

MOTOR DRESSER ver. 3.0

Motor break-in and tune-up machine for R/C motor OPERATION MANUAL

Thank you for purchasing our motor tune-up machine "Motor Dresser ver3.0"
Please read this manual carefully before using the unit to operate it safely and correctly.
Keep the manual in a place where all users can access at any time.

PRECAUTION FOR SAFETY

About markings

Markings indicate the very important information to protect you or other personnel against injury or properties against damage. Markings and their meaning are,

DANGER

This symbol is used to show the information that personnel may die or be seriously injured if the instruction is disregarded or not followed accurately.

WARNING

This symbol is used to show the information that personnel may be seriously injured if the instruction is disregarded or not followed accurately.

CAUTION

This symbol is used to show the information that personnel may be slightly injured or property may be damaged if the instruction is disregarded or not followed accurately.



This sign indicate actions that are not permitted (should not be performed)
Detail descriptions are shown in the drawing or near this sign.

— ALWAYS OBSERVE THE FOLLOWING INSTRUCTIONS —



DANGER

Do not short circuit any output terminal of the main unit.
Turn off the power before connection.

Do not use the unit near ignitable things such as gasoline or thinner.

Do not use any power supply out of rating or battery motor, and do not use for other purposes than model.

Do not place any current conducting part such as metals on the unit.

Do not disassemble or remodel the main unit.

Pay attention to any input output and battery for polarity to connect correctly.



WARNING

Do not disassemble, repair and remodel this equipment.
○ Failure, short circuit, damage and ignition may be caused.

Keep this equipment away from children.
○ Injury or burn may be caused.

Do not overload the motor or battery.
○ Heat generation, leakage, and damage of the battery may be caused.

Do not leave the field during operation in case of trouble.
○ Disruption, heat generation and ignition may be caused due to short circuit.



CAUTION



We are not liable for any damage caused by incorrect use or remodeling.



Do not leave the field because the unit draws large current.



Take extreme care for using the unit, and immediately turn off the power when you feel any abnormal condition.



Do not forcibly stop or touch the fan or motor, and do not peep through the fan during operation.



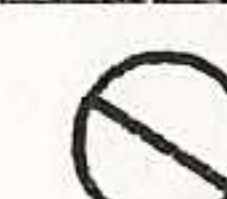
Use the power Driver FA20 specified by us for regulated power supply.



Do not apply voltage exceeding the rating or do not short circuit the output.



Do not operate the switches with wet hands or do not wet them.



Do not drop or shock the unit.



Do not use or store the unit in a place where temperature exceeds 40 C or near any heater.



Keep away from children when not use.



Do not use the unit for any application not specified.



Turn off the power and remove the battery or power supply when not in use.

FEATURES

☆A maximum 24A Ammeter is employed to allow the measurement of large current which previously could not be measured, greatly extending the measurement range of motor consumption currents under no load or load.

☆A Voltmeter is provided to allow voltage checking and the adjustment of correct voltage applied to the motor during break-in operation.

☆The tachometer is a two range switching-type analogue meter, and easy to read the number of revolution for both low and high speeds. The tachometer with a maximum of 50,000 rpm allows the break-in for revolution measurement or the number of revolutions control.

☆The twin bench system is employed to allow the dummy motor to be linked with any motor to be broken in, so motor break-in can be performed without flowing current directly into the motor.

☆Motor checking for a single unit can be easily made without linking with a belt. The best setting is allowed based on the numeric value while monitoring the current, voltage and the number of revolution.

☆Small cooling fans are equipped on the motor twin bench for effective cooling. And, bench unit is made of aluminum material to increase cooling effect.

☆Stall test using a dummy motor allows the power checking of motors. At the same time, the power checking of the nickel-cadmium battery used for power supply can be also made.

☆Current, voltage, the number of revolutions, and stall current can be checked and monitored at the same time to analyze the data of the motor characteristics in detail for setting.

PARTS OF THE UNIT

- ①HEAT SINK ②POWER METER ③OUTPUT VOLTMETER ④TACHOMETER ⑤INPUT AMMETER
⑥POWER METER INPUT TERMINALS ⑦STALL SWITCH ⑧POWER CONTROLLER ⑨TACHOMETER SELECTOR SWITCH
⑩TIMER ADJUSTMENT VOLUME CONTROL ⑪ BREAK-IN TIMER SW ⑫25A BREAKER ⑬POWER SWITCH



HOW TO USE THE UNIT

SETTING UP ACCESSORIES

STANDARD SETTINGS

※At first, attach supplied parts including lead wires, magnet pulley belt, and motor to the dresser unit and the motor belt.

1. Fix the supplied magnet pulley to the motor to be adjusted, and the dummy motor, push them to each shaft base, and fix the magnet pulley on the motor shaft by turning the hexagon bolt on the pulley using the supplied hexagon wrench key.
2. Set a motor to be broken in to be adjusted on the test bench A (sensor coil side), pass the supplied belt on the pulley, and securely fix the motor with motor fixing screws by applying equal force to right and left screws. ※At this time, slign the position of the motor so that the magnet section of the magnet pulley comes to the center of the sensor shaft. Set the dummy motor on the test bench B after mounting the magnet pulley in the same way as the motor to be broken in. Align the two motors in the way that the belt becomes parallel with the side panel when you hooked the belt on the motor pulley. ※The dummy motor is of slender type, so apply cloth tape on the rear side of the plate fixing the motor to prevent the dummy motor from rotating together due to slippage! (When checking a motor under no load, test it by itself without linking to the dummy motor using the belt.)
3. Insert the banana plug of Lead A into the banana jack at the rear side of the Control Panel. Pay attention to insert the red plug into the red jack. Insert the other end of Lead A into the banana jack located at the left side of the motor bench. (This jack is the Power input terminal of the cooling fan.)
4. In the same way, insert the pin plug of lead D into the pin jack. Pay attention to insert the red plug into the red jack. Insert the other end of lead D into the pin jack located at the side of the motor bench. (This jack is the sensor output terminal for tachometer.)
5. Insert the exposed end of lead C into the left terminal at the rear side of the Control Panel. When inserting the lead, push down the lever to show the opening. (At this time, take care not to insert the outer cover of the lead.) Connect the bagworm clip on the other side of the lead to the motor terminal. Be sure to connect red clip to + terminal and black clip to - terminal. (Extreme care should be taken not to short circuit or to connect correctly)

Terminals located at the "Right" of the rear side is "Power Input"

6. Insert the exposed end of lead E into the Right terminal at the rear side of the Control panel. When inserting the cable, push down the lever to show the opening. (This cable consists of a lot of conductors, so if you are hard to insert it into the terminal, cut the lead obliquely.) Take care not to insert the outer cover. Then, connect the plug at the other end of lead E to 7.2V Nickel Cadmium battery (or to an optional regulated power driver FA20 set to the lowest voltage) to use as Power Supply.

