**R1224 REGULATOR INSTALLATION INSTRUCTIONS**

**Read this page before beginning installation**

Some aircraft models were manufactured with different regulators and different wiring arrangements, plugs, etc. Some installations can be accomplished using the basic R1224 Installation Instructions in (12-1001 pages 2, & 3). Supplemental information for individual regulators is provided where necessary. To account for model differences follow the steps below to ensure proper replacement:

1. Find your aircraft model and OEM P/N in the Installation Guide.
2. Follow basic Installation Instructions (12-1001) and the supplemental information when listed.

### Installation Guide

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R1224 & R1224B
REV. C

SUPERCEDED
VERSION SEE STEP 7

DETAIL A

NAMEPLATE MATERIAL TO BE ADHESIVE BACKED SILVER POLYESTER WITH PERMANENT THERMAL PRINT

VOLTAGE ADJUST INCREASE

28VOLT JUMPER POSITION

28VOLT JUMPER POSITION

JUMPER #1 SHOWN IN 14 VOLT POSITION

NOTE: JUMPERS 1 & 2 MUST BE IN THE SAME VOLTAGE POSITION FOR OPERATION AT SELECTED VOLTAGE. AS SHOWN BY DETAIL A

PLANE POWER, LTD.
R1224 ALTERNATOR REGULATOR INSTALLATION INSTRUCTIONS

STANDARD TOLERANCES
ALL DIMENSIONS IN INCHES UNLESS SPECIFIED

DEGREES XX.XX, 360°, 180°, 90° ANGLES ± 1 DEG.
FRACTIONS 1/16, .005 CONCENTRICITY .0005
METRIC TOLERANCES .1 X .02, .2 X .02
PARENSSES ARE REFERENCE DWG.

DRAWN BY: B. JOWERS  DATE: 8/08/06

MATERIALS  DWG. NO: 12-1001  REV: G
Single Engine

READ AND UNDERSTAND ALL INSTRUCTIONS BEFORE APPLYING POWER TO UNIT

1. Remove existing regulator and solid-state over-voltage module (if installed).

2. Install R1224/R1224B Regulator in same location as regulator being replaced. If mounting holes do not align add mounting holes as required using acceptable methods, techniques and practices.

3. Connect GRND terminal to aircraft ground. **It is critical that the regulator ground is connected to airframe ground. Without this ground, the regulator and its internal overvoltage protection cannot function.**

4. Connect the FLD terminal to the FIELD (brush) terminal of the alternator.

5. Connect the ENABLE terminal to the regulator/field power source (the wire from the cockpit ALTERNATOR FIELD switch which is fed from a 7.5 max amp breaker). Note: In order for the over voltage protection circuit to operate the enable terminal must be connected to an operational circuit breaker. (In the event of an over-voltage condition the over-voltage protection circuit will cause the circuit breaker to trip removing all power from the regulating circuit.) **Do not install R1224/R1224B in any aircraft that has an automatic resetting circuit breaker in the enable line.**

6. If the regulator being replaced has a connection to the AUX terminal on the alternator, connect this wire to the AUX terminal. If not, install a jumper wire between AUX and ENABLE. Note: No connection to AUX terminal is necessary if an alternator out lamp is not installed.

7. If the installer wishes to sense voltage at a source other than ENABLE terminal: remove jumper between ENABLE terminal and SENSE terminal. Connect SENSE terminal to desired location.

   For superceded versions of the R1224/R1224B (Rev B & previous) indicated by silver label, step 7 does not apply and no sense terminal exists. Wiring of a ‘Sense’ terminal on these regulators will result in damage to the regulator.

8. If an ALTERNATOR out lamp is installed in the aircraft and is to be actuated by the R1224/R1224B regulator Connect the negative wire of the lamp to the LAMP terminal of the R1224/R1224B regulator.

9. **Remove the regulator cover and ensure that the internal jumper #1 and jumper #2 are set to the proper voltage for the aircraft system.** Refer to the picture on page 1.

10. With the engine running and the alternator switch turned on, using a small screwdriver, set the regulator’s voltage adjustment so that the bus voltage, as measured at the ENABLE terminal is the desired value. Refer to aircraft maintenance manual or battery manufacturer's data for proper voltage setting.

11. Reinstall the R1224/R1224B cover.

Multi-Engine

1. For both regulators, perform steps 1-11 of the Single Engine procedure above.

2. Choose one regulator as the MASTER. It can be either. Connect the OUT terminal of the MASTER Regulator to the IN terminal of the other Regulator.

