



# CABLE SOLUTIONS FOR MOTION CONTROL



TPC WIRE & CABLE CORP.  
*EXPECT HIGH PERFORMANCE®*



## LET TPC DO THE WORK.

### Get your cables connectorized & ready to install.

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TPC has nearly 40 years of experience building high-quality assemblies. Our knowledge combined with our state-of-the-art design and assembly center allows us to provide the high-performance assemblies you demand. From molded assemblies and military connectors to rectangular connectors and heavy-duty locking connectors, TPC's assembly products stand the test of time, saving you the hassle and expense associated with unplanned downtime.

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## VFD Cable Assembly Reduces Motor Failure

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### PROBLEM:

A global manufacturer of structural metal components serving automotive OEMs was experiencing problems with the cable powering its motor. The cable was failing every four months due to environmental abuse from flexing, abrasion, and exposure to chemicals. For each instance of failure, the cost to replace the cable was \$580 in product and labor plus 1 hour of downtime, which added up significantly over time.

### SOLUTION:

The TPC representative recommended Trex-Onics® VFD Shielded Power Cable with a male-to-female six pole rectangular connector assembly. TPC's cable assemblies are built to handle the harshest environments. The custom length Trex-Onics® cable designed for industrial applications where flexing, abrasion, impact, and oil are present, coupled with the requested rectangular connector, created a rugged end-to-end solution.

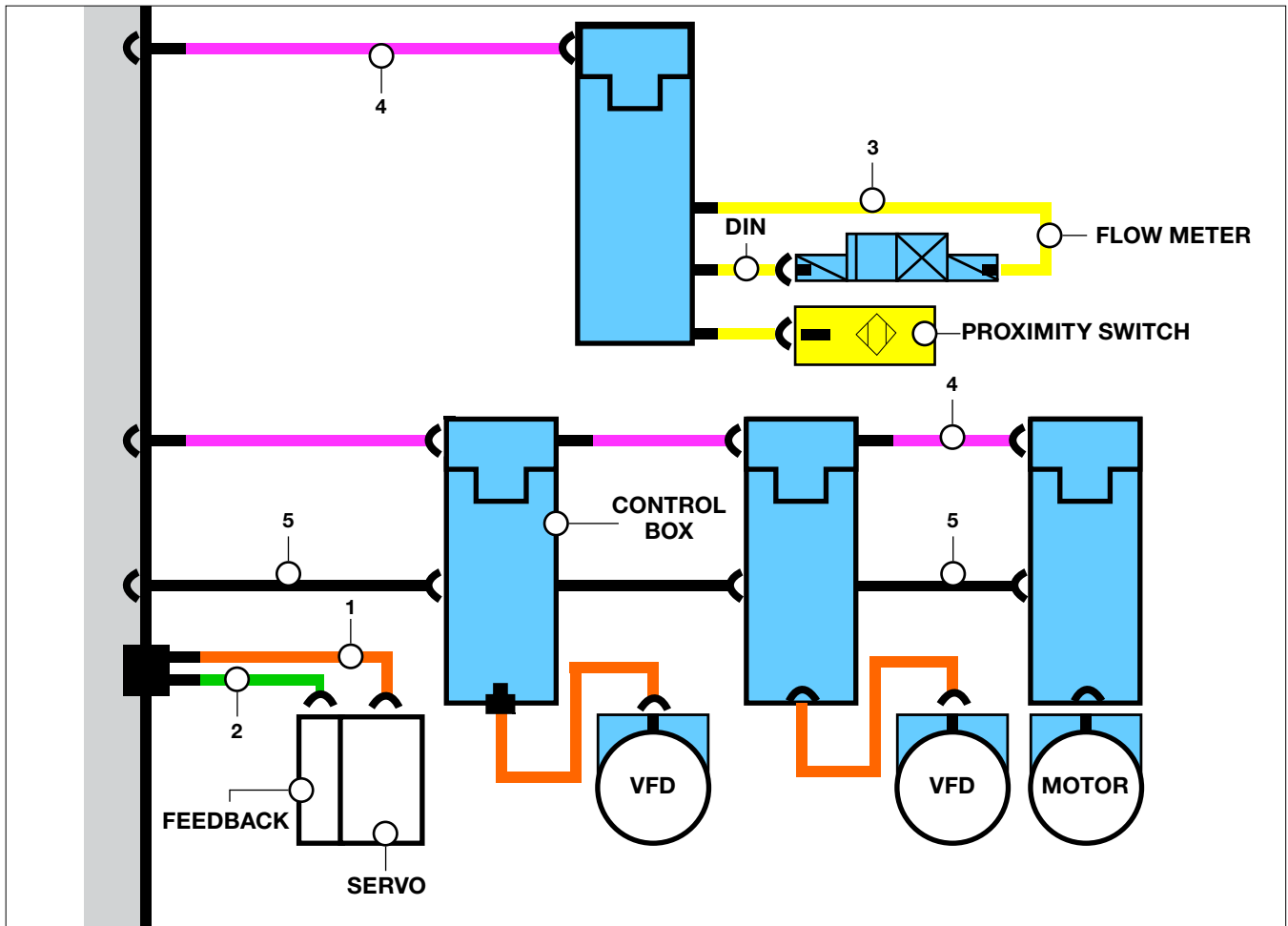
### RESULT:






TPC's Trex-Onics® VFD Shielded Power Cable Assembly was installed in the unit. After 21 months, the cable assembly was still holding up well in the environment. The total cost in products and labor for TPC's solution was just \$787 compared to \$3,060 the customer would've spent repairing/replacing the commodity product. Plus, the customer was able to minimize downtime and actually gained 5 hours of production time.

*Source: TPC Cost Value  
Analysis Report #3356*

# Cable Solutions for Motion Control

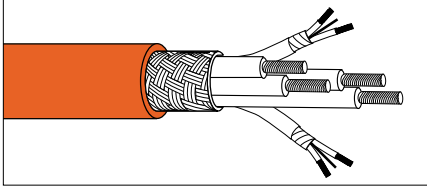
TPC Wire & Cable Corp. is a leading supplier of high-quality, high-performance electrical wire, cable, connectors, and assemblies designed and engineered to withstand harsh industrial environments. We know how critical it is that the cables and connectors installed throughout your motion control systems be able to survive abuse from rigorous and continuous flexing, impact, abrasion, chemicals, and extreme temperatures. TPC products solve the most difficult problems to outlast ordinary cable, reducing your downtime, labor, and overall costs.



- 1.  Shielded power cables (**Servo Motor, VFD, Hybrid Motor Cable – Page 4**)
- 2.  Feedback cables (**High-Flex Encoder, 600V ISP, 300V ISP, Chem-Gard® ISP, Low Cap ISP – Pages 4 & 5**)
- 3.  Sensor/actuator cables (**Mini, Micro, & Quick-Connects, 600V & 300V ISP, Chem-Gard ISP, DIN Cord Sets – Page 6**)
- 4.  Bus cables (**Ethernet, DeviceNet, Profibus, ControlNet – Page 5**)
- 5.  Power cables (**Super-Trex® Ultra-Gard TC & Triple-Gard / Type W, PP&A – Page 8**)

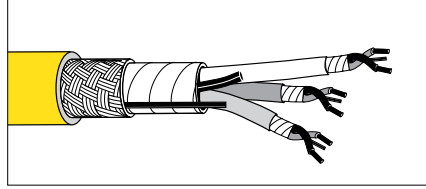
# Motion Control Solutions

## VFD, SERVO, AND ENCODER CABLES



### Trex-Onics® Servo Motor Cable

- Designed to outlast the OEM product and protect motors from damage
- Oil resistant insulation has high dielectric and mechanical properties, also offers low capacitance
- Tinned copper braid shields against radiated and conducted EM and RF interference
- Tinned copper conductors increase flexibility and extend cable life in dynamic applications
- Compatible with Rockwell/Allen-Bradley, Bosch Rexroth, Indramat, Kollmorgen, Siemens, Lenze, and Mitsubishi drive systems



