

TECHNICAL MANUAL

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL
INCLUDING REPAIR PARTS LIST
FOR
BALANCER, VEHICLE WHEEL
MODELS 7500 AND 5400
(WHEEL BALANCER MANUFACTURERS ASSOCIATED
(NSN 4910-00-279-0629)**

HEADQUARTERS, DEPARTMENT OF THE ARMY

MARCH 1981



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and General Support Maintenance Manual
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For**

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know, Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in the back of this manual direct to: Commander, US Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, IL 61299. A reply will be furnished directly to you.

NOTE

This manual is published for the purpose of identifying an authorized commercial manual for the use of the personnel to whom this balancer is issued.

Manufactured by: Wheel Balancer Manufacturers Associated
3140 Big Bend Blvd.
St. Louis, MO 63143

Procured under Contract No. DAAA09-78-C-5107

This technical manual is an authentication of the manufacturers' commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

INSTRUCTIONS FOR REQUISITIONING PARTS

NOT IDENTIFIED BY NSN

When requisitioning parts not identified by National Stock Number, it is mandatory that the following information be furnished the supply officer.

- 1 - Manufacturer's Federal Supply Code Number - 26206
- 2 - Manufacturer's Part Number exactly as listed herein.
- 3 - Nomenclature exactly as listed herein, including dimensions, if necessary.
- 4 - Manufacturer's Model Number - Model 7500 and 5400
- 5 - Manufacturer's Serial Number (End Item)
- 6 - Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.
- 7 - If DD Form 1348 is used, fill in all blocks except h, 5, 6, and Remarks field in accordance with AR 725-50.

Complete Form as Follows:

- (a) In blocks 4, 5, 6, list manufacturer's Federal Supply Code Number - 26206 followed by a colon and manufacturer's Part Number for the repair part.
- (b) Complete Remarks field as follows:
Noun: (nomenclature of repair part)
For: NSN: 4910-00-279-0629
Manufacturer: Wheel Balancer Manufacturers Associated

Model: 7500 and 5400
Serial: (of end item)

Any other pertinent information such as Frame Number, Type, Dimensions, etc.

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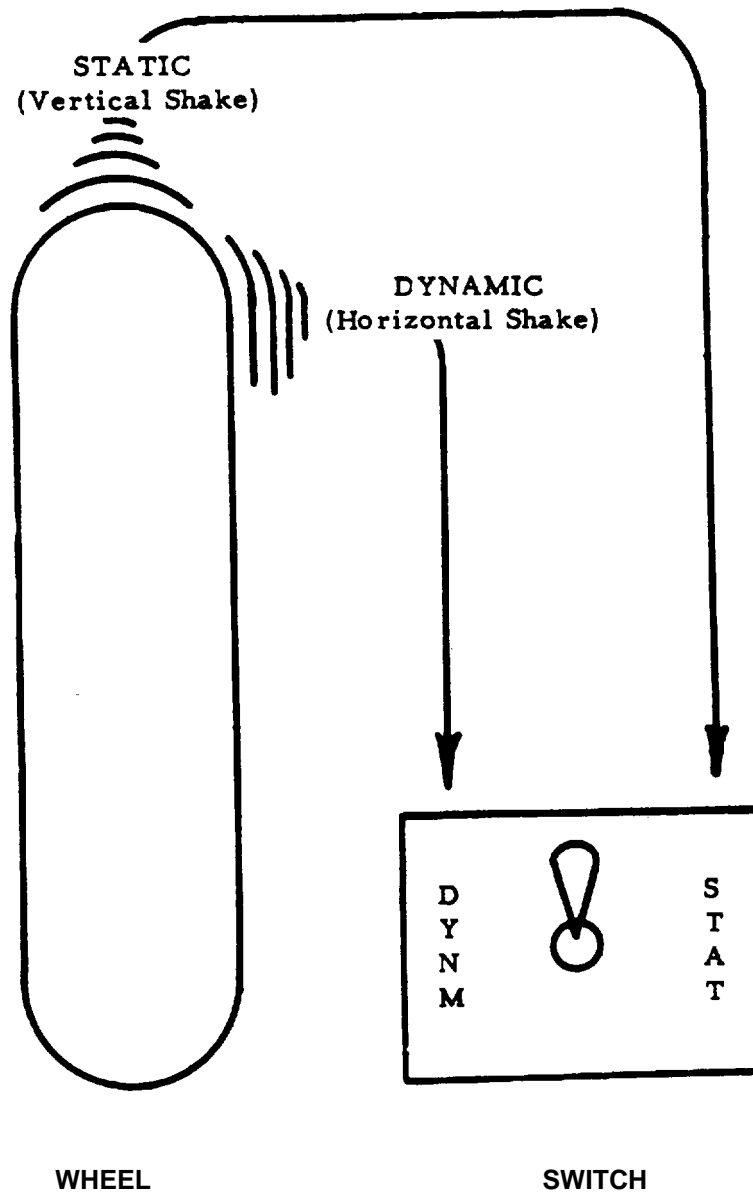
**SECTION I
BALANCER OPERATION**

Where To Put The Weight
How Much Weight
Which Side Of The Wheel

DYNAMIC AND STATIC UNBALANCE

DYNAMIC UNBALANCE. Dynamic is the side-to-side motion a wheel makes while spinning.

STATIC UNBALANCE. Static bounce is the up-and-down motion a wheel makes while spinning. The faster the wheel is spun the harder it will bounce.



SECTION IA

OPERATING INSTRUCTIONS FOR

WHEEL BALANCER

THE ELECTRONIC BALANCER PRINCIPLE IS SIMPLE AND EASY TO UNDERSTAND IF THE PURPOSE OF EACH OF THE UNITS IS KEPT CLEARLY IN MIND

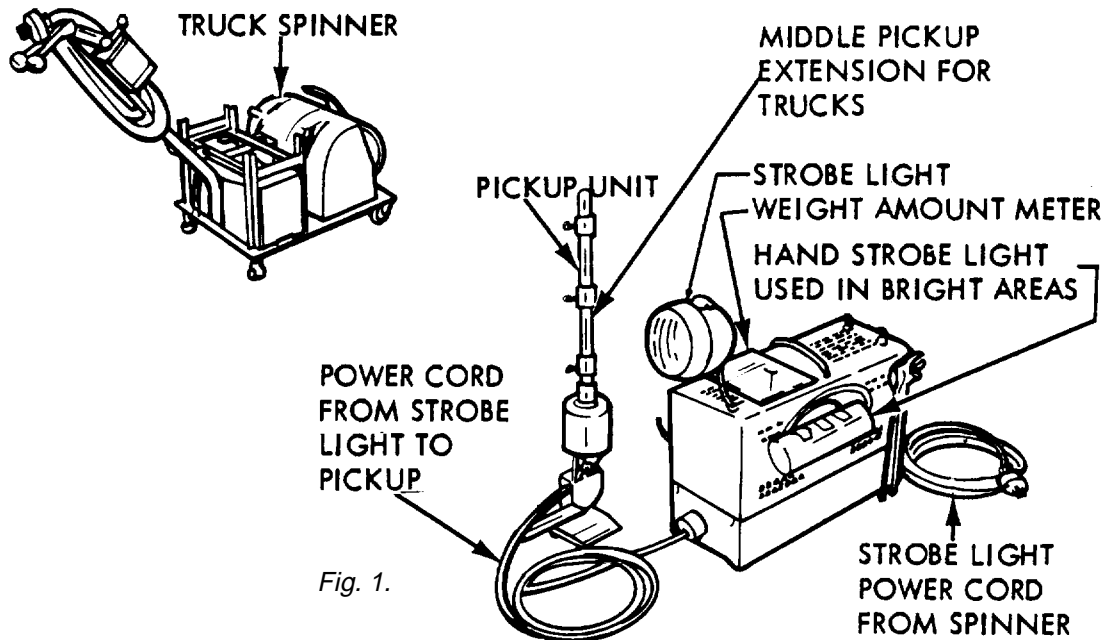


Fig. 1.

