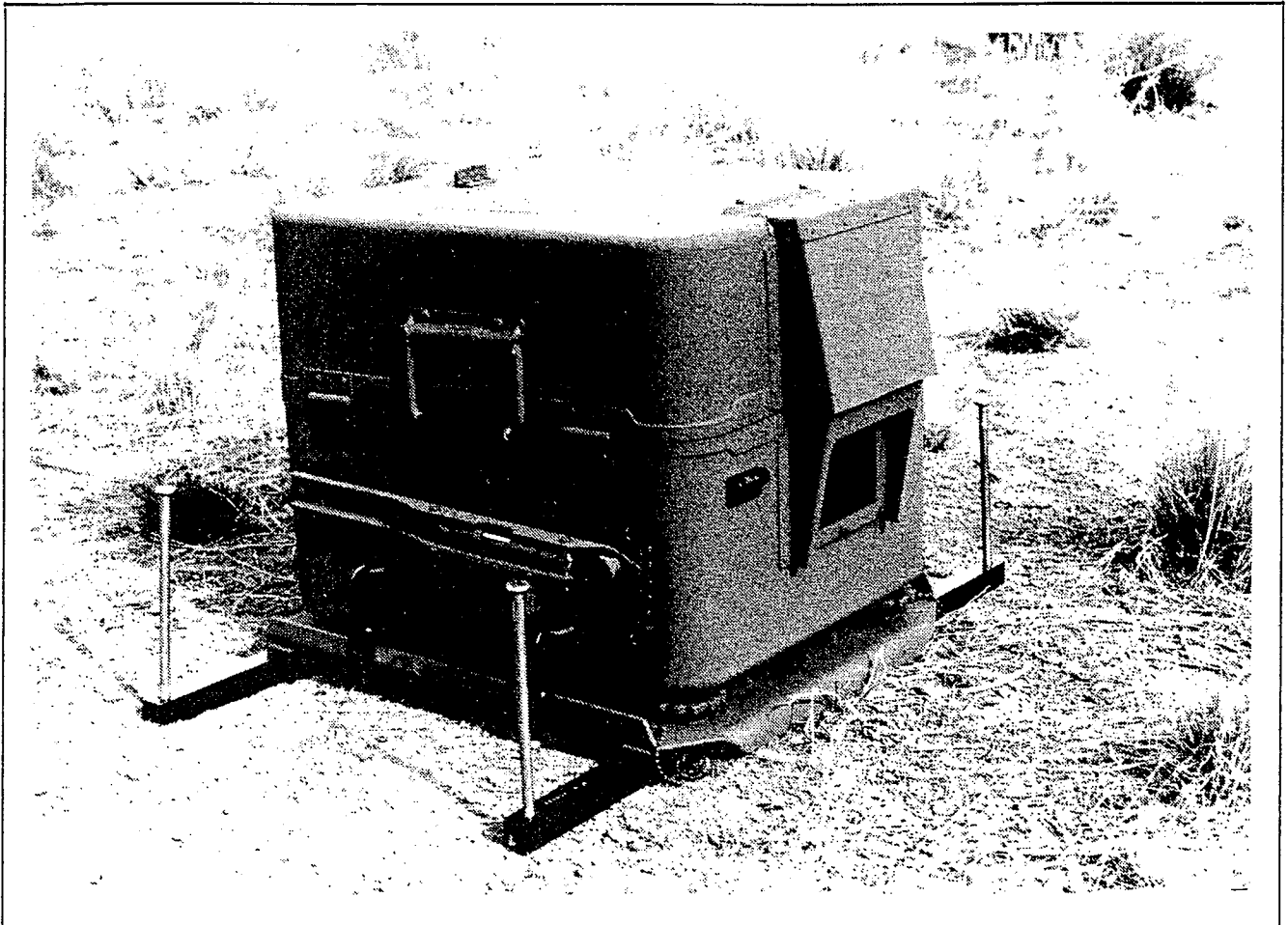


MINI-PLASI

Pulse Light Approach Slope Indicator



OPERATION & INSTALLATION MANUAL

Manual Number PLG051

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**APPLICABLE TO
DA3401 (28 VDC), DA3501 (120 VAC)
MINI-PLASI**



