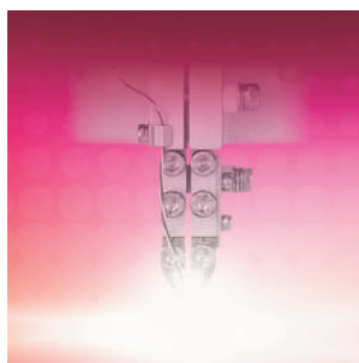


PRODUCT CATALOG



Pulse Heat Unit Series

What is pulse heat?

It is Avio's original process of utilizing resistance heat which is generated by passing an electric current through a metal heating body called a heater chip/heater tool, to instantaneously perform soldering, thermos-compression bonding, and plastic welding with heat and pressure.

Basic flow of the process

1. Press the heater tip/heater tool (Fig. 1) against the target work to pressurize.
2. Apply electric current to the heater tip/heater tool to raise the temperature from room temperature to preset temperature while pressurizing.
3. Hold pressure and heat for the set time.
4. When the set time is over, the welding is stopped, and when the temperature reaches to the preset cool temperature, the pressure is released.
5. The heater tip/heater tool return to room temperature. (Fig. 2)

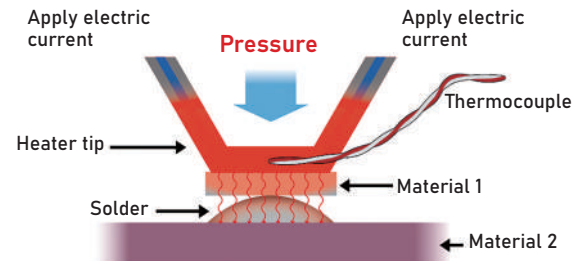


Fig.1 Model of joining by the pulse heat

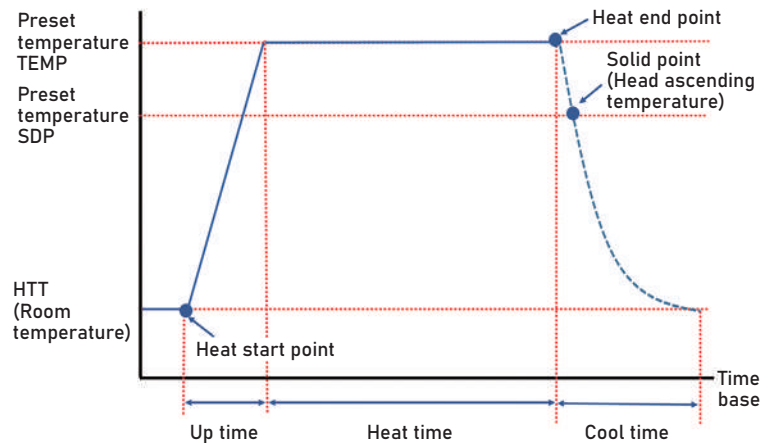


Fig. 2 Temperature profile

Features of the pulse heat

The temperature control feeds back the temperature of the heater tip/heater tool and accurately reproduces the set temperature profile.

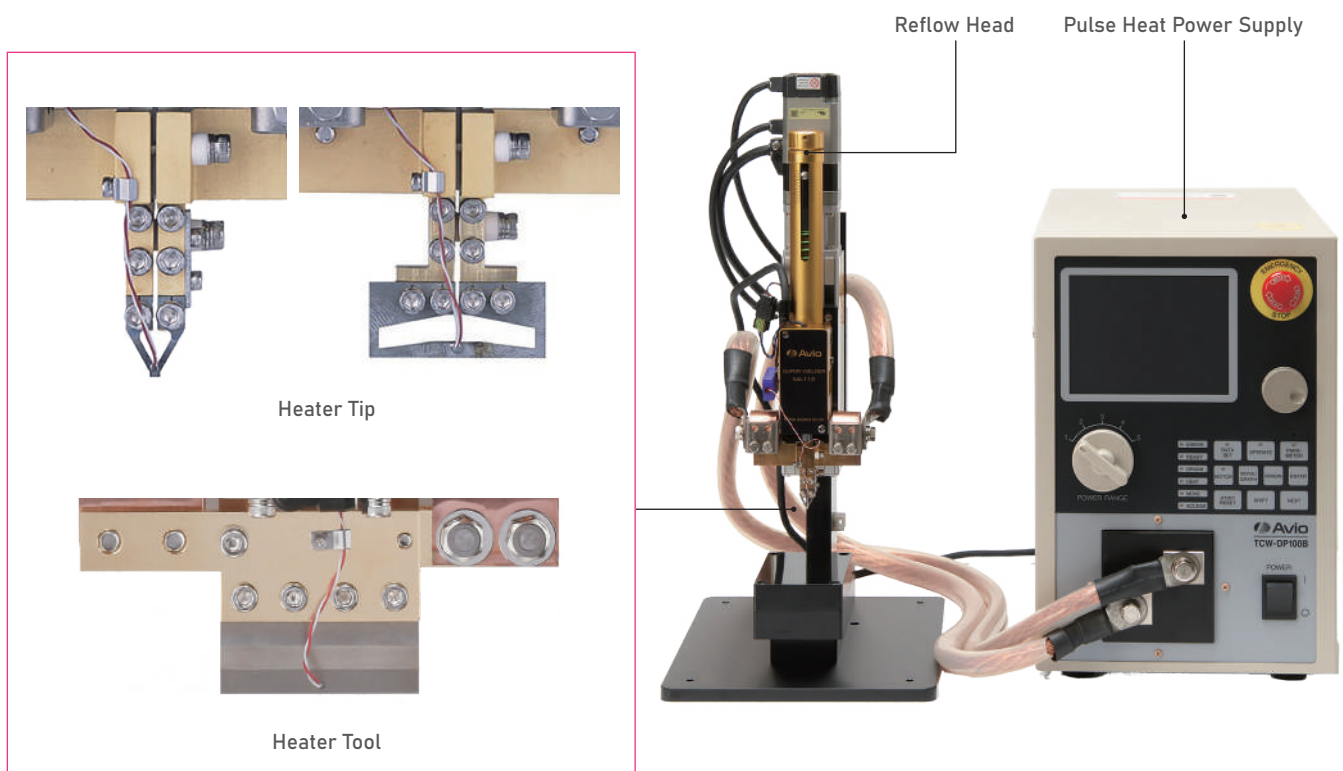
- The temperature rises quickly and the temperature reproducibility is good.
- Temperature profiles such as pre/main heat can be easily realized.
- Due to local heating, the heat effect to the surroundings is small.
- Since it is cooled while being pressed down, there is no unconnected due to floating.
- It does not depend on skill level of the worker.