☆Applying overvoltage to motors may destroy the cooling fan.

Terminals located at the "Left" of the rear side is "Power Output"

- ※ Input Nickel Cadmium battery should be 6.0V to 8.4V Do not use batteries higher than these voltage!
- ※ Regulated Power Supply must be Power Driver FA20 (optional)
- ※ Set the output voltage to the lowest voltage when using the FA20.

Motor Break-in

③The Motor Dresser version 3.0 employs the belt-driven motor break-in system. Previous break-in systems apply DC voltages to the motor brush, so the break-in in high speed rotation may drastically damage the brush. However, this motor dresser uses a dummy motor to perform the break-in without directly applying voltages to the main motor.

1. After performing the standard setting check that each lead wire, motor and other parts are correctly set. Then, set the power controller to the minimum position (anticlockwise).
2. Set the break-in timer to your desired time (about 30 to 60 minutes), and turn on the power by pushing the Power Switch. A function is provided to turn off the power when the timer expires. Always set this function to use a regulated power supply. Timer operation starts when the Timer switch was pushed, but it restarts at the time when the Power Switch or Timer Switch was once turned off and turned on again.
3. Select the scale selector switch of the tachometer from either 20,000 rpm or 50,000 rpm. Set the switch to 50,000 for motors for high speed rotation.
4. The two cooling fans at the motor bench starts to run when you push the Power Switch. Located at the right on the Control Panel. Then, as you slowly turn the power controller clockwise, the dummy motor starts slowly to turn too. (Do not increase the motor speed abruptly.)
5. As the dummy motor rotates, another motor linked with the belt starts to rotate starting the break-in. At this time, adjust tension of the belt linking two motors. There is not any remarkable problem at low speed, but as the speed is increased, the belt may move twisting or immediately slip out.

Adjustment of motor belt tension

- ①If the belt does not move smoothly, or it is rubbed against the plate of the motor bench or bit easily slips off, once turn off the power and loosen the motor mounting screws at the back side of the motor bench, and slightly move two screws outward to increase the belt tension.
- ②Retighten the screws after adjusting correct tension. Repeat this operation to achieve the best tension. Increasing tension higher than necessary may make the belt easy to break or increase the load applied to the motor. Extremely strong tension may increase loss, and decrease efficiency.

※The motor belt is a consumable, so it is recommended to replace it at a regular basis. It may break with the use in several hours depending on strong or weak tension, and load applied to the belt.

Indication of each display meter

DC CURRENT

- It indicates the input current. As the load applied to the motor is increased, the current value shown on the meter becomes larger. The meter indicates about 1A at one scale, and about 24A at the maximum.

TACHOMETER

- It indicates the actual number of revolutions of a motor. The meter indicates the number of revolutions of the motor per minute by converting signal sent from the motor sensor mounted on the motor bench A into electric current.

- The number of revolutions is shown in RPM. The actual number of revolutions can be obtained by multiplying the number on the meter scale by 1,000 (For example: when the meter indication is 18, the number of revolutions is $18 \times 1,000 = 18,000$ rpm, i.e. 18,000 revolutions per minute).

DC VOLTAGE

- It indicates the actual output voltages obtained by adjusting the input supply voltage using P. CONTROLLER. It can be used for the adjustment of the voltages applied to the motor or for monitoring the motor characteristics in each voltage range.

Standard Motor Break-in

- ③Motor break-in varies depending on motor manufacturers or brush conditions. However, the motor break-in is intended to fully exhibit motor's original performance by smoothly breaking in the rotating contacts such as a brush, commutator and bearings (metal bearings).
- ③Some manufacturers produce motors which "require little break-in", but the motors actually broken in are clearly different from these not. ※ As a result, the motor break-in is required even though the time to perform the break-in differs in respective cases.

Motor Break-in

- ①In new motors or motors with brushes replaced, the contact areas with brush and commutators are small and the contacts at right and left are not equal. For that reason, the smooth rotation and the calculated brush contact areas can not be obtained to supply the original current value to the commutator. This condition is generally called "Contactless" condition. Perform the break in so that the contacts at right and left become equal.
- ②Visually check the brush condition of a new motor, and record the relationship between applied voltage and consumption current of the new motor in three points; low, middle and high speed. After completing the break in, record the same data, and store them as data for adjustment.

※ Point to note ! ①

The direction of the rotation of motors is almost set so that the output will be larger in the positive direction. Therefore, at the time break-in completed, the contact surface of the brush is set in the certain direction. Take care that if you exchange the brush between right and left, or change the insertion direction up and down, break-in effect will be decreased.

※ Point to note ! ②

Applying metal oil to the motor bearing is very effective. A small amount of lubrication is recommended. However, take care that oil will not attach to the brush and commutator. In addition, after break-in, it is good to remove any carbon attached to the brush using an optional carbon cleaner.

③The following table shows criterions for standard break-in, but it can not apply to all motors. Set the time slightly longer for hard brushes and shorter for soft brushes.

Low speed revolution	About 3000 to 5000 RPM	About 30 to 40 minutes
Middle speed revolution	About 8000 to 10,000 RPM	About 20 to 30 minutes

※ You need not perform break-in continuously. Above times show total times.

③ After completing motor break-in

Set the motor which completed break-in on the motor bench A, and measure the current the number of revolutions, and voltage without linking to the dummy motor. For spark advance adjustment, set the best timing position while watching the meter, taking consideration into the balance between current and the number of revolutions related to 0 position.

Stall Power Checking

1. This function is used to check the motor torque band by giving a certain load to a motor to be checked assuming the dummy motor as an electronic load Time to check should be at least less than 5 seconds because the load itself is large. Frequent checking may damage the brush and commutator, so the number of times must be minimal as possible.
2. Before checking, correctly set the condition, setup, and applied voltage of Nickel Cadmium battery, and record the data of the stall power checking.

