Title of Document:	HANDLING MANUAL	Issue No. TCM-0-026	Rev. 5
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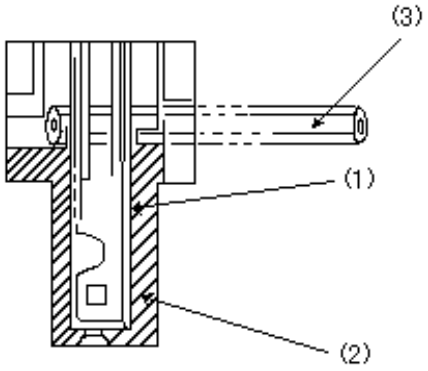
Title subject:	KRD Connector	Revision date: April 2, 2020	

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

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

C O N T E N T S

1. Each Part Name and Function



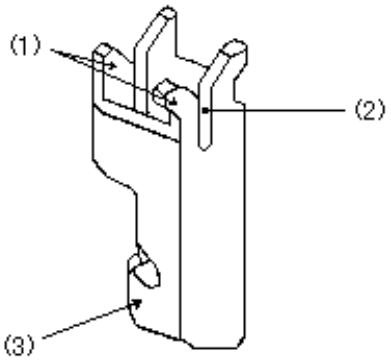
(1) Contact

(2) Housing

(3) Wire

Fig.-1

1-1 Contact



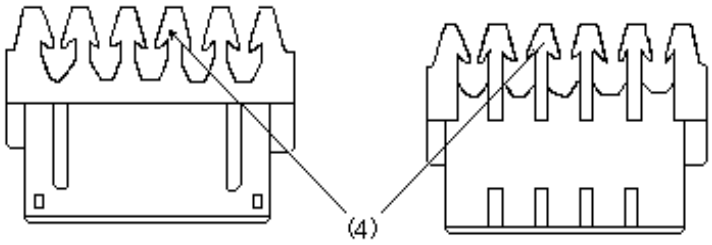
(1) Beam: It has 2 beams where U slot is cut.

(2) U slot: It contacts with wire conductors with the insulation stripped electrically and mechanically.

(3) Contacting part: It contacts with the header post. It has double-relief structure.

Fig.-2

1-2 Housing



(4) Strain relief: It retains wire insulation not to apply to U slot part an external load that applies to a wire.

Fig.-3

2. Storage

2-1 Connector storage

Recommended storage condition: Temperature: 5 – 35 ˚C, Relative humidity 60 % or less
(Under packaging like the state of JST shipment)

Keep off direct sunlight, places exposing to such corrosive gas as industrial gas (generate from a stove and whatnot) and ammonia gas (generate from a toilet and whatnot), dusty place and condensation.
Note that the resin molding part may break due to transportation and handling, such as processing and mating, under dry or low temperature condition.
After unpacking, return products in the original package to store.

3-2 Storage of the processed connectors

Not leaving the processed connectors to stand in a place exposed to high humidity and direct sunshine, and not placing them directly on the ground, keep them in a clean storage room,

3. Applicable Wire

3-1 Wire size and wire insulation outer diameter

Table-1

	Wire insulation O. D. (mm)
AWG #26	ϕ 0.9 ~ ϕ 1.0
AWG #28	

3-2 UL style:..... UL1571, UL1061
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

4. Model Number, Housing Color and Applicable Wire Size

Table-2

Model No.	Housing color	Applicable wire
( )KR-D6S-P	White	AWG #26
( )KR-D8M-P	Green	AWG #28

Note: 2-digit figures in ( ) denotes the circuit number. Example: 3 circuits……03, 10 circuits……10

As for insulation displacement type connectors (IDC), the dimensions of twin U slot vary depending on wire size.
To prevent from mistakes in combination of a connector (dimensions of twin U slot) and applicable wire size, housing color varies according to applicable wire size. Refer to Table-2.

