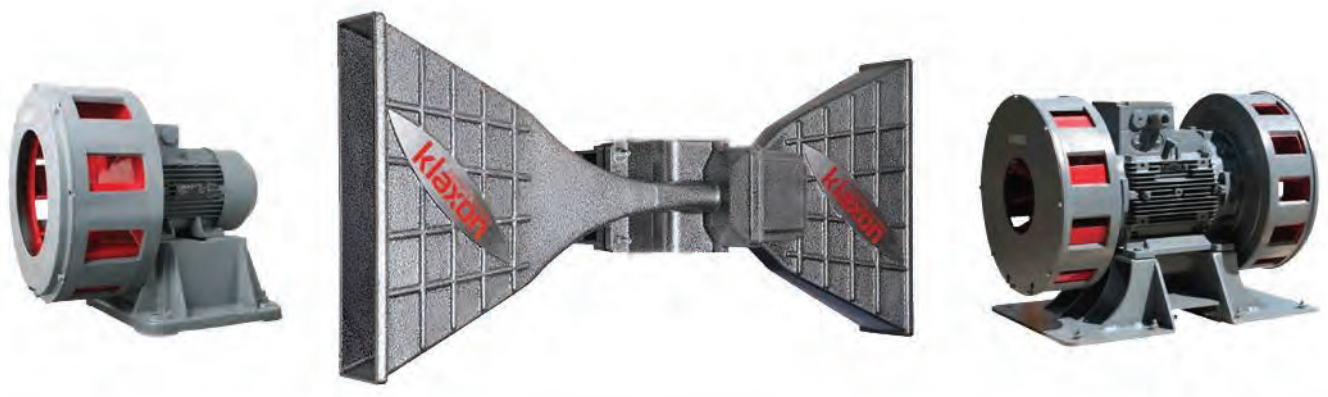
Wide Area Sirens



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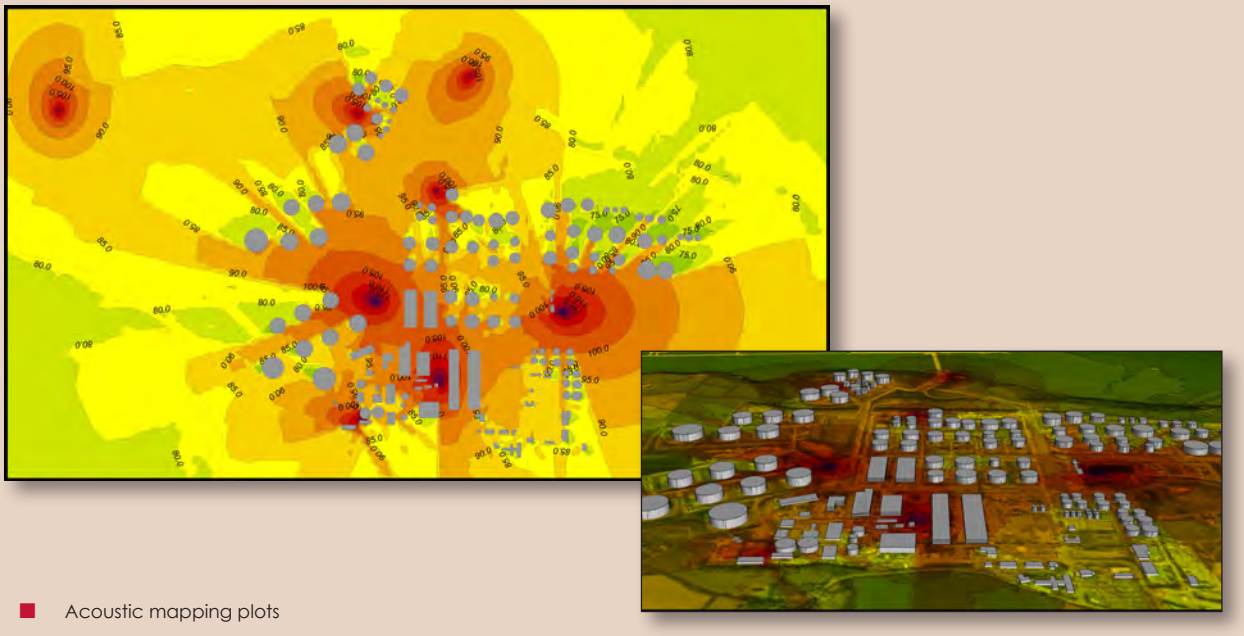
Introduction



Acoustic mapping plots

Introduction

Klaxon Signals, a part of the Texecom organization, have been supplying an extensive range of signalling products and warning systems to the world for over 80 years. Our wealth of experience in the field of signalling stems from vast knowledge gained by providing notification solutions for a broad spectrum of clients and industries.

Petro-Chemical, Nuclear, Civil Defence, Ports, Weather Warning, Construction and education are amongst those industries within our global portfolio who choose to benefit from a Klaxon Wide Area System.

Our expert advice and extensive product range ensures the client receives a warning solution that addresses their specific safety requirements in an appropriate, cost effective and timely manner. Whatever the requirement the client can rest assure that we have the ability to administer and control the project from concept to conclusion.

In doing so the company takes great pride in our sirens and control equipment being of the highest quality for optimum performance and reliability, whilst also providing ongoing support for the lifetime of the system supplied.

The Company naturally has ISO 9001, accreditation and operates a continued product development programme, complemented by rigorous quality checks.

Service

Klaxon's wide area systems provide a full product and service combination incorporating as required pre/post project evaluation, acoustic surveying, personnel training and maintenance for a tailor made solution to meet customer present and future requirements.

Our technical experts will first assess and fully understand your specific site requirements. This may then be accompanied by a site survey which could include a full acoustic survey of the site. The information gathered is used to run a sound coverage simulation which is presented in a graphical format highlighting estimated soundpressure levels across the site. The simulation will help to advise the best system options appropriate for the site.

