REFERENCE MATERIAL

Assembly diagrams and airframe part numbers can be found in the RV-10 construction manual.

Engine part numbers and maintenance instructions are found in the Lycoming parts catalog, maintenance manuals, and Operator's Manual.

Propeller servicing information can be found in the Hartzell owner's manual.

Electrical details are provided on the most recent version of the following drawings:

DC Distribution
Avionics Interconnect

All repairs and modifications should be in accordance with standard aircraft practices, Van's Aircraft support department, and FAA AC43.13 1A and 2A.

100-hour and Annual Condition Inspection Checklist

Date_____ Hobbs Time_____

Tach Time_____ Total Airframe Hours_____

Total Engine Hours_____ Total Propeller Hours_____

Altimeter/Static Due_____ ELT Battery Due_____

Engine

- Clean the engine before beginning the inspection
- Remove and inspect upper and lower cowling
- Inspect hinge pins, eyelets, lower flanges, and all 1/4-turn fasteners
- Change oil (9 qts) and filter (48109 preferred or 48108)
- Send oil sample for analysis
- Open and inspect oil filter for contamination
- Remove, clean, and install oil sump screen (AN900-16 same as MS35769-21)
- Remove filtered air box
- Inspect the filter for shrinking and hardening
- Clean and recharge K&N intake air filter and reinstall F.A.B.
- Inspect alternate air door position (closed)
- Inspect sealing of alternate air door
- Inspect throttle body attachment nuts/bolts
- Inspect crankcase nose seal for oil leaks
- Inspect oil cooler fins and external condition for leaks
- Inspect engine and accessory case for oil leaks and repair as appropriate

- Inspect starter pinion, ring gear for wear and condition
- Inspect starter mountings and lead connections
- Inspect alternator mount and lead connections
- Inspect alternator and alternator belt condition and tension
- Inspect alternator terminals and wires for condition
- Inspect baffles and seals for condition
- Inspect heat muffs, heat boxes and all SCAT hoses
- Pressurize exhaust pipes to check for cracks in heat muff area
- Inspect engine mount and bolts/nuts for cotter pins
- Inspect engine mount to sump clearance
- Inspect shock isolators, mounting bolts and washers for condition
- Inspect firewall for distortion and cracks
- Inspect firewall to engine ground wire
- Inspect all firewall penetrations
- Inspect all wire bundles for security and chafing
- Inspect accessories on rear case
- Inspect engine driven fuel pump with fuel system pressurized
- Inspect crankcase/sump for cracks, leaks and/or missing fasteners
- Inspect exhaust system and mounting brackets for cracks
- Inspect exhaust gaskets for blow-by leaks and re-torque mounting nuts
- Check inlet tube connector tubes for proper clamping at hose clamps
- Perform Differential Compression Test and record

  Cylinders1-6/80: 1_____2_____3_____4_____5_____6_____

- Replace the spark plugs. See the current E-MAG manual.
- Torque the spark plugs using the special method described by E-MAG.
- Check the spark plug wire resistance for the value printed on the jacket.
- Check ignition timing as described in the current E-MAG manual.
- Inspect throttle control cable attachment
- Inspect mixture control cable attachment
- Inspect prop governor control cable attachment
- Inspect all engine controls for proper movement

NOTES:

Propeller / Spinner

- Grease prop hub (Aeroshell 6) per Hartzell Manual
- Inspect propeller bolts and safety wiring
- Inspect spinner and backplate for cracks
- Inspect blades for nicks, cracks and surface erosion, repair as necessary
- Inspect hub for cracks and corrosion
- Check propeller track

