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This manual describes control points about harness assembling operation for insulation displacement connector (IDC) of KR connector (pre-tinplated product) by using JST's automatic insulation displacement (ID) machine, pneumatic press and hand press.

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

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## 1. Model Number

Table-1

	Model No.
Normal type	**KR-6H-P
Reverse type	**KR-6H-PC

Note: The number of circuits in two-digit is indicated with an asterisk.  
e.g.) 2 circuits...02, 15 circuits...15

## 2. Composition and Parts Identification

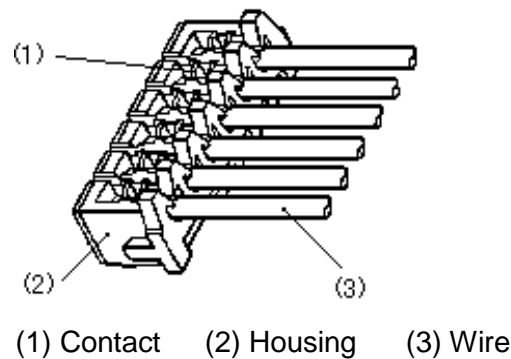


Fig.-1

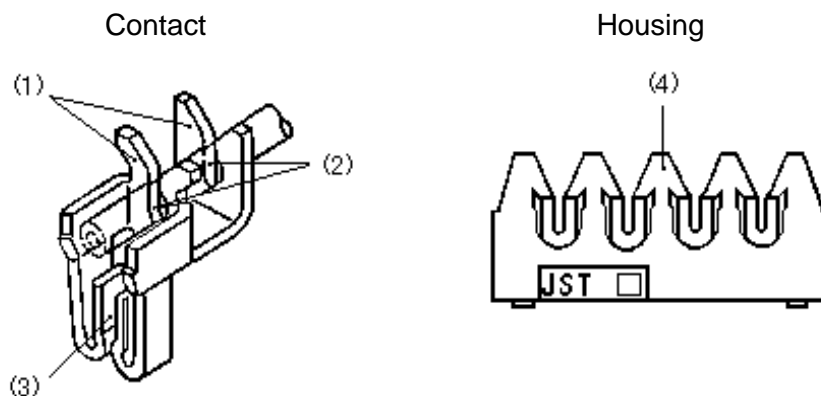


Fig.-2

- ① Beam: .....Two beams have an individual U slot construction.
- ② U slot: .....It cuts wire insulation to contact with wire conductors electrically  
.....and mechanically.
- ③ Contacting part:.....It contacts with header post. Folded beam double-leaf contact construction.
- ④ Strain relief: .....Strain relief retains wire insulation to prevent from that external force  
.....loaded on wire affects U slot.

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### 3. Applicable Wire

#### 3-1 Wire size and wire insulation outer diameter

Table-2

	Wire insulation O. D.
AWG #28 AWG #26	$\phi$ 0.9 ~ $\phi$ 1.0 mm

Standard insulation O.D.: AWG #28:  $\phi$  0.9 mm  
AWG #26:  $\phi$  1.0 mm

3-2 UL style:..... UL1061 and UL1571  
UL1061 and UL1571 for 2 to 12 circuits and UL1061 for 13 to 16 circuits shall be generally used.  
Note: Characteristics of wire insulation differs depending on each wire manufacturer, so that contact JST for checking wires to be used.

3-3 Wire conductor: ..... 7 stranded wires (tin-plated), tin-coated stranded wires

3-4 Packing of wire: ..... Wire is wound on P-30 bobbin when automatic ID machine such as BCD-M5BP is used.  
Other ID machine has no restriction of wire packing, but only be sure to use wires free from twisting

### 4. Control Points of Terminating Operation

Check the following points to conduct an appropriate terminating operation.

#### 4-1 Check ID machine operates properly.

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

##### Main check points

##### ① Hand press

- Check punch is securely pulled down to lower dead point.
- Check connector set position is normal.
- Check no wire chips remain inside of terminating punch, etc.

##### ② Pneumatic press

- Check connector is fed to the normal ID position.
- Check air pressure is normal.
- Check no wire chips remain inside of terminating punch, etc.

##### ③ Automatic ID machine

- Check operation sequence is normal.
- Check bowl-feeder runs normal.
- Check wire tension is appropriate.
- Check wire measuring system operates accurately.
- Check connector set position is normal.

