



SHOCK TAPE

SAY FAREWELL TO ALL BIRDS

Installation Guide



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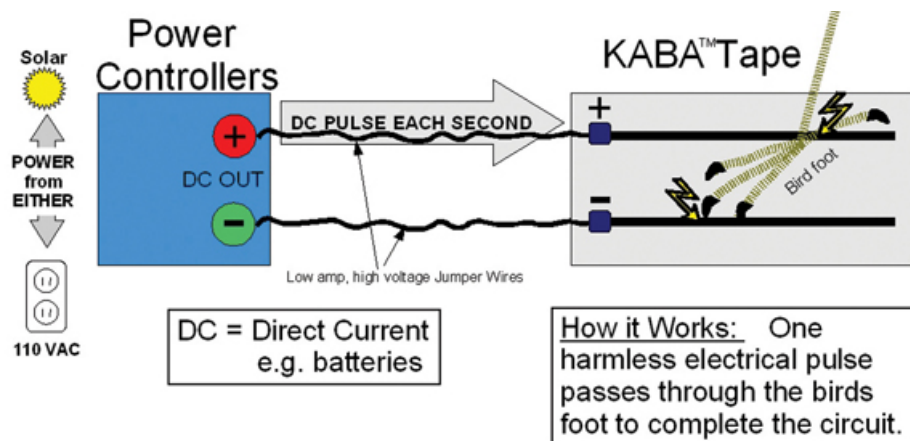
WARNING: READ ALL INSTRUCTIONS

1. Only use this product for the purpose in which it is intended, as defined in this manual.
2. Never run more than one energizer on the same system at one time. The pulses will be too close together and may be hazardous to animals and people. It will also damage energizers.
3. Never alter the design of an energizer or substitute components. This could be hazardous to you and will void the warranty.
4. Instruct all persons how to disconnect an energizer in case of emergency. Post warnings signs every 3 meters.
5. The energizer OK light will flash when power is on the fence and you may hear a clicking noise at the controller. If it a pulse type energizer the OK light operates continuously. Always check the energizer and shock tape for voltage once installation is complete.
6. Shock tape flat wires are always dead ended.
7. Lead-in wire must be insulated to 20,000 V minimum.
8. Never install near flammable materials and gasses.

Introduction

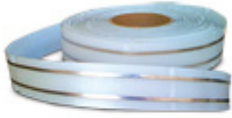
You have purchased one of the finest bird deterrent systems available. Electric Shock-Tape bird deterrent systems incorporate the latest in technologies ensuring excellent pest bird control. The system is 100% effective against all birds and will deter birds for years to come.

Shock pulses condition all birds to fear the tape. The bird has a small body mass and is easily disturbed by the sting passing through its foot or body. Their patterns change immediately. They do not like to be zapped.



Tools and Supplies

Mahatz simplified electric bird shock installations. The supplies shown are the only items needed to install most shock tape systems. Essential tools are scissors, a crimper/stripper and electric fencer tester.



SHOCK TAPE



ENERGIZERS



LEAD-IN WIRE



SLEEVES



WIRE LOOPS



LINE TESTER



DIGITAL TESTER



CRIMPER/STRIPPER



WARNING SIGN



WARNING STICKERS



SCISSORS



SPOOLER

Component Design

Just like the public electric utility wiring systems, Shock-Tape systems runs on 100% aluminum wiring. Lead-in wire, crimp sleeves and tape flat wires are highly conductive, extreme corrosion resistant aluminum.

Use our lead-in wire and connectors for optimal results. The small gauge of our lead-in wire allows an installer to place several wires into one crimp sleeve. Strictly using aluminum components eliminate galvanic corrosion and insure long lasting electrical connections.

The clear tape flat wires are laid upon have an electrical insulation value of approximately 18KV. Maintaining the integrity of acrylic film and adhesive is essential to keep the electricity from leaking through to conductive surfaces below. Patch any tear or puncture. Short pieces of excess tape should used during installation as an insulator.

Tape Durability

Shock-Tape endures all types of exposure with excellent results. The tape is unaffected by a variety of harsh exposure conditions, freezing cold, high surface temperatures, direct sun and salt air. The adhesive base is a pressure sensitive acrylic adhesive.

This same adhesive replaces rivets, screws and welds in jet wing flaps, panel delivery trucks, outdoor signs and mirrored ceiling panels.

A pure acrylic film is laminated to the adhesive base. Acrylic films are proven in outdoor signs, auto and house paints. For this film, sun deck tests have shown no signs of aging (cracking/yellowing) over 9 year period.

The flat wires bonded to the top of the tape are 100% aluminum and are extremely corrosion resistant. They will not oxidize under normal conditions.



Energizers (Chargers)

Energizers are also known as electric fence chargers. Energizers we use have pulsing DC outputs. Sharp, short pulses of electricity occur 1-2 seconds intervals. The substantial off-time between pulses insures that constant arcing cannot ignite combustible materials. A constant arc on the tape raises the temperature at the arc location 1 degree Fahrenheit from surrounding areas.

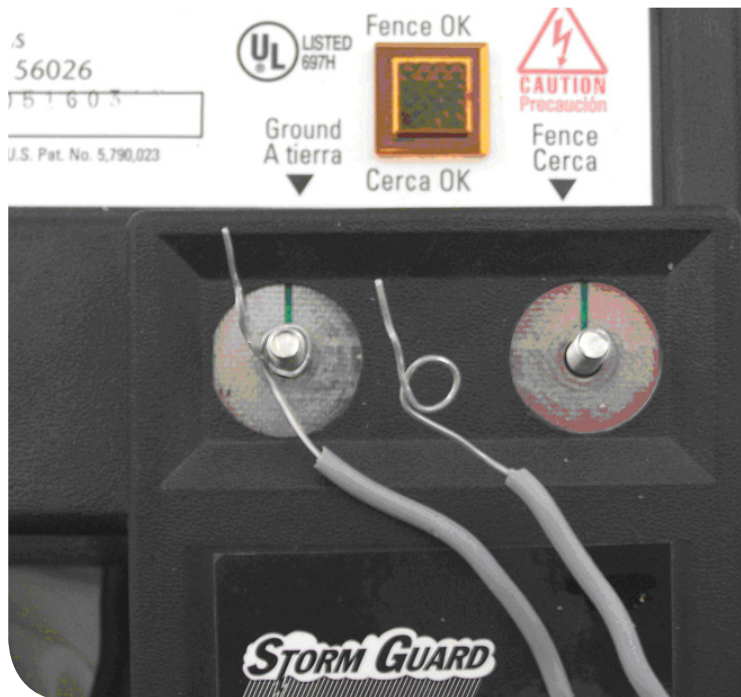
To effectively repel birds, voltage on the tape should be at least 1,500 VDC. The shock must be strong enough to impress the birds.

