MILITARY HANDBOOK

AIRFIELD LIGHTING

TO ALL HOLDERS OF MIL-HDBK-1023/1

1. THE FOLLOWING PAGES OF MIL-HDBK-1023/1 HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
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84j	15 October 1990	new page	
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2. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS.

3. Holders of MIL-HDBK-1023/1 will verify that all changes indicated above have been made. This notice page will be retained as a check sheet. This issuance, together with appended pages, is a separate publication.

4. Each notice is to be retained by stocking points until the military handbook is completely revised or canceled.

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5.1.5 Electrical Requirements. Simulated carrier deck lighting systems are usually connected to 6.6 A circuits. They may be connected to 20 A circuits with 20 A/6.6 A isolation transformers.

5.1.6 Control Requirements. Simulated carrier deck lighting requires on/off control and brightness control with a minimum of three intensity steps. The controls must be interconnected with the controls for the associated runway lights so as to prohibit simultaneous operation of both systems and to provide override capability for operation of the runway lights in an emergency. The operating controls are required at the LSO station and the override capability is required at the control tower.

5.1.7 Equipment Requirements

5.1.7.1 Fixtures. There are no qualifying specifications for fixtures. The fixture generally used is referred to as an L-852N since it is a derivative of the FAA AC 150/5345-46, Type L-852 fixture. The L-852N is a ruggedized version which is designed specifically for USN application. Crouse Hinds Corporation is the only known manufacturer. The fixture is available in Types V, VI, VII, and VIII. Types V and VI are designed to be inset directly in pavement and the last Types VII and VIII are for installation on mounting bases. Lamps are to be 45 W of a type recommended by the fixture manufacturer.

5.1.8 Additional Design Guidance. Although the following publications may not be in complete agreement with this handbook, they contain significant information to assist in the design of simulated carrier deck lighting systems. Where conflict exists between this handbook and the sources listed below this handbook takes precedence:

a) NAVFAC P-272 Definitive Design Drawings:

1404287	Inset Fixture and Wiring Installation Details
1404289	Simulated Carrier Deck Lighting and Plan and Wiring Diagram
1404290	Simulated Carrier Deck Lighting Details

b) FAA Advisory Circulars:

FAA AC 150/5340-4	Runway Centerline and Touchdown Zone Lighting Systems. (For installation methods only)

c) Guide Specifications:

NFGS-16560	Airfield Lighting

5.1.9 Compliance with International Standards. There are no ASCC or NATO Standards covering simulated carrier deck lighting.

5.2 Wheels-Up Lighting (Cat. Code 136-45)

5.2.1 Description. Wheels-up lights are a bar of white lights installed under the approach which are aimed upward and toward the threshold. They are intended to illuminate the underside of landing aircraft to permit observers to determine that the landing gear is fully lowered. The system also includes a portable wheels-watch shelter which protects the observer from the weather and a wheels-watch control panel.

5.2.2 Configuration

5.2.2.1 Wheels-Watch Light Bar. As illustrated in Facility Plate Number 136-45 Sheet 1 of 11, the wheels-watch light bar consists of a row of lights installed 980 ± 5 feet (298.7 ± 1.5 m) from the threshold and on a line perpendicular to the extended runway centerline. As illustrated in Facility Plate Number 136-45 Sheet 8 of 11, the light bar consists of 20 lights spaced 5 feet (1.5 m) apart with the innermost light 105 feet (32 m) from the extended runway centerline. The light bar shall be on the same side of the runway centerline as the air traffic control tower. This line of lights is to be horizontal ± 2 inches (50.8 mm). The height of the lights with the shortest support shall be 26 inches (660.4 mm) maximum above the ground or paved surface. The horizontal aiming of the three innermost lights is toward the runway and 25 degrees toward the runway centerline from a line through the light parallel to the runway centerline and 30 degrees for the remaining lights. Vertical aiming is 30 degrees above the horizontal. The tolerance for the aiming is to be ± 1 degree. The wheels-watch handhole and control panel shall be located 5 feet (1.5 m) outboard of the outermost light.

5.2.2.2 Wheels-Watch Equipment Pad. The wheels-watch equipment pad shall be located as approved by NAVAIR. The pad should be located as close as practical to the wheels-watch handhole and control panel. Refer to Facility Plate Number 136-45 Sheet 2 of 11 for pad details.

5.2.2.3 Wheels-Watch Control Panel. The wheels-watch control panel is located approximately 10 feet (3 m) downwind of the wheels-watch light bar and approximately 205 feet (62.48 m) from the runway centerline. As illustrated in Facility Plate Number 136-45 Sheet 11 of 11, the panel contains the on/off and brightness controls and also provides an external connection for the waveoff light control switch.

5.2.2.4 Wheels-Watch Shelter. The portable wheels-watch shelter is Government-furnished. The system design includes the preparation of a parking area for the shelter adjacent to the wheels-watch control panel together with suitable access to the site.

5.2.3 Power Requirements. Wheels-up lights are connected to 120 Vac multiple circuits requiring somewhat in excess of 10 kW. A 15 kVA pad mount transformer (weatherproof) is recommended.

5.2.4 Control Requirements. Wheels-up lights require on/off control and continuous intensity control from 10 to 100 percent of intensity at the rated voltage. This control is required only at the wheels-watch control panel. Refer to Facility Plate Number 136-45 Sheet 9 of 11 for details.

5.2.5 Equipment Requirements

5.2.5.1 Fixtures. Fixtures shall be as shown on Facility Plate Number 136-45 Sheet 10 of 11.

5.2.5.2 Supports. Fixture supports shall be as illustrated in Facility Plate Number 136-45 Sheet 10 of 11.

5.2.6 Additional Design Guidance.

a) Guide Specifications:

NFGS-16560 Airfield Lighting

5.2.7 Compliance with International Standards. There are no ASCC or NATO Standards pertaining to this system.

5.3 Waveoff Lights (Cat. Code 136-45)

5.3.1 Description. The runway waveoff light system consists of sets of simultaneously flashing red lights installed adjacent to the runway which are aimed toward the threshold. They are intended to inform the pilot that an emergency waveoff or missed approach procedure is necessary. The runway waveoff shall be activated from either the control tower, airfield lighting vault, or the wheels-watch station.

5.3.2 Configuration. For new installations or replacement of existing systems the waveoff lights shall be in accordance with specification MIL-L-29575 (AS) and shall consist of waveoff lights, power converter units, and power and control equipment.

5.3.2.1 Waveoff Lights. As illustrated in Facility Plate Number 136-45 Sheet 1 of 11, the waveoff system consists of six optical assembly units (flashheads) each along the runway edge in the touchdown area. The flashheads are in pairs outbound of the runway edge. Each pair of flashheads shall be on a line at right angles ± 1 degree to the runway centerline and located in a

Figure 33
Figure Not Used

straight line parallel to the runway centerline 10 feet (3.1 m) outside the runway edges. The three pairs of flashheads shall be 900, 1700, and 2500 feet from the runway threshold. A pair of flashheads may be moved the least practical distance up to 100 feet (30.5 m) to provide clearance for runway and taxiway intersections, facilities such as arresting gear and OLS, and major construction problems.

