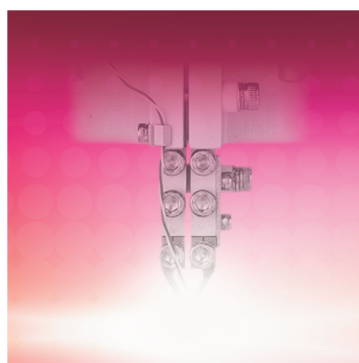


## PRODUCT CATALOG



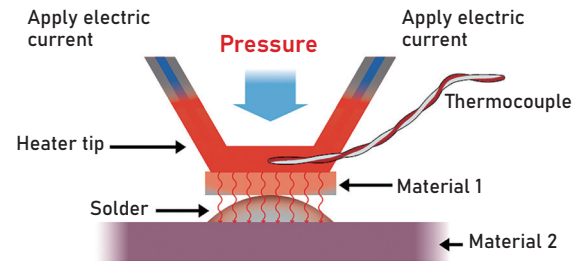
# Pulse Heat Unit Series

## What is pulse heat?

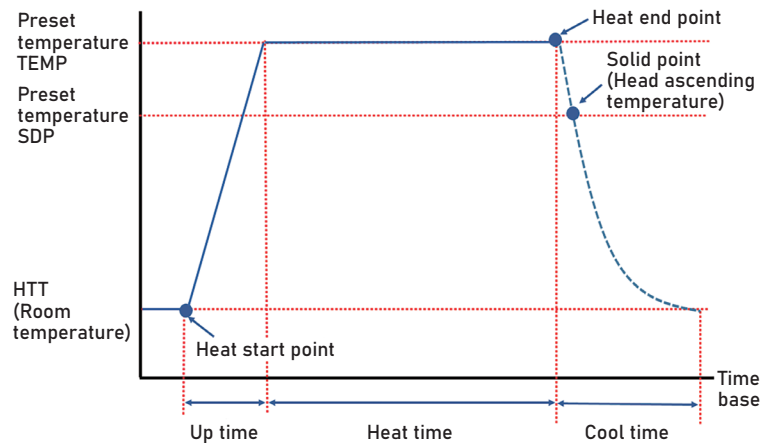
It is Avio's original process of utilizing resistance heat which is generated by passing an electric current through a metal heating body called a heater chip/heater tool, to instantaneously perform soldering, thermos-compression bonding, and plastic welding with heat and pressure.

### 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.

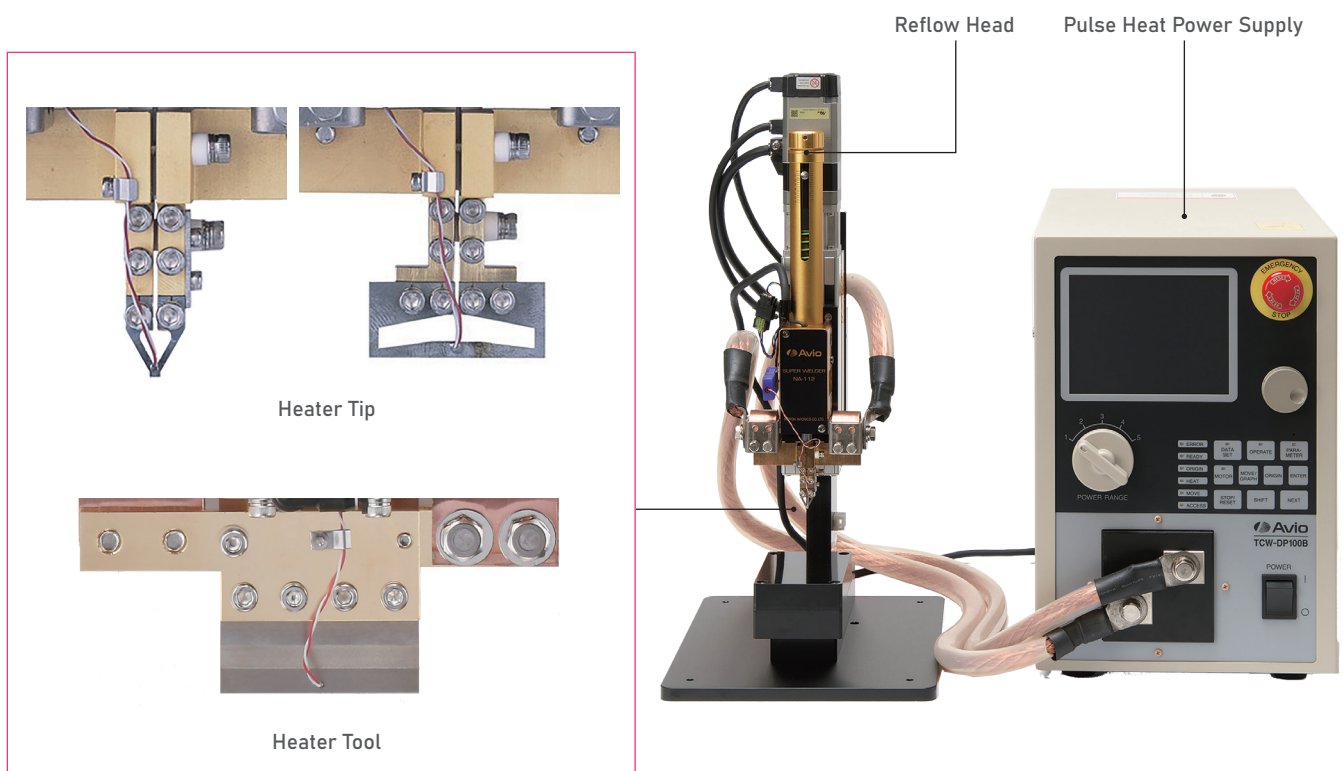
- The temperature rises quickly and the temperature reproducibility is good.
- Temperature profiles such as pre/main heat can be easily realized.
- Due to local heating, the heat effect to the surroundings is small.
- Since it is cooled while being pressed down, there is no unconnected due to floating.
- 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

