

Basic element for a reliable connection is besides the quality of the connector the right choice of the assembly tool. HARTING offers the corresponding tools to all connectors. On the following catalogue pages you find information about tools for crimp, press-in and IDC termination. There are tools available for different levels of automation. The choice varies from pure hand tools for small series or service up to fully automatic assembly tools for high volume series production.



Tools for contacts Han D® (09 15 . . .)









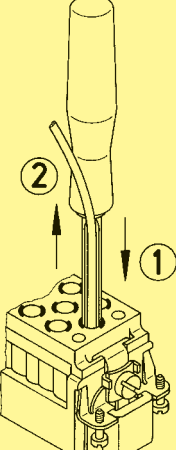
Identification	Part No.	Drawing	Dimensions in mm
HARTING crimping tool with locator for Han D®, Han E®, Han® C	09 99 000 0110	Wire gauge 0.14 - 1.5 mm ²	
HARTING-Service crimping tool with locator for Han D®, Han E®	09 99 000 0021	Wire gauge 0.14 - 1.5 mm ²	
BUCHANAN-crimping tool Locator Multiple crimping tool depth adjustment gauge	09 99 000 0001 09 99 000 0311 09 99 000 0379	Wire gauge 0.14 - 2.5 mm ² 0.14 + 0.25 mm ² ø 1.00 ¹⁾ 0.37 mm ² ø 1.30 0.5-1 + 2.5 mm ² ø 1.55 1.5 mm ² ø 1.80	 ↑  order separately
HARTING-pneumatic crimping tool Locator Multiple crimping tool depth adjustment gauge Table fixing and foot switch for pneumatic crimping tool	09 99 000 0314 09 99 000 0311 09 99 000 0379 09 99 000 0309	Wire gauge 0.37 mm ² ø 1.30 0.5-1 + 2.5 mm ² ø 1.55 1.5 mm ² ø 1.80	 ↑  order separately  
Insertion tool for crimp contacts	09 99 000 0059		For crimp contacts with wires of less than 0.75 mm ² it is recommended that an insertion tool is used. Contacts should be inserted from the wiring side and pushed down until a positive locking is achieved.
Removal tool for crimp contacts Removal tool Replacement-tip for removal tool Removal tool	09 99 000 0012 09 99 000 0004 09 99 000 0052	  	. . 0012 . . 0004 . . 0052 A removal tool is necessary if contacts are to be replaced in the insert. It is inserted from the mating face and pushed over the contact until a stop is noticeable. Additional pressure unlocks the contact and pushes it out of the wiring side. In case of the removal tool (. . 0052) the unlocking process is achieved by pressure on the central rod.

¹⁾ For wire gauge 0.14 and 0.25 mm² use only male contact 09 15 000 6107 or female contact 09 15 000 6207.

Tools for contacts Han E® (09 33 . . .)



Identification	Part No.	Drawing	Dimensions in mm
HARTING crimping tool with locator for Han D®, Han E®, Han® C	09 99 000 0110	Wire gauge 0.5 - 4 mm ²	
HARTING-Service crimping tool with locator	09 99 000 0021	Wire gauge 0.5 - 2.5 mm ²	
BUCHANAN-crimping tool Locator	09 99 000 0001	Wire gauge 0.14 - 4 mm ²	
Multiple crimping tool depth adjustment gauge	09 99 000 0379	Wire gauge 0.14 - 0.37 mm ² ø 1.00 0.5 - 1 mm ² ø 1.55 1.5 - 2.5 mm ² ø 1.80 3 - 4 mm ² ø 2.00	 ↑ order separately
HARTING-pneumatic crimping tool Locator	09 99 000 0314		
Multiple crimping tool depth adjustment gauge	09 99 000 0379	Wire gauge 0.14 - 0.37 mm ² ø 1.00 0.5 - 1 mm ² ø 1.55 1.5 - 2.5 mm ² ø 1.80 3 - 4 mm ² ø 2.00	 ↑ order separately
Table fixing and foot switch for pneumatic crimping tool	09 99 000 0309		
Insertion tool for crimp contacts	09 99 000 0059		For crimp contacts wires of less than 0.75 mm ² it is recommended that an insertion tool is used. Contacts should be inserted from the wiring side and pushed down until a positive locking is achieved.
Removal tool for Han® ES inserts	09 99 000 0367		
Crimp contact removal for Han® EE, Han® Q 5/0, Han® Q 8/0 Han E® and Han A®	09 99 000 0319		A removal tool is necessary if contacts are to be replaced in the insert. The tool is inserted from the wiring side until a stop is noticeable. The wire with the crimp contact can then be pulled out from the same side of the insert.

Tools for contacts Han® C (09 32 . . .)

Identification	Part No.	Drawing	Dimensions in mm
HARTING crimping tool with locator for Han D®, Han E®, Han® C	09 99 000 0110	Wire gauge 1.5 - 4 mm ²	
BUCHANAN- crimping tool	09 99 000 0001	Wire gauge 1.5 - 4 mm ²	 ↑  order separately
Locator	09 99 000 0308		
Multiple crimping tool depth adjustment gauge	09 99 000 0379	Wire gauge 1.5 + 2.5 mm ² ø 1.80 4 mm ² ø 2.00	
HARTING- crimping tool	09 99 000 0303	Wire gauge 4 - 6 mm ²	
Locator as spare part	09 99 000 0304	Locator is supplied with the tool	
HARTING- pneumatic crimping tool	09 99 000 0314		 ↑  order separately 
Multiple crimping tool depth adjustment gauge	09 99 000 0379	Wire gauge 1.5 + 2.5 mm ² ø 1.80 4 mm ² ø 2.00	
Locator	09 99 000 0308		
Table fixing and foot switch for pneumatic crimping tool	09 99 000 0309		
Removal tool for crimp contacts	09 99 000 0305		 <p> A removal tool is necessary to remove the contacts. For each „C“ contact cavity, the location of the internal locking levers are marked on the wiring side with two black arcs. The sides of the tool must be first properly aligned so that the edges of the tool engage both levers simultaneously and then inserted until a stop is noticeable ①. Once it has been inserted, the tool must not be turned. The wire together with the tool can then be pulled out from the wiring side of the insert ②. </p>

Tooling

Crimping machines

Identification	Part No.	
<p>Crimping machine TK stripping and crimping in one operation (without interchangeable unit)</p> <p>interchangeable units for Han D® Han E® Other</p>	<p>09 98 000 6000</p> <p>09 98 000 6001 09 98 000 6002 On request</p>	
<p>Crimping machine TC-C01 for pre-stripped wires</p> <p>for Han D® Han E® Han® C Other</p>	<p>09 98 000 9001 09 98 000 9002 09 98 000 9003 On request</p>	

Tools for crimp termination – D-Sub-S, D-Sub-HD, DIN 41 612

Identification	Part No.	
Service crimp tool for single D-Sub standard contacts for single D-Sub high density contacts	09 99 000 0175 09 99 000 0596	
HARTING-Crimp tool for 500 bandoliered D-Sub standard contacts for 500 bandoliered D-Sub high density contacts	09 99 000 0169 09 99 000 0597	
HARTING-Semi-automatic crimping device Main drive foot-operated 220 V / 50 Hz Crimping head for bandoliered D-Sub standard contacts for DIN 41 612 contacts, types BC FC 1 FC 2 FC 3 BC solid wire Reel holder for 10 000 contacts	09 99 000 0246 09 99 000 0253 09 99 000 0252 09 99 000 0249 09 99 000 0250 09 99 000 0251 09 99 000 0628 09 99 000 0158	Wire gauge 0.09-0.56 mm ² (AWG 28-20) 0.09 - 0.5 mm ² 0.09 - 0.25 mm ² 0.14 - 0.56 mm ² 0.5 - 1.5 mm ² 0.13 mm ² (solid wire)
Insertion and removal tool for single D-Sub standard contacts for single D-Sub high density contacts	09 99 000 0171 09 99 000 0513	 <p>Assembly of crimp contacts After crimping the stranded wire to the contact using a hand tool or automatic crimping device, insert the contact into the chamber with the tool, working from the wiring side. You will hear the contacts snap home and to check that they are securely in place, give the wire a gentle pull.</p> <p>Removing crimp contacts Position the tool from the wiring side as shown in the diagram below and insert into the contact chamber. The contact can then easily be removed from the wiring side together with the wire itself and reinserted in a different chamber. The tool is designed for a maximum insulation diameter of Ø 1.7 mm.</p>

Tools for crimp termination – D-Sub-S, D-Sub-HD, DIN 41 612

Automated crimping machine type BK



Main characteristics

- Smooth run through electronic brakes
- Hand wheel for manual adjustments
- Maintenance friendly through needle bearing rail
- Simple handling by quick change tool and stripper

Part No. 09 98 000 5000

Technical characteristics

Dimensions	
Height	690 mm (1400 mm with a contact reel)
Width	350 mm
Depth	370 mm
Total weight	72 kg
Power supply	230 V, 50/60 Hz, 2.5 A
Consumption	0.75 kW
Motor speed	440 - 2000 rpm
Cable length	2 m incl. plug
Control	SPS
Work cycle trigger	Sensor
Work cycle	0.35 s for stripping and crimping
Illumination	Integrated tool light
Stroke counter	Daywise and fixed
Crimp force monitor	BB07i
Crimping tool	Quick change tool
Adjustable process parameters	Crimping height on wire Crimping height on insulation Depth of insulation stripping Length of insulation stripping Wire retainer position Wire position in the crimp contact Band thrust

Tooling

Identification	for use with	Part No.	Wire gauge [mm ²]	AWG	Insulation [Ø mm]
Crimping tool for D-Sub connectors ¹⁾	standard contacts	09 98 000 3008	0.09 - 0.25	28 - 24	0.7 - 1.4
		09 98 000 3009	0.25 - 0.56	24 - 20	0.9 - 1.7
	high density contacts	09 98 000 3012		26 - 24	0.8 - 1.4

Further details you will find in our product flyer.

¹⁾ 2.5 + 0.5 mm of insulation is stripped from the wire to be crimped

Tools for crimp termination – D-Sub-S, D-Sub-HD

Identification

Part No.