Cabin

- Remove seats, seat backs and under-seat inspection panels
  NOTE: The front seats can be removed without removing the flap tube covers
- Inspect gear attach bolts for proper torque
- Remove all tunnel covers and baggage bulkhead
- Inspect fuel selector valve operation, lubricate as necessary
- Inspect electric fuel pump
- Pressurize and inspect fuel system for leaks
- Remove filter screen from electric fuel pump, clean, and re-install
- Inspect fuel lines in cabin for leaks and chafing
- Inspect rudder pedals, cables and attachments
- Inspect brake masters and associated tubing for leaks
- Inspect control sticks, linkages and push/pull tubes
- Inspect static air lines inside empennage and fuselage for chafing
- Inspect transponder, comm, and GPS antenna mounts and wiring
- Inspect condition of seat belts and shoulder harnesses
- Inspect fire extinguisher condition
- Inspect empennage bulkheads and stringers for cracks and loose rivets
- Inspect elevator and aileron trim servo operation and display
- Inspect security and condition of batteries
- Remove flap torque tube inspection covers
- Inspect flap operation for binding
- Inspect flap position sensor and linkage
- Lubricate flap motor arm and all flap connecting rod ends
- Inspect wire bundles in empennage for security and chafing
- Inspect wire bundles in fuselage sidewalls for security and chafing
- Inspect strobe unit in empennage
- Inspect magnetometer for security
- Verify ELT is armed
- Replace ELT main batteries every 5 years
- Perform ELT G-switch check
- Test ELT output in accordance with the manufacturer's instructions
- Inspect door latching mechanism and door latch pins and receiver holes
- Inspect canopy, windshield, and rear windows for cracks

Panel

- Inspect instruments, wiring, and attachments
- Inspect starter contactor and associated wiring
- Inspect instrument lights and dimmers for operation
- Inspect wire bundles and busses underneath panel for security and chafing
- Inspect AOA, pitot, and static tubing for security and chafing
- Inspect instruments, radios, switches, and breakers for operation

Airframe

- Remove wing root fairings
- Inspect wing attach bolts and nuts for proper torque
- Inspect fuel sender wiring for security and chafing
- Inspect fuel vent check valves for correct operation
- Inspect flap system and torque tube and attachments for play
- Inspect flap actuator rod end and jam nut for security and lubricate
- Lubricate elevator control tube rod ends
- Lubricate aileron control tube rod ends
- Check that static ports are clear
- Inspect skin for loose rivets, corrosion, and other damage
- Remove empennage fairing and fuselage inspection plates
- Inspect rudder and vertical stabilizer for corrosion and condition
- Inspect rudder pivot bolts for proper torque and lubricate
- Inspect rudder control stops for condition
- Inspect rudder cable attachments for security and cotter pin
- Inspect horizontal stabilizer and elevators for corrosion and condition
- Inspect elevator pivot bolts for proper torque and lubricate
- Inspect elevator counterbalance weights for security
- Inspect elevator control stops for condition
- Inspect elevator trim tab, arm, and actuator rod for cracks
- Inspect and lube elevator bellcrank, horns and attachments
- Inspect vertical stabilizer spar attach points for proper torque
- Inspect horizontal stabilizer spar attach points for proper torque
- Remove wing tips
- Inspect wing structure for corrosion and condition
- Inspect strobe wiring for security and chafing
- Inspect fuel tanks, lines and drains for leaks
- Inspect fuel vents for blockage
- Inspect fuel cap and O-ring condition
- Inspect pitot tube and plumbing for security and blockage
- Inspect landing light fixtures for security
- Inspect landing lights for proper operation
- Inspect strobe and position lights for proper operation
- Inspect aileron attach bolts for proper torque
- Inspect aileron control stops and travel
- Inspect aileron bellcranks
- Inspect aileron push tubes for condition and security of jam nuts
- Inspect ailerons for joint alignment in neutral position, adjust if necessary
- Lubricate all aileron rod ends
- Inspect OAT probe
- Install wing tips

