

# CHUCK CONTROLLERS

## Need of a chuck controller

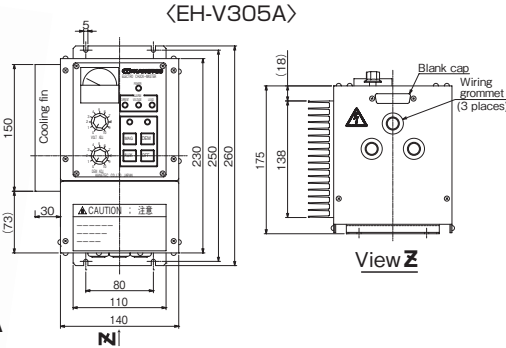
Direct current (DC) is required to generate a magnetic force in the electromagnetic chuck. Also when demounting a workpiece after machining, electrical demagnetization is required to reduce the residual holding power. For this purpose, an Electro Chuck Master or a chuck controller consisting of a rectifier and demagnetizer (Chuck Master dedicated to demagnetization and selector switch) is required.

- Rectifier: Rectifies an input from an alternating current (AC) power source to direct current (DC) and supplies it to the electromagnetic chuck.
- Demagnetizer: Once a workpiece has been attracted to the electromagnetic chuck, it cannot be demounted easily due to its residual holding power even when the power is turned off. The demagnetizer is used to attenuate the DC power from the rectifier and eliminate the residual magnetism.

## Model EH-V NON-CONTACT TYPE CHUCK MASTER\*



EH-V305A

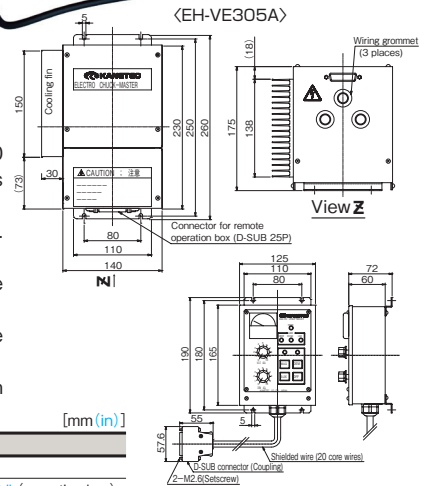


## Remote operation type

<Remote operation box>



EH-VE305A



<Dimensions of remote operation box>

### [Application]

Rectifies an input from an AC power source to DC and outputs it to the electromagnetic chuck.

### [Features]

- Developed as a non-contact type Chuck Master capable of outputting a constant voltage in a wide range of 100 VAC to 220 VAC and providing high speed consistent demagnetizing effect. Also various protective functions have been incorporated and indicator lamps for individual alarms are provided to identify alarms easily.
- Because a relay (consumable part) is not used, this model can be used continuously and withstand frequent ON/OFF operations.
- The holding power of the electromagnetic chuck can be controlled by adjusting the voltage.
- The rapid automatic demagnetization function is activated to reduce the residual holding power of the electromagnetic chuck.
- Many input/output signals are employed that can be utilized by connecting them to the pin terminal type terminal block in the case.
- Model EH-VE is a derived type of Model EH-V305A (operation unit incorporated) to which a remote operation box is attached for remote operation. For 10A operation, select model EH-VE210D.

| Model     | Power Source                       | Output       | Width     | Height    | Depth     | Mass  |
|-----------|------------------------------------|--------------|-----------|-----------|-----------|---|
| EH-V305A  | Single phase 100-220 VAC (50/60Hz) | 0-90 VDC 5A  | 170(6.69) | 260(10.2) | 175(6.89) | 4kg/ 8.8 lb   |
| EH-VE305A |                                    |              |           |           |           | 4kg/ 8.8 lb(main unit) + 1kg/ 2.2 lb(operation box) |
| EH-VE210D | Single phase 200 VAC(50/60Hz)      | 0-90 VDC 10A | 282(11.1) | 290(11.4) |           | 6kg/ 13 lb(main unit) + 1kg/ 2.2 lb(operation box)  |

\*Switch selection (Prior to use, be sure to check the position of the switch.) \*If the magnetic force needs not be adjusted, select Model ES-M.