Drawing

Crimp tool

for turned male
and female contacts
AWG 28-18
8 indent crimp
in acc. to MIL 22 520/2-01

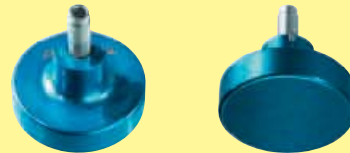
09 99 000 0501



Part No. contact	Part No. locator	Crimp tool selection no.
61 03 000 0112	61 03 600 0024	7
61 03 000 0113	61 03 600 0024	7
61 03 000 0073	61 03 600 0023	7
61 03 000 0074	61 03 600 0023	7
61 03 000 0094	61 03 600 0023	7
61 03 000 0096	61 03 600 0023	7
61 03 000 0078	61 03 600 0023	7
61 03 000 0080	61 03 600 0023	7

Locator for crimp tool
Details see table

61 03 600 0023
61 03 600 0024









Tools for crimp termination

Identification	Part No.																																														
Hand crimp tool for signal contacts	09 99 000 0501	<p>Wire gauge AWG 18 – 28</p>																																													
Die (To be ordered separately.)	09 99 000 0502																																														
Hand crimp tool with fixed die for signal contacts	09 99 000 0505	<p>Wire gauge AWG 20 – 26</p>																																													
Hand crimp tool for power contacts	09 99 000 0509	<table border="1"> <thead> <tr> <th>Contact Part No.</th> <th>Gauge</th> <th>Tool setting</th> </tr> </thead> <tbody> <tr> <td>09 69 182 x420</td> <td>AWG 16, 18, 20</td> <td>3 for AWG 16, 2 for AWG 18 and AWG 20</td> </tr> <tr> <td>09 69 282 x420</td> <td>AWG 16, 18, 20</td> <td>3 for AWG 16, 2 for AWG 18 and AWG 20</td> </tr> <tr> <td>09 69 182 x421</td> <td>AWG 12, 14</td> <td>5 for AWG 12 and 4 for AWG 14</td> </tr> <tr> <td>09 69 282 x421</td> <td>AWG 12, 14</td> <td>5 for AWG 12 and 4 for AWG 14</td> </tr> <tr> <td>09 69 182 x422</td> <td>AWG 10, 12</td> <td>7 for AWG 10 and 6 for AWG 12</td> </tr> <tr> <td>09 69 282 x422</td> <td>AWG 10, 12</td> <td>7 for AWG 10 and 6 for AWG 12</td> </tr> <tr> <td>09 69 182 x423</td> <td>AWG 8, 10</td> <td>7 for AWG 8 and 6 for AWG 10</td> </tr> <tr> <td>09 69 282 x423</td> <td>AWG 8, 10</td> <td>7 for AWG 8 and 6 for AWG 10</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Contact Part No.</th> <th>Gauge</th> <th>Tool setting</th> </tr> </thead> <tbody> <tr> <td>09 69 282 x821</td> <td>AWG 12, 14</td> <td>5 for AWG 12 and 4 for AWG 14</td> </tr> <tr> <td>09 69 282 x823</td> <td>AWG 8, 10</td> <td>7 for AWG 8 and 6 for AWG 10</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Contact Part No.</th> <th>Gauge</th> <th>Tool setting</th> </tr> </thead> <tbody> <tr> <td>09 69 182 x821</td> <td>AWG 12, 14</td> <td>5 for AWG 12 and 4 for AWG 14</td> </tr> <tr> <td>09 69 182 x823</td> <td>AWG 8, 10</td> <td>7 for AWG 8 and 6 for AWG 10</td> </tr> </tbody> </table>	Contact Part No.	Gauge	Tool setting	09 69 182 x420	AWG 16, 18, 20	3 for AWG 16, 2 for AWG 18 and AWG 20	09 69 282 x420	AWG 16, 18, 20	3 for AWG 16, 2 for AWG 18 and AWG 20	09 69 182 x421	AWG 12, 14	5 for AWG 12 and 4 for AWG 14	09 69 282 x421	AWG 12, 14	5 for AWG 12 and 4 for AWG 14	09 69 182 x422	AWG 10, 12	7 for AWG 10 and 6 for AWG 12	09 69 282 x422	AWG 10, 12	7 for AWG 10 and 6 for AWG 12	09 69 182 x423	AWG 8, 10	7 for AWG 8 and 6 for AWG 10	09 69 282 x423	AWG 8, 10	7 for AWG 8 and 6 for AWG 10	Contact Part No.	Gauge	Tool setting	09 69 282 x821	AWG 12, 14	5 for AWG 12 and 4 for AWG 14	09 69 282 x823	AWG 8, 10	7 for AWG 8 and 6 for AWG 10	Contact Part No.	Gauge	Tool setting	09 69 182 x821	AWG 12, 14	5 for AWG 12 and 4 for AWG 14	09 69 182 x823	AWG 8, 10	7 for AWG 8 and 6 for AWG 10
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Positioner for male and female contacts (To be ordered separately.)	09 99 000 0504																																														
Positioner for male contacts (To be ordered separately.)	09 99 000 0522																																														
Positioner for female contacts (To be ordered separately.)	09 99 000 0521																																														
Hand crimp tool for coaxial contacts, solder/crimp version ¹⁾	09 99 000 0503	<table border="1"> <thead> <tr> <th>Contact Part No.</th> <th>Cavity</th> </tr> </thead> <tbody> <tr> <td>09 69 181 x230</td> <td>B</td> </tr> <tr> <td>09 69 281 x230</td> <td>B</td> </tr> <tr> <td>09 69 181 x141</td> <td>C</td> </tr> <tr> <td>09 69 281 x141</td> <td>C</td> </tr> <tr> <td>09 69 181 x140</td> <td>B</td> </tr> <tr> <td>09 69 281 x140</td> <td>B</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Contact Part No.</th> <th>Cavity</th> </tr> </thead> <tbody> <tr> <td>09 69 181 x143</td> <td>A</td> </tr> <tr> <td>09 69 281 x143</td> <td>A</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Contact Part No.</th> <th>Cavity</th> </tr> </thead> <tbody> <tr> <td>09 69 181 x233</td> <td>B</td> </tr> <tr> <td>09 69 281 x233</td> <td>B</td> </tr> </tbody> </table>	Contact Part No.	Cavity	09 69 181 x230	B	09 69 281 x230	B	09 69 181 x141	C	09 69 281 x141	C	09 69 181 x140	B	09 69 281 x140	B	Contact Part No.	Cavity	09 69 181 x143	A	09 69 281 x143	A	Contact Part No.	Cavity	09 69 181 x233	B	09 69 281 x233	B																			
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Die (To be ordered separately.)	09 99 000 0508																																														
Die (To be ordered separately.)	09 99 000 0515																																														
Die (To be ordered separately.)	09 99 000 0519																																														

¹⁾ Only the outer ferrule is crimped (inner conductor is soldered)





Tools for crimp termination – D-Sub-M

Identification	Part No.										
<p>Hand crimp tool for coaxial contacts, crimp/crimp version¹⁾, suitable for inner contact</p>	09 99 000 0501										
<p>Inner contact die (To be ordered separately.)</p>	09 99 000 0507	 <table border="1" data-bbox="1013 571 1356 918"> <thead> <tr> <th>Contact Part No.</th> </tr> </thead> <tbody> <tr><td>09 69 182 x140</td></tr> <tr><td>09 69 282 x140</td></tr> <tr><td>09 69 182 x230</td></tr> <tr><td>09 69 282 x230</td></tr> <tr><td>09 69 182 x232</td></tr> <tr><td>09 69 282 x232</td></tr> <tr><td>09 69 182 x233</td></tr> <tr><td>09 69 282 x233</td></tr> </tbody> </table>	Contact Part No.	09 69 182 x140	09 69 282 x140	09 69 182 x230	09 69 282 x230	09 69 182 x232	09 69 282 x232	09 69 182 x233	09 69 282 x233
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<p>Hand crimp tool for coaxial contacts, crimp/crimp version¹⁾, suitable for outer ferrule</p>	09 99 000 0503										
<p>Outer contact die (To be ordered separately.)</p>	09 99 000 0508	 <table border="1" data-bbox="1013 1265 1356 1411"> <thead> <tr> <th>Contact Part No.</th> <th>Cavity</th> </tr> </thead> <tbody> <tr><td>09 69 182 x140</td> <td rowspan="2">B</td> </tr> <tr><td>09 69 282 x140</td> </tr> <tr><td>09 69 182 x230</td> <td rowspan="2">B</td> </tr> <tr><td>09 69 282 x230</td> </tr> </tbody> </table>	Contact Part No.	Cavity	09 69 182 x140	B	09 69 282 x140	09 69 182 x230	B	09 69 282 x230	
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09 69 182 x140	B										
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<p>Outer contact die (To be ordered separately.)</p>	09 99 000 0518	<table border="1" data-bbox="1013 1467 1356 1568"> <thead> <tr> <th>Contact Part No.</th> <th>Cavity</th> </tr> </thead> <tbody> <tr><td>09 69 182 x232</td> <td rowspan="2">A</td> </tr> <tr><td>09 69 282 x232</td> </tr> </tbody> </table>	Contact Part No.	Cavity	09 69 182 x232	A	09 69 282 x232				
Contact Part No.	Cavity										
09 69 182 x232	A										
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<p>Outer contact die (To be ordered separately.)</p>	09 99 000 0519	<table border="1" data-bbox="1013 1624 1356 1724"> <thead> <tr> <th>Contact Part No.</th> <th>Cavity</th> </tr> </thead> <tbody> <tr><td>09 69 182 x233</td> <td rowspan="2">B</td> </tr> <tr><td>09 69 282 x233</td> </tr> </tbody> </table>	Contact Part No.	Cavity	09 69 182 x233	B	09 69 282 x233				
Contact Part No.	Cavity										
09 69 182 x233	B										
09 69 282 x233											
<p>Insertion and extraction tool for signal contacts</p>	09 99 000 0511										
<p>Extraction tool for coaxial, power and high voltage contacts</p>	09 99 000 0512										

