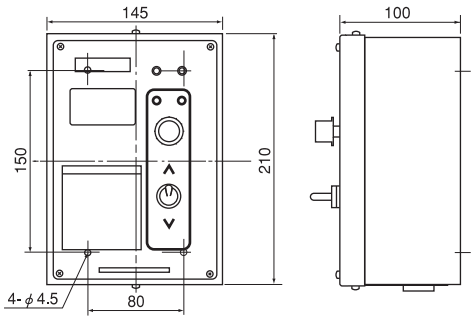
Need of a chuck controller

Direct current (DC) is required to generate a magnetic force in the electromagnetic chuck. Also when removing 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 changeover 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 removed easily due to its residual holding power even if the power is turned off. The demagnetizer is used to attenuate the DC power from the rectifier and eliminate the residual magnetism.

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 in the electromagnetic chuck, the rapid automatic demagnetization function is activated.

[Features]
- An interlock circuit is incorporated.
- Demagnetization is completed quickly by simply pushing the switch. The program has been designed to give consistent demagnetizing effect within a short time.
- Model ES-M305B can be used on both input voltages of 100 VAC and 200 VAC.
- The anti-noise 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 may lack some functions described above.

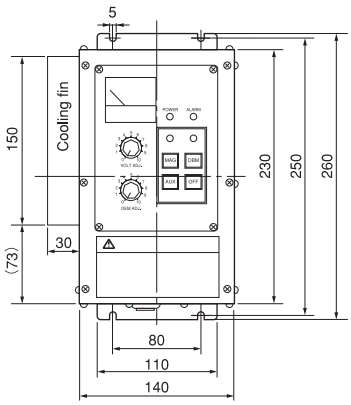
[mm (in)]

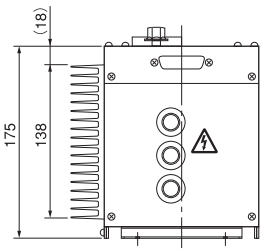
Model	Power Source	Output		Dimensions			Mounting		Mountig Hole	Mass
		Voltage	Current	Width	Height	Depth	Widht	Height		
ES-M103B	single-phase 100 VAC	90 VDC	3A	145 (5.70)	210 (8.26)	100 (3.93)	80 (3.15)	150 (5.90)	4—φ4.5 (φ0.17)	2.3kg/5.1 lb
ES-M305B	single-phase 100/200 VAC ※1		5A							2.5kg/5.5 lb

※1…Switch selection ※If the magnetic force needs not be adjusted, select Model EH.

Model EH-V ELECTRO CHUCK MASTER*

EH-V205C





[Application]
- Developed as a non-contact type chuck master to realize high speed consistent demagnetizing effect. Also various protective functions have been incorporated.
- Because a relay (consumable part) is not used, this model can be used continuously and withstand frequent ON/OFF operations.

[Features]
- Rectifies an input from an AC power source to DC and outputs it to electromagnetic chucks.
- The output DC voltage can be varied to control the holding power of electromagnetic chucks.
- The rapid automatic demagnetization function is activated to reduce the residual holding power in electromagnetic chucks.

[mm (in)]

Model	Power Source	Output	Width	Height	Depth	Mass
EH-V105C	single-phase 100 VAC	0—90 VDC 5A	140 (+30) 5.51 (+1.18)	230 (9.05)	175 (6.89)	4.5kg/10 lb
EH-V205C	single-phase 200 VAC					

※1…Switch selection ※If the magnetic force needs not be adjusted, select Model ES-M.

