

ICE Connector

NQPACK/ YQPACK/ HQPACK Technical Information

Oct.22.1998

I Instruction for Use

(1) Mounting NQPACK on Target Board

1. Standard Type

1-1 Put epoxy type glue lightly on the 4 projected points on the NQPACK. (It will take more than 30 minutes to stiffen glue.) If it is difficult to place NQPACK leads in precise positions onto foot pattern, then follow the **1-2**.

1-2 Insert the NQ-Guide pins which comes with NQPACK to the holes on the NQPACK for precise positioning of NQPACK leads and foot pattern on Target board, as illustrated in **Fig-1**.
The non through holes are 1.0mm in diameter. There are two or three non through holes on NQPACK. For details, see NQPACK specifications.

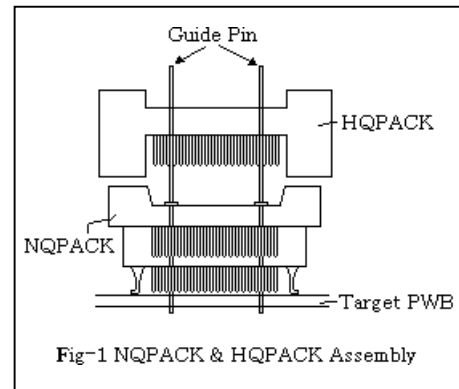


Fig-1 NQPACK & HQPACK Assembly

1-3 Solder NQPACK after HQPACK is assembled. This prevents leads of NQPACK from sticking flux or other sorts of dust.

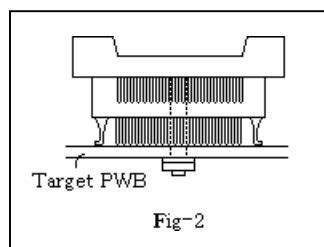
Soldering Condition Reflow Soldering : within 240 °C for 20 seconds
 Manual Soldering : 240 °C for 10 seconds (1 pin)

Note : Please do not immerse connectors in flux, or do not clean connectors with water steam.

1-4 Remove the guide pins.

2. SL Type

After soldering NQPACK leads on to a Target board, NQPACK-SL can be fixed firmly with bolt



provided on the bottom, as illustrated under.

In case of external forces applied to NQPACK, we recommend NQPACK-SL type.

Mounting hole should be provided at the center of NQPACK. Please refer to product drawing for details on the hole. Tighten the NQPACK with nut from the other side of the PWB.

The hole sizes differ from IC packages. Refer to the individual specifications for details.

- 2-1** Drill a hole on PWB. The location of the hole is at the center of NQPACK. M2 or M3 screws are available. Select the screw depending on IC size. For details, refer to the product drawing. Soldering procedure is same as that of the standard type.

3. Important Notes on NQPACK Board Design

- 3-1** The shape and sizes of NQPACK contact pin are same as those of IC lead . Therefore the same foot pattern for IC lead can be used for NQPACK. Recommended foot pattern are shown in the catalog.

If YQPACK is mounted on a big PWB, strong force will be applied to soldered portions of NQPACK lead. In this case, the bigger foot pattern should be used. (Please refer to applicable IC dimensions and sizes shown in the catalog.)

- 3-2** When ICE tools are connected, the big force will be applied to leads after the soldering. Paste the epoxy type glue on the 4 projected points on the NQPACK. Then fix the points to PWB firmly.

- 3-3** NQPACK has guide holes for blind mating with Target board. Drill holes (ø1.0 mm : 2 or 3 places) on the designated location on the PWB for guide pins. As shown in **Fig-1** at the first page. Accurate assembly is possible by using the guide pins (NQPACK parts). ***The guide pins must be removed after soldering NQPACK.***

Note : The nut touching area is the wiring prohibited area. The area of M2 and M3 screws 5 mm approx. and 8 mm approx. in diameter.

(2) IC Package Built-in

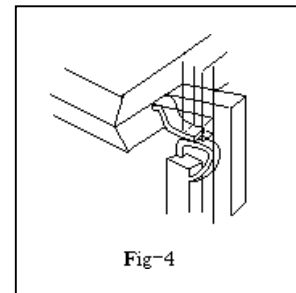
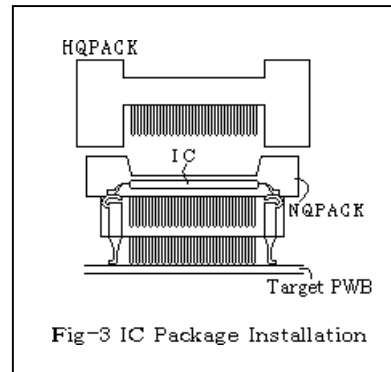
1. Built-in Procedure

1-1 Refer to the catalog. Please check whether IC package is suitable for NQPACK. Our ICE connectors and sockets are developed for test or evaluation of systems only. So that the products are not approved by MITI safety rules or EMI regulations.

