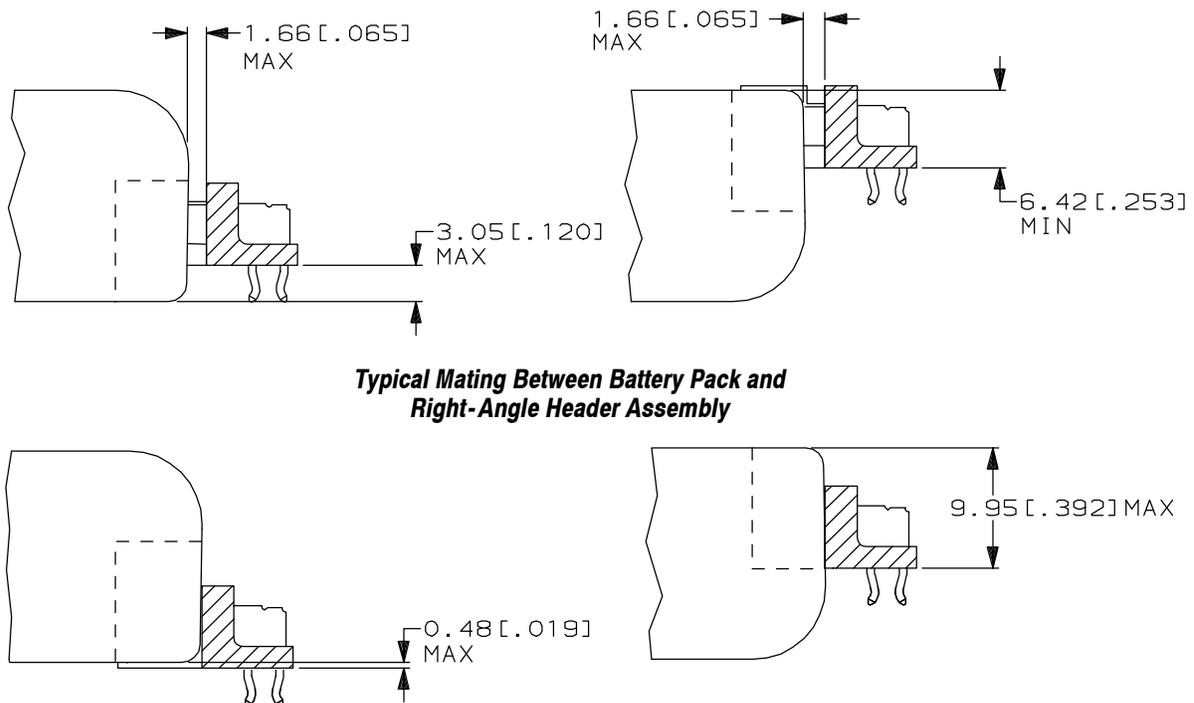


Figure 4

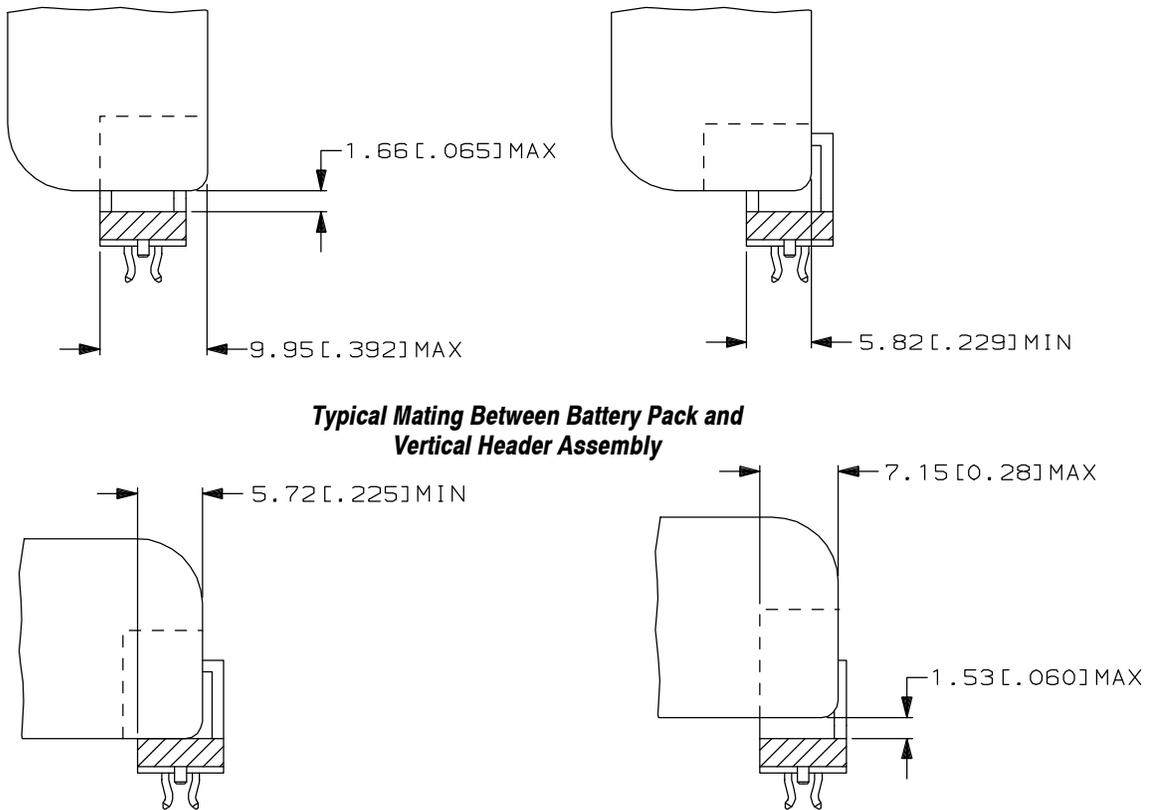


Figure 5

### 3.5. Misalignment

Mating of the battery pack to the header assembly requires careful consideration of the battery compartment. **The compartment MUST confine battery pack to tolerances shown in Figure 6.