Landing Gear

- Remove wheel pants and gear leg covers
- Raise front wheel off ground and inspect side-to-side breakout force of nose wheel. Retorque if required.
- Inspect front nose wheel swivel for security and lubricate front grease fitting
- Remove front wheel and re-pack wheel bearings
- Re-install front wheel and torque properly
- Inspect nose wheel bearing spacers and bearings for wobble/slop/damage
- Remove main tires and brake assemblies
- Check brakes and fill reservoir with MIL-H-83282 (preferred) or MIL-H-5606.
- Check and/or replace brake linings (p/n Cleveland 66-112, rivets p/n: 105-2)
- Inspect and/or replace tires (15/6.00-6 Mains, 5.00-5 Front), rotate if necessary
  NOTE: Preferred main tube PN DTR 20-500 has a 90º stem. ACS PN 06-00356
- Re-pack wheel bearings with grease
- Fill tires with recommended air pressure (40 psi Mains / 55 psi Front)
- Check brake cylinders for condition and leaks
- Check brake lines for security and chafing
- Thoroughly clean axle/brake area of dust
- Re-mount wheels, tires, and brake assemblies (torque brakes: 75-80 In-lbs DRY)
- Inspect wheel pants and attach points for cracks and security
- Inspect gear leg covers for cracks and condition, re-install and secure

Close-Up

- Re-install interior panels, seats, flap covers, all access panels, fairings, seats, and seat cushions
- Replace any single-use fasteners or damaged fasteners

NOTES:

Operational Inspection

- Visual inspection of engine/propeller
- All inspection panels and fairings secure
- Brake system check or condition new brake pads
- Check boost pump for proper pressure
- Oil pressure/oil temperature within limits
- Ignition check
- Check fuel gauges for operation
- Check for proper idle RPM and RPM rise upon leaning mixture
- Check static run up 2700 RPM
- Check fuel selector for engine shutoff
- Check Flight Controls Free and Correct
- Inspect external Antennas
- Thoroughly clean the aircraft
- Verify annually that the navigation and communication systems can be operated for a minimum of 45 minutes using battery power only. At the end of the test, turn on the fuel pump and landing light, and lower the flaps.
- Fly the aircraft.

Documentation

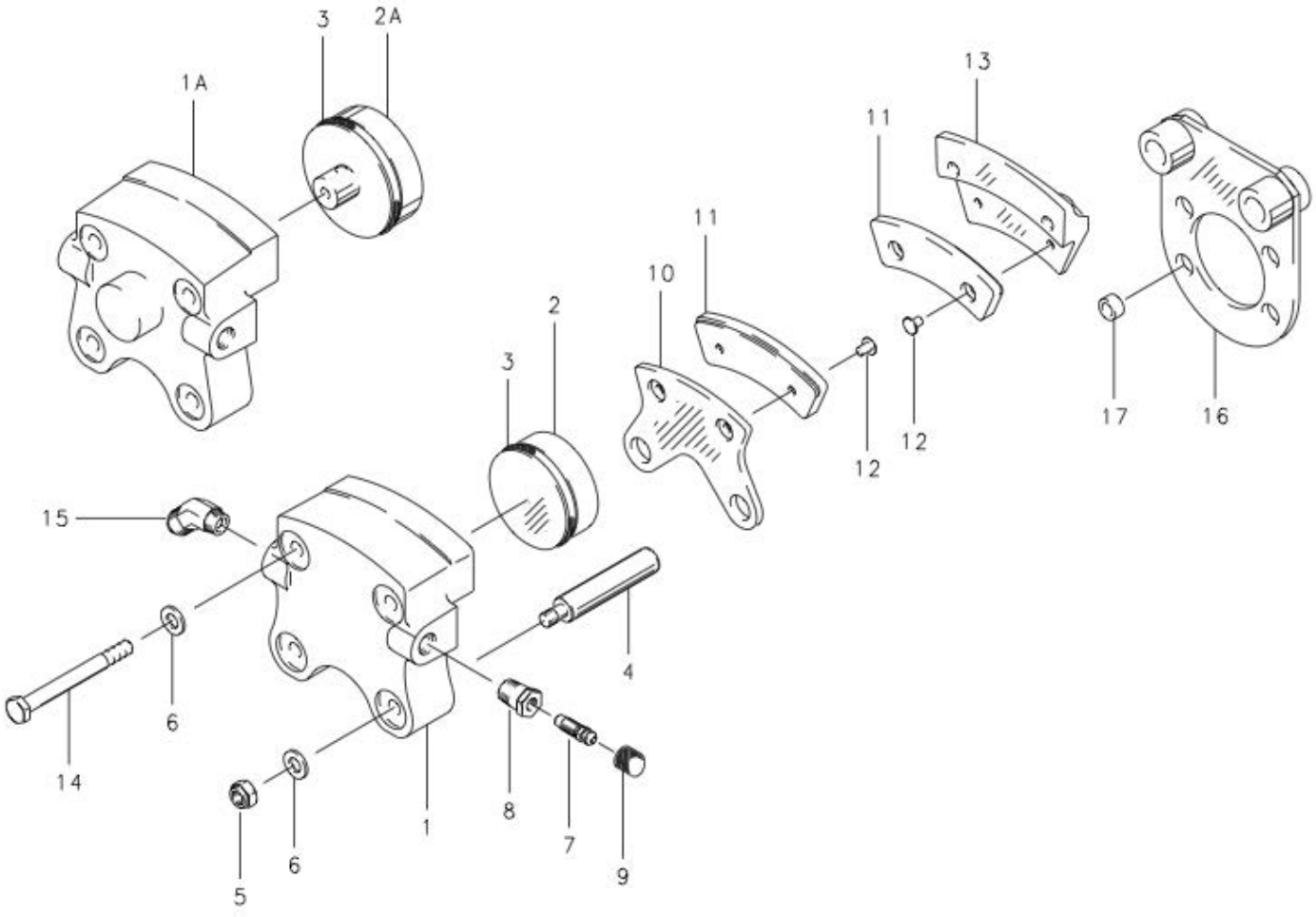
- Verify Registration and Airworthiness Certificate are displayed in the aircraft.
- Verify Operating Limitations are attached to the Airworthiness Certificate
- Verify checklist and Aircraft Operating Manual are in aircraft
- Verify the Weight and Balance report is current and in the aircraft
- Verify external data plate secure and installed
- Review Service Bulletins for applicability and compliance
- Verify IFR pitot/static test date and mark on calendar for new test reminder
- Document condition inspection and record maintenance performed

