Processing Specification

MiniBridge IDC

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Change History

Change #	Description of Changes	Date (DE)
01	Imported “Version 5 Dating 20.06.2017” into current CAQ System QBD.Net plus mainly minor orthographic corrections	13.08.20
02	Pressing dimension tolerances, ERNI genuine tools, partial loading, qualified wires now in separate attachment	17.08.20

1. Notes and Abbreviations

The visualisations in this document are of a schematical nature and adjusted for their respective purposes. For exact product representations we refer to product drawings and CAD models, which can be requested at ERNI.

The terms “cable” and “wire” are used synonymically and can be exchanged in the context of this document.

“AWG22” and “0.35 mm²” are used synonymically.

Abbreviations

IDC	Insulation Displacement Connection
ID	Insulation Displacement

References to Standards

- DIN EN 60352-4
  Lötfreie elektrische Verbindungen - Teil 4: Lötfreie nichtzugängliche Schneidklemmverbindungen; Allgemeine Anforderungen, Prüfverfahren und Anwendungshinweise; Deutsche Fassung EN 60352-4
  (Solderless connections - Part 4: Solderless non-accessible insulation displacement connections - General requirements, test methods and practical guidance)
- IPC-A-620 now IPC/WHMA-A-620
  Requirements and Acceptance for Cable and Wire Harness Assemblies

2. Fundamentals

The acceptance criteria for cable assemblies and cable harness assemblies in the current IPC-A-620 manual is generally recommended for the assembly of ERNI connectors.

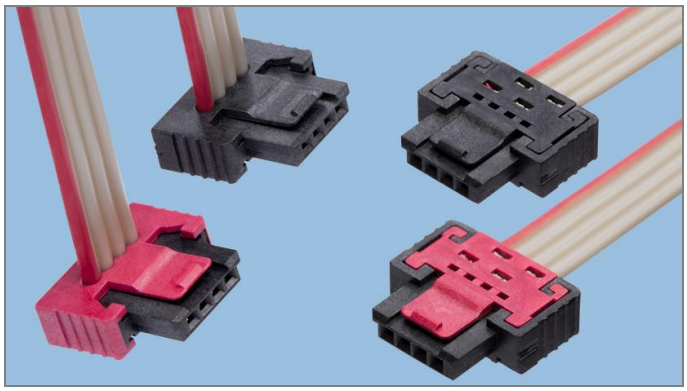
3. Product characteristics

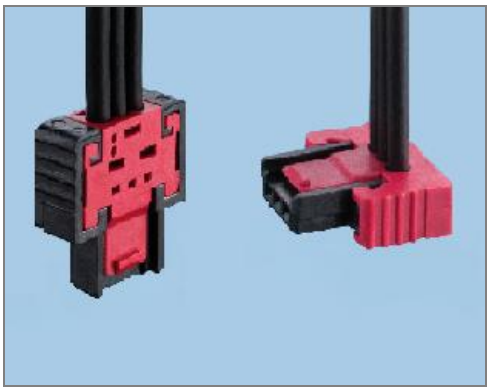
IDC-terminal connectors of the MiniBridge product family are available in the Standard and Koshiri version.

Number of pins:
2, 3, 4, 6, 8, 10 and 12 pins

Locking Types:
Positive lock:
Red cable guide and latch at the Standard and Koshiri version. Detachable by tool.

Friction lock:
Black cable guide and latch at the Standard version. Detachable by hand without tools


MicroBridge Standard (Positive and Friction Lock)


MicroBridge Koshiri (Friction Lock)

Terminal sizes:

- IDC terminals for the Standard version are available in **AWG 26/24 and AWG 22** size
- IDC terminals for the Koshiri version are available in **AWG 22** size

4. Cable types

The MiniBridge IDC termination meets the requirements of DIN EN 60352-4.