Energizers operate on 110 VAC, 220 VAC and Solar Powered. Plug-in models use only several watts of electricity. Each unit is chosen carefully by KABA distributors to attain electrical and performance goals. Arcing between wires through water droplets can occur with powerful energizers operating above 6K VDC. This arcing virtually stops when the output goes below 6K VDC.

Power outputs meet UL standards for human safety. Birds and humans cannot latch on to the tape because the electrical pulse is followed by a long off-time. Energizers can discharge continuously without damage. Our units are "Capacitive Discharge" units with DC output. The positive terminal on the energizer sends out pulses. The other terminal is negative or ground. Just like batteries, this is a simple 2 wire system, + and -. In the bird shock application, earth ground IS NOT USED.

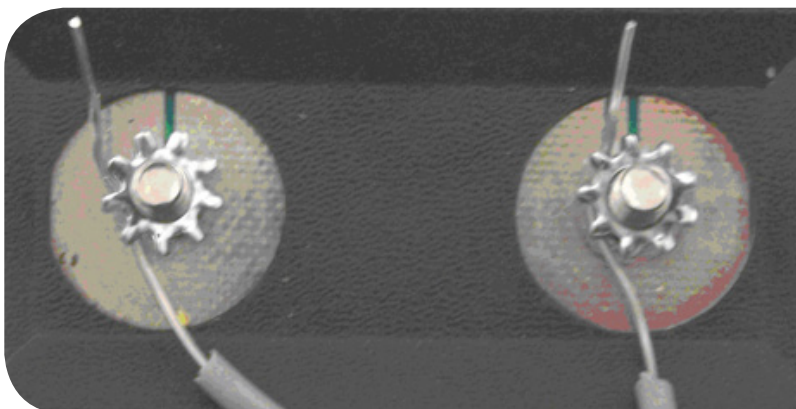
Energizer Setup

110 / 220 VAC energizer with Storm Guard Module



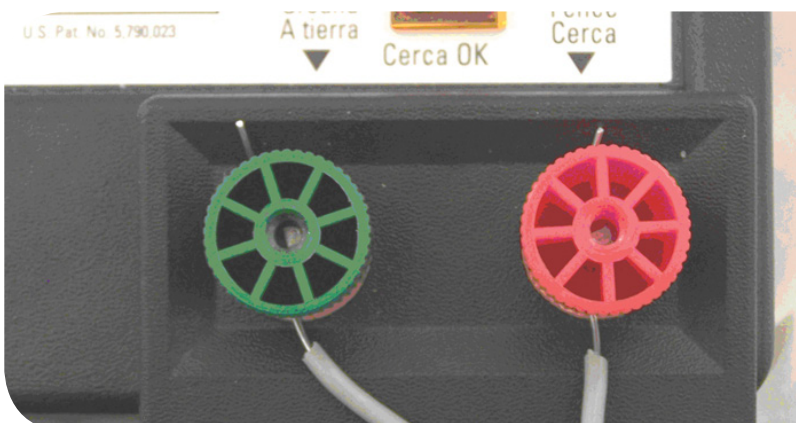
1

Place Storm Guard over terminal posts. Strip 2" of wire insulation. Form complete clockwise loops around posts



2

Place star washers over wire loops.



3

Carefully tighten plastic nuts.

Wire insulation never goes under the plastic nuts.



Energizer Setup

Solar Energizer



1

Stand made from a 6 foot long x 5/4" x 6" deck board.



2

Attached with concrete screws



Surface Preparation

Surfaces must be DRY, OIL FREE, DUST FREE and UNIFIED/STABLE for proper adhesion.

Dry - Insure all surfaces are dry.

Oil free - Use a 50:50 mixture of isopropyl alcohol and water. Isopropyl alcohol is rubbing alcohol. Glass cleaning and oil based cleaning solutions are NOT acceptable. For cleaning heavily oiled surfaces, a citrus based degreasing agent should be used. Follow up with isopropyl alcohol: water mixture and dry surface.

DUST FREE - Remnants of bird manure must be thoroughly removed.

UNIFIED/STABLE - Be cautious of loose surfaces like soft stone, poured concrete, rusted metal and bare wood. Remove all loose material. Use caulk under tape, or seal surface where tape will be applied with an acrylic sealant, or attach narrow metal strips over the surface and bond tape to them.

Will bond to:	Caulk required to bond to:
Metal	Rubber
Painted surfaces	Sandstone
Clay tiles	Unsealed concrete
Asphalt shingles (in very good condition)	Bare wood
Marble	
Glass	
Roof tiles	
Steel	
Different kind of wood (needs testing first)	
Lintels	
Cornice	

Always Test adhesion with tape to insure compatibility. Use caulk to achieve a bond to difficult surfaces as noted. Acrylic latex, polyurethane sealants or terpolymer caulks should be used. Clear caulk is suggested because the spread of the caulk is seen through the shock tape and in a high profile area this could be objectionable.