Following approval the system would be manufactured to the agreed specification. Equipment factory acceptance testing and personnel training can be arranged before delivery of the equipment to the site. A system commissioning visit can also be organised to follow installation for the purposes of final testing and training of on-site operations staff.

The siren systems supplied have a one year warranty period and require very low maintenance, however even after the warranty period has expired ongoing on-site support and technical assistance is available.

Contents

Product Range Overview

Products

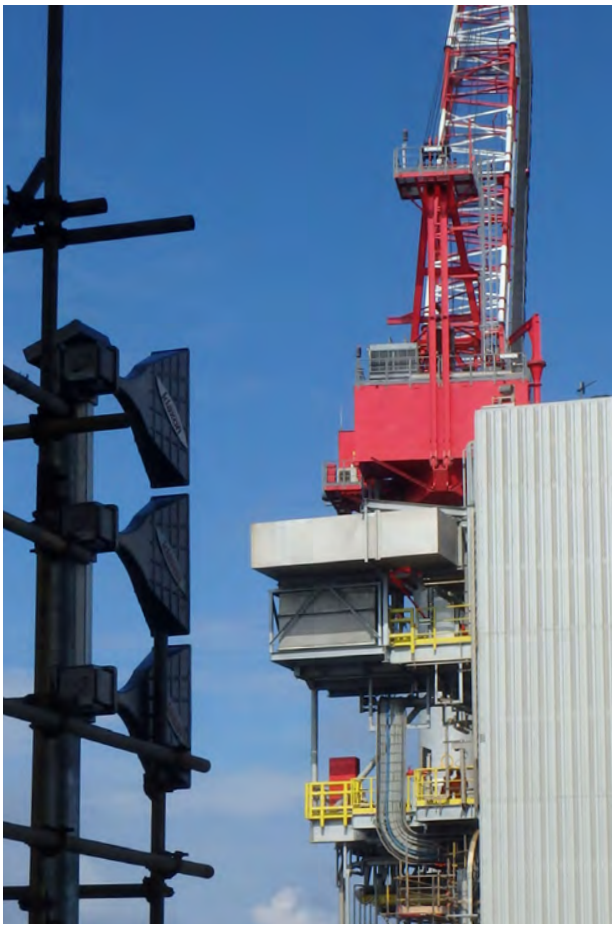
Klaxon Signals provides a range of warning sirens for operation in various environments. The range includes both, conventional motor driven sirens and the more sophisticated and flexible electronic siren systems for non-hazardous and hazardous environment operation.

Motor Driven Sirens

Motor driven sirens are manufactured from cast aluminium and steel for use in outdoor environments. They produce a powerful universally recognised emergency notification signal. ATEX approved models are available for use in hazardous areas.

Features

- Simple robust technology.
- Rugged construction.
- Universally recognised emergency signal.
- Control panels using contact or TCP/IP technology available.



Electronic Siren Systems

Electronic siren systems consist of;

- An array of siren horns manufactured from cast aluminium for installation on a mast. The horns can be mounted in an omni or uni directional configuration depending on the shape and coverage of sound required.
- A controller which provides monitoring and control.

Note: Klaxon can supply the horn array in kit form to be fixed to an existing pole structure, or offer the option of supplying pre-installed onto a pole with or without a base fixing.

Features

- Low, medium and high output siren options. Ranges from 106dB – 127dB at 30 meters.
- Pre-recorded or live voice messages in addition to traditional tones. Different voice messages can be broadcast to different areas simultaneously depending on the situation in each area.
- Perform silent tests at a user defined time period which determines the operational capability of the siren.
- Battery powered siren operation means loss of site power has no effect on the functionality of the siren. An AC power supply is only required to maintain battery charge by default.
- The siren is able to be installed in more locations because it only requires a 110/230VAC supply instead of the standard 400VAC 3phase supply required for motor driven sirens.
- Up to 8 different user defined warning signals can be activated via volt free contacts and more when an RS485 interface is used as a means of control.
- Regional and Local Control. Multiple local, geographically separated warning systems can be alerted through one regionally controlled system, such as an emergency centre or remotely via a computer with internet access.
- Siren system can be charged from a solar panel array for use in remote locations.
- Variable sound levels for each warning signal enables on-site and off-site warning through the same siren.
- Control room to siren connection can be hardwired, TCP/IP, Fibre Optic or VHF/UHF radio.

Motor Driven Sirens

Product Type	Model Name	Control Options
Standard (Non-Hazardous Area)	GP6	Master and slave control panels with integral and wired remote controls that can be operated as single master or master with multiple slave panels.
	GP10	
	GP12	
ATEX (Hazardous Area)	FP6	Master and slave control panels with integral and wired remote controls that can be operated as single master or master with multiple slave panels.
	FP10	

Note: Standard type sirens are also available with anti-icing heaters

Electronic Sirens

Product Type	Model Name	Sound Radiation	Control Options
ES-X	ES1-360X	Omni-directional	Volt-free switch or HMI module (CMC-4, SIP) connected via multicore cable, TCP/IP, Fibre Optic or VHF/UHF radio.
	ES1-2X	Uni or Omni-directional	
	ES2X	Uni or Omni-directional	
ES-S	ES1/2S	Omni-directional	Volt-free switch or HMI module (PC, CMC-4, CMC-8, SIP) connected via multicore cable, TCP/IP, Fibre Optic or VHF/UHF radio.
	ES1/3S	Uni-directional	
	ES2S	Uni or Omni-directional	
	ES3S	Uni or Omni-directional	
	ES4S	Uni or Omni-directional	
ATEX	ES1SF	Uni or Omni-directional	Volt-free switch or HMI module (PC, CMC-4, CMC-8, SIP) connected via multicore cable, TCP/IP or Fibre Optic.
	ES2SF	Uni or Omni-directional	
Internal	100v Line	Adaption for superior system to allow connection of 100v loudspeakers to output.	

