F.8L Falco Electrical System

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F.8L Falco Electrical Kit Manual

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The F.8L Falco Electrical Kit Manual was originally written in 1986, and since then portions of the manual have been revised in 1986, 1992 and 1994 to correct minor deficiencies. At the time of these revisions, a system of tracking revisions had not been fully adopted, and Revision 1, 2, 3 and 4 were identified only by dates on the bottom of each page.

Revision 5 is a completely new version of the manual because the illustrations are now all an integral part of the document on our computers, and the manual has been extensively reformated with a new typeface and layout style. However, the content of the manual is essentially unchanged from Revision 4.

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Log of effective pages:

Page	Date
i thru ii	October 10, 1995
1-1 thru 1-7	October 10, 1995
2-1 thru 2-2	October 10, 1995
3-1 thru 3-4	October 10, 1995
4-1 thru 4-8	October 10, 1995
5-1 thru 5-4	October 10, 1995
6-1 thru 6-22	October 10, 1995
7-1 thru 7-3	October 10, 1995
8-1 thru 8-2	October 10, 1995
9-1 thru 9-7	October 10, 1995
A-1 thru A-11	October 10, 1995
B-1 thru B-2	October 10, 1995
C-1 thru C-2	October 10, 1995

Table of Contents

Chapter 1
Preparing for Installation

This manual will lead you through the installation of the electrical system for the Falco. Before proceeding with the installation, it is important that these instructions be read in their entirety, and the drawings should be studied in detail.

Revisions are included in Appendix C. Post All Revisions.

The electrical system for the Falco is a 14-volt system. You will sometimes hear of this sort of system referred to as a 12 volt system. To quickly clear up the 12/14 volt confusion that sometimes crops up, we should explain that each cell in a lead-acid battery will put out approximately 2.1 volts when fully charged. Thus, the six cell battery used in this system puts out a 12.6 volts when fully charged. To charge the battery, a slightly higher voltage must be put out by the alternator. The required voltage varies according to the temperature of the battery, but the voltage is approximately 14 volts for average conditions. For this reason, the terms "12 volt" and "14 volt" are used interchangeably.

An important feature of the Falco electrical system is that the instrument panel is designed to be easily removable. This means that all wires leading to and from the instrument panel must be routed through plugs. To facilitate the installation and to make the system easy to maintain, all of the wires are color-coded.

This system is designed around an alternator, and a generator may not be used. If your engine has a generator, you will have to obtain an alternator and the required mounting brackets.

Since the instrument panel for the Falco is removable, all of the wiring leading to and from the instrument panel must run through a series of plugs. Since these two parts of the electrical system can be separated from each other, they are normally referred to as completely separate entities. Accordingly, the wiring for the instrument panel is usually referred to as the "panel" wiring, and the wiring for the rest of the airplane is referred to as the "airframe" wiring.

The electrical drawings for the Falco electrical system are installation drawings: the various components are shown in their approximate location in the airplane, unlike schematic drawings in which the locations of components are not shown. The wiring for the instrument panel is always shown in a separate area from the airframe wiring, and the various locations of the components for the airframe wiring are shown in their approximate location. Look at sheet A38. Note that the wiring is shown in separate locations for the instrument panel, the engine compartment, the aft face of frame No. 1, the battery compartment and the aft face of frame No. 6. The plugs and receptacles for disconnecting the instrument panel are shown directly below the instrument panel and are labelled J1, P1, J2, P2, J3, and P3.

Additionally, the drawings are heavily detailed. Sheets A43-46 show details of the actual installation of the various components.

Begin by studying the electrical drawings. At this point in the construction of your aircraft, you will be familiar with reading drawings, but electrical drawings introduce a number of new and unfamiliar symbols. The wires are shown as lines, and the wires connect a variety of components. The components are shown by a series of symbols. In the case of switches, relays, and a number of other components, the symbols are graphic representatives of the internal construction and components, so you can look at the symbol for a switch and understand how it works. In other cases, such as diodes, capacitors, transistors and some of the more complex devices (commonly referred to as "black boxes"), the component cannot be drawn in such a way that its function is obvious. In those cases, a standard symbol is used or a simple rectangular box is drawn to indicate the device. Let's go through the drawings now and study these symbols.

Switches

See Sheet A38. Locate the master switch. The switch is shown on the left side of the drawing. Above the symbol for the switch is "S1". This is the component designator. All switches are designated by the letter "S" and by a number. To the right of the master switch is the alternator switch, designated "S2". To the far left of the drawing you will see the ignition switch, S23. This is a rather complicated rotary switch, but with some study its function is obvious.

Let's go back to the master switch for a moment. Note that on the outside of the rectangle there are four small circles. These are the terminals of the switch, and each is numbered. Each of the switches is shown in a detail drawing, so look up Detail J on sheet A44. Here you can see the terminals labelled for you. When you hook up the wires, you have to follow the wiring diagrams and refer to the details to locate the correct terminals.

In the case of S1 and S2, the switches are "double pole" switches. This means that they are, in effect, two separate switches which operate together in the same case. The broken line indicates that the contacts of the switches move together, and this does not indicate an electrical connection. Note on S23 that the dashed line indicates that four separate switches operate together, and that each switch has five positions. On this particular switch, the internal wiring of the switch is also shown.

The terminals for switches are designated by numbers or letters. Usually numbers are used, but sometimes the switches are supplied with letters on them, so in those cases the letters are used. The terminal numbering or lettering system is used for many other components, and in some cases the terminal is a colored wire leading from the component in which case the wire color is used as the terminal abbreviation. In the case of some single-pole single-throw switches, it does not matter which side of a switch is used for each wire leading to the switch as long as each wire leads to a different terminal, but it is customary to give the terminals numbers so that you might not mistakenly connect both wires to the same terminal of the switch. This would be the case for S6 shown on sheet A39.

While you are looking at sheet A39, locate the following switches: S5, S11, S7, S8, S9 and S10. In each case look up the detail showing the switch. In the case of S7, S8, S9 and S10, these switches are not shown in a detail showing the terminals. These switches have wires leading from them and each switch is marked with the letters C (for "common"), NO (for "normally open") and NC (for "normally closed"). Now go on to the other drawings and locate the rest of the switches.

Later when we get into the wiring and the wire tabulation, we will discuss the complete designation of the termination of wires at components. Look at S1 on sheet A38 again. The wire designated as "P136-20" is shown leading to terminal "1" of the S1 switch. In the shorthand that we will be using, this will be designated S1(1). Thus, the terminal is shown in parentheses after the component designation. This procedure will be used throughout for all components.

Relays

A relay is a type of switch which is electrically operated. Power to the coil of a relay causes the relay to actuate like a switch. On sheet A38, locate the master relay. This is labeled "K1". All relays have the letter "K" as their designator. The coil terminals are X1 and X2. Like the switches, these terminals would be called K1(X1) and K1(X2). See the detail for the relay. Now, locate K2 on this sheet. Turn to Sheet A39 and locate relays K3, K4, K5, K6 & K7. In each case, look up the detail drawings for each relay.

Lamps

The designation for lamps is "DS". On sheet A38, locate DS1, just to the right of the alternator switch. The terminals for lamps are not usually numbered.

Fuses

Fuses protect against fire by blowing before the wire gets too hot due to an overloaded circuit or short-circuit. Fuses are designated by the letter "F", and the terminals for fuses are not normally numbered. On sheet A38, locate F1, F2, F3 and F4. Note that the ampere rating of 3 amps is shown in the symbol. See Detail HH. All of the fuses in this system are 3 amp fuses. Since these fuses protect 22 gauge wires, 6 amp fuses may be used, but 3 amp fuses will be ample for the loads and will blow quickly on any fault. Fuses should be located within 6 inches of the source of power.

Circuit Breakers

Circuit breakers are devices which protect against fire. The circuit breakers act like fuses in that they will trip before the wire gets too hot due to an overloaded circuit or a short-circuit. All of the circuit breakers are shown on sheet A38. See the table for the circuit breakers and also the detail drawings showing the installation. Circuit breaker terminals are not normally numbered. Two types of circuit breakers are used. Most of the circuit breakers are the normal push-pull type. Six of the circuit breakers are "toggle breakers" which are a combination switch and circuit breaker. When the toggle breaker trips due to an overload, the switch toggle trips to the "off" position. The use of push-pull circuit breakers allows for the disabling of all of the circuits. This can be quite important in extending the life of the battery in the event of an alternator failure.

Buses

A bus is a device for distributing electrical power. It is the simplest sort of thing, and a bus is designated by the letter "W". The designation for a bus is following by a plus or minus sign to indicate if it is a positive or negative bus. On the Falco there is one positive bus and three negative (or "ground") buses. The positive bus is W1(+) and is shown on sheet A38. This bus is usually referred to a the "main bus bar", "main bus" or "the bus bar". As you can see from Detail FF, it is a strip of copper which has been tin-plated. See Detail F & G to see how it is installed. The three negative buses on the Falco are: W2(–) which is the main ground bus, W3(–) which is the engine, and W4(–) which is the instrument panel. See Detail DD and EE for the main ground bus.

Batteries

Batteries are designated by the letters "BT". See sheet A38 for BT1, the main battery.

Terminal Blocks

Terminal blocks are designated by the letters "TB", and they are used to join wires at a place where they are easily accessible. On sheet A39, locate TB4, and then see Detail KK.

Plugs & Receptacles

Designated by the letter "P", plugs are a common device for disconnecting wires. Plugs are always mated with receptacles which are designated by the letter "J". Plugs and receptacles have pins, and the pin numbers are shown like the terminal numbers on switches, hence P1(7) is for pin number 7 for the P1 plug. The pin numbers of mating plugs and receptacles always correspond to each other. See sheet A38. Find J1, P1, J2, P2, J3 and P3. Note that like-numbered plugs and receptacles are connected to each other and that the pin numbers of each plug match the pin numbers of the receptacles. See Detail A, B, C & D for these plugs and receptacles. Pin numbers are marked on the plugs and receptacles.

Resistors

Resistors are designated by the letter "R". Resistors are common devices in electrical circuits, and they provide electrical resistance when required for various reasons. The effect of a resistor is to lower the voltage. In the case of R5 shown on sheet A39, the purpose of the resistor is to lower the voltage from the pitot pressure switch (S6) so that the current is within the rating of the switch. In other cases, they are used to protect transistors from overloads.

A special type of variable resistor is a potentiometer. Potentiometers (or "pots") are commonly used as the volume control for aircraft radios. On the instrument panel lighting circuits (see sheet A41 for R1 & R2), they are used in the light dimmer circuits.

Transistors

Transistors are designated by the letter "Q". Transistors are solid state remote switches. When current is applied to the "base" (B), current is allowed to pass from the "collector" (C) to the "emitter" (E). See Q3 on sheet A39. This is a switching transistor, and it is a simple "on-off" device. See sheet A41 for Q1 and Q2 in the panel lighting circuit. These transistors are power-supply transistors, and the voltage to the base is regulated by the potentiometers. As more voltage flows from the potentiometer to the transistor base, more voltage flows from the emitter.

Diodes

Diodes are designated by the letters "CR". Diodes are solid state devices which permit the flow of current in one direction but not the other. Thus, diodes are polar, and it is very important that diodes be installed in exactly the direction shown. Diodes are used for two purposes in this electrical system. In the landing gear circuit, CR1 and CR2 are used to prevent the actuation of the flight time of the clock-timer under certain un-wanted conditions.

Diodes are also used for "coil suppression" with relays. When power is applied to a relay coil, a magnetic field is built up in the coil. When the power is cut off, the field "collapses" sending a surge of high voltage through the system. The diodes short out this surge against itself. The actual operation of this collapsing field and the operation of the diodes is difficult to understand, and it will seem to appear the the diodes are installed so that they will not prevent anything from happening. The larger the coil, the greater the problem caused by the collapsing field, accordingly the diodes should be used for the master and starter relays, and also for the landing gear actuation relays (K3 & K4), but their use with K5, K6 and K7 is optional.

When a component does not fall into one of the above catagories, then the part number or an abbreviation is used. For example: P/N 116-62(A+), Starter(+), LF MAG(RET).

Component Designation Summary

S	Switch
K	Relay
DS	Lamp
F	Fuse
CB	Circuit breaker
W	Bus
BT	Battery
TB	Terminal block
P	Plug
J	Receptacle
R	Resistor
Q	Transistor
CR	Diode

Wire Numbering System

By now you may have noticed that the wires have labels such as P111B-22, G210A-16 and NR342-22. It is essential that you be completely familiar with the wire numbering system that is used. There is a letter associated with each circuit; therefore, we are able to know that G210A-16 is in the landing gear circuit because the wire number begins with a "G". We know that NR342-22 is in the radio and audio circuit because of the letter "R", and that this wire is a negative (or ground) wire since the wire number begins with the letter "N". The following is a list of the letter designations for the circuits in the wire number system:

Circuit Designations	
P	Power circuit
R	Radio and Audio (also used for spare wires)
Q	Fuel pump
F	Flight instruments (i.e. turn & bank)
C	Flight controls (i.e. flaps, autopilot)
G	Landing gear (actuation & control)
E	Instrumentation
L	Lighting (anti-collision, navigation, panel)
H	Pitot heat
N	(used as a prefix) for a negative wire

The wires are numbered, beginning with 101. When a wire is divided into two or more segments, a letter is used to designate the segment. Thus, P115A-20 and P115B-20 are two segments of the same wire. The wire gauge number completes the wire number. In this last case the wire is 20 gauge wire.

The wire gauge sizes used on the Falco are 0, 6, 8, 16, 18, 20 and 22. The wire gauge sizes are in accordance with the American Wire Gauge standard, commonly abbreviated AWG. It is normal to refer to the wire as "22 gauge" or "22 AWG".

Wire Tabulation

The wire tabulation (Appendix A) is an index for the electrical system. This is a key document in installing and understanding the wiring of the airplane. The wires are listed by wire numbers. The "CODE" column gives the complete wire number. The "AWG" column gives the wire gauge. The "SPECIFICATION" column gives the complete wire specification. The "COLOR/STRIPE" column gives the color and color of the stripes on the wire. The "LGTH" column gives the length of the wire in inches. The remaining four columns have to do with the termination of each end of each wire. One end of the wire is arbitrarily called "Terminal A" and the other "Terminal B". The connector for each end is given in the appropriate columns. When special connectors are required (as in the case of avionics and some magnetos) the symbol ***** is used. Connectors thus marked are not included in this kit.

The lengths given in the wire tabulation are for procurement purposes, and they provide some extra length of wire. On installation, the wire will be cut to the required length.

The wire used in this kit is known as "Tefzel" wire due to the Teflon insulation. This is a high-temperature wire that is the current standard of the aircraft industry.

Most of the wires in the Falco are single conductor wires. The specification for this wire is MIL-W-22759/16. After this basic specification is added a number for the wire gauge. Following the wire gauge is a number of one to four digits representing the wire color and the color of any stripes applied to the wire. The basic wire color number is listed first, followed by the stripe color numbers.

There are a number of cases where a shielded wire is required. The specification for an 18 gauge wire of this type should be MIL-C-27500-18TE1T14. The "18" in the number is the wire gauge, and this number changes with the gauge. The official specification for shielded Tefzel wiring does not provide for a color and stripe numbering system, but we have added the same type of numbering system in parentheses.

The wires for the antennas requires a special coaxial wire of a specific impedance. The required wire is included with the antenna kit. Also, the anti-collision strobe lights require a special very high-voltage shielded wire with multiple conductors. This wire is available from Whelen Engineering, the manufacturer of the strobe system.

Take a look at the Wire Color Code Chart (Appendix B). There are ten basic colors which are used for identifying wires. These colors may be used either as the color of the wire or as color-stripes on the wire. Each color is assigned a number; for example, 1 is brown, 3 is orange, 7 is violet and 8 is gray. (These color numbers are the same as are used for denoting the values of resistors.) The numbers for the basic colors are listed at the top of the Wire Color Code Chart. Both with the numbering system and with the listing of the wire colors, the basic color of the wire is always listed first. Also, note that the basic wire color is followed by a slash while the color stripes are separated by hyphens.

To the right is a "Wire No." column. This column lists the wire numbers that use the listed colors. The Wire Color Code Chart is your primary cross-reference with the wire tabulation. Let's say you find a wire that is yellow, and it has blue, green and orange stripes on it. Using the basic color numbers on the top of the chart, write down the numbers listing the basic wire color number first. This would give you the number 4653. Re-arrange the numbers for the color stripes in ascending order: this would give you 4356. Look up this color code number in the wire tabulation, and you find that this color combination is used for the wire number 223. Look up wire number 223 on the wire tabulation, and then locate the wire on the circuit drawing.

Note that the color for NP102A-0 and NP102B-0 as shown as (BLK). The wire is not available in black. In the kit, white wire is supplied, and you will have to mark the wire black. A magic marker or black paint may be used.

Color Code Logic

An effort has been made to use some of the colors of the wires in a logical fashion. Due to color availability in some gauges and types, the logic is not perfect, but here are the basic rules.

- Black wires. All black wires are ground wires leading to a negative bus. Thus, if you see a black wire, it must go to one of the three negative buses.

- Black-striped wires. Any wire with a black stripe on it is a ground wire, but these wires do not go to a negative bus.

- Yellow wires (no stripes). Solid yellow wires without any color stripes are used for lighting circuits. On the instrument panel they are used for the instrument panel lighting. On the airframe, they are used for the navigation lights.

- Yellow wires with stripes. These wires are used in the P2, P3, J2 and J3 plugs and receptacles on the back of the instrument panel. All yellow wires from these plugs are routed forward from the instrument panel.

- White wires with stripes. When these wires are used in the P2, P3, J2 and J3 plugs and receptacles on the back of the instrument panel, they are routed aft from the instrument panel. Note that some wires from the P2 plug are also white and with stripes and must be routed forward.

- White wires with no stripes. These wires are used for short lengths of wires which are easily identified.

- Violet wires. Used for the positive output wires from the alternator to the main power bus.

- Red wires. Used for the positive output wires from the battery to the main power bus.

- Note: Red wires are also supplied with a number of components such as the clock, outside air temperature, etc. The normal custom is that the red wire is to be hooked up to a positive connection, but this should always be confirmed by referring to the drawings or installation instructions supplied with the equipment.

Now is a good time to note the colors of the wires on the drawings. The wire colors were assigned after the drawings were finished and are not shown on the drawings. While this may seem to be an inconvenience, this is a good time to begin working with the circuit drawings and wire tabulation sheets. By the time you have finished marking all of the wires, you should have a very good idea of how to use the electrical drawings and the wire tabulation. Be sure to use a small arrow with each color, since it is easy to get your notes confused. When you write the colors between two lines, you might become confused and make a mistake.

Broken or "dashed" lines are used for a variety of purposes. On Sheet A38, the starting vibrator and its wires are shown with broken lines. The starting vibrator is needed only when certain magnetos are used. The vibrator will not be installed in all aircraft, but No. 126 and 127 wires should be installed and reserved as spare wires for other uses. On Sheet A40, broken lines are used to indicate alternative installations for the intercom and marker beacon receiver. Broken lines are also used to indicate a self-made connection that does not require a wire. For example, the mic and phone jacks are grounded at installation: the act of installing the jacks in the holes results in a ground to the instrument panel. No wires are necessary, although it is a good idea to check for continuity since paint can insulate the jack from the panel. Similarly, the post lights are self-grounding. While on this subject, we should remind you that the forward face of the instrument panel should not be painted for this very reason.

The electrical kit contains a huge number of parts. To contend with the large quantity of wires, components and hardware, the kit is supplied in a number of sub-kits. There are eight wiring kits: six contain the wires for the principal plugs and receptacles (with the pins and sockets installed on the wires); one kit contains the remaining wires needed for the instrument panel; and one kit contains the remaining wires needed for the airframe. Other sub-kits contain: circuit breakers and fuses; switches; relays; lamps; transistors, diodes and resistors; terminals; terminal blocks; plugs and receptacles; and hardware. The miscellaneous sub-kit includes a number of special components which do not fall into other catagories. The battery installation hardware is contained in two separate kits and only one is included, depending on the battery to be installed. A post light kit is included as an option, as is the four cylinder CHT sender kit.

Planning Your Installation

It is important that you plan the installation of options well in advance. It is far better to have the entire system planned in advance rather than to have to contend with the problems presented at the last moment. In particular, the allocation of uses for the spare wires is an item that you must address early. If you are going to install a carbureted engine, a carburetor ice detector is highly recommended, but this system is not needed with injected engines.

A Silver Fuelgard is a worthy addition to any panel. This instrument gives you precise information on the fuel used. (The Fuelgard should be used with injected engines only—the accuracy with carbureted engines is not good due to the irregular flows of fuel to the carburetor bowl.) The accuracy is very high (±2%), and it will tell you exactly how much fuel you have used during the flight (including startup, taxi, take-off and climb), and it will give you a continuous indication of the fuel flow. This will allow you to determine exactly how much flight time you have remaining and the most efficient power settings.

A Century I autopilot should be considered by anyone planning to use the Falco for IFR work. In additon to the normal function of relieving the pilot of work during flight, the autopilot (all electric) gives you a viable alternative in the event of a vacuum system failure. The light for the carburetor ice detector may be used for a number of devices, among these: a starter warning.

The most common use for the spare wires will be for remote avionics. The avionics installation will include a number of wires between the navigation radios and a remote DME or RNAV. Additionally, a remote altitude encoder will require a number of wires leading from the transponder to the encoder. These avionics hookups are not shown on the electrical drawings. The requirements for King DME and RNAV, and most encoders are given on the electrical drawings. Be warned: other makes of DME and RNAV may require more wires than you have available.

Other seemingly unimportant options should be considered. If an avionics cooling fan is installed, its wiring should be planned. If the fan is permanently installed in the airframe (separate from the instrument panel), the power may be taken from the main bus bar side of the ammeter shunt and protected by a fuse. If a map light is desired, this too can be wired in the same way. Remember, that any hookup to the power wires between the alternator shunt and the ammeter shunt

is the same, electrically speaking, as hooking up to the main bus bar. Don't forget the need to protect these circuits with fuses within 6 inches of the power source.

An alternator circuit breaker is sometimes installed on light aircraft to protect the alternator in the event of a shorted battery. This condition would result in a heavy discharge on the ammeter, an indication from the low voltage warning light and a heavy alternator load. The master switch should be shut off immediately, but in case you did not notice this condition, the circuit breaker would trip first. The installation of an alternator circuit breaker was studied, and a decision was made to not install one in this system, but the option is yours. Because of the dual 8 gauge wires leading to the bus bar, two 35 amp circuit breakers should be used, and these could be installed on the center console panel.

Note that some of the spare wires are shielded. One possible use for such wires is for mic and phone jacks for a third seat, so that your rear seat passenger can converse on the intercom.

Some builders may want to consider the installation of a smoke system for airshow work. As a preliminary plan, it is suggested that the oil tank and pump be installed on the right seat tracks, with the right seat removed. The carburetor ice detector indicator light could be used as an indicator light for the system. The smoke system switch is usually installed on the throttle, and it is envisioned that such a system would have a left hand throttle installed. (Provisions have been made in the design of the firewall bulkhead fitting for a smoke system line.) As before, the power for such a system should come from the bus bar side of the ammeter shunt.

The instrument panel has a number of indicator lights. These lights are easily visable in daylight. During extended night flying, the lights are somewhat brighter than is desirable. The problem is largely one of annoying reflections off the inside of the canopy (the windshield is shaded by the glareshield). A number of electrical solutions were studied, but they all proved to be intensely complicated. Our suggestion is to use a "nightcap" for each light. This could be accomplished in a number of ways. One idea would be to use 3/8" diameter nylon tubing, dyed black with "Rit" fabric dye, which would be slipped over the indicator lights at night. Keep your eyes open for items which could be used for these nightcaps. There is bound to be some commonly-used device—something as simple as pencil erasers—which would be ideal for such an application.

Chapter 2
Required Tools

The following is a list of tools which will be needed for the installation of the electrical system:

- **Soldering Iron**. Weller W60 soldering gun (60 watts).

- **Heat Shrink Gun**. A nice thing to have, but not essential since a soldering iron may be used.

- **Crimp Tool for 0, 6 & 8 AWG Wires.** Any of the following tools will crimp the 0, 6 and 8 gauge wire terminals: AMP 601075-1, AMP 601075, AMP 600850-1 or AMP 600850. All of these tools are very expensive, and it would be best to borrow one or to take your crimping job to the tool. All fixed-based operators have one, as well as most truck garages and some automotive garages.

- **Crimp Tool for 16, 18, 20 & 22 AWG Wires.** AMP 59250 is the FAA-approved tool, and this is the proper tool for the job. This tool costs over $100.00 and many builders may not want to spend that much. An alternative (which is not FAA-approved, and which we cannot recommend) is AMP 604252-1 "Super Champ" hand tool. The Super Champ tool leaves a distinctive mark on the ring terminal, and a tough inspector could easily reject your entire electrical system because of it. This would certainly be the case with a production aircraft.

- **Wire Stripper.** For smaller wires, the best tool is AMP 601827-1. This tool is of high quality and very quick to use. It also has a wire cutter built-in. The price (about $40.00) is a little high, but the tool is an excellent one. Almost every radio installation technician will have one in his pocket. (The Greenlee 45000 wire stripper, sold by Grainger for about $25.00, appears to be indentical.) For shielded wire AMP 29898-9 may be used. This is a reasonably cheap stripper (about $5.25), but it is slow and hard to adjust. Also, the "Super Champ" has a stripper. For the larger wires, it is best to work with a pocket knife.

- **Diagonal Side-Cutting Pliers.** Commonly called "dikes", these pliers are essential for nipping tywraps and the ends of wires. We prefer the miniature type.

- **AMP 92019-3 or 91124-1 Extraction Tool.** This tool is required for extracting the male and female contacts from P1 plug and J1 receptacle. If you do not make a mistake, this inexpensive tool is not required. We have a number of these tools available as loaners. If you make a mistake, let us know.

- **AMP 305138 Extraction Tool.** This tool is required for extracting the pins and sockets for P2 plug and J2 receptacle. If you do not make a mistake, this inexpensive tool is not required. We have a number of these tools available as loaners. If you make a mistake, let us know.

- **AMP 91067-2 Insertion/Extraction Tool.** This inexpensive tool is required for the extraction of all of the pins and sockets for P3 plug and J3 receptacle. The pins and sockets can be installed without this tool. If you do not make a mistake, you do not need this tool. We have a number of these tools available as loaners. If you make a mistake, let us know.

- **AMP 29564 Crimp Tool.** This tool is used for crimping the pins and sockets of the AMP Matenlock connectors, shown in Detail MM. This tool is also used for the non-insulated "Faston" terminals used for the relays on the instrument panel. This tool is essentially identical to the tool used for "Molex" connectors, and those tools are widely available. Alternatively, the pins may be crimped in place with needle-nose pliers and soldered.

- **Heat Sink Compound.** Available from Radio Shack, or other electronics supply stores.

- **Solder.** Available from Radio Shack, or other electronics supply stores.

- **Multitester.** This is an essential tool. Available from Radio Shack or other electronics supply stores. You will need the tool to measure ohms, volts and to check for continuity.

- **Offset Flat Screwdriver.** This is essential for tightening the screws for the circuit breakers and main bus bar. The normal straight screwdriver will not work (see Detail G & G). Available at most hardware stores. See Figure 1.

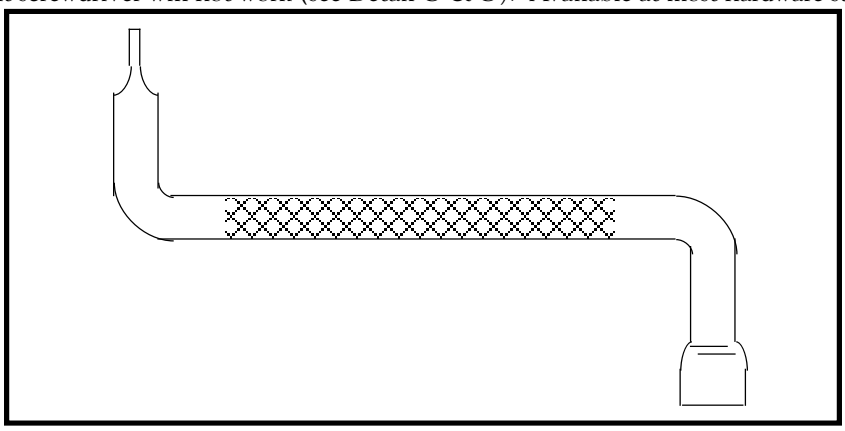


Figure 1

- **RTV Silicone Rubber Compound.** Used for a variety of applications, primarily for sealing around the wires at the firewall. The high-temperature clear compound made by GE or Dow is normally used. Available at a wide variety of locations–hardware stores, electrical supply stores, etc.

- **Lubriplate.** A multi-purpose lubricant recommended by AMP for lubricating the contacts of the plugs and receptacles used in the Falco.

- **EJC-2 Electrical Joint Compound.** A non-drying, non-hardening, non-corrosive lubricant used by electronics technicians and available at electronic supply companies. It is appropriate for use at battery terminals, at the ground bus and at joints of dissimilar metals. Because it is highly conductive, it probably should not be used at the connectors on the instrument panel.

- **Surgical Clamps.** These are very handy for holding wires while soldering. They look like a pair of scissors, but they clamp rather than cut, and they lock closed. They can be purchased at a medical supply company.

Purchasing Tools from AMP

Most large cities have electronics supply stores which carry AMP products, and these tools can be ordered through these stores. The stores will typically carry only the basic automotive type tools and may be unfamiliar with many of the tools listed above (AMP lists over 90,000 in their catalogue).

Even though they might not be listed in your telephone book, there are several AMP representatives in every state. Fixed based operators are regularly visited by these representatives with their truck-full-of-tools. The chief mechanic can easily give you the name and number for the local representative. Please bear in mind that these men do not normally deal with the public. Have your list of tools ready. If you are going to buy a lot of tools, the man will be happy to call on you, but if you only want a couple of inexpensive tools, it would be best to place your order on the telephone and maintain your goodwill with the gentleman.

- ◆ Note: It is not necessary to purchase the crimp tools for the pins, sockets and contacts for the P1, J1, P2, J2, P3 and J3 plugs and receptacles. The pins, sockets and contacts are already installed on the wires for you.

Chapter 3
General Installation Practices

Protection from Abrasion

There is an old saying that "electricity never fails, the problem is always mechanical". This is a very good thing to remember while you are working on the installation of the electrical system. As long as the wires maintain a good electrical contact with the components, electricity will pass through the wires. If a wire is allowed to rub against the threads of a screw or any other sharp edge, the vibration of the airplane will quickly wear through the insulation, and a short-circuit or some other malfunction will result.

The engine compartment has an abundance of the three big troublemakers for electrical systems: heat, vibration and moisture. This area should be watched with extreme care and suspicion. In particular, the movement of the engine will tend to weaken wires if they are not adequately tied in place and if good strain relief is not provided. It is usually at the ring terminals that the problems occur. Be particularly wary of moving parts, such as the engine controls.

