Segmented Radial Crimp (SRC)
Closed Barrel Core Crimp termination
- General Guideline -

Fig. 1 / Closed Barrel Terminal – SRC Die – terminated Terminal – Cross Section - (all exemplary)

LTR	REVISION RECORD	DRAWN	APPROVED	DATE
A	Initial release	U. Bluemmel	E. Glombitza	30.01.2024

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1 Scope

This specification describes the Segmented Radial Crimp (SRC) termination of core conductor crimp for closed barrel crimp terminals on stranded copper conductor wire.
It generally applies to SRC-crimp connections of a stranded inner conductor of a single core wire made from pure copper in nominal wire size 2,5 to 200 mm².
It can be applied analogously for other wire types.

This specification gives general guidelines.
Detailed application data for specific terminals is given in 'Terminal Associated SRC Application Specifications'.

2 Additional documents

'Terminal Associated SRC Application Specifications'.
Information in these has – for the specific terminal - priority over the general guidelines here.

114-97859	Segmented Radial Crimp (SRC) - on Terminals for Charging Inlet (exemplary)

Application Equipment Operation Instructions:

409-35032	SRC-M Segmented Radial Crimping Machine – PN 2335600-[ ]
409-35047	SRC-A Segmented Radial Crimp Applicator – PN 2510896-[ ]

Other additional documents:

2439743	Customer Drawing - TE Connectivity PN of Measure Tips
ISO 6722	Road vehicles - single-core copper conductor cables
ISO 19642	Road vehicles – Automotive cables
ZVEI TLF 0214	Validierung von Automotive-Niedervolt-Steckverbindern / Feb. 2021 Link

3 Description

The following terms are used in this specification. The shown images are exemplary.

