AMP+HVA280-2phi SE High Voltage 2-Position Sealed Plug Connector

MORTAL DANGER — HIGH VOLTAGE

This connector is intended for use in high-voltage applications. Special care must be applied to ensure that the connector functions as intended.

— If you suspect that the connector has been modified, damaged, contaminated, or otherwise compromised, discontinue use immediately.

— This connector should only be serviced by a trained and qualified technician.

CAUTION

*These high-voltage connectors **must not** be mated with any other type of connector.*

NOTE

All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of ±0.10 and angles have a tolerance of ±1°. Figures are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of AMP+ HVA280-2phi SE high-voltage 2-position sealed plug connector. This plug is designed for an application voltage of up to 1000 VDC (using Receptacle Terminal without Insulation grip) and pollution degree 3. The plug has a conductive electro-magnetic interference (EMI) shield to reduce radiated emissions in the application.

The plug incorporates two MCP 2.8-mm receptacle terminals, which mate with two 2.8-mm blade terminals in the mating header. The circuit cavities are numbered on the wire end of the housing and cable seal retainer. The plug features a connector position assurance (CPA) member used to indicate proper engagement of the mated connectors. The plug housing is molded in orange to denote high voltage.

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

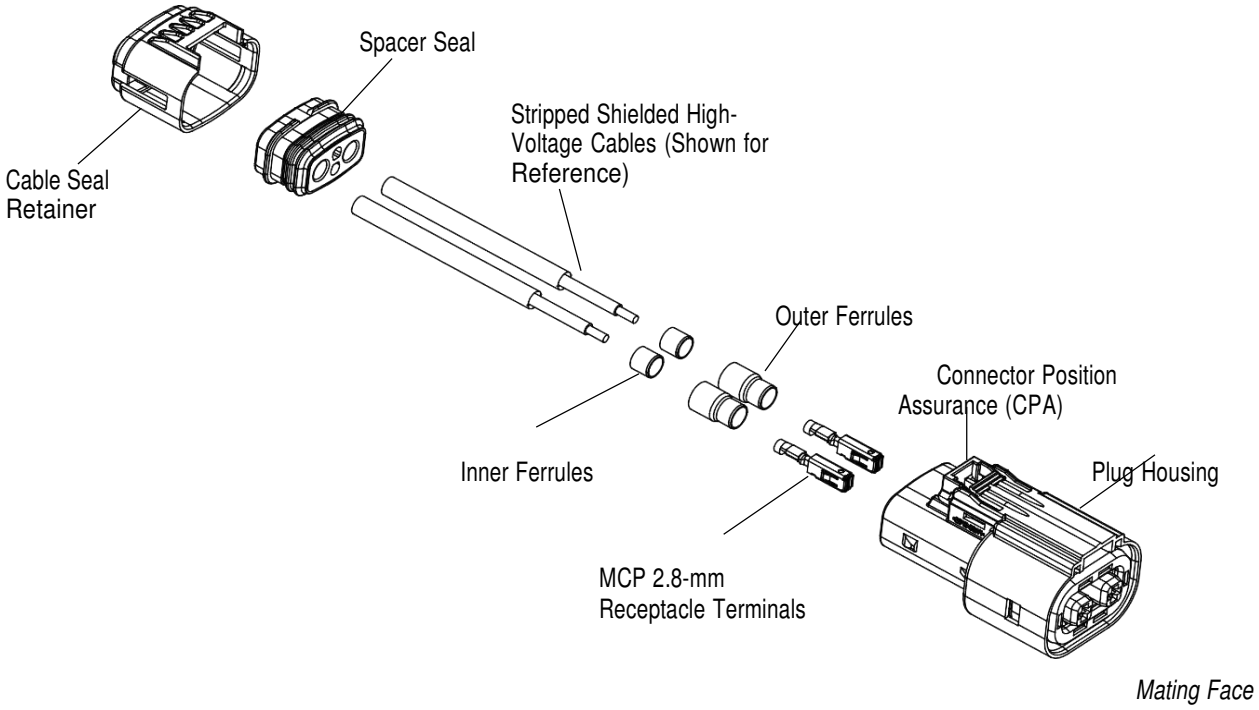

Figure 1

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| Indicates Change

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2. REFERENCE MATERIAL

2.1. Revision Summary

Initial release of application specification

2.2. CUSTOMER ASSISTANCE

Product Base Part Number 2103628 and Product Code J710 are representative of AMP+ HVA280-2phi SE high-voltage 2-position sealed plug connector. 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.

