Micro Resistance Welder Series

NIPPON AVIONICS CO., LTD

Outline of Avio Micro Resistance Welder

Avio Offers Welding Solutions Based on Our Wide Product Portfolio and Welding Know-how.

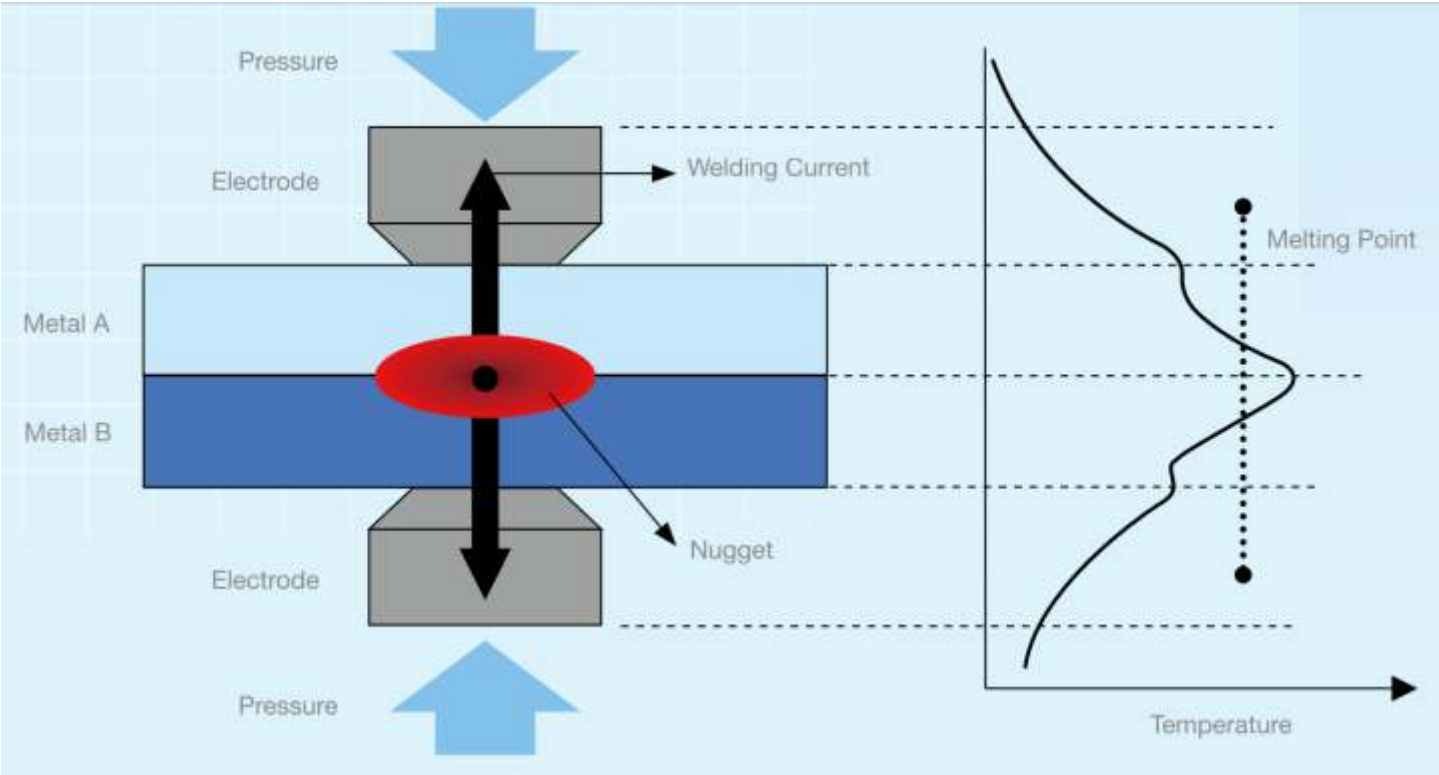
Nippon Avionics Co., Ltd. has been engaged in the technology for joining part to part which is indispensable in “MONOZUKURI (art of manufacturing)" for electronic components, electronic equipment and automobile. Among other things, our resistance welding technology and products which “join metal to metal" that we have accomplishments and experiences over a half century are being used and highly appreciated in various industries.
Furthermore, the recent trend for miniaturization, higher performance and clean energy of the electronic equipment, represented by mobile gears, is accelerated, and as a result, material, shape and size of object for resistance welding are being diversified.
Avio will continue to offer most suitable joining solutions satisfying the customers’ requirement in a timely manner in the manufacturing industry where technical innovation is phenomenal.

What is Resistance Welding?

What is resistance welding which “joins metal to metal"? How can two metals be joined together?
The word “resistance” in “resistance welding" means to resist against certain movement forward. It is associated with heating as in the case of friction heat when a brake is applied.
As seen in the resistance welder model, figure on the right page, electric current is applied while a pressure is applied.
When the electric current tries to advance in a metal, a heat is generated by the resistance of the metal itself and the resistance at the joining section.
The joining section between two metals, in particular, will generate more heat because of higher resistance, and as a result, the two metals are melted and joined together.
This method of joining two metals utilizing resistance heat is called resistance welding.