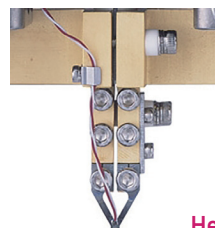


Force Monitor

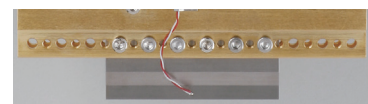


Digital Force Gauge

### P13-14 Heater Tip/Heater Tool



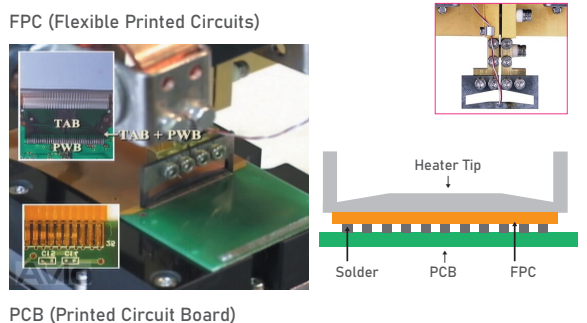
Heater Tip



Heater Tool

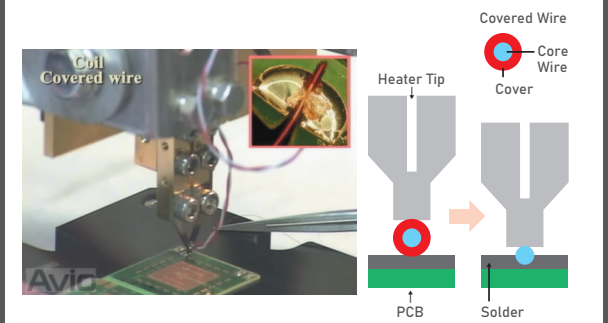
## Pulse Heat Joining Examples

FPC (Flexible Printed Circuits)

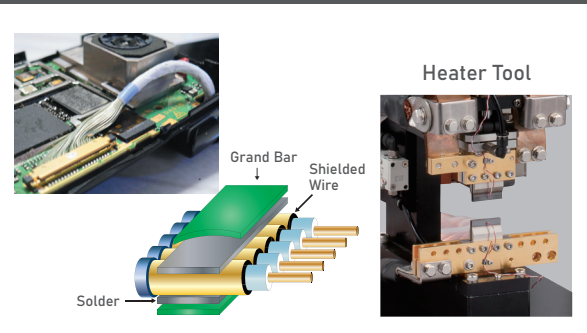


PCB (Printed Circuit Board)

