

Product Manual Standard Asserta Sounder Range

Document Structure: Steve Martin - 18/09/08

Technical Information: Chris Anderson - 14/10/08

Cooper Fulleon Ltd
Llantarnam Park
Cwmbran
South Wales
NP44 3AW
+44 (0)1633 628500
www.fulleon.com

Contents

Title	Page
INTRODUCTION	2
GENERAL FUNCTIONAL DESCRIPTION	2
TONES TABLE	3
SPL DIRECTIONAL OUTPUT VARIATION	4,5,6
Inrush Current at Minimum, Nominal & Maximum Supply Voltage	7,8,9
SPL-V-Input Voltage	10,11
Input Current -V- Input Voltage Data	10,11
Installation Guidance & Advise	12
Power Supplies & Control Panels	13
Wiring	14
Detailed wiring diagrams	15
Typical Loop Calculations & Recommendations	16
Maintenance Advice	17
Product Dimensions	17
Annex A: Document Change Summary	18

Related Documents

Title	Doc. Ref.
Installation Instructions (included with product)	25-5549

Introduction

The Asserta is a range of high performance sounders utilising a rugged housing construction and has been specifically designed to cope with harsher industrial environments with higher ambient noise levels. The design is flexible and may be specified with or without integral beacon. Various AC and DC power supply modules are also available. The products have three synchronised alarm stages and are available in a range of colours.

A range of voice products is also available.

A modular approach helps to reduce the number of variants while still maintaining product choice and flexibility.

General Functional Description

The sounder is normally in an off state, with no voltage applied to the terminals. In this state, the unit has no power and so does not produce any sound.

When the unit is required to produce sound, the appropriate DC voltage is applied to the appropriate designated power terminals (see connection diagram and installation leaflet). This provides power to the circuit via the appropriate power supply module (if fitted). A reverse polarity diode is fitted to allow for use on reverse polarity monitoring systems.

At the heart of the sounder is a microprocessor which, via suitable firmware, generates the appropriate tone depending on the settings on the tone switch (if fitted). The signal generated by the microprocessor feeds a power transistor circuit, which in turn drives the speaker situated in the acoustic horn.

The power supply circuitry allows operation at a wide operating voltage level (see specification table). Sound pressure level (SPL) is adjustable via the volume selector switches (see installation leaflet).



Tones Table

1st & 2nd Tone bank	3rd Tone bank	Switch Setting (0=Open)	Tone Description					Asserta 110			Asserta 120			
			123456	Pattern	Frequency (Hz)	Rate	Market	Description	Average current @ max vol @ 24VDC	24Vdc on axis @1M	EN54-3 30Vdc see notes	Average current @ max vol @ 24VDC	24Vdc on axis @1M	EN54-3 30Vdc see notes
									mA	dB(A)	dB(A)	mA	dB(A)	dB(A)
A 1	A14	111111	Alternating	970 then 800		2Hz (250ms-250ms)	EVIAN		108	111	*	450	117	*
A 2	A14	111110	Sweep	800 to 970		7Hz (7/s)			103	112	*	450	120	*
A 3	A14	111101	Sweep	800 to 970		1Hz (1/s)			105	112	112	450	120	116
A 4	A9	111100	Continuous	2850		Steady			122	106	*	445	109	*
A 5	A4	111011	Sweep	2400 to 2850		7Hz			119	103	*	447	109	*
A 6	A4	111010	Sweep	2400 to 2850		1Hz			121	105	*	446	110	*
A 7	A14	111001	Slow whoop	500 to 1200		3s sweep, 0.5 s silence, then repeat (rep)	Slow Whoop Netherlands		115	111	112	340	119	116
A 8	A14	111000	Sweep (DIN)	1200 to 500		1Hz	Din / PFEER (PAPA)		115	111	112	430	119	116
A 9	A4	110111	Alternating	2850 then 2400		2Hz (250ms-250ms)			121	108	*	450	112	*
A 10	A14	110110	Intermittent	970		0.5Hz (1s On/1s Off)	PFEER alert		71	108	*	229	117	*
A 11	A14	110101	Alternating	970 then 800		1Hz (500ms-500ms)			106	109	*	375	116	*
A 12	A4	110100	Intermittent	2850		0.5Hz (1s On/1s Off)			89	107	*	235	109	*
A 13	A14	110011	Intermittent	970		0.8Hz (250ms On/1s Off)	ASP		35	108	*	100	117	*
A 14	A8	110010	Continuous	970		Steady	PFEER - Toxic gas		104	109	111	450	117	115
A 15	A14	110001	Alternating	440 then 554		100ms-400ms	France NFS 32 S 32-001		76	106	*	294	115	*
A 16	A14	110000	Intermittent	660		3.3Hz (150ms On/150ms Off)	Swedish (Air raid)		60	106	*	232	114	*
A 17	A14	101111	Intermittent	660		0.28Hz (1.8s On/1.8s Off)	Swedish (Local warning)		88	106	*	220	115	*
A 18	A14	101110	Intermittent	660		0.05Hz (6.5s On/13s Off)	Swedish (Pre-mess)		101	106	*	150	115	*
A 19	A1	101101	Continuous	660		Steady	Swedish (All clear)		103	107	*	429	116	*
A 20	A19	101100	Alternating	440 then 554		0.5Hz (1s On/1s Off)	Swedish (Turn out)		83	106	*	312	115	*
A 21	A4	101011	Intermittent	660		1Hz (500ms-500ms)	Swedish		66	106	*	220	115	*
A 22	A4	101010	Intermittent	2850		4Hz (150ms On/100ms Off)			83	105	*	286	108	*
A 23	A14	101001	Sweep	800 to 970		50Hz			102	109	*	419	117	*
A 24	A4	101000	Sweep	2400 to 2850		50Hz			120	106	*	440	110	*
A 25	A14	100111	Intermittent	970		3 x 500ms pulses followed by 1.5s silence then repeat	ISO 8201/US Temporal		62	109	*	180	117	*
A 26	A4	100110	Intermittent	2850		3 x 500ms pulses followed by 1.5s silence then repeat	ISO 8201/US Temporal		64	107	*	180	109	*
A 27	A6	100101	Continuous	4000		Steady			109	101	*	450	105	*
A 28	A14	100100	Alternating	970 then 800		2Hz (250ms-250ms)			106	109	*	414	116	*
A 29	A14	100011	Alternating	990 then 650		2Hz (250ms-250ms) (Symphoni tones)			104	109	111	444	117	115
A 30	A14	100010	Alternating	510 then 610		2Hz (250ms-250ms) (Squashini Micro tones)			96	107	109	370	116	113
A 31	A14	100001	Sweep	300 to 1200		1Hz			84	110	*	285	118	*
A32	A3	100000	Continuous	Bell		Steady	See attached for waveform details		120	111	*	450	117	*
A33	A14	011111	Intermittent	Bell		3 x 500ms pulses followed by 1.5s silence then repeat	Bell / US temporal		69	111	*	180	117	*
A34	A4	011110	Alternating	1000 then 2000		1Hz (500ms-500ms)	Singapore		112	107	*	450	115	*
A35	A14	011101	Intermittent	420		6 step ramped start pulsed @ 0.625S ON / 0.625S OFF	Australian alert		46	108	*	140	116	*
A36	A14	011100	Sweep	500 to 1200		Sweep 3.7s followed by 0.25s gap	Australian evac		91	109	*	340	117	*
A37	A14	011011	Sweep	1400 to 1600		Sweep up 1s, sweep down 0.5s	NF C 48-285		122	108	*	448	116	*
A38	A14	011010	Sweep	500 to 1200		Sweep UP & DOWN over 3s	Siren		94	109	*	310	117	*
A39	A14	011001	Intermittent	720		0.7s ON, 0.3OFF	German ind alarm		90	110	*	310	117	*
A40	A14	011000	Sweep	422 to 775		Sweep for 0.85s, 1s delay, repeat	NFPA Whoop		60	109	*	180	118	*
A41	A3	010111	Continuous	470		Steady	Horn (USA)		85	104	*	340	114	*
A42	A3	010110	Continuous	370		Steady	Air horn (USA)		76	104	*	272	113	*

