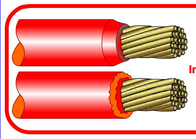
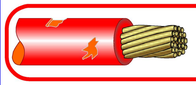
Visual Inspection of Crimp Connections

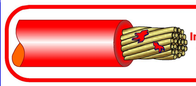
WIRE SOLUTIONS™
the smartest way to connect.

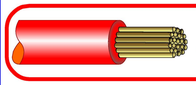
Stripping

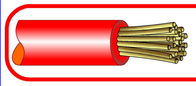
Maximum number of separate strands:
Specified in % according to section where the result is rounded off.
Up to 0,5 mm² = 5%; up to 0.75 mm² = 8%; over 0.75 mm² = 8%
From 25 mm² max. 30 truncated single wires.

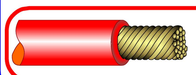




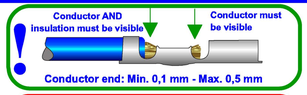




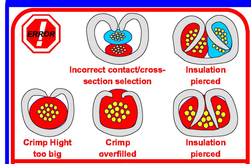


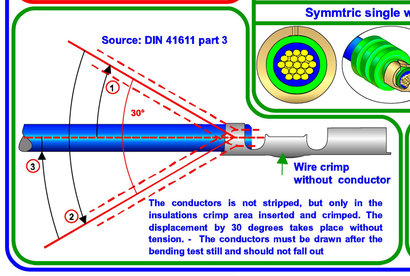


Position of the conductor

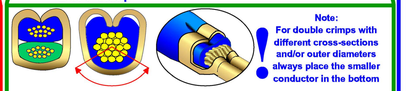


Insulation crimp area





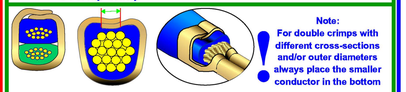
B or F-crimp



Note:
For double crimps with different cross-sections and/or outer diameters always place the smaller conductor in the bottom

At least 1/3 (120°) of the insulation scope must be covered by the crimp flanks. This is required to ensure a secure fixation of insulation. The ends of the crimp flanks may enter these in insulation but not break through. No single wires must be damaged.

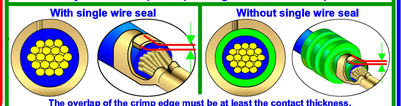
Overlap crimp



Note:
For double crimps with different cross-sections and/or outer diameters always place the smaller conductor in the bottom

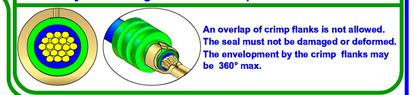
The overlap of the crimp flanks end must conform to at least the contact material thickness

Asymmtric wrap crimp - Single wire seal crimp



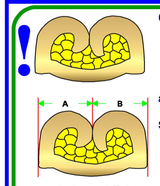
The overlap of the crimp edge must be at least the contact thickness.
The seal must not be damaged or deformed.

Symmtric single wire seal crimp



An overlap of crimp flanks is not allowed.
The seal must not be damaged or deformed.
The envelopment by the crimp flanks may be 360° max.

Wire crimp area - Judgement: Micrograph



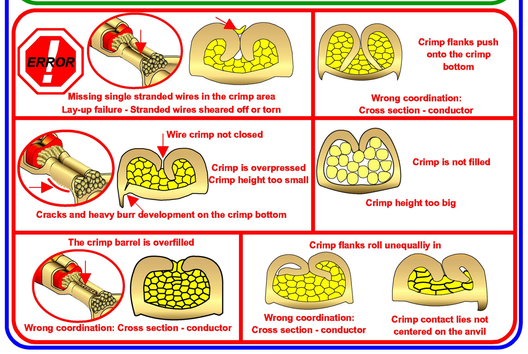
Cavities due to:
- non-uniform distribution of single wires
- uneven rolling of the Crimpflankes
- Changes of contact material thickness,
- Changes of the individual wire diameter
- Change of cross sections,
- or unfavourable crimp tolerances

are not allowed!