1. The spinner is a power source for turning wheels, up to speed for balancing (wheels which are not connected or are disconnected from drive train).
2. The pickup unit is a vibration-sensing device. It converts mechanical vibration into electrical impulses and sends them on to the strobe light and weight meter unit.
3. The strobe light is used for observing the spinning wheel in an apparently stationary (stand still) position.

This strobe light will allow you to see the apparently stationary position of the wheel when the heavy spot is at 1:30 o'clock (left side of vehicle), and at 10:30 o'clock (right side of vehicle).

When the wheel is stopped and turned, by hand, to the apparent stationary position (as seen when using the strobe light) the wheel weight is applied at 7:30 o'clock (on left side of vehicle), or at 4:30 o'clock (on right side of vehicle). The wheel weight location, as seen when using the strobe light, is 45 degrees forward (toward front of vehicle) from bottom dead center. The amount of weight which should be used is shown on the weight amount meter while the wheel is rotating at speed.

ALWAYS TO THE FRONT OF AXLE.

SECTION II

FRONT WHEEL BALANCING PROCEDURE

BE SURE TO READ COMPLETE INSTRUCTIONS
BEFORE USING BALANCER

1. Place jack under center of main frame cross member (beneath cowl area) and raise both front wheels approximately two inches.
2. Spin wheel manually and check for brake drag. Free-up any brake drag by tapping brake backing plate with a hammer; or loosen the brake adjustment.
3. Remove all weights from inside and outside of the wheel rim before starting balancing procedure.
4. Check manually for loose, worn or dry wheel bearings. Wheels depend on bearings for centering. Improperly centered wheels, or wheels and hubs with bad bearings, cannot be balanced correctly. Under these conditions the strobe light will show a splattered pattern in dynamic position. (See Sec V, para 1.) Correct bearing adjustment or replace bad bearings before proceeding to balance the wheel.
5. Check radial and lateral run out. To determine radial run out, place spinner brake plate 3/16" from tread of tire. Rotate tire by hand and watch spacing between brake plate and tire tread. If there is 3/16" or more run out, check for bent wheel, tire bead improperly seated, flat spot on the tire, or out-of-round tire. Lateral (side-to-side) motion must not exceed 3/16". This condition must be corrected before balancing (by such as straightening the wheel, replacing tire or wheel, or using spare wheel and tire), or unsatisfactory results may occur. PROPER TIRE PRESSURE IS VERY IMPORTANT. LOW TIRE PRESSURE WILL CAUSE INCORRECT READINGS.
6. Install pickup unit, Fig. 2, under lower control arm or solid axle, as close to brake backing plate as possible. Make sure it is straight up and down and handle is pointed to the front. Pickup shaft, with internal spring slightly

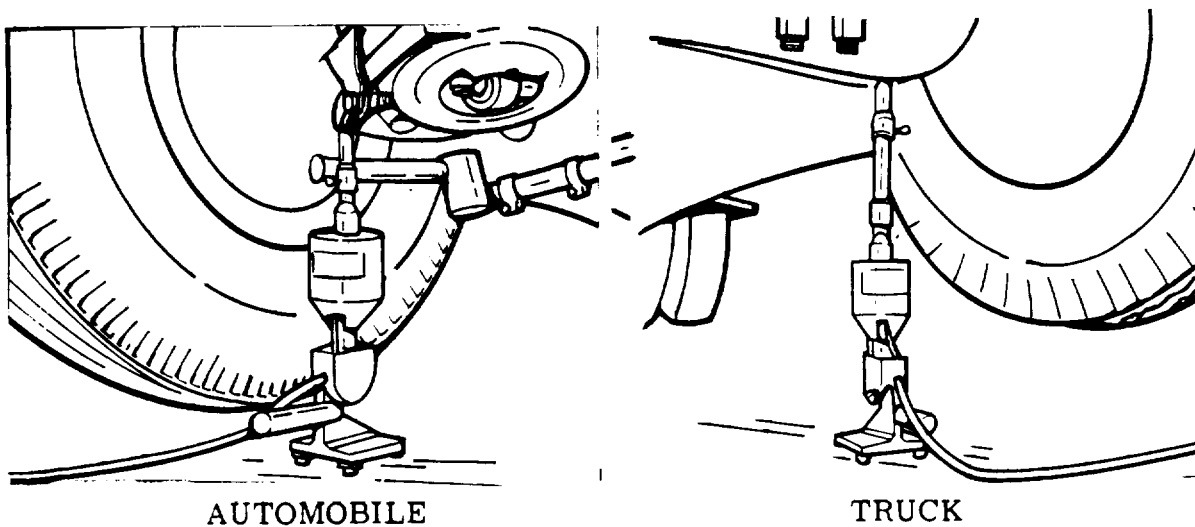


Fig. 2.
PICKUP MUST BE STRAIGHT UP AND DOWN

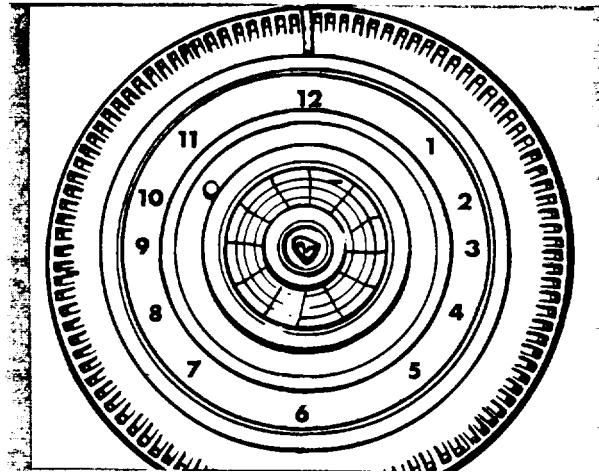


Fig. 3.

REFERENCE MARK COMPARED TO CLOCK

compressed, must work freely without bottoming in its case. One-eighth to one-half inch compression of the shaft is adequate. DO NOT COMPRESS MORE THAN ONE-HALF INCH. Connect the unit electrically to the strobe light unit receptacle. With switch on strobe light unit in STATIC position, a tap on the -front bumper should cause the strobe light to flash. If strobe light does not flash, recheck pickup setting. If pickup is not positioned properly, wrong readings will result.