Resistance Welding Model

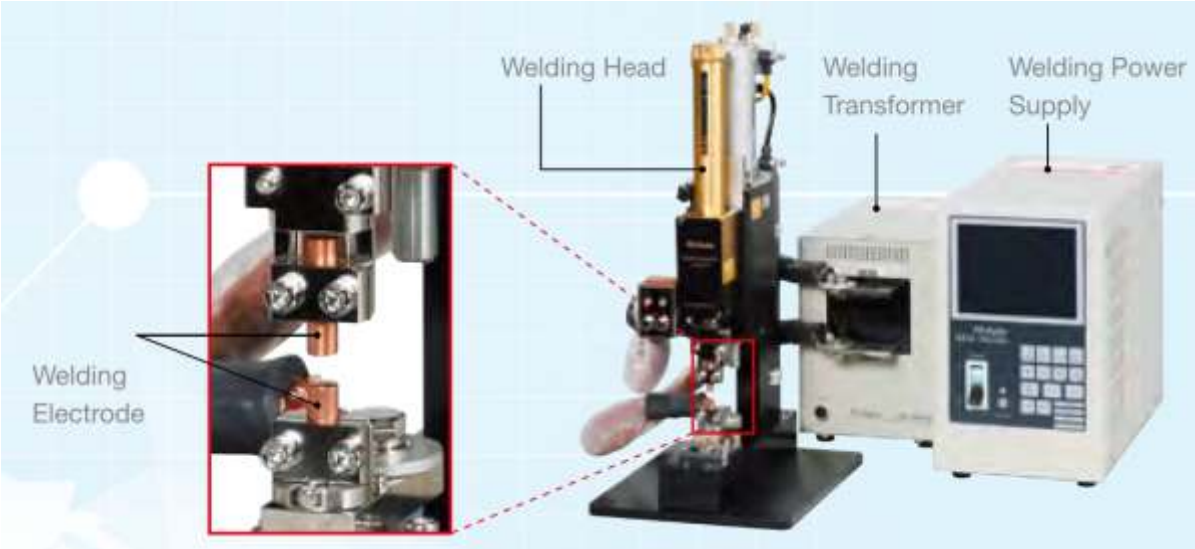
Temperature Distribution at the Welding



Micro Resistance Welder Series

Basic Configuration of Resistance Welder and Role of Each Part.

Resistance welder sandwiches an object to be welded by the welding electrodes, and applies electric current while applying a pressure.



Welding Power Supply: It controls the magnitude, time and waveform of electric current

Welding Transformer : It converts the electric current from the power supply to a larger current

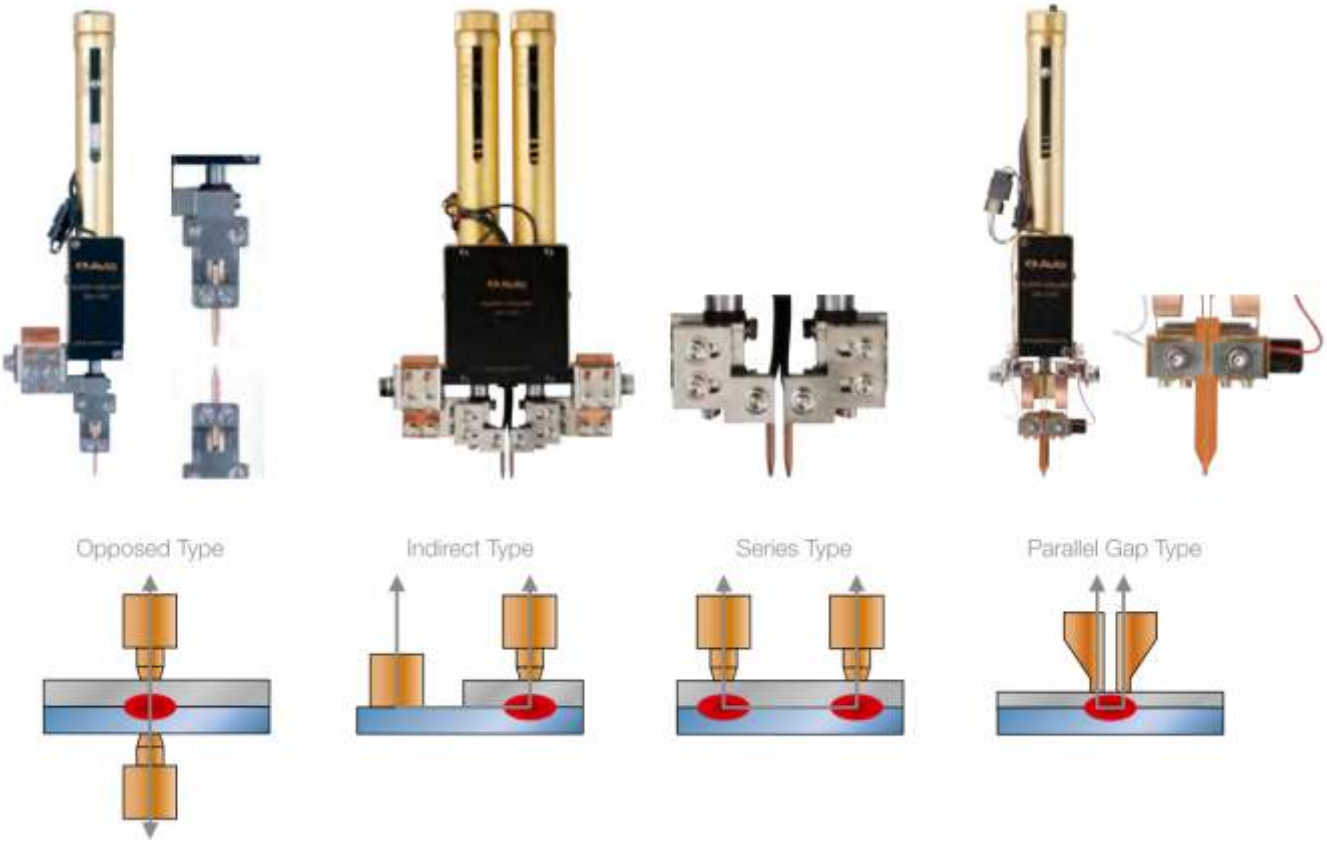
Welding Head : It controls the pressure to be applied

Welding Electrode : It contacts the object to be welded to apply pressure and electric current

* In addition to the above, we have various monitors which measure electric current or applied pressureResistance Welding Model

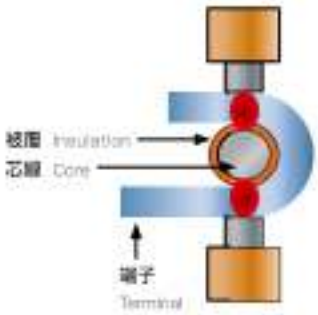
Welding Head & Electrode

How the electrode contacts the object to be welded (how to apply the current) is determined by the shape or structure of the object. Furthermore, shape and material of the electrode and the applied pressure are also important factors in resistance welding.

