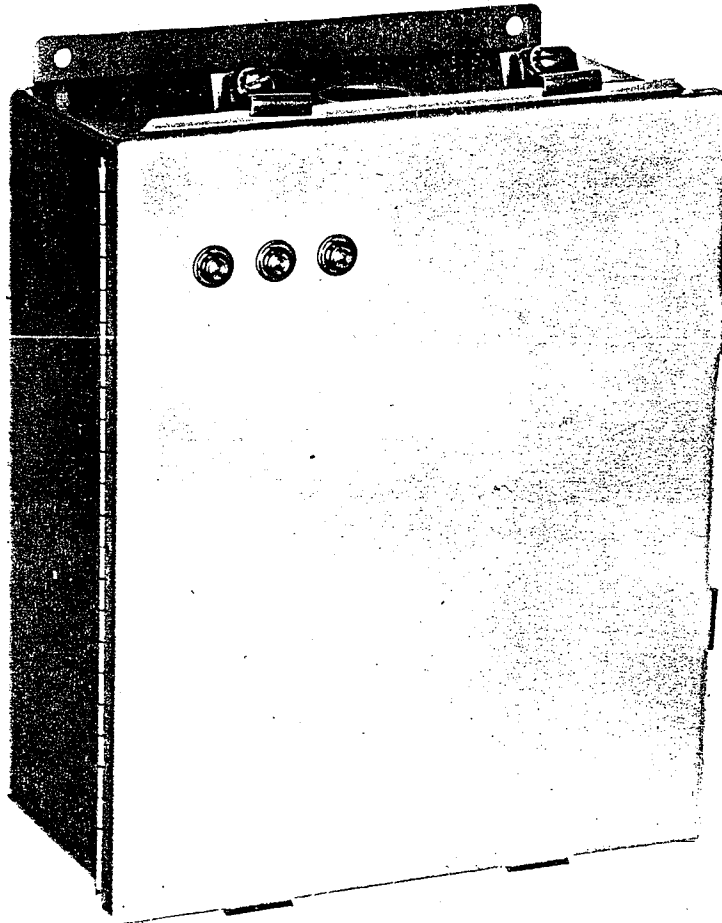


AC POWER LINE PROTECTORS for RADIO TRANSMITTER STATIONS



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NAUTEL AC POWER LINE PROTECTORS

INTRODUCTION

1. Nautel ac power line protectors utilize rugged, high quality, metal oxide varistor devices. They are purpose-designed to protect Nautel's solid-state radio transmitters from the transient energy of lightning strikes or ac line distribution faults without service interruption.

FEATURES

2. Nautel ac power line protectors provide the following features:
- Protection for the entire transmitter facility, including equipment and personnel.
 - Reduction of EMP/RFI interference.
 - Switching response time less than 25 nanoseconds.
 - High transient current capacity.
 - No extinguishing or follow-on current limitations.
 - Excellent clamping characteristics.
 - Wide operating temperature range -40°C to $+85^{\circ}\text{C}$.
 - Front panel neon lamps which indicate the integrity of protection devices.

GENERAL INFORMATION

3. Nautel ac power line protectors should be located close to the output of the service entrance panel and connected between the ac power lines and the station reference ground using short, low-inductance cables to provide protection for all equipment supplied from this source and for personnel working at the facility. Although primarily designed to provide a safe path for the potentially destructive and dangerous currents that result from direct lightning strikes on the transmitting antenna, a very high level of protection from transients originating on the ac line is also achieved. RFI associated with communication equipment is also substantially reduced.

The protectors, which provide up to 30 times the suppression effectiveness of silicon carbide units, will not only improve system reliability and personnel safety, but will also reduce system maintenance costs and associated 'down' time.

Although the potentially destructive energy of a lightning strike is unrelated to the power rating of the transmitter, a trade-off between the cost of the surge protector and the cost of the equipment being protected is generally appropriate. The incidence of lightning storms at the installation site is also an important factor in choosing a suitable protective device.

AVAILABLE UNITS

4. Table I lists the recommended protectors for various transmitter power levels and ac line supply voltages. Models for other voltages are available on special order.

