

# GROUP 10

## ELECTRICAL SYSTEMS

### SECTIONS IN GROUP 10

Section	Subject	Page	Section	Subject	Page
10-A	Electrical Specifications . . . . .	10-1	10-G	Signal Systems . . . . .	10-53
10-B	Battery and Cables. . . . .	10-6	10-H	Instruments and Clock . . . . .	10-60
10-C	Generating System . . . . .	10-13	10-I	Windshield Wiper and Washer Assembly . . . . .	10-92
10-D	Cranking (Starter) System . . . . .	10-23	10-J	Wiring Circuit Diagrams . . . . .	10-112
10-E	Ignition System . . . . .	10-32			
10-F	Lighting System . . . . .	10-46			

## SECTION 10-A

### ELECTRICAL SPECIFICATIONS

#### CONTENTS OF SECTION 10-A

Paragraph	Subject	Page	Paragraph	Subject	Page
10-1	Battery Specifications . . . . .	10-1	10-4	Ignition System Specifications . . .	10-3
10-2	Generating System Specifications . .	10-1	10-5	Lighting System Specifications . . .	10-4
10-3	Cranking (Starter) System Specifi- fications . . . . .	10-2	10-6	Signal Systems Specifications . . . .	10-5

### 10-1 BATTERY SPECIFICATIONS

Item	4400	46-47-4800
Make . . . . .	Delco	Delco
Model . . . . .	1980558	1980570
Location Under Hood . . . . .	R.F. Fender Skirt	L.F. Fender Skirt
Terminal Grounded . . . . .	Negative	Negative
Voltage . . . . .	12	12
Capacity—Wet (Amps. Hrs. @ 20 Hr. Rate) . . .	61	70
Number of Cells & Plates/Cell. . . . .	6, 11	6, 11
Specific Gravity, Full Charge @ 80° F. . . . .	1.260 to 1.280	1.260 to 1.280
Bench Charging Rate, Start . . . . .	5 Amps.	5 Amps.
Bench Charging Rate, Finish . . . . .	2 Amps.	2 Amps.
Separators . . . . .	Porous Rubber	Porous Rubber
Case . . . . .	Hard Rubber	Hard Rubber
Dimensions . . . . .	10 1/4" x 6 13/16" x 8 27/32" High	12 1/32" x 6 13/16" x 8 13/16" High

### 10-2 GENERATING SYSTEM SPECIFICATIONS

#### a. Generator

Make and Type . . . . .	Delco-Remy, Delcotron
Location, Side of Engine . . . . .	Upper Right
Drive and Rotation (Viewing Drive End) . . . . .	Fan Belt, Clockwise

	Standard		Air Condition	
	4400	46-47-4800	4400	46-47-4800
Number . . . . .	1100624	1100623	1100679	1100661
Speed Ratio, Gen. to Engine . . . . .	2.34 to 1	2.52 to 1	2.67 to 1	2.75 to 1
Field Current Draw (Amps.) @ 80° F. and 12 Volts . . .	1.9 to 2.3	1.9 to 2.3	2.1 to 2.5	2.1 to 2.5
Bench Test at 14 Volts (Amps. Cold @ Gen. RPM) . . .	42 @ 6500	42 @ 6500	55 @ 6500	55 @ 6500
Min. Current Output @ 500 Eng. RPM . . . . .	10 Amps.	10 Amps.	10 Amps.	10 Amps.
Min. Current Output @ 1500 Eng. RPM . . . . .	30 Amps.	30 Amps.	40 Amps.	40 Amps.
Belt Tension . . . . .	80 Lbs.	80 Lbs.	80 Lbs.	110 Lbs.

