DF14 Desktop Insulation displacement Machine

Model SA704A/DF14

(903-4515-5)

INSTRUCTION MANUAL

CAUTION :
Be sure to read this Instruction Manual carefully before using it to secure safety in operation. In addition, save this Instruction Manual so that it is available whenever necessary for review.

HIROSE ELECTRIC CO., LTD.

Foreword

Congratulations on your purchase of a DF14 Desktop insulation displacement machine SA704A/DF14.

It is a desktop style insulation displacement machine that operates as follows: When discrete cables that have been cut to a predetermined length are inserted into cable guide one by one or two at a time, a touch sensor mounted inside the machine detects the cables and the machine automatically welds them with pressure to DF14 connectors.
Be sure to read this Instruction Manual carefully before putting the machine into service to fully understand functions and performance of this machine for proper use.

To help fully understand the description given in this **Instruction Manual** and the warning labels attached onto the machine, the warning messages are used in accordance with the below-stated classification. Please be sure to thoroughly understand the messages and follow the instructions.

WARNING :
Used in the case where it is assumed that misuse of the machine can expose the operator to danger of major injury or death.

CAUTION :
Used in the case where it is assumed that misuse of the machine can expose the operator to danger of injury and can cause damage only to property.

CONTENTS

CHAPTER 1 FEATURES

* Simple to operate!

The machine is ready for operation only by turning the power ON and setting the connector. If you move the connector to the insulation displacement starting position and put the cables into the insertion slot, the machine will automatically weld the cables with pressure and feed the connector pitch by pitch. It is also possible to feed the connector pitch by pitch.

* Compact and portable!

The machine is compact in size and only weights approximately 6 kg. So, it is easily portable.

* Increase efficiency in insulation displacement work!

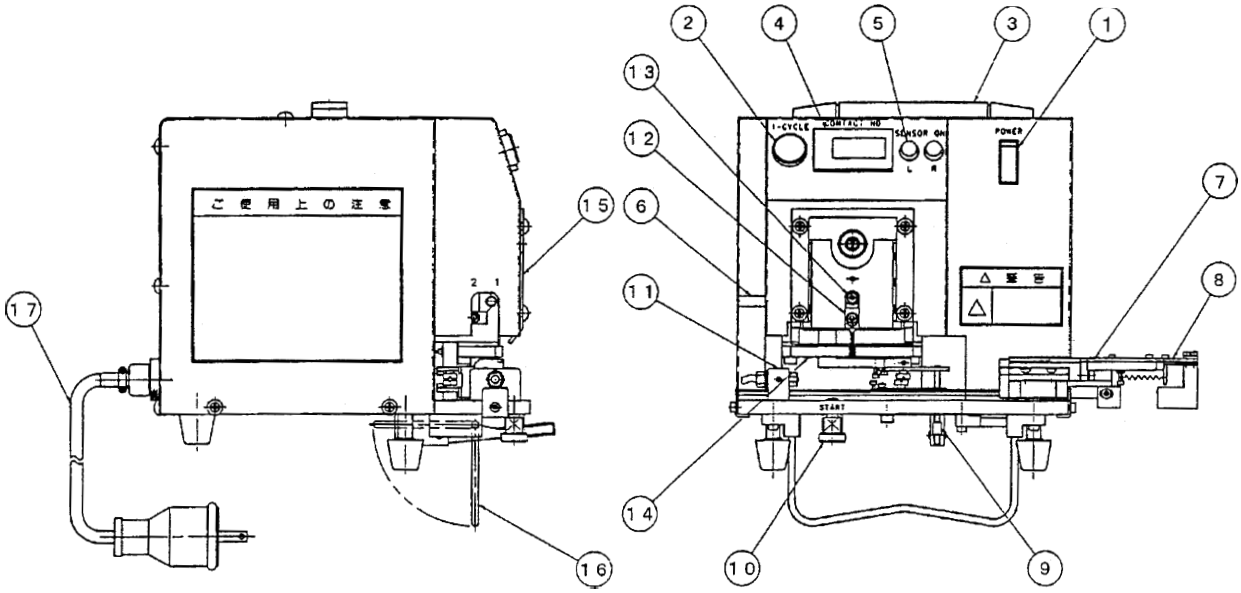
The use of this machine replaces Insulation displacement work with "**inserting cables into cable insertion slot.**" As a result, the machine helps increase efficiency in operation and substantially reduce the length of time required for insulation displacement.

* Able to weld with pressure twist cables!

Operation mode can be changed over only by shifting the operation mode selector lever between the single-sequential insulation displacement mode and the double-simultaneous insulation displacement mode.
The double-simultaneous mode is best-suited to insulation displacement twist cables since two cables are insulation-displaced at a time when this mode is selected.