Throughout the airframe, be watchful for any wire that comes near a moving part, such as control sticks, control cables, bellcranks, etc.

Wires should not be allowed to move about. They should be tied down firmly. A number of clamps are provided in the kit for this purpose. Caterpiller grommets are provided for the openings in frame No. 4, frame No. 6 and the main spar. Additionally, spiral nylon tubing is provided to wrap around wire bundles to protect against abrasion. Grommets are also provided for the wires passing through the firewall and the walls of the battery compartment. Tywraps are very useful in tying wires together and into place. Smaller wires can be tied to the larger wires, and it is probably a good idea to route ground wires together.

RTV silicone rubber compound is used primarily as a sealant at the firewall. There are also a number of other places where it may be used as an abrasion protection; for example, the threads of screws on the flange of the instrument panel may be coated with the compound. Also, the material may be used as an adhesive to keep wires in place, such as wires going up into the top of the forward section of the fuselage for the compass light, glare shield light, etc. Use your imagination and always be a believer in Murphy's Law, "If something can go wrong, it will."

Corrosion

Corrosion can be a very serious problem with electrical systems. It is important that the metal alloys be the same or nearly the same. If different alloys are used and if moisture is present, corrosion is certain to set in quickly. A good example of this is the type of corrosion that frequently builds up around the terminals of batteries in automobiles. The problem of corrosion is the reason that the main bus bar and the main negative bus bar are tin-plated. The ring terminals which attach to these parts are all tin-plated, so the situation is as good as it can be (short of silver or gold plating on everything).

Tywraps

Tywraps are nylon straps used for typing bundles of wires together. They are made by a number of different manufacturers and are readily available at electronics stores. Sub-kit No. 816-24 contains a number of tywraps made by AMP. After installation, the "tail" of the tywrap should be snipped off with diagonal side-cutting pliers.

Checking for Mistakes

Be sure to check your work for mistakes as you go through the installation of the electrical system. It is far easier and quicker to take your time to double-check everything before you install something, and then check it again after installation, than it is to try to locate a mistake in the system after it is all installed. Also, please be sure to check our drawings, wire tabulation, color code chart, installation instructions, etc. for errors. They have been checked many times, but we still find an occasional error. When in doubt, the electrical system drawings take precedence. The wire tabulation is secondary to the electrical system drawings as it is essentially an index. For example, when you are installing the pins in the plugs and receptacles for the instrument panel, be sure to check the pin numbers given against the electrical drawings and wire tabulation sheets. Please notify Sequoia Aircraft immediately of any suspected error.

Unprotected Circuits

It is a good idea to be aware of the circuits and wires which are not protected by circuit breakers or fuses. All of the 0 gauge wires from the battery to the starter are not protected. The main power leads from the alternator(+) and the battery(+) are not protected. Also, it is possible for the smaller negative wires to short against the larger positive wires. The circuit breaker is sized for the larger positive wire and would not protect against such a situation. This type of situation is probably rare, but the possibility exists; therefore, some extra caution in the routing and bundling of the wires is in order.

Checking for Continuity

At many steps during the installation, you will want to check for continuity. This is done with a multitester. Put the tester on one of the ohms (or resistance) settings. Touch the probes together and the needle on the gauge will quickly indicate that the points are in contact. This same process is used during a check for continuity. The probes are touched to each end of a wire that is supposed to be continuous, and the gauge will indicate that if good electrical contact is made.

Inspectability

During the installation of the electrical system, keep in mind the need to be able to inspect the wiring if a problem arises. Try to keep things where you can get to them and where you can see them. Try to imagine that you may have to replace the part you are putting in the airplane and try not to paint yourself into a corner.

Note Changes

There are a number of spare wires provided in this system. Many will be used for your radio installation and others might be used for devices you might install. Do not depend on your memory to keep track of what you did. Note the changes on the drawings and on the wire tabulation sheet and make them a permanent part of the records for your aircraft. Also, a number of wires are provided for equipment that you might not install, and it is a good idea to note that these wires are not used.

Nipples

Rubber nipples are used on the alternator and starter terminals to protect the wire and terminal from moisture and abrasion. These nipples are provided in the kit. There may be other places where you might want to use such nipples, and they may be obtained through the usual aviation supply firms.

Soldering

A good solder joint is the product of something that is as much an art as a science. First, you must have a good pencil-tip soldering iron such as a Weller W60. The tip must be clean. The iron is used to heat the wires, and then solder is applied to the joint. Once sufficient solder is applied, the soldering iron is removed, and the solder is allowed to cool. If the wires are moved during this cooling process, a "cold" solder joint will result. The joint will appear to be acceptable, but there will be a crack in the solder, and no electricity will pass. A good solder joint will have a certain amount of gloss and shine to it, and it will not be dull.

Heat Shrink Tubing

Heat shrink tubing is used as an insulation over the bare wire left from a solder joint. In most applications, it is necessary to first slip the required length of heat shrink tubing over the tip before soldering. Heat shrink tubing may be shrunk with the tip or barrel of a soldering gun. Don't be too shy about burning the tubing. Lightly rub the tip or barrel across the tubing until a good fit is achieved. Sub-kit No. 816-24 contains an assortment of heat shrink tubing. Additional heat shrink tubing may be purchased at electronics stores.

Battery Location

The position of the battery is important for the correct weight and balance of the aircraft. Do not move the position of the battery unless weight and balance considerations demand it. Also, the battery compartment should be painted with two coats of an acid-proof paint, commonly called "bitumastic" paint. Randolph is one manufacturer of this type of point.

Antenna Wire Connections

The antenna kit provides for a BNC connector for the marker beacon receiver at frame No. 8. The installation shown in the drawings calls for the marker beacon receiver to be installed on the aft face of frame No. 6. As the receivers have a BNC connector for the antenna wire, the connector at frame No. 8 may be eliminated so long as the wire from frame No. 8 and the receiver can be easily removed. Also, the antenna wires which lead to the radios will be disconnected with free-

hanging BNC connectors. These antenna wires should be marked or color-coded to facilitate the correct connections. The navigation radio splitter is supplied with BNC connectors, and the splitter should be installed so that additional free-handing connectors are not required.

EGT Installation

The thermocouple leads of the EGT cannot be routed through the plugs and receptacles for the instrument panel. These must be installed and routed so that the EGT can be removed and placed on the floor of the cockpit during the removal of the instrument panel. Refer to Section 8 if a four cylinder CHT installation is to be installed with a four cylinder EGT.

Spare Wires

Sheet A42 shows a number of spare wires and a number of potentially available spare wires. These wires are essential if you are going to install a complete avionics package. Keep track of what spare wires are available. When you prepare for the installation of a DME, RNAV or altitude encoder, the number of available spare wires will be of utmost importance. The spare wires will prove to be important in time. Experience shows that pilots tend to add equipment to their aircraft in a regular pattern. Every month brings new electrical products to the market, and you may be installing a piece of equipment in several years that is not even imagined today.

Wire Routing

As you route wires through the airframe and the instrument panel, make an effort to keep the wires neatly in order. Think of yourself as a strict military type requiring all of your soldiers to march in straight lines. You will find that you will have to bend each wire separately. For some reason, it does not seem to work well to bend several wires together. When the wires are attached to the circuit breakers, you will have to loop the wire up out of the bundle with sufficient length so that you can install and remove the wire. It is also necessary to bend the ends of the ring terminals in many locations to get the wire to go where you want.

Transmit antenna wires are not normally bundled with other wires. These wires can introduce radio frequency into the electrical system and can affect the operation of digital equipment.

Special Problems for the Panel Wiring

The base of the instrument panel has a series of holes provided for tying the bundle if possible. It is difficult to install the spiral plastic tubing and the wires at the same time. One method that works nicely is to tywrap the wires together in a bundle. Then with a separate tywrap, tie the bundle to the base of the panel crossing the tywrap under the bundle. This holds the bundle of wires up from the instrument panel base and will allow the spiral tubing to be "stitched" over the bundle when all is complete. This crossing of the tywrap results in the tywrap taking the shape of a figure-eight, wrapping around the bundle one one end and through the panel base on the other, with the crossing part of the figure-eight between the bundle and the base of the panel.

Shielded Wire

Shielded wire is used in a number of places in the Falco electrical system, primarily to prevent noise in the system. A wire is something of a radio antenna and can send and receive radio frequency and transmit electrical noise by induction with wires in the same bundle. To prevent this, the wire is encased in a shielding. The shielding is a woven braid of copper wire, in effect a woven tube of cooper. The shielding should be grounded at one end only unless otherwise specified. At the plugs and receptacles on the instrument panel, the shielding is "open" for a short distance. This is a normal practice. As the conductor of the wire is a positive wire and the shielded is a negative wire, any contact between the shielding and the conductor will result in a short circuit. At the plugs and receptacles on the instrument panel it is important to check to make sure that no loose strands of the shielding are in contact with the conductor or pin. It is a very good idea to use a short length of heat shrink tubing at this point.

To ground the shielding of a wire, the outer layer of insulation should be removed for about an inch back from the end of the wire. The insulation is then peeled back and soldered to a black wire (22 gauge is sufficient). This solder joint and all exposed shielding is covered with heat shrink tubing. The black wire should exit the heat shrink tubing away from the terminal end. Finally, the end of the wire is stripped to expose the conductor, and the terminal is installed.

Matenlock Connectors

A number of two pin AMP Matenlock connectors are used in this system. There are a large number of similar nylon connectors on the market, all commonly known as "Molex" connectors. These connectors are available with a variety of

pins ranging from 1 to 16. The pins and sockets for many of these types of connectors may be used in either the plug or the receptacle. The Matenlock connectors used in the kit use high quality gold-plated pins and sockets.

There are a number of places in the electrical system where you may chose to install additional connectors. A four-pin connector will be desirable for the OAT gauge, and a three-pin connector may be used with the clock. These connectors are readily available at Radio Shack and other electronics stores.

Instructions for the use of the crimping tool for Matenlock connectors are included with the tool. Briefly, the tool will make two types of crimps, one tight and one somewhat looser. The wire is stripped so that the wire will be fully enclosed by the wire part of the terminal, and the insulation should be gripped by the insulation support. The terminal is first crimped over the wire by the tighter crimp. Next, the insulation support is crimped, first by the looser crimp (to get it started) and then by the tighter crimp. The connection may be soldered for additional strength, but if the proper tool and technique is used, this is not necessary.

Terminals

Most of the connections are made with ring terminals, but there are also a number of other types used in this installation. Spare wires should have their loose ends covered with a cap, and a number of these are included in the kit. Faston terminals are used in several applications, and you may wish to add wristlock terminals in some locations, such as for the landing light or fuel pump.

The terminals for each end of the wires are listed in the wire tabulation.

▲ Warning — The magnetos are in a "switch on" condition when the switch wires are disconnected (as in the removal of the instrument panel); therefore, the usual precautions must be observed. ▲

The Instrument Panel Connectors

It is essential that the plugs on the back of the instrument panel can be connected and disconnected with reasonable effort. It is trouble enough to remove the instrument panel, and you do not want to fight with these plugs in the awkward position you must take to reach them. There are two things that are essential to accomplish this.

First, you must lubricate the contacts of the three connectors so that you can plug them in more easily—AMP recommends the use of Lubriplate grease. Use a toothpick to apply grease to the female contacts. You should be careful not to gob the grease on so that it will bridge between two contacts. Lubriplate has some electrical conductivity, and you don't want the grease re-directing the flow of electricity in your airplane.

Secondly, the wire bundles for the three connectors should be routed in such a way that there is a built-in "stroke" for the plugs. One Falco builder did not realize this necessity and lashed the wires in place without benefit of this "stroke". As a result, it would take him a lot of effort to get the plugs in the receptacles. You've got to have a "stroke" built into the plugs!

Fuse Installation

The FAA requires that all fuses and circuit breakers be installed within reach of the pilot. The result of this is that most production aircraft lack circuit protection on the wires that are protected by fuses in this system. The normal loads on these circuits are very low, and you can expect the fuses to blow only in the event of a short circuit—an event which would probably lead to an electrical fire if not prevented by these out-of-reach fuses. You may take your choice and install the fuses or omit them if you wish to comply with the FARs.

Chapter 4
Basic Harness Assembly

The wires for the main plugs and receptacles are provided in separate kits for each plug and receptacle. The required pins, sockets and contacts are already installed on the wires. The components for the plugs and receptacles are included in sub-kit No. 816-27.

You will now assemble the P1, P2 and P3 plugs and the J1, J2 and J3 receptacles. Refer to Detail B, C and D. Get the required parts from the plug and receptacle kit. Tap the screw holes for the receptacles with an 8-32 tap. Separate the required parts for each plug and receptacle—P1, P2, etc.

Now you will begin with the installation of the wires into the plugs and receptacles. Work very slowly and very carefully. Check and double check each move. Throughout this instruction sheet, we will give you the pin numbers for the wires, but you should check each and every one against the drawings and wire tabulation.

J1 Receptacle Assembly

The wires for the J1 receptacle are included in Sub-kit No. 816-10. Install the wires in the pin numbers listed below.

- Note: The pin numbers are printed on each end of the receptacle. The numbers read across horizontally, and the numbers are shown for only the end holes. This is not a problem with this receptacle since it has only seven pins, but with the other plugs and receptacles this will not be as easy. It is best to install the pins in numerical order and check off each one as you go.

Check all shielded wires. Cut off all loose strands which might short with the contact and cover with heat shrink tubing.

With this receptacle and with the P1 plug, the red, black and violet wires are paired, and these paired wires of the same color are interchangeable. Also, note that the list given below is the same as for the packing list for the wiring kit. This practice is followed with all of the wiring kits for plugs and receptacles in that the item number for the packing list corresponds to the pin number. Each wire should be inserted until the contact is firmly seated in place and will not pull out. An audible "click" should be heard when the contact is inserted. If you attempt to remove the contact without the proper extraction tool, the plug or receptacle will be ruined.

If you make a mistake and install a wire in the wrong hole you should remove the wire with the proper extraction tool. You could change pin numbers by noting the change on your drawing and wire tabulation, making sure you make the same change with the corresponding plug. Technically, there is nothing wrong with changing pin numbers for the wires except that you risk making a mistake somewhere.

J1 RECEPTACLE

PIN NO.	WIRE NO.	AWG	COLOR/STRIPE
1	P129A-8	8	RED
2	P130A-8	8	RED
3	NP131A-8	8	BLK
4	NP132A-8	8	BLK
5	P109A-8	8	VIO
6	P110A-8	8	VIO
7	G210A-12	12	WHT/RED-VIO-GRA

Now, install the cable clamp and screw the strain relief in place. Watch out for potential problems with the screw threads and file off if necessary. Install the seal. The seal goes inside the receptacle, and it does not go over the threads of the receptacle. This can be seated by screwing the plug in place. The contacts should be coated with a thin layer of "Lubriplate" white grease for easier connection. The ring nut of the plug can break if overtightened, but if you break it, replacement is easy and cheap. If you do this, you will need a Size 23 Replacement Coupling Ring, AMP P/N 206251-1. These are available for $1.00 from Sequoia Aircraft Corporation.

P1 Plug Assembly

The wires for the P1 plug are included in Sub-Kit No. 816-14. Check all shielded wires for loose strands and cover with heat shrink tubing. Install the wires in the pin numbers listed below.

P1 PLUG

PIN NO.	WIRE NO.	AWG	COLOR/STRIPE
1	P129B-8	8	RED
2	P130B-8	8	RED
3	NP131B-8	8	BLK
4	NP132B-8	8	BLK
5	P109B-8	8	VIO
6	P110B-8	8	VIO
7	G210B-12	12	WHT/RED-VIO-GRA

Install the cable clamp and strain relief.

J2 Receptacle Assembly

The wires for the J2 receptacle are included in Sub-Kit No. 816-11. Check all shielded wires for loose strands and cover with heat shrink tubing. Install the wires in the pin numbers listed below.

J2 RECEPTACLE

PIN NO.	WIRE NO.	AWG	COLOR/STRIPE
1	NP125A-18	18	WHT/BLK-RED-YEL
2	NP124A-18	18	WHT/BLK-RED-ORG
3	L310B-18	18	BLU/WHT
4	H330B-18	18	GRN/WHT
5	L300B-18	18	YEL/ORG-BLU-GRA
6	Q190B-18	18	YEL/BRN-ORG-GRN
7	C201A-16	16	WHT/RED-BLU-VIO
8	P126A-18	18	YEL/RED-ORG-GRN
9	R402A-16	16	WHT/ORG-YEL-GRN
10	R403A-18	18	WHT/ORG-YEL-BLU
11	R404A-18	18	WHT/ORG-YEL-VIO
12	R405A-18	18	WHT/ORG-YEL-GRA
13	R406A-18	18	WHT/ORG-GRN-BLU
14	R407A-18	18	WHT/ORG-GRN-VIO

Install the cable clamp and strain relief. Install the seal. The seal goes inside the plug. The contacts should be lubricated with "Lubriplate" white grease. If the ring nut is broken it may be easily replaced. If you do this, you will need a size 17, Replacement Coupling Ring, AMP P/N 213810-1. These are available for $1.00 from Sequoia Aircraft Corporation.

P2 Plug Assembly

The wires for the P2 plug are included in Sub-kit No. 816-15. Check all shielded wires for loose strands and cover with heat shrink tubing. Install the wires in the pin numbers listed below.

P2 PLUG

PIN NO.	WIRE NO.	AWG	COLOR/STRIPE
1	NP125B-18	18	WHT/BLK-RED-YEL
2	NP124B-18	18	WHT/BLK-RED-ORG
3	L310A-18	18	BLU/WHT
4	H330A-18	18	GRN/WHT
5	L300A-18	18	YEL/ORG-BLU-GRA
6	Q190A-18	18	YEL/BRN-ORG-GRN
7	C201B-16	18	WHT/RED-BLU-VIO
8	P126B-18	18	YEL/RED-ORG-GRN
9	R402B-16	18	WHT/ORG-YEL-GRN

10	R403B-18	18	WHT/ORG-YEL-BLU
11	R404B-18	18	WHT/ORG-YEL-VIO
12	R405B-18	18	WHT/ORG-YEL-GRA
13	R406B-18	18	WHT/ORG-GRN-BLU
14	R407B-18	18	WHT/ORG-GRN-VIO

Install the cable clamp and strain relief.

J3 Receptacle Assembly

The wires for the J3 receptacle are included in Sub-kit No. 816-12. Check all shielded wires for loose strands and install heat shrink tubing. Install the wires in the pin numbers listed below.

J3 RECEPTACLE

PIN NO.	WIRE NO.	AWG	COLOR/STRIPE
1	P127A-20	20	WHT/BRN-RED-ORG
2	R408A-22	22	WHT/ORG-GRN-GRA
3	P115A-20	20	WHT/BRN-RED-YEL
4	NP104A-20	20	WHT/BLK-BRN-RED
5	P106A-22	22	WHT/BRN-RED-GRN
6	P105A-22	22	WHT/BRN-RED-BLU
7	P123A-20	20	WHT/BRN-RED-VIO
8	P111A-22	22	YEL/BRN-RED-ORG
9	P112A-22	22	YEL/GRN-BLU-VIO
10	G216B-22	22	WHT/BRN-RED-GRA
11	G222B-22	22	YEL/BRN-ORG-VIO
12	G223B-22	22	YEL/ORG-GRN-BLU
13	G224B-22	22	YEL/BRN-GRN-GRA
14	G220C-22	22	WHT/BRN-ORG-YEL
15	G215C-22	22	WHT/BRN-ORG-GRN
16	G214C-22	22	WHT/BRN-ORG-BLU
17	E158B-22	22	WHT/BRN-GRN-VIO
18	E165C-22	22	WHT/BRN-GRN-GRA
19	E162C-22	22	YEL/BRN-RED-VIO
20	E153B-22	22	YEL/RED-BLU-VIO
21	E160B-22	22	YEL/RED-GRN-BLU
22	E151B-22	22	YEL/GRN-VIO-GRA
23	L315B-20	20	WHT/BRN-GRN-BLU
24	L252A-22	22	YEL/ORG-GRN-VIO
25	E169B-22	22	YEL/BRN-ORG-BLU
26	R388B-22	22	WHT/BRN-YEL-VIO
27	R340A-22	22	WHT/BRN-YEL-GRA
28	L281A-22	22	YEL/RED-GRN-GRA
29	G242B-22	22	WHT/BRN-ORG-VIO
30	E154B-22	22	YEL/RED-GRN-VIO
31	E155B-22	22	YEL/BRN-ORG-GRA
32	R375B-22	22	WHT/BRN-YEL-GRN
33	R380B-22	22	WHT/BRN-YEL-BLU
34	E176A-22	22	YEL/BRN-RED-GRA
35	E177A-22	22	YEL/RED-ORG-BLU
36	NR337A-22	22	WHT/BLK-BRN-ORG
37	NR338A-22	22	WHT/BLK-BRN-YEL
38	NR339A-22	22	WHT/BLK-BRN-GRN
39	R409A-22	22	WHT/ORG-BLU-VIO
40	R341A-22	22	WHT/BRN-ORG-GRA
41	NE181A-22	22	WHT/BLK-BRN-GRA
42	E179A-22	22	WHT/BRN-VIO-GRA
43	E183A-22	22	YEL/ORG-GRN-GRA

44	E184A-22	22	WHT/RED-ORG-YEL
45	R410A-22	22	WHT/ORG-BLU-GRA
46	R411A-22	22	WHT/ORG-VIO-GRA
47	NC287A-20	20	WHT/BLK-BRN-BLU
48	C290A-20	20	WHT/BRN-BLU-VIO
49	C288A-20	20	WHT/BRN-BLU-GRA
50	NC289A-20	20	WHT/BLK-BRN-VIO
51	R412A-22	22	WHT/YEL-GRN-BLU
52	R413A-22	22	WHT/YEL-GRN-VIO
53	R414A-22	22	WHT/YEL-GRN-GRA
54	R415A-22	22	WHT/RED-ORG-GRN
55	R416A-22	22	WHT/RED-ORG-BLU
56	R417A-22	22	WHT/RED-ORG-VIO
57	R418A-22	22	WHT/RED-ORG-GRA
58	R419A-22	22	WHT/RED-YEL-GRN
59	R420A-22	22	WHT/RED-YEL-BLU
60	R421A-22	22	WHT/RED-YEL-VIO
61	R422A-22	22	WHT/RED-YEL-GRA
62	R423A-22	22	WHT/RED-GRN-BLU
63	R424A-22	22	WHT/RED-GRN-VIO

Install the cable clamp and strain relief. Install the seal. The seal goes inside the receptacle. The contacts should be lubricated with "Lubriplate" white grease. If the ring nut is broken it may be easily replaced. If you do this, you will need a Size 23, Replacement Coupling Ring, AMP P/N 206251-1. These are available for $1.00 from Sequoia Aircraft Corporation.

P3 Plug Assembly

The wires for the P3 plug are included in Sub-kit No. 816-16. Check all shielded wires for loose strands and install heat shrink tubing. Install the wires in the pin numbers listed below.

P3 PLUG

PIN NO.	WIRE NO.	AWG	COLOR/STRIPE
1	P127B-20	20	WHT/BRN-RED-ORG
2	R408B-22	22	WHT/ORG-GRN-GRA
3	P115B-20	20	WHT/BRN-RED-YEL
4	NP104B-20	20	WHT/BLK-BRN-RED
5	P106B-22	22	WHT/BRN-RED-GRN
6	P105B-22	22	WHT/BRN-RED-BLU
7	P123B-20	20	WHT/BRN-RED-VIO
8	P111B-22	22	YEL/BRN-RED-ORG
9	P112B-22	22	YEL/GRN-BLU-VIO
10	G216A-22	22	WHT/BRN-RED-GRA
11	G222A-22	22	YEL/BRN-ORG-VIO
12	G223A-22	22	YEL/ORG-GRN-BLU
13	G224A-22	22	YEL/BRN-GRN-GRA
14	G220B-22	22	WHT/BRN-ORG-YEL
15	G215B-22	22	WHT/BRN-ORG-GRN
16	G214B-22	22	WHT/BRN-ORG-BLU
17	E158A-22	22	WHT/BRN-GRN-VIO
18	E165B-22	22	WHT/BRN-GRN-GRA
19	E162B-22	22	YEL/BRN-RED-VIO
20	E153A-22	22	YEL/RED-BLU-VIO
21	E160A-22	22	YEL/RED-GRN-BLU
22	E151A-22	22	YEL/GRN-VIO-GRA
23	L315A-20	20	WHT/BRN-GRN-BLU
24	L252B-22	22	YEL/ORG-GRN-VIO
25	E169A-22	22	YEL/BRN-ORG-BLU

26	R388A-22	22	WHT/BRN-YEL-VIO
27	R340B-22	22	WHT/BRN-YEL-GRA
28	L281B-22	22	YEL/RED-GRN-GRA
29	G242A-22	22	WHT/BRN-ORG-VIO
30	E154A-22	22	YEL/RED-GRN-VIO
31	E155A-22	22	YEL/BRN-ORG-GRA
32	R375A-22	22	WHT/BRN-YEL-GRN
33	R380A-22	22	WHT/BRN-YEL-BLU
34	E176B-22	22	YEL/BRN-RED-GRA
35	E177B-22	22	YEL/RED-ORG-BLU
36	NR337B-22	22	WHT/BLK-BRN-ORG
37	NR338B-22	22	WHT/BLK-BRN-YEL
38	NR339B-22	22	WHT/BLK-BRN-GRN
39	R409B-22	22	WHT/ORG-BLU-VIO
40	R341B-22	22	WHT/BRN-ORG-GRA
41	NE181B-22	22	WHT/BLK-BRN-GRA
42	E179B-22	22	WHT/BRN-VIO-GRA
43	E183B-22	22	YEL/ORG-GRN-GRA
44	E184B-22	22	WHT/RED-ORG-YEL
45	R410B-22	22	WHT/ORG-BLU-GRA
46	R411B-22	22	WHT/ORG-VIO-GRA
47	NC287B-20	20	WHT/BLK-BRN-BLU
48	C290B-20	20	WHT/BRN-BLU-VIO
49	C288B-20	20	WHT/BRN-BLU-GRA
50	NC289B-20	20	WHT/BLK-BRN-VIO
51	R412B-22	22	WHT/YEL-GRN-BLU
52	R413B-22	22	WHT/YEL-GRN-VIO
53	R414B-22	22	WHT/YEL-GRN-GRA
54	R415B-22	22	WHT/RED-ORG-GRN
55	R416B-22	22	WHT/RED-ORG-BLU
56	R417B-22	22	WHT/RED-ORG-VIO
57	R418B-22	22	WHT/RED-ORG-GRA
58	R419B-22	22	WHT/RED-YEL-GRN
59	R420B-22	22	WHT/RED-YEL-BLU
60	R421B-22	22	WHT/RED-YEL-VIO
61	R422B-22	22	WHT/RED-YEL-GRA
62	R423B-22	22	WHT/RED-GRN-BLU
63	R424B-22	22	WHT/RED-GRN-VIO

Install the cable clamp and strain relief.

Bundling the Harness

Most production aircraft are built around the wiring harness which is assembled in advance. It is not practical to build a Falco this way; therefore, it will be necessary to pull the wires through the airplane. To prepare for this, the wires should be separated into bundles and temporarily tied with tywraps.

J1 Receptacle Bundling. All of the wires from the J1 receptacle are routed to the right side of the instrument panel and may be bundled together. (Note, when we say right or left, we are referring to the right or left side of the aircraft. When you are working on the instrument panel, this will be the opposite of the view from which you are working.)

J2 Receptacle Bundling. Bundle the following wires as listed. The remaining wires are spare wires and may be routed to either side, but it is suggested that they be kept separate and tied in a convenient place so that they may be easily found when they are required.

J2 RECEPTACLE–LEFT BUNDLE	
NP125A-18	WHT/BLK-RED-YEL
NP124A-18	WHT/BLK-RED-ORG
P126A-18*	YEL/RED-ORG-GRN

* Alternative wiring may require different bundling.

J2 RECEPTACLE–RIGHT BUNDLE	
L310B-18	BLU/WHT
H330B-18	GRN/WHT
L300B-18	YEL/ORG-BLU-GRA
Q190B-18	YEL/BRN-ORG-GRN
C201A-16	WHT/RED-BLU-VIO
R402A-16	WHT/ORG-YEL-GRN

J3 Receptacle Bundling. Bundle the following wires as listed. Note that there are a number of wires which may require different routing due to alternative installations. Some of the wires are routed primarily to the top of the instrument panel, and these are noted with "(up)". The remaining wires are spare wires and may be routed to either side, but it is suggested that they be kept separate and tied in a convenient place so that they may be easily found when they are required.

J3 RECEPTACLE–LEFT BUNDLE

P127A-20*	WHT/BRN-RED-ORG	
P115A-20	WHT/BRN-RED-YEL	
NP104A-20	WHT/BLK-BRN-RED	
P106A-22	WHT/BRN-RED-GRN	
P105A-22	WHT/BRN-RED-BLU	
P123A-20	WHT/BRN-RED-VIO	
G215C-22	WHT/BRN-ORG-GRN	(up)
G214C-22	WHT/BRN-ORG-BLU	(up)
E158B-22	WHT/BRN-GRN-VIO	
E165C-22	WHT/BRN-GRN-GRA	
E162C-22	YEL/BRN-RED-VIO	
E153B-22	YEL/RED-BLU-VIO	
E160B-22	YEL/RED-GRN-BLU	
E151B-22	YEL/GRN-VIO-GRA	
L252A-22	YEL/ORG-GRN-VIO	
E169B-22	YEL/BRN-ORG-BLU	
R340A-22	WHT/BRN-YEL-GRA	(up)
L281A-22	YEL/RED-GRN-GRA	
G242B-22	WHT/BRN-ORG-VIO	(up)
R375B-22	WHT/BRN-YEL-GRN	
NR337A-22	WHT/BLK-BRN-ORG	(up)
NR338A-22	WHT/BLK-BRN-YEL	(up)
NR339A-22	WHT/BLK-BRN-GRN	(up)
NE181A-22*	WHT/BLK-BRN-GRA	(up)
NC287A-20*	WHT/BLK-BRN-BLU	
C290A-20*	WHT/BRN-BLU-VIO	
C288A-20*	WHT/BRN-BLU-GRA	
NC289A-20*	WHT/BLK-BRN-VIO	

* Alternative installations may require different bundling.

J3 RECEPTACLE–RIGHT BUNDLE

P111A-22	YEL/BRN-RED-ORG
P112A-22	YEL/GRN-BLU-VIO
G216B-22	WHT/BRN-RED-GRA
G222B-22	YEL/BRN-ORG-VIO
G223B-22	YEL/ORG-GRN-BLU
G224B-22	YEL/BRN-GRN-GRA
G220C-22	WHT/BRN-ORG-YEL
L315B-20	WHT/BRN-GRN-BLU
R388B-22	WHT/BRN-YEL-VIO
E154B-22	YEL/RED-GRN-VIO
E155B-22	YEL/BRN-ORG-GRA
R380B-22	WHT/BRN-YEL-BLU
E176A-22	YEL/BRN-RED-GRA
E177A-22	YEL/RED-ORG-BLU
R341A-22	WHT/BRN-ORG-GRA
E179A-22*	WHT/BRN-VIO-GRA
E183A-22*	YEL/ORG-GRN-GRA
E184A-22*	WHT/RED-ORG-YEL

* Alternative wiring may require different bundling.