** The compartment must also allow lateral movement of pack.

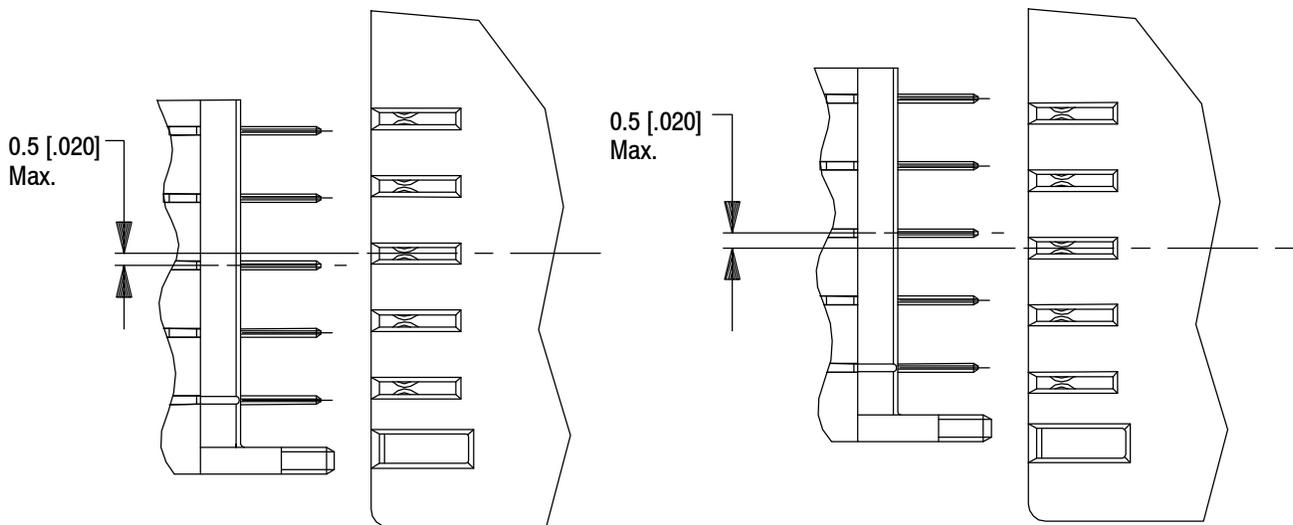


Figure 6

### 3.6. Mating Direction

Various mating configurations of battery packs to header assemblies are shown in Figures 7 and 8.

