



Aerospace  
& Defense

Lighting

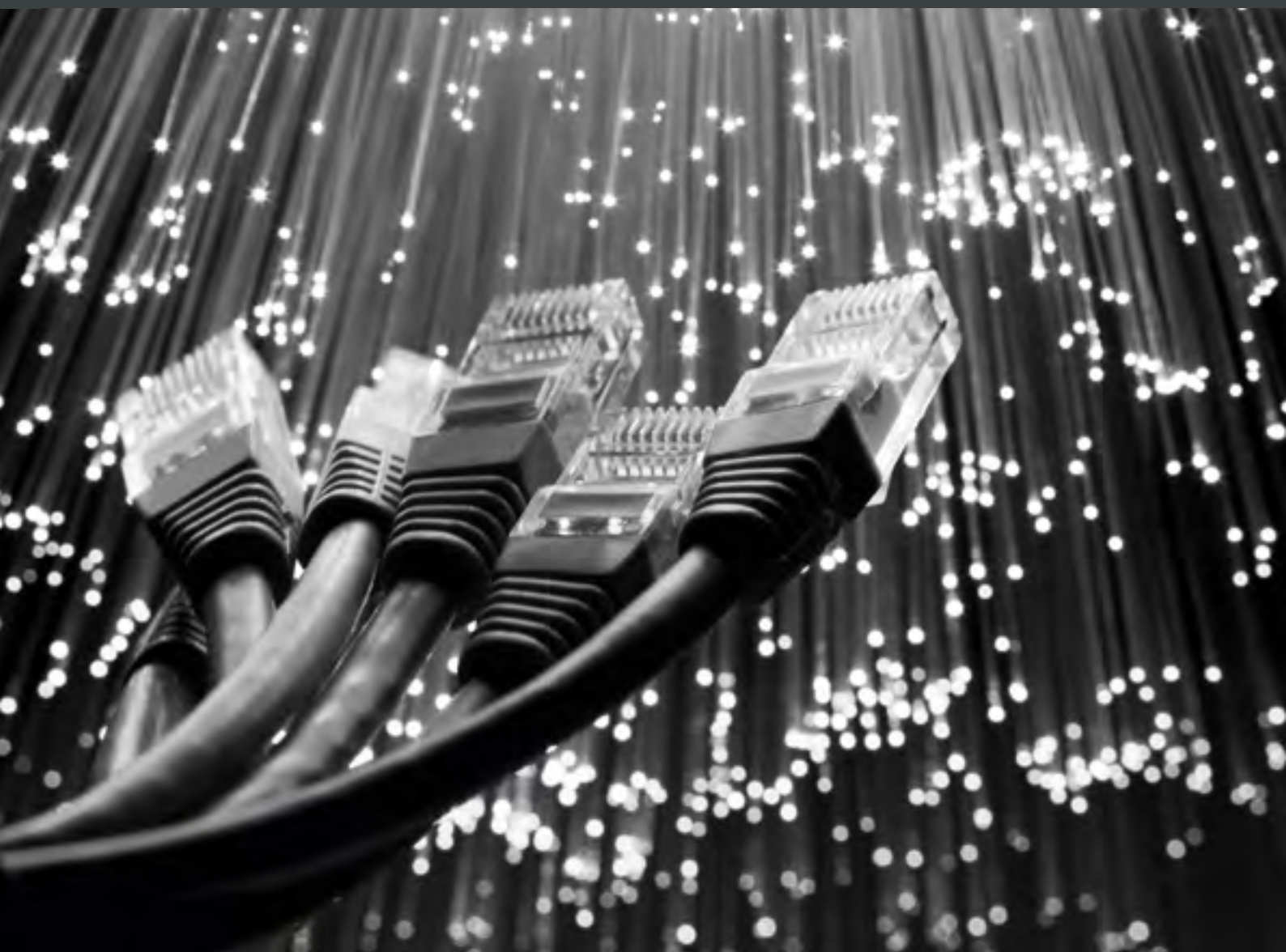
Power  
Management

Internet  
of Things

Transportation

## Components – EMEA

### Cable and Wire



Five Years Out

# Cable and Wire

Cables and cable assemblies are a vital part of computing, IoT and electronics, providing signal connectivity and power across and between networks.

Our portfolio of cables includes products designed for all markets and situations, from industrial and maritime to large-scale data communications and accommodating indoor and outdoor use, harsh environments and small spaces. Since the the world of 5G connectivity is almost upon us, our cables and wires are able to increase system performance across your business and get you to market as quickly as possible.

## V | Five Years Out

Five Years Out is focused on more than just components. Our fully customizable cable and wire range is designed to provide standard cable assemblies and client-specific solutions for business, providing a full suite of products including:

- Cables
- Cable assemblies
- Cable management accessories.

# Content

<b>Arrow – Cable &amp; Wire Linecard</b> .....	6
--	---

<b>Cables</b> .....	<b>7</b>
– 3M .....	8
– Lapp .....	9
– Amphenol ICC .....	10
– Belden .....	11
– Leoni .....	12
– Molex .....	17
– TE Connectivity .....	18

<b>Cable Assemblies</b> .....	<b>19</b>
– Adam Tech .....	20
– Amphenol Global Interconnect Systems .....	22
– Amphenol RF .....	25
– Amphenol ICC .....	26
– ASSMANN WSW .....	28
– Belden .....	30
– Harting .....	31
– 3M .....	32
– ITT Cannon .....	32
– JST .....	34
– Lutronic .....	35
– Molex .....	36
– Pancon .....	44
– Phoenix Contact .....	45
– Radiall .....	47
– Samtec .....	48
– Sumida .....	50
– TE Connectivity .....	52
– W+P Products .....	58

<b>Cable Management Accessories</b> .....	<b>59</b>
– 3M .....	60
– ABB .....	61
– HellermannTyton .....	62
– Molex .....	64
– Panduit .....	66
– TE Connectivity .....	69

# Cables are Innovative



In times of WLAN, Bluetooth and the new mobile communication standard 5G (5th Generation) with data transmission rates of up to 20 Gbit per second, cables and wires are anything but unnecessary.

---

New mobile communication base stations for 5G will be build which will be impossible to manage without modern and efficient cable systems.

In classical automobiles as well as in e-mobiles functional complexity is increasing leading to a higher weight of cable harnesses if there wouldn't be lighter and more efficient systems. Thereby, protection against electromagnetic interferences is as important as full functionality even under extreme conditions like excessive temperatures or damage caused by marten bites.

There are special cables on the market which survive fire without damage or antimicrobial cables for use in hospitals which are resistant to the colonization of germs.

## **Miniaturization and Reliability**

Increasing miniaturization with simultaneously improved performance is the dominating trend in electronic development driving the demand for even faster and more compact systems and devices. The next generation of cables will provide higher data rates with greater bandwidth, while safeguarding impedance and attenuation at the same time. They also will be highly flexible for the use in limited space.

However, even with the development, reliability of wiring will increasingly be in the spotlight. Malfunction and its associated aftercare, maintenance, and repair services can be avoided if cables monitor themselves in terms of mechanical constraints, damage or elevated temperatures.





Image source: HellermannTyton

#### Portfolio for all requirements

We are offering a wide range of cables from industrial applications to mass data communication; for both indoor and outdoor conditions, for rough environments and very tight spaces. In addition, our selection of cable ties, shrink-fit sleeves and matching processing tools is just as diverse.

Arrow works with reliable suppliers and is aware of the importance of internationally recognized technologies and services in order to provide better results and faster product launching times (time-to-market).

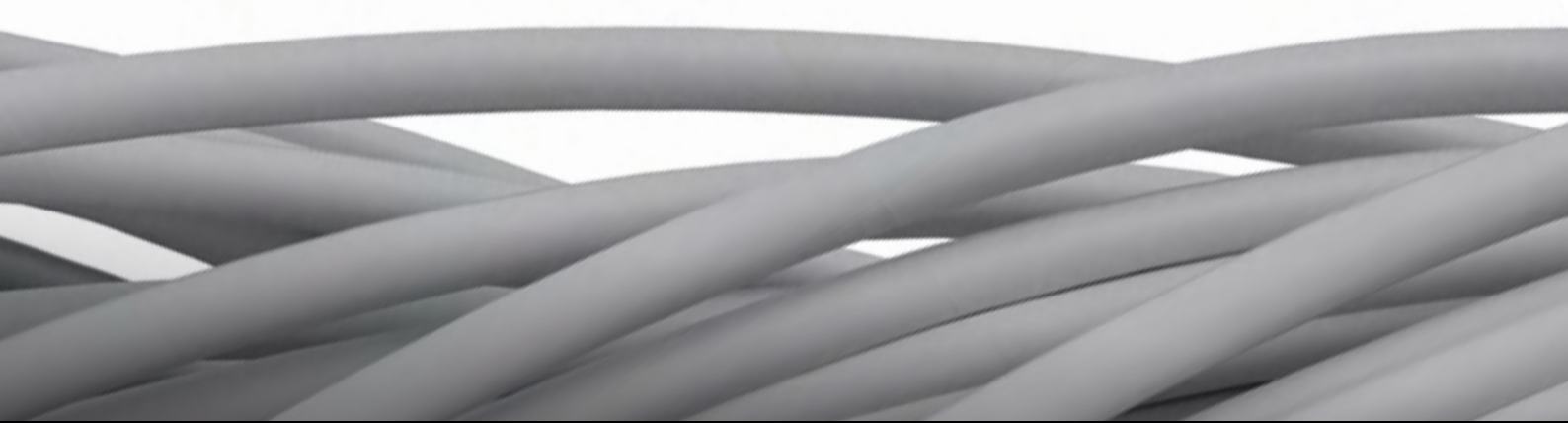
---

Email us for answers to questions or to start a conversation:

**[cableandwire@arrow.com](mailto:cableandwire@arrow.com)**

**We certainly have the right offer for you.**

Is something missing?  
Please feel free to contact us.



# Cable & Wire Linecard

Supplier	Cables					Cable Assemblies					Cable Management Accessories						
	Cable Single-Conductor	Cable Multi-Conductor	Cable Flat	Cable Fiber Optic	Cable Coaxial	Jumper Cable / FFC / FPC	Cable Assembly	Customized Cable Assembly	Power Cord	Computer- & Network Cable	Cable Accessory	Cable Tie	Cable Clamp and Clip	Cable Gland	Cable Marker / Label	Heat Shrink Tubing & Sleeving	Wiring Duct
3M	•	•	•	•			•	•		•	•	•			•	•	
ABB											•	•	•	•	•	•	
Adam Tech						•	•	•	•	•							
AlphaWire	•	•	•		•				•				•			•	
Amphenol		•	•	•	•	•	•	•	•	•	•		•	•	•	•	
ASSMANN WSW			•			•	•	•	•	•	•						
Belden	•	•		•	•		•	•		•							
Harting	•	•	•	•	•	•	•	•	•	•	•		•				
HellermannTyton											•	•	•	•	•	•	•
ITT Cannon							•	•									
JST							•	•	•								
Lapp	•	•		•	•		•	•		•	•	•	•	•	•	•	
Leoni	•	•	•	•	•		•	•									
Lumberg							•										
Lutronic							•	•		•							
Metrofunk	•	•	•		•												
Molex	•	•		•	•	•	•	•	•	•	•	•	•			•	
Pancon							•	•									
Panduit											•	•	•		•	•	•
Phoenix Contact		•	•	•			•	•	•	•	•	•	•	•	•	•	•
Radiall							•	•									
Samtec						•	•	•									
Schurter									•								
SKS Kontakttechnik	•					•	•	•			•	•	•				
Souriau								•									
Sumida			•			•		•									
TE Connectivity	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
W+P Products			•			•	•	•	•	•	•						



## Cables

Various cables and hook-up wires sold by the meter are available in small reels and large coils.

### Type of Cables

- Coaxial
- Fiber optic
- Flat
- Hybrid
- Multi- & single conductor (shielded/unshielded)

### Special Requirements

- Drag chain qualified
- Flammability
- Halogen free
- Harsh environment
- High temperature



Source: 3M



Source: Molex



Source: Belden

## High-speed transmission rates even in tight spaces

Increased miniaturization with a simultaneous increase in performance is the defining trend in electronics development, fueling the demand for devices that are ever faster and more compact. New device generations will require cables that can offer higher data rates and greater bandwidth – while controlling impedance and attenuation and maintaining flexibility in tight spaces. The new 3M Controlled Impedance Cable, 7700 Series, meets exactly these needs.

### Range of main Characteristics and Properties:

**Flat:** The cable is constructed using 30 AWG solid conductors and polyolefin (PO) insulators laid in parallel. The outer insulation is laminated with a flexible foil covering.

**Foldable:** Owing to its flat, ribbonized construction and the longitudinal lamination of the foil covering, the cable can be folded into relatively tight (>0.075" radius) with minimal impact to performance.

**Fit for IDC:** Customers can make their own cable assemblies with IDC contacts on .050" (1.27mm) pitch using a standard bench press! Preparation of the cable to remove the foil covering prior to termination is simple.



# 3M™ Halogen Free Cable – Human and Environment Safety

## Continual Research and Development

Cables employing halogen-free materials increase the safety of people and equipment by several factors without compromising the performance of the cable with respect to both mechanical and electrical characteristics.

## Safety, Health and Environment

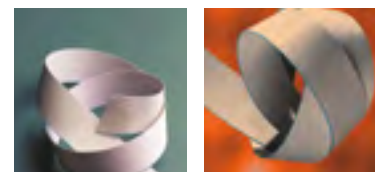
Occupational safety, health and environmental safety are key drivers of our activities. Thus, our offer includes a comprehensive range of cables employing halogen free insulating materials as a substitute for the PVC materials, which have come under critical scrutiny. Cable insulation

made of PVC may release dioxin vapors, smoke and hydrochloric acid when subjected to fire, which can lead to serious damage to health. Moreover, the corrosive soot released can cause considerable damage to property and nearby equipment. When used in sensitive areas, such as facilities, or rail vehicles, the requirements cables and conductors must meet with respect to protecting general safety are very stringent. Our products unite and meet all of these requirements.

### Range of main Characteristics and Properties:

- Low Smoke Zero Halogen (LSZH) in compliance with ICE 6 1034-2:2005
- Low toxicity in compliance with NF-X-70-100-2:2006AWG
- Broad operating temperature range from –40°C to +105°C
- All cable versions permits mass termination to broad line of 3M IDC connectors
- Zippable for branching of discreet terminations
- UL certified
- RoSH compliant

Series	Style	Conductor Size	Pitch
HF365	Standard Cable, stranded wire	28 AWG	1.27 mm
HF447	Standard Cable, solid wire	30 AWG	0.635 mm
HF625	Standard Cable, stranded wire	28 AWG	1.00 mm
HF100	Twisted-Pair Cable, stranded wire	28 AWG	1.27 mm
HF319	High Flex Cable, stranded wire	28 AWG	1.27 mm
HF539	Medium Flex Cable, stranded wire	28 AWG	1.27 mm
HF759	Round Jacketed Unshielded Cable	28 AWG	1.27 mm
HF659	Round Jacketed Shielded Cable	28 AWG	1.27 mm





## At Home in many Markets

From data centers to robotics to industry to patient monitoring equipment, we are committed to enabling the next generation of faster, smaller, and smarter design. 3M offers an extensive portfolio of cables and accessories built for speed and reliability, so you get the performance you need with a little downtime possible.

## The Universe of 3M Cables

3M's lightweight, low profile flat cables are designed to interface 3M and other standard IDC connectors with 0.635 mm to 3.96 mm pitch and wire sizes from 18 to 30 AWG. A complete line of cable types is available including standard round conductor, color coded, ground plane with and without drain wires, extend flex life, mass terminatable twisted pair, jacketed, shielded/jacketed, pleated foil, round jacketed configurations and very flexible and extremely thin Twin Axial Cables.

TPE or halogen free cables for application where PVC can result in outgassing problems. Patented Pleated Foil Cables handles high data rates. Twin Axial Cables for high speed application as well as exist routing and space challenges.

## Wide Range of Accessories

- Cable clamps
- Shielding tapes
- High flex life braided shield
- Heat shrink tubing
- Cable ties
- Grounding clamp
- Drain wire spring clips
- Shielded jacketed, PVC

You need interfaces like SATA, miniSAS, SFP+, PCIe, LVDS or Camera Link®? 3M also offers complete cable assemblies for a wide range of applications.



## From small Start-up to Global Player

The name Lapp not only stands for innovative strength and quality, it also stands for continuity. The desire to actively shape the future and the courage to embrace change and to think in a visionary way that is focused on solutions and customers are what make the company great. Our relationships with our employees, suppliers and customers which are based on partnership have always played a central role here. In less than 50 years, the small Stuttgart-based family business has evolved into a global player with around 3.200 employees – and into an international market leader for cable technology.

To make sure that it stays that way in the future, we always keep a very close eye on the markets. Furthermore, over the years we have demonstrated a keen perception for individual customer needs. We are constantly further developing our products and system solutions and are setting standards in safety, quality and functionality. Whether it's ÖLFLEX® highly flexible cables, UNITRONIC® data communication systems, EPIC® industrial connectors, SKINTOP® cable glands or our customized solutions – if you're faced with a challenge, Lapp has the solution.

Please ask your contact at Arrow for further information.



## Available Series

- ÖLFLEX
- UNITRONIC
- EPIC
- SKINTOP



# Spectra-Strip Cable

Amphenol Spectra-Strip Cable portfolio includes a wide range of low to high speed, standard and custom cables. Portfolio ranges from standard flat cable to our alternative to Fiber Optics, Skewclear cables!

[www.spectra-strip.com](http://www.spectra-strip.com)

Cable reference:	Description:	Application:
135 Series - 3C Color Coded Cable 	28 AWG, 7/36 Strand, Tinned copper .050" Centers 10 - 64 Conductors	Used in applications for digital and analog signal transmission. Color code allows easy circuit tracing and routing. Mass termination and discrete.
132 Series - Twist 'N' Flat Cable 	28 AWG, 7/36 Strand, Tinned copper 2" flat, 18" twist (flats on 20" centers) 10 - 64 Conductors	Used in applications requiring twisted pairs at high speeds, where differential drive signal transmission is used.
191-2801 Series - Spectra-Zip Cable 	28 AWG, 7/36 Strand, Tinned copper .050" Centres, 9 - 64 Conductors Flame retardant, PVC Grey with one red edge	Most economical cable for general purpose interconnection in electronic products.
191-2811/19 Series Spectra- Flex 	28 awg 19/40 silver/Tin plated copper/alloy. .050" centers 9 - 64 conductors (High/Medium Flex Life Cable)	For applications that require repeated flexing without circuit interruption.
151/152 Series Jacketed Cables 	151 Series uses standard Zip Cable inners 152 Series uses standard Twist'N'Flat inners Aluminum/polyester foil or expanded copper mesh shielding .030" Black PVC jacket	Used as external interconnects where shielding is required. Meets FCC requirements 
159-2801 Series-Zip Round'N'Flat 159-2832 Series-Round Twist'N'Flat 169-2832 Series-Loose Pair Round Twist'N' Flat	Utilizes standard Zip and Twist'N'Flat inners .030" Black PVC jacket 3 versions available: 0XX fully shielded, braid, Alum/Mylar, 1XX Alum/Mylar only, 2XX Jacket only, no shield	Used as external interconnects where shielding is required. 
Halogen Free Extruded Ribbon 193-2890-0XX	Congested areas where ventilation is poor, such as buses, subways, elevators, data processing rooms, ships, aircraft, nuclear facilities and other enclosed environments where personnel or equipment could be injured by toxic and corrosive gases.	
Skewclear custom 	SkewClear® is our trademark for a portfolio of low skew cables, scalable from 2.5Gb to > 25Gb Dual side drain or Center drain. Silver or Tin conductor. LDPE, LDPE blend, TPO, FEP Teflon dielectric. Longitudinal or spiral wrap aluminum polyester shield.	

## Industrial Wire and Cable – Automation and Process

The comprehensive DataTuff Industrial Ethernet cable and connectivity range ensures the highest level of reliability, quality and performance. Specifiers can choose from products suitable for indoor and outdoor applications, for use underground, and for other harsh conditions. Cordsets come in RJ45 with IP20 and IP68 protection.



- **Widest choice for best fit** – From the cabinet to the machine
- **Robust** enough to guarantee the highest levels of reliability and performance
- **Meets all data rate requirements**, ranging from 100 Mb/s, through 1 Gb/s to 10 Gb/s
- **Railway approved range (RailTuff)** for use in on-board communications (e.g., Ethernet backbone and VLAN segments, passenger information and entertainment, multimedia services, security, etc.) and trackside

For more information on Belden products please ask your Arrow contact.

