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 ±0.13 [±.005] and angles have a tolerance of ±2°. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of the QP 6.5 connector system with a 6.5 mm centerline. The QP 6.5 connector system is available in dual row 2, 4, and 6 position wire to board configurations for a 16 to 22 AWG wire range.

Basic terms and features of this product are provided in Figure 1.

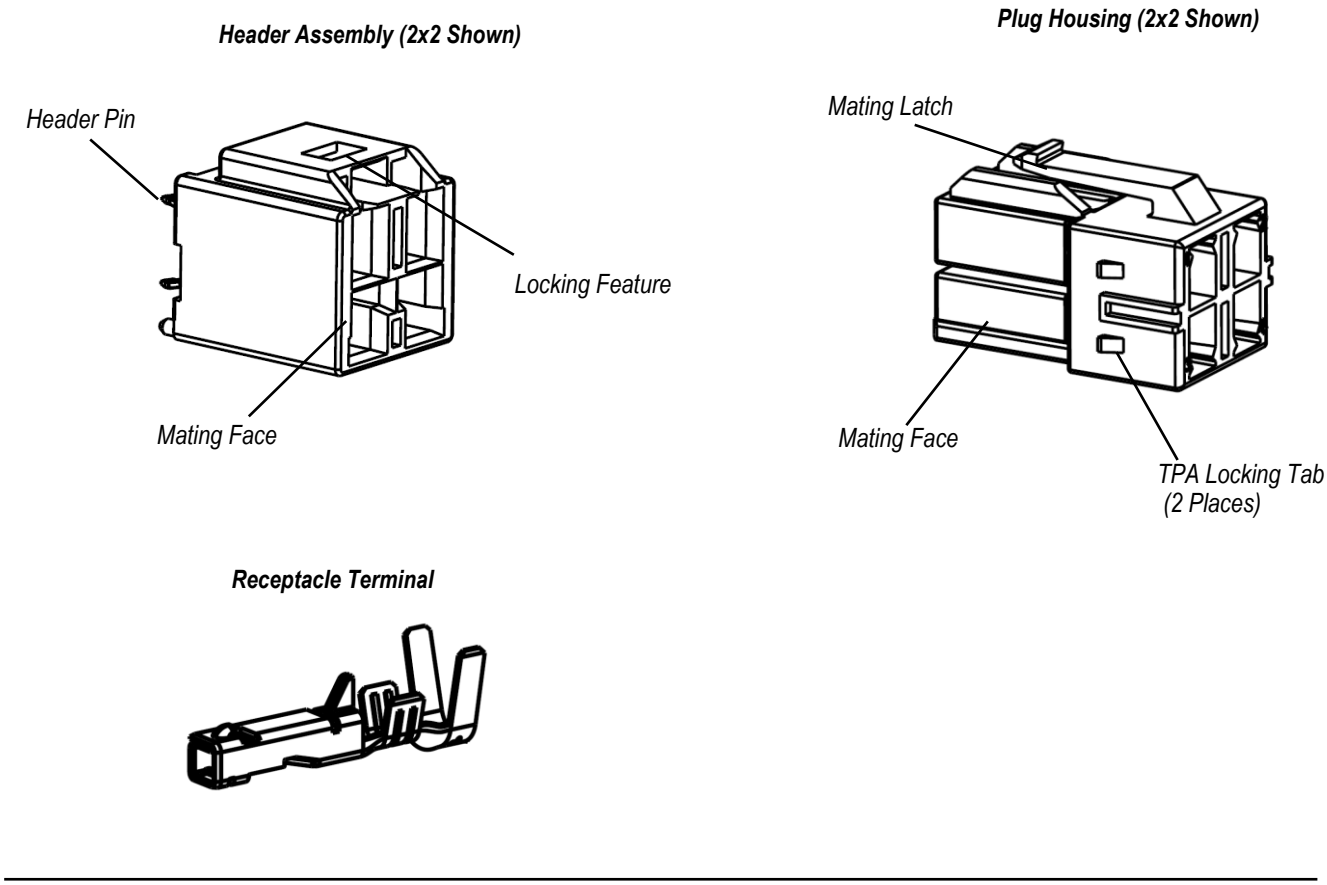


Figure 1

© 2024 TE Connectivity Ltd. family of companies.
All Rights Reserved.
*Trademark

TE Connectivity, TE connectivity (logo), and TE (logo) are trademarks. Other logos, product, and/or company names may be trademarks of their respective owners.

