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Title subject:	CK Connector	Revision date: November 25, 2019	

This manual describes the control points about the harness assembly for the insulation displacement (ID) type CK connector, by using JST's automatic ID machine, the pneumatic ID press and the hand press.

Refer to the handling manual of the ID machine for smooth operation as well.

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1. Composition and Parts Identification

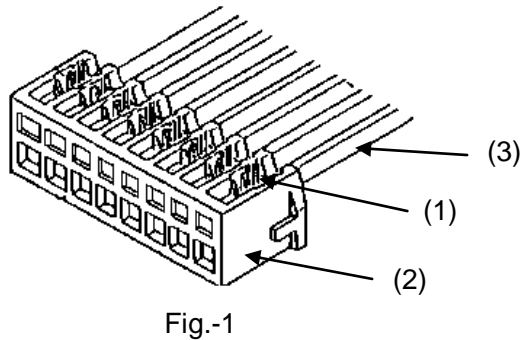


Fig.-1

(1) Contact

(2) Housing

(3) Wire

1-1 Contact

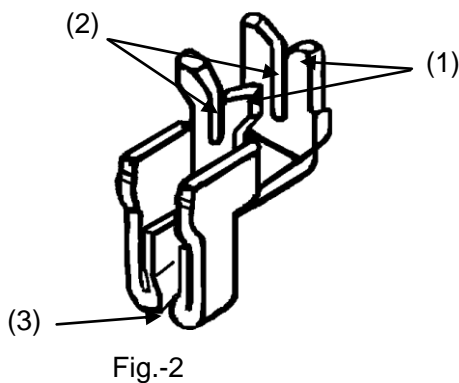


Fig.-2

1-2 Housing

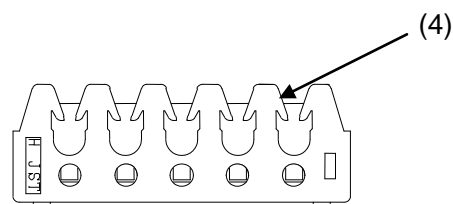


Fig.-3

- (1) Beam: The two beams have the individual U slot construction.
- (2) U slot: It cuts wire insulation to come in contact with wire conductors electrically and mechanically.
- (3) Contacting part: It comes in contact with the header post. Double-leaf construction.
- (4) Strain relief: The strain relief retains the wire insulation so that an external load that applies to the wire does not apply to the termination slot part.

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2. Applicable Wire

Wire to be actually used should be checked for its applicability by JST.

2-1 Wire size and wire insulation outer diameter

Table-1

	Wire insulation outer dia. (mm)
AWG #26, AWG #28	$\phi 0.75 \sim \phi 1.05$

2-2 UL style:UL1061 and UL10272

Note₁: The characteristics of the wire insulation differs depending on each wire supplier.

2-3 Wire conductors:7 stranded wire (tin-plated)

3. Applicable ID Tools

Table-2

ID tools and model No.	ID applicator model No.
Hand press (Model No.: HPD-M2A)	H2A-KR/XR H2-KR/XR20ED-X
Pneumatic press (Model No.: AP-2, AP-2H)	H2-KR/XR20ED-X

Note₂: Contact JST for an automatic ID machine model No.

4. Model Number, Housing Color and Applicable Wire Size

Table-3

Model No.	Applicable wire
**CK-6()-P	AWG #26, AWG #28
**CK-6()-PC	AWG #26, AWG #28

Note₃: “**” denotes 2-digit circuit number. (02 ~ 15)

An alphabet in () denotes the color. (H...Gray, Y...Yellow, R...Red, N...Brown)

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5. Control Points of Terminating Operation

Check the following points to conduct an appropriate terminating operation.

5-1 Check the ID machine operates properly.

Refer to the handling manual of the ID machine before conducting the operation.

Main checkpoints

① Hand press

- Check the ratchet device works normally.
- Check the connector-setting position is normal.
- Check no wire chips adhere to the termination punch, etc.

② Pneumatic Press

- Check the air pressure is normal.
- Check the connector-setting position is normal.
- Check no wire chips adhere to the termination punch, etc.

③ Automatic ID machine

- Check the operation sequence is normal.
- Check the bowl-feeder and the straight-chute run normal.
- Check wire tension is appropriate.
- Check the wire-measuring system operates accurately.
- Check the connector-setting position is normal.