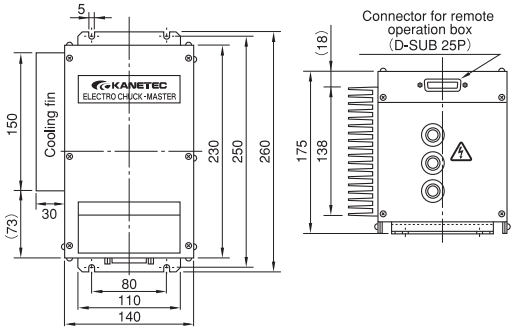
Model EH-VE ELECTRO CHUCK MASTER*

Remote operation type

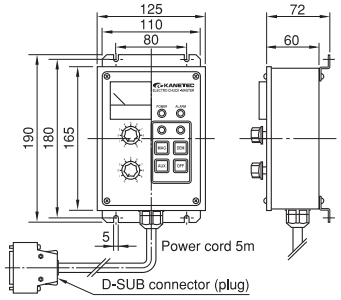
EH-VE105C

〈Remote operation box〉

〈EH-VE105C/205C〉



〈Dimensions of remote operation box〉



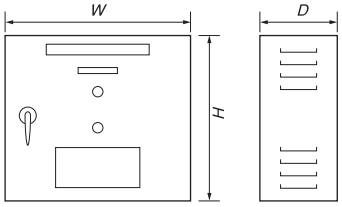
[Application]
As a separate type of Model EH-V 105C/205C (operation unit incorporated), a remote operation box is attached for remote operation. For 10A operation, select model EH-VE210C.

[mm (in)]

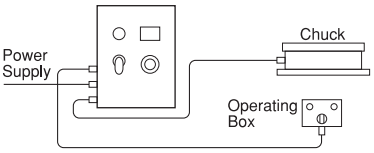
Model	Power Source	Output		Dimensions			Mass
		Voltage	Current	Width	Height	Depth	
EH-VE105C	Single-phase 100 VAC	0—90 VDC	5 ADC	140 (+30) 5.51 (+1.18)	230 (9.05)	175 (6.88)	4.5kg/ 10 lb (Main unit) 1kg/2.2 lb (Operation box)
EH-VE205C	Single-phase 200 VAC						
EH-VE210C	Single-phase 200 VAC		10 ADC	220 (+62) 8.66 (+2.44)	250 (9.84)		5.9kg/13.1 lb (Main unit) 1kg/2.2 lb (Operation box)

※If the magnetic force needs not be adjusted, select Model ES-M.

Model ES-V ELECTRO CHUCK MASTER*



〈Wiring of ES-V〉



[Application]
The input from an AC power source is rectified to DC and 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 in electromagnetic chucks.

[Features]
- Most suitable for large sized electromagnetic chucks and connecting type electromagnetic chucks.
- Low voltage range for variable output is very stable.

[mm (in)]

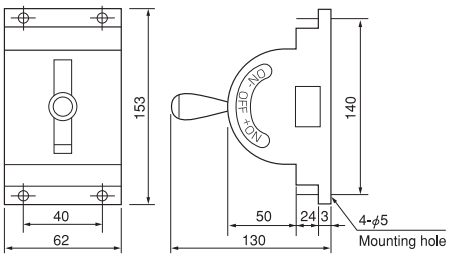
Model	Power Source	Output		Dimensions			Mountig		Mounting Hole	Mass	Operating Box			
		Voltage	Current	Width	Height	Depth	Widht	Height			Width	Height	Depth	Cable
ES-V220A	Single-phase 200 VAC	0—90 VDC Volume	20A	600 (23.6)	550 (21.6)	250 (9.84)	400 (15.7)	596 (23.4)	4—φ10 (φ0.39)	60kg/133 lb	100 (3.93)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

Model S-2A HYSTERESIS MANUAL SWITCH

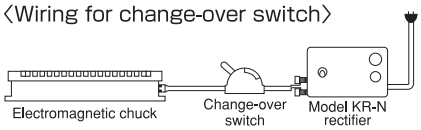
S-2A

[Application]
A switch to relay the 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 for change-over switch〉

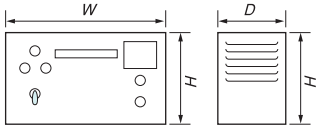


[mm (in)]

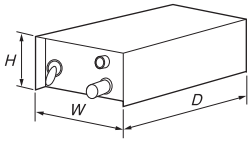
Model	Capacity		Dimensions			Mounting		Mounting Hole	Mass
	Voltage	Current	Width	Height	Depth	Width	Height		
S-2A	Max. 120 VDC	2A	62 (2.44)	130 (5.11)	153 (6.02)	40 (1.57)	140 (5.51)	4—φ5 (φ0.19)	0.4kg/0.8 lb

Model KR RECTIFIER

KR-T203



KR-N103



Model KR-N

[Application]

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

[Features]

- Compact.
- The DC output is of general type having constant voltage.