NOTES:

Excerpted from Cleveland AWBCP0001-17/USA Pages 3-12, 3-13, and 4-44.

30-53, 30-53A, 30-59, 30-59A, 30-59D, 30-59E

Organic Lining



30-53, 30-53A, 30-59, 30-59A, 30-59D, 30-59E

Organic Lining

FIG.	PART NUMBER	DESCRIPTION	QTY. PER ASSY. A	B	C	D	E	F
	091-09600	Cylinder Assy.			1	1		1
	091-09800	Cylinder Assy.	1	1				
	091-11100	Cylinder Assy.					1	
1	061-07300	Cylinder	1	1				
	061-07500	Cylinder			1	1		1
1A	061-08900	Cylinder					1	
	092-01700	Piston Assy.					1	
	092-03200	Piston Assy.	1	1				
	092-04000	Piston Assy.			1	1		
2	062-03000	Piston	1	1				
	062-03900	Piston			1	1		1
2A	062-01600	Piston					1	
3	101-02700	O-Ring (MS28775-222)	1	1				
	101-05200	O-Ring (MS28775-224)			1	1	1	1
4	069-00400	Anchor Bolt	2	2	2	2	2	2
5	094-10300	Nut (MS21044-N4)	2	2	2	2	2	2
6	095-10200	Washer (AN960-416L)	4	4	4	4	4	4
7	079-00300	Screw-Bleeder	1	1	1	1	1	1
8	081-00100	Seat-Bleeder	1	1	1	1	1	1
9	183-00100	Cap-Bleeder	1	1	1	1	1	1
	073-04600	Pressure Plate Assy.	1	1	1	1	1	1
10	063-03400	Pressure Plate	1	1	1	1	1	1
11	066-11200	Lining	1	1	1	1	1	1
12	105-00200	Rivet	2	2	2	2	2	2
	074-03600	Back Plate Assy.	1	1	1	1	1	1
13	064-02900	Back Plate	1	1	1	1	1	1
11	066-11200	Lining	1	1	1	1	1	1
12	105-00200	Rivet	2	2	2	2	2	2
	103-11600	Bolt	2				2	
14	103-11700	Bolt (ABP4-20AM)			2	2		2
	103-12300	Bolt (AN4H17A)		2				
15	104-00500	Fitting (MS20823-4D)					1	
	075-07800	Torque Plate Assy.			1		1	
16	075-03700	Torque Plate Assy.				1		1
	075-14200	Torque Plate Assy.		1				
	(2)	Torque Plate Assy.	1					
17	145-01000	Bushing				2		