5.3.2.2 Waveoff Power Converter Units. A power converter unit (PCU) is required to provide power for each flashhead. As illustrated in Facility Plate Number 136-45 Sheet 1 of 11, the PCUs are located in straight lines parallel to the runway centerline in line with the related flashheads perpendicular to the runway centerline. The PCUs are located 50 feet (15.2 m) from the runway edge and may be moved per NAVAIR approval.

5.3.2.3 Waveoff Equipment Pad. The waveoff equipment pad shall be located as approved by NAVAIR. The pad should be located as close as practical to the PCU as shown in Facility Plate 136-45 Sheet 1 of 11. Refer to Facility Plate Number 136-45 Sheet 2 of 11 for pad details.

5.3.3 Power Requirements. Power for the waveoff power converter unit (PCU) shall be from a 480 volt source. A single 10 kVA minimum 2400/480V pad mount (weatherproof) transformer may supply the power for the waveoff lights via the PCU. Refer to Facility Plate Number 136-45 Sheet 3 of 11 for typical wiring details.

5.3.4 Control Requirements. The waveoff lights shall be controlled manually using momentary-contact type switches. The switches shall be located only at the control tower, airfield lighting vault, and the wheels-watch station. Refer to Facility Plate Number 136-45 Sheets 3 and 4 of 11 for control wiring diagrams.

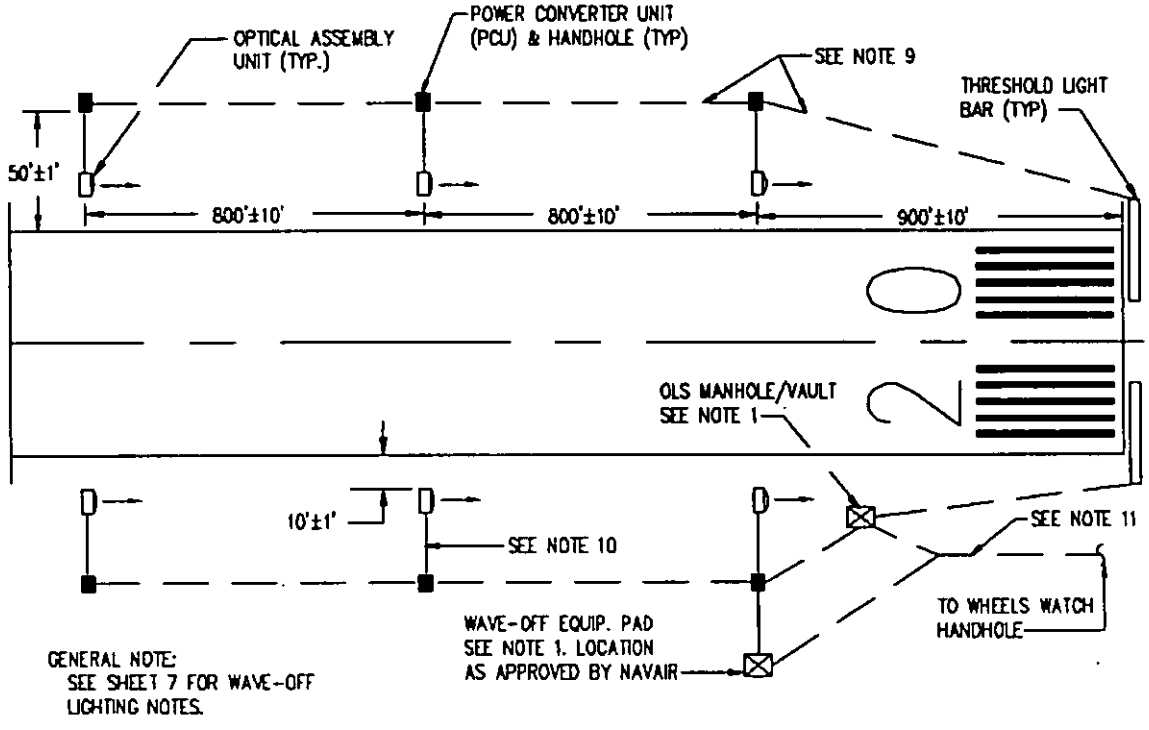
5.3.5 Equipment Requirements

5.3.5.1 Optical Assembly Units (Flashheads). Flashheads shall meet MIL-L-29575. Refer to Facility Plate Number 136-45 Sheet 5 of 11 for flashhead details.

5.3.5.2 Power Converter Units (PCU). Power Converter Units shall meet MIL-L-29575 (AS). Refer to Facility Plate Number 136-45 Sheet 6 of 11 for PCU details.

5.3.6 Compliance with International Military Standards. Neither NATO nor ASCC standards cover runway waveoff lights.

5.4 Related Facilities. Optical Landing Systems (OLS) are often installed in conjunction with the facilities described in this section. Design guidance for these facilities can be found in NAVAIR 51-50AAA-2, General Requirements for Shorebased Airfield Marking and Lighting.



LOCATION PLAN – WAVE-OFF LIGHTING

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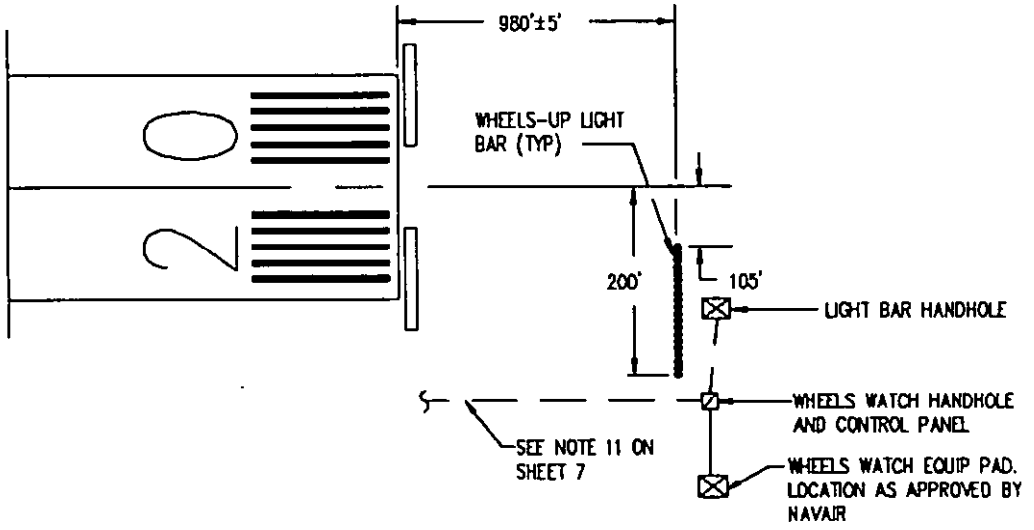