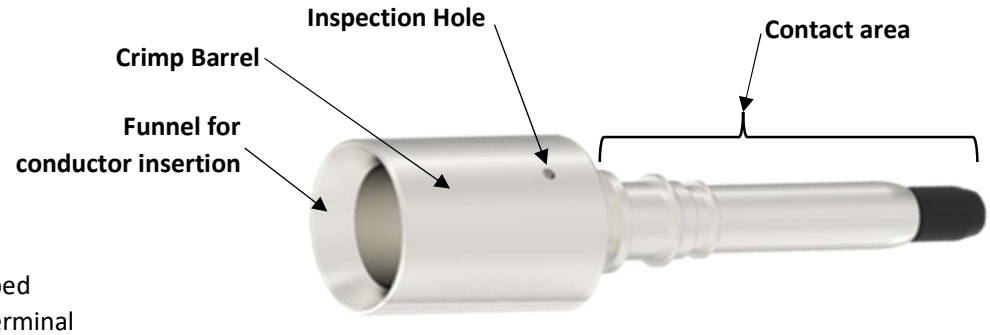


Fig. 2 / uncrimped
Closed Barrel terminal

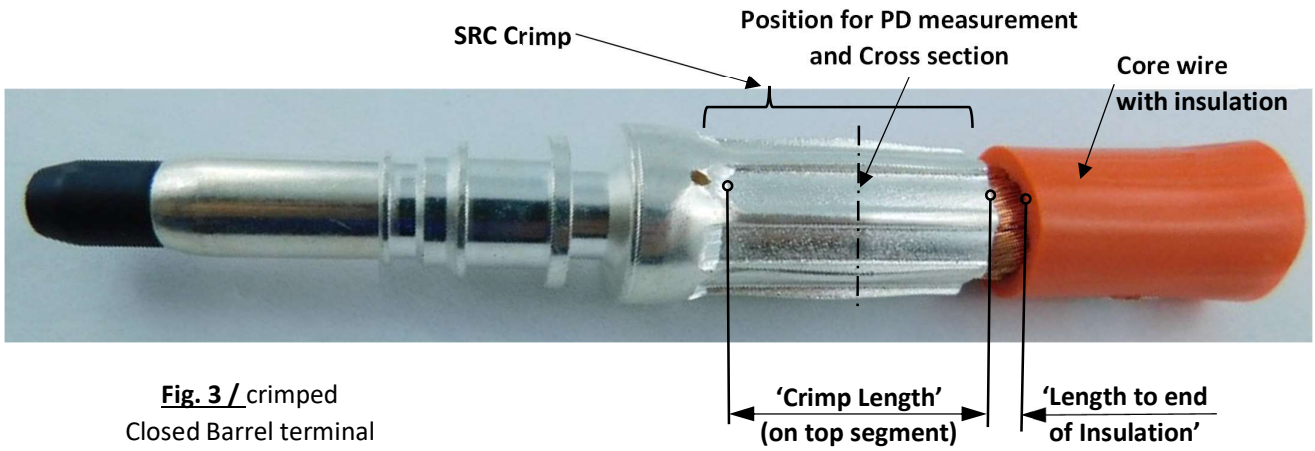


Fig. 3 / crimped
Closed Barrel terminal

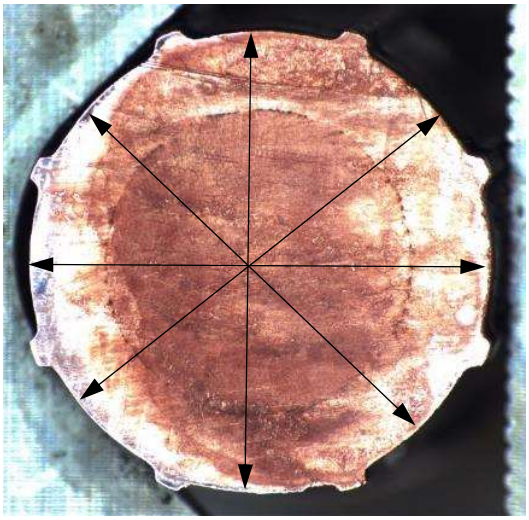


Fig. 4 / cross section
through SRC crimp
- exemplary -

4 Wire

This specification is valid for stranded copper conductor Automotive wires - as described in e.g. ISO 6722 or ISO 19642.
It can be applied analogously for other wire constructions or other conductor materials.
For a specific terminal the validated wire type is described in its 'Terminal Associated SRC Application Specification'. The use of other than the validated wire type stays within the responsibility of the user or needs to be aligned with the associated TE Connectivity Engineering Department.

4.1 Wire preparation

The wire insulation must be stripped before crimping. The suggested **stripping length SL** of the inner conductor insulation is given in the 'Terminal Associated SRC Application Specification'.
The stripping length may be adopted to fulfill the requirements on the crimped terminal of 'Length to end of Insulation' to the crimped barrel end (see chapter 5.1) and visibility of conductor in the inspection hole.

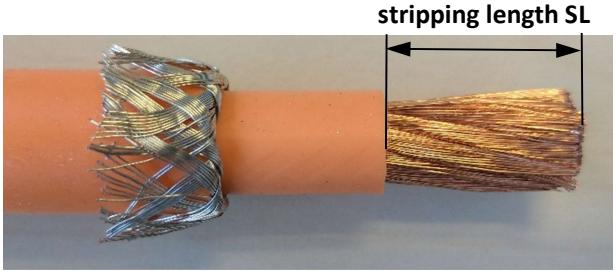


Fig. 5 / stripped wire

The insulation must be separated in a straight cut perpendicular to the wire axis. Flitters or threads of insulation material, which may get into the crimp barrel, are not permitted.
Single strands may not be damaged, fanned out, cut or pulled out.
The operator should avoid touching the strands. Sticking out strands are not permitted.
The strands of the conductor may not be additionally twisted.

Preparation lengths of shield braid and outer insulation sheet (if exists) need to be given in the Product Associated Application Specification.

5 Requirements on the crimped terminal

5.1 Conductor crimp

5.1.1 Conductor position

All strands of the conductor need to be inserted to the crimp barrel. The funnel for wire insertion aids to capture all strands.
The wire is pushed inside the crimp barrel till the front of the conductor reaches to the front end of the crimp barrel.

After crimping – for terminals with inspection hole – the conductor must be visible through this hole.