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***MINI-PLASI* Pulse Light Approach Slope Indicator**

OPERATING AND INSTALLATION INSTRUCTIONS

SECTION I - INTRODUCTION

1.0 Receiving Your System

Thank you for purchasing DeVore Aviation's state-of-the-art Single Box Visual Approach Aid. Upon receipt of the MINI-PLASI, please inspect all containers and parts for shipping damage. Report any shipping damage to the carrier and file the required claims. Review packing slips and contents to ensure all components of the System have been received. A copy of the manufacturer's acceptance testing for the System should be included with the paperwork. Contact DeVore Aviation Corporation of America, Product Support Dept., immediately if any components are missing or if you have any questions regarding the installation or operation of your MINI-PLASI. Use the contact numbers and addresses on the front of this manual.

1.1 Purpose

This document contains the information necessary to install and operate the MINI-PLASI unit at an airport, heliport, or unprepared landing site for use as a visual approach slope indicator.

For maintenance and service information, refer to the Service & Maintenance Manual PLF052 (120 VAC) or PLF054 (28 VDC), and Illustrated Parts Manual PLA052 (120 VAC) or PLA054 (28 VDC).

1.2 Description of System

MINI-PLASI is an emergency and tactical visual approach aid with the range, brilliance, and angular coverage of the FAA approved PLASI visual approach aid system. MINI-PLASI can be used in remote areas and advanced staging and emergency areas caused by floods, earthquakes, fires, etc., for safe air life operation or for temporary use at airports or heliports. MINI-PLASI has the same optical system as the FAA approved PLASI and HELI-PLASI. It is fully portable weighing approximately 60 pounds and is only 17.2 X 18.7 X 24.2 inches in size.

Units are available that operate on either 28 VDC or 120 VAC.

Adjustable legs are provided for setting the approach angle. MINI-PLASI can be mounted on the ground or any suitable surface, such as a box, jeep hood, truck bed, etc. It has an optional portable metal base P/N DA3302-1 to facilitate installation.

The MINI-PLASI is a self-contained unit which, without any aircraft installed devices, provides vertical glide path information including correct position and direction, as well as degree of deviation and rate of change of deviation from the correct glide path. The pilot receives this information visually with minimum need for analysis and interpretation. Minimum range of 4 miles (6.5 kilometers) is sufficient for easy aircraft adjustment to steady-state glide position for desired touchdown.



1.2.1 Projection Signal

From the landing pilot's view, the device generates and projects four horizontal bands of light, only one of which can be seen by the pilot at a given instant. The center band is a steady white light projected as an angular wedge, 16 degrees wide with the apex at the MINI-PLASI unit. This center band defines the correct glide path. An upper band of white light, pulsing at approximately 2.25 pulses per second, is also a wedge of light which gives above glide path indication. A similar lower band of pulsing red light provides the below glide path information. In between the steady white on glide path signal and the pulsing red below glide path signal is a solid red sector which is the slightly below glide path signal and indicates that the pilot is at a known approach angle when at the lower edge of the steady red. The pulses of the white and red above and below lights vary in length from continuous at the edge of the glide path to zero length at the off glide path limit of visual contact. This variation in light pulse length, long near the path - shorter and shorter as deviation from glide path increases - gives the pilot quantitative deviation information. Rate of change of pulse length provides rate of deviation from or closure with the glide path. **(Figure 1)**

MINI-PLASI can be obtained with either a fixed wing or helicopter signal format.

Signal (beam) Angles:

A. For use with fixed wing aircraft: **(Figure 2)**

Width - 16 degrees minimum.

Height - Above glide path signal, pulsing white light:	2.5 degrees.
- On glide path signal, steady white light:	0.35 degrees.
- Slightly below glide path signal, steady red light:	0.175 degrees.
- Below glide path signal, pulsing red light:	2.5 degrees.

B. For use with helicopters: **(Figure 3)**

Width - 16 degrees minimum.

Height - Above glide path signal, pulsing white light:	2.5 degrees.
- On glide path signal, steady white light :	0.60 degrees.
- Slightly below glide path signal, steady red light:	0.30 degrees.
- Below glide path signal, pulsing red light:	5.0 degrees.

