

AN OVERNIGHT GAME-CHANGER— 60 YEARS IN THE MAKING.

HOW ARISO CONTACTLESS CONNECTIVITY PROVIDES INNOVATIVE, NEW WAYS TO SOLVE CUSTOMERS' CONNECTIVITY CHALLENGES.

Over the past 60 years, TE's commitment to exceeding customer expectations has led us to adapt solutions and manufacturing processes across multiple industries, resulting in an entire portfolio of standardized as well as customer-tailored innovations. We've created products that overcome harsh environments where vibration or ocean depths dare to impede; solutions that adhere to sterilization and regulatory requirements where life and health are at stake; and technologies that take into account miniaturization and cost pressures inherent to consumer products manufacturing.

Finding new, often unexpected, ways to meet our customers' challenges has helped us become the world leader in connectivity solutions.



Vibration



Tilt



Through
Materials



Safety



Rotation



Data Power
Signal

WE'VE GONE BEYOND THE SPEC.

Early on, we realized that in order to create groundbreaking solutions and invent superior products, we had to understand the application in context—including all of the business requirements. That's why we expanded our team of field engineers to support customers at their sites. These engineers regularly engage with customers to fully understand their needs and their pain points, and then participate in a collaborative dialog that's a catalyst for innovation.

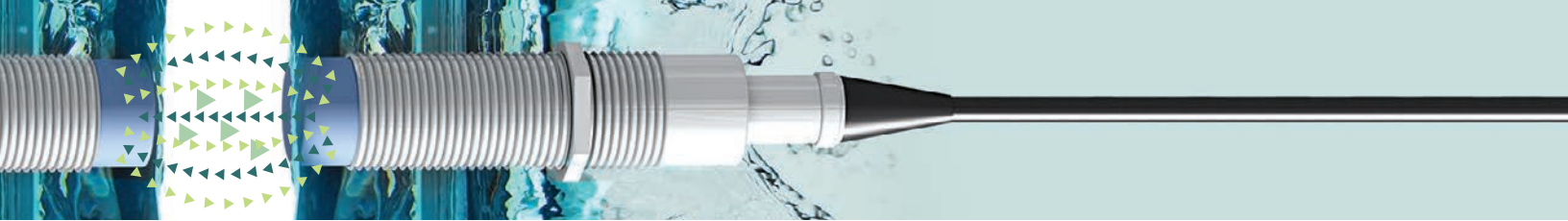
This collaboration made it clear that our existing connector solutions could not fulfill every customer need. We had to investigate alternative technologies. Given our deep expertise with connectors and antennas, developing some type of contactless or wireless solution was a natural path to explore. Whatever the

outcome, the answer had to be as reliable as standard wired power and signal—but with wireless flexibility.

WE KEPT ASKING OURSELVES, "WHAT'S POSSIBLE?"

We wanted a very reliable and affordable solution that would also be small enough to allow easy integration into customer applications. We studied and compared the attributes of various technologies that could transmit power and signal. Our criteria included size, cost, efficiency, and the ability to transmit over a certain distance. What about harsh and safety-critical environments? Could it transmit through water? Would it minimize or eliminate arcing? Should it penetrate metal? Would background noise interfere with transmission?





Inductive coupled power transfer emerged as the most viable technology since inductively coupled devices can transfer power and data across small distances, without any contact. The stationary pieces, such as a robot arm, could transfer power inductively to a rotating, indexing or fixed mobile part, like a gripper. The mobile part makes the power available to power sensors, heaters, cameras, valves, motors, microprocessors, or batteries while it also feeds the data back to the stationary piece. Another advantage of inductively coupled devices is their ability to operate reliably in very demanding environments—underwater, in vacuum chambers, ultra clean environments, surrounded by grease or mud, or on equipment that's spinning at high rpm. Because there are no moving parts to wear out, these devices are virtually maintenance-free—making this a very attractive technology for our client base.

NOW THE TRICKY PART: USING THE TECHNOLOGY TO MANUFACTURE A BEST-IN-CLASS PLATFORM.