CHAPTER 2 SPECIFICATIONS AND CONFIGURATION

2. 1 Configuration and explanation



No.	Designation	Explanation of function
①	Power switch	Used to turn the power on. The lamp lights up when the power switch is set to the ON position.
②	One-cycle switch	Used to perform one cycle of insulation displacement. This switch is used for false placement.
③	Handle	Used to carry the machine.
④	Connector contact number counter	Indicates the number of contacts to which a cable is to be welded with pressure.
⑤	Sensor checking lamps R, L (operation fault indicator lamp)	Light up when an inserted cable is detected. In the case of any operation fault, both lamps flash on and off.
⑥	Operation mode selector lever	Insulation displacement mode is changed over between the single-sequential/ double-simultaneous modes.
⑦	Connector holder	Connector is set in this holder.
⑧	Connector fixing lever	Used to secure the connector placed in the connector holder. Change over the bolt setting position with the number of contacts of the connector.
⑨	Connector holder release lever	Used to release the connector holder from the locked state.
⑩	Positioning pin	Positioning pin against which a cable is to be pressed at the beginning of insulation displacement.
⑪	Holder stopper	Used to limit the pitch-feeding of the connector holder. Change over the set position of the stopper with the number of contacts of the connector.
⑫	Insulation displacement punch	A punch for welding a cable with pressure.
⑬	Insulation displacement height adjusting cotter	Used to adjust the insulation displacement height. The height can be adjusted in five stages in 0.1 mm steps.
⑭	Cable guide	The guide plate when inserting the cable.
⑮	Safety cover	The cover used to permit personnel to work with safety. It has to be detached when replacing the Insulation displacement punch.
⑯	Stand	To be placed before starting insulation displacement work.
⑰	Power cable	A 100 VAC (50/60 Hz) power cable.

2. 2 Specification items

No.	Item	Specification
1	Product number and HRS number	Product number : SA704A/DF14 HRS NO. : 903-4515-5
2	Adaptable connectors	DF14-15S-1.25R30 (CL538-0151-0) DF14-20S-1.25R30 (CL538-0140-3) DF14-25S-1.25R30 (CL538-0152-2) DF14-30S-1.25R30 (CL538-0155-0)
3	Adaptable cables	UL1516 AWG30 (0.102/7) Outside diameter of sheath φ 0.55 mm
4	Power supply	100 VAC (50/60 Hz)
5	Operating environment	Temperature : 10 to 35℃ Relative humidity : 35 to 85 %
6	Outside dimensions	193(W) x 211(D) x 187(H) (mm) (When the stand is retracted)
7	Weight	6 kg
8	Operation style and operating personnel	The number of person in charge : 1 Operating position : Sitting Operating height : Approximately 100 mm from above the table surface. (When the stand is retracted)
9	Processing ability	Approx. 3 sec./core (under the single-sequential mode) Approx. 6 sec./two cores (under the double-simultaneous mode) (Note that the processing ability may vary depending on the operator's skill.)

CHAPTER 3 OPERATION

3. 1 Installing the machine

■ Place for installation ■

Install the machine on a place that satisfies the following requirements.

1. On a level and stable work bench
2. Well-ventilated place
3. In a room with a temperature ranging from 10 to 35℃ and humidity ranging from 15 to 85 %.

CAUTION :
Never install the machine in any of the following places.
(1) A place that is exposed to the direct sunlight.
(2) A place that dusty or dirty.
(3) A place in which temperature and/or humidity significantly changes.
(4) A place that is provided with a heating apparatus.
(5) A place in which volatile materials are used/stored.
(6) A place that vibrates.
(7) A place that is easy to get wet.

■ Connecting the power cable ■

1. Connect the power cable to the main unit of the machine.

Connect the power cable supplied with the machine as an accessory to the power cable connecting connector located on the rear face of the machine.

2. Insert the power plug into a receptacle.

Insert the power plug into a 100 V receptacle (50/60 Hz).

CAUTION :
Be sure to make sure that the power switch mounted on the front face of the machine has been turned OFF before inserting the power plug to the receptacle.

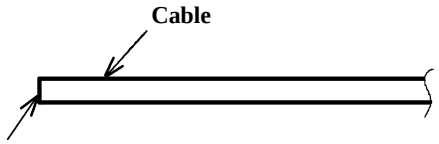
■ Stand ■

Before starting the insulation displacement work, raise the stand that is mounted on the underside of the main unit of the machine. This inclines the machine for easier operation.

3. 2 Preparation for operation

■ Preparing the cable ■

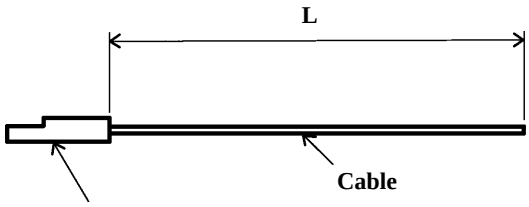
Cut the required number of discrete cables (UL1516, AWG30) to be welded to a predetermined length. Be sure to straighten the top end of the cables.



Cut the cable to finish a vertical cut surface.