Tooling

¹⁾ Both inner and outer conductor are crimped

Tools for crimp termination – InduCom

Identification	Part No.	Drawing																				
Hexagonal head screwdriver for hoods with hexagonal screws	61 03 600 0021																					
Crimp tool for flange and ferrule	61 03 600 0020	 <table border="1" data-bbox="775 792 903 1440"> <thead> <tr> <th>Width of hexagonal nut [mm]</th> </tr> </thead> <tbody> <tr><td>5.0</td></tr> <tr><td>5.5</td></tr> <tr><td>6.0</td></tr> <tr><td>6.5</td></tr> <tr><td>7.0</td></tr> <tr><td>7.5</td></tr> <tr><td>8.0</td></tr> <tr><td>8.5</td></tr> <tr><td>9.0</td></tr> <tr><td>9.5</td></tr> <tr><td>10.0</td></tr> <tr><td>10.5</td></tr> <tr><td>11.0</td></tr> <tr><td>11.5</td></tr> <tr><td>12.0</td></tr> <tr><td>12.5</td></tr> <tr><td>13.0</td></tr> <tr><td>13.5</td></tr> <tr><td>14.0</td></tr> </tbody> </table>	Width of hexagonal nut [mm]	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0
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14.0																						
Inserts for crimp tool	61 03 000 0179 61 03 000 0180 61 03 000 0098 61 03 000 0099 61 03 000 0100 61 03 000 0101 61 03 000 0102 61 03 000 0103 61 03 000 0104 61 03 000 0105 61 03 000 0174 61 03 000 0172 61 03 000 0168 61 03 000 0169 61 03 000 0175 61 03 000 0176 61 03 000 0177 61 03 000 0178 61 03 000 0173																					
Mounting tool for flange for D-Sub hoods (9-37 contacts) for D-Sub hoods (50 contacts)	61 03 600 0017 61 03 600 0018																					
Insertion and removal tool for contacts	09 99 000 0171																					

Modular tooling system for starting connector press-in

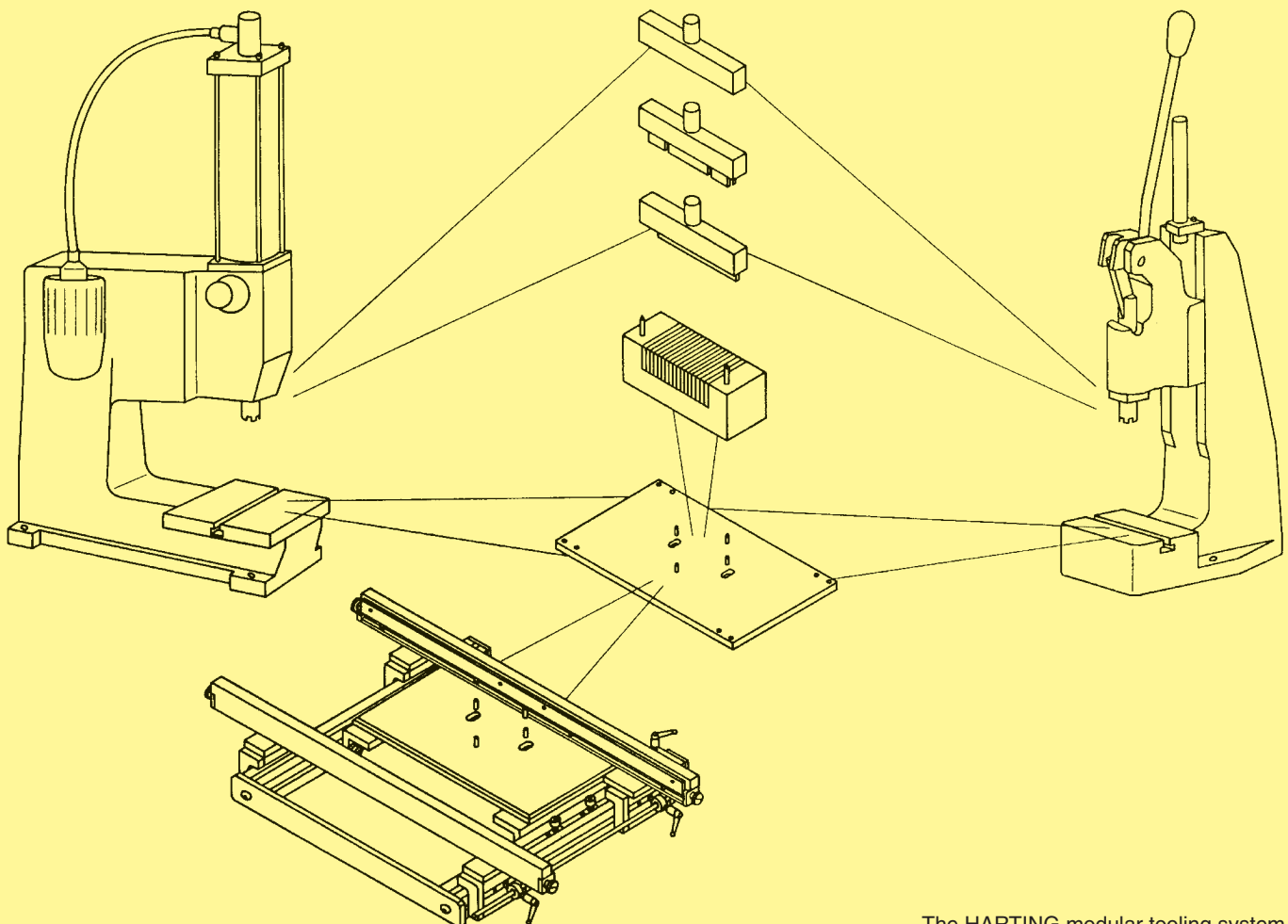
The diversity of connector types with press-in terminations and varying termination styles make it necessary to have a simple, flexible tooling system that can be continuously updated.

The HARTING modular tooling system has significant advantages in terms of economic assembly of the many connector types with press-in terminations. The basic modules of the tooling system which will always be required are:

- Press
- Top tool
- Bottom tool
- Base plate

To increase automation and productivity the following modules may be added to the basic assembly:

- Guide frame with base plate for accurate positioning of the pcb up to a length of 600 mm
- Guide frame "Standard" for hand bench press and pneumatic press and pcb height of 123.5 up to 309.5 mm
- Guide frame "Long" for pneumatic press and pcb height of 123.5 up to 668.5 mm



Handling indications

When setting up an assembly machine it is not necessary to set the working height of the press and adjust the base plate more than once. There is no need for further adjustments. All the other adaptations for various applications are performed efficiently and are reliant by various combinations of individual modules.

Positioning the bottom tool in relation to the top tool

The ram of the HARTING press is generally provided with a cross-shaped groove which accurately positions the top tool in steps of 90°.

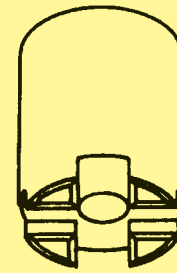
Two guide pins position the bottom tool in relation to the top tool simply and accurately.

These guide pins cannot be used for positioning the pcb or the connector!

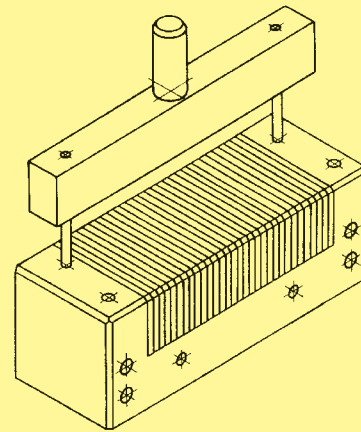
Two pairs of pins on the base plate locate the bottom tool in relation to the top tool in steps of 90°.

Height compensation

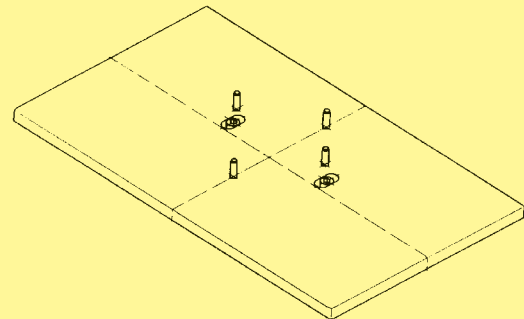
- Various overall heights of connectors are accommodated by type-specific top tools.
- Various pcb thicknesses are accommodated by the use of spacers between the bottom tool and base plate.



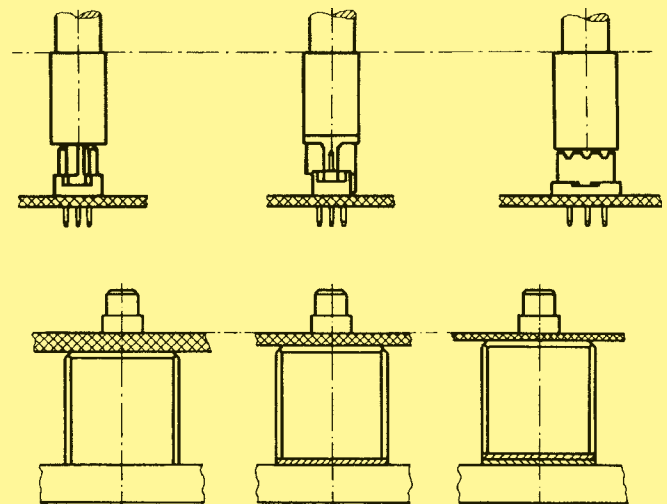
Ram with cross-shaped groove



Positioning the bottom tool in relation to top tool



Base plate with pairs of location pins at 90°



Handling indications

Range of applications for the bottom tool

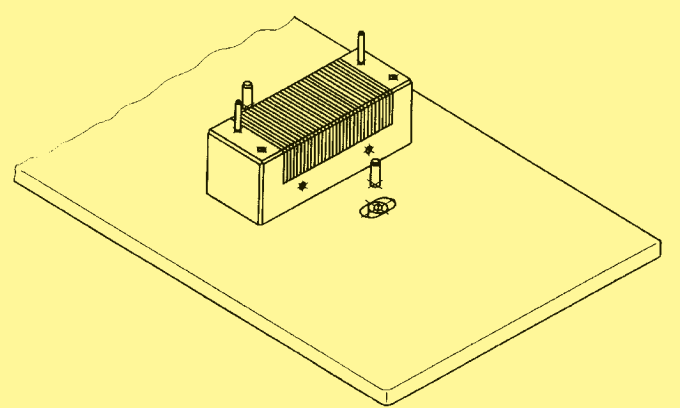
One bottom tool can be used to assemble connectors with straight or angled press-in terminations.

