

Title of Document: HANDLING MANUAL	No. HM-0059 (TCM-1-036)	Date issued: July 29, 1997
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This manual describes control points about harness assembling operation for SSR connector by using JST's fully automatic insulation displacement (ID) machine.

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




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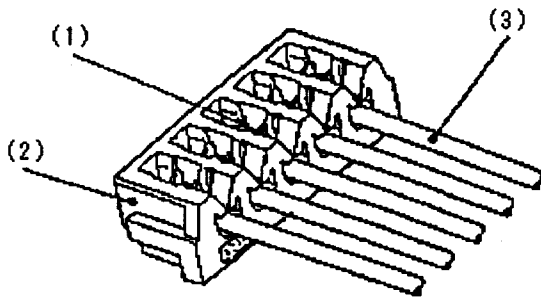
Appendix

IDC Manual No. HM-0061-R3 (TCM-0-002) Method of Measuring Termination Depth by Dial Depth Gauge

IDC Manual No. HM-0062-R3 (TCM-0-005) Method of Measuring Wire Retention Force

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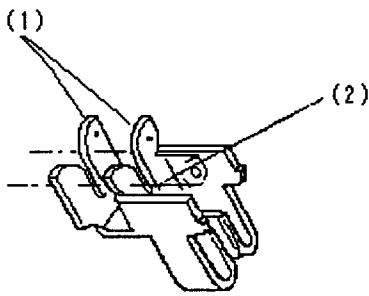
1. Composition and Parts Identification



- (1) Contact
- (2) Housing
- (3) Wire

Fig.-1

1-1 Contact



- (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) Strain relief: Strain relief retains wire insulation to prevent from that external force loaded on wire affects U slot.

Fig.-2

1-2 Housing

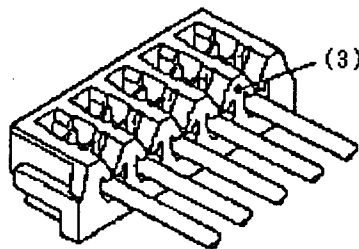


Fig.-3

2. Applicable Wire

2-1 Wire size and wire insulation outside diameter

Table-1

	Wire insulation outside diameter
	SSR connector
AWG #32	∅0.54 mm ±0.02 mm

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- 2-2 UL style: UL 1571
- 2-3 Wire conductor: 7 stranded wire (tin-plated)
- 2-4 Packaging of wire: Wire on P-10 bobbin of JIS C 3201 when fully automatic insulation displacement (ID) machine such as BCD-M5BE is used.

3. Model Number, Housing Color and Applicable Wire Size

Table-2

Model No.	Housing color	Applicable wire size
() SSR-32H	Gray	AWG #32

Note: Circuit No. is indicated in () of model No. as 02SSR-32H for 2 circuits.

4. Control Points of Terminating Operation

Check the following points to conduct an appropriate terminating operation.

4-1 Check ID machine operates normally.

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

Main check points

① Automatic ID machine

- Check operation sequence is normal.
- Check bowl-feeder and straight-chute operate normally.
- Check wire tension is appropriate.
- Check wire measuring system operates accurately.
- Check connector set position is normal.

4-2 Check connector size fits to wire size.

4-3 Check wire color and wire length conform to drawing.

4-4 Check termination depth 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. and size used in previous operation remain in bowl-feeder or straight-chute.

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5. Termination Depth

5-1 Applicable termination depth is stated below.

① Termination appearance

Wire position must be under the protrusion of strain relief of connector as in Fig.-4. Rigid condition of wire insulation and connector may cause wrinkle on wire insulation at strain relief part of connector as shown in Fig.-5. 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.