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Table 1 - AC Power Line Protectors/AC Line Supply Voltages

TX POWER (kW)	AC LINE SUPPLY	PROTECTOR MODEL No.	CONNECTION DIAGRAM No.	RATED SINGLE PULSE ENERGY (joules)	RATED SINGLE PULSE CURRENT (kA)	CLAMPING VOLTAGE at 30,000 AMP PEAK CURRENT (8 x 20us)
50	120/208/3 Ph	NP15-3120	fig 1 or 2	6300	450	380
25	120/208/3 Ph	NP12-3120	fig 1 or 2	5000	360	390
10	120/208/3 Ph	NP6-3120	fig 1 or 2	2500	180	425
2.5 & 5	120/208/3 Ph	NP3-3120	fig 1 or 2	1250	90	475
1 & 2.5	120/240/1 Ph	NP2-1120	fig 3	840	60	500
50	240/415/3 Ph	NP15-3240	fig 1 or 2	22500	525	850
25	240/415/3 Ph	NP12-3240	fig 1 or 2	18000	420	870
10	240/415/3 Ph	NP6-3240	fig 1 or 2	9000	210	1000
2.5 & 5	240/415/3 Ph	NP3-3240	fig 1 or 2	4500	105	1200
1 & 2.5	240/1 Ph	NP2-1240	fig 4	3000	70	1300

TECHNICAL SPECIFICATIONS

5. The following technical specifications are applicable to all models.

Response Time	Less than 25 nanoseconds
Operating Temperature Range	-40°C to + 85°C
Storage Temperature Range	-40°C to +110°C
Humidity	0 - 95% RH

CONNECTION DETAILS

7. Figures 1 thru 4 show the required interconnections between the ac power lines, the surge protector and the station reference ground, and are referenced directly in table 1.

The exact location of the ac power line protector in relation to the station reference ground and the interconnections between the transmitter building and antenna are of vital significance. This is discussed in detail in Reference 1 which should be carefully studied before installing the protector.

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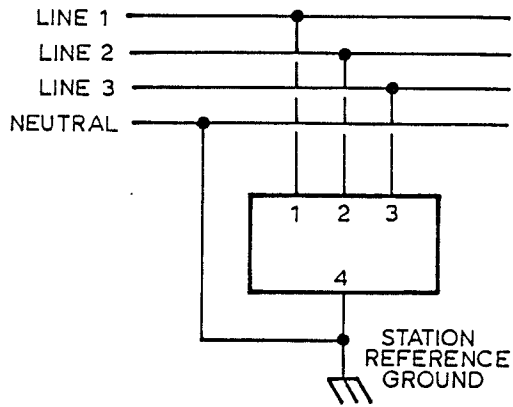


Figure 1 - 3-Phase, 4-Wire

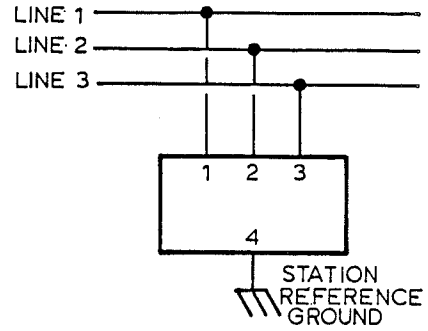


Figure 2 - 3-Phase, 3-Wire

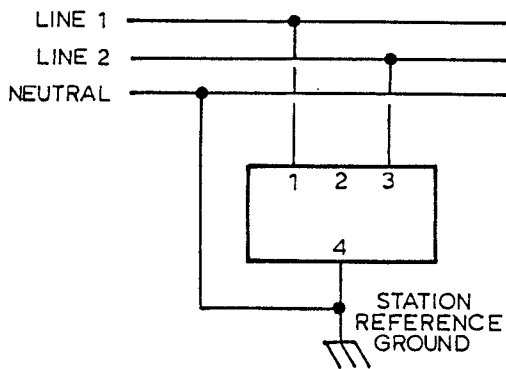


Figure 3 - 120/240 Split Phase
(North American)

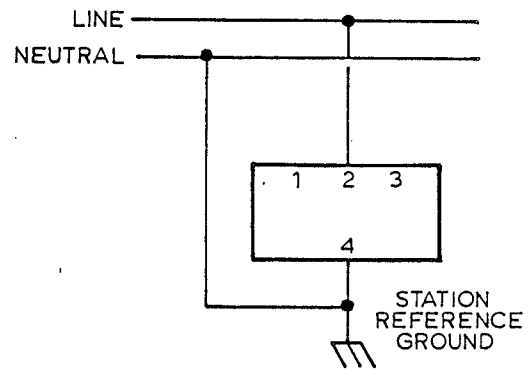


Figure 4 - 240 Volt, 1-Phase
(European)