When pressing in the connectors with angled press-in terminations the positioning pins remain in the bottom tool and serve as guide pins for the connector.

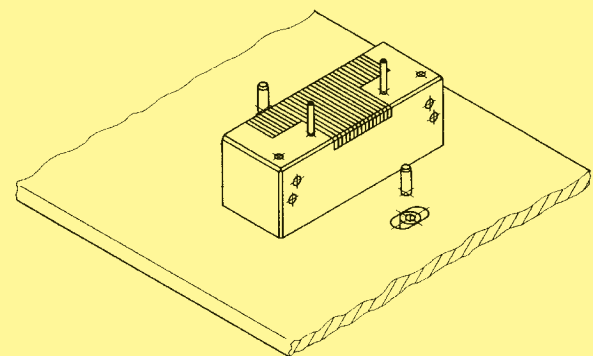
By rotating the bottom tool in steps of 90° and relocating the positioning pins it is possible to assemble half-length connectors with angled press-in terminations.

Bottom tool (narrow version)

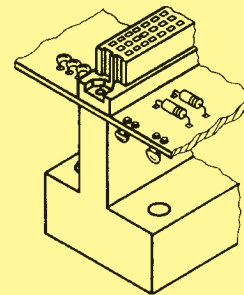
In addition to the square bottom tool with multi-functional properties, HARTING offers the alternative of a narrow bottom tool for assembling connectors with straight press-in terminations. This tool supports the pcb within the press-in connector zone and therefore makes it possible to assemble connectors where electronic components are to be placed in close proximity.



Bottom tool set for assembling connectors with angled pins



Bottom tool set for assembling half-length connectors with angled pins



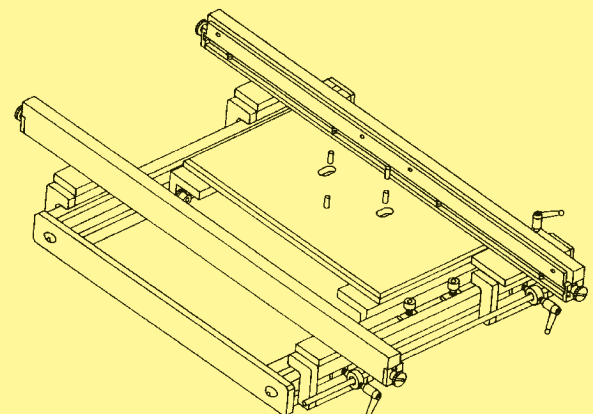
Narrow version of the bottom tool for special applications

Guide frame

The guide frame screwed to the base plate ensures the correct positioning of the pcb in relation to the top and bottom tools and permits a much higher rate of assembly.

Both guide rails are adjustable to accommodate various pcb sizes.

A spring-loaded supporting rail lifts the pcb away from the bottom tool after the press-in operation ensuring that no damage occurs to the conductors as it passes through the machine.



Guide frame for positioning the pcb in relation to the top and bottom tools

For a reliable and safe press-in process HARTING has developed a special tooling system. Each tooling is adapted to the special requirements of the individual connector range, thus a good handling and quick adjustment is guaranteed.

Identification	Part No.	Drawing
Top tool for AdvancedTCA® B+	16 99 000 0001 000	<p>Top tool for AdvancedTCA® B+</p>
Bottom tool for AdvancedTCA® B+	16 99 000 0002 000	
Top tool for MicroTCA™	16 99 000 0003 000	<p>Top tool for MicroTCA™</p>
Bottom tool for MicroTCA™	16 99 000 0004 000	
Top tool for AdvancedTCA® Power Male and female connector	02 99 000 0002	<p>Top tool for AdvancedTCA® Power and MicroTCA™ Power, module version</p>
Bottom tool for AdvancedTCA® Power Male and female connector	16 99 000 0011 000	
Top tool for MicroTCA™ Power Module version Backplane version	02 99 000 0002 16 99 000 0008 000	<p>Top tool for MicroTCA™ Power, backplane version</p>
Bottom tool for MicroTCA™ Power Module version Backplane version	16 99 000 0010 000 16 99 000 0009 000	
Removal tool for AdvancedTCA® B+	16 99 000 0005 000	<p>Removal tool for AdvancedTCA® B+</p>
Removal tool for MicroTCA™	16 99 000 0007 000	
Repair pliers for MicroTCA™	16 99 000 0006 000	<p>Repair pliers for MicroTCA™</p>
Removal tool for MCH Plug stacking-pins	16 99 000 0012 000	

Discrete tooling system – *harbus*[®] HM

For economical and safe press-in of *harbus*[®] HM connectors with 5+2 and 8+2 rows, HARTING has developed a discrete tooling system.

Due to its modular structure it can be adapted to any connector configuration that needs to be pressed-in extremely quickly and securely.

Therefore a top and a bottom tool for each connector style is available. These tools are inserted in a top or bottom carrier tool with a groove, thus guaranteeing exact position of the top and bottom tools and the connectors.

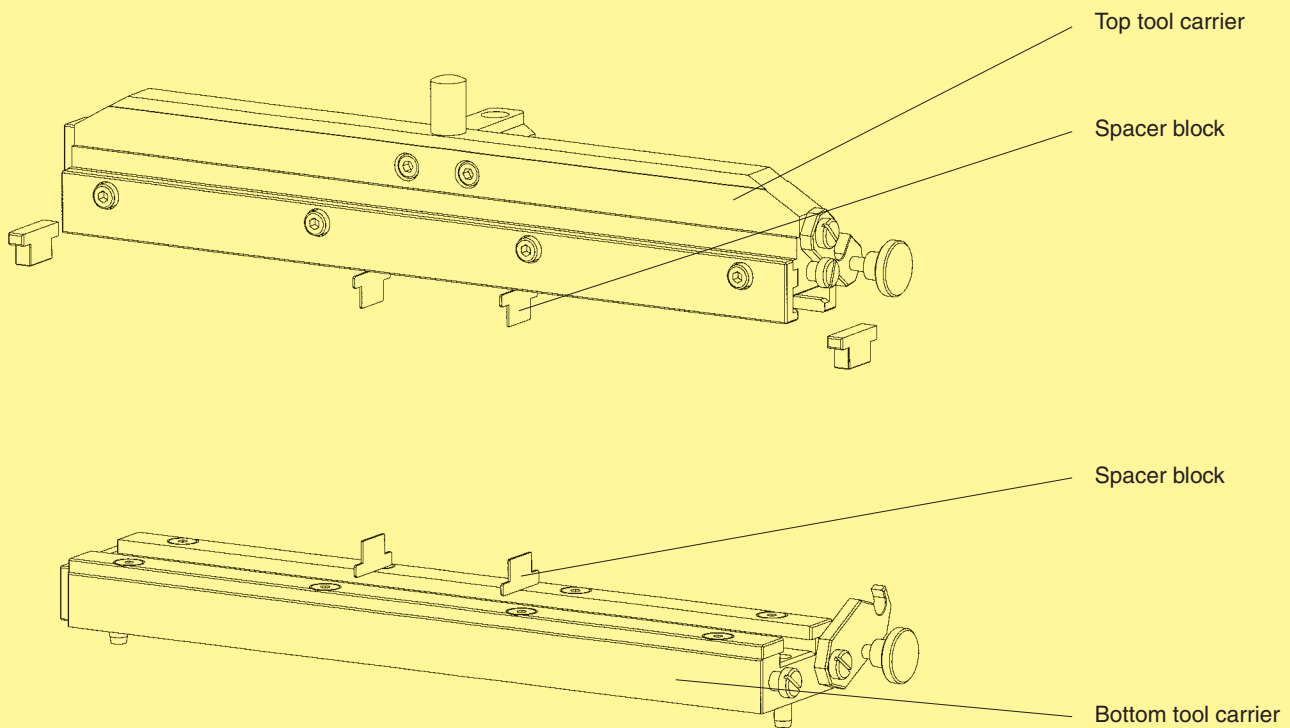
To use identical carrier tools for all connector configurations, HARTING offer spacer blocks to fill gaps between adjacent top or bottom tools.

The carrier tool is either completely filled with top or bottom tools or respective spacer blocks, making it possible to press-in single modules.

To press-in female connectors with pre-installed upper shields, separate top and bottom tools are available.

For lower shield press-in the tooling can be changed easily.

For further information please check our operating instructions or contact your HARTING representative.