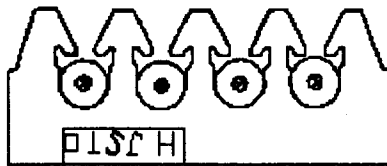


Fig-4



Fig-5 (Example of wrinkling)

② Wire conditions at terminated part (U slot part)

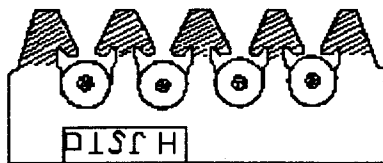


Fig.-6

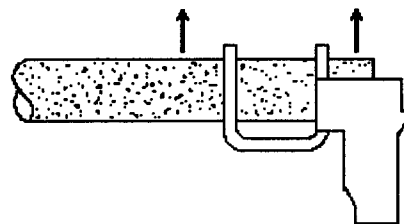
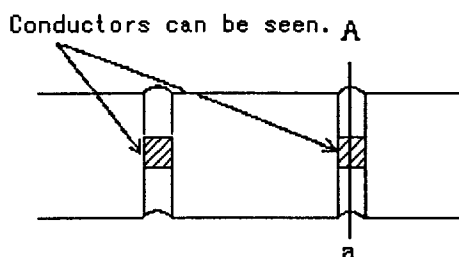


Fig.-7

- After termination, cut off diagonally shaded area (strain relief and housing wall) of housing as shown in Fig-6 and pick up connector contact having terminated wire with pliers.
- To take wire out of contact U slot, carefully press down wire holding wire as shown in Fig.-7.
- Then, check terminated part of wire at U slot. When termination is conducted properly, wire conditions at terminated part are as shown in Fig.-8.



Cross section at A - a

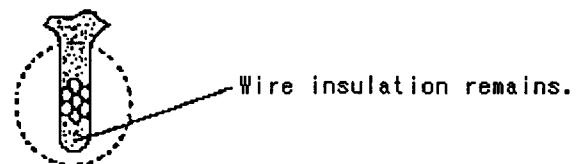


Fig.-8

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

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③ Termination depth dimension as a reference value

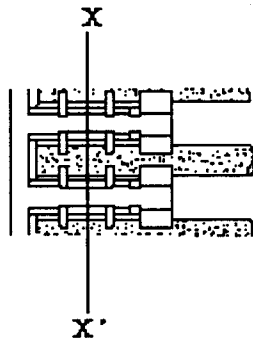


Fig. -9

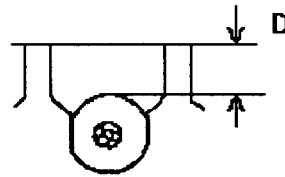


Fig. -10

Measure 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 termination punch, and check it satisfies specified value in Table-3.

Table-3 Termination depth dimension "D"

	UL 1571
AWG #32	0.50 ±0.05 mm

Note: Contact JST for the use of UL style other than stated in left.

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

Table-4 Wire insulation outside diameter

	UL 1571
AWG #32	∅0.54 ±0.02 mm

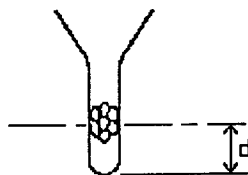
Note: Regarding measurement of termination depth dimension, refer to appendix manual No. HM-0061-R3 (TCM-0-002) Method of Measuring Termination Depth by Dial Depth Gauge.

Termination depth dimension for ID connectors is a similar control point to crimp height for crimp type connectors but it is totally different in principle.

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

On the other hand, U slot dimension of ID connector varies as per wire size, and connection between wire conductors and connector is decided according to U slot dimension. Therefore, control of termination depth dimension is to manage the position where wire conductors are located in U slots.

The reason as a reference value for values of termination depth is that termination depth measuring the distance between surface levels of terminated wire insulation vinyl and connector housing is affected by hardness of wire to be used and its wire insulation outside diameter. Accordingly, a value of termination depth is a reference value not an absolute value.



Exact termination depth is to measure "d" between bottom of slot and position of center core wire of wire conductors as shown in the sketch in left; however, JST specifies termination depth dimension "D" in Fig. -10 instead of "d" by measuring conditions of wire conductors in U slot and wire retention force to facilitate a time-consuming work of measuring "d" as a daily control.

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5-2 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.

