

# Colorized

# Mustang Wiring & Vacuum Diagrams

*(with Electrical Illustrations)*

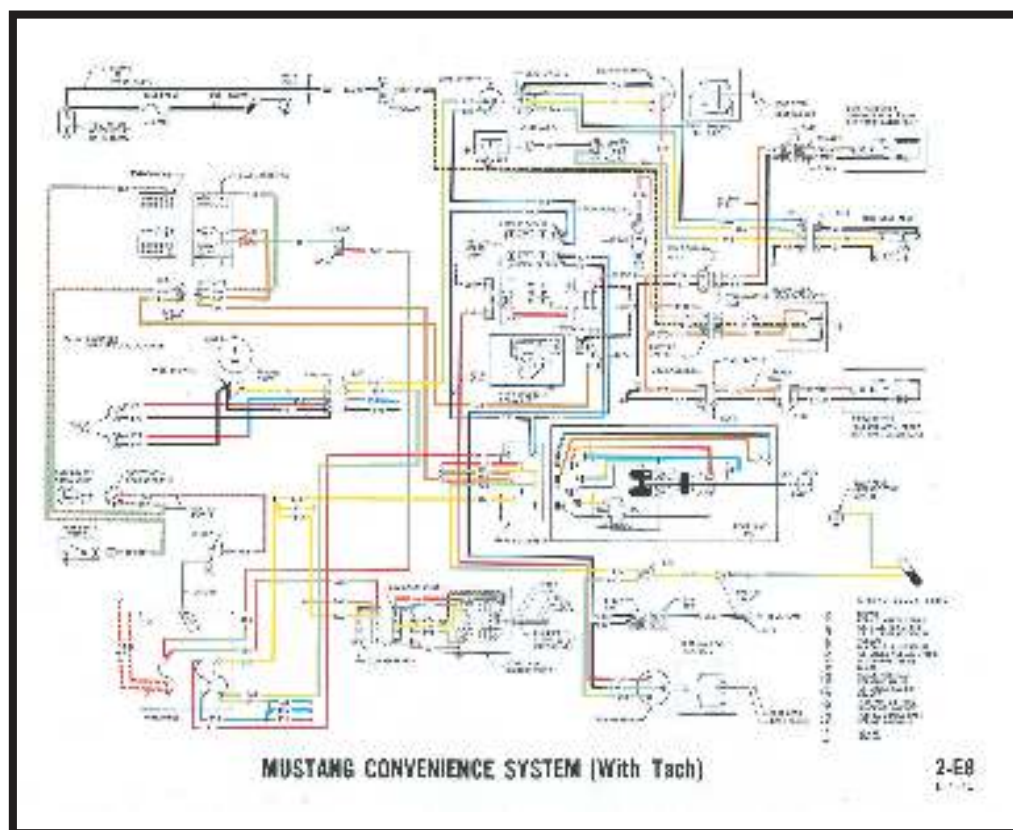
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30-Minute Video  
Ford Training  
Course 13001, Vol 68 S7  
"How to Read Wiring  
Diagrams"  
**Included!**

**A consolidated collection of original Ford  
electrical & vacuum diagrams with illustrations**

## Color diagrams for:

Convenience System; Exterior  
Lights; Interior Lights;  
Heater and Air Conditioner  
Horns; Convertible Top  
Ignition, Starting and Charging  
Heated Backlite, Cigar Lighter,  
Clock, Power Windows;  
Radio AM, FM and Stereo  
Tape; Windshield Wiper and  
Washer; Intermittent Wipers;  
Key Warning Buzzer; Mustang  
Emission Control

and much more!!



Example of colorized diagrams

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## Note from the Editor

This product was compiled using several original Ford Motor Company publications. In some cases, there are slight differences between publications, so it is important to compare between diagrams, schematics, or illustrations. The contents of this product were extracted from: *1971 Wiring and Vacuum Diagrams* (Form FD-7795P-71), *1965/1972 Ford Car Master Parts and Accessory Catalog* (Form FP-7635B), *1971 Car Shop Manual* (Volume III, FORM 7098-71-3), and *How to Read Wiring Diagrams* (FD-7943-G, January 1968).

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## ATTENTION

### Please Read This



It is important to note that there may be errors in the diagrams, even though they are original Ford publications. Below are two examples of possible errors because the color code on the page diagram does not match the master Car Standard Wire Code Chart. If your vehicle has a color coded wire that does not match a diagram you should consult the other diagrams contained in the manual for a possible match.

#### *Example of possible errors*

27	YELLOW
38	BLACK
54	LT. GREEN-YELLOW STRIPE
158	BLACK-PINK HASH STRIPE

In the wiring diagrams from the Ford publication Form 7795P-71, the Key Warning Buzzer Wiring Color Code shows:

**38 Black**

However, the Car Standard Wire Color Code Chart lists:

**38 Black-Orange Stripe**

37	YELLOW
38	BLACK
54	LT. GREEN-YELLOW STRIPE
158	BLACK-PINK HASH STRIPE

In the wiring diagrams from the Ford publication Form 7795P-71, the Key Warning Buzzer Wiring Color Code shows:

**158 Black-Pink HASH STRIPE**

However, the Car Standard Wire Color Code Chart lists:

**158 Black- Pink HASH**

The color coded wiring diagrams are provided for illustration purposes only. Only the wire number should be used for the identification of the wire itself. The color coding of the wires in the product may not match the actual colors of the wires in the vehicle. In some cases, the colors have been altered to provide a visual contrast (i.e. the color white has been shaded to make it more visible). As stated in the paragraph above, there are some variation and/or differences between the original Ford wiring diagrams. If your vehicle has a color coded wire that does not match a diagram you should consult the other diagrams contained in the manual for a possible match.

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Source Document  
Ford Publication Form 7795P-71

# 1971

COURSE 13003 and 1703

# WIRING and VACUUM DIAGRAMS



**SERVICE  
TRAINING**

FORM 77



# FOREWORD

This book contains wiring and vacuum diagrams for all Ford and Lincoln-Mercury car lines and all Ford trucks.

Both wiring and vacuum diagram replacement sheets will be released as required to keep the book current.

All vacuum systems are contained in a separate section.

This book is divided by vehicles. Refer to the applicable section as follows:

- Pinto
- Maverick and Comet
- Mustang and Cougar
- Torino
- Montego
- Ford and Meteor
- Mercury
- Thunderbird
- Mark III
- Lincoln
- Bronco, Econoline and P-Series
- B and F 100 750 Series
- C and CT-Series
- W-Series
- L-Series



The illustrations contained in this book were in effect at the time the book was approved for printing. Ford Motor Companies, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change specifications or design, without notice and without incurring obligation.



# HOW TO USE THE WIRING DIAGRAMS

Two styles of wiring diagrams are contained in this book.

I – Cars (Except Mustang, Cougar and Lincoln) and L-Series Truck.

II – Mustang, Cougar, Lincoln and Truck (Except L-Series)

## I – CARS (Except Mustang, Cougar and Lincoln) AND L-SERIES TRUCKS

Each electrical circuit is illustrated in a clear and easy to follow style.

There are 7 steps that should be followed to use this diagram to diagnose electrical problems.

- Verify the complaint
- Refer to the Index
- Locate Inoperative system
- Identify other systems on the circuit
- Isolate the problem area
- Correct the problem
- Operate the corrected system

### VERIFY THE COMPLAINT

To diagnose a customer complaint "Back Up Lights Don't Work" the first thing we should do is verify the complaint.

If both lights do not work, refer to the INDEX on page 1 of the vehicle schematic.

See LAMPS – BACK-UP on the INDEX. The INDEX lists the location of the part on the drawing.

The drawing is set up like a road map. For example: the Pinto Back-up lights are located at B-27. To locate B-27 on the schematic, find the number 27 at the top of the illustration.

Now, find the letter B on the side of the illustration. Follow the number and the letter until they intersect. The part will be within an inch or two of the intersection.

### LOCATE INOPERATIVE SYSTEM

Generally, the power supply for all components on this drawing comes from the top of the page and over to the battery at the left.

The ground for each component is always toward the bottom of the drawing.

There are symbols used on this drawing that are explained as follows:

- Ground symbols are shown in Figure 1. A ground wire connected away from the component is identified by a code G1 or G2, etc. The location of the remote ground is listed in the GROUND CODES chart and the bottom of the page.



Fig. 1 — Ground Symbols

- Wire color code is shown in Fig. 2. Wiring Color Codes are listed at the bottom of the drawing. New Standard Wiring Color Codes are listed behind these instructions.