P1 Plug Bundling. The two violet wires are bundled to go to the aft face of frame No. l. The one striped wire goes to frame 5 and the remaining wires are bundled to go to the aft face of frame No. 6.

P2 Plug Bundling. The wires for the P2 plug must be separated into those wires which are routed forward and those wires which are routed aft. All forward bundle wires go to the engine compartment and are routed through frame No. 1 to the left or right side of the airplane. Accordingly, the left engine bundle is noted as "(left)" and the right engine bundle is noted as "(right)". These wires should be bundled together initially and then separated into separate bundles.

P2 PLUG–FORWARD BUNDLE		
NP125B-18	WHT/BLK-RED-YEL	(left)
NP124B-18	WHT/BLK-RED-ORG	(left)
L300A-18	YEL/ORG-BLU-GRA	(right)
Q190A-18	YEL/BRN-ORG-GRN	(left)

P2 PLUG–AFT BUNDLE

All of the remaining wires are bundled and routed to frame No. 6.
Separate out the following wires at the specified location.

P2 PLUG–TO CENTER CONSOLE PANEL	
C201B-16	WHT/RED-BLU-VIO

P2 PLUG–TO FRONT OF FRAME NO. 4	
H330A-18	GRN/WHT

P3 Plug Bundling. Separate all yellow wires from the white wires. The yellow wires lead forward from the instrument panel, and the white wires lead aft from the instrument panel. The yellow wires should be bundled together so that they reach the aft face of frame No. 1 together. At that point separate out the following wires.

P3 PLUG–FRAME NO. 1 BUNDLE	
P111B-22	YEL/BRN-RED-ORG
P112B-22	YEL/GRN-BLU-VIO
E162B-22	YEL/BRN-RED-VIO
L252B-22	YEL/ORG-GRN-VIO
R281B-22	YEL/RED-GRN-GRA
E154A-22	YEL/RED-GRN-VIO
E155A-22	YEL/BRN-ORG-GRA

P3 PLUG–TO RIGHT SIDE ENGINE COMPARTMENT	
G222A-22	YEL/BRN-ORG-VIO
G223A-22	YEL/ORG-GRN-BLU
G224A-22	YEL/BRN-GRN-GRA
E153A-22	YEL/RED-BLU-VIO
E160A-22	YEL/RED-GRN-BLU
E151A-22*	YEL/GRN-VIO-GRA
E169A-22	YEL/BRN-ORG-BLU
E183B-22**	YEL/ORG-GRN-GRA

* See Section 8 for alternative routing of K151A-22 if a four cylinder CHT installation is planned.

** If a carburetor ice detector installation is not planned, this wire should be routed aft to frame No. 6.

P3 PLUG–TO LEFT SIDE ENGINE COMPARTMENT	
E176B-22*	YEL/BRN-RED-GRA
E177B-22*	YEL/RED-ORG-BLU

* If a Fuelgard installation is not planned, these wires should be routed aft to frame No. 6.

All of the white wires from P3 plug should be bundled together and routed to frame No. 6. Separate out the following wires at specified locations.

P3 PLUG–TO CENTER CONSOLE PANEL	
G242A-22	WHT/BRN-ORG-VIO

P3 PLUG–TO FRONT OF FRAME NO. 4	
R375A-22	WHT/BRN-YEL-GRN
R380A-22	WHT/BRN-YEL-BLU
NC287B-20*	WHT/BLK-BRN-BLU
C290B-20*	WHT/BRN-BLU-VIO
C288B-20*	WHT/BRN-BLU-GRA
NC289B-20*	WHT/BLK-BRN-VIO

* Route to frame No. 6 if an autopilot is not planned.

P3 PLUG–TO FRAME NO. 5	
G215B-22	WHT/BRN-ORG-GRN
G214B-22	WHT/BRN-ORG-BLU
G216A-22	WHT/BRN-RED-GRA

Chapter 5
Equipment Installation

At this stage it is necessary to install all of the equipment for the electrical system in the aircraft. Some items may be installed later, but it is advisable to plan the location of all of the equipment to be installed. The installation of the equipment for the airframe and instrument panel are covered separately in the manual. The airframe is covered first, but there is no requirement that the airframe work be done first. In fact, the work on the airframe and the instrument panel may be done at the same time.

Airframe Equipment Installation

Battery Compartment. Install the battery (see Detail RR). Drill two 13/16"Ø holes in the floor of the battery compartment. Install two MS35489-14 grommets. These are for the two 0 gauge wires for the battery. Before drilling these holes, you should plan for the routing of the battery wires. Ideally, they should follow the fuselage skin so that they can be held in place with clamps.

Frame No. 6. A great deal of electrical equipment is installed on the aft face of frame No. 6 and in the immediate area. This is an easily accessible area, and it is an ideal environment for electrical equipment (without heat, vibration and moisture). The position of the main negative bus is already shown in the drawings. The other equipment is shown in a new drawing to be issued shortly. If you do not have it, let us know and we will send you a copy. The following equipment is to be installed in this area.

K1 master relay (see Detail T)
K2 starter relay (see Detail T)
P/N 116-61 ammeter shunt (see Detail GG)
356-003 fuse holder & fuses (see Detail HH)
P/N 116-52 voltage regulator (see Detail JJ)
W2(–) main ground bus (see Detail DD)
TB1 terminal block (see Detail LL)
Anti-collision light (strobes) power supply
Carburetor ice detector (if required)
Starting vibrator (if required)

You should also plan for the installation of the marker beacon receiver, remote altitude encoder, remote DME or RNAV receiver and ELT in this location.

You will have to provide a hole through frame No. 6 for the wiring. This is shown on the new drawing mentioned above. Line the plywood edges with nylon caterpiller grommet (Sub-kit No. 816-24).

Frame No. 5. Install the following equipment on frame No. 5.

K3 gear up relay (see Detail W)
K4 gear down relay (see Detail W)
TB4 terminal block (see Detail KK) (may be omitted)
356-002 fuse holder & fuses (see Detail HH)

Frame No. 4. Install caterpiller grommets in the holes in frame No. 4 and the main wing spar.

Control Sticks. Drill 5/16"Ø holes in the base of the control sticks and install MS35489-4 grommets in these holes. The microphone push-to-talk switches (see Detail 0) may be installed in the control stick grips now, but they must be removed to fish the wire through the control sticks at the final wiring.

Center Console Panel. Install the following equipment on the center console panel. See Drawing No. 831-1 for details.

P/N 116-50 gear warning horn

S12 flap switch (see Detail P)
S9 throttle position switch
S10 flap position switch

Frame No. 3. The compass should be installed, and a hole provided so that the wire for the compass light will run to the inside of the plywood skin.

Glareshield. The glareshield lights may be installed now, and a hole should be made for the wiring through the plywood on the top of frame No. 3.

Frame No. 1. Install three grommets on left side of frame No. 1 and one grommet on the right side of frame No. 1 in accordance with Drawing No. 114 (or enclosed sketch). If you plan to install an alternator analyzer, remember to provide room for the transducer when you install the following.

P/N 116-62 alternator shunt (see Detail GG)
356-002 fuse holder & fuses (see Detail HH)

On the forward face of frame No. 1, install S7 Up Limit Switch and S8 Down Limit Switch (see Drawing No. 105).

It is assumed that you have installed plastic conduit in the wings to provide for the installation of the wiring for the anti-collision (strobes), navigation lights and pitot heat. You will also have to be able to get the wires to the tail of the airplane for the tail navigation light and strobe light.

Also, you may be thinking about the location for the OAT probe. As this probe sticks out of the skin slightly, you might want to see if you can find a place for it in the submerged cabin air inlet. If you mount the probe on the left side of the fuselage, remember that the Falco's front tank is usually filled by standing on the wing. A probe in this location is vulnerable to be bumped by careless attendants, or even the owner (as was our embarrassing experience).

You should also be aware of the need to install the sender wires for the fuel tanks. With the need to run the wires for the compass light, glareshield lights and OAT probe, this probably means that the forward tank must be removed during the wiring process. This should be done early in the process so that you can do most of your wiring with the tank in the airplane. While it may be more convenient to have the tank out of the airplane, it is important that when you route the wires that you are sure that you are not rubbing wires against the fuel tank.

Instrument Panel Equipment Installation

Before you begin to install the electrical equipment in the instrument panel, you should do a final fit of all the instruments that are to be installed. It is important to do all of this metal work first as the metal chips that are the product of such holes are likely to remain in the panel, and they could cause a short circuit.

The holes for the DME, OAT, Fuelgard, autopilot switches, carburetor ice detector potentiometer should all be cut. The corner cut-outs for the VOR indicators, accelerometer, and 4 cylinder EGT must also be done. The ignition switch hole tang must be filed to the correct shape. The Alcor EGT gauges are slightly larger than most 2 1/4" gauges and either the hole must be enlarged slightly or the plastic bezel of the gauge must be filed down.

The instrument panel should be installed in the airplane along with the center console panel. All mounting holes in the airframe should be drilled and hardware installed. You will have to cut on frame No. 3 slightly to provide for clearance for some of the instruments. In particular, the upper left post light for the airspeed indicator, the vacuum gauge, the clock-timer, the Fuelgard and the radio stack may require some "adjustment" in the profile of the wood for a proper fit. Practice installing and removing the instrument panel to get the hand of the twists and turns that must be made.

The radio mounting trays should be installed as early as possible. The radios might require some minor modification to the radio stack opening, and it is best to do this work before the instrument panel is painted. The radio mounting trays are usually installed with "nut-serts" or "tric-nuts". After the trays are installed, they should be removed while the wiring is done.

At this point the instrument panel should be painted, and while you are doing this you can also be installing the new "right side up" lettering on the circuit breakers mentioned below. When painting the instrument panel, it is best to avoid

the "shake-and-spray" cans as they tend to adhere poorly. Instead, use Dupont Korlar epoxy primer. A attractive color for the instrument panel is the grey used on Cessna Citations. This paint is Federal Standard No. 595-36118. This flat gray paint can be made up by any paint store.

The instrument panel markings should be applied, and a number of coats of a protective coating should be applied to the panel. From this point on, you should treat the surface of the instrument panel with tender loving care. While installing the electrical equipment, it is a good idea to clamp the panel down so that it will be steady.

You may now begin to install the electrical equipment in the panel. Proceed as follows.

Circuit Breakers & Bus Bar. Install the circuit breakers and main bus bar in the panel. You will be tempted to install the bus bar on the circuit breakers, and then install the entire assembly in the panel. This is not a good idea as the nuts for the circuit breakers are difficult to tighten without scratching the paint. The best method is to install the circuit breakers one at a time, working from the center of the airplane to the right. This way, a crescent wrench may be used on the nuts, and they may be tightened without scratching the paint.

One frustrating design detail of the circuit breakers is that they may not be installed as we intended without turning the push-pull circuit breakers up-side-down. If this is not done, the bus bar will not fit the terminals of all of the circuit breakers. If you wish, you may leave the numbers on the circuit breakers, but the appearance will be a little weird and will detract from the appearance of an otherwise exquisite instrument panel. The solution is to remove the numbers and apply new numbers. This is not as hard as it might sound and the effort is well worth it. In the end, the appearance of the circuit breakers will be so good, that you will be glad that you had to change the numbers. Start by sanding the numbers off the tip of the circuit breakers with a piece of 320 grit emery paper on a table. Then sand the sharp edges smooth. Sand with a piece of 400 grit emery paper. Use a piece of fine steel wool to put a polish on the ends. Apply new numbers (remember which way is "up") by using white 10 point Helvetica Medium transfer lettering. This lettering is made by Letraset, Chartpak and others and may be purchased at a local art or drafting store. This is the same type of lettering that was used for the instrument panel marking kit. Finally, spray with several coats of a clear coating.

- *Note*: At the end of the steel wool stage, you will be tempted to blacken the tips with a magic marker. This will not work as the dye will bleed through when you spray on the clear coating. In any event, the tips turn quite dark when the clear coating is applied.

Now, instead of a set of circuit breakers with poorly marked factory numbers on them and many a sharp edge on the tips, you now have the numbering on right side up, in the same type face as the rest of the panel and with a totally professional appearance.

Grommets. Install the two grommets on the instrument panel flange.

Terminal Blocks. Install the two terminal blocks on the instrument panel flange. The screws are difficult to tighten. If you are not able to make them go, then you might try tapping the nuts (6-32) partially through. If the nuts are completely tapped, they will lose their self-locking properties. You can put Loctite on the threads, or another solution is to dip the screw in RTV silicone rubber compound, which will harden and keep the nuts from coming off. Also, you may find that you will want to coat the exposed screw threads with this same material to keep them from abrading a stray wire.

Alternate Static Source. Install the alternate static source fitting in the base of the instrument panel. This is not part of the electrical system, but is easier to install now, and the wires must be routed around the thing. If you wish, Loctite may be installed on the nut.

Relay Base Modules. Install the three relay base modules on the flange of the instrument panel. If needed, tap out the nuts and use Locite or silicone rubber sealant on the screws as outlined above. If you try putting some of the relays in the relay base modules, you will find that they are quite loose. Don't worry about this, once you have the terminals in place you will need a screwdriver to get the relays out.

Transistor Base. Install the three transistor bases only. Do not install the transistors at this point as the bases must be removed during the wiring operation.

Voltage Monitors. Install the low voltage monitor and high voltage monitor on the instrument panel flange. If needed, tap the nuts and use Loctite or silicone rubber compound on the screws as before.

Master and Alternator Switches. Install the master switch and alternator switch. Do not tighten as these must be removed to hook up the wiring.

Mic & Phone Jacks. Install the microphone and headphone jacks on each side of the panel. Check for continuity with the ground terminals and the instrument panel (see Detail Q).

Light Dimmer Pots. Install the light dimmer potentiometer and switches (see Detail N). The three terminals for the pot must be on the bottom, and a strip of electrical tape should be applied to the instrument panel to protect against a short-circuit.

Mini Switches. All of the miniature switches for the instrument panel may now be installed. These switches are supplied with brass lock washers which you may choose to replace with a plain chrome or nickle-plated washer for the sake of appearance.

Ignition Switch. Install the ignition switch in the hole provided. You will need to file the locking tang as shown on Drawing No. 841-1, Detail F. Take care to avoid damaging the panel markings for this switch.

Engine Instrument Cluster. Install the engine instrument cluster. If you are going to use the optional P4 plug and J4 receptacle, the screws on the inboard end of the cluster will interfere with the cable clamp of the receptacle and these must be cut short. The plastic lens should be installed between the instrument panel and the instrument cluster.

Landing Gear Switch. Install the landing gear switch in the hole provided.

We do not suggest installing the various lamps into the instrument panel at this time, but if you want to see what they look like go right ahead. It is easier to solder the wires to the lamp bases before they are installed in the panel.

Chapter 6
Wiring Hookup

You will now begin to hook up the wires for the airframe and the instrument panel. In each case you will be given the wire number and the terminal to which the wire is to be attached. Refer to the wire tabulation and to the electrical drawings for the details. As you complete each step, check off the item completed. The purpose of this installation manual is to tell you what to do at what time. This list of steps is not intended to replace the electrical drawings or the wire tabulation.

At this time, you have installed the wires into the three sets of plugs and receptacles for the instrument panel. The first order of business will be to hook up these wires so that the confusion brought about by the large number of loose wires will be quickly brought under control. After this is completed, additional wires will be added to the aircraft.

The additional wires for the instrument panel are included in Sub-kit No. 816-13. There are a few exceptions that will be pointed out as we go along. There are several cases where the wire from one of the receptacles is supplied over-length. Once the wire is hooked up, there will be some extra wire left over, and this wire is used for the instrument panel. Note on the packing lists for the wiring sub-kits there is an "INCL" column. This indicates that extra wire is included for this additional wire number. For example, in Sub-kit No. 816-12, the wire for L315B-20 also includes the wire for wire No. 316.

There is a "(REF)" column on the packing lists for the wiring kits. This is for our internal use at Sequoia Aircraft and refers to the item number on our wire procurement specification. Ignore this column.

The wiring for the airframe is included in Sub-kit No. 816-17. As with the instrument panel wiring kit, some wire for the airframe is included with the wire for the plugs. In each case, the extra length of wire is noted in the "INCL" column on the packing lists for the plug wiring kits.

The Heavy Wires

The first order of business will be to install the larger wires for the airframe. These wires are so large that they could damage the smaller wires if an attempt is made to install them after the smaller wires are in place. Also, these wires will require the use of a large crimping tool for the terminals. Depending on your situation, you will have to either take the wires to your local airport to swage the terminals in the shop of an FBO, or you will have to borrow the tool and do the work in your shop. How you proceed at this time will depend on what arrangements you can make for the use of this type of tool. It is critical that the wires from the J1 receptacle have the terminals installed at a very early stage. The ground wires will quickly become buried under a tangle of other wires. The wires to the main bus bar will be more accessible, and this work could be postponed until later. All of these terminals may be soldered in place, but swaging is preferable. Also, it is a very good idea to put some heat shrink tubing over the terminals where it is possible for them to come into contact with other wires (remember, these are all unprotected circuits).

The actual hookup of the heaviest wires to the starter, engine and battery could easily be left for later, and we can think of many good reasons for doing so. We have no objection to postponing this work as long as you do not paint yourself into a corner. It is important that the wires themselves be installed in the aircraft, and that they are secured with clamps.

Install the following wires. Be careful to provide sufficient lengths for each run, and you would do well to install the longer lengths first. Leave enough extra wire on each end for final trimming when the terminal is installed. The wires should pass through frame No. 4 and the main wing spar on the left side of the aircraft. Do not install any terminal at this time.

Use a tape measure or plastic tubing to determine the needed wire lengths. The O gauge wire is very expensive.

▲ **Warning** In this chapter, we now show the wire color next to the wire number. We are doing that at the request of a number of builders. Because this sort of thing is susceptible to typographical errors, be sure to double check any wire color shown here against the wire tabulation sheet. ▲

INSTALL		
☐	P101A-0	WHT
☐	P101B-0	WHT
☐	NP102A-0	(BLK)
☐	NP102B-0	(BLK)
☐	P116-0	WHT
☐	P107-6	WHT
☐	P108-6	WHT

To secure these wires in place, a number of clamps have been included in the hardware sub-kit. On the engine mount, you should install two MS21919-DG12 clamps on each side. On each clamp on the left side, install an MS21919-DG14 clamp with AN525-1032R7 screw, AN960-10L washer and MS21042-3 nut. On each clamp on the right side, install an MS21919-DG6 clamp with the same hardware. The clamps will eventually hold other wires as well, and the MS21919-DG14 clamps will have to be formed to fit the two large wires. In the airframe, the 0 gauge wires may be clamped in place with MS21919-DG8 and MS21919-DG16 clamps held in place with a No. 8x1/2" TRA screw. These are provided in the hardware kit. Additionally, there are a number of 1/4", 3/16" and 1/8" nylon clamps provided for smaller wires, and they should be installed with a No. 6x1/2" TRA screw where needed.

- *Note:* Most production aircraft use aluminum wire for the wire to the starter and to the engine ground. Aluminum wire is lighter. There are two reasons that copper wire is used in this system. First, the aluminum terminals are trouble-prone. Secondly, the ring terminals for aluminum wires require very expensive tooling. The aircraft manufacturers have this tooling, but FBOs do not. When the terminals on aluminum wires on production aircraft must be replaced, mechanics have to replace the entire wire with copper wire.

We will now being the process of the wiring hookup. In each case you should be very careful to check off each step when it is completed.

This is important: You must have some way of noting your progress with the electrical system hookup in addition to checking off the steps shown here. There will be many times when you will be told to hook a wire up to a terminal. The first step will be to look up the wire on the wire tabulation and on the drawing. These drawings and this installation manul will not tell you where to find the wire. Is the wire already installed in the airplane on one end? Must you use a new piece of wire? This will not seem important now that you have nothing in the airplane, but it can become a serious problem later on. We suggest you use a red pen to make a dot on each wire at the point of termination when it is hooked up. Also, you can make a copy of the wire tabulation and circle each completed terminal with the red pen. This way you can easily see from both the electrical drawings and from the wire tabulation that one end of the wire has already been hooked up. Also, this will allow you an easy check to make sure that you have hook up of all of the wires.

HOOKUP			TO	
☐	NP102B-0	(BLK)	W2(–)	
☐	NP102A-0	(BLK)	W2(–)	
☐	P116-0	WHT	K2(A2)	
☐	P101A-0	WHT	K1(A1)	
☐	P101B-0	WHT	K1(A2)	
☐	P101B-0	WHT	K2(A1)	
☐	P107-6	WHT	K1(A2)	
☐	P107-6	WHT	P/N 116-61(A+)	
☐	P101A-0	WHT	BT1(+)	
☐	NP102A-0	(BLK)	BT1(–)	
☐	P108-6	WHT	P/N 116-62(A+)	
☐	P108-6	WHT	Alternator(+)	(install nipple)
☐	P116-0	WHT	Starter(+)	(install nipple)
☐	NP102B-0	(BLK)	W3(–)	

Install J1, J2, and J3 receptacles in the instrument panel. The nuts for the lower screws are difficult to reach, so it is best to install J1 first.

On the hookup of the wires to W4(–), do not tap the threads of the nuts. It is important that these nuts be firmly held in place. Socket head screws are provided, so all that is necessary is to turn the screw while the nut is held in place with a wrench. Two connections should be made at the lower holes as it is difficult to hook up wires to the lower holes after the upper holes are used. Also, be very careful to use the aluminum washers as shown in Detail F, beneath the screw head and between the terminal and the instrument panel. Position these large wires so that they will not interfere with the bundle of wires at the base of the panel.

HOOKUP		TO
☐ NP131A-8	BLK	W4(–)
☐ NP132A-8	BLK	W4(–)
☐ P109A-8	VIO	W1(+)
☐ P110A-8	VIO	W1(+)
☐ P129A-8	RED	W1(+)
☐ P130A-8	RED	W1(+)

Install the instrument panel in the airplane. The forward fuel tank should be in the airplane at this point. Install P1, P2 and P3 plugs into J1, J2 and J3 receptacles, respectively. Route the wires through the airframe. Be very careful to ensure that these wires are bent and routed so that they clear the forward fuel tank. P/N 859-1 has a number of holes drilled in it so that the wires from the instrument panel may be secured in place with tywraps. The wires should be routed between the engine control cables in separate bundles for each plug. Beyond that point, the wires may be joined in a single bundle. The wires should pass through frame No. 4 and the main wing spar on the left side of the aircraft.

The way you install these wires will make a big difference with the ease of removing the instrument panel. When the airplane is finally completed, the plugs are removed. To disconnect the plugs, they must move forward in the aircraft about 1/2". Once you bundle the wires, they become quite stiff, so you will have some difficulty in connecting and disconnecting the plugs if the wiring bundle does not allow for some movement. Be sure you are able to disconnect and connect the plugs before lashing everything firmly in place.

If you have not already done so, the holes through the main wing spar and frame No. 4 should be enlarged to 25x50 per Revision C3p. Be careful not to cut into the lower lamination of the main wing spar.

HOOKUP		TO
☐ P109B-8	VIO	P/N 116-62(A–)
☐ P110B-8	VIO	P/N 116-62(A–)
☐ P129B-8	RED	P/N 116-61(A–)
☐ P130B-8	RED	P/N 116-61(A–)
☐ NP131B-8	BLK	W2(–)
☐ NP132B-8	BLK	W2(–)

Ensure that the wires from the P1, P2 and P3 plugs are securely tied to P/N 859-l, and that the plugs can be removed and replaced freely.

Instrument Panel Hookup

Remove the instrument panel from the aircraft and clamp to your work table. During the hookup of the wires for the instrument panel it is important to keep in mind that the wire bundle will grow as you progress with the wiring. The wires to the circuit breakers should loop up out of the bundle with sufficient length so that the wires may be removed at a later date. The wires to the switches must have sufficient free length out of the bundle so that the switch may be removed if this is necessary to hook up the other terminals of the switch (as in the case of the master switch and alternator switch).

The ring terminals in many cases will have to be bent slightly so that the wires take the right position. This is the case on the hookup to the circuit breakers. Also, when you hook up the wires to the W4(–) negative bus (the instrument panel) you will find that you will need to put two ring terminals on each screw. To save space, it is a good idea to double up and install two wires in each ring terminal.

To maintain order and to make wires easier to find, route all wires to their destination after each hookup step.

HOOKUP		TO
☐ NP104A-20	WHT/BLK-BRN-RED	S1(3)
☐ P123A-20	WHT/BRN-RED-VIO	S2(2)
☐ NP125A-18	WHT/BLK-RED-YEL	S23(R)
☐ Its shielding		S23(GRD)
☐ NP124A-18	WHT/BLK-RED-ORG	S23(L)
☐ Its shielding		S23(GRD)
☐ P126A-18	YEL/RED-ORG-GRN	S23(LR) (optional)
☐ P115A-20	WHT/BRN-RED-YEL	S23(S)
☐ P127A-20	WHT/BRN-RED-ORG	S23(BO) (optional)
☐ R375B-22	WHT/BRN-YEL-GRN	J11(1)
☐ L252A-22	YEL/ORG-GRN-VIO	Q2(E)
☐ E151B-22	YEL/GRN-VIO-GRA	P/N 145-22 (SEND)
☐ E160B-22	YEL/RED-GRN-BLU	P/N 145-23 (SEND)
☐ E153B-22	YEL/RED-BLU-VIO	P/N 145-24 (SPLY)
☐ E169B-22	YEL/BRN-ORG-BLU	P/N 145-24(WPR)
☐ P106A-22	WHT/BRN-RED-GRN	P/N 145-25(+)
☐ P105A-22	WHT/BRN-RED-BLU	P/N 145-25(–)
☐ E162C-22	YEL/BRN-RED-VIO	P/N 145-26 (SEND)
☐ E165C-22	WHT/BRN-GRN-GRA	P/N 145-27 (SEND)
☐ R380B-22	WHT/BRN-YEL-BLU	J12(1)
☐ R402A-16	WHT/ORG-YEL-GRN	CB18
☐ R388B-22	WHT/BRN-YEL-VIO	CB17
☐ C201A-16	WHT/RED-BLU-VIO	CB10
☐ Its shielding		22 gauge BLK wire (12" long)
☐ BLK wire (above)		W4(–)
☐ G210A-12	WHT/RED-VIO-GRA	CB8
☐ L300B-18	YEL/ORG-BLU-GRA	CB7 (save extra wire for 302)
☐ L315B-20	WHT/BRN-GRN-BLU	CB6 (save extra wire for 316)
☐ L310B-18	BLU/WHT	CB5 (save extra wire for 311)
☐ H330B-18	GRN/WHT	CB3 (save extra wire for 332)
☐ Q190B-18	YEL/BRN-ORG-GRN	CB2 (save extra wire for 192)
☐ R341A-22	WHT/BRN-ORG-GRA	TB3(7)

At this time you will install the lamps for the circuit breakers. The positive wire should be soldered to the center post on the lamp base. You may find it easier to solder this wire in place with the lamp free of the instrument panel, or you might prefer to install the lamp in the instrument panel and then solder the wires in place. The solder joints and bare ends of the wire should be covered with heat shrink tubing.

To solder wires to the lamp base, use needle-nose pliers to bend a hook in the base of the wire. Hook this end over the solder terminal of the lamp base. Gently squeeze the "hook" over the solder terminal and solder.

- *Note:* F196-22 may be either 20 gauge or 22 gauge wire. In the kit, it is supplied as 20 gauge wire since 20 gauge wire is specified for the Century I autopilot for reasons of voltage drop, but in either case the circuit is protected by a 5 amp circuit breaker.

HOOKUP		TO
☐ Q192-18	YEL/BRN-ORG-GRN	DS9
☐ NQ193-18	BLK	DS9
☐ H332-18	GRN/WHT	DS10
☐ NH333-18	BLK	DS10
☐ F196-20	RED/YEL	DS11
☐ NF197-22	BLK	DS11
☐ L311-18	BLU/WHT	DS12
☐ NL312-18	BLK	DS12
☐ L316-20	WHT/BRN-GRN-BLU	DS13
☐ NL317-20	BLK	DS13
☐ L302-18	YEL/ORG-BLU-GRA	DS14
☐ NL303-18	BLK	DS14

Route these wires inboard of all of the circuit breakers so that the wires will not come near the main bus bar. Install two wires in each ring terminal for the hookup to W4(–).

HOOKUP		TO
☐ Q192-18	YEL/BRN-ORG-GRN	CB2
☐ H332-18	GRN/WHT	CB3
☐ F196-20	RED/YEL	CB4
☐ L311-18	BLU/WHT	CB5
☐ L316-20	WHT/BRN-GRN-BLU	CB6
☐ L302-18	YEL/ORG-BLU-GRA	CB7
☐ NQ193-18	BLK	W4(–)
☐ NH333-18	BLK	W4(–)
☐ NF197-22	BLK	W4(–)
☐ NL312-18	BLK	W4(–)
☐ NL317-20	BLK	W4(–)
☐ NL303-18	BLK	W4(–)

In the following sequence, R3 and R4 resistors may be installed at the S3 and S4 pot switches or at the Q1(B) and Q2(B) transistor bases. The choice is yours, and you should do whichever is easiest. Install the commoning tabs on TB2 (see Detail A).

When you hook up the wires to the lighting bus, TB2(1-7), you will have to exercise great care to have all of the wires neatly in line. All of the wires to the forward face of the panel flange (remember which way is forward) should be routed through the rubber grommet. So that the wires do not hang down below the instrument panel, you should bring the wire up above the terminal block and then down to the terminal. Except for L272-22, all of the wires should be doubled up in a ring terminal. You are allowed a maximum of four terminals per post, but it is best to keep it to two per post. Bend the wires carefully and tywrap them together. The terminals should be bent slightly so that they fit together nicely. Hook up the wires to the outboard terminal positions first and work your way inboard. The actual terminal called out is not important as long as the wire is terminated to the lighting bus.