Motor Driven Sirens

GP Range

The GP range provides a motor siren solution for general wide are notification in a variety of industrial, civil and commercial environments.

The units are of a sturdy rugged construction and produce the familiar low frequency 'air raid' sound.

Features

- 3 Phase 400VAC ±10% 50Hz supply required for operation (alternative voltages available by request).
- 475Hz constant tone from the GP6 & GP10 sirens and a combined 475/560Hz constant tone signal from the GP12 siren.
- Cast aluminium and steel construction
- Can be supplied with anti-icing heaters installed.
- Control panels can be supplied to safely operate the siren and allow production of a 'wail' tone as a secondary function to the standard 'constant' tone.
- The Motor windings are tropicalized as standard.

Ratings

- Overall unit rated IP55 (Electrical connection box alone is IP65)
- Operating temperature between -20°C and +60°C

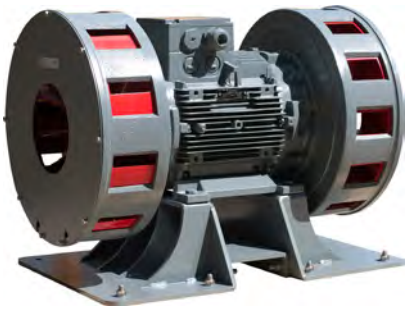
Sound levels - dB(A)

Distance	GP6	GP10	GP12
1m	135	140	145
30m	105	110	115
500m	81	86	91
1km	75	80	85
3km	65	70	75
5km	61	66	71

Note: Levels are indicated over unobstructed flat ground through still air in the prime direction.

GP6 Siren

GP10 Siren



GP12 Siren

Numeric Information

Siren Model	Product Code	Current Rating	Weight	Dimensions: Length, Width & Height
GP6	SWG-0032	5A	50Kg	492 x 398 x 438mm
GP6H (with heater)	SWG-0036		52Kg	582 x 398 x 438mm
GP10	SWG-0023	11A	110Kg	536 x 495 x 557mm
GP10H (with heater)	SWG-0037		112Kg	576 x 495 x 557mm
GP12	SWG-0006	22A	195Kg	762 x 496 x 585mm
GP12H (with heaters)	SWG-0005		199Kg	842 x 496 x 585mm

Motor Driven Sirens

Sound levels - dB(A)

Distance	FP6	FP10
1m	135	140
30m	105	110
500m	81	86
1km	75	80
3km	65	70
5km	61	66

Note: Levels are indicated over unobstructed flat ground through still air in the prime direction.

FP Range

The FP range provides a motor siren solution for hazardous areas that demand an ATEX approved product.

The units are of a sturdy rugged construction and produce the familiar low frequency 'air raid' sound.

Features

- 3 Phase 400VAC ±10% 50Hz supply required for operation (alternative voltages available by request).
- 475Hz constant tone
- Cast aluminium and steel construction
- Control panels can be supplied to safely operate the siren and allow production of a 'wail' tone as a secondary function to the standard 'constant' tone.
- The Motor windings are tropicalized as standard.

Ratings

- Overall unit rated IP55 (Electrical connection box alone is IP65)
- Operating temperature between -20°C and +60°C
- ATEX approved for category 2 (zone 1)
- Overall siren approval - Exd IIG IIC T4
- Non electrical parts approval - EExc IIC T1..T6 X

FP6 Siren

FP10 Siren

Numeric Information

Siren Model	Product Code	Current Rating	Weight	Dimensions: Length, Width & Height
FP6	SWG-0028	5A	66Kg	521 x 398 x 448mm
FP10	SWG-0034	11A	143Kg	612 x 495 x 557mm

GP & FP Siren Control Panels

Control panels can be supplied to safely connect and control the GP & FP range of motor sirens. They also provide the facility to operate different warning tones form the siren by timing the supply to produce a 'wail' tone in addition to the standard 'constant' tone.

Features

- Enclosure manufactured from powder coated mild steel rated to IP65.
- Integral switches on the door allow for complete isolation (lockable in the off position), activation of the constant tone, activation of the wail tone and stopping of the siren operation.
- LED indicators highlight the presence of the 400VAC supply and the derived 110VAC.
- Remote switch input facility allowing volt-free contacts to switch a 110VAC control signal.
- Adjustable warning signal duration timers.
- Adjustable wail tone signal duty cycle (default set to 4 seconds on, 4 seconds off pattern).
- Volt-free output connection which changes state when the contactor is active (useful for beacons or third party system connections).
- Volt-free output connection which changes state in the event of an overload.
- Protected 110VAC output to allow synchronised operation of slave units when multiple sirens are required.
- Protected 230VAC output for GP anti-icing heater connection.
- Thermistor trip relay for FP sirens.
- Remote wired switch module also available - SIP-3 (HDW1036)

Numeric Information

Model	Product Code	Current Protection	Weight	Dimensions: Length, Width & Height
Master Panel for GP6	SWC-0027	16A MCB	21 Kg	235 x 400 x 600mm
Slave Panel for GP6	SWC-0033		15 Kg	235 x 400 x 400mm
Master Panel for GP10	SWC-0029	25A MCB	21 Kg	235 x 400 x 600mm
Slave Panel for GP10	SWC-0035		15 Kg	235 x 400 x 400mm
Master Panel for GP12	SWC-0031	40A MCB	21 Kg	235 x 400 x 600mm
Slave Panel for GP12	SWC-0037		15 Kg	235 x 400 x 400mm
Master Panel for FP6	SWC-0028	16A MCB	21 Kg	235 x 400 x 600mm
Slave Panel for FP6	SWC-0034		15 Kg	235 x 400 x 400mm
Master Panel for FP10	SWC-0030	25A MCB	21 Kg	235 x 400 x 600mm
Slave Panel for FP10	SWC-0036		15 Kg	235 x 400 x 400mm

Electronic Sirens

ES X

The X range of electronic sirens provide an economic solution for a wide variety of industries with the key advantages of continual operation during power loss and no requirement for 3phase power. The option of our ES 360 Horn is ideal for a more aesthetically discreet installation where full coverage up to 103dB(A) at 30m is appropriate.