Note (a): Tones approved under the Construction Products Directive for Fire Alarm Applications, are shown in the column marked EN54-3.
 Note (b): EN54-3 measurements shown reflect minimum expected SPL readings at Maximum Volume at the Loudest Point around the EN54-3 defined sounder axis.
 Note (c): All other tone measurements reflect manufacturers data based on 'on axis' measurements, and are not verified by a Notified body.
 Note (d): Detailed EN54-3 polar SPL measurements are available in the Product Manual for the appropriate sounder.
 Note (e): All measurements taken at 20°C operating temperature.

Directional Output Variation
Operational Performance
**Asserta Sounder & Sounder Beacon –
 AS/SB/120**
Tone No. 03 (Sweep 800 Hz - 900 Hz)
Maximum Volume dB(A)

Angle	SPL(dB) Horizontal Plane			SPL(dB) Vertical Plane		
	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})
15°	104	108	< 6dB	104	108	< 6dB
45	108	112	< 6dB	108	112	< 6dB
75	114	118	< 6dB	114	118	< 6dB
105°	114	118	< 6dB	114	118	< 6dB
135°	109	113	< 6dB	110	113	< 6dB
165°	103	107	< 6dB	103	107	< 6dB

All measurements at 1M distance, unless stated otherwise.
Operational Performance
**Asserta Sounder & Sounder Beacon –
 AS/SB/120**
Tone No. 07 (Sweep 500 Hz - 1200 Hz)
Maximum Volume dB(A)

Angle	SPL(dB) Horizontal Plane			SPL(dB) Vertical Plane		
	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})
15°	104	108	< 6dB	104	108	< 6dB
45	108	112	< 6dB	109	113	< 6dB
75	114	118	< 6dB	114	118	< 6dB
105°	114	118	< 6dB	114	118	< 6dB
135°	110	114	< 6dB	109	113	< 6dB
165°	103	107	< 6dB	103	107	< 6dB

All measurements at 1M distance, unless stated otherwise.
Operational Performance
**Asserta Sounder & Sounder Beacon –
 AS/SB/120**
Tone No. 08 (Sweep 1200 Hz - 500 Hz)
Maximum Volume dB(A)

Angle	SPL(dB) Horizontal Plane			SPL(dB) Vertical Plane		
	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})
15°	104	108	< 6dB	104	108	< 6dB
45	109	112	< 6dB	109	112	< 6dB
75	114	118	< 6dB	114	118	< 6dB
105°	114	118	< 6dB	114	118	< 6dB
135°	110	114	< 6dB	109	113	< 6dB
165°	104	108	< 6dB	104	108	< 6dB

All measurements at 1M distance, unless stated otherwise.

Operational Performance

**Asserta Sounder & Sounder Beacon –
AS/SB/120**

Tone No. 14 (Continuous 970 Hz)

Maximum Volume dB(A)

Angle	SPL(dB) Horizontal Plane			SPL(dB) Vertical Plane		
	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})
15°	100	104	< 6dB	100	103	< 6dB
45	105	109	< 6dB	106	109	< 6dB
75	113	117	< 6dB	114	117	< 6dB
105°	114	117	< 6dB	114	117	< 6dB
135°	108	113	< 6dB	107	111	< 6dB
165°	100	105	< 6dB	99	103	< 6dB

All measurements at 1M distance, unless stated otherwise.

Operational Performance

**Asserta Sounder & Sounder Beacon –
AS/SB/120**

Tone No. 29 (Alternating 990 Hz - 650 Hz)

Maximum Volume dB(A)

Angle	SPL(dB) Horizontal Plane			SPL(dB) Vertical Plane		
	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})
15°	102	106	< 6dB	102	106	< 6dB
45	107	111	< 6dB	108	111	< 6dB
75	113	117	< 6dB	114	117	< 6dB
105°	113	117	< 6dB	113	117	< 6dB
135°	108	112	< 6dB	109	112	< 6dB
165°	101	105	< 6dB	101	105	< 6dB

All measurements at 1M distance, unless stated otherwise.

Operational Performance

**Asserta Sounder & Sounder Beacon –
AS/SB/120**

Tone No. 30 (Alternating 510 Hz / 610 Hz)

Maximum Volume dB(A)

Angle	SPL(dB) Horizontal Plane			SPL(dB) Vertical Plane		
	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})
15°	101	105	< 6dB	101	105	< 6dB
45	107	111	< 6dB	107	111	< 6dB
75	111	115	< 6dB	112	116	< 6dB
105°	111	115	< 6dB	111	115	< 6dB
135°	108	111	< 6dB	107	111	< 6dB
165°	100	104	< 6dB	99	103	< 6dB

All measurements at 1M distance, unless stated otherwise.