   NOTE: Both regulators must be the same part number. Adjustments to the voltage setting of each regulator may be made by turning the other alternator switch off.
Instructions For Continued Airworthiness

It is recommended that the operation of the Plane Power, Ltd. Voltage Regulator be checked every 100 hour inspection or every annual inspection which ever comes first.

If the regulator is operating at the required voltage level, no adjustment is necessary. If the voltage level does not meet the Aircraft Manufacturer’s requirement, adjust the voltage per instructions.

Each 100 hour inspection, the regulator and its’ associated wiring should be checked for secure electrical connections and physical connection to the airframe.

To maintain the inherent protection from HIRF and lightning, as well as over voltage protection of the aircraft electrical system, ensure the ground connection between terminal 1 (GRND) and airframe ground is less than 0.1 OHM.

No special tools are required.
**Guide A**

**Two-Wire Regulators** (Wico, Electrodelta VR-200, VR-710, Wico FVR-4004, X17990, Piper 765-055, 688804, Rockwell B-00331-1)

Grumman AA1B, AA1C
Piper PA-28, PA-32, PA-34-200
Rockwell Commander 114, 114A, 114B, 114TC

These regulators were connected via 3 color-coded wires. Cut the wires near the regulator and crimp the provided ring lugs onto the wires.

- Remove old regulator.
- Ensure that the R1224 jumpers are set for 14V. See Plane-Power R1224 Installation Drawing 12-1001.
- Install R1224 using 12-1021 Adaptor Plate.
- Connect the Black wire to R1224 #1 (GND).
- Connect the Yellow (Field) wire to R1224 #2 (Field).
- Connect the Red (Power) wire to R1224 #3 (Enable).
- Jumper R1224 #3 (Enable) to #4 (Aux).
- **For R1224 Rev C and later (see drawing):** Remove jumper between #8 (Sense) and #3 (Enable). Connect the A (Sense) wire to R1224 #8 (Sense)

If the aircraft was equipped with an overvoltage relay, it may be removed, as the R1224 has internal overvoltage protection. Splice together the power input and output wires that went to the overvoltage regulator.

Adjust voltage as necessary with engine running and alternator enabled.

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**Guide B**

**Two-Wire Regulators** (Electrodelta VR371, VR-500, Cessna, C611002, C611004, C611005.)

American Champion 7ECA, 7GC series, 8GC series.

Cessna 152, 172, 177, 180, 182, 188, 206, 207, 210, 337 series

These regulators were connected via 3 color-coded wires. Cut the wires near the regulator and crimp the provided ring lugs onto the wires.

- Remove old regulator.
- Ensure that the R1224 jumpers are set properly for the aircraft voltage. **Check the aircraft!** See Plane-Power R1224 Installation Drawing 12-1001.
- Install R1224 using 12-1021 Adaptor Plate.
- Connect the Black wire to R1224 #1 (GND).
- Connect the Blue (Field) wire to R1224 #2 (Field).
- Connect the Red (Power) wire to R1224 #3 (Enable).
- Jumper R1224 #3 (Enable) to #4 (Aux).
- **For R1224 Rev C and later:** Remove jumper between #8 (Sense) and #3 (Enable). Connect the A (Sense) wire to R1224 #8 (Sense)

If the aircraft was equipped with an overvoltage relay, it may be removed, as the R1224 has internal overvoltage protection. Splice together the power input and output wires that went to the overvoltage regulator.

Adjust voltage as necessary with engine running and alternator enabled.
Guide C

**Four-Wire Regulators** (Electrodelta VR515, Cessna C611501, C611504 (28V))

Cessna 152, 172, 177, 180, 182, 188, 206, 207, 210 series
Commander 114B, 114TC

Use R1224 and 12-1021 Adaptor Plate.

These regulators were connected via 5 color-coded wires. Cut the wires near the regulator and crimp the provided ring lugs onto the wires.

- Remove old regulator.

- Ensure that the R1224 jumpers are set properly for the aircraft voltage. **Check the aircraft!** See Plane-Power R1224 Installation Drawing 12-1001.

- Install R1224 using 12-1021 Adaptor Plate.

- Connect the Black wire to R1224 #1 (GRND).

- Connect the Blue (Field) wire to R1224 #2 (FIELD).

- Connect the Red (Power) wire to R1224 #3 (ENABLE).

- Connect the Yellow (Lamp) wire to R1224 #5 (LAMP).

- Jumper R1224 #3 (ENABLE) to #4 (AUX).

- **For R1224 Rev B and earlier:** Insulate the end of the Orange (Sense) wire and stow it safely.