**b. Generator Regulator**

Make and Type . . . . .	Delco-Remy, Double Contact
Number . . . . .	1119515
Field Relay Air Gap . . . . .	.015"
Field Relay Closing Voltage . . . . .	2.3 to 3.7
Voltage Regulator Air Gap, Lower Points Just Touching . . . . .	.060"
Voltage Regulator Upper Contact Point Opening . . . . .	.014"
Voltage Regulator Upper Contact Setting @ 2000 Eng. RPM (After 15 Min. Warm-Up @ 1500 Eng. RPM) . . . . .	See Figure 10-21
Voltage Regulator Lower Contact Setting (Step Voltage) . . . . .	.1 to .3 Below Upper Setting

**c. Police Car Generator**

Make and Type . . . . .	Delco-Remy, Delcotron
Number . . . . .	1117765
Location, Side of Engine . . . . .	Right
Drive and Rotation (Viewing Drive End) . . . . .	Fan Belt, Clockwise
Speed Ratio, Generator to Engine . . . . .	2.62 to 1
Field Current Draw (Amps.) @ 80° F. and 12 Volts . . . . .	3.7 to 4.4
Bench Test at 14 Volts (Amps. Cold @ Generator RPM) . . . . .	62 @ 6500
Current Output @ 500 Engine RPM . . . . .	20 Amps. Min.
Current Output @ 1500 Engine RPM . . . . .	50 Amps. Min.
Belt Tension . . . . .	80 lbs.

**d. Police Car Generator Regulator**

Make and Type . . . . .	Delco-Remy, Transistor
Number . . . . .	9000590
Point Gap and Air Gap . . . . .	None, No Moving Parts
Voltage Setting @ 1500 Engine RPM . . . . .	14 ± .3 Volts

**e. Police Car Indicator Light and Field Relay**

Make and Type . . . . .	Delco-Remy, Single Contact
Number . . . . .	1115827
Air Gap, Points Just Touching . . . . .	.011" to .018"
Point Opening . . . . .	.020" to .030"
Closing Voltage . . . . .	2.5 to 3.5 Volts

**10-3 CRANKING (STARTER) SYSTEM SPECIFICATIONS**

**a. Cranking Motor**

	Series 4400	Series 46-47-4800
Make . . . . .	Delco-Remy	Delco-Remy
Number . . . . .	1107306	1107313
Location, Side of Engine . . . . .	Right	Left
Type of Shift . . . . .	Mechanical	Mechanical
Shift Actuation . . . . .	Solenoid	Solenoid
Shift Operation . . . . .	Ignition Switch	Ignition Switch
Type of Drive . . . . .	Overrunning Clutch	Overrunning Clutch
Rotation, Viewing Drive End . . . . .	Clockwise	Clockwise
Gear Ratio, Motor to Engine . . . . .	17.8 to 1	18.4 to 1
No. Teeth on Ring Gear and Drive Pinion . . . . .	160, 9	166, 9
Cranking Speed, Engine RPM (at Operating Temperature) . . . . .	160 Approx.	160 Approx.
No Load Test		
Amperes . . . . .	65 to 100	80 to 120
Volts . . . . .	10.6	10.6
RPM . . . . .	3600 to 5100	3900 to 5400
Locked Armature Test		
Amperes . . . . .	300 to 360	290 to 370
Volts . . . . .	3.5	2.0
Brush Spring Tension - Ounces . . . . .	35 min.	35 min.
Armature End Play . . . . .	.005" to .050"	.005" to .050"
Pinion Clearance in Cranking Position . . . . .	.010" to .140"	.010" to .140"

**b. Solenoid Switch**

	Series 4400	Series 46-47-4800
Make . . . . .	Delco-Remy	Delco-Remy
Solenoid Switch Number . . . . .	1114341	1114339
Current Draw of Solenoid Windings @ 80° F.		
Hold-in Winding, Amps. @ 10 Volts . . . . .	10.5 - 12.5	14.5 - 16.5
Both Windings in Parallel, Amps. @ 10 Volts . . . . .	42 - 49	41 - 47

**10-4 IGNITION SYSTEM SPECIFICATIONS**

**a. Ignition Coil and Resistor**

Make . . . . .	Delco-Remy
Coil Number (Less Bracket) . . . . .	1115087
Current Draw, Amperes @ 12.6 Volts	
Engine Stopped . . . . .	3.8
Engine Idling . . . . .	2.3
Coil Resistance (Ohms) @ 80° F.	
Primary . . . . .	1.28 to 1.42
Secondary . . . . .	7200 to 9500
Resistance Wire . . . . .	Part of Wiring Harness
Resistance, Ohms @ 80° F. . . . .	1.80 ± .05