Operational Performance

**Asserta Sounder & Sounder Beacon –
AS/SB/110**

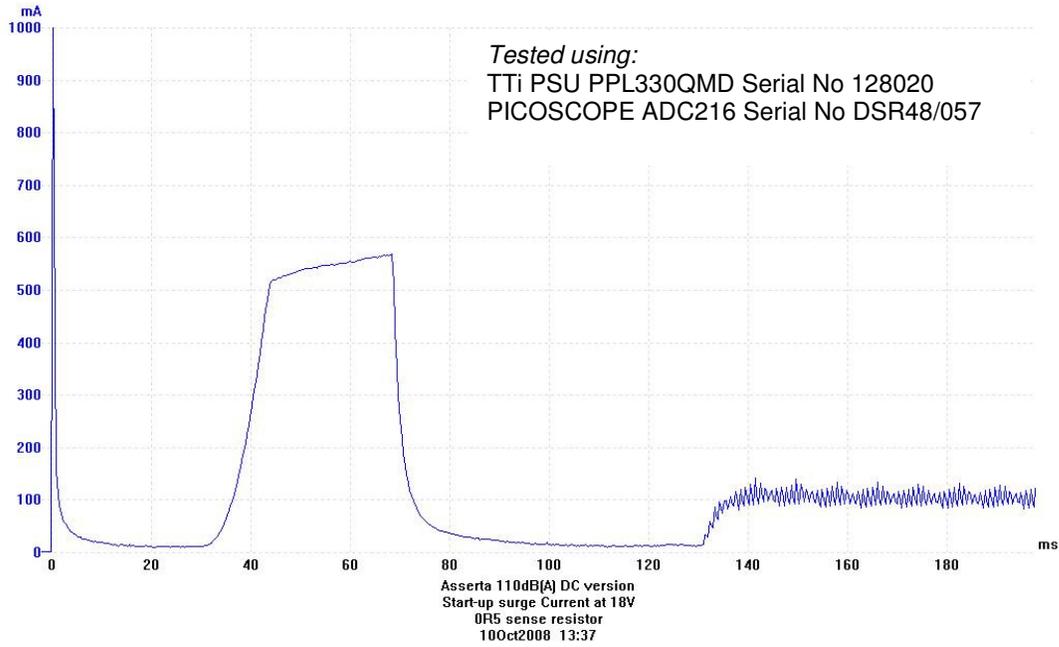
Tone No. 14 (Continuous 970 Hz)

Maximum Volume dB(A)

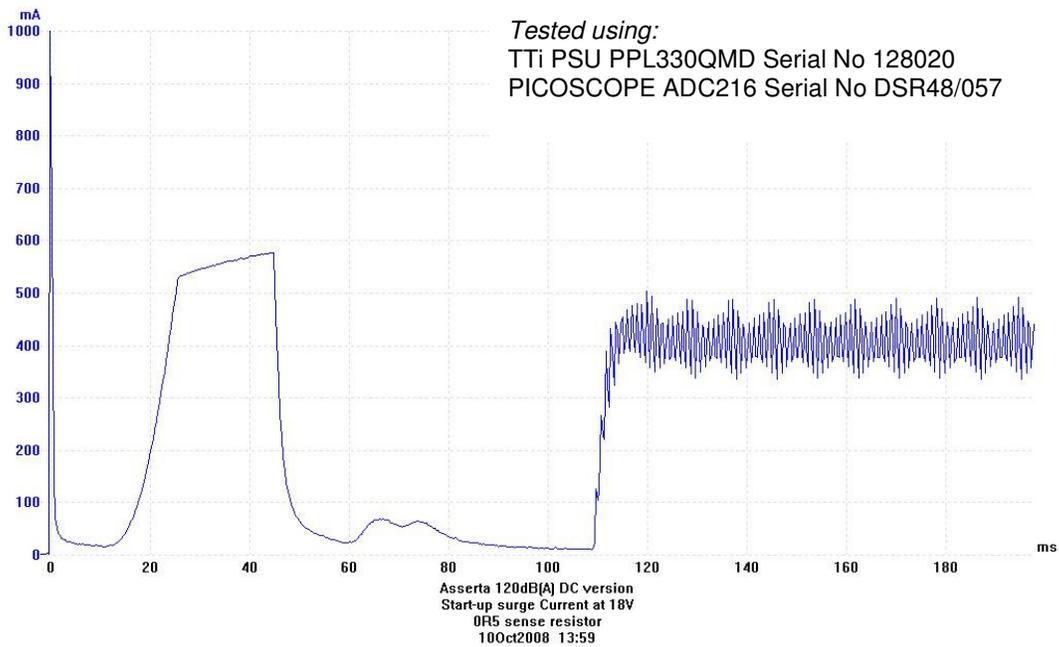
Angle	SPL(dB) Horizontal Plane			SPL(dB) Vertical Plane		
	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})	Min 18V _{DC}	Max 30V _{DC}	Difference (V _{max} - V _{min})
15°	95	99	< 6dB	95	99	< 6dB
45	100	105	< 6dB	100	105	< 6dB
75	108	113	< 6dB	109	113	< 6dB
105°	109	113	< 6dB	109	113	< 6dB
135°	103	107	< 6dB	102	106	< 6dB
165°	95	99	< 6dB	94	99	< 6dB

All measurements at 1M distance, unless stated otherwise.