  **For R1224 Rev C and later:** Remove jumper between #8 (SENSE) and #3 (ENABLE). Connect the Orange (Sense) wire to R1224 #8 (SENSE)

  Insulate the end of the White (OV Lamp) wire and stow it safely. (The R1224 indicates Over Voltage and Low Voltage on a common lamp connected to R1224 #5.)

Adjust voltage as necessary with engine running and alternator enabled.

Guide D

**Ford Regulators**

Grumman AA5 series
Cessna singles

The Ford regulators were connected via a flat plastic plug. Label the wires and cut the plug off. **Marking the wires is important for reconnection!** Crimp the provided ring lugs onto the wires.

- Remove old regulator.

- Ensure that the R1224 jumpers are set properly for the aircraft voltage. Grumman AA-5, AA-5A and AA-5B are 14V. Single-engine Cessna aircraft were 14V or 28V – **check the aircraft!** See Plane-Power R1224 Installation Drawing 12-1001.

- Install R1224. The large holes in the base match the mounting holes used to mount the Ford regulator. Some mounting locations may have protrusions under the regulator, as the Ford units had a hollow area underneath. If this is the case, mount the R1224 on standoffs or use the 12-1021 Adaptor Plate. The 12-1021 can be purchased from Plane-Power

  - Connect the G (Ground) wire to R1224 #1 (GRND).

  - Connect the F (Field) wire to R1224 #2 (FIELD).

  - Connect the S (Supply) wire to R1224 #3 (ENABLE).

  - Jumper R1224 #3 (Enable) to #4 (AUX).

  - **For R1224 Rev B and earlier:** Insulate the end of the A (Sense) wire and stow it safely.

  - **For R1224 Rev C and later:** Remove jumper between #8 (SENSE) and #3 (ENABLE). Connect the A (Sense) wire to R1224 #8 (SENSE)

Adjust voltage as necessary with engine running and alternator enabled.
Guide E

Beechcraft regulators
V35B, V35B-TC, 36, A36, A36TC, B36TC
Beechcraft P/N 60-389017-3, 36-380056-5, 36-380096.1

There is a round connector on these Beechcraft regulators. A round plug on a cable is plugged into the connector on the regulator.

Use R1224B with the Plane-Power 12-1016 Installation Aid (round connector on a short cable. Purchase the 12-1016 connector from Plane-Power).

- Ensure that the R1224B jumpers are set properly for the aircraft voltage. **Check the aircraft!** See Plane-Power R1224 Installation Drawing 12-1001.

- Jumper R1224B #3 (Enable) to #4 (Aux).

- **For R1224B Rev C and later:** Ensure that there is a jumper between #8 (SENSE) and #3 (ENABLE).

- Attach the wires from the 12-1016 Installation Aid to the R1224B regulator as shown in the drawing here.

- Unplug the cable from the regulator. Remove old regulator.

- Install R1224 in the location from which the Beechcraft regulator was removed.

- Connect the cable to the round connector on the 12-1016 Installation Aid.

Adjust voltage as necessary with engine running and alternator enabled.

Guide F

Electrodelta (or WICO) Paralleling Regulators (VR710)
Piper PA-34-200 Seneca (Piper 584 340)

Use two R1224 regulators set for 14V. Use the 12-1021 adaptor plate for mounting (which can be purchased from Plane-Power). **Both regulators must be replaced.**

- Ensure that the R1224 internal jumpers are set properly for the aircraft voltage. See Plane-Power R1224 Installation Drawing 12-1001.

- Cut the wires close to the regulator case of the Electrodelta or Wico regulators and crimp one of the ring lugs provided with the R1224 on each Red and Blue (or Yellow) wire. Remove remaining wires or insulate the ends.

- Remove the old regulators and the associated Over voltage Relays (The R1224 has internal over voltage control so the original units are not needed).

- Install R1224 regulators with 12-1021 adaptor plates in the location from which the original regulators were removed. Ground is obtained from the mounting so be sure that the regulators are mounted securely. It is advisable to connect a wire from #1 (Ground) of each R1224 to aircraft ground.

- Connect each Blue (or Yellow) wire to #2 (Field) of the corresponding R1224.

- Connect each Red wire to #3 (Enable) of the corresponding R1224.

- **Ensure that there is a jumper between #3 (Enable) and #4 (Aux) of each R1224B.** **For R1224B Rev C and later:** Ensure there is a jumper between #3 (Enable) and #8 (Sense) of each R1224B.

- Connect a wire from the right alternator’s R1224 #6 (In) to the left alternator’s R1224 #7 (Out). This designates the right R1224 as Slave and the left R1224 as Master for load-sharing operation.