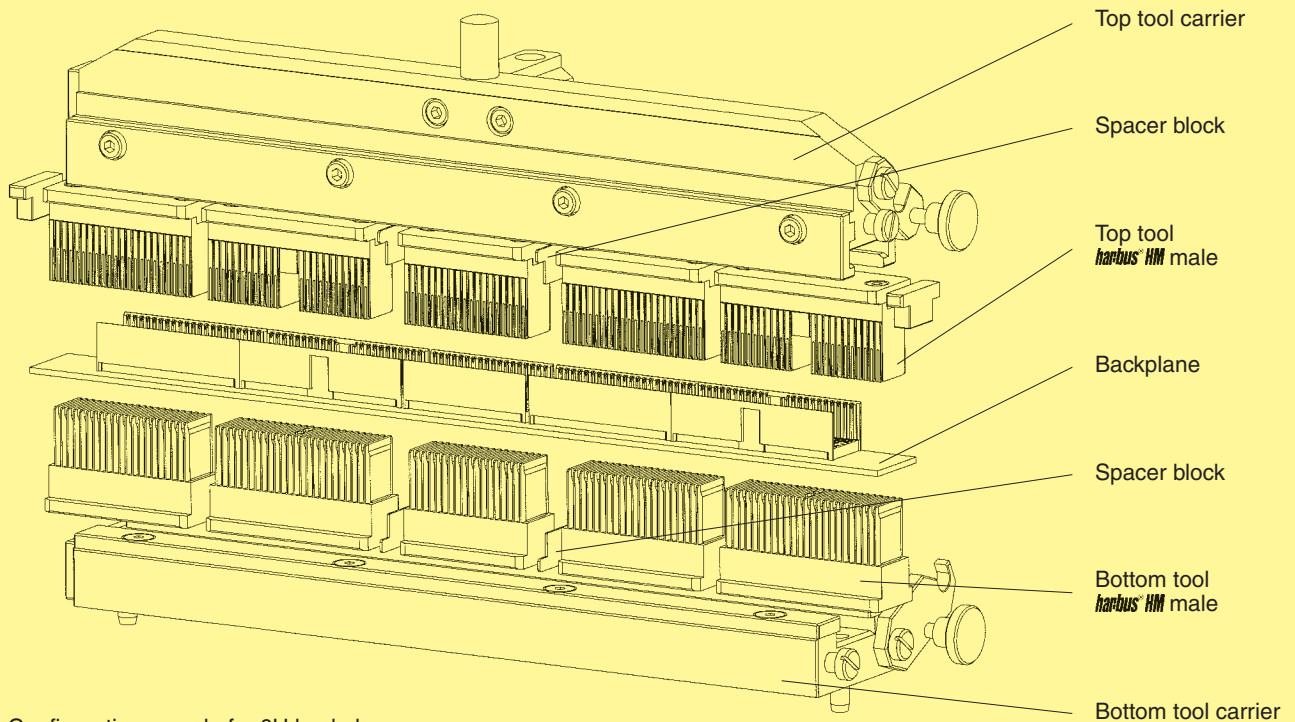


Basis tools of the discrete tooling system

Basis tools for all connector types

Part number connector	Tool identification	Part number tool	Part number connector	Tool identification	Part number tool
17 xx xxx xxxx	Top tool carrier	17 99 000 0012	17 xx xxx xxxx	Spacer block 25 mm	17 99 000 0055
17 xx xxx xxxx	Bottom tool carrier	17 99 000 0013	17 xx xxx xxxx	Spacer block 38 mm	17 99 000 0054
17 xx xxx xxxx	Top tool carrier 3U	17 99 000 0073	17 xx xxx xxxx	Spacer block 44 mm	17 99 000 0053
17 xx xxx xxxx	Bottom tool carrier 3U	17 99 000 0074	17 xx xxx xxxx	Spacer block 50 mm	17 99 000 0052
17 xx xxx xxxx	Spacer block 0.67 mm (CompactPCI)	17 99 000 0057	17 xx xxx xxxx	Centering plate female left	17 99 000 0060
17 xx xxx xxxx	Spacer block 5 mm	17 99 000 0056	17 xx xxx xxxx	Centering plate female right	17 99 000 0061

Discrete tooling system – *harbus*® HM

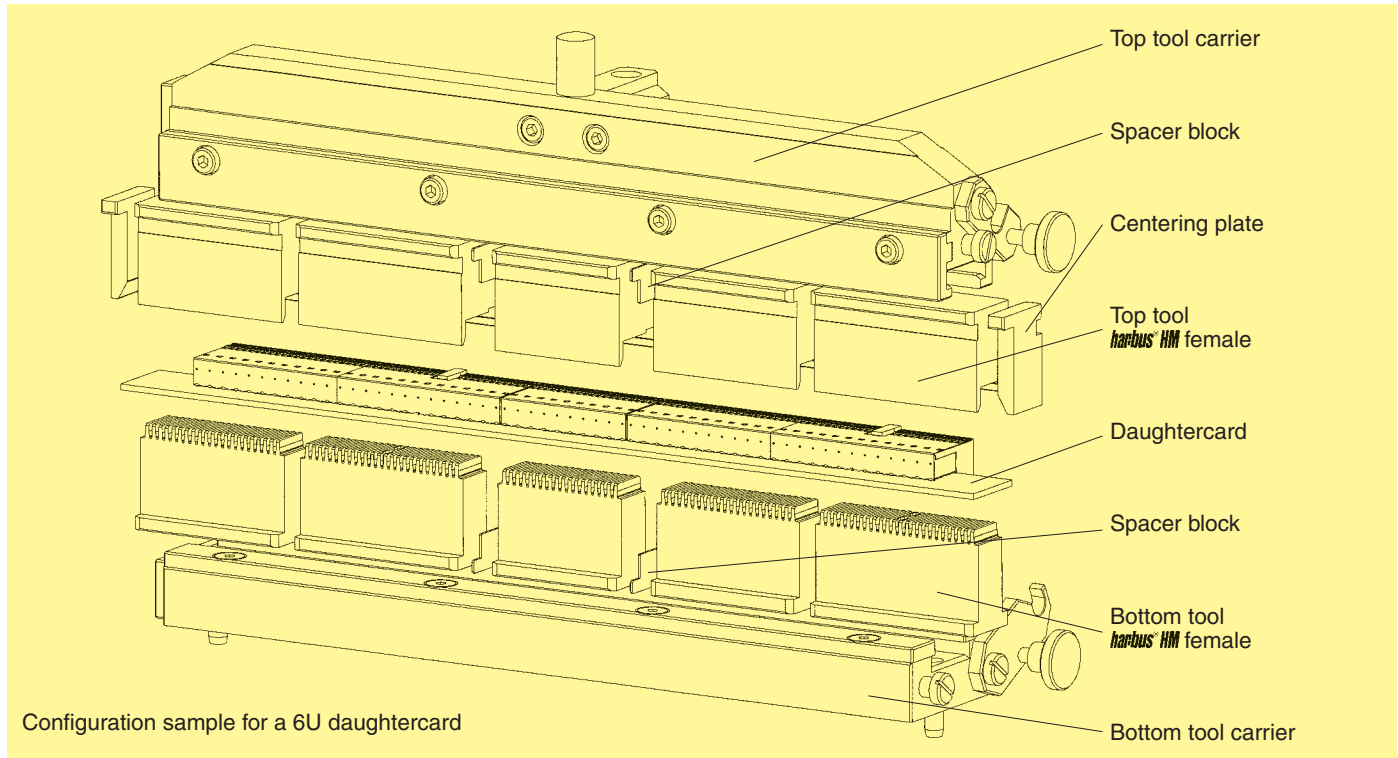


Configuration sample for 6U backplane

Tools for straight male connectors

Part number connector	Tool identification	Part number tool	Part number connector	Tool identification	Part number tool
17 01 xxx xxxx	Top tool, male, type A	17 99 000 0014	17 11 xxx xxxx	Top tool, male, type D	17 99 000 0022
17 01 xxx xxxx	Bottom tool, male, type A	17 99 000 0026	17 11 xxx xxxx	Bottom tool, male, type D	17 99 000 0028
17 02 xxx xxxx	Top tool, male, type B	17 99 000 0020	17 12 xxx xxxx	Top tool, male, type E	17 99 000 0023
17 02 xxx xxxx	Bottom tool, male, type B	17 99 000 0026	17 12 xxx xxxx	Bottom tool, male, type E	17 99 000 0028
17 04 xxx xxxx	Top tool, male, type B	17 99 000 0019	17 13 xxx xxxx	Top tool, male, type AB	17 99 000 0015
17 04 xxx xxxx	Bottom tool, male, type B	17 99 000 0025	17 13 xxx xxxx	Bottom tool, male, type AB	17 99 000 0024
17 05 xxx xxxx	Top tool, male, type B	17 99 000 0018	17 14 xxx xxxx	Top tool, male, type AB	17 99 000 0016
17 05 xxx xxxx	Bottom tool, male, type B	17 99 000 0024	17 14 xxx xxxx	Bottom tool, male, type AB	17 99 000 0025
17 03 xxx xxxx	Top tool, male, type C	17 99 000 0021	17 15 xxx xxxx	Top tool, male, type AB	17 99 000 0017
17 03 xxx xxxx	Bottom tool, male, type C	17 99 000 0027	17 15 xxx xxxx	Bottom tool, male, type AB	17 99 000 0026

Discrete tooling system – *harbus*® HM



Tools for angled female connectors

Part number connector	Tool identification	Part number tool	Part number connector	Tool identification	Part number tool
17 21 xxx xxxx	Top tool, female, type A	17 99 000 0029	17 31 xxx xxxx	Top tool, female, type D	17 99 000 0042
17 21 xxx xxxx	Bottom tool, female, type A	17 99 000 0046	17 31 xxx xxxx	Bottom tool, female, type D	17 99 000 0048
17 22 xxx xxxx	Top tool, female, type B	17 99 000 0038	17 32 xxx xxxx	Top tool, female, type E	17 99 000 0042
17 22 xxx xxxx	Bottom tool, female, type B	17 99 000 0046	17 32 xxx xxxx	Bottom tool, female, type E	17 99 000 0048
17 24 xxx xxxx	Top tool, female, type B	17 99 000 0036	17 33 xxx xxxx	Top tool, female, type AB	17 99 000 0032
17 24 xxx xxxx	Bottom tool, female, type B	17 99 000 0045	17 33 xxx xxxx	Bottom tool, female, type AB	17 99 000 0044
17 25 xxx xxxx	Top tool, female, type B	17 99 000 0034	17 34 xxx xxxx	Top tool, female, type AB	17 99 000 0058
17 25 xxx xxxx	Bottom tool, female, type B	17 99 000 0044	17 34 xxx xxxx	Bottom tool, female, type AB	17 99 000 0045
17 23 xxx xxxx	Top tool, female, type C	17 99 000 0040	17 35 xxx xxxx	Top tool, female, type AB	17 99 000 0029
17 23 xxx xxxx	Bottom tool, female, type C	17 99 000 0047	17 35 xxx xxxx	Bottom tool, female, type AB	17 99 000 0046

