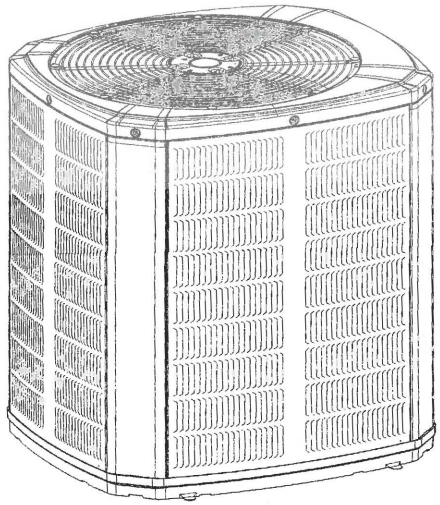
American Standard®
HEATING & AIR CONDITIONING

# Product Data

## Variable Speed AccuLink™ Air Conditioners

**4A7V0024A1000A**
**4A7V0036A1000A**
**4A7V0048A1000A**
**4A7V0060A1000A**



*Note: "Graphics in this document are for representation only. Actual model may differ in appearance."*

September 2013

**12-1356-1**

Ingersoll Rand

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# Mechanical Specification Options

### General

The Outdoor Units are charged from the factory for matched indoor section and up to 15 feet of piping. This unit is designed to operate at outdoor ambient temperatures from 55° F to 120° F in cooling and from —10° F to 66° F in heating. Only AHRI approved indoor matches are approved for use with these models.

### AccuLink™ Air Conditioners

This outdoor unit contains the AccuLink™ Air Conditioners digital communication with 2 wire connection to outdoor and Plug-n-Play set up.

### Casing

Unit casing is constructed of heavy gauge. G60 galvanized steel and painted with a weather-resistant powder paint on all louvered panels and prepaint on all other panels. Corrosion and weatherproof CMBP-G30 DuraBase™ base.

### Refrigerant Controls

Refrigeration system controls include condenser fan, compressor contactor and high and low pressure switches. A factory supplied, field installed filter is standard.

### Compressor

Inverter driven scroll compressor with 25 to 100% output capacity on heat pumps and 30 to 100% output capacity on air conditioners. Noise enclosure minimizes sound levels and built in compressor protection protects compressor will reduce operating speed and current draw to maintain operation while protecting the compressor.

### Condenser Coil

The Spine Fin™ outdoor coil provides low airflow resistance and efficient heat transfer. The coil is protected on all four sides by louvered panels.

### Low Ambient Cooling

As manufactured, this system has built in freeze protection that will allow cooling operation below 55°F but will reduce capacity or shut down completely to prevent operation under adverse conditions.

### Comfort Control

The 950/850 Control is required and provides Plug-n-Play setup and 3 wire connection.