Setup of Stall power check

- ① Set a motor to be checked on the motor bench A.
 - ② Set the dummy motor on the motor bench B.
 - ③ Link two motors with a belt.
 - ④ Connect the exposed end of Lead C to the terminal at the left of the Control Panel, and connect the bagworm clip to the motor terminal. (Connect red lead to + terminal).
 - ⑤ Connect the banana terminal of Lead B to STALL CURRENT terminal (second from right when viewed from the front) on the rear side of the Control Panel, and connect the bagworm clip to the dummy motor terminal.
 - ⑥ Connect the connector of Lead E to the power supply. (7.2V Nickel Cadmium battery or power Driver FA20).
- ※power Driver FA20 is recommended to use the unit under the same condition as possible.

☆ Other setups are the same as the standard setup.

How to check

1. Turn on the power, and set the Tachometer selector switch to 50000 RPM.
※ Set to 20000 RPM for motors with maximum number of revolutions less than 20000 RPM such as Stock motors.
2. Gradually increase the number of revolutions of the motor by slowly turning the Power Controller clockwise until the number of revolutions of a motor to be checked reaches the maximum value.
3. Record the number of revolutions, voltage and input current when the motor reached the maximum number of revolutions.
4. Then, push the Stall switch Quickly record the number of revolutions, voltage and input current when the power was down.

☆ Caution! Point ①

Stall check should be made as soon as possible because it applies large stress to the motor. Check time should be less than 5 seconds at maximum.

☆ Caution! Point ②

Nickel Cadmium batteries have different performances depending on the condition. Even the nickel cadmium battery fully charged, it's power drops as times pass. Therefore, set the charge condition in the same level as possible to obtain data. However, you can select a Nickel Cadmium battery with high output performance; low internal resistance and high voltage.

Result of Stall check

EXAMPLES

For motor A			
Input current	Number of revolutions	Voltmeter	Stall A
Before stall	Maximum number of revolutions-Current-Voltage		
1 6 A	3 0 0 0 0 RPM	6. 0 V	_____
Stall ON	Number of revolutions-Current-Voltage-Stall A		
2 4 A	4 0 0 0 RPM	2. 0 V	1 0 A

In motor A, the maximum number of revolutions is high, but the drop of the number of revolutions under load is large. Low stall current shows that this motor is a type of the motor with small torque emphasizing on rotation.

For motor B			
Input current	Number of revolutions	Voltmeter	Stall A
Before stall	Maximum number of revolutions-Current-Voltage		
8 A	2 0 0 0 0 RPM	6. 5 V	_____
Stall ON	Number of revolutions-Current-Voltage-Stall A		
2 2 A	8 0 0 0 RPM	4. 0 V	1 6 A

In motor B, the maximum number of revolutions is low, but the drop of the number of revolution is small. High stall current shows that this motor is a type of the motor with a small extension of rotation emphasizing on torque.

Consider the stall check as a criteria or reference. In the actual operation, various factors affect the result. However, the data obtained from this stall check always be important factors in the setting of motors. Consider any idea to use this equipment in various methods.