NOTE

Reference customer drawing 2103749 lists compatible part number relationships. For more information on reference drawings, call the number at the bottom of page 1.

2.4. INSTRUCTIONAL MATERIAL

Instruction sheets (408-series) provide product assembly instructions or tooling setup and operation procedures and customer manuals (409-series) provide machine setup and operating procedures. Instructional material that pertains to this product is:

408-8851 SDE-SA Hand Crimping Tool Frame Assembly 9-1478240-0
408-9930 PRO-CRIMPER III Hand Crimping Tool Frame Assembly 354940-1
408-32145 SDE HVA 280 Die Assemblies 2063013-[ ]
409-10052 SDE Electric Bench Terminator 1490076-2

2.5. SPECIFICATIONS

Application specifications (114-series) that provide application requirements for MCP 2.8-mm receptacle terminals are:

114-18148-1 AMP MCP 2.8 Contact System
114-18148-3 AMP MCP 2.8 Contact System with Japanese Automotive Standards Organization (JASO) Wiring

2.6. STANDARDS

Standards that pertain to this product are:

EIA-60529, “Degrees of Protection Provided By Enclosures (IP Code): IP6K9K and IP67 (Mated) and IP2B (Unmated)

SAE/USCAR-2, “Performance Specification for Automotive Electrical Connector Systems”

SAE/USCAR-37, “High Voltage Connector Performance Supplement to SAE/USCAR-2”

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. 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

3.3. MATERIAL

The plug is made of thermoplastic materials. The terminals are made of silver over copper. The shields and ferrules are made of tin over copper.

3.4. CABLE AND SUBCOMPONENT SELECTION

The plug is designed to accept shielded high-voltage cable sizes 2.0, 2.5, 3.0, 4.0, and 5.0 mm^2.

The cable and subcomponent combinations that are validated by TE Connectivity (TE) are given in Figure 2. These combinations should be used together to ensure optimum plug performance. Alternative cables may be used after ensuring performance through validation testing.

NOTE

Only combinations for cable sizes listed in Figure 2 had been tested at the time of publication of this specification.

CABLE	RECOMMENDED SUBCOMPONENTS	
	PART NUMBER	DESCRIPTION
Judd Wire Inc. 3.0-mm2 Individually Shielded High Voltage (Orange)	1-968853-3 OR* 1-2236752-3	MCP 2.8mm Receptacle Terminal OR MCP 2.8mm Receptacle Terminal (w/o INS Grip)
	1587828-2	Inner Ferule
	1587829-2	Outer Ferrule
	2103731-2	Spacer Seal
	2103736-2	Cable Seal Retainer
Judd Wire Inc. 5.0-mm2 Individually Shielded High Voltage (Orange)	1-2289061-3	MCP 2.8mm Receptacle Terminal
	1587828-3	Inner Ferule
	1587829-3	Outer Ferrule
	2103731-3	Spacer Seal
	2103736-3	Cable Seal Retainer
HUBER+SUHNER. 4.0-mm2 Individually Shielded High Voltage (Orange) and High Voltage (Orange and Black)	1-968853-3 OR* 1-2236752-3	MCP 2.8mm Receptacle Terminal OR MCP 2.8mm Receptacle Terminal (w/o INS Grip)
	1587828-3	Inner Ferule
	1587829-3	Outer Ferrule
	2103731-3	Spacer Seal
	2103736-3	Cable Seal Retainer

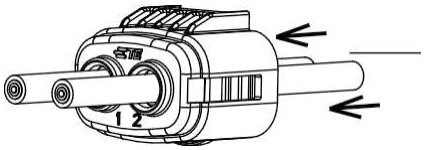
Delphi Wire M6488 3.0-mm2 Individually Shielded	1-968853-3 OR* 1-2236752-3	MCP 2.8mm Receptacle Terminal OR MCP 2.8mm Receptacle Terminal (w/o INS Grip)
	1587828-1	Inner Ferule
	1587829-1	Outer Ferrule
	1-2103731-1	Spacer Seal
	2103736-1	Cable Seal Retainer
Delphi Wire M6488 5.0-mm2 Individually Shielded	1-2289061-3	MCP 2.8mm Receptacle Terminal
	1587828-3	Inner Ferule
	1587829-3	Outer Ferrule
	2103731-3	Spacer Seal
	2103736-3	Cable Seal Retainer
ECOCAB 5.0-mm2 Individually Shielded	1-2289061-3	MCP 2.8mm Receptacle Terminal
	1587828-3	Inner Ferule
	1587829-3	Outer Ferrule
	2103731-3	Spacer Seal
	2103736-3	Cable Seal Retainer