Model KR-T

[Application]

These models rectify the input from an AC power source to direct current and supply it to electromagnetic chucks via a demagnetizer. The DC output can be varied in voltage 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.

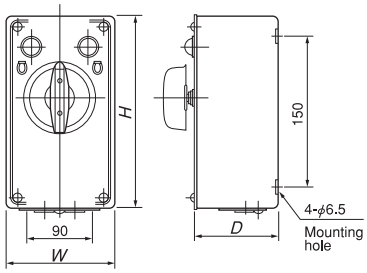
[mm (in)]

Model	Power Source	Output		Dimensions			Mass
		Voltage	Current	Width	Height	Depth	
KR-N101	Single-phase 100 VAC	90 VDC	1A	140 (5.51)	80 (3.15)	110 (4.33)	1.1kg/2.4 lb
KR-N103			3A				
KR-T201	Single-phase 100/200 VAC	0—120 VDC Stepless Volume	1A	280 (11.0)	140 (5.51)	184 (7.24)	5.5kg/ 12 lb
KR-T203			3A				8.5kg/ 18 lb
KR-T205			5A	400 (15.7)	170 (6.69)	290 (11.4)	14.0kg/ 31 lb

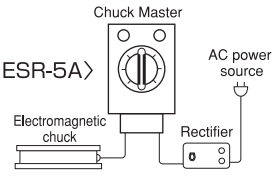
※The output voltage of Model KR-T is stable when above 30 V.

Model ESR HYSTERESIS MANUAL CONTROLLER

ESR-N102



〈Connection of ESR-5A〉



[Application]

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

Model ESR-5A relays the 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 circuits and changing over of resistance values for easy demagnetization.
- Thanks to the manual type, it can be applied to diversified workpieces for individual machining operations by simply turning the dial.

[mm (in)]

Model	Capacity		Dimensions			Mounting		Mounting Hole	Mass
	Input	Output	Width	Height	Depth	Width	Height		
ESR-N102	100 VAC	90 VDC-2A	110 (4.33)	205 (8.07)	85 (3.34)	90 (3.54)	150 (5.90)	4—φ6.5 (φ0.25)	1.8kg/3.9 lb
ESR-5A	Max. 120 VDC	Max. 120 VDC-4A		190 (7.48)	83.6 (3.29)				1.7kg/3.7 lb

For Selection

Choosing an electro chuck master

KANETEC electro chuck masters consist of a rectifier and electronically controlled demagnetization circuit. Residual magnetism can vary dependent upon the workpiece(material, shape, mass, etc.). It is necessary to take this into consideration when setting the demagnetizing time, as the time can range from a few seconds for light residual magnetism to several seconds for stronger residual magnetism. However, the most effective demagnetizing patterns for each set time are programmed in the computer to allow automatic demagnetization by button operation. After studying whether the output required for magnetization may be fixed or must be variable, choose a model suitable for the rating of the electromagnetic chuck.

Choosing a rectifier

①Select a suitable rectifier for installation in combination with a separate demagnetizer. Be sure to observe the following conditions:

Voltage of electromagnetic chuck ≧ 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

②When choosing a chuck master or rectifier specialized for 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

Rectifier output 0 to 120 V

With the above combination, the maximum current of the rectifier will be:

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

③Other considerations should include fluctuation of the voltage in the work area. Choose an output capacity with some allowance.

