

# Amphenol

## PROCESS INSTRUCTION

Number: 123GB-0846

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### 123GB-0846 'Crimp tooling for Rhino D38999 connectors'

#### Key Points with reference to this assembly.

1. Covers recommended crimp tools, strip length and crimping process for 'Rhino' connectors

#### List of Process Documents used in this PI


#### List of Tools used in this PI

See OP10



Note: contact shown unplated

General view of the process, for reference.

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**OP 010. Crimp Tooling Table.**

The section below shows the connector type, cable size and relevant crimp tool information for cable termination.

Appendix 1, at the end of this PI is reference information for the crimp tooling.

<u>Connector Type</u>	<u>Cable mm<sup>2</sup></u>	<u>Crimp Tool</u>	<u>Strip Length / Tolerance (mm)</u>
WPTV-XXxx13-85- <b>1</b> xXx	16	Pump: PS710E251 Head: DV1300 Die: 16mm - 13DB9	+0.0 13.5 -0.5
			Single Crimp
WPTV-XXxx13-85- <b>6</b> xXx	10	Pump: PS710E251 Head: DV1300 Die: 10mm - 13DB8	+0.0 13.5 -0.5
			Single Crimp
WPTV-XXxx13-85- <b>7</b> xXx	6	Hand Tool ES2258	+0.0 10.0 -0.5
			Single Crimp

<u>Connector Type</u>	<u>Cable mm<sup>2</sup></u>	<u>Crimp Tool</u>	<u>Strip Length / Tolerance (mm)</u>
WPTV-XXxx15-120- <b>1</b> xXx	25	Pump: PS710E251 Head: DV1300 Die: 25mm - 13DB11	+0.0 17.0 -0.5
			Single Crimp
WPTV-XXxx15-120- <b>6</b> xXx	16	Pump: PS710E251 Head: DV1300 Die: 16mm - 13DB9	+0.0 13.5 -0.5
			Single Crimp

<u>Connector Type</u>	<u>Cable mm<sup>2</sup></u>	<u>Crimp Tool</u>	<u>Strip Length / Tolerance (mm)</u>
WPTV-XXxx17-185- <b>1</b> xXx	50	Pump: PS710E251 Head: DV1300 Die: 50mm - 13DB14,5	+0.0 19.5 -0.5
			Single Crimp
WPTV-XXxx17-185- <b>6</b> xXx	35	Pump: PS710E251 Head: DV1300 Die: 35mm - 13DB13	+0.0 19.5 -0.5
			Single Crimp

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<u>Connector Type</u>	<u>Cable mm<sup>2</sup></u>	<u>Crimp Tool</u>	<u>Strip Length / Tolerance (mm)</u>
WPTV-XXxx21-340- <b>1</b> xXx (Accessory style A or B only)	95	Pump: PS710E251 Head: DV1300 Die: 95mm - 13DB20	+0.0 20.0 -0.5
			Single Crimp
WPTV-XXxx21-340- <b>1</b> xX <b>C</b>	95	Pump: PS710E251 Head: DV1300 Die: 95mm - 13DB20	+0.0 22.0 -0.5
			Single Crimp
WPTV-XXxx21-340- <b>6</b> xXx	70	Pump: PS710E251 Head: DV1300 Die: 70mm - 13DB17	+0.0 20.0 -0.5
			Single Crimp
WPTV-XXxx21-340- <b>7</b> xXx	50	Pump: PS710E251 Head: DV1300 Die: 50mm - 13DB14,5	+0.0 19.5 -0.5
			Single Crimp
WPTV-XXxx21-340- <b>8</b> xXx	35	Pump: PS710E251 Head: DV1300 Die: 35mm - 13DB13	+0.0 19.5 -0.5
			Single Crimp
<u>Connector Type</u>	<u>Cable mm<sup>2</sup></u>	<u>Crimp Tool</u>	<u>Strip Length / Tolerance (mm)</u>
WPTV-XXxx23-500- <b>1</b> xXx	120	Pump: PS710E251 Head: DV1300 Die: 120mm - 13DB22	+0.0 24.5 -0.5
			Single Crimp
WPTV-XXxx23-500- <b>6</b> xXx	95	Pump: PS710E251 Head: DV1300 Die: 95mm - 13DB20	+0.0 22.0 -0.5
			Single Crimp
WPTV-XXxx23-500- <b>7</b> xXx	70	Pump: PS710E251 Head: DV1300 Die: 70mm - 13DB17	+0.0 22.0 -0.5
			Single Crimp
WPTV-XXxx23-500- <b>8</b> xXx	50	Pump: PS710E251 Head: DV1300 Die: 50mm - 13DB14,5	+0.0 19.5 -0.5
			Single Crimp