1-2 As shown in **Fig-3**, IC will be placed onto the NQPACK after NQPACK are soldered on Target board.

1-3 Use screws attached to HQPACK. There are 4 places to screw, (M2x6mm). Mount HQPACK, IC and NQPACK, together. Tighten each screw equally with precision torque driver (Phillips head tip number 0 or 1). The tightening torque shall be 0.55Kg-cm-maximum. If the torque is higher, it may cause a poor contact.

IC leads are held with NQPACK and HQPACK contact pins. IC leads are isolated with the plastic grooves around NQPACK, therefore IC leads will never touch adjacent leads.



* Runner is restricted around the fixing nut area. (M2 is 5 mm approx., M3 is 8 mm approx.)

2. Instruction for Use

2-1 Please check a broken or a bent leads of IC package by visual. Also check burrs of IC lead and mold by visual before IC package is built in NQPACK.

2-2 Please check a broken or a bent pins on HQPACK by visual before fixing HQPACK. If a broken or a bent pins are found, please repair them with a knife or the likes of thin flat shape.

2-3 IC package can be built in between NQPACK and HQPACK. But this is allowed for test or evaluation purpose only.

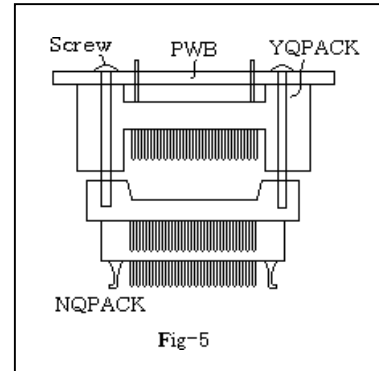
(3) Instruction for ICE Cover

1. Procedure

1-1 PWB should be soldered to YQPACK before NQPACK and YQPACK are assembled.

1-2 Check YQPACK leads are not damaged, before YQPACK and NQPACK are mated together and firmly locked by screws.

And also every time before mating and unmating, please check leads are not damaged. Please repair damaged leads by a knife or the likes.



1-3 Four (4) holes are required in designated location for YQPACK installation. (See **Table-1**)
As shown **Fig-5**, YQPACK soldered with PWB is mated with NQPACK on an user board. Then YQPACK is mounted by the screws provided, M2 x 10mm. Thickness the PWB for the screws provided are 1.0 to 2.0 mm.

Tighten each screw equally with precision torque driver (Phillips head tip) number 0 or 1.

The setting of torques screw driver: 0.55Kg-F-cm (0.054 N-m) is maximum.

If the screwing is too tight then it may cause a poor contact.

1-4 Screws, M2x10mm, is attached to YQPACK to fix it to NQPACK after soldering. (See **Fig-5**)

Note : IC package should not be built in between NQPACK and YQPACK.

2. NQPACK-YQPACK Mounting Screw related PWB Design Specification Data

Table-1 : Screw, small flat head screw are used. [Unit : mm]

Type of Screws	PWB Guide hole diameter (4 places) (*1)	Runner restricted area	
		The size of screw heads	The size of washer(*2)
M2 x 10mm	ø2.4	ø4.4	ø4.8

(*1) Please refer drawing of YQPACK for guide hole details.

(*2) Bigger sizes of flat and spring washer are used as standard.

3. YQPACK Lead Ends Details on Soldering Portion

Table-2 [Unit : mm]

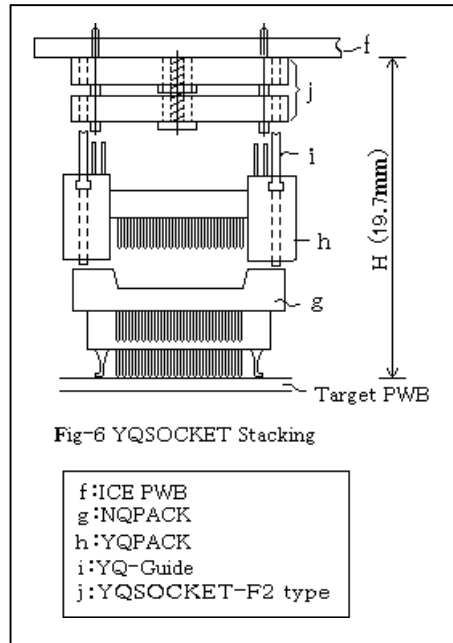
Pitch	Pin cross section of YQPACK	Pin diagonal distance	Diameter of through hole on the PWB
0.3	-	-	-
0.4	0.20 x 0.3	0.36	ø0.45 or more
0.5 ~ 1.0	0.25 x 0.3	0.39	ø0.50 or more