5. Applicable ID Tools

5-1 Hand press and pneumatic press

ID tools and model No.	ID applicator model No.
Hand press model No.: HPD-M2A	H2-KRD20DD-Y
	H2A-KRD
Pneumatic press model No.: AP-2-AP-2H	H2A-KRD

Note: The connectors terminated with other than JST applicable ID tool is out of our guarantee.

5-2 Automatic ID machine

Contact JST for the model number of automatic ID machine.
Note: The connectors terminated with other than JST applicable ID machine is out of our guarantee.

6. Control Points of Terminating Operation
Check the following points to conduct an appropriate terminating operation.

6-1 Check ID machine operates properly.
Refer to the handling manual of ID machine before conducting the operation.

Main check points

(1) Hand press
- Check the checker of the bottom dead center is properly adjusted.
- Check the connector set position is properly adjusted.
- Check no wire chips remain inside the terminating punch, etc.

(※ Check the ratchet device works normally.)

(2) Pneumatic press
- Check the connector set position is properly adjusted.
- Check air pressure is normal.
- Check no wire chips on the termination punch.

(3) Automatic ID machine
- Check operation sequence is normal.
- Check the bowl-feeder runs normally.
- Check wire tension is appropriate.
- Check the wire measuring system operates accurately.
- Check the connector set position is normal.

6-2 Check connector size fits to wire size.

6-3 Check wire color and wire length conform to the drawing.

6-4 Check termination depth of each connector is applicable. Refer to item 5 “Termination Depth.”

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

6-6 Check termination appearance is good. Refer to item 7 “Termination Appearance.”

6-7 Check whether connectors with different circuit No. or wire size, which were used in previous operation, remain in bowl-feeder or chute of an automatic ID machine or a pneumatic press.

6-8 Check the strip length dimension of a stripped wire conform to the drawing and conductors of the stripped part is free form damages. Refer to item 7-7 “Wire insulation stripping.”

7. Termination Depth

7-1 Applicable termination depth is stated below.

(1) Termination appearance
A wire must be under the protrusion of the strain relief of the connector as shown in Fig.-4. Rigid condition of wire insulation and the connector may cause wrinkles on wire insulation at the strain relief part of the connector as shown in Fig.-5. If a wrinkle is found, 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, termination is good.

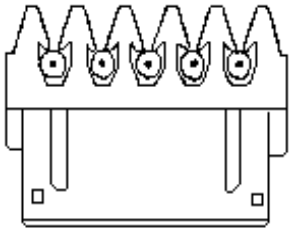


Fig.-4

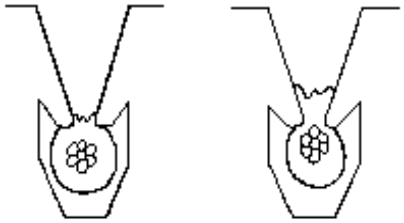


Fig.-5 (Example of wrinkling)

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

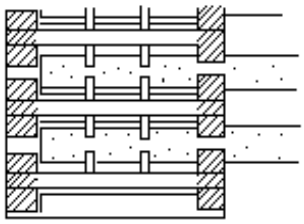


Fig.-6

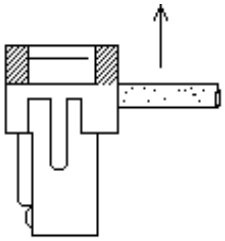


Fig.-7

- After termination, cut off diagonally the shaded area (strain relief and housing wall) of the housing as shown in Fig.-6 and pick up the connector contact with a terminated wire with pliers. Then, carefully take the wire off the contact U slot, holding the wire as shown in Fig.-7.
- Check the wire terminated part at the U slot. When termination is conducted properly, wire insulation at the terminated part remains as shown in Fig.-8.

Conductors can be seen.

