HANDBOOK OF
INSTALLATION, OPERATION
AND
MAINTENANCE INSTRUCTIONS
FOR
MODEL 1000
OR
MODEL 1003
THUNDERBOLT SIREN
CONTENTS

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INTRODUCTION

This handbook contains instructions for the Installation, Operation, Service and Maintenance of the Model 1000 Thunderbolt Siren manufactured by Federal Sign and Signal Corporation, 13600 South Western Avenue, Blue Island, Illinois.

Description of Siren

The Model 1000 Thunderbolt Siren is a high intensity, directional, rotating beam type designed to give warning signals over a large area. It is extremely efficient and will operate from moderate sized power supplies. It produces a sound with substantially uniform output over a wide frequency range with a tone readily distinguished from other sounds such as vehicle sirens, horns and whistles. This device can be easily installed under a wide variety of mounting conditions.

Operation of Siren

Compressed air at low pressure and high volume is generated by a rotary positive displacement blower driven by an electric motor. The compressed air is delivered through a pipe to a high speed rotary valve or chopper which alternately opens and closes the throat of a large exponential horn. Air enters the horn in pulses which form sound waves of a frequency dependent upon the speed of the chopper. The horn is rotated about a vertical axis so that sound waves are emitted in all directions.

Description of Controls

When the control relay switch or manual code switch (See Page 24) is closed, the chopper motor control and the time delay relay are energized. The time delay relay closes the circuits to the blower and rotator motor controls. The motor controls in turn start their respective motors.

When the control relay switch or manual code switch is opened after some predetermined interval, the chopper motor control and the time delay relay are de-energized. The chopper motor is thus turned off. It begins to coast to a stop and the sound frequency falls lower and lower. When the time delay relay is de-energized, it does not immediately open the blower and rotator circuits. Consequently they will continue to run while the chopper is slowing down. The chopper cannot be restarted until the delay period is over. See "Adjustments" when a change in the delay period is desired.

The toggle switches permit individual operation of any of the three motors. The rotator switch has a center "off" position so that the sound may be beamed in any one direction. The "control" switch permits testing of the control circuits such as coding devices, phone lines, switches, etc., without sounding the siren.

The auto-transformer permits the top frequency of the siren to be varied by changing the voltage to the chopper motor. See "Adjustments". (See Page 27).
The Model #1003 Thunderbolt is an advanced model of the basic model #1000 Thunderbolt Siren. This handbook describes the installation, operation and maintenance of the basic Model #1000 Thunderbolt Siren with additional description detailing the function of the model #1003 Thunderbolt.

The Model #1003 is the same as the Model #1000, but has in addition tone modulator valves for control of the double tone chopper rotor in order to give 3 signals. The 3 signals are #1 "ALERT SIGNAL", a double tone sustained signal, #2 "AIR RAID ATTACK SIGNAL", a double tone undulating or up and down scale signal, #3 "FIRE" signal, a rapidly alternating sharp high and low note signal "FI RE" "FI RE".

On the "ALERT" and "ATTACK" signals the two tone modulator valves are left open. On the "FIRE" signal the tone modulator valves alternately open and close rapidly each of the two tone openings from the chopper stator into the siren horn. This gives a sharp high then low note signal as described above.

The basic #1000 Thunderbolt has a control panel which controls the sirens blower motor, rotator motor and chopper motor. The #1003 Thunderbolt also has in addition an auxiliary control panel which controls the tone modulator valves.

Specific reference pages for #1003 Thunderbolt are:

- 3A - TONE MODULATOR VALVES
- 6A - ELECTRICAL INSTALLATION
- 22A - TONE MODULATOR VALVES
- 24B - WIRING LAYOUT
- 25B - WIRING DIAGRAMS
SPECIFICATIONS

Weights:
- Blower Assembly: 850#
- Rotator and Chopper Assembly: 200#
- Horn Assembly: 100#
- Total: 1150#

Sizes:
- Blower Assembly: 24" high, 29" wide, 48" long
- Rotator and Chopper Assembly: 42" high, 14" wide, 22" long
- Horn Assembly: 28" x 28" x 53" long