Motor Tune up

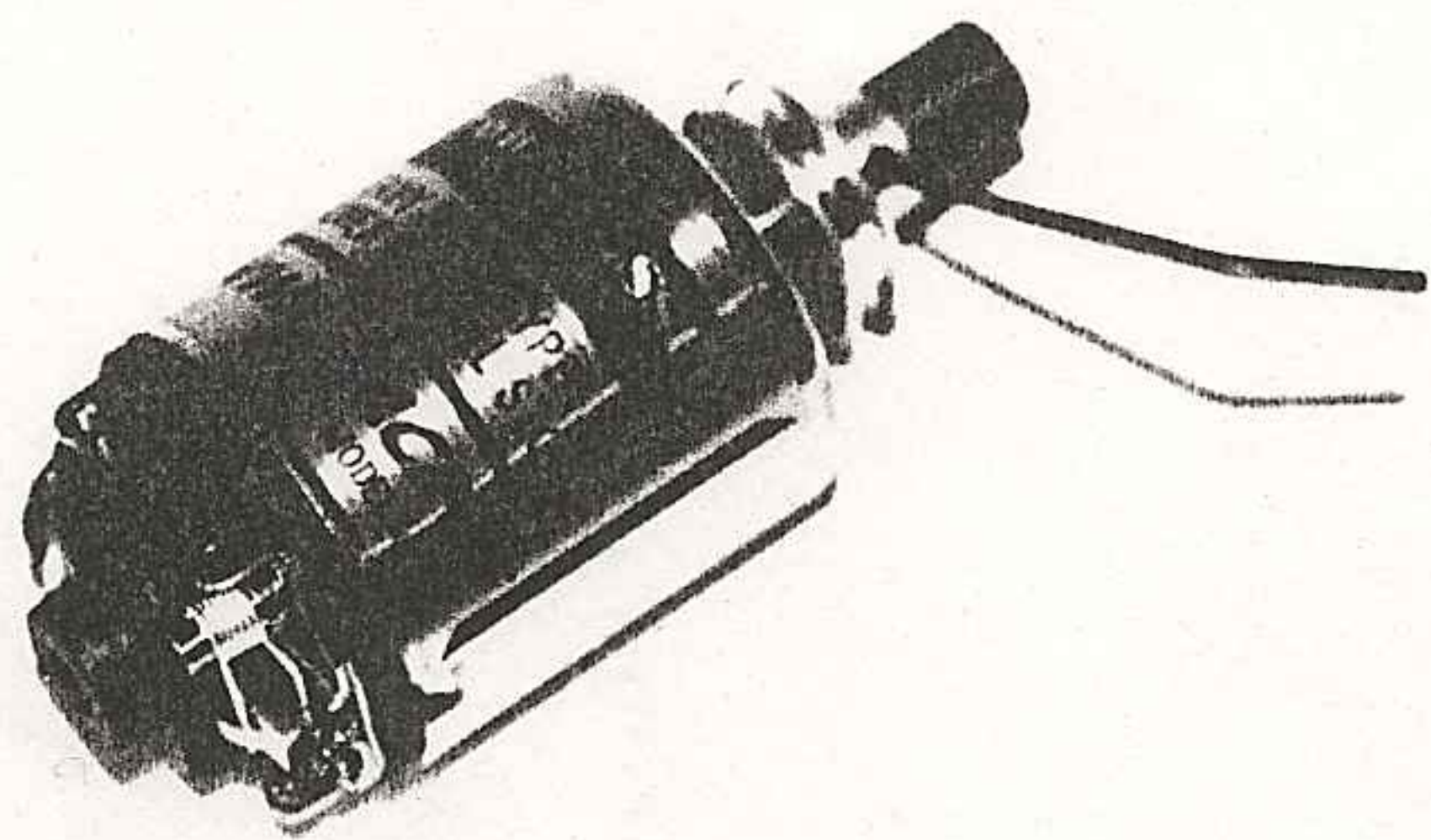
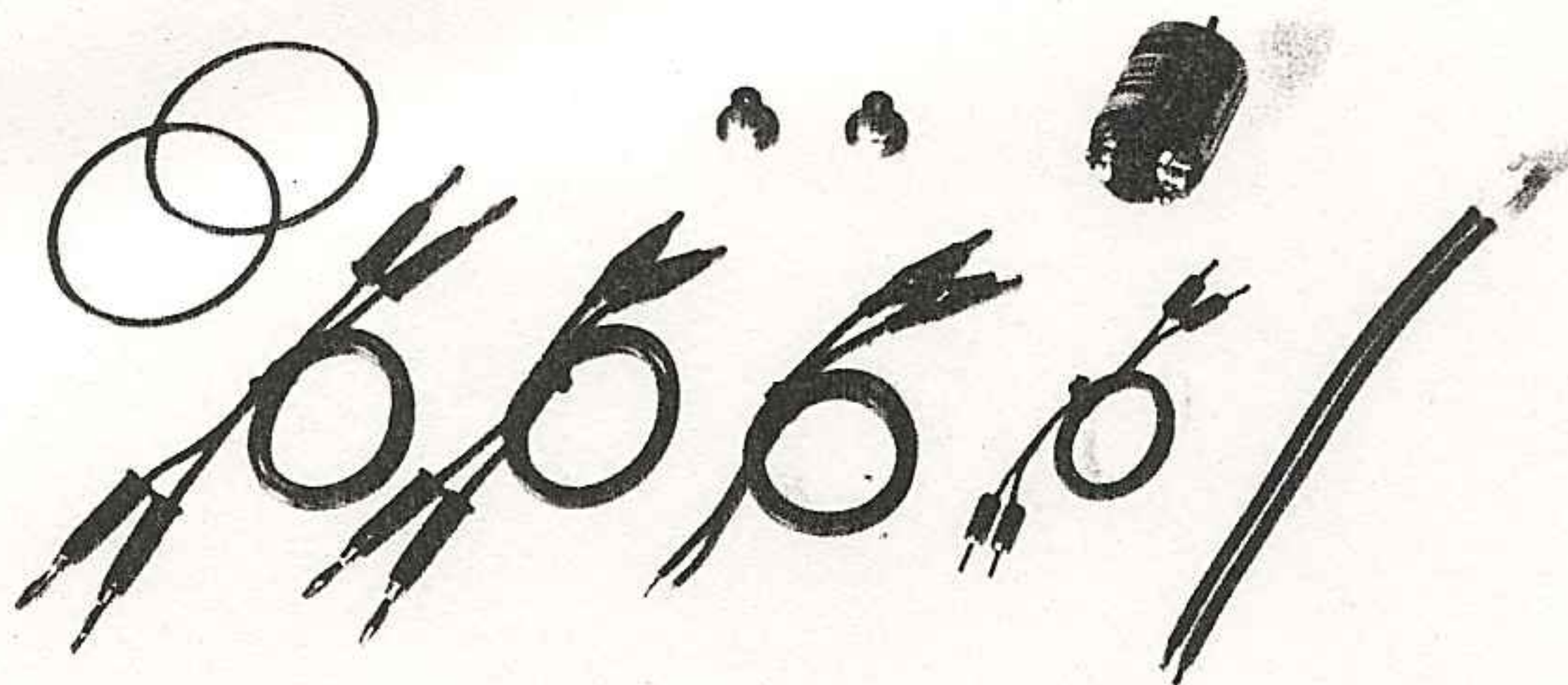
MINI ADVICE

◎A motor with larger spark advance produces larger power, but the extremely larger advance causes short circuit between plus and minus terminals of the brush. Therefore special care must be taken that the spark advance does not increase higher than these specified by motor manufacturers.

◎The larger spark advance increase the power, but the current consumption of Nickel Cadmium battery becomes also large resulting in short running time. Therefore, it is effective in sprint races with the small number of circles, but in higher number of circles, the battery may become unstable, or run out.