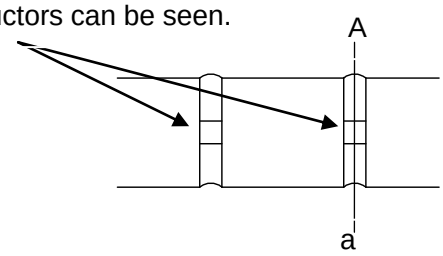
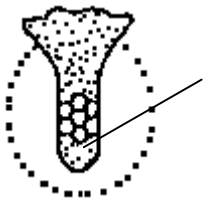


Fig.-8



Remained wire insulation

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

(3) Termination depth dimension……Reference value

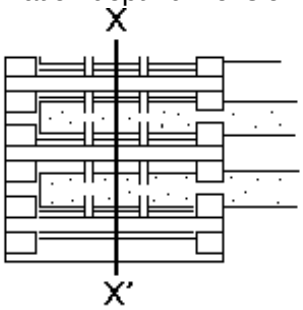


Fig.-9

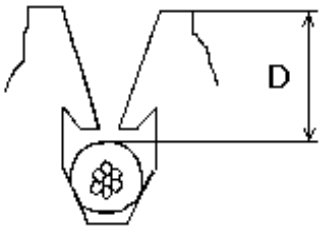


Fig.-10

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

Table-3 Termination depth in dimension “D”

	UL1571 (mm)	UL1061 (mm)
AWG #26	1.3 ±0.1	1.3 ±0.1
AWG #28		

Table-3 is applied when wire insulation outer diameter is as shown in Table-4.

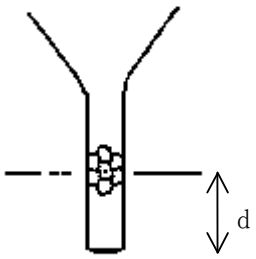
Table-4 Wire insulation outer diameter

	UL1571 (mm)	UL1061 (mm)
AWG #26	ϕ 1.0	ϕ 1.0
AWG #28	ϕ 0.9	ϕ 0.9

Contact JST when using other UL style wire.

Refer to the attached termination depth measurement method, TCM-0-002 for measuring the termination depth.
Termination depth dimension for ID connectors is a similar control points to crimp height for crimp type connectors, but it is totally different in principle.
As the crimp height of crimp type connectors varies, a coefficient of deformation of wire conductors changes enormously, and electrical and mechanical connection to a connector is much affected, so that crimp height is one of the important crimp operation control points.
On the other hand, U slot dimension of ID connectors varies as per wire size, and connection between wire conductors and a connector is decided according to U slot dimension.
Therefore, controlling the 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 why the value of termination depth is reference is as follows.
As termination depth is calculated from the dimension between the datum surfaces of a terminated wire vinyl insulation and the connector housing, the hardness of a wire to be used and its wire insulation outer diameter influence it. Accordingly, termination depth is reference value not an absolute one.



The true termination depth is to measure “d” between the bottom of the slot and the central position of wire conductors as shown in Fig.-11. In order to reduce the time consuming in daily management, however, from the condition check of insulation displacement at U slot and the measurement of wire retention force, JST specifies the termination depth “D”.
As a result, when using the wire JST have confirmed, unless otherwise specified, the dimension is the control value, not the reference value.

Fig.11

7-2 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.