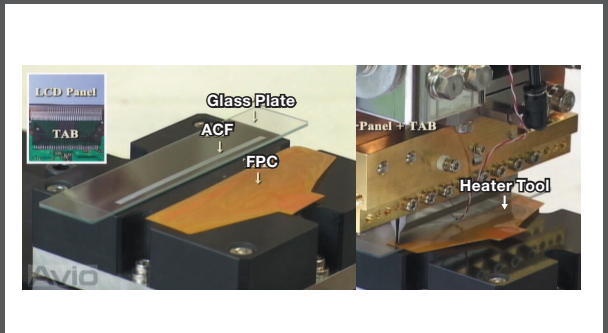
FPC + PCB Soldering



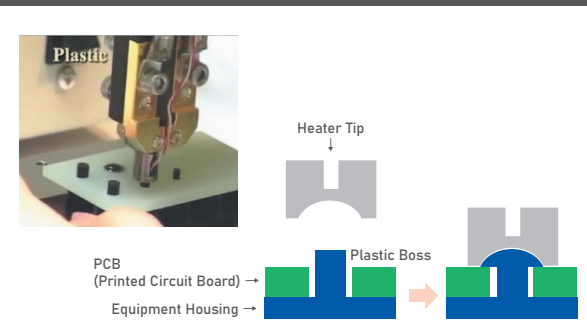
Coated Wire + PCB Soldering



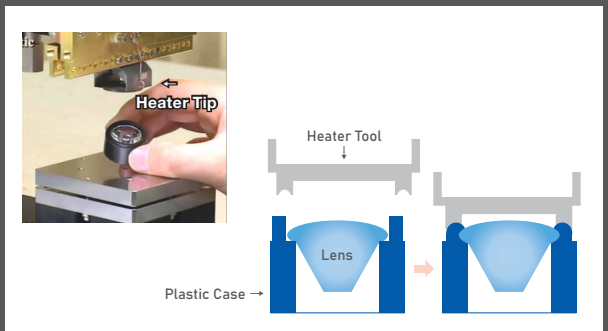
Assembly of Coaxial Cable



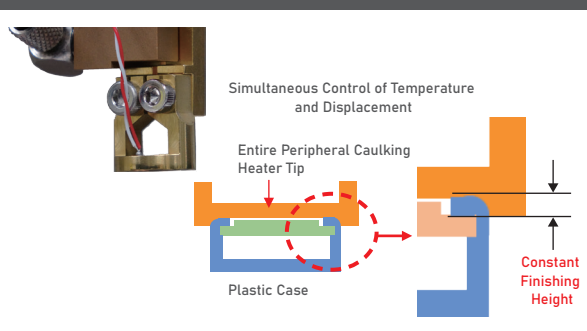
Glass Plate and FPC Thermal Compression Bonding



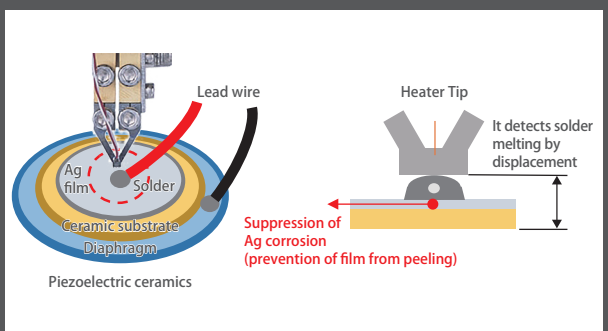
Heat caulking of Circuit Board



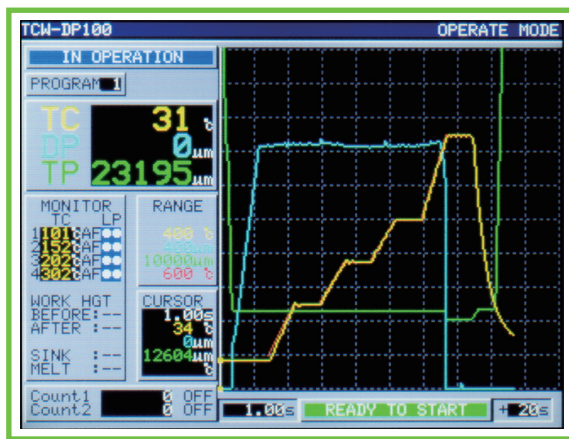
Heat Caulking of Lens



Plastic Casing

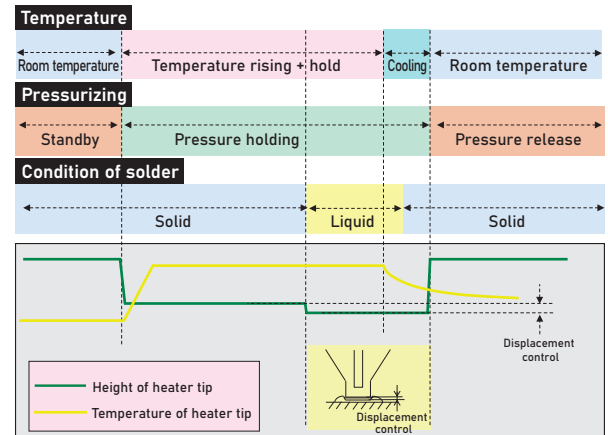


Soldering on the Ag film of piezoelectric ceramics



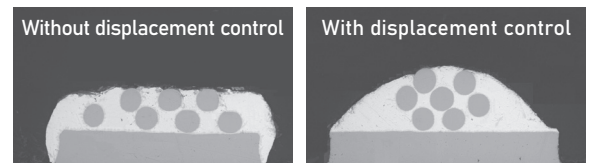
— Temperature profile  
— Heater tip position profile  
— Displacement profile

## Time chart



## Control the amount of penetration

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



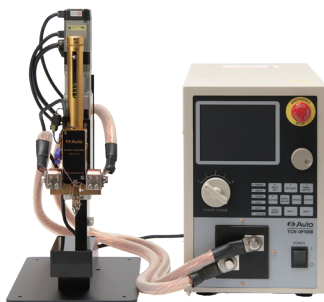
Cross section of strand wire

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)<br>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