140B

Fig. 2 — Wire Color Code



1 to locate the

## CORRECT THE PROBLEM

Use standard continuity tests for open circuits and short circuit tests to find the specific problem.

Repair or replace the electrical component that is malfunctioning.

## OPERATE CORRECTED SYSTEM

It is a good practice to operate the system after a repair has been made to see if it now works.

## BULB AND FUSE CHART

A bulb and fuse chart is included on the first page of this schematic for your convenience.

## II – MUSTANG, COUGAR, LINCOLN AND TRUCKS (Except L-Series)

The index page is the first page in each section. Each electrical schematic will have a notation as to the source of power for that system. All wires will be shown as single lines to provide a clear understanding of the diagrams. To trace a circuit, it is recommended to start at the ground circuit of the inoperative component, trace it through all connectors to the source, and note the possible trouble areas and points of most convenient access. Wire connectors will be identified on the schematic and the pictorial drawings, this will show the technician the location of the connectors. Most wire connectors are shown in open book fashion. A wire on the top right of a connector (open side by side) will be on the top left side of the other half of the connector. See Figure 9 (Wire No. 140 to No. 140A, etc.)

Wire disconnects and connectors will all be black unless a color code is noted on the diagram. The colored disconnects and connectors are to aid the technician in finding the proper circuit to be tested or traced. Pictorial drawings of a component will include specific location of some components in cases where the component is located in the engine

Relays and switches are shown in the "System Off" position. If a vehicle specific wire color in a connector does not match the diagram shown, it can usually be identified by comparing the other colors shown at the wire connectors. Specific wire color deviations in the manufacturing of a wire harness are usually for a short duration.

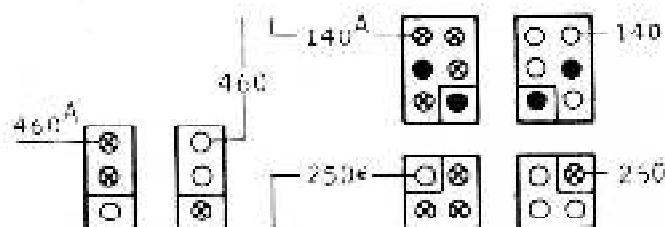


Fig. 9 – Connectors



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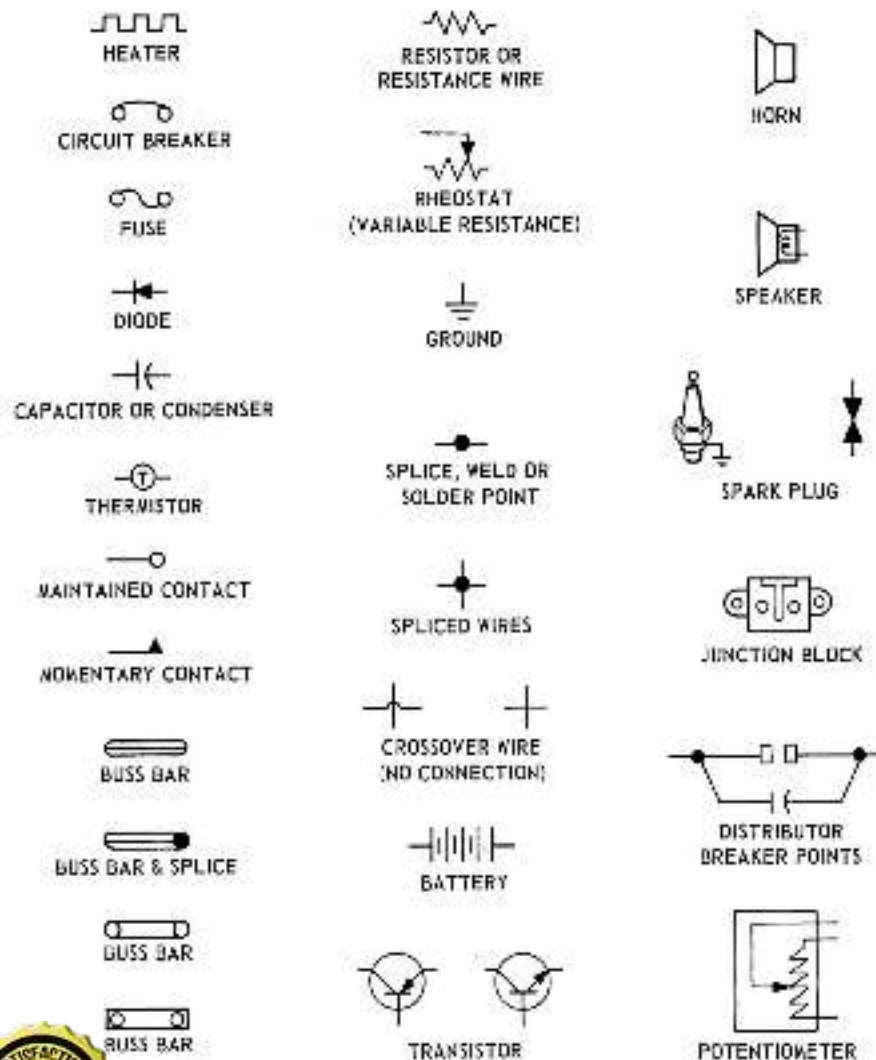
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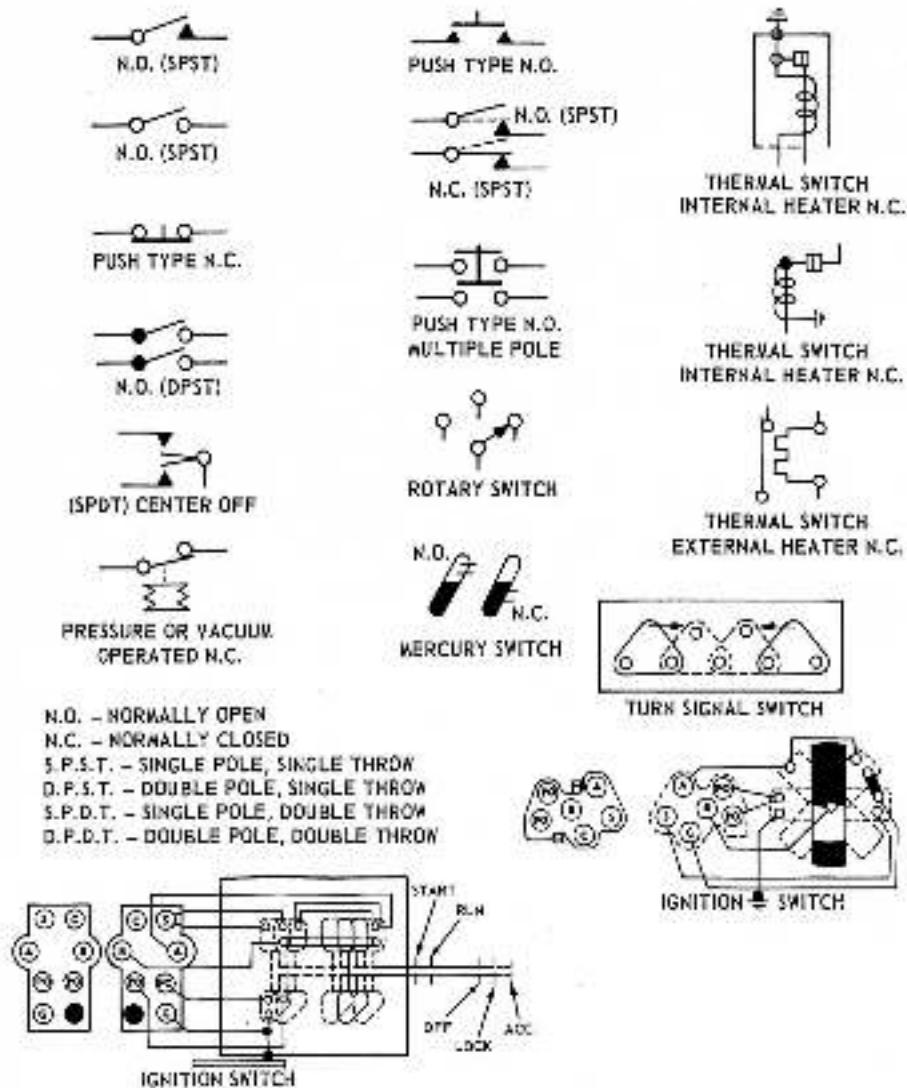
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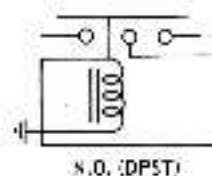
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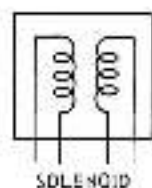
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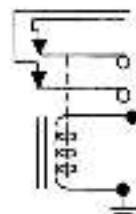
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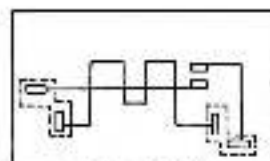
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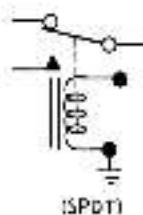
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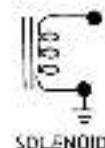
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MAP LAMP RELAY



