

ÖLFLEX® CONNECT CHAIN

Cable Chain Systems made by Lapp



ÖLFLEX® CONNECT

Reliably connecting the world.

The days in which the manufacturing and service sectors could be clearly separated are well and truly over. A change is taking place in people's minds, in factories and in businesses like the Lapp Group. Customers are searching for solutions rather than components, and manufacturers are now developing and providing complex systems.

Our ÖLFLEX® CONNECT range shows what can happen when components and solutions are seen as a single entity rather than treated separately.

Legend

Cable chain engineering guideline

This flap supports you with easier page navigation. The 8 steps refer to cable chain selection from page 25 onwards.

- 1 Input data to determine the type of cable chain**
 Collect all necessary application requirements: cable and hose specifications (weight, outer diameter, jacket material, bend radius), chain travel distance, available space, bracket fixing configuration, etc.
- 2 Cable chain layout design**
 Determine required inner cable chain space while applying all basic rules and check with available application space
- 3 Selection of cable chain type**
 Select a cable chain which fits to requirements using a product selection table
- 4 Bend radius**
 Calculate suitable bending radius in accordance with parameters of all flexible cables and hoses
- 5 Cable chain length calculation**
 Calculate appropriate cable chain length in accordance with given travel distance
- 6 Self-supporting capacity calculation**
 Determine self-supporting capacity with respect to an additional load
- 7 Double-check of selected cable chain type**
 Choose cable chain that fits to determined requirements
- 8 Selection of accessories**
 Specify additional components such as end brackets, separators and channels in accordance with selected chain type







Industries

- | | |
|--|---|
|  Automation |  Assembly time |
|  e-Mobility |  Low weight |
|  Food & beverage |  Oil-resistant |
|  Mechanical and plant engineering |  Optimum strain relief |
|  Oil & gas |  Space requirement |
|  Rail |  Power chain |
|  Solar energy |  Clean room |
|  Wind energy |  Robust |

Product Characteristics

- | | |
|--|--|
|  Suitable for outdoor use |  Reliability |
|  Chemical resistance |  Integrated SKINTOP® cable gland |
|  Flame-retardant |  Voltage |
|  Wide clamping range |  Connector with standard housing unit |
|  Halogen-free |  Interference signals |
|  Heat-resistant |  Temperature-resistant |
|  Cold-resistant |  Torsion-resistant |
|  Corrosion-resistant |  Torsion load |
|  Maximum vibration protection |  UV-resistant |
|  Mechanical resistance |  Waterproof |
| |  Variety of approval certifications |