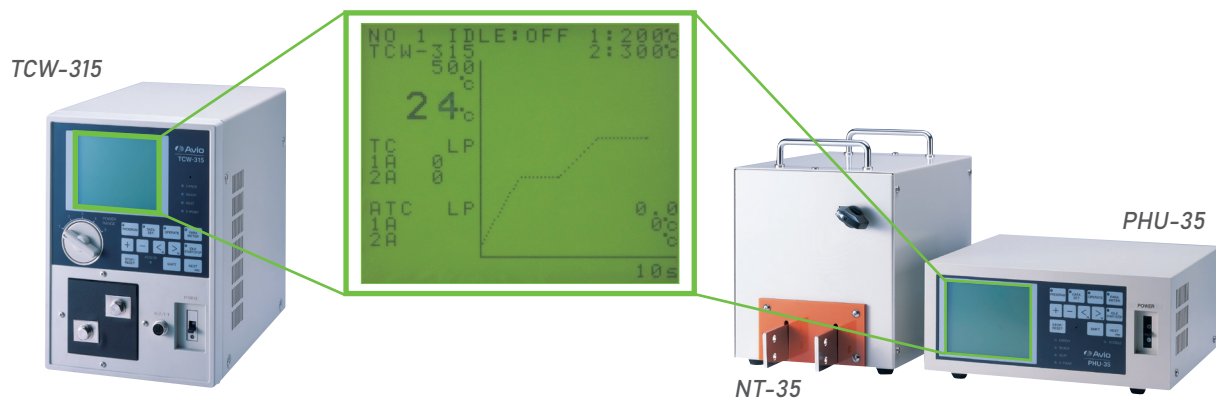
- Temperature monitor (Average value, peak value)
- Abnomaly detection (Excessive temperature rise, thermocouple disconnection)

### 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



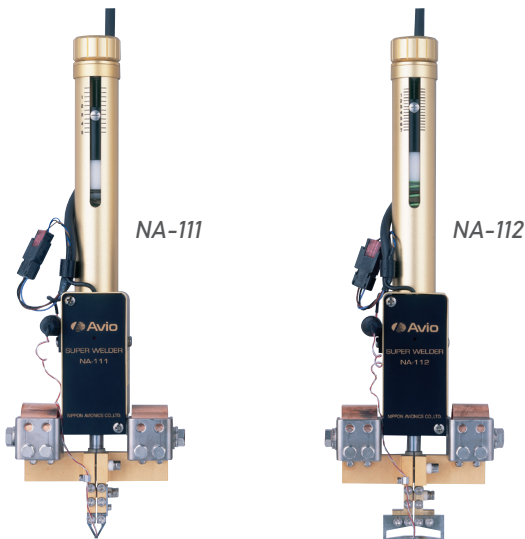
| Item                          | TCW-315  | PHU-35/NT-35   |
|-------------------------------|--|--|
| Heating temperature           | Room temperature ~ 600°C 1°C step, E type/J type<br>Room temperature ~ 900°C K type (Option) | Room temperature ~ 600°C 1°C step, E type/J type<br>Room temperature ~ 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<br>(Option: AC100 ~ 115V)*                                | Single phase AC200V ~ 230V±10% 30A<br>(Option: AC100 ~ 115V)*                                |
| Dimensions/weight             | W200 × D320 × H283mm ≒19.5kg   | PHU-35: W278 × D250 × H120mm ≒7.4kg<br>NT-35: W200 × D270 × H220mm ≒25kg                     |

\* Power option is factory setting

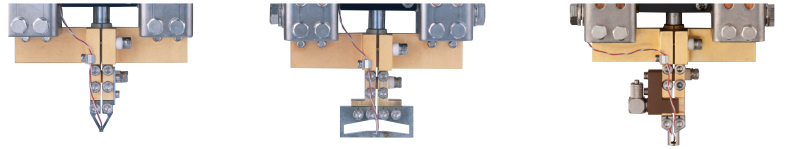
Reflow head (System head)  
Heater tip type

## NA-111, NA-112

Ideal for precision joining and automation



### Heater tip & shank



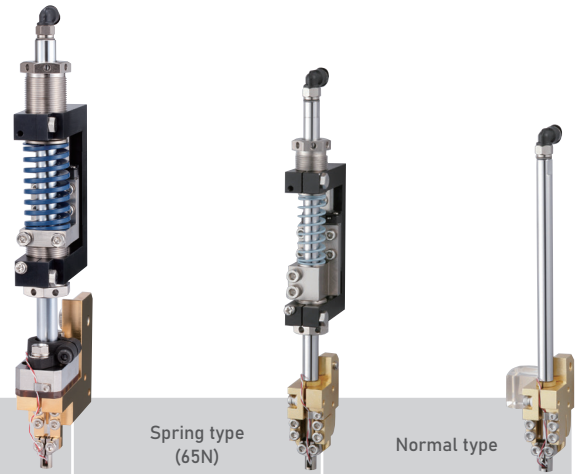
| Item              | NA-111  | NA-112                      |
|-------------------|---|-----------------------------|
| Pressure range    | 0.7 ~ 5N  | 5 ~ 65N                     |
| Pressure method   | Spring  |                             |
| Stroke            | It depends on adapted drive unit.                             |                             |
| 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)