- Pulse heat power supply:
Apply electric current to heater tip/heater tool.
- Reflow head:
Press down the work and apply pressure.
- Heater tip/heater tool:
This is the area to generate heat from the resistance. Relatively small size is called heater tip, and large size is called heater tool.

Also, there are various monitors to measure pressing force.

Basic configuration and role of the pulse heat unit

The pulse heat unit is a device for soldering electronic parts and welding plastic parts. It consists of a reflow head to press the work for applying pressure, and a pulse heat power supply to apply electric current.



Line up of the pulse heat unit

P5-6 Pulse Heat Power Supply



- Displacement pulse heat power supply**
- Simultaneous control of temperature and position of the heater tip
 - Ideal for highly reliable soldering



- General purpose pulse heat power supply**
- Ideal for soldering, thermocompression bonding, and heat caulking



- High power type pulse heat power supply**
- Ideal for automation of soldering, thermos-compression bonding, and heat caulking

P7-11 Reflow Head



System Head



Drive Unit



Accessory



Handheld Type Head



Integrated Type Head

P12-13 Welding Monitor

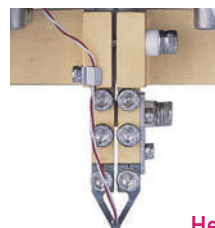


Force Monitor



Digital Force Gauge

P13-14 Heater Tip/Heater Tool



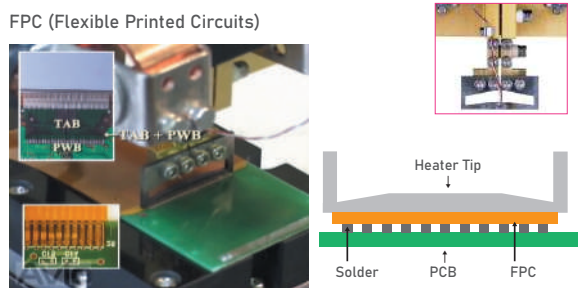
Heater Tip



Heater Tool

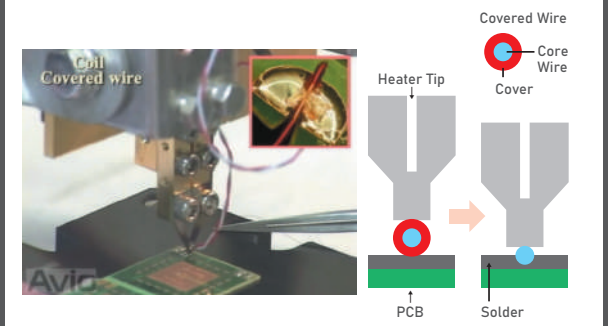
Pulse Heat Joining Examples

FPC (Flexible Printed Circuits)

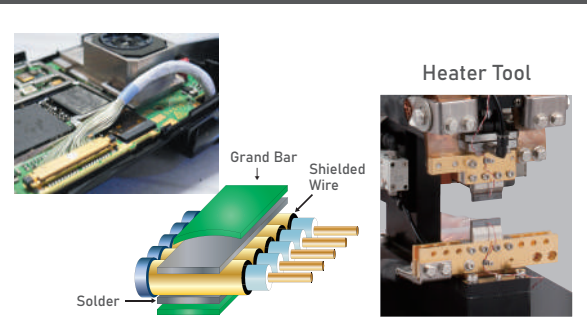


PCB (Printed Circuit Board)