After crimping the '**Length to end of Insulation**' can be checked. It needs to be within 0,1 to 3mm all around (see Fig. 3).

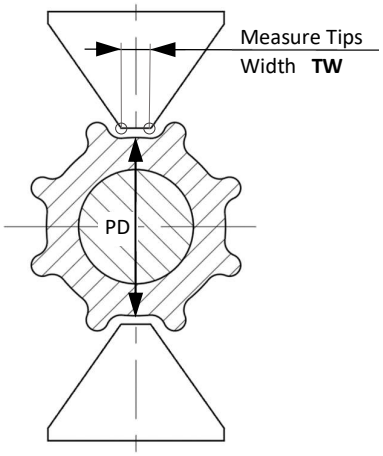
5.1.2 Crimp data for the conductor crimp

The **'Press Diameter' PD** is the key quality feature of this crimp connection. The measurement allows a non-destroying examination and an ongoing process inspection. The 'Press Diameter' value including its tolerance is provided for every wire size to terminal combination in the 'Terminal Associated SRC Application Specification'.

The 'Press Diameter' must be checked for each batch and after every change or switchover of terminal or wire or application equipment.

Measurement of the 'Press Diameter' is done in the middle (axial location) of the SRC-crimp (see Fig. 3) at the convex surface of opposing pressed surfaces.
It is done with a micrometer having **defined tips** (see Fig. 6 &7) – to assure the measurement is between the ribs.

For the 4 directions, the 'Press Diameter' is intended to be of same dimension. Measurement is to be done in only one of the 4 directions (preferred: vertical direction). Assure to not include a rib between the press surfaces in the measurement. Assure to measure via the center of the crimp barrel (see Fig. 6).



Measure in one direction
(preferred: vertical direction)

'Press Diameter'
is intended to be same
in all four directions
within 1% of nominal PD value

Fig. 6 / 'Press Diameter' PD Measurement

Measure Tips Width TW (and TE Connectivity suggested measure tip PN 2439743-x - see Fig. 7) is given in the 'Terminal Associated SRC Application Specification'.

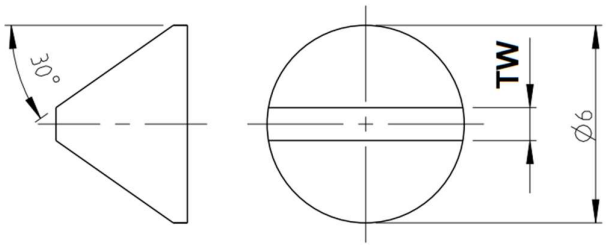


Fig. 7 / Measure Tip - generic -

Fig. 8 / Micrometer with interchangeable tips / TE Connectivity suggests: Micromahr 40EWR-V

The 'Press Diameter' tolerance for the terminal and the directions is not to be accumulated. This means at least one directional measurement (preferred: vertical direction) must pass the Terminal PD tolerance as given in its 'Terminal Associated SRC Application Specification'.

5.1.3 'Crimp Length'

The correct axial position of the terminal in the crimp tool needs to be assured. This is usually done by the Terminal Holder as part of the Application Tool.
This position can also be evaluated by maintaining the required 'Crimp Length' (see Fig. 3).
The 'Crimp Length' is measured in the middle (radial direction) of the topmost press segment.
Its value and tolerance are provided in the 'Terminal Associated SRC Application Specification'.

The correct position is given and can be visually checked by maintaining a small axial distance from the 'Crimp Length' imprint on the barrel to the inspection hole. (see Fig. 3).

NOTE

It is preferred to place the inspection hole to the top direction – for easy view in it - and to identify the topmost press segment.
It is not necessary to statistically monitor the stripping length, the 'Crimp Length' nor the 'Length to end of Insulation'.

5.1.4 Wire Pull Force

The wire pull force needs to pass the limit given in ZVEI TLF 0214 PG10 requirements.

