2000

SpaceAge Control, Inc.

Field Coil and Solenoid Tester
- P/N 209905

1) *Oscillator Switch*
2) *Meter Overload Light*
3) *Meter*
4) *Gain Control*
5) *Atenuator Switch*
6) *Input Jacks*
7) *Power Light*
8) *Power Switch*
9) *Field Coil Wand*
10) *Solenoid Wand*

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AUTO ELECTRIC
EQUIPMENT SUPPLIER

Field Coil and Solenoid Tester
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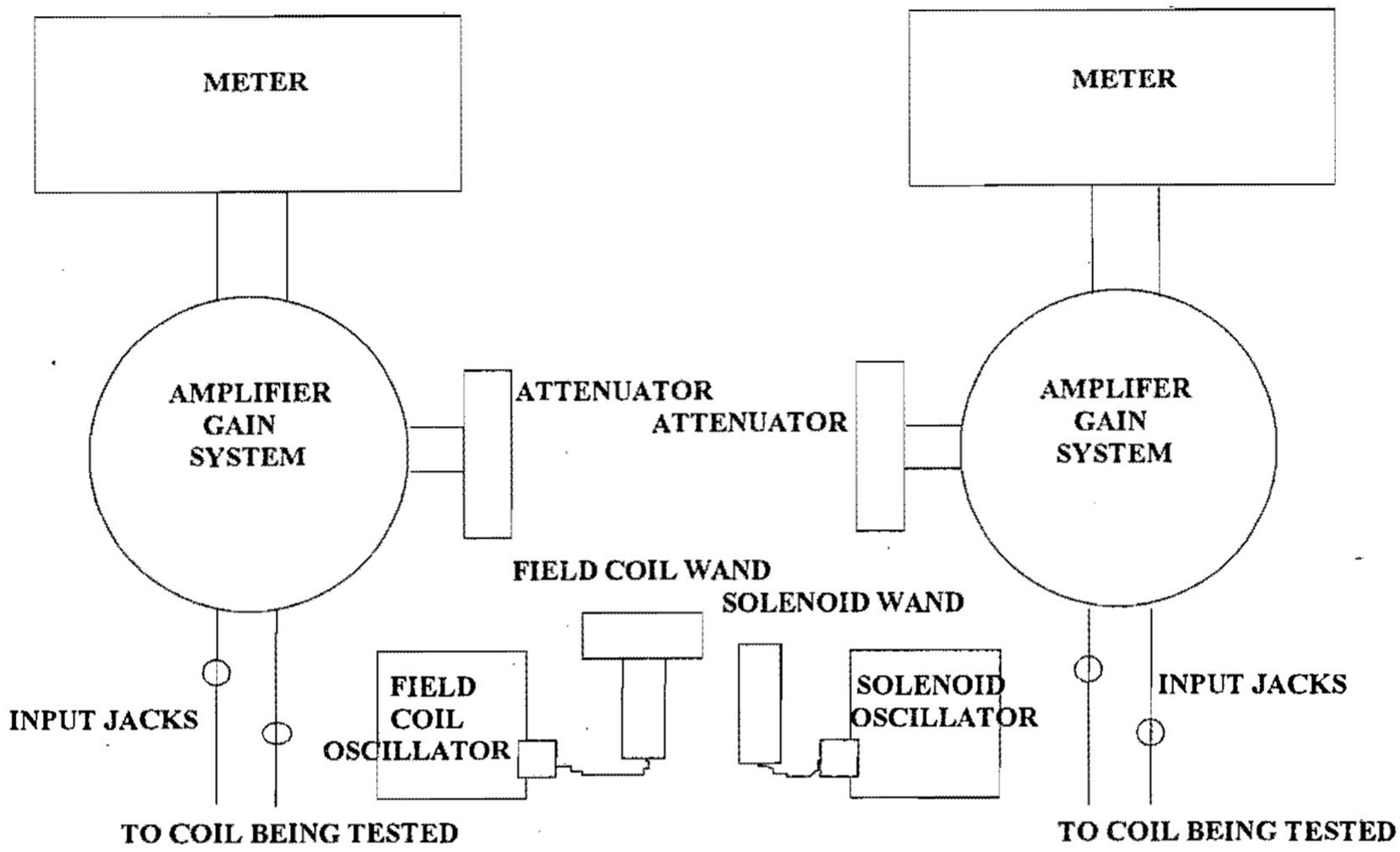
Block Diagram



This combination Solenoid and Field Coil Tester tests either one separately, both at the same time or, in the case of a Solenoid that has two windings, both windings at the same time.

The tester consists of the following:

An oscillating system terminating in a Solenoid Tester Wand
An oscillating system terminating in a Coil Tester Wand
Two separate amplifier circuits with gain control, meters, attenuators and attenuator switches

A switch on the front panel is used to select Solenoid Tester, Field Coil Tester or both. This turns on either oscillator or both as desired.

The amplifiers are always on when the power switch is on.

The tester operates on a 3 wire circuit 115V, 60Hz. Plug three prong plug into proper receptacle for same. Do not use a three to two plug adaptor.