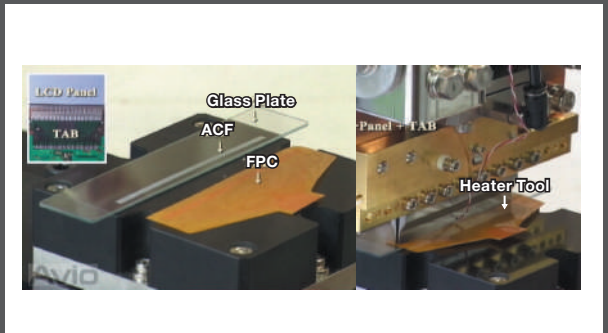
FPC + PCB Soldering



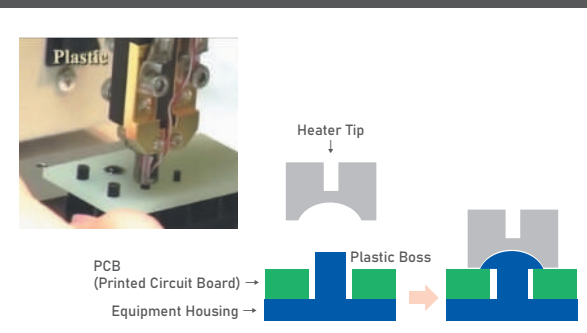
Coated Wire + PCB Soldering



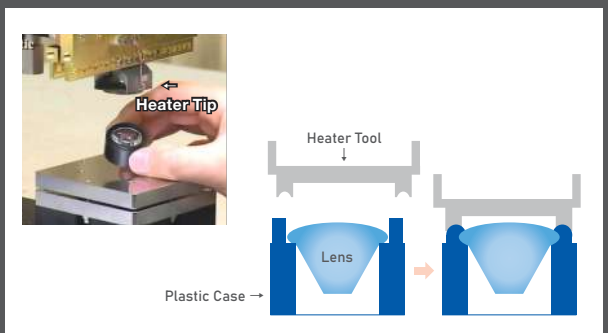
Assembly of Coaxial Cable



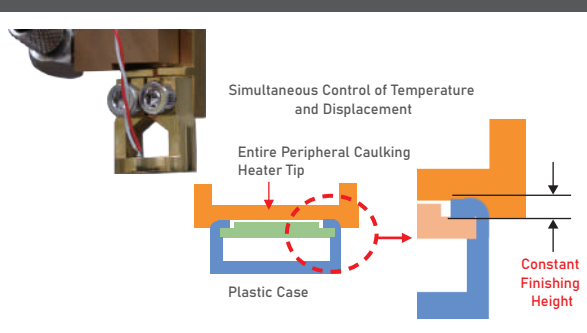
Glass Plate and FPC Thermal Compression Bonding



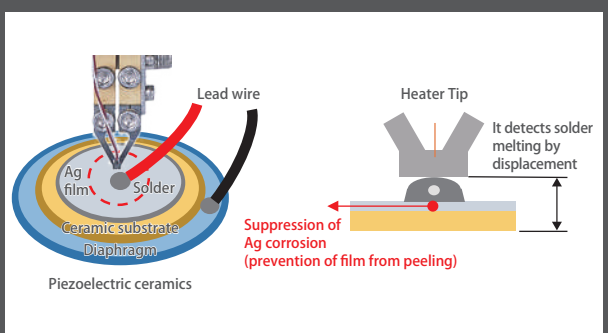
Heat caulking of Circuit Board



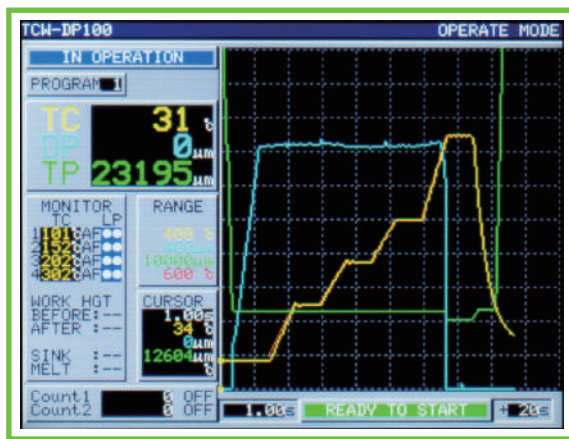
Heat Caulking of Lens



Plastic Casing

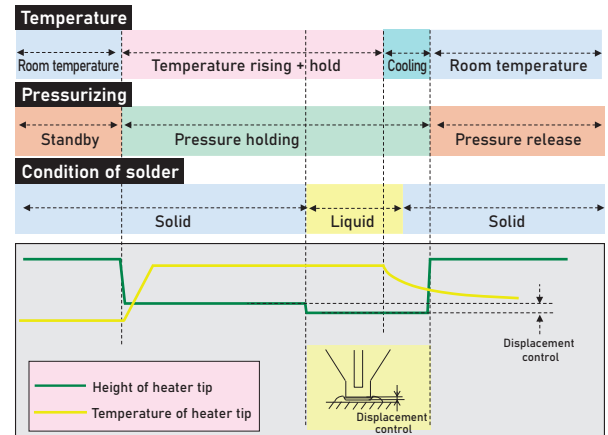


Soldering on the Ag film of piezoelectric ceramics



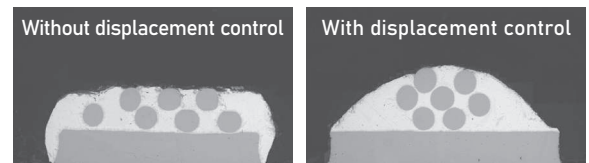
— Temperature profile
— Heater tip position profile
— Displacement profile

Time chart



Control the amount of penetration

- Prevention of loose wire (damage reduction)
- Prevention of bridge



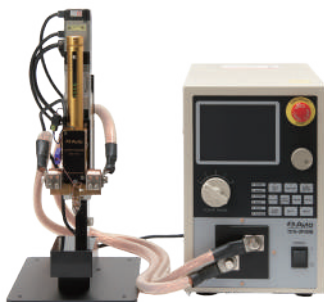
Cross section of strand wire

Displacement pulse
heat power supply

TCW-DP100B

Ultimate Pulse Heat Controller
Concurrency Control of Temperature and
Displacement

Item	TCW-DP100B
Drive unit	NA-201PB-B
Heating temperature	Room temperature ~600°C 1°C step, E type/J type (Option) Room temperature ~900°C, K type (Option)
Heating time	0.00 - 99.99sec.
Rated capacity	750VA Duty cycle 50%
Heat control	4 steps
Monitor function	Temperature, displacement, work height
Motor resolution	1μm
Moving speed	1 to 250.0mm/sec
Displacement control resolution	1μm
Interface	RS-232C, I/O
Transformer	Built-in
Transformer secondary voltage	0.88V, 1.24V, 1.75V, 2.47V, 3.5V
Power source	Single phase AC 200 - 240V ±10% 15A
Dimensions/Weight	W220 × D465.6 × H338 (Excluding protrusions) ≒23Kg



* It must be used in combination with an electric slider drive unit.

- **High-precision displacement control**
As displacement amount is controlled by feedback with a resolution of 1 μm, a uniform amount of penetration is achieved.
- **Various monitoring functions (temperature/displacement)**
- **Digital temperature control**
The digital PID control method realizes a high-speed and high-precision temperature profile, and that supports welding of fine wires and fine workpieces.
- **Release function**
After heating, it secures the thickness of the solder between the workpieces.
- **4-Steps heating**
Various temperature profiles enable to support wide variety of applications.
- **Built-in controller function driven by electric slider**
- **User interface**
As RS-232C & I/O are equipped as standard, it can be easily connected to external devices and can be mounted on an automatic machine.