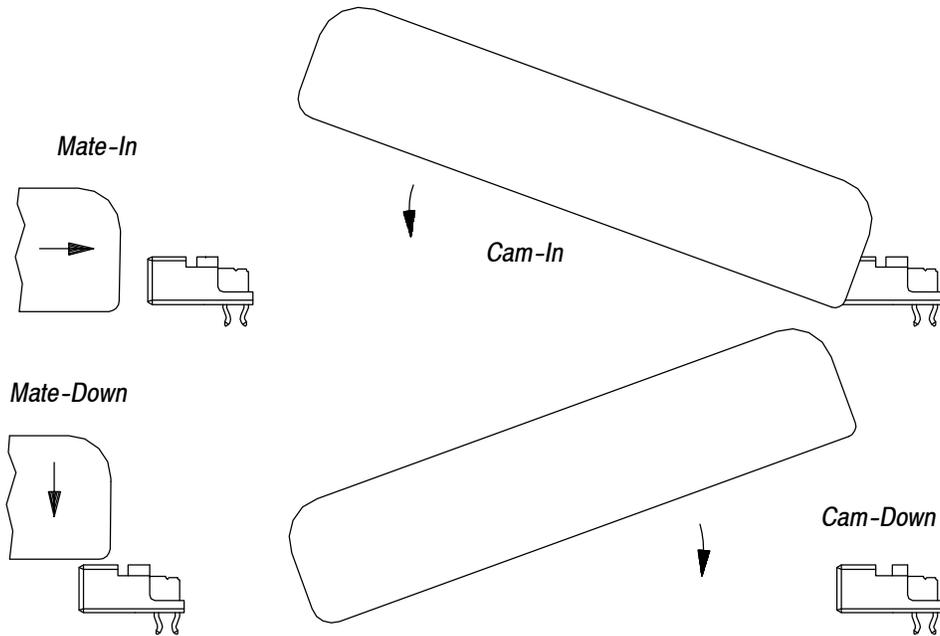


Figure 7

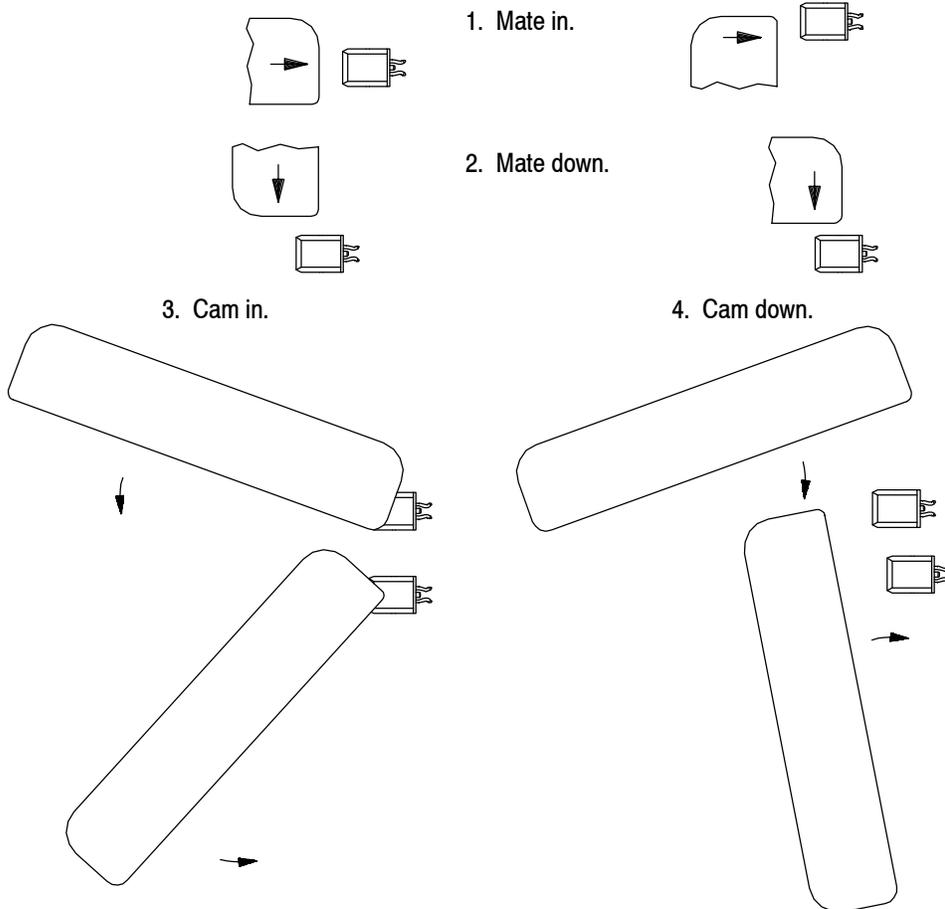


Figure 8

### 3.7. Polarization and Alignment

The Battery Interconnect System includes features for polarization and alignment of the battery pack to the header assembly from the voltage key which functions to ensure proper positioning. See Figure 9.