7. Apply a white mark anywhere on the wheel or tire, or use the valve stem as a mark for reference when the wheel is spinning and the strobe light shows the wheel in an apparently stationary position.
8. Meter switch. Set switch in No. 1 position at start of all balancing of small and medium size cars. Set in No. 2 position for large cars and trucks, or for more sensitive reading. (See Sec V, para 2.) Spin wheel up to speed (See Sec V, para 3) with switch in static position. Watch meter as it reaches its maximum reading. Rotate wheel to maximum speed with spinner. Immediately before taking readings, remove spinner from contact with tire. Instantly after removal of spinner from tire, note amount of ounces indicated on meter scale. Quickly glance at the reference mark, note position of the mark and read mark as you would the hour hand of a clock. (See Fig. 3) Quickly flip the switch from static to dynamic position and observe reference mark on wheel under strobe light operation, while letting the wheel coast down. Take dynamic reading where first seen (See Sec V, para 4). If the strobe light does not flash, no dynamic balancing is needed and weights can be applied to the inside or outside of rim if the weight to be applied is 2 ounces or less. If the weight is over 2 ounces it should be divided equally to both sides of the rim at balance point (see Fig. 4 for balance point). If the strobe light flashes, dynamic balance is needed. Note position of reference mark, and take dynamic reading at highest speed seen.
9. If at any time there is vibration in the car and the strobe light is not flashing, press down on the bumper steadily but lightly until strobe light flashes, note reference mark and apply weight to balance point (7:30 o'clock left side of car, 4:30 o'clock right side of car).

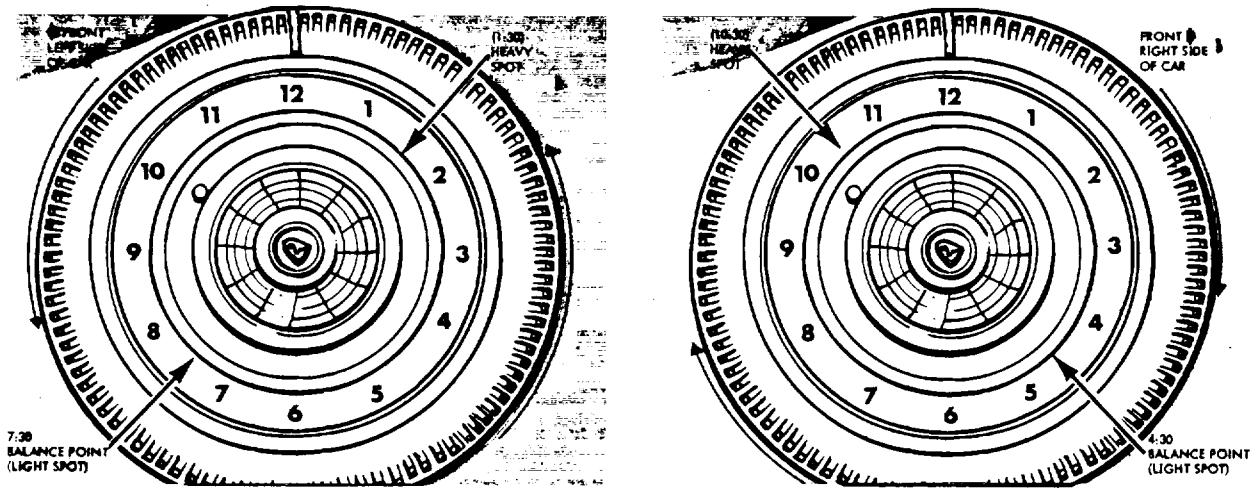


Fig. 4.

WEIGHT IS ALWAYS APPLIED TOWARD THE FRONT OF VEHICLE

10. If the strobe lighted reference mark is seen in the same position in both the static and dynamic conditions, the indicated amount of weight is to be put on the inside of the wheel at 7:30 o'clock (left side of the car) or 4:30 o'clock (right side of the car). If the strobe lighted reference mark is seen at 180 degrees from the static position, the indicated amount of weight is to be put on the outside of the wheel at 7:30 o'clock (left side of the car) or 4:30 o'clock (right side of the car).
11. STOP THE WHEEL AND INSTALL THE PROPER AMOUNT OF WEIGHT AS FOLLOWS:
 - a. Turn the wheel manually until the reference mark is exactly where seen when wheel was in apparent stationary position under strobe light operation, with switch in static position. (The dynamic position is only to tell you whether the weight goes on the inside or outside of the rim.)
 - b. With the wheel held in static position, apply the amount of weight indicated by the meter to the balance point (7:30 o'clock on the left side and 4:30 o'clock on the right side). Inside or outside of the wheel rim as indicated by dynamic flash, if any.
12. With switch in static position, spin the wheel up and recheck balance. If strobe light does not flash, the wheel is balanced. If strobe light flashes:
 - a. Note the position of the weight and reference mark. Recheck dynamic.
 - b. Stop the wheel. Rotate the wheel by hand to position the weight in the apparent stationary location seen under strobe light operation, with switch in static position. Move or add weights as indicated in Fig. 5. Repeat until strobe light does not flash.

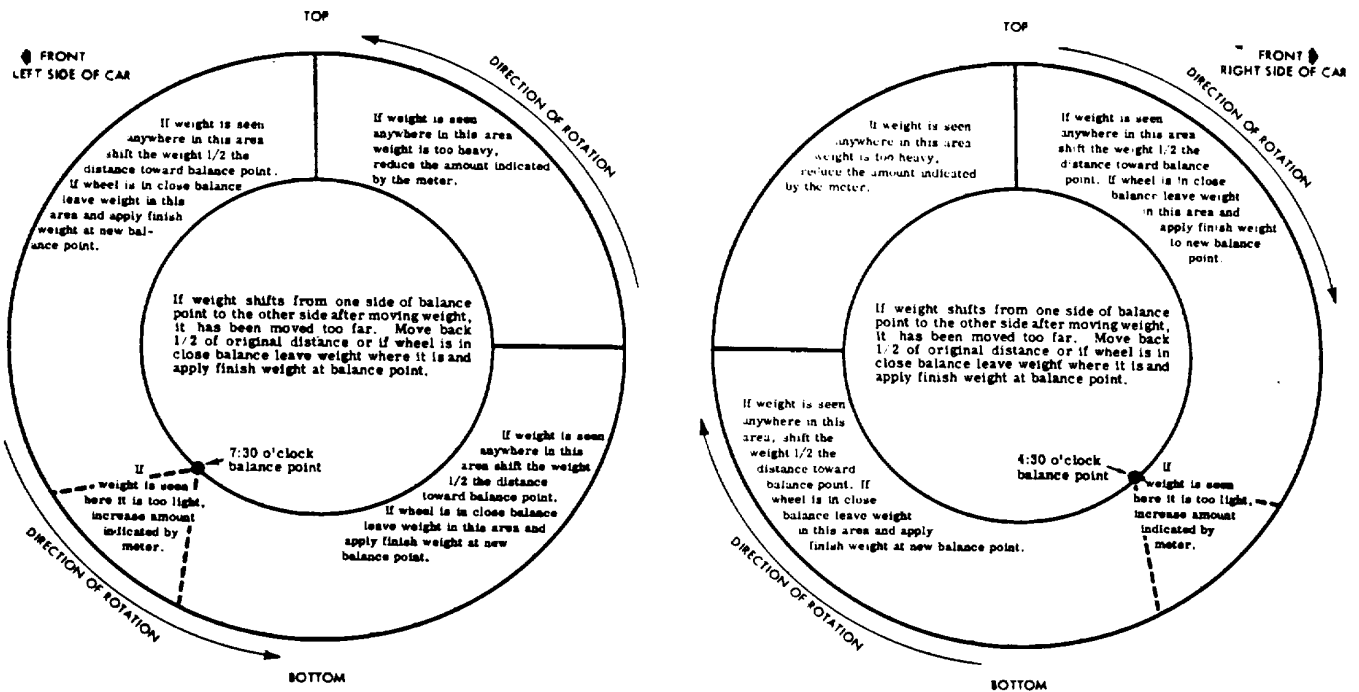


Fig. 5.