Applying shock tape

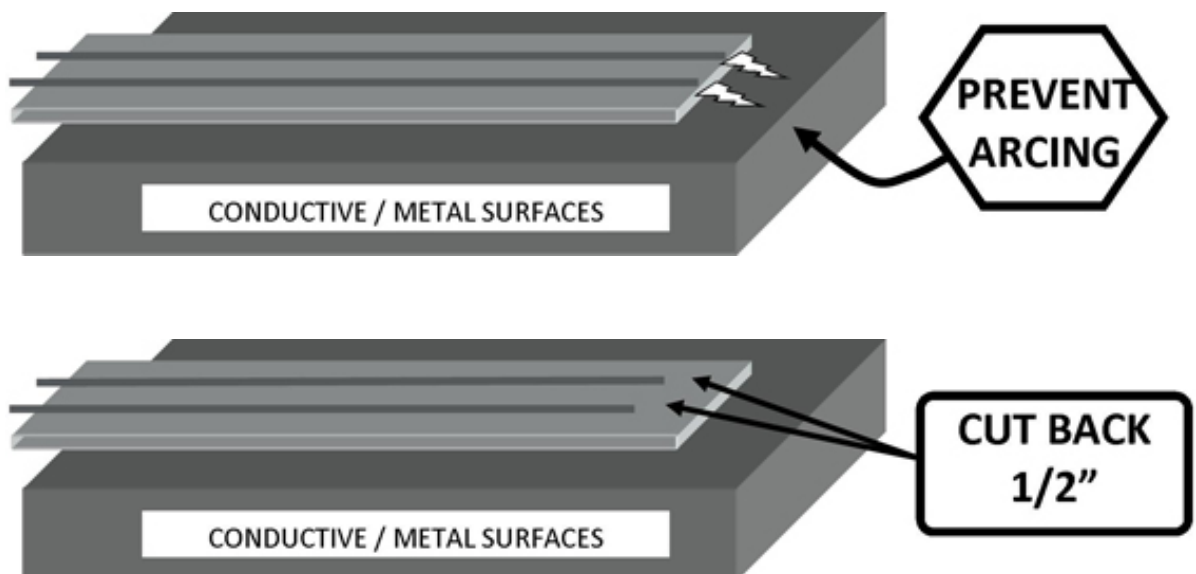
Minimum surface temperature of 40 degrees Fahrenheit or 5 degrees Celsius is required for application. The warmer the surface temp, the greater the adhesion. Cold surfaces inhibit adhesion. Infra-red digital thermometers (see picture) measure surface temps for cold weather installations. Test adhesion to all surfaces. If you sense a poor bond when applying Shock-Tape – STOP and CORRECT the reason(s) before proceeding.



▲ Infra-red digital thermometer

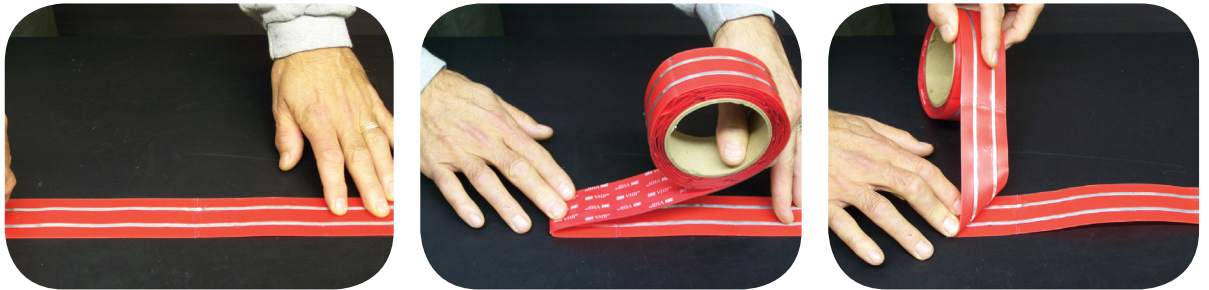
To apply Shock-Tape:

- Peel back several inches of the polyethylene liner
- Firmly press the exposed adhesive to the substrate
- Align, smooth and firmly hold unattached tape in place
- Remove liner away from tape
- Smooth tape with firm hand pressure.
- DO NOT tear Shock-Tape acrylic film top when applying to metal surfaces. The electrical insulation value of the film is necessary to prevent the electricity from arcing through to the metal.
- DO NOT use staples, nails or screws to fasten tape.
- Use the spooler to hold tape rolls when 2 hands are needed.
- Prevent arcing on metal surfaces, trim flat wires at ends of tape (shown below)



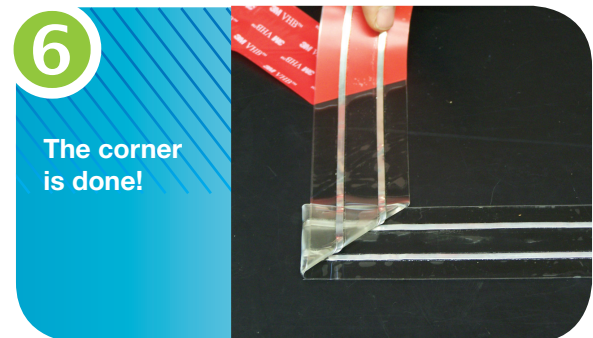
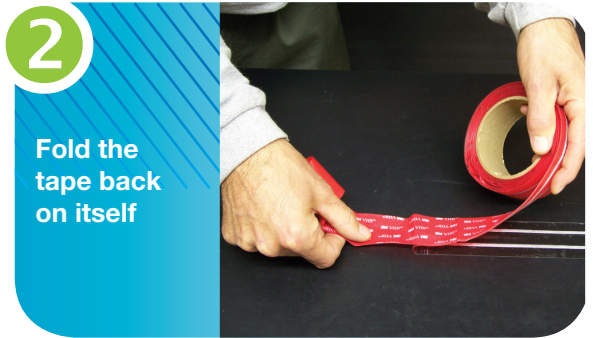
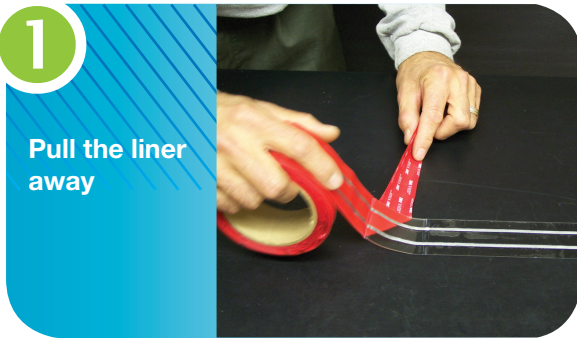
Corners

Make corners without having to cut tape. By folding the tape twice, corners of angles up to 120 degrees can be made very quickly.



In the photos above, the red liner remains on to show how the wires are double insulated from each other when they do cross.