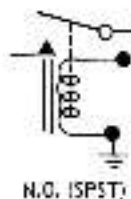
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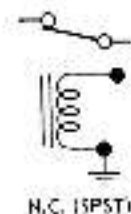
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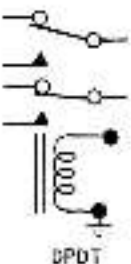
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## LAMPS



SINGLE  
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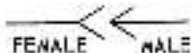
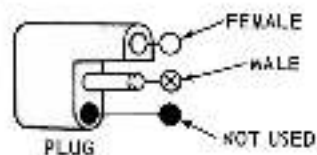


DOUBLE  
FILAMENT

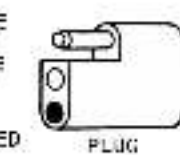


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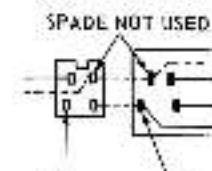
## CONNECTORS



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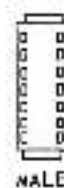


BULLET  
CONNECTOR



FEMALE  
SPADE  
CONNECTOR

MALE  
SPADE  
CONNECTOR



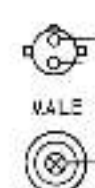
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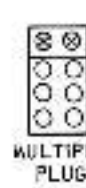
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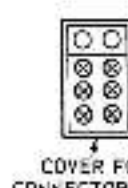
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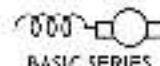


MULTIPLE  
PLUG



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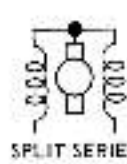
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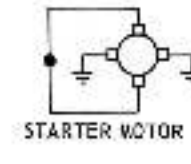
BASIC SERIES



PERMANENT MAGNET

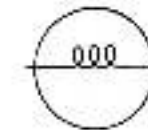
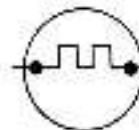


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## GAUGES



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N.C. - NORMALLY CLOSED  
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D.P.S.T. - DOUBLE POLE, SINGLE THROW  
S.P.D.T. - SINGLE POLE, DOUBLE THROW  
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# 1971 MUSTANG AND COUGAR ELECTRICAL DRAWINGS

## SECTION 2 INDEX

	PICTORIAL	SCHEMATIC		PICTORIAL	SCHEMATIC		PICTORIAL	SCHEMATIC
<b>AIR CONDITIONER</b>			<b>GAUGES</b>			<b>POWER SEAT</b>		
Mustang & Cougar	2-E5	2-E29	Mustang	2-E4	2-E11	Cougar		2-E25
<b>CHARGING</b>			Cougar	2-E5	2-E12	<b>POWER WINDOWS</b>		
Mustang	2-E2	2-E10 & 11	Cougar XFF	2-E5	2-E14	Mustang & Cougar	2-E4	2-E32
Cougar	2-E3	2-E13 & 11	<b>HEADLAMP "ON" WARNING BUZZER</b>		2-E29	<b>RADIO AND STEREO TAPE</b>		
Cougar XFF	2-E3	2-E12 & 13				Mustang & Cougar	2-E18 & 19	2-E31
<b>CIGAR LIGHTER</b>			<b>HEATED BACKLITE</b>			<b>SEAT BACK LATCH</b>		2-E7 & 8
Mustang	2-E2	2-E22	Mustang		2-E6	<b>SEAT BELT REMINDER LIGHTS</b>		
Cougar	2-E3	2-E22	Cougar		2-E33	Mustang & Cougar	2-E3 & 4	2-E19 & E15
<b>CLOCK</b>			<b>HEATER AND DEFROSTER</b>			<b>STARTING</b>		
Mustang	2-E5	2-E22	Mustang & Cougar	2-E2 & 3	2-E26	Mustang	2-E2	2-E11
Cougar	2-E4	2-E23	<b>HORNS</b>			Cougar	2-E3	2-E12
<b>CONVENIENCE SYSTEMS</b>			Mustang & Cougar	2-E2 & 3	2-E34	Cougar XFF	2-E3	
Mustang		2-E8	<b>KEY WARNING BUZZER</b>		2-E39	<b>TACHOMETER</b>		
Cougar		2-E4	<b>IGNITION</b>			Mustang & Cougar	2-E5	2-E11
<b>CONVERTIBLE TOP</b>			Mustang	2-E2	2-E10 & 11	<b>TURN SIGNALS</b>		
Mustang & Cougar	2-E2 & 3	2-E19	Cougar	2-E3	2-E12 & 13	Mustang	2-E1	2-E16
<b>EMISSION CONTROL</b>			<b>INTERIOR LIGHTS</b>			Cougar	2-E1	2-E23
Mustang 3.0L Auto Trans.		2-E34	Mustang	2-E2	2-E21	<b>WINDSHIELD WIPERS AND WASHERS</b>		
<b>EXTERIOR LIGHTS</b>			Cougar	2-E3	2-E21	Mustang & Cougar	2-E2 & 3	
Mustang	2-E2	2-E16 & 17	Cougar XFF	2-E3	2-E24	Mustang & Cougar (Transmitter)		
Cougar	2-E3	2-E18 & 19	<b>PARKING BRAKE WARNING LIGHT</b>		2-E9 & 10			
Radi		2-E15						

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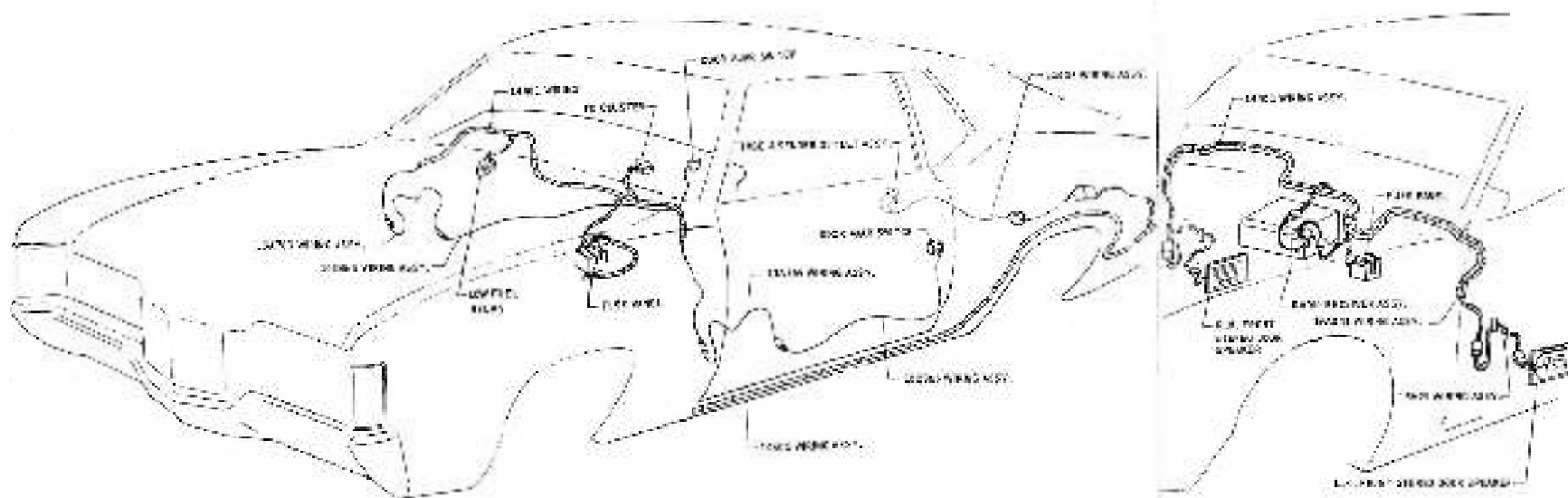
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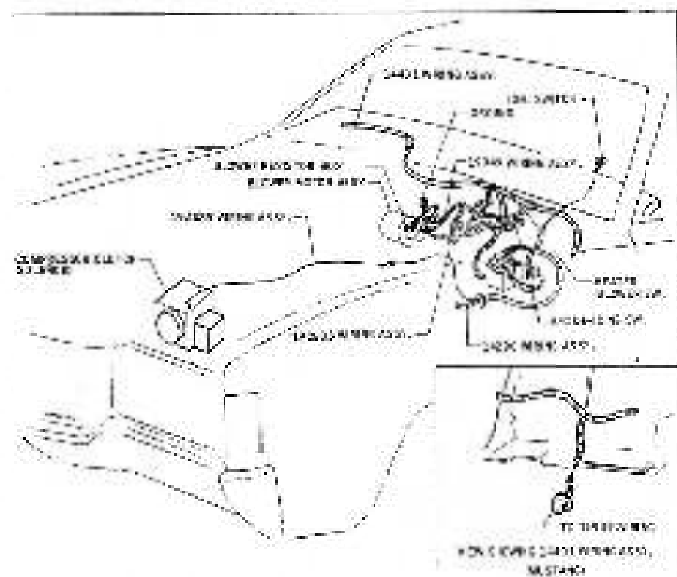