Wire Size [mm²]	Pull Force [N]		Wire Size [mm²]	Pull Force [N]		Wire Size [mm²]	Pull Force [N]
2,5	200		16	1500		70	4200
4	310		25	1900		95	4800
6	450		35	2300		120	5500
10	500		50	3400		>120	5500

Tab. 1 / For reference: Wire Pull Force Requirements

In harness making production environment for large wire sizes and pull force >2000N it may not be necessary to pull the sample to full breakage (if limited by pull test device). If in such case the force limit can't be achieved by the pull test device, it can be considered to do in addition a cross section (of separate sample) and visual judge this for absence of major voids in the conductor strand compression.

5.1.5 Cross section

It is not mandatory to do a cross section of the SRC crimp area.
When creating a cross section, the section layer must be in the middle (axial location) of crimp barrel, perpendicular to the axis of the crimp (see Fig. 3), preferred not within a crimp barrel serration.

The 'Press Diameter' may also be measured in a cross-section image (see Fig. 4). The mechanical operated measurement though takes precedence.

There are no defined specific judgement criteria for the cross section.

5.1.6 Rotational orientation

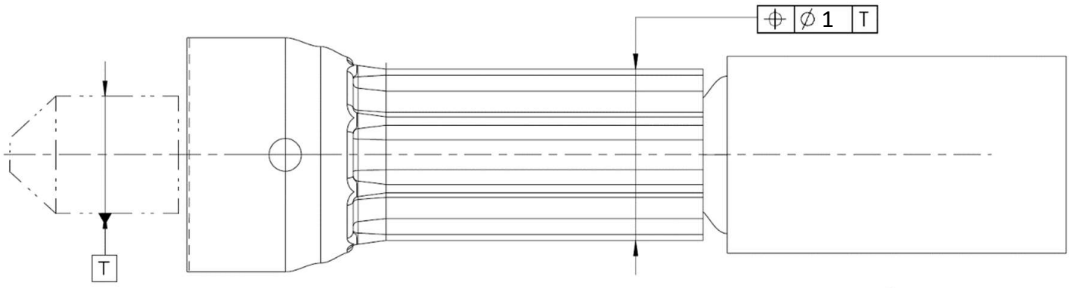
The rotational orientation of the press segments to the crimp barrel is usually not restricted. Though it is preferred to have (if exist) the inspection hole to the top.
For non-round terminals the rotational orientation may be restricted by the Terminal Holder and described in the 'Terminal Associated SRC Application Specification'.

5.2 Contact area

The contact area of the terminal may not be bent, scratched, damaged or deformed after crimping or further processing.

5.3 Form and Position

A general requirement for the allowed bending deformation caused by the SRC is here shown exemplary for round terminals.
For non-round terminals there may be associated definition in its 'Terminal Associated SRC Application Specification'.



T = Datum Plane – center axis of terminal contact area

Fig. 9 / Form and Position requirement

6 Crimp Data and Application Tools

The Crimp Data and Application Tool PNs for a terminal to wire combination are given in its 'Terminal Associated SRC Application Specification'.

7 Application Equipment – General Overview

There are two types of SRC application equipment – witch both have associated terminal specific crimp tools.
Based on the wire size, usually only one Application Equipment type is available for a certain terminal.
Both are available with TE Connectivity's Crimp Force Monitoring CQM II.