5-2 Check the connector size fits to wire size.

5-3 Check wire color and wire length conform to the drawing.

5-4 Check the termination depth of each connector is applicable. Refer to item 5 "Termination Depth."

5-5 Check the wire retention force satisfies the specified value. Refer to item 6 "Wire Retention Force."

5-6 Check the termination appearance is good. Refer to item 7 "Termination Appearance."

5-7 Check whether another connector of different circuits or different sizes that were terminated in the previous termination do not remain in the bowl-feeder or the straight-chute of the automatic ID machine.

5-8 Check that periodically cleaning is conducted; the hand press, the pneumatic press and the automatic ID machine are free from wire chips.

6. Termination Depth

6-1 Applicable termination depth is stated below.

① Termination appearance

The wire must be under the protrusion of the strain relief as shown in Fig.-4.

In case that a wrinkle as shown in Fig.-5 is found on the wire insulation at the strain relief part of the connector, check the wire retention force referring to item 6 "Wire Retention Force." When the measured wire retention force satisfies the specified value mentioned in item 6, the termination is good.

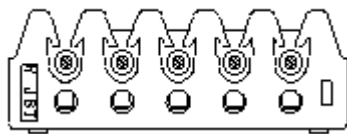


Fig.-4

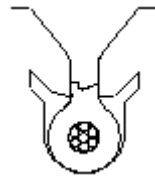


Fig.-5 (Example of wrinkling)

② Wire condition at the terminated part (U slot part)

- After the termination, cut off the shaded area (the strain relief and the housing wall) of the housing as shown in Fig.-6 and pick up the contact with the wires from the housing with the aid of pliers. Then, remove the wire from the contact U slot with care, holding the wire as shown in Fig.-7.

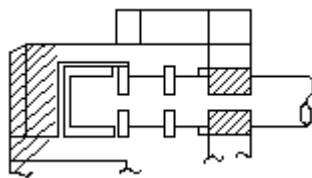


Fig.-6

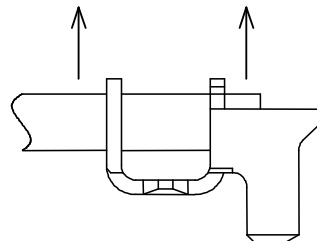


Fig.-7

- Check the wire between the U slots. In case of normal termination, the wire insulation at the terminated part remains as shown in Fig.-8.

Conductors can be seen.

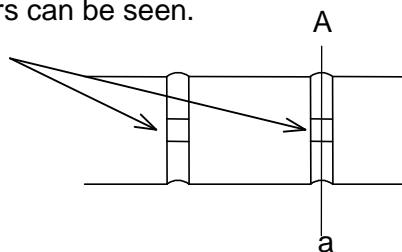
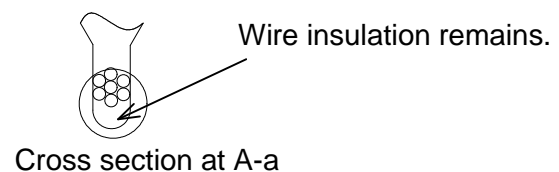


Fig.-8



Cross section at A-a

Note₄: Observe the wire right after removing it from the U slots without delay because the wire insulation rebounds due to the elasticity according to the passage of time.

③ Termination depth dimension.....Reference value

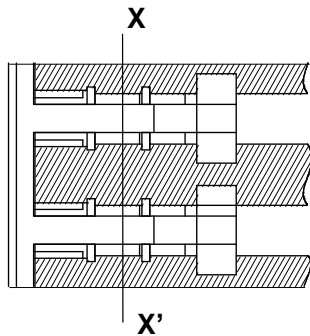


Fig.-9

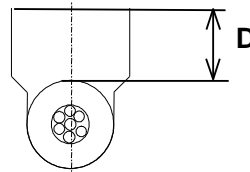


Fig.-10

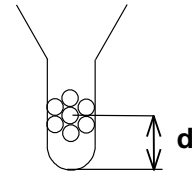


Fig.-11

Measure the termination depth “D” of Fig.-10 at X-X’ part of Fig.-9, where is in the middle part of the two U slots and a flattened part pressed by the termination punch, and check it satisfies the specified value in Table-3.