Figures 1, 2, 3 and 4

NAUTEL AC POWER LINE PROTECTORS

MAINTENANCE

8. These ac power line protectors are designed to provide maintenance-free service in unattended locations and to bypass the energy from thousands of lightning strikes without interruption of the supply. They contain one or more metal oxide varistors which are connected via fuses to each line of the ac power supply. A neon lamp, associated with each fuse, is normally illuminated, indicating that the varistors are connected to the power lines. In the event the varistor becomes shorted and the fuse blown, the appropriate neon lamp is turned off, indicating that corrective maintenance of the protector is necessary. In the event that one or more lamps is turned off, the associated varistor may be checked by switching off the ac line supply and measuring the resistance of the device with a volt/ohmmeter. Shorted devices should be replaced together with the associated fuse.

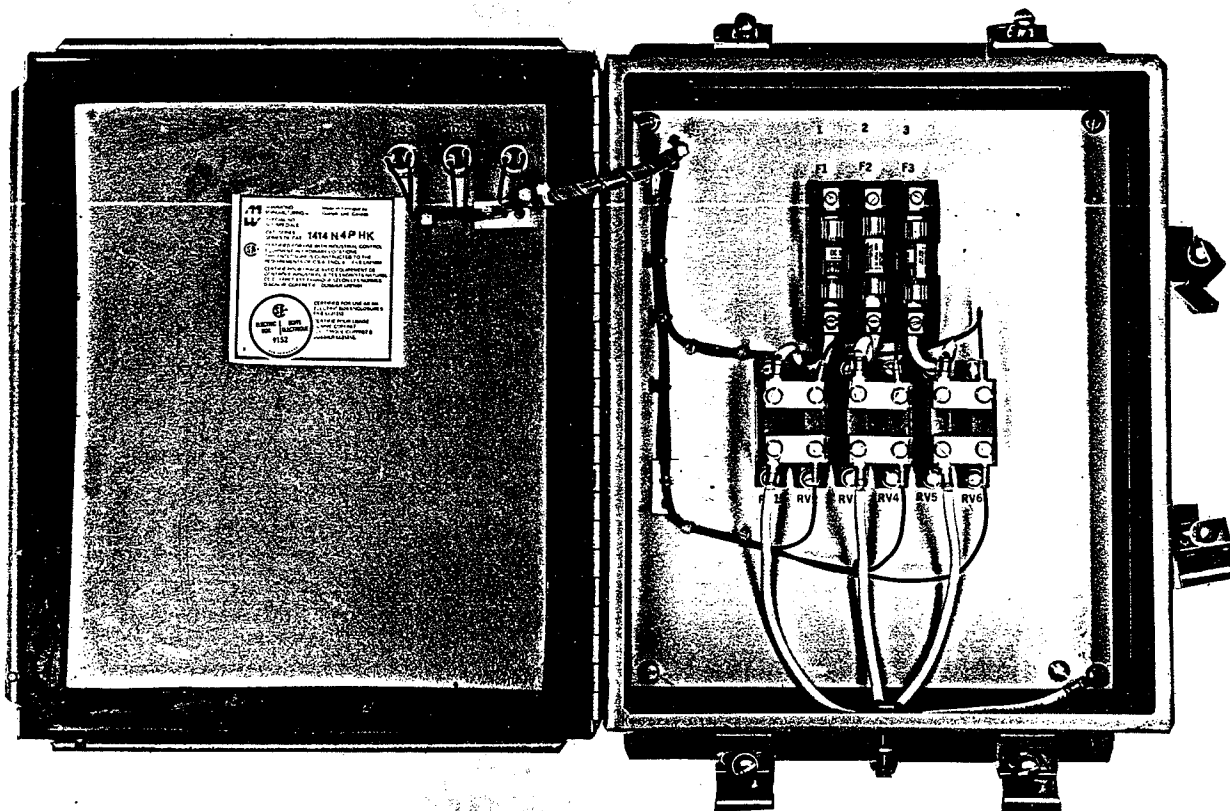


Figure 5 - Internal Connections (Model NP6-3120)