7.1 **SRC-A** – on Electric Excentre Press

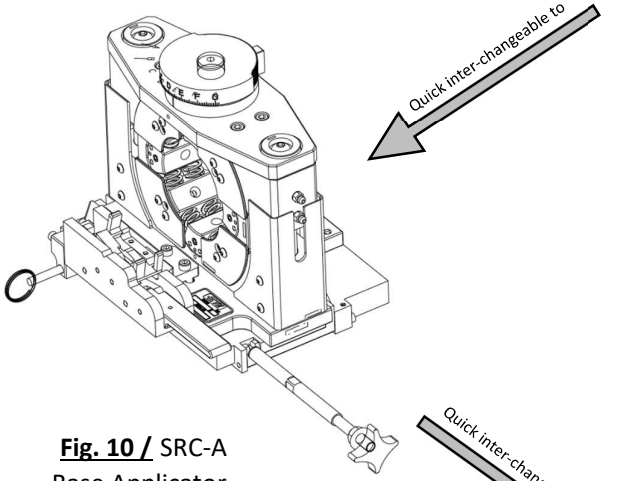


Fig. 10 / SRC-A
Base Applicator
PN 2510896

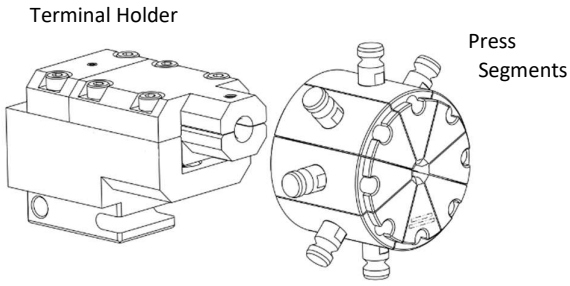


Fig. 11 / Terminal specific
SRC-A Die Set
- exemplary -

Fig. 12 / Crimp Terminator
PN 2335500-x HF20 w/o CQM
PN 2348822-x HV20 with CQM

7.2 **SRC-M** – on Hydraulic Press

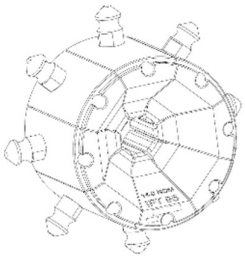


Fig. 13 / SRC-M
Die Set - exemplary -

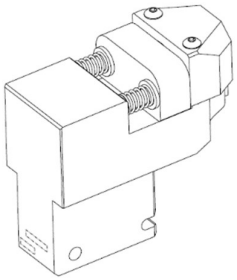


Fig. 14 / SRC-M
Terminal Holder
- exemplary -

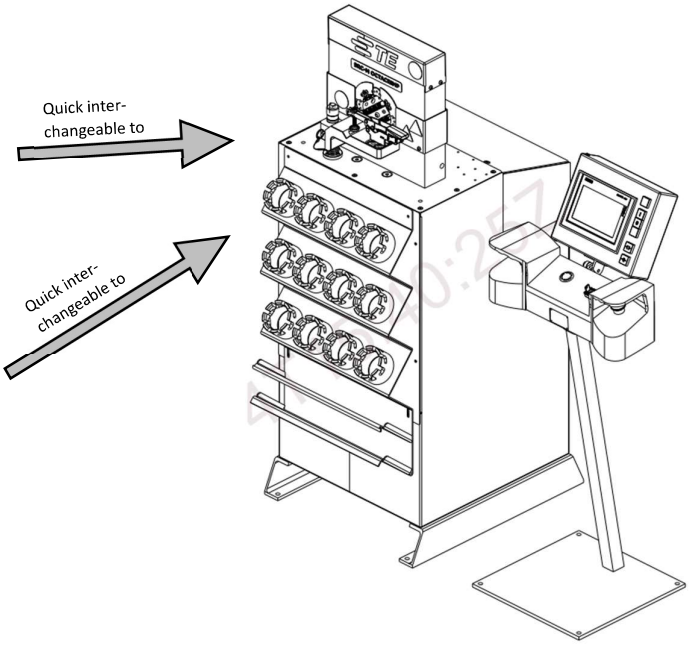


Fig. 15 / SRC-M OCTACRIMP Hydraulic
Press PN 2335600-1 w/o CQM
PN 2335600-2 with CQM

7.3 **Wire Preparation**

For fully automatic cable preparation TE Connectivity recommends the HV-CP cable prep machine part number 2335400-1.

Fig. 16 / HV-CP
cable prep machine

8 Visual & Dimensional Check – Overview

(1) Conductor must be visible through the inspection hole.

(2) Visually check 'Length to end of Insulation'. Needs to be 0,1 to 3mm.

(3) Measure 'Press Diameter' in the middle of the barrel – one direction - needs to be within tolerance. Use measure tips of defined width.

(4) Visual check axial crimp position – Crimp imprint needs to have small distance to inspection hole. Or (4b) (optional) measure 'Crimp Length'.