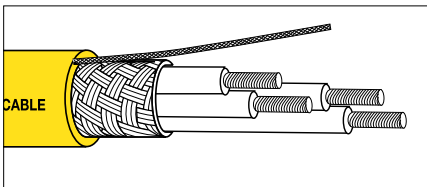
### Trex-Onics® Individually Shielded Multi-Pair Control Cable

- Tested to more than 4,000,000 cable carrier cycles without failure
- Finely-stranded, tinned copper conductors improve flexibility and flex life
- Fluoropolymer insulation on individual conductors to resist oil, solvents and chemicals while providing high dielectric capability, mechanical strength, and cut resistance
- Pairs isolated with color coded FEP overcoat for ease of identification & reduces friction in dynamic applications
- 100% shielding to protect against EM and RM interference
- Cable-bonded design allowing jacket to adhere to braid, reducing conductor movement and elongation



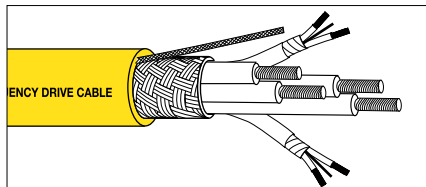
### Trex-Onics® High-Flex Encoder Cable

- Three-in-one solution combining power for the controller with twisted pairs suitable for managing signal and data
- Simplifies inventory, installation, and maintenance to become the ultimate OEM replacement
- Tinned copper braid shields against EM and RF noise
- Pairs used for analog and digital signals protected with braid and foil to maximize flex-life and signal integrity
- Compatible with EnDat, HIPERFACE®, and Synchronous Serial Interface (SSI)



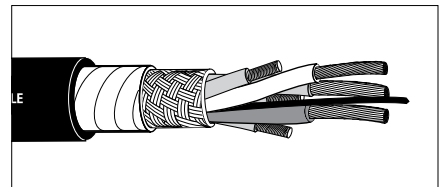
### Trex-Onics® Low Capacitance VFD Shielded Power Cable

- Tested to more than 4,000,000 cable carrier cycles without failure
- Tinned copper braid prevents damage from electrical noise
- Finely-stranded, alpha-numerically marked copper conductors extend life in dynamic applications
- Oil-resistant composite insulation system offers high dielectric, tensile, and mechanical properties



### Trex-Onics® Low Capacitance VFD Shielded Power Cable with Brake & Signal Pairs

- Tested to more than 4,000,000 cable carrier cycles without failure
- All the features and benefits of Trex-Onics® Low Capacitance VFD Shielded Power Cable plus aluminum/mylar foil shielded brake and signal pairs



### Super-Trex® VFD Shielded Power Cable

- Designed specifically for variable frequency drives (VFD)
- Constructed with TSE insulation to withstand corona voltages up to 2,000 volts
- Symmetrical ground wires reduce the effect of noise
- Heavy-duty TSE jacket offers superior protection against oil, ozone, sunlight, UV, chemicals, heat, flame, and weather

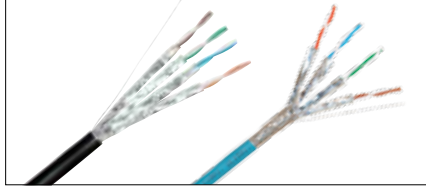
# Motion Control Solutions

## BUS CABLES



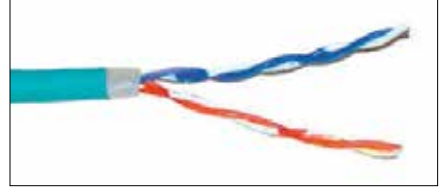
**Chem-Gard® 200°C CAT6 Industrial Ethernet Cable**