Figure 2

HUBER+SUHNER is a trademark.
*Refer to Point 7, on Page 5 & 6

3.5. ASSEMBLY

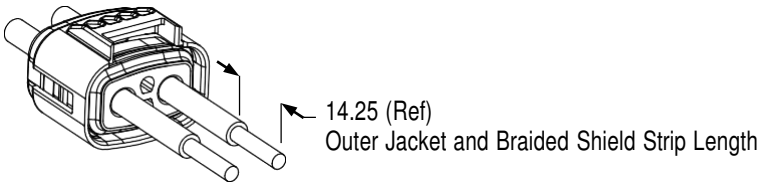
1. The cable seal retainer and spacer seal must be installed onto the cables in the order and orientation shown in Figure 1. The cables must be installed into the cavities according to the circuit cavity markings on the cable seal retainer as shown.



2. The outer jacket and braided shield of each cable must be stripped to the dimension given.

CAUTION

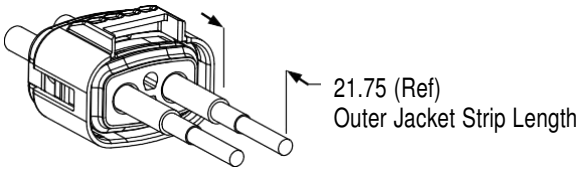
The insulation must not be nicked, scraped, or cut during the stripping operation. There must be no remaining braided shield strands.



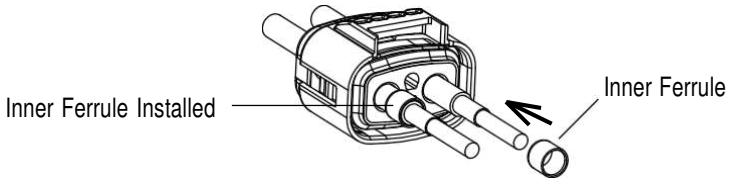
3. The outer jacket must be stripped to the dimension given so that it equals the combined exposed length of the braided shield and conductor insulation.

CAUTION

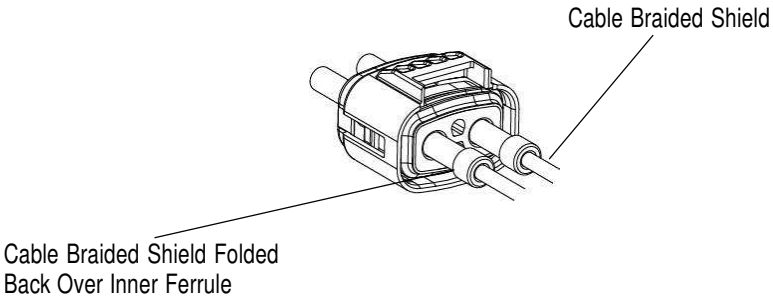
The strands of the braided shield must not be nicked, scraped, or cut during the stripping operation.



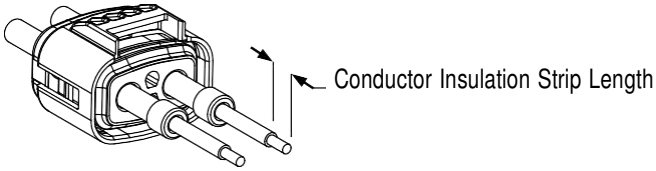
4. An inner ferrule must be installed over each cable jacket as shown. It is acceptable to crimp the receptacle terminals before installing the inner ferrules (refer to Step 7).



5. The braided shield of each cable must be folded back over the inner ferrule. The edge of each inner ferrule must remain flush with the stripped edge of the cable outer jacket.



6. The conductor insulation must be stripped from each cable to the dimension given in the application specification referenced in Paragraph 2.5.