The products are of modular construction which allows the sirens to be scaled and tailored to the user's specific requirement in terms of signalling and omni or uni – directional sound coverage. The system can be supplied as a kit for installation of the horns onto an existing pole structure, or with the horn array preinstalled onto a pole with a junction box.

Features

- Enclosure manufactured from powder coated mild steel with an IP65 rating. Stainless steel enclosures are available by request. Horns are Aluminium alloy.
- Siren is powered from an internal battery supply which remains charged via a monitored PSU. 24VDC for 360 and ES1 with ES2 using 48VDC. Required batteries are supplied as standard.
- Mains supply to the panel PSU is 110/220VAC ±20% @ 47-63Hz.
- Solar panels with charge regulators can be added for appropriate installations where AC is not available.
- Expected siren operation of 6 minutes following a 7 day loss of AC power.
- Siren controller can be configured to operate direct from the AC supply without battery if required.
- Live PA feature via a 600Ω balanced and isolated input or microphone connected to HMI interface.
- Output amplifier features a self healing short circuit with thermal and over current protection.
- Full control of single or multiple units can be achieved via RS485 over distances up to 1.5km.
- VHF/UHF radio units, IP modules or Fibre Optic modems can be used for remote operation.
- Simple control via 8 opto-coupled/volt-free inputs.
- Volt-free output allows operation of third party equipment (e.g. beacons).
- Operating temperature is between -20°C and +60°C.

Numeric Information

Note: Levels are indicated over unobstructed flat ground through still air in the prime direction.

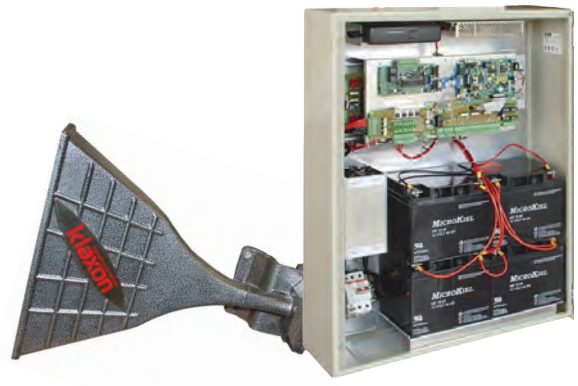
Siren Model	Horn Configuration	Distance from Siren				
		30m	500m	1km	3km	5km
ES1-360X	ES 360 Horn	103	79	73	63	59
ES1-2X	Omni-directional 2 horns	106	81	76	66	62
ES2X	Omni-directional 6 horns	115	91	84	75	71
ES2X	Uni-directional 6 horns	121	97	91	81	77

Electronic Sirens

ES S

The S range of electronic sirens provides a sophisticated, robust and versatile signalling solution for a range of industrial, civil, commercial and environmental requirements.

The products are of modular construction incorporating a user configuration software package which allows the sirens to be scaled and tailored to the user's most complex specific needs including omni or uni – directional sound coverage and customised sound output. These systems are fully compatible with the ES-X range to allow for upgrades and/or expansion.



Features

- Enclosure manufactured from powder coated mild steel with an IP65 rating. Stainless steel enclosures are available by request.
- Siren is powered from an internal 48VDC battery supply which remains charged via a monitored PSU.
- Mains supply to the panel PSU is 110/220VAC ±20% @ 47-63Hz.
- Solar panels with charge regulators can be added for appropriate installations where AC is not available.
- Expected siren operation of 6 minutes following a 4 day loss of AC power.
- Siren controller can be configured to operate direct from the AC supply without battery if required.
- Live PA feature via a 600Ω balanced and isolated input or microphone connected to HMI interface.
- Output amplifier features a self healing short circuit with thermal and over current protection.
- Full control of single or multiple units can be achieved via RS485 over distances up to 1.5km.
- VHF/UHF radio units, IP modules or Fibre Optic modems can be used for remote operation.
- GSM module available for SMS or DTMF operation of up to 255 siren controllers.
- Simple control via 8 opto-coupled/volt-free inputs.
- Volt-free outputs are fully configurable for active siren, PA active, siren fault, AC power loss etc. allowing connection to third party systems (eg. Beacons, existing system).
- 4 optocoupled/volt-free inputs for system monitoring (door open, AC loss).
- Generated tones and/or pre-recorded messages can be stored on the panel. Maximum usable tones/messages depends on the control option being used.
- Replication of existing site tones possible between 200Hz-18kHz for any pattern/sweep.
- User definable schedules for time/date signalling which can be synchronised by an optional GPS clock or by PC if using configuration software.
- Option of 100v Line driver output in place of or in addition to standard horns to allow internal hazardous area signalling.
- Operating temperature is between -20°C and +60°C

Numeric Information

Note: Levels are indicated over unobstructed flat ground through still air in the prime direction.

