

LASAR[®]



SL1-96 (H)

FAA approval has been obtained on technical data in this publication that affects product type design.

Service Letter SL1-96, Rev H

SCOPE: *This service letter provides detailed instructions for upgrading engines and airframes from conventional magnetos to the LASAR[®] engine control system.*

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LOG OF REVISIONS

<u>Rev. No.</u>	<u>Description</u>	<u>Pages Revised</u>	<u>Date</u>
A	Various text changes to improve document clarity.	All	06/05/96
B	Add Dual Point CHT Probes	All	02/14/97
	Change from 20 amp to 10 amp Inline Fuse	All	
C	Revised LVCH Yellow Wire Termination	All	04/01/97
D	Added M-5430 Connector Lubricant. Added instructions for enunciator light and tachometer drive signal connections. Various text changes to improve document clarity.	All	06/20/97
E	Removed "Magnetos Affected" paragraph. Added clarification of enunciator light description and installation. Added placard to enunciator light assembly installation.	All	10/20/97
F	Because of numerous text and formatting changes to improve document clarity, a complete list of changes is not given, and identification of changes, additions, and deletions is not shown in the left-hand margin of each page.	All	01/01/00
	Important changes:		
	STC included as part of document.		
	Added statement to authorize installer to use STC and installation instructions contained in this document.		
	Deleted L-1501-SynchroLASAR® Operation Manual from "Required Service Literature".		
	Changed LASAR® system weight to "approximately 11.5 lbs." in "Weight Changes".		

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G	Added IO-540 and O-540 at 25 degrees to tables in Sections 2.0 and 3.0. Changed Figure 7 - Enunciator Light Assembly Wiring Diagram. Added STC dated 8/27/01 - pages 45-49	All	08/31/01
H	Added component weights. Various text changes to improve document clarity.	9	03/06/02 03/06/02

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To: Distributors, Dealers, Engine Overhaul Facilities, Owners and Operators of Piston Engine Powered Aircraft

Subject: Installation instructions for conversion from Slick and TCM/Bendix magnetos to a LASAR® ignition system.

Background Information:

1. General Description

Conventional impulse coupled and retard breaker Slick and TCM/Bendix ignition systems are approved on certain piston aircraft engines. While these systems have proven to be reliable and adequate for use as the primary ignition system on these engines, it is generally recognized that standard fixed timing magneto systems do not allow the engine to develop optimum performance.

The FAA-PMA approved LASAR® ignition system couples Slick magneto technology with a microprocessor based electronic ignition control to deliver optimum spark energy and timing advance to improve starting, general operation, and fuel efficiency. In the default back-up mode, the LASAR® system provides redundant magneto based ignition at standard fixed timing.

2. LASAR® Controller

The LASAR® controller senses various engine operating parameters and, using these inputs, automatically adjusts spark energy and timing advance based upon the Engine Personality Map (EPM) programmed within the microprocessor.

Determine if the LASAR® controller input power will be regulated at 12 volts or 24 volts, and if Cylinder Head Temperature (CHT) (refer to paragraph 5) will be used, then select the appropriate controller model from the following table.

Airframe Voltage	12 Volt System		24 Volt System	
	Non-CHT	CHT	Non-CHT	CHT
O and IO-320 Engine Series (25° Base Timing Angle)	LC1001-01	LC1011-01	LC1002-01	LC1012-01
IO-360 Engine Series (20° Base Timing Angle, 200 HP)	LC1001-02	LC1011-02	LC1002-02	LC1012-02
IO-360 Engine Series (25° Base Timing Angle, 180 HP)	LC1001-03	LC1011-03	LC1002-03	LC1012-03
O-360 Engine Series (25° Base Timing Angle)	LC1001-04	LC1011-04	LC1002-04	LC1012-04
O/IO-360 Engine Series (25° Base Timing Angle) 200 HP)	LC1001-14	LC1011-14	LC1002-14	LC1012-14
IO-540 Engine Series (20° Base Timing Angle)	N/A	LC1011-10	N/A	LC1012-10
O/IO-540 Engine Series (25° Base Timing Angle)	N/A	LC1011-15	N/A	LC1012-15

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3. LASAR® Magneto

LASAR® magnetos utilize a relay which, when powered by the controller, electrically isolates the contact points from coil current. If power to the relay is interrupted, the contact points come back on line and conventional back up magneto ignition is provided at the standard fixed timing angle. The sensor magneto is equipped with a crankshaft speed/position sensor to provide a reference point for the automatic advance timing feature of LASAR®. The non-sensor magneto is not equipped with a sensor. Both the sensor and non-sensor magnetos are completely repairable and supported by component part availability.

Determine the base ignition timing angle printed on the engine data plate and the drive configuration of the right and left magnetos removed from the engine. Then select the appropriate magneto models from the following table.

Magneto Model Selection Table

Engine Series	O/IO-320 and O/IO-360		IO-540		O/IO-540			
Base Timing Angle	25°		20°		20°		25°	
Drive System	Left	Right	Left	Right	Left	Right	Left	Right
Direct Drive	4776	4770	4766	4770	6766	6770	6776	6770
Impulse Coupled	4771	4775	4761	4775	6766	6770	6776	6770

4. Low Voltage Control Harness

The LASAR® controller interfaces with various airframe systems and the two magnetos through a Low Voltage Control Harness (LVCH). This harness includes two bundled wire branches which terminate in connectors mating to the LASAR® magnetos. These two terminated wire bundles are available in various length to accommodate different system installations.

Measure the distance from the LASAR® controller to the rear housing of both left and right magnetos. This measurement should reflect the intended routing of the low voltage control harness. Calculate Dimensions “A” and “B” by subtracting 10” from each measured length to account for the pigtail harness extending from each LASAR® magneto. Using the following table, find the length that is equal to or slightly longer than Dimensions “A” and “B”, then draw a horizontal line across from the selected length “A” and vertical line up from the selected length “B”. The intersection of these lines is the correct suffix number (-XX) for the required LH1004-XX (LH1001-XX) harness.

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12	-10	-11	-12	-13	-14	-15													
18	-16	-17	-18	-19	-20	-21	-22												
24	-23	-24	-25	-26	-27	-28	-29	-30											
30	-31	-32	-33	-34	-35	-36	-37	-38											
36	-39	-40	-41	-42	-43	-44	-45	-46	-47										
42	-48	-49	-50	-51	-52	-53	-54	-55	-56										
48		-57	-58	-59	-60	-61	-62	-63	-64	-65									
54			-66	-67	-68	-69	-70	-71	-72	-73	-74								
60				-75	-76	-77	-78	-79	-80	-81									
72						-82	-83	-84	-85	-86	-87								
84							-88	-89	-90	-91	-92								
96									-93	-94	-95								
120												-96							
144													-97						
180														-98					
216																			-99
Inches	12	18	24	30	36	42	48	54	60	72	84	96	120	144	180	216			

Dimension "B" - Right Magneto

5. Cylinder Head Temperature Control

Automatic timing advance from the LASAR® system may cause cylinder head temperatures (CHTs) to increase as fuel is burned more efficiently within the combustion chamber. Incremental CHT rise due to ignition timing advance from a non-CHT controlled LASAR® system is typically 15 to 20°F. To accommodate LASAR® system installations on airframes with marginal engine cooling or on airframes where engine cooling characteristics have not been determined, LASAR® systems are offered with CHT control circuitry that incrementally reduces the timing advance angle as CHTs approach a preset maximum limit, thereby reducing CHT rise due to advanced ignition timing. If ignition timing advance is reduced by the CHT control feature, engine performance improvements resulting from optimized ignition timing will be reduced. In extreme situations where the engine continually operates at maximum cylinder head temperatures, LASAR® will command the same ignition timing as provided by conventional magnetos, resulting in comparable engine performance.

NOTE:The full timing advance function of LASAR® ignition systems equipped with CHT control requires CHT probe installation.

Prior to installation of CHT probe assembly, the cylinder that produces the highest temperature during full power, maximum rate of climb configurations must be identified. If this cylinder is not known, then it may be identified using one of the following methods:

- A. Consult engine and/or airframe manufacturer's data for location of the cylinder that produces the highest temperature during full power, maximum rate of climb configurations for the particular airframe model on which the LASAR® is to be installed.

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- B. If the engine is equipped with a multi-point CHT monitoring instrument, record the maximum temperature for EACH cylinder as the aircraft is flown in maximum power, maximum rate of climb until the CHT stabilizes or begins to decrease. During the climb, follow procedures detailed in the engine and airframe Pilot Operating Handbook (POH).
- C. If the engine is not equipped with CHT instrumentation, temporarily install a CHT system as a tool to record the maximum temperature for each cylinder as the aircraft is flown in maximum power, maximum rate of climb to an absolute altitude of 8,000 feet MSL. During the climb, follow procedures detailed in the engine and airframe Pilot Operating Handbook (POH). A single point CHT gauge can be used as a tool by installing the probe on each cylinder and making multiple flights.

Probe Description	Part Number
Single Point Thermistor Probe Assembly	M5340-01
Dual Point Thermistor / "K" Themocouple Probe Assembly	M5340-02
Dual Point Thermistor / "J" Themocouple Probe Assembly	M5340-03

6. Cockpit Enunciator Light-Optional

Some installations of LASAR® systems may include an optional cockpit enunciator light which becomes illuminated when the LASAR® system is operating in the backup mode. Illumination of this light with the ignition switch in the "BOTH" position and the engine running indicates that the LASAR® system has automatically switched to backup operation and that the aircraft may require service prior to the next flight. The pilot should land the aircraft where such service is available. No changes in piloting procedures are necessary if the cockpit light becomes illuminated during flight.

When operating in the backup mode, the orange wire of the Low Voltage Control Harness provides a return ground path for the enunciator light through the controller. The light will become illuminated when the LASAR® system is operating in the backup mode. Proper operation of the light should be confirmed during each preflight magneto check.

The following Enunciator Light Assembly hardware is compatible with the LASAR® system. Equivalent alternatives may be substituted.

Enunciator Light Assembly Description	Part Number
Enunciator Light Receptacle	M5470-01
Lamp, 14 VDC, .10 A	M5470-14
Lamp, 28 VDC, .04 A	M5470-28

7. Tachometer Drive Signal - Optional

Some aircraft tachometers receive an engine speed signal from a magnetic sensor which is installed in the magneto frame replacing the air vent. Each time a rotor magnet passes the sensor, a sinusoidal pulse is induced which is translated by the tachometer into engine RPM. Because rotors in most conventional magnetos utilize two magnets, the tachometer must be modified to correctly translate the additional pulses induced by the LASAR[®] system's four pole rotor magnets. The tachometer manufacturer should be contacted to determine the level of compatibility with LASAR[®] systems.

NOTE: Electronic tachometers connected to the engine speed output (brown wire) of the LASAR[®] controller will not function properly when power is removed from the LASAR[®] controller.

Other aircraft tachometers may interface with conventional magneto P-leads to receive engine speed signals. LASAR[®] systems, however, do not provide the same P-lead signals or wiring attachment points as conventional systems. As an alternative, the LASAR[®] controller generates the engine speed signal shown in Figure 1. This signal may be transmitted to the tachometer by connecting the brown wire in the Low Voltage Control Harness to the tachometer input terminal.

