

WHITEPAPER

ÖLFLEX® CONNECT SERVO

SERVO SYSTEMS MADE BY LAPP

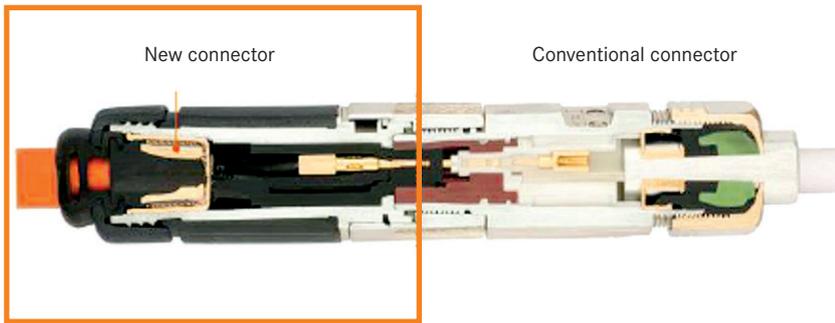




ÖLFLEX® CONNECT SERVO SERVO SYSTEMS MADE BY LAPP

What do you need to focus on when choosing a servo assembly? On high quality, of course. You should also make sure the cable's properties are a good fit for the application. So different variants are required – many of which can be found in the ÖLFLEX® CONNECT SERVO range.

Manufacturers of servo systems love to hype up their products. They refer to various kinds of 'market solution', provide 'guarantees for the system' or promise that your servo controller, motors and preassembled cables are 'designed or optimised to work together'. If you look closer, weaknesses are revealed – especially in the cabling. Servo system suppliers will usually only offer a couple of assemblies: one solution for static and another for dynamic use. There are, however, pitfalls to the latter. The cable recommended for dynamic applications is then used for all applications involving motion. Whether the acceleration or speed is high or low will not be taken into consideration. This can range from 0.1 m/s (woodworking or handling goods) to 10 m/s (pick-and-place machines or wire bonding processes).



In **ÖLFLEX® CONNECT** SERVO Servo Systems made by Lapp, the cable’s shielding is crimped between two metallic shells. The shells cover the entire housing, thus guaranteeing 360° EMC screening.

This is not ideal. On the one hand, a cable may not be able to cope with a specific application. For instance, if it needs to keep up with high travelling distances and millions of accelerations. Or it may be overdesigned – a lower-cost alternative may be able to do the same thing. For these reasons, LAPP provides numerous variants tailored specifically to the application. They stand the test of time and are not overdesigned or costly. LAPP is also the only company to make preassembled servo cables with a connector with 360° shielding and excellent electromagnetic compatibility.

These harnessings from the **ÖLFLEX® CONNECT** SERVO portfolio are globally available with very short lead times – an important bonus for the customer. To achieve this, LAPP has expanded its production network to the USA and Asia. LAPP also has a presence in many countries and works with experts with knowledge of the products and applications – so they can advise customers on tricky problems. In so doing, the user can be sure that they always get the optimum and best-value solution.



INFO

VIDEO

Product animation: **ÖLFLEX® CONNECT** system solutions – we provide the perfect cabling solution anywhere in the world, for every need.



youtu.be/uIBWMcQhbnY?t=124

SERVO CONFIGURATOR

Simply select the application and cable length to find the right servo assembly in seconds.