## Model ES-M ELECTRO CHUCK MASTER\*



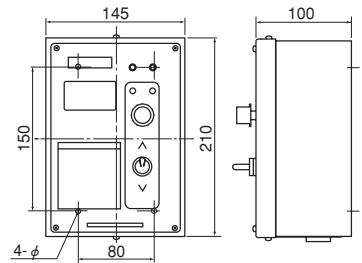
ES-M305B

### [Application]

Rectifies an input from an AC power source to DC and outputs it to the electromagnetic chuck. To eliminate the residual holding power of the electromagnetic chuck, the rapid automatic demagnetization function is activated.

### [Features]

- An interlock circuit is incorporated.
- Demagnetization is completed quickly by simply pressing the switch. The program has been designed to give a consistent demagnetizing effect within a short time.
- Model ES-M305B can be used on both input voltages of 100 VAC and 200 VAC.
- The noise resistance feature ensures consistent performance in certain noisy environment.
- The DC output voltage is constant.
- The fundamental functions required to control electromagnetic chucks are incorporated neatly.



**Precaution for use** Model ES-M103B is a low-cost, readily available type and therefore lacks some functions described above.

| Model    | Power Source                        | Output  |         | Dimensions |           |           | Mounting Hole Pitch |           | Mounting Hole | Mass          |
|----------|-------------------------------------|---------|---------|------------|-----------|-----------|---------------------|-----------|---------------|---------------|
|          |                                     | Voltage | Current | Width      | Height    | Depth     | Width               | Height    |               |               |
| ES-M103B | Single-phase 100 VAC / 50/60 Hz     | 90 VDC  | 3A      | 145(5.70)  | 210(8.26) | 100(3.93) | 80(3.15)            | 150(5.90) | 4-φ4.5(φ0.17) | 2.3kg/ 5.1 lb |
| ES-M305B | Single-phase 100/200 VAC 50/60Hz**1 |         | 5A      |            |           |           |                     |           |               | 2.5kg/ 5.5 lb |

\*1---Switch selection \*\*If the magnetic force needs to be adjusted, select Model EH.

## Model EST-1 ELECTRO CHUCK MASTER\* STAND

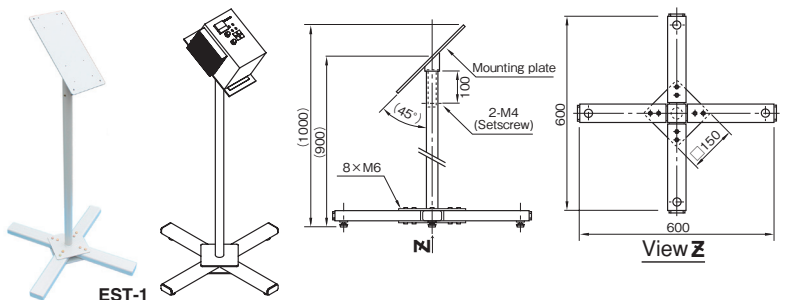
### [Application]

A stand type mounting base that can be used for any types of small Chuck Masters such as ES-M305B and EH-V305A.

### [Features]

- Self-standing and easy installation.
- The mounting plate at the top rotates 360 degrees to enable adjustment after installation.
- A rectifier can also be mounted.

| Model | Dimensions                             | Mass        | Applicable Models                              |
|-------|--|-------------|--|
| EST-1 | 600×600×(1000)<br>(23.6)×(23.6)×(39.4) | 9.5kg/21 lb | EH-V305A, ES-M305B/M103B<br>EPS-215B, RH-M102C |



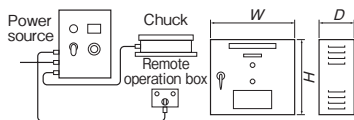
ELECTROMAGNETIC CHUCK CONTROLLERS PERMANENT MAGNETIC CHUCKS PERMANENT MAGNETIC CHUCKS BLOCKS FOR MC VACUUM CHUCKS PROMELTA\* SINE BAR CHUCKS BLOCKS HOLDERS MINI CHUCKS HOLDING TOOLS MEASURING TOOL HOLDERS MAGNETIC HOLDERS MAGNETIC TOOLS

## Model ES-V ELECTRO CHUCK MASTER\*



ES-V220A

(Connection of Model ES-V)



[Application]

An input from an AC power source is rectified to DC, which is output to electromagnetic chucks. The output voltage can be varied to control the holding power of electromagnetic chucks. The automatic demagnetization function is activated to reduce the residual magnetism of the electromagnetic chucks.

