

DEPARTMENT
OF THE ARMY TECHNICAL MANUAL

**OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE
MANUAL INCLUDING REPAIR PARTS LIST**

FOR

BALANCER, VEHICLE WHEEL

MODEL M-76

(NSN 4910-01-093-0167)

HEADQUARTERS,
DEPARTMENT OF THE ARMY

MAY 1984

21 May 1984

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, Munitions and Chemical Command, ATTN: DRSMC-MAS, Rock Island, IL 61299. A reply will be furnished directly to you.

Operator, Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts List for:

Balancer, Vehicle Wheel
Model M-76
(NsN 4910-01-093-0167)

NOTE

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

Manufactured by: The Coats Company
1601 J. P. Hennessy Drive
LaVergne, TN 37086
Procured under Contract No. DAAA09-81-C-5031

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 - Manufacturers Federal Supply Code Number - 57791
- 2 - Manufacturers Part Number exactly as listed herein
- 3 - Nomenclature exactly as listed herein, including (Dimensions, if necessary).
- 4 - Manufacturer's Model Number -M-76
- 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 4, 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 - 57791 followed by a colon and manufacturer's Part Number for the repair part.

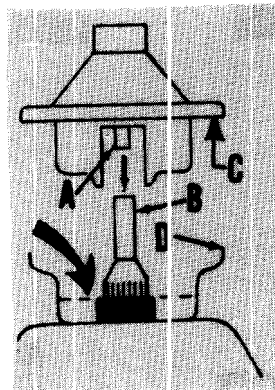
(b) Complete Remarks field as follows:

Noun: (nomenclature or repair part)
For: NSN: 4910-01-093-0167
Manufacturer: The Coats Company
1601 J. P. Hennessy Drive, LaVergne, TN 37086
Model: M-76
Serial: (of end item)

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

1. Preparation for Use and Installation Instructions.

a. **DAMPENING OIL:** Remove the chrome balancer head out of the dampener basin and fill the basin to the top of the step on the center post with SAE 20 (MIL-L-2104) motor oil, approx. 6 fluid ounces. Replace the head . . . be sure that pivot post A fits into tube B and flange C rests on rim of dampener basin D. This oil has no lubricating value. It will not wear out nor will it need to be changed. The oil is an oscillation dampener to stabilize the balancer without interfering with specified sensitivity or accuracy.



b. Required Setup Procedure: To be performed at time of installation and whenever Balancer is moved.

(1) Place a tire and wheel assembly on the Balancer (make sure that the foot pedal is in the "OFF" position).

(2) Using the leveling legs, CENTER the bubble on the CROSS HAIRS.

(3) Turn the Balancer on, using the foot pedal.

(4) Balance the tire and wheel assembly.

(5) Rotate the tire and wheel assembly $\frac{1}{2}$ turn WITHOUT LIFTING IT FROM THE BALANCER (to ensure that the Head remains engaged).

(6) IF the bubble has moved from dead center, use the leveling legs to bring it HALF-WAY back from dead center.

The unit is now ready for use.

2. General Theory of Operation.

a. Static and dynamic unbalance result from an uneven distribution of weight. To correct static and dynamic unbalance you must first locate the heavy area, then counterbalance. This resolves itself to a simple weighing procedure. The degree of accuracy to which you can balance depends entirely upon the accuracy of the weighing device, in this case, the wheel balancer. This is precisely what your wheel balancer is -- a sensitive and accurate weighing device.

Its operation meets the following specifications:

SENSITIVITY: 1.6 ounce inches, equal to 1/5 oz. weight at 8 inch radius. Sensitivity is defined as the smallest amount of weight which will cause visible movement of the balance indicator.

ACCURACY: 2.0 ounce inches, equal to 1/4 oz. weight at 8 inch radius. Accuracy is defined as the maximum average weight variation from perfect balance.

The wheel balancer and ABC wheel weights make up the wheel balancing system.

b. "ON-OFF" POSITIONS: The balancer head pivots on a hardened ball point resting on a flat ground seat. In the "OFF" position the balancer head rests on the outer rim of the oil basin, not on the pivot point. This permits wheels to be put on or taken off the balancer and weights to be pounded onto the wheel while it is still on the balancer without damaging the super-sensitive and accurate pivot point and seat.

In the "ON" position the head has been raised and is supported on the pivot point. With a wheel in position on the head, the balancer now becomes a very sensitive and accurate weighing device.