- 4-2 Check connector size fit to wire size.
- 4-3 Check wire color and wire length conform to drawing.
- 4-4 Check termination depth of each connector is applicable. Refer to item 5 "Termination Depth."
- 4-5 Check wire retention force satisfies specified value. Refer to item 6 "Wire Retention Force."
- 4-6 Check termination appearance is good. Refer to item 7 "Termination Appearance."
- 4-7 Check whether connectors with different circuit No. or wire size, which were used in previous operation, remain in bowl-feeder or chute of automatic ID machine, or of pneumatic machine.
- 4-8 Check strip length dimension of stripped wire conforms to drawing and conductors of stripped part are free from damage. Refer to item 7-7 "Wire insulation stripping."

## 5. Termination Depth

Applicable termination depth is stated below.

### 5-1 Termination appearance

Wire position must be under the protrusion of strain relief of connector as shown in Fig.-3. Condition of remaining wire insulation on notch processing of shielded ribbon wire may cause wrinkle on wire insulation at strain relief part of connector as shown in Fig.-4. If wrinkle is found, check wire retention force referring to item-6 "Wire Retention Force." When measured wire retention force satisfies specified value mentioned in item 6, termination is good.

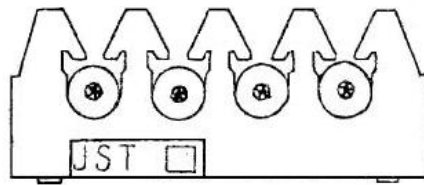


Fig.-3



Fig.-4 (Example of wrinkling)

### 5-2 Wire conditions at terminated part (U slot part)

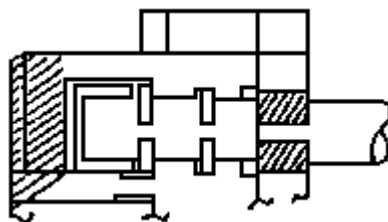


Fig.-5

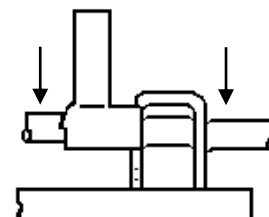


Fig.-6

After termination, cut off diagonally shaded area (strain relief and housing wall) of housing as shown in Fig.-5 and pick up connector contact having terminated wire with pliers. Then, carefully take wire off contact U slot, holding wire as shown in Fig.-6.

Check terminated part of wire at U slot. When termination is conducted properly, wire insulation at terminated part remains as shown in Fig.-7.

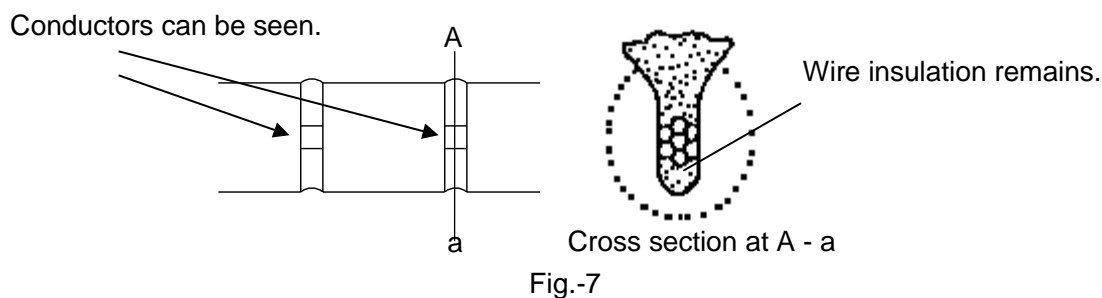


Fig.-7

Note: Conduct observation right after taking wire off U slots of contact without delay due to elasticity of wire insulation.

### 5-3 Termination depth dimension.....Reference value

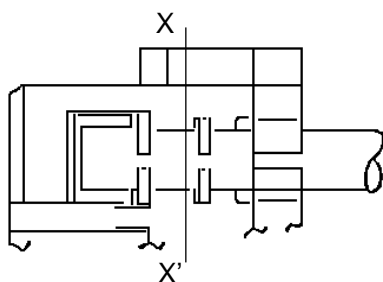


Fig.-8

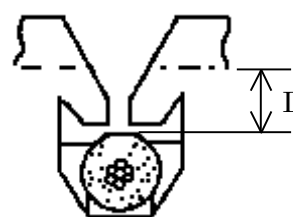


Fig.-9

Measure termination depth dimension "D" in Fig.-9 at X - X' part in Fig.-8, where is in the center part of two U slots and a flattened part pressed by termination punch, and check it satisfies specified value in Table-3.