This tester is designed to test Solenoid and Field Coil windings for shorts between layers of windings, shorts of adjacent windings and grounds to the case.

Setting Up For Testing

For both Solenoid and Field Coil testing, the set point (position of amplifier gain knob and attenuator switch) should be arrived at by using a known good Solenoid or Field Coil of the type or model to be tested.

Switch the power switch on and allow a few minutes for warm up. Switch the attenuator switch to normal and turn the gain control to position 5 on either one to be used or both if both are to be used. Attach the leads from the input jacks to the contacts of the coil to be tested. Turn the left-both-right switch to the appropriate position and locate the wand properly. If the pointer on the meter is to the left of the o.k. position, turn the gain knob to the right until the pointer is in the o.k. position. If the pointer is to the right of the o.k. position, turn the gain knob to the left until the pointer is in the o.k. position. When the pointer is in the o.k. position, log number indicated by gain control knob. This is your set-point position for that type of coil and can be used for future testing.

If two (2) adjacent turns is a coil are shorted the pointer on the meter will fall way to the left of the o.k. position. Good coils will fall in the o.k. position.

Field Coils or Solenoid Coils may be tested either in the case or out of the case but the set-point must be found the same way (in or out of the case) as the testing is to be performed. Keep the wands in the same relative position when testing out of the case as as they are when testing in the case.

For testing some coils it may be easier to adjust the gain with the attenuator switch in the ÷ 4 or ÷ 2o position. If the set-point is found with the attenuator switch in other than the normal position, log this along with the knob position for future use.

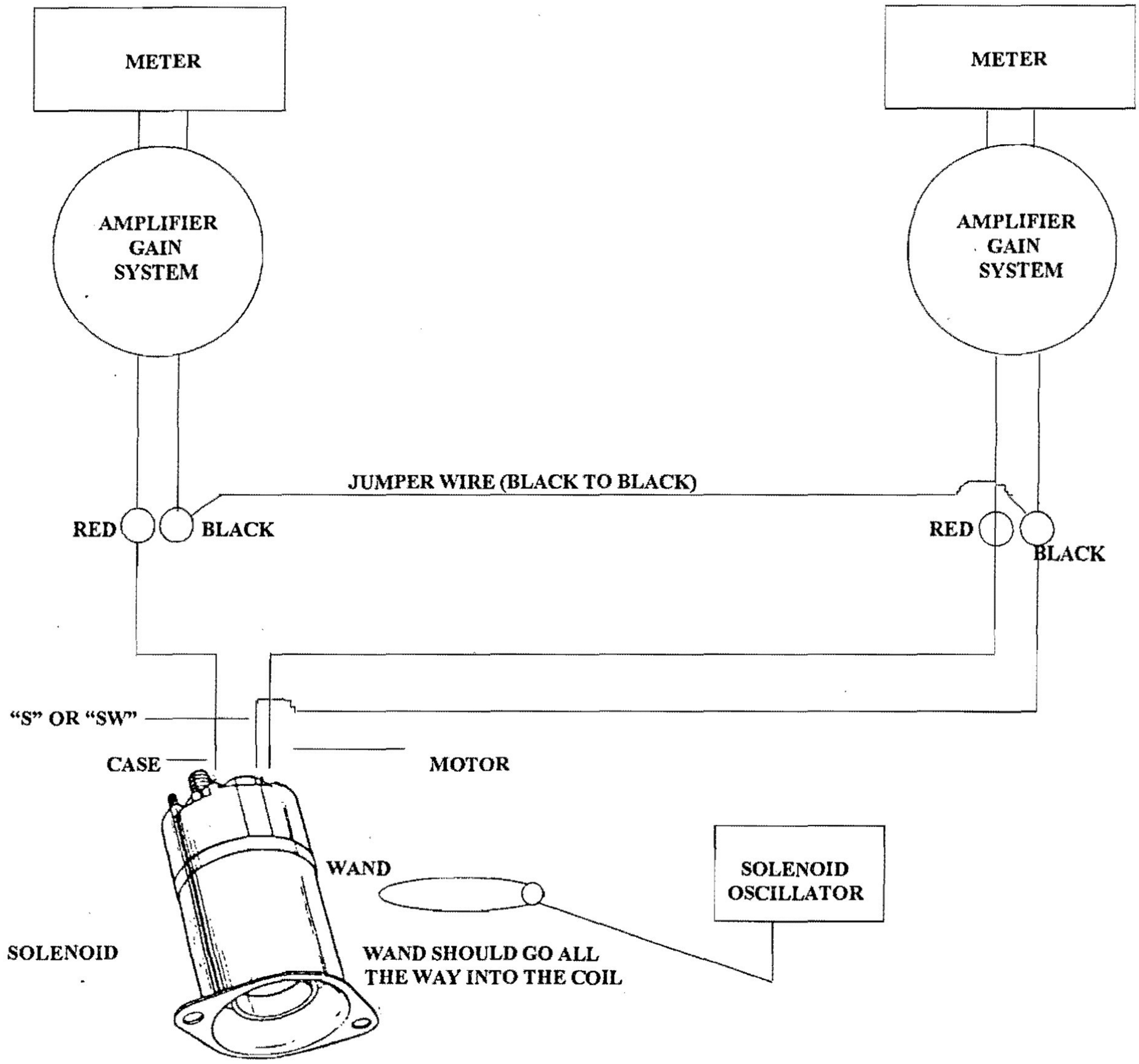
The attenuator switch in the divide by 4, or divide by 20, position actually divides the signal gain by whichever number it is on. Shunt coils usually have a high output and thus would require the use of a lower gain control which would make adjusting less sensitive and easier to use. Putting the switch in the divide by 4 or divide by 20 will accomplish this.