[Features]

- Suitable for large sized electromagnetic chucks and connecting type electromagnetic chucks that require a relatively large electric capacity.
- The low voltage range for variable output is very stable.

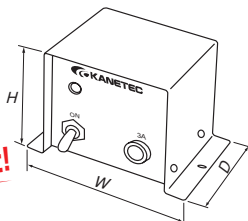
| Model    | Power Source     | Output   |         | Dimensions |            |       | Mounting Hole Pitch |            | Mounting Hole | Mass        | Remote Operation Box |      |      |            |
|----------|------------------|----------|---------|------------|------------|-------|---------------------|------------|---------------|-------------|----------------------|------|------|------------|
|          |                  | Voltage  | Current | Width      | Height     | Depth | Width               | Height     |               |             | Depth                | Cord |      |            |
| ES-V220A | Single-phase     | 0-90 VDC | 20A     | 600 (23.6) | 550 (21.6) | 250   | 400                 | 596 (23.4) | 4-φ10         | 60kg/133 lb | 100                  | 155  | 70   | 5m (196.8) |
| ES-V230A | 200 VAC, 50/60Hz |          | 30A     | 650 (25.5) | 600 (23.6) | 9.84  | 15.7                | 646 (25.4) | φ0.39         | 80kg/177 lb | 3.93                 | 6.10 | 2.75 |            |

## Model KR RECTIFIER FOR ELECTROMAGNETIC CHUCK

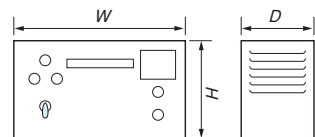


KR-N103A

Very compact!



KR-T203A



### Model KR-N

[Application]

These rectifiers rectify an input from an AC power source to direct current and output it to electromagnetic chucks via a demagnetizer. They can also be used as a source to supply DC to electromagnetic holders.

[Features]

- The very compact size (volume reduced by 50% from our conventional models) saves installation space and can be installed in a control panel, too.
- Since this is connected to a magnet on the backside, connection time can be reduced substantially.
- External control terminals are provided as standard features for automatic operation by means of external contacts, etc.
- Power cable (2 m) and plug included.

### Model KR-T

[Application]

These rectifiers rectify an input from an AC power source to direct current and output it to electromagnetic chucks via a demagnetizer. The output voltage can be varied to control the holding power of electromagnetic chucks.

[Features]

- Both 100 VAC and 200 VAC can be used.
- An output voltmeter is provided.
- The output can be varied in a wide range to provide a wide range of adjustment of the holding power.
- Power cable (2 m) included.

| Model    | Power Source                      | Output     |         | Dimensions |            |            | Mass          |
|----------|-----------------------------------|------------|---------|------------|------------|------------|---------------|
|          |                                   | Voltage    | Current | Width      | Height     | Depth      |               |
| KR-N101A | Single-phase 100 VAC, 50/60Hz     | 90 VDC     | 1A      | 100 (3.93) | 77 (3.03)  | 106 (4.17) | 1.0kg/2.2 lb  |
| KR-N103A |                                   |            | 3A      |            |            |            |               |
| KR-T203A | Single-phase 100/200 VAC, 50/60Hz | 10-120 VDC | 3A      | 280 (11.0) | 140 (5.51) | 184 (7.24) | 8.5kg/ 18 lb  |
| KR-T205  |                                   | 0-120 VDC  | 5A      | 400 (15.7) | 170 (6.69) | 290 (11.4) | 14.0kg/ 31 lb |

\*The output voltage of Model KR-T is stable when above 30 V.

## Model ESR CHUCK MASTER\* DEDICATED TO DEMAGNETIZATION



ESR-N102

[Application]

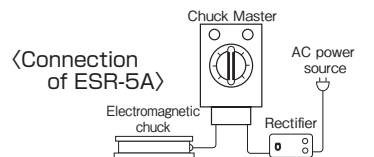
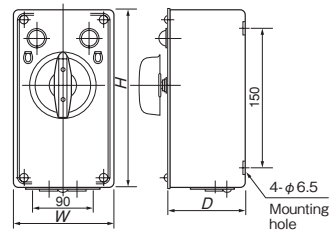
Model ESR-N102 rectifies an input from an AC power source to DC and outputs it to electromagnetic chucks. For demagnetization, the attenuating alternating output is operated manually. A rectifier is built in.