TESTS TO DETERMINE THE ACCURACY OF ELECTRONIC BALANCING. SEE FIGURE 5.

With wheel spinning at high speed, stand a nickel on edge on front fender. It will remain standing if wheel is in perfect balance. The water surface will remain smooth in the beaker, if the wheel is in perfect balance. (See Fig. 6)

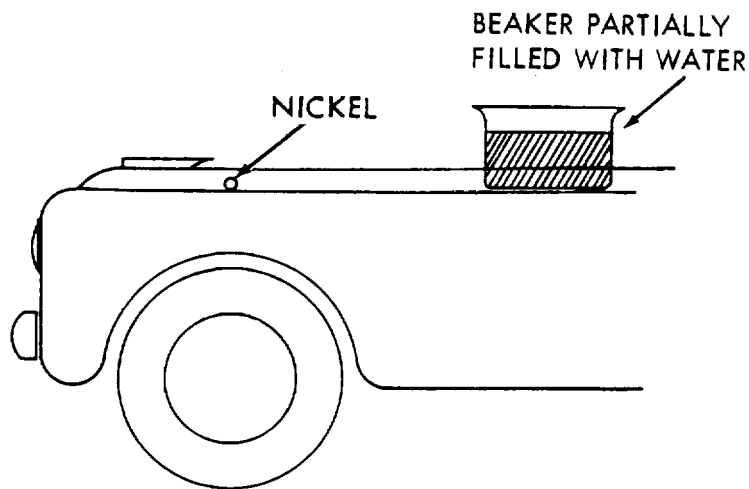


Fig. 6.

SECTION III
REAR WHEEL BALANCING PROCEDURE
CONVENTIONAL DIFFERENTIAL

Rear wheel balancing procedure is the same as for STATIC balancing front wheels. (No dynamic balancing on rear wheels. (See Sec II.)

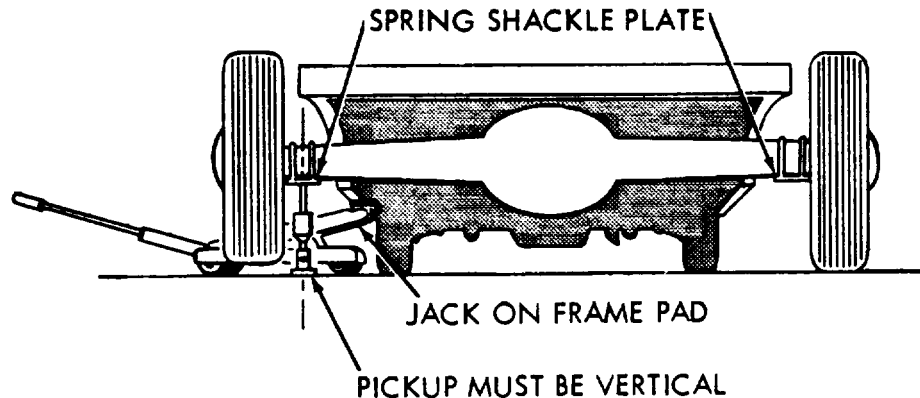


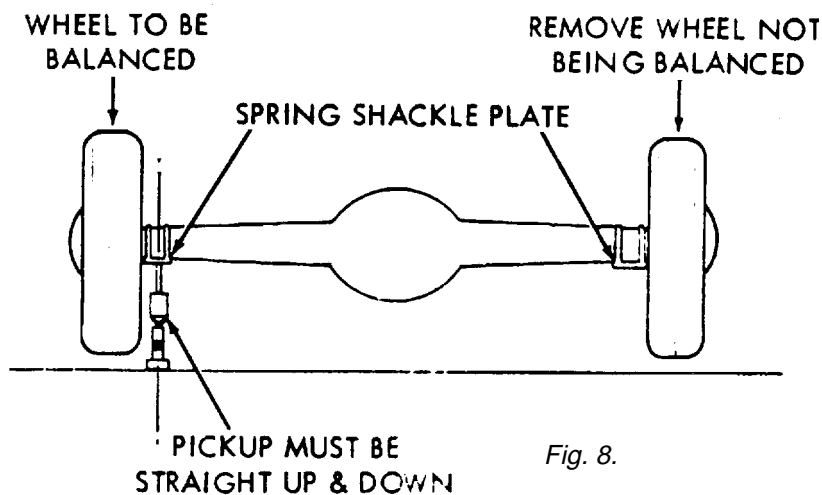
Fig. 7.

1. Place jack in proper position (See Fig. 7) and raise wheel to be balanced approximately two inches. Other rear wheel should remain on floor. When using frame contact hoist, block wheel not being balanced from rotating.
2. Install pickup unit. Position straight up and down under spring shackle plate or shock absorber mounting bar or on axle housing, as near brake backing plate as possible.
3. Make reference mark on wheel or use valve stem as reference mark.
4. **DO NOT USE SPINNER TO ROTATE ENGINE-DRIVEN WHEELS.** Start engine and place transmission in high gear with brakes off. Accelerate slowly to 35 MPH on speedometer. Wheel will be turning 70 MPH (double speed). Maintain this speed with pedal depressor, while checking the static balance, with switch in static position.
 - a. If strobe light flashes, balancing is required. (Disregard any flashing of strobe light except at balancing speed, approx 70 MPH) (35 MPH on speedometer). (See Sec V, para 7.)
 - b. Observe weight amount meter until wheel reaches speed. (Use No. 1 position on coil springs and No. 2 position on leaf springs. If meter appears to be reading high in No. 2 position, switch back to No. 1 position. See Sec II, para 8).
5. Stop the wheel. Turn the wheel manually until reference mark is exactly where seen when wheel was in apparent stationary position under strobe light operation.

- a. Apply weight at balance point as shown in Fig. 4, Section II.
- b. Spin the wheel to speed and recheck for balance. If the strobe light flashes at balance speed of 35 MPH on speedometer, check for weight shift or incorrect amount of weight as shown in Fig. 5. See Sec II, para 8 for weight applications
- c. Wheel is balanced when strobe light does not flash at the recommended balance speed. Strobe light may flash when picking up speed or slowing down. (Disregard.)

SECTION IV

**REAR WHEEL BALANCING PROCEDURE FOR
DUAL TRACTION OR LIMITED SLIP DIFFERENTIAL**



Raise vehicle and place frame or frame pads on Jacks or Jack stands, allowing rear housing to hang free from spring attachments.

1. Raise both rear wheels - approximately two (2) inches. Remove wheel opposite the wheel being balanced.
2. Install pickup unit straight up and down under spring shackle plate or shock absorber bar or on rear axle housing, as near brake backing plate as possible, of wheel to be balanced.
3. Start engine. With transmission in high gear, brakes off, accelerate slowly to 70 MPH. Maintain this speed while checking the wheel balance.
4. Proceed to balance this wheel as before (See Sec III, para 4 and 5).
5. To balance the opposite wheel, replace wheel previously removed.
6. Proceed as before (See Sec IV, para 2, 3 and 4).
7. Wheel is perfectly balanced when strobe light does not flash at recommended wheel speed.
8. Balanced wheel does not have to be removed when balancing second wheel.