To turn the balancer "ON" gently depress the pedal all the way down with your foot. The head and wheel are raised and the balancer is active. The pedal stays down and is held in the "ON" position by the weight of the wheel.

c. AUTOMATIC "OFF": When the weight of the wheel is removed from the balancer, the head and pedal automatically return to "OFF". This protects the pivot point from damage should anyone drop a wheel onto the balancer.

d. MANUAL "OFF": While the wheel is on the balancer the machine may be turned "OFF" by raising the pedal to the "OFF" position with your toe. To protect the accuracy of your balancer, the machine should be turned "OFF" when attaching weights to the outside rim of the wheel while the wheel is still on the balancer.

NOTE

ABC Wheel Weights are required for successful use of the wheel balancer.

Thinline ABC weights fit all vehicles with 13-, 14-, 15-, or 16-inch rims, except for those vehicles that have a straight-lipped rim on the outside.

Special ABC weights are designed with a long clip that fits only the outside straight lip of the rim.

Corresponding thinline and special ABC weights have the same weight and must be used together on wheels that require special weights: two special weights on the outside rim and two corresponding thinline weights on the standard inside rim.

3. Operating Instructions.

a. General. When balancing wheels, keep in mind these facts:

(1) Divide the corrective weight into 4 equal pieces, 2 on the inside rim and 2 on the outside rim.

(2) Therefore, you must always use 4 wheel weights of the same size, two placed on the inside rim and two on the outside rim. Use either 4A, 4B or 4C weights. DO NOT MIX SIZES.

(3) The spreading of the weights permits a consistently more accurate balance, using only 3 sizes of weights instead of 20 sizes.

b. PM-202 Truck Adapter Instructions. This adapter used on brake drum side provides an accurate centering hole for balancing on M-60 and M-76 balancer. Fits: 5 hole wheels on 8.05" centers, 6 hole wheels on 7.25" centers, 8 hole wheels on 6.5" centers.

NOTE: To insure maximum balancing accuracy, keep studs and adapter free from nicks and dirt.

(1) Select hole pattern in adapter matching wheel to be balanced.

(2) With flat side of adapter up, insert studs into hole pattern selected in step No. 1.

(3) Place center hole of adapter over the head of balancer with studs facing upward.

(4) With brake drum side of wheel facing downward, place on adapter nesting lug holes on studs.

NOTE: Install the adapter storage hook in one of the 3/16" holes in the side of the balancer, and secure with the push-on nut from inside.

c. To balance a wheel, use the following procedure:

(1) Prepare wheel.

(a) Remove old weights from wheel. On high-tread tires, excessive accumulation of rocks should be removed.

(b) Clean inside with wire brush to remove excessive dirt and grease.



(2) Mount wheel.

NOTE

Pedal must be at "OFF" position.

(a) Place wheel on balancer, outside face up. Valve stem nearest to the black pointer in the bubble.

(b) Wheel must seat flat on balancer flange to assure accurate reading.

(3) Locate the out-of-balance.

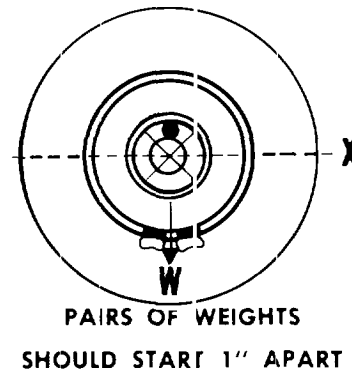
(a) Move pedal to "ON" position.

(b) Steady the wheel with your fingertips to stop the oscillation. The bubble always floats toward the center of the light area and indicates the starting position "W".

(c) Rotate wheel until light spot "W" is in front of you -- DON'T WALK AROUND THE BALANCER!



(4) Select weights of proper size. The bubble must center or pass over center "X" when 4 weights of the same size in 2 pairs 1" apart are placed at point "W". You must always use 4 weights. Try 4 "A" weights first; if they are too light, replace with 4 "B" weights; if these are too light, use 4 "C" weights.



NOTE

If 4 "C" weights do not make bubble center or pass over center, wheel should not be balanced in this condition.

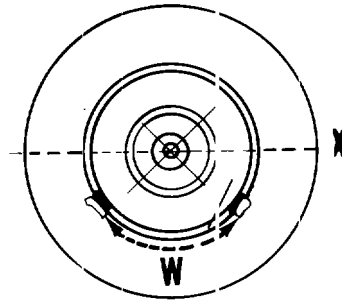
The assembly of wheel and tire contributes to the balancer condition of the unit. It is possible for the heavy portion of each to coincide. This concentration of weight may be relieved by deflating tire and turning it on the rim, halfway round, and reinflating.

A wheel requiring more than 4 "C" weights will not stay in balance.

(5) Balance the wheel by moving the weights.

