

Lowest Loss Signal Transfer Cable

YOU'VE NEVER HEARD IT SO GOOD!

With FORCELINES, cable technology takes a quantum leap towards the perfection of high level signal transfer.

This is attested to by the fact that leading artists, major recording studios, prominent concert halls and demanding domestic users the world over are replacing their loudspeaker cables with FORCELINES.

The Perfect Solution To High Precision Signal Transfer



Applications & tests the world over have confirmed that FORCELINES provide the best results.

For many of the speaker cables available today "magical" improvements in audio reproduction are claimed. The cables' features are often explained in nebulous and pseudo-scientific terms. No wonder they fail to live up to their manufacturer's promises! The fact is that signal transfer adheres to the laws of physics. The problem stems from the fact that most cable manufacturers' know-how – if there is such a thing – is limited to the design of the cable itself; they lack proper understanding

of electronic circuit design and the specific requirements of the many different output stages of amplifiers and the multitude of differing characteristics of speakers. Only with exact understanding of these – in conjunction with cable-specific design criteria – is the correct design achievable.

FORCELINES come closer to the theoretical ideal of perfect signal transfer than any other speaker cable available. The sound scientific reasons are confirmed by a wealth of proven results.

True Load Impedance

Speaker loads present complex impedances that require much higher currents and voltages from amplifiers than is generally believed. The nominal impedance rating of a speaker bears little resemblance to the real impedance seen by the power amplifier. Speaker impedances can easily vary by 500% over the audio range creating a complex load comprising capacitance, inductance and resistance that – and this is where the high current and voltage capability are really required – continuously changes with the music signal, the frequencies, level etc. Over the frequency range some speakers rated at 'nominal 8 Ohms' present the amplifier

with an apparent load impedance that resembles anywhere from below 2 Ohms to above 16 Ohms while others even vary from below 1 to over 60 Ohms all of this frequency dependent. Nominal speaker impedance ratings, therefore, have no practical use as they do not resemble the real loads.

Because of these demands, the limitations of the usual speaker cables result in massive losses in signal transfer, especially with high quality amplifiers. These losses are clearly audible.

Furthermore, reproduction accuracy is lost because most cables dramatically lower the electrical damping the amplifier is providing for the speakers. Optimal control of the speaker diaphragms requires the highest damping - not just at the amplifier's output terminals - but right at the speakers. It is quite obvious that the cable connecting the speaker to the amplifier has a striking influence on the effective damping of the diaphragms and consequently on total performance.

Speaker cables must be able to transfer the tremendously varying currents and voltages of complex audio signals while at the same time assuring absolute signal and phase coherence. In quality systems every single mOhm (= 1/1000 of an Ohm) of lower resistance to signal transfer improves performance.

Cable Capacitance And Inductance

Speakers vary in their sensitivity to capacitance and inductance changes, and so do amplifiers. A characteristic unique to FORCELINES is that their capacitance and inductance is tuneable by the user (other cables have fixed capacitance and inductance). Thanks to their construction as separate individual conductors, the physical placement (and therefore the performance) of FORCELINES can be optimized for each system. Some amplifier/speaker combinations may work well when the cables are lightly twisted, while in other applications separating the two conductors will provide better results. It is also possible to keep the two lines separated at a fixed distance with the special spacers that are enclosed with every FORCELINES package. They allow fine tuning each system for optimal performance. Thanks to this, FORCELINES guarantee ultimate signal transfer with practically any amplifier/speaker combination. A few speaker designers opted to allow a peaky response that requires the user to invest in an - often expensive - cable having filter networks to achieve a half acceptable reproduction. FORCELINES are designed to be free of filtering effects and will faithfully reproduce these speaker anomalies.

Material

In the manufacture of FORCELINES no cost is spared. Special precision tools and high-resolution copper drawing techniques (100x slower than usual) combined with highest-purity conductor material result in the lowest-loss signal transfer available. With their massive outside diameter other cables may look impressive but their size is simply achieved by using large amounts of cheap fibres and fillers. However, it is the conducting material that must be massive (fibers and plastic fillers obviously do not conduct signals). A good indicator for the amount of conducting material used is the weight of a cable as good conductors are heavy (one can find quite a few 'garden-hose' sized cables that can be lifted with two fingers indicating very little actual conducting material).

It is more than simply the use of massive amounts of enhanced copper which makes FORCELINES unique. Special measures are taken to optimize the individual strands for precision signal transfer. With use of proprietary technology, signal reflection - a problem with many cables - is rendered practically non-existent. The result is completely linear, time- and phase-coherent signal transfer.

