

# Robotics & Industrial Control

1946

75 YEARS ● 75 ANS  
1946-2021



# LEMO Manufacturing and R&D Offices



ECUBLENS



DELEMONT



STE-CROIX



BUDAPEST



USA



GERMANY



UNITED KINGDOM



Low Voltage



High Voltage



DIN & CECC EU Standard



Harsh Environment



HDTV / SMPTE – Fiber Optic



Media Converters



Underwater



Coaxial / Triaxial



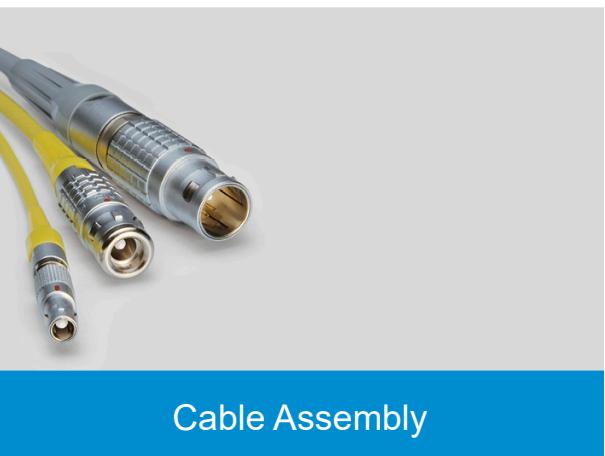
Plastic



Miniature



Custom / Special Order



Cable Assembly

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# HOW FAR DO LEMO CONNECTORS REACH?

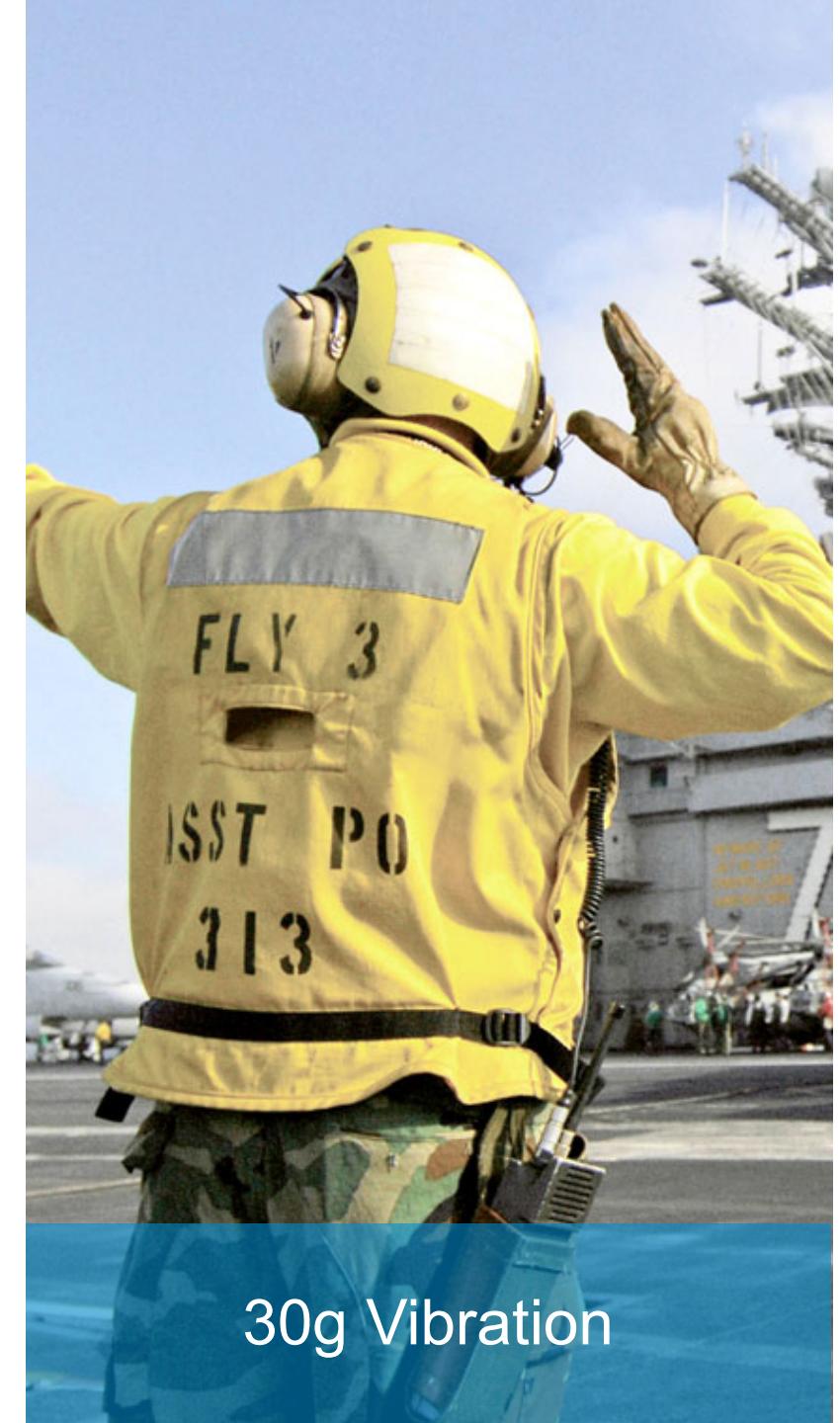




$10^{-7}$  mbar.l/sec  
Air Leakage



Harsh Environment  
-55°C Outside Temp.