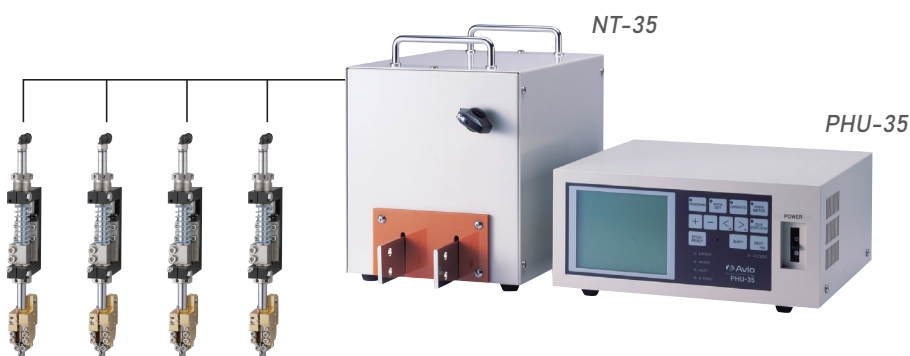
It supports multi-point caulking and automation



| 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.

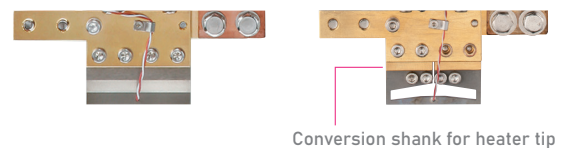
## Heater tool type

# 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



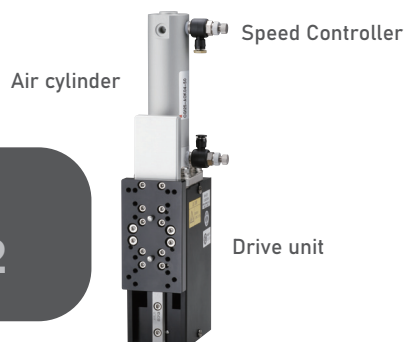
NA-201PB-B



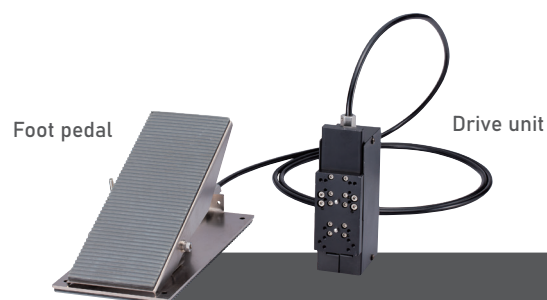
- 1μm motor drive resolution supports precision welding
- It is equipped with a pressurization stabilization function that keeps stable pressure to improve welding quality
- Pressure damage is reduced by the position control function during welding
- Thermal damage is reduced by high pressure low temperature 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



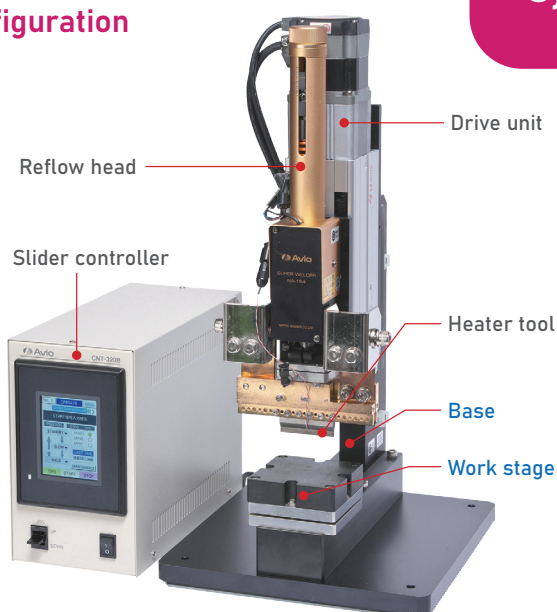
| Item              | NA-221  | NA-222  |
|-------------------|---|---|
| Compatible head   | NA-111, NA-112, NA-151, NA-152, NA-153                    | NA-154  |
| Drive method      | Air   | Air   |
| Stroke            | Max. 50mm   | Max. 50mm   |
| Descending speed  | By adjusting the air in the 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                                |