(4) Stacking with YQSOCKET

(if the mating height should be 13.3 mm or higher)

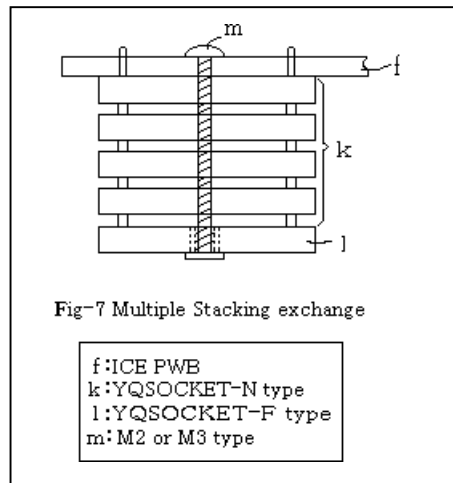
1. As shown in **Fig-6**, NQPACK and YQPACK stacking on PWB is illustrated.

Distance between the top of user board and the bottom of PWB is 13.3 mm. The distance can be extended with additional YQSOCKET between PWB and YQPACK ; One YQSOCKET can extend the distance by 3.2 mm. After soldering NQPACK to an user board, YQPACK will be placed on NQPACK. NQPACK and YQPACK are stacked together with screws through YQ-Guide holes. The lower half of YQ-Guide provides threads for fixing NQPACK and YQPACK. The upper half helps blind mating to stack YQSOCKET onto YQPACK. YQSOCKET mates to YQPACK by mean of YQ-Guide.



2. **Multiple YQSOCKET stacking**

As shown in **Fig-7**, YQSOCKET-F type should be used at the bottom for stacking directly on YQPACK. YQSOCKET-N type should be used in between ICE PWB(f) and YQSOCKET-F. M2 or M3 screw firmly fixes together the total assembly.

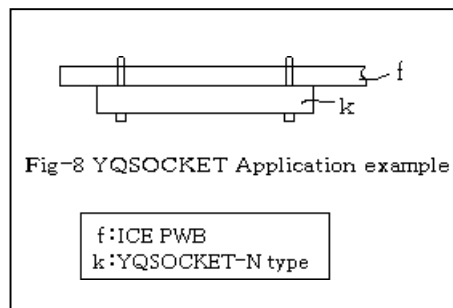


3. **Two YQSOCKET stacking**

As shown in **Fig-6**, two YQSOCKET-F2 type are fixed together with a hexagon socket set screw. Hole for the set screw is not necessary in ICE PWB. But if three or more YQSOCKET are stacked, there must be a hole in ICE PWB.

4. **Single YQSOCKET stacking**

As shown in **Fig-8**, single YQSOCKET is stacked on ICE PWB. There must be a hole for the set screw. We recommend diameter of the hole is 2.3 mm.



(5) Instruction for use on YQ-Guide

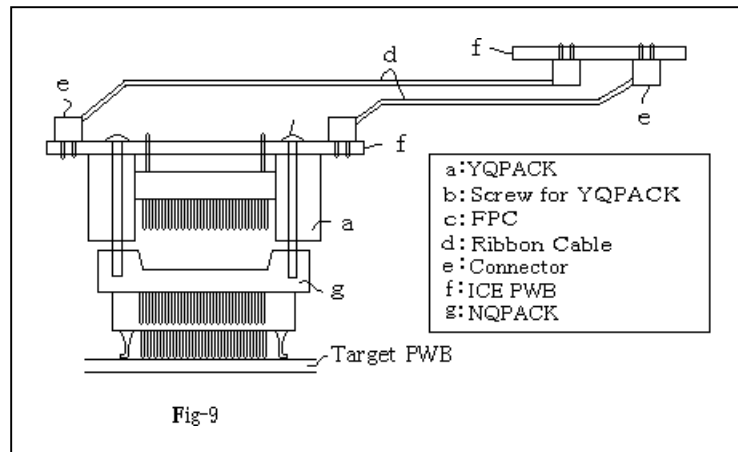
1. YQ-Guide should be used as shown in **Fig-6** on page 5, when you stack NQPACK, YQPACK, and YQSOCKET.