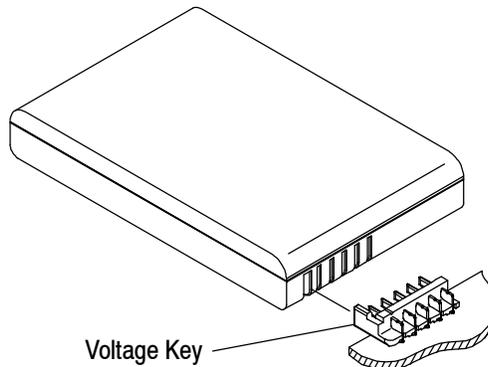


Figure 9

### 3.8. PC Board Mounting

Header assemblies are available with straight solder tines or retention solder tines. Retention solder tines minimize movement during soldering. See Figure 10.

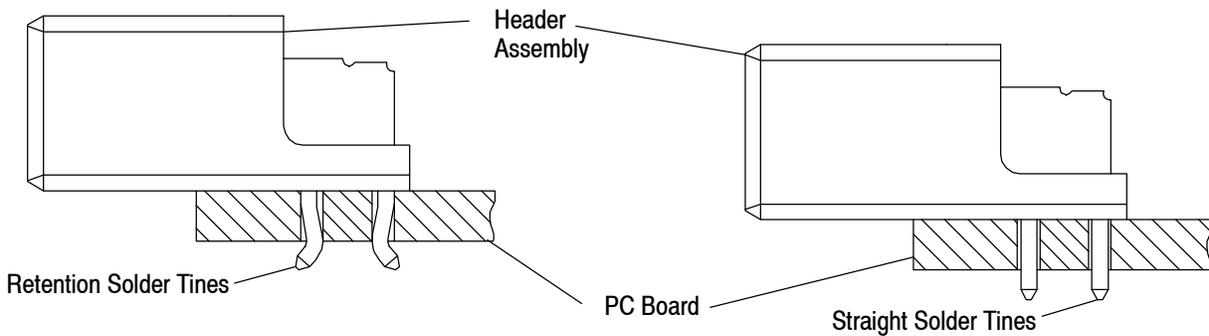


Figure 10

### 3.9. Header Assembly Placement

A header assembly can be placed on the pc board by machine or manually and the solder tines inserted into their respective pc board holes.



**ALWAYS** grip the header assembly by its ends to prevent contamination and distortion of the solder tines.

### 3.10. Soldering

#### A. Flux Selection

The header assembly solder tines must be fluxed with rosin base, aqueous, or suitable no-clean flux before soldering. Selection of flux will depend on the type of pc board material and other components mounted on the pc board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. The header material is infrared reflow and forced air convection reflow. Contact the Product Information Center number at the bottom of page 1 for additional details concerning infrared reflow or forced air convection applications. Temperatures to which these header assemblies are subjected should not exceed 273°C [523°F] for more than 1 minute.

#### B. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult the supplier of the solder paste and flux for recommended cleaning solvents. Figure 11 lists common cleaning solvents that will not affect the header assemblies for the time and temperatures given. If you have a particular solvent that is not listed, consult a TE Representative before using it on these header assemblies.

CLEANER		TIME (Minutes)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
Alpha 2110■	Aqueous	1	132	270
Bioact EC-7◆	Solvent	5	100	212
Butyl Carbitol●	Solvent	1	Room Ambient	
Isopropyl Alcohol	Solvent	5	100	212
Kester 5778❏	Aqueous	5	100	212
Kester 5779❏	Aqueous	5	100	212
Loncoterge 520●	Aqueous	5	100	212
Loncoterge 530●	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

■ Product of Fry's Metals, Inc.    ◆ Product of Petroferm, Inc.    ● Product of Union Carbide Corp.    ❏ Product of Litton Systems, Inc.

Figure 11



Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Trichloroethylene and Methylene Chloride can be used with no harmful affect to the product; however, TE does not recommend them because of the harmful occupational and environmental effects. Both are carcinogenic (cancer-causing) and Trichloroethylene is harmful to the earth's ozone layer.

**C. Drying**

When drying cleaned assemblies and pc boards, make certain the temperatures are within the limitations of: -55° to 105°C [-67° to 221°F] for standard temperature products and -55° to 215°C [-67° to 419°F] for high temperature products. Excessive temperatures may cause header assembly degradation.