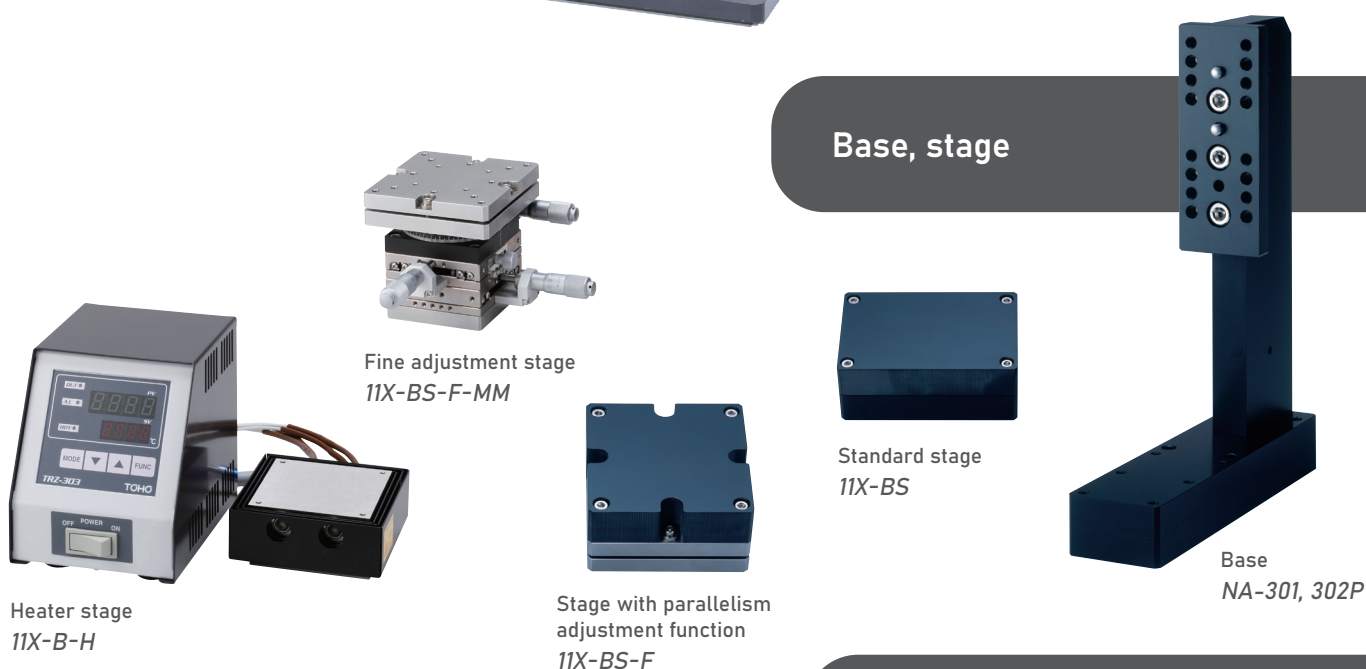
## Manual drive NA-231

| 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<br>Foot pedal: W124 × D268 × H125mm ≒ 2.2kg |