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# Product Specifications

## AIR CONDITIONER MODELS

| **OUTDOOR UNIT** [a] [b] | 4A7V0024A1000A | 4A7V0036A1000A | 4A7V0048A1000A | 4A7V0060A1000A |
|---|---|---|---|---|
| POWER CONNS. — V/PH/HZ [c] | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 |
| MIN. BRCH. CIR. AMPACITY | 17.0 | 18.0 | 23.0 | 27.0 |
| BR. CIR. PROT. RTG. — MAX. (AMPS) | 25 | 25 | 35 | 40 |
| **COMPRESSOR** | SCROLL | SCROLL | SCROLL | SCROLL |
| NO. USED — NO. SPEEDS | 1–VARIABLE | 1–VARIABLE | 1–VARIABLE | 1–VARIABLE |
| R.L. AMPS [d] — L.R. AMPS | 11.5 — 10.2 | 12.4 — 10.2 | 16.0 — 12.0 | 19.3 — 12.0 |
| **FACTORY INSTALLED** | | | | |
| START COMPONENTS [e] | NA | NA | NA | NA |
| INSULATION/SOUND BLANKET | YES | YES | YES | YES |
| COMPRESSOR HEAT | YES | YES | YES | YES |
| **OUTDOOR FAN** | | | | |
| DIA. (IN.) — NO. USED | 23 — 1 | 23 — 1 | 27.5 — 1 | 27.5 — 1 |
| TYPE DRIVE — NO. SPEEDS | DIRECT — VARIABLE | DIRECT — VARIABLE | DIRECT — VARIABLE | DIRECT — VARIABLE |
| CFM @ 0.0 IN. W.G. [f] | 2680 | 2850 | 4560 | 4787 |
| NO. MOTORS — HP | 1 — 1/3 | 1 — 1/3 | 1 — 1/3 | 1 — 1/3 |
| MOTOR SPEED R.P.M. | 200 — 1200 | 200 — 1200 | 200 — 1200 | 200 — 1200 |
| VOLTS/PH/HZ | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 |
| F.L. AMPS | 2.8 | 2.8 | 2.8 | 2.8 |
| **OUTDOOR COIL — TYPE** | SPINE FIN™ | SPINE FIN™ | SPINE FIN™ | SPINE FIN™ |
| ROWS — F.P.I. | 1 — 24 | 1 — 24 | 1 — 24 | 1 — 24 |
| FACE AREA (SQ. FT.) | 19.77 | 23.75 | 27.87 | 30.80 |
| TUBE SIZE (IN.) | 3/8 | 3/8 | 3/8 | 3/8 |
| **REFRIGERANT** | R410–A | R410–A | R410–A | R410–A |
| LBS. — R-410A (O.D. UNIT) [g] | 7 lb — 6 oz | 7 lb — 14 oz | 11 lb — 1 oz | 11 lb — 14 oz |
| FACTORY SUPPLIED | YES | YES | YES | YES |
| LINE SIZE — IN. O.D. GAS | 5/8 [h] | 3/4 [h] | 7/8 [h] | 1 — 1/8 [i] |
| LINE SIZE — IN. O.D. LIQ. [h] | 3/8 | 3/8 | 3/8 | 3/8 |
| **CHARGING SPECIFICATIONS** | | | | |
| SUBCOOLING | 10° | 10° | 10° | 10° |
| **DIMENSIONS** | H X W X D | H X W X D | H X W X D | H X W X D |
| CRATED (IN.) | 46 X 30.1 X 33 | 46 X 30.1 X 33 | 46.4 X 35.1 X 38.7 | 51 X 35.1 X 38.7 |
| **WEIGHT** | | | | |
| SHIPPING (LBS.) | 217 | 228 | 270 | 284 |
| NET (LBS.) | 196 | 207 | 245 | 258 |

(a) Certified in accordance with the Air-Source Unitary Air-conditioner Equipment certification program, which is based on AHRI standard 210/240.
(b) Rated in accordance with AHRI standard 270.
(c) Calculated in accordance with Natl. Elec. Codes. Use only HACR circuit breakers or fuses.
(d) This value shown for compressor RLA on the unit nameplate and on this specification sheet is used to compute minimum branch circuit ampacity and max. fuse size. The value shown is the branch circuit selection current.
(e) No means no start components. Yes means quick start kit components. PTC means positive temperature coefficient starter.
(f) Standard Air — Dry Coil — Outdoor
(g) This value approximate. For more precise value see unit nameplate.
(h) Max. linear length 150 ft.; Max. lift — Suction 50 ft.; Max. lift — Liquid 50 ft.
(i) Max length of refrigerant lines from outdoor to indoor unit MUST NOT exceed 80 feet. The max vertical change MUST NOT exceed 25 feet. See footnote (h) if 7/8" suction line is used.

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# Sound Power Level

| Model | Mode | Speed | A-Weighted Sound Power Level [dB(A)] | Full Octave Sound Power [dB] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz |
| 4A7V0024A | Cool | Min | 57 | 71.2 | 49.8 | 51.4 | 58.3 | 51.6 | 44.2 | 37.4 | 41.2 |
| | Cool | Max | 66 | 74.8 | 64.1 | 61.3 | 66.2 | 61.2 | 56.3 | 49.4 | 46.5 |
| 4A7V0036A | Cool | Min | 55 | 71.0 | 53.4 | 51.2 | 53.5 | 51.5 | 44.6 | 40.3 | 41.0 |
| | Cool | Max | 70 | 73.1 | 70.5 | 65.8 | 67.3 | 66.0 | 60.9 | 54.1 | 50.0 |
| 4A7V0048A | Cool | Min | 57 | 70.7 | 52.5 | 51.7 | 55.3 | 53.4 | 43.6 | 35.1 | 41.6 |
| | Cool | Max | 74 | 75.5 | 73.6 | 72.0 | 72.8 | 68.7 | 63.9 | 58.3 | 52.1 |
| 4A7V0060A | Cool | Min | 62 | 71.7 | 55.8 | 56.8 | 56.7 | 60.1 | 44.7 | 42.3 | 41.0 |
| | Cool | Max | 75 | 87.8 | 77.6 | 75.2 | 72.2 | 70.2 | 64.7 | 59.0 | 51.1 |