- Operating temperature range -60°C to 200°C
- Provides superior performance to meet or exceed CAT6 and Ethernet/IP requirements
- Finely-stranded silver alloy conductors improve high temperature flexibility and offer longer flex life
- Center spline keeps conductors separated and in their proper lay
- Chem-Gard® fluoropolymer jacket resists oil, chemicals, abrasion, cutting, and temperatures



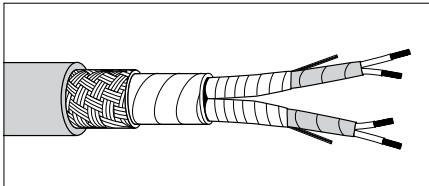
**Trex-Onics® Industrial Ethernet Patch/Work Area CAT6a/CAT7a Cable**

- Flex tested to more than 6,000,000 cycles without electrical failure
- Finely-stranded bare copper conductors for long flex life
- Ultra-Shield® configuration and aluminum/polyester foil shield for interference reduction
- Halogen-free, flame-retardant polyurethane jacket for protection against environmental abuse
- Fully interchangeable with CAT5E, CAT6, and CAT6A cables



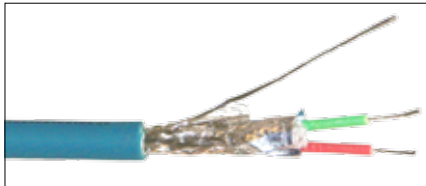
**Trex-Onics® Industrial Ethernet CAT5E / 2-Pair Cable**

- Suitable where robust cable is required due to flexing and repetitive motion
- Stranded copper conductors improve flexibility and flex life
- High-density compound insulation provides dielectric properties that meet CAT5E requirements
- Conductor pairs cabled with lay lengths that ensure signal integrity
- Used in applications using ODVA Ethernet/IP



**Trex-Onics® DeviceNet™ Flex-Net “Thick”/“Thin” High Performance Cable**

- Tested to more than 4,000,000 cable carrier cycles without failure
- Designed to meet electrical requirements identified by the Open DeviceNet Vendors Association (ODVA)
- Ultra-Shield construction combines two shielding technologies for mechanical strength and 100% protection against EMI and RF interference
- Fluoropolymer tape wrap allows braid and conductors to move freely in high-flex, torsional applications



**Trex-Onics® Profibus® Festoon/Trailing Cable**

- Tested to more than 1,000,000 cable carrier cycles without failure
- Finely-stranded, tinned copper conductors resist corrosion, improve flexibility, and reduce conductor fatigue
- Conductors insulated with foamed, high-density polyethylene (HDPE) for a low dielectric constant, excellent electrical characteristics, and improved signal integrity
- Combination of tinned copper braid and aluminum/polyester foil shield provides 100% protection from interference
- Polyurethane jacket protects against cutting, abrasion, oil, and chemicals