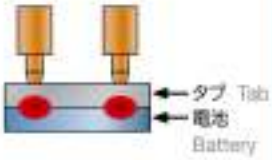


Applications

被覆線 + U字端子
Insulation Wire + U-Shaped Terminal



組電池(2次電池 + タブ)
Battery Pack (Rechargeable Battery + Tab)



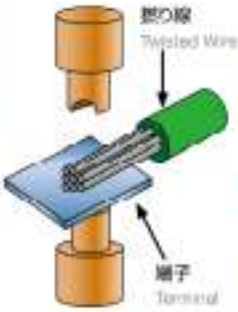
撚り線(コンパクティング)
Twisted Wire (Compacting)

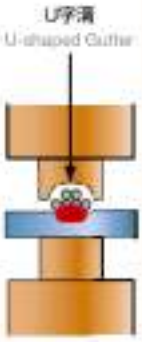
コンパクティング前
Before Compacting

コンパクティング後
After Compacting

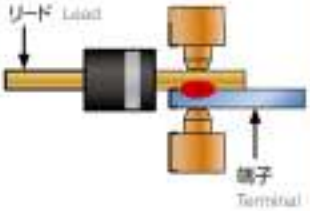
コンパクティング：撚り線の端末を加圧と加熱で矩形に溶接します。
Compacting: Perform welding on the terminal of the twisted wire by adding pressure and heat.

撚り線 + 端子板
Twisted Wire + Terminal Plate

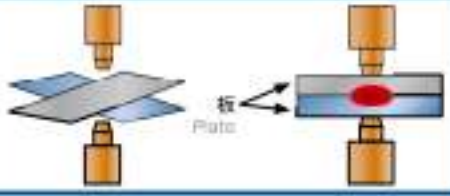




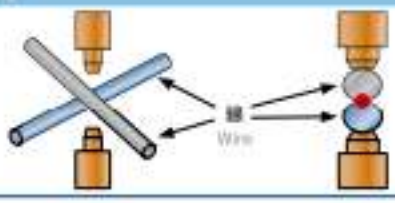
電子部品のリード + 端子板
Lead of Electric Part + Terminal Plate



板 + 板
Plate + Plate

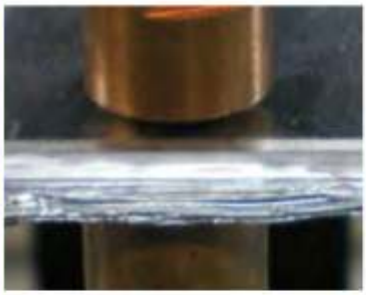


線 + 線
Wire + Wire

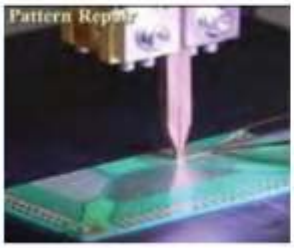


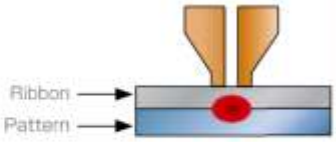
Applications

Laminated Foil + Plate (Al, Cu)

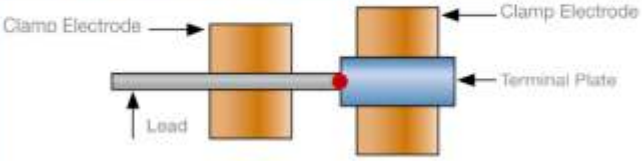


Pattern Repair

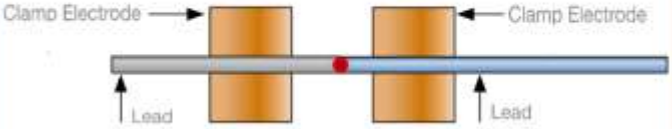




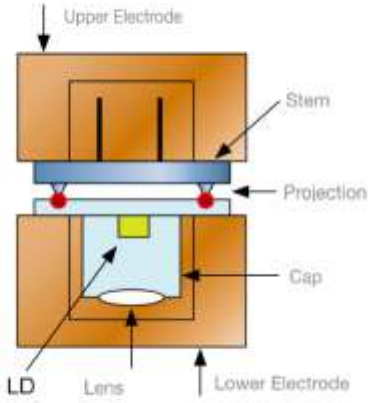
Lead +Terminal Plate



Lead + Lead



Can Seal Welding



Lead-frame + Lead-frame

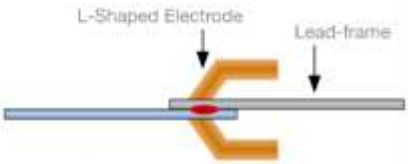
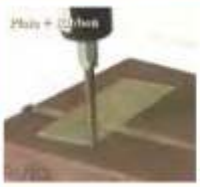
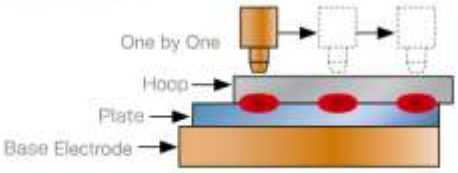
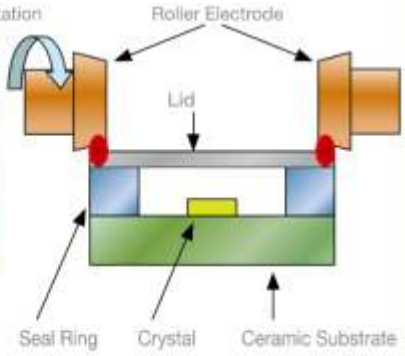


Plate + Hoop Material





Seam Welding : Parallel



Inverter Type

High Productivity by HighSpeed Welding

This model is the highly efficient welding power supply that adopted an inverter. It responds to the change during welding at real time by fast feedback. The highly stabilized welding current generated by the power supply is optimal to the resistance welding for precision electronic parts.

