

Super Clock

SC-5

Installation Instructions

D-Sub II 1105963 Rev. C***

You must read this manual before installing or operating the instrument. This manual contains warranty and other information that may affect your decision to install this product and/or the safety of your aircraft.



S/N: _____



Electronics International Inc.

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SC-5 Important Safety Notice

MUST READ

If you think it is not important to read this manual, you're wrong! This manual contains important information that may affect the safety of your aircraft.

Read the Warranty / Agreement. There is information in the Warranty / Agreement that may alter your decision to install this product. **If you do not accept the terms of the Warranty / Agreement, do not install this product.** This product may be returned for a refund. Contact Electronics International inc. for details.

It is possible for any instrument to fail thereby displaying inaccurate high, low or jumpy readings. Therefore, you must be able to recognize an instrument failure and you must be proficient in operating your aircraft safely in spite of an instrument failure. If you do not have this knowledge, contact the FAA or a local flight instructor for training.

The pilot **must** understand the operation of this product before flying the aircraft. Do not allow anyone to operate the aircraft that does not know the operation of this product.

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Warranty / Agreement

Electronics International Inc. warrants this instrument and system components to be free from defects in materials and workmanship for a period of one year from the user invoice date. Electronics International Inc. will repair or replace any item covered under the terms of this Warranty provided the item is returned to the factory prepaid.

1. This Warranty shall not apply to any product that has been repaired or altered by any person other than Electronics International Inc., or that has been subjected to misuse, accident, incorrect wiring, negligence, improper or unprofessional assembly or improper installation by any person. **This warranty does not cover any reimbursement for any person's time for installation, removal, assembly or repair.** Electronics International retains the right to determine the reason or cause for warranty repair.
2. This warranty does not extend to any machine, vehicle, boat, aircraft or any other device to which the Electronics International Inc. product may be connected, attached, interconnected or used in conjunction with in any way.
3. The obligation assumed by Electronics International Inc. under this warranty is limited to repair, replacement or refund of the product, at the sole discretion of Electronics International Inc.
4. Electronics International Inc. is not liable for expenses incurred by the customer or installer due to factory updates, modifications, improvements, upgrades, changes, or any other alterations to the product that may affect the form, fit, function or operation of the product.
5. Personal injury or property damage do to misinterpretation or lack of understanding this product is solely the pilots responsibility. The pilot **must** understand the operation of this product before flying the aircraft. Do not allow anyone to operate the aircraft that does not know the operation of this product. Keep the Operating Manual in the aircraft at all times.
6. E. I. Inc. is not responsible for shipping charges or damages incurred under this Warranty.
7. No representative is authorized to assume any other liability for Electronics International Inc. in connection with the sale of Electronics International Inc. products.
8. **If you do not agree to and accept the terms of this warranty, you may return the product for a refund.**

This Warranty is made only to the original user. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OR OBLIGATIONS: EXPRESS OR IMPLIED. MANUFACTURER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. PURCHASER AGREES THAT IN NO EVENT SHALL MANUFACTURER BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS OR LOSS OF USE OR OTHER ECONOMIC LOSS. EXCEPT AS EXPRESSLY PROVIDED HEREIN, MANUFACTURER DISCLAIMS ALL OTHER LIABILITY TO PURCHASER OR ANY OTHER PERSON IN CONNECTION WITH THE USE OR PERFORMANCE OF MANUFACTURER'S PRODUCTS, INCLUDING SPECIFICALLY LIABILITY IN TORT.**

1.0 Installation Instructions

1.1 Important Information and Initial Check Out:

- A. **The installer and aircraft owner must read the Warranty before starting the installation.** There is information in the Warranty that may alter your decision to install this instrument. **If you do not accept the terms of the Warranty, do not install this instrument.**
- B. **If you are not an FAA Certified Aircraft Mechanic familiar with the issues of installing aircraft Clocks, Do Not attempt to install this instrument. The installer should use current aircraft standards and practices to install this instrument (refer to AC 43.13-2A).**
- C. **The FAA considers the installation of clocks to be a minor alteration. A letter from the FAA to this effect is located at the back of this manual.** Installation of the SC-5 can be accomplished utilizing FAA acceptable methods, techniques and practices covered under AC 43.13-2A. This is a requirement under FAR Part 1 to qualify as a minor alteration. The SC-5 does not "appreciably" effect weight and balance or electrical load as described in FAR Part 1 and FAR 43 Appendix A. The SC-5 meet the FAA requirements for a clock. Also, they meet the environmental requirements of DO-160B. If the installer determines the installation is a minor alteration, he must say so in the log book. Example: **"4/1/98 Installed Electronics International's SC-5 as a minor alteration. This instrument was installed in accordance with Installation Instructions II 1105963 and AC 43.13-2A."** If the installer determines the installation is a major alteration, a 337 field approval will be required. A minor alteration does not require a 337. **Resolve any FAA approval issues you may have before starting the installation.**
- D. **Before starting installation, read the entire Installation Instructions and resolve any installation, operating and performance issues you may have before starting the installation.**
- E. **THIS INSTALLATION MAY REQUIRE SOME PARTS UNIQUE TO YOUR AIRCRAFT THAT ARE NOT SUPPLIED IN THE KIT.** Read the Installation Instructions and acquire all the parts necessary to install this instrument **before starting the installation.**
- F. **Before starting the installation** make sure the unit will fit in the intended installation location without obstructing the operation of any controls.
- G. If this instrument is to replace an existing unit in the aircraft, it is the installer's responsibility to move or replace any existing instruments or components in accordance with FAA approved methods and procedures. The following Installation Instructions do not cover moving or the removal of any existing instruments or components.