### Cables – Industrial Ethernet – Insulation Material Polypropylene

Data Rates	Jacket Material	Shielding	Armor	Style	Operating Temp. °C	Approvals	Special Features
100 Mb/s 1 Gb/s 10 Gb/s	PVC FRNC/LSNH PUR (halogen-free) TPE Premium FRNC, Insulation and jacket cross-linked (by e-beam) for RailTuff	Foil & Braid >65 %, 80 %, 85 % No shielding	Aluminium interlock armor	Twisted Pair Bonded Pair	-40 up to +80 Plenum: -70 up to +150	DataTuff: UL/AWM IEC RailTuff: EN 50155:2007, Class TX (-40 °C to +85 °C) EN/TS 45545-2:2009 DIN 5510-2 ISO/IEC 11801 2nd edition IEC 61156-6	Torsion resistant >2 million cycles guaranteed, +/- 360° per 1 m length Trailing resistant/Drag chain suitability >2 million to 10 million bending cycles Oil resistant Abrasion resistant LSNH Sunlight Resistant Plenum/High Temp

Available series: 74001E.00500, 74001NH.008100, 74004E.008100, 74004NH.008100

### PROFINET Protocol – Insulation Material Polyolefin

Data Rates	Jacket Material	Shielding	Style	Operating Temp. °C	Approvals	Special Features
100 Mb/s	PVC FRNC/LSNH PUR (halogen-free) FRNC, Insulation and jacket cross-linked (by e-beam) for RailTuff	Foil & Braid >85 %	Quad	-40 up to +80	DataTuff: IEC RailTuff: EN 50155:2007, Class TX (-40 °C to +85 °C) EN/TS 45545-2:2009 DIN 5510-2 ISO/IEC 11801 2nd edition IEC 61156-6	Torsion resistant >2 million cycles guaranteed, +/- 360° per 1 m length Trailing resistant/Drag chain suitability >2 to 10 million bending cycles Fast-Connect Oil resistant Abrasion resistant LSNH

Available series: 70006E.008100, 70006NH.008100

### Patch Cords – Industrial Ethernet Protocol - Insulation Material Polypropylene

Data Rates	Jacket Material	Shielding	Style	Operating Temp. °C	Approvals	Connector & IP Rating	Body Type	Special Features
100 Mb/s 1 Gb/s 10 Gb/s	PVC FRNC/LSNH PUR (halogen-free) TPE	Foil & Braid >65 %, 80 %, 85 % No shielding	Twisted Pair Bonded Pair	-10 °C up to +60 °C -40 °C up to +75 °C	UL/AWM	RJ45 with IP20 and IP68	Over Mold Sliding Booth	Torsion Trailing Oil resistant Abrasion resistant LSNH

Available series: CA00652, CA00600, CA00664, R301602

### PROFINET Protocol – Insulation Material Polyolefin

Data Rates	Jacket Material	Shielding	Style	Operating Temp. °C	Connector & IP Rating	Body Type	Special Features
100 Mb/s	PVC FRNC/LSNH PUR (halogen-free)	Foil & Braid >85 %	Quad	-10 °C up to +60 °C	RJ45 with IP20	Over Mold	Oil resistant Abrasion resistant LSNH

Available series: CA00656, CA00730

## PROFIBUS/PROFINET/Industrial Ethernet

LEONI is a European leader in the field of fieldbus cables as well as cables and cable systems for motion controlled (MC) applications e.g. in CNC machine tools. The on-going cooperation with technology leaders and user organisations allows to offer integral competence to the customers.

The FieldLink® product range provides cable solutions for every type of conventional bus systems e.g. PROFIBUS/PROFINET, Industrial Ethernet, AS-Interface etc. In addition to standard types LEONI also develops and manufactures special cables for industrial communication e.g.

- Hybrid cables to minimise installation time and costs providing data and energy in a single cable
- High flexible cables for trailing applications, available with a TPU jacket for excellent oil resistance
- Cables with rodent protection by additional steel armouring
- Highly flexible cables with extreme cold bending performance of up to – 40 °C
- High temperature resistant cables due to jackets of foamed or cross-linked FEP



Selection of available cables in Arrow's stock:

LEONI order number	Description
L45467-J16-B35	PROFINET type A cable for permanent installation (PVC)
L45467-J17-B18	PROFINET type C trailing cable (TPU)
L45467-G16-C185	PROFIBUS DP cable for permanent installation (PVC)
L45467-G16-C98	PROFIBUS DP trailing cable (easy to strip)
L45581-B42-K8	Industrial Ethernet CAT5 trailing cable (TPU)
L45467-J415-C48	Industrial Ethernet CAT6 trailing cable (easy to strip, FRNC)

## Data Communication Cables Cat 6A

### with functional integrity during fire influence (PH 120+)

LEONI has designed different cable types that will be able to transmit the data characteristics of Cat 6, Cat 6A or Cat 7 in standard use over 3 hours. The Cat 6A cable also transmits the data characteristics in case of fire and afterwards.

The cable was designed in accordance to the requirements of the IEC 60093-350 standard for fire-resistant cables and is similar to the standard design of data transmission cables.

The insulation of the single cores must be involved a combined (hybrid) design of an electrical insulation part of extruded thermoplastic material and a fire-resistant second layer. In the LEONI design, it is a polyethylene inner skin directly extruded on the copper wire and a number of fire-resistant mica tapes, which are wrapped around the thermoplastic insulation.



Overview of available cable types (all combinations available):

Cross section	Type of sheathing material	Armour
22/1	SHF 1	without
23/1	SHF 2	with SWA (special wire armour)
23/7	SHF 2/mud res	with SWB (special wire braid)
24/1	FRNC	
24/7		



## SeaLine® – Data Cables for Marine Applications

LEONI offers a wide range of bus cables and Industrial Ethernet cables tailored to the respective purpose in marine applications.

The outer jacket can be provided with SHF1, SHF2 and mud resistant material as well as materials for special applications. This material guaranteed excellent oil resistance and other environmental resistance characteristics.

**For the armoring we have different options to prevent the cable in regards to mechanical and chemical influences:**

- Stainless steel
- Galvanized steel
- Served wires



## Customised Solutions for Industrial Applications

In addition to the FieldLink® product range LEONI develops customised cables and cable systems to the most suitable solution for unique applications.

Whenever it comes to requested attributes of cables for harsh environments in an industrial behaviour, LEONI will be able to develop individual solutions.

**Decades of experience enable our R&D to create customised cables in the fields of:**

- Trailing and torsional application
- High and low temperature range
- Oil and chemical resistance
- Longterm underwater application
- Flame retardancy
- Hybrid application (Data + Power + ...)
- Tensile reliability



## FieldLink® Motion Control Cables

LEONI disposes of a wide range of hybrid, feedback and power cables for Motion Control. The cables are used for power supply, as well as for signal and data transmission in permanent, flexible and trailing applications and also manufactured by OEM standards. All Motion Control products were tested in the LEONI test center to ensure the long-lasting dynamic requirements.



All FieldLink® MC cables can be found in our product data base

## LEONiQ – Intelligent Cables for Drag Chains

Thanks to the key technology LEONiQ, for the first time predictive maintenance and condition monitoring for cable systems is enabled. LEONI develops intelligent cable systems that actively monitor, analyze and report the condition of data and power cables in drag chains. The clear objective is to avoid unplanned downtimes and to raise production equipment's uptime by planned maintenance services before the error occurs.

### The following conditions can be monitored:

- Mechanical stress
- Shield wear
- External damage
- Liquid intrusion
- Temperature



Here you can find the video about LEONI's new intelligent key technology for drive technology.

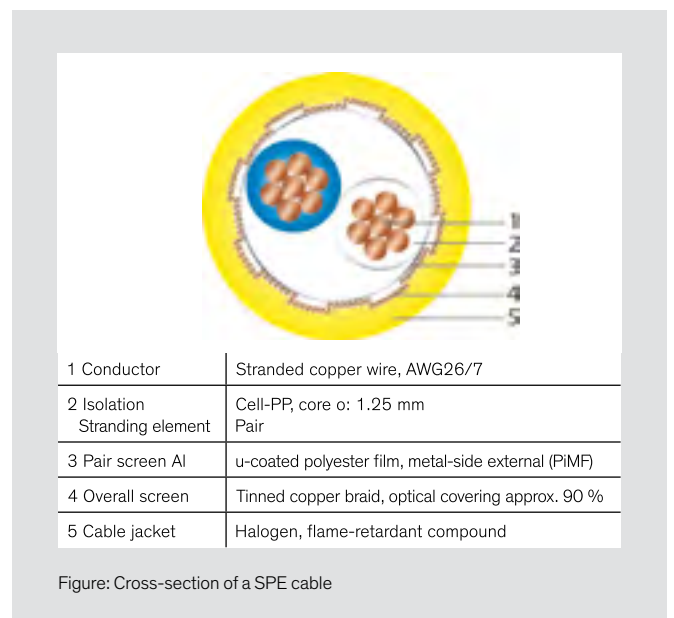
# Ethernet for the Internet of Things?

## 1 Gbit/s over 1-pair balanced transmission channels.

The increasing network requirements driven by the demands of Industry 4.0 and IoT rely on innovative and application-specific solutions. Single-pair Ethernet offers the ideal solution for cablebased communications infrastructure. Particularly for application areas in industry and building management, this represents a smart addition to the communications landscape, which combine Gigabit Ethernet performance, transmission reliability, optimal handling and remote powering as well as space and weight savings. The normative basics have already been defined in IEEE 802.3 Standards for applications within the automotive and non-automotive sectors. For the respective non-automotive applications, the planning orientation incorporated within the international standards of ISO/IEC and IEC is used. The respective standardization projects have been started. The compact design of the device connectivity and the Ethernet compatibility according to IEEE 802.3 offer device development, e.g. within automation as well as sensor and actuator production, a networking concept that represents a simple change from bus- to Ethernet technology. This allows Ethernet to penetrate further into the field level, reduces enormously times for parameterisation, initialization and programming and expands the range of functions of devices.

Single-pair cabling saves space, installation time and costs. At the same time new applications are tapped, which were previously reserved for cable-based infrastructure. After the internet and Ethernet have connected people, computers and machines both in terms of space and time, this is now also happening with objects and things. The backbone of this new technology is provided by, amongst others, single-pair balanced copper cabling. With this it becomes clear that singlepair Ethernet technology is more prevalent within the mega trends of IoT and I4.0 than in cloud computing and big data. Single-pair Ethernet represents an important technological progression, but is still only an addition to existing Ethernet technologies that use multi-pair copper cables or fiber optics and will not replace them.

For more information please follow <https://www.leoni-data.com/en/publications/?q=internet%20of%20things>



## Power over Ethernet on the Rise

**Business Unit Datacom** - For maximum data integrity and bandwidth from the very beginning of the digital data era, we have fulfilled data networking requirements for both the short term and the far future by using great innovation and a forward-looking approach. The profound expertise of the data communication and networks in copper and fiber optical cabling technologies represents a powerful advantage in structured cabling systems for industry, data centres and offices – the sustainable copper and glass fiber cables of our own production are among the safest and most innovative products in the primary to tertiary cabling market.

### Power over Ethernet on the rise

Category 7A data cables can bear higher electricity loads.

Thanks to Power over Ethernet, countless IT devices can now dispense with a 230V power supply. This technology allows buildings and offices to be planned and operated more intelligently and with more energy efficiency.

Not least due to the planned performance increases, LEONI recommends using shielded data cables of Category 7A with the

conductor dimension AWG 22 and connection technology with staggered contact and insulation zones.

Our contribution to Green IT in buildings.

For more information please follow

<https://www.leoni-data.com/de/publikationen/?q=power%20of%20ethernet>



MegaLine® G12-150 S/F	LKD 7KS8 0001 0000
MegaLine® F10-130 S/F	LKD 7KS7 0001 0000

## Shielded Data Cables make the Grade

### Unshielded data cables reach the limits of their performance

Even though unshielded cable technology is still predominant worldwide, there is a clear trend towards using shielded. The fact that cables of Category 8 (2 GHz) can only be realized with a shield demonstrates the technical limits of unshielded cables.

The Technical Bulletin also demonstrates many more advantages of shielded cables which allow real customer benefits, thus providing numerous arguments for using them.

In the comparison of the transmission characteristics, the electromagnetic compatibility, the thermal behavior and the fire behavior, the shield is the downright winner.

For more information please follow

<https://www.leoni-data.com/en/publications/?q=utp>



MegaLine® F10-115 S/F	LKD 7KS7 0008 0000
MegaLine® F6-90 S/F	LKD 7KS7 0010 0000

MegaLine® E5-70 F/F	LKD 7KS6 0022 0000
------------------------	--------------------



## Flamar Standard Cables

Flamar, a Molex company since 2014, proposes a new set of cables designed to cover the broadest range of applications for machine builders and system integrators. Flamar's proven experience in cable manufacturing assures excellent performance, quality and durability in the industrial sector.

Available in multiple packaging sizes with small minimum order quantities, Flamar standard cables for Industrial Automation meet and exceed the most stringent quality requirements at a competitive cost.

### Key Features

- Complete selection of signal and control, servo motor, network and hybrid cables that are UL AWM/CSA recognised or UL listed
- Several jacket materials are available including PVC, Weld-Slag and Oil-Resistant, PUR and TPE) to ensure the correct cable is available for each application
- Cables offer operational flexibility by withstanding a wide temperature range of -40°C to 105°C
- Flame-retardant compliance with UL Vertical Flame Test, UL VW-1, and CSA FT-1 up to CSA FT-4

### Applications

- Line and machine building
- Factory automation
- Non-automotive commercial vehicles



For more information visit: [www.molex.com/flamar/index.html](http://www.molex.com/flamar/index.html)

## Temp-Flex Specialty Wire and Cable Products

Temp-Flex manufactures speciality wire and cable and invests heavily in research and development to provide technological solutions to a wide variety of specialist markets. To ensure product quality and consistency, Temp-Flex is a fully equipped on-site manufacturing facility.

### Key Features

- An extrusion process is employed using fluoropolymer insulation with a concentration on thin walls for the medical industry and faster speeds in the electronics industry
- Typically designed for extreme conditions and harsh environments, all Temp-Flex product lines adhere to RoHS compliancy standards
- Products include:
  - > Microminiature wire and cable
  - > Coaxial cable
  - > Multicore cable
  - > Flat ribbon cable

### Applications

- Medical
- Commercial Aviation
- Industrial
- Telecommunications

For more information visit: [www.molex.com/tempflex](http://www.molex.com/tempflex)



## TE Connectivity Wire and Cable

### SPEC 44 Wire

- Originally developed for military ground systems, Spec 44 is also specified for use in a variety of harsh environment applications.
- -65°C to 150°C
- Dual wall, radiation cross-linked Polyalkene/PVDF construction
- 600, 1000V and 2500V rating
- Small size, light weight
- Resistant to most chemicals

### SPEC 55 Wire

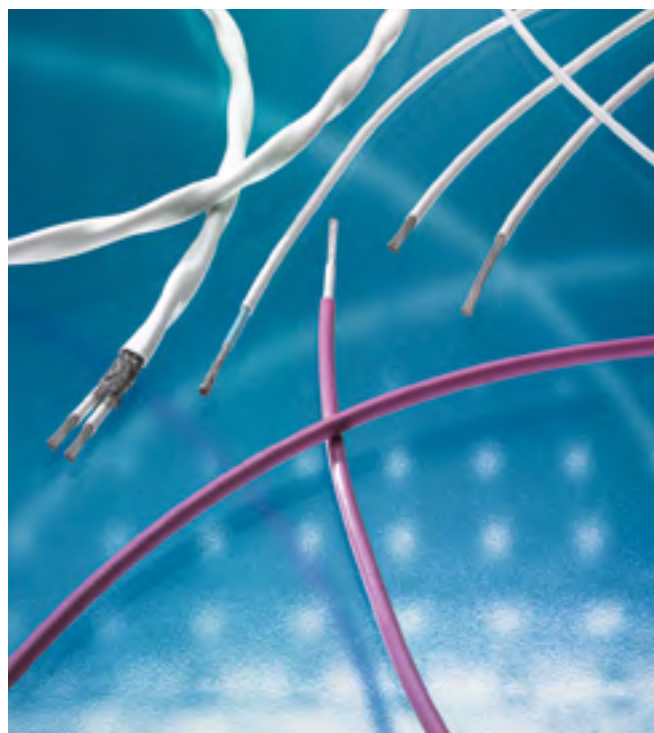
- Available in a range of constructions and specifications to suit both military and commercial aerospace requirements.
- -65°C to 200°C (nickel and silver plated conductor variants)
- Single or dual wall XLETFE construction
- Small size, ultra light weight
- Exceptional chemical resistance

### TYPE 99M Wire

- Limited fire hazard range of wire and cable, complies with the requirements of Def Stan 61-12 Part 18.
- Low flammability
- Low smoke generation
- Low toxicity index
- Low generation of corrosive gases
- Small size, light weight

### Zerohal 100G

- Originally developed to meet the requirements of VG 95218-20 Type E, 100G is primarily specified in marine and rail markets as well as any application at risk from fire.
- Halogen free, low smoke
- Highly flame retardant
- Small size, light weight



#### ORDERABLE SERIES

912, 913, 914, 915, 724, 725

## Cable Assembly

From low-cost to high-quality harnesses: A strong feature of Arrow's product range since many years!

### Standard Cable Assemblies

- Audio & video
- Computer & network
- Fiber optic
- High speed
- Jumper/FFC/FPC
- Power & signal
- Power cord
- RF/coax
- Sensor/actuator
- Solar
- Telephone
- Test & measurement
- Twinaxial



Source: Samtec

### Client-Specific Solutions

Manufacturing technologies:

- Assembly board forming
- Automatic seal insertion
- Bandaging
- Crimping
- Cutting and stripping
- Ferrule crimping
- Hot-Melt
- Injection moulding & casting
- Insulation displacement technology (IDT)
- Labeling & identification
- Pair twisting
- Soldering
- Splicing
- Ultrasonic, resistance & laser welding compacting
- Unpressurised casting
- Single conductor processing
- Tinning

### Services

- Design & development
- First article inspection (FAI)
- Kitting
- Material selection and crossing
- Photomicrograph analysis
- Preparation of drawings
- Production part approval process (PPAP)
- Project planning
- Prototyping
- Safety stock
- Technical consulting
- Toolbuilding



Source: Molex

### Available Certifications

- IPC/WHMA-A-620 Requirements and acceptance for cable and wire harness assemblies
- ISO 13485 Medical devices quality management systems
- ISO 14001 Environmental management systems
- ISO 50001 Energy management
- ISO 9001 Quality management
- ISO/TS 16949 Quality management systems for automotive production
- OHSAS 18001 Occupational health- and safety assessment series
- UL Wiring harnesses/processed wire



Source: TE Connectivity

## Magnetic Cables and Connectors

Magnetic assemblies are a popular and quickly growing cable assembly choice. Adam Tech has incorporated 30 years of connector and cable knowledge and experience to develop a line of magnetic assembly solutions. These connector and cable sets combine magnetic technology with pogo pins to create a durable connection that can also breakaway easily.

### Features and Benefits

- Blind mate easy connection
- Easily detachable for real world applications (especially medical, fitness and charging)
- Waterproof capabilities
- Highly customizable
- Wide range of standard options
- User friendliness



## Harsh Environment Waterproof

Adam Tech's Harsh Environment and Waterproof Cables and Connectors are broad range style of industry standard solutions with IP67 to IP69 ratings. These ruggedized systems are designed to handle harsh environments while providing the utmost reliability.

### Features and Benefits

- IP67 to IP69 rated
- Circular, M8, M12 and RJ45 styles
- Sealed and vibration-proof





## USB and RJ45

### USB

Adam Tech offers a complete range of all USB standard cable assemblies including USB A, USB B, USB Type C and Mini/Micro versions. All assemblies are customizable for length and color.



### RJ45

Adam Tech offers a complete range of RJ45 patch cord cable assemblies fully customizable by length, color and boot type.



## HDMI & DisplayPort and RF

### HDMI & DisplayPort

Adam Tech offers HDMI and Displayport Cables in HDMI to HDMI, HDMI to HDMI Adaptor, DisplayPort to DisplayPort, and Display-Port to Display Adaptor as well as virtually any other configuration or customer specific customization required.



### RF

Adam Tech RF Cables are available in both standard and customizable configurations and types ranging from FAKRA, BNC, SMA, SMB, UHF, Mini UHF, MCX, MMCX and more.



## Customised Value Add Cable Assemblies and Harnesses

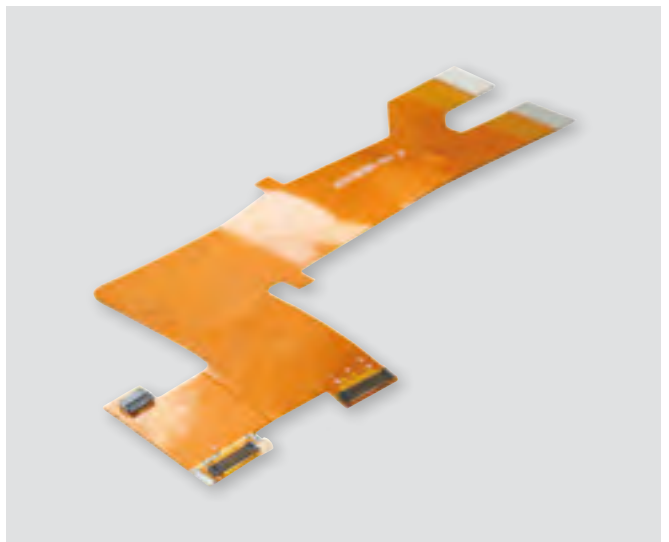
Amphenol Global Interconnect Systems designs and manufactures interconnect solutions for communications networks, Information Technology / Data Communications, Mobile Networks & Industrials markets, around the world.

At Amphenol-GIS, we collaborate with our customers and partners to solve their interconnect challenges with competitive innovative custom and standard interconnect assembly products. We have an open design approach and select interconnect components and raw cable and wires from a wide range of companies to ensure that our products meet our customers specific requirements.

We produce industry-leading power and cable assembly solutions with a focus on continuous improvement processes to push the limits of excellence. Our expertise lies in design, testing, quality assurance and customer service.

### Datacom / Consumer

A wide variety of the products that we offer are used in datacom, consumer electronics, infotainment, embedded computing and green energy applications, including: Ultraport SlimSAS™, OCuLink, HD MiniSAS, MiniSAS, SATA, DisplayPort, HDMI, DVI, USB, water-proof solutions, FPC and FFC



**We have an open component selection policy**

**We do not restrict the choice of connector suppliers used on customised cable assembly designs ...**

## Customised Value Add Cable Assemblies and Harnesses

### Telecom, Industrial & Robotics

Additionally we focus on signal, power, optics and coaxial cable assemblies for mobile networks and industrial, robotics and factory automation markets.

With regards to power cables, our 'power lugs' are durable, low-voltage drop terminations fabricated from the stranded ends of the cable. Since the wire is used to make the lug, the circuit current rating is limited only by the wire.

### European and Global Manufacturing

With a range of high volume and high mix / low volume factories around the globe, we can offer a manufacturing solution to meet all requirements.