Assy. Number

A) 30-53 (1)

B) 30-53A LH & RH

C) 30-59

D) 30-59A

E) [illegible]

F) 30-59E

NOTES:

(1) Inactive assembly – spares support only for parts listed.
(2) Inactive part – no longer available for spares support.

40-59, 40-59A, 40-59D, 40-59E

Tube-Type

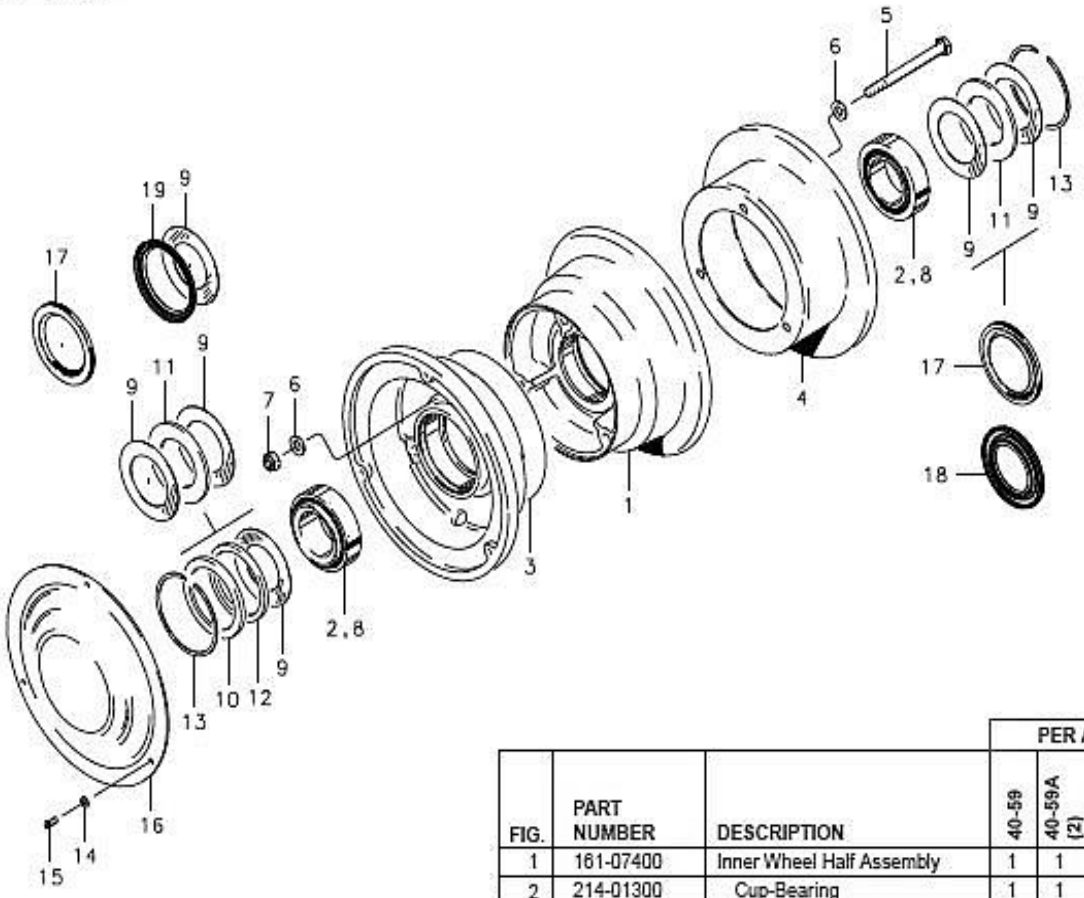


FIG.	PART NUMBER	DESCRIPTION	PER ASSY. 40-59	40-59A (2)	40-59D	40-59E
1	161-07400	Inner Wheel Half Assembly	1	1	1	1
2	214-01300	Cup-Bearing	1	1	1	1
3	162-06900	Outer Wheel Half Assembly	1	1	1	1
2	214-01300	Cup-Bearing	1	1	1	1
4	164-06900	Brake Disc	1		1	1
	164-07500	Brake Disc		1		
	164-17500 (1)	Brake Disc - Chrome		1		
	(3)	Brake Disc - Performance Gold		1		
5	103-21800	Bolt (AN5-34A)	3	3	3	3
6	095-10500	Washer (AN960-516)	6	6	6	6
7	094-10400	Nut (MS21044-N5)	3	3	3	3
8	214-01400	Cone-Bearing	2	2	2	2
9	153-00300	Ring-Grease Seal	1	1		1
	153-00900	Ring-Grease Seal				2
10	153-01500	Ring-Grease Seal				1
11	154-00800	Felt-Grease Seal				1
12	154-01300	Felt-Grease Seal				1
13	155-00100	Snap Ring	2	2	2	2
14	095-15100	Washer-Lock (MS35333-38)			3	
15	102-00600	Screw			3	
16	157-00900	Dust Shield			1	
17	154-03000	Molded Grease Seal			2	
18	154-12000	Molded Grease Seal	1	1		
19	154-12400	Molded Grease Seal	1	1		

NOTES:

(1) Alternate chrome plated disc.

(2) Also available with chrome plated disc. To order, specify assembly number followed by "CHROME."

(3) Performance gold disc no longer available.

ELT Inspection and Self-test

Check for proper installation.
Check for battery corrosion whenever the battery is replaced.
Check for proper operation of the controls (self test):

1 Ensure aircraft power is off
2 Press the TEST button for one second. Repeat one time. Release.
3 A green light will illuminate for 10 seconds then go out for three seconds.
4 System status as indicated:

Flash Pattern	Message
	Test Passed/No GPS Data
	Battery odometer less than 36 hours