www.lappgroup.com/servoconfigurator

SELECTION CRITERIA FOR SERVO ASSEMBLIES

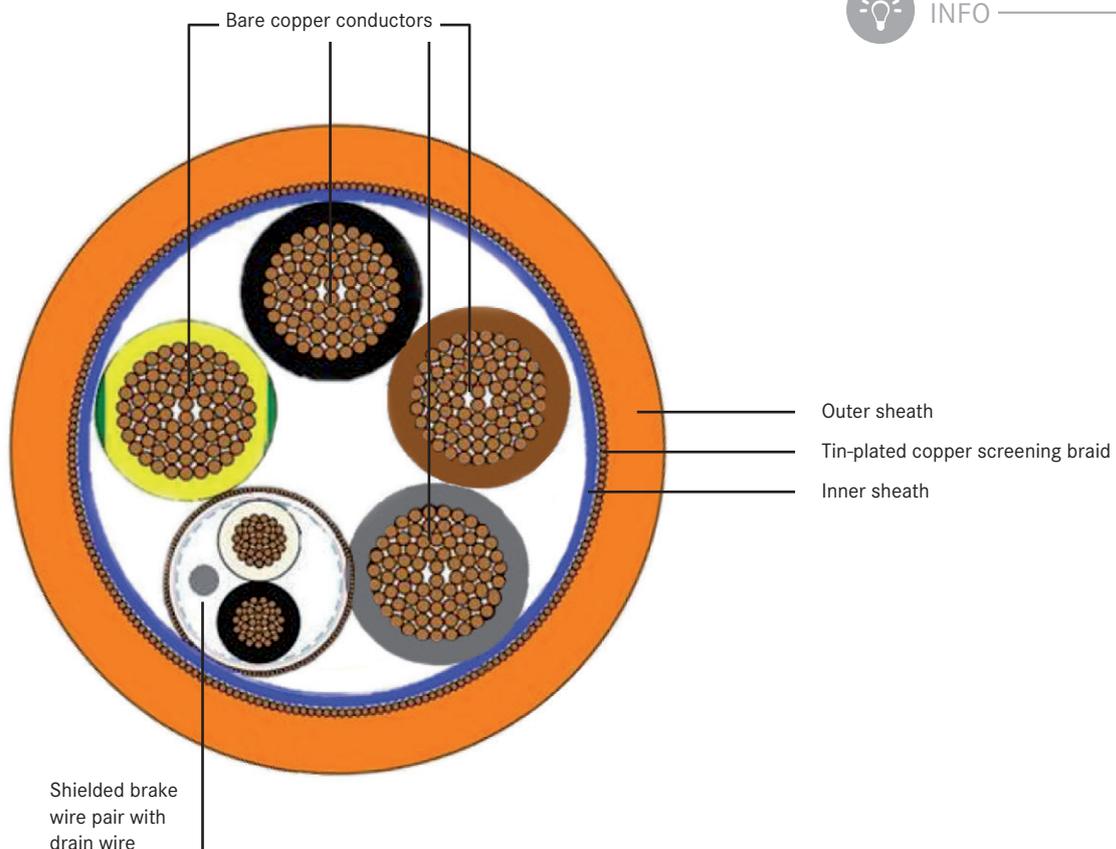
Two factors determine the mechanical suitability of preassembled cables: firstly, their ability to withstand motion; secondly, the material on the outer sheath of the cable and the conductor design. The cable also needs to have certain electrical properties, especially where electromagnetic compatibility is concerned.

– Outer sheath material

PVC is the standard material for cable insulation in static applications. It is low-cost and also able to insulate the conductor. However, PVC is not suitable for highly dynamic applications with high speeds and accelerations – PUR is the preferred material here. It is very hard-wearing and abrasion-proof. This is important as PUR cables often come into contact with other, sometimes harder, materials such as TPE or polyamide that are used together in energy chains. Costs also play a part in making choices. Depending on the number of cores, one single PUR cable can cost up to three times more than a PVC cable. This is overkill when it comes to slow motion with less stress – a PVC cable is perfectly adequate here.



INFO



– Conductor design

The conductor design is vital in determining whether a cable can withstand constant bending. The type of motion (bending or torsion) and the conductor design (twisting, fineness of the wire) have an impact on the number of bending cycles that the cable can withstand.

– Electrical properties

As the revs of new servo actuators increase, so too does the risk of electromagnetic interferences, which can penetrate the servo cable externally or spread to other electrical systems from this cable. The preassembled cables must take this into account, namely with the thickest possible screening braid that is correctly earthed and, above all, a full 360° connection to the connector housings at both ends of the assembly. In addition to the cable, the connector must be carefully selected so that the entire system is guaranteed the best possible EMC protection.