- EMEA – Estonia, Macedonia, Israel
- Americas – USA, Mexico, Canada
- APAC – China, India, Japan

### Certifications

- ISO9001
- ISO14000
- RoHS2 and REACH Compliant
- EICC Compliant
- TL9000
- ISO/TS 16949





Did you know that Amphenol-GIS also offer bus bars and backplanes?

### Bus Bars

Amphenol-Auxel offer a high-tech product range of laminated bus bars to optimize your power distribution interconnection. The designs are based on bonding together extremely thin insulating material and copper or aluminium layers to optimize the electrical parameters and constraints i.e. inductance, skin effect, creepage distances, etc.

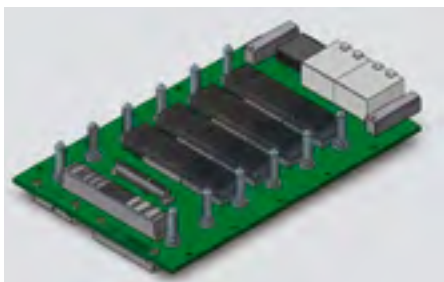
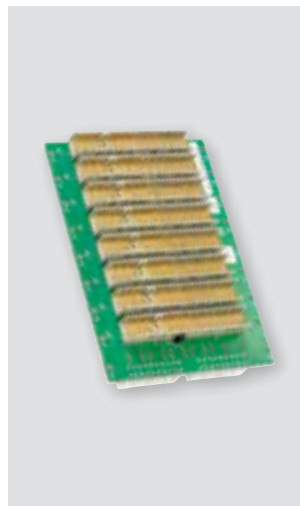
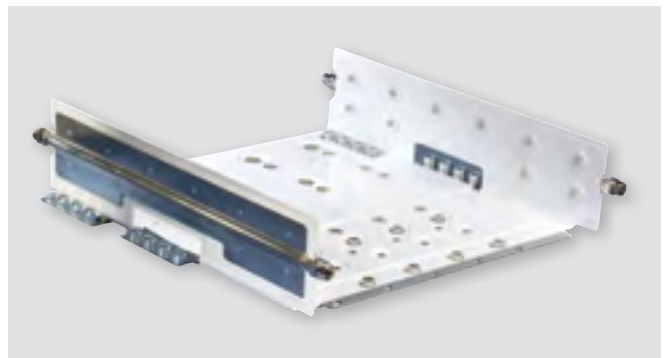
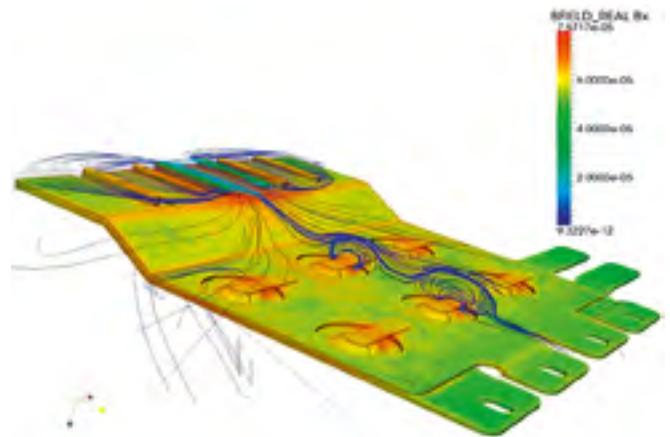
From motor drives and controllers to MRI scanners, from wind and solar energy to propulsion systems for mass transit, from UPS and battery systems to EV and IGBT applications, Amphenol-Auxel helps the world's largest companies to develop bus bars to optimize power distribution in their applications.

12v to 10Kv in power, 3cm to 3m in length and 5g to 300kg in weight, based on our proprietary simulation software and advanced manufacturing technologies (including aluminium extrusion and selective copper surface treatment of aluminium), Amphenol-Auxel provide industry leading solutions for performance, quality, cost, efficiency, weight, air flow etc.

### Backplanes

Amphenol Backplane & System Integration (ABSI) have been designing, assembling and testing backplanes for more than 30 years. As part of the Amphenol Corporation, we continue to invest in our technologies to ensure we remain positioned as the most extensively tooled Backplane Supplier in the industry. Amphenol's experience of interconnect design, manufacturing, development and electrical test technologies allows ABSI to deliver the highest performance backplane at a product cost you can bring to the market.

ABSI – are also leading the evolution of technology for Industry Standard Backplanes and Enclosures. These standards include VPX, VME64, cPCI, PCIe, PCI Serial & ATCA.



With this ever changing technology our clients look for a design partner who can facilitate their roadmap. A partner who can design and supply backplanes and enclosures for today and tomorrow ... That partner is ABSI...



## Amphenol - RF Cable Assemblies

Amphenol RF is the world's largest manufacturer of radio frequency connectors and coaxial adapters, and also offers a full range of pre-assembled, fixed length, standard cable assemblies for use in a variety of applications.

Fixed length cable assemblies are available with an extensive array of connector series interface options on standard flexible and semi-rigid cables. Available assemblies range from micro-coax assemblies (AMC/u.FI type) to high-performance cables including Mil-Spec, low smoke and low loss cables.

In order to meet the needs of the emerging IoT market, Amphenol RF has developed IP67 cable assemblies designed for exposure to a variety of environments. In addition, several new product lines focused on reduced package size and increased data transfer rates have been introduced to the market such as the FAKRA to AMC assembly.

Pre-configured cable assemblies available off-the-shelf can be used to connect wireless modules to antennas. These are commonly used inside the box porting to an external antenna. Typical configurations that are commonly used include AMC to AMC, RP-SMA to AMC, IP67 FAKRA to AMC and MMCX to SMA.

Amphenol RF fixed length broadcast cable assemblies enable the future of broadcast technologies. With increased bandwidth demands in the entertainment industry, our cable assemblies support the latest high definition transmission systems with guaranteed reliability and performance. Solutions include BNC, and 1.0/2.3 DIN connectors as well as Amphenol's HD-BNC series supporting data rates of up to 12 Gb/s.

Amphenol can modify standard RF connectors to provide sealed IP rated solutions; IP67 or IP68 (per customer specification). Ideal for outdoor applications.

Amphenol RF also offers the cost-effective ATC-PS test cable for use in research and test labs which provides low loss and phase stable results. ATC-PS cables feature robust strain relief construction to ensure stability of the center contact relative to the connector body and are ideal for test applications up to 20GHz.

Custom cable assemblies, ranging from modified catalog part numbers to designed-from-scratch solutions, are available upon request.



# Power Cable Assemblies

Product	Description	Features
<p>PwrBlade® Cable Assembly</p> 	<p>The PwrBlade® cable connectors mate with PwrBlade® right-angle or vertical board-mounted headers. Designers can now connect power supplies and power distribution subassemblies in a wider range of applications. The combination of cable connection capability with the board-to-board system provides a universal power distribution connector system.</p>	<ul style="list-style-type: none"> <li>- Supports multiple wire sizes including 8 - 14 AWG wire for power contacts and 22 - 26 AWG for signal contacts</li> <li>- Power contact spacing options exist for AC (300V max) or DC (200V max) power</li> <li>- Provides power contacts for power distribution and signal contacts for power control</li> </ul>
<p>Pwr Profile®</p> 	<p>A low profile, high current density cable assembly. The Pwr Profile® I/O address applications requiring additional power density in space constrained, chassis-based equipment platforms. The innovative power contact design has a lower profile for cable-to-board applications.</p>	<ul style="list-style-type: none"> <li>- Low profile 9.2mm height</li> <li>- Two power contacts for power and return applications</li> <li>- Touch-proof housing design</li> <li>- Polarization to ensure proper mating</li> </ul>
<p>Perma-Tap® Cable Assembly</p> 	<p>The Perma-Tap® power cable assembly saves space and reduces cost. The wires can be cut, stripped and terminated to customer specific lengths. The connector is press-fit to a PCB to provide a compact and secure power delivery solution.</p>	<ul style="list-style-type: none"> <li>- Wire options from 12AWG to 8AWG</li> <li>- Welded connection between wire and contacts</li> <li>- Thermoplastic housing supports operating temperatures from -40°C to +125°C</li> <li>- Halogen-free housing</li> </ul>
<p>HPCE® Cable Assembly</p> 	<p>The HPCE® cable assembly is a next-generation power cable assembly for applications requiring high linear current density and low power loss. It offers both one-piece (cable-to-card edge) and two-piece (cable-to-header) solutions. Both have a low profile (7.5mm) and are based on cost-effective and highly reliable stamped-and-formed power contact technology.</p>	<ul style="list-style-type: none"> <li>- Current rating of 36A for high power and 21A for low power without exceeding a 30°C temperature rise in still air</li> <li>- Highly configurable for custom power needs</li> <li>- Power &amp; Signal First-Mate, Last-Break sequencing for hot swap applications</li> <li>- Various contact types to meet power distribution applications - (High Power: 10 to 14 AWG; Low Power: 14 to 16 AWG; Signal: 22 to 26 AWG)</li> </ul>
<p>Minitek® Pwr</p> 	<p>The Minitek® Pwr connector family is a comprehensive solution designed for power applications, especially suiting wire-to-board and wire-to-wire configurations. The High Current Connectors use high current alloy material for contact for enhanced performance. The Hybrid version are designed for power and signal applications and have a flexible modular design.</p>	<ul style="list-style-type: none"> <li>- Various pitch options: 2.50mm, 3.00mm, 4.20mm, 5.70mm</li> <li>- Fully-polarized, scoop-proof housings</li> <li>- Low insertion force for durability and prevent damage during operation</li> <li>- Blind Mate Interface (BMI) option available in vertical and through-hole terminations for dual row</li> </ul>

# High Speed Data Cable Assemblies

Product	Description	Features
 <p>QSFP DD Cable Assembly</p>	<p>QSFP DD (Double-Density) passive copper cable assemblies have double the number of 25G / 50G (PAM4) lanes when compared to the existing 100G QSFP cabling systems. They will also accept 200G or 400G copper cabled media that covers application lengths from 0.5 meter up to and including 2.5 meters of length. These copper cables are compatible with both 25G/lane NRZ and 50G/lane PAM 4 signaling protocols.</p>	<ul style="list-style-type: none"> <li>- Data Rate: 25G NRZ / 56G PM 4</li> <li>- Cable sizes: 32 AWG - 27 AWG</li> <li>- Double density while maintaining backwards plug compatibility</li> <li>- Passive cable lengths up to 2.5 meters</li> </ul>
 <p>OSFP Cable Assembly</p>	<p>OSFP (Octal Small Form factor Pluggable) cable assemblies double the number of high 25G speed lanes when compared to the existing 100G OSFP cabling systems; from 4 lanes to 8 lanes. Compatible with both 25G/ lane channel NRZ and 50G/ lane channel PAM4 signaling protocols that allow the cables to deliver aggregate bandwidths of 200G and 400G per cable assembly. Copper cable lengths can be supported up to 3 meters. This product complies to industrial standards OSFP MSA, IEEE 802.3by and IEEE 802.3bj.</p>	<ul style="list-style-type: none"> <li>- 200Gb or 400Gb aggregate bandwidth capacity; dual 8 or single 16-pair wire supported</li> <li>- Supports both 25Gbps NRZ and 50Gbps PAM 4 signal transmission</li> <li>- 15 watt single port dissipative heat capacity</li> <li>- Enables use of copper as well as short and long reach optical applications</li> <li>- EEPROM in cable assembly</li> <li>- Cable Sizes: 32AWG-26AWG</li> </ul>
 <p>10G SFP+ Cable Assembly</p>	<p>SFP+ cable assembly is designed to meet the requirements of Small Form Factor industry standard SFF-8431. Passive cable assemblies tailored to meet specific cable lengths while meeting all performance requirements. Amphenol ICC's SFP+ inter-connect system increases small form factor based port bandwidth density well above existing SFP or XFP systems.</p>	<ul style="list-style-type: none"> <li>- 10G Ethernet, Fibre Channel, InfiniBand &amp; SONET multi-platform support</li> <li>- Exceeds 10G Ethernet or Fibre Channel with optimized PCB and auto soldering</li> <li>- Enjoy a reduced power budget and lower port cost compared to optical</li> <li>- Supports a maximum 15 meter length for both passive and active solutions</li> </ul>
 <p>40G QSFP+ Cable Assembly</p>	<p>QSFP (Quad Small Form Factor Pluggable) cable assemblies are fully compliant with existing industry standard specifications such as the QSFP MSA and IBTA (InfiniBand Trade Association). The QSFP cables support bandwidth transmission requirements as defined by IEEE802.3ba (40Gb/s) and Infiniband QDR (4x10Gb/s per channel).</p>	<ul style="list-style-type: none"> <li>- 40G Ethernet, 6G SAS, InfiniBand and SONET multi-platform support</li> <li>- Exceeds 40G Ethernet or Infiniband QDR with optimized PCB and auto soldering</li> <li>- Supports up to a maximum 12 meter for passive plus active copper solution</li> <li>- Fully compatible with different I/O connector brands in the industry</li> </ul>
 <p>SFP28 Cable Assembly</p>	<p>SFP28 cable assemblies are designed to support applications for 25G Ethernet and 32G Fibre Channel. These SFP28 (25G) cable assemblies are assembled with twin-axial SKEWCLEAR® 2-Pair wire; optimized for bandwidth-intense applications such as 25Gb Ethernet, Fibre Channel, InfiniBand, and SONET. It is designed to the open-source SFF-8402 MSA standard in order to guarantee compatibility with the vast majority of SFP28 equipment in the market. This product complies to industrial standards SFF-8431/8432, SFF-8024, 25 Gigabit-Ethernet (25 GBASE-CU), Gigabit-Ethernet (IEEE 802.3by) and 32G Fiber Channel (32GFC Gen 6).</p>	<ul style="list-style-type: none"> <li>- 25G Ethernet, 32G Fibre Channel, InfiniBand &amp; SONET multi-platform support</li> <li>- Low cross-talk and pair-to-pair with SkewClear® Pair Wire</li> <li>- Enjoy a reduced power budget and lower port cost compared to optical</li> <li>- Supports maximum 5 meter length for passive solution</li> <li>- Complies to industrial standards SFF-8431/8432, SFF-8024, 25 Gigabit-Ethernet (25 GBASE-CU), Gigabit-Ethernet (IEEE 802.3by) and 32G Fiber Channel (32GFC Gen 6).</li> </ul>
 <p>mini-SAS HD Cable Assembly</p>	<p>Mini-SAS HD product is the present generation SAS storage interface addressing multi-channel bandwidth requirements of 6Gb/s, 12Gb/s, and 24Gb/s while meeting or exceeding SAS 2.1 SAS 3 and SAS 4 specifications. The Mini-SAS HD product provides greater port density (11mm port-to-port) versus the legacy Mini-SAS 2.1 product (19.01mm port-to-port). Is fully compliant to SFF-8643 and SFF-8644 industry specifications.</p>	<ul style="list-style-type: none"> <li>- Data Rate: 24 Gbps max.</li> <li>- Cable assemblies in 4x and 8x configurations</li> <li>- SAS 3, SAS4, and PCI Express compatible</li> </ul>
 <p>ExaMAX® 56G Backplane Cable Assembly</p>	<p>The ExaMAX® I/O system offers cable assemblies and I/O connector solutions for both internal and external applications. ExaMAX® I/O products are capable of delivering high speed performance of 25 Gb/s per channel with a path to 40 Gb/s and higher. The ExaMAX® I/O system delivers superior linear board signal density and meets the performance requirements of the OIF-CEI-25G-LR industry standard.</p>	<ul style="list-style-type: none"> <li>- Capable of supporting 25Gb/s data rates with a scalable migration path to 40Gb/s</li> <li>- Revolutionary beam-on-beam contact interface</li> <li>- Superior signal integrity performance due to minimized stub and impedance control; 40% lower mating force</li> <li>- Hermaphroditic mating interface protects mating beams</li> <li>- Efficient 92Ω design allows for support of both 85 and 100Ω systems</li> </ul>

We do not sell „products“ we offer „solutions“

ASSMANN WSW components is very well known as a system supplier for heatsinks, cable assemblies and connectors. We offer a broad line of standard cable assemblies. We are able to modify and develop cables based on customer's application and specification. Our focus is to provide solutions to meet customer's requirements by using our capabilities and our product portfolio:

**Product portfolio**

- Circular cable assemblies
- USB cable assemblies
- FFC/ FPC / Flat cable assemblies
- USB cable assemblies
- HDMI cable assemblies
- D-SUB cable assemblies
- Power Cords and power supply cables
- Customized cable harnesses
- Audio and video cable assemblies
- SATA cable assemblies

**Capabilities**

- IDC
- Crimping
- Soldering
- Clamp type
- Inkjet printing on cable coat
- Over-molding
- Hotmelt



Why ASSMANN  
WSW components?



- Technical drawing for each quote
- Broad range of wire type and material specifications
- Industrial approval process (drawing approval, sample approval, series production)
- UL-certified production plants in Asia and Europe
- Short delivery times for prototypes and samples
- Assembling with other manufacturers' components
- Adaptive to design changes
- Broad range of standard products
- Low-cost manufacturing plants in Slovakia (low quantities) and Asia (high quantities)
- PCN (Product Change Notification)



# USB 3.1 SuperSpeed+

## ASSMANN WSW USB 3.1 SuperSpeed+ Cables offer a whole new generation of connectivity

ASSMANN WSW USB 3.1 cables, along with their type-C connectors, combine all possible properties like power supply, charging, sync and data transfer with all USB-C enabled devices in a very quick and safe way. Despite the slick and low-profile design of the type-C connector, this corresponding cable harnesses have an incredible power within. Experience up to 10 Gbps transfer speeds which is about twenty times faster than USB 2.0 and two times faster than USB 3.0.



USB Type A ↔ USB Type C



USB Type C ↔ USB Type C

## Features

- Speed: Increased data transfer rates of about 10 Gbps
- Power: Increased power-handling capabilities to 100W
- Connector: reversible plug
- Special: versions with E-Marker for Power-Device

## Applications

- Consumer
- Data
- Industrial

All these cable assembly combinations are available according to USB.org in standard length of 1 meter and in following different configurations:

- USB 3.1 Type C(M) ↔ USB 2.0 Type A(M)
- USB 3.1 Type C(M) ↔ USB 2.0 Type B(M)
- USB 3.1 Type C(M) ↔ USB 2.0 Type Micro B(M)
- USB 3.1 Type C(M) ↔ USB 3.0 Type A(M)
- USB 3.1 Type C(M) ↔ USB 3.1 Type C(M)



Reversible Plug

## Standard USB Type C Cable – Order reference

Order reference	Datasheet	Product Description
A-USB31C-20A-100	ASS_7348_CA	USB cable, 1000mm, Black – USB 3.1 Type C(M) ↔ USB 2.0 Type A(M)
A-USB31C-20B-100	ASS_7349_CA	USB cable, 1000mm, Black – USB 3.1 Type C(M) ↔ USB 2.0 Type B(M)
A-USB31C-20MB-100	ASS_7350_CA	USB cable, 1000mm, Black – USB 3.1 Type C(M) ↔ USB 2.0 Type Micro B(M)
A-USB31C-31A-100	ASS_7351_CA	USB cable, 1000mm, Black – USB 3.1 Type C(M) ↔ USB 3.0 Type A(M)
A-USB31C-31C-100	ASS_7656_CA	USB cable, 1000mm, Black – USB 3.1 Type C(M) ↔ USB 3.1 Type C(M)

## M12 Power Connectors and molded Cable Assemblies



**The latest offering of Lumberg Automation M12 power connectors is the market's strongest connection in such compact housing.**

The M12 Power Connector opens the world of conventional M12 to high power transmission. With up to 5 Pins and 2.5mm<sup>2</sup>, it is able to carry 16 A at max. 630 V. Thanks to the innovative design, it has the highest reliability, even in harsh environments.

- **Secure** – outstanding performance in power transmission while fulfilling global standards (UL, VDE); designed according to DIN EN 61076-2-111.
- **Operational reliability** – transmitting high power even at high ambient temperatures; higher derating grants maximum uptime in production.
- **Comprehensive** – a wide range of codings (S-, L-, K- & T-) molded, attachable and receptacle, combined with a strong diversity of cables; an ideal solution for nearly all markets and applications.

The M12 Power is your answer to the increasing demand for reliable and powerful connectivity in the smallest possible housings. This also follows the “miniaturization” trend of Industrie 4.0/IIoT.



### Applications

All M12 Power Connectors are designed for permanent usage, even within harsh environments. The special connection design allows for use in high temperatures and in demanding applications. The M12's K- and S-codings are designed for AC power supplies with 630 V AC/16 A, making it the ideal solution as a power connection for AC motors and drives, frequency inverters, motor control switches, auxiliary power distribution for control systems and direct wiring of LED and conventional lighting fixture systems.

The L- and T-coding versions are designed for DC power supplies with 63 V DC/16 A, which works well for low-voltage applications, such as power supplies for fieldbus Ethernet components, network devices, motors and drives and direct wiring of LED and conventional lighting fixture systems.

With its PNO-conformity, the L-coding meets the strictest industry standards for the new generation of I/O boxes (in combination with gray jacket and FE = functional earth).

### Your Benefits

The Lumberg Automation M12 Power Connector is the best choice when transmitting high power in space restricted areas. The high voltage and current ratings, combined with the high derating in harsh environmental conditions, make this product portfolio unique in today's competitive market.

With all available variants (attachable, molded, receptacle), cable diversity from 0.75 mm<sup>2</sup> up to 2.5 mm<sup>2</sup>, shielding and different cable materials, this series offers the best products for every environment. The robust and compact design plus its VDE/UL approval opens a variety of new applications for using M12 Power.