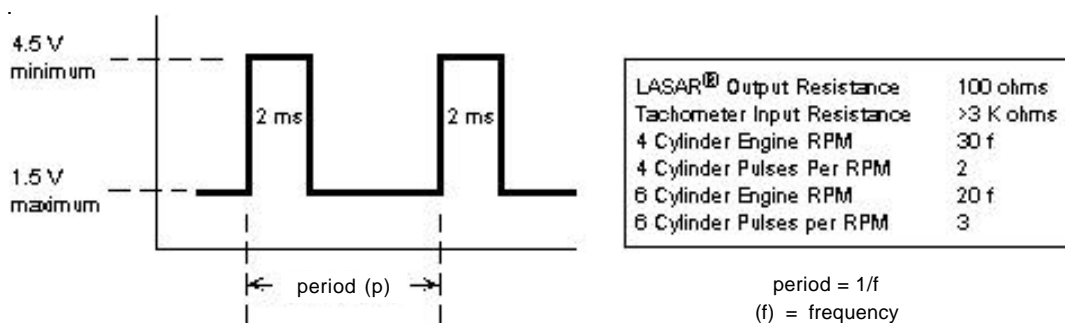


Figure 1
Engine Speed Signal

Because the speed signal generated by the LASAR[®] controller is different than the signal transmitted through conventional ignition system P-leads, modifications to the tachometer may be necessary to correctly interpret engine RPM. The tachometer manufacturer should be contacted to determine the level of compatibility with LASAR[®] systems.

8. Miscellaneous Hardware

Magneto Flange Gasket M3426 (Lycoming P/N LW12681)

9. Fuel Octane Requirements

The LASAR[®] ignition system is approved for use on engines operating with a minimum fuel grade of 100 octane. Operation of LASAR[®] equipped engines using a minimum fuel grade of less than 100 octane has not been validated.

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10. Compliance

Installation of a LASAR® ignition system in a certified aircraft requires compliance with the appropriate airframe or engine Supplemental Type Certificate (STC) and/or FAA field approval. Unison Industries authorizes the installer to use the STC and detailed instructions contained in this document to accomplish the installation of the products described within the STC.

Proof of Compliance:

Completion and submission of FAA Form 337 through the appropriate government agencies and appropriate logbook entries.

Aircraft Affected:

1. All certified engine and airframe applications approved by the FAA for the use of LASAR® ignition systems
2. Certified aircraft and engine installations where FAA field approval is required
3. Non-certified aircraft installations.

Maintenance Parts Affected:

None

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Required Service

Literature: Refer to the following literature for instructions on installation, continued airworthiness, maintenance and overhaul:

- F-1100 - Slick Master Service Manual
- L-1500 - LASAR® Ignition System Master Service Manual which includes:
 - L-1502 - LASAR® Installation, Operation, and Troubleshooting Manual
 - L-1503 - LASAR® Maintenance Manual
 - L-1504 - LASAR® Application Manual
- FMS 1-96 Flight Manual Supplement
- The applicable FAA approved STC
- The Approved Parts Matrix specified in the STC

NOTE: Check with Slick to be sure that you have the most current revisions of the appropriate manuals and pertinent LASAR® Service Bulletins and Service Letters before performing maintenance.

Parts Required per Letter:

LASAR® can only be installed as a complete system. Conventional magnetos are not compatible with the LASAR® system and must be removed from the engine prior to conversion. The LASAR® system can be installed as a replacement for either single or dual impulse coupled magneto installations and is available with CHT sensing. Refer to the Approved Parts Matrix specified in the STC for required part numbers.

Tools Required per Letter:

Standard shop tools and T-300 SynchroLASAR®. A T232 Communication Cable is optional for installation, but required for detailed diagnostics.

Weight Changes:

Apply the appropriate moment arm from the aircraft operators manual for weight and balance calculations. The LASAR® system weighs approximately 12 lbs. The removed ignition system must be weighed to determine its weight. The individual weights of LASAR® system components are as follows:

LASAR® Magneto	4.8 lbs.
LASAR® Controller	1.2 lbs.
LVCH/CHT Probe	.2 lbs.
Ignition Harness	.5 lbs.

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Detailed

Instructions: Installation Instructions for LASAR®

I. Disconnect Aircraft Battery

- A. Disconnect the negative lead from the aircraft battery.
- B. Secure the negative lead away from the negative terminal of the battery to prevent inadvertent contact.

CAUTION: FAILURE TO DISCONNECT THE AIRCRAFT BATTERY DURING LASAR® INSTALLATION MAY RESULT IN SERIOUS INJURY, FIRE, OR DAMAGE TO THE LASAR® CONTROLLER.

II. LASAR® Controller Installation

NOTE: The LASAR® controller requires mounting on the airframe. Because of the diversity of airframe and engine installations for which LASAR® is approved, particular mounting details will vary from airframe to airframe. Install the LASAR® system using the latest revision of FAA Advisory Circular 43.13 and LASAR® Installation, Operation, and Troubleshooting Manual L-1502 as guides. Refer to Figure 2 for mounting hole spacing.

- A. Select a suitable location to mount the LASAR® controller. Be sure that the mounting bracket will not interfere with or affect the aircraft structure. Minor rerouting of wiring or relocation of the accessories may be required. The LASAR® controller and associated cables should be mounted away from heat sources, clear of the exhaust, engine control linkages, and any other system critical to the airworthiness of the aircraft.
- B. Position the LASAR® controller so that the cable connector is facing downward or toward the center of the aircraft. DO NOT mount the LASAR® controller with the cable connector facing upwards or in any other manner that would allow contaminants to collect in the well of the connector.
- C. The LASAR® controller mounting bracket will accept .25 inch diameter bolts. Secure the LASAR® controller using four bolts with appropriate washers and nuts or other appropriate mounting hardware.

NOTE: Mounting hardware sourced locally.

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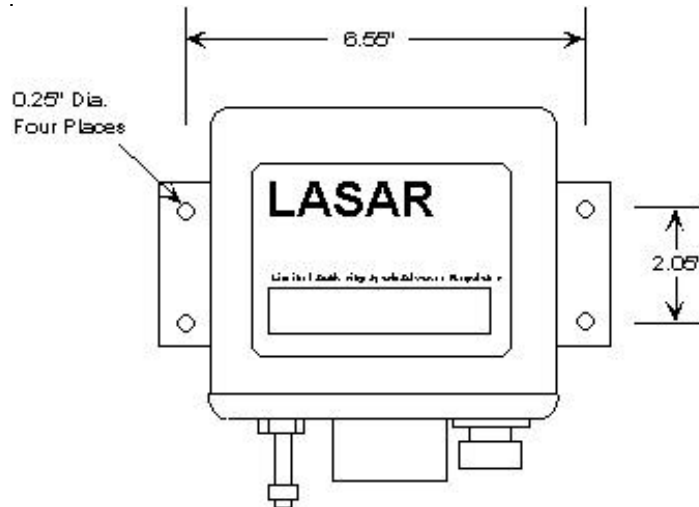


Figure 2
LASAR® Controller
Mounting Bracket Dimensions

III. Engine Preparation

- A. Remove the existing ignition system from the engine. If equipped, remove the starting vibrator and wiring.

WARNING: THE MAGNETO IS "ON" WHEN THE IGNITION SWITCH WIRE (P-LEAD) IS DETACHED FROM THE MAGNETO. NORMAL PRECAUTIONS MUST BE TAKEN TO PREVENT ACCIDENTAL ENGINE IGNITION.

- B. Remove the old magneto mounting gasket from the accessory case. Clean the residual gasket material from the mounting surface.

IV. Install Magneto Drive Gears/Drivers

- A. Install the magneto drive gears/drivers onto the magneto rotor shafts.
- B. Place the washer provided onto the shafts and drive gears/drivers.
- C. Place the nuts provided onto the rotor shafts and torque to 120-360 in/lbs.

WARNING: USE ONLY THE NUTS AND WASHERS PROVIDED.

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- D. Insert the cotter pin through the nut castellations and rotor shaft and secure. If cotter pin will not align with the cotter pin hole within the specified torque range, remove the nut and lightly lap the bottom of the nut with a piece of emery cloth and repeat steps C and D.

V. Engine Set-Up

- A. Align crankshaft to the Base Timing Angle on the compression stroke of cylinder number one. Base Timing Angle can be found on the engine data plate or in the engine Type Certificate Data Sheet.

NOTE: Left and right magnetos refer to the position on the engine as viewed from the rear of the engine, not to the direction of magneto rotation that is noted on the magneto nameplate.

VI. Install Sensor Magneto (in the left magneto position)

NOTE: The sensor magneto is identified by the 10-pin connector.

- A. Align and lock the magneto rotor in the proper position for installation in the engine by inserting the T-118 Timing Pin into the hole in the distributor block labeled "X." See Figure 3. Carefully rotate the magneto drive shaft until the timing pin is fully seated.

WARNING: DO NOT USE DISTRIBUTOR BLOCK HOLES LABELED "L" OR "R."

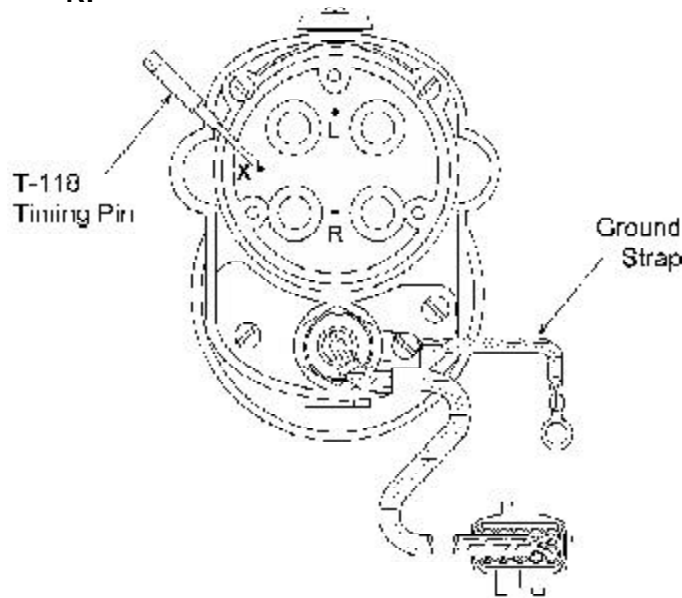


Figure 3
Magneto

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- B. With the crankshaft aligned to the Base Timing Angle position, install the sensor magneto onto the engine. Attach the magneto grounding strap to the engine accessory housing. Tighten the clamp nuts finger tight to hold the magneto in place.

WARNING: MAGNETOS MUST BE PROPERLY GROUNDED TO ENSURE PROPER OPERATION.

WARNING: REMOVE THE TIMING PIN. ROTATION OF THE MAGNETO ROTOR SHAFT WITH THE TIMING PIN INSTALLED MAY DAMAGE THE INTERNAL COMPONENTS OF THE MAGNETO AND RENDER THE UNIT NON-AIRWORTHY.

- C. Remove the T-118 Timing Pin.

VII. Install Non-Sensor Magneto (in the right magneto position)

NOTE: The non-sensor magneto is identified by the 8-pin connector.

- A. Align and lock the magneto rotor in the proper position for installation in the engine by inserting the T-118 Timing Pin into the hole in the magneto distributor block labeled "X". See Figure 3. Carefully rotate the magneto drive shaft until the timing pin is fully seated.

WARNING: DO NOT USE THE DISTRIBUTOR BLOCK HOLES LABELED "L" OR "R."

- B. With the crankshaft aligned to the Base Timing Angle position, install the non-sensor magneto onto the engine. Attach the magneto grounding strap to the engine accessory housing. Tighten the clamp nuts finger tight to hold magneto in place.

WARNING: MAGNETOS MUST BE PROPERLY GROUNDED TO ENSURE PROPER OPERATION.