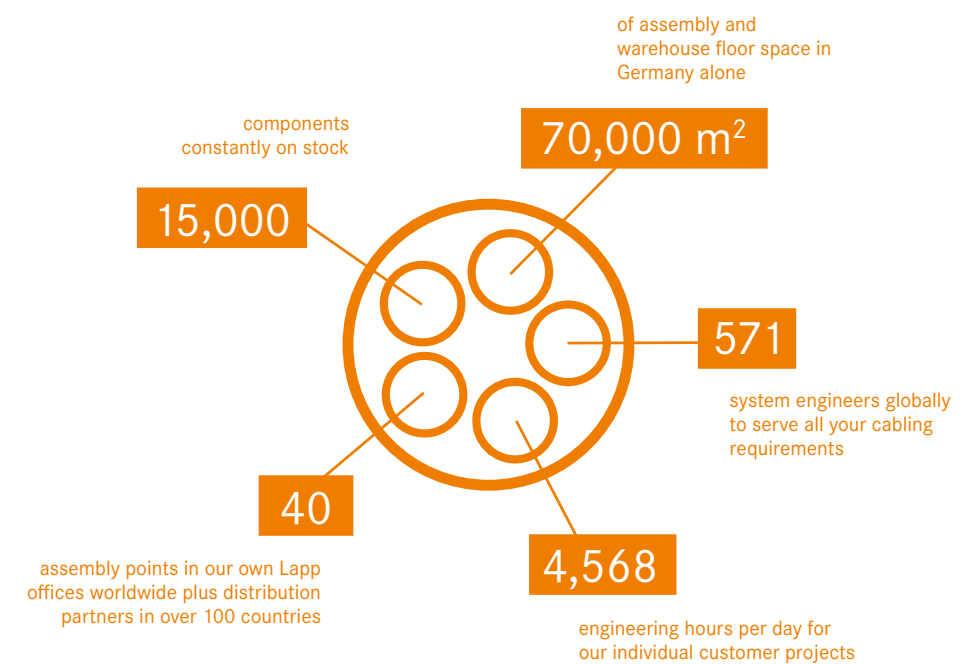
Table of Contents

	Company information	1
	ÖLFLEX® CONNECT	4
	Engineering guide	14
	SILVYN® cable carrier systems	52
	Highly flexible components	258
	Technical table	366



Andreas Lapp,
Matthias Lapp,
Ursula Ida Lapp,
Alexander Lapp,
Siegbert Lapp.

Please note: the purpose of the icons is to provide you with a quick overview and a rough indication of the product features to which the corresponding information relates. You can find details of product characteristics in the “technical data” sections on the product pages.





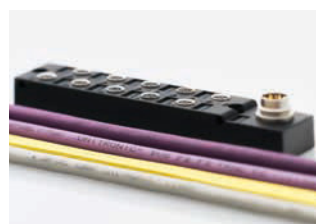
When eight high-quality brands become one strong solution: **ÖLFLEX® CONNECT**.

Products

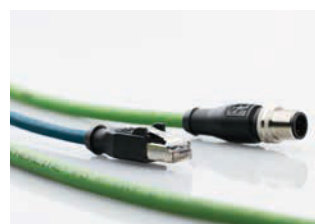
With over 40,000 branded components and thousands of products in stock, we are able to support you with individual cabling solutions and optimum development expertise.



ÖLFLEX®
Power and control cables



UNITRONIC®
Data communication systems



ETHERLINE®
Data communication systems for ETHERNET technology



HITRONIC®
Optic transmission systems



EPIC®
Industrial connectors



SKINTOP®
Cable glands



SILVYN®
Protective cable conduit systems and cable carrier systems



FLEXIMARK®
Marking systems

Solutions

Everything is possible – from customised cable assemblies to industry standard servo connections right through to sophisticated high-speed cable chain systems. Do it all with

ÖLFLEX® CONNECT – System Solutions made by Lapp.

With our three distinct harnessing services, we customize solutions, covering all your connectivity needs:

ÖLFLEX® CONNECT: This is the name under which Lapp is expanding its range of cable assemblies, taking the logical step from a component supplier to a system provider. The focus is on expanding what we do best. At Lapp, this means cables, connectors and accessories, as well as the resulting complete system solution.

But why are we repositioning ourselves like this? When technologies become more complex, solutions for customers have to be simpler. But this requires more than just the components. It requires joined-up thinking, collaborative development and cooperation. This means offering solutions that complement the customer's needs, including the processes.

INFOBOX

ÖLFLEX® CONNECT

Expanding cable assembly, giving better advice to customers and standardising global activities – these are the ideas behind **ÖLFLEX® CONNECT**. To this end, the Lapp Group is building up its engineering, production and assembly capacities in America, Europe and Asia. We have invested in many sites all over the world and will continue investing to strengthen the service we provide to our customers.

ÖLFLEX® CONNECT CABLES

Cable Systems made by Lapp



ÖLFLEX® CONNECT SERVO

Servo Systems made by Lapp



ÖLFLEX® CONNECT CHAIN

Chain Systems made by Lapp



Start thinking smart today

Our idea of a system

Start focusing your resources on your core project and let Lapp handle your connectivity needs for maximum profitability.

We accompany you on the search for sophisticated, tailored and cost-efficient connectivity solutions. With **ÖLFLEX® CONNECT**, we provide you with an extensive selection of custom cable or industry standard servo assemblies right through to complex drag chain applications. From engineering and design to customer specific testing, delivery or on-site installation to small batch sizes or series production - we do it all.