SECTION V

TROUBLESHOOTING AND EXPLANATIONS

1. **SPLATTERED PATTERN.** In the dynamic position you will see more than one reference mark - sometimes two, three or more reference marks are seen at one time and they may or may not appear to rotate. Two reference marks seen at one time indicates that the wheel bearing is loose. Three or four marks seen at one time indicates a rough or bad bearing. (CORRECT THIS BEFORE TRYING TO BALANCE THE WHEEL.)
2. **READING METER ON FRONT WHEELS.** No. 1 position will read accurately on average size cars (Ford, Chevrolet, Plymouth, Rambler, Volkswagen, 15" wheel, Dodge, etc.). Small cars with small wheels and small tires take one-half of reading of meter in No. 1 position.

NO. 2 POSITION is used for more sensitivity on large type cars (Cadillac, Buick, Oldsmobile, etc.).

LARGE TRUCKS. Use No. 2 position and read scale. Multiply scale reading x 8. (Example: Reading 2 ounces x 8 - 16 ounces.) The meter measures the magnitude of vibration or up-and-down movement that the lower control arm, axle or rear housing makes.

Looseness, weak springs or shock absorbers will also let the wheel vibrate more than normal causing the meter to read high. (ALWAYS USE THE METER AS A GUIDE.)

3. If a wheel is badly out of balance (4, 5, 6 ounces or more) at high speed the wheel will tend to vibrate or oscillate violently. Keep the speed of the wheel down until it is partially balanced, then increase the speed of the wheel.
4. If dynamic reference mark does or does not stay exactly in the same position as static reference mark, but stays within the same half of the wheel, it will be read as staying in the same position as static and place the weight inside of wheel. If dynamic reference mark is seen opposite of static reference mark, place weight to outside of wheel at balance point.
5. **REAR WHEEL DYNAMIC.** There is no dynamic balancing required on rear wheels even if the strobe light does flash with switch in dynamic position, because the wheels are rigidly mounted to the differential and they will not whip as much as on the front independent suspension.
6. Any movement of persons inside the car while wheel balancing is being done will cause the strobe light to flash and false readings to occur. It is preferable to remove all people and animals from the vehicle.
7. When balancing rear wheels, a drive-line hop (vibration) is sometimes encountered. This may be determined by apparent rotation of the reference mark under strobe light operation. Also, drive-line hop will occur at a frequency consistent with drive-line (RPM) rotation; whereas wheel unbalance will show up at a frequency consistent with wheel (RPM) rotation.

8. High speed, initial spin-up should be avoided if the amount of vibration is excessive. If this occurs spin the wheel approximately half speed. Install the indicated weight, then proceed with normal balancing procedure.
9. A dry or cracked wheel bearing can usually be detected by the noise it makes during the initial spin-up. A dry bearing howls, a cracked bearing growls and a loose or tight bearing whines.
10. Heavy loading of spinner-to-tire contact should be avoided. Tip the handle of the spinner up slightly using a steady even pressure for good spin-up results. Hold the handle down during braking operation to stop wheel.
11. Tire and spinner wheel contact should be made before starting spinner motor to avoid tire burning . The spinner has adequate torque to spin the wheel up to speed under normal conditions.
12. The shifting of tire inner liner , water or other foreign objects inside a tire will cause irratic weight meter readings. These must be corrected before balance can be accomplished.
13. 35 MPH speedometer speed with only one rear wheel raised will produce 70 MPH speed on wheel being spun due to multiplication of 2 to 1 in the differential.
14. 70 MPH speedometer speed with both rear wheels raised will produce 70 MPH speed on both rear wheels.
15. In wet weather spin each wheel to be balanced to approximately 20 MPH prior to balancing. This will throw off excess water and mud.
16. Proper tire inflation pressure is very important. Low tire pressure will cause improper readings.

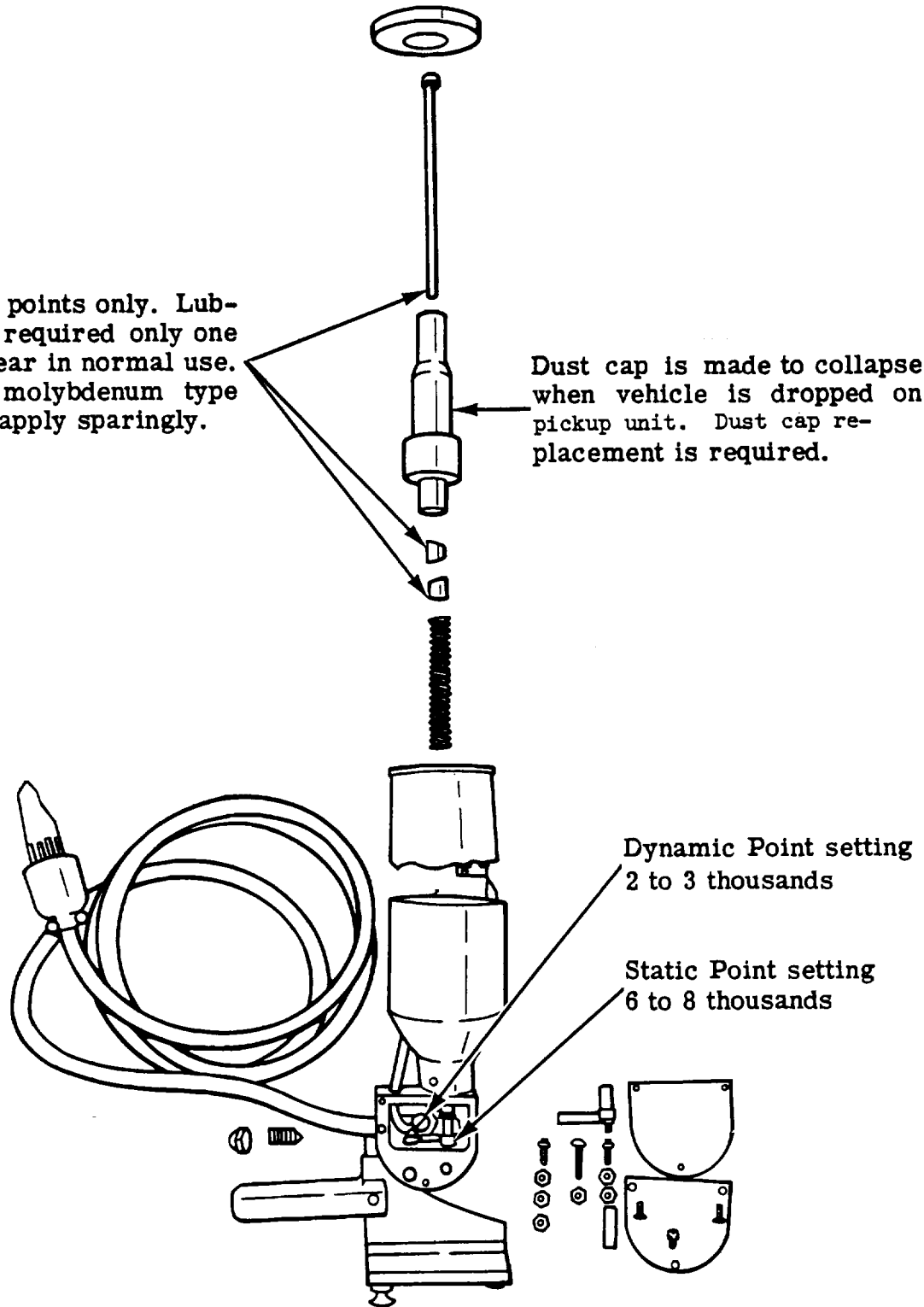
SECTION VI

MAINTENANCE & LUBRICATION INSTRUCTIONS

FOR PICK-UP UNIT

Lubrication points only. Lubrication is required only one time per year in normal use. Use light molybdenum type grease and apply sparingly.