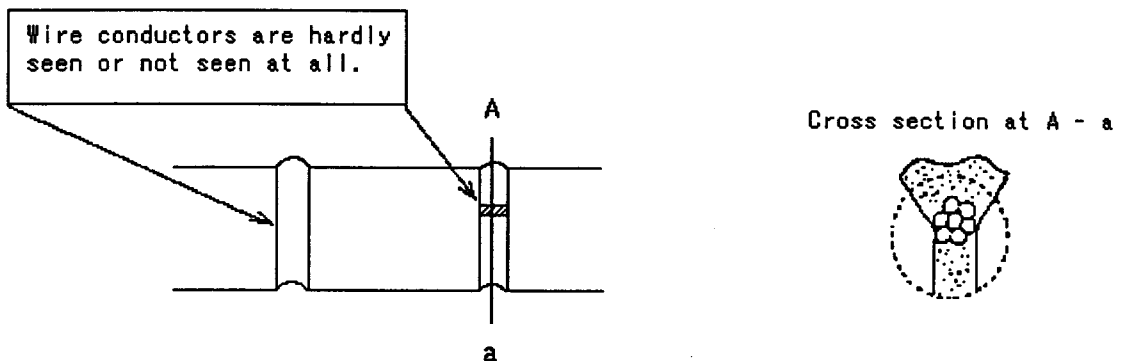


Fig.-12

5-3 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 flaws caused by termination punch appear on flange of housing as shown in Fig.-14.

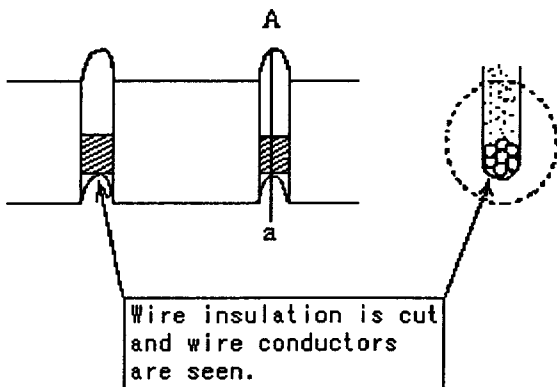
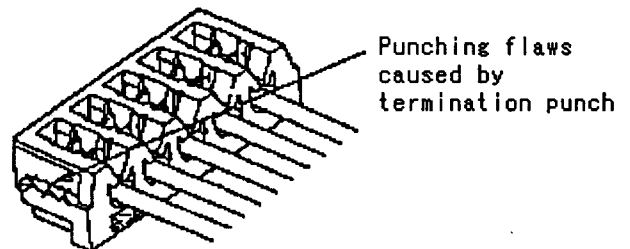


Fig.-13



Note: Punching flaws subject to not in the case of abovementioned ① are allowed.

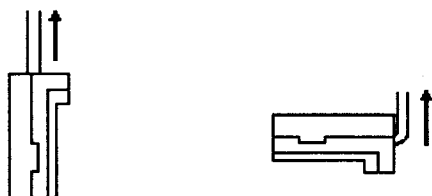
Fig.-14

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6. Wire Retention Force

Pull terminated wire one by one 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 value specified in Table-5.

Refer to appendix manual No. HM-0062-R3 (TCM-0-005) "Method of Measuring Wire Retention Force" for how to measure.



Vertical direction Perpendicular direction

Fig.-15

Table-5 Wire retention force

Wire size	AWG #32
Vertical direction	6N min.
Perpendicular direction	3N min.

7. Termination Appearance

Inspect the following points after termination.

7-1 Punching flaws on housing caused by termination punch — Housing must be free from flaws.

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.

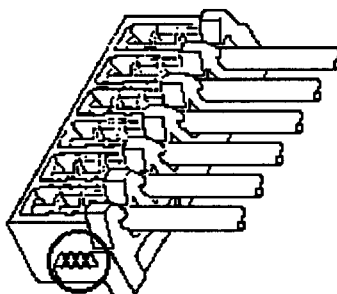


Fig.-16

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.

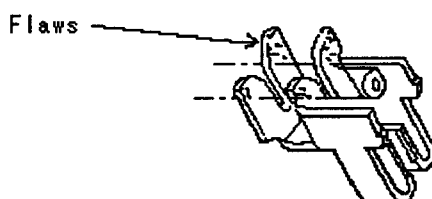
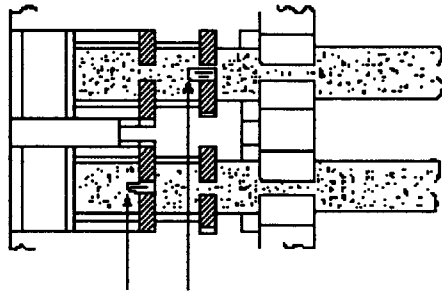


Fig.-17

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.