Symmetrie: A = B

(1) minimum half contact material thickness
(2) minimum half contact material thickness
(3) maximum contact material thickness
(4) minimum 75% contact material thickness

(5) Suporting angel: Maximum 30°
(6) Suporting height: Maximum contact material thickness
(7) Burr height: Smaller contact material thickness
(8) Burr width: Smaller half contact material thickness



Conductor cross section & Pull-out strength

Nominal cross-section Conductor		Pull-out strength (min. nominal value) Open crimp barrel DIN EN 60352	Ferulles / Wire pin EN 60947-1 Date 12/02	Ferulles / Wire pin EN 60999-1 Date 12/00
mm²	AWG	N	N	N
0,05	30	6		
0,08	28	11		
0,10	27			
0,12	26	15		
0,16	25	18		
0,20	24	28	10	10
0,25	23	32		
0,32	22	40		15
0,41	21			
0,50	20	60	30	20
0,75	19	85	30	30
0,82	18	90		
1,00	17	108	35	35
1,30	16	135		
1,50	15	150	40	40
2,10	14	200		
2,50	13	230	50	50
3,30	12	275		
4,00	11	310	60	60
5,30	10	355		
6,00	9	360	80	80
8,40	8	370		
10,00	7	380	90	90
13,30	6			
16,00	5		100	100
21,20	4			
25,00	3		135	135
35,00	2		190	190
				EN 60999-2 Date 4/2004
50,00	1/0		236	236
70,00	2/0		285	285
95,00	3/0		351	351
120,00	4/0		427	427
150,00			427	427
185,00			503	503
240,00			578	578
300,00			578	578

Pull-out strength DIN 46249 Part 1

Nominal cross section Conductor mm²	Nominal Value (Plug width)				Pull-out strength (N) min. Nominal Value 2,8	Pull-out strength (N) min. Nominal Value 4,8 - 9,5
0,14	2,8				20	20
0,25	2,8				40	40
0,50	2,8	4,8	6,3		60	80
0,75	2,8	4,8	6,3		70	120
1,00	2,8	4,8	6,3		80	160
1,50		4,8	6,3			200
2,50		4,8	6,3			250
4,00			6,3	9,5		350
6,00			6,3	9,5		500

For deviating conductor cross-sections the respectively smaller pull-out strength is standard. The pullout strengths result from the nominal value of 2.8 because of the smaller material thickness. (Extract from DIN 46 249 Part 1

Pull-out strength for cable lugs and compression lug

Tensile strain AL-conductor:
40 X Conductor cross section (max. 20.000 N)

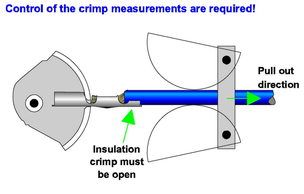
Tensile strain copper-conductor:
60 X Conductor cross section (max. 20.000 N)

Pull-out speed:
Max cross section x 10 N/mm² pro second
(The maximum tensile load per section is reached, this power 1 minute must be kept.
No slides may occur during this time! (Press & hold))

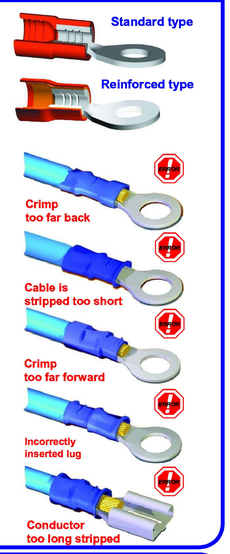
Pull out test

It is not sufficient only to measure the conductor pullout strength, because they can have the same value at different pressing degrees.

Control of the crimp measurements are required!

