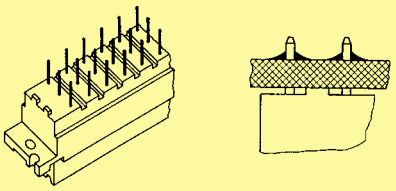
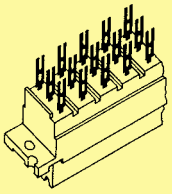
Solder pins for printed circuit boards
explanation see page 00.15

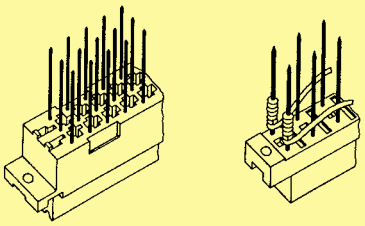
Solder pins for reflow soldering
explanation see chapter 05



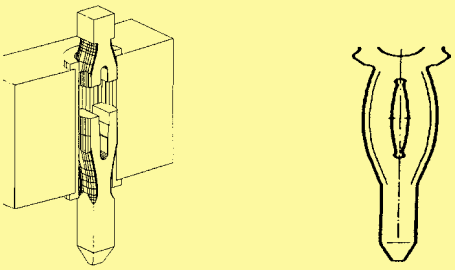
Solder lugs for discrete wiring
explanation see page 00.15



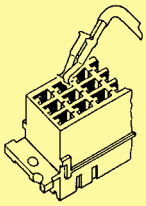
Wrap posts for automatic wiring techniques
explanation see page 00.15



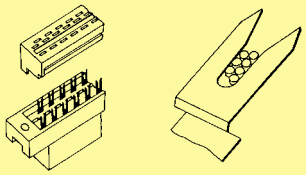
Press-in technology for printed circuit boards
explanation see chapter 04



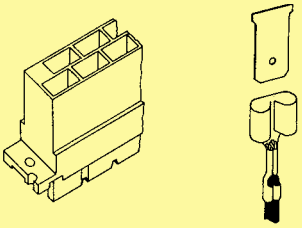
Crimp contacts for flexible wiring, selective loading and ease of replacement
explanation see page 00.16



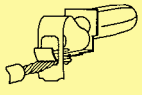
Insulation displacement contacts for mass termination of flat cable



Faston blades for higher power discrete wiring



Cage-clamp contacts provide low cost connection for solid or stranded wires



Solder connection

The term "soldering" is defined in DIN 8505:

> "Soldering is a method of connecting metallic materials using an additional melting metal, if necessary with the assistance of a flux and/or protective gas. The melting temperature of the solder must lie beneath the minimum melting temperature of the base metals being connected. These base metals shall be tinned without melting themselves."

Soft solders commonly used on electronic equipment are to DIN 1707-100. Todays lead free solders have a melting range between 217 °C and 227 °C depending on the composition of the alloy. For soldering metallic materials the flux is defined in DIN EN 29 454-1. Tests are explained in DIN 8526. For soldering male connectors into printed circuit boards, see recommendations for soldering on page 00.06.

Wrapped connection

This technique permits high wiring density and takes over where other techniques would take up too much real estate. As a result of this process, there is a great time saving factor and cost per connection is relatively low when large numbers of connections are to be made.

When wires are correctly wrapped onto a precision manufactured rectangular post produced to the recommended specifications, one can state the following:

> A low resistance, mechanically strong and highly reliable connection is made which is unaffected by normal climatic or temperature changes.

Production of wrapped connections and associated material are defined in DIN EN 60 352-1.

Wrapping techniques

Standard wrap
: Only the non-insulated part of the wire is wrapped around the post. This means that the size of the wrapped connection is kept to the very minimum.

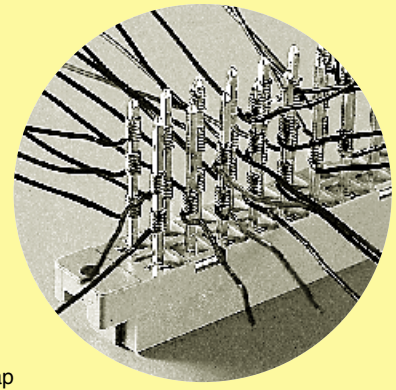
Modified wrap
: The top part of the wrapped connection is made using the cable conductor as stated above but an extra turn is made at the bottom. For this turn insulation is also wrapped around the post to give a great mechanical strength to the joint and also to provide insulation between adjacent posts.

Wrapping tools

To produce quality wrapped connections one must use a special wrapping tool, which can be pneumatic, electric or hand operated. Such tools have interchangeable wrapping heads and sleeves to suit the particular size of the wrap post being used.

The choice of accessories for these wrapping tools depends from the wrapping technique, the size of the wrap post itself and the conductor and insulation diameters of the wire.

The adjacent tables show the maximum amount of wrapped connections that can be placed on the wire wrap post (in acc. to IEC 60352-1).