* YQ-Guide is sold separately from YQSOCKET. But if you buy YQSOCKET-F2, YQ-Guide will be included. The minimum packing quantity is 4 pcs.

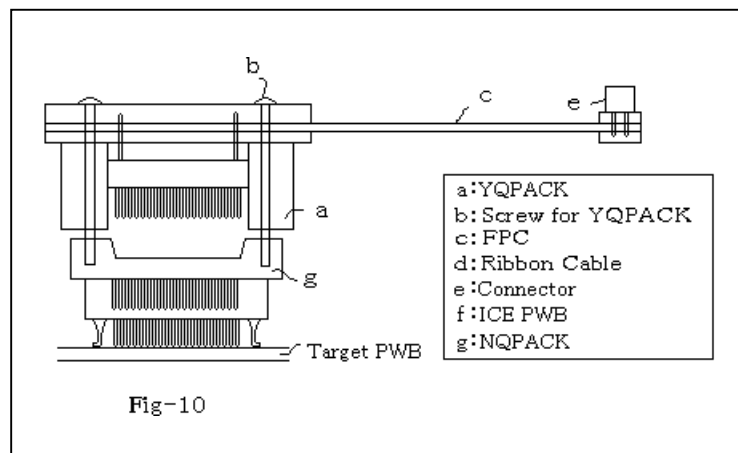
Note : If mating and unmating of YQPACK/YQSOCKET are done without YQ-Guide, it will cause bent pins of YQPACK.

II YQPACK Application

(1) PWB and Ribbon Cable Connection



(2) Flexible Cable Connection



Note : PWB for YQPACK must have the screw holes for fixing NQPACK. Without the holes, NQPACK can not be fixed. Four (4) holes are required. For the further information, refer I-(3)-1-1-3 at page 4.

Please contact us for consulting ICE tool design and manufacturing. We are developing and manufacturing ICE tool as well.

III Existing TQPACK and ICE Tool Connection

Basically, the existing ICE tools for TQPACK can be connected to NQPACK except a few exceptions. (There are some exception, call us for further information.)

1. Connection Procedures

1-1 Solder NQPACK (g) to Target board.

1-2 Mount YQPACK (h) on NQPACK.

1-3 YQPACK and NQPACK are screwed together with the lower portion of YQ-Guide pin, which are threaded. Tighten four screws on the corners equally with precision torque screw driver (Phillips head tip #0 or 1). The setting of torques screw driver is 0.55Kg-F-cm (0.054N-m) maximum.

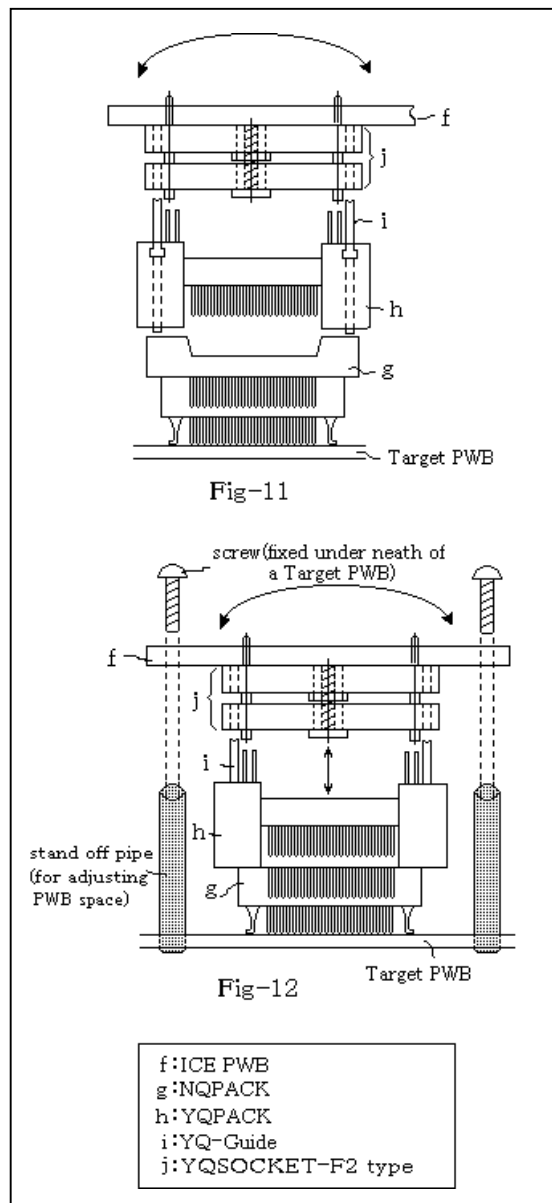
1-4 Solder YQSOCKET-F2(j)(two YQSOCKET stacked) on ICE connecting PWB(f).