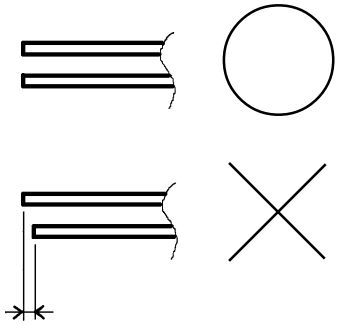
Cut the cables so that the cut surface illustrated above is provided. Relation between the length L mm of harness to be made and the cutting length of discrete cables to be prepared is as follows:

Harness pattern	Length of cable to be prepared
For single-sided harness	L + 4.5 (mm)



DF14 connector

For twist cables, cut them so that cut ends are flush with each other.



Cut ends of cables are not flush with each other.

■ **Items to be checked when turning the power on** ■

Check 1 Is the power cable connected to the main unit of the machine?

Check to be sure that the power cable connector has been securely inserted into the main unit of the machine and the connector fixing screw has been firmly tightened.

Check 2 Is the power plug inserted into the receptacle?

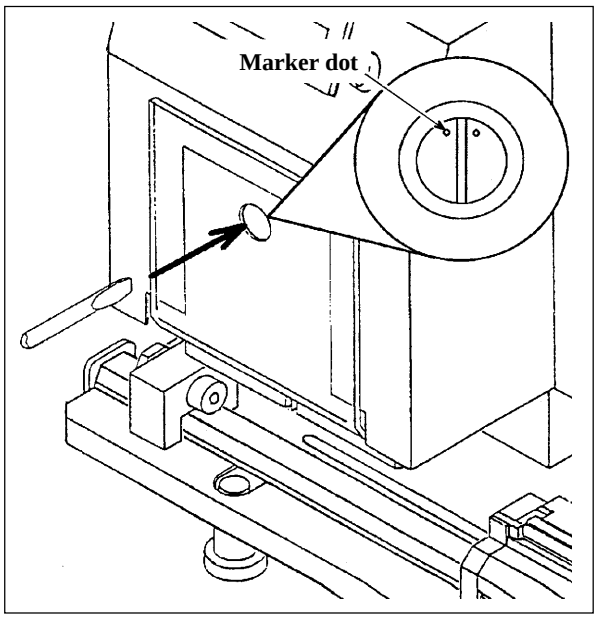
Check to be sure that the power cable has been securely inserted into the receptacle.

CAUTION :
Make sure that the power switch mounted on the front face of the machine has been turned OFF before inserting the power plug to the receptacle.

Check 3 Is the Insulation displacement punch in its top dead center?

Make sure that the pressure-welding punch has been lifted to its top dead center.
(The pressure-welding punch is in its top dead center as long as the marker dot on the shaft that is observed from the round window on the protector is positioned straight up.)

If not, insert a slotted screwdriver from the round window on the front protector of the machine and turn the shaft counterclockwise until the marker dot is brought to the straight-up position.

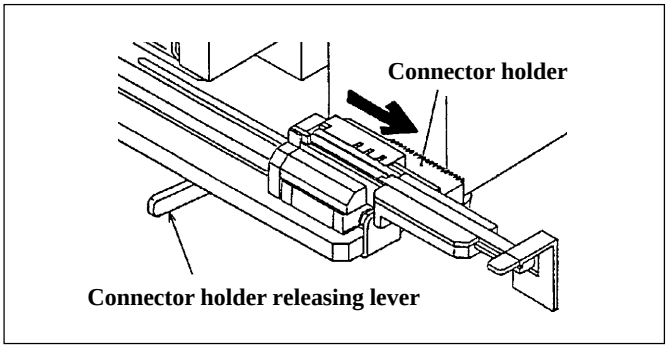


3. 3 Operating procedure

Upon completion of "3. 2 Preparation for operation," start pressure-welding work.

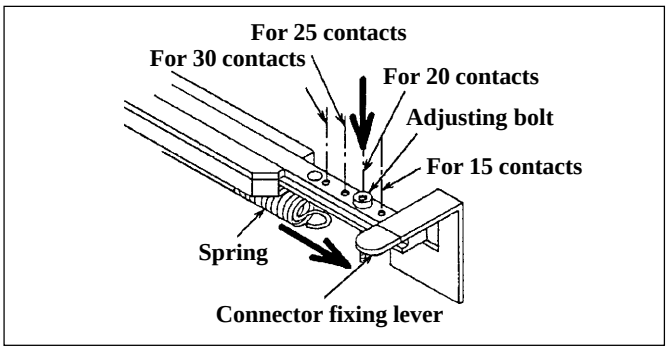
1. Shift the connector holder.

Pressing down the connector holder releasing lever, move the connector holder until the rightmost end of the base is reached.