Oscillator switch (left, right, or both)
Switch on left: Field coil oscillator on
Switch on right: Solenoid oscillator on
Switch on both: Field coil and Solenoid oscillator on
With switch on both, it is possible for one (1) person to test field coils while another tests solenoids.

NOTE: Meter overload lights are to the right of each meter. On bright indicates that the meter is being overdriven, or more output is getting to the meter than sould, with the same type or model as was used in getting the set-point. This could happen if a 24V solenoid or coil was put on when you were set up for 12V. The brightness of the light increases with the signal level so it is possible to have a very dim light in the o.k. area.

SET UP FOR TESTING SOLENOIDS WITH TWO WINDINGS
(Pull in and hold in)
#1114468 & 114348

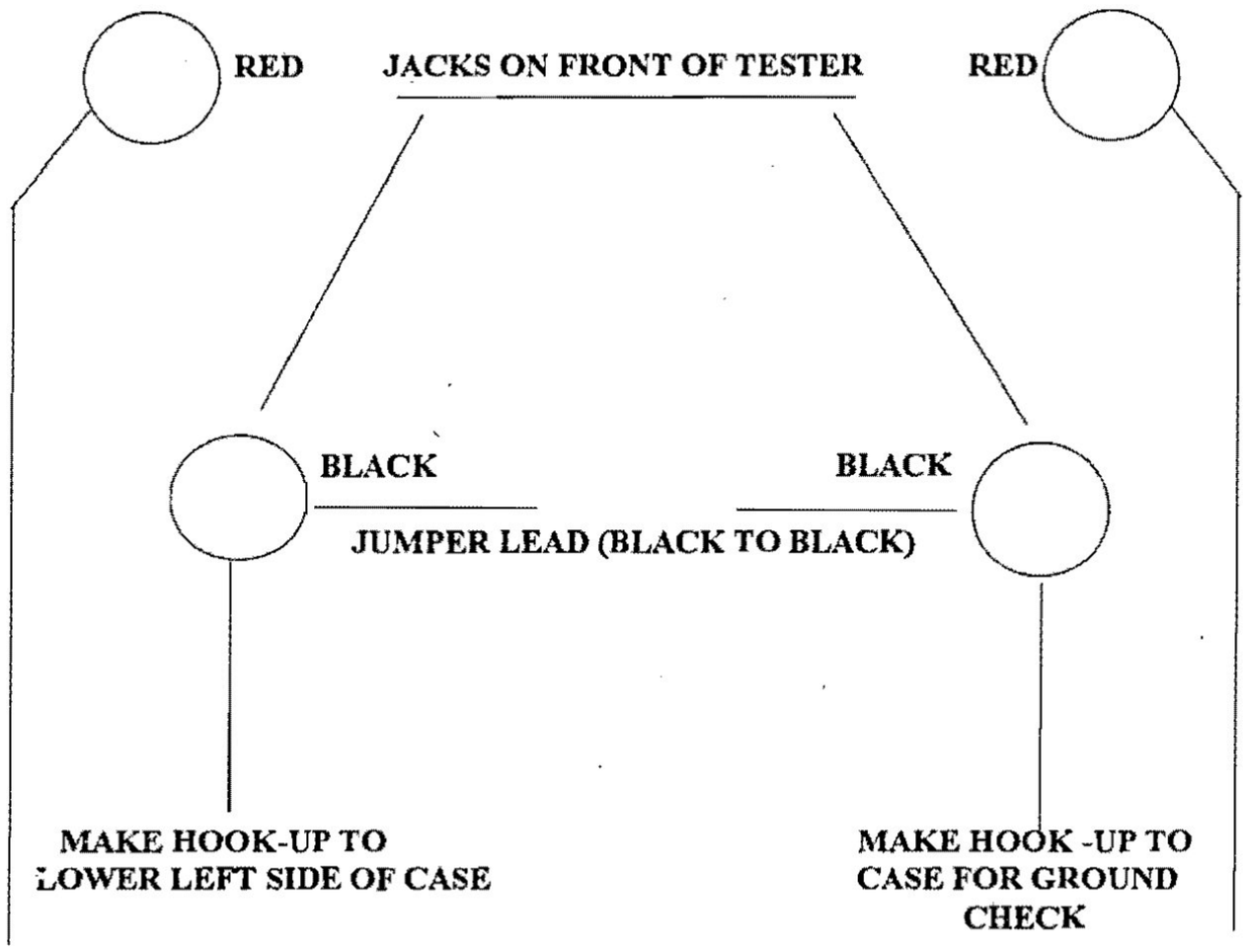
Solenoid Test Block Diagram



If the solenoid being tested is too small to accept the wand with the cover on the front end of it, remove the cover. This will then go into a diameter of .800". Take care not to damage the coating over the windings on the wand when using it without the cover and use it with the cover on when possible. For best results in all tests, it is best to have everything set up the same way for testing as it was in arriving at the set point.