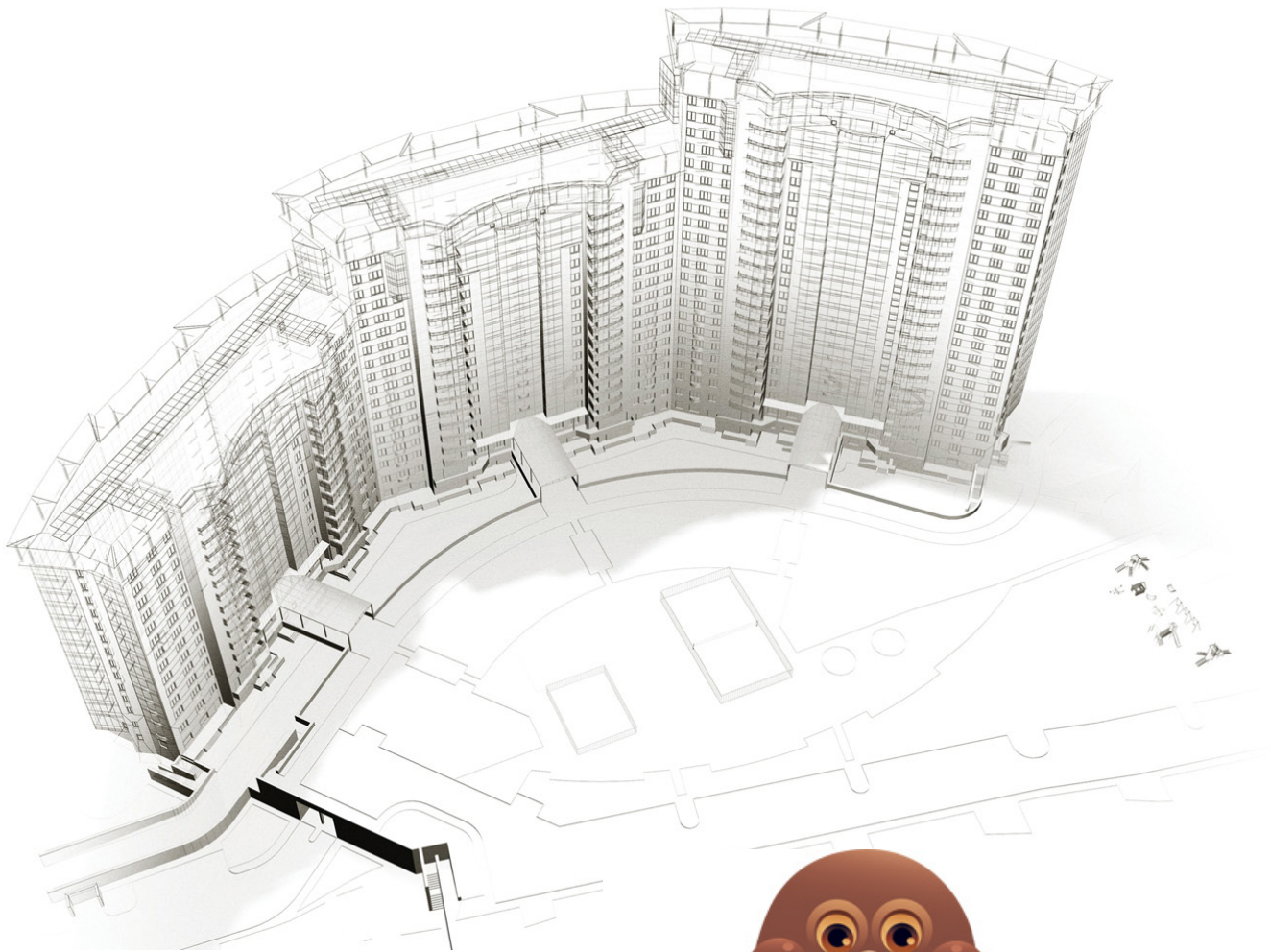
Step-by-step cornering



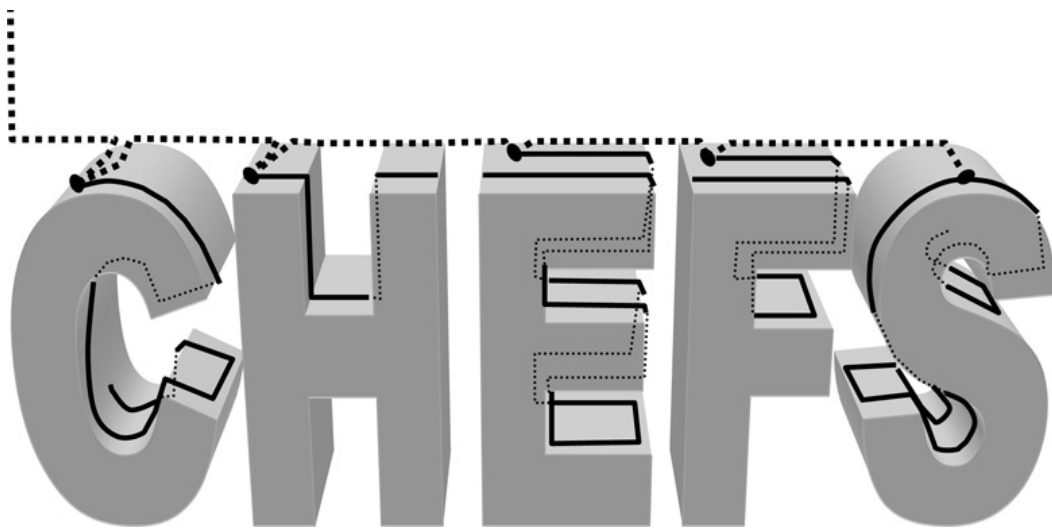
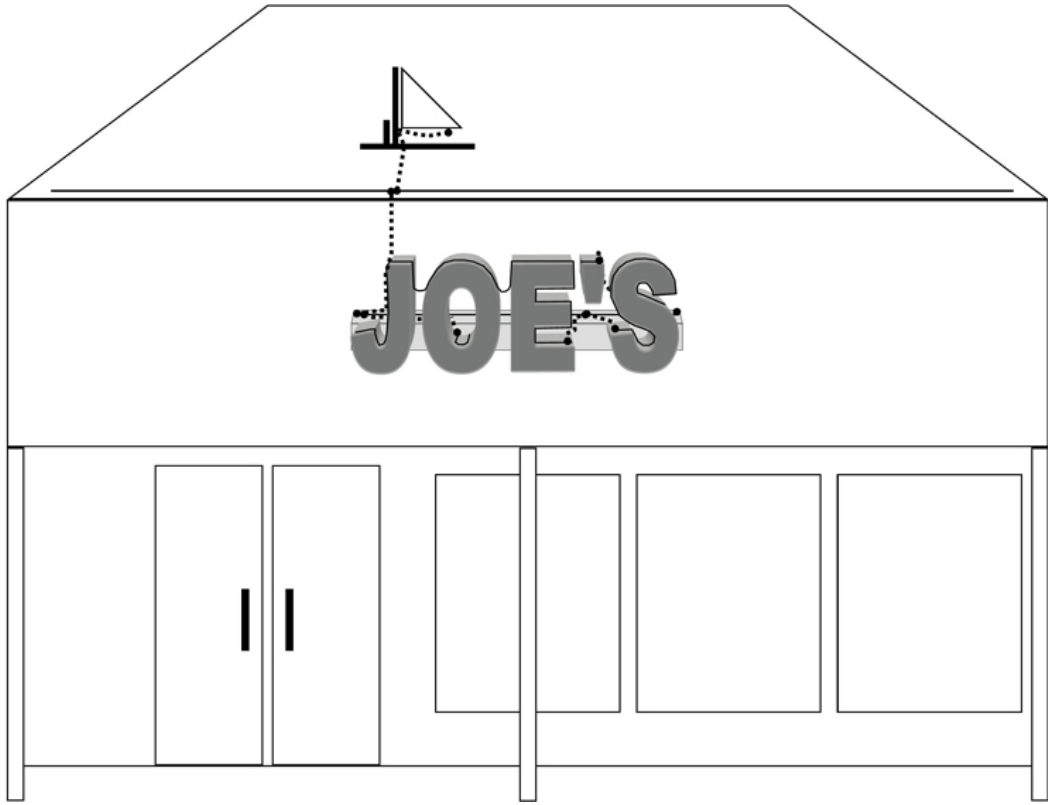
Wiring layouts