## ■ System head basic configuration



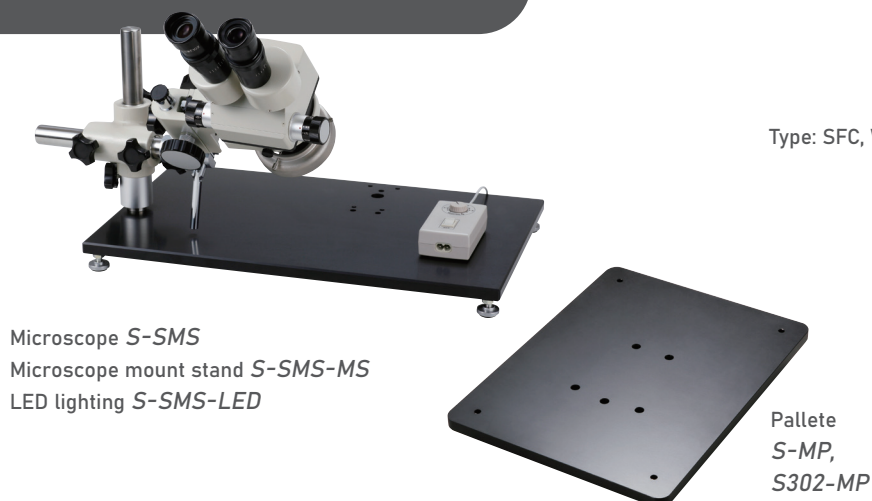
## Accessory System head accessory



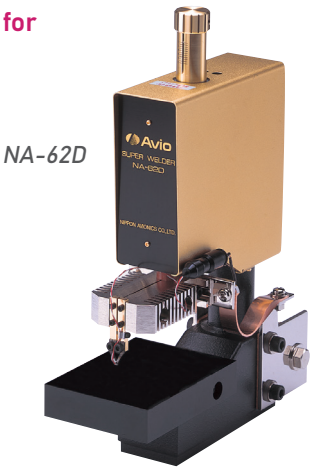
### Base, stage

### Weld cable

## 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



NA-66



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

| 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



- 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

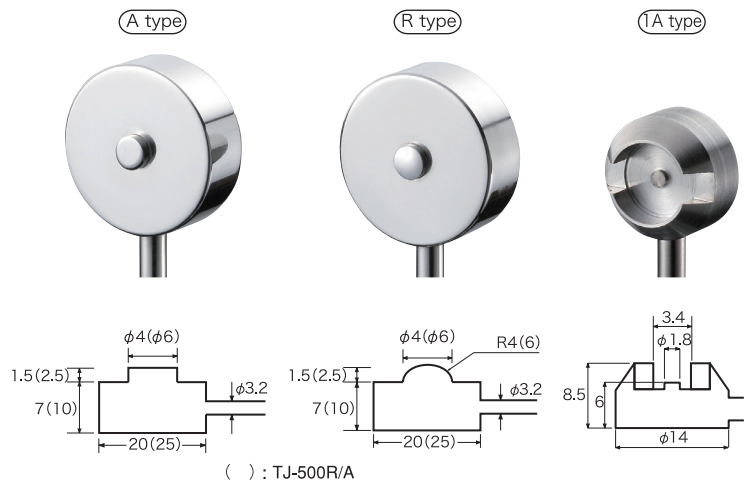
\* FG-400 and TJ series are sold separately.

| 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.

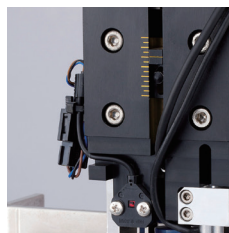
| Item            | TJ-1A             | TJ-20R or TJ-20A | TJ-100R or TJ-100A | TJ-500R or TJ-500A |
|-----------------|-------------------|------------------|--------------------|--------------------|
| Measuring range | 0 - 10N           | 0 - 196N         | 0 - 980N           | 0 - 4900N         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

## Sensor tip shape

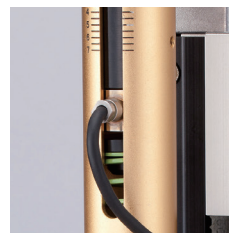


## ■ Pressure gauge sensor built into equipment

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 |

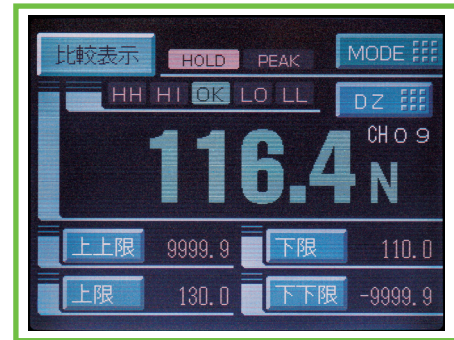
\* A separate pusher is required to install in the system head.

## Welding monitor

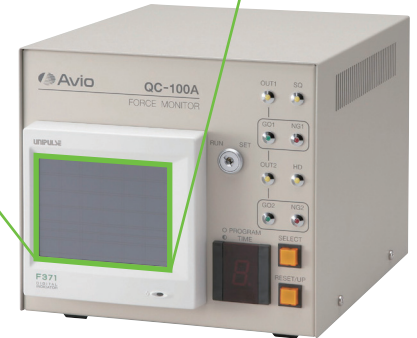
# QC-100A Force monitor

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



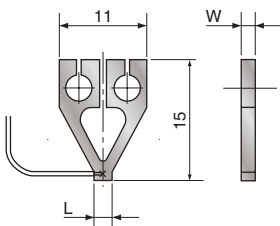
| Item                | Force monitor QC-100A       |
|---------------------|-----------------------------|
| Measuring range     | 0 ~ 1000N                   |
| Accuracy            | ±3% of full scale           |
| Sampling time       | 0.5ms (2000 times/sec)      |
| Squeeze, hold time  | 0 ~ 0.9sec                  |
| 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.

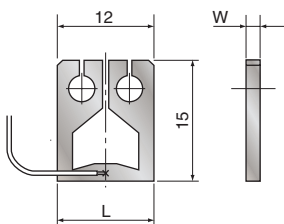
\* TJS series force sensor is used.

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

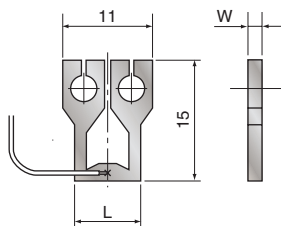
HT-08-1,  
HT-16-2, HT-24-3



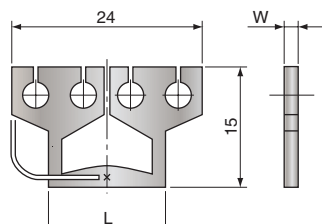
HT-16-12



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



HT-16-15, HT-16-20

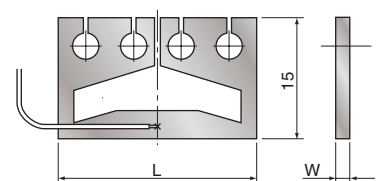


Heater Tip/Heater Tool

## Heater Tip

Variety of standard type is available.