LOCATION PLAN – WHEELS-UP LIGHTING

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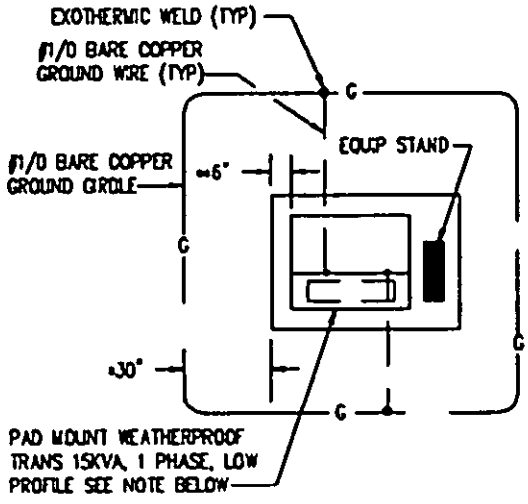
TITLE	DATE	FACILITY PLATE NO.	SHEET
LOCATION PLANS WAVE-OFF & WHEELS UP LIGHTING SYSTEMS	OCT 90	136-45	1 of 11



• MINIMUM CLEARANCE ALL AROUND
•• MINIMUM CLEARANCE FROM EQUIPMENT TO EDGE OF PAD

NOTE: TRANSFORMER SHALL BE RATED AS FOLLOWS:
WAVE-OFF SYS - 2400V PRI TO 480V SEC
WHEELS UP SYS - 2400V PRI TO 120/240V SEC

EQUIPMENT PAD WAVE-OFF & WHEELS UP SYS

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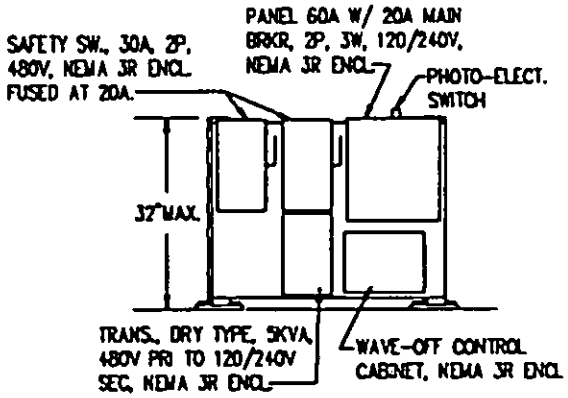

EQUIPMENT STAND WAVE-OFF SYSTEM

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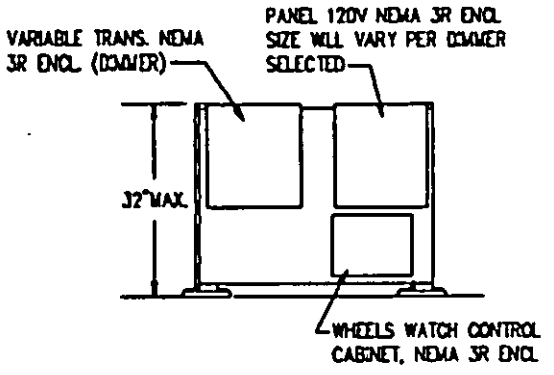

EQUIPMENT STAND WHEELS UP SYSTEM

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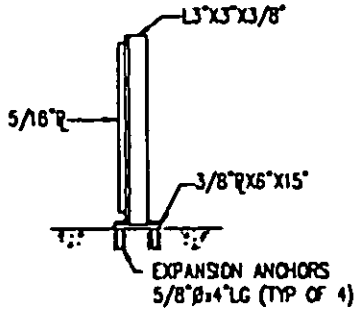

STAND DETAILS SIDE VIEW

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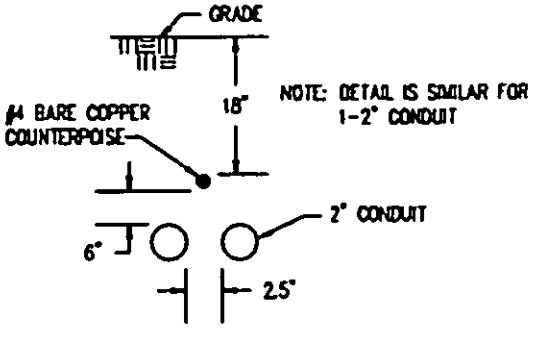