HOOKUP		TO
☐ L274-22	WHT	R1(2)
☐ L274-22	WHT	S3(5)
☐ L254-22	WHT	R2(2)
☐ L254-22	WHT	S4(5)
☐ NL273-22	BLK	R1(1)
☐ NL253-22	BLK	R2(1)
☐ L275-22	YEL/BLU	S3(4)
☐ L271-22	YEL/VIO	R1(3)
☐ L275-22	YEL/BLU	R3
☐ R3		Q1(B)
☐ L270-22	YEL/VIO	Q1(C)
☐ L272-22	YEL	Q1(E)
☐ L270-22	YEL/VIO	CB11
☐ L271-22	YEL/VIO	CB11
☐ L255-22	YEL/GRN	S4(4)
☐ L251-22	YEL/RED	R2(3)
☐ L255-22	YEL/GRN	R4
☐ R4		Q2(B)
☐ L250-22	YEL/RED	Q2(C)
☐ L250-22	YEL/RED	CB12
☐ L251-22	YEL/RED	CB12
☐ L272-22	YEL	TB2(6)
☐ L276-22	YEL	P/N 145-21(L)*
☐ L277-22	YEL	P/N 145-21(L)*
☐ L278-22	YEL	P/N 145-21(L)*
☐ L279-22	YEL	P/N 145-21(L)*
☐ L280-22	YEL	P/N 145-21(L)*
☐ L276-22	YEL	TB2(5)*
☐ L277-22	YEL	TB2(5)*
☐ L278-22	YEL	TB2(6)*
☐ L279-22	YEL	TB2(6)*
☐ L280-22	YEL	TB2(6)*
☐ L281A-22	YEL/RED-GRN-GRA	TB2(6)
☐ NL273-22	BLK	W4(–)
☐ NL253-22	BLK	W4(–)

* As an alternative, you may install a short jumper wire between each lamp terminal and run a single wire to TB2(5 or 6).

Install Q1 and Q2 transistors. Heat sink compound should be applied to both sides of the mica insulator. Surprisingly, the transistors become rather hot when the instrument panel lights are at a low setting, while the temperature of the transistors barely rises when the lights are on their brightest setting. The transistors will not be harmed until they get very hot. The usual test is a "spit-sizzle" test. When the transistors are so hot that when you spit on your finger and touch the transistor and the spit boils off quickly, you are getting into the region where the transistors are close to overheating. It is best to keep the transistors as cool as possible. For normal operation, the transistors will get up to about 120°F with the lights on a dim setting. Note that the vacuum system filter is positioned near the transistors. The flow of air into the filter will help keep the transistors cool, an intended design feature. The placement of the transistors will allow you to check the temperature of the transistors in flight with your fingers.

In the sequence below, you should use two wires in each ring terminal for the hookup to CB9 and CB13.

HOOKUP		TO
☐ P118-20	GRN/YEL	S23(BAT)
☐ P118-20	GRN/YEL	CB21
☐ NP134-18	BLK	S23(GRD)
☐ NP134-18	BLK	W4(–)
☐ NP133-22	BLK	DS1
☐ P117-22	YEL/BRN	DS1
☐ P117-22	YEL/BRN	CB11
☐ P137-20	WHT	S1(2)
☐ P137-20	WHT	S2(1)
☐ NP133-22	BLK	S1(4)
☐ NP135-20	BLK	W4(–)
☐ NP135-20	BLK	S1(4)
☐ P136-20	GRN/RED	S1(1)
☐ P136-20	GRN/RED	CB1
☐ G245-22	ORG/WHT	CB9 (Double up these two wires
☐ G241-22	ORG/WHT	CB9 on a common terminal)
☐ G224B-22	YEL/BRN-GRN-GRA	CB9 (Double up these two wires
☐ G225A-22	ORG/WHT	CB9 on a common terminal)
☐ G225A-22	ORG/WHT	TB3(2)
☐ R5		Q3(B)
☐ G227B-22	WHT/GRN	R5
☐ G227B-22	WHT/GRN	TB3(1)
☐ G225B-22	ORG/WHT	S5(2)
☐ G225B-22	ORG/WHT	TB3(2)
☐ G239-22	ORG/WHT	Q3(C)
☐ G239-22	ORG/WHT	TB3(2)
☐ G240-22	WHT/RED	Q3(E)
☐ G231-22	BLU/RED	S5(1)
☐ G230-22	VIO/WHT	S5(3)
☐ P/N 116-51(BLK)		W4(–)
☐ P/N 116-65(BLK)		W4(–)
☐ P/N 116-51(RED)		CB13 (Double up these two wires
☐ P/N 116-65(RED)		CB13 on a common terminal)
☐ E188-22	RED/WHT	CB13 (Double up these two wires
☐ E150-22	RED/WHT	CB13 on a common terminal)
☐ E150-22	RED/WHT	P/N 145-22(IGN)
☐ E152-22	RED/WHT	P/N 145-22(IGN)
☐ E152-22	RED/WHT	P/N 145-24(IGN)
☐ E161-22	BLU/YEL	CB14
☐ E161-22	BLU/YEL	P/N 145-26(IGN)
☐ E159-22	BLU/YEL	P/N 145-26(IGN)
☐ E159-22	BLU/YEL	P/N 145-23(IGN)
☐ E164-22	BLU/YEL	P/N 145-26(IGN)
☐ E164-22	BLU/YEL	P/N 145-27(IGN)

The engine instrument cluster is supplied with a ground terminal not shown on the drawing. While the case of the instrument is grounded to the instrument panel with its mounting screws, this may not be a reliable ground. Accordingly, connect this ground terminal to the W4(–) bus as follows:

HOOKUP		TO
☐ P/N 145-21(GRD)		22 gauge BLK wire
☐ BLK wire (above)		W4(–)

Install turn & bank in the instrument panel. If you plan to install a Century 1 autopilot, these wires should be hooked up to the circuit breaker and W4(–) and tagged for the installation of the autopilot which will normally be done by an avionics shop.

HOOKUP		TO
☐ F194-20	RED/YEL	CB4
☐ F194-20	RED/YEL	P/N 145-13(+)
☐ NF195-20	BLK	W4(–)
☐ NF195-20	BLK	P/N 145-13(–)

Install the volt-ammeter, EGT, OAT, Isocom, accelerometer, and clock-timer in the instrument panel. The reason for installing the EGT, Isocom, and accelerometer is so that the wiring may be routed around these instruments.

The connectors supplied with the OAT and clock-timer are usually in an inconvenient position, and they end up down in the wiring bundle. If you wish, you may replace these connections positioned higher so that they do not interfere with the bundles of wires. Also, the OAT probe wires should be routed through a connector if you want to be able to remove the instrument. This will require a 4 pin connector, and you must be very careful to keep the red and black probe leads separate from the power and ground leads which are also red and black. You should use a nylon AMP Matenlock, or a Molex Type connector. These are available at Radio Shack and other electronics stores.

HOOKUP		TO
☐ E158B-22	WHT/BRN-GRN-VIO	Clock(BLU)
☐ NE157-22	BLK	Clock(BLK)
☐ NE157-22	BLK	W4(–)
☐ Clock(RED)		P/N 145-26(IGN)
☐ E167-22	RED	OAT(RED)
☐ E167-22	RED	CB20
☐ NE156-22	BLK	OAT(BLK)
☐ NE156-22	BLK	W4(–)
☐ E154B-22	YEL/RED-GRN-VIO	OAT lead(RED)
☐ E155B-22	YEL/BRN-ORG-GRA	OAT lead(BLK)
☐ P111A-22	YEL/BRN-RED-ORG	P/N 145-20(+)
☐ P112A-22	YEL/GRN-BLU-VIO	P/N 145-20(A–)
☐ NP119-22	BLK	P/N 145-20(V–)
☐ NP119-22	BLK	W4(–)

At this time the post lights are installed. The post lights should first have the label removed. If you plan to paint the post lights to match your instrument panel, now is the time to do it. The post lights are grounded to the instrument panel on installation, so the surface of the forward face of the instrument panel should be without paint. Discard the extender spacer supplied with the post light. Install all post lights (16). Install the nylon nut/terminal on the post light. Continue to turn this nut/terminal until the cap of the post light just starts to raise up.

The wires for the post lights should be routed horizontally. Bend the wires for the post light neatly just forward of the nut/terminal. The wires should be routed horizontally to a common point, and then routed down between two instruments, through the grommet and to the lighting bus. We prefer to run the wires down between the artificial horizon and the airspeed indicator, but you should check to make sure that there is room between all of your instruments for these wires. If needed, the post light wires may take several routings down to the base of the panel. Once these wires are tied together, they become quite stiff. Make sure all of the wires will clear the instruments, and we would encourage you to install all of the instruments at this point just to make sure. In the next step, the wires from the base of the instrument panel to the

audio panel, annunciator panel and other switches and lights on the upper part of the instrument panel will be installed. These wires will be tied to the post light wires for stability.

HOOKUP	TO
☐ 16 Post lights	TB2(1-7)

Now, proceed with the following wires. S26 and R8 are not included in the electrical kit. This switch and resistor is supplied with the RST 521 beacon receiver. If an ARC R402A remote marker beacon receiver is installed, the avionics shop doing the installation should supply the switch and resistor.

HOOKUP		TO	
☐ NG229-22	BLK	DS2	
☐ NG229-22	BLK	W4(–)	
☐ G228-22	GRN/BLU	DS2	
☐ G214C-22	WHT/BRN-ORG-BLU	DS3	
☐ G215C-22	WHT/BRN-ORG-GRN	DS3	
☐ NG237-22	BLK	DS4	
☐ NG237-22	BLK	W4(–)	
☐ G235-22	YEL/GRA	DS4	
☐ G236-22	YEL/GRA	S11(2)	
☐ G241-22	ORG/WHT	S11(5)	
☐ G243-22	WHT	DS5	
☐ G243-22	WHT	S11(4)	
☐ NG244-22	BLK	DS5	
☐ NG244-22	BLK	W4(–)	
☐ G242B-22	WHT/BRN-ORG-VIO	S11(3)	
☐ NE181A-22	WHT/BLK-BRN-GRA	DS6	
☐ P/N 116-51 (GRN)		DS7	
☐ E188-22	RED/WHT	DS7	
☐ P/N 116-65 (WHT)		DS8	
☐ NE175-22	BLK	DS8	
☐ NE175-22	BLK	W4(–)	
☐ R336-22	WHT	DS17	
☐ R336-22	WHT	DS18	
☐ R336-22	WHT	DS19	
☐ R336-22	WHT	S26(3)	
☐ R8		S26(3)	
☐ R8		S26(1)	
☐ R340A-22	WHT/BRN-YEL-GRA	S26(4)	
☐ R340A-22	WHT/BRN-YEL-GRA	S26(6)	(install jumper)
☐ R335-22	WHT/BRN	CB20	
☐ R335-22	WHT/BRN	S26(5)	
☐ R335-22	WHT/BRN	S26(2)	(install jumper)
☐ NR337A-22	WHT/BLK-BRN-ORG	DS17	
☐ NR338A-22	WHT/BLK-BRN-YEL	DS18	
☐ NR339A-22	WHT/BLK-BRN-GRN	DS19	

The pitot pressure switch is now installed. This switch sits on top of the artificial horizon. The switch is plumbed to the lines of the pitot and static system. See Drawing No. 151 for the installation of this switch. It would be a good idea if the switch had a foam rubber pad installed between the artificial horizon and the switch to dampen vibrations.

HOOKUP		TO
☐ G226-22	ORG/WHT	S6(1)
☐ G226-22	ORG/WHT	TB3(2)
☐ G227A-22	WHT/BLU	S6(2)
☐ G227A-22	WHT/BLU	TB3(1)

- *Note:* The landing gear will not come up until the airspeed is 68 knots. To actuate the landing gear on the ground, a jumper must be installed across terminals 1 and 2 of terminal block No. 3. This terminal block is located on the right side of the aircraft, allowing easy access with the co-pilot's control stick removed.

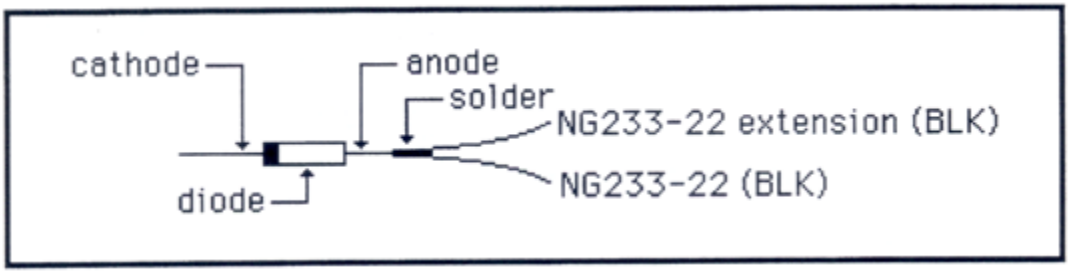
It is now time to hook up the three relays on the right side of the instrument panel flange. The terminals for these relays are a "faston" type terminal. The terminal is crimped on the wire (use AMP 29564 crimp tool) and may be soldered as well for extra strength. The terminal should be installed and then the wire and terminal should be fed up through the relay base module and inserted into its seat. Note that the terminal will fit in only one way.

Note that for K7 there are two terminals marked "87", while for K5 and K6 there is one terminal marked "87" and one marked "87A". Be careful to see that you keep them straight.

- *Note:* It is important that you keep close watch on the wire colors here to avoid confusion. There will be a lot of wires in a small area which must be hooked up correctly.

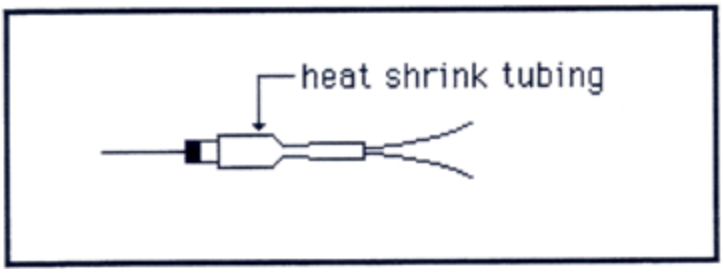
HOOKUP		TO
☐ G223B-22	YEL/ORG-GRN-BLU	K5(87)
☐ G232-22	WHT	K5(87A)
☐ G230-22	VIO/WHT	K5(30)
☐ G216B-22	WHT/BRN-RED-GRA	K6(87A)
☐ G231-22	BLU/RED	K6(30)
☐ G235-22	YEL/GRA	K7(87)
☐ G236-22	YEL/GRA	K7(87)
☐ G245-22	ORG/WHT	K7(30)

A basic design practice of electrical systems is to avoid making junctions of two wires in a wiring bundle. Ideally, all wires should be continuous and junctions should be made at switches, terminal blocks, etc. The installation of the coil suppression diodes for these three relays required that the wires be joined out of the relay base module. While you are wiring up the little "canister" that we are about to create, bear in mind that the whole package might have to be taken apart at some future date. This will require that the little package must pull out and be something that you can work on. This package containing the diode should be positioned so that it is centered on the three relays. There will be a lot of loose wires snaking back and forth, but all can be tied in place when the operation is complete.

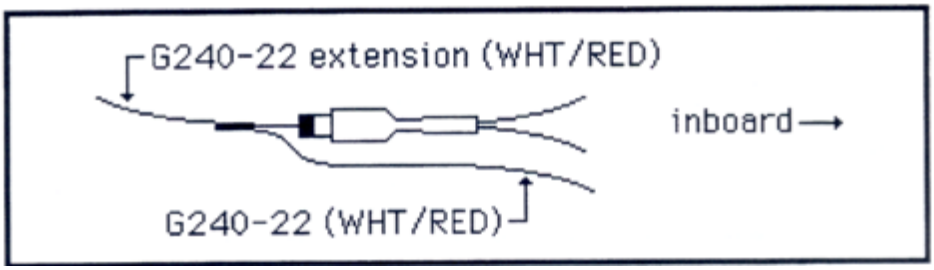


Solder two black ground wires to the anode lead of the diode. One of these wires is the ground wire to W4(–), and the other wire is the extension of the same wire.

HOOKUP	TO	
☐ CR9(anode)	{ NG233-22	BLK
	{ NG233-22 extension (12" long)	BLK

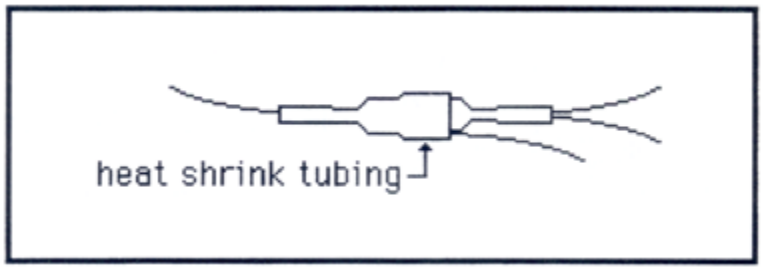


Install heat shrink tubing over the lead so that it covers about half of the body of the diode and the entire solder joint. The diode can be damaged by heating it, so do not overhead the diode when you are shrinking the tubing.



Hold the diode with the black wires toward the center of the aircraft, and center the body of diode with the three relay bases. Cut and strip G240-22 (save the extra wire for its extension) so that the end of the wire can be soldered to the cathode lead of the diode. Use the extra wire for G240-22 extension. The extension should be soldered to the cathode lead as well, but the extension should be positioned so that it goes outboard.

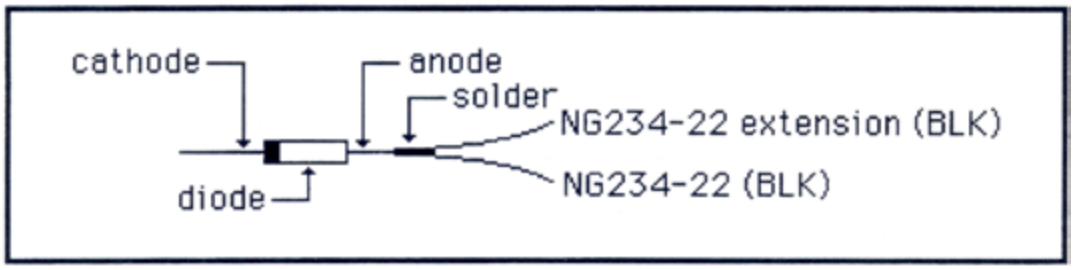
HOOKUP	TO	
☐ CR9(cathode)	{ G240-22	WHT/RED
	{ G240-22 extension	WHT/RED



Install heat shrink tubing over the entire assembly so that only the G240-22 extension exits the heat shrink tubing on the outboard end and the two black wires and G240-22 exit to the inboard end. Do not overheat the diode.

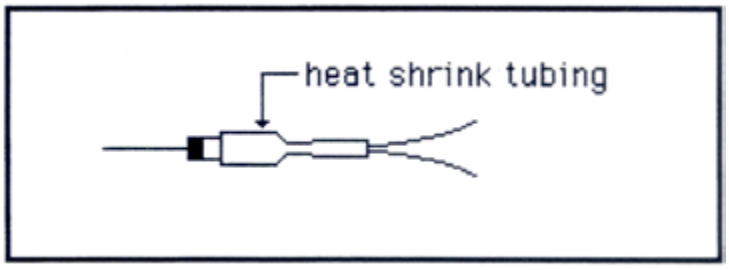
HOOKUP		TO
☐ G240-22 extension	WHT/RED	K5(85)
☐ NG233-22 extension	BLK	K5(86)
☐ NG233-22	BLK	W4(–)

This process will be repeated for the other two relays. There is one difference in that two wires are soldered to the cathode in addition to the extension.

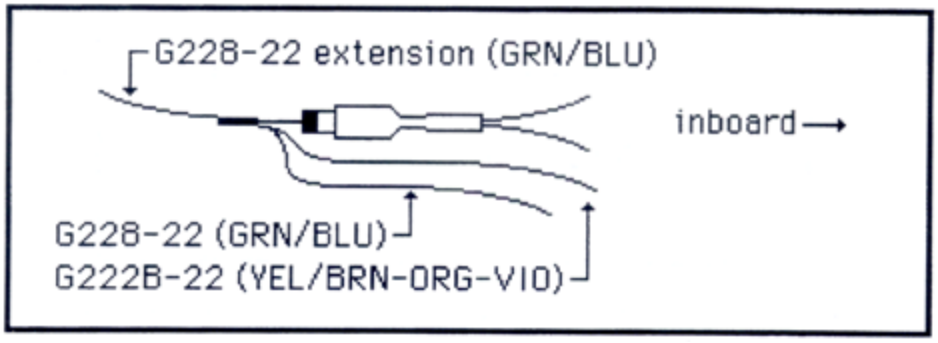


As before, solder two black wires to CR3.

HOOKUP	TO	
☐ CR3(anode)	{ NG234-22	BLK
	{ NG234-22 extension (12" long)	BLK

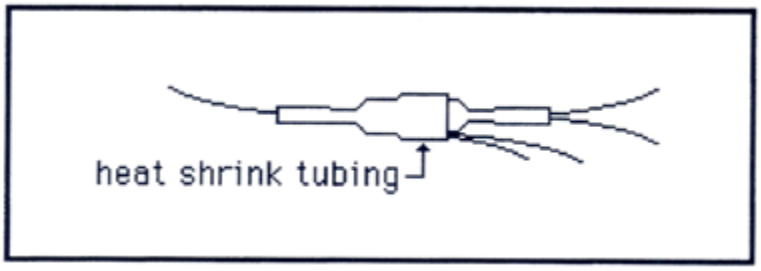


Install heat shrink tubing over the lead so that it covers about half of the body of the diode and the entire solder joint. Do not overheat the diode.



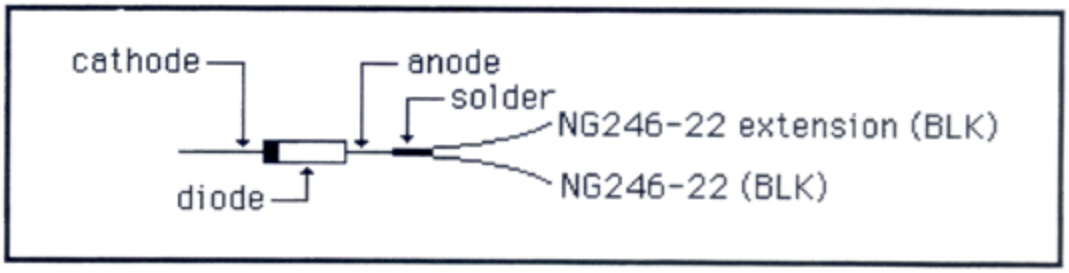
Hold the diode with the black wires toward the center of the aircraft and center the body of the diode with the three relay bases. Cut and strip G228-22 (save the extra wire) and G222B-22. Use the extra wire for G228-22 extension. The extension should be positioned so that it goes outboard.

HOOKUP	TO	
	{ G228-22	GRN/BLU
☐ CR3(cathode)	{ G222B-22	YEL/BRN-ORG-VIO
	{ G228-22 extension	GRN/BLU



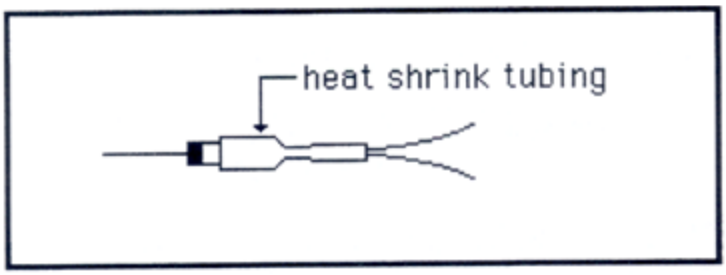
Install heat shrink tubing over the entire assembly so that only the G228-22 extension exits the heat shrink tubing on the outboard end and all other wires exit to the inboard end. Do not overheat the diode.

HOOKUP		TO
☐ G228-22 extension	GRN/BLU	K6(85)
☐ NG234-22 extension	BLK	K6(86)
☐ NG234-22	BLK	W4(–)

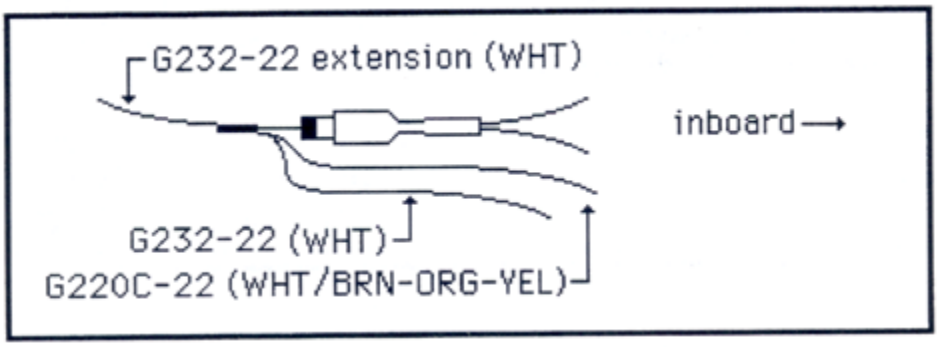


As before, solder two black wires to CR8.

HOOKUP	TO	
	{ NG246-22	BLK
☐ CR8(anode)	{	
	{ NG246-22 extension (12" long)	BLK

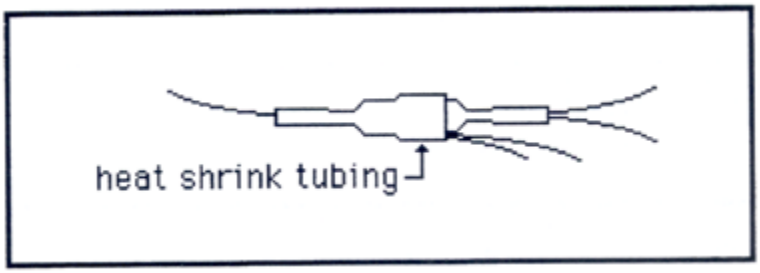


Install heat shrink tubing over the lead so that it covers about half of the body of the diode and the entire solder joint. Do not overheat the diode.



Hold the diode with the black wires toward the center of the aircraft and center the body of the diode with the three relay bases. Cut and strip G232-22 (save the extra wire) and G220C-22. Use the extra wire for G232-22 extension.

HOOKUP	TO	
	{ G232-22	WHT
☐ CR8(cathode)	{ G220C-22	WHT/BRN-ORG-YEL
	{ G232-22 extension	WHT



Install heat shrink tubing over the entire assembly so that only the G232-22 extension exits the heat shrink tubing on the outboard end and all other wires exit to the inboard end. Do not overheat the diode.

HOOKUP		TO
☐ G232-22 extension	WHT	K7(85)
☐ NG246-22 extension	BLK	K7(86)
☐ NG246-22	BLK	W4(–)

Fuelgard Wiring. If you do not plan to install a Silver Fuelgard, you may eliminate the following steps. In that case, the wires should be set aside as spare wires.

HOOKUP	TO	
☐ Fuelgard(1)	CB19	
☐ Fuelgard(2)	W4(–)	
☐ Fuelgard(4)	E177A-22	YEL/RED-ORG-BLU
☐ Fuelgard(8)	E176A-22	YEL/BRN-RED-GRA

Carburetor Ice Detector Option. If a carburetor ice detector is to be installed, hook up the wires as follows. If not, skip this section.

HOOKUP		TO
☐ NE187-22	BLK	R6(1)
☐ NE187-22	BLK	W4(–)
☐ E184A-22	WHT/RED-ORG-YEL	R6(3)
☐ E183A-22	YEL/ORG-GRN-GRA	R6(2)
☐ E179A-22	WHT/BRN-VIO-GRA]	
☐ E180-22	WHT]	S27(4)
☐ E180-22	WHT	DS6
☐ E178-22	WHT	S27(5)
☐ E178-22	WHT	CB20

Starter Warning Option. If the carburetor ice detector is not used, the following wiring connection should be made. This must be made in addition to the starter warning option for the airframe wiring. The starter warning light comes on when the starter relay is on. This type of warning light is required in many European countries. With Continental engines it is not possible to hear if the starter is on, so in the event the starter relay becomes stuck in the "on" position, the starter continues to operate, and the battery is quickly discharged. With Lycoming engines, you will hear the starter in most cases, but if you have no other use for the light, it will cost you nothing to have this feature. Conceivably, it might have some use in quickly diagnosing a problem in which the electrical system malfunctions during starting. Note that in this option, wire No. 181 is no longer a ground wire and wire No. 180 becomes a ground wire.

HOOKUP		TO
☐ NE180-22	(use BLK wire)	DS6
☐ NE180-22	(use BLK wire)	W4(–)

Other Options. The DS6 warning light may be used for other devices. It may be used as a fire warning light by mounting a fusible link and a microswitch in the engine compartment. It may be used as an indicator light for a carbon monoxide detector, of which there are currently several on the market. This light might be used for an engine chip detector. New electrical devices are being announced with regularity, so a new use may arise.

See Section 7 for autopilot, audio and avionics wiring. Normally, this type of wiring is done by an avionics shop, but if you plan to do this work yourself, proceed now to Section 7, complete the wiring for the instrument panel, and then return to this section.

Spare Wires. All spare wires should be capped. Use AMP 324484 caps (included in Sub-kit No. 816-25) on the ends of the wire and crimp with the same tool used for ring terminals. The wire ends should not be stripped when installing the caps.

Install spiral plastic tubing over the bundles and tie all spare wires neatly and tag as "spare".

Airframe Hookup

Hook up the following wires. All of these wires are terminated on the aft face of frame No. 6.

HOOKUP		TO
☐ P127B-20*	WHT/BRN-RED-ORG	Vibrator(BO)
☐ P115B-20	WHT/BRN-RED-YEL	K2(X1)
☐ NP104B-20	WHT/BLK-BRN-RED	K1(X2)
☐ P106B-22	WHT/BRN-RED-GRN	F1 (save extra wire for 106C)
☐ P106C-22	WHT/BRN-RED-GRN	P/N 116-61(B+)
☐ P105B-22	WHT/BRN-RED-BLU	F2 (save extra wire for 105C)
☐ P105C-22	WHT/BRN-RED-BLU	F2
☐ P105C-22	WHT/BRN-RED-BLU	P/N 116-61(B–)
☐ P123B-20	WHT/BRN-RED-VIO	P/N 116-52(RED)
☐ G220B-22	WHT/BRN-ORG-YEL	TB1(1)
☐ L310A-18	BLU-WHT	TB1(4) (save extra wire for 313)
☐ L313-18	BLU-WHT	TB1(4)
☐ L315A-20	WHT/BRN-GRN-BLU	TB1(3)
☐ E158A-22	WHT/BRN-GRN-VIO	TB1(2)

* optional

The following wires are hooked up at frame No. 5. CR4 and CR5 diodes are installed with ring terminals. Slip a piece of clear tubing or heat shrink tubing over the diode. It is not necessary to shrink the tubing. Be extremely careful to observe the polarity of the diodes. If they are installed backwards, a short-circuit will result.

- *Note:* The terminal numbers for the K3 and K4 relays are placed below the terminals for the "A" and "B" terminals while they are above the terminals for the "X" terminals in the electrical drawings.