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<u>Connector Type</u>	<u>Cable mm<sup>2</sup></u>	<u>Crimp Tool</u>	<u>Strip Length / Tolerance (mm)</u>
WPTV-XXxx25-1000- <b>1</b> xXx	Termination style '1' not available for this shell size		
WPTV-XXxx25-1000- <b>6</b> xXx	240	Pump: PS710E251 Head: DV1300 Die: 240mm - 13DB30	+0.0 35.5 -0.5 Double Crimp
WPTV-XXxx25-1000- <b>7</b> xXx	185	Pump: PS710E251 Head: DV1300 Die: 185mm - 13B27	+0.0 35.5 -0.5 Double Crimp
<i>SIZE 25</i> <i>CONTACTS OTHER THAN</i> WPTV-XXxx25-1000- <b>7</b> xXx	185	Pump: PS710E251 Head: DV1300 Die: 185mm - 13DB27	+0.0 35.5 -0.5 Double Crimp
WPTV-XXxx25-1000- <b>8</b> xXx	150	Pump: PS710E251 Head: DV1300 Die: 150mm - 13DB25	+0.0 35.5 -0.5 Double Crimp
WPTV-XXxx25-1000- <b>9</b> xXx	120	Pump: PS710E251 Head: DV1300 Die: 120mm - 13DB22	+0.0 35.5 -0.5 Double Crimp

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### **For Contact Crimping Instructions see OP 020. onwards (following pages)** **Special notice to be taken of the below**

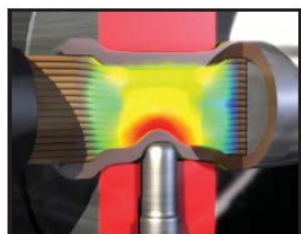
#### **Single Crimp 6mm<sup>2</sup> to 120mm<sup>2</sup>**

Witness marks have been included on the exterior of the contact to aid with positioning of contact in crimp tool, if no witness marks are present contact should be positioned so that crimp barrel is centred in the die. The hex crimp should be equi-spaced between the witness hole and the open end of the contact (strands of cable core to be visible through witness hole).

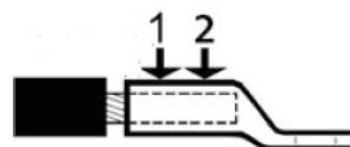
#### **Double Crimp 120mm<sup>2</sup> to 240mm<sup>2</sup>**

**\*(Except for WPTV-XXXX25-1000-7XXX 185MM<sup>2</sup> SEE BELOW)\***

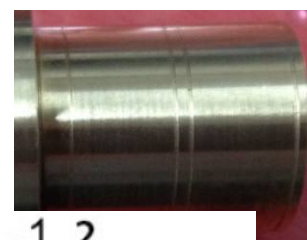
For larger size cables it is recommended that the contact be crimped twice, with the first crimp near the open end of the contact.



Where double crimps are required rotate the contact through 180° between the 1<sup>st</sup> and 2<sup>nd</sup> crimp, thus the 2<sup>nd</sup> op indent crimp for each will be on opposite sides of the contact barrel.



Witness marks have been included on the exterior of the contact to aid with positioning of contact in crimp tool, if no witness marks are present the contact should be positioned so that there is an equal gap between the witness hole and 2<sup>nd</sup> crimp, the open end of the contact and 1<sup>st</sup> crimp, and between both crimps (strands of cable core to be visible through witness hole).



#### **\*For WPTV-XXXX25-1000-7XXX 185MM<sup>2</sup> only\***

For WPTV-XXXX25-1000-7XXX connectors that are terminated to 185mm<sup>2</sup> the following specific methodology must be followed.