Sound Output:
- Intensity: 126 db @ 100 feet
- Frequency: 128 Cycles/Sec. to 700 Cycles/Sec.
  (Maximum frequency may be varied to suit)

Electrical Power Requirements:
- 3 Phase: 208-240 Volts, 35 Amps running current
- 1 Phase: 240 Volts, 54 Amps running current

Blower:
- Type: Rotary

Blower Motor:
- Type: Semi-enclosed, ball bearing, induction

Chopper Motor:
- Type: Ball bearing - series

Rotator Motor:
- Type: Semi-enclosed, ball bearing, induction

Rotator Drive:
- Type: Combination spur and worm gear reduction
- Output Speed: Adjustable to 2, 4 or 8 R.P.M.

Horn:
- Type: Exponential
- Cut-off Frequency: 128 Cycles/Sec.
- Dispersal Angle: 40° x 40° (Approx.)

Control Panel:
- Size: 8" Deep x 18" Wide x 24" High
- Weight: 75#
- Enclosure: General purpose weatherproof
MODEL 1003

#1003 THUNDERBOLT
TONE MODULATOR VALVES
SOLENOID OPERATED

2 AT 1.6 AMPS. EACH AT 240 V-60 CY. 1 PHASE
INSTALLATION

Location of Siren

A number of factors must be considered when the location of this unit is determined.

It will first be necessary to determine the effective range of the siren for the particular region in which it will be installed.

The desired signal level at the fringe of the area to be covered by the siren must be determined first. Signal levels of 70 db for residential area and 80 db for business area are considered adequate for the average city.

The next factor to be determined is the loss per distance doubled. Under ideal conditions where the terrain is flat and buildings are low, the loss will be about 8 db each time the distance is doubled. For instance, with a source strength of 126 db at 100 feet, the signal level will be 118 db at 200 feet, 110 db at 400 feet, 102 db at 800 feet, etc. For average city conditions, this loss factor may be higher, 9 or 10 db per distance doubled and may be as high as 12 db for areas where high buildings predominate.

Page 14 is a graph which will provide an easy means of determining the siren range when the minimum signal level and the loss per distance doubled have been determined. Note the point at which the desired loss per distance doubled curve crosses the line extending to the right of the desired minimum signal level. Directly below this point on the bottom line will be found the effective range of the siren. For example, if the desired minimum signal level is 70 db and the terrain indicates a loss of 8 db per distance doubled, it will be found from the graph that the effective range will be about 2-1/2 miles. If the desired minimum signal level is 80 db and the terrain indicates a 10 db loss per distance doubled, it will be found that the graph indicates a range of about 1/2 mile.

After the approximate range of the siren has been determined, the general location of the unit may be determined by drawing a circle representing the effective range of the siren on a scaled map of the area to be covered by the siren.

Final selection of the site for the siren must also take into consideration the availability of suitable electrical power, ease of installation, height of surrounding buildings, hills or other obstructions. If uniform coverage in all directions is required, it will be necessary to locate the siren above surrounding obstructions, particularly those within a range of several hundred feet from the siren.

It is extremely important that the horn be above all pent houses, parapet walls, exhaust blowers, etc. on the same roof as the siren if good coverage is to be obtained.

Mechanical Installation

Page 15 shows the siren installed in the normal manner, using the ten foot piece of pipe furnished with the unit. This will elevate the centerline of the horn about 14 feet above the mounting surface. If more elevation of the horn is required, a longer piece of 3" standard pipe can be used.

Page 16 shows an installation where the standpipe is longer than ten feet and guy wires or chains must be used to provide additional stability and strength.
Page 17 shows an installation where the unit is mounted against a wall or structure and the standpipe is supported by the wall or structure.

Page 18 shows a method of installation where the blower assembly is mounted within a building and the standpipe is put through the roof. IMPORTANT: When the blower is mounted inside a building with warm, moist air and the outside temperatures are below freezing, provisions must be made for the blower input to take-in outside air. If not; the warm, moist, inside air will cause condensation to form in the chopper and lock the rotor. A 2-1/2 to 3-inch reducing elbow should be connected to the top of the blower, after the screen and plug are removed. Use 3-inch dia. air intake pipe and fittings for the balance of the installation. The end of the 3-inch pipe outside the building should be directed downward, parallel to the wall of the building in which the blower is located (see page 18). It should be above the highest expected snow level. In addition, this end should be screened with 20GA. galvanized, steel hardware cloth with 1/4 x 1/4 mesh to keep birds from nesting in the pipe.