General purpose pulse heat power supply

TCW-315 General purpose type

PHU-35 High power type

Best-selling models suitable for various joining such as soldering, thermos-compression bonding, and heat caulking

Highly reliable joining

Since it heats and cools while being pressurized, it is possible to join with less misalignment of the workpiece.

Variety of temperature profiles

Local and instantaneous heating suppresses heat effect on peripheral parts.

High reproducibility

Digital PID control provides good temperature and time reproducibility, eliminating the need for operator skill.

Lead free compatible

By setting high temperature and long-time heating, lead-free solder can be supported.

User interface

As RS-232C & I/O are equipped as standard, it can be easily connect to external devices and can be installed in an automatic machine.

Various monitoring functions

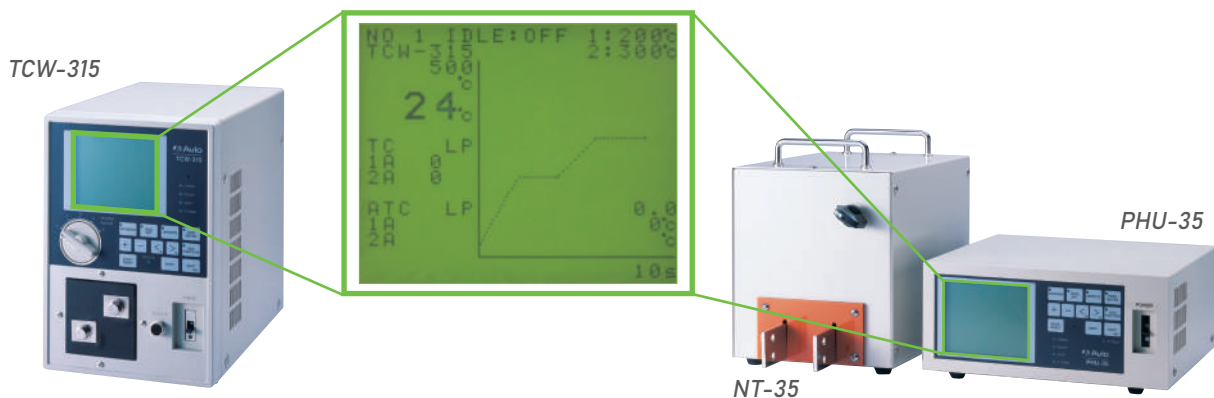
- Temperature monitor (Average value, peak value)
- Abnomaly detection (Excessive temperature rise, thermocouple disconnection)

Other functions

- Setting condition memory (15 conditions)
- Electric valve control for heater tip, heater tool
- Auxiliary thermocouple monitor

Large LCD equipped

Temperature profile at a glance



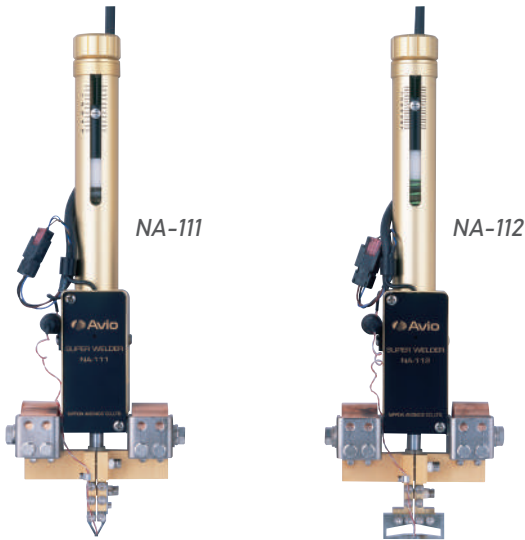
Item	TCW-315	PHU-35/NT-35
Heating temperature	Room temperature ~ 600°C 1°C step, E type/J type Room temperature ~ 900°C K type (Option)	Room temperature ~ 600°C 1°C step, E type/J type Room temperature ~ 900°C K type (Option)
Heating time	000-999 (×100ms, ×10ms)	000-999 (×100ms, ×10ms)
Rated capacity	750VA (50%)	3KVA (50%)
Heat control	2 steps	2 steps
Monitor function	Temperature	Temperature
Interface	RS-232C, I/O	RS-232C, I/O
Transformer	Built-in	NT-35
Transformer secondary voltage	0.88V, 1.24V, 1.75V, 2.47V, 3.5V	1.0V, 2.0V, 3.0V
Power source	Single phase AC200V ~ 230V±10% 15A (Option: AC100 ~ 115V)*	Single phase AC200V ~ 230V±10% 30A (Option: AC100 ~ 115V)*
Dimensions/weight	W200 × D320 × H283mm ≒19.5kg	PHU-35: W278 × D250 × H120mm ≒7.4kg NT-35: W200 × D270 × H220mm ≒25kg

* Power option is factory setting

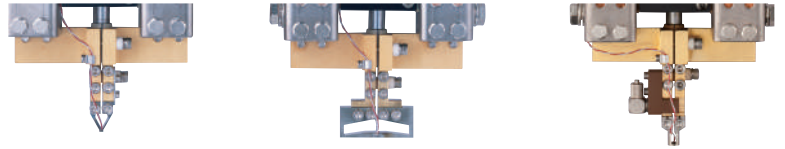
Reflow head (System head)
Heater tip type