**b. Spark Plugs**

	300 Engine	401 & 425 Engines
Make and Model (for Normal Operation) . . . . .	AC 44FFS	AC 44S
Make and Model (for High Speed Operation) . . . . .	AC 42FF	AC 42 COM
Thread and Shell Hex. Sizes . . . . .	14MM, 13/16"	14MM, 13/16"
Gap at Points . . . . .	.035"	.035"
Tightening Torque (ft. lbs.) . . . . .	20	30

**c. Distributor**

Make . . . . .	Delco-Remy
Drive . . . . .	From Camshaft
Rotation, Top View . . . . .	Clockwise
Vacuum Control Number . . . . .	1116210
Firing Order (300 Engine) . . . . .	1-8-4-3-6-5-7-2
Firing Order (401 and 425 Engines) . . . . .	1-2-7-8-4-5-6-3
Contact Point Opening . . . . .	.016" ± .003"
Contact Point Dwell Angle . . . . .	30° ± 1°
Dwell Variation . . . . .	3° Max.
Breaker Arm Spring Tension, Ounces . . . . .	19 to 23
Condenser Make and Capacity, Microfarads . . . . .	Delco-Remy, .18 to .23

	300 Engine	401 & 425 Engines (Except Dual 4-Bbl. with Autq. Trans.)	425 Engine* (Dual 4-Bbl. with Auto. Trans.)
Distributor Number (less Cap) . . . . .	1111050	1111055	1111058
Timing, Crankshaft Degrees before U.D.C. (with Vacuum Hose Disconnected and Engine Idling) . . . . .	2 1/2°	2 1/2°	12°
Centrifugal Advance, Crankshaft Degrees and RPM			
Start Advance, @ RPM . . . . .	550 to 750	600 to 800	550 to 950
Medium Advance, Degrees @ RPM . . . . .	12° to 16° @ 1400	13° to 17° @ 1400	1/2° to 4 1/2° @ 1000
Maximum Advance, Degrees @ RPM . . . . .	26° to 30° @ 4200	28° to 32° @ 3900	18° to 22° @ 3800
Vacuum Advance, Crankshaft Degrees and Inches of Vacuum			
Start Advance, @ In. of Vacuum . . . . .	6 to 8	6 to 8	6 to 8
Maximum Advance, Degrees @ In. of Vacuum . . . . .	14° to 18° @ 16	14° to 18° @ 16	14° to 18° @ 16

**10-5 LIGHTING SYSTEM SPECIFICATIONS**

**a. Lamps, Switches, Wiring**

Headlamp Make and Type . . . . .	Guide, Dual T-3 Sealed Beam
Headlamp Lens Diameter . . . . .	5 3/4"
Tail, Stop, Parking, Signal Lamps, Make . . . . .	Guide
Lighting Switch, Make . . . . .	Delco-Remy
Wiring Circuit Type . . . . .	Single Wire
Wiring Circuit Protection for Head and Front Parking Lights . . . . .	Thermo Circuit Breaker
Thermo Circuit Breaker Location . . . . .	In Lighting Switch
Thermo Circuit Breaker Calibration @ 75° F.	
Stay Closed Indefinitely @ Amps. . . . .	15
Open Within 60 Seconds @ Amps. . . . .	26