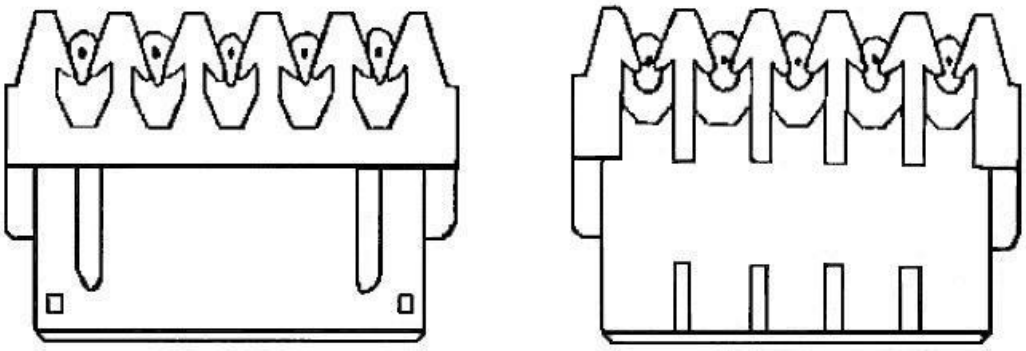


Fig.-12

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

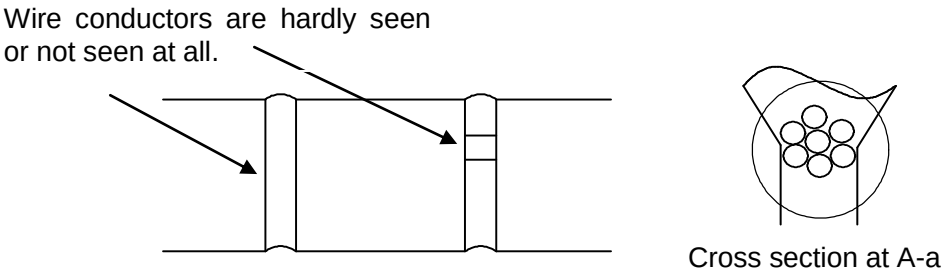


Fig.-13

7-3 Deep termination depth……Excessive termination

When termination is excessive,
(1) When insulation is cut at the bottom of U slot and wire conductors are seen as shown in Fig.-14.
(2) Dents caused by the termination punch appear on the flange of the housing as shown in Fig.-15.

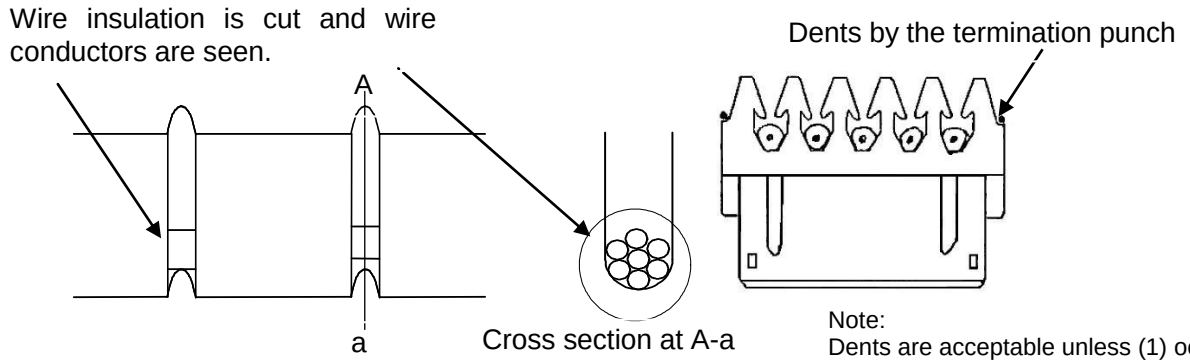


Fig.-14

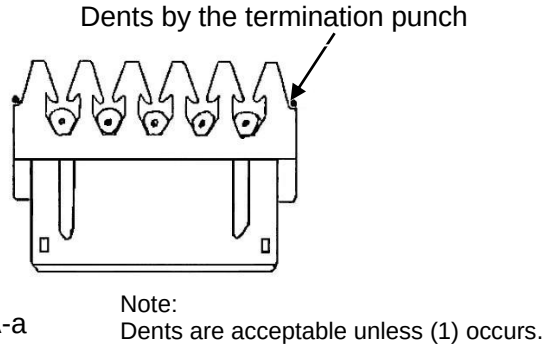


Fig.-15

8. Wire Retention Force

Pull the terminated wire one by one in the direction shown in Fig.16 and measure the load required to disconnect the wire from the contact (wire retention force) with a push-pull gauge.
Then, check that the measured wire retention force satisfies the value specified in Table-5.

Refer to appendix manual No. HM-0062 (TCM-0-005) “Method of Measuring Wire Retention Force” for how to measure the wire retention force.

Table-5 Wire retention force

AWG #26 AWG #28	7.8 N (0.8 kgf) min.