NA-111, NA-112

Ideal for precision joining and automation



Heater tip & shank



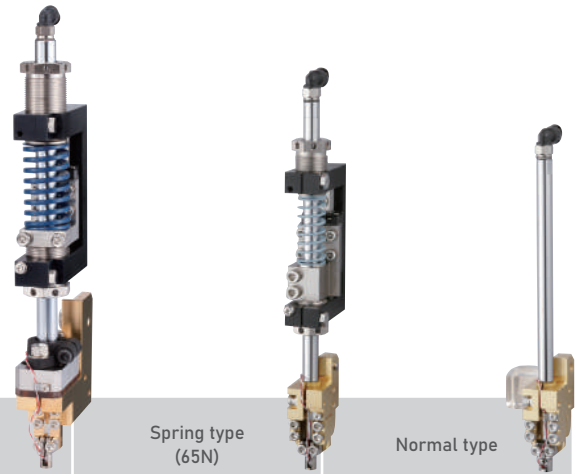
Item	NA-111	NA-112
Pressure range	0.7 ~ 5N	5 ~ 65N
Pressure method	Spring	
Stroke	It depends on adapted drive unit.	
Drive method	Electrical slider (NA-201PB-B), Air (NA-221), Manual (NA-231)	
Dimensions/weight	W106 × D48 × H287mm ≒0.6kg	W106 × D48 × H285mm ≒0.6kg

- Since it is a vertical direct pressurization mechanism, it does not bend due to applied pressure
- Stable welding start by using photo sensor

Reflow head (System head)

Pencil type (build-to-order)

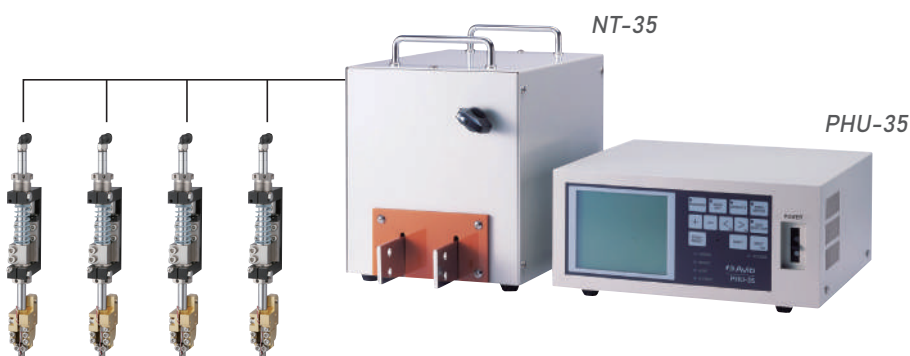
It supports multi-point caulking and automation



Item	Spring type (300N)	Spring type (65N)	Normal type
Dimensions	W26.2 × D101 × H196.2mm	W21 × D47 × H192.1mm	W18 × D42 × H166.9mm
Weight	820g	360g	160g

■ Application examples

Multi-point heat caulking: Multi-head system



- * Please consult us for the number of heads, as it varies with the application.
- * There is only one temperature feedback line.
- * All weld cables must have the same length.

Heater tool type

NA-151, NA-152, NA-153, NA-154, NA-155



- With air cooling port, with parallelism adjustment function
- Water-cooling shank is equipped as a standard (NA-154, NA-155)
- A heater tip can also be attached with use of a conversion shank

Heater tool & shank



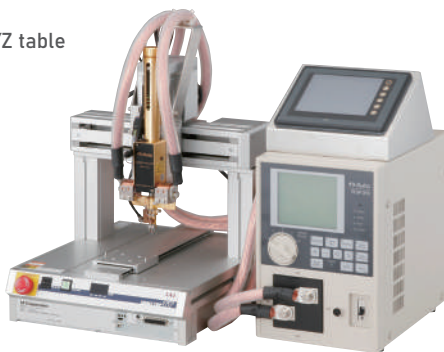
Conversion shank for heater tip

Item	NA-151	NA-152	NA-153	NA-154	NA-155
Pressure range	1.2 ~ 7N	5 ~ 70N	20 ~ 150N	40 ~ 300N	100 ~ 600N
Pressure method	Spring				
Stroke	It depends on adapted drive unit.				30mm
Drive method	Electrical slider (NA-201PB-B), Air (NA-221), Manual (NA-231)			Electrical slider (NA-201PB-B), Air (NA-222)	Air
Dimensions/weight	W124 × D54.8 × H298mm ≒ 1kg			W145 × D64.5 × H332mm ≒ 2.2kg	W217 × D230 × H700mm ≒ 20.1kg

■ We propose an automation system according to needs of customers.

Example of equipment using a pulse heat unit (built-to-order product)

With XYZ table



Top and bottom simultaneous pulse heat type



3-head type



With turn table



ACF thermo-compression bonder



Drive unit Electric slider & controller

CNT-320B & NA-201PB-B, NA-202PB-B

Touch panel display



CNT-320B



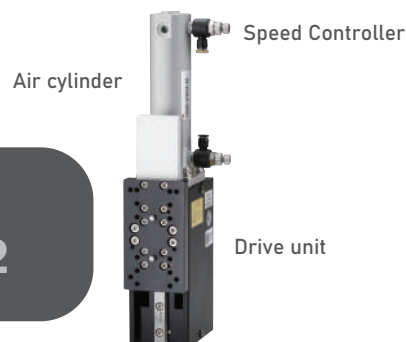
NA-201PB-B



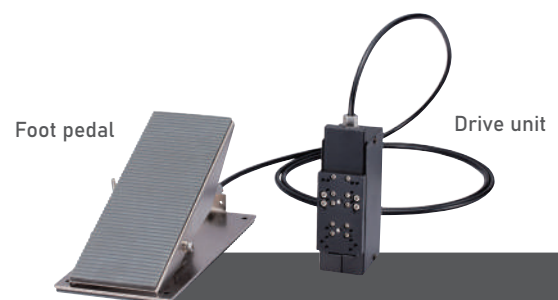
- 1μm motor drive resolution supports precision welding
- It is equipped with a pressurization stabilization function that keeps stable pressure to improve welding quality
- Pressure damage is reduced by the position control function during welding
- Thermal damage is reduced by high pressure low temperature bonding with maximum pressure of 300N (when using NA-202PB-B)
- Color touch panel and lever type jog switch provide intuitive operation
- Low-speed soft landing with a moving speed of 0.1 mm/sec is available
- 7 operating conditions can be saved