The visual presentation is accomplished through the use of optical components, moveable shutters, a red filter and a tungsten halogen projector lamp.

The glide path is defined as the vertical angle established between the center plane of the steady white light and the landing surface. This glide path can be preset at any angle to accommodate the desired approach path considering obstructions, type of aircraft and applicable regulations. For fixed wing aircraft, the glide path angle is normally set to three (3) degrees, and for helicopters to a six (6) degree setting.



1.2.2 Failsafe Systems

The MINI-PLASI system is a "failsafe" design which ensures that any malfunction of the beam projection system will not result in an incorrect signal being displayed to approaching helicopters.

There are two potential failure modes of the projected signal.

The first is loss of power to the unit or the projector lamp, which will result in complete loss of signal with no hazard.

The second is failure of the pulse generator drive system and resulting loss of both pulse signals. This type of failure will result in a steady white over steady red "fail-safe" condition. A safe visual approach can then be accomplished by flying the upper edge of the steady red signal.

There is a very remote possibility of loss of either the upper or lower pulse signal due to failure of an individual drive system. Loss of one of the pulse signals will result in a signal projection of pulsing white over steady red, or steady white over steady and pulsing red.

If there is any visual indication or a suspicion of failure of the pulse generator drive system, or individual shutter drive system, the approach should be accomplished by flying the upper edge of the steady red signal (lower edge of steady white signal).

Corrective actions for the type of failures given above can be found in the MINI-PLASI Service and Maintenance Manual, Trouble Analysis Chart.



SECTION II - MINI-PLASI LOCATION CRITERIA

2.0 MINI-PLASI Location Criteria

2.1 Location of MINI-PLASI

A major consideration in installing the MINI-PLASI is ensuring that the approach path on which the MINI-PLASI signal will be utilized is clear of obstructions within a 16 degree beam spread and clears the highest obstacle by a minimum of 1.3 degrees. (**Figures 2 & 3**)

2.2 Determining Obstruction Clearance

The MINI-PLASI contains a built in "Obstacle Clearance Sight" (gun sight) which is contained on the top housing half. The sight provides for a 1.3 degree clearance of the MINI-PLASI beam over obstacles to ensure that the approach angle selected will clear any obstructions that are in the area. To check for an obstacle free approach path, set the MINI-PLASI to the desired approach angle.

Using the 'sight' at the rear of the top housing of the MINI-PLASI, view through the 'sight' notch to ensure there are no obstacles in the field of view as defined by the top horizontal edge of the bead at the front of the housing, and the two small posts on the bead. If obstacles are viewed in the approach path, readjust the approach angle or realign the unit to provide an obstacle clear approach path. This setting will then establish:

- (a) An obstruction clear surface 8 degrees on both sides of the approach path centerline and extending outward for six miles.
- (b) The minimum vertical aiming angle of the MINI-PLASI.

2.3 Glide Path Angle

The visual glide path angle for fixed wing aircraft is normally set at 3 degrees.

The visual glide path angle for helicopters is normally set at 6 degrees. This angle may be increased up to 15 degrees maximum to provide an obstruction clear surface, if so determined per **Paragraph 2.2**.

2.4 Aiming

The MINI-PLASI should be aimed at the desired glide path angle and should be set to within plus or minus fifteen minutes of the established vertical aiming angle. Reference installation details in **Paragraph 3.5**.

Note: Each graduation of the bubble level is equivalent to 15 minutes.



SECTION III - INSTALLATION

3.0 MINI-PLASI Installation

3.1 Power Supply

The power for the 28 VDC MINI-PLASI (DA3401) is 250 watts (8.8 amps). The unit can be operated from an auxiliary power generator which provides 28 VDC power, or for short periods of operation from a 24 VDC battery source. The latter operation on 24 VDC battery power will result in a slight degradation in performance, but the signal range is still more than adequate on battery power. On battery power, amperage draw in "bright" position (daytime operation) is 7.8 amperes, and in "dim" position (night operation) is 5.3 amperes. The power supply may also be obtained from a 28 VDC source such as a jeep or truck, or rectified 115 VAC or 220 VAC power, using P/N DA3415-1 Power Converter. The power connection between the receptacle on the 28 VDC MINI-PLASI and the power source is by a power cord, P/N DA3044-1, which is provided with the unit. Observe negative and positive polarity of leads at power hook-up.