ÖLFLEX® CONNECT – your benefits

- 1 No capital expenditure**
Avoid investing in your own production facilities – leverage our state-of-the-art equipment and tools
- 2 Less operating expenditure**
Benefit from a simplified supplier base and reduced operating expenditure – get all your cable connectivity solutions from a single source: Lapp
- 3 Reduced Inventory**
No stocks of connectors, cables, conduits and hoses. No component scrap or cutting waste
- 4 Highest scalability**
With Lapp you can immediately respond to changes in market demand. There is no need to worry about component inventories, machines or worker capacities. Just order what you need
- 5 Technical expertise**
Make use of our cabling technology expertise and get uncompromising quality branded products for maximum reliability and safety

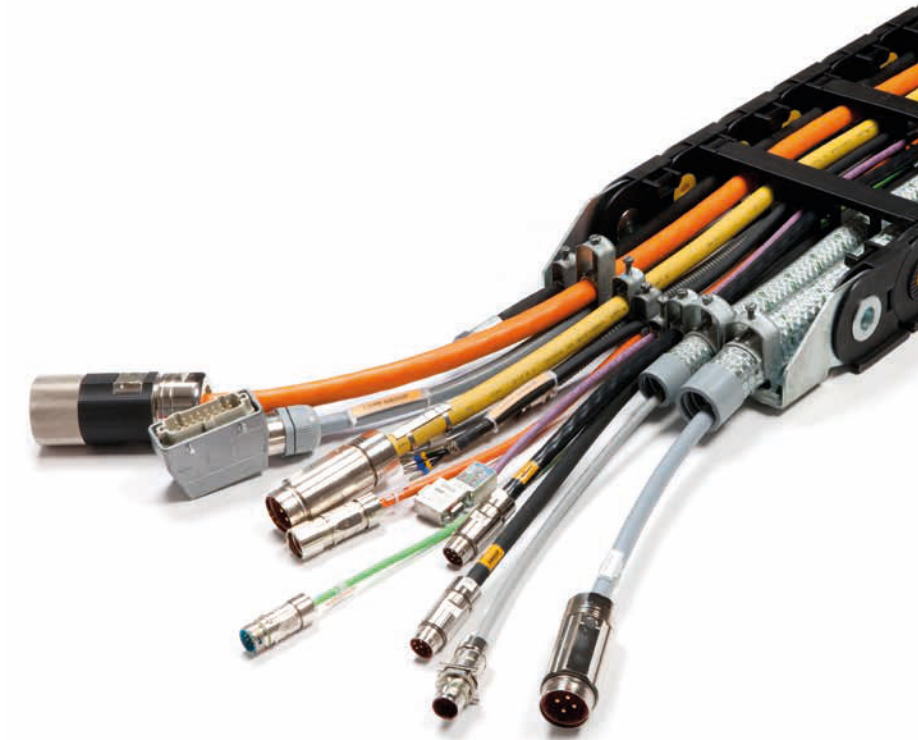
ÖLFLEX® CONNECT CHAIN

Chain systems made by Lapp

Our idea of a cable chain system includes chains made of nylon or steel with highly flexible cables, cable protection conduits, hydraulic hoses or pneumatic hoses **including termination (connectors, fittings) and functional units** such as towing arms or supporting structures.

Your benefits with our cable chain systems:

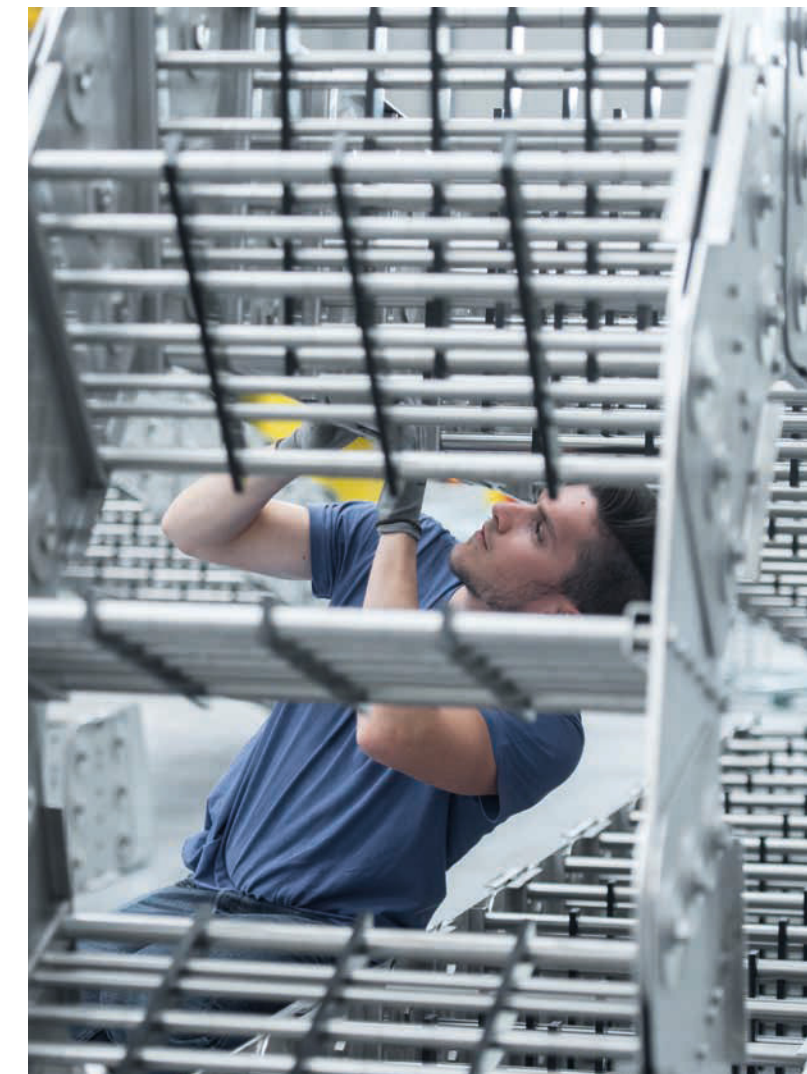
- **Reliable cutting-edge technology**
High-quality components, assembled to deliver minimum maintenance and maximum service life
- **Guaranteed brand quality**
Our cable chain systems are rigorously tested to guarantee hassle-free operation
- **Closer to you**
With multiple manufacturing sites in Europe, Asia and the Americas, we can support your cable chain assembly needs wherever you are
- **Competent system supplier**
With Lapp, you receive everything from one source, from individual cable chain assemblies to a whole integrated system



Our cable chain service

Lapp is there throughout all project phases - from design to component selection to assembly. Our experts work with you every step of the way:

- 1 Technical evaluation**
 - On-the-spot meeting
 - Definition of project scope
 - One contact person during project phase
 - Planning and timing
 - 2 Initial CAD design of the cable chain system**
 - Incl. cable layout
 - 3 Complete project management**
 - Documentation
 - Drawings
 - Selection of components (BOM)
 - Cost and interface controlling
 - 4 Completion of chain system design**
 - Delivery to operation site
 - On-site installation service by Lapp specialists
 - Shipping in professional Lapp packaging
 - After-Sales-Services
- i** Comprehensive test reports and individual installation instructions can be provided upon request.



Configuration options

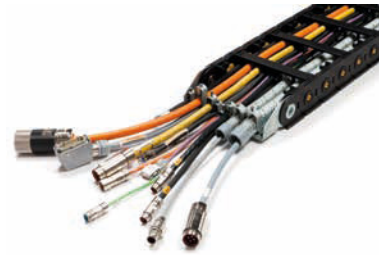
What can be included in a cable chain system:

- Nylon or steel cable chains in accordance with application requirements
- Highly flexible power, control, signal and data network cables including accessories (cable lugs, connectors, etc.)
- Protective cable conduits with conduit glands
- Hydraulic hoses with fittings
- Pneumatic hoses
- Towing arms or other functional units
- CAD drawing of your chain including cable layout (optimal placement and separation of all energy lines in a chain)