Item	CNT-320B & NA-201PB-B	CNT-320B & NA-202PB-B
Compatible head	NA-111, NA-112, NA-151, NA-152, NA-153	NA-154
Drive unit pressure	Max. 150N	Max. 300N
Drive method	Electrical slider	
Drive stroke	Max. 50mm	
Motor resolution	1μm	
Power source (CNT-320B)	DC24V ±5% 4A (Option: AC adaptor AC100 - 240V)	
Dimensions/weight	CNT-320B: W120 × D315.9 × H207mm ≒ 3.7kg	
	NA-201PB-B: W57.5 × D82.5 × H311.2mm ≒ 2.0kg	NA-202PB-B: W74 × D103.5 × H368.6mm ≒ 4.5kg

Air drive NA-221, NA-222



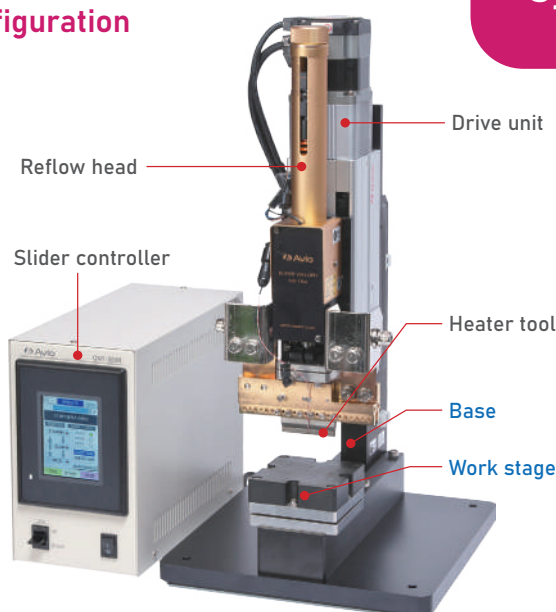
Item	NA-221	NA-222
Compatible head	NA-111, NA-112, NA-151, NA-152, NA-153	NA-154
Drive method	Air	Air
Stroke	Max. 50mm	Max. 50mm
Descending speed	By adjusting the air in the cylinder (Tube diameter φ4mm)	By adjusting the air in the cylinder (Tube diameter φ6mm)
Air pressure	0.4 ~ 0.6MPa	0.4 ~ 0.6MPa
Dimensions/weight	W78 × D83 × H280mm ≒ 1.3kg	W86 × D85 × H289mm ≒ 2.2kg



Manual drive NA-231

Item	NA-231
Compatible head	NA-111, NA-112, NA-151, NA-152, NA-153
Drive method	Foot operated
Stroke	Max. 10mm + Height adjustment 40mm
Dimensions/weight	Main body: W51 × D79 × H192mm ≒ 1.0kg Foot pedal: W124 × D268 × H125mm ≒ 2.2kg

■ System head basic configuration



Base, stage



Weld cable



Length: 100mm Unit Terminal shape: D, L, DP

Ex: SFC - 60 - 500 - DD - 99

Type: SFC, WRC, FMC, EFC

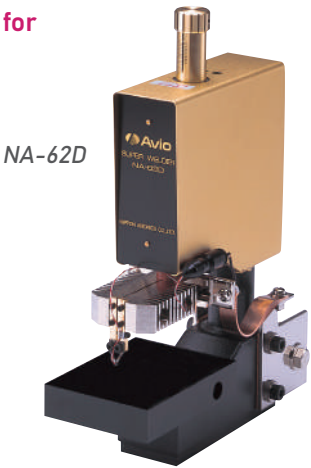
Cross sectional area
of conductor: 22, 60, 66, 120mmSQ

Diameter of
terminal hole: 7, 9mmφ

Microscope set, pallette



■ One-piece type head, ideal for development applications



NA-62D

Reflow head (Integrated head)

NA-62D Standard model

NA-66 Air drive model

Bestselling head supported by patronage over decades

- Drive/pressurizing unit integrated head
- Heater tip compatible
- Two types of manual drive and air drive

NA-66



Item	NA-62D	NA-66
Pressure range	4.9 ~ 44.1N	4.9 ~ 44.1N
Stroke	8mm	8mm
Drive method	Foot operated	Air
Dimensions/weight	W77 × D212 × H275mm ≒2.4kg	W77 × D212 × H360mm ≒3.8kg

Item	Handheld type
Pressure method	Manual pressure
Heat timing	Foot switch
Cooling method	Forced air-cooling
Weld cable length	2m
Dimensions/weight	φ32 × 165mm ≒250g

Notes: There is a limit to the heater tip size.



Reflow head

Handheld type
(Build-to-order item)

Digital force gauge

FG-400 & TJ series

Compact, lightweight and handy type

TJ series



FG-400

- Compact and light weight
- 3 way power supply
- Display hold function is equipped
- Easy zero adjustment
- Automatic recognition of sensor type
- Judgement function (upper limit, lower limit) is equipped

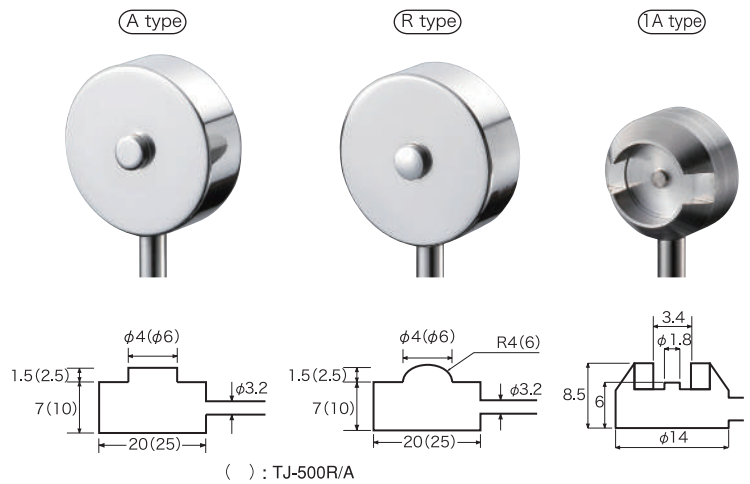
* FG-400 and TJ series are sold separately.