Page 19 shows an installation where the blower must be mounted a certain distance away from the standpipe.

Page 20 shows a method of mounting the Rotator and Chopper assembly on a structural frame when the connection between the Blower and the Rotator and Chopper unit is made by means of thinwall tubing or flexible hose instead of 3" standard pipe.

In all of the various mounting methods, the blower may be separated from the Rotator and Chopper by many feet. For example, a separation of one hundred feet will cause a loss in sound output of only one dB (Approx.).

Normal installations shown on Page 15 and Page 16 may be accomplished without the use of hoists or cranes in the following manner:

1. Uncrate the blower assembly, leaving the shipping crate base mounted to the blower base. This wooden shipping crate base will make an excellent permanent base for the blower.

2. Locate the blower assembly in its final position and secure to the mounting surface.

3. Screw 3" standard pipe included with siren into elbow. Use longer pieces of pipe if required to clear nearby obstacles.

4. Lay the Rotator and Chopper assembly on its side with the conduit fitting in the bottom of the rotator housing, located so that it will be in the position shown on Page 15 when erected. Fasten the mounting flange to the pipe flange using the four 5/8" bolts and the ring gasket which are included with the siren. See Page 21 and Page 22.

5. Raise Rotator and Chopper Unit and turn horn so that it extends downward. See Page 23.

A few men can then raise the unit to a vertical position similar to the manner in which a ladder or flagpole can be elevated. The pipe will hinge at the elbow connection. A pole or short ladder can be inserted under the horn bracket for added leverage and used to help push the unit into position. See Page 23. A rope may be attached to the top of the chopper and used to help pull the unit into position.

8. Lock pipe in position by means of U-Bolt. Use guy wires or chains to further support pipe if it extends more than 10 feet. See Page 16.

9. Unscrew the two bolts on the top of the blower housing and remove the blower housing. Take off the fastening which held the relief valve in place during shipment.
Electrical Installation #1600 Thunderbolt

The general layout of the electrical circuit is shown on Page 24. The wiring diagram of the control panel is shown on Page 25F.

1. Install 3/4" conduit between blower housing and rotator housing.

2. Mount control cabinet as near to siren as possible to shorten wires and conduit and reduce voltage drop. The control panel must be mounted against a vertical wall or surface since the motor controls will not operate properly in any other position.

3. Install 1" conduit between control cabinet and blower housing.

4. Run proper size wires from terminal blocks in bottom of control cabinet through pull box on blower base to blower motor and to rotator housing for connection to rotator and chopper motors. See Page 13 for proper wires needed for various distances between control cabinet and siren. See Page 27 for proper connections of chopper motor leads to control cabinet terminal block.

5. Provide and install a disconnect switch within sight of the control panel and connect with proper wires shown on Page 13.

6. Provide and install a remote relay or AR Timer coding device having a normally open, single pole switch and connect to the terminal strip marked "control" in the control cabinet. A manual code switch may also be installed. It should be noted that manual coding may also be achieved by operating the three toggle switches in the control cabinet.

This siren will work with a wide variety of code timings. For best results when a wailing signal is desired, the coding cycle should have a total time of approximately twelve seconds. The proportion of "on" and "off" time is not important since the "off" time of the siren is determined by the time delay relay in the control cabinet and not by the coding device. This "off" period has been adjusted at the factory for 8 seconds and when the siren is used with a total code cycle of 12 seconds will result in a siren "on" time of 4 seconds. This timing may be changed if desired. See "Adjustments".
After-Installation Inspection

After installing the siren and hooking up the electrical system, the following items should be checked before operation of the siren is attempted.