Cables with following properties are permissible according to this standard

- Flat ribbon cables or discrete wire with round solid core or stranded wires with 7 strands are to be used.
- Stranded wires must have tin-plated (tin or tin-lead) or silver-plated strands.
- The insulating material must be PVC or a different material that is compatible with the cutting and clamping process. That means, that the complete displacement of the insulation material by the inner termination clamp edges should be possible without damaging the wire**.** For stranded wires, the cable insulation must additionally be suitable to hold the strands in place, so they cannot be displaced inadvertently during the assembly process.
- When using flat ribbon cables, the insulation material between wires (including each insulation gap belonging to the flat ribbon cable design) must be completely displaced by the edge of the ID termination clamp.

In addition to DIN EN 60352-4, stranded wires with plain strands are qualified as well.

Due to the compact design of the connector, only cables with an outer diameter, which fits into the corresponding cable guide, can be used. Only cables with a maximum outer diameter of 1.07 mm or 1.27 mm, depending on the cable guide, may be processed.

Qualified cable and wire types are listed in a separate attachment.

5. Tools

5.1. General information

In order to prevent connector damage from excessive pressure the only tools allowed are those which limit the press-in distance so that it may not be possible to press below the lower dimension limit.

Tools need to have sufficient space so that the locking mechanisms cannot become damaged during the pressing process.

The use of ERNI genuine tools for the processing of MiniBridge female connectors is mandatory.

5.2. Partially-populated MiniBridge connectors with 0.35 mm² copper cross-section

There is a variation in the processing of partially-loaded IDC connectors using discrete wire with a cross-section of 0.35 mm² (AWG 22). In this case, the only tools and devices permitted for use are those which close, i.e. fill and support, the unloaded positions of the cable guide and prevent excessive pressure on the neighbouring ID terminal clamps on the plastic body. This can also be achieved with short filling wires or dummy wires which are cut from the processed wire type.

This preventive operation is not necessary using IDC connectors with smaller cross-sections (AWG 24/26). However, it is a useful measure to avoid assembly errors and scrap.

5.3. Processing parameters

5.3.1. Pressing force

Depends on cable cross-section and insulation material. Pressing forces up to 100 Newton per contact are necessary for processing MiniBridge connectors.

Devices such as hand-lever presses, other types of presses, or machines should be designed accordingly.

5.3.2. Pressing speed

A maximum pressing speed of 10 mm/s is recommended.

5.4. Tools available from ERNI

5.4.1. Tools for hand lever presses

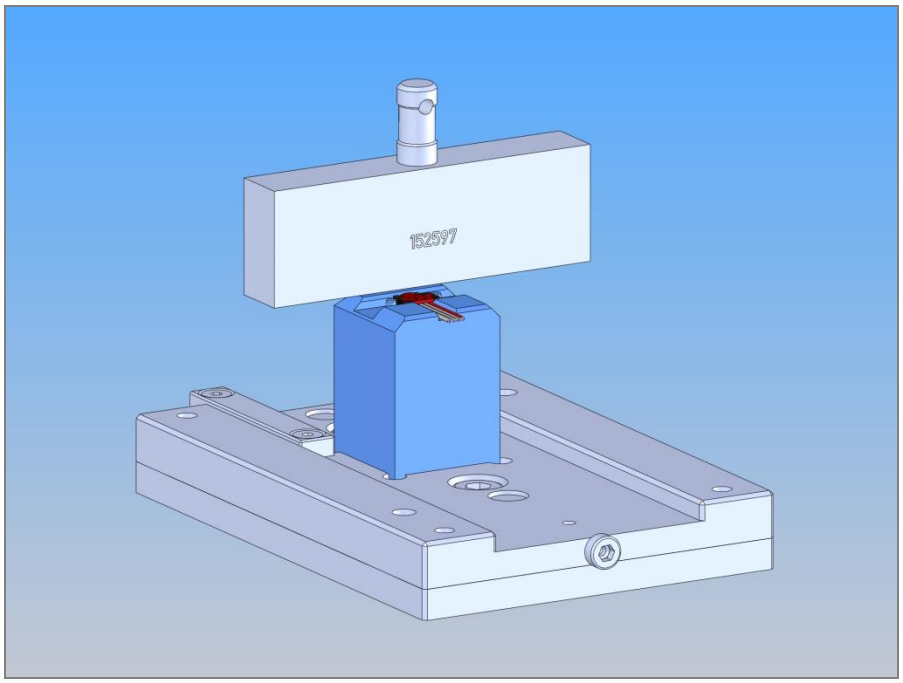
The basic tool set ERNI part number 501260 consists of upper tool and lower tool holder for assembly on hand-lever presses with Ø 10H7 for the upper tool holder and T-slot 10H9 for the lower tool holder.