Connection diagram

Diagram 1 Power source→ Electro chuck master — Chuck

Operation box

Diagram 2 Power source→ Rectifier — Demagnetizer: Chuck master (Changeover switch) — Chuck

Diagram 3 Power source→ Electro chuck master — Chuck

Choosing a demagnetizer

The use of a demagnetizer requires a separate rectifier. Choose a rectifier referring to Choosing 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 According to Electric Capacities《Model selection》

Name	Model	Power Source	DC Output Voltage	DC Output Current	Demag Control	Rectifier	Demagnetizer	Chuck Rating Voltage	Chuck Rating Capacity ※	Connection Diagram
Electro Chuck Master	EH-V105C	Single-phase 100 VAC	0—90 VDC	5A	Automatic	Not required	Not required	90 VDC	4.5A	3
	EH-V205C	Single-phase 200 VAC								
	EH-VE105C	Single-phase 100 VAC								
	EH-VE205C	Single-phase 200 VAC								1
	EH-VE210C			10A					9.0A	
	ES-V220A	Single-phase 200 VAC		20A					18.0A	
	ES-V230A			30A					27.0A	
	ES-M103B	Single-phase 100 VAC	90 VDC	3A					2.7A	3
	ES-M305B	Single-phase 100/200 VAC		5A					4.5A	
Hysteresis manual Controller	ESR-N102	Single-phase 100 VAC		2A	Manual				1.8A	1
	ESR-5A	Max.120 VDC	Max.120 VDC	4A		KR-N,KR-T			3.2A	2
Change-over Switch	S-2A	Max.120 VDC		2A					1.6A	
Rectifier	KR-N101	Single-phase 100 VAC	90 VDC	1A	—	—	S-2A ESR-N102		0.9A	
	KR-T201	Single-phase 100/200 VAC	0—120 VDC						0.8A	
	KR-N103	Single-phase 100 VAC	90 VDC	3A			ESR-5A		2.7A	
	KR-T203	Single-phase 100/200 VAC	0—120 VDC						2.4A	
	KR-T205			5A					4.0A	

※The max. current of the applicable chuck must be the Chuck Master's rated current x 0.9.

Selection by Functions《Model selection》

Name	Model	Function Rectifier	Function Demagnetizer	DC Output Variable	DC Output Invariable	Demag Control Auto	Demag Control Manual	Max. Current
Electro Chuck Master	ES-V	○	○	○	—	○	—	＜DC27.0A
	ES-M	○	○	—	○	○	—	＜DC 4.5A
	EH-V,VE	○	○	○	—	○	—	＜DC 9A
Hysteresis Manual Controller	ESR-N102	○	○	—	○	—	○	＜DC 1.8A
	ESR-5A	—	○	—	—	—	○	＜DC 3.2A
Rectifier	KR-N	○	—	—	○	—	—	＜DC 2.7A
	KR-T	○	—	○	—	—	—	＜DC 4.0A
Change-over Switch	S-2A	—	○	—	—	—	○	＜DC 1.6A

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-V205C.

[Features]

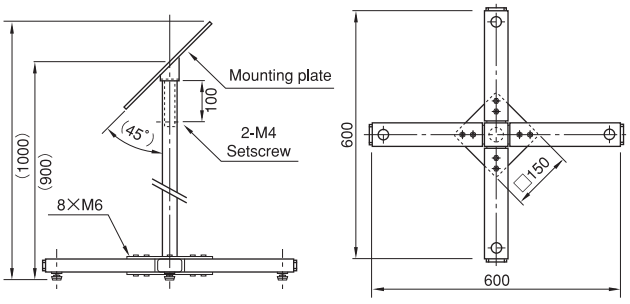
●Self standing and easy installation.

●The mounting plate at the top rotates 360 degrees for adjustment after installation.

●A rectifier can also be mounted.

[mm (in)]

Model	Dimensions	Mass	Applicable Models
EST-1	600×600×(1000) 23.6×23.6×(39.3)	9.5kg/21 lb	EH-V205C/V105C、ES-M305B/M103B EPS-215B、RH-M



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-V205C

ES-M305B

When the residual holding power is strong:

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

When the 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: ES-M Series provides constant output excitation voltage. It does not have a variable voltage output feature.