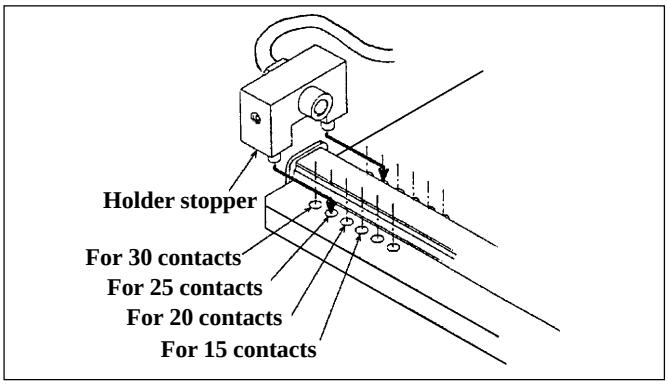
2. Specify the number of cores of connector.

Put the spring to the adjusting bolt of the connector fixing lever according to the number of contacts of connector to be used.



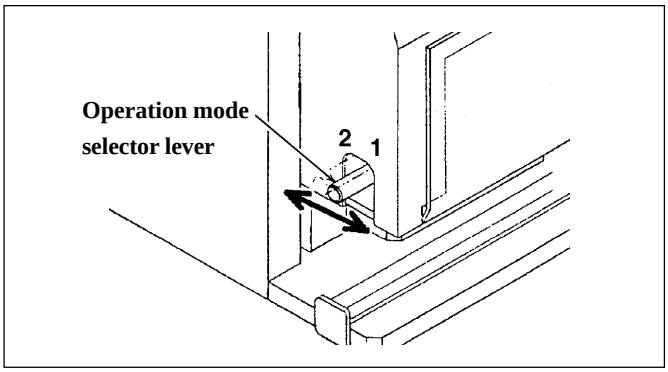
3. Place the holder stopper in position.

Place the holder stopper to the position corresponding to the number of contacts of connector to be used.



4. Specify the operation mode.

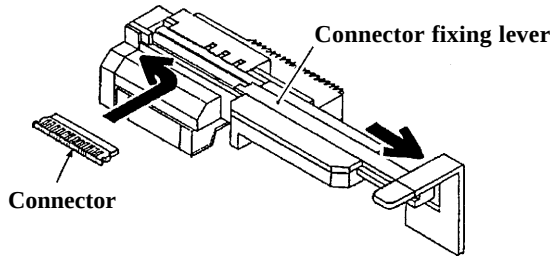
Change over the operation mode selector lever according the the type of cable to be used.
Shift the operation mode selector lever to [1] to operate the machine under the [single-sequential mode] in which cables are welded with pressure one by one, or to [2] to operate the machine under the [double-simultaneous mode] in which two cables are welded with pressure at a time.



5. Set the connector in place.

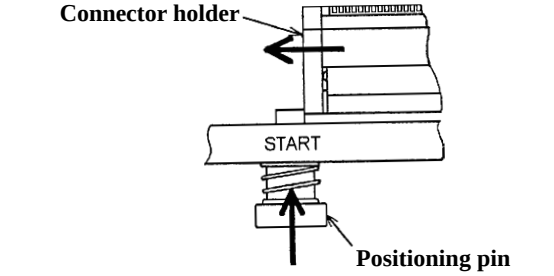
Drawing the connector fixing lever, set the connector in the connector holder.

(Caution) Connector has the correct direction of setting. Set the connector so that the engagement side of the connector is placed at far side.
Take care not to allow the connector to rise. If the connector is set with raised, the connector can break and Insulation displacement punch can be damaged.



6. Shift the connector holder to the starting position of insulation displacement.

Lifting up the positioning pin, press the connector holder against the positioning pin. When the pin is reached, the connector holder is fixed at the Insulation displacement starting position.



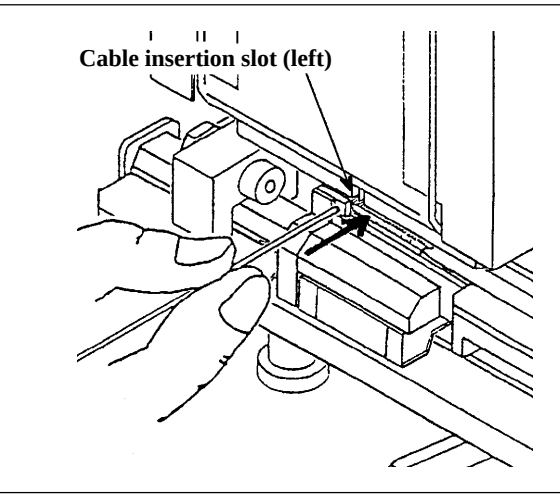
7. Weld the cable with pressure.

For the [single-sequential mode]

Holding the cable prepared by hand at a point that is 20 to 30 mm from the cable end, straighten it and insert it into the cable insertion slot on the left-hand side toward you. The sensor checking lamp lights up and the machine starts insulation displacement procedure. After the cable has been welded with pressure, connector holder will be automatically fed by one pitch.

For the last pin, insert the cable into the cable insertion slot located on the right-hand side toward you.