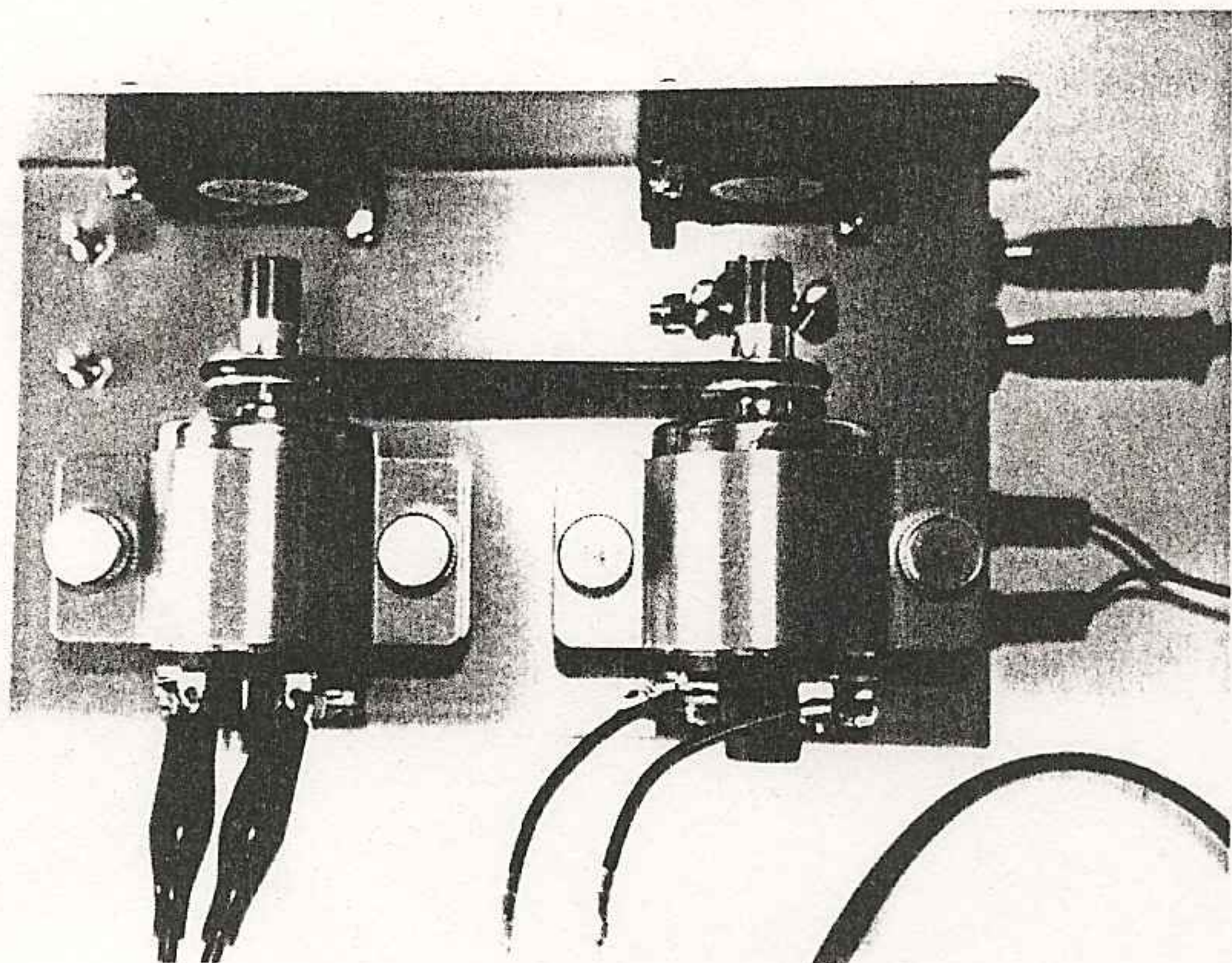
◎In the motor setting it is not good to increase the power only by extending the spark advance. Setting should be made by correctly selecting and adjusting the motor taking consideration into types of cars gear ratio, circuit course condition, course layout and race requirement.

◎Select a motor with the setting target of either rotation or torque, and adjust the spark advance, select the brush, and set the gear ratio taking consideration into the above items for the motor torque band.



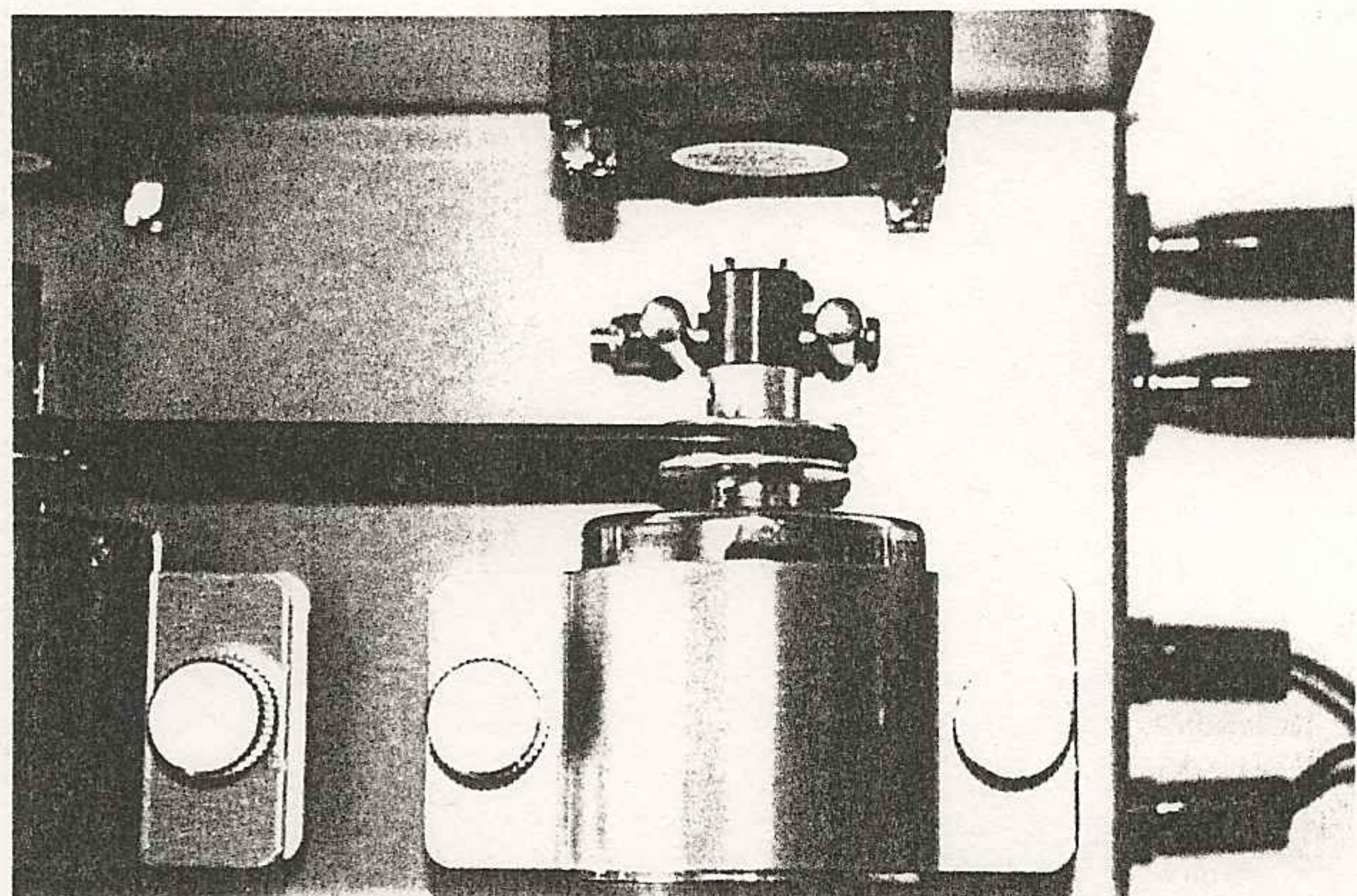
① Accessories

- ① 2 belts ② 2 magnet pulleys ③ Dummy motor
④ Connecting wires with terminals 4 sets ⑤ Nickel Cadmium connector



② Mounting Magnet Pulley

Firmly push the pulley to the shaft base, and fix the magnet pulley on the motor shaft by turning the hexagon bolt on the pulley using the supplied hexagon wrench key.