There are many possible ways to connect the system together. Having a wiring plan on paper is essential. Take pictures, print and mark them up or sketch the plan. Shock tape strips can be wired in series or parallel or mixed. The energizer can be connected to the tape at any point.

Create “zones” for large layouts. Zones allow rapid troubleshooting should there be a power problem. By detaching one zone at a time the problem area is identified quickly. “Taps” are connections where lead-in wire connects to shock tape. The two fundamental taps are the splice tap and end tap.



Sample Wiring Plan



Electrical Connections

Basic electrical knowledge is required to connect the system together.

This tape is intended to carry DC (direct current) electrical pulses generated by electric fence energizers. Energizers have 2 output terminal posts, positive and ground. The positive terminal will produce one sharp, positive pulse every 1-2 seconds. The ground terminal is DC ground for the system.

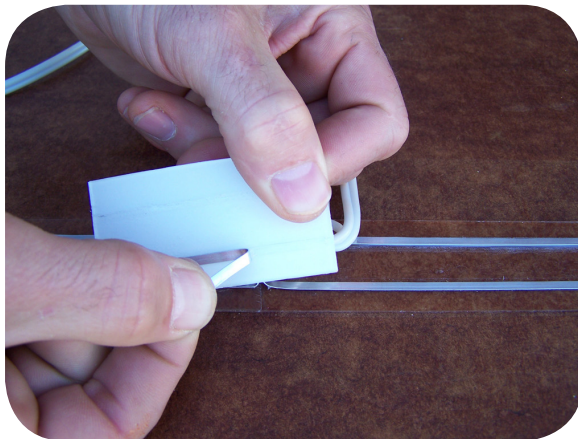
CONNECT this ground terminal ONLY to a shock tape lead-in wire. DO NOT CONNECT this terminal to earth ground. Connect one pair of wires to the next pair of wires. The tape wiring system is polarity insensitive. One wire will be positive and the other negative.

Lead-in Wire

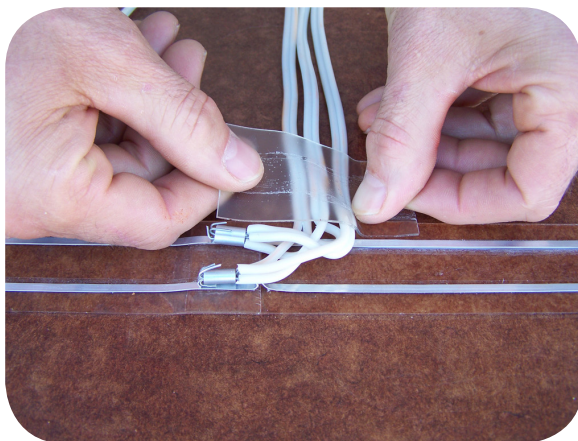
Heavily insulated wire connects all system pieces. Connections are to be made with care.

- Loops or other mechanical fasteners should be used for intermediate fastening.
- Strip off ½" of insulation. DO NOT KNICK WIRES.
- Insert wire completely through the sleeve
- Completely crush each sleeve with crimper in 2 places to insure solid connection

Usage of excess tape

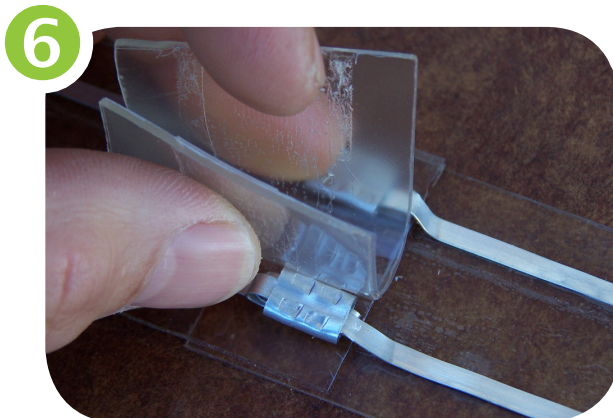
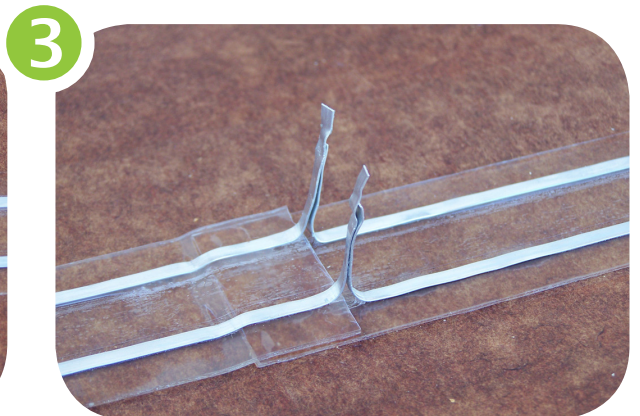
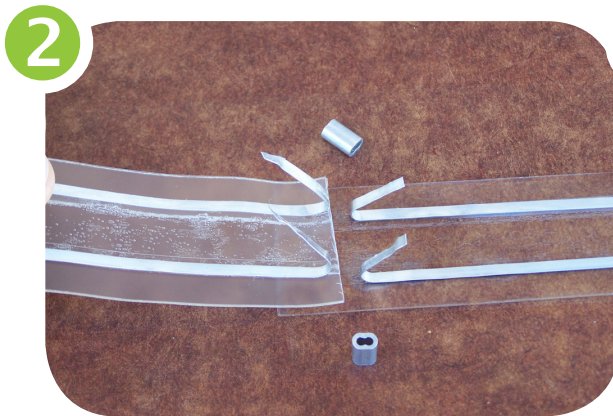
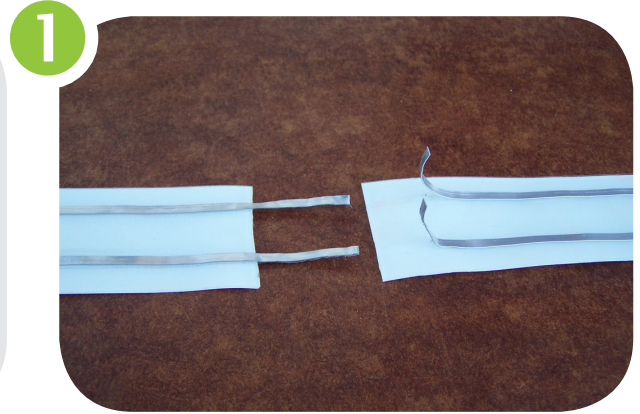