	Transmitter chain failure--contact mfg
	Antenna Fault

5 Sensor test:

Disconnect all wiring. Hold the unit facing away. Check for operation of the crash sensor by applying a rapid forward motion that comes to an abrupt stop. The unit will go into fault mode as indicated by two flashing red lights. This indicates that the unit was activated by the G-switch but failed to transmit because no antenna was detected.

Perform the GNSS self-test for sufficient radiated energy:

Flash Pattern	Message
	Test passed with GPS data present
	Test passed without GPS data present
	Maximum GNSS self-test exceeded
	Battery odometer less than 36 hours
	Transmitter chain failure-contact mfg
	Antenna fault

INSTRUMENT PANEL ACCESS

EFIS 1
Remove the four screws from the corners.
Remove pitot, static, and AOA plumbing from the AHRS connectors.
Remove the wiring connectors.
Remove the EFIS and set it aside.

EFIS 2
Remove four screws securing the panel.
Remove the G5 wiring connector.
Remove the tubing as necessary to remove the instrument cluster.

Glovebox
Remove the upper side panels as necessary to access the outboard placard screws.
Remove the two outboard screws attaching the lighted placard assembly.
Carefully peel back the placard material at the junction between radio stacks. Remove the third screw from the center of the placard assembly.
If necessary, disconnect the wiring from the right side of the placard assembly. Set the assembly aside.
Remove the perimeter screws securing the glove box section. Note the length of the screws.
Flex the right side kick panel down with the top edge leaning towards the control stick.
Pull out the glovebox section. It may be necessary to pull the heater knobs all the way out.
Disconnect the audio jack connector.
Disconnect the ELT remote connector.
Remove two screws from inside the glovebox to remove the lighting controller.
Remove the glovebox section.

