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TECHNICAL SPECIFICATION : Digital Rodent Repellent System

A-1 Digital Rodent Repellent System

1.0 DESIGN INTENT

The rodent repellent system shall be installed on the entire floor in all voids. The objective is to keep the rodents away from the floor by generating very high frequency sound waves (above 20 kHz) which are not legible to human ear but irritates rodents. The objective is to protect all the cables under floor, above ceiling & room void from damage caused by rodents.

2.0 SYSTEM DESCRIPTION

Rodent Repellent system shall be provided in DC areas, UPS rooms, Electrical rooms, MMR areas, Staging rooms, Hub rooms & all shafts etc.

- The system proposed is Digital Rodent repellent system which shall be capable to regulate the wave density, speed, with a combination of 45 such patterns.
- The system proposed is to protect all the equipments, areas with relevant type of high frequency sound producing device called satellites or transducers.
- All these transducers are connected in series or parallel to a main controller which provides power to these units. These satellites shall cover an area not less than 400 Sq.ft for ceiling void; room void & floor void applications.
- Once powered up these transducers produce very high frequency variable sound waves (above 20 Khz) continuously which irritate the rodents and are forced to evacuate the place.
- The frequency at which the transducers produce are illegible to human ear & doesn`t cause any harm and ensure below 1/3rd octave.
- The controller shall have LCD display & can cover area of about 10000 sqf. The controller shall have on board controls for wave speed, wave density, frequency band time etc.
- The System is proposed with backup power from UPS.

3.1 REFERENCE STANDARD:

- Equipment manufacturers recommendations

4.0 SYSTEM COMPONENTS:

4.1 SATELLITES:

The satellites or Transducers shall be circular ceiling mounted low profile units that produce high decibel sound waves at very high frequency not less than 20 Khz. These satellites shall cover an area not less than 400 Sq. ft for Room void application, for ceiling Voids & floor void applications.

These shall be powered thru Main Controller to 24 satellites in parallel.

- Each transducer covers an open area of 400 Sq feet where the average height of the ceiling is 12 feet. Even when installed in the false ceiling or false floorings it will cover an area of 400 sq. feet. The same is possible because of the transducer's streaming effect design.
- Each transducer occupies a maximum space of 15 cubic inches and aesthetically designed to match your décor.
- Being monopolar in nature. They can be installed in any sensitive area with zero risk of sparking.
- The transducers can withstand high temperatures in the false ceilings and low temperatures in cold storages and air locks.
- The transducers do not need a power connection.
- The transducers can be tested on an audible range independently, by selecting the Transducer testing menu from the LCD panel

4.2 CONTROLLER:

The controller shall support 24 Transducers and shall come with a pair of stands and brackets. The master Controller is installed in the main control / server room and the transducers in the problematic area i.e. above and below false ceiling and below false flooring.The master controller needs a power connection of 5A electrical plug point and comes equipped with a 3 pin power supply cord of 1.5 meters

4.2.1 Features:

4.2.1.1 10000 Sq Feet of Area Coverage per system/ Controller.
4.2.1.2 Shall drive up to 24 Transducers. With minimum @ 400sft coverage each.
4.2.1.3 LCD display with on-board controls for changing the following parameters.
4.2.1.3.1 Wave Speed: Is an indicator for the number of frequency sweeps per minute. It can have a maximum value of 130 and a minimum value of 60. The incremental size is 5 i.e. 65, 70, 75 and so on.
4.2.1.3.2 Wave Density: Is an indicator for the number of divisions within a frequency band. It can have a maximum value of 100 and a minimum value of 80. The incremental size is 10 i.e. 80, 90 and 100.
4.2.1.3.3 Frequency Band Time: Is an indicator of the time for which the controller would operate in a pre programmed frequency band. There are 3 bands available: Band A, Band B, and Band C. This parameter can have maximum value of 10 minutes and a minimum value of 1 minute per band. Depending upon the time frame set for each band, the controller will switch the bands automatically.
4.2.1.3.4 Machine/Controller ID: Is an indicator of the machine/controller identification number. It can have any value within the range of 1 to 255.
4.2.1.3.5 Frequency Testing: This feature will enable the user to test and verify the frequency that is being transmitted from the controller to the transducer. This feature would be particularly useful during systems audit.
4.2.1.3.6 Modbus output for BMS integration.
4.2.1.3.7 Transducer Testing: All the 24 transducers can be tested in an audible range all at one go by using this feature.
Provision for restoring all the parameters to the factory default setting
Inbuilt RS/EIA-485 transmissions up to 1.2 kms to protected area.
The transducer can cover up to 400 sq. feet of area above false ceiling, below false ceiling and below false flooring.
Frequency band of > 20 KHz and <60 KHz is pre tuned for 100 different frequencies.