DUCT DETAIL

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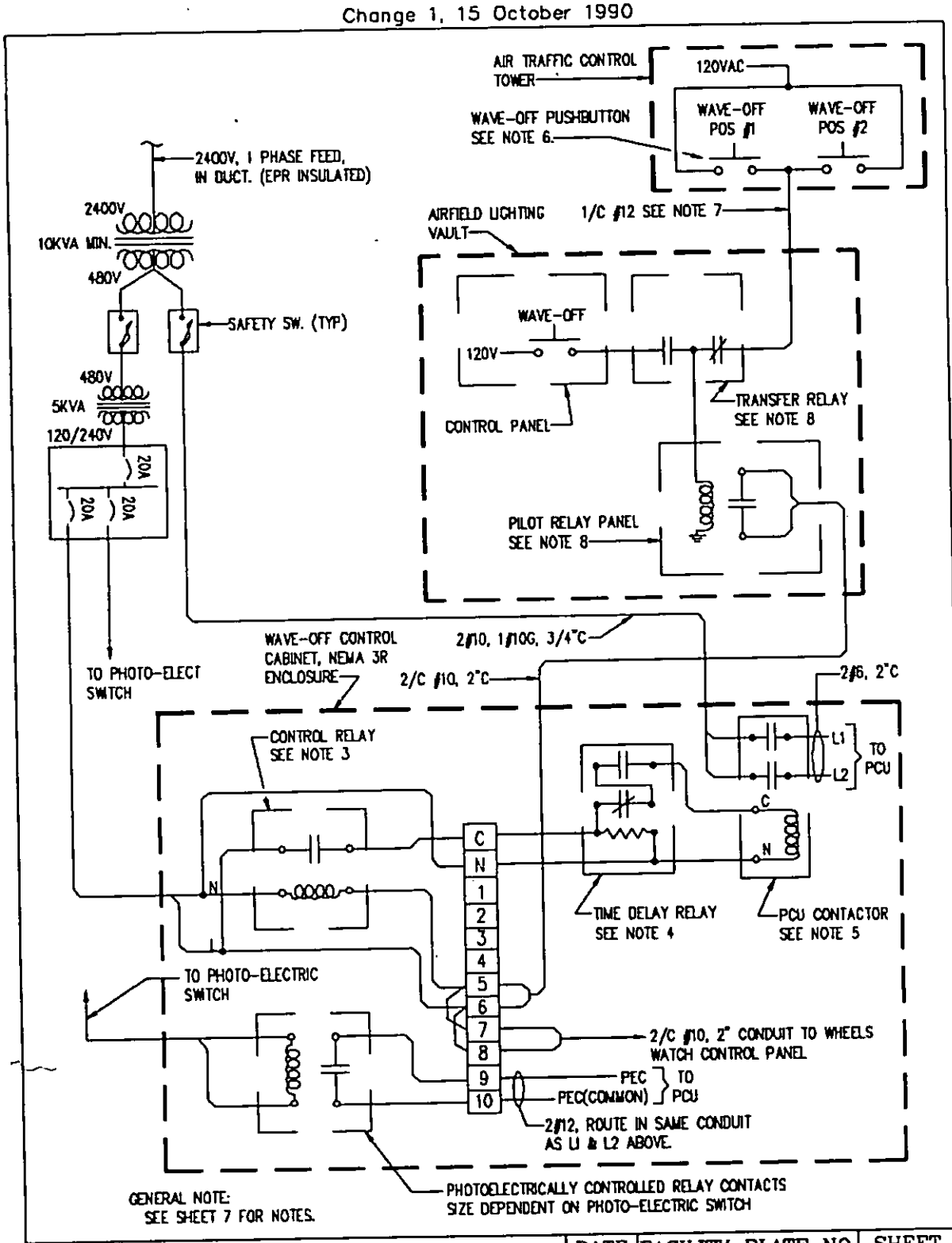
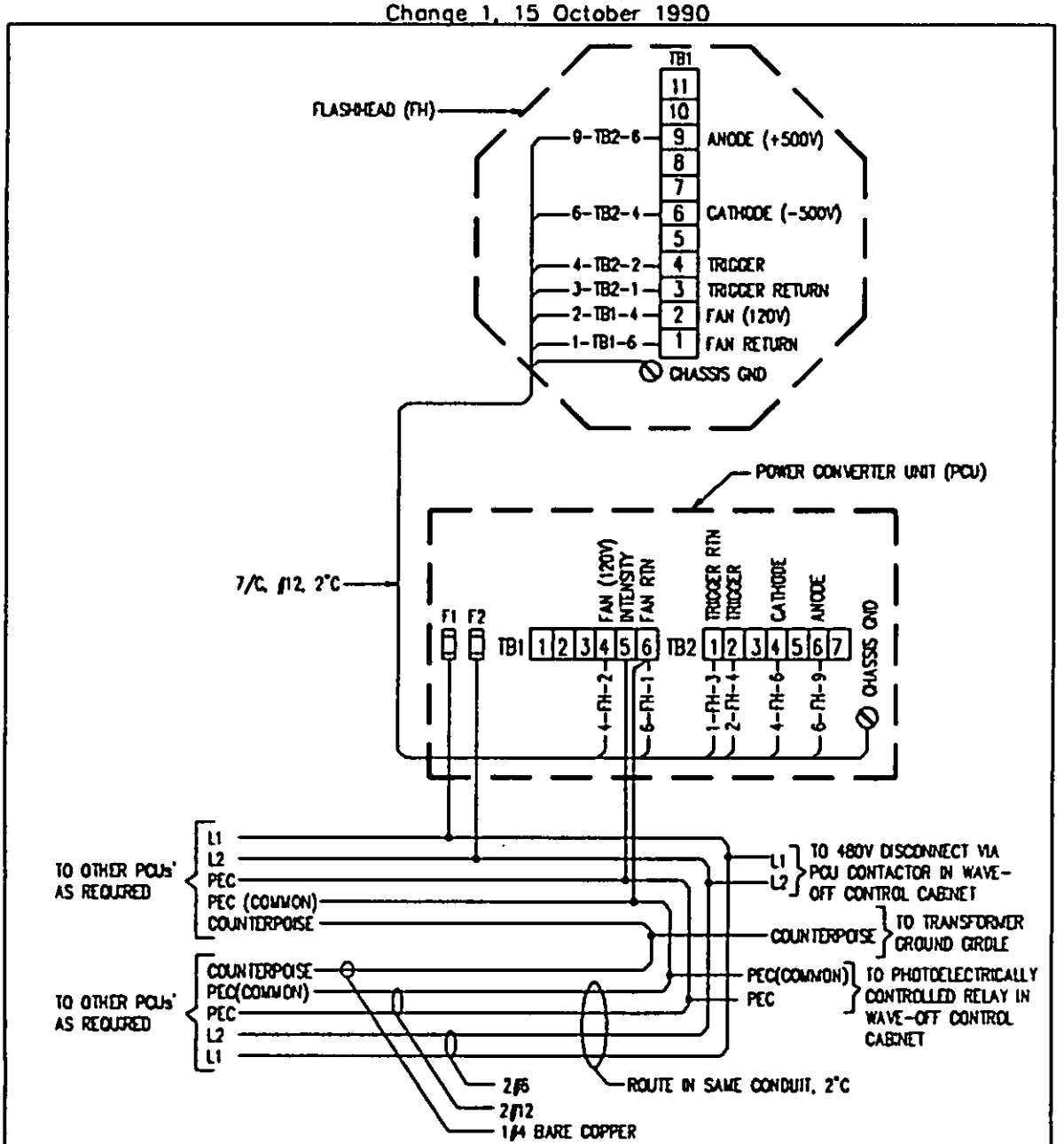
TITLE	DATE	FACILITY PLATE NO.	SHEET
EQUIPMENT PAD AND DUCT DETAILS	OCT 90	136-45	2 of 11

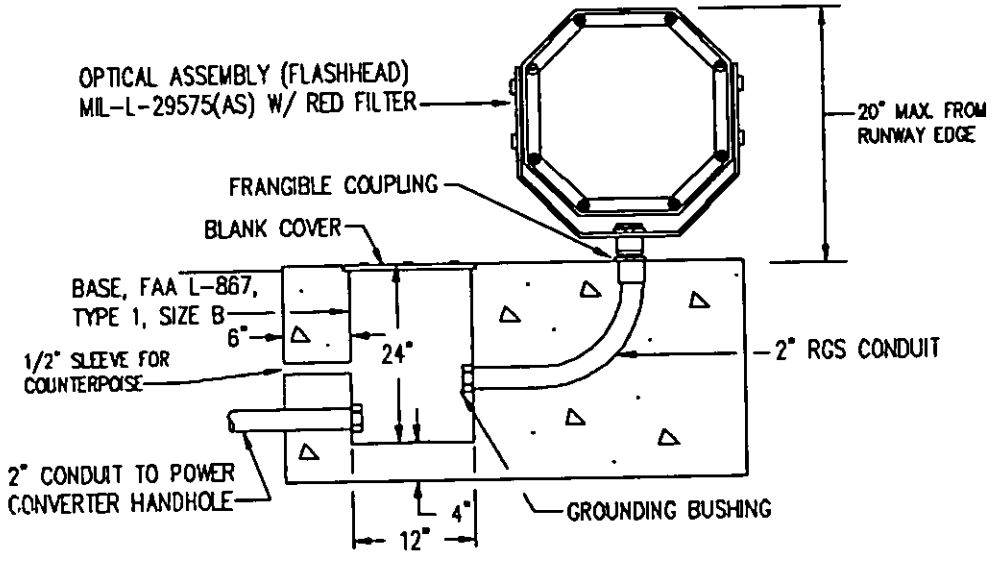


TITLE	DATE	FACILITY PLATE NO.	SHEET
WAVE-OFF WIRING DIAGRAM	OCT 90	136-45	3 of 11



GENERAL NOTE:
WIRING DIAGRAM IS TYPICAL FOR ALL PCUs AND FLASHHEADs.