Siren Model	Horn Configuration	Distance from Siren				
		30m	500m	1km	3km	5km
ES1/2S	Omni-directional 2 horns	106	81	76	66	62
ES1/3S	Uni-directional 3 horns	115	91	84	75	71
ES2S	Omni-directional 6 horns	115	91	84	75	71
ES2S	Uni-directional 6 horns	121	97	91	81	77
ES3S	Omni-directional 12 horns	121	97	91	81	77
ES3S	Uni-directional 12 horns	124	99	93	84	79
ES4S	Omni-directional 18 horns	124	99	93	84	79
ES4S	Uni-directional 18 horns	127	102	96	87	82

Electronic Sirens

ES - Control Options

The following devices are the most commonly supplied to operate the Electronic Siren systems. We do understand that each project is unique, if our standard control options are not the exact requirements for you we may be able to offer a more bespoke solution. All of the following can be supplied to communicate via cable, GSM, TCP/IP, Fibre Optic or VHF/UHF radio.

SIP-51 HMI

The basic switch & indicator HMI unit provides a means of siren control and basic supervision for a single or multiple superior range siren system.

- Activation of up to 4 signals or pre-recorded messages plus stop.
- Indicator can be red or green and illuminated or extinguished to show AC present, Siren fault, Siren active.
- Smaller units available with less switches and/or more/less indicators.
- rated to IP65.

CMC-4 HMI Console

The console features a 2 line 16 character LCD backlit display and allows operation of a single or multiple sirens plus the facility to broadcast live voice using the optional microphone.

- Control of up to 10 sirens
- Operation of up to 4 signals and 2 pre-recorded messages.
- With microphone connected voice messages can be recorded and stored.
- Can be wall mounted or fixed within the siren control cabinet.
- Silent test facility with results displayed on the display.
- Magnetically coded key enables signal and voice activation functions.
- Connection to the siren controller is via RS485 using RJ45 connectors.
- Power is 12VDC which can be supplied over the RS485 cable or by connecting a separate PSU to the 12v input socket.
- All configuration data is stored on non-volatile memory.

CMC-8 HMI Console

The console provides a means of siren control and supervision for a multiple siren system where the use of a PC based control system is not appropriate for the environment.

- Control of up to 96 sirens
- Operation of up to 16 signals and 400 pre-recorded messages.
- User definable groups with definable legends for ease of operation.
- With microphone connected voice messages can be recorded and stored.
- Can be wall or desk mounted.
- 8 Volt-free inputs and 8 volt-free outputs.
- Silent test facility with results displayed on the display.
- Test results can be output to a printer
- Magnetically coded key enables signal and voice activation functions.
- Individual password protection and configurable command restrictions
- Connection to the siren controller is via RS485 using RJ45 connectors.
- Power is 12VDC which can be supplied over the RS485 cable or by connecting a separate PSU to the 12v input socket.
- All configuration data is stored on non-volatile memory.

TALOS HMI Software for a PC System

The software is designed for Microsoft Windows and allows the control and supervision of a complex multiple siren system. The software is provided in three formats named by the total siren limitation of each.

- Control of up to 5, 10 or 128 sirens from a single PC.
- The ability to have multiple control stations connected to a master overall supervisory control station
- Selection of up to 16 alarm signal and 400 pre-recorded messages.
- Live voice broadcast communication facility
- Individual or group siren silent test facility with the results dynamically displayed,.
- User definable legends for sirens, siren groups and signals for ease of operator control
- Master volume control for activated sirens
- Event and siren test logs output to a file or printer.
- Secure multiple operator access control with Individual password protection and configurable command control restrictions

Electronic Sirens - Connection Options

Maximum of 25m - 2 cores per horn, 1.5mm² cable

Hardwired:

- Can be RS485 and/or volt free contacts depending on control options being used.

GSM:

- Utilises a valid sim card with voice and text enabled at each point. Commands can also be received from authorised mobile handsets using SMS or phone call with DTMF decoding.

IP:

- With an existing site network or dedicated LAN using a static IP address for each point. An option is also available to allow activation via a password protected web browser page from any device on the network.

Fibre Optic:

- Can be ring or star configuration using LC Duplex connections with 2 cores of fibre required between each point.

Radio:

- Utilising operating frequencies VHF 136-174 MHz, or UHF 403-470 MHz, a reliable wireless solution when licensed radio is permitted on site.

Note:

Using any of the above types of connection between siren and control room it is possible to operate the siren and also broadcast live audio.

Control Room Equipment

When connecting to the siren using IP, Fibre Optic or Radio, a control room cabinet will be used. Depending on the number of sirens to be controlled and the type of connection required either a Universal cabinet or 19" rack with be provided with the relevant equipment installed and ready for site.

Universal Cabinet setup for Fibre Optic ring configuration

Universal Cabinet

- IP connection to max 255 sirens
- Fibre connection for ring or max 4 sirens in star
- RS485 RJ45 connection for HMI Module or PC
- IP 65
- Connection for optional backup battery

19" Rack Cabinet

- Radio base station
- Fibre connection for 5-96 sirens in star
- RS485 RJ45 connection for HMI Module or PC
- Key lockable access panels on 3 sides
- Connection for optional backup battery on base stations

Radio Base satation unit

19" Rack cabinet

Electronic Sirens – Portable Option

ES P

The ES-P provides a robust, sophisticated and rapidly deployable wide area warning solution. As standard it is designed to be powered from the 12v power socket of a vehicle. The rubber coated magnetic feet of the 360 horn allow versatile placement, including upon a vehicle roof. These features make it ideally suited for emergency and civil defence operation, quarrying, open cast mining, event evacuation, railway maintenance and many other agile mass notification applications.

The control case can be provided as a portable control room solution for ES-X and ES-S systems. In place of the vehicle power connector a 230VAC connection and backup battery is included. The connection would utilise UHF/VHF radio communication between the case and the site sirens.