1. Check the oil level in the blower gear case as recommended in "Lubrication".

2. Turn the blower pulley by hand to see that the blower turns freely.

3. Open the rotator housing and install the oil breather plug if one is found wired and tagged to the oil filler plug.

4. Turn the gear reducer pulley and see that it turns freely.

5. Move all four toggle switches in the control cabinet to "Automatic" position and see that the control relay and manual code switches are open. Then close the disconnect switch, thus supplying power to the control cabinet.

6. Move the blower switch to the "Test" position and observe the blower drive shaft to see if it is turning in a counterclockwise direction when viewed from the pulley end. Note arrow on blower pulley. If not, turn off the blower, open the disconnect switch and reverse two motor connections to obtain the proper direction of rotation. After checking for proper operation, stop the blower by moving the blower switch to the "Automatic" position.

7. Move the rotator switch to the "Test" position and see that the horn rotates. The direction of rotation does not matter. The horn may be stopped in any position by moving the rotator switch to the center "OFF" position.

8. Continue to rotate the horn, but be sure that the blower is not operating. Move the chopper switch to the "Test" position. When the chopper reaches top speed, after several seconds, move the chopper switch to the "Automatic" position and allow the chopper to coast to a stop. Very little sound volume will be generated during this test because the chopper receives no air from the blower. Repeat this operation several times and then move both the chopper and the rotator switches to the "Automatic" position.

9. Move the control switch to "Test" position. The circuits to the blower and rotator motor controls and to the chopper motor are now open. Only the chopper motor control and time delay relay will operate when a code signal is received at the control cabinet and consequently a silent test of the control circuits can be made. Check operation of the control circuits by noting the operation of the chopper motor control.
It should remain energized for about four seconds and be open for approximately eight seconds when operated by an AR Timer having a total cycle of twelve seconds as described in "Electrical Installation, Page #6". See "Adjustments" if a change in timing is desired. Move the control switch to "Automatic" position after checking control circuits.

10. With all four switches in the "Automatic" position, the siren is ready for final operation. It may be tested for full sound output by operating AR Timer or the manual code switch if one has been installed. It may also be tested by moving the blower and rotator switches to "Test" position and then operating the chopper up and down scale by means of the chopper test switch.

Adjustments

To Change Speed of Horn Rotation:

The rotating horn is driven through 3-step cone pulleys. Speeds of approximately two, four or eight revolutions per minute are possible and can be adjusted by changing the V-belt to a different set of pulley grooves. Units are shipped arranged for a recommended 2 RPM speed.

To Change Maximum Frequency of Siren:

The chopper motor is a series type and its maximum speed can be controlled by varying the voltage to the motor. The control panel contains a tapped auto-transformer for this purpose and the speed of the chopper may be changed by moving one of the leads of the chopper motor to a different terminal. Terminal No. 1 gives the lowest top frequency and Terminal No. 7 gives the highest top frequency. See Page 27. After a change of the top frequency has been made, it may be necessary to change the time delay relay adjustment. If the frequency has been lowered, the delay period may be decreased while an increase in top frequency may require an increase in the delay period.

To Adjust Time Delay Relay:

The time delay relay has been adjusted at the factory to keep the blower and rotator running for eight seconds after the chopper has been shut off. This period may be changed by turning the dial on top of the relay. CAUTION: Do not adjust so that delay period is less than 5 seconds.
MAINTENANCE

To insure a high degree of reliability for any signal system, a definite program of inspection, lubrication, test, adjustment and repair must be planned and followed.

Periodic Inspection

The frequency of the following maintenance schedules may be varied to suit specific conditions such as extreme climates, frequent use, availability of maintenance personnel, etc.

Three-month Inspection:

1. Test blower alone by operating the blower switch.
2. Test rotator by operating the rotator switch.
3. While the horn rotates, but with the blower off, test the chopper by operating the chopper switch.
4. Make silent test of control circuits by moving control switch to "Test" position and then operating control circuits while observing chopper motor control for proper timing.
5. Return all four switches to "Automatic" position after test.

Six month Inspection:

In addition to the regular three-month checks, the following items should also be checked.