HOOKUP		TO	
☐ G210B-12	WHT/RED-VIO-GRA	K4(B1)	(save extra wire for 210C)
☐ G210C-12	WHT/RED-VIO-GRA	K4(B1)	
☐ G210C-12	WHT/RED-VIO-GRA	K3(B2)	
☐ NG213A-12	BLK	K3(A2)	
☐ NG213A-12	BLK	K4(A1)	
☐ NG213B-12	BLK	K4(A1)	
☐ NG213B-12	BLK	W2(–)	
☐ G211-12	GRN	K4(A2)	
☐ G211-12	GRN	K3(B1)	(save extra wire for motor hookup)
☐ G212-12	BLU	K4(B2)	
☐ G212-12	BLU	K3(A1)	(save extra wire for motor hookup)
☐ G214B-22	WHT/BRN-ORG-BLU	F5	(save extra wire for 214A)
☐ G214A-22	WHT/BRN-ORG-BLU	F5	
☐ G214A-22	WHT/BRN-ORG-BLU	K4(B2)	
☐ G215B-22	WHT/BRN-ORG-GRN	F6	(save extra wire for 215A)
☐ G215A-22	WHT/BRN-ORG-GRN	F6	
☐ G215A-22	WHT/BRN-ORG-GRN	K3(B1)	
☐ G216A-22	WHT/BRN-RED-GRA	K4(X2)	
☐ G217-22	YEL/BRN-RED-GRN	K3(X1)	(to engine)
☐ CR4(anode)		K3(X2)	
☐ CR4(cathode)		K3(X1)	
☐ CR5(anode)		K4(X1)	
☐ CR5(cathode)		K4(X2)	
☐ NG247A-22	BLK	K3(X2)	
☐ NG247A-22	BLK	K4(X1)	
☐ NG247B-22	BLK	K4(X1)	(route to frame No. 6)

The following wires are hooked up on the aft face of frame No. l.

HOOKUP		TO	
☐ P111B-22	YEL/BRN-RED-ORG	F4	(save extra wire for 111C)
☐ P111C-22	YEL/BRN-RED-ORG	F4	
☐ P111C-22	YEL/BRN-RED-ORG	P/N 116-62(B+)	
☐ P112B-22	YEL/GRN-BLU-VIO	F3	(save extra wire for 112C)
☐ P112C-22	YEL/GRN-BLU-VIO	F3	
☐ P112C-22	YEL/GRN-BLU-VIO	P/N 116-62(B–)	

Hook up the following wires in the forward fuselage section. Note that there are three ground wires that must be run to W2(–). The OAT probe is a polar device, so it is essential that the red and black wires from the instrument are hooked up to the same wires as the sender.

HOOKUP		TO	
☐ L281B-22	YEL/RED-GRN-GRA	DS21	
☐ NL282-22	BLK	DS21	
☐ NL282-22	BLK	W2(–)	
☐ L252C-22	YEL/ORG-GRN-VIO	DS15	(four lamps)
☐ NL256A-22	BLK	DS15	(four lamps)
☐ L252C-22	YEL/ORG-GRN-VIO	J7(1)	
☐ NL256A-22	BLK	J7(2)	
☐ L252B-22	YEL/ORG-GRN-VIO	P7(1)	
☐ NL256B-22	BLK	P7(2)	
☐ NL256B-22	BLK	W2(–)	
☐ E162B-22	YEL/BRN-RED-VIO	J5(1)	(save extra wire for 162A)
☐ E162A-22	YEL/BRN-RED-VIO	P5(1)	
☐ E162A-22	YEL/BRN-RED-VIO	P/N 729-13(+)	
☐ NE163A-22	BLK	P/N 729-13(–)	
☐ NE163A-22	BLK	P5(2)	
☐ NE163B-22	BLK	J5(2)	
☐ NE163B-22	BLK	W2(–)	
☐ E154A-22	YEL/RED-GRN-VIO	OAT probe(RED)	
☐ E155A-22	YEL/BRN-ORG-GRA	OAT probe(BLK)	

Hook up the wires for the aft fuel tank.

HOOKUP		TO	
☐ E165B-22	WHT/BRN-GRN-GRA	J6(1)	(save extra wire for 165A)
☐ E165A-22	WHT/BRN-GRN-GRA	P6(1)	
☐ E165A-22	WHT/BRN-GRN-GRA	P/N 728-10(+)	
☐ NE166A-22	BLK	P/N 728-10(–)	
☐ NE166A-22	BLK	P6(2)	
☐ NE166B-22	BLK	J6(2)	
☐ NE166B-22	BLK	W2(–)	

The following wires are hooked up to the aft face of frame No. 6. CR6 and CR7 diodes are installed with ring terminals. Slip a piece of clear tubing or heat shrink tubing over the diode. It is not necessary to shrink the tubing. Be extremely careful to observe the polarity of the diodes. If they are installed backwards, a short-circuit will result.

Note that a number of wires must be routed to the engine compartment. Temporarily tie the ground wires to the other wires in their circuit in the engine compartment. Be careful to observe the wire gauges, which is marked on the wire.

HOOKUP		TO	
☐ CR6(anode)		K1(X2)	
☐ CR6(cathode)		K1(X1)	
☐ P103-20	WHT	K1(X1)	
☐ P103-20	WHT	K1(A1)	
☐ CR7(anode)		K2(X2)	
☐ CR7(cathode)		K2(X1)	
☐ NP114-20	BLK	K2(X2)	
☐ NP114-20	BLK	W2(–)	
☐ P128-20*	WHT	K2(X1)	
☐ P128-20*	WHT	Vibrator(IN)	
☐ NP122-20	BLK	P/N 116-52(BLK)	
☐ NP122-20	BLK	W2(–)	
☐ P120-20	WHT/RED-GRN-GRA	P/N 116-52 (BLU)	(to engine)
☐ G218B-22	YEL/BRN-RED-BLU	TB1(2)	(to engine)
☐ NG247B-22	BLK	W2(–)	
☐ NQ191-18	BLK	W2(–)	(to engine)
☐ NL301-18	BLK	W2(–)	(to engine)
☐ NE168-22	BLK	W2(–)	(to engine)

* optional

In the following sequence, CR1 and CR2 diodes are soldered in place. Observe polarity as the system will not work if they are installed backwards. Cover diodes with heat shrink tubing and do not overheat bodies of diodes. Install S9 and S10 switches, which are Microswitch 1SE1 switches with JE-5 actuators (roller type). Screws for the installation of the switches are included with the switches. Wires from J9 should be tied to P/N 831-6 and routed through the grommet shown in drawing No. 831-1. Wire leads from these switches will be routed by the flap switch where they will be tied to the flap wires.

HOOKUP		TO		
☐ CR1(cathode)		S9(C)		
☐ CR1(anode)		G219-22	(to frame No. 6)	YEL/BRN
☐ G221-22	BLU/YEL	S9(NO) (to frame No. 6)		
☐ CR2(cathode)		S10(C)		
☐ CR2(anode)		G218A-22	(to frame No. 6)	YEL/BRN
☐ G220A-22	GRN/BLU	S10(NO)	(to frame No. 6)	
☐ G242A-22	WHT/BRN-ORG-VIO	P/N 116-50		
☐ NG238-22	BLK	P/N 116-50	(to frame No. 6)	

Route wires to frame No. 6 as noted above.

HOOKUP		TO
☐ G218A-22	YEL/BRN	TB1(2)
☐ G219-22	YEL/BRN	TB1(2)
☐ G220A-22	GRN/BLU	TB1(1)
☐ G221-22	BLU/YEL	TB1(1)
☐ NG238-22	BLK	W2(–)

On the flap switch, note that the shielding from three wires must be grounded to S12(5). Use short lengths of 22 gauge black wire. The black wires may be doubled up in the ring terminal for S12(5). The short jumper wires (C205-16 and C206-16) do not require shielding. The wires to the flap switch should be about 3" extra length so that the center console panel can be placed on its side to remove the front fuel tank.

HOOKUP		TO	
☐ C206-16	BLU	S12(1)	
☐ C206-16	BLU	S12(6)	
☐ C205-16	GRN	S12(4)	
☐ C205-16	GRN	S12(3)	
☐ NC202-16	BLK	S12(5)	
☐ C201B-16	WHT/RED-BLU-VIO	S12(2)	(save extra wire for 203)
☐ Its shielding		S12(5)	(use 22 gauge BLK wire)
☐ C203B-16	WHT/RED-BLU-VIO	S12(3)	
☐ Its shielding		S12(5)	(use 22 gauge BLK wire)
☐ C204B-16	WHT/RED-BLU-GRA	S12(6)	
☐ Its shielding		S12(5)	
☐ C203B-16	WHT/RED-BLU-VIO	TB4(1)	
☐ C203A-16	WHT/RED-BLU-VIO	TB4(1)	(no shielding ground necessary)
☐ C203A-16	WHT/RED-BLU-VIO	P/N 853(RED)	
☐ C204B-16	WHT/RED-BLU-GRA	TB4(2)	
☐ C204A-16	WHT/RED-BLU-GRA	TB4(2)	(no shielding ground necessary)
☐ C204A-16	WHT/RED-BLU-GRA	P/N 853(BLK)	
☐ NC202-16	BLK	W2(–)	

Install S8 on P/N 619A lower drag strut (see drawing No. 105). S8 is a Microswitch 1SE1 switch with a JE-1 actuator (leaf type). The hardware for installing the switch is included with the switch. The wires for the S8 switch should be routed forward and tied to P/N 619A, then to the nose gear trunnion and to the engine mount.

Install S7 on frame No. 1 (see Drawing No. 105). S7 is a Microswitch 1SE1 switch with a JE-5 actuator (roller type). The hardware for the installation of the switch is inluded with the switch. Cut a hole in frame No. 1 for the wires for S7 switch so that the wires come out on the aft side of frame No. 1. These wires should be routed to the forward face of frame No. 1, then to the grommet into the cockpit. The lead from the switch which is not used should be cut short and capped.

The wires from both switches should be well-secured with tywraps or clamps.

HOOKUP		TO
☐ G224A-22	YEL/BRN-GRN-GRA	S8(C)
☐ G218B-22	YEL/BRN-RED-BLU	S8(NC)
☐ G222A-22	YEL/BRN-ORG-VIO	S8(NO)
☐ G223A-22	YEL/ORG-GRN-BLU	S7(C)
☐ G217-22	YEL/BRN-RED-GRN	S7(NC)
☐ Q190A-18	YEL/BRN-ORG-GRN	P/N 152-20(RED)
☐ NQ191-18	BLK	P/N 152-20(BLK)

At this time the navigation light and pitot heat wires will be installed. You should also pull the anti-collision (strobe) light wires at the same time. Install P8 plug on the heated pitot.

HOOKUP		TO
☐ L319-20	YEL	A650-PG-14(+)
☐ NL321-20	BLK	A650-PG-14(–)
☐ H330A-18	GRN/WHT	J8(1)
☐ NH331-18	BLK	J8(2)
☐ L319-20	YEL	TB1(3)
☐ NL321-20	BLK	W2(–)
☐ L320-20	YEL	A650-PR-14(+)
☐ NL322-20	BLK	A650-PR-14(–)
☐ L320-20	YEL	TB1(3)
☐ NL322-20	BLK	W2(–)
☐ L318-20	YEL	A500-14(+)
☐ NL323-20	BLK	A500-14(–)
☐ L318-20	YEL	TB1(3)
☐ NL323-20	BLK	W2(–)
☐ L313-18	BLU/WHT	Strobe power supply(+)
☐ NL314-18	BLK	Strobe power supply(–)
☐ NL314-18	BLK	W2(–)

At this time you will install the microphone push-to-talk switches on the control sticks. You will need to install the plug and receptacle at the base of each control stock. Note that the co-pilot's control stock will be frequently removed, and the plug/receptacle should be in a convenient spot. It is also important that the plug/receptacle not be allowed to move about and become jammed. This could lead to a serious accident if the controls became jammed because of a loose plug.

The best procedure is to solder all of the wires to the S21 and S22 switches, and then install the plugs and receptacles last. Remove the grip. Feed the wires up through the control stick (through the grommet at the base, installed earlier), through the grip and solder the wires to the switch. Install the grip. Push the switch in place. Pull the wires through the stick and install the plug and receptacle. Then hook up as follows.

HOOKUP		TO
☐ R380A-22	WHT/BRN-YEL-BLU	P9(1)
☐ NR381-22	BLK	P9(2)
☐ R375A-22	WHT/BRN-YEL-GRN	P10(1)
☐ NR376-22	BLK	P10(1)
☐ NR381-22	BLK	W2(–)
☐ NR376-22	BLK	W2(–)

At this point the remaining wires in the engine compartment are hooked up. The landing light is installed on the cowling. On many aircraft, the wires to the landing light have "wristlock" connectors on the wire to facilitate quick removal of the cowling, and you may do this if you wish. In this case, the wristlock connectors will be located at the aft end of the cowling, and the wires to the landing light will be secured to the inside of the cowling with fiberglass cloth and epoxy resin. The alternator field terminals are labelled "F1" and "F2" on the drawings in accordance with standard practice. The field terminals on the alternator are both labelled "field". The alternator field is non-polar; therefore, P120-20 may be hooked up to either field terminal as long as NP121-20 is hooked up to the other field terminal. See Drawing No. 116-1 (sheet A38), Table 1 for the magneto types. The magnetos require special kits for the most common magneto types. For this, see Detail PP, X, Y & Z. It is very important that you install proper strain relief for the alternator wires. The engine vibrations are hard on the alternator wires, and many in-flight alternator failures are the direct result of poor strain relief. This is particularly the case with the field wires.

- *Note:* If a single cylinder cylinder head temperature (CHT) installation is desired, hook up E151A-22 as follows. If a four cylinder CHT installation is desired, see Section 8.

HOOKUP		TO	
☐ NP124B-18	WHT/BLK-RED-ORG	Left magneto(SW)	
☐ NP125B-18	WHT/BLK-RED-YEL	Right magneto(SW)	
☐ P126B-18	YEL/RED-ORG-GRN	Left magneto(RET)	(optional)
☐ P120-20	WHT/RED-GRN-GRA	Alternator(F1)	(install nippple)
☐ Its shielding		Alternator(F2)	(use 22 ga. BLK wire)
☐ NP121-20	BLK	Alternator (F2)	(install nipple)
☐ NP121-20	BLK	Alternator case	
☐ E151A-22*	YEL/GRN-VIO-GRA	P/N 116-55	
☐ E153A-22	YEL/RED-BLU-VIO	J15(A)	
☐ E169A-22	YEL/BRN-ORG-BLU	J15(C)	
☐ NE168-22	BLK	J15(B)	
☐ E160A-22	YEL/RED-GRN-BLU	P/N 116-57(+)	

* see note above

Fuelgard Option. If you do not plan to install a Silver Fuelgard, you may eliminate the following steps. In that case, the wires should be set aside as spare wires.

HOOKUP		
☐ E179B-22	WHT/BRN-VIO-GRA	201B(RED)
☐ E177B-22	YEL/RED-ORG-BLU	201B(WHT)
☐ 201B(BLK)		W3(–)

Carburetor Ice Detector Option. If a carburetor ice detector is to be installed, proceed to the next paragraph. If not, skip this section.

The ARP carburetor ice detector is intended to be a panel-mounted instrument. The box in which the circuit, switch and sensitivity control is installed is too large to be installed on the Falco instrument panel. This requires that the device be modified. The operation of the device is not changed, however the switch and potentiometer are bypassed so that the switch and potentiometer installed on the instrument panel will operate the device. The drawing shows an approximate representation of the interior of the device. There are three elements: a potentiometer (R7) which is abandoned, a switch (S30) which is abandoned, and a circuit board (PC1) which is retained. Install E185-22 and E186-22 in the aircraft. Hookup the carburetor ice detector as shown in Drawing No. 116-16 and follow the notes given.

Starter Warning Option. If you have wired your instrument panel for the starter warning option, proceed as follows. Note that wire No. 181 is no longer a ground wire.

HOOKUP		TO
☐ P113-22	WHT	K2(A2)
☐ P113-22	WHT	F7
☐ E181A-22	WHT/BLK-BRN-GRA	F7

See Section 7 for autopilot, audio and avionics wiring. Normally, this work is done by an avionics shop, but if you plan to do this work yourself, proceed now to Section 7, complete the wiring for the airframe and return to this section.

Spare Wires. All spare wires should be capped. Use AMP 324484 caps (included in Sub-kit No. 816-25) on the ends of the wire and crimp the same tool used for the ring terminals. The wire ends should not be stripped when installing the caps.

When all wiring is complete, inspect the entire system. Install spiral plastic tubing around all large bundles and secure wires with tywraps and clamps.

Chapter 7
Avionics Installation

The installation of the audio circuit and avionics is normally done by a qualified shop. The radios and intercom have connectors which in most cases require some expertise and additional tooling to install. The avionics manufacturers insist that their radios be installed by approved shops, or they will not honor any warranty claims. Accordingly, it is recommended that this installation only be done by a qualified avionics shop.

The electrical drawings show the wiring needed for the audio circuit and some of the basic power hookups for the radios (power, ground, dimmer, antenna, etc.), but they do not show the numerous wires required for the avionics harness between NAV radios and VOR, DME and RNAV, or between the transponder and altitude encoder.

When remote avionics are installed (DME, RNAV, and encoder) the spare wires provided should be used. If additional wires are required, P4 plug and J4 receptacle should be used. Radio installation possibilities are shown on drawing No. 145 and the requirement for the King DME and RNAV and remote encoder are given in the notes for the audio circuit.

If the remote avionics installation requires one or two more wires than are available, contact Sequoia Aircraft for suggestions as there are several ways of achieving this without resorting to an additional plug and receptacle.

The avionics shop should be made aware of the entire wiring system on the Falco. It is preferable that the shop be provided with the entire electrical system drawings and installation manual. Also, the shop should be made aware of which audio circuit wires are already hooked up (marker beacon connections on the instrument panel and mic push-to-talk switch connections). The procedure, discussed earlier of marking all connections with a red pen on the circuit drawings and wire tabulation would be the best way to communicate this information to the shop.

As discussed earlier, the antenna wires should have free-hanging BNC connectors installed to allow for the removal of the instrument panel. The glide slope antenna wire is now shown on the drawings, but it is connected to the splitter with a BNC connector.

The avionics shop should be made aware of the location of the lighting bus so that the internal lights of the avionics will be correctly hooked up. The wires included in the instrument panel wiring sub-kit may be provided so that the color code system can be maintained, using yellow wires for the lighting circuit, black wires for ground wires and white wires for the positive wires. This is important as many avionics shops use red wires for positive wires and white wires for negative wires. Most avionics shops are equiped with wire stamping machines, so the wire numbers could be stamped on the wires for identification.

Builders installing a RST marker beacon should be able to easily install the marker beacon receiver by following the electrical circuit drawing. The installation of the ARC remote marker beacon receiver is normally done by an avionics shop, and the shop will be responsible for providing the S26 marker beacon switch and R8 resistor.

The avionics shop should be aware of the proximity of the front fuel tank. The routing of the wires from the radios in the radio stack should be to the outboard side of the stack, then along the side of the radio stack and through the grommet installed on the right side of the instrument panel forward flange. Due to the close proximity of the radios to the forward fuel tank, side braces should be installed (or eliminated) with a careful eye on possible problems of rubbing the fuel tank. Additionally, a rubber sheet should be cemented to the fuel tank in any location subject to possible abrasion from wiring, hoses or any other thing in the instrument panel.

An avionics cooling fan may be installed either on the airframe with detachable hoses or as part of the instrument panel, but in either case the location of the fan should be studied closely to determine the best location.

The audio system is designed for the installation of a David Clark Isocom. The mic jacks are grounded, and such systems result in both microphones being "hot" when either push-to-talk switch is actuated. The result is that if the pilot wishes to transmit, and the copilot continues to talk, both voices are transmitted over the radio. The David Clark Isocom has internal circuitry which senses which mic switch has been pushed and shuts off the other mic. The RST intercom does not have this feature.

In the event that the intercom must be removed from the aircraft for repair, the audio system would not work. To provide for this situation, mic and phone bypass switches are provided so that the pilot may continue to use the aircraft. The design of the bypass system is such that the pilot's and copilot's headphones will continued to operate, but only the pilot's mic and mic switch will be functional when the system is in the "bypass" mode. The copilot's phone will continue to be functional in the "bypass" mode, but not his mic or mic switch. The normal intercom system uses a "center mic" jack, but this type of design requires the use of a hand-held mic. As the Falco will be flown by pilots who will use headsets exclusively and who would not normally have a hand-held mic in the aircraft, the bypass switches were chosen in preference to the "center mic" jack type of system.

Autopilot Installation

The installation of the Century 1 autopilot requires that the connector on the turn and bank instrument be removed and replaced with a "pigtail" of wires leading from the case of the instrument. (The normal connector will hit the front fuel tank.) The installation of the pigtail and a separate connector must be done by (or approved by) and FAA approved instrument repair station, or the warranty is invalidated.

One alternative has been worked out by a Falco builder. He removed the case for the gyro, then removed the receptacle and re-mounted it on the aft face of the mounting bracket in the gyro. The strain relief for the plug was discarded. This provided enough clearance for the tank.

The autopilot servo should be installed on the right side of the aircraft as shown on Drawing No. 202.

Used autopilots are widely available at reasonable prices and builders may be able to install the pigtail and connector, but the changes to the instrument should be approved by an FAA approved instrument repair station or a possible violation of the FARs might occur.

The wires to the servo may require a change since it is not known if a "right turn" signal from the turn and bank will cause the aircraft to turn right or left. This will have to be determined after installation of the first system, and a revision will be issued if required.

The servo will require a capstan and bridle cable for the control cables of the Falco. You will need the following parts from Century Flight System.

P/N 1C363-1-430R roll servo
P/N 52D75-4-14 turn & bank
P/N 30B200 bridle cable
P/N 42A173-1 cable clamp (2)

Additionally, you will need the following hardware:

AN3-4A (2)
AN960-10L (2)
MS21042-3 (2)
No. 10x3/4" TRA screw (4)

P/N 837-9 is a piece of .125" aluminum which moves the attachment screws 1/2" away from the bolt holes on the servo to provide clearance with the aft aileron cable.

Sigtronics Intercom Installation

The standard intercom installation for the Falco for years has been the David Clark Isocom. It's an excellent intercom, however in 1993 it was discontinued by David Clark Company in favor of a new intercom that will not fit in the hole we provide in the instrument panel. To take its place, we are specifying the Sigtronics SPA-400 intercom, which is also a voice-activated intercom.

The Sigtronics intercom has a 1" x 2.5" rectangular mounting face. As such, it is more compact than the David Clark Isocom, and it may be mounted in the instrument panel in any convenient location—for example, where the DME

indicator is shown, if you're not going to use a DME. If you want to mount the intercom in the same 2-1/4" instrument hole that's provided for the intercom, in addition to the SPA-400 intercom, you'll also need to buy the Sigtronics P/N 900068 adapter plate. This is a plastic plate that you mount in the instrument hole and then mount the intercom to it.

The wiring for the Sigtronics SPA-400 is hooked up as shown below.

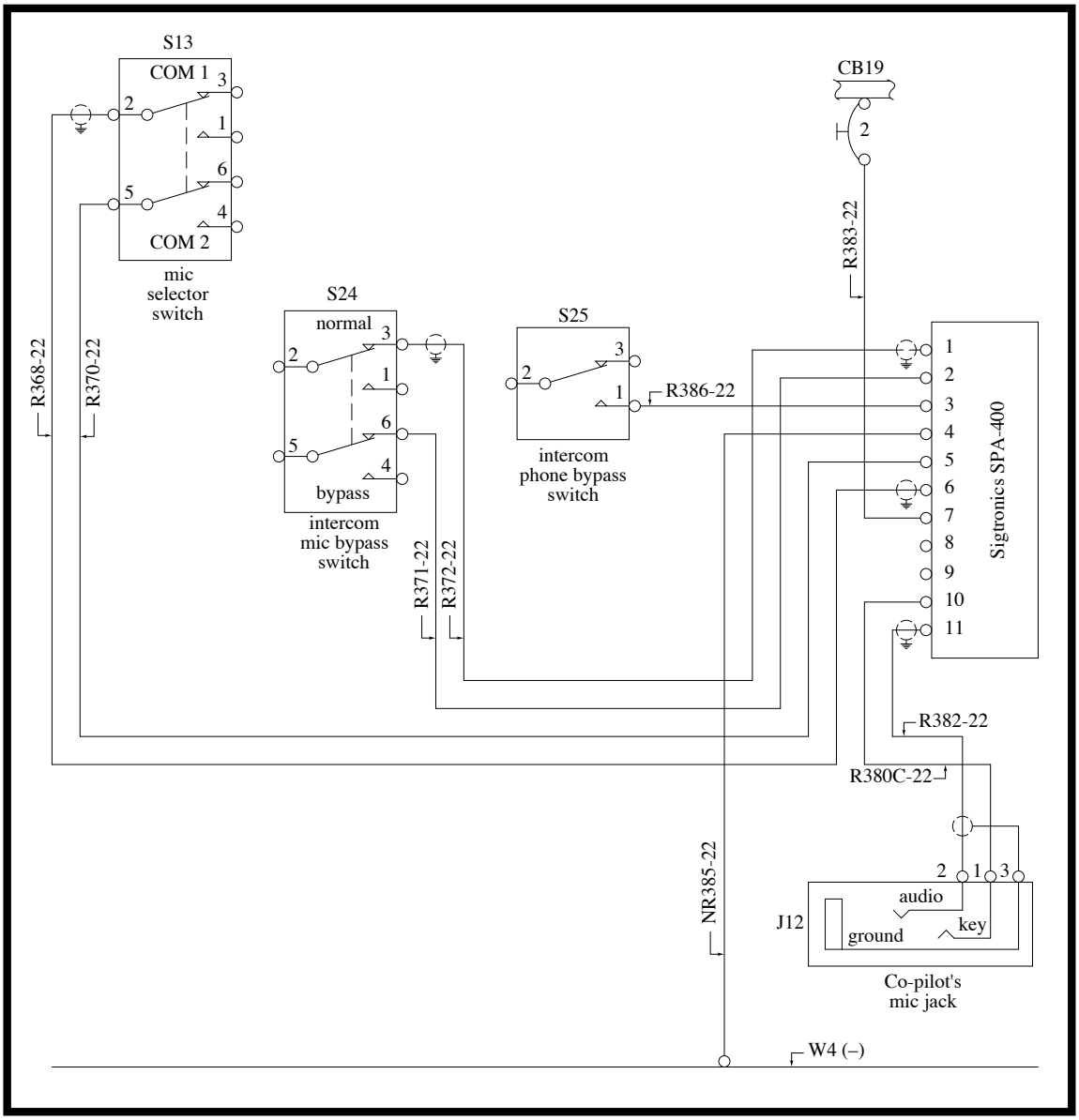


Figure 7-1. Sigtronics Intercom Installation

Note that the scheme shown above has the intercom bypass switches S24 and S25 hooked up 'backwards' as is also shown on the main drawings—that is, 'normal' and 'bypass' are reversed. We are leaving this drawing this way until we can correct the original.

Chapter 8
EGT Installation

An exhaust gas temperature gauge (EGT) is used for several purposes. With injected engines, a single cylinder EGT may be used for leaning. With carbureted engines, the hottest cylinder varies with the throttle position and mixture setting. For that reason a single cylinder EGT with a carbureted engine is nearly worthless.

A four cylinder EGT allows for effective leaning with both carbureted and injected engines. Additionally, this instrument is invaluable in detecting and diagnosing engine problems. In many cases, problems may be detected so early that the installation of a four cylinder EGT gauge is the single most important addition to your instrument panel in terms of safety. Over time, the instrument will pay for itself in efficient leaning and in lower maintenance costs. The only thing better than a four cylinder EGT is a four cylinder EGT and CHT. Fortunately, the installation of such a system in the Falco is an easy and inexpensive addition.

There are several manufacturers of EGTs. The instrument was developed by Alcor, Inc. Alcor's EGT gauges have an expanded scale, so that only the higher temperatures are shown. This is preferable in that the small changes in temperature near peak EGT are more easily seen. EGTs manufactured by others do not have this feature. Additionally, the quality of the thermocouple probes is important. Our experience with owning and operating several Alcor EGTs is that the quality is the best in the industry. Alcor EGTS are the recommended EGTs for the Falco.

In particular, some mention of the very inexpensive Westach EGTs should be made as their low cost will tempt many into purchasing them. Our experience with owning, operating and discarding a Westach EGT left us with the opinion that the only word to describe them is not fit for print. In a review of EGTs, The Aviation Consumer termed them "not suitable for use in an aircraft".

The Alcor EGT gauges and probes should be installed in accordance with the "Installation & Operating Instructions, Alcor Mixture Control and Combustion Analysis Systems" supplied with the instruments. Since the EGT thermocouple leads may not be cut or routed through the plugs and receptacles on the instrument panel, it will be necessary to remove the EGT instrument before the instrument panel can be removed. For this reason, the leads should be routed so that the instrument can be easily removed and put on the cockpit floor.

Single Cylinder EGT. Purchase Alcor Kit No. 211-110-0. This kit includes one 2-1/4" gauge, a single 90" lead and a single EGT probe. This system is recommended only for injected engines, but we are unable to tell you which cylinder the single probe should be installed on. This system can be converted to a four cylinder EGT by purchasing P/N 80827 Dual Cylinder Selector Switch, three P/N 42525 90" leads, and three P/N 86258 probes and installing in accordance with the instructions below for four cylinder EGT and CHT.

Four Cylinder EGT. Purchase Alcor Kit No. 211-140-0. This kit cannot be converted to the four cylinder EGT and CHT installation without replacing the rotary switch which has only two wafers.

Four Cylinder EGT & CHT. Purchase Alcor P/N 46150 EGT meter, P/N 80827 Dual Cylinder Selector Switch, four P/N 42525 90" EGT leads, and four P/N 86258 EGT probes. This system is identical to the four cylinder EGT system described above except that the rotary switch has four wafers instead of two, providing the capability to switch the CHT gauge as well. Install in accordance with the Alcor instructions and the following instructions for the four cylinder CHT installation.

Four Cylinder CHT Installation

Purchase Sequoia Aircraft's 4 cyl. CHT option for Kit No. 816. This option includes three P/N 116-55 CHT senders. The required wires and ring terminals are included in the electrical kit. Install a P/N 116-55 CHT sender on each cylinder as shown in Detail QQ.

Wire No. E151A-22 comes out of the P3 plug and should be routed toward the engine compartment. It should exit the bundle and be routed back up to the instrument panel with the EGT leads. On the EGT meter there is a four-wafer rotary switch. The terminals for each wafer are labelled 11-15, 21-25, 31-25 and 41-45. The terminals are arranged in rows, and the rows are numbered M, 1, 2, 3 and 4. The "M" row is for the meter. This is the common terminal for each wafer of the

rotary switch. Row 1 is for the No. 1 cylinder, Row 2 is for the No. 2 cylinder, etc. The terminal and row numbers are arranged as follows. Additional rows and terminals are for 6 cylinder engines, and they should not be used.

ROW	TERMINAL			
M	11	21	31	41
1	12	22	32	42
2	13	23	33	43
3	14	24	34	44
4	15	25	35	45

Only the last bank of terminals will be used for the four cylinder CHT installation. At the meter switch hook up as follows.