TITLE	DATE	FACILITY PLATE NO.	SHEET
FLASHHEAD AND PCU WIRING DIAGRAM	OCT 90	136-45	4 of 11



WAVE-OFF LIGHT FIXTURE

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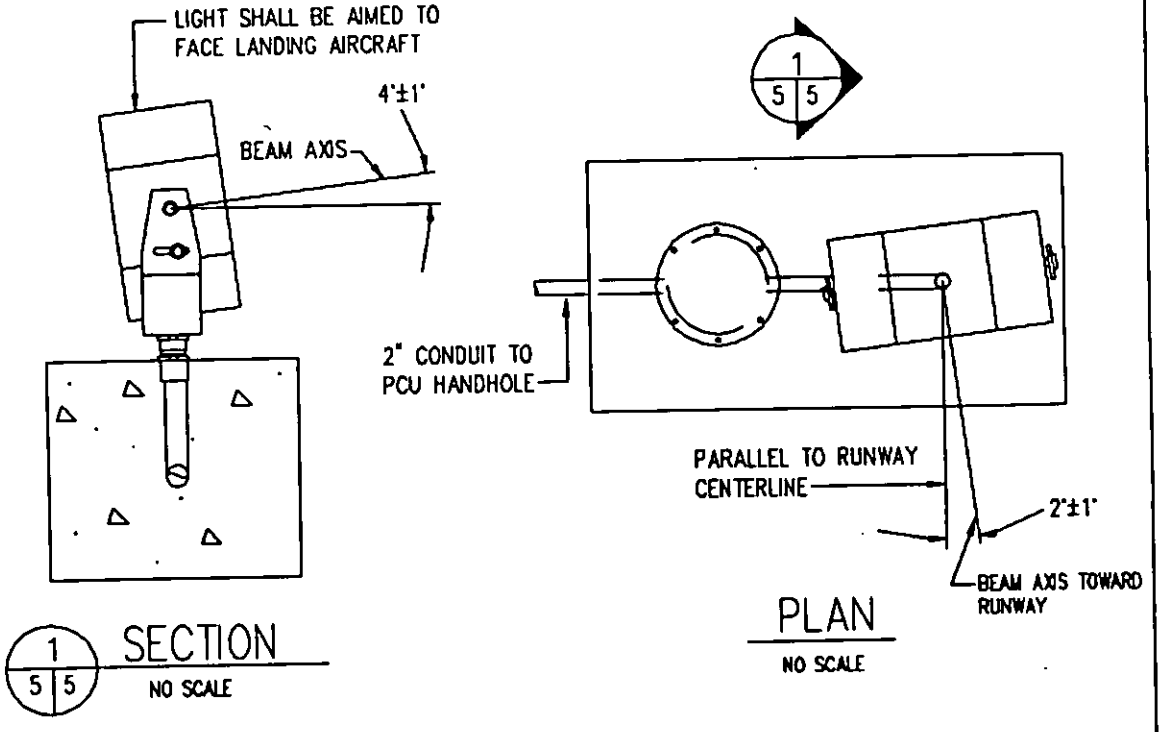

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PLAN

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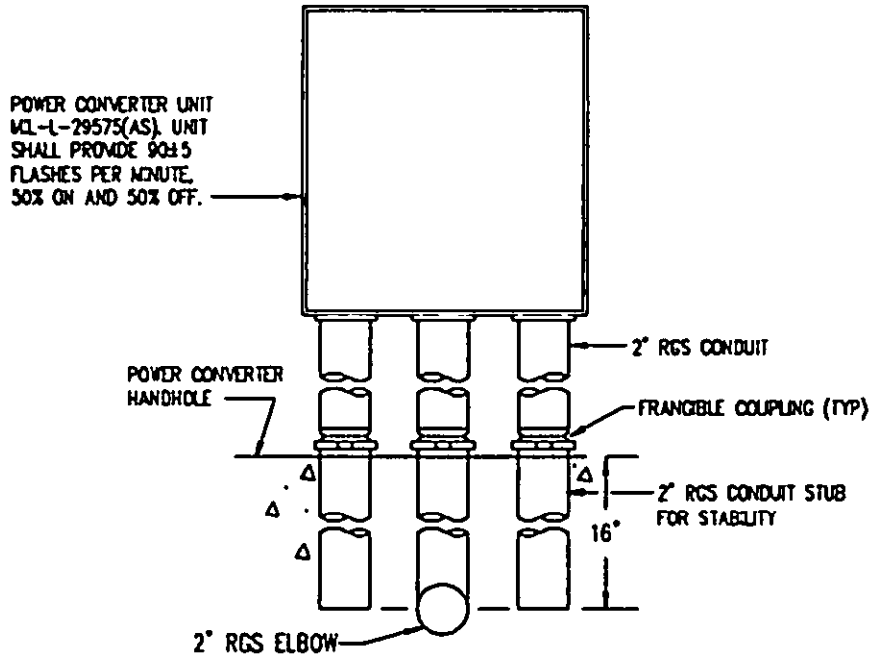
TITLE	DATE	FACILITY PLATE NO.	SHEET
DETAILS - OPTICAL ASSEMBLY UNIT	OCT 90	136-45	5 of 11



POWER CONVERTER UNIT

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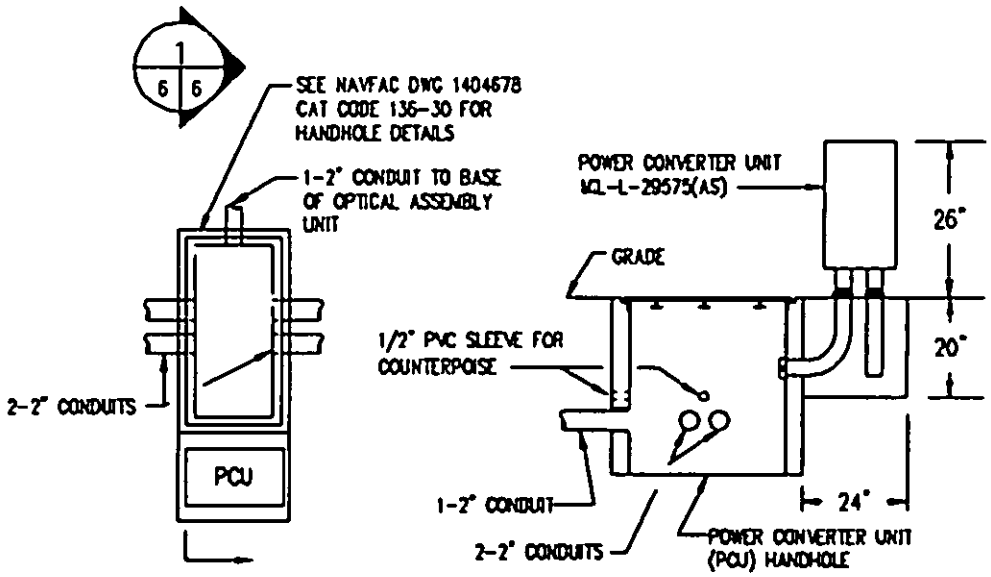