WARNING: REMOVE THE TIMING PIN. ROTATION OF THE MAGNETO ROTOR SHAFT WITH THE TIMING PIN INSTALLED MAY DAMAGE THE INTERNAL COMPONENTS OF THE MAGNETO AND RENDER THE UNIT NON-AIRWORTHY.

- C. Remove the T-118 Timing Pin.

VIII. Align Crankshaft to TDC (Top Dead Center)

- A. Rotate crankshaft forward to the TDC position on the compression stroke of cylinder number one.

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IX. Align Sensor Magneto to TDC

- A. Connect the ten pin connector of the SynchroLASAR® to the sensor magneto connector. Connect the eight pin connector of the SynchroLASAR® to the non-sensor magneto connector. Turn the SynchroLASAR® to the “ON” position.

NOTE: Before proceeding with timing procedures, sensor position must be confirmed. Proceed with steps B or C as necessary.

- B. If the “TDC” light is off when the SynchroLASAR® is turned on, rotate the housing of the sensor magneto counterclockwise for left rotation magnetos or clockwise for right rotation magnetos (as viewed facing magneto distributor blocks) until the “TDC” light just turns on. Proceed to step D.
- C. If the “TDC” light is on when the SynchroLASAR® is turned on, rotate the housing of the sensor magneto clockwise for left rotation magnetos or counterclockwise for right rotation magnetos (as viewed facing magneto distributor blocks) until the “TDC” light turns off. After the light turns off, rotate the housing of the sensor magneto in the opposite direction until the “TDC” light just turns on. Proceed to step D.
- D. Alternately tighten the nuts securing the mounting clamps of the sensor magneto to 8 ft/lbs of torque. Continue to tighten both nuts alternately in several steps to 17 ft/lbs of torque.

CAUTION: DO NOT EXCEED 17 FT/LBS OF TORQUE. DAMAGE TO THE MAGNETO MOUNTING FLANGE MAY RESULT, RENDERING THE UNIT NON-AIRWORTHY.

X. Align Crankshaft to the Base Timing Angle Position

- A. Rotate crankshaft backwards until the magneto “SENSOR BKR PT” light on the SynchroLASAR® turns on and then turns off.
- B. Slowly turn crankshaft forward until the “SENSOR BKR PT” light on the SynchroLASAR® tool turns on.
- C. Crankshaft should be positioned approximately at the Base Timing Angle position.

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XI. Synchronize Sensor and Non-Sensor Magneto Contact Points

NOTE:The contact points of the non-sensor magneto must be aligned with the contact points of the sensor magneto. Do not proceed with this step until the procedures detailed in paragraph X have been completed.

A. Left rotation non-sensor magnetos:

1. If the “Non-Sensor BKR PT” light is off when the SynchroLASAR® is turned to the “ON” or “Non-Sensor BKR PT” position, rotate the housing of the non-sensor magneto counterclockwise (as viewed facing the magneto distributor blocks) until the “Non-Sensor BKR PT” light turns on. Proceed to Step C.
2. If the “Non-Sensor BKR PT” light is on when the SynchroLASAR® is turned to the “ON” or “Non-Sensor BKR PT” position, rotate the housing of the non-sensor magneto clockwise (as viewed facing the magneto distributor blocks) until the “Non-Sensor BKR PT” light turns off. After the light turns off, rotate the housing of the non-sensor magneto counterclockwise until the “Non-Sensor BKR PT” light just turns on. Proceed to Step C.

B. Right rotation non-sensor magnetos:

1. If the “Non-Sensor BKR PT” light is off when the SynchroLASAR® is turned to the “ON” or “Non-Sensor BKR PT” position, rotate the housing of the non-sensor magneto clockwise (as viewed facing the magneto distributor blocks) until the “Non-Sensor BKR PT” light turns on. Proceed to Step C.
2. If the “Non-Sensor BKR PT” light is on when the SynchroLASAR® is turned to the “ON” or “Non-Sensor BKR PT” position, rotate the housing of the non-sensor magneto counterclockwise (as viewed facing the magneto distributor blocks) until the “Non-Sensor BKR PT” light turns off. After the light turns off, rotate the housing of the non-sensor magneto clockwise until the “Non-Sensor BKR PT” light just turns on. Proceed to Step C.

- C. Alternately tighten the nuts securing the mounting clamps of the right magneto to 8 ft/lbs of torque. Continue to tighten both nuts alternately in several steps to 17 ft/lbs of torque.

CAUTION: DO NOT EXCEED 17 FT/LBS OF TORQUE. DAMAGE TO THE MAGNETO MOUNTING FLANGE MAY RESULT, RENDERING THE UNIT NON-AIRWORTHY.

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XII. Check Sensor and Point Synchronization

- A. Rotate the crankshaft backwards from cylinder number one TDC approximately 45°. Rotate the crankshaft forward until the "Sensor TDC" light turns off. Continue to slowly rotate the crankshaft forward until the "Sensor TDC" light just turns on. The crankshaft position must be at TDC ($0^\circ \pm 1^\circ$).
- B. Rotate crankshaft backwards until "Sensor BKR PT" and "Non-Sensor BKR PT" lights turn on, then off.
- C. Rotate crankshaft forward. "Sensor BKR PT" and "Non-Sensor BKR PT" should both turn on at approximately the Base Timing Angle position $\pm 3^\circ$.

XIII. Install Ignition Harness

NOTE: The LASAR® system is approved for use exclusively with genuine Slick ignition harnesses. Use of other harnesses, or harnesses in poor condition, may generate electromagnetic interference which can prevent normal LASAR® operation.

- A. Attach the ignition harness labeled "left" to the left magneto.
- B. Attach the ignition harness labeled "right" to the right magneto.
- C. Route the individual ignition leads to the appropriate spark plug position as indicated by the alphanumeric markings on each spark plug nut. For example, the nut marked "T-1" routes to the top spark plug on cylinder number one.

XIV. Confirm Ignition Switch Operation

- A. Confirm ignition switch operation prior to connecting the LASAR® controller or operating the LASAR® ignition system. With conventional magnetos, the ignition switch may be wired to ground the non-impulse coupled or non-retard breaker magneto when the starter is engaged. Further, ignition switch systems utilizing a starter switch separate from the magneto selector switch may ground the non-starting magneto through the starter switch in conventional magneto installations. If the engine is equipped with retard breaker magnetos, power to the ignition vibrator must be terminated and the ignition vibrator must be removed from the airframe.

NOTE The ignition switch controlling magneto selection must be configured so that both magnetos are "ON" when the switch is in the "BOTH" or "START" position. The LASAR® controller will not function if either magneto is grounded during start.

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B. Reference Figure 4 or consult the ignition switch manufacturer's manual or aircraft wiring schematic to determine proper ignition switch configuration.

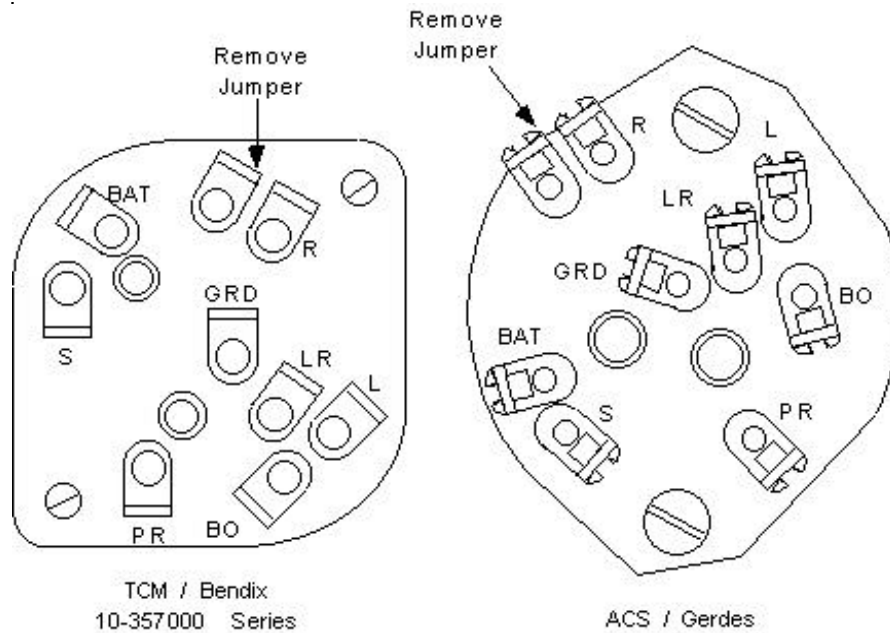


Figure 4
Ignition Switches

XV. Install M5340-XX Cylinder Head Temperature (CHT) Probe Assembly

WARNING: DO NOT INSTALL LASAR® CONTROLLER CONFIGURED WITH THE CHT CONTROL OR CHT PROBE ASSEMBLY IF THE CYLINDER THAT OPERATES AT THE HIGHEST TEMPERATURE DURING FULL POWER, MAXIMUM RATE OF CLIMB CONFIGURATIONS HAS NOT BEEN IDENTIFIED. THIS CYLINDER MAY BE IDENTIFIED USING ONE OF THE METHODS DETAILED IN BACKGROUND INFORMATION, PARAGRAPH 5 OF THIS DOCUMENT.

NOTE: Existing CHT probes may need to be relocated to another cylinder or reconfigured to interface in an alternate location, such as between the cylinder head and spark plug. Consult the CHT gauge manufacturer for data regarding alternate probe interface hardware.

A. Remove plug, existing CHT probe, or existing bayonet adapter from the cylinder that was identified as the hottest cylinder.

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B. Select CHT Probe configuration.

The LASAR® controller requires input from a M5340-X probe which must be located in the hottest cylinder. Any CHT probe currently installed in the hottest cylinder must be reconfigured to fit in an alternate location or replaced by a dual sensor probe which provides signals to both the LASAR® controller and to the existing cockpit instrument. Usually, CHT probes are either a “J” type which uses white and red wires, or a “K” type which uses yellow and red wires. Please refer to the CHT instrument manufacturer for information regarding the type of probe which is being removed. The following descriptions can be used to determine the correct probe assembly part number required for installation:

Single Point Thermistor Probe Assembly M5340-01
This probe should be installed when there is no CHT probe installed in the hottest cylinder.

Dual Point Thermistor/”K” Probe Assembly M5340-02
Install this probe when a “K” type thermocouple is currently installed in the hottest cylinder.

Dual Point Thermistor/”J” Probe Assembly M5340-03
Install this probe when a “J” type thermocouple is currently installed in the hottest cylinder.

C. Clean contaminants from cylinder well and threads.

D. Install M5345 LASAR® CHT probe bayonet adapter.

E. Adjust preload tension and install LASAR® CHT probe spring.

1. Turn LASAR® CHT probe locking nut to a position in the center of the spring assembly.
2. Insert LASAR® CHT probe assembly into cylinder well. The tip of the probe should contact the bottom of the cylinder well.
3. With LASAR® CHT probe in cylinder well, turn the locking nut until slotted end is 3/8 inches from the end of the M5345 bayonet adapter.
4. Align locking nut slot and peg on bayonet adapter. Engage peg into slot and push the locking nut down and then clockwise onto bayonet adapter. Pull back gently on the locking nut to seat peg in slot.

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XVI. Install Enunciator Light Assembly - Optional

- A. Install the light assembly and lamp in a convenient location in the instrument panel which is visible to the pilot.
- B. Using instruction provided with the enunciator light assembly and standard aircraft maintenance practices per AC 43.13, install a placard next to the light assembly. The placard must say "BACKUP IGNITION MODE".