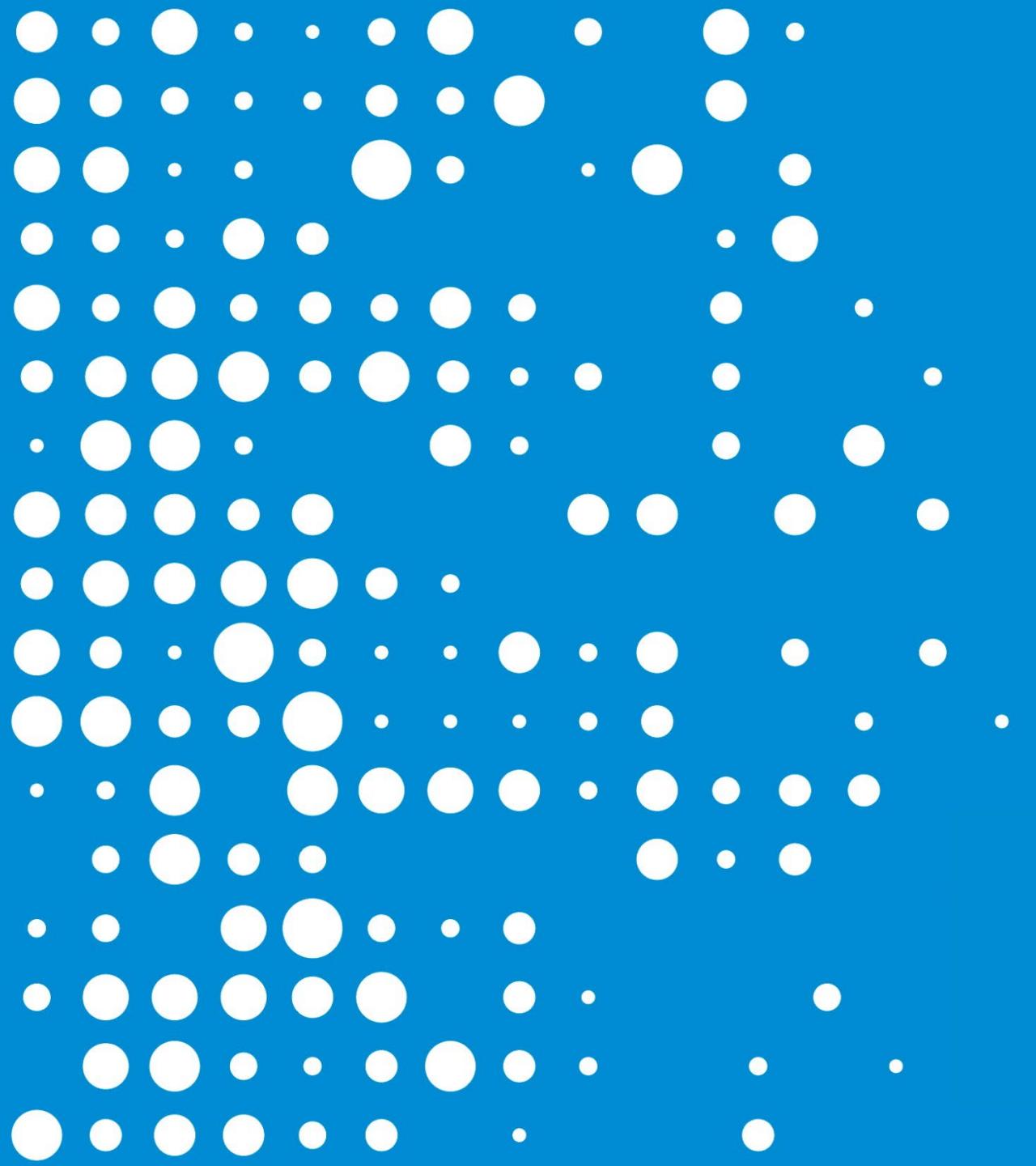
30g Vibration



## LEMO Family of Products

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# Applications

- Quality
- Expertise
- One-stop Shop
- Custom Design Capabilities

Applications where systems are frequently set up and torn down

Where connectors used externally on products

Critical applications where connector has to work every time

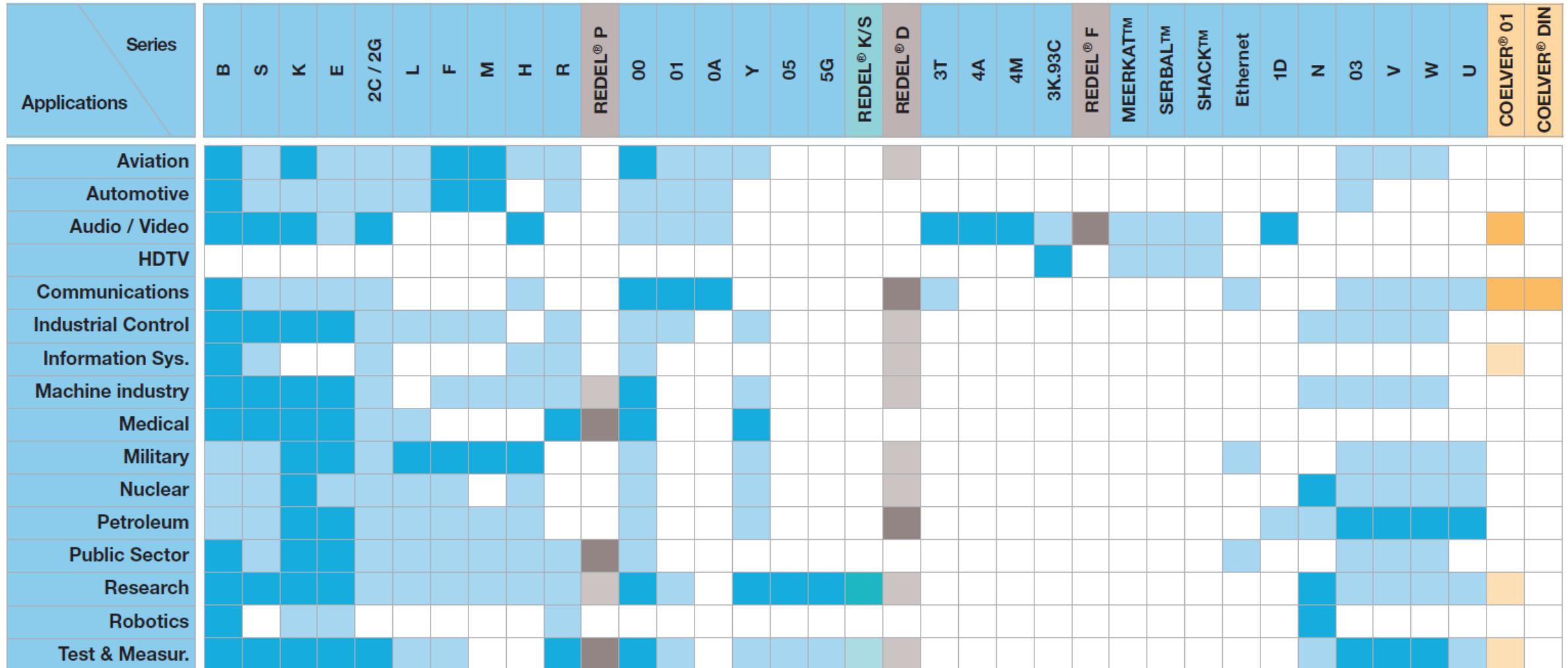
# Connector Selection Guide



The Connector Selection Guide  
features the 36+ Series  
Manufactured by LEMO

# Most Popular by Market Segment

Most frequently used in darker color





LEMO®

# Contacts Available within Series

Series Contact type	B	S	K	E	2C / 2G	L	F	M	H	R	REDEL® P	00	01	0A	Y	05	5G	REDEL® K/S	REDEL® D	3T	4A	4M	3K.93C	REDEL® F	MEERKATTM	SERBALTM	SHACKTM	Ethernet	1D	N	03	V	W	U	COELVER® 01	COELVER® DIN
Unipole																																				
Multipole																																				
Coaxial 50 Ω																																				
Coaxial 75 Ω																																				
Multi Coaxial																																				
Mixed Coax + LV																																				
Triaxial 50 Ω																																				
Triaxial 75 Ω																																				
Mixed Triax + LV																																				
Quadrax																																				
High Voltage																																				
Multi High Voltage																																				