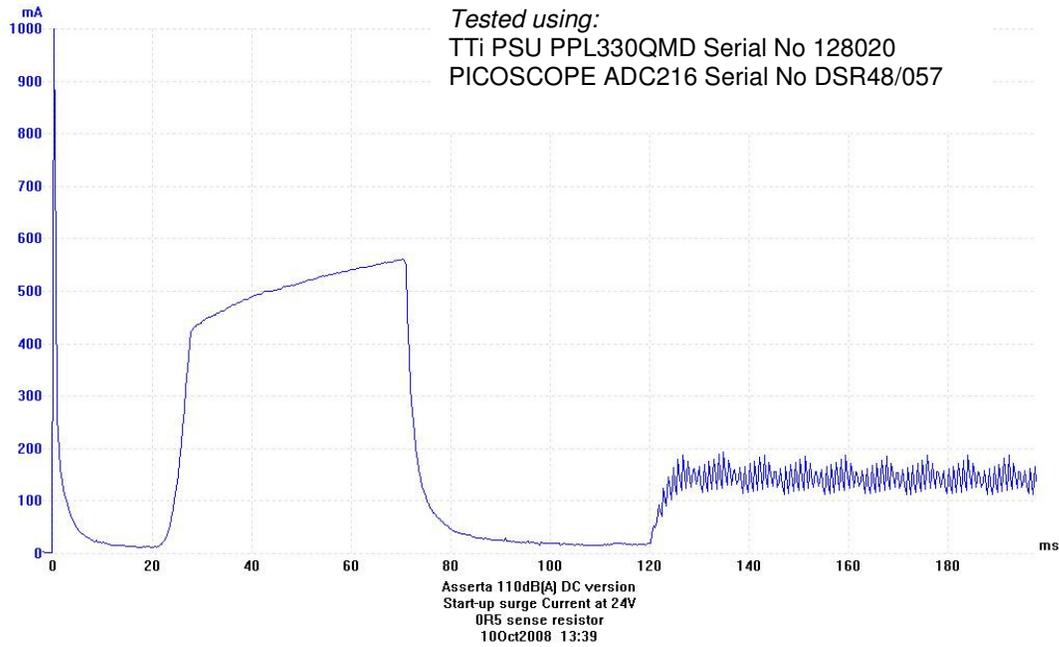
Asserta 110dB(A) / Designation: Start Up Current at 18 volts



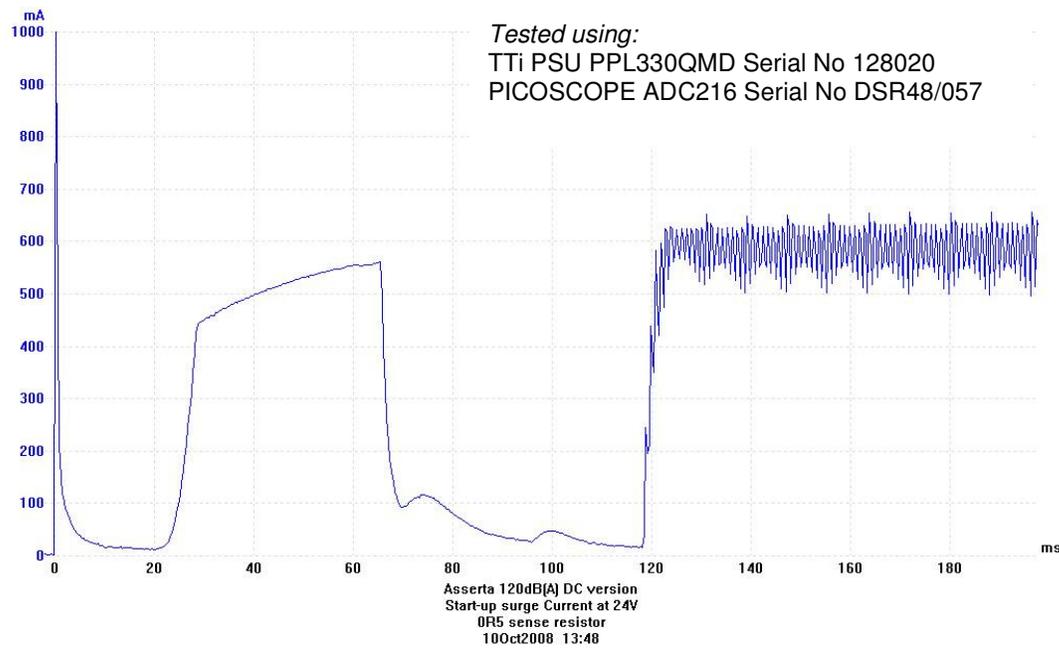
Asserta 120dB(A) / Designation: Start Up Current at 18 volts



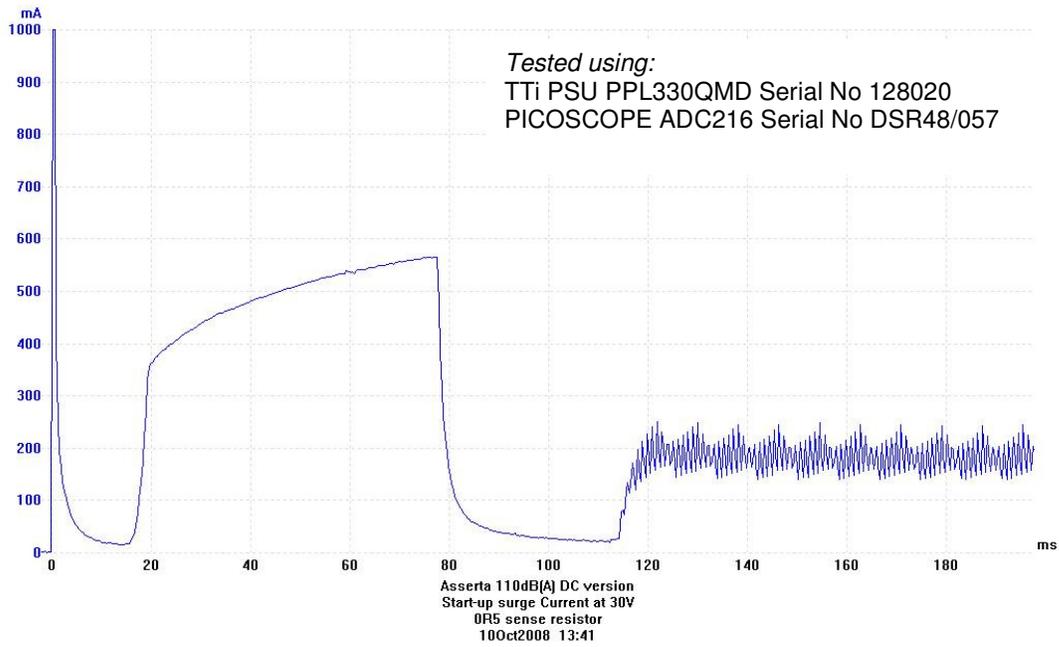
Asserta 110dB(A) / Designation: Start Up Current at 24 volts