TESTING OF DELCO SOLENOID #1119879 & 1119832 (24V)

Place Solenoid on insulated surface (rubber mat on base of tester) and hook up as shown.



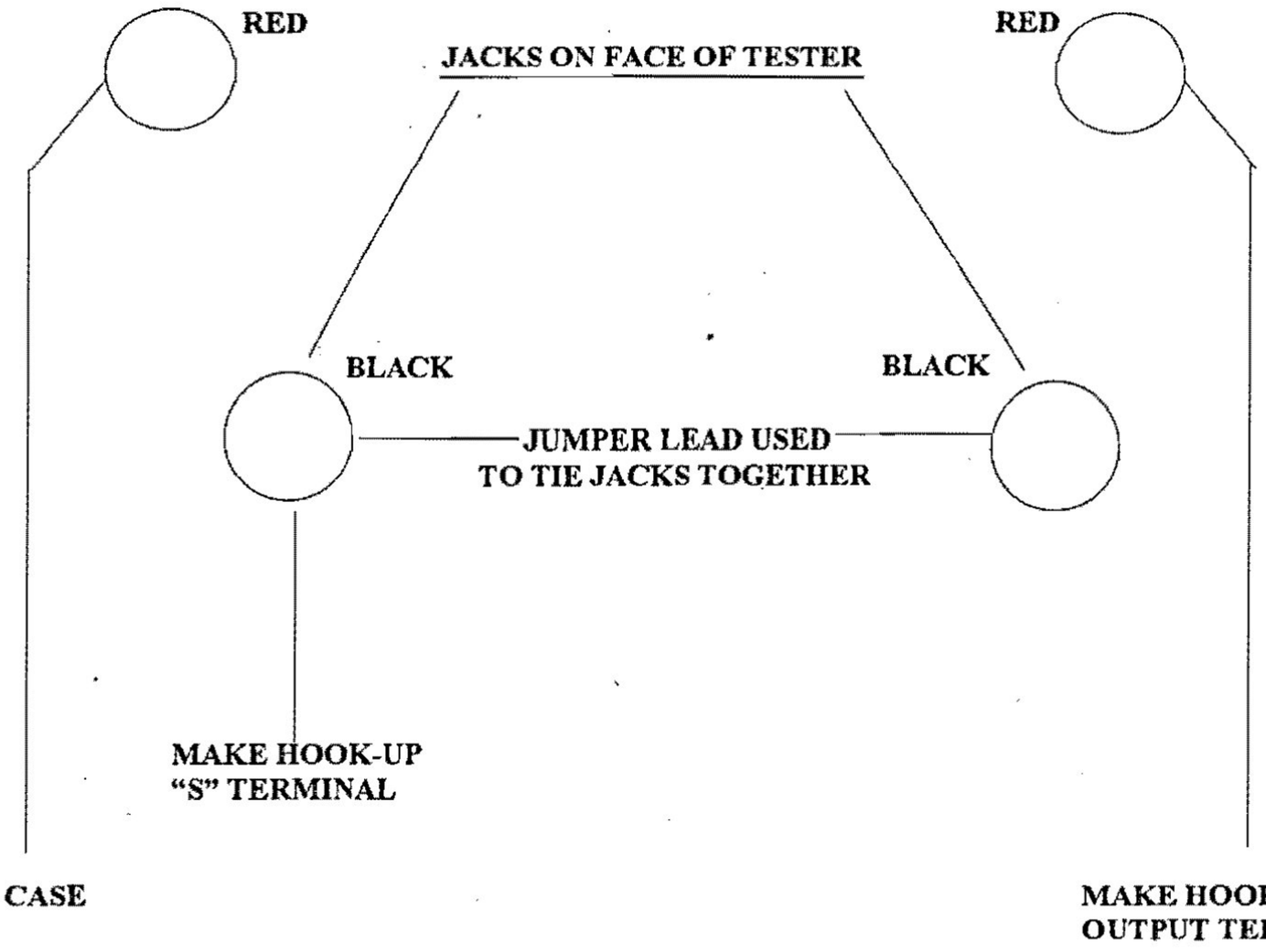
Either coil being grounded to case will cause the meter pointer to move to the left, the same indication as a shorted coil.

Solenoid Wand Note: Only remove the cover (front of wand) on the Solenoid Wand when the diameter of the coil is too small to get the wand inside. When that is the case, remove the cover which makes it small enough to go inside a .800" diameter hole. When the cover is off, care should be taken so the coating on the coil is not damaged.

TESTING OF DELCO SOLENOID #1114468 & 1115540

Place Solenoid on insulated surface (rubber mat on base of tester).