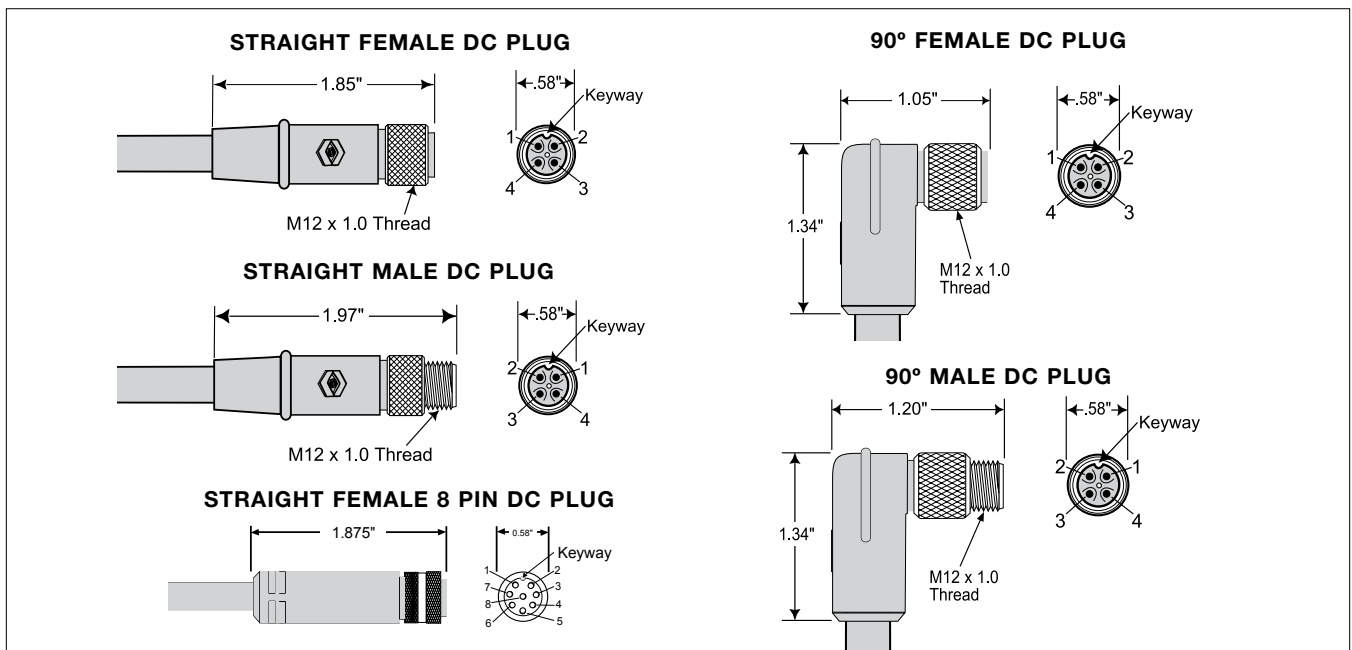
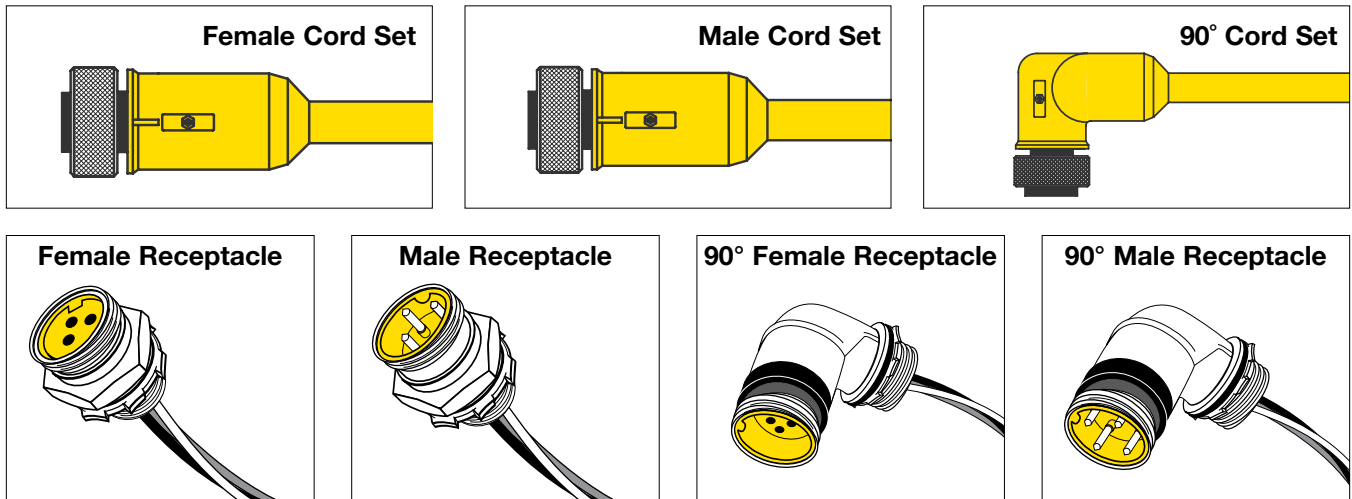
**Trex-Onics® ControlNet RG-6U Quad-Shield Coaxial Cable**