1. Remove blower relief valve, clean off machined surfaces and cover with a film of light oil.
2. Drain any moisture which may have collected in the elbow at the bottom of the standpipe by removing the plug at the bottom of the elbow. Replace drain plug.
3. Check the belt tension of the blower drive. Finger pressure should not depress belt more than approx. 1/2".
4. Check the belt tension of the rotator drive. Finger pressure should not depress belt more than approx. 1/2".
5. Check oil level of blower gear house.
6. Check oil level of rotator gear box.
7. Clean and relubricate rotator spur gear and pinion.
8. Lubricate chopper tube bearings by giving grease cups several turns.

Annually it is recommended that painted surfaces be examined for any necessary maintenance.
LUBRICATION

Blower:

The proper oil level in the blower gear house must be maintained at all times. Check the oil level in the gear house by removing the plug at the end of the blower. If no oil drips from the opening, add oil until it does. Do not over-lubricate as too much oil may cause hard starting and oil leakage. Use No. 10W30 SAE oil. Replace plug.

Bearings at the gear end are lubricated by splash from the gears, but the bearings at the drive end are packed with grease prior to shipment. Grease may be renewed by regreasing through grease fitting at bearing. The old grease will be forced out of the vents during greasing operation.

Blower Motor:

The bearings in this motor are prelubricated ball bearings and will not require lubrication during the life of the unit.

Rotator Gear Reducer:

The oil in the gear box must be maintained at the proper level. Check the level when the unit is not running. To check, remove the "Oil Level" plug and see if gear box is filled to this hole. If not, remove oil breather plug and add oil to bring level to proper point. Use No. 10W30 SAE oil.

Rotator Motor:

The bearings in this motor are prelubricated sealed ball bearings and will not require lubrication during the life of the unit.

Rotator Gear & Pinion:

These gears should be covered with a light film of grease to prevent oxidation. Ordinary cup grease will be suitable.

Chopper Tube Bearings:

These bearings are lubricated by means of two grease cups. One of these cups is located just below the chopper housing and the other is located on the rotator gear in the rotator housing. Cup grease will be suitable for these bearings, Texaco Unitemp or equal.

Chopper Motor:

The bearings in this motor are prelubricated sealed ball bearings and will not require lubrication during the life of the unit.
<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>PROBABLE CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horn does not rotate</td>
<td>Switch in control cabinet on center &quot;off&quot; position</td>
<td>Put switch on automatic or manual position as desired</td>
</tr>
<tr>
<td>Also see Horn Rotates Erratically</td>
<td>Rotator motor control heater relay tripped</td>
<td>Reset control heater relays</td>
</tr>
<tr>
<td></td>
<td>Open connection between Control Panel and motor</td>
<td>Check wiring for continuity</td>
</tr>
<tr>
<td></td>
<td>Rotator motor defective</td>
<td>Check motor and repair or replace if found to be faulty</td>
</tr>
<tr>
<td></td>
<td>Rotary motor control coil defective</td>
<td>Check coil and replace if found to be faulty</td>
</tr>
<tr>
<td></td>
<td>Gear mechanism jammed</td>
<td>Turn pulleys by hand. Locate source of binding if pulleys turn hard.</td>
</tr>
<tr>
<td>Blower does not operate</td>
<td>Blower motor control heater relay tripped</td>
<td>Reset control heater relays</td>
</tr>
<tr>
<td></td>
<td>Open connection between Control Panel and motor</td>
<td>Check wiring for continuity</td>
</tr>
<tr>
<td></td>
<td>Blower motor defective</td>
<td>Check motor and repair or replace if defective</td>
</tr>
<tr>
<td></td>
<td>Blower motor control coil defective</td>
<td>Check coil and replace if defective</td>
</tr>
<tr>
<td></td>
<td>Blower jammed</td>
<td>Turn blower pulley by hand. Should turn easily. Look for cause of jamming if not free.</td>
</tr>
<tr>
<td>Blower motor is overloaded</td>
<td>Blower running in wrong direction</td>
<td>Change leads to motor if direction of rotation is wrong</td>
</tr>
<tr>
<td></td>
<td>Voltage at siren is low</td>
<td>Provide shorter or larger wires to siren. Source of power may not be adequate.</td>
</tr>
<tr>
<td></td>
<td>Relief valve may be stuck</td>
<td>Remove relief valve cover, clean with kerosene or light oil and replace.</td>
</tr>
<tr>
<td></td>
<td>Intake port of blower is closed</td>
<td>Remove obstruction such as rags, paper, etc.</td>
</tr>
<tr>
<td></td>
<td>Oil in blower gear house is too heavy for cold weather</td>
<td>Drain and refill with proper oil specified in these instructions</td>
</tr>
<tr>
<td>Chopper motor does not operate</td>
<td>Chopper motor control heater relay tripped</td>
<td>Reset control heater relay</td>
</tr>
<tr>
<td></td>
<td>Open connection between control panel and motor</td>
<td>Check wiring for continuity</td>
</tr>
<tr>
<td>TROUBLE</td>
<td>PROBABLE CAUSE</td>
<td>REMEDY</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>--------</td>
</tr>
<tr>
<td></td>
<td>Chopper motor defective</td>
<td>Check motor and repair or replace if found defective</td>
</tr>
<tr>
<td></td>
<td>Chopper rotor jammed</td>
<td>Check rotor for free rotation. Remove any foreign material causing jamming.</td>
</tr>
<tr>
<td>Chopper motor operates but blower and rotator do not start when remote relay is energized.</td>
<td>Time delay relay coil open</td>
<td>Check coil for continuity, Replace if defective.</td>
</tr>
<tr>
<td></td>
<td>Circuit to time delay relay open</td>
<td>Check circuit for continuity</td>
</tr>
<tr>
<td></td>
<td>Switches on time delay relay do not operate properly</td>
<td>Check switch for proper operations</td>
</tr>
<tr>
<td></td>
<td>Circuit between time delay relay switch and motor controls open</td>
<td>Check circuits for continuity</td>
</tr>
<tr>
<td>Blower and rotator do not shut off after signal period is over or Blower and rotator shut off before chopper coasts to a stop</td>
<td>Time delay relay is not adjusted properly</td>
<td>See &quot;Adjustments&quot; Page 8</td>
</tr>
<tr>
<td></td>
<td>Time delay relay defective</td>
<td>Check relay and repair or replace if found defective</td>
</tr>
<tr>
<td>Horn Rotates Erratically</td>
<td>Chopper Housing Bearing Binding</td>
<td>Lubricate according to recommendations under &quot;Lubrication&quot;</td>
</tr>
<tr>
<td></td>
<td>Grease on Clutch Bands</td>
<td>Remove bands and clean</td>
</tr>
<tr>
<td></td>
<td>Not enough clutch tension</td>
<td>Tighten clutch band cross bolts. Factory setting 40# pull at junction of horn &amp; bra CAUTION: DO NOT TIGHTEN TOO MUCH SO THAT STRONG GUSTS OF WIND WILL CAUSE DAMAGE TO DRIVE MECHANISM</td>
</tr>
</tbody>
</table>
### TABLE 1
RECOMMENDED WIRE SIZES FOR CONNECTION OF THUNDERBOLT SIREN

#### 208-240 Volts - 3 Phase

<table>
<thead>
<tr>
<th></th>
<th>Full Load Current</th>
<th>Distance in feet</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>100 or less</td>
<td>100 - 200</td>
<td>Over 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Cabinet to blower motor</td>
<td>23 Amps</td>
<td>3 - #10's</td>
<td>3 - #8's</td>
<td>Calculate wire sizes on basis of not over 5% total line drop from power supply to siren for indicated full load current.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Cabinet to chopper motor</td>
<td>10 Amps</td>
<td>2 - #14's</td>
<td>2 - #12's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Cabinet to rotator motor</td>
<td>2 Amps</td>
<td>2 - #14's</td>
<td>2 - #14's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply to Control Cabinet</td>
<td>35 Amps</td>
<td>3 - #6's</td>
<td>3 - #4's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control relay to Control Cabinet</td>
<td>180 Milliamps</td>
<td>2 - #14's</td>
<td>2 - #14's</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 240 Volts - 1 Phase