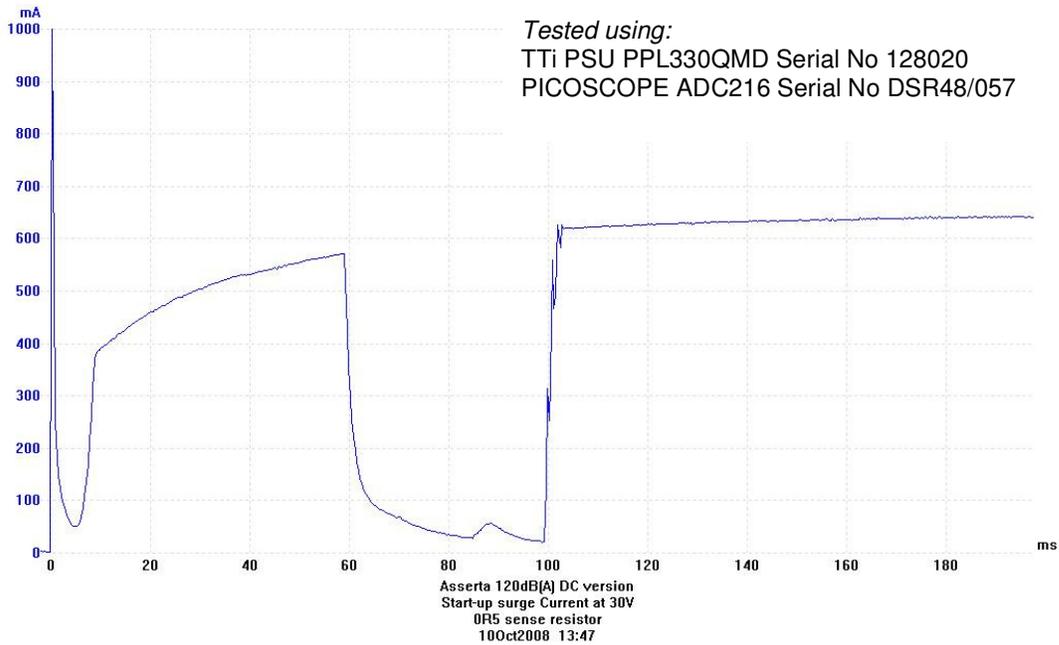
Asserta 120dB(A) / Designation: Start Up Current at 24 volts



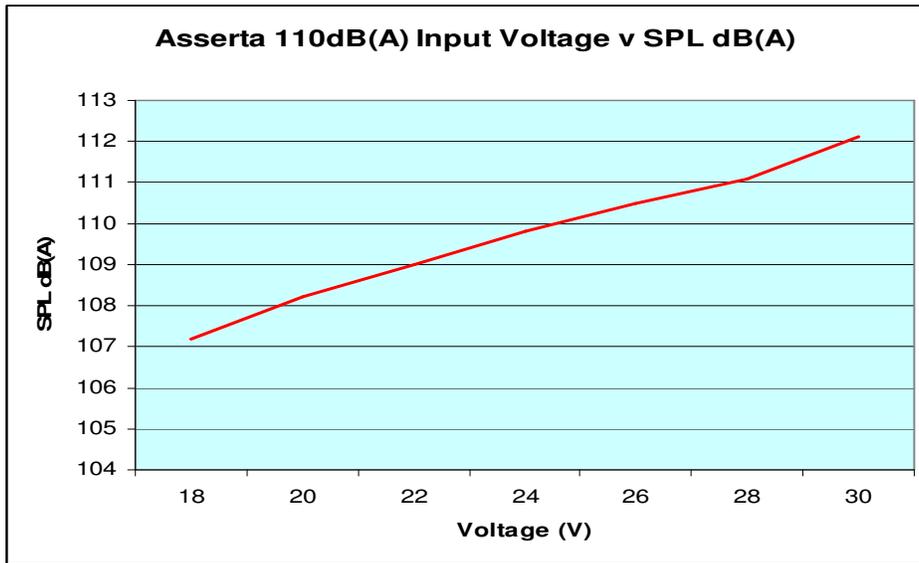
Asserta 110dB(A) / Designation: Start Up Current at 30 volts