**D. Soldering Guidelines**

The header assemblies can be soldered using infrared reflow or forced air convection reflow or equivalent soldering techniques. We recommend using SN60 or SN62 solder for these headers. The temperatures and exposure time shall be within the ranges specified in Figure 12.



Manual 402-40 provides guidelines for establishing soldering practices. Refer to Paragraph 2.4, Manuals.

SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temp)
	CELSIUS	FAHRENHEIT	
INFRARED REFLOW SOLDERING	220°C Max	428°F Max	30-50 Seconds
FORCED AIR CONVECTION REFLOW	220°C Max	428°F Max	30-50 Seconds

Figure 12

**3.11. Inspection**

**A. Solder Fillets**

All solder fillets should conform to the Workmanship Standard 101-21. For a typical fillet for these header assemblies, refer to Figure 13.

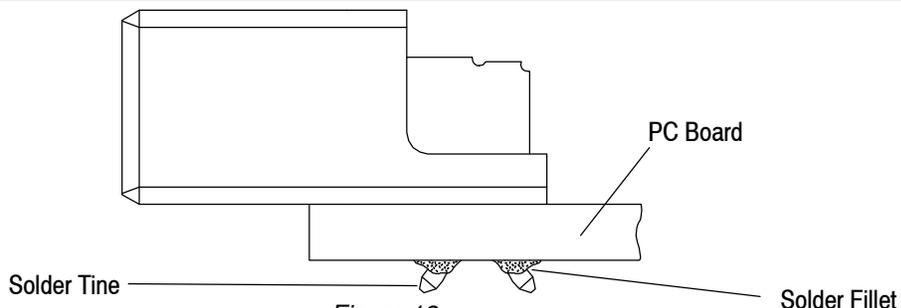


Figure 13

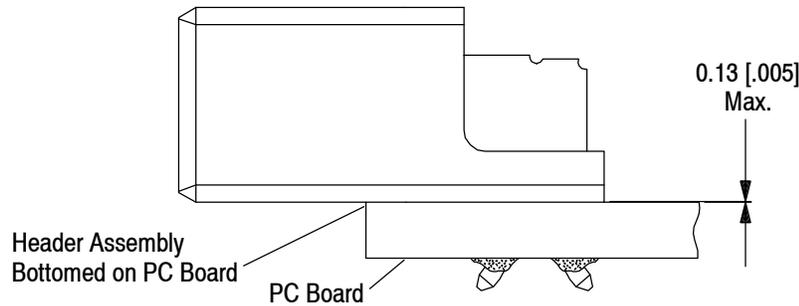


Figure 14

**B. Header Assemblies**

The header assemblies must be bottomed on the pc board. See Figure 14.

**3.12. Repair/Replacement**

Damaged header assemblies must be removed, discarded, and replaced.

**3.13. Battery Housing**

The battery housing assembly includes a top and bottom housing. The bottom housing is supplied with factory installed contacts. The user determines the type of conductor attached to the contact and method of attachment. Refer to product drawing for available attachment area.

**A. Battery Housing Cleaning**

Battery housing contacts are factory lubricated. Cleaning may remove this lubricant. Contact the Product Information Center number at the bottom of page 1 for relubrication recommendations if cleaning is necessary.

**B. Joining of Battery Housing Top and Bottom**

Battery housings are designed with features for ultrasonic bonding.

**4. QUALIFICATIONS**

The battery interconnect low-voltage header assemblies do not require safety approval with Underwriters' Laboratories, Inc. (UL) or certification by the Canadian Standards Association (CSA) . However, this product is qualified to meet criteria listed in the International Electrotechnical Commission (IEC) Connector Study Group listed under IEC 48B.

**5. TOOLING**

The robotic equipment must have a true position accuracy tolerance of 0.13 [.005] to properly locate the connector for insertion. This includes gripper and fixture tolerances as well as equipment repeatability. Insertion location will be programmed by a pantograph/template system or software package. The equipment must use the connector datum surfaces detailed on the Customer Drawing to ensure reliable connector placement. TE machines have been designed for a variety of application requirements. See Figure 15.