XVII. Install Low Voltage Control Harness (LVCH) (See Figures 5 and 6)

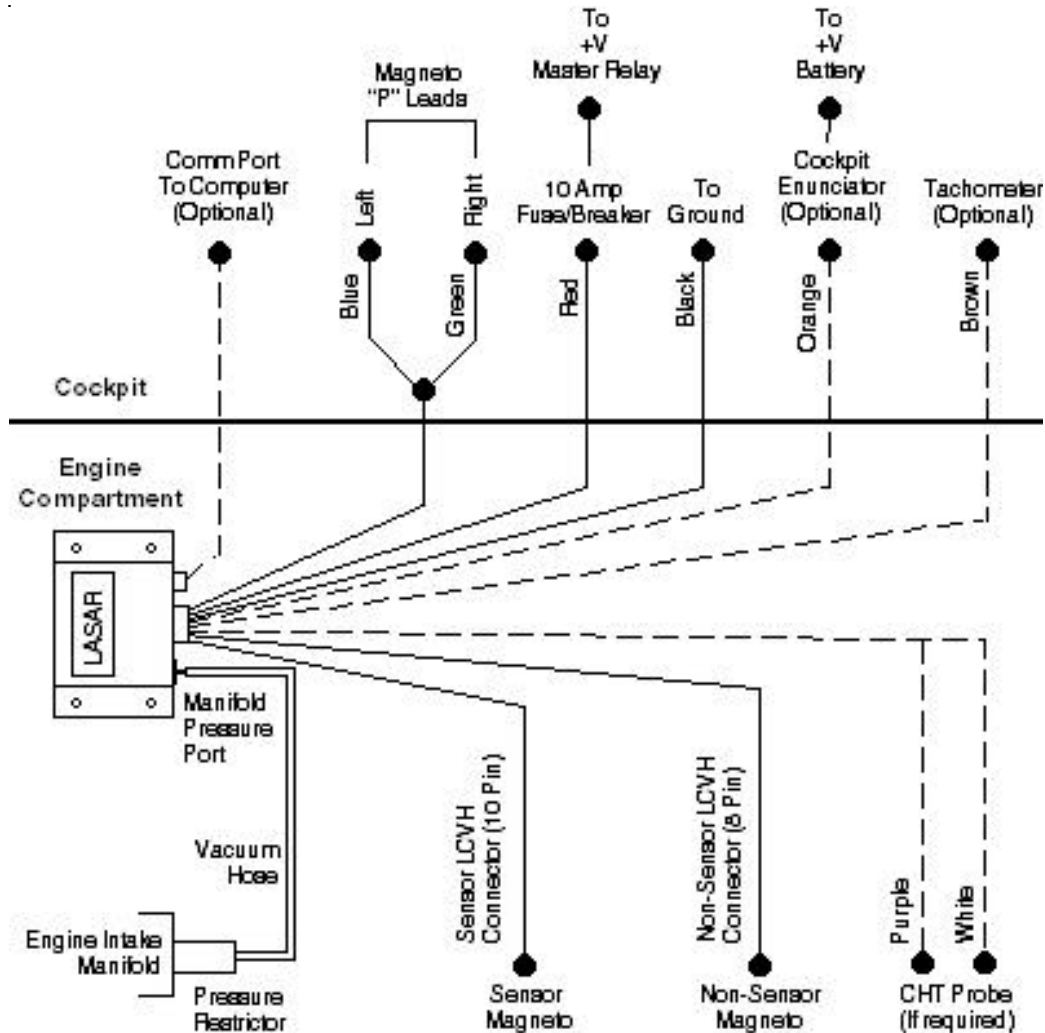


Figure 5
LVCH Wiring Diagram

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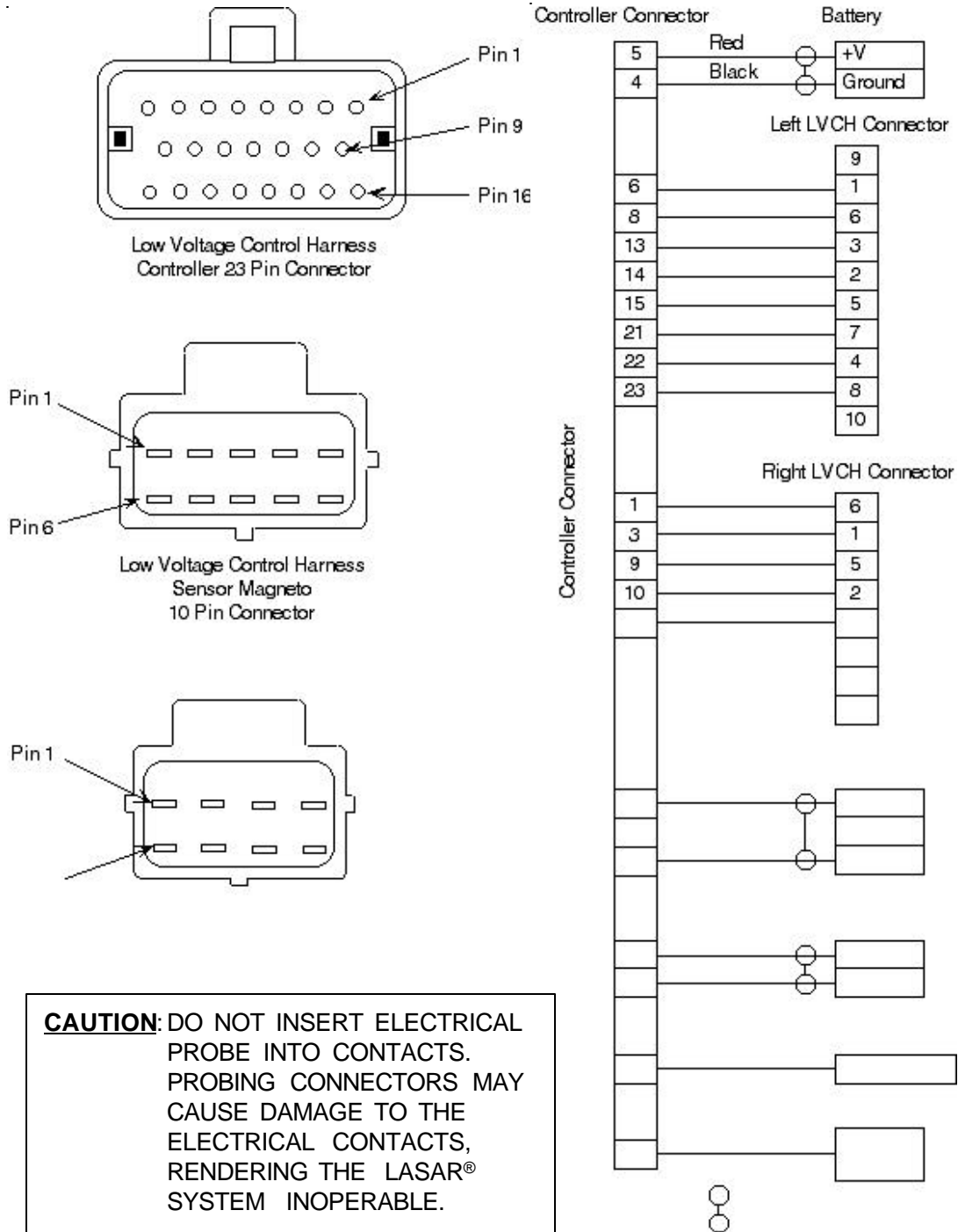


Figure 6
LVCH Point-to-Point
Wiring Diagram

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A. Lubricate connectors.

M-5430 connector lubricant is used with the LASAR® LVCH to lubricate and protect the contact surfaces from fretting, oxidation, and subsequent intermittent electrical contact.

A liberal amount of M-5430 lubricant should be applied to all male and female contacts and to the connector mating surfaces. Sufficient lubricant should be applied to provide 100% coverage of the contact surfaces.

NOTE: Connectors lubricated with M-5430 can easily become contaminated with dirt and other foreign matter. Special handling precautions must be followed to ensure that all connector and contact surfaces are free from all contaminants prior to assembly.

CAUTION: DO NOT ATTEMPT TO CLEAN CONNECTORS USING COMPRESSED AIR OR BY INSERTING TOOLS, TEST PROBES, COTTON SWABS, BRUSHES, OR ANY OTHER OBJECTS INTO THE CONTACT AREA. CONTAMINATED CONNECTORS MAY BE CLEANED BY IRRIGATION WITH ISOPROPYL ALCOHOL OR MINERAL SPIRITS.

B. Attach the low voltage control harness to the LASAR® controller. If the controller connector has been removed for any reason, the connector's elastomer seal must be inspected and repositioned as necessary.

NOTE: To disengage the low voltage control harness cable connector from the controller, gently pry up the release tab from the rear of the low voltage control harness and pull gently on the connector body only. Magneto connectors have a push button release mechanism.

C. Attach the low voltage control harness (10 pin connector) to the sensor magneto. Attach the low voltage control harness (8 pin connector) to the non-sensor magneto.

D. Attach the left P-lead switch wire to the BLUE wire in the LASAR® low voltage control harness.

NOTE: Ensure shielding on P-lead does not ground P-lead at splice.

E. Attach the right P-lead switch wire to the GREEN wire in the LASAR® low voltage control harness.

NOTE: Ensure shielding on P-lead does not ground P-lead at splice.

F. Attach the PURPLE wire of the low voltage control harness to the RED wire of the CHT probe assembly.

G. Attach the WHITE wire of the low voltage control harness to the WHITE wire of the CHT probe assembly.

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- H. If a dual point probe assembly is installed, attach the two remaining CHT probe wires to the cockpit CHT instrument.
- I. Enunciator Light Option (refer to Figure 7):
 1. Connect the enunciator light assembly terminal marked "1" with the aircraft electrical bus at a suitable location. The enunciator light should receive power whenever the aircraft master switch is in the "ON" position.
 2. Connect the enunciator light assembly terminal marked "2" with the orange wire of the low voltage control harness.
 3. Connect the enunciator light assembly terminal marked "3" with the aircraft ground.

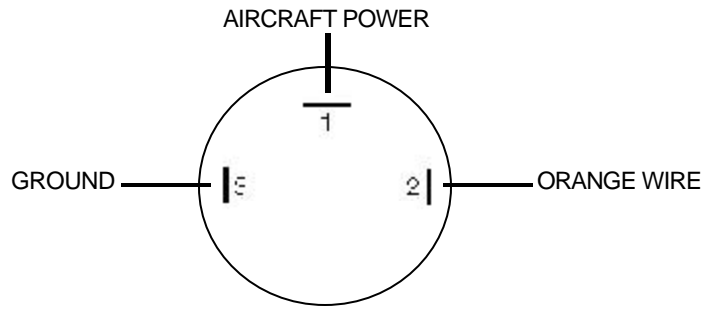


Figure 7
Enunciator Light Assembly
Wiring Diagram

J. Tachometer Option:

1. If the engine speed signal generated by the LASAR® controller is to be used, connect the brown wire of the Low Voltage Control Harness to the tachometer input terminal.

NOTE: Contact the tachometer manufacturer for instrument compatibility with LASAR® systems.

- K. Some early production versions of the LVCH included a yellow wire which is no longer used. If a yellow wire exists, it should be trimmed and secured to prevent electrical contact with any other wire or ground point.

NOTE: Do not route LVCH harness near the high voltage ignition harness or airframe bus power wires.