5.4.2. Lower tools for MiniBridge female straight connector (Type A)

2 pins	ERNI Part- No. 172000
3 pins	ERNI Part- No. 172001
4 pins	ERNI Part- No. 172002

6 pins	ERNI Part- No. 172003
8 pins	ERNI Part- No. 172004
10 pins	ERNI Part- No. 172005
12 pins	ERNI Part- No. 172006

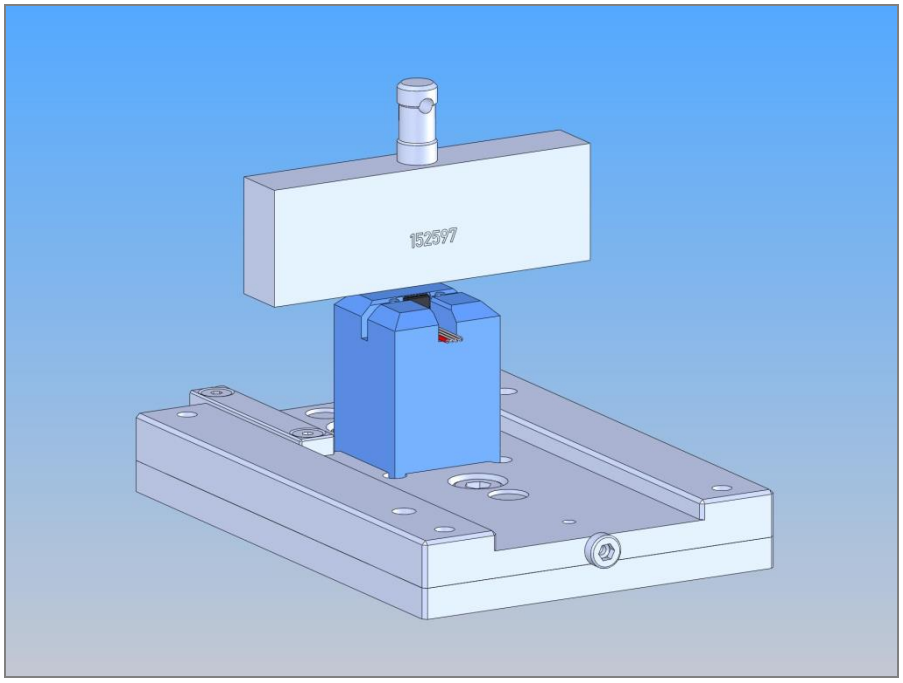
Example



5.4.3. Lower tools for MiniBridge female right angle connector (Type P)

2 pins	ERNI Part- No. 172007
3 pins	ERNI Part- No. 172008
4 pins	ERNI Part- No. 172009
6 pins	ERNI Part- No. 172010
8 pins	ERNI Part- No. 172011
10 pins	ERNI Part- No. 172012
12 pins	ERNI Part- No. 172013