<b>NOTE</b>	<i>For assistance in setting up prototype and production line equipment, contact TE Tooling Engineering through your local TE Representative or call the TE Tooling Assistance Center number at the bottom of page 1.</i>
	

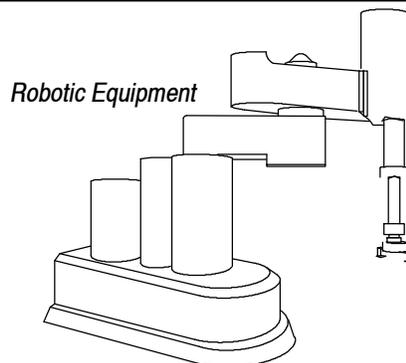
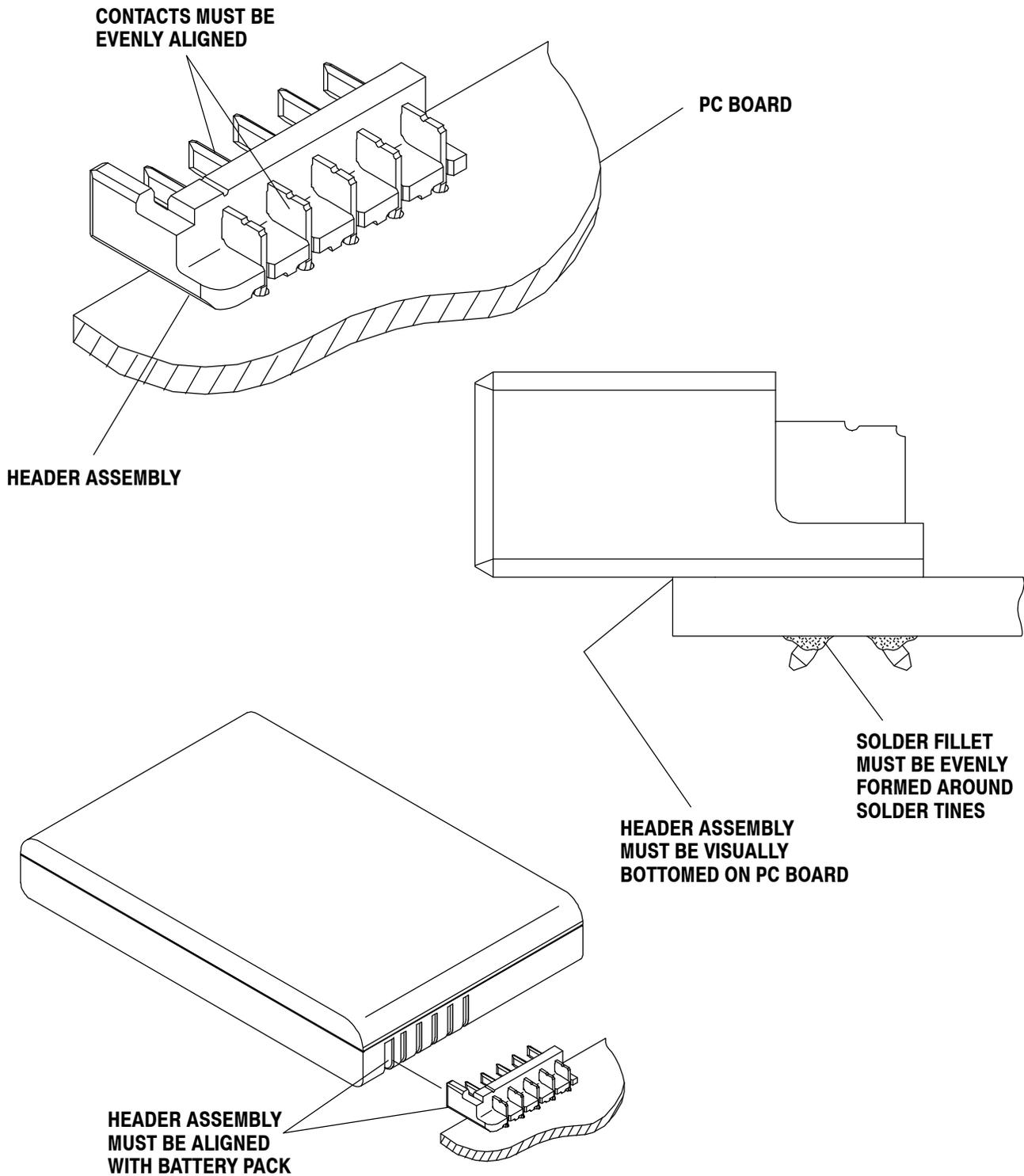


Figure 15

**6. VISUAL AID**

Figure 16 shows a typical application of a Battery Interconnect System. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product.



**FIGURE 16. VISUAL AID**