LINKS

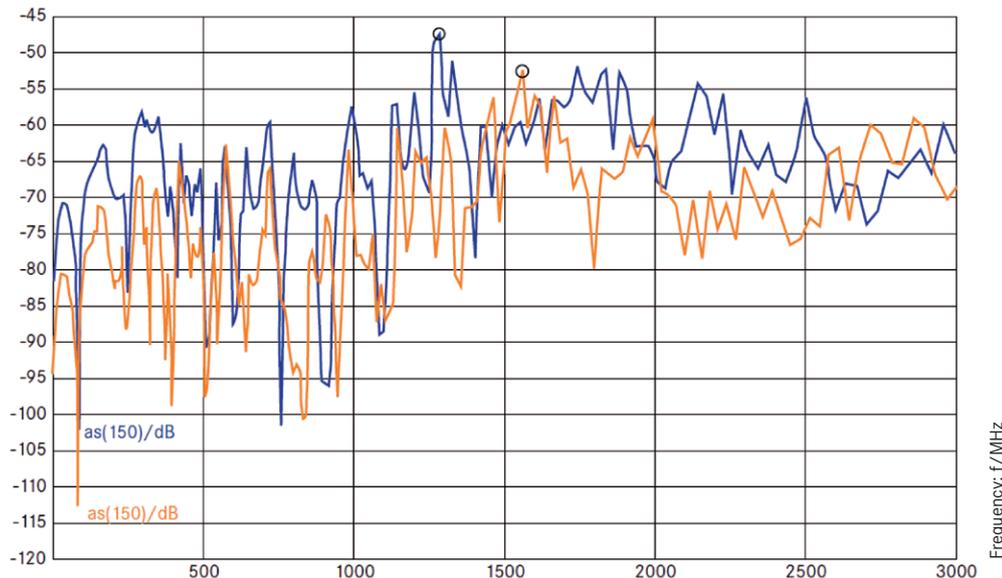


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EMC shielding

Screen attenuation (62153-4-4 Ed. 2 draft PSL 4353 C 4 x 2.5 mm² finish. 45/12 m.

100.0 kHz – 3.0 GHz measured length: 0.75 m



Measurements verify the outstanding effect of the shielding in the 360° shielded connection by LAPP. On the logarithmic scale (higher negative values mean better screening), the difference is 6 dB – the equivalent of four-times better screening.



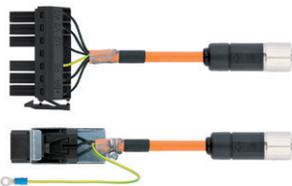
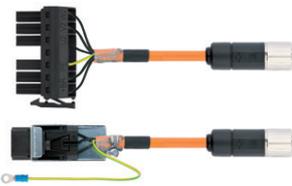
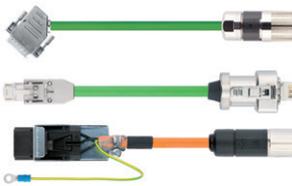
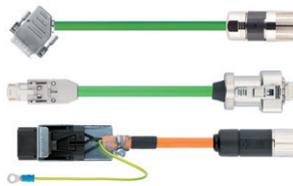
KEY

- Screening in conventional product -47 dB
- Screening in **ÖLFLEX® CONNECT** SERVO Core Line -53 dB

ÖLFLEX® CONNECT SERVO BY LAPP

The **ÖLFLEX® CONNECT SERVO** Core Line, available with a PVC or PUR sheath, is the main product range in LAPP’s portfolio for servoharnessing. These cables have an inner sheath and support applications with a travel length of up to 100 metres and accelerations of up to 50 m/s² with ten million cycles. With a brake wire with a 1.5 mm² cross-section, the Core Line is suitable for cable lengths of up to 100 metres as, in such cases, it can result in a very high voltage drop at the brake end during operation. Longer distances are also possible without this brake cable.

The prominent feature of the Core Line is the semi-automated assembly, a LAPP invention that ensures optimum quality, especially in the shielding. A mechanism removes the sheathing from the cable and opens up the shielding so that there is full, all-round contact with the connector. The 360° shielding improves the effect of the electromagnetic shielding by 400% (or 6dB) compared with conventional solutions and reduces the risk of electromagnetic interference affecting the electronics.