(Caution) Never release the cable until the Insulation displacement punch reaches the top dead center.
In the case of a solid cable, the sensor mounted on the right-hand side toward you only actuates for the last pin.

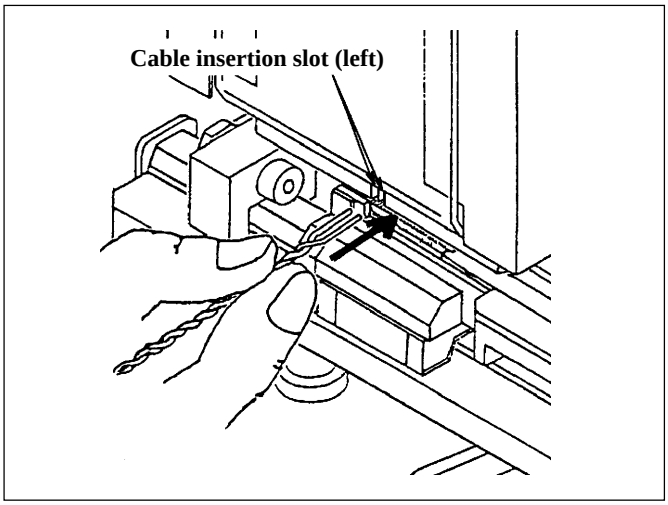


WARNING :
Never insert any thing other than a cable into the cable insertion slot.
Do not place your hand between the connector holder and the cable guide.

For the [double-simultaneous mode]

Holding the cables prepared by hand at a point that is 20 to 30 mm from the cable end, straighten them and insert them into the right and left cable insertion slots at a time. The sensor checking lamp lights up and the machine starts insulation displacement procedure. After the cables have been welded with pressure, connector holder will be automatically fed by two pitches.

(Caution) Never release the cables until the Insulation displacement punch reaches the top dead center. In the case of a twist cable, the machine will not start insulation displacement unless the two sensors are simultaneously rendered ON.

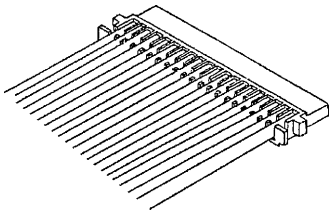


WARNING :
Never insert any thing other than a cable into the cable insertion slot.
Do not place your hand between the connector holder and the cable guide.

Take the aforementioned procedure in repetition until the target number of contacts is finished.

7. Take out the connector.

Once the cables have been welded with pressure to the connector, press down the connector holder releasing lever and shift the connector holder to the right. Draw the connector fixing lever, and take out the connector to which the cables have been welded with pressure.
Make sure that the cables have been properly insulated to the connector.
(Refer to "Checking the quality" on page 12.)



This completes the insulation displacement procedure.

Protector for the connector is assembled using a protector press-fitting jig DF14-1.25R/CV-MP (902-4506-8) (separately available). Refer to the instruction manual supplied with the protector press-fitting jig for details.

3. 4 Indication of connector contact numbers

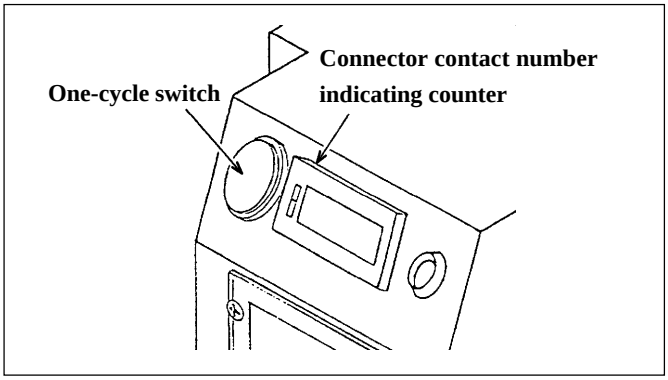
The number appearing on the connector contact number indicating counter mounted on the upper section of the front surface of the machine represents the contact number of connector to be insulated. This number is helpful when performing skip wiring or cross wiring.

(Caution) Be sure to ascertain that the connector contact number indicating counter shows "1" before starting insulation displacement. If you have turned the power off once during welding due to an unexpected trouble or you have shifted the connector holder by hand to a target position, the terminal number shown on the counter might disagree with the number of terminal being welded. In this case, shift the connector holder to the rightmost position or turn the power off once and re-turn it on. This will reset the counter.
Then, shift the connector holder to the Insulation displacement starting position once and cause it to travel to the target welding position by pressing the one-cycle switch.

3. 5 Special wiring

■ Skip wiring ■

To perform skip wiring, press the "one-cycle" switch mounted on the front surface of the machine. The Insulation displacement punch will make a false placement and the connector holder will be fed by one pitch.
(For the [double-simultaneous] mode, the connector holder will be fed by two pitches.)
At this time, do not insert a cable into the cable insertion slot.