1-5 Mount YQSOCKET on YQPACK with upper portion of YQ-Guide.

1-6 When withdraw IC tools, remove them gradually from 4 corners of YQSOCKET with minus screwdriver. As illustrated in **Fig-12**, it will cause a bent or a loose pins on YQPACK to withdraw a tool by rolling YQSOCKET. Please hold NQPACK and YQPACK by fingers to prevent the soldered portions of an user board and YQPACK contact pins from stress, when withdraw a tool.

It will cause a bent pin on YQPACK to withdraw YQSOCKET with rolling force,

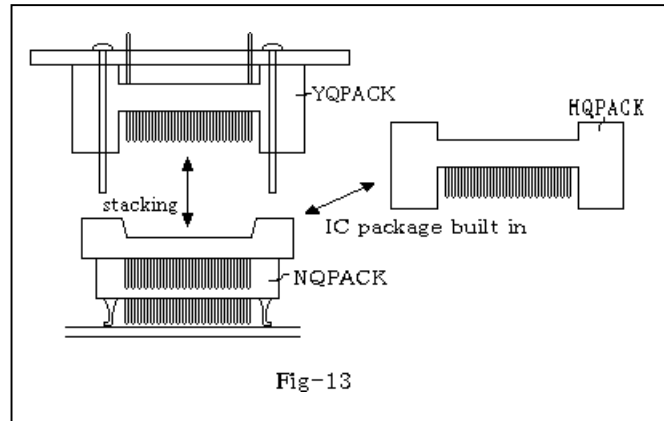
during unmating process of YQSOCKET and YQPACK. PWB fixed YQSOCKET is small, and it might be withdrawn with rolling force, please follow instruction as illustrated right (**Fig-12**).



IV Connector Selection

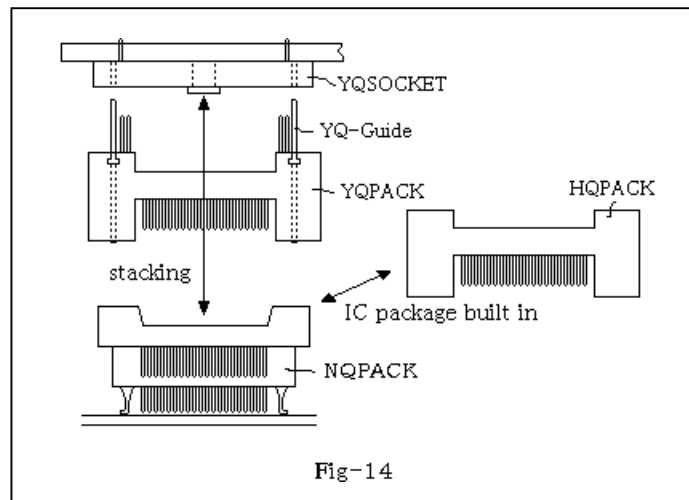
Connector selection differs depending on a connector fixed on a tool. Please confirm the details with tool manufactures.

1. Example ; Stacking connector, YQPACK, is fixed to a tool.



	Suitable Connectors
ICE Connection	NQPACK, YQPACK
ICE Built in	NQPACK, HQPACK

2. Example ; Stacking connector, YQSOCKET, is fixed to a tool.



	Suitable Connectors
ICE Connection	NQPACK, YQPACK, YQ-Guide, YQSOCKET
ICE Built in	NQPACK, HQPACK

3. NQPACK, HQPACK, YQPACK Attachments

NQPACK

NQ-Guide, 2 or 3 pcs (Precise positioning of leads for soldering)

Screw driver, one piece (for fixing HQPACK and NQPACK, or YQPACK and NQPACK)