<table>
<thead>
<tr>
<th></th>
<th>Full Load Current</th>
<th>Distance in feet</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>100 or less</td>
<td>100 - 200</td>
<td>Over 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Cabinet to blower motor</td>
<td>42 Amps</td>
<td>2 - #6's</td>
<td>2 - #4's</td>
<td>Calculate wire sizes on basis of not over 5% total line drop from power supply to siren for indicated full load current.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Cabinet to chopper motor</td>
<td>10 Amps</td>
<td>2 - #14's</td>
<td>2 - #12's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Cabinet to rotator motor</td>
<td>2 Amps</td>
<td>2 - #14's</td>
<td>2 - #14's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply to Control Cabinet</td>
<td>54 Amps</td>
<td>2 - #4's</td>
<td>2 - #2's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control relay to Control Cabinet</td>
<td>180 Milliamps</td>
<td>2 - #14's</td>
<td>2 - #14's</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 480 Volts - 3 Phase

<table>
<thead>
<tr>
<th></th>
<th>Full Load Current</th>
<th>Distance in feet</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>100 or less</td>
<td>100 - 200</td>
<td>Over 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Cabinet to blower motor</td>
<td>12 Amps</td>
<td>3 - #10's</td>
<td>3 - #8's</td>
<td>Calculate wire sizes on basis of not over 5% total line drop from power supply to siren for indicated full load current.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Cabinet to chopper motor</td>
<td>10 Amps</td>
<td>2 - #14's</td>
<td>2 - #12's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Cabinet to rotator motor</td>
<td>1 Amp</td>
<td>3 - #14's</td>
<td>3 - #14's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply to Control Cabinet</td>
<td>23 Amps</td>
<td>3 - #6's</td>
<td>3 - #4's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control relay to Control Cabinet</td>
<td>180 Milliamps</td>
<td>2 - #14's</td>
<td>2 - #14's</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Guy wires or chains extending to rigid tie points.
Support standpipe to wall by means of clamps and expansion bolts.
FIGURE - 6.
Supporting angles fastened to rigid structure

Thinwall tubing, flexible tubing or reinforced rubber hose. (Must be capable of carrying approx. 10 pounds per square inch air pressure)

To blower

FIGURE-7
Horn

Rotator & chopper unit

FIGURE - 8
FIGURE - 9

MODEL 1003
THUNDERBOLT SIREN
NOTE! BEFORE STARTING WIRING WORK TO INSURE YOU HAVE LATEST DATA REFER TO WIRING DIAGRAM ON THE BACK OF THE COVER OF THE CONTROL CABINET.

MODEL & RCMIA# 240
CONTROL PANEL
WIRING DIAGRAM
SERIES A2

EFFECTIVE
OCT. 1973
25 F
NOTE! BEFORE STARTING WIRING WORK TO ENSURE YOU HAVE LATEST DATA REFER TO WIRING DIAGRAM ON THE BACK OF THE COVER OF THE CONTROL CABINET.
NOTE! BEFORE STARTING WIRING WORK TO INSURE YOU HAVE LATEST DATA REFER TO WIRING DIAGRAM ON THE BACK OF THE COVER OF THE CONTROL CABINET.
Connect one of the chopper motor leads to the terminal marked "C" in the control cabinet. Connect the other chopper motor lead to one of the terminals marked 1 to 7. It is suggested that terminal No. 5 be tried first. If any change in the top frequency of the siren is desired after testing it, move the motor lead wire on terminal No. 5 to a higher or lower numbered tap. See Page 8
ANCHOR TO WALL OR OTHER RIGID SUPPORT.

4" x 6" - 6 REQ'D.

2" x 6" - 2 REQ'D.

PLACE ROOFING FELT & TAR UNDER ALL TIMBERS IN CONTACT WITH ROOF.

45 1/2"

8'-0"

8'-0"

SUGGESTED ROOF MAT FOR WEIGHT DISTRIBUTION (APPROX. 18# PER SQ.FT.)
"MAIN CONTROL PANEL" RCM1*240
MODEL 1000 THUNDERBOLT

FOR WIRING DETAILS SEE DIAGRAM ON BACK OF COVER OF MAIN CONTROL PANEL

NOTES:
- RCM2 IS A COMBINATION OF RCM1 AND RCM3
- THIS DWG ILLUSTRATES AF TIMER CONTROLLING (1) 1003 SIREN, WHERE THERE ARE MORE SIRENS REFER TO 8215D805 OR ENGR. DEPT.