Item	FG-400
Display function	0000-9999 N
Zero adjustment	Auto
Hold function	Sample/Peak
External output	RS-232C
Power source	AA batteries, nickel-hydrogen battery, Dedicated AC adaptor (Single phase AC100 - 240V)
Dimensions/weight	W77 × D140 × H27mm ≒ 300g

* A calibration certificate will be issued separately for a fee.

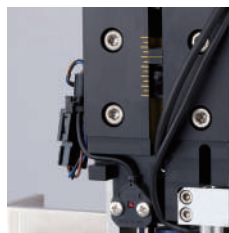
Item	TJ-1A	TJ-20R or TJ-20A	TJ-100R or TJ-100A	TJ-500R or TJ-500A
Measuring range	0 - 10N	0 - 196N	0 - 980N	0 - 4900N
Limit load	20N	294N	1,470N	7,350N
Accuracy	±2% of full scale			

Sensor tip shape

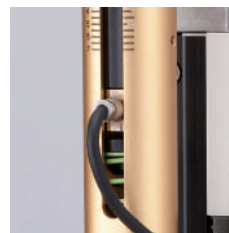


■ Pressure gauge sensor built into equipment

Example of system head built-in



NA-155



NA-11X series,
NA-15X series



Item	TJS-1R	TJS-20R	TJS-100R	TJS-100A-NA124
Measuring range	0 - 10N	0 - 196N	0 - 980N	0 - 980N
Limit load	20N	294N	1470N	1470N
Accuracy	±3% of full scale			
Compatible system head	NA-111, 112 NA-151, 152, 153			NA-154, NA-155

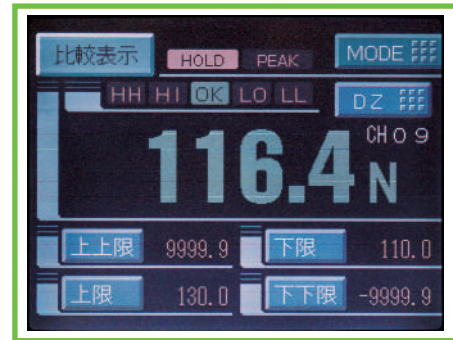
* A separate pusher is required to install in the system head.

Welding monitor

QC-100A Force monitor

Real-time monitoring of force

- Selectable between digital display and graphic display
- Easy to automate in combination with system head
- Easy quality management with enhanced communication functions (output of measured values and judgment results comparison)
- Easy installation of sensor
- High-precision measurement of displacement amount of the welding material
- Waveform analysis by graphic display (High speed sampling at 2000 times/sec)
- Welding process is measured and judged under 2 conditions (Measure and judge under A condition before welding, under B condition after welding)
- Trigger can be set by applied force and displacement



■ High reliability
Ideal for quality control



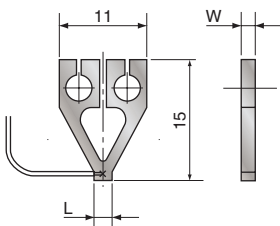
Item	Force monitor QC-100A
Measuring range	0 ~ 1000N
Accuracy	±3% of full scale
Sampling time	0.5ms (2000 times/sec)
Squeeze, hold time	0 ~ 0.9sec
Interface	RS-232C, I/O, Analog output
Power source/weight	DC24V ±10% 2A
Dimensions/weight	W170 × D210 × H150mm ≒3.0kg

* A calibration certificate will be issued separately for a fee.

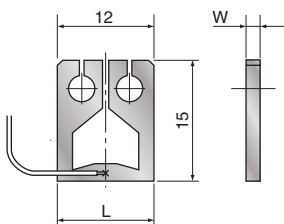
* TJS series force sensor is used.

■ Standard heater tip: HT-W (plate thickness) – L (tip length) Unit: mm

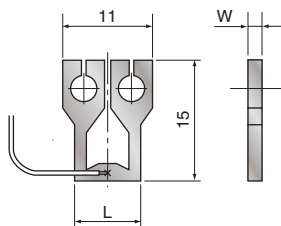
HT-08-1,
HT-16-2, HT-24-3



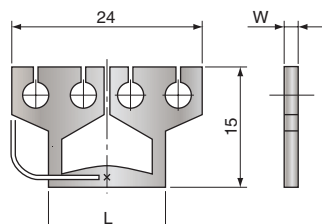
HT-16-12



HT-16-4, HT-16-6,
HT-16-8, HT-16-10



HT-16-15, HT-16-20

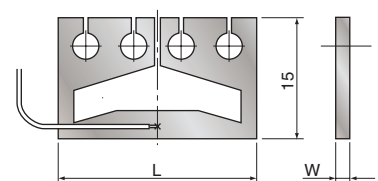


Heater Tip/Heater Tool

Heater Tip

Variety of standard type is available.

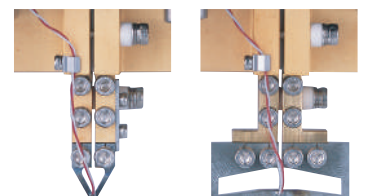
HT-16-25, HT-16-30,
HT-16-35, HT-16-40



Custom order items

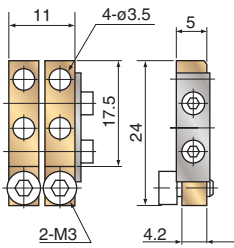
* Specifiable plate thickness: 0.5 / 0.8 / 1.0 / 1.2 / 1.6 / 2.4 / 3.0 / 3.2 / 4.0

In case of special shape requirement such as stepping, chamfering, etc., please specify it in the drawing.