Once we had identified the technology, the objective was to integrate the power coils and near field antenna into a very small form factor—and then manufacture it. TE Connectivity has a tremendous breadth of expertise with both mechanical design and power electronics. Add to that our expertise in magnetics, RF and antennas. Plus, we have a global manufacturing capability to help us produce and deliver a best-in-class solution.

Our unique competencies led us to solve the potential problem of electromagnetic interference by using RF chips coupled with near field antennas. We were also able to reduce the total cost of the couplers by building a streamlined solution using fewer components, while improving performance and reliability.

TIME TO DREAM.

We invented the ARISO contactless connectivity platform in a very short timeframe, based on over sixty years of inductive coupling and mechanical expertise. The platform entails a fundamental change of direction for our customers—one that closes an important gap. Now they can implement our devices in applications where standard connectors and cables could not be used before. And it will enable an entirely new way of thinking about mechanically designed machines.

The Ariso contactless connectivity platform will undoubtedly lead to more innovation. One could envision, for example, a totally new, more sensitive robot that has complete freedom of movement. Our platform provides the building blocks that will allow our customers to dream about new products –and to create them.

WHERE WE ARE TODAY.

We are now manufacturing evaluation kits for our customers, so they can test the hardware in their own environments—alongside our field engineers. Together, we can start to imagine what's possible in a world of contactless connectivity.

EXPERIENCE THE ARISO PLATFORM FOR YOURSELF. ORDER YOUR EVALUATION KIT TODAY.

These evaluation kits give you the freedom to experiment with this technology in your own environment. Integrate TE's Contactless Connectivity technology into current, real-world scenarios of your own or share it with your customers. You never know what possibilities may develop with ARISO contactless connectivity at your fingertips. Contact us today at ARISO@TE.com.

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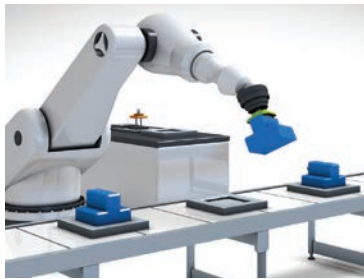
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A diagram showing two cylindrical metal connectors with a central gap. A series of green triangles, representing data or power, are shown being transmitted across the gap between the two connectors. The background is a blue, water-like texture.

ARISO CONTACTLESS CONNECTIVITY CHANGES THE GAME.



INNOVATIVE TECHNOLOGY CREATES A NEW WORLD OF POSSIBILITIES WHEN TRANSPORTING MATERIALS USING CARRIER SYSTEMS.

Today's manufacturing environments are becoming increasingly complex, as smart systems evolve and the demands of data transfer grow to enable communication throughout the manufacturing process. Coupled with shrinking budgets, factory automation is held to a new standard of efficiency. Whether medical, automotive, or pharmaceutical, optimizing operations within any industry can reduce expenses and increase productivity—but only up to a certain point. Making a game-changing impact on the manufacturing process requires true innovation.

With the introduction of TE Connectivity's ARISO contactless connectivity platform, innovations never before imagined, are now possible—to improve productivity, enable greater flexibility, and reduce the total cost of ownership.

CARRIER SYSTEMS ARE A KEY COMPONENT IN MANUFACTURING.

Carrier Systems are used in factory automation throughout the manufacturing process. Primarily designed for materials handling, a carrier system is any moving container that transports devices, equipment, parts, or tools from one location to another. Typical applications include transporting boxes along a conveyor belt, moving pallets, or picking and packing components using a robotic hand. Carrier Systems can also be used to transport raw materials in industrial or heavy construction environments.

CONTACTLESS CONNECTIVITY REMOVES THE BARRIERS.

With the ARISO platform TE is transforming the world of factory automation in many ways.



We pack a lot of power in a small package:

Our technology offers smaller form factors, enabling integration into miniaturized environments and small machinery. In addition to fewer physical constraints, the ARISO platform provides superior power density, delivering increased electric power relative to its size. TE's couplers are either the same size as those offered by the competition with increased power levels, or smaller products with comparable power levels. This compact powerhouse feature not only enables access to more devices, it also offers access to certain types of devices requiring increased power levels.