Table-4 Termination depth dimension “D”

AWG #26	UL10272	$0.80^{+0.1/-0.15}$ mm
	UL1061	$0.80^{±0.1}$ mm
AWG #28	UL1061	$0.80^{±0.1}$ mm

Table-4 is applied when wire insulation outer diameter is as shown in Table-4.

Table-5 Wire insulation outer diameter

	Wire insulation O. D. (mm)
UL1061 AWG #26	φ.1.0
UL1061 AWG #28	φ.0.9
UL10272 AWG #26	φ.0.8

Note₇: Contact JST when using the UL style and the wire insulation outer diameter other than the mentioned in Table-5.

Regarding the measurement of the termination depth, refer to the IDC Manual No. HM-0061 (TCM-0-002) “Method of Measuring Termination Depth by Dial Depth Gauge.”

The termination depth for ID connectors is the control point similar to the crimp height for crimp type connectors, but it is totally different in principle.

As the crimp height of the crimp type connector varies, the coefficient of the deformation of wire conductors changes enormously, and the electrical and the mechanical connection to the connector is much affected, so the crimp height is the important control point.

On the other hand, the U slot dimensions of ID connectors varies as per wire size, and the connection between wire conductors and the connector is decided according to the U slot dimension.

Therefore, the termination depth should compass the position where wire conductors are located in the U slot. This is the concept of the termination depth.

But, the termination depth is a reference value according to the below reason.

The termination depth is affected by the hardness and the outer diameter of the wire because the dimension between the vinyl of the terminated wire insulation and the reference surface of the connector housing is measured as the termination depth. Therefore, the termination depth is set as the reference value, because the value varies.

The exact measurement of the termination depth is to measure the dimension between the core wire conductor and the bottom of the slot as shown in Fig.-11. But, JST specifies dimension “D” as the termination depth in Fig.-10 instead of “d” from the measurement of the wire conductors’ condition in U slot and the wire retention force because the measurement of “d” is time-consuming work as a daily control.

6-2 Shallow termination depth.....Insufficient termination

When termination is insufficient,

- ① Wire insulation is not located under the protrusions of the strain relief as shown in Fig.-12.

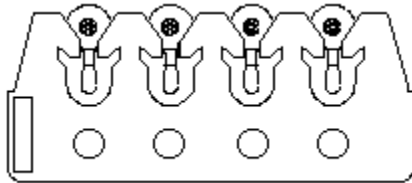


Fig.-12.1

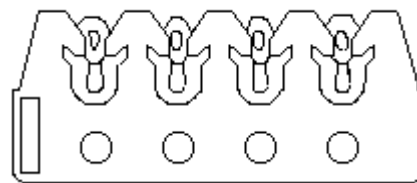


Fig.-12.2

- ② Wire conductors in the U slot are hardly seen or not seen at all as shown in Fig.-13.

Wire conductors are hardly seen or not seen at all.

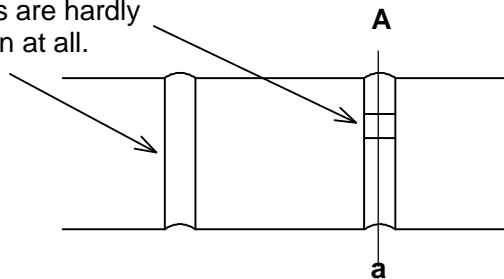
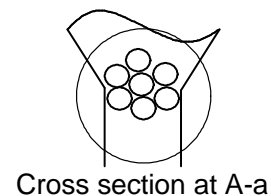


Fig.-13



Cross section at A-a

6-3 Deep termination depth.....Excessive termination

When termination is excessive,

- ① Wire insulation is cut at the bottom of the U slot and wire conductors are seen as shown in Fig.-14.
- ② Punching flaws caused by the termination punch appear on the flange of the housing as shown in Fig.-15.

Wire insulation is cut and wire conductors are seen.