Mixed HV + LV																																				
Fibre Optic																																				
Multi Fibre Optic																																				
Mixed FO + LV																																				
Thermocouple																																				
Fluidic																																				
Multi Fluidic																																				
Mixed Fluidic + LV																																				

## Robotics & Industrial Controls

LEMO's quality and unique features can improve Automated Systems

- Size & Weight Reduction
- Mating Cycle Life
- Reliability
- Customization



## Main Features

- Push-pull for Easy Mating
- High Density Multi-contact
- Hybrid Configurations:
  - LV + Coax
  - LV + HV
  - LV + fluidic/pneumatic
- IP50

## Benefits

- Durable Chrome-plated Brass
- High Mating Cycles 5,000+



## Main Features

- Push-Pull for Easy Mating
- 2-64 Contacts
- Hybrid Configurations:
  - LV + Coax, HV, fluidic/pneumatic
- IP66 / IP68 Water Resistance
- Triple-Walled Shielding

## Benefits

- Water & Corrosion Resistance
- Durable Chrome-plated Brass
- 1,000+ hours Salt Fog
- High Mating Cycles 5,000+



## Main Features

- Ratchet Coupling
- Triple Start Threads
- Compact & Lightweight Aluminum
- High Density: 2-114 contacts
- IP68 Water Resistance
- Anthracite Nickel-plated

## Benefits

- Compact & High Density
- High Shock/Vibration Resistance
- Deep Water Resistant (2m to 15hr)
- Fuel & Oil Resistant