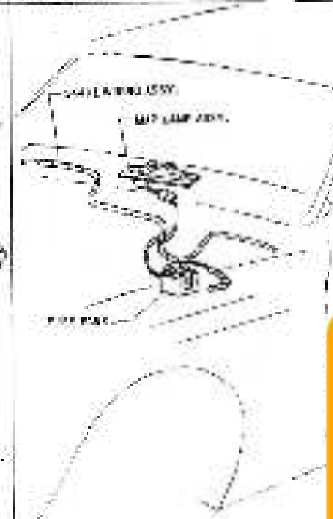
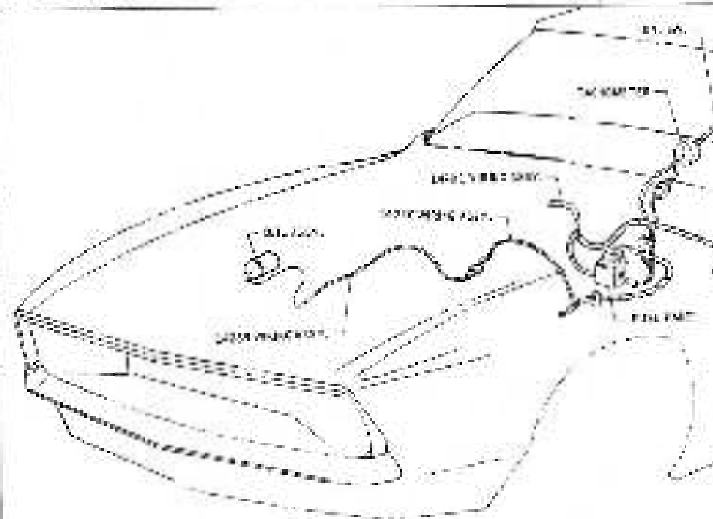


QUARTER LEFT SIDE VIEWING & RIGHT SIDE VIEWING

QUARTER RIGHT SIDE VIEWING & LEFT SIDE VIEWING



REAR VIEWING & FRONT VIEWING



FRONT VIEWING & REAR VIEWING

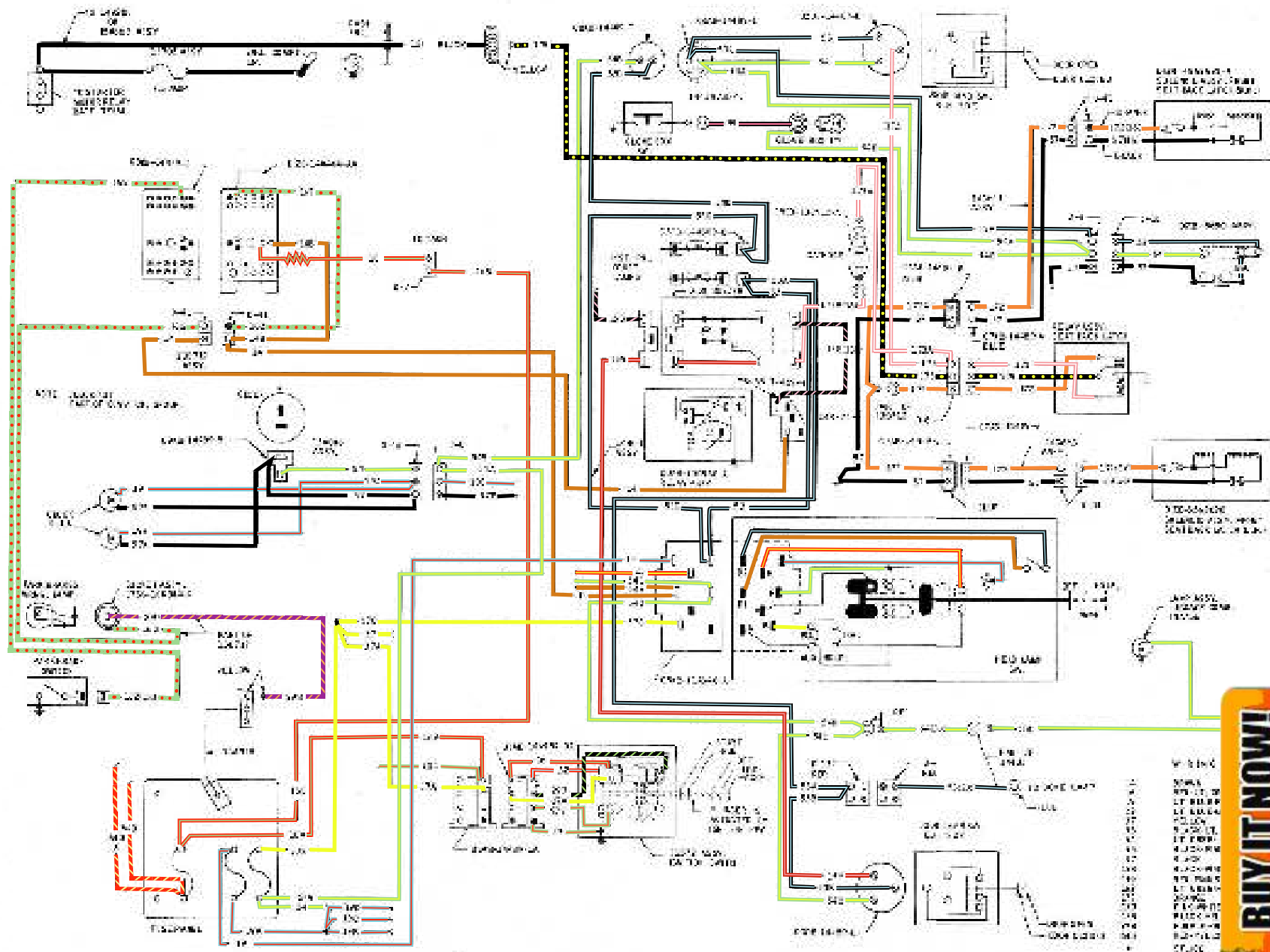
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# 1971

COURSE 13003 and 1703

# WIRING and VACUUM DIAGRAMS



**SERVICE  
TRAINING**

FORM 77



# 1971 VACUUM SYSTEMS INDEX

## FORD-MERCURY-METEOR VACUUM SYSTEM

INCLUDES FORCED VENT SYSTEM .....	V-2
INCLUDES MANUAL AIR CONDITIONER .....	V-3
INCLUDES AUTOMATIC TEMPERATURE CONTROL .....	V-4

LINCOLN CONTINENTAL VACUUM SYSTEM .....	V-5
---	-----

MAVERICK-COMET VACUUM SYSTEM .....	V-6
------------------------------------	-----

MUSTANG-COUGAR VACUUM SYSTEM .....	V-7
------------------------------------	-----

PINTO VACUUM SYSTEM .....	
---------------------------	--

THUNDERBIRD-MARK III VACUUM SYSTEM .....	
--	--

TORINO-MONTEGO VACUUM SYSTEM .....	
------------------------------------	--



## HOW TO USE THE VACUUM DIAGRAMS

IF IT IS A FORD CAR LINE VACUUM SYSTEM, THE TECHNICIAN WILL FIND A PAGE FOR THE TOTAL SCHEMATIC SYSTEM AS WELL AS A LISTING FOR A SCHEMATIC AND PICTORIAL OF EACH SUBSYSTEM ON EACH SECTION INDEX PAGE. IT IS RECOMMENDED THAT THE TECHNICIAN FIRST TURN TO THE TOTAL SYSTEMS SCHEMATIC TO DETERMINE IF THERE ARE ANY BRANCH SYSTEMS OPERATING FROM THE SAME SOURCE. THIS WILL ASSIST IN LOCATING SYSTEM TROUBLES. HE WILL THEN BE ABLE TO TURN TO A PAGE TO FIND DETAILED INFORMATION ON A PARTICULAR SYSTEM. IN TRACING VACUUM SYSTEMS, IT IS RECOMMENDED THAT A CIRCUIT BE TRACED FROM ITS CONTROL UNIT TO ITS SOURCE OF VACUUM, AND THEN FROM THE CONTROL UNIT TO THE OPERATING UNIT, NOTING POINTS OF POSSIBLE MALFUNCTION AND ACCESSIBILITY.