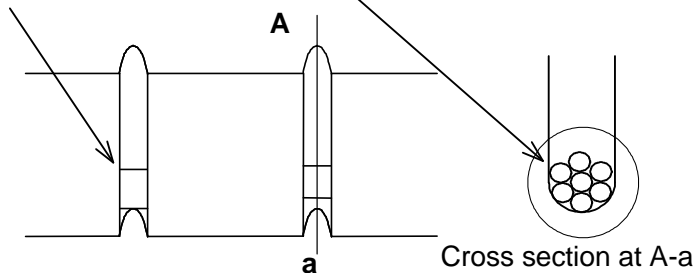


Fig.-14

Cross section at A-a

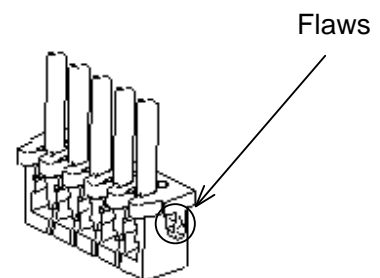


Fig.-15

7. Wire Retention Force

Pull the terminated wire one by one in the direction of the arrow in Fig.-16 and measure the force required to come off the wire of the contact (wire retention force) with the aid of a push-pull gauge, etc. Then, check that the measured wire retention force satisfies the value specified in Table-6.

Refer to the manual No. HM-0062 (TCM-0-005) "Method of Measuring Wire Retention Force" for the measurement method of the wire retention force.

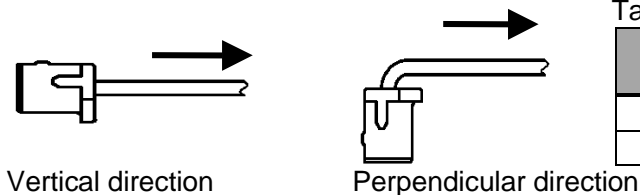


Fig.-16

Table-6 Wire retention force

Wire	Vertical direction	Perpendicular direction
AWG #26	10 N min.	8 N min.
AWG #28		

8. Termination Appearance

Inspect the following points after the termination.

8-1 Punching flaws on the housing caused by the termination punch

.....The housing must be free from flaws.

When the connector-setting position deviates to the pitch direction, scratches and deformation caused by the termination punch may appear at the circled area of the housing as shown in Fig.-17.

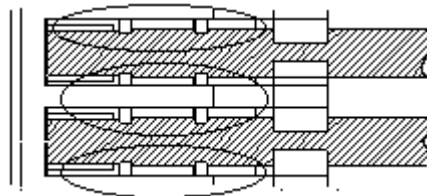


Fig.-17

8-2 Flaws and deformation at the contact's beams.....The beams must be free from flaws and deformation.

When the connector-setting position deviates to the wire axis direction, scratches and deformation caused by the termination punch may appear at the beams of the contact as shown in Fig.-18.

In this case, not only the contact but also the termination punch may be damaged.

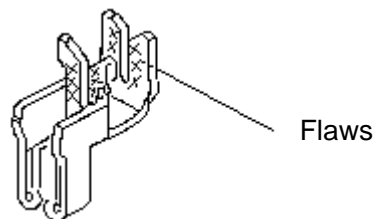


Fig.-18

- 8-3 Exposure of wire conductors around the contact's beams.....Wire conductors must not be exposed.
When the connector-setting position deviates to the wire axis direction, the wire conductors may expose at the front or the back of the contact's beam as shown in Fig.-19.

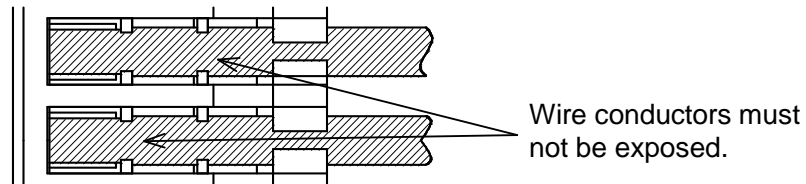


Fig.-19

- 8-4 Gap between the housing wall and wire tip (Wire protruding length)
The gap "G" between the housing wall and the wire tip in Fig.-20 should be 0.3mm max.

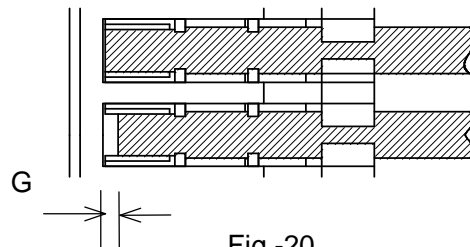


Fig.-20

- 8-5 Overrun of wire.....Wire must not overrun
When the wire tension is not adequate, the wire may overrun as shown in Fig.-21.