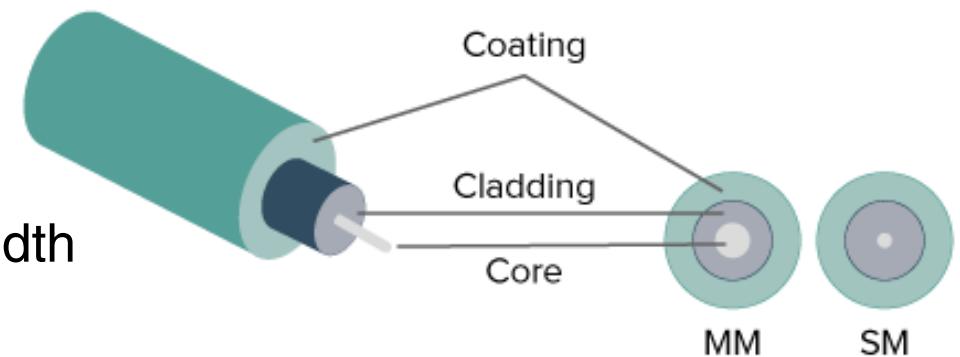
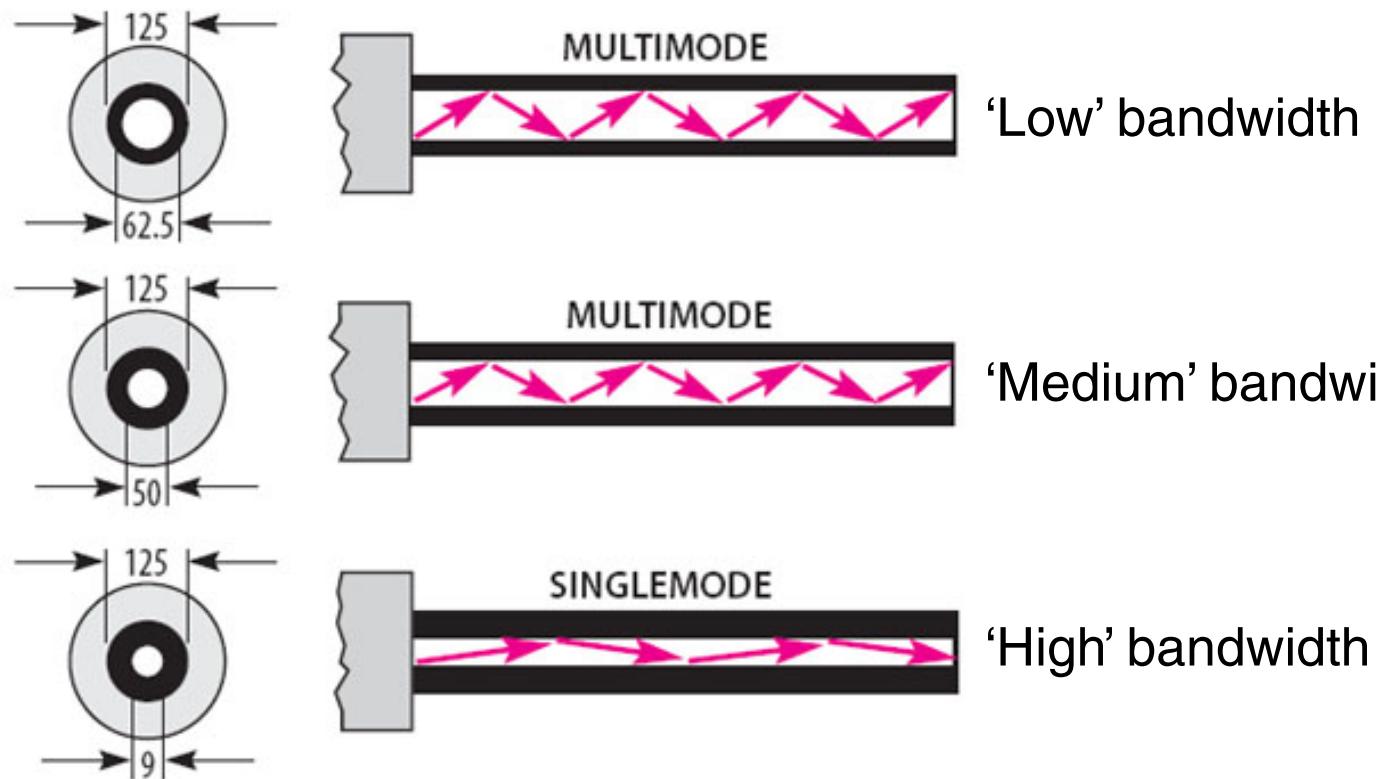
## Main Features

- Push-Pull for Easy Mating
- Miniature Sizes: 0T-3T
- 2-32 Contacts
- IP68 Water Resistance
- Standard Chrome-plated Shell
- Black Chrome-plated Option (seen here)
- Black Plastic Shell Option

## Benefits

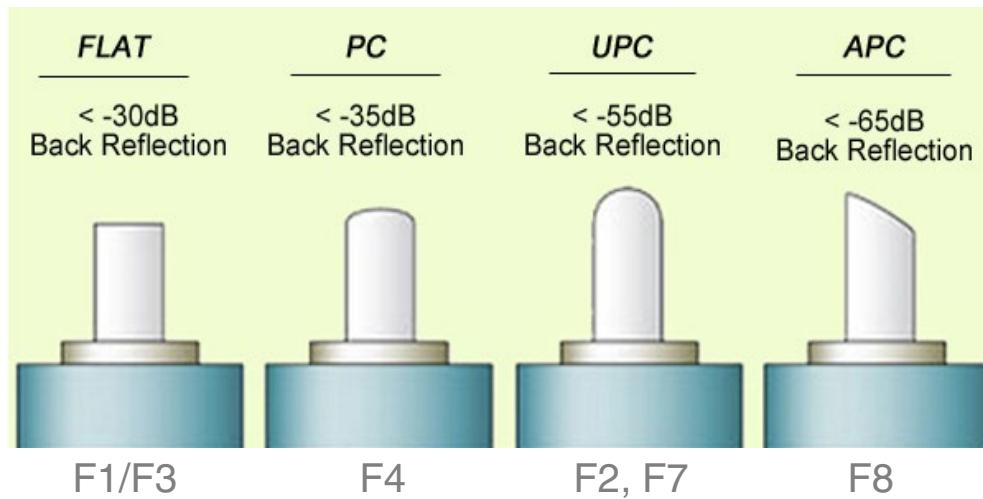
- Break-away / Quick-release
- 1,000+ hours Salt Fog
- High Mating Cycles 3,000+
- Tight Finger Space Operation
- Unique Pin Configurations & Hybrids
- Plug Mates with B Series Receptacles





## Main Features

- 2.0mm Fiber Contact allows for smaller housings. (Standard is 2.5mm)
- Ruggedized watertight single fiber connector (see right)
- Hybrid Configurations:  
FO + LV, HV, Pneumatic/Fluidic



# High Speed Connectors

## Main Features

- CAT 6A (4 twisted pair)
- SPE (Single Pair Ethernet)
- Ruggedized Options
  - M = Ratchet Coupling
  - T = Push-Pull Coupling
- USB Form Factor



## Robotics & Industrial Control Applications

- Legged Robots
- Animatronics (Actuators + Servos)
- High-Speed Cameras
- Machine Control Systems
- Inspection Sensors
- Test & Measurement