Connectors

The widely used standard five-way binding posts and 4mm 'banana plug' connectors are not really satisfactory for accurate transfer of dynamic high level signals. To complement the unique characteristics of FORCELINES, proprietary connectors that assure ultimate signal transfer have been developed. These unique FORCEPLUG 200 and FORCELUG 25 connectors have a special MIL spec. coating and feature a current handling capability of no less than 1800Apeak.

FORCEPLUG 200 precision connectors are carefully terminated to FORCELINES. These proprietary connectors perfectly accommodate the enormous conductor cross-section of FORCELINES.

Specially coated contact areas guarantee a contact resistance of less than 0.00008 Ohms - that is 80 millionth of one Ohm (!), much better than any other audio connector. It is obvious why the resulting performance is unequalled.

FORCEPLUG 200 connectors use multiple, large-surface area, controlled inertia contact springs. They are used exclusively with FM ACOUSTICS precision amplifiers and guarantee ultra low loss contact of a singular standard.

FORCELUG 25 are precision, high-power spade terminals and employ the same

proprietary MIL spec. coating as the FORCEPLUG 200. They are used for lowest-loss connection of FORCELINES to the usual speaker terminals.

Results

FM ACOUSTICS' singular concept of solving the entire interface between amplifiers and speakers results in a pristine signal transfer assuring unrivalled system performance.

FORCELINES are not system dependent and will bring improvements in any reasonable system

Types Of Forcelines

There are now two types of FORCELINES. Both are based on identical design criteria, technology and manufacturing. They yield similar performance characteristics. Correct selection depends on the system components and the length of interconnection.

FORCELINES 5 contain a purified copper conductor cross-section that corresponds to AWG 5 (16.5 mm²). They are recommended for mid- and large-sized speakers of any impedance. They guarantee ultimate signal transfer of quality speaker systems even if they have a low impedance.

FORCELINES 3 have an immense purified copper conductor cross-section that corresponds to AWG 3 (25.6 mm²). They provide the absolutely highest precision signal transfer and are for use with the most demanding speakers of low impedance including speaker with multiple paralleled drivers.

(FORCELINES 7 are no longer made)

Specifications

Type	Precision lowest-loss wideband signal transfer cables
Identification	Connectors colour coded. Specially drawn, linearized & coated corrosion-proof,
Conductors	high-purity copper, Tuneable
Inductance	Tuneable
Capacitance	Highly flexible, high-temperature and flame retardant
Insulation	1.5m / 3m / 5m; other lengths on special order
Lengths	FORCEPLUG 200, FORCELUG 25
Connectors	-250C to +800C operating
Temperature	Special cable spacers included



Accessories
Packing

Foam lined reusable protective case



	FORCELINES 5	FORCELINES 3
Resistance to signal transfer	1.0 Ohm/km	0.66 Ohm/km
Wire size	AWG 5 (16.5 mm ²)	AWG 3 (25.6 mm ²)
Current rating	200 A RMS, 1200 A peak	320 A RMS, 1800 A peak
Voltage rating	500 V RMS	500 V RMS
Outer diameter	~10 mm	~11 mm

Ordering Information

FORCELINES 5 (AWG 5, 16.5 mm², Resistance 1 Ohm per km)

Order No	Connectors	Cable Length	Set includes	Required for Stereo System
				
CA 24610	Forcelug 25 - Forcelug 25	1.5m	2 Pairs	1 Set
CA 24611	Forcelug 25 - Forcelug 25	3.0m	2 Pairs	1 Set
CA 24612	Forcelug 25 - Forcelug 25	5.0m	1 Pair	2 Sets
				
CA 24620	Forceplug 200 - Forcelug 25	1.5m	2 Pairs	1 Set
CA 24621	Forceplug 200 - Forcelug 25	3.0m	2 Pairs	1 Set
CA 24622	Forceplug 200 - Forcelug 25	5.0m	1 Pair	2 Sets

FORCELINES 3 (AWG 3, 25.6 mm², Resistance 0.66 Ohm per km)

Order No	Connectors	Cable Length	Set includes	Required for Stereo System
				
CA 24710	Forcelug 25 - Forcelug 25	1.5m	2 Pairs	1 Set
CA 24711	Forcelug 25 - Forcelug 25	3.0m	2 Pairs	1 Set
CA 24712	Forcelug 25 - Forcelug 25	5.0m	1 Pair	2 Sets
				
CA 24720	Forceplug 200 - Forcelug 25	1.5m	2 Pairs	1 Set
CA 24721	Forceplug 200 - Forcelug 25	3.0m	2 Pairs	1 Set
CA 24722	Forceplug 200 - Forcelug 25	5.0m	1 Pair	2 Sets

Any other length can be made to order.

FORCELINES. YOU'VE NEVER HEARD IT SO GOOD.