Asserta 120dB(A) / Designation: Start Up Current at 30 volts

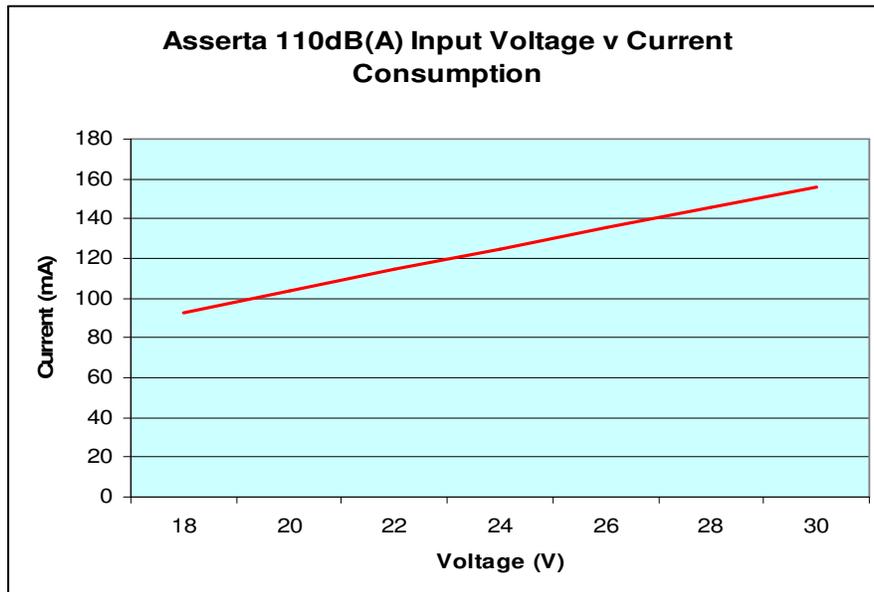


Asserta 110dB(A) / Designation: SPL – v – Input Voltage



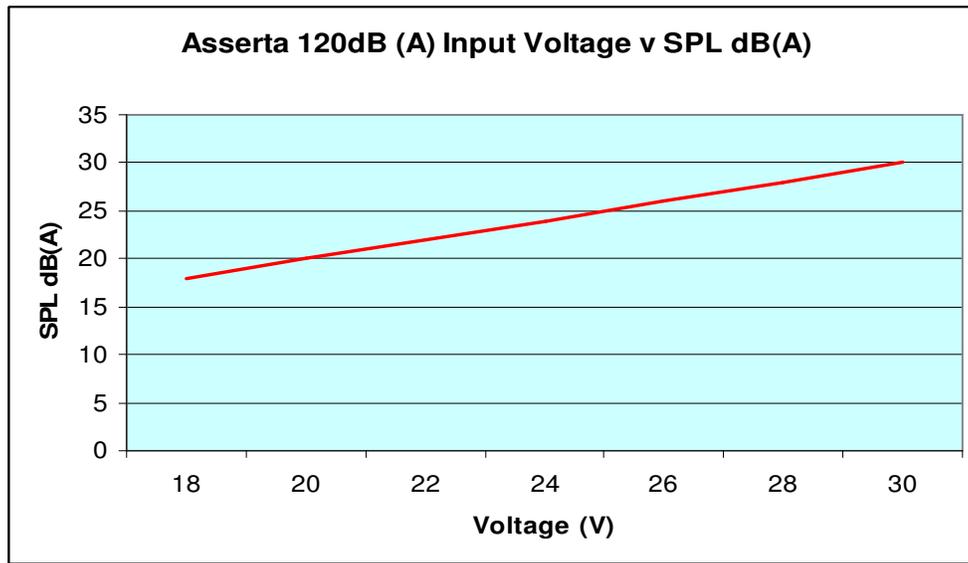
Asserta 110dB (A)							
Voltage	18	20	22	24	26	28	30
SPL @1M	107.2	108.2	109.0	109.8	110.5	111.1	112.1
SPL @ 2M	101.2	102.2	101.0	103.8	104.5	105.1	106.1

Asserta 110dB(A) / Designation: Input Current – V – Input Voltage



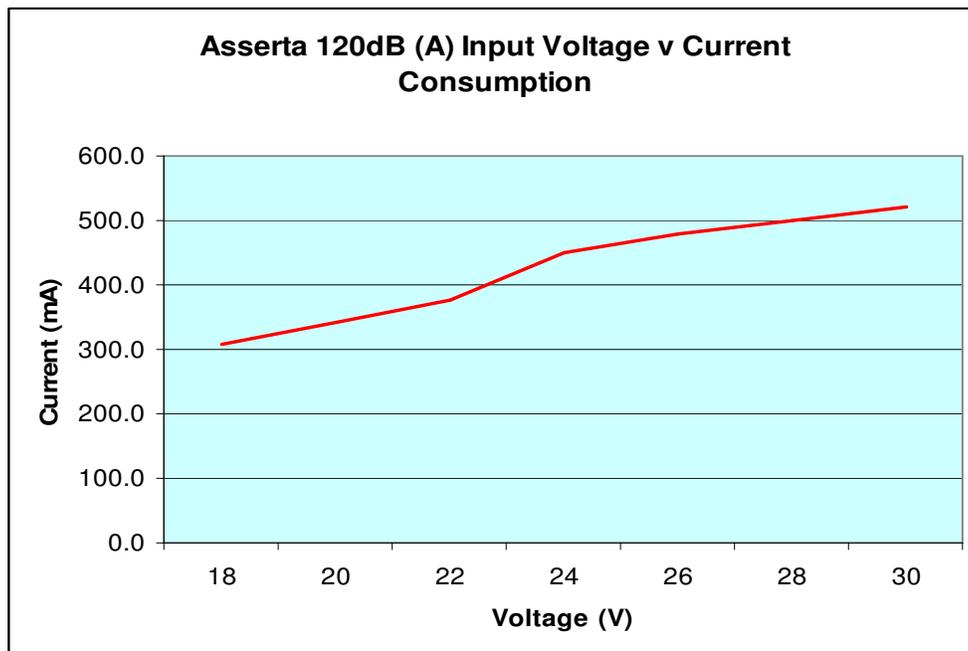
Asserta 110dB (A)							
Voltage	18	20	22	24	26	28	30
Current (mA)	92.6	103.8	114.4	125.0	135.2	145.4	155.8

Asserta 120dB(A) / Designation: SPL – v – Input Voltage



Asserta 120dB (A)							
Voltage	18	20	22	24	26	28	30
SPL @1M	113.3	114.2	115.0	116.0	116.8	117.2	117.8
SPL @ 2M	107.3	108.2	109.0	110.0	110.8	111.2	111.8

Asserta 120dB(A) / Designation: Input Current – V – Input Voltage



Asserta 120dB (A)							
Voltage	18	20	22	24	26	28	30
Current (mA)	307.0	342.0	377.0	450.0	480.0	500.0	522.0

Installation Guidance & Advise

General Safety Advice

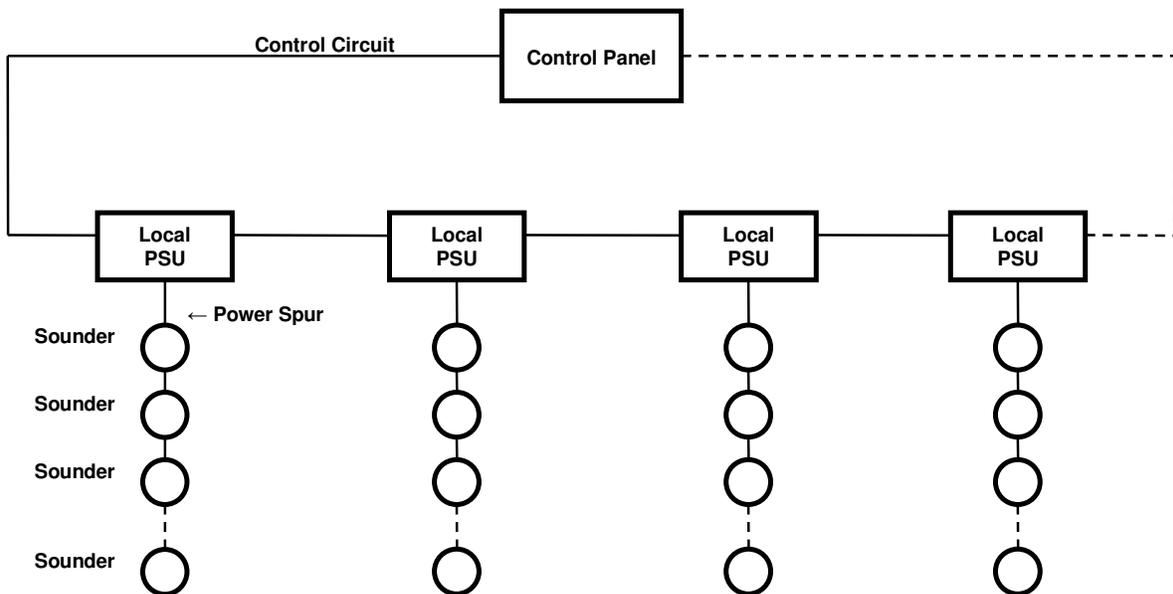
- *Do not work on live circuits*
- *Follow local wiring regulations where relevant*
- *Ensure that the base is secured to the mounting surface using the most appropriate fixings. Plasterboard walls will require special wall plugs.*