1.2 Install the Instrument in the Panel:

The SC-5 fits in a 2 1/4" standard instrument hole. If the instrument is to be installed in a 3 1/8" hole, a brushed aluminum black anodized adaptor plate (A-102) is available from Electronics International Inc.

Install the instrument from behind the instrument panel using 6 x 32 screws. Make sure the instrument and wires do not obstruct the operation of any controls.

1.3 Install the D-Sub Connector:

Starting from under the instrument panel, route the connector's wire harness up to the instrument. Connect the wire harness to the instrument. Tie wrap the wire harness in place. **Be sure these wires do not obstruct the freedom of travel of any controls.**

1.4 Connect the Power and Ground Wires:

Do not hook this instrument up to constant power. The instrument has an internal 15+ year lithium battery to keep time. In the wire harness, the red and black 3' wires are used for instrument power and ground (see the Wiring Diagram at the back of this manual). Route the 3' red wire in the harness to the aircraft's 12 or 24-volt main or emergency bus as applicable via an independent circuit breaker (five amps or less). An alternate method would be to route the red lead to the bus via a one amp in-line fuse. **With this method a spare fuse must be kept in the aircraft.** Route the 3' black wire in the harness to a good ground. **Tie wrap these wires so they do not obstruct the freedom of travel of any controls.**

1.5 Connect the Backlight and LED Control Dimming Wires:

Connect the backlight wires as follows:

- A. You can wire the digital display backlight to turn on whenever the instrument is powered up. Alternatively, for night operation, you can connect the appropriate line to a rheostat or to Electronics International's LED Intensity Control Pot (CP-1) for adjustable brightness.
 - 1) For a 12-volt system connect the white wire labeled 12V BK LT to the bus or rheostat and connect the white wire labeled 24V BK LT to ground (see Wiring Diagram).
 - 2) For a 24-volt system leave the white wire labeled 12V BK LT open and connect the white wire labeled 24V BK LT to the bus or rheostat (see Wiring Diagram).

Connect the LED control dimming wires as follows:

- A. Connect the white wire labeled DIM to the panel light rheostat. For a 24-volt system, install the 1K Ohm resistor in series with the white labeled DIM wire. This wire will dim the green Display Mode Indicator LEDs for night operation when the panel lights are turned on. If this line is left open, the Display Mode Indicator LEDs will remain at full intensity at all times. Also, if the voltage on this line drops below 11.5 volts, the analog LED's will be displayed at full intensity. **Tie wrap all wires so they do not obstruct the freedom of travel of any controls.**
- B. An alternate installation method is to connect the white wire labeled DIM to Electronics International's LED Intensity Control Pot (CP-1). The CP-1 can be connected to any E.I. instrument to provide linear control of the green Display Mode Indicator LEDs for night operation or low ambient light conditions. Be sure to install the 1K ohm resistor in series with the white wire labeled DIM for a 24-volt system.

1.6 (Optional) External Warning Control Line:

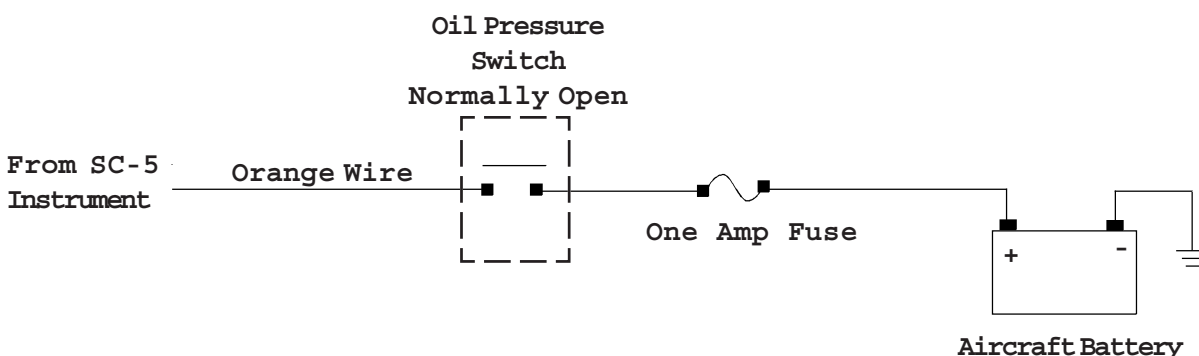
The white wire labeled EXT WARN can be connected to an external light (AL-1), buzzer (ATG-1). This wire grounds when the yellow warning light is on. The current in this line must be limited to 2/10 of an amp maximum. Exceeding this limit will damage the unit. If this feature is not used, leave this line open. **Tie wrap this wire so it does not obstruct the freedom of travel of any controls.**

1.7 24 Volt Engine Timer Control Line:

If this line is left open, the SC-5 Engine Timer will run when the aircraft bus voltage rises to 13 volts or higher. If this line is grounded, the SC-5 Engine Timer will run when the aircraft bus voltage rises to 26 volts or higher. Connect the white wire labeled 24V ETS to ground for a 24-volt system. Leave the white wire labeled 24V ETS open for a 12-volt system.

1.8 (Optional) Engine Timer Start Line:

The SC-5 can be used to bill time for aircraft rental. The SC-5 can be setup to run the Engine Timer even if the Master Switch is turned off and/or the alternator / generator breaker is pulled.



Connect the SC-5 Engine Timer Start Line (orange wire) to the battery via an oil pressure switch and one amp fuse as shown below. This wire can be lengthened using 20 ga. (or larger) copper wire.

1.9 SC-5 System Check-out:

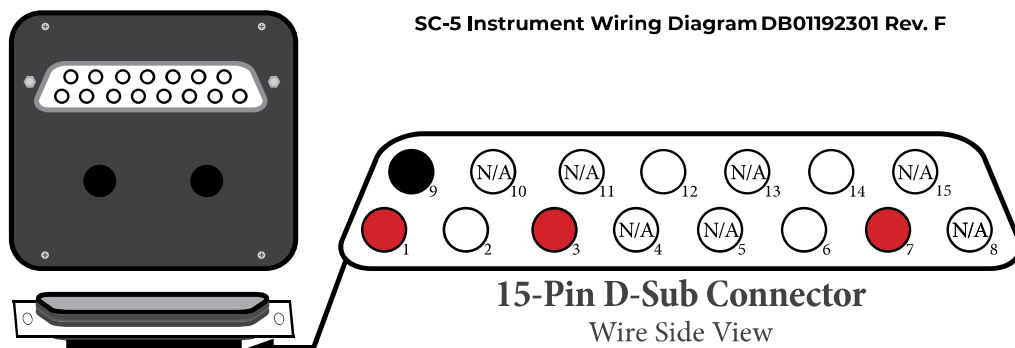
Check the SC-5 instrument operation as follows:

- A. Turn the aircraft master switch on and verify that the yellow Warning LEDs on the SC-5 flash and the "LOCAL" Clock green Display Mode LED is lit. A problem at this step could be caused by poor connections on the red or black power and ground leads.
- B. Push the instrument "STEP" switch to display "ENGINE TIME". The "/Hr" in the upper right corner of the LCD display should **NOT** be blinking. A problem at this step could be caused by a poor connection on the 24-Volt Engine Timer Control Line (white wire labeled 24V ETS).
- C. Start the aircraft engine, set the SC-5 to display "ENGINE TIME" and check that the "/Hr" in the upper right corner of the LCD display is blinking. Press "RESET" to view 10th and 100th hour. A problem at this step could be caused by a poor connection on the 24-Volt Engine Timer Control Line (white wire labeled 24V ETS).

SC-5

Instrument Wiring Diagram

SC-5 Instrument Wiring Diagram DB01192301 Rev. F



15-Pin D-Sub Connector

Wire Side View

Pin 1 (Red - 20ga): Power Lead

3'

BREAKER

Connects to 12- or 24-Volt Bus via 1-amp fuse.
Do NOT connect the instrument to constant power.

Pin 9 (Black - 20ga): Ground Lead

3'

GROUND

Connects to ground.

Pin 2 (White - 20ga): 24V Engine Timer

3'

24V ETS

Connects to ground for a 24-volt system. Leave open for a 12-volt system.

Pin 3 (Red - 20ga): Engine Timer Starter

3'

ETS

Can be connected to the battery via an oil pressure switch and a 1-amp fuse (see manual).