If the Chuck Master does not work properly, check it referring to the following table:

EH-V205C/105C

Symptom / Cause	Chuck does not hold workpiece.	Chuck Master does not output voltage.	Fuse blows.	Demagnetization is not performed.	Alarm indicator lamp lights up.	Check and 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.	●			●	●	Wiring has been broken (wiring short circuit) if measurement of the resistance of the electromagnetic chuck is infinite.
Insulation of electromagnetic chuck and its wiring is poor (short circuit, ground)	●		●	●	●	Disconnect the cord from the output terminal of the Chuck Master and measure the insulation resistance of the electromagnetic chuck. OK when it is above 5 MΩ. If below 5 MΩ, check wiring. If the insulation of the electromagnetic chuck is poor, please ask for repair.

ES-M305B/103B

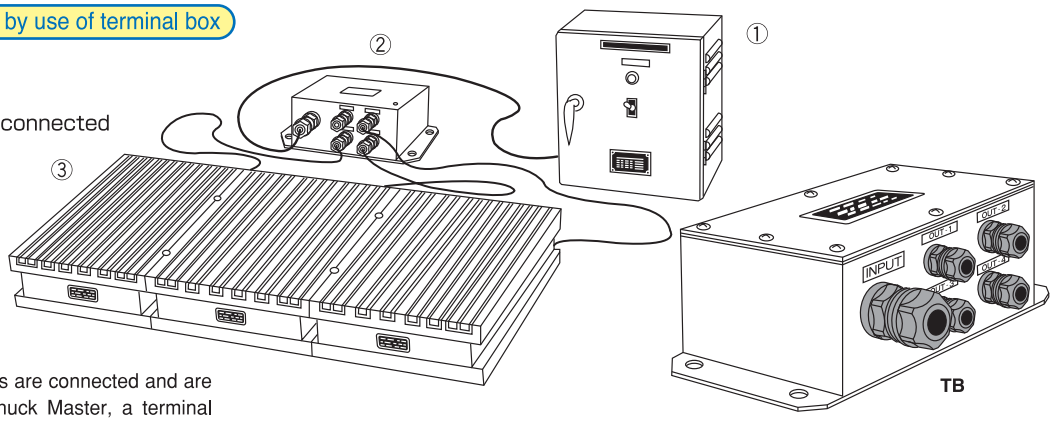
Symptom / Cause	Chuck does not hold workpiece.	Fuse blows.	Demagnetization is not performed.	Check and Action
Power is not being supplied.	●			Check the power source.
Fuse has blown.	●			Remove the fuse from the fuse holder and replace it with a new one.
Power source is exceeding the rated voltage.		●		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 the Chuck Master and measure the insulation resistance of the electromagnetic chuck. OK when it is above 5 MΩ. If below 5 MΩ, check wiring. If the insulation of the electromagnetic chuck is poor, please ask for repair.

※Notes:
- 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 MΩ.
- If the electromagnetic chuck failed, place an appropriate display (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 terminal box

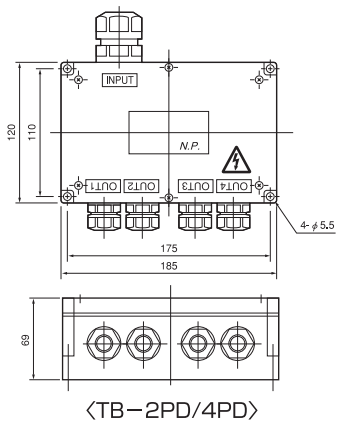
① Electro Chuck Master
② Terminal box
③ Electromagnetic chucks connected



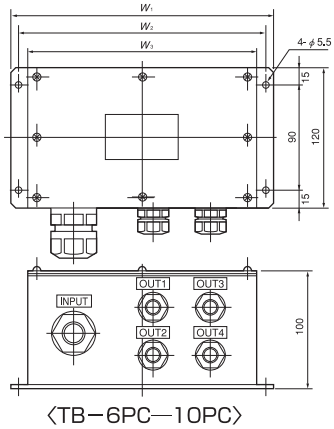
TB

[Application]

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



〈TB−2PD/4PD〉



〈TB−6PC—10PC〉

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

[mm (in)]

Model	Input Capacity	Outlet	Dimensions W_1	W_2	W_3
TB- 2PD	30A	2	(See figure on left)		
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)

〈An example of TB-2PD wiring〉