HOOKUP		TO
☐ E151A-22	YEL/GRN-VIO-GRA	EGT(41)
☐ E146-22	BLU/RED	EGT(42)
☐ E147-22	VIO/WHT	EGT(43)
☐ E148-22	WHT/BRN	EGT(44)
☐ E149-22	WHT/GRN	EGT(45)

Route wires 146, 147, 148 and 149 to the engine compartment. Hook up to P/N 116-55 CHT senders at the cylinders indicated.

HOOKUP		TO
☐ E146-22	BLU/RED	P/N 116-55(Cyl. No. 1)
☐ E147-22	VIO/WHT	P/N 116-55(Cyl. No. 2)
☐ E148-22	WHT/BRN	P/N 116-55(Cyl. No. 3)
☐ E149-22	WHT/GRN	P/N 116-55(Cyl. No. 4)

Now, the EGT switch will also switch the CHT to the cylinder selected. See the Alcor operating instructions to interpret the readings and to diagnose engine problems.

Chapter 9
Troubleshooting

Landing Gear Logic Drawings

To help you understand the working of the landing gear circuit, a few drawings of the system are included. These will be helpful in understanding the operation of the system and in troubleshooting.

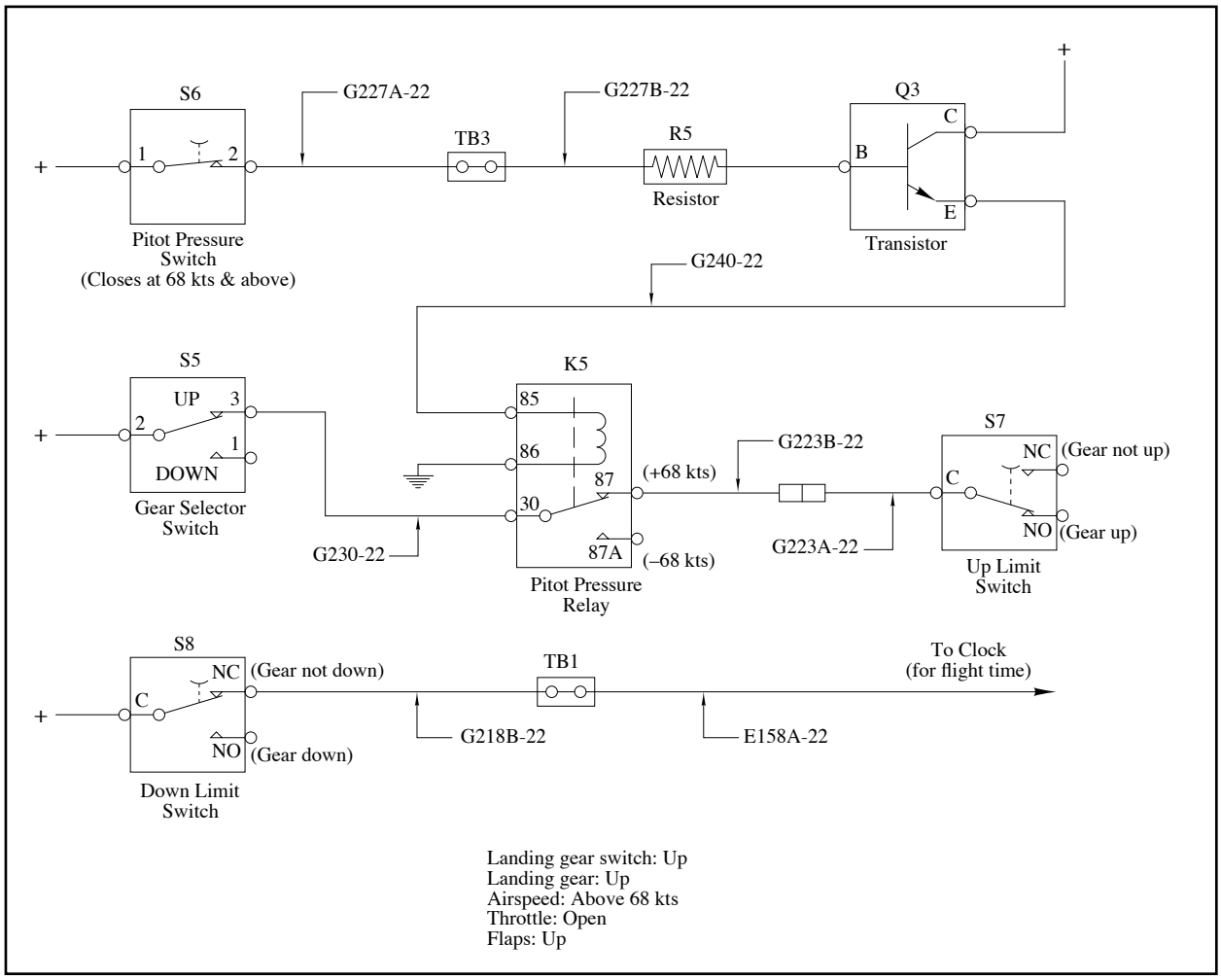


Figure 9-1. "In the Air"—Normal Gear Up Condition

To cycle the landing gear on the ground (on jacks!) a jumper is installed across terminals 1 and 2 of terminal block No. 3. This has the effect of closing S6 pitot pressure switch.

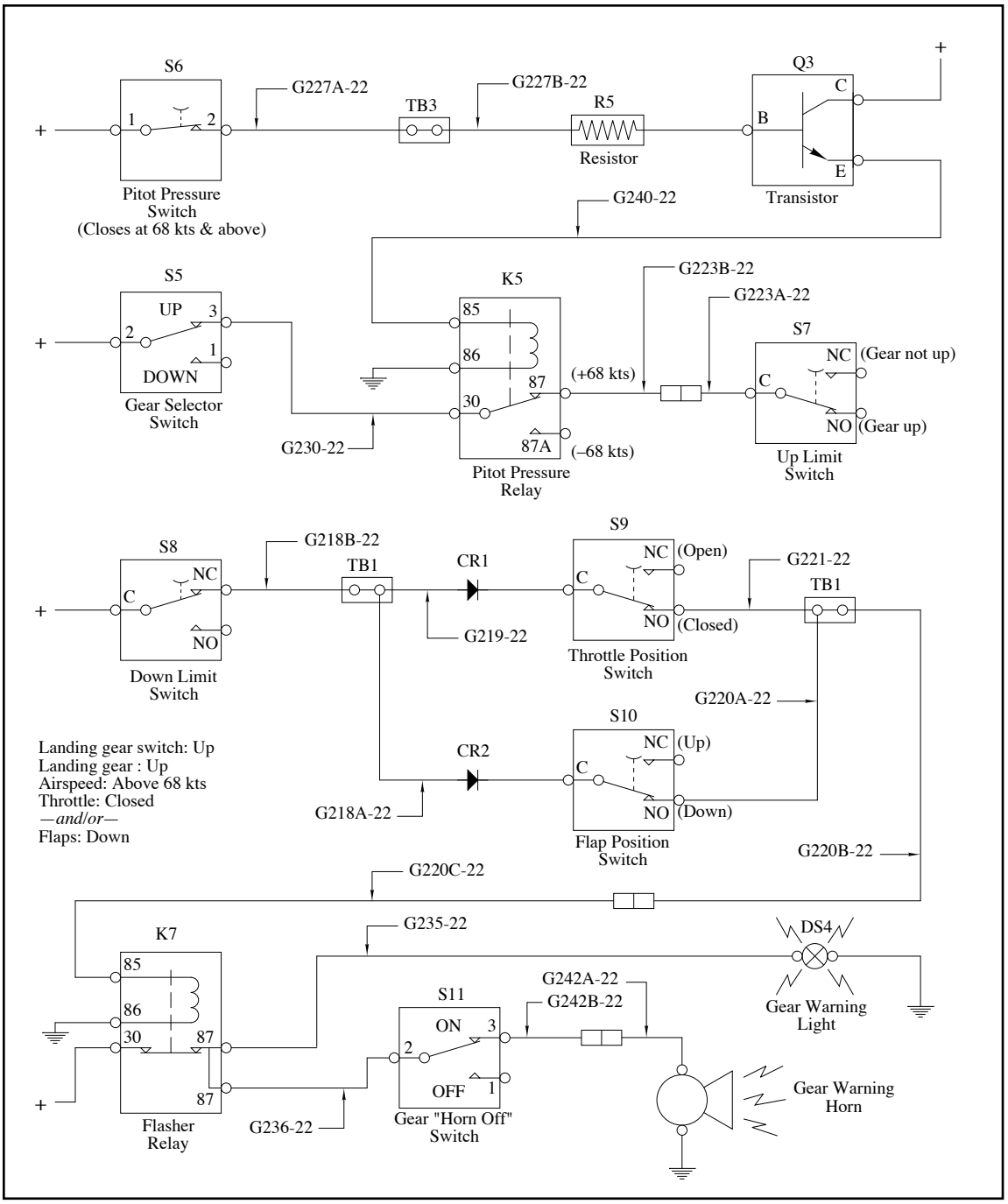


Figure 9-2. "In the Air"—Throttle Closed and/or Flaps Down

The actuation circuit shown at the top of the drawing is separate from the warning circuit shown at the bottom. The actuation circuit is the same as shown in Figure 9-1 for "In the Air—Normal Gear Up Condition. The flight time circuit, shown in Figure 9-1, continues to operate although it is not shown in this circuit drawing. The gear "horn off" switch may be used to turn off the gear warning horn, but the gear warning light continues to operate. The gear "horn off" light is also actuated by the gear "horn off" switch, but this part of the circuit is not shown in this drawing.

The flap position switch should be set to close at 17°. The throttle position switch should be adjusted so that it will close at a power setting which will maintain level flight with the flaps slightly less than 17° down and at an airspeed slightly above 68 kts, thus making it impossible to descend or flare for landing without receiving a warning from the system.

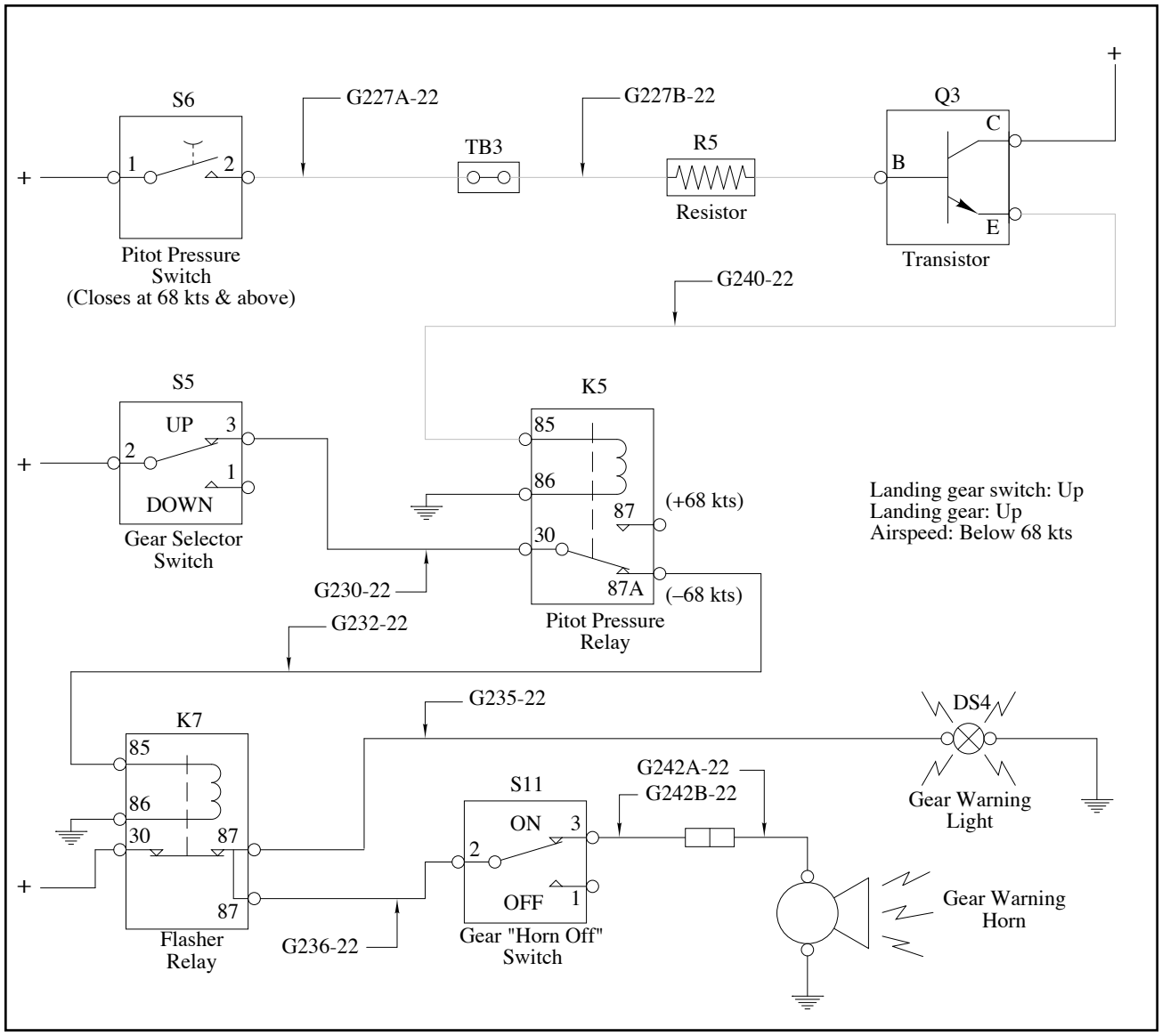


Figure 9-3. "In the Air"—Airspeed Below 68 Kts

The landing gear position has no effect on the warning, which will be actuated any time that the landing gear switch is placed in the "Up" position below 68 kts. This circuit is the same as "On the Ground"—Attempted Gear Retraction. The flight time circuit, shown in Figure 9-1, continues to operate although it is not shown in this circuit drawing.

Since power is supplied to K7(85), power is also supplied to S9(NO) and S10(NO) by G220C-22, G220A-22 and G221-22 (see Figure 9-2). This flow of current is blocked by CR1 and CR2 (see Figure 9-2) otherwise it would flow to TB1 and thence to E158A-22 (see Figure 9- 1) causing the clock to record flight time while on the ground.

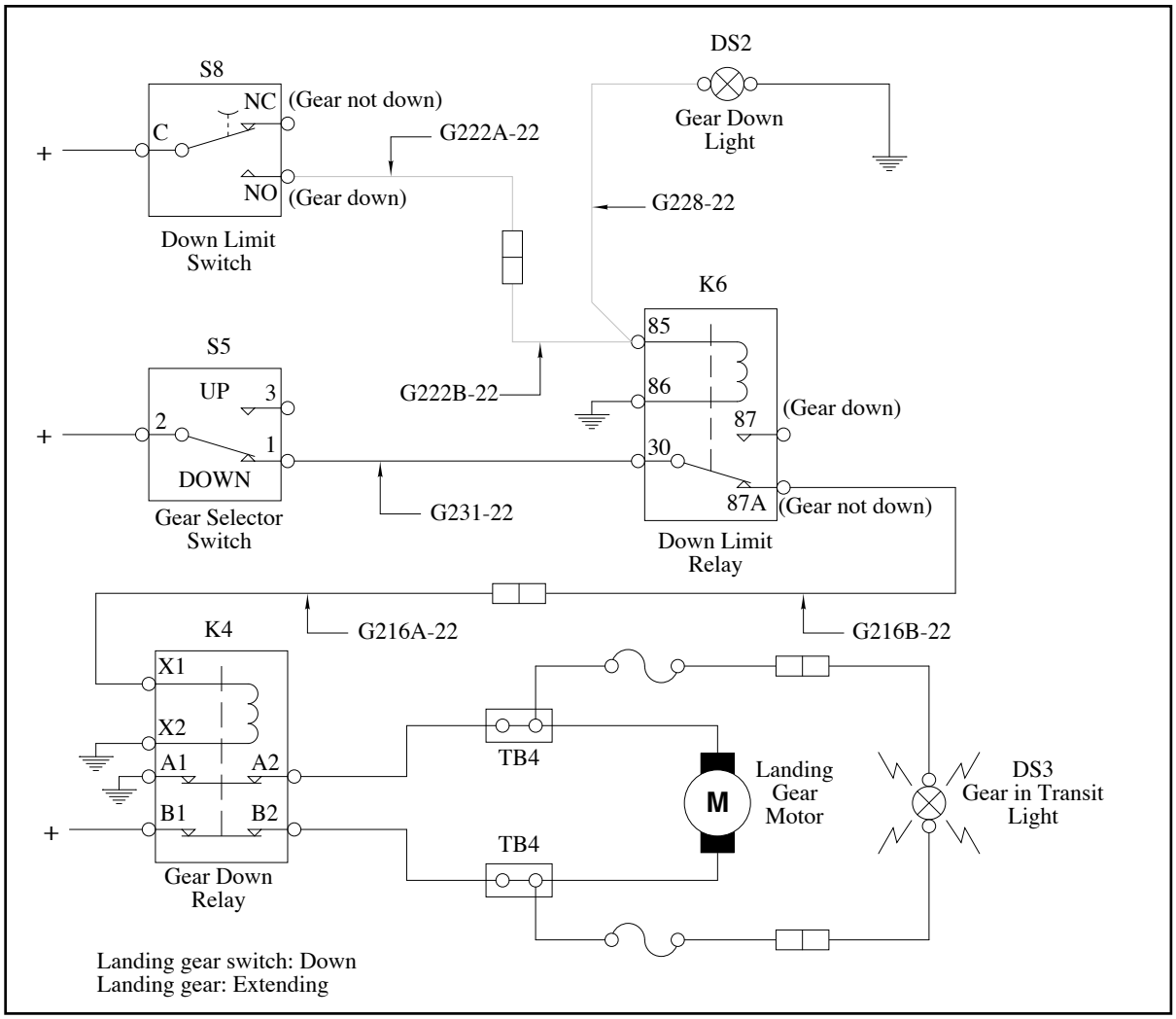


Figure 9-4. "In the Air"—Landing Gear Extension

When landing gear is fully extended, circuit is shown in Figure 9-5. The landing gear can be extended at any speed and with the throttle and flaps in any position; therefore, there is no circuitry to prevent the extension of the landing gear at prohibited high speeds.

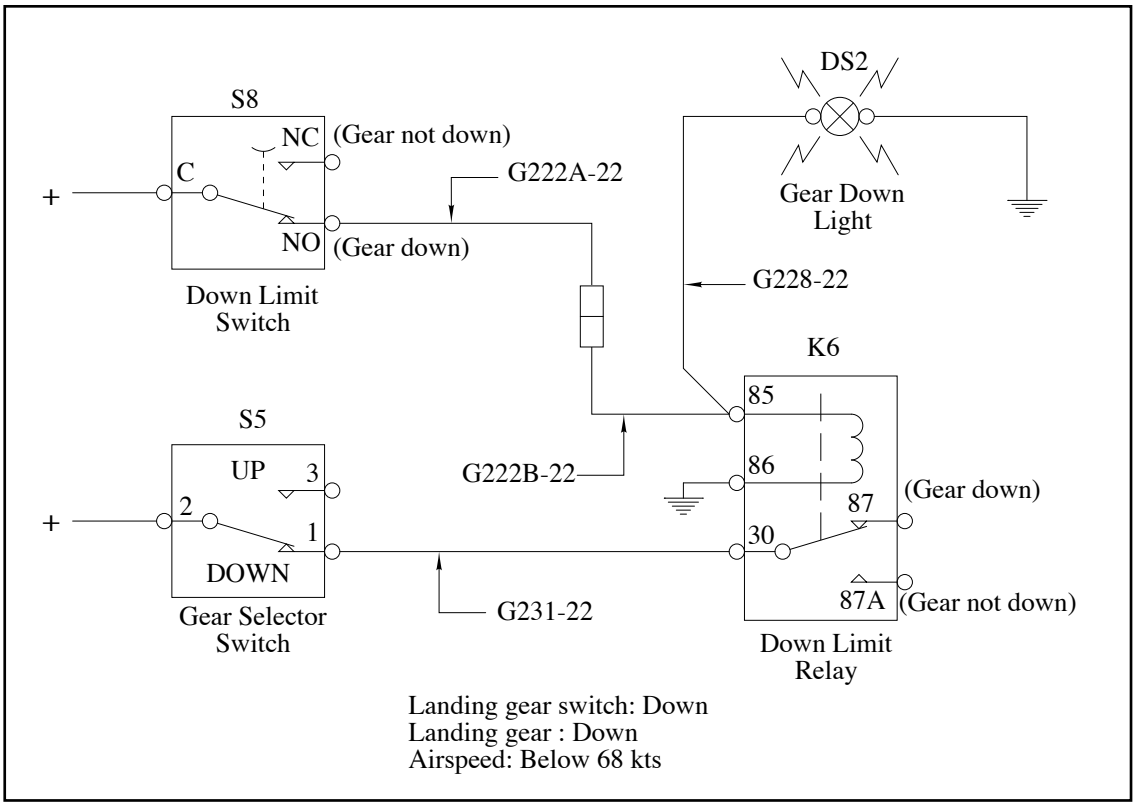


Figure 9-5. "On the Ground"—Normal Gear Down Condition

This condition also applies to gear down flight below 68 kts, as will be experienced immediately after takeoff and prior to landing. For attempts to retract the landing gear below 68 kts, see Figure 9-3. Once 68 kts has been attained, normal gear retraction may be accomplished (see Figure 9-7).

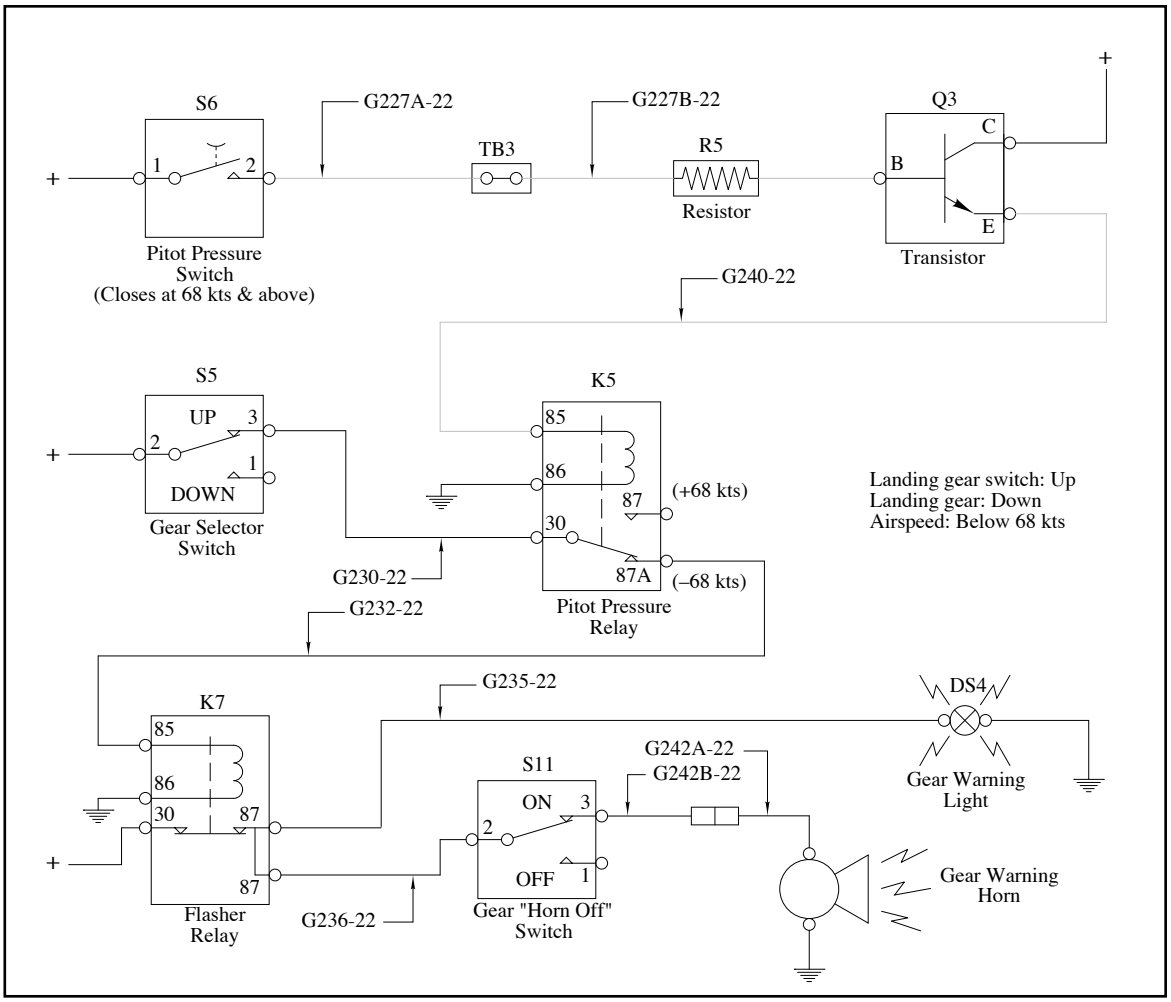


Figure 9-6. "On the Ground"—Attempted Gear Retraction

The landing gear position has no effect on the warning, which will be actuated any time that the landing gear switch is placed in the "Up" position below 68 kts. This circuit is the same as Figure 9-3.

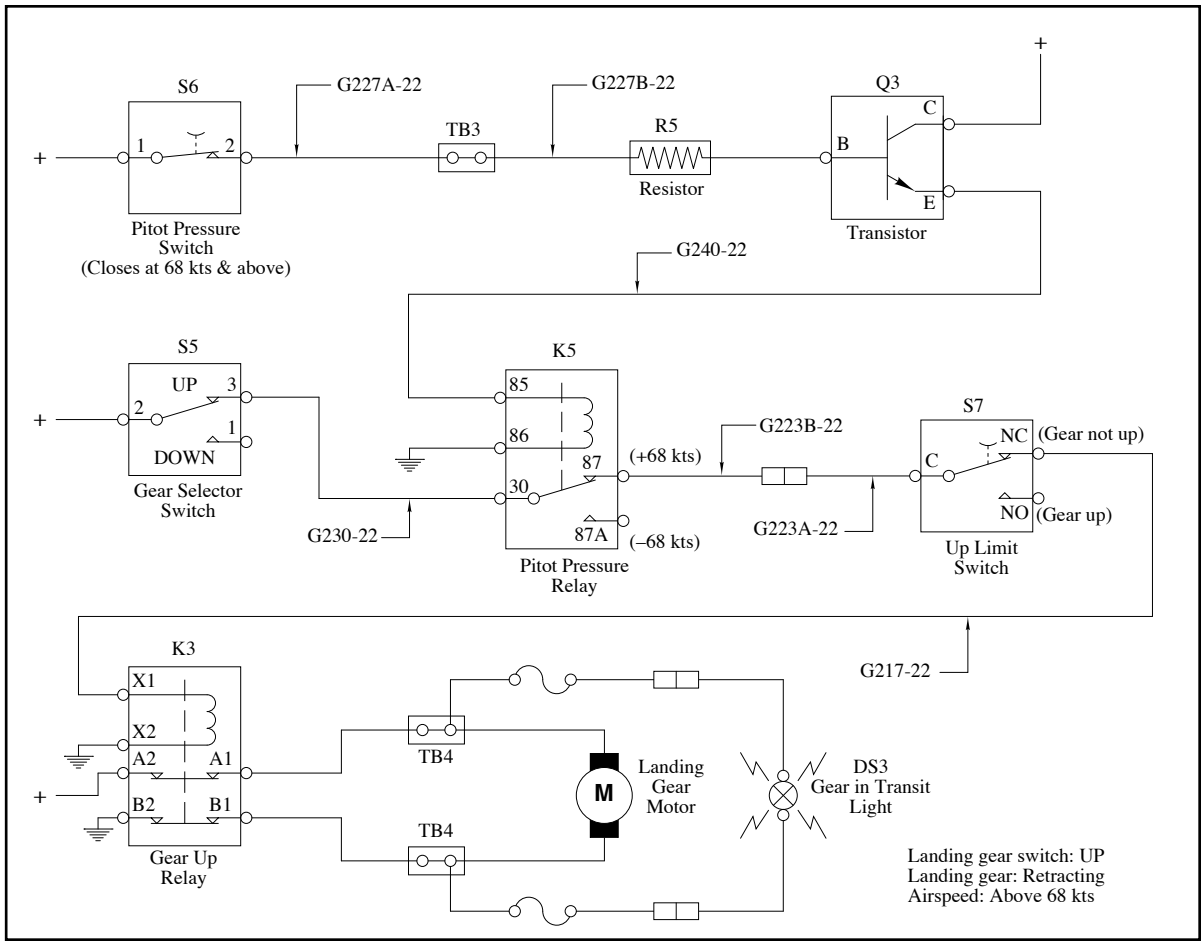


Figure 9-7. "In the Air"—Landing Gear Retraction

When landing gear is fully retracted, the circuit is shown in Figure 9-1.

If the flaps are down more than 17°, the flap position switch will be closed. The landing gear will retract as long as the airspeed is above 68 kts; however, the gear warning light and gear warning horn will give a warning immediately since the down limit switch will switch to the normally closed (NC) position (see Figure 9-2). For this reason, takeoff should be made only with the flaps at 15° so that this condition will not occur.

Davtron OAT

Two builders have had problems with their Davtron OAT giving strange indications. The Davtron OAT uses a solid state sensor (Analog Devices No. AD750) which generates one micro-amp for each degree Kelvin (at 0°F it generates 270 micro-amps). The probe is polarity sensitive, therefore the red wire from the indicator must be wired so that they connect with the red wire on the probe—same thing for the black wire. The red wire delivers +8 volts to the probe, which then generates the micro-amps depending on the temperature. In many ways, the probe works like a thermister (a non-polar two-metal resistor which generates differing resistances depending on the temperature). Unlike a thermister, the sensor is insensitive to the length of the wire, quality of connectors, etc.

The wires to the probe are supplied as a twisted pair, to keep down radio frequency, but Davtron said that this was not essential. (Their only caution was that the transmit antenna wires should not be bundled directly with the normal wiring bundles. This would apply to the antenna wires for the COM, DME and transponder.)

Troubleshooting the OAT probe: If the OAT indicates –199° or –99°, there is an open circuit to the probe or the wires are reversed. If the OAT indicates +199° or +99°, there is a short in the probe wires or at the probe itself.