LAPP Core Line cables		Other product ranges by LAPP	
<p>ÖLFLEX® CONNECT SERVO Core Line in accordance with SIEMENS® 6FX5002 (PUR)</p> 	<p>ÖLFLEX® CONNECT SERVO Core Line for SIEMENS® 6FX-8002 (PUR)</p> 	<p>ÖLFLEX® CONNECT SERVO Basic Line in accordance with SIEMENS® 6FX5002 (PVC)</p> 	<p>ÖLFLEX® CONNECT SERVO Extended Line for SIEMENS® 6FX8002 (PUR)</p> 
<p>Ideal for applications with low stress in cable chains or slow-moving applications, i.e. in woodworking, slow assembly chains or packaging.</p>	<p>The halogen-free PUR sheath makes this variant perfect for fast motion in production lines. It is suitable for 80% of all applications here.</p>	<p>The cable in accordance with SIEMENS® 6FX5002 is the low-cost choice for fixed installation. It is also available with and without the 1.5 mm² brake wire.</p>	<p>This cable for the SIEMENS® standard offers the same top qualities as the Core Line. It is also suitable for highly dynamic applications and has 360° shielding for the best EMC properties. The outer diameter of the cable is slightly thinner, enabling smaller bending radii, which is beneficial when space is limited.</p>
<p>All variants in the Core Line range are also available for Lenze®, SEW® and Rockwell® standards.</p>			

All **ÖLFLEX® CONNECT** servo assemblies with circular connector size 1 are fitted with our newly designed V4.0 connector. It is tamper-proof and cannot be opened by unauthorised persons. It is insulated with plastic coating, suitable for a temperature range of -20 to 90°C and waterproof and dustproof in accordance with the IP67 rating.

PRODUCT RANGE TABLE

The following table shows a comparison of the **ÖLFLEX® CONNECT** SERVO Core Line in accordance with SIEMENS® 6FX5002 (PVC) with the product by the servo manufacturer

	6FX5002		
	Core Line PVC	Basic Line	SIEMENS®
Performance			
Number of cycles	5 million cycles	2 million cycles	100,000 bends
Traverse speed	Up to 3 m/s	Up to 5 m/s	Up to 0.5 m/s
Travel length	Up to 10 m	Up to 10 m	Up to 5 m
Acceleration	Up to 3 m/s ²	Up to 2 m/s ²	Up to 2 m/s ²
Fixed bending radius (min)	4 x outer diameter	6 x outer diameter	5 x outer diameter
Assembly			
Tamper-proof connector	Yes	Yes	No
Improved EMC screening	Yes	Yes	No
Improved quality through semi-automated assembly	Yes	No	No
IP67	Yes	Yes	Yes
Temperature range	-40 to 80 °C (fixed)	-20 to 80 °C (fixed)	-20 to 80 °C (fixed)
Complete components (Controller & drive connector, cable)	Yes	Yes	Yes



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ÖLFLEX® CONNECT
System solutions
made by LAPP

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PRODUCT RANGE TABLE

The following table shows a comparison of the **ÖLFLEX® CONNECT SERVO** Core Line for SIEMENS® 6FX8002 (PUR) with other products.

6FX8002			
	Core Line PUR	Extended Line	SIEMENS®
Performance			
Number of cycles	10 million cycles	10 million cycles	10 million cycles
Traverse speed	Up to 5 m/s	Up to 5 m/s	Up to 5 m/s
Travel length	Up to 100 m	Up to 100 m	Up to 50 m
Acceleration	Up to 50 m/s ²	Up to 50 m/s ²	Up to 50 m/s ²
Flexible bending radius (min)	7.5 x outer diameter	7.5 x outer diameter	7.5 x outer diameter
Assembly			
Tamper-proof connector	Yes	Yes	No
Improved EMC screening	Yes	Yes	No
Improved quality through semi-automated assembly	Yes	No	No
IP67	Yes	Yes	Yes
Temperature range	-20 to 90 °C (Continuous bending)	-20 to 90 °C (Continuous bending)	-20 to 90 °C (Continuous bending)
Complete components (Controller & drive connector, cable)	Yes	Yes	Yes

Information

Unless specified otherwise, all details are nominal values at room temperature. You can receive further information, such as tolerances, upon request if they are available and have been released for publication. SIEMENS® article designations (6FX5002/8002) are registered trademarks of SIEMENS® AG and are listed for comparison purposes only. Photographs and graphics are not to scale and not accurate in every detail of the respective products.

Disclaimer

This whitepaper has been compiled for distribution for information purposes only. LAPP has tried to include as much information on developments in the industry as possible. However, the company's only obligations are set out solely in the standard terms of sale for this product. We reserve the right to amend the information. The aforementioned values, factors and bending cycles are guidelines and act as a non-binding benchmark for assessing the expected lifespan. The values stated for the travel lengths, accelerations and speeds are always to be understood as maximum values that cannot be exploited to their full extent in one and the same application. We reserve the right to adjust and amend the aforementioned values.



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