Storage Bin
Remove EFIS 1.
Remove the four screws on the instrument panel attaching the storage bin.
Maneuver the storage bin out from behind the panel through the EFIS 1 mounting hole.

Aft firewall
Remove the access panels forward of the base of the windshield.

E-Mag LED Codes

RED LED USE CAUTION

When A is powered and E is open, (IGN in the FLY position), the unit displays a red LED and is capable of producing a spark at the spark plug.

BLUE GREEN
WHITE YELLOW

Blue, green, white, and yellow LED color codes are enabled when A is powered and E is grounded. This configuration can be accomplished by using the LED Code Tool (Figure A) is attached to the connector on the ignition unit. Spark is disabled when the LED Code Tool is installed.

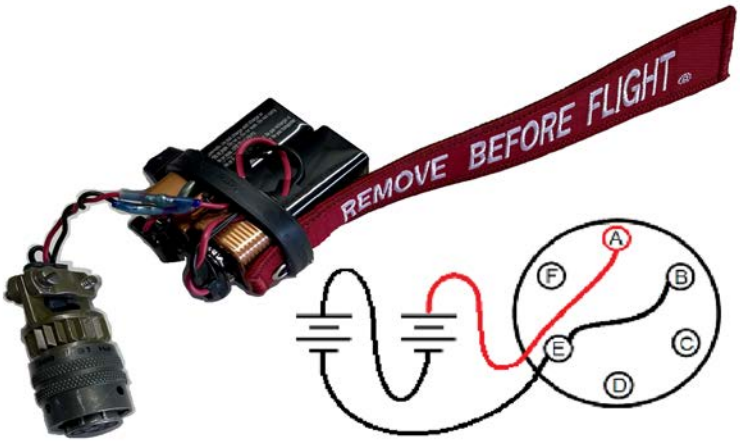
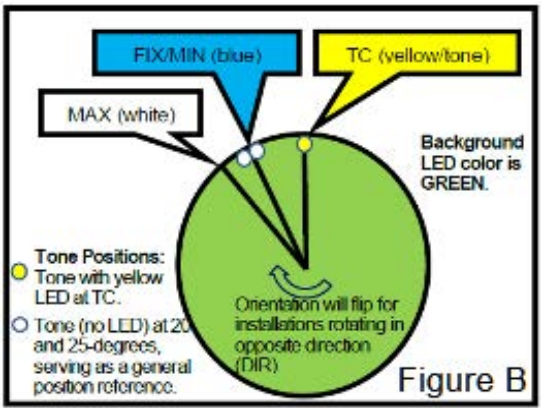


Figure A
LED Code Tool



Ignition setpoints

LEDs

GREEN is the default background color.

YELLOW (with tone) indicates the ignition Top Center (TC) setpoint.

NOTE: YELLOW is a composite color that appears as rapidly alternating colors.

BLUE indicates the MIN setpoint, the lower end of the spark range, generally around 20 BTC.

WHITE signals MAX setpoint, the upper end of the spark range, around 29 BTC.

Tones

Ignition TC – steady tone with YELLOW LED.

Ignition 20 and 25 degree positions (not associated with LED MIN/MAX). 20 and 25 are for the sole purpose of helping installers locate their chosen MIN and MAX setpoints. After setting TC, these tones will sound at the 20 and 25-degree positions. See Figure B. Other positions (18, 22, 35, etc.), if needed, can be interpolated from these references.

NGK spark plug designation
BR8EIX (E-MAG default)
B: 14mm X 1.25mm thread, 13/16" hex
R: Resistor
8: Heat Range where 2 is hot, 12 is cold
E: 19mm (3/4") reach or thread length
IX: 0.6mm Fine Wire Iridium^{o}

Excerpted from Lycoming Overhaul Manual:

CRUSH TYPE ASBESTOS GASKETS		
Threads/Inch On Part To Be Tightened	ANGLE OF TURN	
	Aluminum Asbestos	Copper Asbestos
8	135^{o}	67^{o}
10	135^{o}	67^{o}
12	180^{o}	90^{o}
14	180^{o}	90^{o}
16	270^{o}	135^{o}
18	270^{o}	135^{o}
20	270^{o}	135^{o}
24	360^{o}	180^{o}
28	360^{o}	180^{o}

NOTE
Install all crush type gaskets, except the self centering type, with the unbroken surface against the flange of the plug or part being tightened against a seal. Turn the part until the sealing surfaces are in contact and then tighten to the angle of turn listed in for the appropriate thread size.