Features

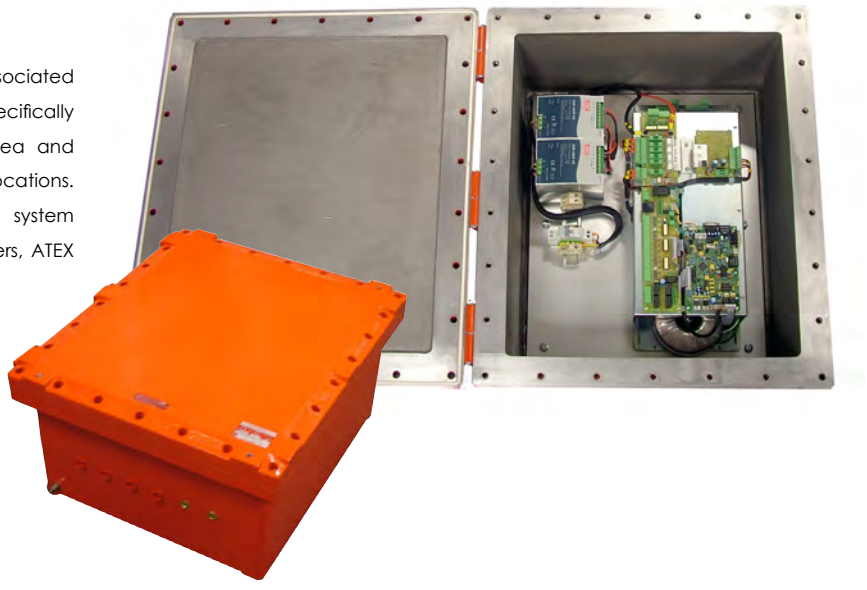
- Audibility of 98dB(A) at 30m
- 4 user selectable & configurable emergency signals.
- Operation of 2 pre-recorded messages and additional can be incorporated as part of the emergency signal tones.
- Live PA via handheld motorola microphone.
- 12v fused vehicle power socket cable provided
- Silent test facility to minimise nuisance signalling to test the siren.
- Programming port allows tones and operation to be adjusted as required allowing versatile deployment.
- Output amplifier features a self healing short circuit with thermal and over current protection.
- Connection between horn and control case is via quick-lok speaker cable (supplied).
- Siren activity and fault report log stored in NVM.
- Operation run time when emitting a continuous sound is reccommended to be max 1hr with vehicle engine running.
- Includes an integrated CMC 4 with mag-key lock for authorised operation.
- Case is rated to IP67 when closed.
- Operating temperature range of -20 to +60 degrees C

Note: Levels are indicated over unobstructed flat ground through still air in the prime direction.

Siren Model	Distance from Siren					
	1m	30m	500m	1km	3km	5km
ES360P	128	98	74	68	58	54

ES ATEX

The electronic siren controller and associated loudspeaker devices have been specifically designed and manufactured for wide area and distributed signalling in hazardous area locations. Dependent on location requirements this system can be supplied with either ATEX horn drivers, ATEX Controller (as pictured) or both.



Main Features

- Certified EExd IIB T6 IP66 Category Ex II 2 G D
- Silent test facility to minimise nuisance signalling to test the siren
- Siren activity and fault report log
- User definable schedules for time/date signalling.
- Full control and fault diagnosis of a single or multiple units via an RS485 interface of up to 1.5km distance from the siren
- 16 user selectable & configurable emergency signals.
- Storage for up to & selectable 400 pre-recorded voice messages. (Voice fi les are stored as PCM-CCITT 8 kHz 8 bits mono).
- Live PA via a 600 ohm balanced & isolated input.
- Multiple control interfaces which include RS232, RS485 and a simple VFC interface via 12 volt free/opto-coupled inputs and 4 relay outputs.
- Output amplifier features a self healing short circuit with thermal and over current protection..
- Option of driving 100V line driver horns instead of or as well as the standard horns for distributed horn installations in hazardous areas.
- Warning and message signalling plus functional siren control completely software configurable to allow ease of modification should requirements change.
- Control cabinet constructed from cast aluminium as (670 x 580 x 333mm), which provides an environmental rating of IP66 and the siren horns are manufactured of cast aluminium.
- Power supplied from an 88-132/176-264Vac @ 47–63Hz power source.
- Operating temperature range of -40 to +40 degrees C.

Numeric Information

Note: Levels are indicated over unobstructed flat ground through still air in the prime direction.

Siren Model	Horn Configuration	Distance from Siren				
		30m	500m	1km	3km	5km
ES2-ATEX	Omni-directional ATEX 6 horns	105	81	75	65	61
ES2-ATEX	Uni-directional ATEX 6 horns	108	84	78	68	64

Wide Area Sirens - Sound Coverage

Sound Coverage

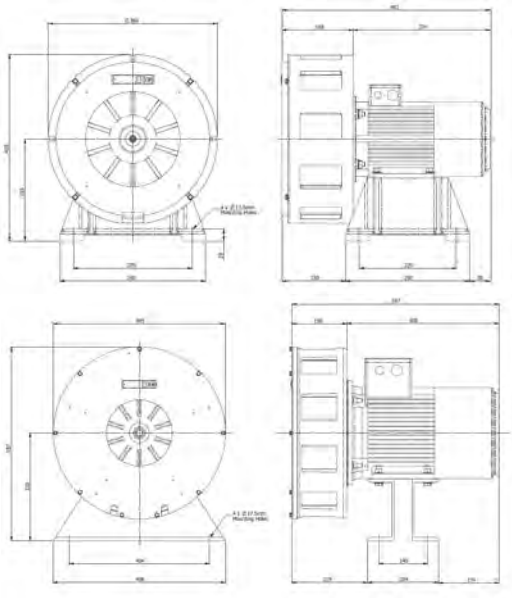
The plots are a plan view indicating the reduction required dependent on the angle from the prime direction. This type of plot allows reference at any distance using the specified dB(A) level as '0' and deducting the relevant amount at the required angle.