Pin 12 (White - 20ga): External Warning

3'

EXT WARN

Can be connected to a relay to control an external light, buzzer, etc. Grounds when either yellow caution light is on. Current must be limited to a maximum of 2/10 amp.

Pin 6 (White - 20ga): 12V Backlight Control Line

3'

12V BK LT

Backlight control line. Connects to 12-volt bus. 12 volts turn on the digital display backlight. Leave open for a 24-volt system.

Pin 14 (White - 20ga): 24V Backlight Control Line

3'

24V BK LT

Backlight control line. Connects to 24-volt bus. 24 volts turn on the digital display backlight. Connect to ground for 12-volt system.

Pin 7 (Red - 20ga): LED Control Dimming Line

3'

DIM

Connects to panel light rheostat. 12- or 24- volts dim the display mode LEDs. Insert the VI-1K in series with this line for a 24-volt system.

SC-5 Specifications & Operating Features

Model:

SC-5 (Super Clock)

Case Dimensions:

2.5" x 2.5" x 2.7" depth, 2 1/4" Bezel.

Weight:

Unit Only - 7 Oz.

Environmental:

Meets DO-160C

Power Requirements:

7.5 to 35 Volts, 1/10 Amp.

Green Display Mode Indicator LEDs:

The intensity of these LEDs is controlled by the dimming wire. 12 or 24 volts on this wire will dim the LEDs for night operation.

Yellow "UP" Timer Warning LED:

The "UP" Timer Warning LED located over the digital display will "blink" when the "UP" Timer reaches the pilot programmed Recurring Alarm setting or a multiple of this setting. Push any button or switch to stop the blinking (acknowledge the alarm) and turn off the "UP" Timer Warning LED.

Yellow "DN" Timer Warning LED:

The "DN" Timer Warning LED located over the digital display will "blink" when the "DN" Timer reaches 0:00. Push any button or switch to stop the blinking and turn off the "DN" Timer Warning LED.

Digital Display:

LCD (viewable in direct sunlight), with 12 and 24-volt backlight control wires for night operation. Displays "88:88" on power up.

External Warning Control Line:

Grounds when any yellow Timer Warning LED is blinking. Current should be limited to 2/10 amp.

Maximum Displayed Range or Setting:

TIMER (displayed) ----- 00:00 to 17 hours, 59 minutes.
Recurring Alarm (setting) --- 00:00 to 99 minutes, 59 seconds.
Start Time (setting) ----- 0:00 to 99 minutes, 59 seconds.

Accuracy:

Local and Zulu Clock ----- +/- 2 minutes/month.
UP and Down Timer ----- +/- .005% plus +/- .5 second.
Engine Timer ----- +/- .005% plus +/- .5 second.

Resolution:

Local and Zulu Clock ----- 1 minute.

Up and Down Timer ----- 1 second (switches to 1 minute for readings over 59 minutes and 59 seconds).

Engine Timer ----- .01 Hours.

Engine Timer Start Voltage:

13 volts +/- .2 volts for a 12-volt system.

26 volts +/- .3 volts for a 24-volt system.

Pilot Programmable Modes:

		Display Modes				
	Power-up	Local Clock	Zulu Clock	UP Timer	Down Timer	Engine Time
Programming	Local Clock	12 or 24-Hour Format		Recurring Alarm	Start Time	
Modes	Zulu Clock					
Modes	Minutes Configuration					

FAA Letter



U.S. Department
of Transportation
**Federal Aviation
Administration**

**Transport Airplane Directorate
Aircraft Certification Service**

1601 Lind Avenue S.W.
Renton, Washington 98055-4056

NOV 18 1997

In Reply
Refer To: 97-190S-721

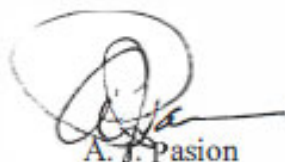
Mr. Ron Roberts
President
Electronics International, Inc.
12620 SW 231st Place
Hillsboro, OR 97123

Dear Mr. Roberts:

This is in regard to your letter and application for supplemental type certificate (STC), both dated November 11, 1997, for replacement clocks to be installed in small airplanes. We consider this change to be minor in accordance with Federal Aviation Regulation (FAR) 21.93(a). Accordingly, an STC is not required to install Electronics International clocks in non-transport category airplanes. Per FAR 21.95 copies of this letter may be given to installing mechanics as evidence that this installation is considered minor.

Since an STC is not required, we are returning your data submittal and application. If you have any questions regarding this matter please contact Mr. Jeff Morfitt of this office at (425) 227-2595.

Sincerely,



A. J. Pasion
Manager, Special Certification Branch
Seattle Aircraft Certification Office

Enclosures

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Providing Excellent Products and
Exceptional Customer Service Since 1979



Electronics
International Inc.