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
Main Power Circuit									
101	P101A-0	0	MIL-W-22759/16-01-9	WHT	84	36916	36917	BT1(+)	K1(A1)
	P101B-0	0	MIL-W-22759/16-01-9	WHT	6	36917	36917	K1(A2)	K2(A1
102	NP102A-0	0	MIL-W-22759/16-01-9	(BLK)	84	36916	36917	BT1(–)	W2(–)
	NP102B-0	0	MIL-W-22759/16-01-9	(BLK)	210	36917	36915	W2(–)	W3(–)
103	P103-20	20	MIL-W-22759/16-20-9	WHT	6	31897	31885	K1(A1)	K1(X1)
104	NP104A-20	20	MIL-W-22759/16-20-9012	WHT/BLK-BRN-RED	36	31885	205089-1	S1(3)	J3(4)
	NP104B-20	20	MIL-W-22759/16-20-9012	WHT/BLK-BRN-RED	96	205090-1	31885	P3(4)	K1(X2)
105	P105A-22	22	MIL-W-22759/16-22-9126	WHT/BRN-RED-BLU	24	31891	205089-1	P/N 145-25(–)	J3(6)
	P105B-22	22	MIL-W-22759/16-22-9126	WHT/BRN-RED-BLU	96	205090-1	31890	P3(6)	F2
	P105C-22	22	MIL-W-22759/16-22-9126	WHT/BRN-RED-BLU	6	31890	31890	F2	P/N 116-61(B–)
106	P106A-22	22	MIL-W-22759/16-22-9125	WHT/BRN-RED-GRN	24	31891	205089-1	P/N 145-25(+)	J3(5)
	P106B-22	22	MIL-W-22759/16-22-9125	WHT/BRN-RED-GRN	96	205090-1	31890	P3(5)	F1
	P106C-22	22	MIL-W-22759/16-22-9125	WHT/BRN-RED-GRN	6	31890	31890	F1	P/N 116-61(B+)
107	P107-6	6	MIL-W-22759/16-6-9	WHT	24	33467	33465	K1(A2)	P/N 116-61(A+)
108	P108-6	6	MIL-W-22759/16-6-9	WHT	96	33465	33465	Alternator(+)	P/N 116-62(A+)
109	P109A-8	8	MIL-W-22759/16-8-7	VIO	18	66259-3	32996	J1(5)	W1(+)
	P109B-8	8	MIL-W-22759/16-8-7	VIO	60	33461	66257-3	P/N 116-62(A–)	P1(5)
110	P110A-8	8	MIL-W-22759/16-8-7	VIO	18	66259-3	32996	J1(6)	W1(+)
	P110B-8	8	MIL-W-22759/16-8-7	VIO	60	33461	66257-3	P/N 116-62(A–)	P1(6)
111	P111A-22	22	MIL-W-22759/16-22-4123	YEL/BRN-RED-ORG	30	31885	205089-1	P/N 145-20(+)	J3(8)
	P111B-22	22	MIL-W-22759/16-22-4123	YEL/BRN-RED-ORG	60	205090-1	31890	P3(8)	F4
	P111C-22	22	MIL-W-22759/16-22-4123	YEL/BRN-RED-ORG	6	31890	31890	F4	P/N 116-62(B+)
112	P112A-22	22	MIL-W-22759/16-22-4567	YEL/GRN-BLU-VIO	30	31885	205089-1	P/N 145-20(A–)	J3(9)
	P112B-22	22	MIL-W-22759/16-22-4567	YEL/GRN-BLU-VIO	60	205090-1	31890	P3(9)	F3
	P112C-22	22	MIL-W-22759/16-22-4567	YEL/GRN-BLU-VIO	6	31890	31890	F3	P/N 116-62(B–)
113	P113-22	22	MIL-W-22759/16-22-9	WHT	6	31897	31890	K2(A2)	F7
114	NP114-20	20	MIL-W-22759/16-20-0	BLK	24	31885	31891	K2(X2)	W2(–)
115	P115A-20	20	MIL-W-22759/16-20-9124	WHT/BRN-RED-YEL	36	31885	205089-1	S23(S)	J3(3)
	P115B-20	20	MIL-W-22759/16-20-9124	WHT/BRN-RED-YEL	96	205090-1	31885	P3(3)	K2(X1)
116	P116-0	0	MIL-W-22759/16-01-9	WHT	216	36917	36916	K2(A2)	Starter(+)
117	P117-22	22	MIL-W-22759/16-22-41	YEL/BRN	42	solder	31890	DS1	CB11
118	P118-20	20	MIL-W-22759/16-20-54	GRN/YEL	48	31890	31885	CB21	S23(BAT)
119	NP119-22	22	MIL-W-22759/16-22-0	BLK	24	31885	31890	P/N 145-20(V–)	W4(–)
120	P120-20	20	MIL-C-27500-20TE1T14(9258)	WHT/RED-GRN-GRA	216	31885	solder	ALT(F1)	P/N 116-52(BLU)
121	NP121-20	20	MIL-W-22759/16-20-0	BLK	6	31885	31894	ALT(F2)	W3(–)
122	NP122-20	20	MIL-W-22759/16-20-0	BLK	24	solder	31891	P/N 116-52(BLK)	W2(–)

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
123	P123A-20	20	MIL-W-22759/16-20-9127	WHT/BRN-RED-VIO	36	31885	205089-1	S2(2)	J3(7)
	P123B-20	20	MIL-W-22759/16-20-9127	WHT/BRN-RED-VIO	96	205090-1	solder	P3(7)	P/N 116-52(RED)
124	NP124A-18	18	MIL-C-27500-18TE1T14(9023)	WHT/BLK-RED-ORG	36	31885	200333-1	S23(L)	J2(2)
	NP124B-18	18	MIL-C-27500-18TE1T14(9023)	WHT/BLK-RED-ORG	144	200336-1	*****	P2(2)	Left Mag(SW)
125	NP125A-18	18	MIL-C-27500-18TE1T14(9024)	WHT/BLK-RED-YEL	36	31885	200333-1	S23(R)	J2(1)
	NP125B-18	18	MIL-C-27500-18TE1T14(9024)	WHT/BLK-RED-YEL	144	200336-1	*****	P2(1)	Rt. Mag(SW)
126	P126A-18	18	MIL-W-22759/16-18-4235	YEL/RED-ORG-GRN	36	31885	200333-1	S23(LR)	J2(8)
	P126B-18	18	MIL-W-22759/16-18-4235	YEL/RED-ORG-GRN	144	200336-1	*****	P2(8)	Left Mag(RET)
127	P127A-20	20	MIL-W-22759/16-20-9123	WHT/BRN-RED-ORG	36	31885	205089-1	S23(BO)	J3(1)
	P127B-20	20	MIL-W-22759/16-20-9123	WHT/BRN-RED-ORG	96	205090-1	42599-2	P3(1)	Vibrator(BO)
128	P128-20	20	MIL-W-22759/16-20-9	WHT	24	31885	42599-2	K2(X1)	Vibrator(IN)
129	P129A-8	8	MIL-W-22759/16-8-2	RED	18	66259-3	32996	J1(1)	W1(+)
	P129B-8	8	MIL-W-22759/16-8-2	RED	96	33461	66257-3	P/N 116-61(A–)	P1(1)
130	P130A-8	8	MIL-W-22759/16-8-2	RED	18	66259-3	32996	J1(2)	W1(+)
	P130B-8	8	MIL-W-22759/16-8-2	RED	96	33461	66257-3	P/N 116-61(A–)	P1(2)
131	NP131A-8	8	MIL-W-22759/16-8-0	BLK	18	32996	66259-3	W4(–)	J1(3)
	NP131B-8	8	MIL-W-22759/16-8-0	BLK	96	66257-3	33463	P1(3)	W2(–)
132	NP132A-8	8	MIL-W-22759/16-8-0	BLK	18	32996	66259-3	W4(–)	J1(4)
	NP132B-8	8	MIL-W-22759/16-8-0	BLK	96	66257-3	33463	P1(4)	W2(–)
133	NP133-22	22	MIL-W-22759/16-22-0	BLK	6	solder	31885	DS1	S1(4)
134	NP134-18	18	MIL-W-22759/16-18-0	BLK	36	31885	31890	S23(GRD)	W4(–)
135	NP135-20	20	MIL-W-22759/16-20-0	BLK	36	31885	31890	S1(4)	W4(–)
136	P136-20	20	MIL-W-22759/16-20-52	GRN/RED	36	31890	31885	CB1	S1(1)
137	P137-20	20	MIL-W-22759/16-20-9	WHT	6	31885	31885	S1(2)	S2(1)
Instrument Circuits									
146	E146-22	22	MIL-W-22759/16-22-62	BLU/RED	132	31885	31880	(See 4 cyl CHT instructions)	
147	E147-22	22	MIL-W-22759/16-22-79	VIO/WHT	132	31885	31880	(See 4 cyl CHT instructions)	
148	E148-22	22	MIL-W-22759/16-22-91	WHT/BRN	132	31885	31880	(See 4 cyl CHT instructions)	
149	E149-22	22	MIL-W-22759/16-22-95	WHT/GRN	132	31885	31880	(See 4 cyl CHT instructions)	
150	E150-22	22	MIL-W-22759/16-22-29	RED/WHT	36	31890	31891	CB13	P/N 145-22(IGN)
151	E151A-22	22	MIL-W-22759/16-22-4578	YEL/GRN-VIO-GRA	108	31880	205090-1	P/N 116-55(+)	P3(22)
	E151B-22	22	MIL-W-22759/16-22-4578	YEL/GRN-VIO-GRA	24	205089-1	31891	J3(22)	P/N 145-22(SND)
152	E152-22	22	MIL-W-22759/16-22-29	RED/WHT	6	31891	31891	P/N 145-22(IGN)	P/N 145-24(IGN)
153	E153A-22	22	MIL-W-22759/16-22-4267	YEL/RED-BLU-VIO	108	solder	205090-1	J15(A)	P3(20)
	E153B-22	22	MIL-W-22759/16-22-4267	YEL/RED-BLU-VIO	24	205089-1	31890	J3(20)	P/N 145-24(SPLY)
154	E154A-22	22	MIL-W-22759/16-22-4257	YEL/RED-GRN-VIO	60	solder	205090-1	OAT Probe(RED)	P3(30)
	E154B-22	22	MIL-W-22759/16-22-4257	YEL/RED-GRN-VIO	36	205089-1	solder	J3(30)	OAT Lead(RED)

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
155	E155A-22	22	MIL-W-22759/16-22-4138	YEL/BRN-ORG-GRA	60	solder	205090-1	OAT Probe(BLK)	P3(31)
	E155B-22	22	MIL-W-22759/16-22-4138	YEL/BRN-ORG-GRA	36	205089-1	solder	J3(31)	OAT Lead(BLK)
156	NE156-22	22	MIL-W-22759/16-22-0	BLK	24	solder	31890	OAT(BLK)	W4(–)
157	NE157-22	22	MIL-W-22759/16-22-0	BLK	36	solder	31890	Clock(BLK)	W4(–)
158	E158A-22	22	MIL-W-22759/16-22-9157	WHT/BRN-GRN-VIO	132	31885	205090-1	TB1(2)	P3(17)
	E158B-22	22	MIL-W-22759/16-22-9157	WHT/BRN-GRN-VIO	36	205089-1	solder	J3(17)	Clock(BLU)
159	E159-22	22	MIL-W-22759/16-22-64	BLU/YEL	6	31891	31891	P/N 145-26(IGN)	P/N 145-23(IGN)
160	E160A-22	22	MIL-W-22759/16-22-4256	YEL/RED-GRN-BLU	108	31891	205090-1	P/N 116-57(+)	P3(21)
	E160B-22	22	MIL-W-22759/16-22-4256	YEL/RED-GRN-BLU	24	205089-1	31891	J3(21)	P/N 145-23(SND)
161	E161-22	22	MIL-W-22759/16-22-64	BLU/YEL	36	31890	31891	CB14	P/N 145-26(IGN)
162	E162A-22	22	MIL-W-22759/16-22-4127	YEL/BRN-RED-VIO	36	31890	350690-2	P/N 729-13(+)	P5(1)
	E162B-22	22	MIL-W-22759/16-22-4127	YEL/BRN-RED-VIO	48	350689-2	205090-1	J5(1)	P3(19)
	E162C-22	22	MIL-W-22759/16-22-4127	YEL/BRN-RED-VIO	24	205089-1	31891	J3(19)	P/N 145-26(SND)
163	NE163A-22	22	MIL-W-22759/16-22-0	BLK	36	31891	350690-2	P/N 729-13(–)	P5(2)
	NE163B-22	22	MIL-W-22759/16-22-0	BLK	96	350689-2	31891	J5(2)	W2(–)
164	E164-22	22	MIL-W-22759/16-22-64	BLU/YEL	6	31891	31891	P/N 145-26(IGN)	P/N 145-27(IGN)
165	E165A-22	22	MIL-W-22759/16-22-9158	WHT/BRN-GRN-GRA	36	31890	350690-2	P/N 728-10(+)	P6(1)
	E165B-22	22	MIL-W-22759/16-22-9158	WHT/BRN-GRN-GRA	144	350689-2	205090-1	J6(1)	P3(18)
	E165C-22	22	MIL-W-22759/16-22-9158	WHT/BRN-GRN-GRA	24	205089-1	31891	J3(18)	P/N 145-27(SND)
166	NE166A-22	22	MIL-W-22759/16-22-0	BLK	36	31891	350690-2	P/N 728-10(–)	P6(2)
	NE166B-22	22	MIL-W-22759/16-22-0	BLK	72	350689-2	31891	J6(2)	W2(–)
167	E167-22	22	MIL-W-22759/16-22-2	RED	N/A	solder	31890	OAT(RED)	CB20
168	NE168-22	22	MIL-W-22759/16-22-0	BLK	216	solder	31891	J15(B)	W2(–)
169	E169A-22	22	MIL-W-22759/16-22-4136	YEL/BRN-ORG-BLU	108	solder	205090-1	J15(C)	P3(25)
	E169B-22	22	MIL-W-22759/16-22-4136	YEL/BRN-ORG-BLU	24	205089-1	31891	J3(25)	P/N 145-24(WPR)
175	NE175-22	22	MIL-W-22759/16-22-0	BLK	24	solder	31890	DS8	W4(–)
176	E176A-22	22	MIL-W-22759/16-22-4128	YEL/BRN-RED-GRA	36	solder	205089-1	Fuelgard(8)	J3(34)
	E176B-22	22	MIL-W-22759/16-22-4128	YEL/BRN-RED-GRA	144	205090-1	solder	P3(34)	201B(RED)
177	E177A-22	22	MIL-W-22759/16-22-4236	YEL/RED-ORG-BLU	36	solder	205089-1	Fuelgard(4)	J3(35)
	E177B-22	22	MIL-W-22759/16-22-4236	YEL/RED-ORG-BLU	144	205090-1	solder	P3(35)	201B(WHT)
178	E178-22	22	MIL-W-22759/16-22-9	WHT	24	31890	solder	CB20	S27(5)
179	E179A-22	22	MIL-W-22759/16-22-9178	WHT/BRN-VIO-GRA	36	solder	205089-1	S27(4)	J3(42)
	E179B-22	22	MIL-W-22759/16-22-9178	WHT/BRN-VIO-GRA	96	205090-1	solder	P3(42)	S30(1)
180	E180-22	22	MIL-W-22759/16-22-9	WHT	48	solder	solder	S27(4)	DS6
181	NE181A-22	22	MIL-W-22759/16-22-9018	WHT/BLK-BRN-GRA	36	solder	205089-1	DS6	J3(41)
	NE181B-22	22	MIL-W-22759/16-22-9018	WHT/BLK-BRN-GRA	96	205090-1	solder	P3(41)	PC1(BLK)
182	NE181C-22	22	MIL-W-22759/16-22-0	BLK	36	solder	31891	PC1(BLK)	W2(–)
183	E183A-22	22	MIL-W-22759/16-22-4358	YEL/ORG-GRN-GRA	36	solder	205089-1	R6(2)	J3(43)
	E183B-22	22	MIL-W-22759/16-22-4358	YEL/ORG-GRN-GRA	96	205090-1	solder	P3(43)	Sender(WHT)

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
184	E184A-22	22	MIL-W-22759/16-22-9234	WHT/RED-ORG-YEL	36	solder	205089-1	R6(3)	J3(44)
	E184B-22	22	MIL-W-22759/16-22-9234	WHT/RED-ORG-YEL	96	205090-1	solder	P3(44)	R7(3)
185	E185-22	22	MIL-W-22759/16-22-92	WHT/RED	216	solder	solder	PC1(RED)	Sender(RED)
186	E186-22	22	MIL-W-22759/16-22-96	WHT/BLU	216	solder	solder	PC1(BLK)	Sender(BLK)
187	NE187-22	22	MIL-W-22759/16-22-0	BLK	36	solder	31890	R6(1)	W4(–)
188	E188-22	22	MIL-W-22759/16-22-29	RED/WHT	36	31890	solder	CB13	DS7
Fuel Pump Circuit									
190	Q190A-18	18	MIL-W-22759/16-18-4135	YEL/BRN-ORG-GRN	96	32446	200336-1	P/N 152-20(RED)	P2(6)
	Q190B-18	18	MIL-W-22759/16-18-4135	YEL/BRN-ORG-GRN	24	200333-1	31890	J2(6)	CB2
191	NQ191-18	18	MIL-W-22759/16-18-0	BLK	144	32446	31891	P/N 152-20(BLK)	W2(–)
192	Q192-18	18	MIL-W-22759/16-18-4135	YEL/BRN-ORG-GRN	18	31890	solder	CB2	DS9
193	NQ193-18	18	MIL-W-22759/16-18-0	BLK	18	solder	31890	DS9	W4(–)
Turn & Bank Circuit									
194	F194-20	20	MIL-W-22759/16-20-24	RED/YEL	36	31890	31890	CB4	P/N 145-13(+)
195	NF195-20	20	MIL-W-22759/16-20-0	BLK	36	31890	31890	P/N 145-13(–)	W4(–)
196	F196-20	20	MIL-W-22759/16-20-24	RED/YEL	18	31890	solder	CB4	DS11
197	NF197-22	22	MIL-W-22759/16-22-0	BLK	18	solder	31890	DS11	W4(–)
Flap Circuit									
201	C201A-16	16	MIL-C-27500-16TE1T14(9267)	WHT/RED-BLU-VIO	24	31902	200333-1	CB10	J2(7)
	C201B-16	16	MIL-C-27500-16TE1T14(9267)	WHT/RED-BLU-VIO	36	200336-1	32442	P2(7)	S12(2)
202	NC202-16	16	MIL-W-22759/16-16-0	BLK	96	32442	31903	S12(5)	W2(–)
203	C203A-16	16	MIL-C-27500-16TE1T14(9267)	WHT/RED-BLU-VIO	36	320562	31902	P/N 853(RED)	TB4(1)
	C203B-16	16	MIL-C-27500-16TE1T14(9267)	WHT/RED-BLU-VIO	48	31902	32442	TB4(1)	S12(3)
204	C204A-16	16	MIL-C-27500-16TE1T14(9268)	WHT/RED-BLU-GRA	36	320562	31902	P/N 853(BLK)	TB4(2)
	C204B-16	16	MIL-C-27500-16TE1T14(9268)	WHT/RED-BLU-GRA	48	31902	32442	TB4(2)	S12(6)
205	C205-16	16	MIL-W-22759/16-16-5	GRN	6	32442	32442	S12(3)	S12(4)
206	C206-16	16	MIL-W-22759/16-16-6	BLU	6	32442	32442	S12(1)	S12(6)
Landing Gear Circuit									
210	G210A-12	12	MIL-W-22759/16-12-9278	WHT/RED-VIO-GRA	18	35108	66261-3	CB8	J1(7)
	G210B-12	12	MIL-W-22759/16-12-9278	WHT/RED-VIO-GRA	84	66358-3	35109	P1(7)	K4(B1)
	G210C-12	12	MIL-W-22759/16-12-9278	WHT/RED-VIO-GRA	12	35109	35109	K4(B1)	K3(B2)
211	G211-12	12	MIL-W-22759/16-12-5	GRN	24	35109	35109	K4(A2)	K3(B1)
212	G212-12	12	MIL-W-22759/16-12-6	BLU	24	35109	35109	K4(B2)	K3(A1)
213	NG213A-12	12	MIL-W-22759/16-12-0	BLK	6	35109	35109	K3(A2)	K4(A1)
	NG213B-12	12	MIL-W-22759/16-12-0	BLK	42	35109	35109	K4(A1)	W2(–)
214	G214A-22	22	MIL-W-22759/16-22-9136	WHT/BRN-ORG-BLU	6	31891	solder	K4(B2)	F5
	G214B-22	22	MIL-W-22759/16-22-9136	WHT/BRN-ORG-BLU	96	solder	205090-1	F5	P3(16)
	G214C-22	22	MIL-W-22759/16-22-9136	WHT/BRN-ORG-BLU	24	205089-1	solder	J3(16)	DS3

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
215	G215A-22	22	MIL-W-22759/16-22-9135	WHT/BRN-ORG-GRN	6	31891	solder	K3(B1)	F6
	G215B-22	22	MIL-W-22759/16-22-9135	WHT/BRN-ORG-GRN	96	solder	205090-1	F6	P3(15)
	G215C-22	22	MIL-W-22759/16-22-9135	WHT/BRN-ORG-GRN	24	205089-1	solder	J3(15)	DS3
216	G216A-22	22	MIL-W-22759/16-22-9128	WHT/BRN-RED-GRA	96	31885	205090-1	K4(X2)	P3(10)
	G216B-22	22	MIL-W-22759/16-22-9128	WHT/BRN-RED-GRA	24	205089-1	60982-1	J3(10)	K6(87A)
217	G217-22	22	MIL-W-22759/16-22-4125	YEL/BRN-RED-GRN	228	solder	31885	S7(NC)	K3(X1)
218	G218A-22	22	MIL-W-22759/16-22-41	YEL/BRN	96	solder	31885	CR2	TB1(2)
	G218B-22	22	MIL-W-22759/16-22-4126	YEL/BRN-RED-BLU	228	31885	solder	TB1(2)	S8(NC)
219	G219-22	22	MIL-W-22759/16-22-41	YEL/BRN	96	31885	solder	TB1(2)	CR1
220	G220A-22	22	MIL-W-22759/16-22-56	GRN/BLU	96	solder	31885	S10(NO)	TB1(1)
	G220B-22	22	MIL-W-22759/16-22-9134	WHT/BRN-ORG-YEL	96	31885	205090-1	TB1(1)	P3(14)
	G220C-22	22	MIL-W-22759/16-22-9134	WHT/BRN-ORG-YEL	30	205089-1	60982-1	J3(14)	K7(85)
221	G221-22	22	MIL-W-22759/16-22-64	BLU/YEL	96	solder	31885	S9(NO)	TB1(1)
222	G222A-22	22	MIL-W-22759/16-22-4137	YEL/BRN-ORG-VIO	96	solder	205090-1	S8(NO)	P3(11)
	G222B-22	22	MIL-W-22759/16-22-4137	YEL/BRN-ORG-VIO	24	205089-1	60982-1	J3(11)	K6(85)
223	G223A-22	22	MIL-W-22759/16-22-4356	YEL/ORG-GRN-BLU	96	solder	205090-1	S7(C)	P3(12)
	G223B-22	22	MIL-W-22759/16-22-4356	YEL/ORG-GRN-BLU	24	205089-1	60982-1	J3(12)	K5(87)
224	G224A-22	22	MIL-W-22759/16-22-4158	YEL/BRN-GRN-GRA	96	solder	205090-1	S8(C)	P3(13)
	G224B-22	22	MIL-W-22759/16-22-4158	YEL/BRN-GRN-GRA	24	205089-1	31890	J3(13)	CB9
225	G225A-22	22	MIL-W-22759/16-22-39	ORG/WHT	12	31890	31885	CB9	TB3(2)
	G225B-22	22	MIL-W-22759/16-22-39	ORG/WHT	60	31885	31885	TB3(2)	S5(2)
226	G226-22	22	MIL-W-22759/16-22-39	ORG/WHT	72	31885	*****	TB3(2)	S6(1)
227	G227A-22	22	MIL-W-22759/16-22-96	WHT/BLU	72	*****	31885	S6(2)	TB3(1)
	G227B-22	22	MIL-W-22759/16-22-95	WHT/GRN	48	31885	solder	TB3(1)	R5
228	G228-22	22	MIL-W-22759/16-22-56	GRN/BLU	36	60982-1	solder	K6(85)	DS2
229	NG229-22	22	MIL-W-22759/16-22-0	BLK	24	solder	31890	DS2	W4(–)
230	G230-22	22	MIL-W-22759/16-22-79	VIO/WHT	72	31885	60982-1	S5(3)	K5(30)
231	G231-22	22	MIL-W-22759/16-22-62	BLU/RED	72	31885	60982-1	S5(1)	K6(30)
232	G232-22	22	MIL-W-22759/16-22-9	WHT	6	60982-1	60982-1	K5(87A)	K7(85)
233	NG233-22	22	MIL-W-22759/16-22-0	BLK	18	60982-1	31890	K5(86)	W4(–)
234	NG234-22	22	MIL-W-22759/16-22-0	BLK	18	60982-1	31890	K6(86)	W4(–)
235	G235-22	22	MIL-W-22759/16-22-48	YEL/GRA	36	60982-1	solder	K7(87)	DS4
236	G236-22	22	MIL-W-22759/16-22-48	YEL/GRA	36	60982-1	solder	K7(87)	S11(2)
237	NG237-22	22	MIL-W-22759/16-22-0	BLK	24	solder	31890	DS4	W4(–)
238	NG238-22	22	MIL-W-22759/16-22-0	BLK	96	31885	31891	P/N 116-50	W2(–)
239	G239-22	22	MIL-W-22759/16-22-39	ORG/WHT	48	31885	solder	TB3(2)	Q3(C)
240	G240-22	22	MIL-W-22759/16-22-92	WHT/RED	48	solder	60982-1	Q3(E)	K5(85)
241	G241-22	22	MIL-W-22759/16-22-39	ORG/WHT	36	31890	solder	CB9	S11(5)
242	G242A-22	22	MIL-W-22759/16-22-9137	WHT/BRN-ORG-VIO	36	31885	205090-1	P/N 116-50	P3(29)

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
	G242B-22	22	MIL-W-22759/16-22-9137	WHT/BRN-ORG-VIO	24	205089-1	solder	J3(29)	S11(3)
243	G243-22	22	MIL-W-22759/16-22-9	WHT	6	solder	solder	S11(4)	DS5
244	NG244-22	22	MIL-W-22759/16-22-0	BLK	24	solder	31890	DS5	W4(–)
245	G245-22	22	MIL-W-22759/16-22-39	ORG/WHT	18	31890	60982-1	CB9	K7(30)
246	NG246-22	22	MIL-W-22759/16-22-0	BLK	18	60982-1	31890	K7(86)	W4(–)
247	NG247A-22	22	MIL-W-22759/16-22-0	BLK	12	31885	31885	K3(X2)	K4(X1)
	NG247B-22	22	MIL-W-22759/16-22-0	BLK	36	31885	31891	K4(X1)	W2(–)
Lighting Circuits									
250	L250-22	22	MIL-W-22759/16-22-42	YEL/RED	48	31890	solder	CB12	Q2(C)
251	L251-22	22	MIL-W-22759/16-22-42	YEL/RED	24	31890	solder	CB12	R2(3)
252	L252A-22	22	MIL-W-22759/16-22-4357	YEL/ORG-GRN-VIO	30	solder	205089-1	Q2(E)	J3(24)
	L252B-22	22	MIL-W-22759/16-22-4357	YEL/ORG-GRN-VIO	120	205090-1	350690-2	P3(24)	P7(1)
	L252C-22	22	MIL-W-22759/16-22-4357	YEL/ORG-GRN-VIO	48	350689-2	solder	J7(1)	DS15
253	NL253-22	22	MIL-W-22759/16-22-0	BLK	36	solder	31890	R2(1)	W4(–)
254	L254-22	22	MIL-W-22759/16-22-9	WHT	6	solder	solder	R2(2)	S4(5)
255	L255-22	22	MIL-W-22759/16-22-45	YEL/GRN	48	solder	solder	S4(4)	R4
256	NL256A-22	22	MIL-W-22759/16-22-0	BLK	48	solder	350689-2	DS15	J7(2)
	NL256B-22	22	MIL-W-22759/16-22-0	BLK	144	350690-2	31891	P7(2)	W2(–)
270	L270-22	22	MIL-W-22759/16-22-47	YEL/VIO	48	31890	solder	CB11	Q1(C)
271	L271-22	22	MIL-W-22759/16-22-47	YEL/VIO	24	31890	solder	CB11	R1(3)
272	L272-22	22	MIL-W-22759/16-22-4	YEL	24	solder	31885	Q1(E)	TB2(1-7)
273	NL273-22	22	MIL-W-22759/16-22-0	BLK	36	solder	31890	R1(1)	W4(–)
274	L274-22	22	MIL-W-22759/16-22-9	WHT	6	solder	solder	R1(2)	S3(5)
275	L275-22	22	MIL-W-22759/16-22-46	YEL/BLU	48	solder	solder	S3(4)	R3
276	L276-22	22	MIL-W-22759/16-22-4	YEL	24	31885	31890	TB2(5)	P/N 145-21(L)
277	L277-22	22	MIL-W-22759/16-22-4	YEL	24	31885	31890	TB2(5)	P/N 145-21(L)
278	L278-22	22	MIL-W-22759/16-22-4	YEL	24	31885	31890	TB2(6)	P/N 145-21(L)
279	L279-22	22	MIL-W-22759/16-22-4	YEL	24	31885	31890	TB2(6)	P/N 145-21(L)
280	L280-22	22	MIL-W-22759/16-22-4	YEL	24	31885	31890	TB2(6)	P/N 145-21(L)
281	L281A-22	22	MIL-W-22759/16-22-4258	YEL/RED-GRN-GRA	24	31885	205089-1	TB2(6)	J3(28)
	L281B-22	22	MIL-W-22759/16-22-4258	YEL/RED-GRN-GRA	120	205090-1	solder	P3(28)	DS21
282	NL282-22	22	MIL-W-22759/16-22-0	BLK	144	solder	31891	DS21	W2(–)
Autopilot Circuit									
285	C285-20	20	MIL-W-22759/16-20-9	WHT	36	31890	solder	CB4	S28(3)
286	C286-20	20	MIL-W-22759/16-20-9	WHT	12	solder	solder	S28(2)	Autopilot(8)
287	NC287A-20	20	MIL-W-22759/16-20-9016	WHT/BLK-BRN-BLU	36	solder	205089-1	Autopilot(1)	J3(47)
	NC287B-20	20	MIL-W-22759/16-20-9016	WHT/BLK-BRN-BLU	96	205090-1	solder	P3(47)	Servo(B)
288	C288A-20	20	MIL-W-22759/16-20-9168	WHT/BRN-BLU-GRA	36	solder	205089-1	Autopilot(3)	J3(49)