2. REFERENCE MATERIAL

2.1. Revision Summary

- Production release

2.2. Customer Assistance

Reference Product Base Part Number 2465656, 2465614, 2465651 and Product Code 2033, 2034, 2035 are representative of the QP 6.5 connector system. Use of these numbers will identify the product line and help you to obtain product and tooling information when visiting www.te.com or calling the number at the bottom of page 1.

2.3. Drawings

Customer drawings for product part numbers are available from www.te.com. Information contained in the customer drawing takes priority.

2465656	Receptacle Terminal, 16-22 AWG Wire Range
2465614	Header Assembly (2P, 4P, and 6P)
2465651	Plug Housing (2P, 4P, and 6P)

NOTE
The listing of a drawing or part number in this specification should not be interpreted as an indication of availability. Contact the TE Product Information Center at the number at the bottom of page 1 for product availability.

2.4. Specifications

Product Specification 108-160978 provides product performance and test results.

3. REQUIREMENTS

3.1. Safety

Do not stack product shipping containers so high that the containers buckle or deform.

3.2. Storage

A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the product material.

B. Shelf Life

The product should remain in the shipping containers until ready for use to prevent deformation to components. The product should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

C. Reels

When using reeled contacts, store coil wound reels horizontally. When storing partial reeled contacts, the end of the strip should be secured to the flange using a wire tie or similar method.

D. Chemical Exposure

Do not store product near any chemical listed below as they may cause stress corrosion cracking in the material.

Alkalies	Ammonia	Citrates	Phosphates Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites	Tartrates

NOTE
Contacts that contain brass must not be stored or used in environments where these chemicals exist.

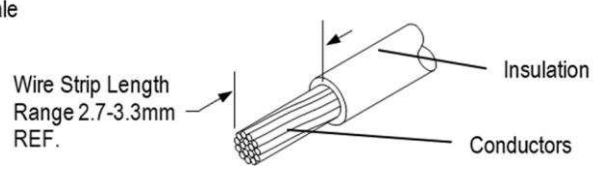
3.3. Wire Selection and Preparation

The contacts designed for unsealed applications accept a single stranded copper wire sizes 22 AWG to 16 AWG with an insulation diameter range on each wire of 2.0 to 3.3 mm.

Each wire must be stripped to the dimension given in Figure 2.

CAUTION
Care must be taken not to nick, scrape, or cut any part of the wire during the stripping operation.

Note: Not to Scale



WIRE	
SIZE [AWG]	**INSULATION DIA. (mm)**
[22-16]	2.0-3.3
	2.5mm MAX. WHEN INSERT TPA

Figure 2

3.4. Contact Crimp

A. Cutoff Tab

The cutoff tab is the remaining portion of the carrier strip after the contact is cut from the strip. The cutoff tab must not exceed 0.25mm in Figure 3.

B. Wire Barrel Crimp

The crimp applied to the wire barrel portion of the contact is the most compressed area and is most critical in ensuring optimum electrical and mechanical performance of the crimped contact. The crimp must be centered on the closed wire barrel. The crimp must result in an “F” crimp where the wire barrel forms a closed seam with no evidence of loose wire strands or wire strands visible in the seam. The crimp height and width must be within the dimensions given in Figure 3.

C. Insulation Barrel Crimp

The crimp applied to the insulation barrel of the contact must result in an “F” crimp where the insulation barrel forms a closed seam with no evidence of wire insulation in the seam and wrap firmly around the wire insulation without cutting into the wire insulation. The crimp height must be within the dimensions provided in Figure 3.

D. Twist and Roll

There should be no twist or roll of the wire barrel or mating portion of the crimped contact that would cause overstress or impair usage. Bend up: 4° MAX. ; Bend down: 3° MAX.; Twisting: 3° MAX.

Rolling: 8° MAX. See Figure 3.

E. Wire End Extrusion

The wire conductor ends must extend beyond the end of the wire barrel within 0-1.0mm wire end extrusion length given in Figure 3.