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# Optional Accessories:

| Model | 4A7V0024 | 4A7V0036 | 4A7V0048 | 4A7V0060 |
|---|---|---|---|---|
| Rubber Isolator Kit | BAYISLT101 | BAYISLT101 | BAYISLT101 | BAYISLT101 |
| Snow Leg — Base & Cap 4" High | BAYLEGS002 | BAYLEG2002 | BAYLEGS002 | BAYLEGS002 |
| Snow Leg — 4" Extension | BAYLEGS003 | BAYLEGS003 | BAYLEGS003 | BAYLEGS003 |
| Extreme Condition Mounting Kit | BAYECMT023 | BAYECMT023 | BAYECMT004 | BAYECMT004 |
| Refrigerant Lineset | TAYREFLN9(a) | TAYREFLN7(a) | TAYREFLN3(a) | TAYREFLN3(a) |

(a) Consult handbook for available length options.

## General Data

### ACCESSORY DESCRIPTION AND USAGE

**Rubber Isolators** — 5 large rubber donuts to isolate condensing unit from transmitting energy into mounting frame or pad. Use on any application where sound transmission needs to be minimized.

**Extreme Condition Mount Kit** — Bracket kits to securely mount condensing unit to a frame or pad without removing any panels. Use in areas with high winds, or on commercial roof tops, etc.

### AHRI STANDARD 210/240 RATING CONDITIONS

- Cooling 80°F DB, 67°F WB air entering indoor coil, 95°F DB air entering outdoor coil.
- High Temperature Heating 47°F DB, 43°F WB air entering outdoor coil, 70°F DB entering indoor coil.
- Low Temperature Heating 17°F DB, 15°F WB air entering outdoor coil, 70°F DB air entering indoor coil.
- Rated indoor airflow for heating is the same as for cooling.

**AHRI STANDARD 270 RATING CONDITIONS** — (Noise rating numbers are determined with the unit in cooling operation) Standard Noise Rating number is at 95°F outdoor air.

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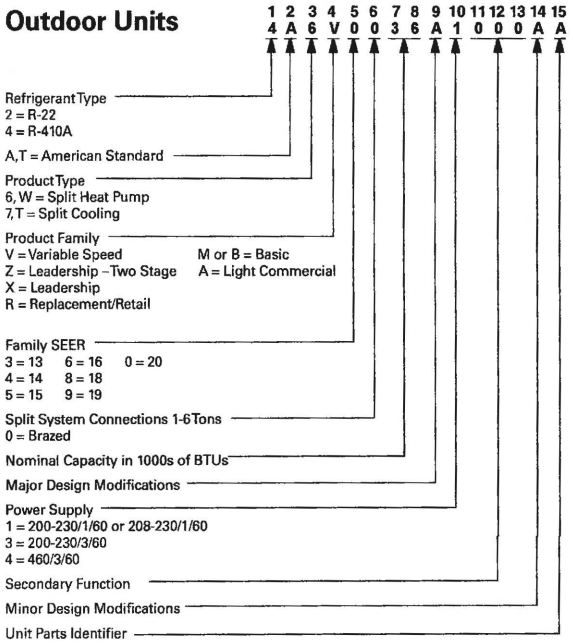
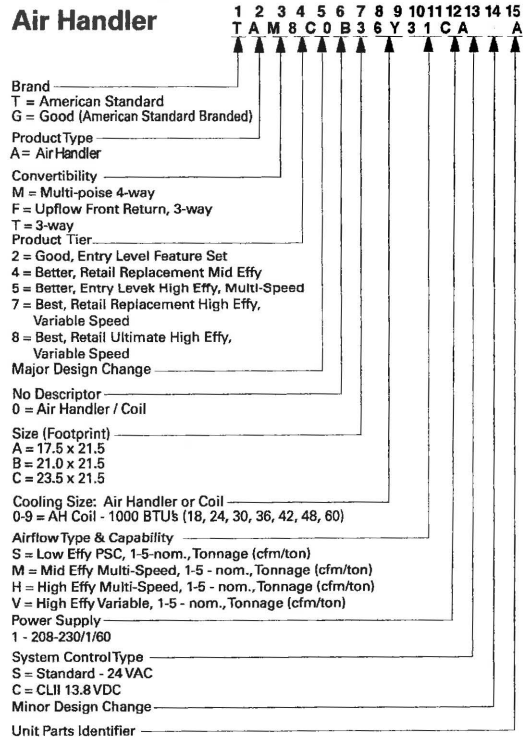
# Model Nomenclature