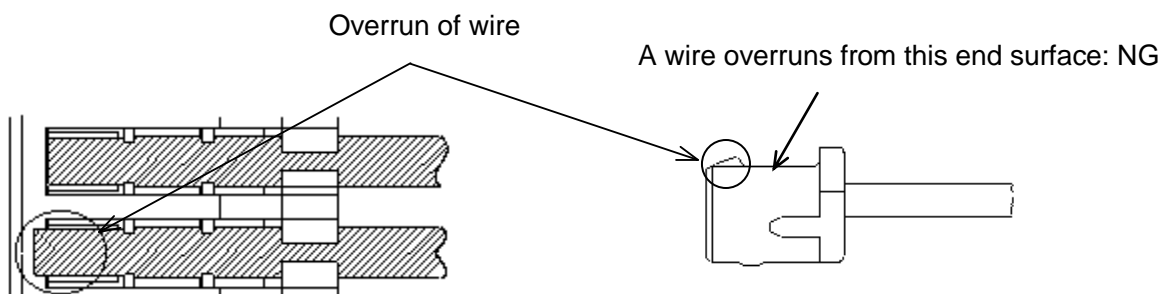


Fig.-21

- 8-6 Deviation of the insulation displacement center.....The insulation displacement center must not deviate.

When the connector-setting position or the wire deviates to the pitch direction, the termination punch, the wire and the U slots do not align, so that the insulation displacement center deviates as shown in Fig.-22.

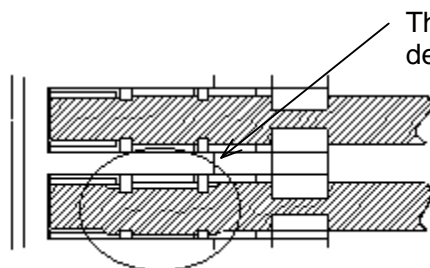


Fig.-22_1

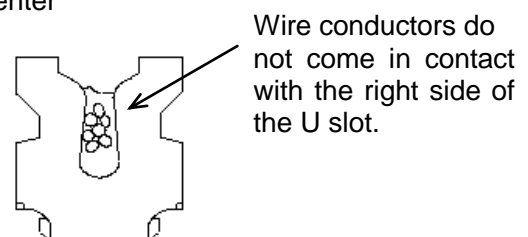


Fig.-22_2

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9. Packing method

Bundle the harnesses with a rubber band per unit quantity (example: 50 sets and 100 sets) and put it in a carton box. (Bundle them with a rubber band about 30 mm away from the connector.) The harness should be packed in a small box with cushion sheet to prevent the connector from the damage.

10. Precautions for Mounting the CK Receptacle Housing on the KRW Connector Holder (Dual-Row Type)

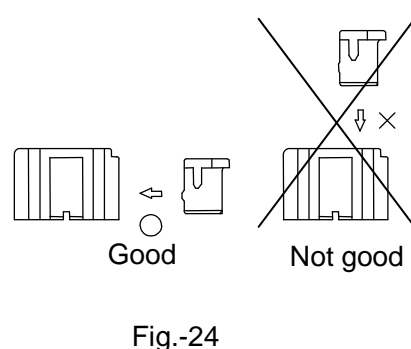
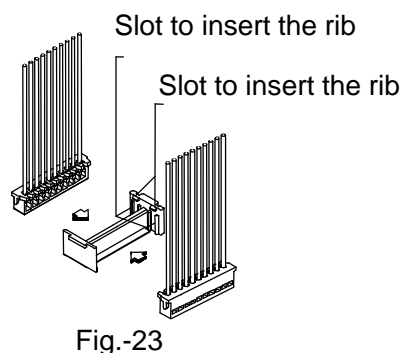
When the CK receptacle housing with terminating the contact (hereinafter referred to as receptacle) is mounted on the KRW connector holder (hereinafter referred to as holder), conduct the following points:

KRW connector holder

Product name	Model No.
KRW connector holder	KRWH-()-H

Note₆: “()” denotes the tow-digit circuit number.

- ① The difference between “line a” and “line b” of the holder is the round holes which is at the line A side.
- ② Insert the receptacles into the holder perpendicularly to the mating axis with the header so that the strain relief sides of the receptacle turn inside. Never insert the receptacle in the mating direction with the header.
- ③ Insert the rib of the receptacle into the holder's slots one side by one side with secure.
- ④ When the receptacle is inserted into the holder in the reverse direction that the strain relief sides turn outside, insert it again in the proper direction so that the strain relief sides turn inside.
- ⑤ When the holder's slots are deformed or damaged, replace it with a new one.
The holder's retention force to the receptacle deteriorates, and the holder may easily come off of the holder.