Example



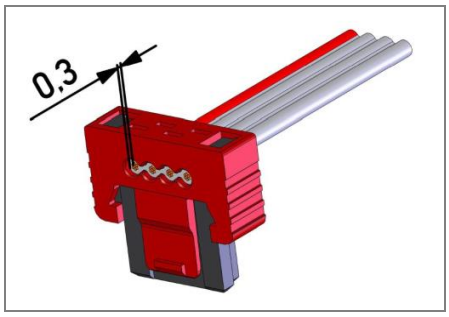
6. Assembly

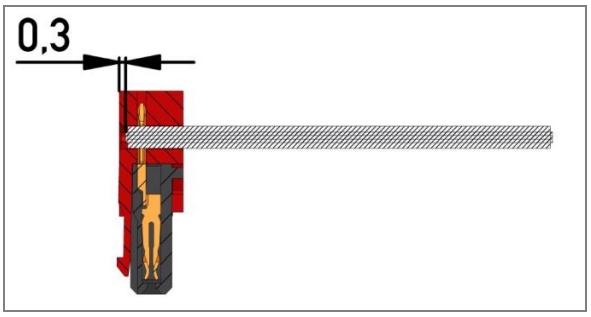
6.1. Positioning of the wire

6.1.1. Right angle cable termination (Type P)

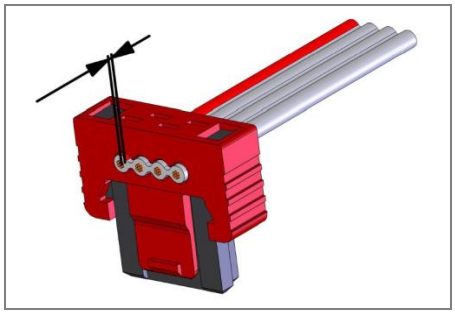
In the end position (cable beginning or cable end) of the connector, the cable tail must be aligned with the housing and cable guide respectively.

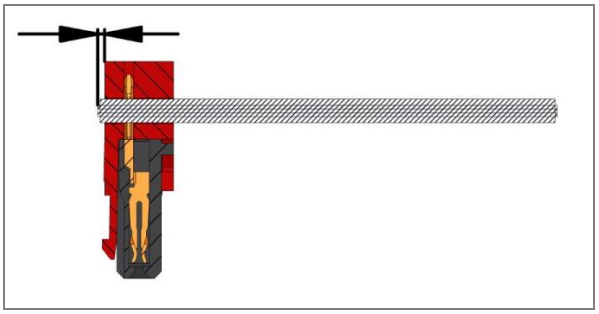
The maximum permissible gap (undercut) of 0.3 mm relates to the distance between the conductor and stranded wires respectively and the housing and cable guide respectively.





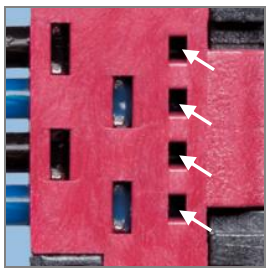
The cable protrusion (overhang) is not relevant to the assembly of the connector and can be arbitrary. The maximal permissible protrusion depends on the application of the cable assembly. An application-specific guideline is recommended if the IPC-A-620 criteria are not sufficient.





6.1.2. Straight cable termination (Type A)

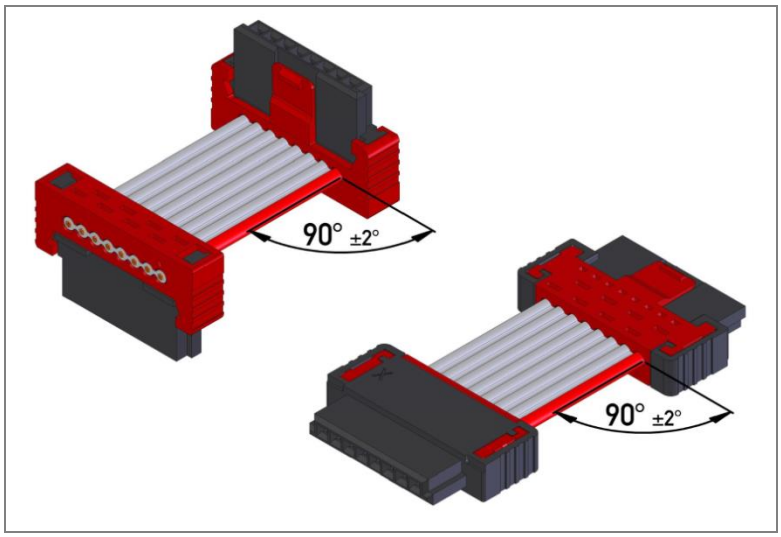
Sufficient plug-in depth (penetration) for flat ribbon cables or discrete wires for a straight cable termination must be ensured and safely achieved. This is guaranteed if the cable (insulation) is visible within the control window.