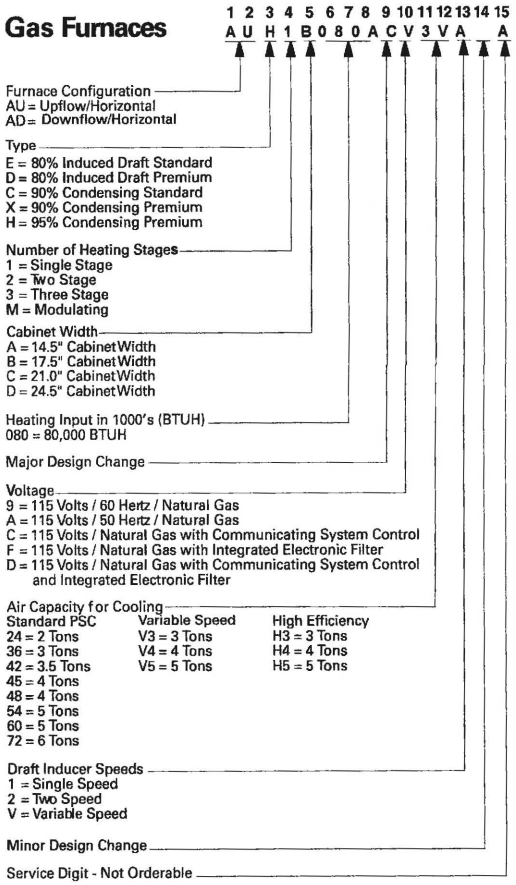
## Outdoor Units



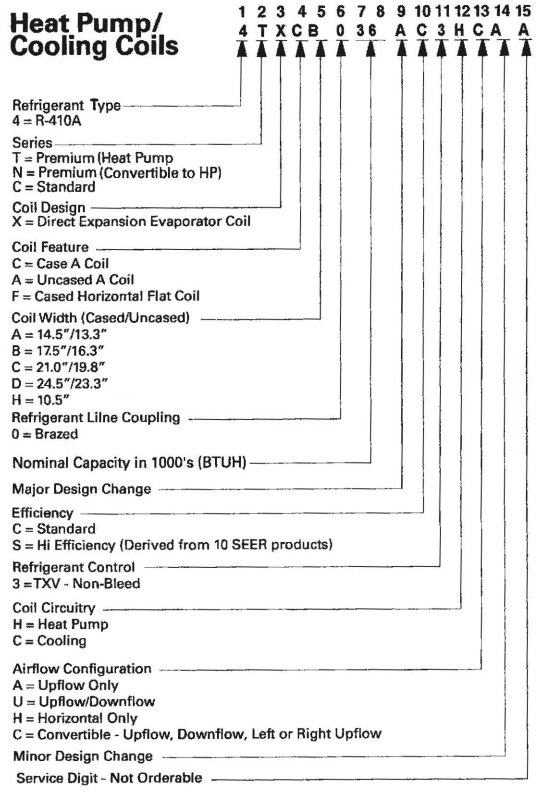

## Air Handler




## Gas Furnaces




## Heat Pump/ Cooling Coils



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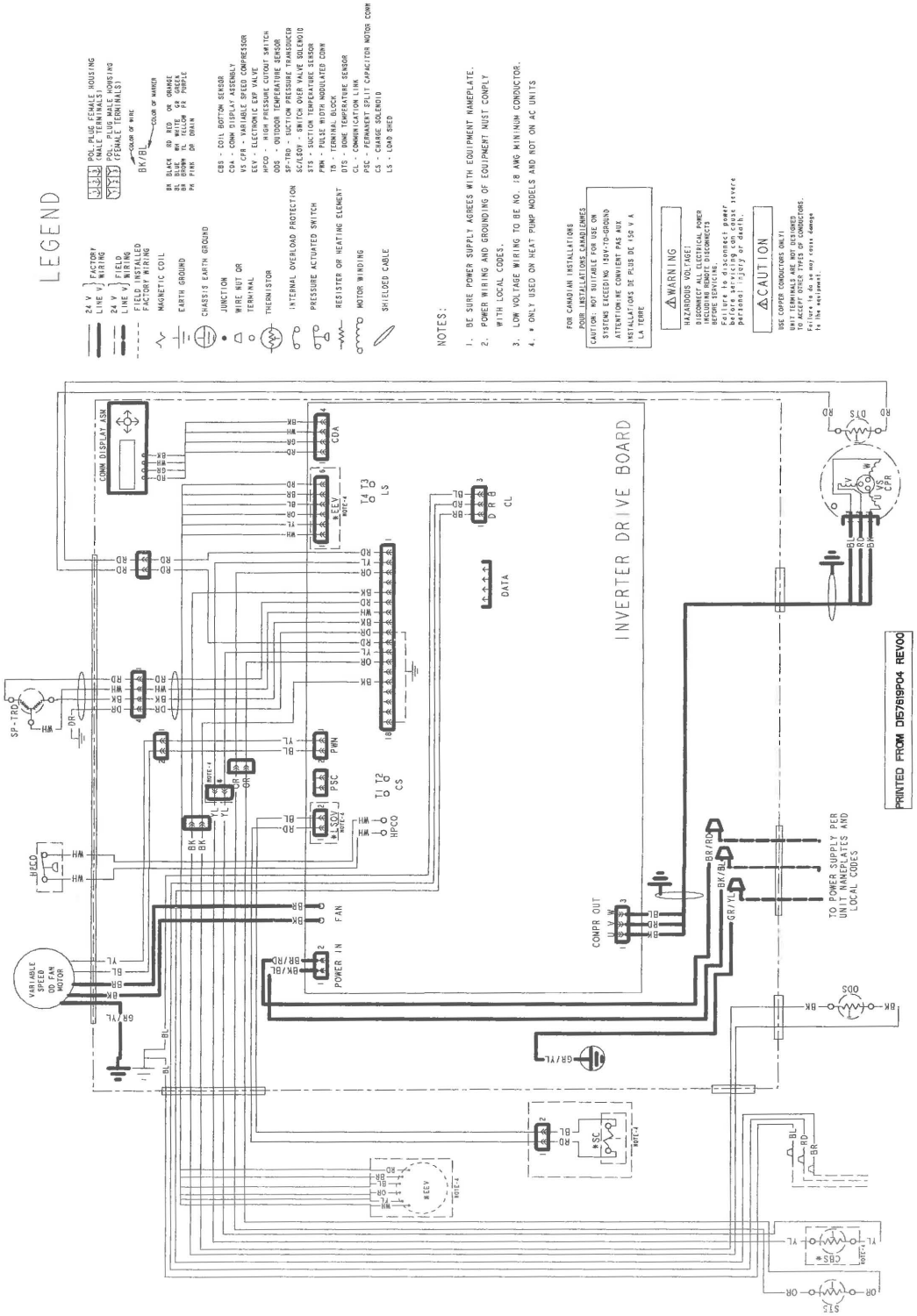
# Wiring — D157619P04





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12-1356-1 23 Sep 2013

Supersedes (New)

Ingersoll Rand

Li Residence

https://www.engineeringtoolbox.com/inverse-square-law-d_890.html

Apps GMAIL Studio C Email CalCERTS, Inc.

yards
miles
naut miles

Convert!

Area

1.0

$m^2$
$km^2$
$in^2$
$ft^2$
$miles^2$
acres

Convert!

Volume

1.0

$m^3$
liters
$in^3$
$ft^3$
us gal

Convert!

Weight

1.0

www.engineeringtoolbox.com says

dL - Sound Pressure Level Difference (dB): -21.58

Lp2 - Sound Pressure Level at Distance (dB) 44.4 Sound Level @ South Property Line

OK

| | |
|---|---|
| 160 | 92 |
| 320 | 86 |
| 640 | 78 |
| 1280 | 74 |
| 2560 | 68 |
| 5120 | 62 |

## Inverse Square Law Calculator

Use the calculator below to calculate the sound pressure level at distance.