Model ESR-5A relays DC output to electromagnetic chucks and for demagnetization, the attenuating alternating output is operated manually. A rectifier needs to be installed in the preceding stage.

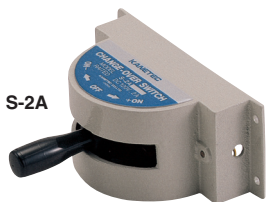
[Features]

- Turning the dial repeats reversal of the circuit and changing over of resistance values for easy demagnetization.
- Thanks to the manual type, this can be applied to diversified workpieces by simply turning the dial.

| Model    | Electrical Rating |                 | Dimensions |            |           | Mounting Hole Pitch |        | Mounting Hole | Mass         |
|----------|-------------------|-----------------|------------|------------|-----------|---------------------|--------|---------------|--------------|
|          | Input             | Output          | Width      | Height     | Depth     | Width               | Height |               |              |
| ESR-N102 | 100 VAC, 50/60Hz  | 90 VDC-2A       | 110 (4.33) | 205 (8.07) | 85 (3.34) | 90                  | 150    | 4-φ6.5        | 1.8kg/3.9 lb |
| ESR-5A   | Max. 120 VDC-4A   | Max. 120 VDC-4A |            | 190 (7.48) | 84 (3.30) |                     |        |               | (3.54)       |



## Model S-2A SELECTOR SWITCH FOR DEMAGNETIZATION



S-2A

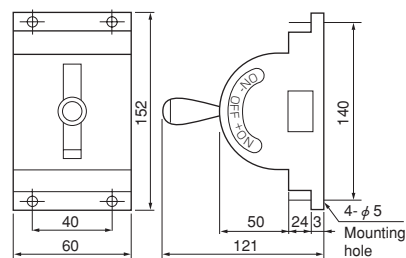
[Application]

A switch to relay DC output from the rectifier to electromagnetic chucks and is operated manually to select the output for demagnetization.

[Features]

- Easy installation and light weight. Simple and robust construction.

(Wiring of selector switch)



| Model | Electrical Rating |         | Dimensions |            |            | Mounting Hole Pitch |            | Mounting Hole | Mass         |
|-------|-------------------|---------|------------|------------|------------|---------------------|------------|---------------|--------------|
|       | Voltage           | Current | Width      | Height     | Depth      | Width               | Height     |               |              |
| S-2A  | Max. 120 VDC      | 2A      | 60 (2.36)  | 121 (4.76) | 152 (5.98) | 40 (1.57)           | 140 (5.51) | 4-φ5 (φ0.19)  | 0.4kg/0.8 lb |

ELECTROMAGNETIC CHUCKS

CHUCK CONTROLLERS

PERMANENT ELECTROMAGNETIC CHUCKS

PERMANENT ELECTROMAGNETIC CHUCKS

BLOCKS FOR MC

VACUUM CHUCKS

PROMELTA\* SYSTEM

SINE BAR CHUCKS

BLOCKS HOLDERS, MINI CHUCKS

HOLDING TOOLS

MEASURING TOOL HOLDERS

MAGNETIC HOLDERS

MAGNETIC TOOLS

## Selection Guide

### Selecting an Electro Chuck Master

KANETEC's Electro Chuck Master consists of a rectifier and electronically controlled demagnetization circuit. Residual magnetism varies largely depending on workpieces (material, shape, mass, etc.). It is therefore necessary to set the demagnetizing time (few seconds to over ten seconds) suitable for particular workpieces. The most effective demagnetizing patterns for each set time have been programmed in the computer to start automatic demagnetization by button operation. After studying whether the output required for magnetization may be constant or must be variable, select a model suitable for the rating of the electromagnetic chuck.

### Selecting a rectifier

① Select a suitable rectifier for installation in combination with a separate demagnetizer. (Connection diagram 2) Be sure to observe the following conditions: Voltage of electromagnetic chuck  $\geq$  output voltage of rectifier  
Current of electromagnetic chuck < output current of rectifier

<Example> Electromagnetic chuck 90 VDC, 0.8 A

Output of rectifier 90 VDC, 1 A

② When selecting a Chuck Master or rectifier dedicated to demagnetization having an output voltage exceeding the rated voltage (90 V) of the electromagnetic chuck, special attention must be paid to the selection of the current capacity.