Wire conductors must not be exposed.

Fig.-18

7-4 Gap between housing wall and wire tip (Wire extruding length)

Gap "G" between housing wall and wire tip in Fig.-19 should be 0.2 mm max.

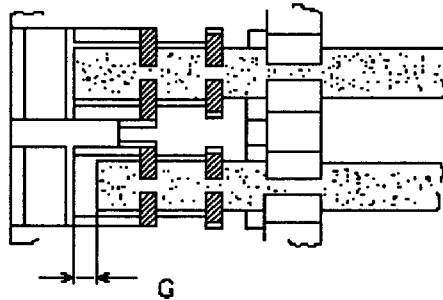


Fig.-19

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.

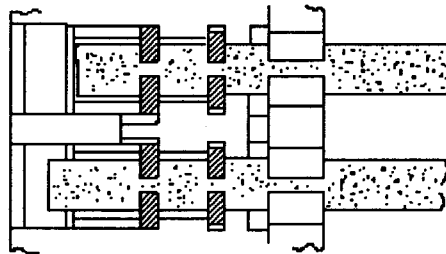


Fig.-20

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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 may deviate as shown in Fig.-21 (a).

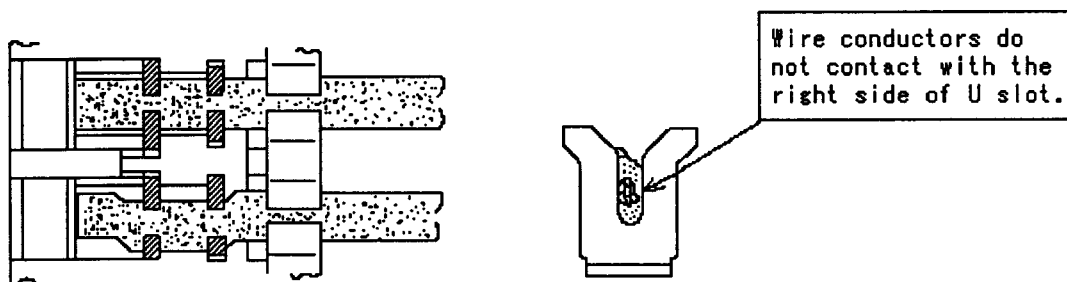


Fig.-21 (a)

Fig.-21 (b)

8. Packaging and Labeling for SSR Harness

8-1 Packaging 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.
Harnesses should be packaged in a small box before packaging in a carton box to prevent from damage, etc.

- ② When wire length is short,

Package harnesses in a small box per unit quantity and then put small boxes in a carton box.
Harnesses should be packaged in a small box with cushion sheet, etc. to prevent from damage, etc.

8-2 Labeling

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

- Examples:
- (1) Harness model number
 - (2) Quantity
 - (3) Production lot number
 - (4) Manufactured date

8-3 Others

Harness products using UL/CSA wires should be packaged with UL/CSA marked labels.

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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.	See Table 3 (reference value) of item 5-1-③ Termination depth dimension.
(4) Wire retention force	See item 6 Wire Retention Force.	Satisfy specified value stated in Table-5 of item 6 Wire Retention Force.
(5) Termination appearance A. Punching flaws on housing caused by termination punch B. Flaws and deformation on contact beams C. Wire conductors expose around contact beams. D. Gap at wire tips E. Overrun of wire F. Deviation of insulation displacement center	Observe terminated housing visually or by stereomicroscope. See item 7-1 Punching flaws on housing caused by termination punch. Observe terminated contact beams visually or by stereomicroscope. See item 7-2 Flaws and deformation at beams of contact. Observe conditions of wire conductors around contact beams visually or by stereomicroscope. See item 7-3 Exposure of wire conductors around beams of contact. Measure by a gauge, projector, etc. See item 7-4 Gap between housing wall and wire tip. Observe wire visually or by stereomicroscope. See item 7-5 Overrun of wire Observe terminated wire visually or by stereomicroscope. See item 7-6 Deviation of insulation displacement center.	Housing must be free from punching flaws caused by termination punch. Contact beams must be free from scratches and deformation. Wire conductors must not expose. Gap: 0.2 mm max. Wires must not overrun. Deviation of insulation displacement center must not happen.