66 $L_{p1}$ - sound pressure level at location 1 (dB) [Max Noise from AC Unit]

1 $R_1$ - distance from source to location 1 (m, ft)

12 $L_{p1}$ - distance from source to location 2 (m, ft) [South Property Line]

Calculate!

## Example - Noise from a Machine

The noise from a machine in distance *1 m* is measured to *110 dB*. The noise reduction due to the inverse square law to a working area at distance *5 m* can be calculated as

$dL = 20 \log ((5\ m) / (1\ m))$

$= \underline{14}\ dB$

Li Residence

https://www.engineeringtoolbox.com/inverse-square-law-d_890.html

Apps GMAIL Studio C Email CalCERTS, Inc.

www.engineeringtoolbox.com says

dL - Sound Pressure Level Difference (dB): -16.9

Lp2 - Sound Pressure Level at Distance (dB) 49.1 Sound Level @ West Property Line

OK

yards
miles
naut miles

Convert!

Area

1.0

$m^2$
$km^2$
$in^2$
$ft^2$
$miles^2$
acres

Convert!

Volume

1.0

$m^3$
liters
$in^3$
$ft^3$
us gal

Convert!

Weight

1.0

| | |
|---|---|
| 160 | 92 |
| 320 | 86 |
| 640 | 78 |
| 1280 | 74 |
| 2560 | 68 |
| 5120 | 62 |

## Inverse Square Law Calculator

Use the calculator below to calculate the sound pressure level at distance.

66 $L_{p1}$ - sound pressure level at location 1 (dB) [Max Noise from AC unit]

1 $R_1$ - distance from source to location 1 (m, ft)

7 $L_{p1}$ - distance from source to location 2 (m, ft) [West Property Line]

Calculate!

## Example - Noise from a Machine

The noise from a machine in distance *1 m* is measured to *110 dB*. The noise reduction due to the inverse square law to a working area at distance *5 m* can be calculated as

$dL = 20 \log ((5\ m) / (1\ m))$

$= 14\ dB$

UdK Berlin
Sengpiel
11.98
Schall

# Decrease in level of sound pressure and sound intensity with distance

## 1. Sound pressure $p$ – a sound field quantity – preferred by 'sound engineers'

If a sound source radiates in a **direct field** (free field) uniformly in all directions, the sound pressure decreases inversely proportional to the distance $r$ from the sound source. The sound pressure $p = F / A$ is given as N/m² = Pascal (Pa). The sound pressure $p$ (pressure ) is force $F$ (force) through area $A$ (area). $p \sim 1 / r$

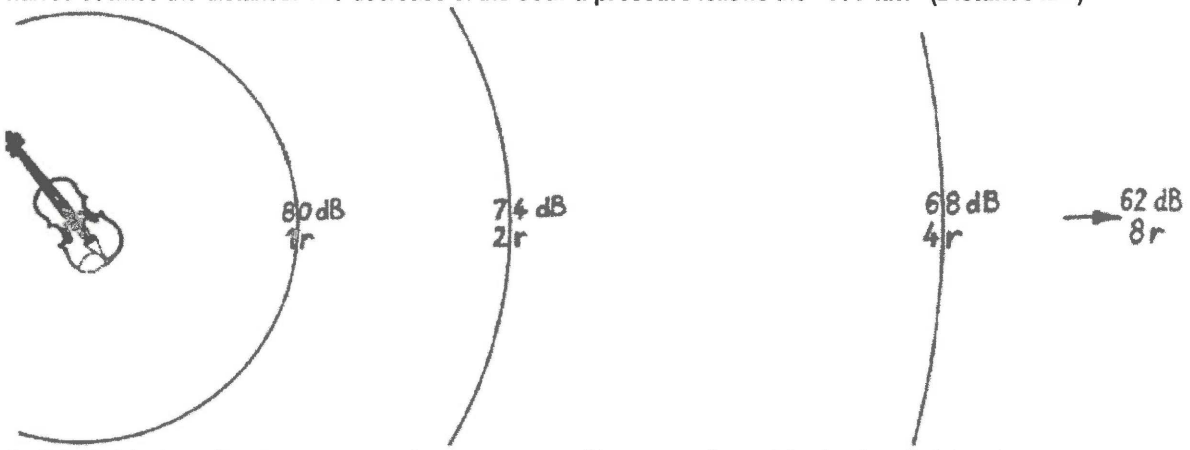
The attenuation of the **sound pressure** is following the **"1 / r law"**, the distance law. For example, the sound pressure $p$ is decreased to half the value, if the distance to the sound source is doubled.