Apply excess tape (with flat wires removed) to secure wires immediately next to connections. These pieces help prevent sleeves from accidental crossing. Form lead-in wires tightly and neatly.



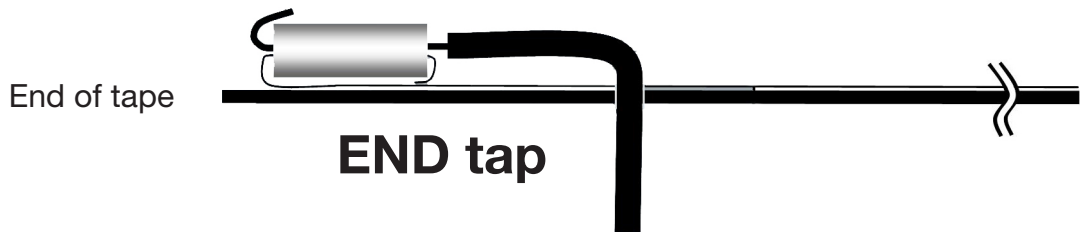
Tape -to- Tape Connection

Connect tape to tape like this. ALWAYS OVERLAP TAPE ENDS. Completely crimp each sleeve twice. Insure sleeves cannot be moved accidentally by using excess tape to secure sleeve positions.

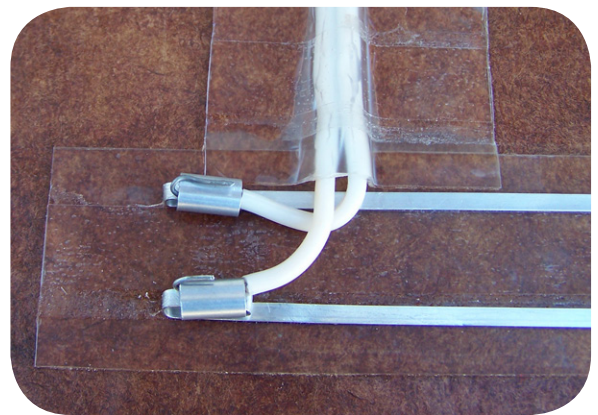


Lead-in wire -to- Tape Connection

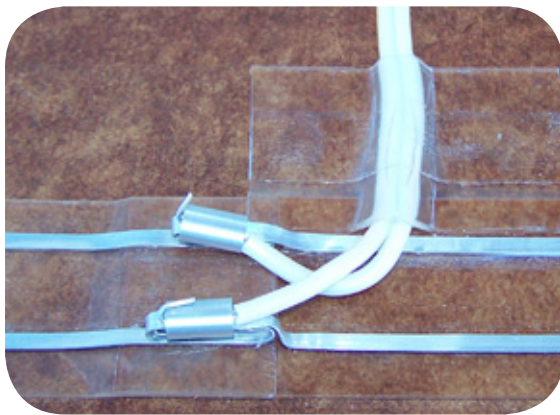
Connecting lead-in wire to tape is made in 2 different manners, END TAP and IN-LINE TAP. Completely crimp each sleeve twice. Insure rigid connections by using excess tape to secure all lead-in wires.



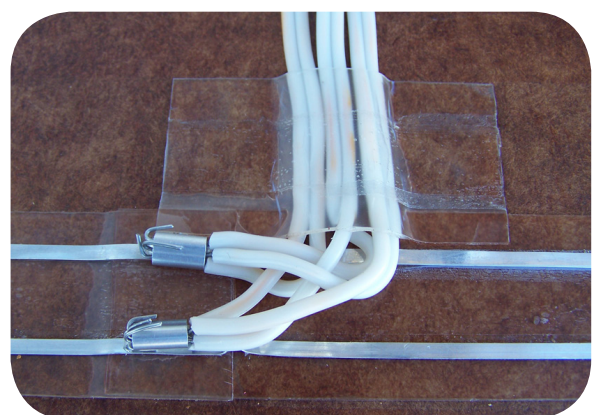
Wire approaching from the end



Wire approaching from the inside



In-line tap with one wire pair



In-line tap with three wire pairs connection



Testing, Acceptance and Troubleshooting

Special testers are required for measuring high voltage pulses. Regular voltmeters do not work. Testers with digital readout or neon lights are necessary to read voltages. Disconnect lead-in wire from energizer terminals. Turn on the energizer.

Measure voltage on the terminals with the digital fence tester; place the single brass spike on the ground terminal and the double prong on the r positive terminal post. A reading of 2K-10K is acceptable.



Reading voltage of the power controller while disconnected from the system.



Reading voltage with the entire Shock-Tape system connected.

Connect lead-in wire to energizer terminals. Measure the voltage. Expect voltage decreases of about 2-5 volts/per foot depending on the energizer being used. Voltage should be at least 1500 volts to train birds. With powerful energizers, voltage levels above 6000 volts may cause random arcing through water droplets.

Voltage readings on the tape should be identical to the measurement seen on the energizer. Check voltage on all tape runs. With the digital tester, swapping tester leads will result in different readings. The lower voltage reading is the correct reading.