CONTROLLER SPECIFICATIONs:

* Operating Frequency : Above 20 KHZ and below 60 Khz.
* Sound output : 80db to 110db at 1metre.
* Power output : 1W per transducer.
* Sweeps per Minute : 130(Configurable).
* Frequency Division : 100(Configurable).
* Power Consumption : 15 Watts Approximately
* Power Supply : 230V AC/ 50Hz 14 Volts DC
* Dimensions : 225(W) x 100(H) x 270(D)mm
* Weight : 6.5 Kgs Approx.
* Mounting : Wall / Table Mounting

4.3 CABLES:

2 core flexible (14/40) SWG multistrand or 0.5 sq. mm single strand. CT wires for connectivity between the transducers and the controller.

Specification:

S.NO	PROPERTY	DATA
1	No. of cores	2 nos.
2	Conductor	Copper Tinned Multi Strand
3	No. Of Conductors	14 nos
4	Core Insulation	PVC Insulation
5	Color of Core Insulation	Red, Black/Blue
6	Outer Sheath	PVC
7	Color of Outer Sheath	Light Grey
8	Voltage Rating	230 V
9	Conductor wire	0.5 sq mm
10	FRLS / Non FRLS	Non FRLS

4.4 STANDS AND BRACKETS:

Power coated Aluminum accessory for mounting of the master controller.

5.0 INSTALLATION:

Installation shall be as shown on the drawings, and as recommended by the major equipment manufacturer.

All cables, junction boxes, cables supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Transducers shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect transducers from contamination and physical damage.

All transducers and control panels shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

Installation of Transducers

All Transducers shall be installed in accordance with installation instructions provided by the manufacturer.

All Transducers shall be installed in the exact locations specified in the design drawings; thus providing the best possible protection.

All Transducers shall be securely fixed to approved boxes and allow for easy fitting and removal of Transducers. Cable and wire entries to Transducers shall be fitted with grommets to prevent possible damage to the insulation.

Cable and wire strain relief clamps shall be provided at all entries to Transducers.

Installation of Controllers

The Main Console shall be installed in accordance with installation instructions provided by the manufacturer.

The Main Console and its associated component parts shall be installed in the location specified in the design drawings.

The Main Console equipment shall be securely fixed, and if required, marked with appropriate notices, warnings, signs as applicable.

Cable and wire entries to the Main Console and associated devices shall be fitted with grommets or glands to prevent possible damage to the insulation.

Cable and wire strain relief clamps shall be provided at entries to Main Console and associated devices as required.

6.0 TESTING:

Sr No	Description	Visual	Test Readings	Documentation
1	All cables are tested for continuity, insulation, resistance etc.			√
2	System installation proper as per drawing	√		
3	Carry out visual checks on all satellites & consoles free from any mechanical damage, cables, interface modules etc. to ensure they are properly installed.	√		
4	Check for proper termination & feruling	√		
5	Check Input A/C Supply Voltage		√	
6	Check location/spacing of satellites as in drawing.	√		√
7	Check Distribution of satellites / Zones as per Drawing.	√		√
8	In Test mode check for each transducer generating sound.	√		
9	Check Frequency output from panel should be min 20KHZ		√	√
10	If power fails, whether panel working on battery supply		NA	
11	Panel display and all key working properly	√		
12	Check if supply is being provided to the Transducers from the main controller	√	√	

7.0 COMMISSIONING:

At final commissioning of each system, the Contractor shall confirm that:

All detection devices, main console are tested and operate correctly.

The standby batteries are adequately sized. (Measurements of the quiescent and alarm loads shall be taken and compared to calculated values used at the design stage.) Calculations and measurements shall be submitted to the Engineer.

Commissioning shall be fully documented and the documentation submitted to the Engineer.

The Contractor shall demonstrate each zone and main console to the satisfaction of the Engineer by conducting a series of witnessed acceptance tests as directed by the Engineer. This shall take place after the above final commissioning and following receipt of the commissioning documentation by the Engineer of all devices in the system, simulation of various faults and operation of all manual controls.
Both the installation and the commissioning activities shall be undertaken as a single continuous operation.

Upon completion of the installation activity, the Rodent System contractor shall Test, Start-up, Commission and Handover the system to the customer.