Dust cap is made to collapse when vehicle is dropped on pickup unit. Dust cap replacement is required.

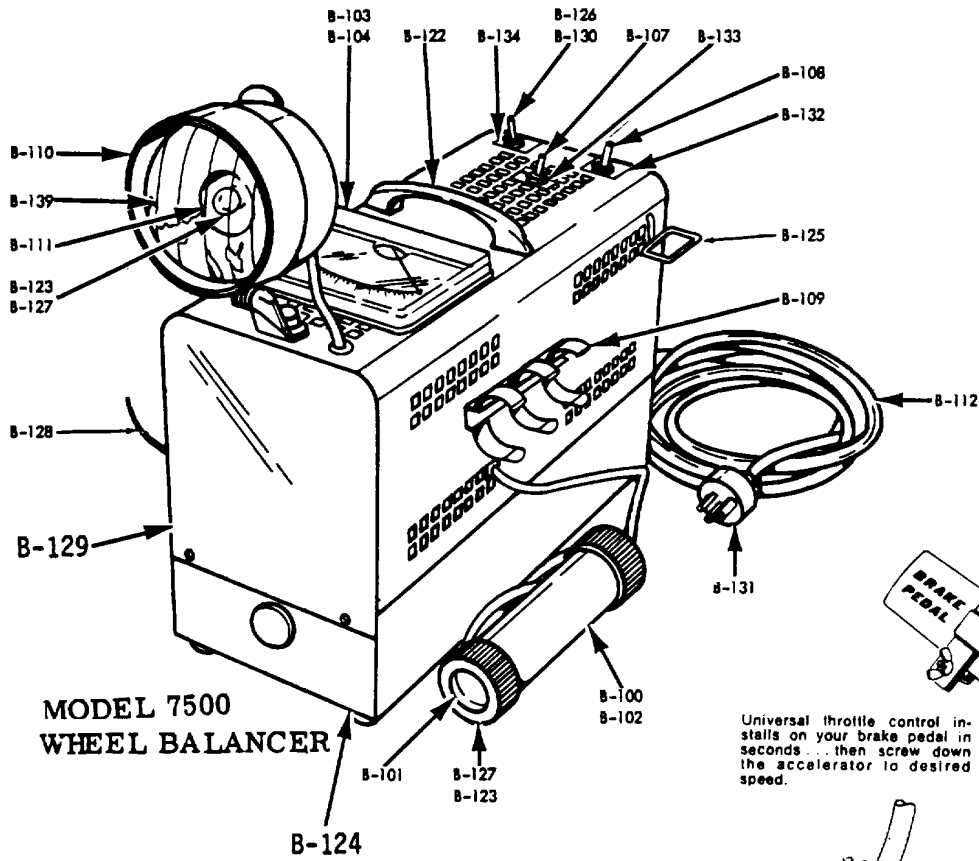


Dynamic Point setting
2 to 3 thousands

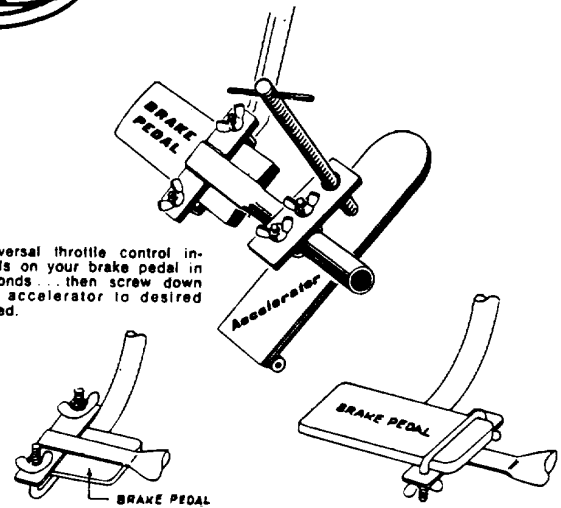
Static Point setting
6 to 8 thousands

MODEL 5400-P PICKUP UNIT

SECTION VII PARTS ILLUSTRATIONS

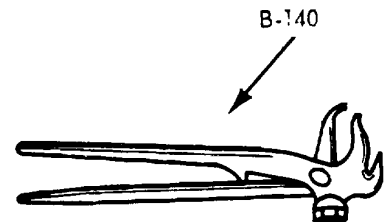
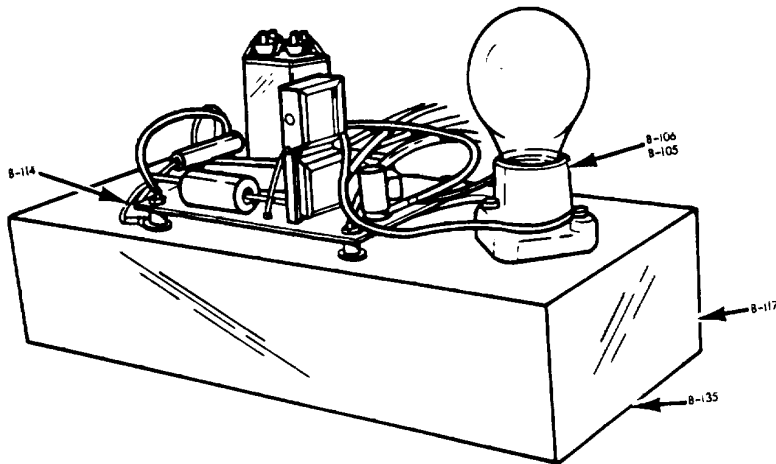


Universal throttle control installs on your brake pedal in seconds... then screw down the accelerator to desired speed.