When complete, installer should note on the energizer in permanent ink the final voltage measurement when the system is fully connected and operational. If trouble exists later, the last good value can be referenced.

For general trouble shooting, most errors occur at connections, corners or tape ends. Listen for arcing. Most of the time a visual check will quickly isolates the trouble area.

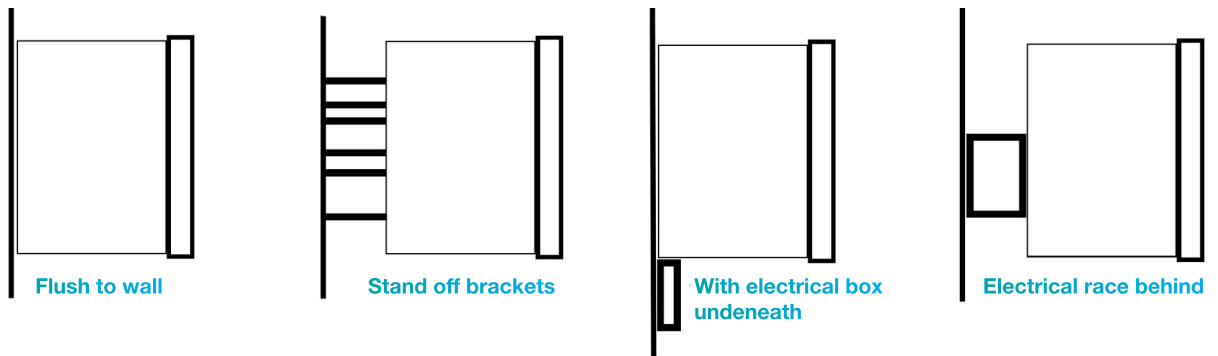
Symptom:	Possible Problem:	Solution:
No / low voltage	Lead-in wires on energize disconnected or insulation not stripped. Improper folded corner. Bare wire trimmings fell on tape. + / - flat wires connected.	Strip lead-in wire, reconnect Reconstruct corner properly Remove the wire trimmings Remove connection
Fluctuating voltage	Shock tape ends not trimmed Bare wire trimmings fell on tape Improper folded corner.	On conductive surface, trim flat wire ends back 1/2" Remove the wire trimming Reconstruct corner properly



Sign Letters

Sign letters are constructed of colored sheets of aluminum and plastic letter faces. A 1" vinyl trim cap is snapped around the plastic face and the entire face assembly fits over the aluminum letter shape. Letters are mounted to a wall or electrical race box. Common attachment means are shown below.

Sign Letters Mounting Variations



Sign Layout Guidelines

Great flexibility exists to placing tape on the letters and wiring together. The installer should be clever and sketch a wiring layout, identifying all wiring connections and the tape path across the sign.

The letters A-W (shown) are a guideline for letters of 8" deep or less. Letters A - B - D - O - P - Q - R have closed interiors.

Multiple strips of tape should be applied to interior bottoms to effectively discourage birds. When sign letters ABDOPQ R are mounted flush to wall, the interiors cannot be wired too, screen off the hole neatly or apply fake strips of tape inside. A common bird reaction is that they are zapped by electrified tape on other letters and then assume all tape is connected, fearing every piece of shock tape live or not.

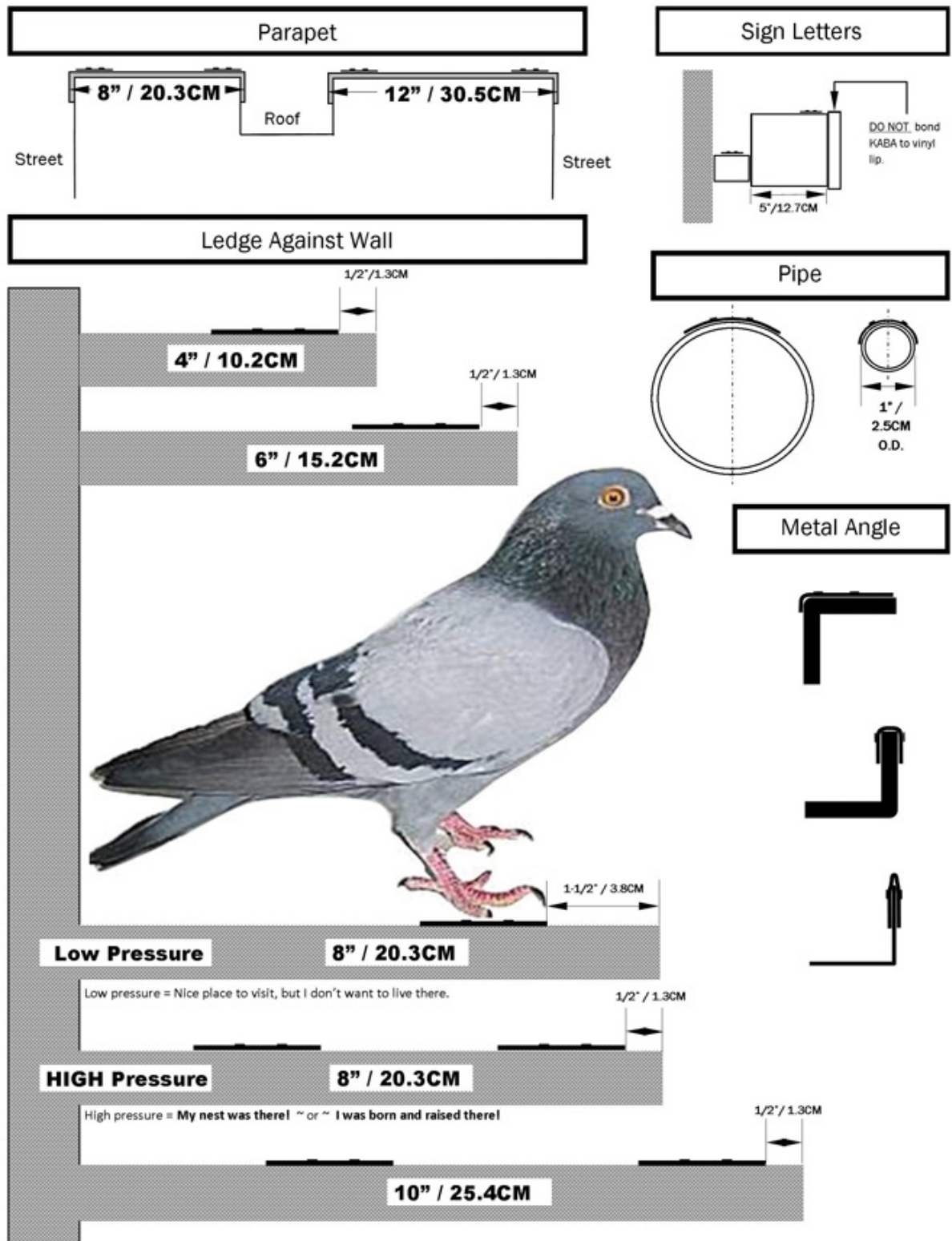
If connecting lead-in wire to tape in confined areas is difficult, make connections to the tape first and then stick tape in place. Several inches of unattached tape between letters are permissible. Longer distances between widely spaced letters can be unsightly, risk the integrity of the shock tape from falling objects and is not recommended; use lead-in wire instead.