(a) Spread the 2 pairs of weights in opposite directions equidistant from point "W" until bubble is centered on crosshairs.

(b) As weights are moved away from point "W" bubble moves toward center "X".



(c) Keep the weights in each pair together, one hung on the rim and one directly behind it on the tire .

NOTE

Spreading the "A" weights reduces their effective balance weight. This permits balancing to an exact fraction of an ounce.

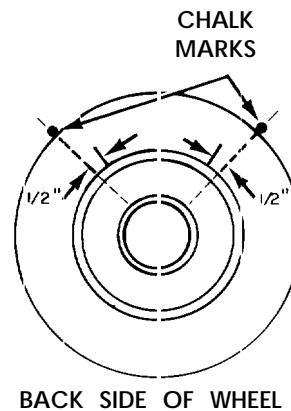
Remember to move the weights toward the bubble. The bubble always moves toward the area where weight is needed.

(6) Mark the tire. Chalk mark the location of each pair of weights on tire tread. This must be done as accurately as possible. Sight from the center of balancer through center of weights. Make the marks straight up-and-down. Accuracy of balancing is established at this point.

(7) Attach weights inside rim. Pick up weights and remove wheel from balancer. Attach the weights on the back rim approx. 1/2 inch inside the marks . Locate position by sighting from mark on tread through center of hole in wheel.

(8) Attach weights outside rim.

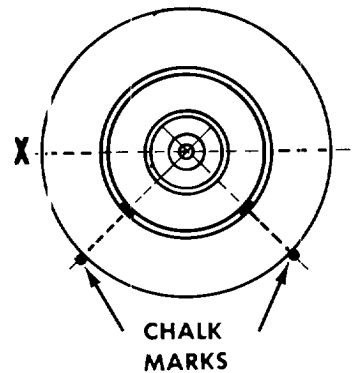
(a) Place wheel on balancer outside face up, same as it was before.



(b) Be sure wheel seats flat on flange to assure accurate reading.

(c) Place pedal to "ON" position.

(d) Hang weight on rim (not on tire) . Lay one of the remaining 2 weights at each mark and check for balance. Adjust to center the bubble by moving weights closer together or farther apart. EASY, now only small movement is needed.



(e) Place pedal to "OFF" position.

(f) Attach outside weights while wheel is still on the balancer.

4. Maintenance Instructions.

a. Daily cleaning. It is necessary to periodically clean the wheel balancer to maintain accuracy. Daily, wipe the chrome head with a rag damp with kerosene (9140-00-242-6749). DO NOT POUR KEROSENE ON THE BALANCER. Any liquid trapped in the cup under the cone will impair the machine's ability to balance and cause the cone to stick. Wipe the cabinet clean, using a rag damp with kerosene, as required.

b. Major Cleaning. Major cleaning is required only occasionally and is indicated by the cone becoming tight on the center tube. When the cone becomes tight it may stick down so the wheel cannot be centered. A sticky cone may not go down easily and may hold a light wheel up.

CAUTION

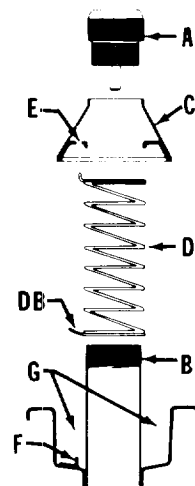
The wheel balancer head is manufactured to very accurate and close tolerances. When cleaning be very careful not to drop it.

(1) DISASSEMBLY: To relieve a sticky cone , remove the entire balancer head from the oil basin and wipe clean with a rag.

(a) Press the cone C down with one hand and hold it depressed. Unscrew cap A and remove from tube B.

(b) Release cone C which will pass off over end of tube B and stand on extended spring D.

(c) Lift spring D and cone C out of basin G and then remove spring D from cone C.



(2) CLEANING.

(a) Cap A should require no cleaning and should not be tampered with.

(b) Clean the basin G with an air blast and wipe out with a rag dampened in kerosene.

(c) Wipe the tube B clean with kerosine rag. Clean the cone C thoroughly by air blast and wipe clean with rag dampened with kerosene .

(d) CAUTION -- DO NOT USE ABRASIVES TO CLEAN THE TUBE AND CONE OR YOU WILL DESTROY THE CLOSE TOLERANCES AND MAY CAUSE THE BALANCER TO WORK IMPROPERLY.

(e) Clean the spring D with a rag or air blast.

(f) Lubricate the outside of tube B with light oil or Lubriplate.

(3) REASSEMBLY.

(a) Insert the spring D over flange on underside of cone C placing end of spring D into hole E on cone C.

CAUTION

CONE AND TUBE ARE CLOSE FIT. TAKE IT EASY -- DO NOT JAM.