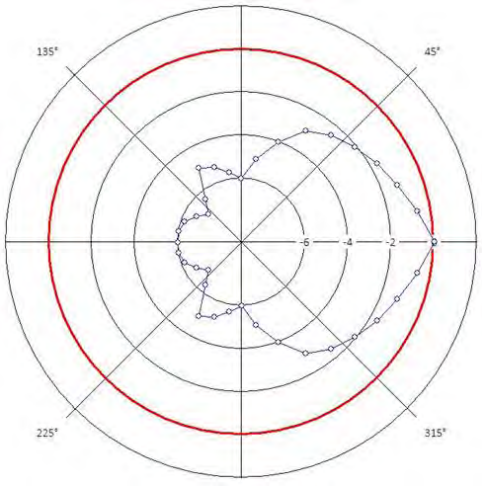
Motor Sirens

The prime direction of a motor siren is the direction in which the center of the rotor is facing.

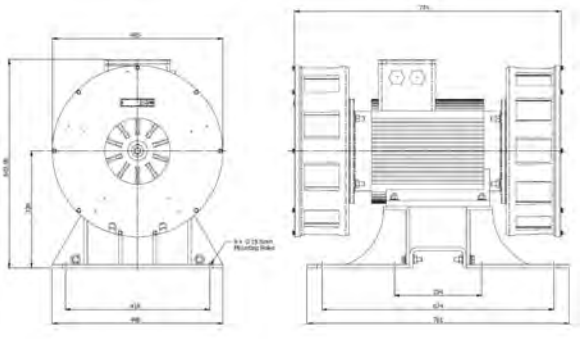
Below are typical sound coverage plots in clear still air on level terrain with no obstructions

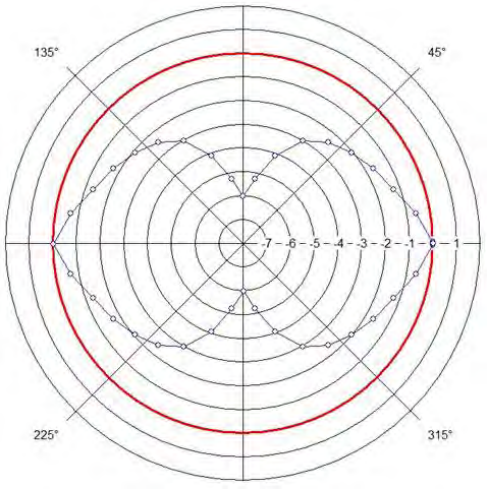
GP6 / GP10 / FP10





GP12





Electronic Sirens

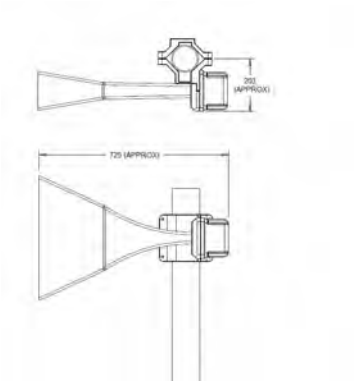
The ES range of sirens can be configured for omni- or uni-directional sound coverage.

Below are typical sound coverage plots in clear still air on level terrain with no obstructions.

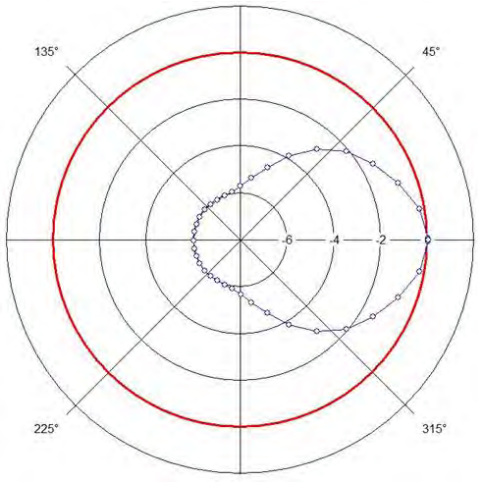
The horn has a narrow - rectangular shape to provide a specific SPL at ±90˚ to the prime direction of radiation.

Uni-directional Configuration

Dimensions

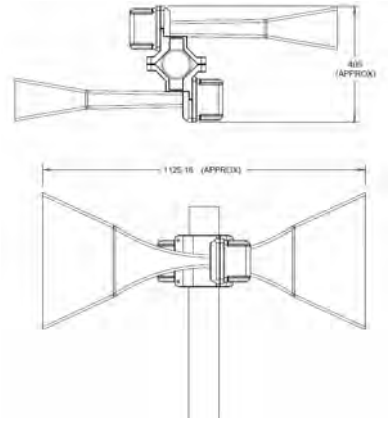


Polar Plot

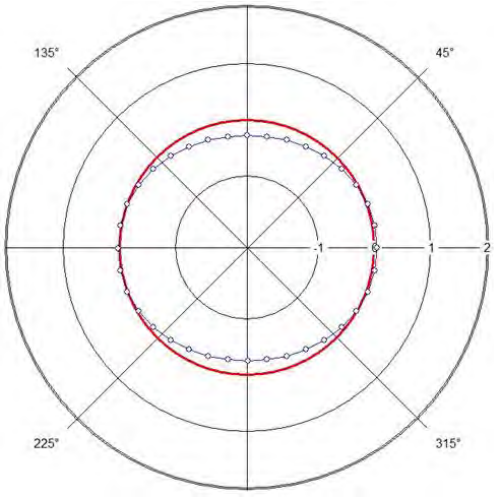


Omni-directional Configuration

Dimensions



Polar Plot



Siren Selection Criteria

Siren Selection

The main factors to take into consideration when determining a solution for a siren system are:

- The sound pressure level* (SPL), of the required warning signals.
- The quality and type of sound(s) in the local environment.
- The ambient noise level that has to be overcome.
- The number of distinct warning signals required.
- The reliance of the siren to operate when required even in the event of power failure.
- The annoyance factor that may be created from scheduled siren testing of certain siren types.
- The electricity supply available to power the siren and the installation costs, particularly if high voltage cabling is required.
- The required duration of the warning signal.
- The means of siren activation and possibly condition monitoring.
- The shape of the sound coverage required.