The power for the 120 VAC MINI-PLASI (DA3501) is 335 watts (2.8 amps). Use power cord P/N DA3304-1, or a 3 conductor cord.

For use with a constant current system, connect to DeVore P/N DA3303-1 Isolation Transformer/Converter assembly.

The on-off switch serves a dual function since it is also a circuit breaker.

Figure 4 provides the wiring diagram for the 28 VDC MINI-PLASI unit.

Figure 5 provides the wiring diagram for the 120 VAC MINI-PLASI unit.

3.2 Installation and Set-Up Procedure:

- a. Set MINI-PLASI at runway or heliport site on a hard surface, box, truck body, etc. The MINI-PLASI shall be located adjacent to the desired touch down point of the aircraft or helicopter, or located as defined by **Section II**. Each MINI-PLASI installation will differ depending on site conditions, obstacles, etc., but user safety and aerospace compatibility shall be prime considerations for locating the units. When using the optional portable base P/N DA3302-1 proceed as follows:
- b. Extend each of the four (4) support legs of the portable base, and secure the legs using the provided 'Pip' Pins.
- c. At the MINI-PLASI site, level the terrain, and secure the portable base to the ground using the four spikes provided or with sandbags in place of the spikes.

NOTE: Do not drive spikes fully down.



- d. Install the MINI-PLASI on the portable base with the MINI-PLASI legs positioned in the recessed holes and the front adjustable legs in the retracted position.
- e. Secure the MINI-PLASI to the portable base by placing the hooks of the bungee cords into the MINI-PLASI tie down rings.
(Note: The approach angle is set after securing the MINI-PLASI to the base).
- f. Set external leveling arm of MINI-PLASI to the desired approach angle and lock.
- g. Connect electrical power to the MINI-PLASI, (**See Figure 4 or 5**)
- h. Adjust the two front legs until the bubble level in the leveling arm is centered and the small lateral bubble level (on the front of the case) is also centered. The MINI-PLASI is now set for correct approach angle and is leveled laterally.
- i. Using the `sight' at the rear of the top housing of the MINI-PLASI, view through the `sight' notch to ensure there are no obstacles in the field of view as defined by the top horizontal edge of the bead at the housing front and the two small posts on the bead. If obstacles are viewed in the approach path, readjust the MINI-PLASI approach angle or realign the unit to provide an obstacle clear approach path per **Paragraph 2.2.**
- j. Select `Bright' or "Dim" lamp operation by the selector switch.
- k. Turn `On' the MINI-PLASI. View through the front window to ensure unit is operating and that the MINI-PLASI signal is visible. Do not look directly at the lamp.

3.3 Operational Checks And Final Adjustments:

Inspect that the PLASI is set to the desired approach angle by checking beam index setting and bubble level for centering. Check the electrical connections to ensure that the power connections are secure, and that the `Bright/Dim' switch is positioned for the desired day or night operating conditions.

Inspect the optical surface for cleanliness. The front window is subject to soil from external sources. Clean the front window and optical surfaces with glass cleaning solution and dust with a lint free tissue or cloth.

Insure that the lamp in service position is locked into the lamp socket.

Turn unit on with `On/Off' switch and check that the lamp and shutter chains operate. Check that the cooling blower is operating.

If the unit does not start, or problems are noted with the lamp, shutter chains or blower operation, consult the `Trouble Analysis Chart' in the MINI-PLASI Service and Maintenance Manual PLF052 (120 VAC) or PLF054 (28 VDC).



3.4 Lamp Removal and Replacement:

Lamp removal of the main lamp and spare lamp from their respective sockets is accomplished by raising the socket wire lever arm. This will pop the lamp out of the socket. To insert a new lamp, slip the lamp contacts into the socket slot until the lamp snaps into place.