Possible cable chain types

Nylon cable chains

- Cable chains made from nylon (polyamide PA 6) cable chains for self-supporting, sliding or circular motion applications
- Open or fully closed design available



Steel cable chains

- Cable chains made of steel (galvanised steel or stainless steel) for standard self-supporting, sliding applications or applications with circular motion
- Open or fully closed design available



Combined cable chains

- Steel (galvanized or stainless) cable chains for standard self-supporting, sliding or circular motion application
- Open or fully closed design available



ÖLFLEX® CONNECT CABLES

Cable Systems made by Lapp

We produce different cable types for fast cabling of CNC machinery, switch boxes, control cabinets and electrical assemblies. Our product range stretches from single cores and multi-core cables through to EMC-shielded cables which can be fitted with a wide selection of crimp contacts, connectors and housings. We also supply highly flexible and durable premium quality spiral cables. Another of our specialities: glass fibre system solutions, which we stock in standard lengths or produce, test and supply in exactly the length you require.

Our range of assembly services

- Cable cutting as required
- Winding with specified bending radius
- Stripping
- Crimping
- Heat shrinking
- Markings (labels, sleeves, marking rings, stainless steel marking)
- Cable printing
- Crimp force monitoring (CFM)
- Push-pull tests
- Resistance testing

ÖLFLEX® CONNECT SERVO

Servo Systems made by Lapp

With our smart servo solutions you get cables in 3 classes: Basic Line, Core Line and Extended Line.

basic line

core line

extended line

All cables are fitted with our newly designed connector. This connector is tamper-proof, as it is pressed rather than screwed like conventional connectors. The 360° screen contact makes a huge improvement to EMC shielding (6db).

In addition, the cable design in our Core Line enables a semi-automated production process. This ensures higher process reliability and a globally regulated quality standard accordingly.

Your benefits at a glance

- Improved EMC shielding (6db) through new connector design (size 1, SIEMENS®)
- Improved quality through semi-automated assembly process
- Tamper proof (connector cannot be opened)
- Complete Lapp solution incl. new controller connector





Green manufacturing

In accordance with Lapp's ambitious environmental goals, all chains are 100% recyclable at the end of their lifecycle. Some of our new chains in addition allow a 50% (or more) reduction in the pushing-pulling force. This means lower absorption of energy for moving our chains, which saves energy costs and helps the environment.

Premium quality spiral cables

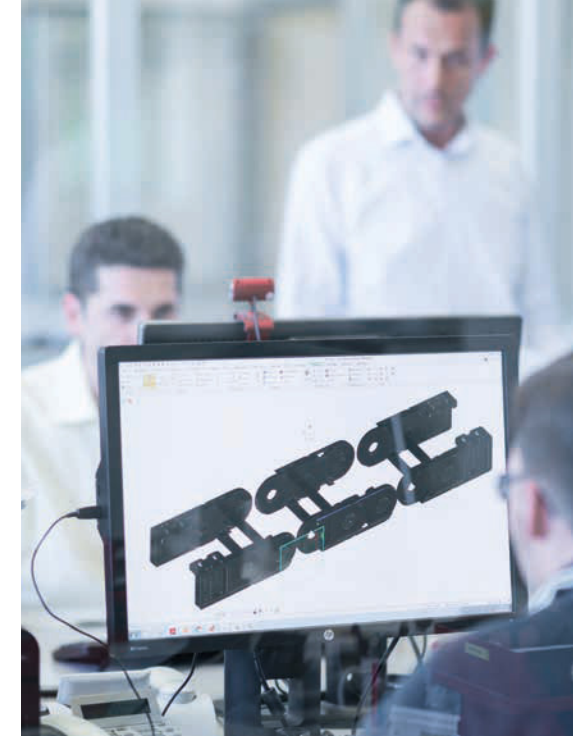
When producing spiral cables, we have a wealth of expertise at our disposal. Flexibility and durability are key factors for applications requiring long-term high performance. It is also crucial to have the appropriate insulation and the right conductor material. With Lapp, your spiral cables are definitely in safe hands.

