

SPECIFICATIONS

FR090WA01/02 3½" alu cone fullrange, 4/8 ohm

The 3½" transducers FR090WA01 (4 ohm) and FR090WA02 (8 ohm) were designed especially for high quality multimedia and lifestyle speakers, where sound reproduction without compromises is required while still keeping size small.

FEATURES

- True full-range design with on-axis output to beyond 20kHz
- Copper cap on center pole to reduce voice coil inductance and to minimize variations in voice coil inductance as a function of voice coil position
- Black anodized alu cone for better heat transfer
- Vented steel chassis for lower air flow speed reducing audible distortion
- Vented voice coil former for reduced distortion and compression
- Heavy-duty black fiber glass voice coil bobbin to reduce mechanical losses resulting in better dynamic performance and low-level details
- Large motor with 22 mm voice coil diameter for better control and power handling
- Low-loss suspension (high Qm) for better reproduction of details and dynamics
- Black motor parts for better heat transfer to the surrounding air
- Conex spider for better durability under extreme conditions
- Gold plated terminals to ensure long-term trouble free connection
- Delivered with EVA gasket attached for hassle-free mounting and secure cabinet sealing



NOMINAL SPECIFICATIONS

Notes	Parameter	FR090WA01		FR090WA02		Unit
		Before burn-in	After burn-in	Before burn-in	After burn-in	
	Nominal size	3½		3½		[inch.]
	Nominal impedance	4		8		[ohm]
	Recommended max. upper frequency limit	full range		full range		[kHz]
1, 4	Sensitivity, 2.83V/1m (average SPL in range 400 - 6,000 Hz)	86.5		83.5		[dB]
2	Power handling, short term, IEC 268-5, no additional filtering					[W]
2	Power handling, long term, IEC 268-5, no additional filtering					[W]
2	Power handling, continuous, IEC 268-5, no additional filtering	10		10		[W]
	Effective radiating area, Sd	36		36		[cm ²]
3, 4, 6	Resonance frequency (free air, no baffle), F _s	113		114		[Hz]
	Moving mass, incl. air (free air, no baffle), M _{ms}	3.45		3.35		[g]
3	Force factor, B _{xl}	2.75		3.4		[N/A]
3, 4, 6	Suspension compliance, C _{ms}	0.58		0.62		[mm/N]
3, 4, 6	Equivalent air volume, V _{as}	1.07		1.14		[lit.]
3, 4, 6	Mechanical resistance, R _{ms}	0.41		0.40		[Ns/m]
3, 4, 6	Mechanical Q, Q _{ms}	6.0		5.9		[-]
3, 4, 6	Electrical Q, Q _{es}	1.03		1.0		[-]
3, 4, 6	Total Q, Q _{ts}	0.88		0.85		[-]
4	Voice coil resistance, R _{DC}	3.2		6.1		[ohm]
5	Voice coil inductance, L _e (measured at 10 kHz)	76		127		[μH]
	Voice coil inside diameter	22		22		[mm]
	Voice coil winding height	7.5		7.5		[mm]
	Air gap height	3		3		[mm]
	Theoretical linear motor stroke, X _{max}	±2.25		±2.25		[mm]
	Magnet weight (dual neodymium)	160		160		[g]
	Total unit net weight excl. packaging	0.40		0.40		[kg]
3, 4, 5	K _{rm}					[mohm]
3, 4, 5	E _{rm}					[-]
3, 4, 5	K _{xm}					[mH]
3, 4, 5	E _{xm}					[-]

Note 1 Measured in infinite baffle.

Note 2 Tested in free air (no cabinet).

Note 3 Measured using a semi-constant current source, nominal level 2 mA.