3.5 Auxiliary Features:

A resettable overheat thermal switch is located in the top half of the housing. The thermal switch will trip open at 180 degrees F, and turn off the lamp in the event of overheating due to cooling blower failure. The thermal switch is reset by depressing the red button located on the switch. A second thermal switch will turn off the cooling fan when the temperature in the housing drops below 50 degrees F. It automatically resets to turn on the fan when the temperature rises above 50 degrees F.



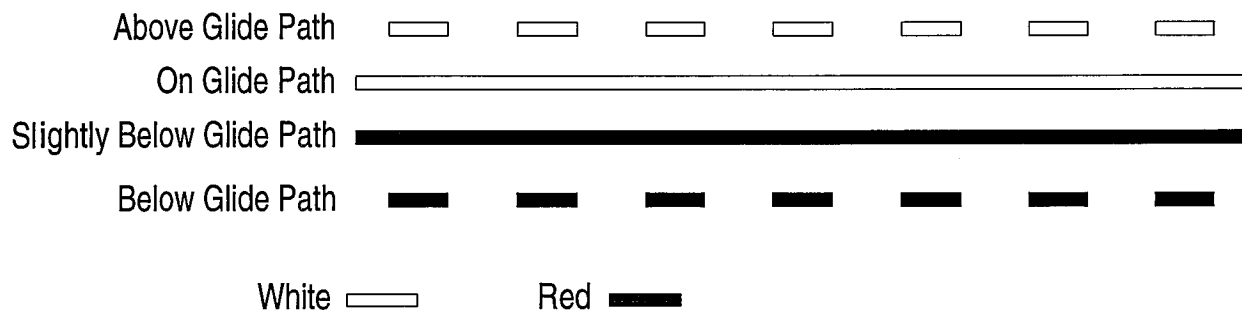


Figure 1 Signal Format



Signal (Beam) Angle

Width 16° minimum

Height Above Course Signal: Pulsing white light 2.5°

On Course Signal: Steady white light .35°

Below Course Signal: Steady red light .175°

Well Below Course Signal: Pulsing red light 2.5°

Normal Glide Path
Nominal 3°

PLASI

Landing Surface

2.5° Pulsing White

.35° Steady White

.175° Steady Red

1.3°

Obstruction Clearance Line

2.5° Pulsing Red

Figure 2 MINI-PLASI Signal Projection (Fixed Wing Aircraft)



Signal (Beam) Angle

Width 16° minimum

Height Above Course Signal: Pulsing white light 2.5°

On Course Signal: Steady white light .60°

Below Course Signal: Steady red light .30°

Well Below Course Signal: Pulsing red light 5.0°

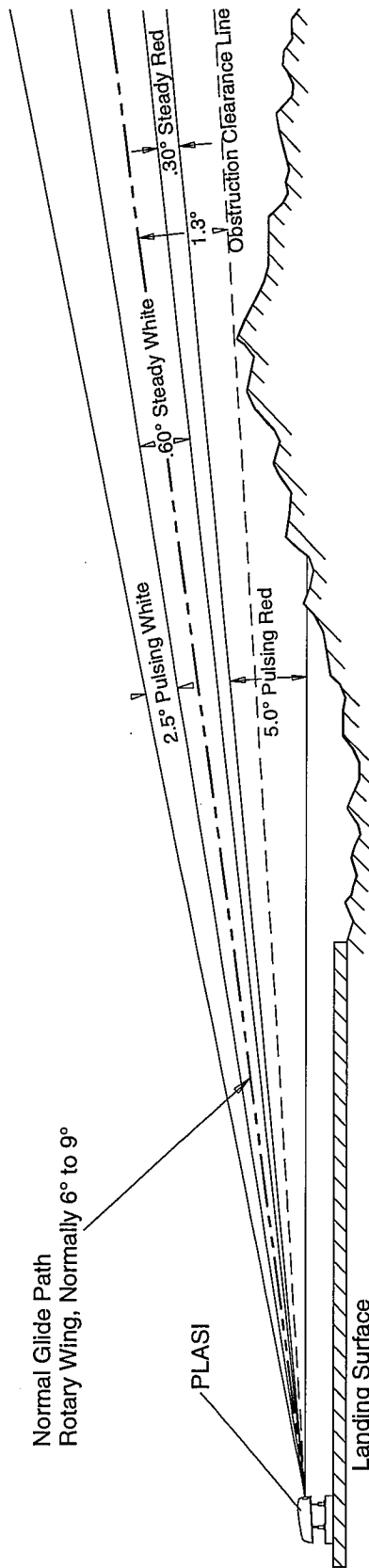


Figure 3 MINI-PLASI Signal Projection (Helicopters)