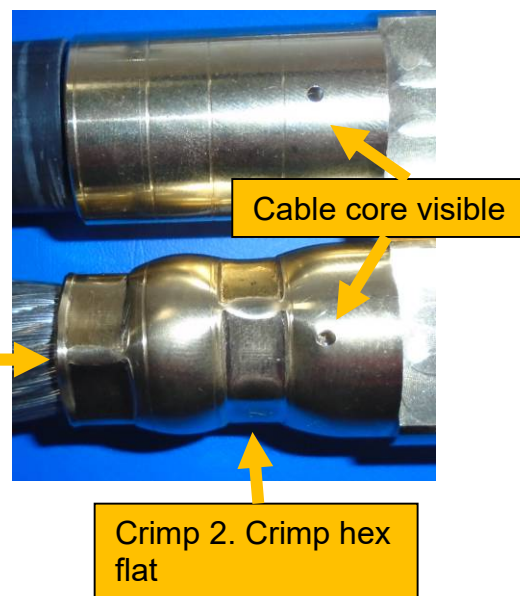
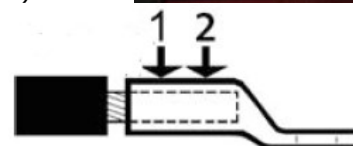
It is recommended that the contact be crimped twice, with the first crimp near the open end of the contact.

Witness marks have been included on the exterior of the contact to aid with positioning of contact in crimp tool, (strands of cable core to be visible through witness hole).

After first crimp rotate cable approximately 30° so that the hex flat of the second crimp is aligned with the hex peak of the first crimp

Note that the crimp die (13B27) for this particular crimp does not employ a secondary dimple.

Strands of cable core to be visible through witness hole



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**OP 020. Preparation**

Main Steps	Key Points	Sketch / Picture
Strip ends of wire with reference to OP10 and collect contacts.		

**OP 030. Set up crimp tool**

Main Steps	Key Points	Sketch / Picture
With reference to OP10 collect crimp tool and dies to suit contact and wire diameter.		

**OP 040. Set crimp tool**

Main Steps	Key Points	Sketch / Picture
Insert dies into crimp tool.	If contact can not pass between dies then remove top die (after checking they both fit correctly).	

**OP 050. Locate contact**

Main Steps	Key Points	Sketch / Picture
Locate contact onto wire.	The conductor strands should FILL the inspection window.	<div>Wire should FILL this inspection hole.</div>

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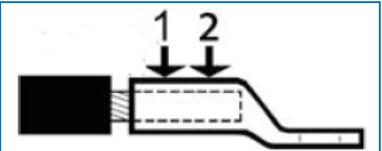
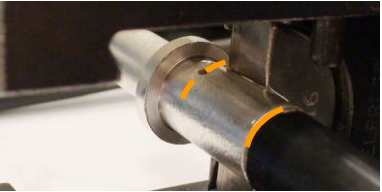
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### OP 060. Place contact

Main Steps	Key Points	Sketch / Picture
Place contact and wire into crimp tool.	<p>Contacts have pairs of visible witness lines on the outside of the crimp barrel to help position for crimping.</p> <p>The contact needs to be placed in the crimp tool so that the jaws are positioned between these lines.</p> <p>For larger diameter cables the contact requires double crimping, two pairs of lines are visible on the contact.</p> <p>Crimp position 1 first (closest to open end of contact) and then position 2.</p> <p>If no lines are visible position so that the jaws are midway between the inspection hole and the end of the contact.</p>	  

### OP 070. Re-Insert top die

Main Steps	Key Points	Sketch / Picture
If removed in OP40 insert the top die above contact.	Re-align the contact with the tooling and cable as OP 50 if contact moves.	

### OP 080. Hold cable

Main Steps	Key Points	Sketch / Picture
Ensure cable is held securely in correct position before and during crimping.		

### OP 090. Crimp

Main Steps	Key Points	Sketch / Picture
Press and hold the button on the pump until crimp tool is fully closed and releases contact.		

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### OP 100. Remove cable

Main Steps	Key Points	Sketch / Picture
To remove cable from crimp tool, remove top die and lift cable free.		

### OP 110. Inspect crimping

Main Steps	Key Points	Sketch / Picture
Inspect crimping to ensure wire and contact are crimped correctly.	<p>The conductor strands should <b>FILL</b> the inspection hole.</p> <p>The insulation on the wire should be seated against the contact with no bare wire showing. Maximum allowable gap 50% of overall wire diameter.</p> <p>The crimp must be centred between the pairs of visible witness lines.</p>	 <p>There should be no deformation of the inspection hole.</p>

### \*FOR WPTV-XXXXXX-XXXX-XXXC ONLY\*

### Application of DR-25 Heat Shrink

#### OP 120. Cut heat shrink

Main Steps	Key Points	Sketch / Picture
Cut heat shrink according to the size required. (See table 1)	Ensure no splits are visible from the cut-out on both ends.	