THE VACUUM SYMBOLS AND THEIR MEANINGS ARE NOTED ON EACH DIVIDER PAGE TO PROVIDE A CLEAR UNDERSTANDING OF THE DIAGRAMS.

### VACUUM

#### CIRCUIT SYMBOLS



VACUUM NO. 1 OR 2 RESERVOIR



INTAKE MANIFOLD PORTING



VACUUM CONTROL



OR



DUAL VACUUM MOTOR



TEE CONNECTOR



4-WAY TEE CONNECTOR



VACUUM DISTRIBUTOR



OR



VACUUM LINE OR AIR SOURCE



CONNECTOR



BLEED VALVE AND CHECK VALVE



BLEED ON A MOTOR



OR



CAP (NOT OPEN)



GROUP CONNECTION



HOSE CLAMP



DASH RUBBER GROMMET



CHECK VALVE



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# 1971 CAR SHOP MANUAL

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- Volume III - Electrical
- Volume IV - Body
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MONTEGO

COUGAR

COMET

METEOR

MERCURY

LINCOLN  
CONTINENTAL

CONTINENTAL  
MARK III



IDENTIFICATION CODES	10
WHEELS and TIRES	11
BRAKES	12
STEERING	13
SUSPENSION	14
DRIVING SHAFTS	15
CLUTCH and MANUAL TRANSMISSION	16
AUTOMATIC TRANSMISSION	17

## VOLUME ONE

IDENTIFICATION CODES	20
GASOLINE ENGINES	21
IGNITION SYSTEM	23
FUEL SYSTEM	24
EXHAUST SYSTEM	26
COOLING SYSTEM	27
STARTING SYSTEM	28

## VOLUME TWO

# VOLUME THREE ELECTRICAL

IDENTIFICATION CODES	40
SEATS	41
WINDOW GLASS and MECHANISMS	42
STATIONARY WINDOW GLASS	43
DOORS, HOOD, LUG PARTS and	44
INTERIOR TRIM	45
TOPS and EXTERIOR FINISHES	46
BODY SHELL, EXTERIOR TRIM, FRAME AND UNDERBODY	47

## VOLUME FOUR

MAINTENANCE and LUBRICATION	50
-----------------------------	----

## VOLUME FIVE

# GROUP INDEX

IDENTIFICATION CODES 30

CHARGING SYSTEM 31

LIGHTING SYSTEM 32

INSTRUMENTS, CLUSTERS  
and CONTROLS 33

MAIN WIRING HARNESSSES  
and CIRCUIT PROTECTION 34

AUXILIARY EQUIPMENT 35

VENTILATING HEATING  
and AIR CONDITIONING 36

SPEED CONTROL  
and ANTI-SKID CONTROL 37



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## FOREWORD

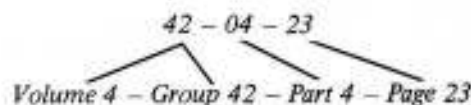
*This manual is divided into five volumes: 1 – Chassis, 2 – Engine, 3 – Electrical, 4 – Body, 5 – Maintenance and Lubrication. These volumes should provide Service Technicians with complete information covering normal service repairs on all 1971 model passenger cars (except Pinto) built by the Ford Companies in the U. S. and Canada. Service procedures for the Pinto are covered in the Pinto Car Shop Manual. As changes in the product occur, this information will be updated by Technical Service Bulletins. When issued, TSB information always supersedes that published herein.*

*Within each volume, information is grouped by system or component plus "General Service" parts which contain information which is common to several similar components.*

*The table of contents on the first page of each volume indicates the general content of the book and provides a handy tab locator to make it easy to find the first page of each "Group". That page will contain an index to "Parts" and the first page of each "Part" contains a detailed index which gives page location for each service operation covered. Page numbers are consecutive in each "Part".*

*To make reference easier, information has been broken down into smaller units so that essentially there is now one "Part" for each component or system. Group numbers indicate the volume in which the group may be found.*

*Indicates:*



*The descriptions and specifications in this manual were in effect at the time this manual was approved for printing. Ford Marketing Corporation reserves the right to discontinue models at any time, or change specifications or design, without notice and without incurring obligation.*



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# Identification Codes

GROUP  
**30**

## PART 30-01 Car Identification Codes

### OFFICIAL VEHICLE IDENTIFICATION NUMBER

The official Vehicle Identification Number (VIN) for title and registra-

tion purposes is stamped on a metal tab that is riveted to the instrument panel close to the windshield on the driver's side of the car and is visible from outside (Fig. 1).



MANUFACTURED BY FORD MOTOR COMPANY 100001

08/70 THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON DATE OF MANUFACTURE SHOWN ABOVE.

NOTE: WORDING WILL VARY WITH VEHICLE LINE

1	2	3	4	5	6	7	8	9	10	11
VEH. IDENT. NO.	1S53F100001	BODY	54D	COL.	A					
TRIM	3A	AXLE	2	TRNS.	W	DSO	33			

NOT FOR TITLE OR REGISTRATION

MADE IN U.S.A.

- 1 CONSECUTIVE UNIT NO.
- 2 BODY SERIAL CODE
- 3 MODEL YEAR CODE
- 4 ASSEMBLY PLANT CODE
- 5 ENGINE CODE
- 6 TRIM CODE
- 7 REAR AXLE CODE
- 8 COLOR CODE
- 9 BODY TYPE CODE
- 10 DISTRICT - SPECIAL EQUIPMENT CODE
- 11 TRANSMISSION CODE

### VEHICLE CERTIFICATION LABEL

The Vehicle Certification Label (V.C. Label) is attached to the rear face of the driver's door. The upper half of the label contains the name of the manufacturer, the month and year of manufacture and the certification statement. The V.C. label also contains the Vehicle Identification Number. This number is also used for Warranty identification of the vehicle. The first number indicates the model year. The letter following the model year number indicates the manufacturing assembly plant. The next two numbers designate the Body Serial Code followed by a letter expressing the Engine Code. The last six digits of the Vehicle Identification Number indicate the Consecutive Unit Number.

The remaining information on the V.C. Label consists of pertinent vehicle identification codes. The **BODY** code is two numerals and a letter identifying the body style. The **COL** (color) code is a number or letter (or both) indicating the exterior paint color code. The **TRIM** code consists of a number-letter combination designating the interior trim. The **axle** code is a number or letter indicating the rear axle ratio and standard or locking type axles. The **TRNS.** code is a number or letter indicating the type of transmission, numerals for manual and letters for automatic. The **DSO** code consisting of two numbers designates the district in which the car was ordered and may appear in conjunction with a Domestic Special Order or Foreign Special Order number when applicable. Ford of Canada **DSO** codes consist of a letter and a number.

### MODEL YEAR CODE

The number 1 designates 1971.

Y 1298-A



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and Identification Number



## CONSECUTIVE UNIT NUMBER

Starting Serial Numbers—1971  
Passenger Cars

100,001—Ford, Torino, Mustang,  
Thunderbird, Maverick

500,001—Mercury, Meteor,  
Montego, Cougar, Comet

800,001—Lincoln Continental &  
Continental Mark III

## ASSEMBLY PLANT CODES

Code Letter	
A	Atlanta
B	Oakville (Canada)
E	Mahwah
F	Dearborn
G	Chicago
H	Lorain
J	Los Angeles
K	Kansas City
N	Norfolk
P	Twin Cities
R	San Jose
S	Allen Park
T	Metuchen
U	Louisville
W	Wayne
X	St. Thomas
Y	Wixom

CY-1299-A

## DATE CODES

A number signifying the date precedes the month code letter. A second-year code letter will be used if the model exceeds 12 months.