We make it easier to get Smart: Carrier systems often require the ability to capture and communicate data, such as tracking a pallet or a part as it moves through the manufacturing process. TE couplers are designed to make the addition of intelligent features easy. Sensors, which capture, store, and communicate data, can be embedded in the couplers themselves. Smart features can also extend the life of an existing product without the need for mechanical modification. For example, there may be two very similar products or components, each requiring different power levels. ARISO couplers can store this information, allowing a single product to automatically apply the appropriate power level.



We can take the heat: A Carrier System includes two couplers, a transmitter, and a receiver. When transferring power from the transmitter to the receiver, a loss of power occurs. For example, 100 watts of power may be transmitted while only 75 watts of power is received, creating a loss of 25%. This power loss generates heat, which can be particularly destructive, causing devices to melt or simply malfunction. ARISO couplers perform efficiently with minimal power loss. Increased efficiency means improved heat management.



We give engineers greater design flexibility: Increased efficiency also means bridging the distance gap between the transmitter and the receiver. As operating distances increase, misalignment—in this case, a good thing—occurs. Misalignment enables freedom of movement not possible with mechanical connectors, which require close physical proximity. With electronic contactless couplers, less precise solutions are possible, making them more adaptable and less expensive. Developing solutions not dependent on proximity is faster and easier with the ARISO platform.

We enable testing on the fly: Testing products and components throughout the manufacturing process is essential to quality control. Yet proper QA takes time and space, typically requiring parts to be sent to a testing area. With ARISO couplers, testing is possible during the actual process or on the fly. Rather than move a part to a dedicated testing area, ARISO sensors can test it as it moves through production, saving time and space. The entire production process is more flexible and more efficient. Because multiple steps occur simultaneously, the ARISO platform shortens production cycles, increasing productivity with greater throughput.

SO, WHAT IS POSSIBLE?

With so many limitations removed, we have only begun to see what is possible. Factory automation and manufacturing may experience improvements unlike any in decades—perhaps in history. Certainly the manufacturing process will be more efficient and flexible. At the least, the process will be smarter; productivity will improve; and total cost of ownership will be reduced.

So much power and imagination lay in future applications of the ARISO platform. So much power lies in what's possible.

EXPERIENCE THE ARISO PLATFORM FOR YOURSELF. ORDER YOUR EVALUATION KIT TODAY.

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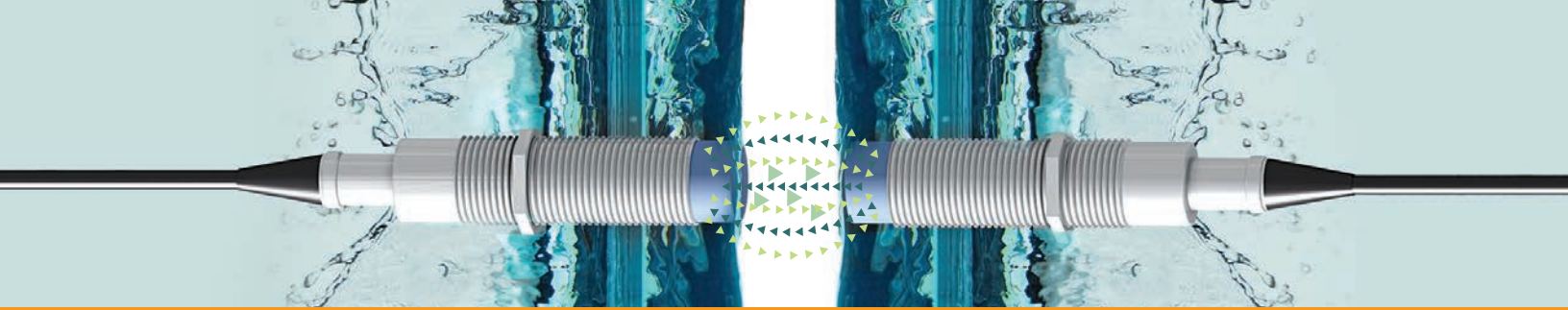
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ARISO CONTACTLESS CONNECTIVITY CHANGES THE GAME.