F. Bellmouths

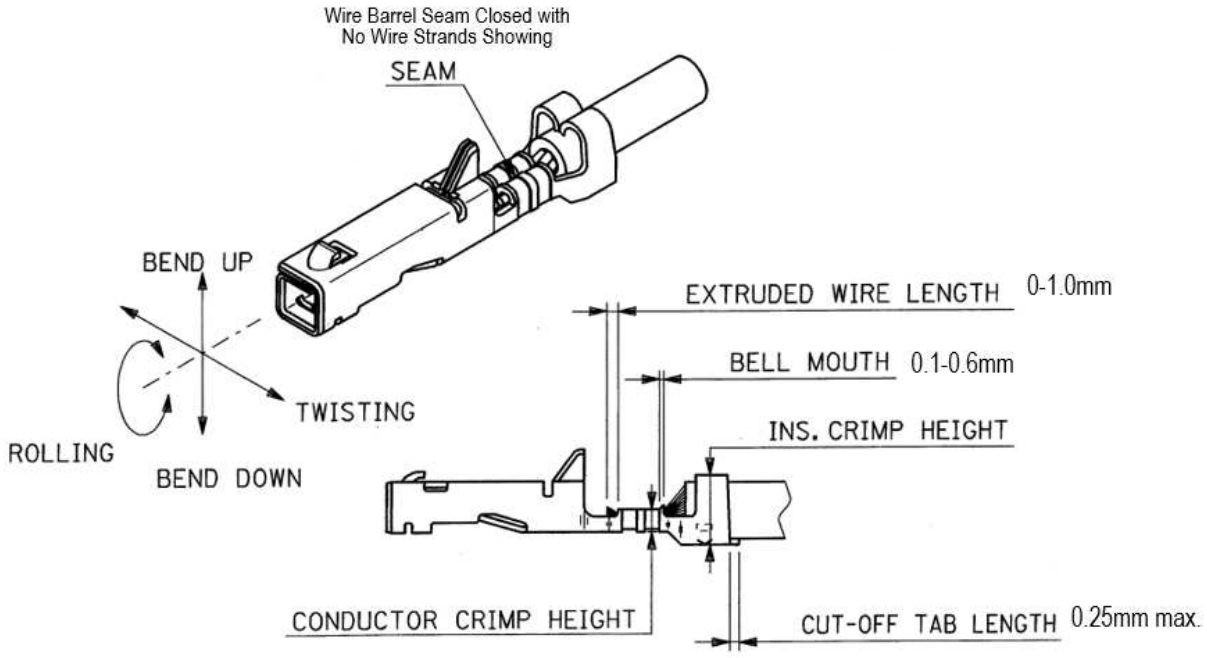
The bellmouth shall conform to the dimensions 0.1-0.6mm given in Figure 3.

G. Wire Location

All conductors must be held firmly inside the wire barrel. No strands can be folded back over the wire insulation. The wire insulation must be inside the insulation barrel, but must not enter the wire barrel. The wire conductors and insulation must be visible within the area between the wire barrel and insulation barrel as shown in Figure 3.

H. Bend Allowance

Then bend allowance between the wire barrel and the cable is acceptable within the limits given in Figure 3.



Base Number	Wire Size (AWG [mm²])	Insulation Diameter Range	Wire Crimp Height	Wire Crimp Width	Insulation Crimp Width	Insulation Crimp Form	Insulation Crimp Height (Ref)	Rear Bellmouth Length
2465656	16 [1.3]	2.0-3.3 (2.0-2.5 when TPA is used)	1.21-1.31	1.95	2.90	"F"	3.80	0.1-0.6
	18 [0.8]		1.16-1.26				3.70	
	20 [0.5]		1.02-1.12				3.65	
	22 [0.3]		0.97-1.02				3.50	

Note: F – F Crimp

Figure 3

3.5. PC Board

A. Material and Thickness

1. Board material will be glass epoxy (FR-4, G-10).
2. Board thickness shall be 1.6 mm.

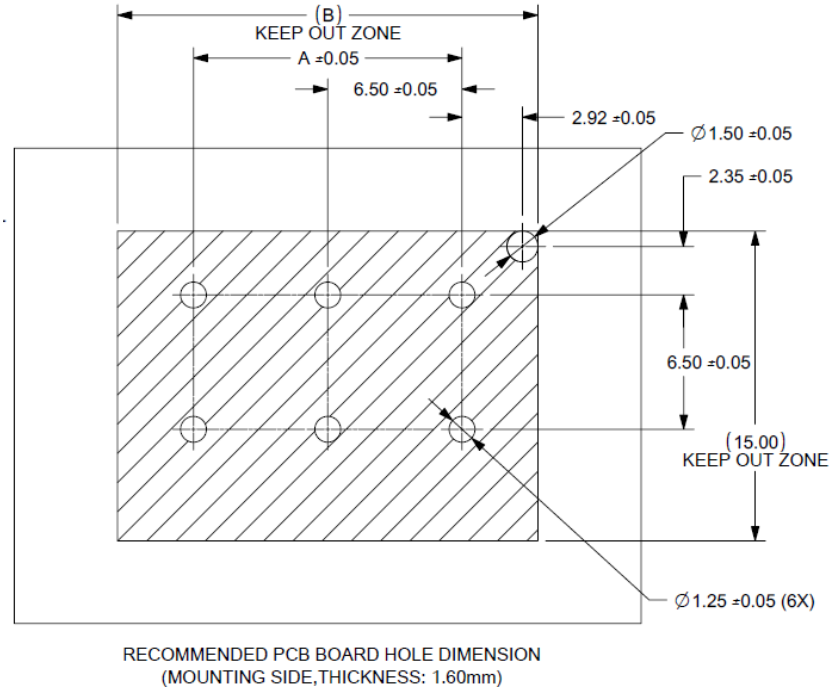
Contact the PRODUCT INFORMATION number at the bottom of Page 1 for suitability of other pc board materials or thicknesses.