Tools for angled shielded female connectors

Part number connector	Tool identification	Part number tool	Part number connector	Tool identification	Part number tool
17 21 xxx xxxx	Top tool, female, type A upper shield	17 99 000 0030	17 34 xxx xxxx	Top tool, female, type AB upper shield	17 99 000 0059
17 21 xxx xxxx	Top tool, female, type A divided shield computer telephony	17 99 000 0031	17 35 xxx xxxx	Top tool, female, type AB upper shield	17 99 000 0030
17 22 xxx xxxx	Top tool, female, type B upper shield	17 99 000 0039	17 21 xxx xxxx	Press-in die lower shield type A	17 99 000 0051
17 24 xxx xxxx	Top tool, female, type B upper shield	17 99 000 0037	17 22 xxx xxxx	Press-in die lower shield type B	17 99 000 0051
17 25 xxx xxxx	Top tool, female, type B upper shield	17 99 000 0035	17 24 xxx xxxx	Press-in die lower shield type B	17 99 000 0050
17 23 xxx xxxx	Top tool, female, type C upper shield	17 99 000 0041	17 25 xxx xxxx	Press-in die lower shield type B	17 99 000 0049
17 31 xxx xxxx	Top tool, female, type D upper shield	17 99 000 0043	17 31 xxx xxxx	Press-in die lower shield type D	17 99 000 0051
17 32 xxx xxxx	Top tool, female, type E upper shield	17 99 000 0043	17 32 xxx xxxx	Press-in die lower shield type E	17 99 000 0051
17 33 xxx xxxx	Top tool, female, type AB upper shield	17 99 000 0033	17 33 xxx xxxx	Press-in die lower shield type AB	17 99 000 0049
			17 34 xxx xxxx	Press-in die lower shield type AB	17 99 000 0050
			17 35 xxx xxxx	Press-in die lower shield type AB	17 99 000 0051

Tooling for backplanes – *harbus*® *HM*

For 6U backplanes with CompactPCI configuration, HARTING has developed this start-up tooling.

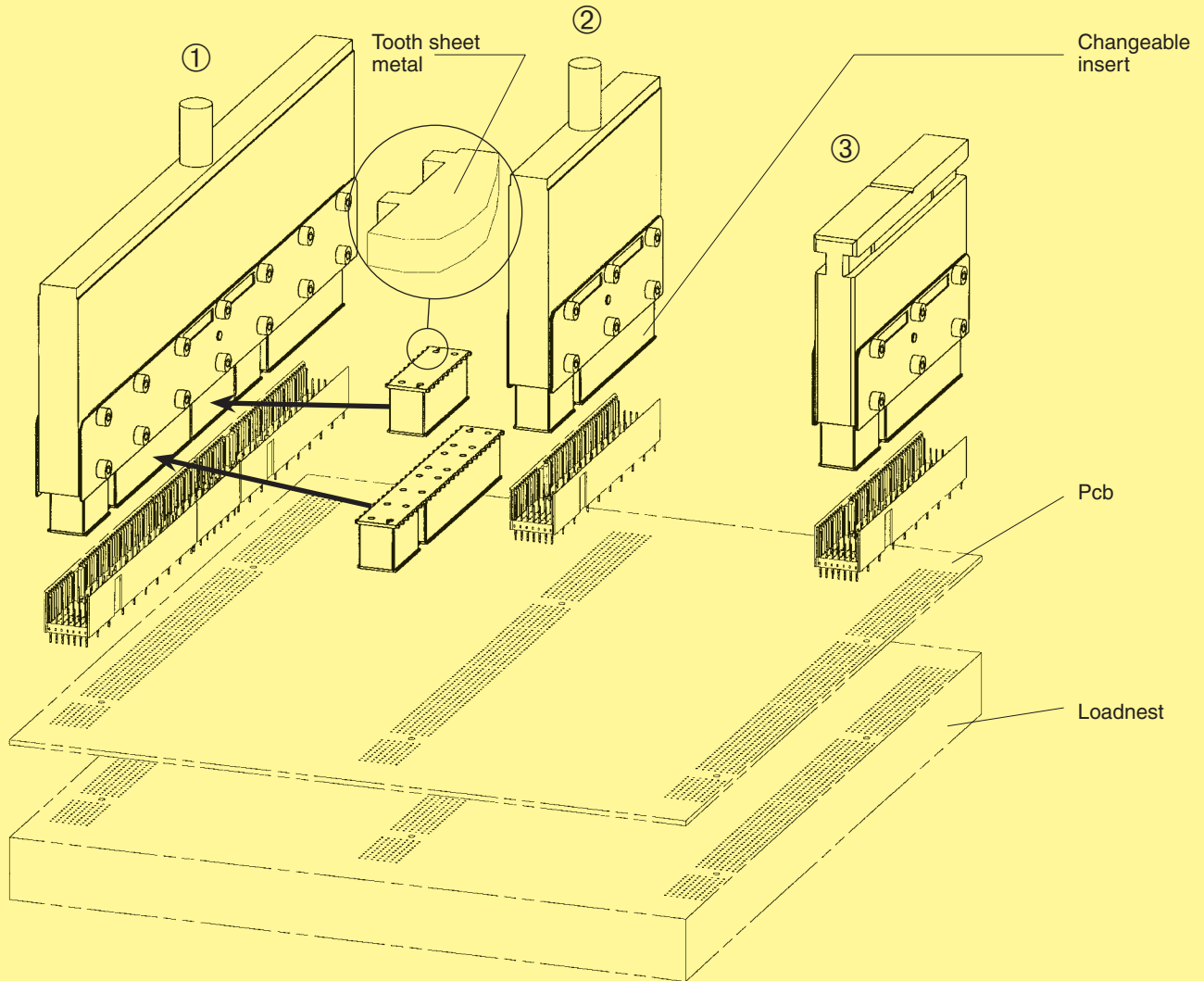
The basis is a top tool carrier with tooth inserts, that are engaged alternately.

Therefore this tooling assembly can be used without any additional set-up time.

The tooth inserts are interchangeable, so that the tooling can be used for other connector configurations as well as for CompactPCI.

The bottom tool should preferably be a loadnest, which carries and aligns the pcb.

For detailed information please contact your local HARTING representative.



Configuration samples for CompactPCI backplanes

Tools for straight male connectors

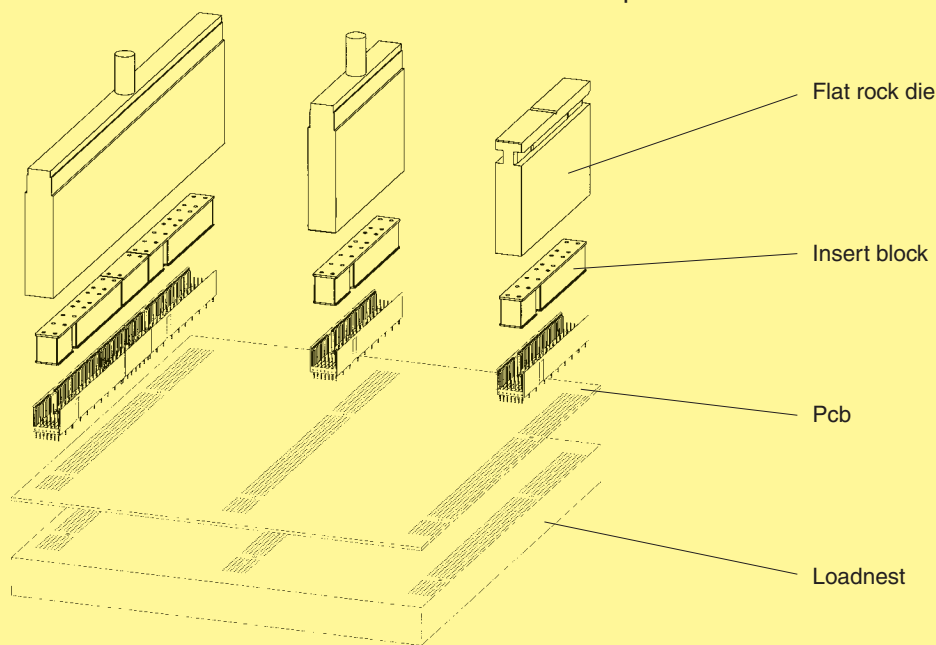
Tool identification	Part number tool	Tool identification	Part number tool
① Insert top tool for 6U CompactPCI	17 99 000 0063	Tooth insert for type Monoblock 47	17 99 000 0066
② Insert top tool for 3U CompactPCI	17 99 000 0065	Tooth insert for type B 19 positions	17 99 000 0068
③ Insert top tool for rotatable tool changer	on request		

Insert blocks for male connectors – *harbus*® *HM*

The insert blocks can be used to press-in *harbus*® *HM* male connectors without any special top tool. These blocks will be put into the connectors manually or automatically.

To press-in the connector no precise position is needed and can be done by a simple flat rock die. This will accelerate the cycle time of the press-in process dramatically.

Insert blocks are developed for use with a loadnest.