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- L. Secure the LASAR® low voltage control harness using standard aircraft wiring procedures and cautions. Any unused LVCH wires can be cut underneath the 23-pin connector shrink wrapping and removed, or coiled and secured for future use.

NOTE: It is recommended that the LASAR® Magneto low voltage harness be left unrestrained between the magnetos and LVCH (8 and 10 pin) connectors.

XVIII. Connect the Manifold Pressure Source

- A. Airframe equipped with a manifold pressure gage:
 1. Install a "T"-fitting in the existing manifold pressure line. Manifold pressure supplied to the controller must be dampened through the use of an M-5241 Pressure Regulator.
 2. Connect the pressure inlet on the LASAR® controller to the manifold pressure source and clamp securely.
- B. Airframe not equipped with a manifold pressure gage:
 1. Locate the access port to an intake chamber of a convenient engine cylinder. Remove plug fitting in the cylinder intake port.
 2. Install M-5241 Manifold Pressure Restrictor fitting.
 3. Connect manifold pressure hose to M-5241 fitting. Clamp securely.
 4. Connect the pressure inlet on the LASAR® controller to the manifold pressure source and clamp securely.

XIX. Connect LASAR® Controller to Electrical Power Source

- A. Attach the RED lead to the switched positive (+) terminal of the electrical system master solenoid. A 10 amp inline fuse or resetable breaker should be installed as part of the input power wiring. The LASAR® controller should receive electrical power only when master switch is on.
- B. Attach the BLACK lead to a suitable grounding point common to the master solenoid ground.

NOTE: An improperly grounded LVCH will damage the LASAR® system.

XVIII. Check LASAR® Installation

- A. Check all wiring connections for proper termination.
- B. Check all wiring for proper routing away from heat generating sources, mechanical stresses, and abrasion.
- C. Check for proper installation of the magnetos and controller.
- D. Check spark plug reinstalled in number one cylinder.

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- E. Check to confirm removal of all installation tools.

XXI.Label Fuel Tank Filler Opening

- A. Confirm that the airframe and engine fuel systems contain fuel with a minimum grade of 100 octane.
- B. Confirm that the fuel tank filler opening is placarded with a label which indicates a minimum fuel grade of 100 octane. Affix a label if necessary.

WARNING: OPERATION OF LASAR® EQUIPPED ENGINES REQUIRES A MINIMUM GRADE OF 100 OCTANE AVGAS.

XXII.Reconnect Aircraft Battery

- A. Confirm that the Master Switch and Ignition Switch are in the “OFF” position.
- B. Reconnect the negative lead of the aircraft electrical system to the negative terminal of the aircraft battery.

WARNING: THE LASAR® SYSTEM IS ARMED AND READY TO FIRE AT ENGINE TDC WHEN THE IGNITION SWITCH IS IN THE “BOTH” OR “START” POSITION AND THE MASTER SWITCH IS “ON.” FORWARD AND REVERSE MOVEMENT OF THE PROPELLER MAY TRIGGER AN IGNITION EVENT.

XXIII.Ground Test LASAR® System

- A. After the initial LASAR® installation is completed and prior to the first flight, a static RPM check should be performed on the ground in accordance with the Pilot Operating Handbook. With the engine operating at static RPM, turn the ignition switch from the “BOTH” position to the “LEFT” and verify that the engine operates smoothly in left magneto only backup mode. Turn the ignition switch to the “RIGHT” position and verify that the engine operates smoothly in right magneto only backup mode.
- B. Prior to all flights, test the LASAR® system on the ground. Perform a normal magneto check according to the Pilot Operating Handbook which initiates comprehensive hardware and software tests of the LASAR® system, including backup magneto operation. When the ignition switch is turned from the “BOTH” position to the “LEFT” or “RIGHT” position, the system automatically switches the selected magneto to backup operation and if equipped, the cockpit enunciator light becomes illuminated. When the ignition switch is returned to the “BOTH” position, the system remains in backup operation for approximately 20 seconds to facilitate engine RPM drop comparison. After the ignition switch has been in the “BOTH” position for more than 20 seconds, the system automatically switches to automatic

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mode operation and the cockpit enunciator light, if equipped will turn off. Proper functioning of the cockpit enunciator light should be confirmed each time a preflight magneto check is performed. Preflight magneto check PASS/ FAIL criteria is identical to that of conventional magneto ignition systems.

Documentation: Make all appropriate logbook entries. LASAR® is approved by STC and requires FAA Form 337 to be filed with the FAA. Attach Flight Manual Supplement FMS 1-96 to the aircraft flight manual. Complete and return the LASAR® Product Registration Card, L-1516.

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United States of America
 Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate

Number SA563CH

This certificate, issued to **Unison Industries**
 530 Blackhawk Park Avenue
 Rockford, IL 61104

certified that the change in the type design for the following product with the limitation and conditions therefor as specified hereon meets the airworthiness requirements of Part * of the * Regulations. *

Original Product-Type Certificate Number:* * See attached FAA Approved Model
 Make:* List (AML) No. SA563CH for list of
 Model* approved engine models and applicable
 airworthiness regulations

Description of Type Design Change:

Authorizes installation of engines equipped with Unison Limited Authority Spark Advance Regulator (LASAR™) ignition system with Cylinder Head Temperature (CHT) monitoring capability on airframes with FAA approved installations of AVCO Lycoming O-320, O-360 or IO-360 engines. The LASAR™ system must be installed on the engine in accordance with STC SE524CH.

Limitation and Conditions:

1. Compatibility of this design change with previously approved modifications must be determined by the installer.
2. The LASAR™ is armed and ready to fire at engine TDC when the ignition switch is in the "BOTH" or "START" position and the master switch is "ON". Forward and reverse movement of the propeller may trigger an ignition event (See Continuation Sheet Page 3)

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: September 4, 1996 Date issued:
 Date of issuance: November 4, 1996 Date amended: January 17, 1997, March 13, 1997
 June 20, 1997, September 24, 1997



By direction of the Administrator

Original signed document on file

Thaddeus D. Krolicki, Jr.
 Manager, Propulsion Branch
 Chicago Aircraft Certification Office
 (Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

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United States of America
 Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate
 (Continuation Sheet)

Number SA563CH

Dated amended: September 24, 1997

Limitations and Conditions: (Continued)

3. Unison Flight Manual Supplement FMS 1-96, no revision, dated 6/3/96 or later FAA approved revisions is required for this installation.
4. Operation of LASAR™ system equipped engines requires a minimum grade of 100 Octane avgas.
5. Check weight and balance calculations.
6. A copy of this Certificate and FAA Approved Model List (AML) No. SA563CH, dated November 4, 1996, or later FAA approved revision must be maintained as part of the permanent records for the modified aircraft.
7. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

-END-

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

FAA Form 8110-2-1 (10-69)

This certificate may be transferred in accordance with FAR 21.47

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FAA APPROVED MODEL LIST (AML) NO. SA563CH
UNISON INDUSTRIES
FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

Date of Issuance November 4, 1996

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. / DATE		
1	Aerostar Aircraft Corp.	360, 400	A11WE	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	
2	August S.p.A	S.205-20/F S.205-20/R S.205-18/F S.205-18/R	A9EU	FAR 21.29 FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	
3	Aircraft Parts & Development Corp.	A-5, A-5T, A-6	A-758	CAR 4a (CAR 8)	SL1-96	11/1/96	FMS 1-96 6/3/96	
4	American Champion	8GCBC, 8KCAB	A21CE	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	
5	American Champion	7GCA, 7GCB, 7KC, 7GCBA, 7GCAA, 7GCBC, 7KCAB	A-759	CAR 4a	SL1-96	11/1/96	FMS 1-96 6/3/96	
6	American General	AA-5, AA-5A, AA-5B, AG-5B	A16EA	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	6/20/97
7	Artic Aircraft	S-1B2	A-754	CAR 4a	SL1-96	11/1/96	FMS 1-96 6/3/96	1/17/97
8	Augustair, Inc.	2150, 2150A, 2180	4A19	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
9	Avion Mudry et Cie	CAP 10B	A36EU	FAR 21.29	SL1-96	11/1/96	FMS 1-96 6/3/96	
10	Beech Aircraft	19A, B19, M19A, 23, A23, A23-19, B23, C23, A24, A24R, B24R, C24R	A1CE	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	