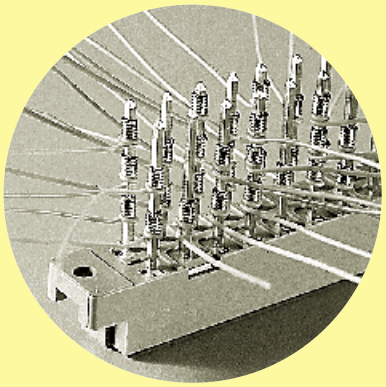


Standard wrap

Valid for standard wrap

Dimension of wire wrap post [mm]	Length of wire wrap post [mm]	Wire diameter [mm] 0.25	0.32	0.4	0.5	0.65	0.8	1.0
		max. allowed wire Ø incl. wire insulation [mm] 0.7	0.9	1.17	1.27	1.32	1.5	1.78
		min. necessary turns per wrap connection (for non-insulated wire) 7	7	6	5	4	4	4
		possible wrap connections per wrap post						
0.6 x 0.6	13	6	5	4	4	4	3	2
0.6 x 0.6	17	8	6	6	5	5	4	3
1 x 1	20	10	7	7	6	6	5	4
1 x 1	22	11	8	7	7	6	5	4

Table 00.05



Modified wrap

Valid for modified wrap

Dimension of wire wrap post [mm]	Length of wire wrap post [mm]	Wire diameter [mm] 0.25	0.32	0.4	0.5	0.65	0.8	1,0
		max. allowed wire Ø incl. wire insulation [mm] 0.7	0.9	1.17	1.27	1.32	1.5	1.78
		min. necessary turns per wrap connection (for non-insulated wire) 7	7	6	5	4	4	4
		possible wrap connections per wrap post						
0.6 x 0.6	13	4	3	2	2	2	2	1
0.6 x 0.6	17	5	4	3	3	3	2	2
1 x 1	20	6	4	4	3	3	3	2
1 x 1	22	6	5	4	4	4	3	2

Table 00.06

Crimp connection

A perfect crimp connection is gastight and therefore corrosion free. It is equivalent to a cold weld of the connected parts. For this reason, major features in achieving high quality crimp connections are the design of the crimping areas of the contact and of course the crimping tool itself. Wires to be connected must be carefully matched to the correct size of crimp contacts. If these basic requirements are met, users will be assured of highly reliable connections with a low contact resistance and a high resistance against corrosion.

The economical and technical advantages are:

- Constant contact resistance as a result of an unvariable crimp connection quality
- Corrosion free connections as a result of cold weld action
- Preparation of harnessing with crimp contacts already fitted
- More economic cable connection

Requirements for crimp connections are set out in DIN EN 60 352-2.

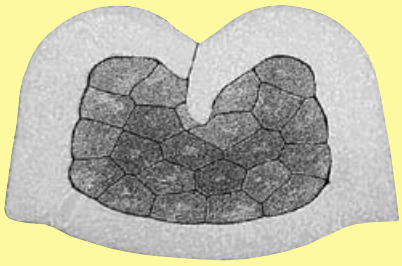
Pull out force of stranded wire

An essential consideration for a good quality of crimp connection is the mechanical retention of the wire in the crimp contact. As set out in DIN EN 60 352-2 the pull out force of the wire from the crimp must be at least 60 % (at 0.75 mm²) of the breaking force of the wire itself.

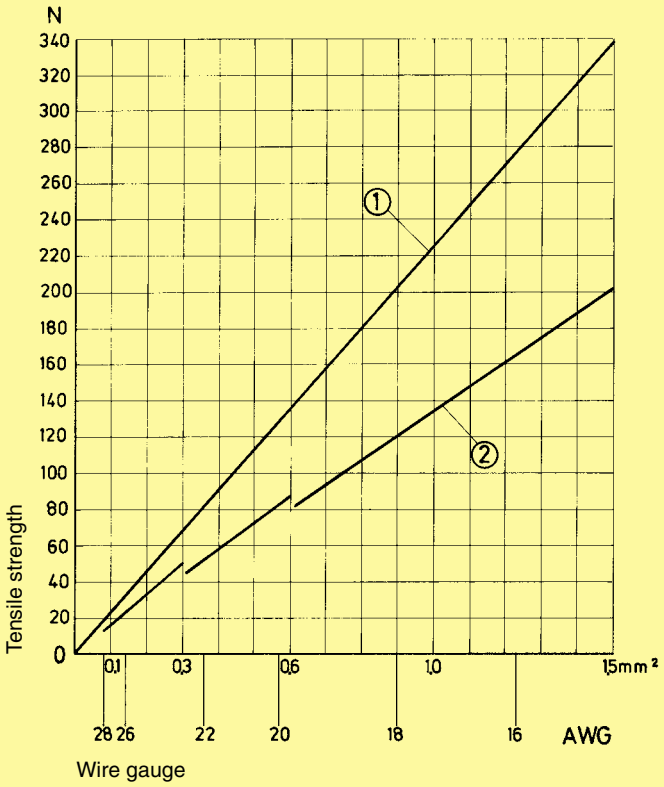
The adjacent diagram shows tensile strength plotted against wire cross sectional area. From this you can see the relationship between the breaking strength of wires and the force necessary to destroy HARTING crimp connections.

① Tensile strength of stranded wire

② Pull out force of wires from HARTING crimp contacts



Crimp cross-section



Crimping tools

Crimping tools (hand operated or automatic) are carefully designed to guarantee a symmetrical deformation of the crimping area of the contact and the wire through the high pressure forming parts of the tool. The locator automatically engages the crimp contact and the wire at the correct point in the tool. The wire insulation can also be included as a secondary feature of some crimp contacts to care for additional mechanical strength.

The ratchet in the tool performs 2 functions:

① It prevents insertion of the crimp into the tool for crimping before the jaws are fully open

② It prevents the tool from being opened before the crimping action is completed

A quality crimp connection can be achieved with this crimping system.
The adjacent sketches show important features of the HARTING hand crimping tool.
The HARTING automatic crimping tool uses bandoliered contacts.
The machine strips insulation from the wire and then crimps the contact. Both the crimping area and the insulation support are independently adjustable to facilitate the use of any wire type with dimensions within the stated crimp capacity.