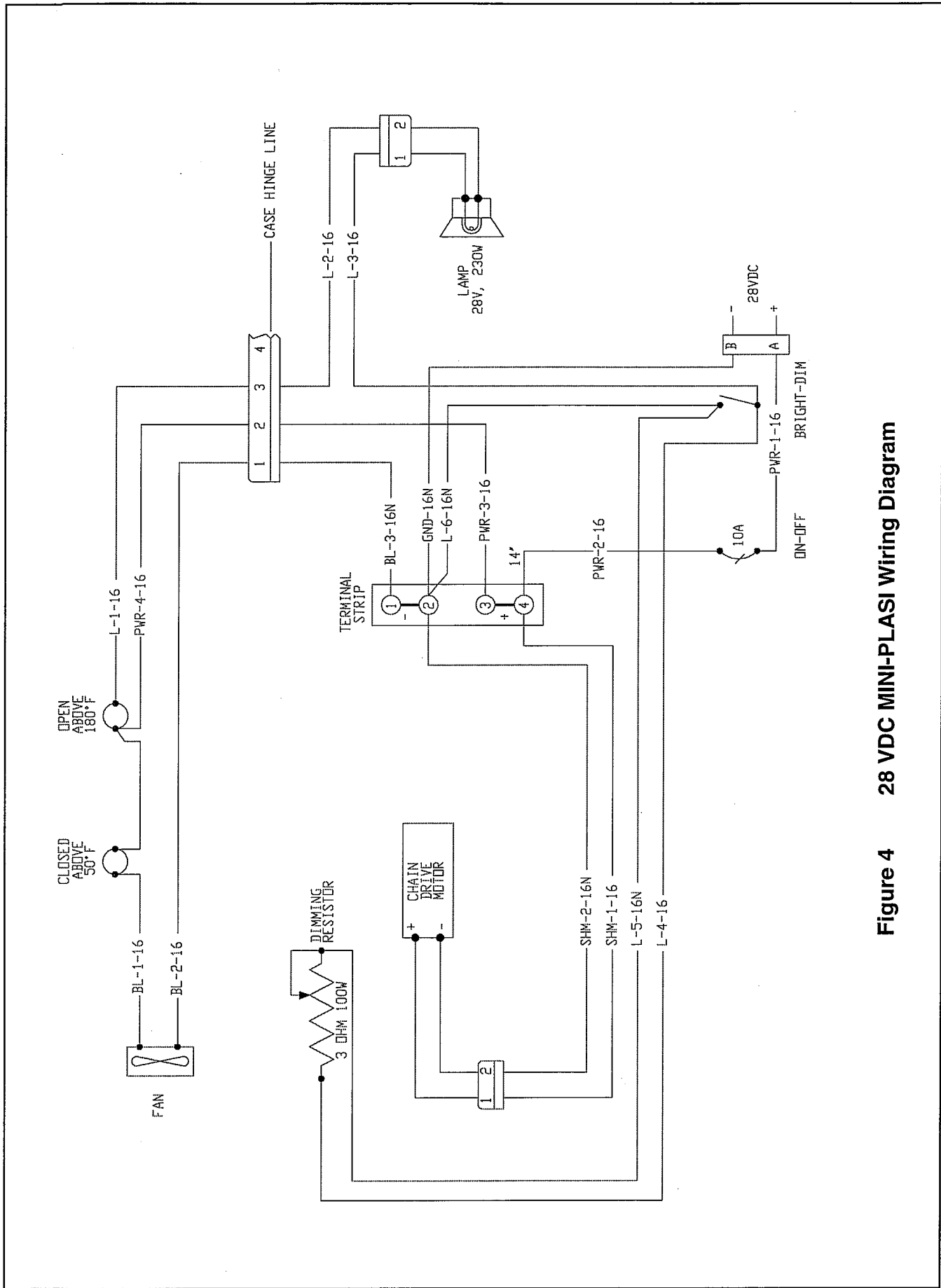


Figure 4 28 VDC MINI-PLASI Wiring Diagram