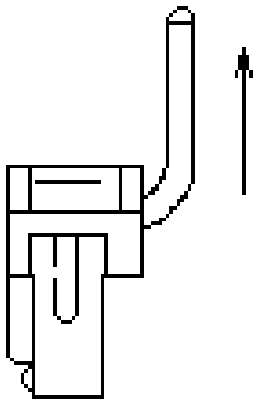


Fig.-16

9. Termination Appearance
Inspect the following points after termination.

9-1 Dents on the housing caused by the termination punch……The housing must be free from dents. When the connector set position deviates to the pitch direction, scratches and deformation caused by the termination punch may appear at the “XXX” marked area of the housing as shown in Fig.-17.

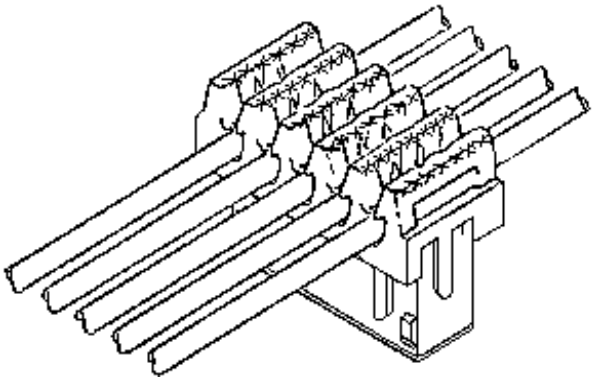


Fig.-17

9-2 Flaws and deformation at the contact beams……The beams must be free from flaws and deformation. When the connector set position deviates to the wire axis direction, scratches and deformation caused by the termination punch may appear at the contact beams as shown in Fig.-18.
In this case, not only the contact but also the termination punch may be damaged.

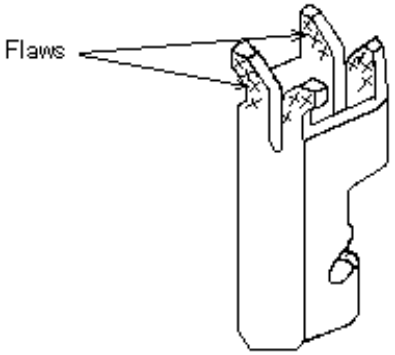


Fig.-18

9-3 Exposure of wire conductors around the contact beams……Wire conductors must not be exposed When the connector set position deviates to the wire axis direction, wire conductors may expose in front or back of the contact beams as shown in Fig.-19.

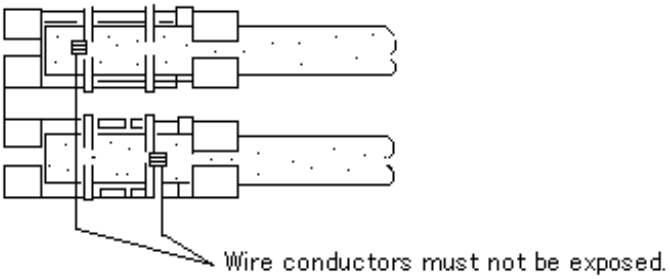


Fig.-19

9-4 Gap between the housing wall and wire tips (Wire protruding length)
Gap “G” between the housing wall and wire tips in Fig.-20 should be 0.3 mm max.

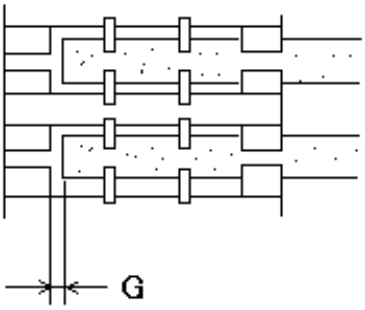


Fig.-20

9-5 Overrun of wire……Overrun “G” should be 0.4 mm max.
When tension is not adequate, a wire may overrun as shown in Fig.-21.