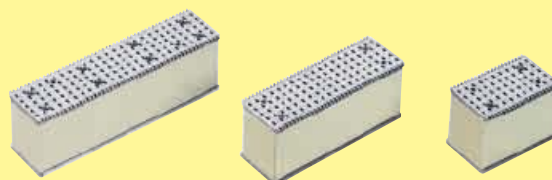
Application samples for insert blocks

Insert blocks for straight male connectors

Part number connector	Tool identification	Quantity and part number tool
17 01 xxx xxxx	Insert block for type A	1 x 17 99 000 0009 or (2 x 17 99 000 0001)
17 04 xxx xxxx	Insert block for type B	1 x 17 99 000 0004
17 05 xxx xxxx	Insert block for type B	1 x 17 99 000 0002
17 02 xxx xxxx	Insert block for type B	1 x 17 99 000 0003
17 03 xxx xxxx	Insert block for type C	1 x 17 99 000 0001
17 06 xxx xxxx	Insert block for type Monoblock 47	1 x 17 99 000 0008 or (1 x 17 99 000 0001 and 1 x 17 99 000 0005)
17 11 xxx xxxx	Insert block for type D	2 x 17 99 000 0006
17 12 xxx xxxx	Insert block for type E	1 x 17 99 000 0007
17 13 xxx xxxx	Insert block for type AB	1 x 17 99 000 0069
17 14 xxx xxxx	Insert block for type AB	1 x 17 99 000 0070
17 15 xxx xxxx	Insert block for type AB	1 x 17 99 000 0071
17 10 xxx xxxx	Insert block for type DE	1 x 17 99 000 0072

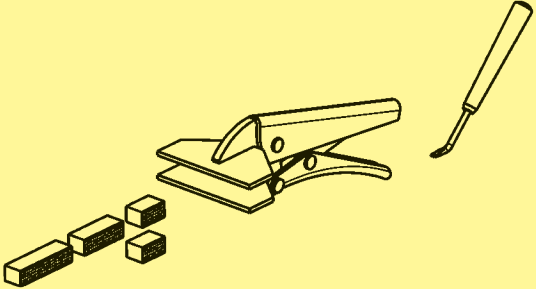
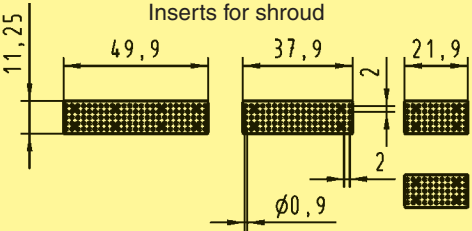
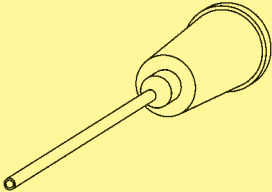

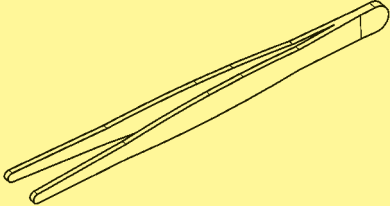
Flat rock dies

Part number connector	Tool identification	Part number tool
17 xx xxx xxxx	Flat rock die for 6U	07 79 000 0155
17 xx xxx xxxx	Flat rock die for 3U	07 79 000 0156

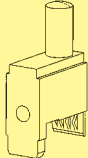
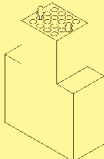


The insert block 17 99 000 0001 e.g. can be used for the types A, C and Monoblock 47.

Repair tooling – *harbus*® *HM*

Identification	for use with	Part number	Drawing	Dimensions [mm]
Tool kit shroud removal	<i>harbus</i> ® <i>HM</i>	17 99 000 0095		
				
Insertion and repair tool for single contact	<i>harbus</i> ® <i>HM</i>	17 99 000 0094		
Removal tool for single male contacts	<i>harbus</i> ® <i>HM</i>	09 99 000 0239		
Mounting tool for coding key	<i>harbus</i> ® <i>HM</i>	17 99 000 0093		

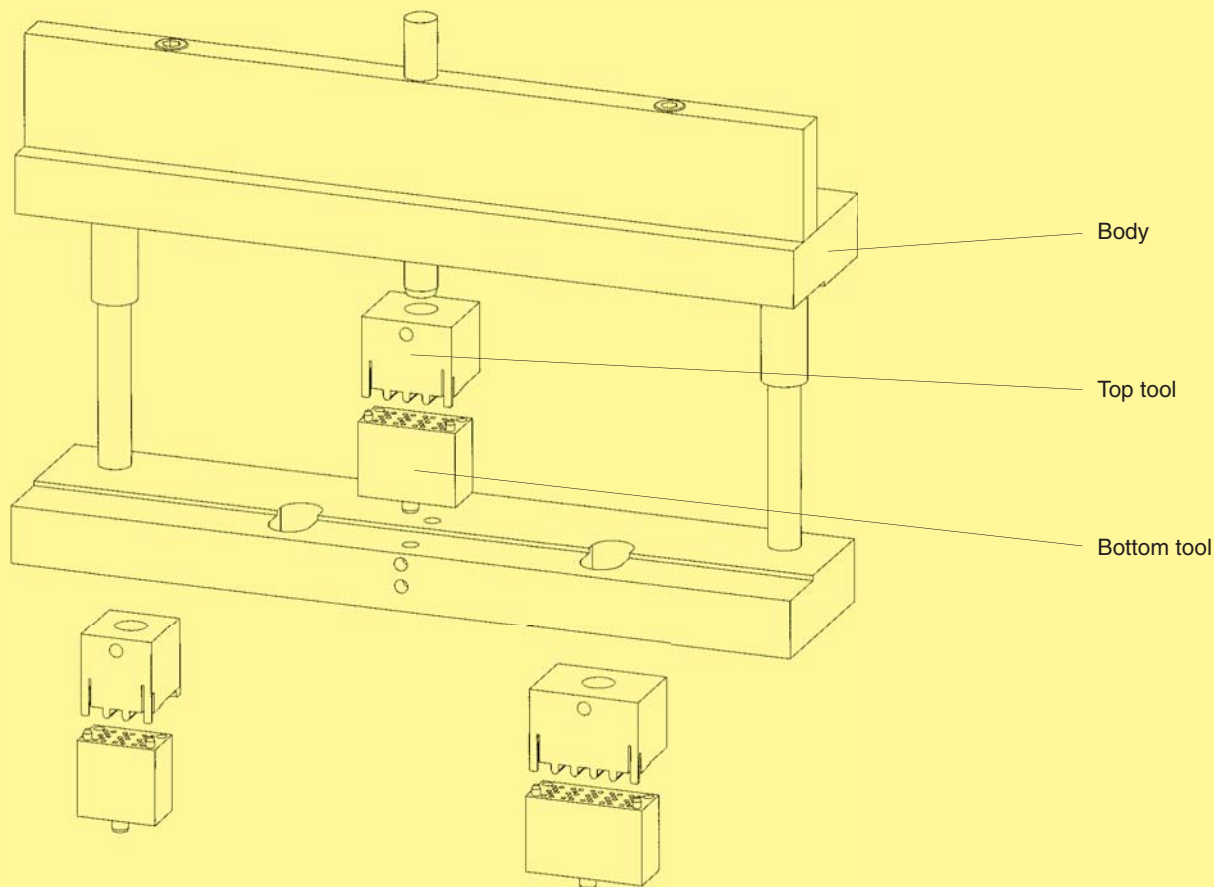
Tooling for angled male connectors – *harbus*® *HM* Power

Identification	for use with	Part number	Drawing	Dimensions [mm]
Top tool for angled male connectors	<i>harbus</i> ® <i>HM</i> Power	17 99 000 0102		
Bottom tool for angled male connectors	<i>harbus</i> ® <i>HM</i> Power	17 99 000 0103		

Discrete tooling system – **Mini Coax**

Straight Mini Coax connectors can be pressed-in with a flat die and a top tool delivered with the connectors. This top tool can be used as contact protection and remains in the connector until the daughtercard is mated.

Angled Mini Coax connectors will be pressed-in with separate top and bottom tools, which will be mounted into a common body.



Configuration for angled modules

Tools for straight modules

Part number connector	Tool identification	Part number tool
07 11 xxx xxxx	1 SU Mini Coax Standard bottom tool	on request
07 11 xxx xxxx	1.25 SU Mini Coax Standard bottom tool	on request
07 11 xxx xxxx	1.50 SU Mini Coax Standard bottom tool	on request

Tools for angled modules

Part number connector	Tool identification	Part number tool
07 31 xxx xxxx	Body	07 79 000 0061
07 31 xxx xxxx	1 SU Mini Coax Standard bottom tool	07 79 000 0045
07 31 xxx xxxx	1 SU Mini Coax Standard top tool	07 79 000 0080
07 31 xxx xxxx	1.25 SU Mini Coax Standard bottom tool	07 79 000 0034
07 31 xxx xxxx	1.25 SU Mini Coax Standard top tool	07 79 000 0081
07 31 xxx xxxx	1.50 SU Mini Coax Standard bottom tool	07 79 000 0171
07 31 xxx xxxx	1.50 SU Mini Coax Standard top tool	07 79 000 0170
07 31 xxx xxxx	1 SU Mini Coax single-row bottom tool	07 79 000 0205
07 31 xxx xxxx	1 SU Mini Coax single-row top tool	07 79 000 0204

Hand bench presses / pneumatic presses

Identification	Part No.	Drawing	Dimensions in mm
Hand bench press	09 99 000 0201		<p>Technical characteristics</p> <p>Working stroke 25 mm</p> <p>Press force 15 kN max.</p> <p>Hole ϕ in the ram ϕ 10 mm</p> <p>Net weight approx. 23 kg</p>
Pneumatic press 40 kN	09 99 000 0282		<p>Technical characteristics</p> <p>Total stroke 48 mm</p> <p>Working stroke 0-6 mm</p> <p>Press force 40 kN max.</p> <p>Air pressure 6 bar</p> <p>Hole ϕ in the ram ϕ 10.01 mm</p> <p>Net weight 136 kg</p> <p>Power supply 110 V / 220 V AC</p>
Adaptor for height compensation ¹⁾	09 99 000 0279		
Guide frame with base plate Standard type for pcb size x = 123,5 - 309,5 mm	09 99 000 0244		
Long type ²⁾ for pcb size x = 123,5 - 668,5 mm	09 99 000 0261		
Base plate	09 99 000 0255		

¹⁾ suitable for 09 99 000 0282 and all CPM machines
²⁾ not suitable for hand bench press

CPM press-in machines

CPM prestige



Part No. 09 89 040 0000

Technical characteristics

Drive	electro-mechanical, servo
Press-in force	100 kN
max. pcb dimensions	600 x 1000 mm
Floor space	1200 x 1150 mm
Weight	980 kg
Power supply	3x 208 / 380 / 400 / 415 V
Consumption	< 1 kW
Colour	on request

CPM prestige

(incl. PC, control software, barcode reader, keyboard, touch screen)

Built-in features:

- Guiding rails (carbon/spring-loaded) for the secure positioning of the pcb
- Touch-screen and Industrial PC with UPS (uninterruptable power supply)
- Barcode reader for management ease of press-in programs
- All dimensions allow an easy integration into production lines

Process monitoring and quality assurance:

- Touch screen interface with graphical and verbal menus for all machine functions
- Autosense: automated press-in interruption at incorrect press-in forces
- Storage and validation of all press-in parameters via quality assurance software (press-in force tolerances)
- Continuous high-precision measurement and recording of press-in forces and distances
- Remote determination of errors and maintenance
- High flexibility through a modular tool range

Options:

- Rotatable tool changer
- Insertion removal station

Insertion removal station

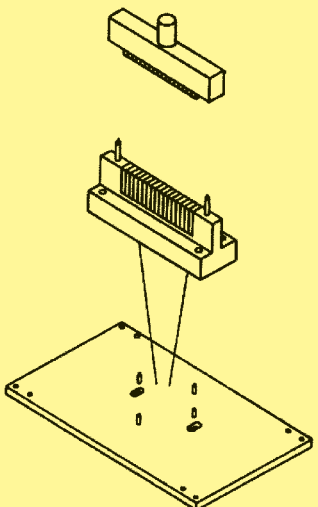

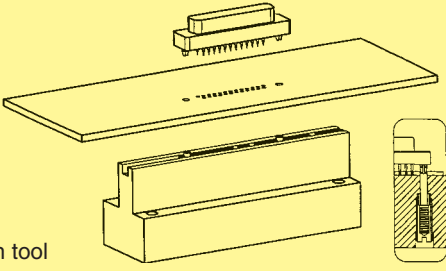



Power supply	220 V / 50 Hz
Air pressure	6 bar (15-16 l/min.)