## Anybots, ANYmal C – 4-Legged Robot T Series

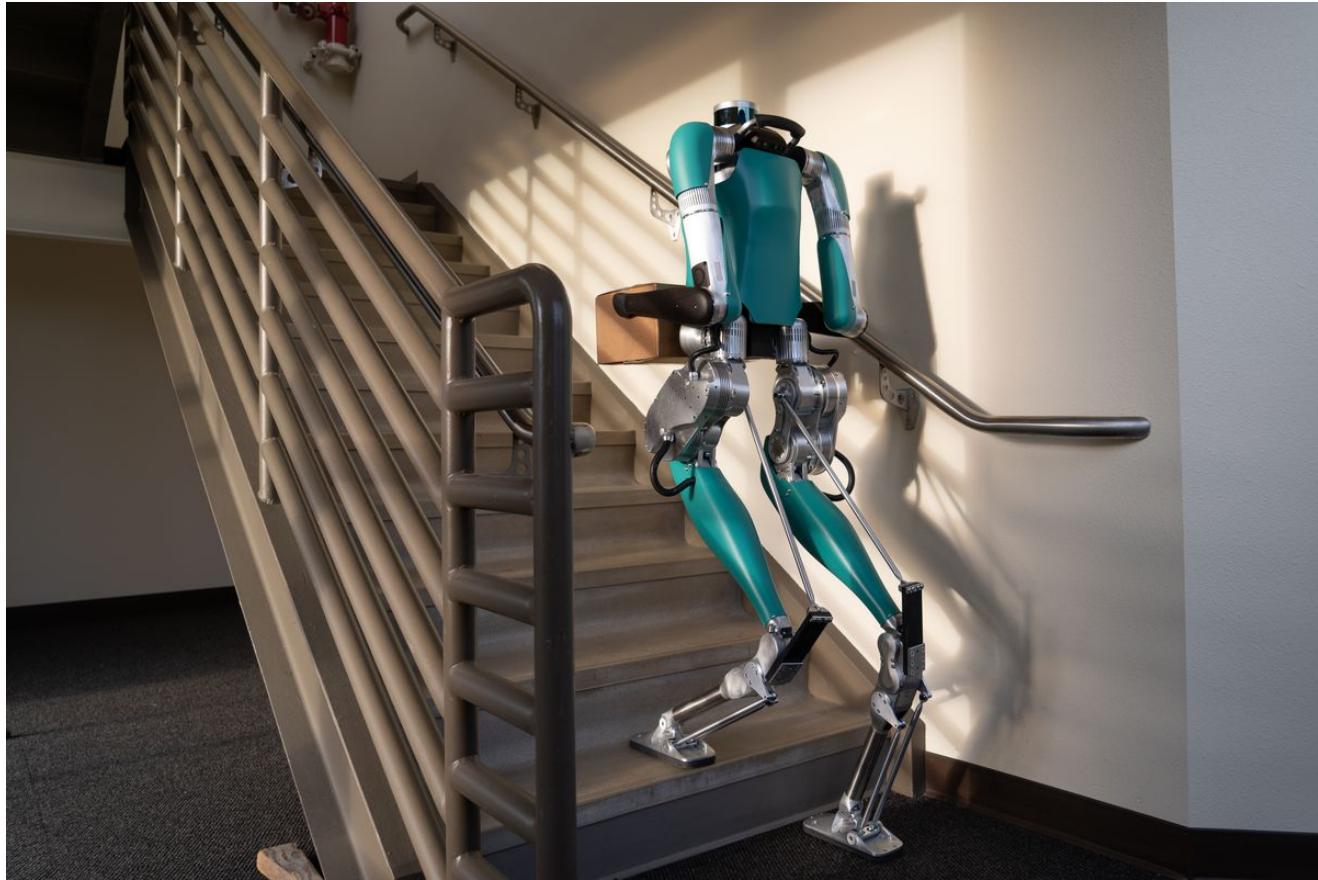


# Quadruped Robot

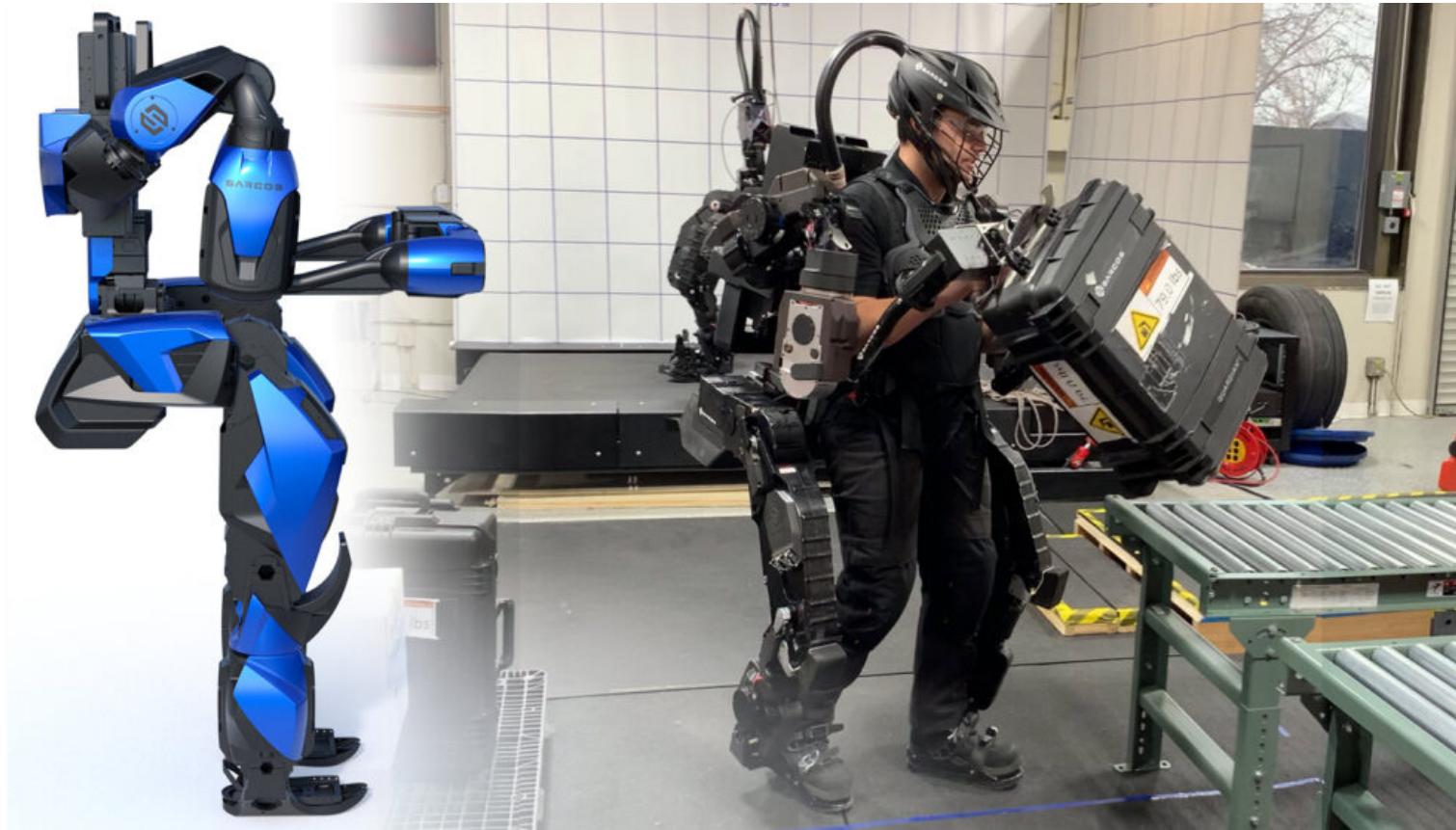
Ghost Robotics, Ghost Q-UGVs™ – Robotic Dog, Controller  
M Series