### Benefits at a Glance

- Comprehensive product portfolio - your one-stop solution
- Market's strongest M12-connector with ratings for 16 A up to 630 V
- Safe machine communication thanks to optional 360° shieldings
- Flexible for any application with temperature range from -40°C to +125°C
- Suitable for every purpose with its conductor size from 0.75 mm<sup>2</sup> up to 2.5 mm<sup>2</sup>
- Conductor size of 2.5 mm<sup>2</sup> enables power supply over the longest distances (L & K)
- Ruggedized for performance – protection class IP65, IP67, IP69K
- Colored contact bearer for easy identification of the coding
- Latest crimp-technology for highest reliability

## PushPull IP20 Cable Assembly for Applications with Limited Space

Harting has increased their intensive RJ45 cable assembly Product portfolio with a new unique PushPull IP20 technology. Due to the trend of miniaturization space for mating becomes more and more smaller.

This has the consequence that operating the unlocking tab of a conventional RJ45 connector often can be very difficult and in some cases even impossible. For such application Harting provides the new RJ45 PushPull IP20 solution. Instead of the unlocking process for conventional RJ45 connectors where you have to press the tab, at a PushPull IP20 connector you can easily release the locking by pulling the housing of the connector. The PushPull locking works with any standard RJ45 sockets and jacks and locks itself by inserting.

With this new lock and unlock mechanism Harting PushPull IP20 cable assemblies are very interesting for like patching in densely packed data center patch panels, difficult-to-access consolidation points or subscriber ports in floor boxes.



The Harting PushPull IP20 cable assemblies with 360° shielded RJ45 plugs meet transmission performances of Cat.5e/Class D and Cat.6A/Class EA according to ISO/IEC 11801. To prevent mishandling each end of Harting PushPull IP20 cable assemblies is fitted with the flag as shown below:



Harting PushPull IP20 cable assemblies are available in several colors and different standard length so that a wide range of installation technologies can be fulfilled. Harting continues to strengthen its position as a leader in the connectivity solutions.

### Part Numbers PushPull IP20 Patchcord

Cat.6A DualBoot® 1:1		Cat.5e DualBoot® 1:1	
grey	09 48 88 88 576 xxx	grey	09 48 89 89 595 xxx
red	09 48 88 88 577 xxx	red	09 48 89 89 596 xxx
yellow	09 48 88 88 578 xxx	yellow	09 48 89 89 597 xxx
green	09 48 88 88 579 xxx	green	09 48 89 89 598 xxx
blue	09 48 88 88 580 xxx	blue	09 48 89 89 598 xxx
orange	09 48 88 88 592 xxx	orange	09 48 89 89 593 xxx

xxx = length in dm  
(standard length: 5, 10, 15, 20, 25, 30, 50, 75 and 100 dm), e.g. 005 for 5 dm length

## VarioBoot RJ45 Cat. 6A Cable Compact, agile and cost-optimised

Made-to-measure problem-solving with standard components – the new overmoulded VarioBoot RJ45 Cat. 6A cable assemblies for 1/10Gbit/s transmission harmonise customer needs with a tailor-made standard. The application dictates the direction.

No matter what the cable routing needs to look like in the end, the HARTING VarioBoot RJ45 goes with you in all directions – without

interference or transmission loss. The path that the Cat. 6A line ends up taking, e.g. through the control cabinet, can be decided at the very end. A short pull on the anti-kink sleeve and a click in the desired direction is all it takes for the line to search out another path. Rounded off by its low height, the HARTING VarioBoot RJ45 offers the perfect solution.



### ORDERABLE PART NUMBER

- 09488484745005: VB RJ45 UaD –VB RJ45 UaD Cat.6A PUR 0.5m
- 09488484745010: VB RJ45 UaD –VB RJ45 UaD Cat.6A PUR 1.0m
- 09488484745020: VB RJ45 UaD –VB RJ45 UaD Cat.6A PUR 2.0m
- 09488484745030: VB RJ45 UaD –VB RJ45 UaD Cat.6A PUR 3.0m
- 09488484745050: VB RJ45 UaD –VB RJ45 UaD Cat.6A PUR 5.0m
- 09488484745075: VB RJ45 UaD –VB RJ45 UaD Cat.6A PUR 7.5m
- 09488484745100: VB RJ45 UaD –VB RJ45 UaD Cat.6A PUR 10m
- 09488484745150: VB RJ45 UaD –VB RJ45 UaD Cat.6A PUR 15m
- 09488484745200: VB RJ45 UaD –VB RJ45 UaD Cat.6A

# 3M™ Controlled Impedance Cable 7700 Series



3M DAC cable assemblies for SFP+ applications utilize two-pair jacketed 3M™ Twin Axial Cable to create highly-flexible, foldable, light-weight and high-performance solutions with up to 10 Gbps, that are compliant with the SFF-8431 standard.

The enhanced small form-factor pluggable (SFP+) is backwards compatible with SFP, and is a common industry form factor supported by many vendors in the networking and telecommunications spaces. SFP+ applications are one of the largest direct-attach copper assembly opportunities due to top-of-rack (ToR) switches being adopted in the growing data center market.

3M Cable Assemblies for SFP+ applications are currently available up to 5 meters using 30 AWG cable compared to competitors who typically use 24 or 26 AWG for 5 meter SFP+ applications. 3M is anticipating a larger AWG solution (24 or 26 AWG), which is targeted to address 10 Gbps applications up to 10 meters.

Shortly 3M will launch the next generation for SFP28 applications which addresses 25 Gbps

## Market Segments/Customer Applications

### Networking/Data Centers

- 8 Gbps Fibre Channel
- 10 Gigabit Ethernet
- Fibre Channel over Ethernet
- Top-of-rack and end-of-row equipment
- Routers, servers and storage
- Networking Interface Cards (NICs)



### Telecommunications

- Hubs
- Switches
- Telecom networks



# High Density Micro Interconnect Solutions & Cable Assembly



ITT Cannon's Micro product family is engineered for applications that require reliable, high-density solutions and when required can withstand up to 230°C of continuous operating temperature for 500 hours. From industry standard 835 13 interconnects to ITT's Ultra High Temp Micro-MDM, these solutions uses up to 100, high performance micro twist pin contacts or special arrangements of power and coaxial contacts rated up to 3A.



### Custom Cabling Solutions

ITT's Micro capabilities include discrete wire terminations to multi wire cable harnesses with multiple connector configurations as part of the final assembly. ITT also specialize in providing terminated flex circuit assemblies, high temperature geophysical cable assemblies that consist of nickel-plated copper wire PTFE jacket per M22759/87, innovative medical electronics cable assemblies, over-mold strain relief systems, and EMI shielded terminations.

### Applications

- Oil Exploration
- Down-hole Drilling
- Satellites
- Military or Aerospace Electronics
- UAVs
- Missile Systems
- Instrumentation
- Test Equipment





# Customized Solutions for the Accelerating EV Charging Market

ITT Cannon's class leading UL and CE certified connectors, plugs, inlets, outlets and accessories offer recognized, trusted and proven charging solutions for today's e-mobility markets. Built in accordance with all key regional standards, ITT offers a fully comprehensive range of AC charging solutions covering Electric Vehicle Supply Equipment (EVSE) and Electric Vehicle (EV) applications. Furthermore, ITT supports customers with the CCS1 and CCS2 Series, which provides a unique liquid cooled High Power Connector for DC applications.

In addition to off-the-shelf solutions, ITT's EV portfolio is fully customizable to meet specific requirements and variants in colors, harnesses and terminals. By using common coupler connector/plug elements such as an ergonomically designed handle, robust contact system and strain relief system, ITT is able to serve global industry players with a consistent, recognizable look and feel to support their own product, user and brand experience.

## AC Charging Solutions

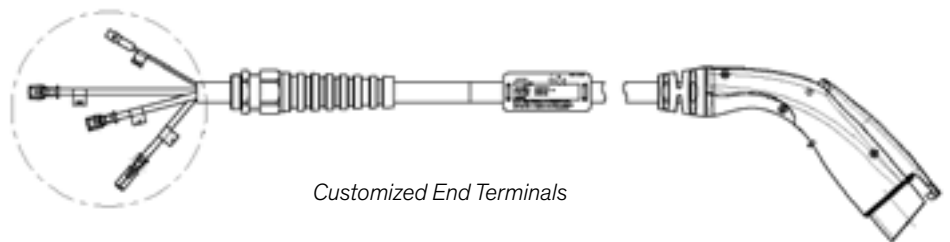
- Cable options certified and approved to regional requirements
- Sealing to meet and exceed specifications
- Single and triple phase variants
- Up to 80A AC Charging option
- Low contact resistance
- Minimum 10k mating cycles
- Connector and plug strain relief provides protection from cable overstressing
- Customized cables, end terminals and handles

## High Power, Liquid Cooled Charging Solutions

- Enables charging up to 500A at 1,000V
- CCS1 and CCS2 variants
- Dielectric liquid cooled cable, connector and contacts
- Minimized cable diameter and weight
- Ergonomic, flexible and easy to use
- 10k mating cycles



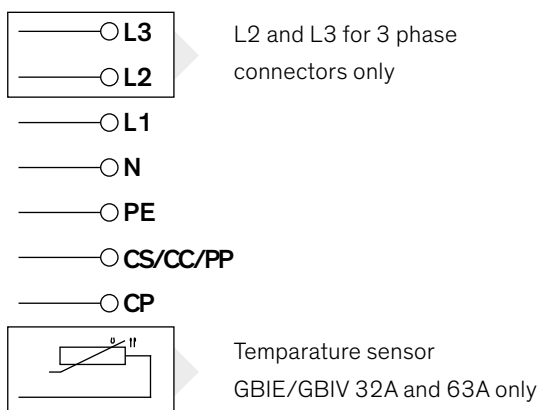
Customized Cables



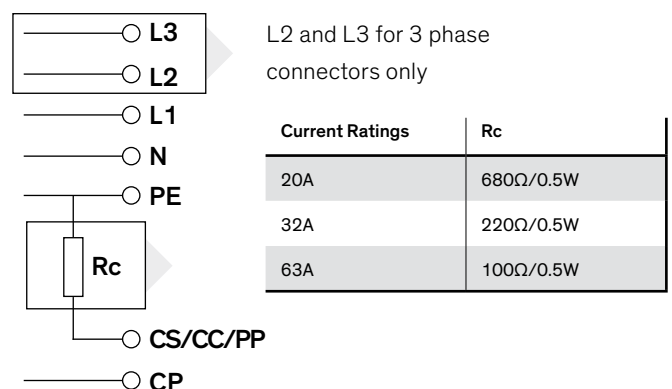
Customized End Terminals

## Wiring Solutions

### ECIER/ECIV/GBIE/GBIV



### ECCE/ECCV



## High Quality Harness Production

The harness production of JST Deutschland GmbH unifies high-quality products and flexible harness manufacturing. JST Deutschland GmbH is a reliable and cost-effective partner for your valuable application. We offer a fully-automatically production for a wide range of harnesses. It is proving our flexibility we also offer small lot size harnesses made by hand. Consult us for a free quote.

### Features

- Harness production IDC and Crimp
- Pitch sizes from 0.6 mm on
- Cable diameter from AWG 12 (6 mm<sup>2</sup>) to AWG 36 (0.013 mm<sup>2</sup>)
- Wire length from 28 mm to 60.000 mm
- In combination with JST connectors also parts from competitor companies can be handled on request.



### Your Benefit

- Sample production
- Low batches as well as high volume
- High quality: ISO/TS 16949: 2009 certified
- UL certified harness production available on request

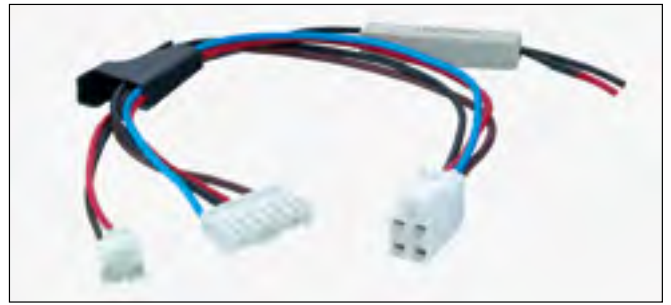
### Options of various terminations

capped		crimped	
stripped		double-crimped	
semi-stripped		sealed	
tin coated		ferrule	
twisted			

## Solutions in Automation: Your Special – Our Standard

The particular strength of Lutronic is – in addition to the standardized M8 & M12 industrial connectors – the development and production of customized solutions for equipment manufacturers.

With our own Lutronic companies in Europe, North America, China and Singapore, we serve international customers, worldwide.



### Customized Cable Assemblies M8 & M12

can be produced as a specialty with any connector type of any manufacturer



### Series M8 & M12

Actuator/Sensor Cordsets | with/without LED | IP65/IP67



### Series M8 & M12

Panel Mount Connectors | for front mounting | with stranded wires



[www.lutronic.biz](http://www.lutronic.biz)

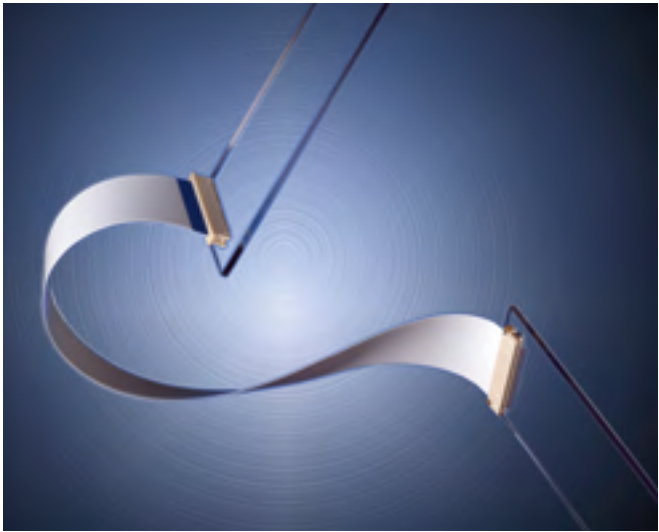
# Jumpers and Flexes

The marketplace continues to demand new and smaller electronic devices that are rugged and reliable, while OEMs strive to maximize profit margins and get their products to market quickly.

Premo-Flex cable jumpers offer an extensive range of custom and off-the-shelf options that enable designers to maximize PCB space, reduce component costs (e.g., by eliminating connectors with direct-to-board versions) and provide devices with reliable board-to-board connections.

### Product Highlights

- 0.30 – 5.08 mm pitch
- Range of 4 – 60 circuits for off-the-shelf, 80+ circuits for custom
- 3 insulations types (Polyester, Aramid, Polyimide) to meet multiple temperature ranges
- Varying lengths and thicknesses



For more information search Premo-Flex at [molex.com](http://molex.com)

---

## Premo-Flex Cable Jumpers

Delivering durable and extra flexible PCB-connection solutions, standard and custom Premo-Flex Cable Jumpers are available in a variety of options for use in virtually any industry.

Premo-Flex offers a complete line of 0.50, 1.00 and 1.25mm pitch flat flex cable (FFC) jumpers, available in cable thickness options of 0.12, 0.22 and 0.27mm, offers standard lengths, pitches and circuit sizes to solve complex board-to-board interconnection challenges in compact and hard to reach applications.

Molex's standard range of Premo-Flex includes options such as Round Flat Cable (RFC) Jumpers, Low-Voltage Differential Signal (LVDS) FFC Assemblies, Hot Bar Soldering and Etched Polyimide Cable Jumpers.

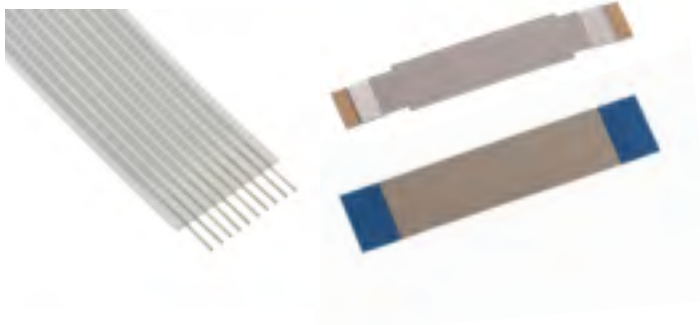
### Key Features

- Durable, low-cost, direct-to-PCB connections
- Ideal for rugged applications with space limitations, including automotive, consumer/home appliance, data/computing, industrial, medical, and aerospace and defense
- Round flat cable design delivers robust signal integrity in high-vibration environments

- Cost-effective direct connection to PCBs eliminates the need for connectors or wire stripping
- Customized cables are available in a variety of pitches, circuit sizes and terminations

### Applications

- Automotive
- Commercial Vehicle
- Consumer
- Defense
- Industrial
- Medical



For more information visit:  
[www.molex.com/product/premoflex\\_ffc-fpc.html](http://www.molex.com/product/premoflex_ffc-fpc.html)



## Copper Flex Assemblies

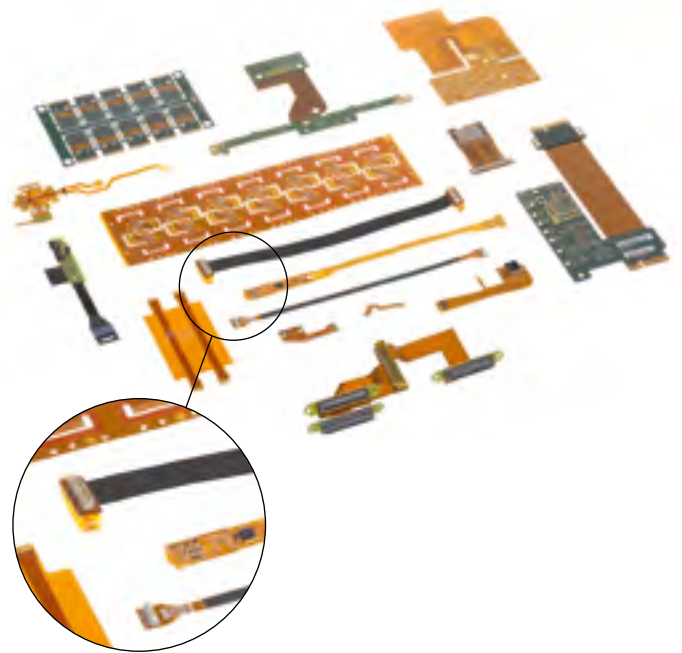
Flex jumpers are used as high-density point-to-point jumpers where space, routing or weight are concerned. Jumpers are also used in dynamic flexing applications such as hinges and hand-held devices. Generally used with ZIF-style or board-to-board connectors. Molex's Copper Flex Jumpers are a low-cost way of interconnecting boards.

### Key features

- Typically 2 or more layers
- Tight line and space widths
- Reduces weight
- Better thermal characteristics than standard rigid board constructions
- ZIF jumpers available
- Flex types include double-sided and multi-layer

### Applications

- Commercial Vehicle
- Consumer
- Industrial
- Medical



For more information visit:

[www.molex.com/product/switch/flexcirc.html](http://www.molex.com/product/switch/flexcirc.html)

## Picoflex Ribbon-Cable Connectors and Jumpers

The Molex 1.27mm Picoflex IDT connector system is a versatile, highly reliable connector system for high-density power and signal ribbon cable applications, where space and real estate is at a premium. The compact headers and receptacles are ideal for space-constrained applications that require 1.27mm industry-standard cable.

The system comprises PCB headers, cable connectors and standard ribbon cable assemblies in various lengths and circuit sizes.

### Key Features

- Strong one-piece upper housing
- Robust multi-point contacts
- Locking features
- Cable strain relief
- Multiple jumpers available – standard and PCB-to-IDT, including Z style

### Applications

- Industrial
- Automotive
- Medical
- Consumer
- Home Appliance



For more information search Picoflex at [molex.com](http://molex.com)

# Standard I/O Assemblies

Molex offers an expansive product line of I/O connectors and matching cable assemblies including USB, HDMI, D-Sub, Modular Jacks, SFP, QSFP+, CXP, iPass+, iPass+ HD and more. This extensive selection of I/O connectors and matching cable assemblies includes numerous next-generation solutions.

Molex is a leader in many industry standard committees and working groups to develop and specify high-performance I/O's throughout a wide variety of industries. These include SAS, SATA, PCIe, HSSG, FIBRE CHANNEL, INFINIBAND, IEC, CEA, IEEE, VESA, USB and many more.

**Molex's standard I/O offering supports a wide range of amperage, with a suitable connector and cable assembly for almost every application. The range includes:**

- USB Products and Solutions
- DisplayPort and MiniDisplayPort Interconnect System
- HDMI Connectors and Cable Assemblies
- MicroCross DVI Connectors and Cable Assemblies
- HandyLink I/O Interconnect System
- BiPass I/O High-Speed Solutions
- RF Cable Assemblies



For more information search io cable assemblies at [molex.com](http://molex.com)

# RF Cable Assemblies

From traditional configurations to custom, multi-port and bundled solutions, Molex expertise ensures you get the right RF cable assembly for your application's needs.

Whether you're designing for smaller spaces, high-vibration environments or another challenging application, Molex has the expertise to develop a high-quality, custom solution that ensures reliability and performance. Molex RF connector designs can accommodate standard RG braided cables, micro coax, semi-rigid cable, vendor specific custom cables, LMR types and hand conformable cables.

With a broad portfolio and a wide array of sizes and configurations, Molex has the solution for your cable assembly requirements.

### Key Features

- Wide range of coaxial cable options and interfaces
- Non-magnetic version available
- 50- and 75-Ohm styles
- Factory tested for 100% hi-pot and continuity

### Applications

- Consumer
- Medical
- Networking
- Data/communications



For more information visit: [www.molex.com/link/rfmicrowavecoax.html](http://www.molex.com/link/rfmicrowavecoax.html)



## SFP and SFP+ Interconnect Solutions

SFP+ interconnects are designed to support applications for 8 Gbps Fibre Channel and 10 Gbps Gigabit Ethernet. SFP+ interconnects use the same space-per-port as standard SFP interconnects. SFP interconnects are designed to support for 1.125 Gbps Fibre Channel and 2.5 Gbps Gigabit Ethernet applications. In addition to cages, connectors and cable assemblies, Molex offers loopback adapters, lightpipe cover assemblies and sealed optical assemblies for both SFP+ and SFP.