<Example> Electromagnetic chuck 90 VDC, 4.5 A

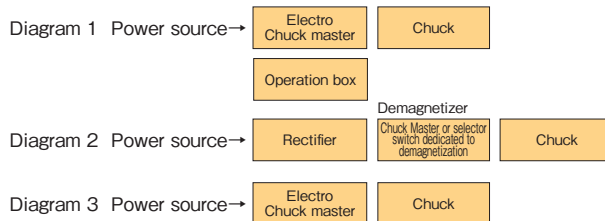
Rectifier output 0 to 120 V

With the above combination, the maximum current of the rectifier is:

$$4.5A \times \frac{120V}{90V} = 6A, \text{ thus a rectifier having output capacity 5A cannot be used.}$$

③ Other considerations should include fluctuation of the voltage in the operation area. Select an output capacity with sufficient allowance.

### Connection diagram



### Selecting a demagnetizer

The use of a demagnetizer requires a rectifier. Select a rectifier, referring to "Selecting a rectifier."

The demagnetizer cannot be used together with the Electro Chuck Master.

The manual demagnetization types, Model S-2A and ESR-5A, cannot be connected to equipment other than a rectifier.

### Selection based on electric capacity <Model selection>

| Name                                      | Model     | Power Source                          | DC Output    |         | Demag. Control | Rectifier    | Demagnetizer | Chuck Rating |               | Connection Diagram |
|---|-----------|---------------------------------------|--------------|---------|----------------|--------------|--------------|--------------|---------------|--------------------|
|   |           |                                       | Voltage      | Current |                |              |              | Voltage      | Max. Current* |                    |
| Electro Chuck Master                      | EH-V305A  | Single-phase 100 VAC-220 VAC 50/60 Hz | 0-90 VDC     | 5A      | Auto           | Not required | Not required | 90 VDC       | 4.5A          | 3                  |
|   | EH-VE305A |                                       |              |         |                |              |              |              |               |                    |
|   | EH-VE210D |                                       |              |         |                |              |              |              |               |                    |
|   | ES-V220A  | Single-phase 200 VAC 50/60 Hz         |              | 10A     |                |              |              |              |               | 1                  |
|   | ES-V230A  |                                       |              | 20A     |                |              |              |              |               |                    |
|   | ES-M103B  |                                       |              | 30A     |                |              |              |              |               |                    |
| Chuck Master dedicated to demagnetization | ES-M305B  | Single-phase 100 VAC 50/60 Hz         | 90 VDC       | 3A      | Manual         | KR-N,KR-T    | Not required | 90 VDC       | 2.7A          | 3                  |
|   | ESR-N102  | Single-phase 100 VAC 50/60 Hz         | 5A           |         |                |              |              |              |               |                    |
| Selector switch                           | S-2A      | Max. 120 VDC 50/60 Hz                 | Max. 120 VDC | 4A      | Manual         | KR-N,KR-T    | Not required | 90 VDC       | 1.8A          | 2                  |
|   |           |                                       |              | 2A      |                |              |              |              | 3.2A          |                    |
| Rectifier                                 | KR-N101A  | Single-phase 100 VAC 50/60 Hz         | 90 VDC       | 1A      | —              | —            | ESR-5A       | 90 VDC       | 0.9A          | 2                  |
|   | KR-N103A  | Single-phase 100 VAC 50/60 Hz         |              | 3A      |                |              |              |              | 2.7A          |                    |
|   | KR-T203A  | Single-phase 100/200 VAC 50/60 Hz     | 10-120 VDC   | 2.4A    |                |              |              |              |               |                    |
|   | KR-T205   |                                       | 0-120 VDC    | 5A      |                |              |              |              | 4.0A          |                    |

\*The max. current of the applicable chuck must be the Chuck Master's rated current  $\times$  0.9 or less. However, for the output voltage 120V, the max. current must be rated current  $\times$  0.8 or less.