Glass-fibre assemblies

Did you know - you can also rely on us for sophisticated glass fibre assemblies. We offer glass fibre harnessings from standard lengths available in stock and manufacture, test and deliver special lengths assembled to your needs. We can even design and incorporate them into your cable chain system.

Highly dynamic applications

Four requirements: low weight, high acceleration, compact dimensions and a long service life. With premium components from Lapp you get a wide range assortment of servo, energy and data cables as well as cable chains for your application needs. Innovative in speed and efficiency, they enable productivity improvements through faster position changes in your system.



CAD-design of cable chain system

Curiosity is what drives us

Our long term experience in highly flexible cables in combination with cable chain systems allows us to discover market trends quickly and work efficiently on valuable innovations for our customers.

Multi-flexible chain

In 1989 we developed the first "ROBOT" chain that you can find in nearly every cable chain catalogue in the industry today. With our next development step we will enter the level of highly flexible cable chain solutions for anthropomorphic robots.

Industry 4.0

Intelligent production requires intelligent products. Every movement, every cycle is recorded by the intelligent brain of our chains of tomorrow and wear is tracked so that maintenance can be scheduled in advance to eliminate downtimes and to guarantee fault-free performance of the entire ÖLFLEX® CONNECT CHAIN system.



ÖLFLEX® CONNECT – more than just a system solution

Every single component used in a Lapp system solution has undergone a demanding development and testing process. With us you will always be on the safe side.

The Lapp Lab

The electrical mechanical and chemical parameters of every component are tested in-house with state-of-the-art testing methods. Our highly flexible cables have to withstand millions of bending cycles at different speeds and with extreme bending radii. They also need to resist mechanical and chemical stresses. Our lab assures performance by:

- Heat, cold and climate tests for aging resistance
- Chemical substance tests
- Mechanical and robot torsion tests
- IP protection rating tests
- Static and dynamic pulling protection tests
- Resistance tests
- Electrical tests and material analysis

System test

Cable assemblies and entire cable chain systems are tested in-house in our test centre. The facility includes robot test applications and high-speed drag chain tracks. Specialised teams test the complete system including all products in their intended field of use – sometimes in extremely hot or cold conditions or with particular environmental influences. Your ÖLFLEX® CONNECT CHAIN will be delivered with a comprehensive test report.

Service point network

With our rapidly increasing tight-knit service point network, we are able to support you globally with any kind of cable, servo or drag chain assembly. We understand your local needs, markets and language.

Scalability

We offer harnessing services from easy cable assembly to highly complex drag chain systems, from batch size 1 to serial production and from short cable harnessings, to cable trees, right through to highspeed drag chain systems with long travel distances.

In-house production

Our branded components are developed, designed and produced by our own hands. We serve your needs directly from 18 production facilities across America, Europe, and Asia.

Logistics

Who actually likes waiting for a solution or replacement? We won't leave you waiting, as we guarantee a quick delivery all over the world with our sophisticated network of logistic centres and professionally trained engineering experts.

Service

Our customers are important to us. That's why we make lots of time for them. Time to fully understand their wants and needs; time to offer the right solution. We are absolutely convinced that this is the only way to establish a long-term partnership beneficial to both sides.

Certifications

Our products are used in almost every industry and are frequently found in the most sophisticated machines that operate around the clock – where downtime is not an option. But it is not just in major machinery that you need to be able to rely on the smallest of connections. It is everywhere. As an evidence of Lapp quality and reliability, our products carry the world's strictest approvals.

Examples of global approvals:



Sustainability

Technological advancement and ecological sustainability are important to us. That is why we are environmentally conscious regarding natural resources. For example, our photovoltaic system in Stuttgart, Germany, generates 1,000 MWh of energy, thus reducing CO₂ emissions by around 650 tonnes per year!



There for you worldwide

To contact your local Lapp Group representative, please visit our website www.lappgroup.com

- **ÖLFLEX® CONNECT CABLE** service-points in over 40 Lapp locations
- Additionally servo harnessings and drag chain assemblies available in regional hubs
- Global engineering centre for special drag chain applications and systems requirements