NRW-IN4200/NT-IN440O
NRW-IN8400/NT-IN8400
NRW-IN8400A/NT-IN8444
NRW-IN16K4/NT-IN16K4

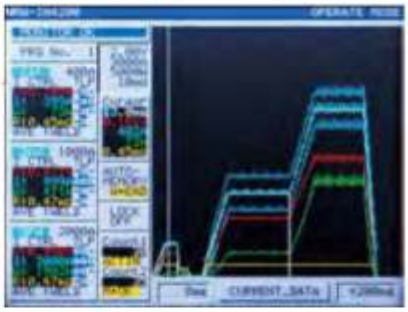
NT-IN4400
NT-IN8400
NT-IN8444

NRW-IN4200
NRW-IN8400
NRW-IN8400A

NT-IN16K4

NRW-IN16K4

Graphic Display of Welding Waveform



Multi-transformer System

- Multi control mode (constant-current, voltage, power)
- Pre-weld check function
- Long-time welding (maximum 3sec)
- Graphic display of welding waveform on large LCD
- Multi monitoring function
- Welding waveform-memory function

Items	NRW-IN4200	NRW-IN8400	NRW-IN8400A	NRW-IN16K4
Welding Transformer	NT-IN4400, NT-IN4448	NT-IN4400, NT-IN4448, NT-IN8400, NT-IN8444		NT-IN16K4
Control Frequency	2 kHz			
Control Mode	Constant Current, Constant Voltage, Constant Power, Fixed Pulse Width		Constant Current, Constant Peak Current, Constant Voltage, Constant Power, Fixed Pulse Width	Constant Current, Constant Voltage, Constant Power, Fixed Pulse Width
Range of Timer Setting	1st, 2nd, 3rd, UP, WELD, DOWN Total Time 0.5 – 3000 ms (0.5 ms Step)		1st, 2nd, 3rd, UP, WELD, DOWN Total Time 0.5 – 3000 ms (0.5 ms Step) Pulsation current function featured	1st, 2nd, 3rd, UP, WELD, DOWN Total Time 0.5 – 3000 ms (0.5 ms STEP)
Setting Range for Weld Type	Current: 400 – 4100 A (1 A Step) Voltage: 0.400 – 4100 V (0.001 V Step) Power: 200 – 8200 W (1 W Step)	Current: 400 – 8200 A (1 A Step) Voltage: 0.400 – 6200 V (0.001 V Step) Power: 200 – 24600 W (1 W Step)		Current: 400 – 16000 A (1 A Step) Voltage: 0.400 – 6200 V (0.001 V Step) Power: 200 – 49200 W (1 W Step)
Current, Voltage, Power, Resistance Monitoring	Average / Peak / Profile			
Trace Monitoring	Current, Voltage, Power, Resistance			
Display of Waveform	Current, Voltage, Power, Resistance			
Number of Conditions	31		255	
Interface	RS-232C			
Cooling Method	Air			
Power Source	AC200 – 230 V 3Φ	AC380 – 415 V 3Φ (Option: AC200 – 230 V 3Φ)	AC200 – 240 V 3Φ (Option: AC380 – 440 V 3Φ)	AC380 – 415 V 3Φ (Option: AC200 – 230 V 3Φ)
Dimension / Weight	W170 × D350 × H265 mm ≒14 kg	W186 × D490 × H265 mm ≒19 kg	W186 × D490 × H265 mm ≒18 kg	W280 × D410 × H470 mm ≒35 kg

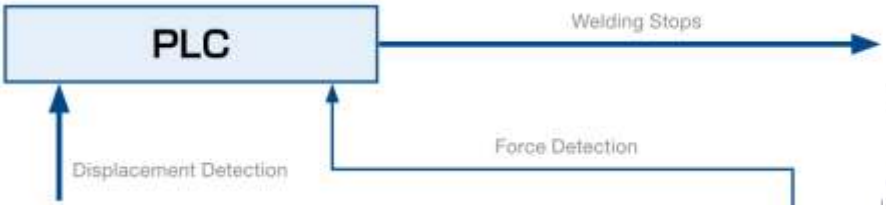
Inverter Type

Optimized System for Fusing

As it is controlled by the amount of deformation, the highly reliable joints can be achieved.

Fusing of Large Motor Coil and Cu Terminal

1800N Spring Pressure
Example of integration of the pressure sensor into a unit



Displacement Monitor QC-200

Force Monitor QC-100

Refer to P14 for detail of the specification.

For Welding of High Conductivity Materials

Welding of Copper (Cu) Bus Bar

Option

Transformer for integration into Equipment

Items	NT-IN12K4
Cooling Method	Water
Dimension / Weight	W92 × D304.5 × H164 mm ≒16 kg

A current sensor is additionally required.

Items	NT-IN4400	NT-IN4448	NT-IN8400	NT-IN8444	NT-IN16K4
Rated Capacity	8.8 kVA	23.2 kVA	30 kVA	50.6 kVA	87.0 kVA
Primary Input Voltage	300 V/600 V				
Secondary Open-circuit Voltage	8.4 V (220 V)	12.9 V (220 V)	14.1 V (220 V)		17.2 V (220 V)
Transformer Turns Ratio	37:1/74:1	24:1/48:1	22:1/44:1		18:1/36:1
Input Frequency	2 kHz				
Maximum Welding Current	4000 A		8000 A		12000 A (200 V) / 16000 A (400 V)
Duty Cycle (Weld Time)	Air cooling 5% (50 ms)	Water cooling 10% (1000 ms)	Air cooling 5% (50 ms)	Water cooling 10% (1000 ms)	Air cooling 6.6% (1000 ms)
Cooling Method	Air	Air/Water	Air	Air/Water	Water
Dimension / Weight	W150 × D267 × H210 mm ≒12 kg	W170 × D312 × H235 mm ≒18.4 kg	W210 × D342 × H210 mm ≒18.0 kg	W190 × D322 × H275 mm ≒25.6 kg	W198 × D420 × H357 mm ≒48 kg

Items	TS-IN4000	TS-IN4400
Dimension / Weight	W150 × D245 × H210 mm ≒5 kg	W200 × D260 × H210 mm ≒10 kg

Digital Force Gauge

Compact Light Weight and Handy Type

FG-400 & TJ series

FG-400 and TJ series are sold separately.