### Selection based on function <Model selection>

| Name                                      | Model    | Function          |                | DC Output |            | Demag. Control |        | Chuck Rated Current |
|---|----------|-------------------|----------------|-----------|------------|----------------|--------|---------------------|
|   |          | Rectifier circuit | Demag. circuit | Variable  | Invariable | Auto           | Manual |                     |
| Electro Chuck Master                      | ES-V     | ○                 | ○              | ○         | —          | ○              | —      | <DC 27.0A           |
|   | ES-M     | ○                 | ○              | —         | ○          | ○              | —      | <DC 4.5A            |
|   | EH-V,VE  | ○                 | ○              | ○         | —          | ○              | —      | <DC 9A              |
| Chuck Master dedicated to demagnetization | ESR-N102 | ○                 | ○              | —         | ○          | —              | ○      | <DC 1.8A            |
|   | ESR-5A   | —                 | ○              | —         | —          | —              | ○      | <DC 3.2A            |
| Rectifier                                 | KR-N     | ○                 | —              | —         | ○          | —              | —      | <DC 2.7A            |
|   | KR-T     | ○                 | —              | ○         | —          | —              | —      | <DC 4.0A            |
| Selector switch                           | S-2A     | —                 | ○              | —         | —          | —              | ○      | <DC 1.6A            |

# Trouble?

If your electromagnetic chuck failed, refer to this page. Symptoms, possible causes and corrective actions of two typical Chuck Masters are presented here. Please follow these instructions prior to asking for repair or purchasing parts.



EH-V305A



ES-M305B

### ◇ Residual holding power is large.

- Turn the demagnetization adjust variable resistor to a point where the maximum demagnetization effect can be obtained.

### ◇ Holding power is weak.

- Set the excitation voltage adjust variable resistor at the maximum.
- If the holding power is still weak, the magnet being used may not be adequate for the shape, material or holding direction of workpieces.

※Note: Since ES-M Series outputs a constant excitation voltage, it does not have the excitation voltage adjust variable resistor.

■ If the Chuck Master does not function properly, check it referring to the following table.

| EH-V305A  |  |                                       |             |                                   |                                 |  |
|---|--|---------------------------------------|-------------|-----------------------------------|---------------------------------|--|
| Symptom   | Electromagnetic chuck does not hold workpiece. | Chuck Master does not output voltage. | Fuse blows. | Demagnetization is not performed. | Alarm indicator lamp lights up. | Check and Corrective Action  |
| Power is not being supplied.  | ●  | ●                                     |             |                                   |                                 | Check the power source.  |
| Fuse has blown.   | ●  | ●                                     |             |                                   |                                 | Remove the fuse from the fuse holder and replace it with a new one.  |
| Power source is exceeding the rated voltage.                        |  |                                       | ●           |                                   | ●                               | Check the power source voltage and use the power source at the rated voltage.  |
| Output voltage adjust variable resistor has been turned CCW fully.  | ●  | ●                                     |             |                                   |                                 | Adjust the output voltage again.   |
| Wiring to electromagnetic chuck has been broken or shorted.         | ●  |                                       | ●           | ●                                 | ●                               | If measurement of resistance of electromagnetic chuck is ∞ Ω, wiring broken. If 0 Ω, wiring shorted.   |
| Insulation of electromagnetic chuck and its wiring is poor (ground) | ●  |                                       | ●           | ●                                 | ●                               | Disconnect the cord from the output terminal of Chuck Master and measure insulation resistance of electromagnetic chuck. OK when it is above 5 MΩ. If less than 5 MΩ, check wiring. If insulation of electromagnetic chuck is poor, please request for repair. |

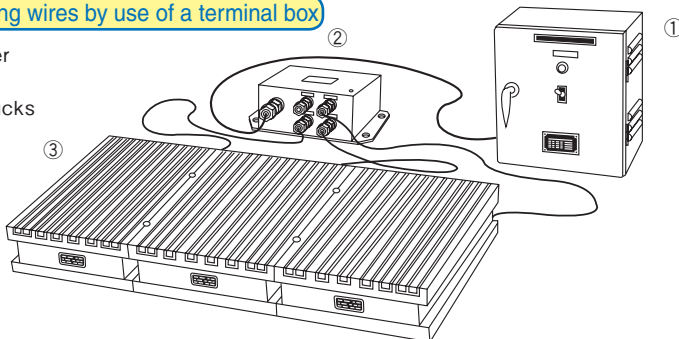
| ES-M305B/103B  |  |             |                                   |  |
|--|--|-------------|-----------------------------------|--|
| Symptom  | Electromagnetic chuck does not hold workpiece. | Fuse blows. | Demagnetization is not performed. | Check and Corrective Action  |
| Power is not being supplied.   | ●  |             |                                   | Check the power source.  |
| Fuse has blown.  | ●  |             |                                   | Remove the fuse from the fuse holder and replace it with a new one.  |
| Power source is exceeding the rated voltage.   |  | ●           |                                   | Check the power source voltage and use the power source at the rated voltage.  |
| Wiring between Chuck Master and electromagnetic chuck is defective or electromagnetic chuck is faulty. | ●  | ●           | ●                                 | Disconnect the cord from the output terminal of Chuck Master and measure insulation resistance of electromagnetic chuck. OK when it is above 5 MΩ. If less than 5 MΩ, check wiring. If insulation of electromagnetic chuck is poor, please request for repair. |