## Agility Robotics, Digit – 2-Legged Robot B & K Series



## Sarcos – Full Body Powered Exoskeleton B Series



## Harmonic Drive, FHA-C Mini Series – Actuator + Integrated Servo Drive B & T Series



# Automated High-Speed Cameras

## IDT Vision – Digital High-Speed Cameras & Hubs M Series



# Industrial Agricultural Robot

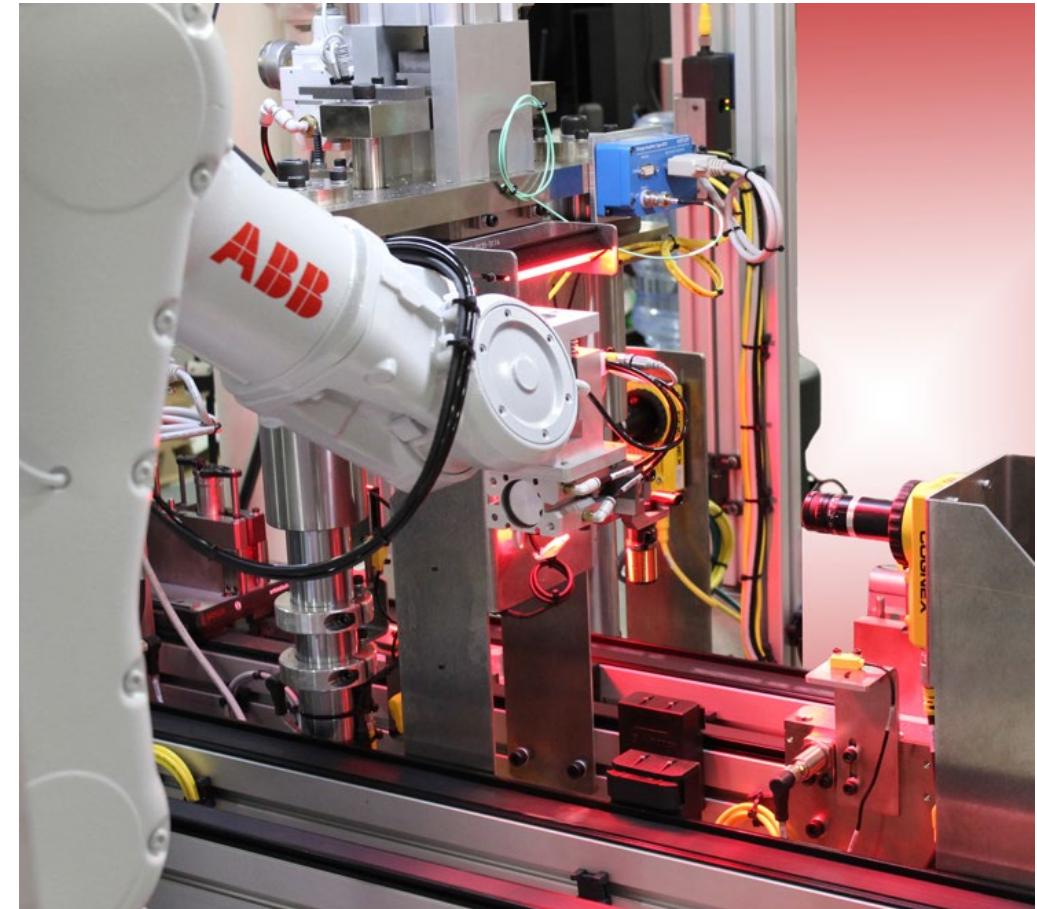
## Abundant Robotics, Apple Harvester M Series