Hook up as shown in diagram.



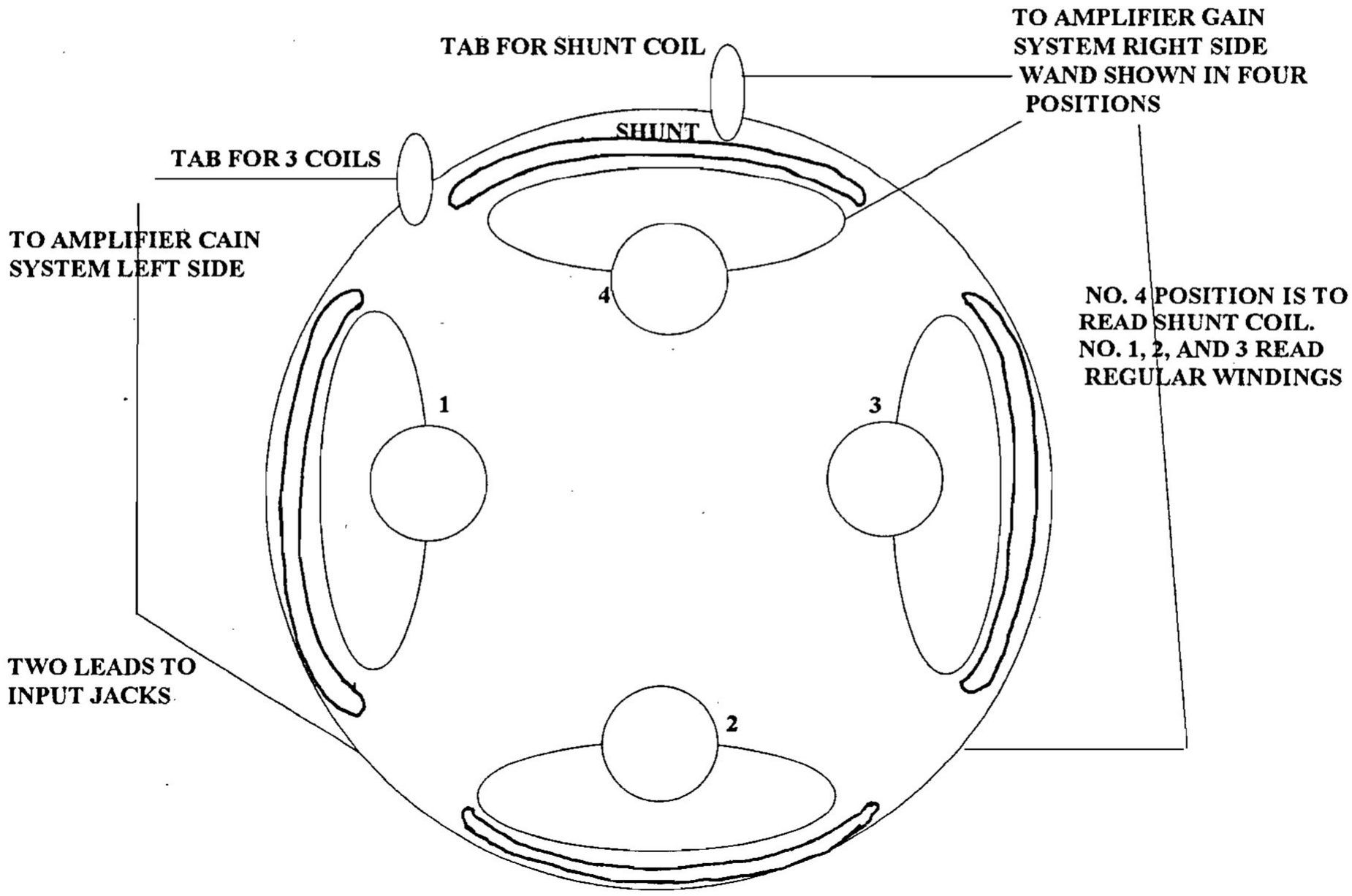
Either coil being grounded to case will cause meter pointer to move to the left, the same indication as a shorted coil.

Note: One end of hold in winding is grounded when manufactured.