(b) Slide spring down onto tube B fitting end of spring DB into slot F in bottom of basin.

CAUTION

CLOSE TOLERANCE -- START THREADS CAREFULLY -- DO NOT CROSS THREAD. Screw cap A into tube until snug. Use hand, only, no wrenches.

(c) Press cone down onto tube and hold while replacing cap A.

c. Checking accuracy.

(1) Level the balancer (para 1b).

NOTE

In the following procedure, it is not necessary to attach the weights to the rim. Just let them lie on wheel in balanced position.

(2) Balance a wheel (para 3c). Center bubble exactly.

(3) Move pedal to "OFF" position.

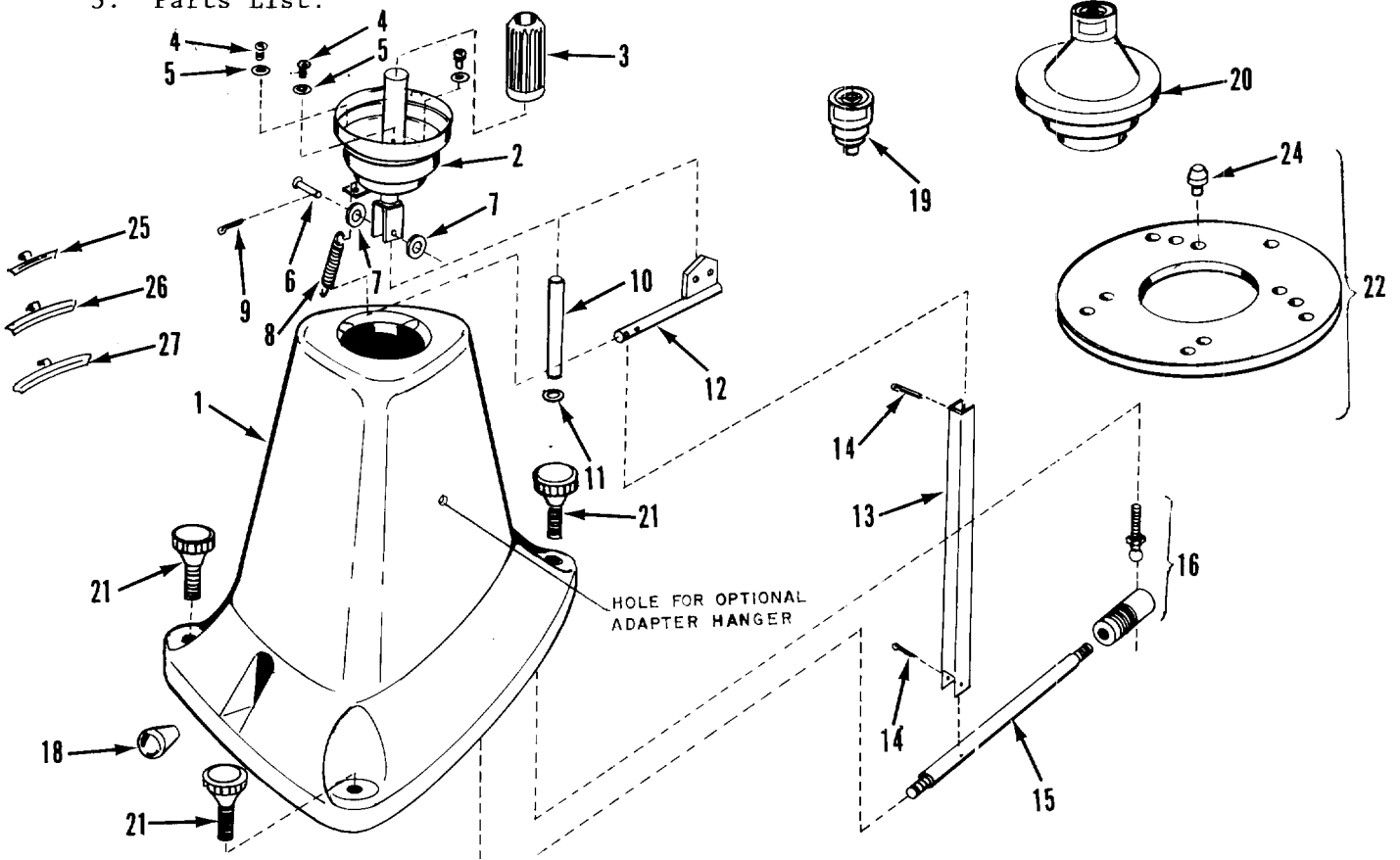
(4) With weights still in place, lift wheel off balancer without rotating head; turn wheel half way around (180°) and replace on balancer.