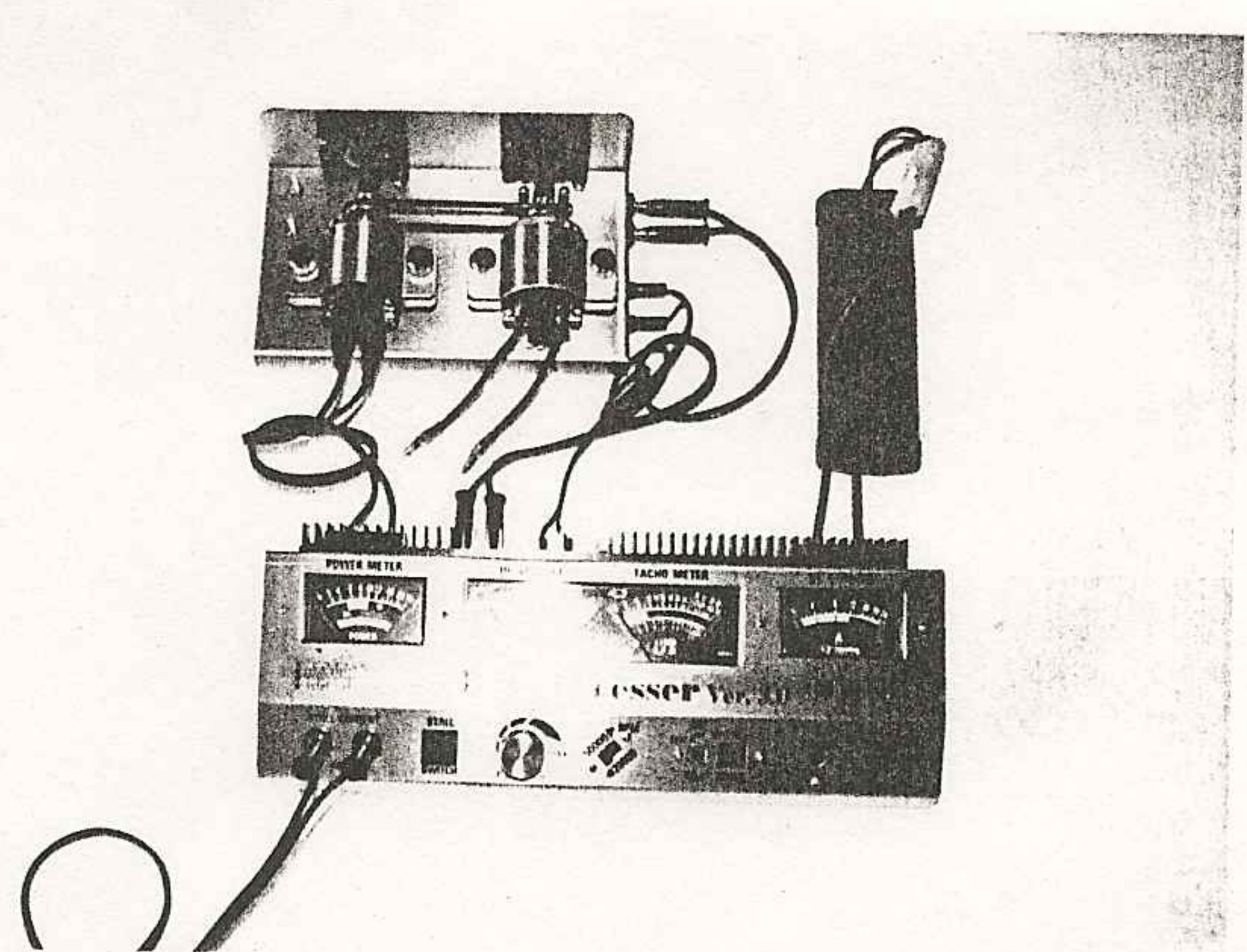
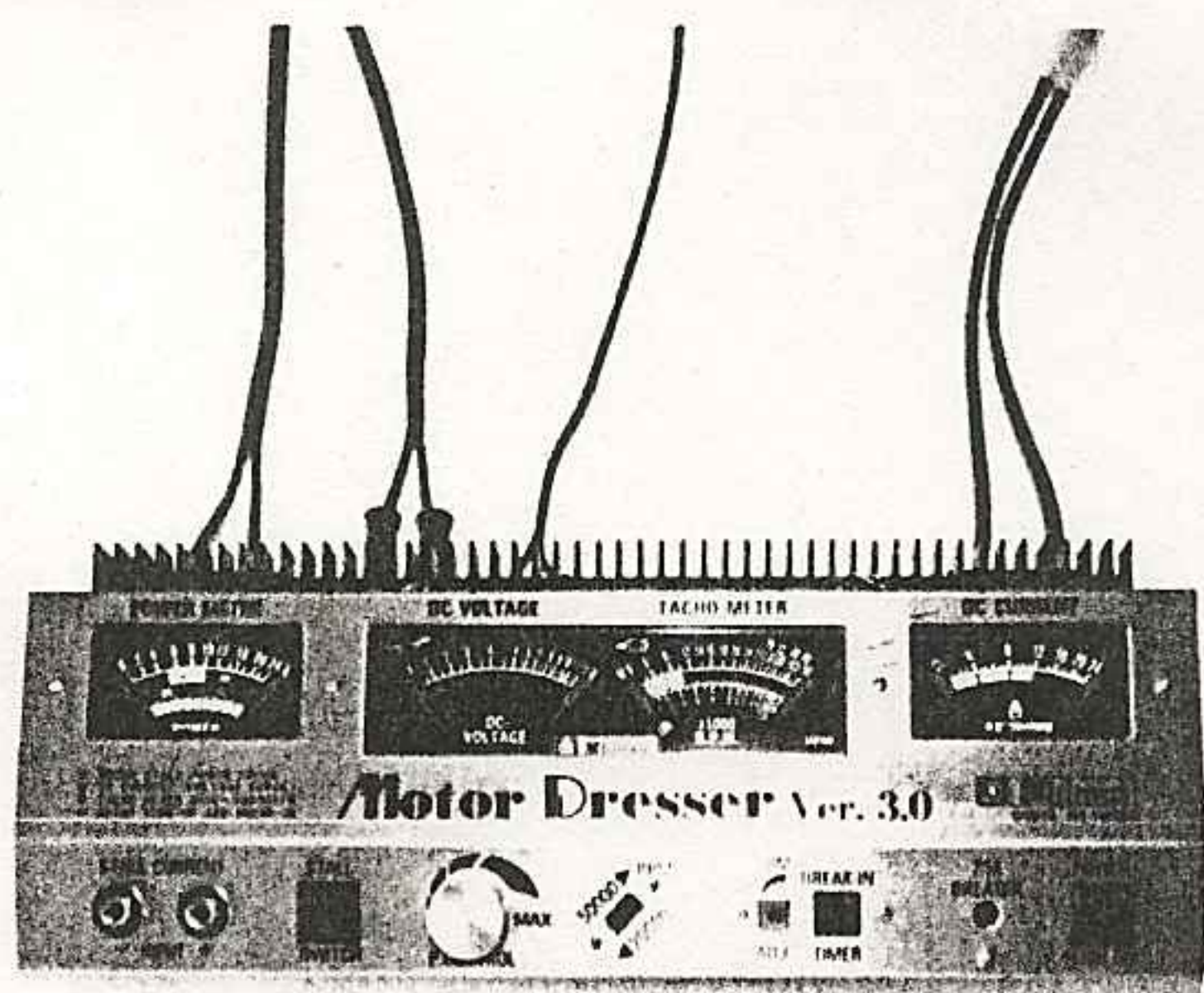