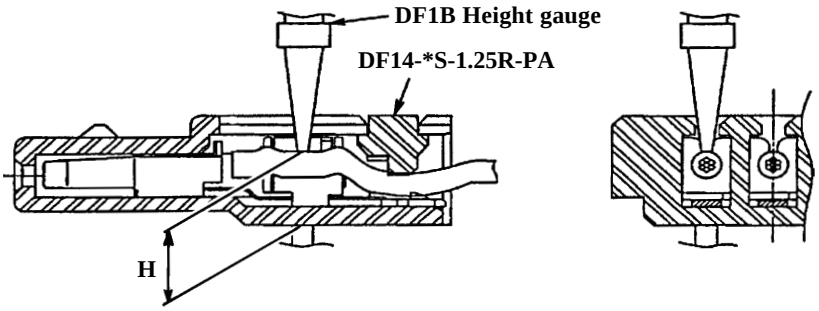


WARNING :
To protect against danger, do not place your hand near the portion to which the Insulation displacement punch comes down (near the cable guide and connector holder) when pressing the one-cycle switch.

3. 6 Checking the quality

Points to be checked and reference values to be used in terms of quality are as follows:
Refer to the DF14-*S-1.25R30 (#) Insulation displacement quality manual on the separate sheet for details.

■ **Pressure-welding height** ■

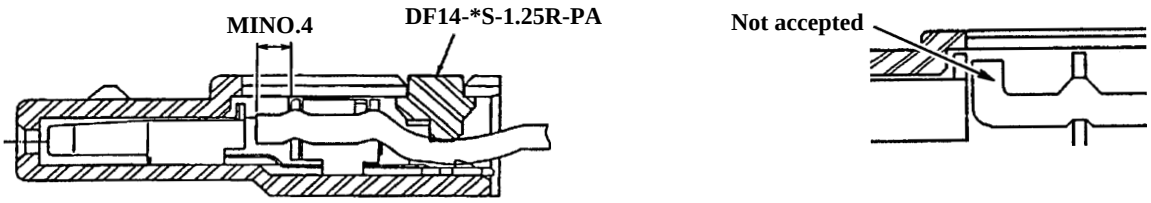


Point to be measured	Reference value insulation displacement height
H	1.40 ± 0.05

Product name	HRS No.
DF1B Height gauge	903-9999-0

(Caution) If the height gauge is not properly positioned relative to the connector, the height gauge might provide a wrong value. Extra caution should be attached to properly position the connector and the height gauge to obtain a correct value. (Press the height gauge against the center of the electric wire.)

■ **Cable jutting position** ■



The cable has to jut out by 0.4 mm or more from the insulated portion on the contact point side.
The cable that juts out excessively to cause the cut surface to face straight up is not accepted.

■ **Other instructions** ■

Check to make sure that the insulated connector and cables are not deformed and have no flaws. If any such defect is found, the machine might have been improperly positioned. Carefully check the faulty state and the position of the machine, and contact our Production Engineering Department.

3. 7 Troubles shooting

Take an appropriate corrective measure according to phenomenon of trouble.

Symptom	Cause	Corrective measure
The machine cannot be energized.	The power cable is not connected to the machine and receptacle.	Connect the power cable to the machine and receptacle referring to "Connecting the power cable" described on page 5.
	Fuse has blown out.	Replace the fuse with a new one. Fuse tube: φ 6.4 x 30 mm (rating: 100 VAC, 5A)
The machine does not perform insulation displacement even when it is energized.	The Insulation displacement punch is not in its top dead center.	Turn the power OFF. Inserting a slotted screwdriver into cam shaft, turn it counterclockwise so that marker dot on the cam shaft is positioned straight up. (Refer to "Items to be checked when turning the power on" described on page 7.)
The sensor checking lamp flashes on and off.	The connector holder is in the insulation displacement prohibition area.	Shift the connector holder once to the rightmost end to move it out of the insulation displacement prohibition area. Then, set the connector holder at the Insulation displacement starting position. If the trouble is not corrected by taking this measure, contact us for service.
	The Insulation displacement punch is not in its top dead center.	Turn the power OFF. Inserting a slotted screwdriver into cam shaft, turn it counterclockwise so that marker dot on the cam shaft is positioned straight up. (Refer to "Items to be checked when turning the power on" described on page 7.)
The sensor checking lamp does not light up.	The shaft does not come in contact with the sensor.	Refer to "Adjustment ①" on page 15.
	The shaft does not slide.	Contact us for service.
	The sensor has failed.	Contact us for service.
The sensor checking lamp remains ON.	The shaft remain in touch with the sensor.	Refer to "Adjustment ①" on page 15.
	The shaft does not slide.	Contact us for service.
The machine has stopped during insulation displacement of cable.	The Insulation displacement punch has been caught in the connector.	Turn the power OFF. Inserting a slotted screwdriver into cam shaft, turn it counterclockwise so that marker dot on the cam shaft is positioned straight up. (Refer to "Items to be checked when turning the power on" described on page 7.)
	Inner portion of the machine is defective.	Contact us for service.
The connector holder is not fed by pitches.	Feeding pawls have worn out or have broken.	Contact us for service.
	Torsion spring of the feeding pawls has come off.	Put the torsion spring onto the hexagon socket head
The insulation displacement height is abnormal.	The height has not been properly specified.	Refer to "Adjustment ②" on page 15.
	The Insulation displacement punch has cracked.	Replace the Insulation displacement punch with a new one. (Refer to "Replacing the Insulation displacement punch" on page 16.)
	The Insulation displacement punch has worn out.	Replace the Insulation displacement punch with a new one. (Refer to "Replacing the Insulation displacement punch" on page 16.)
	Dust has gathered on the connector holder.	Clean up the connector holder.