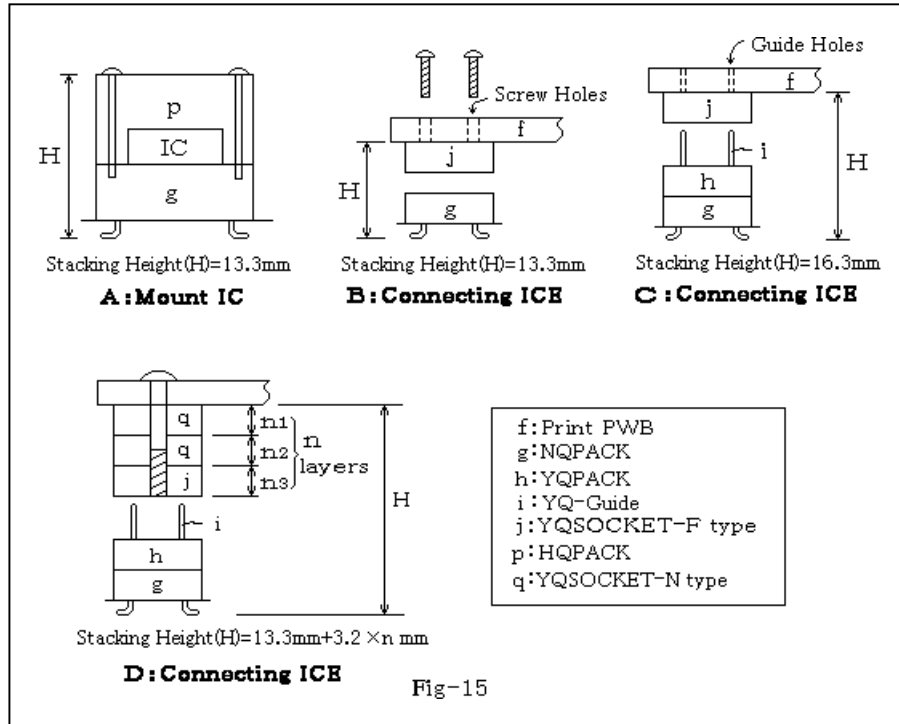
HQPACK

Screws M2x6 mm, 4 pcs (for fixing HQPACK onto NQPACK)

YQPACK

Screws M2x10 mm, 4 pcs (for fixing YQPACK and NQPACK soldered on PWB)

V NQPACK Various Applications



When higher space is required between ICE and Target boards, the additional YQSOCKET will bridge the gap. The bridging space of one YQSOCKET is 3.2mm.

YQSOCKET should be fixed to PWB with a screw as shown in **Fig-15 B**. YQSOCKET-F type should be used at the bottom. YQSOCKET-N type should be used in between PWB and YQSOCKET-F type.

Important Notes in Handling NQPACK/HQPACK/YQPACK

1. Check the IC sizes whether NQPACK is fit for the IC package, for details refer to catalog.
2. When NQPACK/HQPACK/YQPACK are taken out of a packing box, press the product lightly by fingers and remove the packing material first.
3. Packing boxes have been kept under ambient temperature of 50 °C for long time, then the boxes might be deformed. The storage place should be free from sun light, and the room temperature should be 40 °C or lower.
4. Check mold burr around IC package by visual before place the package onto NQPACK. Please remove burr with a knife if you find it.
5. IC leads are easily bent during loading the package to NQPACK, as the leads are very fragile. Check bent lead, and repair it if any before loading.
6. Precision torque driver (number 0 or 1) is recommended for fixing the 4 holes on NQPACK/HQPACK/ YQPACK. (Fix screw with Max 0.054 N·m . When 4 screws are not tighten equally, then it may cause a poor contact.)
7. YQPACK lead pins may be bent during YQPACK/YQSOCKET withdrawal. Please withdraw without rolling force.
8. 4 holes, 2.3mm or 3.3mm in diameter, must be provided on PWB connected to YQPACK. Diameter of screw heads, 3.8mm or 4.3mm, should be runner restriction area.
9. HQPACK should be placed on NQPACK as a cover which protect a flux splash during soldering process of NQPACK.

Recommend soldering Temperature profile :

Reflow : 240 °C for 20 seconds or less

Manual soldering : 240 °C for 10 seconds or less

* Hot air soldering is also recommendable.

10. Cleaning of NQPACK, YQPACK, YQSOCKET should not be done. Cleaning material will contaminate in the connectors due to the construction of the connectors.
11. IC package can not be built in between NQPACK and YQPACK.
12. NQPACK, HQPACK, and YQPACK should be used for test application only.
13. Stacking of NQPACK, IC package, and HQPACK and that of NQPACK and YQPACK are not be allowed for vibration and shock environments.

14.During test of IC package which is built in NQPACK and HQPACK, IC package might become malfunction from temperature rise. Please cool down the connectors by a fan.

15.NQPACK/YQPACK/HQPACK are developed for test application only. The connectors are not approved by MITI Electric appliances safety rules or EMI regulations in Japan.