Table-3 Termination depth in dimension "D"

	UL1571	UL 1061
AWG #28	0.85 + 0.05/-0.15 mm	0.85 + 0.05/-0.15 mm
AWG #26	0.85 + 0.05/-0.15 mm	0.85 + 0.05/-0.15 mm

Note: Termination depth in Table-3 is applied when insulation outer diameter is as Table-4.

Table-4

	UL1571	UL 1061
AWG #28	φ 0.9 mm	φ 0.9 mm
AWG #26	φ 1.0 mm	φ 1.0 mm

Note: Contact JST for the use of UL style other than stated in Table-3.

Regarding measurement of termination depth dimension, refer to the IDC Manual No.TCM-0-002 "Method of Measuring Termination Depth by Dial Depth Gauge."

Termination depth dimension for ID connectors is a similar control point to crimp height for crimp type connectors, but it is basically quite different.

As crimp height of crimp type connector varies, a coefficient of deformation of wire conductors changes enormously, and electrical and mechanical connection to connector is much affected so that crimp height is one of important crimp operation control points.

On the other hand, U slot dimension of ID connector is designed for each wire size, and connection between wire conductors and connector is depended on U slot dimension.

Therefore, control of termination depth dimension is to manage the position where wire conductors are located in U slots. This is the concept of termination depth dimension.

The reason for values of termination depth as reference is as follows. Termination depth obtained by measuring the distance between surface levels of terminated wire insulation and connector housing is affected by hardness of wire to be used and its wire insulation outer diameter.

Accordingly, a value of termination depth is a reference value not an absolute value.

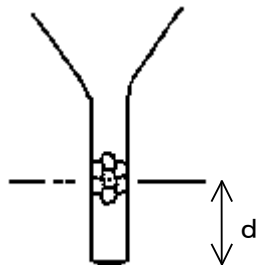


Fig.-10

The true termination depth is to measure "d" between bottom of slot and position of center of wire conductors as shown in Fig.-10. However, in order to reduce the time consuming in daily management, as the result of the checking the condition of insulation displacement at U slot and measuring wire retention force, JST specifies termination depth "D".

Accordingly, dimension "D" becomes not reference value but control value for the use of wires to be checked by JST unless otherwise specified.

#### 5-4 Shallow termination depth.....Insufficient termination

When termination is insufficient,

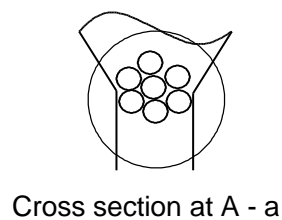
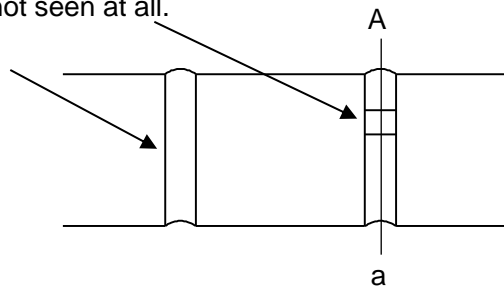
- ① Wire insulation is not located under protrusions of strain relief as shown in Fig.-11.



Fig.-11

- ② Wire conductors in U slot are hardly seen or not seen at all as shown in Fig.-12.

Wire conductors are hardly seen or not seen at all.



Cross section at A - a

Fig.-12

## 5-5 Deep termination depth.....Excessive termination

When termination is excessive,

- ① Wire insulation is cut at the bottom of U slot and wire conductors are seen as shown in Fig.-13.
- ② Punching dents caused by termination punch appear on flange of housing as shown in Fig.-14.

Wire insulation is cut and wire conductors are seen.

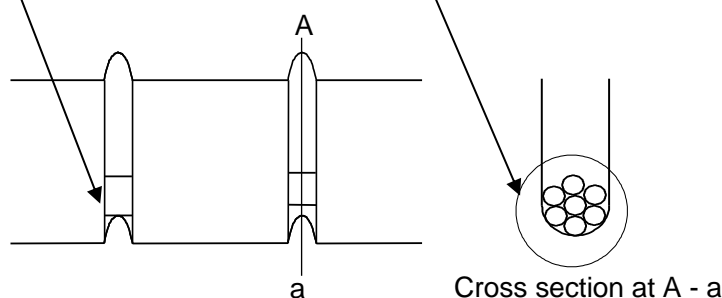
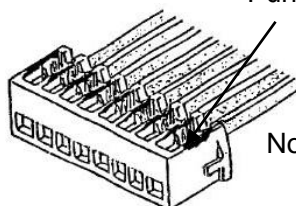


Fig.-13

Punching dents caused by termination punch.