FAA APPROVED MODEL LIST (AML) NO. SA563CH
UNISON INDUSTRIES

FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE	
					NUMBER	REVISION NO. / DATE			
11	Beech Aircraft	95, B95, B95A, D95A, E95	3A16	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96		
12	BOHICA, Inc.	TSC-1A, TSC-1A1, TSC-1A2	A15EA	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96		
13	British Aerospace	B.121 Series 2 B.121 Series 3	A22EU	FAR 21.29 (FAR 23)	SL1-96	11/1/96	FMS 1-96 6/3/96		
14	Burkhart Grob	G115B, G115C G115D, G115D2	A57EU	FAR 21.29 (FAR 23)	SL1-96	11/1/96	FMS 1-96 6/3/96		
15	Cessna Aircraft	150, 150A, 150B, 150C, 150D, 150E, 150F, 150G, 150H, 150J, 150K, A150K, 150L, A150L, 150M, A150M, 152, A152	3A19	CAR 3	SL1-96	Rev. C 4/1/97	FMS 1-96 6/3/96	6/20/97	
16	Cessna Aircraft	170, 170A, 170B, 175, 175A, 175B, 175C, P172D, R172E, R172F, R172G, R172H, R172J, R172K, 172RG	A-799	CAR 3	SL1-96	Rev. C 4/1/97	FMS 1-96 6/3/96	6/20/97	
17	Cessna Aircraft	172, 172A, 172B, 172C, 172D, 172E, 172F, 172G, 172H, 172I, 172K, 172L, 172M, 172N, 172P, 172Q, 172R	3A17	CAR 3	SL1-96	Rev. C 4/1/97	FMS 1-96 6/3/96	6/20/97	
18	Cessna Aircraft	177, 177A, 177B, 177C, 177D, 177E, 177F, 177G, 177H, 177I, 177J, 177K, 177L, 177M, 177N, 177P, 177Q, 177R	3A12	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	1/17/97 3/13/97	
19	Cessna Aircraft	177, 177A, 177B, 177C, 177D, 177E, 177F, 177G, 177H, 177I, 177J, 177K, 177L, 177M, 177N, 177P, 177Q, 177R	A13CE	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96		
20	Cessna Aircraft	177R, 177S, 177T, 177U, 177V, 177W, 177X, 177Y, 177Z, 177AA, 177AB, 177AC, 177AD, 177AE, 177AF, 177AG, 177AH, 177AI, 177AJ, 177AK, 177AL, 177AM, 177AN, 177AO, 177AP, 177AQ, 177AR, 177AS, 177AT, 177AU, 177AV, 177AW, 177AX, 177AY, 177AZ, 177BA, 177BB, 177BC, 177BD, 177BE, 177BF, 177BG, 177BH, 177BI, 177BJ, 177BK, 177BL, 177BM, 177BN, 177BO, 177BP, 177BQ, 177BR, 177BS, 177BT, 177BU, 177BV, 177BW, 177BX, 177BY, 177BZ, 177CA, 177CB, 177CC, 177CD, 177CE, 177CF, 177CG, 177CH, 177CI, 177CJ, 177CK, 177CL, 177CM, 177CN, 177CO, 177CP, 177CQ, 177CR, 177CS, 177CT, 177CU, 177CV, 177CW, 177CX, 177CY, 177CZ, 177DA, 177DB, 177DC, 177DD, 177DE, 177DF, 177DG, 177DH, 177DI, 177DJ, 177DK, 177DL, 177DM, 177DN, 177DO, 177DP, 177DQ, 177DR, 177DS, 177DT, 177DU, 177DV, 177DW, 177DX, 177DY, 177DZ, 177EA, 177EB, 177EC, 177ED, 177EE, 177EF, 177EG, 177EH, 177EI, 177EJ, 177EK, 177EL, 177EM, 177EN, 177EO, 177EP, 177EQ, 177ER, 177ES, 177ET, 177EU, 177EV, 177EW, 177EX, 177EY, 177EZ, 177FA, 177FB, 177FC, 177FD, 177FE, 177FF, 177FG, 177FH, 177FI, 177FJ, 177FK, 177FL, 177FM, 177FN, 177FO, 177FP, 177FQ, 177FR, 177FS, 177FT, 177FU, 177FV, 177FW, 177FX, 177FY, 177FZ, 177GA, 177GB, 177GC, 177GD, 177GE, 177GF, 177GG, 177GH, 177GI, 177GJ, 177GK, 177GL, 177GM, 177GN, 177GO, 177GP, 177GQ, 177GR, 177GS, 177GT, 177GU, 177GV, 177GW, 177GX, 177GY, 177GZ, 177HA, 177HB, 177HC, 177HD, 177HE, 177HF, 177HG, 177HH, 177HI, 177HJ, 177HK, 177HL, 177HM, 177HN, 177HO, 177HP, 177HQ, 177HR, 177HS, 177HT, 177HU, 177HV, 177HW, 177HX, 177HY, 177HZ, 177IA, 177IB, 177IC, 177ID, 177IE, 177IF, 177IG, 177IH, 177II, 177IJ, 177IK, 177IL, 177IM, 177IN, 177IO, 177IP, 177IQ, 177IR, 177IS, 177IT, 177IU, 177IV, 177IW, 177IX, 177IY, 177IZ, 177JA, 177JB, 177JC, 177JD, 177JE, 177JF, 177JG, 177JH, 177JI, 177JJ, 177JK, 177JL, 177JM, 177JN, 177JO, 177JP, 177JQ, 177JR, 177JS, 177JT, 177JU, 177JV, 177JW, 177JX, 177JY, 177JZ, 177KA, 177KB, 177KC, 177KD, 177KE, 177KF, 177KG, 177KH, 177KI, 177KJ, 177KL, 177KM, 177KN, 177KO, 177KP, 177KQ, 177KR, 177KS, 177KT, 177KU, 177KV, 177KW, 177KX, 177KY, 177KZ, 177LA, 177LB, 177LC, 177LD, 177LE, 177LF, 177LG, 177LH, 177LI, 177LJ, 177LK, 177LL, 177LM, 177LN, 177LO, 177LP, 177LQ, 177LR, 177LS, 177LT, 177LU, 177LV, 177LW, 177LX, 177LY, 177LZ, 177MA, 177MB, 177MC, 177MD, 177ME, 177MF, 177MG, 177MH, 177MI, 177MJ, 177MK, 177ML, 177MN, 177MO, 177MP, 177MQ, 177MR, 177MS, 177MT, 177MU, 177MV, 177MW, 177MX, 177MY, 177MZ, 177NA, 177NB, 177NC, 177ND, 177NE, 177NF, 177NG, 177NH, 177NI, 177NJ, 177NK, 177NL, 177NM, 177NN, 177NO, 177NP, 177NQ, 177NR, 177NS, 177NT, 177NU, 177NV, 177NW, 177NX, 177NY, 177NZ, 177OA, 177OB, 177OC, 177OD, 177OE, 177OF, 177OG, 177OH, 177OI, 177OJ, 177OK, 177OL, 177OM, 177ON, 177OO, 177OP, 177OQ, 177OR, 177OS, 177OT, 177OU, 177OV, 177OW, 177OX, 177OY, 177OZ, 177PA, 177PB, 177PC, 177PD, 177PE, 177PF, 177PG, 177PH, 177PI, 177PJ, 177PK, 177PL, 177PM, 177PN, 177PO, 177PP, 177PQ, 177PR, 177PS, 177PT, 177PU, 177PV, 177PW, 177PX, 177PY, 177PZ, 177QA, 177QB, 177QC, 177QD, 177QE, 177QF, 177QG, 177QH, 177QI, 177QJ, 177QK, 177QL, 177QM, 177QN, 177QO, 177QP, 177QQ, 177QR, 177QS, 177QT, 177QU, 177QV, 177QW, 177QX, 177QY, 177QZ, 177RA, 177RB, 177RC, 177RD, 177RE, 177RF, 177RG, 177RH, 177RI, 177RJ, 177RK, 177RL, 177RM, 177RN, 177RO, 177RP, 177RQ, 177RR, 177RS, 177RT, 177RU, 177RV, 177RW, 177RX, 177RY, 177RZ, 177SA, 177SB, 177SC, 177SD, 177SE, 177SF, 177SG, 177SH, 177SI, 177SJ, 177SK, 177SL, 177SM, 177SN, 177SO, 177SP, 177SQ, 177SR, 177SS, 177ST, 177SU, 177SV, 177SW, 177SX, 177SY, 177SZ, 177TA, 177TB, 177TC, 177TD, 177TE, 177TF, 177TG, 177TH, 177TI, 177TJ, 177TK, 177TL, 177TM, 177TN, 177TO, 177TP, 177TQ, 177TR, 177TS, 177TT, 177TU, 177TV, 177TW, 177TX, 177TY, 177TZ, 177UA, 177UB, 177UC, 177UD, 177UE, 177UF, 177UG, 177UH, 177UI, 177UJ, 177UK, 177UL, 177UM, 177UN, 177UO, 177UP, 177UQ, 177UR, 177US, 177UT, 177UU, 177UV, 177UW, 177UX, 177UY, 177UZ, 177VA, 177VB, 177VC, 177VD, 177VE, 177VF, 177VG, 177VH, 177VI, 177VJ, 177VK, 177VL, 177VM, 177VN, 177VO, 177VP, 177VQ, 177VR, 177VS, 177VT, 177VU, 177VV, 177VW, 177VX, 177VY, 177VZ, 177WA, 177WB, 177WC, 177WD, 177WE, 177WF, 177WG, 177WH, 177WI, 177WJ, 177WK, 177WL, 177WM, 177WN, 177WO, 177WP, 177WQ, 177WR, 177WS, 177WT, 177WU, 177WV, 177WW, 177WX, 177WY, 177WZ, 177XA, 177XB, 177XC, 177XD, 177XE, 177XF, 177XG, 177XH, 177XI, 177XJ, 177XK, 177XL, 177XM, 177XN, 177XO, 177XP, 177XQ, 177XR, 177XS, 177XT, 177XU, 177XV, 177XW, 177XX, 177XY, 177XZ, 177YA, 177YB, 177YC, 177YD, 177YE, 177YF, 177YG, 177YH, 177YI, 177YJ, 177YK, 177YL, 177YM, 177YN, 177YO, 177YP, 177YQ, 177YR, 177YS, 177YT, 177YU, 177YV, 177YW, 177YX, 177YY, 177YZ, 177ZA, 177ZB, 177ZC, 177ZD, 177ZE, 177ZF, 177ZG, 177ZH, 177ZI, 177ZJ, 177ZK, 177ZL, 177ZM, 177ZN, 177ZO, 177ZP, 177ZQ, 177ZR, 177ZS, 177ZT, 177ZU, 177ZV, 177ZW, 177ZX, 177ZY, 177ZZ	A20CE	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96		9/24/97

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FAA APPROVED MODEL LIST (AML) NO. SA563CH
UNISON INDUSTRIES
FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

Date of Issuance November 4, 1996

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. / DATE		
21	Chaparral Motors, Inc.	2T-1A-1, 2T-1A-2	A18EA	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	1/17/97
22	Commander Aircraft Co.	112, 112B	A12SO	FAR 23 (FAR 36)	SL1-96	11/1/96	FMS 1-96 6/3/96	1/17/97
23	Dynac Aerospace	100, 100-180	1A21	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
24	Fuji Heavy Industries Ltd.	FA-200-180	A4PC	CAR 10	SL1-96	11/1/96	FMS 1-96 6/3/96	
25	General Avia	F22B	A75EU	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	
26	Maule Aerospace Technology Corp.	M-5-180C, MX-7-160, MX-7-160, MX-7-180, MX-7-180B, MX-7-180A	3A23	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	1/17/97
27	SME Aero, Inc.	MD3-160	A65EU	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	
28	Messerschmitt Bolkow-Blohm	BO-209-150 FV BO-209-150 RV BO-209-150 FF BO-209-160 FV BO-209-160 RV	A27EU	FAR 21.29 (FAR 23) FAR 21.29 FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	6/20/97 6/20/97
29	Mooney Aircraft Corp.	M20, M20A, M20C, M20D, M20E, M20F, M20G, M20J	2A3	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
30	Moravan	Zlin 526L	A30EU	FAR 21.29 (FAR 23)	SL1-96	11/1/96	FMS 1-96 6/3/96	
31	Moravan	Z 242L	A76EU	FAR 21.29 (FAR 23)	SL1-96	11/1/96	FMS 1-96 6/3/96	

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FAA APPROVED MODEL LIST (AML) NO. SA563CH
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FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. / DATE		
32	Partenavia	P68, P68B, P68C, P68 Observer P68 Observer 2	A31EU	FAR 21.29 (FAR 23)	SL1-96	11/1/96	FMS 1-96 6/3/96	
33	Piper Aircraft	PA-18 "150" PA-18A "150" PA-18S "150" PA-18AS "150"	1A2	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
34	Piper Aircraft	PA-22-150, PA-22S-150 PA-22-160, PA-22S-160	1A6	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
35	Piper Aircraft	PA-23, PA-23-160	1A10	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
36	Piper Aircraft	PA-24	1A15	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
37	Piper Aircraft	PA-25	2A8	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
38	Piper Aircraft	PA-25	2A10	CAR 8.10(b)	SL1-96	11/1/96	FMS 1-96 6/3/96	
39	Piper Aircraft	PA-28-140, PA-28-150 PA-28-160, PA-28S-160 PA-28-151, PA-28-161 PA-28-180, PA-28R-180 PA-28S-180, PA-28-181 PA-28R-200, PA-28R-201 PA-28RT-201	2A13	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
40	Piper Aircraft	PA-30	A1EA	CAR 3	SL1-96	REV. C 4/1/97	FMS 1-96 6/3/96	6/20/97
41	Piper Aircraft	PA-34-200	A7SO	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	

FAA APPROVED MODEL LIST (AML) NO. SA563CH
UNISON INDUSTRIES

FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

Date of Issuance November 4, 1996

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS NUMBER	REVISION NO. / DATE	AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
43	REVO, Incorp.	C-1, C-2, LA-4, LA-4-200	1A13	FAR 23, 36 CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
44	Schweizer Aircraft Corp.	269A	4H12	CAR 6	SL1-96	11/1/96	FMS 1-96 6/3/96	
45	SOCATA	MS892E-150 MS893A, MS893E	7A14	CAR 10 (CAR 3) CAR 10 (CAR 3)	SL1-96 SL1-96	Rev.C4/197 11/1/96	FMS 1-96 6/3/96	6/20/97
46	SOCATA	TB9, TB200	A15EU	FAR 21.29	SL1-96	11/1/96	FMS 1-96 6/3/96	
47	Spinks Industries	T-1	AR-31	CAR 8.10(b)	SL1-96	11/1/96	FMS 1-96 6/3/96	
48	STOL Aircraft Corp.	UC-1	A6EA	CAR 3	SL1-96	11/1/96	FMS 1-96 6/3/96	
49	Sud Aviation	GY.80-180	A12IN	CAR 10	SL1-96	11/1/96	FMS 1-96 6/3/96	
50	White International Ltd.	S-1S, S-1T, S-2, S-2A	A8SO	FAR 23, 36	SL1-96	11/1/96	FMS 1-96 6/3/96	
51	White International Ltd.	A-1	A22NM	FAR 23	SL1-96	11/1/96	FMS 1-96 6/3/96	

Original signed document on file

FAA Approved:

Thaddeus D. Krolicki, Jr.
Manager, Propulsion Branch
Chicago Aircraft Certification Office

Date Amended: September 24, 1997

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United States of America
 Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate

Number SE524CH

This certificate, issued to Unison Industries
 530 Blackhawk Park Avenue
 Rockford, IL 61104

certified that the change in the type design for the following product with the limitation and conditions therefor as specified hereon meets the airworthiness requirements of Part * of the * Regulations. *

Original Product-Type Certificate Number: * See attached FAA Approved Model
 Make: * List (AML) No. SE524CH for list of
 Model: * approved engine models and applicable

Description of Type Design Change: ^{airworthiness regulations}
 Replace Slick 4000, 4100, 4200, and 4300 series magnetos and TCM/Bendix S-20, S-200, S-1200 series magnetos with the Unison Limited Authority Spark Advance Regulator (LASAR™) ignition systems, in accordance with Unison Service letter SL1-96 dated November 15, 1996, revision B and Unison Approved Parts Matrix APM 1-96, dated January 3, 1997, revision F, or later FAA approved revisions.