TESTING OF FIELD COILS INSTALLED IN PLACE

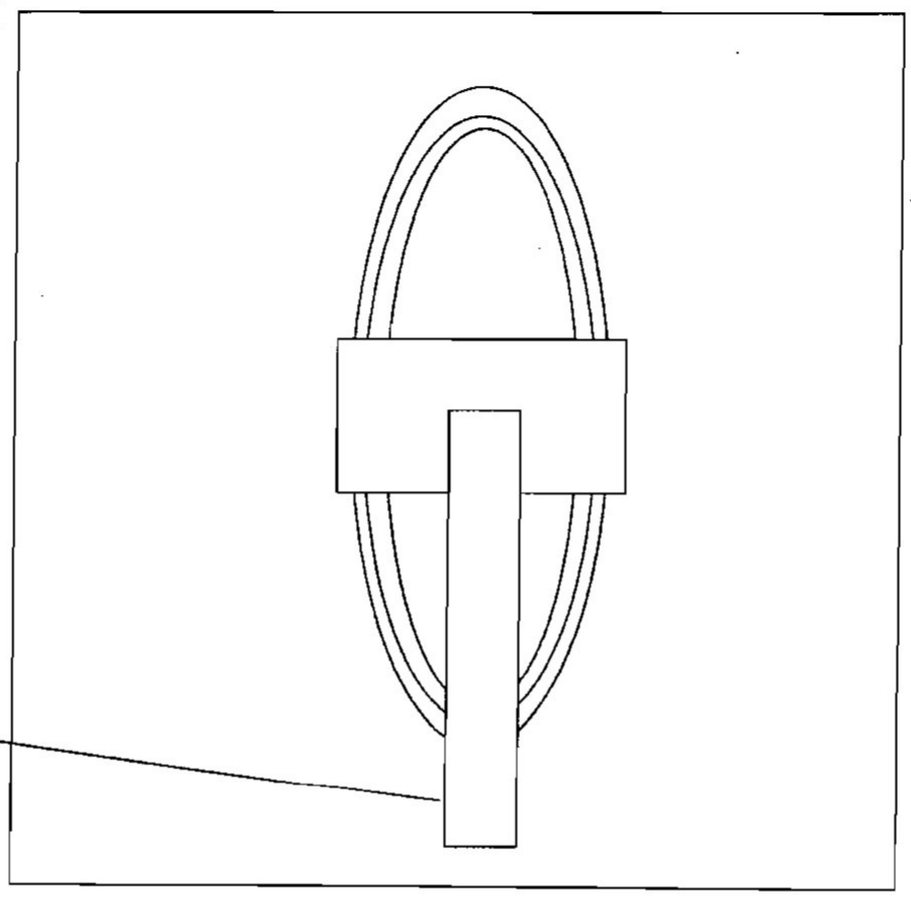
HI TORQUE DELCO

COILS WITH TWO DIFFERENT WINDINGS SUCH AS 3 REGULAR COILS AND ONE SHUNT COIL



HAVE OSCILLATOR SWITCH TO LEFT

SIDE VIEW WITH WAND IN PLACE

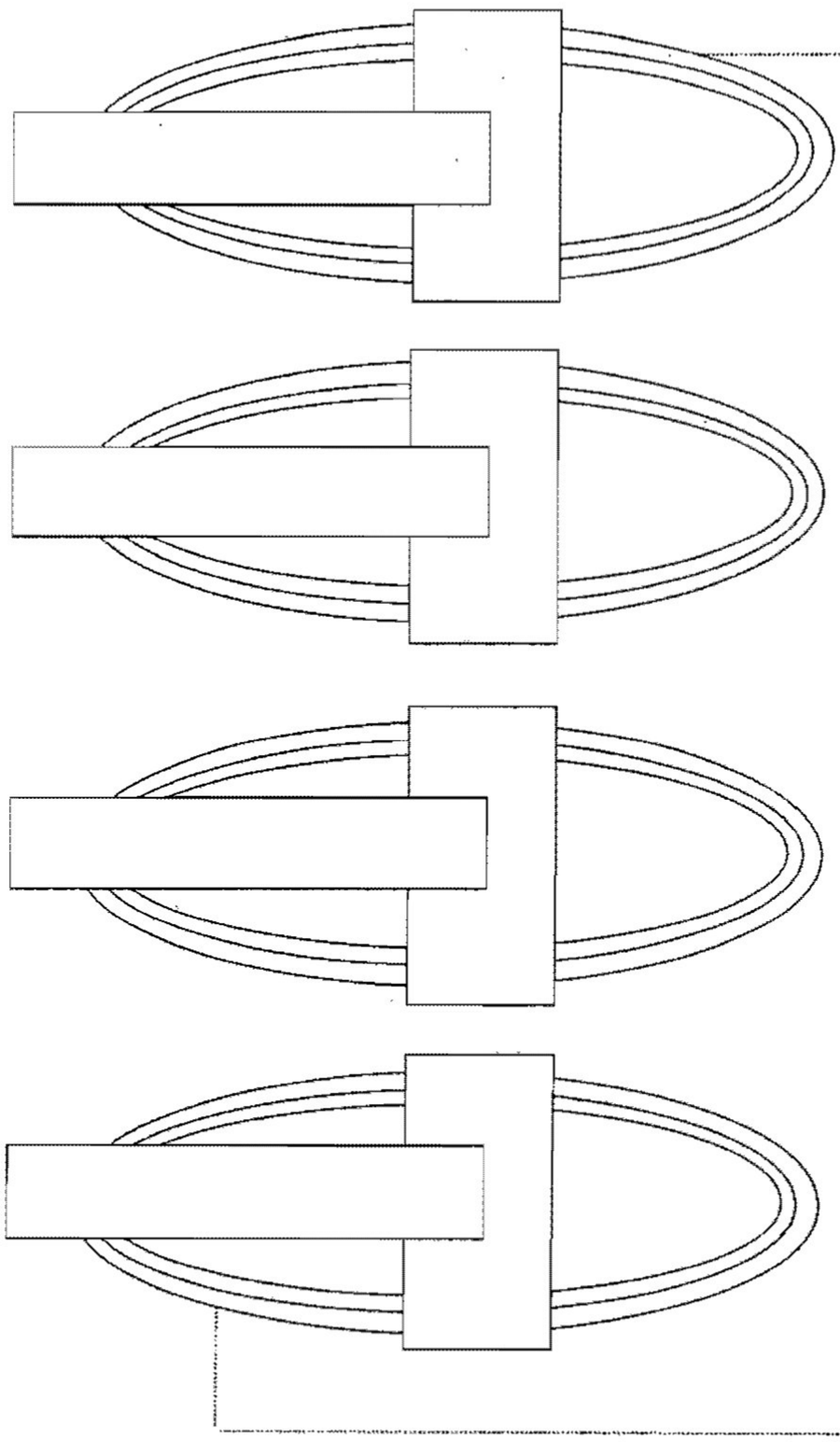


POSITION OF WAND FOR EACH FIELD COIL

TESTING OF LOOSE FIELD COILS