VI Technical Data and Specifications of NQPACK series

* NQPACK/ YQPACK/ HQPACK Specifications

1. Material

1-1 Contact :

Table-3

Metal		NQPACK	YQPACK		HQPACK
			0.4mm pitch	0.5mm pitch	
Under Coating	Base	Alloy (Be-Cu)	Alloy (Be-Cu)	42Alloy (*1)	Alloy (Be-Cu)
Plating	Surface	Ni ; 2.5μm or more	Ni ; 2.5μm or more	Gold ; 0.1μm or more	Ni ; 2.5μm or more
		Gold ; 0.25μm or more	Gold ; 0.1μm or more		Gold ; 0.1μm or more

(*1) : 42Alloy(Fe-Ni)

1-2 Mold :

Liquid Crystal Polymer (Zenite 6130 of Dupont. Filled glass fibre 30%)

Surface Resistivity = $5 \times 10^{16} \Omega$

Volume Resistivity = $3 \times 10^{16} \Omega\text{cm}$ (ASTM-D257)

Dielectric Constant = 3.8 at 1MHz

Dissipation Factor = 0.017 at 1MHz (ASTM-D150)

1-3 Sleeve(YQPACK) :

Ni under coating ; 5μm or more

Gold plating ; 0.1μm or more

2. Electrical

2-1 Contact Resistance :

NQPACK-IC (Mated with HQPACK) ; 70mΩ/pin or less

NQPACK-YQPACK ; 70 mΩ/pin or less

YQPACK-YQSOCKET ; 70 mΩ/pin or less

2-2 Withstand Voltage :

AC 100V for one minute

2-3 Insulation Resistance :

500MΩ Min at 100V DC

2-4 Rating Current :

0.5 A /pin or less

2-5 Operating Temperature :

-25°C to +85°C

3. Insertion and Withdrawal Force

- 3-1 Withdrawal Force between YQPACK-YQSOCKET ; 60 g/pin or less
Insertion Force between YQPACK-YQSOCKET ; 10 g /pin or more
- 3-2 Contact Life :
150 times

4. Soldering

- 4-1 Soldering Temperature :
220 °C for 60 sec (VPS)
240 °C for 20 sec (RS)
*VPS --- Vapor Phase Soldering, RS --- Reflow Soldering

5. Solvent resistance

- 5-1 With stand freon cleaning for 2 minutes max. under normal temperature.

*** NQPACK Characteristics**

1. NQPACK -IC Resistance Test Data (Reliability Against Heat and Humidity)

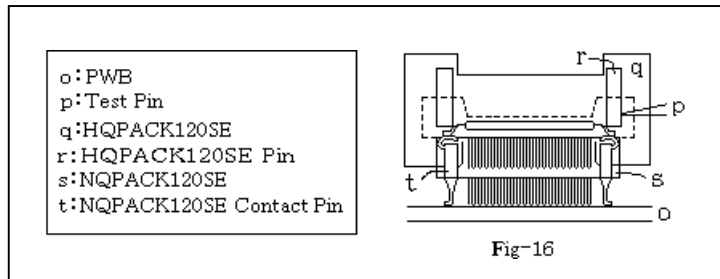
Table-4 [Unit : mΩ]

Exposed	Test Condition							
	150°C				60°C, 90 %Rh			
	\bar{X}	σ_n	X Max.	X Min.	\bar{X}	σ_n	X Max.	X Min.
Initial	16.36	3.46	21	11	16.79	3.45	22	11
240 Hours	16.74	3.29	21	13	16.83	3.47	22	11
360 Hours	16.98	3.30	20	13	16.86	3.48	21	11

Measurement Method : The contact resistance between the pins of NQPACK120SE-IClead-HQPACK120SE is measured under normal room temperature.

Test Points : n = 28(lines) x 3(connectors)

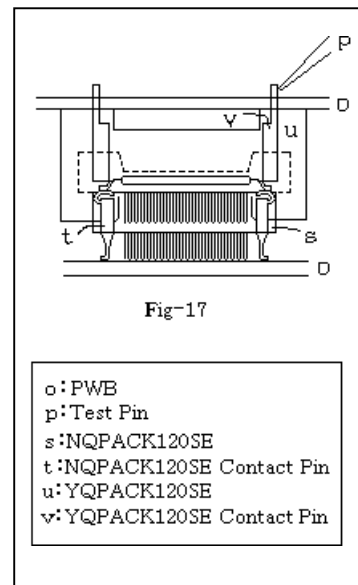
Measurement Equipment : HP 4338A milli-ohm meter