Limitation and Conditions:

1. Compatibility of this design change with previously approved modifications must be determined by the installer.
2. LASAR™ can only be installed as a complete system. Existing magnetos must be removed from the engine prior to conversion.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: 11/7/95
 Date of issuance: 7/31/96

Date reissued:
 Date amended: 9/20/96, 11/8/96, 1/24/97
 6/17/97



By direction of the Administrator

Original signed document on file

 Thaddeus D. Kravitz, Jr.
 Manager, Propulsion Branch
 Chicago Aircraft Certification Office

 (Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

FAA Form 8110-2 (10-68)

This certificate may be transferred in accordance with FAR 21.47

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FAA APPROVED MODEL LIST (AML) NO. SE524CH
UNISON INDUSTRIES

FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

Date of Issuance July 31, 1996

ITEM	ENGINE MAKE	ENGINE MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. / DATE		
1	Textron Lycoming	IO-360-A1A, -A1B, -A1C, -A1D, -A1B6, -A1D6, -A2A, -A2B, -A2C, -A3B6, -B1A, -B1B, -B1C, -B1D, -B1E, -B1F, -B1F6, -B2E, -B2F, -B2F6, -B4A, -C1A, -C1B, -C1C, -C1C6, -C1D6, -C1E6, -C1F, -D1A, -E1A, -F1A, -L2A, -J1AD, -K2A, -A1E, LIO-360-C1E6, AIO-360-A1A, -A1B, -A2A, -A2B, -B1B, AEIO-360-A1A, -A1B, -A1B6, -A1C, -A1D, -A1E, -A1E6, -A2A, -A2B, -A2C, -B1B, -B1D, -B1F, -B1F6, -B1G6, -B2F, -H1A, -B2F6, -B4A, -K1B	1E10	CAR 13	SL1-96	Rev. B 11/15/96		6/17/97

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FAA APPROVED MODEL LIST (AML) NO. SE524CH
UNISON INDUSTRIES

FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

Date of Issuance July 31, 1996

ITEM	ENGINE MAKE	ENGINE MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. / DATE		
2	Textron Lycoming	O-360-A1A, A1C, -A1D, -A1F, -A1F6, -A1G, -A1G6, -A1H, -A1H6, -A1P, -A2A, -A2D, -A2E, -A2F, -A2G, -A2H, -A3A, -A3D, -A4A, -A4D, -A4G, -A4J, -A4K, -A4M, -A4N, -A4P, -B1A, -B1B, -B2A, -B2B, -B2C, -C1A, -C1C, -C1E, -C1F, -C1G, -C2A, -C2B, -C2C, -C2D, -C2E, -C4F, -C4P, -D1A, -D2A, -D2B, -F1A6, -G1A6, -J2A, LO-360-A1E6 BO-360-A1A, -B1A, -B1B	E-286	CAR 13	SL1-96	Rev. B 11/15/96		6/17/97

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FAA APPROVED MODEL LIST (AML) NO. SE524CH
UNISON INDUSTRIES

FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

Date of Issuance July 31, 1996

ITEM	ENGINE MAKE	ENGINE MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. / DATE		
3	Textron Lycoming	O-320-A1A, -A1B, -A2A, -A2B, -A2C, -A2D, -A3A, -A3B, -A3C, -B1A, -B1B, -B2A, -B2B, -B2C, -B3A, -B3B, -B3C, -C1A, -C1B, -C2A, -C2B, -C2C, -C3A, -C3B, -C3C, -D1A, -D1B, -D1C, -D1D, -D1F, -D2A, -D2B, -D2C, -D2F, -D2G, -D2H, -D2J, -D3G, -E1A, -E1B, -E1C, -E1F, -E1J, -E2A, -E2B, -E2C, -E2D, -E2F, -E2G, -E2H, -E3D, -E3H	E-274	CAR 13	SL1-96	Rev. B 11/15/96		6/17/97

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FAA APPROVED MODEL LIST (AML) NO. SE5224CH
UNISON INDUSTRIES

FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

Date of Issuance July 31, 1996

ITEM	ENGINE MAKE	ENGINE MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS NUMBER	INSTALLATION REVISION NO. / DATE	AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE

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FAA Approved:

Original signed document on file

Thaddeus D. Krolicki, Jr.
Manager, Propulsion Branch
Chicago Aircraft Certification Office

Date Amended: June 17, 1997

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United States of America
 Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate

Number SA00769CH

This certificate, issued to **Unison Industries**
 530 Blackhawk Park Avenue
 Rockford, IL 61104

certified that the change in the type design for the following product with the limitation and conditions therefor as specified hereon meets the airworthiness requirements of Part * of the * Regulations. *

Original Product-Type Certificate Number: * * See attached FAA Approved Model
 Make: * List (AML) No. SA00769CH for list of
 Model: * approved airplane models and
 applicable airworthiness regulations

Description of Type Design Change:
 Authorizes installation of engines equipped with Unison Limited Authority Spark Advance Regulator (LASAR™) ignition system with Cylinder Head Temperature (CHT) monitoring capability on airframes with FAA approved installations of Textron Lycoming model IO-540, AEIO-540 and HIO-540 engines. The LASAR™ system must be installed on the engine in accordance with Unison Service Letter SL1-96, revision E, dated 10/20/97, or later FAA approved revision and STC SE00768CH.
 Limitation and Conditions:

1. Compatibility of this design change with previously approved modifications must be determined by the installer.
2. Cylinder Head Temperature (CHT) probe is required for all LASAR™ system aircraft installation. (See Continuation Sheet Page 3)

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: March 20, 1997 Date reissued:
 Date of issuance: October 21, 1997 Date amended:



By direction of the Administrator
Original signed document on file
 Thaddeus D. Krolicki, Jr.
 Manager, Propulsion Branch
 Chicago Aircraft Certification Office
 (Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47

FAA Form 8110-2 (10-68)

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United States of America
 Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate
 (Continuation Sheet)

Number SA00769CH

Dated amended: October 21, 1997

Limitations and Conditions: (Continued)

3. Unison Flight Manual Supplement FMS 1-96, revision B, dated October 20, 1997 or later FAA approved revisions is required for this installation.
4. Operation of LASAR™ system equipped engines requires a minimum grade of 100 Octane avgas.
5. The LASAR™ system is armed and ready to fire at engine TDC when the ignition switch is in the "BOTH" or "START" position and the master switch is "ON". Forward and reverse movement of the propeller may trigger an ignition event.
6. A copy of this Certificate and FAA Approved Model List (AML) No. SA00769CH, dated October 21, 1997, or later FAA approved revision must be maintained as part of the permanent records for the modified aircraft.
7. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

-END-

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

FAA Form 8110-2-1 (10-69)

This certificate may be transferred in accordance with FAR 21.47

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FAA APPROVED MODEL LIST (AML) NO. SA00769CH
UNISON INDUSTRIES
FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

Date of Issuance October 21, 1997

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS NUMBER	REVISION NO. / DATE	AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
2	Aerostar Aircraft Corp.	PA-60-600 (Aerostar 600)	A17WE	FAR 23	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
3	Aircraft Parts & Development Corp.	A-9A	A4WE	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
4	Britten Norman Ltd	BN-2A MK. III, BN-2A MK. III-2, BN-2A MK. III-3	A29EU	FAR 21.29 FAR 23	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
5	Commander Aircraft Co.	114B	A12SO	FAR 23 (FAR 36)	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
6	Dornier-Werke GmbH & Dornier Luftfahrt GmbH	DO 28 B-1	7A13	CAR 10	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
7	Evangel Mission	4500-300, 4500-300 Series II	A17CE	FAR 23	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
8	Extra Flugzeugbau GmbH	EA-300, EA-300S	A67EU	FAR 21	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
9	Found Brothers Aviation Ltd.	FBA-2C	A7EA	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	

FAA APPROVED MODEL LIST (AML) NO. SA00769CH
UNISON INDUSTRIES

FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS NUMBER	INSTALLATION REVISION NO. / DATE	AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
10	Helio Enterprises, Inc	500	A2EA	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
11	Helio Enterprises, Inc	H-250	1A8	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
12	The King's Engineering Fellowship (TKEF)	44	A2W1	FAR 23, 36	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
13	Maule Aerospace Technology Corp	M-5-235C, M-6-235, M-7-235, M-7-235A, M-7-235B, MT-7-235, MX-7-235, M-8-235	2A23	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
14	Pilatus Britten-Norman (Bembridge) Ltd.	BN-2, BN-2A, BN-2A-2, BN-2A-3, BN-2A-6, BN-2A-8, BN-2A-9, BN-2A-20, BN-2A-21, BN-2A-26, BN-2A-27, BN-2B-20, BN-2B-21, BN-2B-26, BN-2B-27	A17EU	FAR 21.29 FAR 23	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
15	Piper Aircraft Corporation	PA-23-250 (Navy UO-1), PA-23-235, PA-E23-250	1A10	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
16	Piper Aircraft Corporation	PA-24-250, PA-24-260	1A15	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
17	Piper Aircraft Corporation	PA-25-235, PA-25-260 (Normal Cat.)	2A8	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	

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FAA APPROVED MODEL LIST (AML) NO. SA00769CH
UNISON INDUSTRIES

FOR
INSTALLING LIMITED AUTHORITY SPARK ADVANCE REGULATOR (LASAR™) IGNITION SYSTEM

Date of Issuance October 21, 1997

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NO. / DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. / DATE		
18	Piper Aircraft Corporation	PA-28-235	2A13	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
19	Piper Aircraft Corporation	PA-32-260, PA-32-300, PA-32S-300, PA-32R-301, PA-32-301	A3SO	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
20	Piper Aircraft Corporation	PA-34-200	A7SO	FAR 23	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
21	SOCATA-Gruppe Aerospatiale	Rallye Series: 235E, 235C	7A14	CAR 10 (CAR 3)	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
22	Twin Commander Aircraft Company	500, 500-B, 500-U, 500-S	6A1	CAR 3	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	
23	White International	S-2B	A8SO	FAR 23, 36	SL1-96	Rev. E, 10/20/97	FMS 1-96 Rev. B, 10/20/1997	

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Original signed document on file

FAA Approved:

Thaddeus D. Krolicki, Jr.
Manager, Propulsion Branch
Chicago Aircraft Certification Office

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United States of America
 Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate

Number SE00768CH

This certificate, issued to **Unison Industries**
 530 Blackhawk Park Avenue
 Rockford, IL 61104

certified that the change in the type design for the following product with the limitation and conditions therefor as specified hereon meets the airworthiness requirements of Part 13 of the Civil Air Regulations. (See Type Certificate Data Sheet No. 1E4 for complete certification basis.)