### Key Features

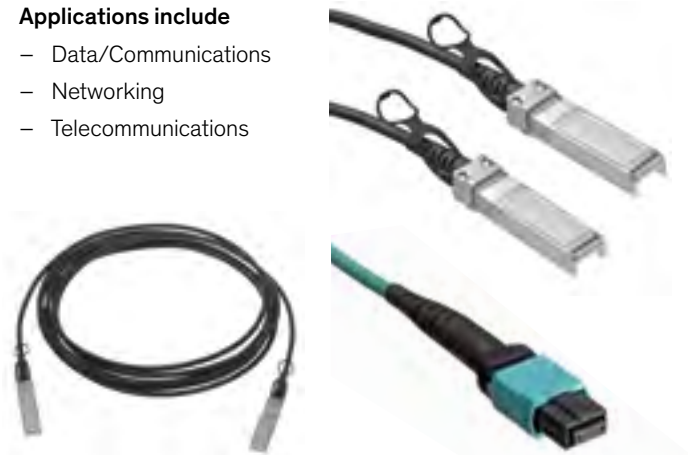
- Supports 2.5 to 10 Gbps data rates
- Meets Ethernet and Fibre Channel industry standards
- SMT design packaged in tape and reel to ensure easy pick-and-place to the PCB
- Cables feature hot-pluggable transceivers and zinc diecast backshells
- Cages available as single row or stacked

Expanding on this solution, zQSFP+ and QSFP+ Integrated Product Systems support Ethernet, Fibre Channel, SAS and InfiniBand Enhanced Data Rate (EDR) applications. Molex's QSFP+ and zQSFP+

Interconnect Systems transmit up to 28 Gbps per-serial-lane and offer thermal protection and Temp-Flex and Optical Cable Assemblies to ensure excellent signal integrity (SI) and prevent electromagnetic interference (EMI)

### Applications include

- Data/Communications
- Networking
- Telecommunications



For more information visit:  
[www.molex.com/link/sfp+.html](http://www.molex.com/link/sfp+.html)

## Automotive Harnesses

Molex cable assemblies provide designers with an extensive selection of interconnect solutions across a wide range of applications in the Automotive market. Molex's range of Automotive harness solutions include product families such as FAKRA, HSAutoLink, Mini50 and more.

### These systems provide an integrated solution in areas such as:

- Connected Mobility
- Safety and Driver Assist
- Powertrain
- Body Electronics
- Comfort and Infotainment

Designed for automotive telematics applications, FAKRA PCB, Cable and Sealed Connection Systems include features such as colour-coded and keyed shrouds, IP69K rating for sealed version and meets USCAR specifications. Applications include audio, navigation and infotainment equipment, Bluetooth and GPS.

Expanding on this family, Molex has recently introduced the High-Speed FAKRA Mini (HFM) Coaxial Cable Solution. This solution delivers 20 GHz of data speed for the connected vehicle, supporting any modern radar, camera, LiDAR or sensor applications.

Automotive harnesses such as Squib Right-Angle AK-2 Cable Assemblies achieve fail-safe connections in critical vehicle safety-restraint-system (SRS) applications. These harnesses are fully compatible to the two-way interface Code 1, 2 and 3, as defined by the global industry specifications. Applications include airbags, seatbelt pretensioners and active hood lift systems.



For more information search automotive harness at [molex.com](http://molex.com)

# Off-the-Shelf Overmolded Cable Assemblies

Molex off-the-shelf Overmolded Cable Assemblies help solve tooling start-up costs by providing a completed assembly that meets the IPC-specification design. Available immediately in select circuit sizes, Molex eliminates both design and tooling time. Providing multiple circuit sizes and cable lengths, Molex combines rugged signal connection with a user-friendly interface.

### Key features

- Capable of carrying 5.0 to 80.0A
- Overmolded strain relief
- Fully isolated terminals
- Positive latching on housings
- Double-ended assemblies

### Applications

- Consumer
- Data/communications
- Industrial
- Networking



For more information visit: [www.molex.com/link/overmolded.html](http://www.molex.com/link/overmolded.html)

---

# Off-the-Shelf Discrete Wire Cable Assemblies

Molex delivers a complete cable solution with off-the-shelf availability for a broad range of Molex connectors and a variety of cable lengths, facilitating prototyping and global production.

Offering the power, small form factor and premium housing features of some of its most popular connectors, Molex OTS cable assemblies can reduce costs associated with tooling, ease design requirements and expedite time to market. Molex provides the convenience of using one vendor for the entire cable solution.

### Key Features

- Discrete cable assemblies with a range of Molex Connectors available off-the-shelf
- Meets current cable assembly industry standards
- Meets 2011/65/EU RoHS Compliance
- UL 1061 and UL 1007 discrete wires
- Pin-to-pin mapping from receptacle to PCB header
- Custom assemblies for production also available

### Applications

- Consumer
- Medical
- Commercial Vehicle
- Data/Computing



For more information search discrete cable assembly at [molex.com](http://molex.com)



## Pre-Crimped Leads

Molex's range of pre-crimped leads offer a simple and cost-effective solution for any pre-production and prototype requirements. Designed to help decrease time to market, these leads eliminate high investment in production tooling for customers who are still at the design-in or pre-production phase.

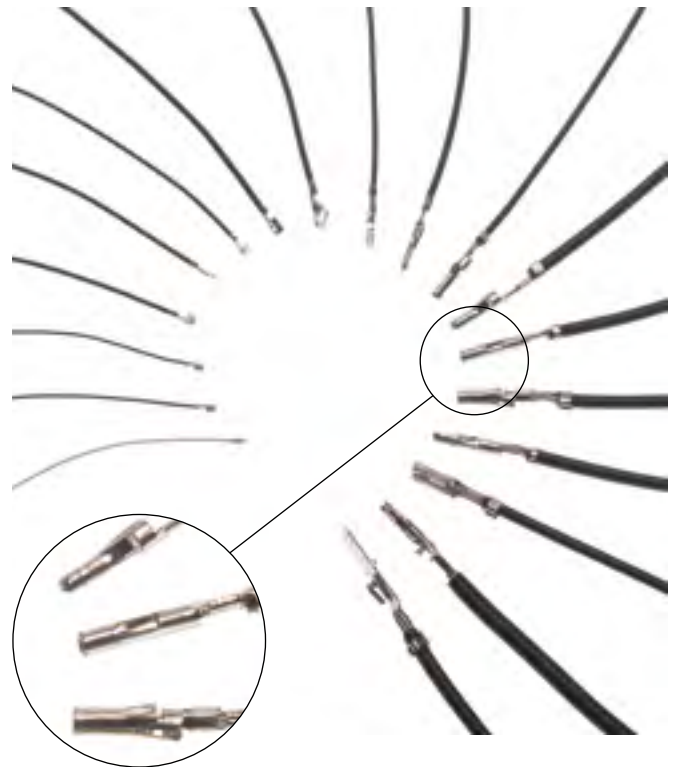
Available for the most popular Molex connector families, the leads are offered in female-to-female and male-to-male configurations and lengths of 150mm and 300mm. Available for a wide range of markets and applications.

### Key features

- Pre-crimped and fully tested cables
- Available in 150mm and 300mm lengths
- Leads crimped on both ends
- UL listed cables
- Available for most popular Molex families

For more information visit:

[www.molex.com/link/precrimped.html](http://www.molex.com/link/precrimped.html)



## Complex Cable Assemblies

Plug-and-play cable options typically offer a single connector on either end, resulting in the necessity for multiple cable assemblies. This takes up precious real estate at a time when more space is needed to provide growing capability demands within smaller products. Complex Cable Assemblies can make multiple connections with one assembly and maximize real estate, freeing up space for additional equipment.

Currently, manufacturers have to install multiple cable assemblies, taking up a great deal of time and increasing labor costs. Molex Complex Cable Assemblies provide plug-and-play convenience, enabling faster installation times and reduced labor.

Often when customers need cable assemblies, they work with multiple vendors to acquire connectors, cables and the actual assembly. Molex is a global manufacturer of connectors and cable assemblies, too, providing a complete connectivity solution.

### Key Features

- Mechanical and electrical designs, development, testing and prototyping support provided
- Global manufacturing, material sourcing and tooling capabilities
- IDT, crimp, solder and welded terminations
- Overmold option available



For more information visit:

[www.molex.com](http://www.molex.com)

Molex's Brad connectors and cables provide one convenient source for specifying numerous passive interconnect and industrial communications requirements, whilst reliably withstanding harsh industrial environments. Standard Brad system solutions simplify design, installation and maintenance processes.

Selecting the right cable for your application is very important to ensure a reliable, problem-free installation. Careful consideration of mechanical abrasion, fluid/chemical exposure, flexibility (drag chain, C-track, torsion), temperature rating and flame retardancy is required to select the cable that will provide performance and reliability in service. The Brad product line offers a complete range of cables, including five standard cable types satisfying most applications.

In all cases, Brad cordsets are available in standard and non-standard lengths. Brad PVC, PUR and TPE cordsets are manufactured with high performance materials and include UL/CSA approvals to ensure compatibility with both European and North American market requirements.

### Brad Micro-Change (M12) Connectors and Cordsets

Brad M12 Micro-Change connectors and cordsets deliver fast and simple replacement of sensors, encoders, switches, and other input and output devices in industrial machinery through superior quality to withstand harsh industrial and weather environments. The Micro-Change comprehensive offering provides a complete connectivity solution.

#### Key Features

- Available in 2- through 5-, 8- and 12-pole IEC compliant configurations
- Single- and dual-keyway designs
- Straight and 90° plugs
- Harsh duty receptacles available with superior EMI/RFI shielding

#### Cables Types Available

- PVC cables for light, cost-sensitive industrial applications
- Weld-slag Oil-resistant (WSOR) cables for cost-sensitive, outdoor applications demanding flexibility
- PUR cables for moderate flexing and for environments encountering cutting fluids and oils
- TPE cables for continuous-flex applications; also ideal for welding cells; cable is weld slag resistant



### Brad Nano-Change (M8) Products

Nano-Change connectors are designed to withstand harsh industrial and weather environments. These connectors are used to interconnect miniature sensors and actuators found in industrial control applications.

#### Key Features

- Small, compact M8 design suited for sealed applications
- Cordsers, receptacles and pre-wired distribution boxes are available in 3, 4, and 5 pole IEC compliant configurations
- Patented anti-vibration feature
- Rated to 60 VAC/ 75VDC, up to 4.0A

#### Cordset Options

- Available with snap or threaded coupler
- Male and female options available
- Straight and 90 degrees
- PUR/PVC/TPE cable options

To view more from the Brad Industrial Automation range visit: [www.molex.com/bradautomation.html](http://www.molex.com/bradautomation.html)

# Molex ready-to-use antennas make it easy to create a truly connected IoT application



In today's connected world, antennas enable devices to communicate wirelessly - even across great distances. This not only allows people to move freely without compromising their connectivity, but also provides the ability to create wireless networks of devices and sensors. Antennas make it easy and cost effective for connected homes, automated building networks and remotely controlled applications to become a reality.

Molex has extensive experience in antenna technologies from concept to completion, using state of the art simulation software and measuring equipment. The Molex range of ready-to-use antennas,

featuring patented technologies, are compact, high performing and available in multiple form factors for all common antenna protocols and frequencies used in IoT, automotive, industrial and medical applications.



With frequencies up to 6GHz and various mounting options available such as SMT, cabled or adhesive, the Molex portfolio of ready-to-use antennas includes:

- Internet of Things (IoT) Antennas: Wi-Fi, Bluetooth, Zigbee
- LTE Cellular Antennas
- GNSS/GPS Antennas
- Combo Antennas
- Near Field Communication (NFC) Antennas
- Ultra-Wideband (UWB) PCB Antenna with Balanced Transmission
- Industrial, Scientific and Medical (ISM) Antennas
- PowerLife Wireless Charging Coils

To find out more, contact your Molex representative at Arrow or visit [www.molex.com](http://www.molex.com) and search Antenna Solutions.

## ORDERABLE PART NUMBERS

- <https://www.arrow.com/en/manufacturers/molex/rf-and-microwave/rf-other/antennas>

## The latest Ready-to-Use Antennas now available from Molex

### External Antennas

#### 206866 Series: 3-in-1

#### (4G/Wi-Fi/GPS) External Antennas

- Fully balanced, IP66-rated antenna that offers high 4G, Wi-Fi and GPS signal performance in telematics, remote monitoring and other applications
- Compact and waterproof enabling space efficiency and easy integration into applications requiring IP66 protection
- 3m cables extend connectivity between the antenna and the application's 3 radio devices for their respective 4G, Wi-Fi and GPS operations
- Cable connectors allow customisation with other connectors including SMA, MMCX and more



### GNSS Antennas

GNSS Active Patch and Flexible antennas compliment ceramic and LDS-chip selections for superior signal processing and ground impedance over a wide range of navigation and tracking applications.

#### 206640 Series: GNSS Active Patch Antenna with Low-Noise Amplifier

- Ceramic patch antenna delivers high gain, high radiation efficiency performance for the most demanding GPS applications
- Microcoaxial RF connectors secure to the application's device radio
- PCB with integrated LNAs and SAW filter

#### 206560 Series: GNSS Flexible Antenna

- Topside of the poly-flexible antenna makes for easy peel-and-stick mounting
- Double-sided adhesive on the antenna reverse enables instant application on the inner wall of the device chassis
- 6 micro-coaxial cable length options extend connectivity for maximum design flexibility
- UFL-type connector secures to the application's device radio

## ORDERABLE SERIES

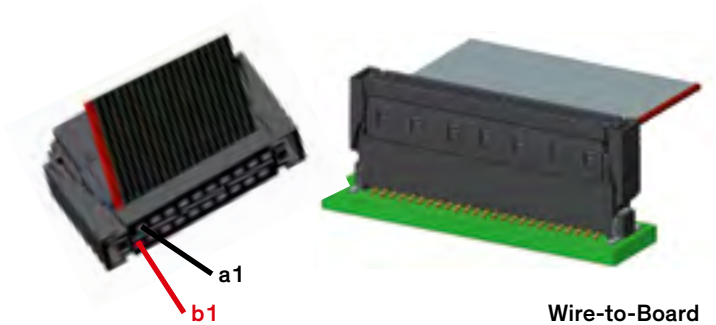
- 206866, 206560 and 206640



# LAT-CON127 Connector System and Cable Assemblies

## Connector system for PCS & Cable Assembly - Pitch 1.27mm (.050")

- Wide range of Board-to-Board and Wire-to-Board connectors
- Tested compatibility with other suppliers
- Cable assemblies are 100% compatible to ERNI with the red wire on position b1
- Request for quote of the cable assembly with indication of the pole number and cable length
- Reliable double sided spring contact
- Male and Female connectors in 2 heights, 9 pole sizes



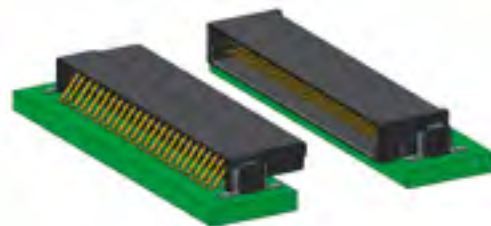
Wire-to-Board



Board-to-Board



Vertikal



Horizontal

Style	Part No. Description
	<b>033-0XX-465</b> Female Cable (IDC)
	<b>033L0XX-167U</b> Male Straight Low Profile
	<b>033L0XX-467U</b> Female Straight Low Profile
	<b>033M0XX-167U</b> Male Straight Mid Profile
	<b>033M0XX-467U</b> Female Straight Mid Profile
	<b>033-0XX-067U</b> Male 90°
	<b>033-0XX-467U</b> Female 90°

XX: No. of Poles = 12 / 16 / 20 / 26 / 32 / 40 / 50 / 68 / 80





Phoenix Contact offers suitable cables and lines for signal, data, and power transmission. Use pre-assembled cable versions or assemble your plug-in connections yourself. In addition to the comprehensive range for field installation, Phoenix Contact offers solutions for copper and FO cabling as well as for photovoltaics.

### Product range

- Copper cables with an IP20, IP65/67/68/69K degree of protection for data cabling with up to 10 Gbps
- FO cables with IP20 and IP65/67 degree of protection for transmission speeds up to 40 Gbps, inclusive of POF, PCF, GOF (multi mode and single mode) fiber types
- Photovoltaic cables as DC cables for assembly with IP68 protective caps

### Features & Benefits

- Wide range of applications, thanks to diverse connector types
- Consistent cabling from the control cabinet to field level
- High degree of flexibility, thanks to customer-specific versions
- Reliable connections for high availability of your production systems

### Applications

- Structured cabling for building infrastructures
- Energy and data transmission in telecommunications or for renewable energies
- Industrial energy and data transmission
- Energy supply and control of motors

### ORDERABLE PART NUMBER

– 1417414	SAC-5PH-M-F/2XF SH1 SCO
– 1422556	NBC-M12MSD/10.0-93E/R4AC AR
– 1420524	SAC-5P-MS/6.0-920/FS SCO AR
– 1402321	SAC-5P-MS/5.0-920/FS SCO AR
– 1518229	SAC-5P-5.0-920/FS SCO
– 1402323	SAC-5P-MS/10.0-920/FS SCO AR
– 1423417	NBC-M12MSD/5.0-93E/R4AC AR
– 1627366	EV-T2G3C-1AC32A-5,0M6,0ESBK01
– 1425947	SAC-5P-3,0-920/M12FS AR
– 1402313	SAC-5P-1.0-920/FS SCO AR

## Tailor-made Connection Technology through Customer-specific Cable Assembly



Phoenix Contact supports you in a fast and competent way, when it comes to the implementation of individual cable systems and assemblies. Our service center will give you comprehensive advice regarding all planning steps and realize your wishes in every detail. Within just a few days you will receive your cable assembly, exactly tailored to the requirements of your application.

### Features & Benefits

- Processing of all cables and connectors offered on the market for data, signal, and power transmission
- Time- and cost-optimized final assembly
- Reduction of logistics costs thanks to a significantly reduced variety of individual parts

### Assembly

Thanks to a multitude of designs, codings, and pin assignments, we can provide you with consistent solutions – if desired, also assemblies with add-on components.



### Marking

We print your cables according to your specifications. Whether printing directly on the cable or using wrap-around labels – we offer the appropriate marking solution for every requirement.



### Labeling and packaging

Your cable assemblies are delivered in individual packaging, with your logo or a bar code as an option.



High transmission speed, optimum attenuation properties, resistant to electromagnetic interference: FO cables are the modern industrial standard. For cables sold by the meter and assembled cables, you can choose between POF, PCF, and GOF with a core diameter of 50  $\mu\text{m}$  and 62.5  $\mu\text{m}$  (multimode) and 9  $\mu\text{m}$  (single mode).

Also, implement flexible, consistent data transmission solutions based on our comprehensive range of standardized FO connectors. Phoenix Contact cables and connection systems offer solutions for various fields of applications.

### Features & Benefits

- Wide product range with all common fiber types sold by the meter
- Fast assembly in the field using professional tools
- Comprehensive product range for all common networks and fieldbuses

### Applications

- Industrial automation
- Mining
- Building Infrastructure
- Power plant solutions
- Data center
- Control rooms and substations



### ORDERABLE PART NUMBER

- 2989297 FL SM PATCH 2,0 LC-SC
- 1409816 FOC-ST:A-LC:A-GZ01/1
- 2901800 FL MM PATCH 5,0 LC-SC
- 2989158 FL MM PATCH 1,0 LC-LC
- 1400702 FOC-ST:A-LC:A-GZ02/2
- 2989187 FL SM PATCH 1,0 LC-LC
- 1400621 FOC-LC:A-LC:A-GZ02/2
- 1012910 FOC-FS:A-FS:A-HB03/1,5

## Ideally suited for Railway Applications: M12 with Push-Pull Fast Locking System

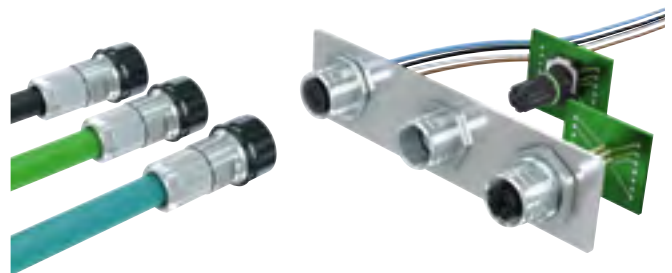
Lock the new M12 connectors with push-pull fast locking system easily and securely with just one click. The trick is that the connector springs back if it is not properly locked. Cross-manufacturer connection compatibility ensures superior availability worldwide.

### Features & Benefits

- Convenient and secure connecting, thanks to the manufacturer-independent locking system
- Reliable shield connection even under extreme mechanical strain
- Connector skips back when not snapped correctly
- Suitable for railway applications exposed to strong shocks and vibrations

### Applications

- Railway applications
- Controllers
- Automation solutions
- Bus interfaces
- Remote I/O systems



### ORDERABLE PART NUMBER

- | Field side | Device side |
|------------|-------------|
| - 1021815  | - 1027678   |
| - 1021783  | - 1027662   |
| - 1021831  | - 1027696   |
| - 1021830  | - 1027669   |
| - 1021816  | - 1027686   |
| - 1021784  | - 1027683   |
|            | - 1027666   |
|            | - 1027670   |

**Outstanding electrical performance, low loss and high frequency characterize the extensive range of Radiall cable assemblies.**

The range includes flexible, semi rigid and handformable cable assemblies with a combination of cable and connectors optimized for each market or application. The TestPro4™ range is the preferred choice for test and lab measurements.