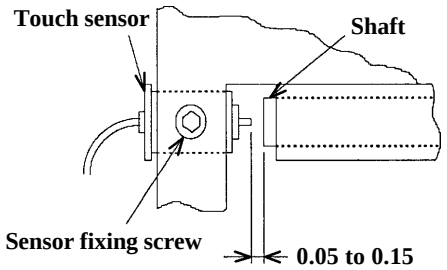
Symptom	Cause	Corrective measure
The cable sheath has broken, or the connector has scratches and flaws.	The Insulation displacement punch has cracked.	Replace the Insulation displacement punch with a new one. (Refer to "Replacing the Insulation displacement punch" on page 16.)
	The Insulation displacement punch has departed from the correct position.	Contact us for service.
Jutting amount of the top of cable is not adequate.	The punch guide is not placed properly.	Contact us for service.
	Faulty adjustment	Straighten the top end of cable and insert it in position.

CAUTION :
This adjustment covers items that can be adjusted by customers in case of a product fault.
The adjustment work shall be carried out by a serviceperson who is familiar with technical matters of the customer.

Adjustment ① Adjusting the position of touch sensor

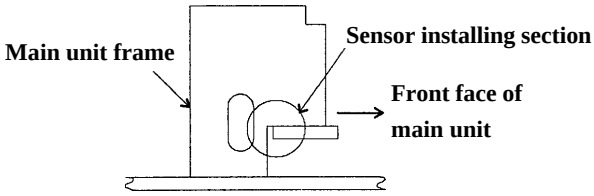
Adjust the touch sensor following the procedure described below:

(1) Turn off the power switch of the machine.
(2) Detach the machine cover (jacket).
(3) Loosen the sensor fixing screw on the main unit frame, and adjust so that a clearance of 0.05 to 0.15 mm is provided between the top end of the sensor and the shaft.
(4) Tighten the sensor fixing screw.
(5) Attach the machine cover (jacket).
(6) This completes the adjustment.



Enlarged view of sensor installing section

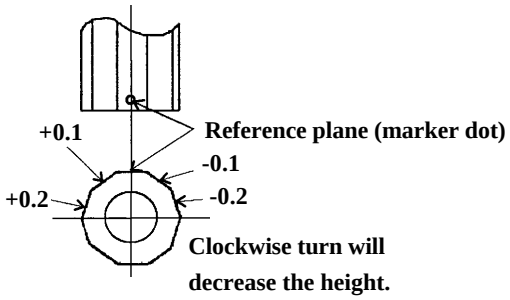
WARNING :
Be sure to turn the power off before detaching the machine cover.
Keep your hands away from the electrical components inside the machine to protect against electric shock hazards.



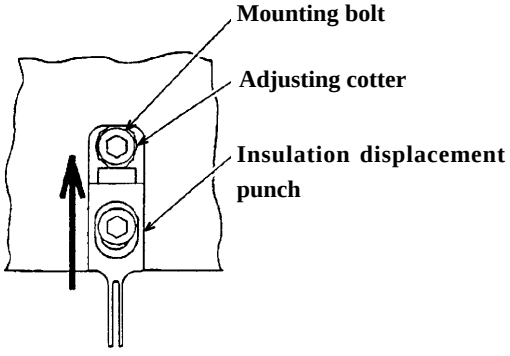
Adjustment ② Setting the height of the Insulation displacement punch

Specify the height of the Insulation displacement punch following the procedure described below:

(1) Turn off the power switch of the machine.
(2) Detach the safety cover from the front face of the main unit.
(3) Loosen the Insulation displacement punch mounting bolt and adjusting cotter mounting bolt.
(4) Turn the adjusting cotter to adjust it to the target height.
(5) Pressing up the Insulation displacement punch, tighten the adjusting cotter mounting bolt.
(6) Tighten the Insulation displacement punch mounting bolt.
(7) Attach the safety cover.
(8) This completes the adjustment.