Contact's tail protruding past the insulator when crimped is deemed as hazardous. Install DR-25 over contacts after crimping to cover any exposed metal work. This operation is very important and will improve safety by eliminating any metal work being exposed to the environment.

See the table below for the recommended heat shrink for each contact size.

**Table 1**

Size	Recommended Heat Shrink DR-25	Recommended overall length (+.100")	Recovered wall thickness
13	DR-25-1/2-0-SP	1.300"	.050
15	DR-25-1/2-0-SP	1.300"	.050
17	DR-25-3/4-0-SP	1.400"	.057
21	DR-25-1-0-SP	1.400"	.075
23	DR-25-1-0-SP	1.400"	.070
25	DR-25-1-1/2-0-SP	1.900"	.095

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**OP 130. Application & Aligning heat shrink**

Main Steps	Key Points	Sketch / Picture
Align heat shrink using witness mark / guideline as a starting point.  Start applying heat using heat gun, start from the witness mark / guideline around the contact and work towards the cable.	Do not pass exceed the witness mark / guideline.  Ensure the heat shrink is aligned with witness mark / guideline around the contact.	

### Heat Shrink Positioning and Length.

The position of heat shrink is a factor to consider during application because it can get caught on the step of the backshell insulator which could limit the insulator to fully engage. See Table 1 for overall length recommendation.

See images below



### Alternative Heat Shrink Option

**DR-25-TW** is a "Thin-Wall" version of DR-25 offering similar properties. Ideal for weight saving and improves clearance between insulator and contact. However, this is more likely to split easier when not applied carefully.

**OP 140. Inspect any split**

Main Steps	Key Points	Sketch / Picture
Check for any visible splits on the body and both ends.	If splits are visible, remove heat shrink and start again from OP 120.	

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**OP 150. Fit backshell insulator**

Main Steps	Key Points	Sketch / Picture
Fit the backshell insulator, ensure it is fully engaged.		

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### **Appendix 1.**

Reference information for the crimp tooling.



## PS710E

*- For the installer working in the distribution network or in the industry*

- Small size and low weight make it easy to use in every situation
- Highest performance both with Li-ion battery 28.8 V and mains power
- Display with keypad for full pump status information to operator
- Possibility to have crimps stored in control system
- PC communication with USB
- To be used with crimp head system 1300 or 250

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### Appendix 2.

Reference information for the heat shrink.

#### DR-25

##### Elastomer

Flexible, abrasion &amp; diesel resistant

DR-25 is made from radiation cross-linked elastomeric material, for long term heat resistance. Ideally suited for high performance wiring harnesses. Used in a wide range of military, aerospace and other harsh environment applications.

##### Features & Benefits

- Excellent chemical & solvent resistance
- Excellent abrasion/mechanical protection
- Compatible with 'System 25' components

##### Operating Temperature

- From -75°C to +150°C

##### Installation

- Minimum shrink temperature +150°C
- Minimum full recovery +175°C

2:1  
shrinkRoHS  
compliant

##### Specifications & Approvals

- AMS-DTL-23053/16
- BS 4G-198 Part 3 10A
- VG 95343 Part 5 Type D
- VDE-0341 Part 9005

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools Only	
3.2	1.6	0.76 mm	100m	DR-25-1/8-0-SP
4.8	2.4	0.84 mm	100m	DR-25-3/16-0-SP
6.4	3.2	0.89 mm	100m	DR-25-1/4-0-SP
9.5	4.8	1.02 mm	100m	DR-25-3/8-0-SP
12.7	6.4	1.22 mm	60m	DR-25-1/2-0-SP
19.0	9.5	1.45 mm	60m	DR-25-3/4-0-SP
25.4	12.7	1.78 mm	30m	DR-25-1-0-SP
38.0	19.0	2.41 mm	15m	DR-25-1-1/2-0-SP
51.0	25.4	2.79 mm	15m	DR-25-2-0-SP
76.0	38.0	3.18 mm	15m	DR-25-3-0-SP

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