B. Tolerance

Maximum allowable bow of the pc board shall be 0.03 mm over the length of the header assembly.

C. PC Board Layout

The mounting and contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the header assembly. Design the pc board using the dimensions provided in Figure 4. The layout shows the top (component) side of the board



POSITION	DIM.A	DIM.B
2	-	7.34
4	6.50	13.84
6	13.00	20.34

Figure 4

D. PC Board Solder Tine Holes

The holes in the pc board for the solder tines must be drilled and plated through to specific dimensions. See Figure 5.

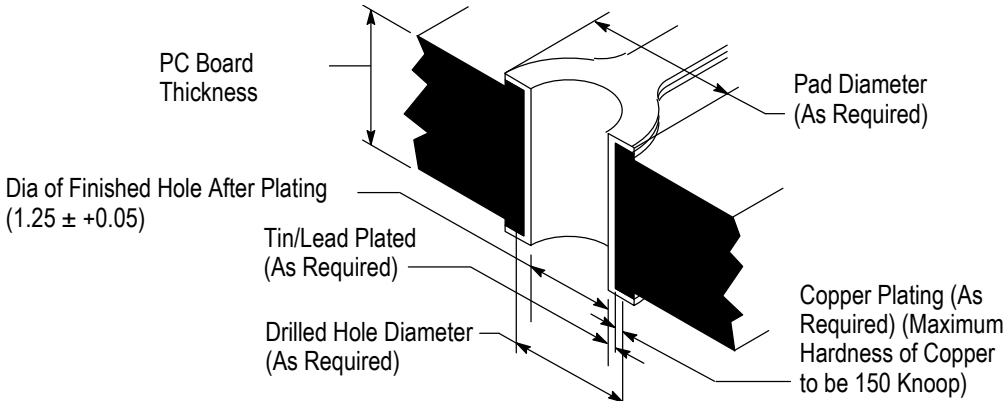


Figure 5

3.6. Soldering

A. Flux Selection

Contact solder tines must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call the PRODUCT INFORMATION number at the bottom of Page 1 for consideration of other types of flux. Some fluxes are compatible with these header assemblies are provided in Figure 6.

TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			ALPHA	KESTER
RMA (Mildly Activated)	Mild	Noncorrosive	611	186

Figure 6

B. Soldering Guidelines

These header assemblies can be soldered using a variety of soldering techniques. The temperatures and exposure time shall be within the ranges specified in Figure 7. We recommend using SN60 or SN62 solder for these header assemblies.

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

SOLDERING PROCESS	TEMPERATURE	TIME (At Max Temperature)
Wave	260°C [500°F] Max. (Wave Temperature)	5 Seconds

Figure 7

C. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. The following is a listing of common cleaning solvents that will not affect the header assemblies for the time and temperature specified. See Figure 8.

DANGER
Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer's Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and Methylene Chloride can be used with no harmful effect to the header assemblies; 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.

If you have a particular solvent that is not listed, contact the TOOLING ASSISTANCE CENTER or PRODUCT INFORMATION number at the bottom of Page 1.

CLEANER		TIME (Minutes)	TEMPERATURE (Max)
NAME	TYPE		
ALPHA 2110	Aqueous	1	132°C [270°F]
BIOACT EC-7	Solvent	5	100°C [212°F]
Butyl CARBITOL	Solvent	1	Ambient Room
Isopropyl Alcohol	Solvent	5	100°C [212°F]
KESTER 5778	Aqueous		
KESTER 5779	Aqueous		
LONCOTERGE 520	Aqueous		
LONCOTERGE 530	Aqueous		
Terpene	Solvent		

Figure 8

D. Drying

When drying cleaned assemblies and pc boards, make certain that temperature limitations are not exceeded: 105°C [221°F] max for a period of 5 minutes for standard temperature products. Excessive temperatures may cause header assembly degradation. Values may vary with different types of automatic cleaning equipment. See the equipment manufacturers' recommendations.