Lamp Modification
The PA-34-200 is equipped with a press-to-test over voltage Lamp for each alternator/ regulator.
Guide G

Lake Regulators (Electrodelta VSF-7202, VSF-7204)

Lake LA4-200, Lake Model 250

These regulators were connected via screw terminals. Label the wires and remove from regulator terminals. **Labeling the wires is important for reconnection.** Cut the ring lugs off of the wires crimp the provided (smaller) ring lugs onto the wires.

- Remove old regulator.
- Ensure that the R1224 jumpers are set for 14V. See Plane-Power R1224 Installation Drawing 12-1001.
- Install R1224 by drilling new mount holes in aircraft or into 12-1021 Adaptor Plate to match the original regulator mount holes in the aircraft.
- Connect the wire marked I to R1224 #3 (ENABLE).
- Connect the wire marked F to R1224 #2 (Field).
- Jumper R1224 #3 (Enable) to #4 (Aux).
- Ensure that there is a jumper between R1224 #8 (Sense) and #3 (Enable).
- It is advisable to connect a wire between the aircraft ground (one of the regulator mounting bolts is a good point) and R1224 #1 (GRND).

Adjust voltage as necessary with engine running and alternator enabled.

Guide H

Lamar Paralleling Regulators

SOCATA GA-7.
Partenavia (Vulcanair) P68 series.

Use 2 R1224B as the mounting holes match the Lamar regulators. **Both regulators must be replaced.**

- Ensure that the R1224B internal jumpers are set properly for the aircraft voltage. See Plane-Power R1224 Installation Drawing 12-1001.
- Mark the wires on the Lamar regulators and disconnect them. **Wire Identification is important for reconnection!**
- Remove the old regulators. If the aircraft was equipped with Lamar Over voltage Relays you can remove them if you desire. (The R1224B has internal over voltage control so the Lamar units are not needed).
- Install R1224B regulators in the location from which the Lamar regulators were removed.
- If the ring lugs on the wires are too large, cut them off and crimp on the provided lugs.
- Connect each G wire to #1 (Ground) of the corresponding R1224B.
- Connect each F wire to #2 (Field) of the corresponding R1224B.
- Connect each S or B wire to #3 (Enable) of the corresponding R1224B.
- Ensure that there is a jumper between #3 (Enable) and #4 (Aux) of each R1224B. **For R1224B Rev C and later:** Ensure there is a jumper between #3 (Enable) and #8 (Sense) of each R1224B.
- Connect the paralleling wire of the right alternator regulator to #6 (IN), thereby designating this regulator as the SLAVE for load-sharing operation.
- Connect the paralleling wire of the left alternator regulator to #7 (OUT), thereby designating this regulator as the MASTER for load-sharing operation.

**Voltage Adjustment:**

Remove the regulator covers. With the engines running, enable only the left (MASTER) alternator and regulator. **Make sure that the right regulator & alternator are disabled.** Adjust the MASTER R1224B for the desired voltage.

Disable the left (MASTER) alternator and regulator and enable the right (SLAVE) R1224B. **Make sure that the left regulator & alternator are disabled.** Adjust the SLAVE R1224B for the desired voltage.

Replace the regulator covers.
Guide I

Replacing R2540-type Regulators
True-Flight (Grumman) AG-5B R2540A, B-00368-15

Prepare the replacement regulator:

- Use the R1224 regulator and a 12-1021 mounting plate (which can be purchased from Plane-Power). Ensure regulator jumpers are set to match aircraft battery voltage (12V or 24V).
- Ensure that the factory installed jumper between SENSE and ENABLE is in place.

Prepare the installation:

- Cut the wires at the regulator body and new ring lugs provided with the R1224 regulator.
- Unplug the wire connector from the aircraft plug.
- Connect the ring lugs to the R1224 regulator as shown below:
  - Red to ENABLE
  - Blue to Field
  - White to AUX
  - Yellow to LAMP
- Mount the R1224 regulator on the 12-1021 plate using appropriate AN or MS hardware.

Replace the regulator:

- Remove the original regulator from the aircraft.
- Install the R1224 regulator on the 10-1021 plate in the same location using existing hardware.
- Plug the harness from the R1224 the aircraft plug.
- Remove the alternator lamp lead from the ALTERNATOR switch on the aircraft and connect it to the aircraft positive BUS via a 1A in-line fuse & holder.

The installation is complete after testing.

Guide J

Grumman AG-5B regulators

The AG-5B regulators were connected via a 4-pin plastic plug and a ground wire with a large ring-lug. Cut the wires near the regulator and crimp the provided ring lugs into the wires. Remove old regulator.