- Compact arid Light Weight
- 3 ways Power Supply
- Display Hold Function is Equipped
- Easy Zero Adjustment Function
- Automatic Recognition of the Type of Sensor
- Judgment Function (Hi & Low) is Equipped

Items	FG-400
Display	4 digi (t 0000 - 9999) N
Zeroing Adjustment	Automatic regulation by switching
Hold Function	Sample/Peak
Interface	RS-232C
Power Source	Use by AA type battery, Ni-H type battery or Dedicated AC adapter (AC100 - 240 V)
Dimension / Weight	W77 × D140 × H27 mm ≒300 g

Calibration certificate for FG-400 is not free of charge. Please ask sales representative for quotation.

Items	TJ-1A	TJ-20R or TJ-20A	TJ-100R or TJ-100A	TJ-500R or TJ-500A
Measuring Range	0 - 10 N	0 - 196 N	0 - 980 N	0 - 4900 N
Critical Load	20 N	294 N	1470 N	7350 N
Accuracy	±2% (of full scale)			

Pressure Sensor for Incorporation into Equipment

Items	TJS-1R	TJS-20R	TJS-100R	TJS-100A-NA124	TJS-500A-NA126
Measuring Range	0 - 10 N	0 - 196 N	0 - 980 N		0 - 4900 N
Critical Load	20 N	294 N	1470 N		7350 N
Accuracy	±3% (of full scale)				
Applicable Welding Head	NA-121,122,123 NA-131,132,142			NA-124 NA-125	NA-126

A pusher is optionally required for integration into the Welding Head.

Example for integration of the sensors into the Welding head

Welding Monitor

Realtime Monitoring of Displacement and Force

Force Monitor QC-100

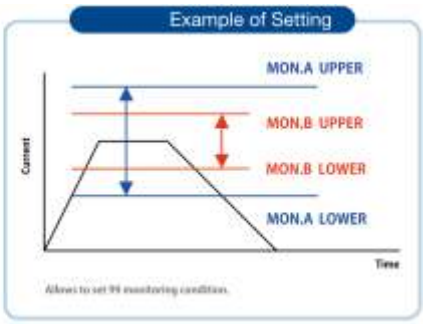
Displacement Monitor QC-200

- Selectable Display: Digital or Graphic
- Easy Automation by Combination with System Head
- Easy QC by Enhancement of Communication Function (Output of Measured Value & Monitoring Result)
- Easy Installation of Force Sensor
- High Accuracy Measurement for Displacement of Welding Material

- Wave Analysis by Graphic Display (High Speed Sampling at 2000 times/sec)
- Measurement & Judge by 2 Conditions for Welding Process (Measurement & Judge for Before/After Welding)
- Trigger by Applied Force or Displacement can be Set

Items	QC-100	QC-200
Measuring Range	0 - 1000 N	0 - 7.5 mm 分解能 Resolution: 1 μm
Accuracy	±3% (of full scale)	±1% (of full scale)
Sampling Time	0.5 ms (2000 times/sec)	
Squeeze, Hold Time	0 - 0.9 sec	
Interface	RS-232C, I/O, Analog output	
Power Source	DC24 V ±10% 2 A	
Dimension / Weight	W170 × D210 × H150 mm ≒3.0 kg	W170 × D210 × H150 mm ≒3.4 kg

Welding Monitor QC-440



Items	QC-440
Judgment Items	Current: Over, Under (3 digits) Time: Over, Under (cycle: 2 digits, msec: 3 digits) Displacement: Over, Under (4 digits) * With GOOD or NG signal output function
Power Source	AC100 - 240 V ±10% 50/60 Hz
Dimension / Weight	W141 × H303 × D344 mm ≒4.5 kg

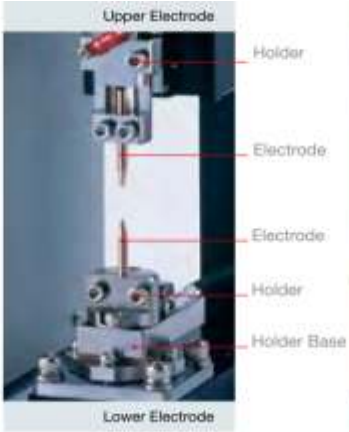
Calibration certificate for QC-440 is not free of charge. Please ask sales representative for quotation.

Accessory

Electrode Accessory

System Head Basic Configuration

Straight Type



Shift Type

■ Upper Electrode Accessory

Head	Electrode(CrCu)	Electrode(Mo)	Type	Holder/Horn	Clamp
NA-121	EH-062-02	–	Straight	S121-16THD *	–
			Shift	S121-16HORN	S121-CLMP
	EH-125-02	EH-125-00	Straight	S121-32THD	–
			Shift	S121-32HORN	S121-CLMP
NA-122	EH-125-02	EH-125-00	Straight	S122-32THD *	–
			Shift	S122-32HORN	S122-CLMP
	EH-250-025	EH-250-005	Straight	S122-64THD	–
			Shift	S122-64HORN	S122-CLMP
NA-124	EH-250-025	EH-250-005	Straight	S124-64THD	–
	EH-60-C	EH-80-00	Straight	S124-80THD *	–

The mark is attached as a part of welding head

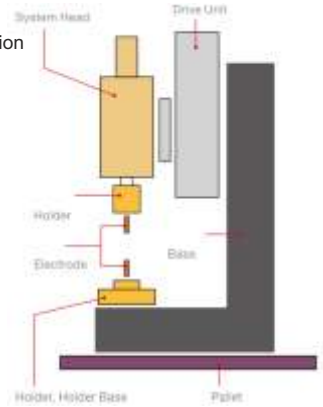
■ Lower Electrode Accessory

Head	Electrode(CrCu)	Electrode(Mo)	Type	Holder/Horn	Holder Base/Clamp
NA-121	EH-062-02	–	Straight	S12X-16BHD	12X-B-F
			Shift	S12X-16BHORN	12X-BS
	EH-125-02	EH-125-00	Straight	S12X-32BHD	12X-B-F
			Shift	S12X-32BHORN	12X-BS
NA-122	EH-125-02	EH-125-00	Straight	S12X-32BHD	12X-B-F
			Shift	S12X-32BHORN	12X-BS
	EH-250-025	EH-250-005	Straight	S12X-64BHD	12X-B-F
			Shift	S12X-64BHORN	12X-BS
NA-124	EH-250-025	EH-250-005	Straight	S12X-64BHD	124-B-F
	EH-60-C	EH-80-00	Straight	S12X-80BHD	124-B-F