2. NQPACK –YQPACK Durability

Table-5 [Unit : mΩ]

Life Test Cycle	Test Data			
	Contact Resistance			
	\bar{X}	σ_n	X Max.	X Min.
Initial	18.69	3.35	23	13
5	22.30	2.31	25	18
10	23.86	2.38	27	19
50	25.09	2.54	29	21
100	26.12	3.10	30	21
150	27.09	3.35	32	21
200	27.93	2.29	32	23
300	29.63	2.56	34	25
400	31.83	2.75	38	24
500	33.18	3.52	42	27



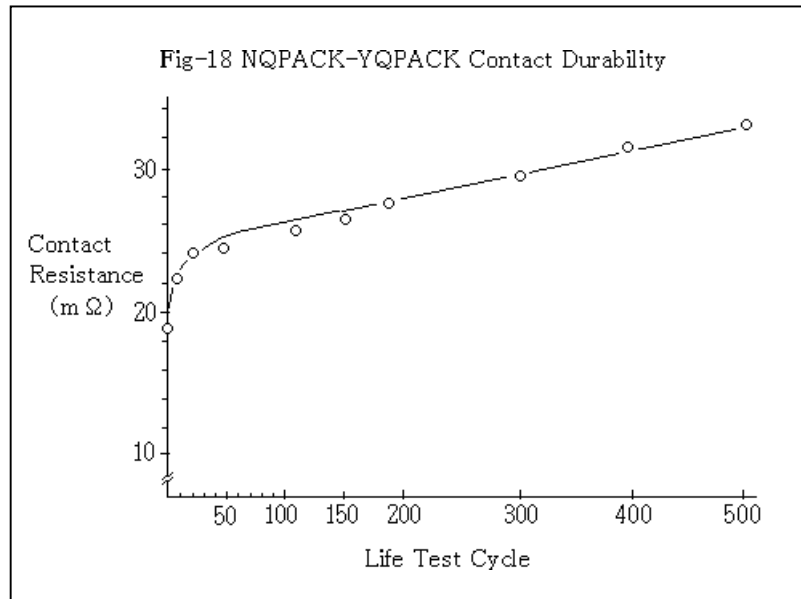
Measurement Condition : Test was made under normal room temperature.

Contact resistance(X) is calculated by formula shown under ;

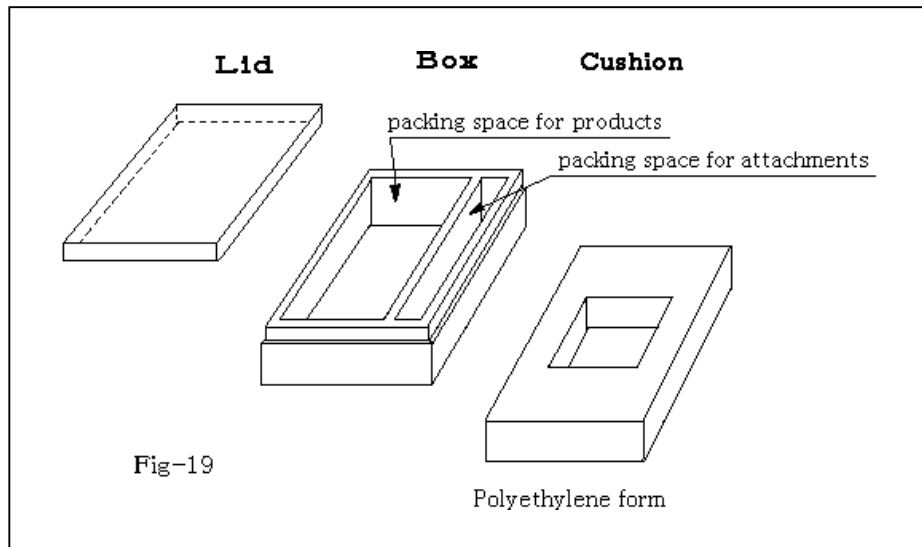
$$X = (\text{Resistance between PWB/NQPACK120SE/YQPACK120SE}) - (\text{YQPACK Pin Resistance, } 43.6 \text{ m}\Omega)$$

Measurement Location : n = 32(lines) x 3(connectors)

Measurement Equipment : HP 4338A milli-ohm meter



VII NQPACK/HQPACK/YQPACK Individual Packing Box



*Box Dimensions

External (55 x 60 x 22 mm)

Internal (42 x 56 x 20 mm)

Material (Polystyrene)

Note: Box is made of the biodegradable plastic. Please stock them under sun light free room.