INNOVATIVE TECHNOLOGY REMOVES MECHANICAL LIMITATIONS, OPENING UP A NEW WORLD OF POSSIBILITIES FOR THE ROBOTICS INDUSTRY.

The field of robotics has evolved dramatically, from the rudimentary industrial robots first introduced in the 1960's, to the ultra-sophisticated intelligent robots of today. Whether for hazardous environments too dangerous for humans, like radioactive clean up or bomb disarmament, or routine industrial settings, including automobile manufacturing or the food and beverage industry, robots can perform a wide range of tasks in diverse situations. Despite rapid advancements, mechanical limitations remained the primary challenge for the robotics industry. That is, until now.

With the introduction of TE Connectivity's ARISO contactless connectivity platform, innovations never before imagined, are now possible—innovations that improve productivity, enable greater efficiency, and create a safer world.

MECHANICAL CONSTRUCTION HAS ITS LIMITS.

Robots are a good example of mechanically constructed objects that use motors to generate movement. These motors power the cables that run either beside a robotic arm or are fed through it. There are several downsides to the mechanical aspects of this construction. Not only do the cables limit range of motion, but the constant movement and friction of the mechanical parts also create wear and tear. This leads to frequent breakage and connector failure, as well as downtime, when operators must replace the worn cables with new ones.



In addition to linear movement, robots also need to move rotationally to perform complex tasks. Traditionally, rotation is achieved with rotating connectors, or slip rings, which are mechanically connected to stationary rings via brushes. Cables are used to position

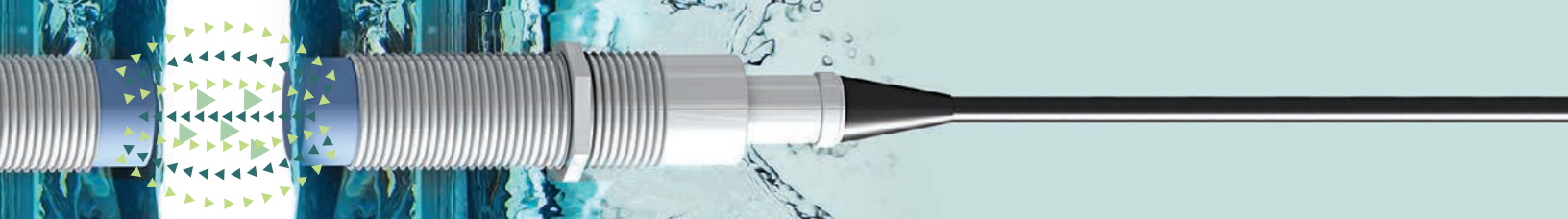
these copper rings in close proximity to enable physical contact with the carbon brushes. Carbon then transfers the electrical current to the ring, thus creating rotation. This constant friction creates wear and tear on the brushes, which must be replaced frequently—causing downtime and affecting productivity.

CONTACTLESS CONNECTIVITY REMOVES THE BARRIERS.

With the ARISO platform, TE has transformed the world of robotics in many ways.

We turn downtime into uptime: Without friction as the byproduct of mechanically constructed parts, the deterioration of moving components is no longer a limiting factor. Not only does this increase machine availability, it also decreases the cost to operate those machines—with less moving parts to replace, and lower maintenance fees.





We give engineers 360 degrees of

flexibility: When a mechanically constructed robotic hand rotates to its fullest extent, it reaches 270°. When

returning to the point of origination, it is faster and more efficient to rotate the additional 90° *forward*; however, due to the mechanical limitations of the cable, it must go back 270°. This process increases production time by a factor of three. Using contactless couplers enables manufacturers to triple their throughput, generating three times more product within the same time period.