Month	Code First Year	Code Second Year
January	A	N
February	B	P
March	C	Q
April	D	R
May	E	S
June	F	T
July	G	U
August	H	V
September	J	W
October	K	X
November	L	Y
December	M	Z

## DISTRICT CODES (DSO)

Units built on a Domestic Special Order, Foreign Special Order, or other Special orders will have the complete order number in this space. Also to appear in this space is the two-digit code number of the District which ordered the unit. If the unit is a regular production unit, only the District code number will appear.

## FORD

Code	District
11	Boston
13	New York
15	Newark
16	Philadelphia
17	Washington
21	Atlanta
22	Charlotte
24	Jacksonville
25	Richmond
28	Louisville
32	Cleveland
33	Detroit
35	Lansing
37	Buffalo
38	Pittsburgh
41	Chicago
43	Milwaukee
44	Twin Cities
46	Indianapolis
47	Cincinnati
51	Denver
53	Kansas City
54	Omaha
55	St. Louis
56	Davenport
61	Dallas
62	Houston
63	Memphis
64	New Orleans
65	Oklahoma City
71	Los Angeles
72	San Jose
73	Salt Lake City
74	Seattle
75	Phoenix
83	Government
84	Home Office Reserve
85	American Red Cross
89	Transportation Services
90-99	Export

## LINCOLN-MERCURY

Code	District
11	Boston
15	New York
16	Philadelphia
17	Washington
21	Atlanta
22	Dallas
23	Jacksonville
26	Memphis
31	Buffalo
32	Cincinnati
33	Cleveland
34	Detroit
41	Chicago
42	St. Louis
46	Twin Cities
51	Denver
52	Los Angeles
53	Oakland
54	Seattle
84	Home Office Reserve
90	Export

## FORD OF CANADA

Code	District
B1	Central
B2	Eastern
B3	Atlantic
11 thru 17	Export
B4	Midwestern
B6	Western
B7	Pacific

Note: Canadian Lincoln-Mercury units use prefix "A" in place of "B".

CK2456-B

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# Charging System

GROUP  
**31**

<b>PART 31-01</b>	<b>PAGE</b>	<b>PART 31-21</b>	<b>PAGE</b>
Charging System General Service ..	31-01-01	Leece-Neville Alternators .....	31-21-01
<b>PART 31-02</b>		<b>PART 31-40</b>	
Batteries .....	31-02-01	Autolite Alternator Regulator .....	31-40-01
<b>PART 31-10</b>		<b>PART 31-42</b>	
Autolite Alternators .....	31-10-01	Leece-Neville Alternator Regulator .....	31-42-01

## PART 31-01 Charging System General Service

COMPONENT INDEX	PAGE	COMPONENT INDEX	PAGE
DESCRIPTION AND OPERATION .....	31-01-01	TESTING .....	31-01-01
Fuse Link - Charging System .....	31-01-01	Charging System .....	31-01-01
REMOVAL AND INSTALLATION .....	31-01-02	Fuse Link Continuity Test .....	31-01-02
Fuse Link Replacement .....	31-01-02		

### 1 DESCRIPTION AND OPERATION

#### CHARGING SYSTEM FUSE LINK

The fuse link is a short length of insulated wire integral with the engine compartment wiring harness. It is several wire gages smaller than the circuit that it protects. Production fuse links are black. Service fuse links are green or black depending on usage. All

fuse links have the words FUSE LINK printed on the insulation. Fig. 1 shows fuse link installations.

The fuse link burns out, thus protecting the alternator or wiring, when heavy current flows, such as when a booster battery is connected incorrectly or a short to ground occurs

in the wiring harness.

A burned out link may have bare wire ends protruding from the insulation, or it may only have expanded or bubbled insulation with illegible identification. If it is hard to determine if the link is burned out, perform a continuity test.





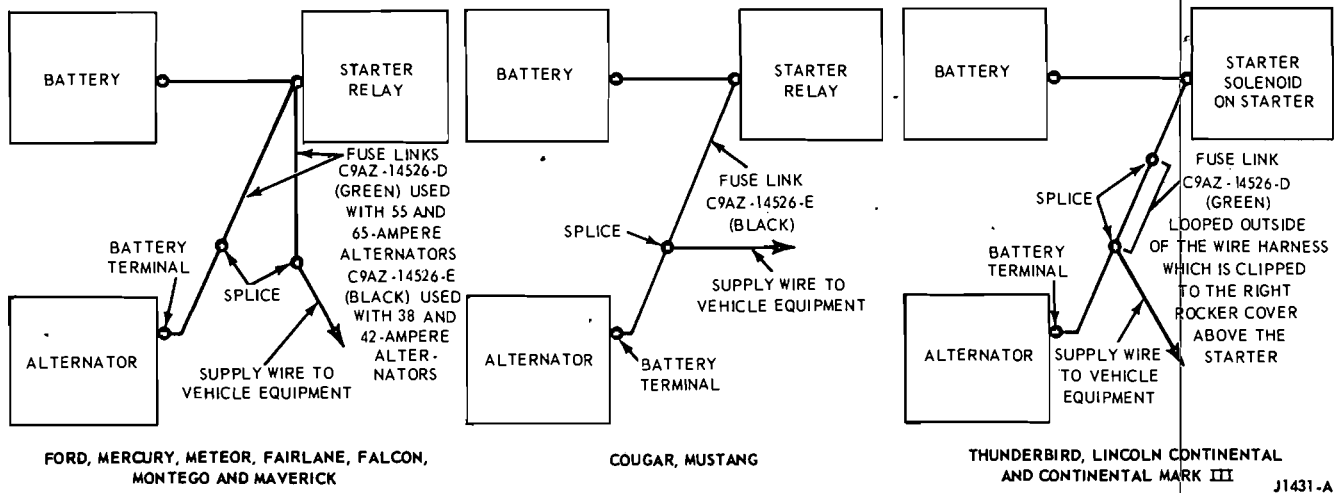


FIG. 1 Fuse Link Installation

## 2 TESTING

### CHARGING SYSTEM

The alternator and alternator regulator are precision built units, and the equipment to make tests in the charging system must be accurate. Voltmeters must be accurate within 0.1 (one tenth) volt within the range of 12 to 16 volts and ammeters within one ampere at 30 to 65 amperes to permit correct measurement of the alternator and regulator. The meters on Rotunda equipment should be calibrated once a year and the date of calibration stamped on the meter face. It is recommended that this practice be followed by technicians with other than approved equipment in order to maintain their meters at acceptable accuracy.

Certain tests outlined in this section are illustrated in schematic and in pictorial form. The schematic illustrates the internal connections of the Rotunda equipment so that these connections can be duplicated when this equipment is not available. The

Rotunda test units are a combination of accepted instruments incorporated into a single unit. The various circuits involved in the tests can be selected by means of switches without the necessity of changing connections. This reduces the time required to test units and circuits on the vehicle.

Where applicable, the tests are divided into On The Vehicle and On The Test Bench procedures. Either procedure can be followed depending on the equipment available for the tests.

Trouble shooting or diagnosis is required before actual repairs can be made in the electrical system. Even where an obvious fault makes the replacement of a unit necessary, you must still find out why the unit failed. The trouble shooting procedures given in the Electrical Systems Diagnosis Manual will aid in making a correct diagnosis. When a trouble is diagnosed correctly, unnecessary repairs are prevented, the time the vehicle is out of service will be decreased, and the

repairs that are made will be permanent.

### FUSE LINK CONTINUITY TEST

1. On the Cougar, Mustang, Thunderbird, Lincoln Continental and Continental Mark III, make certain first that the battery is OK, then turn on the headlights or any accessory. If the headlights or accessory do not operate, the fuse link is probably burned out.

2. On the Ford, Mercury, Meteor, Torino, Montego, Maverick and Comet, there are two fuse links (Fig. 1). Use the same procedure as in step 1 to test the fuse link that protects the vehicle equipment.

To test the fuse link that protects the alternator, make certain that the battery is OK then check with a voltmeter for voltage at the BAT terminal of the alternator. No voltage indicates that the fuse link is probably turned out.

## 4 REMOVAL AND INSTALLATION

stud on one end. When the terminal is not required, cut off the fuse link as close to the terminal as possible and strip approximately 3/8-inch of insulation from the cut end.

2. Disconnect the battery ground cable.

3. Disconnect the fuse link and/or fuse link eyelet terminal from the battery terminal of the starter



relay. On the Thunderbird, Lincoln Continental and the Continental Mark III, the fuse link is looped outside of the wire harness behind the point at which the harness is clipped to the right rocker cover above the starter.