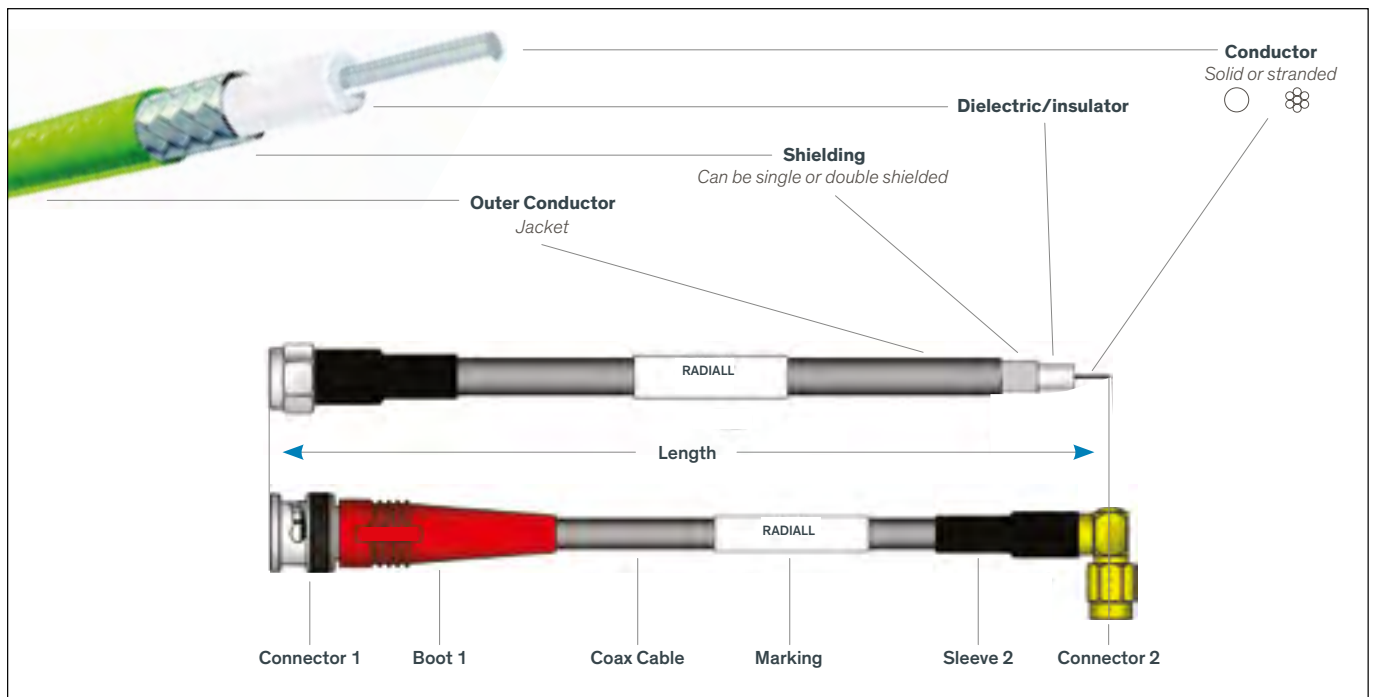
### The Radiall Navigator™

The Radiall Navigator™ is designed to assist our partners and customers providing information about Radiall products as easy as possible in one single document. We recognize that time is a very limited and valuable asset. With this in mind, we have created Radiall Navigator as a supplemental guide to information available in our catalogs and on our website ([www.radiall.com](http://www.radiall.com)).

### Cable Type



### Cable Dimensions mm (Inch)



You can find the document at:  
[www.radiall.com/media/wysiwyg/CableAssemblies\\_WEB.pdf](http://www.radiall.com/media/wysiwyg/CableAssemblies_WEB.pdf)



**Solutionator® Online RF Assembly Builder**

Solutionator® is Samtec’s online parametric filter that lets you easily choose your product and board-level mate in a matter of minutes. It also connects you directly to live chat with an RF engineer, view engineering drawings and request samples and quotes.

For more information visit:  
rf.samtec.com

**Mix-and-Match End Options**

Standard cable assemblies with standard pricing and lead times.

**ORDERABLE PART NUMBER**  
– SMA-J-P-H-ST-TH1

HIGH FREQUENCY MICROWAVE				50 Ω RF CABLES				75 Ω RF CABLES			
Cable	AWG	End Options	Series	Cable	AWG	End Options	Series	Cable	AWG	End Options	Series
MWC-2350CU-01	23	2.92 mm, 2.40 mm, SMA, SMP	RF23C	0.81	36	MHF1, MHF3, MHF4, SMA	MH081	RG 179	30	MCX, MMCX7, SMB, BNC, DIN 1.0/2.3	RF179, GRF7-C, GRF7H-C
MWC-2350-01	23	3.50 mm	RF23S	1.13	32	MHF1, SMA	MH113	1855A	23	HD-BNC™, DIN 1.0/2.3	RFB8T
MWC-2550-01	25	SMA, SMP	RF25S	RG 178	30	MMCX, MCX, SMA, SMB, BNC, TNC, N Type	RF178	1694A	18	BNC, HD-BNC™, DIN 1.0/2.3	RFB6T
CCA-047	28	HMHF1, SMA	RF047	RG 174	26	MMCX, MMCXV, MCX, SMA, SMB, BNC, TNC, N Type	RF174	RG 6	18		RFA6T
RG 405	24	SMA, SMP	RF405	RG 316	26	MMCX, MMCXV, MCX, SMA, SMB, BNC, TNC, N Type	RF316, IJ5C, IJ5H, GRF1-C, GRF1H-C				
RG 402	19	SMA	RF402								

Go to [samtec.com/catalog](http://samtec.com/catalog) to order or view the RF Interconnect Catalog.





## 0.80 mm Pitch Tiger Eye™ Discrete Wire

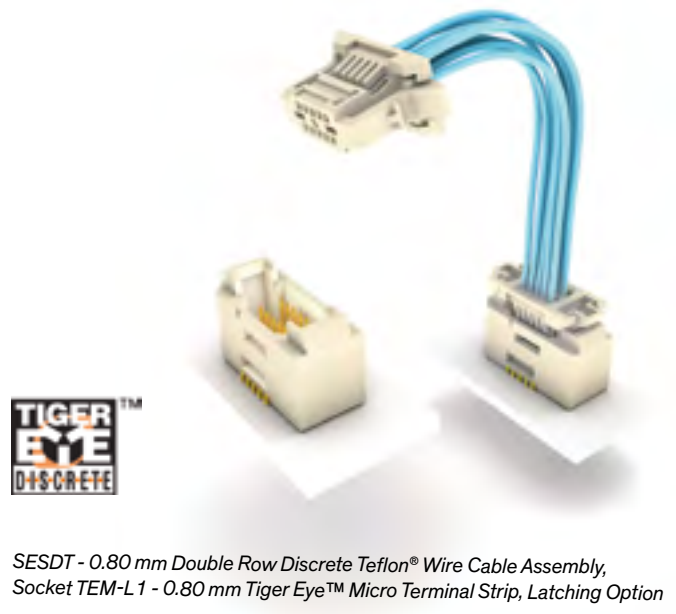
The 0.80 mm pitch Tiger Eye™ discrete wire socket cable assembly (SESdT Series) is available in a double row design with 32 AWG \*Teflon® cable for use in high temperature and other harsh environments where saving board space is crucial.

### Features

- High reliability Tiger Eye™ contact system
- Double row socket
- 10 to 40 total positions
- Standard 32 AWG Teflon® cable
- High mating cycles with board level terminal
- Rugged latching system for harsh environments
- Board level terminal with surface mount tails and through-hole weld tabs for increased stability
- Available as components or complete assemblies

### Tooling

- Hand Tool - CAT-HT-396-3232-12
- Mini Applicator - CAT-MA-396-3232-XX-03



*SESdT - 0.80 mm Double Row Discrete Teflon® Wire Cable Assembly, Socket TEM-L1 - 0.80 mm Tiger Eye™ Micro Terminal Strip, Latching Option*

### AVAILABLE SERIES

- SESdT
- TEM-L1

## 1.00 mm Pitch Discrete Wire System

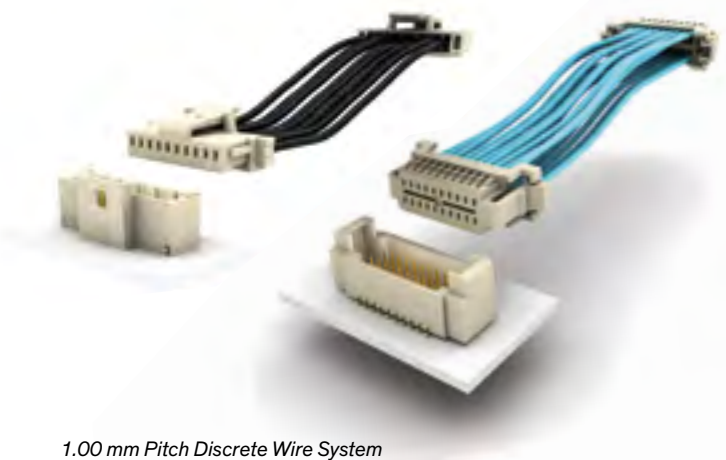
The 1.00 mm Pitch Discrete Wire System provides crimp-style dual leaf contacts for a reliable wire-to-board connection where saving board space is crucial. The 1.00 mm Double Row Discrete Wire Cable Assembly, Socket (S1SD series) and 1.00 mm Discrete Wire Terminal Strip (T1M series) are now available with up to 20 contacts per row.

### Features

- 1.00 mm (.0394") pitch
- Crimp-style dual leaf contact system
- Rugged positive latching for increased retention
- Socket or terminal, single or double row assemblies
- Vertical and right-angle mating headers
- 28 and 30 AWG cable options in PVC or Teflon™
- Supports 2, 3, 4, 5, 10, 15 and 20 contacts per row (S1SD/T1M series)
- Available as components or complete assemblies
- Custom solutions available

### Tooling

- Hand Tool - CAT-HT-309-2830-12
- Bench Mount Clamp - CAT-HT-MNT-02
- See [samtec.com/tooling](http://samtec.com/tooling) for more information



*1.00 mm Pitch Discrete Wire System*

### AVAILABLE SERIES

- S1SD
- T1M

## PANTA® Nano MQS FFC – Connection Innovation



SUMIDA flexible connections GmbH is your partner for special cable assemblies in your field of application e.g. automotive, industry, consumer.

Sumida is the first FFC-Supplier that has passed the Nano MQS validation of TE Connectivity.

We offer research and development capabilities, prototyping, sample as well as manufacturing facilities for special cable assemblies. This includes for example crimp technology, semi/fully automatic manufacturing, testing equipment and appliances for handling of high volume production.

### Benefits

- Crimped FFCs are compatible to current housing family – no specific FFC-housings required
- Application area up to 105°C (further temperatures possible)
- Up to ~1.5A (100µm conductor path thickness)
- Creepage and clearance compatible in high-voltage systems (2.2mm pitch size)
- TE processing tooling available
- Compatible with standard housings
- Crimp samples available

### Characteristics

- Interface: interface-compatible with Nano MQS round conductor contact
- Contact clamp: FFC optimized Nano MQS clamp
- Conductor material: Cu-basis

## PANTA® SMD R – Automatic Solution for Electronic PCB Assembly

SUMIDA flexible connections GmbH presents: PANTA® SMD R  
Take productivity to new heights with the next generation of SMD. PANTA® SMD R are flexible board connections with individual bridging lengths. The PANTA® SMD R combines advantages of SMD Jumper with individual insulation length of PANTA FIX Jumper. Therefore, it is a flexible solution for various assembly configurations on electronic assemblies.

### Benefits

- Automatic assembly by SMD-Pick & Place process
- Variety of possible applications in electronic modules
- Economic alternative compared to e. g. milled and rigid-flexible PCB's
- Higher flexibility and resistance against breakage compared to step-milled PCBs
- No additional manual assy process required
- Reflow soldering (Pb-free recommended reflow profile DIN EN 61760)
- Subsequent bending of the connected PCB's up to 180° are possible
- High vibration and bending resistance

### Characteristics

- Tape & Reel Packaging
- Pitch 1 mm, 1.25 mm, 1.27 mm
- Number of pins: 4 to 16
- Bridging length 20 mm - 40 mm (Pad to Pad)
- Total length starting at min. 22 mm
- Insulation material Nomex®
- Operating temperature - 40 °C to + 125 °C depending on installation situation
- Current rating min 2 A @ 20 °C (DIN EN 60512-5-2)
- Insulation resistance (Ω) 10<sup>10</sup>
- Conductor material Cu-ETP (E-Cu); min 1.5 µm Sn plated
- Conductor size AWG 28 (0.32 mm)
- Recommended Reflow Profil DIN EN 61760
- Voltage rating (VDC) 200V
- Dielectric strength (VDC) 700V



# PANTA® SMD System to Connect PCBs



## SUMIDA flexible connections GmbH presents the PANTA® SMD 0.50

The PANTA® SMD SYSTEM has been designed especially to connect sandwiched PCBs or PCBs positioned at different angles. It offers the user a great variety of possible configurations when designing electronic equipment.

As flexible connecting element for surface connection (Surface Mount Technology, SMT) the PANTA® SMD-Jumpers are very compact in size and allow the production of smaller and more cost effective electronic devices. Also they can be placed on both sides of the printed circuit boards (PCBs). They are optimized for automatic assembly and high volumes and are supplied in blister package for removal and positioning with nozzles in pick-and-place process (SMT placement equipment).

Additional advantages of our PANTA® SMD-Jumper are the improved electrical properties, especially at higher frequencies. In addition, the PANTA® SMD-Jumpers can also be used as a cost effective alternative to rigid-flex printed circuit boards. To reach that you just need to combine or connect two conventional PCB's with a PANTA® SMD-Jumper as a connecting element. (Surface Mounted Interconnect, SMI.)

## PANTA® SMD-Jumper 0.50 mm-pitch

PANTA® SMD-Jumper in pitch 0.5 mm are used as a high density flexible board connection for the usage on PCB in sandwich-configuration or for electronic connections from PCB's to various assembly positions.

### Benefits

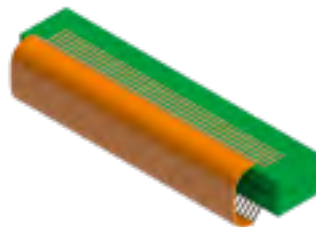
- Variety of possible applications in electronic modules
- High flexibility and bending durability
- Economic alternative compared to e.g. milled and rigid-flexible PCB's
- High temperature resistance
- Automatic assembly by SMD-Pick & Place process
- Reflow soldering (recommended reflow profile DIN EN 61760)
- Subsequent bending of the connected PCB's of up to 180° are possible

### Characteristics

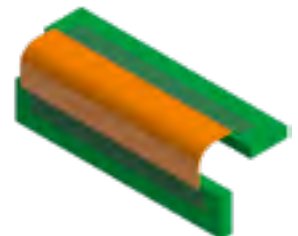
- Pitch: 0.5 mm
- Number of pins: 8 to 50
- Bridging length: 10.80 mm
- Total length: 15.20 mm
- Operating temperature: -40°C to +125°C
- Current rating: 1A @ 20°C (according DIN EN 605 12-5-2)
- Package unity: 1,500 pcs. on tape & reel



1. Jumper placement for reflow process



2. possible post bending options after reflow 180°



3. possible post bending options after reflow 90°

### ORDERABLE PART NUMBER

SMD-nn-050-K-081

nn = Number of pins from 08 to 50 (additional on request)

## Sensor/Actuator M8/M12 Cable Assemblies

TE Connectivity (TE), a world leader in connectivity and sensors, offers M8/M12 cable assemblies for applications such as sensors, robotics and production equipment, where extreme temperatures and harsh environments are likely to be encountered. They are also ideal for non-industrial applications where compact and reliable connections are required. They can be installed quickly, helping to reduce unnecessary downtime and help maintain continuous operation in critical areas.

The new M8/M12 cable assemblies have a protection rating of IP67, which means they are dustproof as well as waterproof down to 1m; these also provide protection from other common industrial elements including EMI, chemicals and mechanical stress. Designed as industry standard solutions, these quick turn cable assemblies help to reduce unnecessary downtime & help maintain continuous operations in critical industrial and harsh environments. Customers can choose from single-ended or double-ended cable assemblies, including M8-to-M12 versions.

M12 configurations are available with 2, 3, 4, 5 and 8 poles; M8 configurations have 3 or 4 poles. Options include straight or angled connectors, and shielded and non-shielded variants. Cable sheathing is either PVC or PUR. Predefined cable lengths are 0.5, 1.0, 1.5, 3, 5, 7.0 and 10.0 meters, while customized assemblies can also be produced with more specific cable lengths.

Another key feature is the M12 X-Code Cable Assembly with a CAT6E 8P cable which helps increase the data transfer capability to as high as 10Gigabit/s, allowing the CA to be used in high speed Ethernet applications. The cable assemblies can be used in combination with TE's male/female connectors and I/O modules. All are tested at TE prior to delivery.



### Features

- IP67 rated: dust and waterproof
- Overmolded PVC or PUR cable assemblies / Shielded & non-shielded versions
- Key options: A, X coded
- M12 Positions: 2, 3, 4, 5 & 8 poles
- M8 Positions: 3 & 4 poles
- M8 & M12 single ended cable assemblies
- M8 & M12 double ended cable assemblies
- M8 to M12 cable assemblies
- Cable length options: 0.5 m, 1 m, 1.5 m, 3 m, 5 m, 7 m, and 10 m (X-code additional lengths: 2.0 m, 4 m, 15 m, 20 m)

### Benefits

- M12 Cable Assemblies are IP67 sealed and tested in TE's factory to eliminate the possibility of false wiring & to ensure robust connection
- Reduce downtime in harsh environments with reliable industry standard solution that includes quick turn, prototype cable assemblies.
- Supports higher bandwidth needs – meeting the requirements of up to 10 Gb/s (X-Code)
- Full solution offering including customized and general market cable assemblies enables 1-stopshopping and reduced TCO



### ORDERABLE PART NUMBER

T4161120005-001, T4151120008-001,  
 T4161120008-001, T4152113002-001,  
 T4162214002-001, T4162113003-007,  
 T4152124004-001, T4162124004-002,  
 T4162224004-001, T4162113005-001



# Micro-MaTch Cable Assemblies – Standard and Value-line

## TE Connectivity's (TE) Micro-MaTch family includes the Standard and Value-line cable assemblies.

These cable assemblies address several Industrial applications like Material Handling, Industrial Control Units, Robots and Motors or commercial applications like Security Equipment, Air & Climate Control Units, Closed Circuit TV (CCTV) systems, Audio and Video Equipment or Pay Terminals. The Standard Micro-MaTch version should be selected in applications where a high mechanical stress can be foreseen.

### Main Characteristics and Benefits

- Reduced inventory and master data management through use of cable assembly instead of connectors and cable
- Predefined length fitting application needs: 7.5 cm, 15 cm and 20 cm, no need to do the cut and assembly work yourself
- 4 up to 20 positions available to cover a wide range of signal needs on the board



### Standard Version

- High resistance against vibration and to fretting corrosion due to connector/contact design
- Temperature range: –40 to +105 °C allows usage under harsh temperature conditions
- Cable type PVC, only this cable is released with Micro-MaTch Standard connectors


### Value-line

- Good for Design-to-cost, for applications with less requirements to vibration and temperature
- Temperature range: –30 to +85 °C
- Cable type PVC, not suitable for use in high temp applications

### Reference part list Standard Version

 Male on Wire (MOW) to MOW	 MOW to Padle Board (PB)
04 pos: 2205060-x	04 pos: 2205068-x
06 pos: 2205061-x	06 pos: 2205069-x
08 pos: 2205062-x	08 pos: 2205070-x
10 pos: 2205063-x	10 pos: 2205071-x
12 pos: 2205064-x	12 pos: 2205072-x
14 pos: 2205065-x	14 pos: 2205073-x
16 pos: 2205066-x	16 pos: 2205074-x
18 pos: 2205067-x	18 pos: 2205075-x
20 pos: 2205076-x	20 pos: 2205077-x

### Reference part list Value-line Version

 MOW to MOW:	 MOW to PB
04 pos: 2205103-x	04 pos: 2205112-x
06 pos: 2205104-x	06 pos: 2205113-x
08 pos: 2205105-x	08 pos: 2205114-x
10 pos: 2205106-x	10 pos: 2205115-x
12 pos: 2205107-x	12 pos: 2205116-x
14 pos: 2205108-x	14 pos: 2205117-x
16 pos: 2205109-x	16 pos: 2205118-x
18 pos: 2205110-x	18 pos: 2205119-x
20 pos: 2205111-x	20 pos: 2205120-x

-x in TE part number to be replaced by -1 for 75 mm or -2 for 150 mm or -3 for 200 mm length of the assembly

Micro-MaTch, TE Connectivity and TE connectivity (logo) are trademarks.

## Industrial Cable Assemblies Services

TE Connectivity (TE) Cable Assemblies takes care of its customers, with total solutions that fit precise needs. With decades of experience, global expertise in development and manufacturing, and a worldwide network of competence centers, TE Cable Assemblies creates customized solutions and standardized products that provide reliable solutions that enable high performance and cost-efficiency in operation.

### TE Cable Assemblies is there to

- Identify customers' needs and objectives
- Map out issues that need a solution
- Quickly take all the steps necessary to move from design into production

To provide fully integrated solutions, TE engineers work hand in hand with development teams dedicated to particular connector types to make sure any solution provides a perfect fit for a customer's need.

Numerous state-of-the-art automatic and semi-automatic manufacturing technologies are at TE's disposal, including cutting, stripping and crimping, soldering, IDC (insulation displacement connection), over-molding and more.

TE Connectivity's own testing capabilities and global competence centers ensure that products are provided with the high quality required around the globe.

TE Cable Assemblies are available for various industrial applications, whether they are on the board or in the field. Whether a customized solution or an off-the-shelf standard cable assembly is needed, TE will work with you to recommend and then provide you the right product.