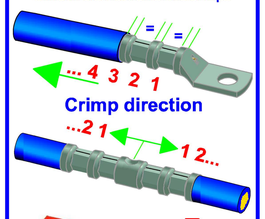


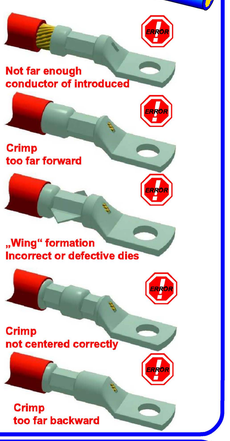
Insulated terminals



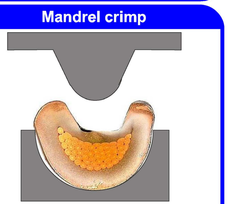
Hexagonal crimp

Crimps can't be to each other not twisted!
Uniform distribution of the crimps





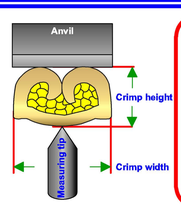
Mandrel crimp

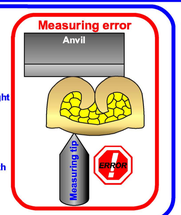


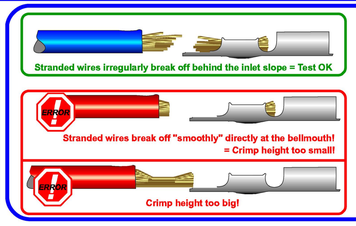
Crimp measures

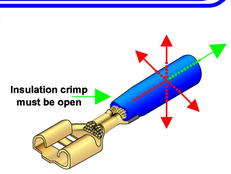
Take the crimp measurements and tolerances from the appropriate specification for the crimp contact to be tested.

Cross section		Tolerance
0,03 - 0,20 mm²	AWG 32-34	+/- 0,02 mm
0,20 - 0,50 mm²	AWG 24-20	+/- 0,03 mm
0,30 - 0,81 mm²	AWG 22-18	+/- 0,04 mm
0,50 - 6,00 mm²		+/- 0,05 mm
6,00 - 25,00 mm²		+/- 0,10 mm
25,00 - 50,00 mm²		+/- 0,15 mm

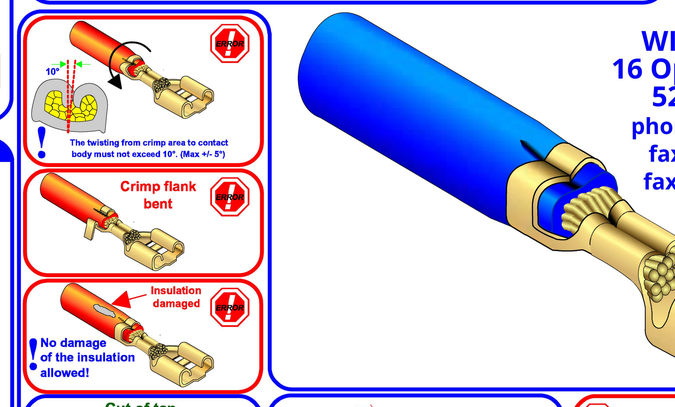








The direction of pull (3) must be in the longitudinal axis of contact and conductor are made! If the director would bend just after the crimp barrel in one direction (4) the inevitable impact on the result!



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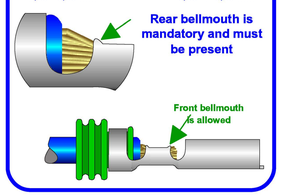
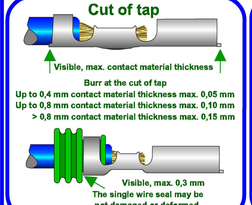
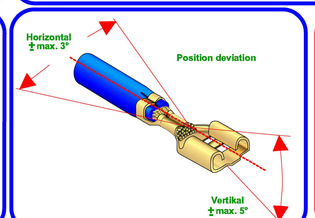
0,03 - 0,56 mm² (AWG 32-20) 0,25 +/- 0,15 mm
0,30 - 0,81 mm² (AWG 22-18) 0,25 +/- 0,15 mm
0,50 - 2,50 mm² 0,40 +/- 0,20 mm
2,50 - 6,00 mm² 0,60 +/- 0,30 mm



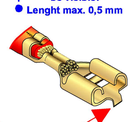
Cut of tap



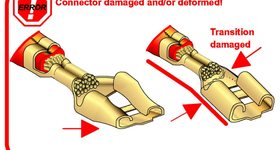


Cut of tap deformed

Note: Cut of tap must be visible!
Lenght max. 0,5 mm



Connector damaged and/or deformed!



Note:
Crimp contacts with damaged, bented or deformed functional areas (cut off tab etc.) must not be aligned and must be scrapped.

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