The double distance 2 × $r$ changes the sound pressure level compared to 1 × $r$:

$$\Delta\ L_p = 20 \times \log 1 / 2 = 20 \times \log 0.5 = (-)\ 6\ \text{dB}$$

- **Distance law for sound pressure:** $p \sim 1 / r$ $\quad p_2 / p_1 = r_1 / r_2$

For an assumed point source applies: Sound pressure waves propagate linearly, when their sound pressure is halved at twice the distance. The decrease of the **sound pressure** follows the **"1 / r law" (Distance law).**




## 2. Sound intensity $I$ – a sound energy quantity – preferred by 'noise fighters'.

If a sound source radiates in a **direct field** (free field) uniformly in all directions, the surfaces zoom as expansion - designating spherical shells. A specific energy is distributed over the surface of each sphere socket and is spread continuously during stretch over an increasing area. The sound intensity $I = P_{ak} / A$ in W/m² decreases sharply with increasing distance $r$ from the source, and while it is inversely proportional to the surface of the sphere. For any point distant from the sound source, the sound intensity is given by:

$$I = P_{ac} / A \sim 1 / r^2 \qquad \text{Sphere area } A = 4\pi \times r^2$$

Here, the sound intensity $I$ is in W / m², which use acoustic power $P_{ac}$ in W and the distance $r$ in meters.

The attenuation of the **sound intensity** is following the **"1 / $r^2$ law"**. For example, the intensity decreases to a quarter when the distance is doubled.

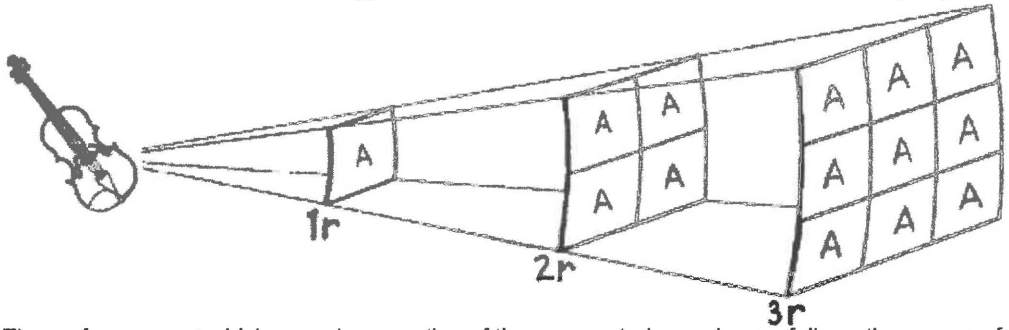
The double distance 2 × $r$ changes the sound intensity level compared to 1 × $r$:

$$\Delta L_I = 10 \times \log (1 / 2^2) = 10 \times \log (1 / 4) = 10 \times \log 0.25 = (-)\ 6\ \text{dB}$$

With the change in distance and the sound level decrease the dB values for the sound pressure level and sound intensity levels are equal. The sound pressure and the intensity ratios are not equal due to the square correlation.

Decrease of sound level: $\Delta L_p = \Delta L_I = 20 \times \log (r_1 / r_2) = 10 \times \log (r_1 / r_2)^2$ but $p_2 / p_1 \neq I_2 / I_1$.

- **Distance law for sound energy:** $I \sim 1 / r^2$ $\quad I_2 / I_1 = r_1^2 / r_2^2$ $\quad$ **Note:** $p_2 / p_1$ **not equal to** $I_2 / I_1$.




The surface area $A$ which occupies a portion of the propagated sound wave follows the square of the distance from the sound source. The decrease in **sound intensity** (energy) follows the **"1 / $r^2$ law" (Inverse square law).**

**Note:** The sound pressure and sound intensity can not be set equal. Actually, this should be obvious, but even in textbooks, the term intensity is frequently chosen wrong when sound pressure is meant.

Never use the term intensity when strength, amplitude or level is meant, such as in "The intensity of the sound pressure is 1 Pascal". **Sound pressure is a sound field quantity and intensity is a sound energy quantity.**

How does the sound depend on the distance to the sound source? http://www.sengpielaudio.com/calculator-SoundAndDistance.htm