- Tested to more than 1,000,000 cable carrier cycles without failure
- Designed for ControlNet applications requiring flexibility and resistance to abrasion, oil, and chemicals
- Finely-stranded, bare copper conductors improve flexibility and offer maximum conductivity
- Conductors insulated with foamed HDPE to provide a low dielectric constant and maintain low capacitance
- Quad-shield protects against RF and EMI noise
- Polyurethane jacket protects against cutting, abrasion, oil, and chemicals

# Motion Control Solutions

## MINI, MICRO & NANO QUICK-CONNECTS™

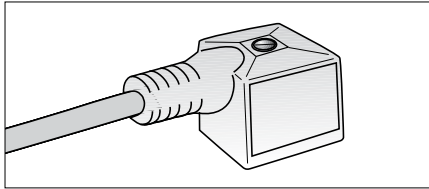
TPC's Quick-Connect™ cord sets make the replacement of your electronic control device or motor's electrical cord faster, easier and safer. Designed to withstand the harsh environments and rigors of industrial applications, TPC Quick-Connects are built using Super-Trex®, Trex-Onics®, Thermo-Trex® and Chem-Gard® cables. Quick-Connects range from 24 AWG to 10 AWG, straight or 90°, shielded or unshielded, and thread sizes include metric M8 & M12 and NPT 7/8", 1", 1 1/8" and 1 1/2".





# Motion Control Solutions

## CONNECTOR ASSEMBLIES



### DIN Connector Assemblies

- RoHS Compliant

A self-sealing design eliminates the need for rubber gaskets and an integrated LED illuminates the entire connector head that can be seen from 360°. Our DIN connectors provide environmental protection up to IP67/NEMA 6, and each unit has built-in surge suppression to protect against electrical spikes or surges.

- Security yellow Trex-Onics® 18 AWG 3 conductor cable with heavy-duty polyurethane jacket
- Rugged polyurethane shell design resists damage from impact, abrasion, oil, and most chemicals
- Durable fiberglass filled nylon insert
- Din Plug is molded to the cord to seal the unit, preventing dust and moisture from damaging the internal wiring
- DIN Connectors in Industry Standard configurations available with Trex-Onics® Mini or Micro Quick-Connects™



### Military Connectors (MIL-C-5015)

- MIL-C-5015
- IP69K Versions Available
- VG 95 234 NATO Specification
- Operating Temp. Range -55°C to 125°C

A circular connector style used by the military for more than 50 years, TPC's Military Connectors (MIL-C-5015) are well suited to commercial applications where a rugged threaded connector is required.

- Mechanical back shell version incorporates a sealing grommet and strain relief for added cable life
- Fully over-molded version ensures a sealed, permanently tamper-proof solution
- Machined aluminum shell with low profile design and reduced length for close-quarter installations

- **Available with more than 180 contact layouts allowing for 1 to 65 positions, up to 150 amps per contact, and a mix of power & signal**
- **Combines with TPC's high-performance cable for a connectorized assembly that arrives ready to install**

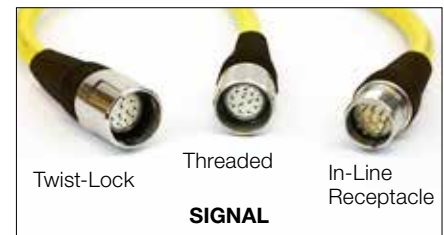
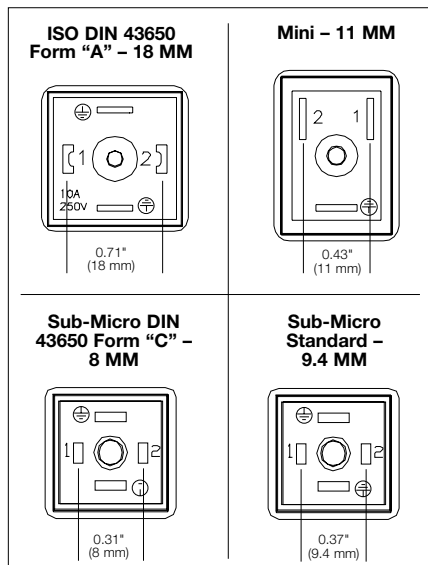