(5) Move pedal to "ON" position.

(6) The indicator should show the wheel still in balance or a slight out-of-balance that requires no more than the weight of five dimes (½ oz.) placed on the tire at the light spot to correct.

(7) If more than ½ oz. of weight is required, the balancer is not repeating within specifications and should be thoroughly cleaned (para 4b).

5. Parts List.



Ref No.	Part No.	Description	Ref No.	Part No.	Description
1	106695	Balancer Cabinet	14	102278	Cotter Pin 1/8" x 1 (Ea.)
2	106891	Dampener Cup & Spacer	15	106846	Pivot Arm
3	106677	Plastic Spacer	16	106951	Ball Joint Assembly
4	106844	Self Tapping Screw (Ea.)	18	106851	Knob Handle
5	106845	Screw Seal (Ea.)	19	106843	Bubble Cap Assy.
6	106455	Clevis Pin	20	106684	Head Assembly Comp.
7	106451	Balancer Fiber Washer	21	106682	Adjustment Legs (Ea.)
8	106449	Balancer Cam Spring	22	106922	PM-202 Adapter Comp.
9	106450	Cotter Pin 1/16 x 1/2	24	106924	5 Stud Package
10	106456	Balancer Lift Rod	25	108179	"A" Weight: .5 oz Box of 50
11	106457	Balancer Snap Ring	26	108183	"B" Weight 1.5 oz Box of 50
12	106852	Cam and Lever	27	108186	"C" Weight 2.5 Box of 50
13	106853	Tie Channel			

By Order of the Secretary of the Army:

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance with DA Form 12-21, requirements for FSC/FSG Group 4910.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

Your Mailing Address

DATE SENT

Date you filled out this form

PUBLICATION NUMBER

TM 9-4910-743-14&P

PUBLICATION DATE

PUBLICATION TITLE

Balancer, Vehicle Wheel

BE EXACT... PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.
2	3	2	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Callout number "4" is missing on figure 2.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

Your Name

SIGN HERE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

TM 9-4910-743-14&P

PUBLICATION DATE

21 May 1984

PUBLICATION TITLE

Balancer, Vehicle Wheel

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

TEAR ALONG PERFORATED LINE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

DA FORM 2028-2
1 JUL 79

PREVIOUS EDITIONS ARE OBSOLETE.

DRSMC OP-16-83

P.S.--IF YOUR UNIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

FILL IN YOUR
UNIT'S ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD 314



TEAR ALONG PERFORATED LINE

Commander
US Army Armament, Munitions and Chemical Command
ATTN: DRSMC-MAS (R)
Rock Island, IL 61299

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

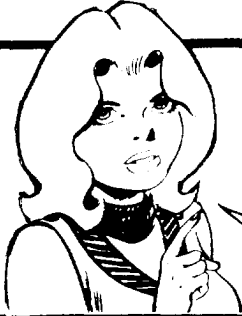
POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD 314



TEAR ALONG PERFORATED LINE

Commander
US Army Armament, Munitions and Chemical Command
ATTN: DRSMC-MAS (R)
Rock Island, IL 61299

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN, JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

TM 9-4910-743-14&P

PUBLICATION DATE

21 May 1984

PUBLICATION TITLE

Balancer, Vehicle Wheel

BE EXACT PIN-POINT WHERE IT IS

PAGE NO

PARA-GRAPH

FIGURE NO

TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

TEAR ALONG PERFORATED LINE

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD 314



TEAR ALONG PERFORATED LINE

Commander
US Army Armament, Munitions and Chemical Command
ATTN: DRSMC-MAS (R)
Rock Island, IL 61299

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 Lb
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

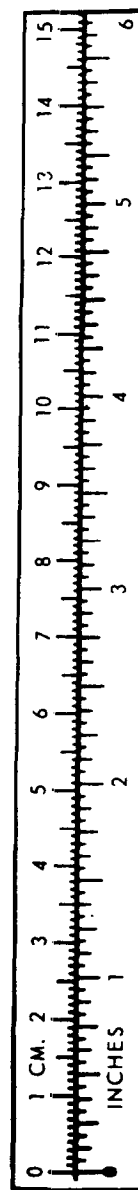
TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212^o Fahrenheit is equivalent to 100^o Celsius
 90^o Fahrenheit is equivalent to 32.2^o Celsius
 32^o Fahrenheit is equivalent to 0^o Celsius
 $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$

APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



**TM 9-4910-743-148P, BALANCER, VEHICLE WHEEL MODEL M-76
(NSN 4910-01-093-0167)**