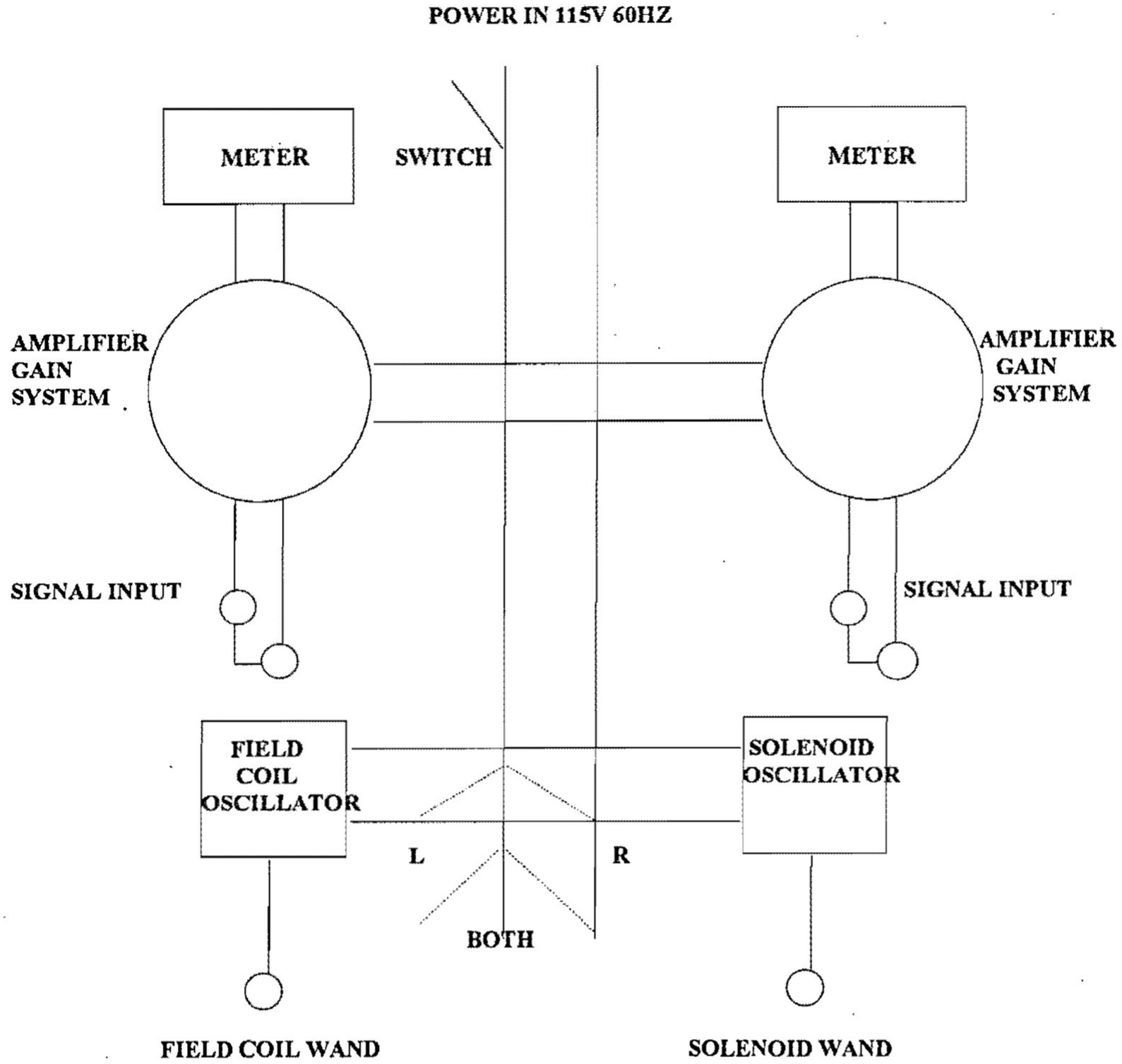
Lay coils out in a row and connect the two (2) leads to input jacks on the tester, and hold the wand over each of the coils, watching the meter reading. All coils should read the same and the same as the similar good coil used for setting the pointer at the set point. Have the oscillator switch on left.