- Ensure that the R1224 jumpers are set for 28V. See Plane-Power R1224 Installation Drawing 12-1001.
- Install R1224 using the 12-1021 adaptor plate. Put the large ring lug on the black wire under one of the mounting bolts.
- Connect the Black (Ground) wire to R1224 #1 (GND).
- Connect the Blue (Field) wire to R1224 #2 (Field).
- Connect the Red (Enable) wire to R1224 #3 (Enable).
- Connect the Yellow (Lamp) wire to R1224 #5 (Lamp)
- Jumper R1224 #3 (Enable) to R1224 #4 (Aux).
- **For R1224 Rev C and later:** Ensure that there is a jumper between R1224 #3 (Enable) and #6 (Sense).

Lamp Modification:

- Remove wire EL36A20 from the output side of the Alternator Control circuit breaker and connect it to the input side of the circuit breaker through a 1A fuse.

Adjust voltage as necessary with engine running and alternator enabled.

The installation is complete after testing.
Guide K

Replacing LAMAR Regulators

Socata GA7 B-00288
Cessna 9910126-2, 9910126-3
Piper 550-390, 550-393, 84199-006, 84199-007
Vulcanair (Partenavia) NOR7.375.3

Prepare the replacement regulators:

- Use two R1224B regulators. Ensure regulator jumpers are set to match aircraft battery voltage (12V or 24V).
- Ensure that the factory jumper between SENSE and ENABLE is in place on both R1224B regulators.
- Add a jumper between SENSE and AUX on both R1224B regulators.

Prepare the installation:

- Tag the wires to both LAMAR regulators: BUS, FIELD, GND, PAR.
- Cut the terminals off the end of these wires and install new ring lugs provided with the R1224B regulators.

Replace the regulators:

- Remove the Lamar regulators from the aircraft.
- Install the R1224B regulators in the same location using existing hardware.
- Connect the wires removed from the LAMAR regulators to the corresponding replacement R1224B:
  - GND to GRND
  - BUS to ENABLE
  - FIELD to FLD
- Choose one R1224B as “MASTER” and connect the PAR wire that was removed from one LAMAR regulator to the OUT terminal.
- Connect the other PAR terminal to IN on the remaining R1224B regulator.

The installation is complete after testing.

Guide L

Replacing FORD-type Regulators

True-Flight (Grumman) C6FF-10316BA, D4FF-103160BA
Cessna C611001-0101 –0102 –0105 –0201, C611004-0102

Prepare the replacement regulator:

- Use the R1224 regulators. Ensure regulator jumpers are set to match aircraft battery voltage (12V or 24V).
- Remove the factory jumper between SENSE and ENABLE.
- Add a jumper between ENABLE and AUX.

Prepare the installation:

- Tag the wires to the FORD-type regulator: A, F, S
- Cut the terminals off the end of these wires and install new ring lugs provided with the R1224 regulator.

Replace the regulator:

- Remove the FORD-type regulator from the aircraft.
- Install the R1224 regulators in the same location using existing hardware.
- Connect the wires removed from the FORD-type regulator to the corresponding replacement R1224:
  - A to SENSE
  - S to ENABLE
  - F to FLD

The installation is complete after testing.
INTERAV These are installed on aircraft, which have been converted to an alternator from a generator by STC SA334SW.

Use R1224.

Label the wires! **Labeling the wires is important for reconnection!** If the ring lugs are damaged, crimp the provided ring lugs onto the wires.

- Remove Interav regulator and over voltage relay. The R1224 has internal over voltage protection, so the Interav over voltage relay is no longer needed.

- Ensure that the R1224 jumpers are set for 14V. See Plane-Power R1224 Installation Drawing 12-1001.

- Install R1224 in the location from which the InterAv regulator was removed.

- Remove the wires on both terminals of the ALTERNATOR switch (on the aircraft panel). Connect one terminal of the switch to the 5A breaker where the wire to “Red-Pos” of the Interav OV Relay was connected. Connect the other terminal of the switch to R1224 #3 (Enable).

- Connect the GND (Ground) wire to R1224 #1 (GRND).

- Connect the Field terminal of the alternator to R1224 #2 (FLD).

- Jumper R1224 #3 (Enable) to #4 (AUX).

- **For R1224 Rev C and later:** Ensure that there is a jumper between R1224 #8 (SENSE) and #3 (ENABLE).

- Remove all disconnected and unused wires.

- If a warning lamp is incorporated, connect one terminal of the lamp to R1224 #5 (Lamp) and the other terminal of the lamp to the aircraft bus through a 1A fuse or breaker. Be sure the lamp is a 100-milliamp bulb or it will not work properly.

Adjust voltage as necessary with engine running and alternator enabled.

The installation is complete after testing.