3.7. Mating and Unmating

The mating face of the cap housing must align with the mating face of the plug housing, then the housing must be pushed together until the mating latch is secured to the latch hole. There should be an audible click. Refer to Figure 9.

To unmate the housings, the plug housing mating latch must be depressed until it is released from the latch retainer, then the housings can be pulled straight apart.

CAUTION
These housings are not intended to be used as an electrical interruption device. To avoid degradation to the contacts, there must be no current flow when unmating.

3.8. Strain Relief and Wire Dress

Wires can be bundled together and supported using cable ties or electrical tap. The wires must remain perpendicular to the housing and avoid an excessively sharp bend radius. The wire bundle must be at least 76.2 mm [3.0 inch] from the back of the housing before bending in any direction. Do not bend unsupported wires as this may cause strain on the contacts.

3.9. Replacement and Repair

Damaged or defective product must not be used. The housings, contacts are not repairable.

4. QUALIFICATION

4.1. Underwriters Laboratories Inc. (UL)

The Multi-load Power Double Lock connector system are recognized by Underwriters Laboratories Inc. (UL) in File E28476.

5. TOOLING

Applicators contain the tooling for feeding and crimping strip-form terminals. Automatic machines provide the power to operate the applicator.

Tooling information for product part numbers is available from www.te.com or by calling the Product Information Center at the number at the bottom of page 1.

5.1. Machine (Power Unit)

The machine provides the force required to drive an applicator for crimping the contacts. These machines can be set up to automatically measure, cut, strip and terminate wire.

5.2. Applicator

Applicators and hand tools for product part numbers are available in Figure 8 and from the Applicator Search Portal on www.te.com or by calling the Product Information Center at the bottom of page 1.

Terminal Part Number	Applicator Part Number
2465656-1	4151367-1

6. VISUAL AID

Figure 9 shows a typical application of this product. 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 or tooling.

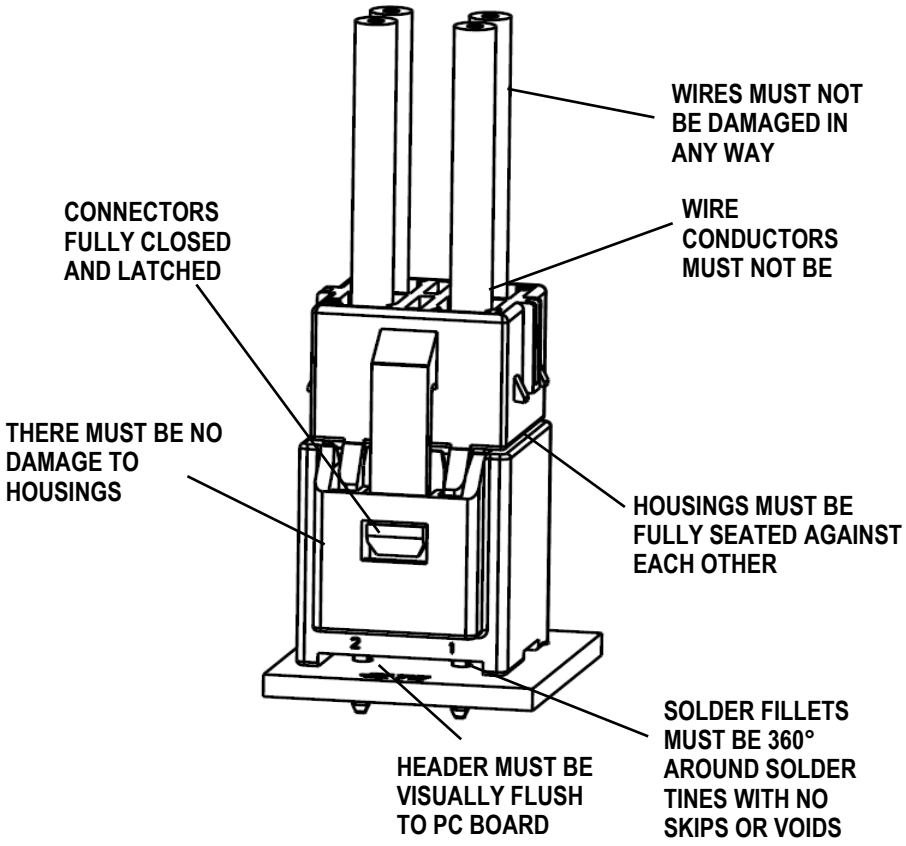


Figure 9