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
	C288B-20	20	MIL-W-22759/16-20-9168	WHT/BRN-BLU-GRA	96	205090-1	solder	P3(49)	Servo(C)
289	NC289A-20	20	MIL-W-22759/16-20-9017	WHT/BLK-BRN-VIO	36	solder	205089-1	Autopilot(4)	J3(50)
	NC289B-20	20	MIL-W-22759/16-20-9017	WHT/BLK-BRN-VIO	96	205090-1	solder	P3(50)	Servo(D)
290	C290A-20	20	MIL-W-22759/16-20-9167	WHT/BRN-BLU-VIO	36	solder	205089-1	Autopilot(9)	J3(48)
	C290B-20	20	MIL-W-22759/16-20-9167	WHT/BRN-BLU-VIO	96	205090-1	solder	P3(48)	Servo(C)
291	C291-22	22	MIL-W-22759/16-22-9	WHT	12	solder	solder	Autopilot(13)	S29(2)
292	C292-22	22	MIL-W-22759/16-22-9	WHT	12	solder	solder	Autopilot(14)	S29(5)
Landing Light Circuit									
300	L300A-18	18	MIL-W-22759/16-18-4368	YEL/ORG-BLU-GRA	132	31890	200336-1	DS20	P2(5)
	L300B-18	18	MIL-W-22759/16-18-4368	YEL/ORG-BLU-GRA	24	200333-1	31890	J2(5)	CB7
301	NL301-18	18	MIL-W-22759/16-18-0	BLK	204	31890	31891	DS20	W2(–)
302	L302-18	18	MIL-W-22759/16-18-4368	YEL/ORG-BLU-GRA	18	31890	solder	CB7	DS14
303	NL303-18	18	MIL-W-22759/16-18-0	BLK	18	solder	31890	DS14	W4(–)
Anti-Collision & Nav Light Circuits									
310	L310A-18	18	MIL-W-22759/16-18-69	BLU/WHT	96	31885	200336-1	TB1(4)	P2(3)
	L310B-18	18	MIL-W-22759/16-18-69	BLU/WHT	24	200333-1	31890	J2(3)	CB5
311	L311-18	18	MIL-W-22759/16-18-69	BLU/WHT	18	31890	solder	CB5	DS12
312	NL312-18	18	MIL-W-22759/16-18-0	BLK	18	solder	31890	DS12	W4(–)
313	L313-18	18	MIL-W-22759/16-18-69	BLU/WHT	36	*****	31885	Pwr Sply(+)	TB1(4)
314	NL314-18	18	MIL-W-22759/16-18-0	BLK	36	*****	31891	Pwr Sply(–)	W2(–)
315	L315A-20	20	MIL-W-22759/16-20-9156	WHT/BRN-GRN-BLU	96	31885	205090-1	TB1(3)	P3(23)
	L315B-20	20	MIL-W-22759/16-20-9156	WHT/BRN-GRN-BLU	24	205089-1	31890	J3(23)	CB6
316	L316-20	20	MIL-W-22759/16-20-9156	WHT/BRN-GRN-BLU	18	31890	solder	CB6	DS13
317	NL317-20	20	MIL-W-22759/16-20-0	BLK	18	solder	31890	DS13	W4(–)
318	L318-20	20	MIL-W-22759/16-20-4	YEL	156	31885	solder	TB1(3)	A500-14(+)
319	L319-20	20	MIL-W-22759/16-20-4	YEL	264	31885	solder	TB1(3)	A650-PG-14(+)
320	L320-20	20	MIL-W-22759/16-20-4	YEL	264	31885	solder	TB1(3)	A650-PR-14(+)
321	NL321-20	20	MIL-W-22759/16-20-0	BLK	264	solder	31891	A650-PG-14(–)	W2(–)
322	NL322-20	20	MIL-W-22759/16-20-0	BLK	264	solder	31891	A650-PR-14(–)	W2(–)
323	NL323-20	20	MIL-W-22759/16-20-0	BLK	156	solder	31891	A500-14(–)	W2(–)
Pitot Heat Circuit									
330	H330A-18	18	MIL-W-22759/16-18-59	GRN/WHT	204	350689-2	200336-1	J8(1)	P2(4)
	H330B-18	18	MIL-W-22759/16-18-59	GRN/WHT	24	200333-1	31890	J2(4)	CB3
331	NH331-18	18	MIL-W-22759/16-18-0	BLK	240	350689-2	31891	J8(2)	W2(–)
332	H332-18	18	MIL-W-22759/16-18-59	GRN/WHT	18	31890	solder	CB3	DS10
333	NH333-18	18	MIL-W-22759/16-18-0	BLK	18	solder	31890	DS10	W4(–)

Audio Circuit

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
335	R335-22	22	MIL-W-22759/16-22-91	WHT/BRN	48	31890	solder	CB20	S26(2&5)
336	R336-22	22	MIL-W-22759/16-22-9	WHT	12	solder	solder	S26(3)	DS17, 18 & 19
337	NR337A-22	22	MIL-W-22759/16-22-9013	WHT/BLK-BRN-ORG	36	solder	205089-1	DS17	J3(36)
	NR337B-22	22	MIL-W-22759/16-22-9013	WHT/BLK-BRN-ORG	96	205090-1	solder	P3(36)	RST521(7)
338	NR338A-22	22	MIL-W-22759/16-22-9014	WHT/BLK-BRN-YEL	36	solder	205089-1	DS18	J3(37)
	NR338B-22	22	MIL-W-22759/16-22-9014	WHT/BLK-BRN-YEL	96	205090-1	solder	P3(37)	RST521(6)
339	NR339A-22	22	MIL-W-22759/16-22-9015	WHT/BLK-BRN-GRN	36	solder	205089-1	DS19	J3(38)
	NR339B-22	22	MIL-W-22759/16-22-9015	WHT/BLK-BRN-GRN	96	205090-1	solder	P3(38)	RST521(5)
340	R340A-22	22	MIL-W-22759/16-22-9148	WHT/BRN-YEL-GRA	36	solder	205089-1	S26(4&6)	J3(27)
	R340B-22	22	MIL-W-22759/16-22-9148	WHT/BRN-YEL-GRA	96	205090-1	solder	P3(27)	RST521(1)
341	R341A-22	22	MIL-W-22759/16-22-9138	WHT/BRN-ORG-GRA	36	31885	205089-1	TB3(7)	J3(40)
	R341B-22	22	MIL-W-22759/16-22-9138	WHT/BRN-ORG-GRA	96	205090-1	solder	P3(40)	RST521(4)
342	NR342-22	22	MIL-W-22759/16-22-0	BLK	48	solder	31891	RST-512(3)	W2(–)
343	R343-20	20	MIL-W-22759/16-20-9	WHT	36	31890	*****	CB15	COM 1(+)
344	NR344-20	20	MIL-W-22759/16-20-0	BLK	36	*****	31890	COM 1(–)	W4(–)
345	R345-22	22	MIL-W-22759/16-22-4	YEL	36	*****	31885	COM 1(dimmer)	TB2(6)
346	R346-20	20	MIL-W-22759/16-20-9	WHT	36	31890	*****	CB15	NAV 1(+)
347	NR347-20	20	MIL-W-22759/16-20-0	BLK	36	*****	31890	NAV 1(–)	W4(–)
348	R348-22	22	MIL-W-22759/16-22-4	YEL	36	*****	31885	NAV 1(dimmer)	TB2(7)
349	R349-20	20	MIL-W-22759/16-20-9	WHT	36	*****	31890	COM 2(+)	CB16
350	NR350-20	20	MIL-W-22759/16-20-0	BLK	36	*****	31890	COM 2(–)	W4(–)
351	R351-22	22	MIL-W-22759/16-22-9	WHT	36	solder	31885	S14(3)	TB3(3)
352	R352-22	22	MIL-W-22759/16-22-9	WHT	36	solder	31885	S15(3)	TB3(4)
353	R353-22	22	MIL-W-22759/16-22-9	WHT	36	solder	31885	S16(3)	TB3(5)
354	R354-22	22	MIL-W-22759/16-22-9	WHT	36	solder	31885	S17(3)	TB3(6)
355	R355-22	22	MIL-W-22759/16-22-9	WHT	36	solder	31885	S18(3)	TB3(7)
356	R356-22	22	MIL-W-22759/16-22-9	WHT	36	solder	31885	S19(3)	TB3(8)
357	R357-22	22	MIL-W-22759/16-22-9	WHT	36	solder	31885	S20(3)	TB3(9)
358	R358-22	22	MIL-C-27500-22TE1T14	WHT	36	*****	solder	COM 1(mic audio)	S13(3)
359	R359-22	22	MIL-W-22759/16-22-9	WHT	36	*****	31885	COM 1(audio)	TB3(3)
360	R360-22	22	MIL-W-22759/16-22-9	WHT	36	*****	solder	COM 1(mic key)	S13(6)
361	R361-22	22	MIL-W-22759/16-22-9	WHT	36	*****	31885	NAV 1(audio)	TB3(5)
362	R362-22	22	MIL-C-27500-22TE1T14	WHT	36	*****	solder	COM 2(mic audio)	S13(1)
363	R363-22	22	MIL-W-22759/16-22-9	WHT	36	*****	31885	COM 2(audio)	TB3(4)
364	R364-22	22	MIL-W-22759/16-22-9	WHT	36	*****	solder	COM 2(mic key)	S13(4)
365	R365-22	22	MIL-W-22759/16-22-9	WHT	36	*****	31885	NAV 2(audio)	TB3(6)

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
366	R366-22	22	MIL-W-22759/16-22-9	WHT	36	*****	31885	ADF(audio)	TB3(8)
367	R367-22	22	MIL-C-27500-22TE1T14	WHT	48	solder	solder	S13(2)	S24(1)
368	R368-22	22	MIL-C-27500-22TE1T14	WHT	48	solder	*****	S13(2)	Isocom(F)
369	R369-22	22	MIL-W-22759/16-22-9	WHT	48	solder	solder	S13(5)	S24(4)
370	R370-22	22	MIL-W-22759/16-22-9	WHT	48	solder	*****	S13(5)	Isocom(7)
371	R371-22	22	MIL-W-22759/16-22-9	WHT	12	solder	*****	S24(6)	Isocom(6)
372	R372-22	22	MIL-C-27500-22TE1T14	WHT	12	solder	*****	S24(3)	Isocom(E)
373	R373-22	22	MIL-C-27500-22TE1T14	WHT	60	solder	solder	S24(2)	J11(2)
374	R374-22	22	MIL-W-22759/16-22-9	WHT	60	solder	solder	S24(5)	J11(1)
375	R375A-22	22	MIL-W-22759/16-22-9145	WHT/BRN-YEL-GRN	108	350690-2	205090-1	P10(1)	P3(32)
	R375B-22	22	MIL-W-22759/16-22-9145	WHT/BRN-YEL-GRN	36	205089-1	solder	J3(32)	J11(1)
376	NR376-22	22	MIL-W-22759/16-22-0	BLK	108	350690-2	31891	P10(2)	W2(–)
377	R377A-22	22	MIL-W-22759/16-22-9	WHT	48	solder	solder	J13(1)	J14(1)
	R377B-22	22	MIL-W-22759/16-22-9	WHT	24	solder	solder	J14(1)	S25(2)
378	R378-22	22	MIL-W-22759/16-22-9	WHT	48	solder	solder	S25(1)	Phone Bus
379	R379-22	22	MIL-W-22759/16-22-9	WHT	12	solder	*****	S25(3)	Isocom(J)
380	R380A-22	22	MIL-W-22759/16-22-9146	WHT/BRN-YEL-BLU	108	350690-2	205090-1	P9(1)	P3(33)
	R380B-22	22	MIL-W-22759/16-22-9146	WHT/BRN-YEL-BLU	36	205089-1	solder	J3(33)	J12(1)
	R380C-22	22	MIL-W-22759/16-22-9	WHT	24	solder	*****	J12(1)	Isocom(8)
381	NR381-22	22	MIL-W-22759/16-22-0	BLK	108	350690-2	31891	P9(2)	W2(–)
382	R382-22	22	MIL-C-27500-22TE1T14	WHT	24	solder	*****	J12(2)	Isocom(H)
383	R383-22	22	MIL-W-22759/16-22-9	WHT	24	31890	*****	CB19	Isocom(I)
384	NR384-22	22	MIL-W-22759/16-22-0	BLK	24	*****	31890	Isocom(D)	W4(–)
385	NR385-22	22	MIL-W-22759/16-22-0	BLK	24	*****	31890	Isocom(A)	W4(–)
386	R386-22	22	MIL-W-22759/16-22-9	WHT	24	*****	solder	Isocom(B)	S25(1)
387	R387-22	22	MIL-W-22759/16-22-4	YEL	36	31885	*****	TB2(6)	Isocom(C)
388	R388A-22	22	MIL-W-22759/16-22-9147	WHT/BRN-YEL-VIO	96	*****	205090-1	Encoder(+)	P3(26)
	R388B-22	22	MIL-W-22759/16-22-9147	WHT/BRN-YEL-VIO	36	205089-1	31890	J3(26)	CB17
389	NR389-22	22	MIL-W-22759/16-22-0	BLK	48	*****	31891	Encoder(–)	W2(–)
391	NR391-16	16	MIL-W-22759/16-16-0	BLK	48	*****	31902	DME(–)	W4(–)
392	R392-22	22	MIL-W-22759/16-22-4	YEL	36	*****	31885	COM 2(dimmer)	TB2(7)
393	R393-20	20	MIL-W-22759/16-20-9	WHT	36	31890	*****	CB16	NAV 2(+)
394	NR394-20	20	MIL-W-22759/16-20-0	BLK	36	*****	31890	NAV 2(–)	W4(–)
395	R395-22	22	MIL-W-22759/16-22-4	YEL	36	*****	31885	NAV 2(dimmer)	TB2(7)
396	R396-22	22	MIL-W-22759/16-22-9	WHT	36	31890	*****	CB18	ADF(+)
397	NR397-22	22	MIL-W-22759/16-22-0	BLK	36	*****	31890	ADF(–)	W4(–)
398	R398-22	22	MIL-W-22759/16-22-4	YEL	36	*****	31885	ADF(dimmer)	TB2(7)
399	R399-22	22	MIL-W-22759/16-22-9	WHT	36	31890	*****	CB17	TPX(+)

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
400	NR400-22	22	MIL-W-22759/16-22-0	BLK	36	*****	31890	TPX(–)	W4(–)
401	R401-22	22	MIL-W-22759/16-22-4	YEL	36	*****	31885	TPX(dimmer)	TB2(7)
402	R402A-16	16	MIL-W-22759/16-16-9345	WHT/ORG-YEL-GRN	36	31902	200333-1	CB18	J2(9)
	R402B-16	16	MIL-W-22759/16-16-9345	WHT/ORG-YEL-GRN	96	200336-1	*****	P2(9)	DME(+)
403	R403A-18	18	MIL-W-22759/16-18-9346	WHT/ORG-YEL-BLU	36		200333-1		J2(10)
	R403B-18	18	MIL-W-22759/16-18-9346	WHT/ORG-YEL-BLU	96	200336-1		P2(10)	
404	R404A-18	18	MIL-W-22759/16-18-9347	WHT/ORG-YEL-VIO	36		200333-1		J2(11)
	R404B-18	18	MIL-W-22759/16-18-9347	WHT/ORG-YEL-VIO	96	200336-1		P2(11)	
405	R405A-18	18	MIL-W-22759/16-18-9348	WHT/ORG-YEL-GRA	36		200333-1		J2(12)
	R405B-18	18	MIL-W-22759/16-18-9348	WHT/ORG-YEL-GRA	96	200336-1		P2(12)	
406	R406A-18	18	MIL-W-22759/16-18-9356	WHT/ORG-GRN-BLU	36		200333-1		J2(13)
	R406B-18	18	MIL-W-22759/16-18-9356	WHT/ORG-GRN-BLU	96	200336-1		P2(13)	
407	R407A-18	18	MIL-W-22759/16-18-9357	WHT/ORG-GRN-VIO	36		200333-1		J2(14)
	R407B-18	18	MIL-W-22759/16-18-9357	WHT/ORG-GRN-VIO	96	200336-1		P2(14)	
408	R408A-22	22	MIL-C-27500-22TE1T14(9358)	WHT/ORG-GRN-GRA	36		205089-1		J3(2)
	R408B-22	22	MIL-C-27500-22TE1T14(9358)	WHT/ORG-GRN-GRA	96	205090-1		P3(2)	
409	R409A-22	22	MIL-C-27500-22TE1T14(9367)	WHT/ORG-BLU-VIO	36		205089-1		J3(39)
	R409B-22	22	MIL-C-27500-22TE1T14(9367)	WHT/ORG-BLU-VIO	96	205090-1		P3(39)	
410	R410A-22	22	MIL-C-27500-22TE1T14(9368)	WHT/ORG-BLU-GRA	36		205089-1		J3(45)
	R410B-22	22	MIL-C-27500-22TE1T14(9368)	WHT/ORG-BLU-GRA	96	205090-1		P3(45)	
411	R411A-22	22	MIL-C-27500-22TE1T14(9378)	WHT/ORG-VIO-GRA	36		205089-1		J3(46)
	R411B-22	22	MIL-C-27500-22TE1T14(9378)	WHT/ORG-VIO-GRA	96	205090-1		P3(46)	
412	R412A-22	22	MIL-C-27500-22TE1T14(9456)	WHT/YEL-GRN-BLU	36		205089-1		J3(51)
	R412B-22	22	MIL-C-27500-22TE1T14(9456)	WHT/YEL-GRN-BLU	96	205090-1		P3(51)	
413	R413A-22	22	MIL-C-27500-22TE1T14(9457)	WHT/YEL-GRN-VIO	36		205089-1		J3(52)
	R413B-22	22	MIL-C-27500-22TE1T14(9457)	WHT/YEL-GRN-VIO	96	205090-1		P3(52)	
414	R414A-22	22	MIL-C-27500-22TE1T14(9458)	WHT/YEL-GRN-GRA	36		205089-1		J3(53)
	R414B-22	22	MIL-C-27500-22TE1T14(9458)	WHT/YEL-GRN-GRA	96	205090-1		P3(53)	
415	R415A-22	22	MIL-W-22759/16-22-9235	WHT/RED-ORG-GRN	36		205089-1		J3(54)
	R415B-22	22	MIL-W-22759/16-22-9235	WHT/RED-ORG-GRN	96	205090-1		P3(54)	
416	R416A-22	22	MIL-W-22759/16-22-9236	WHT/RED-ORG-BLU	36		205089-1		J3(55)
	R416B-22	22	MIL-W-22759/16-22-9236	WHT/RED-ORG-BLU	96	205090-1		P3(55)	
417	R417A-22	22	MIL-W-22759/16-22-9237	WHT/RED-ORG-VIO	36		205089-1		J3(56)
	R417B-22	22	MIL-W-22759/16-22-9237	WHT/RED-ORG-VIO	96	205090-1		P3(56)	
418	R418A-22	22	MIL-W-22759/16-22-9238	WHT/RED-ORG-GRA	36		205089-1		J3(57)
	R418B-22	22	MIL-W-22759/16-22-9238	WHT/RED-ORG-GRA	96	205090-1		P3(57)	
419	R419A-22	22	MIL-W-22759/16-22-9245	WHT/RED-YEL-GRN	36		205089-1		J3(58)
	R419B-22	22	MIL-W-22759/16-22-9245	WHT/RED-YEL-GRN	96	205090-1		P3(58)	

No.	Code	AWG	Specification	Color/Stripe	Lgth (In)	Connector Term A	Connector Term B	From Term A	To Term B
420	R420A-22	22	MIL-W-22759/16-22-9246	WHT/RED-YEL-BLU	36		205089-1		J3(59)
	R420B-22	22	MIL-W-22759/16-22-9246	WHT/RED-YEL-BLU	96	205090-1		P3(59)	
421	R421A-22	22	MIL-W-22759/16-22-9247	WHT/RED-YEL-VIO	36		205089-1		J3(60)
	R421B-22	22	MIL-W-22759/16-22-9247	WHT/RED-YEL-VIO	96	205090-1		P3(60)	
422	R422A-22	22	MIL-W-22759/16-22-9248	WHT/RED-YEL-GRA	36		205089-1		J3(61)
	R422B-22	22	MIL-W-22759/16-22-9248	WHT/RED-YEL-GRA	96	205090-1		P3(61)	
423	R423A-22	22	MIL-W-22759/16-22-9256	WHT/RED-GRN-BLU	36		205089-1		J3(62)
	R423B-22	22	MIL-W-22759/16-22-9256	WHT/RED-GRN-BLU	96	205090-1		P3(62)	
424	R424A-22	22	MIL-W-22759/16-22-9257	WHT/RED-GRN-VIO	36		205089-1		J3(63)
	R424B-22	22	MIL-W-22759/16-22-9257	WHT/RED-GRN-VIO	96	205090-1		P3(63)	

Appendix B
Wire Color Code Chart

NO.	COLOR/STRIPE	WIRE NO.
0	BLK	All ground wires to ground bus
1	BRN	
2	RED	129, 130
3	ORG	
4	YEL	Lighting wires (panel) & Nav light
5	GRN	211
6	BLU	212
7	VIO	109, 110
8	GRA	
9	WHT	Many short wires
24	RED/YEL	194, 196
29	RED/WHT	150, 152, 188
39	ORG/WHT	225, 226, 239, 241, 245
41	YEL/BRN	117, 219, 218A
42	YEL/RED	250, 251
45	YEL/GRN	255
46	YEL/BLU	275
47	YEL/VIO	270, 271
48	YEL/GRA	235, 236
52	GRN/RED	136
54	GRN/YEL	118
56	GRN/BLU	220A, 228
59	GRN/WHT	330, 332
62	BLU/RED	231, 146
64	BLU/YEL	159, 161, 164, 221
69	BLU/WHT	310, 311, 313
79	VIO/WHT	230, 147
91	WHT/BRN	335, 148
92	WHT/RED	185, 240
95	WHT/GRN	227B, 149
96	WHT/BLU	186, 227A
4123	YEL/BRN-RED-ORG	111
4125	YEL/BRN-RED-GRN	217
4126	YEL/BRN-RED-BLU	218B
4127	YEL/BRN-RED-VIO	162
4128	YEL/BRN-RED-GRA	176
4135	YEL/BRN-ORG-GRN	190, 192
4136	YEL/BRN-ORG-BLU	169
4137	YEL/BRN-ORG-VIO	222
4138	YEL/BRN-ORG-GRA	155
4158	YEL/BRN-GRN-GRA	224
4235	YEL/RED-ORG-GRN	126
4236	YEL/RED-ORG-BLU	177
4256	YEL/RED-GRN-BLU	160
4257	YEL/RED-GRN-VIO	154
4158	YEL/RED-GRN-GRA	281
4267	YEL/RED-BLU-VIO	153
4356	YEL/ORG-GRN-BLU	223
4357	YEL/ORG-GRN-VIO	252
4358	YEL/ORG-GRN-GRA	183
4368	YEL/ORG-BLU-GRA	300, 302
4567	YEL/GRN-BLU-VIO	112

NO.	COLOR/STRIPE	WIRE NO.
4578	YEL/GRN-VIO-GRA	151
9012	WHT/BLK-BRN-RED	104
9013	WHT/BLK-BRN-ORG	337
9014	WHT/BLK-BRN-YEL	338
9015	WHT/BLK-BRN-GRN	339
9016	WHT/BLK-BRN-BLU	287
9017	WHT/BLK-BRN-VIO	289
9018	WHT/BLK-BRN-GRA	181
9023	WHT/BLK-RED-ORG	124
9024	WHT/BLK-RED-YEL	125
9123	WHT/BRN-RED-ORG	127
9124	WHT/BRN-RED-YEL	115
9125	WHT/BRN-RED-GRN	106
9126	WHT/BRN-RED-BLU	105
9127	WHT/BRN-RED-VIO	123
9128	WHT/BRN-RED-GRA	216
9134	WHT/BRN-ORG-YEL	220B, 220C
9135	WHT/BRN-ORG-GRN	215
9136	WHT/BRN-ORG-BLU	214
9137	WHT/BRN-ORG-VIO	242
9138	WHT/BRN-ORG-GRA	241
9145	WHT/BRN-YEL-GRN	375
9146	WHT/BRN-YEL-BLU	380
9147	WHT/BRN-YEL-VIO	388
9148	WHT/BRN-YEL-GRA	340
9156	WHT/BRN-GRN-BLU	315
9157	WHT/BRN-GRN-VIO	158
9158	WHT/BRN-GRN-GRA	165
9167	WHT/BRN-BLU-VIO	290
9168	WHT/BRN-BLU-GRA	288
9178	WHT/BRN-VIO-GRA	179
9234	WHT/RED-ORG-YEL	184
9235	WHT/RED-ORG-GRN	415
9236	WHT/RED-ORG-BLU	416
9237	WHT/RED-ORG-VIO	417
9238	WHT/RED-ORG-GRA	418
9245	WHT/RED-YEL-GRN	419
9246	WHT/RED-YEL-BLU	420
9247	WHT/RED-YEL-VIO	421
9248	WHT/RED-YEL-GRA	422
9256	WHT/RED-GRN-BLU	423
9257	WHT/RED-GRN-VIO	424
9258	WHT/RED-GRN-GRA	120
9267	WHT/RED-BLU-VIO	201, 203
9268	WHT/RED-BLU-GRA	204
9278	WHT/RED-VIO-GRA	210
9345	WHT/ORG-YEL-GRN	402
9356	WHT/ORG-YEL-BLU	403
9347	WHT/ORG-YEL-VIO	404
9348	WHT/ORG-YEL-GRA	405
9356	WHT/ORG-GRN-BLU	406
9357	WHT/ORG-GRN-VIO	407
9358	WHT/ORG-GRN-GRA	408
9367	WHT/ORG-BLU-VIO	409
9368	WHT/ORG-BLU-GRA	410
9378	WHT/ORG-VIO-GRA	411

NO.	COLOR/STRIPE	WIRE NO.
9456	WHT/YEL-GRN-BLU	412
9457	WHT/YEL-GRN-VIO	413
9458	WHT/YEL-GRN-GRA	414

Appendix C
Revisions

Revision A38a, July 10, 1983
(1) Note 3. After "to W4" add: "attach E181B-22 to F7".

Revision A38B, April 10, 1986
The wires to the ammeter are apparently reversed, thus showing a charge when it should show a discharge. Therefore
(1) Change P105C-22 to connect to P/N 116-61(B+).
(2) Change P106C-22 to connect to P/N 116-61(B–).

Revision A38C, August 20, 1986
Potter & Brumfield circuit breakers shown are no longer manufactured. Replacements and future kits will have the following:

CB1	Potter & Brumfield W23X1A1G-7.5
CB2	Potter & Brumfield W31X2A1G-10
CB3	Potter & Brumfield W31X2A1G-10
CB4	Potter & Brumfield W31X2A1G-5
CB5	Potter & Brumfield W31X2A1G-10
CB6	Potter & Brumfield W31X2A1G-7.5
CB7	Potter & Brumfield W31X2A1G-10
CB8	Potter & Brumfield W23X1A1G-15 (or W23X1A1G-20 per Revision A39d)
CB9	Potter & Brumfield W23X1A1G-5
CB10	Potter & Brumfield W23X1A1G-15
CB11	Potter & Brumfield W23X1A1G-5
CB12	Potter & Brumfield W23X1A1G-5
CB13	Potter & Brumfield W23X1A1G-5
CB14	Potter & Brumfield W23X1A1G-5
CB15	Potter & Brumfield W23X1A1G-7.5
CB16	Potter & Brumfield W23X1A1G-7.5
CB17	Potter & Brumfield W23X1A1G-5
CB18	Potter & Brumfield W23X1A1G-5
CB19	Potter & Brumfield W23X1A1G-2
CB20	Potter & Brumfield W23X1A1G-2
CB21	Potter & Brumfield W23X1A1G-7.5

Revision A39d, August 20, 1986
(1) New drawing issued.

Revision A40a, July 10, 1983
(1) Label 150 ohm, 1 watt resistor as "R8" at S26 marker beacon switch.

Revision A40b, April 10, 1986
(1) The wires for the two intercom bypass switches are reversed. As a result, the system will be in "bypass" when the switch is in the "normal" position, and vice versa. If already wired, the simplest solution is to turn the switches over so that the tap is on the top of the switch. If not wired, then the wiring should be reversed, that is the wires to the upper poles put on the bottom, and vice versa. Note that the center poles are the common poles and are not affected.

Revision A41a, July 10, 1983
(1) Circuit No. 116-12. Change NL252C-22 to L252C-22.

Revision A41b, April 10, 1986
(1) No. 116-4 Turn & Bank Circuit. F196-22 is supplied as 20AWG wire in kit (same as F194-20).

Revision A42a, January 3, 1984
(1) Late model Silver Fuelgards are supplied with slightly different wiring. Pin numbers and wire colors are as follows:

1	WHT/BLU	to CB19
	WHT/VIO	Tie off (for 24 volt systems)
3	WHT/BLK	to W4(–)
4	WHT	to J3(35)
8	WHT/RED	to J3(34)
5	RED	to Battery(+)
7	BLK	to Battery(–)

(There are two diodes contained in the plug on the back of the Fuelgard for the voltage supply line. A 5.1 volt 1N5338 zener diode is used for the 12 volt wire to CB19.)

Revision A42b, April 10, 1986
(1) No. 116-15 Autopilot Circuit. At servo change to: see Drawing No. 202.
(2) No. 116-15 Autopilot Circuit. F196-22 is supplied as 20AWG wire in kit (same as F194-20).
(3) No. 116-15 Autopilot Circuit. The wires for the autopilot servo are possibly reversed. As such, the autopilot will attempt the turn the airplane to the left when it should be turning to the right, and vice versa. Reverse the wires at the servo as necessary.
(4) No. 116-17 Spare Wires. At J2(8), change P126B-18 to P126A-18. At P2(8), change P126A-18 to P126B-18. At J3(56) change R416A-22 to R417A-22. At P3(41), change E181B-22 to NE181B-22. At J3(41), change E181A-22 to NE181A-22.

Revision A42c, May 4, 2010
In Drawing No. 116-13 Instrument Circuit, the Oil Pressure gauge and sender are now completely different. On the gauge, connect E153B-22 to the SEND terminal. The pressure transducer is now a simpler sender device with a single screw terminal. Connect E153A-22 to this terminal. The sender is grounded to the engine with the metal hose, but it may also be grounded with a separate wire. Wire E169A and B now become spare wires.

Revision A43a, July 10, 1983
(1) Detail B. Change “ream receptacle .169”dia” to “tap receptacle 8-32”
(2) Detail C. Change “ream receptacle .169”dia” to “tap receptacle 8-32”
(3) Detail D. Change “ream receptacle .169”dia” to “tap receptacle 8-32”
(4) Detail E. Change “ream receptacle .169”dia” to “tap receptacle 8-32”
(5) Detail F. Change AN525-832R8 to MS16997-32.

Revision A43b, April 10, 1986
(1) Detail G. Change AN906-8 to AN960-8.

Revision A44a, July 10, 1983
(1) Detail V. The base and emitter are shown incorrectly. Change “B (base) upper terminal” to “E (emitter) upper terminal”. Change “E (emitter) lower terminal” to “B (base) lower terminal”.
(2) Detail V, Note. Eliminate “This is not essential, but it is a good idea.”