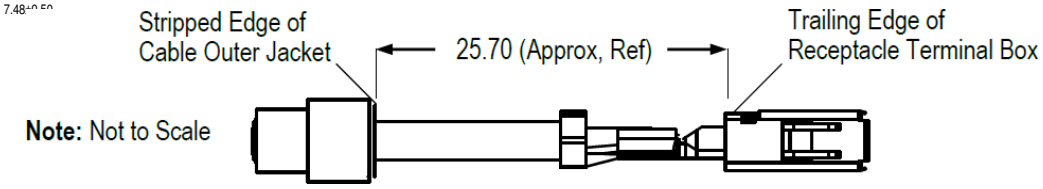


7. A receptacle terminal must be crimped onto each cable using the requirements given in the application specification referenced in Paragraph 2.5.

   After crimping, the trailing edge of the receptacle terminal box should be located from the stripped edge of the cable outer jacket to the dimension (approximately) given.

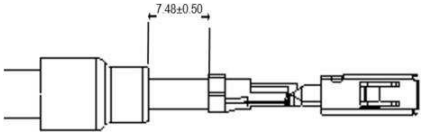
NOTE

It is acceptable to crimp the receptacle terminals before installing the inner ferrules.

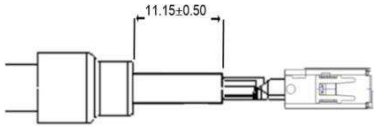


Shown – PN: 968853

* For increased creep distance requirement, a shorter receptacle without the insulation crimp can also be used.
PN: 1-2289061-3

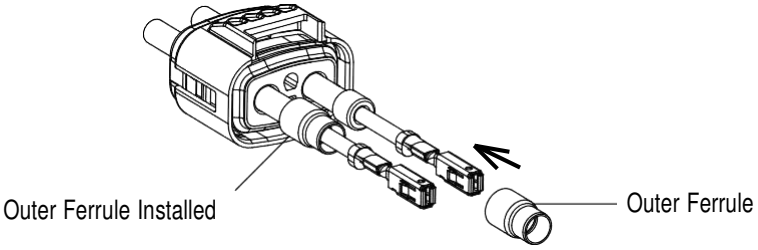


PN 1-968853-3
Creepage Distance – approx. 7.48 mm



PN 1-2289061-3
Creepage Distance – approx.11.15mm

8. An outer ferrule, large diameter end first, must be inserted onto each cable and over the cable braided shield.

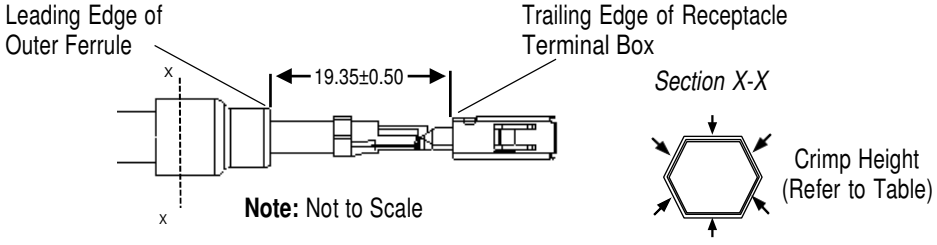


9. Each outer ferrule must be crimped using the tooling given in Section 5. The crimped outer ferrule must meet following requirements:

   — The distance between the leading edge of the outer ferrule and trailing edge of the receptacle terminal box must be maintained at the dimension given.

   — A blade micrometer should be used to measure the ferrule crimp height at 3 places: one on top and one on each opposing side. The crimp height must meet the dimension given.

   — Any loose strands of the braided shield protruding from below the outer ferrule should be trimmed, taking special care not to cut any insulation or leave any detached strands attached to the assembly.



OUTER FERRULE	
PART NUMBER	**CRIMP HEIGHT**
1587829-1	6.20±0.1
1587829-2	6.80±0.1
1587829-3	7.40±0.1

10. The assembly inspection must meet the following criteria:

— cables are inserted in applicable cavity openings in seal retainer

— spacer seal is clean and not damaged

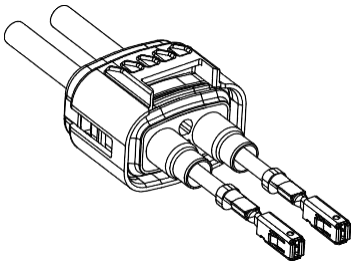
— cable outer jacket or conductor is not damaged

— there are no loose or protruding strands from the cable braided shield and ferrule

— receptacle terminal crimp meets requirements outlined in the application specification referenced in Paragraph 2.5.