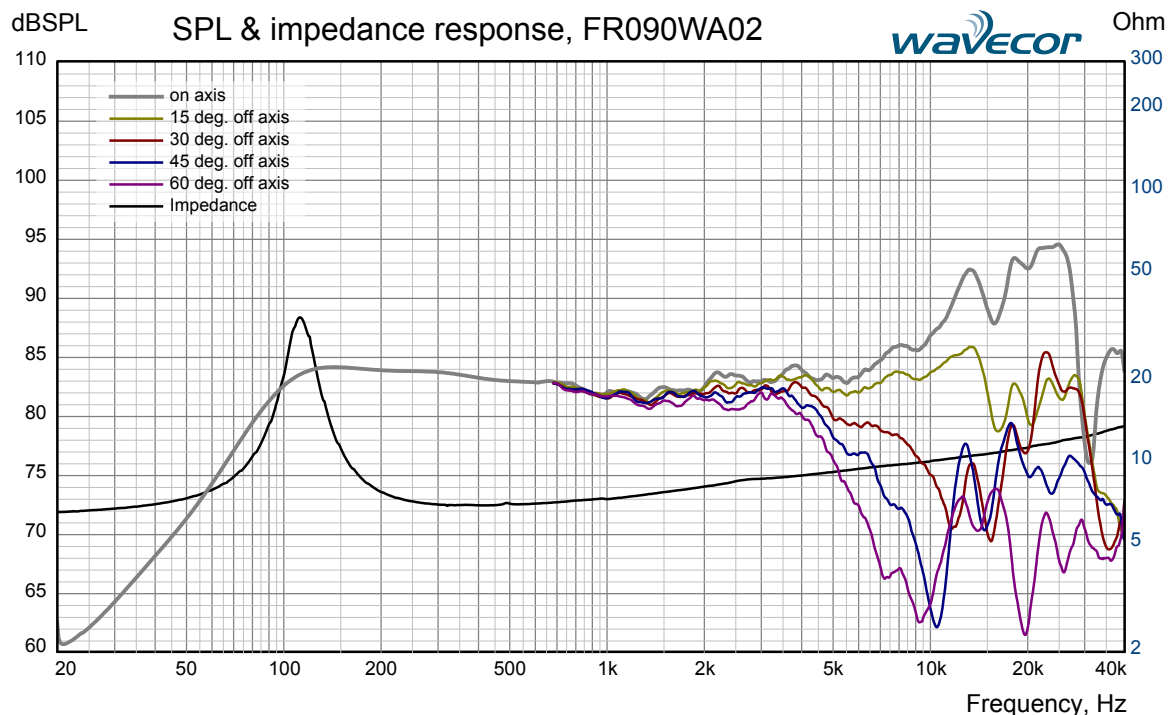
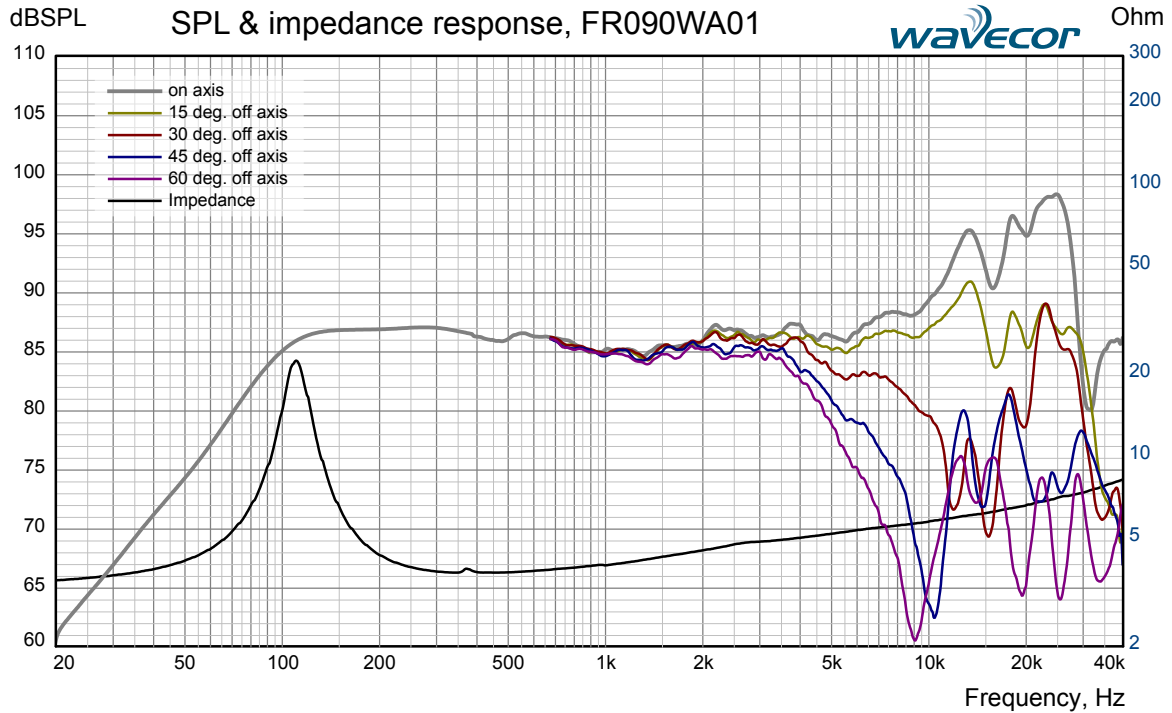
Note 4 Measured at 25 deg. C