Not every process requires increased productivity; sometimes you need greater precision.



We offer just the right touch and endless

flexibility: When picking and packing certain products or handling sensitive materials, a minimal amount of force is

required not to damage the items. The intelligence required to perform at such precise specifications is inherent in a contactless coupler. With ARISO couplers, the gripper or robotic hand can be equipped with electronic, or contactless, sensors that limit the force exerted and stop automatically before exceeding those levels. In addition to data transmission, contactless sensors offer additional improvements over pneumatic sensors. Pneumatic grippers are less energy efficient, not as sensitive, and require air pressure that is not always available in certain applications. Most impressively, contactless couplers enable greater flexibility, allowing various grippers or end detectors to be used with the same robot. And since the process is automated, there is no need for an operator to physically change the gripper.

Just because we're a light touch, doesn't mean we can't get tough.



We perform in the harshest

environments: Oil and gas are among the most challenging environments. Robotic friction can

cause even the smallest arc, which could generate a very costly—or deadly—explosion. While not life-threatening, using mechanical couplers in harsh environments, such as underwater or within lubricants or coolants, is extremely challenging due to corrosion. Rather than using contact to operate in these conditions, hermetically sealed and galvanically isolated contactless couplers use magnetic fields to achieve connectivity.

SO, WHAT IS POSSIBLE?

With so many limitations removed, we have only begun to see what may be possible. Certainly, robots in the near future will be constructed differently, and most likely less expensively. Set up and design will be easier and simpler. At the very least, robots will have greater freedom of movement; productivity will improve; and total cost of ownership will be reduced.

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INTRODUCING

ARISO CONTACTLESS CONNECTIVITY PLATFORM

- Obtain freedom of movement including tilt, angle and misalignment
- Help ensure flexibility by transferring power and signal through fluids, walls and thin barriers

TE Connectivity's (TE) ARISO Contactless Connectivity Platform is a hybrid interconnection system, based on contactless power and data technology, which can easily connect over a short distance without a physical connection. ARISO is not subject to any of the old design parameters, it's immune to vibration, pollutants and harsh environments and unconfined by movement restrictions.

Where traditional connectivity reaches its limits due to space restrictions, vibration, dust and debris, contactless connectivity can provide premier design flexibility while reducing maintenance and installation efforts. The ARISO Contactless Connectivity platform is designed to replace complex and expensive harness construction and slip rings, enabling connectivity where connections previously were not possible.

BENEFITS

- Obtain freedom of movement including tilt, angle and misalignment with contactless connectivity
- Help ensure flexibility by transferring power and signal through fluids, walls and thin barriers
- Build easy on-the-fly connections - connecting remote I/Os or sensors on moving machine parts requiring quick connections and immediate system response e.g. connecting remote I/Os or sensors on moving machine parts requiring quick "contactless" connections and immediate system response
- Obtain rotational freedom that enables faster rotation
- Reach unlimited mating cycles in wet and dusty environments with physically separated coupler ends
- Enable safe and reliable connections in harsh environments through vibration resistant, fully sealed couplers

APPLICATIONS

- Robotics
- Centrifuges
- In-line inspection
- Milling machines
- High end printers
- Rotating tables
- Molding machines



MECHANICAL

- Diameter: 30 mm
- Length of PTx: 80 mm
- Length of PRx: 80 mm
- Thread: M30 x 1.5
- Max Weight: 150 gr
- Cable length: 30 cm

ELECTRICAL

- Power Level: 12 Watt
- Operating voltage: 24 VDC
- Output current: 500 mA

STANDARDS & SPECIFICATIONS

- Switching frequency f : 500 Hz
- IP67
- CE, RoHS

LEARN MORE

[ARISO Contactless Connectivity Web Page](#)
[ARISO Flyer \(English\)](#)

ARISO Videos:

[Overview](#)
[The Benefits](#)
[Basic Principles](#)

ARISO Application White Papers:
[Contactless Connectivity in Carrier Systems](#)
[Contactless Connectivity in Robotics](#)

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