### M23 Connectors

- IP67 / IP69K per EN 60 629 (connected)
- Operating Temp. Range -40° to 125°C
- Mating Cycles > 1000
- Nickel Plated Housing Surface

A superior choice for servo motor cables used in Rockwell, Allen Bradley, and Siemens applications, TPC's Molded & Mechanical M23 Connector Assemblies withstand abuse from continuous flexing and pulling.

- Molded version offers a fully-sealed, tamper-proof backend with superior strain relief and slim, low profile that supports easy installation and routing
- Mechanical version contains a sealing grommet to grip the cable jacket and prevent the ingress of dirt and moisture
- Numerous insert variations accommodate both signal and power applications ranging from 28-14 AWG
- Custom pinouts and wiring are available to meet application needs
- Pairs well with Trex-Onics® Servo Motor and High-Flex Encoder Cables, creating a connectorized assembly that arrives ready to install



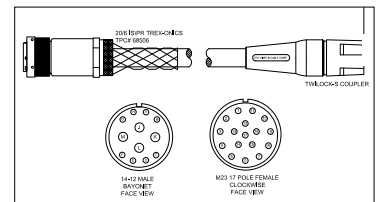
## Designed for Abuse



- **Super-Trex®:** Portable power cables such as the multi-conductor **Type W/Type TC Portable Power & Automation Cable** or single conductor **Type W/RHH-RHW-2** are designed with high-quality compounds to provide excellent service and long-term reliability against industrial and environmental abuse. Whether you use them for heavy-duty tools or powering industrial automation, TPC's **SOOW/Type TC-ER** portable cords endure abuses like heat, twisting, impact and abrasion on a daily basis and are available with reinforced jacketing for applications with tension.
- **Trex-Onics®:** Designed for constant flexing applications such as cable carriers and festoons, this product line is designed to provide a high level of resistance to abrasion and cutting. Trex-Onics® products include power cables and shielded multi-conductor cables for instrumentation, control and communications.
- **Chem-Gard®:** Designed for a broad range of applications where heat, cold or extreme chemical exposure can affect cable performance. Chem-Gard® uses a fluoropolymer insulation and jacket that gives the cable a temperature performance range from -60°C to +200°C. The fluoropolymer jacket also allows the cable to survive in very acidic, alkali or solvent based environments. Chem-Gard®'s unique design makes it an excellent choice for power or control applications.
- **Thermo-Trex®:** High temperature cables and accessories designed for temperatures ranging from 400°F up to an extreme of 3000°F. This line includes power and control cables as well as thermocouple extension wires and sleeving options.
- **Quick-Connects™:** Line of cord sets and cable assemblies designed for applications that require tough, sealed connectors that are able to operate in industrial environments. Available as minis, micros, nanos, and more, Quick-Connects™ make replacement of electrical and electronic control devices quick and simple. Accessories include adapters, shorting plugs, three-way receptacles, and custom items.
- **Thermo-Trex® 500-Plus 12 AWG / 16 AWG Mini Quick-Connect™:** Designed with a tear-resistant silicone jacket. It is an ideal choice for applications exposed to moisture, chemicals, temperatures up to 180°C, UV light and mechanical abuse. Ideal for motors.

## Custom Design & Engineering Capabilities

TPC Wire & Cable Corp. offers custom-engineered products that are designed using specific application and environmental information supplied by the customer. Built to solve a particular problem for an individual customer, these product solutions represent a unique and valuable service offered by TPC, whose engineers are experienced in the electrical, mechanical, chemical, and industrial engineering disciplines. TPC engineers will assemble the critical components of your cable into a final design that delivers a longer-lasting, cost-effective alternative to the constant replacement of ordinary cable.



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