③ Setting to Motor bench 1

Right side with sensor coil is to be specified as Bench A and Left side be Bench B. When you check slender motors, apply tape on the back side of the plate to fix the motor.

④ Setting to Motor bench 2

Set the motor so that the magnet pulley comes to the center of the sensor section. Align the two motors so that the belt will be linear when viewed from the top.

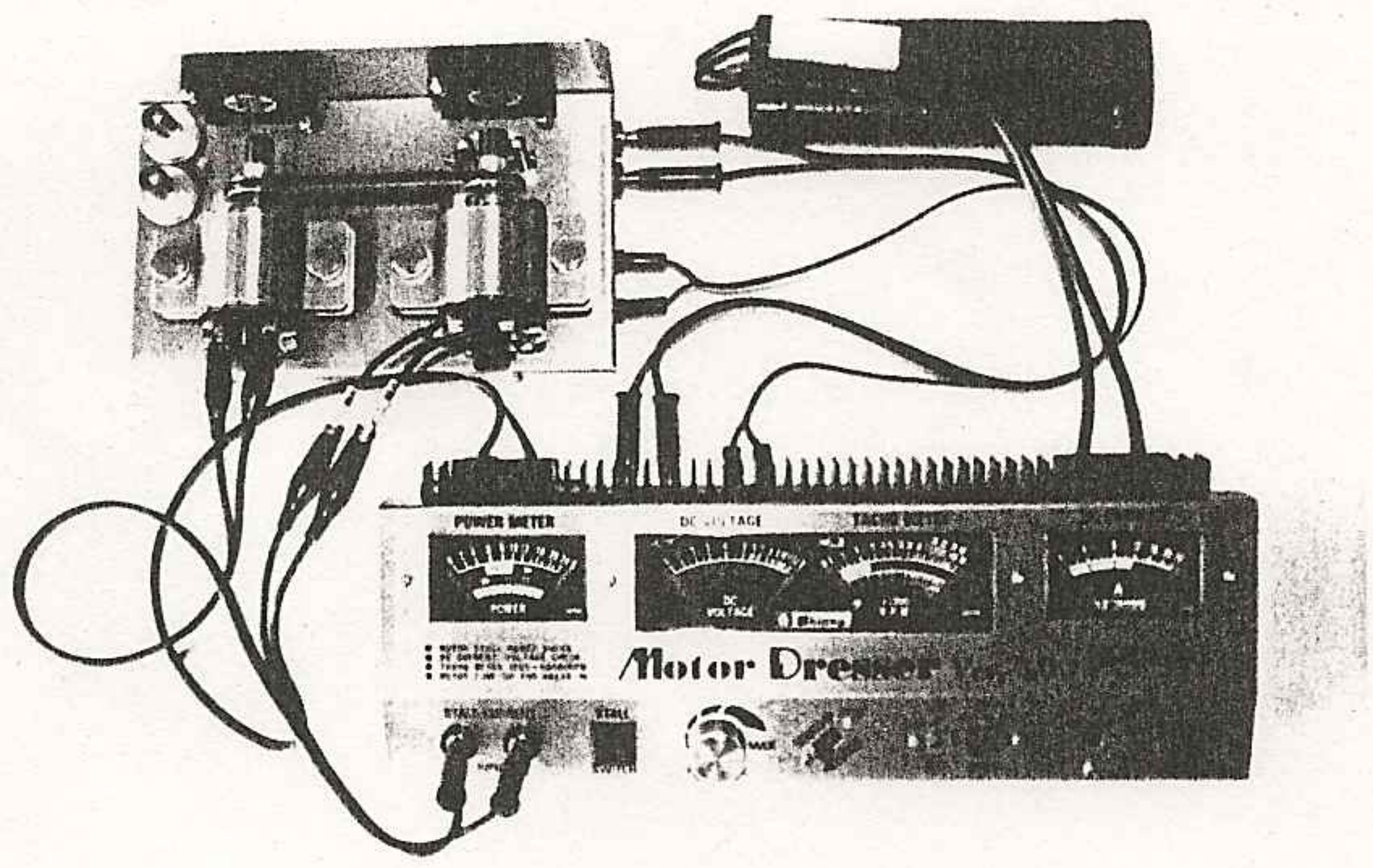
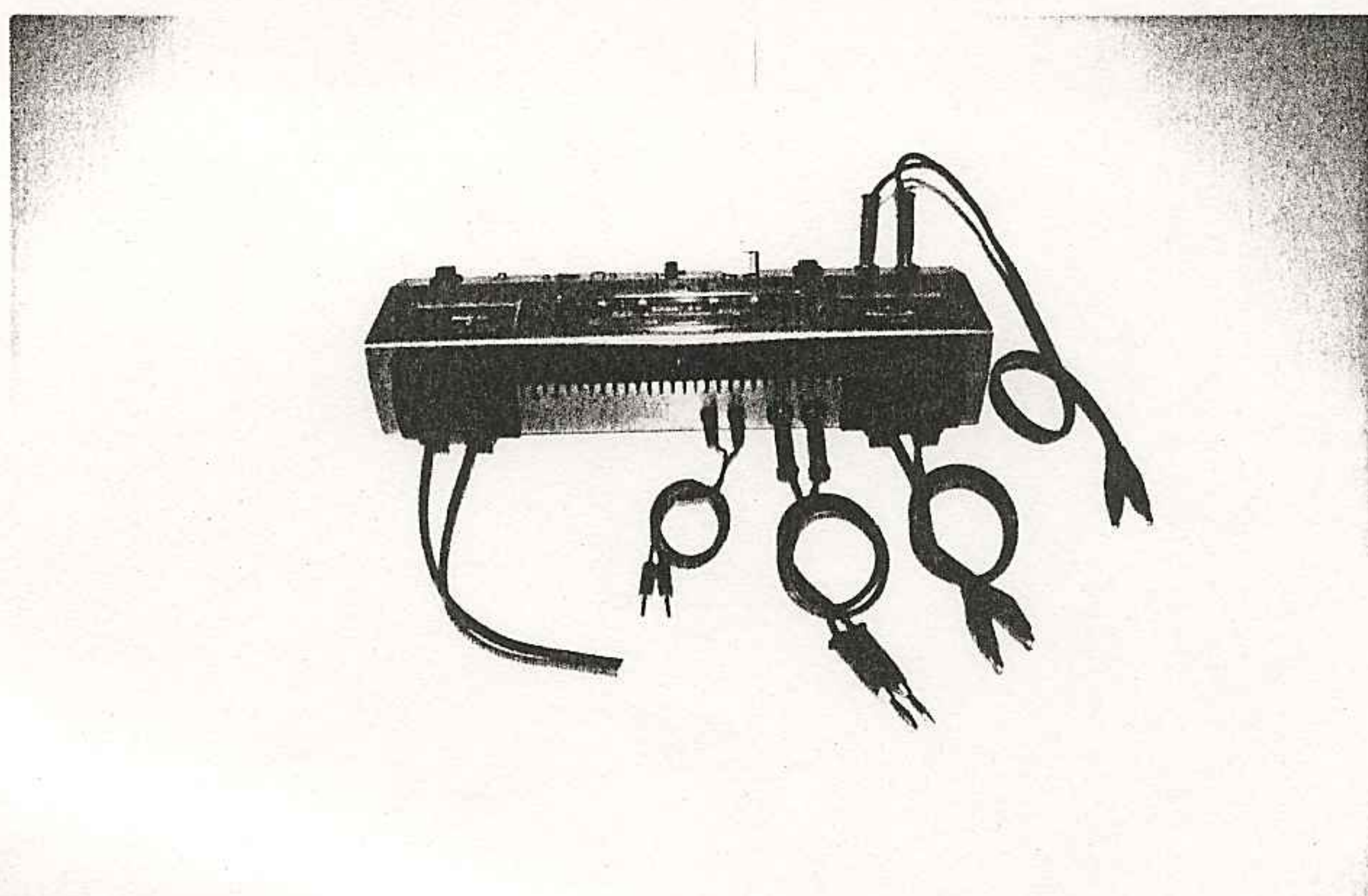