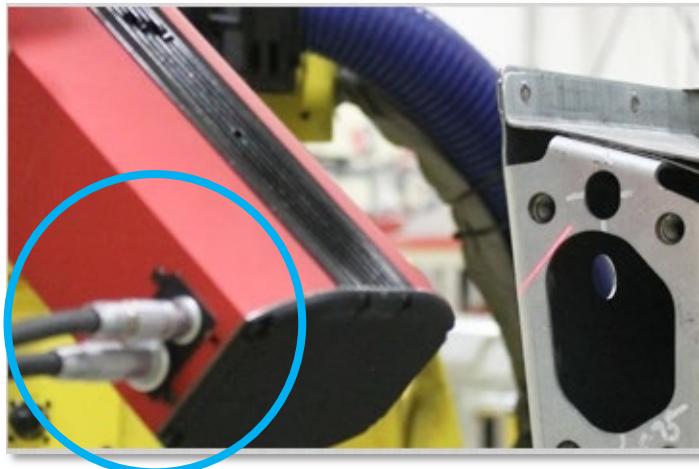
## Amazon Robotics – Robotic Tech Vest (Warehouse Technicians) SP Series, Custom in-Line



## Calvary Robotics, Next Gen Automation – Automation Equipment B Series



## Perceptron, In-Line Automated Robot Guidance B Series



## Schunk Sonosystems – Ultrasonic Welders S Series, High Voltage 5kv



## Teradyne, Spectrum HS – System Tester, Controller B Series



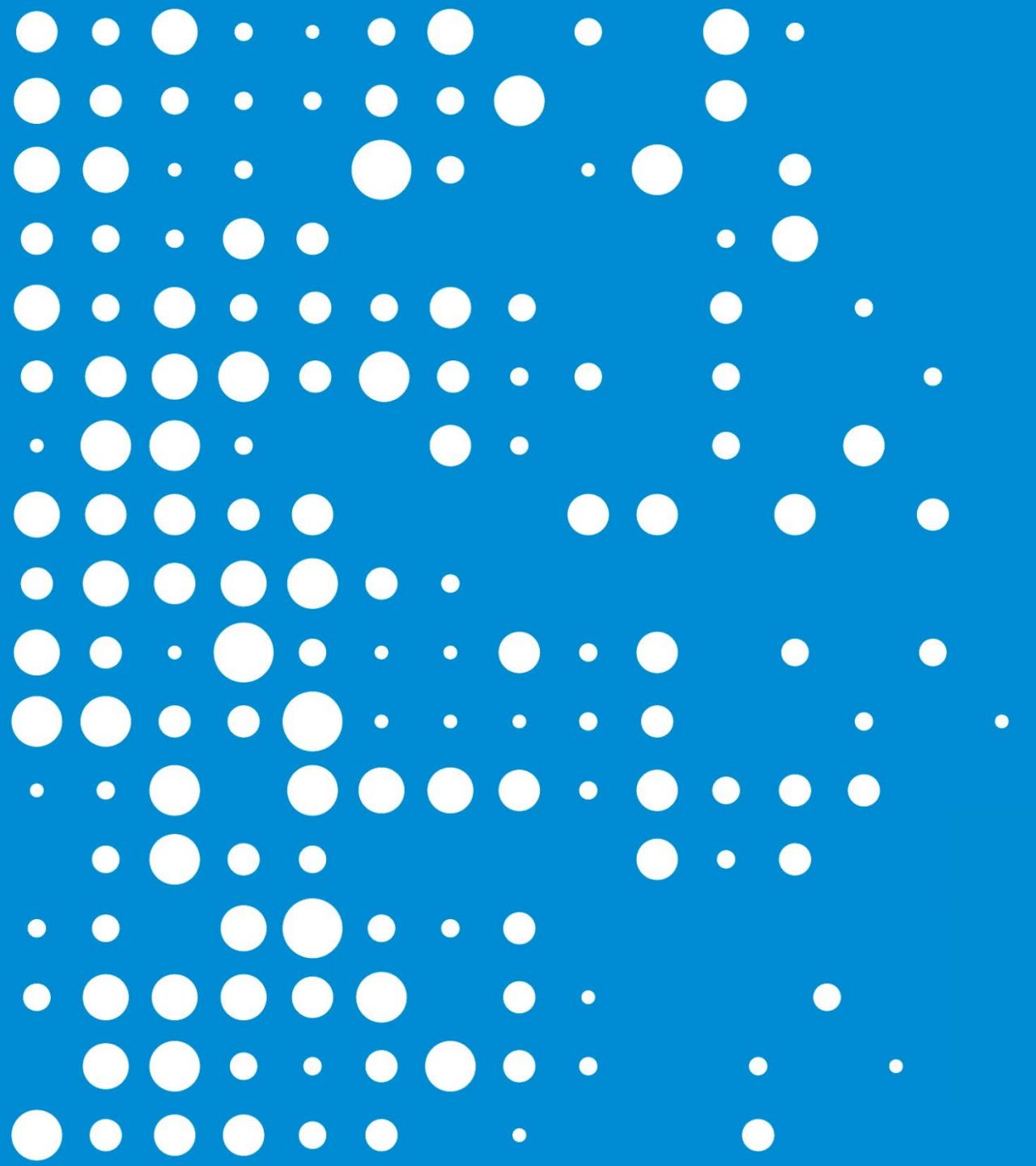
Quality  
Expertise  
One-stop Shop  
Custom Design Capabilities

SERIES - B, K, M & T Series

## FEATURES

- Long Lasting Connectors / High-Reliability
- Harsh Environment / Sealed IP68
- Push Pull or Ratchet Coupling
- Cable Assemblies & Harnesses





# Robotics & Industrial Control Scenarios

## Application: Animatronics

<b>Contact type</b>	Low Voltage Power
<b>Contact number</b>	9 LV
<b>Environment</b>	Robotic Costume
<b>IP Rating</b>	IP68
<b>How durable?</b>	Durable, Lightweight, Sweat Resistant
<b>Plastic or metal housing?</b>	Metal
<b>Is cost a factor?</b>	No