Maintaining IP (Ingress Protection) ratings – Good Practice

- *Use suitable cable glands to maintain the designed IP rating. The stated product rating will ONLY be achieved if the product is installed correctly. A selection of suitable glands is available from all good electrical wholesalers. Always follow the cable gland instructions.*
- *Product orientation is important. If it is desired to achieve a high weatherproof rating, all cables should be brought in and out from the underside of the device. Avoid cable entry from the top side, as water could drain in over time.*
- *Ensuring that all base and mounting screws are secure.*

Power Supplies / Control Panels

- Use a power supply or control panel capable of providing a steady state current of at least 1.2 x the rated operating current of each device.
- Use a power supply or control panel capable of providing a surge current of at least 1.5 x the surge current of each device for at least 10mS.
- A suitable slow-blow fuse must be fitted to the output stage of all power supplies, to help prevent fuse blowing during power up.
- Where a large number of units are to be wired, it is recommended to use multiple power supplies on separate spurs or loops to avoid the huge voltage drops that would otherwise be encountered. See diagram below: -

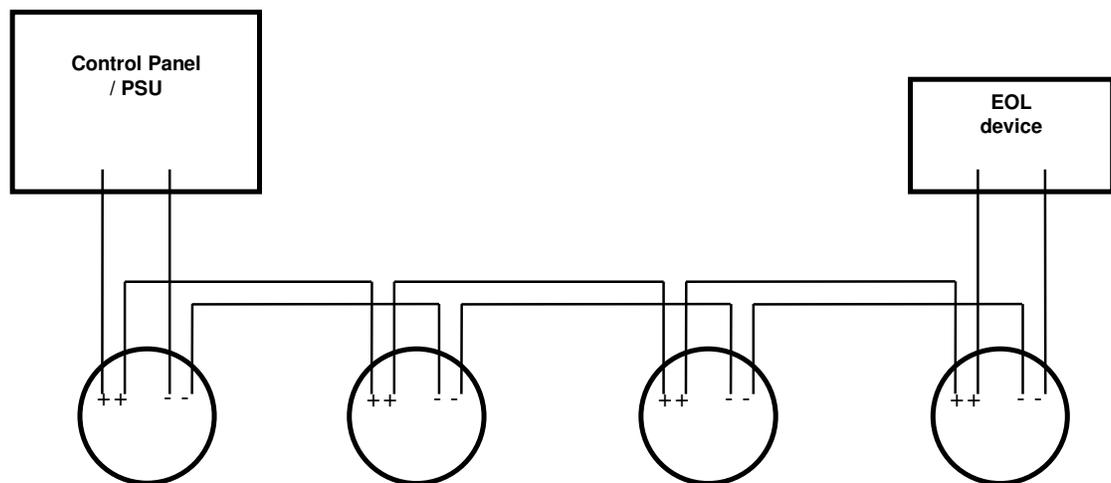


Wiring

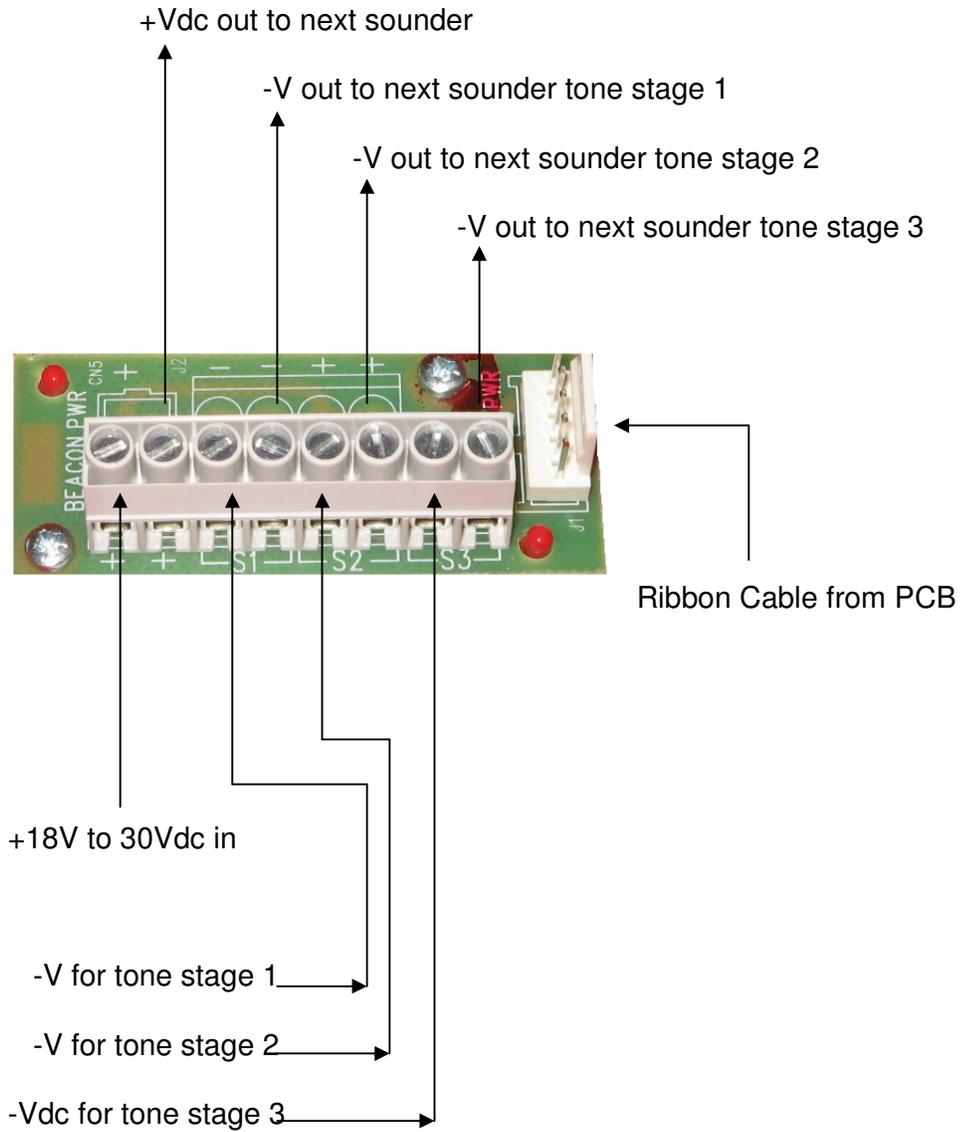
It is essential to know the series resistance of the cable before making a choice here. It is recommended that the thickest wire possible is used. This ensures that the series resistance is minimised and thus the length of the wiring that can be used is maximised. All the measurements and calculations shown on the following pages are for a maximum solid core wire cross sectional area (CSA) of 2.5mm^2 . If using a different cable type, CSA or a material other than copper is used the value of the series resistance of the cable (R_s) will need to be adjusted in the formula below.