Reference 1 Lightning Protection for Radio Transmitter Stations - Nautical Electronic Laboratories Ltd., October, 1984

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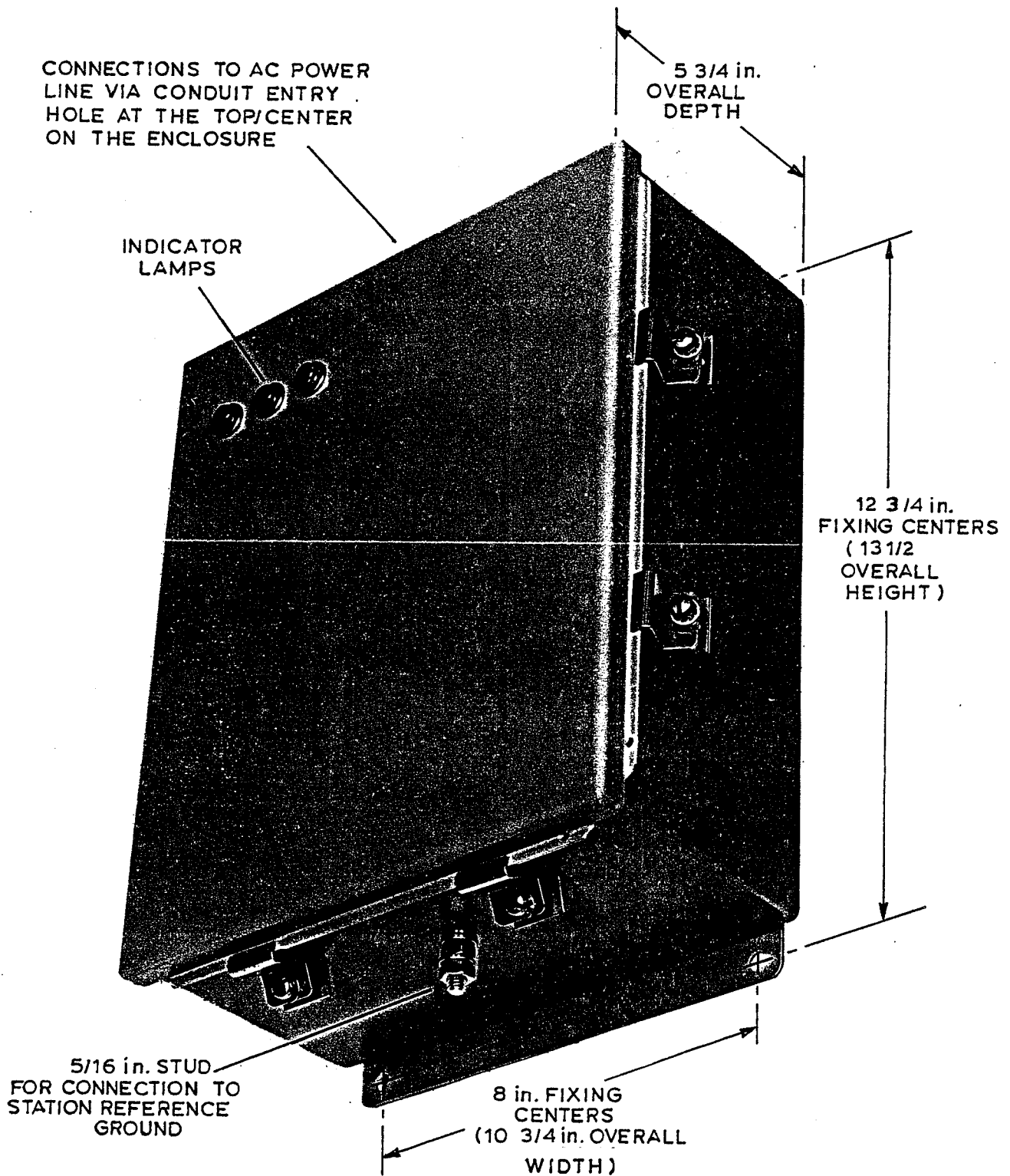


Figure 6 - Outline Details

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