Note: Punching dents subject to not in the case of aforementioned ① are acceptable.

Fig.-14

## 6. Wire Retention Force

Pull termination wire in the direction of arrow in Fig.-15 and measure force by a push-pull gauge, etc. when wire comes off contact. (Wire retention force)

Then, check that measured wire retention force satisfies specified value in Table-5.

Refer to the manual No. TCM-0-005 "Method of Measuring Wire Retention Force" for how to measure wire retention force.

Table-5

AWG #28	7.8 N
AWG #26	9.8 N

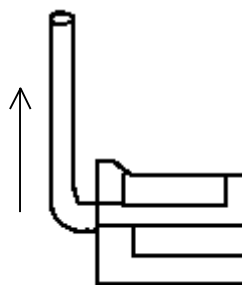


Fig.-15

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## 7. Termination Appearance

Inspect the following points after termination

- 7-1 Punching dents on housing caused by termination punch.....Housing must be free from dents.  
When connector set position deviates to pitch direction, scratches and deformation caused by termination punch may appear at the “XXX” marked area of housing as shown in Fig.-16.

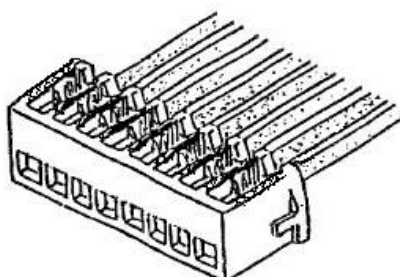


Fig.-16

- 7-2 Flaws and deformation at beams of contact.....Beams must be free from flaws and deformation.  
When connector set position deviates to wire axis direction, scratches and deformation caused by termination punch may appear at beams of contact as shown in Fig.-17.  
In this case, not only contact but also termination punch may be damaged.

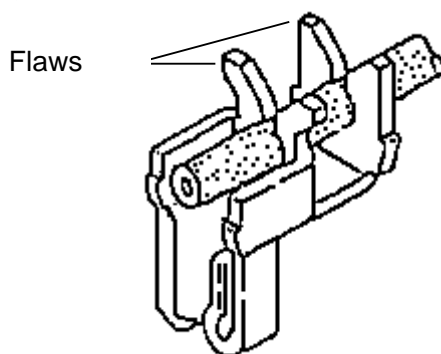


Fig.-17

- 7-3 Exposure of wire conductors around beams of contact.....Wire conductors must not be exposed.  
When connector set position deviates to wire axis direction, wire conductors may expose in front or back of beams of contact as shown in Fig.-18.

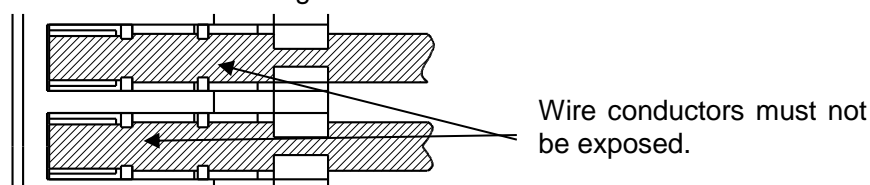


Fig.-18

- 7-4 Gap between housing wall and wire tip (Wire protruding length)  
Gap “G” between housing wall and wire tip in Fig.-19 should be 0.3 mm max.

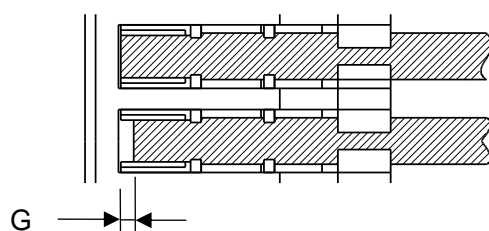


Fig.-19



## 7-5 Overrun of wire.....Wire must not overrun.

When wire tension is not adequate, overrun of wire may happen as shown in Fig.-20.