DO NOT allow shock tape to contact the vinyl trim cap of the letter face. The face has to remain removable for maintenance. When installing on signs, work goes much quicker with longer walking surfaces. Wide staging planks and scissor lifts are very good to work from. Aerial lifts with 2 person baskets are better than 1 person. Ladders are slow and difficult.



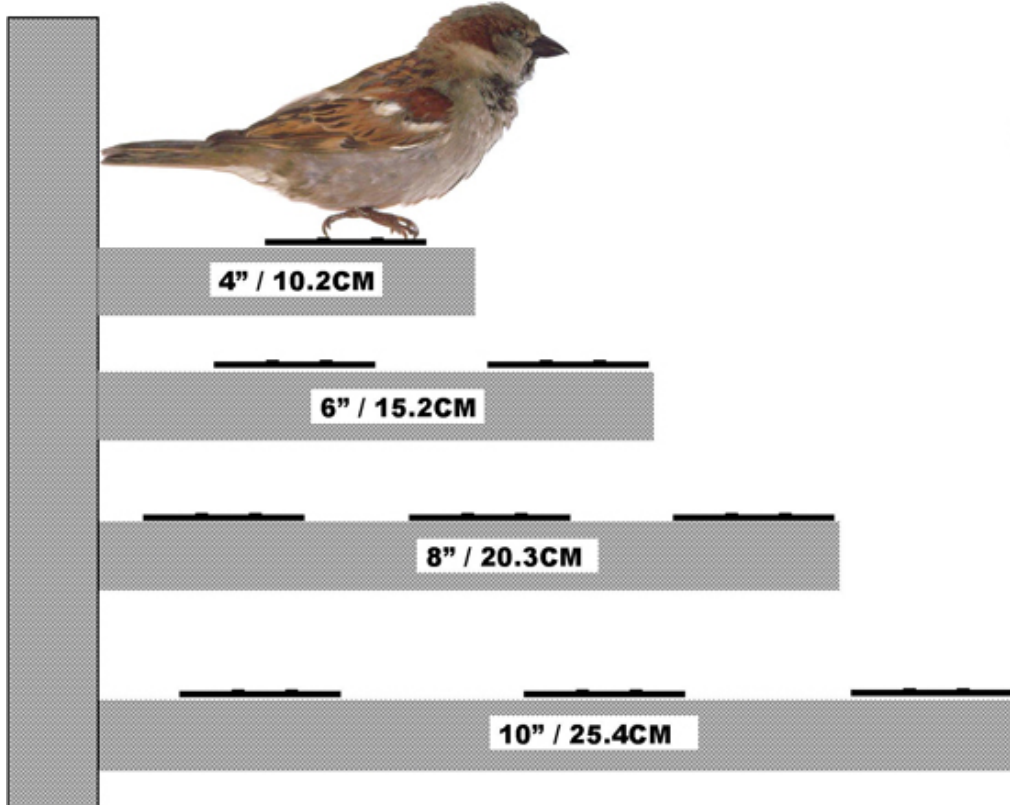
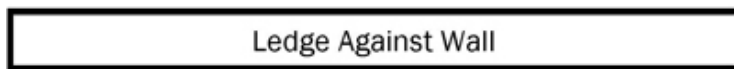
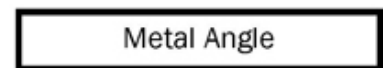
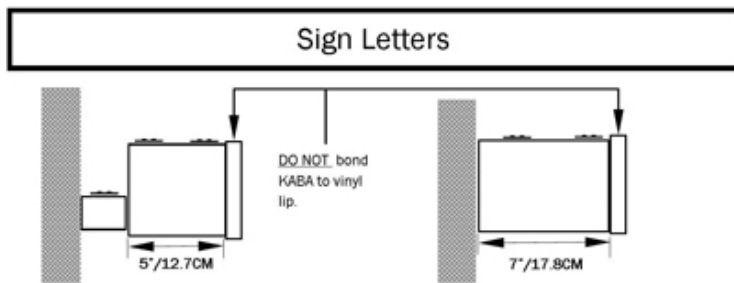
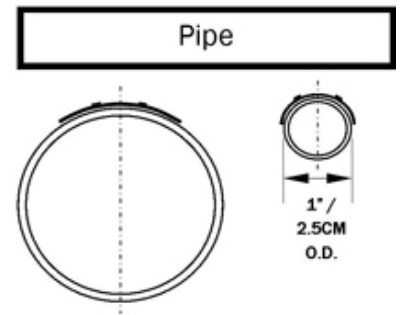
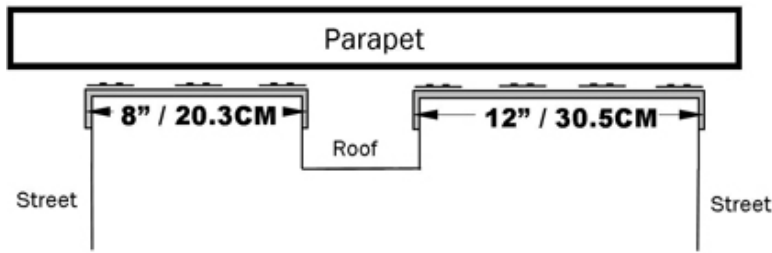
Shock Tape Placement for Pigeons

The following are generally acceptable guidelines for pigeons. High pressure or zero tolerance of bird presence may require additional rows and different positions than shown.



Shock Tape Placement for Sparrows

The following are generally acceptable guidelines for sparrows. High pressure or zero tolerance of bird pressure may require additional rows and different positions than shown.





SHOCK TAPE

SAY FAREWELL TO ALL BIRDS