Compacting Unit

System Head Accessory

System Head Basic Configuration



Lower Holder Accessory

Lower Holder S12X-16BHD

Lower Holder Base 12X-B-F

Lower Electrode Stage 143-BS

Base and Stage

Base
NA-301
NA-302P

Stage 11X-BS

Leveling Stage 11X-BS-F

Pallet
S302-MP
S-MP

XYT Stage 11X-BS-F-MM

Weld Cable

Length: 100mm Step

Terminal Shape: D, L, DP

Ex：SFC - 60 - 500 - DD - 99

Material: SFC, WRC, FMC, EFC

Hole Size: 7, 9mm

Square: 22, 60, 66, 120mmSQ

System Head

Stabile Pressurizing by the Small and High Performance Head

Opposed Type


NA-121


NA-122


NA-124


NA-125


NA-126

Items	Opposed Type					
	NA-121	NA-122	NA-123	NA-124	NA-125	NA-126
Pressure Range	0.7 - 5 N	5 - 65 N	20 - 150 N	40 - 300 N	100 - 600 N	300 - 1800 N
Pressure Method	Spring					
Drive Method	Option: Motor, Air, Manual			Option: Motor, Air	Air	
Diameter of Electrode	Φ1.6 mm	Φ3.2 mm	Φ6.4 mm	Φ8.0 mm	Dedicated electrode attached (EH-F-02)	Dedicated electrode excluded (EH-200)
Dimension / Weight	W74 × D48 × H285 mm ≒0.6 kg	W82 × D50 × H301 mm ≒0.8 kg	W82 × D50 × H301 mm ≒0.8 kg	W97.8 × D56.6 × H326 mm ≒1.5 kg	W212.2 × D204.0 × H794.5 mm ≒21.5 kg	W309 × D315 × H908 mm ≒60 kg

Parallel Gap Type


NA-131


NA-132

Series Typ


NA-142


NA-143

Items	Parallel Gap Type		Series Type		
	NA-131	NA-132	NA-141	NA-142	NA-143
Pressure Range	0.7 - 5 N	5 - 65 N	0.5 - 5 N	5 - 65 N	40 - 150 N
Pressure Method	Spring				
Drive Method	Option: Motor, Air, Manual				Option: Motor, Air
Diameter of Electrode	□3.2 mm		Φ3.2 mm		
Dimension / Weight	W76 × D51 × H299 mm ≒0.7 kg	W76 × D51 × H299 mm ≒0.7 kg	W135.2 × D49.8 × H268 mm ≒1.3 kg	W152.2 × D49.8 × H268 mm ≒1.6 kg	W174.2 × D61.8 × H302 mm ≒2.7 kg

Welding Head

General Purpose Type NA-60A

NA-60A is general purpose weld head which application is widened from various kinds -- of electronic parts that require reliability and accuracy, that is, switches, relay contacts, watches, components among camera etc. and various kinds of mechanical parts.

High Pressurization Type NA-72

NA-72 is suited to the welding of the mechanical parts or thick wtranded wires that need more strong electrode force.

Horizontal Pressurization Type NA-184

NA-184, a high rigid head with left and right electrode drives independently, achieves a stable welding quality. Load cell and Displacement sensor are easy to be integrated into this unit, and can be used as a head of automatic welder.

* A Stand is an option.

Items	NA-60A	NA-72	NA-184
Pressure Range	9.8 - 132.3 N	98 - 588 N	30 - 350 N
Electrode Stroke	max 12 mm	max 30 mm	Main electrode: max 25 mm Sub electrode: max 15 mm
Depth Dimension of Pocket	98 mm	160 mm	—
Drive Method	Foot*1, Air*1	Air*2	Air
Diameter of Electrode	φ6.4 mm / φ3.2 mm*1	φ10 mm	Dedicated Electrode
Dimension / Weight	W72 × D175 × H285 mm ≒2.8 kg	W107 × D240 × H615 mm ≒19 kg	W550 × D150 × H205 mm 〈 Excluding pre-set holder) ≒15 kg

*1 Option
*2 Power Source 1 AC100 V Applicable hose Internal diameter 0:6 mm

Hand Piece Type NA-54A, NA-54LA, NA-57A, NA-58A

The welding machine series of various handy types are arranged to weld a difficult object to weld by a fixed type weld head like at a jamming area.
No side-to-side rocking motion of electrodes. Operable with light power due to its compact and lightweight size.

NA-54A

NA-54LA

NA-57A

NA-58A

Items	NA-54A	NA-54LA	NA-57A	NA-58A
Pressure Range	7.8 - 44.1 N		9.8 - 49 N	手加圧 Manual
Electrode Stroke	Max 10 mm	—		Max 1 mm
Depth Dimension of Pocket	50 mm	—		75 mm
Drive Method	Manual			
Applicable Electrode	EL-125 Series	EL-54L	Dedicated for NA-57A	Dedicated for NA-58A
Dimension	W30 × D195 × H47 mm	W30 × D195 × H47 mm	φ36 × D207 mm	W24 × D16 × H157 mm
Weld Cable	1500 mm			1100 mm

Drive Unit

Motor Drive, Air Drive and Manual Drive

Motor Drive & Controller

- Motor drive with 1μm resolution supports precise welding
- It is equipped with a pressure stability function to keep the pressure stable and to improve the quality of welding
- It reduces pressure damage by using a position control function during welding
- It reduces heat damage by using high pressure/low temperature welding processes with a max. 300 N force (When NA-202P is used)
- It provides intuitive operation by colour touch panel and lever jog switch
- Soft-landing process with a slow moving speed of 0.1mm/sec is provided
- Seven operation conditions can be saved

Items	CNT-320A & NA-201P/NA-202P	CNT-310 & NA-201
Drive Method	Motor	
Stroke	Max 50 mm, 1 μm Step	Max 50 mm, 10 μm Step
Power Source	DC24 V ±10% 4 A (Option: AC Adapter AC100 - 240 V)	DC24 V ±10% 2 A (Option: AC Adapter AC100 - 240 V)
Dimension / Weight	CNT-320A: W120 × D230 × H207 mm ≒3 kg NA-201P: W52.5 × D78.5 × H276.1 mm ≒2 kg NA-202P: W69 × D99.5 × H336.3 mm ≒4.2 kg	CNT-310: W80 × D211 × H188 mm ≒2 kg NA-201: W50 × D82.5 × H320 mm ≒2 kg