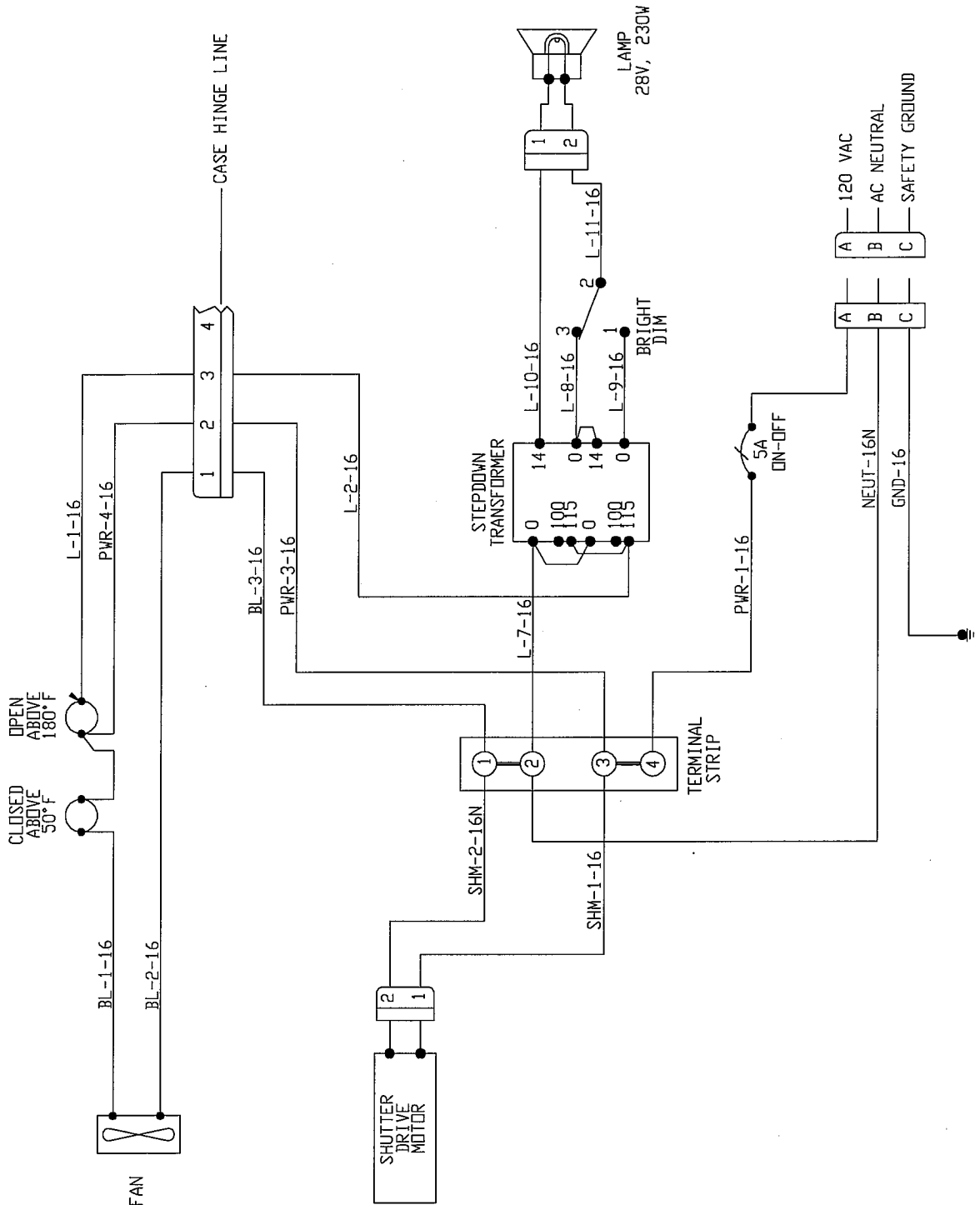


Figure 5 120 VAC MINI-PLASI Wiring Diagram