※Note: •Prior to checking/investigating causes, be sure to turn off the power and disconnect the power cable from the Chuck Master.  
 •Measure the insulation resistance of the electromagnetic chuck with an insulation resistance tester. Be sure it is above 5 M at a test voltage of 500 VDC.  
 •If the electromagnetic chuck failed, place an appropriate warning (such as attaching a tag of "Out of Order. Use Prohibited."). If the cause cannot be identified, please contact the manufacturer.

## Model TB TERMINAL BOX

An example of integrating wires by use of a terminal box

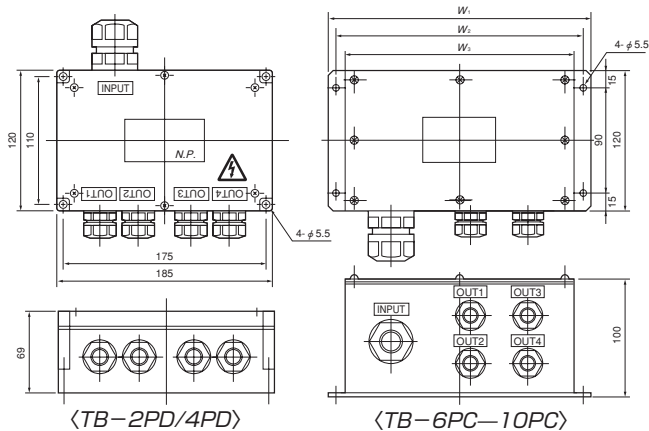
- ① Electro Chuck Master
- ② Terminal box
- ③ Electromagnetic chucks connected



TB-6PC

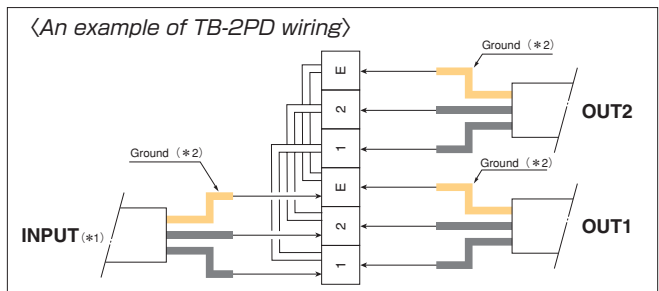
### [Application]

When several electromagnetic chucks are connected and are to be controlled together by one unit of the Chuck Master, a terminal box is required that integrates wires from the chucks. Terminal boxes for 2 circuits up to 10 circuits are available.



※The number of "OUT" in the above figures varies according to the number of branches.

| Model   | Input Capacity | No. of Outputs | Dimensions [mm (in)]   |                |                |
|---------|----------------|----------------|------------------------|----------------|----------------|
|         |                |                | W <sub>1</sub>         | W <sub>2</sub> | W <sub>3</sub> |
| TB- 2PD | 30A            | 2              | (See left-side figure) |                |                |
| TB- 4PD |                | 4              |                        |                |                |
| TB- 6PC |                | 6              | 280 (11.0)             | 266 (10.4)     | 250 (9.84)     |
| TB- 8PC |                | 8              | 330 (12.9)             | 316 (12.4)     | 300 (11.8)     |
| TB-10PC |                | 10             | 380 (14.9)             | 366 (14.4)     | 350 (13.7)     |



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PERMANENT MAGNETIC CHUCKS  
PERMANENT ELECTROMAGNETIC CHUCKS  
BLOCKS FOR MC  
VACUUM CHUCKS  
PROMELTA\* SYSTEM  
SINE BAR CHUCKS  
BLOCKS HOLDERS, MINI CHUCKS  
HOLDING TOOLS  
MEASURING TOOL HOLDERS  
MAGNETIC HOLDERS  
MAGNETIC TOOLS