Note 5 It is generally a rough simplification to assume that loudspeaker transducer voice coils exhibit the characteristics of an inductor. Instead it is a far more accurate approach to use the more advanced model often referred to as the "Wright empirical model", also used in LEAP-4 as the TSL model (www.linearx.com), involving parameters K_{rm}, E_{rm}, K_{xm}, and E_{xm}. This more accurate transducer model is described in a technical paper [here at our web site](#).

Note 6 After burn-in specifications are measured at least 12 hours after exiting the transducer by a 20 Hz sine wave for 2 hours at level 2.83/4.0 V_{RMS} (4/8 ohm version). Units are not burned in before shipping.

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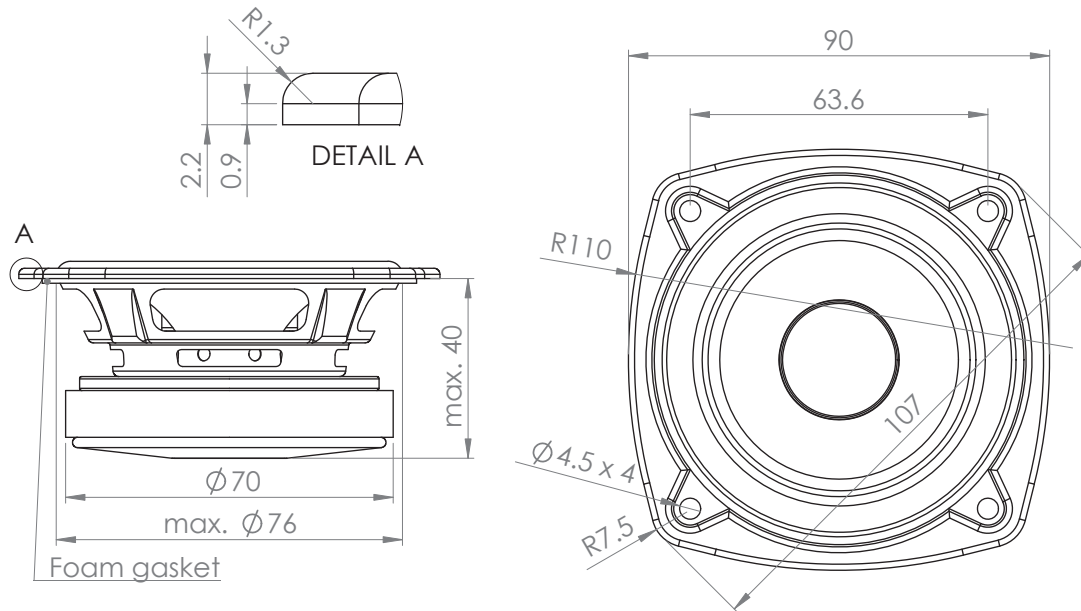
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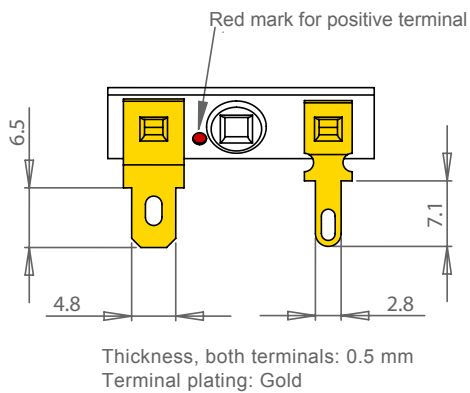
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OUTLINE DRAWING (nominal dimensions, mm)



CONNECTIONS (nominal dimensions, mm)



PACKAGING AND ORDERING INFORMATION

Part no. FR090WA01-01	4 ohm version, packaged individually (one piece per box)
Part no. FR090WA01-02	4 ohm version, bulk packaging
Part no. FR090WA02-01	8 ohm version, packaged individually (one piece per box)
Part no. FR090WA02-02	8 ohm version, bulk packaging

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