4. Cut the fuse link and the

splice(s) from the wire(s) to which it is attached.

5. Splice and solder the new fuse link to the wire(s) from which the old link was cut. Use rosin core solder. Wrap the splice(s) completely with vinyl electricians tape.

6. Securely connect the eyelet terminals (if any) to the battery stud on the starter relay.

7. Install the repaired wiring as before using existing clips if provided.

8. Connect the ground cable to the battery.

1



## PART 31-02 Batteries

COMPONENT INDEX	PAGE	COMPONENT INDEX	PAGE
SPECIFICATIONS .....	31-02-03	TESTING.....	31-02-01
		With Rotunda Battery-Starter Tester (Are 16-31).....	31-02-02
		With Rotunda Cell Analyzer (SRECA-200).....	31-02-01

### 2 TESTING

Tests are made on a battery to determine the state of charge and also the condition. The ultimate result of these tests is to show that the battery is good, needs recharging, or should be replaced.

If a battery has failed, is low in charge, or requires water frequently, good service demands that the reason for this condition be found. It may be necessary to follow trouble shooting procedures to locate the cause of the

trouble. Refer to the Ford Car and Truck Diagnosis Manual for battery diagnosis procedures.

Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture can explode if flames or sparks are brought near the vent openings of the battery. The sulphuric acid in the battery electrolyte can cause a serious burn if spilled on the skin or spattered in the eyes. It should be flushed away

with large quantities of clear water.

Particular care should be used when connecting a booster battery in order to prevent sparks. Be certain to connect positive terminal to positive terminal and negative terminal to negative terminal.

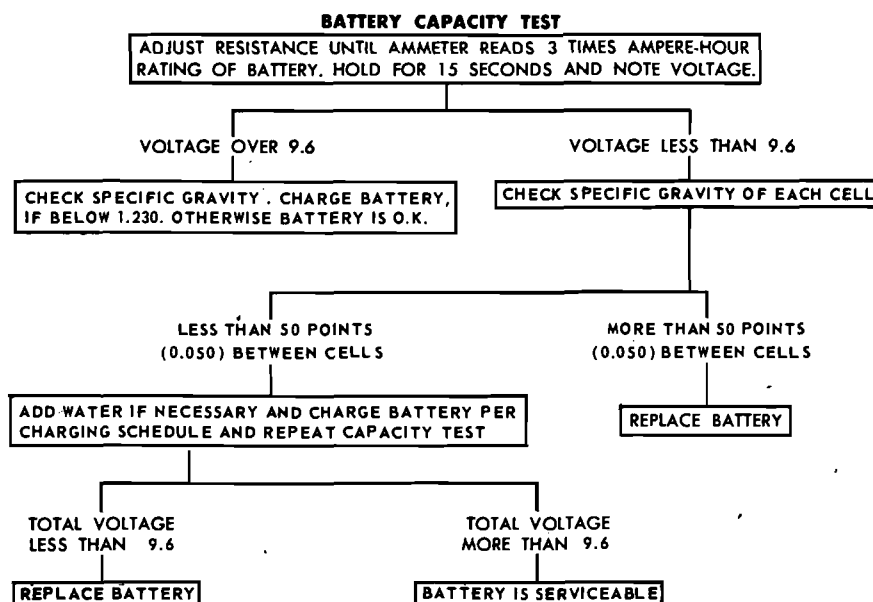
Before attempting to test a battery, it is important that it be given a thorough visual examination to determine if it has been damaged. The presence of moisture on the outside of the case and/or low electrolyte level in one or more of the cells are indications of possible battery damage.

Autolite batteries have a single one-piece cover which completely seals the top of the battery and the individual cell connectors. This cover must not be pierced with test probes to perform individual cell tests.

#### TESTS USING THE ROTUNDA CELL ANALYZER (SRECA-200)

The Rotunda Cell Analyzer (SRECA-200) measures the individual cell voltages by inserting probes into the cell openings. Follow the instructions provided with the unit.

A battery can also be tested by determining its ability to deliver current. This may be determined by conducting a Battery Capacity Test. Fig. 1 shows the battery capacity test in outline form.



J 1039-F



# TESTS USING THE ROTUNDA BATTERY—STARTER TESTER ARE 16-31

## Battery Capacity Test

A high rate discharge tester (Rotunda Battery-Starter Tester ARE 16-31) in conjunction with a voltmeter is used for this test.

1. Turn the control knob on the Battery Starter Tester to the OFF position.

2. Turn the voltmeter selector switch to the 20-volt position.

3. Connect both positive test leads to the positive battery post and both negative test leads to the negative battery post. The voltmeter clips must contact the battery posts and not the high rate discharge tester clips. Unless this is done, the actual battery terminal voltage will not be indicated.

4. Turn the load control knob in a clockwise direction until the ammeter reads three times the ampere hour rating of the battery. (A 45 ampere-hour battery should be tested at 135 amperes load).

5. With the ammeter reading the required load for 15 seconds, note the voltmeter reading. Avoid leaving the high discharge load on the battery for periods longer than 15 seconds.

6. If the voltmeter reading is 9.6 volts or more, the battery has good output capacity and will readily accept a charge, if required. Check the specific gravity. If the specific gravity reading is 1.230 or below, add water if necessary and charge the battery until it is fully charged (Fig. 1). Always disconnect the battery ground cable

Specific Gravity Reading	Charge Rate Amperes	Battery Capacity – Ampere Hours				
		45	55	70	80	85
1.125–1.150 ①	35	65 min.	80 min.	100 min.	115 min.	125 min.
1.150–1.175	35	50 min.	65 min.	80 min.	95 min.	105 min.
1.175–1.200	35	40 min.	50 min.	60 min.	70 min.	75 min.
1.200–1.225	35	30 min.	35 min.	45 min.	50 min.	55 min.
Above 1.225	5	②	②	②	②	②

① If the specific gravity is below 1.125, use the indicated high rate of charge for the 1.125 specific gravity, then charge at 5 amperes until the specific gravity reaches 1.250 at 80° F.

② Charge at 5 ampere rate only until the specific gravity reaches 1.250 at 80° F. At no time during the charging operation should the electrolyte temperature exceed 130° F.

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FIG. 2 Allowable Battery High Rate Charge Time Schedule

when charging the battery.

The battery is fully charged when the cells are all gassing freely and the specific gravity ceases to rise for three successive readings taken at hourly intervals. Additional battery testing will not be necessary after the battery has been properly charged.

7. If the voltage reading obtained during the capacity test is below 9.6 volts, check the specific gravity of each cell.

8. If the difference between any two cells is more than 50 points (0.050), the battery is not satisfactory for service and should be replaced.

9. If the difference between cells is less than 50 points (0.050), the battery should be charged according to the charging schedule in Fig. 2. In some cases the electrolyte level may be

too low to obtain a specific gravity reading. In such cases water should be added until the electrolyte level just covers the ring in the filler well, then charge the battery at 35 amperes for the maximum charging time indicated in Fig. 2 for the capacity of the battery being tested.

10. After the battery has been charged, repeat the capacity test. If the capacity test battery voltage is still less than 9.6 volts, replace the battery. If the voltage is 9.6 volts or more, the battery is satisfactory for service.

11. If the battery is found to be discharged only, check for a loose fan belt, loose electrical connections and charging system performance.



## 9 SPECIFICATIONS

### BATTERIES

Allowable Battery High Rate Charge Time Schedule						
Specific Gravity Reading	Charge Rate Amperes	Battery Capacity—Ampere Hours				
		45	55	70	80	85
1.125–1.150①	35	65 min.	80 min.	100 min.	115 min.	125 min.
1.150–1.175	35	50 min.	65 min.	80 min.	95 min.	105 min.
1.175–1.200	35	40 min.	50 min.	60 min.	70 min.	75 min.
1.200–1.225	35	30 min.	35 min.	45 min.	50 min.	55 min.
Above 1.225	5	②	②	②	②	②

① If the specific gravity is below 1.125, use the indicated high rate of charge for the 1.125 specific gravity, then charge at 5 amperes until the specific gravity reaches 1.250 at 80° F.

② Charge at 5 ampere rate only until the specific gravity reaches 1.250 at 80° F.

At no time during the charging operation should the electrolyte temperature exceed 130° F.