— outer ferrule crimp height and position meets required dimension and outer ferrule is not distorted and straight relative to the cable

Completed Cable Assembly Conforming to Inspection Criteria



11. The receptacle terminals must be installed into the plug housing using the following requirements:

NOTE

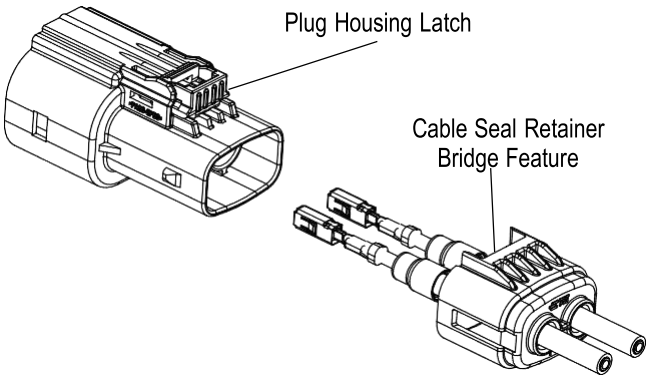
The cable seal retainer and spacer seal should not be removed before installing the terminals.

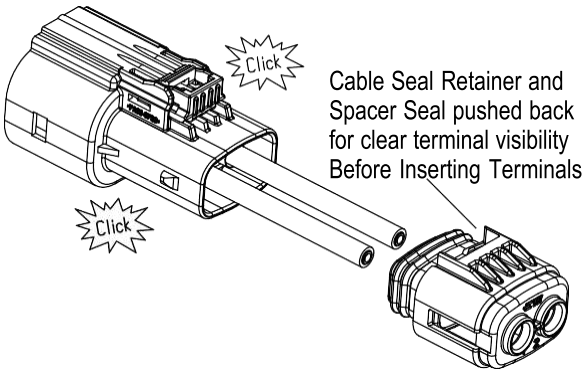
a. The plug CPA member must be in the pre-stage position as shown.

b. The cable assembly must be oriented so that the bridge feature of the cable seal retainer is aligned with the plug housing latch.

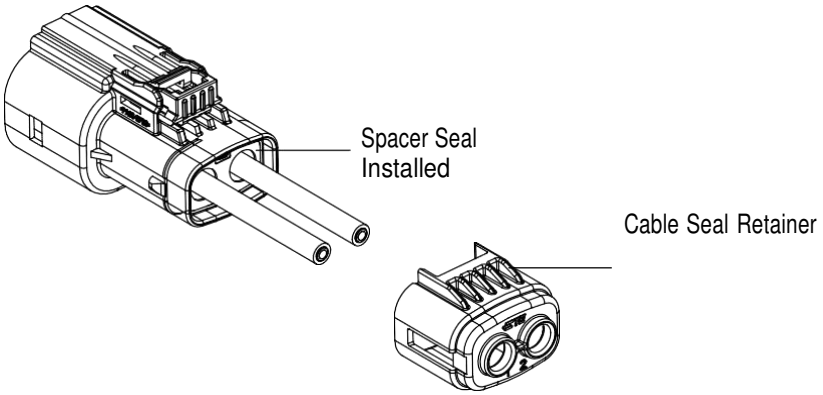
c. The receptacle terminals must be inserted into the circuit cavities until they are fully locked and there is an audible and tactile click.

d. The installation of the ferrules into the contact springs of the plug shield will cause some resistance; therefore, the cable of each receptacle terminal must be lightly pulled to verify full insertion.