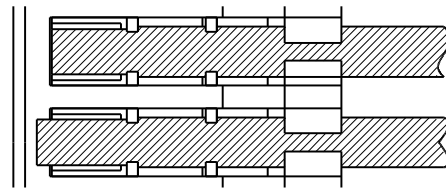


Fig.-20

## 7-6 Deviation of insulation displacement center.....Deviation of insulation displacement center must not happen.

When connector set position or wire deviates to pitch direction, termination punch, wire and U slots do not align so that insulation displacement center deviate as shown in Fig.-21 and Fig.-22.

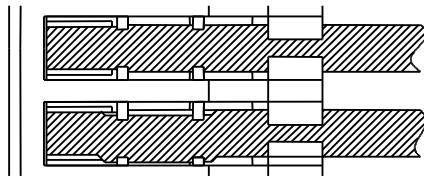
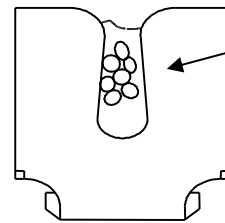


Fig.-21



Wire conductors do not contact with the right side of U slot.

Fig.-22

## 7-7 Wire insulation stripping

Wire conductors must be free from cutting and flaws.

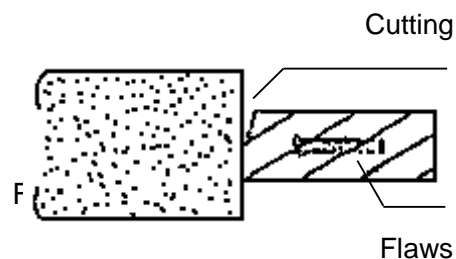


Fig.-23

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## 8. Packing and Labeling

### 8-1 Packing method

- ① When wire length is long,  
Bundle harnesses with a rubber band per unit quantity (example: 50 sets, 100 sets) and put it in a carton box. (Bundle them with rubber band about 30 mm away from connector.)  
Harness should be packed in a small box to prevent from damage.
- ② When wire length is short,  
Packing harnesses in a small box per unit quantity and then put small boxes in a carton box.

### 8-2 Labeling

Conduct the following labeling on a small box and a carton box respectively according to agreement with each customer about labeling.

Example:	①	Harness model No.
	②	Quantity
	③	Production lot No.
	④	Manufactured date

### 8-3 Others

Harness products using UL/CSA wires should be packaged with UL/CSA marked labels according to agreement with each customer about labeling.

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## 9. Harness Inspection

Inspect the following points.

Inspection point		Inspection method	Requirements
(1) • Harness dimensions • Wire strip length		• Verification with drawings • Caliper (or a scale)	• Satisfy drawing dimensions.
(2) Wire to be used • Wire color • Wire size • UL style, etc.		• Verification with drawings • Visual inspection	• Wire colors conform to drawings. • Wire size and UL style conform to drawings.
(3) Termination depth • Wire conditions • Termination depth dimensions		See item 5 Termination Depth.	Table-3 (Reference value) Termination depth dimension “D”
(4) Wire retention force		See item 6 Wire Retention Force.	Satisfy specified value stated in Table-5 of item 6 Wire Retention Force.
(5)  T e r m i n a t i o n  A p p e a r a n c e	A. Punching dents on housing caused by termination punch.	Observe terminated housing visually or by stereomicroscope. See item 7-1 Punching dents on housing caused by termination punch.	Housing must be free from punching dents caused by termination punch.
	B. Flaws and deformation at beams of contact	Observe terminated contact beams visually or by stereomicroscope. See item 7-2 Flaws and deformation at beams of contact.	Contact beams must be free from scratches and deformation.
	C. Wire conductors expose around contact beams.	Observe conditions of wire conductors around contact beams visually or by stereomicroscope. See item 7-3 Exposure of wire conductors around beams of contact.	Wire conductors must not be exposed.
	D. Gap between housing wall and wire tip	Measure by a gauge, projector, etc. See item 7-4 Gap between housing wall and wire tip.	Gap: 0.3 mm max.
	E. Overrun of wire	Observe tip of terminated wire visually or by stereomicroscope. See item 7-5 Overrun of wire.	Wires must not overrun.
	F. Deviation of insulation displacement center	Observe appearance of terminated wire visually or by stereomicroscope. See item 7-6 Deviation of insulation displacement center.	Deviation of insulation displacement center must not happen.
	G. Stripping condition	Observe stripping condition visually or by stereomicroscope. See item 7-7 Wire insulation stripping.	Wire conductors must be free from cutting and flaws.