11. Handling Precautions

① Bundling of Wire

In bundling the wires, do not apply excessive force to the contact. Bundle the wire 60mm or more away from the connector so that operator can hold between the wire and the connector in mating and unmating with the header. Especially, as for the large circuit number and the dual-row type (with the holder), enough wire length is required for the both-end circuits in bundling.

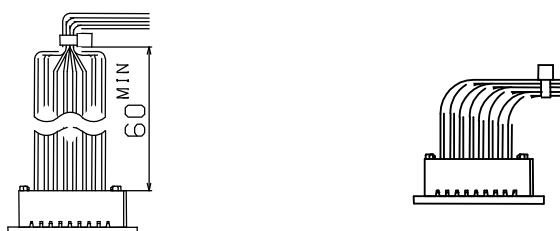


Fig.-25

② Mating and unmating operation with header

Mate and unmate the connector on the mating axis as far as you can do it. In a case the operation on the mating axis is difficult, do the operation within 15° against the mating axis.

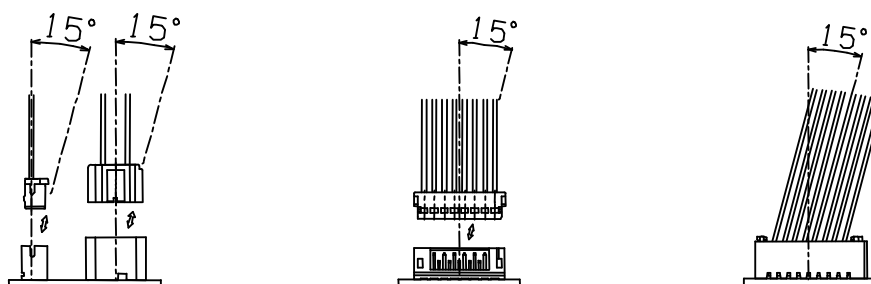


Fig.-26

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12. Harness Inspection

Inspect the following points.

Inspection points		Inspection method	Requirements
(1)	<ul style="list-style-type: none"> • Harness dimensions • Wire strip length 	<ul style="list-style-type: none"> • Verification with drawings • Caliper (or a scale) 	<ul style="list-style-type: none"> • Satisfy the drawing dimensions.
(2)	Wire to be used <ul style="list-style-type: none"> • Wire color • Wire size • UL style, etc. 	<ul style="list-style-type: none"> • Verification with drawings • Visual inspection 	<ul style="list-style-type: none"> • Wire colors conform to the drawings. • Wire size and UL style conform to the drawings.
(3)	Termination depth <ul style="list-style-type: none"> • Wire conditions • Termination depth 	See item 5 Termination Depth.	Table-4 (Reference value) Termination depth dimension "D"
(4)	Wire retention force	See item 6 Wire Retention Force	Satisfy the specified value stated in Table-6 of item 6 Wire Retention Force.
(5) T e r m i n a t i o n d e p t h	A. Punching flaws on the housing caused by the Termination punch	Observe the terminated housing visually (with the aid of a stereomicroscope if necessary). See item 7-1 Punching flaws on the housing caused by the termination punch.	The housing must be free from punching flaws caused by the termination punch.
	B. Flaws and deformation at the contact's beams.	Observe the terminated contact's beam visually (with the aid of a stereomicroscope if necessary). See item 7-2 Flaws and deformation at the contact's beams.	The contact beams must be free from scratches and deformation.
	C. Wire conductors expose around the contact's beams.	Observe the conditions of wire conductors around the contact beams visually (with the aid of a stereomicroscope if necessary). See item 7-3 Exposure of wire conductors around the contact's beams.	Wire conductors must not be exposed.
	D. Gap between the housing wall and wire tip	Measure with the aid of a gauge, projector. See item 7-4 Gap between the housing wall and the wire tip.	Gap: 0.3 mm max.
	E. Overrun of wire	Observe the overrun of the wire visually (with the aid of a stereomicroscope if necessary). See item 7-5 Overrun of wire.	Wire must not overrun.
	F. Deviation of the Insulation displacement center.	Observe the terminated wire visually (with the aid of a stereomicroscope if necessary). See item 7-6 Deviation of the insulation displacement center.	According to the boundary samples