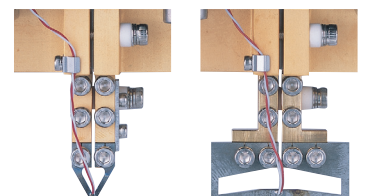
HT-16-25, HT-16-30,  
HT-16-35, HT-16-40



### Custom order items

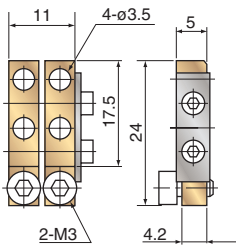
\* Specifiable plate thickness: 0.5 / 0.8 / 1.0 / 1.2 / 1.6 / 2.4 / 3.0 / 3.2 / 4.0

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

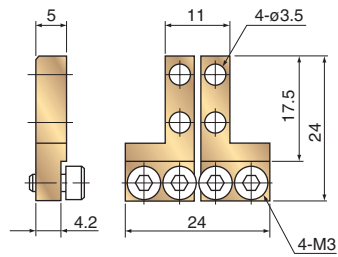


■ **Shank for system head** Unit: mm

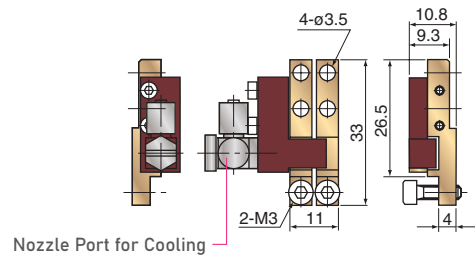
*SHTH-S*



*SHTH-L*

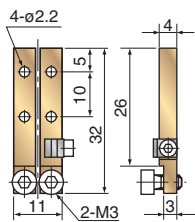


*SHTH-S-T5-BL*

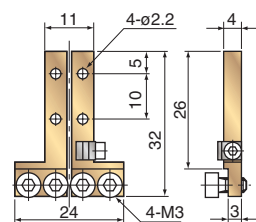


■ **Shank for NA-62D, NA-66** Unit: mm

*HTH-S*

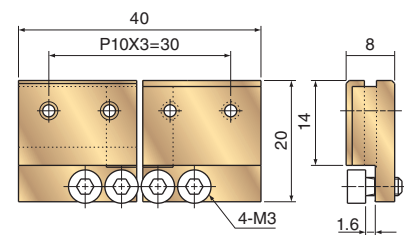


*HTH-L*



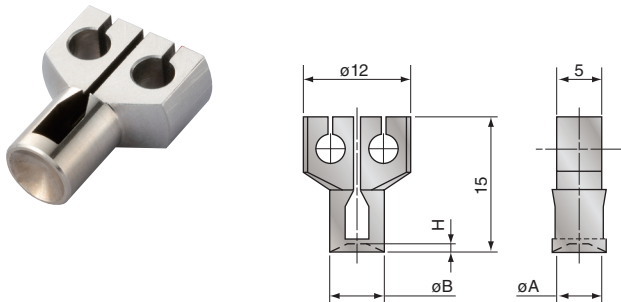
■ **Conversion shank for system head (NA-15X series)** Unit: mm

*15X-SHTH-L-T1.6*



## Heater Tip/Heater Tool

### Heater tip for heat caulking



■ **Reference shape**

|        | Dimensions (mm) |     |      | Volume (mm <sup>3</sup> ) | 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



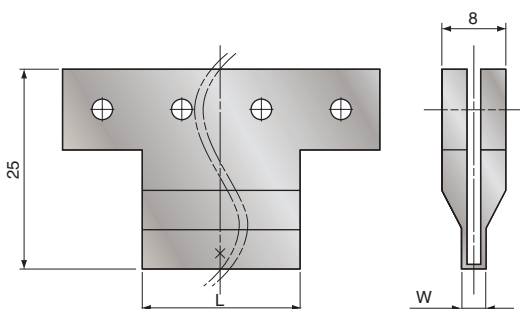
**This type of tool is custom order item**

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

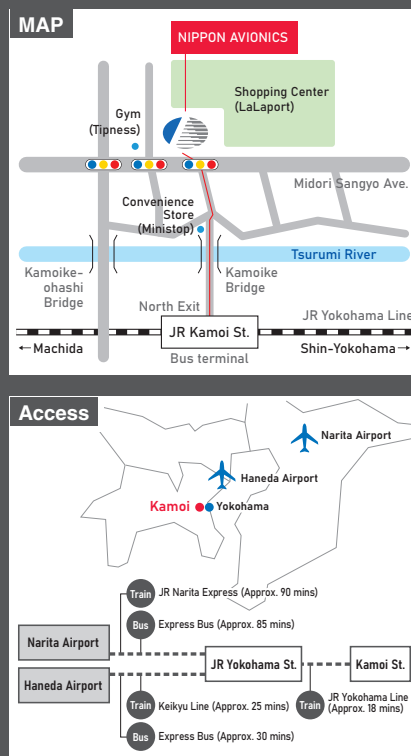


### Shin-Yokohama Plant

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224-0053, Japan

#### Access

7 minutes on foot from JR Kamoi station



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URL <https://www.avio.co.jp/english/>

#### ⚠ 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.