Original Product - Type Certificate Number: 1E4
 Make: Textron Lycoming
 Model: See continuation sheet Page 3

Description of Type Design Change:

Replace Slick 6000, 6100, 6200, and 6300 series magnetos and TCM/Bendix S6-20, S6-200, S6-1200 series magnetos with the Unison Limited Authority Spark Advance Regulator (LASAR™) ignition system, in accordance with Unison Service letter SL1-96 dated October 20, 1997, revision E and Unison Approved Parts Matrix APM 1-97, no revision dated October 17, 1997 or later FAA approved revisions.

Limitation and Conditions:

1. Compatibility of this design change with previously approved modifications must be determined by the installer.
2. LASAR™ can only be installed as a complete system. Existing magnetos must be removed from the engine prior to conversion.
3. 100 minimum grade aviation gasoline.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: February 28, 1997 Date issued:
 Date of issuance: October 21, 1997 Date amended:



By direction of the Administrator
Original signed document on file

 Thaddeus D. Krolicki, Jr.
 Manager, Propulsion Branch
 Chicago Aircraft Certification Office

 (Title)

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United States of America
Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate
(Continuation Sheet)

Number SE00768CH

Dated of Issuance: October 21, 1997

Original Product-Type Certificate Number: 1E4

Make: Textron Lycoming

Model: IO-540-A1A5, -B1A5, B1B5,
-B1C5, -C1B5, C1C5, -C2C, -C4B5, -C4C5, -C4D5, -D4A5, -D4B5, -D4C5,
-E1A5, -E1B5, -E1C5, -G1A5, -G1B5, -G1C5, -G1D5, -G1E5, -G1F5, -J4A5
-K1A5, -K1B5, -K1C5, -K1D5, -K1E5, -K1F5, -K1G5, -K1H5, -K1J5, -K1K5,
-K2A5, -L1A5, -L1C5, -M1A5, -M1C5, -N1A5, -P1A5, -R1A5, -S1A5, -T4B5,
-AA1A5, -AA1B5; AEIO-540-D4A5, -D4B5, -D4C5, -L1B5; HIO-540-A1A.

-END-

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LASAR Magnetos and Controllers
 APPROVED MODEL LISTING (AML)
 DATED: 8-27-01

FEDERAL AVIATION ADMINISTRATION

Unison Industries
530 Blackhawk Park Ave.
Rockford, IL 61104
(815) 965-4700

Part Name	Part Number	Approved Replacement For	FAA Approval Basis and Approved Design Data	Installation Eligibility:	Installation Eligibility: MODEL
Magneto	6776	Modification part	Unison Industries STC SE00768CH dtd. 10/21/97 Unison Industries Dwg. 6776 Revision F, dtd. 5/20/00 or later FAA Approved Revision	MAKE Textron Lycoming	O-540- A1A, -A1A5, -A1B5, -A1C5, -A1D, -A1D5, -A2B, -A3D5, -A4A5, -A4B5, -A4C5, -A4D5, -B1A5, -B1B5, -B1D5, -B2A5, -B2B5, -B2C5, -B4A5, -B4B5, -D1A5, -E4A5, -E4B5, -E4C5, -F1A5, -F1B5, -G1A5, -G2A5, -H1A5, -H2A5 IO-540- A1A5, -B1A5, -B1B5, -B1C5, -C1B5, -C1C5, -C2C, -C4B5, -C4C5, -C4D5, -D4A5, -D4B5, -D4C5, -E1A5, -E1B5, -E1C5, -G1A5, -G1B5, -G1C5, -G1D5, -G1E5, -G1F5, -J4A5, -K1A5, -K1B5, -K1C5, -K1D5, -K1E5, -K1F5, -K1G5, -K1H5, -K1J5, -K1K5, -K2A5, -L1A5, -L1C5, -M1A5, -M1C5, -N1A5, -P1A5, -R1A5, -S1A5, -T4B5, -AA1A5, -AA1B5, -AB1A5, -AC1A5 AEIO-540- D4A5, -D4B5, -D4C5, -D4D5, -L1B5, HIO-540- A1A

LASAR Magnetos and Controllers
 APPROVED MODEL LISTING (AML)
 DATED: 8-27-01

FEDERAL AVIATION ADMINISTRATION

Unison Industries
530 Blackhawk Park Ave.
Rockford, IL 61104
(815) 965-4700

Part Name	Part Number	Approved Replacement For	FAA Approval Basis and Approved Design Data	Installation Eligibility:	Installation Eligibility: MODEL
Controller	LC-1011-15	Modification part	Unison Industries STC SE00768CH dtd. 10/21/97 Unison Industries Dwg. LC-TABV-XX Revision S, dtd. 8/28/01 or later FAA Approved Revision.	MAKE Textron Lycoming	O-540- A1A, -A1A5, -A1B5, -A1C5, -A1D, -A1D5, -A2B, -A3D5, -A4A5, -A4B5, -A4C5, -A4D5, -B1A5, -B1B5, -B1D5, -B2A5, -B2B5, -B2C5, -B4A5, -B4B5, -D1A5, -E4A5, -E4B5, -E4C5, -F1A5, -F1B5, -G1A5, -G2A5, -H1A5, -H2A5 IO-540- A1A5, -B1A5, -B1B5, -B1C5, -C1B5, -C1C5, -C2C, -C4B5, -C4C5, -C4D5, -D4A5, -D4B5, -D4C5, -E1A5, -E1B5, -E1C5, -G1A5, -G1B5, -G1C5, -G1D5, -G1E5, -G1F5, -J4A5, -K1A5, -K1B5, -K1C5, -K1D5, -K1E5, -K1F5, -K1G5, -K1H5, -K1J5, -K1K5, -K2A5, -L1A5, -L1C5, -M1A5, -M1C5, -N1A5, -P1A5, -R1A5, -S1A5, -T4B5, -AA1A5, -AA1B5, -AB1A5, -AC1A5 AEIO-540- D4A5, -D4B5, -D4C5, -D4D5, -L1B5, HIO-540- A1A

LASAR Magnetos and Controllers
 APPROVED MODEL LISTING (AML)
 DATED: 8-27-01

FEDERAL AVIATION ADMINISTRATION

Unison Industries
530 Blackhawk Park Ave.
Rockford, IL 61104
(815) 965-4700

Part Name	Part Number	Approved Replacement For	FAA Approval Basis and Approved Design Data	Installation Eligibility:	Installation Eligibility: MODEL
Controller	LC-1012-15	Modification part	Unison Industries STC SE00768CH dtd. 10/21/97 Unison Industries Dwg. LC-TABV-XX Revision S, dtd. 8/28/01 or later FAA Approved Revision.	MAKE Textron Lycoming	O-540- A1A, -A1A5, -A1B5, -A1C5, -A1D, -A1D5, -A2B, -A3D5, -A4A5, -A4B5, -A4C5, -A4D5, -B1A5, -B1B5, -B1D5, -B2A5, -B2B5, -B2C5, -B4A5, -B4B5, -D1A5, -E4A5, -E4B5, -E4C5, -F1A5, -F1B5, -G1A5, -G2A5, -H1A5, -H2A5 IO-540- A1A5, -B1A5, -B1B5, -B1C5, -C1B5, -C1C5, -C2C, -C4B5, -C4C5, -C4D5, -D4A5, -D4B5, -D4C5, -E1A5, -E1B5, -E1C5, -G1A5, -G1B5, -G1C5, -G1D5, -G1E5, -G1F5, -J4A5, -K1A5, -K1B5, -K1C5, -K1D5, -K1E5, -K1F5, -K1G5, -K1H5, -K1J5, -K1K5, -K2A5, -L1A5, -L1C5, -M1A5, -M1C5, -N1A5, -P1A5, -R1A5, -S1A5, -T4B5, -AA1A5, -AA1B5, -AB1A5, -AC1A5 AEIO-540- D4A5, -D4B5, -D4C5, -D4D5, -L1B5, HIO-540- A1A

LASAR Magnetos and Controllers
 APPROVED MODEL LISTING (AML)
 DATED: 8-27-01

FEDERAL AVIATION ADMINISTRATION

Unison Industries
530 Blackhawk Park Ave.
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Part Name	Part Number	Approved Replacement For	FAA Approval Basis and Approved Design Data	Installation Eligibility:	Installation Eligibility: MODEL
Low Voltage Control Harness	LH-1004-XX	Modification part	Unison Industries STC SE00768CH dtd. 10/21/97 Unison Industries Dwg. LH-1004-XX Revision F, dtd. 4/27/98 or later FAA Approved Revision.	MAKE Textron Lycoming	O-540 -A1A, -A1A5, -A1B5, -A1C5, -A1D, -A1D5, -A2B, -A3D5, -A4A5, -A4B5, -A4C5, -A4D5, -B1A5, -B1B5, -B1D5, -B2A5, -B2B5, -B2C5, -B4A5, -B4B5, -D1A5, -E4A5, -E4B5, -E4C5, -F1A5, -F1B5, -G1A5, -G2A5, -H1A5, -H2A5
Magneto	6770	Modification part	Unison Industries STC SE00768CH dtd. 10/21/97 Unison Industries Dwg. 6770 Revision F, dtd. 5/20/00 or later FAA Approved Revision.		O-540 -A1A, -A1A5, -A1B5, -A1C5, -A1D, -A1D5, -A2B, -A3D5, -A4A5, -A4B5, -A4C5, -A4D5, -B1A5, -B1B5, -B1D5, -B2A5, -B2B5, -B2C5, -B4A5, -B4B5, -D1A5, -E4A5, -E4B5, -E4C5, -F1A5, -F1B5, -G1A5, -G2A5, -H1A5, -H2A5

LASAR Magnetos and Controllers
 APPROVED MODEL LISTING (AML)
 DATED: 8-27-01

FEDERAL AVIATION ADMINISTRATION

Unison Industries
530 Blackhawk Park Ave.
Rockford, IL 61104
(815) 965-4700

Part Name	Part Number	Approved Replacement For	FAA Approval Basis and Approved Design Data	Installation Eligibility:	Installation Eligibility: MODEL
CHT Probe Assembly	M-5340-X	Modification part	Unison Industries STC SE00768CH dtd. 10/21/97 Unison Industries Dwg. M-5340-X Revision A, dtd. 9/26/96 or later FAA Approved Revision.	MAKE Textron Lycoming	O-540- A1A, -A1A5, -A1B5, -A1C5, -A1D, -A1D5, -A2B, -A3D5, -A4A5, -A4B5, -A4C5, -A4D5, -B1A5, -B1B5, -B1D5, -B2A5, -B2B5, -B2C5, -B4A5, -B4B5, -D1A5, -E4A5, -E4B5, -E4C5, -F1A5, -F1B5, -G1A5, -G2A5, -H1A5, -H2A5

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