Air Drive

NA-221, NA-222

Items	NA-221	NA-222
Drive Method	Air	
Stroke	Max 50 mm	
Speed Control	with Speed controller (Φ4 mm Tube)	with Speed controller (Φ6 mm Tube)
Air Pressure	0.05 - 0.6 MPa	0.4 - 0.6 MPa
Dimension / Weight	W78 × H280 × D83 mm ≒1.3 kg	W86 × H289 × D85 mm ≒2.2 kg

Manual Drive

NA-231

Items	NA-231
Drive Method	Manual by foot pedal
Stroke	Max 10 mm
Height Control	Range 40 mm
Dimension / Weight	Drive Unit: W51 × H192 × D79 mm ≒1 kg Foot Pedal: W124 × H125 × D268 mm ≒2.2 kg

Welding Electrode

Weldability by Resistance Welding for Each Material

* This table is intended to be a guideline only, and it should not be interpreted as guaranteeing the welding result.
  Please feel free to consult with us as we will be pleased to sample test for you.
* RWMA for the electrode material indicates the specifications by The Resistance Welding Manufacturing Alliance

	W Mo		Ni alloy		Ni		SUS		Fe (Ni)		Fe (Zn)		Fe (Sn)		Fe		PB		Cu-Zn-Ni		Cu-Ni		Bs		Cu		Al alloy		Al		Ti	
チタン Titanium																															A	II
																															II	1
アルミニウム Aluminium			E	II	E	II	H	II	H	II	D	II	D	II	E	II	D	II					E	II	H	V	C	II	C	II		
			II	5 2	II	3 2 10	II	3 4 2	II	3 8	II	3 4 9	II	3 4 9	II	3 4	II	5 2					II	2	II	2	II	1	II	1		
アルミニウム合金 (ex. Duralumin)			E	II	E	II	H	II	H	II	D	II	D	II	E	II	D	II					E	II	E	V	D	II				
			II	2	II	3 2 10	II	3 4 2	II	3 8	II	3 4 9	II	3 4 9	II	3 4	II	5 2					II	2	II	2	II	1				
銅 Copper	H	II	E	II	E	II	H	II	H	II	H	II	H	II	H	II	D	II	D	II	D	II	E	II	K	V						
	V	3	V		V	3 6 10	V	3 4 2	V	3 4	V	3 4 9	V	3 4 9	V	3 4	V	5 6	V	6	V	6	V	6	V	2						
真鍮 Brass			D	II	D	II	H	II	H	II	E	II	E	II	E	II	C	II	C	II	C	II	C	II								
			IV	6	II	6 10	IV		IV		IV	6	IV	6	IV	3 4	IV	1	IV	1	IV	1	II	1								
白銅 Cupronickel			C	II	C	VI	E	II	E	II	E	II	E	II	E	II	C	II	C	II	B	II										
			II		II		II	2	II	8 2	II	2	II	2	II	3	II	1	II		II	1										
洋白 German Silver			C	II	C	VI	E	II	E	II	E	II	E	II	E	II	C	II	B	II												
			II		II		II	2	II	8 2	II	2	II	2	II	3	II	1	II	1												
リン青銅 Phospher Bronze			D	II	D	II	E	II	E	II	E	II	E	II	D	II	B	II														
			II		II	10	II		II	8	II		II		II	3	II	1														
軟鋼 Steel	D	II	D	II	D	II	B	II	B	II	C	II	C	II	A	II																
	II	3	II	3	II	3 10	III		II	8	II		II	6	II	1																
軟鋼 Sn Plating	E	II	D	II	D	II	C	II	C	II	C	II	D	II																		
	II	9	II	3 9	II	9	II		II	8	II	6 9	II	6 9																		
軟鋼 Zn Plating	E	II	D	II	D	II	C	II	C	II	C	II																				
	II		II	3	II	9	II		II	8	II	6																				
軟鋼 Ni Plating	D	II	D	II	D	II	B	II	B	II																						
	II	8	II	8	II	8	II	8	II	8																						
ステンレス Stainless Steel	D	II	D	II	D	III	A	II																								
	II	5 2	II		II	10	II	1																								
ニッケル Nickel	D	II	C	II	B	II																										
	II	5 2 10	II	1	II	1																										
ニッケル合金 ex.Monel Metal	D	II	B	II																												
	II	5 2 10	II	1																												
モリブデン タングステン Molybdenum Tungsten	D	II																														
	II	5 2																														

Weld-ability	Electrode
Electrode	Special Note

Weldability
A Excellent
B Very good
C Good
D Acceptable
E No good
H Very bad
K Unacceptable

Alloy Components of Electrode
II Cu-Cr-Zr (RWMA-2)
III Cu-Ni-Be (RWMA-3)
IV Cu30%-W70% (RWMA-11)
V W100% (RWMA-13 40%)
M0100%

Special Note
1 Having enough welding strength
2 Possible to weld under a special condition
3 Not enough welding strength
4 Generating a stick instead of a nugget
5 Welding conditions should be adjusted precisely
6 Clean electrode generates no stick
7 Scrubbing before welding
8 Flat electrode to prevent deforming
9 Coating has a chance to melt or burn
10 Pay attention on polarity

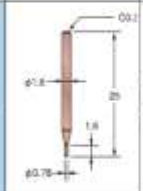
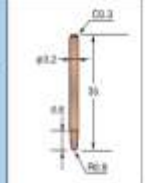
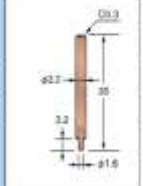
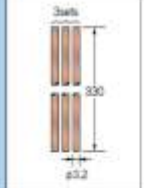
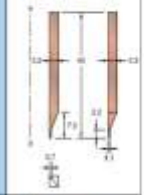
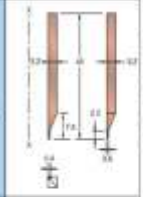
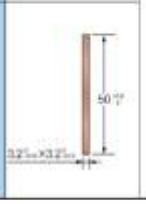
Welding Electrode