To summerise the decision process should focus on:

- Understanding of the required sound pressure levels.
- Choice of siren type.

*Understanding of the Required Sound Pressure Levels

In an ideal situation the difference between ambient background sound levels and siren warning signal would be at least 3db. A useful guide to determining sound level is contained in the table below.

A further consideration is the ability to distinguish a siren signal from the ambient noise, if the signal contains sweeping frequencies and varying temporal patterns this will emphasise the signal recognition to personnel even if the difference between signal and background levels are marginal.

Motor Operated Sirens

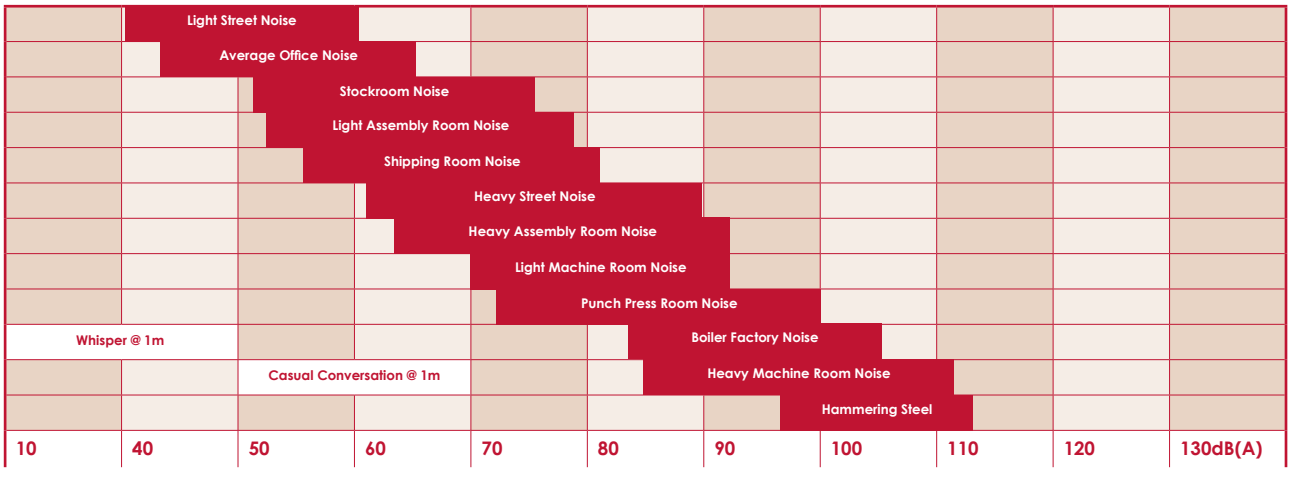
Advantages:

- Simple unsophisticated technology.
- Cost in terms of audible output level over the ES-S units. However if the siren requires an additional control unit to enable the siren to produce a second warning signal the ES-V range is probably the more cost effective option.

Limitations:

- Loss of AC mains power to the siren, which could occur in a major site incident, would prevent the sirens operation and hence prevent a safety warning being provided.
- Only one steady tone alarm signal can be produced unless an electronic control unit is added to allow a wail tone second signal. Maximum number of 2 alarm signals.
- The siren must be sounded at regular intervals to determine its operational condition.
- The sirens require a nominal 400Vac 3 ph supply which may be expensive to provide if the power cable run is long.
- Unit weight if required to be mounted on a mast.

These limitations can be overcome with Electronic Sirens.



Electronic Sirens

Advantages:

- The siren is battery powered in operation, requiring an AC power supply only to maintain the battery charge, therefore loss of site power has no effect on the operation and functionality of the siren.
- The siren perform silent tests at a user defined time period to determine the operational capability of the siren and relays the results of such a test to a monitoring point so that action can be initiated to repair the unit if necessary in a timely fashion and without causing any nuisance sound to neighbours for testing purposes.
- Up to 8 different alarm signals can be activated via volt free contacts and more if an RS485 interface is used to control the siren.
- The alarm signals are fully user definable and may include pre-recorded voice messages as well as tone signals. Live voice is also an option.
- Because the electronic siren only requires a 110/230Vac supply instead of the 400Vac 3ph supply required for motor driven sirens there may be a significant saving on installation costs.
- In suitable remote locations the siren could be powered from a solar panel array.
- Sound levels of each signal can be user defined therefore enabling the possibility of the same siren being able to be used for on-site and off-site warning.
- The siren also contains two extremely flexible user definable schedulers for time signalling purposes.
- The sirens can also support 100V line drive loudspeakers for overcoming high ambient noise levels in specific locations or if a PA function is required.

Limitations:

- More sophisticated technology and therefore requires a greater installation and maintenance skill level.
- Greater initial cost than a conventional motor driven siren (for the superior models) but this is usually offset by the advantages and reduced installation costs of an electronic siren.

Main Differences between ES-X and ES-S Systems are as follows:

- The ES-X range of sirens can be considered as a mid technology solution fitting between the very limited signalling and control facilities of the motor operated siren technology and the fully configurable and monitored ES-S technology.
- The ES-X system offers up to a maximum of 8 different warning signals, live voice broadcasting and battery powered operation so would be unaffected by loss of site power unless for a prolonged period of several days. Control of a single siren via simple VFC switches or single and group siren control over an RS485 or radio network.
- The ES-X systems are limited to a maximum of a 6 horn siren unit but are compatible with ES-S Systems to allow verstatile site design and future-proof expansion options.

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