PLAN

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6 6 SECTION

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TITLE	DATE	FACILITY PLATE NO.	SHEET
DETAILS - POWER CONVERTER UNIT	OCT 90	136-45	6 of 11

NOTES

1. IF AN EXISTING OPTICAL LANDING SYSTEM (OLS) MANHOLE/VAULT WITH 480VAC POWER IS NOT AVAILABLE, PROVIDE AN EQUIPMENT PAD WITH PAD MOUNT TRANSFORMER AS DETAILED ON SHEET 2. IN ADDITION MODIFY THE CONTROLS AS SHOWN ON SHEET 3. THE CONTROLS MAY BE LOCATED IN THE OLS MANHOLE/VAULT IF ONE EXISTS.

2. ALL EQUIPMENT IN THE UNDERGROUND MANHOLE/VAULT SHALL EITHER BE SUBMERSIBLE OR INSTALLED WITHIN A SUBMERSIBLE ENCLOSURE, NEMA 6P ENCL.

3. CONTROL RELAY SHALL BE GENERAL PURPOSE, HERMETICALLY SEALED, 4PDT, 3 AMP CONTACTS WITH 120VAC, 60Hz COIL.

4. TIME DELAY RELAY SHALL HAVE 10 AMP, 120VAC CONTACTS WITH 120VAC 60Hz COIL. RELAY SHALL HAVE ONE NORMALLY OPEN (N.O.) INSTANTANEOUS CONTACTS AND ONE NORMALLY CLOSED (N.C.) TIME DELAY OPENING CONTACT ADJUSTABLE FROM 5 TO 60 SECOND DELAY ON ENERGIZING BUT INITIALLY SET FOR 15 SECONDS DELAY.

5. CONTACTOR SHALL HAVE TWO N.O., 30 AMP, 480VAC CONTACTS WITH 120VAC, 60Hz COIL.

6. WAVE-OFF PUSHBUTTONS SHALL BE N.O. MOMENTARY CONTACTS. LOCATE PUSHBUTTONS WITHIN CONTROL TOWER AS DIRECTED BY THE AIR TRAFFIC CONTROL OFFICER.

7. IF POSSIBLE USE SPARE CONDUCTORS IN THE CONTROL TOWER THAT RUNS BETWEEN THE AIRFIELD LIGHTING VAULT AND THE CONTROL PANEL WITHIN THE CONTROL TOWER.

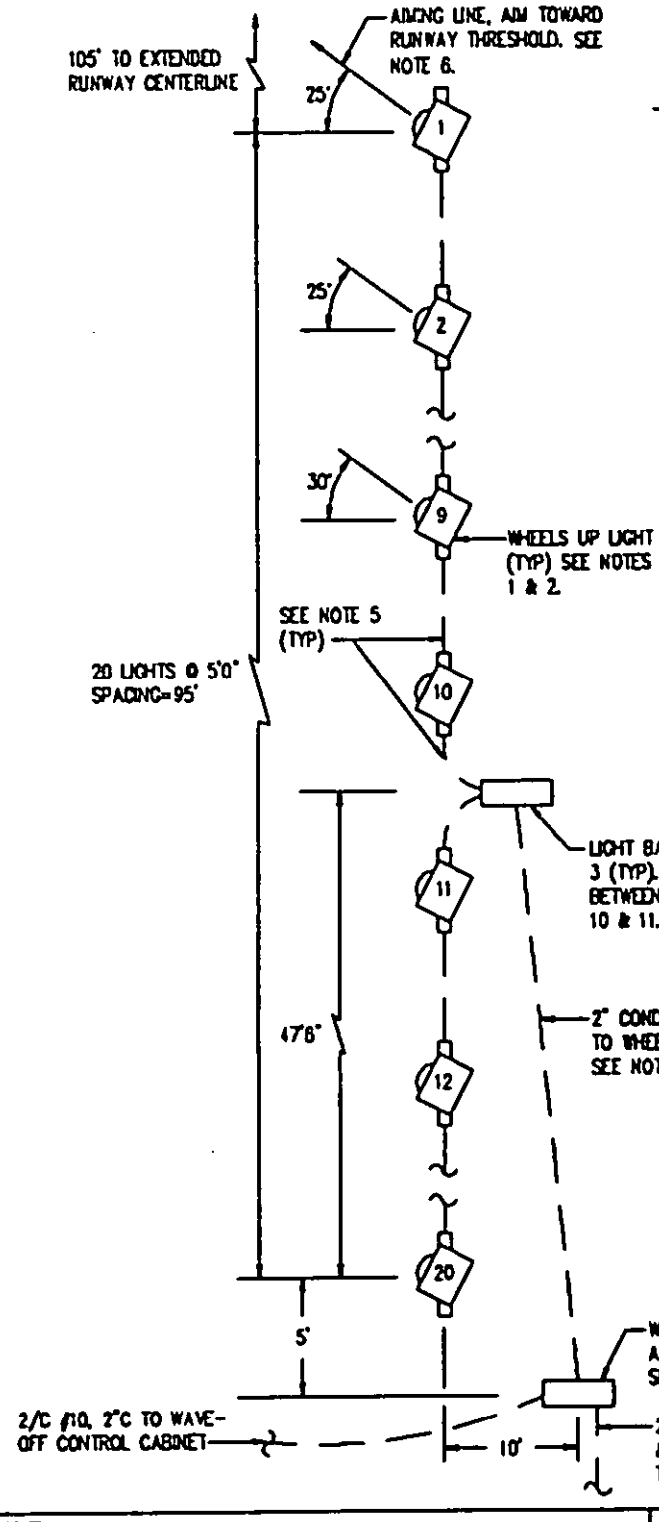
8. IF AVAILABLE USE SPARE PILOT AND TRANSFER RELAYS WITHIN THE AIRFIELD LIGHTING VAULT.

9. PROVIDE 2-2" CONDUITS (1-SPARE) BETWEEN POWER CONVERTER UNITS (PCU). ALSO PROVIDE 2-2" CONDUITS (1-SPARE) BETWEEN PCU AND THRESHOLD.