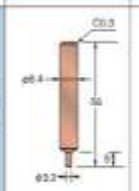
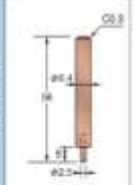
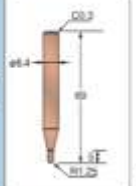
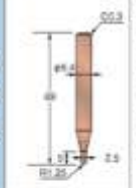
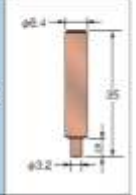
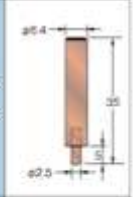
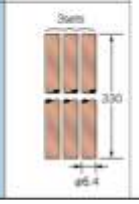
Materials of Electrode

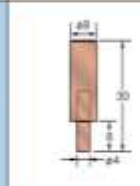
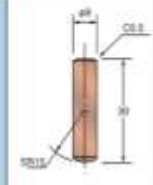
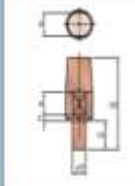
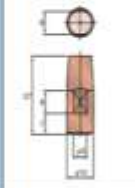
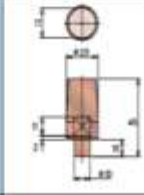
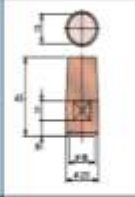
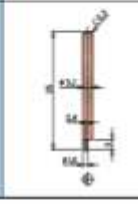
The list below shows rough standards to choose materials for an electrode, though it may be changed according to its surface treatment or dimensions.

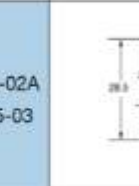
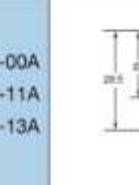
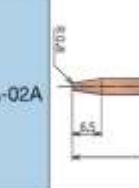
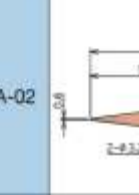
Electrode Number	Alloy Components	Electric Conductivity (IACS%)	Applicable Metal
02 (equivalent to RWMA-2)	Cu-Cr-Zr	around 80%	iron, nickel, chrome and their alloys
03 (equivalent to RWMA-3)	Cu-Ni-Be	around 50%	phosphor bronze, brass
00	pure Mo	around 31%	tinned copper wire, solder plating copper wire
11 (equivalent to RWMA-11)	Cu (30%) -W (70%)	around 46%	noble metal
13 (equivalent to RWMA-13)	pure W	around 32%	copper
20	Cu-Al_2O_3	around 80%	Battery Tab

RWMA stands for The Resistance Welding Manufacturing Alliance
IACS stands for International Annealed Copper Standard

Electrode Number	Shape	AH*
EH-062-02A		NA-121 NA-141
EH-125-02A EH-125-03 EH-125-20		NA-121 NA-122 NA-123 NA-141 NA-142 NA-143 NA-60A
EH-125-00A EH-125-11A EH-125-13A		
CC Alloy		
EP-711-00F EP-711-02F		
EP-406-00F EP-406-02FA		NA-131 NA-132 NA-141 NA-142
Molybdenum Square Bar		

Electrode Number	Shape	AH*
EH-250-02A EH-250-03		
EH-250-00A EH-250-11A EH-250-13A		
EO-250-02A EO-250-03		NA-12 NA-12 NA-12 NA-14 NA-14 NA-60 NA-4
EO-250-00A EO-250-11A EO-250-13A		
EH-250-02S		
EH-250-00S EH-250-13S		
CC Alloy		

Electrode Number	Shape	AH*
EH-80-00		NA-124
EH-60C		
EH-F-00		NA-125 NA-72
EH-F-02		
EH-200-00A		NA-126
EH-200-02A		
EH-125-02E EH-125-20E		NA-141 NA-142 NA-143

Electrode Number	Shape	AH*
EL-125-02A EL-125-03		NA-54A
EL-125-00A EL-125-11A EL-125-13A		
EL-54LA		NA-54LA
EH-57A-02A		NA-57A
EH-58A-02		NA-58A
EHC-F		NA-72
EHM-72		NA-72

* Applicable Weld Head

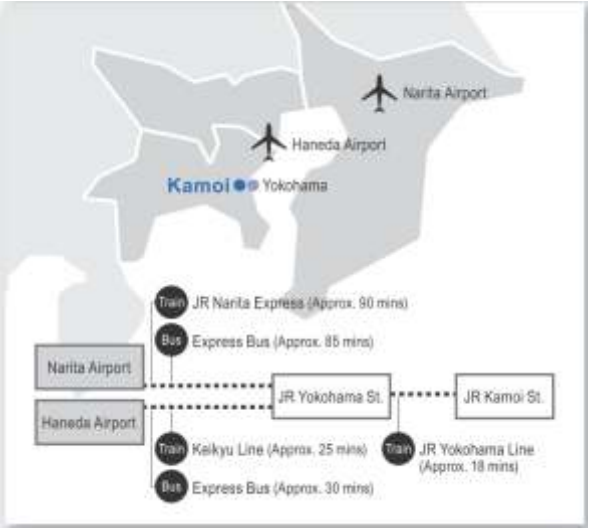
Contact and Service

Evaluation Laboratory

Nippon Avionics Co., Ltd. Shin-Yokohama Plant
Address: 4206, Ikonobe-cho, Tsuzuki-ku, Yokohama,
224-0053, JAPAN

Direction

7 minutes on foot from JR Kamoi Station



⚠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.

NIPPON AVIONICS CO.,LTD.
Welding Products Division
Sales Department
4206, Ikonobe-cho, Tsuzuki-ku, Yokohama,
224-0053, Japan
TEL +81-45-930-3596
FAX +81-45-930-3597
URL http://www.avio.co.jp/

Ihr Ansprechpartner

autorisierter Vertriebspartner für Deutschland
ATN Automatisierungstechnik Niemeier GmbH

Segelfliegerdamm 94-98
D-12487 Berlin, Germany
Tel.: ++49 30 565 9095-0
Fax: ++49 30 565 9095-60
mail: info@atn-berlin.de
web: www.atn-berlin.de