Please note that that all calculations here are for spurs only. It is risky to do calculations on loops, since if one side of a loop were to fail, the maximum equivalent series resistance could double. This may result in possible system start up problems or poor performance issue due to excessive voltage drops.

Typical Wiring Configuration



Asserta 24V Sounder Base Installation Instructions



Typical Calculations (Asserta 120 for example purposes ONLY)

No. of products	Typical max current consumption of product	Typical power supply steady state capability	Max cable resistance for 10% voltage drop @ 20V _{DC}	Max cable length for 10% voltage drop @ 11.2V _{DC}
(N)	(I _s) - Amps	(I _p) - Amps	(R _c) - ohms	(L) - Meters
1	0.45	0.54	^(a) 4.4	^(b) 914
2	0.90	1.08	2.2	628
3	1.35	1.62	1.5	429
4	1.80	2.16	1.1	314
5	2.25	2.70	0.9	257

Typical Calculations (Asserta 120 Sounder/Beacon for example purposes ONLY)

No. of products	Typical max current consumption of product	Typical power supply steady state capability	Max cable resistance for 10% voltage drop @ 20V _{DC}	Max cable length for 10% voltage drop @ 11.2V _{DC}
(N)	(I _s) - Amps	(I _p) - Amps	(R _c) - ohms	(L) - Meters
1	1.1	1.32	1.8	514
2	2.2	2.64	0.9	257
3	3.3	3.96	0.6	171
4	4.4	5.28	0.5	143
5	5.5	6.60	0.4	114

✓ Recommendations & Assumptions:

- Copper wire with core cross sectional area (CSA) of 2.5mm² is assumed to be used
- R_S (Maximum series resistance of copper wire) = 0.7ohm per 100meters (typical)
- Power supplies must be capable of delivering surge currents of 1.5x surge current of each device for at least 10mS
- All sounders are assumed to be wired to the end of a spur (i.e. worst case scenario)
- Where the length of cable or number of sounders used becomes an issue, it is recommended to group units together and use a separate power supply & wiring spur for each group

✓ Formulae:

- Cable Resistance:

$$R_c = V_{\text{drop}} / I_s \quad (\text{where } V_{\text{drop}} = 20 \times 10\%)$$

$$= 2V / I_s$$

$$= 2V / 0.45 = 4.4 \text{ ohm} \quad (a)$$
- Cable Length:

$$L = R_c / [R_s / (100 \times 2)] \quad (\text{assumes feed / return (+/-) wires are same length \& diameter})$$

$$= R_c / 0.0035 \text{ ohm}$$

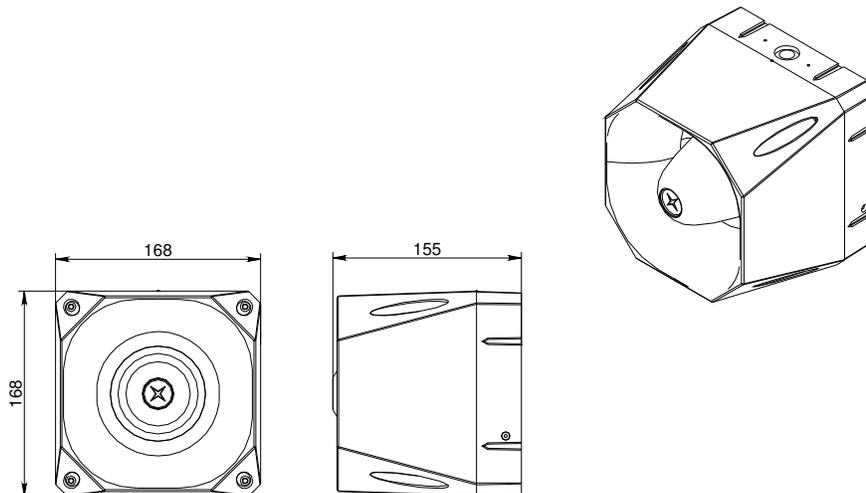
$$= 4.4 \text{ ohm} / 0.0035 \text{ ohm} = 1257 \text{ meters} \quad (b)$$

* Note: All calculations and advice given is for guidance ONLY. No liability is assumed by the manufacture for the use of these calculations, or for any errors or omissions. The installer is responsible for ensuring that the product is installed correctly and safely using all relevant & current wiring regulations & practices.

Maintenance Advice

- ***The product is of a low maintenance design. However, systems should be tested on a regular basis after installation. This is vital where products are used in life safety systems. Please refer to current & relevant maintenance practices.***
- ***If the product is installed in a harsh environment, check seals and housing condition for any obvious signs of wear and tear or damage on a periodic basis.***
- ***Cleaning of the product housing should be carried out using non-abrasive and non-corrosive substances. A lightly moistened soft cloth is usually sufficient.***

Product Dimensions



Annex A: Document Change Summary

Issue Number	Description Of Change	Date
1	Original Document	18/09/08
2		
3		
4	Updated For SPL Data	18/09/08
5	Updated For Inrush Current, SPL, Voltage and General Dimension Drawing.	14/10/08
6	Added tones table and detailed wiring diagrams	22/10/08