*Hybrid Servo Motor cable assembly*



*Discrete wire cable assemblies for signal and power applications*



*Cable harness with molded parts and connectors*



*Ethernet cable assemblies for data communication*

TE Connectivity and TE connectivity (logo) are trademarks.

# Ethernet Cable Assemblies – Industrial RJ45 and Industrial Mini I/O



TE Connectivity's (TE) Ethernet cable assembly family includes the Industrial RJ45 and Industrial Mini I/O cable assemblies. The cable assemblies are available with different cable types that include high-flex PUR for applications with continuous movement.

These cable assemblies can be used in several Industrial applications like Industrial Communications, HMI/PLC, Robots, Servo Motor and Drives. Industrial Mini I/O connectors serve the need for miniaturization and can be designed in industrial applications where a very small form factor is needed. Together with the high flex cable, cabling solutions are possible to connect devices where very limited space is available.

### Main Characteristics and Benefits Industrial RJ45 cable assemblies

- Reduced inventory and master data management through use of cable assembly instead of connectors and cable
- Predefined length fitting application needs: 0.5 m, 1 m, 2 m, 3 m, 5 m, 10 m, meaning no need for assembly and test in the field
- Good resistance against vibration offers a fit to harsh industrial applications due to strong metal latch on connector and robust housing
- 2 Cable types for Industrial Ethernet (AWG26) suitable for applications with a lot of movement or high temperature requirements with data transmission up to 1 Gbps
- Temperature range: -40 to +85 °C/Cable up to 125 °C (high temp cable)

RJ45 Industrial pigtail	RJ45 Industrial patch cords
Hi temp 125 °C: 2300158-x	Hi temp 125 °C: 2300160-x
Hi Flex: 1-2300158-x	Hi Flex: 1-2300160-x

*-x in TE part number to be replaced by -1 for 0.5 m or -2 for 1 m or -3 for 2 m or -4 for 3 m or -5 for 5 m or -6 for 10 m length of the assembly*

### Main Characteristics and Benefits Mini I/O cable assemblies:

- Small form factor of the Industrial Mini I/O connector serves miniaturization need in many applications. 75 % space savings compared to standard RJ45 connectors.
- Very good resistance against shock and vibration due to strong latch mechanism on the connector.
- Reduced inventory and master data management through use of cable assembly instead of connectors and cable
- Predefined length fitting application needs: 0.5 m, 1 m, 2 m, 3 m, 5 m, 10 m, meaning no need for assembly and test in the field
- 3 Cable types for Industrial Ethernet (AWG26) suitable for applications with a lot of movement or high temperature requirements with data transmission up to 1 Gbps
- Different codings available to prevent mismatching
- Availability of Industrial Mini I/O connectors to Industrial RJ45 patch cords to enable integration of RJ45 devices into Industrial Mini I/O environment.
- Temperature range: -40 to +85 °C/Cable up to 125 °C (high temp cable)

Type I pigtails/patch cords	Type II pigtails/patch cords	Type I to RJ45 patch cord
PVC pigtail: 0-2205129-x	PVC pigtail: 0-2205131-x	PVC: 0-2205133-x
Hi. Temp. pigtail: 1-2205129-x	Hi. Temp. pigtail: 1-2205131-x	Hi. Temp.: 1-2205133-x
Hi. Flex. pigtail: 2-2205129-x	Hi. Flex. pigtail: 2-2205131-x	Hi. Flex.: 2-2205133-x
PVC patch cord: 0-2205130-x	PVC patch cord: 0-2205132-x	
Hi. Temp. patch cord: 1-2205130-x	Hi. Temp. patch cord: 1-2205132-x	
Hi. Flex. patch cord: 2-2205130-x	Hi. Flex. patch cord: 2-2205132-x	

*-x in TE part number to be replaced by -1 for 0.5 m or -2 for 1 m or -3 for 2 m or -4 for 3 m or -5 for 5 m or -6 for 10 m length of the assembly*

TE Connectivity and TE connectivity (logo) are trademarks.

## Cable Assembly Solutions

TE Connectivity's (TE) selection of cable assemblies range from power and high-speed data cables to rugged outdoor fiber assemblies. They are used in a wide variety of applications and industries to interconnect components, sub-systems, and equipment.

### SFP28 / QSFP28 Straight and Breakout Cables

These cable assembly products offer 10G through next generation (28G) cabling solutions. Our breakout cable assemblies offer QSFP+ or QSFP28 to four SFP+ or SFP28 connections.



### RAPID LOCK Interconnect System

RAPID LOCK power cable connectors mount directly to RAPID LOCK pins that can be swage or screw mounted. The cable connector is available in right angle or straight mount in a variety of wire sizes.



### Power Cable Assemblies for Open Compute Project (OCP)

These power cable assemblies provide a distribution solution for OCP V2 architecture providing 120 A of power per UL /CSA criteria from a single bus bar distributing 40 A to three Open Rack Sleds.



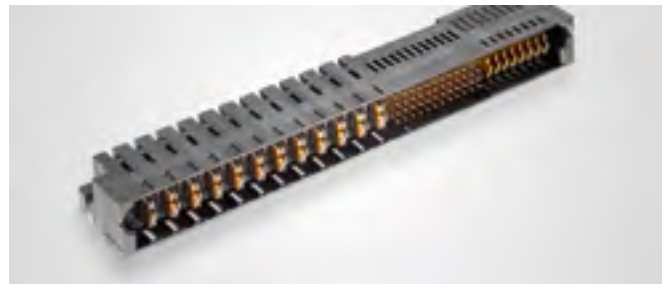
### FullAXS and FullAXS Mini Cable Assemblies

The FullAXS family is a cost-effective solution to make rugged outdoor connections using fiber optic, power or signal connectors sealed for IP 65/67 and reinforced for mechanical strength.



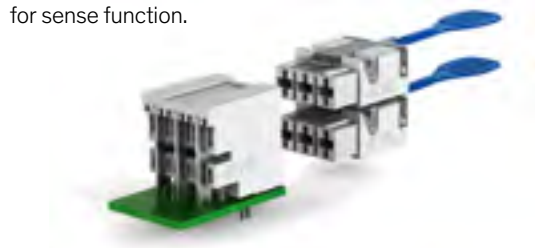
### MULTI-BEAM XLE Cable Assemblies

MULTI-BEAM XLE power distribution systems support up to 50A of power per contact and are hot-pluggable per UL 1977, with options to combine power and signal contacts in multiple combinations.



### ELCON Mini Connectors and Cable Assemblies

ELCON Mini power connectors and cable assemblies are a low profile solution offering 37.5A per contact. ELCON Mini cables have a positive metal latch retention feature and optional coding contacts for sense function.



#### ORDER INFORMATION

Series	GPL	Product Code
SPF28/QSFP28	J83	X257
Rapid Lock	145	D040
ELCON Mini	H82	J568
Full AXS Mini	Z77	L279
Power CableAssemblies for OCP	K77	1080
Multi-Beam XLE	E79	L843



## Flexstrip® offers a Wide Range Family of Board-to-Board Jumpers

Flexstrip® Jumpers provide multi conductor board-to-board connection as an alternative to conventional point-to-point wiring.



Flexstrip® offers a wide range family of board-to-board jumpers that can be repeatedly flexed without failure.

Flexstrip® is an optional solution for a diverse range of applications that require a high performance interconnect. Key to the performance benefit of Flexstrip® is the flat conductor construction which provide unrivalled flexibility and resistance against vibration and high flexing cycles. Conventional round pins at each end ensure a simple assembly and soldering process.

They are available with various insulation materials — Nomex, Teflon, polyester and Kapton — for industrial, automotive and military/aerospace applications. The jumpers can be supplied with between two and 65 conductors, in nine different pitches. Jumper lengths are up to 30 inches, and various pin lengths are available. There is a choice of 15 different terminations on either end. The copper conductors are tin-plated for easy soldering.

### Features and Benefits

- Versatile and highly flexible board to board system
- Provides connections between PCBs, within a piece of equipment without wire stripping or preparation
- Lowest installed cost because no crimping or stripping is required
- Round to flat design provides vibration resistant reliability

### Product Applications

- Computers
- Handheld Terminals
- Bar Code reader
- Printers
- Industrial Machinery
- Automotive
- Consumer devices
- Household Appliances

### ORDERABLE PART NUMBER

- |               |               |
|---------------|---------------|
| – 2-6447164-7 | – 2-1474654-8 |
| – 7-6437144-0 | – 2205294-1   |
| – 4-1437212-9 | – 9-1437214-0 |
| – 5-1437212-0 | – 8-1474612-8 |
| – 4-1437162-8 | – 4-1437165-3 |
| – 1-1437170-9 | – 1-1474621-4 |
| – 5-1437187-6 | – 2205009-1   |
| – 6-1437213-1 | – 6-1437189-3 |

## Great Variety of USB 3.1 Type-C Cables Assemblies

W+P presents a broad spectrum of high-quality cable assemblies from USB 3.1 Type-C connectors to different USB plug types.

### USB 3.1 C is becoming a standard feature

USB 3.1 Type-C connectors are being increasingly installed in electronic devices as standard. However, by no means all connection devices are equipped with USB 3.1 Type-C connectors.

In order to continue optimally connecting old devices, W+P is offering a widely diversified range of USB 3.1 Type-C cable assemblies: Cables from Type-C to Type-C fitted with 15 wires for high-speed data transmission, through to cables from Type-C to Mini-USB B 2.0 with just 4 wires - the range covers all USB connection types currently available on the market. The high-quality processing and overmolding of the connector are a matter of course here.

### Cable assemblies include 9 different types

The Type-C connector is fitted on one end of the cable, while the other cable end is equipped with one of the following connection options: USB A male, USB B male, USB C male, Micro USB B male, Mini-USB B male, USB A 3.1 male, USB B 3.1 male, USB C 3.1 male and Micro USB 3.1 male.

The cables are not only optimised for their intended use in terms of the connector, but also regarding the internal wiring. It is possible to realise the following data transmission standards in this way: USB 2.0, USB 3.0 and USB 3.1. Every desired cable length from 50 to 500 cm can be manufactured upon request.

### – 9 different types of cable assemblies from USB 3.1 Type C connectors:

- > USB A, B and C male
- > Micro USB B male
- > Mini-USB B male
- > USB A, B and C 3.1 male
- > Micro USB 3.1 male

### – Cable length from 50 to 500cm upon request

### – Optimal connecting of all devices currently available on the market

### – Data transmission standards can be realized:

- > USB 2.0
- > USB 3.0
- > USB 3.1

Further information: [wppro.com/USB-cable](http://wppro.com/USB-cable)

### ORDERABLE SERIES

- 832, 8320



## Cable Management Accessories

Find the right balance between high class products and cost effectiveness for your cable assembling.

### Product Categories

- Cable accessory
- Cable clamp and clip
- Cable gland
- Cable marker
- Cable tie
- Heat shrink tubing & sleeving
- Label
- Marking- & identification
- Wiring duct



Source: 3M



Source: Panduit



Source: Lapp



We offer a comprehensive portfolio of solutions in heat shrink technology for various energy, industry and construction applications. These include in particular heat shrink tubing, heat shrink molded parts and heat shrink joint kits in all conceivable variants.

Our heat shrink tubing is based on cross-linked polyolefin, which means they ensure high mechanical strength and high temperature resistance. At the same time, our heat shrink solutions are resistant to solvents and chemicals.

### Heat shrink tubing

We provide a broad range of heat shrink tubing with a variety of wall thicknesses, with or without hot-melt adhesive lining, depending on requirements. In addition to different sizes, lengths, colors and pack sizes, we can offer you a perfect solution for almost every conceivable application.

### Heat shrink molded shapes

Our portfolio of heat shrink molded shapes includes a wide range of end caps, cable termination kits with high dielectric strength as well as 3 and 4-way breakout boots, wall tubes and repair wrap sleeves.

### Heat shrink joint kits

3M™ heat shrink joint kits can be used for all common plastic PVC- or XLPE-armored cables. They are ideally suited for various energy, industry and construction applications.

The 3M™ heat shrink joint kit portfolio includes connection and transition joints for shielded and unshielded cables, optionally also complete with screw or press connectors and fittings for connecting flexible cables and wires.







**Ty-Rap®**

When strength, aesthetics, reliability and performance are required, knowledgeable professionals turn to the original and the best source for cable ties and accessories. Ty-Rap® fastening systems include a full range of cable ties, identification ties, clamps, mounting bases, and installing tools. Using Ty-Rap® fastening systems for all wiring jobs, large and small, will speed and improve the reliability of harnessing and wire bundling while saving you money.

#### Features and Benefits

Rounded edges, on the head and the strap:

- Comfortable handling of the ties
- Prevent sharp edges from damaging the cables
- Protects the material against breaking at this most critical point
- Offer maximum protection from injury

#### “The Grip of Steel”

- Non-magnetic stainless steel locking barb – marine grade type 316 –
- Firmly anchors inside the tie head, ensures a strong, reliable and long lasting fastening under adverse conditions

#### Smooth, Notchless Body

- Reduces stress concentration points
- Stronger and thinner
- Allows secure tying in tight spaces

#### Ribbed and Stippled Surface

- Prevent the tie from slipping around and along the bundle under vibration conditions and external shock

Non-slip tail, for an easy grip and pulling through the head during tensioning

#### Outstanding Range of Special Ties, e.g.

- Ties with mounting hole or integrated peg/nail
- Panel mounting ties
- Identification ties with integrated label

#### Most extensive Choice of Special Materials

- Polyamide 6.6 (standard, UV-resistant, heat stabilized, flame retardant, heat stabilized/UV-resistant), Polyamide 4.6 (extra high temperature) and Polyamide 12
- Polypropylene
- Fluoropolymer (ECTFE), Fluoropolymer (ETFE)
- Detectable Polyamide 6.6 and Detectable Polypropylene
- UL 94 V-0, UL 94 V-2 and UL 94 HB

#### Dedicated Tooling

- The Ty-Rap® tie is automatically cut off and the slight over cut retracts into the head

#### Broad Range of Mounting Bases and Accessories

#### Extensive Range of Approvals and Certifications

Germanischer Lloyd/DNV, Lloyd’s Register of Shipping, Bureau Veritas, VG, Mil Specification, American Bureau of Shipping (ABS), CE declaration, compliant to the low voltage directive and EN/IEC 62275 and UL 62275

#### Angled Tail (turned up)

- Fast and easy insertion into the locking head
- Ideally suited to being picked up from a flat work area

#### Wide Range of Size Combinations

- Several lengths up to 1,143 mm
- 6 typical widths with a tensile strength up to 780 N
- To fasten cable bundles with a diameter up to 330 mm

#### Wide Choice of Colours

- 10 standard colours are available and pre-printed customized ties in any of the standard colours can be supplied on demand

#### Different Types of Packaging

- The unique “workbench boxes” for fast working without problems or losses
- Recyclable packaging for a better contribution to the environment

## HellermannTyton EdgeClip with Cable Tie

**EdgeClip fasteners literally give electrical engineers the edge when routing cables, wires, conduits and hoses in applications where screw holes, weld studs or adhesive are not an option or space is restricted.**

Supplied with outside-serrated cable ties, these tiny plastic clips are ideal for securely fastening sensitive wiring along, across or parallel to edges.

Selecting the right EdgeClip depends on edge thickness and edge height. A variety of geometries ensures a suitable fit for every application scenario.

**Range of main Characteristics and Properties:**

- HellermannTyton offers EdgeClips for three edge thickness ranges:
  - > 0.5 mm to 2.5 mm
  - > 1.0 mm to 3.0 mm
  - > 3.0 mm to 6.0 mm

No additional tools are required for installation. EdgeClips are simply pressed onto the edge by hand.

The built-in spring steel clamp provides sufficient holding force for even the heaviest cable bundles.



EdgeClips	
Orderable Part Number	Type
150-40583	T50SOSEC5A
150-40591	T50ROSEC5B
156-00538	T50REC4B

**ORDERABLE PART NUMBER**  
150-40583; 150-40591; 156-00538

## HellermannTyton Connector Clips

**Connector clips are designed primarily for fastening cable sets in vehicles. These parts are attached to a connector and then secured to mounting points on the chassis.**

HellermannTyton's Connector Clip range includes parts for a wide variety of standard and custom connector types.

**Fixing options include clips with**

- Fir tree or arrowhead for round holes and oval holes
- Weld studs
- Edge mounts
- Adhesive mounts

The connector can be simply pushed onto the clip and also be removed non-destructively at a later time.

Oval fir trees are particularly versatile because they prevent twisting. A single fir tree depth can also be used on a variety of panel thicknesses. Integrated discs protect against dirt and water ingress through mounting holes.



Connector Clips	
Orderable Part Number	Type
133-01073	CCPAEDOP6.0x12.0
151-00180	YCCFT62x122
151-01842	YCCFT82x185

**ORDERABLE PART NUMBER**  
133-01073; 151-00180; 151-01842

### Self-adhesive flexible mounts designed for routing on round or angled surfaces.

The FlexTack cable tie mount is an innovative fixing solution for professional cable management along concave, convex and moderately angled surfaces, or where drilling a hole is not practicable.

The special acrylate-based adhesive provides a strong reliable bond on low energy plastic surfaces such as polypropylene and polyethylene as well as painted, varnished or metallic surfaces.

FlexTack can be used long-term up to +105 °C and offers good weathering resistance, making it suitable for a wide range of indoor and outdoor applications.

The flexible self-adhesive mount gives engineers greater freedom of action in challenging routing scenarios, for example around plant machinery or in electrical and switching cabinets.



*FlexTrack cable tie mounts for round and angled surfaces*

#### ORDERABLE PART NUMBER

- FMB4APT-I
- 151-01527 (black)
- 151-01528 (white)

## EVO7 Cable Tie Tensioning Tool

### Precise tensioning and cutting of plastic cable ties without jarring recoil.

Designed for operator comfort and the highest standards of process reliability, the EVO7 is part of a new generation of manual tensioning tools for plastic cable ties up to a strap width of 4.8 mm.

Whereas traditional cable tie tools tighten and cut the strap in one step, the patent-pending mechanism integrated in the EVO7 locks the strap before the blade cuts it flush behind the head.

The result is elimination of the jarring recoil that can lead to repetitive stress injuries (RSI), prevention of inadvertent stretching of the tie plus significantly improved service life of the stainless steel blade.

The EVO7 provides 33 distinct tension settings ranging from 35 N to 165 N and is factory-calibrated in order to guarantee precisely the same tension level with every application.

The lightweight, yet robust EVO7 is available with a standard grip span (90 mm) or a short grip span (80 mm) for smaller hands.



*The EVO 7 Manual Tensioning Tools for Cable Ties*

#### ORDERABLE PART NUMBER

- EVO7/110-70129
- EVO7SP/110-70130

## Manual Wire Stripping Tool

Molex's manual wire stripper is a self-adjusting tool that provides the widest stripping capacity of any tool of its type in the industry. This cutting and stripping tool has easily interchangeable multiple stripping cassettes that enable precision stripping of a wide range of insulations from PVC to PTFE with just one tool. While the tool is self-adjusting, 90% of wires can be stripped without adjusting the tool. Lightweight and ergonomically designed, this tool is qualified for high volume production and portable field usage.

### Specifications

- Stripping dimension: 1.00mm (.040") maximum thick insulation
- Cables: Power cable, multi-conductor control, fiber optic and copper trunk cables
- Cable Types: Conduit wire, flex power cable, equipment wire and flat phone cable
- Wire Range: 16.00-0.03mm<sup>2</sup> (6-32 AWG)

This wire stripper is designed for conduit wire, flex power cable, equipment wire and flat phone cable. **The wire range is 0.03mm<sup>2</sup> to 16.00mm<sup>2</sup> (6-32 AWG) in diameter and insulation thickness of 1.00mm (.040") maximum.** Although the tool is self-adjusting, 90% of wires can be stripped without adjusting the tool. Lightweight and ergonomically designed, this tool is qualified for high-volume production and portable field usage.

### Key Features

- Provides the widest stripping capacity of any tool of its type in the industry, which will reduce overall tooling investments and provide production flexibility
- Designed with fine adjustability to ensure that thin insulations can be stripped without damage to conductors
- Built-in wire cutter provides production flexibility and reduces overall tooling investments
- Replaceable flat stripping blades and available spares (PVC), and V-blades for stripping PTFE
- Blade changing device facilitates the easy replacement of the blades, and it can be stored in the pocket of the handle

For more information visit:

[www.molex.com/ab/applicationtooling.html](http://www.molex.com/ab/applicationtooling.html)

### ORDERABLE PART NUMBER

63817-1100





# Borrow Molex Crimp Tooling from Arrow Testdrive

**High-performance contacts are becoming increasingly complex, therefore choosing the right tooling is essential in order to avoid compromising performance.**

The hand crimp tooling range from Molex offers ergonomic soft grip handles for comfortable crimping and precision, plus full cycle ratcheting to ensure complete crimps. Plus, a user-friendly terminal locator wire stop holds terminals in the correct crimping position.

Arrow now offers 20 of Molex's best-selling crimp tools through the Testdrive program including Types 2C, 4A and 4D. Simply select the terminal from the list below to identify the appropriate tool\* for your project.