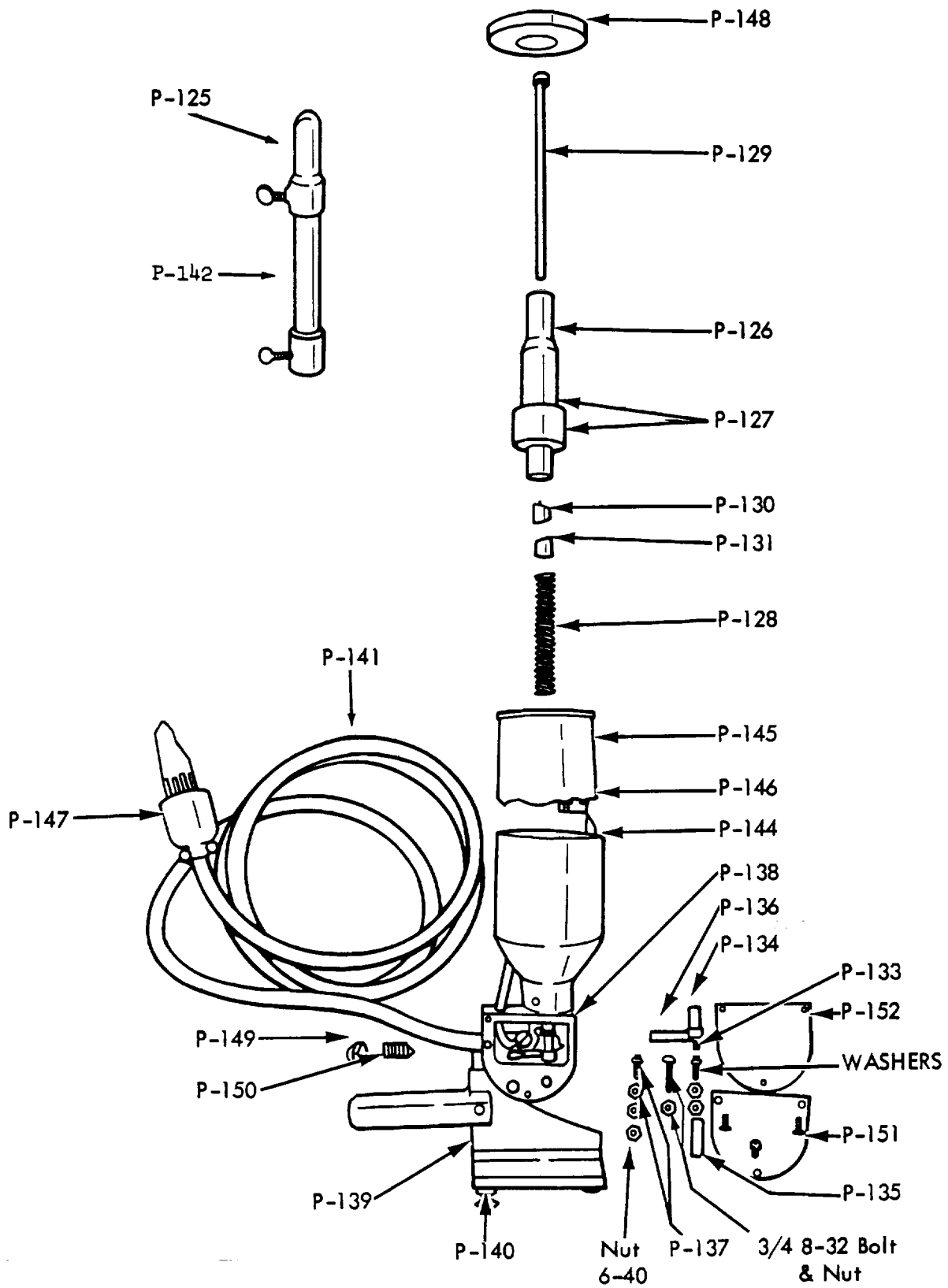


On some vehicles the brake pedal U-bolt clamp may be installed to the left of brake pedal support.

According to brake pedal-accelerator arrangements the U-bolt plate may be placed over or under the brake pedal.

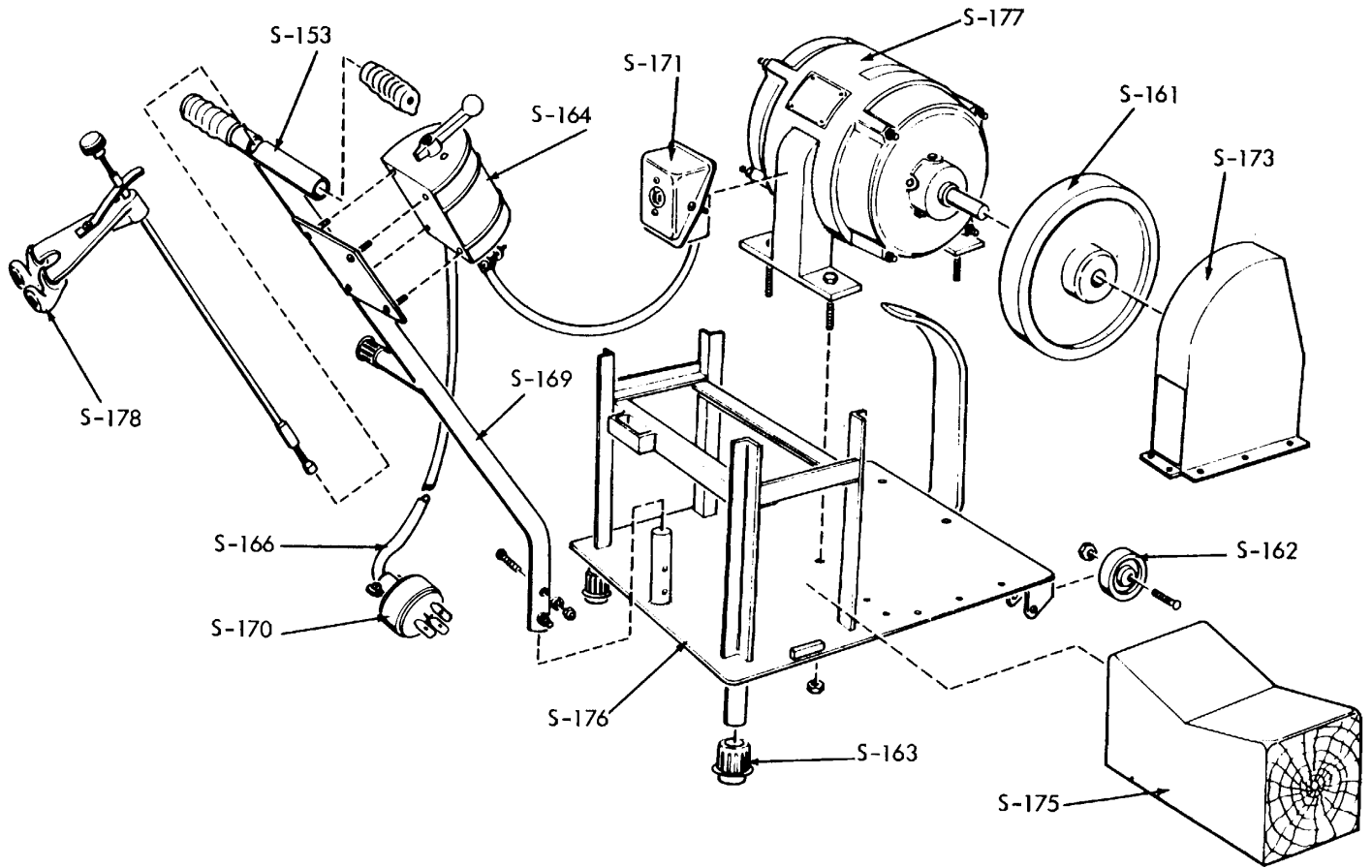


PARTS ILLUSTRATIONS



MODEL 5400-P PICKUP UNIT

PARTS ILLUSTRATIONS
TRUCK SPINNER MODEL 5400 S - T



**SECTION VIII
PARTS LIST
WHEEL BALANCER**

BALANCER UNIT 5400-B

B-100 Hand Light Cover

B-101 Hand Light Lens.

B-102 Hand Light Plastic Cover Inside.....