HOLD THE WAND IN FOUR POSITIONS



TWO LEADS TO INPUT JACKS

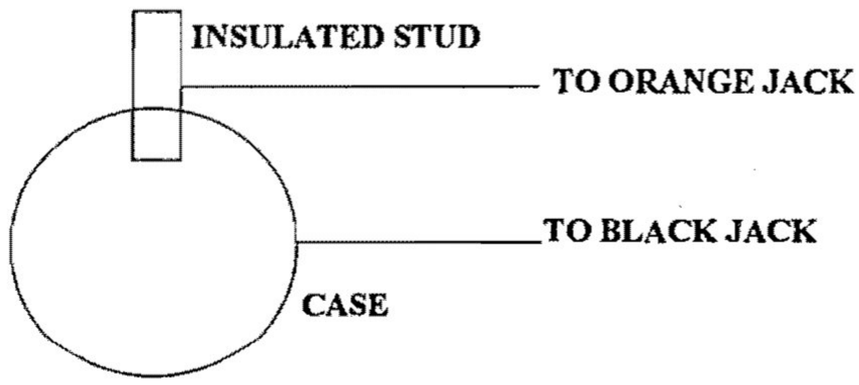
FIELD COIL & SOLENOID TESTER
AC POWER SCHEMATIC



GROUND CHECK CIRCUIT

The orange jack in the lower right corner of the machine is in series with the LED light above the jack. These components constitute the ground test circuit. The black jack to the right of the orange jack is the other half of the circuit.

Example:



If ground of 5K ohm or less is present, the LED light will glow.

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FOR TESTING BALANCE OF SOLENOID WINDINGS
EXAMPLE: DELCO D981

To set the left and right amplifiers to have the same gain it would be best to feed a common signal to the red left and red right input jacks and set the gain controls to give the same meter reading on the left and right meter.

For example, the red left and red right input jacks could be momentarily connected to the motor terminal to get a common signal to set the gain of both amplifiers to be equal. The black input jacks will be connected together and connected to "s" or "sw". After the gains are set, proceed with testing with the hookup.

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ALTERNATE METHOD

The difference in this method is that the meter is set at mid-point and difference either side indicates conduction of coil.

209905 FIELD COIL & SOLENOID TESTER

a. Wand control switch determines which wand will operate, left or right or both (recommend leaving switch in "both".

b. Solenoid wand transmits a high frequency into the solenoid. The result of the induction is read on meter J and/or H.

c. Field coil wand transmits a high frequency into the field coil (in or out of the case). The results of the induction is read on meter J and/or H.

d/e. Meter multiplier switches control the gain of the meter circuits (of meter directly above switch) in increments of 1/4 attenuation, normal gain and 1/20 attenuation.

f. Ground test lead and light work in conjunction with the black lead directly to its right for a ground test circuit from coil to case.

g/i. Sensitivity adjustment dials set fine gain of meter circuits used in conjunction with d/e swtiches to get overall gain.

h/j. Quality meters indicate the resultant induction for either wand b and/or c.

Twelve inch (12") lead with forked connectors is used to tie black jacks together when using one black lead to item being tested.

SOLENOID

1. Standard setting, using an O.E.M. solenoid of the strength you require, insert wand b into the solenoid (have wand to bottom). Set meter control switch a in "both" position.

a. Connect the black test lead (either side) to the common point of the two coils to be tested (s terminal) connect right red test lead to the case (ground) connect the remaining red lead to the starter coil terminal.

b. Turn sensitivity adjustment dial (g/i) until both meters (h/j) read in the center of the dials (f). If necessary use the meter multiplier controls (d/e) to aid in adjusting to f. Once the meters read f, note the position of all switches for future testing.

2. Connect solenoid to be tested as stated above.

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a. Readings below f indicate a coil with less strength or shorted.
b. Readings abovd f indicate a coil with more strength.
c. A recommended sample standard for testing would be to use two segments (h to f an an acceptable good range).

FIELD COILS

1. Standard Delco coil (4 series)
a. Lay the wand (c) in the center of the coil to be tested.
b. Connect the black test lead (either side) to one end of the coil.
c. Connect the red test lead to the other end of the coil.
d. Follow step b under SOLENOID.
e. Rotate the wand from coil to coil and the single meter reading should not vary more than two segments below f.

2. Ford coil with 5 coils.
a. Black test lead to the starter post.
b. Red test lead from the right side of the hot brushes.
c. Red test lead from the left side to the ground brush.
d. To set the pull-in coil, place the wand on the coil and open the point. (Set as in step B under SOLENOID). It should read approximately f on the left meter.
e. The thick coil will read on the right meter when the points are closed. (Set as in step B under SOLENOID). Then rotate the wand to the outer coils and compare their reading. H or above is usable.

SPECIAL NOTE: Many rebuilders grade their coils be strength and wire size. This allows the maximum usage of the coils by matching them with different strength armatures. You establish the standards and can increase or decrease them as your quality demands.