6.2. Flat ribbon cable alignment

A right angle (90°) between the IDC connector and the flat ribbon cable should be attained.

Allowable deviation is ± 2°.

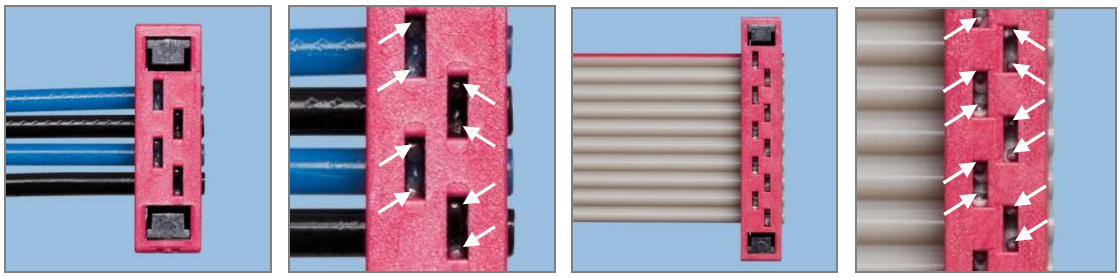


6.3. Position of the IDC Terminal after engaging the housing

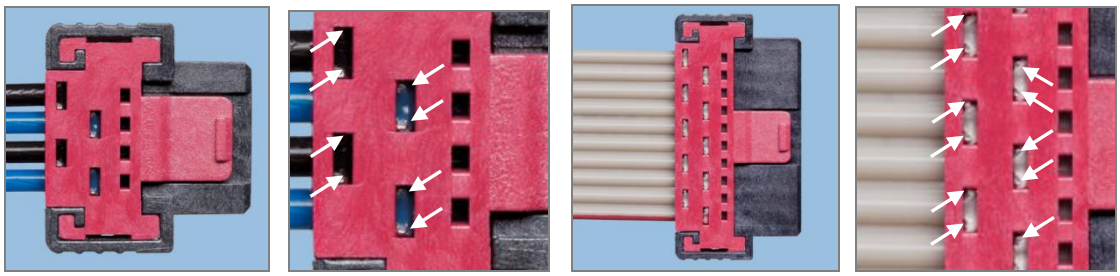
The correct flat ribbon cable or discrete wire position in the ID C is achieved when the tips of the

termination clamps are visible in their corresponding window of the cable guide.

MiniBridge right-angled female connector (Type P)



MiniBridge straight female connector (Type A)



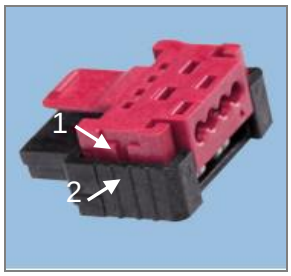
6.4. Cable guide locking

6.4.1. Visual characteristics

Both parts (housing and cable guide) must be fully engaged, however, they must not be over-pressed.