Battery Freezing Temperatures			
Specific Gravity	Freezing Temp	Specific Gravity	Freezing Temp
1.280	–90°F	1.150	+5°F
1.250	–62°F	1.100	+19°F
1.200	–16°F	1.050	+27°F
Battery Ampere Hours		Number Of Plates	
45		54	
55		66	
70		66	
80		78	

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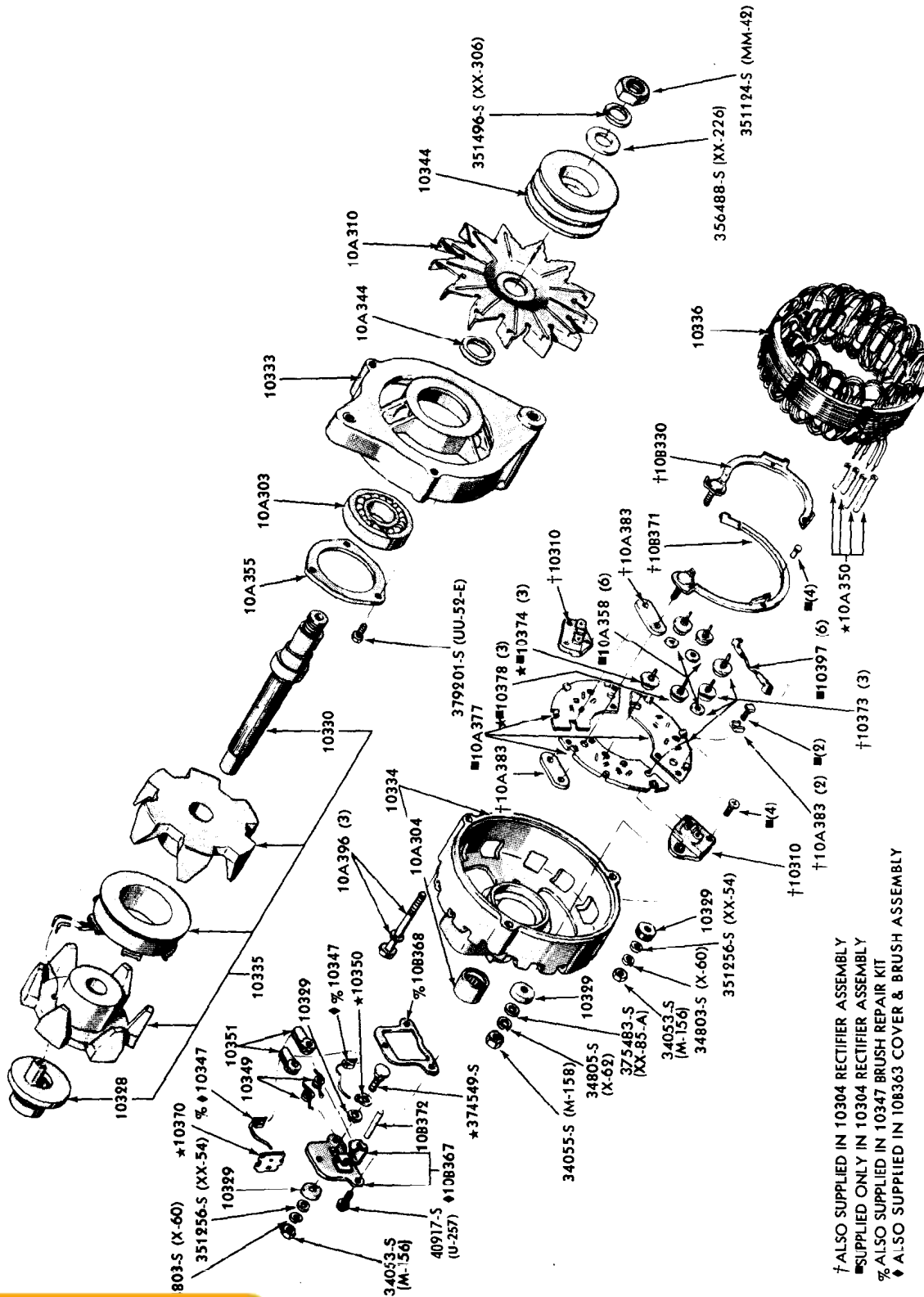
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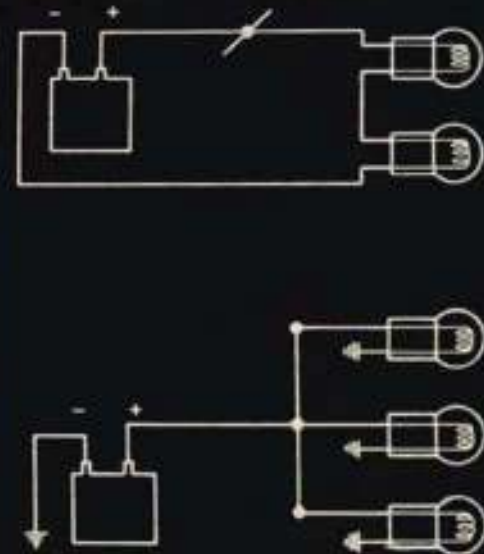
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## TABLE OF CONTENTS

Page

### INTRODUCTION

A LOGICAL APPROACH TO ELECTRICAL DIAGNOSIS . . . . .	1
Like reading a road map . . . . .	2
How wires are numbered and color-coded . . . . .	2
CIRCUIT — A COMPLETE ELECTRICAL PATH BETWEEN TWO POINTS . . . . .	5
2-wire circuit . . . . .	6
Single wire circuit . . . . .	6
Ground connections . . . . .	7
OPEN CIRCUITS . . . . .	8
Shorts . . . . .	9
Grounded circuit . . . . .	9
Series and parallel open circuits . . . . .	10
BREAKS IN PARALLEL CIRCUITS . . . . .	11
Common points . . . . .	14
Splices . . . . .	15
Fuses and circuit breakers . . . . .	17
Quick disconnects . . . . .	18
Male and female elements . . . . .	20
Types of quick disconnects . . . . .	22
HINTS FOR TRACING WIRES THROUGH A DRAWING . . . . .	23
Curve directions . . . . .	23
Common points . . . . .	24
Switches . . . . .	25
Relays . . . . .	26
Assemblies . . . . .	28
Locating the assembly . . . . .	29
Finding the wire . . . . .	30
SUMMARY . . . . .	31



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DEARBORN, MICHIGAN



# INTRODUCTION

## *The Why and Wherefore of Wiring Diagrams*

To the uninformed, a wiring diagram — or a wiring assembly — looks like it might take a genius to figure out.

Not so — as you'll find out when you get better acquainted with these subjects.

There're as understandable and logical as a road map and road markers, when you're finding your way on a cross-country drive.

The ability to read a wiring diagram and relate it to a vehicle's wiring system is, of course, an essential part of a modern service technician's skill. And it's growing in relative importance, too, due to owner's increasing demands for the comforts and conveniences supplied by electrically-operated options and accessories. This opens up greater opportunities, for the forward-looking technician.

## *The Purpose of this Booklet . . .*

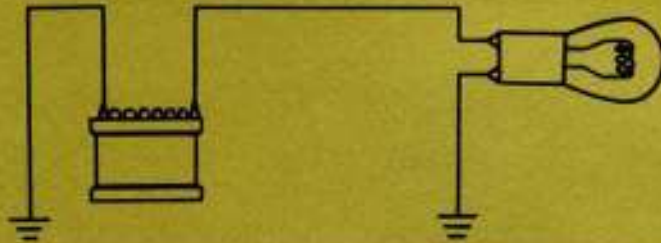
. . . is to acquaint you with the systems by which electrical circuits are traced on vehicles. Specifically, it is designed to help you acquire the ability to make your own power checks, quickly and accurately.

## *Scope of the Booklet*

Basically, this is a printed version of the film, "How to Read a Wiring Diagram." It is in no sense a manual of the shop methods by which electrical repairs are made.

It *can* be a helpful guide that can introduce you to the principles of wiring diagrams and vehicle wiring. As you gain experience in reading wiring diagrams, you'll accumulate your own know-how in this important skill. When it becomes "second nature" to you, these pages will have served their purpose — and yours.





To show how to read wiring diagrams — and to explain how they can be used to help you troubleshoot problems in the electrical system — is what this booklet is all about. Obviously, these are important subjects.

## A LOGICAL APPROACH TO ELECTRICAL DIAGNOSIS



If a customer comes in because his headlights aren't working, you can't just make a snap decision. That's not the *professional way*.



When you go to a doctor, for example, he tries to find out what's *really* wrong with you. He looks beyond the aches and pains you feel, to see what's *causing* the trouble. We call this, *diagnosis*.



Troubleshooting an electrical system calls for diagnosis, too — *Your* diagnosis. *You're* the doctor. You must find out what's causing the trouble, and fix it.



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