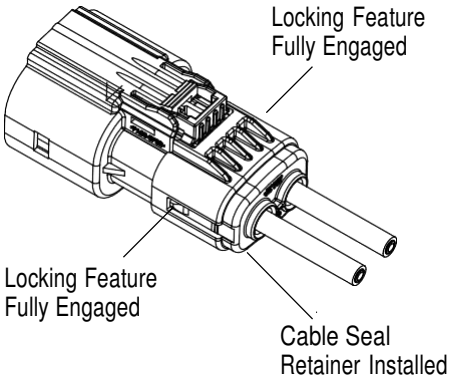




12. The spacer seal must be fully inserted until it stops inside the back of the plug housing as shown.



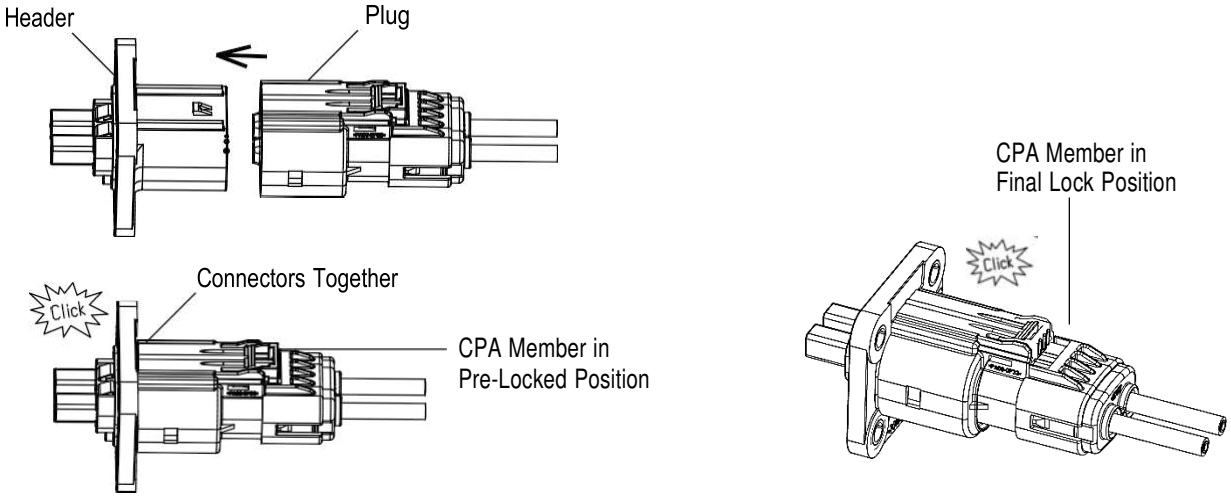
13. The cable seal retainer must be installed over the back of the plug housing so that the bridge feature is aligned with the plug housing latch. Both locking features must be fully engaged.



3.6. MATING AND UNMATING CONNECTORS

A. Mating

There must be no contamination on the mating face of the connectors. The mating face of the plug and header must be aligned, the connectors must be pushed together until there is an audible click, and then the CPA member must be moved to the final lock position.

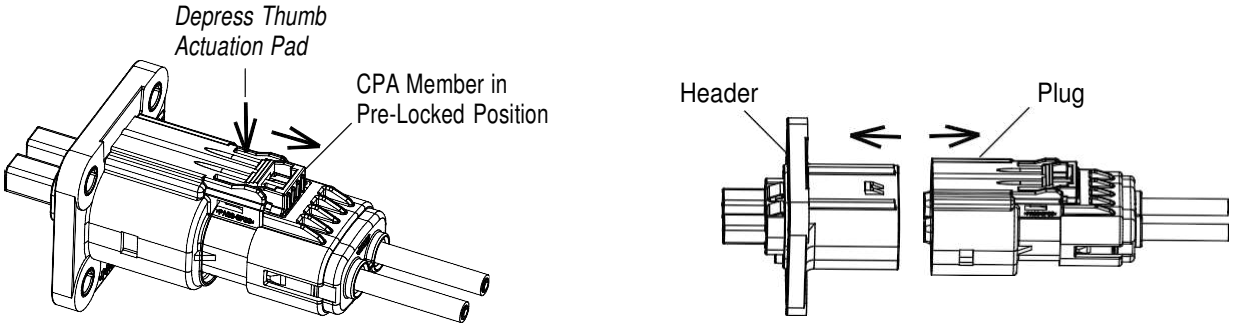


B. UN-MATING

The CPA member must first be pulled to the pre-lock position, next the thumb actuation pad (located on floating latch) must be fully depressed, then the plug must be pulled from the header.

CAUTION

The cables must not be pulled during un-mating.