⑤ Control Panel Front

On the Control Panel, there are meters; Ammeter, Tachometer, Voltmeter and Power meter, buttons; Power, Breaker timer, and Stall buttons, controls; Breaker, Timer, P Control, and Stall input terminals.

⑥ Connection between Control Panel and Motor bench 1

When you do not check Stall, you need not connect the lead to Stall input terminal. To directly check motors, set the motor on the bench A without linking using a belt.



⑦ Control Panel Rear

There are four types of input/output terminals to connect 4 types of leads. Take care not to connect the input lead to the output terminal, and not to insert the outside cover of the lead.

⑧ Connection between Control Panel and Motor bench 2

For Stall checking, connect Power output to the bench A, set the dummy motor on the bench B, and connect the lead from Stall input terminal to the motor terminal.

☆ Troubleshooting

- ☆ Immediately stop the use if you feel any trouble during operation, and contact sales offices or manufacturer.
- ☆ Repair of any failure caused by customer's mishandling is charged. We repair or replace the faulty unit caused by manufacturer's wrong workmanship or faulty material. (Send us the unit with Guarantee Card).
- ☆ If a model you just bought happen to be faulty, please send it to the Service Department shown below. We immediately ship a replacement to you. However, we replace only these for which we are liable after checking the product sent. (Be sure send Guarantee Card with the product. You are charged if you do not send it.)
- ☆ Return the faulty product to our Service Department describing defective condition in detail as possible. If you are urgent, directly send it to us. It can reduce the time required to repair.
- ☆ You can pay the repair charge when you received the product.
 - ※ Specifications, outside design, and price of products are subject to change without notice.
 - ※ Contact to Shinwa Technical Service Department shown below for any question on repair or usage.

Guarantee Requirement

1. If your product fails to operate properly due to defect in material or workmanship during Guarantee period, return it to us, and we will repair free of charge.
2. Guarantee period shall be 6 months from purchase.
3. Following cases are excluded even within Guarantee Period
 - ◎ Failure or damage caused by misuse or use not specified.
 - ◎ Failure or damage caused by transport, drop, disassemble and remodeling after purchase.
 - ◎ Failure or damage caused by earthquake, flood, thunderbolt, and other act of God.
 - ◎ Date, Customer name and store name are not described on the Guarantee Card.
 - ◎ Failure or damage caused by inappropriate repair conducted by customers.
4. This Guarantee is effective only in Japan.

GUARANTEE

Product Name: Motor Dresser Vre 3.0

Motor break-in and tuning machine

This Guarantee Card guarantees to repair products which failed under normal usage during Guarantee Period free of charge. ※ Guarantee Period: Six(6) months after purchase

Purchased date		Guarantee Period: Six(6) months	
Customer Name		Store Name	
Address		Store Name and Address	
Name			
		※ Ineffective without Store Name	

Shinwa Technical Research Co, Ltd