Adjusting cotter

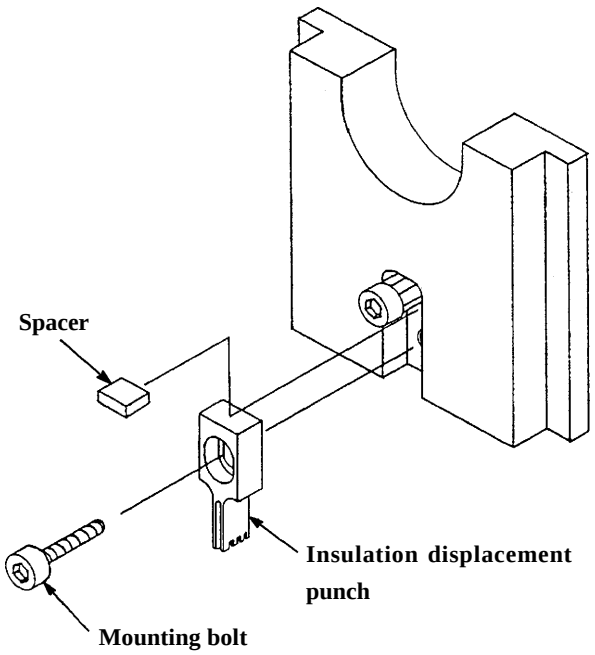


CHAPTER 4 MAINTENANCE AND CONTROL

4. 1 Replacing the Insulation displacement punch

Replace the Insulation displacement punch with a new one if the punch has significantly worn out including the case where it has broken or the insulation displacement height cannot be adjusted with the adjusting cotter.

(1) Turn off the power switch.
(2) Detach the safety cover from the front face of the main unit.
(3) Remove the Insulation displacement punch mounting bolt.
(4) Detach the Insulation displacement punch. At this time, the spacer will also come off.
The spacer is exclusive to the individual Insulation displacement punch. Take care not to mix it with a spacer for any other device when replacing the punch.
(5) Attach a new Insulation displacement punch in position. Re-install the spacer that has come off.
(6) After the replacement, check the insulaion displacement quality according to "3.6 Checking the quality." The insulation displacement height can be adjusted by turning the adjusting cotter. (Refer to "Adjustment ② " on page 15.)

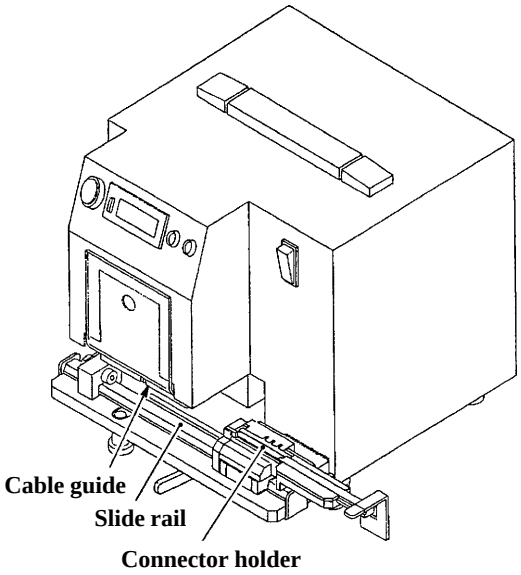


Product number of HRS number of the Insulation displacement punch are as follows:

Designation	Product number	HRS number
Insulation displacement punch	SA704A/DF14 (61)	903-4515-5-61

4. 2 Daily maintenance

As the machine has entered daily use, cable chips might gather around the connector holder and cable guide. Remove the cable chips, dust or any foreign matter gathered with a piece of dry cloth or the like.



4. 3 Extended storage

Follow the instructions given below when storing the machine for an extended period of time.

(1) Disconnect the power cable.
(2) Make sure that the Insulation displacement punch is in its top dead center (the marker dot is positioned straight up).
(3) Clean up the area around the connector holder and cable guide.
(4) Oil the slide rail of the connector holder.
(5) Store the machine with wrapped with a PVC sheeting or the like.
(6) Shift the connector holder to the Insulation displacement starting position and secure there.

4. 4 Moving and transporting the machine

Move the machine holding the handle located on the top of the machine.
To pack and transport it, securely fix the connector holder, retract the standard fill the container with cushioning materials to avoid any external force.

4. 5 Prohibitions

In principle, adjust/replace any part other than the Insulation displacement punch and touch sensor. Never remove the machine cover in any case other than adjustment.

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CAUTION

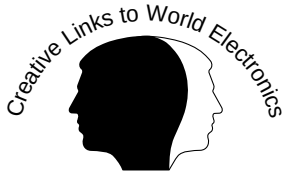
(1) No part of this manual may be reproduced without the permission of Hirose Electric Co., Ltd.

(2) Description in this manual is subject to change in the future without notice.

(3) This instruction manual has been prepared for perfection. Should you find any unclear portion, error and omission, please contact our branch or business office.

(4) It should be understood that, notwithstanding the aforementioned item (3), we assume no responsibility to any claim for loss or failed-to-earn profit resulting from the use of the tool.

(5) We assume no responsibility for any damage resulting from your improper use of the tool or your failure to follow the instructions given in this Instruction Manual, or repair or modification conducted by any third party other than Hirose Electric Co., Ltd.



HRS®

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