(5) Check terminal alignment – bending of body to crimp within tolerance.

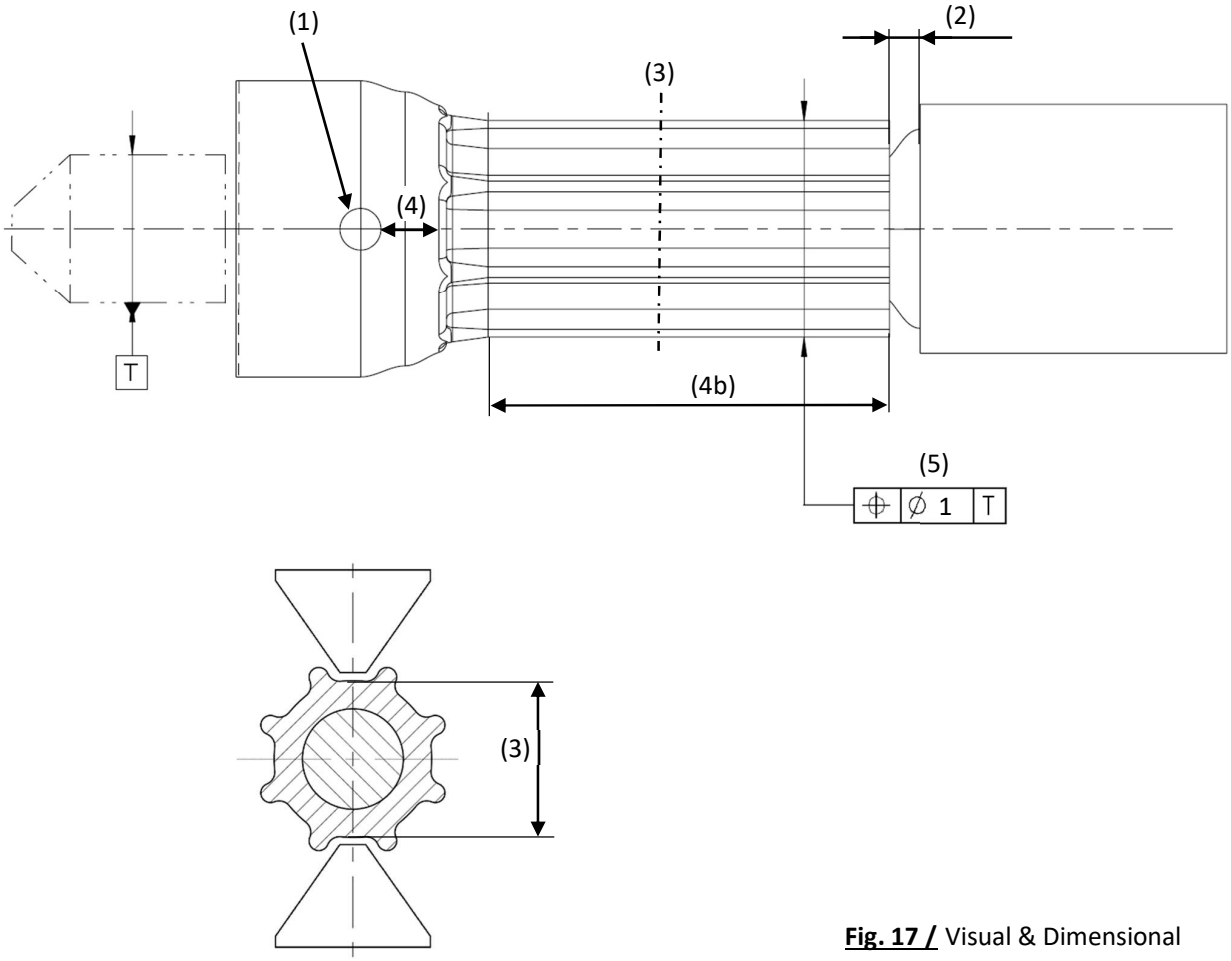


Fig. 17 / Visual & Dimensional Check - Overview -