**Testdrive evaluation of Molex tooling offers:**

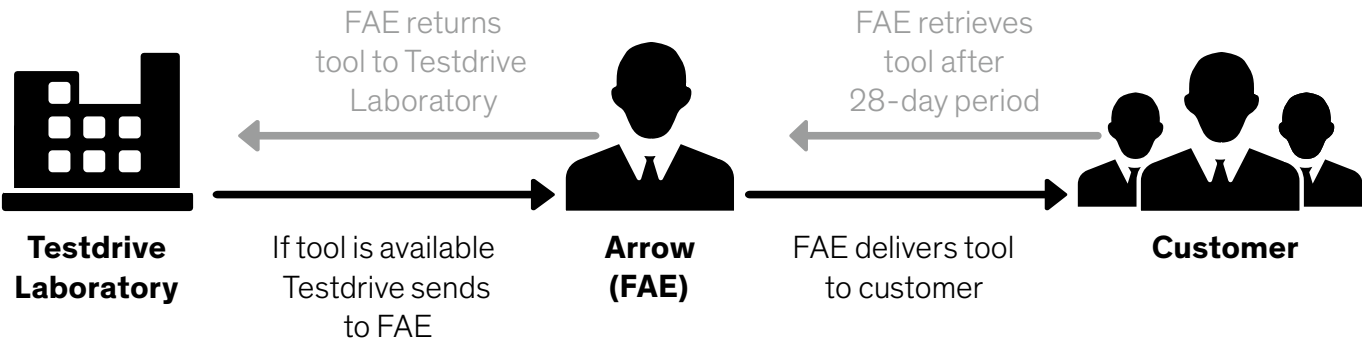
- Hands-on testing of tools without any initial cost
- Faster prototyping – visibility of available tools and a 2-day lead time
- Tools include literature and full crimping instructions
- Easily compare tools to ensure you choose the right tool for your crimping needs

Testdrive is a unique program offered by Arrow and its suppliers to assist you, the design engineer, in selecting the best device for your next-generation products. Prior to committing your precious development tool budget to an unproven chip architecture, Arrow Testdrive provides you with a large selection of leading-edge development tools for a FREE 28-day evaluation period.

\*Ensure the correct tool is selected by searching for your terminal type online at molex.com. Full details of the correct tool are included in the relevant AST document. If the available tools do not meet your terminal specifications, please contact your Arrow FAE.

Associated Crimp Terminals	AWG size	Tooling Part Number
.062" Pin and Socket	18-24	638191300
.093" Pin and Socket	14-20	638191100
.125" Pin and Socket	16-18	638191100
and Commoning Terminals	14-16	
C-Grid III	22-24	638258100
C-Grid III	26-28	638258200
C-Grid SL	24-30	638258800
C-Grid SL	22-24/32-36	638118700
CLIK-Mate	26-28	638194400
Ditto	20-22	638278500
DuraClick	24-30	638190500
Illuminate	26-28	638194400
Illuminate	26-32	638272300
KK (2.54mm)	22-30	638118200
KK (3.96mm)	18-24	638117500
Mega-Fit	12-16	638257100
Mi II	24-30	638190500
MicroBlade	24-30	638190100
MicroClasp	22-26	638116300
Micro-Latch	24-30	638190500
Micro-Lock PLUS	22-26	2002180800
Milli-Grid	24-30	638190100
Mini-Fit Jr.	22-28	638191000
Pico-Clasp	28-32	638191500
Pico-Lock (1.50mm)	24-28	638270800
Pico-SPOX	24-30	638259700
Sherlock	24-30	638190500
SL	24-30	638258800
SPOX	18-24	638116500

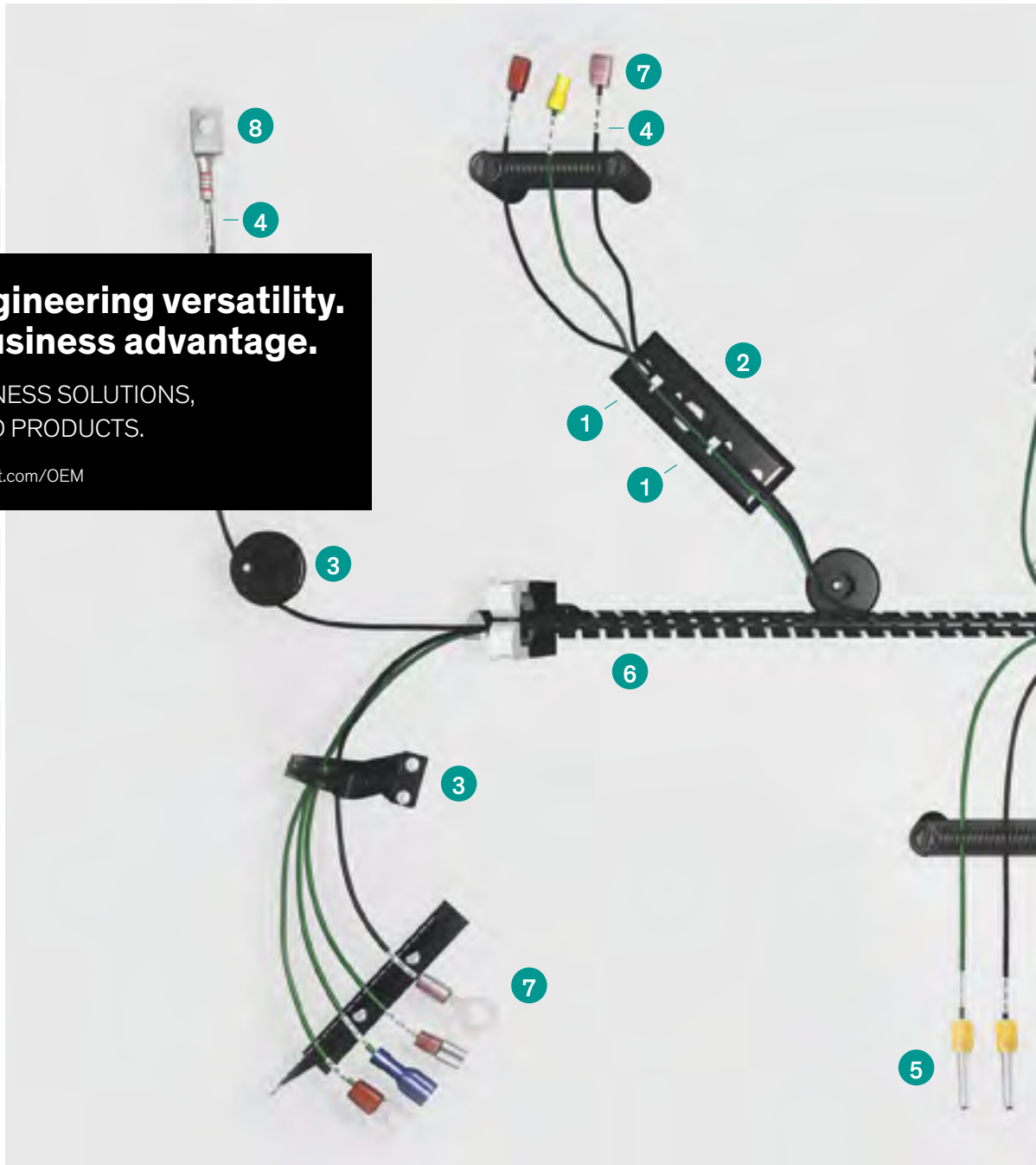
## Test-Drive Laboratory Process



## Our engineering versatility. Your business advantage.

WIRE HARNESS SOLUTIONS,  
TOOLS AND PRODUCTS.

visit [www.panduit.com/OEM](http://www.panduit.com/OEM)



### 1. Cable Ties and Tools

A wide selection of industry approved styles, sizes, materials, and colors plus ergonomic hand tools that provide consistent tensioning results.



### 2. Cable Tie Mounts

Secure quickly and easily with a broad selection of styles for installation flexibility.



### 3. Wire Harness Fixtures

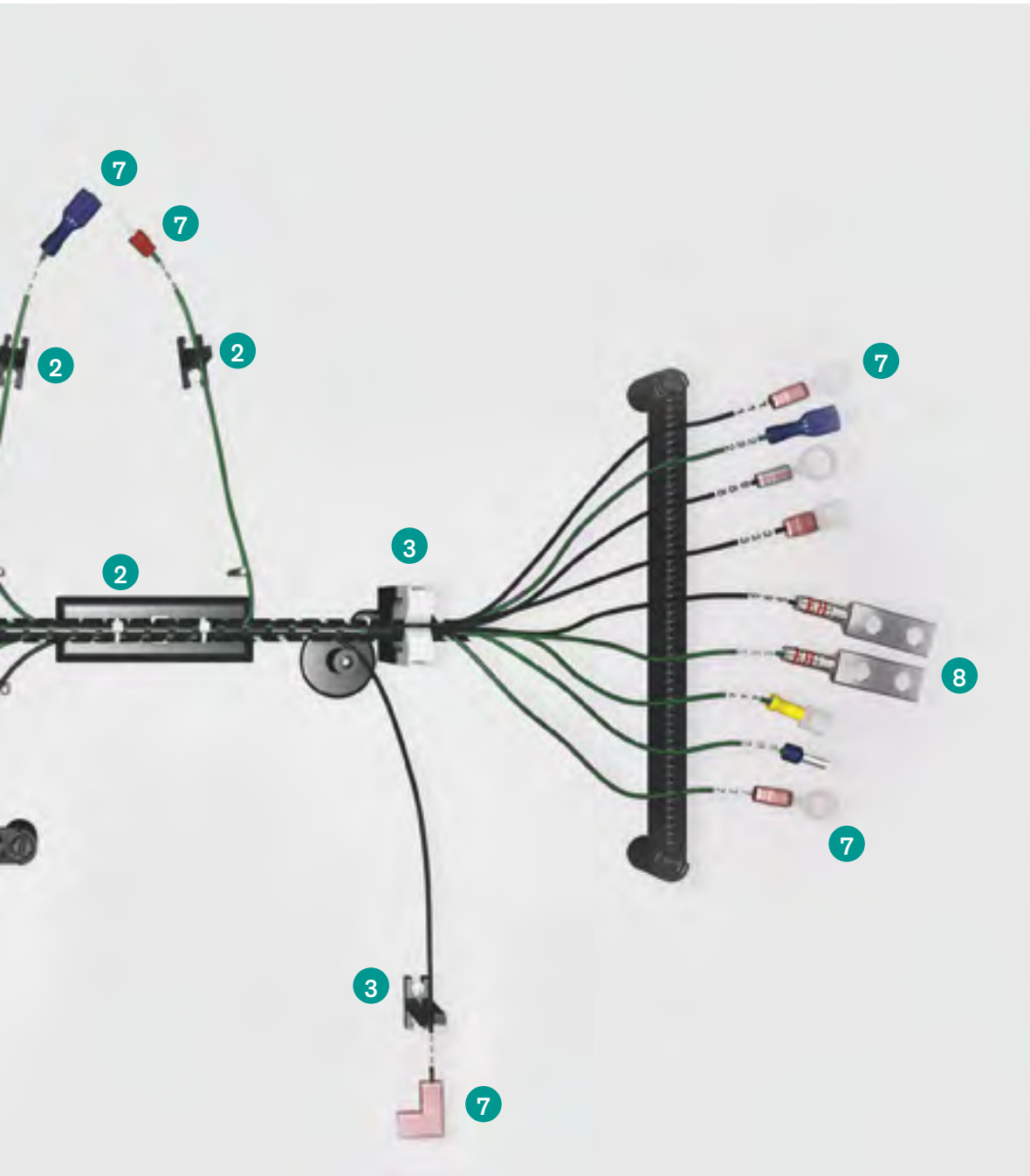
Spacing the wire bundle at a uniform distance and height from the harness board allows easy cable tie application using manual or automatic tooling.



### 4. Identification Solutions

Printers, media and software provide a fast and easy way to create labels in compliance with industry standards for product identification and quality.





**5. Ferrules**

Bare and covered ferrules for use in accordance with UL 486F and Canadian Electrical Code, CSA-C22.2 No. 291-14.



**6. Abrasion Protection**

Spiral wrap, heat shrink and grommet edging products insulate and protect wiring in demanding environments.



**7. Terminals**

Lightweight and durable for ease of use and long life. Terminal tools provide reliable crimps and easy installation to save time.



**8. Compression Connectors**

A variety of imperial and metric connectors meet your application needs. Hand tools and power tools are designed to reduce labor time and cost.



## Ergonomic Cable Tie Installation Hand Tools

### Comfort, Performance and Durability

Panduit's ergonomic series of hand-operated, tool-controlled tension, and cut-off cable tie installation tools are the most preferred hand-operated tools in the industry. These versatile tools can be used for production, maintenance, or construction applications. The ergonomic series of tools is excellent for low to medium volume applications (under 50,000 ties/year) and promote worker safety, help reduce downtime, improve productivity and provide the lowest total installed cost.

### Impact Resistant Resin Tools

- **GTS-E** Tool installs subminiature (8 lbs.) through standard (50 lbs.) cross section cable ties
- **GTH-E** Tool installs standard (50 lbs.) through heavy (175 lbs.) cross section cable ties



### Metal Resin Tools

- **GS2B-E** Tool installs subminiature (8 lbs.) through standard (50 lbs.) cross section cable ties

- **GS4H-E** Tool installs standard (50 lbs.) through heavy (175 lbs.) cross section cable ties
- **GS4EH-E** Tool installs light-heavy (120 lbs.) through extra-heavy (250 lbs.) cross section cable ties

### Key Features and Benefits

- Improved cable tie cut-off mechanism that minimizes the impact to the installer's hand by more than 40% - the lowest in the industry
- Low handle force required to cut-off the cable tie - 15% lower handle force than comparable tools

Part Number	Installs Cable Tie Cross Sections	Description	Std. Pkg. Qty.	Std. Ctn. Qty.
GTS-E	Subminiature, Miniature, Intermediate, Standard	Trigger Handle: Black, Selector Knob: Black, Cushioned Handle: Black. Material: Impact Resistant Resin	1	5
GTH-E	Standard, Heavy-Standard, Light-Heavy, Heavy	Trigger Handle: Red, Selector Knob: Red, Cushioned Handle: Red. Material: Impact Resistant Resin	1	5

## PAT 4.0 Cable Tie System



### Take Productivity to New Heights with the Next Generation

Productivity is critical when it comes to high-volume harnessing, assembly, fastening, and packaging applications. To remain competitive, manufacturers are faced with the constant struggle to increase throughput, reduce lead times, and meet

customer expectations. The Panduit PAT 4.0 Automatic Cable Tie Installation System addresses these challenges by introducing a series of next generation features and functionality to transform wire bundling and assembly as you know it.

### Reel-Fed Cable Ties

- Continuously molded cable ties (up to 5,000 ties/reel) for high productivity and reduced downtime
- Up to 30 lbs. minimum loop tensile strength in miniature cross section; 50 lbs. in standard cross section
- Available in all-nylon and stainless steel locking barb styles
- Available in a variety of materials, colors, and sizes
- **Order Codes:** PLT1M-XMR and PLT1M-XMRO

### 6X Faster than conventional manual cable tie installations

The PAT 4.0 Cable Tie System drives productivity through:

- Industry leading cycle times that are 50 % faster than other automatic cable tie systems providing maximum bundling productivity that is 6X of conventional manual cable tie installations
- User friendly icon-based LCD touch screen simplifies user navigation and provides intuitive help screens to improve troubleshooting and minimize the learning curve for operators, thus keeping your work force dynamic and productive
- Lightweight Ergonomic Tool Head reduces operator fatigue and maximizes maneuverability while minimizing the risk of repetitive motion injury commonly associated with manual cable tie installation tools.

The PAT 4.0 Cable Tie System can be configured for factory network communication, industrial control applications, and robotics integration through the following components:

- Data Interface (DI)- RJ45 Ethernet connection that provides production data for analysis as well as troubleshooting
- Electronic Interface (EI)- 15 pin D-Sub connection allows the user to remotely control the PAT system through industrial controls and robotic applications



## TE Connectivity - Identification Solutions

TE Connectivity (TE) offers complete wire and cable identification and labeling solutions across industries and applications. Designed for the most rigorous indoor or outdoor use, you can choose from an array of flexible options including adhesive-backed labels, heat-shrinkable sleeves, cable markers and hardware/software systems for onsite customization. TE pioneered the heat-shrinkable sleeves and when used in conjunction with our printing system you can be assured of a reliable solution that will stand up to the harshest environments. Printable Tubing World leaders and innovators of a managed marker system. TMS System Six™ products lead the way in ensuring operators can easily print, identify, pick, and then place printed markers onto wires or cables with ease. The adhesive strip that covers the markers helps to keep the markers flat and offers optimum material coverage for printing whilst ensuring a smooth transition under the print head; this avoids unnecessary print head movement. The range of materials cover high performance and commercial applications such as military. Low-fire hazard, fluid resistant high temperature, and electrical or electronic use. Laser beam technology can also be used to mark these products.

### Printable Tags

Innovators and global leaders in tie-on cable marker tags used to identify large cables, wire bundles, or pipes. Due to customer demand two formats are available; (1) a continuous reel of material and (2) organised onto a paper carrier. The flat continuous sheet has precision cut shapes and ensures operators can easily lift the

markers as required. The organised variety are supplied on backing paper which can be written on with a pen if required and are easily removed once printed. The material choices ensure all industry needs are matched. Laser beam technology can also be used to mark these products.

### Standard Labels

Adhesive labels are a cost-effective way to identify wires, wire bundles, and equipment. The range of standard formats and materials have been developed over 40 years and proudly manufactured to cover all known industrial needs. In order to meet customer demand high volume computer printable products and low volume hand written labels are available; for example self-laminating printable vinyl labels for volume users and as pocket books for low volume installer use. The materials offered are used regularly in technical applications in aerospace and defence as well as standard applications such as electricians and panel builders.

### Pre Printed Markers

Quick and simple to use. The pre-printed marker range are established leaders in the wire marking field. Over 60 years' experience in manufacturing pre-printed markers ensure that the Clip-on, Snap-On and Push-on wire markers are a perfect product for low volume installers. They are used to identify wire bundles, cables pipes and conduits. These markers come pre-printed and ready to use with individual letters, numbers and symbols.



### ORDERABLE PART NUMBER

762261-000, 8306110001, A69169-000, 5502830001, 6641710001, EC9859-000, E17344-000, EC7553-000, EC7632-000, A11348-000, 456834-000, EC0190-000

## Heat Shrink Tubing - Protect from Abrasion, Corrosion, and Noise

TE Connectivity (TE) heat shrink tubing provides electrical insulation, mechanical protection, environmental sealing and strain relief for applications such as back-end connector sealing, breakouts, and connector-to-cable transitions. When heated, it conforms to the size and shape of the substrate beneath, enabling quick and easy installation. High expansion ratios for some types makes it possible to repair most damaged cable jackets without removing connectors. Available in a wide range of materials, colors and sizes, heat shrink tubing is delivered in spools, 1.2m lengths, and cut pieces. Clear types permit inspection of covered components and offer excellent transmittance of light.

### Product Features

- Spool lengths, nonstandard cut lengths, expanded/recovered I.D.'s
- Multiple products are offered in flame-retardant (FR) versions
- Meet AS23053 and MIL-PRF-46846 standards – Single Wall
- Comply with AS23053 standards – Dual Wall, Heavy Duty, Harnessing, Specialty
- Custom specs and tolerances
- Various materials meet specific requirements

### Uses

- Shielded splice protections
- Insulation and strain relief for fine gauge wire and fiber optic cables
- Moisture, fungus and weather resistant for outdoor applications
- Thermal insulation of substrates, pipes, hoses and cables
- Color code wiring and circuits
- Insulate and protect components and wiring
- Bundle wires together for protections and ease of assembly



### ORDERABLE PART NUMBER

- |                          |                          |
|--------------------------|--------------------------|
| - HFT5000-30/15-0-SP     | - EJ1485-000             |
| - HFT5000-12/6-0-SP      | - EJ1506-000             |
| - HFT5000-20-10-0-SP     | - EJ2612-000             |
| - RHW-24/6-1200/ADH-0    | - DWFR-16/4-0-STK        |
| - RHW-48/12-1200/ADH-0   | - DWFR8/2-0-STK          |
| - RHW-34/8-1200/ADH-0    | - FL2500-NO.4-J2-0-65MM  |
| - RMW-63/19-1200/ADH-0   | - 7501712002             |
| - RNF-100-3/32-BK-SP     | - SCL-1/4-0-STK          |
| - RNF-100-1/4-BK-SP      | - ES2000-NO.4-B7-0-152MM |
| - RNF-150-1/8-0-SP       | - FL2500-NO.4-J2-0-40MM  |
| - RNF-100-1/8-A1-BK-50MM | - SWFR-9/3-0-STK         |
| - X2-1.0-0-SP            | - DWFR-6/2-0-STK         |
| - EJ2608-000             |                          |

# Innovate faster, for less.

Let Arrow.com help fuel your innovation faster with guaranteed lowest prices, fast delivery and no-fee custom quantity reels.

## **Lowest Price Guarantee**

Get the parts you need at the best prices with the industry's only lowest price guarantee.

## **Fast Delivery**

Buy today. Get it quickly. It's that easy.

## **No-Fee Arrow Reel**

The parts you want, on a reel in the quantity you need, at a price that can't be beat.

Start now at **arrow.com**



# Are You Five Years Out?

Most people live in the present. The world of now. But a handful of us work in a unique world that doesn't quite exist yet—the world of Five Years Out.

Five Years Out is the tangible future. And the people who live and work there know that new technologies, new materials, new ideas and new electronics will make life not only different, but better. Not just cheaper, but smarter. Not just easier, but more inspired.

Five Years Out is an exciting place to be. So exciting that, once you've been there, it's hard to get excited about the present. Because we know what's coming is going to be so much better.

Five Years Out is a community of builders, designers, engineers and imaginers who navigate the path between possibility and practicality. Creating the future of everything from cars to coffeemakers. Are you one of them? Then you're probably working with us.



Arrow Electronics, Inc.  
**Components**  
Frankfurter Straße 211  
63263 Neu-Isenburg, Germany

---

## In Person

**+49 (0) 6102 5030 0**

Call to talk or set up a face-to-face meeting with one of our knowledgeable representatives.

## Via Email

**[cableandwire@arrow.com](mailto:cableandwire@arrow.com)**

Email us for answers to questions or to start a conversation.

## Online

**[arrow.com](http://arrow.com)**

Visit our website for everything from the latest news to line card information.

---

**myarrow™**

Sign up for a free account and get custom pricing, terms and innovative tools at **[my.arrow.com](http://my.arrow.com)**.

---