The Rodent System contractor shall make use of the following documents to record test results and details of commissioning tests:
Cable Test Sheets
Installation Check Report
System Layout Drawing(s)
System Schematic Diagram(s)
The Rodent System contractor shall be responsible for inspecting and testing the complete system.

The Rodent System contractor shall present an Acceptance Certificate for signature by the Consultant/Customer.

8.0 TESTING METHODS:

The system shall be commissioned by a specialist company and full certification for the installation and system will be issued following commissioning and demonstration and sign off. All documentation, commissioning sign offs, results will be attached to the appendix.

		Pre Check Complete	Rodent Repellent System	
Date		TEST NO.1		
Rev.				
Item	**Description**	**Action**	**Pass/Fail**	**Notes**
1	Change parameters such as wave density, frequency Band time, Wave density.			
2	Test the transducers in an audible range one transducer at a time to check the wire connectivity from the corresponding transducer to the console.			
3	Verify the Frequency generated from the panel should be min 20 KHZ.			
4	Verify the presence of ultrasound in the protected areas with the help of an ultrasound detector.			
	Above test shall be repeated for every floor.			
	END OF TEST 1			

		Rodent Repellent System
Date		NOTES & OBSERVATIONS
Rev.		
Item	**Description**	**Comments**

9.0 DOCUMENTATION:

The Rodent system contractor, upon completion of the commissioning activity, shall hand over the system to the customer.

At the time of hand over, the contractor shall provide the customer with the following documentation:

1. Copy of detailed report
2. Component and equipment list
3. Product description sheets
4. System design drawing(s)
6. System schematic diagram(s)
7. System operating manuals

10.0 HANDOVER:

Prior to final acceptance, the installing contractor shall provide complete operation and maintenance instruction manuals to the owner. All aspects of system operation and maintenance shall be detailed, including wiring diagrams of all circuits, a written description of the system design, sequence of operation and drawing(s), illustrating control logic and equipment used in the system. Checklists and procedures for emergency situations, maintenance operations and procedures shall be included in the manual.

11.0 TRAINING:

General

The contractor shall provide the customer with details of the training required by personnel to operate and maintain the Rodent Repellent System.

The Contractor and the customer shall jointly agree the number of staff to attend the training courses.

12.0 MAINTENANCE:

Routine maintenance should be carried out in accordance with relevant customers' requirements.

All performance checks undertaken should be recorded in the system log book.

As a minimum, the following performance checks must be undertaken on each maintenance visit.

Carry out verification checks as detailed in the commissioning instructions.

Remove dust and dirt from the Control Panels/satellites using a soft brush or a lint cloth. A solvent which is harmless to the finishes of metal and plastic may be applied to more stubborn stains.

Examine the exterior of the enclosure for any signs of damage or loose cable glands and rectify any faults found.

Examine the printed circuit boards for signs of overheating, dry joints and/or damaged tracks.

Examine the battery terminals for secure connection and for any signs of corrosion. Replace or repair as required.

Maintenance frequency should be quarterly. Service support in warranty and AMC period should be 24x7x365 days. Software revision upgrade should be part of warranty and AMC scope.

APPENDIX A
ACCEPTANCE CERTIFICATE

Certificate of acceptance for the Digital Rodent Repellent System at:

Address:

.....
.....
.....
.....
Postcode: .....
I/We being the competent person(s) responsible (as indicated by my/our signatures below) for the acceptance of the Digital Rodent Repellent system, particulars of which are set out below, ACCEPT the system on behalf of:
.....
.....
.....
Name (in block letters): ……

Position: ……..

Signature: ……

Date: …..……..

Name (in block letters):

.....
Position:

.....
Signature:

.....
Date:

.....
For and on behalf of: .....
.....
Address:
.....
.....

The extent of liability of the signatory is limited to the system described below.

Extent of system covered by this certificate:
.....
.....
.....
.....
The following work is required before the system can be accepted:
.....
.....
.....
.....

☐ All installation work appears to be satisfactory.*

☐ The system is functioning properly.*

The following documents have been provided to the purchaser or user:*

- ☐ As built drawings.
- ☐ Operating and maintenance instructions.
- ☐ Certificates of design, installation and commissioning.
- ☐ A log book.
- ☐ Sufficient representatives of the user have been properly instructed in the use of the system.

* Tick boxes where applicable.

- ☐ All relevant tests, defined in the Specification, have been witnessed.
(Strike out if not applicable.)

---------- END OF DOCUMENT ----------