**b. Fuses and Circuit Breakers**

Used For	Type	Location
Back-up Lights . . . . .	10 Amp. 1 1/4"	Fuse Block
Blower, Heater-Air Conditioner, and Compressor Clutch . . . . .	30 Amp. 1 1/4"	Fuse Block
Courtesy and Glove Box Lights, Clock . . . . .	5 Amp. 1 1/4"	Fuse Block
Direction Signal, Signal Indicator and Stop Lights . . . . .	10 Amp. 1 1/4"	Fuse Block
Dome Light, Trunk Light and Rear Cigar Lighter . . . . .	20 Amp. 1 1/4"	Fuse Block
Guide-Matic Amplifier . . . . .	5 Amp. 1 1/4"	Fuse Block
Panel Lights and Rheostat . . . . .	3 Amp. 1 1/4"	Fuse Block
Parking Brake Light, Safety Buzzer or Cruise Control . . . . .	6 Amp. 7/8"	Fuse Block
Power Antenna Motor . . . . .	9 Amp. 7/8"	Fuse Block
Radio and Dial Light (Sonomatic) . . . . .	2.5 Amp. 7/8"	Fuse Block
Radio and Dial Light (Wonder Bar) . . . . .	7.5 Amp. 7/8"	Fuse Block
Rear Window Defroster . . . . .	6 Amp. 7/8"	Fuse Block
Tail, License and Cornering Lights, Panel Lights and Rheostat . . . . .	10 Amp. 1 1/4"	Fuse Block
Wiper and Washer Motor, Transmission Solenoids . . . . .	25 Amp. 1 1/4"	Fuse Block
Cigar Lighter . . . . .	Special	In Back of Lighter
Headlights, Front Parking Lights . . . . .	Circuit Breaker	In Light Switch
Power Windows, Vents, Top and Seat . . . . .	Circuit Breaker	Under Left Kick Pad
Tail Gate Wiper and Washer . . . . .	20 Amp. 1 1/4"	In Wiring Connector

**c. Lamp Bulbs**

Location	Bulb. No.	Candlepower
Ash Tray . . . . .	1445	.5
Ash Tray (4700) . . . . .	53	1
Auto. Trans. Control Dial (Console) . . . . .	1816	3
Auto. Trans. Control Dial (Instrument Panel) . . . . .	194	2
Back-Up . . . . .	1156	32
Clock Dial . . . . .	1893	2
Cornering . . . . .	1195	50
Courtesy, Console, Rear Seat Side Rail or Arm Rest . . . . .	90	6
Cruise Control Dial . . . . .	53	1
Dome, Center Roof . . . . .	1004	15
Glove Box . . . . .	1893	2
Headlight High Beam Indicator . . . . .	194	2
Headlight, 5 3/4" Dia., Type 1 (Inner) . . . . .	4001	37.5 Watts
Headlight, 5 3/4" Dia., Type 2 (Outer) . . . . .	4002-L	37.5-55 Watts
Heater-Air Conditioner Control Dial . . . . .	1893	2
Ignition Switch . . . . .	1445	.5
Indicator Lights (Hot, Cold, Oil and Amp.) . . . . .	194	2
Instrument Cluster Dials . . . . .	161	1
License . . . . .	1155	4
Parking Brake Warning . . . . .	1816	3
Parking, Lower (4700) . . . . .	1155	4
Radio Dial . . . . .	1881	1
Turn Signal and Parking, Front . . . . .	1157A	32-4
Turn Signal, Tail and Stop, Rear . . . . .	1157	32-4
Turn Signal Indicator . . . . .	194	2
Trunk . . . . .	89	6

## 10-6 SIGNAL SYSTEMS SPECIFICATIONS

Stop Light Switch, Type . . . . .	Mechanical
Stop Light Switch, Location . . . . .	Pedal Mounting Bracket
Direction Signal Switch, Make . . . . .	Delco-Remy
Direction Signal Flasher, Make and Type . . . . .	Tung-Sol, A-418B
Location . . . . .	Fuse Block
Design Load . . . . .	2 - 32 CP Bulbs
Flash Rate, Cycles per Min. . . . .	.60 to 120
Lamp Bulbs - No. and Candle Power . . . . .	See Par. 10-5, c
Direction Signal and Stop Light Fuse . . . . .	See Par. 10-5, b
Horn - Make and Type . . . . .	Delco-Remy, Solenoid
Horn Number, High Note . . . . .	9000470
Low Note . . . . .	9000469
Horn Amperage Draw at 12 Volts (Either Horn) . . . . .	4.5 to 5.5
Horn Relay and Junction Block Number . . . . .	382429
Horn Relay Adjustment	
Closing Voltage . . . . .	3.0 to 9.0
Speed Warning Buzzer Number . . . . .	1361529
Amperage Draw @ 14.5 Volts . . . . .	.14 Max.