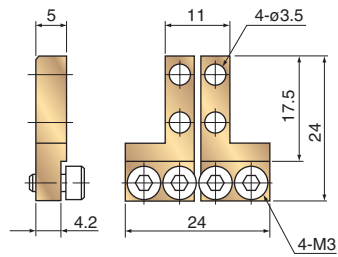


■ **Shank for system head** Unit: mm

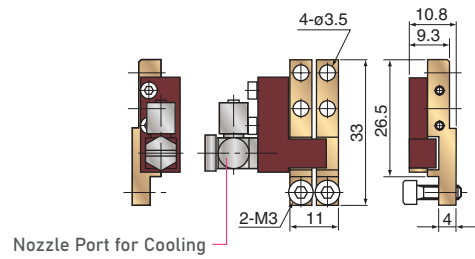
SHTH-S



SHTH-L

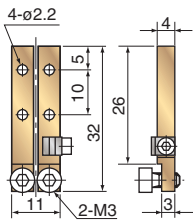


SHTH-S-T5-BL

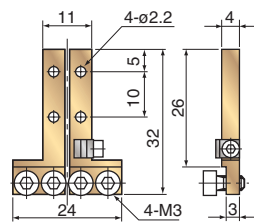


■ **Shank for NA-62D, NA-66** Unit: mm

HTH-S

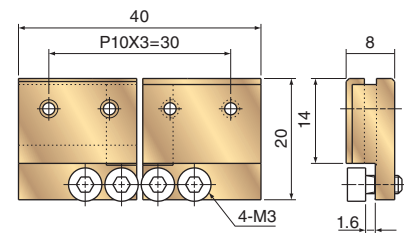


HTH-L



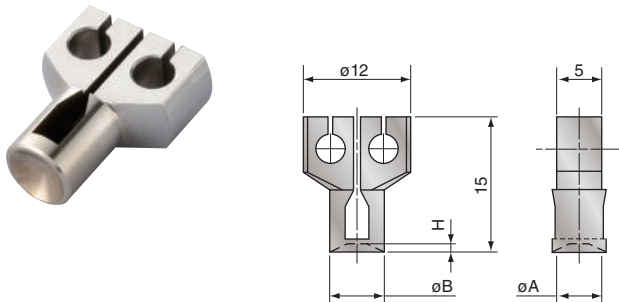
■ **Conversion shank for system head (NA-15X series)** Unit: mm

15X-SHTH-L-T1.6



Heater Tip/Heater Tool

Heater tip for heat caulking



■ **Reference shape**

	Dimensions (mm)			Volume (mm ³)	Guideline for boss size (mm)	
	φA	φB	H		φ	H
CHT-20	2.0	3.0	0.38	0.62	0.7	1.8
CHT-30	3.0	4.0	0.57	2.11	1.2	2.1
CHT-40	4.0	5.0	0.76	5.02	1.7	2.5
CHT-50	5.0	6.0	0.95	9.78	2.3	2.6
CHT-60	6.0	7.0	1.15	17.10	2.9	2.8

Other heater tip shapes and materials are also available on custom order basis.
Multi-point simultaneous heater tip is available on custom order basis.

Heater Tip/Heater Tool

Heater Tool

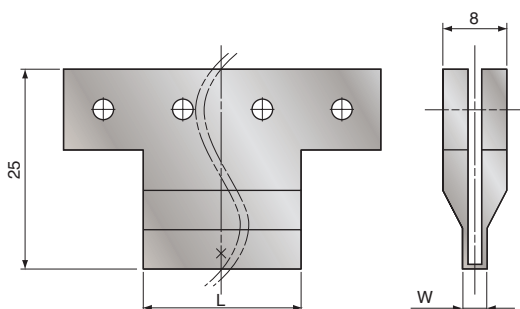


This type of tool is custom order item

W (Tip thickness) × L (Tip length)

W: 1.5mm or longer at standard processing
0.6mm or longer at step shape processing

* When complicated shapes or usage under severe condition is required, it is recommend to consult us in advance, or conduct a sample test before ordering.



Information on sample test

Avio laboratory offers you to perform sample test using actual equipment for welding evaluation and model selection. We also support remote sample test using web conferencing tools. It is also possible to make a test with samples you sent, and we return them after the test. Please see our website for details.

Location of laboratories

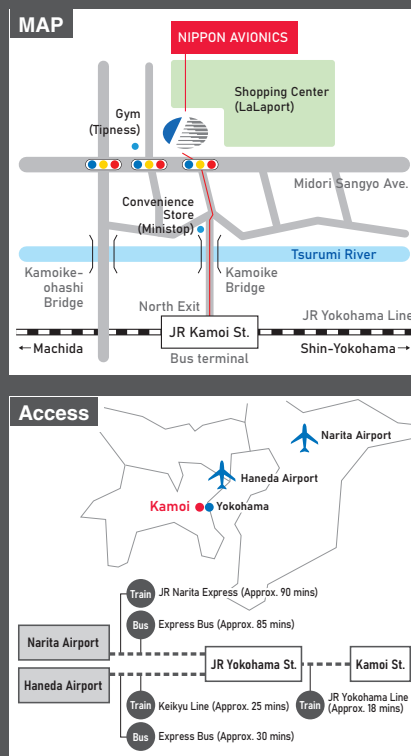


Shin-Yokohama Plant

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224-0053, Japan

Access

7 minutes on foot from JR Kamoi station



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⚠ CAUTION

To operate a unit correctly, read the operation manual carefully. The unit should be situated away from the place filled with water, moisture, steam, dust or soot, which may cause a fire, an electric shock, troubles etc.

The appearance and specifications are subject to change without notice.