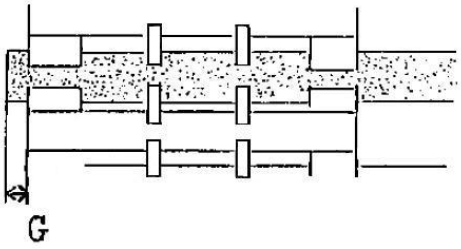


Fig.-21

9-6 Deviation of insulation displacement center……Deviation of insulation displacement center must not happen.
When the connector set position or a wire deviates to the pitch direction, the termination punch, a wire and U slots do not align, so that the insulation displacement center may deviate as shown in Fig.-22 (a) and Fig.-22 (b).

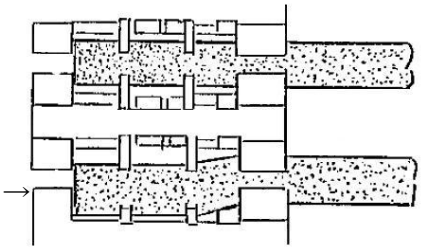


Fig.-22 (a)

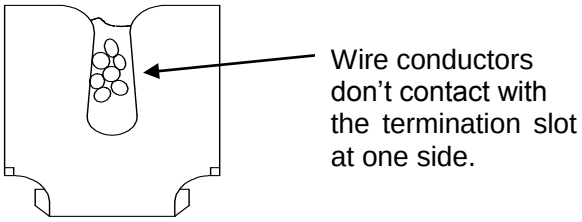


Fig.-22 (b)

9-7 Wire insulation stripping
Wire conductors must be free from cutting and damages.

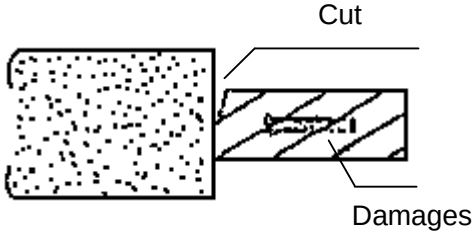


Fig.-23

10. Packing

Bundle the harnesses with a rubber band per unit quantity (example: 50 sets, 100 sets) to prevent them from getting entangled with each other, and put it in the product boxes.
Bundle them with a rubber band, keeping approx. 30 mm away from the connector.
Take countermeasures for packaging not to break the connectors.
(e.g. Wrapping with a bubble wrap)

11. 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 the drawing dimensions.
(2)	Wire to be used • Wire color • Wire size • UL style, etc.	• Verification with drawings • Visual inspection	• Wire colors conform to the drawings. • Wire size and UL style conform to the drawings.
(3)	Termination depth • Wire conditions • Termination depth dimensions	See item 7 Termination Depth.	See item 7 Termination Depth.
(4)	Wire retention force	See item 8 Wire Retention Force.	See item 8 Wire Retention Force.
(5) Termination Appearance	A. Dents on housing caused by termination punch	Observe the terminated housing visually or by stereomicroscope. See item 9-1 Dents on housing caused by termination punch.	Housing must be free from dents caused by termination punch.
	B. Flaws and deformation at beams of contact	Observe the terminated contact beams visually or by stereomicroscope. See item 9-2 Flaws and deformation at beams of contact.	The contact beams must be free from scratches and deformation.
	C. Wire conductors expose around contact beams.	Observe the conditions of wire conductors around the contact beams visually or by stereomicroscope. See item 9-3 Exposure of wire conductors around the beams of the contact.	Wire conductors must not be exposed.
	D. Gap between housing wall and wire tip	Measure by a gauge, projector, etc. See item 9-4 Gap between the housing wall and a wire tip.	Gap: 0.3 mm max.
	E. Overrun of wire	Observe a wire visually or by stereomicroscope. See item 9-5 Overrun of wire.	No overrun of a wire
	F. Deviation of insulation displacement center	Observe the appearance of the terminated wire visually or by stereomicroscope. See item 9-6 Deviation of insulation displacement center.	According to the criteria samples
	G. Condition of wire stripped part	Observe a wire visually or by stereomicroscope. See item 9-7 Wire insulation stripping.	Wire conductors must be free from cutting and flaws.