B-103 Meter

B-104 Capacitor, Meter

B-105 Flasher (Where Applied).....

B-106 Lamp Socket 110 Volt

B-107 Static & Dynamic Switch

B-108 Head & Hand Light Switch.....

B-109 Hand Light Holder

B-110 Head Light Assembly.....

B-111 Head Light Lens, Glass

B-112 AC Cord

B-114 Power Module.....

B-117 Socket, 4 Prong for Pickup Plug In

B-120 Resistor 450 Ohms

B-121 Fuse Holder (Where Applied)

B-122 Handle, Carrying.....

B-123 Socket, Strobe Bulb

B-124 Rubber Feet, Base (set of 4)

B-125 Bracket - Weight Tool

B-126 Switch, Meter

B-127 Bulb, Strobe S55B

B-128 Bracket, Pick-Up Hanger

B-129 Top, Case Cover.....

B-130 Resistor, Meter

B-131 Plug, Armoured - 3 Prong

B-132 Plate, Dynamic Switch

B-133 Plate, Static Switch

B-134 Plate, Meter Switch

B-135 Cover, Bottom.....

B-138 Clamp, AC Cord

B-139 Reflector, Head Lamp.....

B-140 Wheel Weight Tool, Hammer Type

B-157 005 Capacitor 50 Volt

B-158 005 Capacitor 50 Volt

B-159 005 Capacitor 50 Volt

S-178 Pedal Depressor

PICKUP UNIT 5400-S

Pickup Assembly Complete

P-125 V Segment Top

P-126 Dust Cover Cap

P-127 Magnet, Meter (2-Where Applied)

P-128 Spring.....

P-129 Shaft, Clutch.....

P-130 Upper Clutch

P-131 Lower Clutch

P-132 Static Points (set of 2)

P-133 Dynamic Points (set of 2)

P-134 Upper Static Point Holder

P-135 Lower Static Point Holder

P-136 Arm, Dynamic Point Holder

P-137 Insulator, Fiber Base Dynamic Points

P-138 Switch Box

P-139 Base & Handle.....

P-140 Feet, Set.....

P-141 Cord Set Complete.....

P-142 Top Extension, Trucks Etc.

P-143 Thumb Screw

P-144 Coil Case, Meter.....

P-145 Coil, Meter

P-146 Rectifier, Coil

P-147 Plug & Top 4 Prong, Pickup Cord, Shielded

P-148 Cap, Top of Coil Case

P-149 Nut, Acorn.....

P-150 Screw, Allen

P-151 Cover, Switch Box

P-152 Insulator, Switch Box

SPINNER, WHEEL

S-161 Wheel, Spinner

S-162 Caster, Spinner Base, each.....

S-163 Rubber Heel

S-164 Switch Box, 220 Volt.....

S-166 AC Cord, Less Plug.....

S-169 Handle

S-170 Plug, Armoured-3 Prong, 3 0-50 Amp

S-171 Socket-3 Prong, 10-20 Amp

S-173 Guard, Wheel Shield

S-175 Block, Rear wheel.....

S-176 Base, Spinner

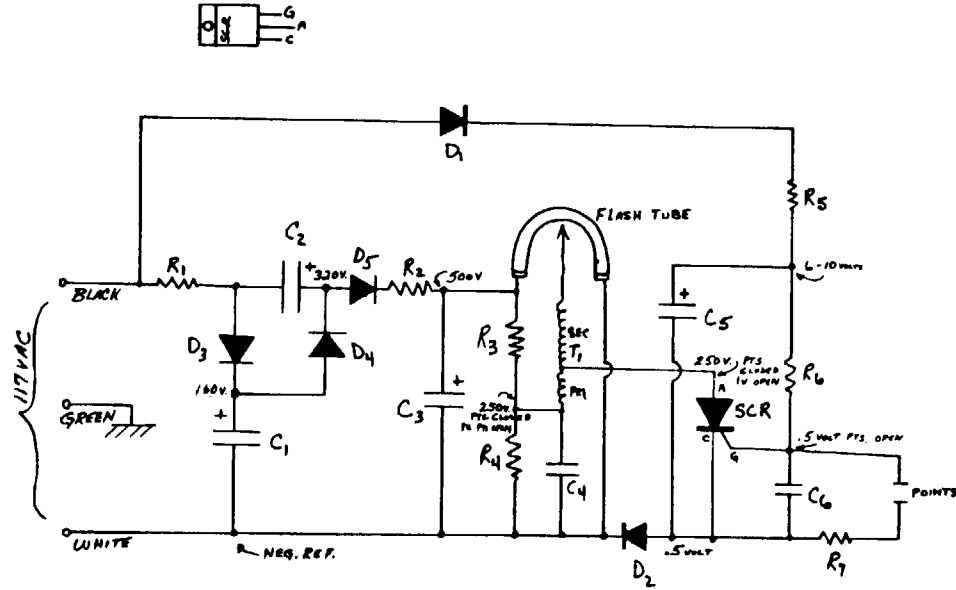
S-177 Motor, 3 hp. 3450 rpm

WEIGHTS

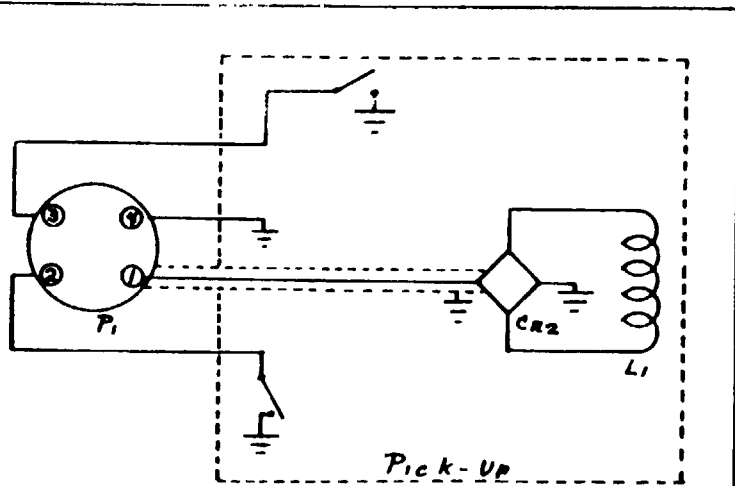
W-150 Starter Set Passenger Car Weights (525)

W-250 Starter Set Truck Weights (275)

DRAWING NUMBER
BP 7500



WHEEL BALANCER SCHEMATIC
500 VOLT POWER SUPPLY AND FLASH TRIGGER



PARTS LIST

- | | | | |
|----------|---------------------|----|-----------------------------|
| V2, V3 | 555 B | J1 | 4 Pin Socket |
| C2 | 3 μfd @ 6 v | P1 | 4 Pin Plug |
| R1 | 450 Ω @ 10 W | M1 | 0-50 Micro-
Ampere Motor |
| CR2 | Convent 1856 TYPE B | L1 | AS1320 |
| S1, 2, 3 | S.P.D.T | | |

DATE	CHECKED	DRAWING NUMBER
1-1-75		BP 7500
DATE	APPROVED	
1-1-75		
NAME		
MODEL 5400B, 6600B & 7500		
REV		
REV		

REVISIONS

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TM 9-4910-702-14&P BALANCER, VEHICLE WHEEL , MODELS 7500 AND 5400-1981

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