10. PROVIDE 1-2" CONDUIT BETWEEN PCUs AND OPTICAL ASSEMBLY UNITS.

11. IF THE WAVE-OFF CONTROLS ARE LOCATED IN THE OLS MANHOLE/VAULT ROUTE 1-2" CONDUIT FROM MANHOLE/VAULT TO WHEELS WATCH HANDHOLE. OTHERWISE ROUTE 1-2" CONDUIT FROM WAVE-OFF EQUIPMENT PAD TO WHEELS WATCH HANDHOLE.

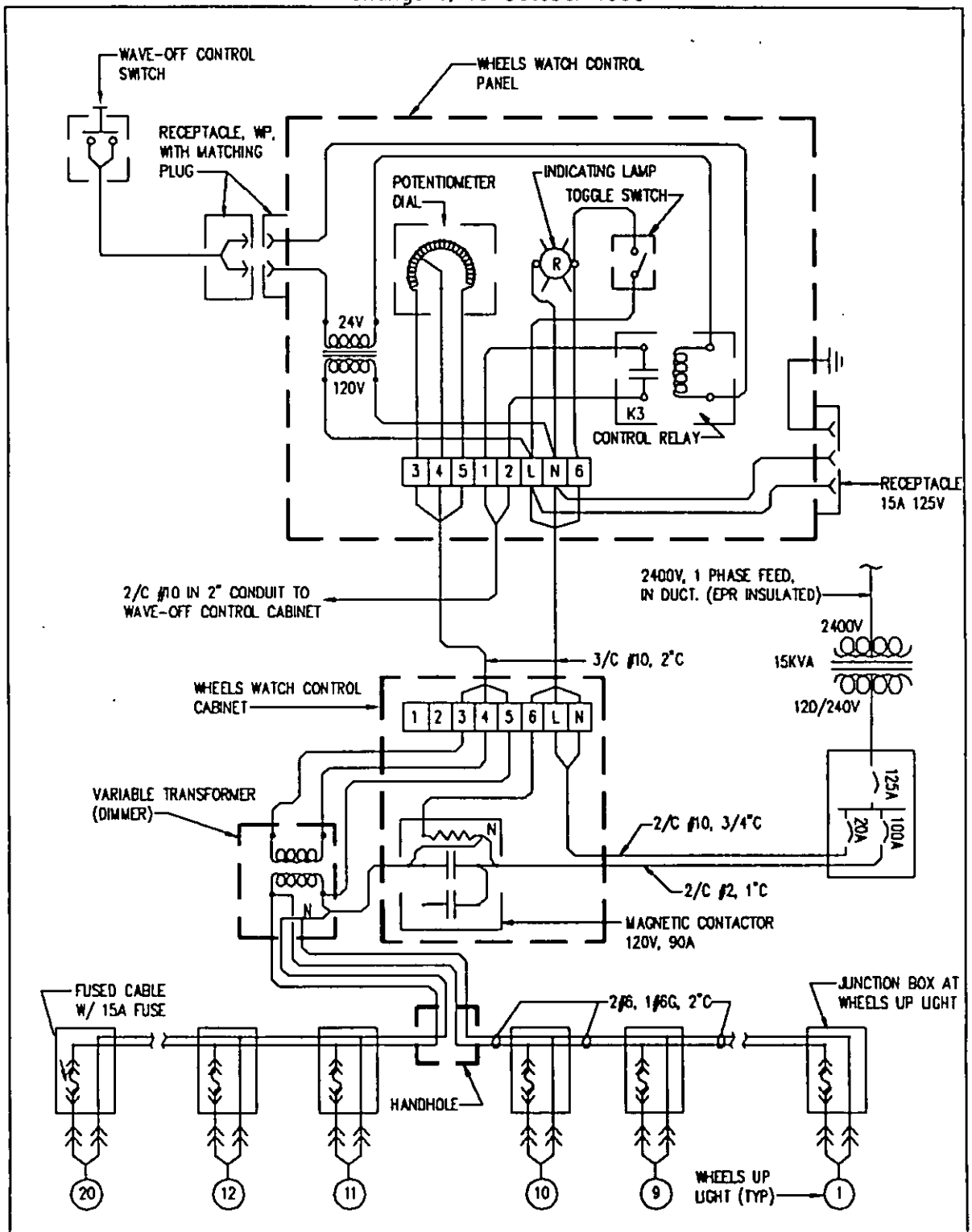
TITLE	DATE	FACILITY PLATE NO.	SHEET
NOTES - WAVE OFF LIGHTING SYSTEM	OCT 90	136-45	7 of 11



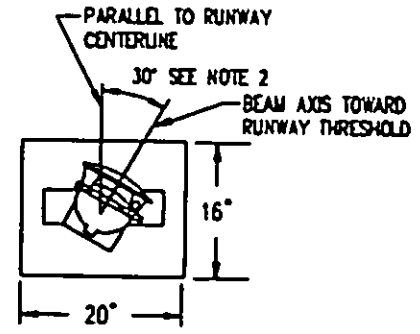
NOTES

1. WHEELS UP LIGHT BAR SHALL BE LOCATED ON SAME SIDE OF RUNWAY AS THE CONTROL TOWER.
2. RELOCATION OR REAIMING OF LIGHT BAR REQUIRES APPROVAL OF NAVFACENGCOM.
3. SEE NAVFAC DRAWING NUMBER 1404678 CATEGORY CODE 136-30 FOR HANDHOLE DETAILS.
4. CONDUCTOR SIZE BETWEEN LIGHT BAR HANDHOLE AND WHEELS UP EQUIPMENT PAD SHALL BE DETERMINED ONCE LOCATION OF EQUIPMENT PAD IS APPROVED BY NAVAIR. THE TOTAL VOLTAGE DROP FOR THE WHEELS UP LIGHTING CIRCUIT SHALL BE MAINTAINED TO ±4% OR LESS.
5. CONDUCTOR SIZE BETWEEN LIGHT BAR HANDHOLE AND WHEELS UP LIGHTS SHALL BE 2#6, 1#6G IN 2" CONDUIT.
6. THE THREE (3) INNER MOST LIGHTS ARE AIMED TOWARD THE RUNWAY AT 25'.