**LEMO Series you would recommend and why?**

## Application: Animatronics

<b>Contact type</b>	Low Voltage Power
<b>Contact number</b>	9 LV
<b>Environment</b>	Robotic Costume
<b>IP Rating</b>	IP68
<b>How durable?</b>	Quick Connect/Disconnect, Small form factor, Sweat Resistant
<b>Plastic or metal housing?</b>	Metal
<b>Is cost a factor?</b>	No

### T Series

IP68, Push-pull



## Application: Nuclear Molten Salt Power Generator

<b>Contact type</b>	Low Voltage Power
<b>Contact number</b>	10 LV
<b>Environment</b>	High Radiation
<b>IP Rating</b>	IP66
<b>How durable?</b>	Remote handling & latching, 30-year operational life
<b>Plastic or metal housing?</b>	Metal – Stainless Steel
<b>Is cost a factor?</b>	No

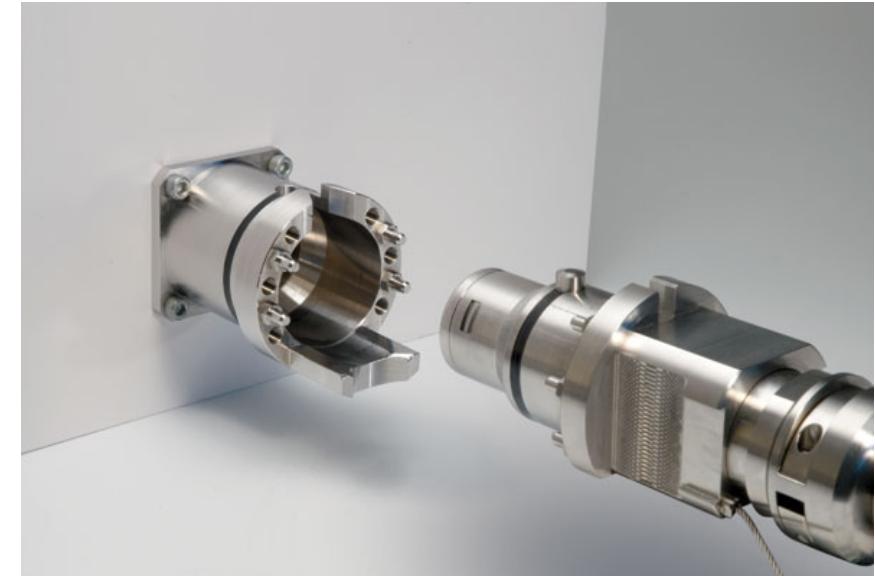
**LEMO Series you would recommend and why?**

## Application: Nuclear Molten Salt Power Generator

<b>Contact type</b>	Low Voltage Power
<b>Contact number</b>	10 LV
<b>Environment</b>	High Radiation
<b>IP Rating</b>	IP66
<b>How durable?</b>	Remote handling & latching, 30-year operational life
<b>Plastic or metal housing?</b>	Metal – Stainless Steel
<b>Is cost a factor?</b>	No

### N Series

Remote handling & latching.  
Stainless Steel shell.



## Application: GPS Antenna - Underwater Buoy

<b>Contact type</b>	Miniature Coax
<b>Contact number</b>	1 Coax
<b>Environment</b>	Submerged underwater
<b>IP Rating</b>	IP68
<b>How durable?</b>	Submersible up to 60 bar (200 ft) Screw coupling
<b>Plastic or metal housing?</b>	Metal
<b>Is cost a factor?</b>	No

**LEMO Series you would recommend and why?**

## Application: GPS Antenna - Underwater Buoy

<b>Contact type</b>	Miniature Coax
<b>Contact number</b>	1 Coax
<b>Environment</b>	Submerged underwater
<b>IP Rating</b>	IP68
<b>How durable?</b>	Submersible to 60 bar (2,000 ft) Screw coupling
<b>Plastic or metal housing?</b>	Metal
<b>Is cost a factor?</b>	No

### 03 Series

Miniature underwater screw coupling.



## Application: Industrial Welding Robot - Auto Assembly Line

<b>Contact type</b>	Low Voltage Signal
<b>Contact number</b>	8 LV
<b>Environment</b>	Factory Floor
<b>IP Rating</b>	IP68
<b>How durable?</b>	Push-pull & high vibration, High shielding for noise >80 dB
<b>Plastic or metal housing?</b>	Metal
<b>Is cost a factor?</b>	No

**LEMO Series you would recommend and why?**

## Application: Industrial Welding Robot - Auto Assembly Line

<b>Contact type</b>	Low Voltage Signal
<b>Contact number</b>	8 LV
<b>Environment</b>	Factory Floor
<b>IP Rating</b>	IP68
<b>How durable?</b>	Push-pull & high vibration, High shielding for noise >80 dB
<b>Plastic or metal housing?</b>	Metal
<b>Is cost a factor?</b>	No

### K or E Series

K has better availability



## Application: Fly-by Wire Harness for Fulfillment Center Technician

<b>Contact type</b>	Low Voltage Signal
<b>Contact number</b>	13 LV
<b>Environment</b>	Warehouse
<b>IP Rating</b>	IP50
<b>How durable?</b>	Lightweight
<b>Plastic or metal housing?</b>	Plastic OK
<b>Is cost a factor?</b>	No

**LEMO Series you would recommend and why?**

## Application: Fly-by Wire Harness for Fulfillment Center Technician

<b>Contact type</b>	Low Voltage Signal
<b>Contact number</b>	13 LV
<b>Environment</b>	Warehouse
<b>IP Rating</b>	IP50
<b>How durable?</b>	Lightweight
<b>Plastic or metal housing?</b>	Plastic OK
<b>Is cost a factor?</b>	No

### REDEL P or SP Series

Wire gauge is the differentiator





Thank You