"AUXILIARY CONTROL PANEL" RCM3*240
MODEL 1003 THUNDERBOLT

IMPORTANT - INTERCONNECT THESE WIRES AS SHOWN L1 TO L1 AND L2 TO L2.
THUNDERBOLT SIREN-POLE MOUNTING

Chopper Assembly

Horn Assembly

3/4" Conduit fitting by Federal
3/4" Conduit to Blower Housing by contractor

Contractor to furnish and securely install necessary Brackets, Angles and Clamps required to fasten 3" air pipe away from top of pole as reqd. Fasten air pipe to pole at intermediate points with pipe straps.

1" Conduit and Entrance Cap to power supply, by contractor. Wires to extend 3' 0" of entrance cap. (See Table 1 in manual for size of wires)

Class 2 - C. P. Pole - Length as required by others.

Conduits to be held by straps or clamps as required, by others.

Contractor to furnish and install fused entrance switch with lock and key.

Contractor must also install Federal weatherproof control panel (8x18x24) and weatherproof telephone type control relay if required. (See table 1 in Manual for current requirements).

Blower Base Frame and Wood Skid (54 1/2" x 33") assembly to be mounted directly to concrete base as shown when necessary.

Ground to be 8'0" x 1/2" copper-weld ground rod with #6 wire clamp.

This drawing for contractor estimating purpose or as a general suggestion.

54 1/2" x 33" x 12" concrete base and footings, when necessary. Top of base to be at least 6" above ground level. Set mounting bolts in concrete.

Note: See other sheets for roof mfg.
THUNDERBOLT CONTROL PANEL
TYPICAL WIRING

SEE FIG. 2, 3 & 4

THUNDERBOLT CONTROL PANEL

TO LINE

X X

CONTROL

TO ROTATOR MOTOR
TO BLOWER MOTOR
TO CHOPPER MOTOR

FIGURE 1

PUSHBUTTON SWITCH CONNECTION

FIGURE 2

X

X

TO CONTROLS

RELAY
(BY OTHERS)

RELAY CONTROL

FIGURE 3

SEE DETAIL ON PG. 39

FIGURE 4

PULL LEVER BOX

FIGURE 5

DIRECT CONNECTION TO
FEDERAL AIR RAID TIMER

IMPORTANT!
CONNECTIONS SHOWN BY DOTTED LINES FOR
3-PHASE OPERATION ONLY
TYPICAL MOUNTING OF THUNDERBOLT AIR-RAID SIREN ON FLAT ROOF

Blower may be set directly on the roof, with stand-pipe sufficiently long to get the rotator, chopper and projector up high enough to clear all nearby obstacles.

IMPORTANT: Centerline of projector must be as high as possible above the roof. A flat roof acts as a reflector if the siren is too low, which would be detrimental to proper sound distribution. Either keep the siren away from superstructures on the roof, such as chimneys or penthouses, or else make sure the projector is 5 feet or more above the top of such superstructures (the higher, the better). Use guy-wires to hold siren rigid.
TYPICAL MOUNTING OF THUNDERBOLT AIR-RAID SIREN IN AREA HAVING HIGH BUILDINGS

Select a building which is either the highest building in its vicinity, or else a building which has no higher building within 500 feet of it. Blower may be set directly on the roof, or on penthouse roof, with stand-pipe of sufficient length to clear all nearby obstacles. The stand-pipe may also be up along the side wall of penthouse, making certain that the projector is 5 feet or more above all obstructions (the higher, the better). Use guy-wires or clamps to hold siren rigid.
TYPICAL MOUNTING OF THUNDERBOLT AIR-RAID SIREN ON PITCHED OR SLOPED ROOF

Blower may be mounted on floor of attic, with stand-pipe through roof and the rotator, chopper and projector sufficiently high above roof, as illustrated. Or, a platform may be built on the roof, with entire unit including blower on the platform.

IMPORTANT: Centerline of projector must be high enough above peak of roof to allow sound to carry over and beyond adjacent buildings and any other obstructions (the higher, the better). Use guy-wires to hold siren rigid.