NOTE
Lubricate all threads unless otherwise specified.

COMMON SERVICE ITEMS

ITEM	SUPPLIER	PART NUMBER
Air Filter	K&N	E-3450 (available pre-oiled)
Alternator Brush	Aircraft Spruce (ACS), etc.	10-1020
Alternator, 60A	Plane Power	AL12-EI60
Battery, Auxiliary	Earth-X	ETX680
Battery, Main	Earth-X	ETX900
Brake pads	Cleveland or Rapco	66-112
Brake rivets	Cleveland or Rapco	105-2
ELT batteries	Emerging Lifesaving Technologies	217-406-001
Engine Oil	Various	Aeroshell 15W-50
Hydraulic (brake) Fluid	Various	MIL-H-83282 or MIL-H-5606
Nose Pivot Grease	Various	Aeroshell 6
Nosewheel and Bearings	Matco Manufacturing	NW501
Oil Filter	Various	48109 (preferred) or 48108
Oil Screen Gasket	Various	AN900-16 or MS35769-21 (same)
Propeller Grease	Various	Aeroshell 6
Spark Plugs	Various	NGK BR8EIX
Tires	Desser, ACS, Vans	15x6.00-6 Mains, 5.00-5 Front
Tubes	Desser, ACS, Vans	Follows tire size. Use 90° stems.
Wheel Bearing Grease	Various	Mobil 28

Service Kit

A kit containing some spare parts and service items can travel with the airplane. Contents are as follows:

Window Cleaner	CAV-110 w/ 2 O-Rings
Terry & Microfiber Towels	Gas Cap & O-Rings
1 qt 15W50	4 Brake Caliper O-Rings
3 Tie-Down Straps	4 Brake Pads And Rivets
Red Tie-Down Extender	2 NGK Spark Plugs
2 Wheel Chocks	Regulator/Brush Assy
Yellow Cargo Strap	Battery Charger
USB Adapter	By:_____ Date:_____

The following additional tools and supplies are generally located in the cockpit, baggage door, or survival kit:

(C) Cowling Screwdriver	(C) Multi-tool
(S) Hatchet/Saw/Hammer tool	(S) Scissors
(B) Valve Stem Cap Driver	(S) Duct Tape
(B) Valve Stem Filler Adapter	(C) (S) (B) Flashlights & Headlamps
	By:_____ Date:_____

(C) cockpit (B) baggage door (S) survival kit

Ground Handling

Moving

Ground handling should usually be accomplished with a tow bar or tug attached to the front wheel. The front wheel can pivot suddenly when being pushed backwards, causing the empennage and wingtips to change direction rapidly and potentially cause damage.

The aircraft can be turned in very tight quarters if one person maneuvers each wing tip.

Securing

Install tie-down rings in each wing. Don't tighten them too much. A half-turn from bottoming is adequate. Secure the plane to the ground with provided ropes or chains, or the red straps and clips from the Service Kit.

The tail tie down is permanently installed. Secure the tail like the wings.

Use chocks under each wheel to prevent rocking.

Insert the tow bar lower tabs between the rudder pedals and the lower pedal tube. Secure the control stick with the bungee attached to the tow bar. Loop the lap belt over the T handle to secure the tow bar.

Install the pitot cover and fuel vent covers from the baggage door.

Lock the baggage door.

Lock the cabin doors by engaging the external locks. Finger-tight is adequate.

Install the canopy cover. Secure the sack for the cover to a strap and tuck the sack under the cover.

END OF SECTION

BLANK