6.4.2. Visual characteristics of the engaged connector

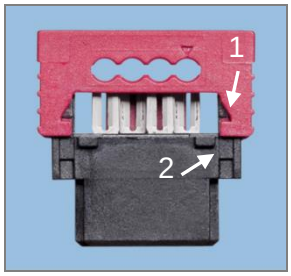
MiniBridge straight female connector (Type A)



Cable guide (1) engaged in housing (2)

Safely (fully) engaged

MiniBridge right-angled female connector (Type P)

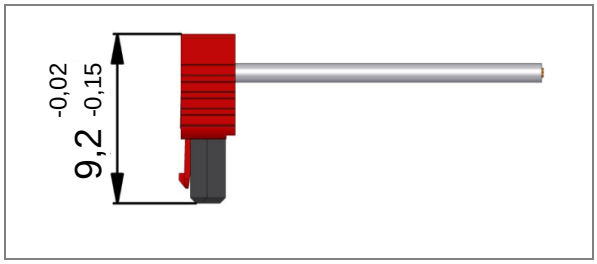


Cable guide (1) engaged in housing (2)

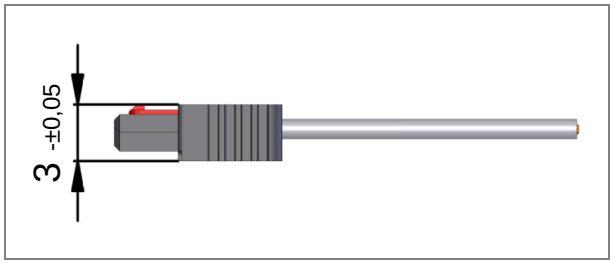
Safely (fully) engaged

6.5. Dimensions

The following dimensions must be achieved for the fully engaged, fully closed connector.



MiniBridge right-angled female connector (Type P)



MiniBridge straight female connector (Type A)

7. Inspection

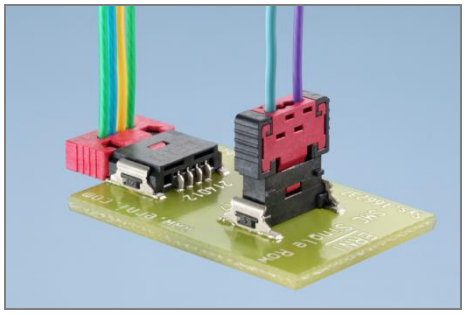
7.1. Inspection of part characteristics

- Cable position
- Flat ribbon cable alignment
- Position of the IDC terminations
- Engaging of the housing parts
- Dimensions of the fully closed connector

7.2. Electrical inspection (electrical test)

A suitable contact probe with a probe tip should be used for electrical inspection. This method provides a connection on the “tip” of the spring contact without damaging the inspection surface. A spring-loaded contact probe with a diameter of 0.35 mm and a spring load of 0.6 N is recommended.

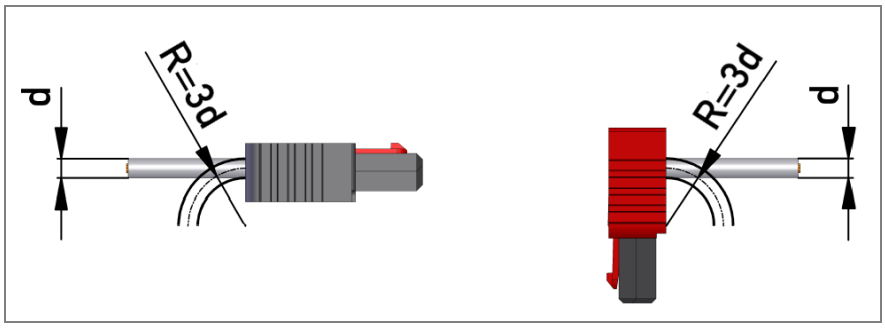
Alternatively, a male connector soldered onto the PCB can be used for the electrical inspection as well.



8. Application note

8.1. Recommendation for cable-laying

The bending radius shall not be less than triple[1)] cable diameter-size for cable-laying directly behind the contact end. This avoids the impairment of the insulation support at the IDC area.



[1)] Based on bending radii for flexible cables according to DIN VDE 0298 Part 3