Part No. 09 89 040 3000
for pcb dimensions of max. 710 mm x 540 mm

Bestseller **CPM prestige with insertion removal station**, adaptable to all HARTING press-in machines.

Tools – SEK, D-Sub, har-mik

Identification	Part No.	
<p>Top tool for SEK</p> <p>Base plate for SEK, D-Sub, har-mik</p>	<p>09 99 000 0197</p> <p>09 99 000 0255</p>	 <p>Top tool</p> <p>Bottom tool</p> <p>Base plate</p>
<p>Bottom tool for har-mik</p>	<p>60 99 000 0031</p>	
<p>Press-out tool for har-mik</p>	<p>60 99 000 0032</p>	
<p>Bottom tool narrow for D-Sub</p> <p>Only one tool for all polarities, with or without grounding pins</p> <p>9-37 way 50 way</p>	<p>09 99 000 0600</p> <p>09 99 000 0523</p>	 <p>Bottom tool</p>
<p>Plastic with metal plate insert tool for D-Sub male</p> <p>9 way 15 way 25 way</p>	<p>09 99 600 0709</p> <p>09 99 600 0715</p> <p>09 99 600 0725</p>	
<p>Other toolings on request</p>		

Tools – SEK, D-Sub, har-mik

Identification	Part No.	Drawing	Dimensions in mm
Top tool for SEK standard connectors 10 way 14 way 16 way 20 way 26 way 34 way 40 way 50 way 60 way 64 way	09 99 000 0710 09 99 000 0714 09 99 000 0716 09 99 000 0720 09 99 000 0726 09 99 000 0734 09 99 000 0740 09 99 000 0750 09 99 000 0760 09 99 000 0764	<p>31° 1,02 6 BA Socket head cap screws x 2 0,89 3,17 2,79 1,27 1,57 1,57 2,54 2,16 3,81 In lower block only : Drill : ϕ 1,02 Countersink : ϕ 1,78 Mini</p>	<p>8,89 3,18 14,27 TOP BLOCK 1,57 LOWER BLOCK 6,1 6,25 Mini</p>
Top tool for SEK male low-profile connectors 6 way 10 way 14 way 16 way 20 way 26 way 34 way 40 way 50 way 60 way 64 way Top tool including insert ➤ 4 Modular insert ➤ 5	09 99 000 0 06 09 99 000 0 10 09 99 000 0 14 09 99 000 0 16 09 99 000 0 20 09 99 000 0 26 09 99 000 0 34 09 99 000 0 40 09 99 000 0 50 09 99 000 0 60 09 99 000 0 64	Top tool including insert <p>ϕ10 X 100 12</p> <p>X Length depends on number of contacts</p>	<p>Modular insert X 6</p> <p>09 99 000 0197</p>
Press-out tool for complete SEK male connectors with 5.5 mm terminations	09 99 000 0220	<p>...0220 5,5mm</p>	
Support block	09 99 000 0218	<p>...0218*</p>	

Tooling

Tools for insulation displacement termination – har-link, har-mik

Identification	Part No.	
Cable aligner for har-link	27 79 000 0001	
Head and table for har-link	27 79 000 0002	 <p>Head Table</p>
Crimping hand tool for har-link	27 99 000 0001	
Hand press for har-link	60 99 000 0007	  <p>A manual for the har-link® cable free connector assembly is available in our online catalogue HARKIS® or on demand at your local HARTING representative</p>
Semi-automatic machine CAT 60 for har-mik	60 99 000 0003	 <p>CAT 60</p>
Support plates for har-mik Pin and socket and female Bellows connector	60 99 000 0004	 <p>Support plates</p>
Support plates for har-mik male Bellows connector	60 99 000 0012	 <p>Support plates</p>
Adaptor for har-mik male Pin and socket connector	60 99 ... 0005	 <p>Adaptor</p>
Adaptor for har-mik male Bellows connector	60 99 ... 0013	 <p>Adaptor</p>

Number of contacts

Tools for insulation displacement termination – har-mik

Tools for insulation displacement termination
for Pin and socket and Bellows range

Selection chart for semi-automatic assembly machine CAT 60

for connector	Semi automatic machine	Support plates	Adaptator	Head and table	Hand press
Male Pin and socket 60 03 ... 5200 60 03 ... 5210 60 03 ... 5220	60 99 000 0003	60 99 000 0004	60 99 ... 0005	60 99 000 0010	60 99 000 0007
Male Bellows 60 13 ... 5200		60 99 000 0012	60 99 ... 0013	60 99 000 0016	

Number of contacts

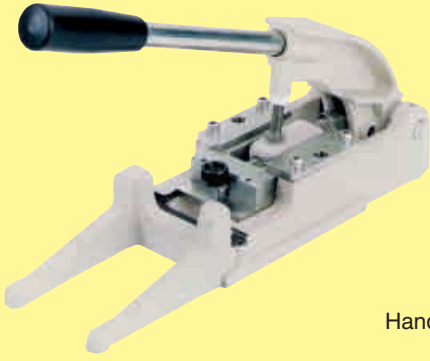

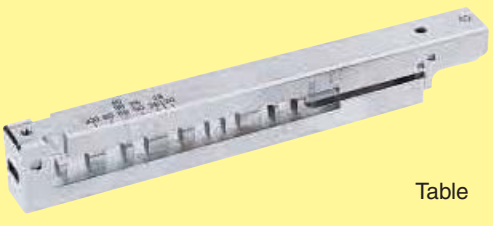



Tools for insulation displacement termination
for Pin and socket and Bellows range

Selection chart for hand assembly








for connector	Hand cable aligner	Head and table	Hand press
Male Pin and socket 60 03 ... 5200 60 03 ... 5210 60 03 ... 5220	60 99 000 0011	60 99 000 0010	60 99 000 0007
Male Bellows 60 13 ... 5200	60 99 000 0017	60 99 000 0016	

Number of contacts

Tools for insulation displacement termination – har-mik

Identification	Part No.	
Hand press	60 99 000 0007	 <p>Hand press</p>
Head and table for male Pin and socket connector	60 99 000 0010	 <p>Head</p>
Head and table for male Bellows connector	60 99 000 0016	 <p>Table</p>
Hand cable aligner for Pin and socket and female Bellows connector	60 99 000 0011	
Hand cable aligner for male Bellows connector	60 99 000 0017	  <p>A manual for the har-mik® connector and cable assembly is available in our online catalogue <i>HARKIS</i>® or on demand at your local HARTING representative.</p>

Tools for insulation displacement termination – D-Sub, har-mik, SEK

Identification	Part No.	Drawing	Dimensions in mm
Bench press for termination of insulation displacement connectors suitable for D-Sub har-mik SEK	09 99 000 0114		
Base plate for termination of flat cables suitable for har-mik	60 99 000 0034		
Base plate for termination of flat cables suitable for D-Sub SEK female SEK DIP SEK LP, 2 rows SEK LP, 4 rows DIN 41612	09 99 000 0135 09 99 000 0115 09 99 000 0134 09 99 000 0131 09 99 000 0130 09 99 000 0150		
Insert for termination of 37 pole male D-Sub connectors	09 99 600 0201		
Hand tool with base plates (included in tool kit) for termination of insulation displacement connectors suitable for D-Sub SEK	09 99 000 0149		
Cable cutter for flat cables suitable for D-Sub har-mik SEK	09 99 000 0116		
Spare parts Blade Cutting plate	09 99 000 0179 09 99 000 0180		

Tooling

Tools for FOC contacts

Identification	Part No.	Drawing	Dimensions in mm
Polishing tool			
DIN 41 626	20 99 000 1092		
POF ²⁾ cable Ø 2.2	20 99 000 1093		
Fibre stripper	20 99 000 1041 20 99 000 1045 20 99 000 1046		0.3 mm 1 mm 0.18/0.3 mm
Crimping tool for 1 mm POF contacts – Han D®, Han E® – DIN 41 626 – Ferrule – F-SMA, -ST	20 99 000 1035		
HARTING Crimping tool for FO connector (glass fibre) SW 4.3 mm 3.8 mm 4.95 mm	20 99 000 1031		
HARTING Crimping tool for FO connector (plastic fibre) SW 6.95, 4.95 and 3.0 mm	20 99 000 1033		for crimping the strain relief to the connector ... 1031 FO cable for glass fibre ... 1033 POF ²⁾ and SERCOS cable Ø 6.0 and 3.6
Epoxy adhesive glass fibre	20 80 001 9902		2 ml EPO-TEK 360 with hardener (10:1), 4 g foil pack
Polishing paper for POF ²⁾ -grain size 1000 for G1 9 µ-grain size for G1 1 µ-grain size	20 80 001 9911 20 80 001 9912 20 80 001 9913		Delivery range: Each part number ordered comprises 2 pieces

²⁾ POF = Polymer optical fibre