4. QUALIFICATION

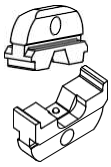
No outside agency approval was defined for the HVA280-2phi SE high-voltage 2-position sealed plug connector at the time of publication of this specification.

5. TOOLING

Tooling part numbers and instructional material packaged with the tooling for crimping the outer ferrule are given in Figure 3.

NOTE

Tooling for crimping the terminal receptacles is given on the application specification referenced in Paragraph 2.5.



SDE HVA 280 Die Assemblies (See Table) (408-32145)

OUTER FERRULE OUTSIDE DIAMETER	CABLE OUTSIDE DIAMETER	DIE ASSEMBLY
6.40 (Size A)	4.11-4.76	2063013-3
7.00 (Size B)	4.76-5.41	2063013-4
7.70 (Size C)	5.41-6.10	2063013-6

SDE-SA Hand Crimping Tool Frame Assembly 9-1478240-0 (408-8851)

PRO-CRIMPER III Hand Crimping Tool Frame Assembly 354940-1 (408-9930)

SDE Electric Bench Terminator 1490076-2 (409-10052)

Figure 3

6. VISUAL AID

The illustration below shows a typical application of this HVA280-2phi SE high-voltage 2-position sealed plug connector. 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.

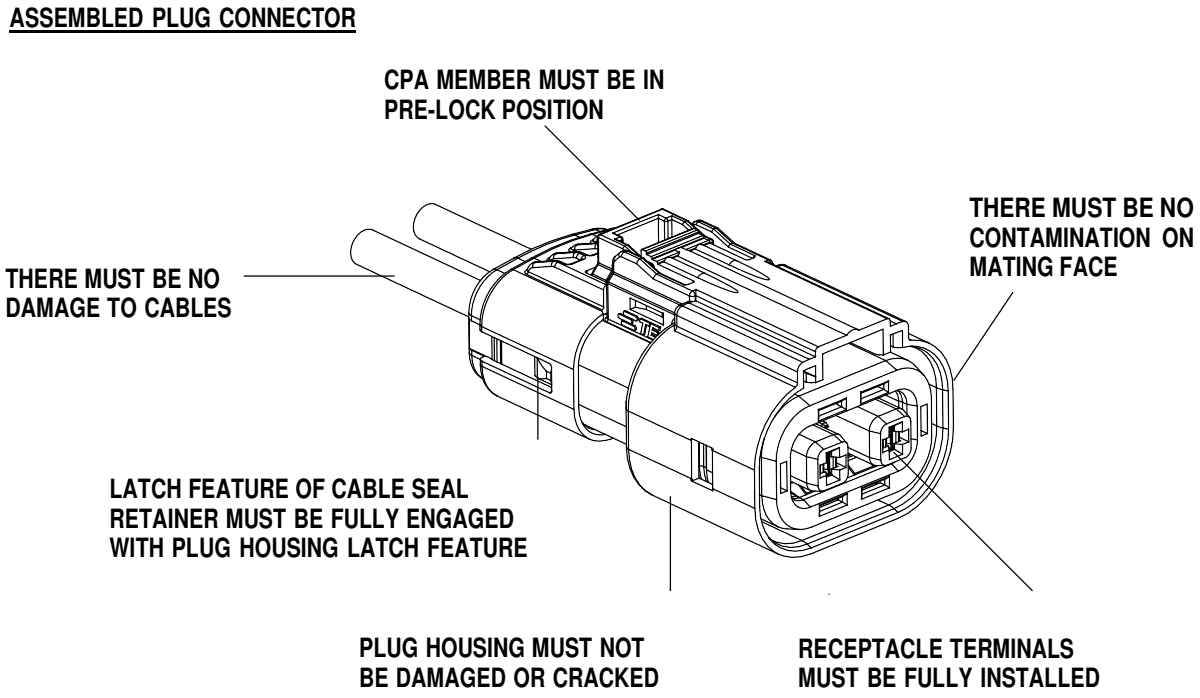


FIGURE 4. VISUAL AID

LTR	REVISION RECORD	DWN	APP	DATE
A	Updated Format, Addition of other validated cables	PK		11SEP18
A1	Updated from the 600 VDC to 1000 VDC	AC		23MAR23
A2	Updated Note after 1000 VDC (using Receptacle Terminal without Insulation grip)	AC		04APR23