TITLE	DATE	FACILITY PLATE NO.	SHEET
ENLARGED PLAN-WHEELS UP LIGHT BAR	OCT 90	136-45	8 of 11

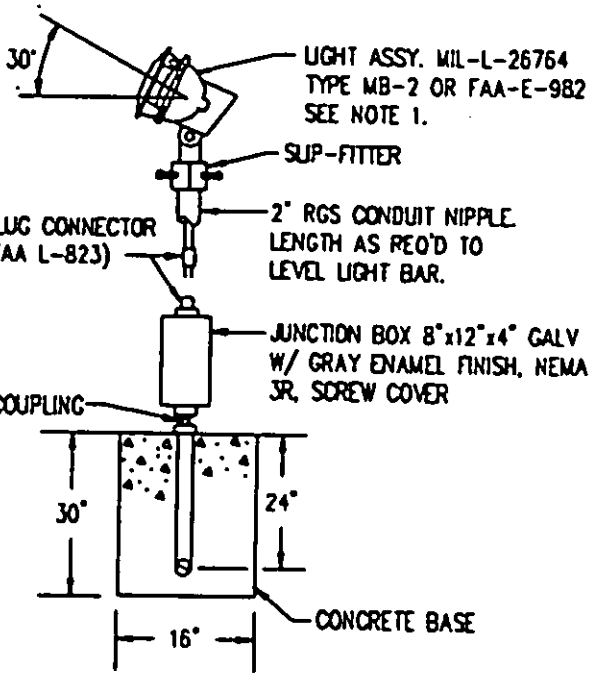


TITLE	DATE	FACILITY PLATE NO.	SHEET
WHEELS UP WIRING DIAGRAM	OCT 90	136-45	9 of 11



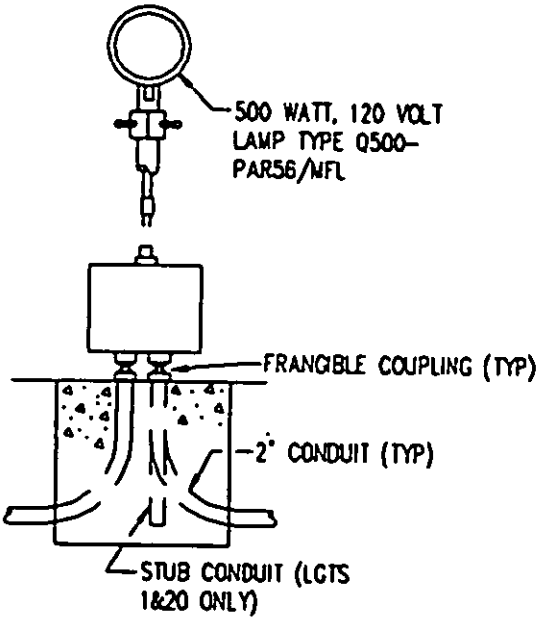
PLAN

NO SCALE



SIDE VIEW

NO SCALE



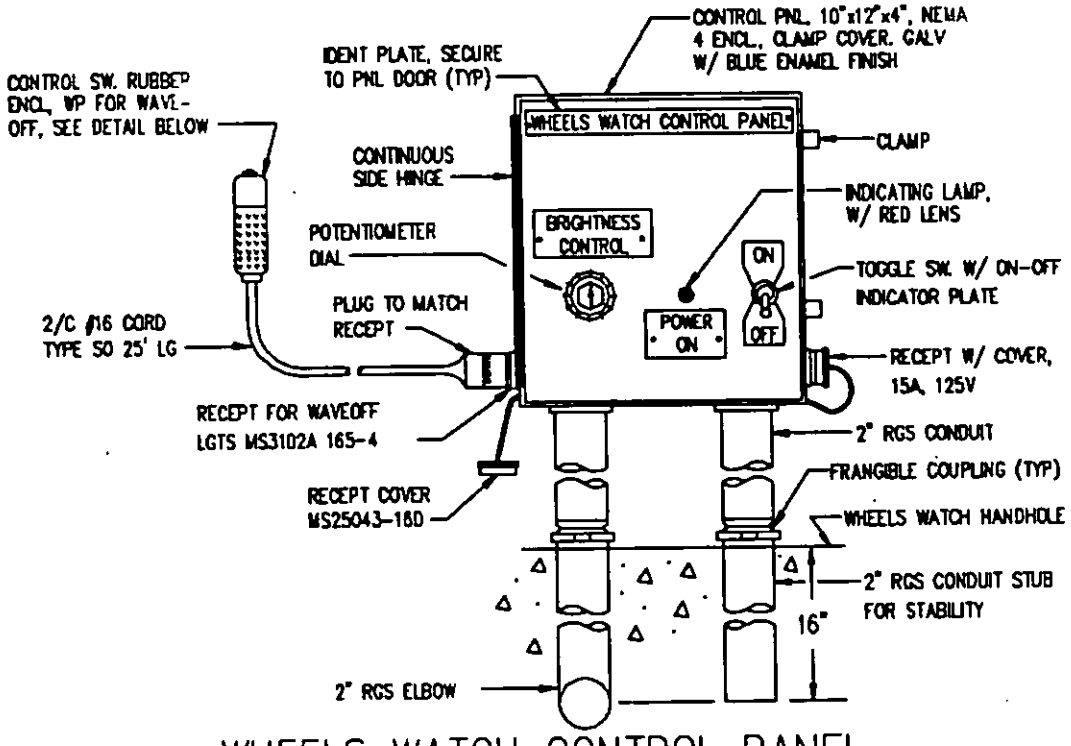
ELEVATION

NO SCALE

NOTE:

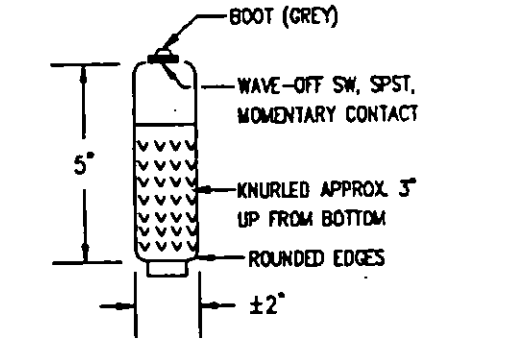
1. THE LAMP SHORTING DEVICE PROVIDED WITH THE FAA-E-982 FIXTURE IS NOT REQUIRED.
2. THE THREE (3) INNER MOST LIGHTS ARE AIMED TOWARD THE RUNWAY AT 25°.

TITLE	DATE	FACILITY PLATE NO.	SHEET
DETAILS - WHEELS UP LIGHT	OCT 90	136-45	10 of 11



WHEELS WATCH CONTROL PANEL

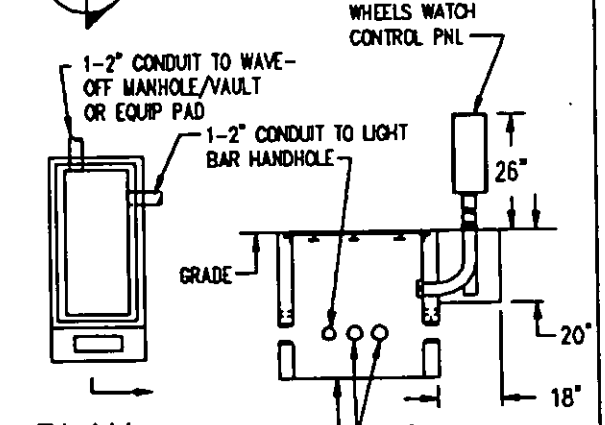
NO SCALE



WAVE-OFF CONTROL SW

NO SCALE

1
11 | 11



PLAN

1
11 | 11

SECTION

NO SCALE

TITLE	DATE	FACILITY PLATE NO.	SHEET
DETAILS-WHEELS WATCH CONTROL PNL	OCT 90	136-45	11 of 11